

**FINAL BASIC ASSESSMENT AND
ADDENDUM TO BASIC ASSESSMENT
AS REQUESTED BY KZN DEPARTMENT
OF AGRICULTURE & ENVIRONMENTAL
AFFAIRS**

Book 1 of 2

**FOR THE PROPOSED WOODBURN BOULEVARD
SHOPPING CENTRE ON THE CORNER OF
WOODHOUSE AND ALAN PATON DRIVE (ON
PORTION 5 OF ERF 4346, PIETERMARITZBURG)
DECEMBER 2013- DC22/0059/2011**



**BOKAMOSO LANDSCAPE ARCHITECTS
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Basic Assessment Report



agriculture & environmental affairs

Department:
Agriculture
& Environmental Affairs
PROVINCE OF KWAZULU-NATAL

EIA File Reference Number:
NEAS Reference Number:
Waste Management Licence Number:
(if applicable)
Date Received:

(For official use only)

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| KZN/EIA/ |
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BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- **Environmental Authorization** subject to basic assessment for an activity that is listed in Listing Notices 1 or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- **Waste Management Licence** for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

Kindly note that:

1. This **basic assessment report** meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Agriculture & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
3. Where required, place a **cross** in the box you select.
4. An incomplete report will be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").
8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

GIBELA UMKHUMBI OLWA NOBUBHA

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9. The KZN Department of Agriculture & Environmental Affairs may require that for specified types of activities in defined situations only parts of this report need to be completed.
10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24 O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.
11. **Please note that this report must be handed in or posted to the District Office of the KZN Department of Agriculture & Environmental Affairs to which the application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).**

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DEPARTMENTAL REFERENCE NUMBER(S)

| | |
|---------------------------------------------------|--|
| File reference number (EIA): | |
| File reference number (Waste Management Licence): | |

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name and contact details of the EAP who prepared this report:

| | | | |
|-----------------------|--------------------------------------------------------------------|-------|---------------|
| Business name of EAP: | Bokamoso Environmental Consultants and Landscape Architects | | |
| Physical address: | 36 Lebombo Avenue Ashlea Gardens Pretoria | | |
| Postal address: | P.O. Box 11375, Maroelana | | |
| Postal code: | 0161 | Cell: | 083 255 838 4 |
| Telephone: | (012) 346-3810 | Fax: | 086 570 565 9 |
| E-mail: | lizelleg@mweb.co.za | | |

2. NAMES AND EXPERTISE OF REPRESENTATIVES OF THE EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

| Name of representative of the EAP | Education qualifications | Professional affiliations | Experience at environmental assessments (yrs) |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lizelle Gregory | BL (UP) Professional Landscape Architect and Environmental Consultant . Registered professional Landscape Architect with Practise Number: | ILASA SALAP IAIA | More than 21 years of experience. Conducted more than 1 000 EIA's and related reports (Refer to Appendix For Company profile and CV Attached) |

3. NAMES AND EXPERTISE OF SPECIALISTS

Names and details of the expertise of each specialist that has contributed to this report:

| Name of specialist | Education qualifications | Field of expertise | Section/ s contributed to in this basic assessment | Title of specialist report/ s as attached in Appendix D |
|--------------------|--------------------------|--------------------|----------------------------------------------------|---------------------------------------------------------|
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SECTION B: ACTIVITY INFORMATION

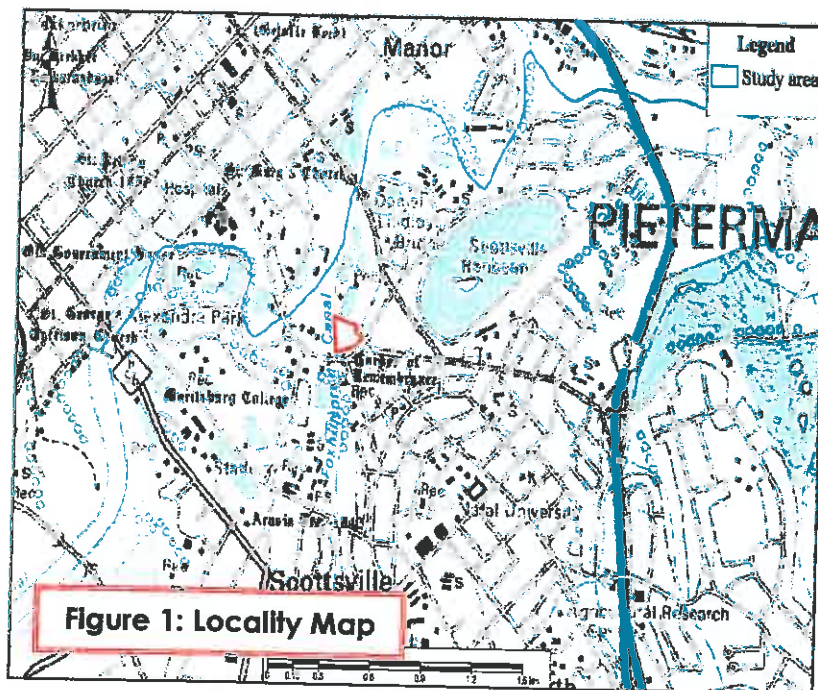
1. PROJECT TITLE

Describe the project title as provided on the application form for environmental authorization:

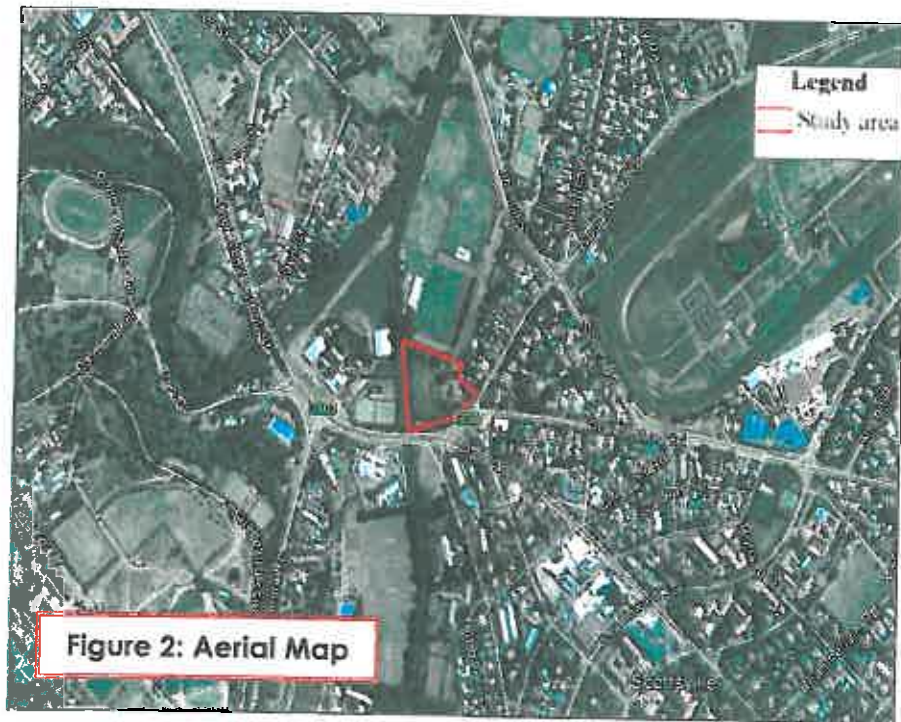
Project Title: Woodburn Boulevard Shopping Centre

O&T Development (Pty) Ltd is planning a proposed 6 500m² shopping centre development to be known as the **Woodburn Boulevard Shopping Centre**.

The proposed development will take place on Portion 5 of Erf 4346 KwaZulu-Natal and it is situated within the uMgungundlovi District Municipality Boundaries, approximately 1Km to the south-west of the Pietermaritzburg CBD. The site is located on the corner of Woodhouse Road and Alan Paton Drive and the Fox-Hillspruit Canal (a tributary of the Umsunduzi River) runs along the western boundary of the study area. **Refer to Figure 1 for Locality Map and Refer to Figure 2 for Aerial Photograph. (Please refer to Appendix H for enlarged copies of figures)**



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2. PROJECT DESCRIPTION

Provide a detailed description of the project:

O&T Development (Pty) Ltd is planning a proposed 6 500m² shopping centre development to be known as the **Woodburn Boulevard Shopping Centre**.

The proposed development will take place on Portion 5 of Erf 4346 KwaZulu-Natal and it is situated within the uMgungundlovi District Municipality Boundaries. The site is located on the corner of Woodhouse Road and Alan Paton Drive and the Fox-Hillspruit Canal (a tributary of the Umsumduzi River) runs along the western boundary of the study area.

The study area was purchased by the applicant for development purposes from the KwaZulu-Natal Rugby Union, which formerly used the study area as additional sporting fields to the main stadium. At present the study area is covered with lawn and some excavation activities already took place on the property. A Vodacom Tower and some advertisement boards and other signage are erected along the southern boundary of the site and is visible from Alan Paton Drive. Apparently the excavations were done by a former party that also planned to develop the property.

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The site is now zoned for business purposes and therefore it was not deemed necessary to also apply for activity 24. During a meeting in March 2013, the local authority and the KZN DAEA confirmed that it will not be necessary to apply for Activity 24, because the study area no longer has a zoning equivalent to an open space zoning.

The site (in its current state) appears neglected and unutilised and is regarded (from an economical point of view) as a prime position for a commercial/retail facility.

The applicant already obtained the town planning rights in 2009 by means of a Development Facilitation Act Application and the local authority fully supports the proposed application. Please note that for Town Planning Application Purposes (the DFA Application), the study area formed part of a larger study area and the proposed shopping centre development is regarded, from a Town Planning point of view, as a first phase of the larger development.

When the applicant commenced with the DFA application (at the time when the 2006 NEMA EIA Regulations were still in effect), the proposed development and its associated activities were not regarded as listed activities and therefore it was not necessary for the applicant to obtain EIA authorisation for the proposed development.

The applicant/ developer however did not commence with construction and since they obtained the DFA approval the EIA Regulations changed.

When the developer approached the involved local authority to finalise the services agreements and the development plans, the local authority indicated that it will now be necessary for the developer to obtain EIA authorisation for activities associated with the shopping centre development, because the proposed phase 1 of the development now triggers activities listed in the 2010 Amended NEMA EIA Regulations.

The developer had several meetings with the local and provincial authorities in order to determine whether it will not be possible to apply for an exemption from the 2010 Amended EIA Regulations, because the application commenced long before the Amended Regulations came into effect, but due to the fact that the 2010 Amended EIA Regulations make no provision for exemption from listed activities, the relevant

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authority confirmed that it will be necessary for the applicant to follow a Basic Assessment Process in terms of the 2010 Amended NEMA EIA Regulations.

Important!!!!!! As explained above, this application is only applicable to the first phase (the shopping centre) of the larger development for which town planning approval has already been granted. If any listed activities are triggered when doing the final layouts and designs for the remainder of the development, the applicant will submit a separate EIA application (most probably for a Basic Assessment) to KZN DAEA for consideration.

The activities triggered by the First Phase (the shopping centre development) are associated with the river that flows to the west of the study area and with the open space usage of the site and to follow now are the activities applied for:

| Indicate the number and date of the relevant notice: | Activity No (s) (in terms of the relevant notice) : | Describe each listed activity as per the detailed project description (and not as per wording of the relevant Government Notice): |
|------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R.544, 18 June 2010 - (Listing Notice 1) | 9 | <p>The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water-</p> <p>(i) With an internal diameter of 0.36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more,</p> <p>Excluding where:</p> <ul style="list-style-type: none"> a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside, a road reserve; or b. Where such construction will occur within urban areas but further than 32 metres from a water course, measured from the edge of a watercourse. |

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| <p>R. 544, 18 June 2010 - (Listing Notice 1)</p> | <p>Activity 11</p> | <p>The Construction of:</p> <ul style="list-style-type: none"> (i) Canals; (ii) Channels; (iii) Bridges; (v) Weirs; (vi) Bulk storm water outlet structures; (x) Infrastructure or structures covering 50 square metres or more. <p>Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> |
| <p>R. 544, 18 June 2010- (Listing Notice 1)</p> | <p>Activity 18</p> | <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from:</p> <ul style="list-style-type: none"> (i) a watercourse; <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving:</p> <ul style="list-style-type: none"> (i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (ii) Occurs behind the development setback line. |
| <p>R. 544, 18 June 2010- (Listing Notice 1)</p> | <p>Activity 37</p> | <p>The expansion of facilities or infrastructure for the bulk transportation of water sewage or storm water where:</p> <ul style="list-style-type: none"> (a) the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more- <p>excluding where such expansions:</p> <ul style="list-style-type: none"> (i) relates to the transportation of water, sewage or storm water within a road reserve; or (ii) where such expansions will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse |

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| R. 544, 18 June 2010- (Listing Notice 1) | Activity 39 | <p>The expansion of:</p> <ul style="list-style-type: none">(i) canals;(ii) channels;(iv) weirs;(v) bulk storm water outlet structures <p>Within a watercourse or within 32 metres from the edge of a watercourse, where such expansions will result in an increased development footprint, but excluding where such expansions will occur behind the development setback line.</p> |
|-------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June 2010), ~~or~~ Listing Notice 3 (GNR 546, 18 June 2010) or [Category A of GN 718, 3 July 2009 \(Waste Management Activities\)](#) which is being applied for as per the project description:

| Indicate the number and date of the relevant notice: | Activity No (s) (in terms of the relevant notice) : | Describe each listed activity as per the detailed project description (and not as per wording of the relevant Government Notice) ¹ : |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R.544, 18 June 2010- (Listing Notice 1) | 9 | <p>The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water-</p> <p>(i) With an internal diameter of 0.36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more,</p> <p>Excluding where:</p> <ul style="list-style-type: none"> c. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside, a road reserve; or d. Where such construction will occur within urban areas but further than 32 metres from a water course, measured from the edge of a watercourse. |
| <p>It was decided to include this activity, because the services and infrastructural design of the proposed shopping centre must still be finalised. The proposed shopping centre development and its associated infrastructure and facilities will be developed within 32 metres from a water course/ the edge of a water course. According to the involved civil engineer, the storm water will be discharged into the river, but the system to be implemented will be in accordance with the local authority storm water standards and guidelines and the proposed system will be designed to prevent flooding, siltation, water pollution and erosion.</p> | | |

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| <p>R. 544, 18 June 2010- (Listing Notice 1)</p> | <p>Activity 11</p> | <p>The Construction of:</p> <ul style="list-style-type: none"> (iv) Canals; (v) Channels; (vi) Bridges; (v) Weirs; (vi) Bulk storm water outlet structures; (x) Infrastructure or structures covering 50 square metres or more. <p>Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> |
| <p>Certain elements and features of the proposed shopping centre will be developed within 32 metres from the watercourse and such features will exceed 50m².</p> | | |
| <p>R. 544, 18 June 2010- (Listing Notice 1)</p> | <p>Activity 18</p> | <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from:</p> <ul style="list-style-type: none"> (ii) a watercourse; <p>but excluding were such infilling, depositing, dredging, excavation, removal or moving:</p> <ul style="list-style-type: none"> (iii) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (iv) Occurs behind the development setback line. |
| <p>During the construction phase more than 5m³ of material will be excavated from the watercourse. The anticipated activities will amongst others include the excavations required for the installation of storm water management measures, the excavations for basement parking and structures, rehabilitation works adjacent to the river and the removal of littering and exoic invaders and the installation of other services associated with the proposed development.</p> <p><i>Please note, that the adjacent water course includes no wetlands in the vicinity of the study area. The local authority and KZN DAEA requested that the possible occurrence of wetlands on and adjacent to the study area be confirmed and according to the appointed wetland specialist, the section of the watercourse adjacent to the study area does not incorporate any wetlands.</i></p> | | |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>R. 544, 18 June 2010</p> | <p>Activity 37</p> | <p>The expansion of facilities or infrastructure for the bulk transportation of water sewage or storm water where: (a) the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more-</p> <p>excluding where such expansions: (i) relates to the transportation of water, sewage or storm water within a road reserve; or (ii) where such expansions will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse</p> |
| <p>There is a possibility that the proposed development will require the upgrading/ expansion of existing services and infrastructure and some of the proposed expansions will be within 32 metres from a watercourse. The services agreement between the local authority and the developer will be finalised as soon as the EIA authorisation is issued. The applicant already spent a significant amount of money on the application, and due to financial reasons it will not be possible to do more detailed services and infrastructural designs until the authorisation has been issued.</p> | | |
| <p>R. 544, 18 June 2010</p> | <p>Activity 39</p> | <p>The expansion of: (i) canals; (ii) channels; (iv) weirs; (v) bulk storm water outlet structures</p> <p>Within a watercourse or within 32 metres from a watercourse, measured from the edge of a watercourse, where such expansions will result in an increased development footprint, but excluding where such expansions will occur behind the development setback line.</p> |
| <p>The services upgradings required for the proposed shopping centre could require the expansion of bulk storm water outlet structures. The services agreement and engineering details could trigger this activity. It was therefore decided to rather include this activity as one of the possible listed activities. The impacts assessment and the mitigation measures included as part of this Basic Assessment therefore took this activity and the anticipated impacts of the construction and operational phases of such potential structures into consideration.</p> | | |
| <p>R. 544, 18 June 2010</p> | <p>Activity 24</p> | <p>The transformation of land larger than 1000m² in size, to residential, retail, commercial, industrial or institutional use, where at the time of coming into effect of this Schedule, such land was zoned open space, conservation or had an equivalent zoning.</p> |

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Prior to the DFA application, which applied for the shopping centre rights as referred to in this BAR, the study area was utilised as sports grounds and such use could be regarded as a zoning equivalent to open space. It was therefore decided to also include this activity as part of the activities applied for. Note that we did not identify this activity as one of the activities applied for on the notices and advertisements, but it was decided, during the compilation of the BAR to rather include this activity as one of the activities applied for in the BAR. It will be highly appreciated if the local authority and KZN Department of Agriculture and Environmental Affairs could confirm whether this activity should be included in the Final BAR.

Important!!!! *During a meeting that was held at the local authority (between the developer, the local authority, the KZN Department of Agriculture and Environmental Affairs (DAEA) and Bokamoso, it was confirmed that the study area is not zoned as open space and therefore it is not necessary to include/ apply for Activity 24. It will therefore not be requested (at the end of the report) that the delegated authority include Activity 24 as part of the listed activities to be authorised (if the delegated authority decide to grant authorisation).*

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4. FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this report. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Sections B 5 – 15 below should be completed for each alternative.

5. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

| | | | | |
|------------------------------------------------------------------|----------------------|-----|-----------------------|----------------|
| | Latitude (S): | | Longitude (E): | |
| Alternative: | | | | |
| Alternative S1 ² (preferred or only site alternative) | 29° | 36' | 45.73" | 30° 23' 27.44" |
| Alternative S2 (if any) | 0 | ' | " | 0 ' " |
| Alternative S3 (if any) | 0 | ' | " | 0 ' " |

In the case of linear activities:

| | | | | |
|------------------------------------------------------|----------------------|---|-----------------------|-------|
| | Latitude (S): | | Longitude (E): | |
| Alternative: | | | | |
| Alternative S1 (preferred or only route alternative) | | | | |
| • Starting point of the activity | 0 | ' | " | 0 0 0 |
| • Middle point of the activity | 0 | ' | " | 0 0 0 |
| • End point of the activity | 0 | ' | " | 0 0 0 |
| Alternative S2 (if any) | | | | |

² "Alternative S.." refer to site alternatives.

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- Starting point of the activity
 - Middle point of the activity
 - End point of the activity
- Alternative S3 (if any)

| | | | | | |
|---|---|---|---|---|---|
| 0 | ' | " | 0 | ' | " |
| 0 | ' | " | 0 | ' | " |
| 0 | ' | " | 0 | ' | " |

- Starting point of the activity
- Middle point of the activity
- End point of the activity

| | | | | | |
|---|---|---|---|---|---|
| 0 | ' | " | 0 | ' | " |
| 0 | ' | " | 0 | ' | " |
| 0 | ' | " | 0 | ' | " |

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 500m along the route for each alternative alignment.

6. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:

Alternative A1³ (preferred activity alternative)

Size of the activity:

| |
|--------------------------------------------------------------------------------------------------------------------------------------|
| 17 820m² |
| The study area for Alternative 1 is 17 820m ² , the proposed retail space will be 4 500m ² . |
| 17 820m² |
| The study area for Alternative 2 is also 17 820m ² and the proposed retail and commercial space is 29 000m ² . |
| m ² |

Alternative A2 (if any)

Alternative A3 (if any)
or, for linear activities:

Alternative:

Alternative A1 (preferred activity alternative)
Alternative A2 (if any)
Alternative A3 (if any)

Length of the activity:

| |
|---|
| m |
| m |
| m |

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative A1 (preferred activity alternative)
Alternative A2 (if any)
Alternative A3 (if any)

Size of the site/servitude:

| |
|----------------|
| m ² |
| m ² |
| m ² |

³ "Alternative A.." refer to activity, process, technology or other alternatives.

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7. SITE ACCESS

Does ready access to the site exist?

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

| | |
|-----|----|
| YES | NO |
| | m |

As already mentioned, the proposed shopping centre development will be situated on the grounds of the KwaZulu-Natal Rugby Union and the proposed access for the shopping centre will remain at the existing access point of the rugby club. Refer to **Figure 3 Below**. It is however important to note that the existing intersection will be upgraded to accommodate the increased traffic generated by the development and other developments in the area.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

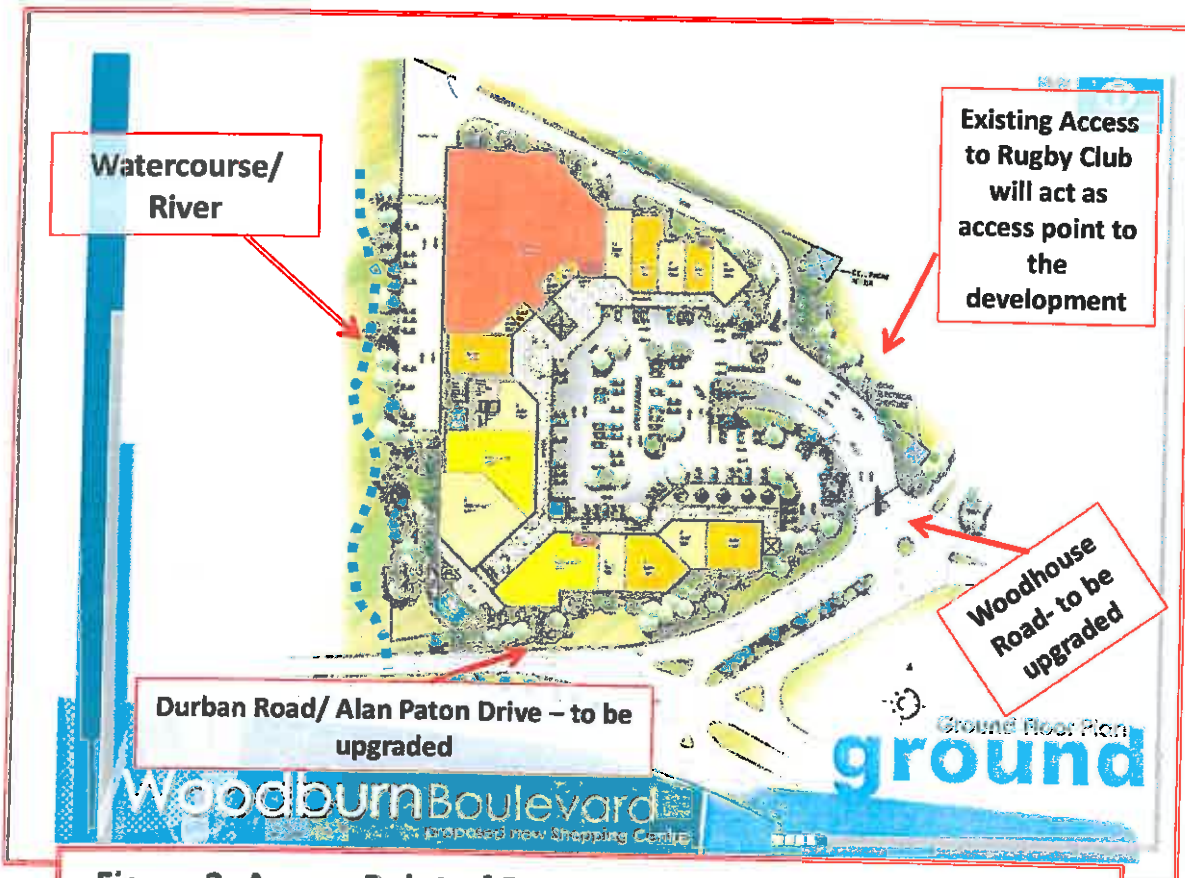
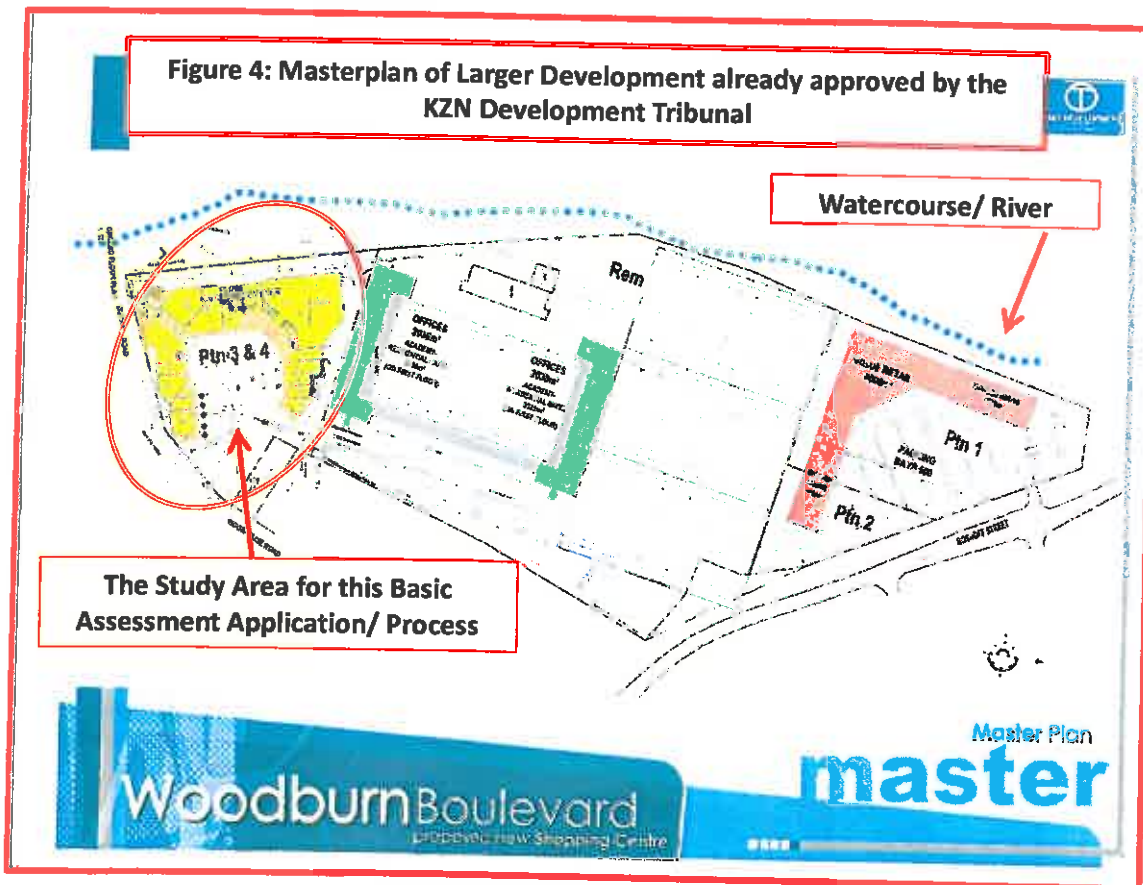


Figure 3: Access Point of Proposed New Shopping Centre and Proposed Development Layout

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Note that the proposed shopping centre will eventually form part of a larger development across the entire property of the Rugby Club, which has already been approved by means of a DFA Application.

The developer is however only planning to develop the shopping centre at this stage and will submit Basic Assessments for the following phases as soon as the land-uses and layouts for such phases have been finalised. **Refer to Figure 4 for Master Layout Plan** of Proposed Larger Development already approved by the KZN Development Tribunal.

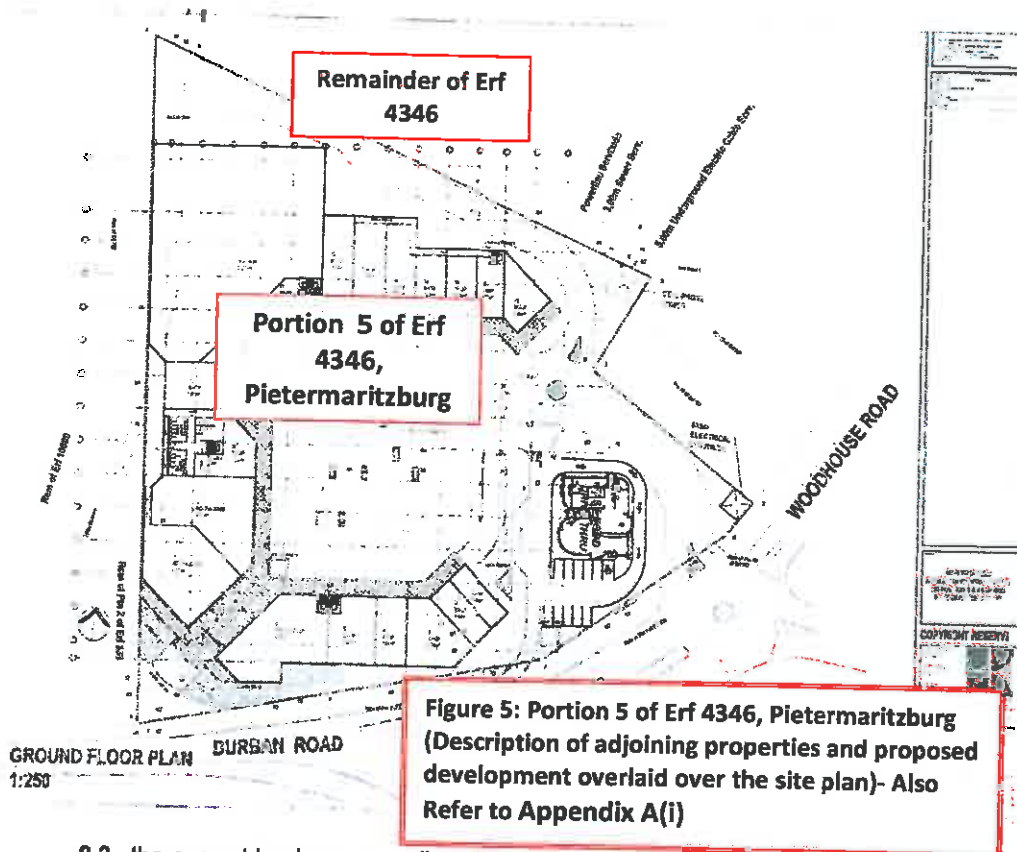


8. SITE OR ROUTE PLAN

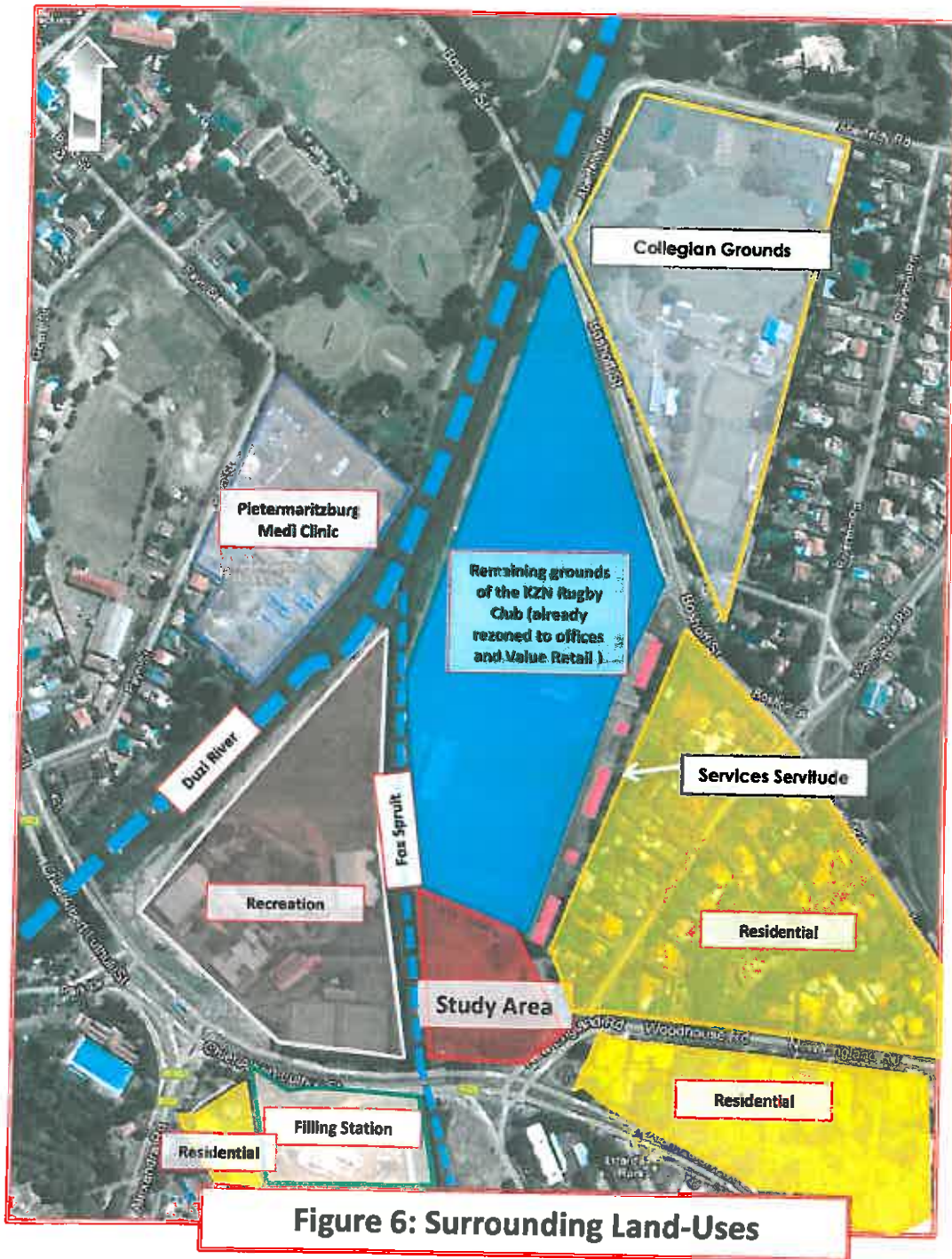
A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this report.

The site or route plans must indicate the following:

- 8.1. the scale of the plan which must be at least a scale of 1:500;
- 8.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site; **Refer to Figure 5 and Appendix A (i)**



- 8.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites; Refer to Appendix A(ii) and Figure 6
- 8.4. the exact position of each element of the application as well as any other structures on the site; Refer to Appendix A (i) and (iii)
- 8.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 8.6. walls and fencing including details of the height and construction material;
- 8.7. servitudes indicating the purpose of the servitude; Refer to Appendix A (i)
- 8.8. sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - rivers, streams, drainage lines or wetlands;
 - the 1:100 year flood line (where available or where it is required by DWA);
 - ridges;
 - cultural and historical features; Refer to Appendix A(iv)
 - areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species); Refer to Appendix A (v)
- 8.9. for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and Refer to Appendix A(vi)
- 8.10. the positions from where photographs of the site were taken. Refer to Appendix B

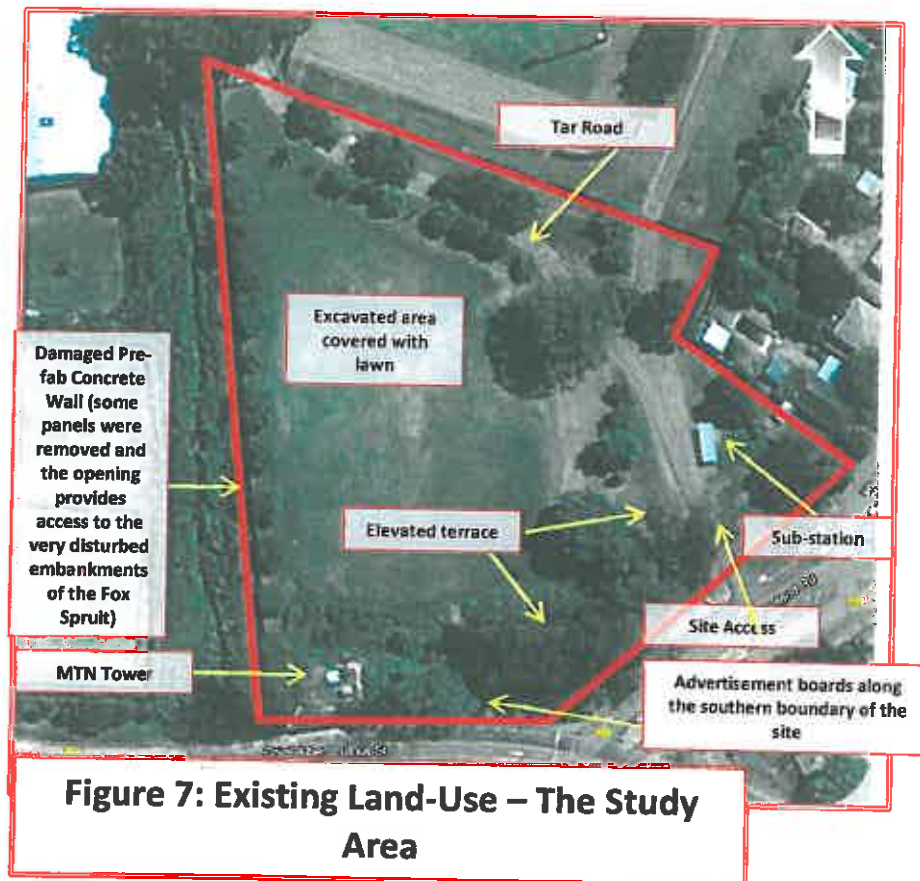


The study area is situated within an area with mixed land-uses. The Woodburn site is partly bordered by the Umsunduzi River and the YMCA complex. To the north-east it is bordered by Boshoff Street and to the east thereof, the Collegians Club and filling station can be found. To the east the property is bordered by residential dwellings

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and to the south the study area is bordered by the Durban/New England Road, from which access is currently obtained.

In the wider surrounding area, a variety of uses are found such as clinics, schools, sports facilities, residential buildings etc. The University of Natal is situated approximately 1km to the south-east of the study area. The university is a tertiary institution, which in itself makes a major contribution in the economy of the city.



9. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under **Appendix B** to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

10. FACILITY ILLUSTRATION

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A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as **Appendix C**. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

11. ACTIVITY MOTIVATION

11.1. Socio-economic value of the activity

| | | |
|---------------------------------------------------------------------------------------------------------------|-------------------------|----|
| What is the expected capital value of the activity on completion? | R 100 000 000.00 | |
| What is the expected yearly income that will be generated by or as a result of the activity? | R 7 000 000.00 | |
| Will the activity contribute to service infrastructure? | YES | NO |
| is the activity a public amenity? | YES | NO |
| How many new employment opportunities will be created in the development phase of the activity? | ± 150 | |
| What is the expected value of the employment opportunities during the development phase? | ±R 8000/ employee | |
| What percentage of this will accrue to previously disadvantaged individuals? | ±50% | |
| How many permanent new employment opportunities will be created during the operational phase of the activity? | ± 150 | |
| What is the expected current value of the employment opportunities during the first 10 years? | ±R6 000/ employee/month | |
| What percentage of this will accrue to previously disadvantaged individuals? | ±60% | |

11.2. Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

According to the applicant, most of the shops/ space in the centre have already been reserved for tenants that are anxious to occupy. In fact, they are currently experiencing enormous development pressure from such tenants who want the developer to supply them with an opening date for the facility. The proposed facility will only be a community centre/ local shopping centre and the main purpose of the facility will be to fulfil in the needs of the surrounding local community.

Furthermore the proposed development will take place on a disturbed site which is situated on a strategically located corner, which makes the proposed facility very accessible and visible. An EIA authorisation, which expired, was already issued for the proposed development on the study area.

During the application process, Bokamoso had several discussions with the various departments of the involved local authority and the local authority indicated that they fully support the proposed development, which already has a very long history and which is already (with its new zoning) incorporated as part of the local authority Frameworks and Plans.

As already mentioned, the town planning application for the proposed development was done in terms of the Development Facilitation Act and the KZN Development Tribunal already approved the land-use rights on the study area in September 2001

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Also note that the Former Department of Agriculture and Environmental Affairs also issued a Positive Record of Decision for the proposed development on the study area, but this authorisation already lapsed and one of the conditions of the authorisation states that a separate authorisation will be required for any development which will affect any river or stream course. It is furthermore important to note that the Department of Agriculture and Environmental Affairs indicated to the Development Tribunal that they are in support of the proposed development, subject to certain conditions, which have been included into the conditions of establishment.

Apart from the fact that the developer already has an impressive tenant list for the proposed facility, the involved town and regional planners supplied the following inputs regarding the need and desirability:

The development of the town of Pietermaritzburg has since its inception been influenced by the topography as well as the presence of certain major transportation routes. It has, as was in the case of many other towns and cities in the country, also been influenced by the former policy of racial segregation. The situation has now changed and the city "experience pressure" to have the imbalance created by the latter, rectified. This process, which takes place naturally, requires adjustments in urban form. It is generally known that the poorer part of the population tend to locate themselves in close proximity of the CBD, which means that a number of commercial activities have to re-adjust themselves in the market place.

It is also a common phenomenon, and especially in the post-apartheid era that developments along transportation corridors proceed to take place and although this phenomena emerges without any specific economic base, it can probably be ascribed to the fact that movement along these corridors leads to the spontaneous development thereof.

However, with the advent of increased motor car ownership amongst the more affluent part of the community on the one hand, and the higher degree of mobility amongst the poorer part of the community on the other hand, an interesting phenomenon can be observed if the changing urban structures of cities are studied. The first mentioned resulted therein that regional shopping centres and decentralised office parks have become viable.

In addition hereto an increase in spending power amongst the more affluent parts of the community created a demand for especially decentralised shopping facilities. As the latter are consumer driven, the market identified the changing pattern and has responded thereto.

Many examples can be found thereof and the Pavillion in Durban-Westville can be quoted as an example in this regard. The further development of the Gateway Shopping Mall in the Umlanga area is another example of a decentralised shopping facility and office development.

The higher degree of mobility among the poorer part of the community resulted therein that the CBD's experienced a total transformation as can be observed in Pietermaritzburg (i.e. Shopping patterns and habits differ in the sense that this part of the community live quite far from the CBD and do not have the choice of variety in the places where they reside and furthermore facilities there are totally underdeveloped if the facilities in the CBD are compared therewith. These two phenomena namely the decentralisation of shopping facilities and the influx to the CBD, have resulted therein that properties abutting onto all major transportation routes / corridors experience a natural tendency to land-use change.

Decentralisation should in view of the above, be accepted as a given and major transportation corridors should be planned to permit the development thereof for uses other than necessarily residential only.

Decentralisation has a negative impact on the residential quality of the existing properties along the corridors for the simple reason that increased traffic movement along the major routes is perceived to increase noise and air pollution levels. The noise levels in residential

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areas should not exceed 55dBA, but along major transport routes such noise levels are often exceeded, which makes it almost unbearable for people to stay in residents adjacent to such roads. This in turn results therein that residential developments along transportation routes over time tend to become decayed. The logical and practical solution for planners should be to accept the change which takes place namely decentralisation and higher mobility and plan these corridors to accommodate the pressures referred to.

The study area form part of and is known as Scotsville-Pelham. The area has always been and still is, to certain extent, a residential suburb situated in relatively close proximity of the CBD. The area also fulfils a major educational function, as far as that a number of schools and university is situated within the area.

The area can be decied as a low residential area consisting of normal single residential houses with some medium density residential development interspersed at places.

Interesting however the presence of boarding houses in the area is ascribed to the presence of the University of Natal where students tend to move into houses or communes.

The area is furthermore served by some commercial developments, the most important of which the shopping centre situated on the corner of Durban Road and King Edwards Avenue.

It is however so that the Scotsville-Pelham area fulfils from a commercial and educational point of view, a far greater role than what is required for its own use. It can be argued that it even serves the entire city and in some instances even fulfils a regional function.

Although this may be a situation which may be difficult to reverse and although it is not the purpose of this motivation to undertake the re-planning of the Scotsville-Pelham area, the continuous pressure which is experienced by areas in the Scotsville-Pelham area for commercial/ business areas should not be permitted to continue unhindered as this will result in a total change in character. When opportunities arise, they should be viewed against the residential character of the area, but at the same time areas should be identified where the pressures which are experienced can be accommodated and it can be argued that the study area is ideally situated to accommodate the need which has been identified by the developers. This opportunity will not only satisfy the need, but it also holds financial benefits for the Natal Rugby Union that needs the money to promote the development of sport in the region.

From an ecological, safety and security point of view, the proposed development can also be regarded as an opportunity, because the development can be designed in such a way that it opens-up towards the Foxspruit, which is currently very polluted and of which the banks are covered with exotic invaders, litter and rubble.

During the site visit it was discovered that someone removed one of the pre-fab concrete wall panels, which separates the study area from the overgrown open spaces along the spruit. We climbed through the opening in the wall in order to determine the state of the riparian zone associated with the river and found it to be overgrown with weeds, covered with rubble and litter and some signs of vagrants that use the area as hiding place were also spotted.

From an environmental (social, economical, ecological and institutional) point of view the proposed development is regarded (if well planned and managed) as sustainable.

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Indicate any benefits that the activity will have for society in general:

- The provision of a wide range of facilities under one roof;
- Highly accessible to the local community and to passer's by. The passersby that will visit the centre will increase the feet that will visit the facility and external buying power will increase the economical viability of the proposed local shopping centre;
- The rehabilitation and protection of the open space area associated with the Fox Spruit;
- Improved safety and security along the spruit;
- Removal of litter from the river and assist with the improvement of the water quality in the river,
- Creation of habitats along the river

Indicate any benefits that the activity will have for the local communities where the activity will be located:

- Temporary jobs during the construction phase;
- Permanent and temporary jobs during the operational phase.
- Increased rates and taxes payable to the local authority,
- Upgrading of existing services and infrastructure.
- Implementation of new infrastructure and services;
- Social upliftment,
- Shopping facilities in close proximity of community, and
- Improved security

12. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline: Administering authority: Date:

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------|
| National Environmental Management Act No 107 of 1998 | National & Provincial | 27 November 1998 |
| The NEMA is primarily an enabling Act in that it provides for the development of environmental implementation plans and environmental management plans. The principles listed in the act serve as a general framework within which environmental management and implementation plans must be formulated. | | |
| Amended NEMA Regulations and Listed Activities R. 543, R. 544, R.545 & R. 546 | National & Provincial | 2 August 2010 |
| Due to the fact that the application was submitted after 2 August 2010, it had to be submitted in terms of the 2010 Amended NEMA EIA Regulations. The new Regulations include three listing notices, which must be considered when compiling an application. | | |

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| <p>Listing Notices 1 and 2 are applicable on a National Basis and the activities as listed in Listing Notice 3 are province specific.</p> <p>If listed activities in Listing Notices 1 and 3 are triggered, the applicant must compile and submit a Basic Assessment Report (BAR) and if activities listed in listing notice 2 are triggered the applicant must follow a full EIA Process.</p> <p>Implications for the Proposed Development: The proposed development only triggers activities in Listing Notice 1 and therefore it will only be necessary to submit a BAR.</p> | | |
| <p>National Water Act, 1998 (Act No. 36 of 1998)</p> | <p>National & Provincial</p> | <p>20 August 1998</p> |
| <p>The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account, amongst other factors, the following:</p> <ul style="list-style-type: none"> ▪ Meeting the basic human needs of present and future generations; ▪ Promoting equitable access to water; ▪ Promoting the efficient, sustainable and beneficial use of water in the public interest; ▪ Reducing and preventing pollution and degradation of water resources; ▪ Facilitating social and economic development; and ▪ Providing for the growing demand for water use. <p>In terms of the Section 21 of the National Water Act, the developer must obtain water use licenses if the following activities are taking place:</p> <ol style="list-style-type: none"> a) Taking water from a water resource; b) Storing water; c) Impeding or diverting the flow of water in a watercourse; d) Engaging in a stream flow reduction activity contemplated in section 36; e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1); | | |

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| <p>f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;</p> <p>g) Disposing of waste in a manner which may detrimentally impact on a water resource;</p> <p>h) Disposing in any manner of water which contains waste from or which has been heated in any industrial or power generation process;</p> <p>i) Altering the bed, banks, course or characteristics of a water course;</p> <p>j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and</p> <p>k) Using water for recreational purposes.</p> <p>The National Water Act also required that (where applicable) the 1:50 and 1:100 year flood line be indicated on all the development drawings (even the drawings for the external services) that are being submitted for approval.</p> <p>Implications for the Proposed Development:</p> <p>In terms of Section 21 of the National Water Act, the installation and upgrading of the external services will most probably require some section 21 Water-Use Licenses (WULA) or General Authorisations (GA).</p> <p>The developer of the industrial township (on the remainder of the study area) already appointed another EAP for the relevant external services applications (EIA and WULA/GA applications). These applications will therefore not form part of this application.</p> <p>Bokamoso had a meeting (June 2012) regarding the possible activities that could be triggered in terms of S21 of the NWA and according to the official at DWA (Ms. Manisha Thakurdin) no S21 WULA will be required, because the watercourse (the Foxhill Spruit) is not a natural watercourse and the study area is not affected by any wetlands.</p> <p>The Department however mentioned that the Existing Liberty Mall site also incorporates sections below the 1:100 year flood line and certain flood management measures had to be implemented in order to prevent the flooding of</p> | | |
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| <p>the permanent structures on the site. The DWA official requested that the flood management measures implemented at the Liberty Mall be considered for purpose of the proposed new Woodburn Shopping Centre, especially if the plan is to place some basement parking below the flood line.</p> <p>The developer/ applicant took this advice from DWA into consideration and appointed the storm water engineers of the Liberty Mall (Jefares & Green) to assist with the compilation of the storm water management concept for the proposed Woodburn Development.</p> <p>Unfortunately this process caused some severe delays in the application process, because the applicant and the EAP wanted to provide DWA with workable solutions for consideration during the EIA process. Refer to Appendix D(f) for a copy of the Jefares and Green report</p> | | |
| <p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p> | <p>National</p> | <p>2004</p> |
| <p>The objectives of this Act are-</p> <p>(a) within the framework of the National Environmental Management Act, to provide for-</p> <p style="padding-left: 40px;">(i) the management and conservation of biological diversity within the Republic and of the components of such biological diversity;</p> <p style="padding-left: 40px;">(ii) the use of indigenous biological resources in a sustainable manner; and</p> <p style="padding-left: 40px;">(iii) the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;</p> <p>(b) to give effect to 'ratified international agreements relating to biodiversity which are binding on the Republic;</p> <p>(c) to provide for co-operative governance in biodiversity management and conservation; and</p> <p>(d) to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.</p> | | |

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| <p>Implications for the Development:</p> <p>No Red Listed Species were identified on site, and the vegetation of the study area is regarded as disturbed.</p> <p>All connectivity with the larger regional open space system will be conserved through the protection and rehabilitation of the riverine system adjacent to the study area.</p> | | |
| <p>National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)</p> | <p>National</p> | <p>2004</p> |
| <p>The purpose of the Act is "To provide for the prevention of the pollution of the atmosphere.</p> <p>Implications for the development:</p> <p>During the construction phase, dust pollution can become a significant factor, especially to the surrounding residences and landowners. Dust control would be adequately minimised during this phase by way of water spraying and possible dust-nets, when working close to existing residential dwellings.</p> <p>The additional vehicles generated by the proposed development is according to the involved Traffic Engineers minimal and air pollution created by the additional vehicles can be regarded as insignificant.</p> | | |
| <p>National Environmental Management Protected Areas Act, 2003 (Act No. 57 of 2003)</p> | <p>National</p> | <p>2003</p> |
| <p>The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological biodiversity and its natural landscapes.</p> <p>Implications for the development:</p> <p>Not Significant. The study area is not situated in a Protected Area identified in terms off he protected areas act.</p> | | |
| <p>National Heritage Resources Act, 1999 (Act No.</p> | <p>National & Provincial</p> | <p>April 1965</p> |

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| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------|
| <p>45 of 1965)</p> | | |
| <p>The National Heritage Resources Act legislates the necessity and heritage impact assessment in areas earmarked for development, which exceed 0.5ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA)/ Amafa Kwazulu Natal.</p> <p>Implications for the development:</p> <p>Although no features of Heritage importance were identified during the Assessment, if any such features are discovered during construction activities and clearing of the application site, the correct "procedures for an Environmental incident" <i>(at the end of EMP, Appendix F)</i> must be followed.</p> | | |
| <p>National Environmental Management: Waste Act, Act. No 59 of 2008</p> | <p>National & Provincial</p> | <p>2008</p> |
| <p>This new act came into effect on 1 July 2009 and it replaces Section 20 of the Environmental Conservation Act. This Act requires that permits be obtained for certain listed activities (as listed under this act). One of the activities that require a permit under the Waste Act is the onsite treatment of effluent.</p> <p>Implications for the Proposed Development:</p> <p>No permits will be required in terms of the Waste Act for the proposed development.</p> | | |
| <p>The Development Facilitation Act, 1995 (Act No 67 of 1995) (DFA)</p> | <p>National</p> | <p>1995</p> |
| <p>This Act is specifically aimed at creating a single legal mechanism to deal with all the diverse aspects of land development in an integrated fashion revolving around:</p> <ul style="list-style-type: none"> ▪ The promotion of integration of the social, economic, institutional and physical aspects of | | |

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| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| <p>land development;</p> <ul style="list-style-type: none">• The promotion of integrated land development in rural and urban areas in support of each other;• The promotions of the availability of residential land and employment opportunities in close proximity to or integrated with each other;• The promotion of a combination of diverse land-uses, with each proposed land development area to be judged on its own merit and no specific use, whether residential, commercial, conservation etc., to be regarded as less important;• Discouraging urban sprawl to promote more compact towns/cities;• Encouraging environmentally sound land development practices; and• Promoting sustained protection of the environment. <p>The Development Principles, listed in Chapter 1 to the Development Facilitation Act, 1995 (the Act), legislate matters of general principle whilst providing mechanisms for more detailed principles and policies to acquire statutory force at national and provincial levels of government. The responsibility of Government as to the day-to-day administration of land development is encapsulated in these principles. The principles aim to reduce the likelihood of capricious or arbitrary decisions in respect of land development proposals by preventing incidents in response to political pressures or otherwise. Such principles were intended to render the development environment more predictable and rational when compared to past planning systems.</p> <p>The Development Facilitation Act, 1995 allows a prospective developer of a land development area to approach a single provincial planning tribunal for authorization. Such planning tribunal has wide powers to incorporate and decide on any related legislative requirements during one consolidated process (i.e. cancel of servitudes; impose zoning restrictions, subdivision of land, etc.).</p> <p><i>Implications for the Proposed Development:</i></p> | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

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| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|
| Not significant, the proposed development will be in line with the principles contained in the DFA. | | |
| The Msunduzi Municipality C-Plan | Local | 2012 |
| <p>According to the Msunduzi Municipality's C-Plan the Foxhill Spruit, which forms the western boundary of the study area incorporates some wetland vegetation. During a site visit conducted by Mrs. L. Gregory of Bokamoso the riparian zone of the Foxhill Spruit was found to be in a very disturbed and neglected state and no wetlands were identified. The local authority and the delegated authority agreed with the findings of Bokamoso, but recommended (during a joint meeting between the applicant, the delegated authority and the local authority that was held in March 2013) that Bokamoso appoint a wetland specialist that is familiar with the area to confirm that there is no wetland on the study area or adjacent to or in the spruit.</p> <p>The wetland specialist (Eco - Pulse) conducted a wetland study along the spruit and concluded that there is no wetland present on or adjacent to the study area.</p> <p>Refer to Appendix D(ii) for Wetland study</p> | | |

13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

Refer to Appendix D (iii) for Engineering Input

13.1. Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

If yes, what estimated quantity will be produced per month?

| | |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|
| YES | NO |
| Not available. The ECO will supply the quantities to the department when notifying the department of commencement of construction | |

How will the construction solid waste be disposed of? (describe)

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During the construction phase the disposal of solid waste will be the responsibility of the developer. An area on the application site will be earmarked for dumping of solid waste to be disposed of during construction. This area must be situated carefully not to be visible from the surrounding residents. The demarcated area must be easily accessible for dumping trucks to collect waste. The waste will be carted to a registered landfill site. The conditions as stipulated above should made part of the authorization when the Department has made a decision. During the operational phase all disposal of solid waste will be the responsibility of the Local Authority.

Where will the construction solid waste be disposed of? (provide details of landfill site)

All construction solid waste will be disposed of at the nearest registered landfill site. No solid waste will be dumped on surrounding open areas or adjacent properties.

Will the activity produce solid waste during its operational phase?

| | |
|---------------|----|
| YES | NO |
| Not available | |

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of? (provide details of landfill site)

The solid waste on the development site will be stored in municipal waste bins/ waste skips and it will be collected by the involved local authority or appointed waste contractor from the waste collection areas. The waste contractor/ municipality will then dispose of the waste at a registered landfill site.

The waste storage and collection areas will make provision for waste separation and for the recycling of waste (i.e. through the provision of a separate storage areas for recyclable waste)

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

| | |
|-----|----|
| YES | NO |
|-----|----|

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Is the activity that is being applied for a solid waste handling or treatment facility?

| | |
|-----|----|
| YES | NO |
|-----|----|

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

13.2. Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

| | |
|-----|----|
| YES | NO |
|-----|----|

If yes, what estimated quantity will be produced per month?

m³

Will the activity produce any effluent that will be treated and/or disposed of on site?

| | |
|-----|----|
| Yes | NO |
|-----|----|

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

| | |
|-----|----|
| YES | NO |
|-----|----|

If yes, provide the particulars of the facility:

Facility name: N/A

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| | | | |
|-----------------|--|-------|--|
| Contact person: | | | |
| Postal address: | | | |
| Postal code: | | | |
| Telephone: | | Cell: | |
| E-mail: | | Fax: | |

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

The solid waste on the development site will be stored in municipal waste bins/ waste skips and it will be collected by the involved local authority or appointed waste contractor from the waste collection areas. The waste contractor/ municipality will then dispose of the waste at a registered landfill site.

