Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Appendix D

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Tel: 031 262 8327
Fax: 086 726 3619

I&AP Distribution List

I&AP REGISTER/DATABASE - DISTRIBUTION LIST					
ORGANISATION	**CONTACT PERSON**	**PHONE NUMBER**	**CONTACT DETAILS**	**COPY OF THE BID SENT**	**COPY OF THE DRAFT BAR SENT**
KZN Department of Transport	Judy Reddy	033 355 8600	KwaZulu-Natal Department of Transport 224 Prince Alfred Street Pietermaritzburg **Judy.Reddy@Kzntransport.gov.za**	✓	✓
Ezemvelo KZN Wildlife	Dominic Wieners	033 845 1346	Ezemvelo KZN Wildlife P.O.Box 13053 Cascades 3202 **data@kznwildlife.com** **Dominic.Wieners@kznwildlife.com**	✓	✓
Department of Water and Sanitation	Siyabonga Buthelezi	031 336 2700	Department of Water and Sanitation 88 Joe Slovo Street Durban 4001 **ButheleziS2@dws.gov.za**	✓	✓
AMAFA	Bernadet Pawandiwa	033 394 6543	bernadetp@amafapmb.co.za	✓	✓
KZN Corporate Governance and Traditional Affairs	Vishnu Govender	031 204 1711	KwaZulu-Natal: Corporate Governance and Traditional Affairs 7 Buro Crescent Mayville Durban 4091 **vishnu.govender@kzncogta.gov.za**	✓	✓
Ward Councillor, Ward 64	Gavin Hegter	072 821 1917	Ward Councillor, Ward 64, gavin.hegter@gmail.com	✓	✓
Commission on Restitution of Land Rights	Lynn Boucher	033 341 2600	Commission on Restitution of Land Rights Private Bag X9120 Pietermaritzburg 3200 **lynn.boucher@drdlr.gov.za**	✓	X
ethekwini Municipality Development Planning Department Land Use Management Branch	Diane Van Rensburg	031 311 7136	City Engineers Building 166 K.E Masinga Road Durban 4001 **Diane.vanrensburg@durban.gov.za**	✓	✓

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs	Ntuthuko Mbewana	031 366 7351	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs 40 Dr A. B. Xuma Street Durban 4001 Ntuthuko.Mbewana@kznedtea.gov.za	✓	✓
South Durban Community Environmental Alliance	Shanusha	+2731 461 1991	shanusha@sdceango.co.za	✓	✓
Ingonyama Trust Board	PJ Warner	033 846 9927	warnerp@ingonyamatrust.org.za	✓	✓
3 Grimsby Road	Brendin Naidoo		brendin.naidoo@senz.co.za	✓	✓
8 Grimsby Road Post Office	Balungile Gumede		Post Office gumede.balu@postoffice.co.za	✓	✓
1322 South Coast Road Corobrik	Sharmila Naicker		southcoast@corobrik.co.za	✓	✓
Furniture Warehouse	Mohamed Setar		mo.setar@gmail.com	✓	✓
1322 South Coast Road Kitchen Studio	Vassie		vassie@kithchenstudio.com	✓	✓

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Background Information Document

Purpose of a Background Information Document (BID)

The purpose of this Background Information Document (BID) is to provide Interested and Affected Parties (I&AP's) with background information on the proposed project and introduce the Environmental Basic Assessment (BA) process to be followed for the proposed project. It also aims to (i) inform I&AP's on how to participate in the BA, (ii) encourage responses to documents that will be distributed for review and (ii) encourage I&AP's to attend any public meetings.

1World Consultants have been appointed as the independent Environmental Assessment Practitioner (EAP), to undertake the Amendment of the Environmental Authorisation for the Proposed Grimsby Road Filling Station.

Nature and Location of Activity

Aniston Investments (Pty) Ltd. proposes to demolish the existing Mayfair Discount City and construction of a filling station with associated infrastructure and multiple fast food outlets on Portion 2 of Erf 821, Grimsby Road, Mobeni, Ward 64, eThekwini Municipality, KwaZulu-Natal.

Figure 1: Proposed Development Site, Currently housing Mayfair Home & Decor

Environmental Impact

Infrastructure supplying the filling station will consist of 3 Type II, double wall steel, underground storage tank tanks with a maximum capacity of 83m³ each

In terms of the Environmental Impact Assessment (EIA) Regulations (2017) promulgated under the National Environmental Management Act (Act No. 107 of 1998) (as amended), a Basic Assessment Study will be required. The proposed development triggers the following listed activity, as per Listing Notice 1:

GNR 327; Activity 14 (i):

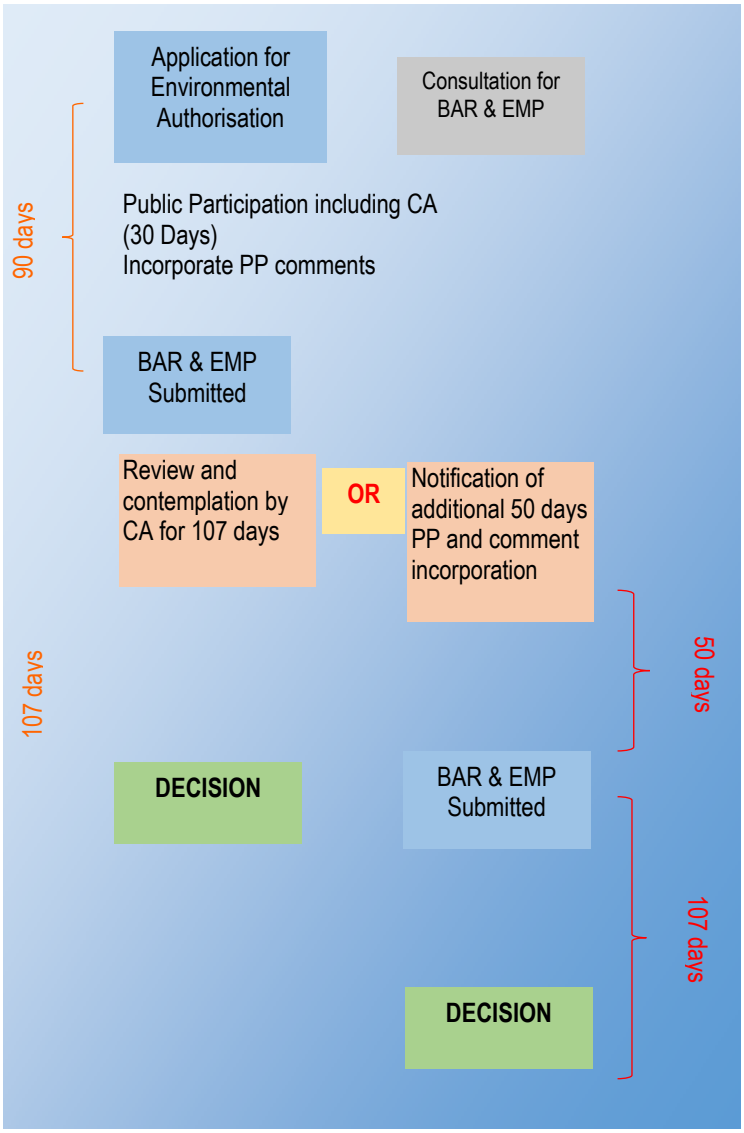
The development of facilities or infrastructure, for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.

The Basic Assessment Process and Public Participation Process (PPP)

The primary aim of the Basic Assessment is to ensure that any potential environmental impacts that may occur, due to the construction and/or operation of the proposed development, are mitigated.

The main aspects of a Basic Assessment are:

- Investigate and gather information on the affected area,
- Describe the environment and how the development would fit in,
- Identify and involve potential I&AP's and stakeholders,
- Identify potential impacts,
- Investigate alternatives to the proposed development,
- Recommend mitigation measures and compile an Environmental Management Plan (EMP) for the construction and operational phases.



Mitigation Measures:

There are several risks associated with construction activities involving the storage and handling of dangerous goods. When a site is being designed and constructed, engineering elements to minimise reliance on management controls and systems, must be factored in. Examples of such elements are installation of double skin tanks with interstitial leak monitoring, and also locating the fuel fill points so that a delivery tanker can enter the site, unload, and leave without having to reverse.

Initial mitigation measures include a minimal working footprint, site demarcation, demarcation of no-go areas, designated and demarcated site access routes, sediment control measures, spillage control measures, dust control measures, general construction control, staff training and site rehabilitation post construction. A monitoring and auditing plan for the construction and operational phases of the fuel station will be formulated to ensure that the mitigation measures, detailed in the Environmental Management Plan (EMP) are followed.

Elements of the Public Participation Process (PPP)

The public is invited to register as an I&AP and take part in the PPP via the following methods:

- Media Notices placed in newspapers.
- Distribution of this Background Information Document (BID)
- Site notice boards
- Stakeholder meetings
- Public meeting (if necessary)
- Submission of comments on the media notices, BID, and Draft Basic Assessment Report.

Note: All information is available on request.

How to Participate?

All Interested and Affected Parties (I&AP's) are invited to register, on the database managed by 1World Consultants (Pty) Ltd by email or fax using the details provided.

Comments and recommendations regarding the proposed development are welcome and may be addressed to:

Adila Gafoor B.Soc. Sci.

Tel: 031 262 8327

Fax: 086 726 3619

Postal: PO Box 2311, Westville, 3630

Email: adila@1wc.co.za

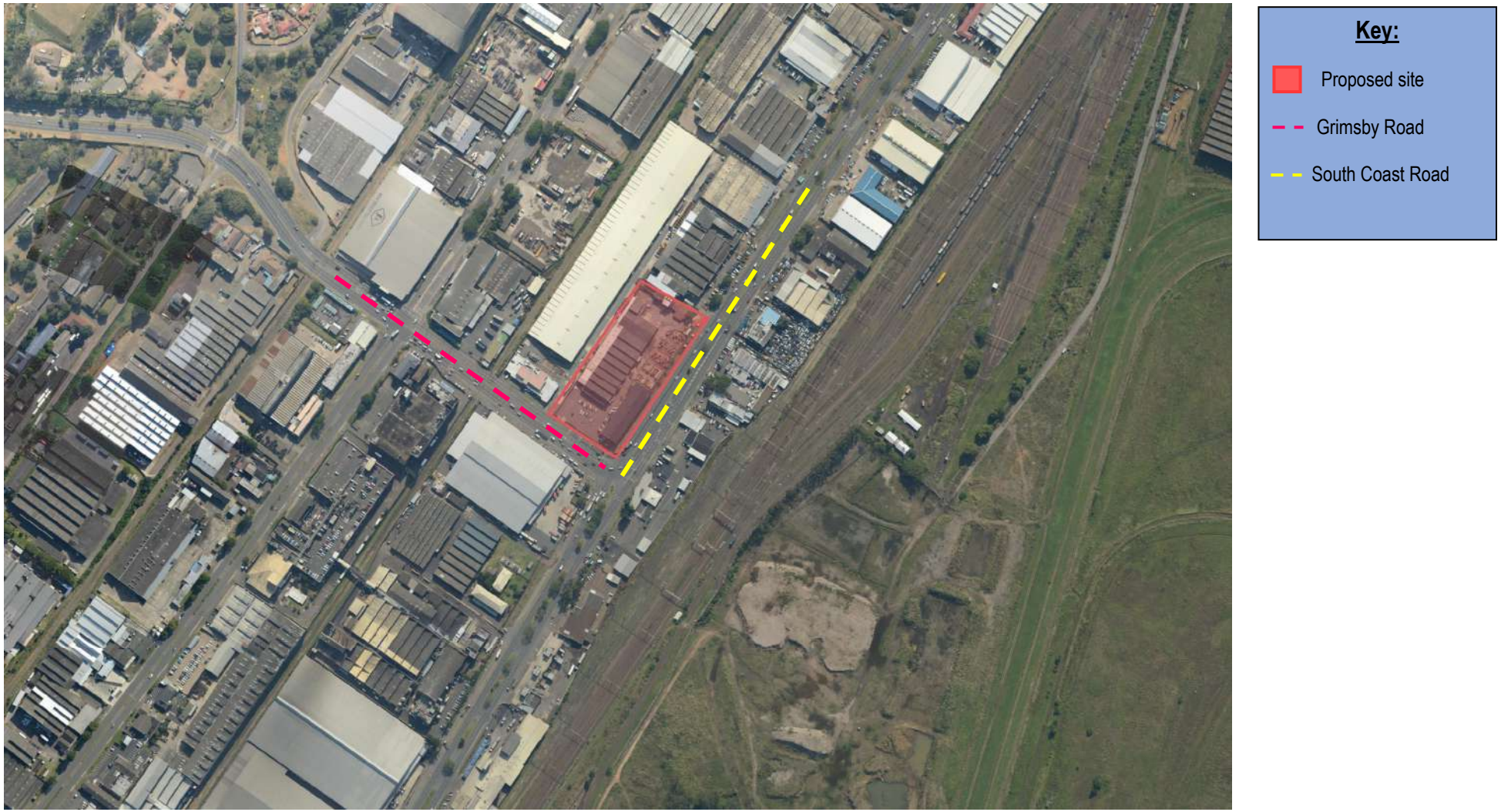


Figure 2: Location of Proposed Development

Figure 3: Proposed Design of Filling Station

adila@1wc.co.za

From: adila@1wc.co.za
Sent: Monday, 01 April 2019 1:10 PM
Cc: 'zmahomedy@gmail.com'; 'max@gbc-architects.com'; 'Roschel Maharaj'
Subject: Background Information Document for the Proposed Grimsby Road Filling Station, Associated Infrastructure and Multiple Fast Food Outlets
Attachments: 1WC_Grimsby Road BID_March 2019.pdf

Importance: High

Tracking:

Recipient	Read
'zmahomedy@gmail.com'	
'max@gbc-architects.com'	
'Roschel Maharaj'	
'Judy.Reddy@Kzntransport.gov.za'	
'data@kznwildlife.com'	
'Dominic.Wieners@kznwildlife.com'	
'ButheleziS2@dws.gov.za'	
'bernadetp@amafapmb.co.za'	
'LARRY.SANDERS@kzncogta.gov.za'	
'lynn.boucher@drdlr.gov.za'	
'diane.VanRensburg@durban.gov.za'	
'Yugeshni.Govender@kznedtea.gov.za'	
'gavin.hegter@gmail.com'	
'wasila@1wc.co.za'	
roschel@1wc.co.za	Read: 2019/04/01 1:14 PM
wasila@1wc.co.za	Read: 2019/04/01 1:15 PM

Good day,

I trust that this email finds you well.

The ***Proposed Grimsby Road Filling Station, Associated Infrastructure and Multiple Fast Food Outlets Project***, located in Ward 64, Mobeni, eThekwini Municipality, refers.

1World Consultants (Pty) Ltd have been appointed as the independent Environmental Assessment Practitioner (EAP) for this project.

You have been identified as a possible Interested and Affected Party (I&AP) or stakeholder for the EIA process.

Attached, please find the Background Information Document (BID) for your review. You are hereby invited to register on the database of I&AP's.

1World utilises email as our primary communication tool. Should you have any queries and/or comments please provide via email.

We look forward to liaising with you.

N.B: Kindly acknowledge receipt of this email and one attachment.

Kind regards,

Adila Gafoor, IAIAsa
Environmental Assessment Practitioner

1world consultants

P.O. Box 2311, Westville, 3630
Tel | 031 262 8327 Fax | 086 726 3619 Cell | 073 236 6529

adila@1wc.co.za

From: adila@1wc.co.za
Sent: Monday, 01 April 2019 3:13 PM
Subject: Background Information Document for the Proposed Grimsby Road Filling Station, Associated Infrastructure and Multiple Fast Food Outlets
Attachments: 1WC_Grimsby Road BID_March 2019.pdf

Importance: High

Good day,

I trust that this email finds you well.

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You have been identified as a possible Interested and Affected Party (I&AP) or stakeholder for the EIA process.

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We look forward to liaising with you.

N.B: Kindly acknowledge receipt of this email and one attachment.

Kind regards,

Adila Gafoor, IAIAsa
Environmental Assessment Practitioner

1world consultants

P.O. Box 2311, Westville, 3630
Tel | 031 262 8327 Fax | 086 726 3619 Cell | 073 236 6529

adila@1wc.co.za

From: adila@1wc.co.za
Sent: Monday, 01 April 2019 3:21 PM
To: Natasha.Brijlal@kznedtea.gov.za
Cc: 'Vanessa.Maclou@kznedtea.gov.za'
Subject: FW: Background Information Document for the Proposed Grimsby Road Filling Station, Associated Infrastructure and Multiple Fast Food Outlets
Attachments: 1WC_Grimsby Road BID_March 2019.pdf; EDTEA.pdf

Importance: High

Good day,

I trust that this email finds you well.

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1World utilises email as our primary communication tool. Should you have any queries and/or comments please provide via email.

We look forward to liaising with you.

N.B: Kindly acknowledge receipt of this email and two attachments.

Kind regards,

Adila Gafoor, IAIAsa
Environmental Assessment Practitioner

1world consultants

P.O. Box 2311, Westville, 3630
Tel | 031 262 8327 Fax | 086 726 3619 Cell | 073 236 6529

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Fax: 086 726 3619

Newspaper Advertisement

The members of the Rising Sun Chatsworth Athletic Club, who successfully completed the half marathon.

Left:
Vivek Natasen received a cash incentive in his age category.

Rising Sun Chatsworth Athletic Club proudly supports Bluff marathon

It was an action-packed day for the Rising Sun Chatsworth Athletics Club team as they participated in the Bluff 21, 1km race, on Sunday. The annual marathon consists of a scenic route and is always a success. Guided by friendly marshalls along the route, the runners were pleased with the overall planning and look forward to showing their support once again next year. Meanwhile, the Rising Sun Chatsworth Athletic Club will host its next breakfast run on Saturday, November 23. The run is being sponsored by Princess Restaurant of Silverglen- opposite Odeon. The restaurant is celebrating its 50th anniversary and will host lots of lucky draws with hampers to be won. The runners are excited to see you at the breakfast run.

NOTICE

PUBLIC PARTICIPATION PROCESS

NOTICE TO UNDERTAKE A BASIC ASSESSMENT FOR THE PROPOSED GRIMSBY ROAD FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLETS IN MOBENI, WARD 64 WITHIN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

EIA REFERENCE NUMBER: DM/0033/2019

Notice is hereby given in terms of the National Environmental Management Act (NEMA), (Act No. 107 of 1998) as amended in GNR 326 (07 April 2017) for the following development proposed by Aniston Investments (Pty) Ltd.

Project Outline: Aniston Investments recognises the potential for developing a filling station with a forecourt, convenience store and multiple food outlets in a strip mall formation, in an industrial area located in the south of Durban at Grimsby Road, Mobeni.

The current land use is a commercial business which specialises in furniture sales.

The current zoning is general industrial which allows for the construction of a filling station. Infrastructure supplying the filling station will consist of 3 Type II, double wall steel, underground storage tank tanks with a net capacity of 249m3.

Therefore, an Environmental Authorisation is needed from the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA). The Draft BAR and the relevant components for the application processes are available on request from 1World Consultants (Pty) Ltd.

PROCESS FOR INCLUSION IN THE PUBLIC PARTICIPATION PROCESS

1World Consultants (Pty) Ltd, the independent Environmental Assessment Practitioner (EAP) have been appointed by Aniston Investments (Pty) Ltd to undertake the required Basic Assessment and associated Public Participation Process for the proposed project.

- Interested and Affected Parties are invited to register via e-mail or fax by submitting their name, contact information and interest in the project to the environmental consultant within 30 days of this advertisement publication, for inclusion in the Participation Process.
- Copies of all documents and reports are available for review and comment, upon request from the EAP.

EAP Details:
Adila Gafoor
(B.Sc. Environmental Management Science)
Postal: P.O Box 2311, Westville, 3630
Email: adila@1wc.co.za
Tel: 031 262 8327
Fax: 086 726 3619

1world consultants

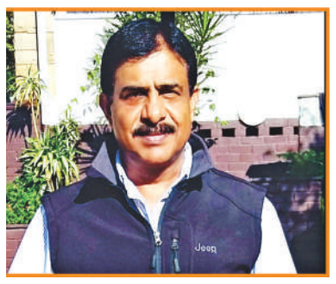
Some of the proud graduates.

Largest bible training institute- free to you

Cornerstone School of the Spirit is the largest established recognised bible training institute in KZN. The school of the spirit offers a first-year National Higher Certificate, a second-year National Higher Diploma, a third year B.Th. and a fourth year Masters in Ministry Program. The teaching content is current and filled with revelation. The 2020 registrations are now open. Cornerstone School of the Spirit is an absolutely free school. There are no registration fees, and no monthly fees. There are no fees of any kind. Their classes commence on January 12, 2020 at 4:45pm. The first year classes are every Sunday evening at 4:45pm prompt or every Wednesday at 10am. You could choose a suitable time. Here is an important question: Do you have a calling over your life. Do you have a feeling God wants you to do something in the kingdom, do you have a sense, a deep sense that God has more for you? Have you ever had the desire to learn more about the scriptures? Then, do not hesitate, WhatsApp the school of the Spirit immediately on 074-841-5887, call their offices on 031 401-0921, email sots@cornrstonekzn.com or visit www.cornerstonekzn.com. The 2020 registrations are now open. It's all absolutely free. Call them now.

'Walk of Life' - a dedication to Chatsworth Hospice

No stranger to the world of marathons, cancer survivor and writer of 'What's your Kilimanjaro?', Bala Gengiah has set his sights on a new adventure called 'Walk of Life'. This 550km walk across India begins on December 8 at Pondicherry, on the east coast, and concludes at Kochi, on the west coast. Gengiah will be accompanied by Jay Moodley, also a marathon and ultra-marathon enthusiast, for the entire walk and by their coach guide and motivator, Logie Govender, for a portion of the run. The purpose of the walk is to raise funds for the Chatsworth Hospice. As a cancer survivor, who climbed Mount Kilimanjaro just six months after losing his kidney to the dreaded illness, he now plans to cross India on foot from Pondicherry to Kochi, a 550km walk of around 23 days. The secondary purpose of this walk is to inspire others striving to overcome any ailment as well as youngsters to follow in their footsteps. The trio would also like to make this route in India a destination route for others to walk. They will be dedicating the first 100km to the 1860 indentured labourers , the second 100km to Mahatma Gandhi, the third 100km to Nelson Mandela, the fourth 100km to Mother Theresa and the fifth 100km to Abdul Kalam. They intend to inspire cancer patients, striving to survive and in doing so, raise funds for the Chatsworth Hospice. The trip will be self-funded as ultra-distance is their passion. This project calls for donations from businesses, industries, professionals and non-professionals, individuals and families. Donations could be an x amount per kilometre or an outright donation. According to Kogi Singh, president of the Chatsworth Hospice, Gengiah made the offer voluntarily to undertake the 24 or 25 days of walking in unpredictable conditions, to help them continue to provide services to their patients.



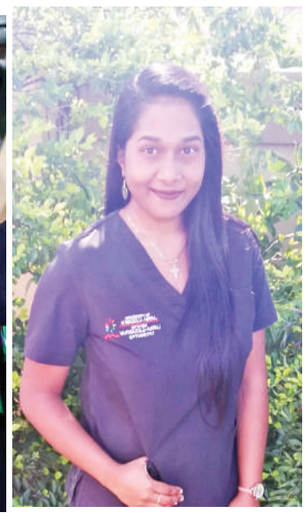
Bala Gengiah

Jay Moodley

Logie Govender

"I appeal to the readers to make this sacrifice of time and energy culminate with a worthwhile amount collected, to salute and honour this warm-hearted and caring man for the herculean task he has undertake," she said.

Donations can be made to: Chatsworth Regional Hospice – Walk of Life, bank: Standard bank, branch: Chatsworth, branch code: 044126 and account number: 054783829.



Sherhara Rajpal and Nicole Naidu are striving towards success.

UKZN students selected as delegates for international event

Students at the University of KwaZulu-Natal, 21-year-old Nicole Naidu and Sherhara Rajpal, also 21-years-old, who are studying towards a Bachelor of Optometry (Honours) and BSc (Honours) Geological Sciences respectively, have been selected to participate as delegates in the Bali Asia International Model United Nations (BAIMUN) held in Indonesia. It is set to take place in January 2020. This event is a simulation of the actual United Nations conference. According to the pair, in this era of globalisation, being globally aware is more important than ever. "South Africa is in dire need of diplomatic, tenacious and confident leaders, who would add value to our country through their skills set," said the students.

The theme for this event is, 'The evolution of cultural and environmental awareness for a brighter future'. The theme will allow delegates to tackle pressing issues plaguing the world. Naidu will be representing the World Health Organisation (WHO) and Rajpal will represent the United Nations Educational, Scientific and Cultural Organisation (UNESCO), while practicing critical thinking, diplomatic skills, strong communication and networking, by sharing in ideas and proposed solutions. "It is a privilege to be able to represent our country, in our academic capacity on an international scale. This event would intensify the impact that we wish to make, as well as help us empower and inspire other young South Africans to aim high, work to their fullest potential and always strive to make the world a better place," added the pair. Their main goal is to show the youth of South Africa, who are the future leaders, that they can be whatever they set their mind to. "We as a generation have so much value to add in our country. It is time we stopped being passive and started digging deep into the potential that we have been blessed with. We encourage all students to never give up on their dreams and to always strive for what they believe in," concluded the students. During their academic careers, they have seen just how big the world is and how much there is out there to be explored if they would be willing to step out of comfort zones and pursue it. The pair humbly request for any financial assistance that would aid in covering the flights and the registration fee. The total cost for this event is R18, 000 per person and they hope that their community will help them take their research, proposed solutions and South Africa to the world. To donate to this cause, contact Sherhara Rajpal on 074-080-5876 and Nicole Naidu on 081-352-2155.

Visit TEG Lifestyle Lounge for a life-time experience

TEG Lifestyle Lounge brings to Chatsworth a new dimension in entertainment. Directors, Siva and Salosh Naidoo have revamped the premises into an upmarket function venue and entertainment centre. Ideally situated in the precinct of Chatsworth CBD, this establishment offers you the convenience of commuting easily. A survey taken has shown that the sprawling township of Chatsworth is in need of live entertainment on a continuous basis. TEG Lifestyle Lounge and Functions Venue offer you this.

As an introduction to the theatre and live music entertainment, the directors are hosting a Latin 80s' dance party featuring Crescendos and Men in Black. This event takes place on Saturday, November 23 at 7:30pm. Another highlight is the relaunch of the popular Sunday Supper Club, on Sunday, November 24 at 5pm.

The line-up for this supper club is a comedy showcase featuring comedians, Andrew Hughes, Kamz Govender, Melvin Stoffels and Jeremiah Gounden. Patrons can also dance to the music of the resident DJ. As safety is of paramount importance, strict security measures are implemented with no carrying of firearms and dangerous weapons and a strict dress code. There is visible security presence of car guards and bouncers to give their patrons peace of mind. They look forward to the support of the community of Chatsworth in realising their endeavours. TEG Lifestyle Lounge is also an ideal venue to host weddings, birthday parties, anniversaries, reunions and fundraisers. They are based at the corner Peak and Tranquil Street, Chatsworth (upstairs Bluff Meats).

Visit 'Wing It' for a delicious food experience

The Wing it Cafe & Burger Bar was established in Kroonstad in the Free State in 2013 by its founder, Fayyaaz Seedat. Coming from a value system of strengthening and maintaining family ties which usually meant good food and company, Seedat nurtured his passion for food to offer the community quality food that is affordable and addictive.

Their food is vastly popular because of its unique taste and fresh ingredients, not forgetting pocket-friendly.

Wing It is famous for its spicy hot wings and crispy fried and grilled chicken. Their exclusive gourmet burgers marinated in their signature sauces are sure to leave a lingering impression. Come in and enjoy their succulent crumbed strips, wraps and burgers or simply indulge in their fresh cut crispy chips.

Aside from the established menu, they frequently introduce new products to keep your taste buds exhilarated and coming back for more!

An array of pure veg and mutton products coming soon, just for you!

Above all else, they are Muslim owned and managed to ensure uncompromised strictly Halaal quality meals and service.

Franchise opportunities are available to successful candidates, who have a passion for people and good food!

CC Promotions presents wheelchair fundraising drive

Giving back to the community is what they stand for. They are bringing a show to you at your doorstep. CC Promotions have remained committed to its diverse and deserving community in Chatsworth, Phoenix and surrounding areas with feeding programmes, caring for the underprivileged, street children and the senior citizens including cancer patients. Most deserving candidates will receive a wheelchair at the said event.

CC Promotions, the household name in the entertainment industry, is once again honoured to present a wheelchair drive, with an array of entertainment with a live band and performances. There is also a sari queen competition that is lined up to set the stage ablaze and to mesmerise you and the family.

Their motive is to create a smile before this Christmas. The above organisation is currently hosting a fundraising wheelchair drive including a dinner and dance and would like you to be part of this event. Wheelchairs are to be given to candidates in Phoenix and Chatsworth for their most deserving individuals. Join them for a fun-filled day at the Blue Lagoon Conference Centre on December 16 at 1pm. It's a show not to be missed, lots of prizes to be won.

They humbly appeal for a generous support, towards their project. Your valued support is an added strength to their organisation. For more information, contact Clive Chetty on 072-127-1570 or 084-014-6123.

Let's 'ABBA' Christmas party at Sibaya

Break out the tinsel, squeeze back into your ABBAsolutely fABBAulous 70s apparel and book your end-of-year Christmas party with the ABBA Show coming to Sibaya Casino and Entertainment Kingdom's Izulu Theatre from Friday December 13 till Sunday January 12, 2020.

Showtime Australia is bringing back their most popular production,the ABBA Show, after unprecedented interest in the worldwide phenomenon arose in early 2018. Durban is the second out of three stops in South Africa over this summer with fellow Sun International venues in Brakpan and Cape Town also hosting the hit show. With the venue location being in a prime spot within Sibaya, ABBA fans will get the chance to indulge in the casino's luxurious facilities, before and after the show. The world class five-star hotel is synonymous with their premium gaming lounges, hospitality and entertainment, making it the perfect place for the ABBA Show audiences to celebrate Christmas with friends, family and work colleagues.

"The festive season is such a great time for this show because it's so joyous and the crowd really gets into it with their costumes and dancing and singing along. It just partners so well with the spirit of celebration that's around at that time of year," producer, director and CEO of the Showtime Australia Group, Johnny Van Grinsven said.

Tickets are on sale now for these holidays. Small, large and private group bookings are available. Secure up to 20 seats online at computicket.com or call the iZulu Theatre on 031 580-5000 for large or private group bookings.

Events Guide

THE CHATSWORTH SIVA ALAYAM, situated at 96 Railview Road, Bayview, will soon host an AGM. All members and devotees are welcome to attend. For more information, contact secretary, Jasmine Govender, on 076-982-7164.

THE UMBILO SHREE AMBALAVAANAR ALAYAM will host a biannual general meeting at the alayam on Saturday, November 30. The meeting will commence at 3pm. An appeal is being made to all devotees to complete membership forms and be present at the meeting. For more information, call 031 261-6509.

THE ARENA PARK SAI CENTRE invites the community to attend the 94th birthday celebrations of their beloved Bhagwan Sri Sathya Sai. The event will take place on Saturday, November 23. It will be held at the Rajput Hall in Arena Park and will start at 3:30pm.

THE KABAL EESWARA LAAYAN invites residents to attend a daily prayer, which will be take place from Friday, November 15 till Saturday, January 11. The prayer will be held at 315 Skyridge Circle in Moorton. It will start at 6pm. All devotees are invited to attend commencement of Swami Ayyappa. Gurukal Thanigasalan will be officiating. For more information, contact chairman, Verma on 082-931-8953, Krish Govender on 082-462-5698 or Dan on 073-461-6101.

THE CROSSMOOR DEVELOPMENT FORUM will host its annual senior citizens year-end treat on November 23 from 10am at the Crossmead Primary School hall. Senior citizens of Crossmoor and Moorton are invited to attend this event. Strictly no children will be allowed to attend this event. For more information, contact Bob Govender 067-042-6710, Archie Pillay 082-377-1779 or Jayshree Naidoo 084-549-5458.

THE THIRU MURUGAN KOVIL, of 85 Golden Poppy Crescent, will hold their annual general meeting on Saturday, November 30 from 2pm. For more information, contact Rogani on 082-449-3313.

THE GITANJALI MUKTHI DHAAM MANDIR will host their annual general meeting on Sunday, November 24 from 4pm at the mandhir (corner of Rank Avenue and Silverglen Drive in Silverglen.) For more information, contact chairman, Pundit R Sharma on 083-521-2620 or secretary, Syd Suknunun on 084-548-2520.

THE MONTFORD SHREE SIVA SOOBRAMONIAR TEMPLE, situated at 464 Road 706, will host the mandala abishegam from November 4 to December 12. The mandala abishegam poorthi will take place on December 19 and 20 from 9am to 1pm and 6pm to 9pm. All devotees, wishing to sponsor an obeyam during the mandala abishegam, can contact the guru on 083-348-7894.

THE WOODHURST DEVOTIONAL GROUP invites devotees to the celebration of Sri Sathya Sai Baba's birthday on November 23, at the Woodhurst Multi Cultural Centre, situated at 27 Galaxy Place, Woodhurst, from 2pm. For more information, contact Ajay Munoo on 083-656-4611.

THE MONTARENA EX STUDENTS ASSOCIATION (MESA) will host a school reunion at the Chatsworth Youth Centre on the December 29 at 12pm. All former pupils are welcome to attend. For more information, contact Vanessa Pillay on 062-216-8378.

THE MANDELA SUMMER CHESS CHALLENGE commences on November 23 at the Nelson Mandela Youth Centre. There are four categories: under 12, under 16, open and seniors over 50. Registration starts at 8am sharp. Lessons are open to the public on Fridays from 5:30pm to 7pm. The organisers are also appealing to the public for sponsorships towards refreshments and equipment. For more information, contact Ally on 082-376-9001 or Nadean on 083-777-7568.

THE SHRI SATHYA SAI SEVA CENTRE OF MOBENI HEIGHTS will be celebrating the 94th birthday of Bhagawan Sri Sathya Sai Baba on November 23 from 3:30pm to 6pm at the Shree Luxmi Narayan Temple.

THE SRI SATHYA SAI CENTRE OF HAVENSIDE will be celebrating the 94th advent of Sri Sathya Sai Baba on November 23 from 5pm to 9pm at the Havenside Community Hall.

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Site Notice Board

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

NOTICE TO UNDERTAKE A BASIC ASSESSMENT FOR THE PROPOSED GRIMSBY ROAD FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLETS IN MOBENI, WARD 64 WITHIN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL.

Notice is hereby given in terms of the National Environmental Management Act (NEMA), (Act No 107 of 1998) published in GN 326 (07 April 2017), of intent to carry out an Environmental Impact Assessment for the abovementioned project, to be conducted in Mobeni, eThekwini Municipality, KwaZulu Natal.

A Basic Assessment is required.

EIA REFERENCE NUMBER: DM/0033/2019

Project Details: Aniston Investments recognises the potential for developing a filling station with a forecourt, convenience store and multiple food outlets in a strip mall formation, in an industrial area located in the south of Durban at Grimsby Road, Mobeni. The current land use is a commercial business which specialises in furniture sales. The current zoning is general industrial which allows for the construction of a filling station. Infrastructure supplying the filling station will consist of 3 Type II, double wall steel, underground storage tanks with a net capacity of 249m^3.

1World Consultants (Pty) Ltd, the independent Environmental Assessment Practitioner (EAP) have been appointed by Aniston Investments (Pty) Ltd to undertake the required Basic Assessment and associated Public Participation Process for the proposed project.

Interested and Affected Parties must register via email or fax by submitting their name, contact information and interest in the project using the contact details below.

Please note a public notice has been published on 19 November 2019 in The Rising Sun Chatsworth Newspaper.

Adila Gafoor ***(Environmental Assessment Practitioner)***
Postal: PO Box 2311, Westville, 3630
Email: adila@1wc.co.za
Tel: 031 262 8327
Fax: 086 726 3619

Date of this Notice: November 2019

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Photographs of Notice Boards on Site

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

[19 November 2019]

Photos of Notice Boards on Site

Figure 1: Zoomed in image of the Site Notice Board at the entrance of Mayfair home & decor

Figure 2: Site Notice Board at the entrance of Mayfair home & decor

Figure 3: Site notice board at the Grimsby Road property entrance

Figure 4: Site Notice Board at the intersection of Grimsby Road and South Coast Road

Figure 5: Site Notice Board along South Coast Road at Corobrick Entrance

1world consultants

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Tuesday, 19 November 2019

Dear Interested and Affected Party:

LANDOWNER NOTIFICATION LETTER

NOTICE TO UNDERTAKE A BASIC ASSESSMENT FOR THE PROPOSED GRIMSBY ROAD FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLETS IN MOBENI, WARD 64 WITHIN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

1World Consultants (Pty) Ltd, the independent Environmental Assessment Practitioner (EAP) have been by Aniston Investments (Pty) Ltd., to undertake the required Basic Assessment and associated Public Participation Process for the proposed Grimsby Road Filling Station and Multiple Fast Food Outlets project **(EIA REF NO.: DM/0033/2019)**.

Project Outline: Aniston Investments recognises the potential for developing a filling station with a forecourt, convenience store and multiple food outlets in a strip mall formation, in an industrial area located in the south of Durban at Grimsby Road, Mobeni. The current land use is a commercial business which specialises in furniture sales (*Mayfair Home & Décor*).

The current zoning is noxious industrial which allows for the construction of a filling station. Infrastructure supplying the filling station will consist of 3 Type II, double wall steel, underground storage tank tanks with a net capacity of 249m^3.

Therefore, an Environmental Authorisation is needed from the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA). The Draft BAR and the relevant components for the application processes are available on request from 1World Consultants (Pty) Ltd.

PROCESS FOR INCLUSION IN THE PUBLIC PARTICIPATION PROCESS

A public notification and involment process is being carried out as part of the process. An advertisement has been placed in the **Chatsworth Rising Sun** newspaper on **19/11/2019**. Site notices have been placed at the proposed development site.

- Interested and Affected Parties are invited to register via e-mail by submitting their name, contact information and reason for their interest and issues/concerns in the Proposed Filing Station via e-mail to the environmental consultant within 30 days of this notification letter, for inclusion in the Participation Process.
- Copies of all documents and reports are available for review and comment, upon request from the EAP.

Any objections, comments and responses to the application must be submitted to 1World Consultants (Pty) Ltd using the following contact details:

- Contact person: Adila Gafoor
- E-mail: adila@1wc.co.za

Please do not hesitate to contact the undersigned if you have any queries or concerns.

Sincerely,
Adila Gafoor

Acknowledgement of Notification Letter:

I BRENDIN NAIDOO, declare under oath that:

- I have received this notification letter and am fully aware of the IWULA;
- I would/ would not prefer to receive a copy of the WULA.

Please complete as per your chosen method of communication

Postal Address: 3 GRIMSBY ROAD

OR

E-mail address: BRENDIN.NAIDOO@SENZ.COZA

19/11/19.

Signature **Date**

1world consultants

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

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- Contact person: Adila Gafoor
- E-mail: adila@1wc.co.za

Please do not hesitate to contact the undersigned if you have any queries or concerns.

Sincerely,
Adila Gafoor

Acknowledgement of Notification Letter:

I Balungile Gumede., declare under oath that:

- (•) I have received this notification letter and am fully aware of the IWULA;
- (•) I would/ ~~would not~~ prefer to receive a copy of the WULA.

Please complete as per your chosen method of communication

Postal Address: _____

OR

E-mail address: Gumede.Balu@postoffice.co.za

_____ _____

Signature **Date**

1world consultants

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

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- Contact person: Adila Gafoor
- E-mail: adila@1wc.co.za

Please do not hesitate to contact the undersigned if you have any queries or concerns.

Sincerely,
Adila Gafoor

Acknowledgement of Notification Letter:

I Sharmila. Naicker, declare under oath that:

- I have received this notification letter and am fully aware of the IWULA;
- I would/would not prefer to receive a copy of the WULA.

Please complete as per your chosen method of communication

Postal Address: 1322 South Coast Road Mobeni

OR

E-mail address: southcoast@corobrik.co.za.

Signature

19/11/2019

Date

1world consultants

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Tuesday, 19 November 2019

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- Copies of all documents and reports are available for review and comment, upon request from the EAP.

Any objections, comments and responses to the application must be submitted to 1World Consultants (Pty) Ltd using the following contact details:

- Contact person: Adila Gafoor
- E-mail: adila@1wc.co.za

Please do not hesitate to contact the undersigned if you have any queries or concerns.

Sincerely,
Adila Gafoor

Acknowledgement of Notification Letter:

I MOHAMED SEDAR, declare under oath that:

- I have received this notification letter and am fully aware of the IWULA;
- I would/ would not prefer to receive a copy of the WULA.

Please complete as per your chosen method of communication

Postal Address: P.O. Box 32131, MOBENI, 4060

OR

E-mail address: MO.SEDAR@GMAIL.COM

19/11/19

Signature **Date**

1world consultants

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Tuesday, 19 November 2019

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- Copies of all documents and reports are available for review and comment, upon request from the EAP.

Any objections, comments and responses to the application must be submitted to 1World Consultants (Pty) Ltd using the following contact details:

- Contact person: Adila Gafoor
- E-mail: adila@1wc.co.za

Please do not hesitate to contact the undersigned if you have any queries or concerns.

Sincerely,
Adila Gafoor

Acknowledgement of Notification Letter:

I Vasiq Ra[illegible], declare under oath that:

- I have received this notification letter and am fully aware of the IWULA;
- I would/ would not prefer to receive a copy of the WULA.

Please complete as per your chosen method of communication

Postal Address: 1322 South Coast Rd Mobeni

OR

E-mail address: VASIQ@KITCHENSTUDIO.COM

[signature]

Signature

19/11/2019

Date

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Comments and Responses Report

COMMENTS AND RESPONSES REPORT: COMMENT RECEIVED ON THE BID			
ORGANISATION	**CONTACT PERSON**	**COMMENT RECEIVED**	**EAP RESPONSE**
eThekwini Municipality	Diane Van Rensburg	(21 May 2019) Dear Sir/Madam, **<u>BACKGROUND INFORMATION DOCUMENT FOR THE PROPOSED PETROL FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLET, MOBENI</u>** With reference to the abovementioned Background Information Document, please be advised that various Municipal Departments have had sight of the proposal and the following comments are submitted for your attention:- **1. eThekwini Electricity Department** The H.V. Operations has no objection to the above mentioned application, however please note: 1.1. The applicant must consult eThekwini Electricity's mains records (held in the drawing office at eThekwini Electricity Headquarters, 1 Jelf Taylor Crescent, for the presence of underground electrical services. In addition should ay overhead line and/or servitude be affected, the specific permission of the Head: Electricity must be sought regarding the proposed development. 1.2. The relocation of MV/LV electrical services, if required in order to accommodate the proposed development, will be carried out at the expense of the applicant. **2. Environmental Planning and Climate Protection Department.** This Department has no comments on the proposed development at this stage. This Department awaits the Draft Basic Assessment Report where there may be further information which gives rise to questions or issues of biodiversity concern which are not currently obvious in this built up area. **3. Land Use Management Branch.** The site, 2 Grimsby Road is Zoned "General Industrial". The intended use as a fuel statin is not freely permitted within this zone and would	(08 July 2019) **Our Ref : ENV19008** **Your Ref: (21/11) DPM/EIA 850** **Attention: Mrs D. van Rensburg** **<u>RE: BACKGROUND INFORMATION DOCUMENT FOR THE PROPOSED PETROL FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLET, LOCATED IN MOBENI, KWAZULU-NATAL</u>** Your comments dated 13 May 2019 on the BID provided to your department by 1World Consultants (Pty) Ltd for the proposed construction of a filling station with associated infrastructure and multiple fast food outlets refers. Kindly note, in the interest of providing you with a comprehensive response there was a delay in formally responding to your comments. **1. eThekwini Electricity Department** 1World acknowledges that the eThekwini Electricity Department has no objection to the proposed development. The points stated have been noted and will be communicated to the developer and contractors team. **2. Environmental Planning and Climate Protection Department** 1World has noted that this Department requires submission of a Draft BAR. A Draft BAR will be prepared and submitted to this Department for a 30-day commenting period. **3. Land Use Management Branch** 1World acknowledges that this Department has highlighted the zoning of the proposed development site as 'General Industrial'. This zoning, as stated by this Department, does not freely permit a fuel station and would require either an application for special consent or rezoning to 'Petrol Service Station'. The architect will be applying for rezoning on behalf of the client.

		require an application for special consent for the filling station and a fast food outlet to be considered and approved. Alternatively the site could be rezoned to "Petrol Service Station." **4. Strategic Spatial Planning Branch.** In terms o the Spatial Development Framework (SDF 2018/2019) and the Central Spatial Development Plan (CSDP 2014/2015) the area in question has been broadly identified for industry. Whilst no major concerns are raised at this stage, it would be appreciated if you could please continue to keep this Branch informed on this matter. The application is however subject to the following conditions: 4.1.1. This Branch's support is subject to the applicant meeting all sector requirements. 4.1.2. This support should not be deemed to be an approval of the eThekwini Municipality. 4.1.3. This Branch reserves the right to comment further should the need arise. **5. Coastal, Storm water and Catchment Management.** This Department has no objections. **6. Parks, Leisure and Cemeteries.** No comment received. **7. Pavement and Geotechnical Engineering.** There is a moderate probability of relatively shallow ground water in that vicinity. For the placement of buried fuel storage tanks a geotechnical and hydrogeological assessment should be undertaken by a SACNASP registered engineering geologist to quantify subsoil conditions and possible constraints that must be taken account of in the design of tanks and structures. Contamination of the subsoils and ground water must be avoided at all costs. **8. eThekwini Transport Authority.**	Kindly provide further clarity on this aspect. **4. Strategic Spatial Planning Branch** 1WC acknowledges that there are no major concerns raised by the Strategic Spatial Planning Branch. Your notes of Points 4.1. to 4.3. are acknowledged. **5. Coastal, Stormwater and Catchment Management** 1World acknowledges that this Department has no objection to the proposed development. **6. Parks, Leisure and Cemeteries** 1World acknowledges that this Department has not provided comment on the proposed development. **7. Pavement and Geotechnical Engineering** Noted. The client has undertaken a Geotechnical Investigation, the findings of this study confirmed the presence of groundwater. This study was provided to a hydrological specialist who has confirmed that a Hydrological Investigation is not required based on the following reasons: • The current proposed site has warehouses and built existing structures with tarred parking. • The area of Mobeni is largely industrial and well developed comprising of numerous factories and main access roads. • Current footprints and operations of the site do not interfere or affect the current groundwater conditions. • No groundwater resources will be used at any point before, during or after the construction phases. • No groundwater resources will be utilized for drinking purposes. Water will be accessed through the main municipal supply water line. • No groundwater resources will be utilized or is required for industrial purposes. • There are currently no boreholes on site that are affecting the water table level or influencing any current ground water conditions.

		No objection in Principle to the Background Information Document (BID) for a proposed filling station with associated infrastructure and fast food outlet on Portion 2 of Erf 821, situated at 2 Grimsby Road, subject to the following:- 8.1.1. A Traffic Impact Assessment (TIA) will be required. 8.1.2. Access will be restricted to "Left in – Left out; furthest away from the intersection of South Coast Road and Grimsby Road. 8.1.3. The City is planning a Second access to the Port of Durban, and it is anticipated that Grimsby Road / South Coast Road intersection will become a raised interchange. 8.1.4. This interchange could possibly compromise access being taken off from Grimsby Road for this proposed development in the future. 8.1.5. The possible proposed interchange would need to be take into consideration when undertaking the TIA – in consultation with this Department. **9. Environmental Health Department.** 9.1.1. The applicant will need to provide a full documented risk assessment that will identify all potential environmental/occupational risks associated with storage and distribution activities of hazardous chemicals products on the premises. The risk assessment should include any mitigatory measures required to deal with any impacts identified e.g. pollution control measures/technologies. 9.1.2. The applicant must undertake to implement any mitigatory measures recommended to deal with any potential nuisances/risks that may arise from the processes on the premises. 9.1.3. The applicant will be required to develop and maintain a Waste Management Plan to effectively manage all waste generated on site. 9.1.4. A MHI assessment must be carried out by the applicant. In terms of the MHI assessment, the applicant will be required to ensure that upon operations on site are implemented and maintained. 9.1.5. The applicant is to ensure that an Environmental Management System is implemented and maintained to effectively manage all	• All current and future stormwater drainage will direct into the municipal stormwater system. A letter from the specialist confirming these points has been attached in Appendix 1 for your reference. **8. eThekwini Transport Authority** Noted1World acknowledges that this Department has no objection to the proposed development. Points 8.1. to 8.5 have been noted and forwarded to the traffic engineer for review. **9. Environmental Health Department** Points 9.1 to 9.8 have been noted. As per point 9.8. please provide direct contact details for the relevant personnel at this department in order for us to liaise with them. A Draft BAR and EMPr will be compiled and submitted to this Department for a 30-day commenting period. **10. eThekwini Water and Sanitation Department** Noted. It is important to take cognisance of the fact that developer will be removing structures, and replacing them with alternative ones, there is no additional loading on the sewer waste water systems. Toilets will be demolished and replaced. The engineer will show this in their calculations. **11. Cleaning and Solid Waste** 1World acknowledges that this Department has not provided comment on the proposed development. **12. Disaster Management** 1World acknowledges that this Department has not provided comment on the proposed development.

		activities on the premises inclusive of the proposed construction phase. 9.1.6. All construction activities to be conducted in accordance with approved building plans. 9.1.7. The applicant will have to ensure that an emergency response plan is drawn up in cognizance with the MHI risk assessment. In addition, upon approval and commencement of operations, the company will be required to test their emergency plan at least once per year and a record of such must be kept. Effective and regular is also required. Documented proof will be required. 9.1.8. Although the eThekwini Muncipality's Scheduled Trade Permitting and Air Emission Licensing process is not typically part of the MHI process, if deemed necessary it will be necessary for Portion 2 of Erf 821, Grimsby Road, Mobeni to accordingly apply for a Scheduled Trade Permit and Air Emissions Licence in terms of the Scheduled Trades and Occupations Bylaws of eThekwini Municipality and NEMA:Air Quality Act, 2004. It is suggested that the applicant liaise with the Environmental Health Unit in this regard. **10. eThekwini Water and Sanitation Department.** 10.1 Comments from Wastewater Planning Branch: This Department notes the Background Information Document for the proposed development. This Department will provide further comments as the proposal goes through the various stages. However, in order for this Department to be able to comment accordingly this Department will need the following information from the applicant. • Type of development. Information is required regarding the sewer currently generated versus the sewer that will be generated due to the new proposed development. • Expected sewer flows (i.e. Additional sewer flows due to the proposal) • Programme of implementation (i.e. timeframes, of when you anticipate to construct and handover units for occupation)	**13. Fire Safety** 1World acknowledges that this Department has no objection to the proposed development. Points 13.1 to 13.5 have been noted and will be communicated to the developer and contractors team.

		• Since the proposal includes fast food restaurants, Oil and Grease traps will be required. • Shapefiles of finalized cadastral and project boundary. It must be noted that the proposed development is situated whit the Southern Wastewater Treatment Plan catchment area. The preliminary treatment process equipment in this plant is the constraint and requires to be upgraded and the timeframes for the upgrades are still to be determined. Due to this, the treatment plant currently does not have enough capacity to cater for additional wastewater flows due to the proposed development. **11. Cleansing and Solid Waste.** No comment received. **12. Disaster Management.** No comment from this Department. **13. Fire Safety.** This Department has no objection to the proposed project subject to the applicant adhering to the following: 13.1. Building plans must be submitted to this Department for scrutiny and approval. 13.2. The applicant must confirm separation distance between the proposed filling station and pipelines. 13.3. The site must comply with the Interim Code Relating to Fire Prevention. 13.4. Full compliance with the road closure procedures and requirements to allow emergency services to respond in cases of emergency. 13.5. Full compliance with other applicable Legislative requirements.	

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Comment Received on the BID

ETHEKWINI MUNICIPALITY

DEVELOPMENT PLANNING, ENVIRONMENT & MANAGEMENT UNIT
Development Planning Department
Land Use Management Branch

166 K.E. Masinga Road
Durban 4001
P.O. Box 680 Durban
4000
Telephone 031-311 111

Our Ref.: (21/11) DPM/EIA 850
DEDTEA Ref:
Enquiries: Mrs D. van Rensburg
Telephone: 031 – 3117136

13 May 2019

1 World Consultants
P.O. Box 2311
Westville
3630

At: Adila Gafoor

Dear Sir/Madam,

BACKGROUND INFORMATION DOCUMENT FOR THE PROPOSED PETROL FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLET, MOBENI.

With reference to the abovementioned Background Information Document, please be advised that various Municipal Departments have had sight of the proposal and the following comments are submitted for your attention:-

1. EThekwini Electricity Department.

The H.V. Operations has no objection to the above mentioned application, however please note:

1.1. The applicant must consult eThekwini Electricity's mains records (held in the drawing office at eThekwini Electricity Headquarters, 1 Jell Taylor Crescent, for the presence of underground electrical services. In addition should any overhead line and/or servitude be affected, the specific permission of the Head: Electricity must be sought regarding the proposed development.

1.2. The relocation of MV/LV electrical services, if required in order to accommodate the proposed development, will be carried out at the expense of the applicant.

2. Environmental Planning and Climate Protection Department.

This Department has no comments on the proposed development at this stage. This Department awaits the Draft Basic Assessment Report where there may be further information which gives rise to questions or issues of biodiversity concern which are not currently obvious in this built up area.

3. Land Use Management Branch.

The site, 2 Grimsby Road is zoned "General Industrial". The intended use as a fuel station is not freely permitted within this zone and would require an application for special consent for the filling station and a fast food outlet to be considered and approved. Alternatively the site could be rezoned to "Petrol Service Station."

4. Strategic Spatial Planning Branch.

In terms of the Spatial Development Framework (SDF 2018/2019) and the Central Spatial Development Plan (CSDP 2014/2015) the area in question has been broadly identified for industry.

Whilst no major concerns are raised at this stage, it would be appreciated if you could please continue to keep this Branch informed on this matter.

The application is however subject to the following conditions:

4.1. This Branch's support is subject to the applicant meeting all sector requirements.

4.2. This support should not be deemed to be an approval of the eThekwini Municipality.

4.3. This Branch reserves the right to comment further should the need arise.

5. Coastal, Storm water and Catchment Management.

This Department has no objections.

6. Parks, Leisure and Cemeteries.

No comment received.

7. Pavement and Geotechnical Engineering.

There is a moderate probability of relatively shallow ground water in that vicinity. For the placement of buried fuel storage tanks a geotechnical and hydrogeological assessment should be undertaken by a SACNASP registered engineering geologist to quantify subsoil conditions and possible constraints that must be taken account of in the design of tanks and

structures. Contamination of the subsoil's and ground water must be avoided at all costs.

8. eThekwini Transport Authority.

No Objection in Principle to the Background Information Document (BID) for a proposed filling station with associated infrastructure and fast food outlet on Portion 2 of Erf 821, situated at 2 Grimsby Road, subject to the following :-

8.1. A Traffic Impact Assessment (TIA) will be required.
8.2. Access will be restricted to "Left in – Left out; furthest away from the intersection of South Coast Road and Grimsby Road.
8.3. The City is planning a Second access to the Port of Durban, and it is anticipated that Grimsby Road / South Coast Road intersection will become a raised interchange.
8.4. This interchange could possibly compromise access being taken off from Grimsby Road for this proposed development in the future.
8.5. The possible proposed interchange would need to be taken into consideration when undertaking the TIA – in consultation with this Department.

9. Environmental Health Department.

9.1. The applicant will need to provide a full documented risk assessment that will identify all potential environmental/occupational risks associated with storage and distribution activities of hazardous chemicals products on the premises. The risk assessment should include any mitigatory measures required to deal with any impacts identified eg. pollution control measures/technologies.
9.2. The applicant must undertake to implement any mitigatory measures recommended to deal with any potential nuisances/risks that may arise from the processes on the premises.
9.3. The applicant will be required to develop and maintain a Waste Management Plan to effectively manage all waste generated on site.
9.4. A MHI assessment must be carried out by the applicant. In terms of the MHI assessment, the applicant will be required to ensure that upon operation all reasonably practicable risk reduction measures for operations on site are implemented and maintained.
9.5. The applicant is to ensure that an Environmental Management System is implemented and maintained to effectively manage all activities on the premises inclusive of the proposed construction phase.
9.6. All construction activities to be conducted in accordance with approved building plans.
9.7. The applicant will have to ensure that an emergency response plan is drawn up in cognisance with the MHI risk assessment. In addition, upon approval and commencement of operations, the company will be required to test their emergency plan at least once per year and a record of such must be kept. Effective and regular communication with authorities and neighbouring facilities is also required. Documented proof will be required.

9.8. Although the eThekwini Municipality's Scheduled Trade Permitting and Air Emission Licensing process is not typically part of the MHI process, if deemed necessary it will be necessary for Portion 2 of Erf 821, Grimsby Road, Mobeni to accordingly apply for a Scheduled Trade Permit and Air Emissions Licence in terms of the Scheduled Trades and Occupations Bylaws of eThekwini Municipality and NEMA: Air Quality Act, 2004. It is suggested that the applicant liaise with the Environmental Health Unit in this regard.

10. eThekwini Water and Sanitation Department.

10.1. Comments from Wastewater Planning Branch:

This Department notes the Background Information Document for the proposed development. This Department will provide further comments as the proposal goes through the various stages.

However, in order for this Department to be able to comment accordingly this Department will need the following information from the applicant.

- Type of development. Information is required regarding the sewer currently generated versus the sewer that will be generated due to the new proposed development.
- Expected sewer flows (i.e. Additional sewer flows due to the proposal)
- Programme of implementation (i.e. timeframes, of when you anticipate to construct and handover units for occupation)
- Since the proposal includes fast food restaurants. Oil and Grease traps will be required.
- Shapefiles of finalised cadastral and project boundary.

It must be noted that the proposed development is situated within the Southern Wastewater Treatment Plant catchment area. The preliminary treatment process equipment in this plant is the constraint and requires to be upgraded and the timeframes for the upgrades are still to be determined. Due to this, the treatment plant currently does not have enough capacity to cater for additional wastewater flows due to the proposed development.

11. Cleansing and Solid Waste.

No comment received.

12. Disaster Management.

No comment from this Department.

13. Fire Safety.

This Department has no objection to the proposed project subject to the applicant adhering to the following:

13.1. Building plans must be submitted to this Department for scrutiny and approval.
13.2. The applicant must confirm separation distance between the proposed filling station and pipelines.
13.3. The site must comply with the Interim Code Relating to Fire Prevention.
13.4. Full compliance with the road closure procedures and requirements to allow emergency services to respond in cases of emergency.
13.5. Full compliance with other applicable Legislative requirements.

Should you seek clarification on any of the above issues, please contact the writer on telephone: 031 - 3117136 or via e-mail: diane.vanrensburg@durban.gov.za in addition, the Department requests that a copy of the Environmental Authorisation be emailed to the same address.

Yours faithfully

MANAGER: LAND USE MANAGEMENT
CB NORTON
(Claire Norton: Professional Planner A/746/1993)

15/06/2019
DATE:

ACTING HEAD: DEVELOPMENT PLANNING, ENVIRONMENT AND MANAGEMENT
M. PHEWA

DATE: 20/6/19

Copy To:
Department of Economic Development, Tourism and Environmental Affairs
Private Bag X 54321
Durban
4000

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619
Company Registration: 2015/084540/07

[08 July 2019]

Our Ref : **ENV19008**
Your Ref: **(21/11) DPM/EIA 850**
Attention: **Mrs D. van Rensburg**

RE: BACKGROUND INFORMATION DOCUMENT FOR THE PROPOSED PETROL FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLET, LOCATED IN MOBENI, KWAZULU-NATAL

Your comments dated 13 May 2019 on the BID provided to your department by 1World Consultants (Pty) Ltd for the proposed construction of a filling station with associated infrastructure and multiple fast food outlets refers. Kindly note, in the interest of providing you with a comprehensive response there was a delay in formally responding to your comments.

1. **eThekwini Electricity Department**
   1World acknowledges that the eThekwini Electricity Department has no objection to the proposed development. The points stated have been noted and will be communicated to the developer and contractors team.

2. **Environmental Planning and Climate Protection Department**
   1World has noted that this Department requires submission of a Draft BAR. A Draft BAR will be prepared and submitted to this Department for a 30-day commenting period.

3. **Land Use Management Branch**
   1World acknowledges that this Department has highlighted the zoning of the proposed development site as 'General Industrial'. This zoning, as stated by this Department, does not freely permit a fuel station and would require either an application for special consent or rezoning to 'Petrol Service Station'.

   The architect will be applying for rezoning on behalf of the client.

   Kindly provide further clarity on this aspect.

4. **Strategic Spatial Planning Branch**
   1WC acknowledges that there are no major concerns raised by the Strategic Spatial Planning Branch. Your notes of Points 4.1. to 4.3. are acknowledged.

5. **Coastal, Stormwater and Catchment Management**
   1World acknowledges that this Department has no objection to the proposed development.

6. **Parks, Leisure and Cemeteries**
   1World acknowledges that this Department has not provided comment on the proposed development.

7. **Pavement and Geotechnical Engineering**
   Noted. The client has undertaken a Geotechnical Investigation, the findings of this study confirmed the presence of groundwater.

   This study was provided to a hydrological specialist who has confirmed that a Hydrological Investigation is not required based on the following reasons:
   - The current proposed site has warehouses and built existing structures with tarred parking.
   - The area of Mobeni is largely industrial and well developed comprising of numerous factories and main access roads.
   - Current footprints and operations of the site do not interfere or affect the current groundwater conditions.
   - No groundwater resources will be used at any point before, during or after the construction phases.

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619
Company Registration: 2015/084540/07

- No groundwater resources will be utilized for drinking purposes. Water will be accessed through the main municipal supply water line.
- No groundwater resources will be utilized or is required for industrial purposes.
- There are currently no boreholes on site that are affecting the water table level or influencing any current ground water conditions.
- All current and future stormwater drainage will direct into the municipal stormwater system.

A letter from the specialist confirming these points has been attached in Appendix 1 for your reference.

8. **eThekwini Transport Authority**
   Noted1World acknowledges that this Department has no objection to the proposed development.

   Points 8.1. to 8.5 have been noted and forwarded to the traffic engineer for review.

9. **Environmental Health Department**
   Points 9.1 to 9.8 have been noted.

   As per point 9.8. please provide direct contact details for the relevant personnel at this department in order for us to liaise with them.

   A Draft BAR and EMPr will be compiled and submitted to this Department for a 30-day commenting period.

10. **eThekwini Water and Sanitation Department**
    Noted.

    It is important to take cognisance of the fact that developer will be removing structures, and replacing them with alternative ones, there is no additional loading on the sewer waste water systems. Toilets will be demolished and replaced. The engineer will show this in their calculations.

11. **Cleaning and Solid Waste**
    1World acknowledges that this Department has not provided comment on the proposed development.

12. **Disaster Management**
    1World acknowledges that this Department has not provided comment on the proposed development.

13. **Fire Safety**
    1World acknowledges that this Department has no objection to the proposed development. Points 13.1 to 13.5 have been noted and will be communicated to the developer and contractors team.

Should you have any further queries please feel free to contact 1World using the details provided above.

For 1World Consultants:

Fatima Peer B.Sc. (Hons) Pr. Sci. Nat.

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619
Company Registration: 2015/084540/07

[08 July 2019]

APPENDIX 1

Geotechnical Solutions (Pty) Ltd

EARTH CIVIL TESTING

Reg.No.- K2011/115681/01 Tax.No.- 9127/374/18/0
Radiation Control – Authority No. 2962/16/1430
106 Francis Road – P.O. Box 303 - Ladysmith – KwaZulu Natal - 3370
Web – www.geo-sol.co.za – Tel – 0715608058 – 0799100920 - Email – geosollab@gmail.com

14 May 2019

...

Attention: Zakir Mahomedy – Aniston Investments

Re: Lot 821 – Portion 2 – Mobeni – Mayfair Discount Cash and Carry – Hydrogeological Investigation Requirements.

To whom it may concern.

A Hydrogeological Investigation is not required for a specific number of reasons:

1. The current proposed site has warehouses and built existing structures with tarred parking.
2. The area of Mobeni is largely industrial and well developed comprising of numerous factories and main access roads.
3. Current footprints and operations of the site do not interfere or affect the current groundwater conditions.
4. No groundwater resources will be used at any point before, during or after the construction phases.
5. No groundwater resources will be utilized for drinking purposes. Water will be accessed through the main municipal supply water line.
6. No groundwater resources will be utilized or is required for industrial purposes.
7. There are currently no boreholes on site that are affecting the water table level or influencing any current ground water conditions.
8. All current and future stormwater drainage will direct into the municipal stormwater system.

It is however noted that the council, client or environmental agents may suggest at a later stage that a Hydrogeological Study be done should on site conditions or building specifications change.

Yours Faithfully

James Harvey Ewusi
Pr. Tech. Eng

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Appendix E

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Heritage Exemption Letter

KWAZULU-NATAL
AMAFA AND RESEARCH INSTITUTE

ISIKHUNGO SAMAFA NOCWANINGO
SAKWAZULU-NATALI

KWAZULU-NATAL
AMAFA- EN NAVORSINGSINSTITUUT

Provincial Heritage Resources Authority KZN

195 Langalibalele Street
PO Box 2685
Pietermaritzburg 3200

Tel: 033 394 6543
Fax: 033 394 6552

Email: beadmin@amafapmb.co.za
www.heritagekzn.co.za

PERMIT

Ref: 19/062

Issued under Sections 37 of the KwaZulu-Natal Amafa and Research Institute Act (5 of 2018)

Approval is hereby given to MAX GUADAGNINO for ANISTON INVESTMENTS(PTY) LTD of 2 GRIMSBY ROAD, MOBENI, DURBAN(cnr of GRIMSBY AND SOUTH COAST ROAD), 4060
In accordance with the application received on 20 May 2019
For ALTERATIONS & ADDITIONS to building situated on Portion 2 of Erf 821 Dunns Grants, being at **2 GRIMSBY ROAD, MOBENI, DURBAN**

CONDITIONS: *This permit is issued subject to the following conditions:-*

1 *That the alterations, additions, and/or demolition are carried out strictly in accordance with* ***NORTH COAST ARCHITECTS drawing no.: 02-821-DB,DATED: 2019-03-01, sheets: 04;***

2 *That, in the event of any contemplated deviation from the approved plans – including the transfer of the work to the supervision of another architect/technologist –a* ***written motivation*** *in support of the deviations must be submitted to the KwaZulu-Natal Amafa and Research Institute (Institute) for consideration and the* ***prior written approval*** *of the Institute must be obtained, before any deviations are carried out;*

3 *In the case of the demolition of a structure/s or part thereof, such demolition must take place* ***not more than 30 days*** *prior to the commencement of the new work, unless otherwise agreed to, in writing, by the Institute;*

4 *Any salvageable items not required for re-use in the project must be offered to the Institute's Conservation Materials Bank and all salvageable elements identified must be delivered to the Institute's Conservation Materials Bank, Midmar, Howick, at the Applicant's cost.*

5 *Where* ***archaeological material or human remains*** *are uncovered during excavation, the Institute must be contacted immediately in order to determine the significance of the find and mitigation required (a professional archaeologist may need to be employed).*

6 *A copy of this permit must be kept on the site at all times.*

7 *The issuing of this permit does not exempt the Applicant from obtaining the approval for the proposed work from the Local Authority or any other Authority, where required.*

THE KWAZULU-NATAL AMAFA AND RESEARCH INSTITUTE RESERVES THE RIGHT TO WITHDRAW THIS PERMIT IF ANY OF THE ABOVE CONDITIONS ARE NOT COMPLIED WITH. FAILURE TO COMPLY WITH THESE CONDITIONS WILL RENDER ANY DEVIATION FROM THE ORIGINAL (PLANS) UNLAWFUL, AND THE INSTITUTE RESERVES THE RIGHT TO TAKE CRIMINAL AND/OR CIVIL ACTION AGAINST THE PERSON/S RESPONSIBLE.

This permit is valid until 04 August 2022 **AND IS NOT TRANSFERABLE.**

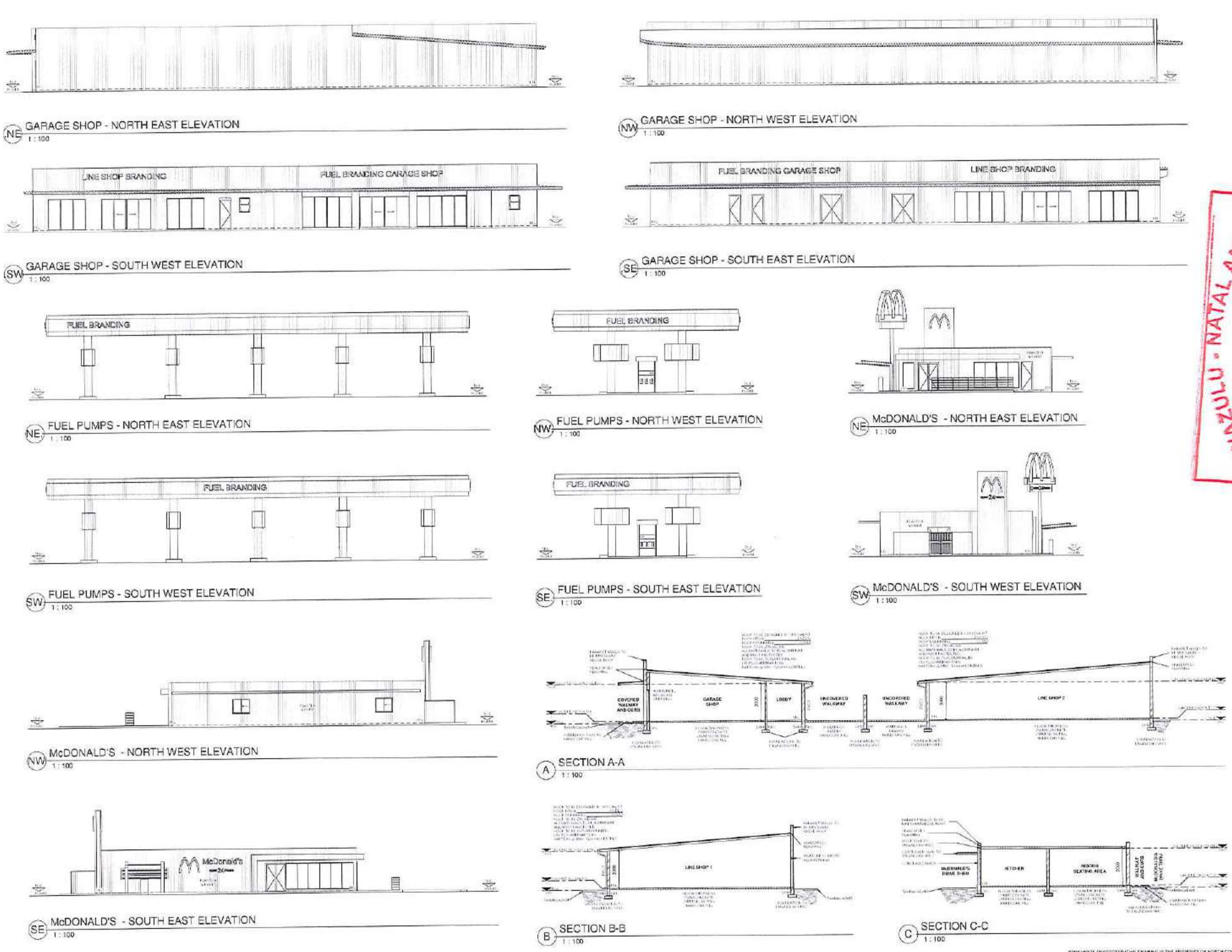
E Pereira

for HEAD OF SECRETARIAT & ADMINISTRATION

DATED AT PIETERMARITZBURG ON THIS 05 **DAY OF** AUGUST **2019**

Permit Number: 2019-02-38a

KWAZULU - NATAL AMAFA AND RESEARCH INSTITUTE
PERM: 2019 -02- 38



(NE) GARAGE SHOP - NORTH EAST ELEVATION
1 : 100

(NW) GARAGE SHOP - NORTH WEST ELEVATION
1 : 100

(SW) GARAGE SHOP - SOUTH WEST ELEVATION
1 : 100

(SE) GARAGE SHOP - SOUTH EAST ELEVATION
1 : 100

(NE) FUEL PUMPS - NORTH EAST ELEVATION
1 : 100

(NW) FUEL PUMPS - NORTH WEST ELEVATION
1 : 100

(NE) McDONALD'S - NORTH EAST ELEVATION
1 : 100

(SW) FUEL PUMPS - SOUTH WEST ELEVATION
1 : 100

(SE) FUEL PUMPS - SOUTH EAST ELEVATION
1 : 100

(SW) McDONALD'S - SOUTH WEST ELEVATION
1 : 100

(NW) McDONALD'S - NORTH WEST ELEVATION
1 : 100

(A) SECTION A-A
1 : 100

(SE) McDONALD'S - SOUTH EAST ELEVATION
1 : 100

(B) SECTION B-B
1 : 100

(C) SECTION C-C
1 : 100

MUNICIPAL STAMPS

north coast architects
A DIVISION OF GUADAGNINO BROTHERS CONSULTING
MAX GUADAGNINO
EMAIL : info@gbc-architects.com

REVISIONS

REV	DATE	DESCRIPTION	REV. BY

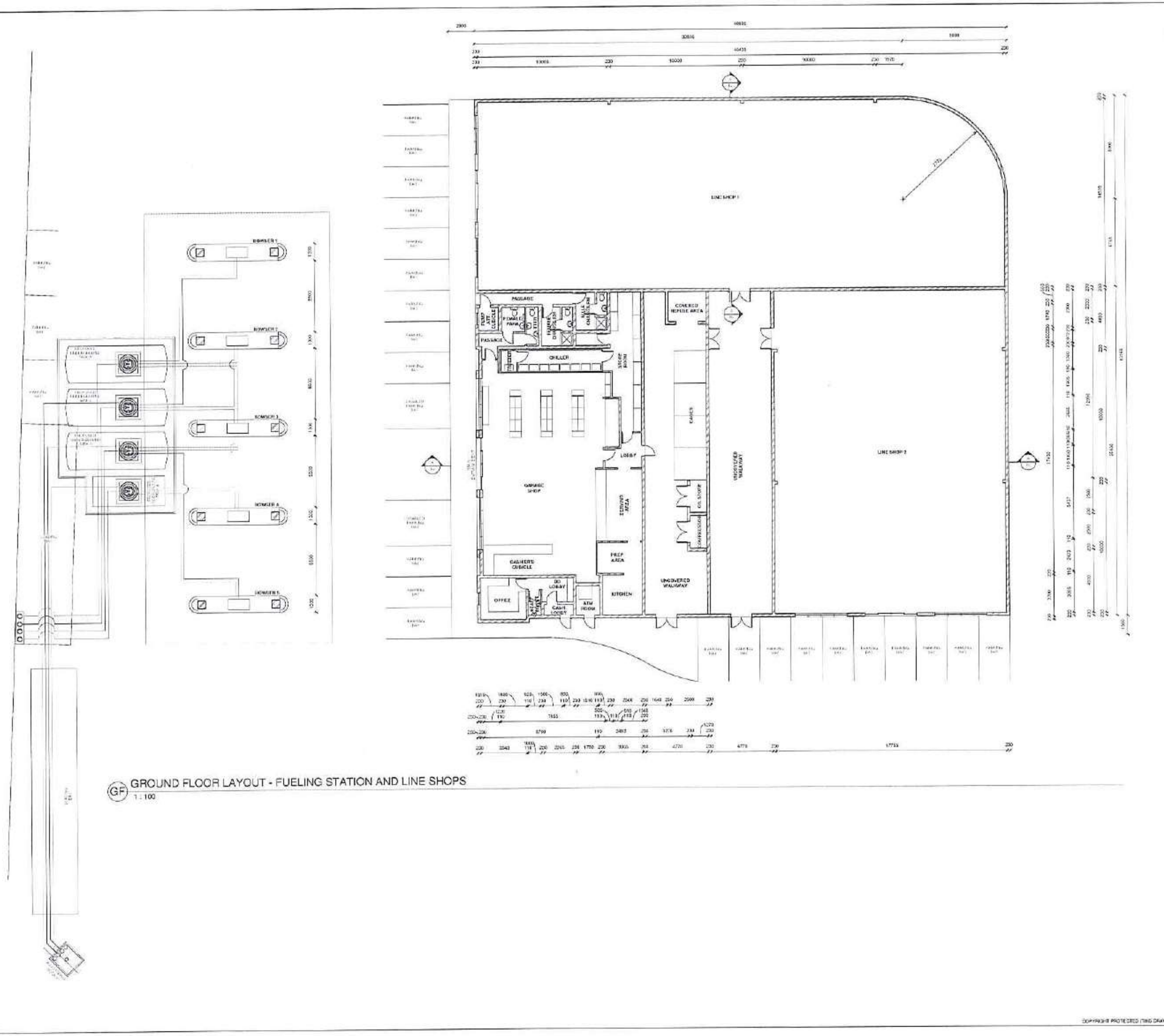
PROJECT
PROPOSED FUELLING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 521 PORTION 2, 2 GRINSBY ROAD, MODENT DURBAN (CORNER OF GRINSBY ROAD AND SOUTH COAST ROAD)

FOR
COUNCIL SUBMISSION

ARCHITECT | OWNER

TITLE
ELEVATIONS AND SECTIONS

DATE	SIZE A0	DESIGNED: GUADAGNINO
BUILDING CLASSIFICATION		DRAWN: GUADAGNINO
DWG. NO.		CHECKED: PUJCALITZ



(GF) GROUND FLOOR LAYOUT - FUELING STATION AND LINE SHOPS
1 : 100

MUNICIPAL STAMPS

north coast architects
A DIVISION OF GUADAGNINO ARCHITECTS CONSULTING
MAX GUADAGNINO

REVISIONS

REV.	DATE	DESCRIPTION	REV. BY

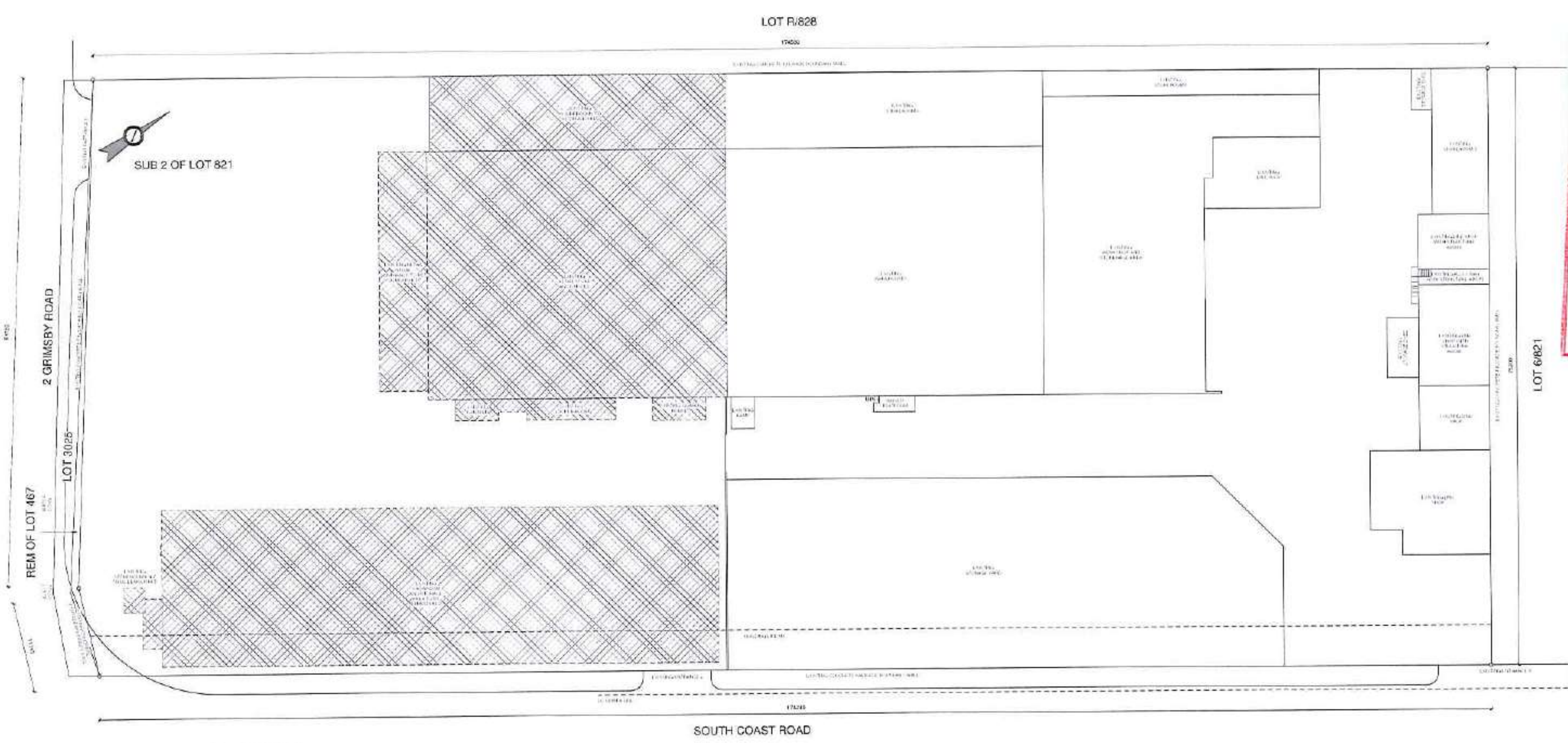
PROJECT
PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 831 PORTION 2, 2 GRIMSBY ROAD, MOBENI, DURBAN (CORNER OF GRIMSBY ROAD AND SOUTH COAST ROAD)

FOR
COUNCIL SUBMISSION

ARCHITECT | OWNER

TITLE
GROUND FLOOR LAYOUT - FUELING STATION, GARAGE SHOP AND LINE SHOPS

DATE	SIZE A0	DESIGNED: GUADAGNINO
BUILDING CLASSIFICATION		DRAWN: GUADAGNINO
DRG. NO. 02621-08		CHECKED: PJJ GALITZ P.R.O REG. NO. 02766



(SL) SITE LAYOUT PLAN - DEMOLITION PLAN
1 : 300

MUNICIPAL STAMPS

KWAZULU - NATAL AMAFA
PERM 2019 -02- 38
AND RESEARCH INSTITUTE

north coast architects

A DIVISION OF GUADAGNINO BROTHERS CONSULTING
MAX GUADAGNINO

REVISIONS

REV	DATE	DESCRIPTION	REV. BY

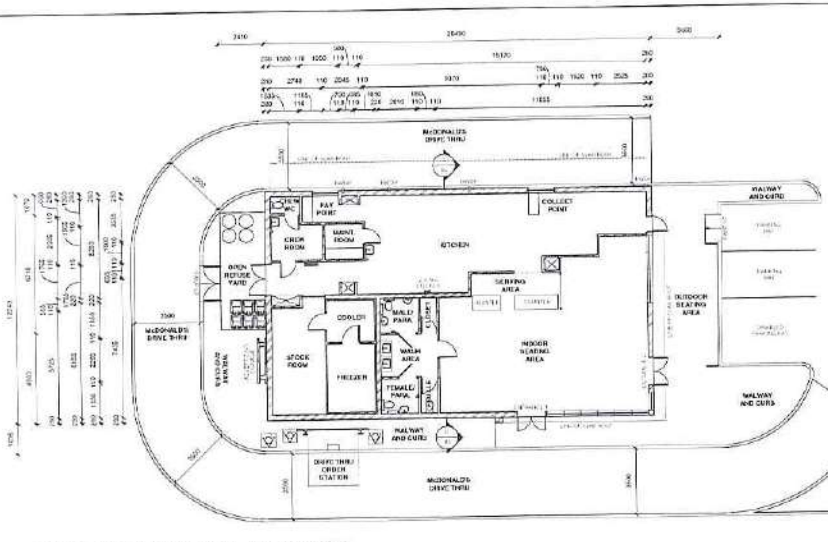
PROJECT
PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 821 PORTION 2 2 GRIMSBY ROAD, MOBENI, DURBAN (CORNER OF GRIMSBY ROAD AND SOUTH COAST ROAD)

FOR
COUNCIL SUBMISSION

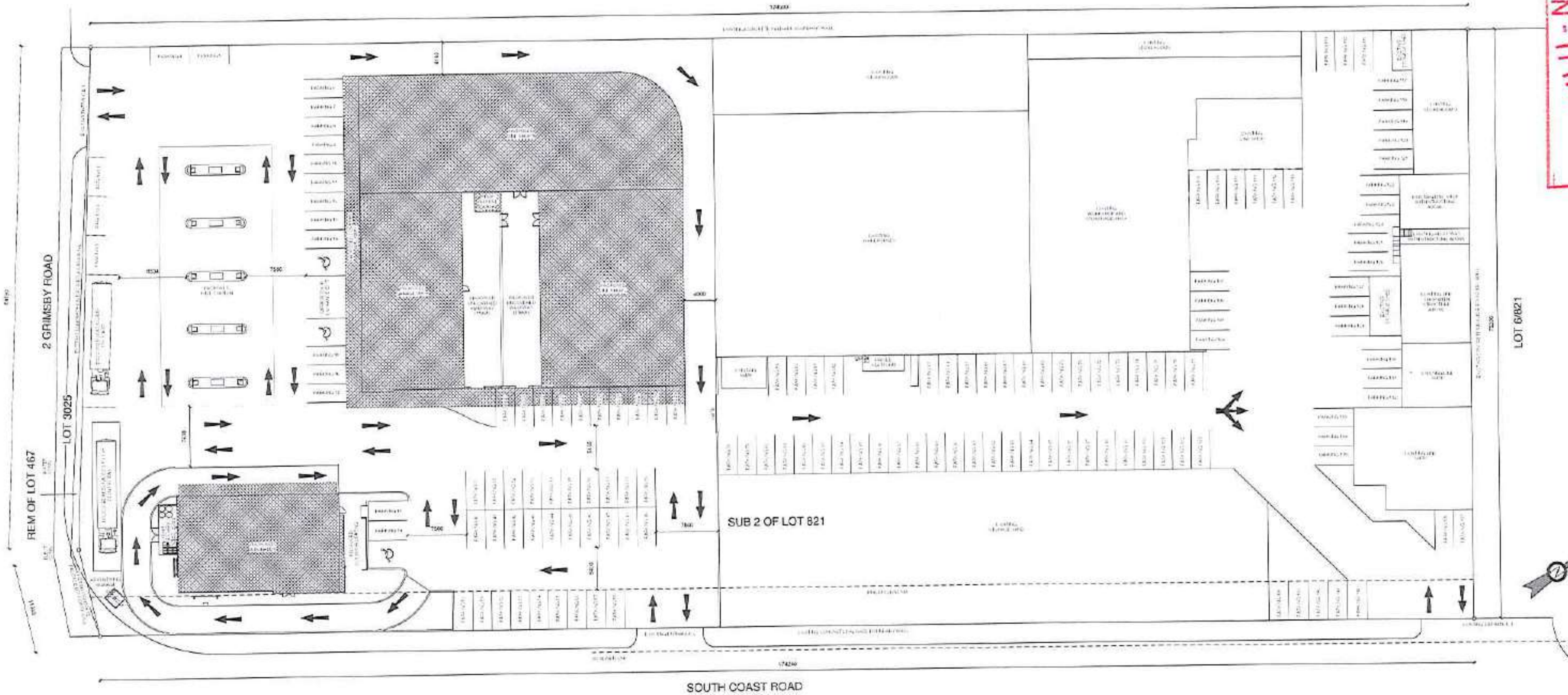
ARCHITECT | OWNER

TITLE
SITE PLAN SHOWING ALL STRUCTURES TO BE DEMOLISHED

SIZE: A3
DRG NO. 60-821-08
DRAWN: GUADAGNINO
CHECKED: P.J. DU PLOOY



GF GROUND FLOOR LAYOUT - McDONALD'S
1 : 100



SL SITE LAYOUT PLAN
1 : 200

PARKING SCHEDULE

LINESHOPS (SINGLE SHOPS):

NOTE: PARKING BAYS REQUIRED FOR OFFICE FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS AND STORAGE.

