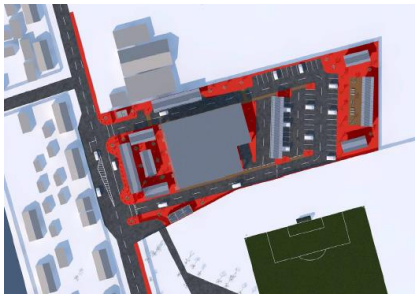
PROPOSED EMDENI PUBLIC TRANSPORT FACILITY



SITE TRAFFIC ASSESSMENT

DRAFT REPORT *(Date: 28 February 2018)*

Report Number: AJA 007/R003

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Johannesburg Development Agency

QUALITY CONTROL DOCUMENT

PROJECT : PROPOSED EMDENI PUBLIC TRANSPORT FACILITY

PROJECT No : AJA 007

CONTRACT No :

Description	**Details**	**Checked / Signed**	**Date**
Document Prapared by	**Mongamo Jantjies** Pr Tech Eng MTech: Civil Engineering		23 Feb 2018
Document Reviewed by	**Tshilidzi Nemarazhe** Pr Eng BSc: Civil Engineering		
Document Approved by	**Mongamo Jantjies** Pr Tech Eng (200870199) MTech: Civil Engineering		28 Feb 2018

It is hereiwth certified that this Site Traffic Assessment has been prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

CONTACT DETAILS

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Site Traffic Assessment Proposed EmdeniPublic Transport Facility **Report Summary**	
Site Location	Farm Portion Soweto: RE/387-IQ, Johannesburg Region D, Gauteng Province
Municipality	City of Johannesburg
Type of Assessment	Traffic Impact Assessment
Proposed Land use	Public Transport Facility 24 Loading bays; 5 Drop off bays; 55 Holding bays; 4 Trading Kiosks; Ablutions; Security Office; Boardroom; General Storage; Managing Office
Proposed Site particulars	Parent property is 291.92 hectares big. Required Site Area for project is 10 400m^2.
Trip Generation Reference	South African Trip Generation Rates, TMH 17, September 2013, Version 1.01
Traffic counts date	July 2017
Assessment Years	Scenario 1: 2017 background traffic demand Scenario 2: 2022 background traffic demand with development trips (Design horizon year) Scenario 3: 2037 background traffic demand with development trips (Planning horizon year)
Access	Access to the site is proposed via Ntshunyana Street between Benya and Zondi Streets.
Capacity of Access	The proposed access can accommodate the expected demand as the proposed facility is for public transport vehicles that are already operating from the site informally.
Proposed road upgrades	Access to be constructed at Entrance and Exit locations. Entrance only is proposed approximately 80m south of Maholwane Street and Exit only at approximately 125m south of Maholwane Street.
Recommendations	The proposed development should be considered favorably from a traffic engineering point of view by the relevant authorities, given the road upgrades proposed in this document. The detailed designs of the upgrades should be designed by a professional engineer with suitable road design experience.
Report prepared for	JOHANNESBURG DEVELOPMENT AGENCY The Bus Factory, No. 3 Helen Joseph Street, Newtown, Johannesburg Contact person: Mr Humbelani Mudau Tel: 011 688 7800 Email: hmudau@jda.org.za
Report prepared by	AJAYI-JANTJIES-ADAMS AND ASSOCIATES P O Box 2890, Faerie Glen, Pretoria Contact person: Mr Mongamo Jantjies Tel: 012 9911993 Email: Mongamo@ajacce.co.za
Report Date	28 February 2018

It is hereiwth certified that this Site Traffic Assessment has been prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

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LIST OF ACRONYMS

COTO	Committee of Transport Officials
GLA	Gross Leasable Area
LOS	Level of Service
SARTSM	South African Road and Traffic Signs Manual
TIA	Traffic Impact Assessment
TMH	Technical Methods for Highways
v/c	Volume capacity ratio
Veh/h	Vehicles per hour
CoJ	City of Johannesburg
JDA	Johannesburg Development Agency
PTF	Public Transport Facility
Km	Kilometre
NMT	Non-Motorized Transport
GPDRT	Gauteng Province Department of Roads and Transport

PROPOSED EMDENI PUBLIC TRANSPORT FACILITY

SITE TRAFFIC ASSESSMENT

1. INTRODUCTION

1.1 Background

The City of Johannesburg (CoJ) through the Johannesburg Development Agency (JDA) is presently planning the development and implementation of a Public Transport Facility in Emdeni which is located in Soweto, Zola, approximately 20km west of the Johannesburg Central Business District (CBD). The Soweto Highway (M70) via Vincent Street (M72) and Chris Hani Road (M68) via Koma Street (M72) provide primary routes for commuters between Zola and Johannesburg.

