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05 AUGUST 2026



YOUR REF:
OUR REF: TPH26727

Tel: (012) 809 2229
E-mail: bea@tph.co.za

CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY
THE EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING
PO BOX 30733
BRAAMFONTEIN
2017

PO Box 11437
Silver Lakes
0054

Tijger Vallei Office Park
Block 9, 1st Floor
78 Pony Street
Silver Lakes
0054

ONLINE SUBMISSION : landuseapplications@joburg.org.za

MOTIVATION FOR THE APPLICATION IN TERMS OF SECTION 26 OF THE CITY OF JOHANNESBURG MUNICIPAL PLANNING BY-LAW, 2016: REMAINING EXTENT OF THE FARM ALLANDALE 10 - IR TO BE KNOWN AS RABIE RIDGE EXTENSION 9

The registered owners of the above-mentioned property instructed our office to submit an application with your Municipality for the establishment of a township on the aforementioned property.

Attached for your attention is the following:

- Annexure A: 1 copy of this letter addressed to the Executive Director: Development Planning.
- Annexure B: 1 copy of the application form completed in full and signed by the applicant – FORM A.
- Annexure C: 1 copy of the Company Resolution and Power of Attorney and Company Documentation.
- Annexure D: 1 copy of the registered Title Deed.
- Annexure E: 1 copy of the confirmation of the Reserved Township Name.
- Annexure F: 1 copy of the Motivating Memorandum.
- Annexure G: 1 copy of the Zoning Certificate.
- Annexure H: 1 copy of the Locality-, Zoning-, Density Zoning- and Land Use Plan.
- Annexure J: 1 copy of the proposed Township Layout Plan nr 1.
- Annexure K: 1 copy of the draft Conditions of Establishment.
- Annexure L: 1 copy of the Geotechnical Investigation Report by Yates Consulting CC.
- Annexure M: 1 copy of the Environmental Authorisation.
- Annexure N: 1 copy of the Electrical Services Statement by BFBA Consultants Johannesburg (Pty) Ltd.
- Annexure O: 1 copy of the Traffic Impact Study by WSP Consulting Engineers.
- Annexure P: 1 copy of the Civil Engineering outline scheme reports by Ceenex Technology Engineering Excellence.
- Annexure Q: 1 copy of the Conveyancer Certificate.
- Annexure R: 1 copy of the Land Surveyor Certificate.
- Annexure S: 1 copy of the undertaking to advertise - FORM E4.



Note: Proof of payment of the application fees will be provided on receipt of an invoice number.

The application will further be circulated to the required external departments. Their comments will be supplied to the Municipality in due course.

Trusting you find this in order.

Kind regards,

A handwritten signature in black ink, appearing to read 'B.E. Fletcher', with a stylized flourish at the end.

**B.E. FLETCHER (PR. PLN A/1202/2001)
THE TOWN PLANNING HUB CC**

Form A – Application Information

APPLICABLE SCHEME:

JOHANNESBURG LAND USE SCHEME, 2018

APPLICATION TYPE:

Application in terms of Section 26 of the City of Johannesburg Planning By-Law, 2016

APPLICATION PURPOSE:

The purpose of the application is to apply for a township establishment in order to obtain land use rights for a mix of uses on the application site.

SITE DESCRIPTION:

Erf/Erven (stand) No(s): **The Remaining Extent**

Township (Suburb) Name: **of the farm Allandale 10 - IR**

Street Address: None available Code:

OWNER:

Full Name: **Gauteng Provincial Government**
Postal Address: **8 Shere Grace, Struben Road, Shere** Code: **0082**
Tel No(w): Fax No:
Cell: 0825542193
Email address: marc@truman.co.za



SIGNED:

Signature of owner/s

DATE: 05 AUGUST 2026

AUTHORISED AGENT (IF APPLICABLE)

Full name: **The Town Planning Hub CC**
Postal Address: **PO Box 11437, Silver Lakes**
Residential Address: -
Tel No (w): **012 809 2229**
Cell: **082 807 2030**
Email address: bea@tph.co.za / tph@tph.co.za

Code: **0054**

Fax No:



SIGNED:
Signature of Agent

DATE: 05 AUGUST 2026

If an AUTHORISED AGENT is submitting the application, please submit:

Special Power of Attorney (Form B)

OR – A letter of authorisation from the owner/s

IF THE OWNER IS A COMPANY

A company resolution authorising the agent is required (Form C)

**Certificate issued by the Companies and Intellectual Property
Commission on Tuesday, April 13, 2021 09:01
Certificate of Confirmation**



Registration number	1995 / 002541 / 07
Enterprise Name	NINFU ALLANDALE DEV (PTY) LTD
Enterprise Shortened Name	None provided.
Enterprise Translated Name	None provided.
Registration Date	23/03/1995
Business Start Date	23/03/1995
Enterprise Type	Private Company
Enterprise Status	In Business
Financial year end	February
Main Business/Main Object	
Postal address	P O BOX 268 FLORIDA HILLS 1716
Address of registered office	86 JOHN VORSTER ROAD RANDPARK RIDGE 2156



The Companies and Intellectual Property Commission
of South Africa
P.O. BOX 429, PRETORIA, 0001, Republic of South Africa. Docex 256, PRETORIA
Call Centre Tel 086 100 2472, Website www.cipc.co.za



**Certificate issued by the Companies and Intellectual Property
Commission on Tuesday, April 13, 2021 09:01
Certificate of Confirmation**



Registration number **1995/002541/07**
Enterprise Name **NINFU ALLANDALE DEV (PTY) LTD**

Auditor
Name **ZEELIE DE KOCK**
Postal Address **P O BOX 268
FLORIDA HILLS
1716**

Active Directors / Officers

Surname and first names	ID number or date of birth	Director type	Appoint-ment date	Addresses
MAMPEULA, RALEBALA MATOME	7912225463081	Director	12/10/2020	Postal: PO BOX 3523, BENONI, BENONI, GAUTENG, 1500 Residential: 1141 MANGENI AVENUE, WATERFALL COUNTRY ESTATE, WATERFALL, GAUTENG, 1687
KAO, TE-EN	8211265506084	Director	05/12/2018	Postal: 13 CHESTER ROAD, PARKTOWN, PARKTOWN, GAUTENG, 2193 Residential: 13 CHESTER ROAD, PARKTOWN, PARKTOWN, GAUTENG, 2193
WU, SHU CHEN	5107150631081	Director	24/03/1995	Postal: P O BOX 653048, BENMORE, BENMORE, GAUTENG, 2010 Residential: 27A SCOTT STREET, WAVERLEY, WAVERLEY, GAUTENG, 2192



The Companies and Intellectual Property Commission
of South Africa
P.O. BOX 429, PRETORIA, 0001, Republic of South Africa. Docex 256, PRETORIA
Call Centre Tel 086 100 2472, Website www.cipc.co.za



Registration No. of company/Registrasienommer van maatskappy
95/02541/07

Certificate of change of name of company

Sertifikaat van verandering van naam van maatskappy

This is to certify that/Hierby word gesertifiseer dat

REM ALLANDALE 10 (PROPRIETARY) LIMITED

has changed its name by SPECIAL RESOLUTION and is now called
sy naam verander het by SPESIALE BESLUIT en nou genoem word

NINFU ALLANDALE DEV (PROPRIETARY) LIMITED

and that the new name has this day been entered in the Register of Companies.
en dat die nuwe naam op hierdie dag in die Register van Maatskappye aangeteken is.

Signed and sealed at Pretoria, this/Geteken en geseël te pretoria op hede die 24

day of/dag van November

One Thousand Nine Hundred and/Eenduisend Negehonderd NINETY FIVE

Registrar of Companies/Registraat van Maatskappye

Certificate of change of name dated 17/11/95 herewith
Hierby sertifikaat van verandering van naam geatseer

Name of Company
Naam van maatskappy NINFU ALLANDALE DEV (PROPRIETARY) LIMITED

Postal Address
Posadres P O BOX 268
FLORIDA HILLS
1716

Date stamp of companies Registration Office
Registrar of Companies

Datumstempel van registrasiekantoor vir
Maatskappye
Registreur van Maatskappye

**RESOLUTION OF THE BOARD OF DIRECTORS OF REM ALLANDALE 10 (PTY) LTD
(ALSO KNOWN AS NINFU ALLANDALE DEV (PTY) LTD), REG NR 1995/002541/07, HELD
AT JOHANNESBURG ON THE 4TH DAY OF MARCH 2024**

Decide:

That the lawful agent of the Company applies to the competent authority for application(s) for title amendment and/or subdivision and/or township establishment and/or appeal and/or proclamation and/or attending to the request for a Section 29 Certificate in respect of the under-mentioned property/ies:

REMAINING EXTENT OF THE FARM ALLANDALE 10 - IR

AND THAT: TE-EN KAO, with ID no 821126 5506 08 4

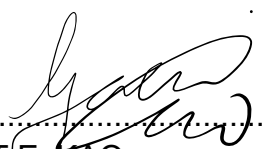
being duly authorized thereto under and by virtue of a resolution of the Board of Directors of the Company to draft and sign all such documents, and in general to do all to execute this resolution.

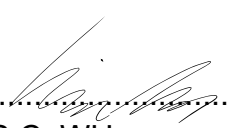
The Company hereby ratify, allow and confirm all and whatsoever the said authorized shall lawfully do, or cause to be done.

The intention of the application/s are to obtain approval of a township establishment application with the City of Johannesburg Metropolitan Municipality. Also included is the possible phasing of the township, the proclamation thereof as well as the subdivision of the farm portion into two (2) portions. This will enable the phasing and development of the phased township by two possible separate developers before proclamation. Specific reference is also made to the request for a Section 29 Certificate that will be required after proclamation.

CERTIFIED A TRUE COPY:


.....
R.M. MAMPEULA


.....
T.E. KAO


.....
S.C. WU

SPECIAL POWER OF ATTORNEY

I, the undersigned,

TE-EN KAO with ID no 821126 5506 08 4

duly authorised by a resolution of the Board of Directors of **REM ALLANDALE 10 (PTY) LTD (ALSO KNOWN AS NINFU ALLANDALE DEV (PTY) LTD)**, REG NR 1995/002541/07), do hereby nominate, constitute and appoint **B.E. FLETCHER (ID NR: 7505090058083)** of the firm **THE TOWN PLANNING HUB CC (REGISTRATION NR: CK1999/010392/23)** with power of substitution, to be my lawful Agent in my name, place and stead, for title amendment and/or subdivision and/or township establishment and/or appeal and/or proclamation in respect of the under-mentioned property/ies:

REMAINING EXTENT OF THE FARM ALLANDALE 10 - IR

and to take all such steps, do all such acts, sign all such documents and appoint or involve all such persons as may be requisite or necessary in order to give effect to the powers hereby granted and, for effecting the aforesaid purposes, to do or cause to be done whatsoever shall be requisite, as fully and effectually, as I might or could do if personally present and acting herein - hereby ratifying, allowing and confirming all and whatsoever the said Agent shall lawfully do, or cause to be done.

The intention of the application/s are to obtain approval of a township establishment application with the City of Johannesburg Metropolitan Municipality. Also included is the possible phasing of the township, the proclamation thereof as well as the subdivision of the farm portion into two (2) portions. This will enable the phasing and development of the phased township by two possible separate developers before proclamation. Specific reference is also made to the request for a Section 29 Certificate that will be required after proclamation.

Signed at Johannesburg on this 4th day of March 2024, in the presence of the undersigned witnesses.

AS WITNESSES:


.....


.....

SIGNATORY:

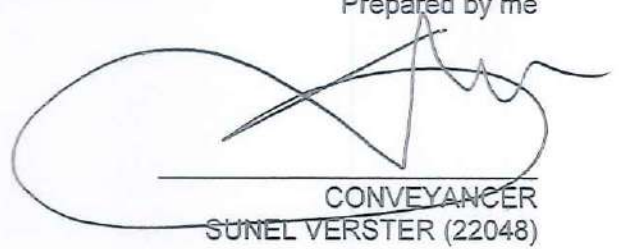

.....
T.E. KAO

1272

DE KLERK, VERMAAK & PARTNERS INC
129 BEETHOVEN STREET
VANDERBIJLPARK, 1911

SEELREG
STAMP DUTY R.....
FOOI
FEES R. 5717.00

Prepared by me


CONVEYANCER
SUNEL VERSTER (22048)



COPY

T	000004506 *2022
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DEED OF TRANSFER

BE IT HEREBY MADE KNOWN THAT:

MARYNA DU TOIT (17312)

appeared before me, REGISTRAR OF DEEDS at PRETORIA, he/she the said
Appararer being duly authorised thereto by a Power of Attorney signed at
JOHANNESBURG on 07 December 2021 and granted to him/her by

REM ALLANDALE 10 PROPRIETARY LIMITED
Registration number 1995/002541/07

And the Appearer declared that his/her said principal had truly and legally sold on 16 November 2021 and that he/she, the said Appearer, in his/her capacity aforesaid, did, by these presents, cede and transfer to and on behalf of

GAUTENG PROVINCIAL GOVERNMENT

its Successors in Title or assigns, in full and free property

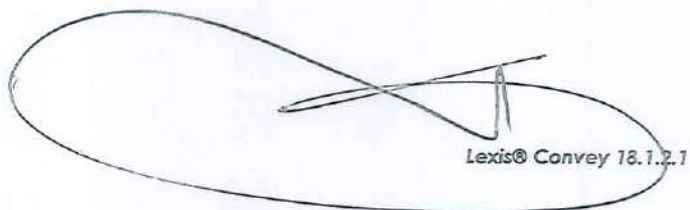
REMAINING EXTENT OF THE FARM ALLANDALE 10, REGISTRATION
DIVISION I.R., PROVINCE OF GAUTENG

MEASURING 129,6391 (ONE HUNDRED AND TWENTY NINE COMMA
SIX THREE NINE ONE) Hectares

FIRST TRANSFERRED by Deed of Grant No 5784 dated 29th August 1870
with diagram annexed and held by Deed of Transfer T71223/1995

SUBJECT TO THE FOLLOWING CONDITIONS:

- A. By virtue of Notarial Deed No. K3796/1977S dated the 8th November, 1977 and registered on the 14th December, 1977, the within-mentioned property is subject to a Servitude to convey gas and electricity in favour of S.A Gas Distributor Limited together with certain ancillary rights as will more fully appear from the said Notarial Deed.
- B. By virtue of Notarial Deed No. K 3138/1980S the right has been granted to the ESKOM to convey electricity over the property hereby transferred together with ancillary rights and subject to conditions as will more fully appear from the said Notarial Deed which Notarial Deed has been amended by virtue of Notarial Deed No. K 2933/1986S dated the 10th July, 1986 and registered on the 26th, August, 1986.
- C. In terms of Section 30(1) of Ordinance 19 of 1973 permission has been granted by the Administrator in terms of Section 5 of Ordinance 19 of 1973 for the subdivision of the withinmentioned property.



Lexis® Convey 18.1.2.1

- D. A portion measuring approximately 1859 square metres of the withinmentioned property has been expropriated by the Community Development Board in terms of Section 2 Act 3/66.
- E. A portion measuring approximately 7,9343 hectares of the withinmentioned property has been expropriated by the Transvaal Province Administrator vide Notice Expropriation EX 588/93
- F. By virtue of Notarial Deed of Servitude K1378/04S dated 11th February 2004 the withinmentioned property is subject to the rights in perpetuity to convey and transmit water by means of pipelines already laid, and which may be laid along a strip of ground 6,5949 Hectares as depicted by the figure A B C D A on Servitude Diagram S.G No 9683/1999 annexed thereto, together with the right in perpetuity to lay or carry through and all other accessories, as will more fully appear from the said Notarial Deed.

SUBJECT to such conditions as are mentioned or referred to in the aforesaid Deed/s.

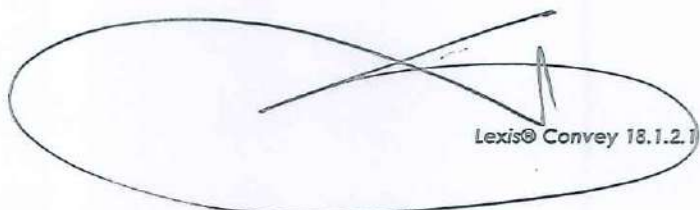
WHEREFORE the Appearer, renouncing all rights and title which the said

REM ALLANDALE 10 PROPRIETARY LIMITED
Registration number 1995/002541/07

heretofore had to the premises, did in consequence also acknowledge it to be entirely dispossessed of, and disentitled to the same, and that by virtue of these presents, the said

GAUTENG PROVINCIAL GOVERNMENT

its Successors in Title or Assigns, now is and henceforth shall be entitled thereto, conformably to local custom, the State, however reserving its rights, and finally acknowledging the purchase price to be the sum of R108 300 658,96 (ONE HUNDRED AND EIGHT MILLION THREE HUNDRED THOUSAND SIX HUNDRED AND FIFTY EIGHT RAND AND NINETY SIX CENTS).

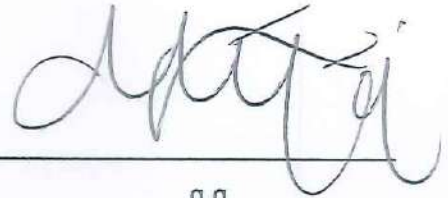


Lexis® Convey 18.1.2.1

IN WITNESS WHEREOF, I the said Registrar, together with the Appearer q.q.,
have subscribed to these presents and have caused the Seal of Office to be affixed
thereto.

THUS DONE AND EXECUTED at the Office of the REGISTRAR OF DEEDS at
PRETORIA on

31 JAN 2022



q.q.

In my presence



REGISTRAR OF DEEDS



a world class African city

CITY OF JOHANNESBURG
Department of Development Planning
Corporate Geo-Informatics

8th Floor A-Block
Metropolitan Centre
158 Civic Boulevards
Braamfontein

PO Box 30733
Johannesburg
South Africa
2017

Tel +27(0) 11 407 6094
Fax +27(0) 11 339 3677
E-mail: yougand@joburg.org.za
www.joburg.org.za

DATE : 27/03/2024

**THE TOWN PLANNING HUB
LOMBARDY CORPORATE
COLE ROAD
SHERE A.H
0084**

RE: TOWNSHIP NAME APPLICATION

With reference to the application site:

REMAINING EXTENT OF THE FARM ALLANDALE 10 - IR

The township name allocated for the above mentioned application site is:

RABIE RIDGE EXT.9

The layout plan submitted must clearly indicate private and public roads. Road names are required for all public roads and private roads, which are the responsibility of a Residents Association.

Yours faithfully

M.P. Hlengwa

Manager: Zoning Section
Data Administration and Mapping
Corporate Geo-Informatics

Contact Person: Yougan Done
Designation: GIS Specialist
Telephone: 011 407 6094
Email: yougand@joburg.org.za

Note:

Please use the above email address to ensure prompt response!

MOTIVATING MEMORANDUM IN SUPPORT OF THIS APPLICATION FOR THE ESTABLISHMENT OF A TOWNSHIP IN TERMS OF SECTION 26 OF THE CITY OF JOHANNESBURG MUNICIPAL PLANNING BY-LAW, 2016 (AS AMENDED 2023), TO BE SITUATED ON -

REMAINING EXTENT OF THE FARM ALLANDALE 10 - IR AND KNOWN AS RABIE RIDGE EXTENSION 9

PREPARED FOR: REM ALLANDALE 10 (PTY) LTD

PREPARED BY: THE TOWN PLANNING HUB CC

Tel: (012) 809 2229
E-mail: bea@tph.co.za

PO Box 11437
Silver Lakes
0054

Lombardy Corporate Park
Block B / Unit 13
Cole Road
Shere AH
0084



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1. INTRODUCTION AND APPLICATION

Application is made in terms of Section 26 of the City of Johannesburg Municipal Planning By-Law, 2016 (as amended 2023) for the establishment of a township, to be situated on the Remaining Extent of the farm Allandale 10-IR, to be known as RABIE RIDGE EXTENSION 9.

The intention of the application is to obtain rights to develop a mixed-use development consisting of land uses such as residential, educational, business and institutional uses.

A previous township establishment application was submitted in 2015, in terms of the Old Ordinance policy documentation. Due to the time that has passed, our office was informed that a new township establishment application must be submitted in terms of Section 26 of the City of Johannesburg Municipal By-Law, 2016 (as amended 2023).

From there this application.

2. GENERAL INFORMATION

2.1 NAME ZONE

A township name has been reserved and will be known as RABIE RIDGE EXTENSION 9.

2.2 LOCALITY

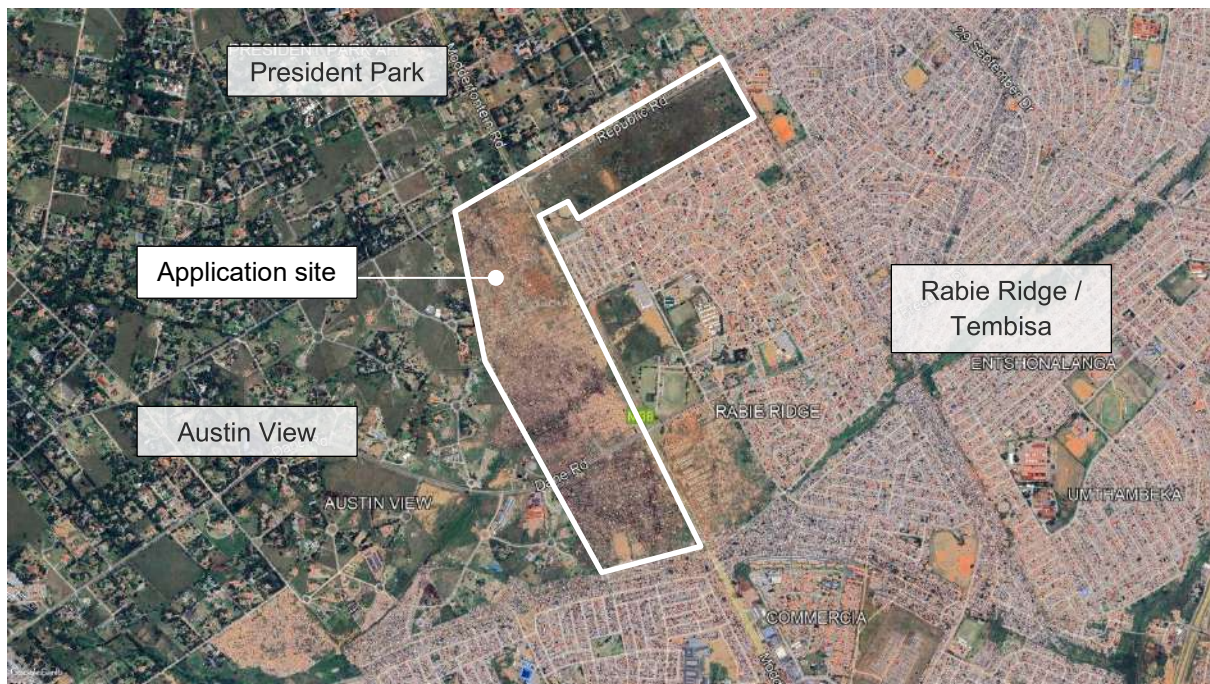
The application site is situated within the jurisdiction of the City of Johannesburg, Gauteng. It forms part of the greater Midrand area and falls within Region A of the City of Johannesburg Metropolitan Municipality.

The site is divided into two portions by Modderfontein Road (M38). Modderfontein Road (M38) also the eastern boundary of the residential portion of the township. Republic Road is to the northern boundary of the township.

President Park Agricultural Holdings, as well as Austin View and Austin Agricultural holdings are in close proximity to the site to the west. Ivory Park and Tembisa is situated directly to the east with Rabie Ridge and Chloorkop/Phomolong to the south.

Please refer to the below aerials that indicate the extent of the township boundary, as well as the locality plan submitted with the application.

Aerial zoomed in –



Aerial zoomed out –



2.3 PROPERTY DESCRIPTION

The property is registered as the Remaining Extent of the farm Allandale 10 - IR.

2.4 OWNER

The property is registered in the name of Gauteng Provincial Government.

2.5 SIZE

The size of the farm portion is 129.6391ha in extent. The area to be included within the township boundary, that excludes the provincial road reserves, is 101.3582ha in extent.

2.6 TITLE DEED

The farm portion is registered under Deed of Transfer T4506/2022.

2.7 TITLE RESTRICTIONS AND SERVITUDES

A Deeds Report and Land Surveyors Report is submitted with the application.

2.8 BONDHOLDER

The property is not bonded by any financial institution.

3. PHYSICAL ASPECTS AND INFORMATION

3.1 DEVELOPMENT CONTEXT

The land to the west of the Modderfontein Road is completely invaded by informal settlers. This started in 2020 to the south of Dane Road and over the past 3 to 4 years expanded exponentially in a northern direction.

The general location of the application site is located to the west of Tembisa and east of the Austin View Agricultural Holdings and further on is the Midrand area with the Old Pretoria Road and the N1 highway as well.

The greater area surrounding the site and the local municipality, as can be seen from the illegal land invasions, are under severe pressure to provide housing options to the community. This guided the land uses applied for. The provision of only single residential stands will not be feasible as the demand for housing is too great in the area. Provision is also made for a school, institutional use and business rights to accommodate social facilities within the development.

3.2 SURROUNDING DEVELOPMENT AND IMPACT

The application site is surrounded by residential development of various densities. The proposed development will fit in with the surrounding residential developments.



Immediate areas surrounding the application site are:

North	► Ebony Ivory Park
East	► Rabie Ridge Ext 1 & Rabie Ridge Ext 2
South	► Commercia and Commercia Ext 37
West	► Austin View Agricultural Holding Ext 1

The application site is well located. It is bordered/traversed by Modderfontein Road (K56) and further bisected by Dane Road as can be seen from the locality and aerials provided.

The development will be able to connect to the existing services infrastructure available. Services Agreements will be entered into dictating the required upgrades and bulk contribution amounts payable by the developer.

3.3 TOPOGRAPHY, VEGETATION AND HYDROGRAPHY

Topography: The land portion to the west of Modderfontein Road (K56) generally slopes from east to west.

The land portion to the east of Modderfontein Road (K56) generally slopes from west to east (towards boundary street in the east).

Vegetation: The land portion to the west of Modderfontein Road (K56) have been completely informally invaded. No natural vegetation remains on site.

The land portion to the east of Modderfontein Road (K56) is vacant with no faunal SCC observed or expected to occur on site.

Broad habitat units distinguished in the ecological studies were mixed grasslands.

Hydrograph: Wetlands were located on the site prior to the illegal invasion activities, and included an isolated hillslope seepage wetland, hillslope seepage wetlands connected to a watercourse, and an unchanneled valley bottom wetland. These wetland systems have also been illegally invaded.

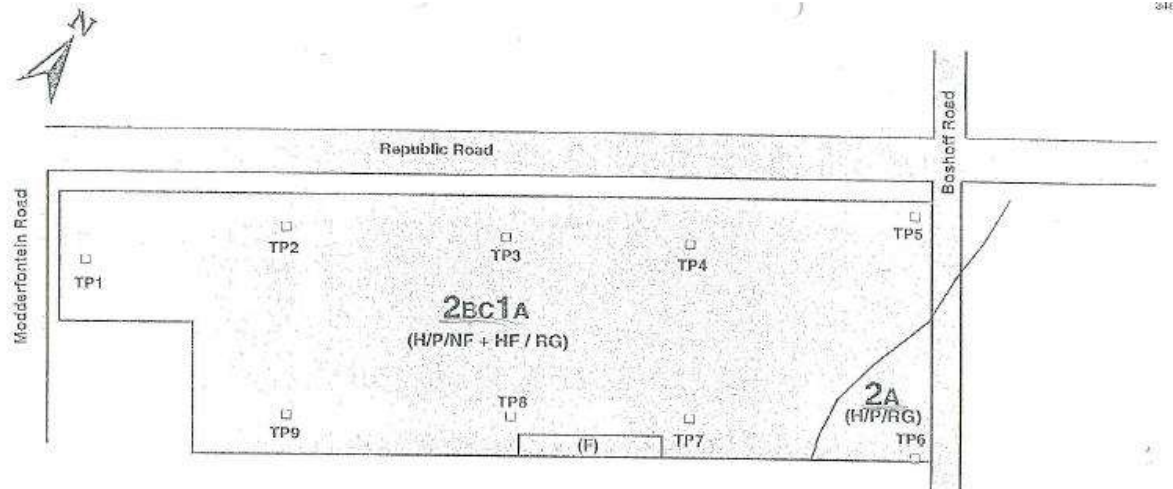
The 1:100 year floodline was determined, taken into account and is certified on the layout plan submitted.

3.4 GEO-TECHNICAL CONDITIONS

A Geological Investigation was conducted on the application site by Yates Consulting CC Engineering Geologists in July and December 1996.

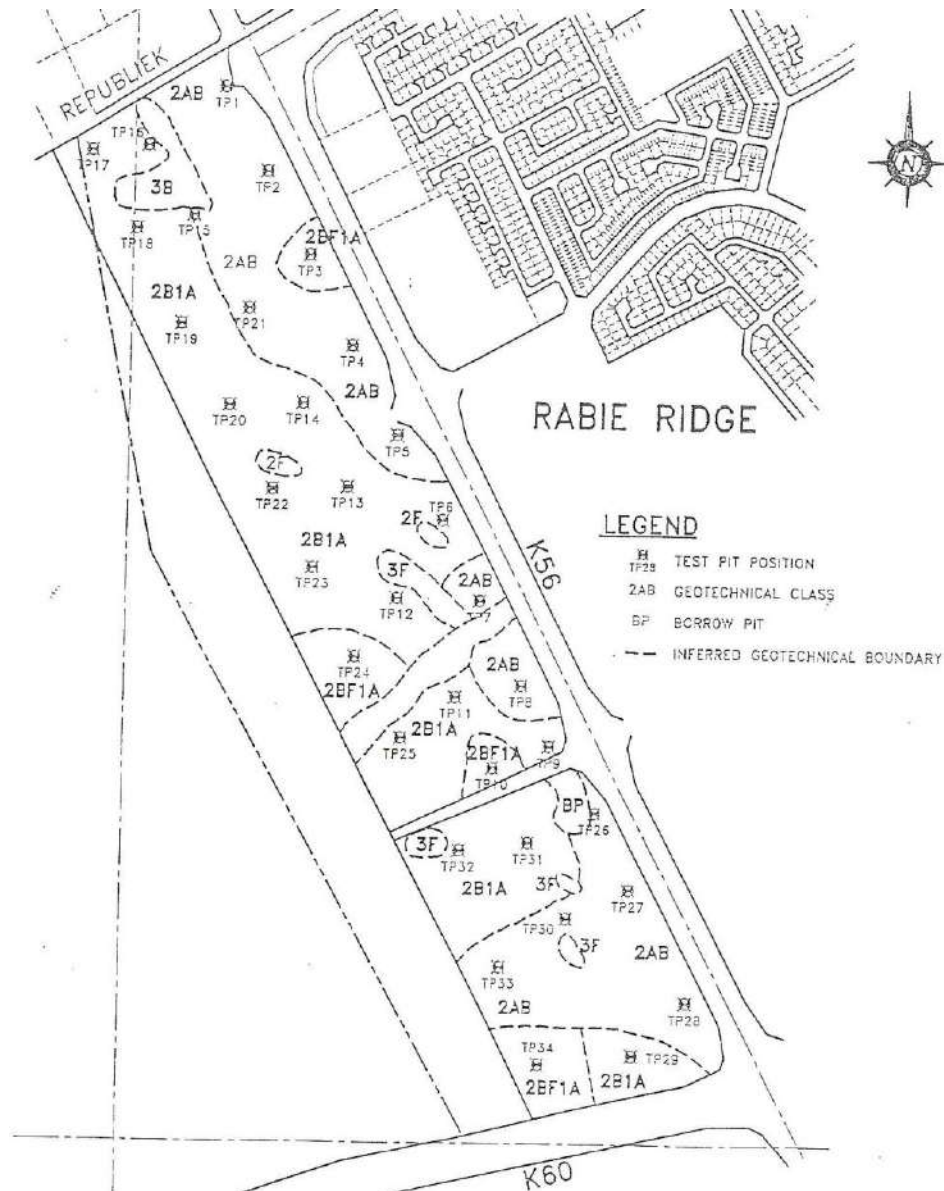
The following will serve as a brief breakdown of their findings.

Phase 1 of the Geological Investigation was conducted on a portion of the application site as can be seen from the below diagram.



The findings of phase 1 is that the property is suitable for residential structures. The area is underlain by Halfway House granitic rocks and in all instances the bedrock granite is overlain by transported, pathogenic and residual soils.

Phase 2 of the Geological Investigation was conducted on a portion of the application site as can be seen from the below diagram.



Phase 2 of the investigation indicated that the bulk of the property is suitable for development however strict measures will be put in place for the development.

Comments were previously received from Technical Co-Ordination on the aforementioned Geotechnical Report, (extracted below):

The geotechnical report no. 3480-001 of July 1996 by Yates Consulting Engineering Geologists has reference. A copy of the report has been filed in the Geotechnical Data Bank, 12th Floor, Metro Centre. It is recommended that proposed township **Rabie Ridge Extension 7**, be zoned as **Soil Zone III**.

Accordingly, the following conditions shall be incorporated in the zoning certificate for each erf and in the relevant clauses of the town planning amendment scheme:

1. “ **ALL ERVEN**

The erf lies in an area with soil conditions that can cause serious damage to the buildings and structures. In order to limit such damage, foundations and other structures must be designed by a competent professional engineer unless it can be proved to the Council that such measures are unnecessary or that the same purpose can be achieved by other more effective means”.

It is proposed that the site be classified as Soil Zone III. Accordingly, the following conditions shall be incorporated in the zoning certificate for each erf and in the relevant clauses of the town planning amendment scheme:

“ **ALL ERVEN**

The erf lies in an area with soil conditions that can cause serious damage to the buildings and structures. In order to limit such damage, foundations and other structures must be designed by a competent professional engineer unless it can be proved to the Council that such measures are unnecessary or that the same purpose can be achieved by other more effective means”.

3.5 ENVIRONMENTAL IMPACT

Seedcracker Environmental Consulting was appointed to submit an Environmental Impact Assessment (EIA) with the Gauteng Department of Agriculture and Rural Development. The process has been completed and a positive Environmental Authorisation was issued by the Department in March of 2024 with reference number GAUT 002/22-23/E3421, a copy of which is submitted with this application.

The authorization was granted for a mixed-use development, and it is valid for 10 years.

3.6 TRAFFIC AND ACCESS

WSP Civil and Structural Engineers have been appointed to attend to the accesses to the proposed development. Gautrans will be consulted and their positive comments be obtained. Access will be provided according to the Municipality and Gautrans's standards.

The latest Traffic Impact Study dates September 2022, after previous studies undertaken for the proposed development (2016).

“The purpose of this study is to determine the traffic impact the proposed development is expected to have on the existing road network and, if required, recommend possible road upgrades to mitigate such an impact. This report also comments on the position of the proposed development accesses, as well as on non-motorised and public transport facilities.” (Page 1)

Public Transport in the area is mainly provided by minibus taxis that operate in Main Road, Modderfontein Road and Dane Road. Due to the impact of the proposed development, additional public transport lay-bys are proposed at the intersections of Main Road/Development Access, Modderfontein Road/Falcon Street and Modderfontein Road/Dane Road.

Pedestrian walkways are also proposed along at least one side of all the Class 3 roads within the development, as well as along Main Road and Modderfontein Road between the new lay-bys. Refer to the aerial on page 9 that indicates these proposals.

EXISTING ROAD NETWORK

Municipal Roads

- **Boshoff Road:** This collector road follows a north-south alignment to the east of the site. The site is proposed to obtain direct access from Boshoff Road.
- **Republic Road:** This road is a municipal road to the west of Modderfontein Road. It is a minor arterial road following the same alignment as future route K111.
- **Falcon Street:** This collector road follows an east-west alignment to the east of the site.
- **Dane Road:** This is a minor arterial road following an east-west alignment to the south of the site.
- **West Road:** This is also a minor arterial road following a north-south alignment to the west of the site. Currently, West Road functions as an access road.

Provincial Roads

- **Modderfontein Road:** This is a major arterial road following a north-south alignment. Future route K56 is planned along the alignment of Modderfontein Road (to be discussed in Section 2.3). Two full accesses to the subject development are proposed off Modderfontein Road.
- **Main Road:** This is also a major arterial road following an east-west alignment. Future route K111 is planned along the alignment of Modderfontein Road (to be discussed in Section 2.3). A partial access to the subject development is proposed off Main Road.

Future Road Planning

- **Route K111:** A provincial dual carriageway road, route K111 is planned on the existing Main Road alignment and will run in a west-east direction past the proposed development, linking Allandale Road to the west and Olifantsfontein Road (R562) to the east. The existing Main Road is currently operating at capacity. Therefore, the planned K111 will mitigate capacity constraints in the future.

- **Route K56:** This will also be a provincial dual carriageway road, and is planned on the existing Modderfontein Road alignment running in a north-south direction past the proposed development, linking Dale Road to the north and Andrew Mapheto Street/Zuurfontein Street to the south.

Access to the proposed township is proposed as follows and can be seen from the proposed township layout plan submitted with the application.

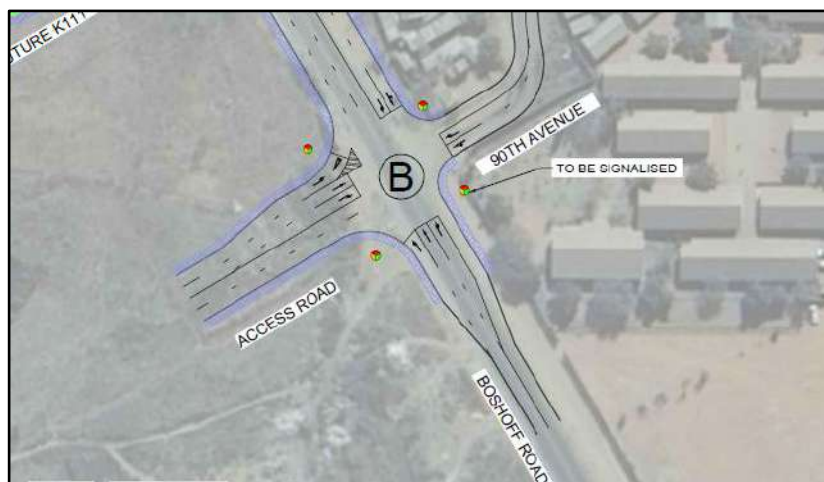
- **Route K56 accesses:** Two full accesses off the planned future K56 alignment are proposed. These accesses are in line with Gautrans' basic planning.



- **Route K111 access:** A partial access (Intersection A) is proposed off the planned future K111, located approximately 730 m east of the Main Road (K111)/Modderfontein Road (K56) intersection, and 350 m west of the Main Road(K111)/Boshoff Road intersection. The partial access is not part of the basic planning of the K111, and Gautrans approval will be required.



- *Boshoff Road access: Full access is proposed at the existing Boshoff Road/Tlangelani Road intersection (intersection 8), located approximately 100 m south of Main Road/Boshoff Road intersection.*



It is concluded in the Traffic Impact Study that once fully developed, the additional demand on the road will require road upgrades and provision of additional public transport facilities in the form of lay-bys to mitigate these increases. The Traffic Impact Study is in support of the proposed mixed-use development. Approval of the study will be sought from JRA and Gautrans prior to approval of this application.

3.7 ENGINEERING SERVICES

Outline Scheme Reports, for Water & Sanitation as well as Roads & Stormwater, have been compiled by Ceenex Consulting Engineers – dated July 2026. A copy of the reports is submitted

with this application and will also be submitted to Joburg Water and JRA directly by Ceenex. The findings will be briefly discussed below.

Water

Existing Infrastructure

“The Rabie Ridge area is served by an existing municipal water reticulation network comprising multiple pipes of varying diameters and materials. The existing Rabie Ridge reservoir serves as the primary bulk supply point for the development. No existing water infrastructure is present within the development boundary.”

Proposed Connection

“The proposed development is bisected by the K56 road, with the water supply infrastructure designed to be implemented progressively in accordance with the approved development phasing. All internal water reticulation infrastructure will be newly constructed and commissioned incrementally to accommodate the increasing water demand associated with each phase of the development.

The western portion of the development will be supplied from the existing Rabie Ridge 7.5 ML Reservoir via a proposed 315 mm diameter uPVC bulk water main. The bulk main will branch into two 250 mm diameter uPVC internal reticulation mains, which will distribute potable water throughout the western portion of the development. Water demand within this area will increase progressively as each development phase is completed and commissioned.

The eastern portion of the development will be supplied through a proposed 110 mm diameter uPVC water main connected to the existing 200 mm diameter uPVC municipal water main within the Rabie Ridge Extension 2 water reticulation network. Similar to the western portion, water demand will increase incrementally as successive phases of the development are implemented.

The proposed phased water supply strategy ensures that adequate potable water is available throughout the construction and operational stages of the development while allowing the internal reticulation network to expand in line with the projected increase in demand.

Water Demand Calculations

The total water demand for the development has been estimated based on the Johannesburg Water Guidelines and is as follows (refer to Table 1):

Fire Fighting Requirements

In accordance with Johannesburg Water Guidelines, the development is classified as Moderate Risk 2, which requires a minimum firefighting flow of:

- 25 l/s

This demand is significantly higher than the peak domestic demand. Therefore, it is necessary to:

- *Assess the capacity of the municipal supply to meet this firefighting requirement*
- *If the municipality does not meet the aforementioned condition, a provision for on-site storage and a booster pump system to ensure adequate pressure and flow for firefighting."*

Sewer

'Existing Infrastructure

No municipal sewer reticulation exists within the development boundary, and no bulk sewer infrastructure runs in proximity to the site. The existing Rabie Ridge sewer reticulation network is located to the east of the K56 road.

Proposed Connection

The sewer servicing strategy differs on either side of the K56 road and will be implemented progressively in line with the phased development. Owing to the absence of nearby bulk sewer infrastructure, the western portion of the development will be serviced by two proposed sewer pump stations. The first lifting station will be located along the western boundary adjacent to Falcon Street, from where sewage will be pumped via a 200 mm diameter rising main to a 200 mm diameter gravity sewer, which will convey flows to a second lifting station located along the western boundary adjacent to Dane Road. From the second lifting station, sewage will be pumped through a 250 mm diameter rising main for discharge into the existing 600 mm diameter outfall sewer located outside the development boundary.

The eastern portion of the development will be connected to the existing Rabie Ridge Extension 2 sewer reticulation network through two 160 mm diameter gravity sewer connections. One connection will discharge into the existing 160 mm uPVC sewer, while the second will connect to the existing 150 mm diameter clay sewer. Sewer flows entering the municipal reticulation network will increase incrementally as each phase of the development is commissioned, with the proposed infrastructure sized to accommodate the ultimate development demand.

Sewer Discharge Calculations

The total sewer discharge for the development has been estimated based on the Johannesburg Water Guidelines and calculated at 49.40 l/s.

Roads

Access to the proposed development and road planning was discussed under point 3.6 in detail.

“It is proposed that the development be served by two full accesses off the planned future K56 alignment which is in line with Gauteng Major Road Network basic planning. Additionally, a partial access is also proposed off the planned future K111, located approximately 730m east of Main Road (K111)/Modderfontein Road (K56) intersection or 350m west of Main Road/Boshoff Road intersection. It is further proposed that a full access be gained off Boshoff Road/90th Avenue intersection, located approximately 100m south of Main Road/Boshoff Road intersection.”

Stormwater

The stormwater management is dealt with in detail, in the services report compiled by WSP Consulting Engineers in October 2023. A summary of their findings and accommodation within the township layout is discussed below.

“The proposed development is divided into three drainage areas: north west, east and south. The general drainage pattern for the north eastern area is from south west to north east, with an average slope of 3%. The north western area has a general drainage pattern from north to south, with an average slope of 3%. The southern area has a general drainage area of south to north, with an average slope of 4%.”

The report confirms that an existing earth channel is located on the southern side of the K111 (Main Road) on the northern boundary of the proposed development. There are also culvert crossings along the property boundary from the channel underneath the K111 (Main Road) draining in a northern direction into the road reserve. It is thus proposed that the runoff associated with the proposed development is to be attenuated such that the predevelopment flows for the 1:5 as well as the 1:25 year storm events are not exceeded.

All attenuation structures to be designed according to the environmental acceptable standards. It is proposed that they cater for energy breakers at the various outlets to minimize the possibility of erosion at the point of discharge. Provision was made in the layout of the township for two erven to be used for stormwater attenuation, to be zoned as “municipal” erven.

4. NECESSITY AND DESIRABILITY OF THE PROPOSED TOWNSHIP

4.1 MOTIVATION

The need to encourage and support **infill development** within the borders of the City of Johannesburg cannot be questioned.

The onus lies with the Municipality to ensure that –

“... Any land development application in terms of this By-law shall have as its main purpose the co-ordinated and harmonious development of the area to which the application relates in such a way as will most effectively tend to promote the health, safety, good order, amenity, convenience and general welfare of such specific area as well as efficiency and economy in the process of such development.” Section 5 of the City of Johannesburg Municipal Planning By-Law, 2016 (as amended 2023)

It is motivated and supported in this motivating memorandum that the implementation of this development will adhere to the above section of the By-Law, the application is applicable in the region it is located in, and the intention thereof is to increase the safety and efficiency of the economy in the area. The proposed uses will provide mainly residential uses that are in close proximity to work opportunities, together with supporting social amenities such as a school and public open space areas.

The application will be further motivated against the following policy documentation;

- Spatial Planning and Land Use Management Act, Act 16 of 2013
- Gauteng Spatial Development Framework, 2030
- Joburg 2040 – Growth and Development Strategy
- Johannesburg Spatial Development Framework, 2040
- Nodal Review 2020

4.1.1 Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA)

The recent introduction of the SPLUMA requires for all land development applications to comply and be motivated in accordance with same.

This application complies with the objectives and development principles of SPLUMA which will be elaborated on further below.

Section 7

7. The following principles apply to spatial planning, land development and land use management:

(a) The Principle of spatial justice, whereby –

- (i) Past spatial and other development imbalances must be redressed through improved access to and use of land;**

- (ii) Spatial development frameworks and policies at all spheres of government must address the inclusion of persons and areas that were previously excluded, with an emphasis on informal settlements, former homeland areas and areas characterised by widespread poverty and deprivation;**
- (iii) Spatial planning mechanisms, including land use schemes, must incorporate provisions that enable redress in access to land by disadvantages communities and persons;**
- (iv) Land use management systems must include all areas of a municipality and specifically include provisions that are flexible and appropriate for the management of disadvantaged areas, informal settlements and former homeland areas;**
- (v) Land development procedures must include provisions that accommodate access to secure tenure and the incremental upgrading of informal areas; and**
- (vi) A Municipal Planning Tribunal considering an application before it may not be impeded or restricted in the exercise of its discretion solely on the ground that the value of land of property is affected by the outcome of the application;**

This application is for the establishment of a township in order to allow for a mixed-use development that includes mainly residential development. The land is owned by the Provincial Government, with its sole purpose to develop it for social inclusionary housing units. It is a direct answer to the spatial injustices of the past, as is so evident in the land invasion happening on the application site. The approval of this application will be step one in giving the people in the area land security and the option of land ownership. The approval will indicate the support of the City of Johannesburg towards planning practices that support the need to be more flexible and inclusionary.

(b) The principle of spatial sustainability, whereby spatial planning and land use management systems must –

- (i) Promote land development that is within the fiscal, institutional and administrative means of the Republic;**
- (ii) Ensure that special consideration is given to the protection of prime and unique agricultural land;**
- (iii) Uphold consistency of land use measures in accordance with environmental management instruments;**
- (iv) Promote and stimulate the effective and equitable functioning of land markets;**
- (v) Consider all current and future costs to all parties for the provision of infrastructure and social services in land developments;**
- (vi) Promote land development in locations that are sustainable and limit urban sprawl; and**
- (vii) Result in communities that are viable;**

This application complies with the above principle. The site is not viable agricultural land in any form. It is in fact illegally invaded and the successful use thereof for agricultural practices will not be possible. The approval of the application will directly support the functioning of land markets in the area and it is foreseen that after approval the landowner will proceed with the required services infrastructure upgrades, as will form part of the Service Level Agreements to be entered into. The application does not result in urban sprawl and will result in a more viable community.

(c) The principle of efficiency, whereby –

- (i) Land development optimises the use of existing resources and infrastructure;***
- (ii) Decision-making procedures are designed to minimise negative financial, social, economic or environmental impacts; and***
- (iii) Development application procedures are efficient and streamlined and timeframes are adhered to by all parties;***

This application complies with the above principle, specifically the optimal use of existing services infrastructure. The proposed development will positively impact the socio-economic and financial markets of the city. It is the intention of the owner to finalise the application timeously and construction of the units as soon as possible.

(d) The principle of spatial resilience, whereby flexibility in spatial plans, policies and land use management systems are accommodated to ensure sustainable livelihoods in communities most likely to suffer the impacts of economic and environmental shocks; and

The Spatial Development Frameworks and Nodal Review available to applicants allow for the change in land use and development controls within the boundaries of the City of Johannesburg, allowing for applications such as these. The positive comments from GDARD have been obtained and submitted to the City of Johannesburg. Once the application site is formalized, it will alleviate any future impacts on the residents by the environment and indirectly that of the economy to as they will at least have land tenure and a roof over their heads.

(e) The principle of good administration, whereby –

- (i) All spheres of government ensure an integrated approach to land use and land development that is guided by the spatial planning and land use management systems embodied in this Act;***
- (ii) All government departments must provide their sector inputs and comply with any prescribed requirements during the preparation or amendment of spatial development frameworks;***
- (iii) The requirements of any law relating to land development frameworks;***

- (iv) ***The preparation and amendment of spatial plans, policies, land use schemes as well as procedures for development applications, include transparent processes of public participation that afford all parties the opportunity to provide inputs on matters affecting them; and***
- (v) ***Policies, legislation and procedures must be clearly set in order to inform and empower members of the public.***

This application complies with the above principle and does not deviate from the prescribed land uses as prescribed in the Nodal Review Policy, the Policy has earmarked the property as a Local Economic Development Zone and Sub-Urban Zone. The Nodal Review policy as well as the SDF, 2040 will be read in conjunction with each other – both policy documentation favour infill development as a development tool that encourages more sustainable human settlement development. All the required Municipal owned Entities will be required to provide comments on the application prior to consideration and approval.

Section 42

42.(1) In considering and deciding on an application a Municipal Planning Tribunal must-

- (c)
 - (i) ***the public interest;***
 - (ii) ***the constitutional and transformation imperatives and the related duties of the State;***
 - (iii) ***the facts and circumstances relevant to the application;***
 - (iv) ***the respective rights and obligations of all those affected;***
 - (v) ***the state and impact of engineering services, social infrastructure and open space requirements; and***
 - (vi) ***the effect of the land development application on the environment.***

- **Public interest:**
This application will definitely address the public interest as housing opportunities will be created in close proximity to work opportunities, with easy access to major transport routes. The required advertising procedures will be adhered to, should any person be aggrieved by the application they will be able to lodge an objection thereto.
- **Constitutional and transformation imperatives and the related duties of the State:**
The application does have a direct interest related to the duties of the State, and the approval hereof will be a direct answer to addressing the required transformation and housing footprint within the borders of the city.
- **Facts and circumstances relevant to the application:**
A previous township establishment application was submitted in 2015, in terms of the old Ordinance policy documentation. Due to unforeseen circumstances, the amendments that had to be undertaken and the time that has passed, our office was informed that a new

township establishment application be submitted in terms of Section 26 of the City of Johannesburg Municipal By-Law, 2016 (as amended 2023).

- Respective rights and obligation of all those affected:
The application will be duly advertised, and anyone aggrieved by the application will be allowed the opportunity to give their grievances thereto.
- State and impact of engineering services, social infrastructure and open space requirements:
The application is to allow for a mixed-use development that will as far as possible tie into the existing service infrastructure. Outline Scheme Reports have already been drawn up as was explained in more detail under paragraph 3.7.
- The effect of the land development application on the environment:
As mentioned above, an Environmental Specialist has been appointed and a positive ROD from GDARD obtained. The application will in actual fact assist in protecting the environment as the land invasions do not have adequate sanitary facilities at the moment.

In general, the rights of the surrounding property owners will be taken into account. The required advertising will take place timeously together with the site notices to be placed on the property. Should anyone be aggrieved by the proposed development our office will pursue to meet with the objectors and discuss possible mitigation measures.

The application will promote *health, safety, order, amenity, convenience and welfare of the area*.

4.1.2. Gauteng Spatial Development Framework, 2030

The Gauteng Spatial Development Framework, 2030 has been adopted and is a development tool that proposed to align development, not only within the City of Johannesburg but across the province.

“The Gauteng Spatial Development Framework (GSDF) 2011 was the first attempt at an integrated, coherent vision of settlement form, transportation and economic development for the province. However, it was not implemented as intended, resulting in a slow pace of spatial, economic and social transformation in the province. In 2015, the Gauteng Provincial Government decided to review the GSDF 2011, a decision that was also prompted by the Spatial Planning and Land Use Management Act (SPLUMA) (Act 16 of 2013), which came into force on 1 July 2015. This resulted in the GSDF 2030, which seeks to (i) direct, guide, focus and (ii) align, coordinate and harmonise all development spending in the province, to ensure rapid, sustainable and inclusive provincial economic growth and township redevelopment, therefore enabling decisive spatial transformation.” Page viii, GSDF 2030

“The Spatial Development Vision

The Gauteng of 2030 is an integrated, connected space that provides for the needs of all who are born in or drawn to the province. Economic growth is spread widely, beyond the core areas, to nodes and multi-modal activity corridors. These nodes and corridors provide safe, high-intensity and high-density mixed land-use settlements, where the young and old are able to walk, cycle and relax in public spaces. A range of public transport modes ensures affordable, province-wide interconnectedness and access to the full spectrum of economic, cultural and educational opportunities, placing the province on a far more sustainable growth trajectory. ...” Page ix, GSDF 2030

In order to make the above spatial vision a reality, various spatial development principles were identified of which one is that of ‘**concentration**’ and the subsequent need to increase economic development / potential in the city.

“To realise the spatial development vision, all developments in the province need to adhere to six spatial development principles: (i) liveability, (ii) concentration, (iii) connectivity, (iv) conservation, (v) diversity, and (vi) viability.” Page 46, GSDF 2030

This application supports the vision by conforming to the development principles, ie:

Liveability: The proposed development is creating opportunities for people to be a part of a growing community, with work opportunities in close proximity. Most importantly, it will assist in providing formal housing that is connected to municipal services.

Concentration: As mentioned above, the clustering of uses will strengthen the economic standing of not only the jurisdiction of the City of Johannesburg but Gauteng as a whole.

Connectivity: The proposed development can easily gain access to both north/south as well as east/west connector roads via Modderfontein Road, Dane Road and Republic Road (K111).

Conservation: An environmental consultant has been appointed, the Environmental Management Plan approved and environmental authorisation issued by the controlling authority.

Diversity: The Nodal Review of the City of Johannesburg is the guiding policy document in such land use applications. The area has been earmarked as a Local Economic Development Zone and Sub-Urban Zone – to be discussed in further

detail below. The surrounding land uses are complementary and will support the economic growth of the Municipality and the Gauteng Province as a whole.

Viability: The intention is to develop a mixed-use development mainly consisting of residential erven, thereby creating a harmonious community with land uses that support each other.

The limitation of urban sprawl is not only a provincial problem, but also applies specifically to local Municipalities. Their actions and decisions directly affect the form and shape of cities in terms of its sustainability and liveability.

In general, the application site conforms to the vision and principles set out in the policy document. The application is in line with spatial transformation and further in line with the guiding policy documentation of the City of Johannesburg.

4.1.3. Joburg 2040 – Growth and Development Strategy

“Vision:

“Johannesburg – a World Class African City of the Future – a vibrant, equitable African city, strengthened through its diversity; a city that provides real quality of life; a city that provides sustainability for all its citizens; a resilient and adaptive society.”

Joburg. My City – Our Future!” Page 35, GDS Joburg 2040

The intended outcome of the afore-mentioned Development Strategy is as follows:

- “Outcome 1: Improved quality of life and development-driven resilience for all*
- Outcome 2: Provide a resilient, liveable, sustainable urban environment – underpinned by infrastructure supportive of a low-carbon economy*
- Outcome 3: An inclusive, job-intensive, resilient and competitive economy that harnesses the potential of citizens*
- Outcome 4: A high performing metropolitan government that pro-actively contributes to and builds a sustainable, socially inclusive, locally integrated and globally competitive Gauteng City Region.”* Page 9, GDS Joburg 2040

By way of approval of this application the City of Johannesburg will be adhering to the outcomes that are proposed within the document. The development will contribute to a sustainable environment, create jobs and overall be an incentive for the Municipality in terms of housing provision within the Gauteng Region.

The document has very strong ideas on community safety, promoting growth and sustainability. Addressing the needs of the vulnerable and their requirements for basic services. All of this is addressed on the application site, by means of this application, the approval thereof and the eventual homes that will be built thereon.

It is clear that this application is in line with the economic growth opportunities listed in the policy document.

4.1.4 Johannesburg Spatial Development Framework, 2040 (2021 update)

*“The core objective of the SDF 2040 is to create **a spatially just world class African city**. The SDF 2040 is premised on spatial transformation, defined through the principles of equity, justice, resilience, sustainability and urban efficiency which it seeks to translate into a development policy.”* Page 13, Joburg SDF 2040(2021 update)

“The Spatial Development Framework thus seeks to address five major issues in Johannesburg’s spatial and social landscape:

- Increasing pressure on the natural environment and green infrastructure.*
- Urban sprawl and fragmentation.*
- Spatial inequalities and the job-housing mismatch.*
- Exclusion and disconnection emanating from:*
- high potential underused areas (the mining belt and the Modderfontein area).*
- securitisation and gated developments, and disconnected street networks (high cul-de-sac ratios and low intersection densities).*
- Inefficient residential densities and land use diversity.”* Pages 12 -13, Joburg SDF, 2040(2021 update)

The application, as submitted, will assist in the Municipality in combating the issues surrounding the City’s spatial and social landscape, in that the development has obtained Environmental Authorisation, the existing wetlands will be retained, and buffer zones implemented and protected.

The application cannot be considered as urban sprawl, the areas surrounding the application site have been developed. Unfortunately, the site has been illegally invaded by vagrants and forming an illegal township. The approval of the application will further be addressing spatial inequalities and supply a diverse range of housing opportunities.

“The future polycentric Johannesburg will bring jobs to residential areas and housing opportunities to job centres rather than merely transporting people between the two. It will create complete nodes where people can live work and play that are efficiently connected by public transport. It will bridge

spatial and social barriers and build a framework for a spatially just city.”

Page 16, Joburg SDF, 2040(2021 update)

The surrounding area of the application site is majority residential in nature, with only local community shops and convenience stores in close proximity. This application makes provision for an educational site, business and institution where work opportunities will be created for future residents. The site is further located east of the Midrand and Halfway House business ‘hubs’ where work opportunities can be found.

The application site is more specifically, classified as a category 1 “Marginalised Area”.

“A large proportion of the population live in areas that are classified as marginalised in that they do not contain the qualities of sustainable and liveable neighbourhoods. These include informal settlements and low-income formal areas.

...

Category 1:

These are typically areas that despite their marginalised classification are relatively well located within the broader urban context. This category displays the following characteristics:

- *Good regional transport connections.*
- *Relatively close to large-scale economic centres.*
- *Interconnected to the urban continuum.*
- *Centrally located within the broader city region.*

Marginalised areas that fall within this category include the broader Ivory Park area, which includes Ebony Park, Kaalfontein and Rabie Ridge. These areas display high potential for integration and functional interconnectedness with economic centres and adjoining urban areas over time. Improvement of public transport links to employment centres of Olifantsfontein industrial node, Midrand and Modderfontein as a future principle metropolitan sub-centre will provide a local public transport backbone around which incremental development, densification and future expansion can take place.” Page 125 Joburg SDF, 2040(2021 update) (*applicants own underlining)

This application is inline with the above extract, as its aim is to ensure integration and functional interconnectedness with the surrounding areas and communities. Public transport requirements were addressed in the Traffic Impact Study that will have to be constructed to assist the broader area as well.

As indicated in the document, services capacity might be a problem, but the approval of this application is at least a step in the right direction to get to a point where serious discussions can be held, and decisions taken to ensure that the development does go to ground in the near future.

The development of these marginalised areas must *“demonstrate its contribution to a more compact, integrated and efficient development pattern and as such the development parameters in this area will impose strict criteria and requirements to ensure the intended outcomes of the strategy are achieved.”* (Page 128, Joburg SDF, 2040(2021 update)). The applicant is in full support of this statement.

Of great importance, is the **“Parameters and requirements for new development related to the marginalised areas within the Consolidation Zone.”** (Page 128, Joburg SDF, 2040(2021 update)). These are summarised in the table below and elaborates on how this application adheres thereto.

PARAMETERS AND REQUIREMENTS	APPLICANT RESPONSE / ADHERENCE
1. Any urban expansion or infill development in the Consolidation Zone will have to demonstrate that it is required in order to address issues related to marginalised in the local context.	The Outline Scheme Reports submitted with this application confirms that services infrastructure upgrades and/or new connections will be required after approval.
2. The focus of any residential development should be on low cost and affordable housing. At least 60% of housing should be geared towards affordability levels below the median household income of R3500 per month.	The land is owned by the government and it is foreseen that majority of the development will be developed only for low cost and affordable housing. The density also restricts some of the units in the Residential 3 stands to be ‘bachelor units’.
3. Residential density must relate to movement and structural logic of the development and support principles for compact walkable neighbourhoods. Developments must realise appropriate densities and ensure a mix of housing typologies and affordability range.	The proposed development is in line with the density proposal in the Nodal Review and Spatial Development Framework. The location of higher density, single “Residential 1” erven, Public Open Spaces, the school and business site was done with careful consideration. The proposed land uses do allow for a mix of housing typologies within the development.
4. Connectivity into the existing suburban fabric and main movement lines should be maximised. To this end design standards for walkability, intersection density, road pattern and proportion of street space must be met.	The proposed layout took into consideration the existing movement lines, where it comes from and where it can connect to. The approval of JRA and Gautrans also influences the road width and access arrangements. The layout plan as submitted is in line with these requirements.
5. Any new development must be in close proximity to an existing or planned economic node. Accessibility to jobs and especially walkable access must be achieved. Adequate space for possible	The closest economic node to the application site is Midrand to the West, as well as Tembisa to the East. The site is accessible to job opportunities in the area, this is evident from the land invasion that is taking place that

expansion of economic centres should be planned for with reference to the Johannesburg economic strategy.	indirectly confirms that the site is well located in relation to where these people most likely work and find access to basic services (other than housing and basic services such as water and sewer).
6. Developments should demonstrate urban efficiency gains related to sustainability indicators.	Urban efficiency in the area will be enhanced through providing a greater area with electricity, water, proper handling of waste and greater safety in the area. The realisation of this proposed development will ensure long-term value to the city, the future residents and possible private investment in the area as a result thereof.

The policy document further elaborates on housing provision in the city. It is our submission that this application is line with the below views (page 141);

- In-situ upgrading of the application site will not be desirable due to the cost for services infrastructure upgrades that will be required.
- The density applied for, will make the upgrading of services infrastructure viable to the city. It will have a ripple effect in the area and open up even more development opportunities that are now restricted as a result, by private investors.
- A school and a health facility are provided for in the development, that will reduce travel times and give access to economic opportunities.

The application is further in line with the 'guide density' and land use mix, as illustrated in the below table (page 155).

Target Locations/Spatial Elements		Density /Mix Regulations	
		Housing Density (per erf) ⁶⁹ (du = dwelling units)	Land Use Mix Allowed (in order of preference) ⁷⁰
2 Consolidation Zone	Marginalised Areas/ (Re) Urbanisation Focus	To be determined per proposal - an urban design/typology issue and not a density issue. It will therefore be dealt with by the development control indicators outlined in this SDF. Guide Density: 50 du/ha	As per approved local SAF/PP/UDF/RSDf

The development control indicators referred to above *"include land use mix, population and job density, the amount and quality of public space, the percentage of affordable housing, connectivity levels and access to public transit (Page 22)."*

This development proposal and township layout adheres to all of the above indicators, and we elaborate further on the inclusionary housing within the development under section 5.3.

The Nodal Review has been approved and adopted by the City of Johannesburg, the property falls within an LED- and Sub-Urban Zone within this Policy document, same will be further motivated under paragraph 4.1.5.

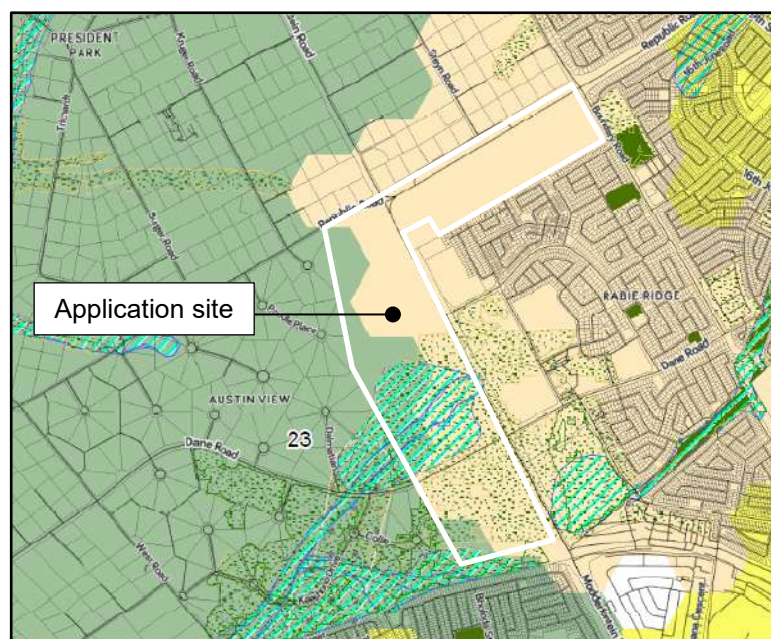
4.1.5 Nodal Review, 2020

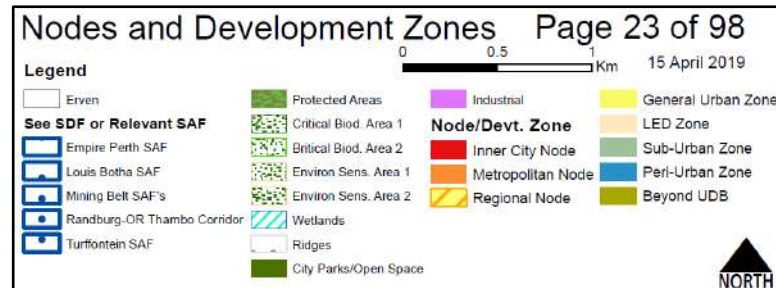
The City of Johannesburg approved and adopted the Nodal Review on 27 February 2020. With this approval the RSDF's have been repealed. The Nodal Review is a comprehensive policy with the intention to ensure development that *"occurs in a way that is holistically sustainable: having positive environmental, social and economic effects"* (page 4, Nodal Review, 2020).

This document outlines the process that was followed in reviewing the nodes in the city and describes a new 'transect' or 'node and development zone' approach which is an evolution of the nodal strategy. It then indicates the development guidelines that should be applied in each of the nodes/development zones of the city.

"Cities are largely founded on connectivity and access. They are places where people and businesses concentrate to gain access to a number of services and amenities. These include (to name a few); jobs, economic activity, markets, schools, healthcare facilities, services, cultural/religious experiences, leisure, entertainment and interaction with other people. The SDF argues that the city needs to transform from a sprawled, car-oriented city, to a compact-polycentric, mixed use, walkable city." Page 13, Nodal Review Policy 2019/20

Below is an extract from the Nodal Review Nodes and Development Zones online plan. The application site is earmarked as a **LED and Sub-Urban Zone**.





Each of the different development zones were provided with detailed development guidelines that should be applied to development applications in the City.

“The Design Guidelines and Form-based Codes specifically address the following:

- *Creating distinctive, attractive environments with a strong sense of place and local ownership;*
- ***Land use intensification and densification*** *that provides additional opportunities for intensity development, but that are designed to activate the street and increase the number and diversity of users;*
- ***Creation of a range of housing opportunities*** *and choices to address a wide spectrum of housing needs and achieve socio-economic integration;*
- ***Land use and transportation integration,*** *by strengthening and directing development around transit amenities and in so doing increase public transport ridership;*
- *Creating pedestrian friendly environments by providing a high quality streetscape that create a comfortable environment for pedestrians.*
- *Promoting alternative modes of transportation to the private vehicle, e.g. walking and cycling.”* Page 36, Nodal Review Policy 2019/20 (*applicants own bolding)

By way of approval of this application the Municipality will be supporting and implementing the aforementioned guidelines, ie: Creating distinctive environments as well as land use intensification. Great care was applied during the planning phases by the professional team in order to have the best possible land uses and internal layout on the site.

When looking at the two zones in more detail (see table 5 and 6), the below can be deducted therefrom in relation to our proposed development and development controls.

- The Sub-Urban zone requires local non-residential functions to support the residential component and the LED zone encourages a mix of uses throughout the neighbourhood. This

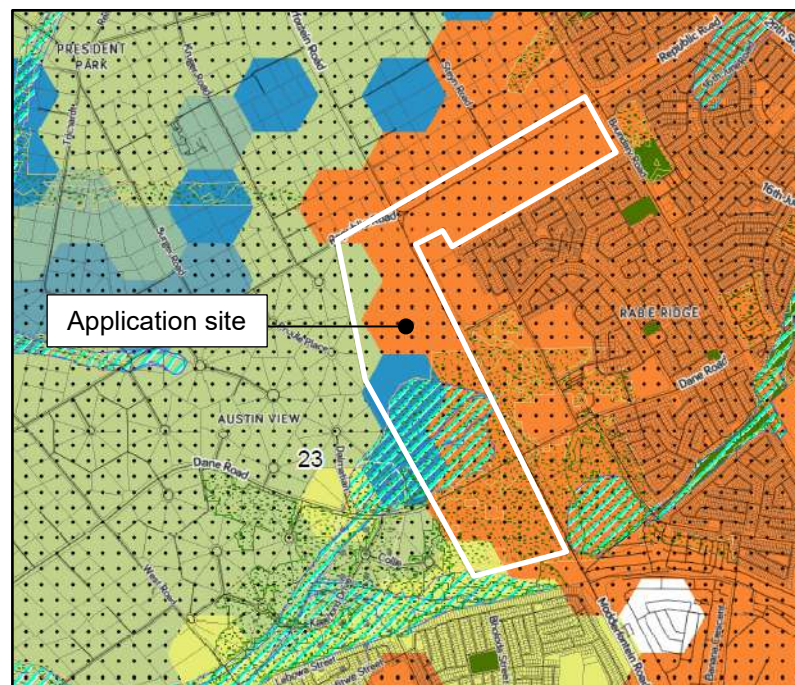
is provided for in our layout, taking into account the surrounding area and uses already provided for. In this layout there are businesses, schools, parks, municipal and institutional uses.

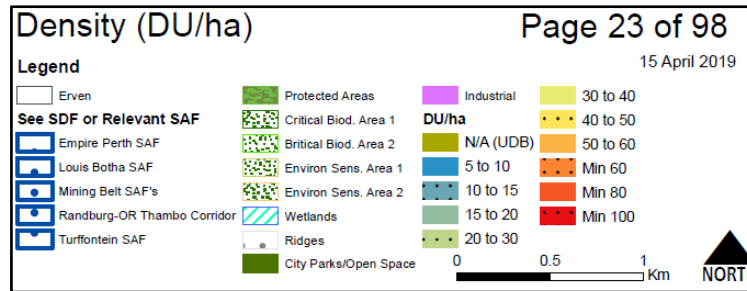
- Functional Open Space to be provided at a guideline of 10% located on site for both zones. Sufficient functional open space is provided in our layout, within walking distance of all erven and centrally located. Calculations for the area requirements were done in terms of the estimated population size and accepted by the Environment and Infrastructure Services Department via email.
- The LED zone allows for higher densities, height and applicable coverage guidelines. The Sub-Urban zone area guided by the approved scheme for the area.

In terms of density, the area is mainly earmarked for a density of minimum 60 dwelling units per hectare. The document confirms that – *“the node/ development zone level at the main access point (along a street) to the erf shall be used. Also taken into account should be the majority node/ development zone that the subject erf falls into (page 21). All major entrances to the proposed township are from the main roads which fall within the LED Zone.*

This application adheres to the desired density, provision for erven with a density of 80 dwelling units per hectare up to 200 dwellings per hectare were made.

A large portion of land is to be zoned wetland / conservation area and was not used in the calculations for the provision of functional open space.





The SDF 2040 as well as the Nodal Review must be read in conjunction with each other. This application is line with the views and planning for the City of Johannesburg.

The application is thus not deviating from the future development envisaged for the specific area.

5. PROPOSED LAYOUT

5.1 THE LAYOUT WITHIN THE URBAN FRAMEWORK

The application site is situated within Region A of the City of Johannesburg demarcated planning zones. The site is well connected in both a north-south and an east-west direction. The proposed land use and footprint will bring much needed structure to the area and hopefully act as a catalyst for future private investment in the area.

The area is characterized / known by the residential areas of Tembisa to the east, with the application site and Austin View/Glen Austin Agricultural Holdings to the west being the 'midway' between Tembisa and Midrand / Halfway House business and industrial nodes along the N1 Highway. Provincial road planning affects the site and is taken into consideration in the township layout plan.

5.2 DEVELOPMENT

The township will consist of the following erven (see attached layout plan):

Proposed uses	Erf/Erven* No	Development Control		Height	Density
		Coverage	FSR		
"Residential 3"	16	As per Scheme (80%)	As per Scheme (2.4)	As per Scheme (5 storeys)	200 units per ha
"Residential 3"	12	As per Scheme (60%)	As per Scheme (2.1)	As per Scheme (4 storeys)	120 units per ha
"Residential 3"	11	As per Scheme (60%)	As per Scheme (1.8)	As per Scheme (3 storeys)	100 units per ha

“Residential 3”	8	As per Scheme (60%)	As per Scheme (1.2)	As per Scheme (2 storeys)	80 units per ha
“Institutional”	1	As per Scheme	As per Scheme	As per Scheme	N/A
“Business 1”	1	60%	0.5	2 Storeys	N/A
“Educational”	1	As per Scheme (70%)	As per Scheme (1.0)	As per Scheme (2 storeys)	N/A
“Public Open Space” Conservation / Wetland	3	N/A	N/A	N/A	N/A
“Public Open Space” Functional Open Space	6	N/A	N/A	N/A	N/A
“Municipal”	2	As per Scheme (60%)	As per Scheme (1.0)	As per Scheme (2 storeys)	N/A
As required by the City of Johannesburg Town Planning Scheme, 2018					

5.3 INCLUSIONARY HOUSING

The City of Johannesburg has adopted a Policy which makes provision for Inclusionary Housing for all new land development applications which apply for a density of 20 dwelling units or more.

“Inclusionary Housing: A housing programme that, through conditions attached to land use rights approvals, requires private developers to dedicate a certain percentage of new housing developments to low income and low middle income households, or to households that may not otherwise afford to live in those developments.” Page 2

For all the options, it is required to provide at least 30% of the *total units* as inclusionary housing units. As the development will be done by the City, we cannot at this stage give information on how the Municipality will apply the requirement. If they opt for Option 3, this make provision for 20% of the total residential floor area that will be made up of units that are 50% of the average market unit size.

	Total Units	Market units	Inclusionary Units
Unit count	5040	3360	1680 (33%)

5.4 LAND USES AND SUITABILITY THEREOF

The proposed development is to permit the development of a mix-use development, consisting of varying residential types and other social amenities such as a school site. The proposed land use also fits in with the surrounding land uses and will be a benefit to the area in the long run.

This memorandum serves as motivation in support of the establishment of a mixed-use development which will include residential, businesses, educational and institutional uses. The

proposed development will aid in reducing the housing backlog in the country and will aid in bringing convenience to the surrounding communities. The business developments proposed on the development site will contribute towards job creation, income generation as well as increasing the rand circulation within the locality and thereby increasing the local economy. The proposed retail development will benefit the residents of the proposed development, as well as those from neighbouring areas.

The proposed educational site will benefit the local community as there will be a school provided for the children of the area where they will receive education that is on international standard.

The property is closely located to the Juksei View industrial area which provides employment to a large number of residents. Affordable housing opportunities will be created close to work opportunities. There are a number of taxi ranks located in the neighbouring areas of Ivory Park, Endayeni and a few others in the Tembisa area that will assist with transport and will provide public transport to the residence. In addition, the Metro Rail ends at the Leralla Station as a pick up point for the area, allowing travel to the north, south and directly into Joburg CBD.

The development area lies to the west of the Rabie Rabie Ridge Sports complex offering recreational amenities to the residents of the area.

The housing development will benefit from the offerings of the surrounding area, the taxi ranks, the sports complex and the industrial area. Then there will be a school and a shopping centre within the proposed township and it will thus be a sustainable township on the long run.

6. SUMMARY

Application is made in terms of Section 26 of the City of Johannesburg Municipal Planning By-Law, 2016 (as amended 2023) for the establishment of a township, to be situated on the Remaining Extent of the farm Allandale 10-IR, to be known as RABIE RIDGE EXTENSION 9.

The intention of the application is to obtain rights to develop a mixed-use development consisting of land uses such as residential, educational, business and institutional uses.

The proposed development will not detrimentally affect anyone's health, once developed it will in actual fact improve the general "health" of the environment and the people to live there. It will improve the existing security and it will promote good order in the area. It will promote the amenity, convenience and general welfare in the area to no expense of the people in the area.

The Municipality's approval of this application will be appreciated.

**ZONING INFORMATION
CERTIFICATE PAD
FOR APPLICATION SUBMISSIONS**



Date: 03/19/2025

Requested by: Lloyd Nkuna
Town Planning Scheme: City of Johannesburg Land Use Scheme 2018
Name of Applicant: THE TOWN PLANNING HUB CC
Erf/Holding Name/Farm Portion: Remainder of the farm Allandale 10-IR
Township/Holding Name/Farm Name: Allandale 10-IR
Street Name and No: Boundary Street

ZONING INFORMATION

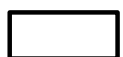
Use Zone: Agricultural
Height Zone: A (H:0) As per attached table 4
Floor Area Ratio: As per attached table 6
Coverage: As per attached table 5
Density: No Density
Building Line: As per attached table 7
Parking: As per scheme
AMENDMENT SCHEME APPLICABLE: N/A
Served By: Lloyd Nkuna

Terms and Conditions:

The Town Planning Scheme is open for inspection on the 8th Floor 158 Loveday Street Braamfontein between 8:00 and 15:30 weekdays. The applicant must verify the information contained herein by inspection of the scheme. Whilst the utmost is done to ensure accuracy the City of Johannesburg does not accept responsibility for any incorrect information given on this form. The applicant's attention is drawn to the general provisions of the Town Planning Scheme. It should be noted that the provisions of the Town Planning Scheme do not override any restrictive conditions that may be contained in the Title Deeds. PLEASE NOTE: No Information will be given telephonically due to the technical and interpretive complications.

LOCALITY PLAN

Remaining Extent of the farm Allandale 10-IR



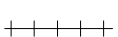
The Site



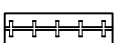
Township Boundary



Road



Railway



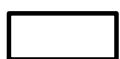
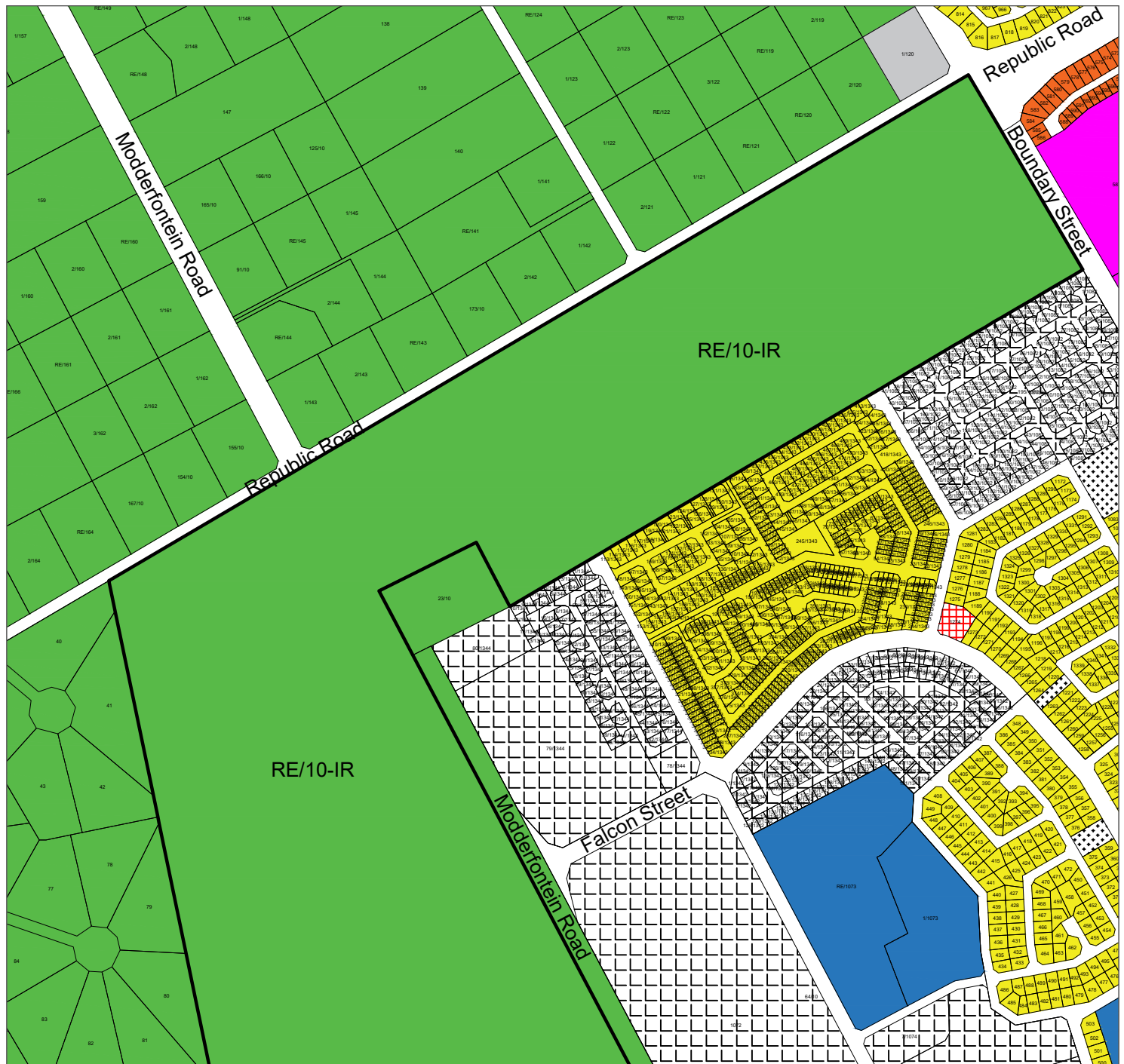
Railway Station



Scale 1:20000

ZONING PLAN

Remaining Extent of the farm Allandale 10-IR



The Site



Educational



Special

Plan 1 of 2



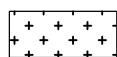
Existing Streets



Institutional



Agriculture



Reservation of land



Business 2



Residential 1



Ecclesiastical



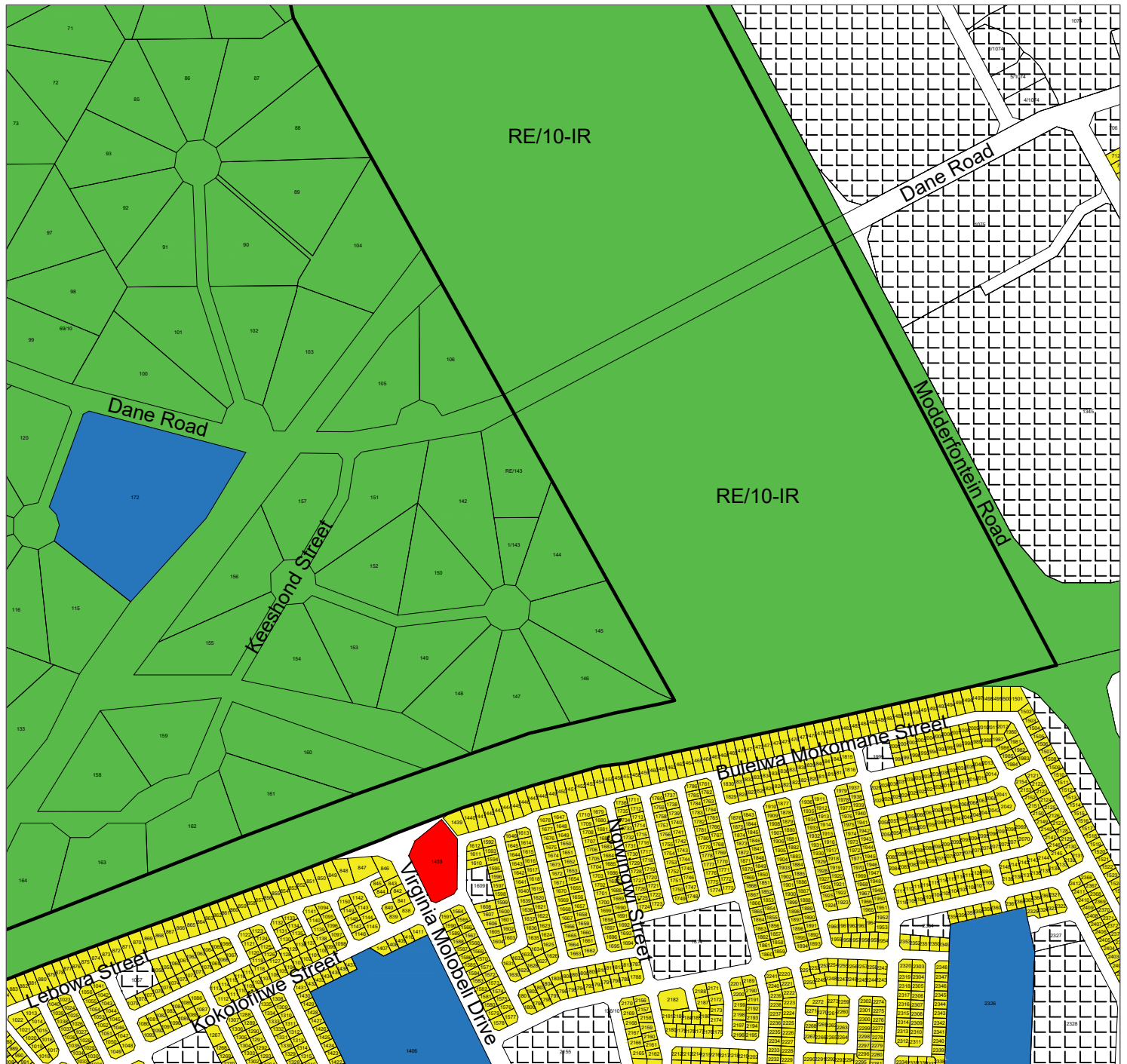
Residential 3



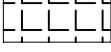
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ZONING PLAN

Remaining Extent of the farm Allandale 10-IR



Plan 2 of 2

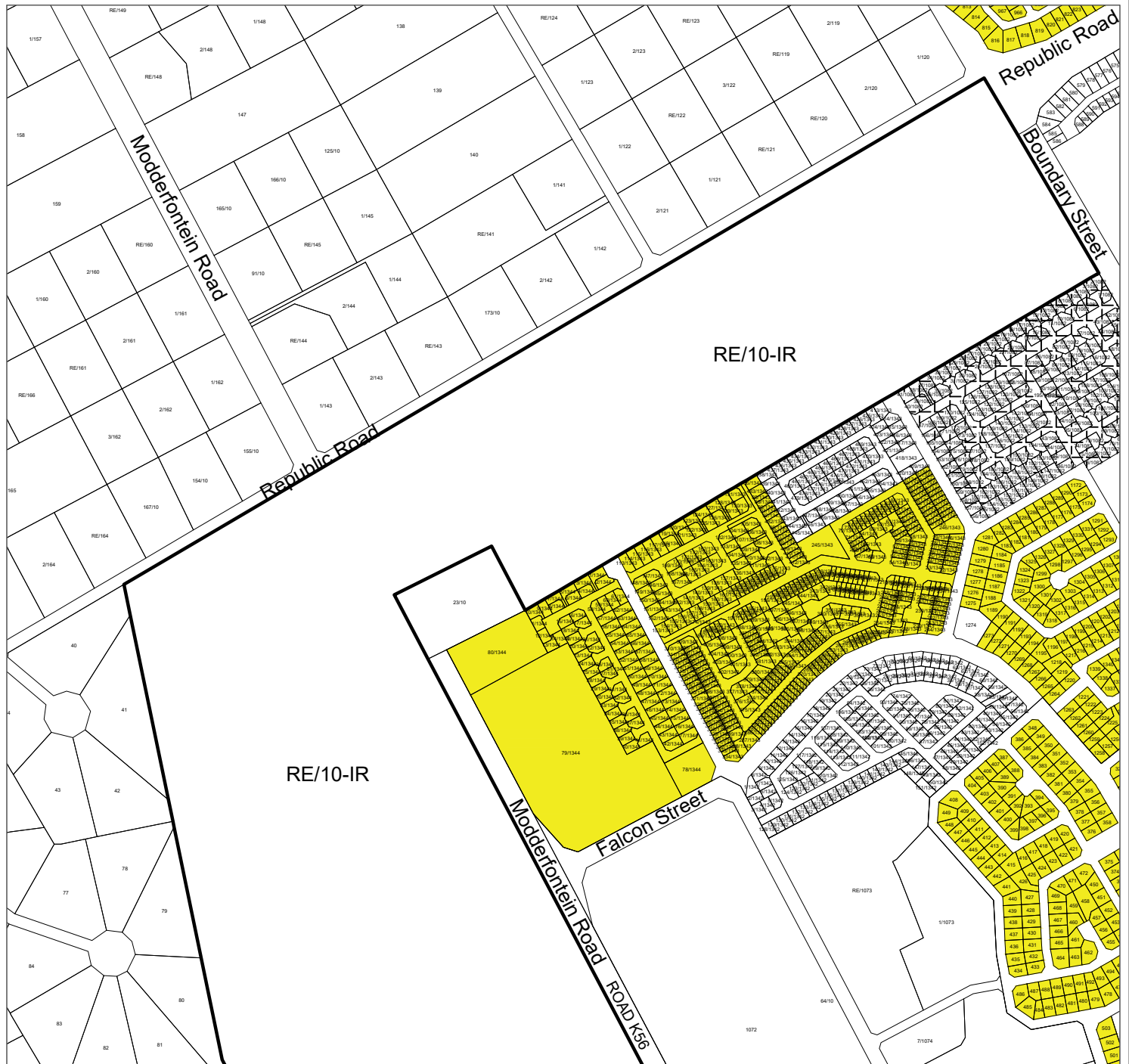
- | | | | |
|--|------------------|---|---------------|
|  | The Site |  | Educational |
|  | Existing Streets |  | Residential 1 |
|  | Agriculture |  | Special |
|  | Business 1 | | |



Scale 1:8000

ZONING DENSITY PLAN

Remaining Extent of the farm Allandale 10-IR



-  The Site
-  Existing Streets
-  Erf

Plan 1 of 2

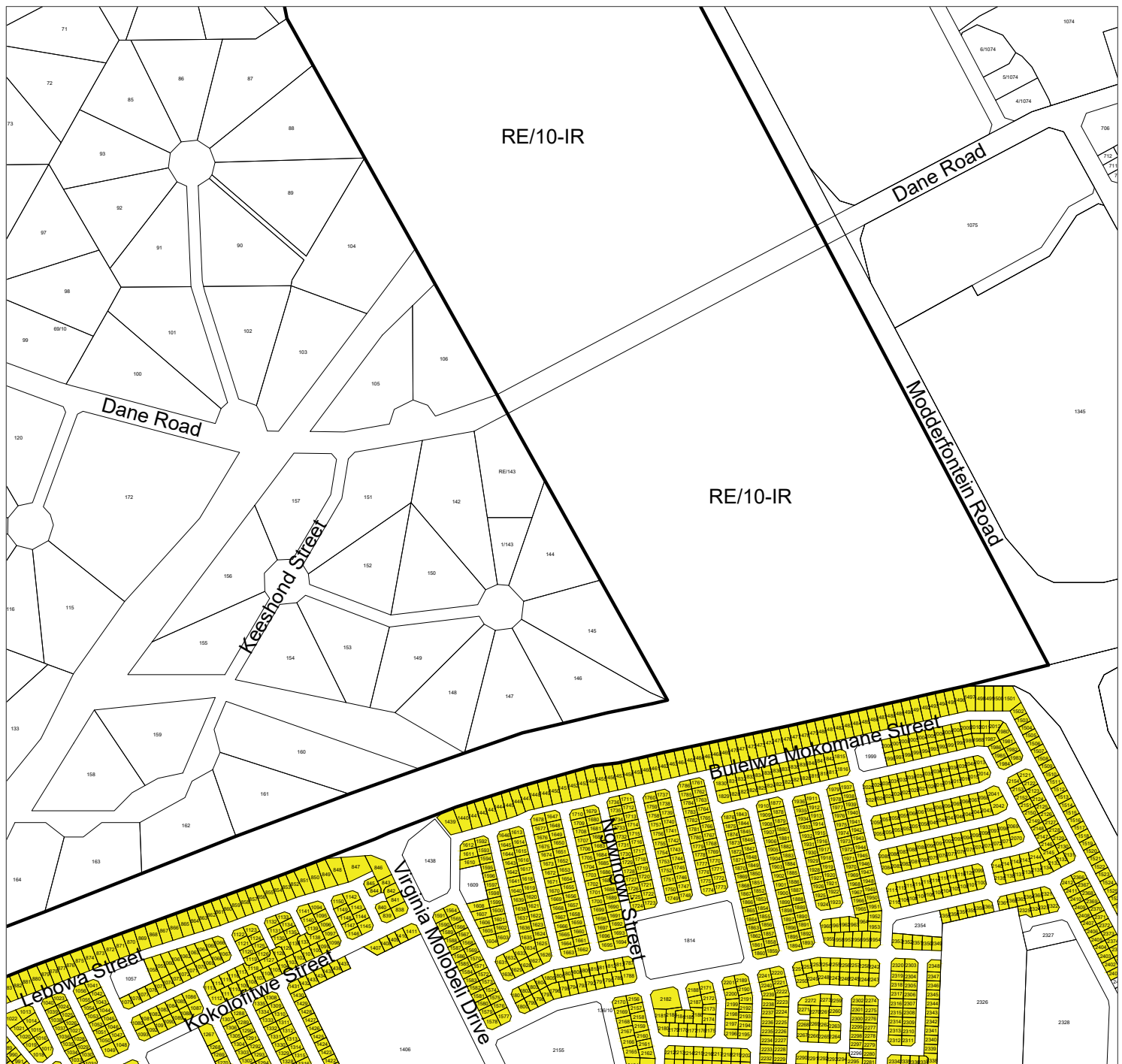


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ZONING DENSITY PLAN

Remaining Extent of the farm Allandale 10-IR



Plan 2 of 2

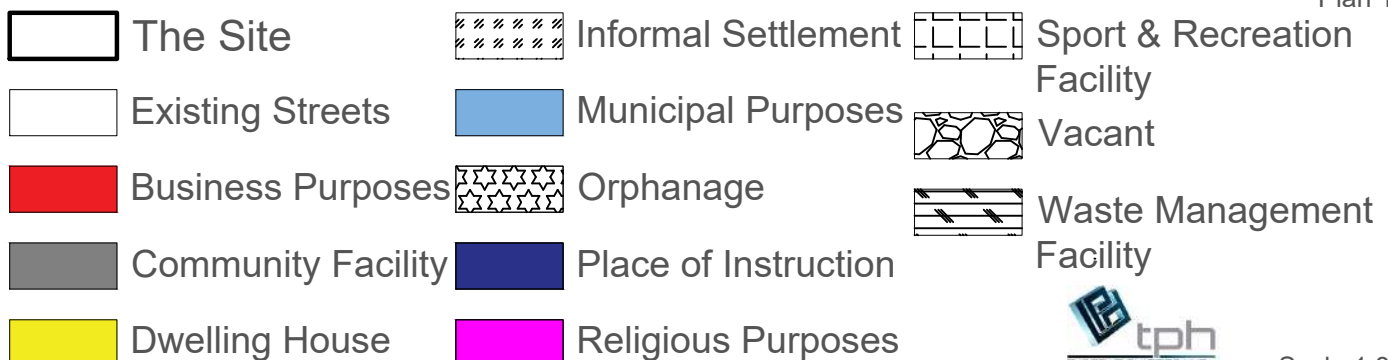
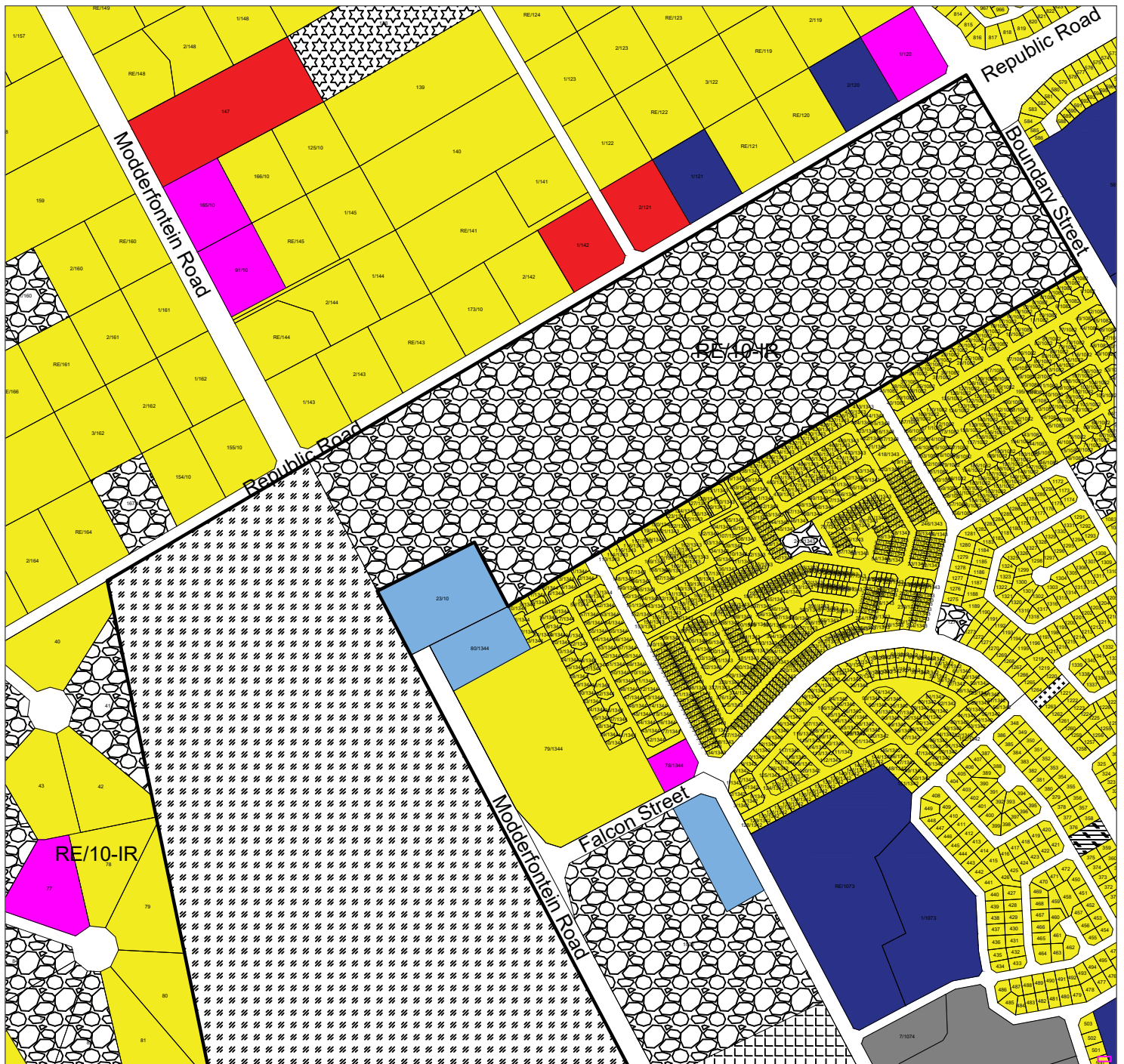
-  The Site
-  Existing Streets
-  Erf



Scale 1:8000

LAND USE PLAN

Remaining Extent of the farm Allandale 10-IR

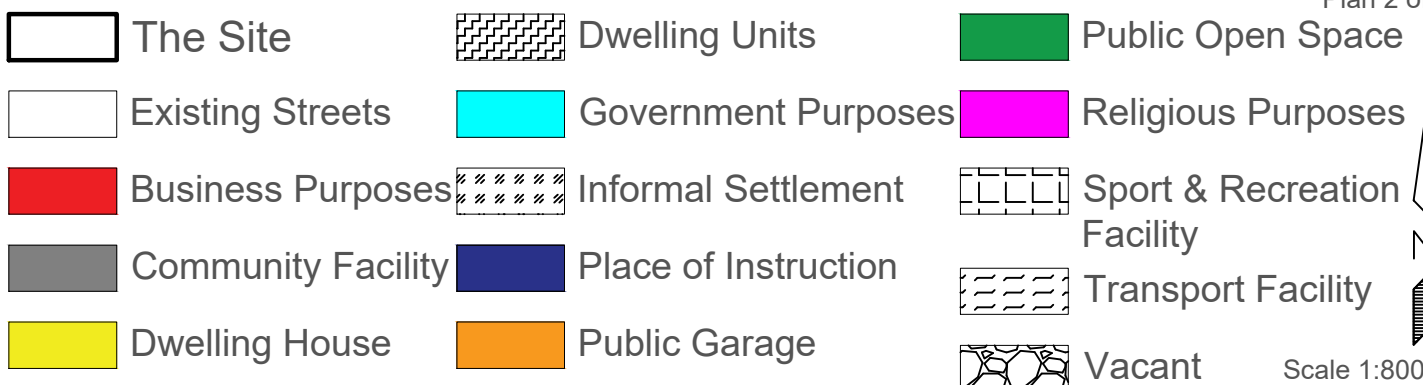
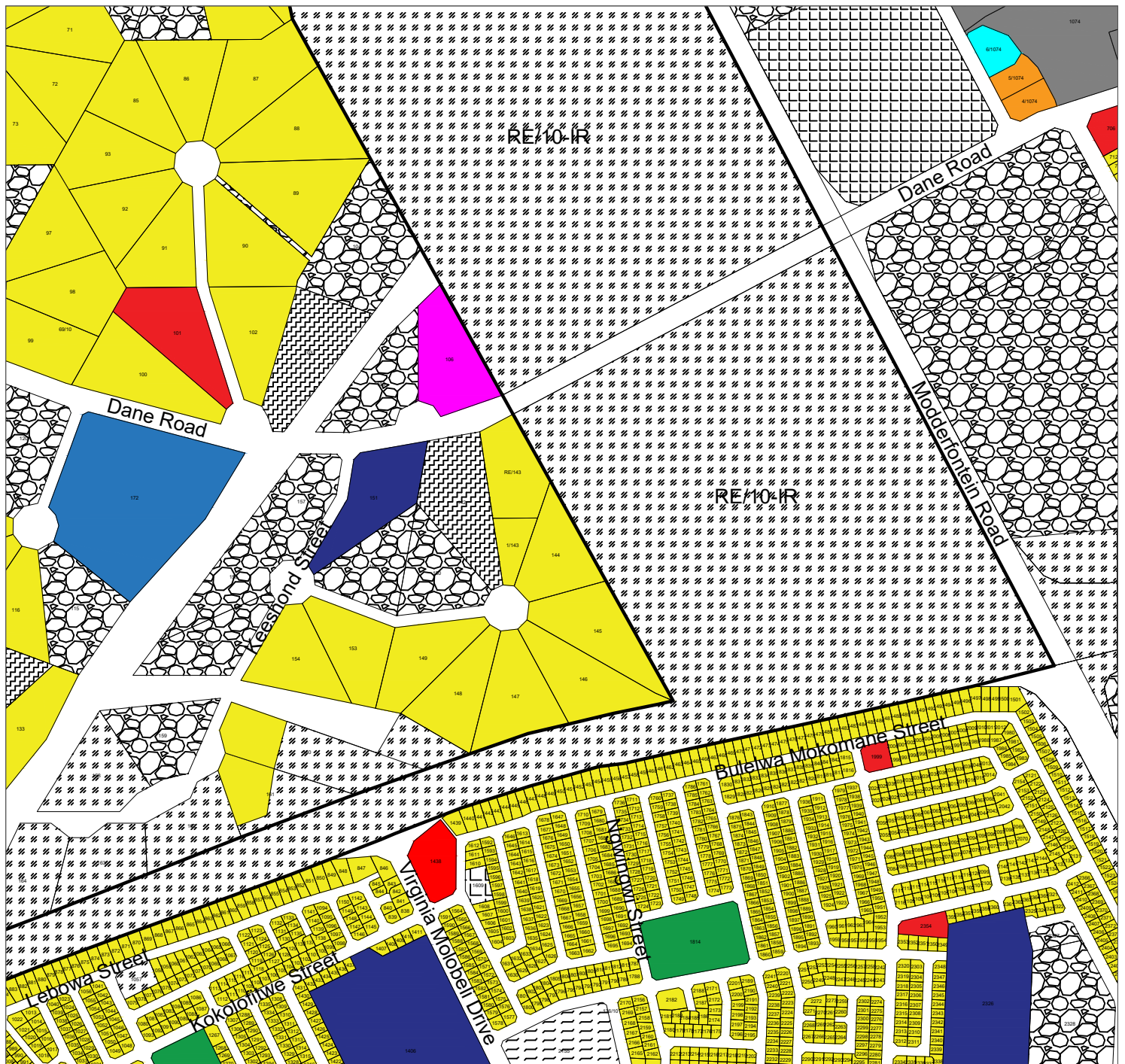


Plan 1 of 2



LAND USE PLAN

Remaining Extent of the farm Allandale 10-IR



Plan 2 of 2



Scale 1:8000

07 SEPTEMBER 2026



YOUR REF: 20-07-6980
OUR REF: TPH26727

Tel: (012) 809 2229
E-mail: bea@tph.co.za

PO Box 11437
Silver Lakes
0054

Tijger Vallei Office Park
Block 9, 1st Floor
78 Pony Street
Silver Lakes
0054

**CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY
THE EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING
PO BOX 30733
BRAAMFONTEIN
2017**

ATTENTION : JEAN RAMAGOLE

AMENDMENT TO APPLICATION IN TERMS OF SECTION 26 OF THE CITY OF JOHANNESBURG MUNICIPAL PLANNING BY-LAW, 2016: REMAINING EXTENT OF THE FARM ALLANDALE 10 - IR TO BE KNOWN AS RABIE RIDGE EXTENSION 9

With reference to the aforementioned application.

Our office has received comments from Gauteng Province Environment. Inline with the Environmental Authorisation that was granted 04 March 2024, certain areas/erven were required to be excluded from the 32m buffer zone.

In light of the aforementioned the layout plan required amendments, this has been done. Furthermore the Conditions of Establishment have been updated accordingly.

Attached hereto please see the following:

- Amended layout plan (Plan 2)
- Amended Conditions of Establishment

Trusting you find this in order.

Kind regards,

**B.E. FLETCHER (PR. PLN A/1202/2001)
THE TOWN PLANNING HUB CC**



Name, surname and professional registration number

STATEMENT OF THE CONDITIONS UNDER WHICH THE APPLICATION MADE BY GAUTENG PROVINCIAL GOVERNMENT (HEREINAFTER REFERRED TO AS THE TOWNSHIP OWNER) IN TERMS OF THE PROVISIONS OF PART 3 OF CHAPTER 5 OF THE CITY OF JOHANNESBURG MUNICIPAL PLANNING BY-LAW, 2016 (HEREINAFTER REFERRED TO AS THE BY-LAW), FOR THE ESTABLISHMENT OF A TOWNSHIP ON THE REMAINING EXTENT OF THE FARM ALLANDALE 10, REGISTRATION DIVISION I.R., GAUTENG PROVINCE, HAS BEEN APPROVED

1. CONDITIONS TO BE COMPLIED WITH PRIOR TO THE OPENING OF THE TOWNSHIP REGISTER AND THE DECLARATION OF THE TOWNSHIP AS AN APPROVED TOWNSHIP.

(1) CANCELLATION OF EXISTING CONDITIONS OF TITLE

The township owner shall at its own costs, cause the following restrictive conditions and/or servitudes to be cancelled or the township area to be freed therefrom:

None

(2) REGISTRATION OF SERVITUDES

The township owner shall at its own costs, cause the following servitudes to be registered to the satisfaction of the City of Johannesburg Metropolitan Municipality:

(3) CANCELLATION OF SERVITUDES

The township owner shall, at its own costs cause the following servitudes to be cancelled:

None

(4) GENERAL

- (a) The local authority shall, after approval of the General Plan, make arrangements with Corporate Geo-Informatics (CGIS) for the allocation of street numbers to the newly created erven in the township.
- (b) A satisfactory geo-technical report (in triplicate) shall be submitted to the local authority and the Amendment Scheme shall not be considered/approved by the local authority until such time as the comments on the said report have been obtained and included in the mentioned Amendment Scheme.
- (c) The 1:100 year floodline certification, duly signed by a professional engineer, in respect of the property on which the township will be established, shall be obtained and indicated on the layout plan, if applicable.
- (d) The township owner shall submit acceptable proof that all outline scheme reports have been submitted to the Municipal Entities (Johannesburg Water and Johannesburg Roads Agency).
- (e) Authorisation/exemption to establish the township in terms of the National Environmental Management Act (No 107 of 1998) shall be obtained (or re-obtained) from the Department of Agriculture and Rural Development and shall be submitted to the local authority.
- (f) The comments of the South African National Roads Agency Limited on the establishment of the township, shall be obtained /re-obtained and shall be submitted to the local authority.

- (g) The comments of the Department: Mineral Resources on the establishment of the township shall be obtained/re-obtained and shall be submitted to the local authority.
- (h) The comments of the Department of Roads and Transport (Gauteng Provincial Government) on the establishment of the township, shall be obtained/re-obtained and shall be submitted to the local authority.
- (i) The township owner shall obtain and submit a certificate from City Power Johannesburg that electricity supply to the township, is available. Provided that if supply is not available and the township has been approved by the local authority 5 years or more than 5 years ago, a letter from City Power shall be submitted confirming that supply is not available.
- (j) The township owner shall, after approval of the General Plan of the township, submit the relevant Amendment Scheme to the local authority for approval, in order that it can be published simultaneously with the declaration of the township as an approved township.
- (k) The township owner shall comply with the provisions of sections 28(5), (9), (10) and (11) of the By-Law.

2. CONDITIONS OF ESTABLISHMENT.

(1) NAME

The name of the township is **Rabie Ridge Extension 9**.

(2) DESIGN

The township consists of erven and roads as indicated on layout plan RRX9/2.

(3) DESIGN AND PROVISION OF ENGINEERING SERVICES IN AND FOR THE TOWNSHIP

The township owner shall, to the satisfaction of the local authority, make the necessary arrangements for the design and provision of all engineering services of which the local authority is the supplier.

(4) GAUTENG PROVINCIAL GOVERNMENT (DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT)

Should the development of the township not been commenced with before the application to establish the township, shall be resubmitted to the Department of Agriculture and Rural Development for exemption/authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended.