FLOOR SPACE : 5 BAYS / 100M
PARKING BAYS REQUIRED @ 1610.90 = 81

TOTAL PARKINGS REQUIRED = 81
TOTAL PARKINGS PROVIDED = 81

WAREHOUSE:

FLOOR SPACE : 1 BAY / 100M
PARKING BAYS REQUIRED @ 1205.064 = 12

TOTAL PARKINGS REQUIRED = 12
TOTAL PARKINGS PROVIDED = 12

WORKSHOP:

FLOOR SPACE : 4 BAY / WORKING AREA
PARKING BAYS REQUIRED : 4 BAY @ 545.437 = 4

TOTAL PARKINGS REQUIRED = 4
TOTAL PARKINGS PROVIDED = 4

CONVENIENCE SHOP (GARAGE SHOP):

NOTE: PARKING BAYS REQUIRED FOR WAREHOUSE FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS AND STORAGE.

FLOOR SPACE : 4 BAY / 100M
PARKING BAYS REQUIRED @ 148.700 = 6

TOTAL PARKINGS REQUIRED = 6
TOTAL PARKINGS PROVIDED = 6

FUELLING STATION OFFICE & GARAGE SERVICE:

FLOOR SPACE : 2 BAYS / 100M
PARKING BAYS REQUIRED @ 40.377 = 2

TOTAL PARKINGS REQUIRED = 2
TOTAL PARKINGS PROVIDED = 2

McDONALDS:

NOTE: PARKING BAYS REQUIRED FOR WAREHOUSE FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS AND STORAGE.

FLOOR SPACE : 10 BAYS / 100M
PARKING BAYS REQUIRED @ 149.531 = 14

TOTAL PARKINGS REQUIRED = 16
TOTAL PARKINGS PROVIDED = 14

STORAGE YARD

FLOOR SPACE : 1 BAY / 100M
PARKING BAYS REQUIRED @ 1345.386 = 13

TOTAL PARKINGS REQUIRED = 13
TOTAL PARKINGS PROVIDED = 13

TOTAL REQUIRED : 137
TOTAL PROVIDED : 142 PARKING BAYS + 3 DISABLED PARKING BAYS

SCHEDULE OF AREAS

AREA OF SITE (GROSS) 13204.00M — (NETT) 13204.00M

EXISTING FLOOR AREA	3222.26M
PROPOSED FLOOR AREA	1634.97M
TOTAL FLOOR AREA	4988.23M
EXISTING COVERAGE	3139.75M
PROPOSED COVERAGE	2119.66M
TOTAL COVERAGE	5258.41M

SCHEDULE OF AREAS FOR McDONALD'S

PROP. McDONALDS	250.93M
PROP. OPEN REFUSE YARD	15.28M
PROP. OUTDOOR SEATING	62.55M
PROP. DRIVE THRU	267.52M
PROP. WALKWAY AND CURBS	88.34M
TOTAL	479.62M

BREAKDOWN OF SCHEDULE OF AREAS

PROP. McDONALDS	250M
PROP. FUEL STATION	470M
PROP. FUELING GARAGE SHOP	380M
PROP. LINE SHOP 1	574M
PROP. LINE SHOP 2	442M

MUNICIPAL STAMPS

north coast architects
A DIVISION OF GUADAGNINO BROTHERS CONSULTING
MAX GUADAGNINO
OFFICE : 064 587 3344
EMAIL : info@gbn-architects.com
http://www.facebook.com/northcoastarchitects

REVISIONS

REV	DATE	DESCRIPTION	REV. BY

PROJECT
PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 821 PORTION 2
2 GRIMSBY ROAD, NGOENI, DURBAN
(CORNER OF GRIMSBY ROAD AND SOUTH COAST ROAD)

FOR
COUNCIL SUBMISSION

ARCHITECT | OWNER

TITLE
SITE PLAN AND McDONALDS FLOOR PLAN LAYOUT

DATE: 2019-03-01	SIZE: A0	DESIGNED: GUADAGNINO M.C.D. REG. NO. CAD3484003
BUILDING CLASSIFICATION		DRAWN: GUADAGNINO M.C.D. REG. NO. CAD3484003
DRG. NO.	10/821-D03	CHECKED: H.J.GALITZ P.R.O. REG. NO. CC700

KWAZULU-NATAL
AMAFA AND RESEARCH INSTITUTE

ISIKHUNGO SAMAFA NOCWANINGO
SAKWAZULU-NATALI

KWAZULU-NATAL
AMAFA- EN NAVORSINGSINSTITUUT

195 Langalibalele Street
PO Box 2685
Pietermaritzburg 3200

Tel: 033 394 6543
Fax: 033 394 6552

Email: beadmin@amafapmb.co.za
www.heritagekzn.co.za

PERMIT

Ref: 19/114

Issued under Sections 37 of the KwaZulu-Natal Amafa and Research Institute Act (5 of 2018)

Approval is hereby given to NATIONAL DEPARTMENT OF PUBLIC WORKS of 256 MADIBA STREET, PRETORIA, 0001
In accordance with the application received on 7 July 2019
For RENEWAL OF EXPIRED PERMIT (SAHRIS 930, dated October 29, 2013) FOR THE ALTERATIONS & ADDITIONS TO CONVERT THE FORMER FET COLLEGE TO A JUSTICE COMPLEX situated on Erf 3138 (consolidation of Ptn 1 of Erf 1909) Ladysmith, being at **9 GOLF ROAD, LADYSMITH**

CONDITIONS: *This permit is issued subject to the following conditions:-*

1. *That the alterations, additions, and/or demolition are carried out strictly in accordance with* ***MNI ARCHITECTS (LADYSMITH) drawing no L12-02-01, -02A 1, & 2, -02B, -03, -04A & B, -05A, B, & C, -06 XP, dated MARCH 2013;***
2. *That, in the event of any contemplated deviation from the approved plans – including the transfer of the work to the supervision of another architect/technologist –a* ***written motivation*** *in support of the deviations must be submitted to the KwaZulu-Natal Amafa and Research Institute (Institute) for consideration and the* ***prior written approval*** *of the Institute must be obtained, before any deviations are carried out;*
3. *In the case of the demolition of a structure/s or part thereof, such demolition must take place* ***not more than 30 days*** *prior to the commencement of the new work, unless otherwise agreed to, in writing, by the Institute;*
4. *Any salvageable items not required for re-use in the project must be offered to the Institute's Conservation Materials Bank and all salvageable elements identified must be delivered to the Institute's Conservation Materials Bank, Midmar, Howick, at the Applicant's cost.*
5. *Where* ***archaeological material or human remains*** *are uncovered during excavation, the Institute must be contacted immediately in order to determine the significance of the find and mitigation required (a professional archaeologist may need to be employed).*
6. *A copy of this permit must be kept on the site at all times.*
7. *The issuing of this permit does not exempt the Applicant from obtaining the approval for the proposed work from the Local Authority or any other Authority, where required.*

THE KWAZULU-NATAL AMAFA AND RESEARCH INSTITUTE RESERVES THE RIGHT TO WITHDRAW THIS PERMIT IF ANY OF THE ABOVE CONDITIONS ARE NOT COMPLIED WITH. FAILURE TO COMPLY WITH THESE CONDITIONS WILL RENDER ANY DEVIATION FROM THE ORIGINAL (PLANS) UNLAWFUL, AND THE INSTITUTE RESERVES THE RIGHT TO TAKE CRIMINAL AND/OR CIVIL ACTION AGAINST THE PERSON/S RESPONSIBLE.

This permit is valid until 11 AUGUST 2022 **AND IS NOT TRANSFERABLE.**

for HEAD OF SECRETARIAT & ADMINISTRATION

DATED AT PIETERMARITZBURG ON THIS 12 **DAY OF** AUGUST **2019**

KWAZULU - NATAL AMAFA AND RESEARCH INSTITUTE
PERM. 2019 -03- 17

Permit Number: 2019-03-17a

BRAMIN CONSULTING ENGINEERS

Consulting Civil, Structural & Geotechnical Engineers

P.O. Box 60430
Phoenix
4080

email: yashvir@bramin.co.za

Telephone: (031) 502 1989
Fax: (086) 571 4138
Cell: 083 777 2255

Our Ref: 1978

17 July 2019

STORMWATER MANAGEMENT REPORT
PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET
2 GRIMSBY ROAD, MOBENI, DURBAN, LOT 821 PNT 2

1.0 INTRODUCTION

Bramin Consulting Engineers were appointed to carry out a stormwater analysis to determine the impact the proposed new fueling station, garage shop and fast food outlet would have on the municipal stormwater system.

The site comprises the following property:

- **2 GRIMSBY ROAD, MOBENI, DURBAN, LOT 821 PNT 2**

The proposed development comprises 5259,41m² building footprint / roofed area, approximately 6300m² of associated driveways / parking area. The remaining 1644,59m² of site area is landscaped gardens.

All stormwater calculations were carried out based on the architectural site plan. The rainfall data was taken from the eThekwini Municipal website for the latitude of 29° 56' 15" and longitude of 30° 57' 42"

The proposed stormwater system will discharge into the attenuation tank and the outflow will discharge into the municipal stormwater system at the lower end of the property on the South Western boundary.

1.1 TERMS OF REFERENCE

All calculations are based on Design Manual: Guidelines and policy for the design of stormwater drainage and stormwater management systems, Engineering Unit Coastal stormwater and catchment management department. This document in reference has been compiled by the Enginering Unit: eThekwini Municipality that adheres to SANS 0400-1990 PART R Stormwater Disposal.

2.0 THE CATCHMENT AREA

The property would have comprised of existing structures and has a total area of 1,3204Ha (13204m²).

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Storm Water Management Plan

3.0 PRE-DEVELOPMENT STORMWATER RUNOFF CO-EFFICIENT

The current (pre-development) stormwater runoff co-efficient was calculated as follows:

	m^2	%	C	Proportioned C value	
Site Area	13204				
Roofed Area	3139,75	24%	0,95	0,23	
Road Area	6000	45%	0,95	0,43	
Landscaped	4064,25	31%	0,3	0,09	
Totals	13204	100%		0,75	Adopted C value

DWA METHOD		
PRE / URBAN Runoff Coefficient		
URBAN	%	
Lawn Sandy < 2%	0%	0,08
Lawn Sandy > 7%	0%	0,18
Lawn Heavy < 2%	0%	0,15
Lawn Heavy > 7%	31%	0,30
Residential Single	0%	0,50
Flats / Dense Townships	0%	0,60
Industry, Light	0%	0,65
Industry, Heavy	0%	0,70
Business Local	0%	0,60
Business CBD	0%	0,85
Streets / Roofs	69%	0,95
	100%	**0,75**
AREA WEIGHTING FACTORS		
	%	DWA
RURAL	0%	0,00
URBAN	100%	0,75
LAKES	0%	0,00
Cdesign	100%	**0,75**

4.0 PRE-DEVELOPMENT STORMWATER RUNOFF

The Rational Method was used to compute the stormwater runoff, as per the following calculations:

Area	=	1,320	ha	
Flow Path Length	=	175	m	
Height Of Fall	=	2,00	m	
Average Grade	=	1,15	%	(2 x 100 / 175)
Flow Velocity	=	1,62	m/s	(from Appendix 1)
Flow Time	=	1,81	mins	(175 / 1,615 / 60)
Time Of Entry	=	15	mins	(from Appendix 1)
Time Of Flow In Pipes	=	0,00	mins	
Time Of Concentration	=	16,81	mins	(15 + 1,8 + 0)
Runoff Factor (C)	=	0,75		(from item 3.0 above)

Using the eThekwini Municipal rainfall data for the latitude of 29° 56' 15" and longitude of 30° 57' 42" the following values were extracted:

	M15	M16,8	M30	**INTENSITY**		
1 in 10 Year Return Period	34,1	35,56	46,2	**126,95**	**mm/h**	(35,56 x 60 / 16,8)
1 in 50 Year Return Period	53,2	55,49	72,2	**198,11**	**mm/h**	(55,49 x 60 / 16,8)

Pre Development Runoff				
1 in 10 Year Return Period	=	**0,3485**	**m^3/s**	(0,75 x 126,95 x 1,3204 / 360)
1 in 50 Year Return Period	=	**0,5439**	**m^3/s**	(0,75 x 198,11 x 1,3204 / 360)

5.0 POST-DEVELOPMENT STORMWATER RUNOFF CO-EFFICIENT

The expected post development stormwater runoff co-efficient was based on the Architects proposed

	m^2	%	C	Proportioned C value	
Site Area	13204				
Roofed Area	5259	40%	0,95	0,38	
Road Area	6300	48%	0,95	0,45	
Landscaped	1645	12%	0,3	0,04	
Totals	13204	100%		0,87	Adopted C value

DWA METHOD		
PRE / URBAN Runoff Coefficient		
URBAN	%	
Lawn Sandy < 2%	0%	0,08
Lawn Sandy > 7%	0%	0,18
Lawn Heavy < 2%	0%	0,15
Lawn Heavy > 7%	12%	0,30
Residential Single	0%	0,50
Flats / Dense Townships	0%	0,60
Industry, Light	0%	0,65
Industry, Heavy	0%	0,70
Business Local	0%	0,60
Business CBD	0%	0,85
Streets / Roofs	88%	0,95
	100%	**0,87**

AREA WEIGHTING FACTORS		
	%	DWA
RURAL	0%	0,00
URBAN	100%	0,87
LAKES	0%	0,00
Cdesign	100%	**0,87**

6.0 POST-DEVELOPMENT STORMWATER RUNOFF

The Rational Method was used to compute the stormwater runoff, as per the following calculations:

Area	=	1,320	ha	
Flow Path Length	=	175	m	
Height Of Fall	=	2,00	m	
Average Grade	=	1,15	%	(2 x 100 / 175)
Flow Velocity	=	1,62	m/s	(from Appendix 1)
Flow Time	=	1,81	mins	(175 / 1,615 / 60)
Time Of Entry	=	15	mins	(from Appendix 1)
Time Of Flow In Pipes	=	0,00	mins	
Time Of Concentration	=	16,81	mins	(15 + 1,8 + 0)
Runoff Factor (C)	=	0,87		(from item 3.0 above)

Using the eThekwini Municipal rainfall data for the latitude of 29° 56' 15" and longitude of 30° 57' 42" the following values were extracted:

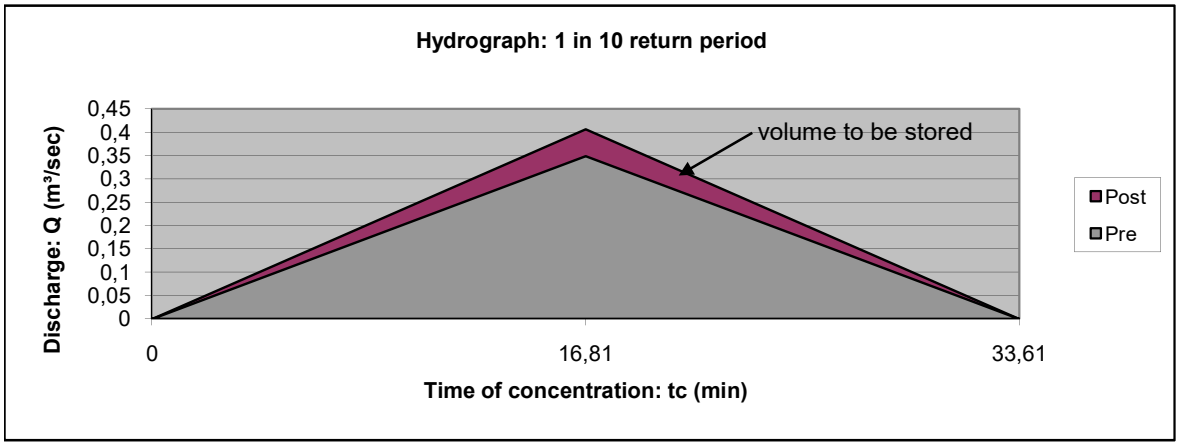
	M15	M16,8	M30	**INTENSITY**		
1 in 10 Year Return Period	34,1	35,56	46,2	**126,95**	**mm/h**	(35,56 x 60 / 16,8)
1 in 50 Year Return Period	53,2	55,49	72,2	**198,11**	**mm/h**	(55,49 x 60 / 16,8)

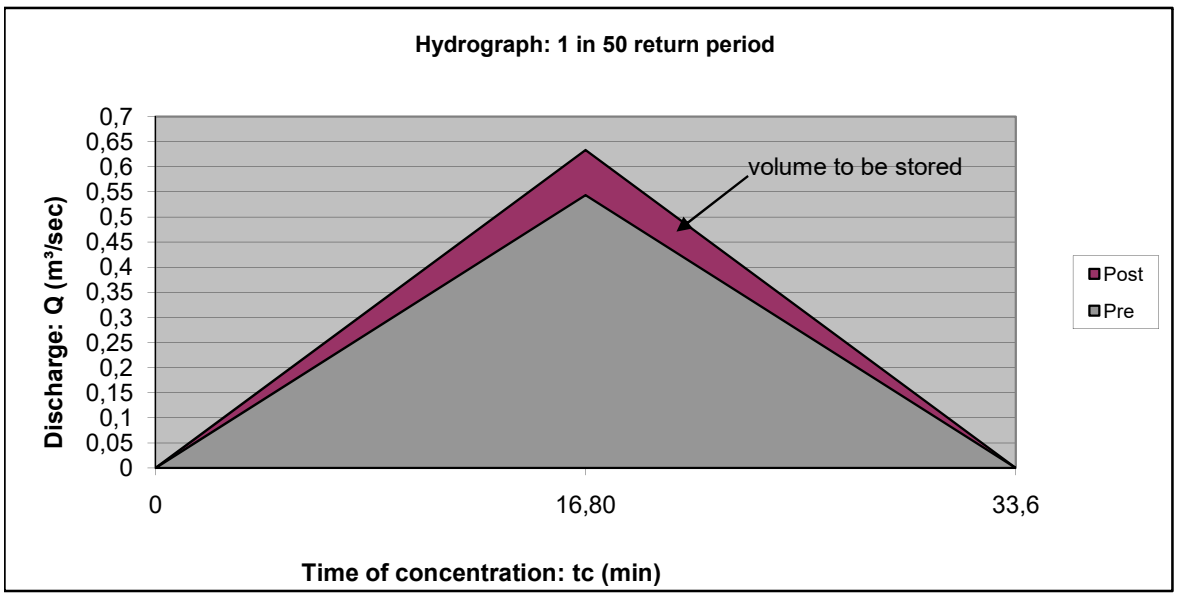
Pre Development Runoff				
1 in 10 Year Return Period	=	**0,4060**	**m^3/s**	(0,87 x 126,95 x 1,3204 / 360)
1 in 50 Year Return Period	=	**0,6336**	**m^3/s**	(0,87 x 198,11 x 1,3204 / 360)

7.0 INCREASE IN STORMWATER RUNOFF

A comparison between the pre-development and post development stormwater runoff can therefore be tabled as follows:

Return Period	Pre Development Stormwater Runoff	Post Development Stormwater Runoff	Increase in Runoff
1 in 10 Year	0,3485 m^3/s	0,4060 m^3/s	0,0576 m^3/s
1 in 50 Year	0,5439 m^3/s	0,6336 m^3/s	0,0898 m^3/s





8.0 STORMWATER ATTENUATION

We propose attenuating the difference between the post and the pre development runoff. This we will achieve by the construction of an attenuation tank to hold the stormwater runoff during the 1:10 and the 1:50 year storm and to discharge at a flow rate which does not exceed the pre development flow rate, as calculated above. The outflow will discharge into the municipal stormwater system on the lower South Western end of the property. An allowance has been made for an overflow pipe in the event of a storm which exceeds a 1:50 year storm taking place. An access manhole is to be created at the top of the attenuation chamber for maintenance purposes.

Storage Volumes Required

1 in 10 Year Return Period	=	**57,99 m^3**	(0,0576 x 16,8 x 60)
1 in 50 Year Return Period	=	**90,49 m^3**	(0,0898 x 16,8 x 60)

Storage Volume for 1 in 10 year return period

Surface area	=	60
Depth (m)	=	1,2
Attenuated Volume (m^3)	=	**72,00**

Storage Volume for 1 in 50 year return period

Surface area	=	60
Depth (m)	=	1,55
Attenuated Volume	=	**93**

9.0 STORMWATER RELEASE

1 in 10 year return period

Ø Pipe size	=	250	mm
Head	=	1,0	m
Ø Orifice	=	250	mm
C Value	=	0,69	
Orifice discharge	=	0,3485	m^3/s

1 in 50 year return period

Ø Pipe size	=	250	mm
Head	=	1,5	m
Ø Orifice	=	300	mm
C Value	=	0,69	
Orifice discharge	=	0,5439	m^3/s

We are discharging our stormwater outflow for the 1:50 year storm from the attenuation tank to the adjacent manhole via a 110 diameter pipe and the flow for the 1:10 year storm via a 250mm Orifice Plate. We have allowed for a 200mm overflow pipe at the top of the chamber. We have catered for a greater volume then required.

10.0 CONCLUSION

We conclude that the above proposed development will not have any increase in stormwater runoff to the municipal system or to the property down slope of our site. The increased stormwater runoff of both the 1 in 10 and 1 in 50 year return periods can be attenuated and that it can be disposed of in a controlled manner within the pre-development runoff rates.

Yours faithfully

Yashvir Maharaj
Pr Tech Eng 201170176

GENERAL NOTES :

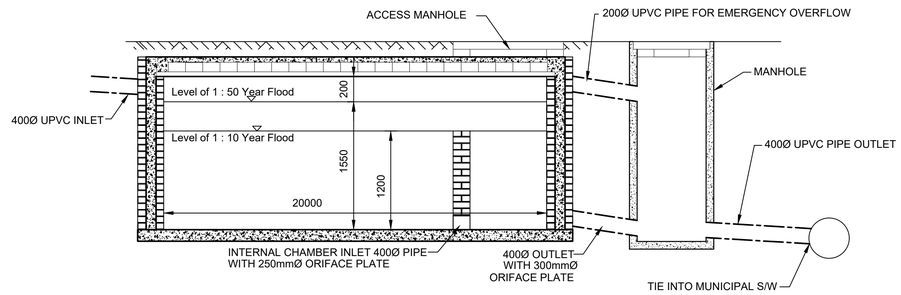
1. ALL SETTING OUT DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR AND ANY DESCREPANCIES REPORTED TO THE ENGINEER.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTS DRAWINGS AND THE STORMWATER MANAGEMENT REPORT NO. 1978-01

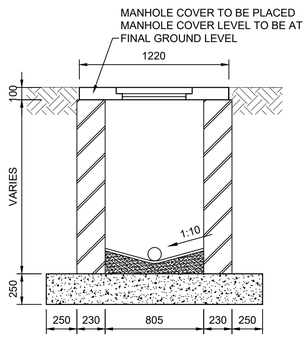
STORMWATER NOTES:

- ALL STORMWATER FROM ROOFS TO DISCHARGE DIRECTLY INTO STORMWATER SYSTEM VIA DOWNPIPES.
- ALL STORMWATER PIPES TO BE 110dia. uPVC CLASS 51.
- STORMWATER PIPES LAID BENEATH DRIVEWAY TO BE CLASS 34. ALL PIPES TO BE LAID AT MIN. FALL OF 1:80.
- ALL PLATFORMS TO BE SHAPED TO FALL TO STORMWATER
- INLETS, MIN FALL 1:100.

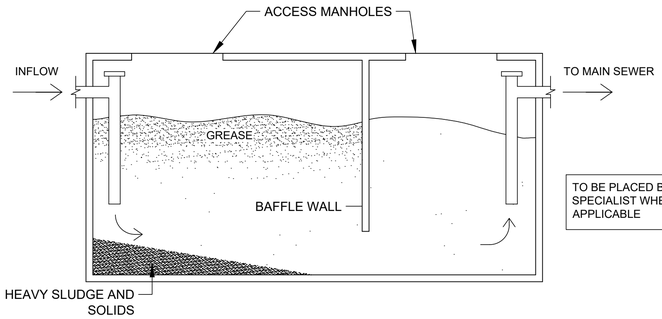
STORMWATER LAYOUT
SCALE 1:300



SECTION THROUGH ATTENUATION TANK
NOT TO SCALE



TYPICAL SECTION STORMWATER MANHOLE : POST CONSTRUCTION
NOT TO SCALE



TYPICAL SECTION: GREASE INTERCEPTOR
NOT TO SCALE

PROJECT TITLE :

PROPOSED NEW FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET
2 GRIMSBY ROAD, MOBENI
DURBAN, LOT 821, PNT 2

DRAWING TITLE :

STORMWATER MANAGEMENT DURING & POST CONSTRUCTION

JOB NUMBER 1978	DESIGNED	Y.B.Maharaj
	DRAWN	K.N
DRAWING NUMBER 01	CHECKED	Y.B.Maharaj
	SCALES	AS SHOWN
REVISION -	DATE	17-07-2019

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Consulting Engineers
Civil ∞ Structural ∞ Geotechnical

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E-Mail: yashvir@bramin.co.za
CK. No: 2010/031255/23

5 July 2019
Our Ref: BCE1978

ETHEKWINI MUNICIPALITY
LAND USE MANAGEMENT DEPARTMENT
METRO WASTE WATER
POST BOX 680
DURBAN
4001

DESCRIPTION OF WORK : EFFLUENT LOADING TO MUNICIPAL WASTE WATER SYSTEM FROM PROPOSED DEVELOPMENT.

ADDRESS : 2 GRIMSBY ROAD, MOBENI, DURBAN
LOT 821 PNT 2

We are the appointed civil engineers on the above development. We have been appointed by the developers to carry out the design of the internal waste water system for the effluent loading into the municipal system.

We confirm that the effluent loading, generated by the new floor area on the above development, will not have a major impact on the municipal system as the existing sewer infrastructure is being removed and replaced, hence no additional effluent will be generated from the proposed development.

We trust the above clarifies the matter and remain at your service.

Yours faithfully

Yashvir Maharaj
Pr Tech Eng 201170176

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Geotechnical Investigation

Lot 821 – Portion 2 - Mobeni

Geo -Technical Investigation

Soil Report Dataset

Mayfair Discount City

Geotechnical Solutions (Pty) Ltd

EARTH CIVIL TESTING

Reg.No.- K2011/115681/01 Tax.No.- 9127/374/18/0

Radiation Control – Authority No. 2962/16/1430

106 Francis Road – P.O. Box 303 - Ladysmith – KwaZulu Natal - 3370

Web – www.geo-sol.co.za – Tel – 0715608058 – 0799100920 - Email – geosollab@gmail.com

Issue Date: January 2019
Revision Number: 01
Project Number: 1901-01

Date:	16 January 2019
Document Number	Geotechnical Investigation – 1901-01
Author:	James Harvey Ewusi III
Revision Number:	1
Checked By:	Muhammad Vawda - (BSc Eng. Civil) (Hons)
Signature:	
Approved By:	James Harvey Ewusi III - (Pr Tech Eng)
Signature:	
For:	Zakir Mahomedy

Geotechnical Solutions (PTY) LTD

Civil Earth Testing - Level 1 BBBEE Contributor

Department of Health Accredited - Radiation Control - Authority No: 2692/16/1430

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Directors: M. Safi (Pr.Sci.Nat)
J.Harvey-Ewusi (Pr Tech Eng)
Z. Bux (Geotechnician-RPO)

Associates: M. Vawda (BSc Eng. Civil) (Hons)
M.M. Vawda (LLB)
A. Ahmed (Legal Secretary)

Table of Contents

List of Figures and Tables

List of Appendix

1 Introduction

Mayfair Discount City is planning to build new business structures at 2 Grimsby Road, Mobeni, Kwazulu Natal. Mayfair Discount City have requested Geotechnical Solutions (Pty) Ltd to carry out geotechnical investigation studies for the proposed new project structures.

2 Terms of Reference

This report covers the geotechnical site assessments associated with Lot 821, Portion 2, Mobeni for Mayfair Discount City. The purpose of this investigation is to sample, analyse and compile reports detailing the natural material conditions on site.

3 Information Supplied

Based on the requirements mentioned in the terms of reference, this document requires the following geotechnical testing:

- Three excavation holes will be dug and excavations will reach a depth of 1.5-2 meters deep in order to understand and establish the natural ground conditions including refusal.
- Two Soil Grading Analysis per hole indicating Atterberg Limits.
- Two Modified AASHTO and Two CBR Bearing analysis per site.
- Seven DCP tests per site including CBR and UCS values.
- One percolation test hole to determine the rate of the water seepage.

4 Site Description

The new proposed structures are located at 2 Grimsby Road, co-ordinates -29.937835°, 30.961095°, in Mobeni, Durban, Kwazulu Natal, South Africa. A Site Map is attached to Appendix A together with the co-ordinates of the various test positions.

4.1 Regional Geology

The area is underlain by sediments of the Natal Group, which rest unconformably on metamorphosed granitoid basement rocks of the Natal Structural and Metamorphic Province.

5 Fieldwork

5.1 Soil Profiling

Three manually excavated inspection pits (H1, H2 and H3) are shown on the locality map in Appendix A. The soil profile lenses and profile logs are shown in Appendix B.

5.2 Soil Grading Analysis

The test pits were supplemented with two Soil Grading Analysis samples per hole making a total of six samples which indicate the Atterberg Limits together with the Soil Mechanical Data.

Two soil samples (A and B) were taken inside the test hole H1 from the representative horizons. Two soil samples (C and D) were taken inside the test hole H2 from the representative horizons. Two soil samples (E and F) were taken inside the test hole H3 from the representative horizons. One Modified AASHTO and one CBR (G and H) samples were collected from H1. One Modified AASHTO and one CBR (I and J) samples were collected from H2.

The samples were analysed in-house at Geotechnical Solutions (Pty) Ltd. to determine their Atterbergs Limits, Moisture Contents, Modified AASHTO Density and CBR Values. The Soil Grading Analysis results are shown in Appendix C together with Atterberg Limits. MOD AASHTO and CBR Values are indicated in Appendix D.

5.3 Dynamic Cone Penetrometer (DCP) testing

Seven Dynamic Cone Penetrometer (DCP) tests were recorded, one for each excavation hole and 4 on the existing parking area. Due to non refusal the DCP tests were conducted inside the excavation holes at maximum depth. The localities of the tests are shown on the map (Appendix A). The test results are outlined in Appendix E.

5.4 Percolation Test

In addition, one Percolation test hole was dug to determine ground water seepage (Appendix F). Geotechnical Solutions (Pty) Ltd. carried out the percolation test.

6 Laboratory Test Results

6.1 Excavation of H1 and Soil Grading Analysis

Two soil samples (A and B) were taken from excavation H1. The Soil Grading Analysis indicates the soil is Brown to Light Brown moist silty sand underlain with Brown to Pale Brown silty sand. The plasticity indices range from 1.88 to 3.88 with linear shrinkages from 1.33% to 1.78%. No Manual refusal was encountered. Groundwater is present.

6.2 Excavation of H2 and Soil Grading Analysis

Two soil samples (C and D) were taken from excavation H2. The Soil Grading Analysis indicates the soil is Brown to Light Brown moist silty sand underlain with Brown to Pale Brown silty sand. The plasticity indices range from 2.24 to 2.72 with linear shrinkages from 1.00% to 1.67%. No Manual refusal was encountered. Groundwater is present.

6.3 Excavation of H3 and Soil Grading Analysis

Two soil samples (E and F) were taken from excavation H3. The Soil Grading Analysis indicates the soil is Brown to Light Brown moist silty sand underlain with Brown to Pale Brown silty sand. The plasticity indices range from 2.72 to 2.75 with linear shrinkages from 1.00% to 1.33%. No Manual refusal was encountered. Groundwater is present.

6.4 Dynamic Cone Penetrometer Testing

Seven DCP tests were carried out and are attached to Appendix E. The DCP CBR Values range from 7.5% to 27.3% and the UCS values range from 88.34kPa to 275.37kPa with no DCP's reaching manual refusal.

6.5 Percolation test hole

One Percolation test hole was dug downslope from any possible water boreholes. A soil percolation drop of 0mm was obtained due to the hole being waterlogged. The Percolation Analysis and Percolation Soil Profile (P1) are attached to Appendix F.

6.6 Water Table Level

Ground water was encountered in all of the excavation holes.

6.7 Maximum Allowable Bearing Pressure at all locations

Bearing Pressures, CBR and MOD AASHTO Values are indicated in Appendix C. Samples were taken from excavation H1 for MOD AASHTO and CBR Bearing testing. The allowable bearing pressures for the excavation holes range between 90KN/m^2 to 150KN/m^2.

Allowable Bearing Pressures per DCP				
SITE	**Hole**	**DCP**	**Min SD (mm/blow)**	**Allowable Bearing Pressure (KN/m^2)**
Lot 821 Portion 2	H1	DCP 1	34	120
	H2	DCP 2	30	90
	H3	DCP 3	11	95
	Parking	DCP 4	36	150
	Parking	DCP 5	36	150
	Parking	DCP 6	36	150
	Parking	DCP 7	25	135

Areas which results indicate a lack of bearing pressure due to non-refusal would ideally require importing of G7-G5 material and compacting to 95%-98% MOD AASHTO upon which foundations can be founded.

6.8 Site Stability

The site is flat however excavations into the overlying sands have a potential for collapse. This must be taken into account for the earthworks and construction phase of developments.

6.9 Seepage and Drainage

The area is predominantly silty sands. Water permeability through the soils is high and drainage is to the East.

7 Conclusions and Recommendations

The site is covered by parking areas and built existing warehouse structures. Minimal Wildlife is present. Traffic is moderate due to the main external access routes.

7.1 Methods of construction

All earthworks should be carried out in a manner to promote stable development of the site. It is recommended that earthworks be carried out along the guidelines given in SANS 1200 (current version).

A raft type foundation H2 is recommended due to no refusal or bedrock excavated. The results from the laboratory tests indicate that the Colluvial soils derived from weathering and transportation are loose gravelly silty sands with no manual refusal.

Typical Founding Material	Character Of Founding Material	Expected Range Of Total Soil Movements (mm)	Assumed Differential Movement (% of Total)	Site Class
Rock	Stable	Negligible	-	R
Fine grained soils with moderate to very high plasticity (clays,silty clays, clayey silts, and sandy clays)	Expansive Soils	<7.5 15 - 30	50% 50%	H H2

The project consists of the construction of new building structures. The site classification has been established in terms of the NHBRC system and the following foundation solutions are recommended.

Site Class	Foundation Solution
R	Normal – Standard strip footings
H	Normal – Standard strip footings
H2	1. Stiffened Raft Foundation 2. Piled Construction. 3. Modified – strip footings on soil raft or engineered fill

Areas which results indicate a lack of bearing pressure due to non-refusal would ideally require importing of G7-G5 material and compacting to 95%-98% MOD AASHTO upon which foundations can be founded. Placement of fill layers should be undertaken in layers not exceeding 200mm thick when placed loose and compacted

using suitable compaction plant to achieve at least 93% Modified AASHTO maximum dry density within 1-2% (wet/dry) of optimum moisture.

Density control of placed fill material should be undertaken at regular intervals during fill construction. One needs to inspect cut and fill heights greater than 2.0m would and approved by a geotechnical practitioner for stability. Geotechnical Solutions can carry out compaction test inspections of foundations prior to any concrete poured.

7.2 Excavation stability requirements and batter slopes

As a guide, Temporary side slopes of trenches or excavations to a maximum depth of 2m should be restricted to the following:

- Fill, transported soils and sandy residual soils (Topsoil and Colluvial) – 1v:h (vertical:horizontal) up to a depth of 2m. For deeper depths to 3m batters should be formed to 1v:2h provided there is no groundwater seepage. If ground water seepage is observed then trenches will need to be shored;
- Residual Clay Soils – 1v:0.5h; for deeper excavations up to 3m batter to 1v:2h;
- Highly to Moderately Weathered Bedrock – Vertical (Provided, no daylighting bedding planes or clay gouge is visible);
- Competent tightly/jointed bedrock – Vertical (Provided, no daylighting bedding planes or clay gouge is visible).

7.3 Possible risks associated with the construction of the proposed structures.

It is recommended that excavations be carried out in the dry season as far as possible and completed/backfilled with a minimum of delay.

Lateral support should be used all situations where ground water is encountered or instability is observed. Workers should not enter or work below any excavation cuts deeper than 1.5m that is not shored or battered back as described above.

It remains the responsibility of the contractor however to fully comply with the requirements of the current Occupational Health and Safety Act.

Evapotranspiration beds in areas where there is shallow bedrock, clayey soils and or areas in which percolation methods are not considered feasible consideration can be given to enhancing the soils to make the site suitable for use of percolation systems.

SUITABILITY OF SITE		
Values given should only be used as a guide for suitability of specific sanitation systems		
>300	mm/hr	Any sanitation system may be considered .
100 - 300	mm/hr	Any sanitation system may be considered .
25 - 100	mm/hr	These sites may not be suitable for septic tank systems , especially if sites are small
15 - 25	mm/hr	Suitable for al sanitation systems except septic tanks.
8 - 25	mm/hr	Suitable for all dry or semi dry sanitation systems .
<8	mm/hr	Not suitable for soak-aways.

A simple measure that can be implemented is the creation of evapotranspiration bed. An evapotranspiration bed can be constructed which will involve the placement of permeable, sandy soil bed which will dispose of the effluent.

Another evapotranspiration bed system could comprise a lattice of narrow sand filled trenches constructed adjacent to the percolation trench system, the effect of the evapotranspiration beds or trenches are to effectively substitute the insitu impermeable soil mass with a permeable one, and significantly increase the area of application of effluent to the insitu subsoil's.

Although there are no known parameters available for design of an evapotranspiration bed or trench system, such systems in practice have worked satisfactorily on a trial and error basis.

The effect of vegetation on the disposal of effluent should, however, not be underestimated. This is particularly the case in the areas of low percolation soils. The judicious planting of high water demand plants and trees such as canna, banana, wattle, casuarinas and gum will assist the evapotranspiration process significantly. Conversely, clearing of vegetation or the building over evapotranspiration areas will greatly limit or debilitate the process.

7.4 Drainage and runoff

The Colluvial subsoils are of a clayey nature such that erosion is not considered a high risk. However the pediment areas where bedrock is shallow, erosion should be kept as low as possible by limiting the flow and velocity of stormwater runoff and by lining drainage channels where necessary.

Stormwater from all roof and paved areas should be piped and collected in surface drains and discharged into a suitably designed stormwater retention system. It is

therefore necessary to provide adequate stormwater surface drainage as part of the infrastructure development of the area.

The most important factor in the stable development of the site is the control and removal of drainage surface and ground water from the site. In controlling the erosional effects of surface runoff, it is necessary to limit the distance travelled by the runoff water. Greater distances mean greater volume accumulation and generally more severe erosion.

Earthworks and drainage measure should be designed in such a way as to prevent ponding, or high concentrations, of stormwater or groundwater anywhere on the site, both during and after development. The terraces should be shaped to a gradient to prevent water ponding on the surface and should be graded to direct water away from the fill edges and foundations.

A marked increase in water content at foundation level could result in collapse settlement/heave. Runoff from roofs should be piped from gutters through downpipes and ground pipes into the stormwater system.

At the first stage of site clearance prior to construction, topsoil should be cleared across the area and stockpiled separately for use in later rehabilitation. Once construction is completed then the disturbed areas must be levelled, scarified and topsoiled. Vegetation can then take place by either planting grass sods or by seeding, with a follow up water programme.

8 References

Linström, W., 1987. *The geology of Durban area,* Government Printer, Pretoria, S.A*., 52pp.*

9 Appendices

Appendix A: Site Map

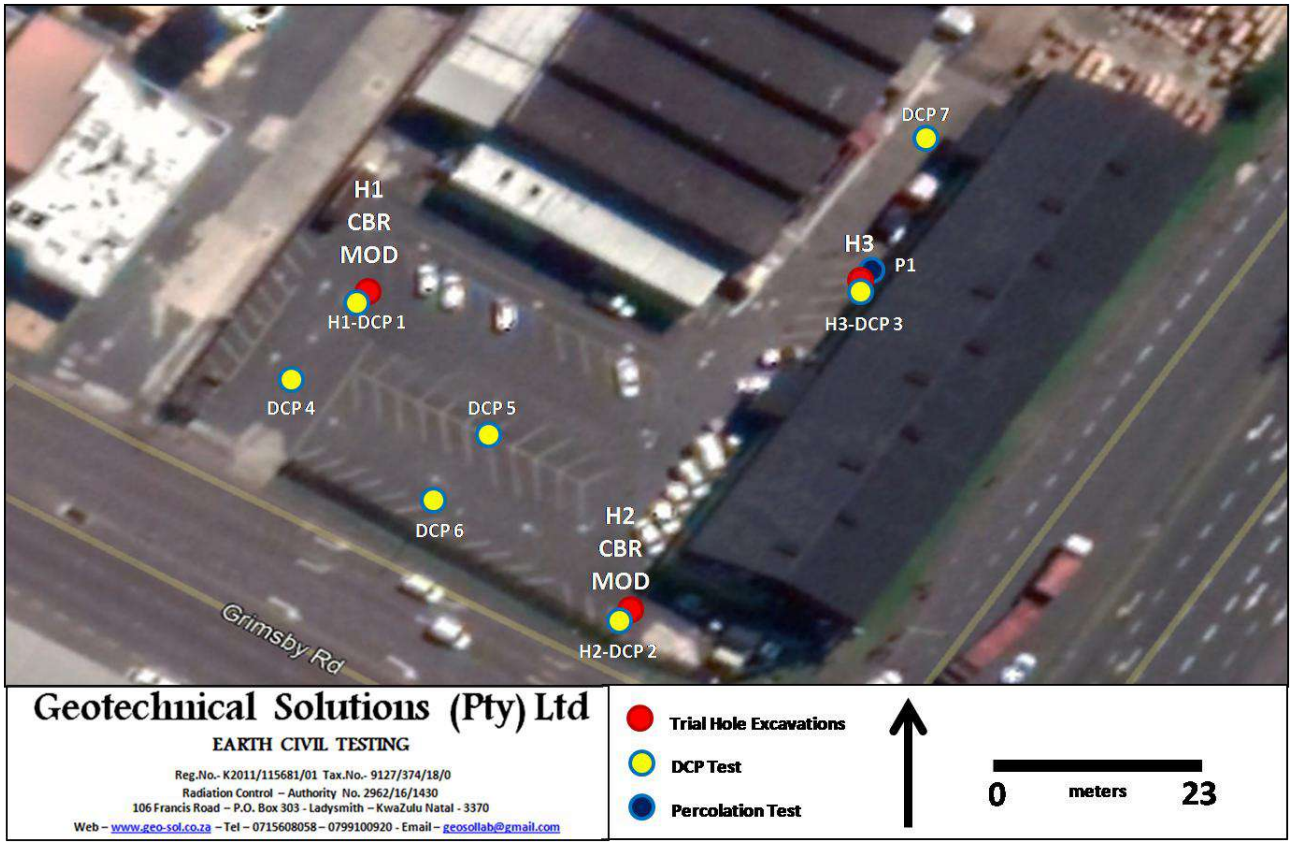

Figure 1: Location of the soil profile holes and position of the test sites.

	X	Y	Z
H1	-29.937835°	30.961095°	23m
H2	-29.938118°	30.961370°	22m
H3	-29.937778°	30.961614°	22m
H1 - DCP 1	-29.937835°	30.961095°	23m
H2 - DCP 2	-29.938118°	30.961370°	22m
H3 - DCP 3	-29.937778°	30.961614°	22m
DCP 4	-29.937870°	30.961019°	23m
DCP 5	-29.937914°	30.961199°	23m
DCP 6	-29.938001°	30.961140°	23m
DCP 7	-29.937603°	30.961710°	22m

Table 1: Co-ordinates for the Soil profiles, soil grading analysis, DCP's and percolation test hole.

Appendix B: Soil Profiles

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Web – www.geo-sol.co.za – Tel – 0715608058 – 0799100920 - Email – geosollab@gmail.com

WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937835°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961095°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	23m

Section No.	H 1				
		0mm	Existing Asphalt		
	100mm	A	Brown to Light Brown Moist Silty Sand		
	500mm	B MOD -G CBR-H	Brown to Pale Brown Wet Silty Sand		
	1100mm				
	1350mm	DCP 1 START	No Manual Refusal – Groundwater in Hole Slope Drainage – East		
Drawn	ZB	Checked	JH-E		Y

Figure 2: Logged Soil Profile for Hole 1.

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.938118°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961370°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Section No.	H 2		
		0mm	Existing Asphalt
	100mm	C	Brown to Dark Brown Quarry Aggregate
	500mm	D MOD -I CBR-J	Brown to Light Brown Moist Silty Sand
	1200mm	DCP 2 START	Brown to Pale Brown Wet Silty Sand
			No Manual Refusal – Groundwater in Hole Slope Drainage – East

Drawn	ZB	Checked	JH-E	Y

Figure 3: Logged Soil Profile for Hole 2.

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937778°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961614°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Section No.	H 3		0mm		
	200mm		Existing Asphalt		
		E	Brown to Light Brown Moist Silty Sand		
	600mm				
		F	Brown to Pale Brown Wet Silty Sand		
	1000mm	DCP 3 START			
			No Manual Refusal – Groundwater in Hole Slope Drainage – East		
Drawn	ZB		Checked	JH-E	Y

Figure 4: Logged Soil Profile for Hole 3.

Appendix C: Soil Grading Analysis results

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937835°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961095°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	23m

Soil Grading Analysis

Sample No.	H1 - Sample A	**Depth Taken**	300mm
Description	BR-Light Br Silty Sand	**Lab. No.**	L01-H1-01

SOIL SIEVE GRADING		
% Passing	**37.50**	100.00
	26.50	100.00
	19.00	100.00
	13.20	100.00
	4.75	99.40
	2.00	98.80
	0.425	94.40
	0.075	13.00

MECHANICAL DATA	
Coarse Sand	4.45
Coarse Fine Sand	73.48
Medium Fine Sand	6.48
Fine Sand	2.43
Silt & Clay	13.16

CLASSIFICATION	
Unified	SM – Silty Sand

PLASTICITY			*MOD AASHTO*	
Liquid Limit	**LL**	20.78	**Density Kg/mc**	-
Plasticity Index	**PI**	3.88	**O.M.C**	-
Linear Shrinkage (%)	**LS**	1.78		

Soil Sieve Analysis – Mechanical Analysis - TMH1 –Method A1; TMH1 – Method A5
Plasticity Atterberg Limits – TMH1 Method – A3 – Linear Shrinkage –TMH1 Method – A4
MOD AASHTO – OMC –TMH1 Method – A7 – Field Density Nuclear Gauge – TMH1 Method – A10
California Bearing Ratio – CBR – Untreated Soils – TMH1 Method – A8
California Bearing Ratio – CBR – Lime Stabalised Soils – TMH1 Method – A9

Figure 5: Soil Grading Analysis of H1, Sample A.

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LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961095°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	23m

Soil Grading Analysis

Sample No.	H1 - Sample B	**Depth Taken**	800mm
Description	Br-Pale Br Silty Sand	**Lab. No.**	L01-H1-02

SOIL SIEVE GRADING		
% Passing	**37.50**	100.00
	26.50	100.00
	19.00	100.00
	13.20	100.00
	4.75	99.40
	2.00	98.80
	0.425	95.20
	0.075	13.20

MECHANICAL DATA	
Coarse Sand	3.64
Coarse Fine Sand	61.74
Medium Fine Sand	17.21
Fine Sand	4.05
Silt & Clay	13.36

CLASSIFICATION	
TRH 4	G7

PLASTICITY			*MOD AASHTO*	
Liquid Limit	**LL**	9.80	**Density Kg/mc**	2125.85
Plasticity Index	**PI**	1.88	**O.M.C**	7.61
Linear Shrinkage (%)	**LS**	1.33		

Soil Sieve Analysis – Mechanical Analysis - TMH1 –Method A1; TMH1 – Method A5
Plasticity Atterberg Limits – TMH1 Method – A3 – Linear Shrinkage –TMH1 Method – A4
MOD AASHTO – OMC –TMH1 Method – A7 – Field Density Nuclear Gauge – TMH1 Method – A10
California Bearing Ratio – CBR – Untreated Soils – TMH1 Method – A8
California Bearing Ratio – CBR – Lime Stabalised Soils – TMH1 Method – A9

Figure 6: Soil Grading Analysis of H1, Sample B.

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.938118°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961370°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Soil Grading Analysis

Sample No.	H2 - Sample C	**Depth Taken**	250mm
Description	BR-Light Br Silty Sand	**Lab. No.**	L01-H2-01

SOIL SIEVE GRADING		
% Passing	**37.50**	100.00
	26.50	100.00
	19.00	100.00
	13.20	100.00
	4.75	98.20
	2.00	97.60
	0.425	93.80
	0.075	15.20

MECHANICAL DATA	
Coarse Sand	3.89
Coarse Fine Sand	65.98
Medium Fine Sand	11.07
Fine Sand	3.48
Silt & Clay	15.57

CLASSIFICATION	
Unified	SM – Silty Sand

PLASTICITY			*MOD AASHTO*	
Liquid Limit	**LL**	19.35	**Density Kg/mc**	-
Plasticity Index	**PI**	2.24	**O.M.C**	-
Linear Shrinkage (%)	**LS**	1.00		

Soil Sieve Analysis – Mechanical Analysis - TMH1 –Method A1; TMH1 – Method A5
Plasticity Atterberg Limits – TMH1 Method – A3 – Linear Shrinkage –TMH1 Method – A4
MOD AASHTO – OMC –TMH1 Method – A7 – Field Density Nuclear Gauge – TMH1 Method – A10
California Bearing Ratio – CBR – Untreated Soils – TMH1 Method – A8
California Bearing Ratio – CBR – Lime Stabalised Soils – TMH1 Method – A9

Figure 7: Soil Grading Analysis of H2, Sample C.

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Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Soil Grading Analysis

Sample No.	H2 - Sample D	**Depth Taken**	600mm
Description	Br-Pale Br Silty Sand	**Lab. No.**	L01-H2-02

SOIL SIEVE GRADING		
% Passing	**37.50**	100.00
	26.50	100.00
	19.00	100.00
	13.20	100.00
	4.75	99.20
	2.00	98.60
	0.425	95.40
	0.075	11.60

MECHANICAL DATA	
Coarse Sand	3.25
Coarse Fine Sand	67.34
Medium Fine Sand	14.20
Fine Sand	3.45
Silt & Clay	11.76

CLASSIFICATION	
TRH 4	G7

PLASTICITY			*MOD AASHTO*	
Liquid Limit	**LL**	17.47	**Density Kg/mc**	2094.31
Plasticity Index	**PI**	2.72	**O.M.C**	8.39
Linear Shrinkage (%)	**LS**	1.67		

Soil Sieve Analysis – Mechanical Analysis - TMH1 –Method A1; TMH1 – Method A5
Plasticity Atterberg Limits – TMH1 Method – A3 – Linear Shrinkage –TMH1 Method – A4
MOD AASHTO – OMC –TMH1 Method – A7 – Field Density Nuclear Gauge – TMH1 Method – A10
California Bearing Ratio – CBR – Untreated Soils – TMH1 Method – A8
California Bearing Ratio – CBR – Lime Stabalised Soils – TMH1 Method – A9

Figure 8: Soil Grading Analysis of H2, Sample D.

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937778°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961614°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Soil Grading Analysis

Sample No.	H3 - Sample E	**Depth Taken**	400mm
Description	BR-Light Br Silty Sand	**Lab. No.**	L01-H3-01

SOIL SIEVE GRADING		
% Passing	**37.50**	100.00
	26.50	100.00
	19.00	100.00
	13.20	100.00
	4.75	98.60
	2.00	96.80
	0.425	92.80
	0.075	10.80

MECHANICAL DATA	
Coarse Sand	4.13
Coarse Fine Sand	67.77
Medium Fine Sand	13.43
Fine Sand	3.51
Silt & Clay	11.16

CLASSIFICATION	
Unified	SM – Silty Sand

PLASTICITY			*MOD AASHTO*	
Liquid Limit	**LL**	17.48	**Density Kg/mc**	-
Plasticity Index	**PI**	2.72	**O.M.C**	-
Linear Shrinkage (%)	**LS**	1.33		

Soil Sieve Analysis – Mechanical Analysis - TMH1 –Method A1; TMH1 – Method A5
Plasticity Atterberg Limits – TMH1 Method – A3 – Linear Shrinkage –TMH1 Method – A4
MOD AASHTO – OMC –TMH1 Method – A7 – Field Density Nuclear Gauge – TMH1 Method – A10
California Bearing Ratio – CBR – Untreated Soils – TMH1 Method – A8
California Bearing Ratio – CBR – Lime Stabalised Soils – TMH1 Method – A9

Figure 9: Soil Grading Analysis of H3, Sample E.

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937778°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961614°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Soil Grading Analysis

Sample No.	H3 - Sample F	**Depth Taken**	850mm
Description	Br-Pale Br Silty Sand	**Lab. No.**	L01-H3-02

SOIL SIEVE GRADING		
% Passing	**37.50**	100.00
	26.50	100.00
	19.00	100.00
	13.20	100.00
	4.75	98.00
	2.00	94.40
	0.425	91.40
	0.075	13.80

MECHANICAL DATA	
Coarse Sand	3.18
Coarse Fine Sand	66.74
Medium Fine Sand	11.65
Fine Sand	3.81
Silt & Clay	14.62

CLASSIFICATION	
Unified	SM – Silty Sand

PLASTICITY			*MOD AASHTO*	
Liquid Limit	**LL**	17.70	**Density Kg/mc**	-
Plasticity Index	**PI**	2.75	**O.M.C**	-
Linear Shrinkage (%)	**LS**	1.00		

Soil Sieve Analysis – Mechanical Analysis - TMH1 –Method A1; TMH1 – Method A5
Plasticity Atterberg Limits – TMH1 Method – A3 – Linear Shrinkage –TMH1 Method – A4
MOD AASHTO – OMC –TMH1 Method – A7 – Field Density Nuclear Gauge – TMH1 Method – A10
California Bearing Ratio – CBR – Untreated Soils – TMH1 Method – A8
California Bearing Ratio – CBR – Lime Stabalised Soils – TMH1 Method – A9

Figure 10: Soil Grading Analysis of H3, Sample F.

Appendix D: MOD AASHTO and CBR test results

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937835°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961095°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	23m

MOD AASHTO Final Test Results – H1 - Sample G

MOD AASHTO	
Density Kg/mc	2125.85
O.M.C	7.61

Figure 11: Mod AASHTO test results H1, sample G.

CBR Final Test Results – H1 - Sample H

	%
CBR @ 100% Compaction	16.86
CBR @ 98% Compaction	15.92
CBR @ 97% Compaction	15.61
CBR @ 95% Compaction	15.00
CBR @ 93% Compaction	14.82
CBR @ 90% Compaction	13.86
Swell @ 100% Compaction	2.36

Figure 12: CBR test results, H1 sample H.

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WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.938118°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961370°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

MOD AASHTO Final Test Results – H2 - Sample I

MOD AASHTO	
Density Kg/mc	2094.31
O.M.C	8.39

Figure 13: Mod AASHTO test results H2, sample I.

CBR Final Test Results – H2 - Sample J

	%
CBR @ 100% Compaction	18.43
CBR @ 98% Compaction	17.57
CBR @ 97% Compaction	16.98
CBR @ 95% Compaction	15.24
CBR @ 93% Compaction	14.69
CBR @ 90% Compaction	14.01
Swell @ 100% Compaction	1.57

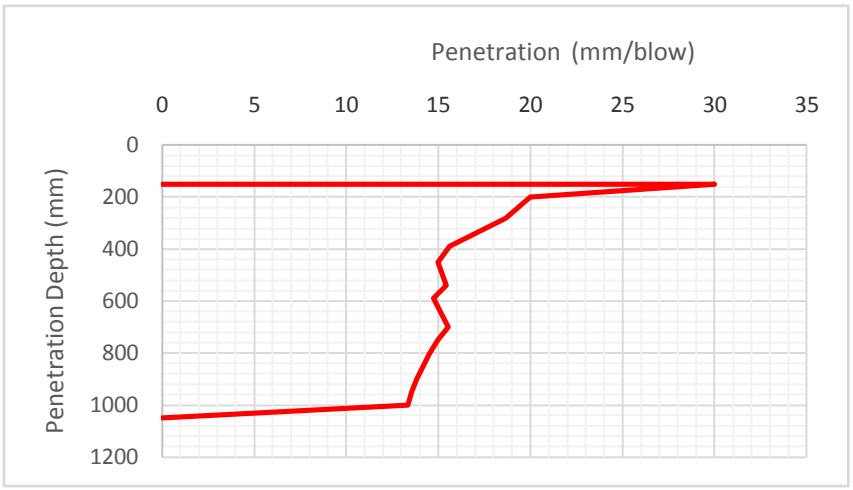
Figure 14: CBR test results, H2 sample J.

Appendix E: DCP tests (co-ordinates as shown on map)

Geotechnical Solutions Pty Ltd.	DCP INVESTIGATION

Test Date 16 January 2019 DCP No. 1

Site: Mobeni Hole No. 1



Penetration Guide mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
10 - 30	Med. Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 1350 mm below NGL

Remarks: No Refusal – Groundwater in hole

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	25.00	10	25.00	16.1	173.02
201 - 400	13.10	16	17.09	16.3	174.91
401 - 600	14.70	15	15.06	19.7	206.64
601 - 800	16.00	15	14.14	23.7	243.15

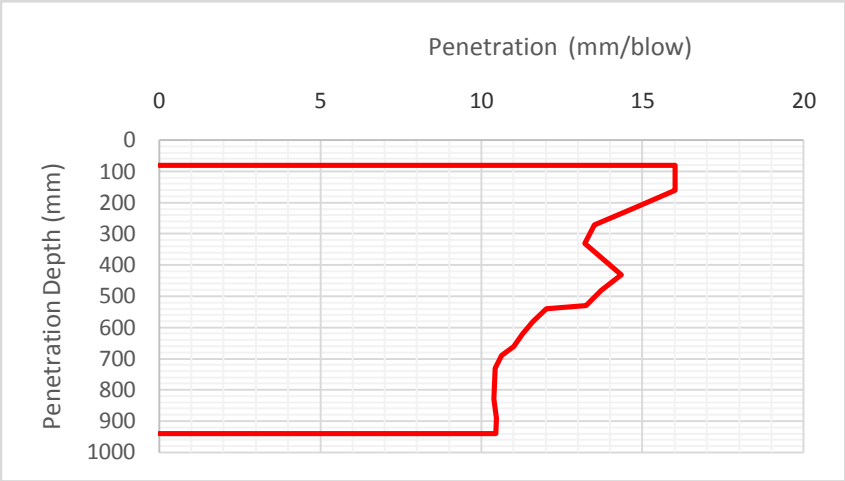
Figure 15: DCP Investigation for H1 - DCP 1.

Geotechnical Solutions Pty Ltd.

DCP INVESTIGATION

Test Date 16 January 2019 DCP No. 2

Site: Mobeni Hole No. 2



Penetration Guide mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
10 - 30	Med. Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 1200 mm below NGL

Remarks: No Refusal – Groundwater in hole

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	15.20	13	16.00	17.3	184.32
201 - 400	14.30	15	13.79	19.8	207.57
401 - 600	10.50	24	12.98	16.1	173.02
601 - 800	8.40	24	10.63	10.1	114.79

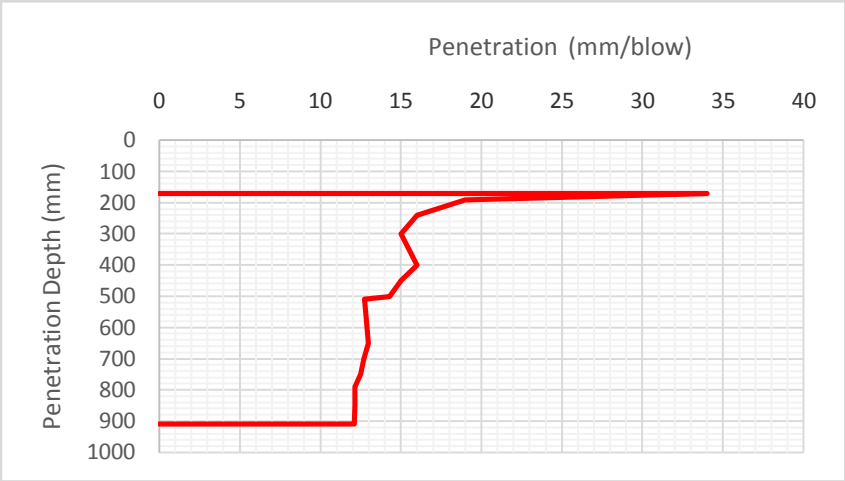
Figure 16: DCP Investigation for H2 - DCP 2.

Geotechnical Solutions Pty Ltd.

DCP INVESTIGATION

Test Date 16 January 2019 DCP No. 3

Site: Mobeni Hole No. 3



Penetration Guide mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
10 - 30	Med. Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 1000 mm below NGL

Remarks: No Refusal – Groundwater in hole

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	29.80	11	26.50	11.3	126.71
201 - 400	15.60	14	15.67	12.7	140.42
401 - 600	11.40	21	13.73	15.1	163.53
601 - 800	10.70	19	12.44	23.4	240.44

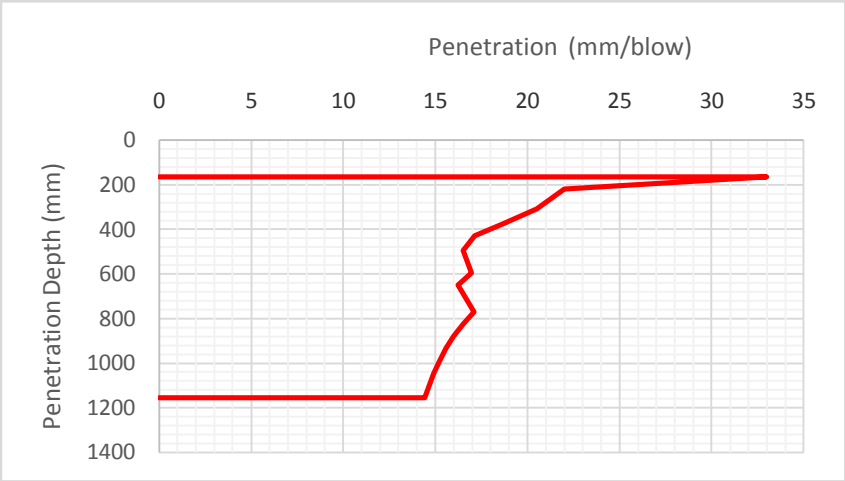
Figure 17: DCP Investigation for H3 - DCP 3.

Geotechnical Solutions Pty Ltd.

DCP INVESTIGATION

Test Date 25 January 2019 DCP No. 4

Site: Mobeni Hole No. Parking



Penetration Guide mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
10 - 30	Med. Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 0 mm below NGL

Remarks: No Refusal

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	29.15	8	27.5	9.9	112.78
201 - 400	14.63	14	20.41	18.2	192.73
401 - 600	16.08	13	16.88	20.9	217.68
601 - 800	18.99	12	15.77	27.3	275.37

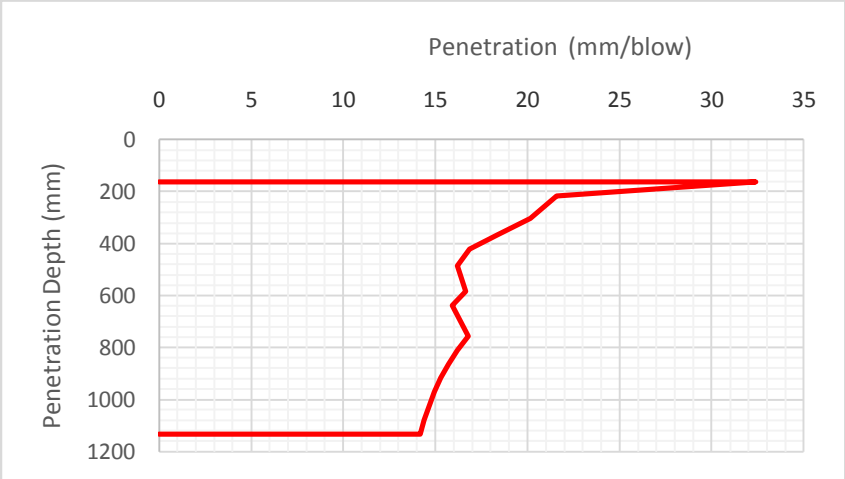
Figure 18: DCP Investigation for DCP 4, parking.

Geotechnical Solutions Pty Ltd.

DCP INVESTIGATION

Test Date 16 January 2019 DCP No. 5

Site: Mobeni Hole No. Parking



Penetration Guide mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
10 - 30	Med. Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 0 mm below NGL

Remarks: No Refusal

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	28.30	9	27.00	9.2	105.74
201 - 400	14.27	15	18.46	17.7	188.06
401 - 600	15.69	14	16.41	20.4	213.09
601 - 800	18.54	13	16.16	26.7	270.04

Figure 19: DCP Investigation for DCP 5, parking.

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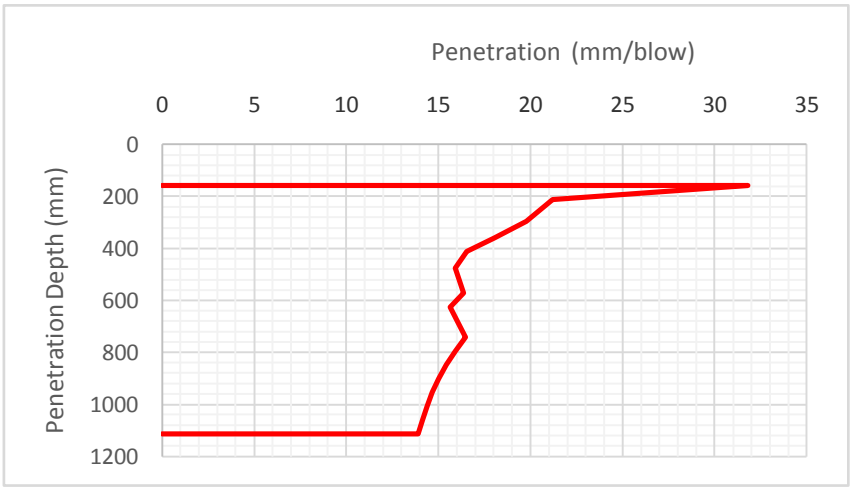
Geotechnical Solutions Pty Ltd.

DCP INVESTIGATION

Test Date 16 January 2019 DCP No. 6

Site: Mobeni Hole No. Parking



Penetration Guide	
mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
10 - 30	Med. Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 0 mm below NGL

Remarks: No Refusal

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	27.45	9	24.26	8.4	97.60
201 - 400	13.91	15	17.56	17.2	183.38
401 - 600	15.29	14	16.11	19.9	208.49
601 - 800	18.09	13	15.86	26.2	265.58

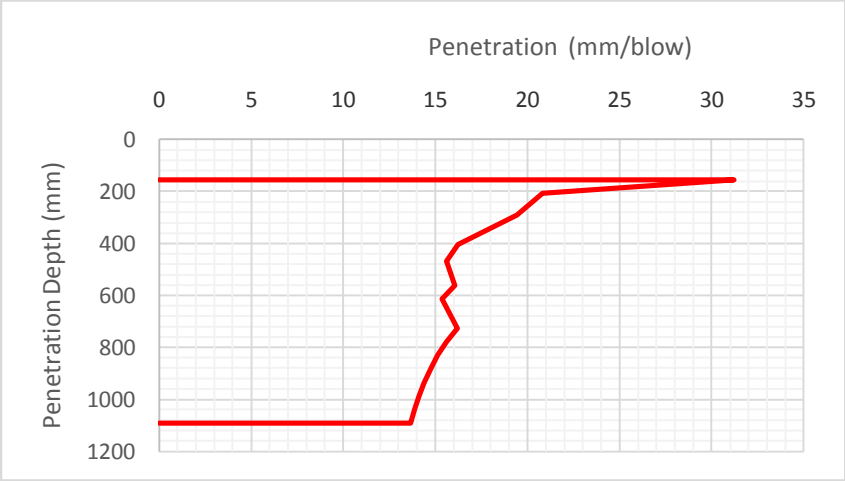
Figure 20: DCP Investigation for DCP 6, parking.

Geotechnical Solutions Pty Ltd.

DCP INVESTIGATION

Test Date 16 January 2019 DCP No. 7

Site: Mobeni Hole No. Parking



Penetration Guide	
mm/blow	Consistency
< 5	Very Dense
5 - 10	Dense
	Med.
10 - 30	Dense
30 - 75	Loose
75 - 100	Very Loose

Depth of hole in which DCP was taken : - 0 mm below NGL

Remarks: No Refusal

Depth (mm)	Weighted avg. pen. rate (%)	Blows	Average (mm/blow)	CBR (%)	UCS (kPa)
0 - 200	26.62	9	23.80	7.5	88.34
201 - 400	13.59	15	17.23	17.0	181.50
401 - 600	14.91	14	15.66	19.4	203.87
601 - 800	17.65	13	15.40	25.6	260.22

Figure 21: DCP Investigation for DCP 7, parking.

Appendix F: Soil percolation profile

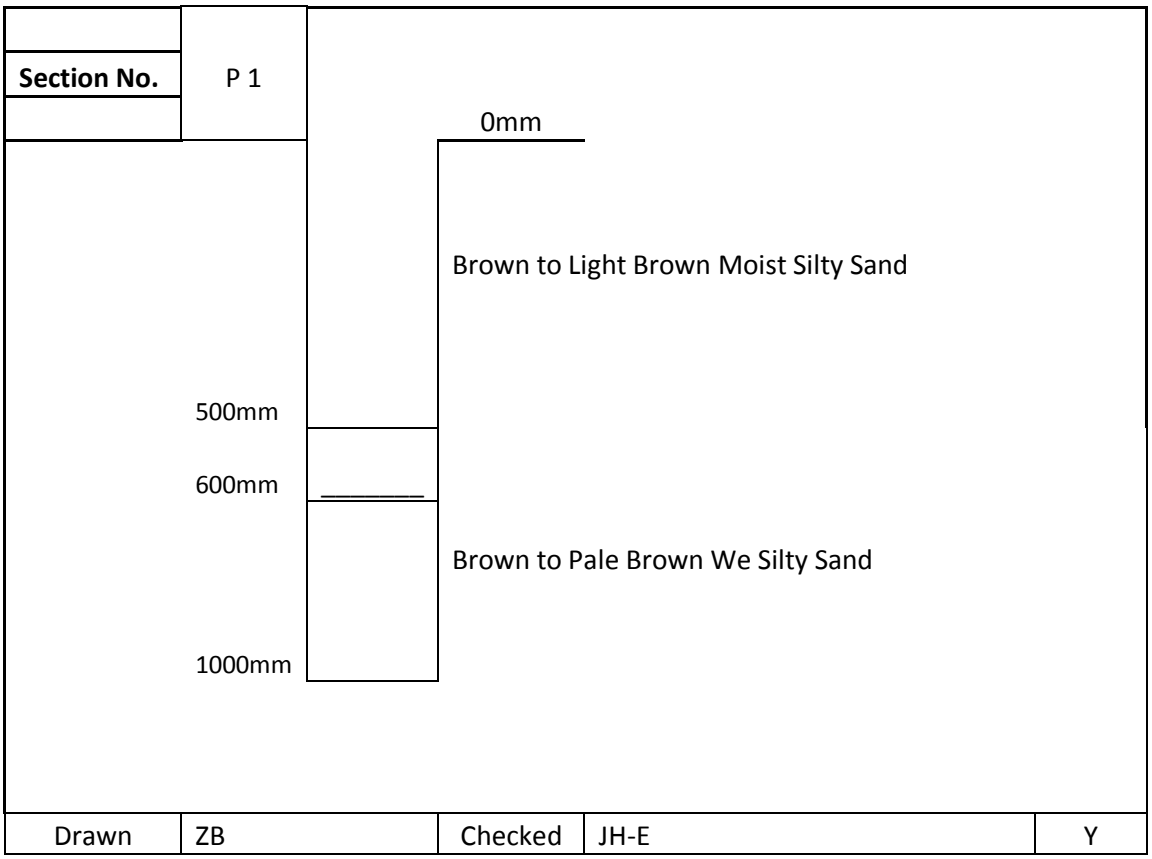
Geotechnical Solutions (Pty) Ltd

EARTH CIVIL TESTING

Reg.No.- K2011/115681/01 Tax.No.- 9127/374/18/0
Radiation Control – Authority No. 2962/16/1430
106 Francis Road – P.O. Box 303 - Ladysmith – KwaZulu Natal - 3370
Web – www.geo-sol.co.za – Tel – 0715608058 – 0799100920 - Email – geosollab@gmail.com

WN	1901-01	**Client**	Zakir Mahomedy	**(X)**	-29.937778°
LN	L01-MN1	Mayfair Discount City - Mobeni		**Site Co-Ords (Y)**	30.961614°
Date	16/01/2019	**GeoTechnician**	Z. Bux / M. Vawda	**(Z)**	22m

Geotechnical Solutions (Pty) Ltd – Soil Percolation Profile



Hole Number	Percolation Test Drop - Level (mm) In 30minutes After 2 Hours Of Soaking
Percolation 1	0mm – Hole is soaked with groundwater

Remarks/Comments	
	Runoff – East

Figure 22: Soil profile for percolation test as shown on map in Appendix A.

Appendix G: Site Photos

Figure 23: A collection of site photos showing fieldwork.

Geotechnical Solutions (Pty) Ltd

EARTH CIVIL TESTING

Reg.No.- K2011/115681/01 Tax.No.- 9127/374/18/0
Radiation Control – Authority No. 2962/16/1430
106 Francis Road – P.O. Box 303 - Ladysmith – KwaZulu Natal - 3370
Web – www.geo-sol.co.za – Tel – 0715608058 – 0799100920 - Email – geosollab@gmail.com

14 May 2019

...

Attention: Zakir Mahomedy – Aniston Investments

Re: Lot 821 – Portion 2 – Mobeni – Mayfair Discount Cash and Carry – Hydrogeological Investigation Requirements.

To whom it may concern.