Figure 1: Location of the Site in relation to Johannesburg CBD (Google, 2017)

JDA appointed AJA Consulting to conduct a Traffic Impact Assessment (TIA) for the proposed Public Transport Facility (PTF) which is planned for implementation at Region D, west of Johannesburg. The TIA was completed as submitted to JRA for comments and / or approval in October 2017. The JRA sent comments in February 2018, with a requirement for a Site Traffic Assessment (STA) to be conducted. This report, the STA is compiled for submission as per JRA requirements and comments on the TIA that was submitted in October 2017.

1.2 Objectives of the study

Inadequate site or township transport facilities may not only affect public safety on the site or in the township itself but could have significant overflow impacts on the wider transportation system which could contribute to congestion and traffic safety problems on the public road network. It is also necessary to ensure that site and township facilities are properly integrated with the surrounding transportation system, particularly with the public transport system (COTO, 2012).

The Site Traffic Assessment (STA) is undertaken to form part of the submissions of the Site Development Plan. The STA is submitted because the proposed development is a public transport facility. The STA is aimed at assessing the access, site circulation system and transportation facilities with regards to the site. The main objective of the STA is to assess the expected operational conditions of transport facilities that are proposed in the Site Development Plan.

2. DEVELOPMENT PARTICULARS

The proposed development site is in the Gauteng Province, City of Johannesburg, Region D, approximately 20 km west of Johannesburg CBD, in Soweto, Zola. The site is located on Farm Portion Soweto: RE/387-IQ. The site is 291.92ha in size. The sub-division and rezoning required for the public transport facility is 1.04ha from the parent property. The site is located some 100m south of the intersection of Moholwane and Ntshunyana Streets. The immediate site is surrounded by mostly a residential settlement, with a supermarket, a hardware and a sports complex in close proximity. Existing informal Public Transport operations in the form of minibus taxis operate on the proposed site.

Figure 2: Site location (Google earth, 2017)

The proposed development is a Public Transport Facility with the following accommodation schedule:

- 40 Taxi loading bays
- 4 Drop Off bays

- 69 Holding bays
- 6 Trading kiosks
- Ablutions
- Security office
- Boardroom
- General storage
- Admin Offices

The total size of the site required for the propose facility is approximately 10 400m^2. The building Zone Schedule for the site is as detailed in Table 1.

Table 1: Building Zone Schedule (ZAS Architects, 2018)

Building Zone Schedule

Site Size 10 438 m^2

Related Zone Name	Related Zone Number	Measure Area (m^2)
Ablution Buildings		
	01	34.18
	02	34.18
	03	50.91
Kiosks		
	01	21.44
	02	19.16
	03	19.16
	04	21.44
	05	19.16
	06	19.16
Office Block		
	01	111.80
	02	111.80
Recreational Area	01	53.46
Refuse Area	01	51.13
Security	01	19.78

3. STUDY AREA

Emdeni is one of the quieter residential areas of Soweto, without major roads and much development momentum, except for small supporting commercial functions. The Naledi and Merafi stations have been identified as Public Transport Priority areas (City of Johannesburg, 2010).

3.1 Adjacent Road Network

The Soweto Highway (M70) via Vincent Street (M72) and Chris Hani Road (M68) via Koma Street (M72) provide primary routes for commuters between Emdeni and Johannesburg CBD. In terms of Public Transport, the area is currently serviced by buses and taxis. Other Capital Investment projects planned for the area include:

- improvement of public transport facilities at Merafe and Naledi rail stations;
- Development of a public square and taxi facilities at Merafe and Naledi rail stations;
- Upgrading of Naledi rank;
- Upgrading of Zola office rank;
- Upgrading of Zola Library rank; and
- Improvement of access to stations via connecting roads and pedestrian link bridges of railway lines (City of Jamesburg, 2010).

Adcock Street (R558) runs in the north-south direction some 2km west of Emdeni. The Moroka Bypass (N12) runs in the east-west direction some 6km south of Emdeni. Class Roads surround the Emdeni and provide connectivity with higher order roads. Steve Kgane Road runs in the east-west direction some 1km north of the proposed site, and Bolani Road is approximately 750m south of the proposed site.