(5) GAUTENG PROVINCIAL GOVERNMENT (DEPARTMENT OF ROADS AND TRANSPORT)

- (a) The township owner shall, before or during development of the township, erect a physical barrier which is in compliance with the requirements of the said Department along the lines of no access as indicated on the approved layout plan of the township. The erection of such physical barrier and the maintenance thereof shall be done to the satisfaction of the said Department.
- (b) The township owner shall comply with the conditions of the Department as set out in the Department's letter dated

(6) NATIONAL GOVERNMENT (DEPARTMENT: MINERAL RESOURCES)

Should the development of the township not been completed before the application to establish the township, shall be resubmitted to the Department : Mineral Resources for reconsideration.

(7) ACCESS

(a) Access to or egress from the township shall be provided to the satisfaction of the local authority and/or Johannesburg Roads Agency (Pty) Ltd and/or the Department of Roads and Transport.

(b) No access to or egress from the township shall be permitted via the line/lines of no access as indicated on the approved layout plan of the township.

(8) ACCEPTANCE AND DISPOSAL OF STORMWATER DRAINAGE

The township owner shall arrange for the stormwater drainage of the township to fit in with that of the adjacent road/roads and all stormwater running off or being diverted from the road/roads shall be received and disposed of.

(9) REFUSE REMOVAL

The township owner shall provide sufficient refuse collection points in the township and shall make arrangements to the satisfaction of the local authority for the removal of all refuse.

(10) REMOVAL OR REPLACEMENT OF EXISTING SERVICES

If, by reason of the establishment of the township, it should be necessary to remove or replace any existing municipal, TELKOM and/or ESKOM services, the cost of such removal or replacement shall be borne by the township owner.

(11) DEMOLITION OF BUILDINGS AND STRUCTURES

The township owner shall at its own costs cause all existing buildings and structures situated within the building line reserves, side spaces or over common boundaries to be demolished to the satisfaction of the local authority, when requested thereto by the local authority.

(12) OBLIGATIONS WITH REGARD TO THE CONSTRUCTION AND INSTALLATION OF ENGINEERING SERVICES AND RESTRICTIONS REGARDING THE TRANSFER OF ERVEN

(a) The township owner shall, after compliance with clause 2.(3) above, at its own costs and to the satisfaction of the local authority, construct and install all engineering services including the internal roads and the stormwater reticulation, within the boundaries of the township. Erven and/or units in the township may not be transferred into the name of a purchaser, prior to the local authority certifying to the Registrar of Deeds that these engineering services had been constructed and installed.

(b) The township owner shall fulfil its obligations in respect of the installation of electricity, water and sanitary services as well as the construction of roads and stormwater drainage and the installation of systems therefor, as agreed between the township owner and the local authority in terms of clause 2.(3) above. Erven and/or units in the township, may not be transferred into the name of a purchaser, prior to the local authority certifying to the Registrar of Deeds that sufficient guarantees/cash

contributions in respect of the engineering services have been submitted or paid to the said local authority.

(13) **OBLIGATIONS WITH REGARD TO THE PROTECTION OF ENGINEERING SERVICES**

The township owner shall, at its costs and to the satisfaction of the local authority, survey and register all servitudes required to protect the constructed/installed services. Erven and/or units in the township may not be or transferred into the name of a purchaser, prior to the local authority certifying to the Registrar of Deeds that these engineering services had been or will be protected to the satisfaction of the local authority.

3. DISPOSAL OF EXISTING CONDITIONS OF TITLE.

All erven shall be made subject to existing conditions and servitudes, if any:

(1) Excluding the following conditions, due to location;

“D. A portion measuring approximately 1859 square meters of the withinmentioned Property has been expropriated by the Community Development Board in terms of Section 2 Act 3/66.”

(2) Excluding the following conditions due to expropriation;

“E. A portion measuring 7, 9343 hectares of the within mentioned property has been expropriated by the Transvaal Province Administrator vide Notice Expropriation EX588/93.”

4. CONDITIONS OF TITLE.

A Conditions of Title imposed in favour of the local authority in terms of the provisions of Chapter 5 Part 3 of the By-law.

(1) **ALL ERVEN**

(a) Each erf is subject to a servitude, 2m wide, in favour of the local authority, for sewerage and other municipal purposes, along any two boundaries other than a street boundary and in the case of a panhandle erf, an additional servitude for municipal purposes 2m wide across the access portion of the erf, if and when required by the local authority: Provided that the local authority may dispense with any such servitude.

(b) No building or other structure shall be erected within the aforesaid servitude area and no large rooted trees shall be planted within the area of such servitude or within 2m thereof.

(c) The local authority shall be entitled to deposit temporarily on the land adjoining the aforesaid servitude such material as may be excavated by it during the process of the construction, maintenance or removal of such sewerage mains and other works as it, in its discretion may deem necessary and shall further be entitled to reasonable access to the said land for the aforesaid purpose subject to any damage done during the process of the construction, maintenance or removal of such sewerage mains and other works being made good by the local authority.

5. CONDITIONS TO BE INCORPORATED IN THE TOWN PLANNING SCHEME IN TERMS OF SECTION 54 OF THE BY-LAW, IN ADDITION TO THE PROVISIONS OF THE CITY OF JOHANNESBURG LAND USE SCHEME, 2018 (AS AMENDED 2025).

(1) ERVEN 3773-3779, 3797-3800, 3809-3813

- (a) Use Zone 3: "Residential 3"
- (b) Primary Rights: Dwelling units, residential buildings (excluding hotels)
- (c) Secondary uses: Uses in Column (3)
- (d) Uses not permitted: Uses in Column (4)
- (e) Height: As per Scheme (5 storeys)
- (f) Coverage: As per Scheme (80%)
- (g) F.S.R: As per Scheme (2.4)
- (h) Density: 200 dwelling units per hectare
- (i) Parking: As per Scheme
- (j) Building Lines: As per Scheme
Erven fronting Roads K111 and K56 and K60: 16m;
provided that the building line may be relaxed subject to a
formal request/application being approved by the Gauteng
Provincial Department of Roads & Transport.
- (k) General:
 - 1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
 - 2. The erven shall be landscaped and maintained to the satisfaction of the Council.
 - 3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.
 - 4. Ingress and egress from the site shall be to the satisfaction of the local authority.
 - 5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(2) ERVEN 3780, 3782-3783, 3801-3802, 3804, 3821-3822, 2824-3825, 3830, 3834

- (a) Use Zone 3: "Residential 3"
- (b) Primary Rights: Dwelling units, residential buildings (excluding hotels)
- (c) Secondary uses: Uses in Column (3)
- (d) Uses not permitted: Uses in Column (4)

- (e) Height: As per Scheme (4 storeys)
- (f) Coverage: As per Scheme (60%)
- (g) F.S.R: As per Scheme (2.1)
- (h) Density: 120 dwelling units per hectare
- (i) Parking: As per Scheme
- (j) Building Lines: As per Scheme
Erven fronting Roads K111 and K56 and K60: 16m; provided that the building line may be relaxed subject to a formal request/application being approved by the Gauteng Provincial Department of Roads & Transport.
- (k) General:
 1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
 2. The erven shall be landscaped and maintained to the satisfaction of the Council.
 3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.
 4. Ingress and egress from the site shall be to the satisfaction of the local authority.
 5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(3) ERVEN 3785-3789, 3818-3820, 3828-3829

- (a) Use Zone 3: "Residential 3"
- (b) Primary Rights: Dwelling units, residential buildings (excluding hotels)
- (c) Secondary uses: Uses in Column (3)
- (d) Uses not permitted: Uses in Column (4)
- (e) Height: As per Scheme (3 storeys)
- (f) Coverage: As per Scheme (60%)
- (g) F.S.R: As per Scheme (1.8)
- (h) Density: 100 dwelling units per hectare
- (i) Parking: As per Scheme

(j) Building Lines: As per Scheme

(k) General:

1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
2. The erven shall be landscaped and maintained to the satisfaction of the Council.
3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.
4. Ingress and egress from the site shall be to the satisfaction of the local authority.
5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(4) ERVEN 3790-3793, 3795, 3815-3817

(a) Use Zone 3: "Residential 3"

(b) Primary Rights: Dwelling units, residential buildings (excluding hotels)

(c) Secondary uses: Uses in Column (3)

(d) Uses not permitted: Uses in Column (4)

(e) Height: As per Scheme (2 storeys)

(f) Coverage: As per Scheme (60%)

(g) F.S.R: As per Scheme (1.2)

(h) Density: 80 dwelling units per hectare

(i) Parking: As per Scheme

(j) Building Lines: As per Scheme

(k) General:

1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
2. The erven shall be landscaped and maintained to the satisfaction of the Council.
3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.

4. Ingress and egress from the site shall be to the satisfaction of the local authority.
5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(5) ERF 3831

- | | | |
|-----|---------------------|---|
| (a) | Use Zone 6: | “Business 1” |
| (b) | Primary Rights: | Business purposes, shops, residential buildings, place of instruction, social halls, restaurant, care sales lot, moto showrooms, showrooms, offices, public or private parking area, institutions, religious purposes, dwelling units |
| (c) | Secondary uses: | Uses in Column (3) |
| (d) | Uses not permitted: | Uses in Column (4) |
| (e) | Height: | As per Scheme (2 storeys) |
| (f) | Coverage: | As per Scheme (60%) |
| (g) | F.S.R: | As per Scheme (0.5) |
| (h) | Density: | Not applicable |
| (i) | Parking: | 3 parking bays per 100m ² |
| (j) | Building Lines: | As per Scheme
Roads K111 and K56: 16m; provided that the building line may be relaxed subject to a formal request/application being approved by the Gauteng Provincial Department of Roads & Transport. |
- (k) General:
1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
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 3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.
 4. Ingress and egress from the site shall be to the satisfaction of the local authority.
 5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(6) ERF 3832

- (a) Use Zone 16: "Institutional"
- (b) Primary Rights: Institutions, place of instruction, social halls, religious purposes
- (c) Secondary uses: Uses in Column (3)
- (d) Uses not permitted: Uses in Column (4)
- (e) Height: As per Scheme (2 storeys)
- (f) Coverage: As per Scheme (70%)
- (g) F.S.R: As per Scheme (1.0)
- (h) Density: Not applicable
- (i) Parking: As per Scheme
- (j) Building Lines: As per Scheme
Erven fronting Roads K111 and K56: 16m; provided that the building line may be relaxed subject to a formal request/application being approved by the Gauteng Provincial Department of Roads & Transport.
- (k) General:
 - 1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
 - 2. The erven shall be landscaped and maintained to the satisfaction of the Council.
 - 3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.
 - 4. Ingress and egress from the site shall be to the satisfaction of the local authority.
 - 5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(7) ERF 3796

- (a) Use Zone 17: "Educational"
- (b) Primary Rights: Institutions, place of instruction, social halls, religious purposes
- (c) Secondary uses: Uses in Column (3)
- (d) Uses not permitted: Uses in Column (4)

- (e) Height: As per Scheme (2 storeys)
- (f) Coverage: As per Scheme (70%)
- (g) F.S.R: As per Scheme (1.0)
- (h) Density: Not applicable
- (i) Parking: As per Scheme
- (j) Building Lines: As per Scheme
- (k) General:

1. A site development plan, on a scale of 1:200 or such other scale as approved by the Council shall be submitted to the Council for approval before submission of any building plans. No building may be erected prior to the approval of such development plan by the Council and the entire development of the Council, the plan may be amended for time to time.
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(8) ERVEN 3784, 3805, 3807, 3808

- (a) Use Zone 25: "Public Open Space"
- (b) Primary Rights: Public open space, Conservation, wetland
- (c) Secondary uses: Uses in Column (3)
- (d) Uses not permitted: Uses in Column (4)
- (e) Height: Not applicable
- (f) Coverage: Not applicable
- (g) F.S.R: Not applicable
- (h) Density: Not applicable
- (i) Parking: As per Scheme
- (j) Building Lines: As per Scheme
Erven fronting Roads K111 and K56: 16m; provided that the building line may be relaxed subject to a formal request/application being approved by the Gauteng

Provincial Department of Roads & Transport.

(k) General:

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(9) ERVEN 3781, 3803, 3814, 3823, 3826, 3827, 3833

- | | | |
|-----|---------------------|--|
| (a) | Use Zone 25: | "Public Open Space" |
| (b) | Primary Rights: | Public Open Space |
| (c) | Secondary uses: | Uses in Column (3) |
| (d) | Uses not permitted: | Uses in Column (4) |
| (e) | Height: | Not applicable |
| (f) | Coverage: | Not applicable |
| (g) | F.S.R: | Not applicable |
| (h) | Density: | Not applicable |
| (i) | Parking: | As per Scheme |
| (j) | Building Lines: | As per Scheme
Erven fronting Roads K60: 16m; provided that the building line may be relaxed subject to a formal request/application being approved by the Gauteng Provincial Department of Roads & Transport. |

(k) General:

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3. No goods or materials of whatsoever nature shall be dumped placed or stored outside any buildings.
4. Ingress and egress from the site shall be to the satisfaction of the local authority.
5. The activities on the premises shall in no way be offensive, injurious, or a danger to health, or cause a nuisance, be it by noise, sight or smell.

(10) ERVEN 3794, 3806

- | | | |
|-----|---------------------|--|
| (a) | Use Zone 16: | "Municipal" |
| (b) | Primary Rights: | Municipal purposes, transport facilities |
| (c) | Secondary uses: | Uses in Column (3) |
| (d) | Uses not permitted: | Uses in Column (4) |
| (e) | Height: | As per Scheme (2 storeys) |
| (f) | Coverage: | As per Scheme (60%) |
| (g) | F.S.R: | As per Scheme (1.0) |
| (h) | Density: | Not applicable |
| (i) | Parking: | As per Scheme |
| (j) | Building Lines: | As per Scheme |
| (k) | General: | |

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ENGINEERING GEOLOGICAL INVESTIGATION
FOR
RABIE RIDGE EXTENSION 3, MIDRAND

Undertaken for

NENFU ALLANDALE DEVELOPMENTS (PTY) LTD

REPORT NO: 3480-001

JULY 1996



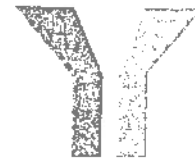
YATES CONSULTING CC
ENGINEERING GEOLOGISTS

ENGINEERING GEOLOGICAL INVESTIGATION UNDERTAKEN FOR RABIE RIDGE EXTENSION 3, MIDRAND

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ENGINEERING GEOLOGY
GEOTECHNICAL ENGINEERING
ENVIRONMENTAL GEOHYDROLOGY

ENGINEERING GEOLOGICAL INVESTIGATION UNDERTAKEN FOR RABIE RIDGE EXTENSION 3, MIDRAND

1 INTRODUCTION

At the request of Mr SC Wu of Messrs Ninfu Allandale Development (Pty.) Ltd, Yates Consulting cc undertook engineering geological investigations for proposed township application purposes on a Portion of the Farm Allandale 110 IR, due north of the existing suburb of Rabie Ridge.

The objectives of the investigation may be summarized as follows: -

- a) to determine the relevant engineering properties of the underlying soil and rock present on the site.
- b) to give general foundation recommendations for the proposed township development on the site.
- c) to comment on the excavation characteristics and possible uses of the materials underlying the site for the use in layerworks in paving and roads;
- d) to comment on site water management aspects, particularly pertaining to shallow groundwater or seepage.

The investigation has been carried out in terms of the requirements for a township geological investigations in non-dolomitic areas for proclamation purposes as laid down by the Geological Survey and Provincial Administration in terms of the Town Planning and Ordinance Act of 1986.

This report, together with the accompanying Geotechnical Planning and Soils Map (Figure 1 - Appendix A), summarizes the finding of the investigation. The Map shows the suitability of the site for the development of residential structures, taking into account inter alia the following: -

- collapsible soils
 - shallow groundwater or seepage
 - active soils
 - highly compressible soils
 - erodability of soils
 - difficulty of excavation to 1,5 m depth
 - steep slopes
 - areas subject to flooding
- 

The accompanying map shows the positions of the test pits. The classification used on this map is based on that proposed by Brink, Partridge and Williams entitled "Appropriate methods of Engineering Geological evaluation for rapid urbanization in developing countries".

2 DESCRIPTION OF THE SITE

The site investigated is situated due north of the existing suburb of Rabie Ridge; it comprises a portion of the Remainder of the Farm Allandale 110 IR in Midrand, and is approximately 31.1 hectares in extent.

The site comprises open grassveld and is bounded by Modderfontein road in the west, Republic road in the north and extends to approximately 100 m east of Boshoff road in the east; the area immediately south of the site is in the process of being developed, while the area east of Boshoff road has been occupied by squatters.

The site is underlain by Halfway House granitic rocks and in all instances the bedrock granite is overlain by transported, pedogenic and residual soils.

4

3 SUMMARY OF CONCLUSIONS

From the results of the investigations carried out the area has been subdivided into two zones as indicated on Figure 1. With reference to Table 1 (an index table for Figure 1 together with a summary of recommendations), it should be noted that the subscript symbol (Parameter) indicates the type of problem envisaged, while the class indicates the severity of the problem. Where more than one class of problem occurs in a particular area the most severe is stated first with less severe categories being suffixed to the end. Thus an area designated as $2_B 1_A$ has a permanent or seasonal water table within 1.5m of the surface, in addition to which a surficial horizon (<750mm thick) of collapsible material is present also.

Based on the investigation conducted, the following conclusions have been drawn:

- ① A generalized soil profile for the site consists of hillwash, overlying pebble marker gravels, overlying nodular ferricrete (locally cemented to hardpan ferricrete), which in turn overlies dense residual granite.
- ② Shallow groundwater seepage, representing a perched water table, has developed on the very dense hardpan ferricrete present within 1.5 m of the surface. It is thus recommended that damp proofing measures are incorporated into the design of all structures.
- ③ In Zone $2_B 1_{AC}$ (Figure 1), no foundation problems for lightly loaded (< 100kPa) conventional single and double storey structures are foreseen if foundations are located on the medium dense pebble marker gravels or nodular ferricrete or hardpan ferricrete present throughout this zone; founding depths will vary between 0.3 and 0.7 m below natural ground level. In Zone 2_A (Figure 1), foundations should be placed on the medium dense pebble marker gravels present at approximately 1.40 mbgl; alternatively, foundation trenches should be excavated to a depth and breadth of at least 1.5 B (B = foundation width), before compacting the base of the trench and backfilling the excavated material in controlled layers to the desired founding level; backfilled layers should be a minimum of 150 mm in thickness and must be compacted to at least 93% Modified AASHTO density. For small units in this zone it may be more practical to remove all material from the plan area of the structure to a depth of at least 1.5 B (B = foundation width) before returning the excavated material in controlled layers at

TABLE 1 : Geotechnical Classification for township development and summary of recommendations

PARAMETER		CLASS	SOIL PROBLEM	RECOMMENDATION
A.	Collapsible soil	1	Surface collapsible horizon <750 mm thick	Excavate foundation trenches down to competent material below collapsible horizon or to a depth and breadth of 1.5 B (B = foundation width). The base of the trench should be compacted before either founding at this depth or returning the excavated material in controlled layers ¹ to the desired founding level. Material below floor should be removed to at least 0.45 m before being returned in controlled layers layers ¹ . Landscaping around structures should be implemented to ensure ponding of water in the vicinity of foundations is prevented.
		2	Collapsible horizon >750 mm thick	
B.	Seepage	2	Permanent or seasonal water table within 1,5 m of surface	Damp proofing measure are recommended beneath all structures
C.	Difficulty of excavation to 1,5 m depth	1	< 10 % rock or hardpan pebbles	< 10% intermediate excavation (SARS 1200) is anticipated necessitating the use of pneumatic tools for excavation; the remainder of the site is classified as soft excavation (SARS 1200) .
NOTES :				
1. Excavated material should be returned in controlled layers not exceeding 150 mm in thickness and compacted to at least 93% Modified AASHTO density.				



above. In both zones it is recommended that the hillwash material beneath floors be removed to a depth of at least 0.45 m before being returned in controlled layers as above.

- The site in general is classified as soft excavation in terms of SABS 1200, although very dense hardpan ferricrete is present at relatively shallow depth (<1.50 mbgl) locally (less than 10% of the area); these localised areas are classified as intermediate excavation in terms of SABS 1200 and will require pneumatic tools for excavation.
- The hillwash and residual granite materials are suitable for use as general fill and for the selected layers in roads. The nodular ferricrete and hardpan ferricrete are potentially suitable for use as subgrade material in accordance with TMH 14, but soil parameters will need to be verified through laboratory testing.
- Large stock piles of soil and domestic wastes (>2 m in height) have been dumped in the vicinity of Test Pit 7 and 8 and will need to be removed to spoil before this section of the site can be utilized.

It should be noted that the investigations undertaken were general in nature and are intended for township planning purposes only. Insufficient information has been obtained to permit specific founding recommendations to be made and individual investigations must be undertaken once the design details of each of the structures are known.

4 RECOMMENDATIONS

4.1 Foundations

Collapsible Soils (Subscript A)

The subscript A on the Geotechnical Planning and Soil Map indicates the presence of potentially collapsible hillwash soils. The precautionary treatment is not usually costly; for lightly loaded residential structures such treatment will involve excavating foundation trenches down to competent material, e.g. the nodular ferricrete or hardpan ferricrete of at least medium dense consistency or (for Class 2) to a depth and breadth of 1.5 times the foundation footing width. The base of the foundation trench should be compacted prior to either founding



at this depth or backfilling the excavated material in compacted layers to the desired founding level; backfill layers should be a maximum of 150mm thick and compacted to at least 93% Modified AASHTO density; the hillwash material beneath all floor slabs should be removed to a depth of at least 0.45 m, and replaced in controlled layers as above. For small units it may be more practical to remove the collapsible material from the entire plan area of the structure before returning it in controlled layers as above.

Landscaping around all structures is recommended to ensure that ponding of surface water does not occur in the vicinity of foundations.

Seepage (subscript B)

Shallow groundwater seepage was noted during the investigations and is attributed to a perched water table. It is thus recommended that damp proofing measures be incorporated into the design of all structures.

Difficulty of excavation to 1.5m (subscript C)

The site in general is classified as soft excavation in terms of SABS 1200, although the very dense hardpan ferricrete, present at shallow depth (<1.50 mbgl) locally, is classified as intermediate excavation in terms of SABS 1200; this latter material will require the use of pneumatic tools for excavation of service trenches.

4.2 Material Usage

The hillwash material, present throughout the site, compacts well with a maximum dry density of 1999 kg/m^3 at an optimum moisture content of 9.6%; this material classifies as G8 in terms of TRH 14, making it suitable for use as general fill and potential suitable for use in the selected layer of roads. The nodular ferricrete and hardpan ferricrete are both potentially suitable for use as subgrade material, in accordance with TMH 14, but will need to be verified through laboratory testing.

TABLE 2: Summary of basic soil properties

Test Pit No.	Sample Horizon [m]	Material	Unified Class.	Soil composition				Grad. M ed.	Atterberg Limits		LS [%]	Activity	Maximum Dry Density [kg/m ³]	Optimum Moisture Content [%]	CBR @ % Mod. AASHTO density			
				clay [%]	silt [%]	sand [%]	gravel [%]		LL [%]	PI [%]					100	97	95	93
TP 1	0.60	Hillwash	SC/SM	8	21	54	17	1.34	24.8	5.5	2.7	LOW						
TP 1	1.1-2.5	Residual granite	SC/SM	7	31	48	14	1.13	26.1	5.8	2.7	LOW						
TP 5	1.1	Residual granite	SM	8	32	29	31	1.34	34.8	8.4	4.0	LOW						
TP 6	0.9	Hillwash	SC/SM	7	34	51	8	1.02	27.8	6.3	3.3	LOW	1999	9.6	20	17	15	14
TP 7	1.1-2.9	Residual granite	SC	9	29	38	24	1.27	29.9	8.7	4.7	LOW						

5 GEOTECHNICAL EVALUATION

The basic physical properties of the subsoils within the project area are summarized in Table 2.

The results of grading and Atterberg Limits determinations, together with a brief description of the various subsoils present, are summarized below:

5.1 Transported Soils

Hillwash - The hillwash is present throughout the project area and comprises slightly moist, reddish brown, very loose - medium dense, intact, silty sand with scattered fine gravels. The material is generally of the order of 0.2 - 0.7 m thick.

The basic soil properties of the hillwash are as follows:

- the Liquid Limit falls in the range 25 - 28
- a Plasticity Index of approximately 6
- a linear shrinkage of approximately 3 %
- the material classifies in the "SM/SC" category of the Unified Soil Classification
- the hillwash has a low potential expansiveness

Pebble marker - This horizon is present at the intersection of the transported and residual soils and comprises abundant medium and fine gravels, densely packed in a matrix of brown, silty sand that may be locally ferruginous cemented; overall consistency of the material is generally medium dense with a thicknesses of roughly 0.3 m.

Dump material/fill - This material comprises a variety of soil types deposited together with domestic and garden refuse.

5.2 Pedogenic Soils



Nodular ferricrete - This material comprises abundant friable and hard ferruginous concretions, densely packed and locally ferruginous cemented in a silty sand matrix; the overall consistency of the material is medium dense to dense, with an average thickness of 0.4 m; with depth the nodular ferricrete usually grades into hardpan ferricrete.

Hardpan ferricrete - The presence of hardpan ferricrete in the subsoils generally resulted in refusal of the backhoe. The colour of the material is usually yellow-brown mottled and speckled black, while the consistency is usually very dense. The full thickness of this horizon could not always be assessed but is likely to be about 0.3 m.

5.3 Residual Soils

Residual granite - This material was encountered throughout the project area and is present below a mantle of transported and pedogenic soils.

It generally comprises a slightly moist, reddish or yellow-brown, medium dense - dense, intact, clayey or silty sand with numerous fine gravels. The residual granite attains thicknesses greater than 2 m and is usually ferruginised in the horizon immediately underlying the nodular/hardpan ferricrete.

The basic soil properties of the residual granite are as follows:

- the Liquid Limit falls in the range 26 - 35
- the Plasticity Index falls in the range 6 - 9
- the linear shrinkage falls in the range 3 - 5%
- the material classifies in the "SM" or "SC" categories of the Unified Soil Classification
- the residual granite has a low potential expansiveness

5.4 Potentially Expansive Soils

Plotting of the Plasticity Index (whole sample) against clay percentage on a standard Activity diagram for each sample tested, revealed that the transported and residual soils are not expansive.



5.5 Potentially Collapsible Soils

A modified collapse test was undertaken on an "undisturbed" block sample of firm, intact, reddish brown, clayey sand hillwash. The test result reveals that the hillwash is collapsible with 1.5% collapse occurring when soaked under an imposed load of 80kPa. Normal consolidation settlement of 1.1% is possible under a similar load.

The potential differential settlement, i.e. collapse settlement plus $\frac{1}{2}$ normal consolidation settlement that structures could experience if founded on the hillwash without the appropriate precautions being taken, is about 20 mm per metre of hillwash stressed. It is recommended that foundations be placed below this horizon as discussed in Section 4.1 above.

5.6 Potentially Compressible Soils

The hillwash as mentioned above is compressible and normal consolidation settlement of 1.1% is possible under light foundation loads. Engineering solutions to counteract the effects of collapse settlement, will automatically take into account settlements arising from normal consolidation.

The slightly ferruginised clayey sand residual granite, present beneath the hillwash, was subjected to an oedometer test to assess its consolidation properties. The results reveal that the material is over consolidated and settlements for light foundation loads will be less than 2.5mm.

6 SITE INVESTIGATIONS

6.1 Fieldwork

The site investigation was carried out during June 1996 and comprised the excavation of nine test pits excavated with the aid of a Caterpillar 416 tractor-mounted-backhoe on hire from Messrs. Paul Heslop Plant Services. The positions of the test pits are shown on the accompanying map (Figure 1 - Appendix A). Test pits were excavated to refusal or the depth capabilities of the backhoe.

Test pits were logged according to standard procedures. i.e. using the MCCSSO soil classification; detailed soil profile logs are included in Appendix B.

6.2 Sampling

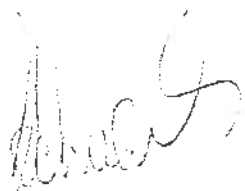
During inspection of the in situ soils two "undisturbed" block sample and three indicator samples, representative of the various subsoils present beneath the site, were taken for laboratory testing purposes. All of the samples were submitted to the laboratories of Messrs Soiltech (Pty.) Ltd for testing according to our instructions.

6.3 Laboratory Testing

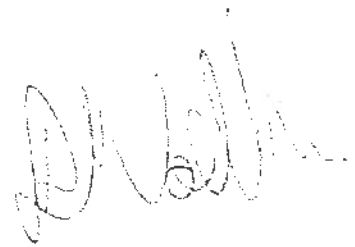
In order to more accurately identify and classify the various subsoils present beneath the site, five samples were subjected to particle size analyses down to 2 μm , together with Atterberg Limits determinations. The results of these tests were used to classify the soils according to the Unified Soil Classification and to assess their potential activity as discussed in Section 5.4 of this report.

The hillwash material was identified as potentially collapsible; a single sample of this material was thus subjected to rapid collapse tests at an imposed load of 80kPa. Furthermore, a bulk sample of this material was subjected to moisture density tests, together with CBR determinations, to assess its compaction characteristics. A sample of the weakly ferruginised residual granite, identified in the field as potentially compressible, was subjected to an oedometer test to assess its consolidation properties.

The results of all these tests are included in Appendix C of this report. while an analysis of the results is made in Section 5.

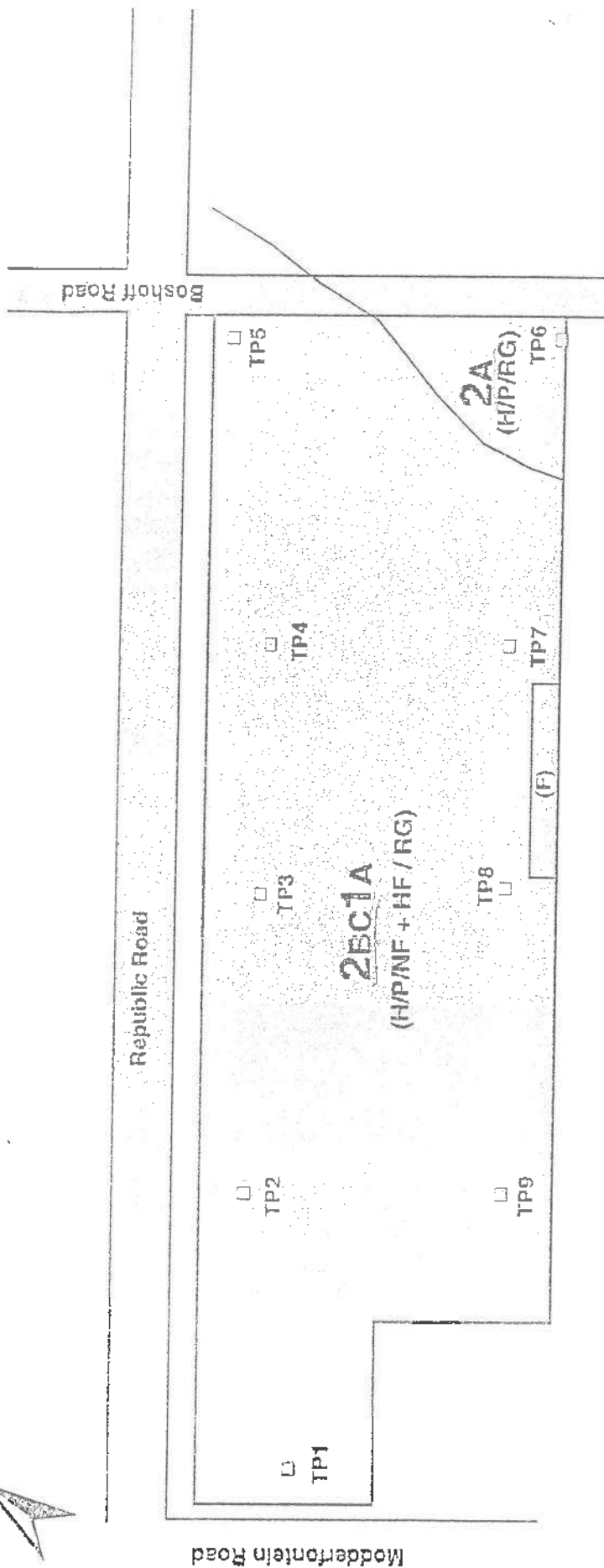


H.J. Schurink, Pr Sci Nat, GDE



DG Walker Pr Sci Nat

APPENDIX A
FIGURE 1



SUBSOIL AND GEOLOGY

- H Hillwash - slightly moist, reddish brown, loose - medium dense intact silty sand with scattered fine gravels
- P Pebble marker - abundant medium and fine gravels, densely packed in a matrix of silty sand with an overall consistency of medium dense
- NF Nodular ferricrete - densely packed ferruginous concretions in a silty sand matrix
- HF Hardpan ferricrete - yellow brown mottled and speckled black and very dense
- F Fill - garden and domestic refuse deposited together with a variety
- RG Residual granite - slightly moist reddish or yellowish brown firm / medium dense - dense intact clayey or silty sand with fine gravels, upper horizons may be ferruginous cemented

LEGEND:

- TP9 Test pit position
- Geotechnical class boundary
- 2EC1A Geotechnical class
- 2A (F) Abbreviated soil profile

Figure 1 : Geotechnical planning and soils map

APPENDIX B
SOIL PROFILES

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O. BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



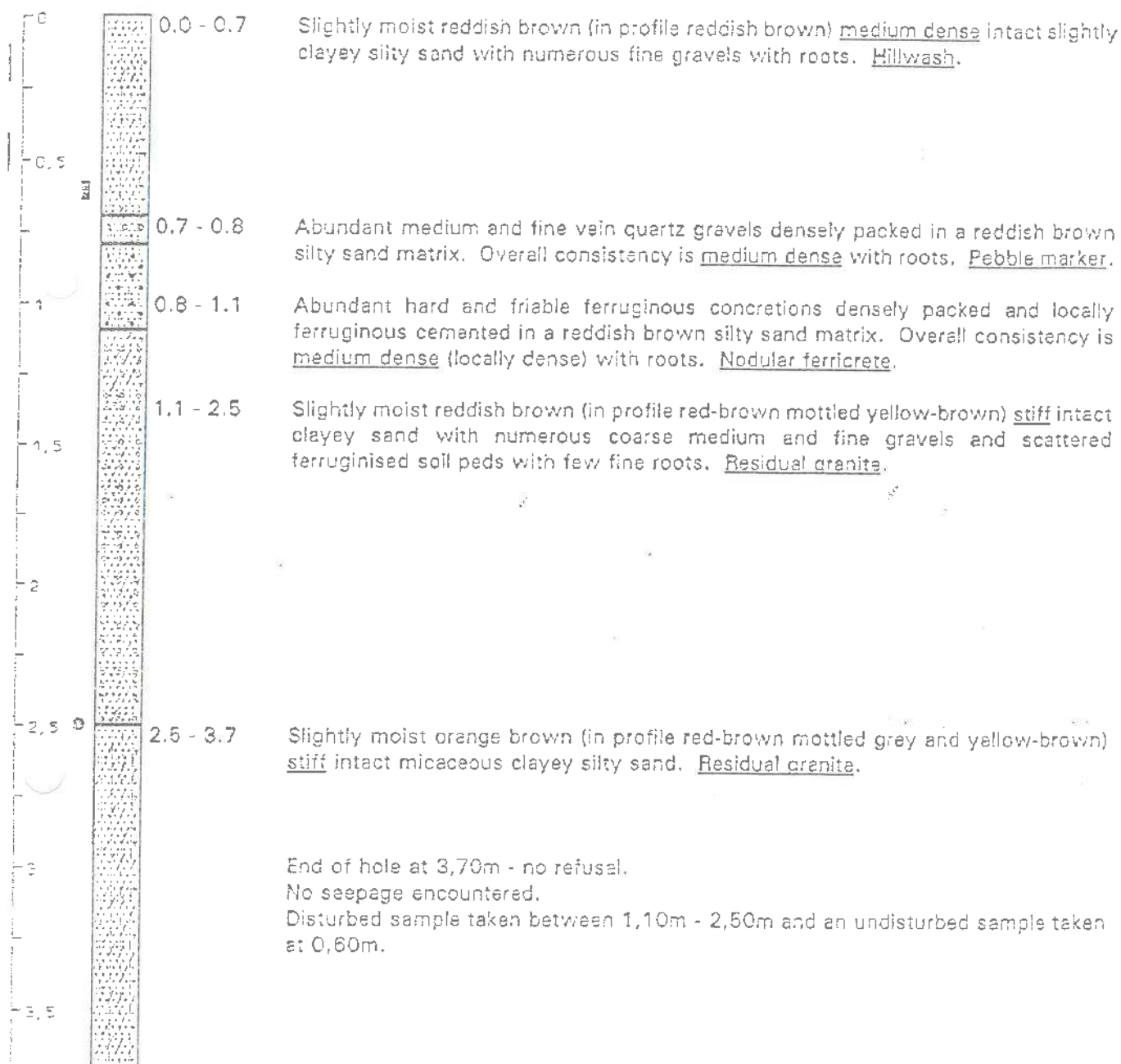
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 83/09392/23

SOIL PROFILE

TEST PIT TP1



DRILLING RIG	: Cat 416 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFIED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Niffo Allendale Dev	JOB NO	: 3490	SHEET NO	: 1 of 5
PROJECT	: Rocio Ridge Extension 3	REFERENCE NO	: 1004200		

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



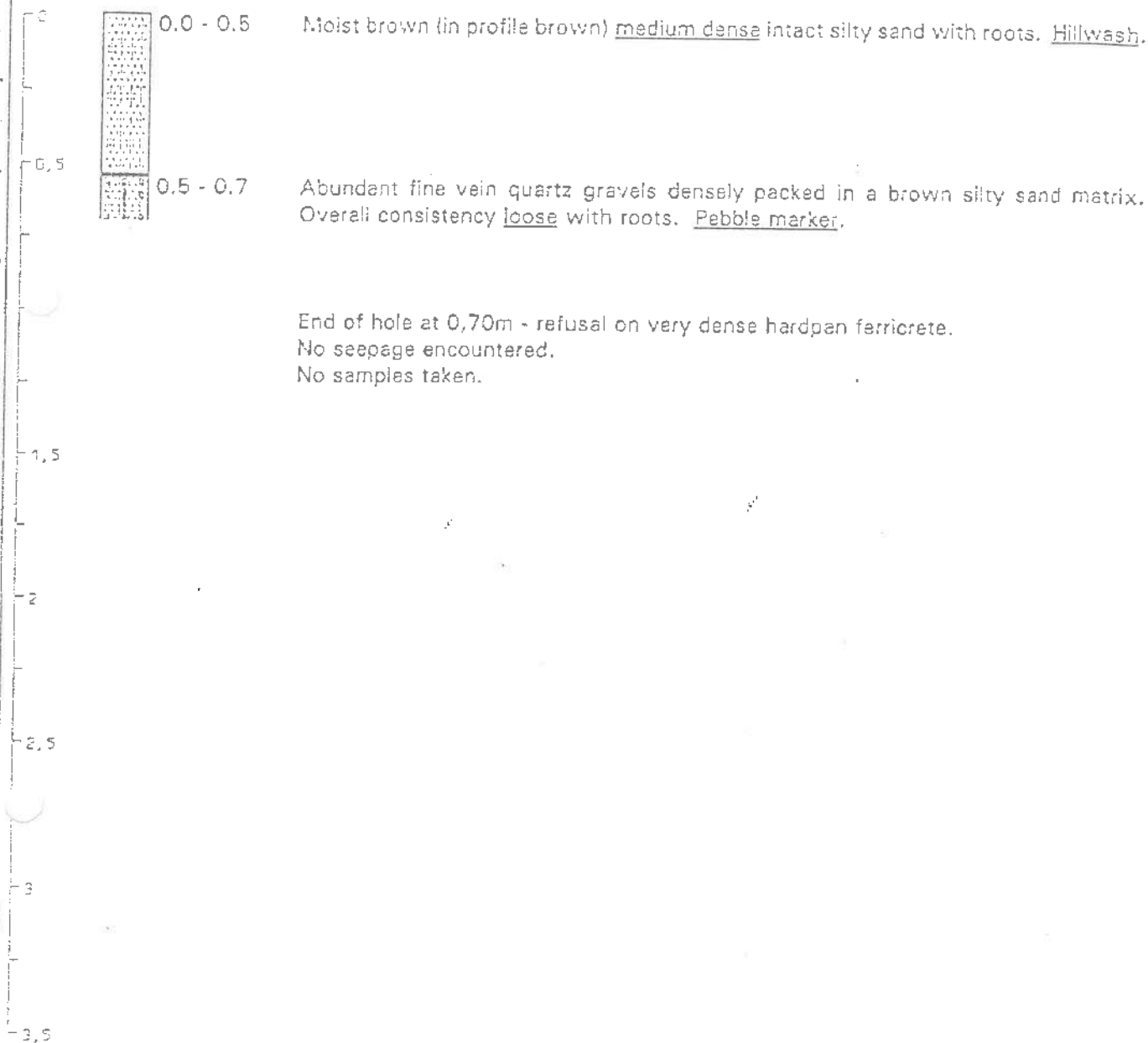
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 83/09392/23

SOIL PROFILE

TEST PIT TP2



DRILLING RIG	: Cat 416 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFILED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Ninfu Allendale Dev	JOB NO	: 3480	SHEET NO	: 2 of 9
PROJECT	: Rabie Ridge Extension 3	REFERENCE NO	:		: 61043000

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



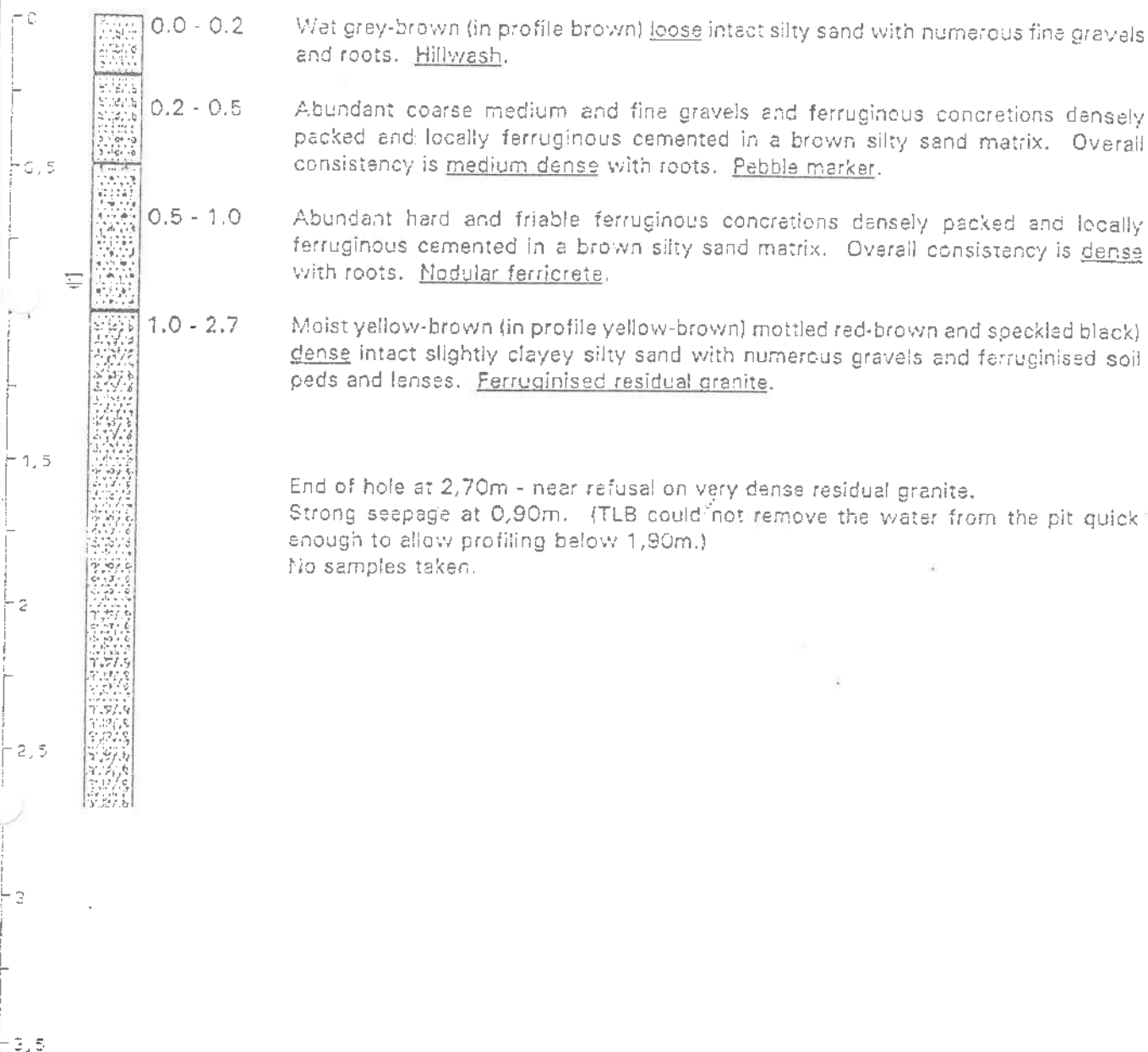
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 83/09392/23

SOIL PROFILE

TEST PIT TP3



DRILLING RIG	: Cat 416 B	DATE	: 1999-06-11	X CO-ORDINATE	:
PROFIED BY	: HJ Schurink	DATE	: 1999-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Nintu Allandale Dev	JOB NO	: 3420	SHEET NO	: 3 of 3
PROJECT	: Rabie Ridge Extension 3			REFERENCE NO	: 21046000

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



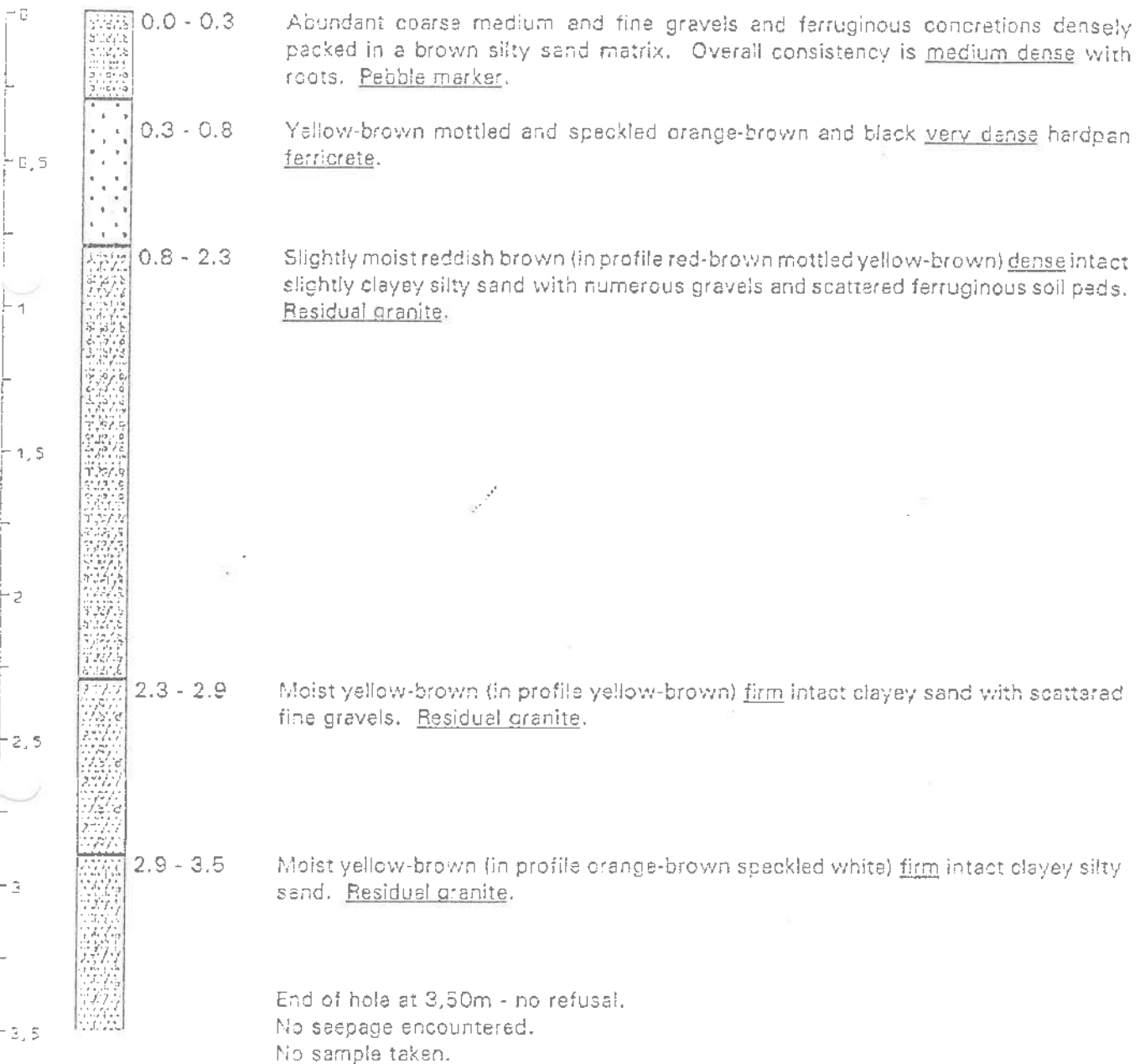
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP4



DRILLING RIG	: Cat 418 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFILED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Nintu Allandale Dev	JOB NO	: 3480	SHEET NO	: 4 of 9
PROJECT	: Rabie Ridge Extension 3	REFERENCE NO	:		: 1343004

327 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



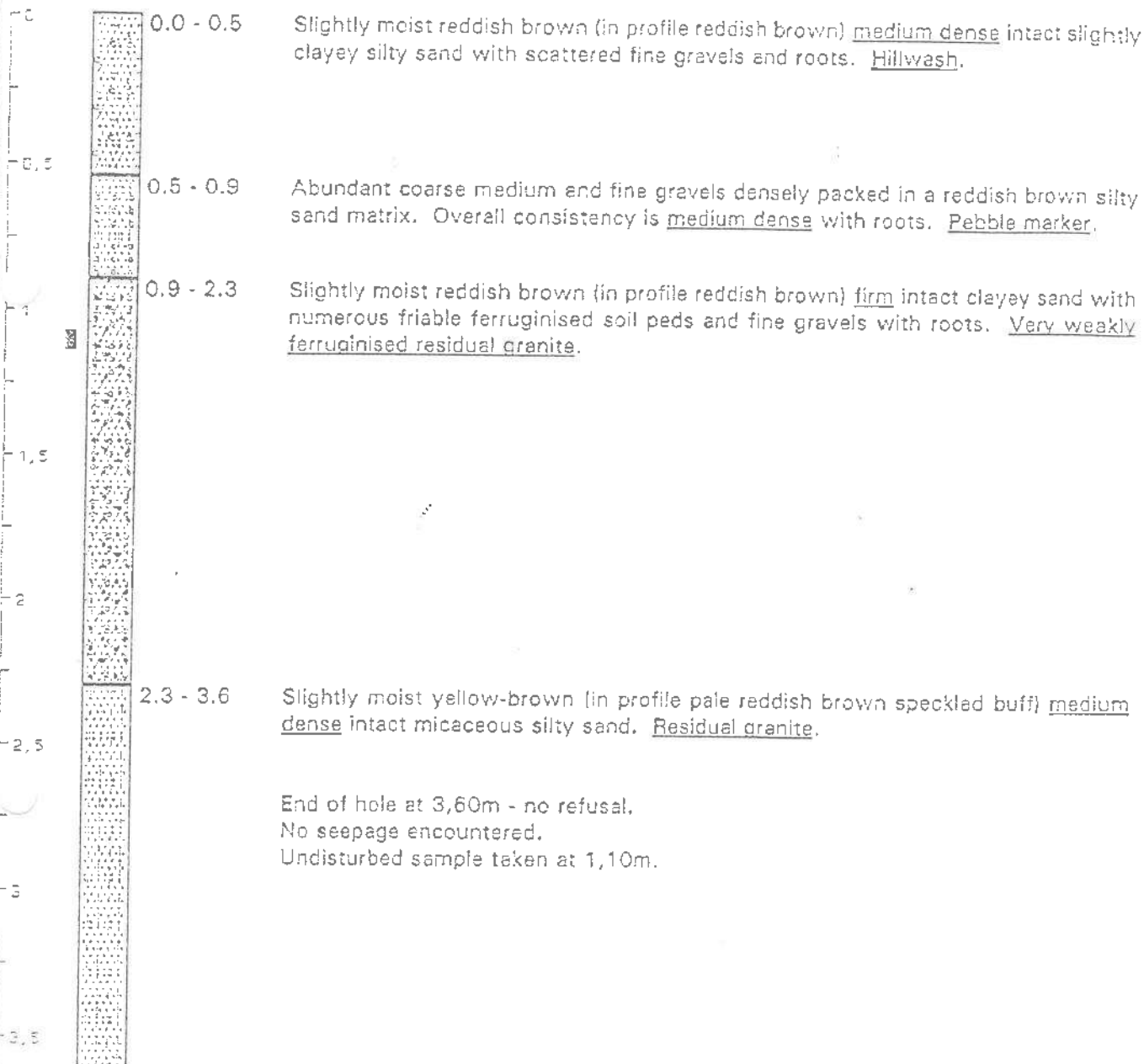
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP5



DRILLING RIG	: Cat 416 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFIED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Ninfu Allandale Dev	JOB NO	: 3480	SHEET NO	: 5 of 6
PROJECT	: Rabie Ridge Extension 3			REFERENCE NO	: 21348006

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6250
FAX: (011) 315-0317

REG. NO. CK 86/09392/23

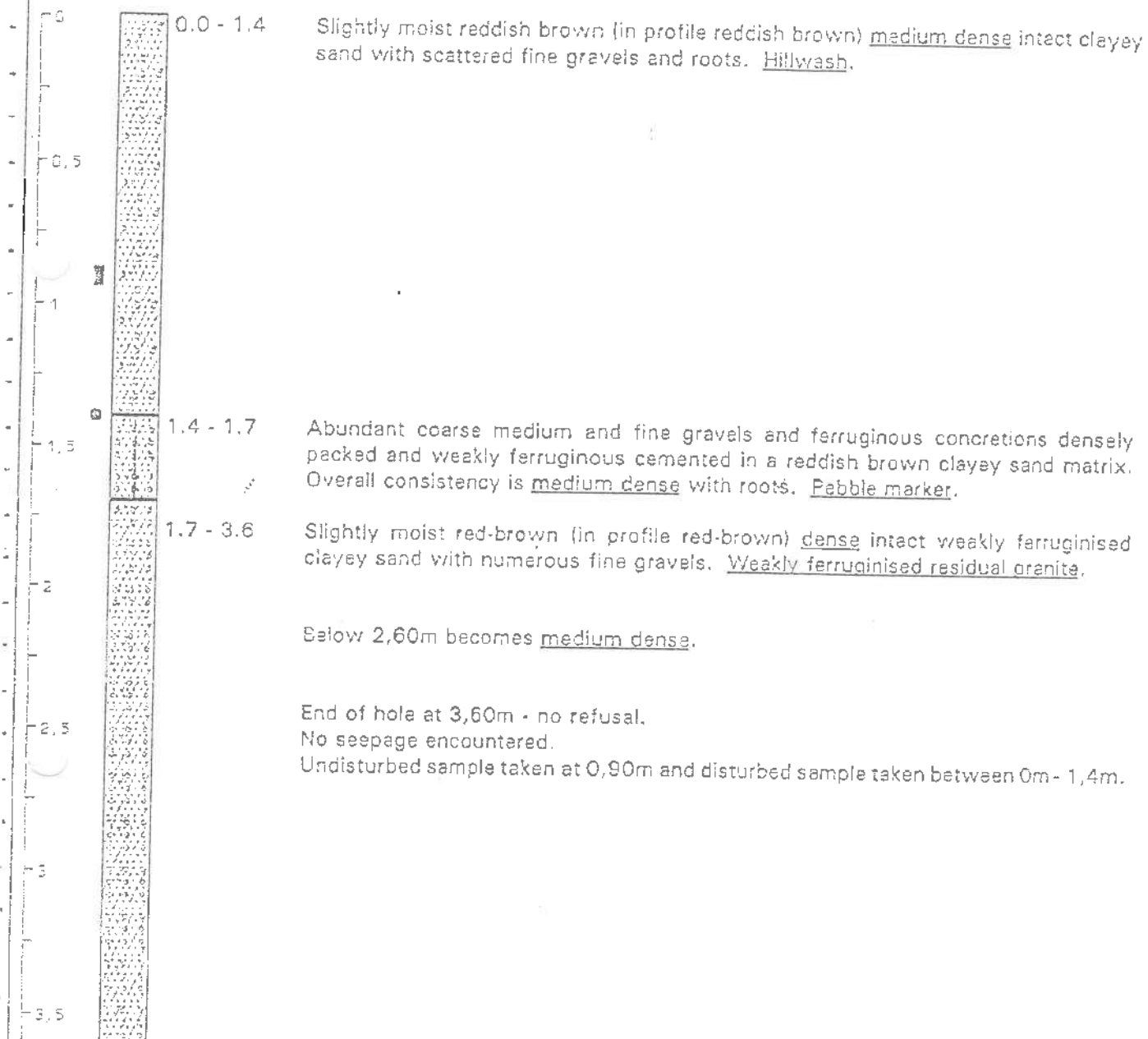


YATES CONSULTING CC

ENGINEERING GEOLOGISTS

SOIL PROFILE

TEST PIT TP6



DRILLING RIG	: Cat 416 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFIED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Ninfu Allandale Dev	JOB NO	: 3480	SHEET NO	: 5 of 9
PROJECT	: Rabie Ridge Extension 3			REFERENCE NO	: 01048016

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



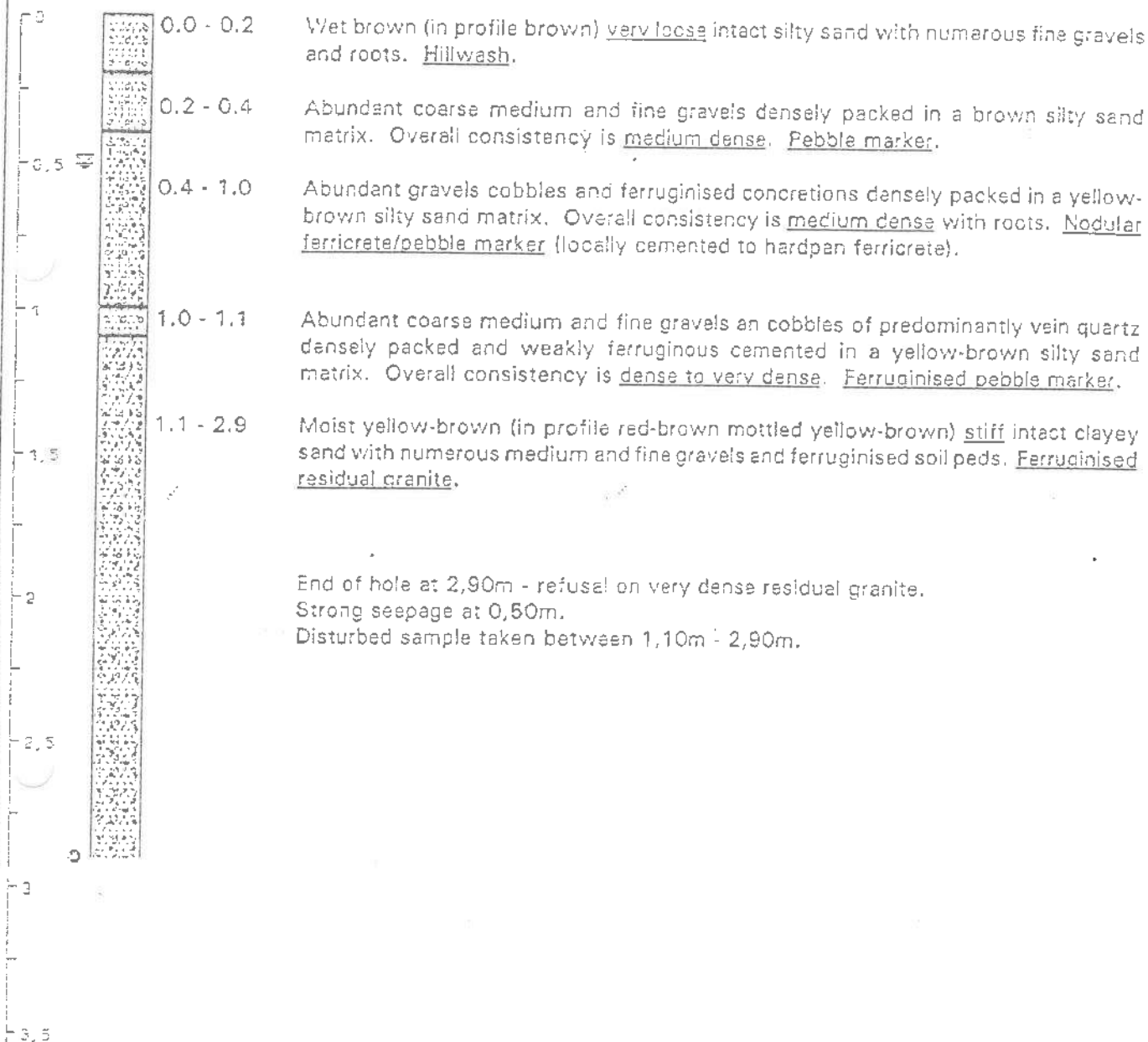
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 83/09392/23

SOIL PROFILE

TEST PIT TP7



DRILLING RIG	: Cat 416 B	DATE	: 1995-06-11	X CO-ORDINATE	:
PROFILED BY	: HJ Schurink	DATE	: 1995-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Ninfu Allandale Dev	JOB NO	: 3420	SHEET NO	: 7 of 8
PROJECT	: Rabie Ridge Extension 3	REFERENCE NO	P/3420/95		

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



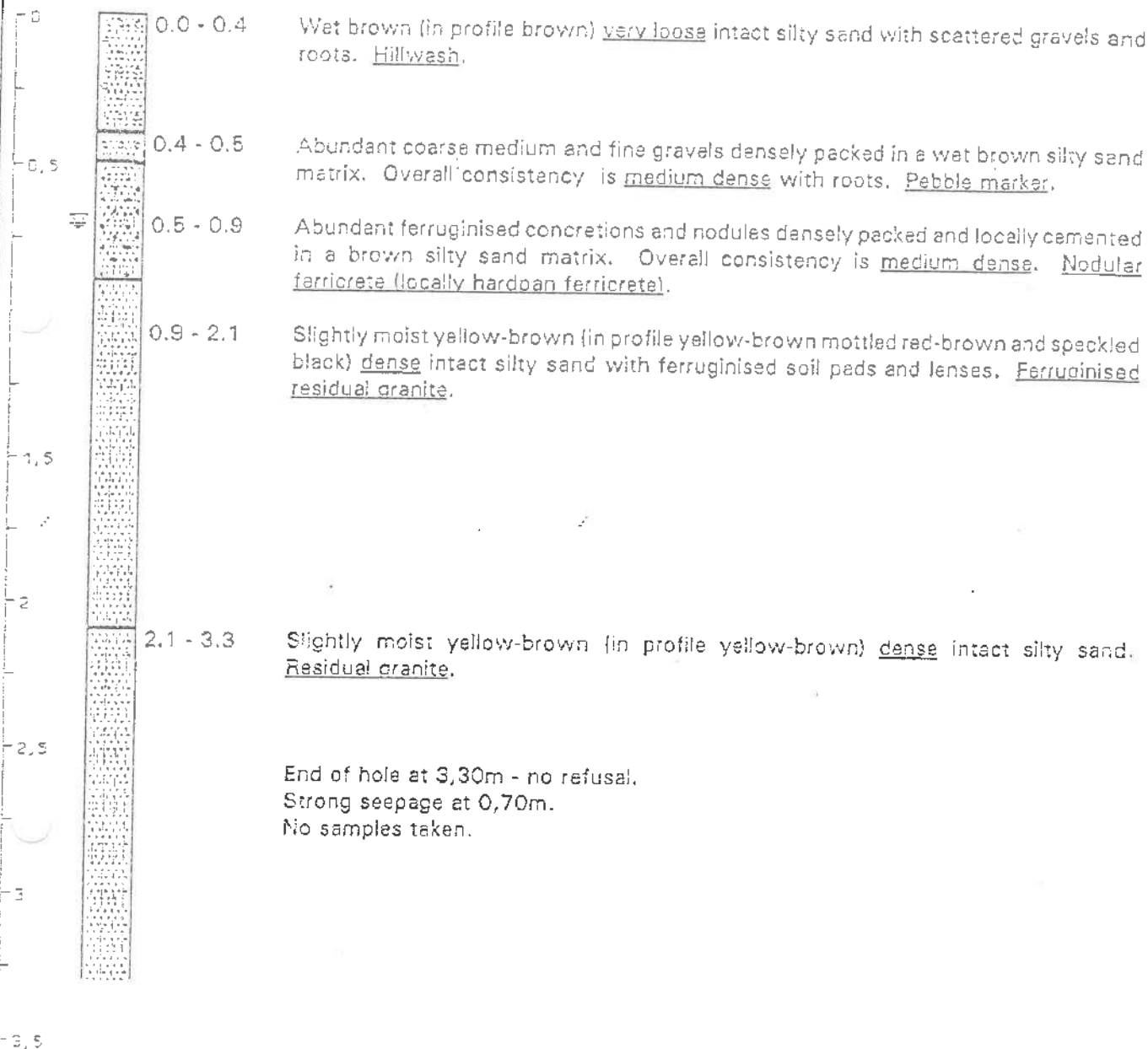
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 85/09392/23

SOIL PROFILE

TEST PIT TP8



DRILLING RIG	: Cat 416 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFILED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Ninfu Allandale Dev	JOB NO	: 3420	SHEET NO	: 8 of 9
PROJECT	: Rabie Ridge Extension 3	REFERENCE NO	:		: pfs48008

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



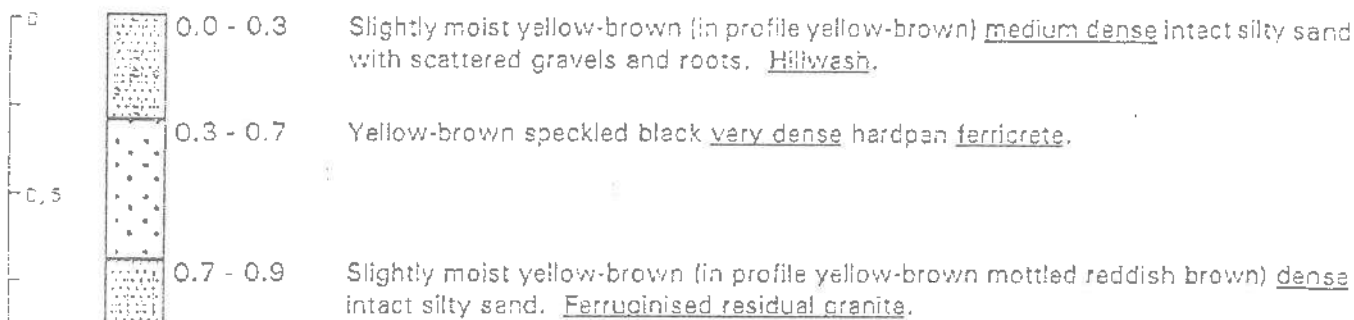
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP9



End of hole at 0,90m - refusal on very dense ferruginised residual granite.
 No seepage encountered.
 No sample taken.

DRILLING RIG	: Cat 416 B	DATE	: 1996-06-11	X CO-ORDINATE	:
PROFIED BY	: HJ Schurink	DATE	: 1996-06-11	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Nintu Allandale Dev	JOB NO	: 3420	SHEET NO	: 9 of 9
PROJECT	: Rabie Ridge Extension 3	REFERENCE NO	:		: d1243009

APPENDIX C
LABORATORY TEST RESULTS

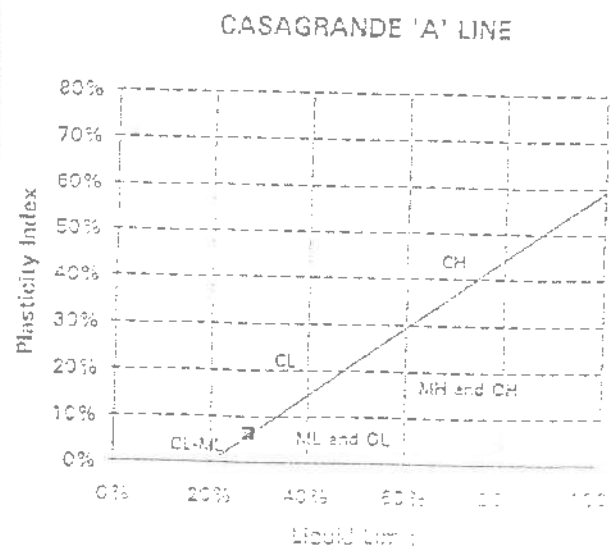
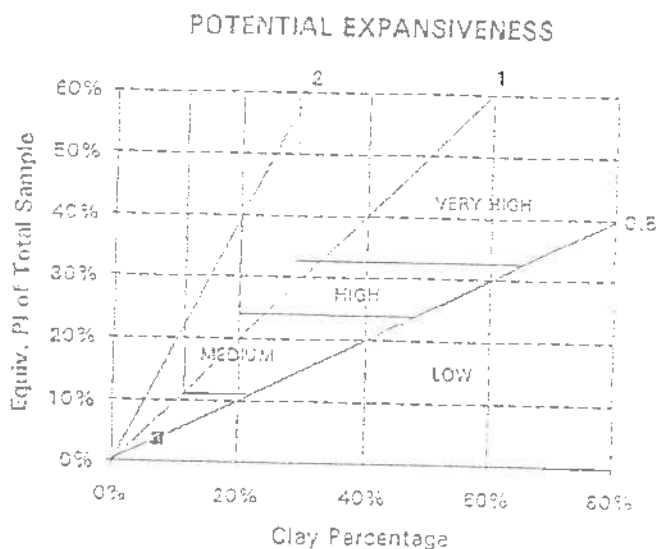
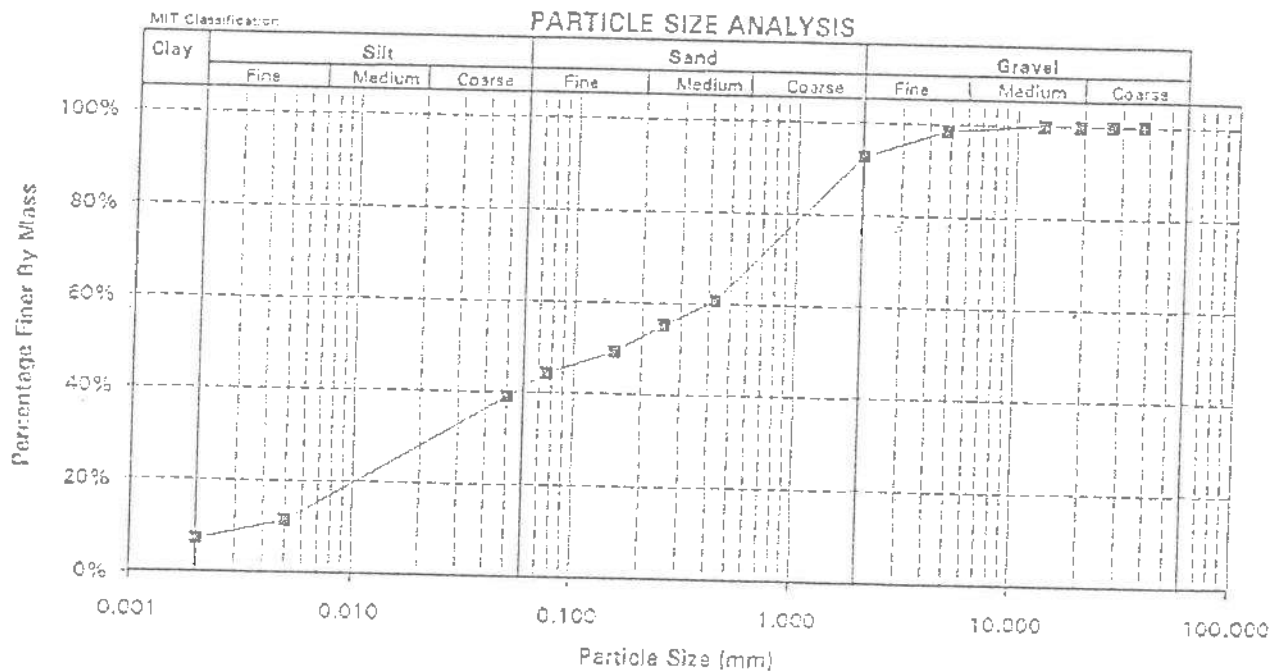


SOILTECH

QUALITY IS OUR FOUNDATION

FOUNDATION INDICATOR

Client	Yates Consulting (Acc No. YA 001)	Date	18/6/96
Project	Rabie Ridge Ext 3	Job #	19180
Site	-		
Test Pos	TP 6	Depth	0.90m
Sample	Hillwash		
SIEVE ANALYSIS			
Sieve(mm)	% Passing	Sieve(mm)	% Passing
37.500	100%	0.250	55%
25.000	100%	0.150	49%
19.000	100%	0.075	44%
13.200	100%	0.050	39%
4.750	93%	0.005	11%
2.000	93%	0.002	7%
0.425	61%		
ATTERBERG LIMITS			
		Test 1	Test 2
Liquid Limit		27.3%	27.9%
Average		27.8%	
Plastic Limit		22.0%	21.1%
Average		21.5%	
Plasticity Index (PI)		6.3%	
Linear Shrinkage		3.3%	
Grading Modulus		1.02	
PRA Classification			
Unified Classification			
PI of whole sample			
% Gravel			
% Sand			
% Silt			
% Clay			



Checked

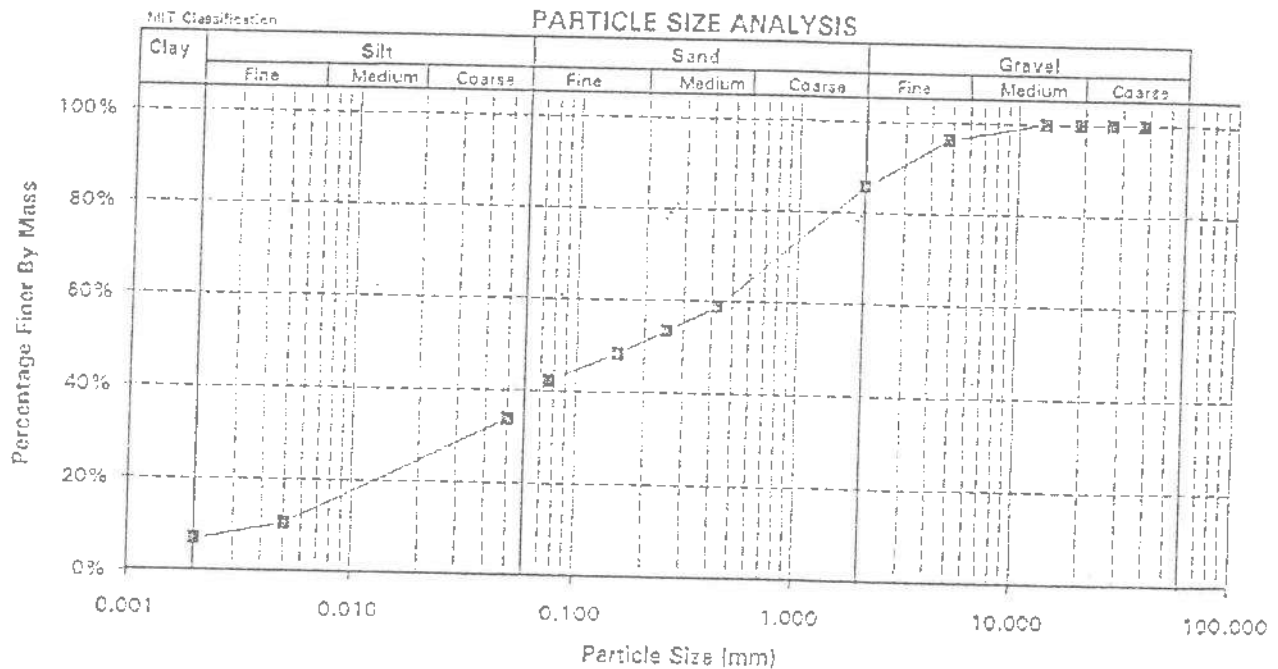


SOILTECH

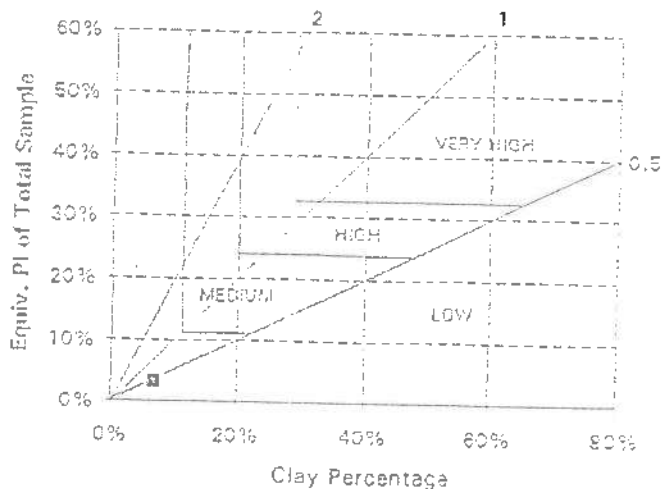
QUALITY IS OUR FOUNDATION

FOUNDATION INDICATOR

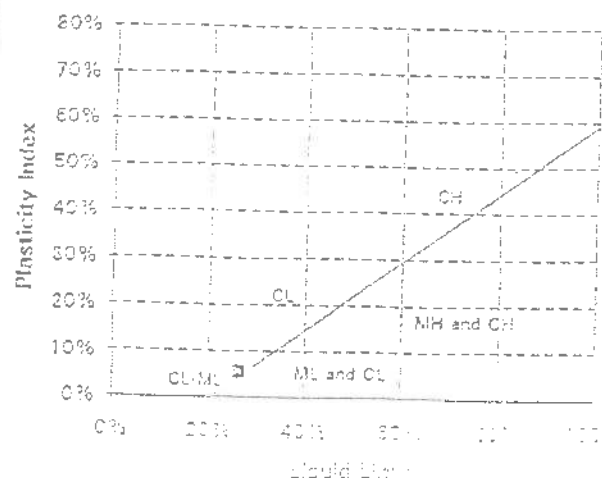
Client	Yates Consulting (Acc No. YA 001)			Date	18/6/96	
Project Site	Rabie Ridge Ext 3			Job #	19160	
Test Pos	TP 1			Depth	1.10-2.50m	
Sample	Resid Granite					
SIEVE ANALYSIS				ATTERBERG LIMITS		
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2
37.500	100%	0.250	53%	Liquid Limit	25.5%	26.8%
25.000	100%	0.150	48%	Average	26.1%	
19.000	100%	0.075	42%	Plastic Limit	20.5%	20.1%
13.200	100%	0.050	34%	Average	20.3%	
4.750	98%	0.005	11%	Plasticity Index (PI)	5.6%	
2.000	86%	0.002	7%	Linear Shrinkage	2.7%	
0.425	59%			Grading Modulus	1.13	
				FRA Classification	A-4 (1)	
				Unified Classification	SC:SM	
				PI of whole sample	3.4%	
				% Gravel	14.4%	
				% Sand	48.0%	
				% Silt	30.8%	
				% Clay	6.8%	



POTENTIAL EXPANSIVENESS



CASAGRANDE 'A' LINE



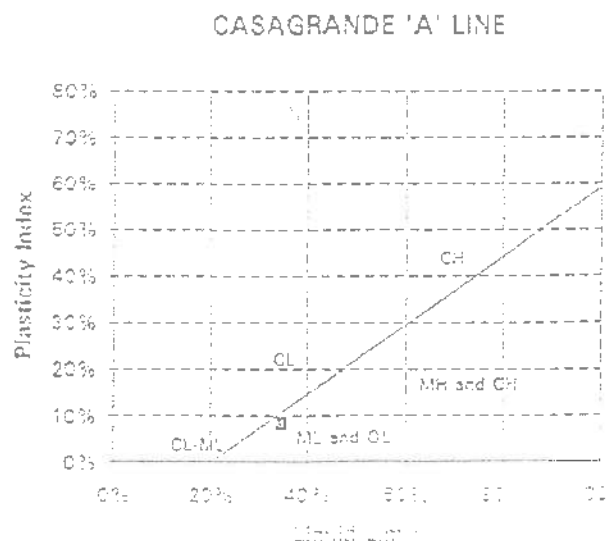
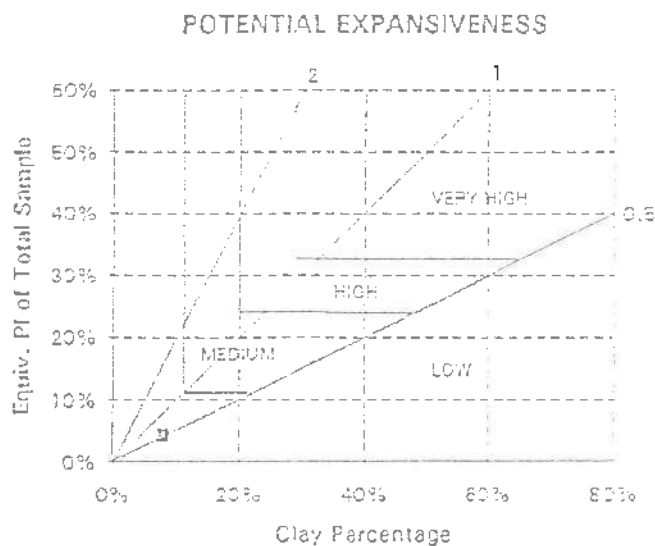
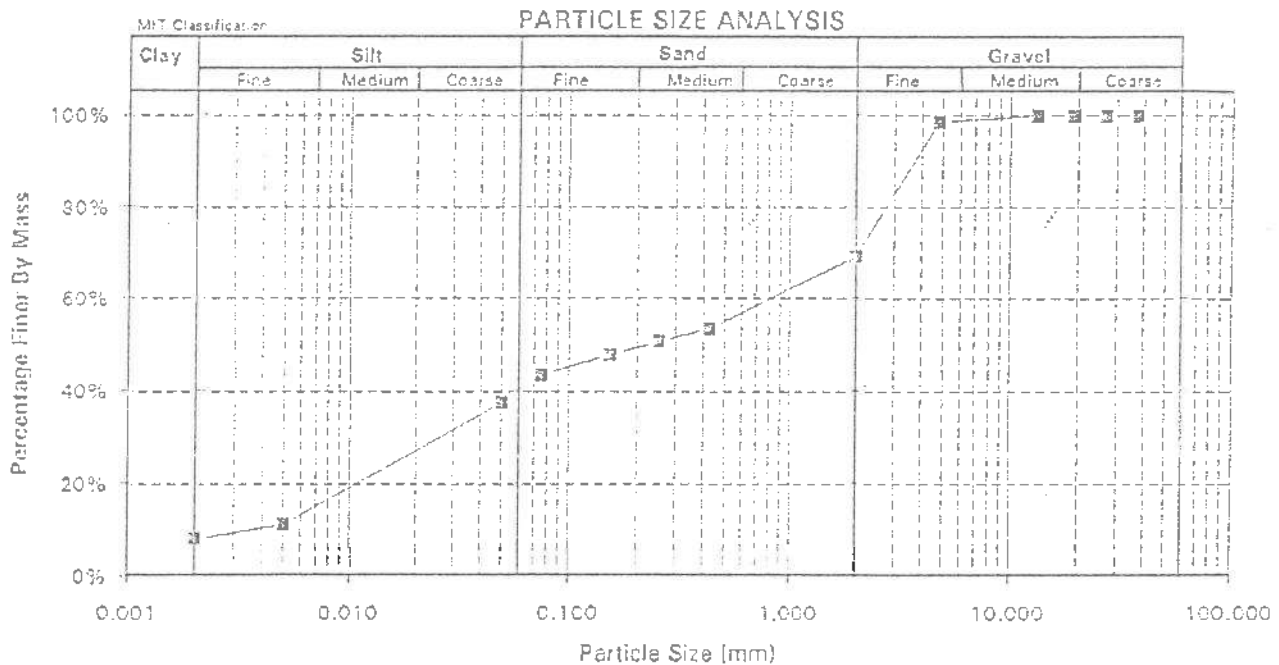


SOILTECH

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FOUNDATION INDICATOR

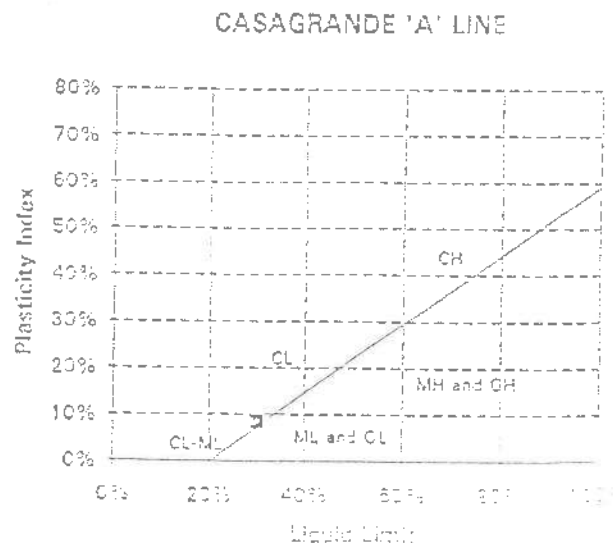
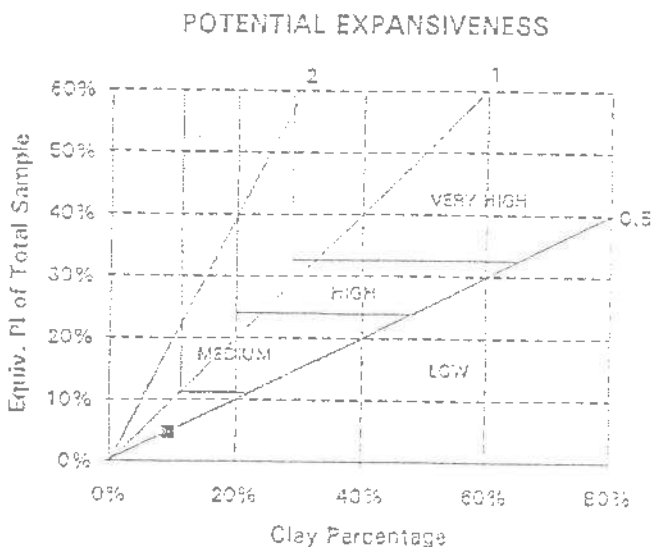
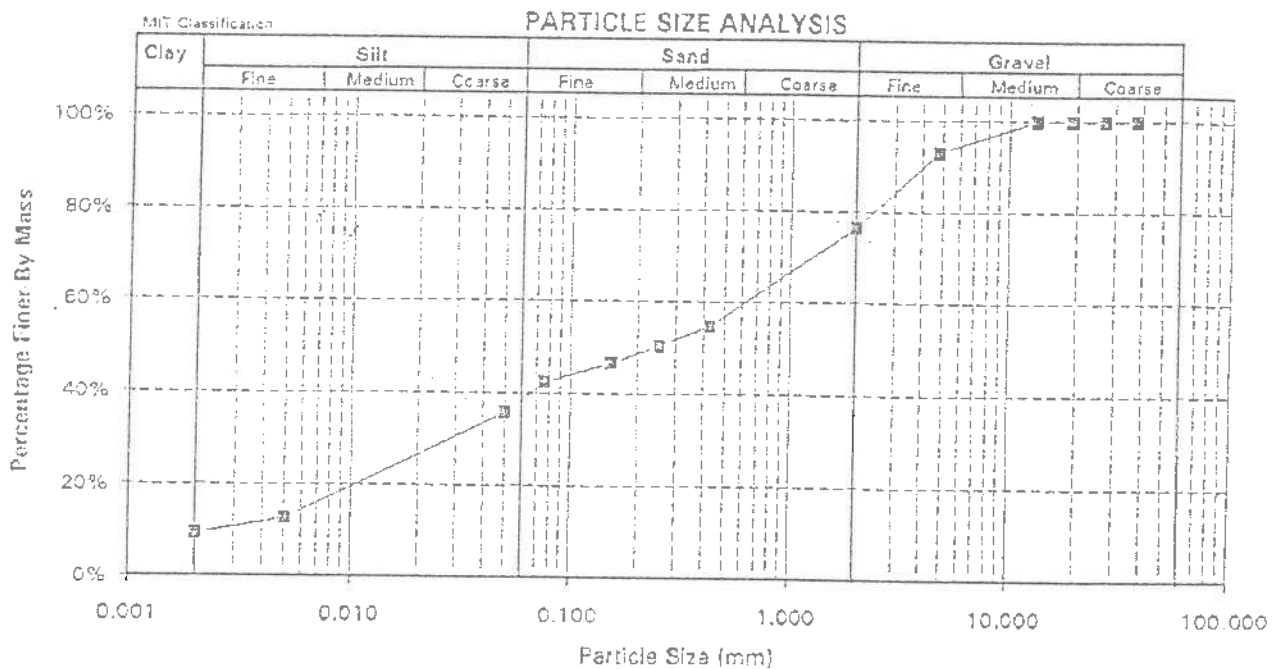
Client	Yates Consulting (Acc No. YA 001)				Date	18/6/96		
Project	Rabie Ridge Ext 3				Job #	19180		
Site	-							
Test Pos	TP 5				Depth	1.10m		
Sample	Resid Granite							
SIEVE ANALYSIS				ATTERBERG LIMITS				
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2		
37.500	100%	0.250	51%	Liquid Limit	34.5%	34.6%	FRA Classification	A-4 (2)
26.500	100%	0.150	43%	Average	34.6%		Unified Classification	SM
15.000	100%	0.075	43%	Plastic Limit	26.5%	26.3%	PI of whole sample	4.5%
13.200	100%	0.060	37%	Average	26.4%		% Gravel	30.2%
4.750	99%	0.005	11%	Plasticity Index (PI)	8.4%		% Sand	29.1%
2.000	69%	0.002	8%	Linear Shrinkage	4.0%		% Silt	22.1%
0.425	53%			Grading Modulus	1.34		% Clay	8.0%



Checked

FOUNDATION INDICATOR

Client		Yates Consulting (Acc No. YA 001)		Date	18/6/96		
Project		Rable Ridge Ext 3		Job #	19180		
Site							
Test Pos		TP 7		Depth	1.10-2.90m		
Sample		Resd Granite					
SIEVE ANALYSIS				ATTERBERG LIMITS			
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2	
37.500	100%	0.250	50%	Liquid Limit	29.8%	30.1%	
25.000	100%	0.150	47%	Average	29.9%		
19.000	100%	0.075	42%	Plastic Limit	21.6%	20.9%	
13.200	100%	0.050	36%	Average	21.3%		
4.750	93%	0.005	13%	Plasticity Index (PI)	8.7%		
2.000	76%	0.002	9%	Linear Shrinkage	4.7%		
0.425	56%			Grading Modulus	1.27		
PRA Classification							A-4 (U)
Unified Classification							SC
Pl of whole sample							4.7%
% Gravel							23.6%
% Sand							37.7%
% Silt							29.3%
% Clay							9.4%



Checked

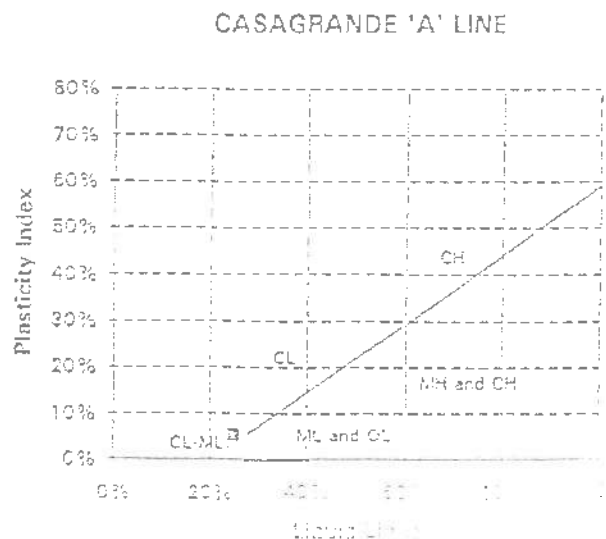
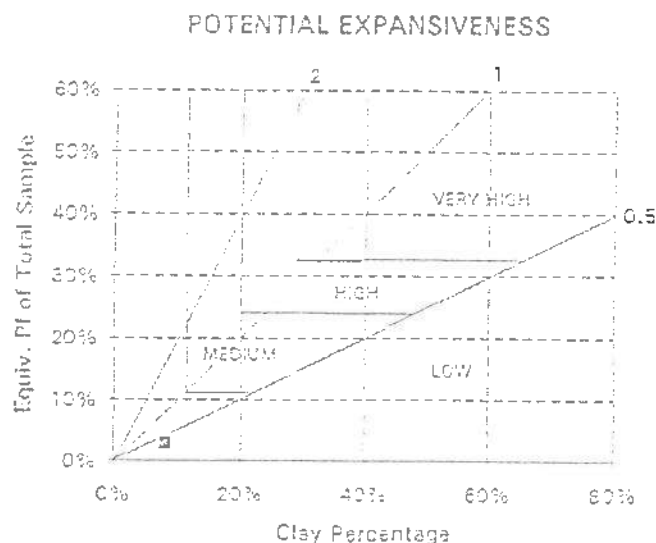
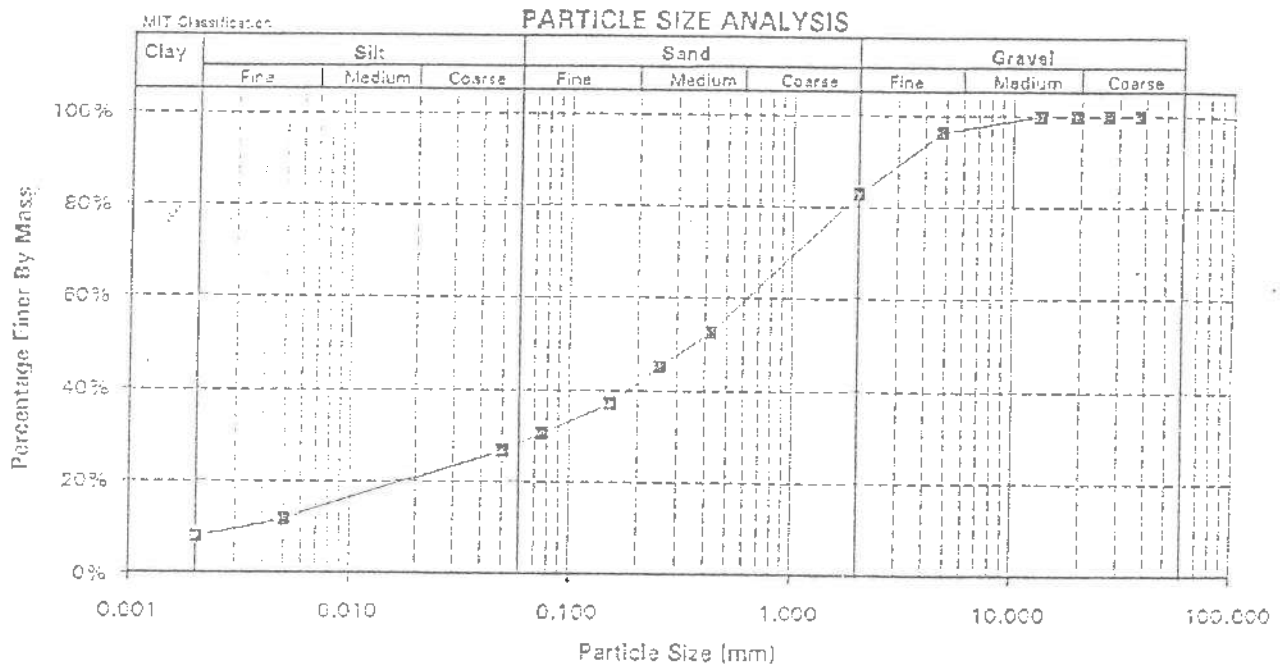


SOILTECH

QUALITY IS OUR FOUNDATION

FOUNDATION INDICATOR

Client	Yates Consulting (Acc No. YA 001)				Date	18/6/98	
Project	Rable Ridge Ext 3				Job #	19180	
Site	-						
Test Pos	TP 1				Depth	0.60m	
Sample	Hillwash						
SIEVE ANALYSIS				ATTERBERG LIMITS			
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2	
37.500	100%	0.250	45%	Liquid Limit	24.9%	24.8%	PRA Classification
25.000	100%	0.150	37%	Average	24.8%		Unified Classification
19.000	100%	0.075	31%	Plastic Limit	19.4%	19.2%	Pl of whole sample
13.200	100%	0.060	27%	Average	19.3%		% Gravel
4.750	98%	0.005	12%	Plasticity Index (PI)	5.5%		% Sand
2.000	83%	0.002	8%	Linear Shrinkage	2.7%		% Silt
0.425	53%			Grading Modulus	1.34		% Clay



Kliënt Client: Yates Consulting	Datum Date: 19.6.96	Bladsy/Page
Projek Project: Rabie Ridge Ext. 2	Werk Nr. Job No.	
Terrein Site	T.G. Nr. T.H. No. 6	

KONSOLIDASIE TOETS – CONSOLIDATION TEST $\epsilon_r = 87\%$

Diepte van Monster:
Depth of Sample: 0.9 m

Monster: Onversteurd:
Sample: Undisturbed

Monster Beskrywing:
Sample Description

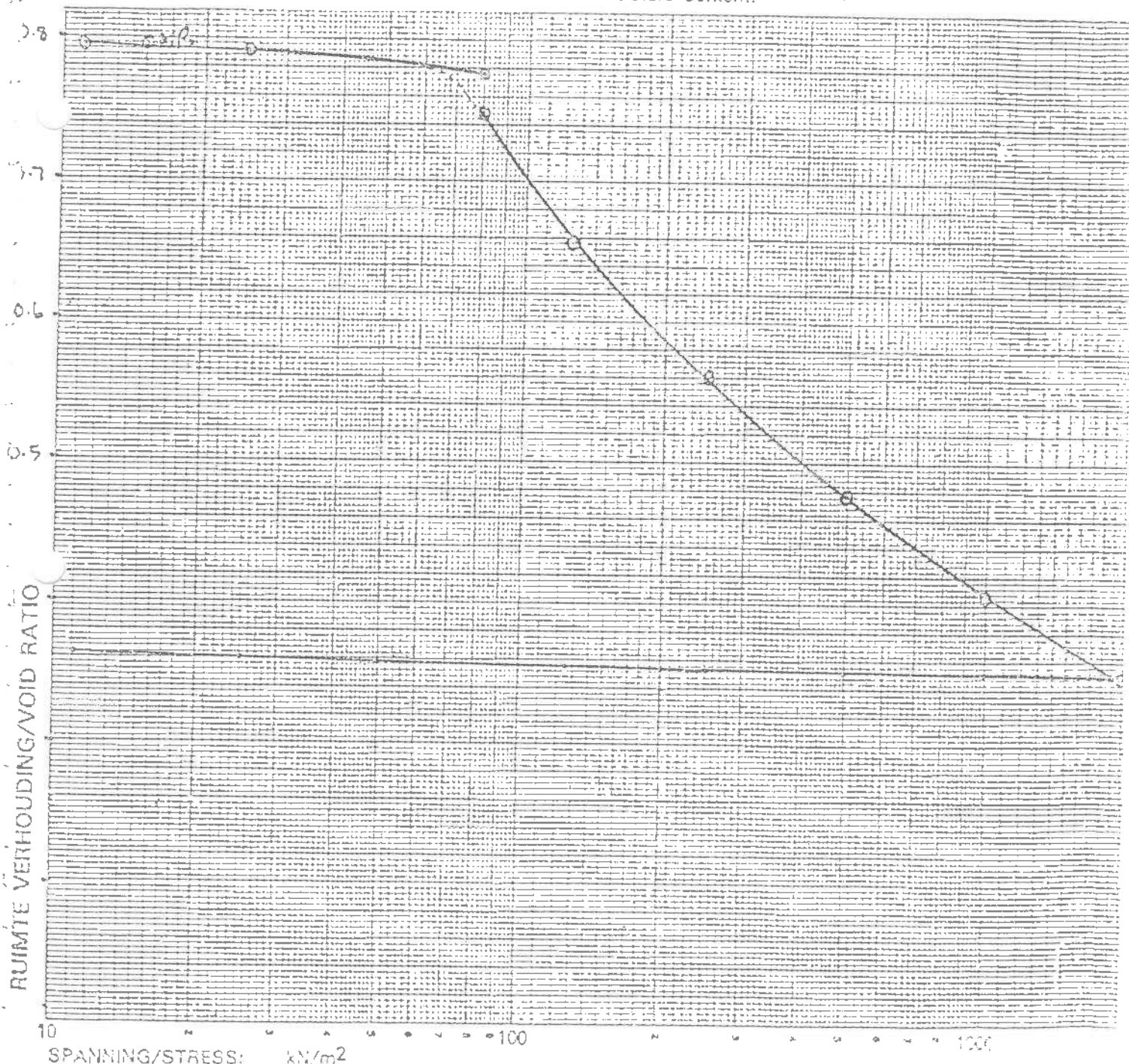
Opmerkings:
Comments: Soaked at 80 kPa:

Soortlike Gewig:
Specific Gravity: 2.67

Aanvanklike Droë Digtheid:
Initial Dry Density: 1487 kg/m³

Aanvanklike Voggehalte:
Initial Moisture Content: 11.02 %

Finale Voggehalte:
Final Moisture Content: 17.47 %



CLIENT Yates Consulting

DATE 19.6.96

PROJECT Rabie Ridge Ext. 7

JOB No

SITE

TEST No 6



KONSOLIDASIE TOETS - CONSOLIDATION TEST

Diepte van

Monster:

Depth of

Sample:

Opmerkinge:

Remarks:

0.9m

Volg No.:

Serial No.:

9127

Toets Nr.:

Test No.:

1

Soaked at 80 kPa

Aangewende Druk Applied Pressure	Finale Meterlesing Final Dial Reading	Dikte Verandering Change in Thickness	Monster Hoogte Sample Thickness	Ruimte Hoogte Height of Voids	Ruimte VERhouding Void Ratio $e = \frac{H - H_s}{H_s}$
kN / m ²	mm	ΔH mm	H mm	H-Hs mm	
0	0		20.000	8.865	.796
11	.012		19.988		.795
25	.058		19.942		.791
50	.222		19.778		.776
	.524		19.476		.749
125	1.544		18.456		.657
250	2.620		17.380		.561
500	3.552		16.448		.477
1000	4.248		15.652		.406
2000	4.984		15.016		.349
1000	4.968		15.032		.350
500	4.952		15.048		.351
250	4.922		15.068		.352
125	4.910		15.090		.355
50	4.880		15.120		.358
25	4.852		15.148		.360
11	4.820		15.180		.367
0					
11					
25					
50					
125					
250					
500					
1000					
2000					

Collapse @ 80 kPa = 1.5 %
Normal Con. at 11 %

KONSOLIDASIE PARAMETERS - CONSOLIDATION PARAMETERS

	Terrain Monster Field Sample	Toets Monster Test Sample		
VOLUME water stowende solids			$e_0 = \frac{e_1 - e}{\log_{10} \frac{\sigma_1}{\sigma_2}}$	
VOLUME Ruimte Voids			$A_v = \frac{e_1 - e}{\sigma_1 - \sigma_2}$	
Ruimte Verhouding Void Ratio				
0.42 e				
Gemiddelde Dichtheid Average Density			$M_v = \frac{A_v}{1 + e_1} \times \frac{1}{\Delta \sigma}$	
e_0	e st. Po	15 kPa		

SOILTECH

DATE 19.6.96

JOB No

TEST No



Diaplan Monster: 0.9m
Depth of Sample:

Test Number: 3

Volgnummer: 9177
Serial Number:

Remarks: Soaked at 90 kpa

Load Kilohertz Correction	KN/m ²	25	50	125	250	500	1000	2000
F _{yd} Time	(min - 1)	1	2	3	4	5	6	7
		Meter Reading	Dial Reading	Meter Reading	Dial Reading	Meter Reading	Dial Reading	Meter Reading
0.0	0	0	0	0	0	0	0	0
0.2	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.3	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.5	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
0.6	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
0.8	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
1.0	1	1	1	1	1	1	1	1
1.5	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
2.0	4	4	4	4	4	4	4	4
2.5	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
3.0	9	9	9	9	9	9	9	9
3.5	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25
4	16	16	16	16	16	16	16	16
5.0	25	25	25	25	25	25	25	25
6.0	36	36	36	36	36	36	36	36
7.0	49	49	49	49	49	49	49	49
8.0	64	64	64	64	64	64	64	64
9.0	81	81	81	81	81	81	81	81
10.0	100	100	100	100	100	100	100	100
15.0	225	225	225	225	225	225	225	225
20.0	400	400	400	400	400	400	400	400
30.0	900	900	900	900	900	900	900	900
Final Comp	mm	0.56						

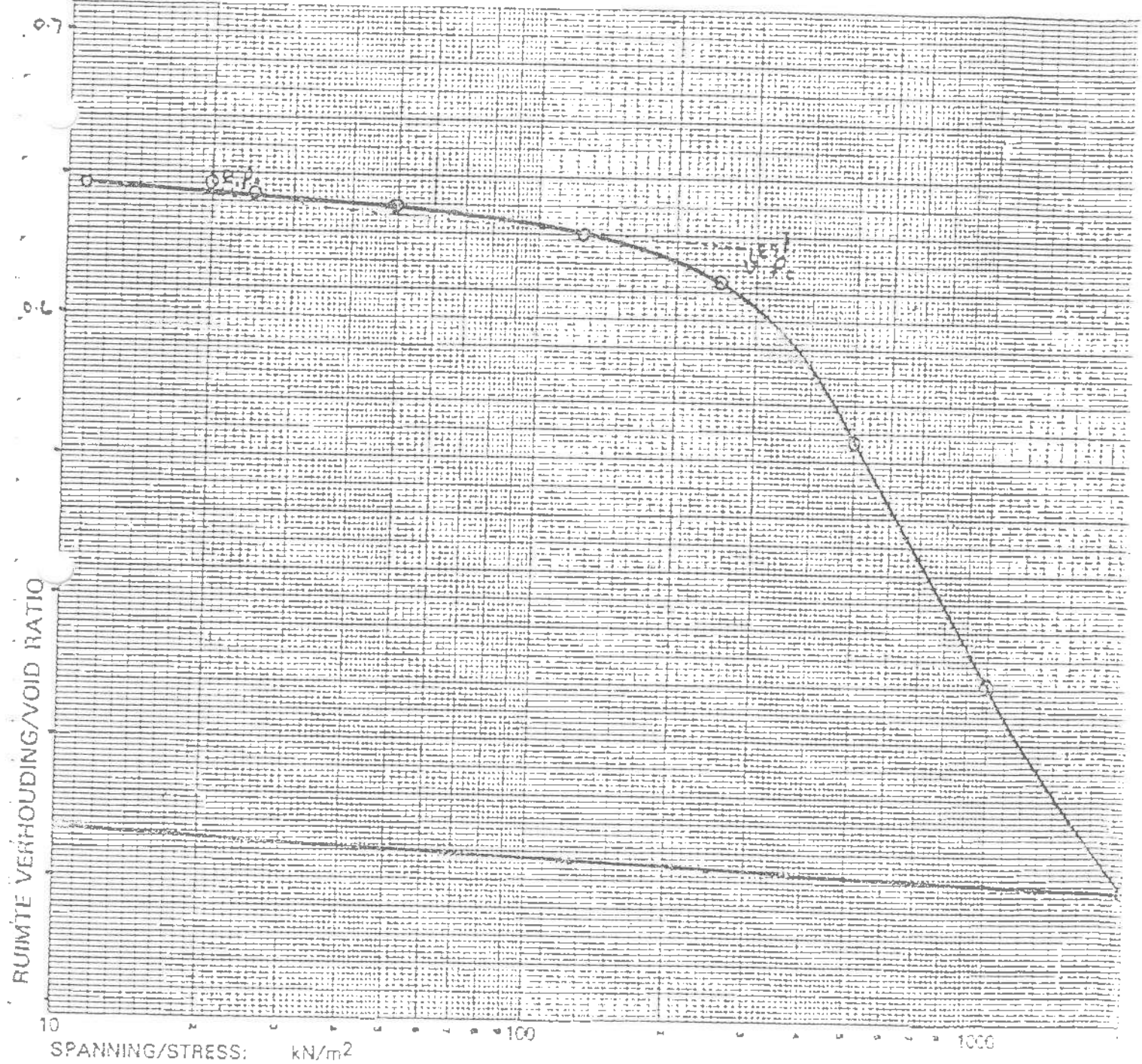
TYD-VERSAKINGS LESINGS
TIME-SETTLEMENT READINGS

SOLITECH

Kliënt Client: Yates Consulting	Datum Date: 19.6.96	Bladsy./Page
Projek Project: Rabie Ridge Ext. 3	Werk No. Job No.	
Terrain Site	T.G. No. T.H. No. 5	

KONSOLIDASIE TOETS — CONSOLIDATION TEST

Diepte van Monster: Depth of Sample: 1.1 m	Soortlike Gewig: Specific Gravity: 2.62
Monster: Onversteurd: Sample: Undisturbed	Aanvanklike Droë Digtheid: 1591 kg/m ³
Monster Beskrywing: Sample Description	Aanvanklike Voggehalte: 14.60 %
Opmerkings: Comments: Soaked at 11 kPa	Finale Voggehalte: 15.81 %



CLIENT Yates Consulting

DATE 19.6.96

PROJECT Rabie Ridge Ext. 2

JOB No

SITE

TEST No 5



KONSOLIDASIE TOETS – CONSOLIDATION TEST

Diepte van
Monster: 1.1 m

Depth of

Sample:

Opmerkinge: Soaked at 11 kpa

Remarks:

Volg No.: 9124

Serial No.:

Toets Nr. 2

Test No.:

Aangewende Druk Applied Pressure	Finale Meterlezing Final Dial Reading	Dikte Verandering Change in Thickness	Monster Hoogte Sample Thickness	Ruimte Hoogte Height of Voids	Ruimte VERhouding Void Ratio $e = \frac{H - H_s}{H_s}$
kN / m ²	mm	ΔH mm	H mm	H-H _s mm	
0	0		20.000	7.856	.647
11	.010		19.990		.646
25	.042		19.958		.643
50	.094		19.906		.639
125	.208		19.792		.630
250	.400		19.600		.614
500	1.088		18.912		.557
1000	2.140		17.860		.471
2000	3.022		16.978		.398
1000	2.000		17.000		.400
500	2.976		17.024		.402
250	2.950		17.050		.404
125	2.920		17.080		.406
50	2.878		17.122		.410
25	2.842		17.158		.413
11	2.796		17.204		.417
0					
11					
25					
50					
125					
250					
500					
1000					
2000					

KONSOLIDASIE PARAMETERS – CONSOLIDATION PARAMETERS

	Terrein Monster Field Sample	Toets Monster Test Sample		
VOLUME water stovende solids			$e_0 = \frac{e_1 - e}{\lg_{10} \sigma' - \lg_{10} \sigma'_c}$	
VOLUME Ruimte Voids			$A_v = \frac{e_1 - e}{\sigma' - \sigma'_c}$	
Ruimte Verhouding Void Ratio				
0.42 e				
Gemiddelde Dichtheid Average Density			$M_v = \frac{\Delta e}{1 + e_1} \times \frac{1}{\Delta \sigma'}$	
e_0	est. P_0	20 kPa		

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CLIENT Yates Consulting

DATE 19.6.96

PROJECT Rabie Ridge Ext. 3

JOB No

SITE

TEST No

5



KONSOLIDASIE TOETS - CONSOLIDATION TEST

Diepte van Monster: 1.1m
 Diepte of Sample:

Opmerking: Soaked at 11 kpa
 Remarks:

Toets Nummer: 2
 Test Number:

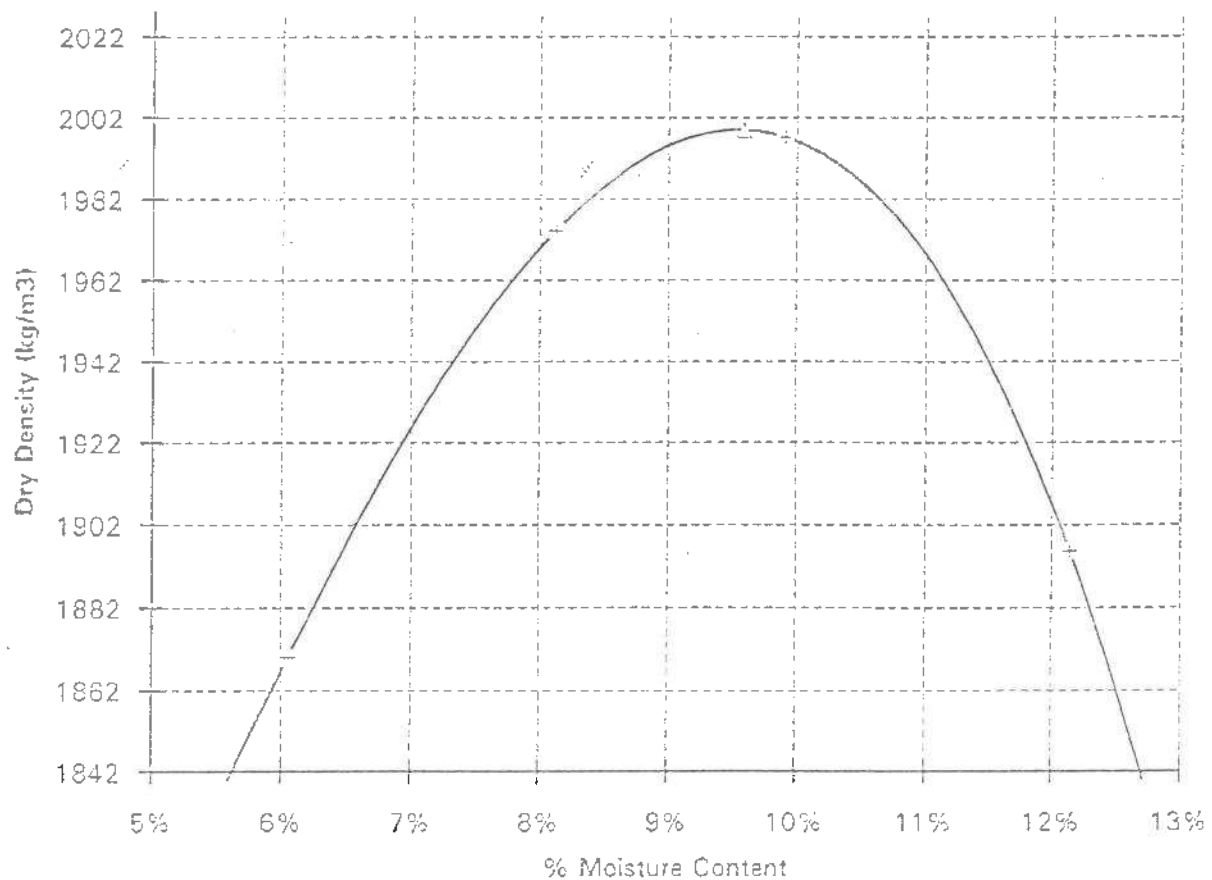
Volgnummer: 9124
 Serial Number:

TYD-VERSAKKINGS LESINGS
 TIME-SETTLEMENT READINGS

Lading		mm/m ²		25		50		125		250		500		1000		2000	
Correctie				7		11		16		22		29		38		52	
Tyd		(min - s)		Meter Lesing		Dial Reading		Meter Lesing		Dial Reading		Meter Lesing		Dial Reading		Meter Lesing	
Time																	
√t		f		g		h		i		j		k		l		m	
0.0	0.00	5	5	38	21	58	47	120	104	222	100	577	544	1108	1070		
0.2	0.02	20	12	46	25	107	87	142	111	447	416	926	948	1458	1406		
0.3	0.03	21	14	47	26	104	88	146	114	467	428	1005	967	1476	1424		
0.4	0.04	21	14	48	27	105	89	148	116	479	450	1016	978	1486	1434		
0.5	0.05	22	15	48	27	106	90	149	117	488	459	1024	986	1494	1442		
0.6	0.06	22	15	49	28	107	91	150	118	495	466	1029	992	1494	1448		
0.8	0.08	22	15	50	29	108	92	152	120	505	476	1029	1001	1500	1448		
1.0	0.10	22	16	50	29	109	92	152	120	505	476	1029	1001	1500	1448		
1.5	0.15	22	16	51	30	110	94	156	124	512	482	1036	1007	1508	1456		
2.0	0.20	23	17	52	31	112	95	160	128	522	495	1056	1018	1522	1471		
2.5	0.25	24	17	52	31	112	96	160	128	522	495	1056	1018	1522	1471		
3.0	0.30	24	17	52	31	112	96	160	128	522	495	1056	1018	1522	1471		
3.5	0.35	24	17	52	31	112	96	160	128	522	495	1056	1018	1522	1471		
4.0	0.40	25	18	53	32	113	97	162	131	527	509	1074	1029	1529	1481		
5.0	0.50	25	18	53	32	113	97	162	131	527	509	1074	1029	1529	1481		
6.0	0.60	26	19	55	34	114	98	164	134	541	516	1084	1049	1534	1489		
7.0	0.70	26	19	55	34	114	98	164	134	541	516	1084	1049	1534	1489		
8.0	0.80	26	19	55	34	114	98	164	134	541	516	1084	1049	1534	1489		
9.0	0.90	26	19	55	34	114	98	164	134	541	516	1084	1049	1534	1489		
10.0	1.00	27	20	56	35	116	100	167	137	551	529	1092	1055	1544	1496		
15.0	1.50	27	20	56	35	116	100	167	137	551	529	1092	1055	1544	1496		
20.0	2.00	27	20	56	35	116	100	167	137	551	529	1092	1055	1544	1496		
30.0	3.00	28	21	58	37	118	102	170	140	568	544	1103	1065	1554	1507		
Final Comp	mm	0.047	0.094	0.208	0.400	1.088	2.140	3.082									
1		11kPa (34)		25kPa (25)		50kPa (21)		125kPa (24)		250kPa (27)		500kPa (41)		1000kPa (46)			
2		1472		1444		1421		1470		1427		1494		1440		1512	
3		1478															
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MOISTURE DENSITY TEST

Client	Yates Consulting (Acc No. YA 001)	Date	14/6/96
Project	Rable Ridge Extension 3	Job #	19180
Site	-		
Test Pos	TP. 6	Depth	0.0 - 1.40m
Sample	-		
	Moisture Content	Dry Density (kg/m ³)	Maximum Dry Density (kg/m ³)
1	8.1%	1974.2	1999
2	9.9%	1997.2	
3	12.1%	1895.8	Optimum Moisture Content
4	6.1%	1870.1	9.6%
5			
6			
Compactive Effort	MOD / CER		
Remarks	Unstabilised		





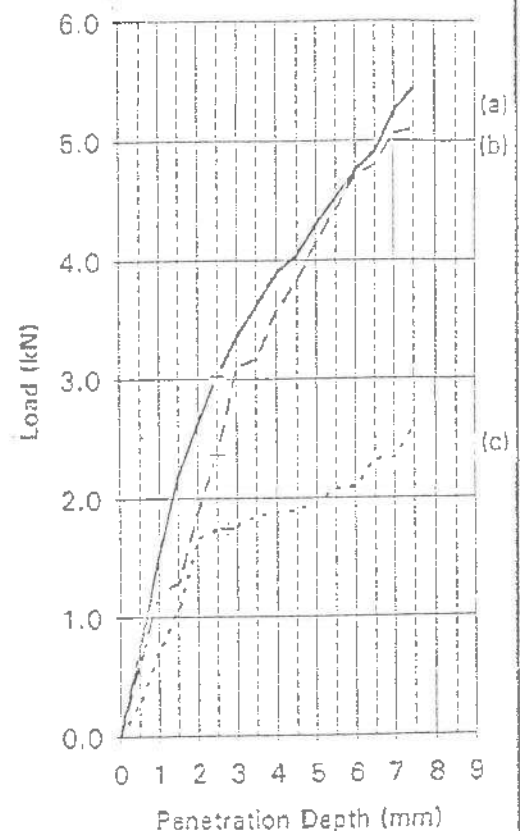
SOILTECH

QUALITY IS OUR FOUNDATION

CALIFORNIA BEARING RATIO

Client	Yates Consulting (Acc No. YA 001)	Date	14/6/96
Project	Rabie Ridge Extension 3	Job #	19180
Site	-		
Test Pos	TP. 6	Depth	0.0 - 1.40m
Sample	-		
MOD Details		1999	
Max Dry Density kg/m ³		9.6	
Opt Moisture Content %			
Moisture Content of CBR Sample		Test 1	Test 2
		9.4%	9.2%
		Average: 9.3%	
Samples:	(a)	(b)	(c)
Compaction Data			
Dry Density kg/m ³	2051	1938	1859
Compaction	102.6%	96.9%	93.0%
Expansion Data			
% Swell after 4 days	0.35%	0.31%	0.04%
CBR Values			
@ 2.54mm	23	18	13
@ 5.08mm	21	21	10
@ 7.62mm	21	20	no data
Penetration correction			
mm	0	0	0.25
CBR Values at 2.54mm from best fit curve to MOD AASTHO Densities		Density	Compaction
		1999	100%
		1939	97%
		1899	95%
		1859	93%
		1799	90%
			CBR
			20
			17
			15
			14
			11

Penetration Curves



PHASE 2 ENGINEERING GEOTECHNICAL
INVESTIGATION FOR
RABIE RIDGE EXTENSION 3

Undertaken for
URBAN DYNAMICS

REPORT NO: 3565-001

DECEMBER 1996



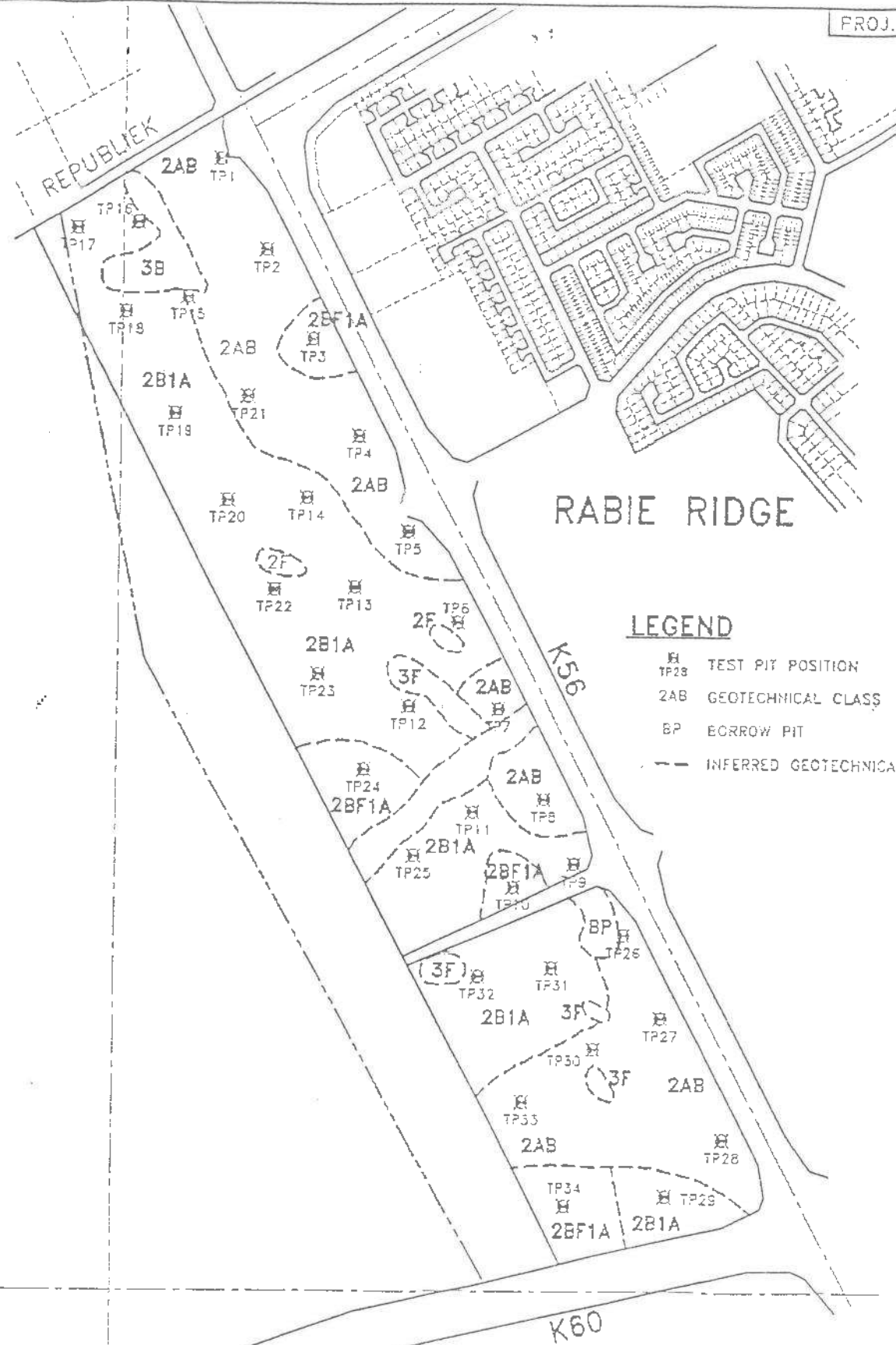
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ENGINEERING GEOLOGISTS

PHASE 2 ENGINEERING GEOLOGICAL INVESTIGATION FOR
RABIE RIDGE EXTENSION 3

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APPENDIX A
FIGURE 1



LEGEND

- TP28 TEST PIT POSITION
- 2AB GEOTECHNICAL CLASS
- BP BORROW PIT
- INFERRED GEOTECHNICAL BOUNDARY

CLIENT: URBAN DYNAMICS
 TITLE: GEOTECHNICAL ZONATION - ALLANDALE EXT.