The waste storage and collection areas will make provision for waste separation and for the recycling of waste (i.e. through the provision of a separate storage areas for recyclable waste)

13.3. Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

| | |
|-----|----|
| YES | NO |
| YES | NO |

If yes, is it controlled by any legislation of any sphere of government?

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

If no, describe the emissions in terms of type and concentration:

The only emissions that will be released into the atmosphere as a result of the development will be the additional traffic exhaust fumes that will be released. This will however be insignificant.

13.4. Generation of noise

Will the activity generate noise?

| | |
|-----------------------------------|----|
| YES, there is a possibility | NO |
| YES | NO |

If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

Air conditioner noise – not significant
 Noise generated by transformers and fridges-sometimes unpleasant, if necessary must put in building
 Traffic noise
 Noise caused by places of refreshment, especially after 24h00.

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14. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

| | | | | | |
|------------------|-------------|-------------|----------------------------|-------|---------------------------------|
| municipal | water board | groundwater | river, stream, dam or lake | other | the activity will not use water |
|------------------|-------------|-------------|----------------------------|-------|---------------------------------|

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

| | |
|--------|----|
| litres | |
| YES | NO |

Does the activity require a water use permit from the Department of Water Affairs?

If YES, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this report.

15. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The following recommendations should be considered:

- To orientate building towards the North.
- Where possible energy saving light bulbs must be used in all the units as well as outside.
- Time switches must be used for outdoor lighting.
- Geysers must be fitted with insulation blankets.
- Solar panels can be used to heat the water and geysers and for outdoor lighting.
- Maximum utilization of daylight.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The EMP for the development will encourage the developer to use solar power as alternative energy source, even if this alternative source only supplies a fraction of the energy required.

SECTION C: SITE/ AREA/ PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No.
(e.g. A):

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- Subsections 1 - 6 below must be completed for each alternative.

Note: Due to the fact that there are no site alternatives, this form will only be completed once for Alternative 1 (the preferred alternative with a lower coverage) and 2.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

| | | | | | | | | | |
|------|------|---|------|---|-------------|-------|---|-------------|------------------|
| Flat | 1:50 | - | 1:20 | - | 1:15 - 1:10 | 1:10 | - | 1:7,5 - 1:5 | Steeper than 1:5 |
| | 1:20 | | 1:15 | | | 1:7,5 | | | |

Alternative S2 (if any):

| | | | | | | | | | |
|------|------|---|------|---|-------------|-------|---|-------------|------------------|
| Flat | 1:50 | - | 1:20 | - | 1:15 - 1:10 | 1:10 | - | 1:7,5 - 1:5 | Steeper than 1:5 |
| | 1:20 | | 1:15 | | | 1:7,5 | | | |

Alternative S3 (if any):

| | | | | | | | | | |
|------|------|---|------|---|-------------|-------|---|-------------|------------------|
| Flat | 1:50 | - | 1:20 | - | 1:15 - 1:10 | 1:10 | - | 1:7,5 - 1:5 | Steeper than 1:5 |
| | 1:20 | | 1:15 | | | 1:7,5 | | | |

The natural topography of the site has been severely disturbed. A large platform for use as sport fields were created on the site. Such platform was created by cutting away the existing soil and dumping it at an unknown spoil site. This action left the remaining platform below the 1:50 year flood line of the Foxhill Spruit.

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site (Please cross the appropriate box).

Alternative S1 (preferred site):

| | | | | | | | | |
|-----------|---------|-----------------------------|---------------|-------------|-------|----------------------------|------|-----------|
| Ridgeline | Plateau | Side slope of hill/mountain | Closed valley | Open valley | Plain | Undulating plain/low hills | Dune | Sea-front |
|-----------|---------|-----------------------------|---------------|-------------|-------|----------------------------|------|-----------|

Alternative S2 (if any):

| | | | | | | | | |
|-----------|---------|-----------------------------|---------------|-------------|-------|----------------------------|------|-----------|
| Ridgeline | Plateau | Side slope of hill/mountain | Closed valley | Open valley | Plain | Undulating plain/low hills | Dune | Sea-front |
|-----------|---------|-----------------------------|---------------|-------------|-------|----------------------------|------|-----------|

Alternative S3 (if any):

| | | | | | | | | |
|-----------|---------|-----------------------------|---------------|-------------|-------|----------------------------|------|-----------|
| Ridgeline | Plateau | Side slope of hill/mountain | Closed valley | Open valley | Plain | Undulating plain/low hills | Dune | Sea-front |
|-----------|---------|-----------------------------|---------------|-------------|-------|----------------------------|------|-----------|

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Has a specialist been consulted for the completion of this section?

| | |
|-----|----|
| YES | NO |
|-----|----|

If YES, please complete the following:

| | |
|-------------------------------------|----------------------------|
| Name of the specialist: | |
| Qualification(s) of the specialist: | |
| Postal address: | |
| Postal code: | |
| Telephone: | |
| E-mail: | |
| | Cell: <input type="text"/> |
| | Fax: <input type="text"/> |

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| | | |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites? | YES | NO |
| If YES, specify and explain: | | |
| Are there any special or sensitive habitats or other natural features present on any of the alternative sites? | YES | NO |
| If YES, specify and explain: | Even though the Foxhill Spruit forms the western boundary of the study area, this open space strip cannot be regarded as ecologically sensitive, because it has been severely disturbed by littering, the dumping of rubble and exotic invaders and weeds. The area adjacent to the river however has high ecological potential and should be rehabilitated as part of the development project to promote habitat creation, the protection of water quality and the development of the ecological potential as identified. | |
| Are any further specialist studies recommended by the specialist? | YES | NO |
| If YES, specify: | | |
| If YES, is such a report(s) attached in Appendix D? | YES | NO |

Signature of specialist: _____ Date: _____

The 1:250 000 geological map of the area reveals that the site is generally underlain by shales of the Pietermaritzburg Formation of the Ecca Group. Extensive alluvial terrace deposits are however associated with the confluences of the major rivers of the area and it is expected that this may occur on this site. The alluvium consists of interlayered dark grey-brown, brown or red-brown silty and sandy clay as well as clayey to silty sands. It varies in thickness from between 2m and 8.5m and some exposures of the alluvial boulder can be expected.

Is the site(s) located on any of the following (cross the appropriate boxes)?

| | Alternative S1: | | Alternative S2 (if any): | | Alternative S3 (if any): | |
|------------------------------------------------------------|-----------------|----|--------------------------|----|--------------------------|----|
| | YES | NO | YES | NO | YES | NO |
| Shallow water table (less than 1.5m deep) | YES | NO | YES | NO | YES | NO |
| Dolomite, sinkhole or doline areas | YES | NO | YES | NO | YES | NO |
| Seasonally wet soils (often close to water bodies) | YES | NO | YES | NO | YES | NO |
| Unstable rocky slopes or steep slopes with loose soil | YES | NO | YES | NO | YES | NO |
| Dispersive soils (soils that dissolve in water) | YES | NO | YES | NO | YES | NO |
| Soils with high clay content (clay fraction more than 40%) | YES | NO | YES | NO | YES | NO |
| Any other unstable soil or geological feature | YES | NO | YES | NO | YES | NO |
| An area sensitive to erosion | YES | NO | YES | NO | YES | NO |

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities.

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Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUND COVER

Has a specialist been consulted for the completion of this section?

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <p>YES</p> <p>Only a wetland delineation conducted by Eco-Pulse.</p> <p>The EAP is a Qualified Professional Landscape Architect and due to the disturbed nature of the study area and its surroundings it was not regarded as necessary to conduct any ecological, red data or any associated studies</p> | <p>NO</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|

If YES, please complete the following:

| | | | |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------|
| Name of the specialist: | Eco-Pulse | | |
| Qualification(s) of the specialist: | Adam Teixeira-Leite (Professional scientists- recommended by the local authority) Douglas Macfarlane (Professional scientists- recommended by the local authority) | | |
| Postal address: | Address: 26 Mallory Road, Hilton, South Africa, 3245 | | |
| Postal code: | 3245 | | |
| Telephone: | | Cell: | 084 368 4527 |
| E-mail: | dmacfarlane@eco-pulse.co.za | Fax: | |
| Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites? | YES | NO | |
| If YES, specify and explain: | | | |
| Are there any special or sensitive habitats or other natural features present on any of the alternative sites? | YES | NO | |
| If YES, specify and explain: | | | |
| Are any further specialist studies recommended by the specialist? | YES | NO | |
| If YES, specify: | It was recommended that a wetland study be conducted in order to confirm the possible occurrence of wetlands on or adjacent to the study area. The wetland specialist confirmed that there are no wetlands in the vicinity of the study area. | | |

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If YES, is such a report(s) attached in Appendix D?

| | |
|-----|----|
| YES | NO |
|-----|----|

Signature of specialist: Refer to Appendix Dii for signed report

Date: April 2013

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

| | | | | |
|--------------------------------------------|-------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------|
| Natural veld - good condition ^E | Natural veld with scattered aliens ^E | Natural veld with heavy alien infestation ^E | Veld dominated by alien species ^E Area along the river - not part of the study area, but adjacent to study area | Gardens |
| Sport field | Cultivated land | Paved surface | Building or other structure | Bare soil |

If any of the boxes marked with an "E" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

Note: Also refer to Pages 18 and 20-23 of this document for more detail regarding surrounding land-use

| Land use character | YES | NO | Description |
|------------------------------------------|-----|----|--------------------------------------------------------------|
| Natural area | YES | NO | Disturbed riparian vegetation adjacent to the FoxHill Spruit |
| Low density residential | YES | NO | Mainly to the east |
| Medium density residential | YES | NO | Mainly to the south, north and the east |
| High density residential | YES | NO | Mainly to the south - high rise block |
| Informal residential | YES | NO | |
| Retail commercial & warehousing | YES | NO | To the south |
| Light industrial | YES | NO | |
| Medium industrial | YES | NO | |
| Heavy industrial | YES | NO | |
| Power station | YES | NO | Small substation and power line servitude on the site |
| Office/consulting room | YES | NO | Hospital to the west |
| Military or police base/station/compound | YES | NO | |
| Spoil heap or slimes dam | YES | NO | |

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| | | | |
|----------------------------------|-----|----|---------------------------------------------------------------------------------------------------------------------------------|
| Quarry, sand or borrow pit | YES | NO | |
| Dam or reservoir | YES | NO | |
| Hospital/medical centre | YES | NO | Hospital to the west |
| School/ creche | YES | NO | |
| Tertiary education facility | YES | NO | |
| Church | YES | NO | |
| Old age home | YES | NO | |
| Sewage treatment plant | YES | NO | |
| Train station or shunting yard | YES | NO | |
| Railway line | YES | NO | |
| Major road (4 lanes or more) | YES | NO | |
| Airport | YES | NO | |
| Harbour | YES | NO | |
| Sport facilities | YES | NO | To the north and west of the study area |
| Golf course | YES | NO | |
| Polo fields | YES | NO | |
| Filling station | YES | NO | To the south of the study area |
| Landfill or waste treatment site | YES | NO | |
| Plantation | YES | NO | |
| Agriculture | YES | NO | |
| River, stream or wetland | YES | NO | The Fox Hill spruit forms the western boundary of the study area and the Duzi flows almost parallel to the spruit, further west |
| Nature conservation area | YES | NO | |
| Mountain, hill or ridge | YES | NO | |
| Museum | YES | NO | |
| Historical building | YES | NO | |
| Protected Area | YES | NO | |
| Graveyard | YES | NO | |
| Archaeological site | YES | NO | |
| Other land uses (describe) | YES | NO | |

6. CULTURAL/ HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?

| | |
|-----|----|
| | |
| YES | NO |

If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

Briefly explain the recommendations of the specialist:

Even though no specialist was appointed to assist with surveys, Bokamoso did notify SAHRA & Amafa Kwazulu Natal of the proposed development.

Will any building or structure older than 60 years be affected in any way?
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

| | |
|-----|----|
| | |
| YES | NO |
| | |
| YES | NO |

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If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

SECTION D: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the local and district municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
 - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or

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- (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that an application for environmental authorization has been submitted to the KZN Department of Agriculture & Environmental Affairs in terms of the EIA Regulations, 2010;(ii)
 - (iii) a brief project description that includes the nature and location of the activity to which the application relates;
 - (iv) where further information on the application can be obtained; and
 - (iv) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE PROCESS

The EAP must ensure that the public participation process is according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of subregulation 54(2) in the manner agreed by the KZN Department of Agriculture & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments

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and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as Appendix E to this report.

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

Has any comment been received from the district municipality?

YES NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Has any comment been received from the local municipality?

YES NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

The comments were received on 15 August 2012. There were also various meetings between the local authority and the EAP in order to discuss the issues identified during the process.

Has any comment been received from a traditional authority?

YES NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

7. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES NO

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Yes, a meeting was held with Department of Water Affairs on 21 August 2012 in order to discuss the findings of the DBAR and in order to confirm whether it will be necessary to compile and submit Section 21 WULA for the proposed development. DWA confirmed during the meeting that the Foxhill Spruit is a man-made channel, which has already been altered and therefore it will not be necessary to apply for (c) and (i).

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

- Development within the flood line area and storm water management;
- Water pollution, siltation, erosion;
- Rehabilitation of areas adjacent to the Fox Hill Spruit;
- Confirm occurrence of a wetland;
- Availability of services;
- Current zoning of the study area; and
- Traffic impacts (access).

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

The issues raised by the I & APs were recorded and addressed in an issues and response report attached hereto as Appendix E(iii).

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

2.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Alternative S1 (preferred alternative)

The application site is currently vacant and has been disturbed by human activity. S1 deals with locality alternatives and there is **only one locality alternative**, namely the study area as described in this application, for the proposed development.

The applicant purchased the study area from the land-owner after extensive research indicated that the study area is suitable for the Proposed Shopping Centre.

Note: no mitigation measures will be supplied for the positive impacts, because it is not necessary to mitigate positive impacts. Where possible mitigation measures to prevent or restrict negative impacts will be supplied when the negative impacts are listed. These mitigation measures will be incorporated as part of the EMP. **Refer to Appendix H**

Direct impacts: Impact directly caused by the development

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Indirect Impacts: impacts caused by development impacts – not directly noticeable or identifiable

Direct Impacts (Planning and Design Phase):

Positive:

- High Visibility;
- Maximum exposure;
- Very Accessible;
- Size and shape of the property regarded as ideal;
- Availability of municipal services;
- Not regarded as ecologically sensitive;
- A positive RoD was already issued for the proposed development on a former occasion;
- The study area is situated within the "urban edge";
- In terms of "noise pollution" the proposed land-use is regarded as very compatible with the noise levels created by the surrounding major roads;

Negative:

- Possible riverine vegetation, hydrology issues and 1:100 year flood line along western boundary of the study area – layout must take these aspects into consideration and original layout must take the flood lines into consideration;
- Water pollution risks;
- Storm water management very important and can be a costly exercise;
- Perched water conditions;
- External services must be installed and upgraded in order to link-up with municipal services (not the responsibility of the applicant, the property owner already appointed another EAP to assist with the EIA and Section 21 Water-use License Application processes)

Indirect Impacts:

Positive:

- Not in close proximity of other similar shopping centers;
- Saving in fuel costs, because not necessary to travel to other shopping centres convenient shopping;
- Will be developed on a site that is situated within the urban edge, but some major upgrading are required to the services and infrastructure to connect it to the municipal system.

These upgrades are much needed in the vicinity of the study area and such services and infrastructure are often not possible to implement without economical injections from large developers such as the applicant. Once the external services/ bulk lines are implemented, the way is paved for the commencement/ implementation of smaller developments around the larger development that made connections to municipal services possible. The smaller development is usually complimentary to the larger development and in this case the shopping centre. This symbiosis contributes to sustainable development, because:

- 1) The Shopping Centre Development will make it possible for smaller developments in the services catchment to connect to municipal services and to density around the Shopping Centre; and
- 2) The additional people that are drawn to the area through the smaller developments will increase the feet drawn to the shopping centre.
 - The establishment of social facilities such as movies, places of refreshment, restaurants and other forms of

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entertainment

Negative:

- Reckless development activities next to the wetland and drainage line can cause siltation and water pollution and can have a negative impact on the ecological integrity of the larger regional open space system;
- Possible economical impacts on other shopping centers, competitive shop outlets/ restaurants in Pietermaritzburg (competition);
- If not sympathetically planned, the architectural style, finishes (especially exterior finishes, color themes, lighting and signage, could have a detrimental impact on the visual qualities and "sense of place" of the surrounding environment.

Mitigation:

- Take the 1:100 year flood line into consideration when planning the basements and other levels of the proposed facility;
- Plan to erect a conservation fence on the conservation line and incorporate the costs for such a fence into the tender documents of the contractors from the start;
- Storm water management plans must be designed to address the construction (temporary measures) and operation phases (mostly permanent measures);
- Appoint a suitably qualified urban economist to conduct a market study that will identify the specific retail and commercial needs for the proposed shopping centre (only if necessary);
- The proposed development will be situated on a very prominent site and if well planned and managed, the proposed development could be developed to act as "Place Making Structure" and to enhance the "Sense of Place" of the study area and its surroundings.

Definition and More detailed discussion of "Sense of Place" and "Place Structure" as referred to above.

"Sense of Place" is the subjective feeling a person gets about a place by experiencing the place visually, physically, socially and emotionally. The "Sense of Place" of an area is one of the major contributors to the "Image of the area".

The **image of an area** consists of two main components, namely *place structure* and *sense of place*. These could be defined as the following.

- **Place Structure** refers to the arrangement of physical place making elements within a unique structure that can be easily legible and remembered
- The **Sense of Place** is the subjective meaning attached to a certain area by individuals or groups and is linked to its history, culture, activities, ambience and the emotions the place creates.

The main "Sense of Place" creators on the study area are the views towards the south and the wetland area which is situated to the south and west of the site.

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As already mentioned, the surrounding area has been earmarked for mixed urban development by the Local Municipality and the study area and its surroundings are situated in the urban edge. It is anticipated that the area will develop more rapidly once the Shopping Centre has been developed and once the external services upgrading have been completed.

Areas that are in the process of being transformed from "i.e. residential to commercial" often appear neglected and structures on such properties often appear dilapidated and the tranquil and rural atmosphere often change to an atmosphere of an area without identity and with safety and security problems. Vagrants and criminals often move into such areas, because the security risks associated with such neglected areas often force people away. As mentioned in this report, one of the specialists found a dead body hanging from a tree during one of the site inspections.

Once the new and approved urban developments are completed, the newly developed structures, landscapes, facilities etc will create a different Sense of Place with a safe and urban atmosphere. Vagrants and criminals will feel uncomfortable and move out of the area, because the new developments will attract eyes into the area and vagrants and criminals often feel uncomfortable when they know that they are being watched.

The theme/ styles of the new urban developments are very important, because the first developments in such an area will set the development themes/ trends and standards. Other developments to follow in the area will most likely follow the same trends/ themes and standards. From a Sense of Place and Place making point of view, the proposed development is regarded as very important. The proposed development will act as one of the social gathering points/nodes in the area and if well planned and managed this node could help to set a theme for the surrounding developments. Furthermore the proposed development could be planned to feature as prominent landmark, it could act as place making structure and it could enhance the Sense of place of the study area and its surroundings.

Alternative S2

Similar to Alternative 1 and will therefore not be repeated

No-go alternative (compulsory)

The "No-Go" option is not regarded as a viable option, because the study area is currently unutilised and it is becoming a sleeping and walking area for vagrants. The Natal Rugby Union sold the land to the developer for development purposes and is no longer responsible for the maintenance and security of the property.

The no-go alternative entails that the site stays in its current state without development. This alternative cannot be implemented and is not regarded as a viable. If the study area is left in its current (disturbed) state, the site will be subject to erosion, siltation and water pollution. Once these destructive processes "kick-in", the direct impacts on the site will eventually trigger indirect impacts on the adjacent wetlands and other ecological systems to which the study area is connected.

From a social point of view, the undeveloped and derelict site can become a security risk. Sites that have been earmarked for development and that already have development rights in place; can easily become neglected if it takes long to get the development off the ground.

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In the case of the specific study area, the "no-go" area is not regarded as a viable alternative.

Indicate mitigation measures that may eliminate or reduce the potential impacts listed above:

| Alternative S1 | Alternative S2 | Alternative S3 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| <ul style="list-style-type: none"> - Amend the development layout to avoid the wetland areas, wetland buffers and areas below the 1:100 year flood line; - Delineate a conservation line on the plans for the beginning and where possible avoid any work within 1m from the wetland buffer; - Plan to erect a conservation fence on the conservation line and incorporate the costs for such a fence into the tender documents of the contractors from the start; - Storm water management plans must be designed to address the construction (temporary measures) and operation phases (mostly permanent measures); - Appoint a suitably qualified urban economist to conduct a market study that will identify the specific retail and commercial needs for the proposed Regional Mall. The study must take the existing and latent rights of the possible competitive into consideration and must rather strive to identify complimentary needs in the specific catchment; - The proposed development will be situated on a very prominent site and if well planned and managed, the proposed development could be developed to act as "Place Making Structure" and to enhance the "Sense of Place" of the study area and its surroundings; - The architectural styles and finishes must blend in tastefully with the surrounding environment, especially if one takes into consideration that the proposed development will be situated at the "entrance" into Pietermaritzburg. The strategic location of the site creates an opportunity to create a structure that will be regarded as a "Place-making Structure"/ Landmark; - If planned and managed correctly, the proposed development could have a positive impact on the | N/A | N/A |

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| | | | |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| | <p>surrounding areas and can create a "Sense of Place" and act as a Place making Structure/ Landmark in this new development area,</p> <ul style="list-style-type: none"> - Due to the location and topography of the study area and surroundings the proposed development will be visible from the surrounding properties and roads. However, it could also have a positive impact if the development is well-planned and integrated with the surrounding area. The visibility is also desirable and positive in terms of the retail component of the development, and • Designs and features that incorporate/ reflect some of the histories of the surrounding area will most definitely contribute to the "Sense of Place" of the study area and the surrounding area. | | |
| | | | |

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

| |
|----------------------------|
| <i>Direct impacts:</i> |
| <i>Indirect impacts:</i> |
| <i>Cumulative Impacts:</i> |

Alternative A2 (if any)

| |
|----------------------------|
| <i>Direct Impacts:</i> |
| <i>Indirect Impacts:</i> |
| <i>Cumulative Impacts:</i> |

No-go alternative (compulsory)

| |
|----------------------------|
| <i>Direct impacts:</i> |
| <i>Indirect impacts:</i> |
| <i>Cumulative Impacts:</i> |

Indicate mitigation measures to manage the potential impacts listed above:
Alternative A1 (preferred alternative)

| |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A1 Commercial: Shopping Centre Development</p> <p>O&T Developement (Pty) Ltd is planning a proposed 6 500m² shopping centre development to be known as the Woodburn Boulevard Shopping Centre.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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Alternative A1 (Shopping Centre): Direct/ Indirect/ Cumulative Impacts

Note: No mitigation required for positive impacts, some guidelines were however supplied (where regarded as necessary) in order to ensure optimal development of environmental opportunities/ potential associated with positive impacts

Design and Planning Phase:

| Environmental Aspects | Stability | Geology, Soil and Soil | Water Quality | Flora | Fauna | Land Use Character | Visual Quality & sense of place | Air Quality | Archaeology | Socio-Economic | Direct Impact | Indirect Impact | Cumulative Impact |
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| DESIGN AND PLANNING PHASE | | | | | | | | | | | | | |
| 1) If the layout encroaches onto the wetland and wetland buffer area/ riverine area | ■ | | ■ | ■ | ■ | | | | | | √ | √ | √ |
| Mitigation: | Amend the original mall layout in order to avoid the wetland, wetland buffers and take the 1:100 year flood line into consideration – discuss the fact that the development will be below the flood line with the local authority and DWA. | | | | | | | | | | | | |
| 2) If the layout encroaches onto the 1:100 year flood line | ■ | | ■ | ■ | ■ | | | | | ■ | √ | √ | √ |
| Mitigation: | Amend the original mall layout in order to avoid the wetland, wetland buffers and – discuss the fact that the development will be below the flood line with the local authority and DWA | | | | | | | | | | | | |
| 3) Even though the local authority agreed that the services can be connected to the municipal systems, some upgrading will be required to link the services of the proposed development up with the local authority service networks | | | | | | | | | | ■ | √ | √ | √ |
| Mitigation: | -Identify all the external services upgrading required to connect to the municipal system – water and sanitation and apply and plan for the upgrading of such services | | | | | | | | | | | | |
| Guidelines: | -Plan bulk services networks, capacities and alignments of bulk services in such a way that it will be possible for future smaller developments to also link-up with municipal services; -Prevent the pumping of services. Rather plan for services to gravitate | | | | | | | | | | | | |
| 4) The study area is very visible. The proposed shopping centre | | | | | | | | | | ■ | √ | √ | |

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| <p>creates the ideal opportunity to design a development that will enhance the "Sense of Place" of the study area and the surrounding area</p> | | | | | | | | | | | | | | |
| Guidelines: | <p>-The architectural styles and finishes must blend in tastefully with the surrounding environment, especially if one takes into consideration that the proposed development will be situated at the "entrance" into Pietermaritzburg. The strategic location of the site creates an opportunity to create a structure that will be regarded as a "Place-making Structure" / Landmark</p> | | | | | | | | | | | | | |
| <p>6) The topography of the study area is regarded as ideal for a regional mall (from a design, engineering and social point of view) Design – not too steep and therefore no significant cut and fill exercises required Engineering – slope sufficient to allow for the successful installation of services Social – not many stairs and steep exterior areas</p> | ◆ | ◆ | ◆ | ◆ | ◆ | | | | | | ◆ | √ | √ | |
| Guidelines: | <p>-Plan for the implementation of temporary storm water management measures during the construction phase; -Storm water management during the operational phase is also very important, because the study area is situated adjacent to a flood line and a spruit; - the storm water management must be planned to prevent erosion, siltation and water pollution; - The storm water discharge points must be outside the wetland buffer and the flood line; -The storm water management must be designed to ensure the long terms sustainability of the wetland system and to protect the ecological integrity of the larger open space system to which it is connected</p> | | | | | | | | | | | | | |
| <p>7) Geological conditions ideal for the development of a shopping centre.</p> | ◆ | ◆ | | | | | | | | | ◆ | √ | √ | √ |
| Guidelines: | <p>- Some perched water conditions could occur along the southern boundary of the study area (adjacent to the wetland area) and storm water management and basements must be planned to address potential seepage problems. The appointed geotechnical engineer must approve the design of the structures and must conduct more detailed geotechnical investigations in order to confirm the absence of colomites and the presence of perched water conditions (the follow up survey must be done during the rainy season, because the identification of perched water conditions is more accurate during eh rainy season)</p> | | | | | | | | | | | | | |

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| 8) Vehicle maintenance, site camps, storage of building materials and products on site and storage of waste on site could cause pollution | ■ | ■ | | | | | | ■ | ■ | | ■ | √ | √ | √ |
| Mitigation: | -Locate and design areas allocated for the storage of waste and equipment and to act as site camp in such a way that it will prevent pollution (air, water, soil, noise and visual) during the construction and operational phases of the project. | | | | | | | | | | | | | |
| 9) Heavy vehicle traffic and noise increase on the local roads. | | | | | | | ■ | | | | ■ | √ | √ | |
| Mitigation: | -Determine heavy vehicle movement patterns and circulation routes during the planning phase. If necessary allow for a separate heavy vehicle access route. Allow for delivery areas that are in close proximity of the site access road and the freeway. Do not allow any heavy vehicle access (construction vehicles) through the wetland or flood line areas. Incorporate vehicle movement rules as part of the tender documentation. | | | | | | | | | | | | | |
| 10) Veld fires may cause damage to infrastructure, vegetation and fauna | | | ■ | ■ | | | | | | | ■ | √ | √ | √ |
| Mitigation: | -Provide a designated area for fires (for heating and cooking by construction workers only) during the construction phase; - No fires will be allowed during the operational phase | | | | | | | | | | | | | |
| 11) Construction during the rainy season can cause unnecessary delays and damage to the environment | ■ | ■ | ■ | ■ | | | | | | | ■ | √ | √ | √ |
| Mitigation: | - If possible, compile a construction program that will allow for the main construction works (especially the construction works in close proximity of the flood line and the wetland areas) during the winter months | | | | | | | | | | | | | |
| 12) Accidental introduction of exotic invaders | | | ■ | | | | | | | | | √ | √ | √ |
| Mitigation: | -Appoint a suitably qualified Landscape Architect or Horticulturist to assist with the compilation of landscaping and planting plans that specify the usage of plant species that are indigenous, preferably endemic. In cases where exotic species are to be used, such species must be non-invasive. -The Landscape Architect must be appointed to supervise the landscaping implementation during the construction phase and must certify (once the landscaping has been implemented) that the plant species that were used comply with the required standards. | | | | | | | | | | | | | |
| 13) Lighting pollution | | | | | | | ■ | | | | ■ | √ | √ | |
| Mitigation: | - Security lighting during the construction and operation phase must be carefully planned. These lights must not spill into the eyes of oncoming traffic and must not shine into adjacent properties; -Interior lighting must be subtle and in order to prevent it from lighting up the sky and from using energy, the implementation of movement switches (especially for large glassed interior areas that are highly visible) should be considered during design stages; - Exterior lighting, especially the lighting in the vicinity of the open space areas must be designed to shine downwards and the bulbs to be used should rather be "dim" than bright; -Prevent the implementation of exterior advertising signs and name boards that will flicker into the eyes of surrounding neighbours and into the eyes of oncoming traffic; | | | | | | | | | | | | | |

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| | -Obtain the necessary approvals for the erection of advertising and other signs (also take the SAMOAC document into consideration) at the relevant authorities. If signs are visible from a national road, Applications must be submitted to SANRAL. If signs are visible from a provincial road (KZN Roads) the application must be submitted to KZN Roads Department and if visible from a local road, the application must be submitted to the Msunduzi Local Municipality. Exterior lighting, especially the lighting in the vicinity of the open space areas must be designed to shine downwards and the bulbs to be used should preferably | | | | | | | | | | | |
| 14) If areas where vegetation was removed for construction are not rehabilitated. | ■ | ■ | ■ | | | | | | | ✓ | ✓ | ✓ |
| Mitigation: | - Compile a rehabilitation plan for the construction phase. Areas that will remain as natural vegetation after the development took place (i.e. the wetland and wetland buffer area) must be indicated on all the planning drawings and measures must be put in place (already during the construction phase) to protect and rehabilitate these areas on an on-going basis | | | | | | | | | | | |
| 15) Topsoil may be lost if not removed, stockpiled correctly and used during rehabilitation works. | ■ | ■ | ■ | | | | | | | ✓ | | |
| Mitigation: | -Identify areas that are suitable for the storage of topsoil on all planning drawings. These areas must be located outside drainage lines, wetland buffers and wetland areas. Furthermore, it should not be stored in areas with perched water conditions | | | | | | | | | | | |
| 16) Security could become a problem during the construction phase | | | | | | ■ | | | | ✓ | ✓ | |
| Mitigation: | -Allow for 24 hour security on the construction site during the construction phase. Make provision for security costs in the project budgeting and tender process; -Only allow security personnel to sleep on the site during the construction phase and also plan for the implementation of a security system that will reflect a database of all workers and personnel on site during the construction phase; -If possible fence the construction site and allow for one/ two allocated and monitored contractor's entrance/s | | | | | | | | | | | |

Alternative A2

A2 Shopping Centre with a higher Coverage (29 000m²)

Apart from the fact that the coverage of the second alternative is significantly higher, the anticipated impacts are regarded as similar. In some cases such impacts are however more severe, because of the larger coverage (i.e. will have a larger impact on the traffic, will have a larger impact on storm water (more impermeable surfaces) etc.

Due to the similarities of the anticipated impacts, it was decided that the table as supplied above, is also applicable to Alternative 2. No additional tables are required.

Alternative A3

Not applicable

No-go alternative (compulsory)

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The "No-Go" option is not regarded as a viable option, because the study area is currently unutilised and it is becoming a sleeping and walking area for vagrants. The Natal Rugby Union sold the land to the developer for development purposes and is no longer responsible for the maintenance and security of the property.

The no-go alternative entails that the site stays in its current state without development. This alternative cannot be implemented and is not regarded as a viable. If the study area is left in its current (disturbed) state, the site will be subject to erosion, siltation and water pollution. Once these destructive processes "kick-in", the direct impacts on the site will eventually trigger indirect impacts on the adjacent wetlands and other ecological systems to which the study area is connected.

From a social point of view, the undeveloped and derelict site can become a security risk. Sites that have been earmarked for development and that already have development rights in place, can easily become neglected if it takes long to get the development off the ground.

In the case of the specific study area, the "no-go" area is not regarded as a viable alternative.

The following measures must be put in place to end, prevent and restrict environmental degradation if it is decided that the no-go option will be the preferred alternative.

- Rehabilitation plan;
- Temporary and permanent erosion, siltation and water pollution prevention measures;
- A security plan to prevent any further security/ crime related incidences on the study area;
- An on-going alien and weeds control programme

Note: This alternative is not regarded as a viable alternative, because the study area has been earmarked for development (inside the urban edge), construction already commenced and it is not regarded as sustainable to spend large sums of money on the rehabilitation on land which is already disturbed and it will not (from a financial point of view) be possible for the owner to maintain the site and implement that rehabilitation and weed control programmes without enjoying any economic benefits from the activities on the study area.

Alternative A1:

Alternative A2:

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2.2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

Alternative S1 (preferred alternative) – Site Alternative

Direct Impacts: Impact directly caused by the development

Indirect Impacts: Impacts caused by development impacts – not directly noticeable or identifiable

Direct Impacts (Construction Phase):

Positive:

- Temporary jobs to local community that reside in close proximity of study area

Negative:

- Temporary impacts on the hydrology (wetland, wetland buffer and 1:100 year flood line areas);
- Water pollution risks;
- Services not readily available for usage during the construction phase. Will have to use generators and must arrange for temporary toilet facilities and water

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| | trucks |
| | <ul style="list-style-type: none">- Dangerous when construction vehicles enter onto the freeway from the study area;- Temporary disruption of services and access to surrounding properties |
| Indirect Impacts: | |
| Positive: | <ul style="list-style-type: none">- Temporary economical injection to surrounding businesses (i.e. filling station across the street, hardware stores, take away outlets etc.) |
| Negative: | <ul style="list-style-type: none">- Reckless construction activities next to the wetland and drainage line can cause siltation and water pollution and can have a negative impact on the ecological integrity of the larger regional open space system; |
| Mitigation: | <ul style="list-style-type: none">- Delineate a conservation line on the plans for the beginning and where possible avoid any work within 1m from the wetland buffer;- Plan to erect a conservation fence on the conservation line and incorporate the costs for such a fence into the tender documents of the contractors from the start.- Storm water management plans must be designed to address the construction phase (temporary measures). |

Alternative S2

N/A

Alternative S3

N/A

No-go alternative (compulsory)

The no-go alternative entails that the site stays in its current state without development (if at all possible to prevent the owners from implementing the N12 Industrial Township rights already approved).

As already mentioned construction already commenced on the N12 Industrial Township study area and large areas are already left exposed. The following measures must be put in place to end, prevent and restrict environmental degradation:

- Rehabilitation plan;
- Temporary and permanent erosion, siltation and water pollution prevention measures;
- A security plan to prevent any further security/ crime related incidences on the study area;

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- An on-going alien and weeds control programme.

Note: This alternative is not regarded as a viable alternative, because the study area has been earmarked for development (inside the urban edge), construction already commenced and it is not regarded as sustainable to spend large sums of money on the rehabilitation on land which is already disturbed and it will not (from a financial point of view) be possible for the owner to maintain the site and implement that rehabilitation and weed control programmes without enjoying any economical benefits from the activities on the study area

Indicate mitigation measures that may eliminate or reduce the potential impacts listed above:

| Alternative S1 | Alternative S2 | Alternative S3 |
|------------------------------------------------|--------------------------|----------------|
| Already addressed above – also refer to EMP | Already addressed above. | N/A |

Alternative A1 (Shopping Centre of 6 500m²): Direct/ Indirect/ Cumulative Impacts

Note: No mitigation required for positive impacts, some guidelines were however supplied (where regarded as necessary) in order to ensure optimal development of environmental opportunities/ potential associated with positive impacts

Construction Phase:

| Environmental Aspects | Stability | Geology, Soil and Soil | Water Quality | Flora | Fauna | Land Character Use | Visual Quality & sense of place | Air Quality | Archaeology | Socio-Economic | Direct Impact | Indirect Impact | Cumulative Impact |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|-------|-------|--------------------|---------------------------------|-------------|-------------|----------------|---------------|-----------------|-------------------|
| CONSTRUCTION PHASE | | | | | | | | | | | | | |
| 1) Erosion | ■ | | ■ | ■ | | | ■ | | | | √ | √ | √ |
| Mitigation: | <p>– A storm water management plan must be compiled for the construction and operational phases of the proposed development;</p> <p>– Large exposed areas during the construction phases should be limited. Where possible areas earmarked for construction during later phases should remain covered with vegetation coverage until the actual construction phase. This will prevent unnecessary erosion and siltation in these areas;</p> <p>– Rehabilitate exposed areas immediately after construction in these areas is completed (not at the end of the project);</p> <p>– Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided;</p> <p>– Specifications for topsoil storage and replacement to ensure sufficient soil coverage as soon as possible after construction must be implemented;</p> <p>– All embankments must be adequately compacted and planted with grass to stop any excessive soils erosion and scouring of the landscape;</p> <p>– Storm water diversion measures are recommended to control peak flows during thunder storms;</p> <p>– The eradication of alien vegetation should be followed up as soon as possible by replacement with indigenous vegetation to ensure quick and sufficient coverage of exposed areas.</p> | | | | | | | | | | | | |

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| <p>2) Siltation, erosion and water pollution could occur in the systems lower down in the catchment area if a stormwater management plan is not implemented</p> | ■ | ■ | ■ | ■ | | | | | | √ | √ | √ | |
| <p>Mitigation:</p> | <p>The storm water design for the proposed development must be designed to:</p> <ul style="list-style-type: none"> - Reduce and/ or prevent siltation, erosion and water pollution. If erosion, siltation and water pollution is not addressed, the sustainability of the drainage and the open space systems lower down in the catchment area can be negatively impacted by the development. - Storm water runoff should not be concentrated as far as possible and where possible sheet flow should be implemented. - The vegetation must be retained as far as possible, and rehabilitated if disturbed by construction activities to ensure that erosion and siltation do not take place. | | | | | | | | | | | | |
| <p>3) Construction works within or the wetland area or flood line in close proximity of the wetland area or the 1;100 year flood line area could have a negative impact on the hydrology, the integrity of the wetland area and on the ecological systems associated with the drainage line/ wetland</p> | ■ | ■ | ■ | ■ | | | | | | ■ | √ | √ | √ |
| <p>Mitigation:</p> | <ul style="list-style-type: none"> - Delineate a conservation line on the plans for the beginning and where possible avoid any work within 1m from the wetland buffer; - Prior to the commencement of construction, the appointed ECO and contractor must confirm (on site) the delineation of the conservation fence; - Erect the conservation fence prior to the commencement of construction activities; - No construction vehicles will be allowed within the conservation area (the area fenced-off for conservation purposes); - Only workers that do rehabilitation works and workers allocated to implement services within the wetland buffer areas will be allowed to enter the protected areas; - Any works in such areas will be done under strict supervision (it is however important to note that the construction of the shopping centre will not require any construction related works within the riverine areas. - The reason why work within the adjacent wetland areas is addressed is due to the fact that Isago already has an RoD which allows for construction and rehabilitation works within the wetland zones; - Storm water management plans must be designed to address the construction phase (temporary measures); - A comprehensive storm water management plan indicating the management of all surface runoff generated as a result of the development (during both the construction and operational phases) prior to entering any natural drainage system or wetland, must be submitted and approved by the local authority and DWA and submitted to KZINDAE prior to construction activities commencing; - Attenuation ponds and energy dissipaters must be installed on the study area to | | | | | | | | | | | | |

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| | <p>break the speed of the water and to act as siltation ponds;</p> <ul style="list-style-type: none"> - Surface storm water generated as a result of construction phase must not be channelled directly into any natural drainage system or wetland; - The storm water management plan must indicate how surface runoff will be retained outside of the demarcated buffer/flood zone and how the natural release of retained surface runoff will be simulated; - The storm water management plan should be designed in a way that aims to ensure that post development runoff does not exceed predevelopment values in: <ul style="list-style-type: none"> • Peak discharge for any given storm; • Total volume of runoff for any given storm; • Frequency of runoff; and • Pollutant and debris concentrations reaching water course; - Bio-swale and bio-filters could be installed to minimize the risk of pollutants entering the natural drainage system of the area. | | | | | | | | | | | | |
| <p>4) Should the construction phase be scheduled for the summer months, frequent rain could cause very wet conditions, which makes it extremely difficult to build in and to do rehabilitation works of disturbed areas.</p> | ■ | ■ | ■ | ■ | | | | | ■ | ■ | √ | √ | √ |
| <p>Mitigation:</p> | <p>-Construction workers and construction vehicles and machinery must stay out of the soggy areas during the wet periods. Barrier tape should be used to demarcate the areas that are drenched with water (especially the ecologically sensitive areas and the areas covered with valuable topsoil) and it should only be removed when the appointed Environmental Control Officer (ECO)/ site supervisor/ project manager/ main contractor regard the conditions in the affected areas as favourable.</p> | | | | | | | | | | | | |
| <p>5) If dry and windy conditions occur during the construction phase, dust pollution could become a problem.</p> | | | | | | | | | | | √ | √ | √ |
| <p>Mitigation:</p> | <p>-Sweeping of the construction site, clearing of builders' rubble and debris as well as the regular watering of the construction site (storage areas, roads etc.) must take place. During the windy periods the site should be damped down at least two times per day.</p> | | | | | | | | | | | | |
| <p>6) The eradication of weeds and exotic invaders</p> | ◆ | ◆ | ◆ | ◆ | | | | | | | √ | √ | √ |
| <p>Guidelines:</p> | <ul style="list-style-type: none"> - All Category 1 Declared weeds, Category 2 Declared invader and Category 3 Declared invaders occurred on the study area and must be eradicated prior to construction and throughout the operational phase of the development; - No plants not indigenous to the area, or exotic plant species, especially lawn grasses and other ground-covering plants, should be introduced in the communal landscaping of the proposed site, as they will drastically interfere with the nature of the area; - Forage and host plants required by pollinator species in the area should also be used in landscaped areas. | | | | | | | | | | | | |
| <p>7) Noise of construction machinery could have a negative impact on the fauna species during the</p> | | | | ■ | | | | | | | √ | | |

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| construction phase. | | | | | | | | | | | | | | | | |
| Mitigation: | - Noise should be kept to a minimum and the development should be done in phases to allow faunal species to temporarily migrate into the conservation areas in the vicinity. | | | | | | | | | | | | | | | |
| 8) During the construction phase (if not managed correctly) fauna species could be disturbed, trapped, hunted or killed. | | | | ■ | | | | | | | | ✓ | | | | |
| Mitigation: | - The integrity of remaining wildlife should be upheld, and no trapping or hunting by construction personnel should be allowed. Caught animals should be relocated to the conservation areas in the vicinity. Council shall prosecute offenders; - Conservation-orientated clauses should be built into contracts for construction personnel as well as buyers of property within the new development complete with penalty clauses for non-compliance; - Domestic pets must be excluded from areas of good quality bird habitat; - Information boards must be erected within the development information residents of the presence of Red Data bird species, their identification, conservation status and importance, biology, habitat requirements and the requirements of the plan in terms of management. | | | | | | | | | | | | | | | |
| 9) Loss of habitat can lead to the decrease of fauna numbers and species. | | | | ■ | | | | | | | | ✓ | ✓ | | | |
| Mitigation: | - All mitigation measures for impacts on the indigenous flora of the area should be implemented in order to limit habitat loss as far as possible and maintain and improve available habitat, in order to maintain and possibly increase numbers and species of indigenous fauna. | | | | | | | | | | | | | | | |
| 10) Perched water conditions during construction | ■ | ■ | | | | | | | | | | | ✓ | ✓ | ✓ | |
| Mitigation: | - Some perched water conditions could occur along the southern boundary of the study area (adjacent to the wetland area and during wet conditions it could become necessary to de-water areas for construction purposes. In many cases water is pumped from construction areas/ cut-off trenches are implemented to create dry conditions for construction. Discuss the temporary and permanent dewatering alternatives with the architect, civil engineer, geo-hydrologist, wetland specialist, geotechnical engineer and ECO in order to determine the most suitable method. The most economical alternative is not necessarily the preferred alternative from a geo-hydrological and ecological point of view. The solution must be sustainable. | | | | | | | | | | | | | | | |
| 11) Structures of cultural and historical significance may be destroyed. | | | | | | | | | | ■ | | | ✓ | | | |
| Mitigation: | - It should be noted that in terms of the South African Resources Act (Act 25 of 1999) Section 35(4) no person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or material; - Also important is that Section 34(1) of this act states that no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit, issued by the relevant provincial heritage resources authority. | | | | | | | | | | | | | | | |
| 12) Possibility of illegal settlements and increased security problems | | | | | | | | | | | | | | ✓ | ✓ | |
| Mitigation: | - With the exception of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included); - Presence of law enforcement officials at strategic places must be ensured. | | | | | | | | | | | | | | | |

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| 13) Damage to roads | | | | | | | | | ■ | ✓ | ✓ | |
| Mitigation: | <p>-Construction vehicles must avoid using sub-standard roads (i.e. roads in agricultural holdings that are not constructed to provincial/ local authority standards);</p> <p>-Record the condition of the surrounding roads (with photographs) prior to construction and require that contractors repair all damages caused during the construction phase;</p> <p>-Cover newly paved areas and kerbs with a sand layer during the construction phase to prevent direct damage;</p> <p>-Construction vehicles should only be permitted to use a designated construction entrance;</p> <p>Construction vehicles and activities as well as other heavy vehicles to avoid peak hour traffic times.</p> | | | | | | | | | | | |
| 14) Damage to the existing services and infrastructure during the construction phase and disruptions in services (i.e. electricity, water, damage to Telkom cables) during the construction phase. | | | | | | | | | ■ | ✓ | ✓ | ✓ |
| Mitigation: | <p>-Determine areas where services will be upgraded and relocated well in advance;</p> <p>- Discuss possible disruptions with affected parties to determine most convenient times for service disruptions and warn affected parties well in advance of dates that service disruptions will take place.</p> | | | | | | | | | | | |
| 15) Dangerous excavations | | | | | | | | | ■ | ✓ | | |
| Mitigation: | <p>- Although regarded as a normal practice, it is important to erect proper signs indicating the danger of the excavation in and around the development site. Putting temporary fencing around excavations where possible.</p> | | | | | | | | | | | |
| 16) Creation of temporary and permanent jobs | | | | | | | | | ◆ | ✓ | ✓ | ✓ |
| Mitigation: | <p>- In order to limit the influx of people from other areas, it is recommended that (where possible) only people from the local communities be employed.</p> | | | | | | | | | | | |
| 17) Surface water flows will be altered during the construction phase | ■ | ■ | ■ | ■ | | | | | | ✓ | ✓ | |
| Mitigation: | <p>A comprehensive storm water management plan indicating the management of all surface runoff generated as a result of the development (during both the construction and operational phases) prior to entering any natural drainage system or wetland, must be submitted and approved by the local authority and DWA and submitted to KZNDAAE prior to construction activities commencing;</p> <p>- Attenuation ponds and energy dissipaters must be installed on the study area to break the speed of the water and to act as siltation ponds;</p> <p>- Surface storm water generated as a result of construction phase must not be channelled directly into any natural drainage system or wetland;</p> <p>- The storm water management plan must indicate how surface runoff will be retained outside of the demarcated buffer/flood zone and how the natural release of retained surface runoff will be simulated;</p> <p>- The storm water management plan should be designed in a way that aims to ensure that post development runoff does not exceed predevelopment values in:</p> <ul style="list-style-type: none"> •Peak discharge for any given storm; •Total volume of runoff for any given storm; •Frequency of runoff; and •Pollutant and debris concentrations reaching water course; <p>- Bio-swale and bio-filters could be installed to minimize the risk of pollutants</p> | | | | | | | | | | | |

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| <p>18) The use of insufficient drainage systems during the construction phase (i.e. sub-surface drainage systems & no mechanisms to break the speed of the surface water)</p> | ■ | ■ | ■ | ■ | | | | | | | | √ | √ |
| <i>entering the natural drainage system of the area.</i> | | | | | | | | | | | | | |
| <p>Mitigation:</p> | <ul style="list-style-type: none"> - Attenuation ponds and energy dissipaters must be installed on the study area to break the speed of the water and to act as siltation ponds; - Implement temporary storm water management measures that will help to reduce the speed of surface water. These measures will also assist with the prevention of water pollution, erosion and siltation; - In order to prevent large exposed areas, it is recommended that the construction of the development be done in phases. Each phase should be rehabilitated immediately after the construction for that phase has been completed. The rehabilitated areas should be maintained by the appointed rehabilitation contractor until a vegetative coverage of at least 75% has been achieved; - No excavated materials should be dumped in or near drainage channels. | | | | | | | | | | | | |
| <p>19) Waste Management The construction and operational phases of the proposed development will create large quantities of builder's and domestic waste to be accommodated by local legal landfill sites.</p> | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | √ | √ |
| <p>Mitigation:</p> | <ul style="list-style-type: none"> - Prevent unhygienic usage on site and pollution of the natural assets. Develop a central waste temporary holding site to be used during construction. (Near the access entrance). This site should comply with the following: <ul style="list-style-type: none"> - Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; - Small lightweight waste items should be contained in skips with lids to prevent wind littering; - Bunded areas for containment and holding of dry building waste. - THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT IS ALREADY DISTURBED. THESE AREAS SHALL NOT BE IN CLOSE PROXIMITY OF DRAINAGE CHANNELS; - Workers will only be allowed to use temporary chemical toilets on the site. CHEMICAL TOILETS SHALL NOT BE IN CLOSE PROXIMITY OF DRAINAGE CHANNELS; - No French drain systems may be installed; - No bins containing organic solvents such as paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site; - All waste must be removed to a recognized waste disposal site on a weekly basis. No waste materials may be disposed of on or adjacent to the site. The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable to the Local Authority; - Keep records of waste reuse, recycling and disposal for future reference. Provide information to ECO. (Environmental Control Officer) | | | | | | | | | | | | |
| <p>20) Vehicle maintenance, site camps, storage of building materials and products on</p> | ■ | ■ | | | | ■ | ■ | ■ | | | | √ | √ |

Basic Assessment Report

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|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|---|--|--|---|---|---|--|
| | <ul style="list-style-type: none"> -Designated areas for stockpiling of construction materials must be specified by the Environmental Control Officer in an area that is already disturbed; -Remove vegetation only in designated areas for construction; -Rehabilitation works must be done immediately after the involved works are completed; -All compacted areas should be ripped prior to them being rehabilitated/landscaped; -The top layer of all areas to be excavated must be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material should be used for the rehabilitation of the site and for landscaping purposes; -Strip topsoil at beginning of works and store in stockpiles no more than 1,5 m high in designated materials storage area; - Stockpiles should be covered correctly | | | | | | | | | | | |
| 26) Security could become a problem during the construction phase | | | | | | ■ | | | ■ | √ | √ | |
| Mitigation: | <ul style="list-style-type: none"> -Allow for 24 hour security on the construction site during the construction phase. Make provision for security costs in the project budgeting and tender process; -Only allow security personnel to sleep on the site during the construction phase and also plan for the implementation of a security system that will reflect a database of all workers and personnel on site during the construction phase; -If possible fence the construction site and allow for one/ two allocated and monitored contractor's entrance/s | | | | | | | | | | | |

Alternative 2 (A shopping Centre of 29 000m²): Direct/ Indirect/ Cumulative Impacts

Note: The construction phase impacts of this alternative is similar to the construction phase impacts of Alternative 1 and therefore the above mentioned impacts table will not be repeated.

From an environmental management point of view it will be more advantageous to implement Alternative, which supplies detailed construction guidelines, especially with regards to the protection of the wetland and drainage line areas.

2.3. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

Note: The operational phase impacts of this alternative is similar to the operational phase impacts of Alternative 1 and therefore the above mentioned impacts table will not be repeated.

Alternative S1 (Preferred Alternative)

Alternative A1 (Shopping Centre): Direct/ Indirect/ Cumulative Impacts

Note: No mitigation required for positive impacts, some guidelines were however supplied (where regarded as necessary) in order to ensure optimal development of environmental opportunities/ potential associated with positive impacts.

Operational Phase impacts for S1 and A1 are combined in the table below

Basic Assessment Report

| Environmental Aspects | Geology, Soil and Soil | Water Quality | Flora | Fauna | Land Use Character | Visual Quality & sense of | Air Quality | Archaeolo | Socio-Economic | Direct | Indirect | Cumulative Impact |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|-------|--------------------|---------------------------|-------------|-----------|----------------|--------|----------|-------------------|
| OPERATIONAL PHASE | | | | | | | | | | | | |
| 1) The eradication of weeds and exotic invaders | ◆ | ◆ | ◆ | ◆ | | | | | | √ | √ | √ |
| Guidelines: | <p>- All Category 1 Declared weeds, Category 2 Declared invader and Category 3 Declared invaders occurred on the study area and must be eradicated prior to construction and throughout the operational phase of the development;</p> <p>- No plants not indigenous to the area, or exotic plant species, especially lawn grasses and other ground-covering plants, should be introduced in the communal landscaping of the proposed site, as they will drastically interfere with the nature of the area;</p> <p>- Forage and host plants required by pollinator species in the area should also be used in landscaped areas.</p> | | | | | | | | | | | |
| 2) Noise caused by restaurant, places of amusement, events (especially after hours) and noise caused by air conditioners, compressors etc. | | | | ■ | | | | | ■ | | √ | |
| Mitigation: | <p>- Implement operational phase guidelines supplied by acoustical engineer for the operational phase during the operational phase;</p> <p>-Take the Gauteng Noise Control Regulations, 1999 into consideration, even though the study area is not situated in Gauteng- this document will supply useful noise guidelines and thresholds</p> | | | | | | | | | | | |
| 3) Upgrading of municipal services | | | | | | | | | ◆ | √ | √ | √ |
| 4) Upgrading of provincial and local roads | | | | | | | | | ◆ | √ | √ | √ |
| Mitigation: | | | | | | | | | | | | |
| 5) Increase in adjacent land-values | | | | | | | | | ◆ | √ | | |
| 6) Rates and taxes payable to the local authority | | | | | | | | | ◆ | √ | √ | √ |
| 7) Traffic increase in the area, will have an impact on the traffic flow of the area – more severe impacts anticipated with the Regional Mall Development | | | | | | | | | ■ | √ | √ | |
| Mitigation: | -Already addressed during construction phase | | | | | | | | | | | |
| 8) Creation of many permanent jobs | | | | | | | | | ◆ | √ | √ | √ |

Basic Assessment Report

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| <ul style="list-style-type: none"> ➤ Impacts on existing services- some disruptions of services; ➤ Security problems; ➤ Large exposed areas with infertile soils; ➤ Decommissioning activities could cause danger to children and animals of the surrounding areas; ➤ Illegal disposal of demolition waste; ➤ Demolition works during the dry and windy season will be more detrimental from an air pollution point of view; ➤ Demolition works during the rainy season can cause unnecessary delays and damage to the environment; ➤ Uncontrolled activities and access to sensitive areas in the vicinity; ➤ Uncontrolled fires may cause damage or loss to vegetation and fauna in the area. ➤ Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines; and <p>Indirect impacts:</p> <ul style="list-style-type: none"> ➤ Loss of permanent jobs; ➤ Loss of rates and taxes payable to the local authority; ➤ Decrease in land values (site and adjacent properties) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alternative S2 |
| Not applicable |
| Alternative S3 |
| Not applicable |
| No-go alternative (compulsory) |
| <p>During the decommissioning phase the derelict buildings if left unattended will bring in factors such as crime into the area. Vandalism of buildings and rodents can also become issues</p> |

Indicate mitigation measures that may eliminate or reduce the potential impacts listed above:

| Alternative S1 and A1 | Alternative A2 | Alternative S2, S3 and A3 |
|----------------------------------------------------------------------------------------------------------------|----------------|---------------------------|
| An environmental rehabilitation plan must be in place for the possibility that the activity will be abandoned. | Not applicable | Not applicable |

6. PROPOSED MANAGEMENT OF IMPACTS AND MITIGATION

Indicate how identified impacts and mitigation will be monitored and/or audited.

| Alternative S1 and A1 | Alternative S2 | Alternative S3 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| <p>These impacts will be mitigated and monitored through the implementation of an EMP for the Planning & Design, Construction and Operational Phases. The EMP (Refer to Appendix H) recommends that the developer appoint someone to compile a decommissioning plan for a possible decommissioning / upgrading phase within the first operational year of the Shopping Centre. This Decommissioning</p> | Not applicable | Not applicable |

Basic Assessment Report

| | | |
|---------------------------------------------------------------------------------------------------------------|--|--|
| Plan must be submitted to the involved local authority and KZNDAE for record keeping and monitoring purposes. | | |
|---------------------------------------------------------------------------------------------------------------|--|--|

7. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative S1 (Site Alternative) and A1 (Activity Alternative) (The Preferred Alternative)

Alternative S1:

Project Title: Woodburn Boulevard Shopping Centre

O&T Development (Pty) Ltd is planning a proposed 6 500m² shopping centre development to be known as the **Woodburn Boulevard Shopping Centre**.

The proposed development will take place on Portion 5 of Erf 4346 KwaZulu-Natal and it is situated within the uMgungundlovi District Municipality Boundaries, approximately 1Km to the south-west of the Pietermaritzburg CBD. The site is located on the corner of Woodhouse Road and Alan Paton Drive and the Fox-Hillspruit Canal (a tributary of the Umsumduzi River) runs along the western boundary of the study area. **Refer to Figure 1 for Locality Map and Refer to Figure 2 for Aerial Photograph.**

Alternative A1:

Commercial: Shopping Centre (6 500m²) – total development footprint 17 820m²

The developer proposes to construct a Shopping Centre (area to be transformed – 17 820m²) on the study area. The proposed Mall will promote economic development in Pietermaritzburg.

According to the applicant's urban economists and the involved local authority, the study area is ideally situated for the proposed development.