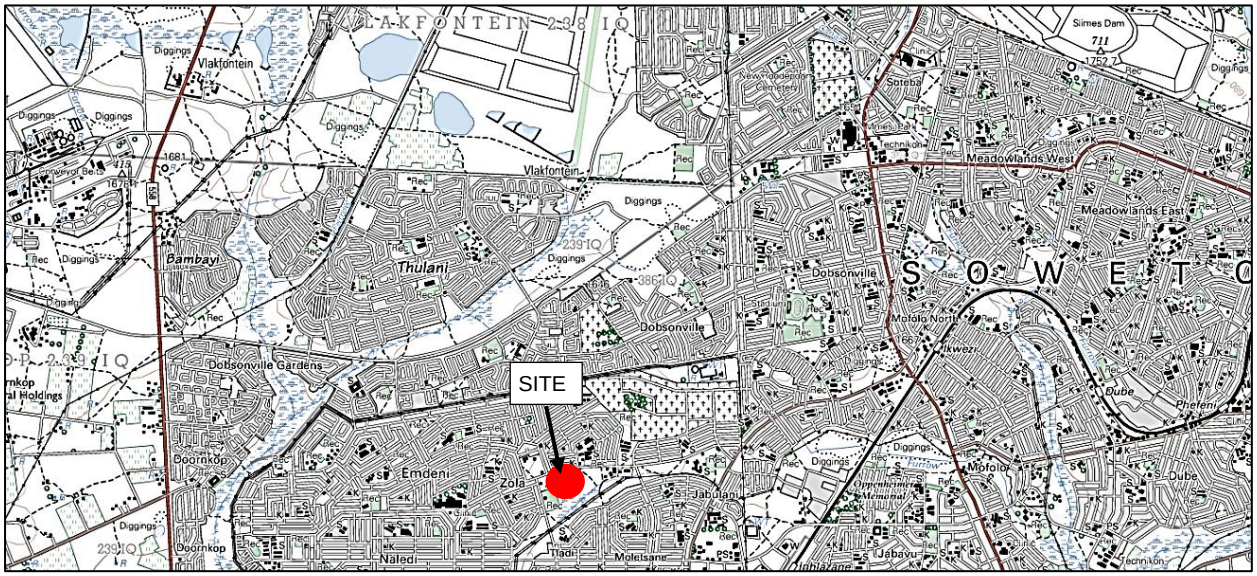

Figure 3: Study Area

3.2 Access to the site

The access to the proposed site is via Ntshunyana Street, approximately 80m south of the intersection of Ntshunyana and Maholwane Streets. Ntshunyana Street is a Class 4 road that is connected to a Class 3 road (Bolani Road) approximately 750m south of the intersection of Ntshunyana and Maholwane Streets. This collector road predominantly serves residential traffic

and public transport. Ntshunyana Street carries less than 10 000 vehicles per day and less than 1 000 vehicles in the peak hour.

Bolani Road is a Class 3 road which links Ntshunyana Street with Koma Street to the east, another Class 3, which in turn connects with Chris Hani Road (M68) to the south, a Class 2 metropolitan motorway.

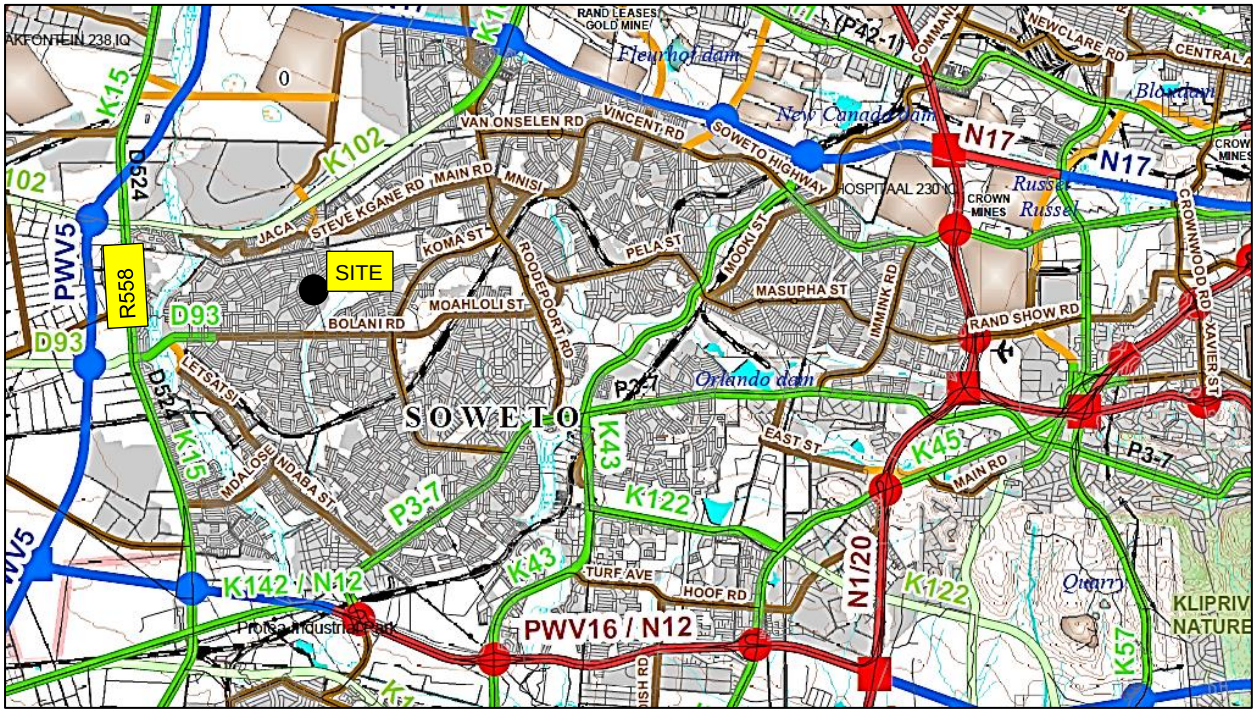

Figure 4: Gauteng Strategic Major Road Network within the Study Area (GPDRT, 2010)