DRWG. No. FIGURE 1

Y
 YATES CONSULTING CC
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 101 DREWE ROAD, PRETORIA 0001

APPENDIX B
SOIL PROFILES

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-8230
FAX: (011) 315-0317



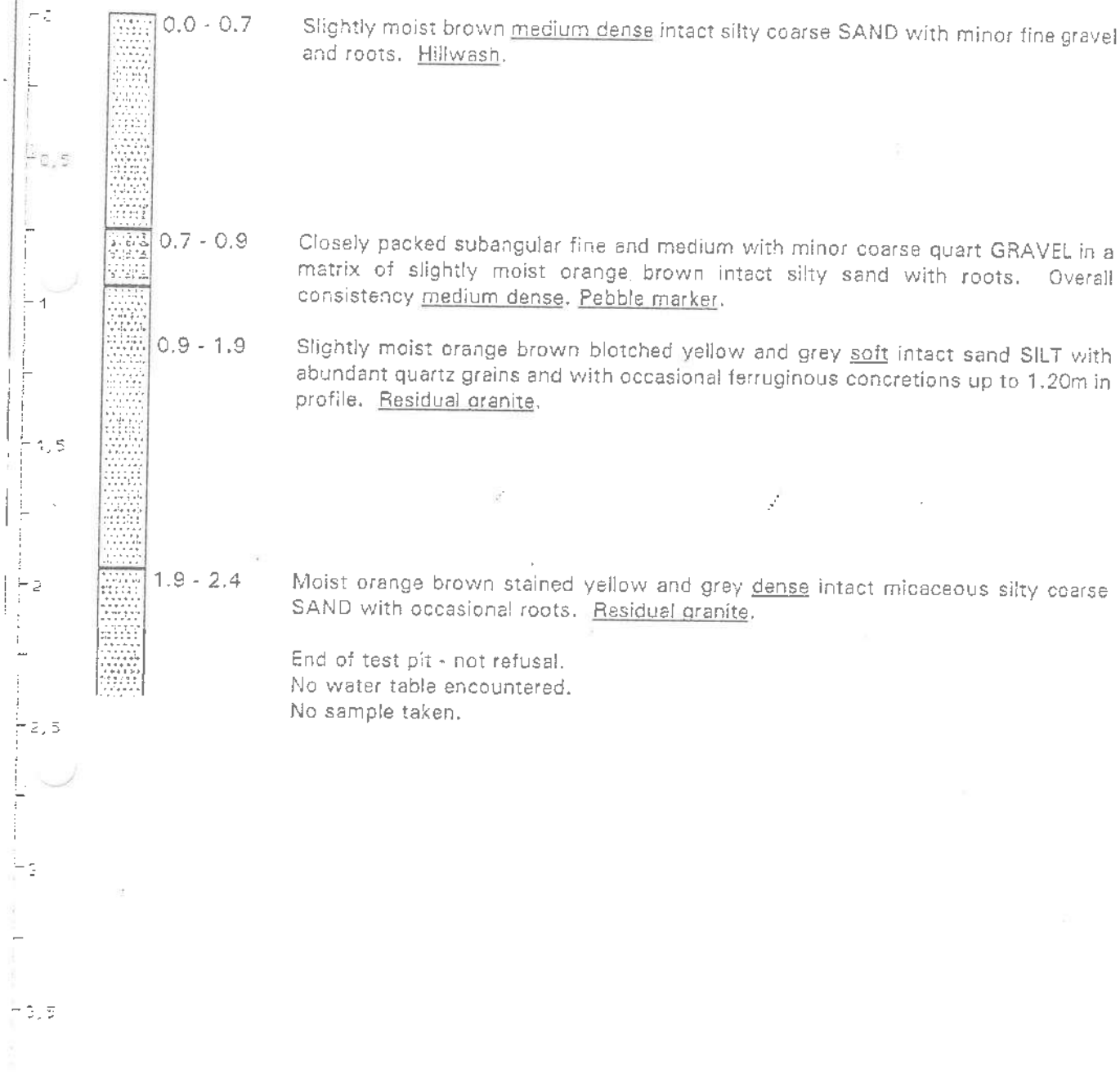
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REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP1



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3665	SHEET NO	: 1 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 2136551

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



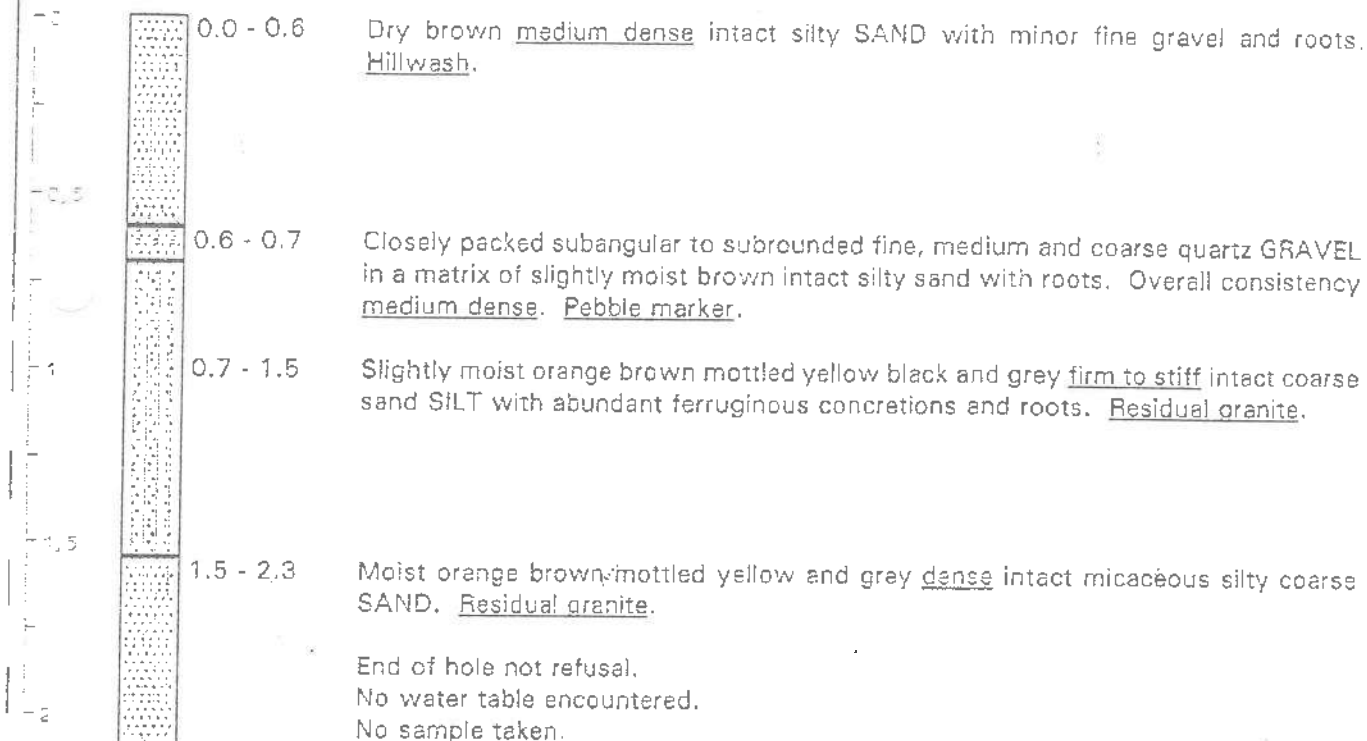
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ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP2



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 2 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO			: 01060502

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317

REG. NO. CK 88/09392/23



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SOIL PROFILE

TEST PIT TP3

0.0 - 0.2	Dry brown <u>medium dense</u> intact silty SAND with roots and abundant gravel in last 50mm of profile. <u>Hillwash</u> .
0.2 - 0.5	Tightly packed FERRUGINOUS CONCRETIONS in a matrix of dry yellowish brown intact silty sand with minor roots. Overall consistency <u>dense to very dense</u> . <u>Nodular ferricrete</u> .
End of hole - abrupt refusal on hardpan ferricrete. No water table encountered. No sample taken.	

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 3 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: p/286503

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1686 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



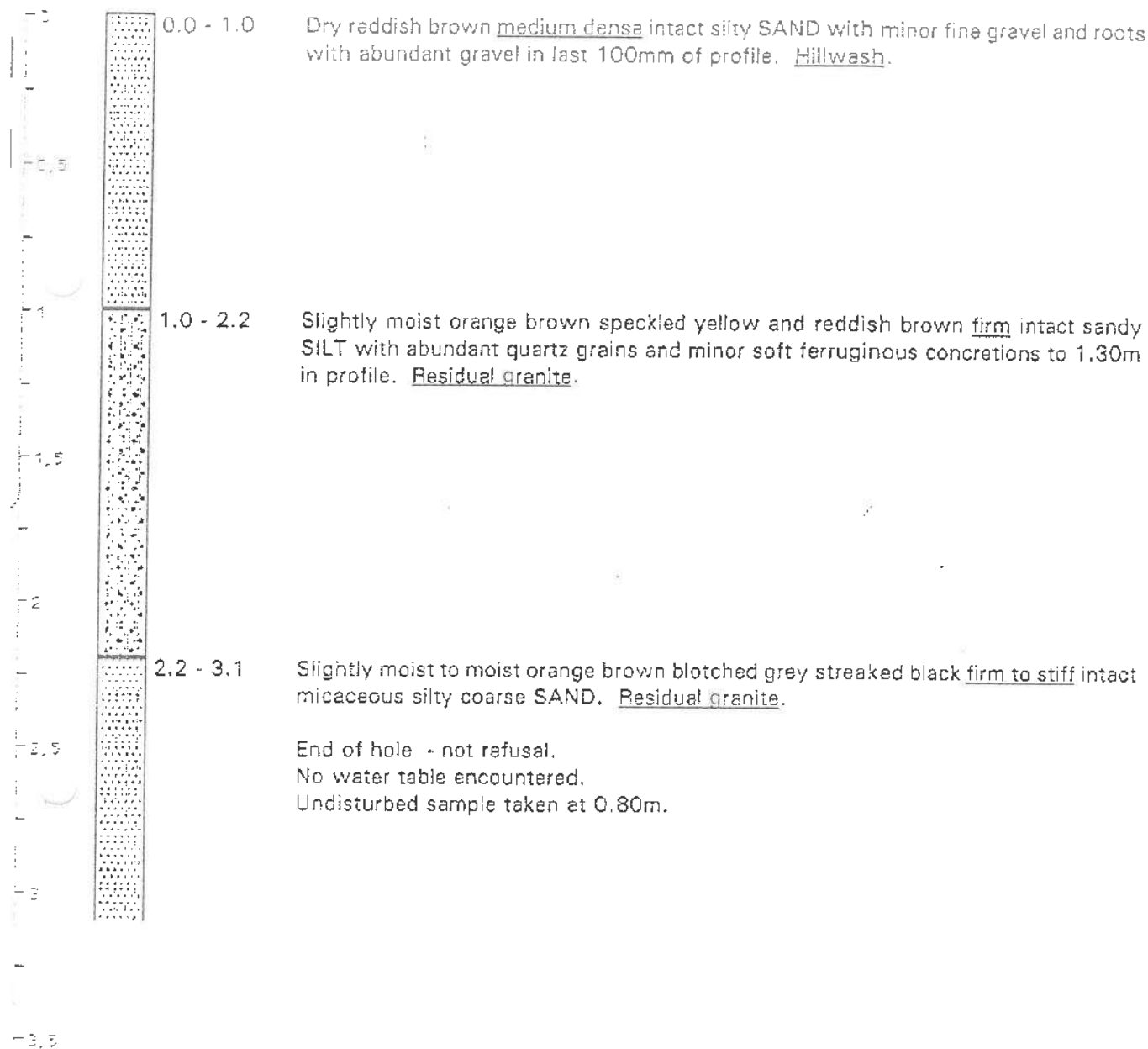
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ENGINEERING GEOLOGISTS

REG. NO. CX 66/09392/23

SOIL PROFILE

TEST PIT TP4



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 4 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		: 07000004

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION.25
 1625 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



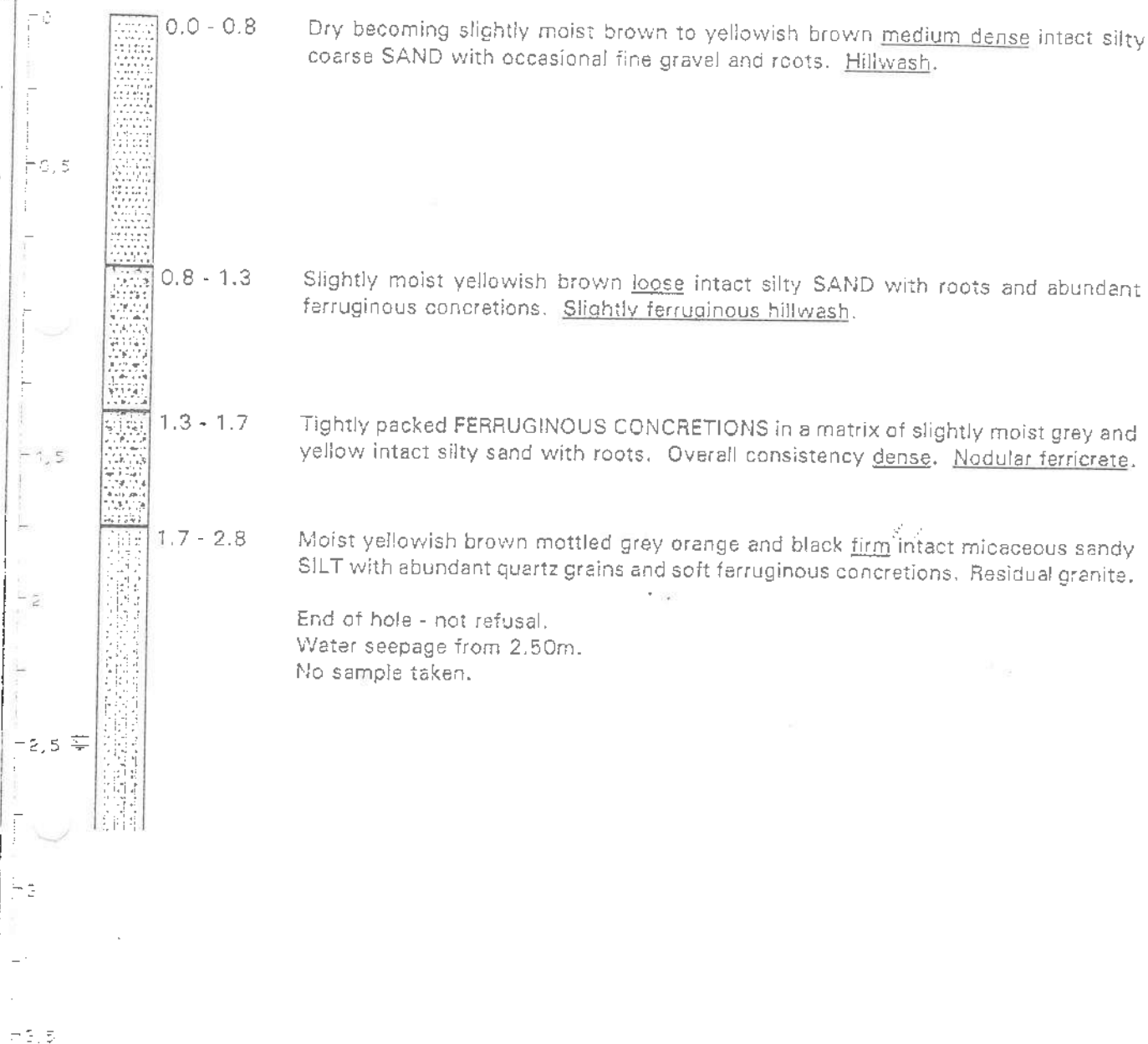
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ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP5



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 5 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		: 356506

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O. BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317

REG. NO. CK 89/05352/23

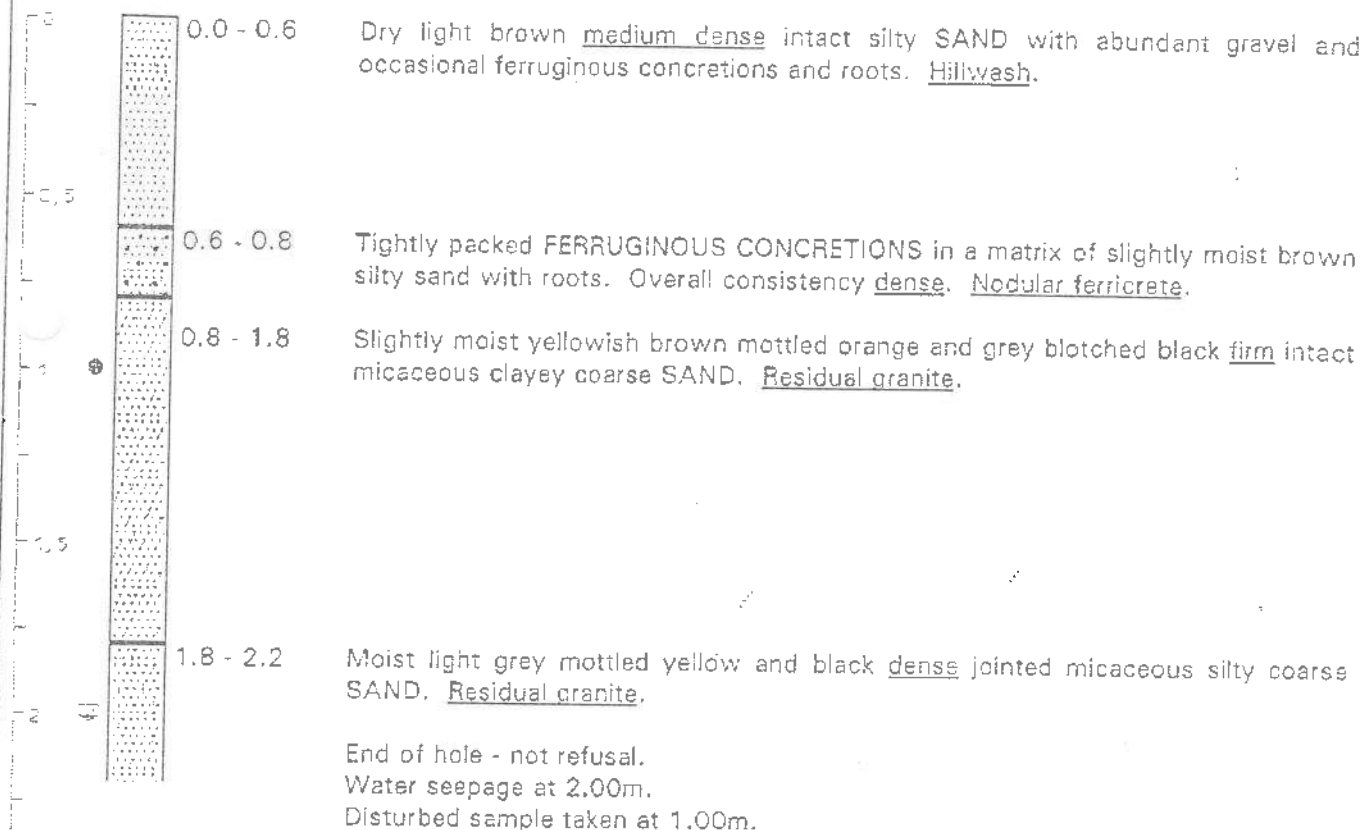


YATES CONSULTING CC

ENGINEERING GEOLOGISTS

SOIL PROFILE

TEST PIT TP6



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 6 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 8/55250

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O. BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



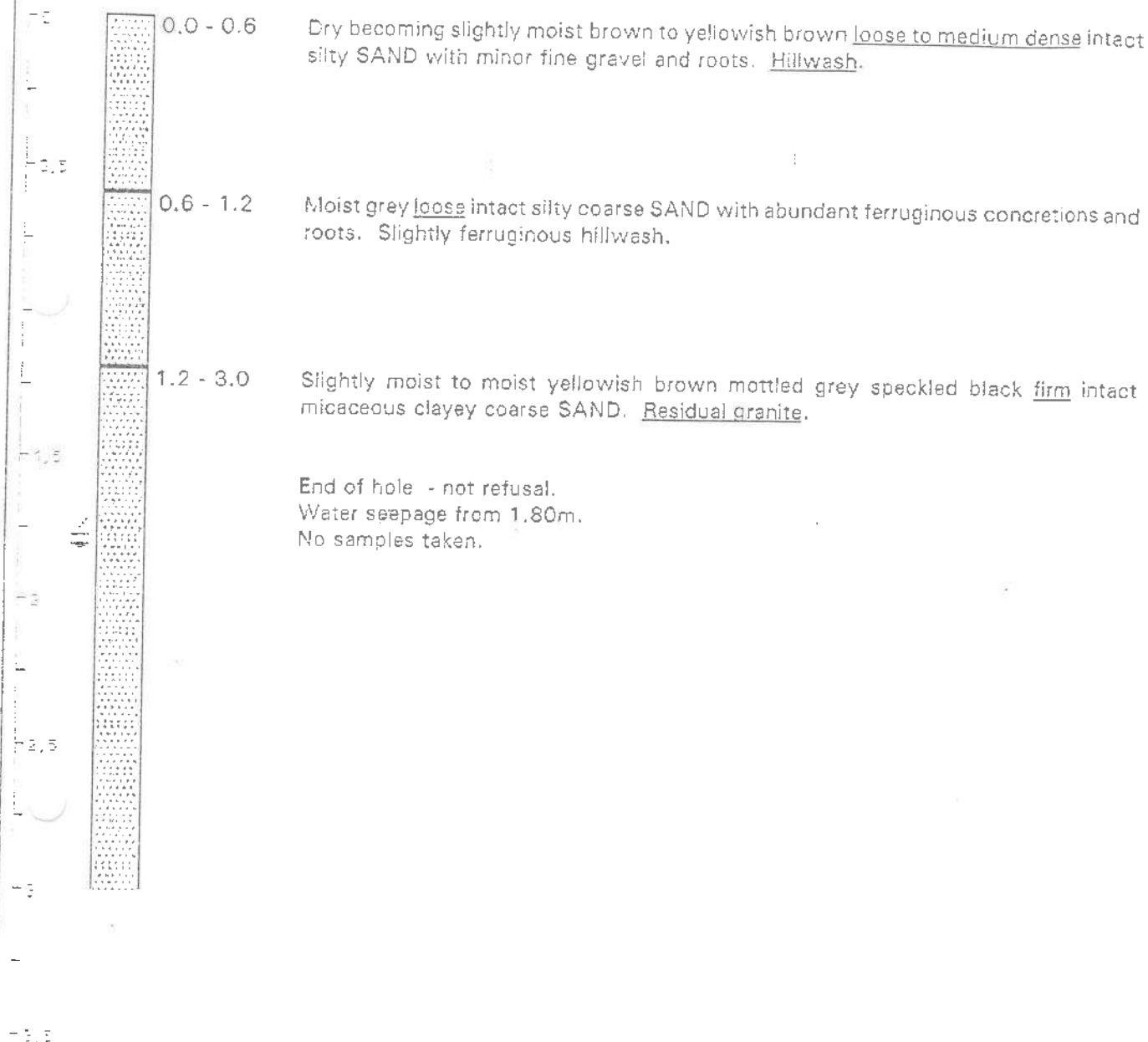
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP7



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 7 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/C9392/23

SOIL PROFILE

TEST PIT TP8

0.0 - 0.5 Slightly moist light yellowish brown medium dense intact silty coarse SAND with roots. Hillwash.

0.5 - 0.9 Moist grey loose intact silty coarse SAND with abundant ferruginous concretions. Hillwash.

0.9 - 2.4 Moist orange brown mottled yellow and grey speckled black firm intact micaceous silty coarse SAND. Residual granite.

End of hole - not refusal.
 Bottom of pit wet.
 No samples taken.

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3555	SHEET NO	: 8 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: E938803

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



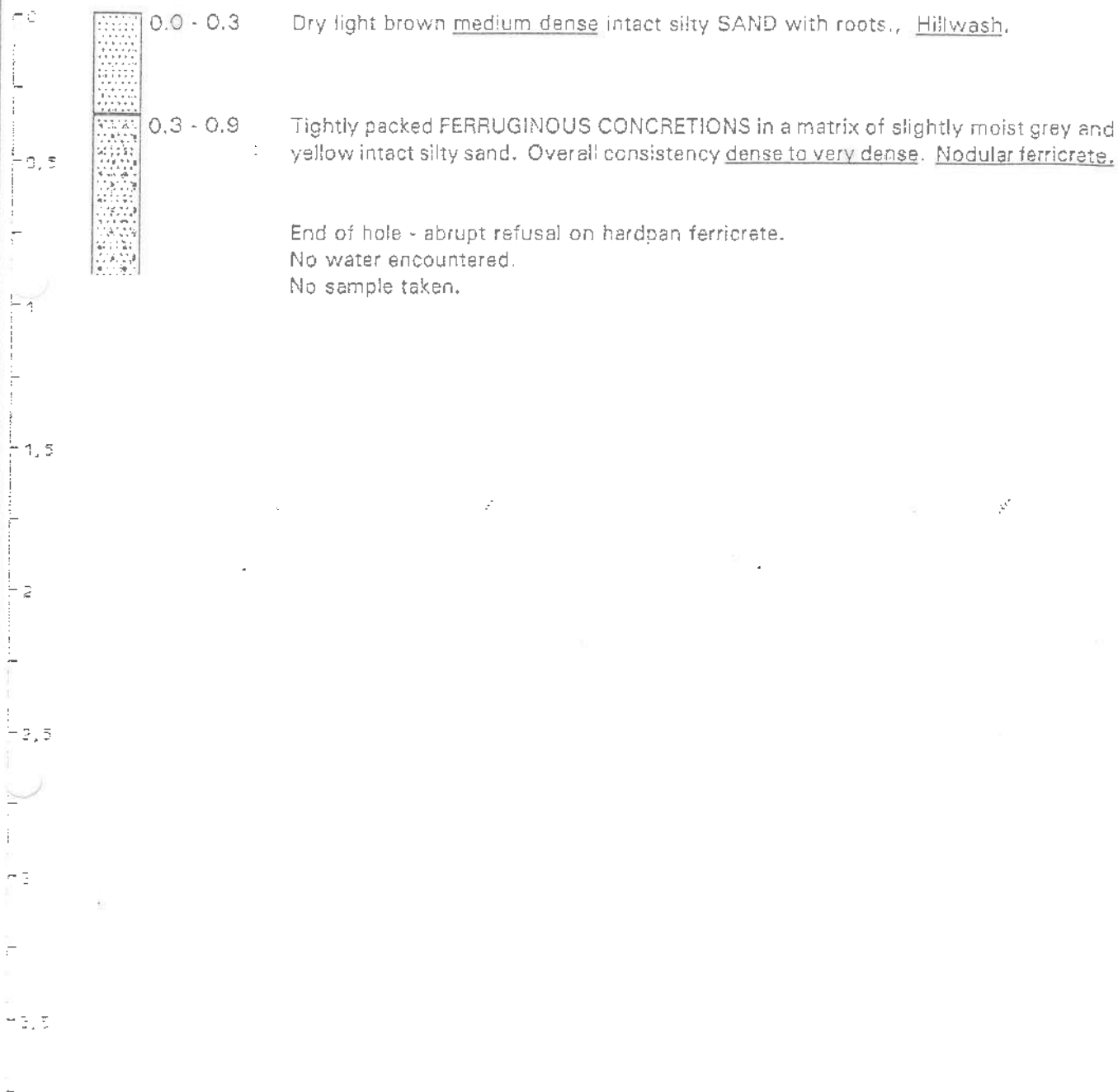
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP10



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 10 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01365511

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



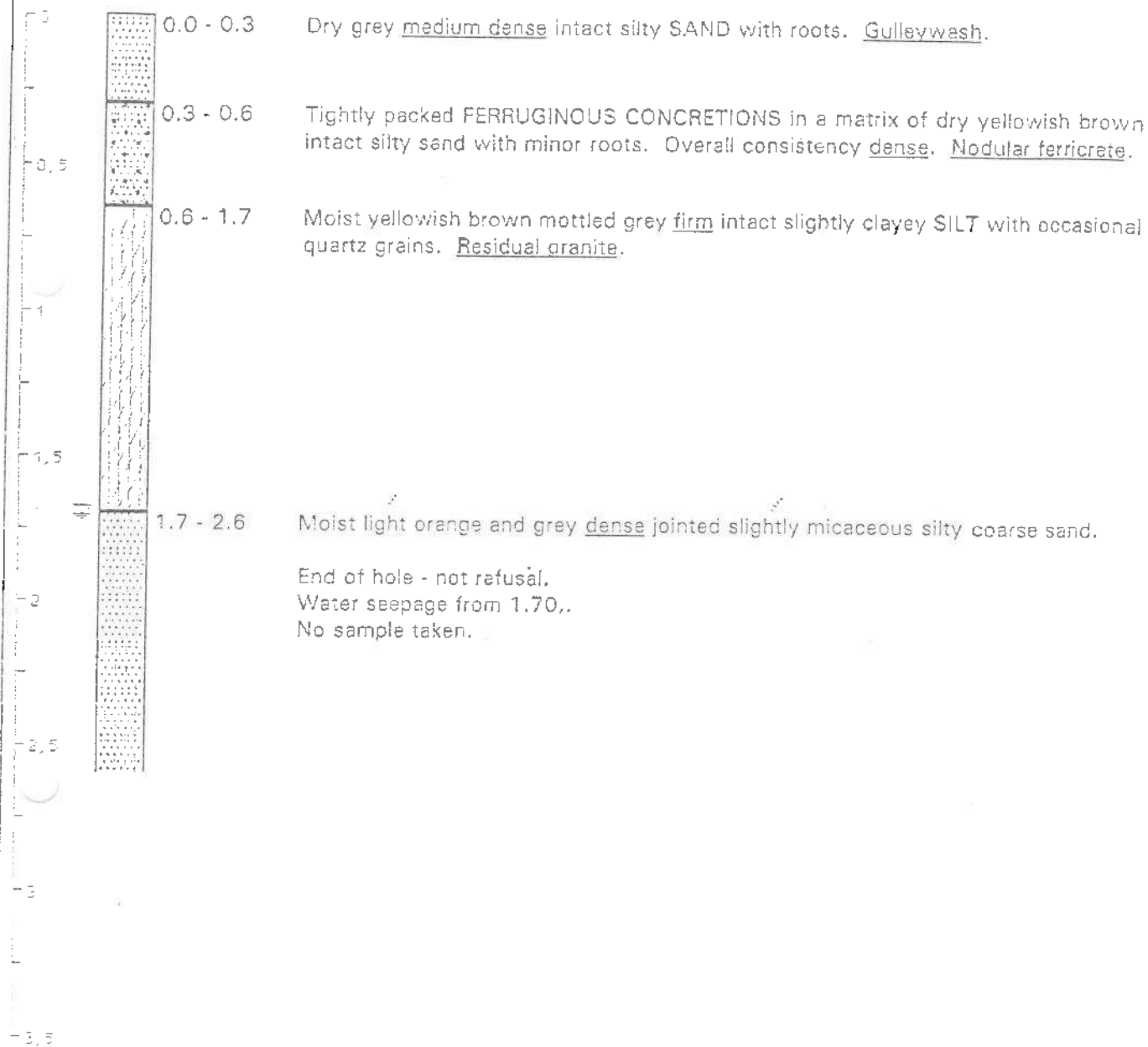
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP11



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 11 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



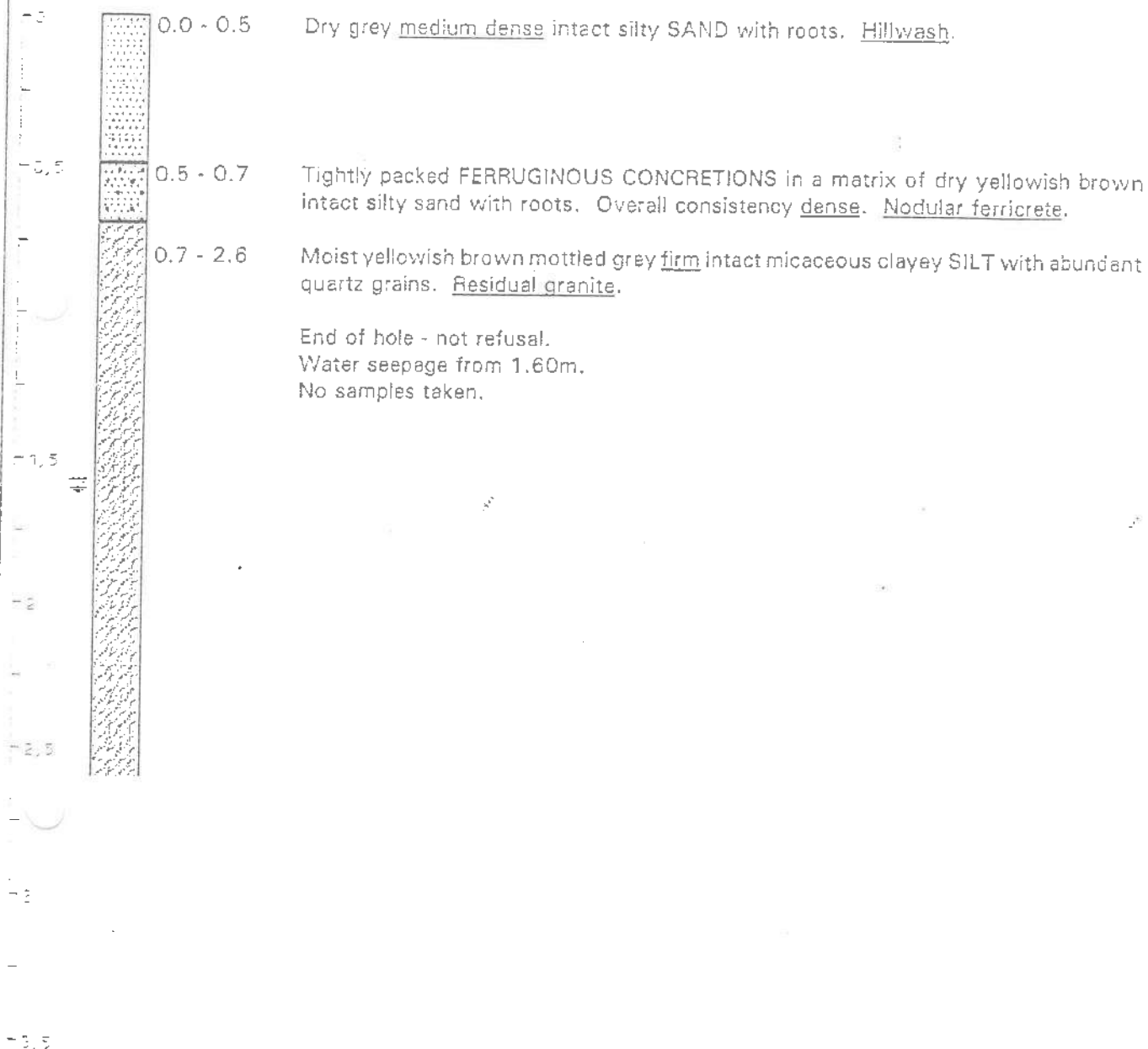
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP12



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 12 of 31
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		: p1056512

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O.BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



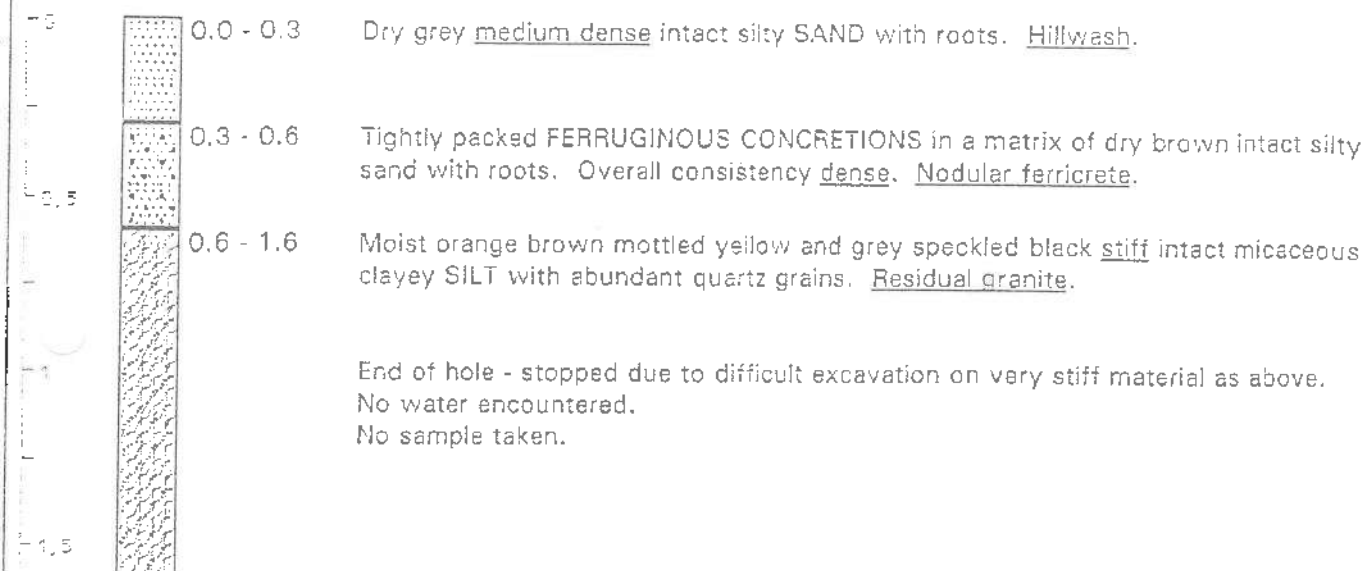
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP13



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 13 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		: 01000011

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1655 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



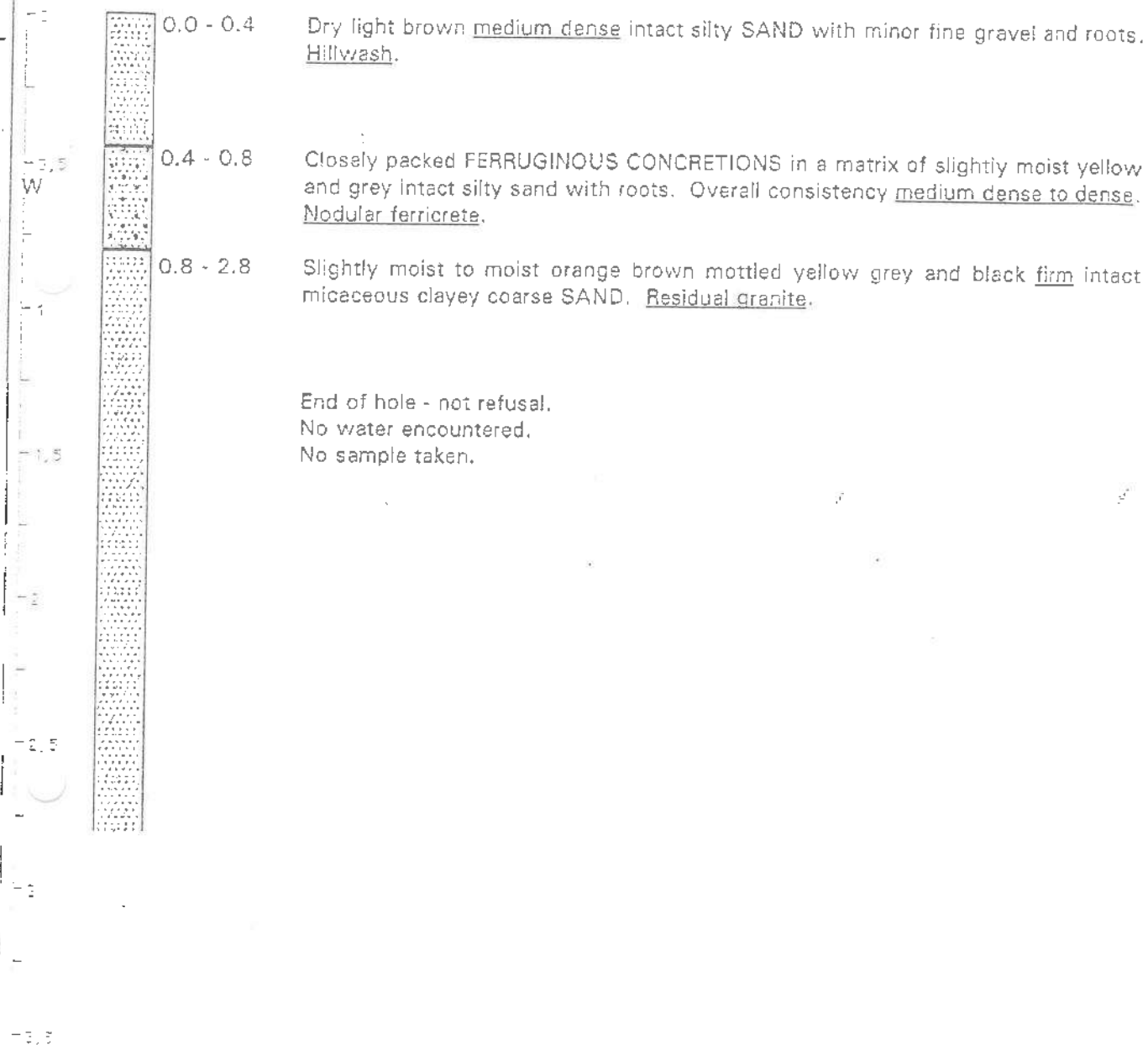
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP9



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 5 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 61356515

APPENDIX C
LABORATORY TEST RESULTS

Klient Client	Yates Consulting	Datum Date	23.10.96	Blaai/Pag Page
Projek Project	Rabie Ridge	Werk Nr. Job No		
Terrein Site		Blk. Nr. Blk. No	4	

KONSOLIDASIE TOETS -- CONSOLIDATION TEST

Diepte van Monster:
Depth of Sample: 0.8 m

Monster: Onverstoord:
Sample: Undisturbed

Monster Beskrywing:
Sample Description $CP_{100}: 7.21\%$

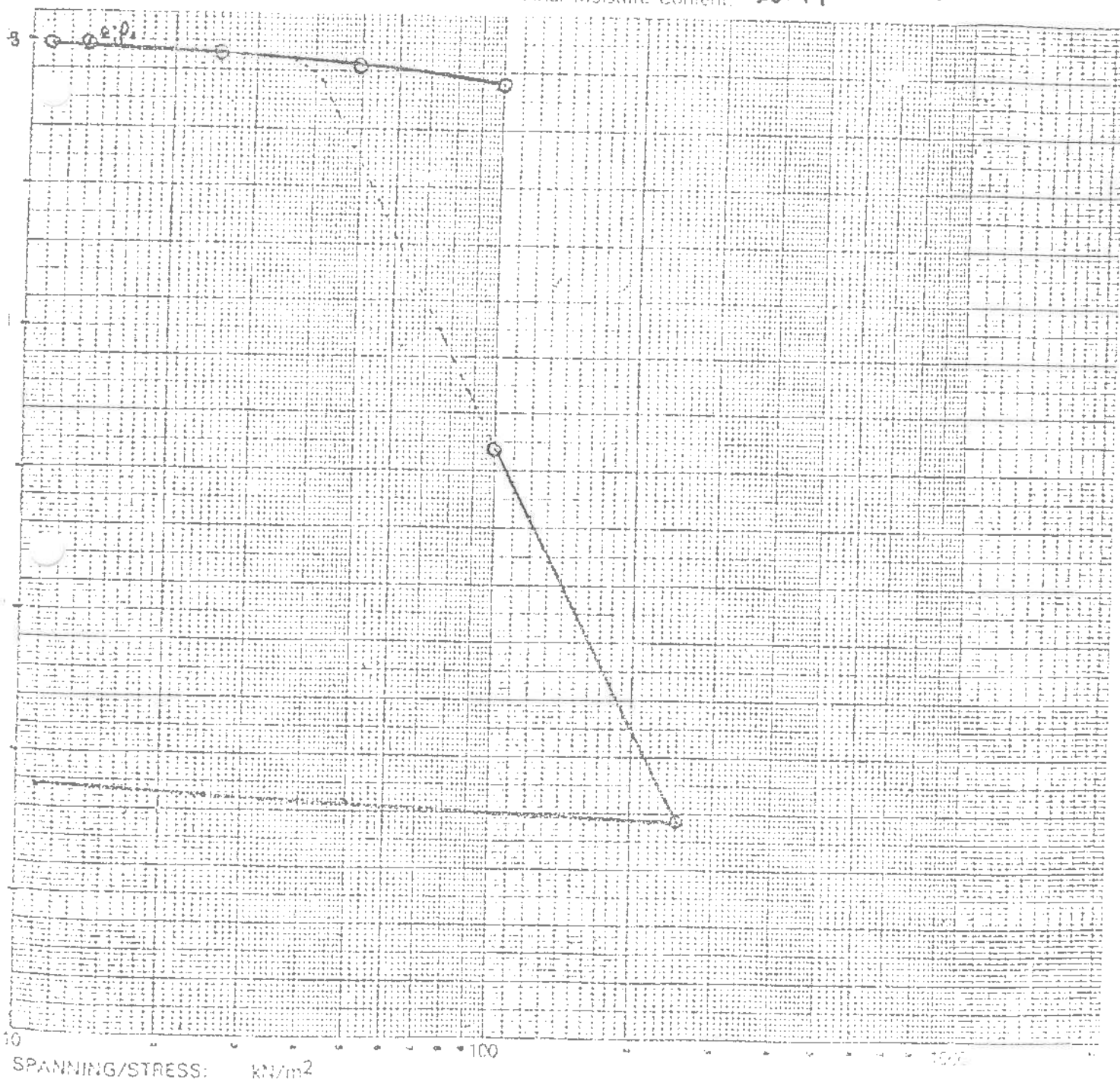
Opmerkings:
Comments: 100

Seerlike Gewig:
Specific Gravity: 2.61

Aanvanklike Droë Digtheid:
Initial Dry Density: 1451 kg/m^3

Aanvanklike Voggelalte:
Initial Moisture Content: 8.44 %

Finale Voggelalte:
Final Moisture Content: 20.49 %



SPANNING/STRESS: kN/m^2

CLIENT Yates Consulting

PROJECT Rabie Ridge

SITE

DATE 27.10.96

JOB No

TEST No 4



KONSOLIDASIE TOETS - CONSOLIDATION TEST

Diepte van Monstert: 0.8m
Depth of Sample:

Opmerking: Soaked at 100 kPa
Remarks:

Toets Hammer:
Test Number: 1

Volgnummer: 9446
Serial Number:

TYD-VERSACKINGS LESINGS TIME-SETTLEMENT READINGS

Load	kN/m ²	25		50		100		250		500		1000		2000	
Corrected		1	7	2	11	3	15	4	22	5		6		7	
Time	(min - 1)	Meter Reading		Dial Reading		Meter Reading		Dial Reading		Meter Reading		Dial Reading		Meter Reading	
√ t	t	5	5h	5	5h	5	5h	5	5h	5	5h	5	5h	5	5h
0.0	0.00	1	1	25	14	32	41	80.9	79.1						
0.2	0.04	10	12	41	30	14	39	127.2	123.1						
0.3	0.09	21	14	42	31	15	40	129.7	123.5						
0.4	0.16	31	14	42	31	16	41	131.1	126.9						
0.5	0.25	41	14	42	31	17	42	132.2	130.0						
0.6	0.36	51	14	42	31	18	42	132.2	130.0						
0.8	0.64	61	14	42	31	19	42	132.2	130.0						
1.0	1.00	71	14	42	31	20	42	132.2	130.0						
1.5	2.25	82	16	46	35	30	65	146.9	144.7						
2.0	4.00	92	16	46	35	31	66	148.0	143.8						
2.5	6.25	102	16	47	35	32	67	149.2	145.0						
3.0	9.00	112	16	47	35	33	67	150.3	146.5						
3.5	12.25	122	16	47	35	34	67	151.4	147.0						
4.0	16.00	132	17	48	37	35	68	152.5	147.7						
5.0	25.00	142	17	49	38	36	69	153.6	148.2						
6.0	36.00	152	18	49	38	37	69	154.7	148.7						
7.0	49.00	162	18	49	38	38	70	155.8	149.0						
8.0	64.00	172	18	49	38	39	70	156.9	149.2						
9.0	81.00	182	18	50	39	40	71	158.0	149.5						
10.0	100.00	192	18	50	39	41	71	159.1	149.7						
15.0	225.00	202	19	51	40	42	72	160.2	150.0						
20.0	400.00	212	19	52	41	43	72	161.3	150.4						
25.0	625.00	222	19	52	41	44	72	162.4	150.8						
30.0	900.00	232	19	52	41	45	72	163.5	151.2						
35.0	1225.00	242	19	52	41	46	72	164.6	151.7						
40.0	1600.00	252	19	52	41	47	72	165.7	152.2						
45.0	2025.00	262	19	52	41	48	72	166.8	152.7						
50.0	2500.00	272	19	52	41	49	72	167.9	153.2						
55.0	3025.00	282	19	52	41	50	72	169.0	153.7						
60.0	3600.00	292	19	52	41	51	72	170.1	154.2						
65.0	4225.00	302	19	52	41	52	72	171.2	154.7						
70.0	4900.00	312	19	52	41	53	72	172.3	155.2						
75.0	5625.00	322	19	52	41	54	72	173.4	155.7						
80.0	6400.00	332	19	52	41	55	72	174.5	156.2						
85.0	7225.00	342	19	52	41	56	72	175.6	156.7						
90.0	8100.00	352	19	52	41	57	72	176.7	157.2						
95.0	9025.00	362	19	52	41	58	72	177.8	157.7						
100.0	10000.00	372	19	52	41	59	72	178.9	158.2						
105.0	11025.00	382	19	52	41	60	72	179.0	158.7						
110.0	12100.00	392	19	52	41	61	72	180.1	159.2						
115.0	13225.00	402	19	52	41	62	72	181.2	159.7						
120.0	14400.00	412	19	52	41	63	72	182.3	160.2						
125.0	15625.00	422	19	52	41	64	72	183.4	160.7						
130.0	16900.00	432	19	52	41	65	72	184.5	161.2						
135.0	18225.00	442	19	52	41	66	72	185.6	161.7						
140.0	19600.00	452	19	52	41	67	72	186.7	162.2						
145.0	21025.00	462	19	52	41	68	72	187.8	162.7						
150.0	22500.00	472	19	52	41	69	72	188.9	163.2						
155.0	24025.00	482	19	52	41	70	72	189.0	163.7						
160.0	25600.00	492	19	52	41	71	72	190.1	164.2						
165.0	27225.00	502	19	52	41	72	72	191.2	164.7						
170.0	28900.00	512	19	52	41	73	72	192.3	165.2						
175.0	30625.00	522	19	52	41	74	72	193.4	165.7						
180.0	32400.00	532	19	52	41	75	72	194.5	166.2						
185.0	34225.00	542	19	52	41	76	72	195.6	166.7						
190.0	36100.00	552	19	52	41	77	72	196.7	167.2						
195.0	38025.00	562	19	52	41	78	72	197.8	167.7						
200.0	40000.00	572	19	52	41	79	72	198.9	168.2						
205.0	42025.00	582	19	52	41	80	72	199.0	168.7						
210.0	44100.00	592	19	52	41	81	72	200.1	169.2						
215.0	46225.00	602	19	52	41	82	72	201.2	169.7						
220.0	48400.00	612	19	52	41	83	72	202.3	170.2						
225.0	50625.00	622	19	52	41	84	72	203.4	170.7						
230.0	52900.00	632	19	52	41	85	72	204.5	171.2						
235.0	55225.00	642	19	52	41	86	72	205.6	171.7						
240.0	57600.00	652	19	52	41	87	72	206.7	172.2						
245.0	60025.00	662	19	52	41	88	72	207.8	172.7						
250.0	62500.00	672	19	52	41	89	72	208.9	173.2						
255.0	65025.00	682	19	52	41	90	72	209.0	173.7						
260.0	67600.00	692	19	52	41	91	72	210.1	174.2						
265.0	70225.00	702	19	52	41	92	72	211.2	174.7						
270.0	72900.00	712	19	52	41	93	72	212.3	175.2						
275.0	75625.00	722	19	52	41	94	72	213.4	175.7						
280.0	78400.00	732	19	52	41	95	72	214.5	176.2						
285.0	81225.00	742	19	52	41	96	72	215.6	176.7						
290.0	84100.00	752	19	52	41	97	72	216.7	177.2						
295.0	87025.00	762	19	52	41	98	72	217.8	177.7						
300.0	90000.00	772	19	52	41	99	72	218.9	178.2						
305.0	93025.00	782	19	52	41	100	72	219.0	178.7						
310.0	96100.00	792	19	52	41	101	72	220.1	179.2						
315.0	99225.00	802	19	52	41	102	72	221.2	179.7						
320.0	102400.00	812	19	52	41	103	72	222.3	180.2						
325.0	105625.00	822	19	52	41	104	72	223.4	180.7						
330.0	108900.00	832	19	52	41	105	72	224.5	181.2						
335.0	112225.00	842	19	52	41	106	72	225.6	181.7						
340.0	115600.00	852	19	52	41	107	72	226.7	182.2						
345.0	119025.00	862	19	52	41	108	72	227.8	182.7						
350.0	122500.00	872	19	52	41	109	72	228.9	183.2						
355.0	126025.00	882	19	52	41	110	72	229.0	183.7						
360.0	129600.00	892	19	52	41	111	72	230.1	184.2						
365.0	133225.00	902	19	52	41	112	72	231.2	184.7						
370.0	136900.00	912	19	52	41	113	72	232.3	185.2						
375.0	140625.00	922	19	52	41	114	72	233.4	185.7						
380.0	144400.00	932	19	52	41	115	72	234.5	186.2						
385.0	148225.00	942	19	52	41	116	72	235.6	186.7						
390.0	152100.00	952	19	52	41	117	72	236.7	187.2						
395.0	156025.00	962	19	52	41	118	72	237.8	187.7						
400.0	160000.00	972	19	52	41										

CLIENT Yates Consulting

DATE 22.10.96

PROJECT Rabie Ridge

JOB No

SITE

TEST No 4



KONSOLIDASIE TOETS - CONSOLIDATION TEST

Diepte van Monster: 0.8 -

Depth of

Sample:

Opmerking: Soaked at 100 kpa

Remarks:

Volg No.: 9446

Serial No.:

Toets Nr. 1

Test No.:

Aangevande Druk Applied Pressure	Finale Meterlezing Final Dial Reading	Dikte Verandering Change in Thickness	Monster Hoogte Sample Thickness	Ruimte Hoogte Height of Voids	Ruimte Verhouding Void Ratio $e = \frac{H - H_s}{H_s}$
kN / m ²	mm	ΔH mm	H mm	H-Hs mm	
0	0		20.000	8.885	.799
11	.008		19.992		.799
25	.078		19.962		.796
50	.082		19.918		.792
100	.146		19.854		.786
	1.593		18.412		.637
250	2.024		16.976		.527
500					
1000					
2000					
1000					
500					
250					
125	2.000		17.000		.529
50	2.966		17.024		.527
25	2.978		17.062		.525
11	2.900		17.100		.528
0					
11					
25					
50					
125					
250					
500					
1000					
2000					

KONSOLIDASIE PARAMETERS - CONSOLIDATION PARAMETERS

	Terrain Monster Field Sample	Toets Monster Test Sample		
VOLUME water verzadigd silt			$e_0 = \frac{e_L - e}{\log_{10} \sigma'_L - \log_{10} \sigma'_L}$	
VOLUME Voids			$A_v = \frac{e_L - e}{\sigma'_L - \sigma'_L}$	
Ruimte Verhouding Void Ratio			$M_v = \frac{e_0}{1 + e_0} \times \frac{1}{\Delta \sigma}$	
0.42 e				
Gemiddelde Origineel Average Density				
e_0	est. P_0	17 kPa		

SOILTECH

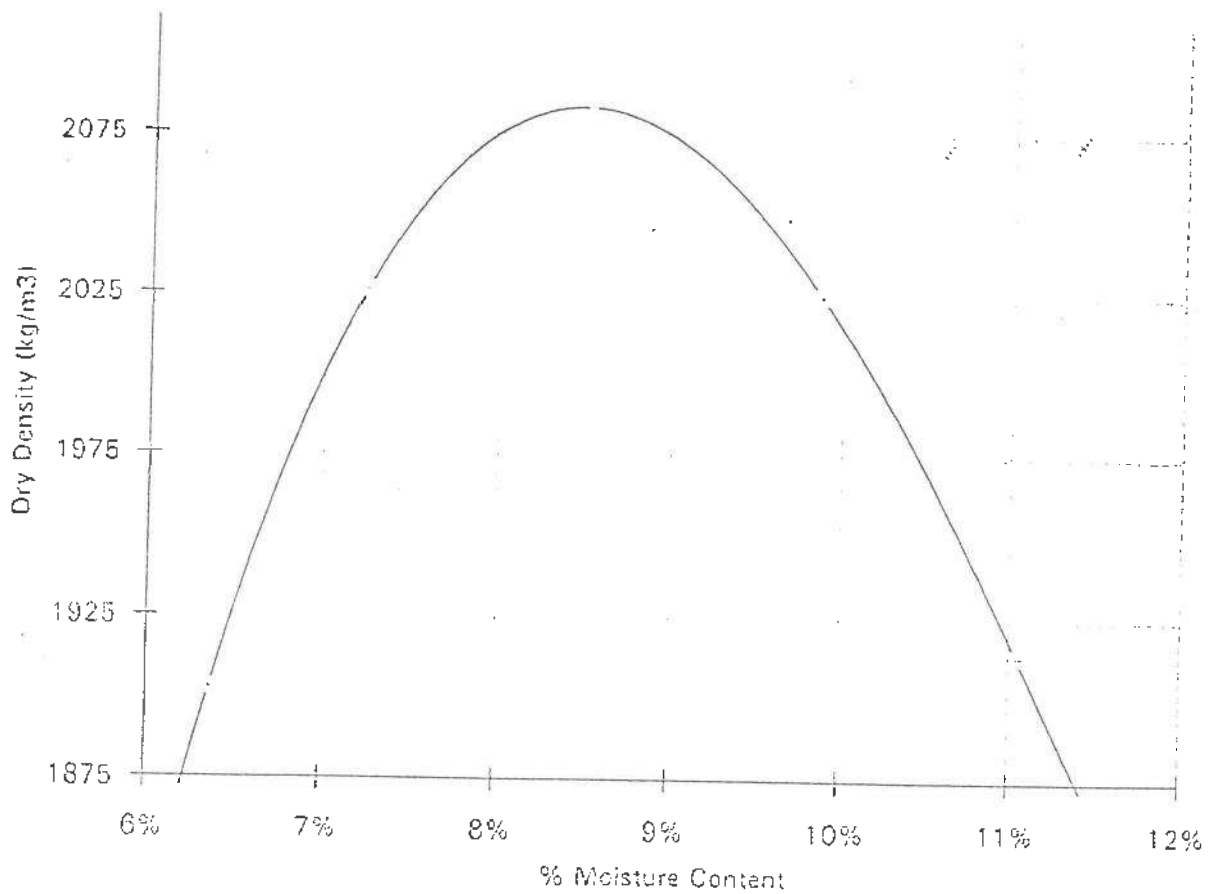


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MOISTURE DENSITY TEST

Client	Yates Consulting (Acc No. YA 001)		Date	18/10/98
Project	Rabie Ridge		Job #	19607
Site	-			
Test Pos	TP. 21		Depth	0.0 - 1.0m
Sample	-			
	Moisture Content	Dry Density (kg/m ³)	Maximum Dry Density (kg/m ³)	2083
1	9.9%	2024.9		
2	11.0%	1914.1		
3	7.2%	2026.3	Optimum Moisture Content	8.5%
4	6.4%	1903.1		
5				
6				
Compactive Effort		MOD / CES		
Remarks		Unstabilised		





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CALIFORNIA BEARING RATIO

Client Project Site	Yates Consulting (Acc No. YA 001) Rabie Ridge	Date Job #	18/10/96 19607
Test Pos Sample	TP. 21	Depth	0.0 - 1.0m

MOD Details

Max Dry Density kg/m³
Opt Moisture Content %

2033
8.5

Moisture Content of CBR Sample

Test 1

Test 2

8.7%

8.4%

Average:

8.6%

Samples:

(a)

(b)

(c)

Compaction Data

Dry Density kg/m³
Compaction

2056
98.7%

1984
95.3%

1895
91.0%

Expansion Data

% Swell after 4 days

0.21%

0.10%

0.06%

CBR Values

@ 2.54mm

37

22

15

@ 5.08mm

58

32

14

@ 7.62mm

54

no data

15

Penetration correction

mm

0

0.25

0

CBR Values at 2.54mm from best fit curve to MOD AASTHO Densities

Density

Compaction

CBR

2033

100%

42

2021

97%

29

1979

95%

23

1937

93%

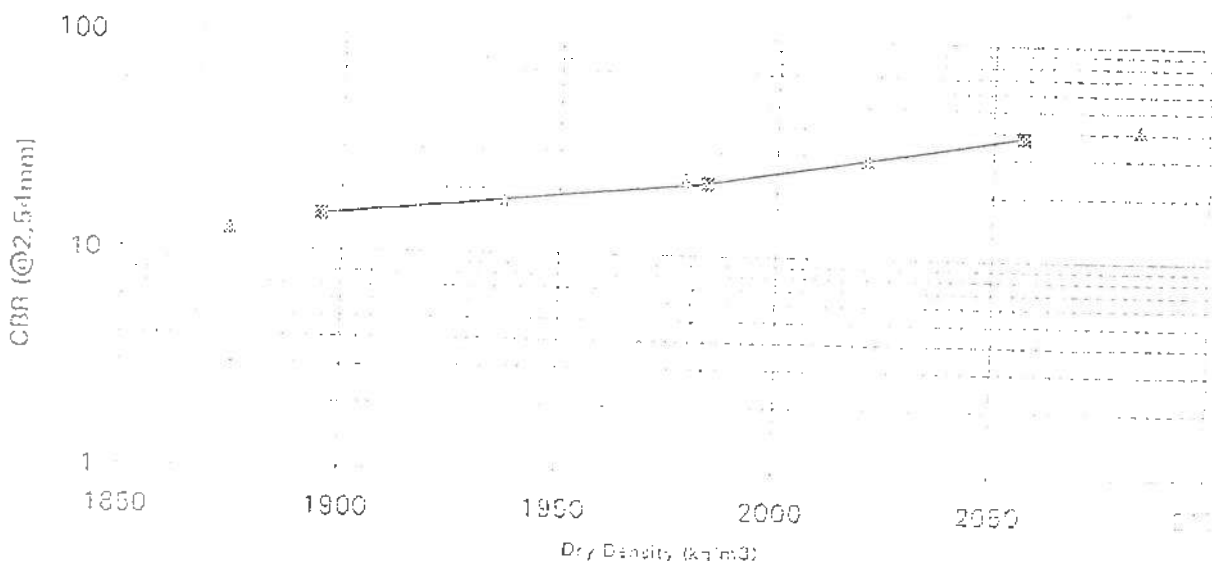
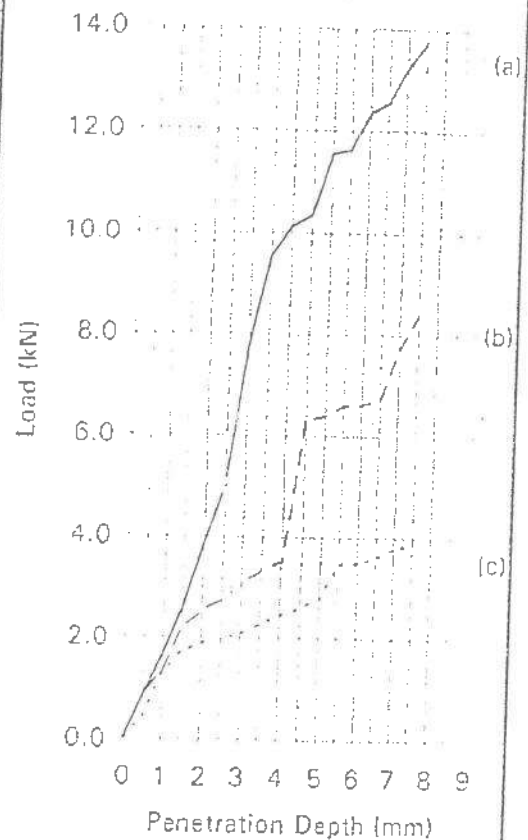
18

1875

90%

13

Penetration Curves



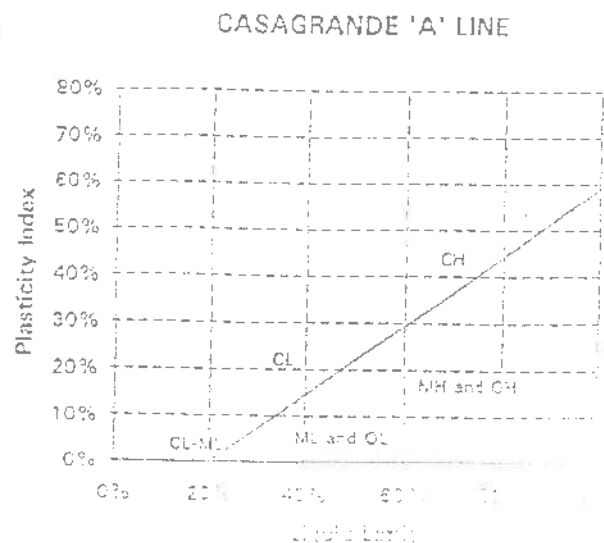
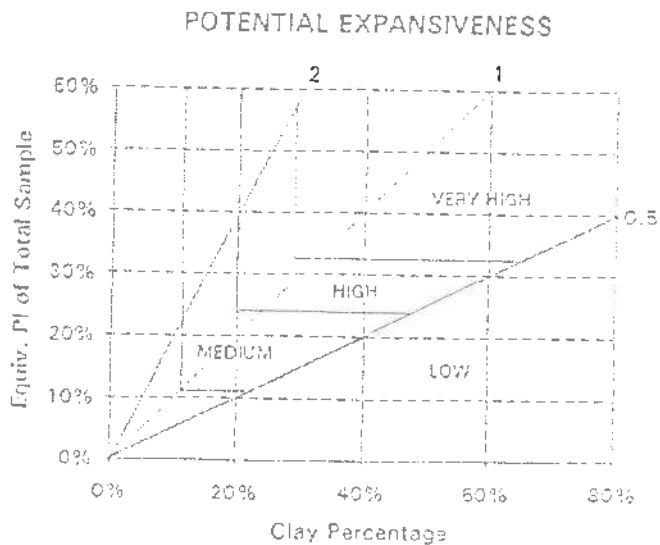
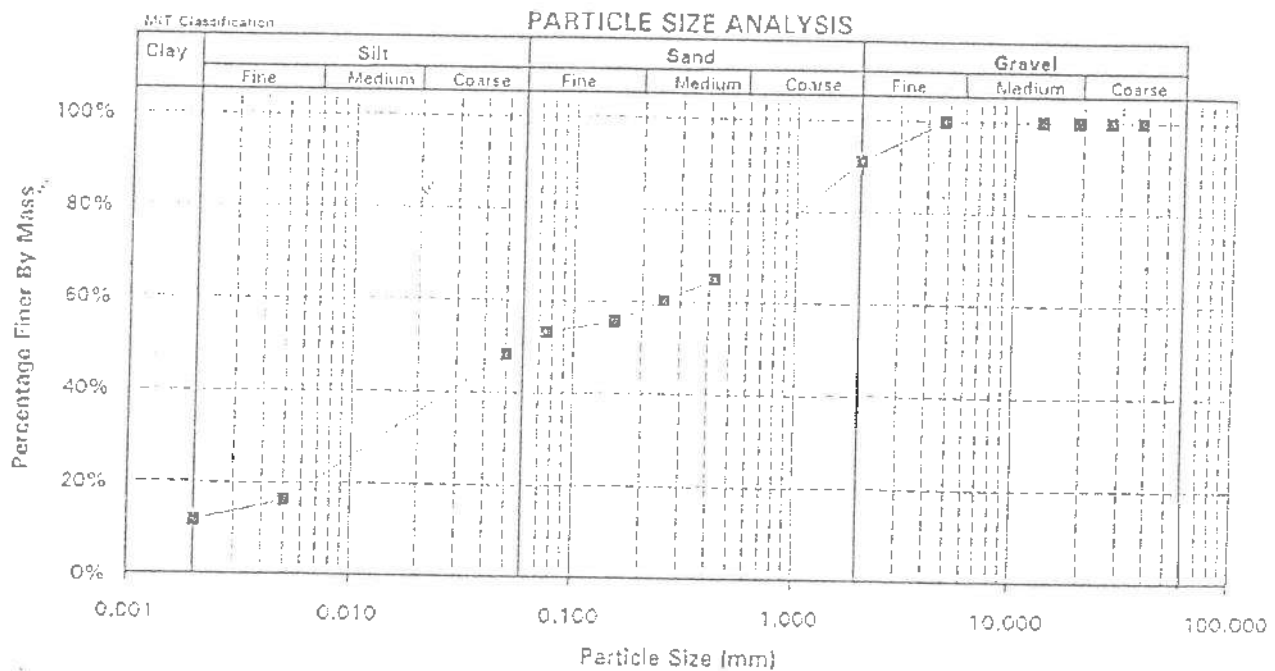


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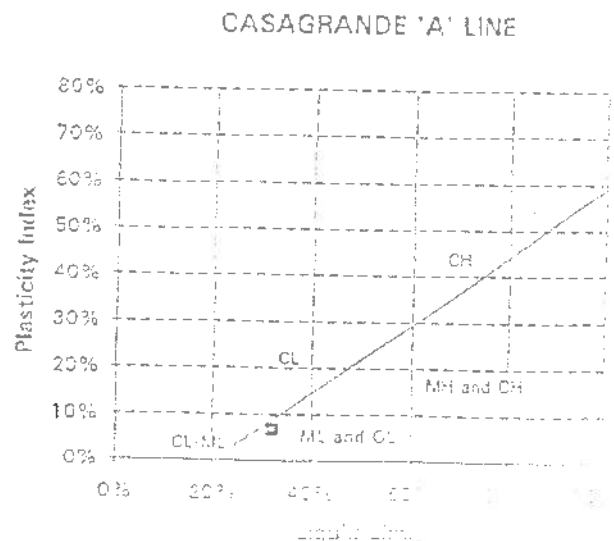
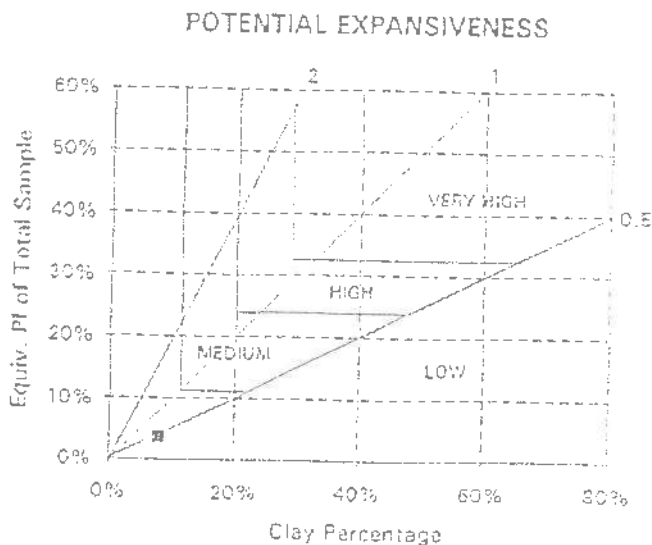
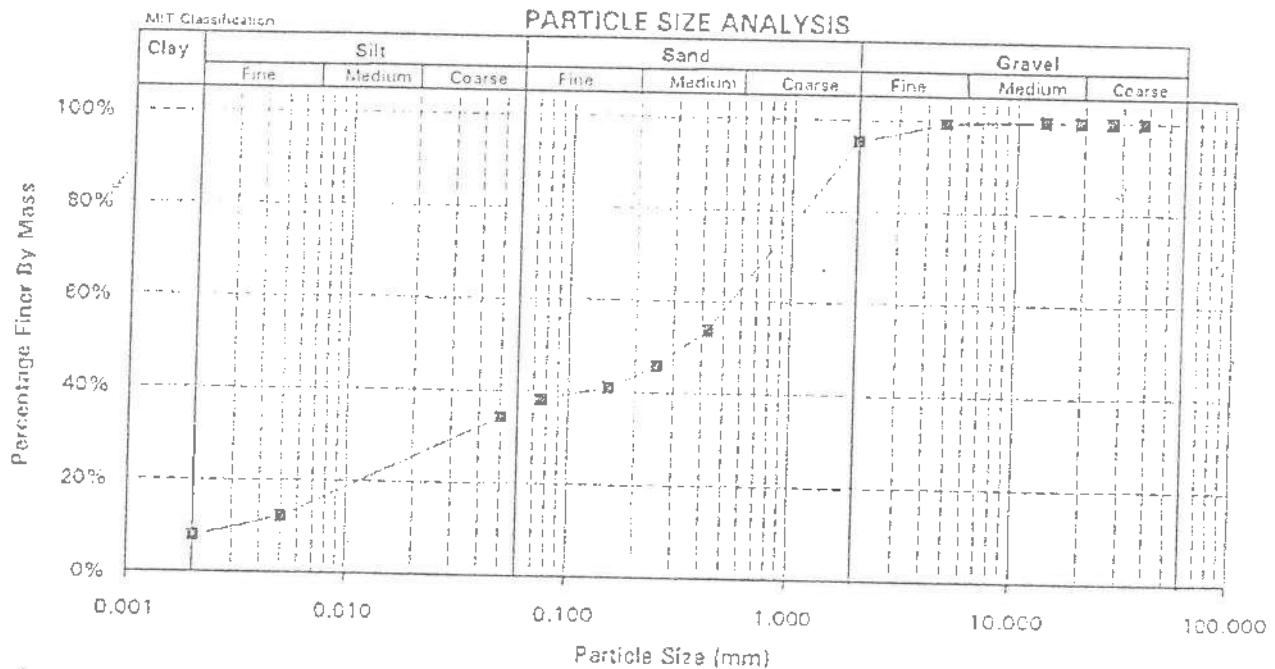
FOUNDATION INDICATOR

Client	Yates Consulting (Acc No. YA 001)				Date	25/10/96	
Project	Rabie Ridge				Job #	19607	
Site	-						
Test Pos	TP4				Depth	0.80m	
Sample	-						
SIEVE ANALYSIS				ATTERBERG LIMITS			
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2	
37.500	100%	0.250	60%	Liquid Limit	#N/A	#N/A	PRA Classification
25.000	100%	0.150	56%	Average	#N/A		Unified Classification
19.000	100%	0.075	53%	Plastic Limit	#N/A	#N/A	PI of whole sample
13.200	100%	0.050	48%	Average	#N/A		% Gravel
4.750	100%	0.005	16%	Plasticity Index (PI)	#N/A		% Sand
2.000	91%	0.002	12%	Linear Shrinkage	0.0%		% Silt
0.425	65%			Grading Modulus	0.91		% Clay



FOUNDATION INDICATOR

Client	Yates Consulting (Acc No. YA 001)				Date	25/10/96	
Project	Rabia Ridge				Job #	19607	
Site							
Test Pos	TP 6				Depth	1.00m	
Sample							
SIEVE ANALYSIS				ATTERBERG LIMITS			
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2	
37.500	100%	0.250	48%	Liquid Limit	32.3%	31.7%	PRA Classification
26.500	100%	0.150	41%	Average	32.0%		Unified Classification
15.000	100%	0.075	38%	Plastic Limit	25.1%	25.5%	PI of whole sample
13.200	100%	0.050	34%	Average	25.3%		% Gravel
4.750	99%	0.005	12%	Plasticity Index (PI)	6.7%		% Sand
2.000	95%	0.002	8%	Linear Shrinkage	3.3%		% Silt
0.425	54%			Grading Modulus	1.13		% Clay





SOILTECH

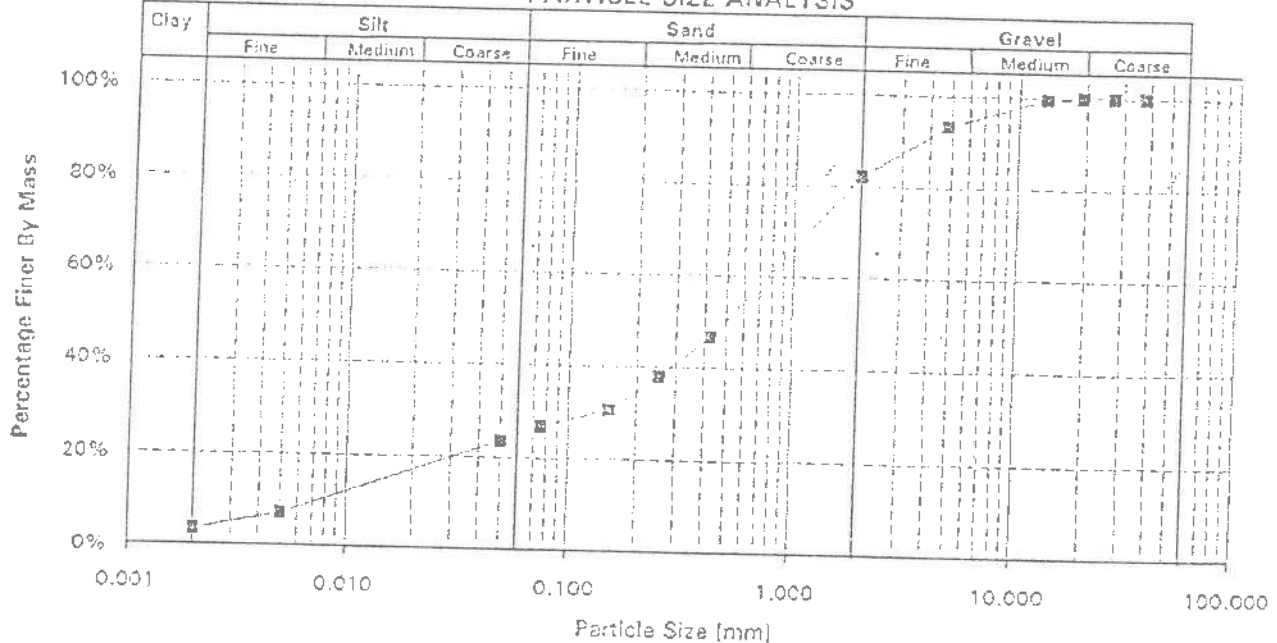
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FOUNDATION INDICATOR

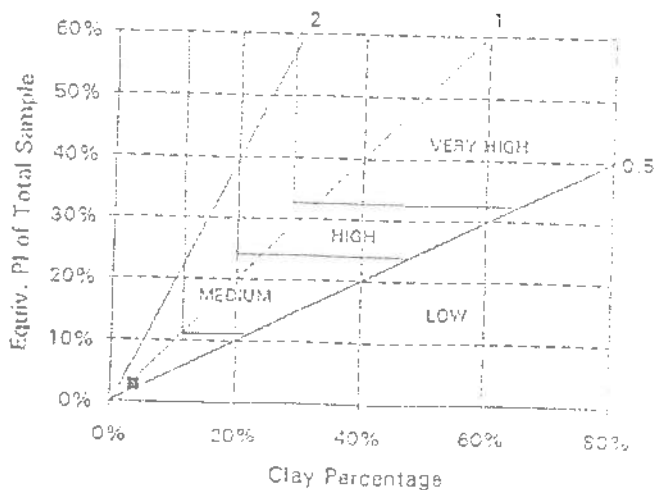
Client	Yates Consulting (Acc No. YA 001)			Date	25/10/95	
Project	Rabie Ridge			Job #	19607	
Site	-					
Test Pos	TP 19			Depth	0.50m	
Sample	-					
SIEVE ANALYSIS				ATTERBERG LIMITS		
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2
37.500	100%	0.250	39%	Liquid Limit	21.7%	21.4%
25.000	100%	0.150	31%	Average	21.6%	
19.000	100%	0.075	27%	Plastic Limit	15.0%	16.8%
13.200	100%	0.050	24%	Average	15.9%	
4.750	93%	0.005	7%	Plasticity Index (PI)	5.7%	
2.000	82%	0.002	4%	Linear Shrinkage	2.7%	
0.425	45%			Grading Modulus	1.44	
				PRA Classification	A-2-4	
				Unified Classification	SC/SM	
				PI of whole sample	2.6%	
				% Gravel	17.8%	
				% Sand	57.1%	
				% Silt	21.5%	
				% Clay	3.6%	

MIT Classification

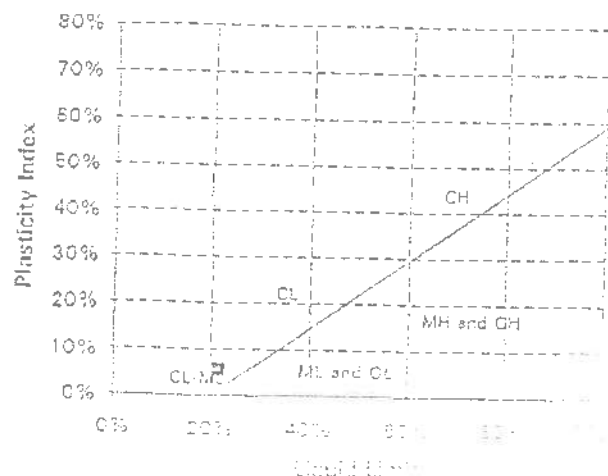
PARTICLE SIZE ANALYSIS



POTENTIAL EXPANSIVENESS

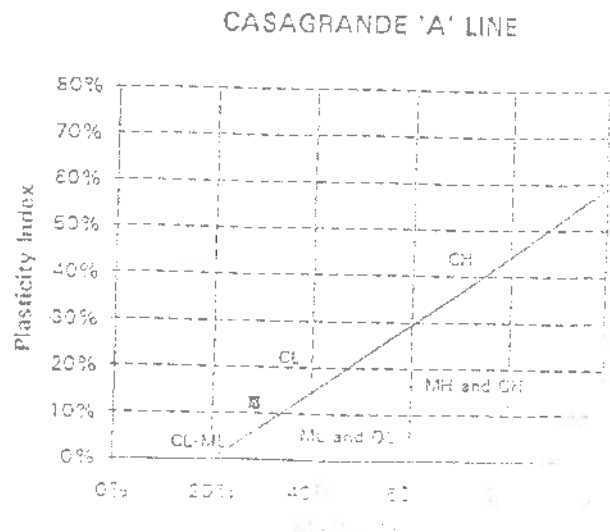
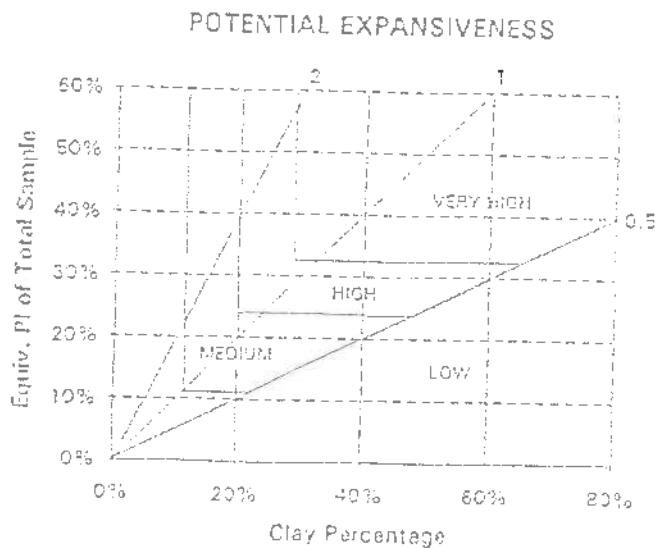
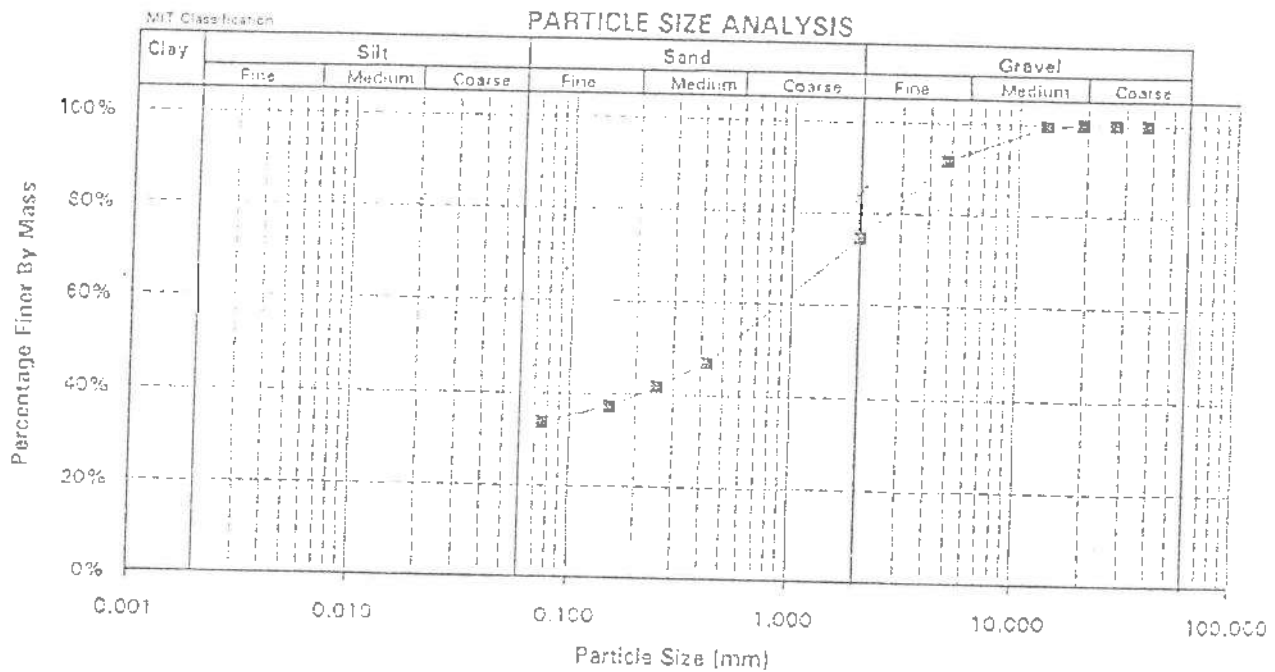


CASAGRANDE 'A' LINE



ROAD INDICATOR

Client	Yates Consulting { Acc No. YA 001 }		Date	25/10/96	
Project Site	Rabie Ridge		Job #	19607	
Test Pos	TP 21		Depth	0.0-1.0m	
Sample					
SIEVE ANALYSIS				ATTERBERG LIMITS	
Sieve(mm)	% Passing	Sieve(mm)	% Passing	Test 1	Test 2
37.500	100%	0.250	42%	Liquid Limit	29.4%
25.000	100%	0.150	37%	Average	28.2%
19.000	100%	0.075	34%	Plastic Limit	16.3%
13.200	100%			Average	16.0%
4.750	92%			Plasticity Index (PI)	16.1%
2.000	74%			Linear Shrinkage	12.2%
0.425	47%			Grading Modulus	4.7%
					1.45
				PRA Classification	A 2.6
				Unified Classification	SC
				PI of whole sample	5.7%
				% Gravel	23%
				% Sand	41%
				% Fine	34%





SOILTECH

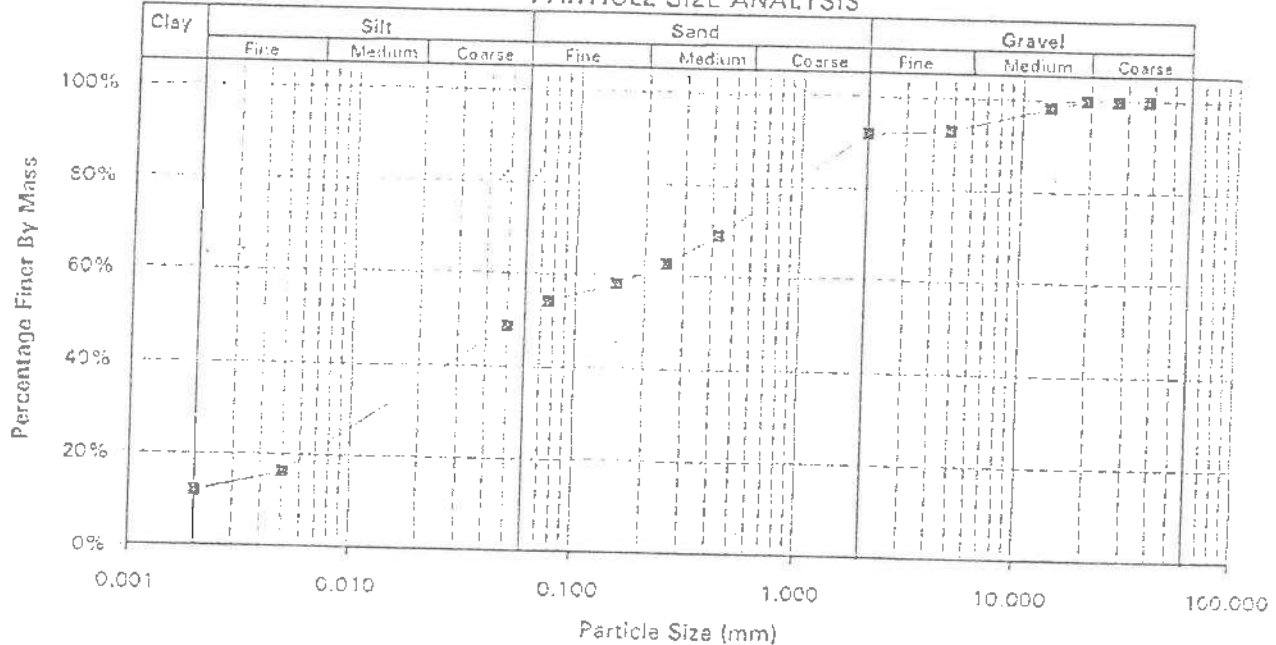
QUALITY IS OUR FOUNDATION

FOUNDATION INDICATOR

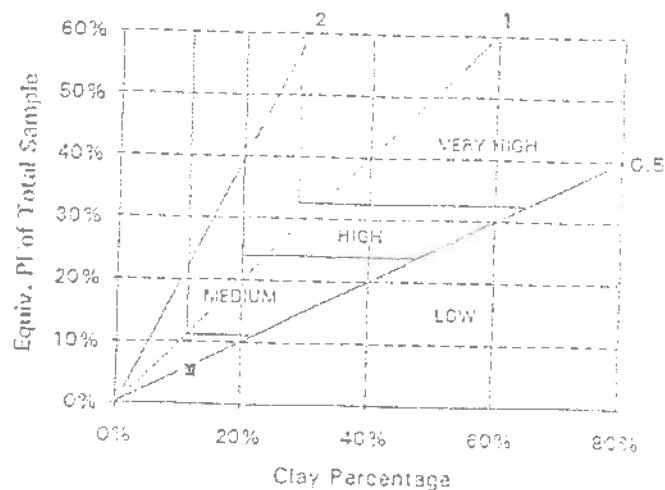
Client	Yates Consulting (Acc No. YA 001)			Date	25/10/96	
Project	Rable Ridge			Job #	19607	
Site						
Test Pos	TH 27			Depth	0.80m	
Sample						
SIEVE ANALYSIS				ATTERBERG LIMITS		
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2
37.500	100%	0.250	63%	Liquid Limit	28.7%	38.6%
26.500	100%	0.150	58%	Average	28.7%	
19.000	100%	0.075	54%	Plastic Limit	20.6%	21.6%
13.200	99%	0.050	49%	Average	21.1%	
4.750	93%	0.005	16%	Plasticity Index (PI)	7.6%	
2.000	92%	0.002	12%	Linear Shrinkage	3.3%	
0.425	69%			Grading Modulus	0.85	

MIT Classification

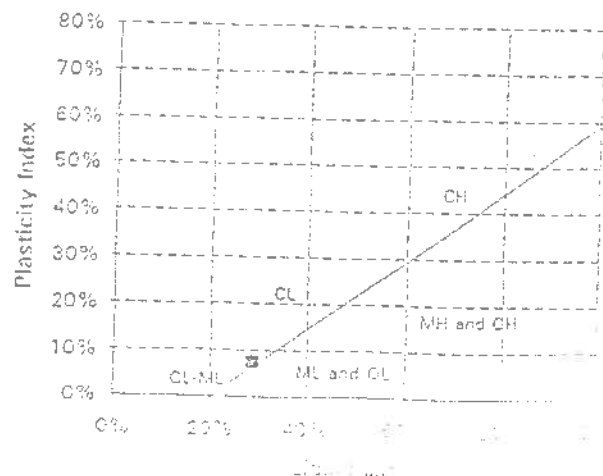
PARTICLE SIZE ANALYSIS



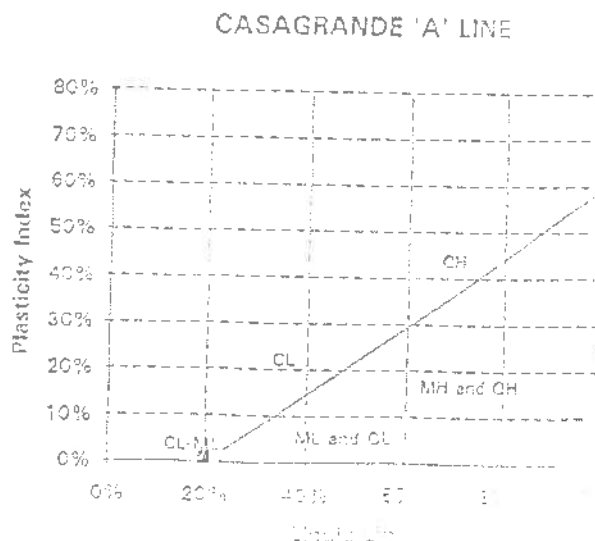
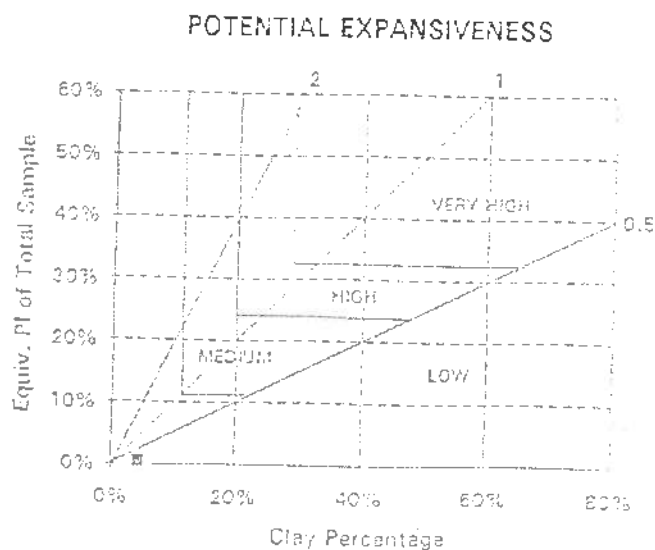
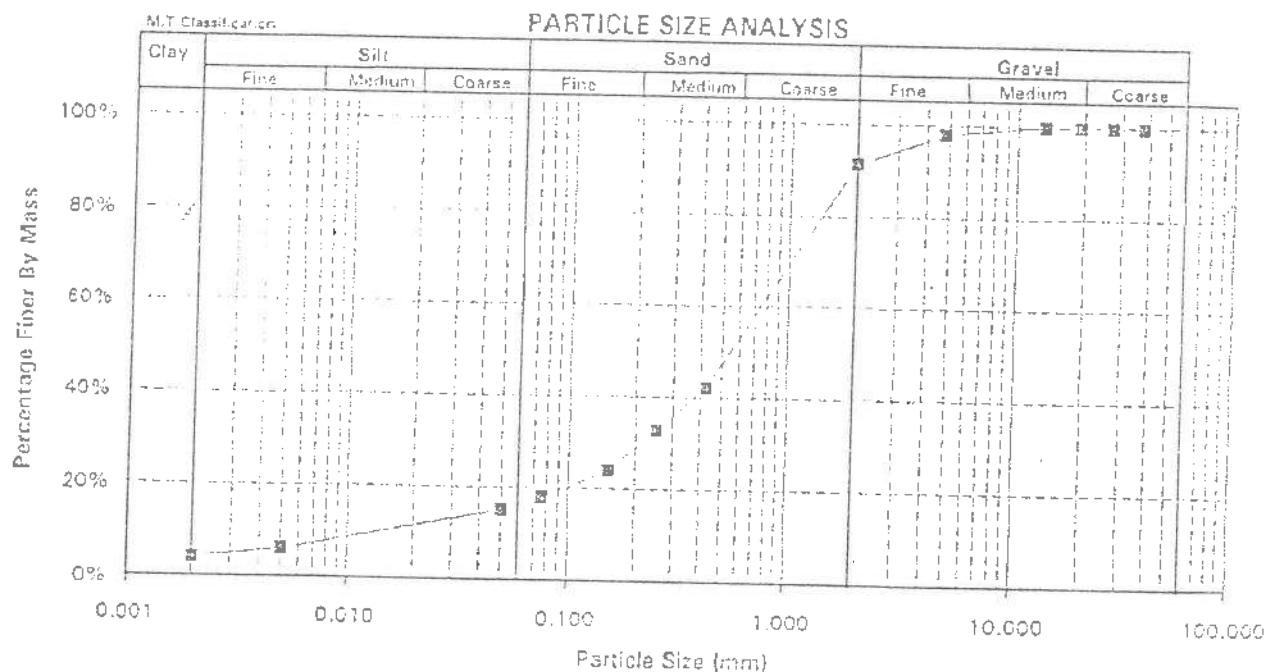
POTENTIAL EXPANSIVENESS



CASAGRANDE 'A' LINE



Client		Yates Consulting (Acc No. YA 001)		Date		25/10/96	
Project		Rabie Ridge		Job #		19607	
Site		.					
Test Pos		TP 30		Depth		0.60m	
Sample		.					
SIEVE ANALYSIS				ATTERBERG LIMITS			
Sieve(mm)	% Passing	Sieve(mm)	% Passing		Test 1	Test 2	
37.500	100%	0.250	33%	Liquid Limit	19.7%	19.6%	PRA Classification
25.000	100%	0.150	24%	Average	19.7%		Unified Classification
19.000	100%	0.075	19%	Plastic Limit	18.7%	18.9%	PI of whole sample
13.200	100%	0.050	15%	Average	18.8%		% Gravel
4.750	99%	0.003	6%	Plasticity Index (PI)	0.8%		% Sand
2.000	91%	0.002	4%	Linear Shrinkage	0.0%		% Silt
0.425	42%			Grading Modulus	1.49		% Clay
							A-1-b
							SW
							0.4%
							8.7%
							74.9%
							12.1%
							4.3%



397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



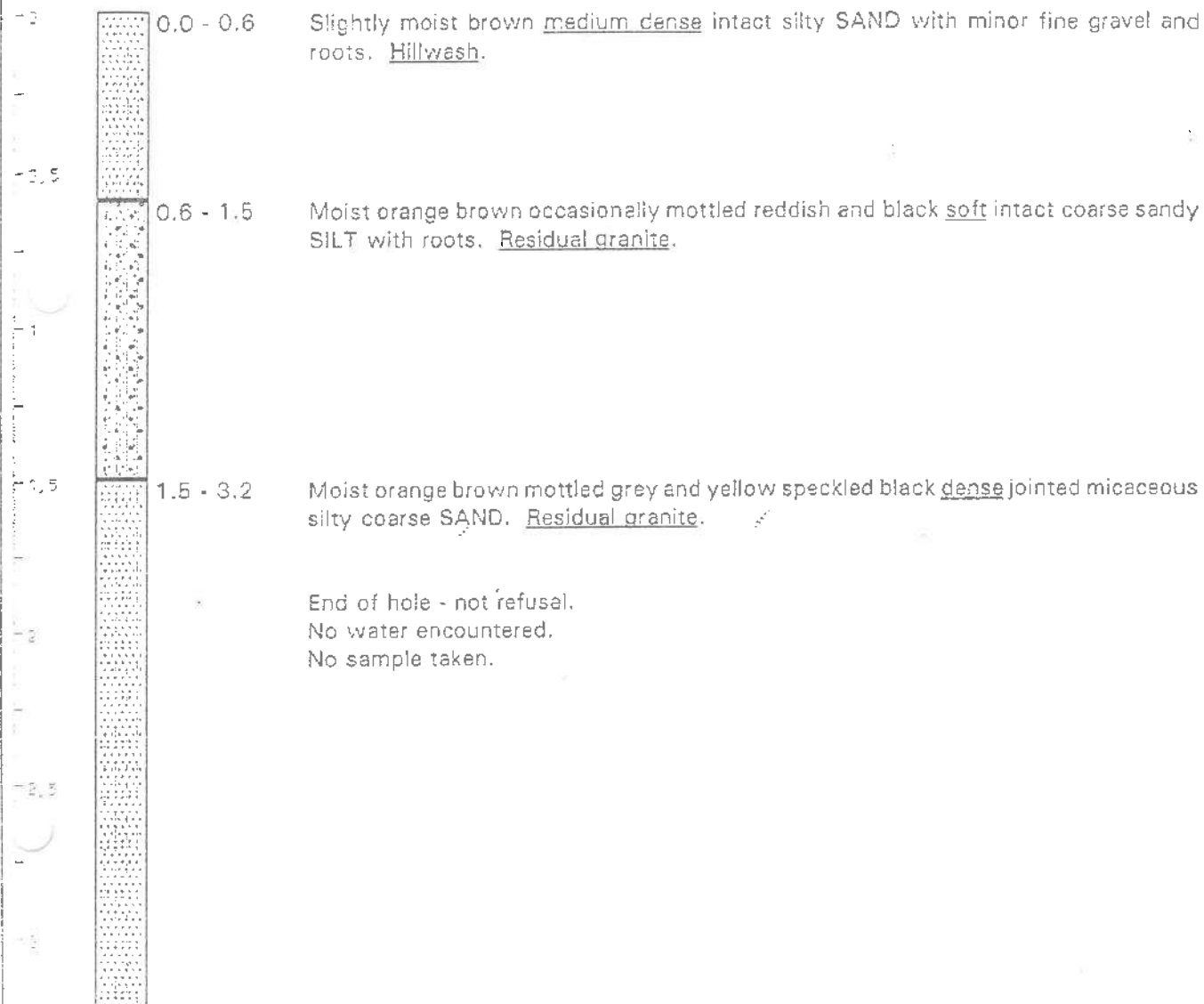
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 89/09392/23

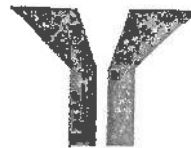
SOIL PROFILE

TEST PIT TP14



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3566	SHEET NO	: 14 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01356614

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



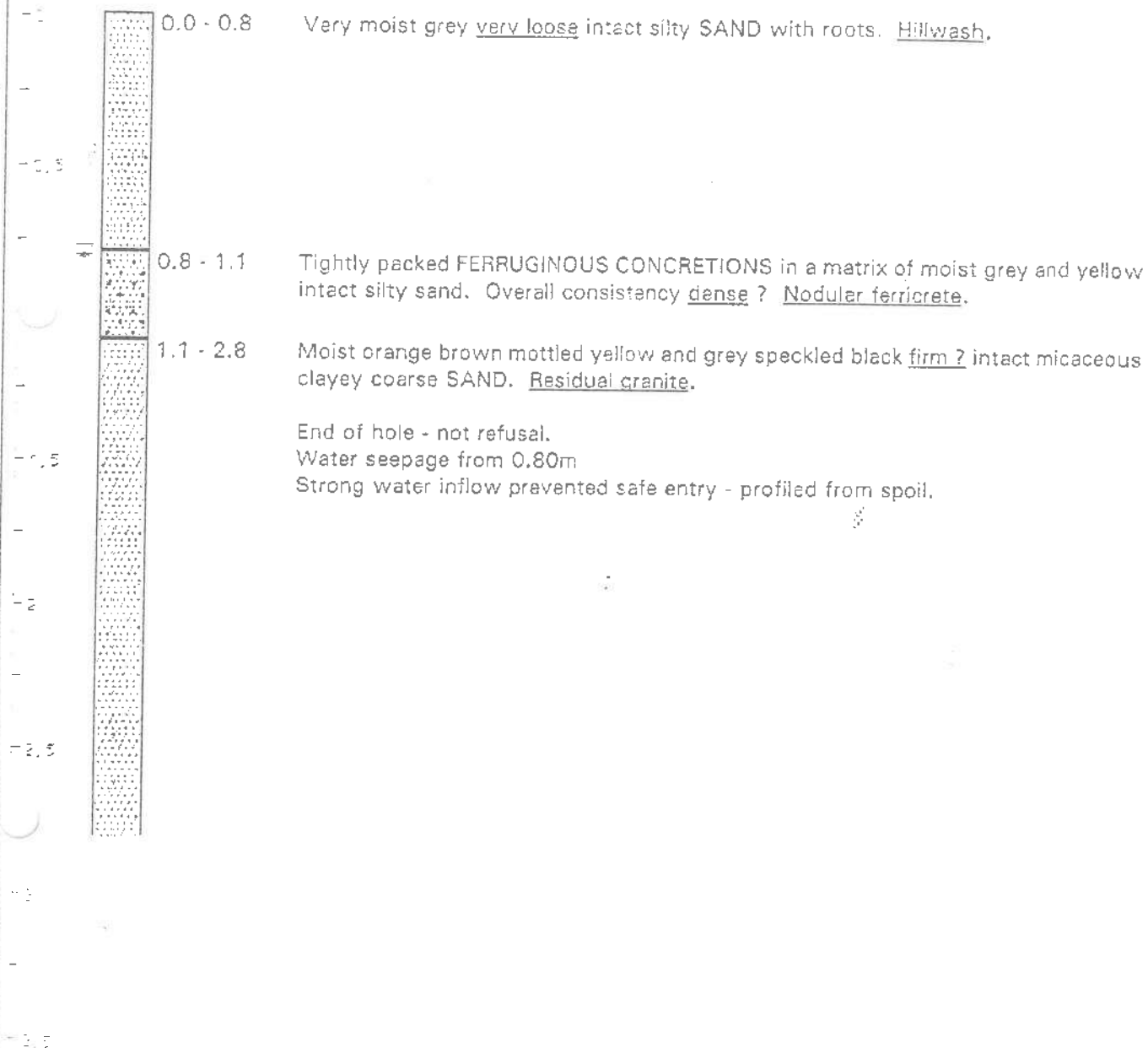
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP15



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 15 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 6f356515

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O. BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



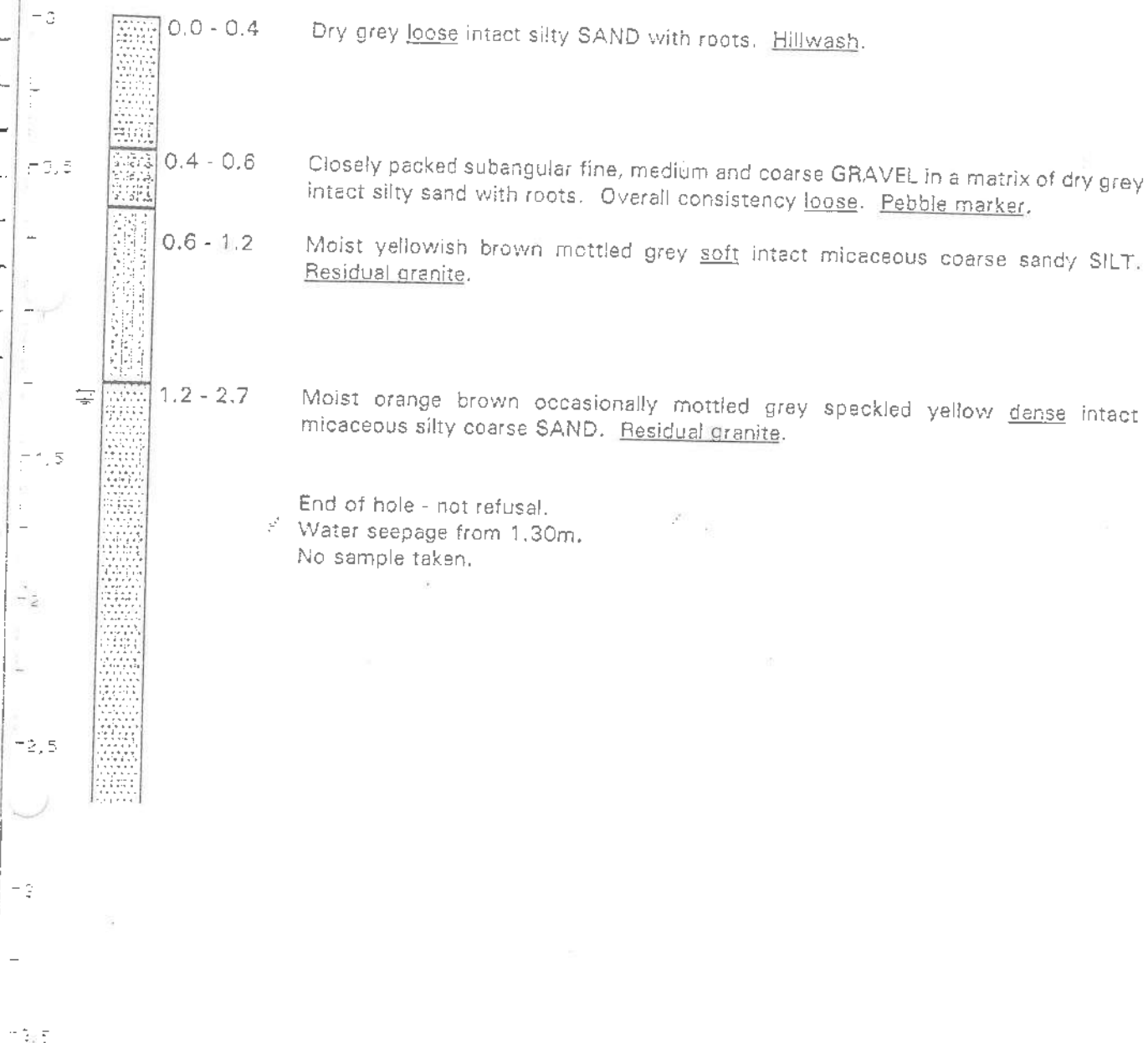
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP16



DRILLING RIG	: Cat 415 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 16 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01266010

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317

REG. NO. CK 88/09392/23



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SOIL PROFILE

TEST PIT TP17

0.0 - 0.3	Dry light brown <u>medium dense</u> intact silty SAND with roots. <u>Hillwash</u> .
0.3 - 0.6	Closely packed subangular fine, medium and coarse GRAVEL in a matrix of slightly moist light brown silty sand with roots. Overall consistency <u>loose to medium dense</u> . <u>Pebble marker</u> .
0.6 - 1.0	Moist light brown <u>loose</u> intact silty coarse SAND with abundant ferruginous concretions. <u>Residual granite</u> ?
1.0 - 2.1	Moist orange brown speckled black and yellow streaked grey <u>firm</u> intact micaceous clayey coarse SAND. <u>Residual granite</u> .
End of hole - not refusal. No water encountered. No sample taken.	