The most significant impacts identified for the construction and operational phases are:

Construction Phase:

Negative Impacts:

Bio-Physical Environment:

- Perched water conditions;
- Impacts on the water- resources, hydrology and geo-hydrology,
- Erosion and siltation;
- Construction during the rainy season;

Socio-Economical Environment:

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- Waste management;
- Temporary disruption of services and accesses to surrounding properties;
- Noise pollution;
- Visual pollution;
- Safety and security problems;
- Dangerous conditions on roads;
- Dust pollution;
- Dangerous conditions on and around site (i.e. dangerous excavations)

Institutional Environment:

- If development is approved, the developer, contractor and sub-contractors must comply with conditions of the authorisation and with the EMP;
- Must allow for compliance with the conditions of the authorisation and the EMP in the project budget and in the tender documentation;
- More costly to implement a development that complies with the EMP, conditions of the authorisation and all other relevant legislation, policies and frameworks

Positive Impacts:

Bio-Physical Environment:

- Protection of the wetlands and drainage areas
- Rehabilitation of disturbed areas and coverage of exposed areas.
- Implementation of an EMP that supplies guidelines for sustainable and environmentally sound development

Socio-Economical Environment:

- Creation of temporary jobs,
- Economical advantages to surrounding businesses (i.e. filling station, hardware stores, food outlets etc.);

Institutional Environment:

- Project planning already made financial provision for emergency situations, rehabilitation and other mitigation measures

Operational Phase:

Negative Impacts:

Bio-Physical Environment:

- Damage of the wetland areas if visitors to the mall have access to the natural open space areas

Socio-Economical Environment:

- Possible noise pollution,
- Visual pollution (if not well planned and managed);
- Increased traffic;
- Competition (other retail and commercial facilities in the area);

Institutional Environment:

- Implementation of guidelines and mitigation measures as supplied in approvals and EMP;

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- Must allow for compliance with the conditions of the authorisation and the EMP in the project budget for the centre management;
- More costly to implement a development that complies with the EMP, conditions of the authorisation and all other relevant legislation, policies and frameworks

Positive Impacts:

Bio-Physical Environment:

- Protection of the riverine system and removal of exotic invaders; Rehabilitation of disturbed areas and coverage of exposed areas;
- Implementation of an EMP that supplies guidelines for sustainable and environmentally sound development

Socio-Economical Environment:

- Creation of permanent and temporary jobs;
- Upmarket social facilities in the area;
- Increase of surrounding property values;
- Installation of bulk services and infrastructure for the larger area. Will make it possible for smaller developments to connect to municipal services and to get off the ground;
- Upgrading of services and surrounding roads;
- Rates and taxes payable to the local authority;
- Convenient shopping facility (one stop facility);
- Improved security;
- If well planned and managed the development will set a trend and standards for other future developments in the area.

Institutional Environment:

- The establishment of a development that will comply with the most recent legislation, frameworks and policies.

Summary of the preferred Alternative (Alternative S1 and A1):

Biophysical Environment:

During the site visit it was clear that the application site is not affected by any sensitive or ecological features such as ridges, rocky outcrops, rivers or drainage lines which will require protection and conservation. Furthermore, no Red Data fauna or flora species were identified on the proposed development site or in its immediate surroundings.

The most significant bio-physical issues associated with the proposed development are the ground water pollution risks associated with the perched water conditions. The potential impacts on the hydrological features (i.e. spruit to the west of the site) associated with the drainage feature along the southern boundary of the study area were also regarded as significant.

Unacceptable storm water management practices and the possible introduction of invader plants into the surrounding environment are also regarded as issues that should be addressed.

It was however found that it will be possible to mitigate the anticipated bio-physical impacts to more acceptable levels/ to prevent impacts completely and if planned and managed correctly, the proposed development could even contribute to the bio-diversity (i.e. in terms of habitat creation) of the surrounding Environment

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Social Environment:

Most of the adverse social impacts are only temporary impacts that are associated with the construction phase of the development. These impacts are usually easy to mitigate, especially if effective management measures (i.e. an Environmental Management Plan) are implemented.

Although the proposed development will be visible from the surrounding properties, the proposed Retail/Commercial development can be designed and implemented to be visually more acceptable to the surrounding area.

According to the appointed civil engineers the provision of services will not be a problem. The study area is situated within the urban edge and in an area earmarked for densification and urban development. The services master planning for the area will thus make provision for future municipal services in the area. It has already been confirmed by the involved local authority that it will be possible to link the study area to the municipal water supply system in the area. As already mentioned, the local authority already has a longer term master plan for the installation of a new gravity sewer pipeline in the area and an EAP has already been appointed to apply for the sections of the external services that will trigger listed activities in terms of the 2010 Amended NEMA Regulations and to apply for the necessary Section 21 Water-Use Licenses in terms of the National Water Act, 1998.

According to the traffic engineers, some road upgradings (especially at the intersection) will be required to accommodate the proposed development.

Only 3 Interested and Affected Parties Registered during the Public Participation Process. The approach was to follow a transparent and accommodating Public Participation Process which allows the interested and affected parties ample opportunity to raise issues and to supply inputs regarding the development proposal. The public participation that was followed was done in accordance with the public participation guidelines as supplied in NEMA. Flyers were distributed to surrounding landowners, tenants, stakeholders and residents by means of hand delivering, faxes or e-mails. A notice was also placed in the Local Newspaper and 2 advertisements were erected at prominent points on the proposed application site. It is the opinion of Bokamoso that all the issues raised during the Public Participation Process have been listed, addressed and significantly mitigated to establish a sustainable development on the study area. No "Fatal Flaws" associated with the social environment were identified.

Economical Environment:

Surrounding Properties

If the development is constructed and managed according to high architectural and landscaping standards, the proposed development will only improve the character as well as the "sense of place" in the area. In order to regulate high building and design standards, the buildings will be designed to comply with pre-determined architectural standards and guidelines (architectural styles, sizes of the buildings, finishes of the buildings etc.). The proposed development will most definitely contribute to an increase in the surrounding property values.

Job Creation

o Construction phase

During the Construction phase, it is estimated that one construction job is created for every R300 000 spent on Building costs. It is estimated that approximately 15% of these created jobs will be permanent positions.

o Operational phase

Statistically it is accepted that every 38-40m² of Retail Gross Lettable Area developed will create 1 permanent job within the Retail sphere.

Furthermore in addition to the jobs created within the Retail sector, job creation within

Functions.

Agricultural Activities

The current land use of the site has led to severe degradation of soils. Furthermore, none of the surrounding properties are currently practising any agricultural or related activities.

Institutional Environment

The proposed development is in line with the planning frameworks and policies for the area. The proposed development site is also situated within the urban edge.

Alternative S2

N/A

Alternative S3

N/A

Alternative A1 (preferred alternative)

Already addressed above as part of S1 Alternative

Alternative A2

A2 Residential Development

The second activity alternative considered is the option of developing the entire study area as a residential development. This option was considered prior to the submission and approval of the DFA application and this option was eventually not regarded as the preferred option because 1) the study area has an ideal locality for a commercial/ business. Retail development and it is very sought after, and 2) due to the high traffic volumes on the surrounding roads, the noise levels on and around the study area is very high and it is not ideal for a residential development. The acceptable noise levels for a residential area are an urban area is 55dBa.

The most significant impacts identified for the construction and operational phases are:

Construction Phase:

Negative Impacts:

Bio-Physical Environment:

Not significant, the site is already disturbed

-Possible siltation problems if construction phase storm water management is not implemented

Socio-Economical Environment:

- Waste management;
- Temporary disruption of services and accesses to surrounding properties;
- Noise pollution;
- Visual pollution;
- Safety and security problems;
- Dangerous conditions on roads;
- Dust pollution;
- Dangerous conditions on and around site (i.e. dangerous excavations)

Positive Impacts:

Bio-Physical Environment:

- Rehabilitation of disturbed areas and coverage of exposed areas;
- Implementation of an EMP that supplies some guidelines for development

Socio-Economical Environment:

- Creation of temporary jobs;
- Economical advantages to surrounding businesses (i.e. filling station, hardware stores, food outlets etc.);

Institutional Environment:

- Not significant

Operational Phase:

Negative Impacts:

Bio-Physical Environment:

- Implementation of indigenous urban landscaping

Socio-Economical Environment:

- Noise pollution (higher than the acceptable levels for a residential development);
- Visual pollution (if not well planned and managed);
- Increased traffic (lighter vehicle and heavy vehicle traffic)

Institutional Environment:

- Not significant. A commercial/ retail development has already been approved on the study area. A residential development will not be in line with the approved land-use rights.

Positive Impacts:

Bio-Physical Environment:

- Implementation of an EMP that supplies some guidelines for development

Socio-Economical Environment:

- Creation of permanent and temporary jobs;
- Availability of upmarket industrial facilities in the area;
- Increase/ decrease of surrounding property values;
- Installation of bulk services and infrastructure for the larger area. Will make it possible for smaller developments to connect to municipal services and to get off the ground;
- Upgrading of services and surrounding roads;
- Rates and taxes payable to the local authority

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Institutional Environment:

- A commercial/ retail development has already been approved on the study area. A residential development will not be in line with the approved land-use rights.

Alternative A3

Not applicable

No-go alternative (compulsory)

The "No-Go" alternative

The study area currently appears neglected and the rugby club made the land available to developers for development purposes. The rugby club does not have the funds to maintain the study area and it is currently a safety risk and a maintenance burden.

When looking at the current overgrown and neglected state of the riparian area of the Foxhill spruit which borders the study area, it is clear that the authorities also lack the capacity to maintain and police open spaces in the area. The management of the study area as an open space area (this is currently the case) is therefore not an option.

From a social point of view, the undeveloped and neglected site can become a security risk. Sites that have been earmarked for development and that already have development rights in place: can easily become neglected if it takes long to get the development off the ground. The fact that a dead person was found on the study area during one of the specialist's site visits proves the current security risks.

In the case of the specific study area, the "no-go" area is not regarded as a viable alternative.

8. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to

| | |
|-----|----|
| YES | NO |
| X | |

make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner).

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

if "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorization that may be granted by the competent authority in respect of the application:

- Mitigation measures, in the form of the EMP (**Appendix F**), must be implemented during the construction and operational phases;
- The EMP and ROD must be implemented by the contractor and/or any sub-contractors;
- An onsite ECO (Environmental Control Officer) must be appointed to monitor the implementation of the EMP;
- Environmental monitoring must be conducted as specified in the EMP;
- External environmental monitoring must be conducted to ensure overall compliance

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Basic Assessment Report

- with legislative requirements and the EMP;
- A Stormwater Management Plan must be compiled by the appointed engineer and implemented during construction and operational phases;
- The Site Development Plan (SDP) and Landscape development Plan (LDP) should be approved by the Local Authority;
- No snaring or hunting of animals during the construction phase;
- If during construction any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found, the operations must be stopped and a qualified archaeologist or SAHRA must be contacted immediately for an assessment of the find;
- After clearing of the vegetation the site should be protected against erosion;
- Proper compaction must be executed to prevent settlements from taking place;
- Foundation recommendations made by the engineer must be adhered to;
- The safety and security of the people in the surrounding area are important and must be taken in to consideration during the construction phase;
- Specific roads must be allocated for the use by construction vehicles and photos must be taken prior to construction in order to determine if any damage has been done. Upgrading of the roads is a prerequisite (if so required according to the traffic engineer);
- The developer/engineers must make sure that sufficient services are available;
- Local people must be employed;
- All waste must be disposed of at a registered waste disposal site;
- The applicant must apply for the necessary section 21 Water Use Licenses and supply proof of such application to KZNDAE; and
- Rehabilitation must be done correctly and to the satisfaction of the ECO

SECTION G: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Public Participation

Appendix F: Final Environmental Management Programme (EMPr)

Appendix G: Other information

Appendix A:

Site plan

| | |
|-------------|--|
| DATE | |
| PROJECT | |
| CLIENT | |
| SCALE | |
| DRAWN BY | |
| CHECKED BY | |
| APPROVED BY | |

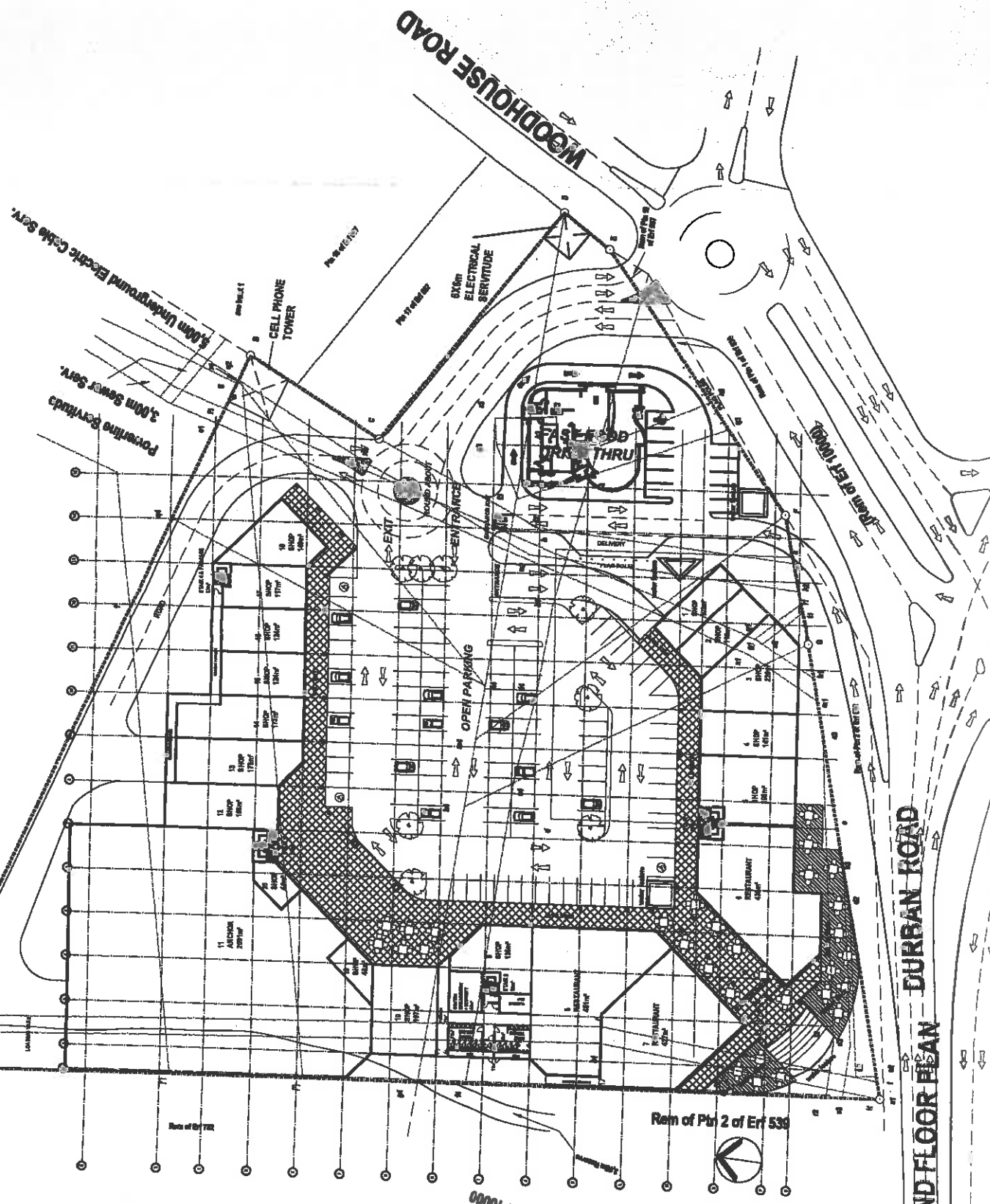
NEW PROPOSED
WOODHOUSE SHIPPING CENTRE
ON PORTION 1 & 4 ERF 4341
PETERMARITZBURG - FT

COPYRIGHT RESERVE

ROOCCERMAN
+ PARTNERS
ARCHITECTS

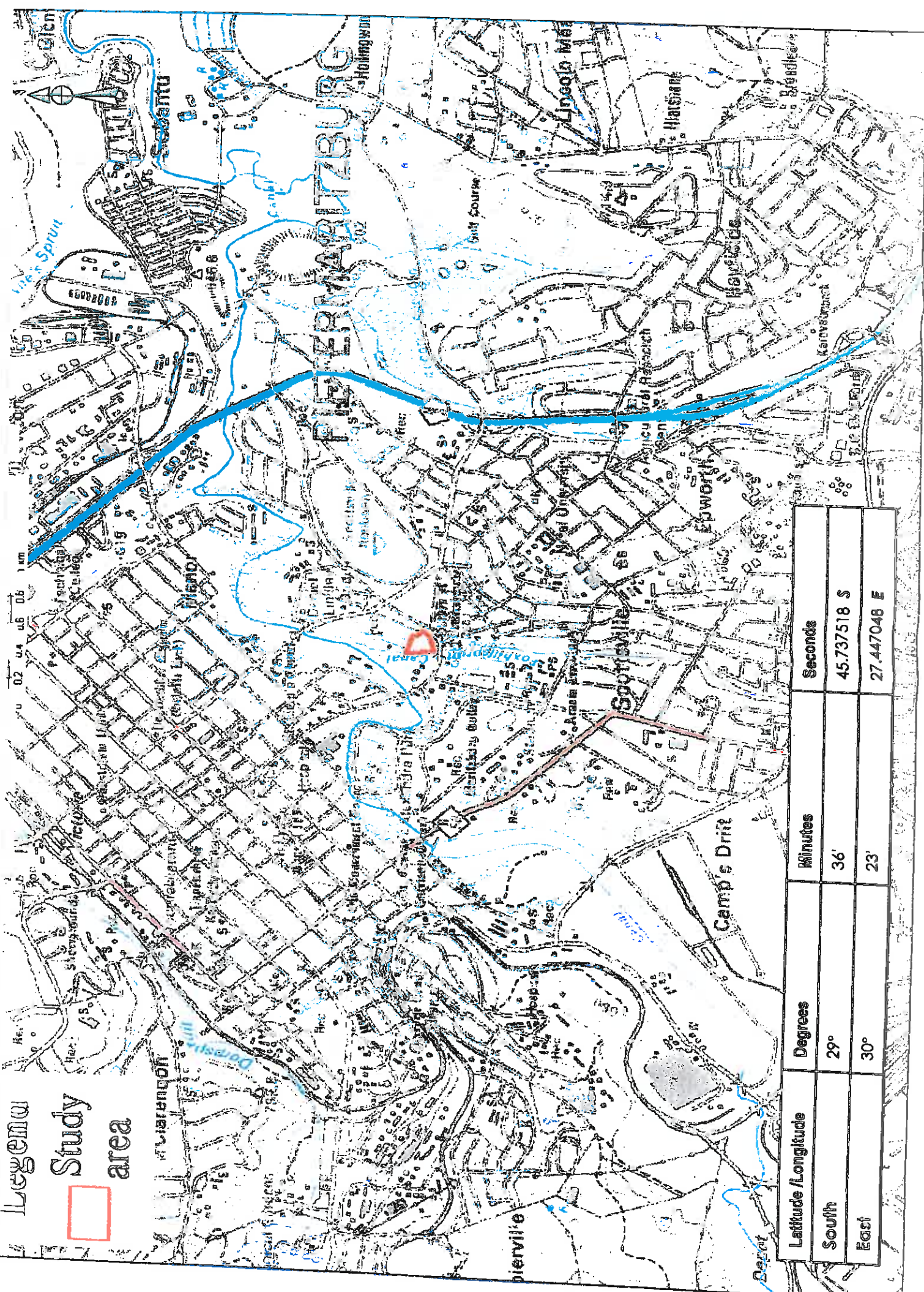
GROUND FLOOR PLAN

| | |
|----------|--|
| NO. | |
| DATE | |
| BY | |
| FOR | |
| SCALE | |
| PROJECT | |
| CLIENT | |
| LOCATION | |
| DATE | |



GROUND FLOOR PLAN

1:250



Legend
 Study area

| Latitude / Longitude | Degrees | Minutes | Seconds |
|----------------------|---------|---------|-------------|
| South | 29° | 36' | 45.737518 S |
| East | 30° | 23' | 27.447048 E |

AFRICON CONSULTING

Professional Services in Development

Africon Engineering International (Pty) Limited Reg No 93/05435/07



Our reference : K101(7028)/COR/RJJ/sv

03 March 1999

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Training and Communications

04/03/99
8:15

Sirs

PIETERMARITZBURG : RIVERSIDE DEVELOPMENT : FLOODLINES

Large sections of the proposed development lie within the flood plain of the Duzi River. The sections in question are the new shopping centre on the Woodburn fields and the proposed hotel on the Collegians Club grounds.

The area under discussion has been flooded on various occasions, the most notably being the floods of 1987.

Various floodline calculations have been commissioned on the Duzi River, the latest being a study by SWK Consulting Engineers in September 1995. The study was commissioned by Umgeni Water when a decision was taken to lower the dam wall of the Henley Dam, upstream of Pietermaritzburg.

The dam wall has subsequently been lowered and it is, therefore, believed that this study provides the best information with regards to the floodlines under the present land use in the Duzi River catchment.

The floodlines were calculated using the IFMS (Integrated Flood Management Systems) software, which is based on the well-known HEC2 model. The section of river between Henley Dam and the Darville Water Works was modelled by SWK. Detailed cross-sections at strategic points and major changes in the river flow direction was used as input to the model. The calculated flows were also calibrated with recorded flood volumes. Inlet and outlet conditions at all structures crossing the river were included in the model.

Extracts from the SWK report indicating the positions of the cross-sections applicable to the development (10930 – Woodburn site, and 10688 – Collegians Club site) and the 1:20, 1:50 and 1:100 flood levels are attached to this report.

to page 2/

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Local Directors: AJ Louw (Regional Manager), RJ Joubert (Pietermaritzburg Office Manager)
Local Associate: SR Kerr
Member of the South African Association of Consulting Engineers *Non-executive director **Alternate non-executive director *Malaysian

Current legislation requires that no development takes place within the 1:50 year floodline (level 620,14 msl) and that special conditions apply to developments within the 1:100 year floodline (621,12 msl). For reference purposes the Medi-Clinic Private Hospital across the river is built on a platform at a level of approximately 621,5 msl and has not been affected by any recent floods.

As discussed with yourselves the possibility of building the shopping centre and hotel on columns above the floodlines is a viable option. This solution will have a minimal impact on the existing floodline (if any) and as an added benefit the space below the hotel and shopping centres can be used for parking.

Considering the small level difference between the 1:50 and 1:100 year floodlines it is recommended that consideration be given to building the structures at the 1:100 year floodline levels.

We trust the above is of use to yourselves.

Yours faithfully



RJ JOUBERT
pp AFRICON CONSULTING

Enclosures

1/20 year

I F M S - INTEGRATED FLOOD MANAGEMENT SYSTEM - STEADY STATE MODEL
FLOOD LINES COMPUTATIONS
Developed by Dr P. Kolovopoulos
Version 2.01

Program is licensed to: SCOTT WILSON KIRKPATRICK
Serial number: 1

Output file: d:\flood\duzi\duz.RES

| Chainage | Water lvl | Crit. lvl | Bed level | Energy lvl | Froude | Flow |
|------------------------------------------------------------------|-----------|-----------|-----------|------------|--------|--------|
| 500.00 | 598.20 | 598.20 | 591.84 | 599.08 | 1.08 | 670.00 |
| 1000.00 | 599.42 | 595.73 | 590.35 | 599.78 | 0.19 | 670.00 |
| 1057.00 | 599.66 | 598.19 | 591.84 | 599.87 | 0.15 | 670.00 |
| 1350.00 | 599.97 | 595.70 | 590.35 | 600.26 | 0.14 | 670.00 |
| 1500.00 | 601.02 | 601.02 | 594.63 | 602.05 | 1.10 | 670.00 |
| 2000.00 | 602.29 | 599.67 | 594.67 | 602.60 | 0.48 | 670.02 |
| 2240.00 | 602.72 | 599.54 | 594.67 | 602.89 | 0.23 | 650.00 |
| 2500.00 | 602.89 | 601.19 | 594.31 | 603.25 | 0.28 | 650.00 |
| 2540.00 | 603.03 | 601.12 | 594.31 | 603.35 | 0.25 | 650.00 |
| 3000.00 | 603.81 | 601.54 | 594.56 | 604.02 | 0.15 | 650.00 |
| 4700.00 | 604.49 | 602.75 | 597.07 | 604.50 | 0.01 | 650.00 |
| 6600.00 | 604.63 | 603.91 | 598.33 | 605.60 | 0.77 | 650.00 |
| 7500.00 | 608.00 | 606.17 | 603.22 | 608.19 | 0.14 | 560.00 |
| 7503.00 | 608.00 | 605.71 | 601.85 | 608.20 | 0.12 | 560.00 |
| 7517.00 | 607.91 | 606.44 | 602.71 | 608.26 | 0.26 | 560.00 |
| 8000.00 | 609.55 | 608.89 | 604.87 | 610.06 | 0.50 | 560.02 |
| 8050.00 | 609.97 | 609.16 | 605.46 | 610.41 | 0.37 | 560.00 |
| 8072.00 | 610.13 | 608.24 | 605.46 | 610.46 | 0.16 | 560.00 |
| 8072.20 | 610.52 | 608.24 | 606.00 | 610.80 | 0.12 | 560.00 |
| 8098.00 | 608.40 | 609.12 | 606.88 | 610.83 | 3.31 | 560.00 |
| 8100.00 | 610.11 | 610.28 | 606.88 | 611.27 | 1.40 | 560.00 |
| 8190.00 | 610.74 | 610.74 | 607.36 | 611.71 | 1.00 | 560.00 |
| 8990.00 | 615.56 | 615.31 | 610.33 | 617.11 | 1.00 | 560.00 |
| 9390.00 | 617.57 | 616.83 | 610.48 | 617.69 | 0.13 | 560.00 |
| 9790.00 | 617.76 | 615.96 | 611.67 | 618.11 | 0.49 | 560.00 |
| 10290.00 | 618.25 | 616.76 | 612.52 | 618.82 | 1.00 | 560.00 |
| 10688.00 | 619.05 | 617.07 | 613.42 | 619.38 | 0.17 | 560.00 |
| 10690.00 | 619.10 | 617.03 | 613.42 | 619.39 | 0.15 | 560.00 |
| 10692.00 | 619.14 | 616.74 | 613.42 | 619.40 | 0.13 | 560.00 |
| 10692.20 | 619.01 | 616.74 | 614.00 | 619.29 | 0.14 | 560.00 |
| 10698.00 | 619.16 | 616.74 | 613.42 | 619.42 | 0.13 | 560.00 |
| 10700.00 | 619.14 | 616.87 | 613.51 | 619.43 | 0.15 | 560.00 |
| 10930.00 | 619.29 | 618.11 | 614.50 | 619.68 | 1.00 | 560.00 |
| 11422.00 | 620.84 | 621.33 | 616.82 | 623.04 | 1.00 | 560.00 |
| 11422.20 | 621.33 | 621.33 | 617.00 | 622.92 | 1.00 | 560.00 |
| 11428.00 | 622.26 | 621.33 | 616.82 | 623.18 | 0.52 | 560.00 |
| 11430.00 | 622.88 | 621.47 | 616.82 | 623.25 | 0.30 | 560.00 |
| 11435.00 | 622.89 | 621.46 | 616.82 | 623.26 | 0.29 | 560.00 |
| 11444.00 | 622.72 | 621.36 | 617.03 | 623.46 | 0.39 | 560.00 |
| 11444.20 | 622.39 | 621.33 | 617.00 | 623.25 | 0.47 | 560.00 |
| 11449.00 | 622.84 | 621.36 | 617.03 | 623.53 | 0.36 | 560.00 |
| 11450.00 | 623.10 | 621.05 | 617.03 | 623.56 | 0.33 | 560.00 |
| 11510.00 | 623.16 | 621.71 | 616.89 | 623.71 | 0.52 | 560.00 |
| 11960.00 | 624.13 | 623.04 | 617.96 | 624.46 | 0.31 | 560.00 |
| 12104.00 | 624.27 | 621.76 | 616.34 | 624.67 | 0.27 | 560.00 |
| 12110.00 | 624.16 | 621.54 | 616.34 | 624.82 | 0.23 | 560.00 |
| Bridge Opening-->Pressure flow Flow : 560.00 Velocity : 3.50 | | | | | | |
| 12112.00 | 624.60 | 621.54 | 616.34 | 625.17 | 0.19 | 560.00 |
| 12575.00 | 624.90 | 623.34 | 618.27 | 625.68 | 0.46 | 560.00 |
| 12595.00 | 625.58 | 623.34 | 618.27 | 626.09 | 0.50 | 560.00 |
| 12600.00 | 625.49 | 623.04 | 618.27 | 626.20 | 0.25 | 560.00 |
| 12600.20 | 625.61 | 622.77 | 618.00 | 626.23 | 0.21 | 560.00 |

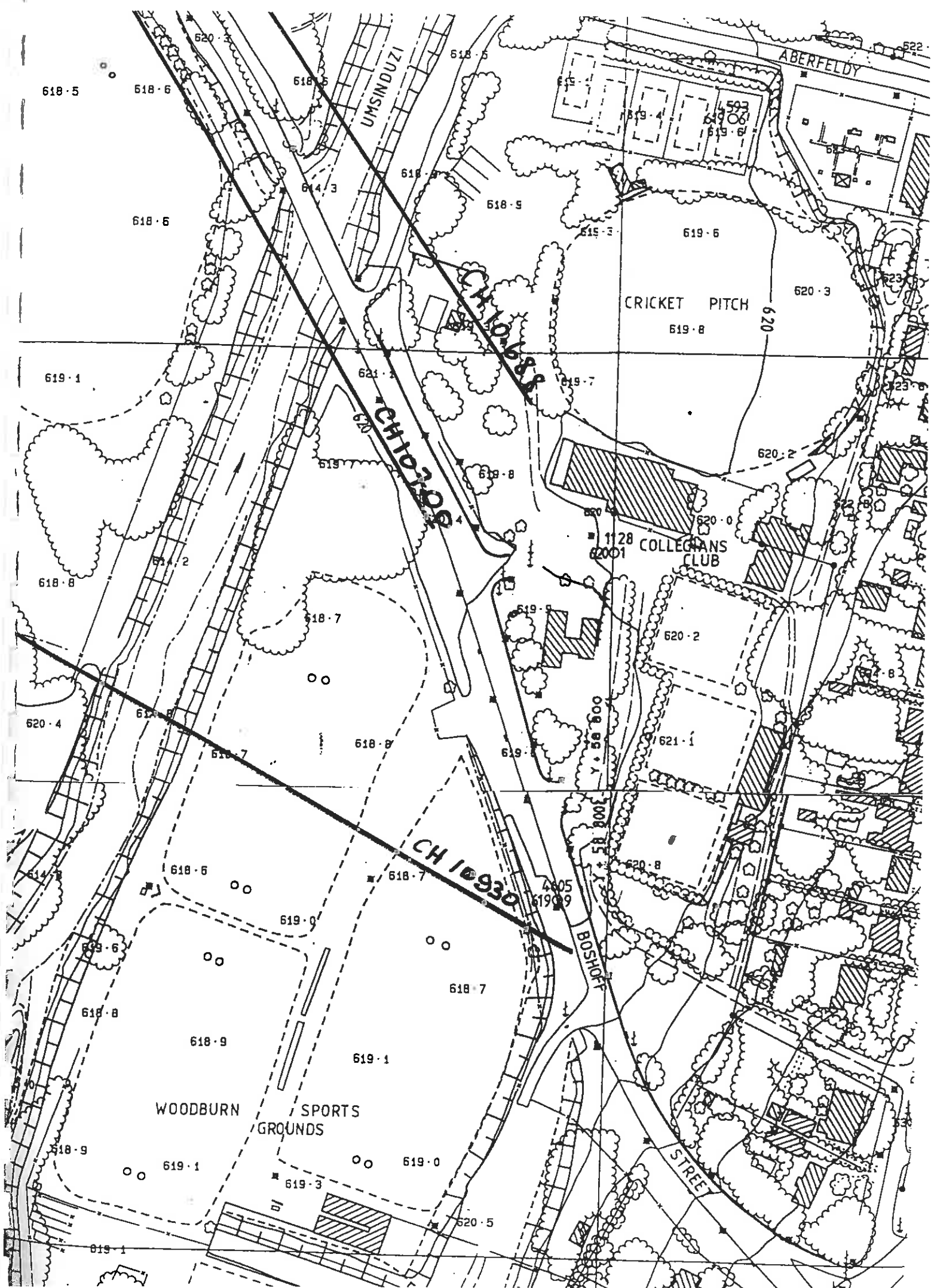
1/50 year

I F M S - INTEGRATED FLOOD MANAGEMENT SYSTEM - STEADY STATE MODEL
FLOOD LINES COMPUTATIONS
Developed by Dr P. Kolovopoulos
Version 2.01

Program is licensed to: SCOTT WILSON KIRKPATRICK
Serial number: 1

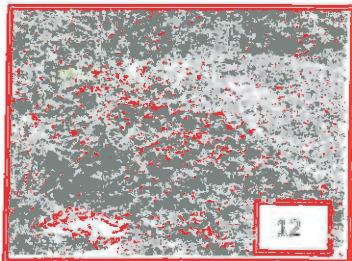
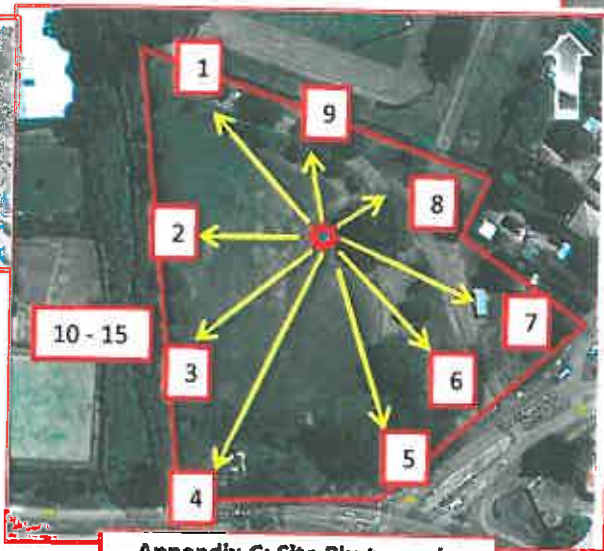
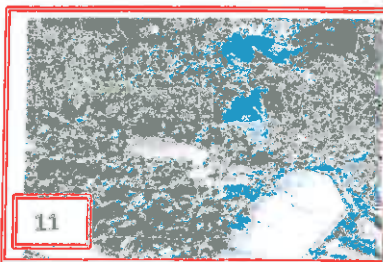
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| Chainage | Water lvl | Crit. lvl | Bed level | Energy lvl | Froude | Flow |
|--------------------------------|-----------|-----------|---------------|-----------------|--------|--------|
| 500.00 | 598.72 | 598.72 | 591.84 | 599.67 | 0.96 | 930.00 |
| 1000.00 | 599.96 | 596.71 | 590.35 | 600.50 | 0.27 | 930.00 |
| 1057.00 | 600.39 | 598.70 | 591.84 | 600.62 | 0.15 | 930.00 |
| 1350.00 | 600.68 | 596.67 | 590.35 | 601.10 | 0.22 | 930.00 |
| 1500.00 | 601.66 | 601.66 | 594.63 | 602.72 | 1.00 | 930.00 |
| 2000.00 | 603.00 | 600.69 | 594.67 | 603.24 | 0.30 | 930.00 |
| 2240.00 | 603.33 | 600.53 | 594.67 | 603.49 | 0.17 | 900.00 |
| 2500.00 | 603.41 | 602.00 | 594.31 | 603.91 | 0.40 | 900.00 |
| 2540.00 | 603.60 | 601.95 | 594.31 | 604.03 | 0.38 | 900.00 |
| 3000.00 | 604.57 | 602.24 | 594.56 | 604.82 | 0.16 | 900.01 |
| 4700.00 | 605.21 | 602.86 | 597.07 | 605.22 | 0.01 | 900.00 |
| 6600.00 | 605.21 | 605.04 | 598.33 | 606.47 | 1.00 | 900.00 |
| 7500.00 | 608.81 | 606.68 | 603.22 | 609.02 | 0.14 | 780.00 |
| 7503.00 | 608.79 | 606.32 | 601.85 | 609.04 | 0.13 | 780.00 |
| 7517.00 | 608.71 | 607.10 | 602.71 | 609.10 | 0.24 | 780.00 |
| 8000.00 | 610.24 | 609.50 | 604.87 | 610.78 | 0.47 | 780.00 |
| 8050.00 | 610.58 | 609.69 | 605.46 | 611.11 | 0.39 | 780.00 |
| 8072.00 | 610.62 | 608.79 | 605.46 | 611.13 | 0.23 | 780.00 |
| 8072.20 | 610.52 | 608.79 | 606.00 | 611.05 | 0.24 | 780.00 |
| 8098.00 | 608.88 | 609.67 | 606.88 | 611.61 | 2.82 | 780.00 |
| 8100.00 | 610.47 | 610.90 | 606.88 | 612.02 | 1.81 | 780.00 |
| 8190.00 | 610.74 | 611.26 | 607.36 | 612.62 | 1.91 | 780.00 |
| 8990.00 | 616.90 | 616.90 | 610.33 | 618.12 | 1.16 | 780.00 |
| 9390.00 | 618.41 | 617.09 | 610.48 | 618.50 | 0.07 | 780.00 |
| 9790.00 | 618.52 | 616.79 | 611.67 | 618.79 | 0.47 | 780.00 |
| 10290.00 | 618.85 | 618.55 | 612.52 | 619.37 | 0.66 | 780.00 |
| 10688.00 | 619.47 | 617.67 | 613.42 | 620.00 | 0.26 | 780.00 |
| 10690.00 | 619.57 | 617.61 | 613.42 | 620.01 | 0.21 | 780.00 |
| 10692.00 | 619.63 | 617.36 | 613.42 | 620.03 | 0.19 | 780.00 |
| 10692.20 | 619.48 | 617.36 | 614.00 | 619.91 | 0.20 | 780.00 |
| 10698.00 | 619.67 | 617.36 | 613.42 | 620.06 | 0.18 | 780.00 |
| 10700.00 | 619.63 | 617.50 | 613.51 | 620.09 | 0.21 | 780.00 |
| 10930.00 | 620.14 | 619.53 | 614.50 | 620.28 | 0.18 | 780.00 |
| 11422.00 | 621.65 | 622.21 | 616.82 | 624.18 | 1.00 | 780.00 |
| 11422.20 | 622.21 | 622.21 | 617.00 | 624.05 | 1.00 | 780.00 |
| 11428.00 | 623.26 | 622.21 | 616.82 | 624.34 | 0.53 | 780.00 |
| 11430.00 | 624.17 | 622.30 | 616.82 | 624.43 | 0.18 | 780.00 |
| 11435.00 | 624.17 | 622.30 | 616.82 | 624.44 | 0.18 | 780.00 |
| 11444.00 | 623.90 | 622.24 | 617.03 | 624.73 | 0.37 | 780.00 |
| Bridge Opening-->Pressure flow | | | Flow : 780.00 | Velocity : 3.91 | | |
| 11449.00 | 624.51 | 622.24 | 617.03 | 625.15 | 0.25 | 780.00 |
| 11450.00 | 624.87 | 621.83 | 617.03 | 625.19 | 0.20 | 780.00 |
| 11510.00 | 625.08 | 622.60 | 616.89 | 625.25 | 0.13 | 780.00 |
| 11960.00 | 625.31 | 623.56 | 617.96 | 625.55 | 0.22 | 780.00 |
| 12104.00 | 625.34 | 622.95 | 616.34 | 625.73 | 0.21 | 780.00 |
| 12110.00 | 625.34 | 622.95 | 616.34 | 625.77 | 0.32 | 780.00 |
| Bridge Opening-->Pressure flow | | | Flow : 552.48 | Velocity : 3.45 | | |
| 12110.40 | 625.86 | 625.86 | 625.00 | 626.28 | 1.00 | 227.52 |
| 12112.00 | 626.02 | 622.95 | 616.34 | 626.29 | 0.13 | 780.00 |
| 12575.00 | 625.82 | 624.44 | 618.27 | 626.75 | 0.44 | 780.00 |
| 12595.00 | 626.75 | 624.45 | 618.27 | 627.12 | 0.34 | 780.00 |

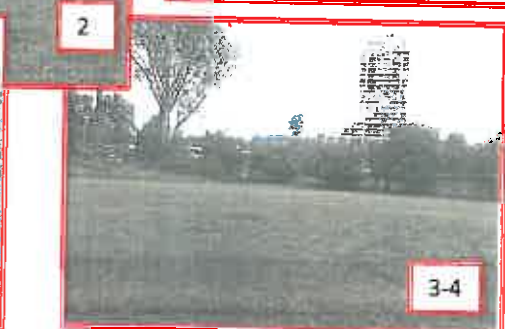
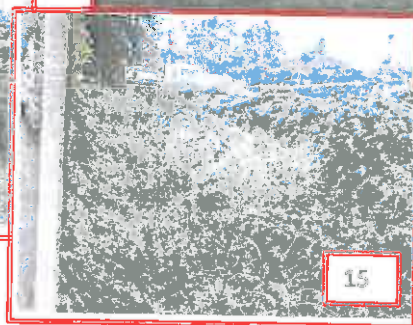
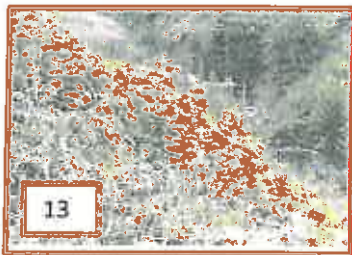


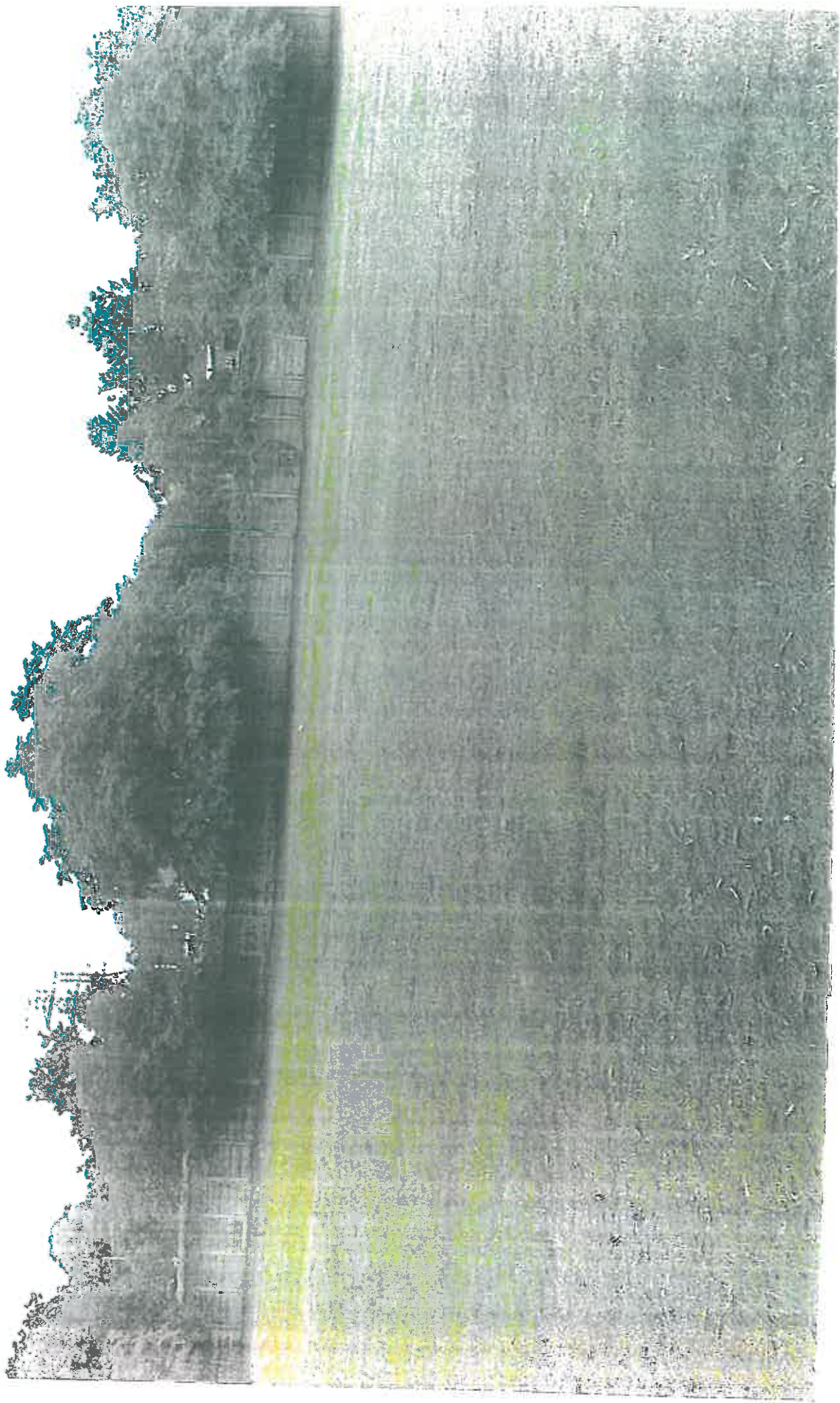
Appendix B:

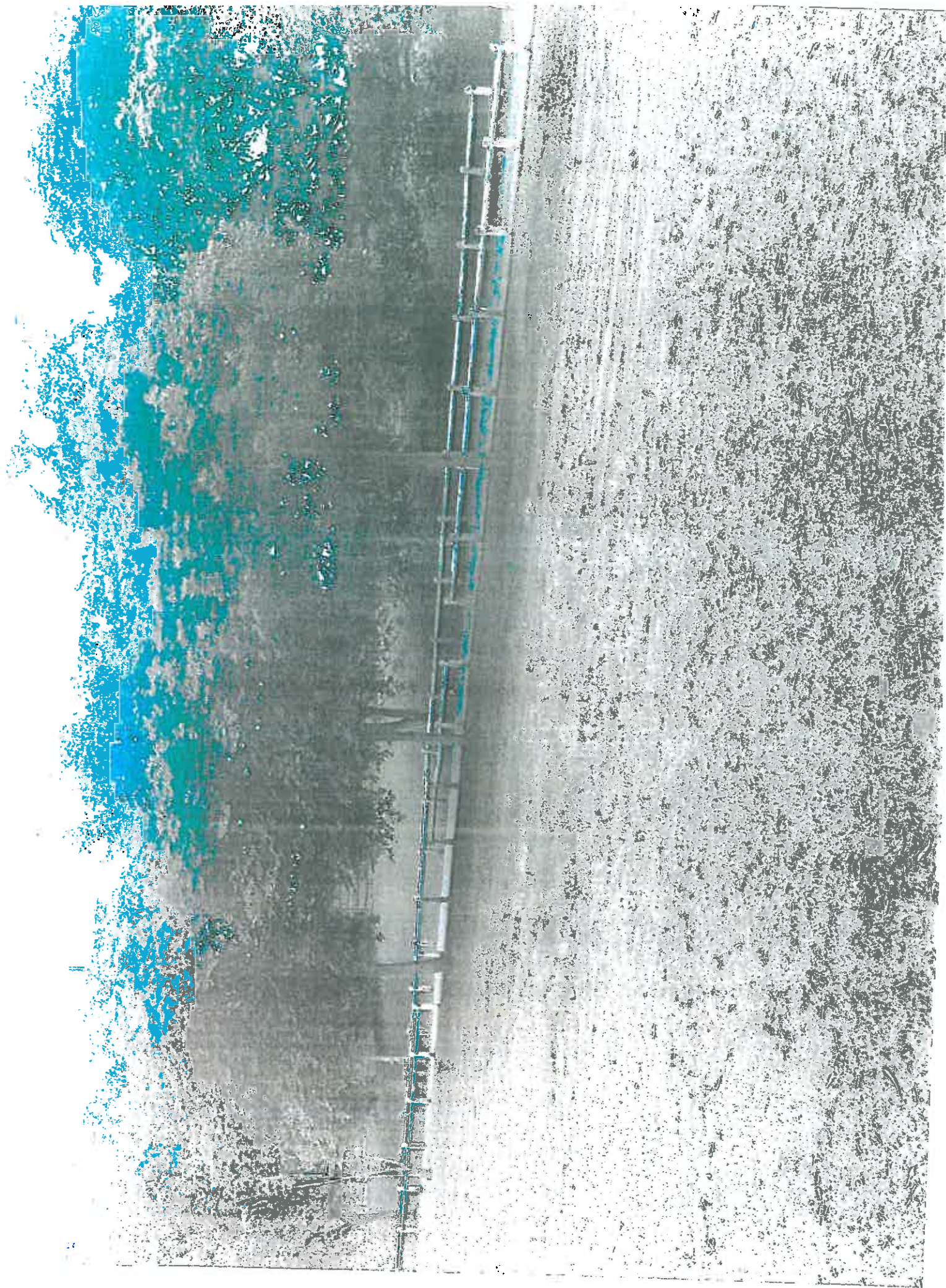
Photographs

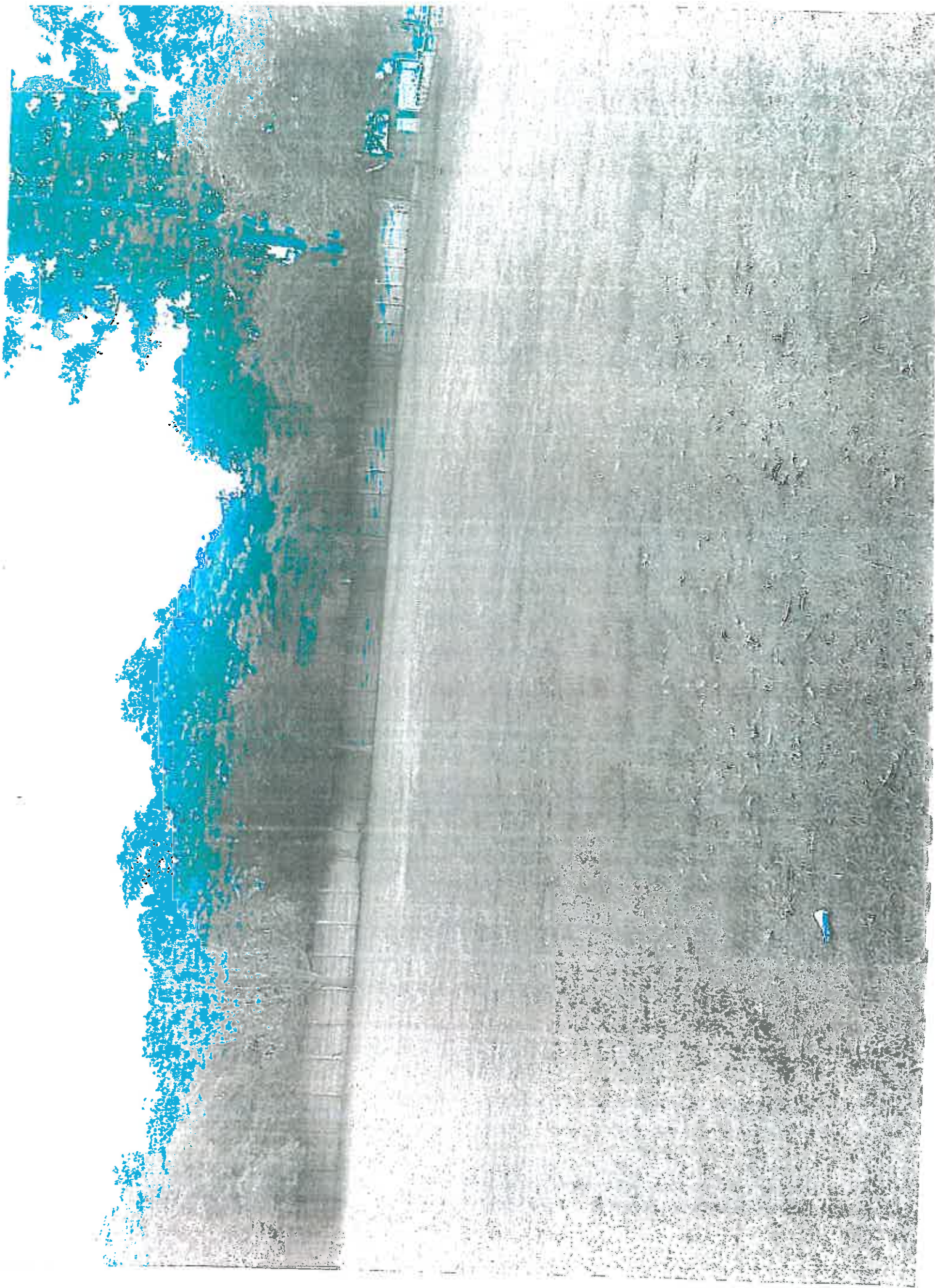


Appendix C: Site Photographs









NEOPOLEN RUGBY STADIUM

011 2023

The World of Temperature Control

ICLISHING
SEPARATION

NEO
011

DAIKIN



HOT
FRIGID

THE RUGBY & HALL

ALL RUGBY BALLS ARE
NO. 001 & 02 OF 743 LBS
1 ALL OF THE 02 OF 743 LBS
DANGER EVERY YEAR
KEEP THEM

THE
011



WOODBURY RUGBY STADIUM

The World of
**Temperature
Control**

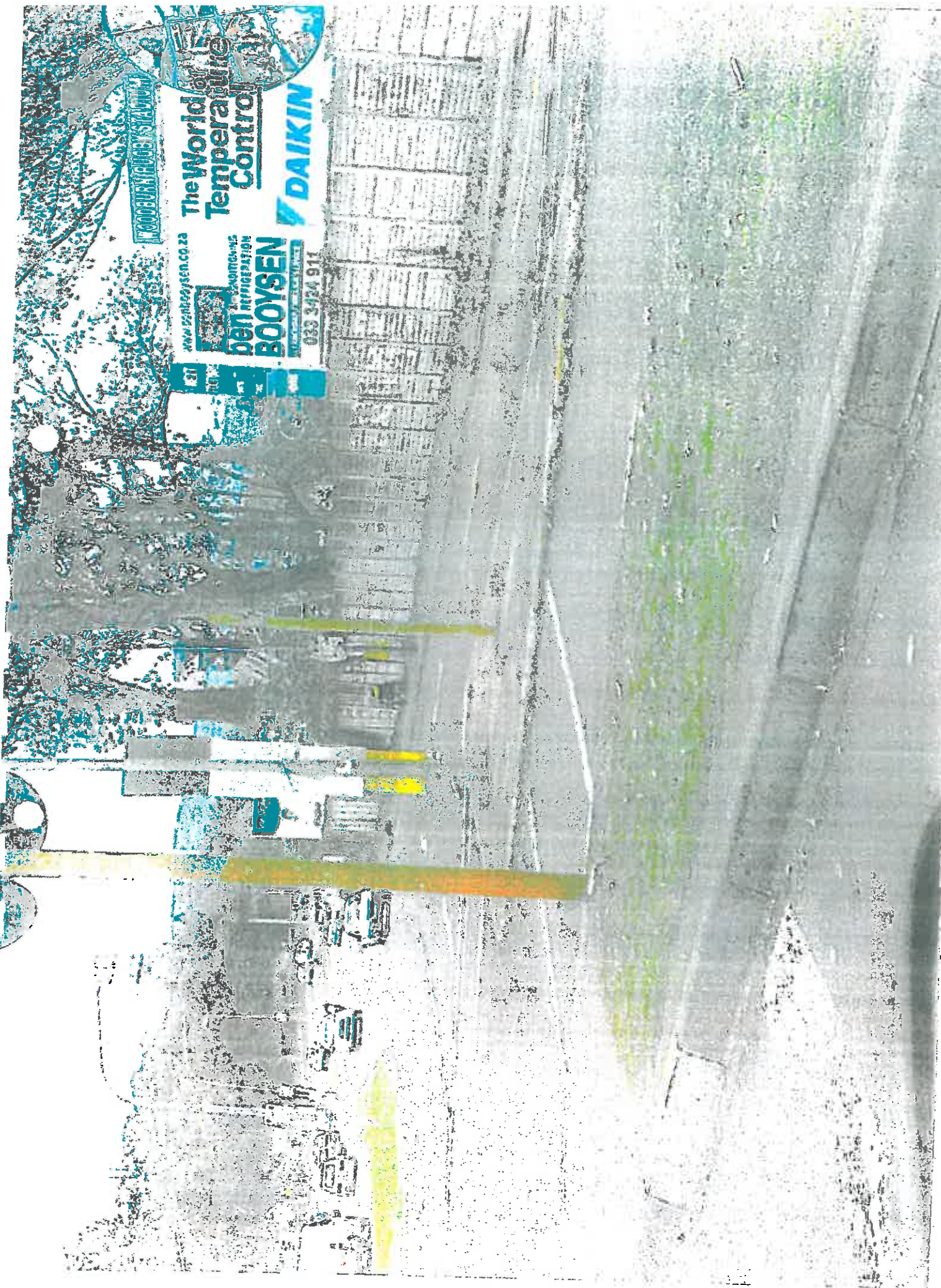
DAIKIN

www.booyesen.co.za

open
REFRIGERATION

BOOYSEN

033 3424 911





POWERADE · Kick 'n Whistle



UNIVERSITY OF MICHIGAN
ANN ARBOR, MI 48106-1000
734-763-1000



Notice is given by the
the Kwazulu-Natal Department of Agriculture, Environmental Affairs & Rural
Development, in terms of regulation no. R543 published in the Government Notice no.
33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107
of 1998) governing Basic Assessment procedures (Notice 1 and 3 - Governing Notice
R544 & R546) for the following activity:

Name of project: Woodburn Boulevard Shopping Centre

Project description: The proposed project will entail the development of 6500m²
shopping Centre in the city of Pietermaritzburg, Kwazulu-Natal.

Property description: The study area is located on the corner of Woodhouse Road and
Alan Paton Drive on Portion 5 of Erf 4346, Pietermaritzburg.

The application was submitted for the following activities in terms of the Government
Notice R. 544, R. 545 & R. 546, 18 June 2010:

| | |
|----------------------|-------------|
| R. 544, 18 June 2010 | Activity 9 |
| R. 544, 18 June 2010 | Activity 11 |
| R. 544, 18 June 2010 | Activity 18 |
| R. 544, 18 June 2010 | Activity 37 |
| R. 544, 18 June 2010 | Activity 39 |

Extent: The total study area is approximately 1.7885 ha in extent.