A Hydrogeological Investigation is not required for a specific number of reasons:

1. The current proposed site has warehouses and built existing structures with tarred parking.
2. The area of Mobeni is largely industrial and well developed comprising of numerous factories and main access roads.
3. Current footprints and operations of the site do not interfere or affect the current groundwater conditions.
4. No groundwater resources will be used at any point before, during or after the construction phases.
5. No groundwater resources will be utilized for drinking purposes. Water will be accessed through the main municipal supply water line.
6. No groundwater resources will be utilized or is required for industrial purposes.
7. There are currently no boreholes on site that are affecting the water table level or influencing any current ground water conditions.
8. All current and future stormwater drainage will direct into the municipal stormwater system.

It is however noted that the council, client or environmental agents may suggest at a later stage that a Hydrogeological Study be done should on site conditions or building specifications change.

Yours Faithfully

James Harvey Ewusi
Pr. Tech. Eng

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Socio-Economic Impact Study

URBAN STUDIES

DURBAN MOBENI
RETAIL AND FILLING STATION STUDY

FOR

ANISTON INVESTMENTS

PREPARED BY
DR DIRK A PRINSLOO AND
DIRK NICO PRINSLOO

APRIL 2019

www.urbanstudies.co.za

Contents

1. BACKGROUND

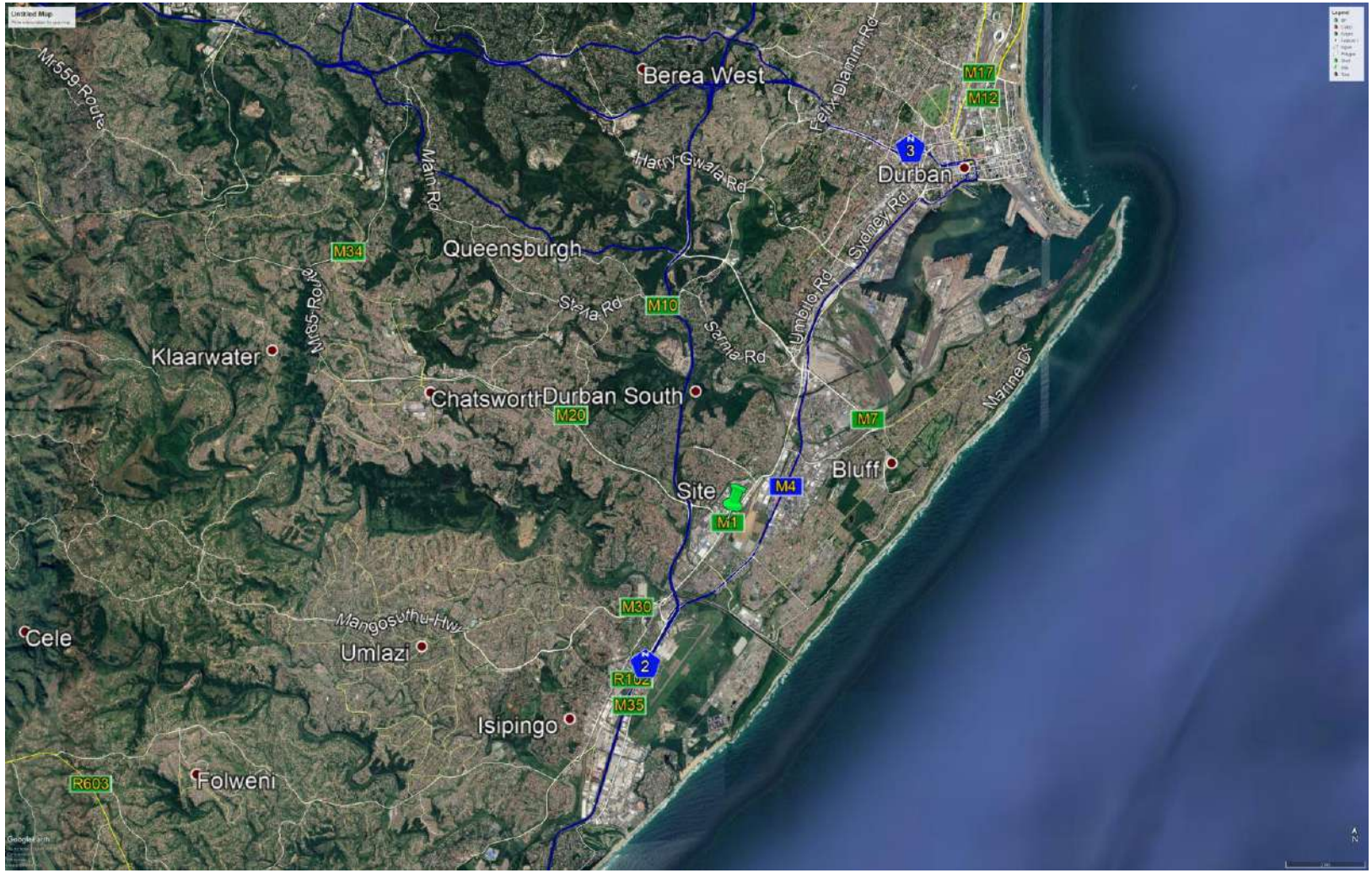
The proposed retail and filling station site is centrally located on the corner of South Coast Road and Grimsby Road in the industrial area of Mobeni, eThekwini. The area is characterised by factories, motor related businesses, warehouses and other industrial facilities.

The main focus of the research will be to understand the dynamic nature of the market and to quantify the retail and filling station development potential for the site. The research will also focus on the socio-economic impact of the development.

The following map shows the macro location of the site. The following macro location variables are important to note:

- The highway road infrastructure is well established in the area. The Mobeni market has good access to both the N2 and M4 highways;
- The surrounding eThekwini market is well established in terms of residential communities and other supporting land use amenities;
- The Mobeni area links both the Durban Port and the old Durban Airport which will be utilised as industrial space in future;
- Mobeni East is experiencing good growth with the focus on large scale distribution and warehouse facilities;
- The formal shopping centre supply in the Mobeni market is limited and therefore creates a potential gap in the marketplace.

Macro Location of the Site in Mobeni



2. RESEARCH OBJECTIVES

The **main objectives** of the research were the following:

- ✓ To understand the **dynamic nature** and **growth prospects** of the market;
- ✓ To establish the **current** and **future retail** and **filling station market potential** for the proposed site;
- ✓ To focus on the **role** and **function** of the proposed development;
- ✓ To provide **strategic input** for a sustainable development;
- ✓ To quantify the **socio-economic impact** on job creation and the local economy;
- ✓ To quantify the **impact on existing facilities** in the surrounding area.

The market research will add strategic value for the proposed retail and filling station development in Mobeni.

3. RESEARCH METHODOLOGY

This is a desk research study and the following existing sources of information were used:

- Urban Studies' databank 2005-2018;
- Stats SA, Census 2011, adjusted for 2019/24;
- Stats SA, Community Survey, 2016;
- Various websites;
- Google Earth Pro;
- MapInfo Pro 17.0;
- South African Council of Shopping Centres Directory;
- Mobeni Traffic Surveys by Mikros Traffic Monitoring KZN (Pty) Ltd.

4. POPULATION NUMBERS, GROWTH AND PROJECTIONS

The impact area was demarcated for the site to indicate the household, commercial and industrial activities and to indicate how the dynamic nature of the area will influence the proposed development.

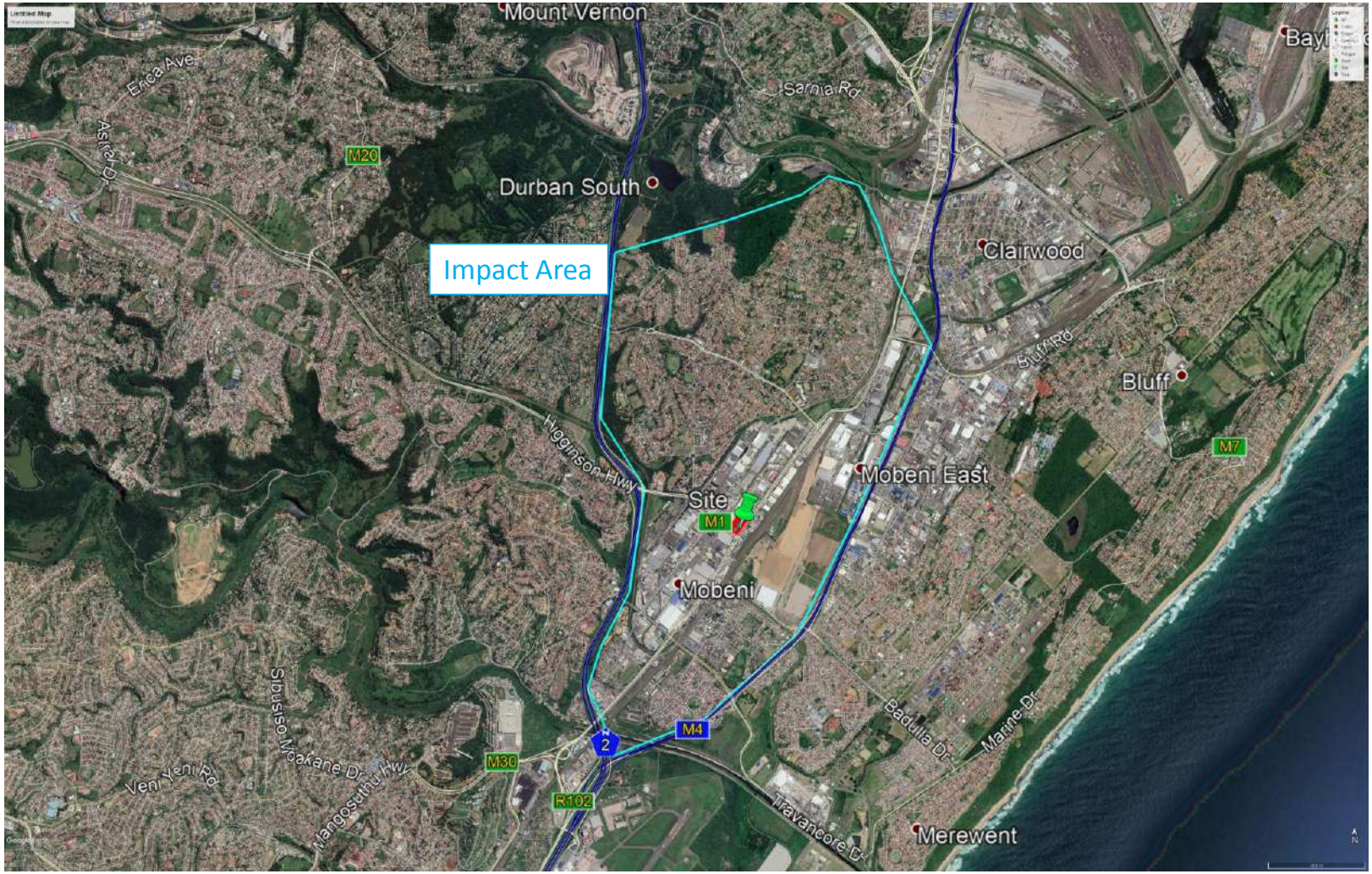
The growth rate since 2001 for the area was **4%**. This is mainly due to the densification of the existing suburbs and also due to the fact that the suburb boundaries have changes from the 2001 to the 2011 Census. There are currently ±12 000 households within the surrounding area from the site.

Table 4.1: Population Numbers and Projections

Suburbs	Population	Households
Montclair	16 301	5 024
Woodlands	5 765	1 547
Mobeni West	4 052	2 243
Mobeni East	3 396	1 524
Total 2011	**29 514**	**10 338**
2% Growth 2019	**34 580**	**12 113**
2% Growth 2024	**38 180**	**13 373**

Source: Stats SA

Impact Area of the Site in Mobeni



5. DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE

The following is a summary of the profile of Impact Area compared to the South African Metro Middle market profile.

Key: **Impact Area**; **South African Middle Market**

Age Groups

Between 20 and 34 years:

37%

30%

Housing

Houses:	Flat:
45%	**40%**
57%	**16%**

Population Groups

Black:	White
75%	**15%**
33%	**47%**

Education

Matric and higher:

53%

59%

Economically Active

Employed:

53%

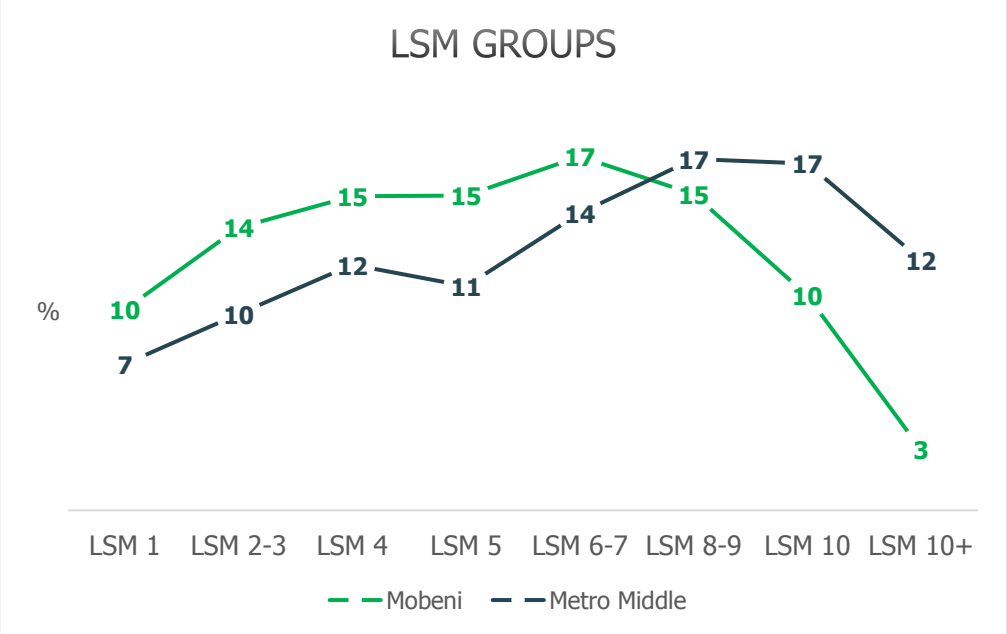
65%

Household Income

Monthly:

R10 000

R23 000



*LSM = Living Standard Measurement – a South African classification used countrywide. The income per LSM category reflects the monthly household income.

LSM 1-4	<R5 000		LSM 6	R7 000	R10 000	LSM 8	R15 000	R20 000	LSM 10	R35 000	R60 000
LSM 5	R5 000	R7 000	LSM 7	R10 000	R15 000	LSM 9	R20 000	R35 000	LSM 10+	>R60 000	

Table 5.1: Demographics and Socio-Economic Profile

	Mobeni		Mobeni
Age Groups	%	**Individual Monthly Income**	%
<19 years	27	No income	45
20 to 34	37	R1-400	3
35-54	25	R410-800	2
55+	11	R801-1600	8
Population Groups		R1601-3200	8
Black	75	R3201-6400	9
Coloured	3	R6401-12800	12
Asian	7	R12801-25600	10
White	15	R26501-51200	2
Language Groups		R51201-102400	0
Afrikaans	4	R102401-204800	0
English	31	R204801+	0
African	61	**Annual Household Income**	
Other	4	No income	21
Employment		R1-4800	7
Employed	53	R4801-9600	3
Unemployed	14	R9601-19200	14
Discouraged work seeker	3	R19201-38400	15
Not economically active	31	R38401-76800	15
Education		R76801-153600	17
No schooling	2	R153601-307200	15
Completed Primary	18	R307201-614400	10
Some Secondary	28	R614401-1228800	2
Completed Secondary	34	R1228801-2457600	0
Higher	19	R2457600+	0
Sector		Median hh income 2011	R 65 282
Formal Sector	83	Median hh income 2019	R 120 832
Informal sector	9	Median hh income pm 2019	R 10 069
Private Households	7	**LSM Groups**	
Other	1	LSM 1	10
Dwelling Unit		LSM 2-3	14
House	45	LSM 4	15
Traditional Dwelling	1	LSM 5	15
Flat/Apartment	40	LSM 6-7	17
Cluster House	4	LSM 8-9	15
Townhouse	2	LSM 10	10
Semi detached house	0	LSM 10+	3
House/flat/room in backyard	1	**Tenure**	
Informal dwelling (shack in backyard)	4	Rented	52
Room/flatlet	1	Owned but not yet paid off	28
Other	1	Occupied rent free	6
		Owned and fully paid off	12
		Other	3

Source: StatsSA Census 2011, adjusted for 2019/24

Table 5.2: Number of Households per LSM Group

LSM Groups	% of Total	Households 2019	Households 2024
LSM 1-4	39	4 694	5 183
LSM 5	15	1 853	2 045
LSM 6-7	17	2 082	2 299
LSM 8-9	15	1 862	2 056
LSM 10	10	1 263	1 395
LSM 10+	3	359	396
Total	**100**	**12 113**	**13 373**

5.1. Car Ownership

The following table shows the average number of cars per LSM Group. The Mobeni market is representative of a middle market and with an average of approximately 1 car per household.

Table 5.3: Number of Cars per LSM Group

LSM Groups	Cars per Household
LSM 1-4	0,3
LSM 5	0,4
LSM 6	0,6
LSM 7	1,1
LSM 8	1,4
LSM 9	1,6
LSM 10	2,1
LSM 10+	2,3

5.2. Expenditure Levels

The expenditure levels for the proposed development can be divided into two sections:

5.2.1. Retail Expenditure

Table 5.4 shows the rand value expenditure on various **retail product** categories per LSM group.

Table 5.4: Average Monthly Spending on Consumer Goods (R)

Product categories	LSM 10	LSM 8-9	LSM 6-7	LSM 4-5	LSM 1-3
Groceries	R5 390	R3 410	R2 178	R1 405	R993
Clothing and shoes	R1 119	R813	R637	R526	R349
Health & Beauty	R1 000	R498	R344	R331	R158
Furniture & appliances	R407	R323	R256	R279	R153
Household goods	R799	R444	R245	R238	R176
Takeaways/restaurants	R941	R524	R330	R226	R168
Entertainment	R550	R277	R125	R65	R66
Other	R1 650	R880	R715	R385	R143
Total	**R11 856**	**R7 169**	**R4 830**	**R3 455**	**R2 206**

Source: Urban Studies 2018

5.2.2. Transportation & Fuel

Fuel Expenditure

The expenditure on fuel forms part of the transportation cost of a household. The percentage spend on fuel or transport cost differs for the various LSM categories.

To link up with the demand model for fuel – which is based on the passing traffic volumes - it is more suitable to focus on the average fuel pumped per stop. This figure ranges from 15 to 30+ litres per stop and correlates with the socio-economic profile of the market and the passing traffic.

The average spend for the proposed site would be approximately **20 litre fuel** per stop.

Convenience Retail Expenditure

The expenditure levels for convenience retail at a filling station correlates with total fuel pumped. The rand value ranges from R1 per litre to R3.50 per litre. The retail expenditure level will depend on a number of factors including:

- Fuel demand per month;
- Quality of the store;
- Availability of stock;
- Level of competition;
- Service levels;
- Security and especially night-time security.

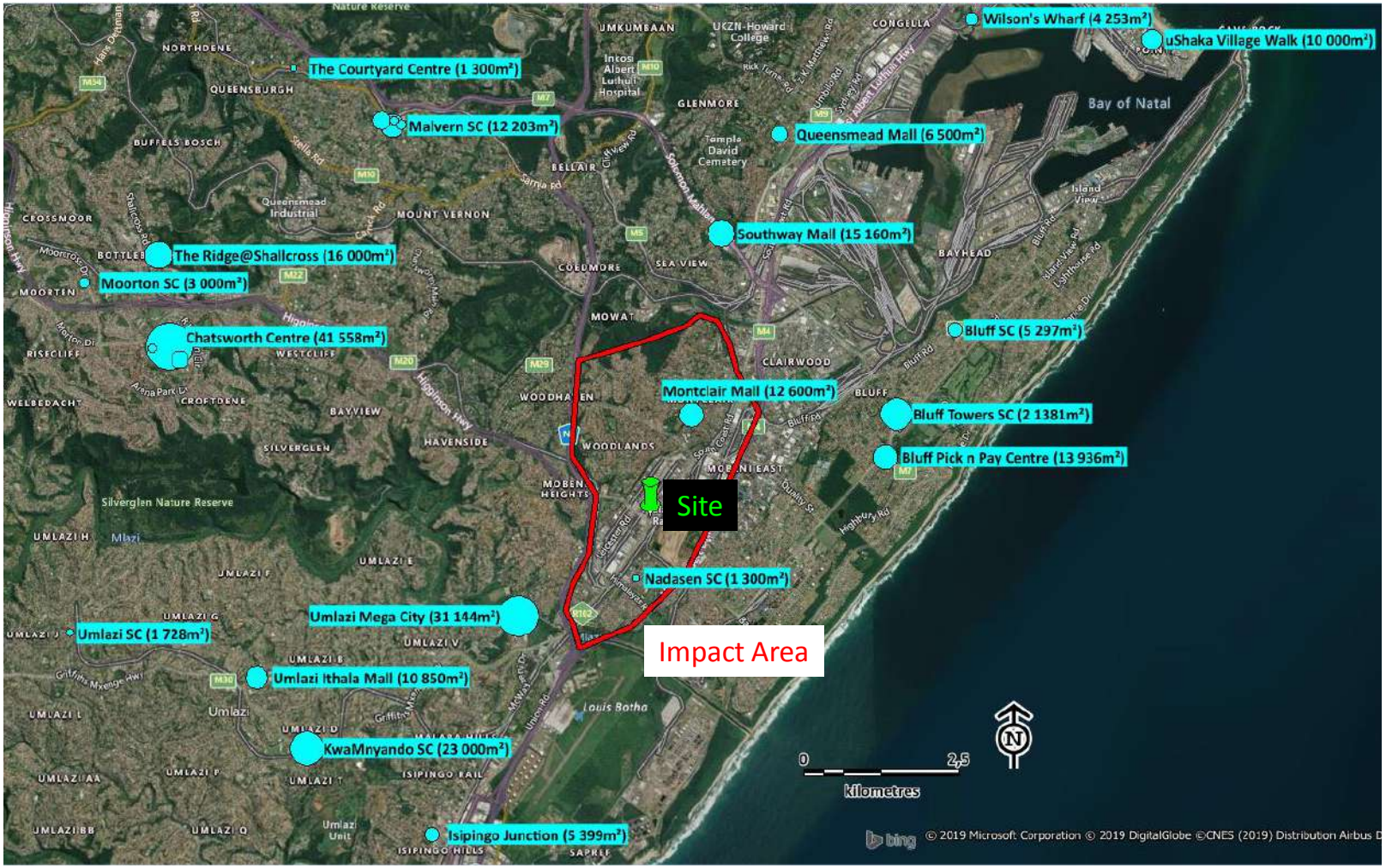
6. RETAIL SUPPLY

The following table and aerial map show the shopping centre supply within the broader surrounding market. The retail within the Mobeni area is limited and mainly due to the historical nature of the industrial market.

Table 6.1 Existing Shopping Centre Supply

Centre	GLA in m²	No. of Shops	Tenants*
Montclair Mall	12 600	46	Pick n Pay, Clicks
Nadasen SC	1 300	7	Post Office, Nadasens Hardware
	13 900		
East			
Bluff Towers SC	21 381	72	Shoprite Checkers, Edgars, Foschini, Truworths, Miladys, Mr Price, Woolworths
Bluff Pick n Pay Centre	13 936	40	Pick n Pay Super, Mr Price, Clicks, Virgin Active, Pep, Clicks, Pick n Pay Clothing, Pick n Pay Liquor
Bluff Shopping Centre	5 297	36	Spar, Hardware Store, Fish & Chip Co, Post Office, Post Net, Hairdresser, Barber
	40 614		
North			
Southway Mall	15 160	43	Checkers
Queensmead Mall	6 500	37	Spar
	21 660		
West			
Chatsworth Centre	41 558	150	Shoprite, Edgars, Hub, Foschini, Truworths, Mr Price, Jet, Clicks, Pep, Shoprite Liquors
The Ridge@Shallcross	16 000	62	CheckersHyper, Nando's, Spur, KFC, McDonalds
Pick n Pay Chatsworth	7 111	13	Pick n Pay
Moorton SC	3 000	10	Individually owned small stores. Supermarket, general dealer
Chatsworth Plaza	2 000	0	
	69 669		
South			
Umlazi Mega City	31 144	97	Superspar, Woolworths, Jet, Mr Price, Cashbuild
KwaMnyando SC	23 000	0	Shoprite, Pick 'n Pay, Truworths, Identity, Markhams, Totalsport, Exact, Jet, Edgars Active, Sterns, Foschini, Ackermans, Pep, Mr Price Apparel
Umlazi Ithala Mall	10 850	38	Rhino Cash & Carry, Ithala Bank, Post Office, Pep, Savells, Standard Bank, Rage
Isipingo Junction	5 399	23	Shoprite Checkers
Umlazi SC	1 728	10	Small shops
	72 121		

Shopping Centres in the Area

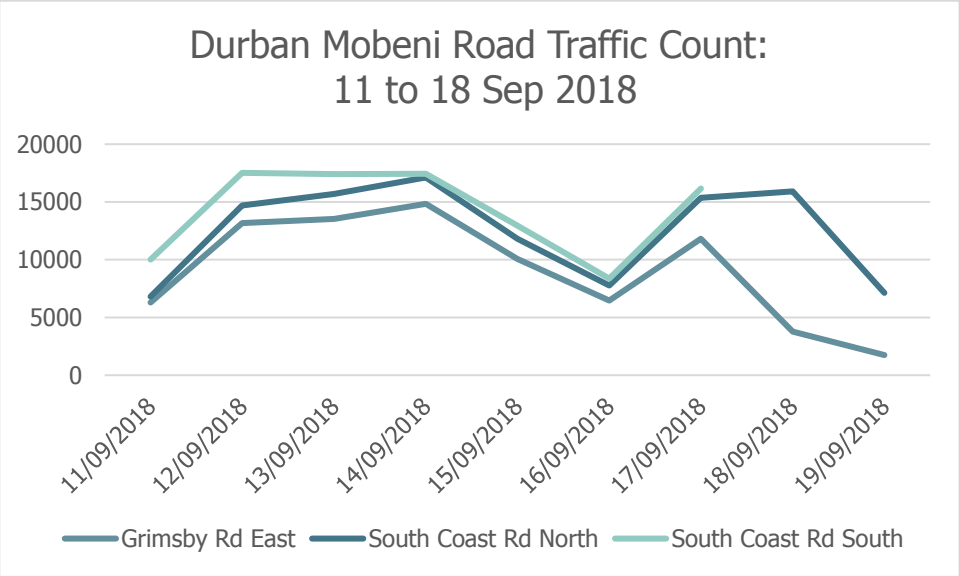


7. FILLING STATION ANALYSIS

7.1. Traffic Count

The traffic count was done by Mikros Traffic Monitoring KZN (Pty) Ltd at the site and was done on 11 Sept 2018 to 19 Sept 2018 at two points namely Grimsby Road, in an easterly direction and at South Coast Road, in both north and south bound. All vehicles were counted during this time.

The following graphs indicate the traffic volumes for each of the points.



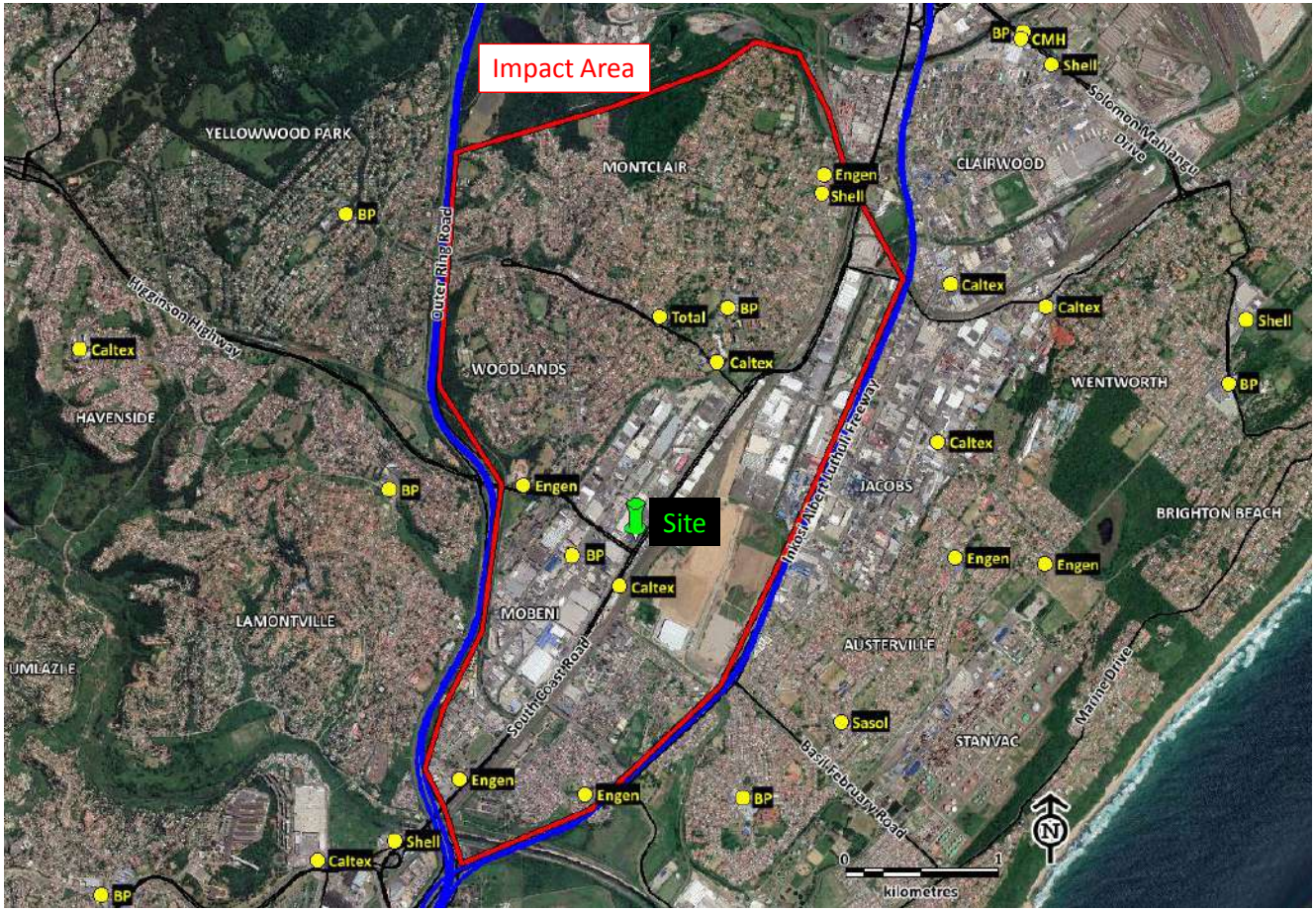
The following maps show a daily average of all passing traffic.

Traffic Count (Daily Average)

7.2. Supply Analysis

The following maps show the current filling station competition in the area. There are in total 10 filling station competitors located within the impact area of the proposed Mobeni site.

Filling Stations in the Area



8. DYNAMICS OF THE AREA

8.1. City of eThekwini

8.1.1. Spatial Development Framework Plan

According to the latest documents form the City of eThekwini, Spatial Development Framework (SDF) Plan, 2018-2019, the Mobeni area is seen as an investment opportunity node and part of the densification corridors of the City. See SDF map below.

8.1.2. Planned Infrastructure

The Mobeni area forms part of the C4 area in the planned infrastructure planning of corridors that will continue until 2030. The map below indicates all the planned infrastructure with Phase 3 (including C4) highlighted.

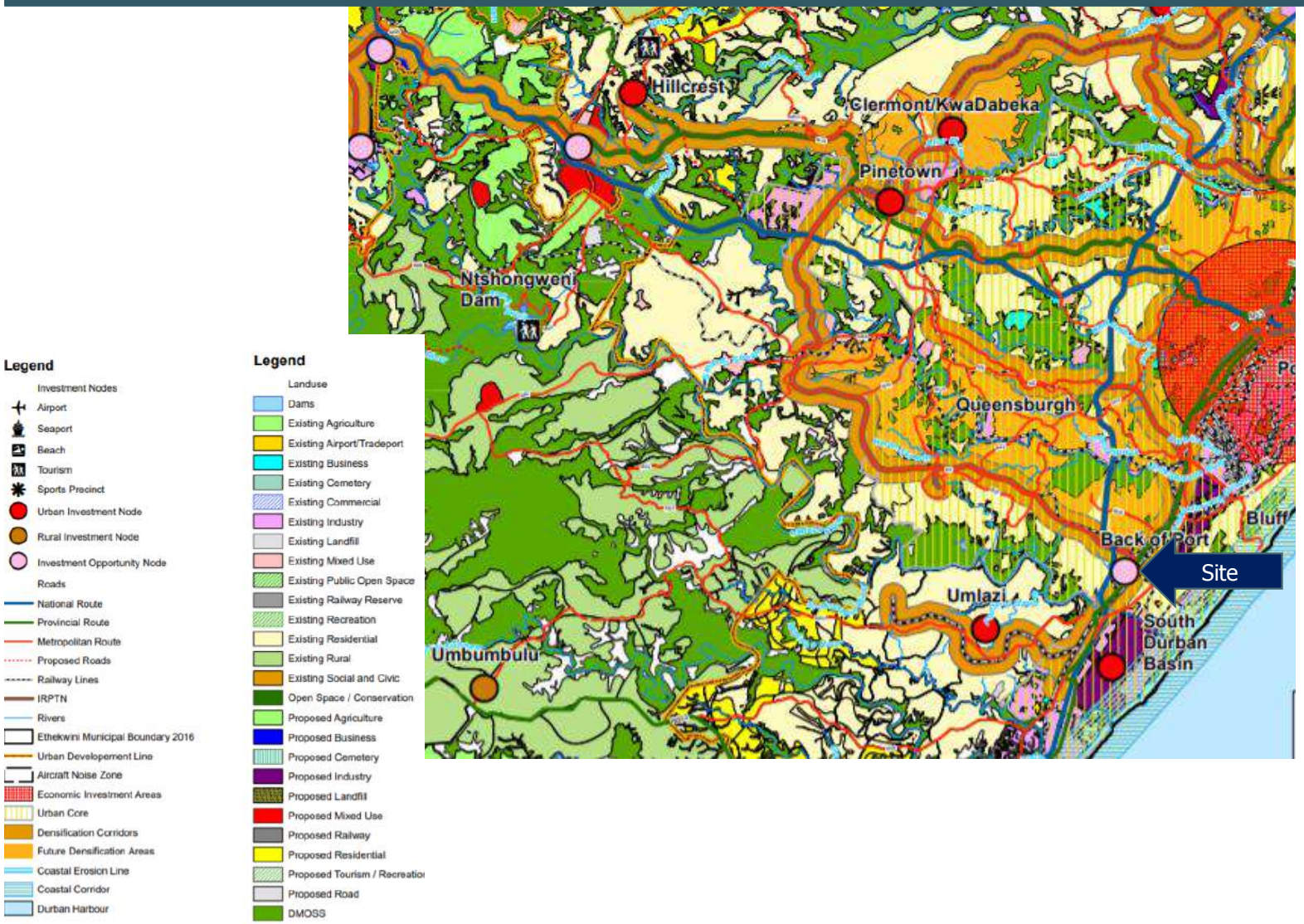
8.1.3. Central Area – Spatial Development Plan 2013/2014

The City of eThekweni is divided into different zones for the spatial development. The Mobeni area falls under the Central Area. The map below indicates the land use for the area. The Mobeni area is part of the existing industrial areas, adjacent to the port/ logistics area. See Central Spatial Development Plan below.

8.1.4. Central Area – Roads and Rail Network Plan 2013/2014

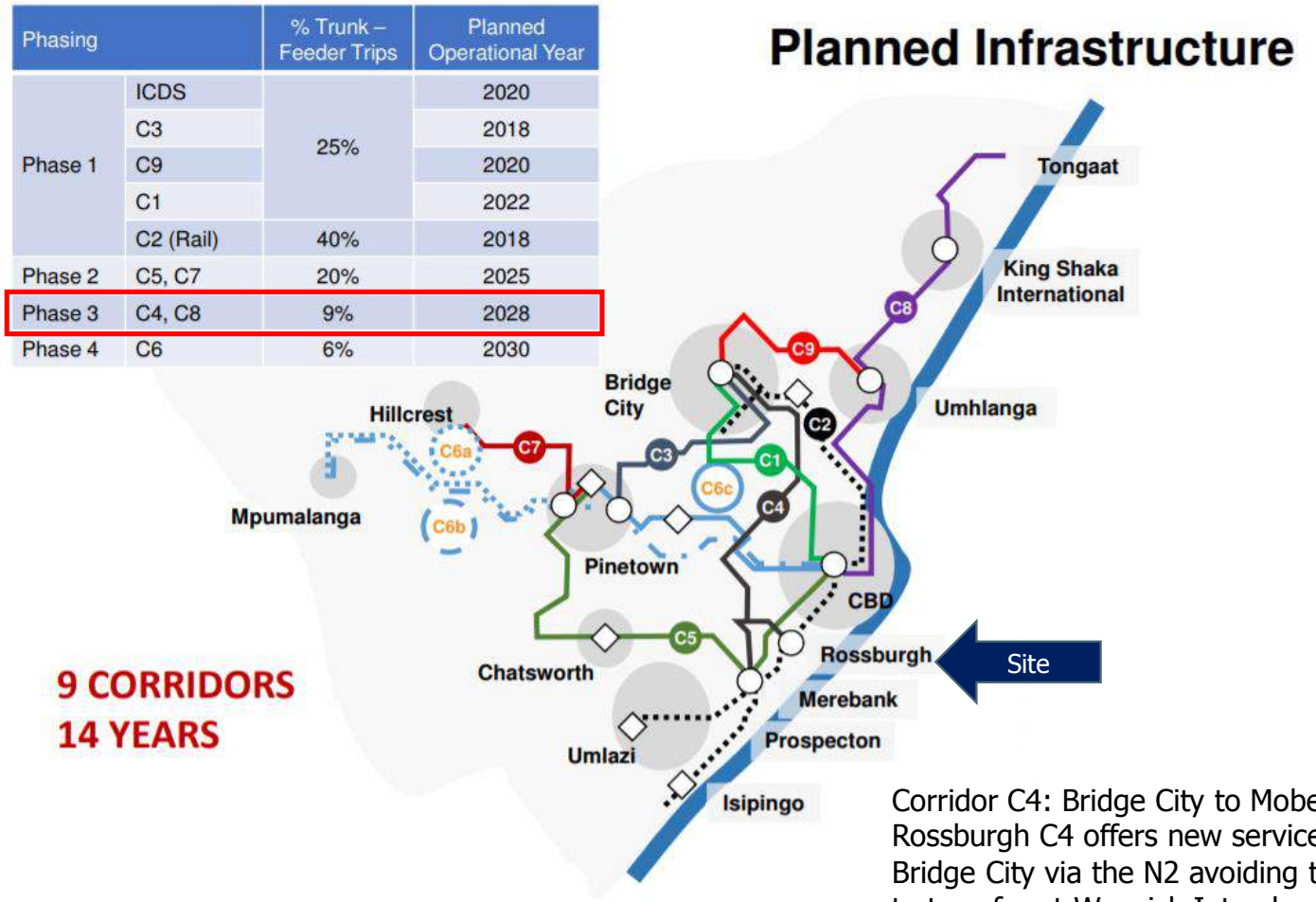
According to the map below the Mobeni area is located on an IRPTN (Integrated Rapid Public Transport network) route.

Spatial Developments Framework 2018-2019



Planned Infrastructure

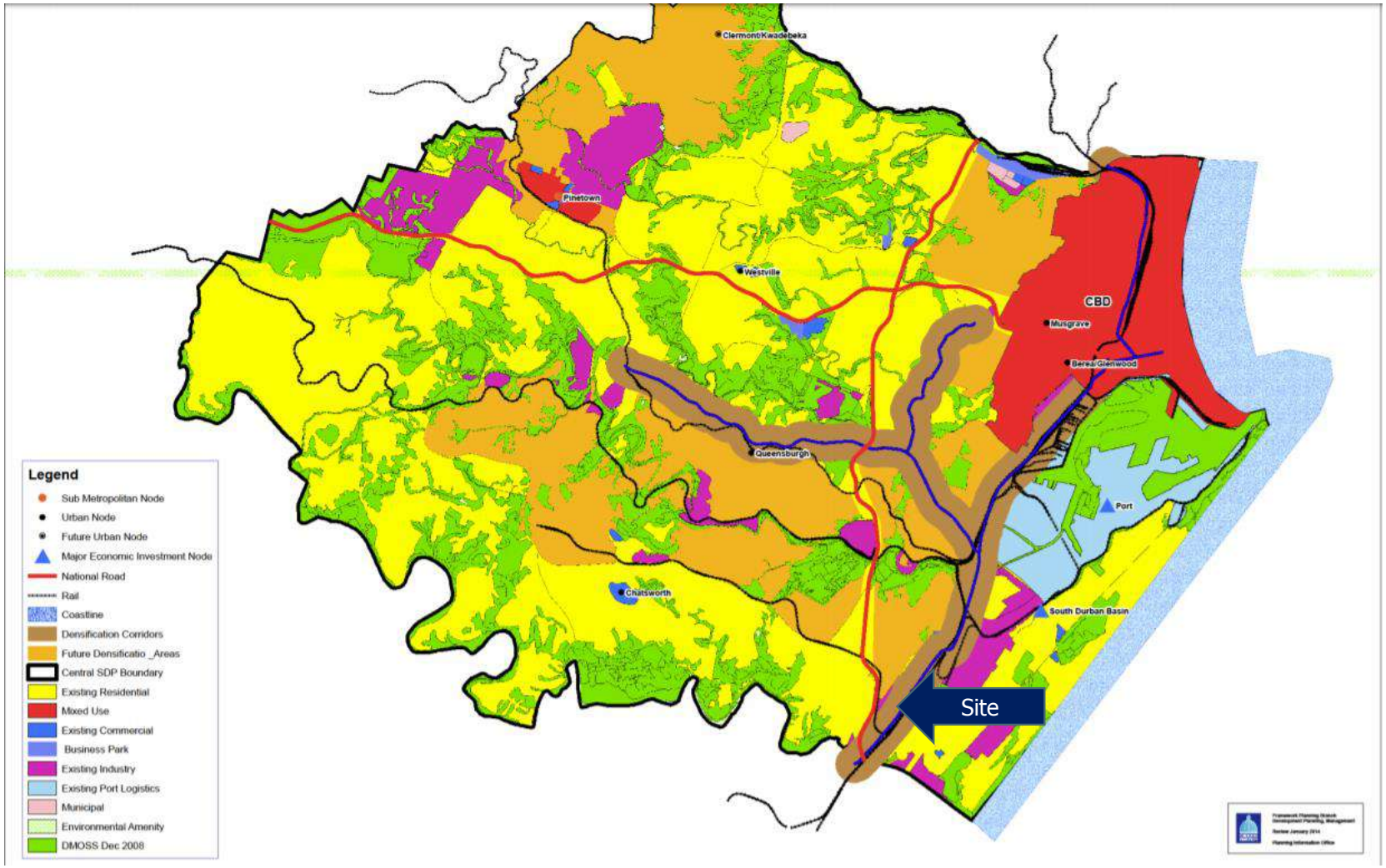
Phasing		% Trunk – Feeder Trips	Planned Operational Year
Phase 1	ICDS	25%	2020
	C3		2018
	C9		2020
	C1		2022
	C2 (Rail)	40%	2018
Phase 2	C5, C7	20%	2025
Phase 3	C4, C8	9%	2028
Phase 4	C6	6%	2030



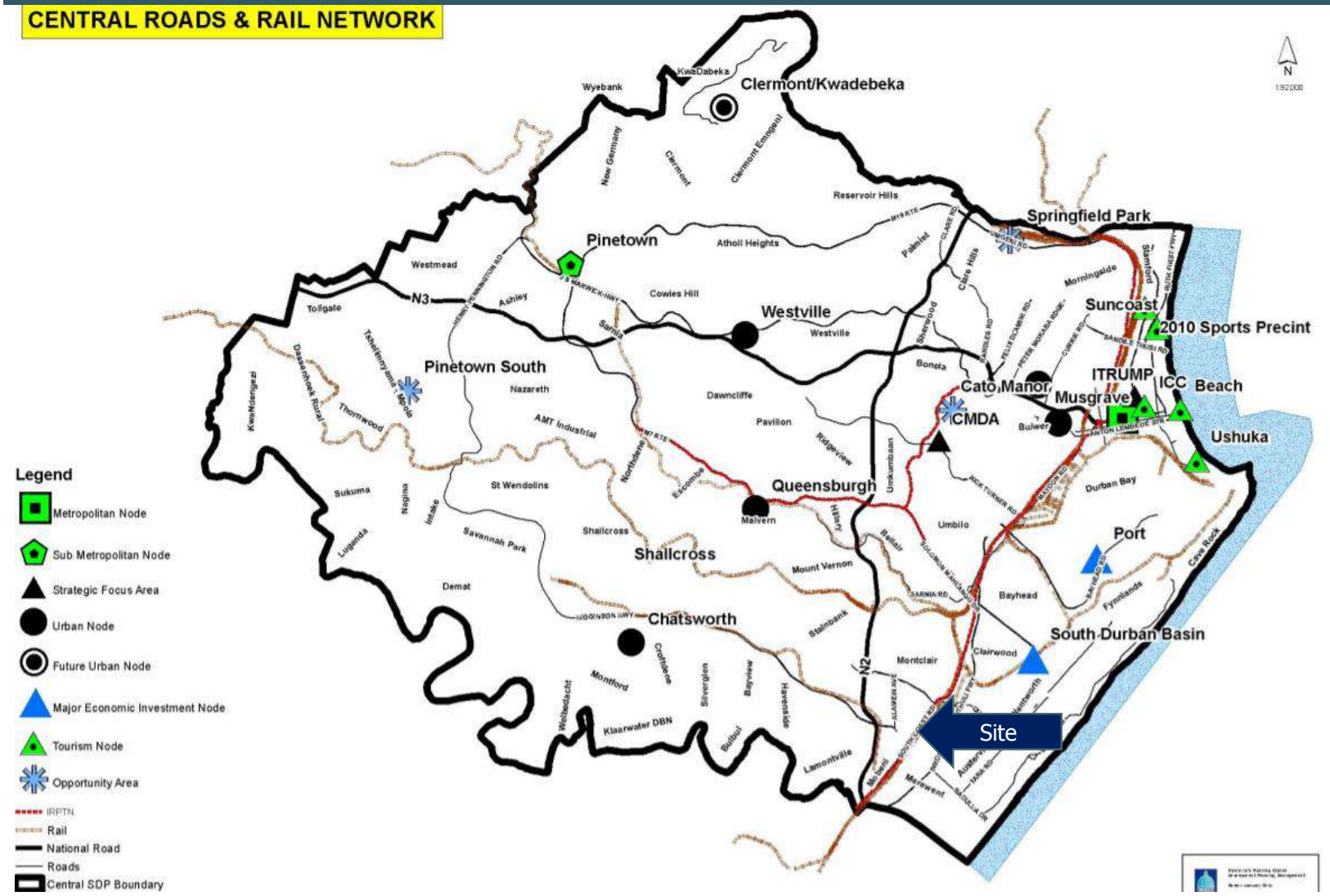
Corridor C4: Bridge City to Mobeni and Rossburgh C4 offers new services from Bridge City via the N2 avoiding the need to transfer at Warwick Interchange with the route splitting to serve both Rossburgh and Mobeni.

URBAN STUDIES

Central Spatial Development Concept Plan 2013/2014



Central Roads and Rail Network Plan 2013/2014



URBAN STUDIES

9. SITE EVALUATION

The following table shows the location rating for the proposed filling station and retail site. The land uses are combined in terms of the location rating due to the fact that the facilities will be intertwined. Note the following regarding the location:

- The site received a location rating of **78%**;
- Regarded as a good site centrally located within the Mobeni market;
- Strong competition exists – however the existing facilities are not as well located as the proposed development;
- The additional facilities (including building materials/ hardware) will further enhance the attractiveness of the site in future.

Table 8.1: Filling Station & Retail Location Rating

Micro Location Rating	Rating
General accessibility	
Main road access	9
Local roads	9
Travel barriers (10 good - no barrier)	7
Internal movement	8
Ingress	7
Egress	7
Visibility	
From what distance	9
Obstruction (10 good - no obstruction)	9
Topography (10 good - no slopes)	8
Type of location	
Industrial	8
Adjoining uses	
Complementary	8
Competition (10 good - no competition)	6
Changes over time (medium term)	8
Secure area	8
After hour trade	8
Passing traffic	
Vehicle traffic volumes	8
Convenience factor	8
Character/ type of traffic	8
Average speed	7
Meso Factors	
Number of households	7
LSM Profiles	7
Image of the area	8
Total	**78%**

Quality of rating	
Rating (%)	**Description of quality**
>80	very good
70-80	good
60-70	average
50-60	lower than average
<50	not suitable for development

Micro Location of the Site in Mobeni

10. DEMAND MODEL

The demand model section is broken up into 3 sections including: fuel demand, convenience retail demand and hardware/ building materials demand.

10.1. Fuel Demand

Table 10.1 shows the fuel demand for the proposed site for 2019 and 2024. Note the following:

- Traffic volumes are expected to grow at 3% per annum over the next 5 years;
- The monthly traffic volume is based on the Mikros traffic survey and only considers the traffic running east on Grimsby Road and the traffic running north on South Coast Road;
- Two different scenarios were applied with a 2% and 3% interception rate respectively.

Table 10.1: Mobeni Fuel Demand

Scenario A (@ 2% interception rate)	**2019**	**2024**
Monthly Traffic Volume (all vehicles)	732 000	848 589
Interception Rate	2%	2%
Average Litres per Vehicle	20	20
Total Estimated Litres (per month)	**292 800**	**339 435**
Scenario B (@ 3% interception rate)	**2019**	**2024**
Monthly Traffic Volume (all vehicles)	732 000	848 589
Interception Rate	3%	3%
Average Litrage per Vehicle	20	20
Total Estimated Litres (per month)	**439 200**	**509 153**

10.2. Convenience Retail Demand

Based on the potential demand for fuel that exists for the proposed filling station – the following table shows the retail turnover potential for a convenience store as part of the filling station.

Table 10.2: Convenience Retail Demand

Convenience Store Demand 2019	**Scenario A**	**Scenario B**
Filling Station Fuel per Month	292 800	439 200
Retail Demand & Conversion (linked to litrage per month)		
Low	R1,00	R1,00
Moderate	R2,00	R2,00
High	R3,00	R3,00
Retail Potential (based on various scenarios)		
Low	R292 800	R439 200
Moderate	R585 600	R878 400
High	R878 400	R1 317 600

10.3. Hardware/ Building Supplies

The following table shows the market demand for a potential hardware store at the Mobeni site. The expected monthly turnover is R4 million and a store of ±2 500m² is warranted.

Table 10.3: Hardware Demand

Mobeni Hardware & Building Supplies Development Potential	
Expected Annual Turnover	R48 839 616
Expected Monthly Turnover	R4 069 968
Warranted Lettable Area (m²)	2 442

11.SOCIO-ECONOMIC IMPACT

11.1. Job Opportunities

The table below shows the number of job opportunities that will be created as a result of the Mobeni development. Note that the table shows both the development phase and the operational phase job opportunities.

Table 11.1: Number of Job Opportunities

Land Use	Job Opportunities	
	Development Phase	Operational Phase
Filling Station	35	40
Fast Food	10	15
Hardware/ Building Supplies	25	30
Total	**70**	**85**

The following table shows the total economic impact as a result of the development. Together with a multiplier effect the total impact on the local economy will be >R70 million.

Table 11.2: Total Economic Impact

Total Economic Development Impact	
Filling Station	R30 000 000
Fast Food	R10 000 000
Hardware/ Building Supplies	R21 250 000
Total	**R61 250 000**

12.CONCLUSION AND RECOMMENDATIONS

Note the following:

- The proposed site is well located within the Mobeni industrial market;
- The surrounding road network is well established and provide good access to the proposed site;
- The filling station will pump an estimated 290 000 to 440 000 litre fuel per month;
- The convenience retail facility linked to the filling station will do an estimated turnover of between R600 000 and R1 million per month;
- A hardware facility of 2 500m² is warranted at the site;
- The total number of job opportunities created will be ±155. This includes both the development/construction phase and the operational phase;
- The impact of the development on other filling stations is estimated at 2%-3%. This correlates with the expected interception rate for the proposed Mobeni filling station. There are a number of existing filling stations that are not well located nor do they provide an attractive offering;
- The proposed facility will improve the overall attractiveness of the Mobeni area.

Environmental & Engineering Consultants
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Traffic Impact Assessment

Mahomedy's Ext 2000 Pty Ltd

Grimsby Petrol Filling Station | 2 Grimsby Road, Mobeni, Durban | Lot 821 Portion 2

Traffic Impact Assessment | Application made in support of Environmental Assessment, Rezoning and Special Consent Application

eThekwini Municipality

Rev 2 | 17 October 2019

Job number 264682

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ARUP

Document Verification

ARUP

Job title		Grimsby Petrol Filling Station | 2 Grimsby Road, Mobeni, Durban | Lot 821 Portion 2			**Job number** 264682
Document title		Traffic Impact Assessment | Application made in support of Environmental Assessment, Rezoning and Special Consent Application			**File reference**
Document ref		eThekwini Municipality			
Revision	**Date**	**Filename**	GRIM-ARUP-A-XX-RP-YT-1001.docx		
Rev 1	16 Oct 2019	**Description**	Rev 1		
			Prepared by	Checked by	Approved by
		Name	K Mitchell	N Hassen	M Kajee
		Signature			
Rev 2	17 Oct 2019	**Filename**	GRIM-ARUP-A-XX-RP-YT-1002.docx		
		Description			
			Prepared by	Checked by	Approved by
		Name	K Mitchell	N Hassen	M Kajee
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

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Traffic Counts

Appendix D

Zoning Information (refer to town planning report)

Appendix E

Traffic Road Layout (TRL)

Appendix F

TIA Electronic Copy & Sidra Intersection 8 Files (on request)

1 ETA Checklist

TRAFFIC IMPACT ASSESSMENT CHECKLIST				
Content	**Yes**	**No**	**N/A**	**Comment**
1. Traffic impact assessment cover	√			
2.Cover letter signed by ECSA registered professional	√			
3.Development Particulars				
3.1. Development description and reference name	√			
3.2. Location plan	√			
3.3. Land use rights existing and applied, including type and extent of rights, list of land uses under proposed zoning including town planning controls	√			
4. Study area				
4.1 Study area plan or map indicated	√			
5. Background information				
5.1. Listed information – transport facilities and planning	√			
5.2. Relevant information provided by municipality e.g. Framework plans, road classification traffic models, etc.	√			
5.3. Schematic diagram/s	√			
6. Site investigation				
6.1. Documented and photographic record (e.g. road conditions, geometrics, operations, transport facilities, etc)	√			
7.Traffic Demand Estimation				
7.1. Carried out for worst case trip demand land use under the proposed change in land use or extent as stipulated in the town planning application	√			
7.2. Assessment years	√			
7.3 Assessment hours	√			
7.4. Traffic counts not more than 2 years old – date and time	√			
7.5. Traffic growth rates	√			
7.6. Trip generation rates	√			
7.7. Modal split	√			
8.Traffic Assignment and Trip Distribution				
8.1. Manual assignment and trip distribution	√			
8.2. Simulation software trip distribution and assignment – software files must be provided	√			
8.3. Supporting information documented for traffic distribution and assignment	√			
8.4. Traffic Assignment and Trip Distribution diagrams	√			

9. Total traffic demand	Yes	No	N/A	Comment
10. Demand side mitigation	√			
11. Proposed improvements				
11.1. New roads or widening or intersection improvements – TRL drawing and fatal flaw implementation screening checklist			√	
11.2. Traffic signals must meet ETA's Urban Traffic Control requirements warrant. In addition, a roundabout assessment comparison must be carried out			√	
11.3. Traffic management plans			√	
12. Traffic Impact Assessment				
12.1. Assessment based on worst case land use scenario	√			
12.2. Design year horizon assessment				
12.2.1. Without" proposed mitigating measures	√			
12.2.2. "With" proposed mitigating measures			√	
12.3. Planning year horizon assessment				
12.3.1. "With" proposed mitigating measures			√	
13. Site Impact Assessment				
14. Road network, master planning and cost				
14.1. Any changes to road master planning			√	
14.2. Transport / Road services contribution			√	
14.3. Improvement costs			√	
14.4. Recommendations	√			
14.5. Traffic Road Layout Plans			√	
14.6. Eng. Drawings, Cost estimate, Financial guarantees, & Undertakings for new or existing road improvements			√	
15. Recommendations				
15.1. The change in land use for which approval is required.	√			
15.2. Proposed type and location of all erf accesses.	√			
15.3. The improvements, changes and mitigation measures that are required, subject thereto that these improvements or measures may be amended in subsequent investigations.	√			
15.4. Elements of the road network master plan that should be implemented in support of the development.	√			
15.5 Traffic management measures aimed at protecting residential or other sensitive areas.	√			
16. Appendix				
16.1. Relevant Traffic Impact Assessment Correspondence. Traffic Counts, analysis details, maps, plans, etc	√			

Assessed by:…….....……. Date of assessment:…….....

Approved / Not Acceptable :

Traffic impact assessment required for changes in land use were :

- *The change* in land use results in more than 11 peak hour vehicles trips over above the existing land use landuse rights.*

**Change in land use – special consent / rezoning applications*

2 Letter Signed by ECSA Registered Professional

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17 October 2019

Dear Sir/Madam

Traffic Impact Assessment (TIA) for 2 Grimsby Road, Mobeni, Durban

The undersigned has been appointed as the registered professional for this Traffic Assessment and has applied due diligence to the content of this report and endeavoured to ensure that the report is free of technical errors and takes full responsibility for its contents.

Arup (Pty) Ltd also undertakes to attend any forum where the TIA is in dispute to report on matters that relate to the TIA. We understand and agree that the municipality shall not be liable to compensate us in this regard.

Yours sincerely,

Mohamed Kajee
Senior Transport and Traffic Engineer
Arup

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Pr. Eng.: 20170238

3 Development Details

3.1 Background

Arup (Pty) Ltd has been appointed by Mahomedy's Ext 2000 Pty Ltd to undertake a Traffic Impact Assessment (TIA) for the proposed retail development and petrol filling station to be located in Mobeni, Durban (KZN). **This TIA will form part of the environmental, rezoning and special consent application for the site.**

3.2 Site Location

The proposed development is situated at 2 Grimsby Road, Mobeni. The aforementioned site will henceforth be referred to as "the site". The site is located approximately 15km south of the Durban CBD.

The site location and locality plan can be seen in **Figures 1** and **2**, respectively.

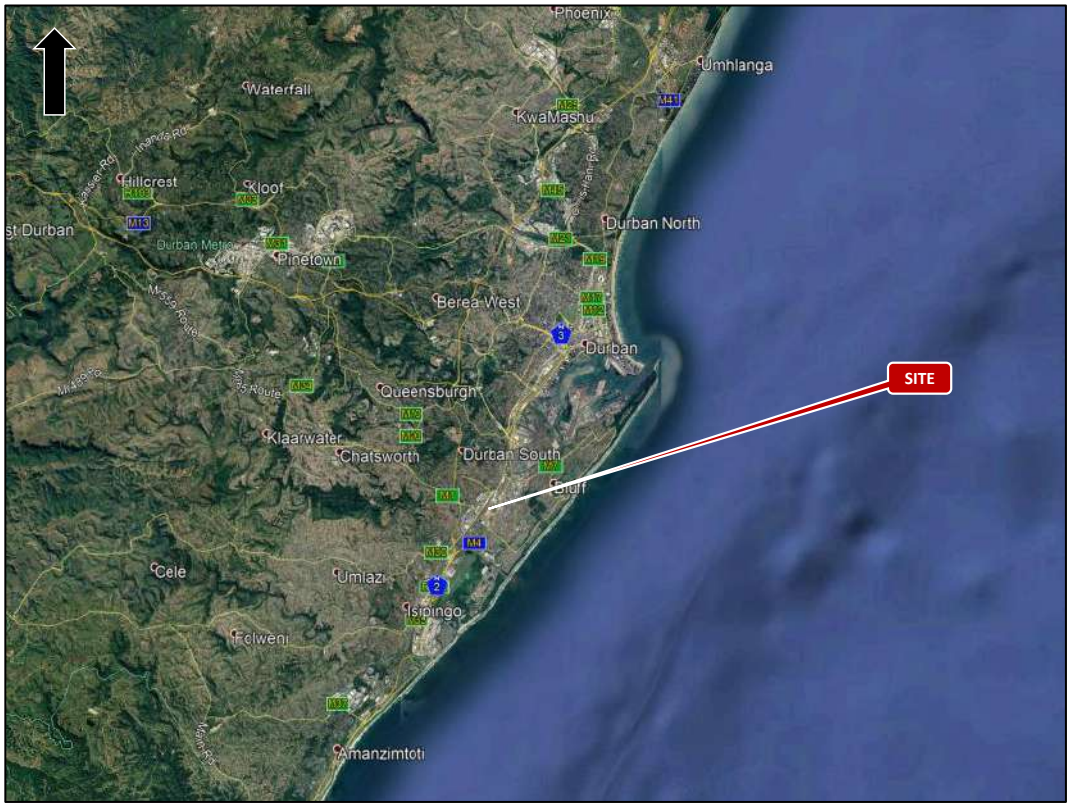


Figure 1: Site Location

Figure 2: Locality Plan

Note: the development site extends northwards as shown in the figure, however, this TIA focusses primarily on that portion of the site that is affected by the development since it is proposed that the remainder of the site will continue to operate in isolation and as it is currently.

3.3 Development Details

The site currently operates as a retail store on level terrain. A demolition plan has been developed to bring down the existing structures for the construction of the new development. The development is to incorporate a petrol filling station and convenience shop along with two retail stores totalling 1502m² in size with 330m^2 of "associated" office space. Furthermore, a drive-thru totalling 251m² in size makes up part of this development. As this project is currently at rezoning stage, the architectural plans are yet to be finalised.

3.4 Existing and Proposed Rights

The site is currently zoned General Industrial and accommodates multiple warehouse buildings. The intention is to demolish some of the existing buildings in the "affected area" and construct a garage convenience shop, line shops with offices, a drive-thru and a petrol filling station. The site is to be rezoned to General Business 2 and special consent is required for the petrol filling station component.

3.5 Access Arrangements

The proposed development will take access off Grimsby Road as well as off South Coast Road as illustrated in **Figure 3**. Both accesses to the site will be restricted to left in and left out only.

The access on South Coast Road is located in an existing PT lay-bye area and it is recommended that road markings be installed to differentiate the lay-bye from the vehicle access scoop. Refer to **Appendix E**.

3.5.1 Sight Distance

In accordance with *TRH17*, the aforementioned access roads require a minimum sight distance of approximately 150m assuming a design speed of 80km/h.

At current, the available sight distance at the proposed access is ideal.

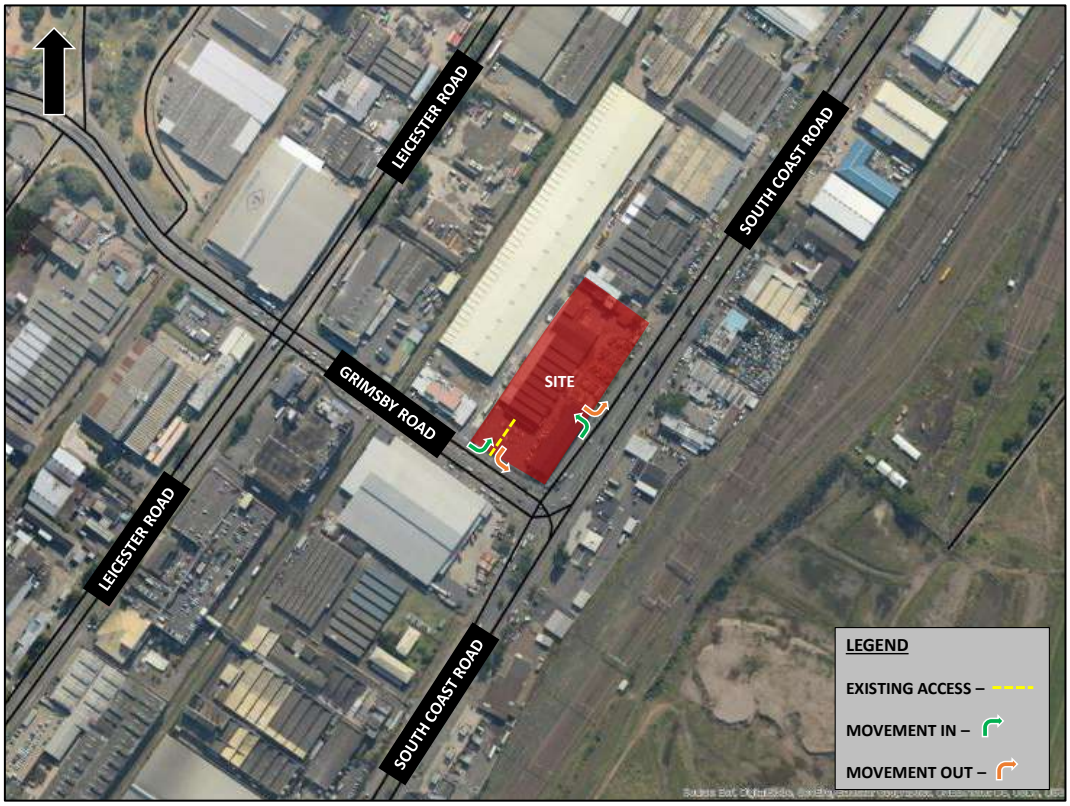


Figure 3: Access Arrangement

4 Study Area

The extent of the study area selected as illustrated in **Figure 4** includes the following road(s) of significance:

- Grimsby Road
- South Coast Road

- Leicester Road

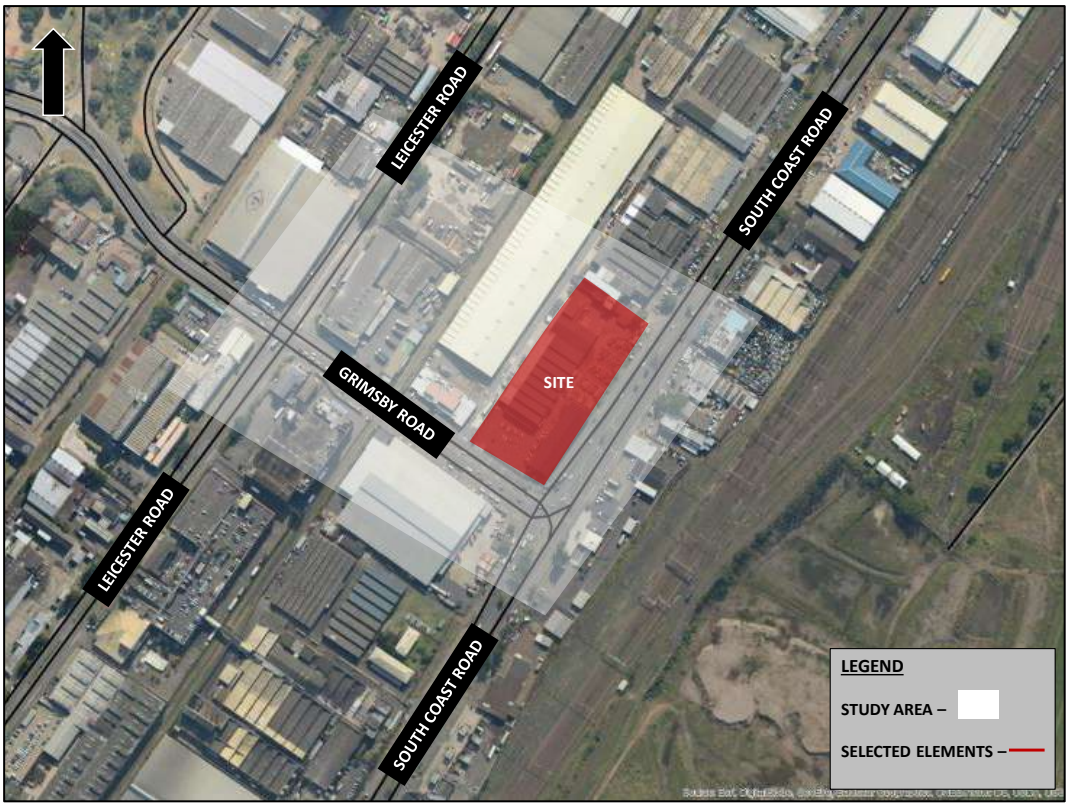


Figure 4: Study Area

5 Background Information

5.1 Existing Road Network

Information regarding the class of road and numbers of lanes for roads of significance within the study area is illustrated in **Figures 5** and **6**.

It should be noted that the data on the numbers of lanes contained in **Figure 6** (as obtained from the eThekwini GIS database) does not reflect localised road widening. The information on the existing numbers of lanes in the vicinity of the intersections can be found in the Sidra layouts provided in **Section 14** of this report.

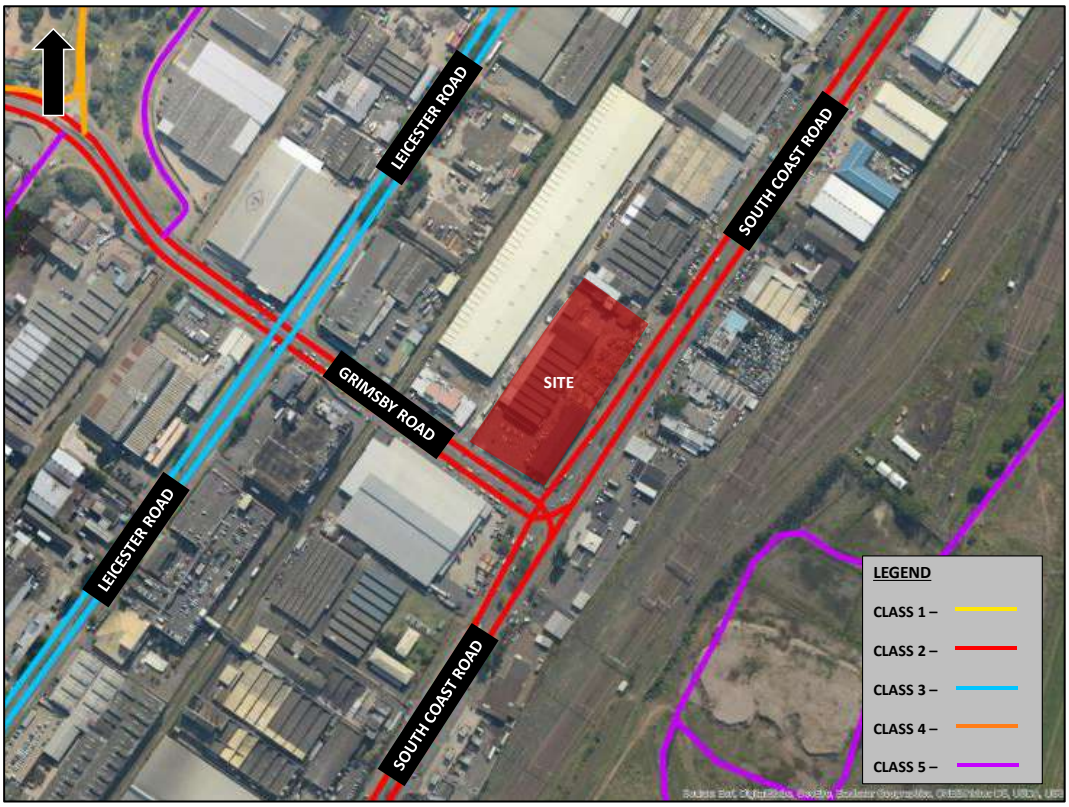


Figure 5: Class of Roads [Source: eThekwini Municipality GIS Database]

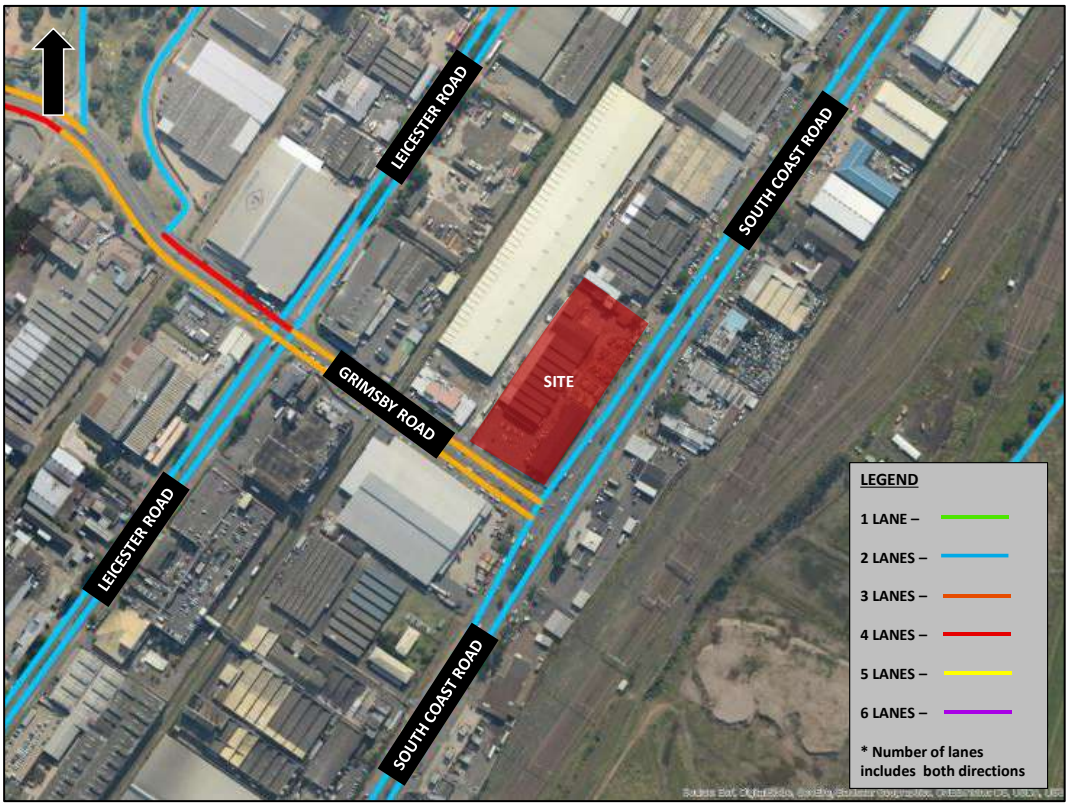


Figure 6: Number of Lanes [Source: eThekwini Municipality GIS Database]

5.2 Existing Intersection Controls

Based on the study area, it was determined that the following intersections be analysed:

- Grimsby Road/ Leicester Road
- Grimsby Road/ South Coast Road

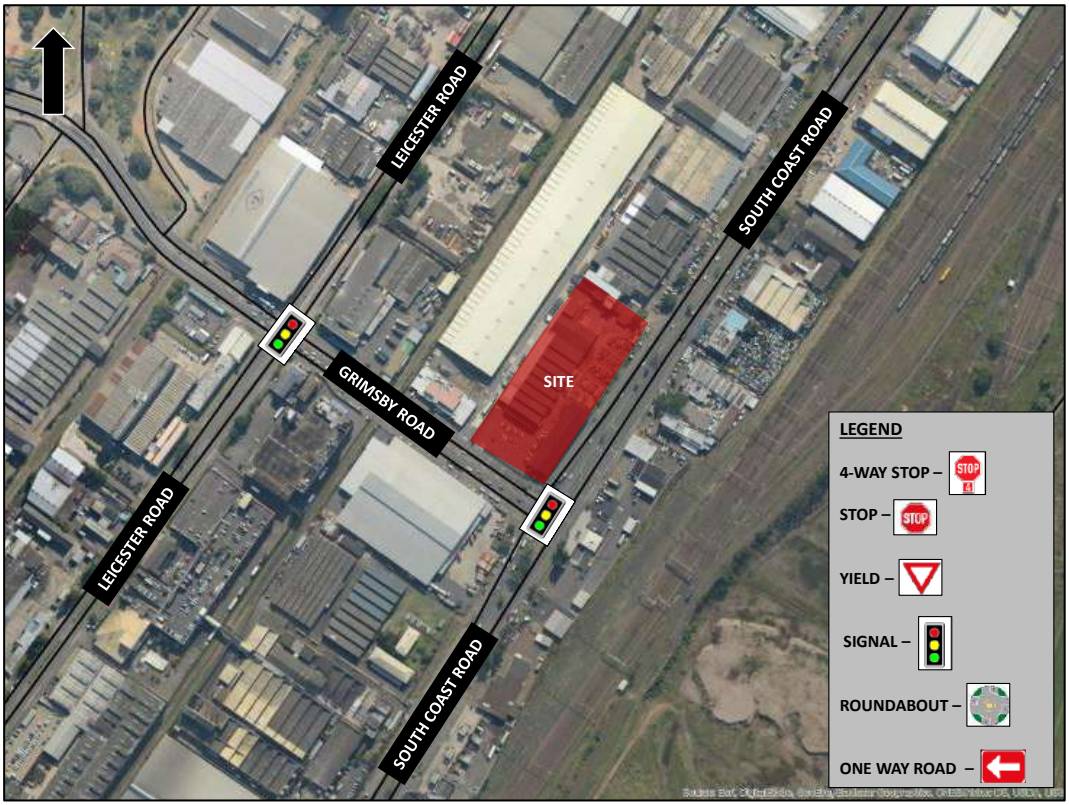


Figure 7: Intersection Locations & Current Traffic Control

5.3 Existing Public Transport, Pedestrian & Cycling Facilities

An assessment was undertaken to determine any existing public transport, pedestrian and cycling facilities located in the vicinity of the site, as shown below in **Figure 8.**

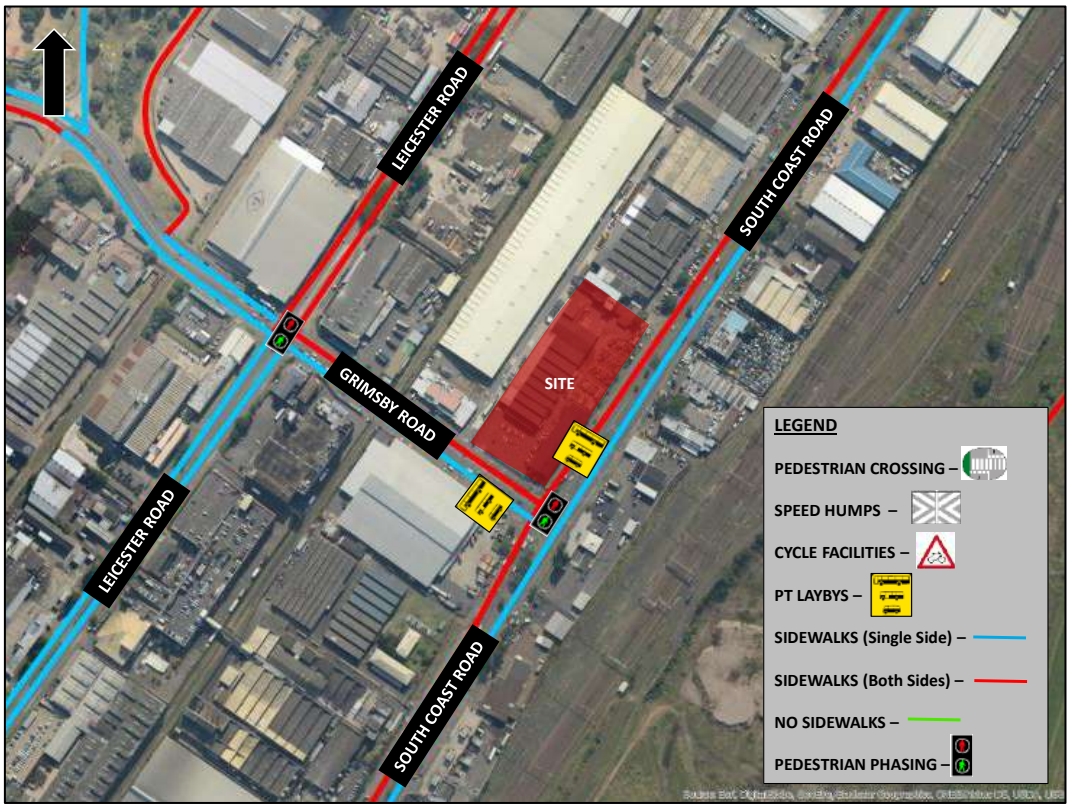


Figure 8: Location of Existing Facilities

5.4 Planned Transport Upgrades

No information was made available by the authorities regarding any planned upgrades to transport facilities and infrastructure that are likely to be implemented in the area during the time horizon for which this traffic assessment has been undertaken.

However, it is known that there are plans to upgrade the Grimsby Road/ South Coast Road intersection from an at-grade intersection to a grade separated interchange. This may negatively impact the site's access points in the future, however, at present insufficient information is available to make any provision for this upgrade.

5.5 Review of Available Planning Documents

No information on available planning documents has been provided by the authorities.

6 Site Investigation

On-site observations were undertaken to determine possible operational issues in the vicinity of the site during the critical peak hour (PM). Some of the important on-site observations are listed below and illustrated in **Figure 9**.