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 17 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01955517

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1635 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1655
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



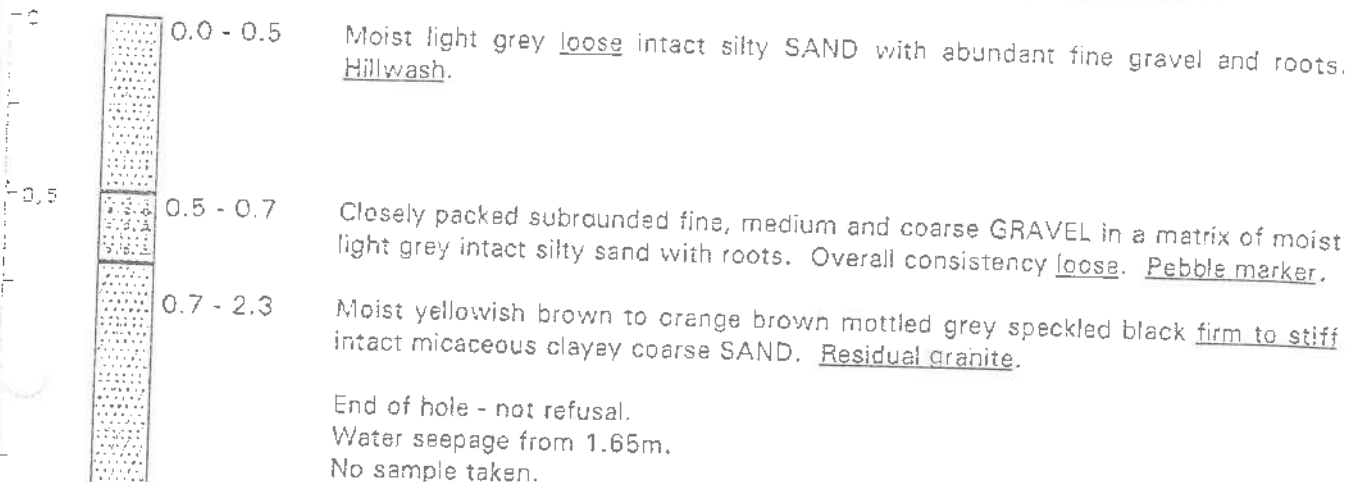
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP18



DRILLING RIG	: Cat 416 B	DATE	: 1998-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1998-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3585	SHEET NO	: 18 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: cf356818

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



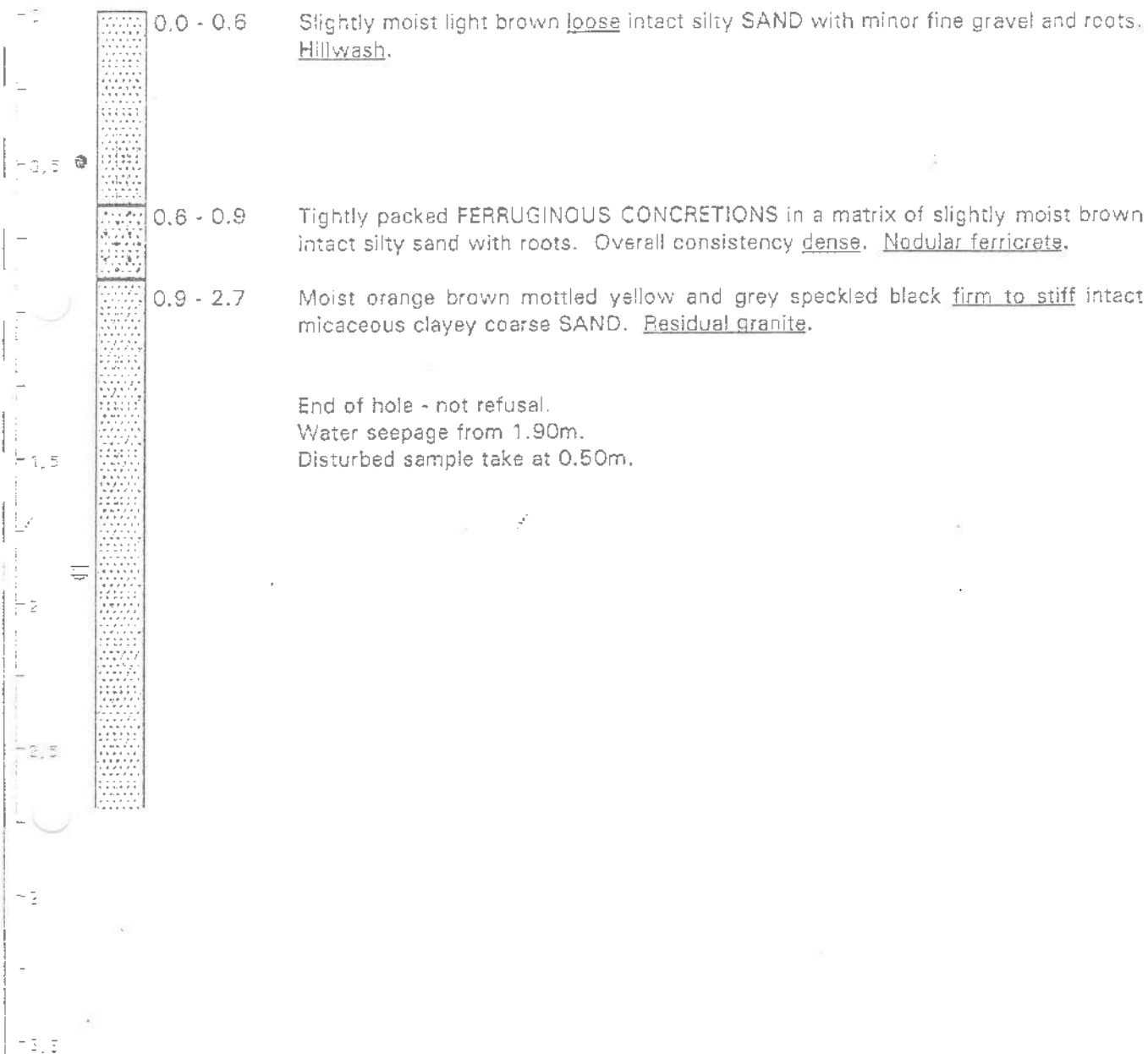
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 89/09392/23

SOIL PROFILE

TEST PIT TP19



DRILLING RIG	: Cat 416 B	DATE	: 1998-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1998-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 19 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: c:356519

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1695 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 82/09392/23

SOIL PROFILE

TEST PIT TP20

- 0.0 - 0.4 Slightly moist light brown loose intact silty SAND with roots. Hillwash.
- 0.4 - 0.8 Moist yellowish brown loose intact silty SAND with abundant gravel and ferruginous concretions and roots. Slightly ferruginised pebble marker.
- 0.8 - 2.4 Moist orange brown mottled grey and red speckled black dense jointed micaceous silty coarse SAND. Residual granite.

End of hole - not refusal.
Water seepage from 2.0m.
No sample taken.

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 20 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: p1356520

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP21

0.0 - 0.9 Slightly moist brown to yellowish brown loose intact silty SAND with abundant fine gravel and roots and with minor soft ferruginous concretions in last 100mm of profile. Hillwash.

-0.5

0.9 - 2.6

Moist orange brown mottled grey and black speckled yellow medium dense intact micaceous silty coarse SAND. Residual granite.

End of hole - not refusal.

Water seepage from 1.80m.

Sides of pit collapse below 1.80m

Bulk disturbed sample taken from 0.10m - 0.90m.

-1.5

-2

-2.5

-3

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFIED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 21 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: c1356521

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317

REG. NO. CK 88/09392/23



YATES CONSULTING CC

ENGINEERING GEOLOGISTS

SOIL PROFILE

TEST PIT TP22

0.0 - 0.6 Slightly moist light brown medium dense intact silty coarse SAND with roots and abundant fine and medium gravel in last 100mm of profile. Hillwash.

0.6 - 0.8 Closely packed FERRUGINOUS CONCRETIONS in a matrix of moist light brown intact silty coarse sand with roots. Overall consistency medium dense. Nodular ferricrete.

0.8 - 2.3 Moist orange brown mottled yellow and grey blotched black dense jointed micaceous silty coarse SAND. Residual granite.

End of hole - not refusal.

Water seepage in bottom of pit.

No sample taken.

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 22 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 21956500

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317

REG. NO. CK 88/09392/23



YATES CONSULTING CC

ENGINEERING GEOLOGISTS

SOIL PROFILE

TEST PIT TP23

0.0 - 0.4	Dry light brown <u>medium dense</u> intact silty coarse SAND with roots. <u>Hillwash</u> .
0.4 - 0.8	Closely packed FERRUGINOUS CONCRETIONS in a matrix of dry light brown intact silty sand with roots. Overall consistency <u>medium dense</u> . <u>Nodular ferricrete</u> .
0.8 - 1.3	Slightly moist to moist yellowish brown mottled grey and black <u>stiff to very stiff</u> intact micaceous clayey coarse SAND with abundant ferruginous concretions. <u>Residual granite</u> .
End of hole - stopped due to very difficult excavation. No water encountered. No sample taken.	

BILLING REF	: Cat 416 2	DATE	: 1996-10-16	X CO-ORDINATE	:
FILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
PTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
IENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 23 of 34
OBJECT	: Rabie Ridge Ext 3			REFERENCE NO	: pf356523

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP24



0.0 - 0.7

Dry becoming moist grey to yellowish brown medium dense intact silty coarse SAND with roots. Hillwash.

0.7 - 0.8

Tightly packed FERRUGINOUS CONCRETIONS in a matrix of slightly moist yellowish brown intact silty sand. Overall consistency very dense. Nodular ferricrete.

End of hole - refusal on hardpan ferricrete,
No water encountered.
No sample taken.

BORING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
BORED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 24 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: pt356524

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



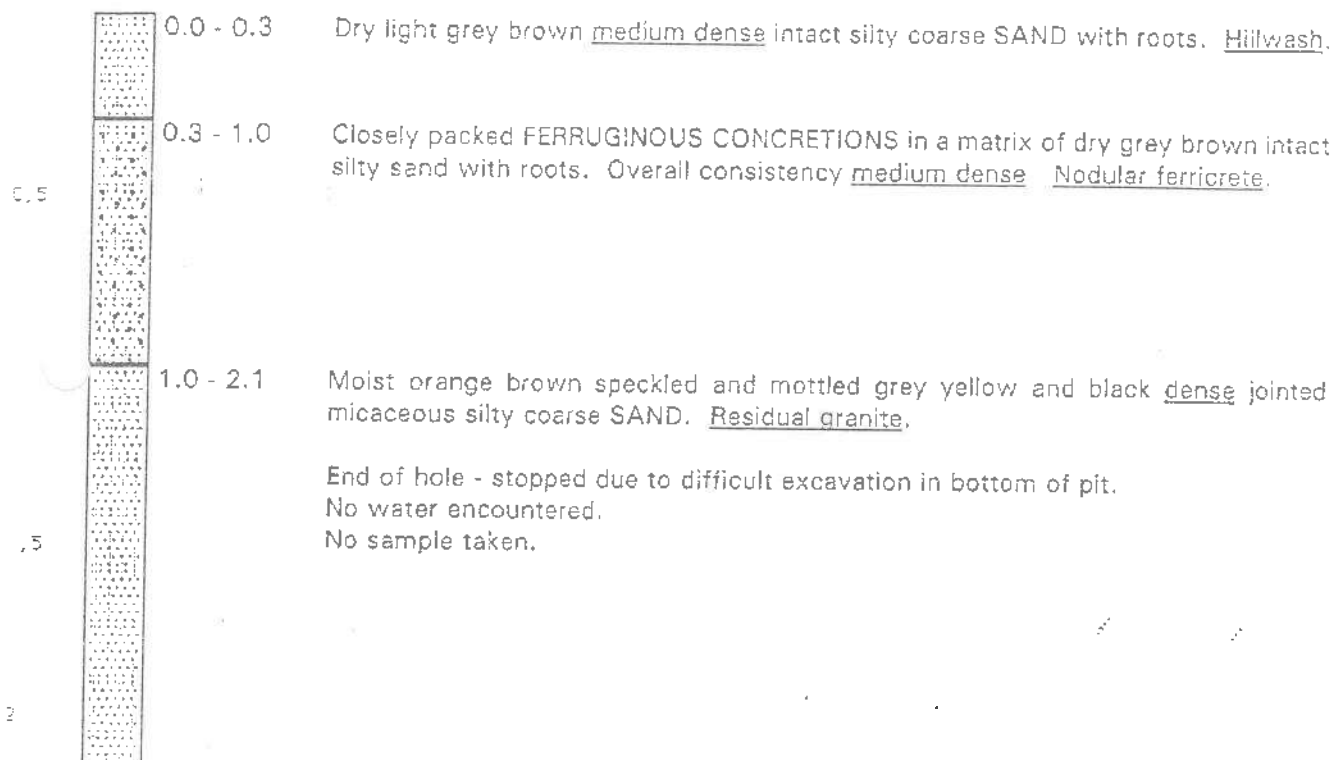
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP25



BORING RIG	: Cat 415 B	DATE	: 1996-10-16	X CO-ORDINATE	:
DRAWN BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 25 of 34
SUBJECT	: Rabie Ridge Ext 3			REFERENCE NO	: p/356525

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317

REG. NO. CK 83/09392/23

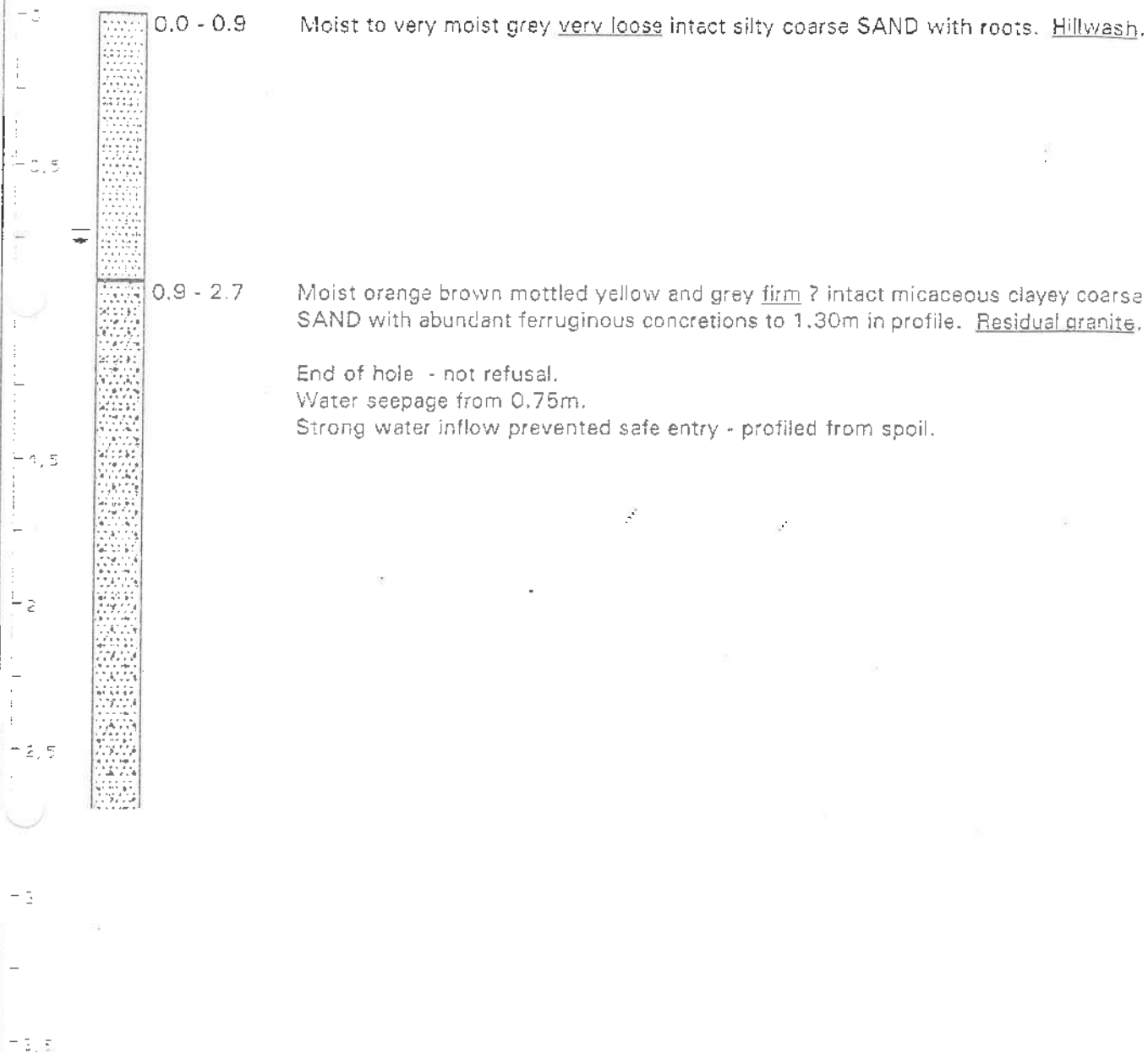


YATES CONSULTING CC

ENGINEERING GEOLOGISTS

SOIL PROFILE

TEST PIT TP26



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 26 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01356523

397 NEW ROAD WEST
 HALFWAY GARDENS EXTENSION 25
 1685 MIDRAND
 P.O. BOX 6004, HALFWAY HOUSE, 1685
 TELEPHONE: (011) 315-6230
 FAX: (011) 315-0317



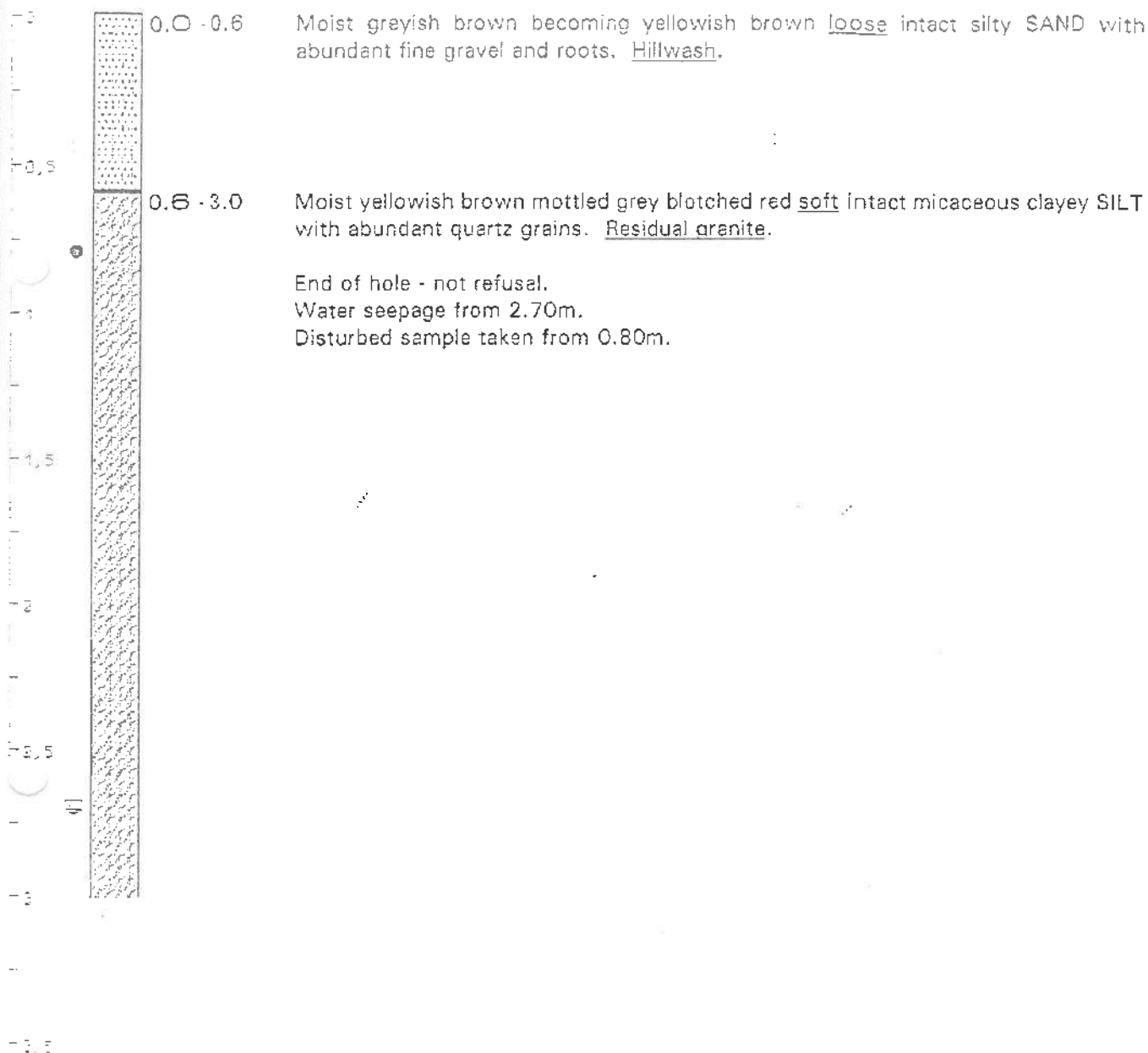
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 8 8.09392/23

SOIL PROFILE

TEST PIT TP27



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3585	SHEET NO	: 27 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 61256537

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



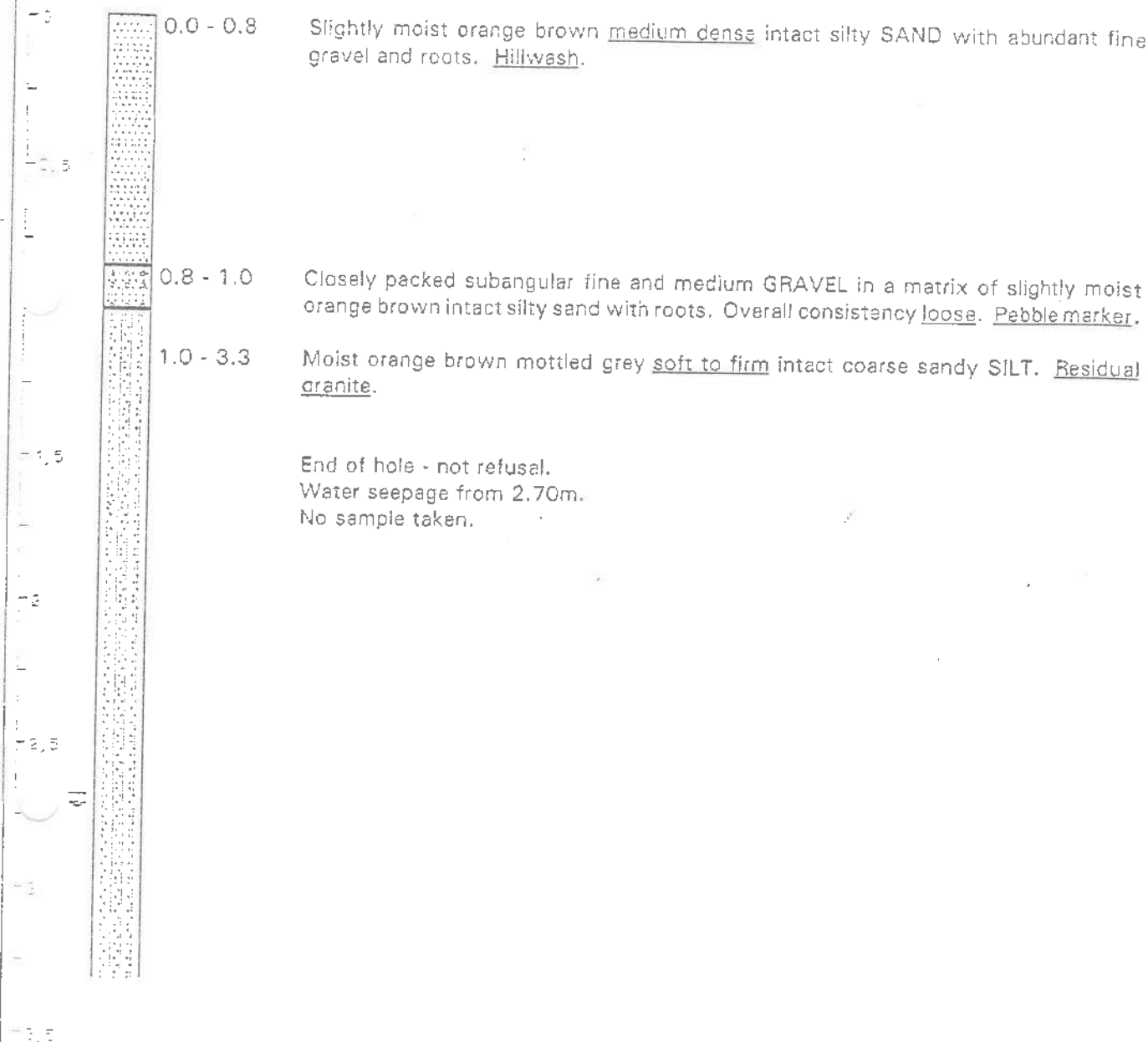
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 83/09392/23

SOIL PROFILE

TEST PIT TP28



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3555	SHEET NO	: 23 of 24
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		: 61355523

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



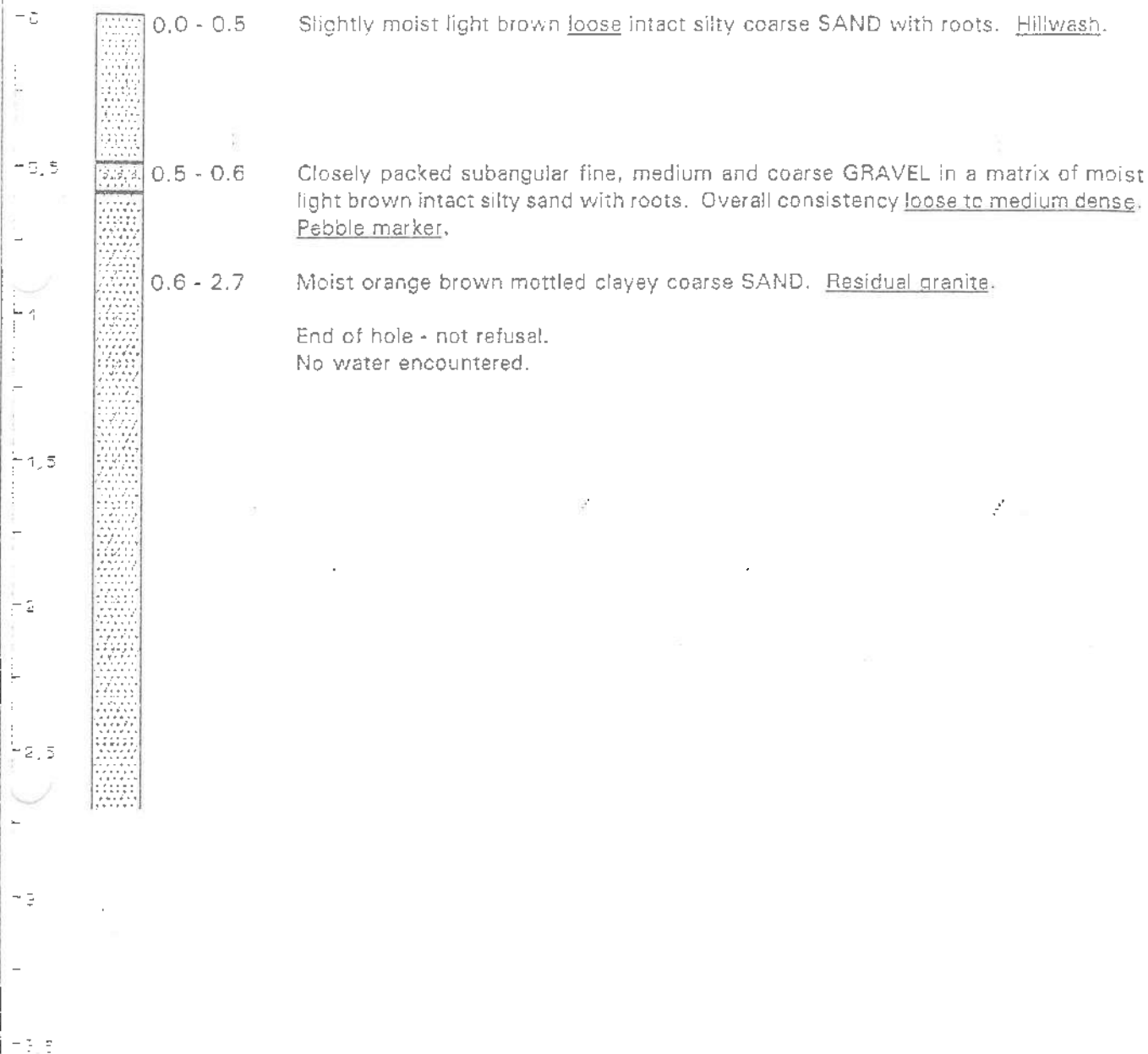
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88.09392/23

SOIL PROFILE

TEST PIT TP29



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFIED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 29 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01356600

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



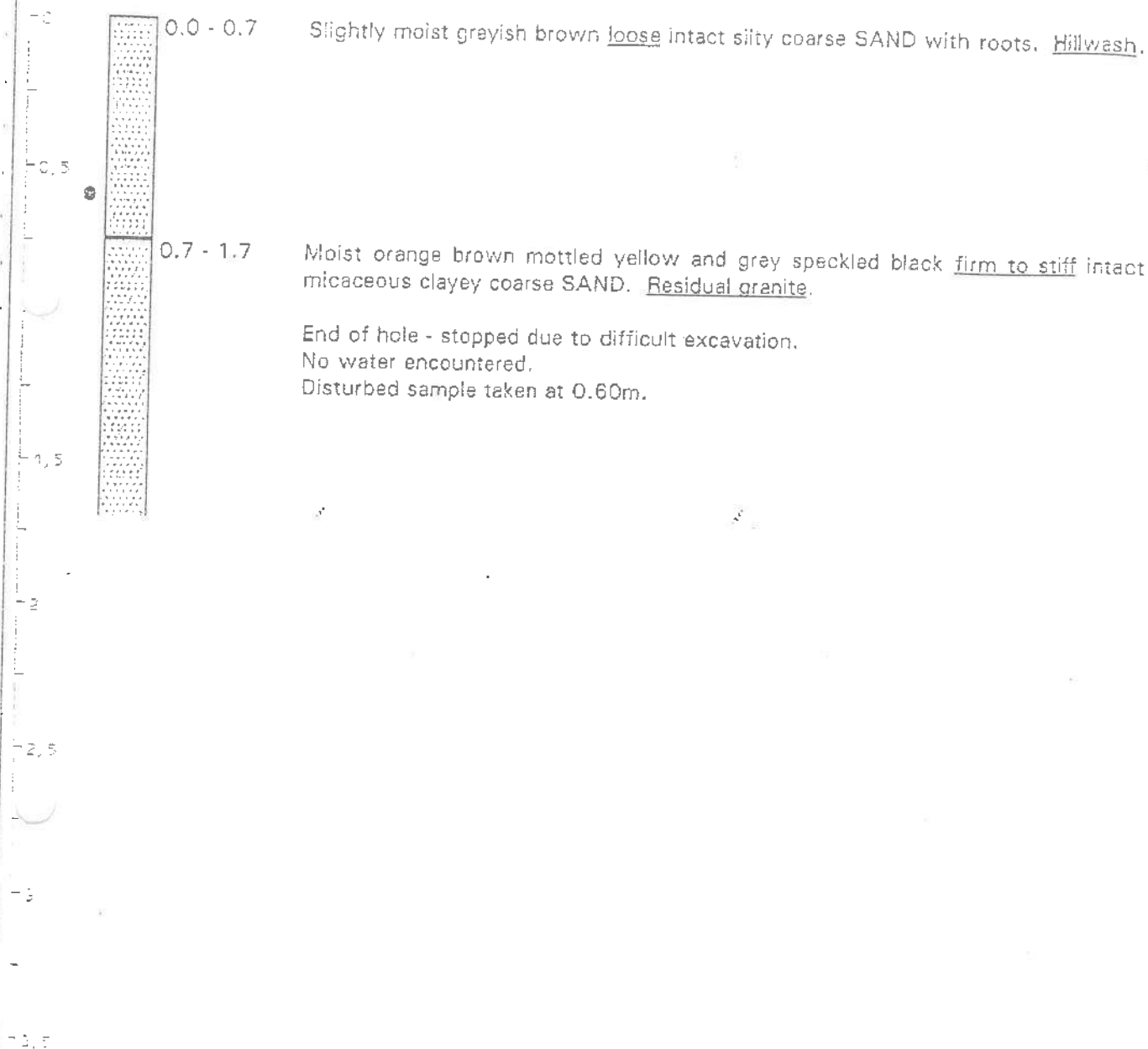
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP30



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFIED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 30 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01055500

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



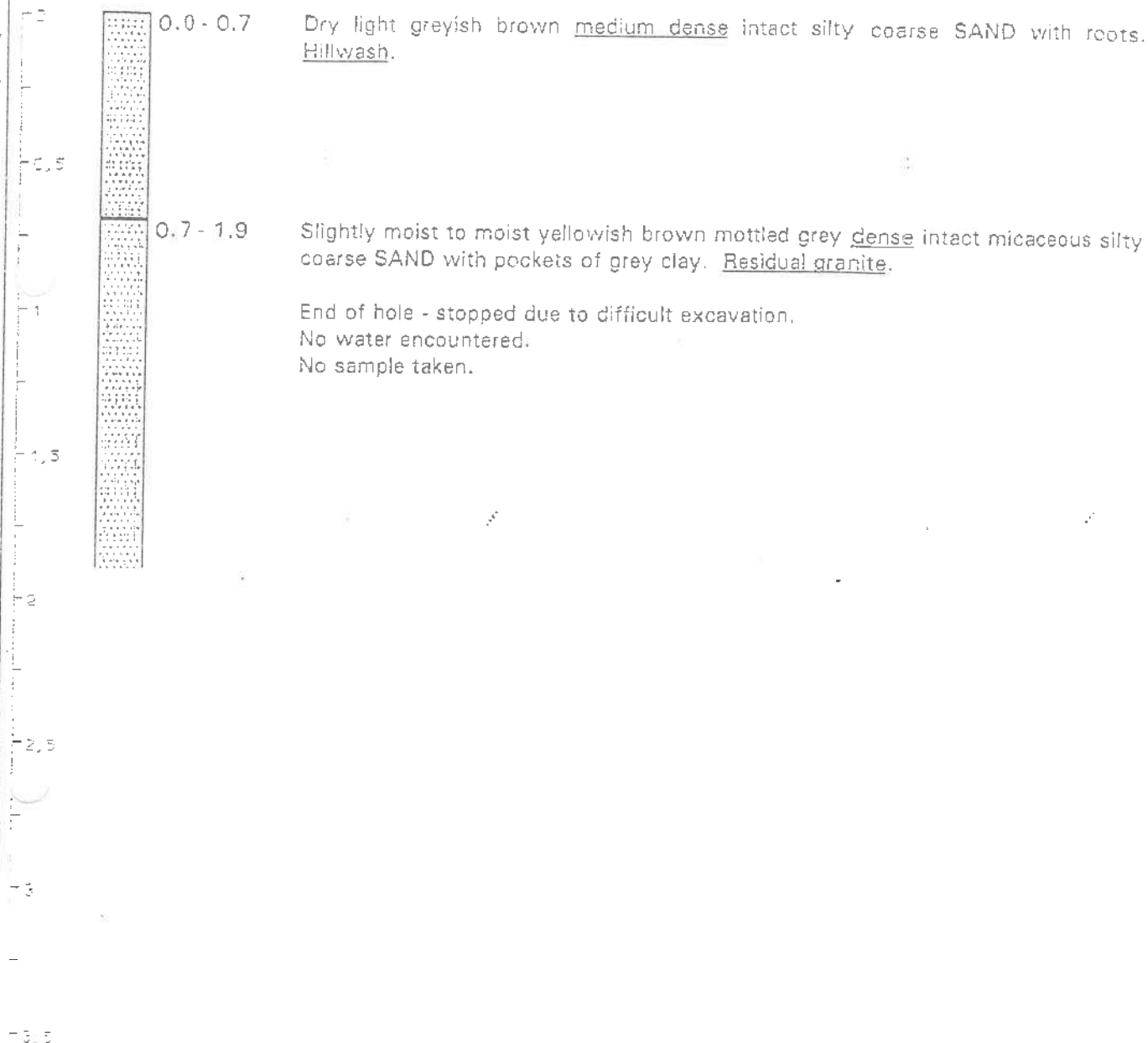
YATES CONSULTING CC

ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP31



DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 31 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:		: 61366501

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



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ENGINEERING GEOLOGISTS

REG. NO. CK 89-09392/23

SOIL PROFILE

TEST PIT TP32

0.0 - 0.5	Dry light greyish brown <u>loose</u> intact silty coarse SAND with roots. <u>Hillwash</u> .
0.5 - 0.7	Closely packed FERRUGINOUS CONCRETIONS in a matrix of dry greyish brown intact silty sand with roots. Overall consistency <u>medium dense</u> . <u>Nodular ferricrete</u> .
0.7 - 1.3	Slightly moist light orange brown streaked grey speckled black <u>dense to very dense</u> jointed micaceous silty coarse SAND. <u>Residual granite</u> .
End of hole - stopped due to difficult excavation. No water encountered. No sample taken.	

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3555	SHEET NO	: 32 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: cr355532

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O.BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317



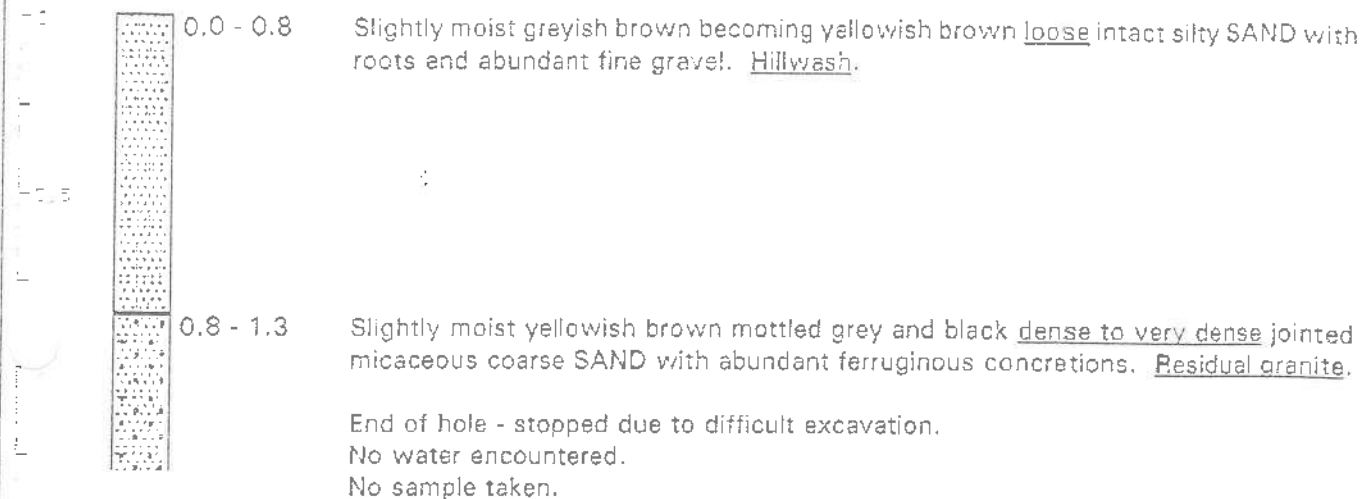
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REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP33



DRILLING RIG	: Cat 416 B	DATE	: 1998-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1998-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 33 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: p1059502

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1685 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1685
TELEPHONE: (011) 315-6230
FAX: (011) 316-0317



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ENGINEERING GEOLOGISTS

REG. NO. CK 88/09392/23

SOIL PROFILE

TEST PIT TP34

0.0 - 0.4 Dry light brown loose intact silty Sand with roots. Hillwash.

0.4 - 0.5 Tightly packed FERRUGINOUS CONCRETIONS in a matrix of dry light brown intact silty sand with roots. Overall consistency very dense. Nodular ferricrete.

End of hole - abrupt refusal on hardpan ferricrete.
No water encountered.
No sample taken.

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 34 of 34
PROJECT	: Rabie Ridge Ext 3	REFERENCE NO	:	DIS26534	:

397 NEW ROAD WEST
HALFWAY GARDENS EXTENSION 25
1695 MIDRAND
P.O. BOX 6004, HALFWAY HOUSE, 1635
TELEPHONE: (011) 315-6230
FAX: (011) 315-0317

REG. NO. CK 88/09392/23



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ENGINEERING GEOLOGISTS

SOIL PROFILE

TEST PIT TP34



0.0 - 0.4

Dry light brown loose intact silty Sand with roots. Hillwash.

0.4 - 0.5

Tightly packed FERRUGINOUS CONCRETIONS in a matrix of dry light brown intact silty sand with roots. Overall consistency very dense. Nodular ferricrete.

End of hole - abrupt refusal on hardpan ferricrete.
No water encountered.
No sample taken.

DRILLING RIG	: Cat 416 B	DATE	: 1996-10-16	X CO-ORDINATE	:
PROFILED BY	: MJ vd Walt	DATE	: 1996-10-16	Y CO-ORDINATE	:
DEPTH W/TABLE	:	AFTER	:	COLLAR ELEVATION	:
CLIENT	: Urban Dynamics	JOB NO	: 3565	SHEET NO	: 34 of 34
PROJECT	: Rabie Ridge Ext 3			REFERENCE NO	: 01554834



GAUTENG PROVINCE

AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Reference: GAUT 002/22-23/E3421
Enquiries: Tendani Rambuda
Tel: +27 (0)11 240 3386
Tendani.Rambuda@gauteng.gov.za

Ninfu Allandale Dev (Pty) Ltd
13 Chester Road
Parkwood
JOHANNESBURG
2193

By Registered Mail

Email: gavin@thefufoundation.com

Telephone Number: 082 419 2782

GDARD
Office of the Hon
04 MAR 2024
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Dear Gavin Kao,

ENVIRONMENTAL AUTHORISATION GRANTED: THE PROPOSED RABIE RIDGE EXT 7 MIXED-USE DEVELOPMENT ON THE REMAINDER OF THE FARM ALLANDALE 10-IR, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY

With reference to the above subject matter, please be advised that the Department has decided to grant environmental authorisation. An Environmental Authorisation (EA) and reasons for the decision are attached herewith.

In terms of Regulation 4 (2) of the Environmental Impact Assessment Regulations, 2014, as amended, you must notify all registered interested and affected parties, in writing, within 14 days of the date of this EA, of the Department's decision in respect of your application as well as the provisions that are contained on the Appeal Regulations regarding the submission of appeals. A copy of this EA must also be appended to the letter of notification to the registered interested and affected parties.

Your attention is drawn to Chapter 2 of the National Appeals Regulations, 2014, which prescribes the appeal procedure to be followed. Should any person wish to lodge an appeal against this decision or any aspect of this decision, he/she must submit the appeal to the appeal administrator, and a copy of the appeal to the applicant, any registered interested and affected party, and any organ of state with interest on the matter within 20 days from the date that the notification of the decision was sent to the registered interested and affected parties by the applicant; or the date that the notification of the decision was sent to the applicant by the Department, whichever is applicable. The appeal(s) must be submitted in writing by any of the following means:

Postal Address:

The Appeals Administrator
Department of Agriculture, Rural Development and Environment
P.O. Box 8769
JOHANNESBURG
2000

Physical Address

The Appeals Administrator
Department of Agriculture, Rural Development and Environment
56 Eloff Street, Umnotho House, 23rd Floor
JOHANNESBURG
2000

Fax No: 011 240 3158/2700

Email Address: appeals@gauteng.gov.za

The appeal must be submitted in the prescribed appeal form obtainable from the appeal administrator, Ms. Tsholofelo Mere, at telephone number 011 240 3204 or email address tsholofelo.mere@gauteng.gov.za. The appeal form is also available from the website: www.gauteng.gov.za. Should you have any queries or require additional information regarding the appeal process, you can contact the appeal administrator on any of the mentioned contact details.

Kindly take note that in terms of Section 43(7) of the National Environmental Management Act, 1998 (NEMA), as amended, the lodging of an appeal suspends an environmental authorisation as well as its associated Environmental Management Programme. This means that the activity authorised by this EA must not commence until such time that the appeal is finalised.

Kind regards,



GDARD
Office of the HOD
04 MAR 2024
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MS. MATILDA GASELA

ACTING HEAD OF DEPARTMENT: AGRICULTURE, RURAL DEVELOPMENT AND ENVIRONMENT

DATE: 04 March 2024



GAUTENG PROVINCE

AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL AUTHORISATION

Reference Number:	GAUT 002/22-23/E3421
Holder of Authorisation:	Ninfu Allandale DEV (Pty) Ltd
Location of Activity / Activities:	Remainder of the Farm Allandale 10-IR
21 Digit SG Number	T0IR000000000001000000

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1. Decision

The Department is satisfied, on the basis of the information available to it and subject to compliance with the conditions of this environmental authorisation, that the applicant should be authorised to undertake the activities specified below.

2. Activities Authorised

Under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended) and the Environmental Impact Assessment Regulations, 2014, the Department hereby authorises-

Ninfu Allandale Dev (Pty) Ltd (hereafter referred to as the Applicant)

with the following contact details-

13 Chester Road
Parkwood
JOHANNESBURG
2193

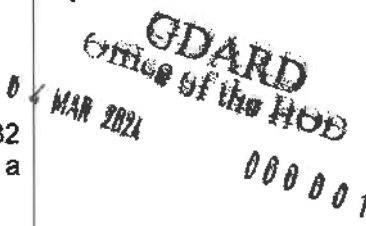
Tel No.: 082 419 2782

Email: gavin@thefufoundation.com

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Office of the ROD
04 MAR 2024
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to undertake the activities (hereafter referred to as "The Activities") listed in the table below:

Activity number and description	Proposed activity/development description
GN R. 327: Activity 12 The Development of- (ii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs (a) Within a watercourse (b) In front of a development setback (c) No development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	The development of infrastructure exceeding 100 square metres within 32 metres of a wetland, and within the wetland, will be required for the construction and upgrading of bulk infrastructure.
GN.R.327: Activity 13 The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more.	The development will have 4 storm water attenuation dams constructed on site as per the stormwater management plan.
GN. R 327: Activity 19 Infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse Excluding where.....	There will be an infilling or depositing of any material of more than 10 cubic metres from a watercourse.

GN. R 325: Activity 15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) The undertaking of a linear activity; or (ii) Maintenance purposes undertaken in accordance maintenance management plan.	The proposed development is more than 20 hectares in extent; therefore, more than 20 hectares of indigenous vegetation will be cleared
GN R. 324: Activity 4 c (iv) The development of a road wider than 4 metres with a reserve less than 13,5 metres in Gauteng where (iv) Sites are identified as Critical Biodiversity Areas (CBA) or Ecological Support Area (ESA) in the Gauteng Conservation Plan or in bioregional plans.	Proposed intersection upgrades in the Traffic Impact Report will be required in areas identified as CBA and ESA in the screening tool Internal township roads will have roadway width of 4m and a road reserve width of 13,5m
GN R. 324: Activity 12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (C) Gauteng (ii) Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or	clearing of vegetation of more than 300 square metres or more of indigenous vegetation will be required for the proposed development, in areas identified as CBA and ESA in the screening tool.
GN R. 324 Activity 14(ii)(a) (c) (iv) The development of – (i) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs (a) within a water course (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.	The development will require infrastructure or structure with a physical footprint of 10 square meter or more 

-for the proposed mixed-use development to be known as Rabie Ridge Extension 7 on the Remainder of the Farm Allandale 10-IR, which falls within the jurisdiction of the City of Johannesburg Metropolitan Municipality.

Scope of Environmental Authorisation.

3. Specific Conditions

3.1 The Environmental Authorisation is partially granted for the proposed mixed-use development. Therefore, the layout plan attached as Plan Number 4 must be revised or be amended. Erven 3274, 3275, 3288, 3289, 3499, 3500, 3501, 3502, 3503, 3592, 3593, 3594, 3595, 3609, 3610, 3611, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3649, 3650, 3651, 3746 and part of Road 13m and part of Road 16m must be

removed from the wetland and its 30m buffer zone. The requested revised layout plan must be submitted to this Department within 60 days of the signature of this environmental authorisation for approval. No commencement of activities on the site before amended layout plan is approved by this Department.

- 3.2 Although the watercourse is invaded by informal settlement, the edge of the watercourse must be clearly demarcated in the field with pegs or pole that will last for the duration of the construction phase, colour-coded as follows:
- **Red-** Indicating the edge of the riparian zone (This should be placed along the entire length of the property/site.)
 - **Orange-** Indicating the edge of the buffer zone (32m for rivers/30m for wetland within urban areas).
- 3.3 No development other than the authorised activities will be allowed within the watercourse or its 32/30 meters buffer zone, measured from the edge of a watercourse.
- 3.4 The construction area must clearly be demarcated before any construction of the activities takes place.
- 3.5 Signage must be displayed during the construction phase to inform the public about the potentially dangerous conditions of site during the construction phase.
- 3.6 The construction campsite and the sanitary facilities as well as storage area for construction material and machinery must be placed away from the watercourse and its 32 meters' buffer zone measured from the edge of the watercourse. Additionally, these must be placed on areas of the site that have already been transformed.
- 3.7 A detailed storm water management plan must be designed for approval by the City of Johannesburg Metropolitan Municipality using Sustainable Urban Drainage Systems (SUDS) principles. The use of energy dissipaters to slow the velocity of water inflow into the watercourse must be done in line with the abovementioned SUDS plan to mitigate erosion.
- 3.8 Attenuation pods must be located outside the 32-meter buffer zone from the edge of the watercourse.
- 3.9 The stormwater masterplan and the potential impacts thereof, must be reviewed one year post development and incorporate an analysis of changes in the water levels and water quality of boreholes (selected boreholes as identified in the Groundwater Hydrocensus Report attached in the Final EIAR), and measures to address, manage or mitigate any emerging concerns should be investigated.
- 3.10 Sewer pipelines must be monitored every 5 years with an emergency plan in place in case of sewer pipeline failure.
- 3.11 Sustainable renewable energy measures that include lighting and heating must be incorporated into the development plan to reduce the carbon footprint of the development.
- 3.12 Emphasis must be placed on solar geysers since this is the appliance that consumed the most energy. 50% of energy must be obtained from renewable energy sources.
- 3.13 Rainwater harvesting measures such as installation of water storage tanks must be included as far as possible in the building designs. The condition is in line with water conservation plan as the country falls within a water scare region.
- 3.14 The preparation of building material (e.g., mixing of cement, concrete, sand etc.) must be done on a concrete impermeable surface to avoid seepage into the soil and eroding into the watercourse.
- 3.15 Should any heritage resources of any nature be uncovered during the construction, all activities must stop immediately and SAHRA and/ or professional Heritage Specialists be contacted immediately for investigations and remedial measures.
- 3.16 Post development rehabilitation must be undertaken using local indigenous species.

4. Commencement and completion of the activities

- 4.1 The development of the authorised activities, including post development/construction rehabilitation must be concluded within a period of 10 years from the date of signature of

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Office of the HOD

04 MAR 2024

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Environmental Authorisation Registration Number: GAUT 002/22-23/E3421

this environmental authorisation. If the authorised activities have not been concluded within that period, the authorisation lapses.

- 4.2 Continuation of the authorised activities after the lapsing period of this EA and where such continuation will meet the threshold of any listed activities, will constitute an offence.
- 4.3 Commencement with one listed activity authorised in terms of this environmental authorisation constitutes commencement with all other authorised activities.

5. Management of the activities

The Environmental Management Programme ("EMPr") submitted as part of the application for environmental authorisation is also authorised in terms of this EA and must be implemented. In addition, the following is considered part of the subject EMPr:

- 5.1 All waste streams to be generated during construction and operational phase must be managed in accordance with the hierarchy of waste management principles and disposal at an authorised landfill or waste disposal site must be the last option. Proof of disposal of waste must be kept on site and made available to the Department upon request.
- 5.2 The Applicant must submit recommendations to amend the EMPr where the findings of the environmental audit reports indicate insufficient mitigation of environmental impacts associated with the undertaking of the activities, or insufficient levels of compliance with the environmental authorisation or the EMPr and where applicable, the closure plan.
- 5.3 The request to amend the EMPr must contain recommendations or mitigation to rectify the shortcomings identified in the environmental audit report.
- 5.4 The recommendation to amend the EMPr must be submitted to this Department for approval together with the environmental audit report in accordance with the Regulations. Such updated EMPr must have been subjected to public participation process, which has been agreed to by the competent authority prior submission.
- 5.5 In assessing whether to grant approval of an amended EMPr because of an audit report, the competent authority may request such amendments to the EMPr as it deems appropriate to ensure that the EMPr or closure plan sufficiently provides for avoidance, management and mitigation of environmental impacts associated with the undertaking of the activities.

6. Monitoring and Reporting

- 6.1 An independent Environmental Control Officer (ECO) must be appointed to oversee the development of activities and guide compliance with the conditions of the environmental authorisation and the EMPr. An ECO must submit compliance report at least once during preparation and construction phase of the development and one post development rehabilitation phase to mark completion for the construction of the proposed development.
- 6.2 An ECO must be appointed prior to any commencement of the authorised activities.
- 6.3 Once appointed, the name and contact details of the ECO must be submitted to the Department's Compliance Monitoring Section. Documentation such as monitoring or audit or compliance reports and notifications, required to be submitted, must be submitted thereto.
- 6.4 Frequency of the submission of environmental audit report must be once within 30 days after completion of the construction phase and a final environmental audit report within 30 days after the completion of the development including associated post development rehabilitation and monitoring actions.
- 6.5 The applicant/ECO must keep records of all activities on the site, problems identified, transgressions identified / noted, and a task schedule of the functions undertaken by the ECO.
- 6.6 The environmental audit report must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014 and must indicate the date of the audit, the name of the auditor and the

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04 MAR 2024
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outcome of the audit in terms of compliance with the conditions of the environmental authorisation as well as the requirements of the EMPr.

- 6.7 Records relating to monitoring and auditing must be kept on the site and be made available to any authorised person(s) acting on behalf of the relevant competent authority in respect of the proposed development.

7. Notification of commencement of activities

- 7.1 A written notification of commencement of the activities, including site preparation, must be given to the Department 14 days prior to commencement of the activities on the site. The notice must include the date on which it is anticipated that the activities will commence as well as the EA reference number and be submitted to the Director: Compliance Monitoring, Ms. Sasa Sekhotha, the official of the Department at the email address: Sasa.Sekhotha@gauteng.gov.za.

8. General Conditions

- 8.1 The conditions of this EA are binding on the applicant ("Holder of EA"), including any person acting on his or her behalf, including but not limited to an agent, sub-contractor, employee or person rendering a service to the applicant.
- 8.2 The activities authorised may only be carried out at the property or site indicated in this EA.
- 8.3 Any changes to, or deviation from, the activities' description set out in this EA must follow the appropriate amendment process described in the Environmental Impact Assessment Regulations, and be approved, in writing, by the Department before such changes or deviation are effected. In assessing whether to approve such changes, the Department may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the applicant to apply for further authorisations in terms of the Regulations.
- 8.4 Where any of the applicant's contact details changes, including the name of the applicant, the physical or postal address and/or telephonic details, the applicant must follow the relevant amendment process as prescribed in the Environmental Impact Assessment Regulations, by submitting an amendment application to the Department for consideration and decision making as soon as the new details become known to the applicant.
- 8.5 This EA does not negate the holder's responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activities.
- 8.6 This EA and EMPr must be kept at the property or site where the activity or activities will be undertaken. The documents must be produced to any authorised official of the Department who requests to inspect them and must also be made available for inspection by any employee or agent of the holder of the EA who works or undertakes work at the property.
- 8.7 Non-compliance with a condition of this EA may result in criminal prosecution or other actions provided for in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended) and the Environmental Impact Assessment Regulations.
- 8.8 If the Department has reason to believe that the EA was obtained through fraud, non-disclosure of material information or misrepresentation of a material fact, the Department may, in writing, suspend or partially suspend, with immediate effect, the EA and direct the holder of such EA forthwith, to cease any activities that have been commenced with or to refrain from commencing any activity, pending a decision to withdraw the EA.

Date of the Environmental Authorisation:

04 MARCH 2024

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04 MAR 2024
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ANNEXURE 1: REASON FOR DECISION

1. Information considered in making the decision.

In reaching its decision, the Department took, *inter alia*, the following into consideration:

- 1.1 The information contained in the Final Environmental Impact Assessment Report received by the Department on 06 November 2023:
 - 1.1.1 Additional information received by this Department on 08 January 2024;
 - 1.1.2 Additional information received by this Department on 25 January 2024;
 - 1.1.3 Social Assessment Report;
 - 1.1.4 SEF Wetland Report;
 - 1.1.5 Wetland Impact Judgement Rehabilitation;
 - 1.1.6 Terra Soil Hydrology Report;
 - 1.1.7 Hydrocensus, Groundwater Use and Groundwater Quality Assessment Report;
 - 1.1.8 Water and Sewer Report;
 - 1.1.9 Stormwater Management Report;
 - 1.1.10 Traffic Impact Report;
 - 1.1.11 Agricultural Assessment Report;
 - 1.1.12 Heritage Impact Assessment Report; and
 - 1.1.13 Environmental Management Programme.
- 1.2 The relevant information contained in the Departmental information base including the Geographical Information System (GIS), Gauteng Conservation Plan Version 3.3, the Gauteng Pollution Buffer Zone Guidelines, 2017 and the Gauteng Provincial Environmental Management Framework (GPEMF), 2021.
- 1.3 The objectives and requirements of relevant legislation, policies, and guidelines, including Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended).
- 1.4 Screening tool report generated 09 May 2022.
- 1.5 The finding of the site inspection undertaken by Ms. Aluwani Nemutudi and Mr Tendani Rambuda, officials of the Department and EAP representative on 08 December 2023.

2. Key factors considered in making the decision

All information presented to the Department was taken into account in the Department's consideration of the application. A summary of the issues which, in the Department's view, were of the most significance is set out below.

- 2.1 The environmental attributes exhibited by the proposed site for development.
- 2.2 The site is transversed by watercourses.
- 2.3 The need and desirability.
- 2.4 GPEMF (2021) Environmental Management zone 1 and 2
- 2.5 Agricultural land capabilities
- 2.6 Shallow ground water table.
- 2.7 The public participation process.

3. Findings

After consideration of the information and factors listed above, the Department made the following findings:

- 3.1 Notwithstanding that the Gauteng Conservation Plan Version 3.3 depicts that the site is within Threatened Ecosystem Remaining Extent (Endangered), Ecological Support Area, Orange Listed Plant, River, and Wetland buffers. However, sufficient mitigation measures

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04 MAR 2024
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have been provided to ensure that impacts emanating from the proposed development are minimal.

- 3.2 The proposed site is recently illegal invaded by informal settlement which resulted in the degradation of vegetation on site, however the Applicant or the "Holder" submitted an affidavit that shows that the "Holder" did not initiate the current invasion on the site by building informal settlement or commencement on site.
- 3.3 The Department is not against the proposed development, which is why the Department is requesting a revised or an amended layout plan, since the site is already occupied illegally informal settlements.
- 3.4 There will be no development permitted within 32-meter buffer measured from the edge of the watercourse and the activities on the other side of Dane road (which has been existing before the EIA regime) that are affected by 32-meters buffer zone must be removed as per condition 3.1 of this EA.
- 3.5 According to the letter from the City of Johannesburg (CoJ) dated 09 September 2023: "due to the presence of an existing road (Dane Road) which would have potentially isolated the wetland system, the road could serve as southern buffer of HGM 1 and HGM 2 wetland units, in case where the 30 meters buffer extended beyond the road", this Department would like to indicate that the area where the Department requesting a revised layout plan to exclude the wetland areas from development is where both the wetland and the 32 meters buffer zones are encroached by the proposed development and it is not only the buffer zone, just to clarify the point raised by CoJ.
- 3.6 There is a pressing need for a mixed used development within Rabie Ridge community.
- 3.7 The proposed site falls within the Environmental Management Zone 1 which is identified as urban development zone which promote the infill development and the proposed development is in line with the GPEMF (2021) Environmental Management Zone 1. There is a small area affected by Zone 2, but this area within Zone 2 falls within the identified wetland area or open space area.
- 3.8 According to the agricultural assessment, it has been concluded by the specialist that the relative extent of the soil within arable agriculture potential identified within the investigation of the subject property is unlikely to justify the acquisition and maintenance of essential farming implements, and the extent of the soil is unlikely to sustain viable crop production.
- 3.9 It has been concluded that damp proofing measures must be incorporated into the design of all structures by the Geotechnical study.
- 3.10 According to Hydrocensus, Groundwater Use and Groundwater Quality Assessment (dated May 2023), the proposed development area may have a moderate recharge potential, which is in line with the low-moderate recharge potential identified by the National Framework Ecosystem Priority Areas (2011) database.
- 3.11 The Social Impact Assessment dated February 2016 indicates that the proposed development will benefit the local communities through job creation and as a result reducing poverty and providing houses to the people.
- 3.12 The public participation process complied with the requirements of the EIA Regulations, 2014. The registered Interested and Affected parties' (I&AP) were consulted in the process, included in the process was the advertisement the proposed development in the newspaper and placing of site notices at various conspicuous places on site.

In view of the above, the Department is satisfied that, subject to compliance with the conditions contained in the EA, the activities will not conflict with the general objectives of integrated environmental management laid down in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended) and that any potentially detrimental environmental impacts resulting from the proposed activities can be mitigated to an acceptable level. The Environmental Authorisation is accordingly granted.

BFBA Consultants Johannesburg (PTY) LTD

CONSULTING ELECTRICAL & MECHANICAL ENGINEERS

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DURBAN
PIETERMARITZBURG



Reg No 2015/297822/07

Our Ref. CC27351/Rabie Ridge/Pending

11 JUNE 2026

ATTENTION: Mrs. Bea Fletcher

The Town Planning Hub
8 Tigervallei Office
78 Pony Street
SILVERLAKES GOLF ESTATE
0054

SENT AS An E-MAIL
bea@tph.co.za
No of pages: 1 of 2

Dear Sir,

RABIE RIDGE – BULK ELECTRICAL SUPPLY PROJECT – ELECTRICAL CAPACITY REQUIREMENTS

BFBA Consultants Johannesburg herewith provide estimated electrical loads for the Rabie Ridge, Situated on Remaining Extent of Allendale 10 -IR, Greater Johannesburg Metropolitan Municipality.

Attached details:

PUBLIC OPEN SPACE PROVISIONING

- Area affected by wetland / conservatio: 27.4192ha
- Functional Open Space provided: 3.2804ha

Calculations:

Number of units: Residential 3 units - 4470 (excluding area east of Road K56)

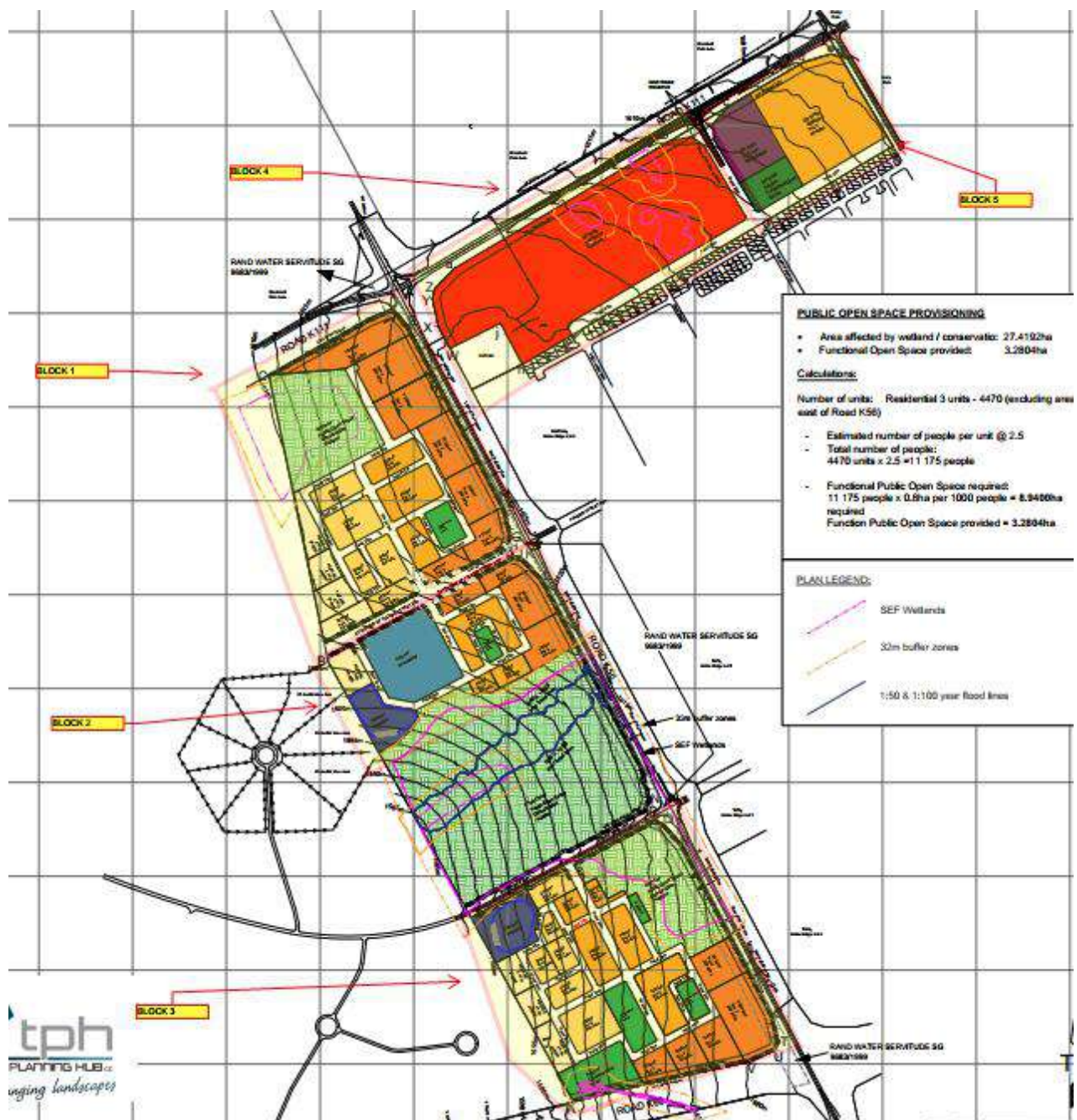
- Estimated number of people per unit @ 2.5
- Total number of people:
 $4470 \text{ units} \times 2.5 = 11\,175 \text{ people}$
- Functional Public Open Space required:
 $11\,175 \text{ people} \times 0.8 \text{ ha per } 1000 \text{ people} = \mathbf{8.9400 \text{ ha}}$
required
Function Public Open Space provided = **3.2804ha**

DIRECTORS

C.E. CHEMALY Pr. Tech Eng B Tech MSAIEE



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Capacity estimation is based on the following calculations.

For dwellings we use Rusks formula = $ADMD = (A \times 0,15) + ((A \times (1 - 0,15)) / (\sqrt{n}))$

Where: A = Amperes per unit = 60

N = Number of Units

For Business 1, Educational, Municipal, Institutional etc. we use 0,08kVA per sq.m.

BLOCK 1 – 2189 Dwellings – ADMD = 4 635kVA

Rable Ridge Load Calculations										Using Rusk's Formula									
	Sq.m	Ha	dUrHa	Coverage	FAR	Building Sq.m	km	12x VAKm	No dwellings	0.08VAsq.m	Total VVA	2N((N-4)/(N+1))	ADMD	A/Unit	Ave	2.19 NVA/Unit	KVA		
Block 1	Res 3	15008	1.5908	200				318.16	0.08		1.273	642.3012		9.101335	230	2072.607	2072607	318.16	659
	Res 3	13013	1.3013	200				260.26	0.08		1.041	526.497		9.138563	230	2101.67	2.10167	666.88568	547.032563
	Res 3	12750	1.275	200				255	0.08		1.020	515.9766		9.142421	230	2102.527	2.102527	536.144963	
	Res 3	10566	1.0566	200				211.32	0.08		845	428.6117		9.170653	230	2109.25	2.10925	445.726763	
	Res 3	9156	0.9156	200				183.12	0.08		732	372.2074		9.189333	230	2115.295	2.115295	387.352763	
	Res 3	7375	0.7375	200				147.5	0.08		590	300.6596		9.244841	230	2126.233	2.126233	331.619363	
	Res 3	4637	0.4637	200				92.74	0.08		371	193.145		9.388855	230	2159.437	2.159437	200.266163	
	Res 3	6007	0.6007	120				72.084	0.08		481	150.8859		9.500284	230	2185.065	2.185065	157.506243	
	Res 3	9648	0.9648	120				115.76	0.08		772	237.5006		9.31485	230	2141.641	2.141641	247.950683	
	Res 3	5628	0.5628	120				67.536	0.08		450	140.9645		9.533974	230	2192.814	2.192814	148.038883	
	Res 3	5203	0.5203	100				52.03	0.08		416	109.9469		9.683109	230	2229.415	2.229415	115.966463	
	Res 3	8357	0.8357	100				83.57	0.08		669	173.0691		9.431524	230	2169.25	2.16925	181.284263	
	Res 3	5628	0.5628	100				56.28	0.08		450	118.4553		10.05977	230	2306.646	2.306646	80.7857625	
	Res 3	3502	0.3502	100				35.02	0.08		280	75.87343		10.05977	230	2306.646	2.306646	80.7857625	
	Res 3	4637	0.4637	100				46.37	0.08		371	98.61334		9.777711	230	2246.673	2.246673	104.26263	
	Res 3	4628	0.4628	80				37.024	0.08		370	72.595		10.08023	230	2394.027	2.394027	84.5340425	
Res 3	4173	0.4173	80				33.384	0.08		334	62.5872		10.08023	230	2318.453	2.318453	77.392425		
Res 3	5419	0.5419	80				43.352	0.08		404	92.58872		9.831852	230	2261.326	2.261326	98.0330025		
Res 3	5054	0.5054	80				40.432	0.08		404	86.71918		9.891928	230	2275.144	2.275144	91.5889025		
Functional Space																			
Street Lights	4802		0.4802	80			2.05	38.416	0.08		25	25						25	
	165091							2183.374			11.712	4.439		2.85521				2.109153	4.635

**BLOCK 2 – 706 Dwellings + Educational 27 621 sq.m + Municipal 10 818 sq.m –
ADMD = 4 610kVA**

[illegible]

BLOCK 3 – 1589 Dwellings + Municipal 13 472 sq.m ADMD = 4 582kVA

Block 3	Res 3	8114	0.8114	200																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						</
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BLOCK 4 – Business 1 = 144 985 sq.m ADMD = 11 599kVA & BLOCK 5 -276 Dwellings + Institutional 16 546 sq.m = 1 904kVA

We trust you find the above in order and please advise if additional information is required.

Block 4 =Bf 3702	Sq.m	Ha	du/Ha	70%	1,4	142085,3			No dwellings	0,08kVA/sq.m	Total kVA	2N((N=4)/(N+1))			
Business 1	144985									0,08	11599	11599	0	11599	
Block 5											11599	11599		11599	
Erf	Sq.m	Ha	du/Ha						No dwellings	0,08kVA/sq.m	Total kVA	2N((N=4)/(N+1))			
3704 Res 3	46069	4,5069	60						276,414	0,08	3696	558,8064	230	2100,007	2,100007
3703 Institutional	16546	1,6546		70%	1,4	16215,08			0	0,08	1324	1324	9,130465	580,471343	
8280 Functional Open	8280	0,828							0	0,08	0	0	0	1324	
									276,414	0,24	5009	0 1882,486		1904	

Total Capacity Required:

- Block 1 = 4 635 kVA
- Block 2 = 4 610 kVA
- Block 3 = 4 528 kVA
- Block 4 = 11 599 kVA
- Block 5 = 1 904 kVA + 105kVA Arterial Street Lights
- **Total = 27 380kVA or 27,38 MVA**

The above calculations have been checked using various formulas and they are all in line with the same. Per dwelling ADMD calculates to average of **2.19kVA** per dwelling.

Trust you find the above in order, please advise if additional information is required.

Yours faithfully

BFBA CONSULTANTS JOHANNESBURG (PTY) LTD



.....
CE CHEMALY Pr. Tech. Eng.
DIRECTOR

NINFU ALLANDALE DEV (PTY) LTD

TRAFFIC IMPACT ASSESSMENT

RABIE RIDGE EXTENSION 7, CITY OF JOHANNESBURG, GAUTENG PROVINCE

26 SEPTEMBER 2022

CONFIDENTIAL





TRAFFIC IMPACT ASSESSMENT

RABIE RIDGE EXTENSION 7, CITY OF JOHANNESBURG, GAUTENG PROVINCE

NINFU ALLANDALE DEV (PTY) LTD

TYPE OF DOCUMENT (VERSION)
CONFIDENTIAL

PROJECT NO.: 16975
DATE: SEPTEMBER 2022

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Revision 2	Updated TIA		
Date	30 June 2016	September 2022		
Prepared by	Christopher E Nair Civil Engineer	Pieter Jooste Traffic Engineer (BEng)		
Signature	-			
Checked by	Christopher E Nair Civil Engineer	Nico Roets Associate (Pr Tech)		
Signature	-	 PR TECH ENG 361167282		
Authorised by	Eben Kotze (Pr Tech)	Nico Roets Associate (Pr Tech)		
Signature	-	 PR TECH ENG 361167282		
Project number	16975	16975		
Report number	2	3		
File reference	-	-		

SIGNATURES

PREPARED BY



Pieter Jooste, Traffic Engineer
Mr

REVIEWED BY

Nico Roets, Associate
Mr

This report was prepared by WSP for the account of NINFU ALLANDALE DEV (PTY) LTD, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

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PRODUCTION TEAM

CLIENT

NINFU ALLANDALE DEV (PTY) LTD

WSP

Reviewer

Nico Roets

SUBCONSULTANT

SA Traffic Surveys (Pty) Ltd

Pieter Jooste

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SKC003:	PROPOSED UPGRADES OF INTERSECTION 2
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SKC006:	PROPOSED UPGRADES OF INTERSECTION 5
SKC007:	PROPOSED UPGRADES OF INTERSECTION 6
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- A** PREVIOUS TIA COMMENTS FROM AUTHORITIES
- B** TOWNSHIP LAYOUT PLAN AND SCHEDULE OF RIGHTS
- C** DEVELOPMENT TRIP CALCULATIONS
- D** SIDRA OUTPUTS

1 INTRODUCTION

1.1 BACKGROUND AND TERMS OF REFERENCE

WSP was appointed to amend the Traffic Impact Assessment (TIA) for Rabie Ridge Extension 7, City of Johannesburg, Gauteng Province. The township will be situated on the remainder of the farm Allandale 10-IR.

A previous study was conducted by WSP in June 2016, but has since lapsed. Comments received on this previous study is attached to this report as **Appendix A**.

The site is currently undeveloped. The proposed township locality and the surrounding road network is indicated in **Figure 1** (all figures and drawings are attached at the back of the report). An aerial view of the site is also shown in **Figure 2**.

The purpose of this study is to determine the traffic impact the proposed development is expected to have on the existing road network and, if required, recommend possible road upgrades to mitigate such an impact. This report also comments on the position of the proposed development accesses, as well as on non-motorised and public transport facilities.

1.2 EXTENT OF THE DEVELOPMENT

Rabie Ridge Extension 7 will consist of the land-uses as shown on **Table 1-1** below.

Table 1.1 Proposed Land-Uses

Land-Use	Extent
Residential 1	442 units
Residential 3	5 687 units
Business 1 (Shopping Centre)	40 000 m ² Gross Leasable Area (GLA)
Community Facility (Primary School)	1 200 students
Institutional (Private Hospital)	5 133 m ² GLA

The proposed township layout plan and schedule of rights are attached as **Appendix B**.

1.3 APPROVAL OF SUBMISSION

This report will be subject to approval from the following relevant roads authorities:

- Johannesburg Roads Agency (JRA);
- City of Ekurhuleni, and
- The Gauteng Department of Roads and Transport (Gautrans)

2 SURROUNDING ROAD NETWORK

2.1 STUDY AREA

The guidelines in the South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual (TMH 16), as well as professional judgement, yielded that the following intersections be included in the scope of this study:

- Main Road (future K111)/ Boshoff Road (Intersection 1)
- Main Road (future K111)/ Modderfontein Road (future K56) (Intersection 2)
- Modderfontein Road (future K56)/ Falcon Street (Intersection 3)
- Modderfontein Road (future K56)/ Dane Road (Intersection 4)
- Modderfontein Road (future K56)/ Unnamed Gravel Road (Intersection 5)
- Dane Road/ West Road (Intersection 6)
- West Road/ Republic Road (Intersection 7)
- Boshoff Road/ Tlangelani Road (Intersection 8)

The locations of the study intersections are shown in **Figure 1**.

2.2 EXISTING ROAD NETWORK

2.2.1 MUNICIPAL ROADS

The municipal road master plan is shown in **Figure 3**.

- **Boshoff Road**: This collector road follows a north-south alignment to the east of the site. The site is proposed to obtain direct access from Boshoff Road.
 - **Republic Road**: This road is a municipal road to the west of Modderfontein Road. It is a minor arterial road following the same alignment as future route K111.
 - **Falcon Street**: This collector road follows an east-west alignment to the east of the site.
 - **Dane Road**: This is a minor arterial road following an east-west alignment to the south of the site.
 - **West Road**: This is also a minor arterial road following a north-south alignment to the west of the site. Currently, West Road functions as an access road.
-

2.2.2 PROVINCIAL ROADS

The provincial road master plan is shown in **Figure 4**.

- **Modderfontein Road**: This is a major arterial road following a north-south alignment. Future route K56 is planned along the alignment of Modderfontein Road (to be discussed in **Section 2.3**). Two full accesses to the subject development are proposed off Modderfontein Road (to be discussed in **Section 4**).
 - **Main Road**: This is also a major arterial road following an east-west alignment. Future route K111 is planned along the alignment of Modderfontein Road (to be discussed in **Section 2.3**). A partial access to the subject development is proposed off Main Road (to be discussed in **Section 4**).
-

2.2.3 NATIONAL ROADS

No national roads are located inside the study area.

2.3 FUTURE ROAD PLANNING

The following two future roads are planned in the study area:

- **Route K111:** A provincial dual carriageway road, route K111 is planned on the existing Main Road alignment and will run in a west-east direction past the proposed development, linking Allandale Road to the west and Olifantsfontein Road (R562) to the east. The existing Main Road is currently operating at capacity. Therefore, the planned K111 will mitigate capacity constraints in the future.
- **Route K56:** This will also be a provincial dual carriageway road, and is planned on the existing Modderfontein Road alignment running in a north-south direction past the proposed development, linking Dale Road to the north and Andrew Mapheto Street/Zuurfontein Street to the south.

3 DATA COLLECTION

3.1 TRAFFIC COUNTS

New traffic surveys were commissioned by WSP on Monday 5 September 2022 at all study intersections identified in **Section 2.1**. The existing peak hour traffic volumes are presented in **Figure 5**.

The new survey indicated a 14.6% growth in AM peak hour traffic volumes, and a 16.9% growth in PM peak hour traffic volumes since 2016. This equates to an average annual traffic growth rate of between 2.3% and 2.6%.

3.2 SITE VISIT

The study area was visited on Monday 5 September 2022 to assess the following:

- The geometric layouts of the study intersections;
 - Road signage and markings on the surrounding roads, and
 - Existing pedestrian and public transport services and facilities.
-

3.3 LATENT DEVELOPMENTS

Known latent developments considered by this study are shown in **Figure 6**, and discussed in the following subsections. The peak hour traffic volumes for latent developments considered are shown in **Figure 7**.

In order to accommodate any other possible latent rights, an annual background traffic growth factor of 3.0% over 5 years was also applied to the existing traffic volumes. This is in accordance with the requirements of the guidelines in the TMH 16.

Future 2027 background traffic volumes, which includes latent development traffic as per **Figure 7**, are shown in **Figure 8**.

3.3.1 CLAYVILLE EXTENSION 50 & 71

A traffic study for Clayville Extensions 50 and 71 was undertaken by WSP in November 2015. The development includes the following:

- 595 Residential Units (single dwelling units)
- 10 550 Residential Units (apartments and flats)
- 59 600m² GLA of Shopping Centre
- 25 600m² GLA of Offices
- 1 Public Secondary School (1 200 students)
- 1 Public Primary School (1 200 students)

It is estimated that this development is approximately 20% complete. The closest intersections to the proposed development are Modderfontein Road/Dale Road and Main Road/Karee Street intersections, which are located approximately 2.8 km and 5 km north of the proposed development. The assigned development traffic volumes on Modderfontein Road are nominal and it was thus assumed that these latent development trips are part of the growth in background traffic.

3.3.2 LORDSVIEW INDUSTRIAL PARK

A traffic study for Lordsview Industrial Park was undertaken by MPE Traffic and Transportation Engineers in November 2014. The development includes the following:

- 800 761 m² GLA Industrial Park

It is estimated that this development is approximately 50% complete which, when fully developed, is expected to generate approximately 6 073 and 6 073 vehicles during the AM and PM peak hours. The closest study intersection to the latent development is the Modderfontein Road/Gravel Access Road intersection, located approximately 2.3 km north of this development.

It is expected that the latent development trips will be to and from the Commercial and Chloorkop areas located to the north and east of the site. There are two accesses off Modderfontein Road between the Modderfontein Road/Gravel Access Road intersection, and the Modderfontein Road/ E T Mdakalaan intersection where trips will be assigned to and from.

4 SITE ACCESS

The following accesses to the subject development are proposed:

- **K56 accesses:** Two full accesses off the planned future K56 alignment are proposed. These accesses are in line with Gautrans' basic planning.
- **K111 access:** A partial access (Intersection A) is proposed off the planned future K111, located approximately 730 m east of the Main Road (K111)/Modderfontein Road (K56) intersection, and 350 m west of the Main Road(K111)/Boshoff Road intersection. The partial access is not part of the basic planning of the K111, and Gautrans approval will be required.
- **Boshoff Road access:** Full access is proposed at the existing Boshoff Road/Tlangelani Road intersection (intersection 8), located approximately 100 m south of Main Road/Boshoff Road intersection.

The proposed access positions are shown in **Drawing SKC001**.

5 DEVELOPMENT TRIP GENERATION

The South African Trip Data Manual (TMH17) was used to estimate the trip generation for the development. The estimated development trips during peak traffic hours are summarised in **Table 5.1** below, with the detailed calculations attached as **Appendix C**.

The distribution and assignment of these development trips are shown in **Figure 9**.

Table 5.1 Peak Hour Development Trips

Land-Use and Extent	Weekday AM			Weekday PM		
	In	Out	Total	In	Out	Total
Res 1(single dwelling): 442 units	28	83	111	77	33	111
Res 3(apartments & flats): 1124 units (120 units/ha)	70	211	281	197	84	281
Res 3(apartments & flats): 4564 units (200 units/ha)	285	856	1141	799	342	1141
Public Primary School: 1200 students	152	152	303	54	54	107
Private Hospital: 5 133 m ² GLA	35	23	58	21	31	52
Shopping Centre: 40 000 m ² GLA	109	59	168	475	475	951
TOTAL	678	1383	2061	1623	1020	2643

The development trips above include the following trip reduction factors, as per the TMH17:

- **Residential 1 units:** No trip reduction factors
- **Residential 3 units:** No trip reduction factors
- **Shopping Centre:** Trip reduction factors applied for mixed-use, low vehicle ownership, and transit nodes.
- **Public Primary School:** Trip reduction factors applied for mixed-use, low vehicle ownership, and transit nodes.
- **Private Hospital:** Trip reduction factors applied for low vehicle ownership and transit nodes.

A peak hour trip generation rate of 0.25 vehicle trips per residential unit was used for Residential 1 and Residential 3 land-uses as recommended by JRA and, therefore, no adjustment factors were applied to these development nodes.

6 TRAFFIC IMPACT AND CAPACITY ANALYSIS

6.1 ASSESSMENT YEARS

Analysis of the base year scenario as well as a five-year future horizon scenario is proposed. For this study the base year scenario is taken as 2022 and the horizon scenario is taken as 2027.

6.2 ASSESSMENT SCENARIOS

The following traffic scenarios are evaluated:

- Scenario 1: Future 2027 peak hour traffic, which include latent development traffic volumes (volumes as per **Figure 8**);
 - Scenario 2: Future 2027 plus development peak hour traffic (volumes as per **Figure 10**) without any road upgrades, and
 - Scenario 3: Future 2027 plus development peak hour traffic (volumes as per **Figure 10**) with road upgrades
-

6.3 INTERSECTION CAPACITY ANALYSIS

The capacity analysis for the above scenarios at each study intersection is performed using “SIDRA Intersection 8” traffic engineering software. Please refer to **Appendix D** for the detailed SIDRA outputs. The analysis results for each scenario are summarised and discussed in the following subsections.

To get a true reflection of current traffic conditions, existing peak hour signal timings were used to analyse traffic signal-controlled intersections (i.e., not optimised timings).

6.3.1 SCENARIO 1: FUTURE 2027 PEAK HOUR TRAFFIC

Table 6.1 Traffic Analysis Result Summary – Future 2027 Peak Hour Traffic

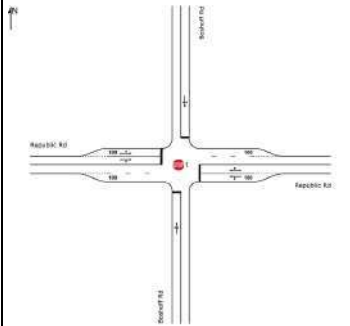
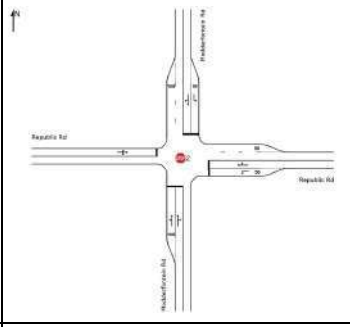
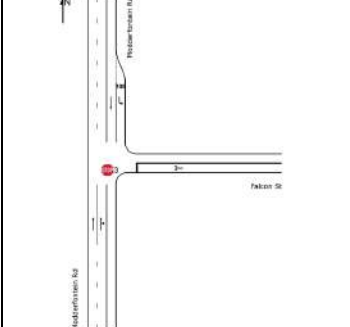
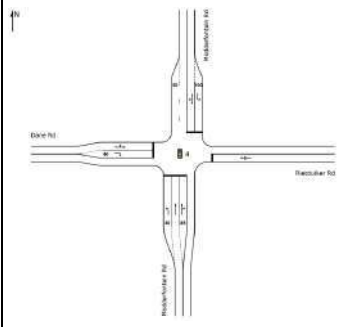
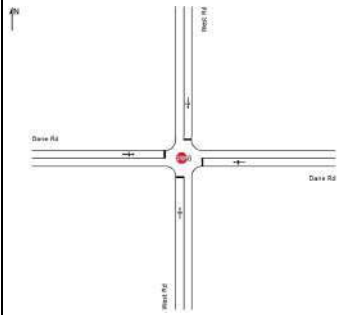
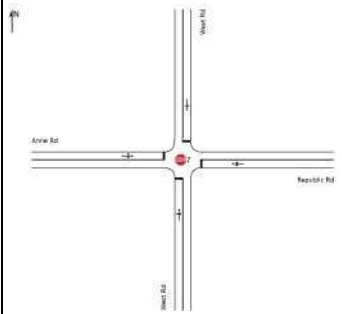
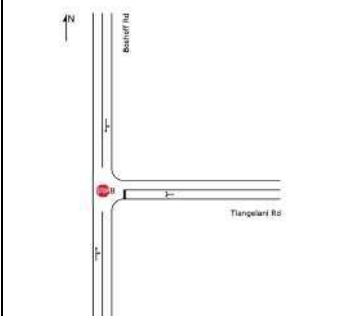
Intersection	Overall			Critical Movement			Intersection Layout & Traffic Control
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	
1. Main Rd/ Boshoff Rd	AM 1.21 PM 1.03	AM 124 PM 52	AM F PM F	AM 1.21 PM 1.03	AM 223 PM 89	AM F PM F	Existing layout & control 
2. Main Rd/ Modderfontein Rd	AM 2.235 PM 1.33	AM 431 PM 93	AM F PM F	AM 2.235 PM 1.33	AM 1129 PM 330	AM F PM F	Existing layout & control 
3. Modderfontein Rd/ Falcon St	AM 3.321 PM 3.81	AM 612 PM 653	AM F PM F	AM 3.321 PM 3.81	AM 2104 PM 2538	AM F PM F	Existing layout & control 
4. Modderfontein Rd/ Dane Rd	AM 2.20 PM 2.08	AM 490 PM 417	AM F PM F	AM 2.20 PM 2.08	AM 1133 PM 1010	AM F PM F	Existing layout & control 

Table 6.1 (continues) Traffic Analysis Result Summary – Future 2027 Peak Hour Traffic

Intersection	Overall			Critical Movement			Intersection Layout & Traffic Control
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	
5. Modderfontein Rd/Unnamed Gravel Rd	This is an informal intersection and it was decided that no trips will be distributed from or to the gravel road. The analysis is, therefore, not applicable to this intersection.						
6. Dane Rd/ West Rd	AM 1.73 PM 1.22	AM 422 PM 125	AM F PM F	AM 1.73 PM 1.22	AM 677 PM 229	AM F PM F	Existing layout & control 
7. Modderfontein Rd/ Falcon St	AM 0.98 PM 1.18	AM 43 PM 132	AM E PM F	AM 0.98 PM 1.18	AM 68 PM 201	AM F PM F	Existing layout & control 
8. Boshoff Rd/ Tlangelani Rd	AM 0.38 PM 0.34	AM 1 PM 1	AM n/a PM n/a	AM 0.38 PM 0.34	AM 10 PM 10	AM A PM B	Existing layout & control 

6.3.2 SCENARIO 2: FUTURE 2027 PLUS DEVELOPMENT PEAK HOUR TRAFFIC (WITHOUT UPGRADES)

**Table 6.2 Traffic Analysis Result Summary – Future 2027 Plus Development Peak Hour Traffic
(Without Upgrades)**

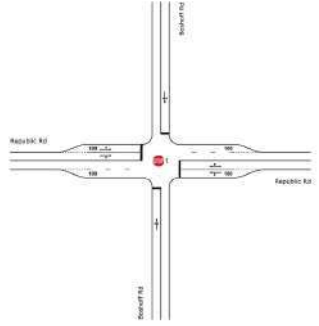
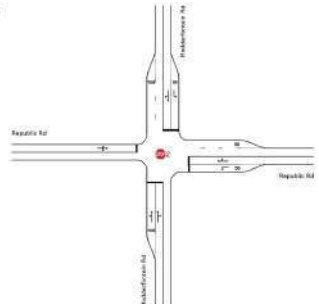
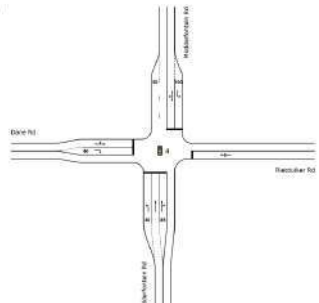
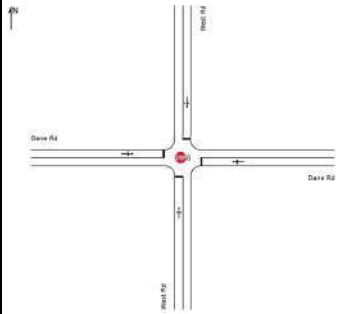
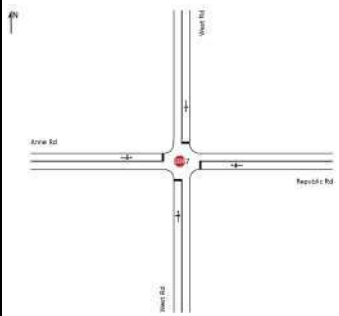
Intersection	Overall			Critical Movement			Intersection Layout & Traffic Control
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	
1. Main Rd/ Boshoff Rd	AM 1.32 PM 1.11	AM 207 PM 79	AM F PM F	AM 1.32 PM 1.11	AM 312 PM 146	AM F PM F	Existing layout & control 
2. Main Rd/ Modderfontein Rd	AM 2.58 PM 1.77	AM 561 PM 219	AM F PM F	AM 2.58 PM 1.77	AM 1438 PM 719	AM F PM F	Existing layout & control 
3. Modderfontein Rd/ Falcon St	Not applicable for this scenario (development traffic cannot distribute through this intersection without road upgrades)						
4. Modderfontein Rd/ Dane Rd	AM 2.80 PM 5.06	AM 736 PM 1216	AM F PM F	AM 2.80 PM 5.06	AM 1673 PM 3689	AM F PM F	Existing layout & control 

Table 6.2 (continues) Traffic Analysis Result Summary – Future 2027 Plus Development Peak Hour Traffic (Without Upgrades)

Intersection	Overall			Critical Movement			Intersection Layout & Traffic Control
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	
5. Modderfontein Rd/Unnamed Gravel Rd	This is an informal intersection and it was decided that no trips will be distributed from or to the gravel road. The analysis is, therefore, not applicable to this intersection.						
6. Dane Rd/ West Rd	AM 1.93 PM 1.47	AM 525 PM 242	AM F PM F	AM 1.93 PM 1.47	AM 862 PM 448	AM F PM F	Existing layout & control 
7. Modderfontein Rd/ Falcon St	AM 1.40 PM 1.34	AM 219 PM 174	AM F PM F	AM 1.40 PM 1.34	AM 389 PM 337	AM F PM F	Existing layout & control 
8. Boshoff Rd/ Tlangelani Rd	Not applicable for this scenario (development traffic cannot distribute through this intersection without road upgrades)						

6.3.3 SCENARIO 3: FUTURE 2027 PLUS DEVELOPMENT PEAK HOUR TRAFFIC (WITH UPGRADES)

Table 6.3 Traffic Analysis Result Summary – Future 2027 Plus Development Peak Hour Traffic (With Upgrades)

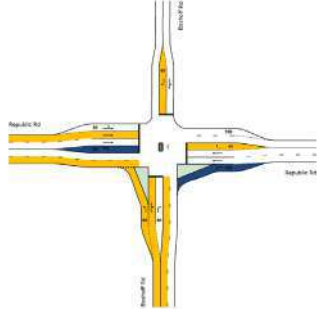
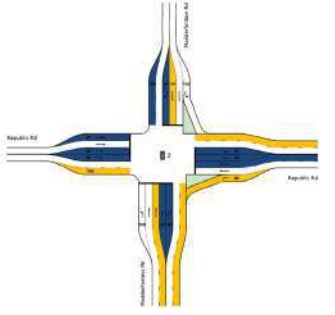
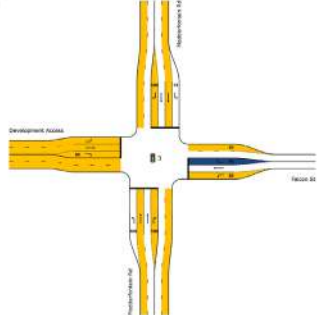
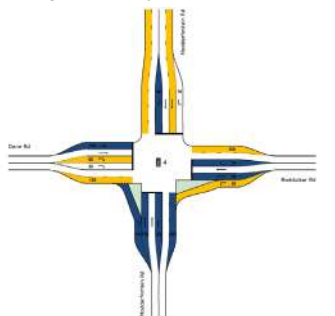
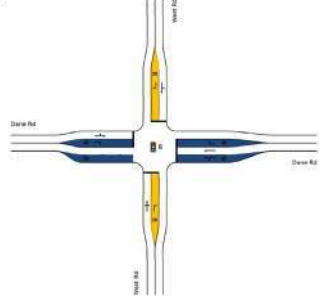
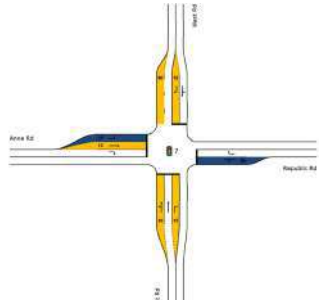
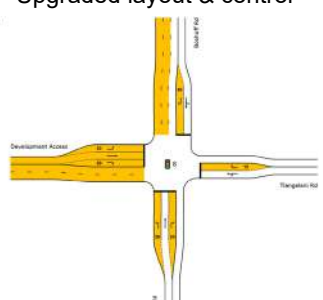
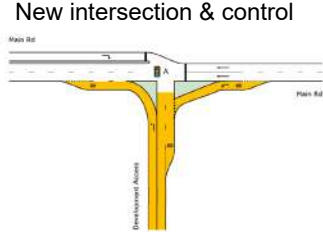
Intersection	Overall			Critical Movement			Intersection Layout & Traffic Control
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	
1. Main Rd/ Boshoff Rd	AM 0.98 PM 0.78	AM 37 PM 14	AM D PM B	AM 0.98 PM 0.78	AM 5 PM 34	AM D PM C	Upgraded layout & control 
2. Main Rd/ Modderfontein Rd	AM 0.67 PM 0.97	AM 16 PM 24	AM B PM C	AM 0.67 PM 0.97	AM 29 PM 68	AM C PM E	Upgraded layout & control 
3. Modderfontein Rd/ Falcon St	AM 0.89 PM 0.77	AM 30 PM 20	AM C PM C	AM 0.89 PM 0.77	AM 50 PM 36	AM D PM D	Upgraded layout & control 
4. Modderfontein Rd/ Dane Rd	AM 0.93 PM 0.86	AM 23 PM 20	AM C PM C	AM 0.93 PM 0.86	AM 51 PM 40	AM D PM D	Upgraded layout & control 

Table 6.3 (continues) Traffic Analysis Result Summary – Future 2027 Plus Development Peak Hour Traffic (With Upgrades)

Intersection	Overall			Critical Movement			Intersection Layout & Traffic Control
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	
5. Modderfontein Rd/Unnamed Gravel Rd	This is an informal intersection and it was decided that no trips will be distributed from or to the gravel road. The analysis is, therefore, not applicable to this intersection.						
6. Dane Rd/ West Rd	AM 0.77 PM 0.87	AM 12 PM 20	AM B PM B	AM 0.77 PM 0.87	AM 43 PM 51	AM D PM D	Upgraded layout & control 
7. Modderfontein Rd/ Falcon St	AM 0.97 PM 0.89	AM 38 PM 25	AM D PM C	AM 0.97 PM 0.89	AM 54 PM 49	AM D PM D	Upgraded layout & control 
8. Boshoff Rd/ Tlangelani Rd	AM 0.58 PM 0.50	AM 12 PM 11	AM B PM B	AM 0.58 PM 0.50	AM 34 PM 33	AM C PM C	Upgraded layout & control 
A. Main Rd/ Development Access	AM 0.78 PM 0.49	AM 8 PM 12	AM A PM B	AM 0.78 PM 0.49	AM 49 PM 23	AM D PM C	New intersection & control 

7 ROAD UPGRADES

Table 7.1 below summarises the proposed road upgrades identified through the analysis procedure in the foregoing sections.