Name of the proponent: O & T DEVELOPMENT (PTY) LTD

Location: The study area is located on the corner of Woodhouse Road and Alan Paton
Drive on Portion 5 of Erf 4346 Pietermaritzburg. When travelling South on the N3 through
the town of Pietermaritzburg one could take the New England Road exit to the left
follow this road for approximately 1.4 km until reaching Woodhouse Road. The study
area is located on the corner of Woodhouse Road and Alan Paton Drive.

Date of notice: 28 November 2011

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants

George Gericke

P.O. Box 11375

Windsor Gardens, Pietermaritzburg

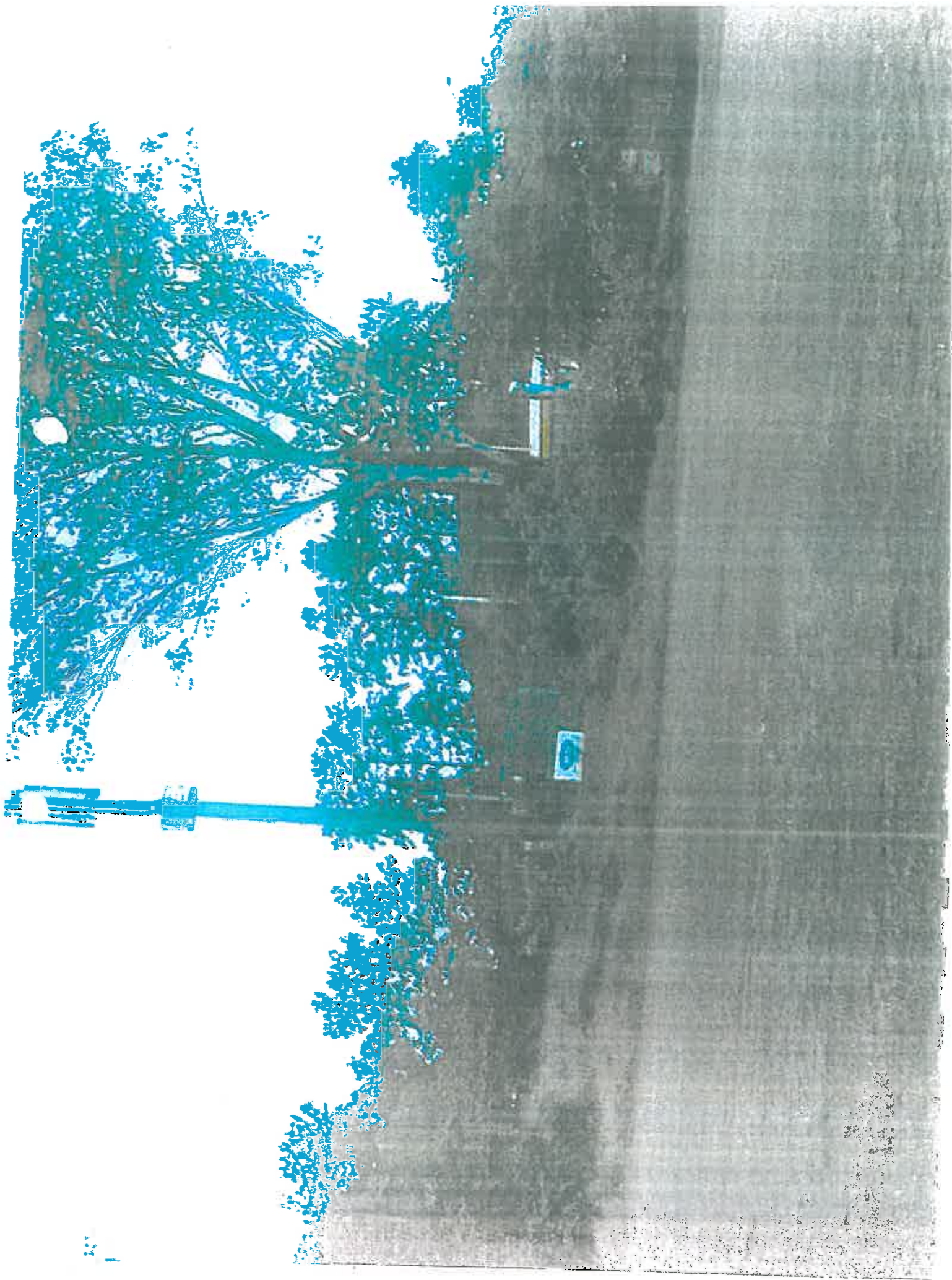
www.bokamoso.net

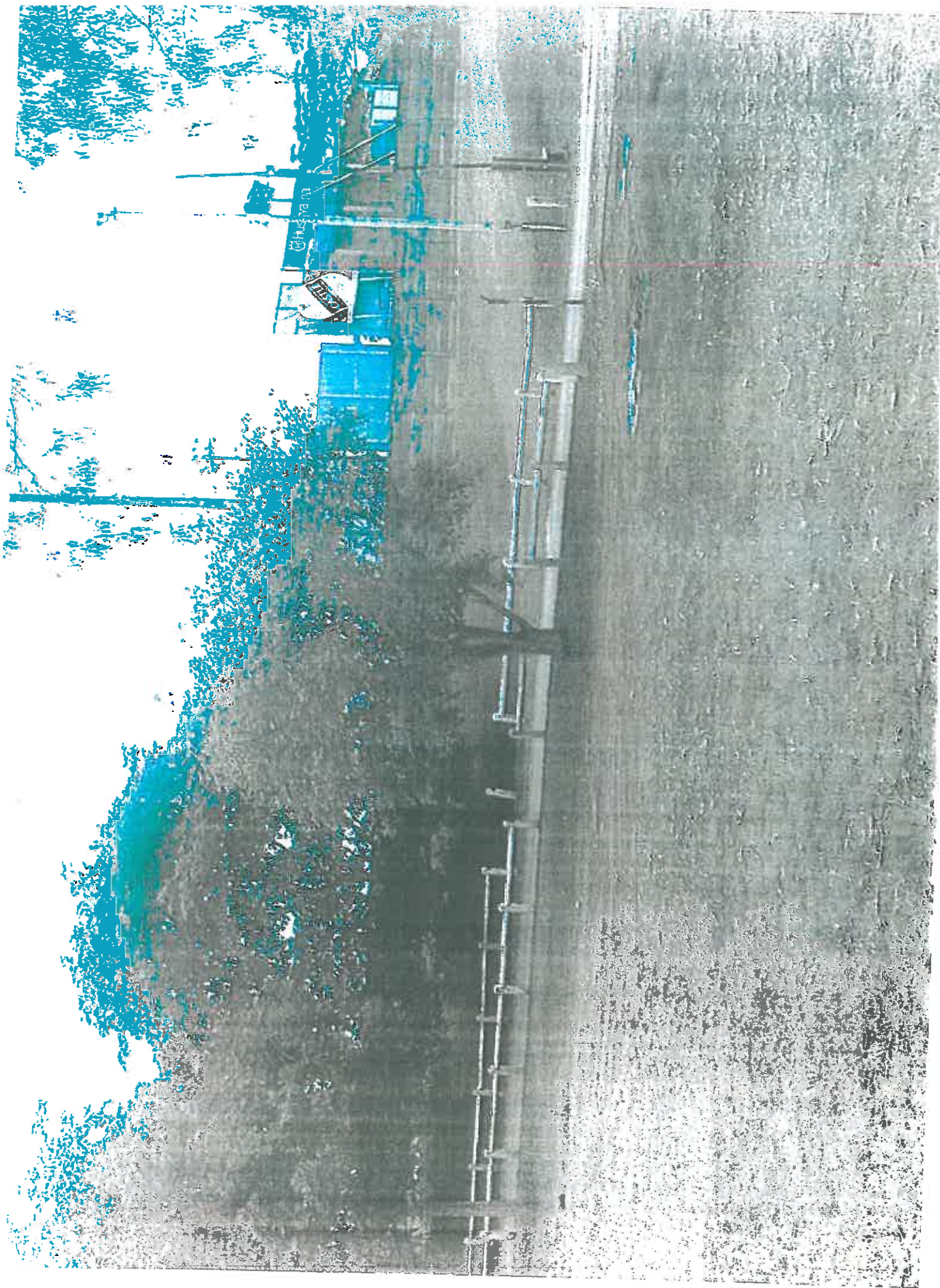
Tel: (012) 346 3810

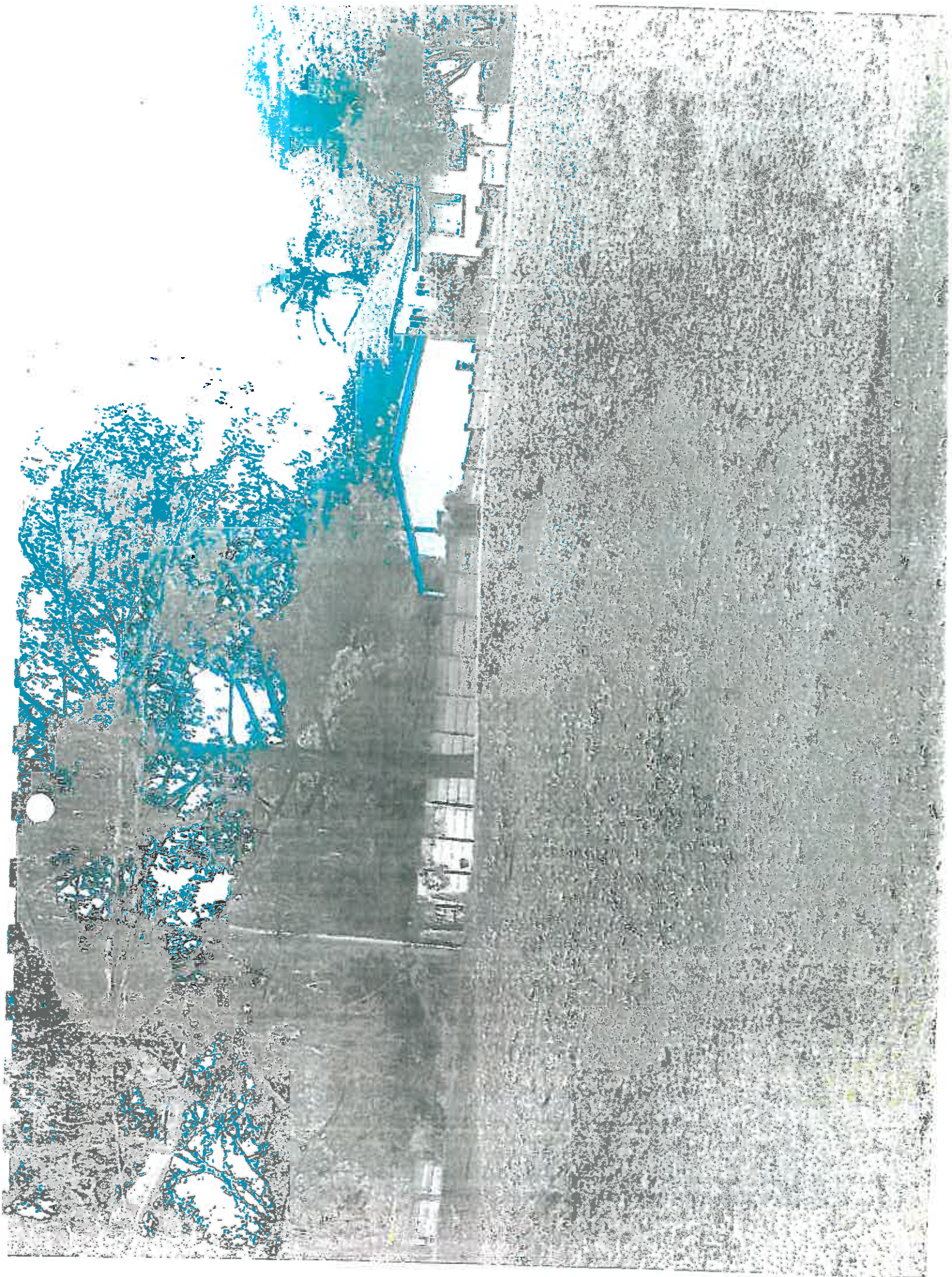
Fax: 086 570 5659

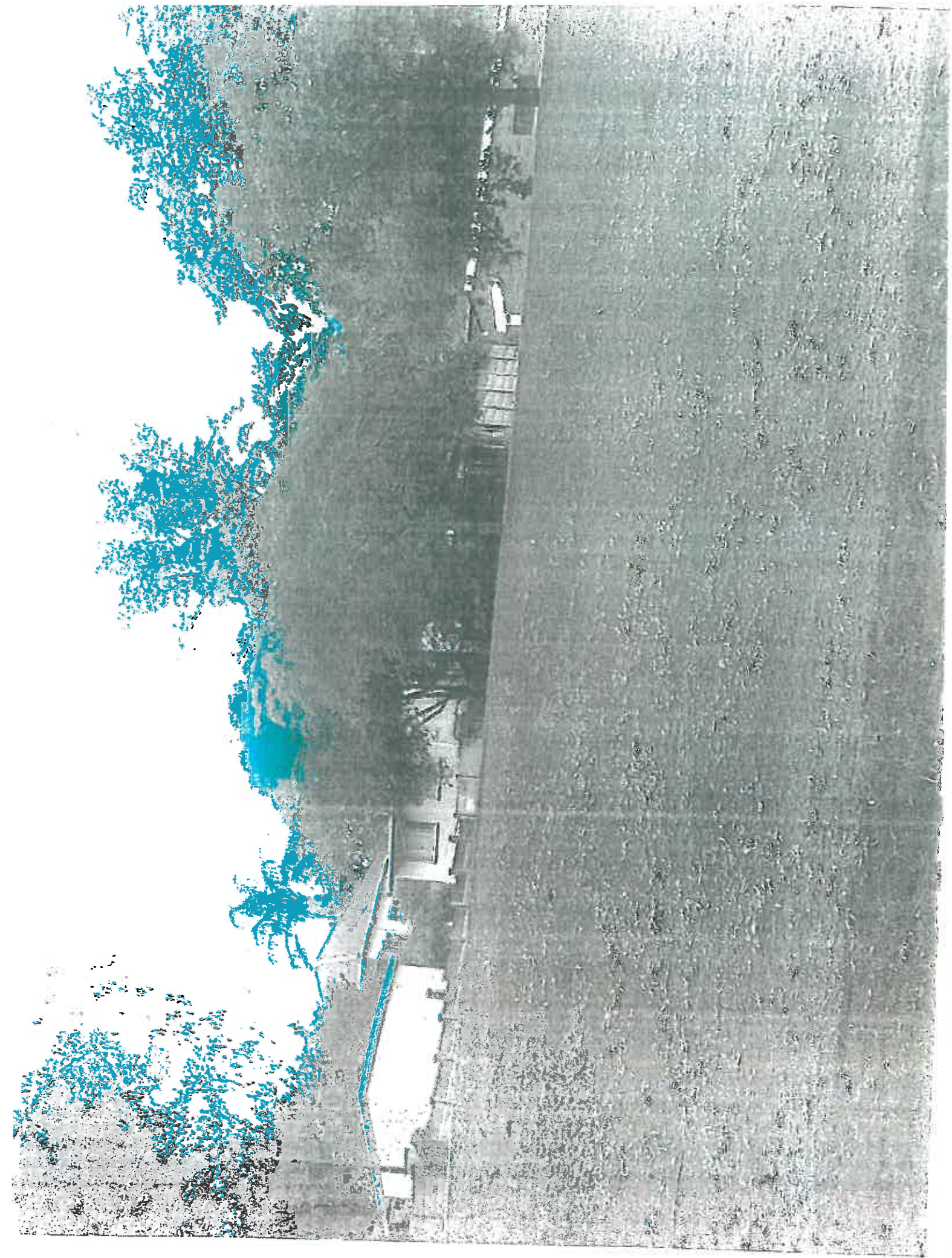
email: lizelleg@mweb.co.za

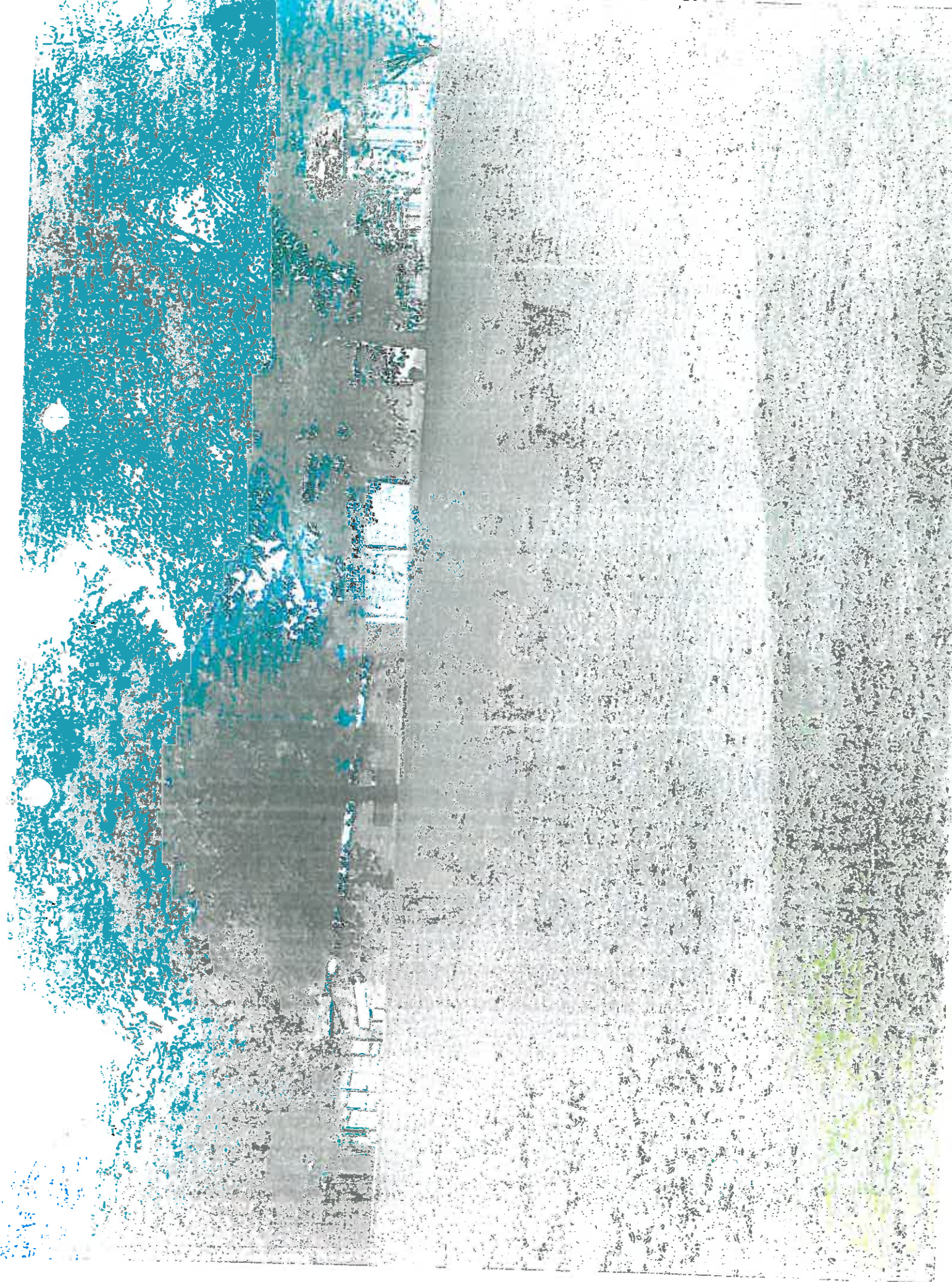
In order to ensure that you are identified as an interested and/or affected party please
submit your name, contact information and interest in the matter, in writing, to the
contact person given above within 40 days of publication of this advertisement.



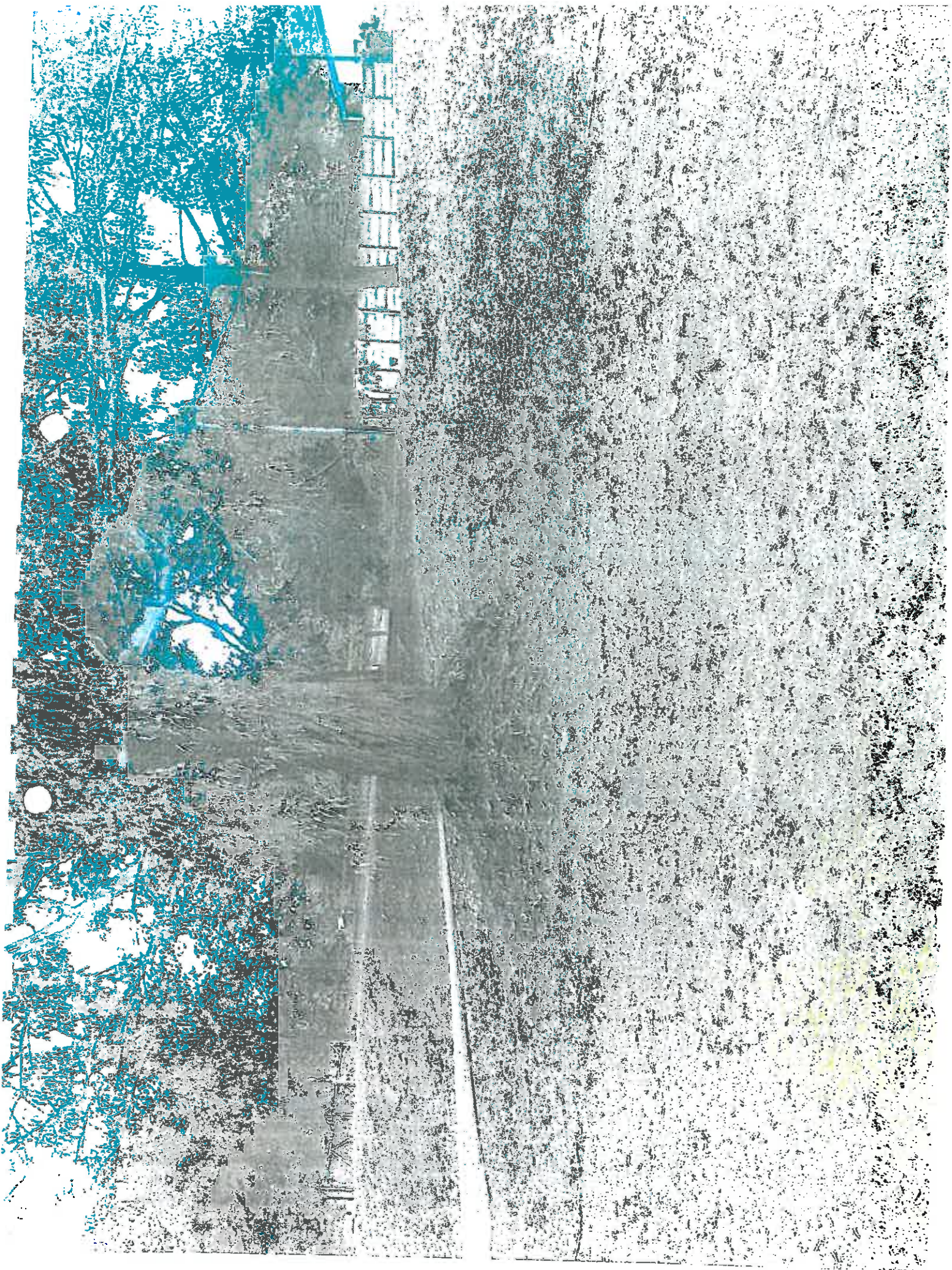


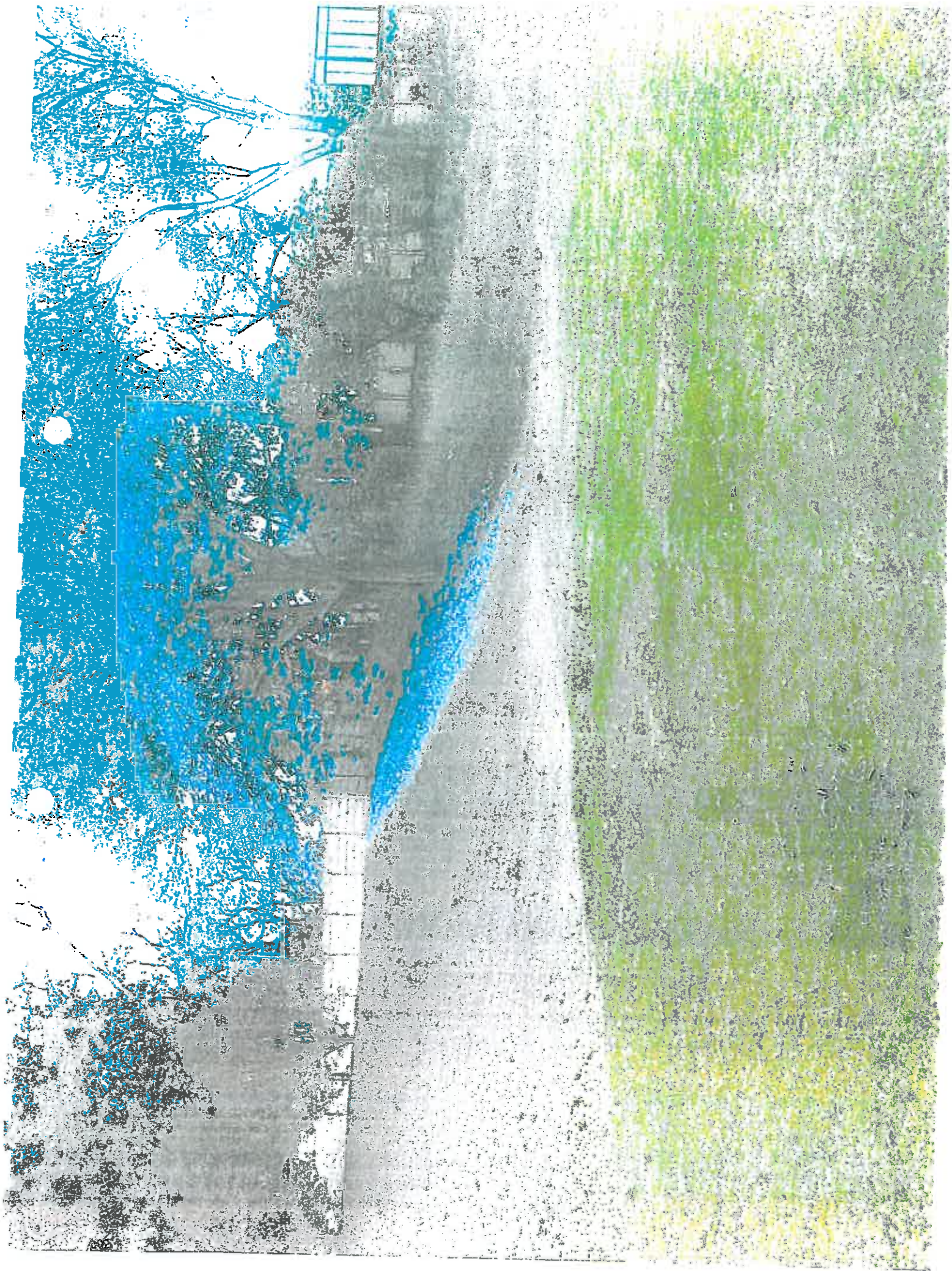


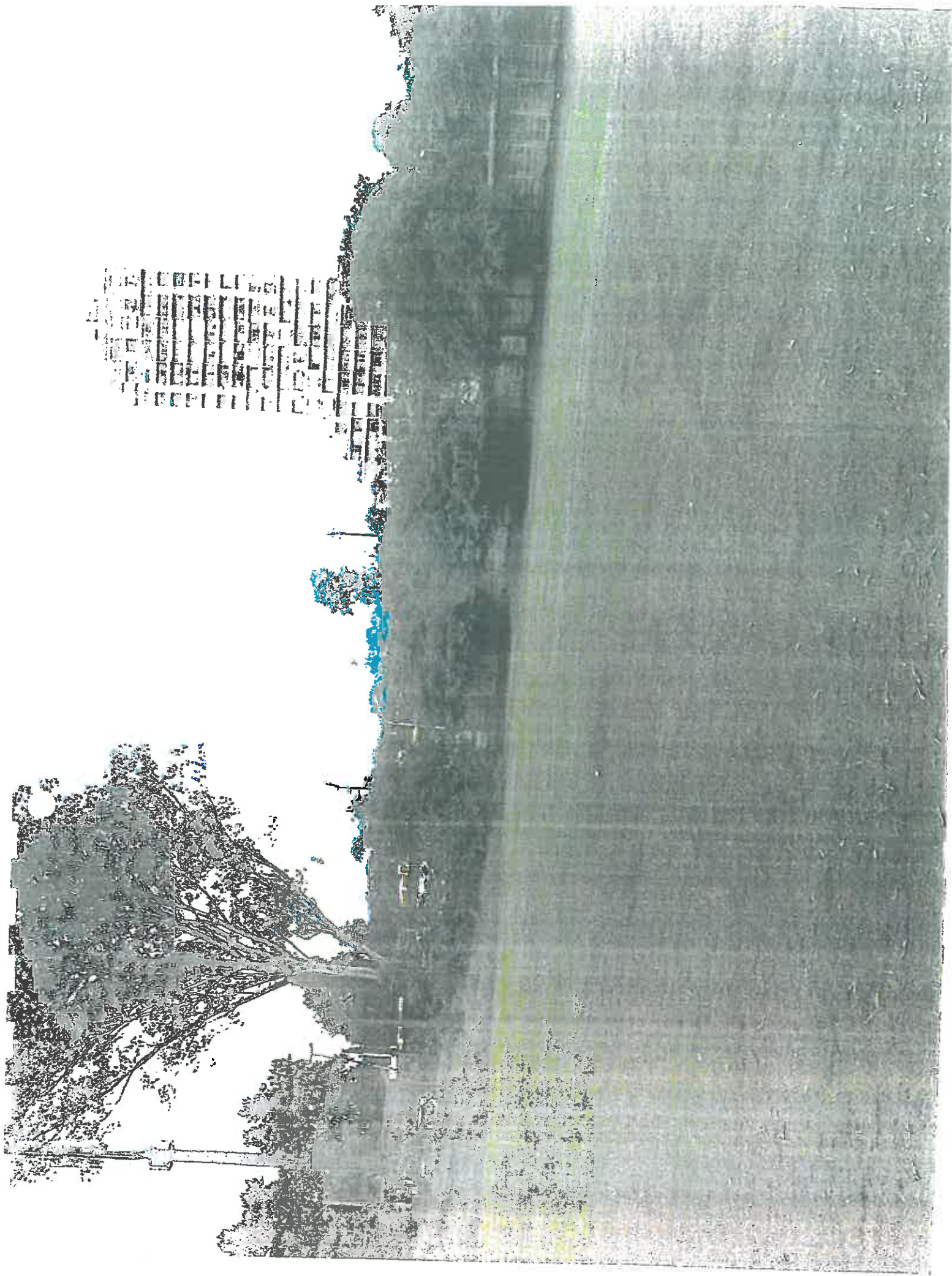


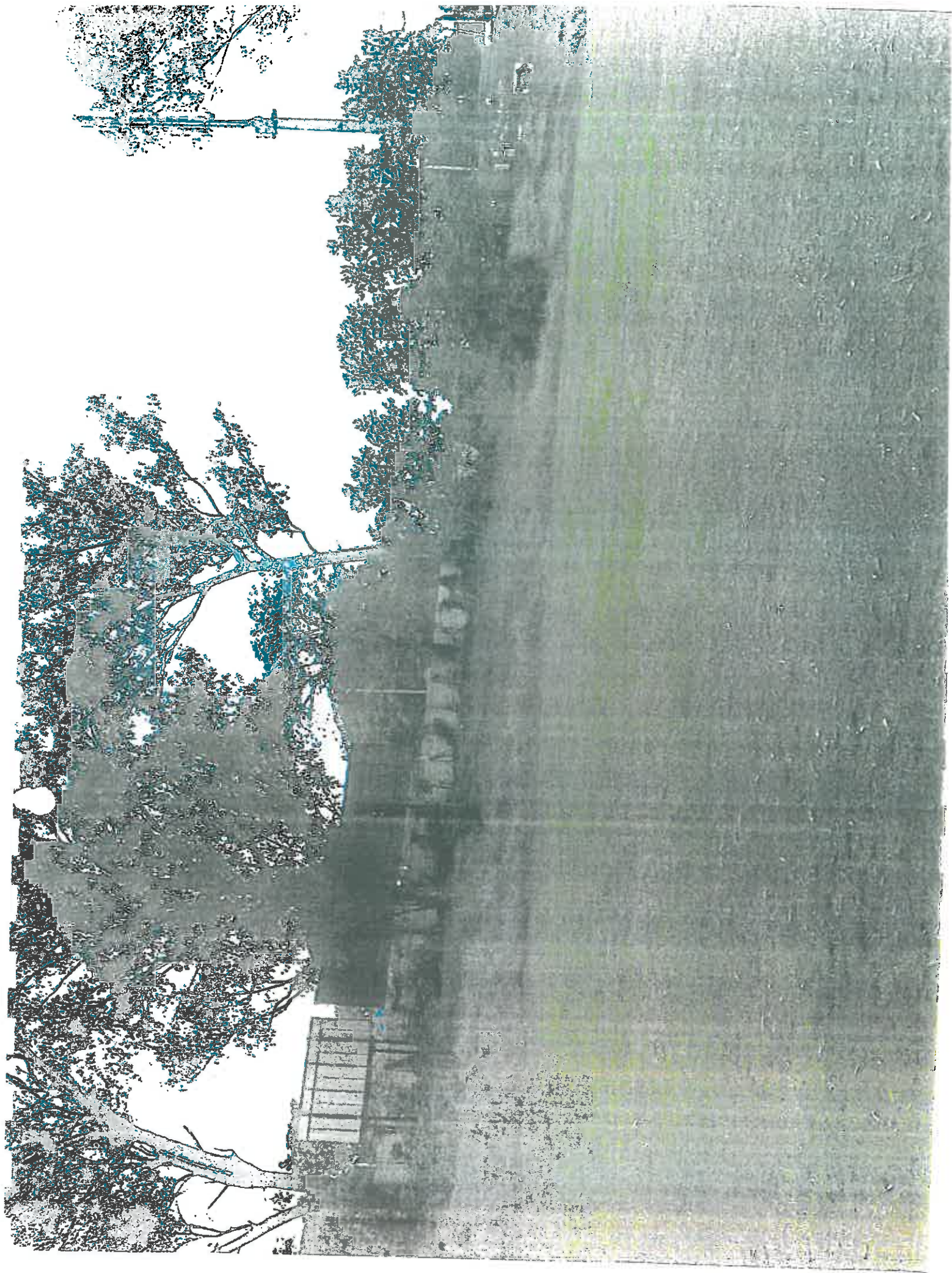




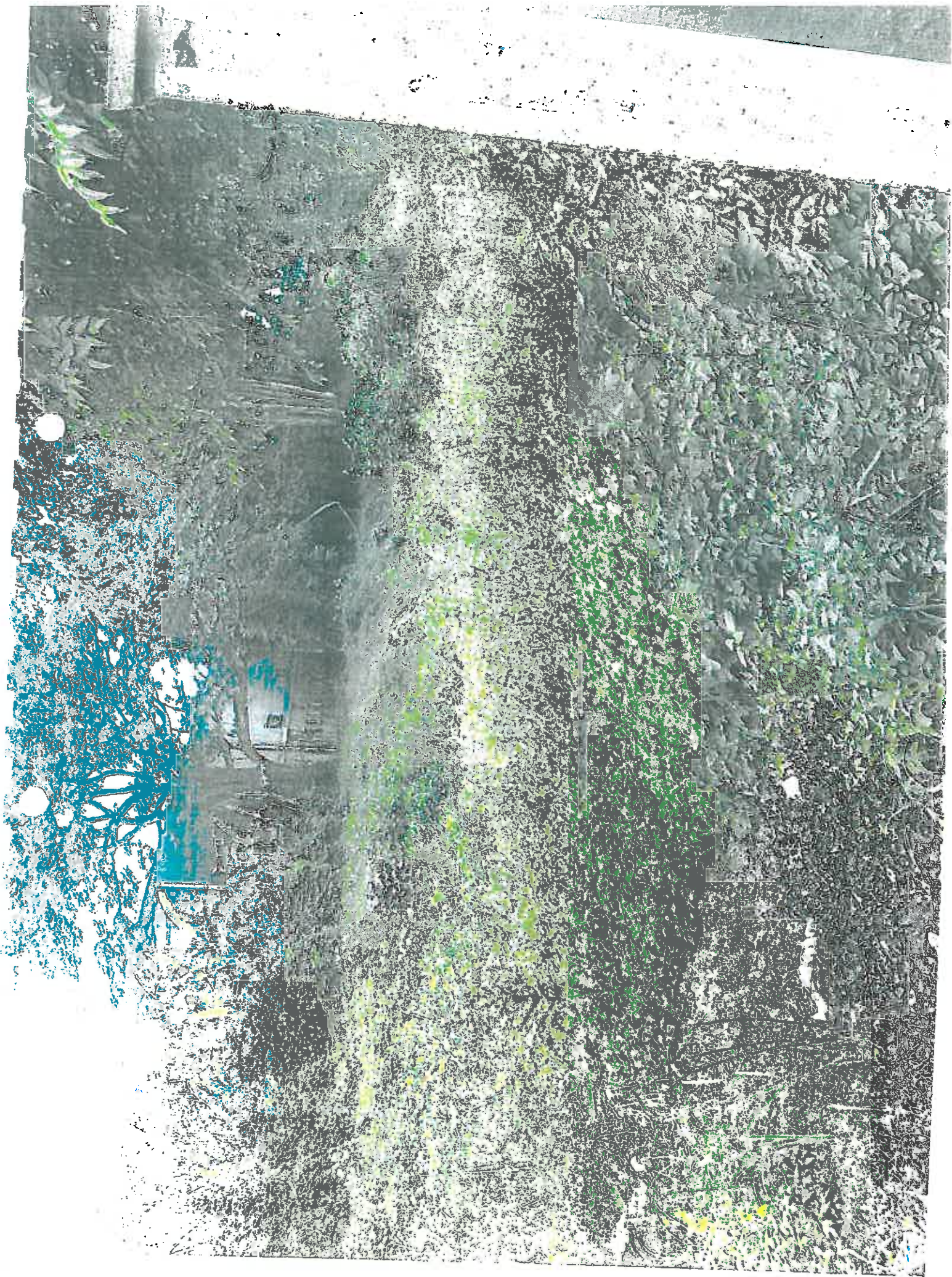


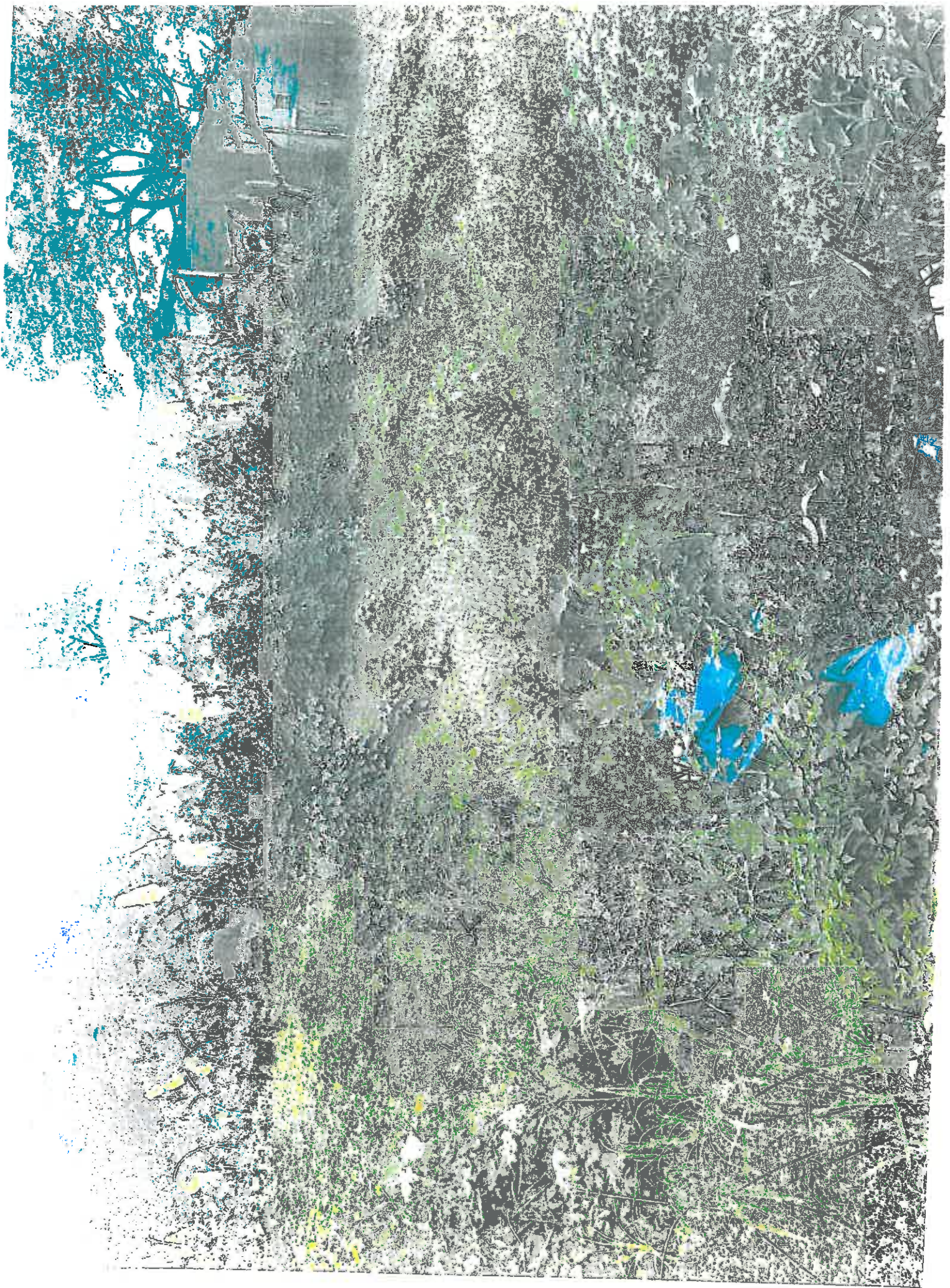


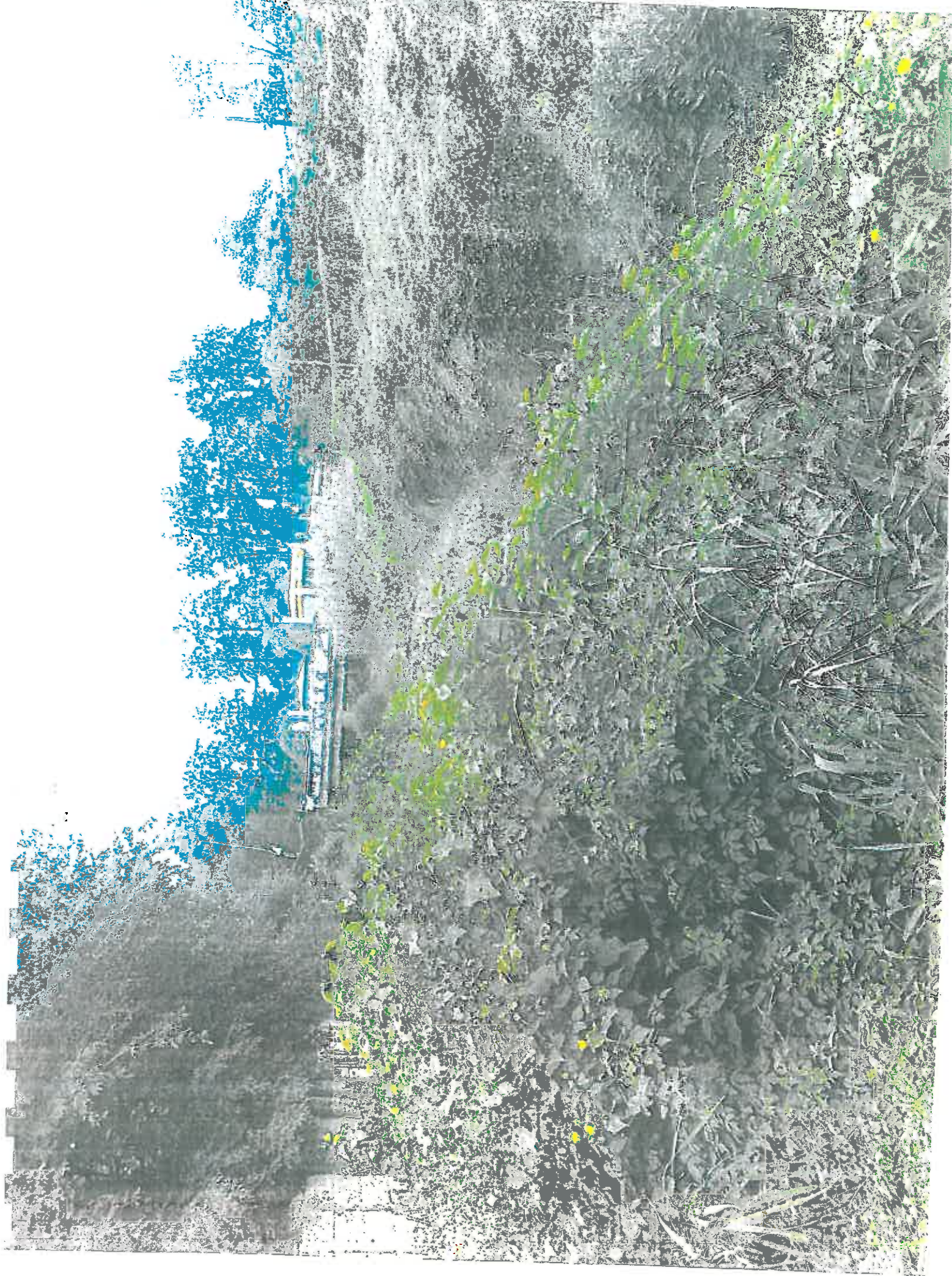


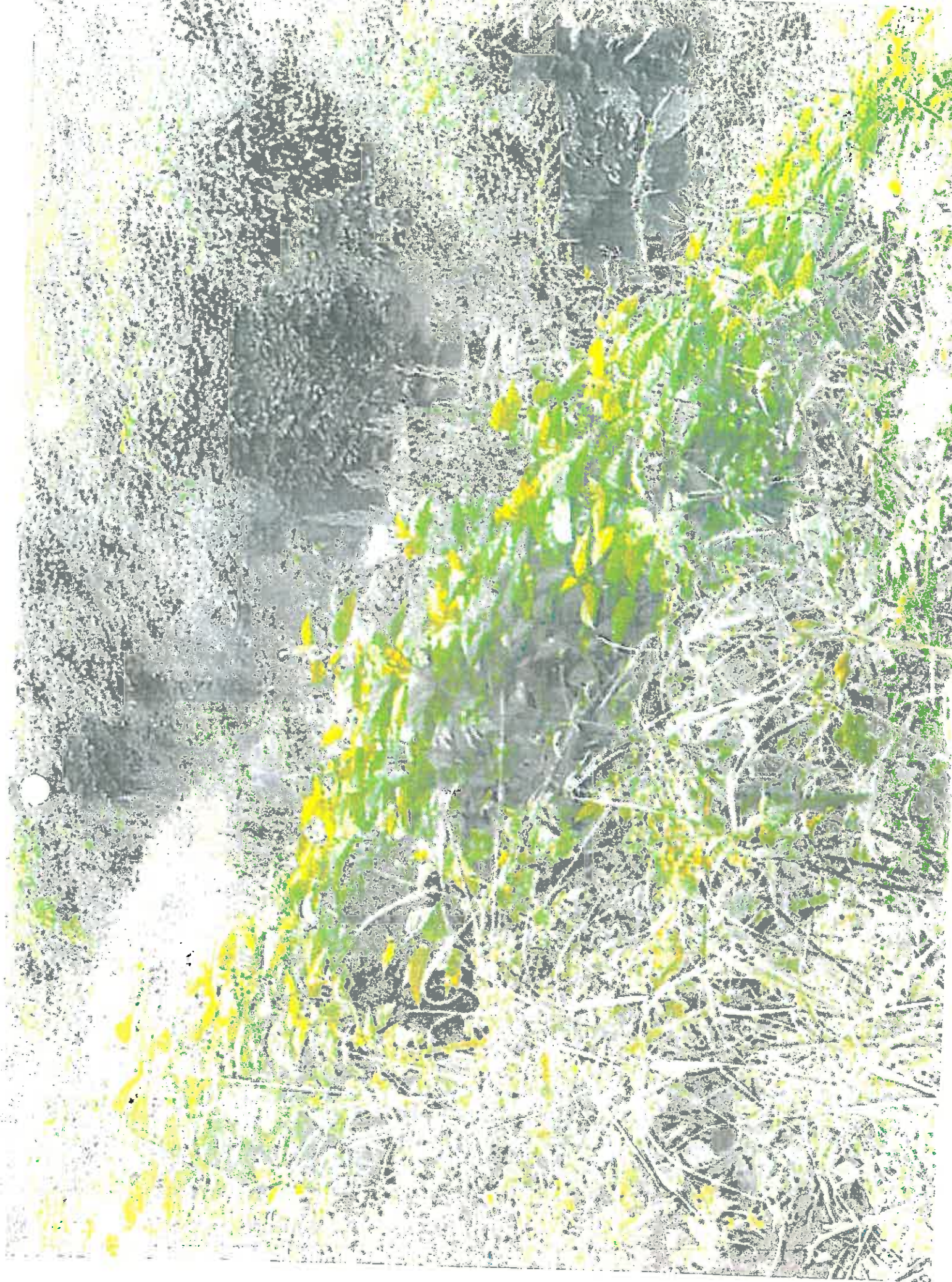


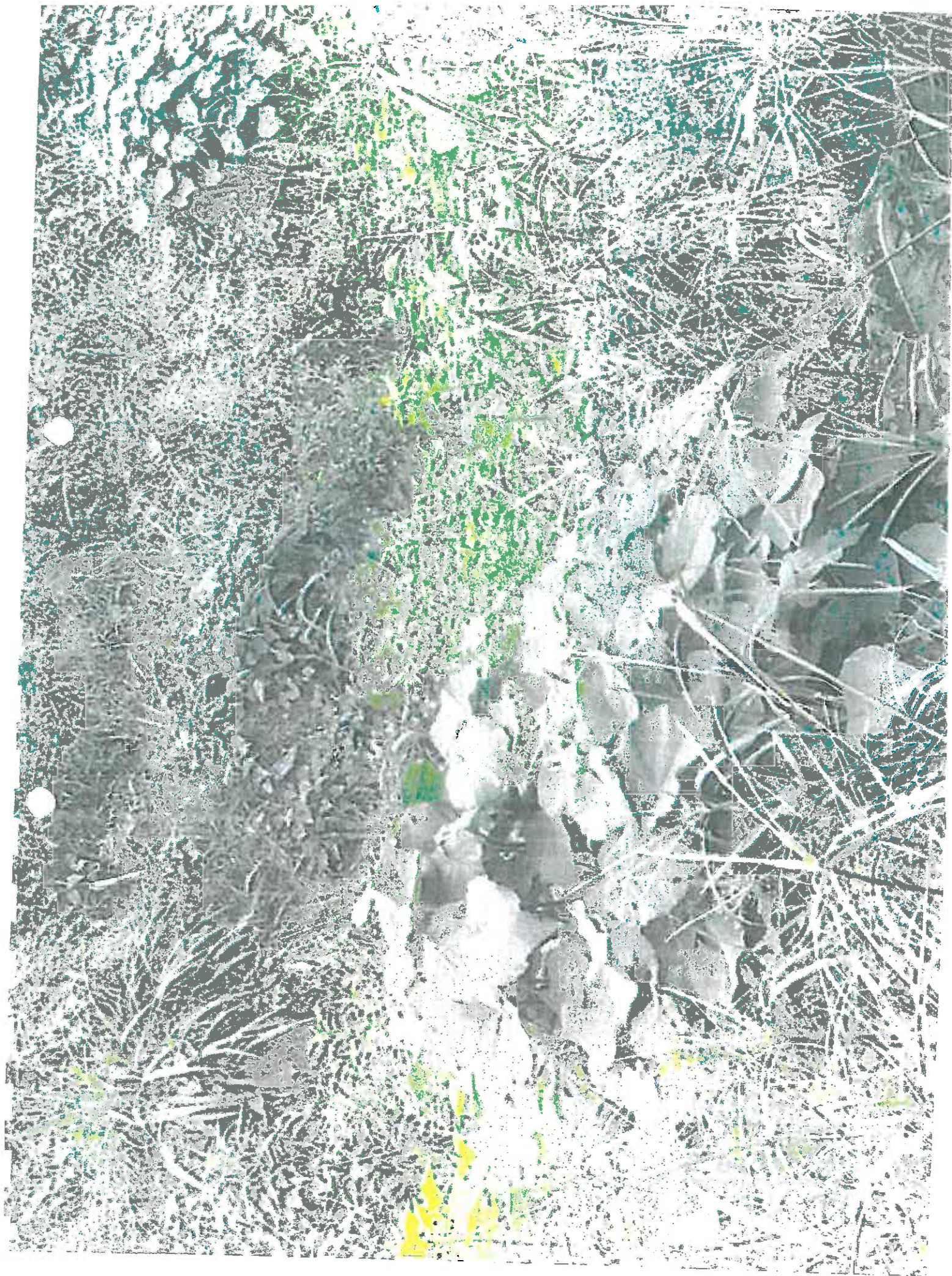




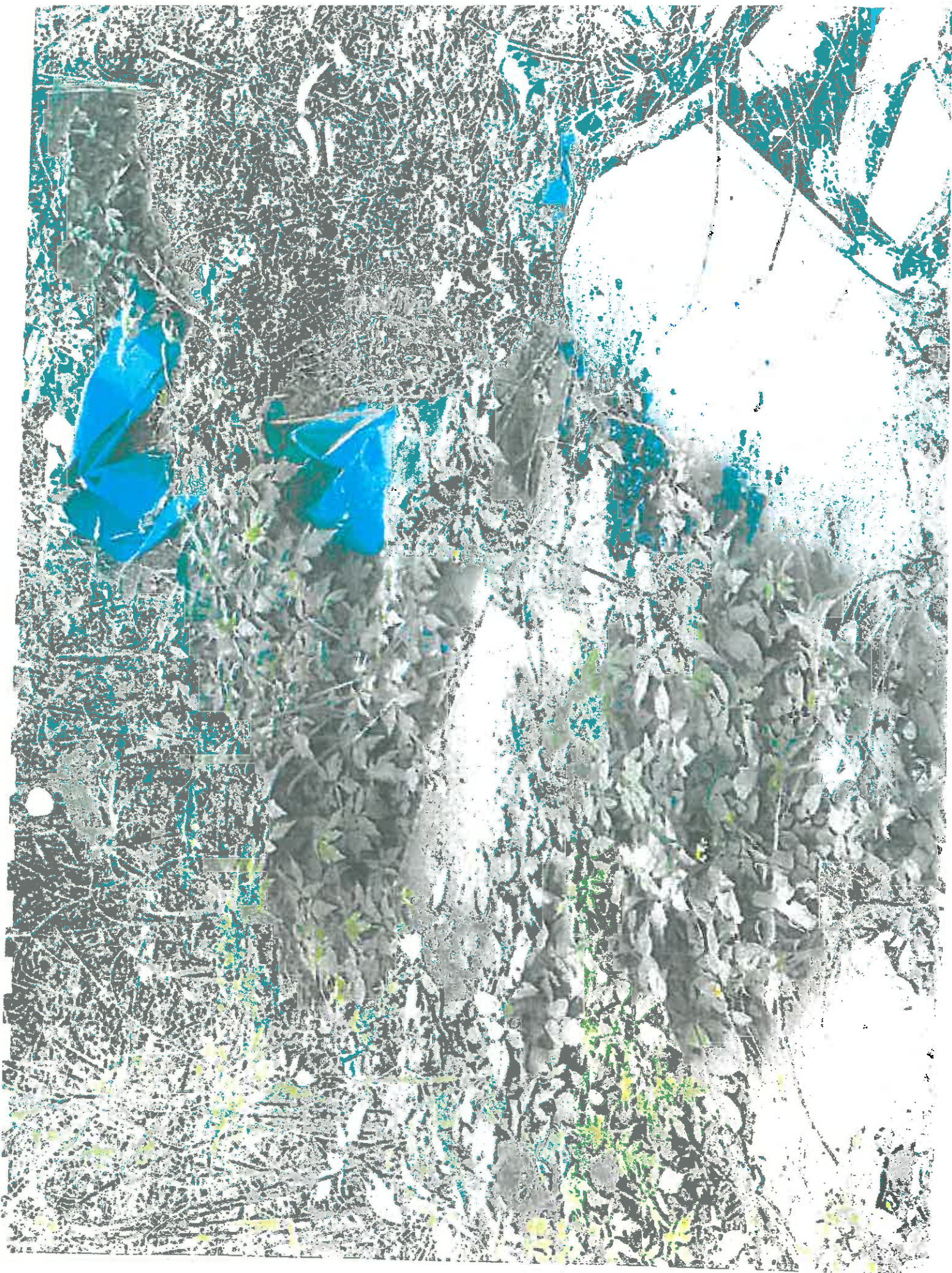


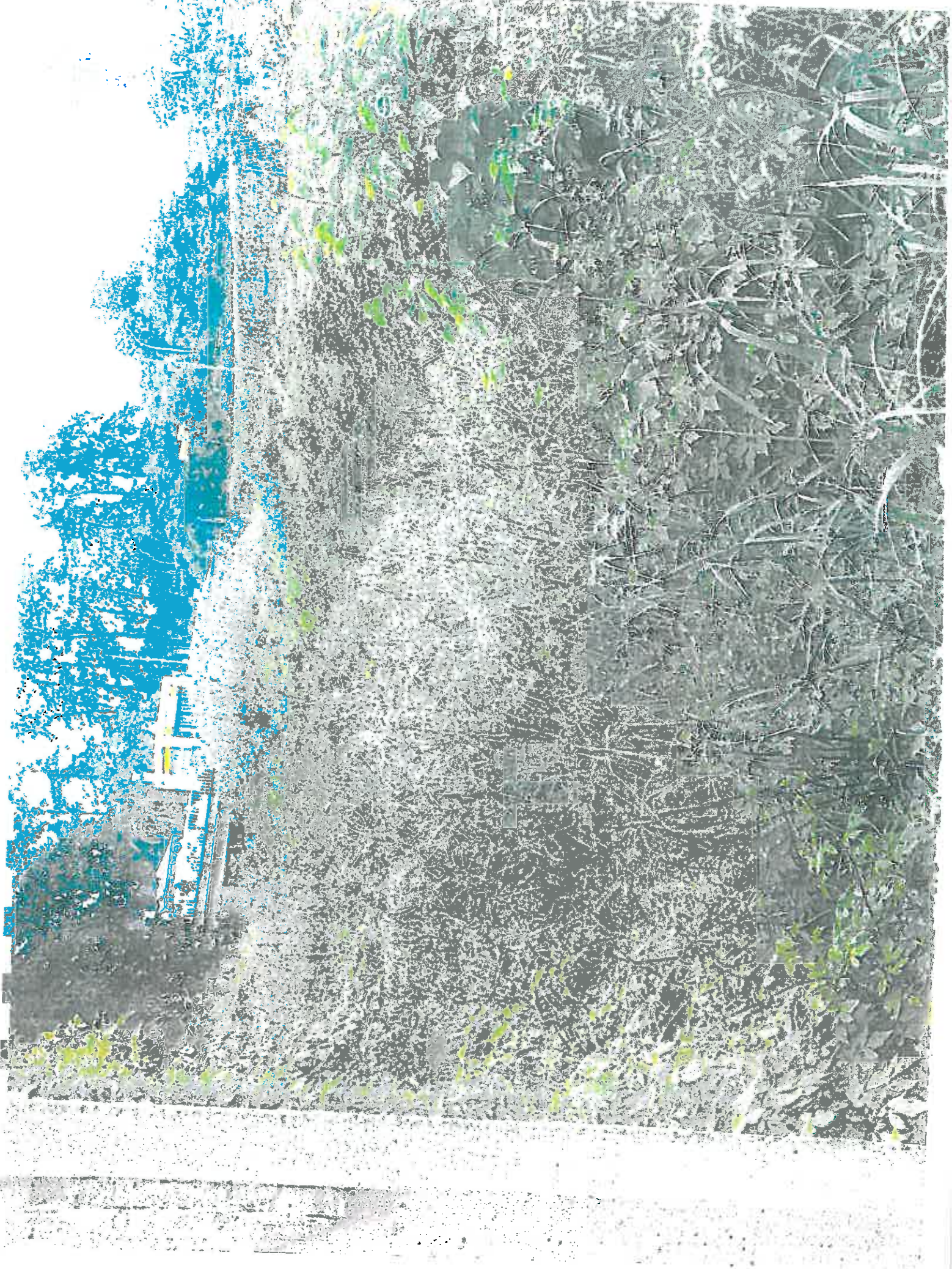












Appendix C:

Facility Illustration

Computer generated Perspective
perspective



Woodburn Boulevard
proposed new Shopping Centre



WOODBURN SHOPPING CENTRE - PIETERMARITZBURG

DATE: 2010/05/07 | REV E

AREA SCHEDULE

SITE AREA: 17827 m²

| BASEMENT | | C2A | GLA | COVER AREA | P. REQ. | P. PROV. |
|----------------|--|-----|-----|------------|---------|----------|
| STAIR 1 | | | | | | |
| STAIR 2 | | 59 | | | | |
| STAIR 3 | | 20 | | | | |
| STAIR 4 | | 59 | | | | |
| STORE 1 | | 20 | | | | |
| STORE 2 | | 55 | 56 | | | |
| STORE 3 | | 71 | 71 | | | 1 |
| ANCHOR STORE | | 18 | 18 | | | 1 |
| | | 649 | 649 | | | 1 |
| | | | | | | 7 |
| PARKING SPACES | | | | | | |
| | | | | | | 359 |
| | | 352 | 794 | 0 | 10 | 359 |

GROUND FLOOR:

| | | | | | | |
|-------------------|-------------|-------------|----------|------------|--|------------|
| SHOP 1 | 239 | 239 | | | | |
| SHOP 2 | 155 | 155 | | | | 15 |
| SHOP 3 | 259 | 259 | | | | 10 |
| SHOP 4 | 138 | 138 | | | | 16 |
| SHOP 5 | 442 | 442 | | | | 9 |
| RESTAURANT 6 | 455 | 495 | | | | 24 |
| RESTAURANT 7 | 449 | 449 | | | | 25 |
| RESTAURANT 8 | 173 | 173 | | | | 27 |
| SHOP 9 | 223 | 223 | | | | 8 |
| SHOP 10 | 32 | 32 | | | | 12 |
| ANCHOR 11 | 2000 | 2000 | | | | 2 |
| SHOP 12 | 30 | 30 | | | | 122 |
| SHOP 13 | 27 | 27 | | | | 2 |
| SHOP 14 | 38 | 38 | | | | 2 |
| SHOP 15 | 172 | 172 | | | | 3 |
| SHOP 16 | 180 | 196 | | | | 11 |
| SHOP 17 | 122 | 122 | | | | 12 |
| SHOP 18 | 116 | 116 | | | | 8 |
| SHOP 19 | 132 | 132 | | | | 7 |
| | | | | | | 8 |
| STAIR 1 | 36 | | | | | |
| STAIR 2 | 19 | | | | | |
| STAIR 3 | 36 | | | | | |
| STAIR 4 & PASSAGE | 58 | | | | | |
| CENTRE MANAGER | 44 | | | | | |
| CLEANERS | 20 | | | | | 1 |
| MALE TOILETS | 33 | | | | | |
| FEMALE TOILETS | 31 | | | | | |
| DUCT | 17 | | | | | |
| PARAPLEGIC TOILET | 4 | | | | | |
| PASSAGE | 73 | | | | | |
| WALKWAYS | 1533 | | | | | |
| PARKING SPACES | | | | | | |
| | 7543 | 5438 | 0 | 324 | | 117 |
| | | | | | | 117 |
| TOTALS | 8294 | 6232 | 0 | 334 | | 476 |



CELL PHONE TOWER

OPEN PARKING



Ground Floor Plan ground

Woodburn Boulevard

proposed new Shopping Centre



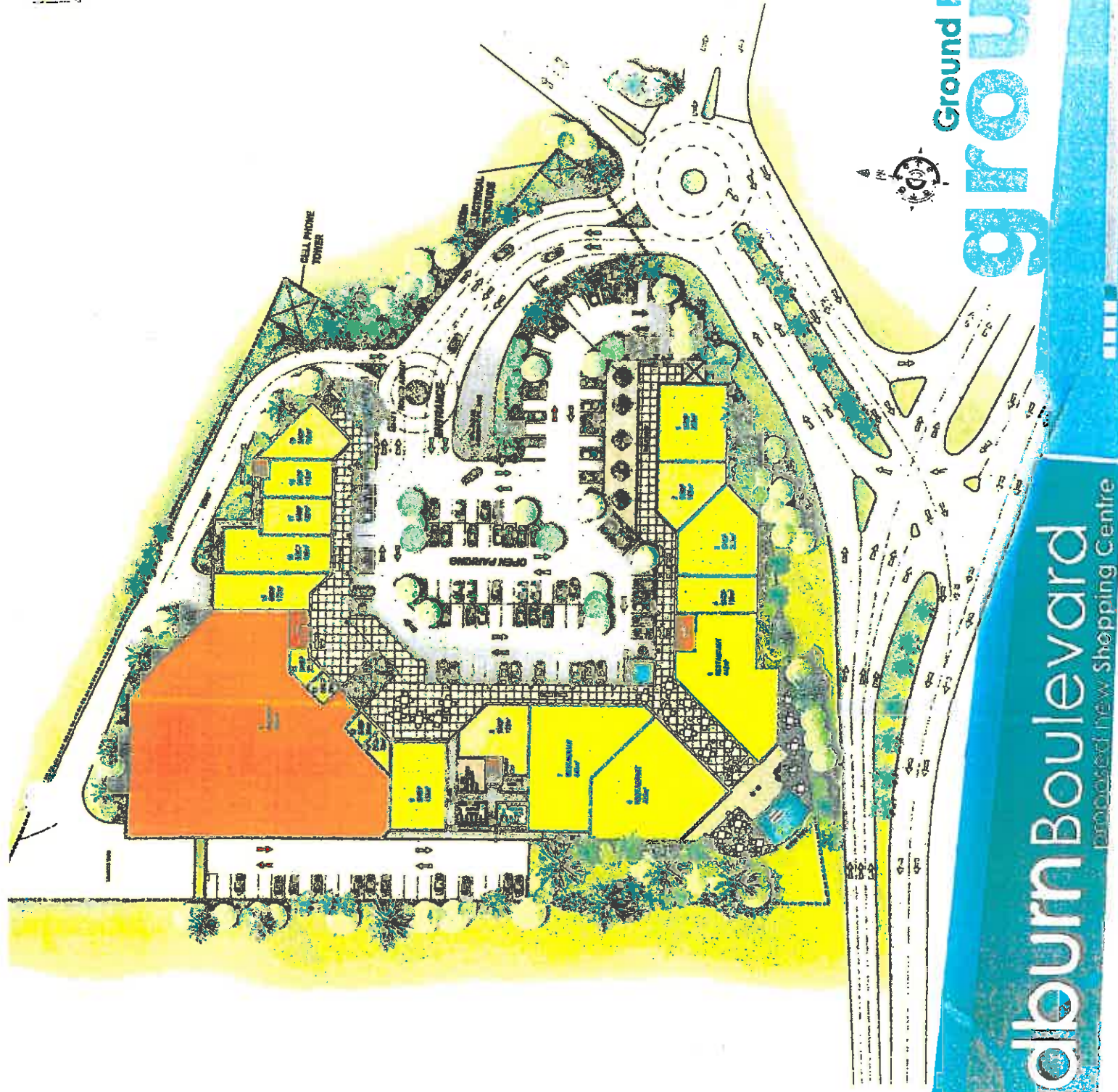
Basement Plan basement

Woodburn Boulevard
Proposed new Shopping Centre

Woodburn Boulevard

proposed new Shopping Centre
PIETERMARITZBURG





Ground Floor Plan

groun

Woodburn Boulevard

proposed new Shopping Centre

Annexure H

3.19.30 Special Area 30 (nb DFA Tribunal decision)

3.19.30.1 In addition to the general provisions of the Scheme, the following shall apply exclusively to the Special Area 30 zone.

3.19.30.2 Use of Land and Buildings

3.19.30.2.1 Reference to Map -cross-hatched black, being Parts of Erven 194, 298, and 4346, Pietermaritzburg, and part of Rem of Townlands being the Collegians Club/Woodburn Rugby Stadium, off Boshoff Street : Scottsville.

3.19.30.2.2 Expressly Permissible Development or uses of Land or Uses of Buildings -

1.6.4 Business Premises, subject to Proviso 3.19.30.3.1

1.6.28 Residential Building including Flats but excluding an Hotel, subject to Proviso 3.19.30.3.4.

1.6.29 Restaurant, subject to Proviso 3.19.30.3.1

1.6.33 Shop, subject to Proviso 3.19.30.3.1

1.6.36 Specialised Office, subject to Proviso 3.19.30.3.2

3.19.30.2.3 Development or Uses of Land or Uses of Buildings Permitted by Special Consent -

1.6.15 Motor Saleroom, subject to Proviso 3.19.30.3.3

1.6.16 Motor Workshop (ancillary to a Motor Saleroom and excluding panel beating, spray painting and engine and chassis overhauls)

1.6.24 Place of Public Entertainment, subject to Proviso 3.19.30.3.1.

1.6.28 Residential Building including Flats and an Hotel, subject to Proviso 3.19.30.3.4.

3.19.30.2.4 Expressly Prohibited Development or Uses of Land or Uses of Buildings -

All Development or uses of Land or uses of Buildings not under Clause 3.19.30.2.2 hereof.

Appendix D:

Specialist Reports

Appendix D1:

Jeffares & Green Engineering Report



Jeffares & Green

CONSULTING ENGINEERS

**PROPOSED WOODBURN
DEVELOPMENT**

**STORMWATER MANAGEMENT
PLAN
AND FLOODLINE DELINEATION
REPORT**



PROPOSED WOODBURN DEVELOPMENT

STORMWATER MANAGEMENT PLAN AND FLOODLINE DELINEATION REPORT

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882



| Verification | Capacity | Name | Signature | Date |
|---------------|---------------------|---------------|-----------|------------|
| By Author | Hydrologist | Ernest Oakes | | 15/02/13 |
| Checked by | Hydrologist | Ryan Gray | | 15/02/2013 |
| Authorised by | Executive Associate | Simon Johnson | | 15/02/13 |

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Jeffares & Green

ENGINEERING & ENVIRONMENTAL CONSULTING

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1 INTRODUCTION

O & T Development (Pty) Ltd (O & T Development) appointed Jeffares & Green (Pty) Ltd (J&G) to undertake a 1:50 year design flood stormwater management plan (SWMP) and floodline delineations for the 1:50 and 1:100 year design floods for a proposed development at Woodburn. The development site is located in Pietermaritzburg in the Msunduzi Local Municipality within KwaZulu-Natal (**Figure 2-1**). J&G were appointed to proceed with the SWMP and floodline delineations on the 14th November 2012 by O & T Development on the basis of quotation 12/SW61/RG dated 8th October 2012.

The objectives of this investigation were as follows

- 1) Assess the impact that the proposed development would have on the stormwater system under the 1:50 year return period flood conditions.
- 2) Determine solutions to channel and attenuate the additional 1:50 year return period stormflows that are generated by the new development at the site.
- 3) Assess the extents of the inundation areas resulting from the 1:50 and the 1:100 year design flood events, which included assessing a potential mitigation measure to prevent flooding of the site whilst minimising any impact on surrounding infrastructure.

For a floodline investigation, detailed survey data and resultant contour data is required in order to produce accurate floodline delineations. The client was able to provide survey data for the Foxhill Spruit River adjacent to the development site. Contour data at intervals of 5 metres were sourced by J&G and used in conjunction with the supplied survey data in order to create a full coverage of the floodplain. The accuracy of the floodline is determined by the quality of the contour and survey data, hence, the 1:50 and 1:100 year return period floodlines produced in this study are as accurate as the data provided to J&G by the client combined with the 5 m contours used for the floodplains.

2 SITE LOCALITY

The site (**Figure 2-1**) is located in Pietermaritzburg adjacent to the Foxhill Spruit River, a tributary of the uMsunduzi River. The Foxhill Spruit River originates in Foxhill Farm south-south west of Oribi Heights. The site lies to the north of Chief Albert Luthuli Street at the corner of Woodhouse Road. A site plan of the proposed Woodburn development is shown in **Figure 2-2**. The Woodburn rugby grounds are situated to the north of the proposed development site. The site is currently under grassland cover. There is an access road to the Woodburn rugby grounds through the proposed development site. The downstream point of the proposed development site has the coordinates:

29° 36' 42.21" S

30° 23' 24.46" E

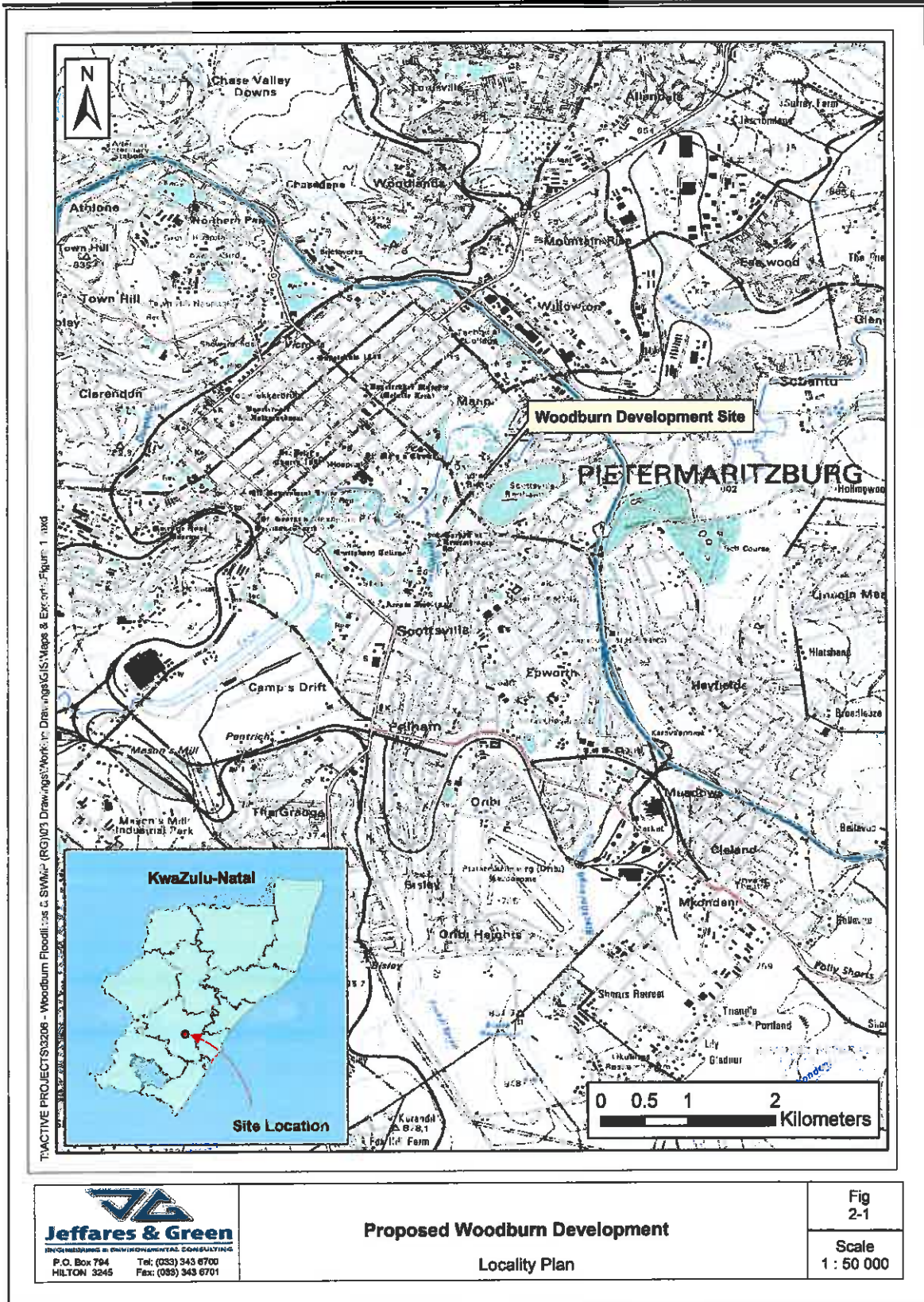


Figure 2-1 Locality Plan for the Proposed Woodburn Development Site

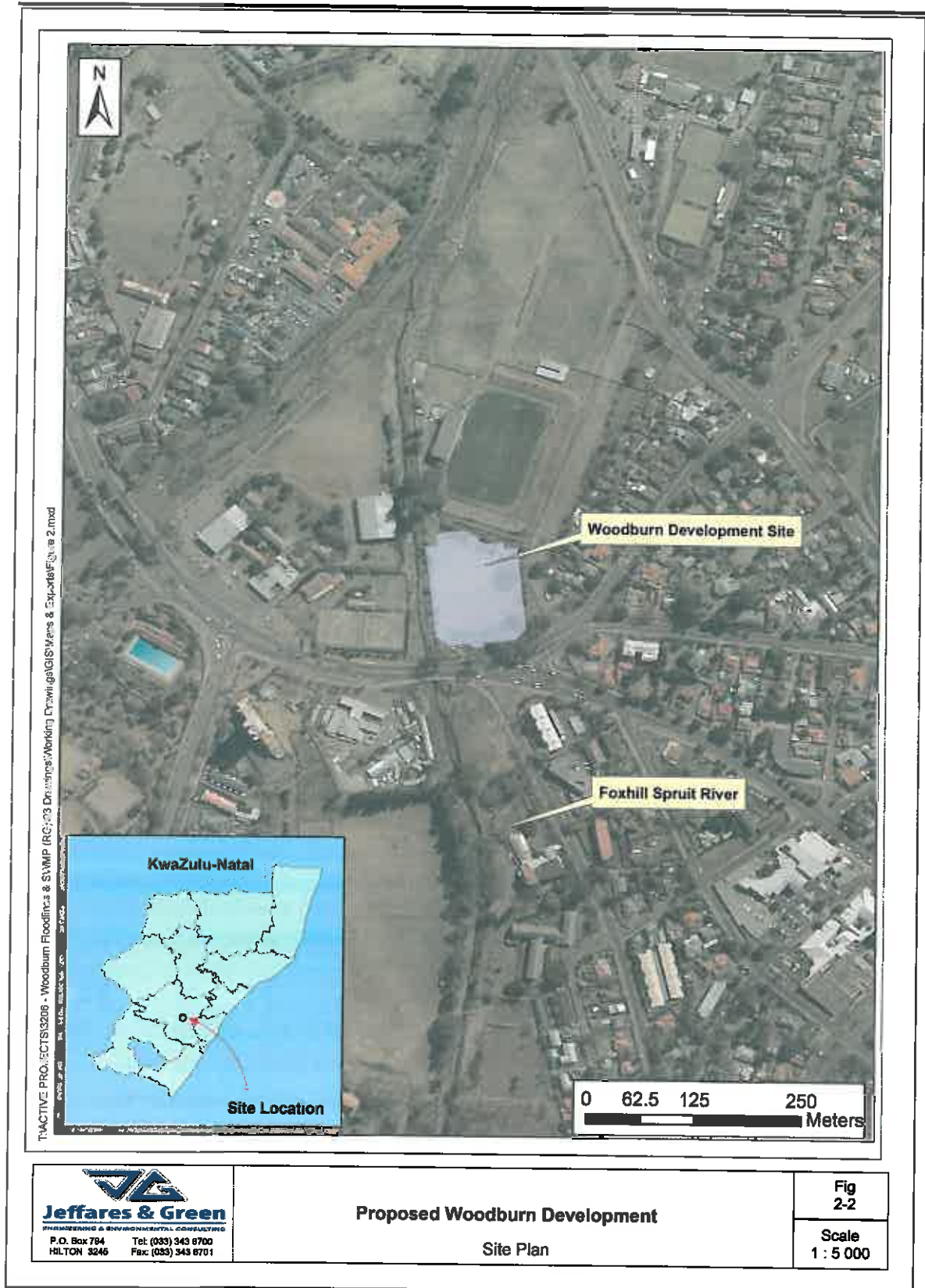


Figure 2-2 Site Plan for the Proposed Woodburn Development Site

3 METHODOLOGY

This section outlines the methodology adopted for this investigation, namely, the selection of the appropriate method for the calculation and determination of the peak discharge for the site and the Foxhill Spruit River Catchment. This was followed by the determination of the extents of the areas inundated by the 1:50 and 1:100 year design floods.

3.1 Stormwater Management Plan Flood Hydrology

The peak discharge for a particular site can be calculated using various methodologies. The method adopted for this study was the Rational Method. The Rational Method is one of the best-known and widely used methods for determining the peak floods of small to medium catchments (100 km² or less). The peak flow equation is based on a runoff coefficient (C), average rainfall intensity (I) and the effective area of the catchment (A).

The Rational formula is defined as:

$$Q = 0.278(CIA) \quad \text{Equation 1}$$

Where:

| | | |
|---|---|-----------------------------------------------------|
| Q | = | peak flow (m ³ /s) |
| C | = | run-off coefficient (dimensionless) |
| I | = | average rainfall intensity over catchment (mm/hour) |
| A | = | effective area of catchment (km ²) |

The Rational formula has the following assumptions:

- The rainfall has a uniform spatial distribution across the total contributing catchment;
- The rainfall has a uniform time distribution for at least a duration equal to the time of concentration;
- The peak discharge occurs when the total catchment contributes to the flow occurring at the end of the critical storm duration, or time of concentration;
- C remains constant for the storm duration, or the time of concentration; and
- The return period of the peak flow, T, is the same as that of the corresponding rainfall intensity.

The municipal requirements of the inputs (excluding catchment area) for the Rational Method for the SWMP component of this study were used and are presented in **Table 3-1**.

Table 3-1 Municipal Input Requirements for the Rational Method

| | Catchment Area (km ²) | Run-off Coefficient | 1:50 yr Rainfall Intensity (mm/hr) |
|------------------|--------------------------------------|---------------------|---------------------------------------|
| Pre-development | 0.018 | 0.35 | 165 |
| Post-development | 0.018 | 0.85 | 165 |

The level pool routing method was used to assess the pre and post-development stormflow volumes generated at the study site and to quantify the required attenuation volume required to mitigate the impacts of the proposed development on the municipal stormwater system.

3.2 Floodline Determination

The 1:50 and 1:100 year peak discharge values were calculated using the Rational Method. Rainfall data is essential for determining design flood events. For this purpose, design rainfall data was extracted from the six closest rainfall stations for which design rainfall is available using the Design Rainfall Utility developed by Smithers and Schulze (2000). Details of the six closest rainfall stations are presented in **Table 3-2**. The Mean Annual Precipitation (MAP) for the proposed development was determined as 741 mm, as per the gridded design rainfall results based on the relative position of the six closest stations to the site (Smithers and Schulze, 2000). The design rainfall depths were based on the data from the rainfall stations listed in **Table 3-3**.

Table 3-2 Rain Gauge Characteristics Used to Determine the Woodburn Development Catchment Design Rainfall

| Station Name | SAWS Number | Distance from Site (km) | Record Used (years) | Mean Annual Precipitation (mm) | Altitude (m) |
|-----------------------|-------------|-------------------------|---------------------|--------------------------------|--------------|
| Ukulinga Agri Res Sta | 0239700 A | 2.5 | 33 | 714 | 866 |
| Pietermaritzburg | 0239577 W | 6.5 | 49 | 949 | 819 |
| Botanic Gardens – Pmb | 0239605 P | 8.0 | 83 | 1 001 | 882 |
| Allerton | 0239604 W | 9.7 | 87 | 1 072 | 882 |
| Baynesfield Estates | 0239585 A | 12.1 | 65 | 829 | 838 |
| Thornville | 0239676 S | 12.6 | 28 | 845 | 853 |

Table 3-3 Design Rainfall of the Woodburn Development Site

| Duration | Return Period (Years) Design Rainfall Depth (mm) | | | | | | |
|----------|--------------------------------------------------|-------|-------|-------|-------|-------|-------|
| | 1:2 | 1:5 | 1:10 | 1:20 | 1:50 | 1:100 | 1:200 |
| 5 min | 10.5 | 15.3 | 19.3 | 23.9 | 31.2 | 37.9 | 45.9 |
| 10 min | 14.4 | 21.0 | 26.5 | 32.9 | 43.0 | 52.2 | 63.2 |
| 15 min | 17.4 | 25.3 | 32.0 | 39.6 | 51.8 | 63.0 | 76.2 |
| 30 min | 21.8 | 31.7 | 40.0 | 49.6 | 64.9 | 78.8 | 95.4 |
| 45 min | 24.8 | 36.2 | 45.6 | 56.6 | 74.0 | 89.9 | 108.8 |
| 1 hour | 27.3 | 39.7 | 50.1 | 62.1 | 81.2 | 98.7 | 119.4 |
| 1.5 hour | 31.1 | 45.3 | 57.1 | 70.8 | 92.6 | 112.5 | 136.1 |
| 2 hour | 34.1 | 49.7 | 62.7 | 77.7 | 101.6 | 123.5 | 149.4 |
| 4 hour | 39.3 | 57.3 | 72.3 | 89.6 | 117.2 | 142.5 | 172.4 |
| 6 hour | 42.8 | 62.3 | 78.6 | 97.5 | 127.4 | 154.9 | 187.4 |
| 8 hour | 45.4 | 66.1 | 83.4 | 103.4 | 135.2 | 164.3 | 198.8 |
| 10 hour | 47.5 | 69.2 | 87.4 | 108.3 | 141.6 | 172.1 | 208.2 |
| 12 hour | 49.3 | 71.9 | 90.7 | 112.4 | 147.0 | 178.6 | 216.1 |
| 16 hour | 52.4 | 76.2 | 96.2 | 119.3 | 156.0 | 189.5 | 229.3 |
| 20 hour | 54.8 | 79.8 | 100.8 | 124.9 | 163.3 | 198.5 | 240.1 |
| 24 hour | 56.9 | 82.9 | 104.6 | 129.7 | 169.5 | 206.1 | 249.3 |
| 1 day | 48.3 | 70.3 | 88.7 | 110.0 | 143.8 | 174.8 | 211.5 |
| 2 day | 61.3 | 89.2 | 112.6 | 139.6 | 182.5 | 221.8 | 268.4 |
| 3 day | 70.4 | 102.6 | 129.5 | 160.5 | 209.8 | 255.0 | 308.5 |
| 4 day | 76.4 | 111.2 | 140.3 | 173.9 | 227.5 | 276.4 | 334.5 |
| 5 day | 81.3 | 118.4 | 149.4 | 185.2 | 242.1 | 294.3 | 356.1 |
| 6 day | 85.5 | 124.6 | 157.2 | 194.9 | 254.8 | 309.7 | 374.7 |
| 7 day | 89.3 | 130.1 | 164.2 | 203.5 | 266.1 | 323.4 | 391.3 |

The physiographic information (i.e. the river reach and the topography) was prepared in HEC-GeoRAS for input into the hydraulic model HEC-RAS. The flood peaks resulting from the 1:50 and 1:100 year design floods were hydraulically modelled against the merged five metre contour and survey data. The results from HEC-RAS were then exported to HEC-GeoRAS for the final floodline delineations.

From analyses done in ArcGIS 9.3, the land use of the Woodburn development's contributing catchment is approximately 50% urban and 50% rural. The urban component of the land use consists of approximately 88% houses, 2% heavy industry and 10% streets. The rural component of the land use consists of vegetation classified as grasslands. These variables were determined by delineating the various land uses and calculating their respective areas. The soils of the contributing catchment are 50% "Permeable" and 50% "Semi-Permeable" as indicated by soil coverage information of South Africa. The surface slope for each catchment was estimated from a digital terrain model (DTM) created from 20 m contour data, four classes of surface slope (<3, 3-10, 10-30 and 30-100 %) were

identified, this was followed by the determination of their respective areas. Further to the afore-mentioned characteristics of the contributing catchments, characteristics of further hydrological significance at the study site are presented in **Table 3-4**.

Table 3-4 Woodburn Contributing Catchment Characteristics

| Area (km ²) | Length of Longest Watercourse (km) | MAP (mm) | Time of Concentration (hrs) | Catchment Centroid (dec deg) | | Average Slope (m/m) |
|-------------------------|------------------------------------|----------|-----------------------------|------------------------------|-----------|---------------------|
| | | | | Latitude | Longitude | |
| 10.57 | 7.88 | 741.0 | 1.29 h | 29.64909 | 30.38923 | 0.02754 |

As mentioned in the previous section, the HEC-RAS model was used to undertake the hydraulic modelling. Survey data was provided by the client. To further increase the accuracy of the simulations, the survey data and the contour data at intervals of 5 metres were input into ArcMAP (**Figure 3-1**) and merged to create a DTM. This allows for the cross-section elevations to be extracted from the DTM utilising HEC-GeoRAS. This data was subsequently exported into the HEC-RAS model for hydraulic modelling of the previously calculated peak discharge values. The bridge that crosses the Foxhill Spruit River on Chief Albert Luthuli St. to the south of the site was included in the hydraulic modelling to consider its impacts on the 1:50 and 1:100 year flood events. The back-water effects of the Msunduzi River were not taken into account. Once the hydraulic modelling was completed, the resultant floodline was imported into ArcMAP for delineation over the project area.

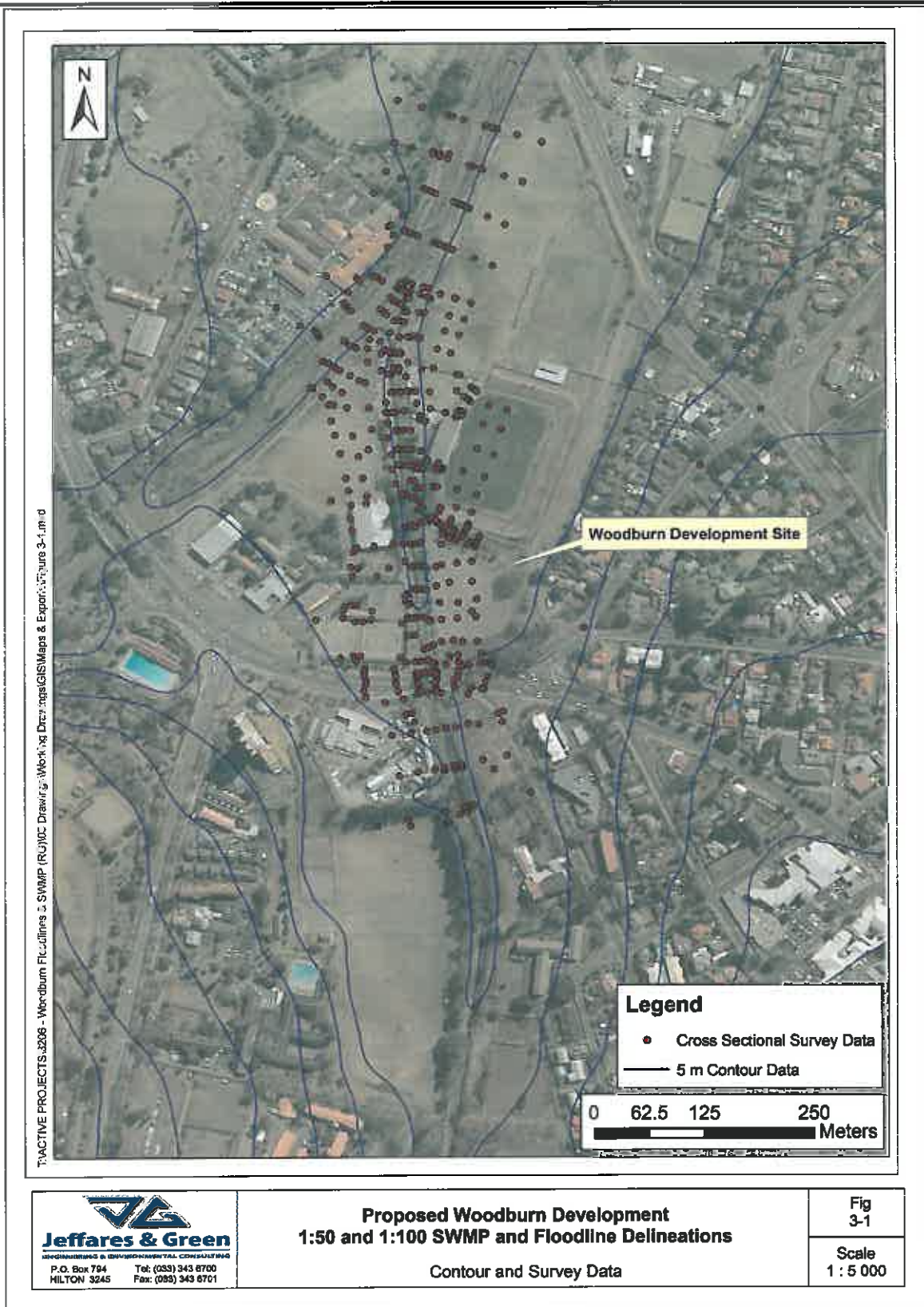


Figure 3-1 Contour Data and Survey Data used for the Determination of the 1:50 and 1:100 Year Floodlines

4 RESULTS

4.1 Stormwater Management Plan Hydrology

The pre- and post-development peak discharge values resulting from the 1:50 year design flood at the site are shown in **Table 4-1**. The resulting pre- and post-development stormwater volumes for the same return period are shown in **Table 4-2**. As part of the requirements of the SWMP, a stormwater attenuation volume of 1 107 m³ will be required to mitigate the impact of the proposed development (**Table 4-2**). Thus, an engineering solution is required to attenuate the post-development peak to that which occurred under pre-development conditions (i.e. ensuring flood neutrality). The ability of the stormwater management intervention to attenuate the post-development peak is based on the size of the outlet structure and the available storage volume.

Table 4-1 Pre- and Post-Development Design Flood Peak Discharge Values

| Peak Discharge | 1:50 Year Return Period (years) | |
|------------------------------------|----------------------------------------|-----------------------------------------|
| | Pre-development (m ³ /s) | Post-development (m ³ /s) |
| Q _p (m ³ /s) | 0.29 | 0.70 |

Table 4-2 Pre- and Post-Development Stormflow Volumes

| | Pre-development (m ³) | Post-development (m ³) | Required Attenuation (m ³) |
|------------------------------------|--------------------------------------|---------------------------------------|-------------------------------------------|
| Stormflow Volume (m ³) | 783.0 | 1 890.0 | 1 107.0 |

Attenuation is attained by routing the 1:50 year return period peak flow hydrograph through a retention structure/s, that detains or ponds the runoff water and, thereafter, releases the flow at a slower rate (i.e. the pre-development peak flow rate). This, however, means that a volume of water will need to be stored during the period in which inflow (maximum equal to 0.70 m³/s) is greater than the outflow (maximum equal to 0.29 m³/s).

A number of SWMP scenarios were considered for this investigation. A scenario that entailed the use of attenuation tanks adjacent to each of the trading areas on the ground level of the proposed development was considered. The stormwater stored in the attenuation tanks would be routed to the Foxhill Spruit River during the 1:50 year design flood event. This would aid in the disaggregation of the total stormwater produced resulting in a lower quantity of runoff produced by the parking lot and additional paved areas. The stormwater generated by the parking lot and additional paved areas would have been directed to an

attenuation pond in the form of a water feature which would release water to the receiving environment at a controlled rate. This approach would have reduced and possibly nullified the need to store a portion of the post-development stormwater in the basement level parking. Additional storage tank options were also considered for the below basement parking area (i.e. sub-terrain) or in the suspended slab of the ground level.

The second SWMP scenario suggested was to raise the basement level parking by concrete or earth fill to counter the effects of the 1:50 year and 1:100 year flood water elevations on the stormwater system discharge outlet submergence. It was suggested that the level of the basement parking be raised to a height which would give sufficient freeboard to allow stormwater temporarily stored in the basement parking lot to be released into the Foxhill Spruit River during the 1:50 year and 1:100 year design flood events without the Foxhill Spruit River backing up into the development through the stormwater system.

After discussions with the client, J&G was instructed to use the following method due to economic reasons. A portion of the stormwater generated by the 1:50 year design flood event would be diverted to the Foxhill Spruit River. The balance of the stormwater would be diverted to the basement parking lot and temporarily stored until the recession of the 1:50 year design flood waters. The above-mentioned diversion would be accomplished by a system of appropriately sized pipes situated in a catch pit on the ground level parking (**Figure 4-1**) level and a second set of appropriately sized pipes in a catch pit situated in a basement parking lot. It is recommended that the ground level and basement level catch pits are covered with metal grating (or similar covering) to prevent blockage of the SWMP infrastructure. The details pertaining to the final SWMP design are discussed in this section. The inundation of the parking areas, including the associated risks to people and property at the site, were discussed with the client and engineer, who were happy to proceed.

The discharge from the system into the receiving environment must equal to, or be less than the pre-development peak of 0.29 m³/s. The depth to flow relationship for round pipe culverts (Henderson, 1966) was used to determine the discharge at incremental flow depths for three outlet pipes (one outlet pipe with a diameter of 0.4 m and two outlet pipes with a diameter of 0.45 m) at a slope of 0.1% (**Figure 4-2** and **Figure 4-3**).

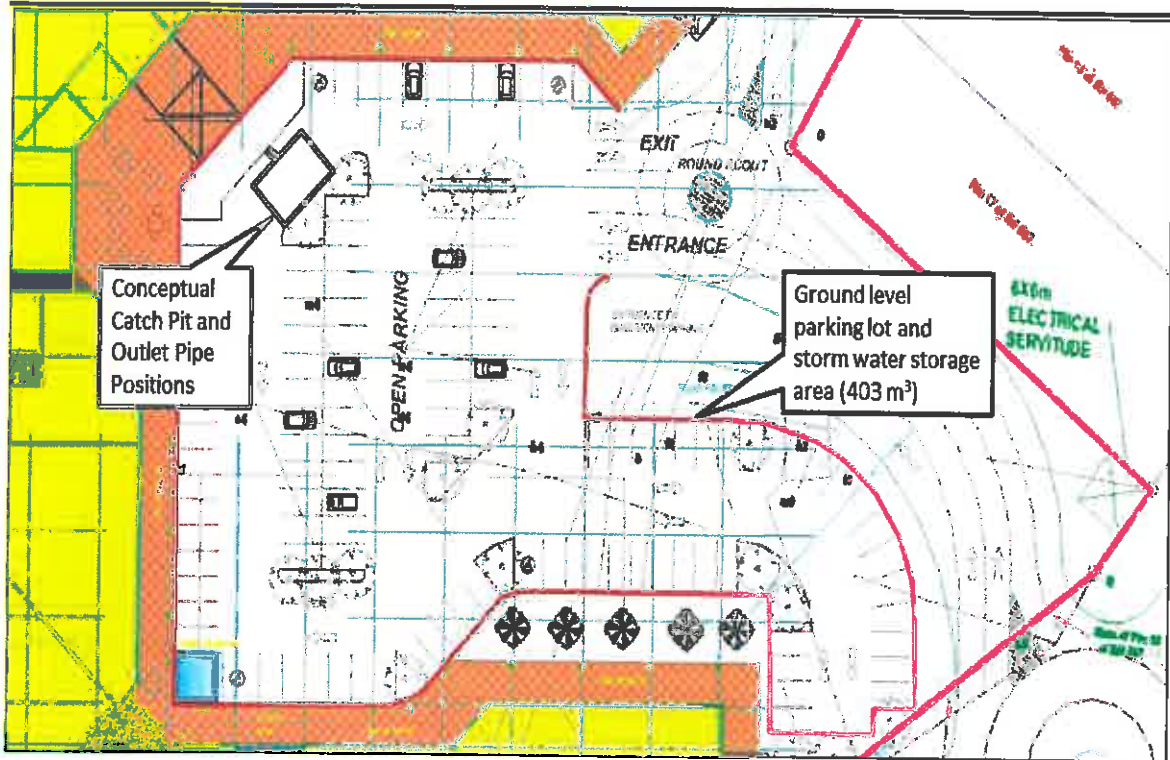


Figure 4-1 Conceptual Plan View of the Ground Level SWMP infrastructure

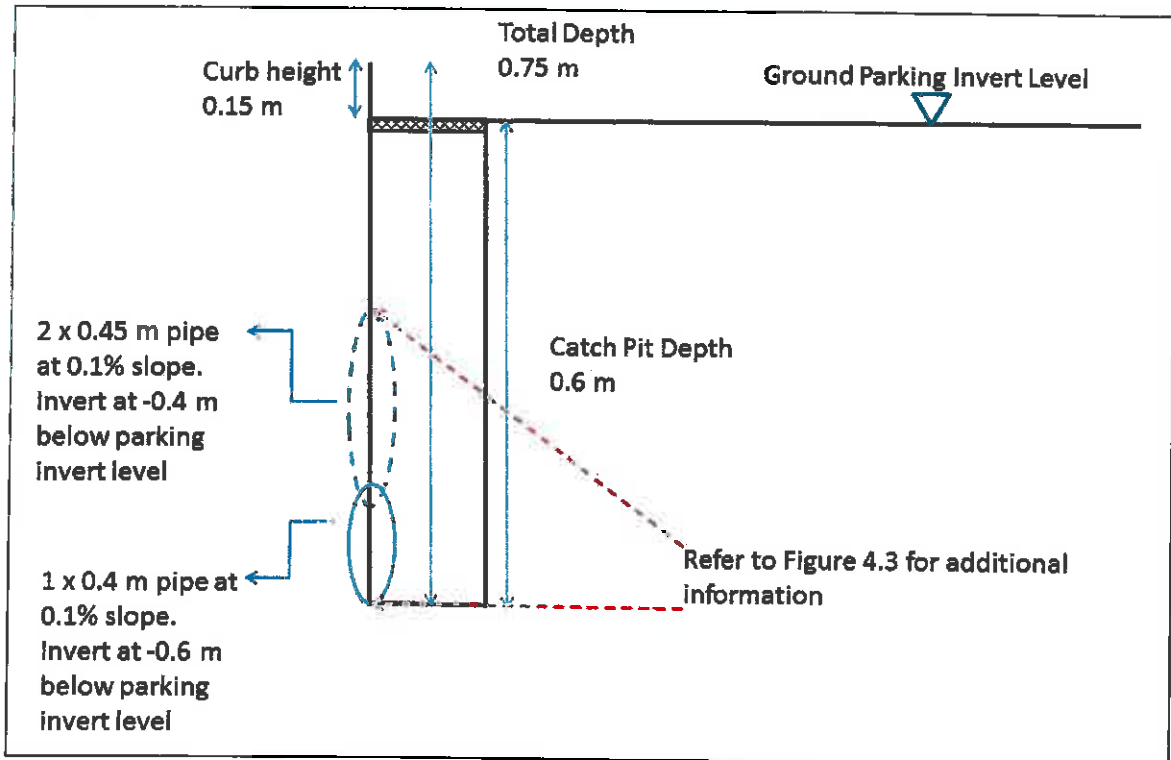


Figure 4-2 Conceptual Long Section Schematic of the Ground Level Catch Pit and the Stormwater Diversion Pipes.

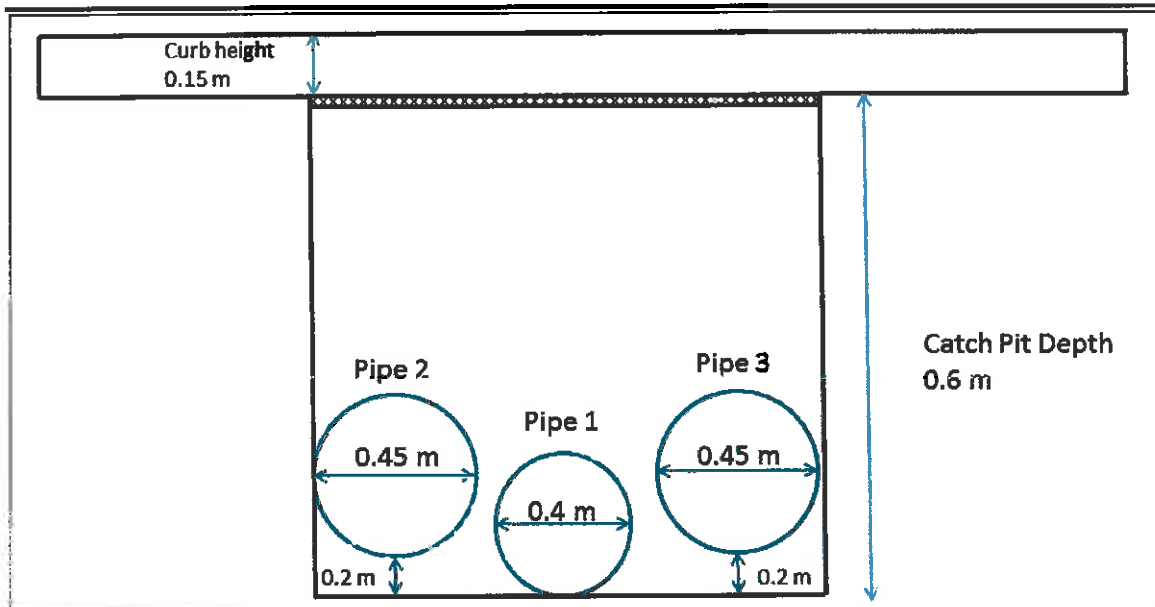


Figure 4-3 Conceptual Cross Section Schematic of the Catch Pit and the Stormwater diversion Pipes.

The final discharges of the individual pipes at a freeboard depth of 0.7 m are shown in **Table 4-3**. In order to prevent the flooding of the basement parking lot during the lower magnitude design flood events (i.e. the 1:2 year design flood event), it is recommended that the two larger outlet pipes are situated at an elevation of 0.2 m above the invert of the catch pit as shown in the schematic (**Figure 4-3**). The stormwater diversion system is conceptually designed such that Pipe 1 is situated at the invert level of the ground floor level catch pit and will lead into a sump located in the basement parking lot, (described further in the following paragraph) and then out to the receiving environment. Pipe 1 would discharge water into the Foxhill Spruit River at a rate of $0.28 \text{ m}^3/\text{s}$ (**Table 4-3**). This is less than the pre-development peak of $0.29 \text{ m}^3/\text{s}$ ensuring flood neutrality. The discharge from Pipe 1 would then require a stored stormwater volume of 403 m^3 which is obtained from the ground level parking area with a depth of 0.15 m. This results in the balance (704 m^3) of the total required attenuation ($1\,107 \text{ m}^3$) being diverted to the basement parking lot resulting in a standing water depth of 0.09 m. It is recommended that the ground floor parking lot is sloped toward the catch pit location to allow for the sufficient diversion and attenuation of the 1:50 year design stormwaters. Furthermore, all storm water producing and diversion structures (i.e. trading areas and downpipes) at the ground floor level are to direct the runoff they produce to the SWMP infrastructure located on the ground floor parking area. A layout plan view of the conceptual SWMP of the ground level is shown in **Appendix A**.

Table 4-3 Outflow Discharge of the Stormwater Pipes

| Freeboard (m) | Foxhill Spruit River | | Basement Parking Lot | |
|------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | Pipe 1 Discharge (m ³ /s) | Pipe 2 Discharge (m ³ /s) | Pipe 3 Discharge (m ³ /s) | Pipe 3 Discharge (m ³ /s) |
| 0.7 | 0.28 | 0.21 | 0.21 | 0.21 |

The 704 m³ of stormwater diverted to the basement parking lot would reach a height of approximately 0.09 m during the 1:50 year design flood event based on the surface area of the basement parking lot (8 521 m² as provided by the client). A plan view of the basement level parking component of the SWMP is shown in **Figure 4-4**. The inflow characteristics of the 1:50 year design flood diverted by Pipes 2 and 3 into the basement level parking are shown in **Table 4-4**. In order to discharge the volume of water diverted to the basement level parking, two outlet pipes (diameters of 0.3 m) situated at an elevation of 0.4 m below the invert of the basement level parking are required (**Figure 4-5**) which will be situated in an sump in the storage area.

As mentioned previously, the development site is located adjacent to the Foxhill Spruit River. The proximity of the site to the Foxhill Spruit River necessitates the need to retain the stormwater stored in the basement level parking lot during the period in which the flood water levels of the river are above the elevation of the stormwater outlet pipes that drain the basement level parking (i.e. for the 1:50 year design flood and higher). No provision was made for the lower return period design flood events. Due to the need to retain the stormwater during the afore-mentioned flood events, a non-return valve will need to be installed on the two 0.3 m diameter pipes to prevent outlet control of the stormwater system and the Foxhill Spruit River flood waters entering the basement level parking through a backwater effect (**Figure 4-5**). The non-return valves will allow water to be released from the basement level parking lot following the recession of the 1:50 year design flood event and any events longer than this. Further to the above requirements, it is recommended that overflow structures situated at elevations of 621.3 mAMSL and 622 mAMSL are installed in the sump as emergency intervention structures to allow stormwater to exit the basement parking lot in the event of storm durations exceeding the recommended attenuation period of 0.5 hours. The above mentioned heights of 621.3 mAMSL and 622 mAMSL are to compensate for the levels of the 1:50 and 1:100 year flood water levels of the Foxhill Spruit River. This will be discussed further in **Section 4.2**.

The SWMP results (**Table 4-5**) indicate that two 0.3 m diameter pipes sloped to 0.1% will discharge stormwater to the receiving environment at a rate of 0.22 m³/s. This is favourable

as it is less than the pre-development peak discharge of 0.29 m³/s. As for the ground level parking, it is recommended that the basement level parking is sloped to the position of the basement level catch pit to allow for the sufficient diversion and attenuation of the 1:50 year design stormwaters. As mentioned, during the 1:50 year design flood event, the flood waters of the Foxhill Spruit River will rise above the level of Pipes 4 and 5, which serve to drain the basement parking lot. During this period, Pipe 1 will discharge water to the Foxhill Spruit River at a rate of 0.28 m³/s as it has the required hydraulic head to discharge into the flooding river. The discharge rate of Pipe 1 will diminish and eventually stop as the 1:50 year flood waters recede. Pipes 4 and 5 will discharge water at a combined rate of 0.22 m³/s after the 1:50 year flood waters have receded, thus, the maximum discharge of stormwater to the receiving environment will not exceed 0.29 m³/s at any time. A layout plan view of the conceptual SWMP of the basement level is shown in **Appendix B**. The layout plan includes extents of the 1:50 and the 1:100 year floodlines, the proposed retaining wall which will be discussed further in **Section 4.2**.

Table 4-4 Inflow characteristics of the Diverted 1:50 Year Design Flood Event into the Basement Level Parking

| Inflow Volume (m ³) | Inflow Discharge (m ³ /s) |
|------------------------------------|-----------------------------------------|
| 704 | 0.42 |

Table 4-5 Basement Level Outflow Pipe Requirements and Outflow Discharge

| Freeboard (m) | Pipe 4 Discharge (m ³ /s) | Pipe 5 Discharge (m ³ /s) | Total Pipe Discharge (m ³ /s) |
|------------------|-----------------------------------------|-----------------------------------------|---------------------------------------------|
| 0.4 | 0.11 | 0.11 | 0.22 |

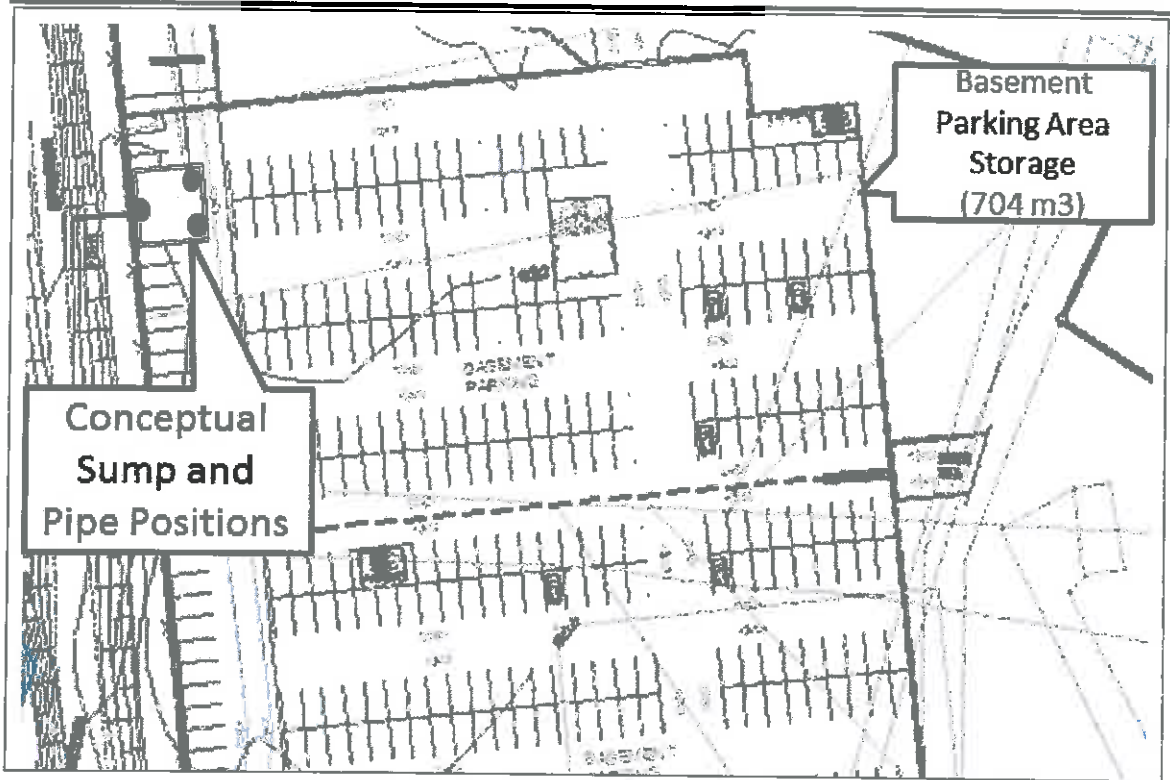


Figure 4-4 Conceptual Plan View of the Basement Level SWMP Infrastructure

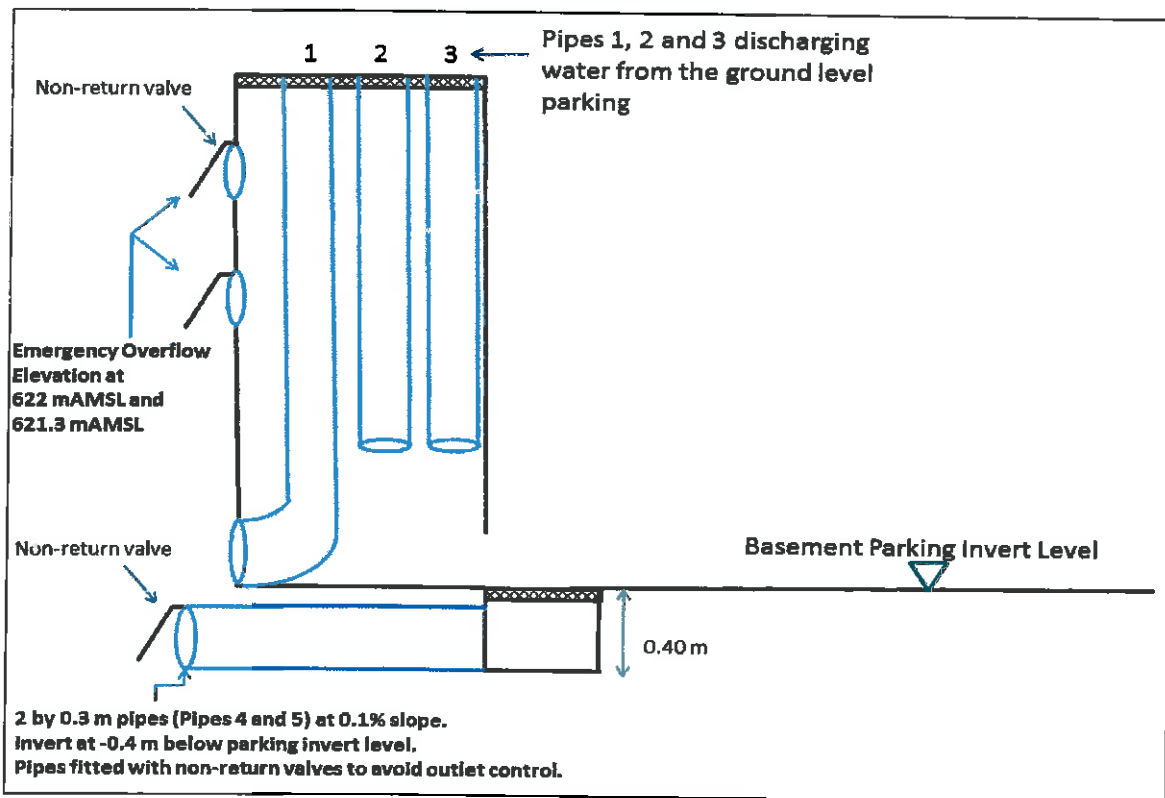


Figure 4-5 Conceptual Long Section Schematic of the Basement Level Sump, Catch Pit and Stormwater Diversion Pipes.