3.3 Public transport within the study area

Public transport operations near the proposed site are in the form of taxis and buses. There are existing bus stops along Maholwane Street, the nearest bus stops to the site are at the intersection of Ntshunyana and Maholwane Streets. Informal taxi operations take place at approximately 80m south of the aforementioned intersection.

Figure 5: Public transport operations near the proposed site

4. PROPOSED FACILITY OPERATIONS AND GEOMETRY

4.1 Taxi Operations

The proposed facility is designed to cater for current operations that take place adjacent to the proposed site. At the time of completing this study, the information of the operators, vehicles and routes was not available.

4.2 Design Geometry

The proposed design vehicle for the facility is a minibus taxi with the following specifications:

- Length : 5.380m
- Width : 1.880m
- Height : 3.285m
- Wheelbase : 3.110m
- Turning Circle : 6.2m
- Front tread : 1.655m
- Rear treat : 1.650m

The design of the facility caters for the design vehicle in terms of turning radii, bay dimensions and parking provisions. The proposed facility is such that vehicles enter the facility at a two-lane entrance only access point with the two lanes merging into one lane. From this point forward, the vehicles can easily access the loading bays by turning towards the right, continue to load and / or off-load and thereafter proceed to the tow-lane exit via Jabavu Road. The holding bays are located towards the back of the site, traffic flow between the access points, loading area and holding area can be done with relative ease, as sufficient circulation in the site has been provided for (Refer to Annexure A).

The minimum design standards adopted were based on the Guidelines for Human Settlement Planning and Design and were adopted for the facility are as per Table 2.

Table 2: Design Standards

Item	Description	Criteria	Adopted for the Site
4	Passenger Car Radius	6.2 m	6.2 m
5	Minimum lane width	3.1 m	3.1 m
6	Minimum Sidewalk width	2.0 m	2.0 m
7	Minimum Parking Bay Width	2.5 m	2.5m
8	Minimum Parking Bay Length	5.0 m	5.0 m
9	Minimum Loading Bay Width	3.0 m	3.0 m
10	Minimum Loading Bay Length	6.0 m	6.0 m

5. SITE INVESTIGATIONS

AJA Consulting conducted traffic counts and site observations on the 26th of July 2017. The data that was collected is as follows:

- Twelve hour turning movement traffic counts
- Twelve hour classified traffic counts
- Photographs

Several site visits were conducted to observe traffic movements and public transport operations. The traffic counts data was detailed in the Traffic Impact Assessment that was submitted to the JRA for approval in October 2017.

Figure 6: Current location of informal taxi operations along Ntshunyana Street

6. TRAFFIC DEMAND

The traffic demand for the proposed public transport facility will take into consideration two horizon years. The design and the planning horizon years. The design horizon year is the year selected for determining transportation improvements that are required to accommodate the proposed development. The transportation / road improvements must be designed for a horizon year of 5 years. The planning horizon year, though not used for determining the transportation improvements that are required for the development, is the year selected for determining whether it is physically possible to accommodate the proposed development together with future traffic growth. The planning horizon year to be used for the development is 20 years.

6.1 Traffic growth

Traffic growth rates were calculated based on economic trends. To do that, the performance of the economy (GDP) and population over the planning horizon was evaluated. The growth rate of Gauteng is estimated to increase to 3.7% in 2018, growing from 2.2% in 2013 and 1.4% in 2014. The Gauteng economy is expected to experience slow economic growth in the next three to five years (Gauteng Province Department of Economic Development, 2015). Traffic growth rates for low growth areas should be between 0 and 3%. The traffic growth that was adopted for this study is 1.4%, which is similar to growth rates between 2014 and 2017. The growth rate was applied to background and development traffic for a five-year period till 2022 for design horizon analysis. The same rate was applied to background and development traffic over a twenty-year period for planning horizon analysis.

6.2 Trip Generation

The proposed development will generate trips to the proposed access / exit points and will not generate significant additional traffic on the road network as the public transport vehicles that will be using the proposed facility are already operating from site. The proposed facility is as follows as detailed in Chapter 2:

- 40 Taxi loading bays
- 4 Drop Off bays
- 69 Holding bays
- 6 Trading kiosks
- Ablutions
- Security office
- Boardroom
- General storage
- Admin Offices

The total size of the site required for the propose facility is approximately 10 400m^2. The trips to be generated by this proposed facility are as detailed in Table 3.