These upgrades are also shown in **Drawings SKC002-SKC010**.

Table 7.1 Proposed Road Upgrades

Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
1. Main Rd/ Boshoff Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 30 m long)	Developer
	East	— New right-turn lane (min. 30 m long) — New left-turn slip lane with auxiliary lane (min. 120 m long)	— Developer — Roads Authority
	South	— New right-turn lane (min. 80 m long) — New left-turn slip lane with auxiliary lane (min. 80 m long)	Developer
	West	— Additional through lane — New right-turn lane (min. 30 m long)	— Developer — Roads Authority
2. Main Rd/ Modderfontein Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 30 m long) — Additional through lane (min. 30 m long)	— Roads Authority — Developer
	East	— Two new right-turn lanes (min. 60 m and 90 m long) — Additional through lane — New left-turn slip lane with auxiliary lane (min. 120 m long)	— Roads Authority — Roads Authority — Developer
	South	— Two new right-turn lanes (each min. 90 m long) — Additional through lane	— Roads Authority — Developer
	West	— Two new right-turn lanes (min. 60 m and 90 m long) — New shared-left and through lane (min. 60 m long)	Roads Authority

Table 7.1 (continues) Proposed Road Upgrades

Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
3. Modderfontein Rd/ Falcon St	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 100 m long) — Additional through lane	Developer
	East	— New right-turn lane (min. 60 m long) — New left-turn slip lane with auxiliary lane (min. 60 m long)	— Roads Authority — Developer
	South	— New right-turn lane (min. 100 m long) — New left-turn slip lane with auxiliary lane (min. 100 m long) — Additional through lane	Developer
	West	— New right-turn lane (min. 60 m long) — New left-turn lane — New through lane	Developer
4. Modderfontein Rd/ Dane Rd	Control	— Upgrade existing traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 60 m long) — Additional through lane	— Roads Authority — Developer
	East	— New right-turn lane (min. 30 m long) — New left-turn slip lane with auxiliary lane (min. 30 m long) — Additional through lane (min. 30 m long)	— Roads Authority — Developer — Roads Authority
	South	— New right-turn lane (min. 60 m long) — New left-turn slip lane with auxiliary lane (min. 60 m long) — Additional through lane (min. 120 m long)	Roads Authority
	West	— Extend existing right-turn lane to min. 30 m long — Additional right-turn lane (min. 60 m long) — New shared-left-and through lane (min. 100 m long)	— Developer — Developer — Roads Authority
5. Modderfontein Rd/ Gravel Rd	No upgrades		

Table 7.1 (continues) Proposed Road Upgrades

Intersection/Road Link	Control/ Approach	Required Upgrade	Responsible Party
6. Dane Rd/ West Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 20 m long)	Developer
	East	— New right-turn lane (min. 50 m long) — New shared-left and through lane (min. 20 m long)	Roads Authority
	South	— New right-turn lane (min. 20 m long)	Developer
	West	— New right-turn lane (min. 20 m long)	Roads Authority
7. West Rd/ Dane Rd	Control	— Convert to traffic signal control	Developer/Roads Authority
	North	— New right-turn lane (min. 15 m long)	Developer
	East	— New shared-left and through lane (min. 60 m long)	Roads Authority
	South	— New right-turn lane (min. 15 m long) — New shared-left and through lane (min. 30 m long)	Developer
	West	— New right-turn lane — New left-turn lane (min. 15 m long)	— Developer — Roads Authority
8. Boshoff Rd/ Tlangelani Rd	Control	— Convert to traffic signal control	— Developer
	North	— New right-turn lane (min. 80 m long)	— Developer
	East	— New right-turn lane (min. 15 m long)	— Developer
	South	— New right-turn lane (min. 20 m long) — New left-turn lane (min. 20 m long)	— Developer
	West	— New right-turn lane (min. 20 m long) — New left-turn lane (min. 30 m long) — New through lane	— Developer

Table 7.1 (continues) Proposed Road Upgrades

Intersection/Road Link	Control/Approach	Required Upgrade	Responsible Party
A. Main Rd/ Development Access	Control	— Convert to traffic signal control	— Developer
	East	— New left-turn slip lane with auxiliary lane (min. 120 m long) — Additional through lane	— Developer
	South	— New left-turn slip lane	— Developer
	West	— New right-turn lane (min. 20 m long) — Additional through lane	— Developer
Main Road	Both directions	— Additional through lane (both directions) between Intersection 1 and 2	— Developer
Modderfontein Road	Both directions	— Additional through lane (both directions) between Intersection 2 and 4	— Developer

7.1 DEVELOPMENT PHASING

The roads and intersection upgrades are phased in conjunction with the construction programme received from the developer. The following phases have been considered:

- **Phase 1:** Shopping centre and hospital
- **Phase 2:** Residential 1 and Residential 3 (120 units/ha) units
- **Phase 3:** Residential 3 (200 units/ha) and primary school

It is possible for the order of the phases to change, or even overlap.

Table 7.2 overleaf summarises the proposed road upgrades for each of the above phases.

Table 7.2 Development Road Upgrades Per Phase

Intersection/Road Link	Control/ Approach	Required Upgrade	Phase
1. Main Rd/ Boshoff Rd	Control	— Convert to traffic signal control	1
	North	— New right-turn lane (min. 30 m long)	
	East	— New right-turn lane (min. 30 m long)	
	South	— New right-turn lane (min. 80 m long) — New left-turn slip lane with auxiliary lane (min. 80 m long)	
	West	— Additional through lane	
2. Main Rd/ Modderfontein Rd	Control	— Convert to traffic signal control	1
	North	— Additional through lane (min. 30 m long)	
	East	— New left-turn slip lane with auxiliary lane (min. 120 m long)	
	South	— Additional through lane	
	West	No upgrades	
3. Modderfontein Rd/ Falcon St	Control	— Convert to traffic signal control	2
	North	— New right-turn lane (min. 100 m long) — Additional through lane	
	East	— New left-turn slip lane with auxiliary lane (min. 60 m long)	
	South	— New right-turn lane (min. 100 m long) — New left-turn slip lane with auxiliary lane (min. 100 m long) — Additional through lane	
	West	— New right-turn lane (min. 60 m long) — New left-turn lane — New through lane	

Table 7.2 (continues) Development Road Upgrades Per Phase

Intersection/Road Link	Control/ Approach	Required Upgrade	Phase
4. Modderfontein Rd/ Dane Rd	Control	— Upgrade existing traffic signal control	2
	North	— Additional through lane	
	East	— New left-turn slip lane with auxiliary lane (min. 30 m long)	
	South	None	
	West	— Extend existing right-turn lane to min. 30 m long — Additional right-turn lane (min. 60 m long) —	
5. Modderfontein Rd/ Gravel Rd	No upgrades		
6. Dane Rd/ West Rd	Control	— Convert to traffic signal control	3
	North	— New right-turn lane (min. 20 m long)	
	East	None	
	South	— New right-turn lane (min. 20 m long)	
	West	None	
7. West Rd/ Dane Rd	Control	— Convert to traffic signal control	2
	North	— New right-turn lane (min. 15 m long)	
	East	None	
	South	— New right-turn lane (min. 15 m long) — New shared-left and through lane (min. 30 m long)	
	West	— New right-turn lane	

Table 7.2 (continues) Development Road Upgrades Per Phase

Intersection/Road Link	Control/ Approach	Required Upgrade	Phase
8. Boshoff Rd/ Tlangelani Rd	Control	— Convert to traffic signal control	1
	North	— New right-turn lane (min. 80 m long)	
	East	— New right-turn lane (min. 15 m long)	
	South	— New right-turn lane (min. 20 m long) — New left-turn lane (min. 20 m long)	
	West	— New right-turn lane (min. 20 m long) — New left-turn lane (min. 30 m long) — New through lane	
A. Main Rd/ Development Access	Control	— Convert to traffic signal control	1
	East	— New left-turn slip lane with auxiliary lane (min. 120 m long) — Additional through lane	
	South	— New left-turn slip lane	
	West	— New right-turn lane (min. 20 m long) — Additional through lane	
Main Road	Eastbound	— Additional through lane between Intersection 1 and 2	2
	Westbound	— Additional through lane between Intersection 1 and 2	1
Modderfontein Road	Northbound	— Additional through lane between Intersection 2 and 4	3
	Southbound	— Additional through lane between Intersection 2 and 4	2

8 NON-MOTORISED AND PUBLIC TRANSPORT

8.1 PUBLIC TRANSPORT

8.1.1 EXISTING SERVICES AND FACILITIES

Public transport in the study area is mainly provided by minibus taxis and busses which operates along Main Road, Modderfontein Road and Dane Road.

8.1.2 PROPOSED FACILITIES

The proposed development is expected to generate a significant demand for public transport and it is therefore proposed that public transport lay-bys be provided at the following intersections:

- Main Road/Development Access (Intersection A)
- Modderfontein Road/Falcon Street (Intersection 3)
- Modderfontein Road/Dane Road (Intersection 4)

The proposed lay-bys are shown in **Drawing SKC001**.

8.2 NON-MOTORISED TRANSPORT

8.2.1 EXISTING FACILITIES

No non-motorised transport infrastructure currently exists in and around the subject site.

8.2.2 PROPOSED FACILITIES

In order to aid pedestrian movement to and from the proposed development, it is suggested that paved pedestrian walkways be provided along at least one side of all Class 3 roads within the development. It is further recommended that paved sidewalks be provided along Main Road and Modderfontein Road between the new public transport lay-bys and the access to the development, as shown in **Drawing SKC001**.

9 CONCLUSIONS AND RECOMMENDATIONS

The key conclusions and recommendations of this study are presented below:

- This TIA was undertaken in support of Rabie Ridge Extension 7, City of Johannesburg, Gauteng Province. The township will be situated on the remainder of the farm Allandale 10-IR;
- The development includes 442 Residential 1 units, 5 687 Residential 3 units, 40 000 m² Business 1 rights, a community facility (1 200 student public primary school) and a 5 133 m² private hospital;
- It is estimated that the development will generate a total of 2 061 and 2 643 peak hour trips during the weekday AM and PM peak traffic hours;
- The following accesses to the development are proposed
 - K56 accesses: Two full accesses off the planned future K56 alignment are proposed. These accesses are in line with Gautrans' basic planning.
 - K111 access: A partial access (Intersection A) is proposed off the planned future K111, located approximately 730 m east of the Main Road (K111)/Modderfontein Road (K56) intersection, and 350 m west of the Main Road(K111)/Boshoff Road intersection. The partial access is not part of the basic planning of the K111, and Gautrans approval will be required.
 - Boshoff Road access: Full access is proposed at the existing Boshoff Road/Tlangelani Road intersection (intersection 8), located approximately 100 m south of Main Road/Boshoff Road intersection.
- The study scope for this TIA included the following intersections:
 - Main Road (future K111)/ Boshoff Road (Intersection 1)
 - Main Road (future K111)/ Modderfontein Road (future K56) (Intersection 2)
 - Modderfontein Road (future K56)/ Falcon Street (Intersection 3)
 - Modderfontein Road (future K56)/ Dane Road (Intersection 4)
 - Modderfontein Road (future K56)/ Unnamed Gravel Road (Intersection 5)
 - Dane Road/ West Road (Intersection 6)
 - West Road/ Republic Road (Intersection 7)
 - Boshoff Road/ Tlangelani Road (Intersection 8)
- New traffic surveys were carried out at the study intersections on Monday 5 September 2022. The new survey indicated a 14.6% growth in AM peak hour traffic volumes, and a 16.9% growth in PM peak hour traffic volumes since 2016. This equates to an average annual traffic growth rate of between 2.3% and 2.6%;
- Known latent developments considered by this study are shown in **Figure 6**, and the peak hour traffic volumes for latent developments considered are shown in **Figure 7**. In order to accommodate any other possible latent rights, an annual background traffic growth factor of 3.0% over 5 years was also applied to the existing traffic volumes;
- To mitigate the impact of the development traffic, road upgrades as per **Table 7.1** and as shown in **Drawings SKC002-SKC010** are proposed, and
- The proposed development is expected to generate a significant demand for public transport and it is therefore proposed public transport lay-bys be provided at the following intersections:
 - Main Road/Development Access (Intersection A)
 - Modderfontein Road/Falcon Street (Intersection 3)
 - Modderfontein Road/Dane Road (Intersection 4)
- In order to aid pedestrian movement to and from the proposed development, it is suggested that paved pedestrian walkways be provided along at least one side of all Class 3 roads within the development. It is further recommended that paved sidewalks be provided along Main Road and Modderfontein Road between the new public transport lay-bys and the access to the development.

The proposed development is supported from a traffic engineering perspective provided that the recommendations made in this study are implemented.

REFERENCES

- Committee of Transport Officials (COTO). TMH 17 South African Trip Data Manual. Volume 1, Version 1.0, September 2012.
- Committee of Transport Officials (COTO). TMH 16 South African Traffic Impact and Site Traffic Assessment Manual. Volumes 1 and 2, Version 1.0, August 2012
- Committee of Transport Officials (COTO). TRH 26 South African Road Classification and Access Management Manual. Version 1.0, August 2012.
- WSP. Clayville Extensions 50 & 71 Mixed Use Development, Traffic Impact Study. November 2015.
- Moyeni Professional Engineering. Lordsview Industrial Park, Traffic Impact Study. November 2014.

FIGURES







16975 Rabie Ridge Ext. 7



Project:

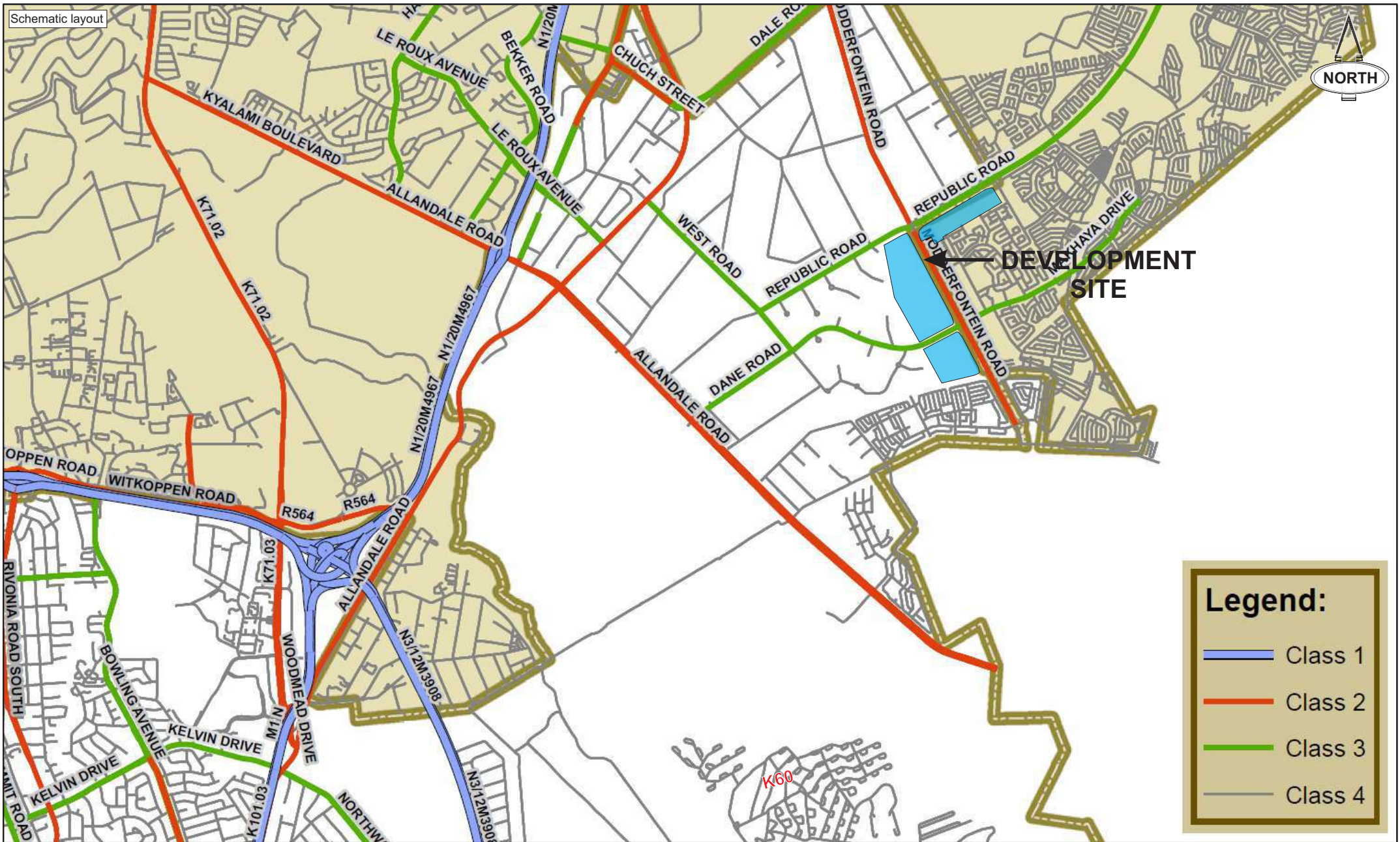
**TRAFFIC IMPACT ASSESSMENT:
RABIE RIDGE EXT.7, JOHANNESBURG**

Figure Description:

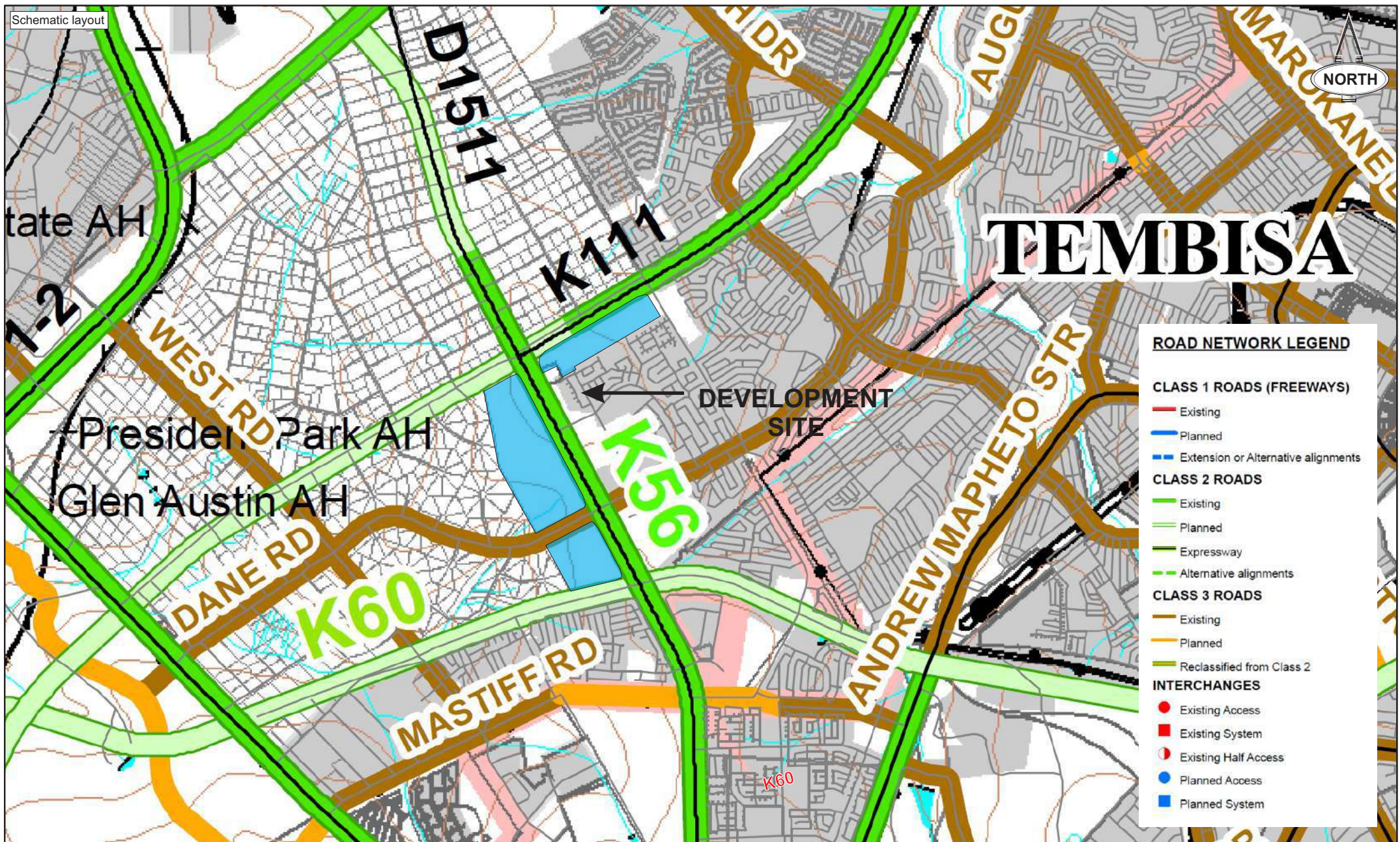
SITE AERIAL VIEW

No.

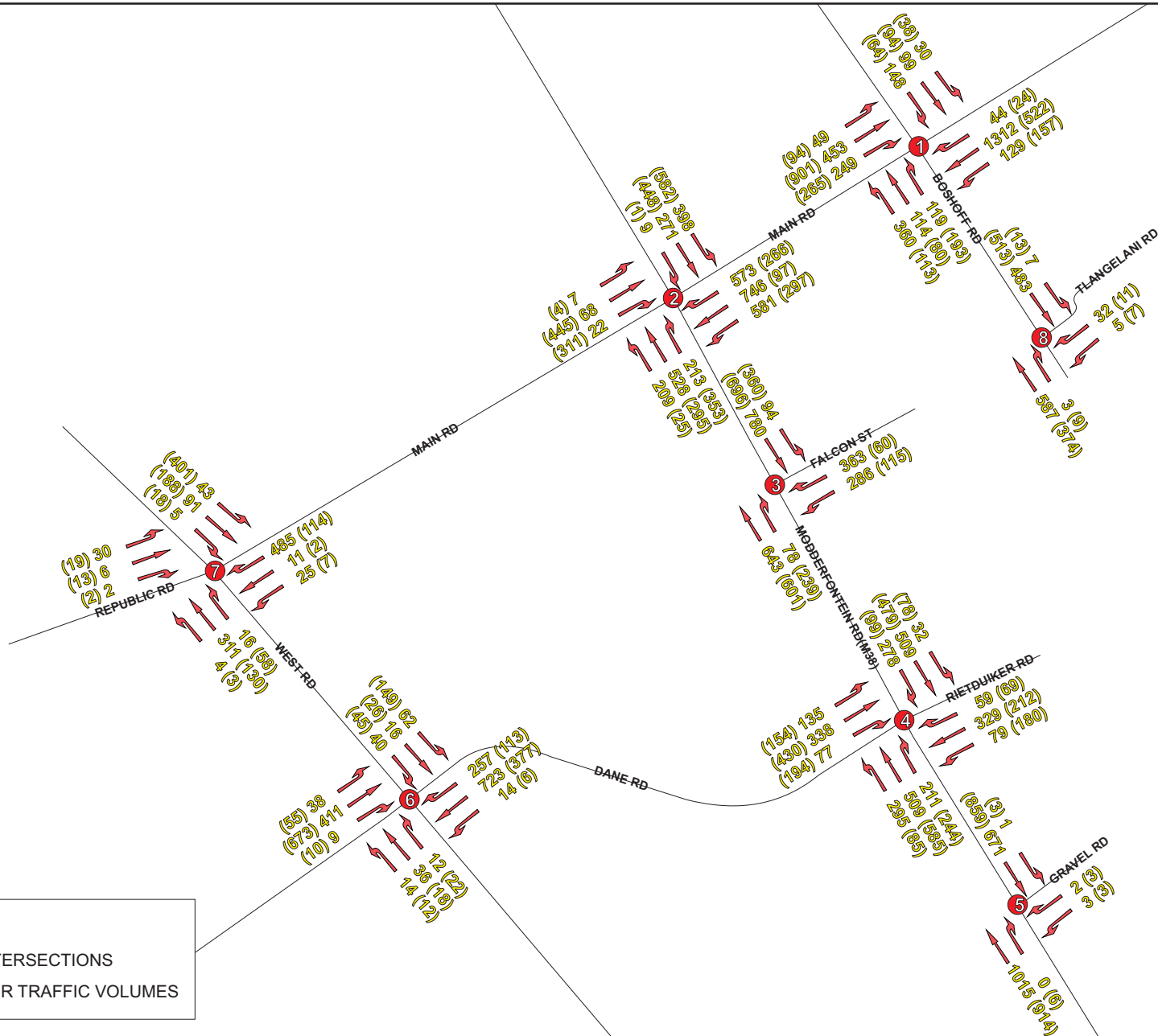
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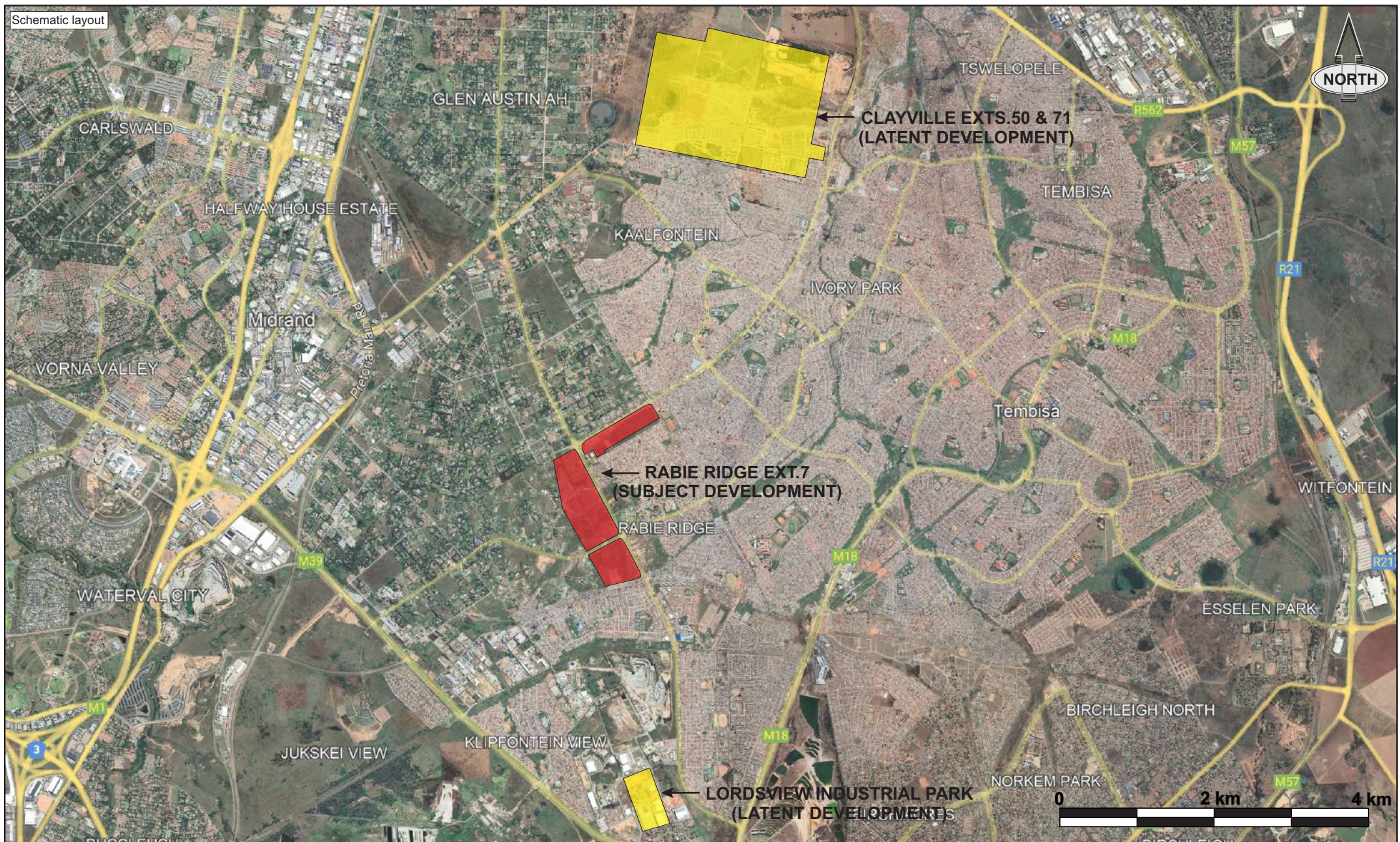


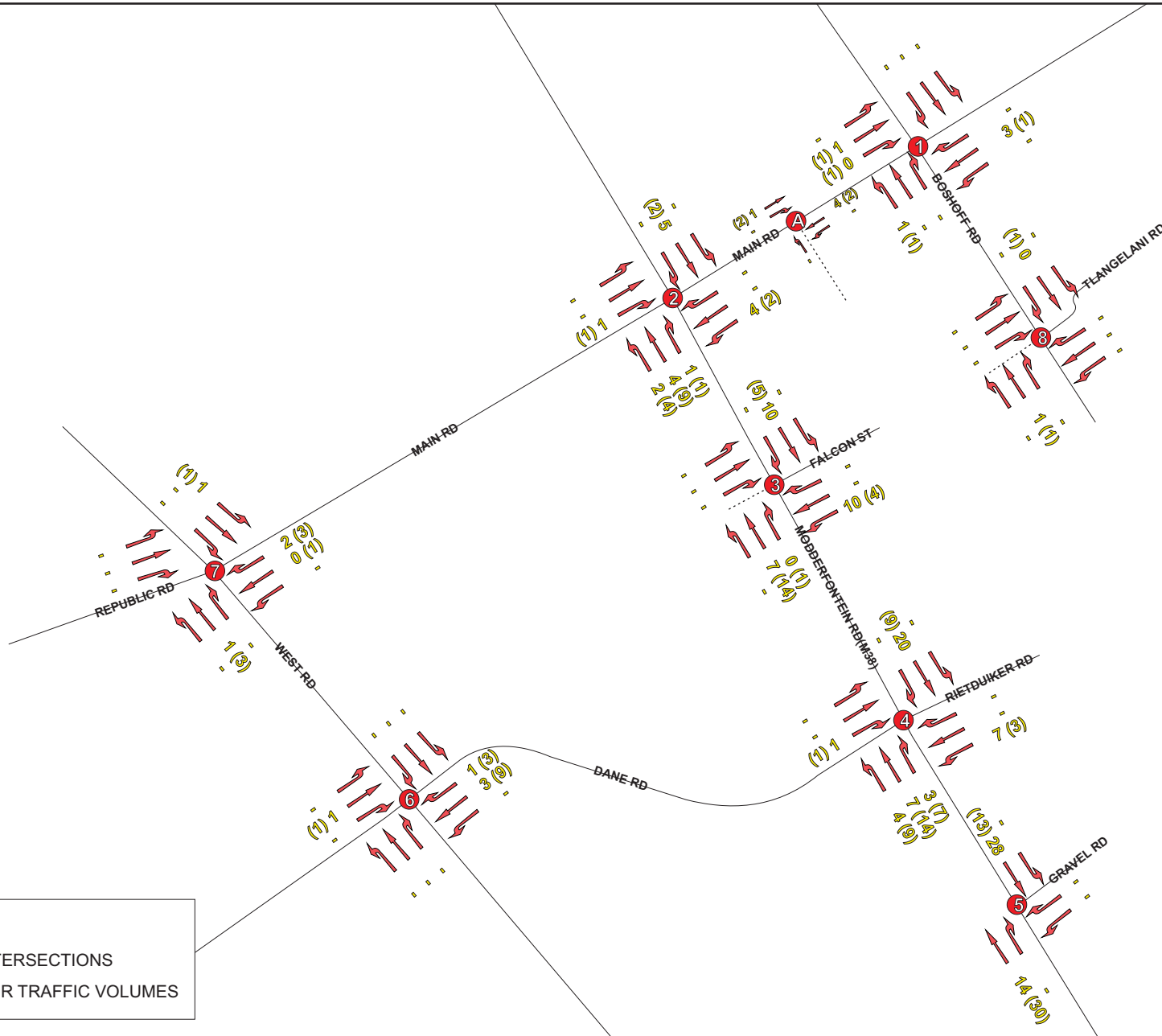
16975 Rabie Ridge Ext. 7

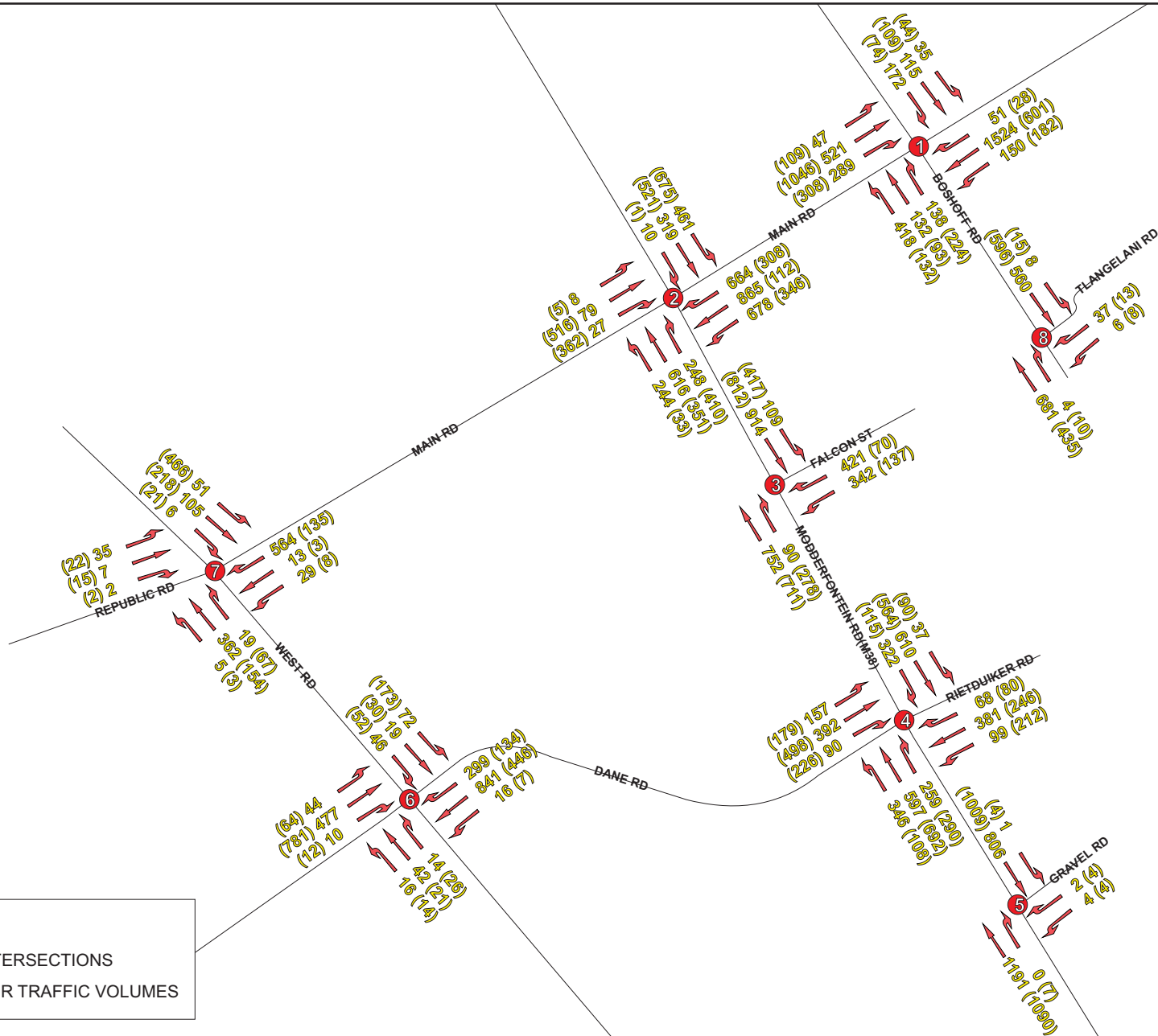


16975 Rabie Ridge Ext. 7



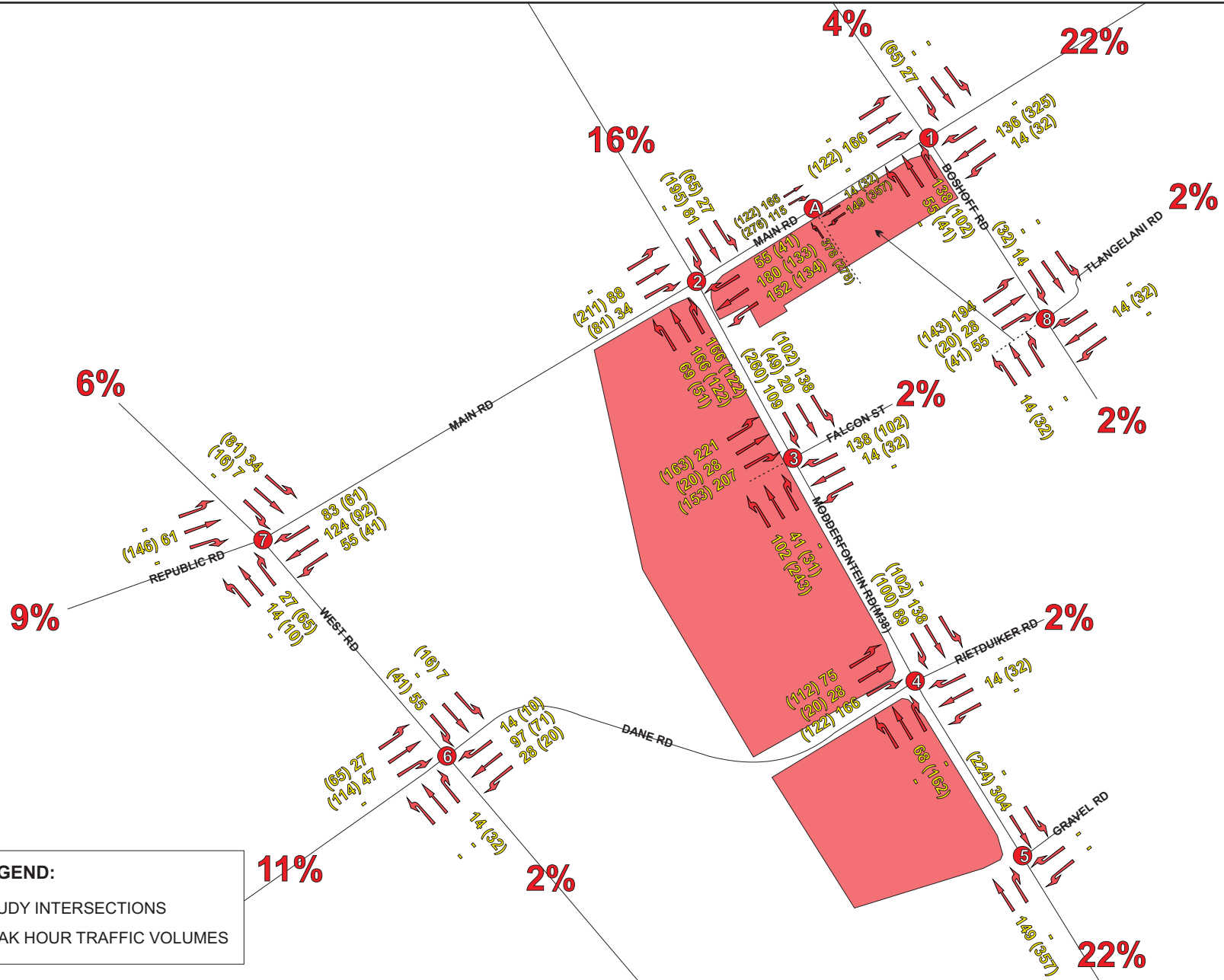


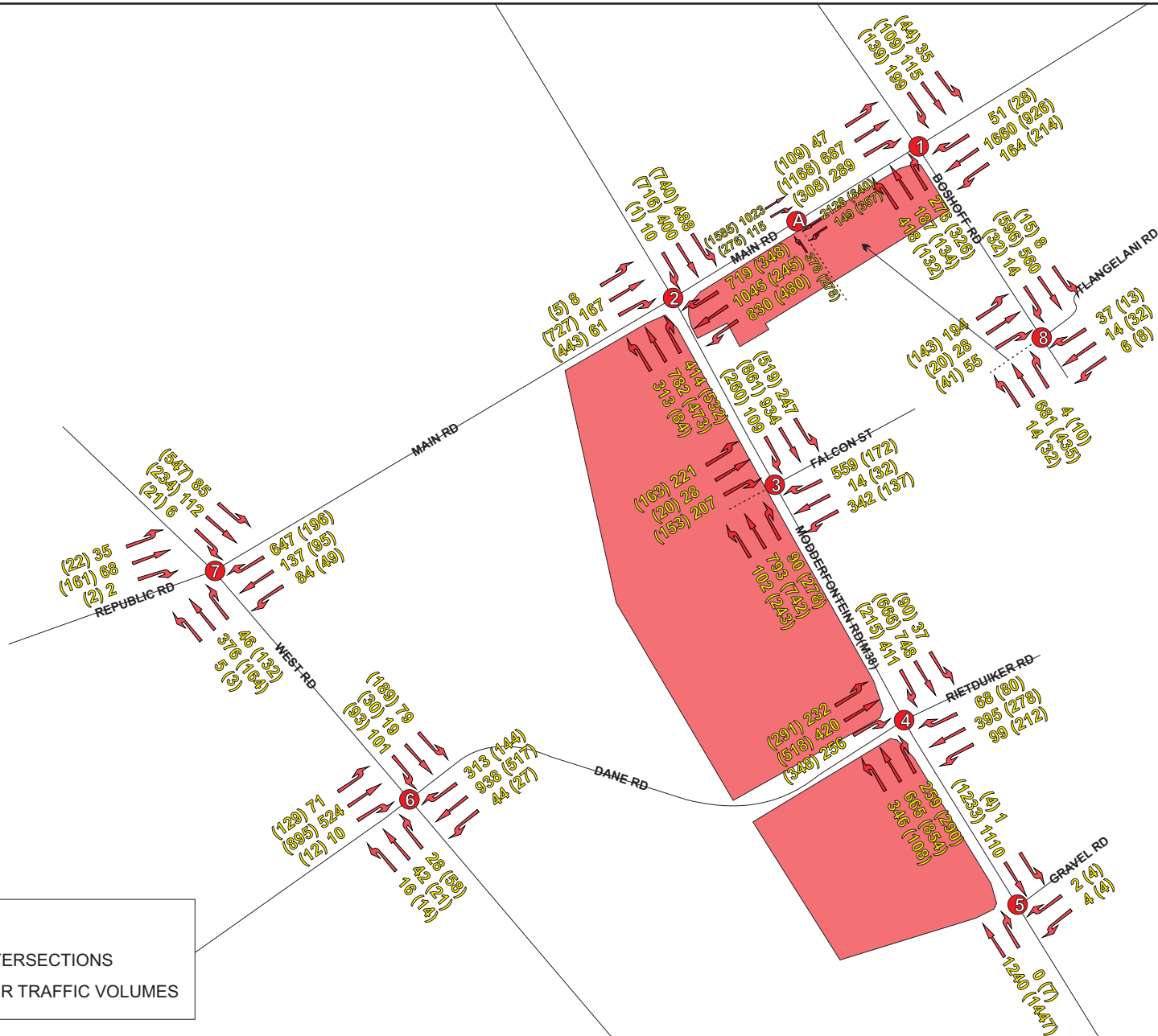




LEGEND:

- STUDY INTERSECTIONS
- AM (PM) PEAK HOUR TRAFFIC VOLUMES



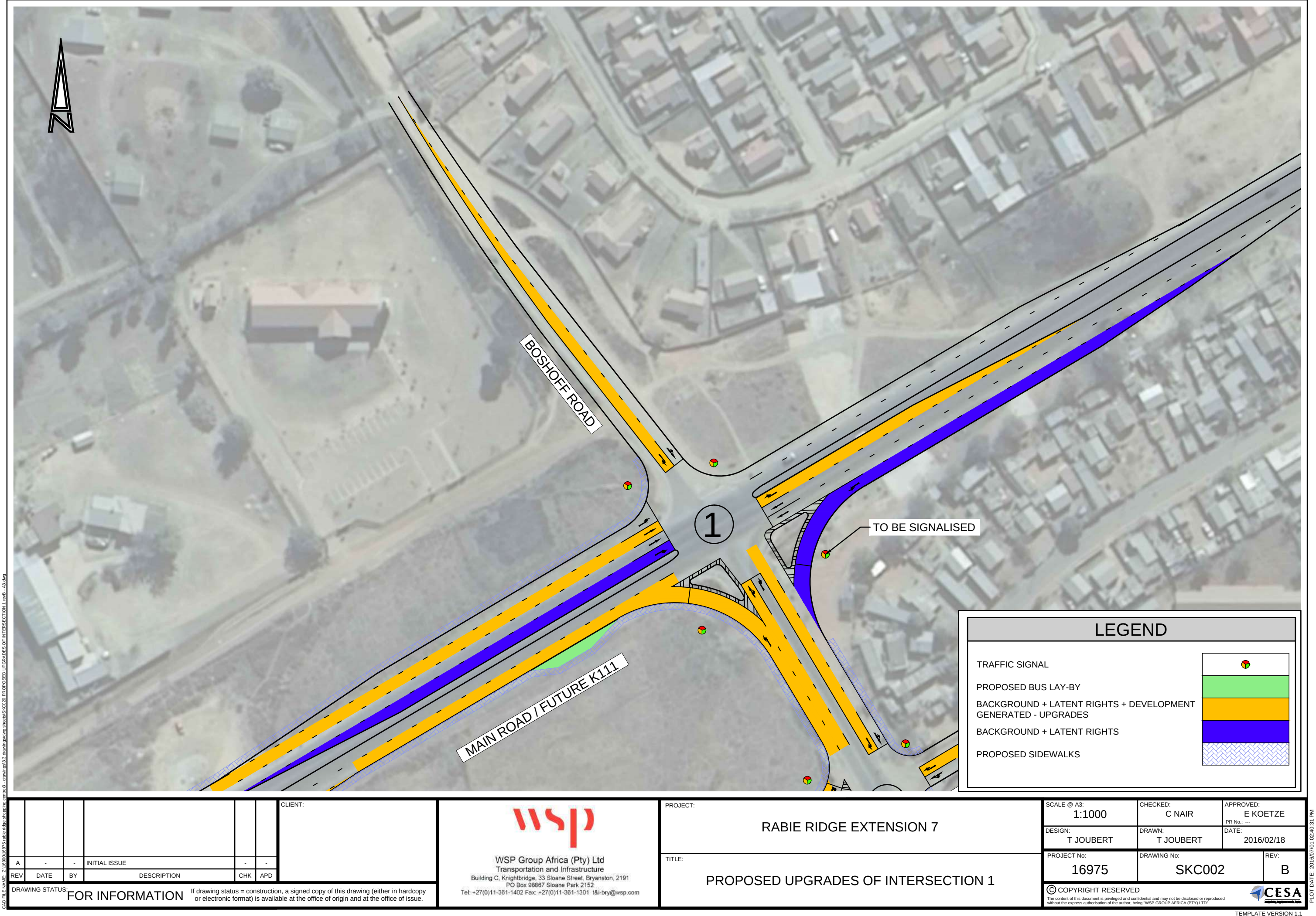


LEGEND:

- STUDY INTERSECTIONS
- AM (PM) PEAK HOUR TRAFFIC VOLUMES

DRAWINGS





A	-	-	INITIAL ISSUE	-	-
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Tel: +27(0)11-361-1402 Fax: +27(0)11-361-1301 t&i-bry@wsp.com

PROJECT:

RABIE RIDGE EXTENSION 7

TITLE:

PROPOSED UPGRADES OF INTERSECTION 1

SCALE @ A3: 1:1000	CHECKED: C NAIR	APPROVED: E KOETZE
DESIGN: T JOUBERT	DRAWN: T JOUBERT	DATE: 2016/02/18
PROJECT No: 16975	DRAWING No: SKC002	REV: B

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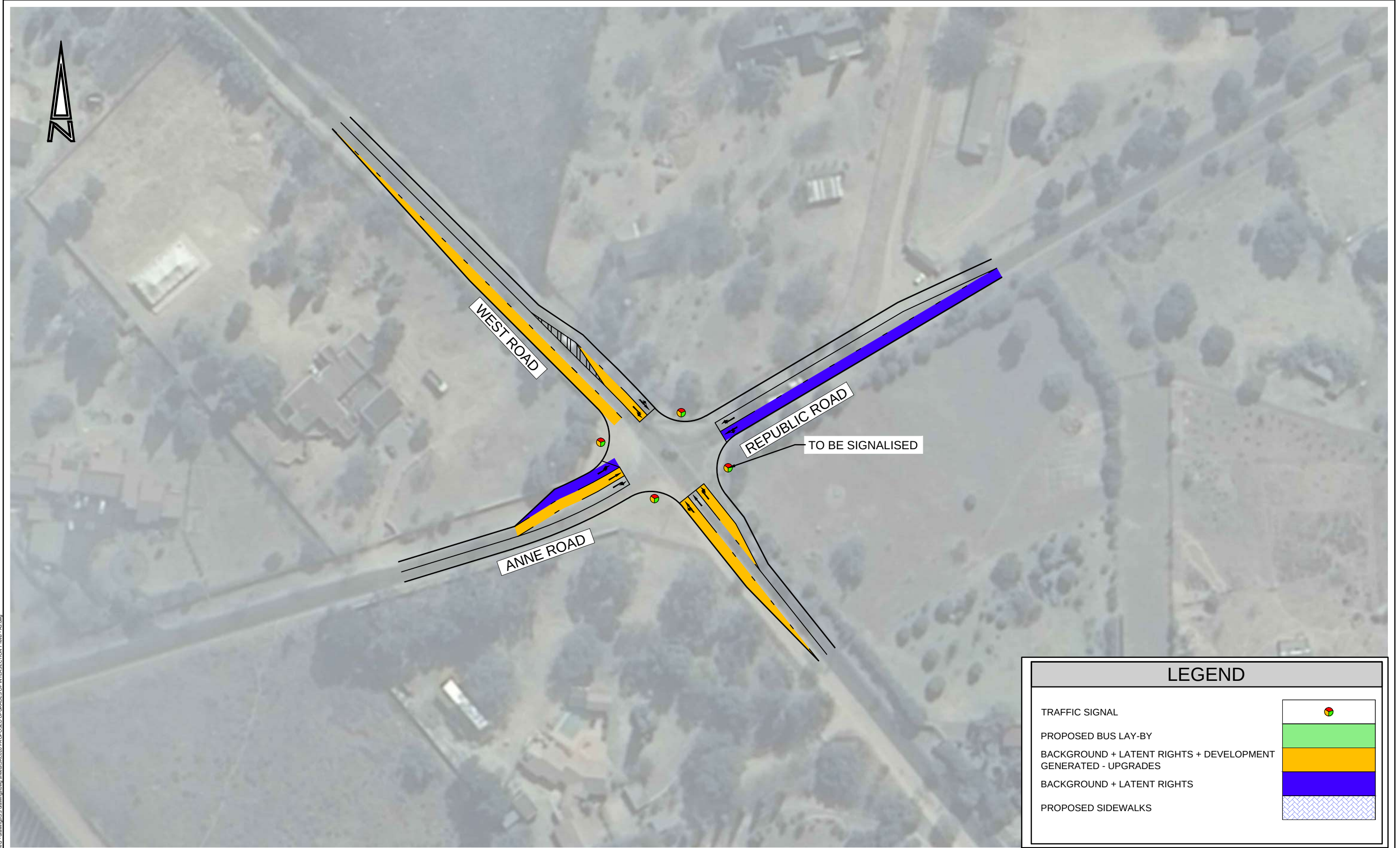
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TITLE:	EXISTING INFORMAL GRAVEL ACCESS (INTERSECTION 5)

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DESIGN: T JOUBERT	DRAWN: T JOUBERT	DATE: 2016/02/18
PROJECT No: 16975	DRAWING No: SKC006	REV: A
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PLOT DATE: 2016/02/29 02:38:08 PM



LEGEND

TRAFFIC SIGNAL

PROPOSED BUS LAY-BY

BACKGROUND + LATENT RIGHTS + DEVELOPMENT
GENERATED - UPGRADES

BACKGROUND + LATENT RIGHTS

PROPOSED SIDEWALKS

B	2016-07-01	TJ	LAYOUT AMENDED	CN	EK
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PROJECT:

RABIE RIDGE EXTENSION 7

TITLE:

PROPOSED UPGRADES OF INTERSECTION 7

SCALE @ A3:

1:1000

CHECKED:

C NAIR

APPROVED:

E KOTZE

DESIGN:

T JOUBERT

DRAWN:

T JOUBERT

DATE:

2016/02/18

PROJECT No:

16975

DRAWING No:

SKC008

REV:

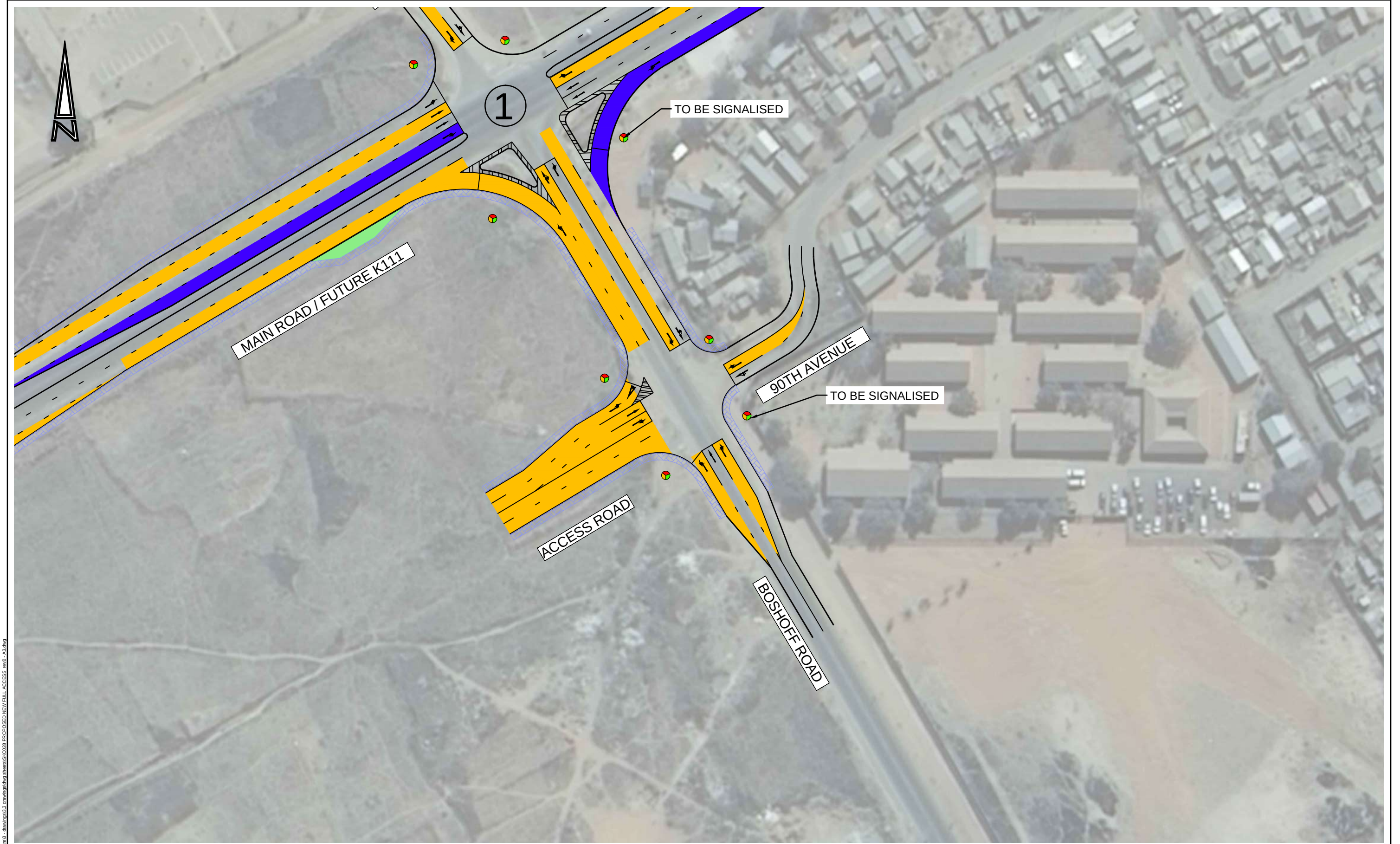
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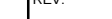
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PLOT DATE: 2016/07/01 03:16:56 PM



						CLIENT:		 WSP Group Africa (Pty) Ltd Transportation and Infrastructure Building C, Knightbridge, 33 Sloane Street, Bryanston, 2191 PO Box 98867 Sloane Park 2152 Tel: +27(0)11-361-1402 Fax: +27(0)11-361-1301 t&f-bry@wsp.com		PROJECT:		SCALE @ A3: 1:1000		CHECKED: C NAIR		APPROVED: E KOTZE	
B	2016-07-01	TJ	LAYOUT AMENDED	CN	EK	RABIE RIDGE EXTENSION 7				DESIGN: T JOUBERT		DRAWN: T JOUBERT		DATE: 2016/02/29			
A	-	-	INITIAL ISSUE	-	-					PROJECT No: 16975		DRAWING No: SKC009		REV: B			
REV	DATE	BY	DESCRIPTION	CHK	APD	TITLE: PROPOSED NEW FULL ACCESS (INTERSECTION 8)				© COPYRIGHT RESERVED The content of this document is privileged and confidential and may not be disclosed or reproduced without the express authorisation of the author, being "WSP GROUP AFRICA (PTY) LTD" 							
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TEMPLATE VERSION 1.0

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PLOT DATE: 2016/07/01 03:27:03 PM



LEGEND

TRAFFIC SIGNAL

PROPOSED BUS LAY-BY

BACKGROUND + LATENT RIGHTS + DEVELOPMENT
GENERATED - UPGRADES

BACKGROUND + LATENT RIGHTS

PROPOSED SIDEWALKS

B	2016-07-01	TJ	LAYOUT AMENDED	CN	EK
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PROJECT:

RABIE RIDGE EXTENSION 7

TITLE:

PROPOSED NEW PARTIAL ACCESS
(INTERSECTION A)

SCALE @ A3:

1:1000

CHECKED:

C NAIR

APPROVED:

R KOTZE

DESIGN:

T JOUBERT

DRAWN:

T JOUBERT

DATE:

2016/02/18

PROJECT No:

16975

DRAWING No:

SKC010

REV:

B

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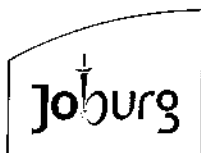
Engineering & Construction Solutions

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PLOT DATE: 2016/07/01 09:22:50 PM

APPENDIX

A PREVIOUS TIA COMMENTS FROM AUTHORITIES



a world class African city



City of Johannesburg
Johannesburg Roads Agency

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South Africa
2017

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Ref: 17/8/R45-7
T de Jager

WSP Group Africa
Postnet Suite 287
Private Bag x025
Lynnwood Ridge
0040

Date: 12 April 2016

Email: Christopher.nair@wspgroup.co.za

Attention: Christopher Nair

Sir,

RABIE RIDGE EXTENSION 7 – TRAFFIC IMPACT ASSESSMENT

Your letter and Traffic Impact Assessment dated 07 March 2016 refers.

The Report was studied by our Traffic Engineering and Analysis Section, and the Johannesburg Roads Agency comments as follows:

The JRA cannot finalize comments without the comments from the Gauteng Department of Road and Transport (GDRT) regarding the future planning of the K111, K56 and K60.

Comment from Ekurhuleni Metropolitan Municipality is required with regard to the intersection which is affected by the EMM/CoJ border viz, Modderfontein Road (K56) and the K60 (see **drawing 1a**).

The JRA requires that addendum drawings are submitted; addressing the road improvements of the latent developments as well as the road improvements for the proposed development. This must be labelled as such for ease of assessment. All drawings must be scaled and overlaid on an aerial drawing in order for this department to assess the feasibility thereof.

Should you require clarity on the above please contact Ms. Sidony Ellapen at (011) 298-5009.

pp Manager: Development Control
tdj/mm

Roads & Stormwater Department



Ekurhuleni
METROPOLITAN MUNICIPALITY

Northern Service Delivery Region

Civic Centre
cnr C R Swart Drive and Pretoria Road
KEMPTON PARK

P O Box 13
KEMPTON PARK
1620

Fax: (011) 398 2074
lucky.mohlomi@ekurhuleni.gov.za

Your ref. : 16975
Our ref. : 17/5/1/6
Enquiries : Lucky Mohlomi
Tel. : 011 999 0393
Date : 17 May 2016

WSP Group Africa (Pty) Ltd
PostNet Suite No 278
Private Bag X025
Lynnwood Ridge
0040

Attention : Christopher Nair

RE: TRAFFIC IMPACT ASSESSMENT – RABIE RIDGE EXTENSION 7

Reference is made to your report dated February 2016.

With reference to Section 38 of the NLTA, the sustainability of the proposed development and integration within the current transport infrastructure should be the primary objective of the study and therefore it remains the responsibility of the Consultant to ensure that the theoretical conclusions and recommendations in the report are practical to implement.

The proposed development is located within the jurisdiction of the City of Johannesburg, from a land use perspective; and the road network and associated elements that will be affected by the expected traffic from the proposed development also falls within the jurisdiction of both the Johannesburg Roads Agency and the Gauteng Department of Roads and Transport. It can therefore be confirmed that none of road segments (based on the analysed network) within the jurisdiction of the City of Ekurhuleni will be affected and therefore this department can only take note of the report.

Trusting the above is in order.

A handwritten signature in black ink, appearing to read 'R M Van Huyssteen'.

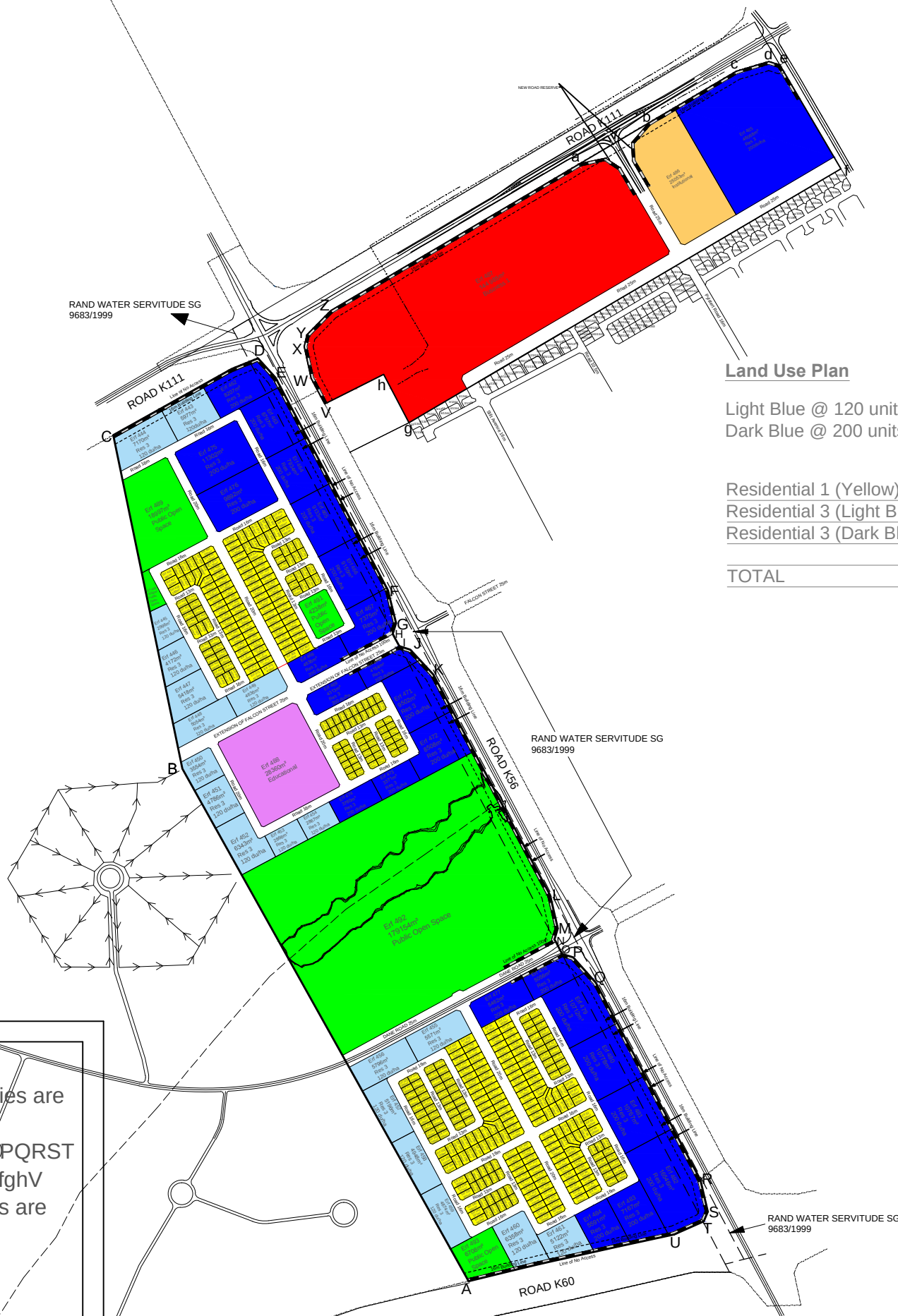
R M VAN HUYSSTEEN (Pr. Eng)
ACTING DIVISIONAL HEAD: PLANNING
ROADS & STORMWATER DEPARTMENT

B TOWNSHIP LAYOUT PLAN AND SCHEDULE OF RIGHTS



NOTES:

1. The township boundaries are indicated by points ABCDEFGHIJKLMNOPQRST U and VWXYZabcdeghv
2. All areas and distances are estimated.



Land Use Plan

Light Blue @ 120 units per hectare
Dark Blue @ 200 units per hectare

	1st Units
Residential 1 (Yellow) - 13.1787ha	442
Residential 3 (Light Blue) - 9.3704ha	1124
Residential 3 (Dark Blue) - 22.8186ha	4563
TOTAL	6129

LOCALITY PLAN



VOORGESTELDE DORP: RABIE RIDGE EXT 7
PROPOSED TOWNSHIP:
GELEE OP: REMAINING EXTENT
SITUATED ON:
VAN DIE PLAAS: ALLANDALE 10-IR
OF THE FARM:
PLAASLIKE BESTUUR: GREATER JOHANNESBURG METROPOLITAN
LOCAL AUTHORITY: MUNICIPALITY

LAND USE TABLE

USE	AREA	OF TOWNSHIP	AMOUNT OF ERVEN	ERF NUMBERS
RESIDENTIAL 1	13.1787ha	15.28%	442	1 - 442
RESIDENTIAL 3 - 120duha	9.3704ha	10.86%	19	443 - 461
RESIDENTIAL 3 - 200duha	22.8186ha	26.45%	24	462 - 485
BUSINESS 1	14.4985ha	16.80%	1	487
INSTITUTIONAL	2.5053ha	2.90%	1	486
EDUCATIONAL	2.8360ha	3.29%	1	488
PUBLIC OPEN SPACE	21.0729ha	24.42%	5	489 - 493
ACCESS				
ROADS				
TOTAL	86.2804ha	100%	493	

SIZE OF ERVEN

USE	MINIMUM	RULING

STREETS

MINIMUM HELLING:
MINIMUM GRADIENT:
MAKSIMUM HELLING:
MAXIMUM GRADIENT:
TOTALE LENGTE:
TOTAL LENGTE:

PB VIEW:	RR x7/3	SKAAL:	1:9500 on A3	PLAN NR:	3
LA VIEW:		SCALE:		PLAN NO:	
DATE	AMENDMENT	DATE	AMENDMENT		
APRIL 2014	01/SUBMITTED				
APRIL 2015	02/AMENDED				
FEB 2016	03/AMENDED				

KONTOERINTERVAL: 5 m
CONTOUR INTERVAL:
DATUM G.H.S.S. (TRIG):
DATE A.H.S.L. (TRIG): N / A
KONTOER OPMETING DEUR: JOHANSE LOOCKE - FJ LOOCK LAND SURVEYORS
ONTWERP DEUR: C. NORTJE
DESIGNED BY:
APPLIKANT: B.E. FLETCHER
APPLICANT:

IT IS HEREBY CERTIFIED THAT THE PROPERTY SHOWN ON THIS DRAWING IS NOT AFFECTED BY FLOODWATER 1:50 AND 1:100 YEAR RECURRENCE INTERVAL EVENT DETERMINED IN ACCORDANCE WITH SECTION 144 OF THE NATIONAL WATER ACT (ACT 36 OF 1998).

Proposed uses	Erf/Erven* No	Size		Height	
		Coverage	FSR		
“Residential 1”	442	60%	1	2 Storeys	As per Scheme
“Residential 3”	24	50%	2,5	5 Storeys	200 units per ha
“Residential 3”	19	40%	1,6	4 Storeys	120 units per ha
“Business 1”	1	60%	0,45	2 Storeys	As per Scheme
“Institutional”	1	80%	1,0	2 Storeys	As per Scheme
“Educational”	1	60%	1,2	3 Storeys	Institutional, Places of Public Worship and an Orphanage
“Public Open Space”	5				
As required by the Halfway House and Clayville Town Planning Scheme, 1976					

C DEVELOPMENT TRIP CALCULATIONS





RABIE RIDGE EXTENSION 7

TRIP GENERATION TABLE

						COTO TRIP DATA MANUAL (TMH17)														Adjusted Peak Hour Trip Rate (veh/h)			Expected Peak Hour Trip Generation (Veh/h)									
						Trip Code	Weekday AM	Peak Hour Base Trip Generation Rates (veh/h)		Weekday PM	SPLIT		Saturday	SPLIT		Trip Reduction Factors (%)							Weekday AM	Weekday PM	Saturday	Weekday AM			Weekday PM			Saturday
IN	OUT	IN	OUT	IN	OUT			Mixed-use (Pm)	Vehicle Ownership (Pv)		Transit Nodes or Corridors (Pt)	Total (Pc)		In	Out	TOTAL	In	Out	TOTAL	In	Out	TOTAL										
Development		Land Use		Size (ha)	Unit of Measurement																											
Rabie Ridge X7	Residential 1	Dwelling Units (284m² and 503stands/ha)		13.18	442	units	210 - Single Dwelling Units	0.25	25%	75%	0.25	70%	30%	0.25	50%	50%	0%	0%	0%	0.0%	0.250	0.250	0.250	28	83	111	77	33	111	55	55	111
	Residential 3	Dwelling Units (120units/ha)		9.37	1 124	units	220 - Apartments and Flats	0.25	25%	75%	0.25	70%	30%	0.25	50%	50%	0%	0%	0%	0.0%	0.250	0.250	0.250	70	211	281	197	84	281	141	141	281
	Residential 3	Dwelling Units (200units/ha)		22.82	4 564	units	220 - Apartments and Flats	0.25	25%	75%	0.25	70%	30%	0.25	50%	50%	0%	0%	0%	0.0%	0.250	0.250	0.250	285	856	1141	799	342	1141	570	570	1141
	Community Facility	Education		2.84	1 200	students	520 - Public Primary School	0.85	50%	50%	0.30	50%	50%				30%	50%	15%	70.3%	0.253	0.089		152	152	303	54	54	107			
	Institutional	Private Hospital (assumed FSR = 0.5)		1.03	51	100m² GLA	612 - Private Hospital	1.65	60%	40%	1.50	40%	60%				0%	20%	15%	32.0%	1.122	1.020		35	23	58	21	31	52			
	Business 1	Retail (40 000m² GLA)		14.50	400	100m² GLA	820 - Shopping Centre	0.78	65%	35%	4.44	50%	50%	5.87	50%	50%	10%	30%	15%	46.5%	0.419	2.377	3.146	109	59	168	475	475	951	629	629	1258
Total				63.73																												

DEVELOPMENT SUMMARY	
	Units/GLA m²
Single Dwelling (Units)	442
Apartments & Flats (Units)	5 688
Public Primary School (students)	1 200
Private Hospital (GLA - m²)	5 133
Shopping Centre (GLA - m²)	40 000



D

SIDRA OUTPUTS

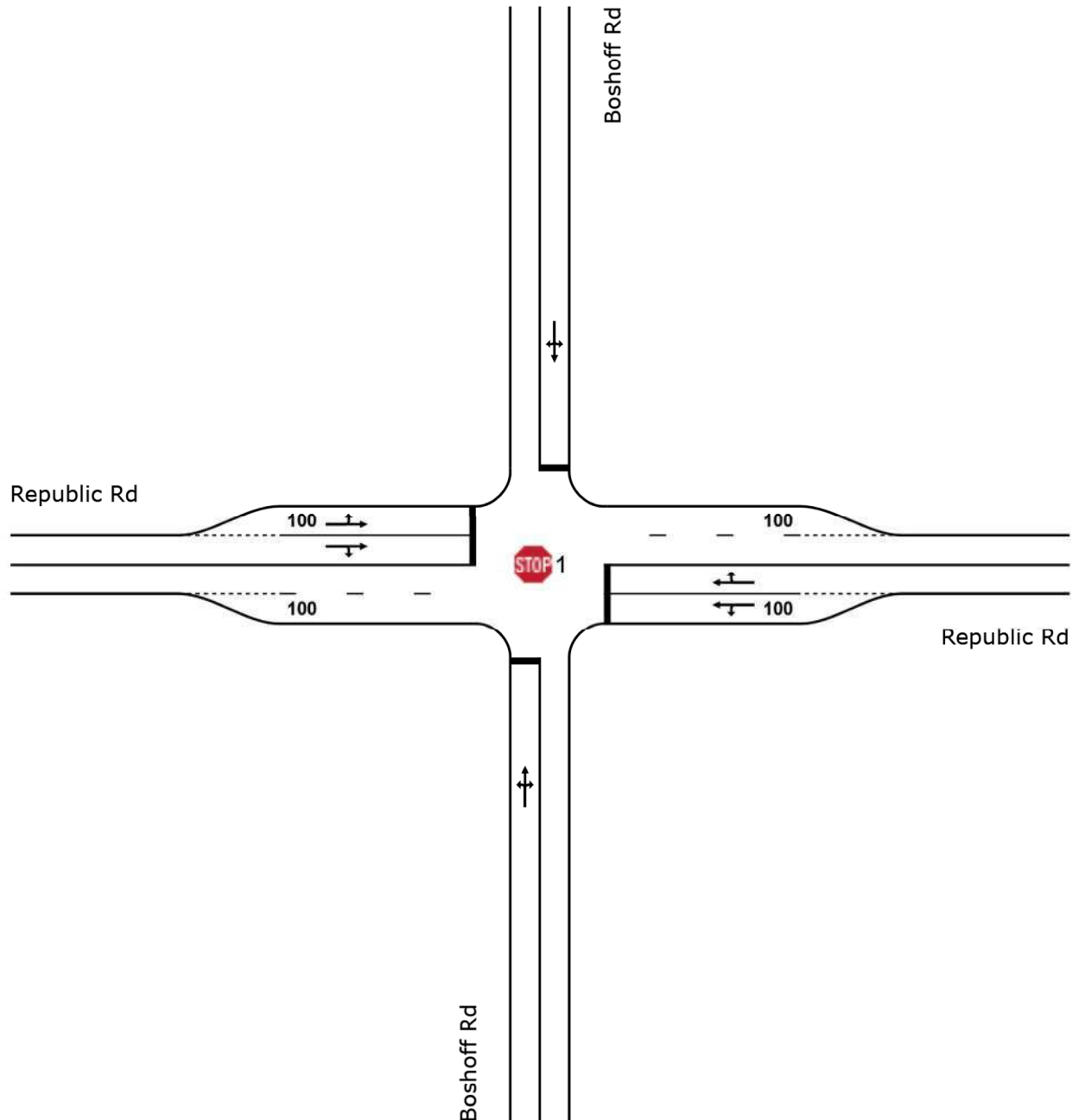
SITE LAYOUT

 **Site: 1 [01_2022 AM]**

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 1 [01_2022 AM]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	364	2.0	0.832	32.8	LOS D	8.6	61.3	0.99	2.19	6.19	39.2
2	T1	115	2.0	0.832	32.9	LOS D	8.6	61.3	0.99	2.19	6.19	39.2
3	R2	120	2.0	0.832	32.6	LOS D	8.6	61.3	0.99	2.19	6.19	39.1
Approach		599	2.0	0.832	32.8	LOS D	8.6	61.3	0.99	2.19	6.19	39.1
East: Republic Rd												
4	L2	130	2.0	1.042	98.3	LOS F	31.9	227.3	1.00	4.94	18.23	23.0
5	T1	1325	2.0	1.042	98.0	LOS F	31.9	227.3	1.00	4.94	18.23	23.0
6	R2	44	2.0	1.042	98.2	LOS F	31.9	227.3	1.00	4.94	18.23	23.0
Approach		1500	2.0	1.042	98.0	LOS F	31.9	227.3	1.00	4.94	18.23	23.0
North: Boshoff Rd												
7	L2	30	2.0	0.389	14.3	LOS B	1.6	11.1	0.78	1.37	2.41	48.5
8	T1	100	2.0	0.389	14.5	LOS B	1.6	11.1	0.78	1.37	2.41	48.6
9	R2	149	2.0	0.389	14.1	LOS B	1.6	11.1	0.78	1.37	2.41	48.4
Approach		280	2.0	0.389	14.2	LOS B	1.6	11.1	0.78	1.37	2.41	48.5
West: Republic Rd												
10	L2	49	2.0	0.527	14.1	LOS B	2.6	18.3	0.84	1.49	2.92	49.0
11	T1	458	2.0	0.527	13.7	LOS B	2.6	18.3	0.84	1.49	2.92	48.8
12	R2	252	2.0	0.527	13.9	LOS B	2.6	18.3	0.84	1.48	2.92	48.8
Approach		759	2.0	0.527	13.8	LOS B	2.6	18.3	0.84	1.49	2.92	48.8
All Vehicles		3137	2.0	1.042	57.7	LOS F	31.9	227.3	0.94	3.26	10.82	30.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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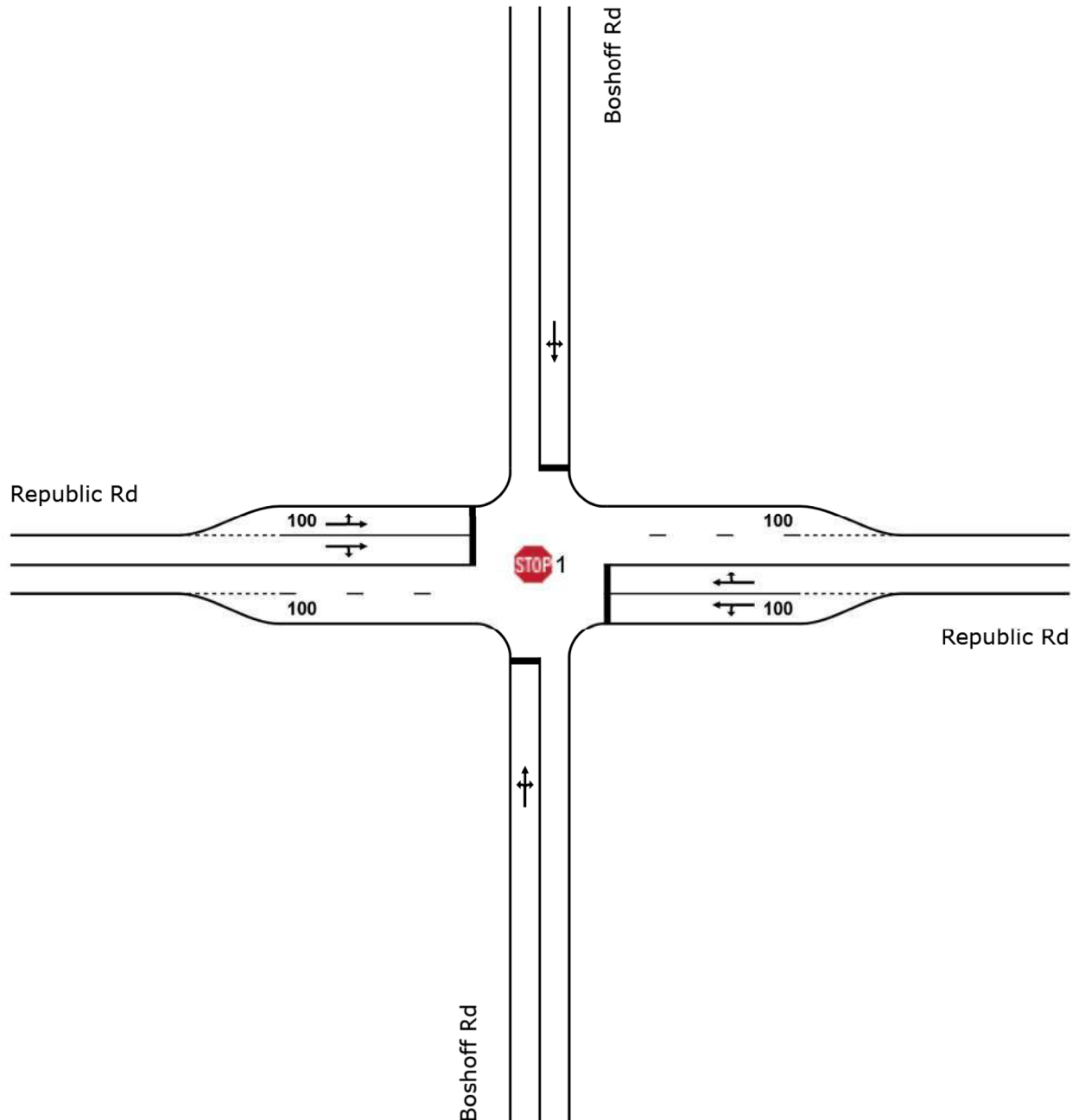
SITE LAYOUT

 **Site: 1 [02_2022 PM]**

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 1 [02_2022 PM]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	114	2.0	0.542	16.9	LOS C	2.7	19.3	0.84	1.49	2.99	47.0
2	T1	81	2.0	0.542	17.1	LOS C	2.7	19.3	0.84	1.49	2.99	47.0
3	R2	195	2.0	0.542	16.8	LOS C	2.7	19.3	0.84	1.49	2.99	46.9
Approach		390	2.0	0.542	16.9	LOS C	2.7	19.3	0.84	1.49	2.99	46.9
East: Republic Rd												
4	L2	159	2.0	0.493	13.4	LOS B	2.3	16.3	0.82	1.45	2.77	49.4
5	T1	527	2.0	0.493	13.1	LOS B	2.3	16.3	0.82	1.46	2.77	49.2
6	R2	24	2.0	0.493	13.3	LOS B	2.3	16.3	0.82	1.46	2.77	49.4
Approach		710	2.0	0.493	13.1	LOS B	2.3	16.3	0.82	1.46	2.77	49.2
North: Boshoff Rd												
7	L2	38	2.0	0.275	13.0	LOS B	1.0	6.9	0.74	1.32	2.12	49.3
8	T1	95	2.0	0.275	13.2	LOS B	1.0	6.9	0.74	1.32	2.12	49.3
9	R2	65	2.0	0.275	12.8	LOS B	1.0	6.9	0.74	1.32	2.12	49.2
Approach		198	2.0	0.275	13.0	LOS B	1.0	6.9	0.74	1.32	2.12	49.3
West: Republic Rd												
10	L2	95	2.0	0.884	38.2	LOS E	11.4	81.3	1.00	2.53	7.71	37.1
11	T1	910	2.0	0.884	37.9	LOS E	11.4	81.3	1.00	2.53	7.71	37.0
12	R2	268	2.0	0.884	38.1	LOS E	11.4	81.3	1.00	2.53	7.71	37.0
Approach		1273	2.0	0.884	38.0	LOS E	11.4	81.3	1.00	2.53	7.71	37.0
All Vehicles		2571	2.0	0.884	26.0	LOS D	11.4	81.3	0.91	1.98	5.20	42.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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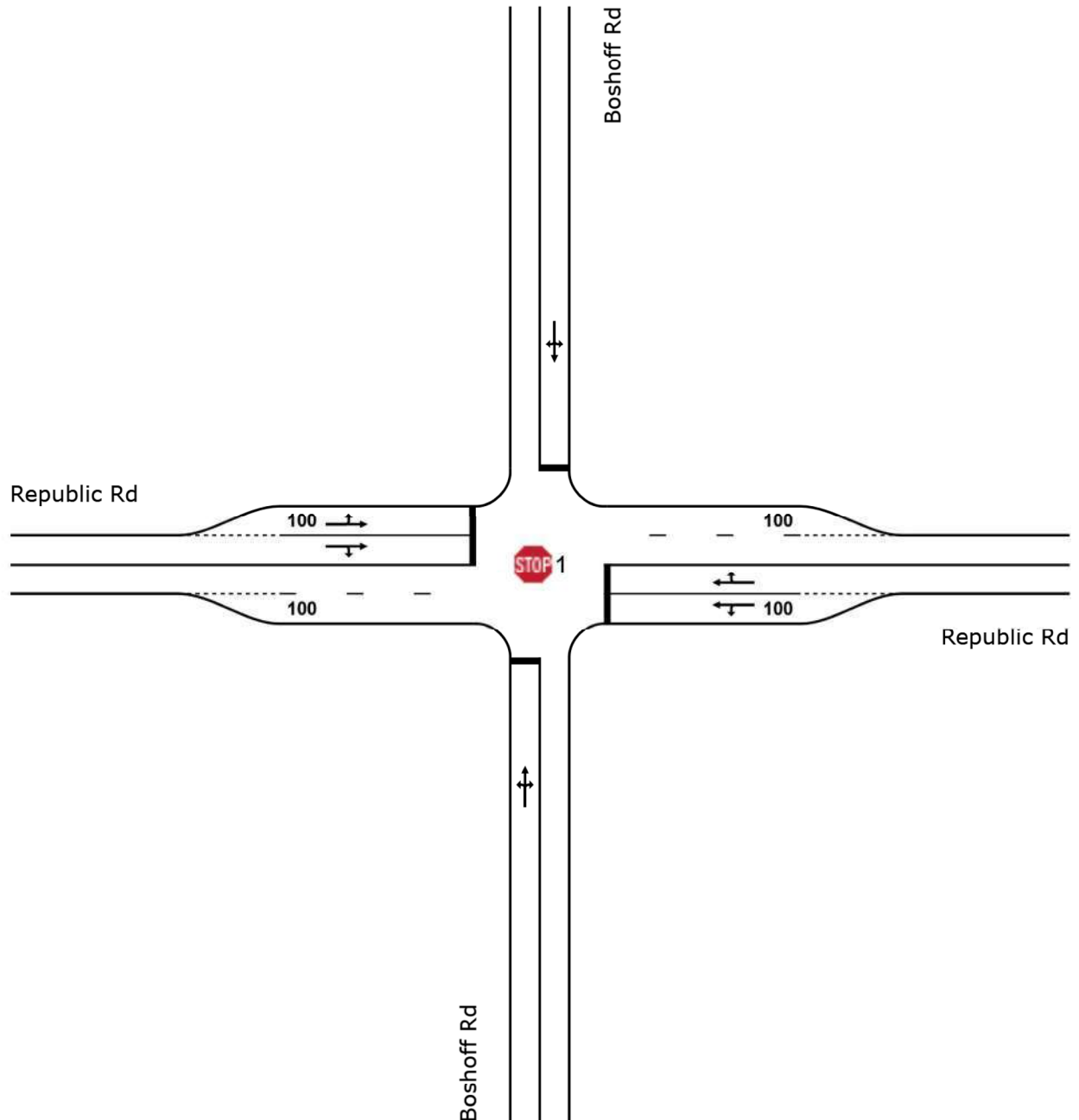
SITE LAYOUT

 **Site: 1 [03_2027 AM + Lat]**

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 1 [03_2027 AM + Lat]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	422	2.0	0.965	63.2	LOS F	19.2	136.4	1.00	3.47	11.79	29.5
2	T1	133	2.0	0.965	63.4	LOS F	19.2	136.4	1.00	3.47	11.79	29.6
3	R2	139	2.0	0.965	63.0	LOS F	19.2	136.4	1.00	3.47	11.79	29.5
Approach		695	2.0	0.965	63.2	LOS F	19.2	136.4	1.00	3.47	11.79	29.5
East: Republic Rd												
4	L2	152	2.0	1.210	223.0	LOS F	73.9	526.3	1.00	9.11	36.44	12.9
5	T1	1539	2.0	1.210	222.7	LOS F	73.9	526.3	1.00	9.11	36.44	12.9
6	R2	52	2.0	1.210	222.8	LOS F	73.9	526.3	1.00	9.11	36.44	12.9
Approach		1742	2.0	1.210	222.7	LOS F	73.9	526.3	1.00	9.11	36.44	12.9
North: Boshoff Rd												
7	L2	35	2.0	0.452	15.2	LOS C	2.0	14.1	0.81	1.41	2.61	48.0
8	T1	116	2.0	0.452	15.4	LOS C	2.0	14.1	0.81	1.41	2.61	48.0
9	R2	174	2.0	0.452	15.0	LOS C	2.0	14.1	0.81	1.41	2.61	47.9
Approach		325	2.0	0.452	15.2	LOS C	2.0	14.1	0.81	1.41	2.61	47.9
West: Republic Rd												
10	L2	47	2.0	0.601	16.0	LOS C	3.3	23.8	0.87	1.57	3.33	47.9
11	T1	526	2.0	0.601	15.6	LOS C	3.3	23.8	0.87	1.57	3.33	47.6
12	R2	292	2.0	0.601	15.8	LOS C	3.3	23.8	0.87	1.57	3.33	47.6
Approach		866	2.0	0.601	15.7	LOS C	3.3	23.8	0.87	1.57	3.33	47.6
All Vehicles		3628	2.0	1.210	124.2	LOS F	73.9	526.3	0.95	5.54	20.79	19.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\01_Republic Rd_Boshoff Rd.sip8

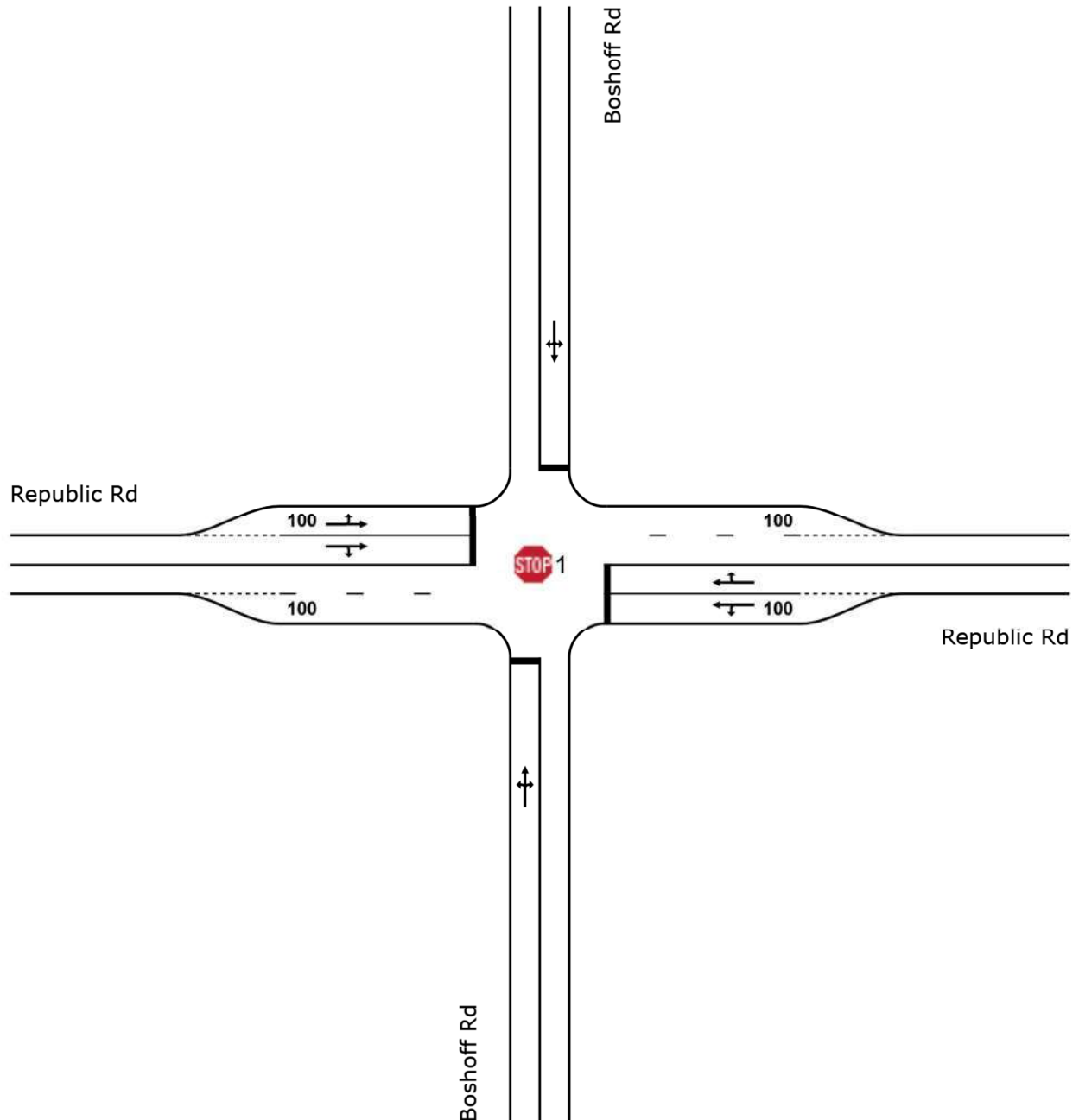
SITE LAYOUT

 **Site: 1 [04_2027 PM + Lat]**

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 1 [04_2027 PM + Lat]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	133	2.0	0.630	19.4	LOS C	3.7	26.4	0.88	1.60	3.52	45.6
2	T1	94	2.0	0.630	19.6	LOS C	3.7	26.4	0.88	1.60	3.52	45.6
3	R2	226	2.0	0.630	19.2	LOS C	3.7	26.4	0.88	1.60	3.52	45.5
Approach		454	2.0	0.630	19.4	LOS C	3.7	26.4	0.88	1.60	3.52	45.5
East: Republic Rd												
4	L2	184	2.0	0.569	15.1	LOS C	3.0	21.2	0.85	1.53	3.14	48.3
5	T1	607	2.0	0.569	14.7	LOS B	3.0	21.2	0.85	1.53	3.14	48.2
6	R2	28	2.0	0.569	14.9	LOS B	3.0	21.2	0.85	1.53	3.14	48.3
Approach		819	2.0	0.569	14.8	LOS B	3.0	21.2	0.85	1.53	3.14	48.2
North: Boshoff Rd												
7	L2	44	2.0	0.318	13.4	LOS B	1.2	8.4	0.76	1.33	2.22	49.0
8	T1	110	2.0	0.318	13.6	LOS B	1.2	8.4	0.76	1.33	2.22	49.1
9	R2	75	2.0	0.318	13.3	LOS B	1.2	8.4	0.76	1.33	2.22	48.9
Approach		229	2.0	0.318	13.5	LOS B	1.2	8.4	0.76	1.33	2.22	49.0
West: Republic Rd												
10	L2	110	2.0	1.026	89.4	LOS F	28.9	205.8	1.00	4.60	16.74	24.4
11	T1	1057	2.0	1.026	89.0	LOS F	28.9	205.8	1.00	4.60	16.74	24.3
12	R2	311	2.0	1.026	89.2	LOS F	28.9	205.8	1.00	4.60	16.74	24.4
Approach		1478	2.0	1.026	89.1	LOS F	28.9	205.8	1.00	4.60	16.74	24.4
All Vehicles		2980	2.0	1.026	52.2	LOS F	28.9	205.8	0.92	3.05	9.87	32.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

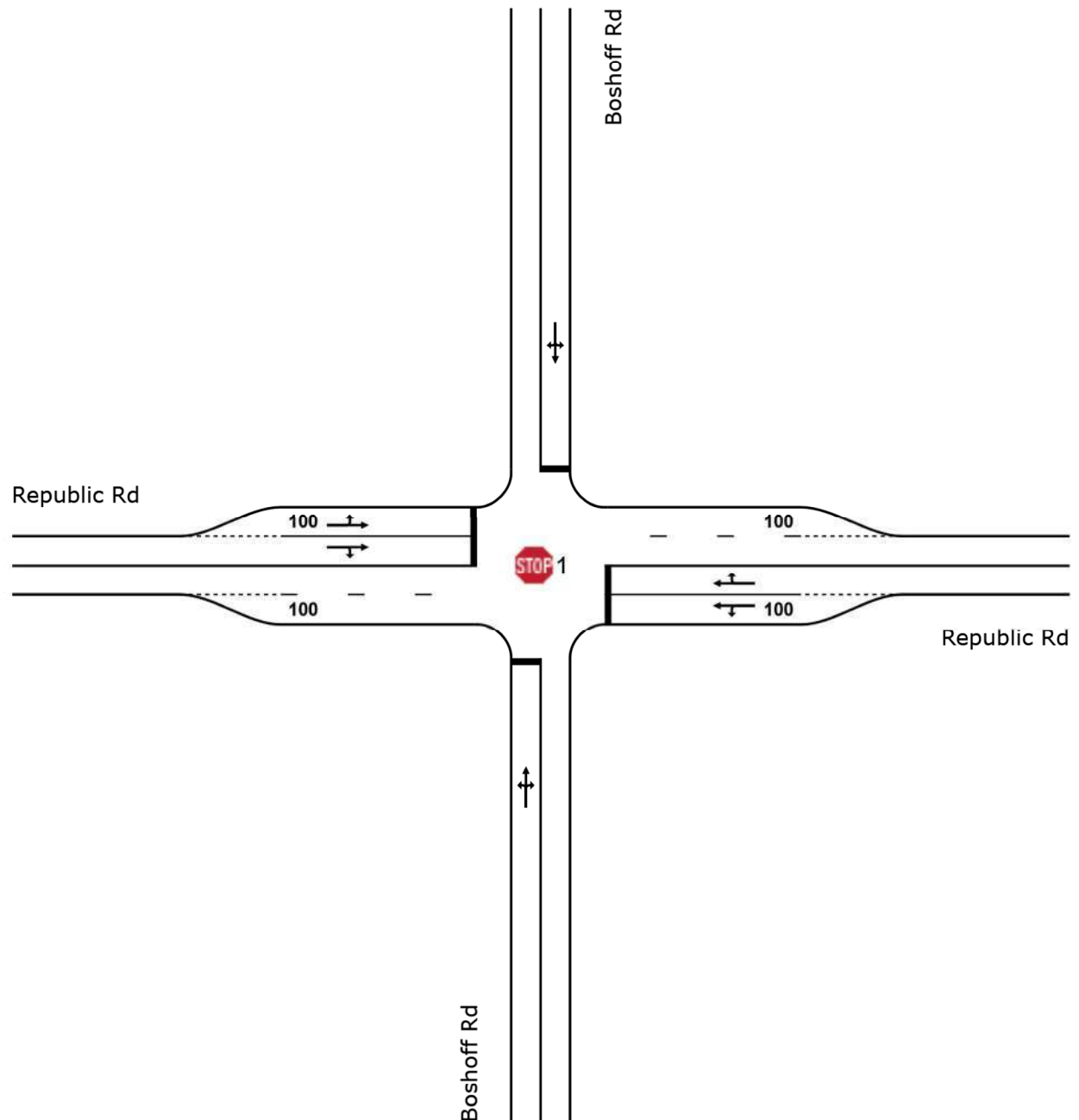


Site: 1 [05_2027 AM + Lat + Dev]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 1 [05_2027 AM + Lat + Dev]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	422	2.0	1.236	247.0	LOS F	81.2	578.0	1.00	9.73	39.18	11.9
2	T1	189	2.0	1.236	247.2	LOS F	81.2	578.0	1.00	9.73	39.18	11.9
3	R2	279	2.0	1.236	246.9	LOS F	81.2	578.0	1.00	9.73	39.18	11.9
Approach		890	2.0	1.236	247.0	LOS F	81.2	578.0	1.00	9.73	39.18	11.9
East: Republic Rd												
4	L2	166	2.0	1.315	311.8	LOS F	103.8	739.2	1.00	11.55	47.11	9.8
5	T1	1677	2.0	1.315	311.5	LOS F	103.8	739.2	1.00	11.55	47.11	9.8
6	R2	52	2.0	1.315	311.7	LOS F	103.8	739.2	1.00	11.55	47.11	9.8
Approach		1894	2.0	1.315	311.5	LOS F	103.8	739.2	1.00	11.55	47.11	9.8
North: Boshoff Rd												
7	L2	35	2.0	0.490	15.8	LOS C	2.3	16.1	0.82	1.44	2.76	47.6
8	T1	116	2.0	0.490	16.0	LOS C	2.3	16.1	0.82	1.44	2.76	47.6
9	R2	201	2.0	0.490	15.7	LOS C	2.3	16.1	0.82	1.44	2.76	47.5
Approach		353	2.0	0.490	15.8	LOS C	2.3	16.1	0.82	1.44	2.76	47.5
West: Republic Rd												
10	L2	47	2.0	0.601	16.0	LOS C	3.3	23.8	0.87	1.57	3.33	47.9
11	T1	526	2.0	0.601	15.6	LOS C	3.3	23.8	0.87	1.57	3.33	47.6
12	R2	292	2.0	0.601	15.8	LOS C	3.3	23.8	0.87	1.57	3.33	47.6
Approach		866	2.0	0.601	15.7	LOS C	3.3	23.8	0.87	1.57	3.33	47.6
All Vehicles		4002	2.0	1.315	207.1	LOS F	103.8	739.2	0.96	8.10	31.97	13.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

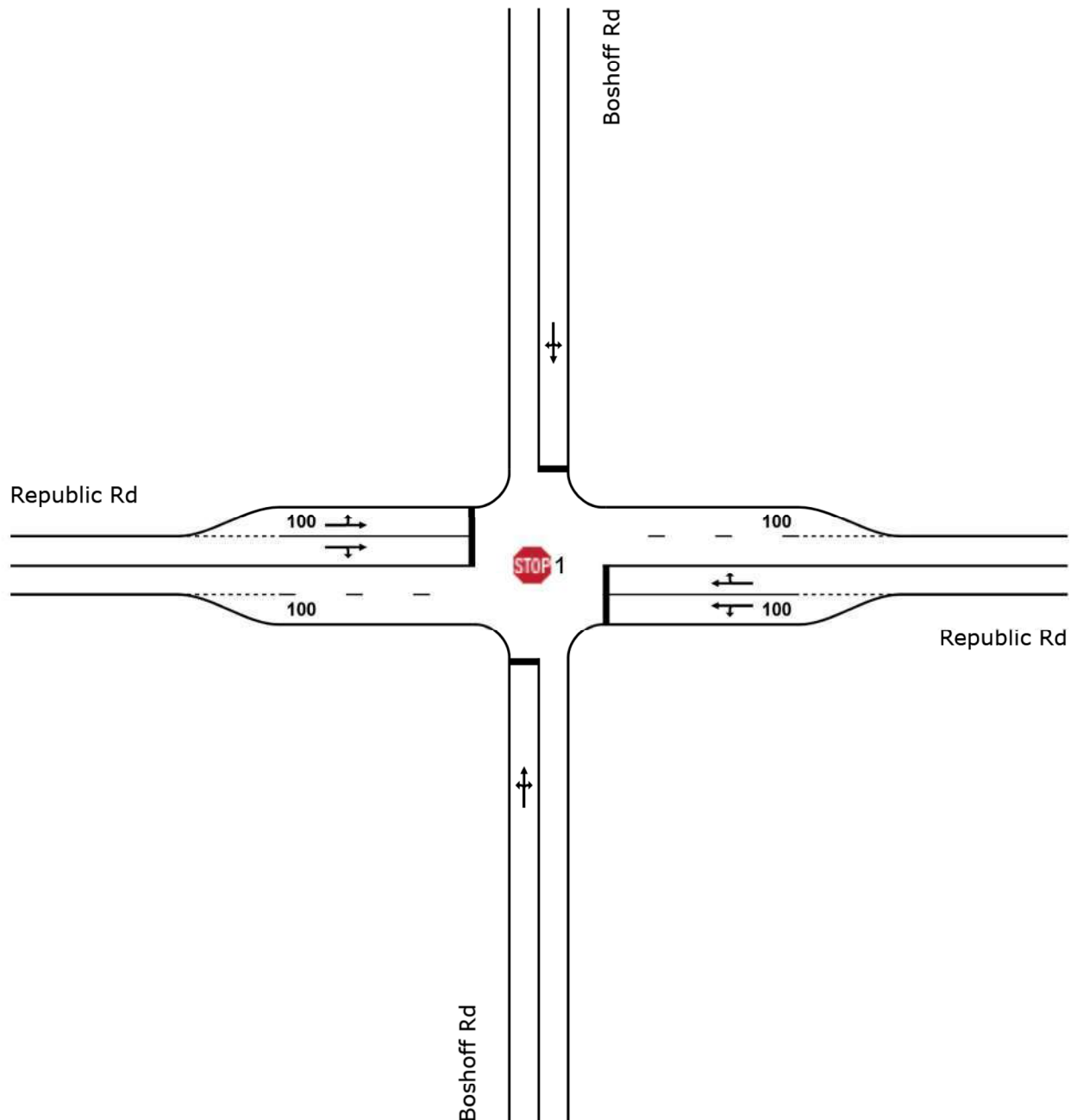


Site: 1 [06_2027 PM + Lat + Dev]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 1 [06_2027 PM + Lat + Dev]

Republic Rd/Boshoff Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	133	2.0	0.831	32.6	LOS D	8.6	60.9	0.99	2.18	6.16	39.2
2	T1	135	2.0	0.831	32.8	LOS D	8.6	60.9	0.99	2.18	6.16	39.3
3	R2	329	2.0	0.831	32.4	LOS D	8.6	60.9	0.99	2.18	6.16	39.1
Approach		598	2.0	0.831	32.5	LOS D	8.6	60.9	0.99	2.18	6.16	39.2
East: Republic Rd												
4	L2	216	2.0	0.819	28.8	LOS D	8.1	57.6	0.98	2.13	5.91	41.0
5	T1	935	2.0	0.819	28.4	LOS D	8.1	57.6	0.98	2.13	5.91	40.9
6	R2	28	2.0	0.819	28.6	LOS D	8.1	57.6	0.98	2.13	5.91	41.0
Approach		1180	2.0	0.819	28.5	LOS D	8.1	57.6	0.98	2.13	5.91	40.9
North: Boshoff Rd												
7	L2	44	2.0	0.410	14.5	LOS B	1.7	12.1	0.79	1.39	2.47	48.4
8	T1	110	2.0	0.410	14.7	LOS B	1.7	12.1	0.79	1.39	2.47	48.4
9	R2	140	2.0	0.410	14.4	LOS B	1.7	12.1	0.79	1.39	2.47	48.2
Approach		295	2.0	0.410	14.5	LOS B	1.7	12.1	0.79	1.39	2.47	48.3
West: Republic Rd												
10	L2	110	2.0	1.112	145.7	LOS F	47.9	341.0	1.00	6.64	25.67	17.7
11	T1	1180	2.0	1.112	145.4	LOS F	47.9	341.0	1.00	6.64	25.67	17.7
12	R2	311	2.0	1.112	145.6	LOS F	47.9	341.0	1.00	6.64	25.67	17.7
Approach		1601	2.0	1.112	145.4	LOS F	47.9	341.0	1.00	6.64	25.67	17.7
All Vehicles		3674	2.0	1.112	79.0	LOS F	47.9	341.0	0.98	4.04	14.28	26.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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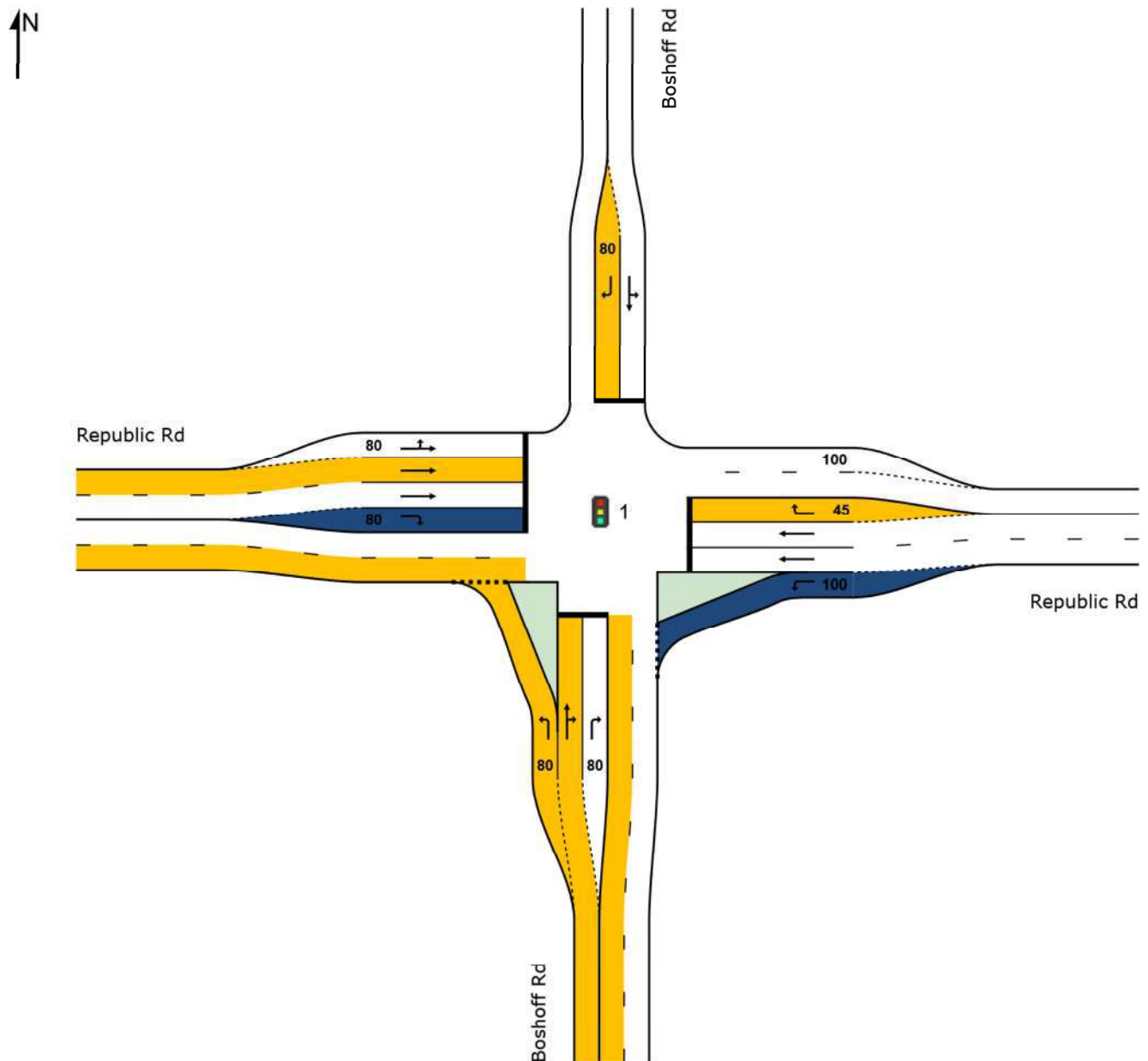
SITE LAYOUT