4.2 Floodline Delineations

The peak discharge values determined for the 1:50 and 1:100 year return periods for the Foxhill Spruit catchment at the proposed development are shown in **Table 4-6**.

Table 4-6 Foxhill Spruit Catchment Design Flood Results of the Proposed Woodburn Development Site

| Peak Discharge | Return Period (years) | |
|---------------------------|-----------------------|-------|
| | 1:50 | 1:100 |
| Q_p (m ³ /s) | 113.4 | 142.0 |

The results from the 1:50 and 1:100 year floodline analyses are shown in **Figure 4-6** and **Figure 4-7** respectively (the 1:50 and 1:100 year floodlines are presented separately in **Appendices C** and **D** respectively). The blue floodlines, which present the current site conditions, indicate that a significant portion of the Woodburn development site is inundated by both the 1:50 and 1:100 year design flood events. This is possibly due to the low slope gradient as indicated by the sparsely positioned contour lines (**Figure 3-1**). The low slope gradient allows for flood waters from the 1:50 and 1:100 year design flood events to encroach on and inundate the development site.

A flood prevention scenario was assessed during the hydraulic modelling component of the study. This introduced a retaining wall to prevent flood waters entering the development site. It was found that the 1:50 year flood reached a maximum height of approximately 1.13 m approximately 121 m downstream of the bridge, which is located upstream of the study site. The 1:100 year flood reached a maximum height of approximately 1.76 m. It is, therefore, proposed that a flood protection barrier (retaining wall) with a minimum height of at least 1.76 m from the ground level be constructed to prevent any possible damage of the site resulting from the 1:50 and 1:100 year design flood events. The length of the retaining wall parallel to the Foxhill Spruit River would need to be approximately 141 m long. The north and south ends of the retaining wall would need to span a distance of approximately 10 m. The afore-mentioned retaining wall height is based on the elevation of the modelled flood waters and does not take into account wind-run and wave action during the 1:50 and 1:100 year design flood events. It is recommended that these factors be taken into account by the site engineer during the final design of the flood protection barrier, thereby allowing for a freeboard component to the berm.

As mentioned, the level of the 1:100 year design flood waters reaches an elevation of approximately 620.07 mAMSL at a distance of approximately 121 m downstream of the Chief Albert Luthuli Road bridge. In order for the stormwater management infrastructure (**section 4.1**) to adequately discharge the 1:50 year design discharge, the level of the basement parking lot will need to be situated at an elevation of approximately 2.6 m above the elevation of the Foxhill Spruit River bank adjacent to the proposed development site to accommodate the required freeboard of 0.8 m and to ensure that the outlet pipe is not submerged by the 1:100 year design flood event water level.

In addition to the analyses, it was noted that no additional structures on the left side of the Foxhill Spruit River are impacted upon by the construction of a retaining wall around the areas of concern of the proposed Woodburn development. However, the bowling green and parking lot of the bowls club will be affected by the construction of the retaining wall under the 1:100 year flood conditions.

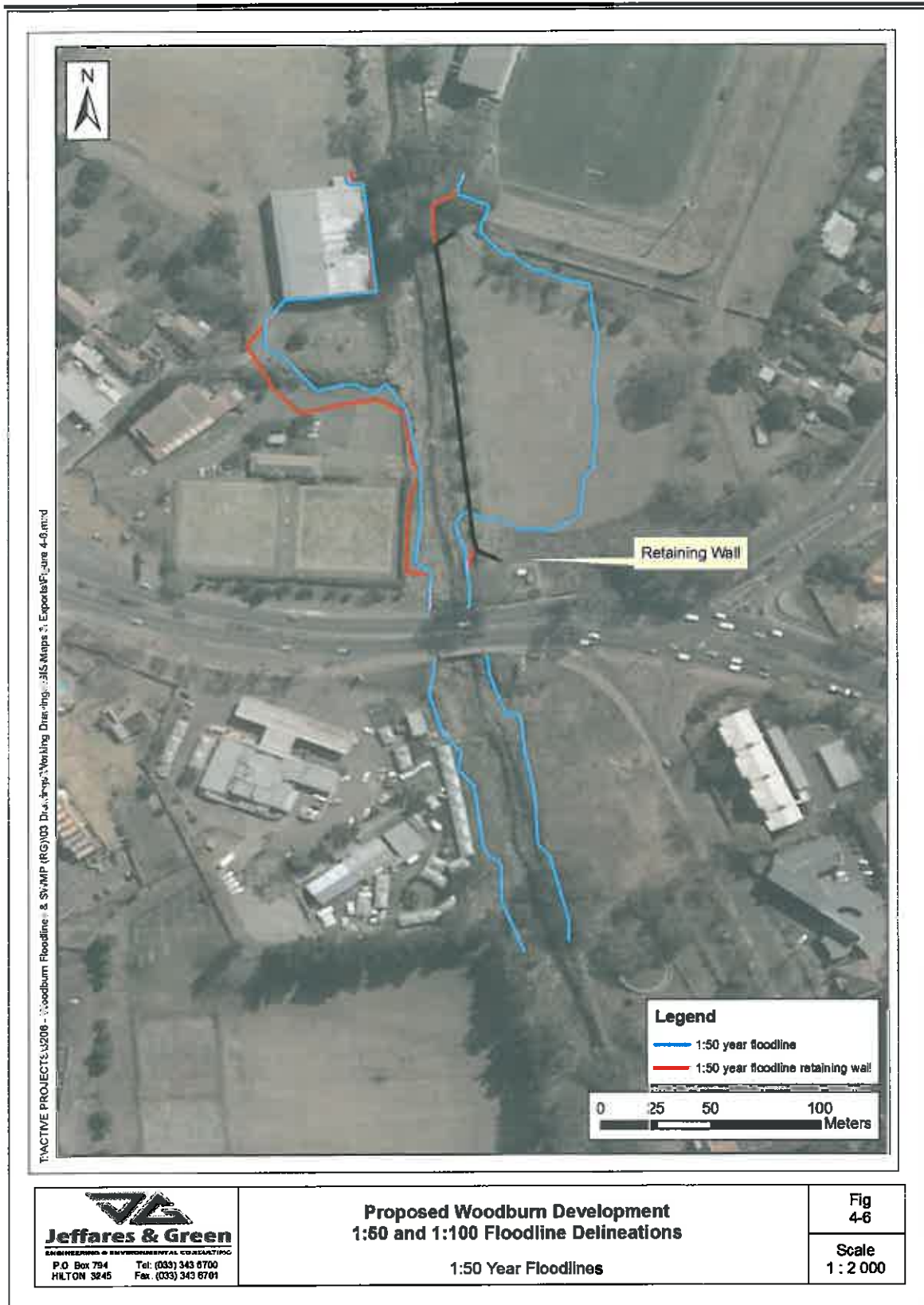


Figure 4-6 The 1:50 Year Floodlines for the Proposed Woodburn Development

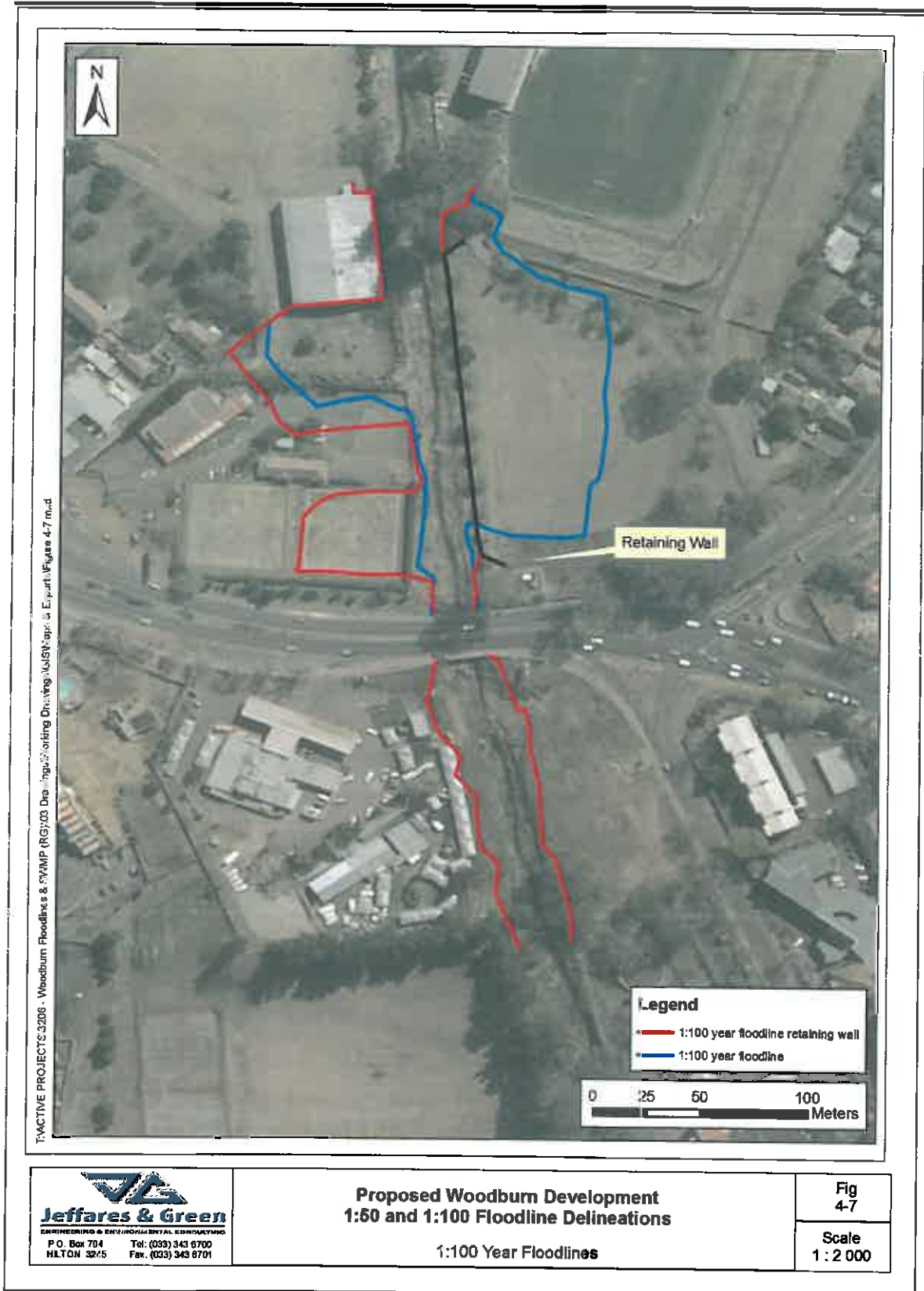


Figure 4-7 The 1:100 Year Floodlines for the Proposed Woodburn Development

5 CONCLUSIONS AND RECOMMENDATIONS

As part of the proposed Woodburn development project, assessments of a stormwater management plan (SWMP) and delineations of the 1:50 and 1:100 year floodlines were undertaken for the Foxhill Spruit River adjacent to the proposed development site. The first part of the investigation was to provide O & T Development with an indication of the stormflow volume generated by the proposed developments. The second part of the investigation was to provide O & T Development with an indication of the extents of the 1:50 and 1:100 year floodlines of the Foxhill Spruit River and to assess the areas of the property that may be vulnerable to inundation in the event of a 1:50 and 1:100 year floods.

The results from the assessment of the SWMP indicated that an additional volume of 1 107 m³ is required to attenuate the impact of the development occurring at the study site. Based on the clients instruction to use the parking areas as attenuation storage facilities, it is proposed that an outlet with a 0.4 m diameter pipe (Pipe 1) situated at the invert level of the catch pit. Pipe 1 would need to be positioned 0.6 m below the invert level of the ground level parking lot. In addition, two pipes (Pipes 2 and 3) with a diameter of 0.45 m would need to be placed with their invert levels 0.4 m below the invert level of the ground floor parking level. Pipe 1 would serve as a diversion of a portion of the stormwater resulting from the 1:50 year design flood event to the Foxhill Spruit River at a discharge rate of 0.28 m³/s. This was deemed acceptable as the discharge rate from Pipe 1 (0.28 m³/s) would be less than the pre-development discharge rate of 0.29 m³/s. Pipes 2 and 3 would serve to divert the balance of the stormwater to the basement at a combined rate of 0.42 m³/s.

The release of the 1:50 year design flood waters would be accomplished by 2 pipes (Pipes 4 and 5) with a diameter of 0.3 m installed in a sump 0.4 m meters below the invert level of the basement parking lot. Pipes 4 and 5 would discharge the stormwater from the basement parking lot at a combined rate of 0.22 m³/s. This is less than the pre-development peak of 0.29 m³/s. As mentioned, the development is located adjacent to the Foxhill Spruit River. It is worth noting that the 1:50 and 1:100 year design flood levels result in the submergence of the basement level outlet structures. Thus, the stormwater diverted to the basement level parking lot will need to be retained until the recession of the 1:50 or the 1:100 year design flood waters. Pipes 4 and 5 would need to be fitted with non-return valves that would prevent the Foxhill Spruit River flood waters flowing into the basement parking lot. The discharge rate of Pipe 1 will diminish and eventually stop when the above-mentioned flood water levels have receded (due to the shorter time of concentration of the site in relation to the river) to

an elevation that allows for the release of stormwater stored in the basement parking lot. Thus, the total discharge of Pipes 1, 4 and 5 will not exceed the pre-development peak of 0.29 m³/s. In addition to Pipes 4 and 5 serving as release structures from the basement level parking lot, it is recommended that emergency overflow structures fitted with non-return valves are installed in the sump containing Pipes 1 to 3. The elevations of the outlet structures should be 622 mAMSL and 621.3 mAMSL to prevent their submergence by the 1:100 and 1:50 year design flood levels, respectively. It is recommended that the ground and basement level SWMP infrastructure are installed in the north-west portion of their respective levels. The results of the hydraulic modelling exercise indicate that the flood waters are at the lowest elevation in line with the north-west portion of the basement level parking lot approximately 121 m below the Chief Albert Luthuli Road bridge upstream of the site., hence, providing storm water discharge earlier in the flood event. It should be noted that the ground level catch pit is in close proximity to the shopping area in the north-west portion of the development. It is therefore recommended that the catch pit, outlet pipes and manhole grating (or similar covering) are properly maintained and kept free of debris or other material which may cause as an obstruction to stormwater flow.

The results from the floodline assessment of the 1:50 and 1:100 year design floods indicate that a significant portion of the proposed development site will be inundated by the two afore-mentioned floods. It is proposed that a retaining wall with a minimum height of 1.76m metres be constructed to aid in the prevention of inundation by the 1:50 and 1:100 year design flood events (this excludes freeboard allowances for wind and wave action). Furthermore, no additional structures on the left side of the Foxhill Spruit River are impacted upon by the 1:50 and 1:100 year design floods with the intervention of a retaining wall at the proposed development site. However, the bowling green on the left side of the river will be inundated by the 1:100 year flood waters resulting from the intervention of a retaining wall. It must be noted that this may not occur, but due to the course level of the contour data on the adjacent river bank, it was not possible to confirm this.

The schematics of the plan, long and cross section views (**Figures 4-1 to 4-5**) of the SWMP are for conceptual purposes. The dimensions depicted in the above-mentioned schematics are not to scale. It is recommended that the design engineer takes cognisance of the required pipe, freeboard and slope requirements during the design of the SWMP infrastructure. However, the ultimate detailed design is at the engineer's discretion. Finally, erosion protection measures need to be included at all stormwater outlets discharging into the Foxhill Spruit River (e.g. flow splitters, reno mattresses and gabion baskets).

6 REFERENCES

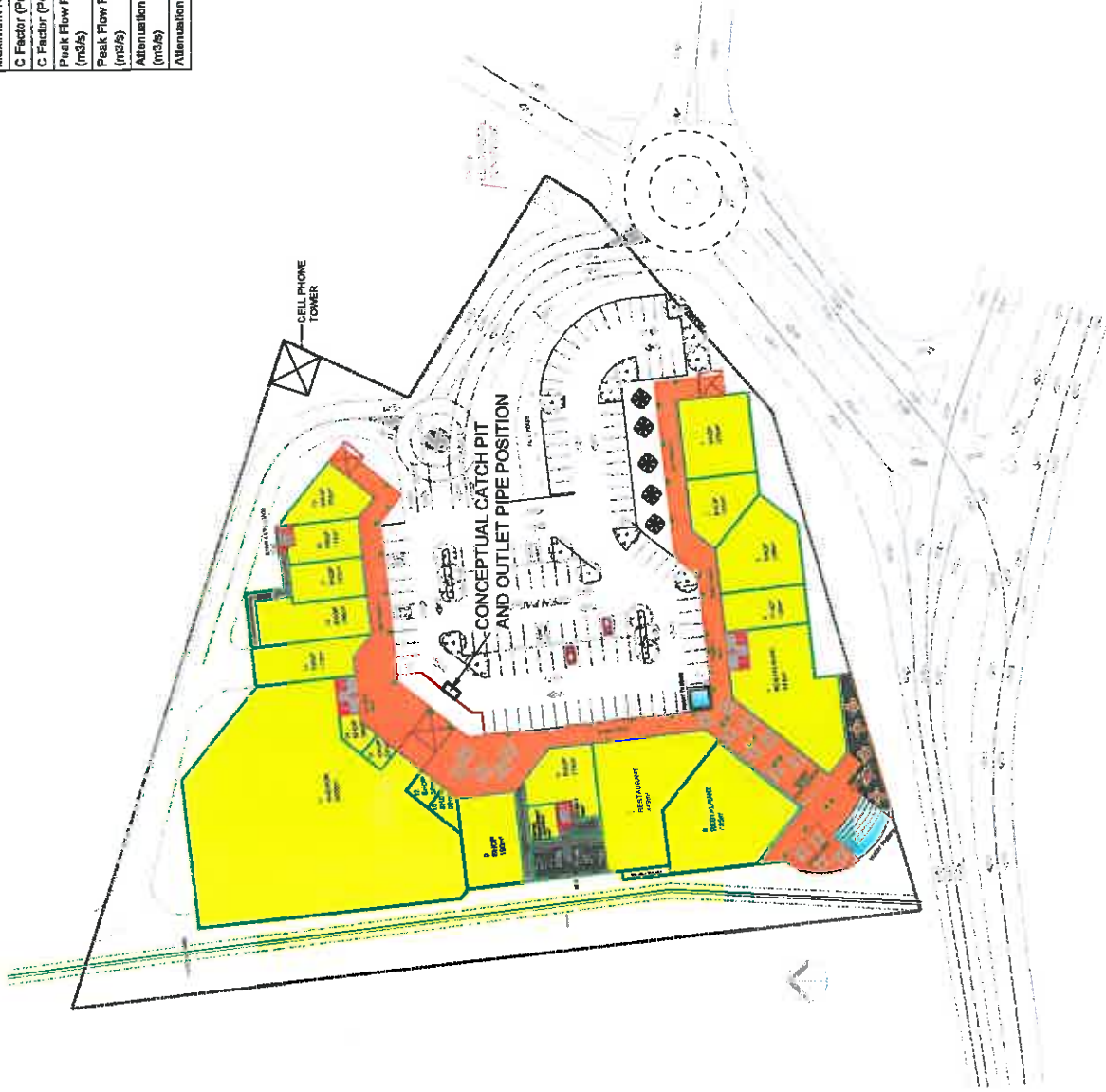
Henderson, F. M. 1966. Open Channel Flow, MacMillan Series in Civil Engineering.

Smithers, J.C. and Schulze, R.E. 2003. Design Rainfall and Flood Estimation in South Africa. Water Research Commission, Pretoria, RSA, WRC Report 1060/1/03. pp 156 plus CD-Rom.

APPENDIX A

Layout Plan of the Ground Level Conceptual Stormwater Management Plan

| | Area km ² | Return Period (years) | | | | | |
|---------------------------------------------------|-------------------------|-----------------------|--------|--------|--------|---------|---------|
| | | 2 | 5 | 10 | 20 | 50 | 100 |
| Maximum Rainfall Intensity | | 51.5 | 75.0 | 94.7 | 117.3 | 165.0 | 196.5 |
| C Factor (Pre-Development) | | 0.35 | 0.35 | 0.35 | 0.35 | 0.35 | 0.35 |
| C Factor (Post-Development) | | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Peak Flow Pre-Development (m ³ /s) | 0.0178 | 0.09 | 0.13 | 0.16 | 0.20 | 0.29 | 0.32 |
| Peak Flow Post-Development (m ³ /s) | 0.0178 | 0.22 | 0.32 | 0.40 | 0.49 | 0.70 | 0.78 |
| Attenuation Requirement (m ³ /s) | | 0.13 | 0.19 | 0.23 | 0.28 | 0.41 | 0.46 |
| Attenuation Requirement (m ³) | | 342.00 | 501.00 | 633.00 | 764.00 | 1197.00 | 1247.00 |



SCALE
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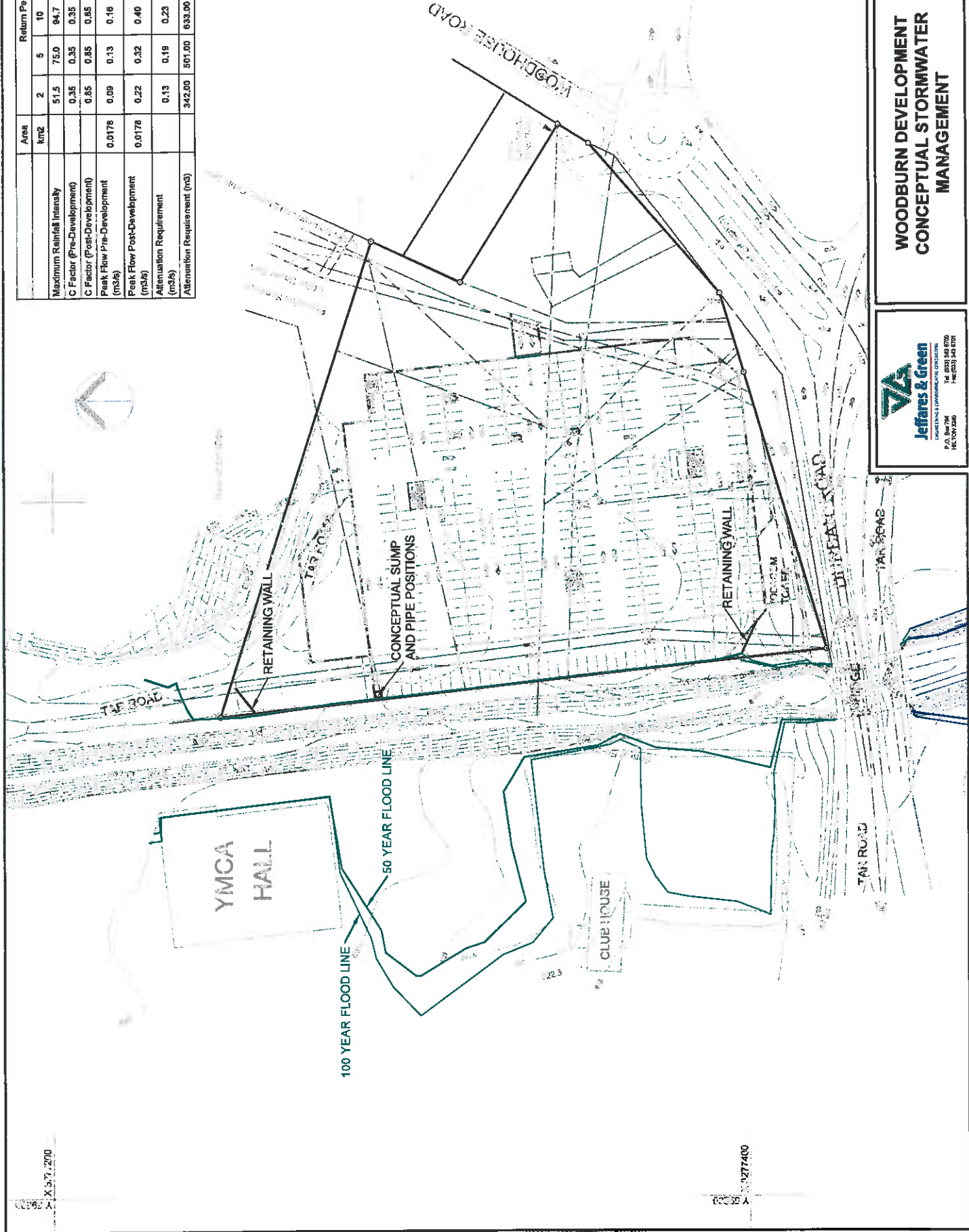
FIG. A-1

**WOODBURN DEVELOPMENT
CONCEPTUAL STORMWATER
MANAGEMENT**

APPENDIX B

**Layout Plan of the Basement Level Conceptual Stormwater Management Plan,
1:50 and 1:100 Year Floodlines and the Proposed Retaining Wall**

| | Area km ² | Return Period (years) | | | | | |
|---------------------------------------------------|-------------------------|-----------------------|--------|--------|--------|---------|---------|
| | | 2 | 5 | 10 | 20 | 50 | 100 |
| Maximum Rainfall Intensity | | 51.5 | 75.0 | 94.7 | 117.3 | 165.0 | 186.5 |
| C Factor (Pre-Development) | | 0.35 | 0.35 | 0.35 | 0.35 | 0.35 | 0.35 |
| C Factor (Post-Development) | | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Peak Flow Pre-Development (m ³ /s) | 0.0176 | 0.09 | 0.13 | 0.16 | 0.20 | 0.29 | 0.32 |
| Peak Flow Post-Development (m ³ /s) | 0.0176 | 0.22 | 0.32 | 0.40 | 0.49 | 0.70 | 0.78 |
| Attenuation Requirement (m ³ /s) | | 0.13 | 0.19 | 0.23 | 0.29 | 0.41 | 0.46 |
| Attenuation Requirement (m ³) | | 342.00 | 501.00 | 633.00 | 764.00 | 1107.00 | 1247.00 |



SCALE
1:1000

**WOODBURN DEVELOPMENT
CONCEPTUAL STORMWATER
MANAGEMENT**

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FIG. B-1

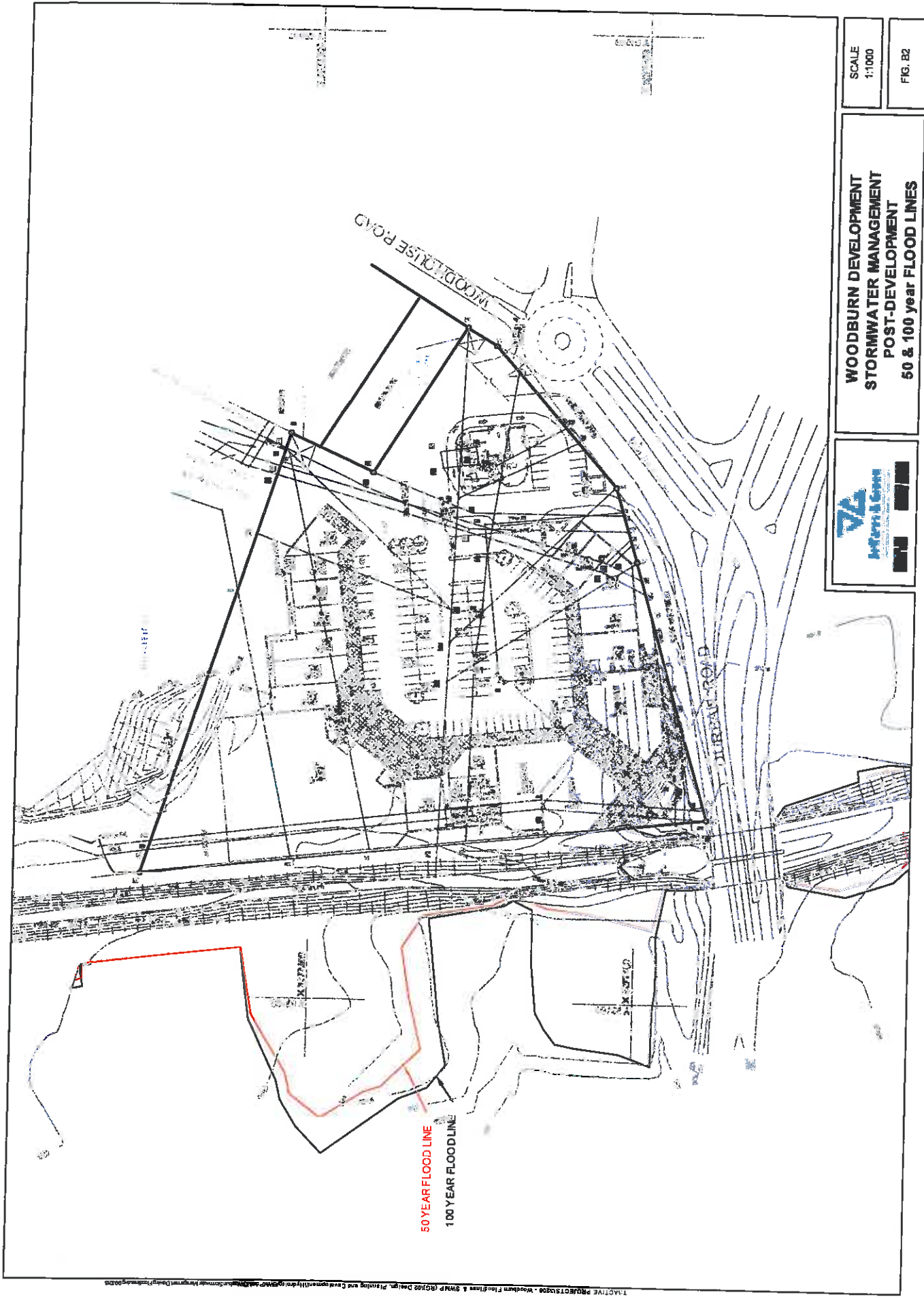
X 537 200
2012

3277430
Y 5322

SCALE
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FIG. B2

**WOODBURN DEVELOPMENT
STORMWATER MANAGEMENT
POST-DEVELOPMENT
50 & 100 year FLOOD LINES**



50 YEAR FLOOD LINE
100 YEAR FLOOD LINE

INACTIVE PROJECTS 2020 - Woodburn Flood Lines & Stormwater Management Design, Planning and Construction - J.A. Jones & Co. Inc. (www.jajones.com)

APPENDIX C

1:50 and 1:100 Year Floodlines of the Proposed Woodburn Development Site

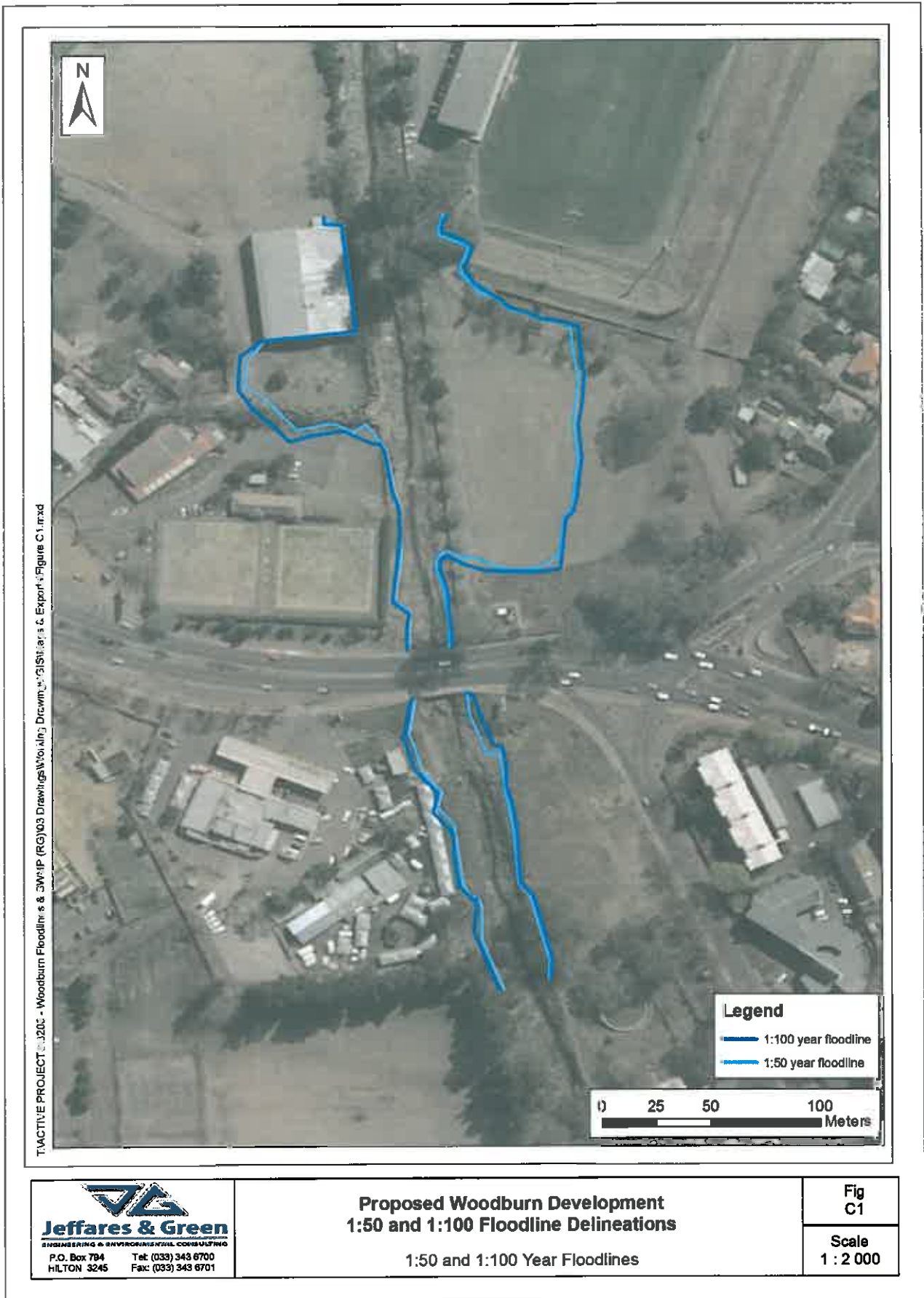


Figure C1 The 1:50 and 1:100 year Floodlines for the Proposed Woodburn Development

APPENDIX D

**1:50 and 1:100 Year Floodlines of the Proposed Woodburn Development Site
With the Proposed Retaining Wall Protection**

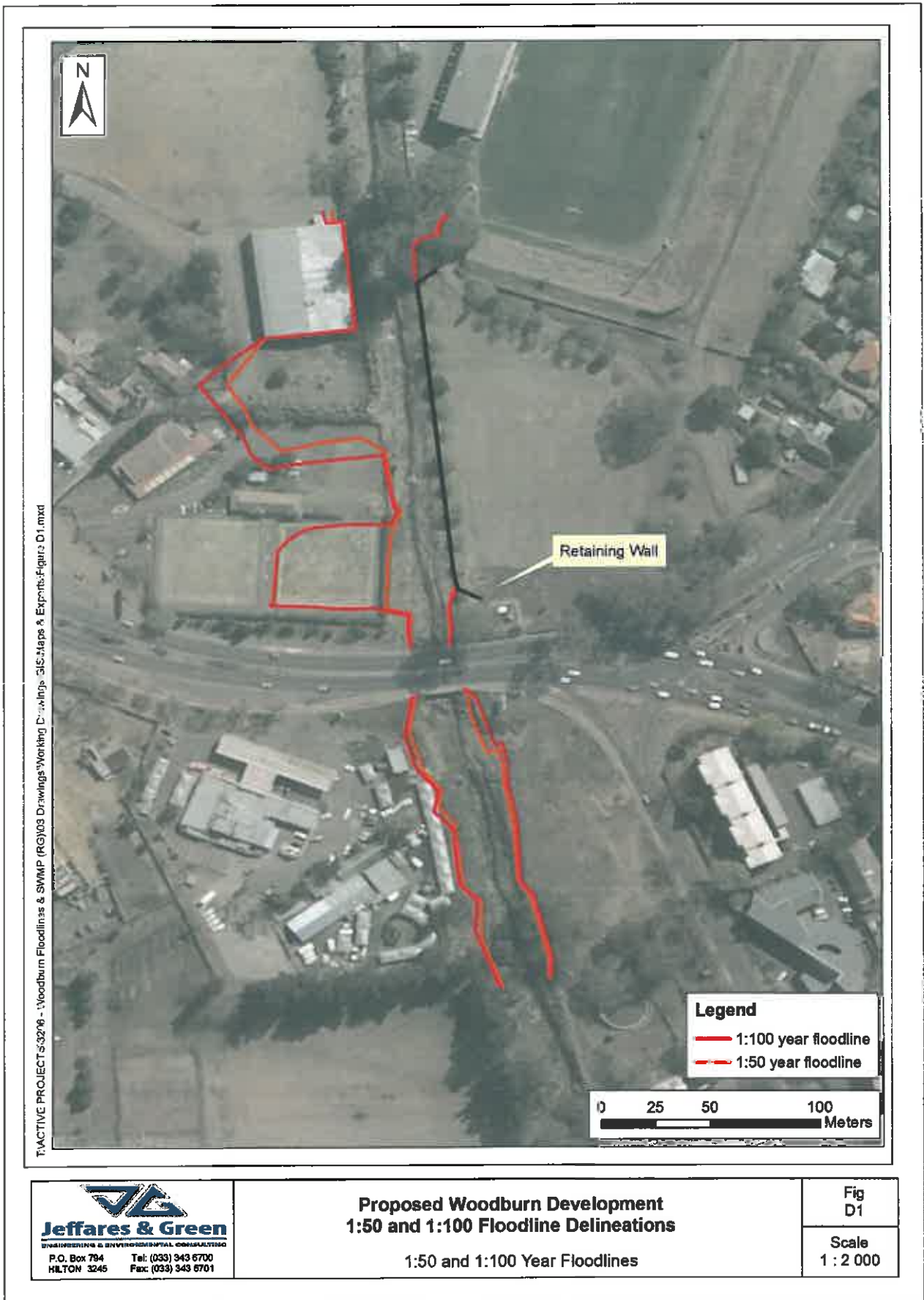


Figure D1 The 1:50 and 1:100 year floodlines and Retaining Wall for the Proposed Woodburn Development

Appendix D2:

Wetland Delineation Assessment

**Proposed Woodburn Boulevard Shopping
Centre, Pietermaritzburg KwaZulu-Natal**

***Specialist Wetland Delineation
Assessment***

Version 1.0

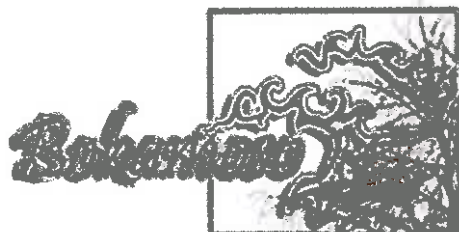


Date: April 2013

Author(s): Adam Teixeira-Leite & Douglas Macfarlane

Report No: EP75-01

Prepared for:



**Landscape Architects &
Environmental Consultants**

by



Date:

April 2013

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SPECIALIST WETLAND DELINEATION REPORT DETAILS AND DECLARATION

| | |
|----------------------------------|------------------------------------------------------------------------------------------------------|
| Document Title: | Proposed Woodburn Boulevard Shopping Centre: <i>Specialist Wetland Delineation Assessment Report</i> |
| Report prepared by: | Adam Teixeira-Leite |
| Field of study/Expertise: | Wetland Ecology |
| Date: | 09 April 2013 |
| Revision Number: | 1 |
| Approved by: | Douglas Macfarlane |
| Date: | 10 April 2013 |
| Signature: |  |
| Client: | BOKAMOSO: Landscape Architects & Environmental Consultants |

I Adam Teixeira-Leite hereby declare that this report has been prepared independently of any influence or prejudice as may be specified by the Department of Agriculture and Environmental Affairs.

Signed: _____



Date: _____

09 April 2013

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DEFINITION OF TERMS

| | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Delineation | Refers to the technique of establishing the boundary of a resource such as a wetland or riparian area. |
| Ecosystem | An ecosystem is essentially a working natural system, maintained by internal ecological processes, relationships and interactions between the biotic (plants & animals) and the non-living or abiotic environment (e.g. soil, atmosphere). Ecosystems can operate at different scales, from very small (eg. a small wetland pan) to large landscapes (eg. an entire water catchment area). |
| Habitat | The general features of an area inhabited by animal or plant which are essential to its survival (ie. the natural "home" of a plant or animal species). |
| Indigenous | Naturally occurring or "native" to a broad area, such as South Africa in this context. |
| Invasive alien species | Invasive alien species means any non-indigenous plant or animal species whose establishment and spread outside of its natural range threatens natural ecosystems, habitats or other species or has the potential to threaten ecosystems, habitats or other species. |
| Transformation (habitat loss) | Refers to the destruction and clearing an area of its indigenous vegetation, resulting in loss of natural habitat. In many instances, this can and has led to the partial or complete breakdown of natural ecological processes. |
| Water course | Means a river or spring, a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks (National Water Act, 1998). |
| Wetland | Refers to land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil (NWA, 1998). |

ABBREVIATIONS USED

| | |
|--------------|------------------------------------------------------------------------------------------------------------------------|
| DEAT | Department of Environmental Affairs & Tourism (now DEA) |
| DWA | Department of Water Affairs (formerly DWAF) |
| FW | Facultative wetland species - usually grow in wetlands (67-99% occurrence) but occasionally found in non-wetland areas |
| GIS | Geographical Information Systems |
| GPS | Global Positioning System |
| IAPs | Invasive Alien Plants |
| KZN | Province of KwaZulu-Natal |
| NEMA | National Environmental Management Act No.107 of 1998 |
| NWA | National Water Act No.36 of 1998 |
| Ow | Obligate wetland species - almost always growing in wetlands (>90% occurrence) |
| SANBI | South African National Biodiversity Institute |

1 INTRODUCTION

1.1 Background to the assessment, area of study and proposed development activity

Eco-Pulse Consulting Services was appointed by Bokamoso: Landscape Architects & Environmental Consultants to conduct a wetland delineation study for the proposed Woodburn Boulevard Shopping Centre. The project area shown in Figure 1 is located on portion 5 of ERF 5346, corner of Woodhouse Road and Alan Paton Drive, Pietermaritzburg, KwaZulu-Natal.

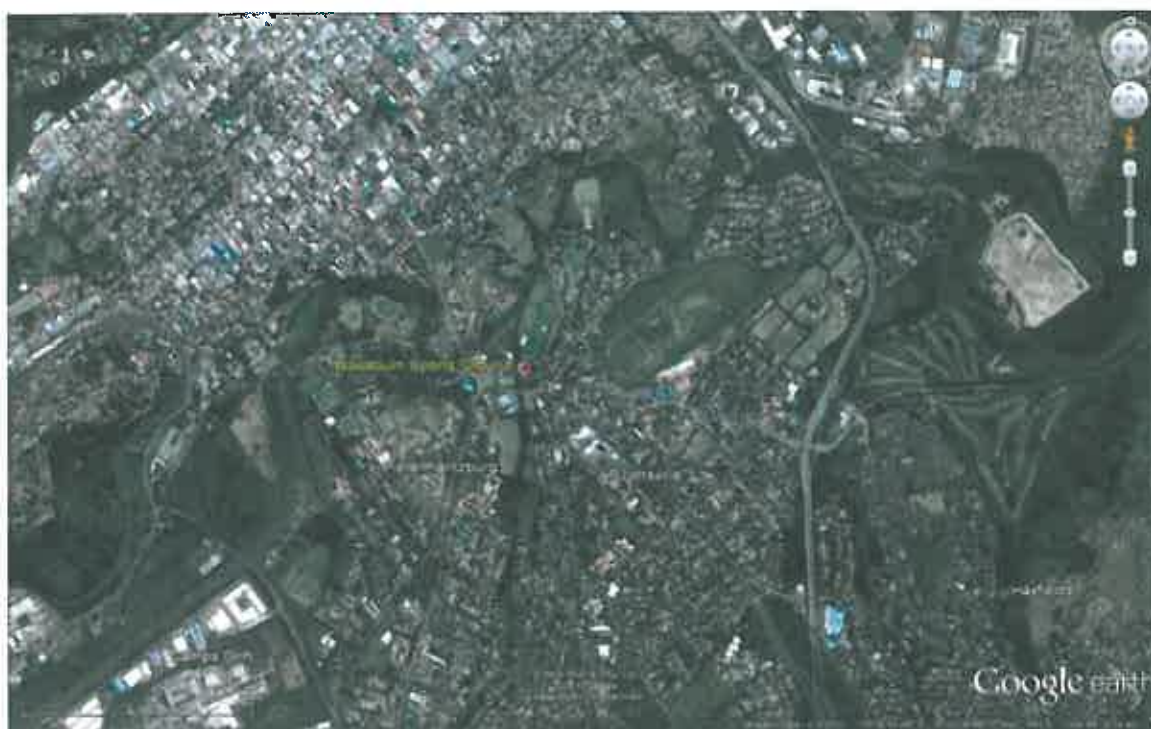


Figure 1 Google Earth™ map showing the location of the project area (Woodburn Sports Ground) in Pietermaritzburg, KwaZulu-Natal.

1.2 Scope of work

The focus of work was to undertake wetland delineation on the site of the proposed Woodburn Boulevard Shopping Centre. The scope of work included:

- Field visit by wetland ecologist to verify and delineate wetland habitat within the development zone according to the methods contained in the manual 'A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (DWAF, 2005);
- GIS mapping of the outer wetland boundary (boundary between temporary wetland and terrestrial areas);
- Brief description of wetland soils, habitat and vegetation;

- Drafting of a specialist wetland delineation report documenting the methodology and findings of the wetland delineation assessment, including all relevant wetland delineation maps.

1.3 Project team

Details of project team members involved in the project are indicated below in Table 1:

Table 1. Details of team members

| Team Member | Qualifications | Details |
|------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Douglas Macfarlane (Eco-Pulse) | BSc (Agric) MSc | Douglas Macfarlane is a Principal Scientist at Eco-Pulse and the director of the company. His qualifications include a BSc in Wildlife science (completed Summe Cum Laude) and an MSc in Environment & Development. He is a registered Professional Natural Scientist in the field of Ecological Science, having worked both in the corporate sector and consulting environment. He has been working in the field of wetland and ecological assessments for over 10 years. He was responsible for finalisation and review of the report. |
| Adam Teixeira-Leite (Eco-Pulse) | BSc Hons (Envs) | Adam is an employee at Eco-Pulse and Environmental Scientist with a BSc Honours degree in Environmental Science. Over the past 5 years he has worked extensively on numerous wetland projects requiring the delineation of wetlands and assessment of wetland functional importance and sensitivity, as well as wetland rehabilitation planning, in KwaZulu-Natal, the Western Cape and Eastern Cape and in Gauteng. Adam has also been recently involved in projects requiring the assessment of terrestrial and aquatic biodiversity involving both desktop analysis and field verification as well as in the development of a Biodiversity Sector Plan for the Ugu District Municipality. He has also been extensively involved in vegetation assessments and alien invasive plants surveys and nursery audits for eThekweni Municipality. He was responsible for undertaking the field work and drafting this report. |

2. METHODOLOGY

2.1 Data sources consulted

The following data sources and GIS spatial information provided in Table 2 below was consulted to inform the assessment. The data type, relevance to the project and source of the information has been provided.

Table 2. Information and data coverage's used to inform the wetland assessment

| DATA/COVERAGE TYPE | RELEVANCE | SOURCE |
|----------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------|
| Colour Aerial Photography (2009) | Mapping of wetlands and other features | National Geo-Spatial Information |
| Latest Google Earth™ Imagery | To supplement available aerial photography where needed | Google Earth™ On-line |
| 5m Elevation Contours | To assist with desktop mapping of wetlands, delineation of catchments and calculation of slope/gradients | Surveyor General |

2.2 Methods used

2.2.1 Wetland Delineation

The outer boundary of wetlands occurring on the site was identified and delineated according to the Department of Water Affairs wetland delineation manual 'A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (DWAF, 2005). Three specific wetland indicators were used in the detailed field delineation of wetlands, which include:

➤ **Terrain unit indicator**

A practical index used for identifying those parts of the landscape where wetlands are likely to occur based on the general topography of the area.

➤ **Wetland vegetation indicator**

Vegetation in an untransformed state is a useful guide in finding the boundary of a wetland as plant communities generally undergo distinct changes in species composition as one proceeds along the wetness gradient from the centre of a wetland towards adjacent terrestrial areas. An example of criteria used to classify wetland vegetation and inform the delineation of wetland zones is provided in Table 3.

Table 3. Criteria used to inform the delineation of wetland habitat based on wetland vegetation (adapted from Macfarlane *et al.*, 2008 and DWAF, 2005)

| Vegetation | Temporary wetness zone | Seasonal wetness zone | Permanent wetness zone |
|-------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Herbaceous | Mixture of non-wetland species and hydrophilic plant species restricted to wetland areas | Hydrophilic sedges and grasses restricted to wetland areas | Emergent plants including reeds and bulrushes; floating or submerged aquatic plants |
| Woody | Mixture of non-wetland and hydrophilic species restricted to wetland areas | Hydrophilic woody species restricted to wetland areas | Hydrophilic woody species restricted to wetland areas with morphological adaptations to prolonged wetness (e.g.: prop roots) |
| SYMBOL | HYDRIC STATUS | DESCRIPTION/OCCURRENCE | |
| ow | Obligate wetland species | Almost always grow in wetlands (>90% occurrence) | |
| fw | Facultative wetland species | Usually grow in wetlands (67-99% occurrence) but occasionally found in non-wetland areas | |
| f | Facultative species | Equally likely to grow in wetlands (34-66% occurrence) and non-wetland areas | |
| fd | Facultative dry-land species | Usually grow in non-wetland areas but sometimes grow in wetlands (1-34% occurrence) | |
| d | Dryland species | Almost always grow in drylands | |

➤ **Soil wetness indicator**

According to the wetland definition used in the National Water Act (NWA, 1998), vegetation is the primary indicator which must be present under normal circumstances. However, in practice the soil

wetness indicator (informed by investigating the top 50cm of wetland topsoil) tends to be the most important, and the other three indicators are used to refine the assessment. The reason for this is that vegetation responds relatively quickly to changes in soil moisture and may be transformed by local impacts; whereas the soil morphological indicators are far more permanent and will retain the signs of frequent saturation (wetland conditions) long after a wetland has been transformed/drained (DWAF, 2005a). Thus the on-site assessment of wetland indicators focused largely on using soil wetness indicators, determined through soil sampling with a soil auger, with vegetation and topography being a secondary indicator. A Munsell Soil Colour Chart was used to ascertain soil colour values including hue, colour value and matrix chroma as well as degree of mottling in order to inform the identification of wetland (hydric) soils. Soil sampling points were recorded using a GPS (Global Positioning System) and captured using Geographical Information Systems (GIS) for further processing. An example of soil criteria used to assess the presence of wetland soils is provided below in Table 4 while Figure 2 provides a conceptual overview of soil and vegetation characteristics across the different wetness zones.

Table 4. Soil criteria used to inform wetland delineation using soil wetness as an indicator (after DWAF, 2005)

| Soil depth | Temporary wetness zone | Seasonal wetness zone | Permanent wetness zone |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 – 10cm | Matrix chroma: 1- 3 (Grey matrix <10%) Mottles: Few/None high chroma mottles Organic Matter: Low Sulphidic: No | Matrix chroma: 0- 2 (Grey matrix >10%) Mottles: Many low chroma mottles Organic Matter: Medium Sulphidic: Seldom | Matrix chroma: 0- 1 (Prominent grey matrix) Mottles: Few/None high chroma mottles Organic Matter: High Sulphidic: Often |
| 30 – 50cm | Matrix chroma: 0 – 2 Mottles: Few/Many | As Above | As Above |

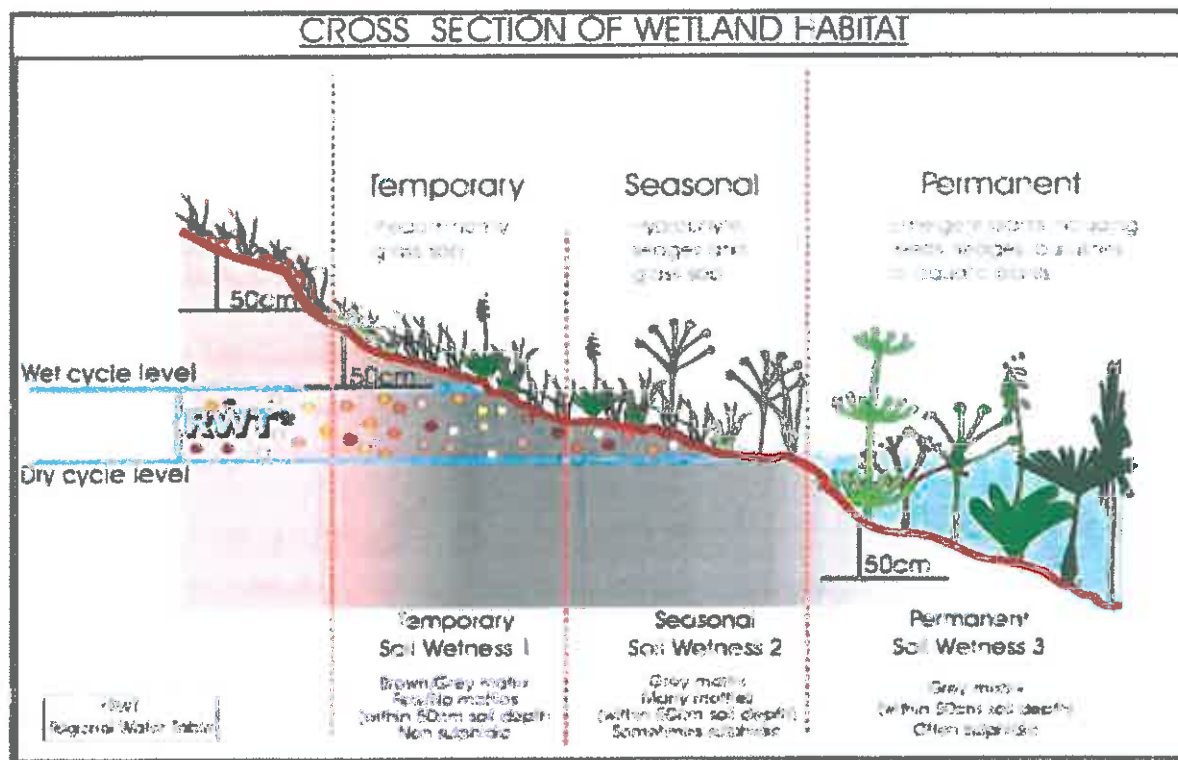


Figure 2 Diagram representing the different zones of wetness found within a wetland (from DWAF, 2005).

3. ASSESSMENT FINDINGS

3.1 Wetland Delineation

A number of soil samples were taken from different sites within the project area as indicated in Figure 3. The findings of the assessment are summarized in Table 5, below. **No wetland habitat was identified at the project site.** The site is a sports field surrounded by planted trees and with an area of alien bush dominated by exotic plants and weeds along the southern boundary. A small stream is located outside of the western fenceline, immediately adjacent to the property.

Table 5. Summary of findings of the delineation study at Woodburn

| Component Assessed | Summary of Findings | Results Indicate wetland? |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Terrain | The topography of the site is very flat and raised above the floodline of the adjacent stream (Photo 1). The terrain is largely unfavourable for wetland formation. | No |
| Soils | Soils are highly compacted and contain gravel and other artificial fill material, indicating these soils have been largely disturbed (Photo 3 & 4). Soils are dry clay-loams. Soils sampled are not indicative of hydric conditions at the site as they do not display typical signs of wetness: | No |

| Component Assessed | Summary of Findings | Results Indicate wetland? |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| | <ul style="list-style-type: none"> • Soils do not contain any mottling • Soils are dry (little soil moisture) and have an estimated low organic content • Soils are not sulphidic • Soil value and matrix chroma are too high to be considered wetland soil type <ul style="list-style-type: none"> ○ Hue: 7.5YR ○ Value: 5-6 ○ Chroma: 2-3 ○ Colour: brown to light-brown | |
| <p>Vegetation</p> | <p>Vegetation comprises a combination of indigenous and exotic grasses and a variety of exotic herbaceous plants (Photo 2). None of these plant species are indicative of wetland habitat and are dryland species that indicate terrestrial (non-wetland) habitat conditions at the site. For a list of the plant species occurring at the site, refer to Annexure A at the back of this report.</p> | <p>No</p> |



Figure 3 Map showing the location of soil sampling sites and photo points.

Site Photos (location of Photo points shown in Figure 3, above)



P1 View West: overview of project area and sports field



P2 View East: alien plants and weeds along southern boundary of the site



P3 Terrestrial soils sampled at the site



P4 Terrestrial soils containing fill material

3.2 Description of stream to the west

The location of the watercourse to the immediate west of the project area is shown in Figure 3 and Photo 5. The watercourse is classified as a stream channel, with the main active channel being between 1 and 2m wide. The channel is incised, with the channel banks being roughly 2.5 – 3m above the active channel bed. The channel is a mixed bedrock-alluvial system and has been subject to artificial canalization. A large amount of artificial materials, building rubble, debris and solid waste has accumulated within the system. The channel banks comprise mainly fine sandy material and are steep sloping. The combination of sandy, erodible material and steep slope means that these slopes are inherently unstable and relatively susceptible to erosion (Photo 6). The vegetation of the stream comprises predominantly alien plants including a variety of aquatic invader species such as *Canna indicand* *Commelina benghalensis*, as well as woody species and herbaceous plants including *Arundo donax*, *Solanum mauritianum* and *Manihot esculenta*. The indigenous component of vegetation is very sparse and includes a few local grasses and sedge species such as *Cyperus sexangularis* and *Sporobolus spp.*



P5 View North: stream channel located immediately west of the property

5. CONCLUSION

The results of the wetland delineation exercise undertaken at Woodburn Sports Ground found that no wetland habitat is currently present on the site. A watercourse (stream) exists outside of the property on the western side and should be managed to prevent negative ecological impacts to this system during the construction & operational phases of the proposed development.