- Minimal queues and delays experienced at the intersection of Grimsby Road and South Coast Road.
- Minimal queuing/delays observed at the Leicester Road and Grimsby Road intersection.
- Significant pedestrian activity observed along Grimsby Road.
- Significant public transport traffic observed along Grimsby Road.

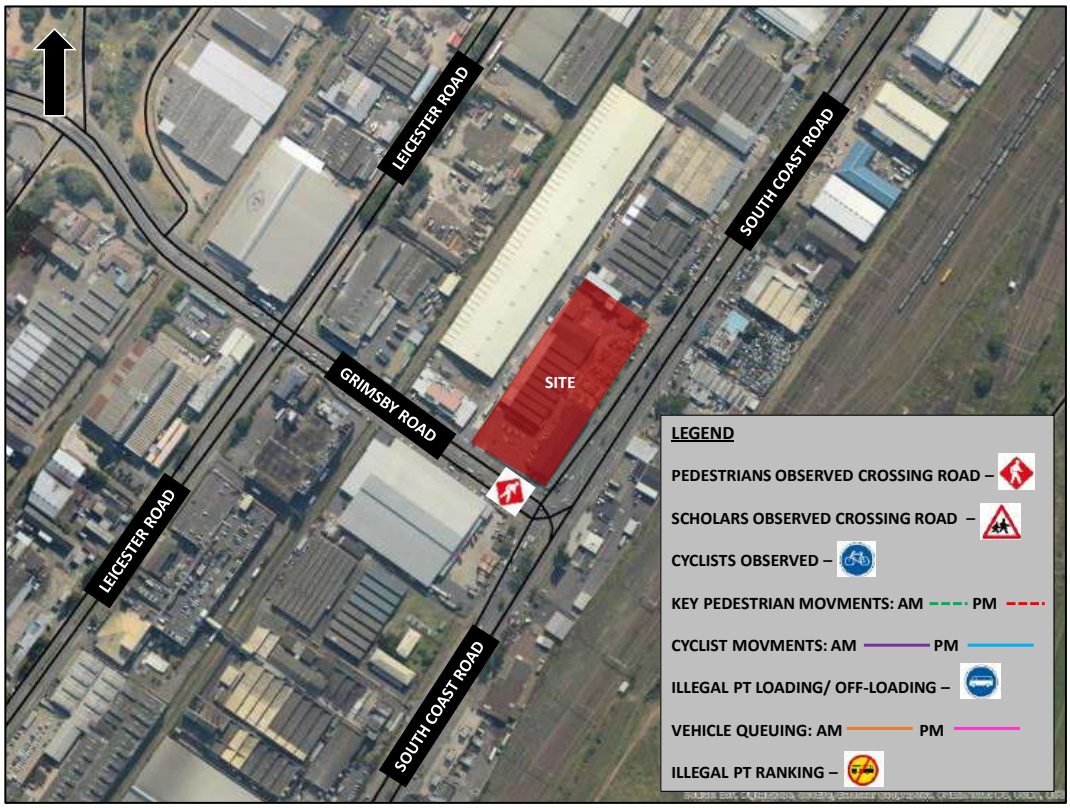


Figure 9: Site Investigation

The following pictures were taken during a site visit:

Photo 1: Queueing observed at western approach of the intersection of Leicester Road and Grimsby Road

Photo 2: Looking west along Grimsby Road- legal on-street ranking. No operational issues noted.

Photo 3: Looking south along South Coast Road from the Grimsby Road intersection.

7 Affected Planning/ Road Authorities

As per **Figure 10**, all significant roads within the study area fall under the control of eThekwini Municipality.

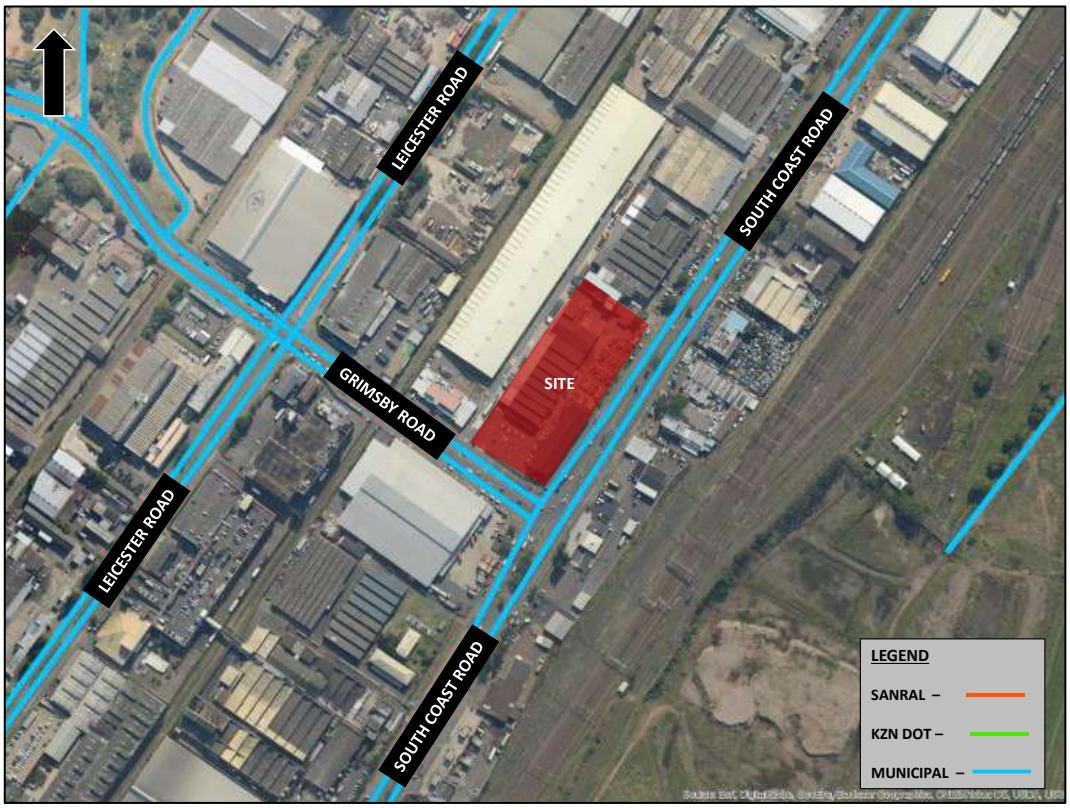


Figure 10: Road Ownership [Source: eThekwini Municipality GIS Database]

8 Traffic Demand Estimation

8.1 Development Proposal

The current development proposal consists of 1502m² of retail and 251m² of fast food in the form of a drive-thru. These land uses are to be accompanied by a petrol filling station and 330m^2 of offices. The client is to gain special consent for the petrol filling station component of the development.

8.2 Trip Generation

The *ETA Manual for Traffic Impact Assessments and Site Traffic Assessments* recommends a rate for **shopping and retail** of 0.6 trips/100sqm GLA, 3.4 trips/100sqm GLA and 4.5 trips/100sqm GLA during the AM, PM and Saturday peak hours respectively. The recommended AM, PM and Saturday IN:OUT splits are 65:35, 50:50 and 50:50 respectively.

The *ETA Manual for Traffic Impact Assessments and Site Traffic Assessments* recommends a rate of 45 trips/100sqm GLA, 30 trips/ 100sqm GLA and 50 trips/100sqm GLA during the AM, Midday and PM peak hours respectively for **fast food/ drive-thru**. For this study, only the AM and PM peak hours were assessed. The recommended AM and PM IN:OUT splits are both 55:45.

The *ETA Manual for Traffic Impact Assessments and Site Traffic Assessments* recommends a rate of 2.1 trips/100sqm GLA, 2.1 trips/ 100sqm GLA and 0.45 trips/100sqm GLA during the AM, PM and Saturday peak hours respectively for **offices**. The recommended AM, PM and Saturday IN:OUT splits are 85:15, 15:85 and 50:50 respectively.

The *ETA Manual for Traffic Impact Assessments and Site Traffic Assessments* recommends that for a **filling station**, trip generation rate is comprised of 4% of adjacent streets.

Based on the recommended rates, the proposed development is expected to generate **368** trips during the AM peak hour, **511** trips during the PM peak hour and **483** trips during the Saturday peak hour. A summary of the trip generation calculation for the proposed development is provided in **Table 1-4.**

Table 1: Trip Generation Table Retail

Land Use	GLA m^2	Period	Trip Generation			
			Base Rate	Adjustment Factor	New Rate	TOTAL Trips
Proposed Retail	1502	AM Peak	0,6	5.20	3.1	**47**
		PM Peak	3.4		17.7	**265**
		Sat Peak	*5		26.0	**390**

Trip Type	RETAIL					
	AM		PM		Saturday	
	IN (65%)	OUT (35%)	IN (50%)	OUT (50%)	IN (50%)	OUT (50%)
Primary	30	16	44	44	53	53
*PB			50	50	68	68
DIV			38	38	74	74
Total	**47**		**265**		**390**	

***Peak Hour factor = 0.9**
***Size adjustment factor = 2,9**

Table 2: Trip Generation Table Drive-thru

Land Use	GLA m^2	Period	Base trip gen rate	Trip Generation	
				Base Rate	TOTAL Trips
Drive-thru	251	AM Peak	45	45	**113**
		PM Peak	50	50	**126**
		SAT AM	0	0	**0**

Trip Type	Drive-thru					
	AM		FRI PM		Saturday	
	IN (55%)	OUT (45%)	IN (55%)	OUT (45%)	IN (50%)	OUT (50%)
Primary	62	51	16	13	-	-
PB	-	-	36	29	-	-
DIV	-	-	17	14	-	-
Total	**113**		**126**		**-**	

Table 3: Trip Generation Table Petrol Filling Station

Land Use	Passing Volume			Trip Rate	Trips Gen			In: Out Split					
	FRI AM	FRI PM	SAT AM		AM	PM	SAT	AM		PM		SAT	
								In	Out	In	Out	In	Out
Petrol Filling Station	2510	1407	1135	4%	100	56	45	100	100	56	56	45	45
Total per Peak Hour								**200**		**112**		**90**	

Table 4: Trip Generation Table Offices

Land Use	Trip Rate			Trips Gen			In: Out Split					
	AM	PM	SAT	AM	PM	SAT	AM		PM		SAT	
							In	Out	In	Out	In	Out
Offices	2.1	2.1	0.45	7	7	2	6	1	2	5	1	1
Total per Peak Hour							**7**		**7**		**2**	

8.3 Modal Split

No reduction in trip generation for low vehicle-ownership rates nor proximity to public transport have been applied.

8.4 Assessment Years

According to the *ETA Manual for TIA's & STA's*, developments that generate less than 1000 peak hour passenger car trips will warrant the following assessment(s) to be undertaken:

- Design Horizon Year – 2024 plus development.

9 Trip Distribution & Assessment

The trip distribution and assignment were based on traffic counts, spatial location and local knowledge.

The resulting trip distributions for the AM, PM and Saturday peak hours are illustrated in **Figures 11-16**.

The AM, PM and Saturday peak hours development traffic were then assigned to the road network as illustrated in **Figures 17, 18** and **19.**

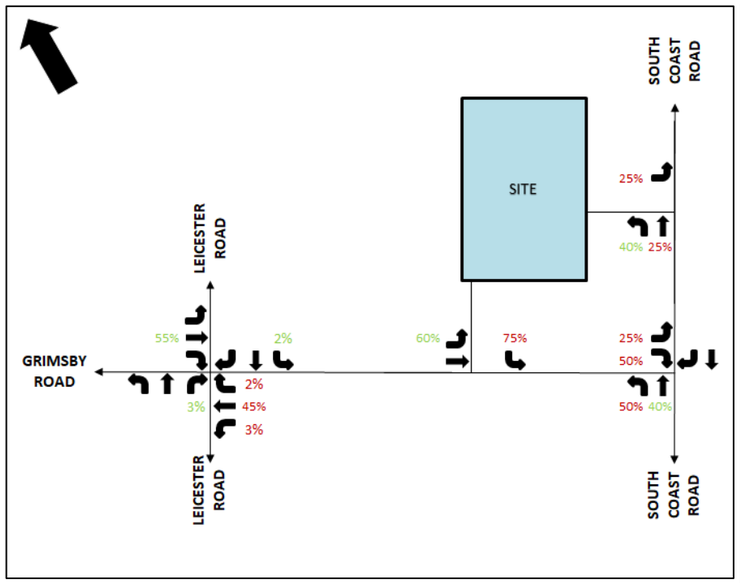


Figure 11: % Primary Trip Distribution – AM peak hour

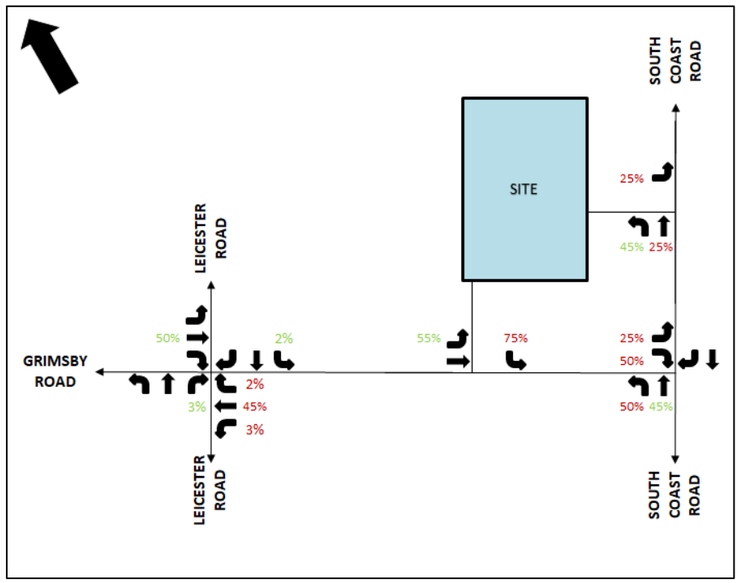


Figure 12: % Primary Trip Distribution – PM peak hour

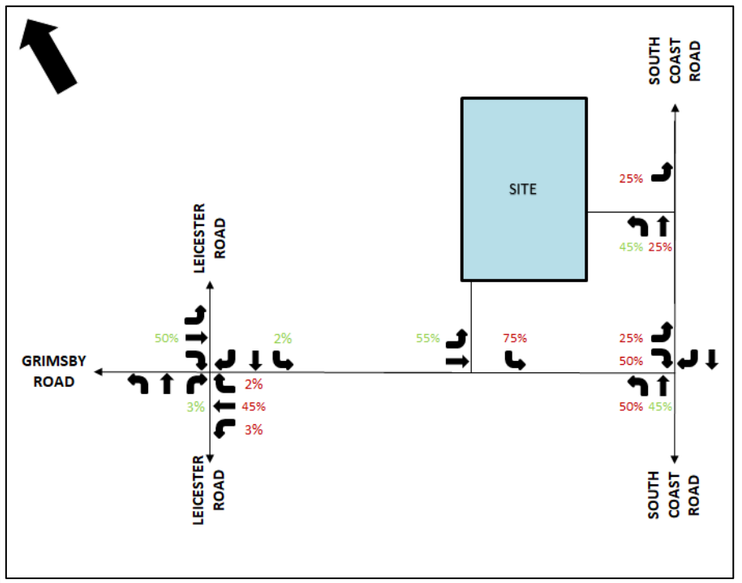


Figure 13: % Primary Trip Distribution – Saturday peak hour

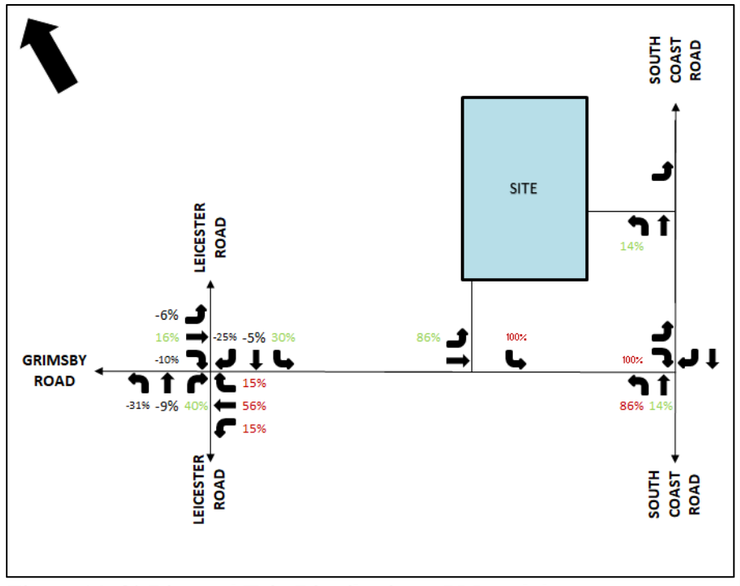


Figure 14: % Diverted Trip Distribution – PM peak hour

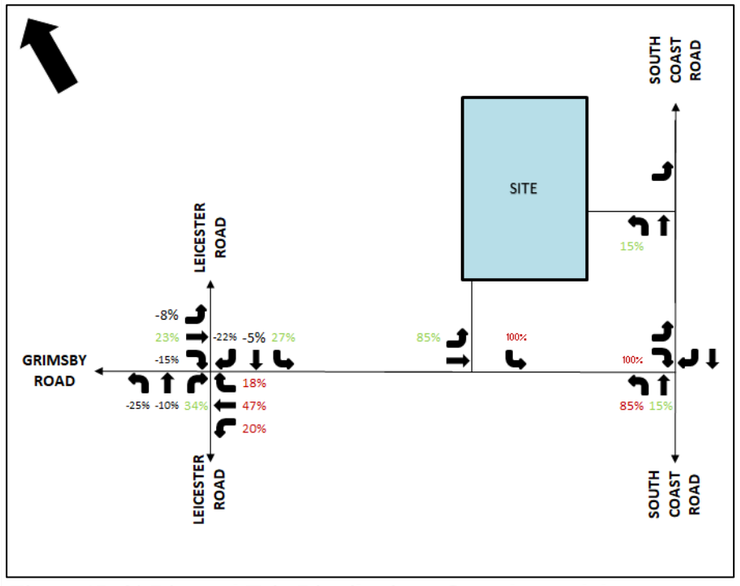


Figure 15: % Diverted Trip Distribution – Saturday peak hour

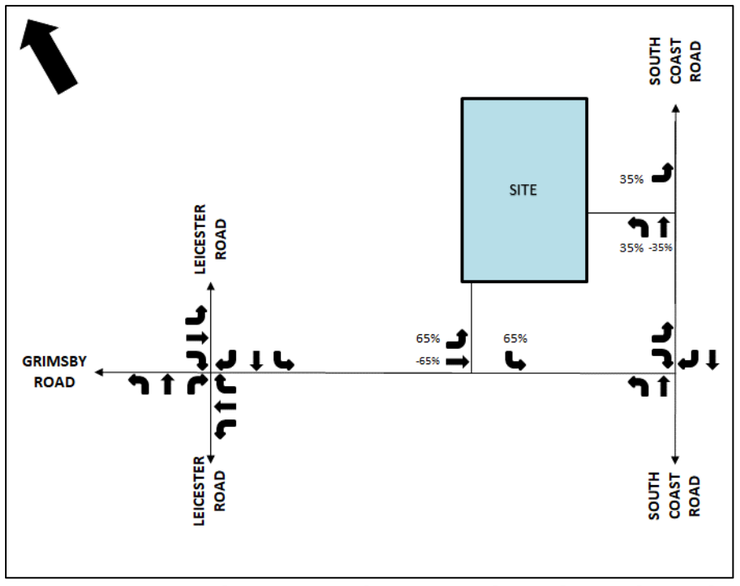


Figure 16: % Passer-by Trip Distribution – Friday and Saturday peak hour

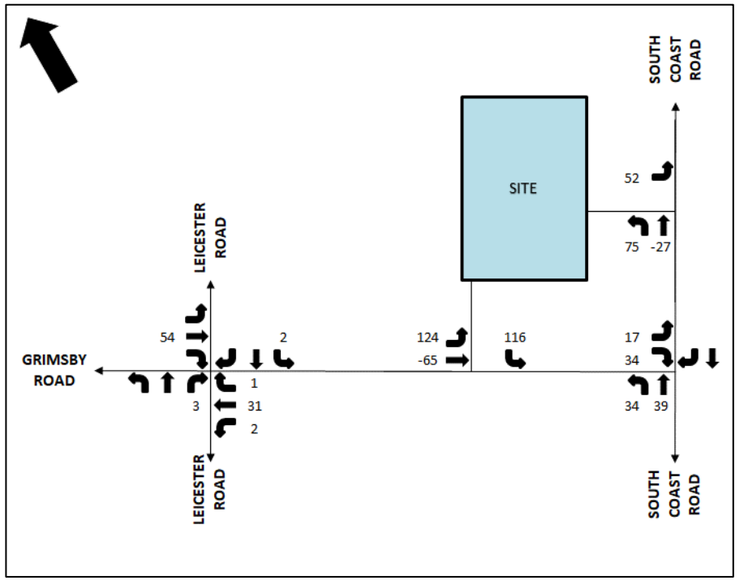


Figure 17: AM peak hour development traffic

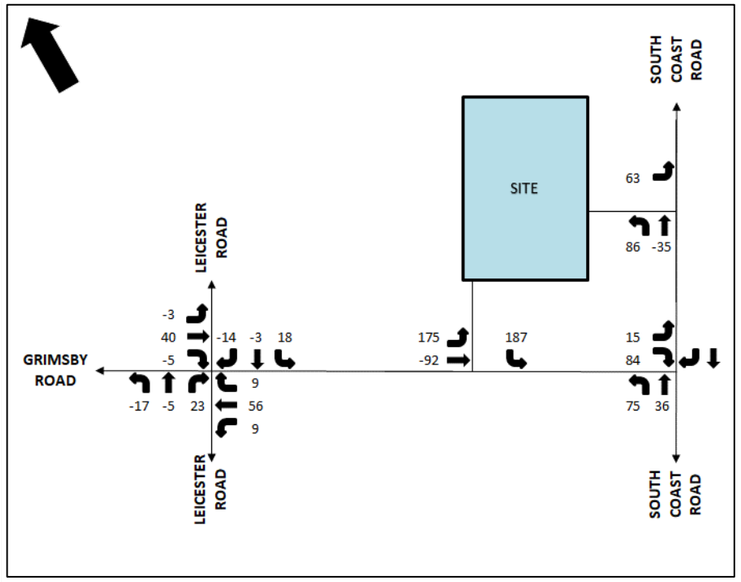


Figure 18: PM peak hour development traffic

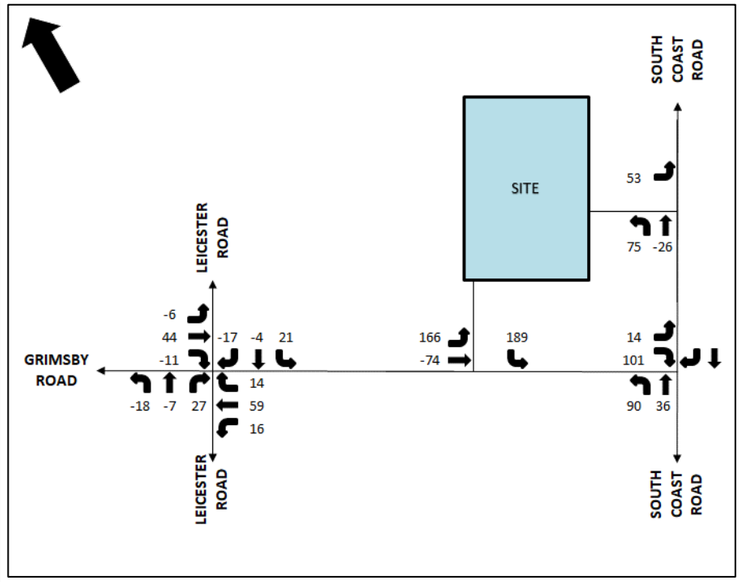


Figure 19: Saturday peak hour development traffic

10 Background Traffic Demand Estimation

10.1 Existing Traffic Volumes (2019)

To determine the existing traffic volumes at the intersections, classified traffic counts were undertaken for the affected intersections as per details provided in **Table 5**. The traffic counts were analysed, and it was determined that a common peak hour for each intersection be used for analytical purposes in order to assess the most practical case.

Table 5: Traffic Count List

Intersection Name	Date of Survey & Day of the week	Duration	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
Grimsby Road and South Coast Road	31/05/2019 Friday	06:00 - 18:00 (12 hours)	06:45 - 07:45	15:30- 16:30	-
	01/06/2019 Saturday	08:00 - 14:00 (6 hours)	-	-	12:45 - 13:45
Grimsby Road and Leicester Road	31/05/2019 Friday	06:00 - 18:00 (12 hours)	06:45 - 07:45	15:30- 16:30	-
	01/06/2019 Saturday	08:00 - 14:00 (6 hours)	-	-	12:45 - 13:45

10.2 Forecast Traffic Volumes (2024)

As per the *ETA Manual for TIA's and STA's*, a background growth rate of 2% may be considered for an area experiencing low-to-average growth. The area in the vicinity of the proposed site does not contain large amounts of undeveloped land therefore, the area can be considered a low growth area in terms of future development.

11 Approved Neighbouring Developments

No information regarding approved neighbouring developments was made available at the time of undertaking this TIA.

12 Total Traffic Demand

The total traffic demand has been estimated for the following scenarios:

- 2019 existing volumes;
- 2019 existing plus development;
- 2024 forecast volumes;
- 2024 forecast plus development.

12.1 2019 Existing

The 2019 existing morning, afternoon and Saturday peak hours traffic based on the traffic counts are illustrated in **Figures 20, 21** and **22**.

12.2 2019 Existing plus Development

The proposed development traffic was then added to the 2019 existing morning, afternoon and Saturday traffic volumes as illustrated in **Figures 23, 24** and **25.**

12.3 2024 Forecast

The 2024 forecast traffic volumes for the morning, afternoon and Saturday peak hours can be seen in **Figures 26, 27** and **28**.

12.4 2024 Forecast plus Development

The 2024 forecast traffic volumes with the proposed development traffic for the morning, afternoon and Saturday peak hours can be seen in **Figures 29, 30** and **31.**

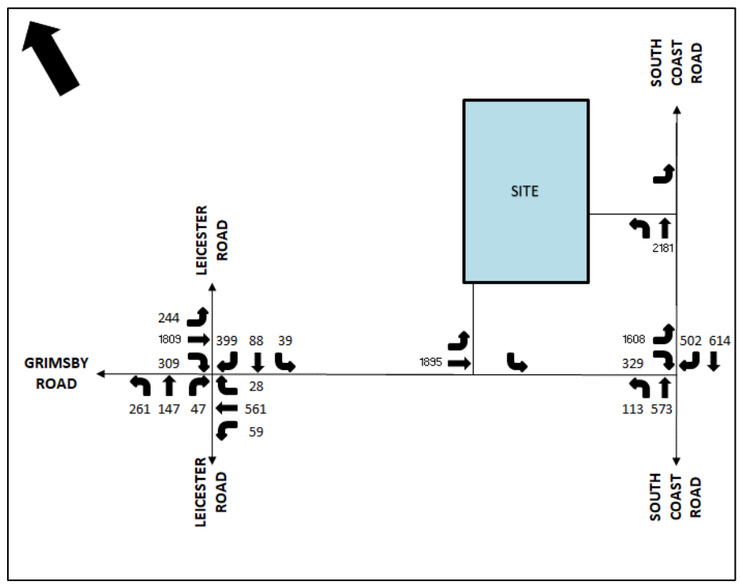


Figure 20: Existing 2019 AM Peak Hour Volumes

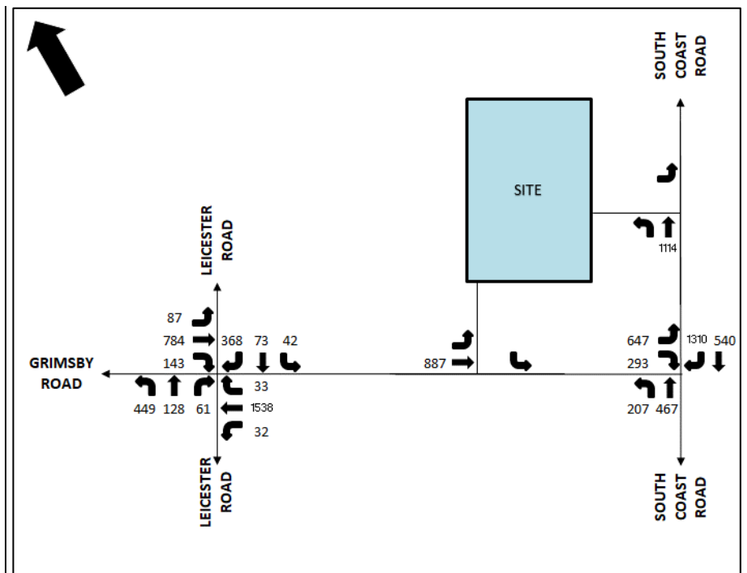


Figure 21: Existing 2019 PM Peak Hour Volumes

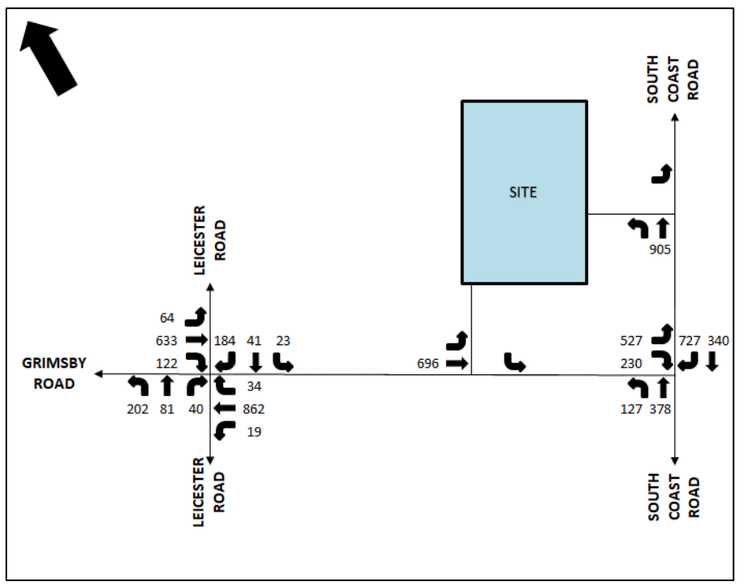


Figure 22: Existing 2019 Saturday Peak Hour Volumes

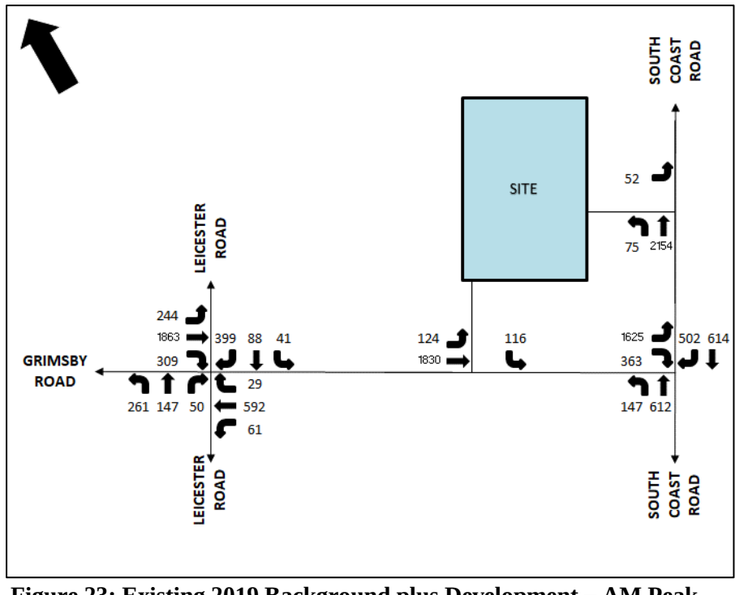


Figure 23: Existing 2019 Background plus Development – AM Peak Hour

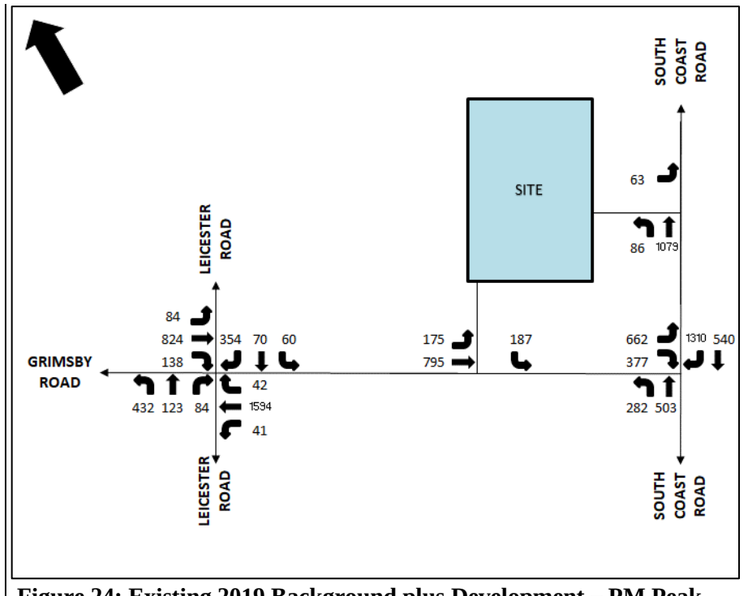


Figure 24: Existing 2019 Background plus Development – PM Peak Hour

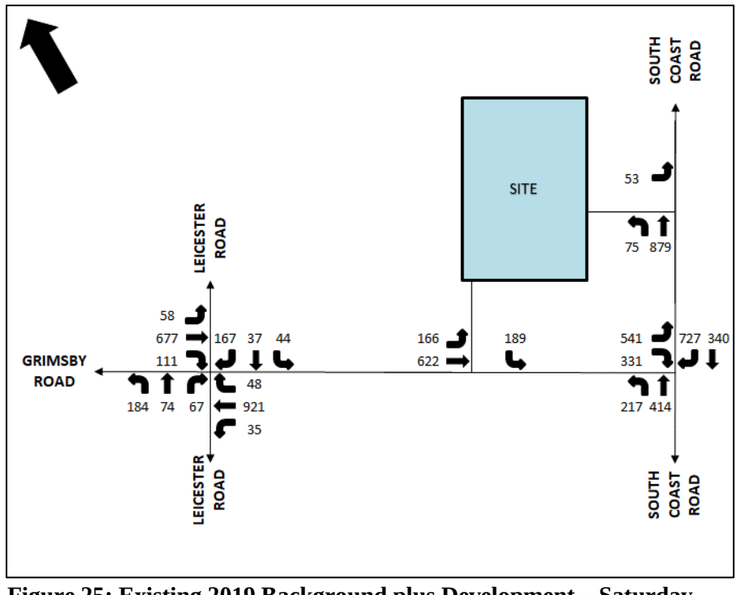


Figure 25: Existing 2019 Background plus Development – Saturday Peak Hour

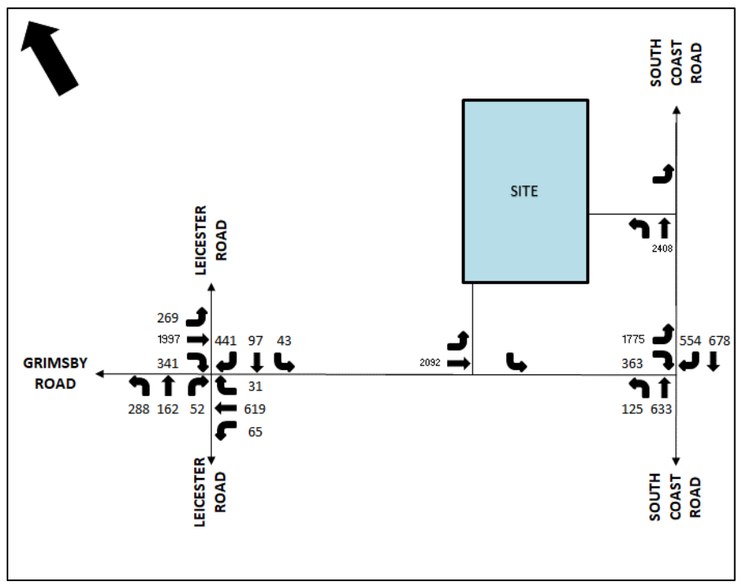


Figure 26: Forecast 2024 AM peak hour volumes

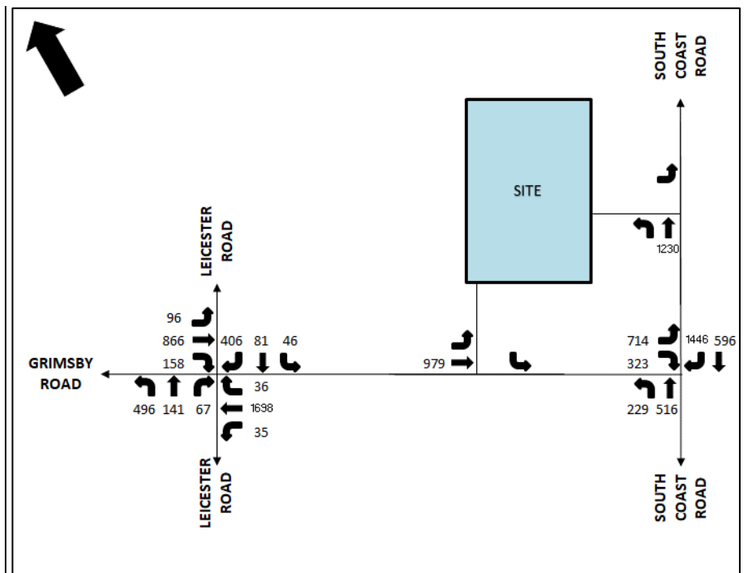


Figure 27: Forecast 2024 PM peak hour volumes

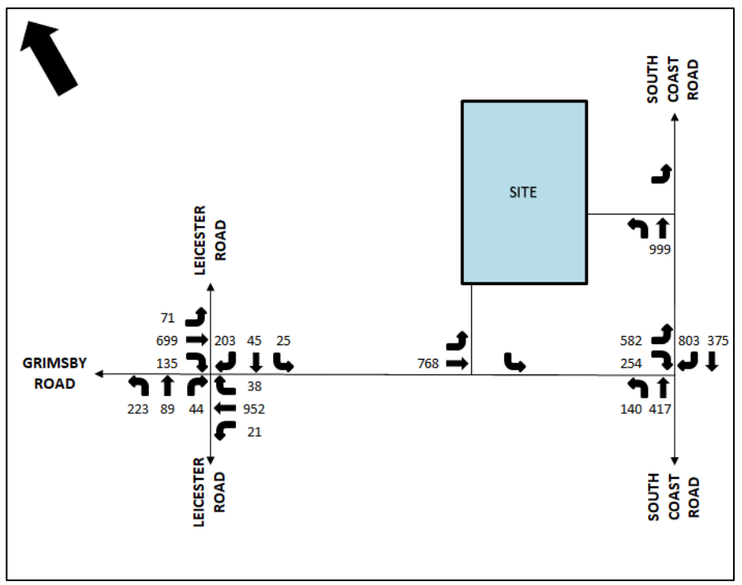


Figure 28: Forecast 2024 Saturday peak hour volumes

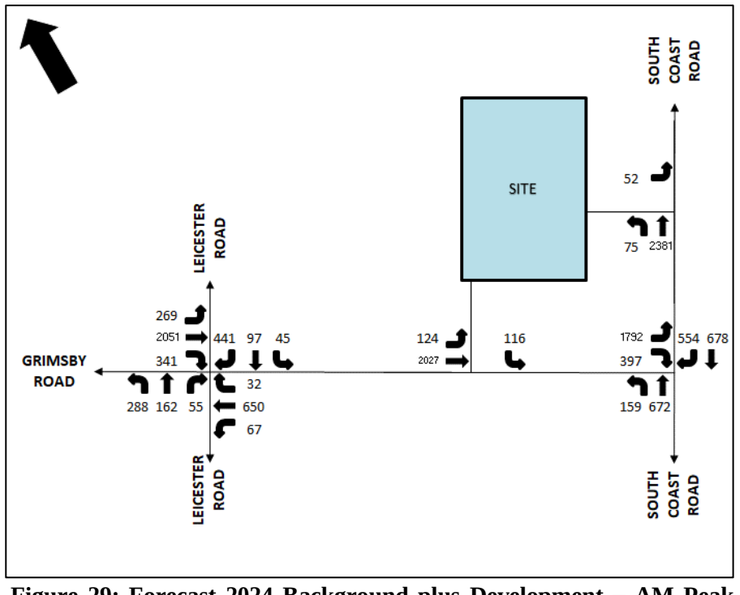


Figure 29: Forecast 2024 Background plus Development – AM Peak Hour

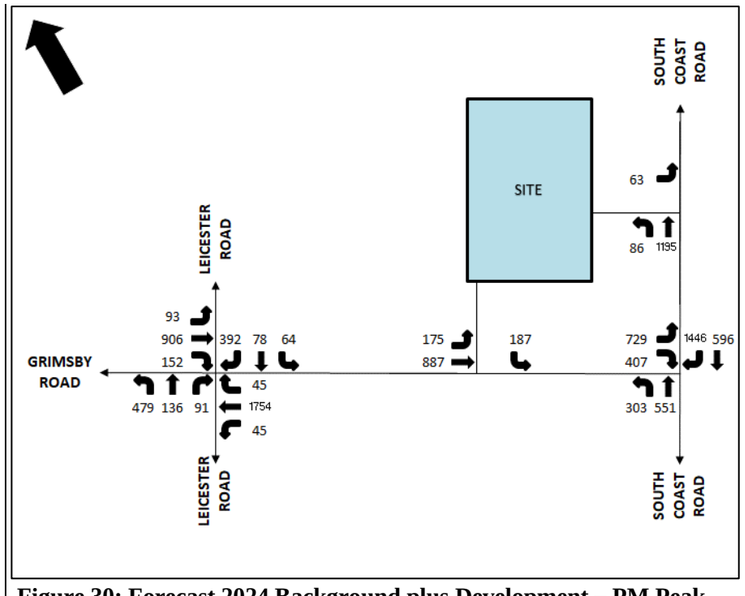


Figure 30: Forecast 2024 Background plus Development – PM Peak Hour

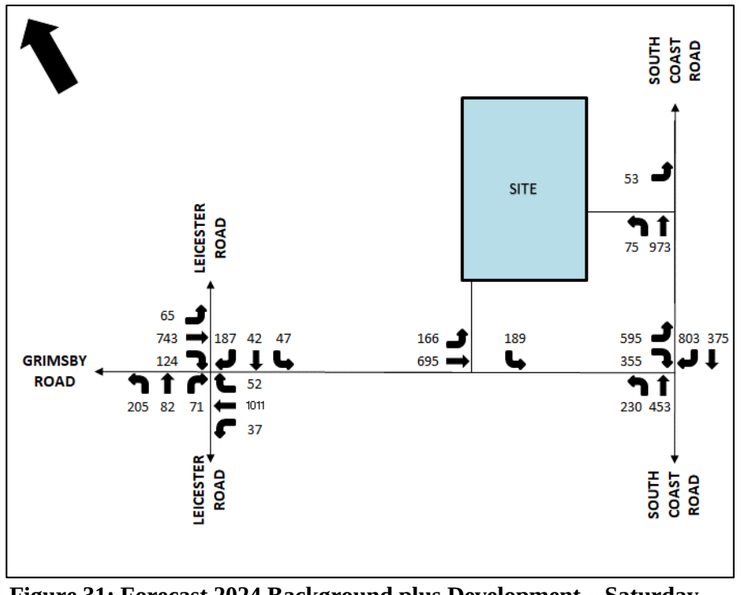


Figure 31: Forecast 2024 Background plus Development – Saturday Peak Hour

12.5 Multi-modal Demand & Estimation

Not applicable.

13 Demand Side Mitigation

Not applicable.

14 Traffic Impact Assessment Scenarios

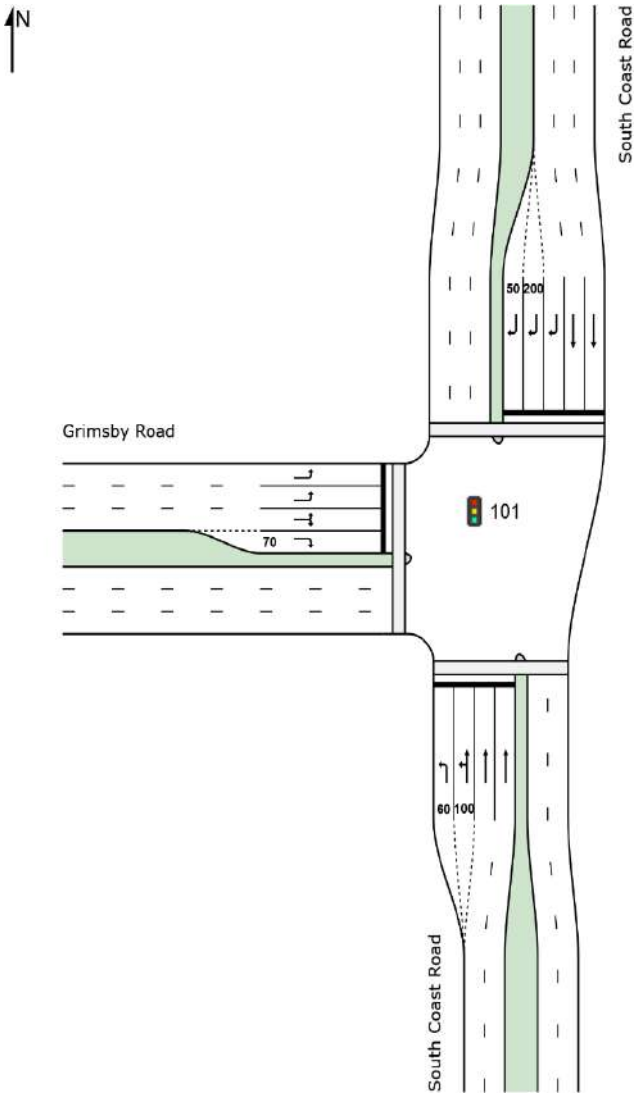
An assessment was undertaken to determine the Levels of Service (LOS) at the analysed intersections. LOS is a measure used by traffic engineers to gauge the performance of intersections. The delay is inversely proportional to the LOS which implies that the LOS decreases as the delay increases. The LOS ranges from A to F, with LOS A being the most favourable.

14.1 2019 Existing (Background)

The 2019 background volumes without development traffic were analysed using the software Sidra, Version 8.0. **Table 6** contains illustrations indicating the existing intersection layouts as analysed in Sidra. **Table 7** contains a summary of the intersection analyses for the existing road network conditions.

Table 6: Existing Intersection Configuration

Grimsby Road & South Coast Road



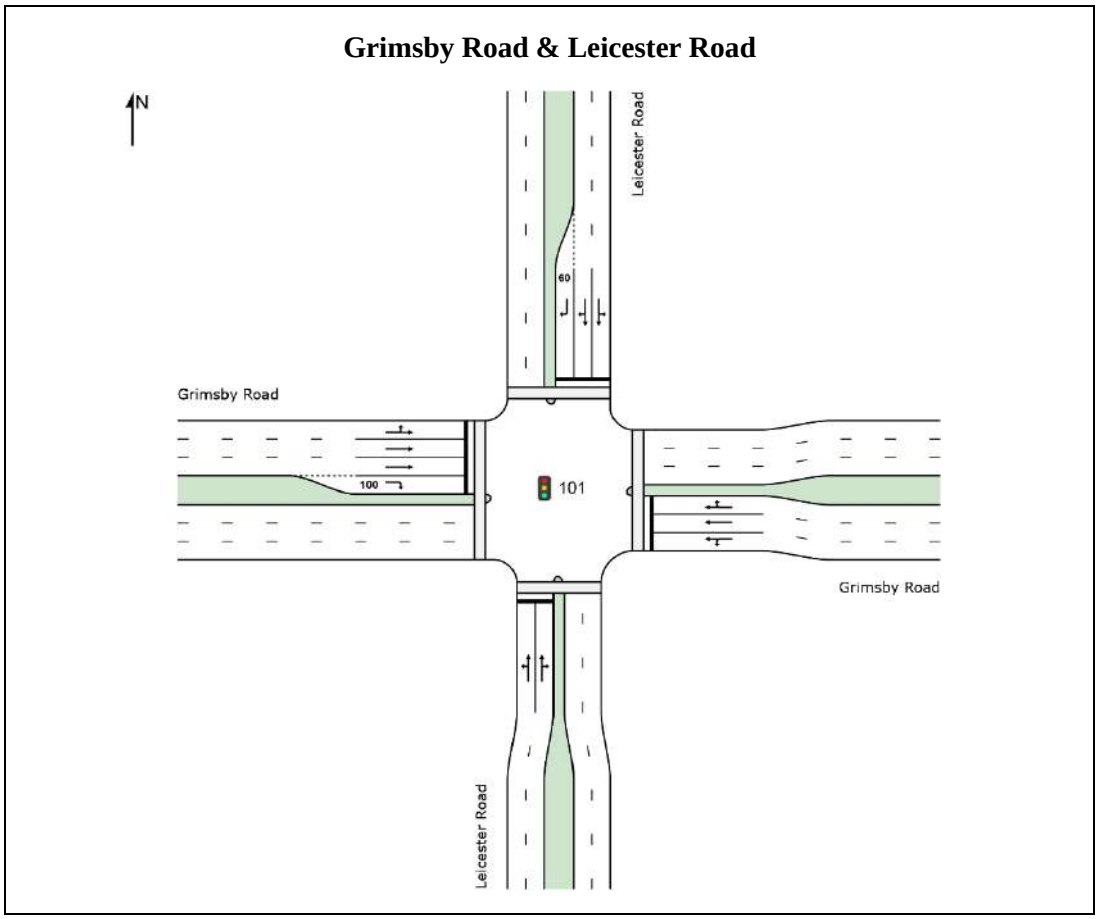


Table 7: Intersection Analysis with 2019 Background Traffic

Intersection / Approach		2019 Existing								
		AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Grimsby Road & South Coast Road	South Approach	0.476	20.7	C	0.388	19.7	B	0.314	19.8	B
	North Approach	0.409	17.3	B	0.637	16.1	B	0.341	12.4	B
	West Approach	0.493	13.9	B	0.356	16.3	B	0.279	15.8	B
	Overall	**0.493**	**16.1**	**B**	**0.637**	**16.9**	**B**	**0.341**	**15.1**	**B**
Grimsby Road & Leicester Road	South Approach	0.634	27.0	C	0.746	35.0	D	0.429	24.1	C
	East Approach	0.440	20.1	C	0.794	29.0	C	0.456	15.5	B
	North Approach	0.383	17.8	B	0.557	32.9	C	0.218	18.5	B
	West Approach	0.619	10.6	B	0.579	16.8	B	0.304	9.0	A
	Overall	**0.634**	**15.0**	**B**	**0.794**	**27.2**	**C**	**0.456**	**14.7**	**B**

As is apparent in the table, all analysed intersections operate at acceptable overall LOSs in all peak hours of the 2019 background traffic scenario.

14.2 2024 Forecast (background)

The intersection analysis was undertaken for the 2024 forecast background traffic. The analysis results can be seen in **Table 8.**

Table 8: Intersection Analysis with 2024 Forecast Background Traffic

Intersection / Approach		2024 Forecast Background Traffic								
		AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Grimsby Road & South Coast Road	South Approach	0.526	21.1	C	0.429	19.9	B	0.346	19.9	B
	North Approach	0.379	15.5	B	0.713	17.9	B	0.382	12.8	B
	West Approach	0.571	15.1	B	0.392	16.4	B	0.309	16.0	B
	Overall	**0.571**	**16.3**	**B**	**0.713**	**17.9**	**B**	**0.382**	**15.4**	**B**
Grimsby Road & Leicester Road	South Approach	0.700	27.9	C	0.803	35.2	D	0.474	24.4	C
	East Approach	0.621	23.5	C	0.854	32.1	C	0.506	15.9	B
	North Approach	0.354	16.3	B	0.773	38.0	D	0.249	18.7	B
	West Approach	0.684	10.9	B	0.679	16.3	B	0..354	9.3	A
	Overall	**0.700**	**15.6**	**B**	**0.854**	**29.1**	**C**	**0.506**	**15.0**	**B**

As is apparent in the table, all analysed intersections operate at acceptable overall LOSs in all peak hours of the 2024 background traffic scenario.

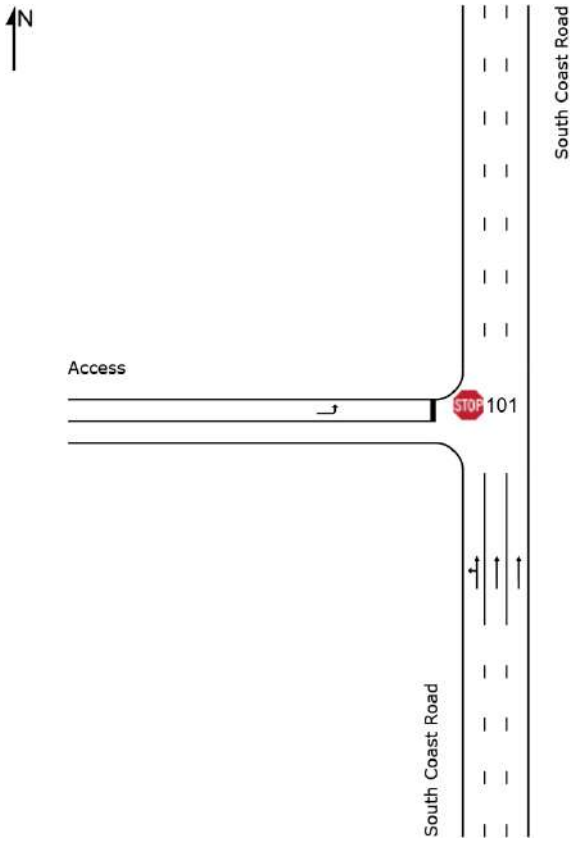
14.3 2019 Existing plus Development Traffic

The intersection analysis was undertaken for the 2019 background plus development traffic scenario.

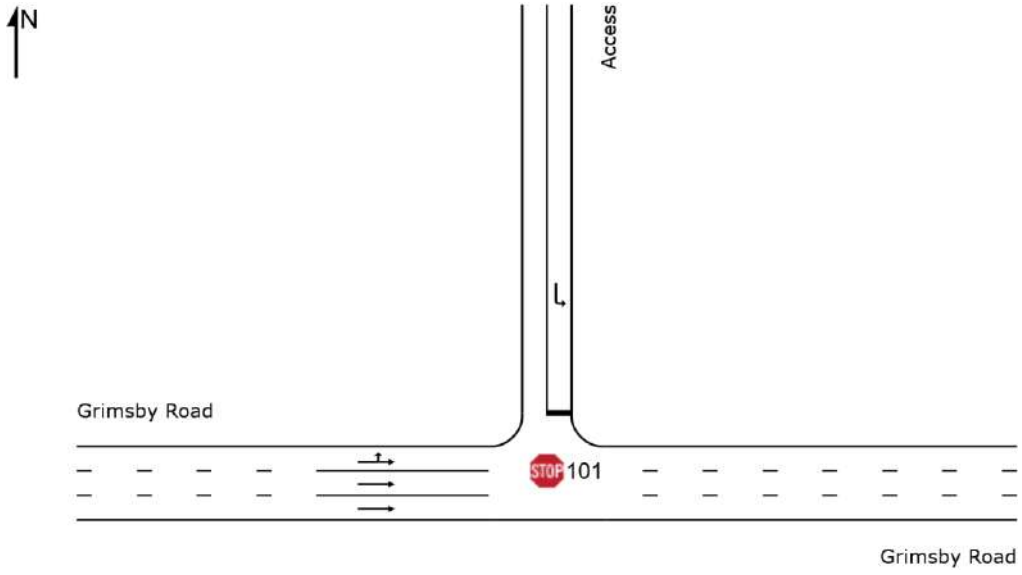
An illustration of the proposed accesses intersections is provided in **Table 9**

Table 9: Proposed Access Layout

Access & South Coast Road



Access & Grimsby Road



The analysis results can be seen in **Table 10**.

Table 10: Intersection Analysis with 2019 Background plus Development Traffic

Intersection / Approach		2019 Background + Development Traffic								
		AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Grimsby Road & South Coast Road	South Approach	0.504	20.7	C	0.414	19.5	B	0.340	19.3	B
	North Approach	0.343	15.0	B	0.647	16.5	B	0.348	12.6	B
	West Approach	0.539	15.1	B	0.446	17.2	B	0.390	17.2	B
	Overall	**0.539**	**16.2**	**B**	**0.647**	**17.3**	**B**	**0.390**	**15.8**	**B**
Grimsby Road & Leicester Road	South Approach	0.634	27.0	C	0.745	36.8	D	0.449	26.3	C
	East Approach	0.437	19.3	B	0.835	32.3	C	0.465	14.3	B
	North Approach	0.406	18.3	B	0.508	31.6	C	0.213	20.5	C
	West Approach	0.633	10.7	B	0.622	17.5	B	0.278	7.9	A
	Overall	**0.634**	**15.0**	**B**	**0.835**	**28.9**	**C**	**0.465**	**14.3**	**B**
Access & S. Coast Road	South Approach	0.400	0.2	NA	0.209	0.4	NA	0.171	0.4	NA
	West Approach	0.088	12.5	B	0.059	9.4	A	0.046	9.1	A
	Overall	**0.400**	**0.5**	**NA**	**0.209**	**0.8**	**NA**	**0.171**	**0.8**	**NA**
Access & Grimsby Road	North Approach	0.154	11.2	B	0.146	8.7	A	0.140	8.5	A
	West Approach	0.351	0.4	NA	0.174	0.9	NA	0.142	1.1	NA
	Overall	**0.351**	**1.0**	**NA**	**0.174**	**2.1**	**NA**	**0.142**	**2.4**	**NA**

As is apparent in the table, all analysed intersections are expected to operate at acceptable overall LOSs in all peak hours of the 2019 background plus development traffic scenario.

14.4 2024 Forecast plus Development Traffic

The intersection analysis was undertaken for the 2024 background plus development traffic scenario.

The analysis results can be seen in **Table 11**.

Table 11: Intersection Analysis with 2024 Background plus development Traffic

Intersection / Approach		2024 Forecast Background + Development Traffic								
		AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Grimsby Road & South Coast Road	South Approach	0.554	21.0	C	0.454	19.8	B	0.373	19.5	B
	North Approach	0.384	15.6	B	0.723	18.5	B	0.389	13.2	B
	West Approach	0.593	15.5	B	0.483	17.3	B	0.419	17.2	B
	Overall	**0.593**	**16.6**	**B**	**0.723**	**18.5**	**B**	**0.419**	**16.1**	**B**
Grimsby Road & Leicester Road	South Approach	0.700	28.0	C	0.797	38.4	D	0.500	26.6	C
	East Approach	0.649	24.0	C	0.842	30.9	C	0.512	14.7	B
	North Approach	0.354	16.4	B	0.782	40.4	D	0.246	20.7	C
	West Approach	0.698	11.0	B	0.694	16.4	B	0.326	8.1	A
	Overall	**0.700**	**15.8**	**B**	**0.842**	**29.4**	**C**	**0.512**	**14.6**	**B**
Access & S. Coast Road	South Approach	0.441	0.2	NA	0.230	0.4	NA	0.188	0.4	NA
	West Approach	0.100	13.6	B	0.062	9.6	A	0.048	9.2	A
	Overall	**0.441**	**0.5**	**NA**	**0.230**	**0.8**	**NA**	**0.188**	**0.8**	**NA**
Access & Grimsby Road	North Approach	0.170	11.9	B	0.151	8.9	A	0.143	8.6	A
	West Approach	0.387	0.4	NA	0.191	0.9	NA	0.155	1.0	NA
	Overall	**0.387**	**0.9**	**NA**	**0.191**	**2.0**	**NA**	**0.155**	**2.3**	**NA**

As is apparent in the table, all analysed intersections are expected to operate at acceptable overall LOSs in both peak hours of the 2024 background plus development traffic scenario.

14.5 Planning Year Horizon (>2000 trips)

The proposed development is not expected to generate more than 2000 trips. To this end, no planning year horizon scenario has been analysed.

15 Traffic Signal Warrant

Not applicable.

16 Link Capacity

An assessment was undertaken of the link demands for the 2024 forecast plus development scenario. The analysis was undertaken for the following roads:

- Grimsby Road – Class 2
- South Coast Road- Class 2

The analysis was done for the weekday PM and Saturday peak hours.

Section	Item	AM	PM	Sat
Grimsby Road (eastbound)	Max. traffic volume (veh/hr)	2190	1061	861
	Capacity (veh/hr)*	2700		
	Free flow speed (km/h)	45		
	v/c	0.81	0.39	0.32
Grimsby Road (westbound)	Max. traffic volume (veh/hr)	749	1844	1100
	Capacity (veh/hr)*	2400		
	Free flow speed (km/h)	40		
	v/c	0.31	0.77	0.46
South Coast Road (northbound)	Max. traffic volume (veh/hr)	2456	1281	1048
	Capacity (veh/hr)*	3300		
	Free flow speed (km/h)	54		
	v/c	0.74	0.39	0.32
South Coast Road (southbound)	Max. traffic volume (veh/hr)	1232	2043	1178
	Capacity (veh/hr)*	3300		
	Free flow speed (km/h)	54		
	v/c	0.37	0.62	0.36

**the capacities of these roads have been estimated based on free-flow speeds (FFS) of the roads and determined using the HCM "speed-flow curve with LOS criteria" graph (for LOC D). The FFSs have been assumed based on off-peak car-follow speed surveys and validated using Google Maps live traffic data for the relevant links.*

As is apparent in the table, the 2024 forecast plus development traffic volumes on Grimsby Road and South Coast Road are not expected to exceed the link capacity of the road.

17 Summary of Proposed Upgrades & TRL

Currently the access on South Coast Road coincides with a bus layby. It is proposed that the end of the layby be clearly marked using paint to ensure that public transport do not travel across the site's access point. See TRL attached as **Appendix E**.

18 Site Traffic Assessment

As this project is at rezoning stage, the architectural plans are not yet finalised. It is recommended that a Site Traffic Assessment be undertaken at building plan submission stage that will assess the following:

- Access layout;
- Parking numbers, layout and driveway geometry (including ramps);
- Loading area/bay numbers, layout and geometry (including ramps) if required;
- Drop-off facility requirements and layout if required;
- Tracking of relevant vehicle-types accessing and circulating throughout the site using AutoTURN V9.

The access point is to be designed in the following manner and reflected on the site development plan:

- The width of the access point at the property boundary is not to be less than 6m nor greater than 9m. Should the access width requirement at the boundary be greater than 9m, a pedestrian refuge median (min. 1.5m wide) must be provided, ideally between ingress and egress lanes.
- If there is an approved access point this is to be used, otherwise a vehicle access scoop is to be provided.
- The grade of the access lane from the road edge to the property boundary to be not greater than ±4%. This is to allow for future road widening.

The aforementioned aspects are to be assessed in light of the regulatory specifications set out in the document Summary of Recommended Minimum Standards for Parking and Loading Facilities to be Provided within the Property (eThekwini Municipality, 30/10/2013) and the ETA's Manual for TIA and STA, V0.1, October 2015.

19 Pedestrian Assessment

Some pedestrian activity was observed along Grimsby Road in the vicinity of the site. Adequate sidewalks are already provided along this road. The relatively low pedestrian activity generated by the development may be adequately accommodated by the existing infrastructure.

20 Public Transport Assessment

Public transport vehicles were observed travelling along Grimsby Road and along South Coast Road. The proposed development is not expected to generate a significant amount of public transport trips thus the existing PT operations will suffice.

Notwithstanding the above, there is an existing PT lay-bye on South Coast Road outside the development.

21 Transport Requirements and Costs

Not applicable.

22 Conclusion & Recommendations

Arup (Pty) Ltd has been appointed by Mahomedy's Ext 2000 Pty Ltd to undertake a Traffic Impact Assessment (TIA) for the proposed development to be located in Mobeni, Durban (KZN). This TIA will form part of the Rezoning Application for the site.

The site currently operates as a retail store on level terrain. A demolition plan has been developed to bring down the existing structures for the construction of the new development. The development is to incorporate a petrol filling station and convenience shop along with two retail stores totalling 1502m² in size with 330m^2 of office space. Furthermore, a drive-thru totalling 251m² in size makes up part of this development.

The site is currently zoned General Industrial and accommodates multiple warehouse buildings. The site is to be rezoned to General Business 2 and special consent is required for the petrol filling station component.

The proposed development will take access off Grimsby Road as well as off South Coast Road. Both accesses to the site will be restricted to left in and left out only. The access on South Coast Road is located in an existing PT lay-bye area and it is recommended that road markings be installed to differentiate the lay-bye from the vehicle access scoop. This road marking plan must be approved by the eThekwini Transport Authority and implemented by the developer. Refer to **Appendix E**.

Based on the *ETA Manual for Traffic Impact Assessments and Site Traffic Assessments* recommended rates, the proposed development is expected to generate 368 trips during the AM peak hour, 511 trips during the PM peak hour and 483 trips during the Saturday peak hour. These trips were then assigned to the road network and added to the background and forecasted years to generate scenarios.

Several scenarios of the proposed development were tested in SIDRA v8.0 to obtain a Level of service for the intersections of significance, namely:

- 2019 Background
- 2019 Background Plus Development
- 2024 Forecast Background
- 2024 Forecast Background Plus Development

It is evident that the analysed intersections are expected to operate at an acceptable overall LOS for all the above-mentioned scenarios.

It is further noted that there is some pedestrian activity that was observed along Grimsby Road in the vicinity of the site. However adequate sidewalks are already provided along this road. The relatively low pedestrian activity generated by the development may be adequately accommodated by the existing infrastructure.

In addition, public transport vehicles were observed travelling along Grimsby Road and along South Coast Road. However, the proposed development is not

expected to generate a significant amount of public transport trips thus the existing PT operations will suffice.

Therefore, after analysis, from a traffic and transportation point of view, the proposed development does not impede on the operation of the existing road network and thus the current road infrastructure is sufficient to accommodate the said development.

23 References

1. eThekwini Transport Authority, 2015. Manual for Traffic Impact Assessments and Site Traffic Assessments. Version 0.1, October 2015.

2. eThekwini Municipality, 2013. Summary of Recommended Minimum Standards for Parking and Loading Facilities to be provided within the Property. 30 October 2013.

Appendix A

Architect's Site Plan

TO BE FINALISED

Appendix B

Email Correspondence (none)

Appendix C

Traffic Counts

TRAFFIC SURVEY																
CLIENT:	ARUP															
SITE:	INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD															
DATE:	PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019															
UNITS:	CLASSIFIED															

APPROACH FROM	NORTH															TOTAL
NAME	SOUTH COAST ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	0	0	0	0	0	34	41	5	2	82	72	15	10	1	98	180
08:15 - 08:30	0	0	0	0	0	28	12	5	1	46	61	12	7	2	82	128
08:30 - 08:45	0	0	0	0	0	43	24	4	3	74	77	4	8	3	92	166
08:45 - 09:00	0	0	0	0	0	36	15	3	6	60	66	15	11	1	93	153
09:00 - 09:15	0	0	0	0	0	29	21	3	1	54	64	5	10	4	83	137
09:15 - 09:30	0	0	0	0	0	43	25	3	3	74	67	14	10	1	92	166
09:30 - 09:45	0	0	0	0	0	48	30	4	3	85	81	13	11	2	107	192
09:45 - 10:00	0	0	0	0	0	43	30	4	2	79	90	8	9	0	107	186
10:00 - 10:15	0	0	0	0	0	58	18	9	2	87	118	17	17	1	153	240
10:15 - 10:30	0	0	0	0	0	31	22	1	1	55	77	4	9	0	90	145
10:30 - 10:45	0	0	0	0	0	39	28	4	4	75	130	16	14	2	162	237
10:45 - 11:00	0	0	0	0	0	54	21	4	0	79	103	14	7	1	125	204
11:00 - 11:15	0	0	0	0	0	44	20	2	8	74	120	9	14	2	145	219
11:15 - 11:30	0	0	0	0	0	20	15	2	4	41	78	6	16	0	100	141
11:30 - 11:45	0	0	0	0	0	43	23	5	2	73	151	7	12	2	172	245
11:45 - 12:00	0	0	0	0	0	35	17	4	1	57	119	7	5	2	133	190
12:00 - 12:15	0	0	0	0	0	41	15	5	2	63	150	9	8	1	168	231
12:15 - 12:30	0	0	0	0	0	58	25	2	5	90	150	11	13	2	176	266
12:30 - 12:45	0	0	0	0	0	47	20	2	2	71	142	7	15	2	166	237
12:45 - 13:00	0	0	0	0	0	57	21	0	4	82	165	11	9	0	185	267
13:00 - 13:15	0	0	0	0	0	46	15	2	0	63	158	7	5	3	173	236
13:15 - 13:30	0	0	0	0	0	74	17	3	8	102	164	13	6	2	185	287
13:30 - 13:45	0	0	0	0	0	46	20	2	3	71	140	7	3	3	153	224
13:45 - 14:00	0	0	0	0	0	54	20	3	2	79	136	10	8	3	157	236

TRAFFIC SURVEY																	
CLIENT:	ARUP																
SITE:	INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD																
DATE:	PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019																
UNITS:	CLASSIFIED																

APPROACH FROM	SOUTH															TOTAL
NAME	SOUTH COAST ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	19	2	5	0	26	55	21	4	6	86	0	0	0	0	0	112
08:15 - 08:30	16	2	3	0	21	37	21	3	3	64	0	0	0	0	0	85
08:30 - 08:45	22	3	1	0	26	50	25	2	5	82	0	0	0	0	0	108
08:45 - 09:00	17	1	1	0	19	46	22	4	2	74	0	0	0	0	0	93
09:00 - 09:15	16	1	1	0	18	36	20	3	3	62	0	0	0	0	0	80
09:15 - 09:30	22	0	0	0	22	32	13	3	8	56	0	0	0	0	0	78
09:30 - 09:45	20	3	0	0	23	35	19	2	2	58	0	0	0	0	0	81
09:45 - 10:00	29	0	2	0	31	56	20	7	4	87	0	0	0	0	0	118
10:00 - 10:15	17	1	3	0	21	60	23	2	2	87	0	0	0	0	0	108
10:15 - 10:30	19	2	2	0	23	52	16	3	4	75	0	0	0	0	0	98
10:30 - 10:45	22	3	1	0	26	63	15	5	9	92	0	0	0	0	0	118
10:45 - 11:00	25	0	1	0	26	56	12	5	1	74	0	0	0	0	0	100
11:00 - 11:15	30	0	1	0	31	66	15	5	7	93	0	0	0	0	0	124
11:15 - 11:30	16	1	2	1	20	39	14	3	0	56	0	0	0	0	0	76
11:30 - 11:45	25	3	2	0	30	64	17	4	4	89	0	0	0	0	0	119
11:45 - 12:00	23	1	1	0	25	47	16	3	1	67	0	0	0	0	0	92
12:00 - 12:15	24	1	4	1	30	71	16	2	6	95	0	0	0	0	0	125
12:15 - 12:30	33	0	1	0	34	43	15	4	5	67	0	0	0	0	0	101
12:30 - 12:45	24	7	3	0	34	32	19	2	4	57	0	0	0	0	0	91
12:45 - 13:00	24	1	4	0	29	60	16	5	4	85	0	0	0	0	0	114
13:00 - 13:15	24	0	2	0	26	70	18	5	4	97	0	0	0	0	0	123
13:15 - 13:30	19	2	2	0	23	60	18	4	5	87	0	0	0	0	0	110
13:30 - 13:45	33	4	2	0	39	59	17	0	3	79	0	0	0	0	0	118
13:45 - 14:00	13	1	4	0	18	61	15	1	3	80	0	0	0	0	0	98
TOTAL	**532**	**39**	**48**	**2**	**621**	**1250**	**423**	**81**	**95**	**1849**	**0**	**0**	**0**	**0**	**0**	**2470**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD

DATE: PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019

UNITS: CLASSIFIED

APPROACH FROM	EAST															TOTAL
NAME																
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 - 09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 - 09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD

DATE: PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019

UNITS: CLASSIFIED

APPROACH FROM	WEST															TOTAL
NAME	GRIMSBY ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	164	16	11	3	194	0	0	0	0	0	43	1	2	0	46	240
08:15 - 08:30	110	13	8	1	132	0	0	0	0	0	55	2	0	0	57	189
08:30 - 08:45	90	7	9	2	108	0	0	0	0	0	53	1	2	0	56	164
08:45 - 09:00	106	17	9	1	133	0	0	0	0	0	52	1	1	0	54	187
09:00 - 09:15	113	10	10	1	134	0	0	0	0	0	48	0	1	0	49	183
09:15 - 09:30	93	13	14	3	123	0	0	0	0	0	48	1	3	0	52	175
09:30 - 09:45	113	10	10	2	135	0	0	0	0	0	63	1	1	0	65	200
09:45 - 10:00	110	4	4	0	118	0	0	0	0	0	38	0	4	0	42	160
10:00 - 10:15	119	5	10	0	134	0	0	0	0	0	60	2	5	0	67	201
10:15 - 10:30	111	5	4	2	122	0	0	0	0	0	56	0	1	0	57	179
10:30 - 10:45	124	13	13	5	155	0	0	0	0	0	45	1	3	0	49	204
10:45 - 11:00	127	7	6	0	140	0	0	0	0	0	55	0	4	0	59	199
11:00 - 11:15	101	5	8	2	116	0	0	0	0	0	32	1	2	0	35	151
11:15 - 11:30	116	9	11	2	138	0	0	0	0	0	55	0	0	0	55	193
11:30 - 11:45	120	8	4	1	133	0	0	0	0	0	57	2	2	0	61	194
11:45 - 12:00	108	10	13	2	133	0	0	0	0	0	37	0	3	0	40	173
12:00 - 12:15	120	11	9	4	144	0	0	0	0	0	54	0	2	0	56	200
12:15 - 12:30	110	10	5	2	127	0	0	0	0	0	49	0	3	0	52	179
12:30 - 12:45	109	6	6	0	121	0	0	0	0	0	45	1	3	0	49	170
12:45 - 13:00	94	12	13	1	120	0	0	0	0	0	46	2	1	1	50	170
13:00 - 13:15	70	10	7	2	89	0	0	0	0	0	59	3	0	0	62	151
13:15 - 13:30	76	10	7	3	96	0	0	0	0	0	54	1	1	0	56	152
13:30 - 13:45	165	6	6	3	180	0	0	0	0	0	59	0	0	0	59	239
13:45 - 14:00	99	11	7	1	118	0	0	0	0	0	52	0	0	1	53	171
TOTAL	**2668**	**228**	**204**	**43**	**3143**	**0**	**0**	**0**	**0**	**0**	**1215**	**20**	**44**	**2**	**1281**	**4424**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019

UNITS: CLASSIFIED

APPROACH FROM	NORTH															TOTAL
NAME	LEICESTER ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	3	0	2	0	5	7	0	1	0	8	31	0	2	0	33	46
08:15 - 08:30	4	0	0	0	4	9	0	0	0	9	38	0	4	0	42	55
08:30 - 08:45	1	0	3	0	4	12	0	1	0	13	33	1	0	0	34	51
08:45 - 09:00	2	0	2	0	4	7	0	1	0	8	25	0	2	0	27	39
09:00 - 09:15	1	0	1	0	2	6	1	0	0	7	31	0	1	0	32	41
09:15 - 09:30	6	0	1	0	7	11	0	0	1	12	37	0	0	0	37	56
09:30 - 09:45	3	0	0	0	3	7	0	0	0	7	32	0	0	0	32	42
09:45 - 10:00	3	0	0	0	3	14	1	1	0	16	34	0	2	0	36	55
10:00 - 10:15	6	0	1	0	7	9	0	1	0	10	41	0	2	0	43	60
10:15 - 10:30	4	0	0	0	4	11	0	0	0	11	35	0	2	0	37	52
10:30 - 10:45	3	0	2	0	5	7	1	1	0	9	30	0	6	0	36	50
10:45 - 11:00	9	0	2	0	11	11	0	1	0	12	32	0	0	0	32	55
11:00 - 11:15	2	0	1	0	3	13	0	0	0	13	33	0	2	0	35	51
11:15 - 11:30	5	0	2	0	7	12	0	3	0	15	38	0	4	0	42	64
11:30 - 11:45	2	1	2	0	5	8	0	2	0	10	31	1	2	0	34	49
11:45 - 12:00	3	0	1	0	4	8	0	0	0	8	38	0	5	0	43	55
12:00 - 12:15	3	0	0	0	3	8	0	0	1	9	58	0	4	1	63	75
12:15 - 12:30	3	0	0	0	3	7	1	0	0	8	45	0	3	0	48	59
12:30 - 12:45	5	0	3	0	8	12	0	0	0	12	31	0	1	0	32	52
12:45 - 13:00	2	0	2	0	4	14	0	0	2	16	43	0	0	0	43	63
13:00 - 13:15	1	0	2	0	3	11	0	0	1	12	52	0	0	0	52	67
13:15 - 13:30	3	1	1	0	5	8	0	0	0	8	50	0	2	0	52	65
13:30 - 13:45	2	0	2	0	4	2	0	0	0	2	30	1	2	0	33	39
13:45 - 14:00	2	0	1	0	3	3	1	1	0	5	41	0	1	0	42	50
TOTAL	**78**	**2**	**31**	**0**	**111**	**217**	**5**	**13**	**5**	**240**	**889**	**3**	**47**	**1**	**940**	**1291**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019

UNITS: CLASSIFIED

APPROACH FROM	SOUTH															TOTAL
NAME	LEICESTER ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	35	1	4	0	40	20	1	1	0	22	8	1	4	0	13	75
08:15 - 08:30	23	0	2	0	25	14	1	0	0	15	5	1	3	0	9	49
08:30 - 08:45	41	0	3	0	44	17	1	0	0	18	5	1	1	0	7	69
08:45 - 09:00	39	0	1	0	40	13	1	0	0	14	2	0	1	0	3	57
09:00 - 09:15	37	0	1	0	38	11	1	0	0	12	6	0	4	0	10	60
09:15 - 09:30	53	0	6	0	59	16	1	1	0	18	10	0	4	0	14	91
09:30 - 09:45	15	1	1	0	17	14	1	1	0	16	1	0	3	0	4	37
09:45 - 10:00	42	1	7	1	51	16	0	2	0	18	4	0	2	0	6	75
10:00 - 10:15	35	0	8	0	43	13	1	2	0	16	5	0	0	0	5	64
10:15 - 10:30	44	0	1	0	45	15	1	0	0	16	7	0	4	0	11	72
10:30 - 10:45	42	0	5	0	47	18	2	2	0	22	7	0	5	0	12	81
10:45 - 11:00	57	0	3	0	60	18	2	2	0	22	9	0	0	0	9	91
11:00 - 11:15	39	0	2	0	41	20	2	1	0	23	9	0	1	0	10	74
11:15 - 11:30	42	0	4	0	46	19	0	1	0	20	6	0	2	0	8	74
11:30 - 11:45	36	0	2	0	38	8	1	2	0	11	6	0	0	0	6	55
11:45 - 12:00	42	0	5	0	47	18	1	2	1	22	3	0	4	1	8	77
12:00 - 12:15	37	2	1	0	40	12	0	0	0	12	2	0	2	0	4	56
12:15 - 12:30	47	2	4	0	53	6	0	0	0	6	4	0	2	0	6	65
12:30 - 12:45	55	0	4	0	59	8	0	0	0	8	4	0	0	0	4	71
12:45 - 13:00	48	0	0	0	48	23	0	0	0	23	3	0	3	1	7	78
13:00 - 13:15	38	0	2	0	40	15	0	0	1	16	2	1	0	0	3	59
13:15 - 13:30	46	0	1	0	47	16	1	1	0	18	2	1	3	0	6	71
13:30 - 13:45	56	0	4	0	60	17	1	1	1	20	14	1	1	0	16	96
13:45 - 14:00	56	0	2	0	58	23	1	2	1	27	9	0	0	0	9	94
TOTAL	**1005**	**7**	**73**	**1**	**1086**	**370**	**20**	**21**	**4**	**415**	**133**	**6**	**49**	**2**	**190**	**1691**

TRAFFIC SURVEY	
CLIENT:	ARUP
SITE:	INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD
DATE:	PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019
UNITS:	CLASSIFIED