 **Site: 1 [07_2027 AM + Lat + Dev (Upgraded)]**

Republic Rd/Boshoff Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 1 [07_2027 AM + Lat + Dev (Upgraded)]**

Republic Rd/Boshoff Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	422	2.0	0.622	19.1	LOS B	6.9	49.3	0.86	0.85	1.02	45.3
2	T1	189	2.0	0.850	33.5	LOS C	9.3	66.2	1.00	1.03	1.42	38.2
3	R2	279	2.0	0.850	40.3	LOS D	9.3	66.2	1.00	1.02	1.48	36.3
Approach		890	2.0	0.850	28.8	LOS C	9.3	66.2	0.93	0.94	1.25	40.5
East: Republic Rd												
4	L2	166	2.0	0.259	15.0	LOS B	2.6	18.2	0.75	0.73	0.75	47.6
5	T1	1677	2.0	0.981	54.5	LOS D	43.5	310.0	1.00	1.45	1.77	31.8
6	R2	52	2.0	0.122	16.9	LOS B	0.9	6.6	0.63	0.71	0.63	46.0
Approach		1894	2.0	0.981	50.0	LOS D	43.5	310.0	0.97	1.36	1.65	33.0
North: Boshoff Rd												
7	L2	35	2.0	0.375	28.8	LOS C	4.0	28.4	0.91	0.74	0.91	42.0
8	T1	116	2.0	0.375	23.2	LOS C	4.0	28.4	0.91	0.74	0.91	42.9
9	R2	201	2.0	0.957	55.3	LOS E	8.4	60.0	1.00	1.21	2.01	31.2
Approach		353	2.0	0.957	42.1	LOS D	8.4	60.0	0.96	1.01	1.54	35.3
West: Republic Rd												
10	L2	47	2.0	0.043	10.8	LOS B	0.6	4.2	0.43	0.64	0.43	49.9
11	T1	526	2.0	0.213	5.9	LOS A	3.5	24.9	0.49	0.41	0.49	54.7
12	R2	292	2.0	0.907	31.8	LOS C	6.7	48.0	1.00	1.03	1.66	38.9
Approach		866	2.0	0.907	14.9	LOS B	6.7	48.0	0.66	0.64	0.88	47.9
All Vehicles		4002	2.0	0.981	37.0	LOS D	43.5	310.0	0.89	1.08	1.38	37.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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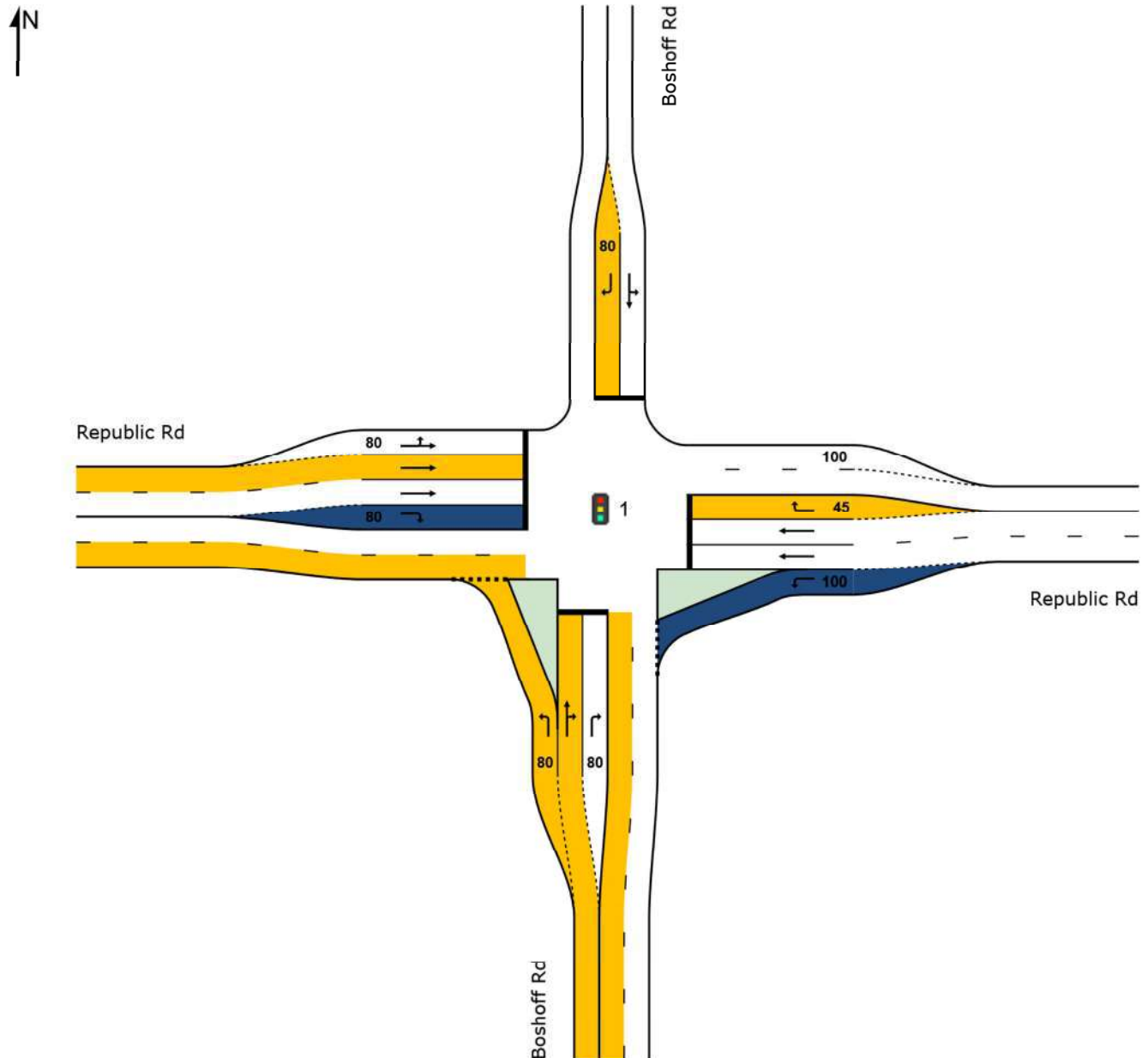
SITE LAYOUT

 **Site: 1 [08_2027 PM + Lat + Dev (Upgraded)]**

Republic Rd/Boshoff Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 1 [08_2027 PM + Lat + Dev (Upgraded)]**

Republic Rd/Boshoff Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	133	2.0	0.196	8.5	LOS A	1.1	7.6	0.46	0.67	0.46	52.0
2	T1	135	2.0	0.742	27.8	LOS C	7.7	55.0	0.99	0.91	1.18	40.1
3	R2	329	2.0	0.742	34.4	LOS C	7.7	55.0	1.00	0.91	1.19	38.5
Approach		598	2.0	0.742	27.2	LOS C	7.7	55.0	0.88	0.86	1.03	41.2
East: Republic Rd												
4	L2	216	2.0	0.149	6.7	LOS A	1.0	7.3	0.28	0.63	0.28	53.2
5	T1	935	2.0	0.392	7.3	LOS A	7.4	52.7	0.58	0.51	0.58	53.6
6	R2	28	2.0	0.099	17.6	LOS B	0.5	3.8	0.63	0.70	0.63	45.6
Approach		1180	2.0	0.392	7.4	LOS A	7.4	52.7	0.52	0.53	0.52	53.3
North: Boshoff Rd												
7	L2	44	2.0	0.354	27.8	LOS C	4.0	28.3	0.89	0.73	0.89	42.3
8	T1	110	2.0	0.354	22.2	LOS C	4.0	28.3	0.89	0.73	0.89	43.2
9	R2	140	2.0	0.473	31.4	LOS C	3.9	28.0	0.95	0.79	0.95	39.2
Approach		295	2.0	0.473	27.4	LOS C	4.0	28.3	0.92	0.76	0.92	41.1
West: Republic Rd												
10	L2	110	2.0	0.099	11.5	LOS B	1.4	10.3	0.47	0.68	0.47	49.3
11	T1	1180	2.0	0.494	7.9	LOS A	10.1	72.0	0.63	0.56	0.63	53.1
12	R2	311	2.0	0.780	27.3	LOS C	9.6	68.5	0.90	0.95	1.14	40.8
Approach		1601	2.0	0.780	11.9	LOS B	10.1	72.0	0.67	0.64	0.72	50.0
All Vehicles		3674	2.0	0.780	14.2	LOS B	10.1	72.0	0.68	0.65	0.72	48.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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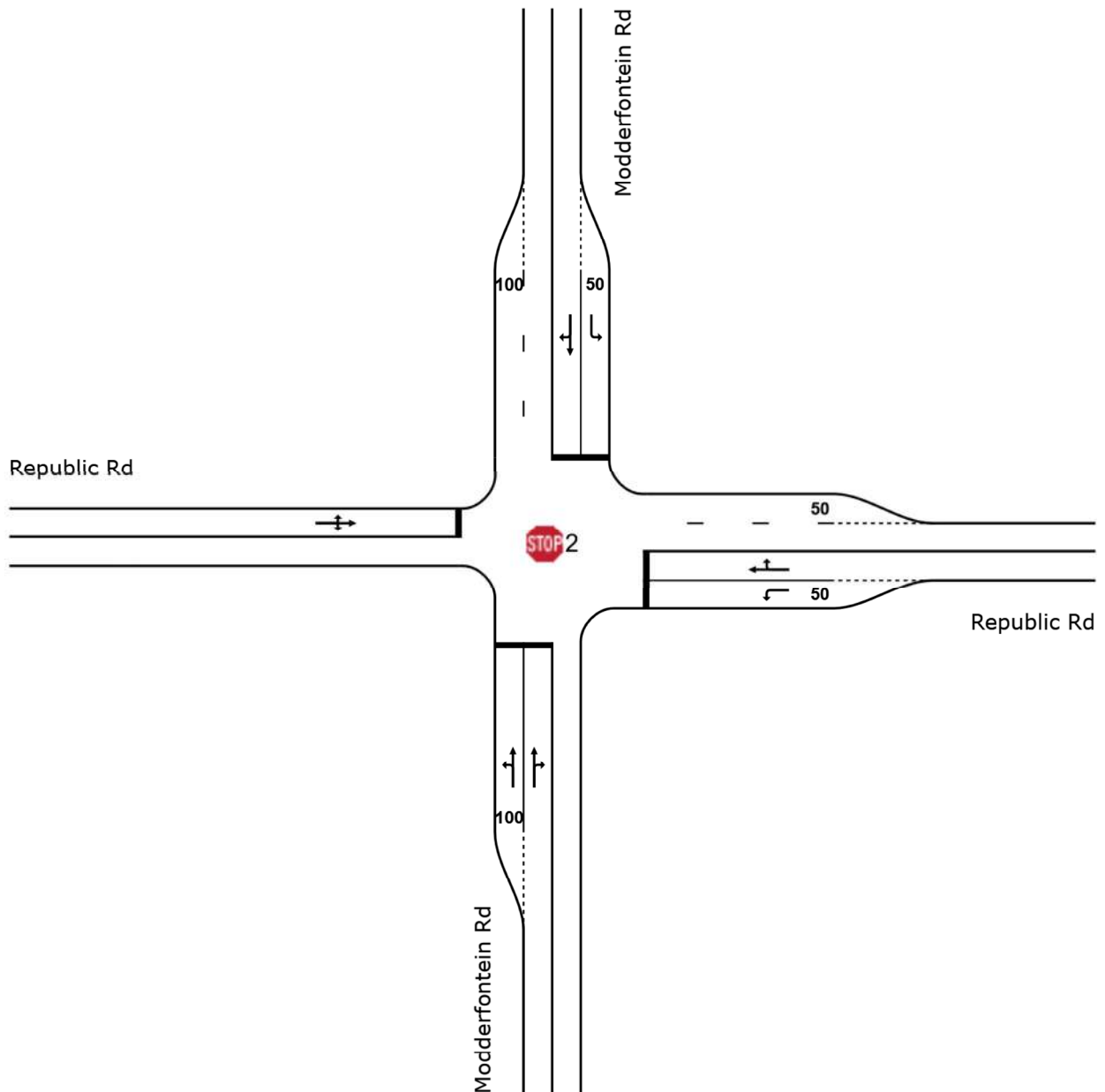
SITE LAYOUT

 **Site: 2 [01_2022 AM]**

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 2 [01_2022 AM]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	213	2.0	0.483	13.2	LOS B	2.2	15.7	0.82	1.44	2.73	49.2
2	T1	539	2.0	0.863	29.5	LOS D	10.2	72.4	0.95	2.15	5.96	40.6
3	R2	217	2.0	0.863	34.5	LOS D	10.2	72.4	1.00	2.38	7.04	38.3
Approach		969	2.0	0.863	27.0	LOS D	10.2	72.4	0.93	2.04	5.49	41.7
East: Republic Rd												
4	L2	612	2.0	0.425	9.9	LOS A	2.6	18.9	1.00	1.17	1.87	51.7
5	T1	785	2.0	1.928	854.1	LOS F	286.4	2039.0	1.00	21.07	88.72	4.0
6	R2	603	2.0	1.928	854.0	LOS F	286.4	2039.0	1.00	21.07	88.72	4.0
Approach		2000	2.0	1.928	595.9	LOS F	286.4	2039.0	1.00	14.98	62.16	5.6
North: Modderfontein Rd												
7	L2	419	2.0	0.291	9.1	LOS A	1.5	10.8	0.86	1.07	1.56	51.7
8	T1	285	2.0	0.409	11.7	LOS B	1.7	12.0	0.79	1.39	2.47	50.3
9	R2	9	2.0	0.409	11.4	LOS B	1.7	12.0	0.79	1.39	2.47	50.1
Approach		714	2.0	0.409	10.2	LOS B	1.7	12.0	0.83	1.20	1.94	51.1
West: Republic Rd												
10	L2	7	2.0	0.142	11.9	LOS B	0.4	3.1	0.70	1.27	1.86	49.9
11	T1	72	2.0	0.142	12.1	LOS B	0.4	3.1	0.70	1.27	1.86	50.0
12	R2	23	2.0	0.142	11.8	LOS B	0.4	3.1	0.70	1.27	1.86	49.8
Approach		102	2.0	0.142	12.0	LOS B	0.4	3.1	0.70	1.27	1.86	49.9
All Vehicles		3785	2.0	1.928	324.0	LOS F	286.4	2039.0	0.94	8.70	34.67	9.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

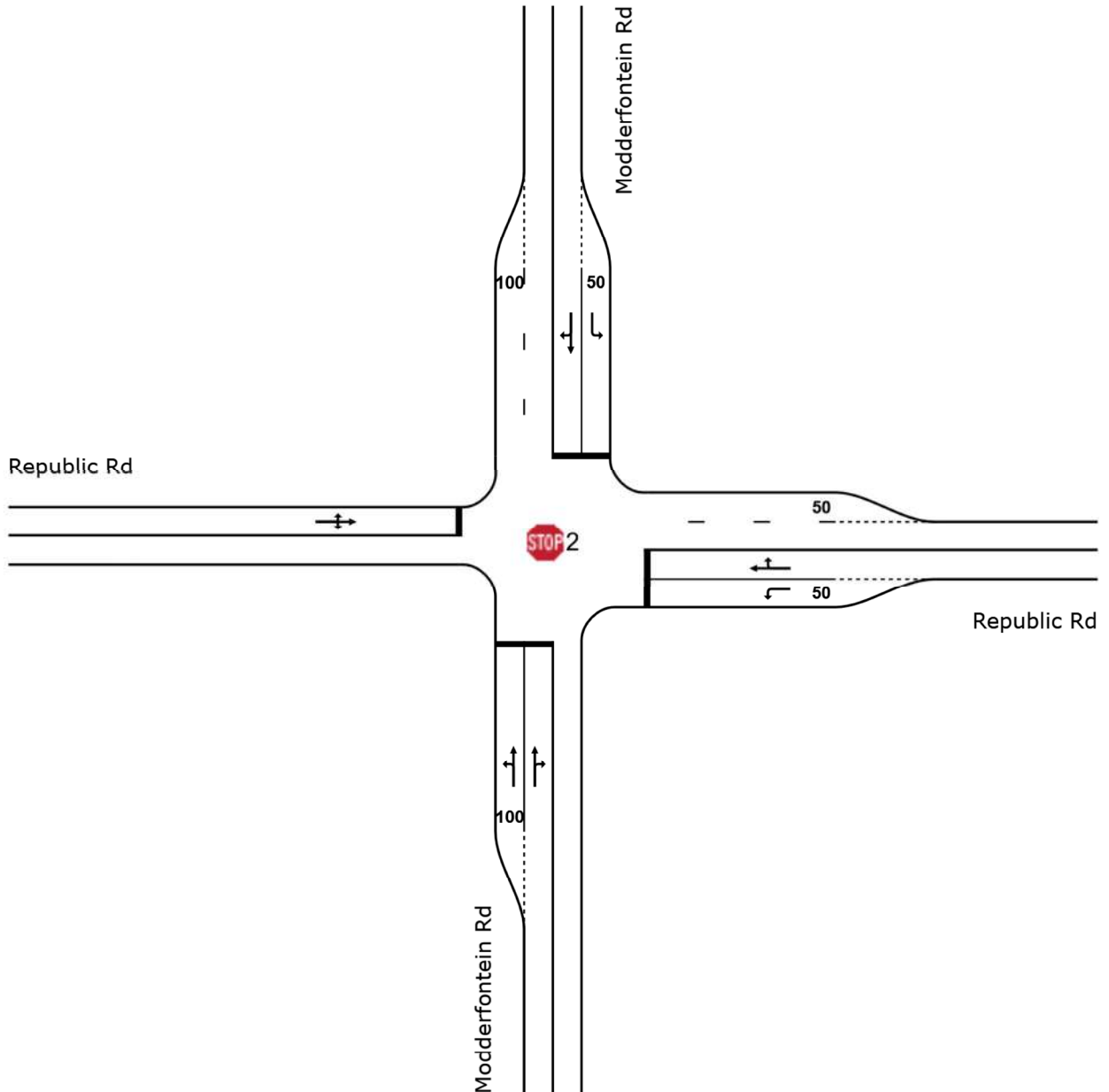


Site: 2 [02_2022 PM]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 2 [02_2022 PM]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	27	2.0	0.365	11.5	LOS B	1.4	10.1	0.77	1.36	2.34	50.3
2	T1	321	2.0	0.651	13.3	LOS B	4.0	28.5	0.80	1.43	2.70	49.3
3	R2	384	2.0	0.651	17.5	LOS C	4.0	28.5	0.89	1.64	3.68	46.5
Approach		732	2.0	0.651	15.4	LOS C	4.0	28.5	0.85	1.54	3.20	47.8
East: Republic Rd												
4	L2	323	2.0	0.224	8.8	LOS A	1.1	7.7	0.80	1.03	1.45	51.7
5	T1	105	2.0	0.548	14.3	LOS B	2.8	19.7	0.85	1.50	3.03	48.8
6	R2	289	2.0	0.548	14.1	LOS B	2.8	19.7	0.85	1.50	3.03	48.8
Approach		717	2.0	0.548	11.8	LOS B	2.8	19.7	0.83	1.29	2.32	50.0
North: Modderfontein Rd												
7	L2	633	2.0	0.439	10.1	LOS B	2.8	19.9	1.00	1.19	1.89	51.7
8	T1	487	2.0	0.678	18.5	LOS C	4.4	31.5	0.91	1.69	3.90	46.2
9	R2	1	2.0	0.678	18.1	LOS C	4.4	31.5	0.91	1.69	3.90	46.0
Approach		1121	2.0	0.678	13.7	LOS B	4.4	31.5	0.96	1.40	2.77	49.1
West: Republic Rd												
10	L2	4	2.0	1.147	175.2	LOS F	57.0	405.7	1.00	7.54	29.60	15.5
11	T1	484	2.0	1.147	175.4	LOS F	57.0	405.7	1.00	7.54	29.60	15.5
12	R2	338	2.0	1.147	175.0	LOS F	57.0	405.7	1.00	7.54	29.60	15.5
Approach		826	2.0	1.147	175.2	LOS F	57.0	405.7	1.00	7.54	29.60	15.5
All Vehicles		3396	2.0	1.147	53.0	LOS F	57.0	405.7	0.92	2.90	9.29	32.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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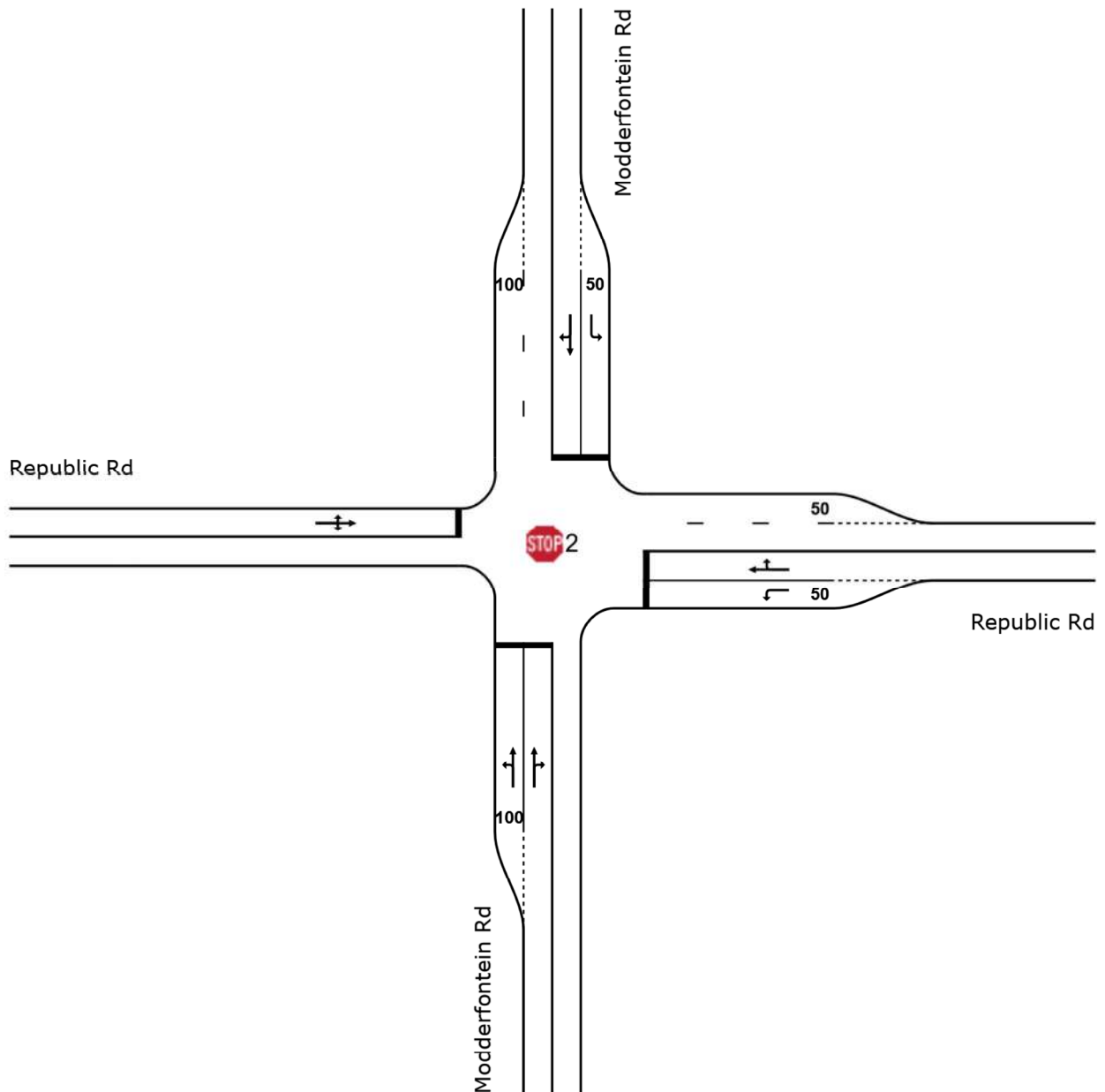
SITE LAYOUT

 **Site: 2 [03_2027 AM + Lat]**

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 2 [03_2027 AM + Lat]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	249	2.0	0.563	14.9	LOS B	2.9	20.8	0.85	1.52	3.11	48.2
2	T1	629	2.0	1.007	63.3	LOS F	25.4	181.0	0.96	3.53	12.04	29.5
3	R2	253	2.0	1.007	78.9	LOS F	25.4	181.0	1.00	4.20	15.00	26.1
Approach		1131	2.0	1.007	56.1	LOS F	25.4	181.0	0.95	3.24	10.73	31.3
East: Republic Rd												
4	L2	714	2.0	0.496	10.5	LOS B	3.4	24.5	1.00	1.23	1.99	51.4
5	T1	911	2.0	2.235	1129.1	LOS F	378.9	2697.9	1.00	23.94	101.28	3.1
6	R2	699	2.0	2.235	1129.0	LOS F	378.9	2697.9	1.00	23.94	101.28	3.1
Approach		2323	2.0	2.235	785.4	LOS F	378.9	2697.9	1.00	16.96	70.78	4.3
North: Modderfontein Rd												
7	L2	485	2.0	0.337	9.4	LOS A	1.9	13.3	0.90	1.10	1.66	51.7
8	T1	336	2.0	0.481	12.9	LOS B	2.2	15.6	0.82	1.44	2.73	49.6
9	R2	11	2.0	0.481	12.5	LOS B	2.2	15.6	0.82	1.44	2.73	49.4
Approach		832	2.0	0.481	10.8	LOS B	2.2	15.6	0.87	1.24	2.10	50.8
West: Republic Rd												
10	L2	8	2.0	0.167	12.1	LOS B	0.5	3.8	0.71	1.27	1.91	49.8
11	T1	83	2.0	0.167	12.3	LOS B	0.5	3.8	0.71	1.27	1.91	49.9
12	R2	28	2.0	0.167	11.9	LOS B	0.5	3.8	0.71	1.27	1.91	49.7
Approach		120	2.0	0.167	12.2	LOS B	0.5	3.8	0.71	1.27	1.91	49.8
All Vehicles		4405	2.0	2.235	431.0	LOS F	378.9	2697.9	0.95	10.04	40.53	7.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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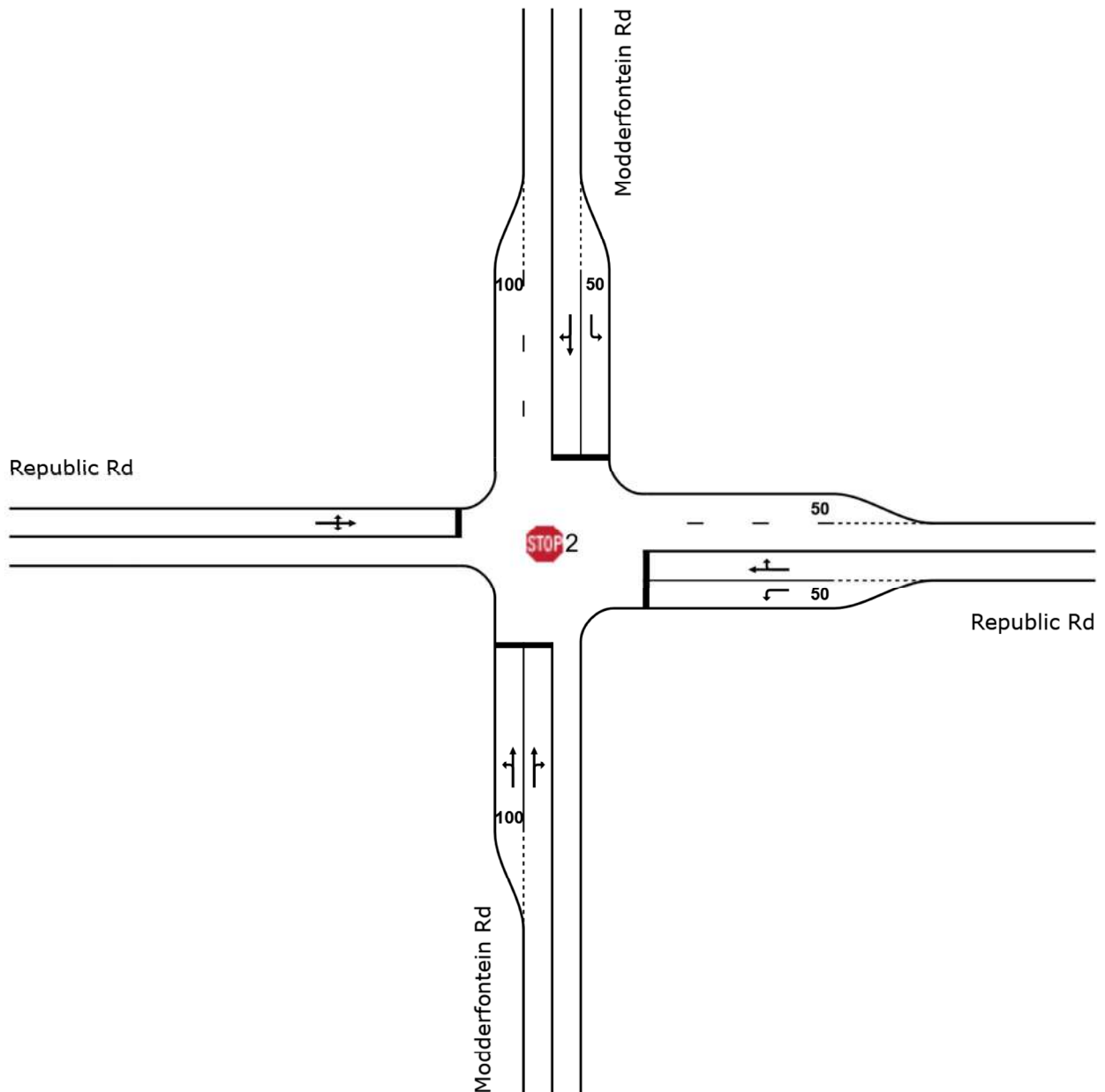
SITE LAYOUT

 **Site: 2 [04_2027 PM + Lat]**

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 2 [04_2027 PM + Lat]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	36	2.0	0.430	12.3	LOS B	1.8	13.0	0.80	1.40	2.54	49.7
2	T1	382	2.0	0.769	15.8	LOS C	6.4	45.5	0.84	1.55	3.23	47.7
3	R2	446	2.0	0.769	23.9	LOS C	6.4	45.5	0.95	1.92	4.98	43.0
Approach		863	2.0	0.769	19.9	LOS C	6.4	45.5	0.90	1.73	4.10	45.3
East: Republic Rd												
4	L2	376	2.0	0.261	9.0	LOS A	1.3	9.4	0.83	1.05	1.51	51.7
5	T1	122	2.0	0.634	16.7	LOS C	3.8	26.8	0.88	1.61	3.55	47.3
6	R2	335	2.0	0.634	16.6	LOS C	3.8	26.8	0.88	1.61	3.55	47.3
Approach		833	2.0	0.634	13.2	LOS B	3.8	26.8	0.86	1.36	2.63	49.2
North: Modderfontein Rd												
7	L2	734	2.0	0.510	10.7	LOS B	3.6	25.6	1.00	1.23	2.01	51.3
8	T1	566	2.0	0.788	25.4	LOS D	7.0	49.7	0.96	1.99	5.29	42.6
9	R2	1	2.0	0.788	25.0	LOS D	7.0	49.7	0.96	1.99	5.29	42.4
Approach		1301	2.0	0.788	17.1	LOS C	7.0	49.7	0.98	1.56	3.44	47.1
West: Republic Rd												
10	L2	5	2.0	1.333	329.7	LOS F	109.0	775.9	1.00	11.93	48.79	9.4
11	T1	561	2.0	1.333	329.9	LOS F	109.0	775.9	1.00	11.93	48.79	9.4
12	R2	393	2.0	1.333	329.5	LOS F	109.0	775.9	1.00	11.93	48.79	9.4
Approach		960	2.0	1.333	329.7	LOS F	109.0	775.9	1.00	11.93	48.79	9.4
All Vehicles		3957	2.0	1.333	92.7	LOS F	109.0	775.9	0.94	4.07	14.42	23.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\02_Republic Rd_Modderfontein Rd.sip8

SITE LAYOUT

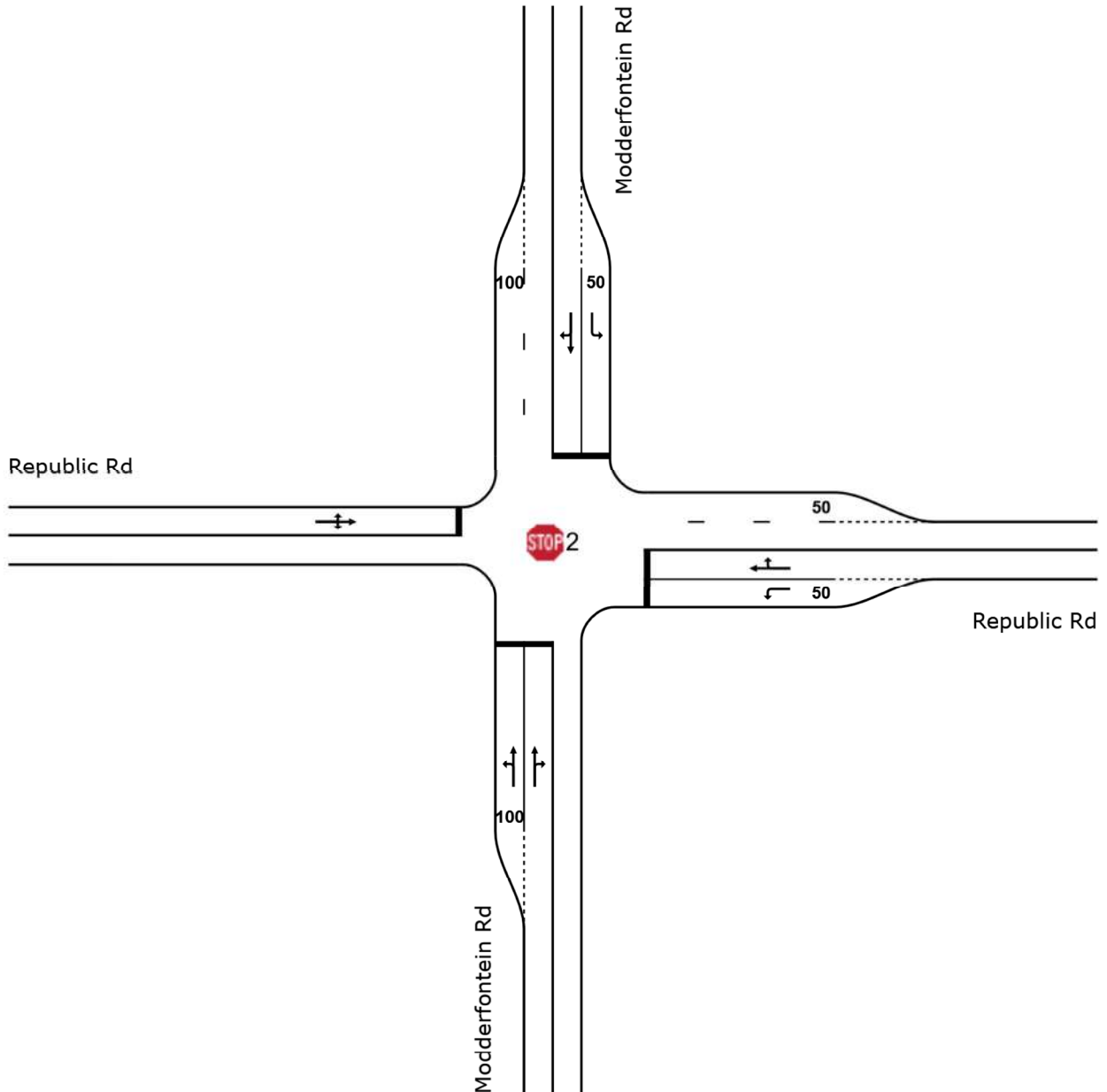


Site: 2 [05_2027 AM + Lat + Dev]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 2 [05_2027 AM + Lat + Dev]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	319	2.0	0.767	24.0	LOS C	6.4	45.3	0.95	1.92	4.96	43.2
2	T1	798	2.0	1.371	262.3	LOS F	120.1	855.4	0.99	9.57	38.47	11.3
3	R2	422	2.0	1.371	360.1	LOS F	120.1	855.4	1.00	12.73	52.30	8.7
Approach		1540	2.0	1.371	239.7	LOS F	120.1	855.4	0.98	8.85	35.31	12.2
East: Republic Rd												
4	L2	874	2.0	0.607	11.9	LOS B	4.8	34.1	1.00	1.29	2.26	50.4
5	T1	1100	2.0	2.579	1437.5	LOS F	482.7	3436.6	1.00	26.35	111.83	2.4
6	R2	757	2.0	2.579	1437.3	LOS F	482.7	3436.6	1.00	26.35	111.83	2.4
Approach		2731	2.0	2.579	981.3	LOS F	482.7	3436.6	1.00	18.33	76.77	3.5
North: Modderfontein Rd												
7	L2	514	2.0	0.357	9.5	LOS A	2.0	14.4	0.92	1.11	1.70	51.7
8	T1	421	2.0	0.599	15.6	LOS C	3.3	23.7	0.87	1.56	3.31	47.9
9	R2	11	2.0	0.599	15.3	LOS C	3.3	23.7	0.87	1.56	3.31	47.7
Approach		945	2.0	0.599	12.3	LOS B	3.3	23.7	0.90	1.32	2.44	49.9
West: Republic Rd												
10	L2	8	2.0	0.345	13.7	LOS B	1.3	9.4	0.77	1.35	2.29	48.8
11	T1	176	2.0	0.345	13.9	LOS B	1.3	9.4	0.77	1.35	2.29	48.9
12	R2	64	2.0	0.345	13.6	LOS B	1.3	9.4	0.77	1.35	2.29	48.7
Approach		248	2.0	0.345	13.8	LOS B	1.3	9.4	0.77	1.35	2.29	48.8
All Vehicles		5464	2.0	2.579	560.7	LOS F	482.7	3436.6	0.97	11.95	48.84	5.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

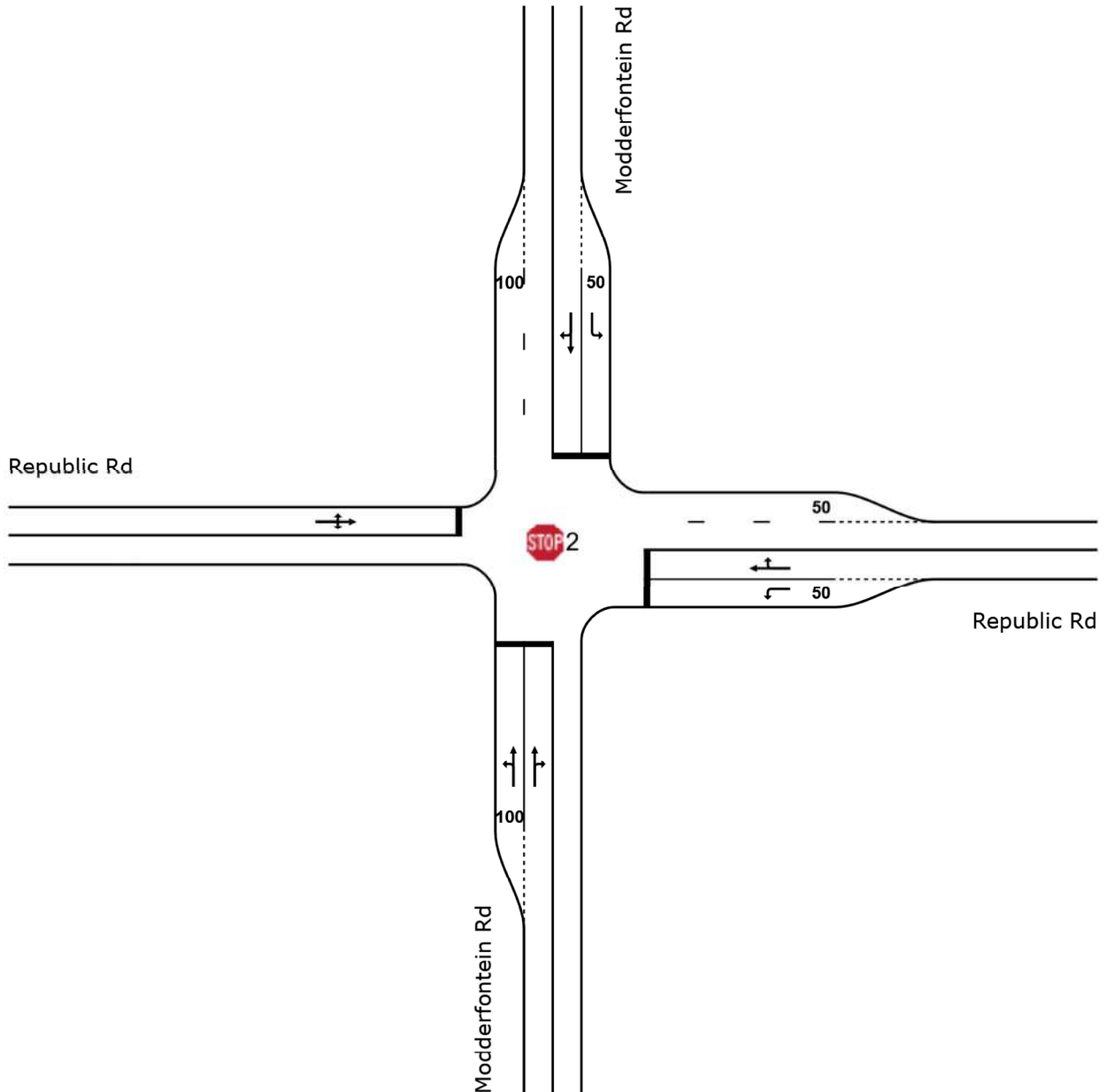


Site: 2 [06_2027 PM + Lat + Dev]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 2 [06_2027 PM + Lat + Dev]

Modderfontein Rd_Republic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	91	2.0	0.590	15.7	LOS C	3.2	22.9	0.86	1.55	3.26	47.7
2	T1	514	2.0	1.054	47.6	LOS E	34.5	245.8	0.91	2.84	8.96	33.8
3	R2	578	2.0	1.054	105.9	LOS F	34.5	245.8	1.00	5.23	19.49	21.9
Approach		1184	2.0	1.054	73.6	LOS F	34.5	245.8	0.95	3.91	13.66	27.2
East: Republic Rd												
4	L2	522	2.0	0.362	9.5	LOS A	2.1	14.8	0.93	1.11	1.71	51.7
5	T1	266	2.0	0.895	40.2	LOS E	12.2	87.0	1.00	2.63	8.13	36.3
6	R2	378	2.0	0.895	40.1	LOS E	12.2	87.0	1.00	2.63	8.13	36.4
Approach		1166	2.0	0.895	26.4	LOS D	12.2	87.0	0.97	1.95	5.26	41.9
North: Modderfontein Rd												
7	L2	804	2.0	0.559	11.2	LOS B	4.2	29.6	1.00	1.26	2.12	50.9
8	T1	778	2.0	1.082	124.4	LOS F	40.8	290.7	1.00	5.91	22.46	19.8
9	R2	1	2.0	1.082	124.1	LOS F	40.8	290.7	1.00	5.91	22.46	19.8
Approach		1584	2.0	1.082	66.9	LOS F	40.8	290.7	1.00	3.55	12.13	28.7
West: Republic Rd												
10	L2	5	2.0	1.774	718.8	LOS F	239.9	1708.3	1.00	19.25	80.80	4.7
11	T1	790	2.0	1.774	719.0	LOS F	239.9	1708.3	1.00	19.25	80.80	4.7
12	R2	482	2.0	1.774	718.7	LOS F	239.9	1708.3	1.00	19.25	80.80	4.7
Approach		1277	2.0	1.774	718.9	LOS F	239.9	1708.3	1.00	19.25	80.80	4.7
All Vehicles		5211	2.0	1.774	219.2	LOS F	239.9	1708.3	0.98	7.12	27.77	13.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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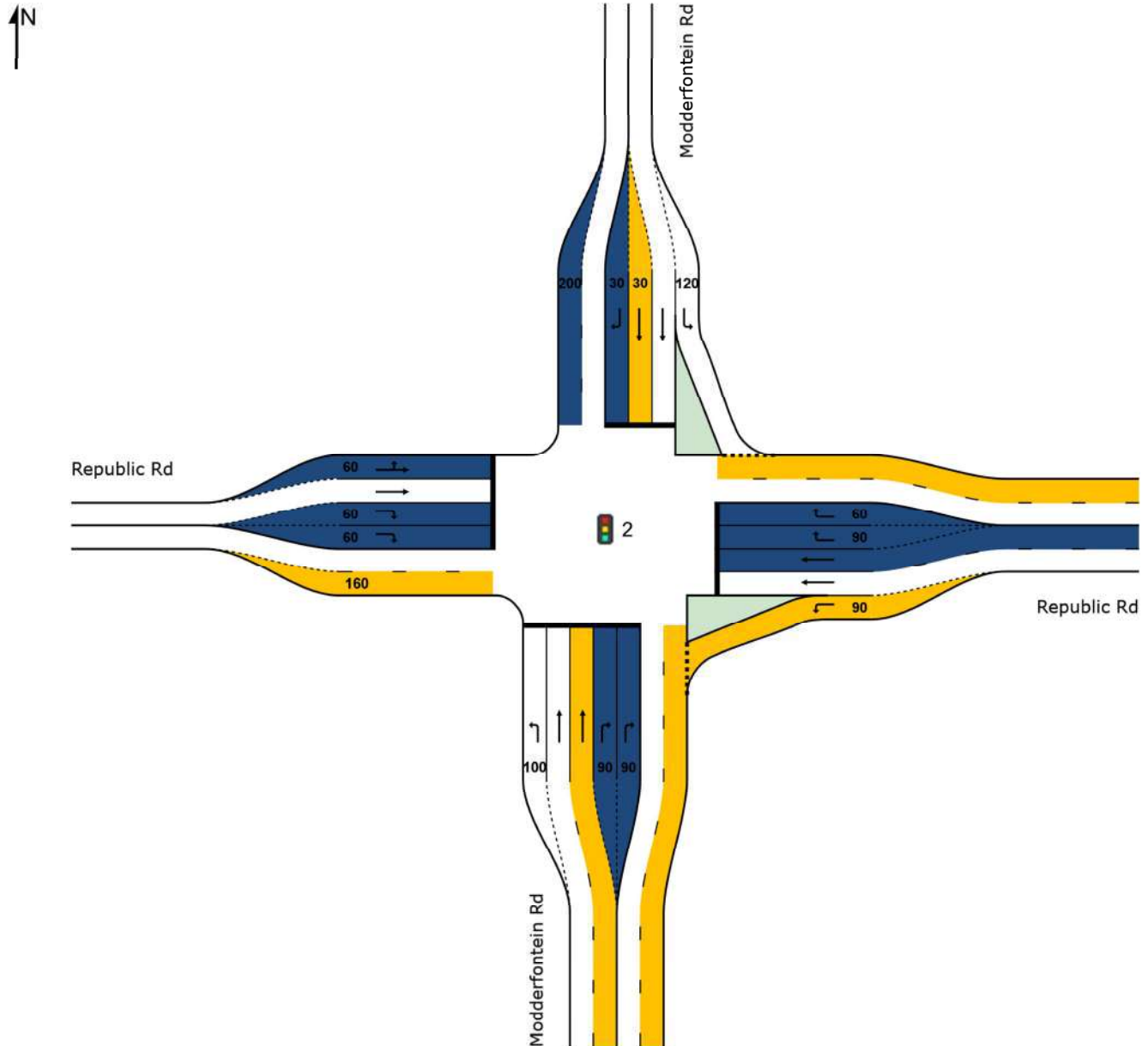
SITE LAYOUT

 **Site: 2 [07_2027 AM + Lat + Dev (Upgraded)]**

Modderfontein Rd_Republic Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 2 [07_2027 AM + Lat + Dev (Upgraded)]**

Modderfontein Rd_Republic Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	319	2.0	0.493	23.1	LOS C	7.6	54.3	0.85	0.81	0.85	42.6
2	T1	798	2.0	0.585	18.2	LOS B	9.9	70.4	0.88	0.76	0.88	46.3
3	R2	422	2.0	0.668	29.4	LOS C	6.1	43.5	0.94	0.87	1.05	40.3
Approach		1540	2.0	0.668	22.3	LOS C	9.9	70.4	0.89	0.80	0.92	43.7
East: Republic Rd												
4	L2	874	2.0	0.381	7.6	LOS A	6.5	46.0	0.43	0.69	0.43	52.6
5	T1	1100	2.0	0.597	12.7	LOS B	12.5	88.7	0.78	0.69	0.78	49.7
6	R2	757	2.0	0.651	20.2	LOS C	9.0	64.3	0.83	0.83	0.85	44.6
Approach		2731	2.0	0.651	13.2	LOS B	12.5	88.7	0.68	0.73	0.69	49.0
North: Modderfontein Rd												
7	L2	514	2.0	0.264	8.6	LOS A	4.5	32.1	0.46	0.69	0.46	51.8
8	T1	421	2.0	0.309	16.3	LOS B	4.7	33.2	0.79	0.65	0.79	47.5
9	R2	11	2.0	0.059	28.8	LOS C	0.3	1.9	0.85	0.68	0.85	40.4
Approach		945	2.0	0.309	12.2	LOS B	4.7	33.2	0.61	0.67	0.61	49.6
West: Republic Rd												
10	L2	8	2.0	0.097	15.2	LOS B	1.5	10.7	0.59	0.49	0.59	50.3
11	T1	176	2.0	0.097	9.6	LOS A	1.5	10.7	0.59	0.47	0.59	51.7
12	R2	64	2.0	0.157	25.1	LOS C	0.8	5.5	0.80	0.72	0.80	42.3
Approach		248	2.0	0.157	13.8	LOS B	1.5	10.7	0.64	0.54	0.64	48.9
All Vehicles		5464	2.0	0.668	15.6	LOS B	12.5	88.7	0.73	0.73	0.74	47.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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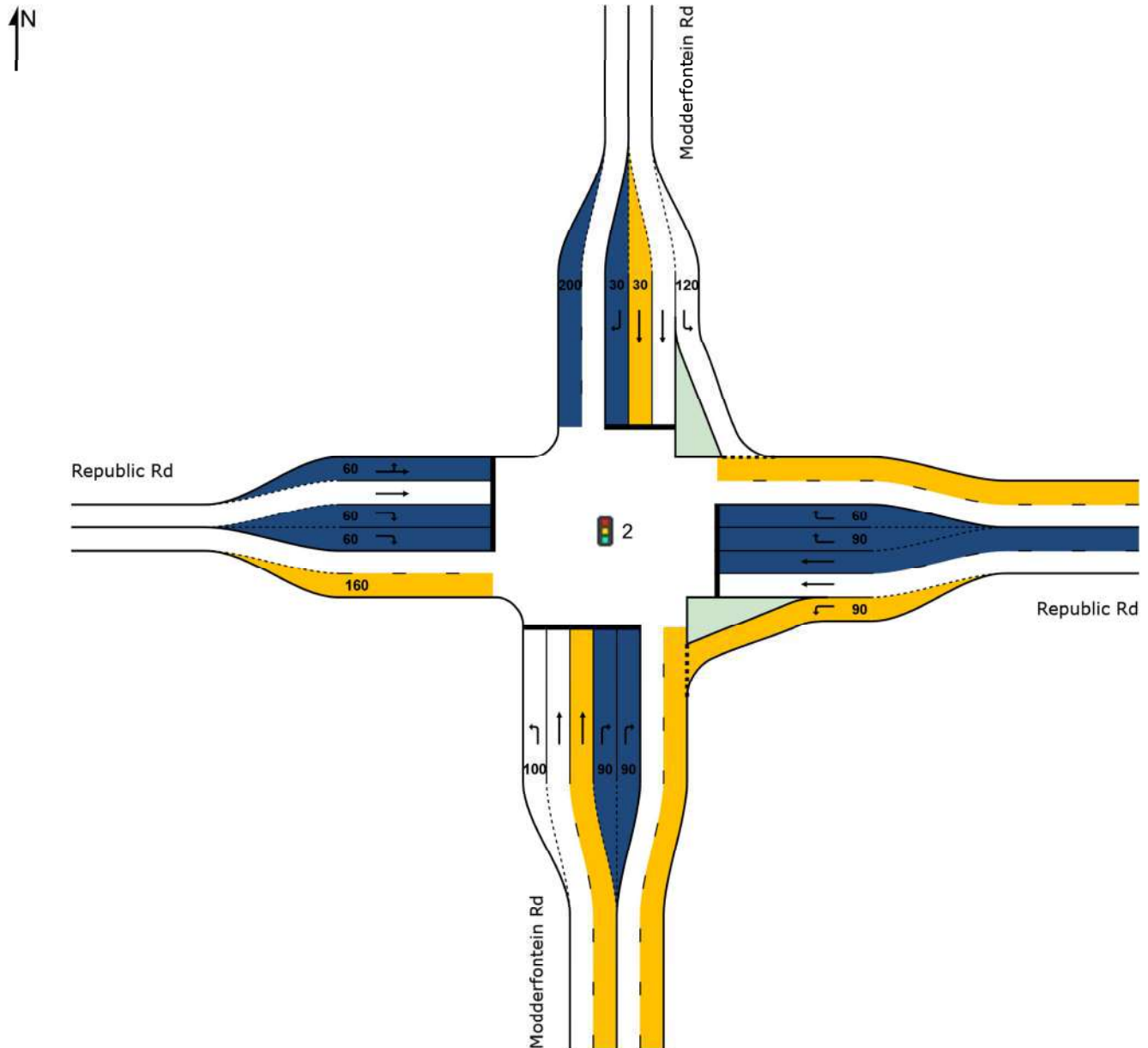
SITE LAYOUT

 **Site: 2 [08_2027 PM + Lat + Dev (Upgraded)]**

Modderfontein Rd_Republic Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 2 [08_2027 PM + Lat + Dev (Upgraded)]**

Modderfontein Rd_Republic Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	91	2.0	0.101	15.2	LOS B	1.5	10.6	0.59	0.70	0.59	46.9
2	T1	808	2.0	0.423	11.5	LOS B	7.9	56.4	0.71	0.61	0.71	50.5
3	R2	578	2.0	0.969	68.9	LOS E	15.4	109.8	1.00	1.37	2.09	28.2
Approach		1477	2.0	0.969	34.2	LOS C	15.4	109.8	0.82	0.91	1.24	38.4
East: Republic Rd												
4	L2	522	2.0	0.408	10.2	LOS B	4.7	33.5	0.63	0.74	0.63	50.8
5	T1	266	2.0	0.202	15.6	LOS B	2.9	20.8	0.75	0.60	0.75	47.9
6	R2	378	2.0	0.948	58.0	LOS E	8.5	60.3	1.00	1.23	2.03	30.6
Approach		1166	2.0	0.948	26.9	LOS C	8.5	60.3	0.78	0.87	1.11	41.4
North: Modderfontein Rd												
7	L2	804	2.0	0.753	16.9	LOS B	13.3	94.4	0.95	0.86	0.98	46.5
8	T1	778	2.0	0.415	11.4	LOS B	7.6	53.9	0.70	0.60	0.70	50.6
9	R2	1	2.0	0.004	19.5	LOS B	0.0	0.2	0.67	0.60	0.67	44.9
Approach		1584	2.0	0.753	14.2	LOS B	13.3	94.4	0.83	0.73	0.84	48.4
West: Republic Rd												
10	L2	5	2.0	0.584	23.8	LOS C	9.9	70.2	0.88	0.76	0.88	45.2
11	T1	790	2.0	0.584	18.2	LOS B	9.9	70.2	0.88	0.76	0.88	46.3
12	R2	482	2.0	0.628	26.7	LOS C	6.5	46.4	0.91	0.84	0.96	41.6
Approach		1277	2.0	0.628	21.4	LOS C	9.9	70.2	0.89	0.79	0.91	44.4
All Vehicles		5504	2.0	0.969	24.0	LOS C	15.4	109.8	0.83	0.82	1.02	43.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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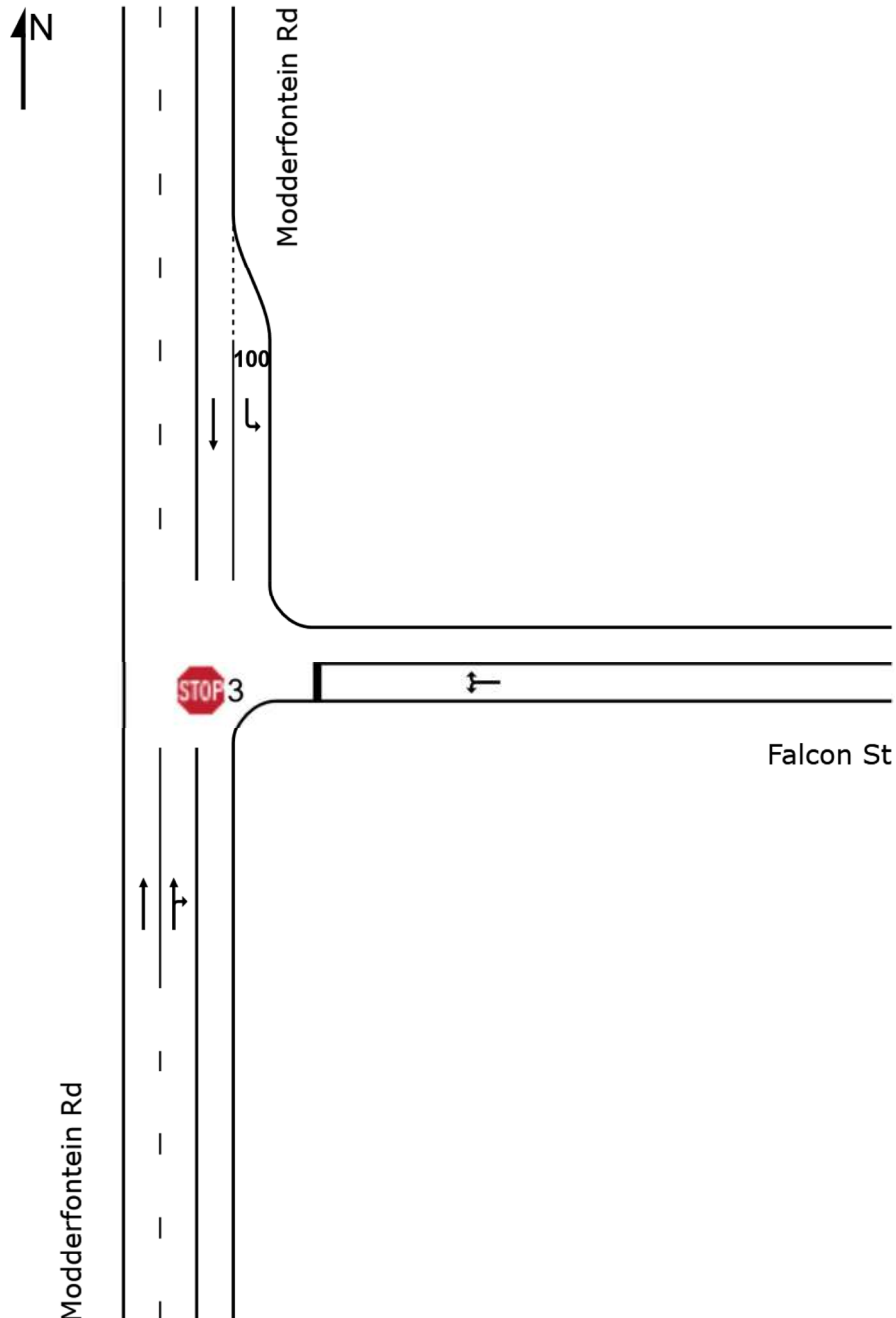
SITE LAYOUT

 **Site: 3 [01_2022 AM]**

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 3 [01_2022 AM]

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
2	T1	677	2.0	0.239	0.8	LOS A	1.1	7.7	0.14	0.07	0.16	58.5
3	R2	82	2.0	0.239	10.3	LOS B	1.1	7.7	0.45	0.22	0.51	53.7
Approach		759	2.0	0.239	1.9	NA	1.1	7.7	0.18	0.09	0.20	58.0
East: Falcon St												
4	L2	301	2.0	2.010	922.9	LOS F	220.7	1571.3	1.00	10.55	40.25	3.7
6	R2	382	2.0	2.010	925.9	LOS F	220.7	1571.3	1.00	10.55	40.25	3.7
Approach		683	2.0	2.010	924.6	LOS F	220.7	1571.3	1.00	10.55	40.25	3.7
North: Modderfontein Rd												
7	L2	99	2.0	0.053	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
8	T1	821	2.0	0.422	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		920	2.0	0.422	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles		2362	2.0	2.010	268.3	NA	220.7	1571.3	0.35	3.10	11.70	11.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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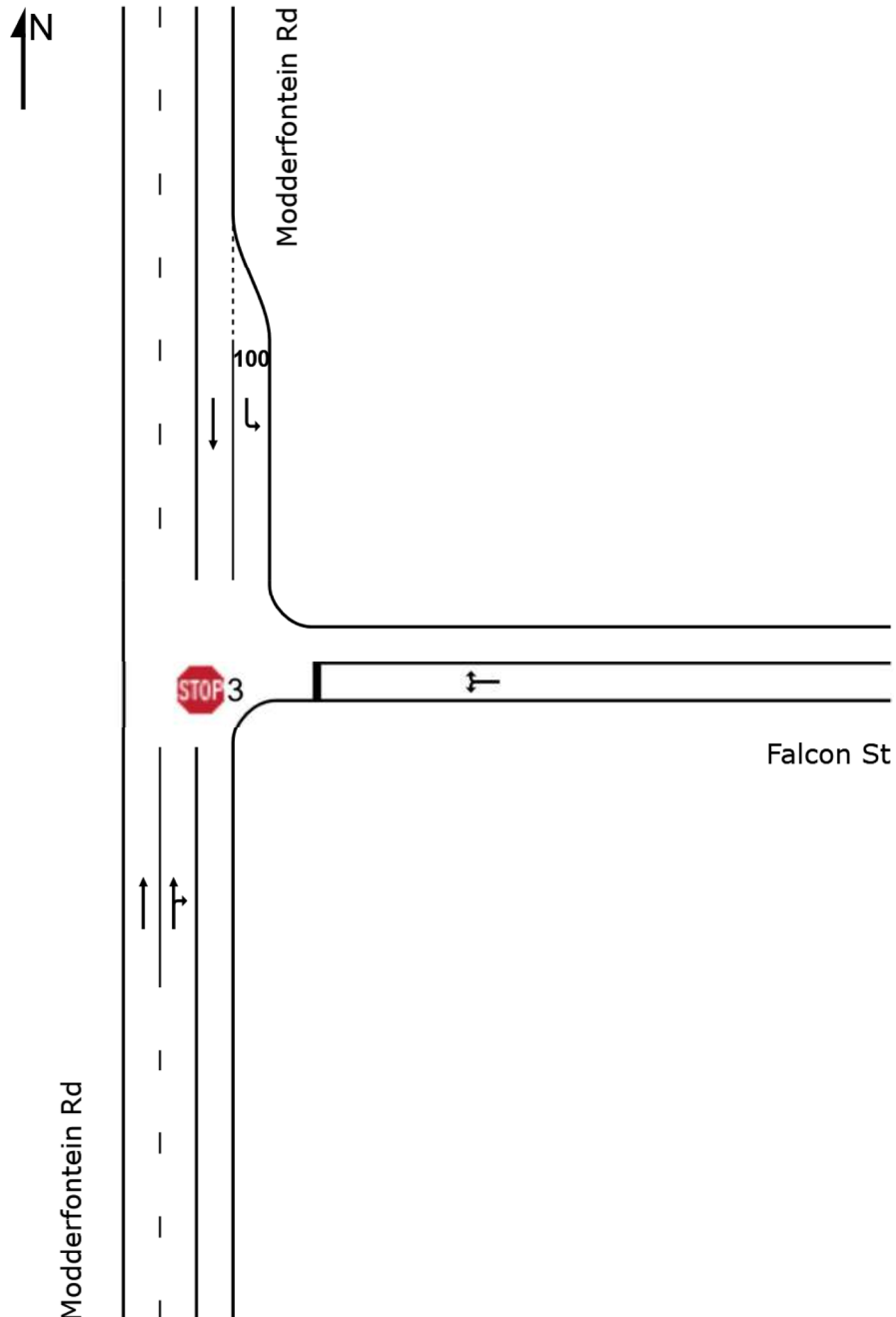
SITE LAYOUT

 **Site: 3 [02_2022 PM]**

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 3 [02_2022 PM]

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
2	T1	633	2.0	0.325	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	252	2.0	0.494	13.4	LOS B	2.0	14.2	0.78	1.01	1.15	47.6
Approach		884	2.0	0.494	3.8	NA	2.0	14.2	0.22	0.29	0.33	55.8
East: Falcon St												
4	L2	121	2.0	0.494	14.4	LOS B	1.6	11.5	0.75	1.09	1.10	46.5
6	R2	63	2.0	0.494	23.3	LOS C	1.6	11.5	0.75	1.09	1.10	46.4
Approach		184	2.0	0.494	17.5	LOS C	1.6	11.5	0.75	1.09	1.10	46.5
North: Modderfontein Rd												
7	L2	379	2.0	0.205	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
8	T1	733	2.0	0.377	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1112	2.0	0.377	1.9	NA	0.0	0.0	0.00	0.20	0.00	57.6
All Vehicles		2180	2.0	0.494	4.0	NA	2.0	14.2	0.15	0.31	0.23	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 20 September 2022 08:20:16

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\03_Modderfontein Rd_Falcon St.sip8

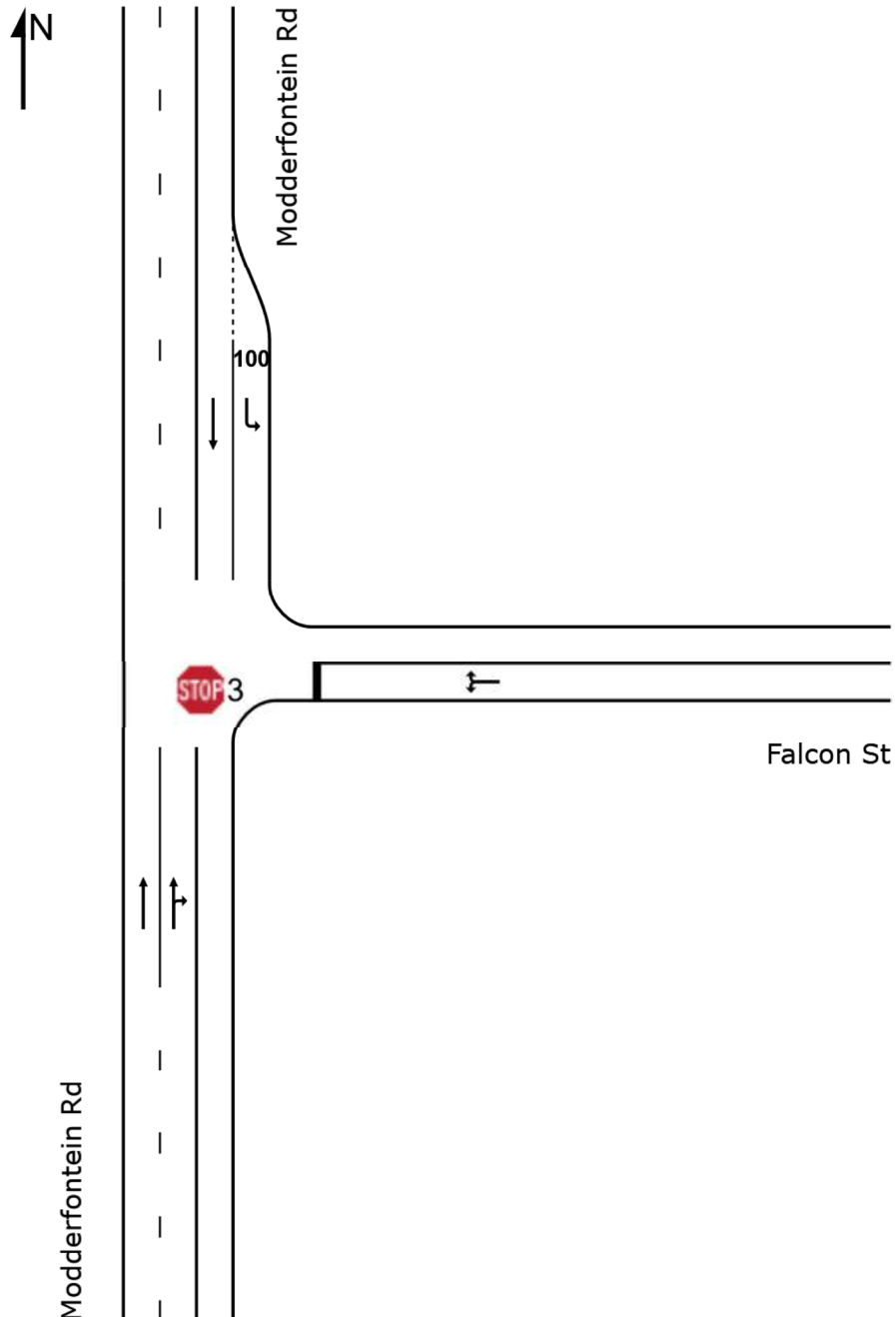
SITE LAYOUT

 **Site: 3 [03_2027 AM + Lat]**

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 3 [03_2027 AM + Lat]

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
2	T1	792	2.0	0.297	1.3	LOS A	1.7	11.8	0.16	0.07	0.20	58.2
3	R2	95	2.0	0.297	12.5	LOS B	1.7	11.8	0.59	0.27	0.73	52.0
Approach		886	2.0	0.297	2.5	NA	1.7	11.8	0.21	0.09	0.25	57.4
East: Falcon St												
4	L2	360	2.0	3.321	2101.5	LOS F	358.8	2554.9	1.00	11.13	44.96	1.7
6	R2	443	2.0	3.321	2104.3	LOS F	358.8	2554.9	1.00	11.13	44.96	1.7
Approach		803	2.0	3.321	2103.0	LOS F	358.8	2554.9	1.00	11.13	44.96	1.7
North: Modderfontein Rd												
7	L2	115	2.0	0.062	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
8	T1	962	2.0	0.495	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		1077	2.0	0.495	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles		2766	2.0	3.321	611.6	NA	358.8	2554.9	0.36	3.29	13.14	5.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\pietel\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\03_Modderfontein Rd_Falcon St.sip8

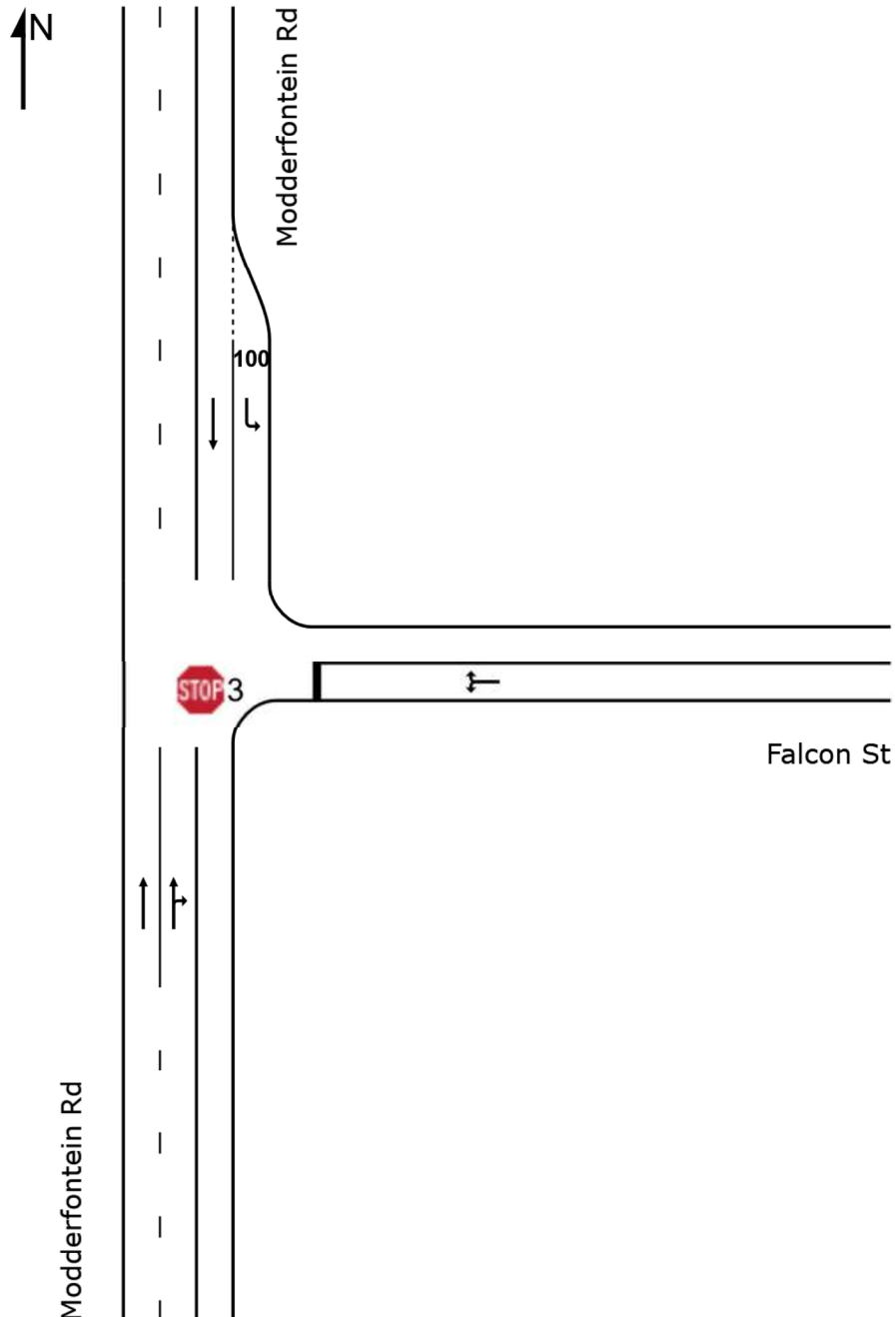
SITE LAYOUT

 **Site: 3 [04_2027 PM + Lat]**

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 3 [04_2027 PM + Lat]

Modderfontein Rd/Falcon St

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
2	T1	748	2.0	0.385	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	293	2.0	0.746	20.8	LOS C	3.7	26.6	0.91	1.21	1.90	43.4
Approach		1041	2.0	0.746	5.9	NA	3.7	26.6	0.26	0.34	0.53	54.1
East: Falcon St												
4	L2	360	2.0	3.806	2537.9	LOS F	379.0	2698.7	1.00	10.79	42.85	1.4
6	R2	443	2.0	3.806	2542.3	LOS F	379.0	2698.7	1.00	10.79	42.85	1.4
Approach		803	2.0	3.806	2540.3	LOS F	379.0	2698.7	1.00	10.79	42.85	1.4
North: Modderfontein Rd												
7	L2	439	2.0	0.237	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
8	T1	855	2.0	0.439	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1294	2.0	0.439	1.9	NA	0.0	0.0	0.00	0.20	0.00	57.5
All Vehicles		3138	2.0	3.806	653.0	NA	379.0	2698.7	0.34	2.96	11.14	5.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\pietel\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\03_Modderfontein Rd_Falcon St.sip8

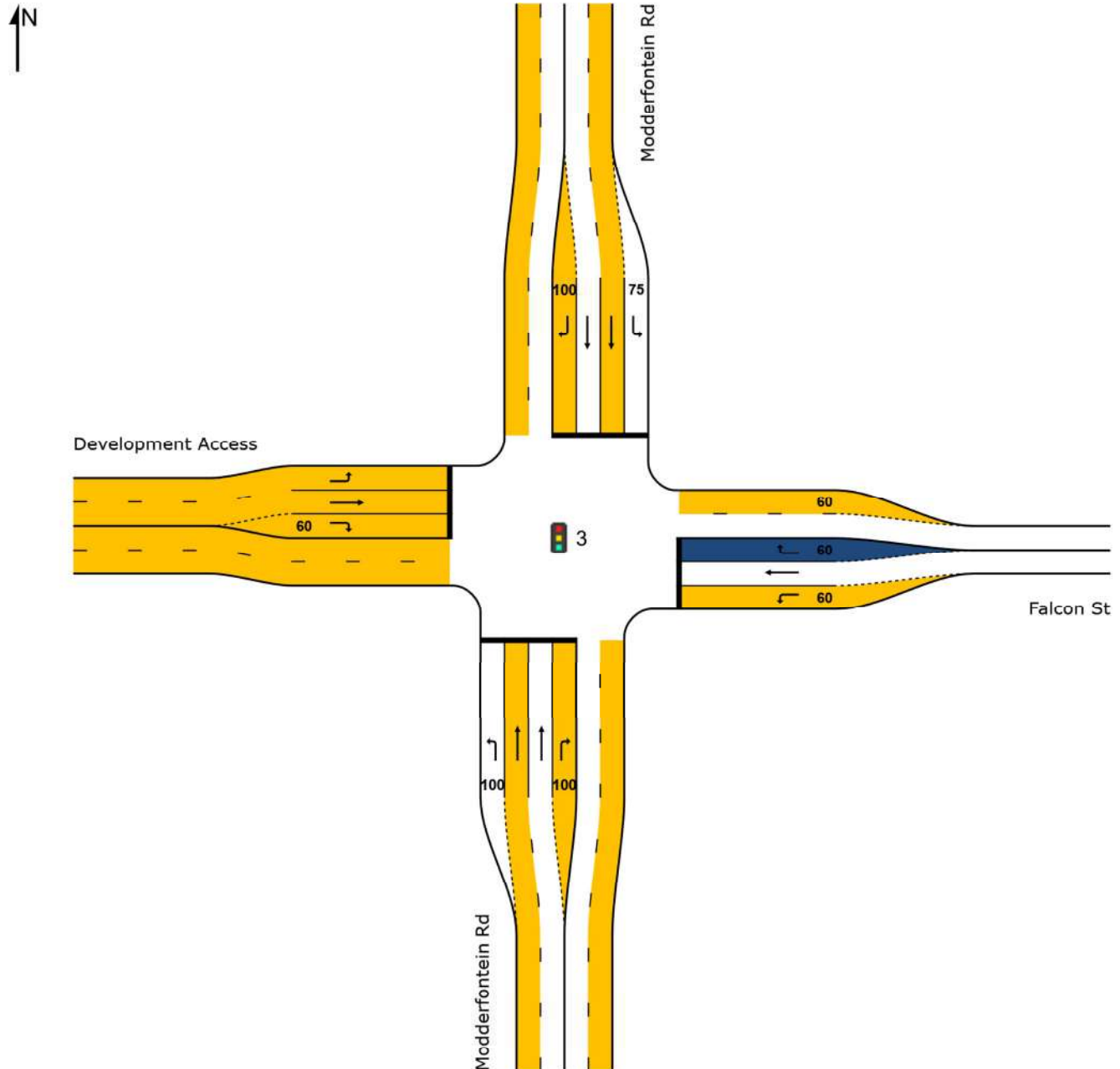
SITE LAYOUT

 **Site: 3 [05_2027 AM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Falcon St

Site Category: -

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 3 [05_2027 AM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Falcon St

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	107	2.0	0.203	26.3	LOS C	2.8	20.1	0.80	0.75	0.80	41.1
2	T1	835	2.0	0.751	27.1	LOS C	14.0	99.7	0.97	0.89	1.06	41.6
3	R2	95	2.0	0.840	48.3	LOS D	3.8	26.8	1.00	0.94	1.54	33.1
Approach		1037	2.0	0.840	28.9	LOS C	14.0	99.7	0.95	0.88	1.08	40.6
East: Falcon St												
4	L2	360	2.0	0.358	15.3	LOS B	7.0	49.7	0.61	0.75	0.61	46.8
5	T1	15	2.0	0.014	7.8	LOS A	0.2	1.6	0.48	0.34	0.48	53.3
6	R2	588	2.0	0.847	26.5	LOS C	17.2	122.3	0.98	0.96	1.19	41.4
Approach		963	2.0	0.847	22.0	LOS C	17.2	122.3	0.83	0.87	0.96	43.5
North: Modderfontein Rd												
7	L2	260	2.0	0.209	10.3	LOS B	3.4	24.0	0.41	0.69	0.41	50.1
8	T1	983	2.0	0.885	36.6	LOS D	20.0	142.7	1.00	1.09	1.34	37.5
9	R2	115	2.0	0.849	48.5	LOS D	4.7	33.4	1.00	0.99	1.57	33.1
Approach		1358	2.0	0.885	32.6	LOS C	20.0	142.7	0.89	1.00	1.18	39.0
West: Development Access												
10	L2	233	2.0	0.677	36.3	LOS D	7.9	56.4	0.98	0.85	1.06	36.9
11	T1	29	2.0	0.082	25.9	LOS C	0.9	6.1	0.86	0.62	0.86	42.2
12	R2	218	2.0	0.891	49.8	LOS D	9.4	67.2	1.00	1.09	1.58	32.8
Approach		480	2.0	0.891	41.8	LOS D	9.4	67.2	0.98	0.95	1.28	35.2
All Vehicles		3838	2.0	0.891	30.1	LOS C	20.0	142.7	0.90	0.93	1.11	39.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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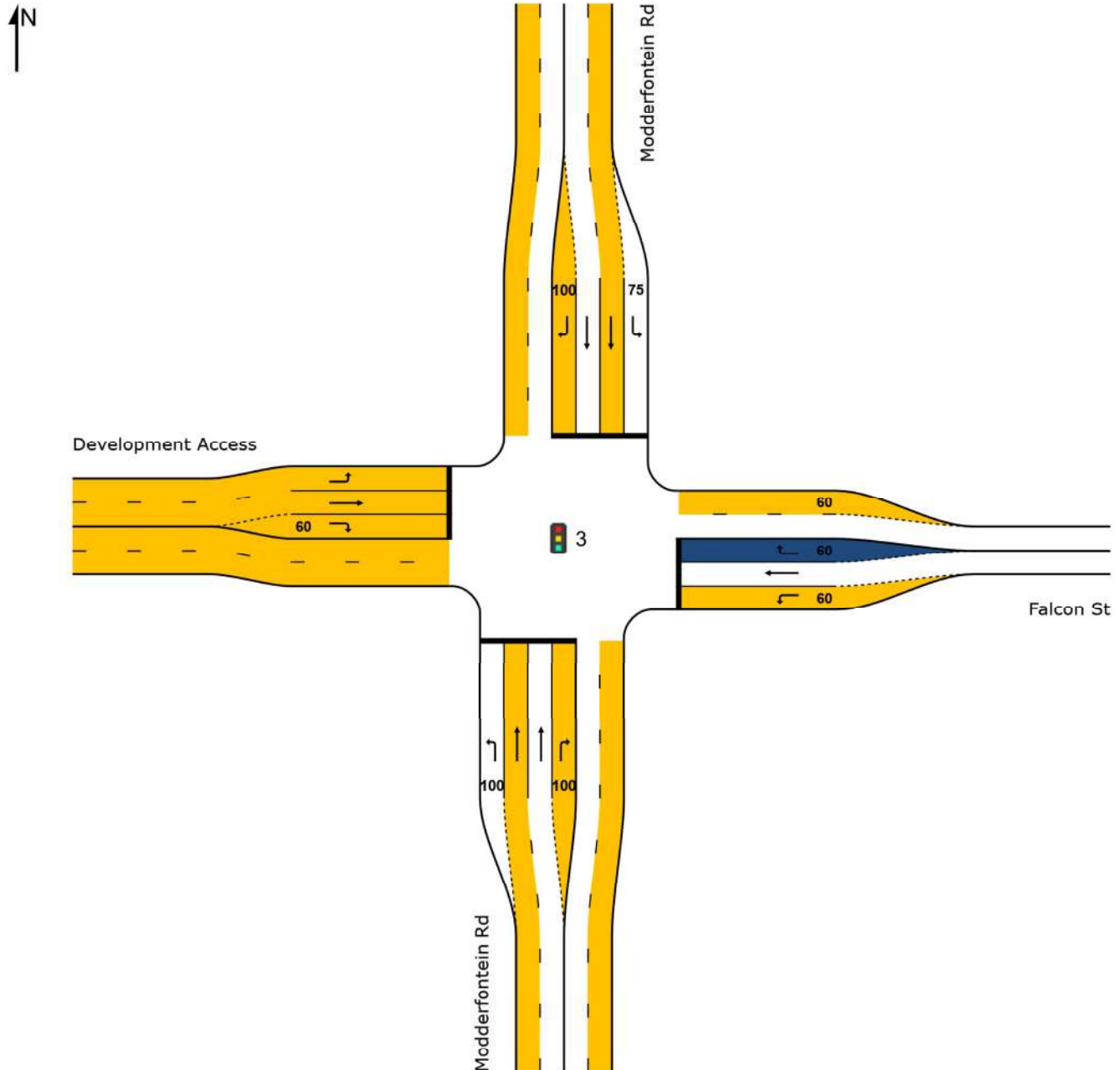
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:05:46

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\03_Modderfontein Rd_Falcon St.sip8

SITE LAYOUT

 **Site: 3 [06_2027 PM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Falcon St
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 3 [06_2027 PM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Falcon St

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	256	2.0	0.361	20.1	LOS C	5.5	38.8	0.76	0.78	0.76	44.2
2	T1	781	2.0	0.524	15.7	LOS B	9.0	64.0	0.82	0.71	0.82	47.8
3	R2	293	2.0	0.564	23.3	LOS C	6.8	48.5	0.90	0.88	1.10	42.8
Approach		1329	2.0	0.564	18.2	LOS B	9.0	64.0	0.83	0.76	0.87	45.9
East: Falcon St												
4	L2	144	2.0	0.187	17.6	LOS B	2.7	19.2	0.67	0.73	0.67	45.5
5	T1	34	2.0	0.115	24.7	LOS C	0.9	6.3	0.90	0.65	0.90	42.8
6	R2	181	2.0	0.740	35.9	LOS D	5.7	40.9	1.00	0.91	1.23	37.4
Approach		359	2.0	0.740	27.5	LOS C	5.7	40.9	0.86	0.81	0.97	40.8
North: Modderfontein Rd												
7	L2	546	2.0	0.770	26.0	LOS C	15.5	110.7	0.94	0.90	1.05	41.2
8	T1	906	2.0	0.608	16.3	LOS B	10.9	77.5	0.86	0.74	0.86	47.4
9	R2	274	2.0	0.474	17.2	LOS B	6.0	42.5	0.84	0.81	0.84	45.9
Approach		1726	2.0	0.770	19.5	LOS B	15.5	110.7	0.88	0.81	0.92	45.0
West: Development Access												
10	L2	172	2.0	0.223	17.8	LOS B	3.3	23.2	0.68	0.74	0.68	45.4
11	T1	21	2.0	0.072	24.4	LOS C	0.5	3.9	0.89	0.63	0.89	42.9
12	R2	161	2.0	0.653	34.2	LOS C	4.9	34.8	0.99	0.85	1.10	38.1
Approach		354	2.0	0.653	25.7	LOS C	4.9	34.8	0.83	0.79	0.89	41.6
All Vehicles		3768	2.0	0.770	20.4	LOS C	15.5	110.7	0.86	0.79	0.90	44.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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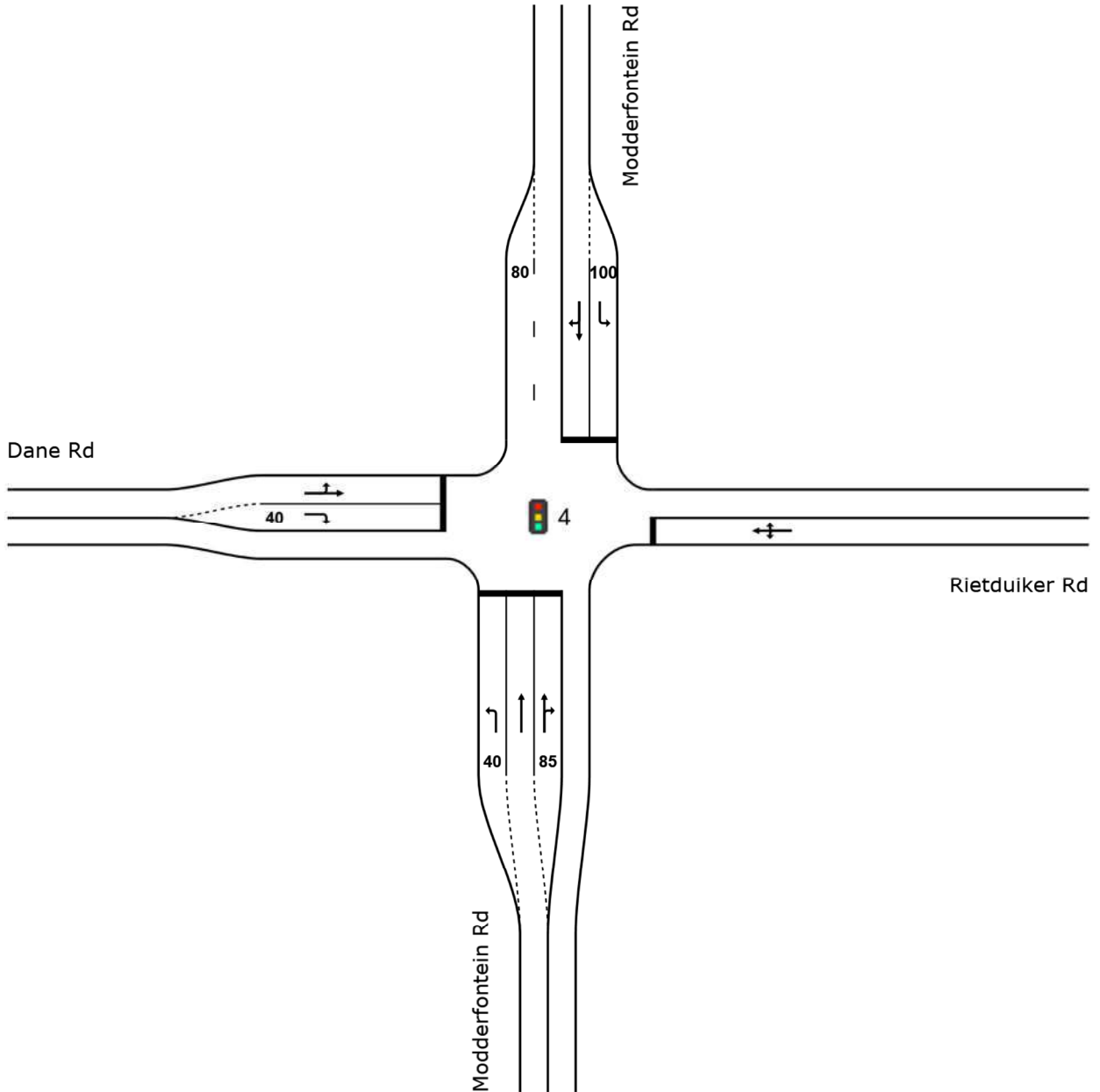
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:10:41

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\03_Modderfontein Rd_Falcon St.sip8

SITE LAYOUT

 **Site: 4 [01_2022 AM]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [01_2022 AM]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	301	2.0	0.276	15.2	LOS B	6.4	45.7	0.52	0.73	0.52	46.9
2	T1	519	2.0	0.530	11.1	LOS B	12.7	90.2	0.60	0.53	0.60	50.8
3	R2	226	2.0	0.564	19.1	LOS B	5.1	36.3	0.81	0.78	0.81	44.3
Approach		1046	2.0	0.564	14.0	LOS B	12.7	90.2	0.62	0.64	0.62	48.1
East: Rietduiker Rd												
4	L2	81	2.0	1.623	605.7	LOS F	98.8	703.7	1.00	3.04	5.04	5.4
5	T1	336	2.0	1.623	600.1	LOS F	98.8	703.7	1.00	3.04	5.04	5.4
6	R2	60	2.0	1.623	605.7	LOS F	98.8	703.7	1.00	3.04	5.04	5.4
Approach		477	2.0	1.623	601.8	LOS F	98.8	703.7	1.00	3.04	5.04	5.4
North: Modderfontein Rd												
7	L2	33	2.0	0.039	19.9	LOS B	0.8	5.6	0.58	0.68	0.58	44.2
8	T1	519	2.0	1.602	587.4	LOS F	168.6	1200.4	1.00	3.56	4.95	5.5
9	R2	284	2.0	1.602	593.0	LOS F	168.6	1200.4	1.00	3.56	4.95	5.5
Approach		836	2.0	1.602	567.1	LOS F	168.6	1200.4	0.98	3.45	4.78	5.7
West: Dane Rd												
10	L2	138	2.0	0.994	84.3	LOS F	32.7	233.0	1.00	1.36	1.73	25.6
11	T1	345	2.0	0.994	78.8	LOS E	32.7	233.0	1.00	1.36	1.73	25.9
12	R2	79	2.0	0.291	43.0	LOS D	3.2	22.5	0.92	0.76	0.92	34.7
Approach		561	2.0	0.994	75.1	LOS E	32.7	233.0	0.99	1.27	1.62	26.8
All Vehicles		2919	2.0	1.623	280.0	LOS F	168.6	1200.4	0.86	1.96	2.73	10.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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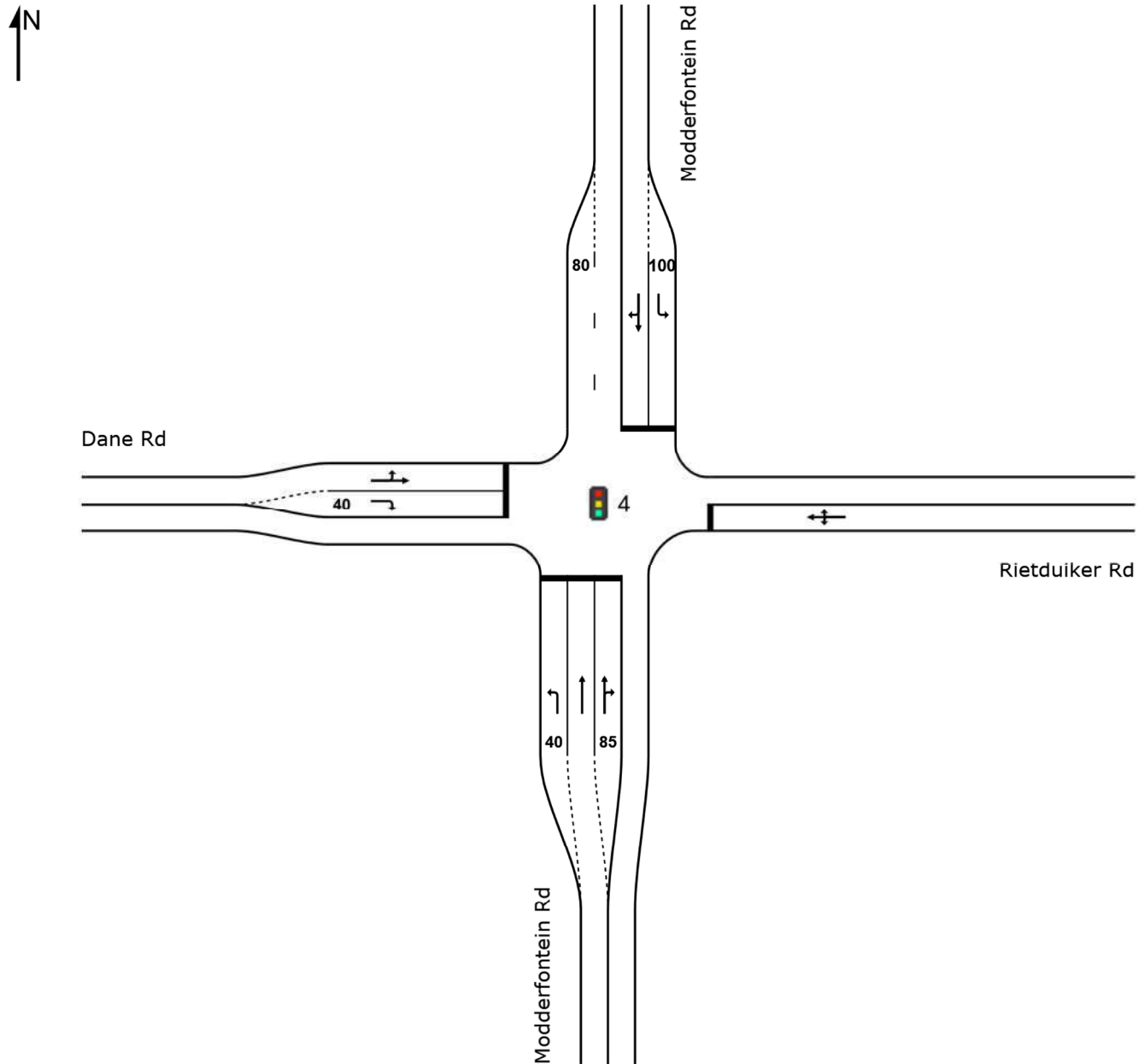
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Monday, 19 September 2022 17:46:32

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 4 [02_2022 PM]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [02_2022 PM]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	90	2.0	0.102	19.3	LOS B	2.2	15.3	0.58	0.70	0.58	44.6
2	T1	622	2.0	0.726	19.4	LOS B	20.9	149.1	0.83	0.74	0.83	45.5
3	R2	260	2.0	0.805	31.6	LOS C	8.4	59.7	1.00	0.91	1.21	38.4
Approach		972	2.0	0.805	22.6	LOS C	20.9	149.1	0.85	0.78	0.91	43.3
East: Rietduiker Rd												
4	L2	191	2.0	1.798	760.2	LOS F	113.4	807.7	1.00	3.27	5.61	4.4
5	T1	226	2.0	1.798	754.7	LOS F	113.4	807.7	1.00	3.27	5.61	4.4
6	R2	73	2.0	1.798	760.2	LOS F	113.4	807.7	1.00	3.27	5.61	4.4
Approach		490	2.0	1.798	757.7	LOS F	113.4	807.7	1.00	3.27	5.61	4.4
North: Modderfontein Rd												
7	L2	83	2.0	0.144	29.7	LOS C	2.6	18.7	0.76	0.74	0.76	39.6
8	T1	510	2.0	1.374	381.6	LOS F	101.6	723.2	1.00	2.80	3.97	8.1
9	R2	105	2.0	1.374	387.2	LOS F	101.6	723.2	1.00	2.80	3.97	8.0
Approach		698	2.0	1.374	340.6	LOS F	101.6	723.2	0.97	2.55	3.58	8.9
West: Dane Rd												
10	L2	164	2.0	1.016	96.4	LOS F	47.9	340.7	1.00	1.45	1.81	23.5
11	T1	457	2.0	1.016	90.8	LOS F	47.9	340.7	1.00	1.45	1.81	23.8
12	R2	206	2.0	0.423	35.4	LOS D	7.6	54.1	0.87	0.80	0.87	37.4
Approach		828	2.0	1.016	78.1	LOS E	47.9	340.7	0.97	1.29	1.58	26.1
All Vehicles		2988	2.0	1.798	232.9	LOS F	113.4	807.7	0.94	1.74	2.49	12.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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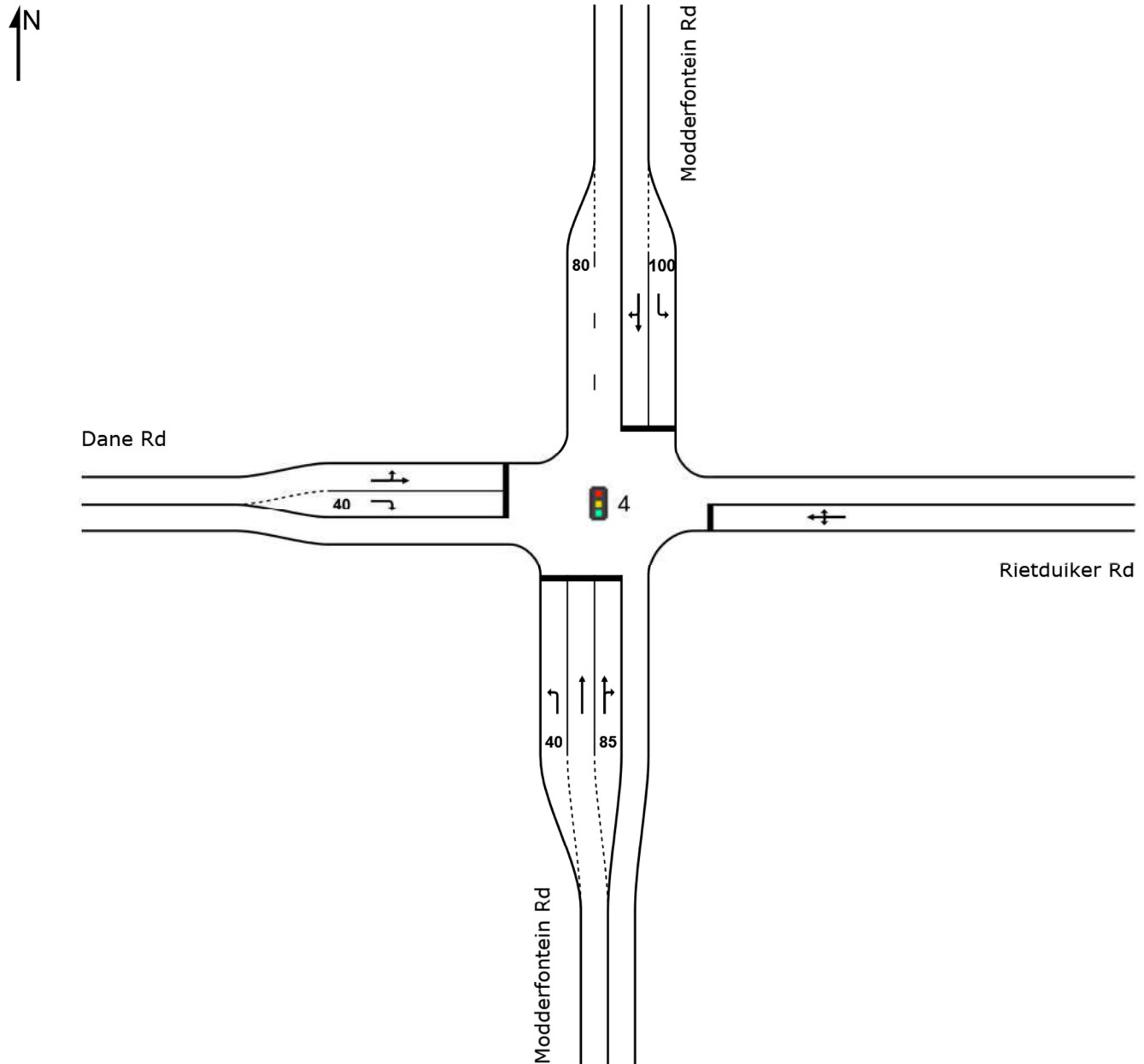
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Monday, 19 September 2022 17:48:57

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 4 [03_2027 AM + Lat]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [03_2027 AM + Lat]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	353	2.0	0.330	16.1	LOS B	8.0	57.0	0.56	0.74	0.56	46.4
2	T1	609	2.0	0.699	12.5	LOS B	16.3	115.8	0.66	0.59	0.66	49.8
3	R2	264	2.0	0.699	21.3	LOS C	6.7	47.6	0.84	0.82	0.90	43.2
Approach		1227	2.0	0.699	15.4	LOS B	16.3	115.8	0.67	0.68	0.68	47.2
East: Rietduiker Rd												
4	L2	101	2.0	1.941	887.2	LOS F	138.5	986.0	1.00	3.54	6.00	3.8
5	T1	389	2.0	1.941	881.6	LOS F	138.5	986.0	1.00	3.54	6.00	3.8
6	R2	69	2.0	1.941	887.2	LOS F	138.5	986.0	1.00	3.54	6.00	3.8
Approach		559	2.0	1.941	883.3	LOS F	138.5	986.0	1.00	3.54	6.00	3.8
North: Modderfontein Rd												
7	L2	38	2.0	0.047	21.2	LOS C	0.9	6.7	0.60	0.68	0.60	43.6
8	T1	622	2.0	2.202	1127.0	LOS F	263.8	1877.9	1.00	4.47	6.59	3.0
9	R2	329	2.0	2.202	1132.6	LOS F	263.8	1877.9	1.00	4.47	6.59	3.0
Approach		989	2.0	2.202	1086.6	LOS F	263.8	1877.9	0.98	4.33	6.36	3.1
West: Dane Rd												
10	L2	160	2.0	1.110	162.9	LOS F	56.0	398.6	1.00	1.84	2.43	16.3
11	T1	400	2.0	1.110	157.3	LOS F	56.0	398.6	1.00	1.84	2.43	16.4
12	R2	92	2.0	0.307	42.1	LOS D	3.6	26.0	0.92	0.77	0.92	35.0
Approach		652	2.0	1.110	142.5	LOS F	56.0	398.6	0.99	1.69	2.22	17.7
All Vehicles		3427	2.0	2.202	490.3	LOS F	263.8	1877.9	0.88	2.39	3.48	6.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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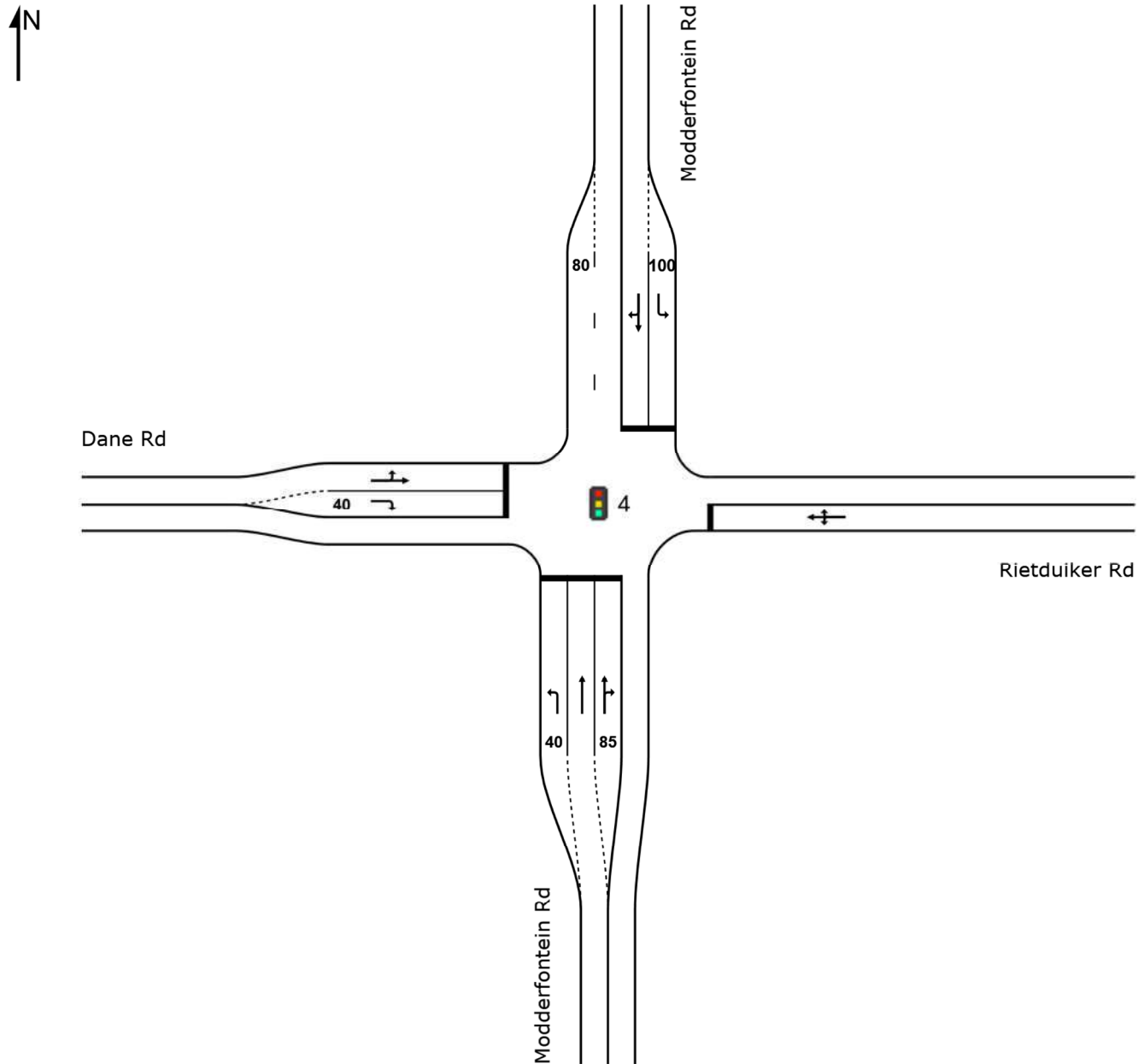
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:24:15