Table 3: Development Trip Generation

Item No.	Description	Units	Size	Trips Generated			
				Daily	AM	PM	W/end
1	Taxi Loading Bays	No.	40	4000	400	400	400
2	Taxi Holding Bays	No.	69	1656	138	138	138
3	Drop off bays	No.	4	400	40	40	40
4	Ablution Buildings	m^2	119,27	101	3	3	1
5	Trader Kiosks	m^2	119,52	4	1	0	0
6	Office Block	m^2	223,6	190	5	5	1
7	Recreational Area	m^2	53,46	1	0	0	0
8	Refuse Area	m^2	51,13	1	0	0	0
9	Security Building	m^2	19,78	17	0	0	0
Note: Adopted bay turnover is 10 taxis per LOADING and DROP-OFF bay per hour; 2 taxis per HOLDING bay per hour				**6371**	**586**	**586**	**580**

Typical public transport stop / bay turnover in public transport facilities are 6 and 10 vehicles per bay per hour, in some instances the turnover can increase to 30 minutes per vehicle per hour when the facility is mainly used as a holding facility (JDA, 2010). Based on the proposed facility the adopted bay turnover rates are 10 taxis per loading and drop-off bays per hour and 2 taxis per holding bay per hour.

It can be noted from Table 3 that the proposed facility has a capacity to generate 6 371 trips per day, 586 trips in midweek peak hour and 580 trips in weekend peak hour. Out of the potential 6371 daily trips. 6054 are taxis and 317 are private cars. The potential weekday peak hour trips comprise of 577 taxis and 9 are private cars. The potential weekend peak hour trips comprise of 578 taxis and 2 private cars.

Based on classified and turning our movements near the proposed site, it can be concluded that 32% of the traffic is taxis. This results in current trips of 53 and 46 taxis in the morning and afternoon peak hours respectively, based on background traffic.

6.3 Trip Distribution

Trip distribution is based on current trip patterns. The facility is aimed at formalising existing informal operations. The trips for both design and planning horizon years were distributed based on existing traffic patterns for analysis purposes.

7. SITE TRAFFIC ASSESSMENT

7.1 Loading Bay Utilization Factor

The utilization factor for the facility's loading bays is determined by applying standard queuing theory and assuming random arrivals of all vehicles. Table 4 details he utilization factors for the proposed facility.

Table 4: Facility Loading Bay Utilization Factors

Scenario	**Trip Generation (Demand Traffic)**		**Service Rate**	**Utilization Factor**	
	AM	PM	AM / PM	AM	PM
Current (2017)	53	46	586	0.09	0.08
Design Horizon (2022)	121	115	586	0.21	0.20
Planning Horizon (2037)	149	141	586	0.25	0.24

It can be noted from Table 4 that the proposed facility will be able to accommodate traffic to be generated by the facility for both design and planning horizons, with the maximum utilization factor of 0.25 for morning peak of the planning horizon.

7.2 Site Access Assessment

Traffic impact assessment for the site access was undertaken for the following scenarios:

- Status quo
- Design horizon year
- Planning horizon year

The status quo assessment is undertaken to understand when the current Levels of Service are at the intersections adjacent to the development. The design horizon year assessment was undertaken with the purpose of establishing mitigation measures that are required to accommodate the proposed development. The planning horizon year assessment was carried out to ascertain whether it was physically possible to accommodate the proposed and future developments in the spatial development framework of the study area. The detailed assessment of the affected intersections and the proposed site access was conducted at Traffic Impact Assessment (TIA) stage. It was concluded in the TIA that the site access will operate at level of service A for both AM and PM peaks for the design horizon. However, the level of services for the planning horizon analysis at the proposed site access deteriorates to LOS E and B for morning and afternoon peak hours respectively.

8. CONCLUSION

Given the findings in the report, the following conclusions are drawn:

1. The proposed public transport facility development has a service rate or capacity of 6 371 trips per day, 586 trips in the midweek peak hour and 580 trips in the weekend peak hour.
2. The current taxi trips from the site are 53 and 46 peak hour trips in the morning and afternoon peaks respectively.
3. The proposed site for the development is the current site where taxi operations are taking place in an informal set up.
4. The access to the proposed development will be off Ntshunyana Street.
5. Capacity analysis indicate that the proposed access is adequate to accommodate the potential trips to be generated by the development in the short to medium term.
6. The proposed access will operate at LOS A for the design horizon of 2022. However, the LOS deteriorates to E and B for morning and afternoon peaks respectively for the planning horizon traffic of 2037.
7. The proposed public transport facility's maximum utilization factor is 0.25 for the morning factor of the planning horizon traffic, meaning that the facility has more than sufficient capacity to handle current and future internal traffic.