APPROACH FROM	EAST															TOTAL
NAME	GRIMSBY ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	5	0	0	0	5	90	15	10	2	117	5	0	2	0	7	129
08:15 - 08:30	1	1	1	0	3	84	11	7	1	103	0	0	1	0	1	107
08:30 - 08:45	6	0	2	0	8	99	7	4	3	113	3	0	2	0	5	126
08:45 - 09:00	3	0	3	0	6	76	13	7	2	98	1	0	1	0	2	106
09:00 - 09:15	5	0	3	0	8	78	8	7	4	97	1	0	2	0	3	108
09:15 - 09:30	3	0	3	0	6	90	14	3	2	109	2	0	3	0	5	120
09:30 - 09:45	3	0	0	0	3	79	11	9	1	100	3	0	1	0	4	107
09:45 - 10:00	7	1	0	0	8	103	13	7	1	124	6	0	1	0	7	139
10:00 - 10:15	1	0	6	0	7	109	12	8	1	130	9	0	3	0	12	149
10:15 - 10:30	3	0	2	0	5	107	16	5	1	129	6	0	4	0	10	144
10:30 - 10:45	7	0	0	0	7	151	11	14	0	176	8	0	0	0	8	191
10:45 - 11:00	6	1	0	0	7	114	14	5	1	134	2	1	4	0	7	148
11:00 - 11:15	6	0	0	0	6	120	10	10	1	141	4	0	5	0	9	156
11:15 - 11:30	8	0	3	0	11	151	10	8	2	171	6	0	3	0	9	191
11:30 - 11:45	2	0	3	0	5	140	9	7	3	159	4	0	4	0	8	172
11:45 - 12:00	8	0	0	0	8	166	8	6	3	183	5	0	1	0	6	197
12:00 - 12:15	4	1	0	0	5	189	8	12	1	210	2	0	2	1	5	220
12:15 - 12:30	6	0	4	0	10	201	13	10	2	226	6	0	1	0	7	243
12:30 - 12:45	3	1	0	0	4	136	13	8	1	158	2	0	5	0	7	169
12:45 - 13:00	9	0	0	0	9	199	5	16	1	221	1	0	0	0	1	231
13:00 - 13:15	4	1	0	0	5	190	12	2	3	207	3	0	5	0	8	220
13:15 - 13:30	1	0	1	0	2	167	15	3	3	188	10	0	2	0	12	202
13:30 - 13:45	1	1	0	0	2	199	7	3	3	212	1	1	2	0	4	218
13:45 - 14:00	3	0	0	0	3	140	9	9	2	160	2	0	3	0	5	168
TOTAL	**105**	**7**	**31**	**0**	**143**	**3178**	**264**	**180**	**44**	**3666**	**92**	**2**	**57**	**1**	**152**	**3961**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: PEAK HOUR COUNT ON SATURDAY 01 JUNE 2019

UNITS: CLASSIFIED

APPROACH FROM	WEST															TOTAL
NAME	GRIMSBY ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
08:00 - 08:15	12	0	1	0	13	195	15	8	4	222	25	0	2	0	27	262
08:15 - 08:30	15	0	0	0	15	150	11	4	0	165	26	0	3	0	29	209
08:30 - 08:45	10	0	1	0	11	142	9	7	2	160	18	0	4	0	22	193
08:45 - 09:00	9	0	1	0	10	148	17	7	1	173	26	0	3	0	29	212
09:00 - 09:15	3	1	0	0	4	136	8	5	1	150	25	0	6	0	31	185
09:15 - 09:30	11	0	3	0	14	126	16	10	3	155	29	0	2	0	31	200
09:30 - 09:45	14	2	1	0	17	147	6	6	2	161	31	0	6	0	37	215
09:45 - 10:00	12	1	0	0	13	158	6	9	0	173	32	1	2	0	35	221
10:00 - 10:15	11	2	3	0	16	146	6	8	0	160	32	0	4	0	36	212
10:15 - 10:30	6	1	1	0	8	146	5	9	3	163	37	0	1	0	38	209
10:30 - 10:45	11	3	3	0	17	151	14	6	4	175	30	0	4	0	34	226
10:45 - 11:00	10	0	3	0	13	151	8	5	0	164	43	0	2	0	45	222
11:00 - 11:15	3	1	0	0	4	141	7	6	2	156	26	0	2	0	28	188
11:15 - 11:30	6	2	0	0	8	150	7	9	2	168	22	1	3	0	26	202
11:30 - 11:45	3	2	1	0	6	149	10	3	1	163	32	0	2	0	34	203
11:45 - 12:00	9	1	0	0	10	141	9	11	1	162	22	0	0	0	22	194
12:00 - 12:15	5	0	1	0	6	151	12	9	3	175	24	0	2	0	26	207
12:15 - 12:30	4	0	0	0	4	141	11	4	1	157	29	0	1	0	30	191
12:30 - 12:45	8	0	0	0	8	132	7	7	0	146	20	0	4	0	24	178
12:45 - 13:00	10	0	0	0	10	119	10	5	1	135	22	0	1	0	23	168
13:00 - 13:15	11	0	2	0	13	113	16	6	2	137	24	1	2	0	27	177
13:15 - 13:30	16	0	3	0	19	139	8	5	3	155	32	1	2	0	35	209
13:30 - 13:45	11	0	3	0	14	168	10	2	1	181	30	0	1	0	31	226
13:45 - 14:00	6	0	1	0	7	142	5	4	2	153	24	0	1	0	25	185
TOTAL	**216**	**16**	**28**	**0**	**260**	**3482**	**233**	**155**	**39**	**3909**	**661**	**4**	**60**	**0**	**725**	**4894**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	NORTH															TOTAL
NAME	SOUTH COAST ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	0	0	0	0	0	46	56	5	6	113	111	12	11	2	136	249
06:15 - 06:30	0	0	0	0	0	48	82	1	1	132	57	10	2	5	74	206
06:30 - 06:45	0	0	0	0	0	41	64	3	4	112	60	21	8	4	93	205
06:45 - 07:00	0	0	0	0	0	61	55	8	6	130	65	27	12	2	106	236
07:00 - 07:15	0	0	0	0	0	71	58	4	5	138	71	26	10	4	111	249
07:15 - 07:30	0	0	0	0	0	77	59	5	5	146	89	17	9	2	117	263
07:30 - 07:45	0	0	0	0	0	94	43	3	12	152	91	14	9	3	117	269
07:45 - 08:00	0	0	0	0	0	72	34	3	8	117	78	19	20	4	121	238
08:00 - 08:15	0	0	0	0	0	60	37	5	1	103	81	8	22	2	113	216
08:15 - 08:30	0	0	0	0	0	52	23	9	3	87	77	11	20	4	112	199
08:30 - 08:45	0	0	0	0	0	48	32	6	3	89	105	14	24	1	144	233
08:45 - 09:00	0	0	0	0	0	46	22	11	1	80	80	7	12	5	104	184
09:00 - 09:15	0	0	0	0	0	58	27	13	1	99	82	6	23	2	113	212
09:15 - 09:30	0	0	0	0	0	31	26	9	5	71	112	11	20	1	144	215
09:30 - 09:45	0	0	0	0	0	44	14	7	3	68	110	6	31	2	149	217
09:45 - 10:00	0	0	0	0	0	52	20	4	1	77	116	8	24	0	148	225
10:00 - 10:15	0	0	0	0	0	37	21	14	4	76	107	6	21	3	137	213
10:15 - 10:30	0	0	0	0	0	52	19	6	1	78	98	7	14	0	119	197
10:30 - 10:45	0	0	0	0	0	57	20	9	4	90	132	14	19	2	167	257
10:45 - 11:00	0	0	0	0	0	56	10	10	2	78	138	4	13	2	157	235
11:00 - 11:15	0	0	0	0	0	80	16	8	3	107	168	4	31	2	205	312
11:15 - 11:30	0	0	0	0	0	71	25	11	2	109	131	9	18	3	161	270
11:30 - 11:45	0	0	0	0	0	51	13	9	3	76	148	11	30	1	190	266
11:45 - 12:00	0	0	0	0	0	38	17	6	11	72	163	6	17	2	188	260
12:00 - 12:15	0	0	0	0	0	59	18	10	3	90	154	8	18	3	183	273
12:15 - 12:30	0	0	0	0	0	73	19	14	1	107	126	5	28	3	162	269
12:30 - 12:45	0	0	0	0	0	56	17	9	8	90	195	18	33	4	250	340
12:45 - 13:00	0	0	0	0	0	73	27	8	2	110	101	4	19	2	126	236
13:00 - 13:15	0	0	0	0	0	80	18	10	2	110	133	4	11	2	150	260
13:15 - 13:30	0	0	0	0	0	62	27	11	6	106	155	8	18	0	181	287
13:30 - 13:45	0	0	0	0	0	63	22	5	3	93	121	6	17	4	148	241
13:45 - 14:00	0	0	0	0	0	61	37	10	8	116	172	10	24	2	208	324
14:00 - 14:15	0	0	0	0	0	90	32	7	2	131	258	15	12	2	287	418
14:15 - 14:30	0	0	0	0	0	102	25	5	5	137	166	13	17	2	198	335
14:30 - 14:45	0	0	0	0	0	90	31	10	3	134	212	10	21	2	245	379
14:45 - 15:00	0	0	0	0	0	111	34	5	9	159	155	10	18	5	188	347
15:00 - 15:15	0	0	0	0	0	90	30	7	1	128	233	10	21	6	270	398
15:15 - 15:30	0	0	0	0	0	91	28	10	3	132	245	12	25	3	285	417
15:30 - 15:45	0	0	0	0	0	92	33	5	5	135	274	22	25	6	327	462
15:45 - 16:00	0	0	0	0	0	79	34	4	6	123	172	10	15	0	197	320
16:00 - 16:15	0	0	0	0	0	83	35	6	6	130	307	17	23	6	353	483
16:15 - 16:30	0	0	0	0	0	70	24	8	5	107	301	23	14	3	341	448
16:30 - 16:45	0	0	0	0	0	86	30	5	6	127	331	16	15	6	368	495
16:45 - 17:00	0	0	0	0	0	68	30	4	10	112	295	15	17	12	339	451
17:00 - 17:15	0	0	0	0	0	81	38	7	8	134	309	24	9	6	348	482
17:15 - 17:30	0	0	0	0	0	77	38	2	5	122	255	18	10	5	288	410
17:30 - 17:45	0	0	0	0	0	78	25	6	2	111	198	23	12	5	238	349
17:45 - 18:00	0	0	0	0	0	62	26	1	5	94	176	20	10	7	213	307
TOTAL	**0**	**0**	**0**	**0**	**0**	**3220**	**1471**	**338**	**209**	**5238**	**7514**	**599**	**852**	**154**	**9119**	**14357**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	SOUTH															TOTAL
NAME	SOUTH COAST ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	20	1	4	0	25	47	39	1	17	104	0	0	0	0	0	129
06:15 - 06:30	19	8	4	1	32	64	55	0	9	128	0	0	0	0	0	160
06:30 - 06:45	19	5	0	0	24	65	40	1	8	114	0	0	0	0	0	138
06:45 - 07:00	13	8	2	1	24	87	51	4	6	148	0	0	0	0	0	172
07:00 - 07:15	19	5	0	3	27	116	43	4	6	169	0	0	0	0	0	196
07:15 - 07:30	19	2	1	0	22	76	29	5	3	113	0	0	0	0	0	135
07:30 - 07:45	20	3	3	2	28	64	31	3	7	105	0	0	0	0	0	133
07:45 - 08:00	16	4	1	0	21	60	19	1	4	84	0	0	0	0	0	105
08:00 - 08:15	15	1	3	0	19	62	20	4	4	90	0	0	0	0	0	109
08:15 - 08:30	11	1	3	0	15	49	26	3	3	81	0	0	0	0	0	96
08:30 - 08:45	14	2	3	0	19	45	22	3	3	73	0	0	0	0	0	92
08:45 - 09:00	19	1	5	1	26	52	16	5	4	77	0	0	0	0	0	103
09:00 - 09:15	25	1	5	0	31	49	19	7	6	81	0	0	0	0	0	112
09:15 - 09:30	16	0	2	0	18	54	13	8	4	79	0	0	0	0	0	97
09:30 - 09:45	21	5	3	0	29	46	13	3	5	67	0	0	0	0	0	96
09:45 - 10:00	18	0	2	0	20	60	12	0	4	76	0	0	0	0	0	96
10:00 - 10:15	16	6	6	0	28	23	11	9	4	47	0	0	0	0	0	75
10:15 - 10:30	27	1	6	0	34	98	29	18	7	152	0	0	0	0	0	186
10:30 - 10:45	21	2	2	0	25	44	18	7	1	70	0	0	0	0	0	95
10:45 - 11:00	26	1	4	0	31	49	14	3	7	73	0	0	0	0	0	104
11:00 - 11:15	22	0	6	0	28	68	15	5	2	90	0	0	0	0	0	118
11:15 - 11:30	25	1	3	0	29	59	15	10	6	90	0	0	0	0	0	119
11:30 - 11:45	27	0	5	0	32	45	21	10	2	78	0	0	0	0	0	110
11:45 - 12:00	17	2	3	0	22	40	16	3	2	61	0	0	0	0	0	83
12:00 - 12:15	27	1	6	0	34	98	14	14	3	129	0	0	0	0	0	163
12:15 - 12:30	42	0	5	0	47	52	16	8	5	81	0	0	0	0	0	128
12:30 - 12:45	17	2	4	0	23	68	18	10	5	101	0	0	0	0	0	124
12:45 - 13:00	48	1	2	0	51	43	15	7	2	67	0	0	0	0	0	118
13:00 - 13:15	28	0	8	0	36	63	15	5	2	85	0	0	0	0	0	121
13:15 - 13:30	33	1	7	2	43	63	21	7	2	93	0	0	0	0	0	136
13:30 - 13:45	34	1	0	0	35	50	20	6	1	77	0	0	0	0	0	112
13:45 - 14:00	25	0	7	0	32	78	20	5	2	105	0	0	0	0	0	137
14:00 - 14:15	52	1	4	0	57	93	20	10	2	125	0	0	0	0	0	182
14:15 - 14:30	25	1	3	0	29	61	13	7	0	81	0	0	0	0	0	110
14:30 - 14:45	50	1	5	1	57	102	17	8	2	129	0	0	0	0	0	186
14:45 - 15:00	27	0	5	0	32	61	18	7	1	87	0	0	0	0	0	119
15:00 - 15:15	28	0	5	0	33	78	32	10	5	125	0	0	0	0	0	158
15:15 - 15:30	50	2	6	0	58	77	14	7	1	99	0	0	0	0	0	157
15:30 - 15:45	54	2	4	1	61	76	23	3	3	105	0	0	0	0	0	166
15:45 - 16:00	19	2	3	0	24	80	33	4	4	121	0	0	0	0	0	145
16:00 - 16:15	49	1	5	0	55	68	20	5	6	99	0	0	0	0	0	154
16:15 - 16:30	35	1	8	1	45	68	31	5	4	108	0	0	0	0	0	153
16:30 - 16:45	18	0	1	0	19	55	20	5	2	82	0	0	0	0	0	101
16:45 - 17:00	39	0	5	0	44	48	20	4	2	74	0	0	0	0	0	118
17:00 - 17:15	41	1	1	0	43	52	31	6	8	97	0	0	0	0	0	140
17:15 - 17:30	34	1	6	0	41	60	29	1	4	94	0	0	0	0	0	135
17:30 - 17:45	35	1	3	1	40	37	21	3	1	62	0	0	0	0	0	102
17:45 - 18:00	27	1	2	0	30	37	23	3	1	64	0	0	0	0	0	94
TOTAL	**1302**	**81**	**181**	**14**	**1578**	**2990**	**1091**	**267**	**192**	**4540**	**0**	**0**	**0**	**0**	**0**	**6118**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF SOUTH COAST ROAD AND GRIMSBY ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	WEST															TOTAL
NAME	GRIMSBY ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	189	19	5	6	219	0	0	0	0	0	32	1	0	1	34	253
06:15 - 06:30	291	31	9	13	344	0	0	0	0	0	46	1	2	0	49	393
06:30 - 06:45	268	22	6	7	303	0	0	0	0	0	29	2	2	0	33	336
06:45 - 07:00	318	12	13	3	346	0	0	0	0	0	53	2	8	0	63	409
07:00 - 07:15	298	21	10	10	339	0	0	0	0	0	69	2	1	0	72	411
07:15 - 07:30	363	24	11	10	408	0	0	0	0	0	76	1	2	0	79	487
07:30 - 07:45	387	17	20	7	431	0	0	0	0	0	92	2	5	0	99	530
07:45 - 08:00	298	17	15	5	335	0	0	0	0	0	74	2	3	1	80	415
08:00 - 08:15	231	17	19	2	269	0	0	0	0	0	62	3	7	1	73	342
08:15 - 08:30	164	12	16	2	194	0	0	0	0	0	42	0	1	0	43	237
08:30 - 08:45	212	8	24	1	245	0	0	0	0	0	39	2	3	0	44	289
08:45 - 09:00	128	10	13	1	152	0	0	0	0	0	26	1	2	0	29	181
09:00 - 09:15	147	8	20	1	176	0	0	0	0	0	40	1	6	0	47	223
09:15 - 09:30	133	8	22	2	165	0	0	0	0	0	30	1	7	0	38	203
09:30 - 09:45	119	8	22	1	150	0	0	0	0	0	40	0	2	0	42	192
09:45 - 10:00	124	19	21	2	166	0	0	0	0	0	41	2	4	0	47	213
10:00 - 10:15	177	9	16	3	205	0	0	0	0	0	33	0	5	0	38	243
10:15 - 10:30	119	9	24	2	154	0	0	0	0	0	32	1	4	0	37	191
10:30 - 10:45	147	10	18	1	176	0	0	0	0	0	51	1	10	0	62	238
10:45 - 11:00	130	9	20	3	162	0	0	0	0	0	37	2	5	0	44	206
11:00 - 11:15	147	9	21	2	179	0	0	0	0	0	52	1	3	0	56	235
11:15 - 11:30	147	8	25	1	181	0	0	0	0	0	33	1	12	0	46	227
11:30 - 11:45	153	6	22	1	182	0	0	0	0	0	40	1	1	0	42	224
11:45 - 12:00	142	11	20	3	176	0	0	0	0	0	20	0	3	0	23	199
12:00 - 12:15	108	12	25	2	147	0	0	0	0	0	48	0	2	0	50	197
12:15 - 12:30	120	6	19	0	145	0	0	0	0	0	54	2	7	0	63	208
12:30 - 12:45	143	12	23	2	180	0	0	0	0	0	42	0	4	0	46	226
12:45 - 13:00	134	3	13	1	151	0	0	0	0	0	56	0	5	2	63	214
13:00 - 13:15	144	11	17	5	177	0	0	0	0	0	49	0	4	0	53	230
13:15 - 13:30	124	8	14	0	146	0	0	0	0	0	65	2	4	1	72	218
13:30 - 13:45	136	5	29	3	173	0	0	0	0	0	60	1	7	0	68	241
13:45 - 14:00	148	11	17	3	179	0	0	0	0	0	76	4	4	1	85	264
14:00 - 14:15	104	16	19	2	141	0	0	0	0	0	63	5	5	0	73	214
14:15 - 14:30	117	6	18	6	147	0	0	0	0	0	59	2	5	0	66	213
14:30 - 14:45	138	11	16	1	166	0	0	0	0	0	61	0	1	1	63	229
14:45 - 15:00	142	13	18	3	176	0	0	0	0	0	57	1	8	1	67	243
15:00 - 15:15	117	11	14	0	142	0	0	0	0	0	57	0	6	0	63	205
15:15 - 15:30	99	8	14	1	122	0	0	0	0	0	49	1	5	0	55	177
15:30 - 15:45	129	17	16	2	164	0	0	0	0	0	58	0	4	0	62	226
15:45 - 16:00	90	7	16	4	117	0	0	0	0	0	81	0	5	0	86	203
16:00 - 16:15	125	12	14	3	154	0	0	0	0	0	57	3	2	0	62	216
16:15 - 16:30	110	19	9	5	143	0	0	0	0	0	59	1	6	0	66	209
16:30 - 16:45	81	16	13	2	112	0	0	0	0	0	74	1	1	0	76	188
16:45 - 17:00	74	24	6	5	109	0	0	0	0	0	42	1	1	0	44	153
17:00 - 17:15	77	17	8	5	107	0	0	0	0	0	65	0	1	1	67	174
17:15 - 17:30	88	14	14	5	121	0	0	0	0	0	57	1	3	0	61	182
17:30 - 17:45	85	22	3	3	113	0	0	0	0	0	52	1	1	1	55	168
17:45 - 18:00	76	18	8	1	103	0	0	0	0	0	47	1	1	0	49	152
TOTAL	**7541**	**623**	**775**	**153**	**9092**	**0**	**0**	**0**	**0**	**0**	**2477**	**57**	**190**	**11**	**2735**	**11827**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	NORTH															TOTAL
NAME	LEICESTER ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	25	2	1	0	28	2	10	1	1	14	46	0	2	0	48	90
06:15 - 06:30	4	1	0	0	5	8	0	0	0	8	64	0	2	0	66	79
06:30 - 06:45	4	0	2	0	6	21	0	0	6	27	119	0	3	1	123	156
06:45 - 07:00	5	0	2	0	7	11	0	0	0	11	92	0	3	0	95	113
07:00 - 07:15	8	0	0	0	8	15	0	1	1	17	91	0	3	0	94	119
07:15 - 07:30	8	0	2	0	10	30	2	1	1	34	75	1	5	0	81	125
07:30 - 07:45	6	0	2	0	8	18	0	1	1	20	104	0	6	1	111	139
07:45 - 08:00	3	0	0	0	3	14	1	1	0	16	46	0	0	0	46	65
08:00 - 08:15	5	0	6	0	11	13	0	0	0	13	53	1	3	0	57	81
08:15 - 08:30	12	0	1	0	13	14	0	1	0	15	37	0	3	0	40	68
08:30 - 08:45	3	0	1	0	4	5	0	0	0	5	37	0	3	0	40	49
08:45 - 09:00	6	0	3	0	9	9	0	1	0	10	37	0	4	0	41	60
09:00 - 09:15	5	0	1	0	6	15	0	2	0	17	29	0	5	0	34	57
09:15 - 09:30	6	0	2	0	8	9	0	2	0	11	35	0	2	0	37	56
09:30 - 09:45	5	0	3	0	8	10	0	1	0	11	29	0	2	0	31	50
09:45 - 10:00	3	0	1	0	4	9	0	2	0	11	28	1	5	0	34	49
10:00 - 10:15	4	0	3	0	7	7	0	1	0	8	17	0	1	0	18	33
10:15 - 10:30	5	0	5	0	10	14	0	4	0	18	33	1	3	0	37	65
10:30 - 10:45	6	0	1	0	7	15	0	5	0	20	42	0	8	0	50	77
10:45 - 11:00	6	0	1	0	7	6	0	2	0	8	26	0	1	0	27	42
11:00 - 11:15	3	0	1	0	4	13	0	2	0	15	36	0	10	0	46	65
11:15 - 11:30	9	0	1	0	10	11	0	1	1	13	36	0	2	0	38	61
11:30 - 11:45	5	0	1	0	6	5	0	1	0	6	24	0	1	0	25	37
11:45 - 12:00	3	0	1	0	4	11	0	1	0	12	35	0	3	0	38	54
12:00 - 12:15	1	0	5	0	6	9	1	3	0	13	49	0	1	0	50	69
12:15 - 12:30	1	0	2	0	3	9	0	0	0	9	36	1	3	0	40	52
12:30 - 12:45	1	0	3	0	4	12	0	1	0	13	35	0	1	0	36	53
12:45 - 13:00	11	0	3	0	14	14	0	0	0	14	43	0	4	0	47	75
13:00 - 13:15	6	0	1	0	7	13	0	0	0	13	65	0	9	0	74	94
13:15 - 13:30	6	0	2	0	8	13	0	1	1	15	49	0	3	0	52	75
13:30 - 13:45	6	0	5	0	11	27	0	0	0	27	92	0	2	0	94	132
13:45 - 14:00	17	0	5	0	22	23	0	2	1	26	77	5	4	0	86	134
14:00 - 14:15	4	0	3	0	7	21	0	1	0	22	66	1	5	1	73	102
14:15 - 14:30	10	0	3	0	13	19	0	0	0	19	59	2	4	0	65	97
14:30 - 14:45	4	0	3	0	7	14	2	1	0	17	65	0	4	0	69	93
14:45 - 15:00	6	0	5	0	11	14	0	4	1	19	54	0	3	0	57	87
15:00 - 15:15	6	0	1	0	7	10	1	0	0	11	77	1	3	1	82	100
15:15 - 15:30	6	0	0	0	6	16	1	1	1	19	69	2	3	0	74	99
15:30 - 15:45	7	0	0	0	7	15	0	1	1	17	73	0	7	0	80	104
15:45 - 16:00	8	0	1	0	9	9	1	1	0	11	80	0	2	1	83	103
16:00 - 16:15	9	0	3	0	12	26	0	1	0	27	110	0	8	1	119	158
16:15 - 16:30	4	0	3	0	7	8	0	3	0	11	57	0	5	0	62	80
16:30 - 16:45	4	0	4	0	8	22	0	1	1	24	139	3	2	0	144	176
16:45 - 17:00	1	0	0	0	1	8	0	1	0	9	58	1	4	0	63	73
17:00 - 17:15	2	0	0	0	2	22	0	1	0	23	87	1	1	0	89	114
17:15 - 17:30	1	0	1	0	2	18	0	0	0	18	53	2	1	0	56	76
17:30 - 17:45	3	1	1	0	5	21	1	1	0	23	81	0	3	0	84	112
17:45 - 18:00	2	0	0	0	2	16	1	1	1	19	40	0	3	0	43	64
TOTAL	**275**	**4**	**95**	**0**	**374**	**664**	**21**	**56**	**18**	**759**	**2785**	**23**	**165**	**6**	**2979**	**4112**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	SOUTH															TOTAL
NAME	LEICESTER ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	7	0	0	0	7	5	2	0	0	7	4	2	0	0	6	20
06:15 - 06:30	27	0	1	0	28	19	0	1	2	22	7	0	2	0	9	59
06:30 - 06:45	44	0	0	2	46	24	1	0	1	26	10	2	1	1	14	86
06:45 - 07:00	44	0	3	1	48	22	2	2	1	27	4	0	4	0	8	83
07:00 - 07:15	62	0	4	1	67	42	3	1	2	48	5	1	1	4	11	126
07:15 - 07:30	74	0	4	1	79	25	0	0	2	27	5	0	1	0	6	112
07:30 - 07:45	45	0	4	0	49	30	1	1	2	34	7	1	1	1	10	93
07:45 - 08:00	34	0	6	0	40	24	0	1	0	25	4	0	4	0	8	73
08:00 - 08:15	32	1	5	0	38	16	0	2	0	18	2	0	3	0	5	61
08:15 - 08:30	39	0	5	1	45	13	0	2	0	15	6	0	1	0	7	67
08:30 - 08:45	31	0	9	1	41	11	1	2	0	14	4	0	5	0	9	64
08:45 - 09:00	45	0	15	5	65	15	0	2	0	17	8	1	0	0	9	91
09:00 - 09:15	31	0	7	0	38	16	1	1	0	18	5	0	2	0	7	63
09:15 - 09:30	40	1	10	0	51	14	0	0	0	14	5	0	5	0	10	75
09:30 - 09:45	42	0	10	0	52	20	0	2	1	23	3	0	3	0	6	81
09:45 - 10:00	48	0	4	0	52	17	0	2	0	19	10	0	5	0	15	86
10:00 - 10:15	43	0	8	0	51	12	0	1	0	13	9	0	1	0	10	74
10:15 - 10:30	40	0	8	2	50	16	0	1	0	17	12	0	2	0	14	81
10:30 - 10:45	41	0	8	0	49	19	0	4	0	23	10	0	1	1	12	84
10:45 - 11:00	42	0	7	0	49	11	0	1	0	12	8	0	1	1	10	71
11:00 - 11:15	53	0	3	0	56	12	3	0	0	15	14	1	4	0	19	90
11:15 - 11:30	44	0	4	0	48	21	2	1	0	24	9	1	6	0	16	88
11:30 - 11:45	38	1	9	0	48	14	0	2	0	16	10	1	1	0	12	76
11:45 - 12:00	41	1	13	0	55	17	0	0	0	17	13	1	3	0	17	89
12:00 - 12:15	50	0	11	0	61	29	0	2	0	31	7	1	6	0	14	106
12:15 - 12:30	56	1	7	0	64	17	1	1	0	19	12	1	1	0	14	97
12:30 - 12:45	44	1	6	0	51	23	1	0	0	24	14	1	4	0	19	94
12:45 - 13:00	42	0	6	0	48	19	0	0	0	19	5	0	2	0	7	74
13:00 - 13:15	47	0	6	0	53	17	0	0	0	17	10	1	5	0	16	86
13:15 - 13:30	63	0	10	5	78	29	0	1	1	31	8	1	2	0	11	120
13:30 - 13:45	62	0	9	2	73	24	1	0	1	26	14	1	4	0	19	118
13:45 - 14:00	44	0	7	3	54	23	1	0	1	25	10	0	1	0	11	90
14:00 - 14:15	78	0	9	0	87	19	0	2	0	21	6	1	0	0	7	115
14:15 - 14:30	60	0	20	3	83	23	0	7	3	33	6	0	0	0	6	122
14:30 - 14:45	126	0	12	1	139	22	2	0	0	24	13	0	2	0	15	178
14:45 - 15:00	89	0	5	0	94	28	1	3	0	32	11	0	3	0	14	140
15:00 - 15:15	77	1	5	1	84	22	1	1	1	25	5	0	2	0	7	116
15:15 - 15:30	67	1	8	1	77	21	1	1	1	24	4	0	0	0	4	105
15:30 - 15:45	93	0	8	1	102	23	1	0	1	25	15	0	4	0	19	146
15:45 - 16:00	77	0	10	1	88	27	0	1	1	29	9	1	1	0	11	128
16:00 - 16:15	120	0	4	1	125	33	1	5	1	40	7	1	4	0	12	177
16:15 - 16:30	101	0	4	0	105	20	1	2	0	23	5	1	2	0	8	136
16:30 - 16:45	101	1	10	0	112	26	3	3	0	32	7	0	2	0	9	153
16:45 - 17:00	75	1	1	0	77	12	3	0	1	16	6	0	0	0	6	99
17:00 - 17:15	66	1	4	0	71	14	0	1	1	16	4	0	0	0	4	91
17:15 - 17:30	74	1	1	0	76	26	0	0	0	26	17	0	3	0	20	122
17:30 - 17:45	62	1	3	0	66	19	1	1	0	21	4	0	0	0	4	91
17:45 - 18:00	58	2	2	0	62	13	1	0	0	14	2	0	0	0	2	78
TOTAL	**2719**	**15**	**315**	**33**	**3082**	**964**	**36**	**60**	**24**	**1084**	**375**	**21**	**105**	**8**	**509**	**4675**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	EAST															TOTAL
NAME	GRIMSBY ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	7	2	2	0	11	124	14	7	0	145	0	0	1	0	1	157
06:15 - 06:30	6	6	1	0	13	131	13	4	6	154	5	0	0	0	5	172
06:30 - 06:45	9	9	1	1	20	105	21	7	5	138	8	0	2	0	10	168
06:45 - 07:00	7	6	2	0	15	70	20	11	1	102	1	1	2	0	4	121
07:00 - 07:15	7	2	2	0	11	148	25	4	5	182	4	1	2	0	7	200
07:15 - 07:30	8	3	1	0	12	47	18	11	3	79	5	0	2	0	7	98
07:30 - 07:45	6	4	2	1	13	120	15	11	3	149	2	0	1	0	3	165
07:45 - 08:00	8	1	3	0	12	87	20	14	3	124	2	0	2	0	4	140
08:00 - 08:15	4	1	4	0	9	97	11	17	3	128	5	0	2	0	7	144
08:15 - 08:30	10	0	4	0	14	83	12	21	4	120	0	0	1	0	1	135
08:30 - 08:45	4	0	4	0	8	98	11	12	0	121	3	0	2	0	5	134
08:45 - 09:00	5	0	3	0	8	88	7	18	6	119	2	0	2	0	4	131
09:00 - 09:15	7	0	3	0	10	94	5	23	4	126	1	0	1	0	2	138
09:15 - 09:30	6	2	1	0	9	119	6	20	0	145	3	0	2	0	5	159
09:30 - 09:45	6	1	2	0	9	127	5	25	3	160	1	0	2	0	3	172
09:45 - 10:00	11	1	3	0	15	130	4	32	1	167	0	0	0	0	0	182
10:00 - 10:15	7	0	2	0	9	113	3	16	2	134	2	0	2	0	4	147
10:15 - 10:30	2	0	0	0	2	104	8	18	0	130	11	0	3	0	14	146
10:30 - 10:45	2	3	0	0	5	128	10	15	2	155	4	0	4	0	8	168
10:45 - 11:00	6	2	0	0	8	198	9	14	3	224	3	0	3	0	6	238
11:00 - 11:15	9	1	2	0	12	170	2	28	3	203	5	0	2	0	7	222
11:15 - 11:30	10	0	1	0	11	191	11	19	1	222	4	0	4	0	8	241
11:30 - 11:45	1	1	0	0	2	143	8	28	1	180	0	0	2	0	2	184
11:45 - 12:00	4	1	2	0	7	185	7	18	1	211	3	0	3	0	6	224
12:00 - 12:15	15	1	1	0	17	179	4	17	1	201	4	1	0	0	5	223
12:15 - 12:30	7	1	4	0	12	218	4	39	5	266	5	0	0	0	5	283
12:30 - 12:45	4	0	2	0	6	177	12	13	3	205	2	0	0	0	2	213
12:45 - 13:00	7	2	2	0	11	159	9	28	3	199	3	0	0	0	3	213
13:00 - 13:15	7	1	1	0	9	167	4	22	3	196	2	0	2	0	4	209
13:15 - 13:30	14	1	1	0	16	196	10	22	3	231	2	0	2	0	4	251
13:30 - 13:45	9	0	3	0	12	148	6	18	4	176	0	0	2	0	2	190
13:45 - 14:00	6	0	2	0	8	182	9	17	2	210	2	0	3	0	5	223
14:00 - 14:15	7	1	0	0	8	305	14	16	1	336	4	0	0	0	4	348
14:15 - 14:30	15	2	0	0	17	199	14	18	1	232	5	0	2	0	7	256
14:30 - 14:45	3	0	4	0	7	267	11	12	4	294	8	1	5	0	14	315
14:45 - 15:00	3	0	2	0	5	204	10	24	5	243	4	0	2	0	6	254
15:00 - 15:15	7	0	0	0	7	270	8	25	4	307	7	0	3	0	10	324
15:15 - 15:30	3	1	5	0	9	299	8	21	3	331	5	1	2	0	8	348
15:30 - 15:45	6	2	2	0	10	324	18	28	5	375	4	0	1	0	5	390
15:45 - 16:00	5	1	0	0	6	216	18	20	2	256	6	0	1	0	7	269
16:00 - 16:15	7	0	0	0	7	372	17	21	5	415	3	0	6	0	9	431
16:15 - 16:30	3	0	2	0	5	346	19	20	3	388	2	0	1	0	3	396
16:30 - 16:45	7	0	0	0	7	356	18	12	7	393	2	0	4	0	6	406
16:45 - 17:00	6	0	3	0	9	345	12	3	10	370	0	0	3	0	3	382
17:00 - 17:15	4	1	1	0	6	360	28	20	7	415	1	0	4	0	5	426
17:15 - 17:30	8	0	0	0	8	262	19	9	3	293	0	1	4	0	5	306
17:30 - 17:45	6	3	0	0	9	264	22	11	6	303	1	0	3	0	4	316
17:45 - 18:00	6	2	1	0	9	217	19	8	7	251	1	0	1	0	2	262
TOTAL	**317**	**65**	**81**	**2**	**465**	**8932**	**578**	**837**	**157**	**10504**	**147**	**6**	**98**	**0**	**251**	**11220**

TRAFFIC SURVEY

CLIENT: ARUP

SITE: INTERSECTION OF GRIMSBY ROAD AND LEICESTER ROAD

DATE: 12 HOUR COUNT ON FRIDAY 31 MAY 2019

UNITS: CLASSIFIED

APPROACH FROM	WEST															TOTAL
NAME	GRIMSBY ROAD															
MOVEMENT	LEFT TURN					STRAIGHT					RIGHT TURN					ALL
TIME	C	T	H	B	TOTAL	C	T	H	B	TOTAL	C	T	H	B	TOTAL	MOVEMENTS
06:00 - 06:15	21	1	1	0	23	188	21	3	5	217	60	2	4	2	68	308
06:15 - 06:30	21	1	0	0	22	309	31	6	13	359	92	0	1	2	95	476
06:30 - 06:45	41	2	0	0	43	336	23	10	7	376	69	0	4	0	73	492
06:45 - 07:00	37	0	2	0	39	358	13	12	4	387	56	0	1	0	57	483
07:00 - 07:15	63	0	4	0	67	369	24	8	10	411	86	0	5	0	91	569
07:15 - 07:30	59	1	2	0	62	407	19	9	8	443	80	0	2	0	82	587
07:30 - 07:45	59	1	4	0	64	451	18	18	6	493	65	0	2	1	68	625
07:45 - 08:00	54	1	3	0	58	349	19	8	4	380	58	0	3	0	61	499
08:00 - 08:15	52	0	2	0	54	293	12	20	5	330	52	0	4	3	59	443
08:15 - 08:30	35	0	5	0	40	189	11	14	2	216	34	0	9	0	43	299
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08:45 - 09:00	21	0	3	0	24	191	11	14	1	217	27	0	9	0	36	277
09:00 - 09:15	21	1	2	0	24	158	9	21	2	190	25	0	9	1	35	249
09:15 - 09:30	15	0	1	0	16	159	9	21	2	191	37	1	7	0	45	252
09:30 - 09:45	9	1	4	0	14	136	5	16	1	158	24	0	8	0	32	204
09:45 - 10:00	17	0	3	0	20	148	13	18	2	181	28	0	4	0	32	233
10:00 - 10:15	15	1	5	0	21	187	8	13	3	211	27	0	6	0	33	265
10:15 - 10:30	18	1	6	0	25	142	11	24	2	179	32	1	13	0	46	250
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11:00 - 11:15	20	1	4	0	25	134	10	16	2	162	17	0	2	0	19	206
11:15 - 11:30	15	2	4	0	21	165	9	32	1	207	23	0	7	0	30	258
11:30 - 11:45	24	0	5	1	30	139	7	22	2	170	22	1	8	0	31	231
11:45 - 12:00	10	0	6	0	16	128	9	17	2	156	24	0	4	0	28	200
12:00 - 12:15	16	2	5	0	23	133	12	18	1	164	20	1	5	0	26	213
12:15 - 12:30	19	0	5	0	24	169	11	22	0	202	22	0	12	0	34	260
12:30 - 12:45	22	1	5	0	28	145	6	13	1	165	21	0	5	0	26	219
12:45 - 13:00	14	1	4	0	19	158	4	16	3	181	28	0	10	0	38	238
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13:15 - 13:30	25	0	7	0	32	144	7	15	1	167	30	0	10	3	43	242
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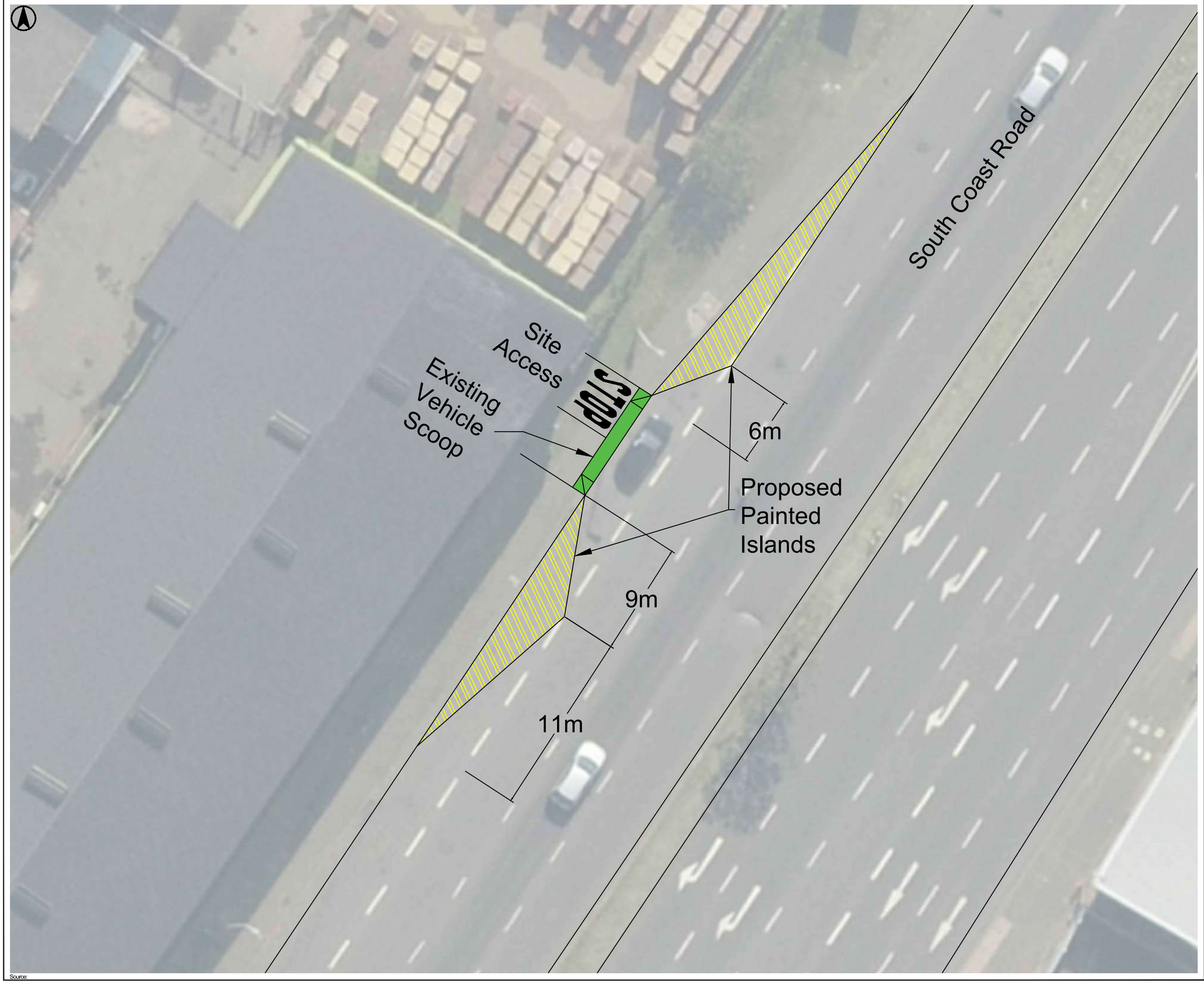
15:30 - 15:45	13	0	4	0	17	155	17	8	2	182	20	0	8	0	28	227
15:45 - 16:00	18	0	4	0	22	152	12	15	4	183	42	0	1	0	43	248
16:00 - 16:15	13	0	5	0	18	147	14	14	2	177	21	0	2	0	23	218
16:15 - 16:30	15	0	1	0	16	149	20	9	5	183	33	1	2	0	36	235
16:30 - 16:45	24	1	5	0	30	142	21	7	2	172	36	0	2	0	38	240
16:45 - 17:00	18	0	2	0	20	113	23	7	5	148	31	0	1	1	33	201
17:00 - 17:15	18	0	0	0	18	131	17	6	3	157	36	0	5	1	42	217
17:15 - 17:30	22	0	0	0	22	117	14	12	5	148	7	0	0	0	7	177
17:30 - 17:45	15	0	0	1	16	135	28	4	5	172	62	1	1	0	64	252
17:45 - 18:00	12	0	0	0	12	114	15	6	1	136	45	0	0	0	45	193
TOTAL	**1092**	**24**	**148**	**2**	**1266**	**8993**	**652**	**716**	**154**	**10515**	**1774**	**10**	**241**	**18**	**2043**	**13824**

Appendix D

Zoning Information (refer to town planning report)

Appendix E

Traffic Road Layout (TRL)



Source:

Issue	Date	By	Chkd	Appd
01	16-10-2019	KM	MK	MK

ARUP

Arup Transport Planning
167 Florida Road, Morningside, Durban, South Africa
Postnet Suite No 25, Private Bag X504, Northway, 4065
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www.arup.com

Client

Mayfair Home

Job Title

Grimsby Road PFS

Drawing Title

Layby Marking

Job No	Drawing Status
264682	**For Information**

Drawing No	Issue
000001	**01**

Appendix F

TIA Electronic Copy & Sidra Intersection 8 Files (on request)

Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Major Hazard Installation Risk Assessment

labour
Department:
Labour
REPUBLIC OF SOUTH AFRICA
Approved Inspection Authority # CI MHI 0015

sanas
Inspection Body

MHI RISK ENGINEERS (PTY) LTD K2012067890

MAJOR HAZARD INSTALLATION RISK ASSESSMENT FOR THE PROPOSED PETROL STATION AT 2GRIMSBY ROAD,MOBENI,DURBAN

FINAL REPORT

Author	Mr R Moothusamy
Risk Assessor	Mr R Moothusamy
Date of site assessment	17 September 2019
Date of report issue	4 October 2019
Type of risk assessment	New Petrol Station
Report Number	02-212019
Email	terrence@mhiriskengineers.com
Telephone Office	(031) 5634249
Cell	0716702114

Control Page

Document Change History

Page/Line	Change	Date	Rev
Document Template	Initial Release	07 April 2019	0
SANAS Logo	Logo	05 June 2019	1

Previous MHI Risk Assessment Reports

Name of Organisation	Date Issued	Report Number
None		

Report Contributors

The raw data and results presented in this assessment is based on the contribution from the following team members who are responsible for the design, operation and maintenance of the plant and equipment:

Name	Organisation	Discipline
Max Guadagnino	North Coast Architects	Project Manager
Zakir Mahomedy	Mayfair	Director
Adila Gafoor	1World Consultants	Environmental Consultants

Supporting Documentation

The validity, results and conclusions of this assessment are based on the following information, drawings , reports and documentation of the plant and equipment:

Documents	Title	Other Information
Drawings	Lot 821 Portion 2 – Demo Plan	

Drawings	Lot 821 Portion 2 – Ground Floor	
Drawings	LOT 821 Portion 2 – Ground Floor	
Document	BPSA Fuel Package August 2014	
Document	BP Tank Design Data Sheet	
Document	Background information document for the proposed petrol filling station with the associated infrastructure and multiple fast food outlet, Mobeni	(21/11)DPM/EIA 850

Acknowledgements

MHI Risk Engineers would like to thank the following people for assisting with the site visits.

Name	Organisation	Discipline
Zakir Mahomedy	Mayfair	Director
Shaheed Rai	Corobrik	Manager
Michael Singh	Warehouse	Manager

Equipment & Software

MHI Risk Engineers has used the following equipment to conduct the risk assessment

Name	Serial Number	
Lenovo Computer	MP07QNQA	
Effects and Risk Curves	Risk Curves 10.2 Effects 10.2	

Disclaimer

Note: Although every effort has been made by MHI Risk Engineers to obtain the correct information and to carry out an appropriate , independent and competent study , MHI Risk Engineers cannot be held liable for any incident or indirectly relates to the work in ths document and that may have an effect on the client or any other third party.

Confidentiality

The contents of this document are private and confidential and may not be released to third parties without the permission of the clients permission.

Certificate of Completion of Major Hazardous Risk Assessment

This is to verify that a risk assessment has been conducted at LOT 821 Portion 2 in accordance to the MHI Regulations and SANS 1461 and approved.

Company	Aniston Investments Pty Ltd
Address	Cnr Grimsby and South Coast Road
Representative	Max Guadagnino, North Coast Architects

The unique report details are shown below

Report No	02-212019
Date of Issue	04 October2019

The facility was found to be **NOT A MAJOR HAZARD INSTALLATION .** There is no risk to the society around the facility. The risk to employees on site is within the tolerable limits.

R Moothusamy Pr Eng. B.Eng. (Chemical) (Terrence)

SANAS AND DEPARTMENT OF LABOUR APPROVED SIGNATORY

labour
Department:
Labour
REPUBLIC OF SOUTH AFRICA
Approved Inspection Authority # CI MHI 0015

sanas
Inspection Body

MHI RISK ENGINEERS (PTY) LTD K2012067890

MHI Risk Engineers (PTY) LTD is a consulting company that specialises in providing a process safety consultancy to the MHI Industry. MHI Risk Engineers is an approved inspection authority(AIA) for conducting Major Hazard Installation(MHI) risk assessments in accordance with the occupational health and safety act 85 of 1993, Major Hazard Regulations(July 2001). MHI Risk Engineers is accredited by the South African National Accreditation System(SANAS) in accordance with the IEC/ISO 17020:2012 standard. The MHI Risk Assessments are conducted according to the South African National Standards 1461 document. The accreditation consists of a number of elements including technical competence and third party independence.

The independence of MHI Risk Engineers is demonstrated by the following :

1. MHI Risk Engineers does not sell or repair equipment that can be used in the process industry.
2. MHI Risk Engineers does not have any shareholding in processing companies.
3. MHI Risk Engineers does not design equipment or processes.

Mr R.T Moothusamy is a professional engineer who holds a Bachelor of Engineering Degree (Chemical) and has worked within the MHI Industry for the past 17 years. Mr Moothusamy is an Approved signatory for the MHI Risk Assessments and has meet the competency requirements of SANAS for assessment of the risk of hazardous component which include fires, toxic releases and explosions.

Mr R Moothusamy (Terrence)

labour

Department:
Labour
REPUBLIC OF SOUTH AFRICA

National Department of Labour
Republic of South Africa

APPROVED INSPECTION AUTHORITY

Registered in accordance with the provisions of the Occupational Health and Safety Act, Act 85 of 1993, as amended and the Major Hazard Installation Regulations.

This is to certify that:

MHI RISK ENGINEERS (PTY) LTD

has been temporary registered by the Department of Labour as an Approved Inspection Authority: Type A, to conduct Major Hazard Installation Risk Assessment, in terms of Regulation 5(5)(a), of the Major Hazard Installation Regulations.

CONDITIONS OF REGISTRATION:

- The AIA must at all time comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993, as amended.
- This registration certificate is not transferable.
- This registration will lapse if there is a name change of the AIA or change in ownership.

CHIEF INSPECTOR

Valid from: **20 June 2019**
Expires: **03 June 2023**
Certificate Number: **CI MHI 0015**

CERTIFICATE OF ACCREDITATION

In terms of section 22(2)(b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that: -

MHI RISK ENGINEERS (PTY) LTD
Co. Reg. No.: 2012/067890/07
DURBAN

Facility Accreditation Number: **MHI0036**

is a South African National Accreditation System Accredited Inspection Body to undertake **TYPE A** inspection provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation, Annexure "A", bearing the above accreditation number for

MAJOR HAZARD INSTALLATIONS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17020:2012

The accreditation demonstrates technical competency for a defined scope and the operation of a management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant SANAS accreditation symbol to issue facility reports and/or certificates

Mr R Josias
Chief Executive Officer

Effective Date: 04 June 2019
Certificate Expires: 03 June 2023

This certificate does not on its own confer authority to act as an Approved Inspection Authority as contemplated in the Major Hazard Installation Regulations. Approval to inspect within the regulatory domain is granted by the Department of Labour.

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: MHI0036

TYPE A

Permanent Address: MHI Risk Engineers (Pty) Ltd 38 Elderberry Drive Glen Hills Durban 4051 Tel: (031) 563 3413 Cell: 071 670 2114 E-mail: tmoothusamy84@gmail.com	**Postal Address:** 38 Elderberry Drive Glen Hills Durban North 4051 Issue No.: 01 Date of issue: 04 June 2019 Expiry date: 03 June 2023	
Nominated Representative: Mr TR Moothusamy **Quality Manager:** Mr TR Moothusamy	**Technical Manager:** Mr TR Moothusamy	**Technical Signatory:** Mr TR Moothusamy
Field of Inspection	**Service Rendered**	**Codes and Regulations**
Regulatory: The supply of services as an Inspection Authority for Major Hazard Risk Installation as defined in the Major Hazard Risk Installation Regulations, Government Notice No. R692 of 30 July 2001	Major Hazard Installation Risk Assessments for the following material categories: 2) Gases: i) Flammable Gases ii) Non-flammable, non-toxic gases (asphyxiants) iii) Toxic gases 3) Flammable liquids 4) Flammable solids, substances liable to spontaneous combustion, substances that on contact with water release flammable gases 5) Oxidizing substances and organic Peroxides 6) Toxic liquids and solids	MHI Regulation par. 5 (5) (b) i) Frequency/Probability Analysis ii) Consequence Modelling iii) Hazard Identification and Analysis vi) Emergency planning reviews Guideline for quantitative risk assessment "Purple Book" CPR 18E, first edition 1999 A guide for the Control of Major Accident Hazard Regulations 1999, UK HSE.

Original date of accreditation: 04 June 2019

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Accreditation Manager

Executive Summary

1. Introduction

North Coast Architects have been appointed as the Project Management Consultant to develop plans for the construction of a new petrol station, fast food outlets and shops at the corner of 2 Grimsby Road and South Coast Road, Mobeni, KwaZulu Natal. The eThekwini Municipality, Development Planning, Environment and Management Unit has requested that a Major Hazard Installation Risk Assessment be conducted for the proposed development.

2. Methodology

The risk assessment was done to meet the requirements of the eThekwini municipality.

The objective of the report was to conduct the risk assessment to evaluate the risk to the public and the employees at the filling station.

The method used in conducting the quantitative risk assessment is the SANS 1461 Standard.

The weather data for the risk assement was obtained as a yearly average from the South African weather station for Durban South.

The population data used was sourced from the TNO Green Book.

2.1 Consequence Analysis

The following scenarios were analysed for each of the above equipment

- Catastrophic Rupture
- Leak of entire vessel contents in 10 min and
- Leak in vessel for 10 minutes.

The hazardous events analysed were

- Pool Fire
- Flash fire and
- Explosion

The consequential effects for each release was modelled using the TNO Effects software v 10.2 . The worst-case scenarios for each release was plotted on the map. A graph for the effect's distances were also developed. The graph shows the distance from the point of source to the 1% lethality contour and the limits for toxic gas exposure, over pressure and heat radiation. Details can be found within report.

2.2 Equipment

Vessel Name	Chemical	Volume	Temperature	Pressure
Petrol Tanker	Petrol	$43m^3$	20 deg C	101.5 kpa
Diesel Tanker	Diesel	$43m^3$	20 deg C	101.5 kpa

2.3 Frequency Analysis

The risk analysis was done using the TNO Risk Curves Software v 10.2. The failure data used was sourced from the Bevi Manual. The details on the plant specific frequency data can be found in the body of the report under the section frequency analysis.

2.4 Risk Analysis

The risk acceptance criteria used is according to the SANS1461 standard,

Population Group	Tolerable (deaths/person/year)	Intolerable (deaths/person/year)
Public	$1x10^{-6}$	$1X10^{-4}$
Employee	$1x10^{-5}$	$1X10^{-3}$

3. Results

The consequence modelling for both diesel and petrol was conducted. Both chemicals have similar consequence effects. The consequence effects report for petrol has been reported.

The worst case scenario is the catastrophic rupture of the petrol tanker offloading hose which results in the entire contents of the tanker being discharged to the ground. The consequence effects below show the effects for heat radiation if the material catches fire.

Table 3 -1 shows the effects distances from the point of the source.

Table 3-1 Heat Radiation Effects and 1% Lethality

Equipment	Catastrophic Rupture			Large Leak			Small Leak		
	37,5 Kw/m^2	12,5 Kw/m^2	1% Lethality(m)	37,5 Kw/m^2	12,5 Kw/m^2	1% Lethality(m)	37,5 Kw/m^2	12,5 Kw/m^2	1% Lethality(m)
Road Truck Tanker - Petrol	9	14	15	9	14	15	2	5	5
Offloading Hose - Petrol	16	15	16	8	15	16	3	5	6

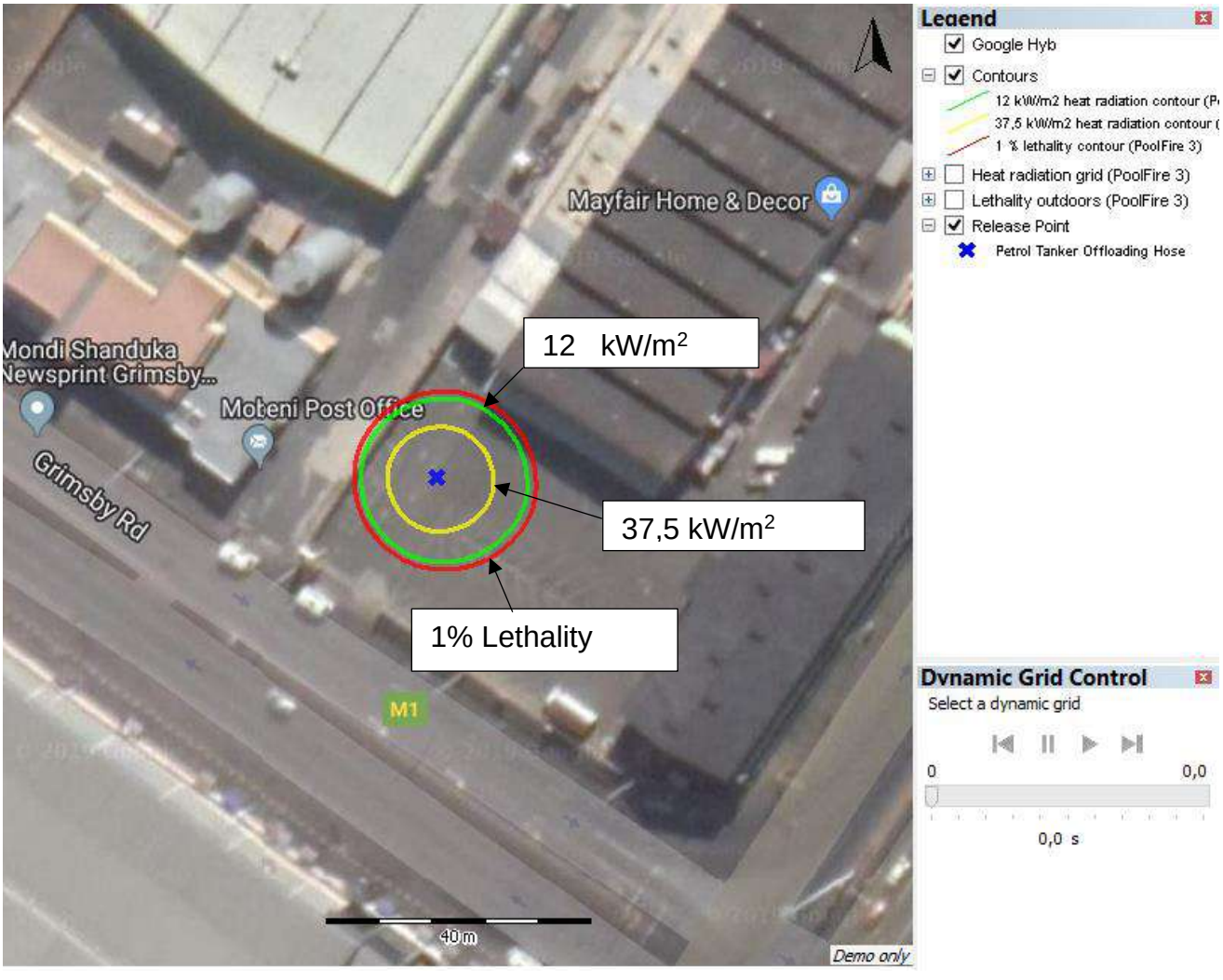


Figure-3-1-1 Heat Radiation -Consequence Effects-Petrol Tanker Hose Catastrophic Rupture

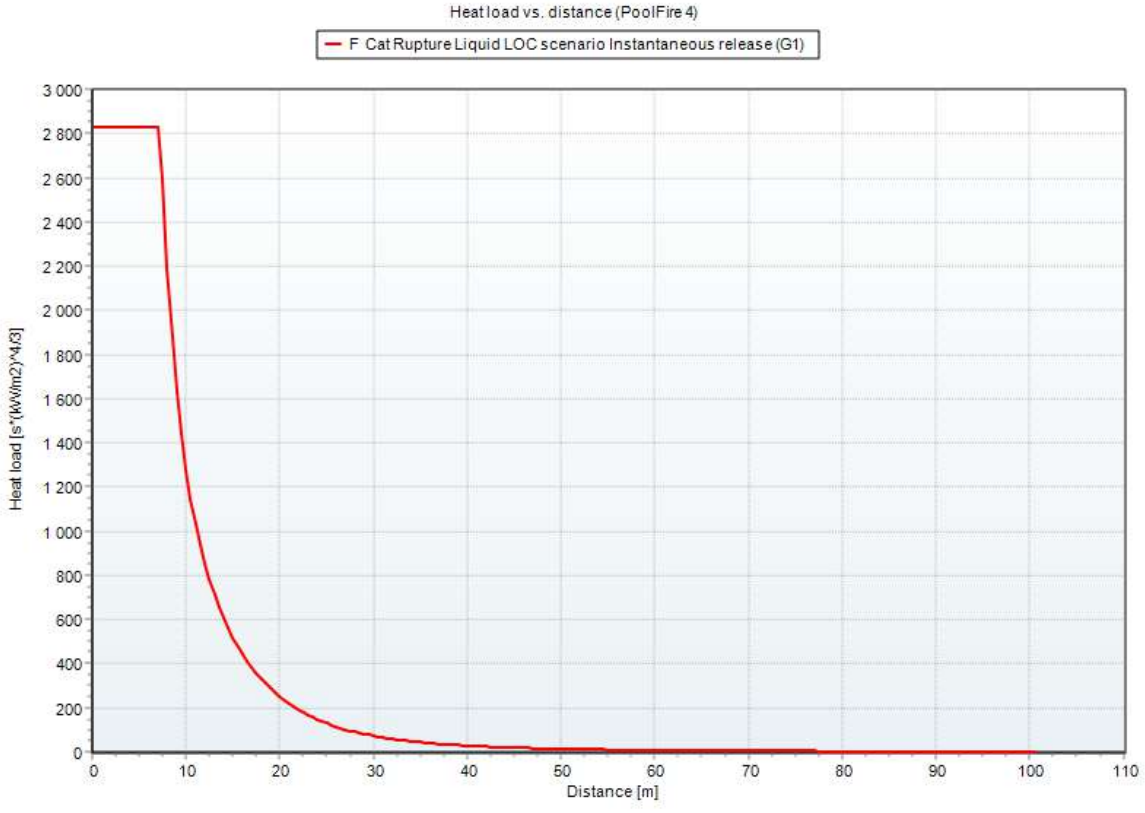


Figure 3-2 Heat Radiation vs Distance for Petrol Tanker Hose Rupture - Fire

3.1 Risk Contours

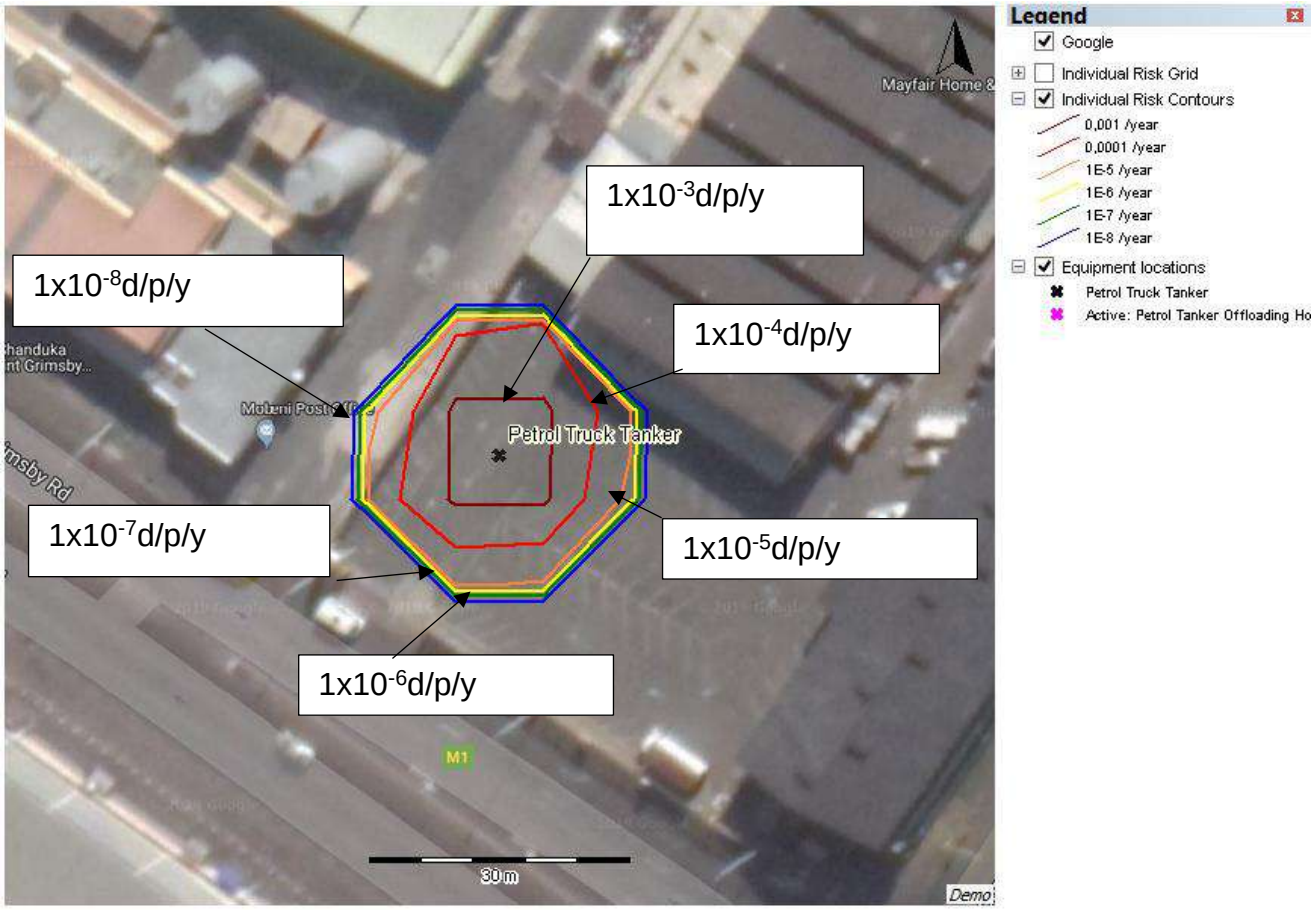


Figure 3-3 Individual Risk Contours for the Proposed Petrol Station

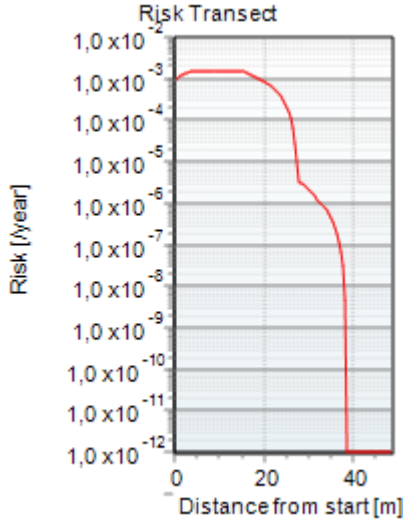


Figure 3-4 Risk Profile Across the site

3.2 F-N Curve for offsite population and employees

The proposed petrol station does not pose a risk to the offsite population as well as its employees. The existing area is zone as an industrial area. As a result, the F-N curve has not been plotted.

3.3 Discussion

The petrol station does not pose any risk to the society around them provided all the recommendations in this report is undertaken. The risk to their employees onsite is within the acceptable range of $1x10^{-3}$ and $1x10^{-4}$.

The maximum extent of the 1% lethality due to the heat radiation covers an area of 430 m^2 or a diameter of 25m around the offloading tanker.

There are no other hazardous installations on site. If the company is to store LPG on site then the location of the storage area is to be reviewed and the risk profile determined

4. Recommendations

4.1 Risk Reduction

The measures below shall be implemented to ensure that the risk posed by the proposed petrol station is reduce to as low as reasonably possible:

- A HAZOP is to be conducted at the design phase of the petrol station.

- All aspects of the construction regulations and the occupational health and safety act are to be adhered to.
- All critical tasks to have written procedures.
- All recommendations in the Hazard Analysis section ,but not limited to, of this report must be adhered to.
- A process safety management plan shall be implemented to reduce the risk of an accident.
- An audit of the process safety management plan is to be undertaken on commissioning of the petrol station.
- The emergency plan shall be reviewed every three years.

4.2 Review of the risk assessment

The risk assessment shall be reviewed if there are any major changes to the design of the petrol station and/or building positions.

5. Emergency Plan

Since there structure is a new development there is no emergency plan. The draft onsite emergency plan has been developed and will be implemented upon commissioning of the petrol station.

The Emergency Plan developed will be in line with the SANS 1514 Standard.

The emergency plan shall be reviewed every three years and test once a year.

6. Land Use Planning

The current site is zone for industrial use. There is no societal risk which extends outside the boundary of the petrol station, hence there is no restrictions around the petrol station.

The proposed McDonalds restaurant is 25m outside the $1x10^{-7}$ risk contour. Hence there are no restrictions on the proposed restaurant to be built.

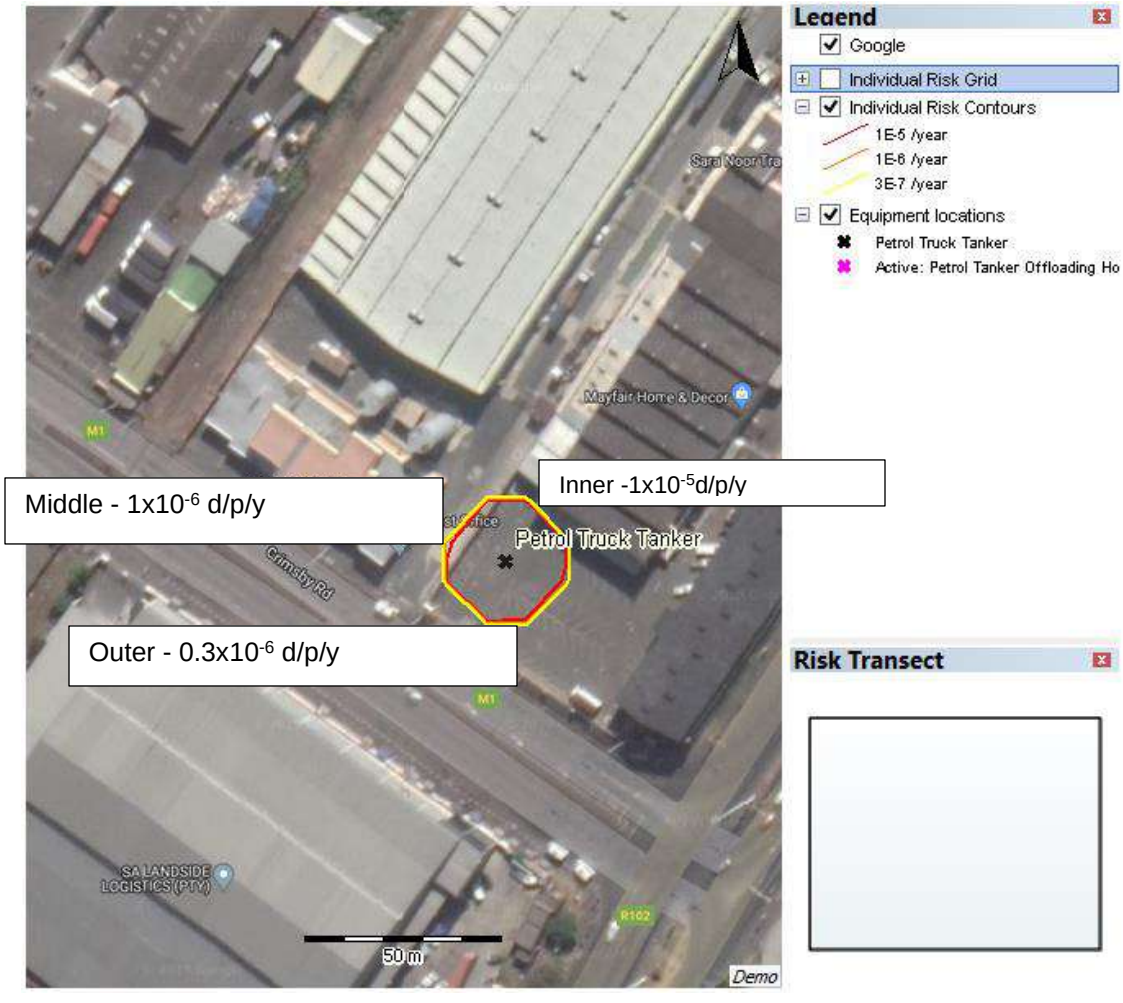


Figure 1-2 Map showing the restricted zones for land use planning

7. Legislations

It is the responsibility of the Management team of the propose Petrol Station to ensure that the site complies to all aspects of the occupational health and safety act 85 of 1993 and its regulations, with the National Building Regulations and Building Standard Act 10 of 1977 and the local bylaws.

8. Conclusions

It can be concluded that the proposed petrol station does not pose a risk to the society around its borders. The risk to their employees is within the tolerable limits provided that all

the recommendations are adhered to. The proposed restaurant falls in a safe zone, which will not be affected by any incidents evaluated in this risk assessment.

Table of Contents

Table of Appendices

Acronyms, Definitions

Acceptable risk : The average rate of risk considered tolerable for a given incident outcome

Accident : A specific combination of events or circumstances that leads to an undesirable consequence

Acute hazard the potential for injury or damage to occur as a result of an instantaneous or short duration exposure to the effects of an accident

Chronic hazard the potential for injury or damage to occur as a result of prolonged exposure to an undesirable condition

Chemical exposure indexes The CEI provides a method of rating the relative potential of acute health hazards to people from possible chemical release incidents

Consequences the direct undesirable result of an accident usually measured in health and safety effects, loss of property or business costs, or a measure of the expected effects of an incident outcome case

Consequence analysis Once hazards have been established methods exist for analysing their consequences(size of vapour cloud, blast damage radius, overpressure expected etc) This is independent of frequency or probability.

Domino effect/ knock-on effect An incident which starts in one piece of equipment and affects other nearby items such as vessels containing hazardous materials by thermal blast or fragment impact.

Event An event is associated with an incident, either as a cause or a contributing cause of the incident or as a response to the initiating event

Event sequence: A specific, unplanned sequence or events composed of initiating events and intermediate events that may lead to an incident

Event tree: seeks to identify the ultimate consequences of an event

Fault tree: seeks to identify the basic cause of a specific event. It is a method for representing the logical combinations of various systems states which lead to a particular outcome know as the top event

FMEA (***Failure mode and effect analysis)***: A hazard identification technique in which all know failure modes of components or features of a system are considered in turn and undesired outcomes noted.

HAZOP : HAZOP stands for “hazard and operability studies” This is a set of formal hazard identification and elimination procedures designed to identify hazards to people process plants and the environment

Incident ; The loss of containment material or energy.

Incident outcome : The physical outcome of an incident e.g leak of a flammable and toxic gas could result in a jet fire, vapour cloud explosion a vapour cloud fire , a toxic cloud etc.

Probability : The likelihood of the occurrence of events or a measure of the degree of belief, the values of which range from 0 to 1.

Probability analysis Evaluates the likelihood of a event occurring .Using the failure rate data for equipment, piping, instruments, the fault tree techniques, the frequency (events/year) can be quantified.

Quantitative Risk Assessment : The systematic development of numerical estimates of the expected frequency and/or consequence of potential accidents associated with the facility or operation. Using consequence and probability analyses and other factors such as population density and expected weather conditions , QRA predicts the fatality rate for a given event.

Risk Analysis : The development of a quantitative estimate of risk based on engineering evaluation and mathematical techniques for combining estimates of incidents consequences and frequencies.

Risk Assessment: The process by which results of a risk analysis are used to make decisions, either through a relative ranking of risk reduction strategies or through comparison with risk targets.

Worst credible incident The most serve incident considering only incident outcome and their consequences of all identified incidents and their outcomes

1 Introduction

1.1. Scope of the Risk Assessment

The aim of the risk assessment is to comply with the MHI Regulations as stated in the Occupational Health and safety regulations. The outcome of this risk assessment is to determine the risk and incident would pose to the employees and to the public. The risk assessment will guide the facility on how to plan for an emergency situation.

The proposed fuel station will dispense Petrol and Diesel which will be stored in under ground tanks. The tanks will be designed and constructed according the guidelines set out in document BPSA Fuel Package August 2014 or similar. There will be various fast food outlets in the complex together with commercial shops which will be opened to the public.

Table 1-1: Equipment and Chemicals to be Analysed

Vessel /Plant Name	Chemical Description	Volume	Comments
Diesel storage tank	Diesel 500ppm	83m^3	
Diesel delivery truck	Diesel 500ppm	30m^3	
Diesel piping from Tanker to Storage Tank	Diesel 500ppm	0.005m^3	
Diesel piping from storage tank to pump	Diesel 500ppm	0.10m^3	
Petrol storage tank	Unleaded Petrol	83m^3	
Petrol delivery truck	Unleaded Petrol	30 m^3	
Petrol piping from Tanker to Storage Tank	Unleaded Petrol	0.10m^3	
Petrol piping from storage tank to pump	Unleaded Petrol	0.005m^3	

Table 1-2: Inventories on site

Chemical	Maximum Inventory on Site	Maximum amount that can be released
Diesel	$83m^3$	$43m^3$
Petrol	$83m^3$	$43m^3$

The purpose of this risk assessment is to determine the impact to the employees, the population within the market and in the surrounding areas if there is a release of a Chemical into the environment from the process activities. The MHI Report will have to be reviewed during the design phase of the project.

The report will cover

1. Hazard Identification
2. Hazard analysis
3. Consequence analysis
4. Frequency analysis
5. Risk calculations
6. Risk judgement
7. Risk treatment
8. Land-use planning and
9. Emergency preparedness

1.2. Legal Aspects

The Major Hazard Installations Regulations is part of the Occupational Health and Safety Act and Regulations 85 of 1993. The MHI Regulations, GN R692 in GG 22506 of 30 July 2001.

The MHI regulations apply to employers or companies that have on their premise a quantity of a substances which may pose a risk that could affect the health and safety of the employees and the public.

It is the duty of the employer to notify the local government in writing of the erecting of any installation that will be major hazard installation prior to the commencement of the erection and conversion of any installation into a major hazard installation.

The employer has 60 days in which to inform the local government about the status of their facility. In addition, no employer is to increase storage of an MHI or production capacity or alter the process or any other change which may increase the risk of a major hazard installation without notifying the local government and provincial director in writing. It is required that the all changes to the MHI facility be advertised in a local newspaper in the vicinity of the major hazard installation. Any person of the interested of affected person may object to the changes made or will be made to a major hazard installation if that person deems the change is unacceptable to the person.

The MHI risk assessment must be carried out by an Approved Inspection Authority , who will be appointed by the department of labour.

No local government shall permit an erection of an MHI which may pose a risk to airports, neighbouring independent major hazard installations , housing and other centres of population or any other similar facility

Any facility must inform the local authorities within 21 days if the installation is no longer a Major Hazard Installations.

Failure to comply with the regulations ,may result in conviction and up to 12 months of imprisonment.

1.3.Methodology

The Quantitative risk assessment(QRA) will be conducted according to the SANS 1461 Standard for Quantitative Risk Assessments for Major Hazardous Installations.

Quantitative risk assessment is also known as probabilistic risk assessment which deals with major hazards which could cause large number of deaths. The risk analysis is a detailed process into the hazard identification, risk assessment , risk evaluation and the risk management. The QRA is an analytical process which helps the organisation understand the consequences of the undesired events and to quantify the probabilities for the identified risk. The QRA will determine if the risk can be tolerated or if risk reduction measures are required. The QRA flow chart is shown below:

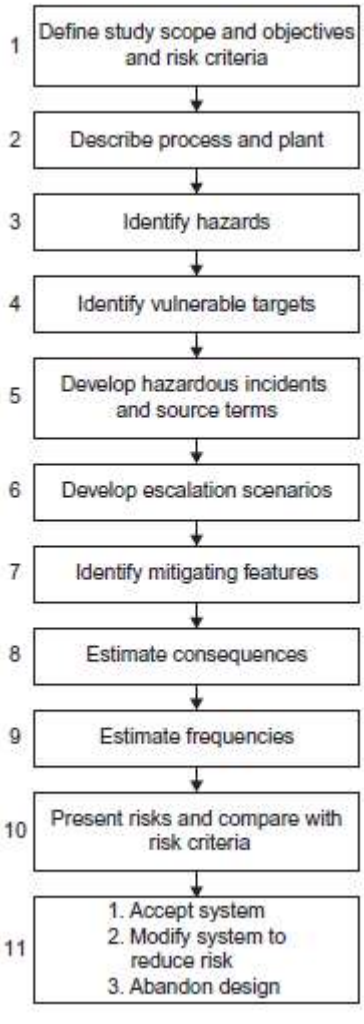


Figure 1-1 Quantitative Risk Assessment Process

The technical information used to perform the quantitative risk assement is from the TNO books namely:

- CPR 12E(2005). Methods for determining and processing probabilities(“Red Book”) :TNO.
- CRP 14E(1997). Methods for Calculation of Physical Effects (“Yellow Book”). First Edition. Apeldoorn. TNO.
- CRPE 16E(1992). Methods for Determination of Possible Damage(“Green Book”). First Edition. Apeldoorn. TNO.
- CPR 18E (1999). Guidelines for Quantitative Risk Assessment (“Purple Book”). First Edition Apeldoorn. TNO. RIVM (2009). Reference Manual Bevi Risk Assessments. Edition 3.2.Bilthoven, the Netherlands: National Institute of Public Health and the Environment.

These books have been used in the development of the software to allow the calculation of the effects and the risk curves. The software used is TNO Effects v 10.2 and TNO Risk Curves 10.2 . The serial number of the computer used for the risk calculations is SN MP07QNQA.