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 4 [04_2027 PM + Lat]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [04_2027 PM + Lat]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	115	2.0	0.133	20.1	LOS C	2.8	20.2	0.60	0.72	0.60	44.1
2	T1	736	2.0	0.949	50.5	LOS D	41.4	294.5	0.93	1.16	1.33	32.8
3	R2	309	2.0	1.098	138.6	LOS F	24.2	172.3	1.00	1.37	2.47	16.2
Approach		1160	2.0	1.098	70.9	LOS E	41.4	294.5	0.91	1.17	1.56	26.3
East: Rietduiker Rd												
4	L2	226	2.0	2.079	1010.3	LOS F	149.7	1065.9	1.00	3.67	6.33	3.3
5	T1	262	2.0	2.079	1004.8	LOS F	149.7	1065.9	1.00	3.67	6.33	3.4
6	R2	85	2.0	2.079	1010.3	LOS F	149.7	1065.9	1.00	3.67	6.33	3.3
Approach		572	2.0	2.079	1007.8	LOS F	149.7	1065.9	1.00	3.67	6.33	3.4
North: Modderfontein Rd												
7	L2	96	2.0	0.166	29.9	LOS C	3.1	21.8	0.76	0.74	0.76	39.5
8	T1	600	2.0	1.969	909.2	LOS F	181.9	1295.5	1.00	3.89	6.07	3.7
9	R2	122	2.0	1.969	914.8	LOS F	181.9	1295.5	1.00	3.89	6.07	3.7
Approach		818	2.0	1.969	807.1	LOS F	181.9	1295.5	0.97	3.52	5.45	4.1
West: Dane Rd												
10	L2	190	2.0	1.150	194.6	LOS F	81.6	580.9	1.00	2.06	2.66	14.2
11	T1	530	2.0	1.150	189.1	LOS F	81.6	580.9	1.00	2.06	2.66	14.3
12	R2	240	2.0	0.473	35.1	LOS D	8.9	63.4	0.88	0.81	0.88	37.5
Approach		961	2.0	1.150	151.6	LOS F	81.6	580.9	0.97	1.74	2.21	16.9
All Vehicles		3511	2.0	2.079	417.3	LOS F	181.9	1295.5	0.96	2.28	3.42	7.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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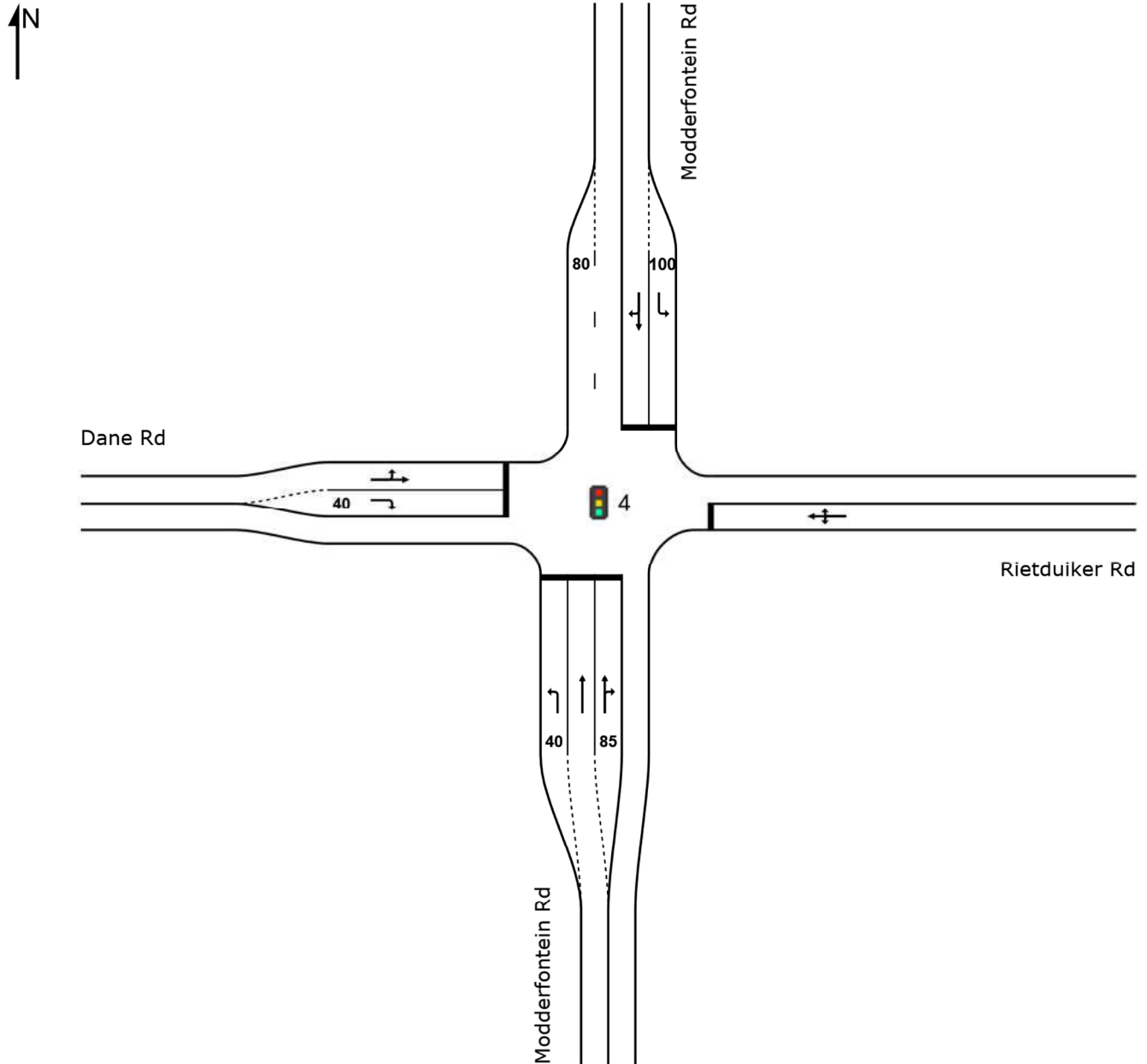
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:25:10

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 4 [05_2027 AM + Lat + Dev]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [05_2027 AM + Lat + Dev]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	353	2.0	0.318	15.0	LOS B	7.6	54.0	0.53	0.73	0.53	47.0
2	T1	679	2.0	0.756	12.2	LOS B	18.4	131.2	0.66	0.60	0.67	50.0
3	R2	264	2.0	0.780	26.0	LOS C	7.2	51.6	0.89	0.88	1.07	40.9
Approach		1296	2.0	0.780	15.8	LOS B	18.4	131.2	0.67	0.69	0.71	47.0
East: Rietduiker Rd												
4	L2	101	2.0	2.023	960.4	LOS F	146.9	1045.8	1.00	3.63	6.20	3.5
5	T1	403	2.0	2.023	954.8	LOS F	146.9	1045.8	1.00	3.63	6.20	3.5
6	R2	69	2.0	2.023	960.4	LOS F	146.9	1045.8	1.00	3.63	6.20	3.5
Approach		573	2.0	2.023	956.5	LOS F	146.9	1045.8	1.00	3.63	6.20	3.5
North: Modderfontein Rd												
7	L2	38	2.0	0.044	19.4	LOS B	0.9	6.3	0.57	0.68	0.57	44.5
8	T1	763	2.0	2.799	1667.6	LOS F	374.1	2663.6	1.00	5.04	7.53	2.1
9	R2	419	2.0	2.799	1673.1	LOS F	374.1	2663.6	1.00	5.04	7.53	2.1
Approach		1220	2.0	2.799	1618.5	LOS F	374.1	2663.6	0.99	4.91	7.31	2.2
West: Dane Rd												
10	L2	237	2.0	1.565	555.0	LOS F	132.6	944.3	1.00	3.27	4.80	5.8
11	T1	429	2.0	1.565	549.4	LOS F	132.6	944.3	1.00	3.27	4.80	5.9
12	R2	261	2.0	1.114	167.3	LOS F	25.6	182.5	1.00	1.50	2.59	15.6
Approach		927	2.0	1.565	443.1	LOS F	132.6	944.3	1.00	2.77	4.18	7.1
All Vehicles		4016	2.0	2.799	735.7	LOS F	374.1	2663.6	0.89	2.87	4.30	4.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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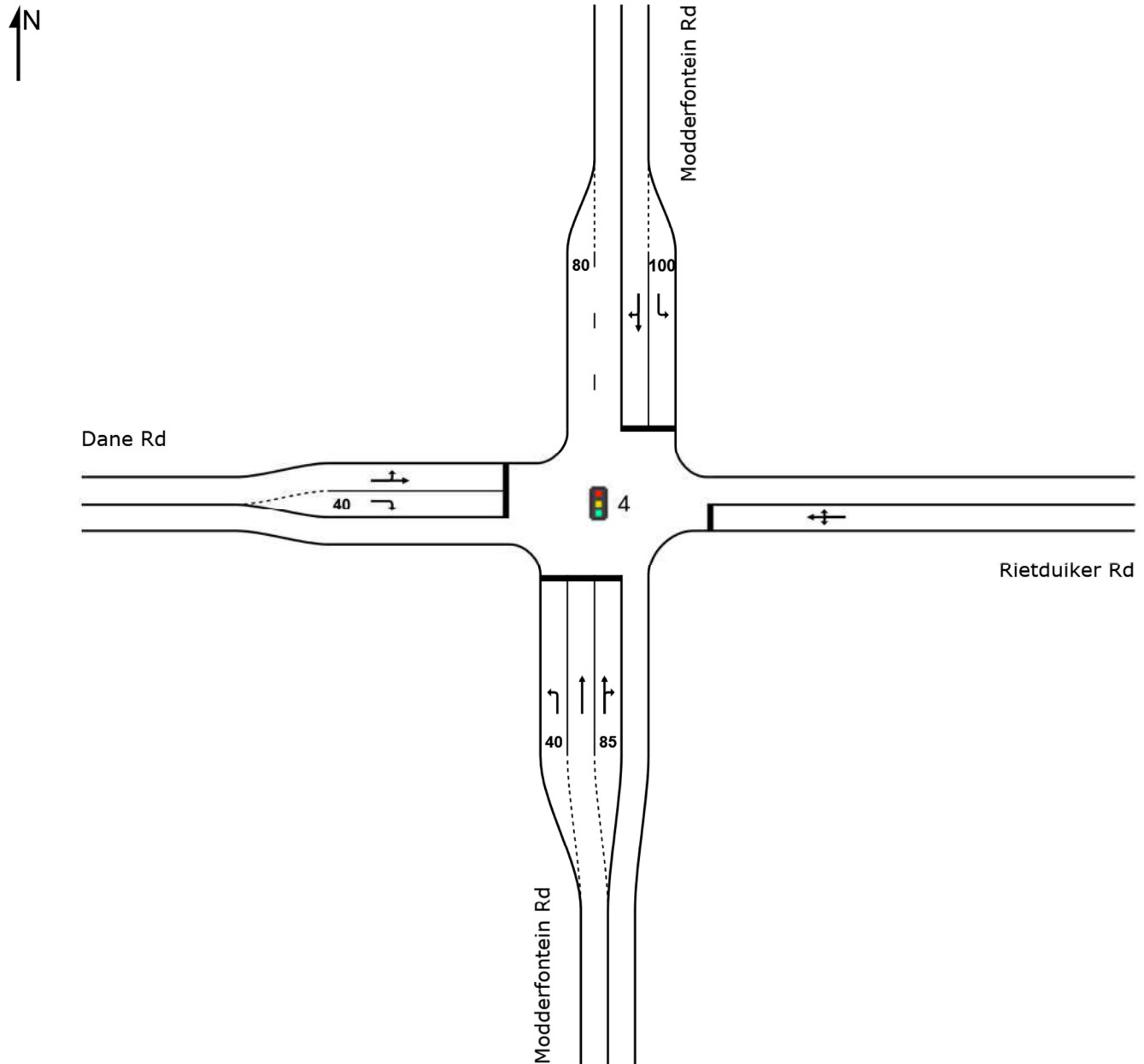
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:26:33

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 4 [06_2027 PM + Lat + Dev]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [06_2027 PM + Lat + Dev]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	115	2.0	0.114	16.1	LOS B	2.4	17.2	0.51	0.70	0.51	46.4
2	T1	909	2.0	1.003	76.6	LOS E	68.0	484.1	1.00	1.42	1.64	26.5
3	R2	309	2.0	1.477	460.1	LOS F	49.5	352.2	1.00	2.01	4.48	6.6
Approach		1332	2.0	1.477	160.2	LOS F	68.0	484.1	0.96	1.49	2.20	15.9
East: Rietduiker Rd												
4	L2	226	2.0	2.207	1125.4	LOS F	165.5	1178.3	1.00	3.81	6.60	3.0
5	T1	296	2.0	2.207	1119.9	LOS F	165.5	1178.3	1.00	3.81	6.60	3.0
6	R2	85	2.0	2.207	1125.4	LOS F	165.5	1178.3	1.00	3.81	6.60	3.0
Approach		606	2.0	2.207	1122.7	LOS F	165.5	1178.3	1.00	3.81	6.60	3.0
North: Modderfontein Rd												
7	L2	96	2.0	0.126	23.1	LOS C	2.6	18.5	0.65	0.72	0.65	42.6
8	T1	709	2.0	5.061	3683.3	LOS F	352.7	2511.4	1.00	4.48	9.09	1.0
9	R2	229	2.0	5.061	3688.9	LOS F	352.7	2511.4	1.00	4.48	9.09	1.0
Approach		1033	2.0	5.061	3345.3	LOS F	352.7	2511.4	0.97	4.13	8.30	1.1
West: Dane Rd												
10	L2	310	2.0	1.745	715.8	LOS F	194.9	1387.4	1.00	3.84	5.43	4.6
11	T1	551	2.0	1.745	710.3	LOS F	194.9	1387.4	1.00	3.84	5.43	4.6
12	R2	370	2.0	1.384	397.2	LOS F	61.4	437.0	1.00	2.14	4.07	7.8
Approach		1231	2.0	1.745	617.5	LOS F	194.9	1387.4	1.00	3.33	5.02	5.3
All Vehicles		4202	2.0	5.061	1216.0	LOS F	352.7	2511.4	0.98	3.01	5.16	2.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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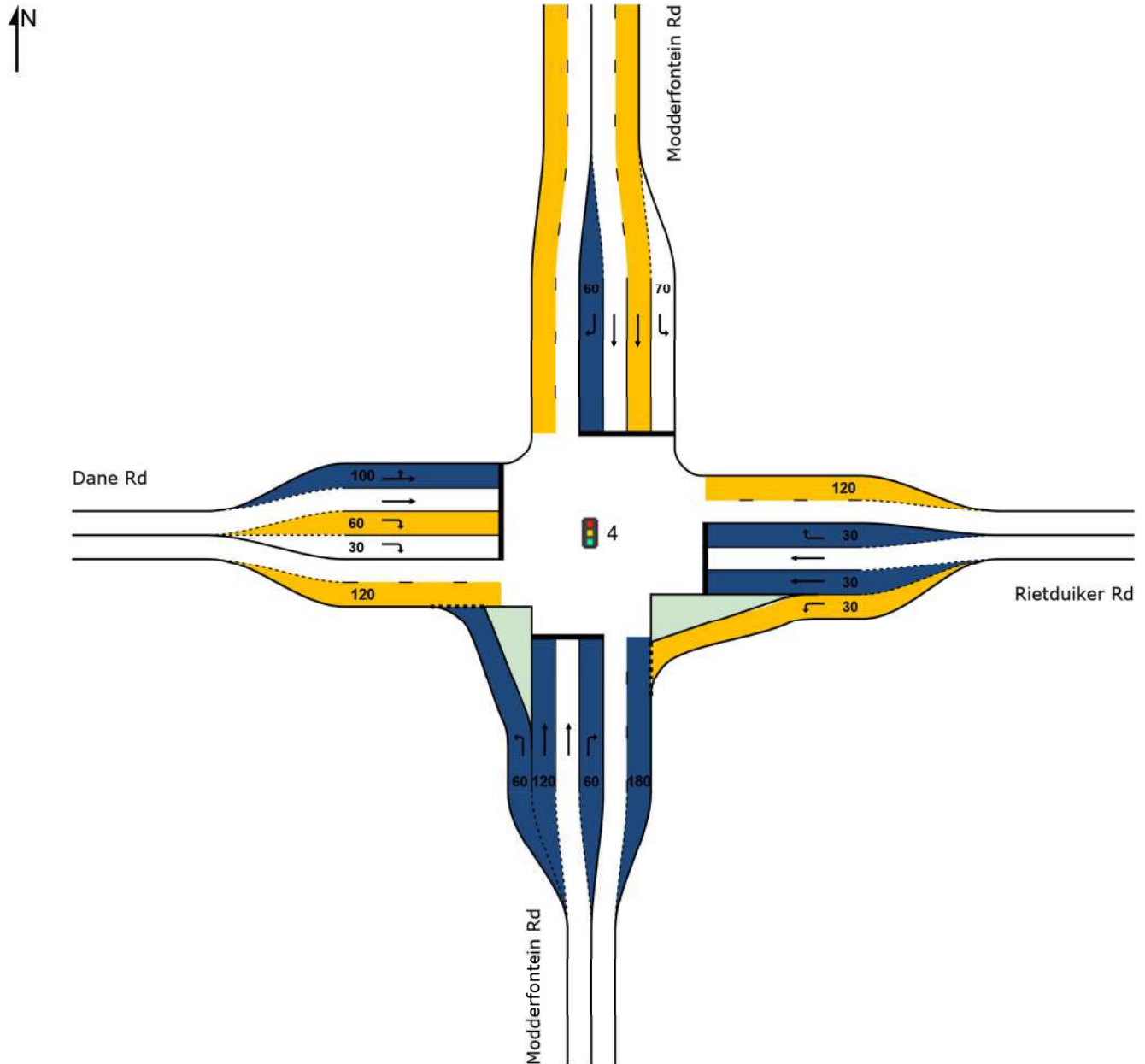
SITE LAYOUT

 **Site: 4 [07_2027 AM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [07_2027 AM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	353	2.0	0.728	22.3	LOS C	8.2	58.1	0.97	0.88	1.08	43.6
2	T1	679	2.0	0.269	5.7	LOS A	4.6	32.4	0.49	0.42	0.49	54.9
3	R2	264	2.0	0.654	18.4	LOS B	6.2	44.2	0.77	0.83	0.83	45.6
Approach		1296	2.0	0.728	12.8	LOS B	8.2	58.1	0.68	0.63	0.72	49.4
East: Rietduiker Rd												
4	L2	101	2.0	0.136	7.9	LOS A	0.6	4.5	0.40	0.65	0.40	52.5
5	T1	403	2.0	0.538	25.0	LOS C	5.6	39.8	0.95	0.77	0.95	42.6
6	R2	69	2.0	0.620	40.2	LOS D	2.2	16.0	1.00	0.77	1.15	35.9
Approach		573	2.0	0.620	23.8	LOS C	5.6	39.8	0.86	0.75	0.88	43.1
North: Modderfontein Rd												
7	L2	38	2.0	0.031	10.3	LOS B	0.4	3.0	0.41	0.65	0.41	50.0
8	T1	763	2.0	0.303	5.8	LOS A	5.3	37.4	0.50	0.44	0.50	54.8
9	R2	419	2.0	0.927	50.6	LOS D	19.8	141.2	0.99	1.22	1.69	32.6
Approach		1220	2.0	0.927	21.3	LOS C	19.8	141.2	0.67	0.71	0.91	44.3
West: Dane Rd												
10	L2	237	2.0	0.904	43.5	LOS D	12.1	86.1	1.00	1.12	1.57	35.0
11	T1	429	2.0	0.904	37.7	LOS D	12.5	89.0	1.00	1.12	1.56	36.9
12	R2	261	2.0	0.762	38.9	LOS D	4.3	30.6	1.00	0.91	1.33	36.3
Approach		927	2.0	0.904	39.5	LOS D	12.5	89.0	1.00	1.06	1.50	36.2
All Vehicles		4016	2.0	0.927	23.1	LOS C	19.8	141.2	0.77	0.77	0.98	43.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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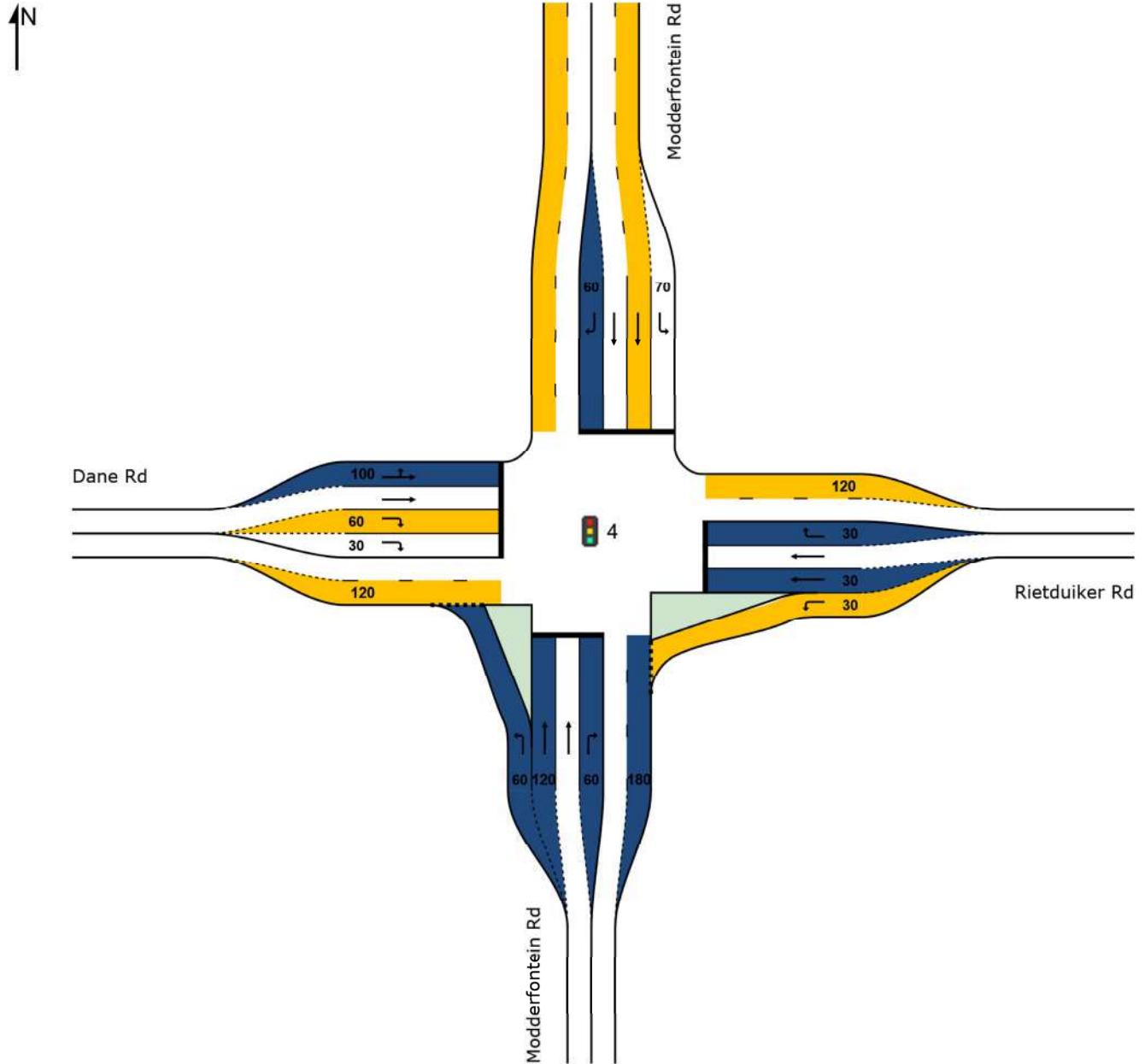
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:33:52

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 4 [08_2027 PM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Dane Rd
Site Category: -
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 4 [08_2027 PM + Lat + Dev (Upgraded)]**

Modderfontein Rd/Dane Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Modderfontein Rd												
1	L2	115	2.0	0.141	11.2	LOS B	1.4	9.6	0.58	0.69	0.58	50.1
2	T1	909	2.0	0.404	8.4	LOS A	7.7	54.9	0.62	0.54	0.62	52.8
3	R2	309	2.0	0.848	35.5	LOS D	11.4	81.1	0.94	1.07	1.39	37.6
Approach		1332	2.0	0.848	14.9	LOS B	11.4	81.1	0.69	0.68	0.79	48.1
East: Rietduiker Rd												
4	L2	226	2.0	0.317	8.9	LOS A	1.7	12.4	0.51	0.70	0.51	51.7
5	T1	296	2.0	0.289	20.1	LOS C	3.6	25.6	0.85	0.68	0.85	45.2
6	R2	85	2.0	0.661	39.6	LOS D	2.7	19.6	1.00	0.81	1.19	36.1
Approach		606	2.0	0.661	18.7	LOS B	3.6	25.6	0.75	0.70	0.77	45.7
North: Modderfontein Rd												
7	L2	96	2.0	0.090	12.4	LOS B	1.3	9.4	0.50	0.69	0.50	48.7
8	T1	709	2.0	0.315	7.9	LOS A	5.7	40.2	0.58	0.50	0.58	53.2
9	R2	229	2.0	0.742	27.0	LOS C	6.9	49.1	0.89	0.94	1.12	41.2
Approach		1033	2.0	0.742	12.6	LOS B	6.9	49.1	0.64	0.61	0.69	49.5
West: Dane Rd												
10	L2	310	2.0	0.857	36.5	LOS D	14.4	102.2	1.00	1.03	1.34	37.4
11	T1	551	2.0	0.857	30.8	LOS C	14.8	105.5	1.00	1.04	1.33	39.6
12	R2	370	2.0	0.670	32.3	LOS C	5.5	39.5	0.97	0.87	1.10	38.9
Approach		1231	2.0	0.857	32.7	LOS C	14.8	105.5	0.99	0.99	1.26	38.8
All Vehicles		4202	2.0	0.857	20.1	LOS C	14.8	105.5	0.77	0.76	0.90	44.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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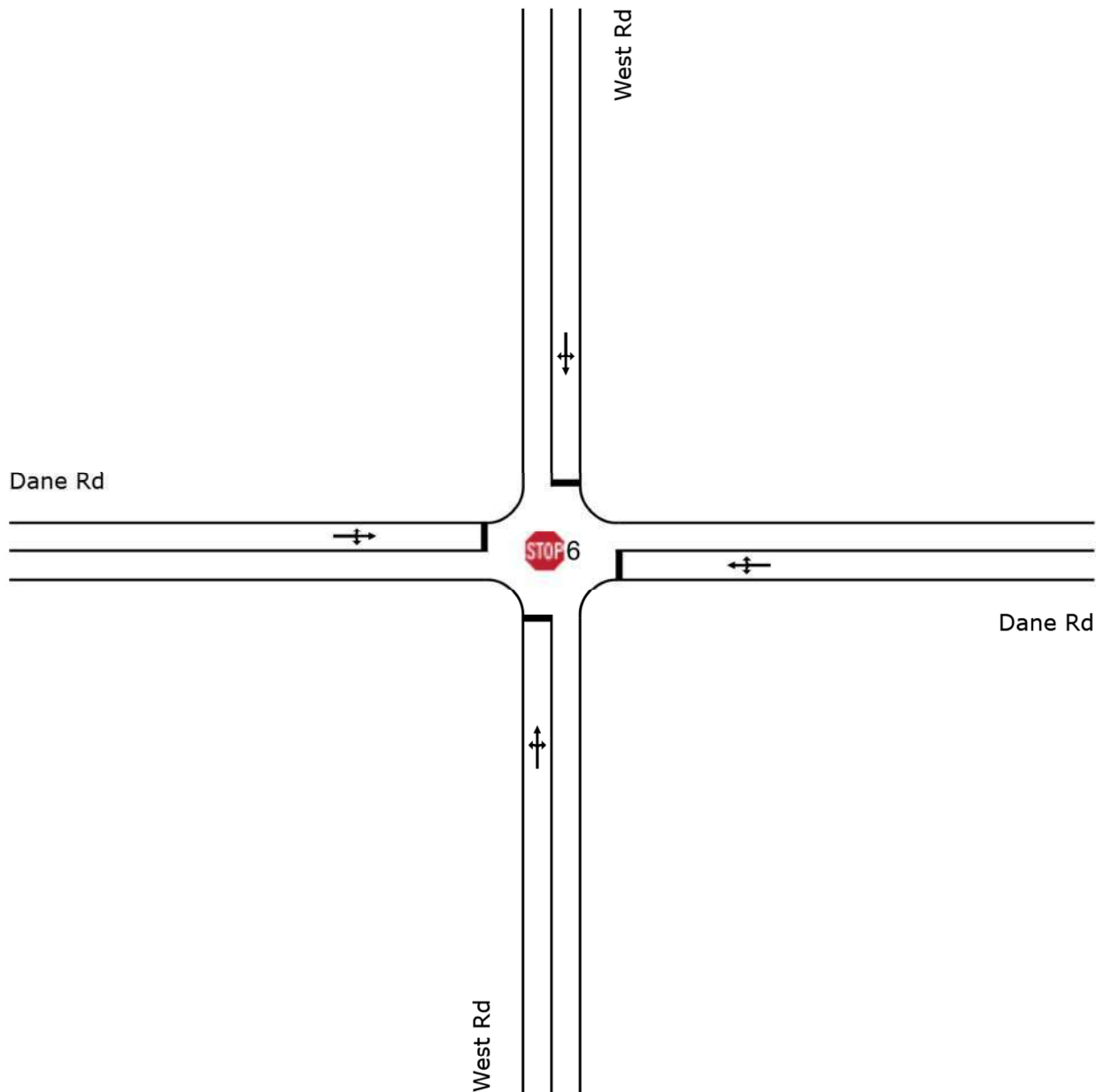
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 12:35:14

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\04_Modderfontein Rd_Dane Rd.sip8

SITE LAYOUT

 **Site: 6 [01_2022 AM]**

Dane Rd/West Rd
Site Category: -
Stop (All-Way)



MOVEMENT SUMMARY



Site: 6 [01_2022 AM]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	15	2.0	0.093	11.6	LOS B	0.3	2.0	0.69	1.27	1.79	50.4
2	T1	39	2.0	0.093	11.3	LOS B	0.3	2.0	0.69	1.27	1.79	50.2
3	R2	13	2.0	0.093	11.0	LOS B	0.3	2.0	0.69	1.27	1.79	50.0
Approach		67	2.0	0.093	11.3	LOS B	0.3	2.0	0.69	1.27	1.79	50.2
East: Dane Rd												
4	L2	15	2.0	1.484	461.9	LOS F	153.5	1092.9	1.00	14.89	61.74	7.0
5	T1	777	2.0	1.484	461.6	LOS F	153.5	1092.9	1.00	14.89	61.74	7.0
6	R2	276	2.0	1.484	461.4	LOS F	153.5	1092.9	1.00	14.89	61.74	7.0
Approach		1069	2.0	1.484	461.5	LOS F	153.5	1092.9	1.00	14.89	61.74	7.0
North: West Rd												
7	L2	67	2.0	0.176	12.2	LOS B	0.6	4.0	0.71	1.28	1.92	50.0
8	T1	17	2.0	0.176	11.8	LOS B	0.6	4.0	0.71	1.28	1.92	49.7
9	R2	43	2.0	0.176	11.6	LOS B	0.6	4.0	0.71	1.28	1.92	49.5
Approach		127	2.0	0.176	11.9	LOS B	0.6	4.0	0.71	1.28	1.92	49.8
West: Dane Rd												
10	L2	41	2.0	0.684	21.5	LOS C	4.5	32.3	0.91	1.71	3.96	44.7
11	T1	442	2.0	0.684	21.2	LOS C	4.5	32.3	0.91	1.71	3.96	44.5
12	R2	10	2.0	0.684	21.0	LOS C	4.5	32.3	0.91	1.71	3.96	44.3
Approach		492	2.0	0.684	21.2	LOS C	4.5	32.3	0.91	1.71	3.96	44.5
All Vehicles		1755	2.0	1.484	288.4	LOS F	153.5	1092.9	0.94	9.69	38.92	10.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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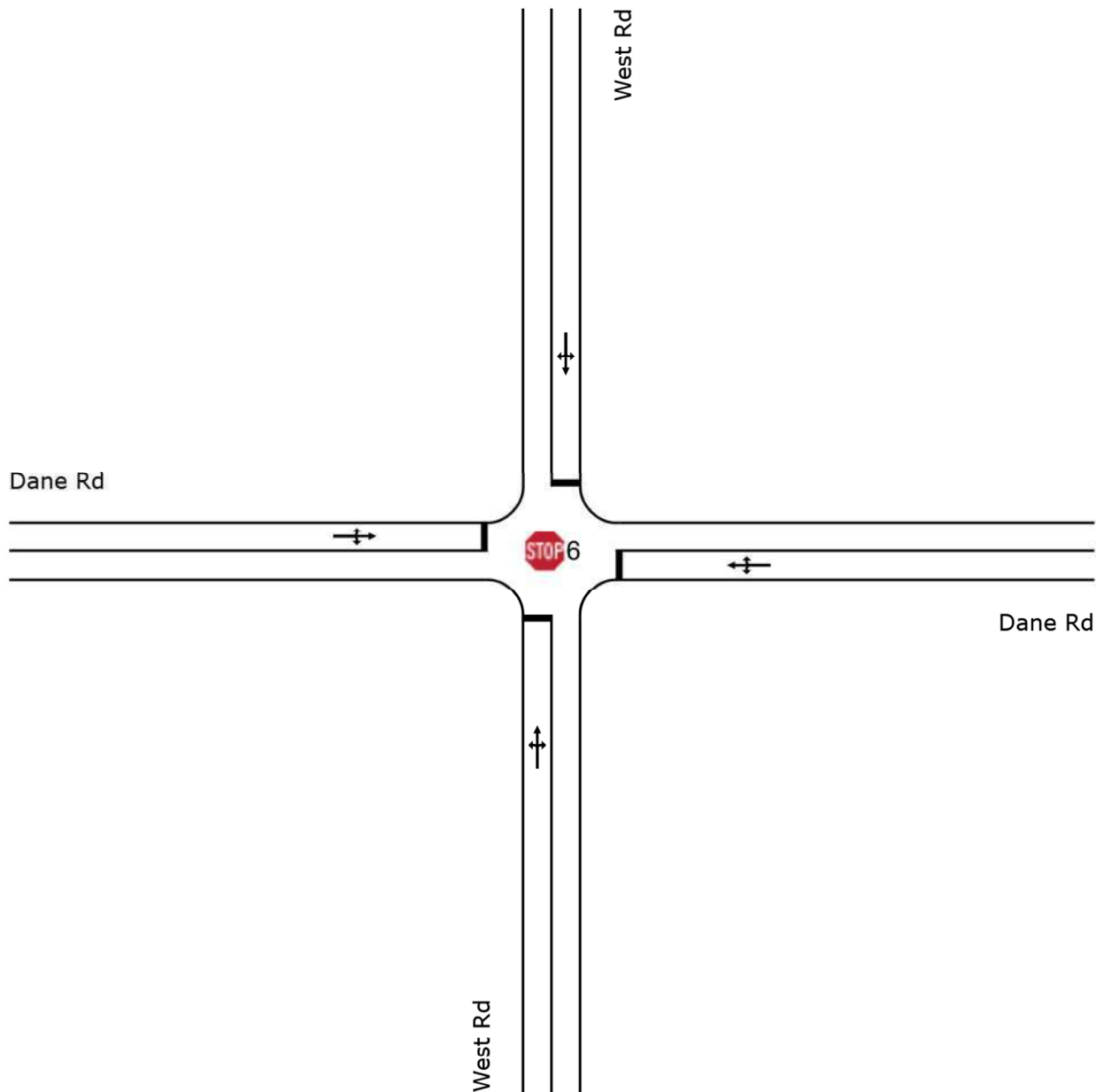
Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 10:47:18

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SITE LAYOUT

 **Site: 6 [02_2022 PM]**

Dane Rd/West Rd
Site Category: -
Stop (All-Way)



MOVEMENT SUMMARY



Site: 6 [02_2022 PM]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	12	2.0	0.074	11.5	LOS B	0.2	1.5	0.68	1.26	1.76	50.5
2	T1	18	2.0	0.074	11.2	LOS B	0.2	1.5	0.68	1.26	1.76	50.2
3	R2	22	2.0	0.074	10.9	LOS B	0.2	1.5	0.68	1.26	1.76	50.0
Approach		53	2.0	0.074	11.1	LOS B	0.2	1.5	0.68	1.26	1.76	50.2
East: Dane Rd												
4	L2	6	2.0	0.703	22.4	LOS C	4.9	34.7	0.92	1.75	4.15	44.2
5	T1	385	2.0	0.703	22.1	LOS C	4.9	34.7	0.92	1.75	4.15	44.0
6	R2	115	2.0	0.703	21.9	LOS C	4.9	34.7	0.92	1.75	4.15	43.8
Approach		506	2.0	0.703	22.1	LOS C	4.9	34.7	0.92	1.75	4.15	43.9
North: West Rd												
7	L2	152	2.0	0.312	13.4	LOS B	1.1	8.2	0.75	1.33	2.20	49.2
8	T1	27	2.0	0.312	13.0	LOS B	1.1	8.2	0.75	1.33	2.20	49.0
9	R2	46	2.0	0.312	12.8	LOS B	1.1	8.2	0.75	1.33	2.20	48.7
Approach		224	2.0	0.312	13.2	LOS B	1.1	8.2	0.75	1.33	2.20	49.1
West: Dane Rd												
10	L2	56	2.0	1.046	103.4	LOS F	32.8	233.5	1.00	5.04	18.65	22.3
11	T1	687	2.0	1.046	103.1	LOS F	32.8	233.5	1.00	5.04	18.65	22.3
12	R2	10	2.0	1.046	102.8	LOS F	32.8	233.5	1.00	5.04	18.65	22.2
Approach		753	2.0	1.046	103.1	LOS F	32.8	233.5	1.00	5.04	18.65	22.3
All Vehicles		1537	2.0	1.046	60.1	LOS F	32.8	233.5	0.93	3.28	10.89	30.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

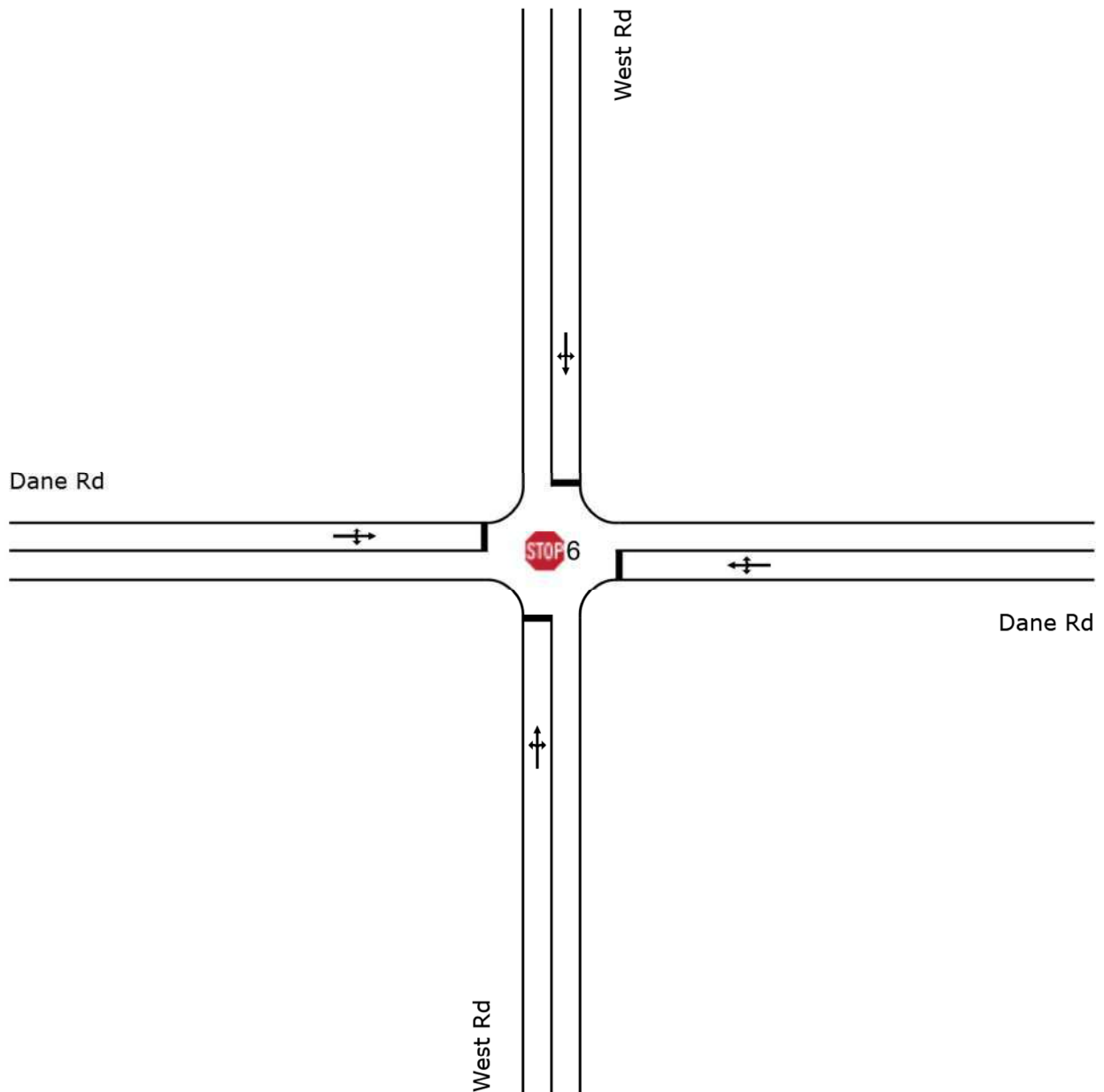
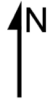


Site: 6 [03_2027 AM + Lat]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 6 [03_2027 AM + Lat]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	17	2.0	0.108	11.7	LOS B	0.3	2.3	0.69	1.27	1.81	50.4
2	T1	45	2.0	0.108	11.4	LOS B	0.3	2.3	0.69	1.27	1.81	50.1
3	R2	15	2.0	0.108	11.1	LOS B	0.3	2.3	0.69	1.27	1.81	49.9
Approach		77	2.0	0.108	11.4	LOS B	0.3	2.3	0.69	1.27	1.81	50.1
East: Dane Rd												
4	L2	17	2.0	1.726	676.5	LOS F	225.7	1607.0	1.00	18.63	78.09	4.9
5	T1	904	2.0	1.726	676.2	LOS F	225.7	1607.0	1.00	18.63	78.09	4.9
6	R2	322	2.0	1.726	676.0	LOS F	225.7	1607.0	1.00	18.63	78.09	4.9
Approach		1243	2.0	1.726	676.1	LOS F	225.7	1607.0	1.00	18.63	78.09	4.9
North: West Rd												
7	L2	77	2.0	0.205	12.4	LOS B	0.7	4.8	0.72	1.29	1.97	49.8
8	T1	20	2.0	0.205	12.0	LOS B	0.7	4.8	0.72	1.29	1.97	49.6
9	R2	49	2.0	0.205	11.8	LOS B	0.7	4.8	0.72	1.29	1.97	49.4
Approach		147	2.0	0.205	12.1	LOS B	0.7	4.8	0.72	1.29	1.97	49.6
West: Dane Rd												
10	L2	47	2.0	0.793	28.6	LOS D	7.1	50.8	0.97	2.01	5.38	41.2
11	T1	513	2.0	0.793	28.3	LOS D	7.1	50.8	0.97	2.01	5.38	41.0
12	R2	11	2.0	0.793	28.0	LOS D	7.1	50.8	0.97	2.01	5.38	40.9
Approach		571	2.0	0.793	28.3	LOS D	7.1	50.8	0.97	2.01	5.38	41.0
All Vehicles		2039	2.0	1.726	421.5	LOS F	225.7	1607.0	0.96	12.07	49.33	7.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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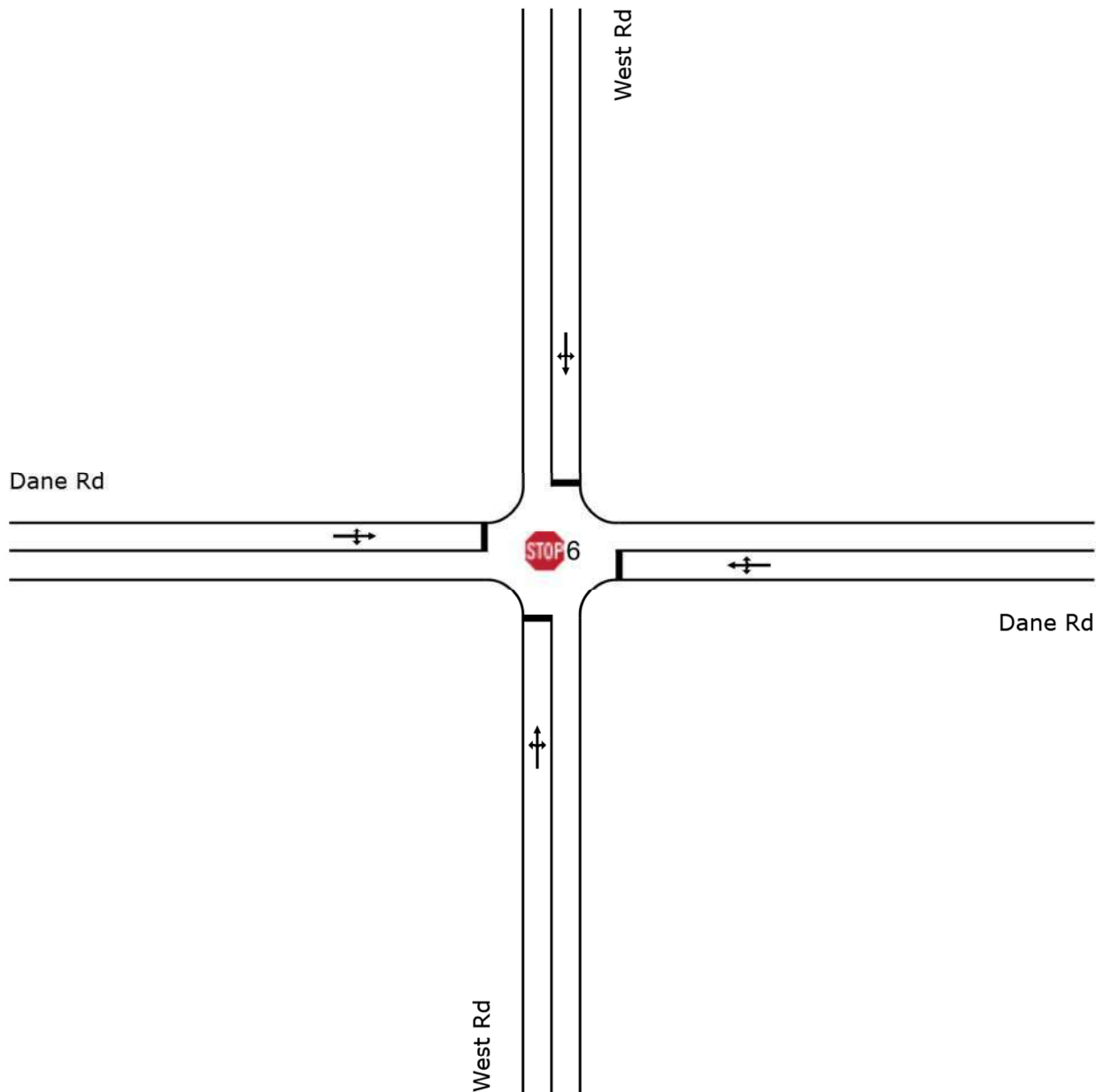
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SITE LAYOUT

 Site: 6 [04_2027 PM + Lat]

Dane Rd/West Rd
Site Category: -
Stop (All-Way)



MOVEMENT SUMMARY



Site: 6 [04_2027 PM + Lat]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	14	2.0	0.086	11.6	LOS B	0.3	1.8	0.68	1.26	1.78	50.4
2	T1	21	2.0	0.086	11.2	LOS B	0.3	1.8	0.68	1.26	1.78	50.2
3	R2	27	2.0	0.086	11.0	LOS B	0.3	1.8	0.68	1.26	1.78	50.0
Approach		62	2.0	0.086	11.2	LOS B	0.3	1.8	0.68	1.26	1.78	50.1
East: Dane Rd												
4	L2	7	2.0	0.832	32.7	LOS D	8.6	61.3	0.99	2.19	6.19	39.3
5	T1	455	2.0	0.832	32.4	LOS D	8.6	61.3	0.99	2.19	6.19	39.2
6	R2	137	2.0	0.832	32.2	LOS D	8.6	61.3	0.99	2.19	6.19	39.0
Approach		599	2.0	0.832	32.4	LOS D	8.6	61.3	0.99	2.19	6.19	39.2
North: West Rd												
7	L2	177	2.0	0.361	13.9	LOS B	1.4	10.0	0.77	1.36	2.33	48.8
8	T1	31	2.0	0.361	13.6	LOS B	1.4	10.0	0.77	1.36	2.33	48.6
9	R2	53	2.0	0.361	13.3	LOS B	1.4	10.0	0.77	1.36	2.33	48.4
Approach		260	2.0	0.361	13.8	LOS B	1.4	10.0	0.77	1.36	2.33	48.7
West: Dane Rd												
10	L2	65	2.0	1.215	229.3	LOS F	75.2	535.3	1.00	9.22	36.92	12.6
11	T1	797	2.0	1.215	228.9	LOS F	75.2	535.3	1.00	9.22	36.92	12.6
12	R2	12	2.0	1.215	228.7	LOS F	75.2	535.3	1.00	9.22	36.92	12.6
Approach		874	2.0	1.215	229.0	LOS F	75.2	535.3	1.00	9.22	36.92	12.6
All Vehicles		1796	2.0	1.215	124.7	LOS F	75.2	535.3	0.95	5.46	20.44	19.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

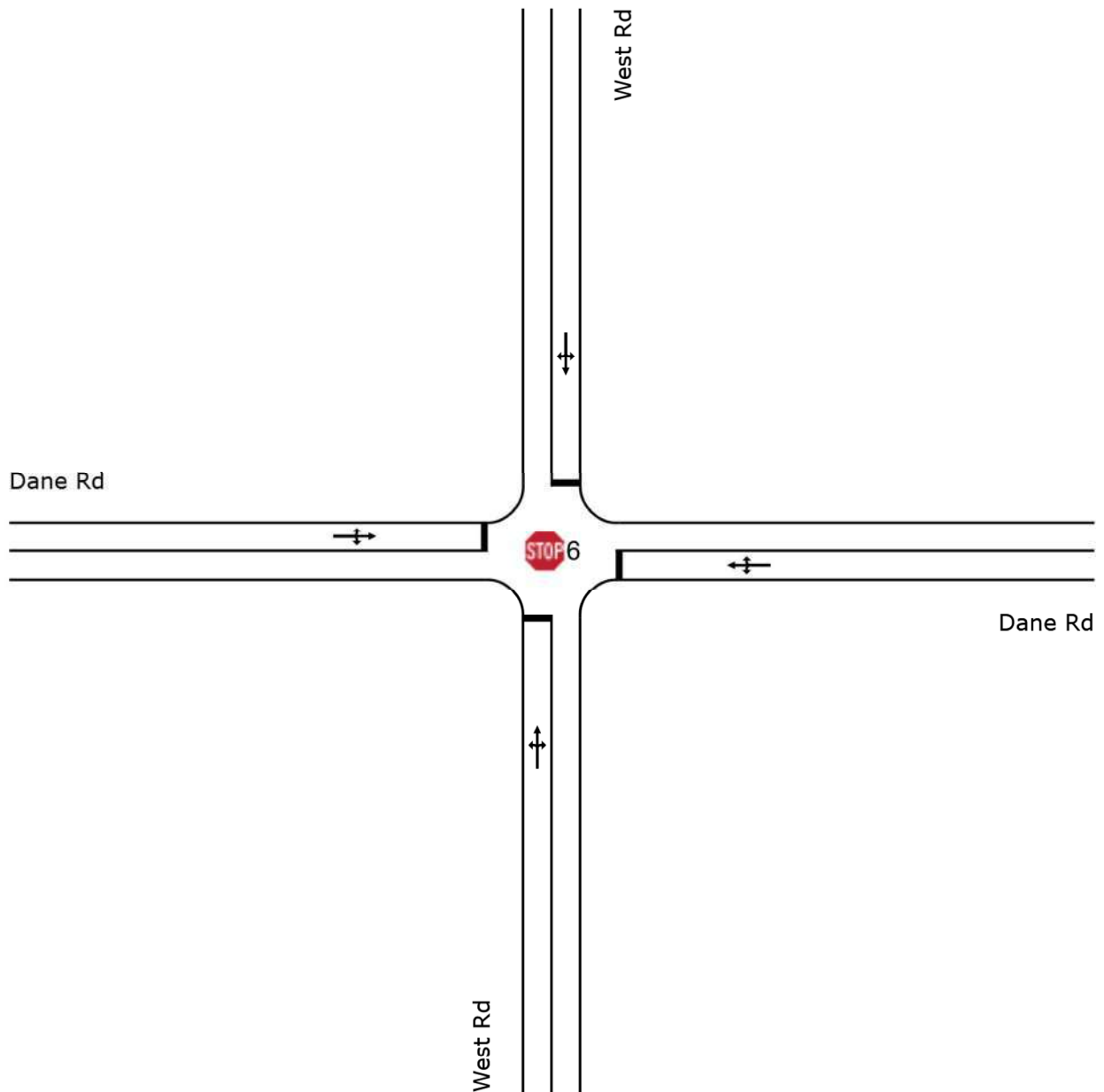


Site: 6 [05_2027 AM + Lat + Dev]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 6 [05_2027 AM + Lat + Dev]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	17	2.0	0.128	11.8	LOS B	0.4	2.8	0.70	1.28	1.84	50.3
2	T1	45	2.0	0.128	11.5	LOS B	0.4	2.8	0.70	1.28	1.84	50.0
3	R2	30	2.0	0.128	11.3	LOS B	0.4	2.8	0.70	1.28	1.84	49.8
Approach		92	2.0	0.128	11.5	LOS B	0.4	2.8	0.70	1.28	1.84	50.0
East: Dane Rd												
4	L2	47	2.0	1.934	861.9	LOS F	288.1	2051.1	1.00	21.13	88.99	3.9
5	T1	1009	2.0	1.934	861.6	LOS F	288.1	2051.1	1.00	21.13	88.99	3.9
6	R2	337	2.0	1.934	861.3	LOS F	288.1	2051.1	1.00	21.13	88.99	3.9
Approach		1392	2.0	1.934	861.5	LOS F	288.1	2051.1	1.00	21.13	88.99	3.9
North: West Rd												
7	L2	85	2.0	0.297	13.2	LOS B	1.1	7.7	0.75	1.33	2.17	49.3
8	T1	20	2.0	0.297	12.9	LOS B	1.1	7.7	0.75	1.33	2.17	49.1
9	R2	109	2.0	0.297	12.6	LOS B	1.1	7.7	0.75	1.33	2.17	48.9
Approach		214	2.0	0.297	12.9	LOS B	1.1	7.7	0.75	1.33	2.17	49.1
West: Dane Rd												
10	L2	76	2.0	0.904	44.8	LOS E	12.8	91.4	1.00	2.71	8.47	34.8
11	T1	563	2.0	0.904	44.5	LOS E	12.8	91.4	1.00	2.71	8.47	34.7
12	R2	11	2.0	0.904	44.3	LOS E	12.8	91.4	1.00	2.71	8.47	34.6
Approach		651	2.0	0.904	44.5	LOS E	12.8	91.4	1.00	2.71	8.47	34.7
All Vehicles		2349	2.0	1.934	524.6	LOS F	288.1	2051.1	0.97	13.44	55.35	6.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

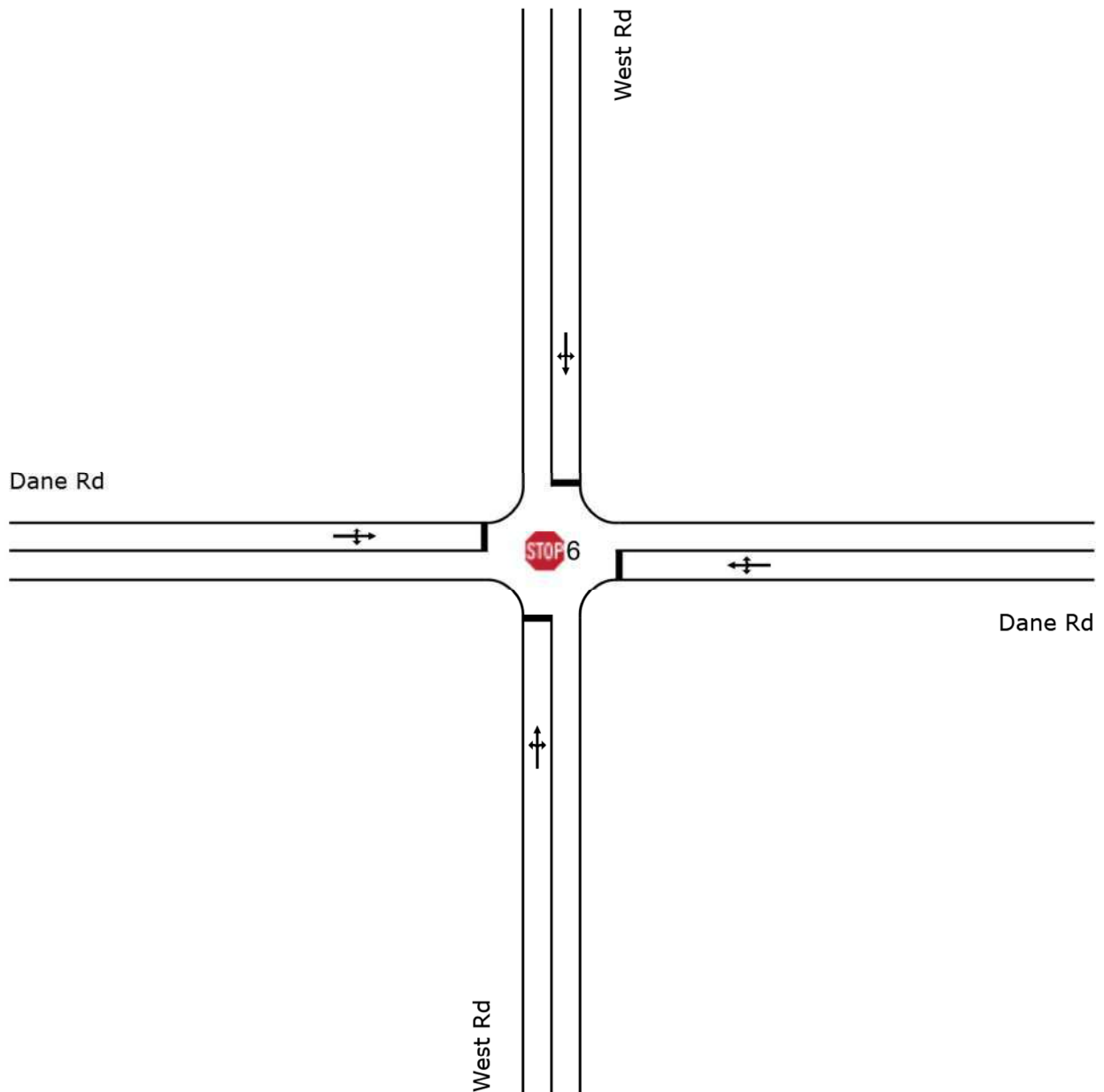
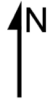


Site: 6 [06_2027 PM + Lat + Dev]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 6 [06_2027 PM + Lat + Dev]

Dane Rd/West Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	14	2.0	0.132	11.9	LOS B	0.4	2.9	0.70	1.27	1.85	50.3
2	T1	21	2.0	0.132	11.5	LOS B	0.4	2.9	0.70	1.27	1.85	50.0
3	R2	59	2.0	0.132	11.3	LOS B	0.4	2.9	0.70	1.27	1.85	49.8
Approach		95	2.0	0.132	11.4	LOS B	0.4	2.9	0.70	1.27	1.85	49.9
East: Dane Rd												
4	L2	28	2.0	0.975	67.1	LOS F	20.5	145.8	1.00	3.63	12.48	28.7
5	T1	528	2.0	0.975	66.7	LOS F	20.5	145.8	1.00	3.63	12.48	28.6
6	R2	147	2.0	0.975	66.5	LOS F	20.5	145.8	1.00	3.63	12.48	28.5
Approach		702	2.0	0.975	66.7	LOS F	20.5	145.8	1.00	3.63	12.48	28.6
North: West Rd												
7	L2	193	2.0	0.442	15.0	LOS C	1.9	13.6	0.80	1.41	2.58	48.2
8	T1	31	2.0	0.442	14.7	LOS B	1.9	13.6	0.80	1.41	2.58	47.9
9	R2	95	2.0	0.442	14.5	LOS B	1.9	13.6	0.80	1.41	2.58	47.7
Approach		318	2.0	0.442	14.8	LOS B	1.9	13.6	0.80	1.41	2.58	48.0
West: Dane Rd												
10	L2	132	2.0	1.468	447.7	LOS F	148.7	1058.7	1.00	14.60	60.47	7.2
11	T1	913	2.0	1.468	447.3	LOS F	148.7	1058.7	1.00	14.60	60.47	7.2
12	R2	12	2.0	1.468	447.1	LOS F	148.7	1058.7	1.00	14.60	60.47	7.2
Approach		1057	2.0	1.468	447.4	LOS F	148.7	1058.7	1.00	14.60	60.47	7.2
All Vehicles		2172	2.0	1.468	241.9	LOS F	148.7	1058.7	0.96	8.54	33.92	12.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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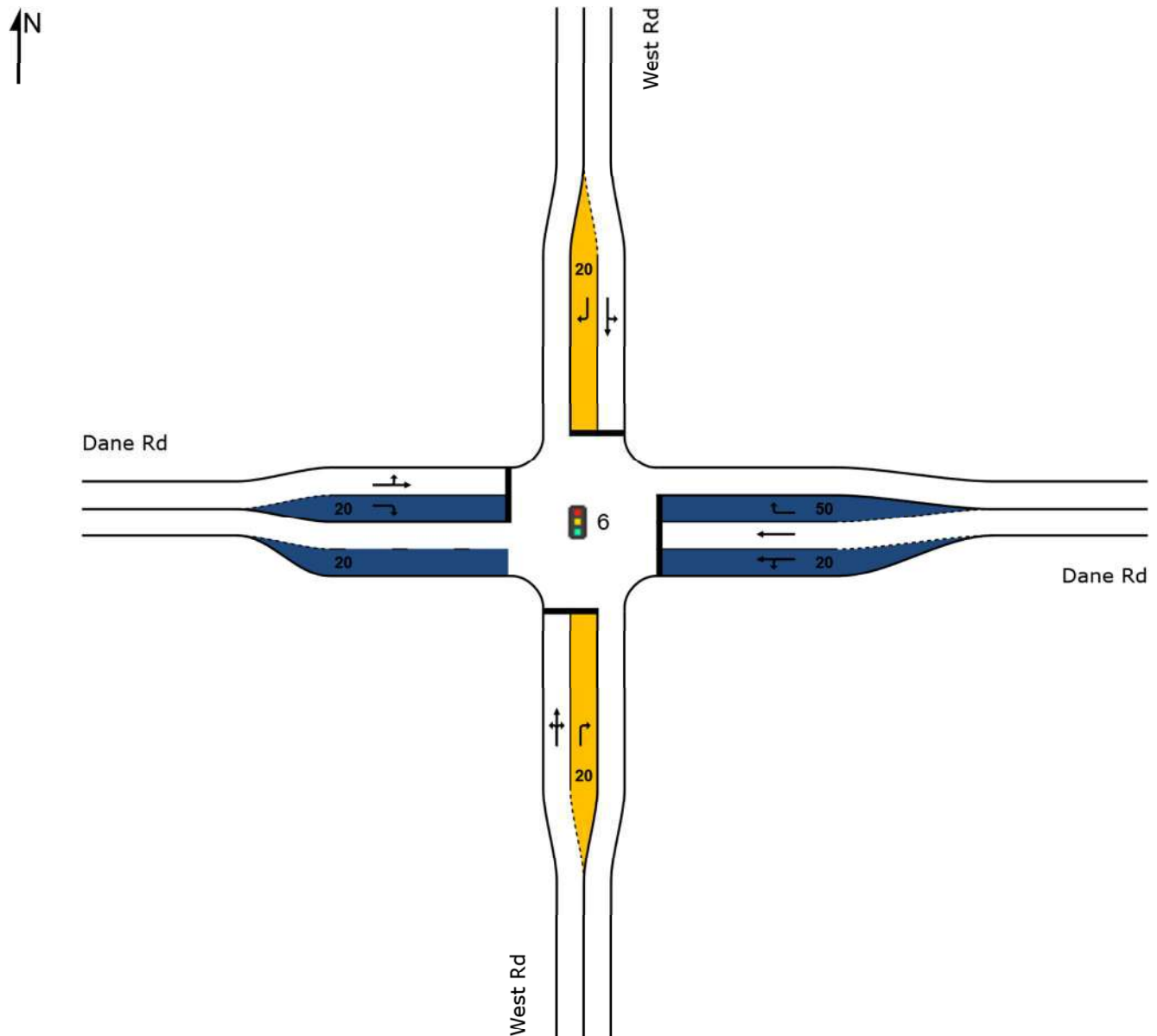
SITE LAYOUT

 **Site: 6 [07_2027 AM + Lat + Dev (Upgraded)]**

Dane Rd/West Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 6 [07_2027 AM + Lat + Dev (Upgraded)]**

Dane Rd/West Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 65 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	17	2.0	0.352	37.6	LOS D	2.0	14.2	0.98	0.74	0.98	38.0
2	T1	45	2.0	0.352	32.1	LOS C	2.0	14.2	0.98	0.74	0.98	38.7
3	R2	30	2.0	0.271	41.0	LOS D	1.0	7.2	1.00	0.70	1.00	35.3
Approach		92	2.0	0.352	36.0	LOS D	2.0	14.2	0.98	0.72	0.98	37.4
East: Dane Rd												
4	L2	47	2.0	0.155	8.6	LOS A	2.1	15.0	0.33	0.37	0.33	54.6
5	T1	1009	2.0	0.743	4.8	LOS A	13.3	94.6	0.49	0.47	0.50	55.5
6	R2	337	2.0	0.730	20.0	LOS C	9.1	64.9	0.76	0.87	0.89	44.1
Approach		1392	2.0	0.743	8.6	LOS A	13.3	94.6	0.55	0.56	0.59	52.2
North: West Rd												
7	L2	85	2.0	0.611	39.2	LOS D	3.5	25.2	1.00	0.81	1.10	36.3
8	T1	20	2.0	0.611	33.6	LOS C	3.5	25.2	1.00	0.81	1.10	36.9
9	R2	109	2.0	0.769	42.6	LOS D	3.9	27.7	1.00	0.89	1.35	34.6
Approach		214	2.0	0.769	40.4	LOS D	3.9	27.7	1.00	0.85	1.23	35.5
West: Dane Rd												
10	L2	76	2.0	0.472	9.6	LOS A	8.4	59.5	0.45	0.44	0.45	54.2
11	T1	563	2.0	0.472	4.0	LOS A	8.4	59.5	0.45	0.44	0.45	55.7
12	R2	11	2.0	0.039	14.0	LOS B	0.2	1.2	0.51	0.65	0.51	47.7
Approach		651	2.0	0.472	4.8	LOS A	8.4	59.5	0.45	0.44	0.45	55.4
All Vehicles		2349	2.0	0.769	11.5	LOS B	13.3	94.6	0.58	0.56	0.62	50.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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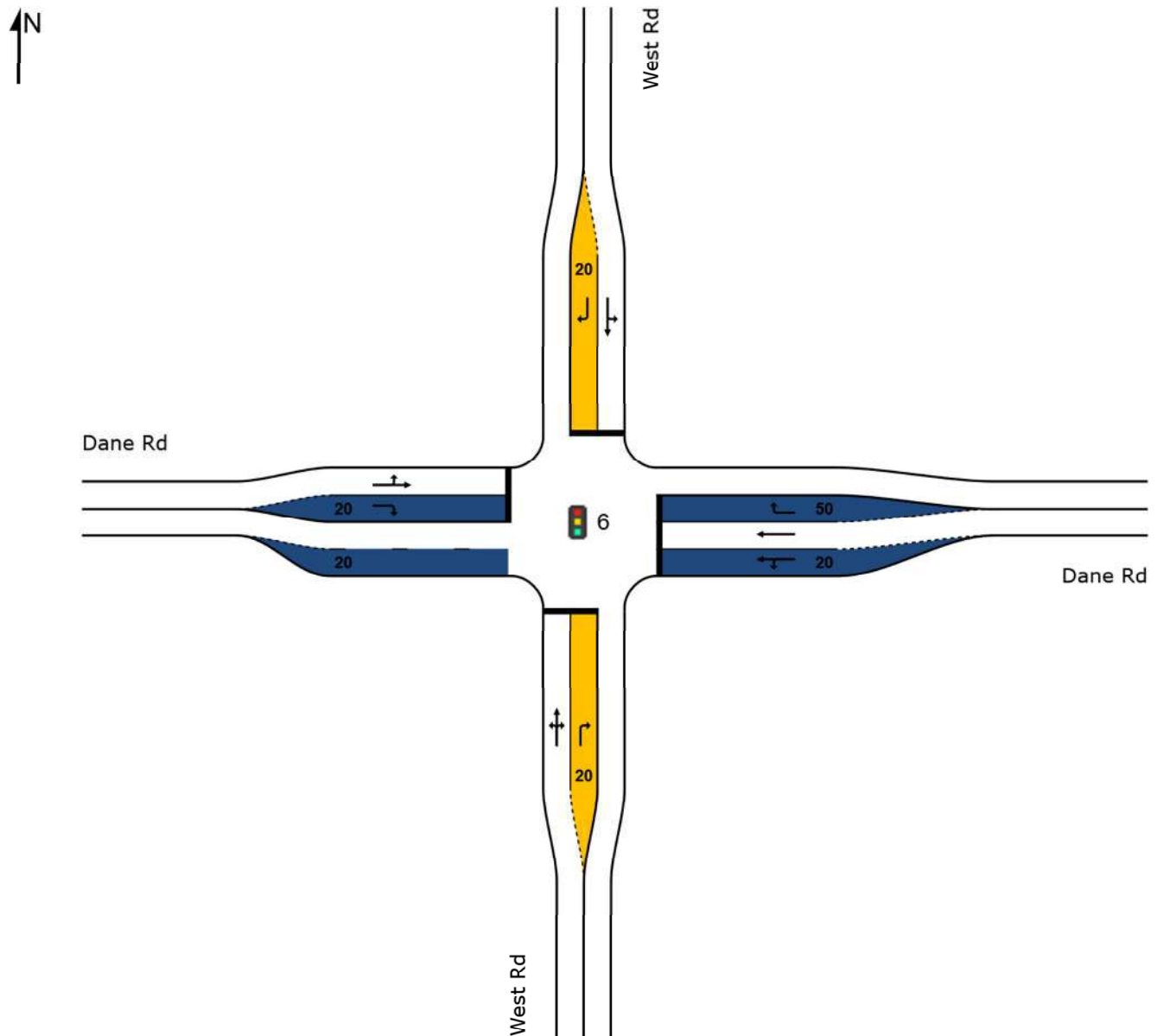
SITE LAYOUT

 **Site: 6 [08_2027 PM + Lat + Dev (Upgraded)]**

Dane Rd/West Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 6 [08_2027 PM + Lat + Dev (Upgraded)]**

Dane Rd/West Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	14	2.0	0.109	32.7	LOS C	1.1	7.5	0.88	0.67	0.88	39.7
2	T1	21	2.0	0.109	27.1	LOS C	1.1	7.5	0.88	0.67	0.88	40.5
3	R2	59	2.0	0.457	42.4	LOS D	2.1	15.1	1.00	0.75	1.00	34.9
Approach		95	2.0	0.457	37.5	LOS D	2.1	15.1	0.95	0.72	0.95	36.7
East: Dane Rd												
4	L2	28	2.0	0.079	10.2	LOS B	1.2	8.7	0.38	0.41	0.38	53.1
5	T1	528	2.0	0.380	5.6	LOS A	6.9	49.2	0.47	0.42	0.47	54.8
6	R2	147	2.0	0.870	51.0	LOS D	6.7	47.9	1.00	1.10	1.66	32.1
Approach		702	2.0	0.870	15.3	LOS B	6.9	49.2	0.57	0.56	0.71	47.7
North: West Rd												
7	L2	193	2.0	0.811	41.0	LOS D	8.3	58.9	0.99	0.96	1.30	35.5
8	T1	31	2.0	0.811	35.4	LOS D	8.3	58.9	0.99	0.96	1.30	36.2
9	R2	95	2.0	0.362	35.4	LOS D	3.0	21.7	0.94	0.77	0.94	37.2
Approach		318	2.0	0.811	38.8	LOS D	8.3	58.9	0.98	0.90	1.19	36.1
West: Dane Rd												
10	L2	132	2.0	0.840	20.1	LOS C	31.0	220.6	0.81	0.83	0.90	46.9
11	T1	913	2.0	0.840	14.5	LOS B	31.0	220.6	0.81	0.83	0.90	48.0
12	R2	12	2.0	0.025	13.1	LOS B	0.2	1.3	0.47	0.65	0.47	48.3
Approach		1057	2.0	0.840	15.2	LOS B	31.0	220.6	0.81	0.83	0.90	47.9
All Vehicles		2172	2.0	0.870	19.6	LOS B	31.0	220.6	0.76	0.75	0.88	45.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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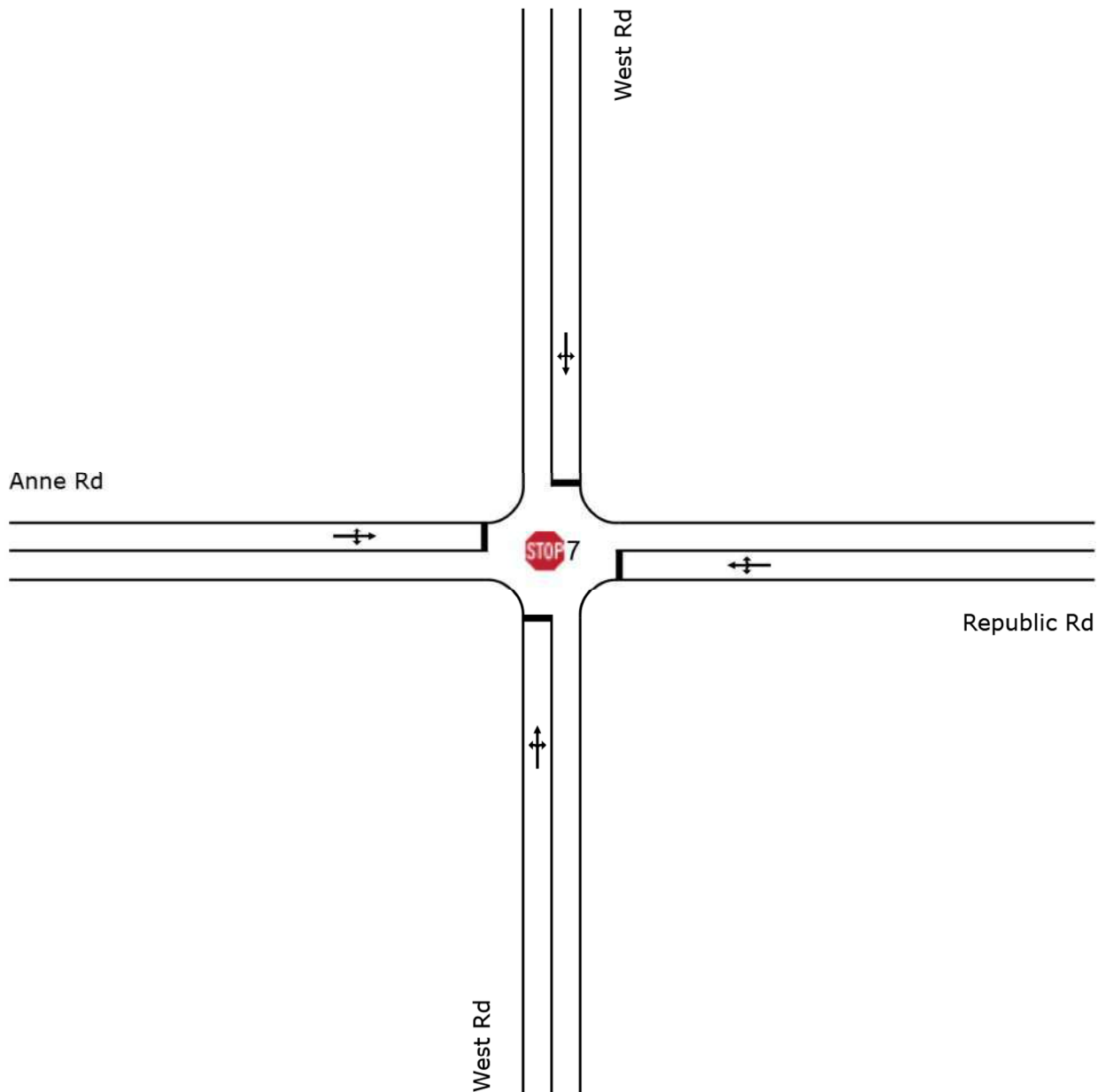
SITE LAYOUT

 **Site: 7 [01_2022 AM]**

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 7 [01_2022 AM]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	5	2.0	0.535	16.8	LOS C	2.6	18.8	0.84	1.50	2.96	47.4
2	T1	362	2.0	0.535	16.4	LOS C	2.6	18.8	0.84	1.50	2.96	47.2
3	R2	19	2.0	0.535	16.2	LOS C	2.6	18.8	0.84	1.50	2.96	47.0
Approach		385	2.0	0.535	16.4	LOS C	2.6	18.8	0.84	1.50	2.96	47.1
East: Republic Rd												
4	L2	29	2.0	0.841	34.0	LOS D	9.0	64.4	0.99	2.24	6.43	38.7
5	T1	13	2.0	0.841	33.6	LOS D	9.0	64.4	0.99	2.24	6.43	38.6
6	R2	564	2.0	0.841	33.4	LOS D	9.0	64.4	0.99	2.24	6.43	38.4
Approach		606	2.0	0.841	33.4	LOS D	9.0	64.4	0.99	2.24	6.43	38.5
North: West Rd												
7	L2	50	2.0	0.224	12.5	LOS B	0.8	5.4	0.73	1.31	2.01	49.8
8	T1	106	2.0	0.224	12.2	LOS B	0.8	5.4	0.73	1.31	2.01	49.6
9	R2	6	2.0	0.224	12.0	LOS B	0.8	5.4	0.73	1.31	2.01	49.4
Approach		162	2.0	0.224	12.3	LOS B	0.8	5.4	0.73	1.31	2.01	49.7
West: Anne Rd												
10	L2	35	2.0	0.061	11.4	LOS B	0.2	1.3	0.68	1.25	1.74	50.4
11	T1	7	2.0	0.061	11.1	LOS B	0.2	1.3	0.68	1.25	1.74	50.1
12	R2	2	2.0	0.061	10.9	LOS B	0.2	1.3	0.68	1.25	1.74	49.9
Approach		44	2.0	0.061	11.3	LOS B	0.2	1.3	0.68	1.25	1.74	50.3
All Vehicles		1197	2.0	0.841	24.3	LOS C	9.0	64.4	0.90	1.84	4.54	42.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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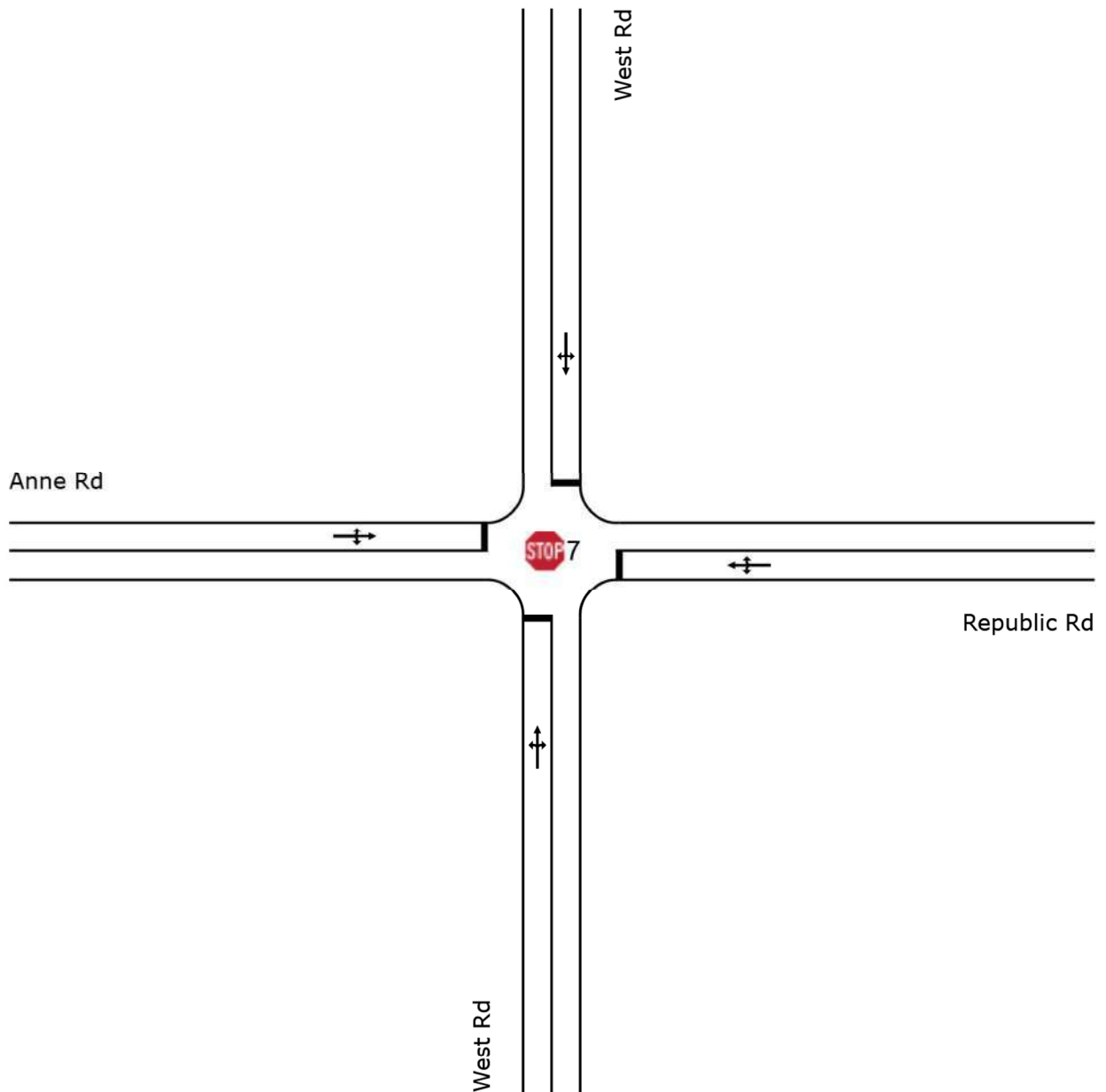
SITE LAYOUT

 Site: 7 [02_2022 PM]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 7 [02_2022 PM]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	4	2.0	0.320	13.4	LOS B	1.2	8.5	0.76	1.35	2.22	49.4
2	T1	157	2.0	0.320	13.1	LOS B	1.2	8.5	0.76	1.35	2.22	49.1
3	R2	70	2.0	0.320	12.9	LOS B	1.2	8.5	0.76	1.35	2.22	48.9
Approach		230	2.0	0.320	13.0	LOS B	1.2	8.5	0.76	1.35	2.22	49.1
East: Republic Rd												
4	L2	8	2.0	0.206	12.4	LOS B	0.7	4.8	0.72	1.29	1.98	49.9
5	T1	2	2.0	0.206	12.1	LOS B	0.7	4.8	0.72	1.29	1.98	49.7
6	R2	137	2.0	0.206	11.8	LOS B	0.7	4.8	0.72	1.29	1.98	49.4
Approach		148	2.0	0.206	11.9	LOS B	0.7	4.8	0.72	1.29	1.98	49.5
North: West Rd												
7	L2	483	2.0	1.016	86.2	LOS F	27.0	192.0	1.00	4.38	15.78	24.9
8	T1	227	2.0	1.016	85.8	LOS F	27.0	192.0	1.00	4.38	15.78	24.9
9	R2	22	2.0	1.016	85.6	LOS F	27.0	192.0	1.00	4.38	15.78	24.8
Approach		731	2.0	1.016	86.0	LOS F	27.0	192.0	1.00	4.38	15.78	24.9
West: Anne Rd												
10	L2	23	2.0	0.057	11.4	LOS B	0.2	1.2	0.68	1.26	1.74	50.5
11	T1	16	2.0	0.057	11.1	LOS B	0.2	1.2	0.68	1.26	1.74	50.2
12	R2	2	2.0	0.057	10.8	LOS B	0.2	1.2	0.68	1.26	1.74	50.0
Approach		41	2.0	0.057	11.2	LOS B	0.2	1.2	0.68	1.26	1.74	50.3
All Vehicles		1151	2.0	1.016	59.2	LOS F	27.0	192.0	0.90	3.27	10.79	30.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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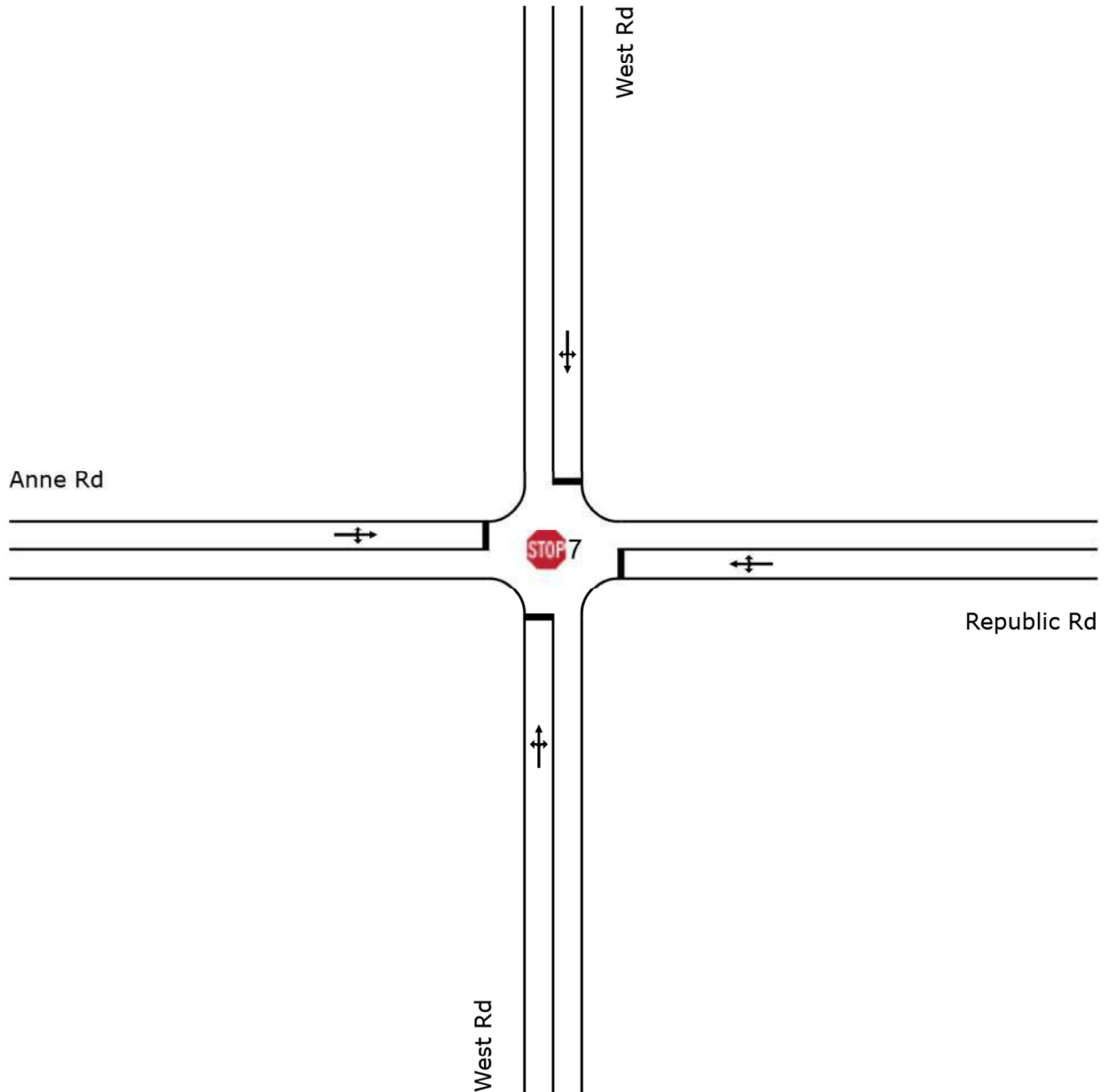
SITE LAYOUT

 **Site: 7 [03_2027 AM + Lat]**

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 7 [03_2027 AM + Lat]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	6	2.0	0.623	19.2	LOS C	3.6	25.8	0.88	1.60	3.47	46.0
2	T1	421	2.0	0.623	18.8	LOS C	3.6	25.8	0.88	1.60	3.47	45.8
3	R2	22	2.0	0.623	18.6	LOS C	3.6	25.8	0.88	1.60	3.47	45.6
Approach		449	2.0	0.623	18.8	LOS C	3.6	25.8	0.88	1.60	3.47	45.8
East: Republic Rd												
4	L2	34	2.0	0.979	68.6	LOS F	21.0	149.4	1.00	3.69	12.74	28.3
5	T1	15	2.0	0.979	68.2	LOS F	21.0	149.4	1.00	3.69	12.74	28.2
6	R2	656	2.0	0.979	68.0	LOS F	21.0	149.4	1.00	3.69	12.74	28.2
Approach		705	2.0	0.979	68.0	LOS F	21.0	149.4	1.00	3.69	12.74	28.2
North: West Rd												
7	L2	59	2.0	0.262	12.9	LOS B	0.9	6.5	0.74	1.33	2.09	49.6
8	T1	122	2.0	0.262	12.5	LOS B	0.9	6.5	0.74	1.33	2.09	49.4
9	R2	7	2.0	0.262	12.3	LOS B	0.9	6.5	0.74	1.33	2.09	49.2
Approach		188	2.0	0.262	12.6	LOS B	0.9	6.5	0.74	1.33	2.09	49.5
West: Anne Rd												
10	L2	41	2.0	0.071	11.5	LOS B	0.2	1.5	0.68	1.25	1.76	50.3
11	T1	8	2.0	0.071	11.1	LOS B	0.2	1.5	0.68	1.25	1.76	50.1
12	R2	2	2.0	0.071	10.9	LOS B	0.2	1.5	0.68	1.25	1.76	49.9
Approach		51	2.0	0.071	11.4	LOS B	0.2	1.5	0.68	1.25	1.76	50.3
All Vehicles		1393	2.0	0.979	42.6	LOS E	21.0	149.4	0.91	2.61	7.91	35.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\07_West Rd_Repbulic Rd.sip8

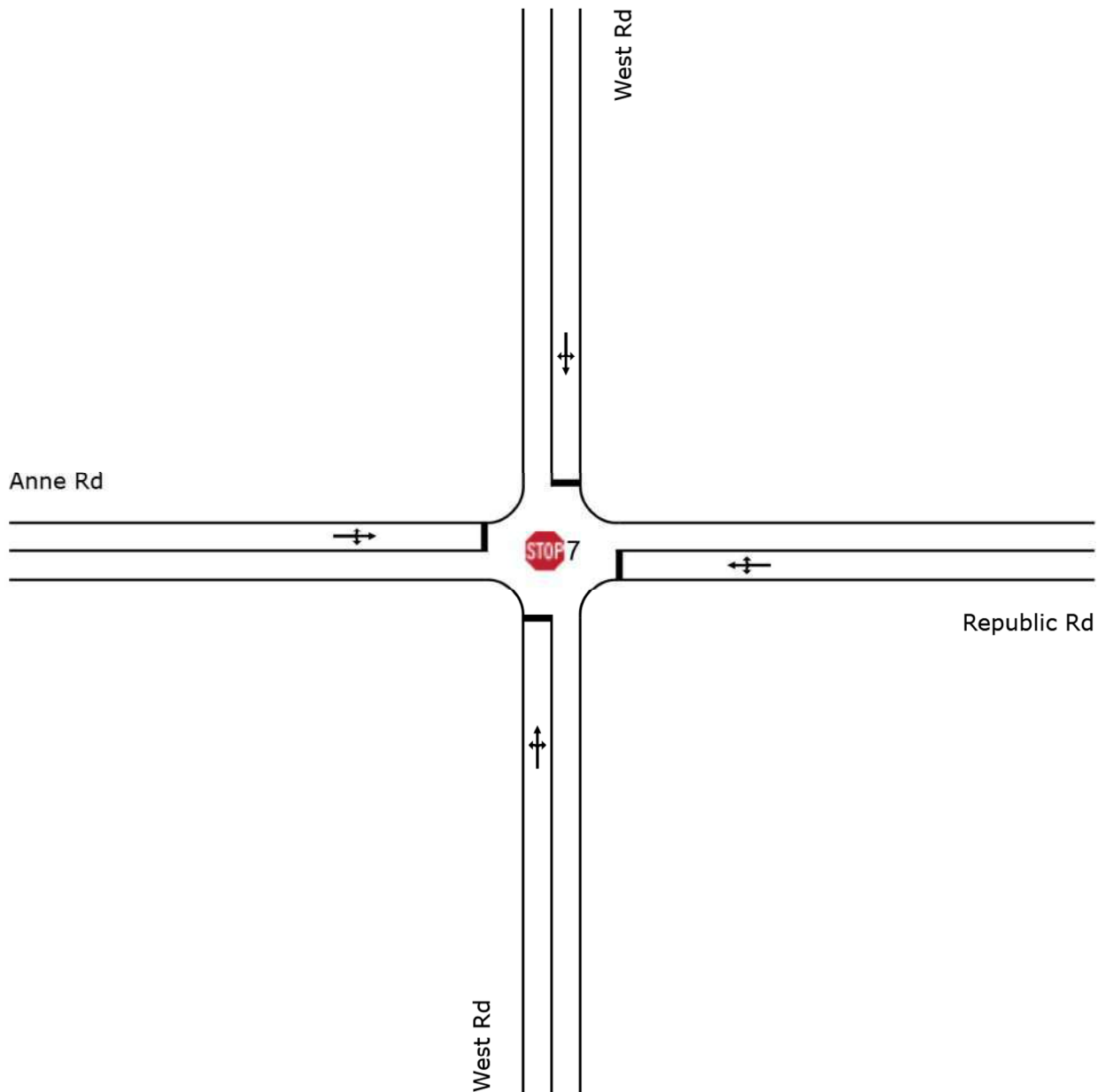
SITE LAYOUT

 Site: 7 [04_2027 PM + Lat]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 7 [04_2027 PM + Lat]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	4	2.0	0.375	14.1	LOS B	1.5	10.6	0.78	1.38	2.37	49.0
2	T1	186	2.0	0.375	13.7	LOS B	1.5	10.6	0.78	1.38	2.37	48.7
3	R2	81	2.0	0.375	13.5	LOS B	1.5	10.6	0.78	1.38	2.37	48.5
Approach		270	2.0	0.375	13.7	LOS B	1.5	10.6	0.78	1.38	2.37	48.7
East: Republic Rd												
4	L2	10	2.0	0.244	12.7	LOS B	0.8	6.0	0.73	1.30	2.05	49.7
5	T1	4	2.0	0.244	12.4	LOS B	0.8	6.0	0.73	1.30	2.05	49.5
6	R2	163	2.0	0.244	12.1	LOS B	0.8	6.0	0.73	1.30	2.05	49.3
Approach		176	2.0	0.244	12.2	LOS B	0.8	6.0	0.73	1.30	2.05	49.3
North: West Rd												
7	L2	561	2.0	1.180	200.8	LOS F	65.6	467.2	1.00	8.36	33.16	14.0
8	T1	263	2.0	1.180	200.5	LOS F	65.6	467.2	1.00	8.36	33.16	14.0
9	R2	25	2.0	1.180	200.3	LOS F	65.6	467.2	1.00	8.36	33.16	13.9
Approach		849	2.0	1.180	200.7	LOS F	65.6	467.2	1.00	8.36	33.16	14.0
West: Anne Rd												
10	L2	27	2.0	0.065	11.4	LOS B	0.2	1.4	0.68	1.26	1.75	50.4
11	T1	18	2.0	0.065	11.1	LOS B	0.2	1.4	0.68	1.26	1.75	50.2
12	R2	2	2.0	0.065	10.9	LOS B	0.2	1.4	0.68	1.26	1.75	50.0
Approach		47	2.0	0.065	11.3	LOS B	0.2	1.4	0.68	1.26	1.75	50.3
All Vehicles		1342	2.0	1.180	131.8	LOS F	65.6	467.2	0.91	5.78	21.79	18.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\07_West Rd_Repbulic Rd.sip8

SITE LAYOUT

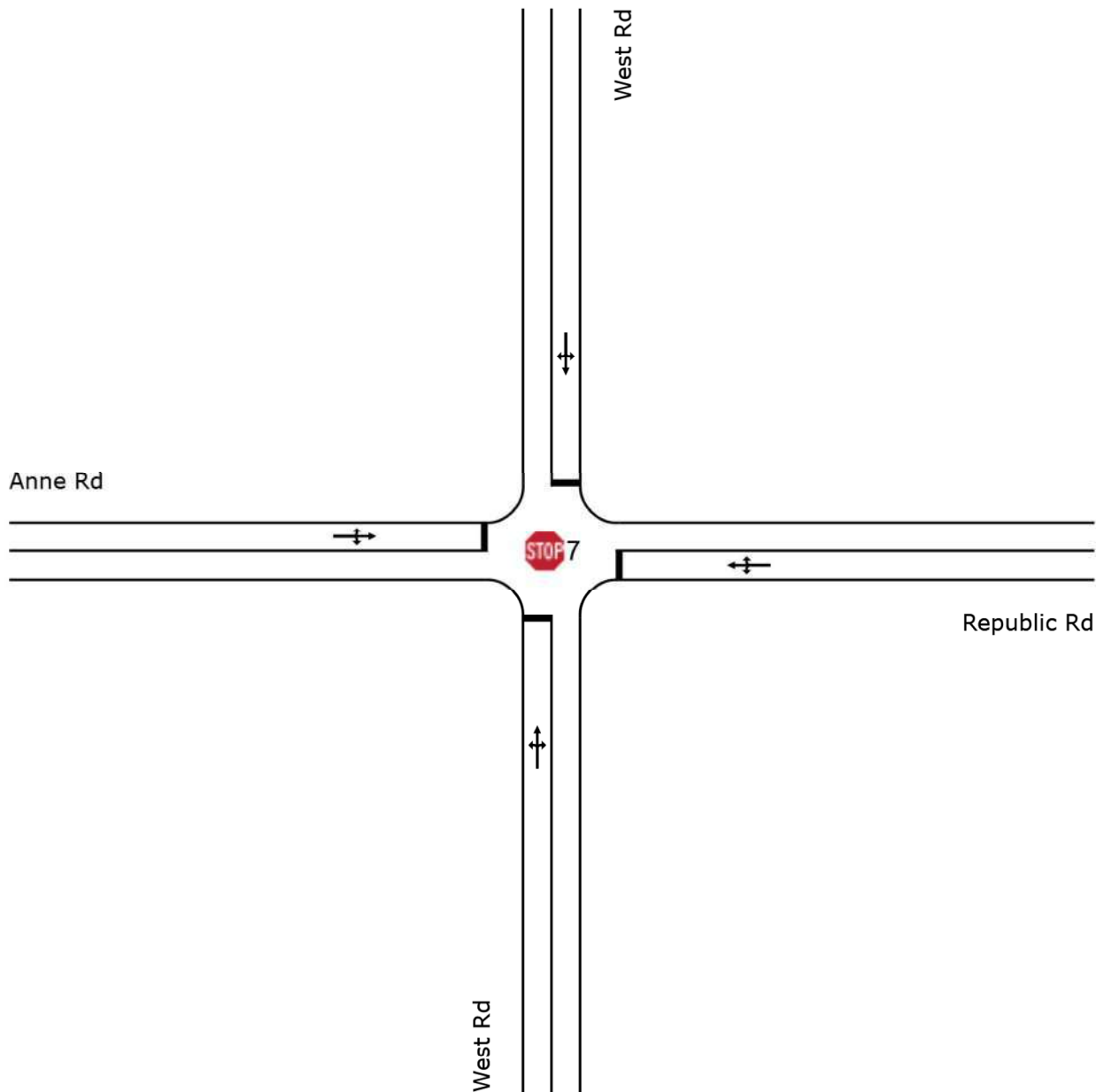
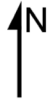


Site: 7 [05_2027 AM + Lat + Dev]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 7 [05_2027 AM + Lat + Dev]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	6	2.0	0.690	21.8	LOS C	4.6	33.0	0.91	1.72	4.01	44.5
2	T1	437	2.0	0.690	21.5	LOS C	4.6	33.0	0.91	1.72	4.01	44.3
3	R2	53	2.0	0.690	21.2	LOS C	4.6	33.0	0.91	1.72	4.01	44.2
Approach		497	2.0	0.690	21.4	LOS C	4.6	33.0	0.91	1.72	4.01	44.3
East: Republic Rd												
4	L2	98	2.0	1.402	389.4	LOS F	129.1	919.1	1.00	13.35	54.97	8.1
5	T1	159	2.0	1.402	389.1	LOS F	129.1	919.1	1.00	13.35	54.97	8.1
6	R2	752	2.0	1.402	388.8	LOS F	129.1	919.1	1.00	13.35	54.97	8.1
Approach		1009	2.0	1.402	388.9	LOS F	129.1	919.1	1.00	13.35	54.97	8.1
North: West Rd												
7	L2	99	2.0	0.328	13.5	LOS B	1.2	8.7	0.76	1.35	2.24	49.2
8	T1	130	2.0	0.328	13.2	LOS B	1.2	8.7	0.76	1.35	2.24	49.0
9	R2	7	2.0	0.328	13.0	LOS B	1.2	8.7	0.76	1.35	2.24	48.7
Approach		236	2.0	0.328	13.3	LOS B	1.2	8.7	0.76	1.35	2.24	49.1
West: Anne Rd												
10	L2	41	2.0	0.170	12.1	LOS B	0.5	3.9	0.71	1.29	1.91	50.1
11	T1	79	2.0	0.170	11.8	LOS B	0.5	3.9	0.71	1.29	1.91	49.9
12	R2	2	2.0	0.170	11.5	LOS B	0.5	3.9	0.71	1.29	1.91	49.6
Approach		122	2.0	0.170	11.9	LOS B	0.5	3.9	0.71	1.29	1.91	49.9
All Vehicles		1864	2.0	1.402	218.8	LOS F	129.1	919.1	0.93	7.94	31.25	13.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SITE LAYOUT

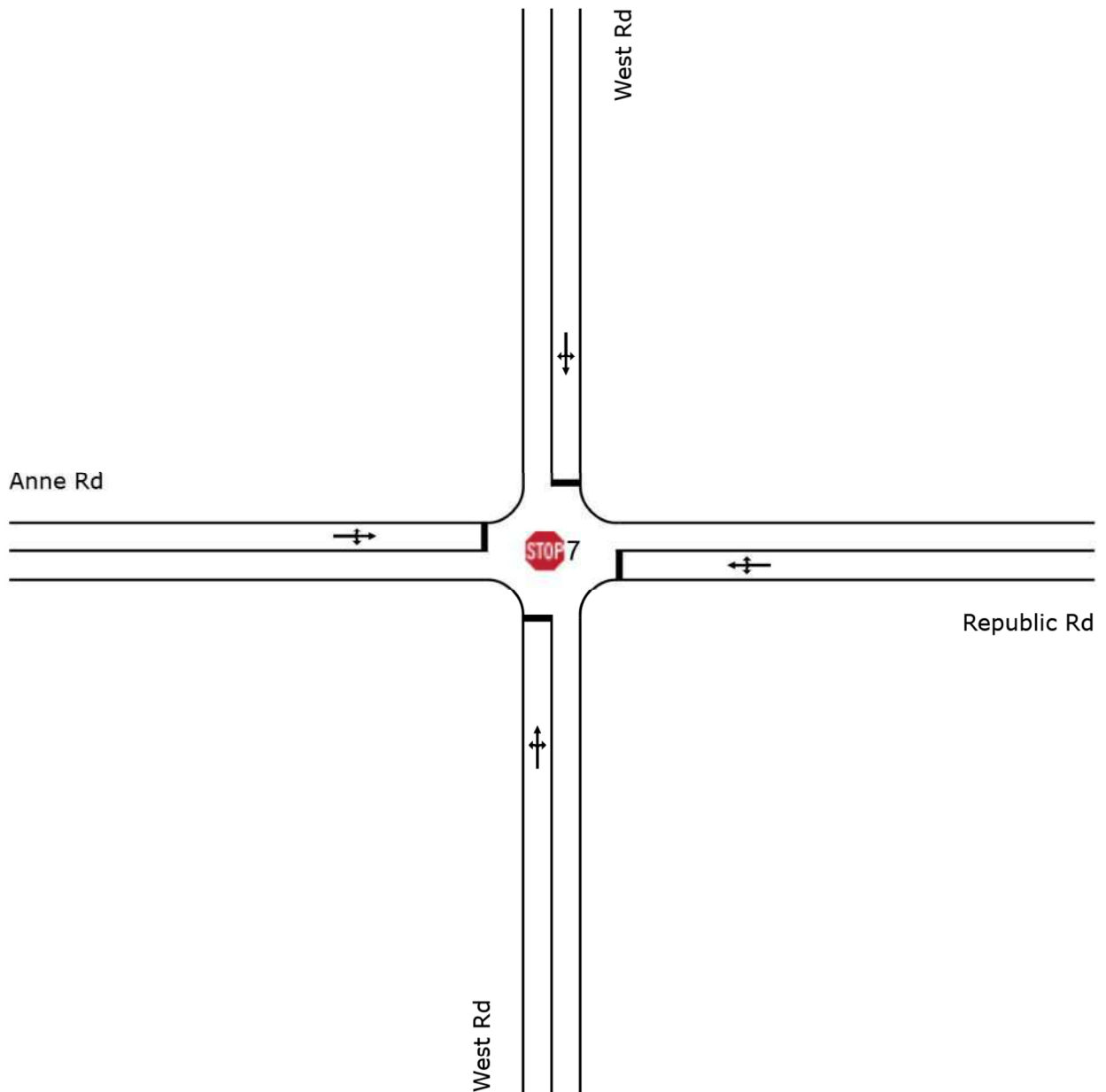
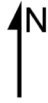


Site: 7 [06_2027 PM + Lat + Dev]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)



MOVEMENT SUMMARY



Site: 7 [06_2027 PM + Lat + Dev]

West Rd/Repbulic Rd

Site Category: -

Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	4	2.0	0.500	16.1	LOS C	2.3	16.7	0.83	1.46	2.80	47.7
2	T1	198	2.0	0.500	15.7	LOS C	2.3	16.7	0.83	1.46	2.80	47.5
3	R2	159	2.0	0.500	15.5	LOS C	2.3	16.7	0.83	1.46	2.80	47.3
Approach		360	2.0	0.500	15.6	LOS C	2.3	16.7	0.83	1.46	2.80	47.4
East: Republic Rd												
4	L2	59	2.0	0.569	17.6	LOS C	3.0	21.2	0.85	1.53	3.14	46.8
5	T1	114	2.0	0.569	17.3	LOS C	3.0	21.2	0.85	1.53	3.14	46.6
6	R2	236	2.0	0.569	17.0	LOS C	3.0	21.2	0.85	1.53	3.14	46.4
Approach		410	2.0	0.569	17.2	LOS C	3.0	21.2	0.85	1.53	3.14	46.5
North: West Rd												
7	L2	659	2.0	1.342	337.4	LOS F	111.6	794.6	1.00	12.12	49.63	9.2
8	T1	282	2.0	1.342	337.1	LOS F	111.6	794.6	1.00	12.12	49.63	9.2
9	R2	25	2.0	1.342	336.9	LOS F	111.6	794.6	1.00	12.12	49.63	9.2
Approach		966	2.0	1.342	337.3	LOS F	111.6	794.6	1.00	12.12	49.63	9.2
West: Anne Rd												
10	L2	27	2.0	0.310	13.3	LOS B	1.1	8.1	0.75	1.35	2.20	49.4
11	T1	194	2.0	0.310	13.0	LOS B	1.1	8.1	0.75	1.35	2.20	49.2
12	R2	2	2.0	0.310	12.8	LOS B	1.1	8.1	0.75	1.35	2.20	49.0
Approach		223	2.0	0.310	13.0	LOS B	1.1	8.1	0.75	1.35	2.20	49.2
All Vehicles		1959	2.0	1.342	174.3	LOS F	111.6	794.6	0.91	6.72	25.90	15.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\07_West Rd_Repbulic Rd.sip8