9. RECOMMENDATIONS

Given the findings in the report, the following recommendations are made:

1. The proposed Site Development Plan should be considered favourably from a traffic engineering point of view by the relevant authorities, given the proposed road upgrades in this report.
2. Detailed designs for the proposed improvements should be undertaken by a professional engineer / technologist with suitable road design experience.
3. Sidewalks of a minimum of 2m wide should be implemented on all site frontages as.

10. BIBLIOGRAPHY

1. Department of Transport, “Manual for Traffic Impact Studies,” RR 93/635, October 1995
2. Department of Transport, “South African Trip Generation Rates”, RR 92/228, June 1995
3. Guidelines for Geometric Design of Urban Arterial Roads, 1986
4. South African Road Traffic Signs Manual (SARTSM), Volume 2.
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7. Technical Methods for Highways (TMH 16), Volume 1, South African Traffic Impact and Site Traffic Assessment Manual, Version 1.0, 2012.
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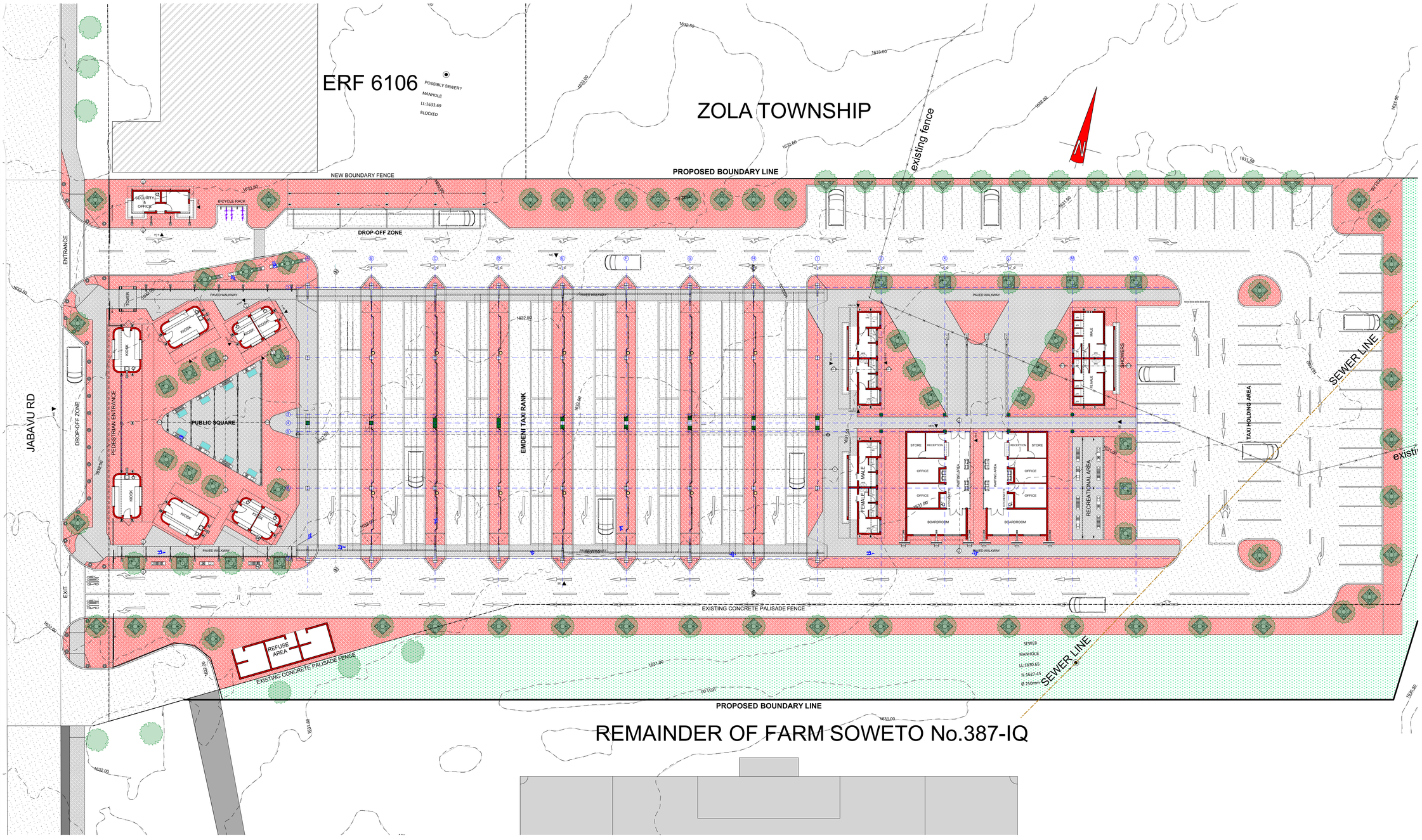
9. Gauteng Road Atlas 2015/16.
10. Johannesburg Inner City Traffic & Transportation Study, 2010.
11. Strategic Integrated Transport Plan Framework for the City of Joburg, 2013.
12. Gauteng Strategic Plan 2014 - 2019, 2015.