The identification of the hazards is the first step in the process . There are many techniques which can be used for hazard identification. These include HAZOPs, What if analysis failure modes, effects and criticality analysis, event tree and fault tree analysis.

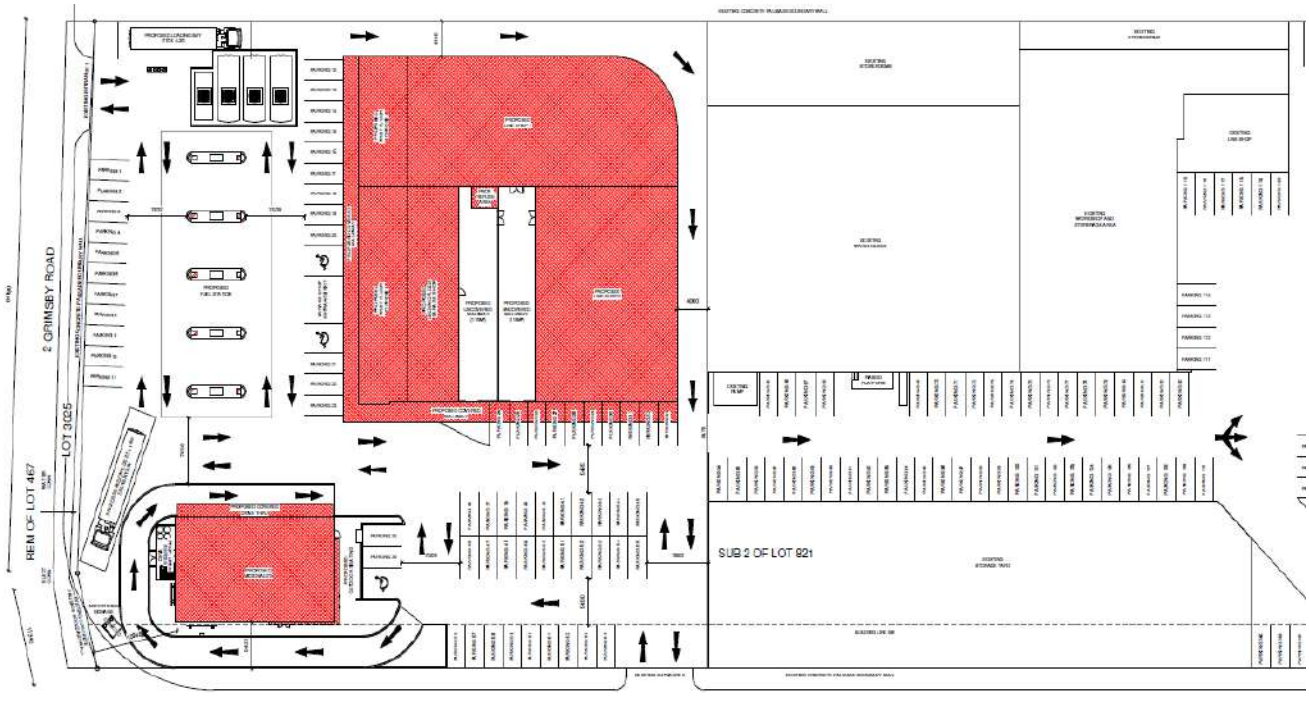
2 Description

2.1 Company Main Activities

The proposed company is a petrol station. The main activities will be to dispense fuel to the public. Various fast food outlets and commercial shops will be constructed on the property. There will be a quick shop located on the premises of the petrol station.

2.2 Location

The proposed development is locate at the corner of Grimsby and South Coast Road, Mobeni, KwaZulu Natal



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2.3 Process Description

The proposed design of the petrol station is to be developed. This section describes the general description as discuss in the BPSA Fuel Package August 2014. All suggested safeguards in the document must be implemented.

The petrol station will be used to sell fuel to the public. The fuel will be petrol and diesel. The petrol station will comprise of 4 underground storage tanks which will be designed according to the codes and practices outlined by the petroleum supplier. There will be two petrol tanks

and 2 diesel tanks. The petrol tanks will be 43m^3 in volume, one diesel tank will be 43m^3 and 23m^3 for the 50ppm diesel storage tank. There will be ten petrol filling pump stations.

2.4 Population Data

Number of people on site

The area in which the petrol station will be located is zone as an industrial area. The population data used is from the TNO green book for industrial and restaurant zoned areas.

Table 2-1 Population data for a Business Area, TNO Green Book.

	Business Branch	Ground area (ha) per establishment	Number of working people per establishment	Personnel density
0	Agriculture and fishing (expect agricultural and gardening industries)	2	6	3
1	Exploration of minerals	10	30	3
2 / 3	Industry	0.6	25	40
4	Public Utilities	9	50	6
5	Construction and Installation industries	0.16	12	75
6	Commerce	0.1	4	40
7	Hotels and Restaurants	0.4	3	8
8	Repairs of consumer goods	0.1	5	50
9	Transportation and storage	0.7	11	15
10	Banking and insurance business services(expect government)	0.1	8	85
11	Other services(partially)(except, among others, education, health care)	0.1	3.5	35

The population data for the risk assessment was based on the TNO Green book.

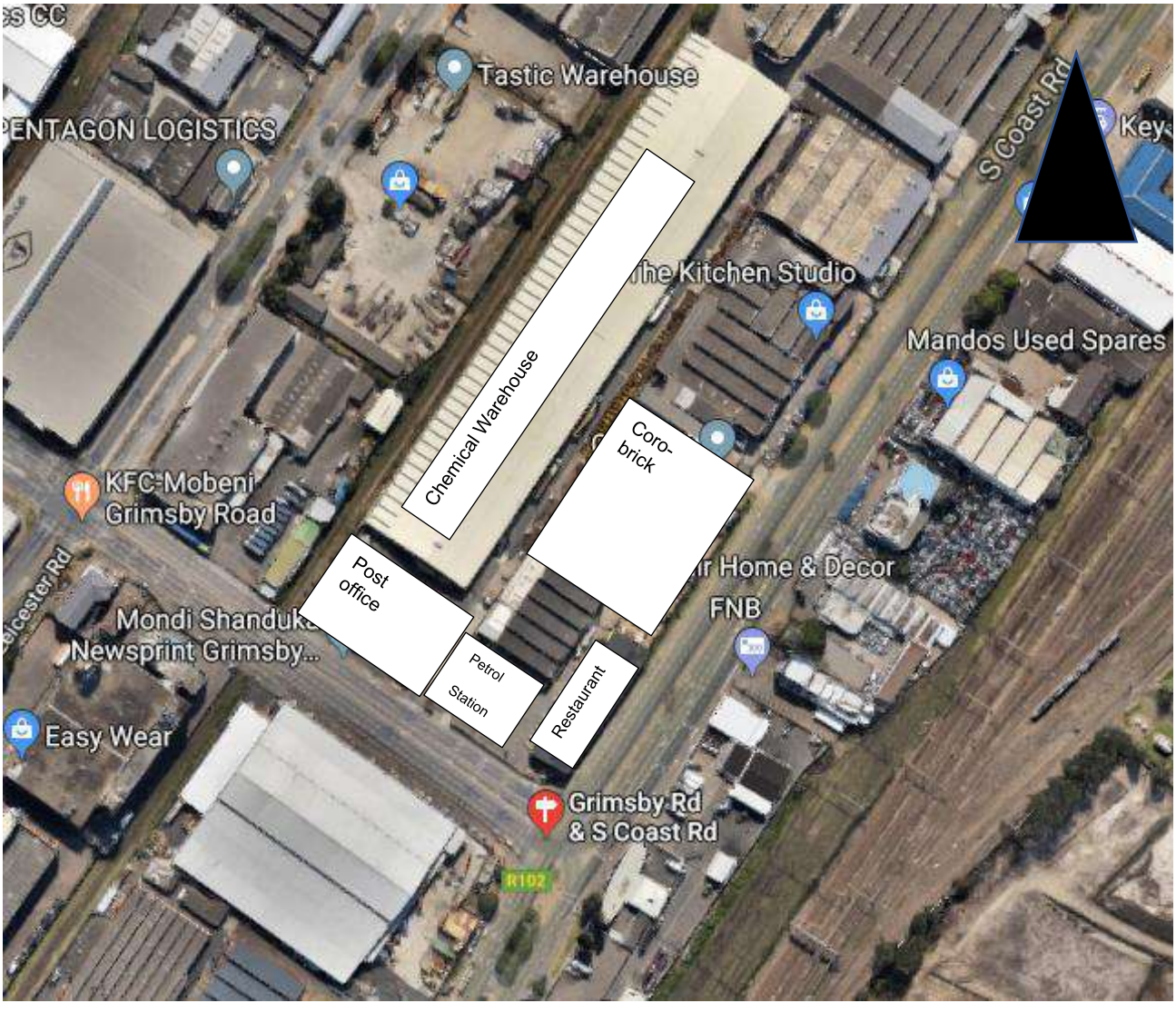
Table 2-2 Population data group for business areas, TNO Green Book

Personnel Density	Population Density	Category
Low	5 per/ha	0/1/4/7/9
Medium	40 per/ha	2/3/6/8/11
High	80 per	5/10

Table 2-3 Population density for residential areas, TNO Green Book.

Type of residential area	Population density/ha
Nature Area(forest,water, etc)	0
Remote Area(agriculture	1
Scattered housing	5
Quite residential (0% high buildings)	25
Busy residential (25% high buildings)	70
Urban area (85% high buildings)	120

2.5 Satellite Map of Neighbouring facilities



2.6 Relevant meteorology

2.6.1 Weather

As part of the consequence calculations specific weather data shall be used. In the case of the proposed development a yearly average for 2017/2018 was used . This data was sourced from the South African Weather station. The table below shows the weather conditions which will be used

Table 2-4 Environment Data

Environmental Parameters	DAY	NIGHT
Ambient temperature	27	19
Substrate temperature	18	14
Atmospheric pressure	101.3	101.3
Humidity	82	82
Solar radiation	500 W/m2	0 W/m2
Mixing height	10m	10m
Wind Rose	See below	

2.6.2 Wind Data

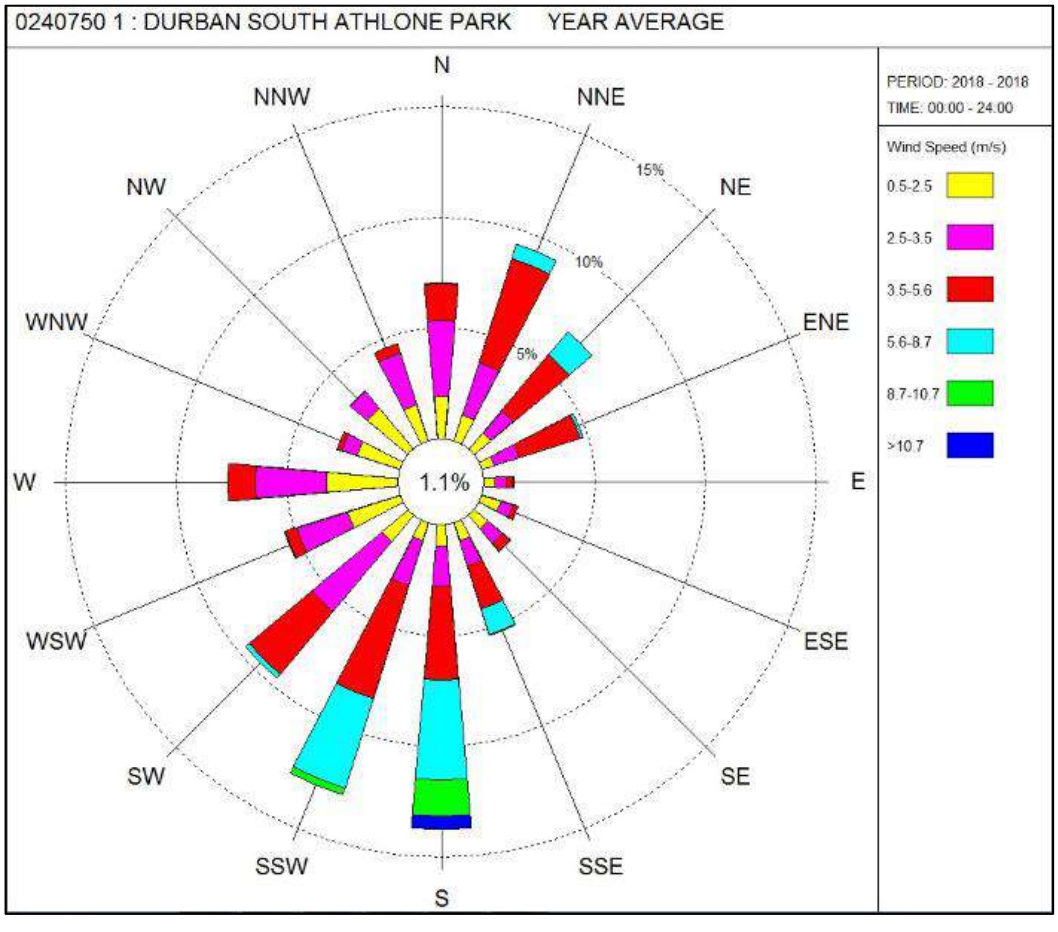


Figure 2-1 Wind Rose for Durban South , yearly average

The weather classes , wind direction and wind speed are have been illustrated in the table below:

Table 2-5 Weather Data, Wind Direction, Wind Speed, Probability of weather conditions and Pasquill Stability Class

Wind sector		% Wind Direction	Wind Speed	Pasquill Class		Probability of Wind Direction
DEG	DIRECTION		M/S	DAY	NIGHT	
0	N	7,5	3	C	F	0,075
22,2	NNE	10	4,5	C	E	0,1
44,4	NE	6	4,5	C	E	0,06
66,6	ENE	4,5	5	D	D	0,045
88,8	E	2	1	B	F	0,02
111	ESE	2	2	C	F	0,02
133,2	SE	2,5	2	C	F	0,025
155,4	SSE	5	5,5	D	D	0,05
177,6	S	13,5	7	D	D	0,135
199,8	SSW	12,5	6,5	D	D	0,125
222	SW	5,5	5	D	D	0,055
244,2	WSW	9	3	C	E	0,09
266,4	W	7,5	3,5	C	E	0,075
288,6	WNW	3,5	1	B	F	0,035
310,8	NW	4,5	2	C	F	0,045
333	NNW	4,5	3	C	F	0,045
		100				1

Table 2-6 Weather Classes considered in the study

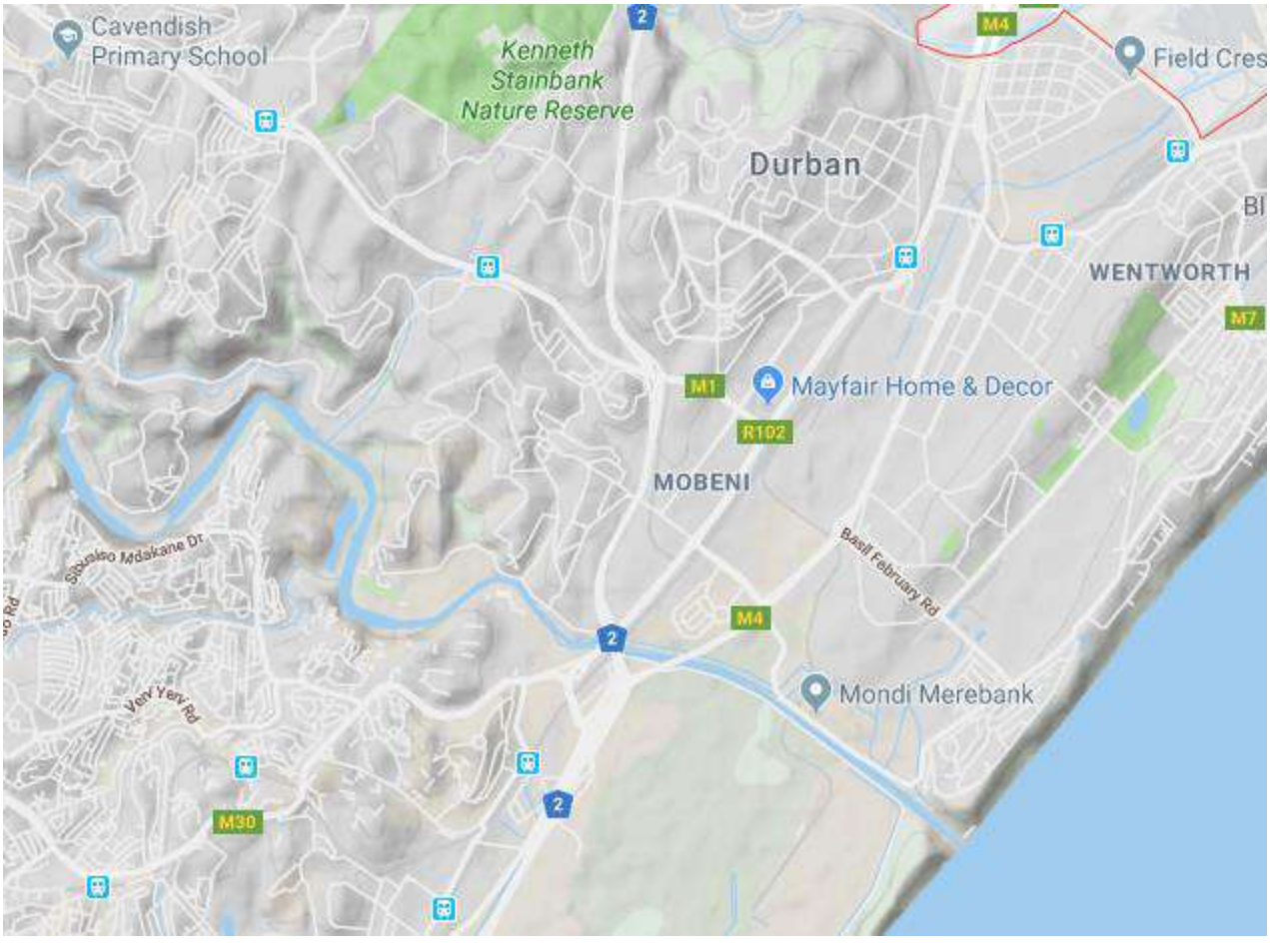
Pasquill weather category	**Air Temperature**	**Wind Speed (m/s)**
F(stable)	Yearly average of a minimum daily temperature	0 to 2
B	Yearly average f maximum daily temperature	2 to 4
D(neutral)	Daytime – yearly average of maximum daily temperatures Night time – Yearly average of minimum daily temperature	4 to 10

In addition, the meteorological properties are to be consider. These are listed in the table below

Table 2-7 Meteorological properties which were considered in the study

Parameter
Ambient temperature – yearly average daily temperature
Substrate/bund temperature – yearly average daily temperature
Barometries pressure – Atmospheric pressure taking elevation above sea level
Humidity – Yearly average daytime and yearly average night time
Solar radiation(heating pools) 500 W/m^2 daytime and 0W/m^2 for night time
Mixing height
Wind rose data including periods of calm

2.7 Topography of the area



3 Hazard Identification

3.1 Material on Site

The SANS 10228:2003 provides a guide on how to categorize dangerous substances as shown below:

Table 3-1: Material Classes SANS 10228

Class	Description
Class 1	Explosives (covered by explosives act and not considered in MHI Regulations)
Class 2	Gases(only flammable or toxic gases could impact the public)
Class 3	Flammable liquids(these could form large pool fires or release flammable vapour clouds)
Class 4	Flammable solids (could contribute to warehouse fires etc)
Class 5	Oxidising substances and peroxides (possible explosions)
Class 6	Toxic and infectious substances (only MHI if they emit vapours that can affect persons outside the boundary or liquids that are extremely close to the site boundary with no containment)
Class 7	Radioactive materials (excluded from MHI Regulations , covered by other regulations)
Class 8	Corrosive(generally not a major hazard unless very close to the public boundary)
Class 9	Miscellaneous materials that are combustible and can lead to escalation of fires or toxic products of combustion

The material which have potential to cause harm are the combustibles, flammables, explosive and toxic. These will be considered in this risk assessment.

Table 3-2: Classification of Material on Site

Chemical	Gases or liquified gases Class 2	Flammable liquids Class 3	Flammable Solids Class 4	Oxidising substances Class 5	Toxic Vapours released from spill Class 6	Corrosives Class 8	Miscallenous materials that are Combustible with toxic or asphyxiant products Class 9	Potential MHI Issue
Petrol		Yes						
Diesel		Yes						

The material safety data sheets can be found in the appendix.

3.2 Chemical Properties

Table 3-3 Physical properties of Chemical #1 and potential effects

Name	BP Premium Unleaded Fuel
UN Number	86290-81-5
Class	Class 3
Subsidiary Risk	Fire and Explosion
Boiling point	30^{o}C to 210^{o}C
Flash point	<-40^{o}C
SG	0.74 to 0.76 g/cm^{3}
Chemical Reactivity	Incompatible with oxidising agents
Flammability level in air	1.4% to 7.6%
Auto Ignition temperature	>350^{o}C
Potential health effects-Acute toxicity	Eye – stinging or redness if accidental contact with eye Skin - Likely to cause skin rash and skin burning Inhalation – aspiration hazard if swallowed. Can enter the lungs and cause damage Ingestion – irritant to the respiratory track. May cause dizziness,nausea, headaches and drowsiness if high concerntrations are inhaled
Potential health effects – Chronic toxicity	Exposure to benzene may result in blood disorders e.g anaemia and leukaemia. Benzene is a class 1 carcinogen

Ecological Effects	Toxic to aquatic organisms Spillages may penetrate the soil causing ground water contamination
Freezing point	Not available
Physical State	Liquid
Water Soluble	Not soluble in water

3.3 Reactions

The petrol will react with any oxidising agents. It should be kept away from oxidising agents. The petrol is flammable, all sources of ignition (spark or flame) shall be avoided. Excessive heat shall also be avoided.

When the petrol decomposes the products may include carbon oxides(carbon monoxide and carbon dioxide)

3.4 Licencing

An approval licence will be obtained from the eThekwini municipality for the construction and operation of the petrol station.

3.5 Site Layout for Proposed Petrol Station

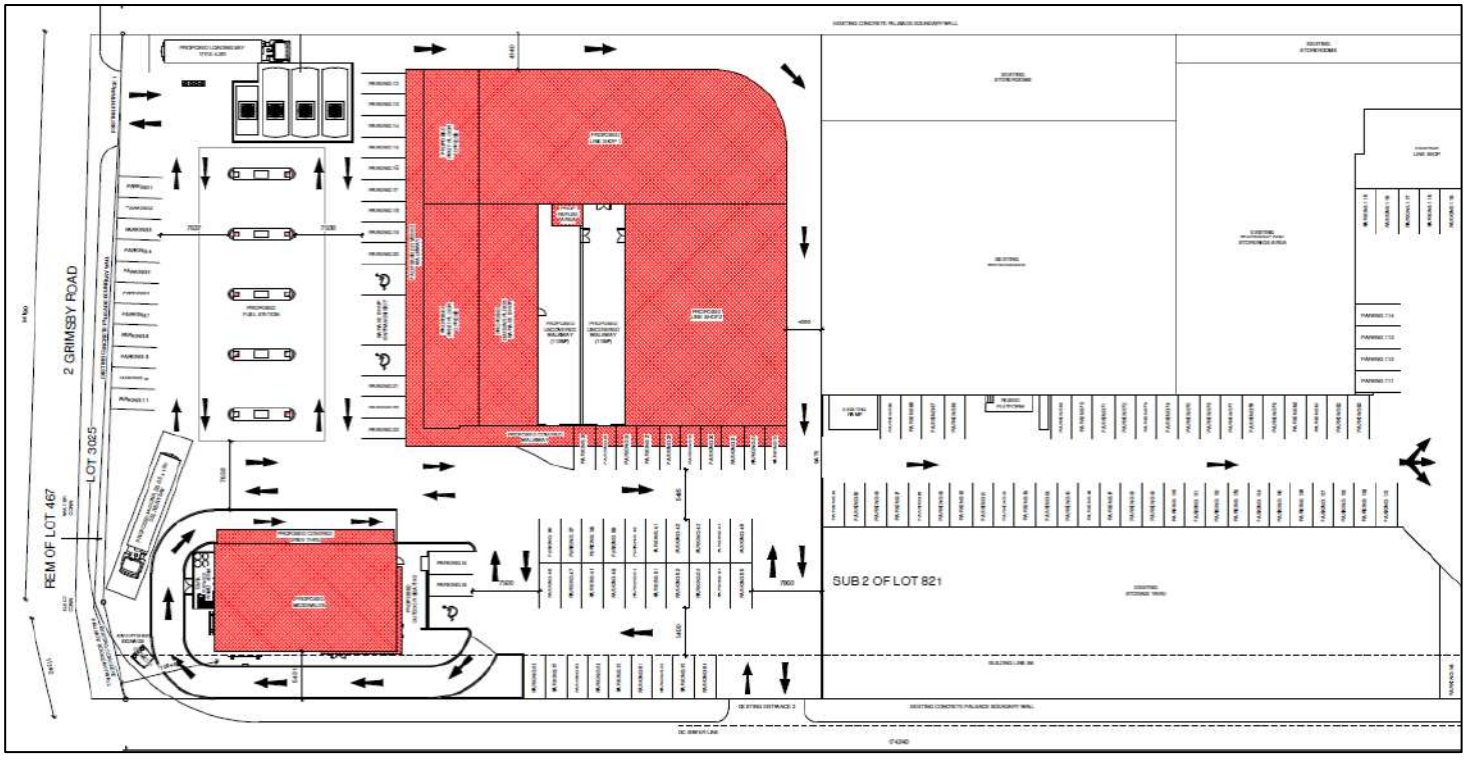


Figure 3-1 Site Layout for Proposed Petrol Station

3.6 Geographical Layout for Proposed Petrol Station

Figure 3-2 Geographical Layout of the proposed petrol station shown in red block, fast food outlet in blue block, shops in green block

3.7 Incidents/Accidents on Site

The new petrol station is a proposed development hence there are no historic details of incidents. During the HAZOP the lessons learnt from previous incidents should be incorporated into the design of the proposed petrol station.

3.8 Major accidents and incidents at related facilities

1. Petrol attendant gets hit by a motor vehicle – install speed calming devices on entrance and exit/warning signs
2. Mans car runs over him while , inspecting the cars engine – Don't allow drive cars to be left unattended at the pump stations
3. Mvoti, March 2016, Petrol truck caught a light during offloading. The incident was a result of theft of fuel while the truck was being offloaded
4. In Paris in 1958, an explosion destroys a garage equipped with fuel distributionpumps, killing 17 people, when the garage owner activates an electrical switch that ignites fuel vapours emitted via aleak caused by severing an obsolete pipe that had been left in place after undeclared expansion work (ARIA **31803**).
5. In Annecy, a worker dies following an explosion in the manhole of a fuel tank, while he was welding disused tanks, without a fire permit or safety plan: the tank capacities had not been rendered inert or filled with foam as specified by procedure.
6. In Montluçon,France, improper distancing of vents in the compartments of a fuel tank (the 4 vents were interconnected) allowed fuel vapours to spread from a compartment being filled to another compartment on which maintenance was being done; the vapours exploded, killing one worker
7. In Grenoble, an employee is intoxicated by emissions while cleaning an empty petrol tank, probably due to a defect in his respiratory mask; a second employee who comes to his assistance is also intoxicated
8. Portes-Lès-Valence, France and Les-Chères, France- 2 people die when their vehicles run into petrol station pumps and catch on fire.
9. In Peru in 2002, a bus runs into the petrol pumps at a service station, causing an explosion and fire. Casualties are high:35 people are killed and 20 more injured
10. In driving over the pump hose, a heavy goods vehicle causes overpressure in the relief valve, leading to the leakage of 200litres of petrol onto the road
11. Ghana Petrol Station Fire; 150 people are believed to have died in the petrol station blaze and 25 from the flooding. People where taking refuge at a fuel station due to flooding in the area.

3.9 Safety System

The proposed design and best practices shall be employed when constructing the petrol station. When conducting the hazard and operability study the safeguards and instrumentation reliability must be reviewed. The potential cause for accidents, learnings from other incidents must be taken into consideration. A process description which details how the fuel system operates must be developed.

12. Hazard Analysis

3.10 Scenarios to be modelled

Table 12-1 Failures Scenarios to be modelled for each containment system

Equipment	Petrol Tanker Truck
Tank/Petrol Tanker	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds
Offloading Hose Pipes	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds

Equipment	Diesel Tanker Truck
Tank/Petrol Tanker	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds
Offloading Hose Pipes	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds

3.11 Hazard Analysis

A detail Hazard and Operability Study must be conducted during the design phase of the project.

Table 12-2: Hazard Analysis for proposed petrol station

Plant /Section	Event Incident	Causes	Consequences	Preventative measures in place	Recommended Protective Measures
Petrol/Diesel Truck	Catastrophic rupture of vessel	Accident damage Actions by unauthorised personnel Reversing of tanker Hot work Vapour release Static electricity	Fuel spill – land pollution Pool Fire/ BLEVE Fire	Proposed installation none in place . HAZOP to be conducted before at the design phase	Deliveries to be received in off-peak time Barriers to be installed to prevent accidental collision with paper trucks turning into the neighbour's property Earthing to be installed Speed calm devices to be installed at the entrance and exit of fuel station Drainage of tanker fill points to a retention system Procedure to ensure that the forecourt is closed during deliveries Overfill protection on tanks to prevent spills Stock management system to be implemented to ensure that correct amount of fuel is ordered. Driver controlled delivery equipment Adequate lighting to allow for visibility of the tank truck Provision of firefighting equipment and absorbent material Vent pipe to be located in a safe area Surface must be impervious to prevent fuel seepage into ground water system Warning signs – when truck is being offloaded to make public aware of the hazard. Emergency Response Planning guide to be developed and tested Training of staff Provision of correct PPE Procedures to ensure safe offloading is done

	Large leak on pipe or vessel	Damage by accident Poor maintenance	Fuel spill – land pollution Pool fire BLEVE	None in place new installation. HAZOP to be conducted before at the design phase	Ensure there is a maintenance program in place to check offloading hoses pipes and the tanker , ensure Earthing system to be installed Ensure that offloading hoses are out of the way of moving vehicles when offloading Ensure that the driver or operator is always present during offloading petrol/diesel
	Small leak on a pipe/vessel	Damage by accident Poor maintenance	Fuel spill – land pollution Pool fire BLEVE	None in place new installation. HAZOP to be conducted before at the design phase	Ensure there is a maintenance program in place to check offloading hoses pipes and the tanker , ensure Ensure that offloading hoses are out of the way of moving vehicles when offloading Ensure that the driver or operator is always present during offloading petrol/diesel
Storage tanks	Catastrophic rupture of vessel/piping	Ignition of vapour space Over pressure of vessel Poor engineering design	Fuel spill – land pollution Fire Explosion	None in place, new installation. HAZOP to be conducted before at the design phase	Ensure design of underground storage tanks is done according to internal standards. Ensure that vent valves allow release of pressure inside tank Earthing system to be installed Install flame arrestors on vent lines Ensure leak detection systems are installed to detect underground pipe leaks
	Large leak on pipe or vessel		Fuel spill – land pollution Explosion		Ensure leak detection systems are installed to detect underground pipe leaks Ensure a maintenance plan is developed and followed. Records of maintenance done is to be kept. Ensure maintenance procedures will ensure that the quality of work done is verified. Earthing system to be installed
	Small leak on a pipe/vessel		Fuel spill – land pollution Explosion		Ensure leak detection systems are installed to detect underground pipe leaks Earthing system to be installed Ensure a maintenance plan is developed and followed. Records of maintenance done is to be kept. Staff training Audits on maintenance systems Ensure maintenance procedures will ensure that the quality of work done is verified
Petrol /diesel pump	Catastrophic rupture of vessel/piping	Accident damage	Fuel spill – land pollution Pool fire	None-in place, new installation. HAZOP to be conducted	Install speed calming devices at entrance and exit of fuel station Install fuel pump protection barriers

			Flash fire	before at the design phase	Install emergency shut off valves to limit fuel loss in the event of an accident Earthing system to be installed
	Large leak on pipe or vessel	Poor hose quality Poor maintenance	Fuel spill – Air /land pollution Pool fire Flash fire	None in place, new installation. HAZOP to be conducted before at the design phase	Ensure that internal standards for petrol/hose standards are adhered during design phase Ensure maintenance programs are developed to check hose for regular wear and tear Ensure that operators are trained on the use of the hose pipes and defects are reported immediately to the supervisor Earthing system to be installed
	Small leak on a pipe/vessel	Poor hose quality Poor maintenance	Fuel spill – Air /land pollution Pool fire Flash fire	None in place, new installation. HAZOP to be conducted before at the design phase	Ensure that internal standards for petrol/hose standards are adhered during design phase Ensure maintenance programs are developed to check hose for regular wear and tear Ensure that operators are trained on the use of the hose pipes and defects are reported immediately to the supervisor Earthing system to be installed

4 Process Safety Management System

Process safety management(PSM) has been developed to prevent releases of an highly hazardous chemical substance. Process safety management refers to a set of interrelated systems which are used to managing hazards within the process industries. The object of the Process Safety Management system is to reduce the frequency and the severity of incidents resulting from release of chemicals and other energy sources. The typical Process Management System consists of 14 elements. These are

1. Process Safety Information
2. Process Hazard Analysis – HAZOP, What if studies, FMEA
3. Operating Procedures – Process Control and critical tasks
4. Training – Process Safety, Operating procedures, emergency planning
5. Contractors – training, awareness of site hazards
6. Mechanical Integrity – Maintenance programs
7. Hot Work – Permit to work system
8. Management of Change - System
9. Incident Investigation – Root cause investigations
10. Compliance Audits
11. Trade Secrets
12. Employee Participation
13. Pre-Start up review
14. Emergency Planning and Response

Process safety information should include

1. Toxicity information
2. Permissible exposure limit
3. Physical data
4. Reactivity data
5. Corrosivity data
6. Thermal and chemical stability data
7. Hazardous effects of inadvertent mixing of different materials that could foreseeably occur.

8. Information pertaining to the technology of the process should include at least the following:
9. A block flow diagram or simplified process flow diagram
10. Process chemistry and its properties
11. Maximum intended inventory
12. Safety upper and lower limits for such items as temperatures, pressures, flows or compositions
13. An evaluation of the consequences of deviations, including those affecting the safety and health of the employees
14. Information pertaining to the equipment in the process should include the following:

Materials of construction

15. Piping # 1 and instrument diagram (P&IDs)
16. Electrical classification
17. Relief system design and design basis
18. Ventilation system design
19. Design codes and standards employed
20. Material and energy balances for processes built after May 26, 1992
21. Safety system (for example, interlocks, detection or suppression systems)

The installation is a proposed installation, there are no documentation in place yet. The process safety management systems must be developed during the design phase included when undertaking the HAZOP studies.

5 Consequence Analysis

5.1 Scenarios included in the Consequence Analysis

For this risk assessment, a computer program will be used to develop the consequence models namely TNO Effects and TNO Risk Curves.

The data in the table below used for the consequence analysis and will also be included in the risk calculations.

The underground storage tank and the underground piping will only contribute to environmental pollution if there is a catastrophic rupture or leak. The tank and piping will be buried at least 0.5m under ground. A concrete slab will be constructed over the underground petrol and diesel tanks. The covering will make it impossible for the material to reach the ground level. The static electricity risk when offloading the tanker must be addressed during the HAZOP.

Table 5-1 Failures Scenarios to be modelled for each containment system

Equipment	Scenarios Modelled
Petrol Delivery Tanker	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds
Petrol Offloading of road tanker	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds

Equipment	Scenarios Modelled
Diesel Delivery Tanker	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds
Diesel Offloading of road tanker	Catastrophic Rupture
	Large leak, Release of entire vessels contents in 10 minutes
	Small leak, release in 600 or 1800 seconds

5.2 Process Data used in Modelling

Table 5-2 Equipment Data

Equipment	Chemical	Volume	Mass	Temperature	Pressure
Road Tanker	Petrol	43m4	30000kg	20 deg C	101,5kpa
Road Tanker	Diesel	43m3	30000kg	20 degC	101,5kpa

Table 5-3 Data used in the consequence modelling software

Parameter	Units	Value
Heat Radiation contour levels	Kw/m^2	10,12,5,37,5
Lethality levels	%	1
Initial temperature in equipment	Deg C	20
Vessel Volume	m^3	43
Filling Degree	%	90
Ambient Pressure	bar	1,0151
Representative rate	%	First 20
Evaporation from		LAND
Type of pool surface		Spreading in bunds
Maximum pool surface area	m^2	82
Temperature subsoil	Deg C	18
Wind speed at 10 m	m/s	1
Ambient Temperature	Deg C	25
Ambient relative humidity	%	80
Solar heat radiation flux	W/m^2	500
North/South Latitude of the location	Deg	29
Type of subsoil (evaporation)		Heavy concrete
Subsoil roughness description(pool)		concrete
Maximum time for evaporation	seconds	1800
Type of pool fire calculation	Two Zone model Rew & Hulbert	
Type of pool		circluar

Height of receiver	m	1,8
Height of confined pool above ground	m	0
Fraction of combustion heat radiated		0.35
Amount of CO2 in atmosphere		0.0003
Reporting distance	m	100
Maximum heat exposure duration	s	20
Protective clothing		No
Heat radiation Probit A	(sec*(W/m^2)^n)	-36.38
Heat radiation Probit B		2,56
Heat radiation damage Probit N		1,3333
Fraction of Flammable cloud confined		0.08
Threshold pressure	mbar	350
Peak pressure	mbar	100
Lethality indoors		0.025
Meteorological data (D, F, B)		Pasquill
Roughness length	m	1

5.3 Consequence Plots

The consequence plots will be done the following scenarios:

- Heat radiation – 37,5 kw/m^2 & 12.5 kw/m^2
- 1% lethality for each of the above scenarios

There are no overpressure effects or toxic effects as a result of the ignition of the petrol or diesel.

Results for the most stable weather class F

Table 5-4: Heat Radiation Effects Summary

Equipment	Catastrophic Rupture			Large Leak			Small Leak		
	37,5 Kw/m^2	12,5 Kw/m^2	1% Lethality(m)	37,5 Kw/m^2	12,5 Kw/m^2	1% Lethality(m)	37,5 Kw/m^2	12,5 Kw/m^2	1% Lethality(m)
Road Truck Tanker - Petrol	9	14	15	9	14	15	2	5	5
Offloading Hose - Petrol	16	15	16	8	15	16	3	5	6

5.3.1 Heat Radiation Effects for flammable substances

The worst case scenario for each containment system has been plotted in the consequence effects. The effects for petrol was chosen to be plotted as it has a lower flash point than diesel. The results plotted in the graphs below are summarised in table 6-3 above.

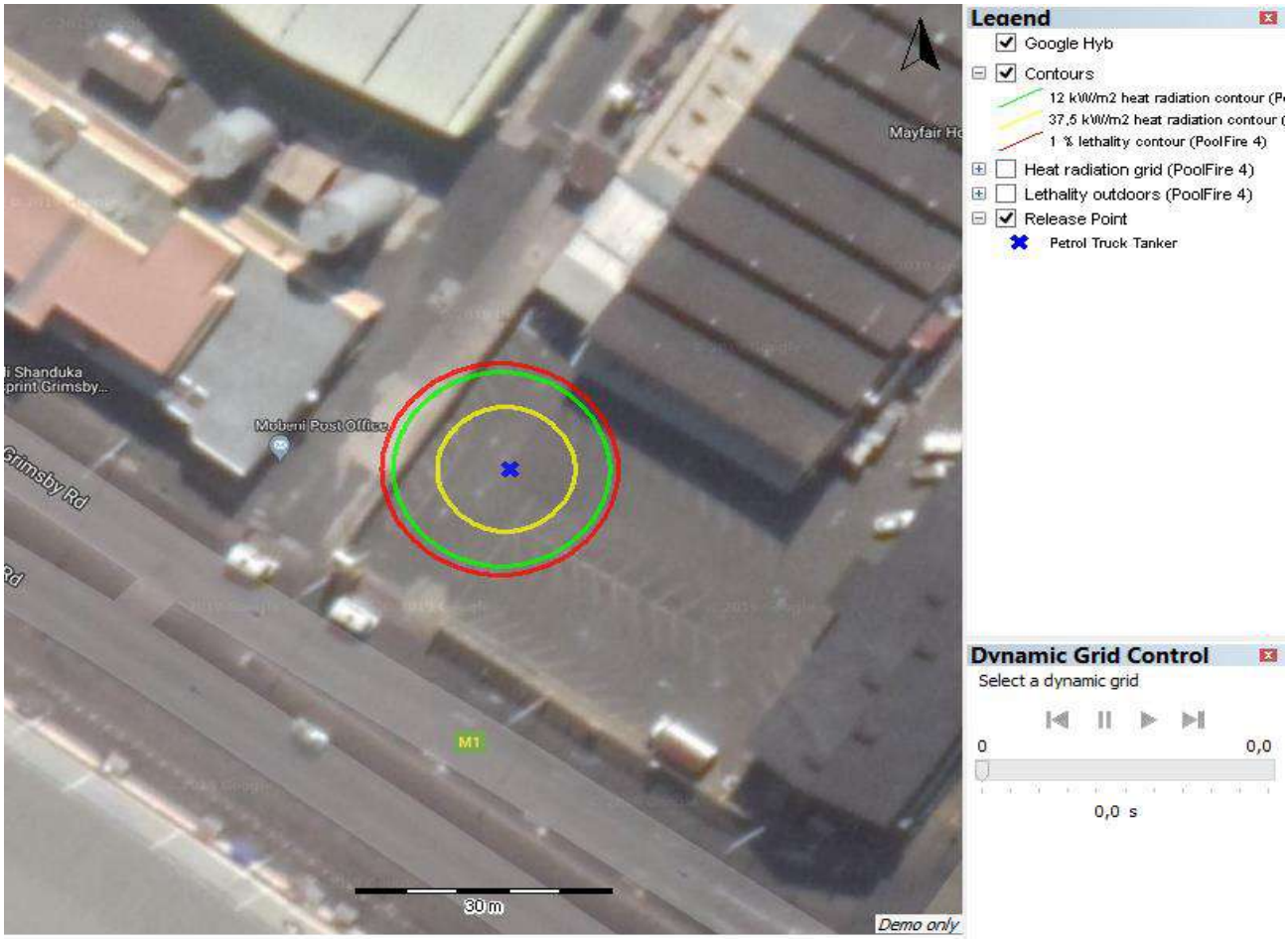


Figure -5-1:Heat Radiation Effects for Petrol - Tanker Catastrophic Rupture

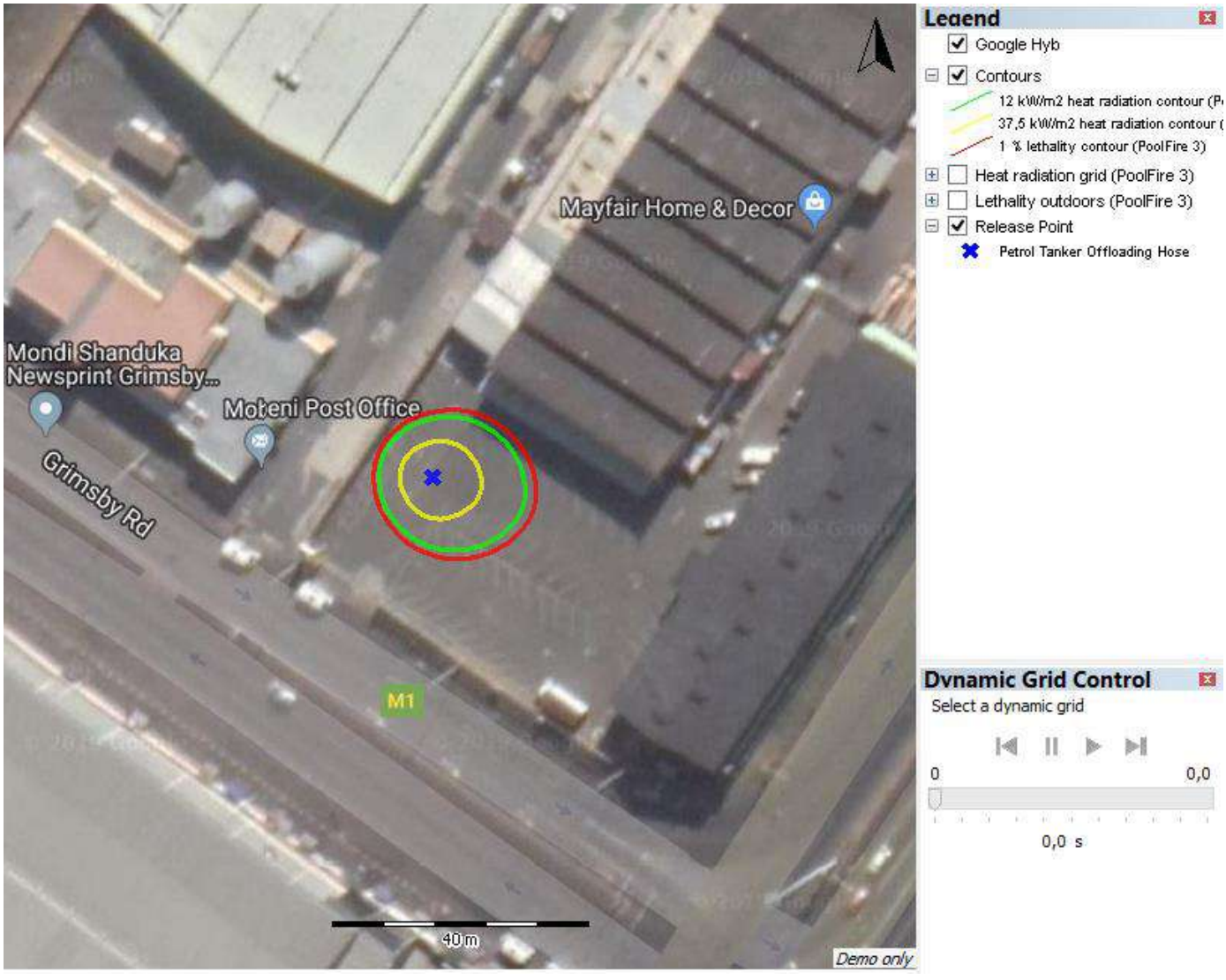


Figure 5-2 Heat Radiation- Petrol Tanker - Large Leak

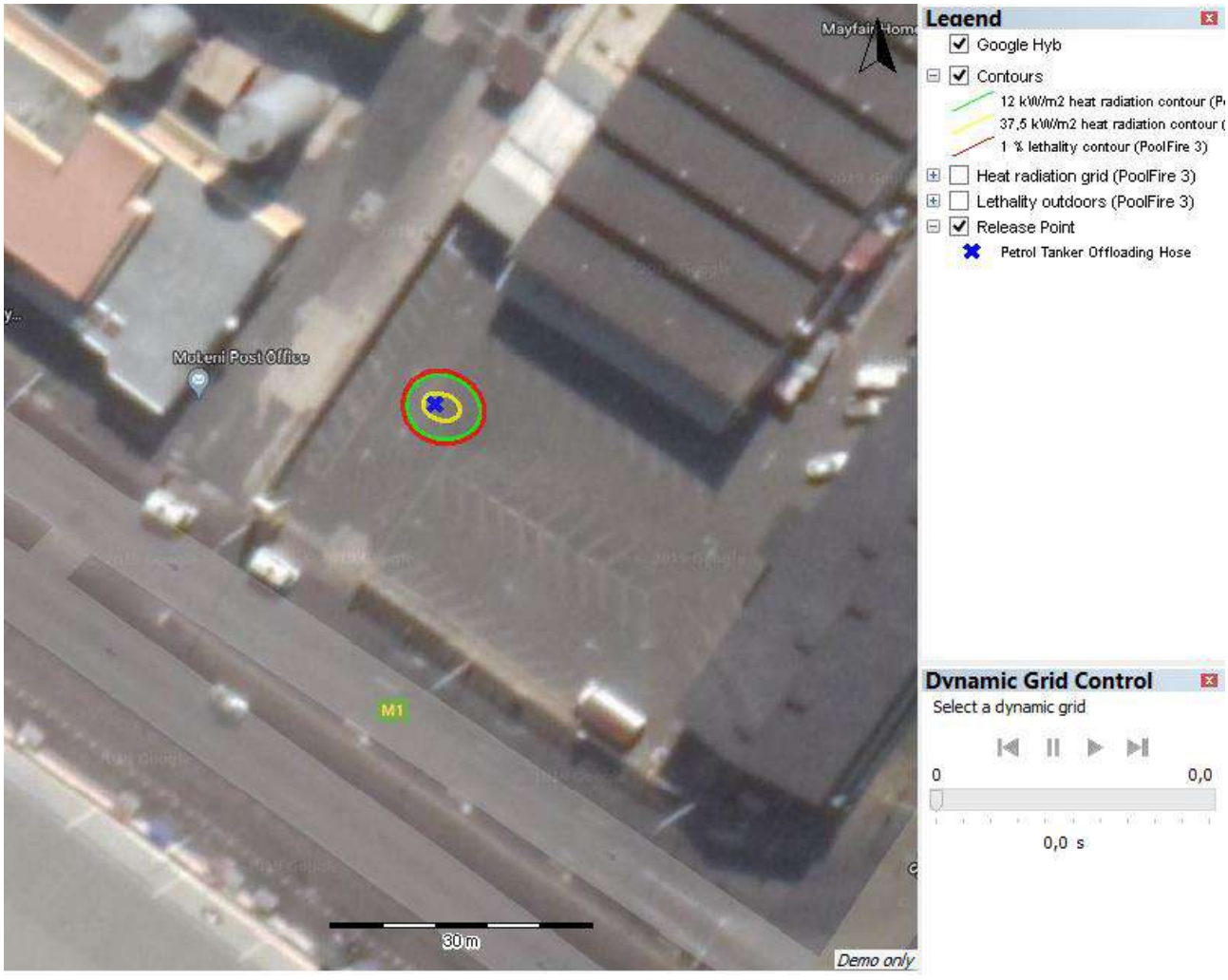


Figure 5-3 Heat Radiation -Petrol Tanker - Small Leak

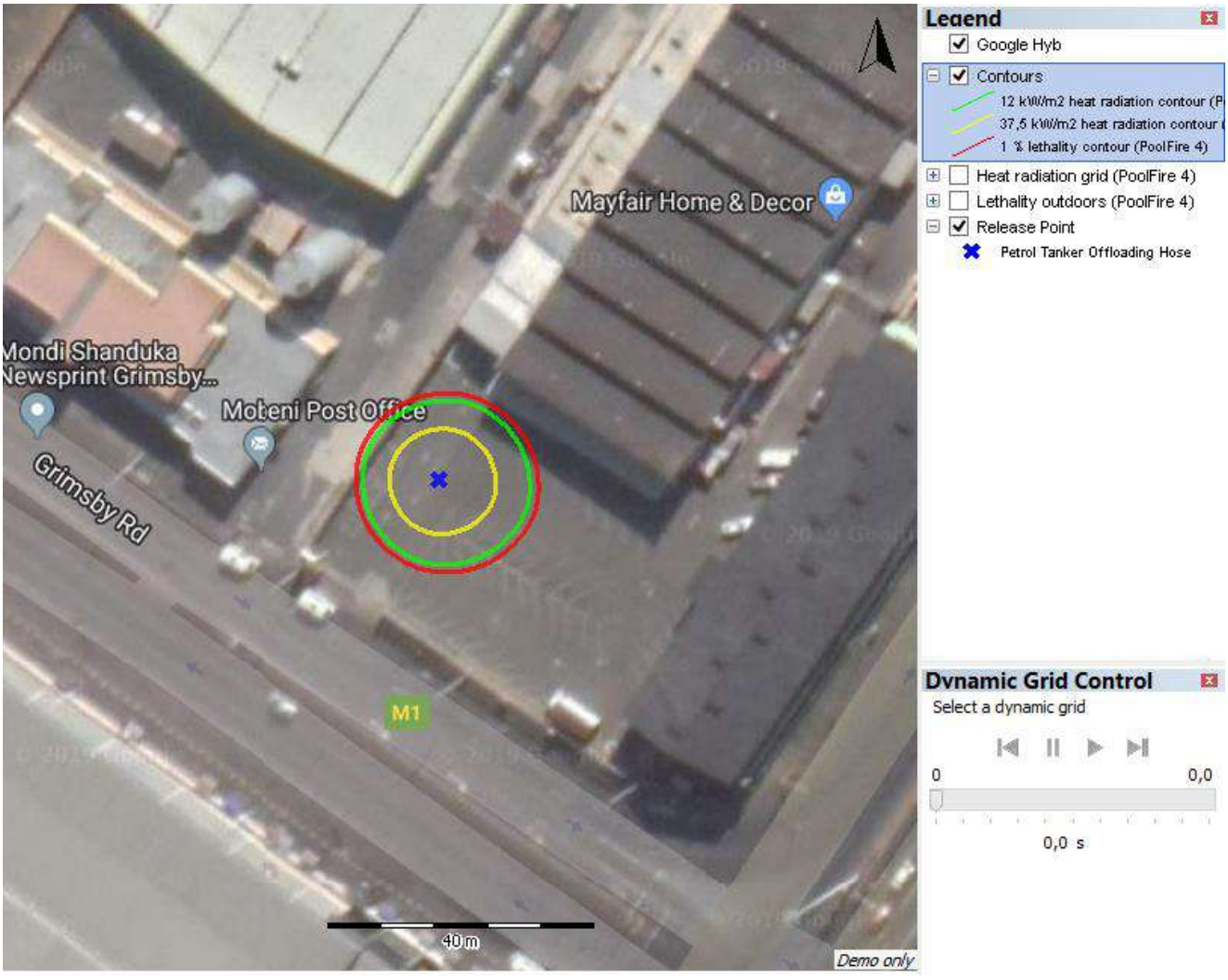


Figure 5-4 Heat Radiation-Petrol Tanker Offloading Hose - Catastrophic Rupture

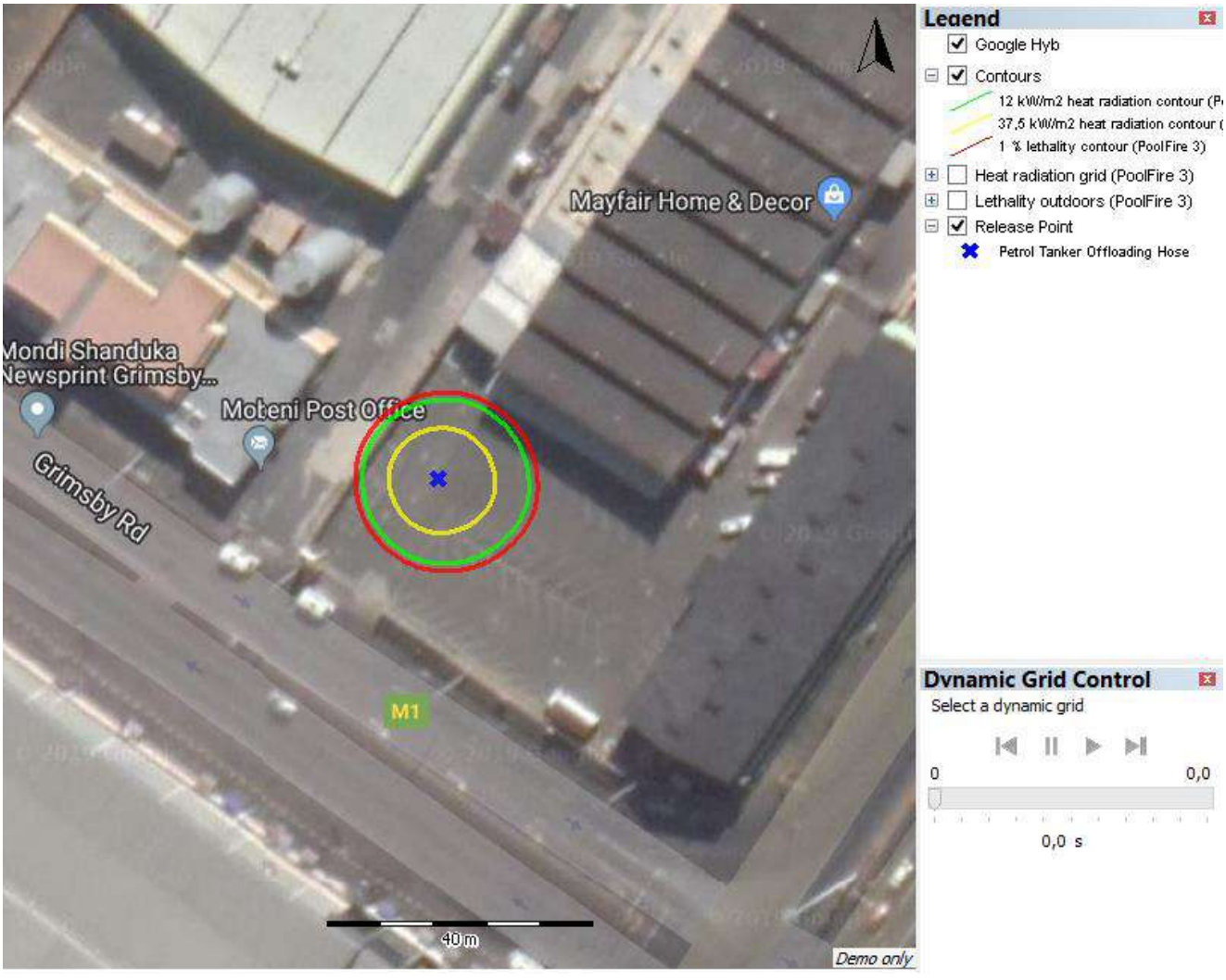


Figure 5-5 Heat Radiation-Petrol Tanker Offloading Hose - Large Leak

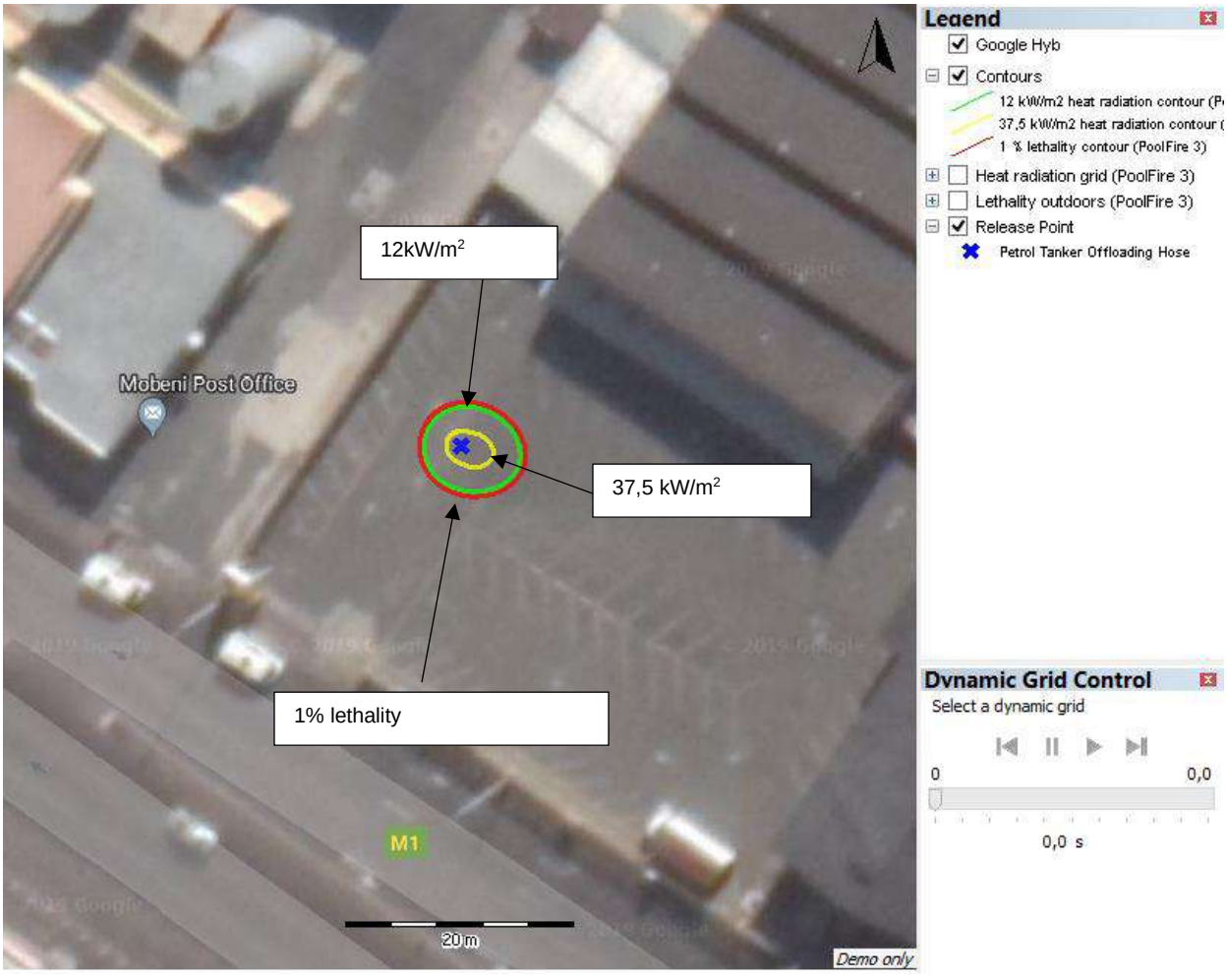


Figure 5-6 Figure 6 5 Heat Radiation-Petrol Tanker Offloading Hose – Small Leak

5.3.2 Over Pressure Effects for Explosive and Flammable Material

The consequence analysis showed that there are no overpressure effects as a result of the petrol or diesel being ignited.

5.4 Consequence Scenarios modelled for the Proposed Petrol Station

Table 5-5: Scenarios modelled for each Equipment

Equipment	Scenario	(Jet fire/pool fire/Flash fire/Toxic plume/Over pressure)
Petrol Tanker Truck #1	Catastrophic Rupture	Pool fire/Flash fire
	Large leak	Pool fire/Flash fire
	Small Leak	Pool fire/Flash fire
Petrol Tanker Truck Offloading Hose #2	Catastrophic Rupture	Pool fire/Flash fire
	Large leak	Pool fire/Flash fire
	Small Leak	Pool fire/Flash fire

The largest effects from each scenario is listed in the section below. The maximum, minimum and width of the effect has been calculated.

5.4.1 Petrol Tanker Truck #1– Catastrophic Rupture-Heat Radiation

Table 5.4-2 Heat Radiation - Petrol Tanker Truck #1 - Catastrophic Rupture

Heat Radiation	Max Distance (m)	Min distance (m)	Width(m)
37,5kW/m^2 heat radiation contour	9	-8	16
12,5kW/m^2 heat radiation contour	14	-12	25
10 kW/m^2 heat radiation contour	15	-13	27
1% Lethality Contour	15	-13	27

The graph below shows the distance from the effect where people exposed will incur 3rd degree lethal burns.

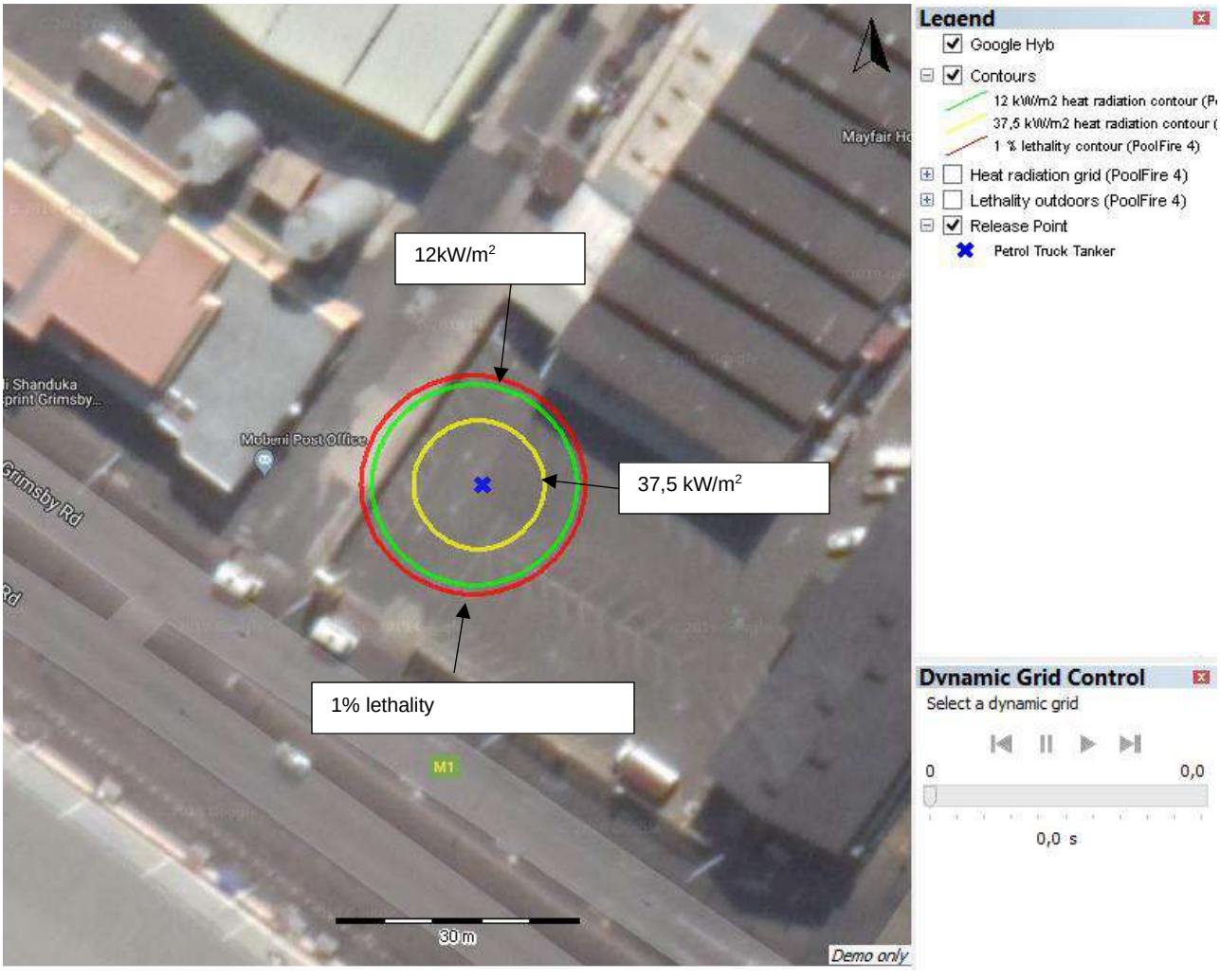


Figure 5-7 Petrol Tanker Truck-Catastrophic Rupture- Heat Radiation Effects-Contours

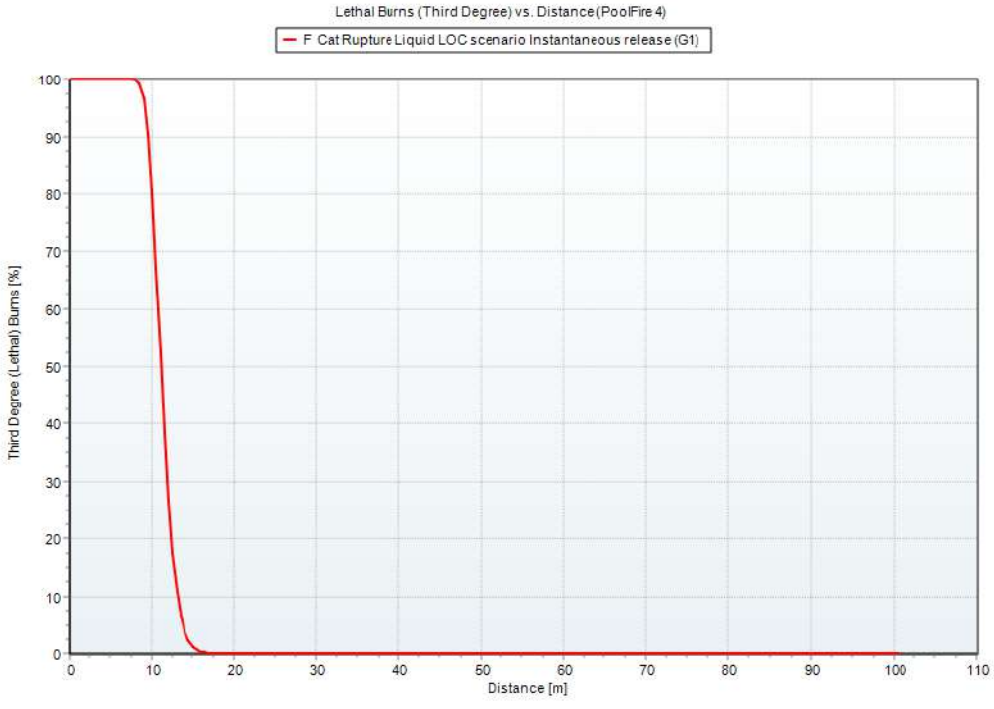


Figure 5-8 Petrol Tanker#1-Catastrophic Rupture-Heat Radiation vs Lethal Burns

The graph below shows the heat radiation from the source of the fire during the most stable weather conditions

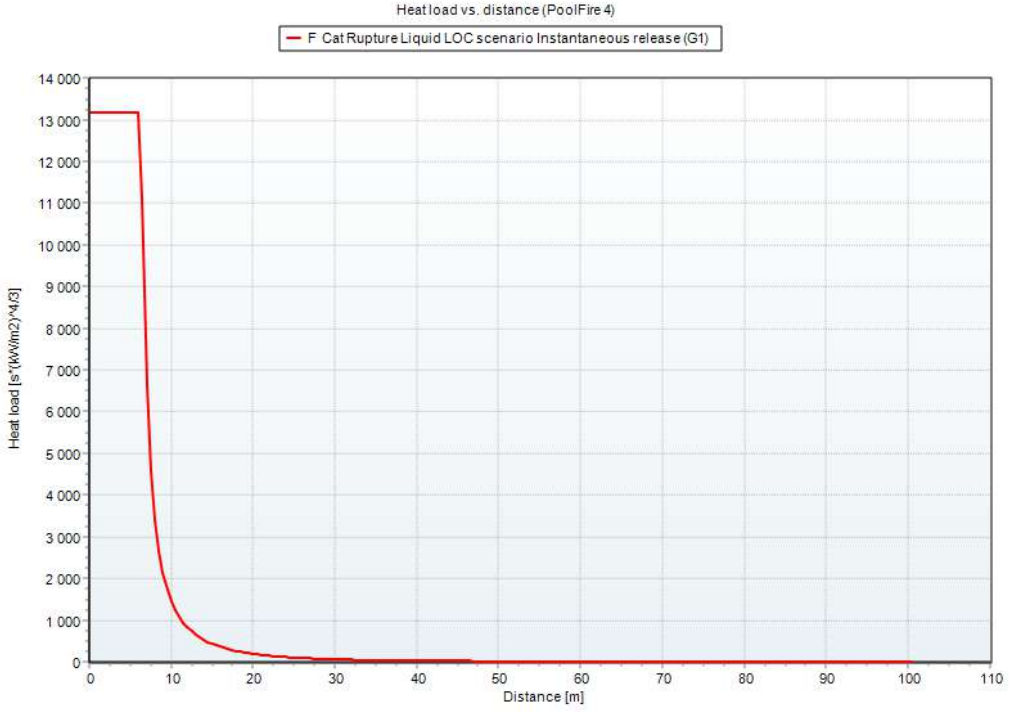


Figure 5-9 Petrol Tanker -Catastrophic Rupture- Heat Radiation vs Distance

5.4.2 The Petrol Tanker Offloading Hose # 2 Heat Radiation- Catastrophic Rupture

Table 5-6 Petrol Tanker Offloading Hose # 2 – Catastrophic Rupture – Heat Radiation Effects

Heat Radiation	Max Distance (m)	Min distance (m)	Width(m)
37,5kW/m^2 heat radiation contour	8	-5	12
12,5kW/m^2 heat radiation contour	15	-9	21
10 kW/m^2 heat radiation contour	16	-9	23
1% Lethality Contour	16	-9	23

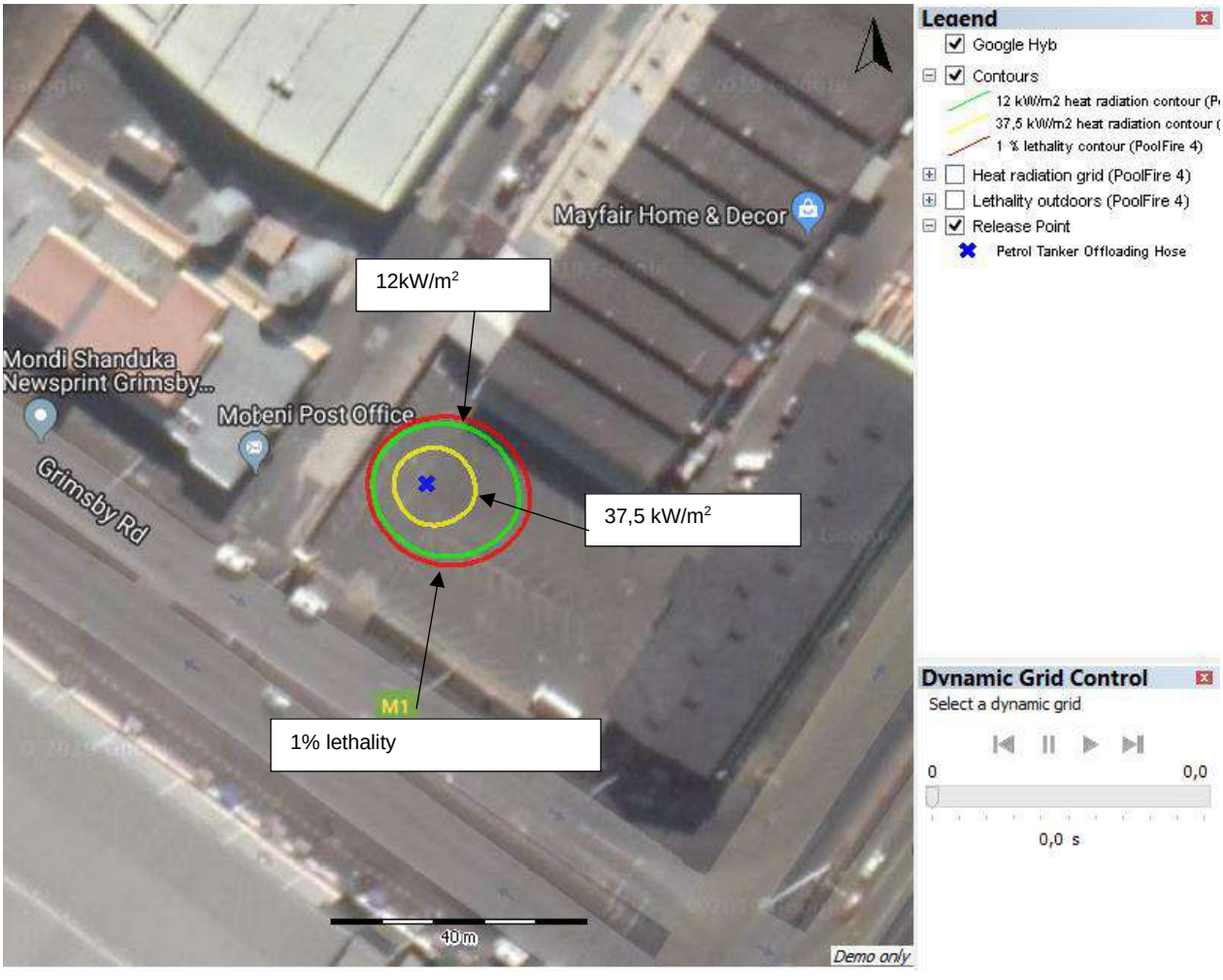


Figure 5-10 Petrol Tanker Offloading Hose-Catastrophic Rupture- Heat Radiation Effects-Contours

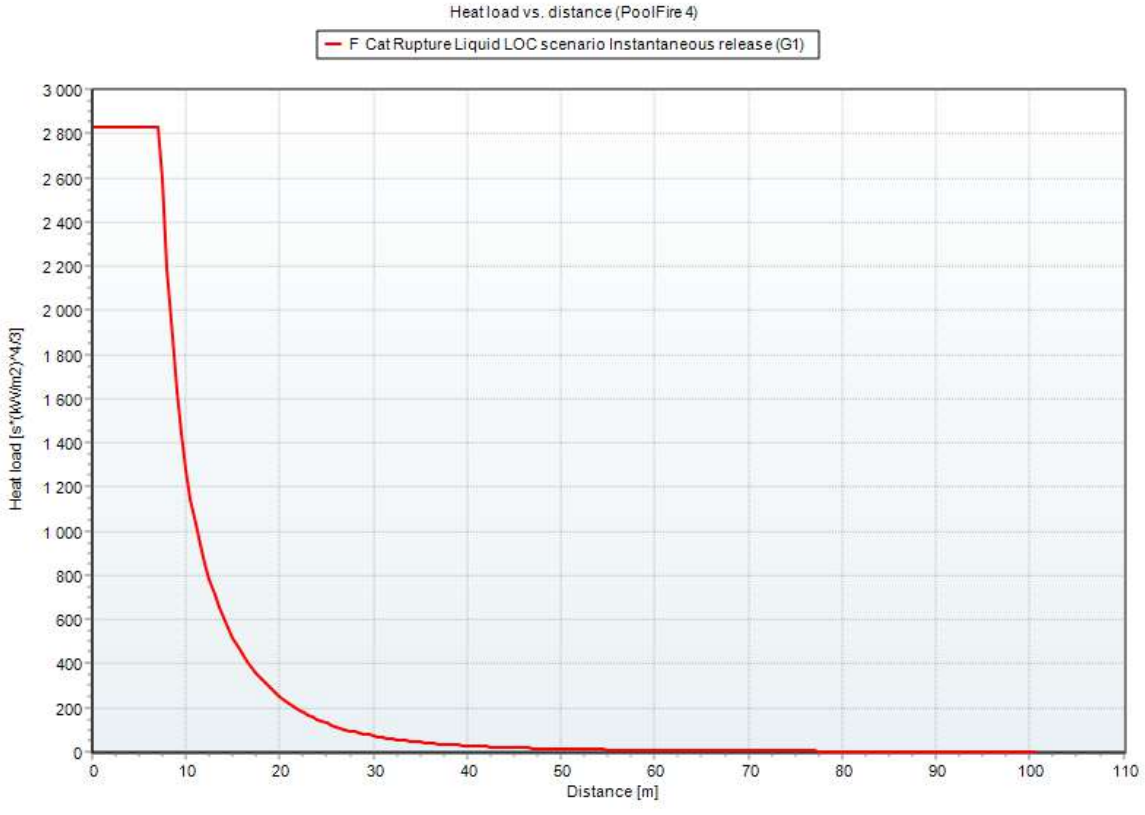


Figure 5-11 Petrol Tanker Offloading Hose - Catastrophic Rupture - Heat Radiation Effects-Distance from center

5.5 Domino Effects

There are no Major Hazard Installations around the proposed petrol station hence there is no risk to Domino Effects

5.6 MHI Classification

If the effects extend outside the site boundary , the event will be classified as an MHI Event. The events considered below shows that although the catastrophic rupture extends by a few meters outside the boundary, there is a double brick wall, height of 2 meters which will contain the effects to the site boundary.

A summary of the events which extend out of the site boundaries are shown below:

Table 5-7: MHI Classification

Equipment/Plant	Incident	Distance to MHI Threshold	Distance to site boundary	MHI EVENT (Yes/No)
Petrol Truck Tanker	Catastrophic Rupture	14m	10m	Yes
Petrol Truck Hose Rupture	Catastrophic Rupture	14m	10m	Yes

Although, the results show that the radiation effects extend outside the site boundary, the presence of a double brick wall, couple with the fact that the 1% lethality extends into an unoccupied building will reduce the effects of the heat radiation to the neighbouring facilities.

There is no risk to society as a result of the operations of the petrol station. The petrol station becomes a major hazard installation during the offloading of a diesel or petrol tanker. The area on which the heat radiation extends is not an occupied area, in addition there is a double brick wall to the height of 2m which will protect people in the heat radiation zone.

Since the petrol station is located in an industrial area, there is no risk to people within society. In addition , it is assumed that a full HAZOP is conducted on the design of the petrol station. All safeguards shall be implemented as recommended. The petrol station shall implement a process safety management system to ensure that the safety of the people onsite is protected.

Based on the results obtained the petrol station is not classified as a Major Hazard Installation.

6 Frequency Analysis

For this report the Bevi failure data has been used to estimate the failure rates. When information is not available in Bevi the alternative data source will be stated. If there are no historical data available, the fault tree analysis will be used to determine the failure frequencies.

Failure frequency data will be used from BEVI manual unless otherwise stated. The plant specific data is show in table 7-1.

It is assumed that the establishment has all the necessary process safety management systems in place. If the process safety management systems are not in place the risk ranking will be higher.

6.1 Plant specific data

The table below shows the probability of each failure scenario occurring. A correction factor is a factor which can be used to reduce the probability of failure or increase the probability of failure for example if a site has many layers of protection the probability of failure can be reduced however in the absence of layers of protection the probability of failure can be increased.