Should you have any queries regarding the findings of this report, please contact Eco-Pulse Consulting.

Douglas Macfarlane, Pr.Sci.Nat.

Principal Scientist

Eco-Pulse Consulting

dmacfarlane@eco-pulse.co.za

6. REFERENCES

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ANNEXURE A: Vegetation species list.

| Botanical name | Common name | Status | Red Data List (SANBI) | General Description |
|-----------------------------------|------------------------------|------------|-----------------------|------------------------------------------------|
| <i>Ageratum conyzoides</i> | Ageratum | Exotic | N/A | Exotic herb |
| <i>Bidens bipinnata</i> | Spanish blackjack | Exotic | N/A | Exotic herb |
| <i>Bidens pilosa</i> | Common blackjack | Exotic | N/A | Exotic herb |
| <i>Cardiospermum grandiflorum</i> | Balloon-vine | Exotic | N/A | Exotic creeper/climber |
| <i>Chloris gayana</i> | Rhodes grass | Indigenous | Least Concern | Indigenous grass |
| <i>Chloris pycnothrix</i> | Spiderweb grass | Indigenous | Least Concern | Indigenous grass |
| <i>Conyza albida</i> | Tall fleabane | Exotic | N/A | Annual weed |
| <i>Conyza canadensis</i> | Horseweed fleabane | Exotic | N/A | Annual weed |
| <i>Cyperus congestus</i> | | Indigenous | Least Concern | Indigenous sedge |
| <i>Cyperus esculentus</i> | Yellow nutsedge | Exotic | N/A | Exotic sedge |
| <i>Eucalyptus grandis</i> | Gum tree | Exotic | N/A | Exotic large tree |
| <i>Ipomoea alba</i> | Moonflower | Exotic | N/A | Exotic creeper |
| <i>Jacaranda mimosifolia</i> | Jacaranda | Exotic | N/A | Exotic large tree |
| <i>Lantana camara</i> | Lantana | Exotic | N/A | Exotic shrub |
| <i>Macfadyena unguis-cati</i> | Cat's claw creeper | Exotic | N/A | Exotic creeper/climber |
| <i>Melia azedarach</i> | Syringa | Exotic | N/A | Exotic tree |
| <i>Melinis repens</i> | Natal red top | Indigenous | Least Concern | Indigenous grass common in disturbed areas |
| <i>Mirabilis jalapa</i> | Four o' clocks | Exotic | N/A | Exotic herb |
| <i>Panicum chinzi</i> | Sweet buffalo grass | Indigenous | Least Concern | Indigenous grass |
| <i>Paspalum dilatatum</i> | Dallis grass/Common paspalum | Exotic | N/A | Exotic grass |
| <i>Paspalum distichum</i> | Water couch grass | Exotic | N/A | Exotic grass occurring in disturbed, wet areas |
| <i>Pennisetum clandestinum</i> | Kikuyu | Exotic | N/A | Exotic grass |
| <i>Plantago lanceolata</i> | Buchhorn plantain | Exotic | N/A | Exotic grass |
| <i>Ricinus communis</i> | Castor Oil Plant | Exotic | N/A | Exotic shrub/tree |
| <i>Solanum mauritanium</i> | Bugweed | Exotic | N/A | Exotic soft-wooded perennial shrub/small tree |
| <i>Solanum sisymbirifolium</i> | Wild tomato | Exotic | N/A | Exotic herb/creeper |
| <i>Sorghum hapeense</i> | Johnson grass | Exotic | N/A | Exotic grass |
| <i>Sporobolus africanus</i> | Rat's tail dropseed | Indigenous | Least Concern | Indigenous grass |
| <i>Sporobolus pyramidalis</i> | Cat's tail dropseed | Indigenous | Least Concern | Indigenous grass |
| <i>Tithonia rotundifolia</i> | Red sunflower | Exotic | N/A | Exotic shrub/small tree |

Appendix D3:

Engineering Input

Lizelle Gregory

From: Ryk Joubert <ryk@brava.co.za>
Sent: 09 May 2012 11:09 AM
To: 'Lizelle Gregory'
Subject: RE: Woodburn Shopping Centre - Portion 5 of Erf 4346
Attachments: Draft Infrastructure report.pdf

Hi Lizelle

Kyk asb na hierdie verslaggie van my en laat weet of dit meeste van die vrae beantwoord

Groete

Ryk

From: Lizelle Gregory [<mailto:lizelleg@mweb.co.za>]
Sent: 08 May 2012 10:46 AM
To: 'Ryk Joubert'
Subject: RE: Woodburn Shopping Centre - Portion 5 of Erf 4346

Ryk,

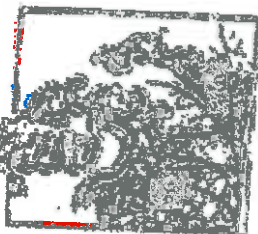
Dankie - dit lyk reg.

Ek het ook bevestiging nodig dat die stormwaterafdeling van die Stadsraad dat hulle die stormwaterbestuurs-konsep ondersteun en dat hulle bevestig dat hulle die ontwikkeling se afval kan ontvang. (Die "Waste Afdeling").

Groete,

Lizelle

Elsa Viviers
Namens toebehore van
Lizelle Gregory



Environmental Consultants &
Landscape Architects

111 27 11 270 5210 11 270 5210 5210 11 270 5210 5210
e: info@berkenhout.co.za / t: 011 270 5210 / f: 011 270 5210

From: Ryk Joubert [<mailto:ryk@brava.co.za>]
Sent: 25 April 2012 12:52 PM
To: 'Lizelle Gregory'
Subject: FW: Woodburn Shopping Centre - Portion 5 of Erf 4346

Hi Lizelle

Sal die onderstaande response van die stadsraad voldoende wees indien ek daarna verwys in my services report?

Groete

Ryk

From: Dhamendra Ragoonandan [<mailto:Dhamendra.Ragoonandan@msunduzi.gov.za>]
Sent: 25 April 2012 12:16 PM
To: Ryk Joubert
Cc: Rodney Colling; Brenden Sivparsad
Subject: RE: Woodburn Shopping Centre - Portion 5 of Erf 4346

This email and all contents are subject to the following disclaimer:
http://www.msunduzi.gov.za/Email_Disclaimer.pdf or send a blank e-mail to disclaimer@msunduzi.gov.za to have the document e-mailed to you.

Hello Ryk

As per our telephonic conversation on the 20/04/2012.

As long as the water and sewerage demand remains the same as the previous application the city can sustain the water and sanitation demand.

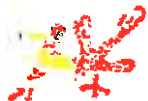
As per your request this is purely for EIA purposes.

Any other requirements from this business unit shall be addressed in the service level agreement.

PS Rodney please take note of this.



DHAMENDRA RAGOONANDAN
MANAGER PLANNING & DESIGN (ACTING)
WATER & SANITATION
TEL : 029 3022115
FAX : 029 3022520
CELL : 082 2050970
email: dhamendra.ragoonandan@msunduzi.gov.za



1820 1820 1820 1820 1820

From: Ryk Joubert [<mailto:ryk@brava.co.za>]
Sent: 25 April 2012 08:48 AM
To: Dhamendra Ragoonandan
Subject: FW: Woodburn Shopping Centre - Portion 5 of Erf 4346

Hi Dees

Any chance that you can still get around to this request of mine before the end of the week?

Regards

Ryk

From: Ryk Joubert [<mailto:ryk@brava.co.za>]
Sent: 20 April 2012 11:54 AM
To: 'dhamendra.ragoonandan@msunduzi.gov.za'
Subject: Woodburn Shopping Centre - Portion 5 of Erf 4346

Hi Dees

As per our telephone discussion this morning herewith the information I need for a new EIA being prepared for the Woodburn Shopping centre

Tony Statakis is still working on the shopping centre development at Woodburn & has commissioned a new EIA as the present one has expired. In order to finalise this report I need to update my services report. The scope of the development hasn't changed and he is still looking at a 6500m².

All that I need is confirmation from the city that:

- That city will/can provide a sewer connection to the site (should not be a problem as a main outfall sewer already crosses the site)
- The city will/can provide a water connection to the site (should also not be a problem as there is water in close proximity to the site and being a commercial development the water demand is fairly low)
- The city can provide solid waste removal services to the development – I don't know if you can help with this but maybe you can point me towards the right person.

I have already spoken to the roads & stormwater branch & have the city's requirements from Hoessein Essop which I will work into my report.

I already have confirmation of the above, but the EIA process requires confirmation to these facts that isn't older than 6 mths, so hence my request for updated confirmation.

The electrical engineer is dealing with the electrical supply.

Regards

Ryk

Ryk Joubert PrEng

Brava Engineers (Pty) Ltd.
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Tel: +27 33 345 0602 Fax: +27 33 342 7813
Cel: +27 82 552 1743 email: ryk@brava.co.za

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1 INTRODUCTION

This report has been prepared in response to O&T Developments (Pty) Ltd's intention to develop a new upmarket shopping complex on Portion 5 of Erf 4346, Pietermaritzburg.

The development will comprise an upmarket convenience shopping centre of extent 6500m² with associated parking facilities.

2 SITE DESCRIPTION AND GEOLOGY

The site is a 17 827m² open space which has already been incorporated in the Msunduzi Municipality Town Planning Scheme as a Special Area 30 development zone. The site is a levelled platform under grass and was previously used for sport and recreation.

The natural topography of the site has been heavily disturbed. A large level platform was prepared on the site for use as a sports field. The platform was created by cutting away the existing soil to an unknown spoil site, leaving the new embankment level below the original 1:50yr floodline of the Foxhill Stream.

Grass lands cover the majority of the site with a clump of old Eucalyptus trees on the eastern boundary.

The 1:250 000 geological mapping of the area reveals that the site is generally underlain by shales of the Pietermaritzburg Formation of the Ecca Group.

Extensive alluvial terrace deposits are however associated with the confluences of the major rivers of the area and it is expected that this may occur on this site. The alluvium consists of interlayered dark grey-brown, brown or red-brown silty and sandy clay as well as clayey to silty sands. It varies in thickness from between 2m and 8.5m and some exposures the alluvial boulder can be expected.

A detailed geotechnical investigation hasn't been commissioned but no areas of slope instability or unsuitable soil conditions are expected.

A flood line analysis of the Foxhill Stream has been undertaken. Due to the extensive earthmoving operations the natural ground levels have been disturbed to such an extent that the largest portion of the site now lies below the 1:10yr flood line.

3 PROPOSED INFRASTRUCTURE

3.1 Roads and Storm Water

3.1.1 Access

A traffic impact assessment for the site was undertaken by WSP. The study identified the following access points:

- a) Access onto the site off the east bound carriageway of Allen Paton Avenue
- b) Access onto and from the site off Woodhouse Road

3.1.2 Internal Roads

The internal roads would be blacktopped roads designed according to the capacity requirements of Traffic Impact Assessment.

3.1.3 Stormwater Management

The site is upstream of the Duzi River and Foxhill Stream confluence and is known to be at risk of flooding. The 1:10, 1:20, 1:50 and 1:100 yr flood lines for the Foxhill Stream were calculated and the drawing showing the flood lines is attached to this report. This drawing shows that the largest part of the developable land is within the flood lines.

The situation has been made worse by the extensive earthworks operations carried out to create a level platform. The natural ground levels have been lowered to below the 1:10yr flood line while in its original state the site would have been above the 1:50yr flood line.

It has however always been the intention that any development on the site would be built above the 1:50yr flood line and that to achieve this, the development would be constructed on columns with no other permanent structures within the 1:50yr flood line. This principle was approved by the DPA when they approved the rezoning and subdivision of the land in 2001.

Subsequent to the approval various pieces of legislation governing the development of land has changed significantly. With regards to storm water management, the local authority now requires that for any new development the post development 1:50yr storm water discharge does not exceed the pre development 1:50yr storm water discharge.

To comply with this requirement, it is necessary to attenuate the runoff and this is normally achieved by providing a detention facility. To cater for a 1:50yr flood, the detention facility should be constructed above 1:50yr flood line if it is to be effective.

This can only be achieved by either raising the natural ground levels to above the 1:50yr flood line or by creating sufficient storage in the parking area on the development ground floor. In this development the natural ground level is in fact a basement level which will be below the 1:50yr flood if left as is.

Should it be decided that the most economical and practical solution to attenuate the storm water is to raise the level of the ground to above the 1:50yr flood line, additional flood line studies will be required to determine the effect on the upstream and downstream land owners.

The final solution is beyond the scope of this report and will be addressed in detail during the design of the facility when a storm water management plan will be

prepared for the development. It is however sufficient to say that a suitable solution can be engineered.

3.2 Services

3.2.1 Water Supply

The Msunduzi Municipality is the water supply authority and they have indicated that they could provide potable water to the development

3.2.2 Sanitation

The Msunduzi Municipality is responsible for sewage reticulation in the city and they have indicated that they have sufficient capacity in their network to accommodate the new development

Ungeni Water is responsible for the treatment of the effluent and is presently busy with a major upgrade of the Darwill Waste Water plant and no development constraints are expected.

3.2.3 Electrical

Msunduzi Municipality is the service provider. A separate report has been prepared by the electrical consultants

3.2.4 Solid Waste Removal

Msunduzi Municipality is responsible for the solid waste removal and disposal within the municipal boundaries. The site is already serviced by this department and any further developments will not be an added burden to the service.

Waste collection for the development will be designed to be compatible with the systems and resources of the municipality.

4 Conclusion

With careful planning and due consideration for the sensitive nature of the site, there is no reason to believe that the proposed development cannot take place as envisaged.

Appendix D4:

Traffic Impact Study

Traffic Impact Study



WOODBURN SHOPPING CENTRE

PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

NOVEMBER 2010

Revision 1

TRAFFIC →

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- Annexure B** **Draft Site Development Plan**
- Annexure C** **Relevant outputs of the SIDRA5 intersection capacity analysis**

1 INTRODUCTION

1.1 Purpose

WSP SA Civil and Structural Engineers (Pty) Ltd was appointed by Venture Properties to conduct a Traffic Impact Study (TIS) for the proposed new Woodburn Shopping Centre situated on Portions 3 & 4 (i.e. to be consolidated to Portion 5) of Erf 4346 Pietermaritzburg FT. A first TIS submission was made to the Msunduzi Council's Department of Roads, Transport and Public Works in September 2009. This report is an amended TIS that deals with the comments received from the Council. Refer to Annexure A for the comments received from the Council.

1.2 Locality

The proposed development is situated on Portion 5 of Erf 4346 Pietermaritzburg FT (See Figure 1: Locality Plan).

The site is bounded by:

- a. The remainder of Erf 4346 and Portion 16 of Erf 567 to the north;
- b. Woodhouse Road to the east;
- c. Alan Paton Avenue (R103) to the south and
- d. The remainder of Erf 1000 to the west

1.3 Scope

The study covers the following aspects:

- a. Description of the development;
- b. Traffic surveys and data;
- c. Trip generation, distribution and assignment;
- d. Assessment of operational conditions at critical points in the road infrastructure;
- e. Comments on public transport and the accommodation of pedestrians;
- f. Comments on parking, internal circulation and loading/unloading and
- g. Conclusions and recommendations.

2 PROPOSED DEVELOPMENTS & SURROUNDING ROAD NETWORK

2.1 Description of Proposed Development

The proposed development on Portion 5 of Erf 4346 Pietermaritzburg is for the purposes of a shopping centre which includes a sit-down/drive-thru restaurant. Refer to Annexure B for copy of the Draft Site Development Plan (SDP). Table 2.1 contains details of the proposed development.

Table 2.1: Proposed Development

| Development Control | Description |
|---------------------|--------------------------------------------------------------------------------------------------------------|
| Size of Stand | 17 820 m ² |
| Zoning | Business, Motor showroom, Ancillary motor workshop, Restaurants, Shops. |
| Land Use | (1) Shopping Centre = 6100m ² GLA (2) Restaurant (sit-down/drive-thru) = 400m ² GLA |
| Coverage | 13 000m ² (permissible) |
| Storeys | 1 storey (permissible) |
| On-site parking | 1,2m ² gross parking for every 1m ² of gross floor area |

Note: (1) GLA – Gross Leasable Area

The following comments can be made regarding Table 2.1:

- e. The proposed development is a total of 6500m² GLA in extent;
- f. The total number of parking bays required is 6500m² GLA x 1,2m² per 1m² GLA = 7800m² of parking area. If it is assumed that one parking bay covers approximately 22m² then a total of 355 parking bays will be required for the proposed development.

2.2 Development Scenario

For the purposes of this study it will be assumed that the proposed development will occur in a single phase. The base year for the traffic impact study is considered to be 2010.

The proposed development may be considered small from a trip generation point of view (< 2000 peak hour vehicle trips). The horizon year for this traffic impact study is considered to be 2015 (base year + 5 years) as per the Manual for Traffic Impact Studies.¹

2.3 Other Proposed Developments

The memorandum received from the Council dated 25 August 2010 (Refer to Annexure A) states the following with regards to other proposed developments; "the ... master plan shows proposed development on Ptn 1, Ptn 2 and Rem which have not been taken into account on the TIA (i.e. the WSP TIS of September 2009)".

The above statement resulted in discussions with the developer of the proposed Woodburn Shopping centre and again with the council. The said developer stated that although the master plan may indicate proposed developments on Ptn 1, Ptn 2 and Rem that these developments have not been approved and is not likely to take place in the near future.

A subsequent letter received from the council dated 26 October 2010 (Refer also to Annexure A) states; "Regardless of other portions not earmarked for development in the near future, the TIA and or the new traffic counts need to be undertaken and incorporate the following major intersections (at least) as they are the most critical: .../Woodhouse/Boshoff intersection... and ... Alan Paton.../Woodhouse... intersection."

This revised TIS therefore does not consider any other specific future developments in the area, as there is none that is approved. However, provision for other proposed development in the area is catered for in the normal background traffic growth as reflected in Section 3.4 of this report.

2.4 Existing Road Network

The following roads may be impacted by the proposed development.

- 1. Alan Paton Avenue (R103) – Class 2 (Metropolitan Distributor);
- 1. Alexandra Road (R56) – Class 2 (Metropolitan Distributor);
- 2. Leinster Road - Class 4 (Urban Collector);
- 1. New England Road - Class 4 (Urban Collector) and
- 2. Boshoff Street/Survey Road - Class 4 (Urban Collector).

For the surrounding area road network refer to Figure 1.

¹ Manual for Traffic Impact Studies, Report RR83/835, Department of Transport, October 1995.

2.5 Site Access

It is the developer's intention to apply for access to the proposed development as follows (Refer to Figure 2):

- ☐ **Access 1:** A full access onto the exiting priority control intersection of Durban Road/Woodhouse Road/New England Road. The proposal is to change the existing intersection control to roundabout control in order to accommodate the access to the proposed development and
- ☐ **Access 2:** Provide a "left in only" access to the development Alan Paton Avenue / Durban Road just west of the intersection with Leinster Road.

3 TRAFFIC FLOWS & TRIP GENERATION

3.1 Existing Traffic Flows

Traffic counts were carried out during the morning and afternoon peak periods, as follows:

- Intersection 1: Alan Paton Avenue (R103) and Alexandra Road (R56) signalised intersection (15:30– 18:30 on Friday 3 July 2009 and 10:30 – 14:00 on Saturday 4 July 2009);
- Intersection 2: Alan Paton Avenue (R103) and Lombard Road signalised intersection (15:30– 18:30 on Friday 3 July 2009 and 10:30 – 14:00 on Saturday 4 July 2009) AND (15:00– 18:30 on Friday 5 November 2010 and 10:00 – 14:00 on Saturday 6 November 2010);
- Intersection 3: Durban Road/Woodhouse Road and New England Road (R56) priority controlled intersection (15:30– 18:30 on Friday 3 July 2009 and 10:30 – 14:00 on Saturday 4 July 2009);
- Intersection 4: Woodhouse Road and Brohoff Street/Survey Road signalised intersection (15:00– 18:30 on Friday 5 November 2010 and 10:00 – 14:00 on Saturday 6 November 2010);

The traffic counts at intersections 1 and 2 were associated to 2010 counts based on the 2009 to 2010 escalation figures derived from intersection 2. The resulting peak hour traffic volumes at the intersections in the vicinity of the site are summarised in Figure 3.

3.2 Development Trip Generation

The proposed development on Portion 5 of Erf 4346 Pietermaritzburg is for the purposes of a shopping centre which includes a sit-down/drive-thru restaurant as mentioned in Section 2.1 of this report.

The guideline document of the Department of Transport, entitled "South African Trip Generation Rates (SATGR)"² was used for establishing the trip generation rates for the proposed development in the critical morning and afternoon peak hours. The manual recommends that the 75th percentile equations be used to calculate the trip generation rate for shopping/retail centres for design purposes with a 50:50 directional split as follows:

$$\text{Friday PM-Peak: } TGR_{75th} = 224.5 \times GLA^{-0.34}$$

² South African Trip Generation Rates, 2nd Edition, Report RR92/228, Department of Transport, June 1995.

■ Saturday Peak: $TGR_{7th} = 250.2 \times GLA^{-0.30}$

With:

TGR – Trip Generation Rate per 100m² GLA and

GLA – Gross Leasable Area

For fast food restaurants the manual recommends a Friday afternoon peak hour trip generation rate of 29.7 trips per 100m² GLA. No suitable trip generation rate could be obtained for the Saturday peak period. A trip generation rate of 50% of that of the Friday afternoon is assumed to be applicable, namely 17.8 trips per 100m² GLA. The resulting trip generation rates for the proposed development is summarised in Table 3.1.

Table 3.1: Trip Generation Rates

| Land Use | Unit | Recommended Trip Generation Rates | | |
|----------------------|--------------------------------------|-----------------------------------|-------|--------------------------|
| | | Period | Rate | Direction Split (In/Out) |
| Retail | 100m ² GLA ⁽¹⁾ | Friday PM-Peak | 11.59 | 50:50 |
| | | Saturday Peak | 18.31 | 50:50 |
| Fast Food Restaurant | 100m ² GLA ⁽¹⁾ | Friday PM-Peak | 29.7 | 55:45 |
| | | Saturday Peak | 17.8 | 55:45 |

Note: (1) GLA – Gross Leasable Area

The expected number of trips that will be generated was estimated by applying the trip generation rate to the extent of the proposed development. Table 3.2 contains a summary of the estimated number of trips that will be generated, during the Friday afternoon and Saturday peak hours respectively.

Table 3.2: Trip Generation

| Land Use | Gross Leasable Area (GLA) | Trip Trips Generated | | | | | | | |
|----------------------|---------------------------|----------------------|------------|------------|------------|----------------------|-------------|------------|------------|
| | | Friday PM Peak Hour | | | | Saturday Peak Hour | | | |
| | | Trip Generation Rate | Total | In | Out | Trip Generation Rate | Total | In | Out |
| Retail | 6100 | 11.59 | 708 | 354 | 354 | 18.31 | 1116 | 558 | 558 |
| Fast Food Restaurant | 400 | 29.7 | 119 | 58 | 53 | 17.8 | 71 | 39 | 32 |
| TOTAL | | | 827 | 410 | 407 | | 1187 | 597 | 590 |

Three types of trips are generated by shopping/retail centres:

- **Primary trips:** The visit to the shopping centre is the primary reason for the trip;
- **Pass-by trips:** Motorists are intercepted without diversion by the shopping centre on their way from an origin to a primary destination, which is not the shopping centre and
- **Diverted trips:** Motorists are attracted from neighbouring streets in the vicinity of the shopping centre. These streets have no direct access to the shopping centre and necessitate a diversion to reach the shopping centre.

Diverted and pass-by trips generated by the retail component of the proposed development are considered as trips already present on the road network and are intercepted or diverted to the proposed development. Primary trips are considered as new trips to the proposed development. Based on the SATGR Manual and for the purposes of this study the trip categories for the retail component of the proposed development are as follows:

- **Primary trips (p)** - 42% of generated trips;
- **Pass-by (pb)** - 35% of generated trips and
- **Diverted trips (d)** - 23% of generated trips and

The expected trip generation taking into consideration trip categories for the proposed development are shown in Figures 5a and 5b.

3.3 Trip Distribution

Assumptions on the expected trip distribution were based on the location of the site access in relation to the surrounding road network along with the existing peak period traffic patterns. The expected trip distribution and expected development traffic volumes are shown in Figures 6a and 6b.

3.4 Future Traffic Flows & Growth

Due to the impact of the current economic recession on development the existing 2009 traffic volumes were escalated at an average annual growth rate of 3.0% in order to estimate future horizon year, 2015 background traffic volumes.

Figure 4 depicts the estimated 2015 horizon year traffic volumes.

4 TRAFFIC IMPACT & CAPACITY ANALYSIS

4.1 Road Network Capacity

The analysis of intersections has been carried out using the SIDRA software³ analysis package calibrated as far as possible for local conditions.

For the purposes of this study, the following intersections are considered to be critical, and have been assessed:

- 1. Intersection 1: Alan Paton Avenue (R103) and Alexandra Road (R56) signalised intersection;
- 2. Intersection 2: Alan Paton Avenue (R103) and Leinster Road signalised intersection;
- 3. Intersection 3: Durban Road/Woodhouse Road and New England Road (R56) priority controlled intersection.
- 4. Intersection 4: Woodhouse Road/Boshoff Street signalised intersection.

The following scenarios were considered in the analysis:

- 1. Scenario 1: Existing/Base year (2010) without the proposed development;
- 2. Scenario 2: Base year (2010) with the proposed development;
- 3. Scenario 3: Horizon year (2015) without the proposed development and
- 4. Scenario 4: Horizon year (2015) with the proposed development.

The following parameters were used in the analysis:

- 1. Critical peak hours – Friday afternoon (16:30 to 18:30) and Saturday morning (12:15 to 13:15) peak hours;
- 2. Background traffic growth rate of 3% per annum to escalate existing traffic volumes to the 2015, horizon year;
- 3. Existing control and layout for the intersections analyzed and
- 4. Upgraded control and layouts where relevant for the intersections analyzed.

³ csSIDRA V5 software and manuals, Akcelik and Associates, 2010.

FRIDAY PM-PEAK: The intersection currently operates at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 12.7 seconds and overall volume capacity (v/c) ratio of 0.586. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection currently operates at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 12.3 seconds and overall volume capacity (v/c) ratio of 0.427. None of the individual movements or approaches is predicted to become problematic.

(i) Scenario 2: Base year (2010) with development:

NOTE: It is recommended that the current traffic signal settings be optimized.

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 32.7 seconds and overall volume capacity (v/c) ratio of 0.888. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 28.5 seconds and overall volume capacity (v/c) ratio of 0.713. None of the individual movements or approaches is predicted to become problematic.

(ii) Scenario 3: Horizon year (2016) without development:

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 13.5 seconds and overall volume capacity (v/c) ratio of 0.801. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 13.4 seconds and overall volume capacity (v/c) ratio of 0.422. None of the individual movements or approaches is predicted to become problematic.

(iv) Scenario 4: Horizon year (2018) with development:

NOTE: It is recommended that the developer upgrade the intersection by changing the lane configuration of the north approach through lane to a combined through and right turn lane (Refer to Figure 2). Further it is recommended that the current traffic signal settings be optimized.

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 23.5 seconds and overall volume capacity (v/c) ratio of 0.789. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 21.4 seconds and overall volume capacity (v/c) ratio of 0.661. None of the individual movements or approaches is predicted to become problematic.

4.2.3 Intersection 3: Durban Road/Woodhouse Road and New England Road (R56) roundabout

Annexure C3.1 has reference. The following comments are relevant regarding the analysis of this intersection:

(i) Scenario 4: Horizon year (2014) with development:

NOTE: It is recommended that the developer upgrade the existing intersection to a roundabout control and layout (Refer to Figure 2).

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) A, average delay of 8.7 seconds and overall volume capacity (v/c) ratio of 0.448. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 10.2 seconds and overall volume capacity (v/c) ratio of 0.600. None of the individual movements or approaches is predicted to become problematic.

4.2.4 Intersection 3: Woodhouse Road and Boshoff Street/Survey Road signalised Intersection

Annexures C4.1 to C4.4 has reference. The following comments are relevant regarding the analysis of this intersection:

(v) **Scenario 1: Existing / base year (2010) without development:**

FRIDAY PM-PEAK: The intersection currently operates at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 18.8 seconds and overall volume capacity (v/c) ratio of 0.714. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection currently operates at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 19.6 seconds and overall volume capacity (v/c) ratio of 0.644. None of the individual movements or approaches is predicted to become problematic.

(vi) **Scenario 2: Base year (2010) with development:**

NOTE: It is recommended that the current traffic signal settings be optimized.

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 19.6 seconds and overall volume capacity (v/c) ratio of 0.775. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) B, average delay of 17.8 seconds and overall volume capacity (v/c) ratio of 0.727. None of the individual movements or approaches is predicted to become problematic.

(vii) **Scenario 3: Horizon year (2015) without development:**

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 22.9 seconds and overall volume capacity (v/c) ratio of 0.879. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the Intersection Level of Service probably (LOS) B, average delay of 17.9

seconds and overall volume capacity (v/c) ratio of 0.745. None of the individual movements or approaches is predicted to become problematic.

(vii) **Scenario 4: Horizon year (2016) with development:**

NOTE: It is recommended that the current traffic signal settings be optimized.

FRIDAY PM-PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 25.7 seconds and overall volume capacity (v/c) ratio of 0.901. None of the individual movements or approaches is predicted to become problematic.

SATURDAY PEAK: The intersection is predicted to operate at acceptable traffic flow conditions with the intersection Level of Service probably (LOS) C, average delay of 20.0 seconds and overall volume capacity (v/c) ratio of 0.829. None of the individual movements or approaches is predicted to become problematic.

4.2.5 Operational Assessment Conclusions

According to the Manual for Traffic Impact Studies⁴, it is proposed that a developer mitigate the traffic impact of any proposed development under the following circumstances:

- a. If the Level of Service (LOS) of any element drops below D; or
- b. If the volume to capacity ratio (V/C) of any element increases above 0.95; and
- c. If the contribution of the development is at least 2% of the sum of the critical lane volumes of the elements.

The following comments can be made regarding the above criteria for each of the intersections analyzed:

- a. **Intersection 1 - Alan Paton Avenue (R103) and Alexandra Road (R56) signalised Intersection:** According to the capacity analysis results the west approach right turn is a problematic movement. The proposed development is not envisaged to add any additional traffic volumes to this movement. In fact, due to the effect of traffic diversion (Refer to Figure 5A and 5B), it will actually reduce traffic volumes for the movement. Any mitigation measures required for this movement should therefore be undertaken by the road authorities. The south approach right turn is also predicted to become problematic. The proposed development is predicted to contribute 16% and 26% of the volumes in the base year during the Friday afternoon peak and Saturday peak periods respectively. It is recommended that the developer provide the necessary mitigation measures for this movement.

⁴ Manual for Traffic Impact Studies, Report RR93/635, Department of Transport, October 1995.

- 2. Intersection 2 – Alan Paton Avenue (R103) and Leinster Road signalled Intersection:** According to the capacity analysis results the north approach right turn is a problematic movement. The proposed development is predicted to contribute 36% and 50% of the volumes in the base year during the Friday afternoon peak and Saturday peak periods respectively. The developer should therefore provide the necessary mitigation measures for this movement.
- 3. Intersection 3 – Durban Road/Woodhouse Road and New England Road (R56) roundabout:** The developer should provide the appropriate access to his development.
- 4. Intersection 4 – Woodhouse Road and Roehoff Street/Survey Road signalled Intersection:** This intersection is not predicted to become problematic with or without development traffic.

5 ROAD AND/OR INTERSECTION IMPROVEMENTS

Based on the type and extent of development proposed and the capacity analyses covered in Section 4, it is recommended that the following road and intersection upgrades be undertaken by the developer (Refer to Figure 2):

- ✦ **Intersection 1 - Alan Paton Avenue (R103) and Alexandra Road (R56) signalised intersection:** The south approach right turn movement should be upgraded by constructing a short dedicated right turn lane as indicated in Figure 2. The developer should also optimise the traffic signal settings. The upgrading of the west approach right turn movement should be undertaken by the road authorities.
- ✦ **Intersection 2 - Alan Paton Avenue (R103) and Leinster Road signalised intersection:** The lane configuration of the north approach through movement should be changed to a through/right turn movement as indicated in Figure 2. The developer should also optimise the traffic signal settings.
- ✦ **Intersection 3 - Durban Road/Woodhouse Road and New England Road (R56) roundabout:** Proposed Access 1 to the development should be provided by the developer as indicated in Figure 2 by upgrading the existing intersection to roundabout control.
- ✦ Proposed Access 2 to the development should be provided by the developer as indicated in Figure 2 as a "left in only" Access.

6 PUBLIC TRANSPORT

The proposed development will generate a public transport demand in the vicinity of the proposed development through the creation of employment opportunities such as employees, security personnel and maintenance/domestic staff as well as customers who rely on public transport.

It is recommended that two public transport laybys be provided by the developer along Woodhouse Road together with a pedestrian side walk along the road facing perimeter of the site to make provision for public transport users (Refer to Figure 2).

7 PARKING SITE CIRCULATION AND OFF-STREET LOADING

Parking should be provided on site and in accordance with requirements of the local authorities. According to the National Parking Standards⁵, the parking requirement for small retail centres (< 5 000m² GLA) is 6,0 parking bays/spaces per 100m² GLA. This yields 366 parking bays for a GLA of 6100m². According to our past experience and surveys done for fast-food / drive-thru restaurant developments a minimum of 25 parking bays should be provided. In this particular case, the resultant parking ratio for a total GLA of 400 m² is 6,25 parking bays/spaces per 100m² GLA.

According to the Site Development Plan (Annexure A) on-site parking is provided as follows:

- Shopping centre = 434 parking bays and
- Fast food/drive-thru restaurant = 11 parking bays.

It can therefore be concluded that the total number of parking bays provided is adequate.

Parking bay dimensions on the Site Development Plan appear to comply with the national requirements (5m x 2,5m per bay and module widths of 17,5m).

No detailed geometric layout plan of the proposed internal road layout and junctions is currently available. Due cognisance should however be given to generally acceptable geometric standards for design speeds and design vehicles, roadway widths, alignments and intersection design. Issues such as sight distances, bellmouth radii and intersection geometry will, however, have to be checked for compliance on the detailed layout plan. It is recommended that the provision for loading facilities be evaluated based on generally acceptable geometric standards.

⁵ Parking Standards Report PG 3/85, 2nd Edition, Department of Transport, November 1985.

8 CONCLUSIONS & RECOMMENDATIONS

From the results of the analysis in this study it can be concluded that:

- (i) The proposed development on Portion 5 of Erf 4346 Pietermaritzburg FT is for the purposes of a shopping centre with a sit-down / drive-thru restaurant.
- (ii) The proposed development is predicted to generate 827 vehicle trips/hour during the Friday afternoon peak period and 1187 vehicle trips/hour during the Saturday peak period of which 42% of the trips generated by the shopping centre are considered as new trips.
- (iii) An average background traffic growth rate of 3% per annum has been assumed. This is also considered to cater for the traffic impact of any other future developments in the area.
- (iv) The number of parking bays as per the draft SDP is considered to be sufficient.

It is therefore recommended that:

- (i) The following proposed road upgrading measures be implemented by the developer in order to mitigate the impact of the proposed development:
 - a. **Intersection 1 - Alan Paton Avenue (R103) and Alexandra Road (R56) signalised intersection:** The south approach right turn movement should be upgraded by constructing a short dedicated right turn lane as indicated in Figure 2. The developer should also optimise the traffic signal settings.
 - b. **Intersection 2 - Alan Paton Avenue (R103) and Leinster Road signalised intersection:** The lane configuration of the north approach through movement should be changed to a through/right turn movement as indicated in Figure 2. The developer should also optimise the traffic signal settings.
 - c. **Intersection 3 - Durban Road/Woodhouse Road and New England Road (R56) roundabout:** Proposed Access 1 to the development should be provided by the developer is indicated in Figure 2 by upgrading the existing intersection to roundabout control.
 - d. Proposed Access 2 to the development should be provided by the developer is indicated in Figure 2 as a "left in only" Access.
- (ii) The following proposed road upgrading measures be implemented by the road authorities:

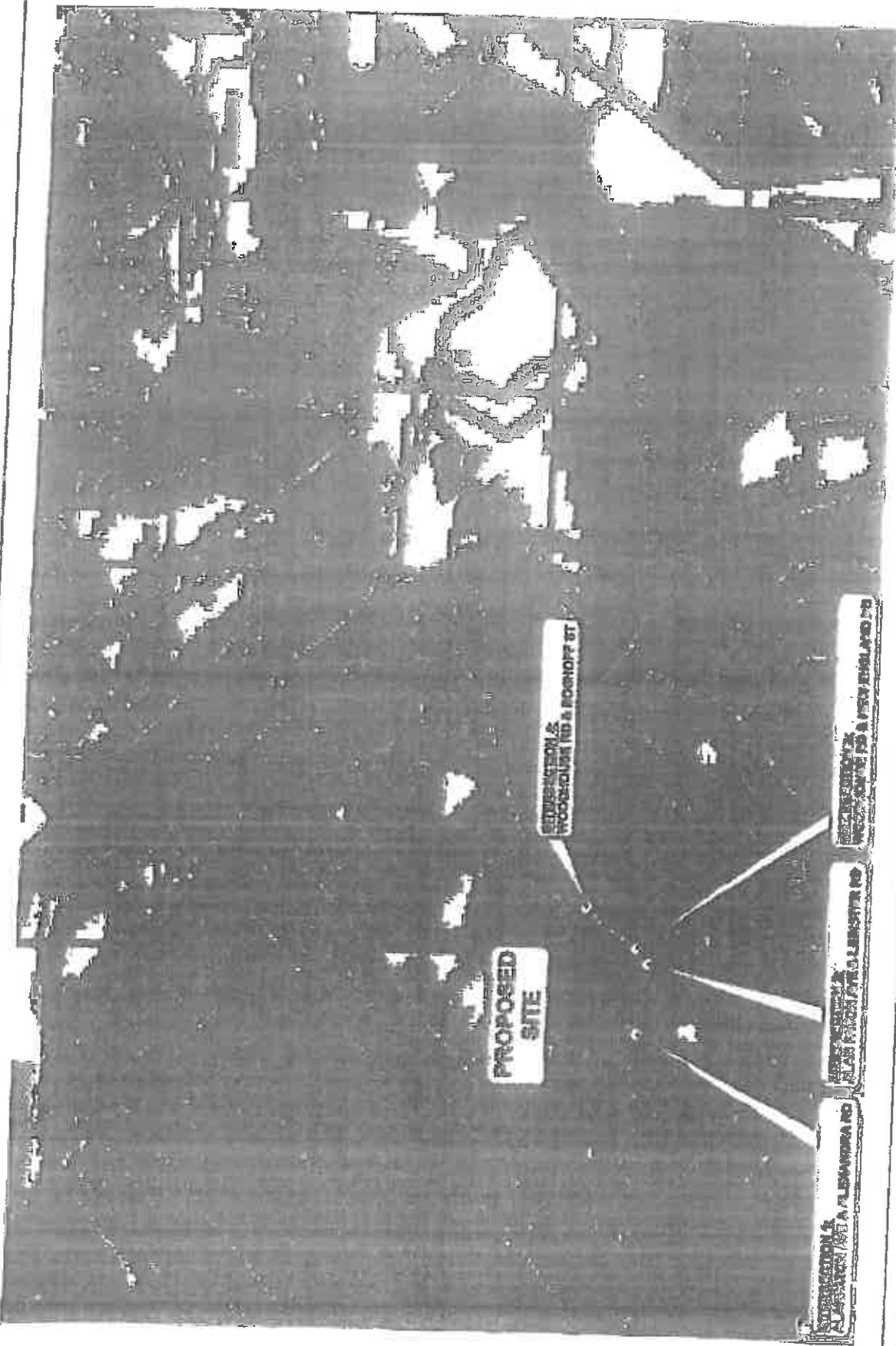
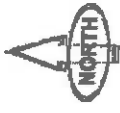
- (i) Intersection 1 - Alan Paton Avenue (R103) and Alexander Road (R56) signalised intersection: The west approach right turn movement should be upgraded as indicated in Figure 2.**

- (ii) It is recommended that two public transport laybys be provided by the developer along Woodhouse Road together with a pedestrian side walk along the road facing perimeter of the site to make provision for public transport users.**

- (iv) All aspects of road upgrading must be designed and constructed to the satisfaction of the local authority.**

- (v) The proposed development may be approved from a traffic impact point of view subject to compliance with the relevant standards and requirements specified with respect to all internal traffic related functions.**

- (vi) A registered Professional Engineer should be appointed to attend to all aspects of design.**



Schematic layout

Checked by: H. Schreier Pr. Eng
 327502_Woodburn Boulevard Locality Plan_1.dwg
 No. 1

Figurs Description:

LOCALITY PLAN

Project:
 O & T WOODBURN BOULEVARD, PIETERMARITZBURG



Figures

- Figure 1 Locality Plan
- Figure 2 Road Widening and Access Layout Plan
- Figure 3 Existing 2010 Peak Hour Traffic Volumes
- Figure 4 Future 2015 Traffic Volumes without Development Traffic
- Figure 5a Trip Generation and Assignment – Friday PM-Peak Hour
- Figure 5b Trip Generation and Assignment – Saturday Peak Hour
- Figure 6 Base Year 2010 Traffic Volumes with Development Traffic
- Figure 7 Horizon Year 2015 Traffic Volumes with Development Traffic

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LEGENDS
UPGRADES BY AUTHORITIES
UPGRADES BY DEVELOPER

| | | |
|--------------------|--------------------|------------------|
| SCALE: 1:2000 | DESIGNED: R. JAVEN | DATE: 2012/11/12 |
| SECTION: R. JAVEN | DRAWN: ND MOKANSI | REV: 2 |
| PROJECT No: 327592 | OWNER No: | B |

PROJECT: WOODBURN BOULEVARD PIETERMARITZBURG

TITLE: ROAD WIDENING AND ACCESS LAYOUT PLAN

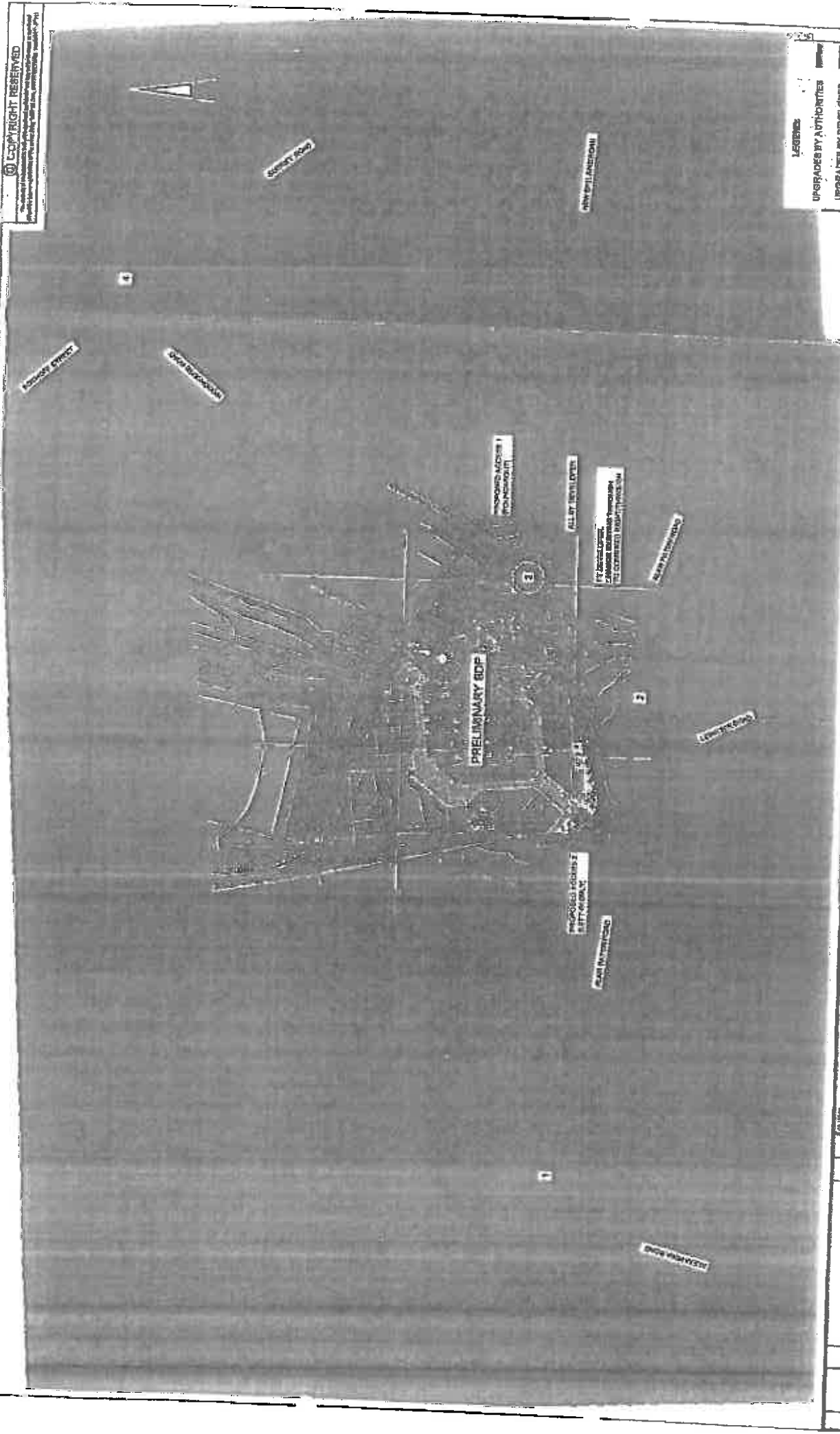


WSP SA Civil and Structural Engineers (Pty) Ltd
 34 Berrade Avenue, Upperville 9384, Pretoria 0001
 Partlet 201/19, Phisoa Sea 2004, Swakopmund
 Tel: +27(0)53-864461 Fax: +27(0)53-864462

CLIENT: VENTURE PROPERTIES

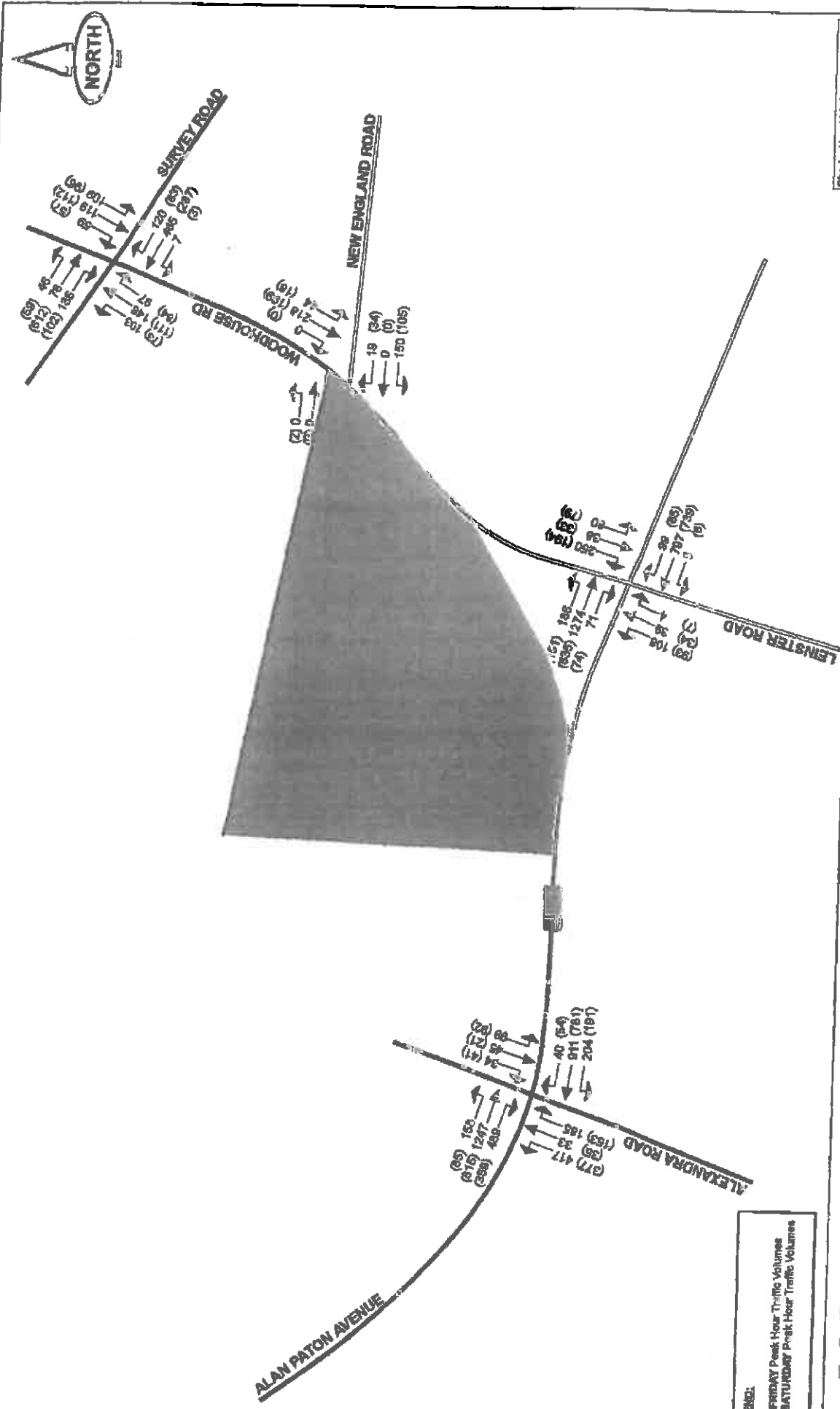
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FOR INFORMATION



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Schematic layout



Checked by: H Strauss Pr Eng

3275x2_Woodburn Boulevard_Existing 2010 Peak Hour Traffic Volumes_3.cdr

Figure Description:

EXISTING 2010 PEAK HOUR TRAFFIC VOLUMES

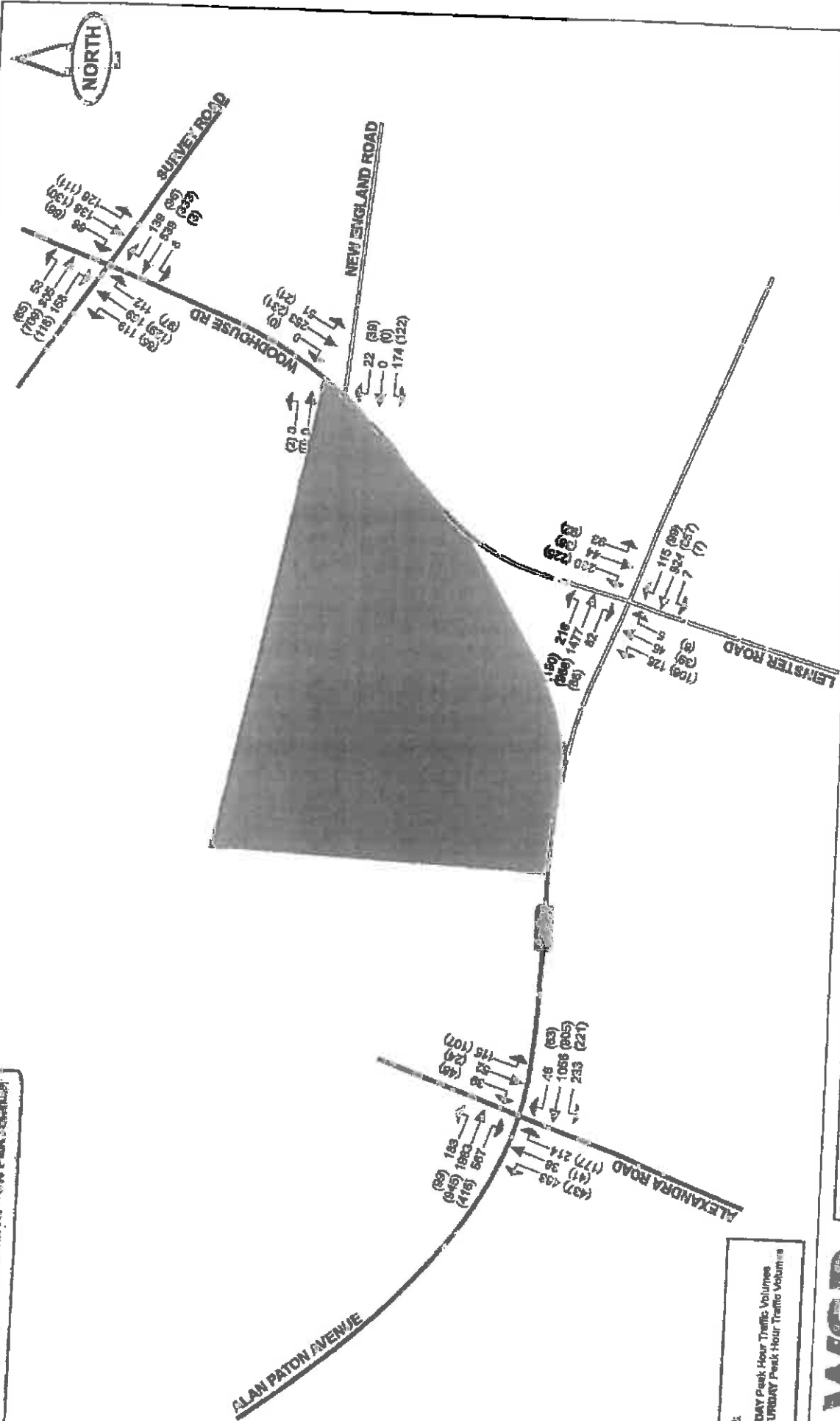
WOODBURN BOULEVARD

Project:



Schematic layout

BACKGROUND TRAFFIC GROWTH = 0% PER ANNUM



Checked by: H Scheuvs Pr Eng

307562_Woodburn Boulevard_Horizon Year 2015 Peak Hour without Proposed Development_4.cdr

Figure Description:

HORIZON YEAR 2015 PEAK HOUR TRAFFIC VOLUMES WITHOUT PROPOSED DEVELOPMENT

No. 4

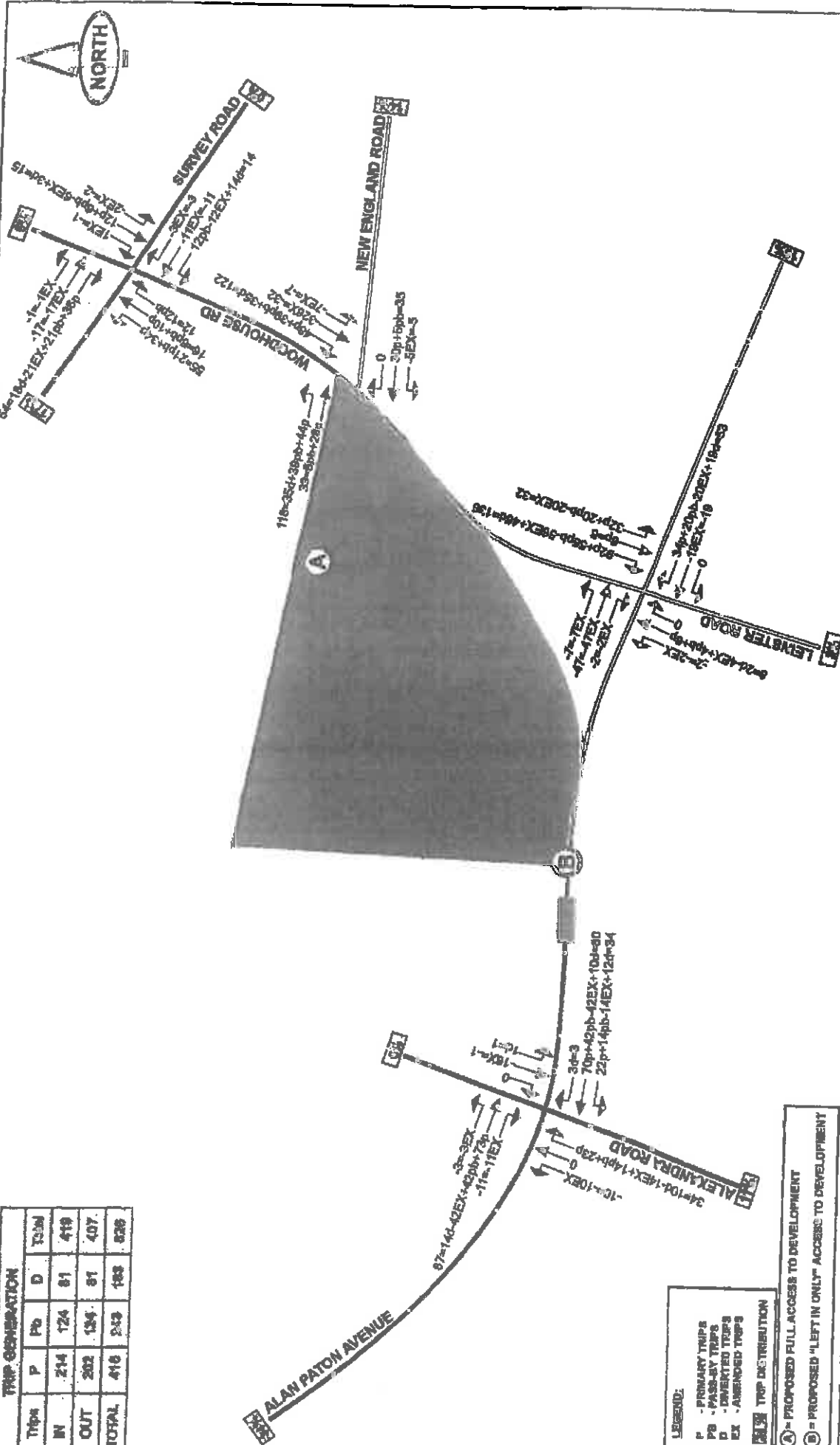
Project:

WOODBURN BOULEVARD



Schematic layout

| TRIP GENERATION | | | | |
|-----------------|-----|-----|-----|------|
| Trps | P | Pb | D | TotM |
| IN | 214 | 124 | 81 | 419 |
| OUT | 202 | 134 | 91 | 407 |
| TOTAL | 416 | 258 | 183 | 826 |



LEGEND:
 P - PRIMARY TRIPS
 Pb - PASS-BY TRIPS
 D - DIVERTED TRIPS
 EX - AWAYD TRIPS
 A - TRIP DISTRIBUTION

(A) - PROPOSED FULL ACCESS TO DEVELOPMENT
 (B) - PROPOSED "LEFT IN ONLY" ACCESS TO DEVELOPMENT



Project:

WOODBURN BOULEVARD

Figure Description:

TRIP GENERATION & ASSIGNMENT
 FRIDAY PM PEAK HOUR

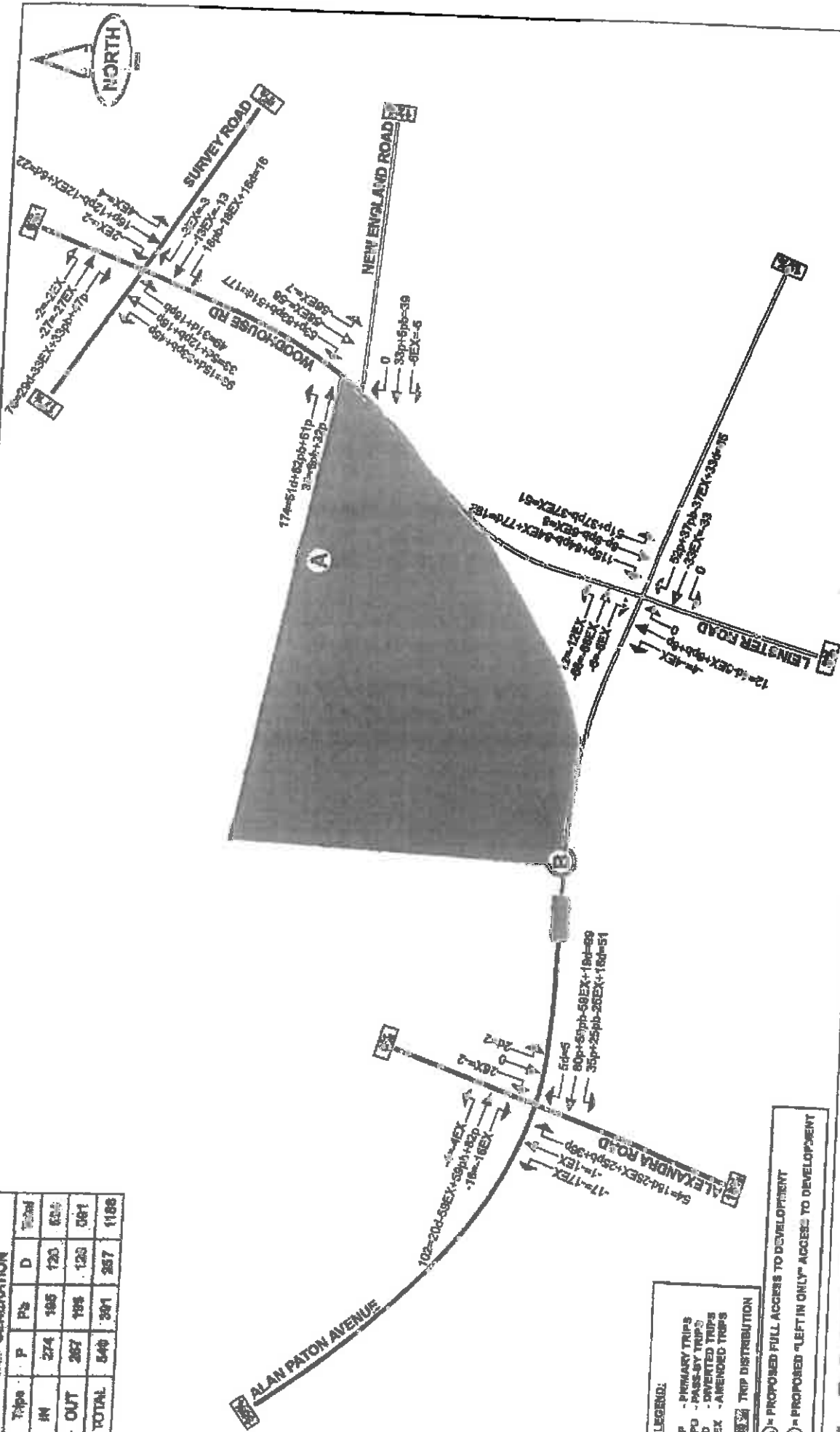
No.