Annexure A : Preliminary Drawings



000 SITE PLAN 1:250

GENERAL NOTES

1 All work to be done in accordance with the National Building Regulation and local bylaws

2 This drawing is not be scaled. Figured dimensions to be used. All dimensions are in millimetres unless otherwise stated

3 This drawing must be read in conjunction with all the relevant drawings and specifications

4 Any discrepancies on the drawings are to be brought to the architect's attention by the contractor before putting work in hand

5 All dimensions and levels must be checked on site by the contractor before putting work in hand

6 The contractor must obtain the Architect's written confirmation of any instruction which involve a variation to the contract before putting work in hand

7 All mechanical and electrical work is to be done in accordance with the National Building Regulations

8 The contractor is to locate and identify any/all existing services and to protect these from damage whilst on site thro'out the construction period

9 All work and materials is to comply to relevant S.A.N.S. codes where applicable

DRAINAGE NOTES

1 Access eyes to all bends and junctions and changes in gradient to waste and soil pipes

2 All rodding eyes to have marked covers at ground level

3 All waste pipes to be fully accessible

4 Waste fittings to have 75MM deep seal traps

5 Gradients to waste branches to be between 1,25 and 5

6 Gradients to soil branches to be between 2,5 and 45

7 All soil pipes under building to be encased in min 150mm concrete

IF IN DOUBT - PLEASE ASK

Accommodation Schedule:

- 40 Loading Bays
- 4 Drop Off Bays
- 69 Holding Bays
- 6 Trading Kiosks
- Ablutions
- Security Office
- Boardroom
- General Storage
- Admin Offices

ZAS Architects and planners
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email: info@splace.co.za

REVISIONS

REV	DATE	DESCRIPTION
B	2018-02-09	1. Kiosk buildings and Public Square repositioned
		2. Admin office, Ablution buildings, swapped and updated
C	2018-02-15	1. Kiosk buildings and Public Square repositioned
		2. Admin office, Ablution buildings, swapped and updated
		3.Site boudary increased