Table 6-1: Frequency Data

Equipment	Incident	Failure Data	Correction factor	Frequency data used in software
Equipment 1# Petrol Tanker Truck	Catastrophic Rupture	$1x10^{-5}$/yr	1	$1x10^{-5}$/yr
	Large Leak, release in 600s	$5x10^{-7}$/yr	1	$5x10^{-7}$/yr
Equipment 2# Petrol Tanker Offloading Hose	Catastrophic Rupture	*$3x10^{-6}$ per hr	1	$8X10^{-4}$/yr
	Large Leak, release in 600s	**$3x10^{-7}$ per hr	1	$8X10^{-3}$/yr

*/** 200 hours taken as being the offloading hours per year to calculate the frequency per year

7 Risk Calculations

The individual risk and the societal risk have been calculated using TNO Effects and Risk Curves software.

7.1 The Individual Risk Contours

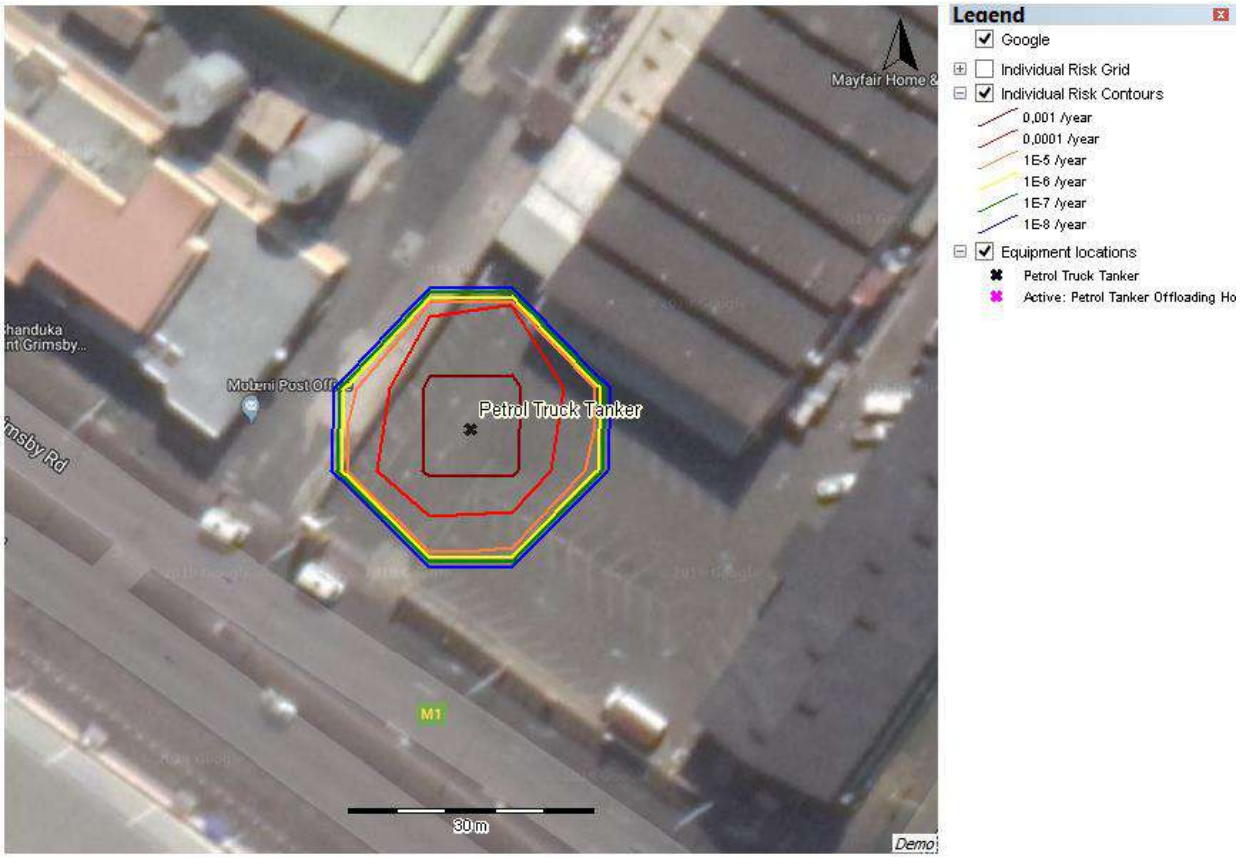


Figure 7-1 Risk Contour Plots for the Tanker Offloading Hose Catastrophic Rupture

7.2 Risk Levels across the site

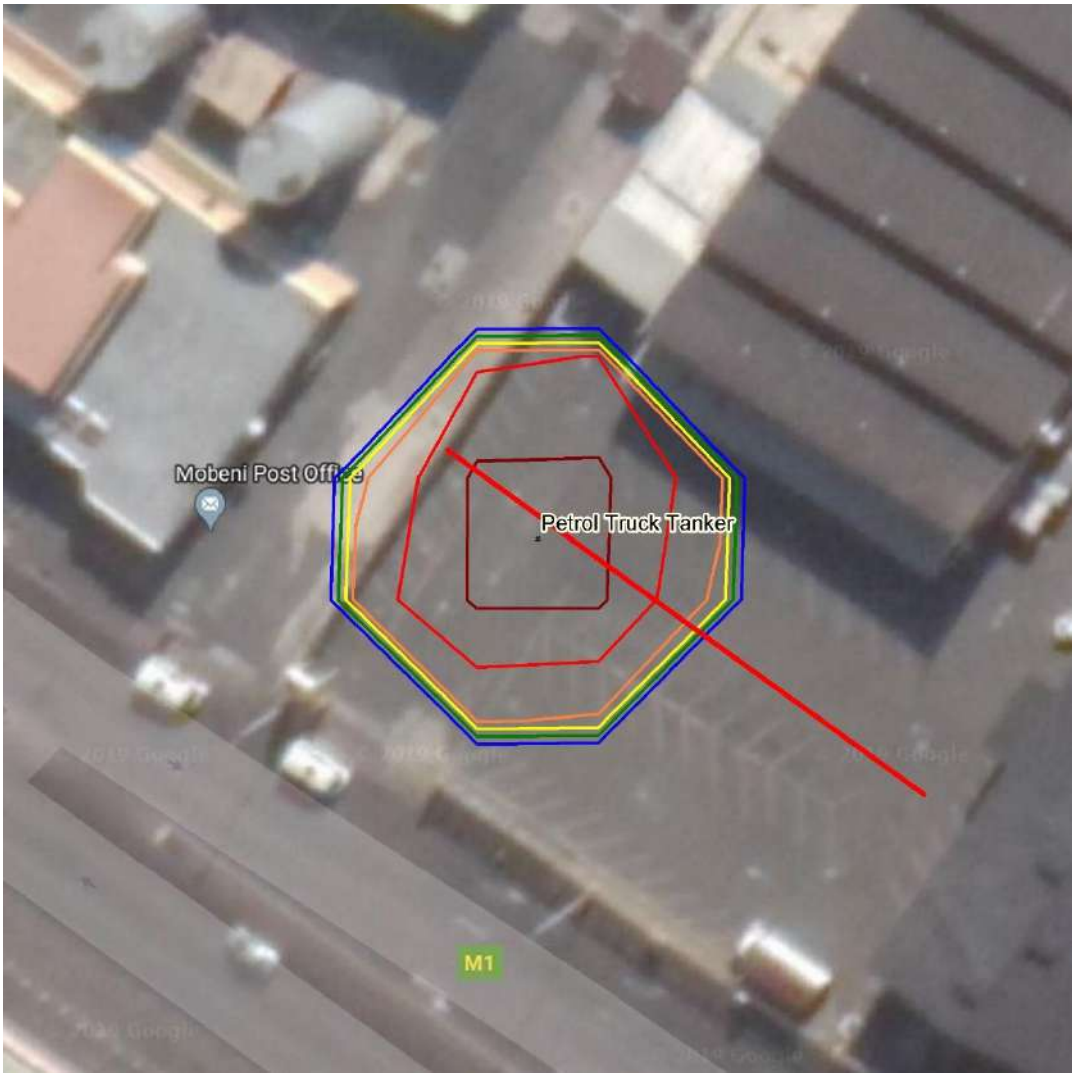


Figure 7-2 Risk Transect Across the site from NE to SW.

In addition to the risk contours, the risk profile was computed. The risk profile is the risk at various points on a strain line. A line was drawn from North West to South East. The risk profile shows that the risk falls within the boundaries of the site

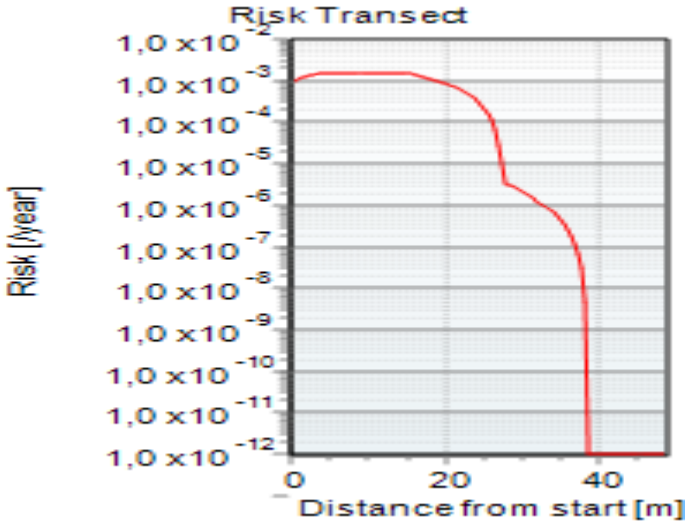


Figure 7-3 Risk Line Profile – North West to South East within the site boundary

The individual risk the proposed location of the restaurant is $1x10^{-012}$ d/p/y. This is negligible when compared to the allowed risk of 1x10-06 d/p/y.

7.3 The F-N Curve

The effects as a result of an incident at the proposed petrol station does not extend to society. The F-N curve has not been plotted as a result.

8 Risk Judgement

The risk acceptance criteria have been developed over many years. The risk criteria indicate if the risk to public or society is acceptable, or control measures are needed to reduce the risk to acceptable levels.

8.1 The Public Risk Acceptance Criteria

The risk acceptance criteria for the members of public can be seen below . The tolerable range is between $1x10^{-4}$ and $1x10^{-5}$ d/p/yr.

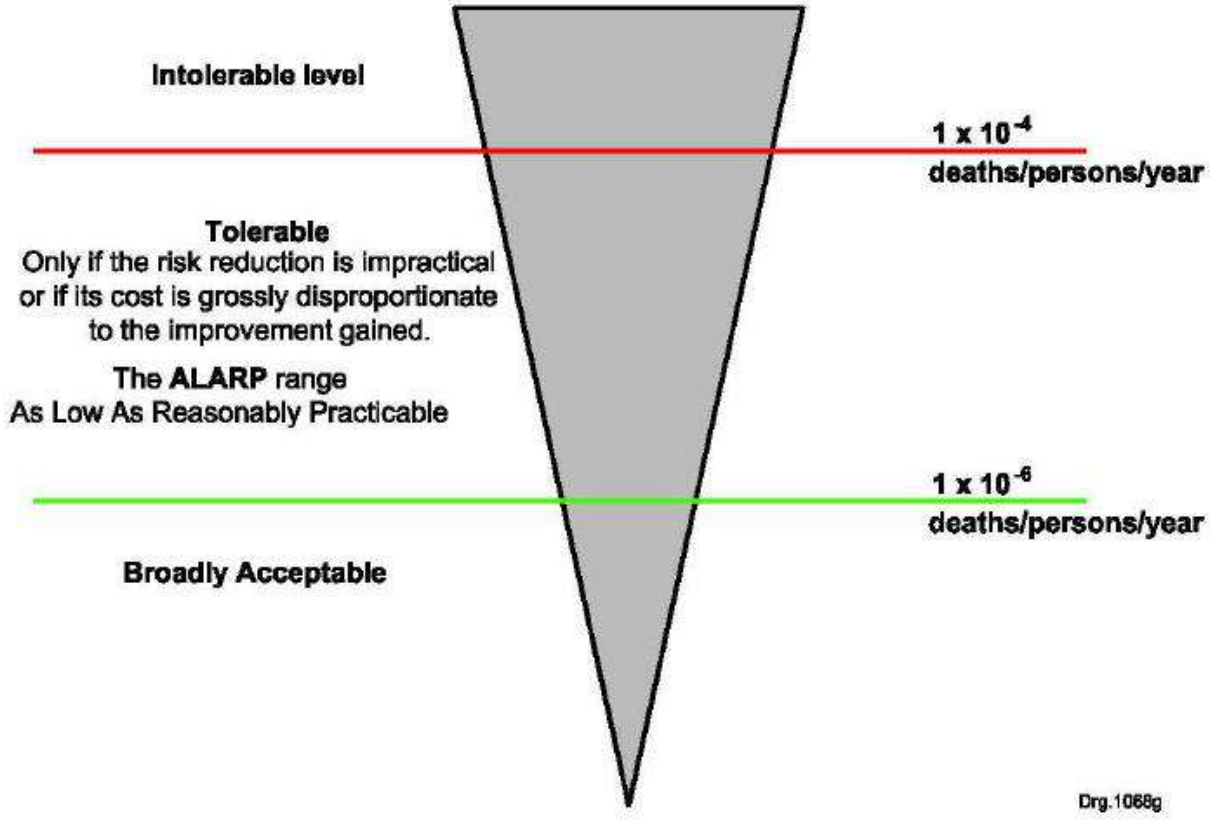


Figure 8-1: The Public ALAP risk Decision making framework

8.2 The Employee Risk Acceptance Criteria

The acceptable range for risk to the employee is between $1x10^{-3}$ and $1x10^{-5}$ d/p/yr

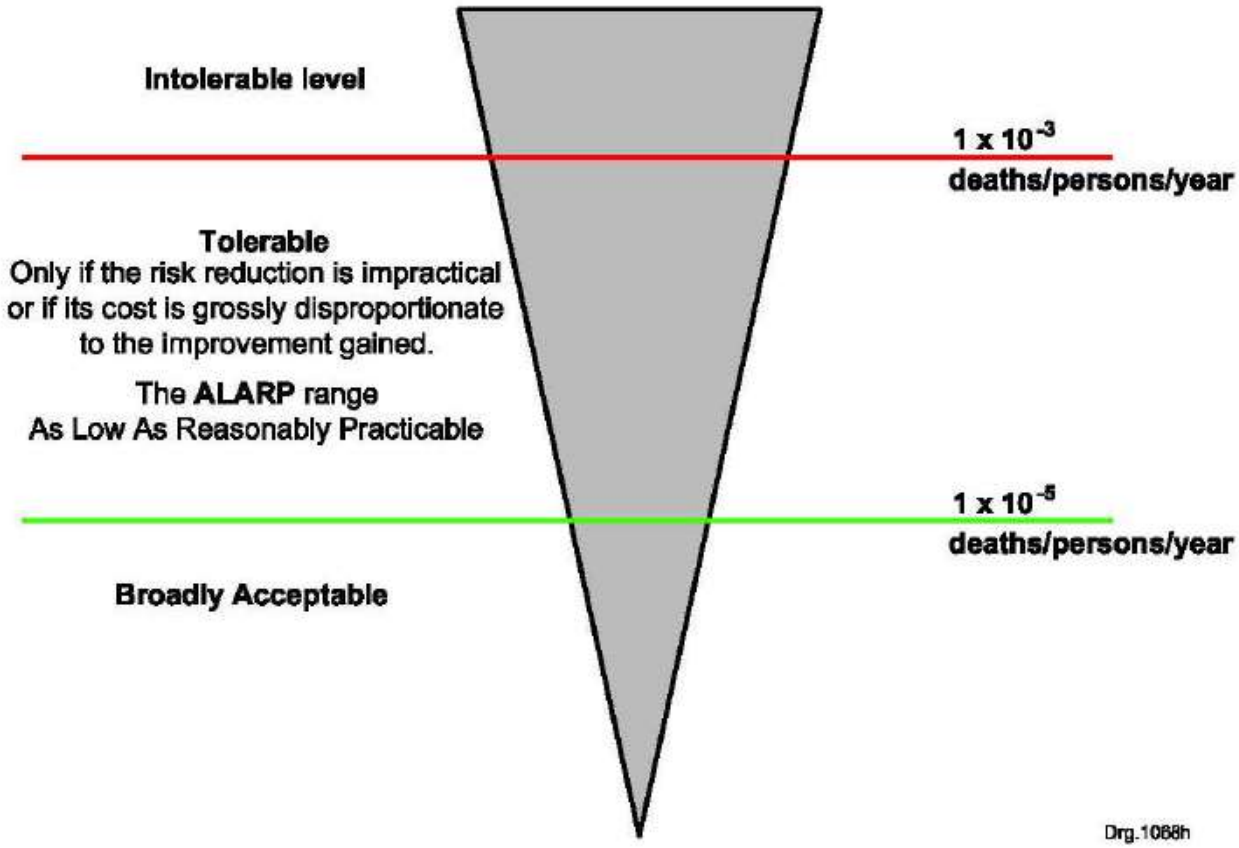


Figure 8-2 Employee risk acceptance criteria

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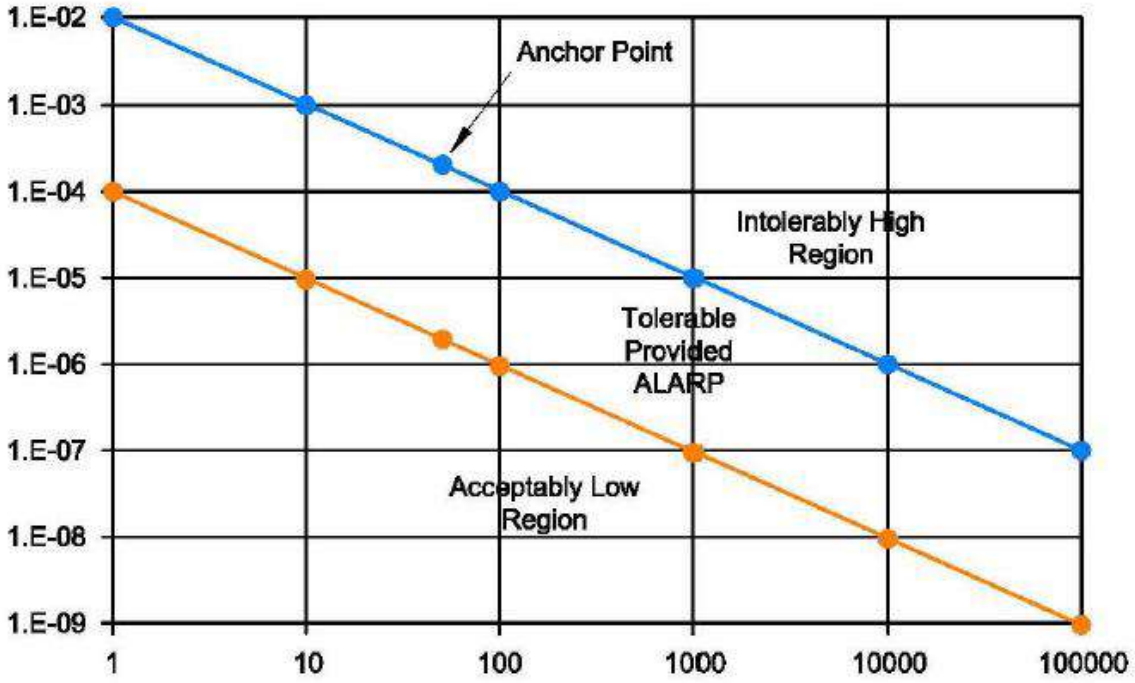
8.3 Societal Risk Acceptance Criteria

The graph below is the F-N Curve where F is the frequency of event and N is the number of deaths of people. The acceptable range is show in the area between the two lines.


1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
1
10
100
1000
10000
100000
Anchor Point
Intolerably High Region
Tolerable Provided ALARP
Acceptably Low Region

8.4 Societal Risk

The effects from the proposed petrol station does not pose any threat to the society hence there is no societal risk curve which has been plotted.

8.5 Employee Risk

The risk to employees at the petrol station falls with the acceptable range of $1x10^{-03}$ d/p/y and $1x10^{-05}$ d/p/y.

There is no risk to the people at the restaurants and shops.

8.6 Risk Reduction

9.6.1 A HAZOP is to be conducted at the design phase of the petrol station.

9.6.2 All aspects of the construction regulations and the occupational health and safety act are to be adhered to.

9.6.3 All critical task to have written procedures.

9.6.4 All recommendations in the Hazard Analysis section ,but not limited to, of this report must be adhered to.

9.6.5 A process safety management plan shall be implemented to reduce the risk of an accident.

8.7 ALARP

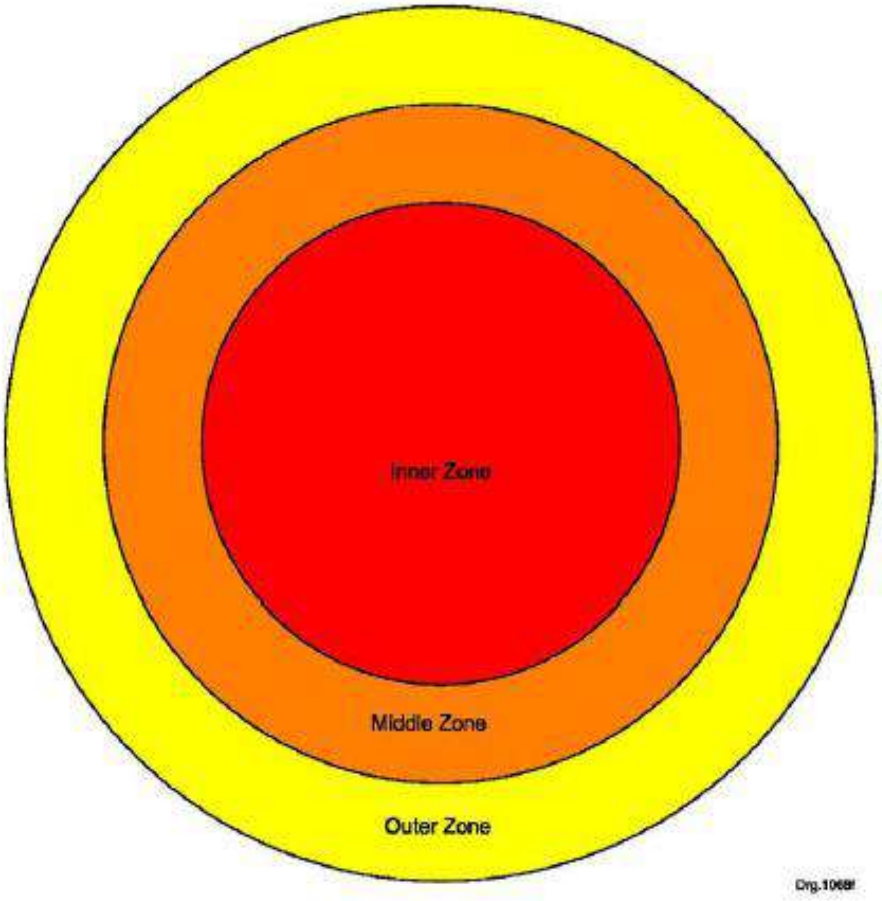
It has been assumed that all the best practice guidelines have been followed to reduce the risk as low as reasonably followed. An audit after the petrol station has been commissioned shall be done.

9 Land Use Planning

The development of the land surrounding a Major Hazard Installation is of great importance in protecting the public. These issues have been highlighted in incidents in Mexico City and Bhopal India where most casualties were people who lived in high density residential areas close to the hazardous sites. These two specific incidents carried specific warnings as the residential areas were mostly informal settlements which had sprung up and encroached on the establishments involved in the incidents. Distances from the potential incident source to members of the public is a very effective measure to ensure that in the event of an incident the effect on the public is a very effective measure to ensure that in the event of an incident the effect on the public will be minimised.

The HSE has published many guidelines relating to the risk criteria for land planning in the vicinity of the Major Hazard Installation. The most frequently used tools for decision making are:

1. Which zone does the development is located in relation to the major hazard installation i.e. inner zone(IZ), middle zone(MZ) or outer zone (OZ)
2. The sensitivity levels are obtained from the HSE Development types categorization. The sensitivity levels are shown in the figure below



Key

Inner zone includes all areas where risk is > 10 chances per million per annum.

Middle zone > 1 chance per million per annum.

Outer zone > 0,3 chances per million per annum.

Figure 9-1 Land Zone Planning Risk Criteria

Table 9-1 Population sensitivity levels

Sensitivity levels	
Level 1	Based on normal working population
Level 2	Based on general public – at home or involved in normal activities
Level 3	Based on vulnerable members of public (children, those with mobility difficulties or those unable to recognise physical danger.
Level 4	Large examples of level 3 and outdoor examples of level 2

Once the level of sensitivity has been determined the matrix below can be used to advise for or against any developments in the vicinity

1	2	3	4
Level of sensitivity	Development in Inner Zone	Development in Middle Zone	Development in Outer Zone
Level 1	Do not Advice Against (DAA)	Do not Advice Against (DAA)	Do not Advice Against (DAA)
Level 2	Advice Against (AA)	Do not Advice Against (DAA)	Do not Advice Against (DAA)
Level 3	Advice Against (AA)	Advice Against (AA)	Do not Advice Against (DAA)
Level 4	Advice Against (AA)	Advice Against (AA)	Advice Against (AA)

9.1 Restricted Development Distance

Table 9-2 Table showing diameter of each land use planning zone

Zone	Diameter of effect zone	Sensitivity Level	Land Planning Advice
Inner Zone	No restricted zones	No restricted zones	No restricted zones
Middle Zone	No restricted zones	No restricted zones	No restricted zones
Outer Zone	No restricted zones	No restricted zones	No restricted zones

9.2 Map plot showing restricted development zones

There are no restricted development zones at the location of the petrol station. All restrictions fall within the site boundary provided the double brick wall on the North East boundary is intact.

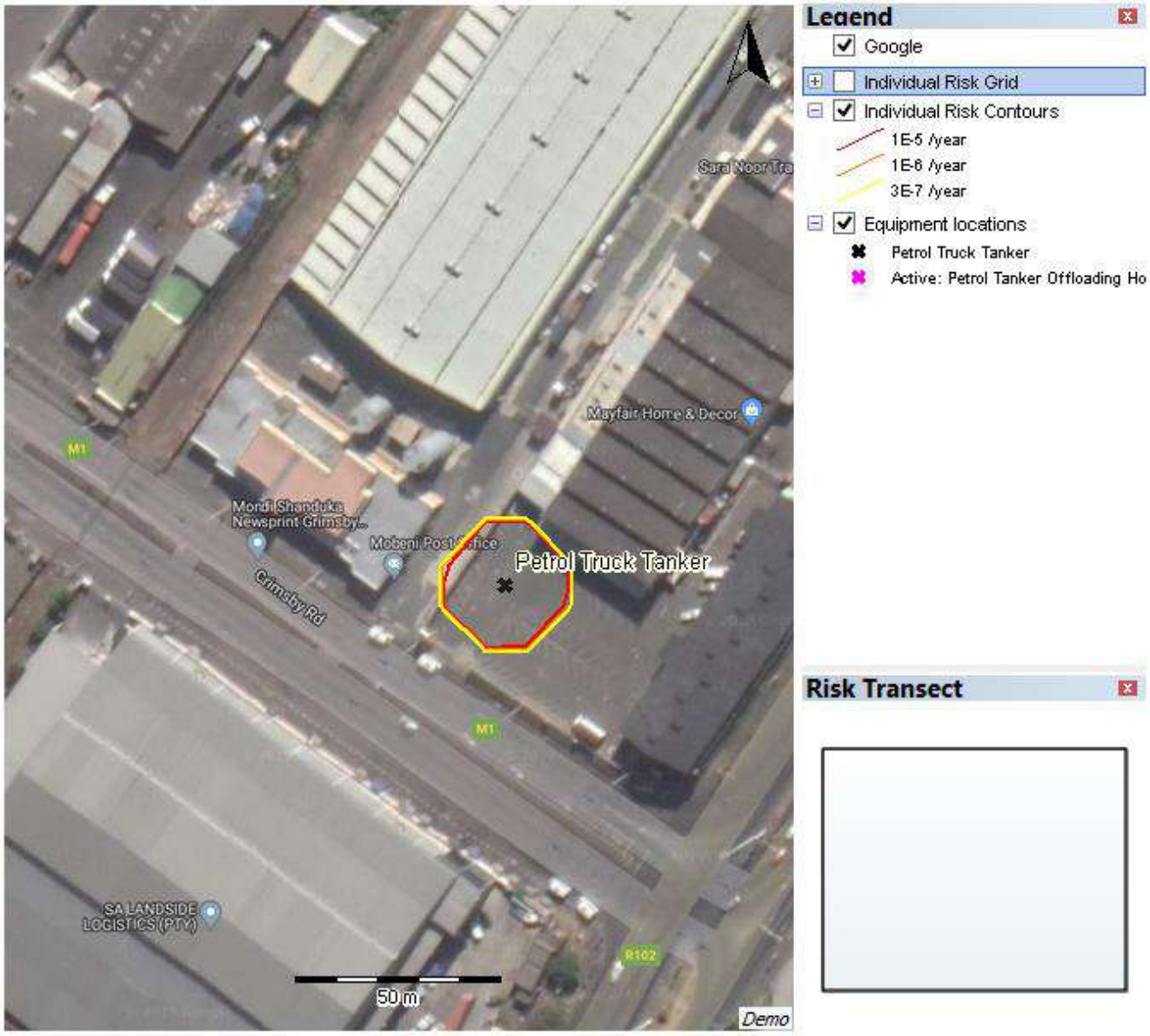


Figure 9-2 Map showing land planning restricted zones

9.3 Conflicts for new developments

There are no conflicts for new developments as a result of the new petrol station. The double brick wall on the North West Side of the property should not be demolished.

9.4 Conclusions and Recommendations for Land Use Planning

The proposed petrol station does not pose a risk to society or the people who maybe present in the restaurants hence there is no restrictions on the developments around within the property.

10 Emergency Planning

10.1 Onsite Emergency Planning

Since there structure is a new development there is no emergency plan. The draft onsite emergency plan has been developed and will be implemented upon commissioning of the petrol station.

10.2 Offsite Emergency Planning

The eThekwini Municipality has a detailed offsite emergency plan which will be employed in the event of an offsite event. In the case of the proposed petrol station it is unlikely that any events will extend the boundary of the site.

10.3 Recommendations for the Sites Emergency Plan

The proposed sites emergency plan has been developed according to the SANS 1514 Emergency Planning Guideline. The outline for the emergency plan has been developed. The emergency plan will have to be tested upon completion of the

11 Environmental

The environmental aspects related to the plant will not be considered in this report. The company must follow requirements of The National Environmental Management Act(NEMA). (Reference EIA report is available).The Environmental Impact Assessment is in the draft format and will be officially issued once the traffic assessment and MHI report is completed.

12 Conclusions and Recommendations

12.1 Hazardous Installations on Site

There are no other hazardous installations on site. If the company is to store LPG on site, then the location of the storage area is to be reviewed and the risk profile determined.

12.2 Maximum Extent of the 1% Lethality consequence

The maximum extent of the 1% lethality due to the heat radiation covers an area of 430 m^2 or a diameter of 25m around the offloading tanker.

12.3 Risk Evaluation

The petrol station does not pose any risk to the society around them provided all the recommendations in this report is undertaken. The risk to their employees onsite is within the acceptable range of $1x10^{-3}$ and $1x10^{-4}$

12.4 Recommendations for Risk Reduction

12.4.1 A HAZOP is to be conducted at the design phase of the petrol station.

12.4.2 All aspects of the construction regulations and the occupational health and safety act are to be adhered to.

12.4.3 All critical task to have written procedures.

12.4.4 All recommendations in the Hazard Analysis section ,but not limited to, of this report must be adhered to.

12.4.5 A process safety management plan shall be implemented to reduce the risk of an accident.

12.5 Technical Assumptions

12.5.1 All safety best practices have been implemented.

12.5.2 A full scale HAZOP has been conducted on the design of the petrol station.

12.5.3 All safe gaurds have been implemented according to the Occupational Health and Safety Act.

12.6 Land use planning

The current site is zone for industrial use. There is no societal risk which extends outside the boundary of the petrol station, hence there is no restrictions around the petrol station.

The proposed McDonalds restaurant is 25m outside the $1x10^{-7}$ risk contour. Hence there are no restrictions on the proposed restaurant to be built.

13 Proof of Competence

13.1 CV of Risk Assessor

(Terrence) Rajendren Moothusamy Pr Eng, AMIChemE

PROFESSIONAL AFFILIATIONS:

Organization	Member #	Membership
Engineering Council of South Africa	#2015000079	Pr. Eng.
South African Institute of Chemical Engineers	#00708	Associate Process Safety Engineer

COMPUTER SKILLS

Package	Skill Level
MS Office; Excel, Word PowerPoint	Advanced
MS Projects	Advanced
SAP/R3	Advanced

EDUCATION & QUALIFICATIONS:

Qualification	Date Completed	Institution
SAMTRAC – Advanced	2018	NOSA
Introduction to SAMTRAC	2016	NOSA
Quantitative Risk Assessment	2015	ISHECON
Project Management	2014	University of Stellenbosch
Post Graduate Diploma in Business Administration	2007	GIBS(UP)
B.Tech Pulp and Paper	2003	DUT
B.Sc. Chemical Engineering	2001	UKZN

WORK EXPERIENCE:

MHI RISK ENGINEERS (Pty) Ltd – Director/Technical Manager (Approved Inspection Authority) - June 2018

Duties: Developing Process Safety guidelines/ Developing guidelines for Emergency Planning/Developing methods for Quantitative Risk Assesments using EPA software/ Developing training material for process safety topics/ Developing Criteria for Major Hazardous Installation Compliance/ Developing Training Materials on the legislation around Major Hazardous Installations in South Africa, General Machinery Regulations in South Africa and OSCH Act/Implemented ISO 17020/2012 Management System Standard/Business networking/ Building customer relationships/Sales of services to clients /Marketing Products and Services

BUCKMAN South Africa

Technical Account Manager – July 2016 to June 2018

Duties :Conducting HAZOPS/Developing and reviewing safe work procedures/Training/Auditing safe work procedure use/Performing Safety Risk Assessments/Safety Audits on high risk installations and activities/Managing, Developing & Coaching Staff/Managing and developing relationships with Customers/Reconciliation of invoices and delivery notes/Managing contractors on site /Project Management for installation of new chemical plants/Managing Inventory on site /Managing site chemical budget/Writing technical reports, trial proposals and tender documentation/Sales of new products and technology to the customer.

Varsity College

Part Time Lecturer – January 2016 to September 2016

Duties: Preparation of Project Management Lecture Notes /Performing lectures at Varsity College

DOW Chemical Company, Coatings Division – New Germany, SA

Improvement Engineer – August 2009 to September 2015

Process Safety Role – Risk Management e.g. Identification of Gaps in the Safety Systems, Process Audits e.g. Burner Management Risk Assessment, Loss Prevention Principals Risk Assessment, Process Field Risk Assessments, Process Safety Training for operators and staff e.g. Reactive Chemicals, Layers of Protection Analysis, Root Cause Analysis for Reactive Chemicals Incidents,, development of critical procedures e.g. Management of Change, Safety System Impairment policy, Development of emergency drills scenarios.

Project Management Role – Scope, Capex Applications, Project Risk Management, Project Planning, Cost Management, Contractor Management, Contract Management, Commissioning, Training of Staff, Factory acceptance testing.

Process Engineering Role - Troubleshooting mechanical, instrumentation, process control and production related problems on the plant e.g. faulty valves, flowmeters, pumps, control issues. Issuing Safe Work Permits, Coaching operators, Optimising batch recipe control and operating instructions, leading a team to identify opportunities on site and implement improvement projects using six sigma methodologies and product quality investigations

Product Development Role – Scale up of new products, Risk Assessments, feasibility studies, raw material availability, process development etc.

Occupational Hazards Management – Conducting field risk audits, On the job risk audits, BBP risk evaluations, writing safe work permits, developing confined space entry procedures , work at elevated heights safe work permits, coaching employees in the field.

Rohm & Haas – New Germany, South Africa

Technical Manager – February 2008 to July 2009

Duties : Troubleshooting Quality related problems in production/ Handling and responding to customer complaints / Customer visits/ Conducting RCIs for Quality using Apollo tool/Troubleshooting process related problems / Maintaining the plants Asset Utilization Improvement Plan/ Scale up of new products/Ensuring Management of Change system is followed/ Acting as Production Manager/Supervising Junior Process Engineers/ Collaboration with International team of experts to solve quality related challenges/Promotion of products with customers

Sappi Fine Papers - Stanger Mill, Gledhow

Process Engineer – April 2004 to January 2008

Process Engineer Duties - Troubleshooting, Process Optimization and solution implementation on Paper, Coater Machine, Supercalender Machine, Vari-Roll winder & Coater Kitchen/ Budget forecasting/ Acting as Production Superintendent/Optimization of the coating formulations/Trials for new products/Facilitating End State Analysis Sessions/Conducting Hazop/Swift studies/Planning, implementation and reporting of trials on the Coater Machine and Paper Machine/Investigating customer complaints and providing recommendations/Drawing Piping and instrumentation diagrams and writing process descriptions/Management of the Plant Modification System/Presentations to senior management

14 References

1 Perry's' Chemical Engineers' Handbook, Robert H. Perry, 7th Edition, McGraw Hill.

2 AICHE(1985) Guidelines for Hazard Evaluation Procedures. New York: American Institute of Chemical Engineers.

3 CPR 12E(2005). Methods for determining and processing probabilities("Red Book") :TNO.

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5 CRPE 16E(1992). Methods for Determination of Possible Damage("Green Book"). First Edition. Apeldoorn. TNO.

6 CPR 18E (1999). Guidelines for Quantitative Risk Assessment ("Purple Book"). First Edition Apeldoorn. TNO.

7 RIVM (2009). Reference Manual Bevi Risk Assessments. Edition 3.2.Bilthoven, the Netherlands: National Institute of Public Health and the Environment.

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9 Lees,F.P(2001) Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control. Second Edition. London: Butterworth.

10 South African National Standards(SANS) 1461 Quantitative Risk Assessments for Major Hazardous Installations. 2018 Edition 1.

15 APPENDICES

15.1 Appendix 1 - Site Emergency Plan

15.2 Appendix 2 - Material Safety Data Sheets

15.3 Appendix 3 - Drawings

15.4 Appendix 4 - Raw Data for the Software

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Draft Environmental Management Programme

EIA REF. NO.: DM/0033/2019

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

PROPOSED GRIMSBY ROAD FUEL FILLING STATION WITH ASSOCIATED INFRASTRUCTURE AND MULTIPLE FAST FOOD OUTLETS, MOBENI, ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

Prepared by:

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Acronym Used

Acronym	Definition
BA	Basic Assessment
EDTEA	Department of Economic Development, Tourisms and Environmental Affairs (KwaZulu-Natal)
DW&S	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ECO	Environmental Control Officer
EWS	eThekwini Water and Sanitation
EMPr	Environmental Management Programme
I&AP	Interested and Affected party(ies)
PM	Project Manager

Disclaimer:
This Environmental Management Programme (EMPr) has acknowledged the impacts such as health and waste that are associated with the development. This EMPr must not be considered a Waste Management Plan or assumed to be a health license.

1.INTRODUCTION

1World Consultants (Pty) Ltd has been appointed by Aniston Investments (Pty) Ltd, to undertake the required environmental services for the proposed construction of a fuel filling station, associated infrastructure and multiple fast food outlets. The proposed development will be situated at 02 Grimsby Road, Mobeni, Durban, eThekwini Municipality.

As per GNR. 327 and 324 of the EIA Regulations, 2017, a Basic Assessment (BA) Process has been undertaken. All the environmental outcomes; impacts and residual risks of the proposed Listed Activity being applied for have been noted in the BA Report and assessed accordingly by the Environmental Assessment Practitioner (EAP). The requirements of the BA Process have been followed as per Appendix 1 of GNR 327 (2017) and are consequently adhered to in the BA Report. All the environmental outcomes impact and residual risks of the proposed Listed Activity being applied for have been noted in this BA Report and assessed accordingly by the EAP.

Ultimately, the outcome of a BA Process must be to provide the Competent Authority, the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN-EDTEA), with sufficient information to provide an informed decision on the Application, in terms of Environmental Authorisation (EA), in order to avoid or mitigate any detrimental impacts that the activity may inflict on the receiving environment. Thus, this EMPr document is inserted in the BA Report as part of the submission requirements for EA.

This EMPr has been compiled in accordance with Government Notice (GNR) 326, Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (2017). In this regard, the EMPr provides mitigation measures for impacts identified in the BA report by defining the relevant objectives, outcomes and actions. This EMPr must form an integral part of the contract documents between Aniston Investments (Pty) Ltd and the appointed contractor during the construction phase of the development, as it outlines the methodology and duties required such that construction can be achieved in an environmentally sustainable manner.

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

The EMPr was prepared by 1World Consultants (Pty) Ltd. The details of the representative EAPs who prepared the report are detailed in Table 1. The Curriculum Vitae and qualifications of the detailed EAPs are provided in Appendix B of the Draft BAR.

Table 1: Details and Qualifications of EAPs

1World Consultants (Pty) Ltd			
EAP	**Qualifications and Professional Affiliations**	**Experience at environmental assessments**	**Contact details**
Fatima Peer	B.Sc (Hons) Pr. Sci. Nat., IAIAsa	Senior EAP	fatima@1wc.co.za
Adila Gafoor	B.Soc. Sci. (Geog), IAIAsa	EAP	adila@1wc.co.za
Wasila Vorajee	B.Sc. (Hons) Geological Sciences, Cand. Sci. Nat., IAIAsa	Junior EAP	wasila@1wc.co.za

3. ACTIVITY INFORMATION

3.1. PROJECT LOCATION

The site is located at 2 Grimsby Road, Mobeni, Durban, within the eThekwini Municipality, KwaZulu-Natal. The development will include the demolition of existing infrastructure (Mayfair Home & Décor) to make way for the proposed new infrastructure. The proposed activity is located in the south of Durban, within Ward 64 of the eThekwini Municipality. The 21-digit Surveyor General (SG) number for the properties affected are provided below. The coordinates for the activity are also provided in Table 2 below.

Table 2: Site Details

	Fuel Filling Station and Associated Infrastructure and Multiple Fast Food outlets
Property Description	Portions 2 of Erf 821
Ward	Ward 64, eThekwini Municipality
SG Number	NOFT00840000282100002
Property Size	13 204 m^2
Zoning	General Industrial
GPS Coordinates (Central Plot)	29°56'16.38"S; 30°57'40.61"E

The southern and western limits of the corner situated site are bound by South Coast Road and Grimsby Road, respectively. The site and the surrounds are generally developed with predominantly commercial building developments.

Figure 1: Locality Map of the Proposed Development (DEA Screening Tool, 2017)

3.2. PROJECT DESCRIPTION

The proposed development comprises of the construction of a filling station with associated buildings, infrastructure and various fast food outlets. The development will occur over a single plot of land on Grimsby Road (Portion 2 of Erf 821). The current use of the property is a home and décor discount shop called *'Mayfair Home & Décor'*. Access to the site will be from Grimsby Road and South Coast Road. The development area is a known general industrial area consisting mainly of other retail and commercial/industrial buildings. The heavily industrialised area is zoned accordingly to its use.

The design of the proposed fuel station is based on a standard urban filling station, of forecourt with canopy, five dispensing islands, pumps with cut-off valves, subsurface piping between storage tanks and pumps, and a separate building structure housing an office, convenience shop as well as toilets.

The site for the proposed activity has been assessed based on a working footprint of approximately 6000 m^2 for the construction phase to allow for all related activities**.** The specifications of the filling station and convenience store are provided in Table 3 below.

Table 3: Proposed Project Specifications

Fuel Filling Station and Associated Buildings	
Ward	Ward 64 eThekwini Municipality
Site Size	13 204 m^2
MacDonalds Fastfood Outlet	250.60 m^2
Fuel Station	476 m^2
Fueling Garage Shop	326.14 m^2
Line Shop 1	257.14 m^2
Line Shop 2	918.70 m^2
Final Development Footprint (including walkways, etc)	±5 384.82 m^2
Working Footprint	±6 0000 m^2

3.3. PROJECT SPECIFICATIONS

Proposed plan of the development is provided in Appendix C of the Draft BAR. The plan depicts the positioning and scale of the:

- filling station including forecourt and tanks;
- convenience store; and
- various fast food outlets.
- Access points, driveways and parking areas,

all on the property size of approximately 1.3204Ha.

The area schedule is as follows:

Site Size	**1.32 Ha**
Fast-food Outlet	**676.02 m²**
• Proposed McDonald's	250.80 m²
• Proposed Open Refuse Yard	15.21 m²
• Proposed Uncovered Outdoor Seating	62.55 m²
• Proposed Uncovered Drive Thru	237.12 m²
• Proposed Covered Drive Thru	30.00 m²
• Proposed Uncovered Walkway and Curbs	80.34 m²
Fuel Station	**476.19 m²**
Fueling Garage Shop	**326.14 m²**
Line Shop 1	**257.14 m²**
Line Shop 2	**918.70 m²**
Stairwell	**7.98**
Refuse Area	**7.92**
First Storey Offices	**330.21**
Final Development Footprint (including walkways, etc)	**±5 2384.62 m²**

Table 4: Capacities of Underground Storage Tanks (UST's)

Tank	Capacity (m³)
Unleaded Petrol Tank 1	83 m³
Unleaded Petrol Tank 2	83 m³
Diesel	83 m³
TOTAL VOLUME OF UTS's	**249 m³**

Figure 2 below represents the preferred layout of the development. This layout includes the proposed filling station, convenience store and McDonalds Fast Food Outlet. This layout was chosen as the preferred alternative on the criteria of being the best suited for the purpose of the proposed development. Refer to Appendix 1 of this EMPr for the facility design.

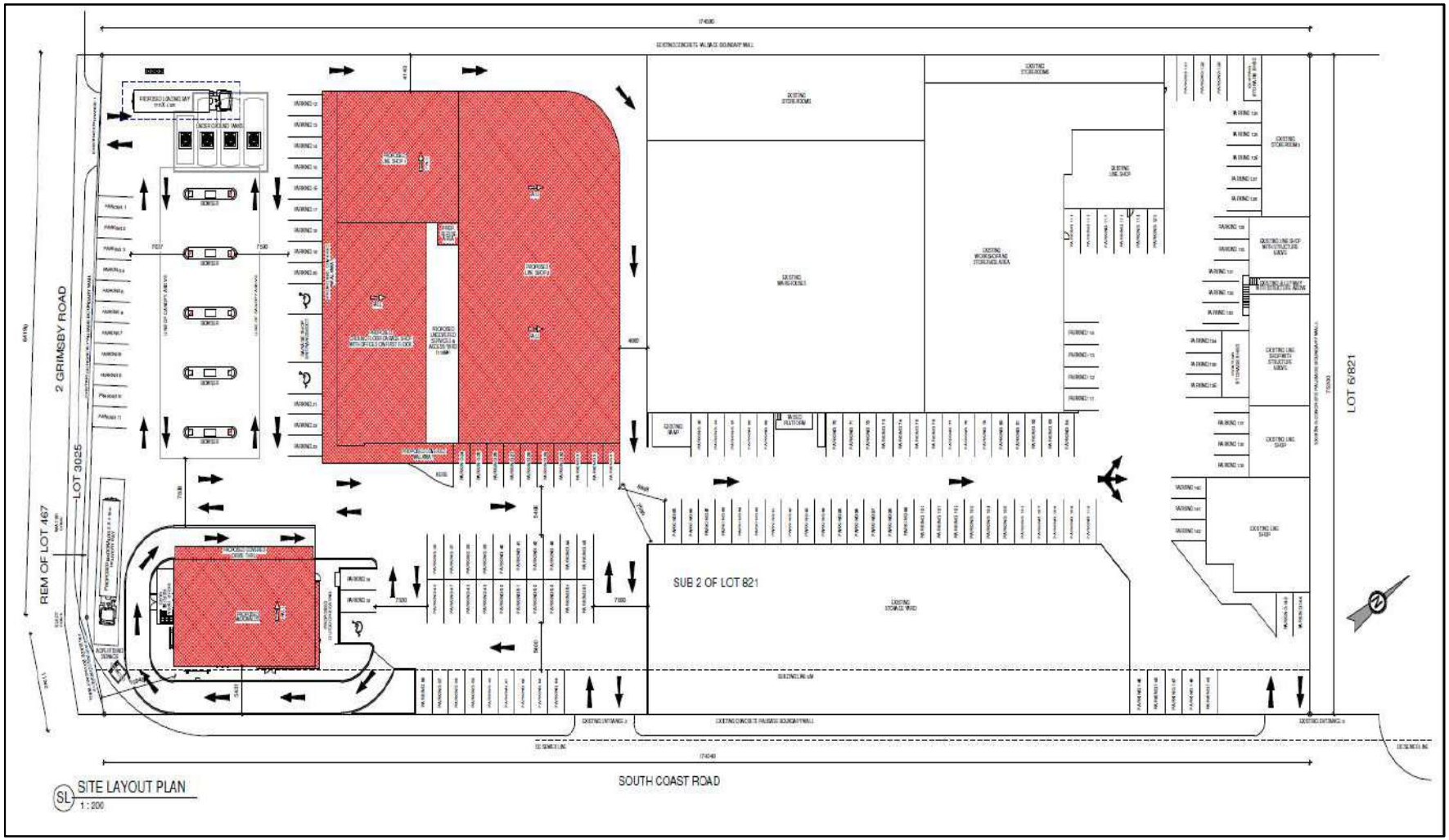


Figure 2: Proposed Layout Showing Positions of the Various Components of the Development

3.4. POINTS TO CONSIDER

- General Construction Activities
- Clearance of Site
- Increased Traffic Frequency on Road Infrastructure
- Dust
- Erosion
- Installation and Use of Ablution Facilities
- Cleaning of Vehicles, Equipment and Construction Areas
- Storage and Handling of Hazardous Chemicals
- Generation of Hazardous Waste
- Production of General Waste and Building Rubble
- Storage, Mixing and Disposal of Cement and Concrete
- Fire Establishment
- Generation of Noise from Construction Vehicles and Machinery
- Use of Resources such as Electricity, Water, Oil, Grease, Fuel and Construction Material
- Injury to Local People and Construction Workers
- Disturbance on Heritage Resources
- Socio Economic Impacts

3.5. RELEVANT LEGISLATION AND GUIDELINES

In terms of the Environmental Impact Assessment (EIA) Regulations 2017, promulgated in terms of the National Environmental Management Act, 1998 (NEMA) a basic assessment has been conducted by an independent Environmental Assessment Practitioner (EAP), 1World Consultants (Pty) Ltd. According to the BA requirements, an Environmental Management Programme (EMPr) was formulated to address the impacts identified. The EMPr endeavours to monitor, minimise and mitigate impacts identified and concerns raised by interested and affected parties and/or stakeholders.

The EMPr presented covers activities authorised by the competent authority (EDTEA) only. Activities not approved must be submitted for environmental authorisation, before commencement. If the impacts identified in the BAR be more significant than assessed, the environmental management plan must be reviewed; and updated if necessary. The EMPr is not independent of the BAR, therefore both must be read in conjunction with each other.

The following Listed Activity in Government Notice (GN) R327 (Listing Notice 1) of 2017 are triggered:

Table 5: Relevant Activities from EIA Regulations 2017

EIA Regulations 2017			
Regulation Year	**Listed Activity NEMA**	**Description of Activity**	**Applicability to the Project**
2017	Listing Notice 1: Activity 14	The development and related operation of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Developers, Aniston Investments (Pty) Ltd, proposes to construct a filling station which includes the installation of Underground Storage Tanks to store fuel, with a combined capacity of more than 80m^3 (249m^3).

The Draft Environmental Management Programme is submitted and is subject to approval by the Department of Economic Development, Tourism and Environmental Affairs. The Environmental Management Programme is formulated to include only those aspects pertaining to the environmental authorisation. It may not have taken all the necessary legislation and

regulations, pertaining to the actual development activities. The appointed project manager and/or developer must adhere to the necessary legal requirements.

Examples of such legislation or regulations, amongst others, include:

- The Constitution (1996)
- Labour Relations Act (1995)
- National Building Regulations and Building Standards Act (1977)
- Health Act (1977)
- National Water Act (1998)
- Occupational Health and Safety Act (1994)
- National public health and food hygiene regulations
- National Water Act 1998 (Act 36 of 1998)

The EMPr covers legislative requirements derived from the following:

- National Environmental Management Act (107 of 1998) as amended,
- National Water Act,
- National Environment Management Act: Biodiversity Act,

4. PROPOSED MONITORING AND AUDITING

4.1. SITE AUDITS

- The route and construction activities must be inspected during the construction and operational phases, according to the conditions of the environmental authorisation, which is generally once a month during construction.
- The date and time of the inspection may not be available to the contractor and/or developer.
- The audit must be executed by an independent environmental control officer (ECO).

4.2. AUDIT METHODOLOGY

- The inspection will cover all aspects stipulated in the proposed management plan.
- Each action will be assigned according to "Adequately done", "Inadequately done" and "Not done".
- The ECO may adjust actions should they not be effective in protecting sensitive elements or mitigating threats. This may require an amendment to the EMPr and EDTEA must be consulted prior to any changes.
- Audits will be well documented in Monthly Audit Reports and submitted to the Competent Authority and the Project Manager.

4.3. ROLES AND RESPONSIBILITY

- Ultimately, the client (Aniston Investments (Pty) Ltd) is responsible for the **implementation** of the environmental management programme.
- Should a concern be raised by an interested and affected party and/or stakeholder, EDTEA will refer to the monthly audit reports from the ECO.
- The ECO is not responsible for the implementation of the EMPr but is responsible for auditing the developer's and contractor's compliance to the EMPr.
- Following the rehabilitation of the affected site and the final ECO inspection and report, a site handover to the developer must be scheduled.

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different, but vital role to ensure sound environmental management during the construction phase. The project team will consist of the Project Manager from Aniston Investments (Pty) Ltd, the Project Engineer, the Environmental Control Officer (ECO) and the Contractor. The stakeholders are discussed below.

4.3.1. EDTEA

EDTEA is the designated provincial authority responsible for authorizing the environmental application EMPr related to the project. EDTEA has overall responsibility for ensuring that the Applicant complies with the Conditions of EA and EMPr.

4.3.2. APPLICANT: ANISTON INVESTMENTS (PTY) LTD

Under South African environmental legislation, the Applicant/ Employer is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. Aniston Investments (Pty) Ltd as the Applicant/ Employer therefore has overall environmental responsibility to ensure that the implementation of this EMPr complies with the relevant legislation and the Conditions of EA. The following fall within the responsibilities of Aniston Investments (Pty) Ltd:

- Be familiar with the recommendations and mitigation measures of the EMPr and ensure that the contractor and all staff agree to adhere to it.
- Monitor site activities on an ongoing basis or contract the service out
- Conduct internal audits of the site
- Ensure the contractor confines their activities to within the demarcated area

- Rectify transgressions via communication with the contractor and staff and the ECO
- Liaise with the ECO with regard to audit reports to be provided to EDTEA

4.3.3. PROJECT ENGINEER

The Project Engineer will provide the project specifications of the construction phase. The contractor is legally bound to follow these specifications unless agreed upon by the Engineer. The engineer has the following responsibilities:

- Monitor compliance of the project, following provision of inspection reports provided by the ECO.
- Assess the Contractors performance with regard to completion of the task and keep records on a monthly basis.
- Facilitate the site handover to the Contractor.

Company Name	Bramin Consulting Engineers
Contact Person	Yashvir Maharaj
Address	P.O. Box 60430 Phoenix, 4080
Telephone	031 502 1989
Fax	086 571 4138
Email	yashvir@bramin.co.za

4.3.4. ENVIRONMENTAL CONTROL OFFICER (ECO)

The ECO is responsible for monitoring and reporting that the contractor and applicant are implementing and following the EMPr during the construction and operational phases (for the timeframe specified in the conditions of the environmental authorisation) and to liaise and report to EDTEA. The following will fall within the ECO responsibilities:

- Have a working knowledge of the recommendations and mitigation measures as provided in this EMPr and of the permits, authorisations and licenses.
- Conduct monthly audits of the construction site according to the EMPr and according to the conditions of the environmental authorisation.
- Provide the contractor with environmental training and a copy of the EMPr and confirm in writing that it is understood.
- Liaise with the contractor and project manager.
- Recommend corrective steps for any non-compliance activity on site with respect to the EMPr.
- Compile a monthly audit report highlighting compliance and non-compliance with the EMPr and submit to EDTEA.
- All agreements between the contractor and the ECO with regard to the EMPr will be in writing and co-signed by the Project Manager.
- The ECO will not be on site on a daily basis and the Contractor is responsible for implementing the EMPr. The Contractor will be provided with a contact number for the ECO.

Company Name	TBC
Contact Person	TBC
Address	TBC
Telephone	TBC
Email	TBC

4.3.5. CONTRACTOR AND SUB-CONTRACTORS

The Contractor is responsible for implementing and adhering to the EMPr during the construction phase, in all respects as stipulated. Compliance with the EMPr by staff during the construction must be adhered to by the contractor and this must be recorded by the contractor for audit purposes. The following will be the responsibility of the Contractor:

- Be familiar with the EMPr and all conditions of authorisations, licenses and/or permits.
- Supply method statement for implementation of the EMPr.
- Attend training provided by the ECO, and relay training to all staff and sub-contractors. Proof of training must be kept on record.
- Maintain an environmental file that must contain the following documents:
    - Company environmental policy
    - Hazardous material handling and storage protocols
    - Spill Contingency Plan
    - Emergency Response Plan and Contact Numbers
    - Waste disposal certificates
    - Servicing of portable toilets
- Maintain an environmental complaint register that must have carbon copies and numbered pages, to record all incidents that occur on site during construction. Incidents include but may not be limited to:
    - Public involvement / complaints
    - Occupational health and safety incidents
    - Incidents / spills involving hazardous materials and/or equipment on site
    - Non-compliance incidents
    - Spills into or around watercourses
    - Encountering fauna of interest
    - Finding archaeological artefacts and/or human remains
- Bear any costs associated with non-compliance and/or damage to the environment as a result of not implementing the EMPr or due to negligence.

5. THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

The focus of the environmental management programme is to allow for the proposed filling station and various food outlets, whilst still protecting the environment. Particular reference is given to the following key aims:

- The general protection of the receiving environment via compliance with all applicable laws, protocols and guidelines,
- Prevent or minimise pollution of the receiving environment,
- Minimise disturbance of the environment and aim to protect flora and fauna,
- Prevent soil erosion and soil degradation,
- Facilitate the rehabilitation of disturbed areas, and
- Restrict the nuisance factor by providing protocols for staff and/or vehicles.

Damage to surrounding roads (by construction vehicles), etc. may result from the proposed construction activities. Chemicals such as paints, sealants, coatings, adhesives and solvents may contaminate the soils and groundwater if proper procedure is not followed.

5.1. OBJECTIVES OF THE EMPR

The objectives of the EMPr are to:

- Comply with local, provincial, national and/or international regulations, standards and guidelines, relating to the protection of the environment.
- Clarify roles and responsibilities of the team members.
- Identify measures of mitigating any potential negative impacts thereby reducing or eliminating them.
- Provide detail on specific actions required for minimising negative impacts and provide tools or methods for monitoring the effectiveness of mitigation measures.
- Optimise positive impacts to maximise the benefit thereof.
- Provide management of concerns/complaints from I&AP's.
- Provide monitoring and auditing processes during all phases of the development.
- Provide methods of compliance monitoring and reporting of the monitoring.
- Provide waste management, recycling and re-use strategies.

5.2. ENVIRONMENTAL MONITORING

A monitoring program to for compliance with the EMPr will be implemented for the duration of the proposed construction. The program will include the following:

- Monthly site visits and audits (subject to the conditions of any environmental authorisation or license) which will be conducted by the Environmental Control Officer (ECO) to monitor compliance to the final EMPr
- Provide corrective recommendations to rectify any non-compliance
- Compilation and submission of audit reports to EDTEA providing rating of compliance with the EMPr. Any evidence of damage to areas outside the construction zone will be recorded via photographs as well as a record of the date and time of damage, type of damage and reason for damage. The contractor will be liable for damages if it has resulted from non-compliance to the EMPr.
- A register of complaints from I&AP's will be opened and maintained. Complaints and concerns must be responded to immediately.

Note – The EMPr has been prepared pre-construction and must be regarded as a working document that may be updated if and when necessary. Any amendments made to the proposed construction must be submitted to the Competent Authority as an amendment to the authorisation for approval before being implemented.

5.3. COMPLIANCE WITH THE EMPR

The EMPr specifies the requirements to be implemented by the developer in order to minimise and manage any potential environmental impacts. The provisions of this EMPr will be legally binding to the Authorisation Holder or any authority to whom responsibility has been delegated to, for the proposed development, for the duration of the construction phase.

The EMPr is legally binding to the contractors/sub-contractor(s) and must be included in the Contractual Clauses. A copy of the approved EMPr must be kept on site during construction and operation. In terms of the Environmental Conservation Act and the National Environmental Management Act, those parties responsible for damage to the environment must pay the costs to repair and compensate for environmental and/or human health as well as for preventative measures to avoid or reduce further damage. The Contractor must make provisions in the budget for implementation of the EMPr.

Non-compliances may result in the application of penalty(ies) following non-compliance after a written warning by the Competent Authority (EDTEA). Failure to rectify non-compliances within one (1) week of the issue OR a repeat offense will result in a fine issued by the Competent Authority (EDTEA).

The fines will be paid by the Contractor to the Developer to be utilised in the landscaping and/or rehabilitation of the site.

5.4. LAYOUT OF THE EMPR

The EMPr is presented in five phases namely, the pre-construction, demolition, construction, rehabilitation and operational phases of the project. Each phase has specific mitigation measures that address potential impacts which may be unique to that phase, as explained briefly below:

1. Pre-Construction Phase – This phase includes pre-construction activities including the site handover, site establishment, environmental training and access routing.

2. Demolition Phase - This phase involves the demolition, dismantling and removal of existing structures (Mayfair Home & Décor), any redundant infrastructure (i.e. pipelines, services, building structures, etc.), as well as, associated minor civil works and waste management activities.

3. Construction Phase - The construction phase includes all activities on the site that are required to render the fuel station operational. This phase of the EMPr includes, but is not limited to, construction activities such as; excavation, foundation laying and the installation of fuel tanks and bulk services. The duration of the construction Phase is approximately 18-24 months. Environmental training must be provided to the contractor before commencement of construction activities.

4. Rehabilitation Phase – This phase of the EMPr provides for the removal of the contractor's camp, rehabilitation of the site and any disturbed areas and handover to the Client.

5. Operational Phase – Operation means that the development is ready to be used for its intended purpose. This phase of the EMPr provides for the Management and Maintenance of the proposed filling station and food outlets.

N.B: The specifications of all mitigation measures, the responsibilities and the procedures for each phase must form part of contractual documentation. Hence, the relevant personnel will be required to comply with these phases of the EMPr.

5.5. TRAINING

Contractors and workers must receive basic training in environmental awareness i.e. minimisation of impacts to sensitive elements, waste management, water pollution and the requirements of the EMPr.

5.6. IMPLEMENTATION OF EMPR BY CONTRACTOR

The contractor must implement and comply with the EMPr at all times. If clarity be required, the contractor must contact the ECO for advice. The ECO must provide the contractor with their contact details. The Stormwater Management Plan (SWMP) must be adhered too. Refer to Appendix 2 of this Draft EMPr for the SWMP.

5.7. ENVIRONMENTAL FILE

The Environmental File comprises the following documents and must be kept on site in order to record compliance:

- Copy of any Environmental Authorisation, licenses, permits, Stormwater Management Plan, and the approved Final EMPr.
- Method statement for complying to the EMPr.
- Record of complaints from I&AP's capturing the time, date, location and nature of complaint as well as the actions taken and by whom. The complaints register must have carbon copy pages and numbered pages.
- Emergency Response Plan and Record of emergencies and incidents
- Spill Contingency Plans
- Proof of Training
- Emergency contacts and numbers
- Material Safety Data Sheets for any hazardous substances
- Dust suppression records
- Written corrective action instructions provided by the ECO (including emails)
- Any Non-Conformance Reports (NCR) that have been issued to the contractor and/or sub-contractor(s). A Non-Conformance follows non-compliance to rectifying a problem area and must be reported to the Competent Authorities. A Non-Conformance Report typically contains the following information:
    - Details on the non-conformance,
    - Any plant or equipment involved,
    - Any chemicals or hazardous substances involved,
    - Details on the non-conforming action,
    - Nature of associated risk(s),
    - Corrective actions to rectify non-conformance, as agreed by all parties concerned,
    - Timeframes for corrective measures to be implemented,
    - Record of compliance by corrective actions, as verified by the ECO

5.8. ENVIRONMENTAL EMERGENCY RESPONSE PLAN

The Contractor is responsible for preparing an Environmental Emergency Response Plan. This is to exhibit the Contractors ability to respond effectively to incidents that may have detrimental impacts on the environment. Such incidents include the following among others:

- Accidental spillage of hazardous substances (oil, fuels, sewage, etc.) resulting in negative impacts such as; soil contamination, surface and groundwater pollution, habitat and biodiversity loss, etc.
- Accidental toxic air emissions resulting in negative impacts such as; air pollution, habitat and biodiversity loss, etc.
- Accidental discharges to watercourses and onto land resulting in negative impacts such as; contamination, pollution, habitat and biodiversity loss, etc.,

The emergency response plan must include for the following:

- Provide actions to be taken in the event of an emergency, in the most logical sequence of events,
- Emergency contact numbers,
- Roles of designated emergency response team members from the contractor's team,
- Incident recording,

- Remediation measures to be implemented,
- Information on hazardous substances, plant and equipment, including warnings and potential risks,
- Proof of emergency response training, including proof of emergency preparedness, as per legal requirements.

5.9. METHOD STATEMENTS

Beside the emergency response plan, the Contractor must provide the following method statements in the environmental file:

- Construction site establishment,
- Dust suppression,
- Cement mixing/concrete batching,
- Contaminated/used water,
- Erosion control and stormwater management,
- Storage, handling and decanting of fuel (diesel) and other hazardous substances,
- Project management including training,
- Personnel and public safety,
- Rehabilitation of disturbed areas,
- Solid and liquid waste management,
- Sourcing and Storage of materials,
- Rest and Wash areas, including toilets,
- Interaction with public and stakeholders, and
- Traffic Management Plan.

6. PRE-CONSTRUCTION PHASE

The pre-construction phases include all activities that are required to render the project ready to begin construction.

Authorisations, Permits and Licenses:		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
All legally required authorisations, permits and licenses must be obtained prior to commencement of construction.	Developer	Once
The Developer must appoint an independent EAP and/or ECO.	Developer	Once
All I&AP's and stakeholders must be notified prior to commencement of construction.	Developer/Contractor	Once

Appointment of Contractor:		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
An experienced and suitably qualified contractor must be appointed.	Developer/Engineer	Once
The EMPr must form part of the contractual agreements with any Contractor which must include any Sub-Contractor(s). The Contractor must take cognisance of this when budgeting during the tender process.	Developer	Once
The Contractor must comply fully with the authorisations, permits and licenses pertaining to the construction phase of the project.	Developer/Contractor	Once
Tender documents must allow for the employment of local community members.	Developer/Contractor	Once
The Contractor must provide Method Statements pertaining to implementation of the EMPr, emergency response plans, stormwater management, hazardous substance handling and storage, spill contingency plans, environmental incidents records file and complaints register.	Developer/Contractor	Once
All activities which require method statements may only commence once the method statements have been approved by the engineer and or ECO as applicable	Developer/Contractor	Once
The Method Statements must be submitted to the ECO for record keeping.	Developer/Contractor/ECO	Once

Appointment of ECO		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
An independent ECO must be appointed to monitor the implementation of the EMPr before the start of construction activities.	Developer	Once
The Appointed ECO must monitor the project from an environmental perspective, as per the conditions of any authorisations, permits and licenses and according to the EMPr. The findings of each inspection must be documented in a monthly report and submitted to the CA.	ECO	Monthly or as specified in the Authorisation

Environmental Education and Training		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The Contractor must receive environmental training to effectively implement the EMPr.	Developer/ECO	Once
The Contractor must relay training received to all staff and sub-contractors, in a language easily understandable to them. All contractors' representatives, sub-contractors and staff must acknowledge receipt of training in writing.	Contractor/SHE Officer/ECO	Once
Toolbox sessions must be scheduled and must include refreshers on environmental responsibilities.	Contractor/SHE Officer	Once
All site personnel must have a basic level environmental awareness training session. Topics covered must include: • What is meant by "The Environment", • Why the environment needs to be protected and conserved, • How construction activities can impact on the environment, • What can be done to mitigate against such impacts, • Awareness of emergency and spill response provisions, • Social responsibility during construction of the filling station e.g. being considerate of the local community who share the roads	Contractor / ECO	Once
The ECO must provide training to the Contractor's representatives. It is the Contractors responsibility to provide the site foremen with environmental training and to confirm that the foremen have sufficient understanding to pass this information onto the construction staff. Translators must be used for thorough training.	ECO	Once

Training by the contractor must be provided to the staff members for use of the firefighting equipment.	Contractor	Once
Environmental awareness posters on site must be used to further facilitate compliance to the EMPr.	Contractor	Once
The need for a clean site policy must be explained to the workers. This includes prohibiting sanitation activities outside of the ablution facilities and toilets provided by the Contractor.	Contractor	Weekly
Staff operating equipment (e.g. loaders, excavators, etc.) must be trained and sensitised to any potential hazards associated with their tasks.	Contractor	Weekly/ Monthly
Although the Contractor is responsible for ensuring that the environmental awareness training of staff members is put in place, it must be the direct responsibility of the appointed ECO to carry out the training. Each staff member must sign a register confirming their attendance at this training. This register must be included in the site Environmental file.	ECO	Once
The contractor must monitor the performance of the workers to verify that the training was properly understood and is being followed.	Contractor	Weekly
The ECO must monitor the construction phase periodically to ascertain if training was effective.	ECO	Monthly
Areas that are demarcated as 'No-Go' areas must not be accessed by workers.	Contractor/ ECO	Once
There must be no trapping of animals on site.	Contractor/ ECO	Weekly/ Monthly
A pre-construction walk-through must be implemented by the ECO. This will be used to identify any species of conservation importance that have occupied the site after the compilation of this report.	ECO	Once

Environmental Planning and Design		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
A set of "before" photographs must be captured for record keeping purposes and to monitor any degradation of the environment.	Contractor	Once
All construction activities must be limited to the property boundary in order to reduce the footprint of the proposed activity and impact on adjacent land and/or properties.	Contractor/ ECO	Once/ Monthly
Construction areas must be fenced off or demarcated prior to and during construction.	Contractor/ ECO	Once/ Monthly
The design of the filling station and associated infrastructure must ensure that there is limited impact on the receiving	Developer	Once

environment.		
The filling station must enhance the visual character of the area	Developer	Once
As far as possible, all yards must and storage areas must be enclosed by masonry walls or screens	Developer	Once

Site Establishment		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Prior to establishment of the site camp/ office, the contractor will produce a site layout plan showing the positions of all equipment storage, waste management areas, stockpiling, fuel storage areas and other infrastructure.	Contractor	Once
The ECO / Engineer must approve the site selected for the Construction Camp.	Contractor/ ECO	Monthly
The construction camp must be defined, secured and limited to authorised contractors only.	Contractor	Monthly
The construction camp must be comprised of: • site office • ablution facilities • designated first aid area • eating areas • staff lockers • storage areas • refuelling areas (if required)	Contractor	Daily
The ECO / Contractor must demarcate the construction camp so that the minimal amount of space is occupied.	Contractor	Monthly
Excavations must be sensitive to existing pipelines and services on site.	Contractor	Daily
All site disturbances must be limited to the areas where approved structures will be constructed.	Contractor	Daily

Access Control		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The Local Traffic Department must be informed at least a week in advance if the traffic in the area is affected during construction.	Developer/ECO	Once
Access in and out of the site must be allowed only at one point to minimise impacts during construction.	Contractor	Once
Personnel and vehicle must be restricted during construction so as to control access to otherwise potentially dangerous excavations and materials.	Developer/ECO	Daily/ Weekly
Movement of construction vehicles potentially impacting on urban infrastructure must be mitigated through the use of appropriate warning signs, and not entering or leaving the site during peak traffic hours.	Developer/ECO	Daily/ Weekly
The contractors must comply with the recommendations from the traffic study. Layout design must accommodate the impact on existing traffic flow patterns (e.g. access points).	Developer/ECO	Daily/ Weekly

7. DEMOLITION PHASE

This phase involves the demolition, dismantling and removal of existing structures (Mayfair Home & Décor), any redundant infrastructure (i.e. pipelines, services, building structures, etc.), as well as, associated minor civil works and waste management activities.

Dust Emissions and Dust Suppressant Alternatives		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Soft strip (of all retaining walls and windows) before demolition to act as a screen against dust.	Contractor	Once
Water suppression methods must be utilized such as; hand-held sprays or hoses. Dust suppression measures include but are not limited to: • staging works to minimise areas of disturbance at any one time before working on other areas • using an environmentally friendly chemical spray to bind soil together thus stabilising unused soil • restricting speed of vehicles onsite • covering stockpiles and locating them where they are protected from the wind • covering the load when transporting material • ceasing work in dry and windy conditions.		Weekly/ Monthly
Avoid explosive blasting and rather use appropriate manual or mechanical alternatives.		Once
Bag and remove any biological debris or damp down such material before demolition.	Contractor /ECO	Once
Re-vegetate earthworks and exposed areas/soils stockpiles to stabilize surfaces.		Monthly

Noise and Vibration Disturbance		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Personnel must be trained in etiquette regarding noise and trespassing, as well as in health issues and occupational safety.	ECO	Once
Construction activities must be limited to normal construction industry working hours.	Contractor	Monthly/Weekly
A registered contractor providing a project schedule must be employed. Penalties for extending the timeline must be enforced to try and minimise the period of impact.	Developer	Once
In addition, construction vehicles and machinery must be fitted with the appropriate noise muffling devices and must be appropriately maintained to ensure that the machines and vehicles do not produce excessive noise disturbance.	Contractor	Ongoing
No loud music is allowed on site and workers must always be aware of disturbance to neighbours.	Contractor /ECO	Ongoing
The contractor must inform the surrounding offices and community in advance or prior to operations that bear the risk of nuisance and accidents.	Contractor	Once
The contractor is responsible for compensating if the vibration during demolition will damage any structures.	Contractor	Ongoing

Visual Quality		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
The site must be well maintained and neat. The use of screening during construction is recommended.	Contractor/ ECO	Monthly
The contractor must adhere to project schedule in order to minimise the length of the demolition period.	Contractor	Monthly
Facilities such as toilets, bins, tanks and stockpiles must be neat and covered to reduce negative visual impact	Contractor/ ECO	Monthly

Disturbance to the Local Businesses and Pedestrians		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Install corresponding signs, hoarding boards, temporary alternate route for bypasses.	Contractor	Monthly
Install barriers (GI sheets, geo-net) especially at the boundary that meets the road, to shield from dust and aggregates.	Contractor/ Engineer	Monthly
Provide adequate lighting at demolition site for the night to prevent accident.	Contractor	Monthly

Waste Management		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Personnel must be trained in etiquette regarding littering and waste management.	Contractor/ ECO	Monthly
Demolition debris must be stockpiled and disposed of at an appropriate and licensed disposal facility. A waste disposal certificate must be obtained and recorded in the Environmental File. Debris must also be re-used in the construction of the filling station where possible.	Contractor/ ECO	Monthly
Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).	Contractor/ ECO	Monthly
In the case of a spill of hydrocarbons, chemicals or bituminous, the spill must be contained and cleaned up by use of a spill kit and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk.	Contractor/ ECO	Monthly
On-site chemical toilets must be provided for domestic purposes during construction phase and must be serviced on a weekly basis. Service waybills must be obtained and kept in the Environmental File.	Contractor/ ECO	Weekly
Littering is prohibited and general housekeeping must be enforced. Waste bins and skips must be placed at strategic points around the site for easy disposal of waste and litter.	Contractor/ ECO	Monthly

Safety for Demolition Workers		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Personal Protective Equipment (PPE) including safety gears, helmets, safety belts, masks, gloves and boots, must be used by construction workers at all times.	Contractor/ H&S Rep	Monthly
A rescue and emergency plan must be implemented on site.	Contractor/ Engineer/ H&S Rep	
Workers must be provided with first aid and health facilities at the site i.e. First aid kit.	Contractor/ H&S Rep	

8. CONSTRUCTION PHASE

The construction phase includes all activities on the site that are required to render the project operational. Environmental training must be provided to the contractor before commencement of construction activities. The duration of the construction phase is approximately 18 - 24 months.