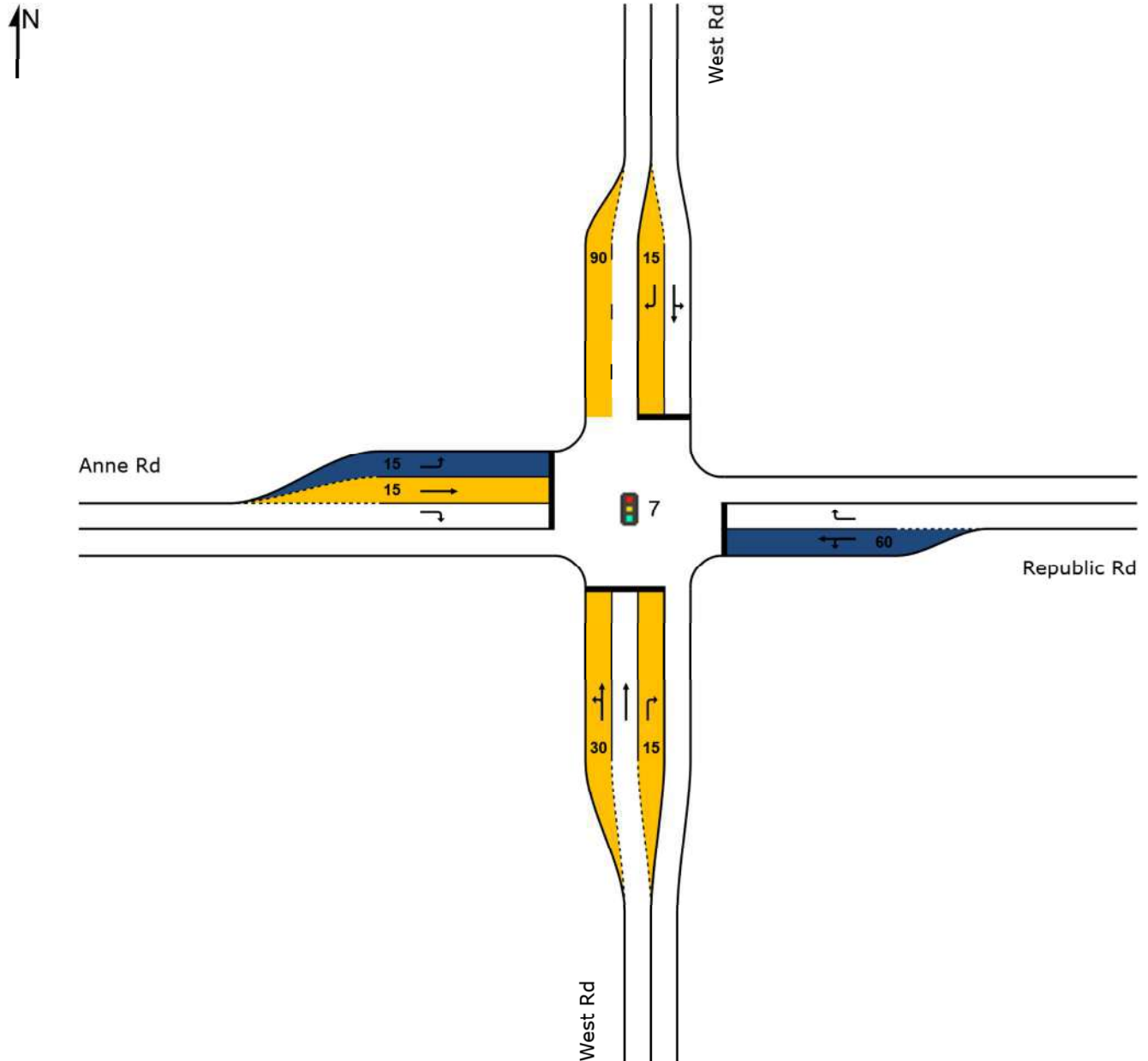
SITE LAYOUT

 **Site: 7 [07_2027 AM + Lat + Dev (Upgraded)]**

West Rd/Repbulic Rd

Site Category: -

Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

 **Site: 7 [07_2027 AM + Lat + Dev (Upgraded)]**

West Rd/Repbulic Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	6	2.0	0.493	31.3	LOS C	4.5	31.8	0.95	0.77	0.95	41.2
2	T1	437	2.0	0.965	42.8	LOS D	12.4	88.1	0.98	1.09	1.62	35.2
3	R2	53	2.0	0.399	37.4	LOS D	1.7	11.8	0.99	0.73	0.99	36.4
Approach		497	2.0	0.965	42.1	LOS D	12.4	88.1	0.98	1.05	1.54	35.4
East: Republic Rd												
4	L2	98	2.0	0.213	10.6	LOS B	3.2	22.6	0.45	0.51	0.45	52.3
5	T1	159	2.0	0.213	5.0	LOS A	3.2	22.6	0.45	0.51	0.45	53.7
6	R2	752	2.0	0.960	53.6	LOS D	36.4	259.3	0.92	1.16	1.62	31.4
Approach		1009	2.0	0.960	41.8	LOS D	36.4	259.3	0.80	1.00	1.32	35.0
North: West Rd												
7	L2	99	2.0	0.730	34.3	LOS C	7.0	50.1	1.00	0.90	1.17	39.0
8	T1	130	2.0	0.730	28.7	LOS C	7.0	50.1	1.00	0.90	1.17	39.7
9	R2	7	2.0	0.064	38.2	LOS D	0.2	1.5	0.99	0.63	0.99	36.4
Approach		236	2.0	0.730	31.3	LOS C	7.0	50.1	1.00	0.89	1.17	39.3
West: Anne Rd												
10	L2	41	2.0	0.035	9.9	LOS A	0.4	3.1	0.39	0.65	0.39	50.3
11	T1	79	2.0	0.064	4.5	LOS A	0.9	6.2	0.40	0.32	0.40	55.9
12	R2	2	2.0	0.003	11.1	LOS B	0.0	0.2	0.43	0.60	0.43	49.7
Approach		122	2.0	0.064	6.4	LOS A	0.9	6.2	0.40	0.43	0.40	53.8
All Vehicles		1864	2.0	0.965	38.2	LOS D	36.4	259.3	0.85	0.96	1.30	36.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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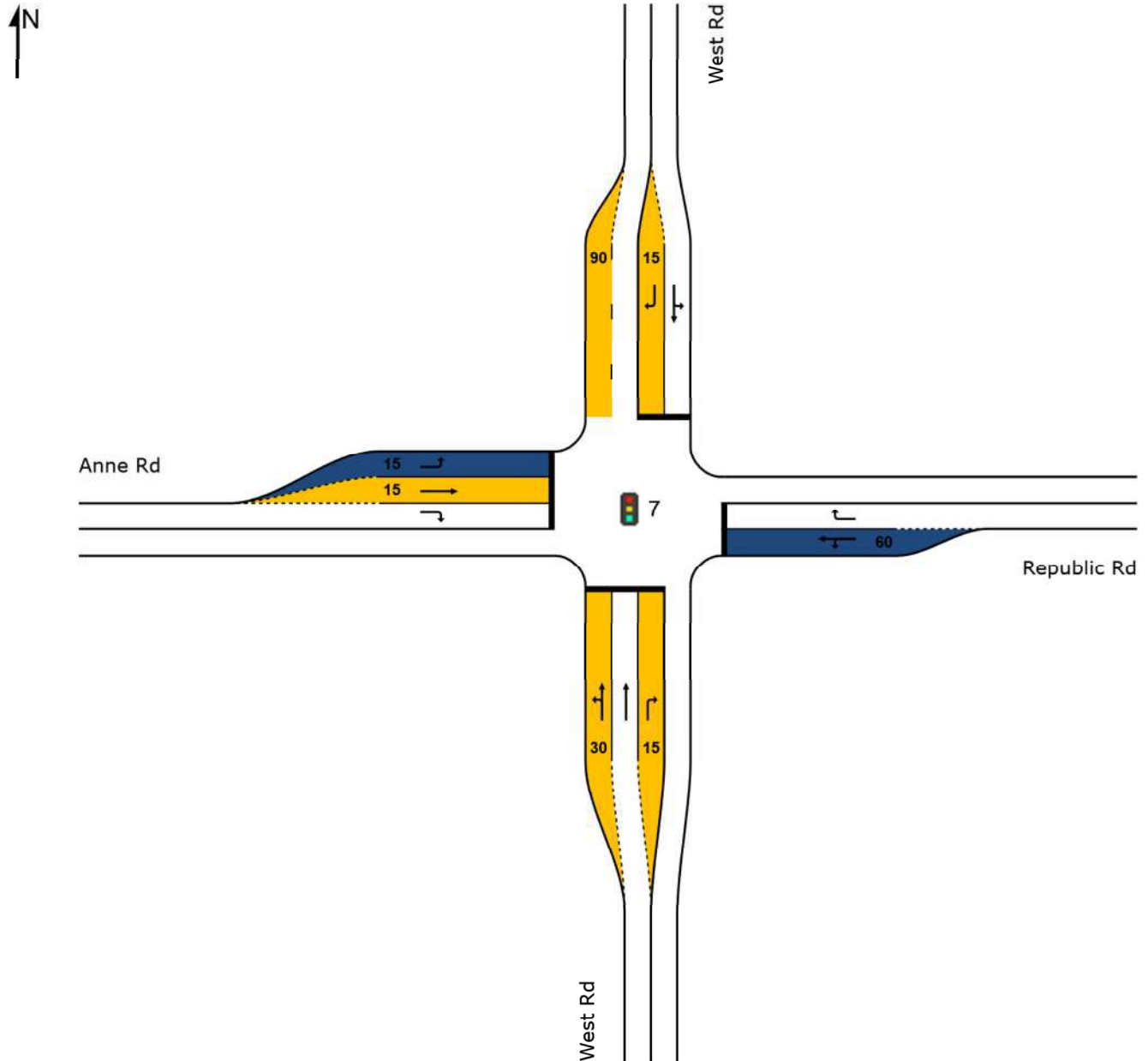
SITE LAYOUT

 **Site: 7 [08_2027 PM + Lat + Dev (Upgraded)]**

West Rd/Repbulic Rd

Site Category: -

Signals - Fixed Time Isolated



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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\07_West Rd_Repbulic Rd.sip8

MOVEMENT SUMMARY

 **Site: 7 [08_2027 PM + Lat + Dev (Upgraded)]**

West Rd/Repbulic Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: West Rd												
1	L2	4	2.0	0.055	11.7	LOS B	0.9	6.7	0.43	0.36	0.43	52.9
2	T1	198	2.0	0.109	6.3	LOS A	1.9	13.7	0.45	0.36	0.45	54.3
3	R2	159	2.0	0.859	47.0	LOS D	6.7	48.0	0.98	1.06	1.56	33.2
Approach		360	2.0	0.859	24.3	LOS C	6.7	48.0	0.68	0.67	0.94	42.4
East: Republic Rd												
4	L2	59	2.0	0.378	30.8	LOS C	5.1	36.6	0.89	0.74	0.89	40.7
5	T1	114	2.0	0.378	25.2	LOS C	5.1	36.6	0.89	0.74	0.89	41.6
6	R2	236	2.0	0.890	48.6	LOS D	9.9	70.5	1.00	1.04	1.54	32.8
Approach		410	2.0	0.890	39.5	LOS D	9.9	70.5	0.95	0.91	1.26	35.9
North: West Rd												
7	L2	659	2.0	0.818	20.5	LOS C	27.4	195.1	0.83	0.87	0.90	44.8
8	T1	282	2.0	0.818	15.0	LOS B	27.4	195.1	0.83	0.87	0.90	45.8
9	R2	25	2.0	0.028	12.1	LOS B	0.4	2.6	0.44	0.64	0.44	49.2
Approach		966	2.0	0.818	18.7	LOS B	27.4	195.1	0.82	0.86	0.89	45.2
West: Anne Rd												
10	L2	27	2.0	0.060	28.6	LOS C	0.7	5.1	0.81	0.70	0.81	40.1
11	T1	194	2.0	0.436	25.4	LOS C	5.8	41.3	0.90	0.73	0.90	42.4
12	R2	2	2.0	0.008	32.7	LOS C	0.1	0.5	0.86	0.62	0.86	38.4
Approach		223	2.0	0.436	25.9	LOS C	5.8	41.3	0.89	0.73	0.89	42.0
All Vehicles		1959	2.0	0.890	24.9	LOS C	27.4	195.1	0.83	0.82	0.98	42.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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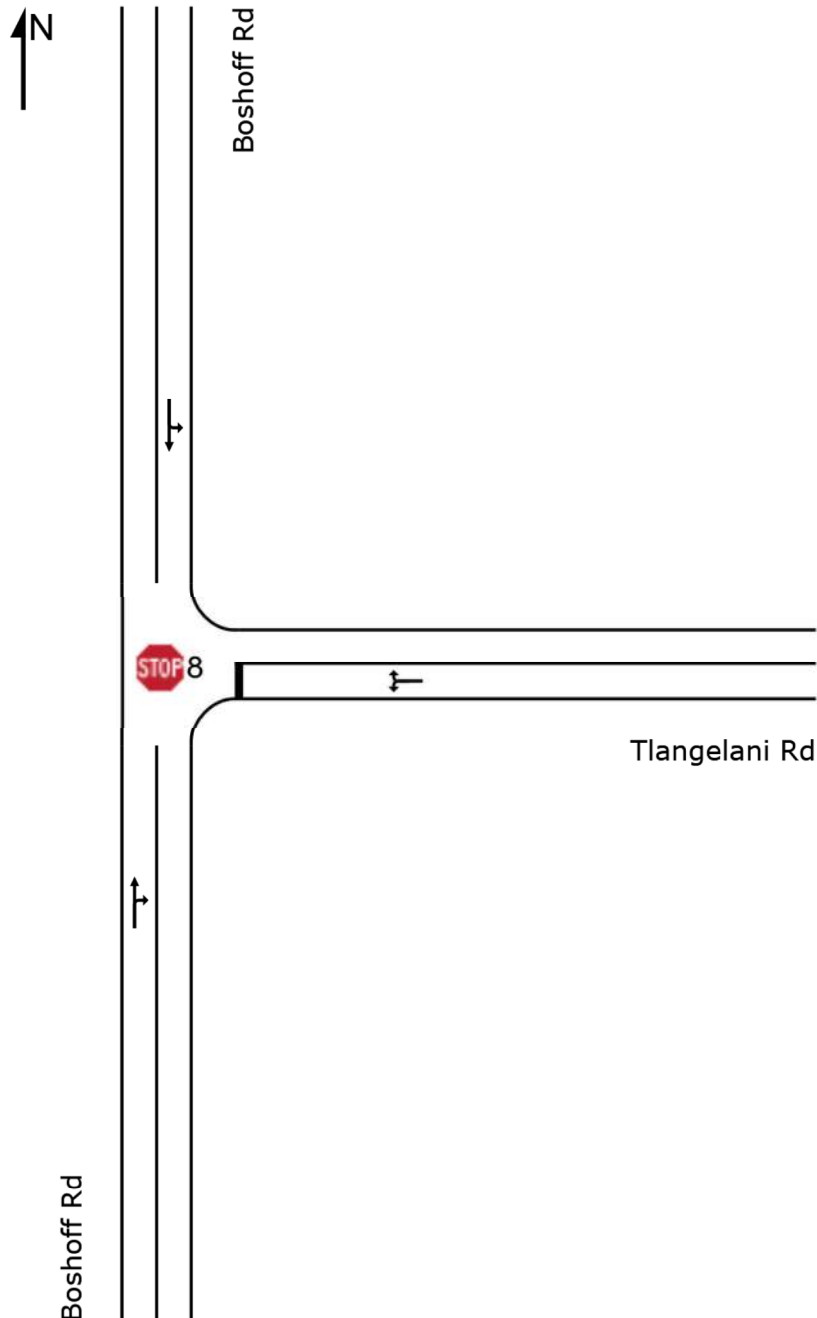
SITE LAYOUT

 **Site: 8 [01_2022 AM]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 8 [01_2022 AM]

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
2	T1	618	2.0	0.324	0.0	LOS A	0.0	0.3	0.01	0.00	0.01	59.9
3	R2	3	2.0	0.324	7.8	LOS A	0.0	0.3	0.01	0.00	0.01	57.6
Approach		621	2.0	0.324	0.1	NA	0.0	0.3	0.01	0.00	0.01	59.9
East: Tlangelani Rd												
4	L2	5	2.0	0.045	9.6	LOS A	0.1	0.4	0.28	1.00	0.28	51.5
6	R2	34	2.0	0.045	8.7	LOS A	0.1	0.4	0.28	1.00	0.28	51.0
Approach		39	2.0	0.045	8.9	LOS A	0.1	0.4	0.28	1.00	0.28	51.0
North: Boshoff Rd												
7	L2	7	2.0	0.268	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	508	2.0	0.268	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		516	2.0	0.268	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1176	2.0	0.324	0.4	NA	0.1	0.4	0.01	0.04	0.01	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\08_Boshoff Rd_Tlangelani Rd.sip8

SITE LAYOUT

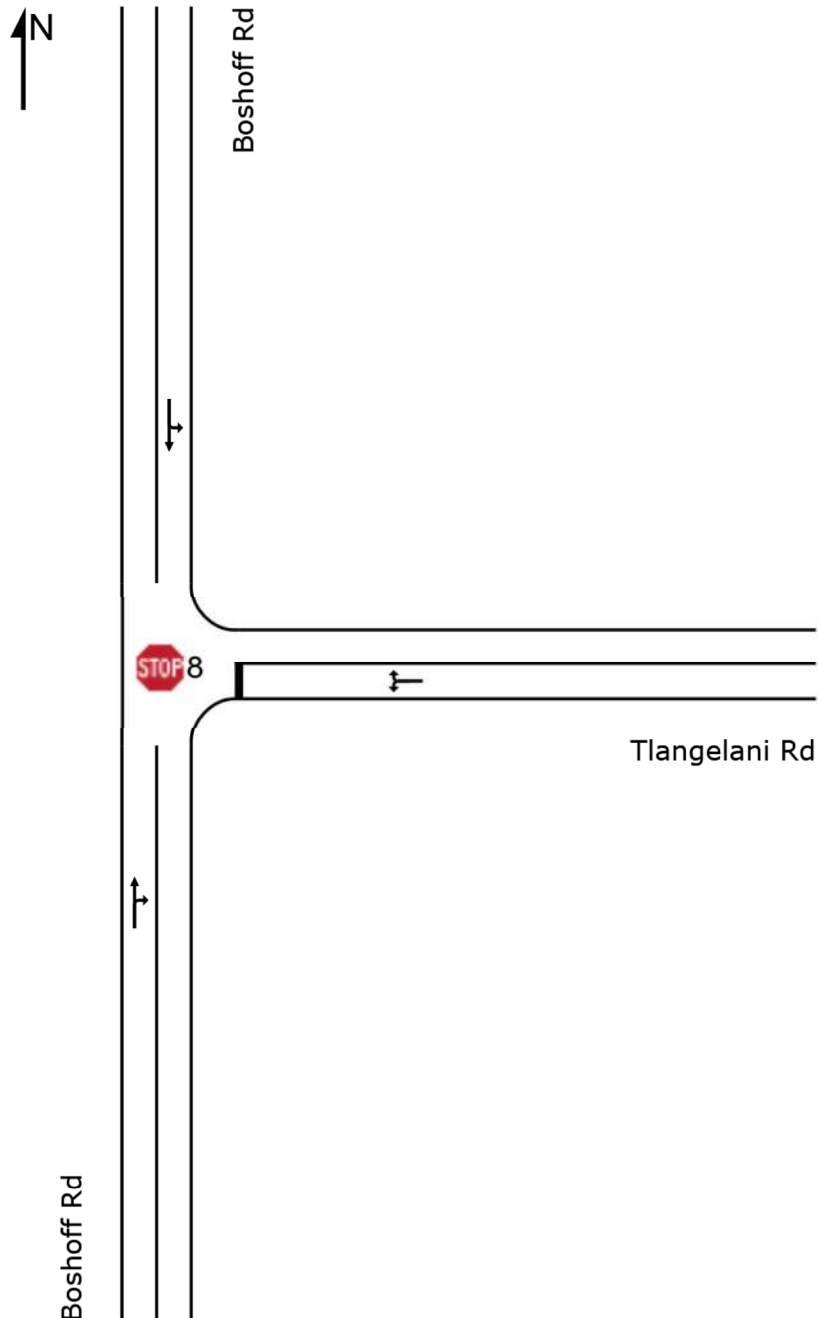


Site: 8 [02_2022 PM]

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 8 [02_2022 PM]

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
2	T1	394	2.0	0.213	0.1	LOS A	0.1	0.6	0.03	0.01	0.03	59.7
3	R2	9	2.0	0.213	7.7	LOS A	0.1	0.6	0.03	0.01	0.03	57.4
Approach		403	2.0	0.213	0.3	NA	0.1	0.6	0.03	0.01	0.03	59.7
East: Tlangelani Rd												
4	L2	7	2.0	0.021	9.7	LOS A	0.0	0.2	0.29	0.97	0.29	51.5
6	R2	12	2.0	0.021	8.4	LOS A	0.0	0.2	0.29	0.97	0.29	51.0
Approach		19	2.0	0.021	8.9	LOS A	0.0	0.2	0.29	0.97	0.29	51.2
North: Boshoff Rd												
7	L2	14	2.0	0.288	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	540	2.0	0.288	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		554	2.0	0.288	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		976	2.0	0.288	0.4	NA	0.1	0.6	0.02	0.03	0.02	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\08_Boshoff Rd_Tlangelani Rd.sip8

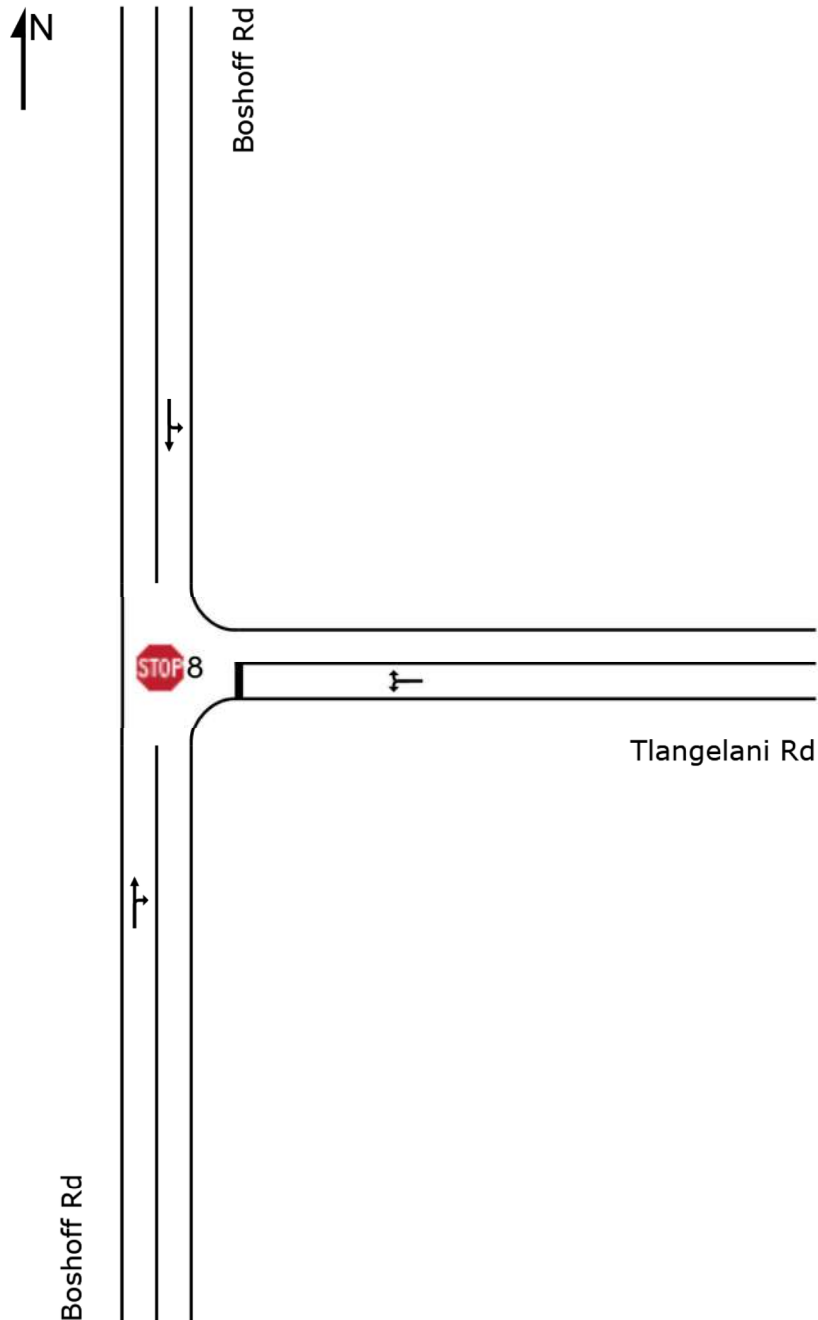
SITE LAYOUT

 **Site: 8 [03_2027 AM + Lat]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 8 [03_2027 AM + Lat]

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
2	T1	717	2.0	0.377	0.0	LOS A	0.1	0.4	0.01	0.00	0.01	59.9
3	R2	4	2.0	0.377	8.7	LOS A	0.1	0.4	0.01	0.00	0.01	57.5
Approach		721	2.0	0.377	0.1	NA	0.1	0.4	0.01	0.00	0.01	59.9
East: Tlangelani Rd												
4	L2	6	2.0	0.057	10.0	LOS A	0.1	0.5	0.35	1.00	0.35	51.3
6	R2	39	2.0	0.057	9.1	LOS A	0.1	0.5	0.35	1.00	0.35	50.8
Approach		45	2.0	0.057	9.2	LOS A	0.1	0.5	0.35	1.00	0.35	50.9
North: Boshoff Rd												
7	L2	8	2.0	0.311	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	589	2.0	0.311	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		598	2.0	0.311	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1364	2.0	0.377	0.4	NA	0.1	0.5	0.02	0.04	0.02	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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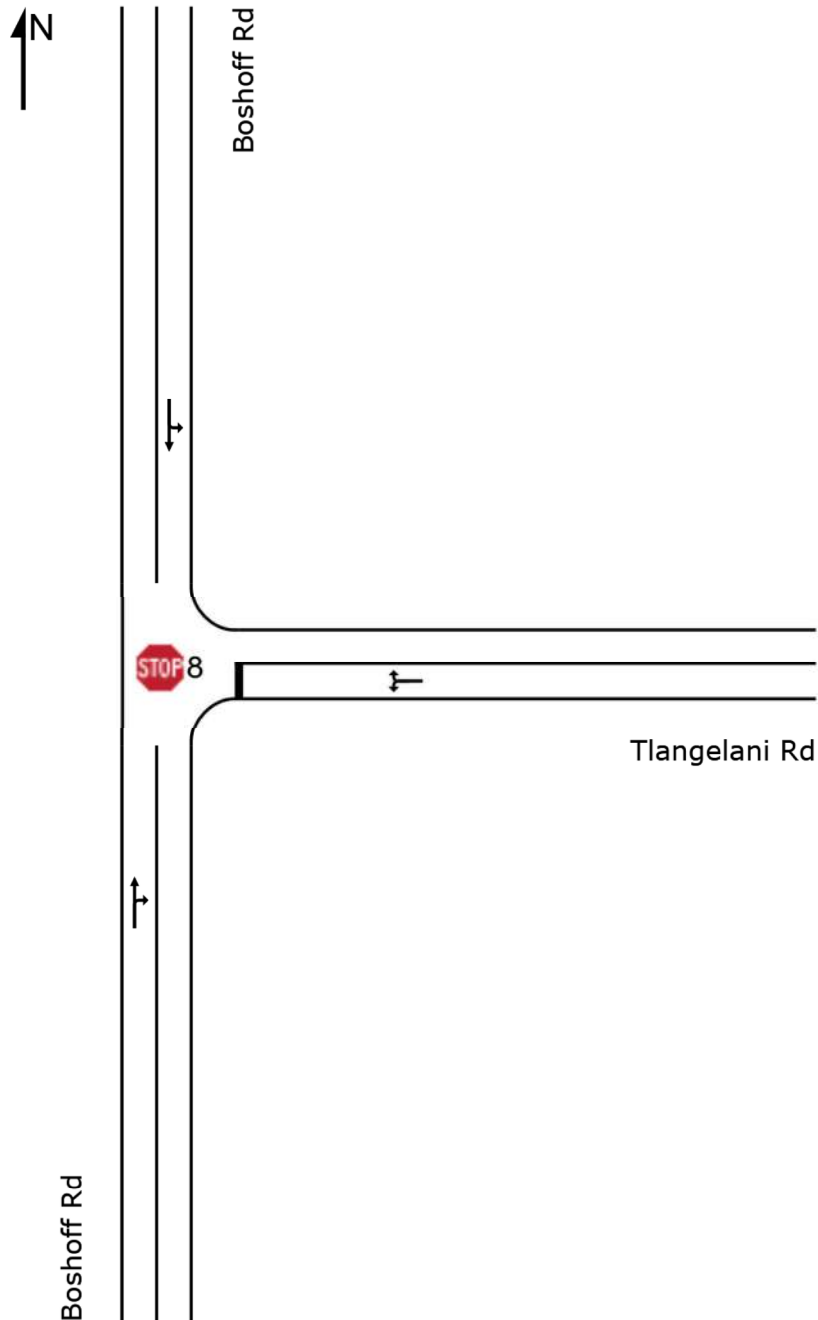
SITE LAYOUT

 **Site: 8 [04_2027 PM + Lat]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)



MOVEMENT SUMMARY



Site: 8 [04_2027 PM + Lat]

Boshoff Rd/Tlangelani Rd

Site Category: -

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
2	T1	458	2.0	0.249	0.1	LOS A	0.1	0.9	0.04	0.01	0.04	59.7
3	R2	11	2.0	0.249	8.4	LOS A	0.1	0.9	0.04	0.01	0.04	57.4
Approach		468	2.0	0.249	0.3	NA	0.1	0.9	0.04	0.01	0.04	59.7
East: Tlangelani Rd												
4	L2	8	2.0	0.026	10.1	LOS B	0.0	0.3	0.34	0.98	0.34	51.3
6	R2	14	2.0	0.026	8.7	LOS A	0.0	0.3	0.34	0.98	0.34	50.8
Approach		22	2.0	0.026	9.2	LOS A	0.0	0.3	0.34	0.98	0.34	51.0
North: Boshoff Rd												
7	L2	16	2.0	0.335	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
8	T1	627	2.0	0.335	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		643	2.0	0.335	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles		1134	2.0	0.335	0.4	NA	0.1	0.9	0.02	0.03	0.02	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\08_Boshoff Rd_Tlangelani Rd.sip8

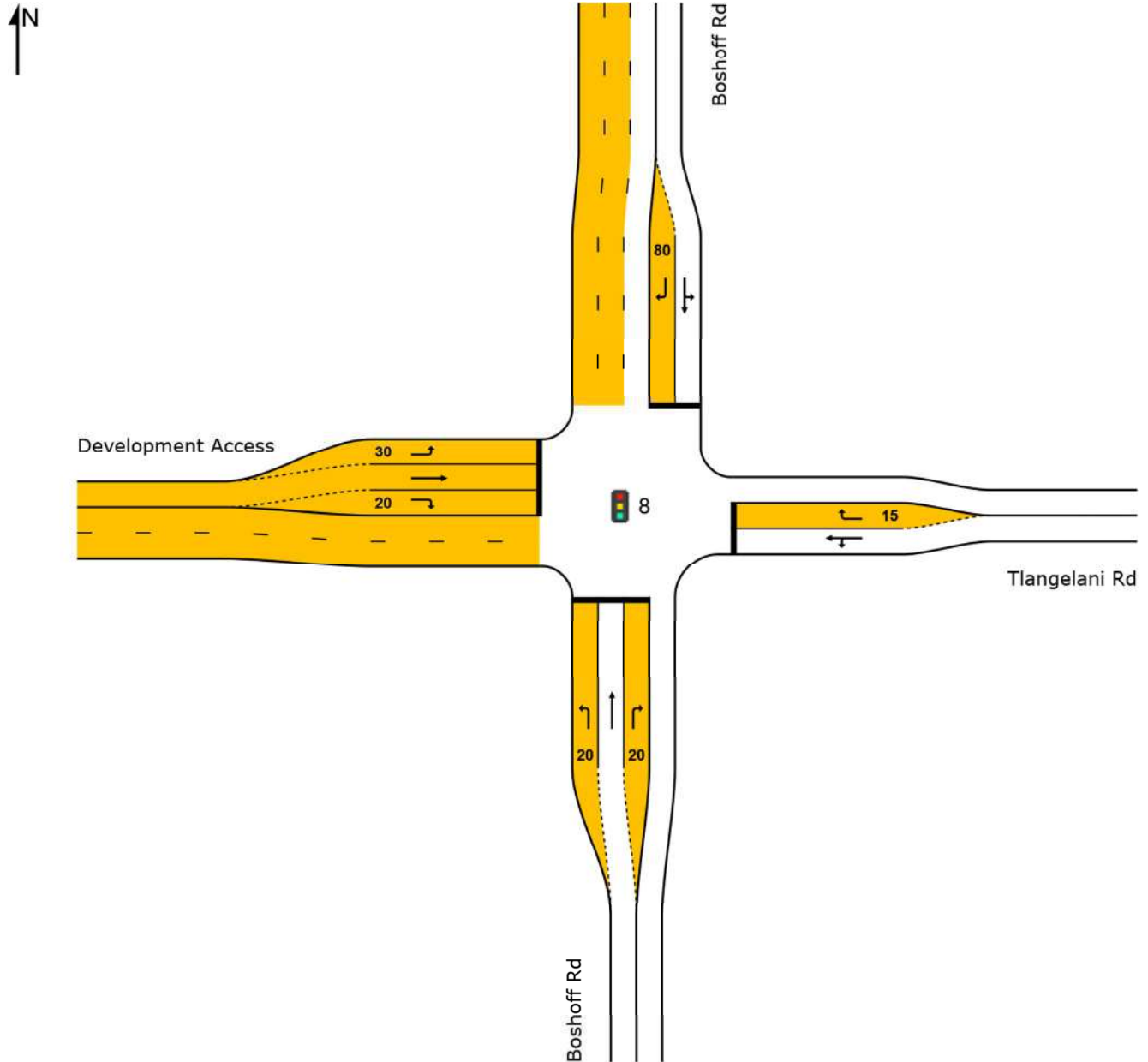
SITE LAYOUT

 **Site: 8 [05_2027 AM + Lat + Dev (Upgraded)]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 8 [05_2027 AM + Lat + Dev (Upgraded)]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	15	2.0	0.012	10.3	LOS B	0.2	1.2	0.40	0.63	0.40	50.1
2	T1	717	2.0	0.576	7.3	LOS A	12.4	88.4	0.64	0.57	0.64	53.6
3	R2	4	2.0	0.010	14.9	LOS B	0.1	0.5	0.55	0.64	0.55	47.0
Approach		736	2.0	0.576	7.4	LOS A	12.4	88.4	0.63	0.57	0.63	53.5
East: Tlangelani Rd												
4	L2	6	2.0	0.057	27.9	LOS C	0.5	3.7	0.85	0.63	0.85	42.2
5	T1	15	2.0	0.057	22.3	LOS C	0.5	3.7	0.85	0.63	0.85	43.1
6	R2	39	2.0	0.226	34.4	LOS C	1.1	8.1	0.95	0.73	0.95	37.5
Approach		60	2.0	0.226	30.8	LOS C	1.1	8.1	0.92	0.69	0.92	39.2
North: Boshoff Rd												
7	L2	8	2.0	0.475	12.3	LOS B	9.5	67.6	0.58	0.52	0.58	52.6
8	T1	589	2.0	0.475	6.7	LOS A	9.5	67.6	0.58	0.52	0.58	54.0
9	R2	15	2.0	0.045	17.2	LOS B	0.3	1.9	0.62	0.66	0.62	46.2
Approach		613	2.0	0.475	7.0	LOS A	9.5	67.6	0.58	0.52	0.58	53.8
West: Development Access												
10	L2	204	2.0	0.573	30.9	LOS C	5.7	40.8	0.96	0.81	0.96	39.1
11	T1	29	2.0	0.079	22.4	LOS C	0.7	5.2	0.86	0.62	0.86	43.9
12	R2	58	2.0	0.194	29.0	LOS C	1.5	10.7	0.88	0.74	0.88	40.1
Approach		292	2.0	0.573	29.6	LOS C	5.7	40.8	0.94	0.77	0.94	39.7
All Vehicles		1700	2.0	0.576	11.9	LOS B	12.4	88.4	0.68	0.59	0.68	50.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\08_Boshoff Rd_Tlangelani Rd.sip8

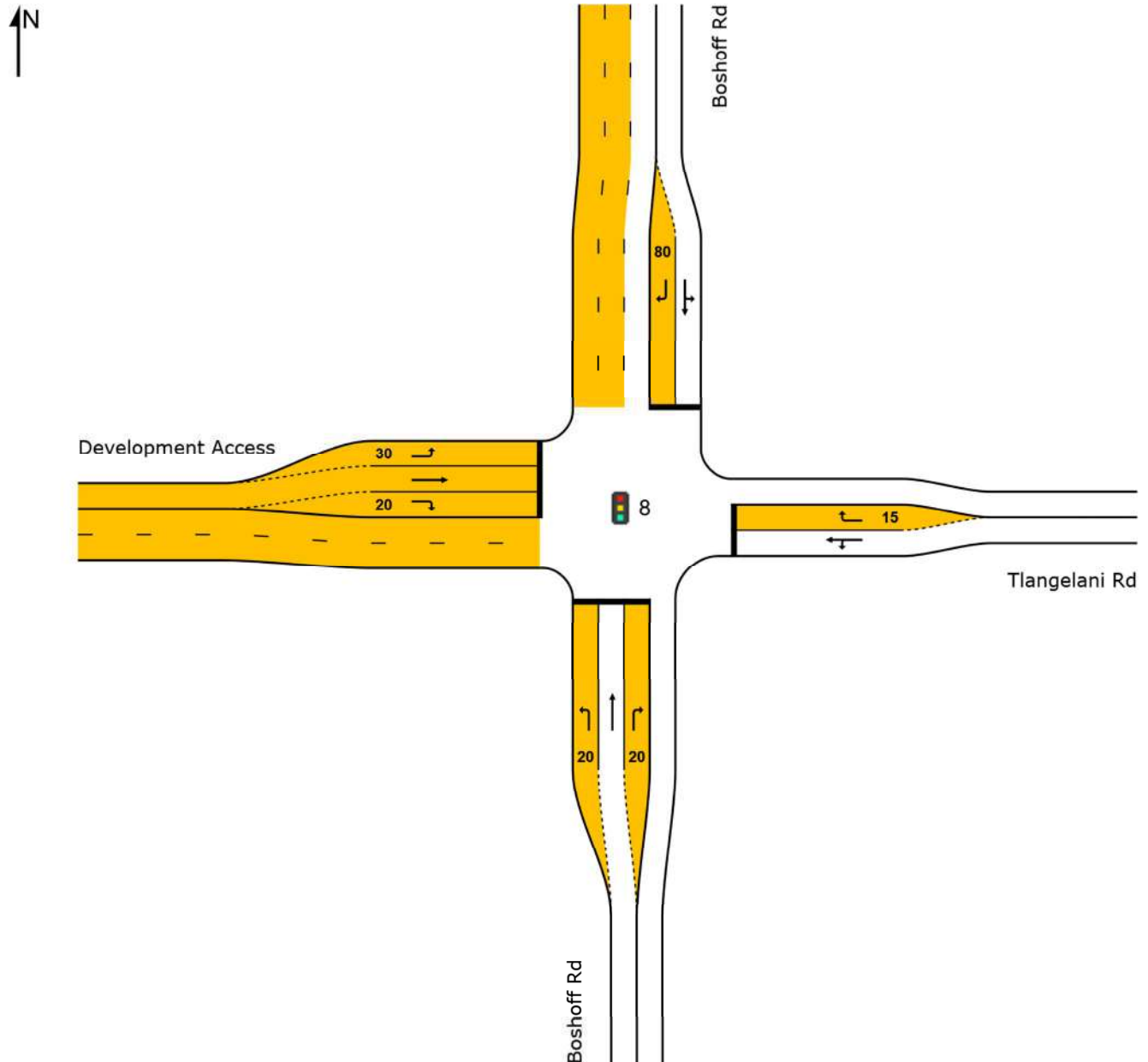
SITE LAYOUT

 **Site: 8 [06_2027 PM + Lat + Dev (Upgraded)]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: 8 [06_2027 PM + Lat + Dev (Upgraded)]**

Boshoff Rd/Tlangelani Rd

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Boshoff Rd												
1	L2	34	2.0	0.027	9.9	LOS A	0.4	2.6	0.39	0.64	0.39	50.3
2	T1	458	2.0	0.360	5.6	LOS A	6.3	45.0	0.51	0.44	0.51	55.0
3	R2	11	2.0	0.027	15.1	LOS B	0.2	1.2	0.56	0.66	0.56	46.9
Approach		502	2.0	0.360	6.1	LOS A	6.3	45.0	0.50	0.46	0.50	54.5
East: Tlangelani Rd												
4	L2	8	2.0	0.125	29.3	LOS C	1.1	7.7	0.88	0.67	0.88	41.8
5	T1	34	2.0	0.125	23.7	LOS C	1.1	7.7	0.88	0.67	0.88	42.7
6	R2	14	2.0	0.074	33.4	LOS C	0.4	2.7	0.93	0.68	0.93	37.9
Approach		56	2.0	0.125	26.9	LOS C	1.1	7.7	0.90	0.67	0.90	41.3
North: Boshoff Rd												
7	L2	16	2.0	0.497	11.9	LOS B	10.1	71.8	0.58	0.52	0.58	52.9
8	T1	627	2.0	0.497	6.3	LOS A	10.1	71.8	0.58	0.52	0.58	54.3
9	R2	34	2.0	0.066	13.1	LOS B	0.5	3.5	0.51	0.66	0.51	48.8
Approach		677	2.0	0.497	6.8	LOS A	10.1	71.8	0.57	0.53	0.57	53.9
West: Development Access												
10	L2	151	2.0	0.464	31.2	LOS C	4.2	29.8	0.95	0.79	0.95	38.9
11	T1	21	2.0	0.062	23.3	LOS C	0.5	3.8	0.87	0.62	0.87	43.5
12	R2	43	2.0	0.165	30.8	LOS C	1.2	8.2	0.91	0.73	0.91	39.3
Approach		215	2.0	0.464	30.3	LOS C	4.2	29.8	0.93	0.76	0.93	39.4
All Vehicles		1449	2.0	0.497	10.8	LOS B	10.1	71.8	0.61	0.54	0.61	50.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\08_Boshoff Rd_Tlangelani Rd.sip8

MOVEMENT SUMMARY

 **Site: A [01_2027 AM + Lat + Dev (Upgraded)]**

Main Rd/Development Partial Access

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Development Access												
1	L2	398	2.0	0.215	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
Approach		398	2.0	0.215	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
East: Main Rd												
4	L2	157	2.0	0.104	6.8	LOS A	1.0	7.0	0.24	0.60	0.24	53.2
5	T1	2240	2.0	0.778	5.7	LOS A	26.0	185.2	0.61	0.57	0.61	54.9
Approach		2397	2.0	0.778	5.8	LOS A	26.0	185.2	0.59	0.57	0.59	54.8
West: Main Rd												
12	R2	121	2.0	0.748	48.8	LOS D	5.1	36.6	1.00	0.88	1.24	32.9
Approach		121	2.0	0.748	48.8	LOS D	5.1	36.6	1.00	0.88	1.24	32.9
All Vehicles		2916	2.0	0.778	7.5	LOS A	26.0	185.2	0.52	0.58	0.53	53.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\A_Main Rd_Development Access.sip8

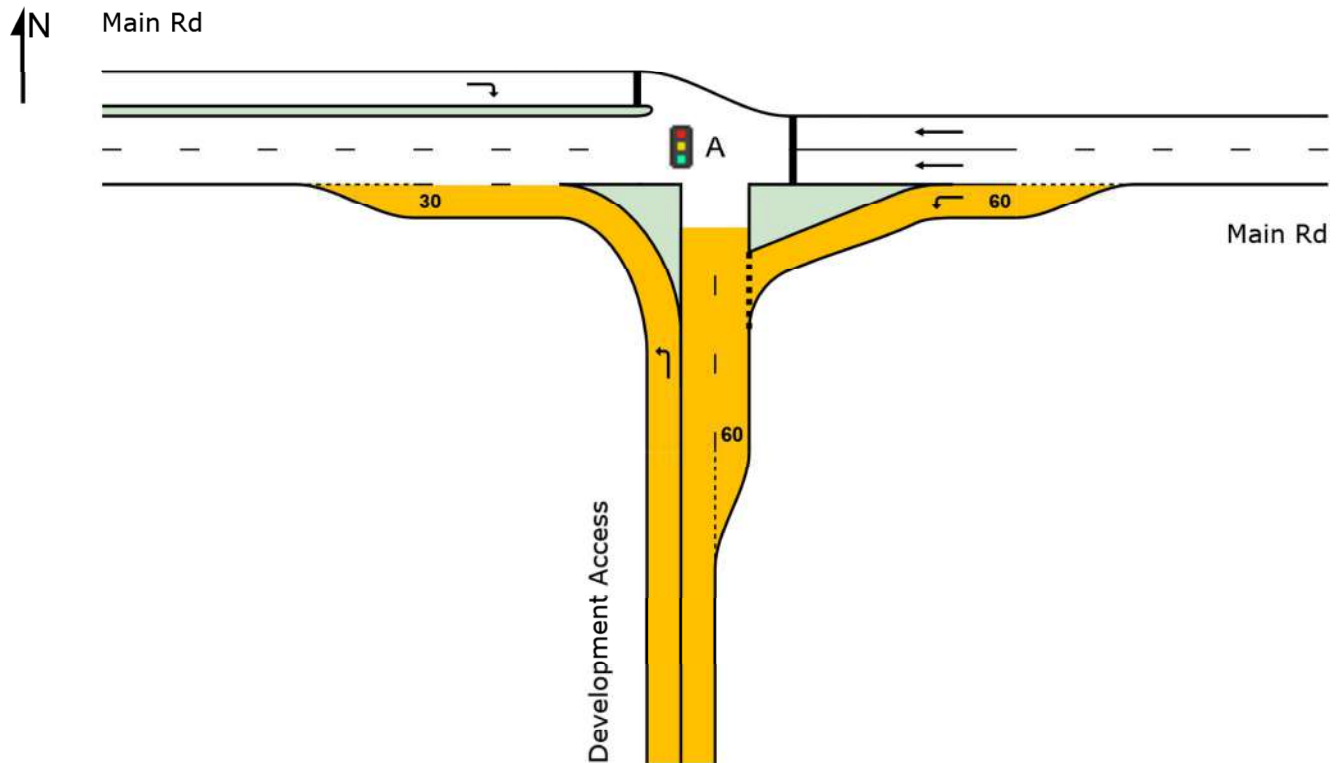
SITE LAYOUT

 **Site: A [01_2027 AM + Lat + Dev (Upgraded)]**

Main Rd/Development Partial Access

Site Category: -

Signals - Fixed Time Isolated



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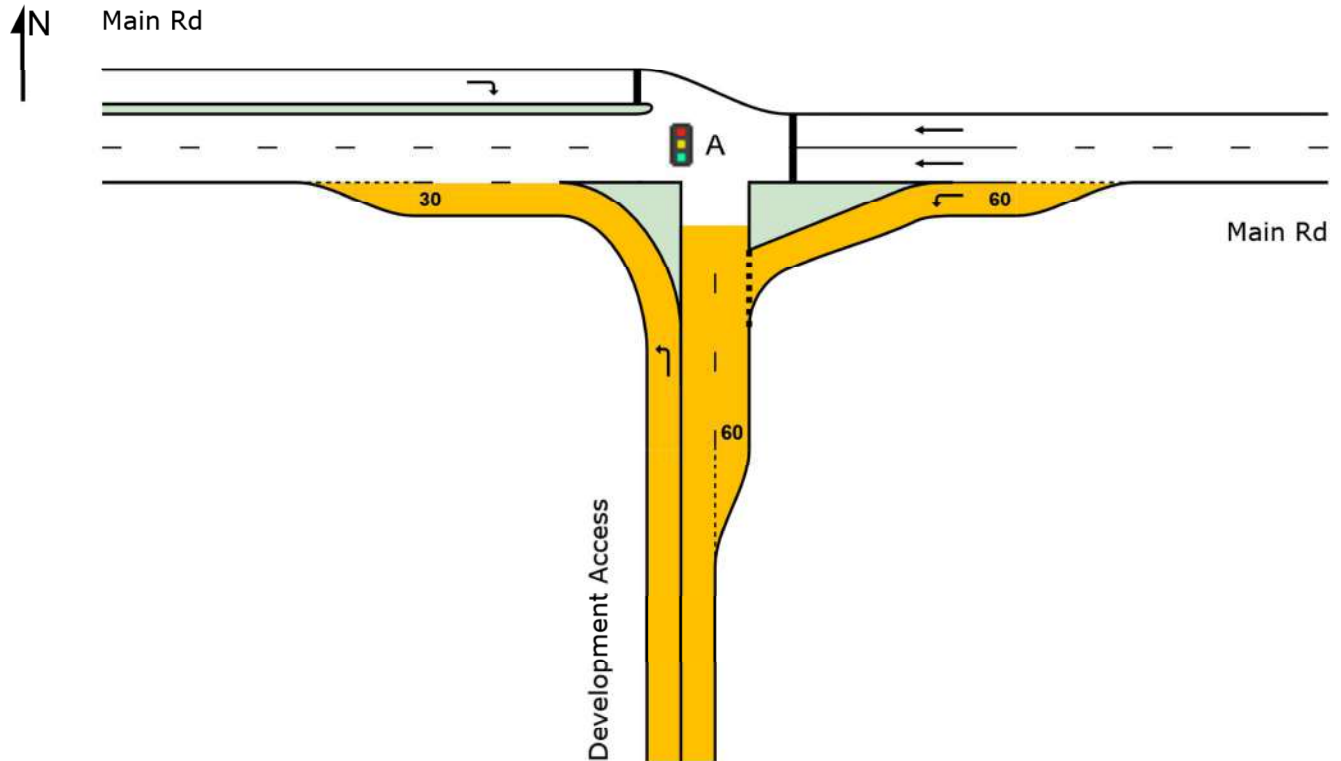
SITE LAYOUT

 **Site: A [02_2027 PM + Lat + Dev (Upgraded)]**

Main Rd/Development Partial Access

Site Category: -

Signals - Fixed Time Isolated



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Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\A_Main Rd_Development Access.sip8

MOVEMENT SUMMARY

 **Site: A [02_2027 PM + Lat + Dev (Upgraded)]**

Main Rd/Development Partial Access

Site Category: -

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Development Access												
1	L2	293	2.0	0.158	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
Approach		293	2.0	0.158	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
East: Main Rd												
4	L2	376	2.0	0.315	8.2	LOS A	3.4	24.0	0.44	0.68	0.44	52.1
5	T1	884	2.0	0.487	12.0	LOS B	9.0	64.3	0.74	0.64	0.74	50.1
Approach		1260	2.0	0.487	10.9	LOS B	9.0	64.3	0.65	0.65	0.65	50.7
West: Main Rd												
12	R2	291	2.0	0.471	23.0	LOS C	6.9	49.1	0.84	0.80	0.84	42.7
Approach		291	2.0	0.471	23.0	LOS C	6.9	49.1	0.84	0.80	0.84	42.7
All Vehicles		1843	2.0	0.487	12.0	LOS B	9.0	64.3	0.58	0.66	0.58	49.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: INFRATRANS TRAFFIC AND TRANSPORTATION ENGINEERING | Processed: Tuesday, 27 September 2022 13:23:35

Project: C:\Users\piete\Dropbox\Traffic Surveys Pty Ltd\2_Projects\314_Rabie Ridge X7, Johannesburg TIA\01_Report\Work files\A_Main Rd_Development Access.sip8

**PROPOSED NEW MIXED-USE DEVELOPMENT IN
RABIE RIDGE**

(SITUATED ON ALLANDALE 10-IR)

Version 1

OUTLINE SERVICES SCHEME REPORT

PREPARED FOR

JOHANNESBURG WATER

(July 2026)

PREPARED BY:



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ANNEXURES

Annexure A: Drawings

1 INTRODUCTION

CEENEX (Pty) Ltd has been appointed by Davidoff- project and development management to compile an outline services scheme report for the proposed mixed-use development situated at Rabie Ridge, Allandale 10-IR, within the City of Johannesburg Metropolitan Municipality.

The purpose of this report is to assess and describe the provision and capacity of municipal engineering services required to support the proposed township development. Specifically, it focuses on evaluating the impact of the development on water supply and sewer reticulation infrastructure.

The development will consist of the following:

- 4746 residential 3 units,
- 14.49 ha Business 1;
- 1.68 ha Institutional,
- 2.76 ha Educational,
- 30.69 ha Open Space and
- 2.43 ha Municipality

The report aims to provide Johannesburg Water with a clear overview of the anticipated demand on these services and to determine whether the existing infrastructure has sufficient capacity or whether upgrades will be required. It outlines the technical approach, proposed connections to existing municipal infrastructure, estimated demand calculations and key design considerations in accordance with the applicable standards and Johannesburg Water Guidelines and Standards.

2 PROJECT DESCRIPTION

The proposed development site is located on Allandale 10-IR. It is on the northern side of K111 road, at the corner of Modderfontein Rd and Republic Rd, within Rabie ridge. The approximate coordinate of the centre of the site is 26° 0'55.35"S and 28° 9'44.85"E.

The property consists of 2 erfs with a total area of 101.358 hectares. See Annexure A for the site plan.

Figure 1 below illustrates the locality of the site:



Figure 1 – Locality

The proposed development is a mixed-use residential and commercial located within the Allandale 10-IR, forming part of Rabie ridge, in the City of Johannesburg Metropolitan Municipality.

- Topography: The site slopes from West to East at an average gradient of approximately 4%

Elevation:

- Highest Point: 1628 m MSL (Northern boundary)
- Lowest Point: 1588 m MSL (Western boundary)

Development Phasing:

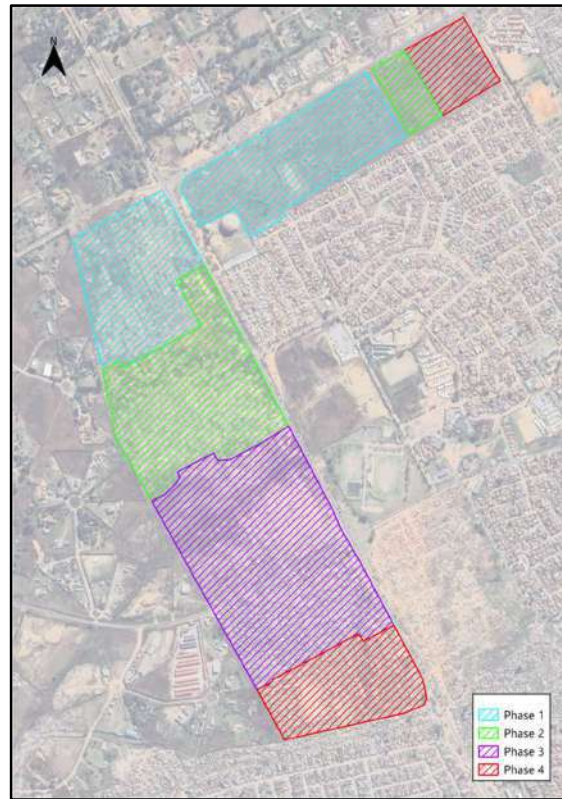


Figure 2 – Development Phasing Plan

The proposed Rabie Ridge Extension development will be implemented in four phases comprising commercial, residential, mixed-use, educational, and supporting land uses. The phased implementation strategy will facilitate the coordinated provision of engineering services and supporting infrastructure in line with the anticipated development growth.

Phase 1 will comprise the development of a 28,000 m² shopping centre together with a portion of the Residential 3 (75 514 m²) development. This phase will establish the primary commercial node within the development while introducing an initial residential component to support economic activity and create an active urban environment.

Phase 2 will comprise the development of a filling station, supporting hardware and related commercial facilities, together with a further portion of the Residential 3 development (112 758 m²). This phase will strengthen the commercial offering within the township and provide essential services to both residents and the surrounding communities.

Phase 3 will comprise the majority of the Residential 3 development (45 153 m²), together with the proposed school site and associated community facilities. This phase will accommodate a significant proportion of the ultimate residential population and provide the necessary educational infrastructure to support the growing community.

Phase 4 will comprise the balance of the residential 3 and mixed-use development areas (113 585 m²), completing the township in accordance with the approved development framework. Upon completion, the development will consist of approximately 2,800 Residential 3 dwelling units, a

regional shopping centre, a filling station, supporting commercial facilities, educational facilities, and associated public open spaces.

3 WATER INFRASTRUCTURE

Existing Infrastructure

The Rabie Ridge area is served by an existing municipal water reticulation network comprising multiple pipes of varying diameters and materials. The existing Rabie Ridge reservoir serves as the primary bulk supply point for the development. No existing water infrastructure is present within the development boundary.

Proposed Connection

The proposed development is bisected by the K56 road, with the water supply infrastructure designed to be implemented progressively in accordance with the approved development phasing. All internal water reticulation infrastructure will be newly constructed and commissioned incrementally to accommodate the increasing water demand associated with each phase of the development.

The western portion of the development will be supplied from the existing Rabie Ridge 7.5 ML Reservoir via a proposed 315 mm diameter uPVC bulk water main. The bulk main will branch into two 250 mm diameter uPVC internal reticulation mains, which will distribute potable water throughout the western portion of the development. Water demand within this area will increase progressively as each development phase is completed and commissioned.

The eastern portion of the development will be supplied through a proposed 110 mm diameter uPVC water main connected to the existing 200 mm diameter uPVC municipal water main within the Rabie Ridge Extension 2 water reticulation network. Similar to the western portion, water demand will increase incrementally as successive phases of the development are implemented.

The proposed phased water supply strategy ensures that adequate potable water is available throughout the construction and operational stages of the development while allowing the internal reticulation network to expand in line with the projected increase in demand.

Water Demand Calculations

The total water demand for the development has been estimated based on the Johannesburg Water Guidelines and is as follows (refer to Table 1):

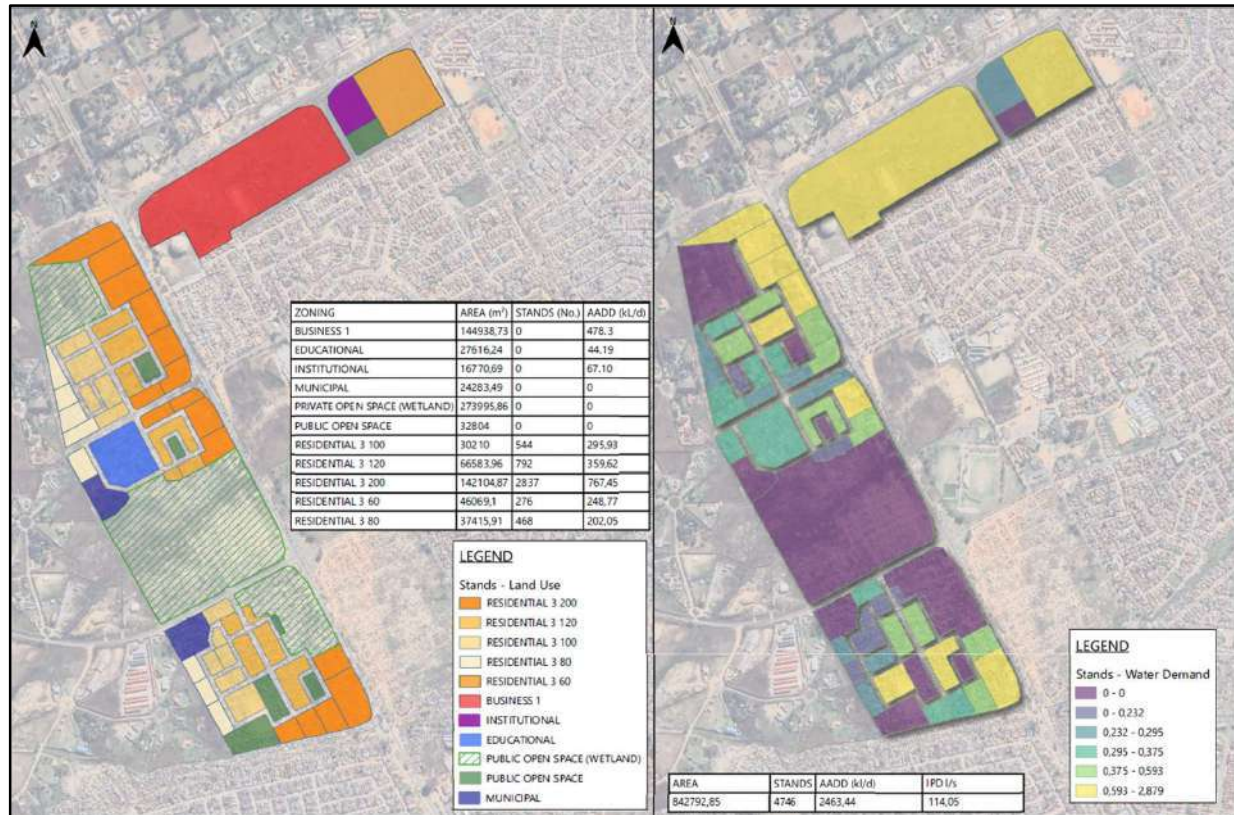


Figure 3 – Water Demand Design Guidelines

Description	Category (JW)	Area (m²)	Area (ha)	Daily Flow (kl/d)	Flow (l/s)	Peak Factor	Fire Flow (l/s)	Peak Demand (l/s)
Phase 1								
Shopping centre	Business and commercial	144,939	14.49	478.30	5.54	4	25	22.14
Mixed-use	Residential III	41,671	4.17	225.02	2.60	4	25	10.42
	Residential III	15,655	1.57	84.54	0.98	4	25	3.91
	Residential III	13,560	1.36	73.22	0.85	4	25	3.39
	Residential III	4,628	0.46	24.99	0.29	4	25	1.16
Total Phase 1								41.02
Phase 2								
Garage	Business and commercial	16,774	1.68	67.10	0.78	4	25	3.11
Mixed-use	Residential III	57,906	5.79	312.69	3.62	4	25	14.48
	Residential III	20,435	2.04	110.35	1.28	4	25	5.11
	Residential III	13,767	1.38	74.34	0.86	4	25	3.44
	Residential III	20,650	2.06	111.51	1.29	4	25	5.16
Total Phase 2								31.30
Total (Phase 1+2)								72.32
Phase 3								
School	Educational	27,621	2.76	44.19	0.51	4	25	2.05
Mixed-use	Residential III	19,933	1.99	107.64	1.25	4	25	4.98

	Residential III	17,763	1.78	95.92	1.11	4	25	4.44
	Residential III	7,457	0.75	40.27	0.47	4	25	1.86
Total Phase 3								13.33
Total (Phase 1+2+3)								85.65
Phase 4								
Mixed-use	Residential III	42,543	4.25	229.73	2.66	4	25	10.64
	Residential III	10,573	1.06	57.09	0.66	4	25	2.64
	Residential III	9,711	0.97	52.44	0.61	4	25	2.43
	Residential III	4,689	0.47	25.32	0.29	4	25	1.17
	Residential III	46,069	4.61	248.77	2.88	4	25	11.52
Total Phase 4								28.40
Total (Phase 1+2+3+4)								114.05

Table 1 – Water Demand Calculations**Fire Fighting Requirements**

In accordance with Johannesburg Water Guidelines, the development is classified as Moderate Risk 2, which requires a minimum firefighting flow of:

- 25 ℓ/s

This demand is significantly higher than the peak domestic demand. Therefore, it is necessary to:

- Assess the capacity of the municipal supply to meet this firefighting requirement
- If the municipality does not meet the aforementioned condition, a provision for on-site storage and a booster pump system to ensure adequate pressure and flow for firefighting

4 SEWER INFRASTRUCTURE

Existing Infrastructure

No municipal sewer reticulation exists within the development boundary, and no bulk sewer infrastructure runs in proximity to the site. The existing Rabie Ridge sewer reticulation network is located to the east of the K56 road.

Proposed Connection

The sewer servicing strategy differs on either side of the K56 road and will be implemented progressively in line with the phased development. Owing to the absence of nearby bulk sewer infrastructure, the western portion of the development will be serviced by two proposed sewer pump stations. The first lifting station will be located along the western boundary adjacent to Falcon Street, from where sewage will be pumped via a 200 mm diameter rising main to a 200 mm diameter gravity sewer, which will convey flows to a second lifting station located along the western boundary adjacent to Dane Road. From the second lifting station, sewage will be pumped through a 250 mm diameter

rising main for discharge into the existing 600 mm diameter outfall sewer located outside the development boundary.

The eastern portion of the development will be connected to the existing Rabie Ridge Extension 2 sewer reticulation network through two 160 mm diameter gravity sewer connections. One connection will discharge into the existing 160 mm uPVC sewer, while the second will connect to the existing 150 mm diameter clay sewer. Sewer flows entering the municipal reticulation network will increase incrementally as each phase of the development is commissioned, with the proposed infrastructure sized to accommodate the ultimate development demand.

Sewer Discharge Calculations

The total sewer discharge for the development has been estimated based on the Johannesburg Water Guidelines and is as follows (refer to Table 2):

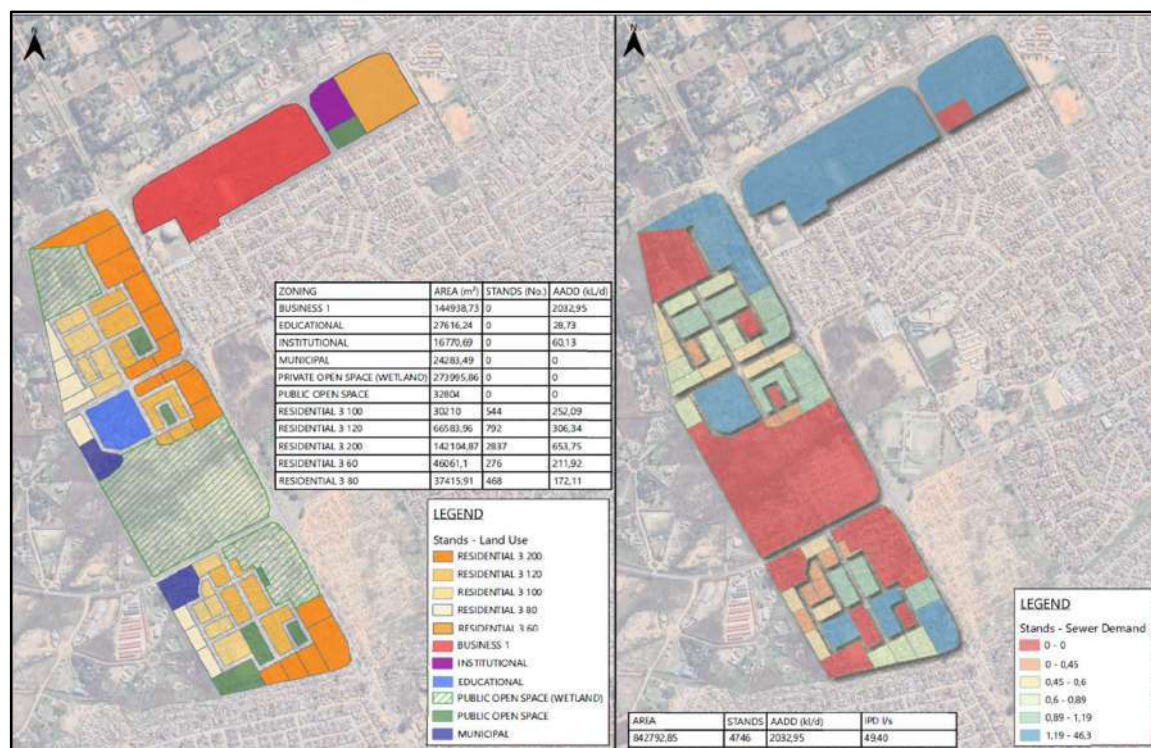


Figure 4 – Sewer Discharge Design Guidelines

Description	Category (JW)	Area (m ²)	Area (ha)	Daily Flow (kl/d)	Flow (l/s)	Peak Factor	Peak Demand (l/s)
Phase 1							
Shopping centre	Business and commercial	144,939	14.49	347.85	4.03	1.3	5.23
Mixed-use	Residential III	41,671	4.17	191.69	2.22	2.3	5.10
	Residential III	15,655	1.57	72.01	0.83	2.3	1.92
	Residential III	13,560	1.36	62.38	0.72	2.3	1.66

	Residential III	4,628	0.46	21.29	0.25	2.3	0.57
Total Phase 1							14.48
Phase 2							
Fuel station	Business and commercial	16,774	2.51	60.13	0.70	1.3	0.91
Mixed-use	Residential III	57,906	5.79	266.37	3.08	2.3	7.09
	Residential III	20,435	2.04	94.00	1.09	2.3	2.50
	Residential III	13,767	1.38	63.33	0.73	2.3	1.69
	Residential III	20,650	2.06	94.99	1.10	2.3	2.53
Total Phase 2							14.71
Total (Phase 1+2)							29.19
Phase 3							
School	Educational	27,621	2.76	28.73	0.33	2.3	0.76
Mixed-use	Residential III	19,933	1.99	91.69	1.06	2.3	2.44
	Residential III	17,763	1.78	81.71	0.95	2.3	2.18
	Residential III	7,457	0.75	34.30	0.40	2.3	0.91
Total Phase 3							6.29
Total (Phase 1+2+3)							35.49
Phase 4							
Mixed-use	Residential III	42,543	4.25	195.70	2.27	2.3	5.21
	Residential III	10,573	1.06	48.64	0.56	2.3	1.29
	Residential III	9,711	0.97	44.67	0.52	2.3	1.19
	Residential III	4,689	0.47	21.57	0.25	2.3	0.57
	Residential III	46,069	4.61	211.92	2.45	2.3	5.64
Total Phase 4							13.91
Total (Phase 1+2+3+4)							49.40

Table 2 – Sewer Discharge Calculations

5 BULK CONTRIBUTIONS

The developer will be required to make bulk infrastructure contributions for both water supply and sewer services in accordance with municipal regulations. These contributions are levied to ensure that the existing municipal infrastructure can support the additional load generated by the development.

The calculation and determination of these contributions will be undertaken by the City of Johannesburg, based on:

- The approved conditions of establishment, and
- The submission and acceptance of clearance certificates from all relevant municipal departments, including Johannesburg Water and City Planning.

The developer acknowledges this requirement and will engage with the relevant municipal authorities to ensure that all contributions are paid as stipulated prior to service connection or occupancy certification.

6 EXTERNAL UPGRADES COST SUMMARY

It should be noted that external upgrades are defined as the infrastructure that falls outside the development boundary. This excludes the internal water and sewer reticulation services.

Based on the current assessment, no link services or external infrastructure upgrades have been identified as necessary to support the proposed development. However, this conclusion is subject to confirmation by Johannesburg Water during their review of this report.

7 CONCLUSION

The proposed mixed-use development at Rabie Ridge has been assessed to determine the water supply and sewer infrastructure requirements in accordance with Johannesburg Water guidelines. The development will be implemented over four phases, with the internal water and sewer reticulation infrastructure constructed incrementally to accommodate the projected increase in demand. At full development, the estimated peak water demand is 114.05 L/s, while the estimated peak sewer discharge is 49.40 L/s.

The western portion of the development will be supplied from the existing Rabie Ridge Reservoir via a new 315 mm uPVC bulk water main, which will branch into two 250 mm uPVC mains. Wastewater from this portion will be conveyed by two proposed sewer lifting pump stations, with 200 mm and 250 mm rising mains discharging into the existing 600 mm diameter outfall sewer.

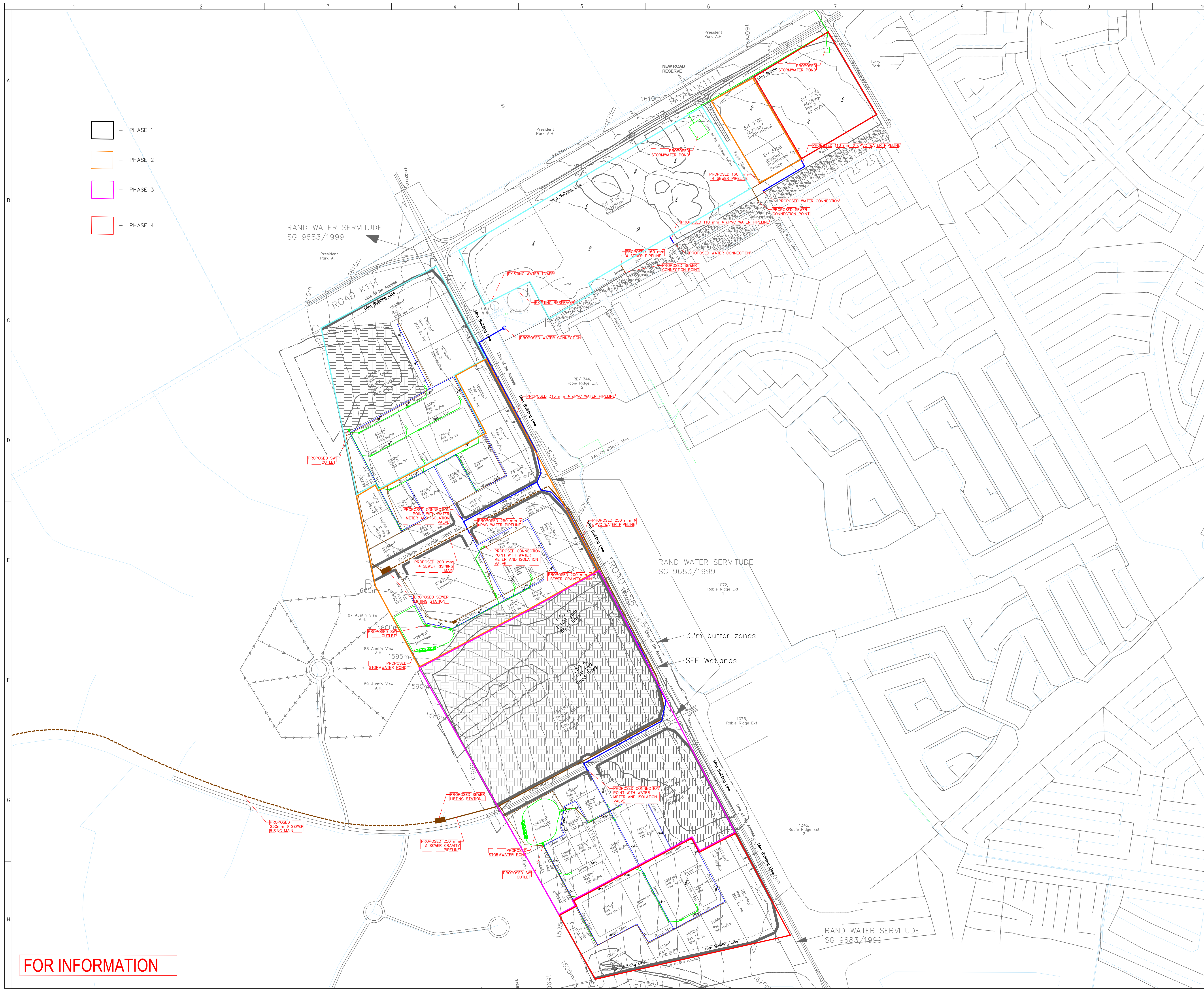
The eastern portion of the development will be supplied through a new 110 mm uPVC water connection to the existing 200 mm diameter uPVC water main within the Rabie Ridge Extension 2 water reticulation network. Sewerage from this portion will discharge via two new 160 mm diameter sewer connections to the existing 160 mm uPVC and 150 mm clay sewer pipelines.

The developer will be responsible for the design and construction of all internal engineering services, including the phased installation of water and sewer reticulation infrastructure. In addition, the developer shall be liable for any bulk infrastructure contributions and connection fees as determined by the City of Johannesburg. The proposed servicing arrangements and any associated upgrade requirements remain subject to the approval of Johannesburg Water and the relevant municipal authorities before implementation of the development.

8 ANNEXURE A – DRAWINGS



PROJECT STATUS				SHEET	REVISION
				1/2	A
CONCEPT DRAWING	TENDER DRAWING	CONSTRUCTION DRAWING	AS BUILT DRAWING		



FOR INFORMATION

NOTES

LEGEND

- STORM WATER DRAINAGE PATH
- PROPOSED SW PIPELINE
- PROPOSED SW OUTLET
- PROPOSED SEWER RISING MAIN
- PROPOSED SEWER GRAVITY PIPE
- PROPOSED SEWER LIFTING STATION
- EXISTING SEWER PIPELINE
- PROPOSED WATER PIPELINE
- EXISTING WATER PIPELINE

A	18-06-26	ISSUED FOR APPROVAL	SDH
NO.	DATE	REVISION	

AMENDMENTS

CLIENT	
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Approved	Date
LOCAL AUTHORITY	
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Approved	Date
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Approved	Date
PROJECT NAME	
RABIE RIDGE	

DRAWING TITLE	
SITE DEVELOPMENT PLAN	

	NAME
Client	
Designer	M HLUNGWANE
Drawn By	M HLUNGWANE
Checked By	N MEYER
Approved	N MEYER
Engineer	N MEYER

SCALE	1:4 250 (A1)	ORIGINAL PAPER SIZE	A1
CONTRACT NO.	11448		
PROJECT NO.	11448		
DRAWING NUMBER	11448-004-001		

PROJECT STATUS				SHEET	REVISION
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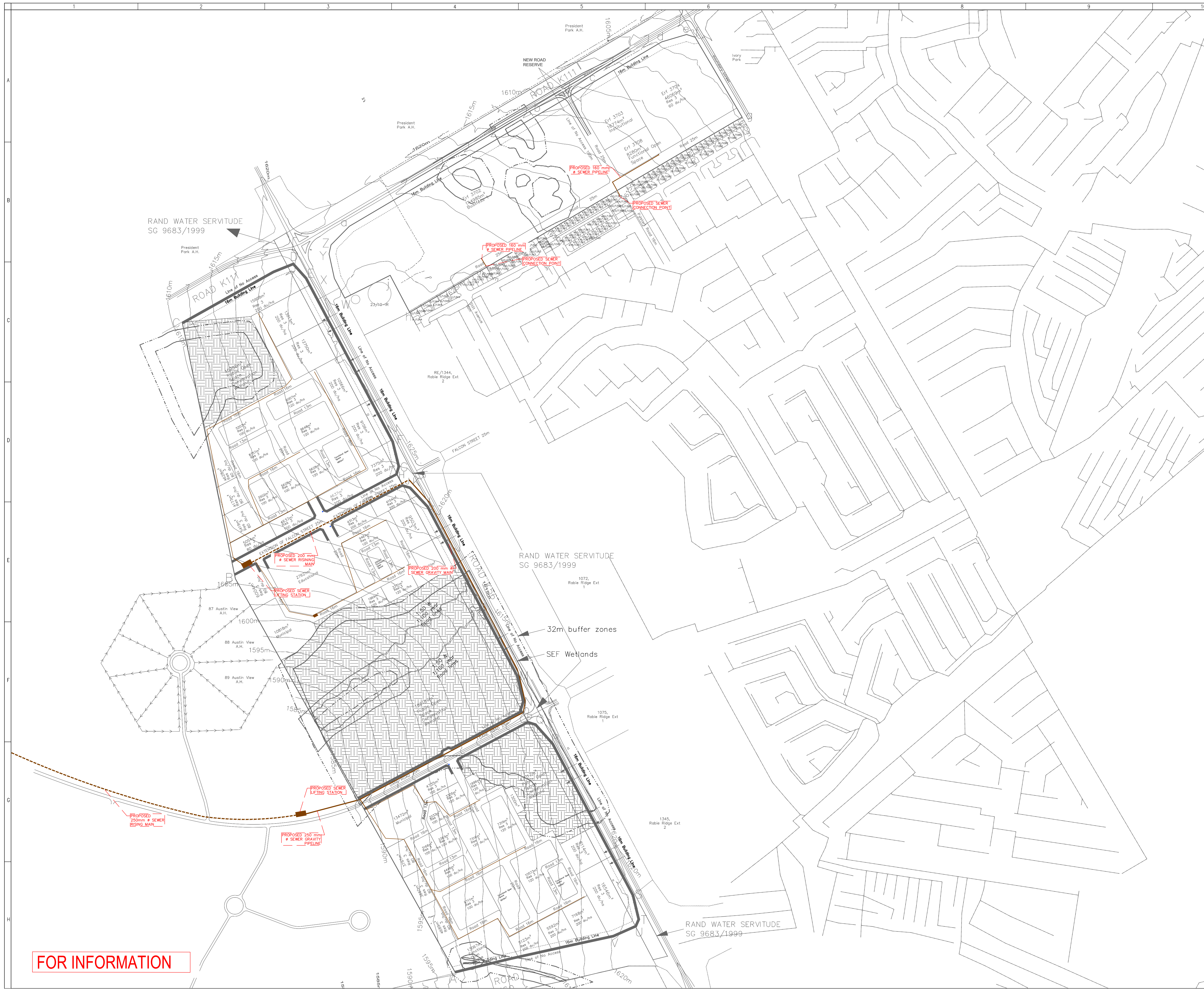
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Approved	Date
PROJECT NAME	
RABIE RIDGE	

DRAWING TITLE	
WATER LAYOUT	

NAME	
Client	
Designer	M HLUNGWANE
Drawn By	M HLUNGWANE
Checked By	N MEYER
Approved	N MEYER
Engineer	M HLUNGWANE
SCALE	1:4 250 (A1)
ORIGINAL PAPER SIZE	A1
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PROJECT NO.	11448
DRAWING NUMBER	11448-050-001
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☐ CONSTRUCTION DRAWING	☐ AS BUILT DRAWING
SHEET	REVISION
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- PROPOSED SEWER LIFTING STATION
- EXISTING SEWER PIPELINE
- PROPOSED WATER PIPELINE
- EXISTING WATER PIPELINE

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AMENDMENTS

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Approved _____ Date _____

LOCAL AUTHORITY



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Approved _____ Date _____

PROJECT NAME

RABIE RIDGE

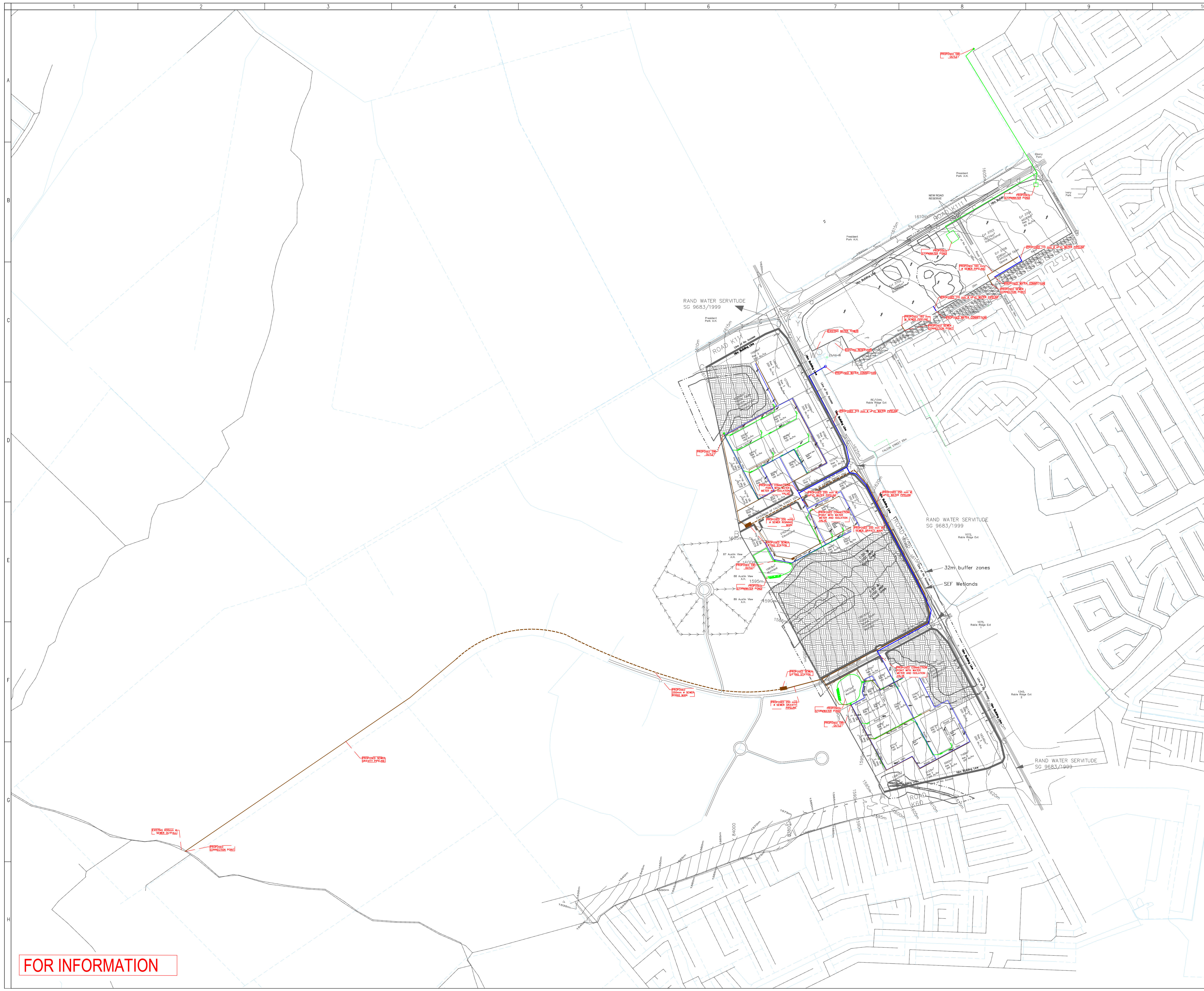
DRAWING TITLE

SEWER LAYOUT

	NAME
Client	
Designer	M HLUNGWANE
Drawn By	M HLUNGWANE
Checked By	N MEYER
Approved	N MEYER
Engineer	N MEYER

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PROJECT NO.	11448		
DRAWING NUMBER	11448-100-001		

PROJECT STATUS				SHEET	REVISION
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AMENDMENTS

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TEL :+27 (0)83 287-5980

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Fax: +27 (0)12 361-4371

Approved _____ Date _____

PROJECT NAME

RABIE RIDGE

DRAWING TITLE

SITE DEVELOPMENT PLAN

	NAME	
Client		
Designer	M HLUNGWANE	
Drawn By	M HLUNGWANE	
Checked By	N MEYER	
Approved	N MEYER	
Engineer	N MEYER	

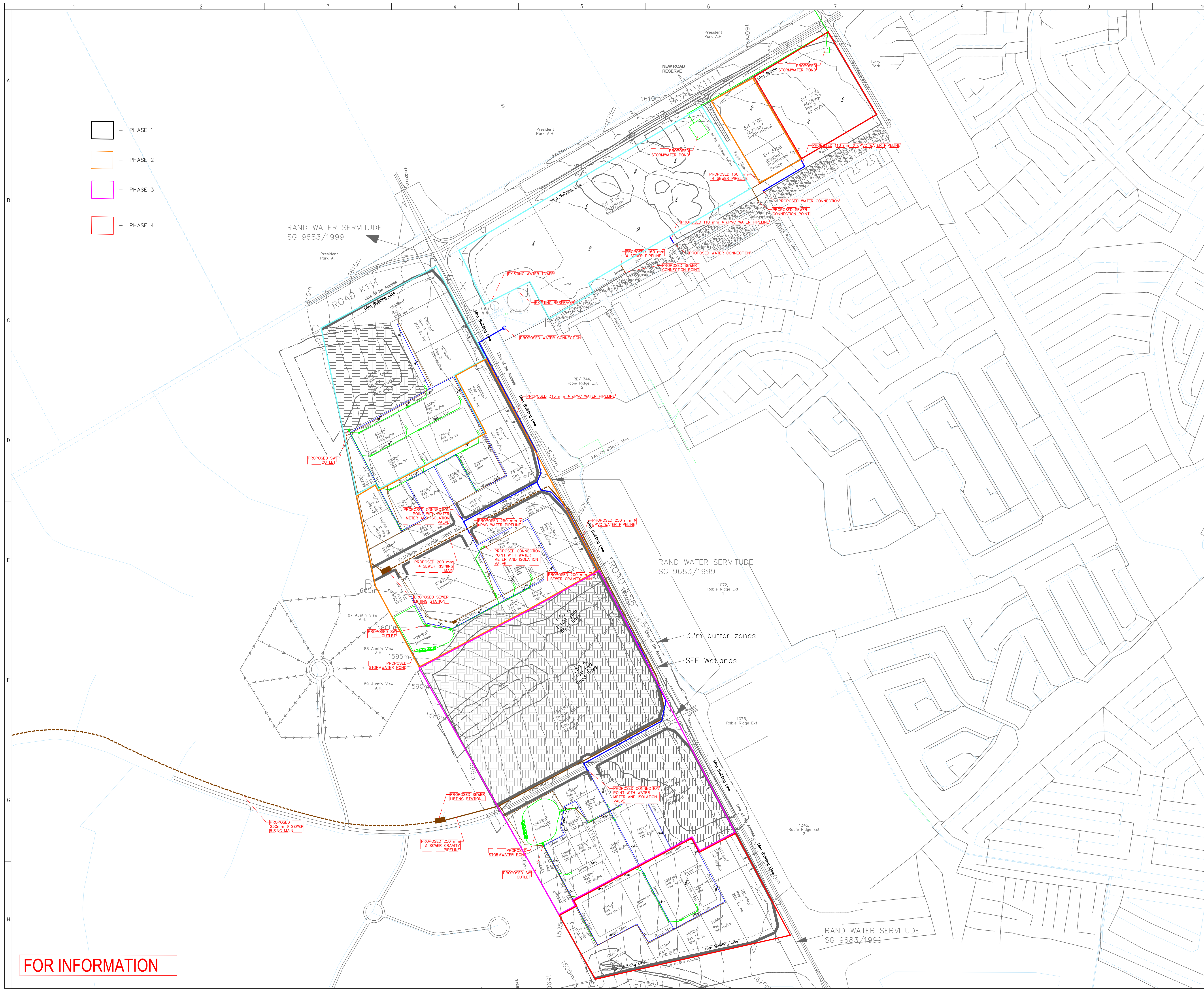
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PROJECT NO.	11448
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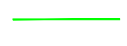
PROJECT STATUS				SHEET	REVISION
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-  - PROPOSED SEWER GRAVITY PIPE
-  - PROPOSED SEWER LIFTING STATION
-  - EXISTING SEWER PIPELINE
-  - PROPOSED WATER PIPELINE
-  - EXISTING WATER PIPELINE

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NO.	DATE	REVISION	

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		131 12th Avenue
		Rivonia
		Gauteng (RSA)
		TEL :+27 (0)83 287-5980

Approved _____ Date _____

LOCAL AUTHORITY		JOHANNESBURG WATER
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	NAME
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Drawn By	M HLUNGWANE
Checked By	N MEYER
Approved	N MEYER
Engineer	N MEYER

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DRAWING NUMBER	11448-004-001
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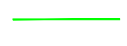
PROJECT STATUS		SHEET	REVISION
☒ CONCEPT DRAWING	☐ TENDER DRAWING	2/2	A
☐ CONSTRUCTION DRAWING	☐ AS BUILT DRAWING		



FOR INFORMATION

NOTES

LEGEND

-  - STORM WATER DRAINAGE PATH
-  - PROPOSED SW PIPELINE
-  - PROPOSED SW OUTLET
-  - PROPOSED SEWER RISING MAIN
-  - PROPOSED SEWER GRAVITY PIPE
-  - PROPOSED SEWER LIFTING STATION
-  - EXISTING SEWER PIPELINE
-  - PROPOSED WATER PIPELINE
-  - EXISTING WATER PIPELINE

A	18-06-26	ISSUED FOR APPROVAL	SDH
NO.	DATE	REVISION	

AMENDMENTS

CLIENT	
	Davidoff Ltd 131 12th Avenue Rivonia Gauteng (RSA) TEL :+27 (0)83 287-5980

Approved	Date
LOCAL AUTHORITY	
JOHANNESBURG WATER	
	TURBINE HALL, 65 NTEMI PILISO STREET, NEWTOWN JOHANNESBURG, 9301(RSA) TEL :+27 (0)11 688-1400

Approved	Date
CONSULTANT DETAIL	
CEENEX (Pty) Ltd	
	291 Sprite Avenue Menlyn Woods Faerie Glen, Pretoria (RSA) TEL :+27 (0)12 361-4373 Fax: +27 (0)12 361-4371

Approved	Date
PROJECT NAME	
RABIE RIDGE	

DRAWING TITLE	
WATER LAYOUT	

	NAME
Client	
Designer	M HLUNGWANE
Drawn By	M HLUNGWANE
Checked By	N MEYER
Approved	N MEYER
Engineer	M HLUNGWANE

SCALE	1:4 250 (A1)	ORIGINAL PAPER SIZE	A1
CONTRACT NO.	11448		
PROJECT NO.	11448		
DRAWING NUMBER	11448-050-001		

PROJECT STATUS				SHEET	REVISION
☒ CONCEPT DRAWING	☐ TENDER DRAWING	☐ CONSTRUCTION DRAWING	☐ AS BUILT DRAWING	1/1	A



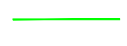
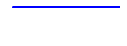
1/1	A
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FOR INFORMATION

NOTES

LEGEND

-  - STORM WATER DRAINAGE PATH
-  - PROPOSED SW PIPELINE
-  - PROPOSED SW OUTLET
-  - PROPOSED SEWER RISING MAIN
-  - PROPOSED SEWER GRAVITY PIPE
-  - PROPOSED SEWER LIFTING STATION
-  - EXISTING SEWER PIPELINE
-  - PROPOSED WATER PIPELINE
-  - EXISTING WATER PIPELINE

A	18-06-26	ISSUED FOR APPROVAL	SDH
NO.	DATE	REVISION	

AMENDMENTS

CLIENT		Davidoff Ltd
		131 12th Avenue Rivonia Gauteng (RSA)
		TEL :+27 (0)83 287-5980

Approved	Date
----------	------

LOCAL AUTHORITY		JOHANNESBURG WATER
		TURBINE HALL, 65 NTEMI PILISO STREET, NEWTOWN JOHANNESBURG, 9301(RSA)
		TEL :+27 (0)11 688-1400

Approved	Date
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CONSULTANT DETAIL		CEENEX (Pty) Ltd
		291 Sprite Avenue Menlyn Woods Faerie Glen, Pretoria (RSA)
		TEL :+27 (0)12 361-4373 Fax: +27 (0)12 361-4371

Approved	Date
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PROJECT NAME		RABIE RIDGE
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DRAWING TITLE		STORM WATER LAYOUT
---------------	--	--------------------

	NAME	
Client		
Designer	M HLUNGWANE	
Drawn By	M HLUNGWANE	
Checked By	N MEYER	
Approved	N MEYER	
Engineer	M HLUNGWANE	

SCALE	1:4 250 (A1)	ORIGINAL PAPER SIZE	A1
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CONTRACT NO.	11448
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PROJECT NO.	11448
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DRAWING NUMBER	11448-200-001
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PROJECT STATUS				SHEET	REVISION
☒ CONCEPT DRAWING	☐ TENDER DRAWING	☐ CONSTRUCTION DRAWING	☐ AS BUILT DRAWING	1/1	A

PretoriaLynnwood Bridge, 4 Davenry Street
Lynnwood Manor, Pretoria, South Africa

PO Box: 1014, Pretoria 0001, South Africa

DOCEX: 81 Pretoria

Direct line | +27 12 432 6000

Fax | +27 12 432 6599

Email | mail@adams.africa

TO WHOM IT MAY CONCERN

Dear Sir / Madam,

Our Reference: LDK/MDLM/H1062

Your Reference:

Date: 30 July 2026

CONVEYANCER'S CERTIFICATE:**APPLICATION TO THE CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY IN TERMS OF SECTION 26 OF THE
CITY OF JOHANNESBURG PLANNING BY-LAW, 2016****IN RESPECT OF:****THE REMAINING EXTENT OF THE FARM ALLANDALE 10, REGISTRATION DIVISION I.R., PROVINCE OF GAUTENG****TO BE KNOWN AS:****RABIE RIDGE EXTENSION 9 TOWNSHIP****CONVEYANCER'S CERTIFICATE: FOR PURPOSES OF APPLICATION FOR ESTABLISHMENT OF A TOWNSHIP**

I, the undersigned,

LINDA KHUMALO (106648)

a Conveyancer, practising as such under the name and style of Adams & Adams, situated in Johannesburg in the Province of Gauteng, do hereby certify that I have perused the records of the Deeds Registry, Pretoria, and existing Title Deeds and confirm the following:

1. That the Remaining Extent of the Farm Allandale 10, Registration Division I.R., Province of Gauteng (hereinafter referred to as "the Property") is held by Deed of Transfer T4506/2022 and has vested in the name of City of Johannesburg Metropolitan Municipality by virtue of endorsement in terms of Section 15(2)(a) and (6) of the Housing Act 107 of 1997, registered under T21287/2024.
2. The extent of the Property as depicted in Deed of Transfer T4506/2022 is 129,6391 (One Hundred and Twenty Nine Comma Six Three Nine One) Hectares however on the Deeds Office property search the extent of the Property is depicted as 103,3976 (One Hundred and Three comma Three Nine Seven Six) Hectares. **(The Land Surveyor to confirm the correct extent).**
3. I confirm that there is no mortgage bond registered over the Property.

LK

4. **Conditions of Title of the Property and applicability to the establishment of a township are as follows:**

- 4.1 By virtue of Notarial Deed No. K3796/1977S dated the 8th November, 1977 and registered on the 14th December, 1977, the property is subject to a Servitude to convey gas and electricity in favour of S.A. Gas Distributor Limited together with certain ancillary rights as will more fully appear from the said Notarial Deed. ***(This condition will affect all erven in the township as ancillary rights are applicable).***
- 4.2 By virtue of Notarial Deed No. K3138/1980S the right has been granted to ESKOM to convey electricity over the property hereby transferred together with ancillary rights and subject to conditions as will more fully appear from the said Notarial Deed which Notarial Deed has been amended by virtue of Notarial Deed No. K2933/1986S dated the 10th July, 1986 and registered on 26th, August, 1986. ***(This condition will affect all erven in the township as ancillary rights are applicable).***
- 4.3 In terms of Section 30(1) of Ordinance 19 of 1973 permission has been granted by the Administrator in terms of Section 5 of Ordinance 19 of 1973 for the subdivision of the within mentioned property. ***(We suggest that the town planner applies for the removal of this condition if it has served its purpose, so that it does not get carried forward to the township).***
- 4.4 A portion measuring approximately 1859 square metres of the withinmentioned property has been expropriated by the Community Development Board in terms of Section 2 Act 3/66. ***(This condition will affect all erven in the township unless it can be shown that the expropriation has been registered).***
- 4.5 A portion measuring approximately 7,9343 hectares of the withinmentioned property has been expropriated by the Transvaal Province Administrator vide Notice Expropriation EX588/93. ***(This condition will affect all erven in the township unless it can be shown that the expropriation has been registered).***
- 4.6 By virtue of Notarial Deed of Servitude K1378/04S dated 11th February 2004 the withinmentioned property is subject to rights in perpetuity to convey and transmit water by means of pipelines already laid, and which may be laid along a strip of ground 6,5949 Hectares as depicted by the figure A B C D A on Servitude Diagram S.G No 9683/1999 annexed thereto, together with the right in perpetuity to lay or carry through all accessories, as will more fully appear from the said Notarial Deed. ***(This condition will affect all erven in the township as ancillary rights are applicable. A Section 4(1)(b) Application in terms of the Deeds Registries Act will have to be done to qualify the conditions on the title deed to reflect that ancillary rights are applicable).***
5. The following caveats are noted against the Property as appears from the Deeds Office property deeds search and enclosed for your ease of reference:
- 5.1 **I - 11765/1998LG-98052** - Refers to the withdrawal of General Plan S.G No. A3407/1991 of Commercial Extension 27.
- 5.2 **I - 1062/2018I** - Refers to a court order wherein Deed of Transfer T1179/2016 was cancelled and Deed of Transfer T71223/1995 was revived.
- 5.3 **I - 3068/2023C** – Refers to a note by Gauteng Provincial Government.
- 5.4 **I - 6463/2006LG** - Refers to the withdrawal of General Plan S.G No. 4931/1989 of Wadeville Extension 25.
- 5.5 **I - 8995/2005LG** – Refers to the withdrawal of General Plan S.G No. 7701/1997 of Commercial Extension 35.
- 5.6 **I - 9340/2007LG** - Refers to the Subdivision of Portion 169 of the Farm Allandale.
- 5.7 **1 - 9207/2008LG** - Refers to the withdrawal of General Plan S.G No. 3016/1998 of Allandale Extension 10.

LK

Signed at Johannesburg on 30th July 2026.

A handwritten signature in black ink, appearing to read 'Linda Khumalo', written over a horizontal line.

LINDA KHUMALO



FJ LOOCK LAND SURVEYORS Inc.

Cadastral, Topographical, Engineering Surveys

LAND SURVEYOR CERTIFICATE OF PROPOSED TOWNSHIP RABIE RIDGE EXT. 9, SITUATED ON PORTION 295 OF THE FARM ALLANDALE NO. 10-IR

This Land Surveyor Certificate addresses the registered Title Deed conditions affecting **Proposed Township Rabie Ridge Extension 9** situated on unregistered Portion 295 of the farm Allandale No. 10-IR, a portion of the **Remainder of the farm Allandale No. 10-IR, Province of Gauteng**. The certificate summarises the servitudes and other restrictions noted in the Deed of Transfer.



F.J. Loock Land Surveyor Inc.

Tel: (012) 996 0051; Fax: (012) 996 0052; Plot 273, Zwavelpoort, Pretoria
johanse@loocklandsurveyors.co.za; www.loocklandsurveyors.co.za; P.O.BOX 90581, Garsfontein, Pretoria, 0042

F.J. Loock Land Surveyor (PLS - 1096); VAT REG. NR 4440251322



FJ LOOCK LAND SURVEYORS Inc.

Cadastral, Topographical, Engineering Surveys

Property Description:

Remainder of the farm Allandale No. 10
Registration Division IR
Province of Gauteng

Held by:

Deed of Transfer No. T4506/2022

Surveyor-General Diagram:

Diagram SG No. A5803/1951

With reference to above-mentioned Deed of Transfer and Surveyor-General diagram and available cadastral information relating to the property, the following:

SUBJECT TO THE FOLLOWING CONDITIONS:

- A.** By virtue of Notarial Deed No. K3796/1977S dated the 8th of November, 1977 and registered on the 14th of December, 1977, the within-mentioned property is subject to a Servitude to convey gas and electricity in favour of S.A. Gas Distributor Limited together with certain ancillary rights as will more fully appear from the said Notarial Deed.

Although above-mentioned servitude does not affect the proposed township or the Remainder of the farm Allandale No. 10-IR due to location, the servitude is granted to S.A. Gas Distributor Limited together with ancillary rights and therefore must be carried forward onto the erven of the proposed Township.

- B.** By virtue of Notarial Deed No. K3138/1980S the right has been granted to the ESKOM to convey electricity over the property hereby transferred together with ancillary rights and subject to conditions as will more fully appear from the said Notarial Deed which Notarial Deed has been amended by virtue of Notarial Deed No. K2933/1986S dated the 10th of July 1986 and registered on the 26th of August 1986.

Above-mentioned servitude is granted to ESKOM together with ancillary rights and therefore must be carried forward onto the erven of the proposed Township.

- C.** In terms of Section 30(1) of Ordinance 19 of 1973 permission has been granted by the Administrator in terms of Section 5 of Ordinance 19 of 1973 for the subdivision of the within-mentioned property.

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johanse@loocklandsurveyors.co.za; www.loocklandsurveyors.co.za; P.O.BOX 90581, Garsfontein, Pretoria, 0042

F.J. Loock Land Surveyor (PLS - 1096); VAT REG. NR 4440251322



FJ LOOCK LAND SURVEYORS Inc.

Cadastral, Topographical, Engineering Surveys

- D. A portion measuring approximately 1859 square metres of the within-mentioned property has been expropriated by the Community Development Board in terms of Section 2 Act 3/66.
- E. A portion measuring approximately 7,9343 hectares of the within-mentioned property has been expropriated by the Transvaal Province Administrator, vide Notice of Expropriation EX 588/93
- F. By virtue of Notarial Deed of Servitude K1378/04S dated 11th February 2004 the within-mentioned property is subject to the rights in perpetuity to convey and transmit water by means of pipelines already laid, and which may be laid along a strip of ground 6,5949 Hectares as depicted by the figure A B C D A on Servitude Diagram S.G No 9683/1999 annexed thereto, together with the right in perpetuity to lay or carry through and all other accessories, as will more fully appear from the said Notarial Deed.

The location of this servitude is shown in yellow on the plan on page 1 of this certificate.


F.J. Loock
Pr. Land Surveyor
GPr LS1096

July 2026

F.J. Loock Land Surveyor Inc.
Tel: (012) 996 0051; Fax: (012) 996 0052; Plot 273, Zwavelpoort, Pretoria
johanse@loocklandsurveyors.co.za; www.loocklandsurveyors.co.za; P.O.BOX 90581, Garsfontein, Pretoria, 0042

F.J. Loock Land Surveyor (PLS - 1096); VAT REG. NR 4440251322

UNDERTAKING TO ADVERTISE

An application for the establishment of a township shall comply with the following procedures:

- (a) Notice of the application shall be given once by simultaneously publishing a notice in the **Provincial Gazette** and a **newspaper** that circulates within the area of jurisdiction of the application site in English;
- (b) Such notice shall clearly reflect in terms of which section of this By-law the application is made and which land use scheme or any other scheme is applicable;
- (c) Such notice shall reflect full details of the application including, but not limited to, the street address, the name of the proposed township and the nature and general purpose of the application;
- (d) Such notice shall further reflect the name, postal address, telephone number, fax number and e-mail address of the person submitting the application;
- (e) Such notice shall further reflect that the application and its accompanied documents will lie open for inspection at specified times and at specified places at the City's offices and that any objection, comment or representation in regard thereto must be submitted timeously to the City in writing by registered post, by hand, by facsimile or by e-mail within a period of 28 days from the date of publication of the notice as envisaged in subsection (a) above.
- (f) A **site notice** that contains the same detail as envisaged in subsections (b) to (e) above shall be displayed on the land under consideration in English;
- (g) Such notice shall be displayed on the land from the same date as the date of the publication of the notice mentioned in subsection (a) above;
- (h) Such notice shall be in the format as determined by the City;
- (i) Such notice shall be displayed in a conspicuous place on the land in question where it would be best and easily visible and can be easily read from each and every adjacent public street or other adjacent public place;
- (j) Such notice shall be maintained in a clearly legible condition for a period of not less than 21 days from the date of publication of the notice mentioned in subsection (a) above; and

- (k) In addition to the requirements in subsections (a) and (f) above, a **letter** shall also be dispatched within 7 days of date of the publication of the notice envisaged in subsection (a) above to the owners/occupiers of all contiguous erven, including those on the opposite side of a street or lane by registered post, by hand or by any other means available informing such owners/occupiers of all the detail as prescribed in subsection (b) to (e) above.
- (l) Proof of compliance with the above must be submitted to the City in the form of a written **affidavit** within 14 days of expiry of the date contemplated in subsection (e) above.

I hereby state that I intend to advertise this application on:

Date: _____

OWNER / AUTHORISED AGENT

Full name: Beatrix Elizabeth Fletcher

Postal Address: PO Box 11437, Silver Lakes Code: 0054

Tel No (w): 012 8092229 Fax No: _____

Cell: 082 807 2030

E-mail address: bea@tph.co.za

SIGNED:  _____
Signature of owner/s

DATE: 05 August 2026

POWER OF ATTORNEY

I, the undersigned,

Phindile Mbanjwa

Identity Number: 760811 0308 08 0

In my capacity as Head of the Department Human Settlements of Gauteng Provincial Government (Gauteng: Department Human Settlements), hereby confirm the following:

1. On or about 16 November 2021 the Gauteng: Department Human Settlements entered into a Sale Agreement with REM Allandale 10 (Pty) Ltd (also known as Ninfu Allandale Dev), **(hereinafter referred to as REM Allandale 10)** in terms of which:
 - 1.1 The Gauteng: Department Human Settlements purchased the Sale Property which is defined as "that portion of the Remainder of the Farm Allandale 10 IR located within the City of Johannesburg Metropolitan Municipality, Gauteng Province **measuring approximately 103,9391 hectares** in extent as more fully appears from the Diagram annexed hereto as Annexure "A" **encapsulated in red.**"
 - 1.2 In terms of clause 1.3.13 it was agreed that the **Transfer Property** (129,6391 hectares) would be transferred to the PURCHASER and after transfer the Sale Property (**103,9391 hectares**) and the Balance of the Remaining Extent (25.7 hectares) as more fully appears from Annexure "A" **encapsulated in blue**, would be subdivided from the Transfer Property and the Balance of the Remaining Extent (25.7 hectares) will be transferred back to REM Allandale 10.
 - 1.3 On 31 January 2022 the Transfer Property (129,6391 hectares) was transferred to the Gauteng: Department Human Settlements **and therefore REM Allandale 10 is entitled to apply for the subdivision of the Transfer Property into the Sale Property (103,9391 hectares) and the Balance of the Remaining Extent (25.7 hectares) and transfer of the Remaining Extent back to REM Allandale 10, which shall all be at the cost of REM Allandale 10.**

2. SUBDIVISION AND TOWN PLANNING

I hereby appoint REM Allandale 10 (Pty) Ltd, Registration Number: 1995/002541/07, and or any of its directors or representatives, with power of substitution to be the lawful Agent of the Gauteng: Department of Human Settlements, **to, all at its own costs:**

- 2.1 **Subdivide the Sale Property (103,9391 hectares) and the Balance of the Remaining Extent (25.7 hectares) from each other and the transfer of the Balance of the Remaining Extent (25.7 hectares) back to REM Allandale 10.**
- 2.2 **Apply for and execute whatever Town Planning and or EIA (Environmental Impact Assessment) as well as any other expert reports it needs to obtain to develop the Balance of the Remaining Extent (25,7 hectares)**

S
Pm

And generally for effecting the purposes aforesaid to do or cause to be done whatsoever shall be requisite, hereby ratifying, allowing and confirming and promising and agreeing to ratify, allow and confirm all and whatsoever the said Agent shall lawfully do, or cause to be done, by virtue of these presents.

Signed at JOHANNESBURG on this 15th day of AUGUST 2022
in the presence of the undersigned witnesses.

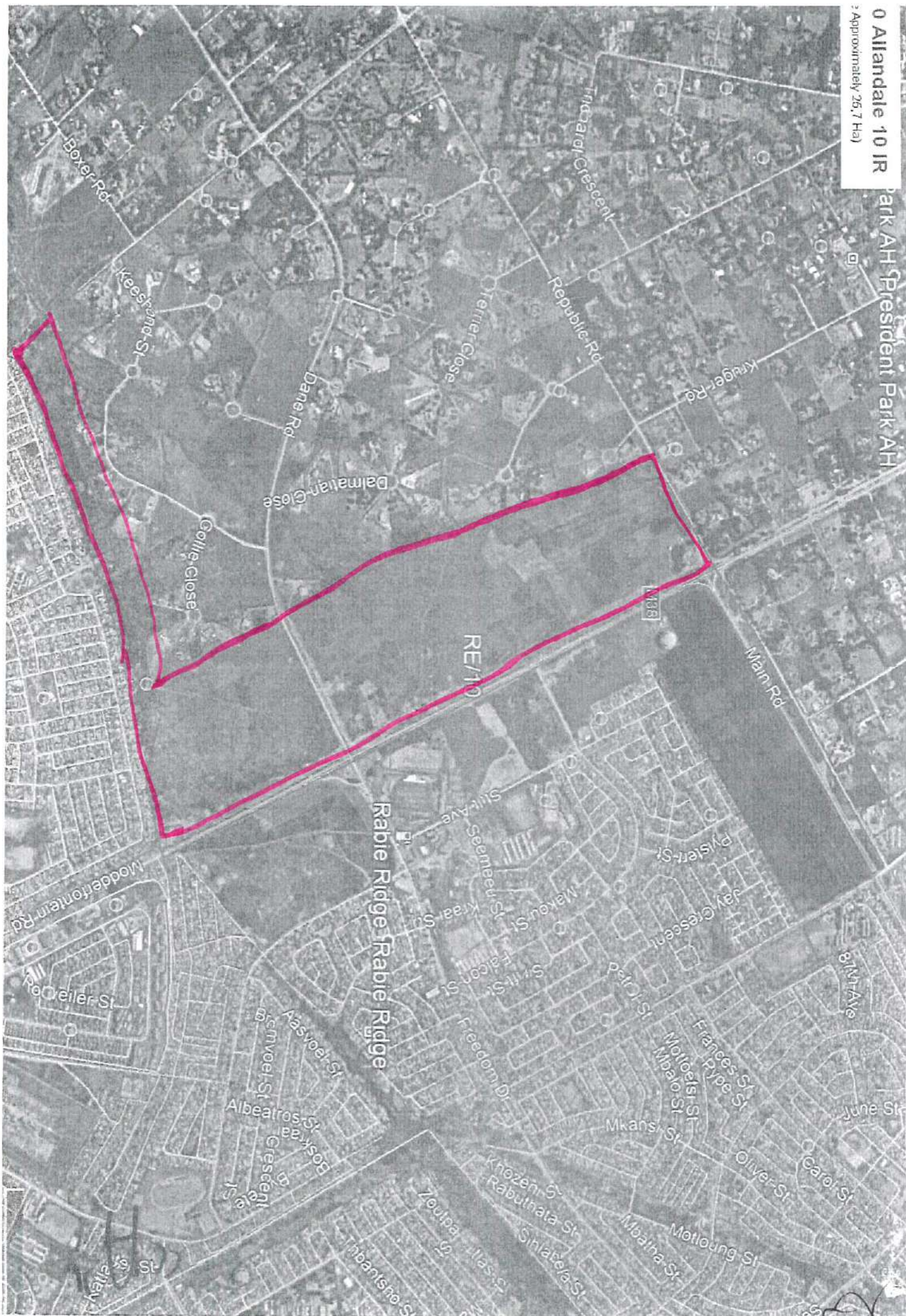
AS WITNESSES:

1.  _____

2.  _____



Approximately 26.7 Ha)



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Beneficiary name

CITY OF JOHANNESBURG

Account number

**3200

Bank

STANDARD BANK

Branch

ALL BRANCHES

Beneficiary reference

LUM5057/1097

Your reference

Rabie Ridge X 9

Payment date

Tue Aug 11 2026 09:11:08 GMT+0200 (South Africa Standard Time)

Amount

R 10 500.00