JDA Johannesburg Development Agency

INSTITUTION: CLIENT NAME

SERVICE: JDA ZOLAI TRF Taxi Rank

CONTRACT: #Project ID

DISCIPLINE: ARCHITECTURAL

WORK DESCRIPTION: WORKING DRAWING: FOR APPROVAL

DRAWING DESCRIPTION: SITE PLAN

PROJECT REF	PROJECT REF	#Project ID	CONSULTANT REF. No
DESIGN	ZS	PM	DRAWN
SCALE	AS SHOWN	ZS	CHECKED

RESPONSIBLE PROFESSIONAL: ARCHITECT

DATE	NAME	SIGNATURE	PR No
2018-02-22	ZAYN SHAIKH		5348

RESPONSIBLE PROFESSIONAL: ENGINEER

DATE	NAME	SIGNATURE	PR No
2018-02-22	PROJECT ENGINEER		PR No,

CONSULTANT: ZAS ARCHITECTS & PLANNERS
TEL : (011) 486-4103 FAX : (086) 515 1833

CONTRACTOR: CONTRACTOR

CAD SYSTEM	ArchiCAD	#Project ID	FILE NAME
FORMAT	DRAWING NUMBER		REV
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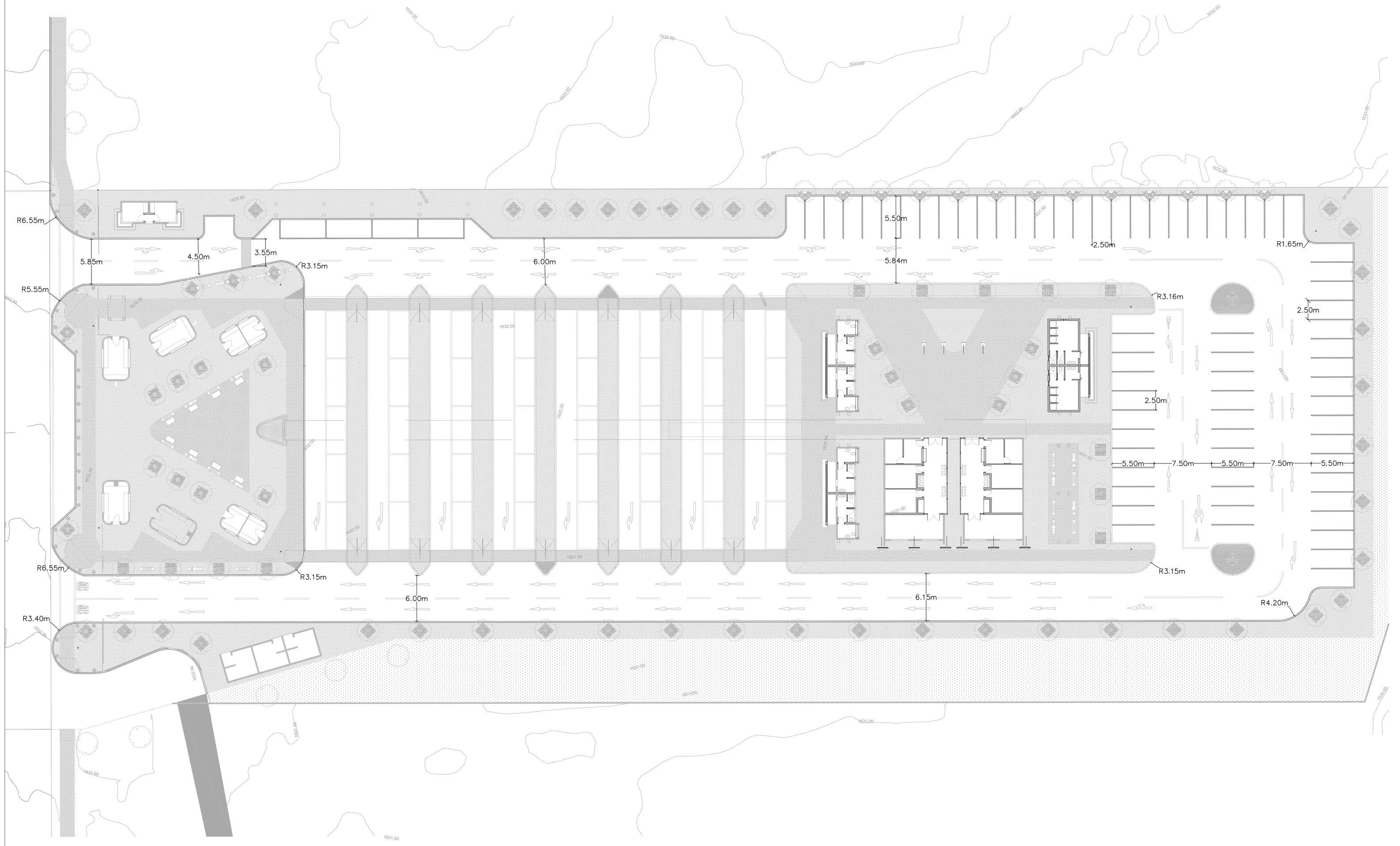

ASSOCIATED DRAWINGS LEGEND

DRAWING NUMBER	DESCRIPTION
0901107C-C-3-001-0	*EXISTING SERVICES*
0901107C-C-3-100-0	*WATER LAYOUT*
0901107C-C-3-101-0	*SEWER LAYOUT*
0901107C-C-3-102-0	*STORMWATER LAYOUT*
0901107C-C-3-103-0	*SERVICES LAYOUT*
0901107C-C-3-104-0	*ROAD & PARKING LAYOUT*
0901107C-C-3-105-0	*BULK EARTHWORK*
0901107C-C-3-600-0	*WATER DETAILS*
0901107C-C-3-601-0	*SEWER DETAILS*
0901107C-C-3-602-0	*SEWER LONGSECTION*
0901107C-C-3-603-0	*ROAD & STORMWATER DETAILS*
0901107C-C-3-604-0	*STORMWATER LONGSECTION*

GENERAL NOTES

1. Drawings to be read in conjunction with all relevant Architect's, Consultant's, and Specialist's drawings and specifications.
2. All details and dimensions subject to confirmation on site. Any discrepancies must be brought to the engineer's attention prior to construction.
3. Drawings are not to be scaled.
4. All construction workmanship and materials to be in accordance with the relevant provisions of "The Application of the National Building Regulations" (SANS 10400), Building Standards act (Act103) and the relevant parts of SABS 1200.
5. The works will be inspected form time to time by the consulting engineer to ascertain that the contractor is carrying out the work in general conformity with the engineering drawings and documents. Such inspections are not for the contractors benefit and do not relieve him of the responsibility for the proper construction of the works in accordance with the engineering drawings, documents and good building practice.
6. The signed original copy of this drawing is kept at the engineer's office.

PROJECT SPECIFIC NOTES

1.

NO.	DATE	AMENDMENT

Client:

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Consultant:

csm

Tel: +27(0) 861 878 252

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CIVIL

Project:

ZOLA TRANSPORT FACILITY

Drawing Title:

ROAD & PARKING LAYOUT

Prof. Registered Signature	Client Signature
PR.ENG 980386	Client Name
A. DE KLERK	JDA

Date: 2018/02/22	Designed: GM
Size: A1	Drawn: GM
Scale: 1:250	Checked: ADK
Building Occupancy: n/a	Climate Zone: n/a
Stage: 03	

Project #:	Discipline:	Drawing #:	Rev:
0901107C	C	104	-

INFORMATION