General Construction Activities		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The ECO must monitor the contractor's compliance with the requirement to provide environmental awareness training to all site staff.	ECO	Monthly or as and when required
Environmental signage must be displayed on the site including – "no smoking", "fire hazards", etc.	Contractor/ ECO	Monthly
Emergency numbers must be clearly displayed.	Contractor/ ECO	Monthly
Access to fuel and other equipment stores must be strictly controlled so unnecessary materials are not brought onto ground unless required	Contractor/ ECO	Monthly
The contractor is to ensure that all employees, including sub-contractors and their employees, are required to attend on-site Environmental Awareness Training prior to commencing work on site.	Contractor/ ECO	Monthly
Follow-up Environmental Awareness Training must be undertaken from time to time as new subcontractors or crews commence work or for specific activities that may potentially impact the environment, or if work is being undertaken in sensitive environments.	Contractor/ ECO	Monthly
The contractor must maintain accurate records of any training undertaken.	Contractor/ ECO	Monthly
Training must cover all aspects of the EMPr, procedures to be followed, the sensitivity of the site and importance of adhering to "no-go" areas.	Contractor/ ECO	Monthly

Clearance of Site		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
"No-go" areas prior to earthworks commencing must be demarcated with danger tape for protection for the duration of the construction phase.	Contractor/ ECO	Monthly
The contractor must draw up a plan for submission to the ECO indicating the locations of construction infrastructure including the site-camp, paint or cement cleaning pits, toilets, site office, and "no-go" areas.	Contractor	Once
No unauthorised entry, stockpiling, dumping or storage of equipment in "no-go" areas, or outside the site boundary is permitted.	Contractor/ ECO	Monthly
All construction activities, plant, labour and materials must be restricted within the site boundary.	Contractor/ ECO	Monthly
Demarcation must remain in place for the duration of the work on site.	Contractor/ ECO	Monthly
Excavations must be sensitive to existing pipelines and services on site.	Contractor	Once
Rehabilitation of disturbed areas must be undertaken within a month after construction activities have concluded.	Contractor/ ECO	Monthly

Earthworks		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
All trenches must be clearly demarcated and barricaded on site at all times.	Contractor/ ECO	Daily or as and when required
Trenches must have one sloped side to allow animals which fall in to get out.	Contractor/ ECO	Monthly
The earthworks operation must be carried out by a suitably qualified contractor.	Contractor	Monthly

Pollution of Groundwater and Soil		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The base of the fuel tank excavations must be flat and free from rocks and other foreign objects and covered by 150mm thick backfill of acceptable quality, compacted to specification with the correct backfill material and prepared using accepted construction practices to ensure stability and sustainability of underground tanks.	Contractor/ ECO	Daily or as and when required
Type II, double wall steel, underground storage tanks must be used to lessen the likelihood of leaks.	Contractor	Once
Leak detection monitoring device must be mounted into tanks to detect any leaks before significant contamination occurs.	Contractor	Once
External corrosion protection coating must be built into the tank design to reduce corrosion and ultimately lessen the likelihood of leaks.	Contractor	Once
The underground storage tanks must comply with SANS 10089.	Contractor	Once
Fuel tanks must be thoroughly inspected before installation for any apparent fractures or damage to the tank and ensure that the protective coating of the tank is intact. Any obvious or suspected damage to the tank is the contractor's responsibility. The Contractor must inform the fuel company before continuing with the installation of the tank.	Contractor	Once
Tanks must be located towards the lower levels of the site as this provides a natural gradient for the pipelines up to the dispensers. Where two or more tanks are placed in a common excavation, a minimum spacing of 500 mm between tanks must be allowed.	Contractor	Once
The excavation must be protected against the ingress of surface runoff water and must be kept reasonably free of sub-surface water by pumping out if necessary.	Contractor	Once
If the Contractor finds a high-water table on an installation, the Engineer must be contacted before installing the tank.	Contractor	Once
Spills that result in the contamination of ground and/or surface water must be reported immediately to the ECO.	Contractor	Once
Employees must be provided with absorbent spill kits and disposal containers to handle spillages.	Contractor/ ECO	Monthly
Train employees and contractors on the correct handling of spillages and precautionary measures that must be implemented to minimize potential spillages.	Contractor	Monthly
Employees must record and report any spillages to the ECO.	Contractor	Monthly

The stormwater management design for the area must be evaluated to ensure that dirty water does not flow from the site into the stormwater drainage channels.	Contractor/ ECO	Monthly
Sediment trapping berms and temporary erosion control measures must be implemented during the construction phase.	Contractor/ ECO	Monthly
During the construction phase vehicles and machinery must make use of existing access routes, before adjacent areas are considered for access.	Contractor/ ECO	Monthly
Storage areas must be clearly demarcated and located away from open drainage infrastructure.	Contractor/ ECO	Monthly
During construction contractors used for the project must have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly.	Contractor/ ECO	Monthly
All machinery and equipment must be inspected regularly for faults and possible leaks, these must be serviced off-site.	Contractor/ ECO	Monthly
All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials must be supported.	Contractor/ ECO	Monthly

The Cleaning of Vehicles, Equipment and Construction Areas		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
No washing of vehicles or equipment is permitted on site.	Contractor/ ECO	Monthly
Cleaning of equipment must take place within designated areas.	Contractor/ ECO	Monthly
A dedicated cleaning area must be demarcated to facilitate washing of all cement and painting equipment.	Contractor/ ECO	Monthly
No wastewater must be disposed on site, onto the soil or into any water body.	Contractor/ ECO	Monthly
Soil contaminated with hazardous substances, fuel or oil must be treated as hazardous waste and removed from site.	Contractor/ ECO	Monthly

Increased Traffic Pressures and Access		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
All loads must be securely fastened when being transported.	Contractor/ ECO	Monthly or as and when required
All speed limits and other traffic regulations on the public roadways must be adhered to.	Contractor/ ECO	Monthly or as and when required
Construction vehicles and personnel must adhere to business hours. This must be relaxed to accommodate abnormal vehicles, so daily life and/or regular traffic is not hindered.	Contractor/ ECO	Daily
Construction vehicles must use predetermined and agreed routes to and from site.	Contractor/ ECO	Monthly or as and when required
Pointsmen to guide traffic for entry and exit of construction vehicles must be used where required.	Contractor/ ECO	Monthly or as and when required
Vehicles must park on demarcated areas only.	Contractor/ ECO	Daily or as and when required

Stormwater Management		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
• The following measures must be implemented during the construction phase: o Earth drains to the top of cut embankments; o Temporary v-drains; o Silt curtains along the drains and cut and fill embankments to mitigate erosion and prevent excessive discharge of latent soil elements into environmental sensitive areas. o The use of shade clothes strategically positioned along the environmental sensitive areas so that no contamination	Contractor	Monthly

with respect to dust and litter enter.		
The sands on this site are moderately erodible, stormwater controls must be maintained at all times. During construction, earth berms and/ or sandbags, must be used along all banks.	Contractor/ ECO	Monthly
Clean storm water must be diverted away from ablution facilities to avoid possible contamination and must be directed to the storm water drainage system. Construction site must be contoured to ensure free flow of runoff and to prevent ponding of water. Runoff from the camp must be directed via temporary channels.	Contractor/ ECO	Monthly
The contractor must adhere to and implement the SWMP.	Contractor	Ongoing
The earthworks operation must be carried out by a suitably qualified contractor.	Developer	Once
The designs have allowed for sufficient stormwater drainage. Drainage channels must be lined to reduce the flow and velocity of stormwater runoff (where necessary).	Contractor/ ECO	Monthly

Installation and Use of Ablution Facilities		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Sufficient ablution facilities must be provided – minimum of 1 toilet per 15 workers.	Contractor/ ECO	Monthly
Toilets must have properly closing doors and supplied with toilet paper.	Contractor/ ECO	Monthly or as and when required
The location of toilets must be approved by the ECO prior to site establishment and must be located within 100m of any work front.	ECO	Monthly
Chemical toilets must be serviced weekly. The contractor must monitor that no spillage occurs and that the contents are removed from site according to approved methods. Servicing receipts must be obtained and kept on site within the site environmental file.	Contractor/ ECO	Weekly
All temporary chemical toilets must be removed from the construction camp and be disposed in a safe and efficient manner.	Contractor	Daily/ Weekly

The Storage, Mixing and Disposal of Cement and Concrete		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
No mixing of concrete or cement directly on the ground is permitted. The mixing of concrete must only be done on a mixing tray or on impermeable sheeting.	Contractor/ ECO	Monthly
Bricklayers and plasterers must minimise any cement spill or runoff in their work area and the work area must be cleaned of all cement spillage at the end of each workday.	Contractor/ ECO	Daily/ Monthly
Both used and unused cement bags must be stored in weatherproof containers so as not to be affected by rain or runoff.	Contractor/ ECO	Monthly

Storage and Handling of Hazardous Chemicals, Including Fuel		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
All fuels and flammable materials must be handled and stored as per the relevant Material Safety Data Sheet(s) (MSDS). Storage must be within bunded areas with a capacity of holding more than the volumes contained within it (e.g. if the volume to be stored is 5m^3 the bunded area must be able to hold **more than** 5m^3). The storage area and vessels of substances must be clearly labelled for identification and level of hazard (e.g. 'Petrol' = 'Highly Flammable Liquid').	Contractor/ ECO	Monthly
Storage and handling of flammable materials must comply with standard fire safety regulations. Safety signage including "No Smoking", "No Naked Lights" and "Danger", and product identification signs, must be clearly displayed on fuel stores and tanks.	Contractor/ ECO	Monthly
Drip trays must be used to contain possible spillage from equipment, vehicles and plant. These must be emptied weekly into secondary containers and disposed at a licensed landfill site. The Contractor must receive a waste disposal certificate and keep for record purposes in the Environmental file.	Contractor/ ECO	Monthly
If refueling of equipment occurs on site, the ground must be protected with a non-permeable surface, and proper dispensing equipment must be used i.e. hand pumps and funnels. Drums must not be tipped to dispense fuel since this increases the probability of accidental spills	Contractor/ ECO	Daily or as and when required
All liquid fuels (petrol and diesel) must be stored in tanks or containers with lids on an impermeable surface.	Contractor/ ECO	Monthly

Fuel and flammable materials must be kept under lock and key at all times and must be stored at a central, easily accessible location.	Contractor/ ECO	Monthly
Fire-fighting equipment (i.e. fire extinguisher) must be closely available at hand. No smoking is permitted within the vicinity of storage areas. No smoking signs must be clearly visible for all.	Contractor/ ECO	Monthly
All personnel handling fuels and hazardous substances/materials must be issued with Personal Protective Equipment (PPE) and must be wearing PPE when handling hazardous substances/materials.	Contractor/ ECO	Monthly
Soil contaminated with hazardous substances, fuel or oil must be treated as hazardous waste and removed from site.	Contractor/ ECO	Monthly

Utilisation of Resources such as Electricity, Water, Oil, Grease, Fuel and Construction Materials		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Plant and equipment must be maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.	Contractor/ ECO	Monthly
Plant and equipment must be checked on a daily basis for leaks. If leaks are detected, the plant or equipment must be removed from service immediately and repaired. If repairs cannot be achieved, the plant or equipment must be removed from service and replaced with plant or equipment that is in good working order (i.e. without any leaks).	Contractor/ ECO	Monthly
Leaking water taps, and hosepipes must be repaired immediately.	Contractor	As and when required
Running water taps and hosepipes must not be left unattended. All hose and tap connections must be fitted with correct plumbing fittings.	Contractor	Daily

Waste Management		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Temporary waste storage points must be pre-determined and located in already disturbed areas. These storage points must be accessible by waste removal trucks and must not be highly visible from the properties of the surrounding landowners/ in areas where the wind direction will not carry bad odours across the properties of adjacent landowners.	Contractor	Once
Weather-proof waste bins must be provided and emptied regularly.	Contractor/ ECO	Daily or as and when required
Construction waste material must be disposed into covered skips or bins provided on site.	Contractor/ ECO	Daily
All waste generated on-site during construction must be collected in bins and/ or skips with lids and disposed of at a registered landfill site. Waste disposal certificates must be received for record keeping in the environmental file.	Contractor/ ECO	Daily or as and when required
A waste management recycling strategy must be implemented for general waste material. Waste material must be separated into different waste containers i.e. paper, plastic, cans and re-used where possible.	Contractor/ ECO	As and when required
Refuse skips must be for general waste disposal and must be covered with shade cloth or lids.	Contractor/ ECO	Monthly
Refuse bins must be provided for domestic waste (litter) and placed in designated eating areas and any other areas where deemed necessary to control littering.	Contractor/ ECO	Monthly
Building rubble must be kept separate from other construction waste. Rubble must be kept clean of brick ties, plastics, papers and cement bags at all times.	Contractor/ ECO	Monthly
Accumulation of large stockpiles of rubble and waste is prohibited. Waste must be removed at regular intervals at a minimum frequency of once a week.	Contractor/ ECO	Weekly
Burning of waste material is not be permitted.	Contractor/ ECO	Daily or as and when required
Hazardous materials are generated when there are spillages during construction and maintenance periods. This waste must be cleaned up using absorbent material provided in spill kits on site. Waste must be disposed off at a registered waste facility and a waste disposal certificate must be obtained.	Contractor/ ECO	Daily or as and when required

The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated.	Contractor	Once

Air Quality Impacts		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Dusty roads on dry windy days must be watered to prevent excessive dust generation.	Contractor/ ECO	Monthly or as and when required
Safety measures such as construction signage boards and speed limit sign boards for vehicles and for workmen must be implemented to slow down traffic within the development area, thus reducing dust.	Contractor/ ECO	Monthly
Dust dispersion from construction activities, roads and soil stockpiles must be limited and suppressed to the maximum extent practical.	Contractor/ ECO	Monthly
Stockpiles must be situated away from the site boundary, watercourses and nearby receptors.	Contractor/ ECO	Monthly
All machinery, plant and equipment must be in good working order.	Contractor/ ECO	Monthly
All areas impacted by construction must be regularly maintained including roads and pavements.	Contractor/ ECO	Monthly
Speed bumps or traffic speed signs must be erected to reduce speeding onsite, which could result in the generation of dust.	Contractor/ ECO	Monthly

Visual Impacts		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The site must be well maintained and neat.	Contractor/ ECO	Monthly
The contractor must adhere to project schedule in order to minimise the length of the construction period.	Contractor	Monthly
Inspections of the site by an Environmental Control Officer are required and must be conducted on a monthly basis.	ECO	Monthly

Generation of Noise from Construction Vehicles and Machinery		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The site workers and contractors must adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).	ECO	Monthly
Personnel must be trained in etiquette regarding noise, trespassing, health issues and occupational safety.	Contractor/ ECO	Monthly
Vehicles and equipment must be maintained on a monthly basis to prevent spillage of oil, diesel, fuel or hydraulic fluid.	Contractor/ ECO	Monthly
All plant and machinery must be fitted with silencers.	Contractor/ ECO	Daily/ Monthly
Construction activities must be undertaken according to working hours stipulated by the Developer i.e. during daylight between 7am to 5pm.	Contractor/ ECO	Daily/ Monthly
No sound amplification equipment such as sirens, loud hailers or hooters must be used on site except in emergencies and no amplified music is permitted on site.	Contractor/ ECO	Daily/ Monthly
No loud music is allowed on site and workers must always be aware of disturbance to neighbours.	Contractor/ ECO	Daily/ Monthly
Permission from the ECO and Contractor must be received if work needs to be undertaken outside of normal work hours.	Contractor/ ECO	Monthly
No noisy work must be conducted over the weekends or on religious public holidays.	Contractor/ ECO	Monthly
Route construction related traffic along roadways that will cause least disturbance.	Contractor/ ECO	Monthly

Health and Safety Impacts		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Nearby businesses must be made aware of the construction works.	EAP	Once
Trenches and excavations must not be left open and unmarked.	Contractor/ ECO	Monthly
Barricades and signs must be used where necessary.	Contractor/ ECO	Monthly
All relevant Health and Safety legislation as required in South Africa must be strictly adhered to. This includes the Occupational Health and Safety Act.	Contractor/ ECO	Monthly

Fire safety measures must be included in the design of the facility. Fire safety equipment must be provided on site during construction.	Contractor/ ECO	Monthly
First aid kits and incident records file must be provided on site.	Contractor/ ECO	Monthly
Safety gear including hard hats and safety shoes must be provided and worn at all times while on site.	Contractor/ ECO	Monthly
Emergency numbers must be clearly visible on site.	Contractor/ ECO	Monthly
Trespassing and/or utilising the site as a thorough fare is prohibited by unauthorised persons.	Contractor/ ECO	Monthly
Contractor staff are prohibited from trespassing over the site boundaries.	Contractor	Monthly
Interaction with objecting parties at the site must be well documented. A complaints register must be readily available on site. Interaction with external parties must be courteous.	Contractor	Monthly
Acceptable construction, staff practices must be followed such as: • All members of the construction workforce working on the site or near the roads must be provided with high visibility clothing to be clearly seen by motorists. • The workforce must be provided with sufficient potable water and under no circumstances are they to use untreated water from local watercourses for drinking. • The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.	Contractor/ ECO	Monthly
Although the Contractor is responsible for ensuring that the environmental awareness training of staff members is put in place, it must be the direct responsibility of the appointed ECO to carry out the training. Each staff member must sign a register confirming their attendance at this training. This register must be included in the site Environmental File.	ECO	Monthly

Fire risk		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Basic fire-fighting equipment, fire extinguishers, must be placed at strategic locations on site (e.g. at the site office, flammable material store and watchman's container).	Contractor/ ECO	Monthly
Fire extinguishers must be provided in all vehicles and fire beaters must be available on site.	Contractor/ ECO	Monthly
Emergency numbers/ contact details must be available on site, where applicable.	Contractor/ ECO	Monthly
Equipment must be maintained in good working order to the satisfaction of local fire authorities.	Contractor/ ECO	Monthly
No open fires are permitted. A dedicated braai facility must be approved by the ECO, if the campsite is in close proximity to firefighting equipment. At no time must a braai fire be left unattended.	Contractor/ ECO	Monthly
Smoking is prohibited near places where any readily combustible or flammable materials are present. Notices must be prominently displayed prohibiting smoking in such areas.	Contractor/ ECO	Monthly
Welding, flame cutting, and other hot work must be undertaken in places where safety precautions are in place (i.e. not near potential sources of combustion and with a fire extinguisher immediately accessible).	Contractor/ ECO	Monthly
All flammable materials must be stored in a lockable storage area.	Contractor/ ECO	Monthly
Combustible materials must not accumulate on the construction site.	Contractor/ ECO	Monthly
Cooking must be restricted to bottled gas facilities in designated areas approved by the ECO. This facility must be supervised and strictly controlled.	Contractor/ ECO	Monthly

Social Impacts		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The Contractor must inform neighbours of disruptive activities at least 24 hours beforehand. This can take place by way of posters placed in selected positions giving the Developer's and Contractor's details, by way of notice in the local newspaper, direct letter-drop to nearby properties, or, any other method approved by the Developer.	Contractor	Once
Local people must be employed where possible.	Developer/ EAP	Monthly or as and when required
A security fence must be erected around the site boundary to prevent the possibility of theft.	Contractor	Once
A security guard must be appointed as a security measure.	Developer	Once
Servitudes of infrastructure must be confirmed prior to design of the development and permission granted.	Developer	Once
Contractors staff must stay within the site boundary and not wonder onto neighbouring sites.	Contractor/ ECO	Monthly

Closure of Construction Camp Site

- Once construction has been completed and all excess material has been removed, the camp site must be rehabilitated.
- Any spilled concrete must be removed, and any soil compacted during the construction phase must be ripped, levelled and re-vegetated or surfaced.
- After all construction work is complete, the contractor is required to dismantle/detach/demolish and remove the temporary facility from site and make good to all damage, to the satisfaction of the engineer and ECO.
- All structures comprising the camp site must be removed from the site.
- The camp, storage and waste storage areas must be inspected for spills of substances such as paint, oil, etc and these must be cleaned up.
- All temporary worker facilities must be removed or decommissioned.
- Copies of all certificates from any waste disposals must be provided to the ECO.
- Burying of any waste on site is prohibited. All waste must be disposed of at a licensed waste facility, proof of safe disposal must be kept on site for record keeping purposes.
- The contractor must repair any damage that the construction works have caused to neighbouring sites.
- The ECO must be notified of the complete decommissioning of the site camp after which the ECO will perform a final audit of the site.

9. REHABILITATION PHASE

The Rehabilitation Phase refers to the closing of the camp site and site handover to the Developer. The following plans have been appended to the EMPr:

General		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with Section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998.	Developer/ Contractor	Monthly
A meeting must be held on site between the Engineer, Site Environmental Officer, ECO and the Contractor to approve all remediation activities and monitor that the site has been restored to a condition approved by the Engineer.	Developer/ Contractor/ ECO/ Engineer	Once
All areas where temporary services were installed must be rehabilitated to the satisfaction of the Engineer.	Contractor/ Engineer	Once
Once rehabilitation has been carried out, a post-construction audit must take place for final compliance. The contractor must rectify any non-compliance found by this audit, prior to vacating the site.	Contractor/ ECO	Once

Site Clean-up		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
All remaining maintenance materials, building rubble and waste must be removed from the site. Remove all construction material from the area where construction has been completed. Removal of material must be undertaken by hand where possible.	Developer/ Contractor	Monthly
Upon completion of the project or decommissioning of the construction camp, the sites must be rehabilitated to the pre-use or determined purpose for the areas. If required, the surface must be ripped and re-vegetated.	Contractor	Monthly
All structures comprising the construction camp must be removed from site. The area that previously housed the construction camp must be checked for spills of substances such as oil, paint etc. and these must be cleaned up.	Developer/ Contractor	Monthly
The Contractor must arrange the cancellation and removal of all temporary services.	Contractor	Monthly

All temporary chemical toilets must be removed from the construction camp and be disposed in a manner approved by the Contract/ ECO.	Contractor/ ECO	Monthly
Final rehabilitation must be completed within a period specified by the Engineer.	Developer/ Contractor/ Engineer	Monthly

Employees		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Staff must take cognisance of this EMPr as well as any local Municipality Standard EMPr for construction, maintenance and management.	Developer	Monthly
Staff must abide by the mitigation measures that apply to waste management, sanitation, surface water pollution, traffic, access, soil erosion, stormwater management, protection of flora and fauna, public safety & health and the noise and disturbance factor.	Developer	Monthly
Employees must receive training with regard to environmental management.	Developer	Monthly
Employees must wear uniforms, supplied by the employer.	Developer	Monthly

Management and Monitoring		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Immediate repair operation for any damaged portion of the new infrastructure must be taken.	Developer	As and when required
Buffer zones, gabion walls, ripraps etc., must be implemented to prevent stormwater from pooling and to direct stormwater to existing stormwater infrastructure on the surrounding roads and residential area.	Engineer	As and when required

10. OPERATIONAL PHASE

The Operational Phase is addressed in terms of the environment. Although it refers to the Management and Maintenance of the filling station, it is not to be used as an operational guideline for this task. The measures below are purely to ensure protection of the environment during the operational phase of the facility.

Health and Safety		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Relevant operation staff must receive training on the correct operation of the storage tanks, as well as maintenance and repair procedures when leaks are detected.	Developer	Daily
An emergency response plan must be available on site and employees must be familiar with the plan.	Developer	Daily
The correct PPE must be used on the site.	Developer	Daily
Appropriate Health and Safety signage must be placed on and around the tank.	Developer	Daily
Fire extinguishers and sandbags must be readily available on site and easily accessible. Firefighting equipment must comply with SANS 1151 (Portable rechargeable fire extinguishers- halogenated hydrocarbon type extinguishers) and be inspected regularly.	Developer	Daily
No smoking is permitted on site.	Developer	Daily
No cell phones must be used during fuel dispensing.	Developer	Daily
Overfill and spillages during tanker refueling and fuel dispensing must be prevented by the installation of automatic cut off devices.	Developer	Daily
Tank delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher.	Developer	Daily
A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the underground storage tanks to prevent fugitive emissions.	Developer	Daily
The fast food outlets must be registered with the Department of Health before the operational phase commences. This process entails an inspection of the fast food outlets and ensures that the outlet meets the required health and safety standards.	Developer	Daily

The Department of Health must conduct regular inspections to ensure that all the requisite precautions are being taken.	Developer	As and when required

Groundwater and Soil Contamination		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Sewerage and stormwater infrastructure must be protected against contamination by grease and flammable substances utilised or sold on the site. Grease, oil and solid traps with suitable grease removal facilities must be installed.	Developer	Daily
Regular inspection programs to ensure that the tanks, pipes and related infrastructure are in optimal condition and intact.	Developer	Monthly
Signs must be posted at the pump instructing customers not to top off fuel tanks and to notify an employee in the event of a spill.	Developer	As and when required
Emergency shutoff switches must be labelled.	Developer	Daily
A spill contingency plan must be available on site and staff must be appropriately trained to contain and dispose of contaminated materials.	Developer	As and when required
All chemical storage areas must be situated on impermeable concrete floors with bunding capable of containing 100% of any spillage.	Developer	Monthly
Accidental spills that occur outside of the bunded area must be contained and prevented from entering the stormwater system.	Developer	As and when required
Spills must be treated with the appropriate spill absorbent.	Developer	As and when required
An adequate supply of absorbent materials must be readily available.	Developer	Daily
Routine spot cleaning of small spills at fuelling areas with dry methods. Dry methods include using rags or absorbents.	Developer	As and when required
Where necessary, spill absorbent must be removed by a certified hazardous waste removal company.	Developer	As and when required
Any significant spills or leak incidents must be reported in terms of the National Environmental Management Act and the Water Act.	Developer	As and when required
Underground storage tanks must be fitted with automatic leak detectors that alert management to a leak.	Developer	Once
Leaking taps and hose pipes must be repaired immediately.	Developer	As and when required

Running water taps and hosepipes must not be left unattended.	Developer	Daily
Overfill and spillages during tanker refuelling and fuel dispensing must be prevented by the installation of automatic cut off devices.	Developer	Once
Tanker delivery drivers must be present during the delivery of fuel with the emergency cut of switch.	Developer	Daily
In the event of the pump dispenser or the hoses being knocked over or ripped off, the fuel supply must be cut off by shear-off valves	Developer	As and when required
All forecourt staff must undergo appropriate training, which must include training to prevent spillages during fuel dispensing.	Developer	Monthly
A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the underground storage tanks.	Developer	Daily
An emergency response plan must be in place for the site, this must clearly describe emergency procedures and include a notification list including the names and phone numbers of local management, fire and police and spill response contractors.	Developer	Daily
If contamination or leakage is detected, BP's emergency response plan must be followed.	Developer	As and when required
Fuel stock must be monitored on a daily basis and these records must be kept on site.	Developer	Daily
Underground storage tanks must have corrosion protection.	Developer	Once
Inspection wells must be installed within the underground containment area. These wells must be inspected on a monthly basis so that leaks can be detected early.	Developer	Monthly
An early warning system must be considered for placement beneath the storage tanks.	Developer	Once
Any spill must be cleaned up immediately and contaminated soil must be disposed of at a designated site.	Developer	As and when required
The pump, refuelling and forecourt areas must all be located on a hardened surface which drains into a common drain. This drain must feed onsite oil and water separator such as a Zorbit Grease Trap, the accumulated grease and oil must be removed by an accredited company.	Developer	As and when required

Storm Water Management		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Stormwater from all roof and paved areas will be piped from gutters through downpipes and ground pipes into the stormwater system. Thereafter, discharged into the attenuation tank before entering the municipal system.	Developer	Monthly
Storm water measures must be inspected to verify that the structures are functional and not causing soil erosion.	Developer	Monthly
Clean storm water must be kept away from areas where it could be contaminated and must be directed to a storm water drainage system.	Developer	Monthly
Surface water off paved surfaces must be directed towards the stormwater inlets as is designed, and contaminated wastewater must not be diverted into the stormwater system (i.e. the use of stormwater inlets for receiving contaminated water is prohibited).	Developer	Monthly
The storm water drainage system must be maintained and not contaminated by other waste sources.	Developer	Monthly

Accidental Spillage of Hazardous Chemicals or Materials, such as Fuel and Chlorine		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Chemicals must be stored in a lockable, well ventilated building.	Developer	Monthly
Storage areas for hazardous chemicals must comply with standard fire safety regulations.	Developer	Monthly
Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, must be clearly displayed in areas housing chemicals.	Developer	Monthly
Fire-fighting equipment must be available close at hand and no smoking is permitted within the vicinity of storage areas.	Developer	Monthly
Chemicals must be properly labelled and handled in a safety conscious manner.	Developer	Monthly
All personnel handling hazardous chemicals and hazardous materials must be issued with Personal Protective Equipment (PPE).	Developer	Monthly or as and when required
The removal of only the daily-required amount of chemicals must be used.	Developer	Daily or as and when

		required
If refuelling on site or from drums is required, the ground must be protected, and proper dispensing equipment must be used i.e. hand pumps and funnels. Drums must not be tipped to dispense fuel.	Developer	As and when required
Spill kits must be readily available.	Developer	Daily

Generation of General and Domestic Waste		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
The Service Manager must monitor that waste containers are provided for the collection of general waste at various points on the premises.	Developer	Daily or as and when required
Bins and skips must be strategically placed for the disposal of general and domestic waste.	Developer	Daily or as and when required
All containers must be kept in a clean and hygienic manner.	Developer	Daily
Storage containers must be stored in a manner that prevents the harbouring of pests.	Developer	Daily
Waste must be disposed of at a registered landfill site. Safe disposal certificates must be provided to the developer for record keeping.	Developer	Weekly or as and when required

General Sanitation Onsite		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Ablution facilities must be maintained to prevent or minimise blockage and leakages.	Developer	Daily or as and when required
Awareness of the importance of proper hygiene must be created among employees.	Developer	As and when required
Toilets must have properly closing doors and supplied with toilet paper.	Developer	Daily

Air Quality Impact		
Actions and Mitigation Measures	**Responsible Peron(s)**	**Monitoring Frequency**
Speed bumps or traffic speed signs must be erected to reduce speeding onsite minimising the generation of dust.	Developer	Once
Underground storage tanks must be fitted with breather pipes.	Developer	Once
Vent pipes must be fitted such that they face away from the neighbouring residential areas.	Developer	Once
All operator delivery vehicles must be adequately maintained to reduce exhaust emissions.	Developer	As and when required

Increase in Ambient Noise Level		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
A grievance procedure must be established whereby noise complaints can be received, recorded and responded to appropriately.	Developer	As and when required
The machinery on site must be in proper working condition, fitted with silencing equipment.	Developer	Monthly
A dB reading of less than 50dB at the site boundary must be maintained.	Developer	Monthly
Equipment must be kept in good repair and lose or rattling covers, worn bearings and broken equipment must be repaired immediately.	Developer	Monthly

Visual Impact		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Litter and waste must be effectively managed to avoid visual problems in the area.	Developer	Daily
Buildings must receive on-going maintenance to avoid visual decay.	Developer	Monthly or as and when required
Light pollution must be minimized. Lighting on site is to be sufficient for safety and security purposes but must not be intrusive on Grimsby Road or South Coast Road.	Developer	Once

Traffic Associated with the Bulk Delivery of Fuels		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Delivery times must be scheduled so that they do not conflict with other deliveries/ removals	Developer	Daily
There must be sufficient turning space for delivery vehicles	Developer	Daily

Resource Use During Operation		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Regular maintenance and inspection of equipment, such as hose pipes and tanks, to prevent leaks must be conducted.	Developer	Monthly or as and when required
Regular site inspections by supervisors must be conducted.	Developer	Monthly or as and when required
Areas that are being used for chemical storage must be situated on impermeable concrete floors with bunding capable of containing 100% of any spillage.	Developer	Daily
Proper environmental training and awareness of employees must be conducted.	Developer	Daily
Resource consumption must be monitored.	Developer	Daily
Leaking taps and hose pipes must be repaired immediately.	Developer	Daily
Running water taps and hosepipes must not be left unattended.	Developer	Daily
Fuel dispensers must not be left unattended when filling fuel for vehicles.	Developer	Daily

Social Impacts		
Actions and Mitigation Measures	**Responsible Person(s)**	**Monitoring Frequency**
Increased opportunities during the operation phase of the fuel station, convenience store and food outlets. The project will employ a total of 40 people for the operation phase.	Developer	As and when required

Security guard(s) must be appointed as a security measure.	Developer	Daily
Suitable security mechanisms such as cameras and alarm system must be installed.	Developer	Daily
All recruitment must be in-line with Employment Equity Policy.	Developer	As and when required
The policy will also promote the employment of women to ensure that gender equality is attained as per the Employment Equity Act No 55 of 1998.	Developer	As and when required
Where possible, priority must be given to job seekers from the local area.	Developer	As and when required
The operator must build the capacity of employees through development plans, technical, health and safety training and provide them with relevant training certificates.	Developer	Once

11. PROCEDURES FOR ENVIRONMENTAL INCIDENTS

11.1. Leakages and spills

- Identify the source of the problem;
- Stop the leak, if safe to do so;
- Contain spilt material, using spill kit or sand;
- Notify Environmental Control Officer;
- Remove spilt material and place in sealed container (if possible); and
- Site manager in liaison with the ECO, to follow incident management plan.

11.2. Failure of erosion/ sediment control devices

- Prevent further escape of sediments;
- Contain escaped material using silt fence, hay bales, pipes, etc.;
- Notify ECO;
- Repair or replace failed device as appropriate;
- Dis/ scrape up escaped material; take care not to damage vegetation;
- Remove escaped material from site; and
- Monitor for effectiveness until re-establishment.

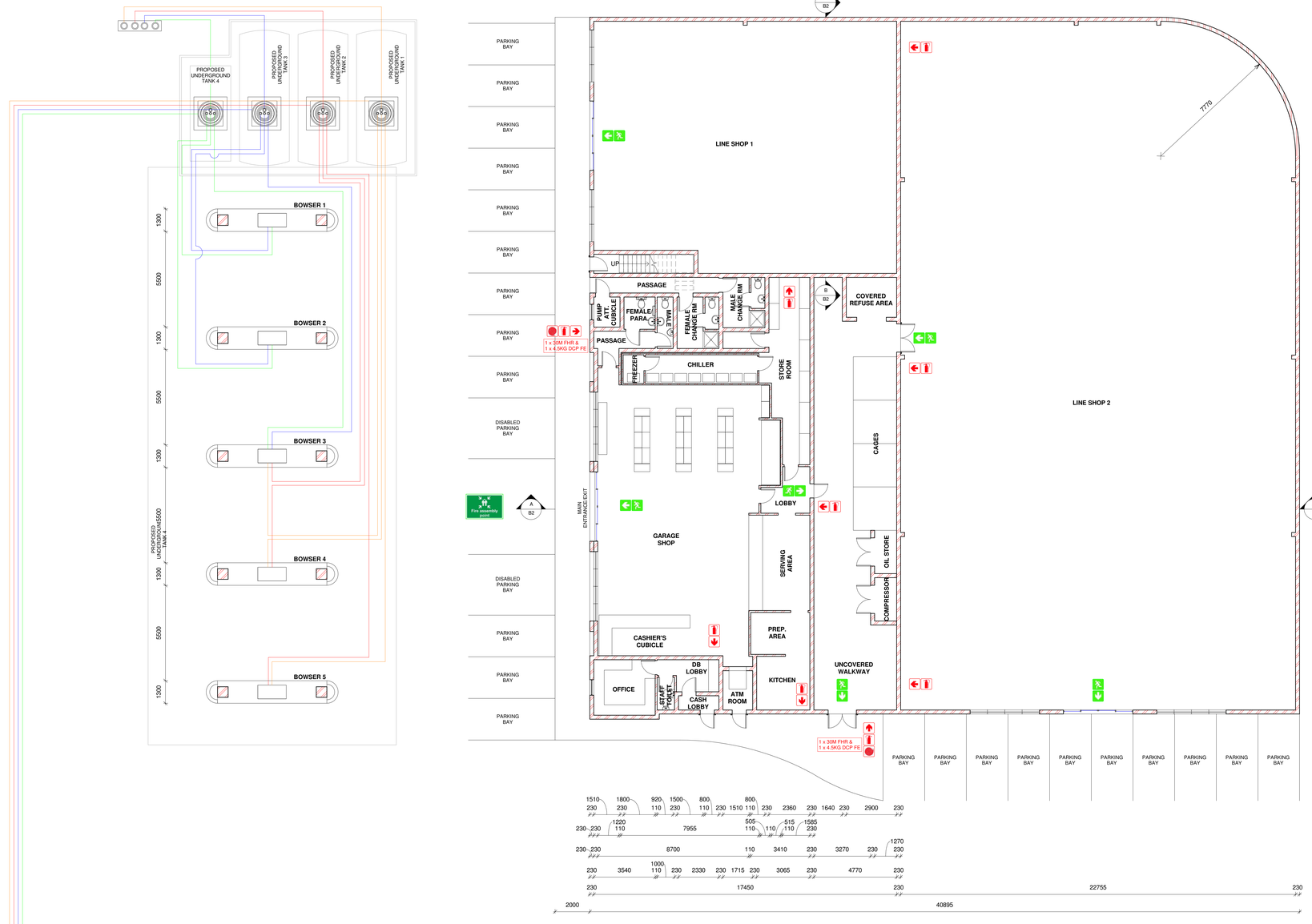
11.3. Bank/ slope failure

- Stabilise toe of slope to prevent sediment escape using aggregate bags, silt fence, logs, hay bales, pipes, etc.;
- Notify ECO;
- Site Manager, in liaison with ECO to follow Incident Management plan;
- Divert water upslope from failed fence;
- Protect area from further collapse as appropriate;
- Restore as advised by ECO; and
- Monitor for effectiveness until stabilised.

12. CLOSING COMMENTS

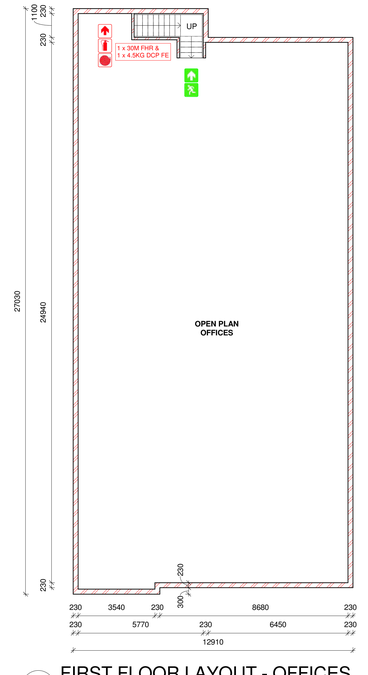
- This EMPr will be submitted to KZN EDTEA for approval.
- The Client's/Contractor's Environmental Code of Conduct, the stormwater management plan and specialist study reports must be provided as Appendices to this EMPr in the Environmental File during construction

Appendix 1
Facility Design



GF GROUND FLOOR LAYOUT - FUELING STATION AND LINE SHOPS

1 : 100



FF FIRST FLOOR LAYOUT - OFFICES

1 : 100

GENERAL NOTES
*DIMENSIONS TO BE USED IN PREFERENCE TO SCALING.
*ALL DIMENSIONS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORK.
*ALL BUILDING WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE NBR & STANDARDS ACT (ACT 103 OF 1977), SABS 0400 AND SANS 10400.
*ALL UNDERGROUND SERVICES TO BE IDENTIFIED PRIOR TO COMMENCEMENT OF ANY EXCAVATION.
*WHERE CERTAIN WORKS REQUIRE AN ENGL DESIGN & CERTIFICATION NO WORK MUST COMMENCE WITHOUT THE OF THE APPOINTED ENGINEER.
*DRAWINGS TO BE APPROVED BY LOCAL MUNICIPALITY BEFORE COMMENCEMENT OF ANY WORK.
*BOUNDARY BEACONS TO BE EXPOSED AND DEMARKED
*SOIL POISONING IN ACCORDANCE WITH SABS 0124 REQUIRED.
*ALL NEW WALLS, LINTELS AND ROOF STRUCTURES TO ENGINEERS DETAIL.
*FINISHED LEVELS ON RETAINING WALL THAT EXCEEDS 1.0M HIGH, TO BE FITTED WITH SAFETY RAILINGS OR BALUSTRADES (WHERE APPLICABLE).

DRAINAGE NOTES
*SEWER SYSTEM TO BE IN ACCORDANCE WITH NBR.
*DRAINAGE SHOWN IN SCHEMATIC IS PURELY FOR DIRECTIONAL PURPOSES.
*ASVP TO ANY FITTING OR APPLIANCE THAT HAS A VERTICAL DROP IN EXCESS OF 1200MM.
*ALL BENDS TO BE LONG RADIUS BENDS FITTED WITH AN ACCESS EYE.

WALL NOTES
*110MM AND 220MM SABS APPROVED BRICK WALLS WITH BRICK FORCE EVERY THIRD COURSE.
*PRE-STRESSED LINTELS OVER ALL OPENINGS.
*DPC TO ALL WALLS AT FLOOR LEVEL AND UNDER ALL WINDOW SILLS.
*VERTICAL DPC TO ANY CHANGES IN FLOOR LEVEL, DPC TO SABS 298.
*ALL BRICKWORK IN FOUNDATIONS AND PLINTH - UP TO FLOOR LEVEL - TO BE 220MM SABS APPROVED BRICKS ONLY.

ROOFING NOTES
*CONCRETE CEMENT TILES ON 38x38 BATTERNS @ 320 CRS. ON PDC UNDERLAY, ON 114x38 RAFTERS @ 760 CRS, ON 114x38 WALL PLATE WITH SISALATION (ACCORRDING TO SANS PART XA). ALL TRUSSES TO MANUFACTURERS SPECIFICATION @ MIN 17.5 DEG PITCH.
*SHEETING ROOF ON SISALATION (ACCORDING TO SANS PART XA) ON 75x50MM PURLINS @ 1200 CRS, ON RAFTERS TO MANUFACTURERS SPEC. @ MIN 5 DEG PITCH.
*100mm AEROLITE INSULATION - R-Value = 2.7

CEILING/PARTITIONING NOTES
*12SE FLAT GYPSUM CEILING BOARD COMPLYING WITH SANS 266, 6.5MM THICK, OR AS SPECIFIED.
*USE MINERAL FIBRE BLANKET INSULATION TO COMPLY WITH SANS 1381 AND SANS 10400 XA.

PLASTERING NOTES
*USE COMMON CEMENT COMPLYING WITH SANS 50197-1, STRENGTH CLASS 32.5N OR MASONRY CEMENT COMPLYING WITH SANS 50413-1.

ELECTRICAL INSTALLATION NOTES
*COMPLY WITH ALL REQUIREMENTS OF THE LOCAL AUTHORITY AND WITH SANS 10142.
*ALL WORK MUST BE DONE UNDER SUPERVISION OF A REGISTERED ELECTRICIAN.

ENERGY NOTES
*THE INSTALLATION, MAINTENANCE, REPAIR AND REPLACEMENT OF DOMESTIC SOLAR WATER HEATING SYSTEMS AND THERMAL INSULATION TO BE IN ACCORDANCE WITH PART XA SANS 10106.
*FENESTRATION (GLAZING) TO BE IN ACCORDANCE WITH PART XA SANS 10106.
*DIAMETER OF ALL NEW WATER FEEDS TO BE 15 TO 22MM DIA IN ACCORDANCE WITH SANS 10252-1.

ENERGY USAGE NOTES
*ROOF ASSEMBLIES TO RECEIVE INSULATION TO ACHIEVE THE R-VALUE AS INDICATED IN TABLE 7, THICKNESS GIVEN IN SANS 204 TABLE 10, SEE SANS 10400-WA CLAUSE 4, 4.5 AND SANS 204 TABLE 10.
*NON MASONRY WALLS WILL HAVE R-VALUES AS PROVIDED. SEE SANS 10400-XA CLAUSE 4.4.3.1.
*DOUBLE SKIN MASONRY WITH PLASTER INSIDE OR RENDER OUTSIDE COMPLIES. SINGLE LEAF: MINIMUM 140MM WITH PLASTER INSIDE OR RENDER OUTSIDE COMPLIES. SEE SANS 10400-XA CLAUSE 4.4.3.2.
*OTHER MASONRY WALLS WILL HAVE R-VALUE OF 0.35. SEE SANS 10400-XA CLAUSE 4.4.3.3.
*AIR LEAKAGE SHALL NOT EXCEED 2 L/S/M² FENESTRATION AREA; 0.30 6 L/S-M² FIXED GLAZING; AND 5 L/S-M² REVOLVING/SWING DOORS. SEE SANS 10400-XA CLAUSE 4.4.11 AND SANS 613 CLAUSE 4.4.
*FENESTRATION MORE THAN 15% AREA TO NET FLOOR AREA PER STOREY THEN THE SOLAR HEAT GAIN AND HEAT CONDUCTANCE SHOULD COMPLY WITH SANS 204 CLAUSE 4.3.4.
*FENESTRATION UP TO 15% AREA TO NET FLOOR AREA PER STOREY COMPLIES. SEE SANS 10400-XA CLAUSE 4.4.4.1.
*PROVIDE 50% OF HOT WATER REQUIRED BY VOLUME THROUGH NON-ELECTRICAL RESISTANCE SOURCES, I.E A HEAT PUMP. ALL EXPOSED HOT WATER PIPING TO BE INSULATED WITH R-VALUE OF 1. SEE SANS 10400-XA CLAUSE 4.1.

STAIRS & BALUSTRADES CONSTRUCTION NOTE:
*RISERS TO BE 190MM, TREADS TO BE 250MM.
*HANDRAILS TO BE 1000MM HIGH BOLTED TO WALL AND STAIRS WITH M8 RAWLBOLTS.
*BALUSTRADES TO BE 1000MM HIGH, SPACED NOT LESS THAN 100MM AND BOLTED TO WALL WITH M10 RAWLBOLTS.

SECTION CONSTRUCTION NOTE:
*ALL BRICKWORK IN FOUNDATIONS AND PLINTH UP TO FLOOR LEVEL WHICH IS MIN 150MM ABOVE GROUND LEVEL- TO BE 220MM SABS APPROVED BRICKS.
*NO BLOCKS WILL BE ALLOWED TO BE USED IN FOUNDATIONS UNDER ANY CIRCUMSTANCE.

CONCRETE and FORMWORK NOTE:
*USE CEMENT TO COMPLY WITH SANS 50197-1, STRENGTH CLASS 32.5N OR HIGHER.
*CEMENT MUST BE SABS-MARK BEARING.
*USE NATURAL CRUSHED OR BLENDED SAND FOR USE IN CONCRETE TO COMPLY WITH SANS 1083.
*STONE FOR USE IN CONCRETE TO COMPLY WITH SANS 1083.
*CAST CONCRETE TEST CUBES OF SIZE AND QUANTITY, AND AT INTERVALS OR OF BATCHES IN ACCORDANCE WITH SANS TEST METHOD 5861. HAVE THESE TEST CUBES TESTED FOR COMPRESSIVE STRENGTH BY AN APPROVED LABORATORY, ACCORDING TO SANS TEST METHOD 5863.
*USE STEEL BARS FOR CONCRETE REINFORCEMENT COMPLYING WITH SANS 920, OF TYPE AND NOMINAL SIZE AS SPECIFIED BY ENGINEER.
*PROVIDE SLIP JOINTS BETWEEN WALL AND IN SITU CONCRETE SLABS OR BEAMS BY TROWELLING SMOOTH THE BEARING SURFACES AND COVERING THE BEARING AREA WITH TWO LAYERS OF 0.25MM POLYOLEFIN SHEETING.
*ALL EXPANSION AND MOVEMENT JOINTS AS PER ENGINEERS DETAIL AND SPECIFICATION.
*ALL RETAINING WALLS TO ENGINEERS DETAIL AND SPECIFICATION.
*ALL CONCRETE WORK TO ENGINEERS DETAIL AND SPECIFICATION.

MUNICIPAL STAMPS

north coast architects
proud members of the 'go green initiative'
A DIVISION OF GUADAGNINO BROTHERS CONSULTING
MAX GUADAGNINO
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REVISIONS

REV:	DATE:	DESCRIPTION	REV. BY:

PROJECT

PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 821 PORTION 2.
2 GRIMSBY ROAD, MOBENI, DURBAN.
(CORNER OF GRIMSBY ROAD AND SOUTH COAST ROAD)

FOR

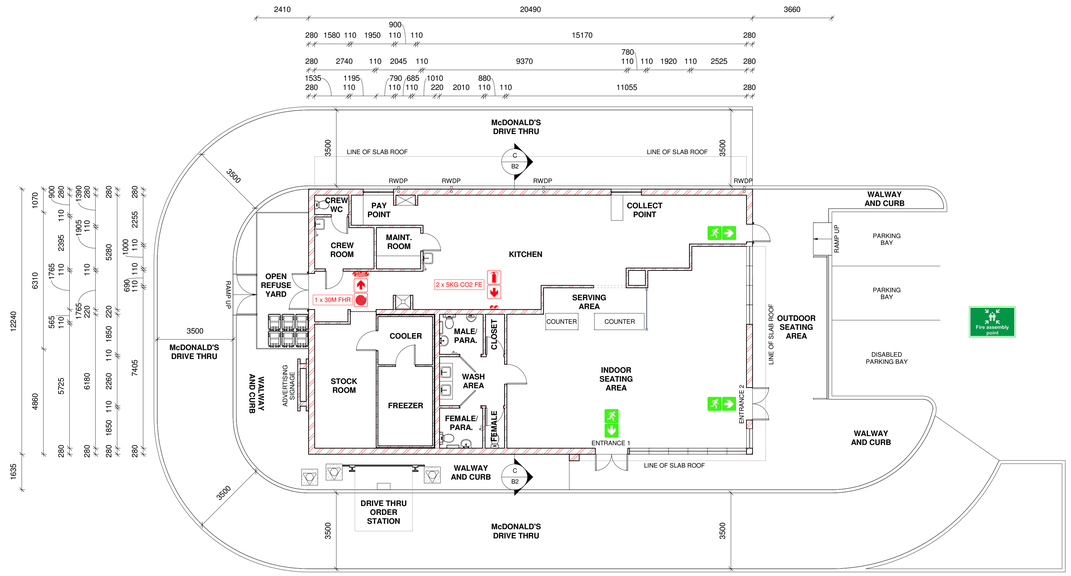
COUNCIL SUBMISSION

ARCHITECT | OWNER

TITLE

GROUND FLOOR LAYOUT - FUELING STATION, GARAGE SHOP AND LINE SHOPS

DATE: 2019-03-01	SIZE: A0	DESIGNED: GUADAGNINO R.C.D REG. NO. CAD36684926
BUILDING CLASSIFICATION: B3		DRAWN: GUADAGNINO R.C.D REG. NO. CAD36684926
DRG. NO.: 02-821-DB		CHECKED: PJJ CALITZ P.R.D REG. NO. D2766



GF. GROUND FLOOR LAYOUT - McDONALD'S

1 : 100

PARKING SCHEDULE

LINESHOPS (SINGLE SHOPS):

NOTE: PARKING BAYS REQUIRED FOR FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS AND STORAGE.

FLOOR SPACE : 5 BAYS / 100M²
PARKING BAYS REQUIRED @ 1603.89 = 80

TOTAL PARKINGS REQUIRED = 80
TOTAL PARKINGS PROVIDED = 80

WAREHOUSE:

FLOOR SPACE : 1 BAY / 100M²
PARKING BAYS REQUIRED @ 1205.96= 12

TOTAL PARKINGS REQUIRED = 12
TOTAL PARKINGS PROVIDED = 12

WORKSHOP:

FLOOR SPACE : 4 BAY / WORKING AREA
PARKING BAYS REQUIRED : 4 BAY @ 841.44 = 4

TOTAL PARKINGS REQUIRED = 4
TOTAL PARKINGS PROVIDED = 4

CONVENIENCE SHOP (GARAGE SHOP):

NOTE: PARKING BAYS REQUIRED FOR FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS AND STORAGE.

FLOOR SPACE : 6 BAY / 100M²
PARKING BAYS REQUIRED @ 148.39 = 9

TOTAL PARKINGS REQUIRED = 9
TOTAL PARKINGS PROVIDED = 9

PARKING SCHEDULE

OFFICES:

NOTE: PARKING BAYS REQUIRED FOR FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS AND STORAGE.

FLOOR SPACE : 6 BAYS / 100M²
PARKING BAYS REQUIRED @ 330.21 = 20

TOTAL PARKINGS REQUIRED = 20
TOTAL PARKINGS PROVIDED = 20

FUELLING STATION OFFICE & GARAGE SERVICE:

FLOOR SPACE : 2 BAYS / 100M²
PARKING BAYS REQUIRED @ 60.33 = 2

TOTAL PARKINGS REQUIRED = 2
TOTAL PARKINGS PROVIDED = 2

McDONALDS:

NOTE: PARKING BAYS REQUIRED FOR FLOOR SPACE EXCLUDING TOILETS, PASSAGE WAYS, STAIRWELLS, KITCHEN AND STORAGE.

FLOOR SPACE : 10 BAYS / 100M²
PARKING BAYS REQUIRED @ 142.10 = 14

TOTAL PARKINGS REQUIRED = 14
TOTAL PARKINGS PROVIDED = 14

STORAGE YARD

FLOOR SPACE : 1 BAY / 100M²
PARKING BAYS REQUIRED @ 1345.34 = 13

TOTAL PARKINGS REQUIRED = 13
TOTAL PARKINGS PROVIDED = 13

TOTAL REQUIRED : 154
TOTAL PROVIDED : 149 PARKING BAYS +
3 DISABLED PARKING BAYS

SCHEDULE OF AREAS

AREA OF SITE (GROSS)13204.00 M² (NETT)13204.00 M²

*NOTE: NETT IS THE SITE AREA EXCLUDING ANY ROAD SERVITUDES OR PUBLIC RIGHT OF WAY

EXISTING FLOOR AREA:	3333.26 M²
PROPOSED FLOOR AREA:	2006.41 M²
TOTAL FLOOR AREA:	5339.67 M²
EXISTING COVERAGE:	3139.75 M²
PROPOSED COVERAGE:	2244.87 M²
TOTAL COVERAGE:	5384.62 M²

SCHEDULE OF AREAS FOR McDONALD'S

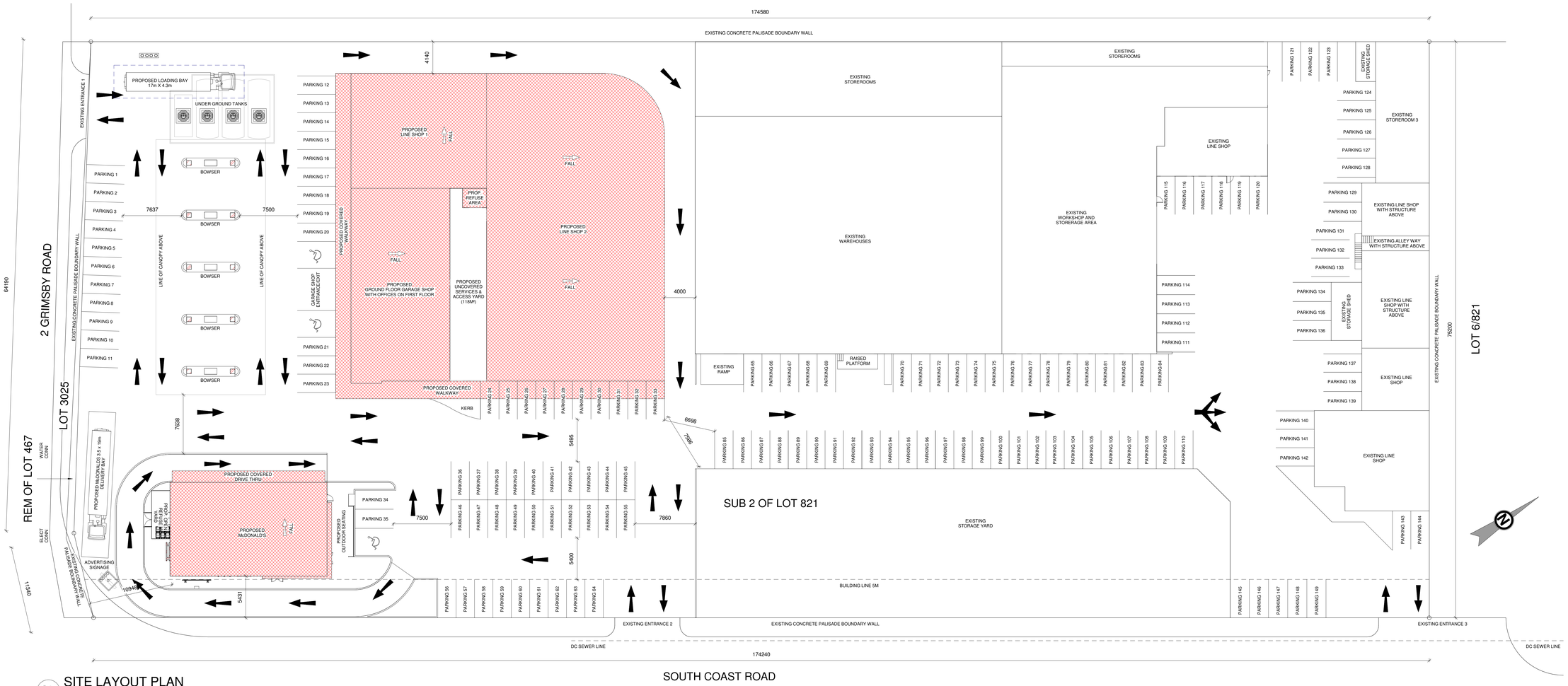
PROP. McDONALD'S:	250.80 M²
PROP. OPEN REFUSE YARD:	15.21 M²
PROP. UNCOVERED OUTDOOR SEATING :	62.55 M²
PROP. UNCOVERED DRIVE THRU :	237.12 M²
PROP. COVERED DRIVE THRU :	30.00 M²
PROP. UNCOVERED WALKWAY AND CURBS :	80.34 M²
TOTAL :	**676.02 M²**

BREAKDOWN OF SCHEDULE OF AREAS

PROP. McDONALD'S:	250.80 M²
PROP. FUEL STATION:	476.19 M²
PROP. FUELING GARAGE SHOP:	326.14 M²
PROP. LINE SHOP 1 :	257.14 M²
PROP. LINE SHOP 2 :	918.70 M²
PROP. STAIRWELL :	7.98 M²
PROP. REFUSE AREA :	7.92 M²
PROP. FIRST STOREY OFFICES :	330.21 M²

MUNICIPAL STAMPS

LOT R/828



SL SITE LAYOUT PLAN

1 : 200

north coast architects
proud members of the 'go green initiative'
A DIVISION OF GUADAGNINO BROTHERS CONSULTING
MAX GUADAGNINO
OFFICE : 084 087 3364
EMAIL : info@gbc-architects.com
http://www.facebook.com/northcoastarchitects

REVISIONS

REV:	DATE:	DESCRIPTION	REV. BY:

PROJECT

PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 821 PORTION 2.
2 GRIMSBY ROAD, MOBENI, DURBAN.
(CORNER OF GRIMSBY ROAD AND SOUTH COAST ROAD)

FOR

COUNCIL SUBMISSION

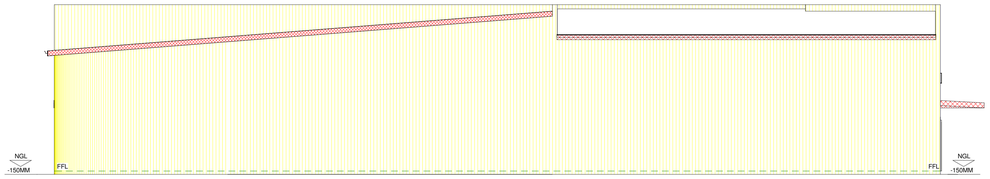
ARCHITECT | OWNER

TITLE

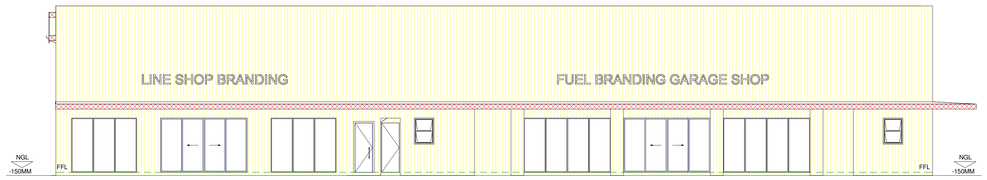
SITE PLAN AND McDONALDS FLOOR PLAN LAYOUT

DATE: 2019-03-01	SIZE: A0	DESIGNED: GUADAGNINO R.C.D REG. NO. CAD36684926
BUILDING CLASSIFICATION: B3		DRAWN: GUADAGNINO R.C.D REG. NO. CAD36684926
DRG. NO.: 02-821-DB		CHECKED: PJJ CALITZ P.R.D REG. NO. D2766

.NE GARAGE SHOP - NORTH EAST ELEVATION
1 : 100

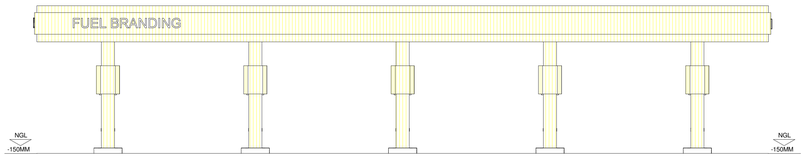


.NW GARAGE SHOP - NORTH WEST ELEVATION
1 : 100

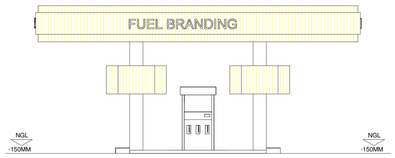


.SW GARAGE SHOP - SOUTH WEST ELEVATION
1 : 100

.SE GARAGE SHOP - SOUTH EAST ELEVATION
1 : 100

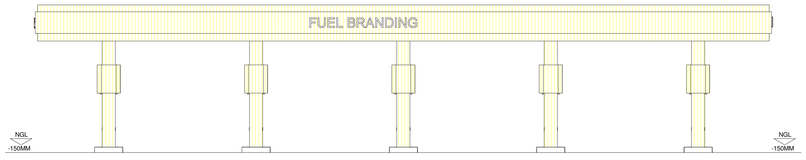


NE. FUEL PUMPS - NORTH EAST ELEVATION
1 : 100

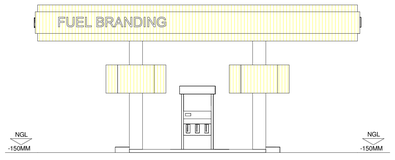


NW. FUEL PUMPS - NORTH WEST ELEVATION
1 : 100

NE McDONALD'S - NORTH EAST ELEVATION
1 : 100

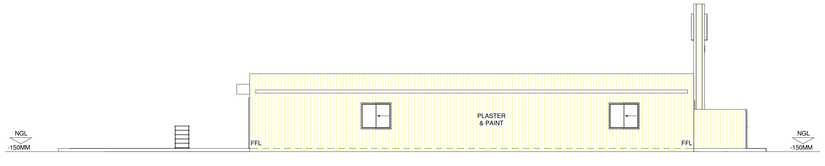


SW. FUEL PUMPS - SOUTH WEST ELEVATION
1 : 100

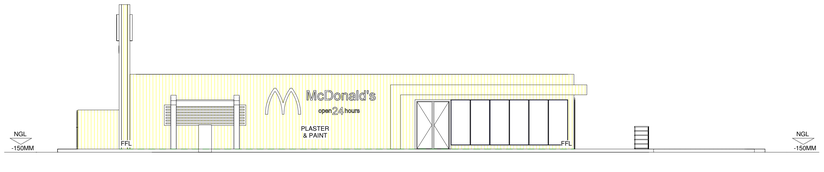


SE. FUEL PUMPS - SOUTH EAST ELEVATION
1 : 100

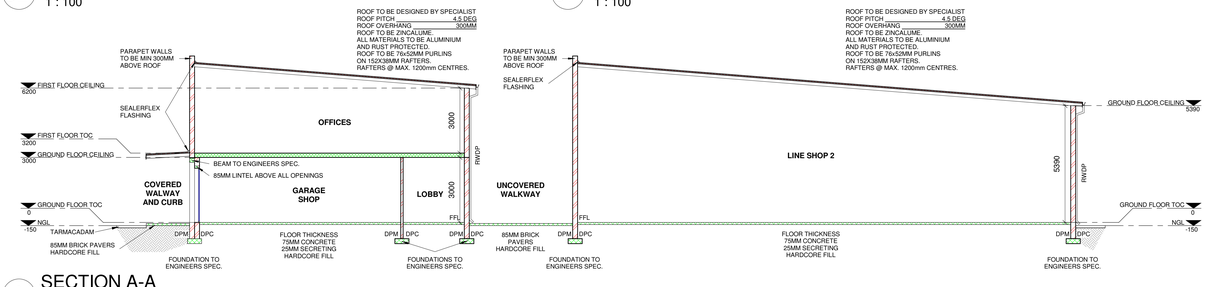
SW McDONALD'S - SOUTH WEST ELEVATION
1 : 100



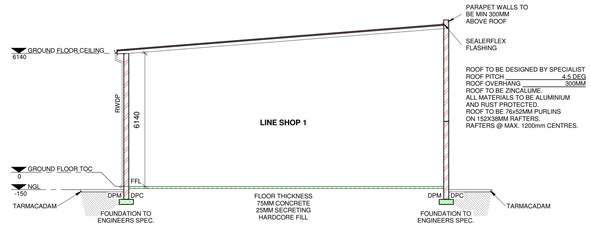
NW McDONALD'S - NORTH WEST ELEVATION
1 : 100



SE McDONALD'S - SOUTH EAST ELEVATION
1 : 100



A SECTION A-A
1 : 100



B SECTION B-B
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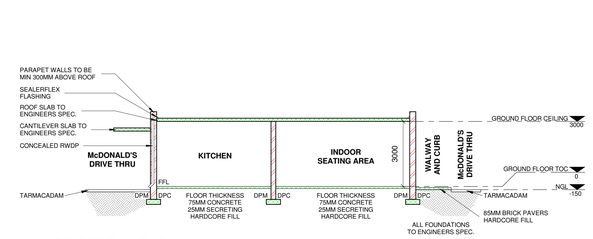

C SECTION C-C
1 : 100

MUNICIPAL STAMPS

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MAX GUADAGNINO
OFFICE : 084 087 3364
EMAIL : info@gbc-architects.com
http://www.facebook.com/northcoastarchitects

REVISIONS

REV:	DATE:	DESCRIPTION	REV. BY:

PROJECT

PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET FOR LOT 821 PORTION 2.
2 GRIMSBY ROAD, MOBENI, DURBAN.
(CORNER OF GRIMSBY ROAD AND SOUTH COAST ROAD)

FOR

COUNCIL SUBMISSION

ARCHITECT | OWNER

TITLE

ELEVATIONS AND SECTIONS

DATE: 2019-03-01	SIZE: A0	DESIGNED: GUADAGNINO R.C.D REG. NO. CAD36684926
BUILDING CLASSIFICATION: B3		DRAWN: GUADAGNINO R.C.D REG. NO. CAD36684926
DRG. NO.: 02-821-DB		CHECKED: PJ CALITZ P.R.D REG. NO. D2766

Appendix 2
Stormwater Management Plan

BRAMIN CONSULTING ENGINEERS

Consulting Civil, Structural & Geotechnical Engineers

P.O. Box 60430
Phoenix
4080

email: yashvir@bramin.co.za

Telephone: (031) 502 1989
Fax: (086) 571 4138
Cell: 083 777 2255

Our Ref: 1978

17 July 2019

STORMWATER MANAGEMENT REPORT
PROPOSED FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET
2 GRIMSBY ROAD, MOBENI, DURBAN, LOT 821 PNT 2

1.0 INTRODUCTION

Bramin Consulting Engineers were appointed to carry out a stormwater analysis to determine the impact the proposed new fueling station, garage shop and fast food outlet would have on the municipal stormwater system.

The site comprises the following property:

- **2 GRIMSBY ROAD, MOBENI, DURBAN, LOT 821 PNT 2**

The proposed development comprises 5259,41m² building footprint / roofed area, approximately 6300m² of associated driveways / parking area. The remaining 1644,59m² of site area is landscaped gardens.

All stormwater calculations were carried out based on the architectural site plan. The rainfall data was taken from the eThekwini Municipal website for the latitude of 29° 56' 15" and longitude of 30° 57' 42"

The proposed stormwater system will discharge into the attenuation tank and the outflow will discharge into the municipal stormwater system at the lower end of the property on the South Western boundary.

1.1 TERMS OF REFERENCE

All calculations are based on Design Manual: Guidelines and policy for the design of stormwater drainage and stormwater management systems, Engineering Unit Coastal stormwater and catchment management department. This document in reference has been compiled by the Enginering Unit: eThekwini Municipality that adheres to SANS 0400-1990 PART R Stormwater Disposal.

2.0 THE CATCHMENT AREA

The property would have comprised of existing structures and has a total area of 1,3204Ha (13204m²).

3.0 PRE-DEVELOPMENT STORMWATER RUNOFF CO-EFFICIENT

The current (pre-development) stormwater runoff co-efficient was calculated as follows:

	m^2	%	C	Proportioned C value	
Site Area	13204				
Roofed Area	3139,75	24%	0,95	0,23	
Road Area	6000	45%	0,95	0,43	
Landscaped	4064,25	31%	0,3	0,09	
Totals	13204	100%		0,75	Adopted C value

DWA METHOD		
PRE / URBAN Runoff Coefficient		
URBAN	%	
Lawn Sandy < 2%	0%	0,08
Lawn Sandy > 7%	0%	0,18
Lawn Heavy < 2%	0%	0,15
Lawn Heavy > 7%	31%	0,30
Residential Single	0%	0,50
Flats / Dense Townships	0%	0,60
Industry, Light	0%	0,65
Industry, Heavy	0%	0,70
Business Local	0%	0,60
Business CBD	0%	0,85
Streets / Roofs	69%	0,95
	100%	**0,75**
AREA WEIGHTING FACTORS		
	%	DWA
RURAL	0%	0,00
URBAN	100%	0,75
LAKES	0%	0,00
Cdesign	100%	**0,75**

4.0 PRE-DEVELOPMENT STORMWATER RUNOFF

The Rational Method was used to compute the stormwater runoff, as per the following calculations:

Area	=	1,320	ha	
Flow Path Length	=	175	m	
Height Of Fall	=	2,00	m	
Average Grade	=	1,15	%	(2 x 100 / 175)
Flow Velocity	=	1,62	m/s	(from Appendix 1)
Flow Time	=	1,81	mins	(175 / 1,615 / 60)
Time Of Entry	=	15	mins	(from Appendix 1)
Time Of Flow In Pipes	=	0,00	mins	
Time Of Concentration	=	16,81	mins	(15 + 1,8 + 0)
Runoff Factor (C)	=	0,75		(from item 3.0 above)

Using the eThekwini Municipal rainfall data for the latitude of 29° 56' 15" and longitude of 30° 57' 42" the following values were extracted:

	M15	M16,8	M30	**INTENSITY**		
1 in 10 Year Return Period	34,1	35,56	46,2	**126,95**	**mm/h**	(35,56 x 60 / 16,8)
1 in 50 Year Return Period	53,2	55,49	72,2	**198,11**	**mm/h**	(55,49 x 60 / 16,8)

Pre Development Runoff				
1 in 10 Year Return Period	=	**0,3485**	**m^3/s**	(0,75 x 126,95 x 1,3204 / 360)
1 in 50 Year Return Period	=	**0,5439**	**m^3/s**	(0,75 x 198,11 x 1,3204 / 360)

5.0 POST-DEVELOPMENT STORMWATER RUNOFF CO-EFFICIENT

The expected post development stormwater runoff co-efficient was based on the Architects proposed

	m^2	%	C	Proportioned C value	
Site Area	13204				
Roofed Area	5259	40%	0,95	0,38	
Road Area	6300	48%	0,95	0,45	
Landscaped	1645	12%	0,3	0,04	
Totals	13204	100%		0,87	Adopted C value

DWA METHOD		
PRE / URBAN Runoff Coefficient		
URBAN	%	
Lawn Sandy < 2%	0%	0,08
Lawn Sandy > 7%	0%	0,18
Lawn Heavy < 2%	0%	0,15
Lawn Heavy > 7%	12%	0,30
Residential Single	0%	0,50
Flats / Dense Townships	0%	0,60
Industry, Light	0%	0,65
Industry, Heavy	0%	0,70
Business Local	0%	0,60
Business CBD	0%	0,85
Streets / Roofs	88%	0,95
	100%	**0,87**

AREA WEIGHTING FACTORS		
	%	DWA
RURAL	0%	0,00
URBAN	100%	0,87
LAKES	0%	0,00
Cdesign	100%	**0,87**

6.0 POST-DEVELOPMENT STORMWATER RUNOFF

The Rational Method was used to compute the stormwater runoff, as per the following calculations:

Area	=	1,320	ha	
Flow Path Length	=	175	m	
Height Of Fall	=	2,00	m	
Average Grade	=	1,15	%	(2 x 100 / 175)
Flow Velocity	=	1,62	m/s	(from Appendix 1)
Flow Time	=	1,81	mins	(175 / 1,615 / 60)
Time Of Entry	=	15	mins	(from Appendix 1)
Time Of Flow In Pipes	=	0,00	mins	
Time Of Concentration	=	16,81	mins	(15 + 1,8 + 0)
Runoff Factor (C)	=	0,87		(from item 3.0 above)

Using the eThekwini Municipal rainfall data for the latitude of 29° 56' 15" and longitude of 30° 57' 42" the following values were extracted:

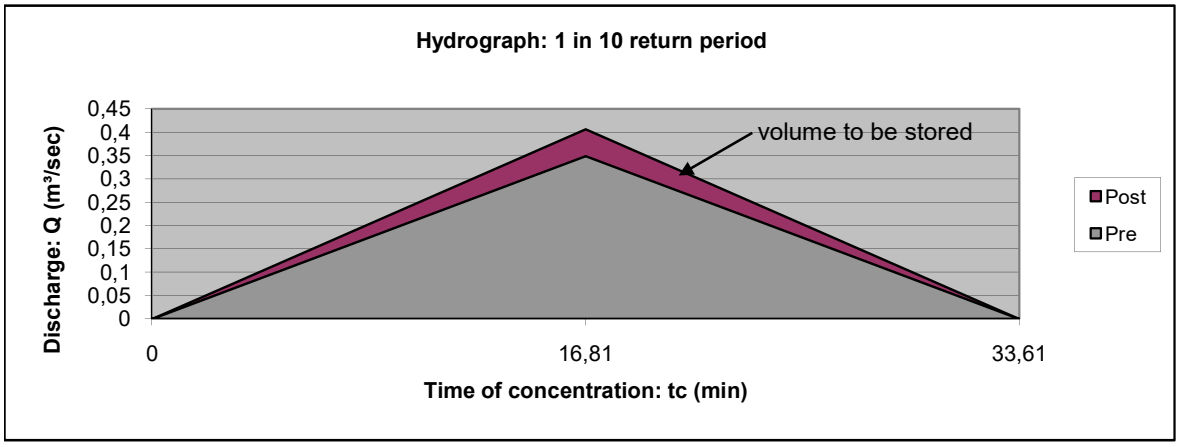
	M15	M16,8	M30	**INTENSITY**		
1 in 10 Year Return Period	34,1	35,56	46,2	**126,95**	**mm/h**	(35,56 x 60 / 16,8)
1 in 50 Year Return Period	53,2	55,49	72,2	**198,11**	**mm/h**	(55,49 x 60 / 16,8)

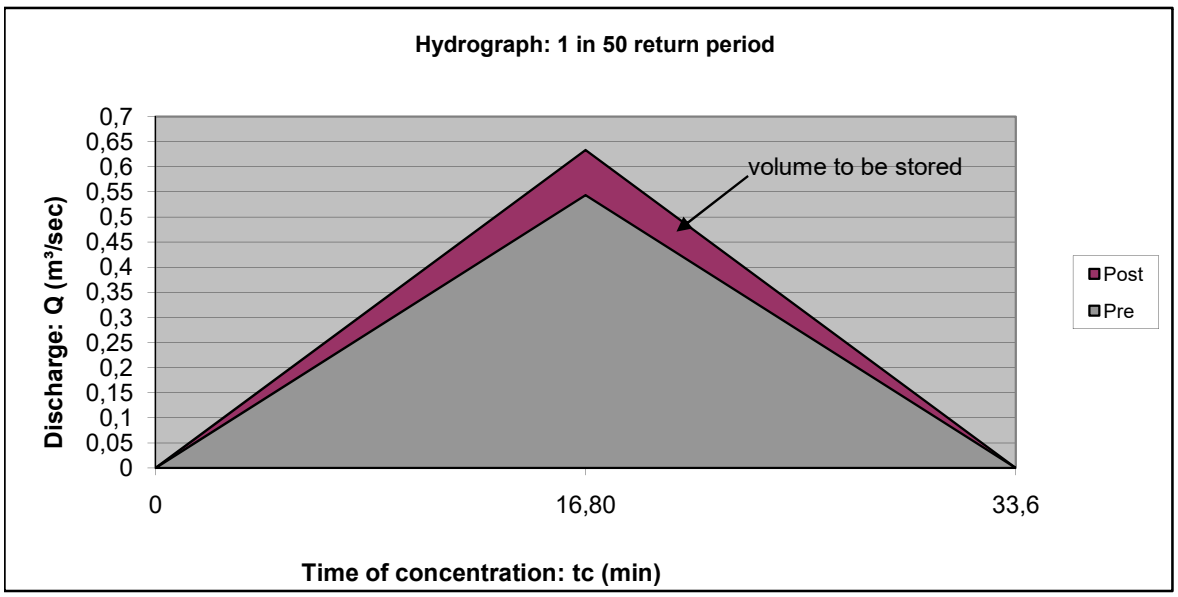
Pre Development Runoff				
1 in 10 Year Return Period	=	**0,4060**	**m^3/s**	(0,87 x 126,95 x 1,3204 / 360)
1 in 50 Year Return Period	=	**0,6336**	**m^3/s**	(0,87 x 198,11 x 1,3204 / 360)

7.0 INCREASE IN STORMWATER RUNOFF

A comparison between the pre-development and post development stormwater runoff can therefore be tabled as follows:

Return Period	Pre Development Stormwater Runoff	Post Development Stormwater Runoff	Increase in Runoff
1 in 10 Year	0,3485 m^3/s	0,4060 m^3/s	0,0576 m^3/s
1 in 50 Year	0,5439 m^3/s	0,6336 m^3/s	0,0898 m^3/s





8.0 STORMWATER ATTENUATION

We propose attenuating the difference between the post and the pre development runoff. This we will achieve by the construction of an attenuation tank to hold the stormwater runoff during the 1:10 and the 1:50 year storm and to discharge at a flow rate which does not exceed the pre development flow rate, as calculated above. The outflow will discharge into the municipal stormwater system on the lower South Western end of the property. An allowance has been made for an overflow pipe in the event of a storm which exceeds a 1:50 year storm taking place. An access manhole is to be created at the top of the attenuation chamber for maintenance purposes.

Storage Volumes Required

1 in 10 Year Return Period	=	**57,99 m^3**	(0,0576 x 16,8 x 60)
1 in 50 Year Return Period	=	**90,49 m^3**	(0,0898 x 16,8 x 60)

Storage Volume for 1 in 10 year return period

Surface area	=	60
Depth (m)	=	1,2
Attenuated Volume (m^3)	=	**72,00**

Storage Volume for 1 in 50 year return period

Surface area	=	60
Depth (m)	=	1,55
Attenuated Volume	=	**93**

9.0 STORMWATER RELEASE

1 in 10 year return period

Ø Pipe size	=	250	mm
Head	=	1,0	m
Ø Orifice	=	250	mm
C Value	=	0,69	
Orifice discharge	=	0,3485	m^3/s

1 in 50 year return period

Ø Pipe size	=	250	mm
Head	=	1,5	m
Ø Orifice	=	300	mm
C Value	=	0,69	
Orifice discharge	=	0,5439	m^3/s

We are discharging our stormwater outflow for the 1:50 year storm from the attenuation tank to the adjacent manhole via a 110 diameter pipe and the flow for the 1:10 year storm via a 250mm Orifice Plate. We have allowed for a 200mm overflow pipe at the top of the chamber. We have catered for a greater volume then required.

10.0 CONCLUSION

We conclude that the above proposed development will not have any increase in stormwater runoff to the municipal system or to the property down slope of our site. The increased stormwater runoff of both the 1 in 10 and 1 in 50 year return periods can be attenuated and that it can be disposed of in a controlled manner within the pre-development runoff rates.

Yours faithfully

Yashvir Maharaj
Pr Tech Eng 201170176

GENERAL NOTES :

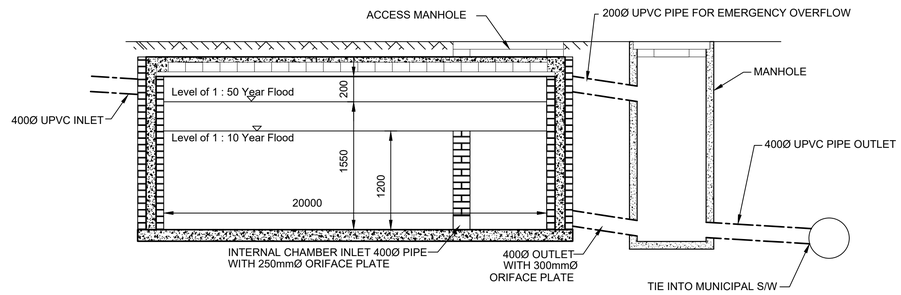
1. ALL SETTING OUT DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR AND ANY DESCREPANCIES REPORTED TO THE ENGINEER.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTS DRAWINGS AND THE STORMWATER MANAGEMENT REPORT NO. 1978-01

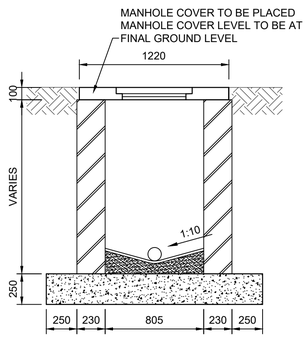
STORMWATER NOTES:

- ALL STORMWATER FROM ROOFS TO DISCHARGE DIRECTLY INTO STORMWATER SYSTEM VIA DOWNPIPES.
- ALL STORMWATER PIPES TO BE 110dia. uPVC CLASS 51.
- STORMWATER PIPES LAID BENEATH DRIVEWAY TO BE CLASS 34. ALL PIPES TO BE LAID AT MIN. FALL OF 1:80.
- ALL PLATFORMS TO BE SHAPED TO FALL TO STORMWATER
- INLETS, MIN FALL 1:100.

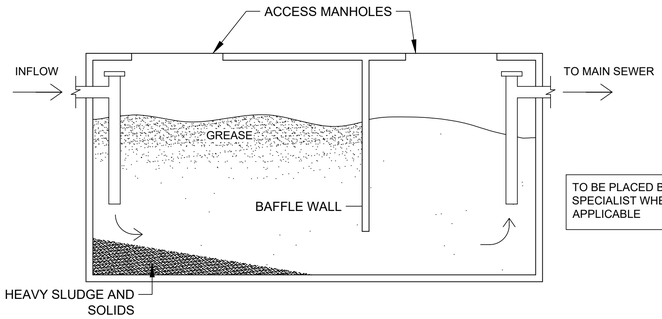
STORMWATER LAYOUT
SCALE 1:300



SECTION THROUGH ATTENUATION TANK
NOT TO SCALE



TYPICAL SECTION STORMWATER MANHOLE : POST CONSTRUCTION
NOT TO SCALE



TYPICAL SECTION: GREASE INTERCEPTOR
NOT TO SCALE

PROJECT TITLE :

PROPOSED NEW FUELING STATION, GARAGE SHOP AND FAST FOOD OUTLET
2 GRIMSBY ROAD, MOBENI
DURBAN, LOT 821, PNT 2

DRAWING TITLE :

STORMWATER MANAGEMENT DURING & POST CONSTRUCTION

JOB NUMBER 1978	DESIGNED	Y.B.Maharaj
	DRAWN	K.N
DRAWING NUMBER 01	CHECKED	Y.B.Maharaj
	SCALES	AS SHOWN
REVISION -	DATE	17-07-2019

BRAMIN
Consulting Engineers
Civil ∞ Structural ∞ Geotechnical

P.O Box 60430
Phoenix
4080
Telephone: 031 502 1989
Fax: 086 571 4138

14 109172 Street
Grove End, Phoenix
Cell: 083 777 2255
yashvir@bramin.co.za

BRAMIN
CONSULTING ENGINEERS
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P.O. Box 60430
Phoenix,
4080
Tel: 031 502 1989

14 109172 Street
Grove End, Phoenix
Cell: 083 777 2255
Fax: 086 571 4138

E-Mail: yashvir@bramin.co.za
CK. No: 2010/031255/23

5 July 2019
Our Ref: BCE1978

ETHEKWINI MUNICIPALITY
LAND USE MANAGEMENT DEPARTMENT
METRO WASTE WATER
POST BOX 680
DURBAN
4001

DESCRIPTION OF WORK : EFFLUENT LOADING TO MUNICIPAL WASTE WATER SYSTEM FROM PROPOSED DEVELOPMENT.

ADDRESS : 2 GRIMSBY ROAD, MOBENI, DURBAN
LOT 821 PNT 2

We are the appointed civil engineers on the above development. We have been appointed by the developers to carry out the design of the internal waste water system for the effluent loading into the municipal system.

We confirm that the effluent loading, generated by the new floor area on the above development, will not have a major impact on the municipal system as the existing sewer infrastructure is being removed and replaced, hence no additional effluent will be generated from the proposed development.

We trust the above clarifies the matter and remain at your service.

Yours faithfully

Yashvir Maharaj
Pr Tech Eng 201170176