5A

Checked by: H Schreier Pr Eng
 327892_Woodburn Boulevard_Trip Generation & Assignment Friday PM Peak Hour_5A.dwg

Schematic layout

| TRIP GENERATION | | | | |
|-----------------|-----|-----|-----|-------|
| Trips | P | Pb | D | Total |
| IN | 274 | 185 | 125 | 584 |
| OUT | 267 | 188 | 126 | 581 |
| TOTAL | 540 | 373 | 251 | 1164 |



LEGEND:
 P - PRIMARY TRIPS
 Pb - PASS-BY TRIPS
 D - DIVERTED TRIPS
 EX - ARRANGED TRIPS
 [Symbol] TRIP DISTRIBUTION
 [Symbol] PROPOSED FULL ACCESS TO DEVELOPMENT
 [Symbol] PROPOSED "LEFT IN ONLY" ACCESS TO DEVELOPMENT

Checked by: H Schweser, Pr Eng
 27/02, Woodburn Boulevard, Trip Generation & Assignment Saturday PM Peak Hour, 5/04/01

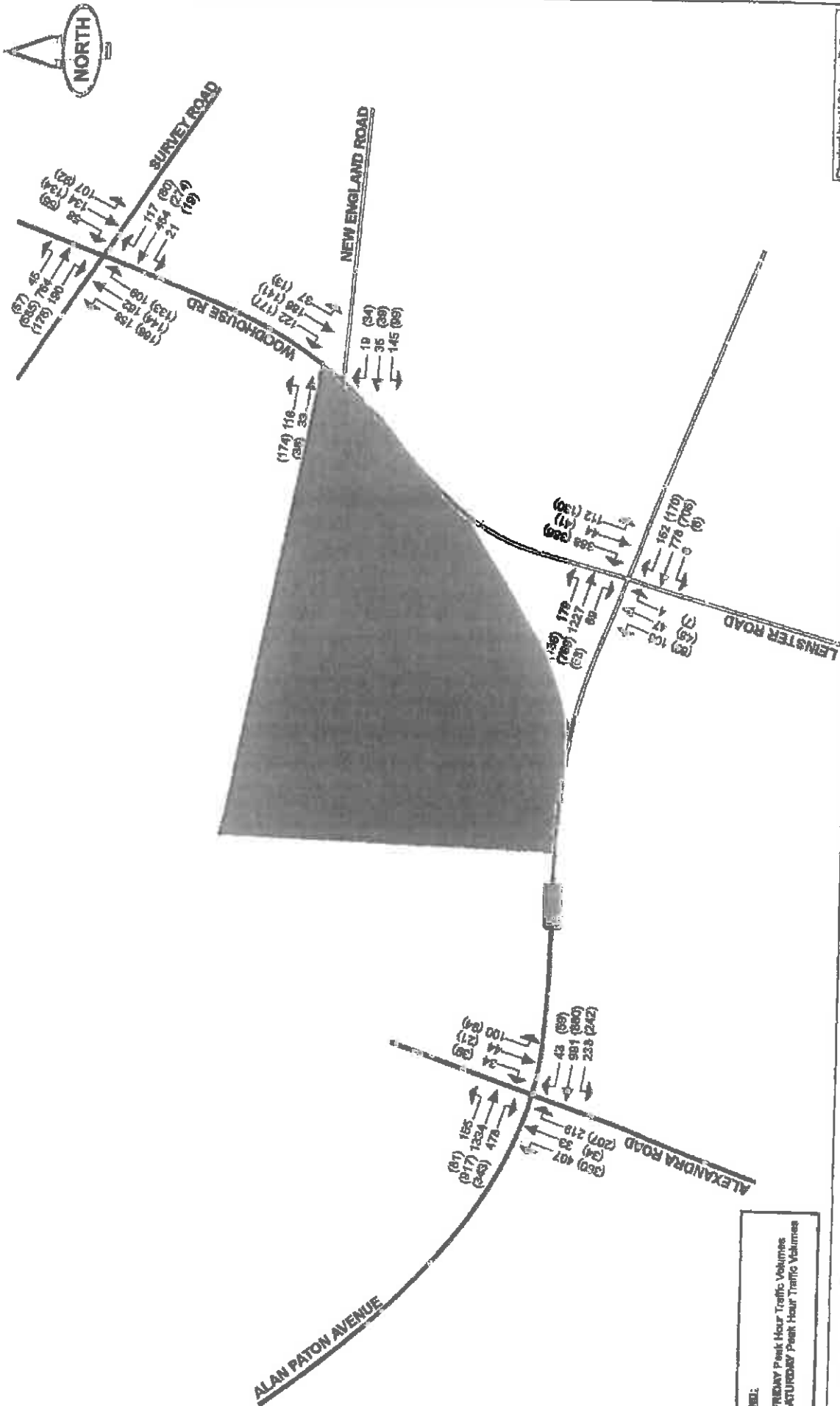
Project: **WOODEURN BOULEVARD**

Figure Description: **TRIP GENERATION & ASSIGNMENT SATURDAY PM PEAK HOUR**

No. **55**



Schematic layout



Checked by: H Schwane Pr. Eng

327092_Woodburn Boulevard_Base Year 2010 Peak Hour Traffic Volume with Proposed Development_6.cdr

Figure Description:

BASE YEAR 2010 PEAK HOUR TRAFFIC VOLUMES WITH PROPOSED DEVELOPMENT

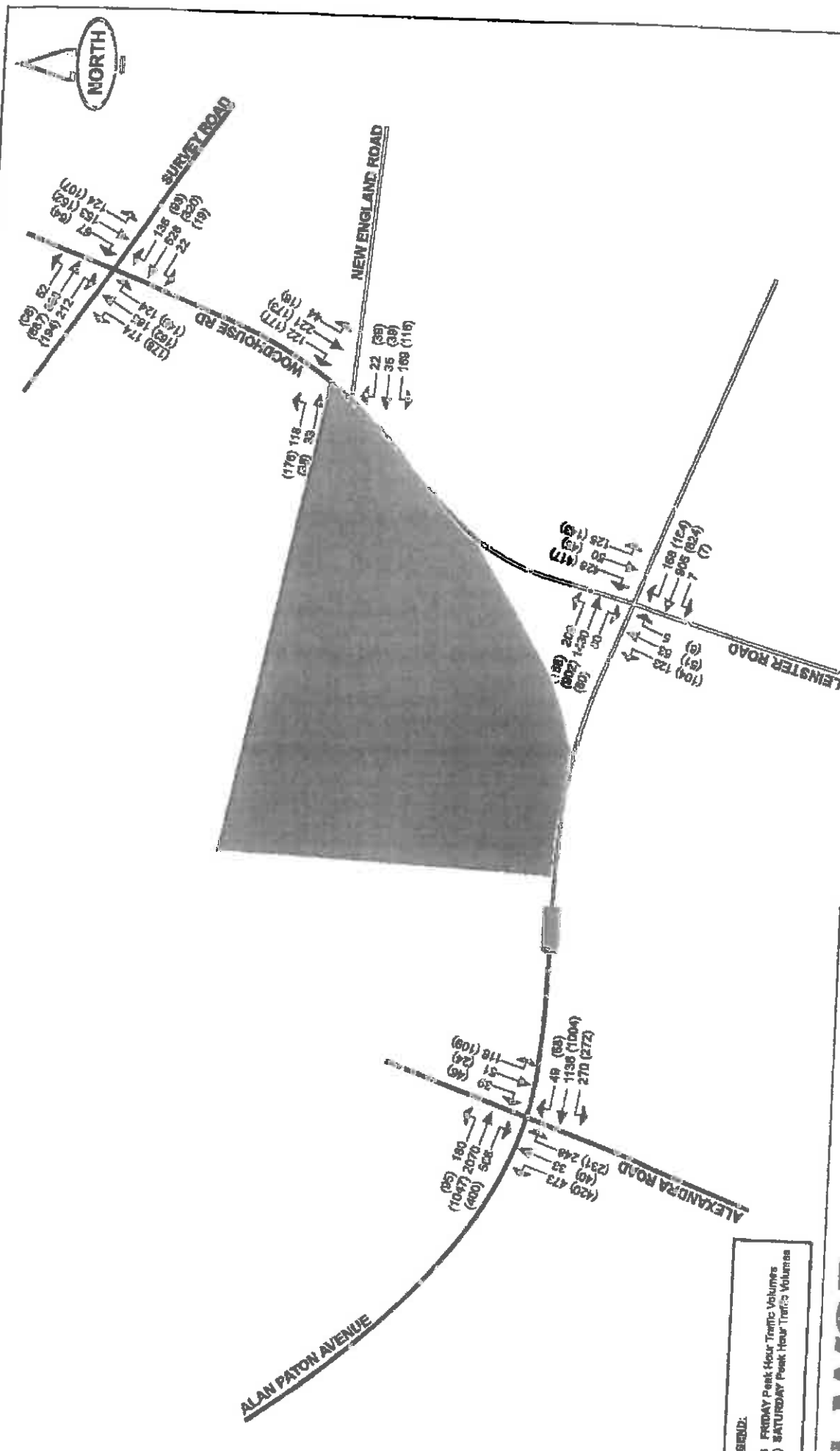
No. 6

Project:

WOODBURN BOULEVARD



Schematic layout



| | |
|---------------------|-------------------------------------------------------------------------------------------------------|
| Project: | 327862_Woodburn Boulevard_Horizon Year 2015 Peak Hour Traffic Volume with Proposed Development_7.corr |
| Figure Description: | HORIZON YEAR 2015 PEAK HOUR TRAFFIC VOLUMES WITH PROPOSED DEVELOPMENT |
| No. | 7 |
| Checked By: | H. Schreiner Pr Eng |



Annexure A

**Memorandums from
Msunduzi Council's Department
of Roads, Transport and Public Works**





**INFRASTRUCTURE DEVELOPMENT, SERVICE
DELIVERY, AND MAINTENANCE MANAGEMENT
Roads, Transportation & Public Works (RTPW)**

MINUTE

Tel: (033) 392-2152

Email: sibulele.diko@msunduzi.gov.za

TO : **CORPORATE STRATEGIC PLANNING**
Att: Walter Van Rensburg

FROM : **EXECUTIVE: ROADS, TRANSPORTATION & PUBLIC WORKS (ACTING)**
Eng: Ms S. Diko

REF :

DATE : **25 August 2010**

SUBJECT : **WOODBURN BOULEVARD SITE DEVELOPMENT PLAN
PORTION 4&5 OF ERF 4346 PMB**

The Woodburn Boulevard site development plan application for portion 4&5 of erf 4346 PMB has reference;

The Traffic Impact Assessment (TIA) attached to this application cannot be accepted and/or approved and needs to be amended, for the following reasons;

The traffic counts were undertaken during school holidays, traffic counts should be undertaken during the school terms so as to get a realistic idea of the "normal" trip generation figures and volumes.

The TIA indicates "No information could be obtained of any other approved developments in the area which may require consideration in this study" yet the attached master plan shows proposed development on Ptn 1, Ptn 2 and Rem which have not been taken into account on the TIA.

The Study Area for the Traffic Impact Assessment should therefore include (regardless of any phasing that there maybe);

1. Woodhouse road up to and including Surrey/Woodhouse/Boshoff intersection
2. Opening the closed section of New England road, as the proposed development will put strain on woodhouse road as the only road to and from the New England Road/Hesketh area.
3. Boshoff Street from Surrey/Woodhouse/Boshoff to the Riverside Bridge including the proposed access to Ptn 1 and 2.

Analyze the Saturday critical morning peak as 11h00 – 12h00

The TIA should further indicate how the entrance/s will be controlled (e.g. boom controlled or security controlled) and the measures to be taken to ensure that there is a free flow at all times. Pedestrian side walk should be provided on the perimeter of the site
Public Transport Laybys should be safely positioned closer to the proposed accesses

(ACTING) EXECUTIVE: RTPW



THE MSUNDUZI MUNICIPALITY

INFRASTRUCTURE DEVELOPMENT, SERVICE DELIVERY, AND MAINTENANCE MANAGEMENT

ROADS, TRANSPORTION & PUBLIC WORKS (RTPW)

Room 503
333 Church Street
Petermaritzburg
3201

Private Bag X206
Petermaritzburg
3200

Fax 033 392 2396

Tel. 033 392 2162

Email: sibusis.office@msund

Enquiries: S. Diko

Our Ref: IS/2/42/1

Your Ref:

28 October 2010

WSP SA Civil & Structural Engineers Pty Ltd
34 Bouverdia Street
Lynnwood Ridge
Pretoria
0081

Attention: Mr R. Raven
Fax: 012- 361 4142

Dear Sir;

RE: WOODBURN DEVELOPMENT

Our telephonic conversation this morning refers;

It appears as though there is a problem with some of my external emails not reaching the recipients, as I have been responding to your emails. Please accept my sincere apologies in this regard; I have raised the matter with our ITC to resolve.

We require traffic counts to be undertaken during the normal school term not only because it's a standard practise but because we need uniformity and the problems we experience with traffic congestion are worse during the school term.

Regardless of the other portions not earmarked for development in the near future, the TIA and/or the new traffic counts need to be undertaken and incorporate the following major intersections (at least) as they are the most critical;

1. Surrey/Woodhouse/Boshoff intersection,
2. Alan Paton (Old Durban Road)/Woodhouse/Leister intersection

The application I received showed the entire site developmental plan, including proposed development on Ptn 1, Ptn 2 and Rem. Hence we felt it's proper to undertake one study and/or whatever improvements might be required be done at once.

The position of the public transport lay byes can be "fixed" during the design stage.


I would make myself available anytime you need to meet with me, so as to fast track and clarify any further issues you might have.

27. Oct. 2010 10:15

QUANTITY SURVEY

No. 9138 P. 2

Yours faithfully

 26/10/2010

SIBULELE DIKO
MANAGER: TRANSPORTATION PLANNING

Annexure B

Draft Site Development Plan (SDP)



Annexure C

Relevant outputs of the SIDRA Intersection Capacity Analysis

- C1 Intersection 1: Alan Paton Avenue (R103) and Alexandra Road (R56)**
- C2 Intersection 2: Alan Paton Avenue (R103) and Leinster Road Signalised Intersection**
- C3 Intersection 3: Woodhouse Road and New England Road Roundabout**
- C4 Intersection 4: Woodhouse Road and Boshoff Street**

Annexure C1.1

MOVEMENT SUMMARY

Site: 1-1 Alan Paton/Alexandra 2010 Sat
AM-Peak Exist

1 - Alan Paton Ave / Alexandra Rd 2010 Existing Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 50 seconds

| Movement Performance - Vehicles | | | | | | | | | | | |
|----------------------------------------|-------|--------|------------|------------|-------|-----------|-------------|---------------|---------------|-----------------|-----------------|
| Approach | Phase | Volume | Cycle Time | Flow Ratio | LOS | Delay (s) | Queue (Veh) | Stop Time (s) | Stop Time (h) | Stop Time (min) | Stop Time (sec) |
| South: Alexandra Road (S) | | | | | | | | | | | |
| 1 | L | 397 | 2.0 | 0.729 | LOS C | 6.8 | 48.7 | 1.00 | 0.90 | 31.8 | |
| 2 | T | 37 | 2.0 | 0.785 | LOS C | 7.1 | 50.8 | 1.00 | 0.98 | 30.9 | |
| 3 | R | 161 | 2.0 | 0.796 | LOS D | 7.1 | 50.8 | 1.00 | 0.96 | 30.7 | |
| Approach | | 595 | 2.0 | 0.795 | LOS C | 7.1 | 50.8 | 1.00 | 0.92 | 31.3 | |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 201 | 2.0 | 0.247 | LOS A | 1.5 | 10.5 | 0.34 | 0.68 | 47.9 | |
| 5 | T | 822 | 2.0 | 0.324 | LOS A | 6.3 | 45.2 | 0.61 | 0.44 | 50.7 | |
| 6 | R | 57 | 2.0 | 0.141 | LOS B | 1.2 | 8.3 | 0.54 | 0.73 | 42.5 | |
| Approach | | 1080 | 2.0 | 0.324 | LOS A | 6.3 | 45.2 | 0.48 | 0.50 | 49.6 | |
| North: Fling Station Access (N) | | | | | | | | | | | |
| 7 | L | 97 | 2.0 | 0.342 | LOS A | 0.9 | 6.7 | 0.41 | 0.88 | 47.3 | |
| 8 | T | 22 | 2.0 | 0.077 | LOS C | 0.6 | 5.5 | 0.90 | 0.63 | 35.0 | |
| 9 | R | 43 | 2.0 | 0.272 | LOS C | 1.7 | 12.0 | 0.99 | 0.71 | 30.9 | |
| Approach | | 162 | 2.0 | 0.342 | LOS B | 1.7 | 12.0 | 0.83 | 0.66 | 40.0 | |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 89 | 2.0 | 0.084 | LOS A | 0.6 | 3.3 | 0.28 | 0.65 | 48.3 | |
| 11 | T | 658 | 2.0 | 0.338 | LOS A | 6.6 | 47.3 | 0.51 | 0.45 | 50.8 | |
| 12 | R | 378 | 2.0 | 0.915 | LOS D | 16.8 | 119.4 | 0.94 | 1.24 | 26.0 | |
| Approach | | 1325 | 2.0 | 0.915 | LOS B | 16.8 | 119.4 | 0.82 | 0.69 | 39.8 | |
| All Vehicles | | 3162 | 2.0 | 0.515 | LOS B | 10.8 | 110.4 | 0.64 | 0.67 | 40.0 | |

MOVEMENT SUMMARY

Site: 1-2 Alan Paton/Alexandra 2010 Fri
PM-Peak Exist

1 - Alan Paton Ave / Alexandra Rd 2010 Existing Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 50 seconds

| Movement Performance - Vehicles | | | | | | | | | | | |
|----------------------------------------|-------|--------|------------|------------|-------|-----------|-------------|---------------|---------------|-----------------|-----------------|
| Approach | Phase | Volume | Cycle Time | Flow Ratio | LOS | Delay (s) | Queue (Veh) | Stop Time (s) | Stop Time (h) | Stop Time (min) | Stop Time (sec) |
| South: Alexandra Road (S) | | | | | | | | | | | |
| 1 | L | 439 | 2.0 | 0.806 | LOS D | 7.8 | 55.3 | 1.00 | 0.97 | 30.8 | |
| 2 | T | 35 | 2.0 | 0.666 | LOS C | 8.9 | 63.2 | 1.00 | 1.10 | 28.4 | |
| 3 | R | 195 | 2.0 | 0.697 | LOS D | 8.9 | 63.2 | 1.00 | 1.10 | 28.3 | |
| Approach | | 669 | 2.0 | 0.697 | LOS D | 8.9 | 63.2 | 1.00 | 1.01 | 29.9 | |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 215 | 2.0 | 0.250 | LOS A | 1.4 | 9.9 | 0.32 | 0.67 | 48.1 | |
| 5 | T | 959 | 2.0 | 0.378 | LOS A | 7.5 | 53.3 | 0.53 | 0.46 | 50.3 | |
| 6 | R | 42 | 2.0 | 0.155 | LOS B | 0.9 | 6.4 | 0.55 | 0.73 | 42.3 | |
| Approach | | 1216 | 2.0 | 0.378 | LOS A | 7.5 | 53.3 | 0.49 | 0.51 | 49.6 | |
| North: Fling Station Access (N) | | | | | | | | | | | |
| 7 | L | 104 | 2.0 | 0.529 | LOS B | 1.7 | 11.8 | 0.55 | 0.72 | 45.1 | |
| 8 | T | 47 | 2.0 | 0.165 | LOS C | 1.6 | 11.7 | 0.91 | 0.67 | 35.7 | |
| 9 | R | 36 | 2.0 | 0.226 | LOS C | 1.4 | 9.9 | 0.98 | 0.71 | 30.9 | |
| Approach | | 187 | 2.0 | 0.529 | LOS B | 1.7 | 11.8 | 0.72 | 0.71 | 39.1 | |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 165 | 2.0 | 0.156 | LOS A | 0.9 | 6.4 | 0.28 | 0.66 | 48.3 | |
| 11 | T | 1467 | 2.0 | 0.682 | LOS A | 12.4 | 88.2 | 0.64 | 0.57 | 48.4 | |
| 12 | R | 67.3 | 2.0 | 0.338 | LOS E | 19.4 | 137.8 | 1.00 | 1.37 | 21.1 | |
| Approach | | 1994 | 2.0 | 1.000 | LOS B | 19.4 | 137.8 | 0.67 | 0.73 | 39.2 | |
| All Vehicles | | 4065 | 2.0 | 1.000 | LOS B | 19.4 | 137.8 | 0.68 | 0.71 | 39.8 | |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

327582

Revision 1

Annexure C1.2

MOVEMENT SUMMARY

Site: 1-3 Alan Paton/Alexandra 2010 Sat
AM-Peak Exst + Develop

1 - Alan Paton Ave / Alexandra Rd 2010 Existing + Development Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 50 seconds

| Approach | Phase | Volume | Cycle Time | Delay | LOS | SA | SA | SA | SA | SA |
|--------------------------------------|-------|--------|------------|-------|------|-------|-----|------|------|------|
| South Alexandra Road (S) | | | | | | | | | | |
| 1 | L | 378 | 2.0 | 0.609 | 30.5 | LOS C | 6.2 | 44.2 | 0.96 | 0.63 |
| 2 | T | 36 | 2.0 | 0.463 | 22.1 | LOS C | 4.3 | 30.3 | 0.95 | 0.75 |
| 3 | R | 218 | 2.0 | 0.463 | 30.1 | LOS C | 4.3 | 30.3 | 0.95 | 0.78 |
| Approach | | 633 | 2.0 | 0.609 | 29.9 | LOS C | 6.2 | 44.2 | 0.97 | 0.81 |
| East Alan Paton Road (E) | | | | | | | | | | |
| 4 | L | 255 | 2.0 | 0.299 | 8.8 | LOS A | 1.7 | 12.2 | 0.33 | 0.58 |
| 5 | T | 826 | 2.0 | 0.420 | 7.4 | LOS A | 8.5 | 60.4 | 0.64 | 0.55 |
| 6 | R | 62 | 2.0 | 0.126 | 12.9 | LOS B | 1.1 | 7.5 | 0.45 | 0.72 |
| Approach | | 1243 | 2.0 | 0.420 | 8.0 | LOS A | 8.5 | 60.4 | 0.58 | 0.59 |
| North Fern Station Access (N) | | | | | | | | | | |
| 7 | L | 99 | 2.0 | 0.250 | 8.7 | LOS A | 0.6 | 4.3 | 0.30 | 0.66 |
| 8 | T | 22 | 2.0 | 0.088 | 20.0 | LOS B | 0.7 | 5.3 | 0.88 | 0.62 |
| 9 | R | 41 | 2.0 | 0.248 | 33.4 | LOS C | 1.6 | 11.2 | 0.97 | 0.72 |
| Approach | | 162 | 2.0 | 0.251 | 16.5 | LOS B | 1.6 | 11.2 | 0.55 | 0.67 |
| West Alan Paton Road (W) | | | | | | | | | | |
| 10 | L | 85 | 2.0 | 0.081 | 8.5 | LOS A | 0.4 | 3.1 | 0.26 | 0.65 |
| 11 | T | 885 | 2.0 | 0.437 | 7.5 | LOS A | 8.9 | 63.2 | 0.64 | 0.58 |
| 12 | R | 381 | 2.0 | 0.714 | 19.0 | LOS B | 9.2 | 65.2 | 0.75 | 0.89 |
| Approach | | 1412 | 2.0 | 0.714 | 10.5 | LOS B | 9.2 | 65.2 | 0.65 | 0.85 |
| All Vehicles | | 3409 | 2.0 | 0.714 | 13.4 | LOS B | 6.2 | 55.2 | 0.67 | 0.68 |

MOVEMENT SUMMARY

Site: 1-4 Alan Paton/Alexandra 2010 Fri
PM-Peak Exst + Develop

1 - Alan Paton Ave / Alexandra Rd 2010 Existing + Development Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 50 seconds

| Approach | Phase | Volume | Cycle Time | Delay | LOS | SA | SA | SA | SA | SA |
|--------------------------------------|-------|--------|------------|-------|------|-------|------|-------|------|------|
| South Alexandra Road (S) | | | | | | | | | | |
| 1 | L | 428 | 2.0 | 0.818 | 43.2 | LOS D | 8.6 | 61.2 | 1.00 | 1.13 |
| 2 | T | 35 | 2.0 | 0.606 | 25.0 | LOS C | 4.7 | 33.2 | 0.99 | 0.82 |
| 3 | R | 231 | 2.0 | 0.605 | 33.0 | LOS C | 4.8 | 34.0 | 0.99 | 0.82 |
| Approach | | 694 | 2.0 | 0.818 | 36.9 | LOS D | 8.6 | 61.2 | 1.00 | 1.02 |
| East Alan Paton Road (E) | | | | | | | | | | |
| 4 | L | 251 | 2.0 | 0.332 | 9.0 | LOS A | 2.0 | 14.0 | 0.36 | 0.69 |
| 5 | T | 1043 | 2.0 | 0.440 | 6.4 | LOS A | 8.9 | 63.7 | 0.60 | 0.63 |
| 6 | R | 45 | 2.0 | 0.117 | 12.1 | LOS B | 0.7 | 5.1 | 0.41 | 0.71 |
| Approach | | 1339 | 2.0 | 0.440 | 7.1 | LOS A | 8.9 | 63.7 | 0.55 | 0.57 |
| North Fern Station Access (N) | | | | | | | | | | |
| 7 | L | 105 | 2.0 | 0.328 | 8.7 | LOS A | 0.6 | 4.6 | 0.31 | 0.66 |
| 8 | T | 46 | 2.0 | 0.189 | 22.7 | LOS C | 1.7 | 11.8 | 0.93 | 0.89 |
| 9 | R | 36 | 2.0 | 0.228 | 34.4 | LOS C | 1.4 | 9.9 | 0.98 | 0.71 |
| Approach | | 187 | 2.0 | 0.328 | 17.1 | LOS B | 1.7 | 11.8 | 0.69 | 0.58 |
| West Alan Paton Road (W) | | | | | | | | | | |
| 10 | L | 163 | 2.0 | 0.154 | 8.5 | LOS A | 0.9 | 6.1 | 0.28 | 0.66 |
| 11 | T | 1404 | 2.0 | 0.592 | 7.3 | LOS A | 12.7 | 90.2 | 0.69 | 0.61 |
| 12 | R | 503 | 2.0 | 0.937 | 39.2 | LOS D | 19.4 | 137.8 | 0.97 | 1.15 |
| Approach | | 2071 | 2.0 | 0.938 | 15.2 | LOS B | 19.4 | 137.8 | 0.72 | 0.75 |
| All Vehicles | | 4291 | 2.0 | 0.528 | 16.5 | LOS D | 10.4 | 137.8 | 0.71 | 0.73 |

TRAFFIC IMPACT STUDY

327592

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

Revision 1

Annexure C1.3

MOVEMENT SUMMARY

Site: 1-5 Alan Paton/Alexandra 2015 Sat
AM-Peak Exist

1 - Alan Paton Ave / Alexandra Rd 2015 Background Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 90 seconds

| Approach | Direction | Volume | PHF | LOS | Delay (s) | Queue (veh) | SA | SL | SA/SL | SA/SL | SA/SL |
|------------------------------------------|-----------|--------|-----|-------|-----------|-------------|------|-------|-------|-------|-------|
| South: Alexandra Road (S) | | | | | | | | | | | |
| 1 | L | 437 | 2.0 | 0.241 | 23.0 | LOS C | 7.4 | 52.4 | 0.64 | 0.75 | 37.0 |
| 2 | T | 41 | 2.0 | 0.553 | 42.2 | LOS D | 6.4 | 45.7 | 0.99 | 0.78 | 25.8 |
| 3 | R | 177 | 2.0 | 0.553 | 50.3 | LOS D | 6.4 | 45.7 | 0.99 | 0.79 | 25.4 |
| Approach | | 655 | 2.0 | 0.553 | 31.6 | LOS C | 7.4 | 52.4 | 0.75 | 0.77 | 32.2 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 221 | 2.0 | 0.270 | 8.6 | LOS A | 1.9 | 13.8 | 0.22 | 0.65 | 48.6 |
| 5 | T | 805 | 2.0 | 0.553 | 22.4 | LOS C | 16.6 | 118.0 | 0.82 | 0.72 | 35.4 |
| 6 | R | 63 | 2.0 | 0.159 | 34.9 | LOS C | 3.1 | 22.0 | 0.79 | 0.75 | 30.7 |
| Approach | | 1189 | 2.0 | 0.553 | 20.6 | LOS C | 16.6 | 118.0 | 0.71 | 0.71 | 37.0 |
| North: Fling Station Approach (N) | | | | | | | | | | | |
| 7 | L | 107 | 2.0 | 0.278 | 8.3 | LOS A | 0.7 | 4.9 | 0.18 | 0.64 | 48.8 |
| 8 | T | 24 | 2.0 | 0.098 | 36.7 | LOS D | 1.5 | 10.5 | 0.92 | 0.66 | 27.9 |
| 9 | R | 48 | 2.0 | 0.460 | 66.0 | LOS E | 3.2 | 23.0 | 1.00 | 0.74 | 23.7 |
| Approach | | 179 | 2.0 | 0.450 | 25.2 | LOS C | 3.2 | 23.0 | 0.60 | 0.67 | 35.3 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 88 | 2.0 | 0.098 | 8.2 | LOS A | 0.6 | 4.0 | 0.16 | 0.63 | 48.9 |
| 11 | T | 945 | 2.0 | 0.578 | 22.7 | LOS C | 17.4 | 123.7 | 0.81 | 0.73 | 35.2 |
| 12 | R | 416 | 2.0 | 0.578 | 39.0 | LOS D | 8.8 | 68.9 | 0.91 | 0.82 | 29.0 |
| Approach | | 1460 | 2.0 | 0.578 | 26.3 | LOS C | 17.4 | 123.7 | 0.81 | 0.75 | 33.8 |
| All Vehicles | | 3493 | 2.0 | 0.575 | 26.3 | LOS C | 17.4 | 123.7 | 0.75 | 0.74 | 34.6 |

MOVEMENT SUMMARY

Site: 1-5 Alan Paton/Alexandra 2015 Fri
PM-Peak Exist

1 - Alan Paton Ave / Alexandra Rd 2015 Background Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 110 seconds

| Approach | Direction | Volume | PHF | LOS | Delay (s) | Queue (veh) | SA | SL | SA/SL | SA/SL | SA/SL |
|------------------------------------------|-----------|--------|-----|-------|-----------|-------------|------|-------|-------|-------|-------|
| South: Alexandra Road (S) | | | | | | | | | | | |
| 1 | L | 508 | 2.0 | 0.348 | 29.2 | LOS C | 9.7 | 69.0 | 0.76 | 0.79 | 33.5 |
| 2 | T | 40 | 2.0 | 0.460 | 35.4 | LOS D | 7.1 | 50.7 | 0.93 | 0.76 | 28.1 |
| 3 | R | 225 | 2.0 | 0.460 | 43.4 | LOS D | 7.1 | 50.7 | 0.93 | 0.80 | 27.6 |
| Approach | | 774 | 2.0 | 0.460 | 33.7 | LOS C | 9.7 | 69.0 | 0.82 | 0.79 | 31.3 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 248 | 2.0 | 0.264 | 8.2 | LOS A | 1.8 | 12.6 | 0.17 | 0.64 | 48.9 |
| 5 | T | 1112 | 2.0 | 0.532 | 15.6 | LOS B | 17.5 | 124.3 | 0.72 | 0.64 | 39.9 |
| 6 | R | 48 | 2.0 | 0.273 | 49.7 | LOS D | 3.0 | 21.4 | 0.85 | 0.75 | 25.4 |
| Approach | | 1408 | 2.0 | 0.532 | 15.6 | LOS B | 17.5 | 124.3 | 0.63 | 0.64 | 40.4 |
| North: Fling Station Approach (N) | | | | | | | | | | | |
| 7 | L | 121 | 2.0 | 0.506 | 8.3 | LOS A | 0.8 | 5.7 | 0.19 | 0.64 | 48.7 |
| 8 | T | 55 | 2.0 | 0.134 | 32.2 | LOS C | 2.9 | 20.6 | 0.86 | 0.65 | 30.5 |
| 9 | R | 41 | 2.0 | 0.404 | 60.0 | LOS D | 2.6 | 18.6 | 0.86 | 0.74 | 25.4 |
| Approach | | 217 | 2.0 | 0.505 | 22.2 | LOS C | 2.9 | 20.6 | 0.50 | 0.66 | 36.8 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 193 | 2.0 | 0.187 | 8.1 | LOS A | 1.2 | 8.2 | 0.15 | 0.63 | 49.0 |
| 11 | T | 2219 | 2.0 | 1.085 | 116.5 | LOS F | 99.4 | 708.0 | 1.00 | 1.70 | 13.9 |
| 12 | R | 465 | 2.0 | 1.468 | 389.9 | LOS F | 45.9 | 326.9 | 1.00 | 2.10 | 5.1 |
| Approach | | 2877 | 2.0 | 1.468 | 153.4 | LOS F | 99.4 | 708.0 | 0.84 | 1.69 | 11.3 |
| All Vehicles | | 6276 | 2.0 | 1.468 | 93.7 | LOS F | 99.4 | 708.0 | 0.82 | 1.24 | 16.6 |



TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4348 PIETERMARITZBURG FT

327592

Revision 1

Annexure C1.4

MOVEMENT SUMMARY

Site: 1-7 Alan Paton/Alexandra 2015 Sat
AM-Peak Extol + Develop

1 - Alan Paton Ave / Alexandra Rd 2015 Background + Development Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 50 seconds

| Approach | Direction | Volume | LOS | Delay (s) | Queue (V) | Stop Time (s) | Stop Length (s) | Stop Rate (V/s) | Stop Length (s) | Stop Rate (V/s) |
|---------------------------------------|-----------|--------|-----|-----------|-----------|---------------|-----------------|-----------------|-----------------|-----------------|
| South Alexandra Road (S) | | | | | | | | | | |
| 1 | L | 442 | 2.0 | 0.812 | 35.3 | LOS D | 7.8 | 65.9 | 1.00 | 0.97 |
| 2 | T | 42 | 2.0 | 0.583 | 23.8 | LOS C | 4.9 | 34.9 | 0.98 | 0.80 |
| 3 | R | 243 | 2.0 | 0.582 | 31.8 | LOS C | 5.0 | 36.3 | 0.98 | 0.82 |
| Approach | | | | | | | | | | |
| | | 727 | 2.0 | 0.812 | 33.5 | LOS C | 7.8 | 55.9 | 0.99 | 0.91 |
| East Alan Paton Road (E) | | | | | | | | | | |
| 4 | L | 286 | 2.0 | 0.356 | 8.0 | LOS A | 2.3 | 16.0 | 0.37 | 0.69 |
| 5 | T | 1057 | 2.0 | 0.479 | 7.8 | LOS A | 9.8 | 69.6 | 0.66 | 0.58 |
| 6 | R | 72 | 2.0 | 0.146 | 12.5 | LOS B | 1.2 | 8.4 | 0.44 | 0.72 |
| Approach | | | | | | | | | | |
| | | 1415 | 2.0 | 0.479 | 8.3 | LOS A | 9.8 | 69.6 | 0.59 | 0.61 |
| North Flang Station Access (N) | | | | | | | | | | |
| 7 | L | 116 | 2.0 | 0.307 | 8.7 | LOS A | 0.7 | 5.0 | 0.31 | 0.63 |
| 8 | T | 26 | 2.0 | 0.088 | 21.1 | LOS C | 0.9 | 6.3 | 0.63 | 0.64 |
| 9 | R | 48 | 2.0 | 0.308 | 34.6 | LOS C | 1.9 | 13.4 | 0.99 | 0.72 |
| Approach | | | | | | | | | | |
| | | 188 | 2.0 | 0.307 | 17.0 | LOS B | 1.9 | 13.4 | 0.56 | 0.67 |
| West Alan Paton Road (W) | | | | | | | | | | |
| 10 | L | 100 | 2.0 | 0.085 | 8.5 | LOS A | 0.5 | 3.6 | 0.27 | 0.65 |
| 11 | T | 1102 | 2.0 | 0.489 | 7.9 | LOS A | 10.3 | 73.1 | 0.67 | 0.59 |
| 12 | R | 421 | 2.0 | 0.816 | 26.0 | LOS C | 12.9 | 92.1 | 0.83 | 1.00 |
| Approach | | | | | | | | | | |
| | | 1623 | 2.0 | 0.816 | 12.6 | LOS B | 12.9 | 92.1 | 0.69 | 0.70 |
| All Vehicles | | | | | | | | | | |
| | | 3354 | 2.0 | 0.816 | 15.1 | LOS E | 12.9 | 92.1 | 0.70 | 0.71 |

MOVEMENT SUMMARY

Site: 1-5 Alan Paton/Alexandra 2015 Fri
PM-Peak Extol + Develop

1 - Alan Paton Ave / Alexandra Rd 2015 Background + Development Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 60 seconds

| Approach | Direction | Volume | LOS | Delay (s) | Queue (V) | Stop Time (s) | Stop Length (s) | Stop Rate (V/s) | Stop Length (s) | Stop Rate (V/s) |
|---------------------------------------|-----------|--------|-----|-----------|-----------|---------------|-----------------|-----------------|-----------------|-----------------|
| South Alexandra Road (S) | | | | | | | | | | |
| 1 | L | 473 | 2.0 | 0.808 | 43.8 | LOS D | 11.4 | 80.9 | 0.96 | 0.82 |
| 2 | T | 38 | 2.0 | 0.495 | 35.7 | LOS D | 7.6 | 54.1 | 0.94 | 0.78 |
| 3 | R | 246 | 2.0 | 0.494 | 43.7 | LOS D | 7.6 | 54.1 | 0.94 | 0.81 |
| Approach | | | | | | | | | | |
| | | 758 | 2.0 | 0.808 | 43.4 | LOS D | 11.4 | 80.8 | 0.95 | 0.81 |
| East Alan Paton Road (E) | | | | | | | | | | |
| 4 | L | 270 | 2.0 | 0.336 | 8.1 | LOS A | 1.5 | 10.4 | 0.17 | 0.64 |
| 5 | T | 1136 | 2.0 | 0.544 | 15.9 | LOS B | 17.9 | 127.5 | 0.73 | 0.66 |
| 6 | R | 49 | 2.0 | 0.153 | 24.0 | LOS C | 2.0 | 13.9 | 0.81 | 0.74 |
| Approach | | | | | | | | | | |
| | | 1455 | 2.0 | 0.544 | 14.7 | LOS B | 17.9 | 127.5 | 0.82 | 0.65 |
| North Flang Station Access (N) | | | | | | | | | | |
| 7 | L | 116 | 2.0 | 0.491 | 8.3 | LOS A | 0.9 | 6.1 | 0.20 | 0.84 |
| 8 | T | 51 | 2.0 | 0.125 | 32.1 | LOS C | 2.7 | 19.5 | 0.86 | 0.65 |
| 9 | R | 39 | 2.0 | 0.389 | 51.2 | LOS D | 2.5 | 18.0 | 0.86 | 0.74 |
| Approach | | | | | | | | | | |
| | | 206 | 2.0 | 0.490 | 22.3 | LOS C | 2.7 | 19.5 | 0.50 | 0.65 |
| West Alan Paton Road (W) | | | | | | | | | | |
| 10 | L | 180 | 2.0 | 0.159 | 8.0 | LOS A | 0.9 | 6.5 | 0.13 | 0.63 |
| 11 | T | 2070 | 2.0 | 0.890 | 66.4 | LOS E | 71.4 | 508.3 | 1.00 | 1.34 |
| 12 | R | 586 | 2.0 | 0.681 | 21.4 | LOS C | 10.4 | 74.1 | 0.69 | 0.83 |

TRAFFIC IMPACT STUDY

327592

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

Revision 1

| | | | | | | | | | | |
|--------------|------|-----|-------|------|-------|------|-------|------|------|------|
| Approach | 2816 | 2.0 | 0.990 | 53.6 | LOS D | 71.4 | 608.3 | 0.88 | 1.18 | 23.6 |
| All Vehicles | 6296 | 2.0 | 0.990 | 48.1 | LOS D | 71.4 | 608.3 | 0.79 | 8.63 | 27.8 |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4348 PIETERMARITZBURG FT

327692

Rev: 1.0

Annexure C2.1

MOVEMENT SUMMARY

Site: 2-1 Alan Paton/Lainster 2010 Sat
AM-Peak Exist

2 - Alan Paton Ave / Lainster Rd 2010 Existing Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 90 seconds

| Approach | Phase | Volume | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) |
|----------------------------------|-------|--------|-----|-----------|-----------|-------|-----------|-----------|------|-----------|-----------|
| South: Lainster Road (S) | | | | | | | | | | | |
| 1 | L | 98 | 2.0 | 0.067 | 7.9 | LOS A | 0.4 | 2.9 | 0.12 | 0.83 | 49.1 |
| 2 | T | 36 | 2.0 | 0.083 | 27.4 | LOS C | 2.2 | 15.4 | 0.79 | 0.60 | 32.5 |
| 3 | R | 7 | 2.0 | 0.083 | 35.5 | LOS D | 2.2 | 15.4 | 0.79 | 0.79 | 31.6 |
| Approach | | 141 | 2.0 | 0.083 | 14.3 | LOS B | 2.2 | 15.4 | 0.33 | 0.63 | 42.4 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 6 | 2.0 | 0.302 | 16.2 | LOS B | 9.4 | 66.8 | 0.49 | 0.98 | 43.3 |
| 5 | T | 778 | 2.0 | 0.303 | 7.9 | LOS A | 9.4 | 66.9 | 0.49 | 0.42 | 47.4 |
| 6 | R | 89 | 2.0 | 0.274 | 22.5 | LOS C | 3.4 | 24.3 | 0.81 | 0.76 | 37.2 |
| Approach | | 874 | 2.0 | 0.303 | 9.5 | LOS A | 9.4 | 66.9 | 0.50 | 0.46 | 46.1 |
| North: Lainster Road (N) | | | | | | | | | | | |
| 7 | L | 83 | 2.0 | 0.051 | 7.9 | LOS A | 0.3 | 2.4 | 0.12 | 0.63 | 49.1 |
| 8 | T | 36 | 2.0 | 0.088 | 27.2 | LOS C | 1.8 | 12.5 | 0.79 | 0.58 | 32.9 |
| 9 | R | 204 | 2.0 | 0.411 | 38.4 | LOS D | 9.3 | 66.0 | 0.88 | 0.80 | 29.3 |
| Approach | | 322 | 2.0 | 0.411 | 29.3 | LOS C | 9.3 | 66.0 | 0.67 | 0.73 | 33.2 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 169 | 2.0 | 0.124 | 8.0 | LOS A | 0.7 | 4.8 | 0.13 | 0.63 | 49.1 |
| 11 | T | 879 | 2.0 | 0.427 | 6.8 | LOS A | 13.6 | 96.6 | 0.54 | 0.48 | 46.1 |
| 12 | R | 78 | 2.0 | 0.427 | 17.0 | LOS B | 10.6 | 75.2 | 0.54 | 0.91 | 42.3 |
| Approach | | 1116 | 2.0 | 0.427 | 9.3 | LOS A | 13.6 | 93.6 | 0.48 | 0.53 | 46.2 |
| All Vehicles | | 2085 | 2.0 | 0.427 | 12.9 | LOS B | 13.6 | 96.6 | 0.59 | 0.64 | 43.7 |

MOVEMENT SUMMARY

Site: 2-2 Alan Paton/Lainster 2010 Fri
PM-Peak Exist

2 - Alan Paton Ave / Lainster Rd 2010 Existing Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 90 seconds

| Approach | Phase | Volume | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) |
|----------------------------------|-------|--------|-----|-----------|-----------|-------|-----------|-----------|------|-----------|-----------|
| South: Lainster Road (S) | | | | | | | | | | | |
| 1 | L | 114 | 2.0 | 0.086 | 7.9 | LOS A | 0.5 | 3.4 | 0.12 | 0.83 | 49.1 |
| 2 | T | 41 | 2.0 | 0.095 | 29.2 | LOS C | 2.3 | 16.6 | 0.82 | 0.81 | 31.7 |
| 3 | R | 4 | 2.0 | 0.095 | 37.2 | LOS D | 2.3 | 16.6 | 0.82 | 0.79 | 30.9 |
| Approach | | 169 | 2.0 | 0.095 | 14.2 | LOS B | 2.3 | 16.6 | 0.32 | 0.63 | 42.5 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 6 | 2.0 | 0.311 | 15.4 | LOS B | 9.6 | 68.6 | 0.47 | 0.99 | 43.9 |
| 5 | T | 839 | 2.0 | 0.315 | 7.1 | LOS A | 9.6 | 68.6 | 0.47 | 0.41 | 46.3 |
| 6 | R | 104 | 2.0 | 0.556 | 28.6 | LOS C | 5.0 | 35.9 | 0.78 | 0.81 | 33.2 |
| Approach | | 949 | 2.0 | 0.556 | 9.6 | LOS A | 9.6 | 68.6 | 0.50 | 0.46 | 46.0 |
| North: Lainster Road (N) | | | | | | | | | | | |
| 7 | L | 84 | 2.0 | 0.052 | 7.9 | LOS A | 0.3 | 2.5 | 0.12 | 0.63 | 49.1 |
| 8 | T | 40 | 2.0 | 0.084 | 29.1 | LOS C | 2.1 | 14.6 | 0.81 | 0.81 | 31.9 |
| 9 | R | 263 | 2.0 | 0.580 | 41.5 | LOS D | 12.1 | 85.9 | 0.94 | 0.83 | 28.1 |
| Approach | | 387 | 2.0 | 0.580 | 32.9 | LOS C | 12.1 | 85.9 | 0.75 | 0.76 | 31.4 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 196 | 2.0 | 0.154 | 8.0 | LOS A | 0.8 | 6.0 | 0.13 | 0.63 | 49.1 |
| 11 | T | 1341 | 2.0 | 0.586 | 9.2 | LOS A | 20.0 | 142.5 | 0.60 | 0.55 | 45.6 |
| 12 | R | 75 | 2.0 | 0.586 | 17.4 | LOS B | 16.6 | 118.5 | 0.60 | 0.94 | 42.4 |
| Approach | | 1612 | 2.0 | 0.586 | 9.5 | LOS A | 20.0 | 142.5 | 0.56 | 0.68 | 45.8 |
| All Vehicles | | 3187 | 2.0 | 0.586 | 12.7 | LOS B | 20.0 | 142.5 | 0.56 | 0.57 | 43.2 |



Annexure C2.2

MOVEMENT SUMMARY

Site: 2-3 Alan Paton/Leinster 2010 Set
AM-Peak Exist + Develop

2 - Alan Paton Ave / Leinster Rd 2010 Existing + Development Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 90 seconds

| Approach | Direction | Volume | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) |
|----------------------------------|-----------|--------|-----|-----------|-----------|-------|-----------|-----------|------|-----------|-----------|
| South: Leinster Road (S) | | | | | | | | | | | |
| 1 | L | 84 | 2.0 | 0.108 | 11.8 | LOS B | 1.8 | 11.5 | 0.43 | 0.69 | 45.7 |
| 2 | T | 48 | 2.0 | 0.064 | 14.8 | LOS B | 2.0 | 14.5 | 0.59 | 0.45 | 40.9 |
| 3 | R | 7 | 2.0 | 0.064 | 22.7 | LOS C | 2.0 | 14.5 | 0.59 | 0.86 | 38.4 |
| Approach | | 149 | 2.0 | 0.106 | 13.1 | LOS B | 2.0 | 14.5 | 0.49 | 0.62 | 43.6 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 6 | 2.0 | 0.881 | 39.8 | LOS D | 16.0 | 114.2 | 0.94 | 0.87 | 30.3 |
| 5 | T | 743 | 2.0 | 0.660 | 31.3 | LOS C | 18.0 | 114.2 | 0.94 | 0.81 | 30.7 |
| 6 | R | 179 | 2.0 | 0.701 | 33.4 | LOS C | 7.4 | 52.9 | 0.98 | 0.84 | 31.4 |
| Approach | | 928 | 2.0 | 0.701 | 31.8 | LOS C | 18.0 | 114.2 | 0.85 | 0.81 | 30.8 |
| North: Leinster Road (N) | | | | | | | | | | | |
| 7 | L | 137 | 2.0 | 0.140 | 11.3 | LOS B | 2.6 | 18.6 | 0.36 | 0.68 | 45.8 |
| 8 | T | 43 | 2.0 | 0.046 | 14.4 | LOS B | 1.8 | 11.3 | 0.58 | 0.44 | 41.3 |
| 9 | R | 408 | 2.0 | 0.708 | 33.2 | LOS C | 16.7 | 118.7 | 0.90 | 0.88 | 31.6 |
| Approach | | 586 | 2.0 | 0.708 | 28.7 | LOS C | 18.7 | 118.7 | 0.75 | 0.79 | 34.7 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 146 | 2.0 | 0.160 | 8.6 | LOS A | 1.2 | 8.8 | 0.22 | 0.65 | 48.6 |
| 11 | T | 808 | 2.0 | 0.713 | 32.5 | LOS C | 17.8 | 125.3 | 0.98 | 0.84 | 30.2 |
| 12 | R | 72 | 2.0 | 0.267 | 28.7 | LOS C | 3.0 | 21.8 | 0.88 | 0.75 | 33.1 |
| Approach | | 1027 | 2.0 | 0.713 | 28.9 | LOS C | 17.8 | 125.3 | 0.85 | 0.81 | 32.2 |
| All Vehicles | | 2692 | 2.0 | 0.713 | 28.5 | LOS C | 17.8 | 125.3 | 0.84 | 0.80 | 32.7 |

MOVEMENT SUMMARY

Site: 2-4 Alan Paton/Leinster 2010 Fri
PM-Peak Exist + Develop

2 - Alan Paton Ave / Leinster Rd 2010 Existing + Development Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 90 seconds

| Approach | Direction | Volume | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) | LOS | Delay (s) | Queue (m) |
|----------------------------------|-----------|--------|-----|-----------|-----------|-------|-----------|-----------|------|-----------|-----------|
| South: Leinster Road (S) | | | | | | | | | | | |
| 1 | L | 112 | 2.0 | 0.133 | 11.9 | LOS B | 2.0 | 13.9 | 0.45 | 0.70 | 45.4 |
| 2 | T | 49 | 2.0 | 0.072 | 18.1 | LOS B | 2.2 | 15.9 | 0.67 | 0.51 | 37.8 |
| 3 | R | 4 | 2.0 | 0.072 | 27.1 | LOS C | 2.2 | 15.9 | 0.67 | 0.84 | 35.8 |
| Approach | | 165 | 2.0 | 0.133 | 14.4 | LOS B | 2.2 | 15.9 | 0.52 | 0.65 | 42.5 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 8 | 2.0 | 0.588 | 33.5 | LOS C | 18.0 | 113.8 | 0.88 | 0.90 | 33.0 |
| 5 | T | 819 | 2.0 | 0.588 | 25.3 | LOS C | 18.0 | 113.9 | 0.88 | 0.75 | 33.7 |
| 6 | R | 160 | 2.0 | 0.713 | 32.3 | LOS C | 6.0 | 42.6 | 1.00 | 0.85 | 31.8 |
| Approach | | 985 | 2.0 | 0.714 | 26.5 | LOS C | 18.0 | 113.9 | 0.88 | 0.75 | 33.4 |
| North: Leinster Road (N) | | | | | | | | | | | |
| 7 | L | 118 | 2.0 | 0.138 | 15.1 | LOS B | 3.2 | 22.7 | 0.48 | 0.89 | 42.5 |
| 8 | T | 46 | 2.0 | 0.060 | 18.9 | LOS B | 1.8 | 13.8 | 0.68 | 0.51 | 37.8 |
| 9 | R | 408 | 2.0 | 0.868 | 50.6 | LOS D | 21.4 | 152.7 | 1.00 | 1.01 | 25.2 |
| Approach | | 573 | 2.0 | 0.868 | 40.7 | LOS D | 21.4 | 152.7 | 0.87 | 0.90 | 28.4 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 188 | 2.0 | 0.217 | 8.5 | LOS A | 1.8 | 11.3 | 0.21 | 0.65 | 48.6 |
| 11 | T | 1282 | 2.0 | 0.888 | 40.3 | LOS D | 32.4 | 230.6 | 1.00 | 1.05 | 27.2 |
| 12 | R | 73 | 2.0 | 0.237 | 25.1 | LOS C | 2.7 | 19.2 | 0.81 | 0.76 | 35.5 |
| Approach | | 1553 | 2.0 | 0.888 | 36.7 | LOS D | 32.4 | 230.6 | 0.90 | 1.00 | 28.1 |
| All Vehicles | | 3278 | 2.0 | 0.888 | 32.7 | LOS C | 32.4 | 230.6 | 0.87 | 0.88 | 30.8 |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

327592

Revision 1

Annexure C2.3

MOVEMENT SUMMARY

**Site: 2-3 Alan Paton/Leinster 2015 Sat
All-Peak Exist**

**2 - Alan Paton Ave / Leinster Rd 2015 Background Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 90 seconds**

| Movement | Phase | Volume | Speed | Queue | LOS | Delay | Stop | Start | End | Start | End |
|---------------------------------|-------|--------|-------|-------|------|-------|------|-------|------|-------|------|
| South Leinster Road (S) | | | | | | | | | | | |
| 1 | L | 114 | 2.0 | 0.086 | 7.9 | LOS A | 0.5 | 3.9 | 0.12 | 0.63 | 49.1 |
| 2 | T | 41 | 2.0 | 0.084 | 25.0 | LOS C | 2.4 | 16.8 | 0.78 | 0.58 | 33.7 |
| 3 | R | 8 | 2.0 | 0.084 | 33.1 | LOS C | 2.4 | 16.8 | 0.78 | 0.80 | 32.7 |
| Approach | | 163 | 2.0 | 0.084 | 13.5 | LOS B | 2.4 | 16.8 | 0.32 | 0.62 | 43.1 |
| East Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 7 | 2.0 | 0.372 | 18.1 | LOS B | 11.8 | 83.8 | 0.55 | 0.97 | 41.9 |
| 5 | T | 902 | 2.0 | 0.371 | 9.8 | LOS A | 11.8 | 83.8 | 0.55 | 0.49 | 45.3 |
| 6 | R | 104 | 2.0 | 0.386 | 25.0 | LOS C | 4.3 | 30.8 | 0.88 | 0.78 | 35.7 |
| Approach | | 1014 | 2.0 | 0.383 | 11.5 | LOS B | 11.8 | 83.8 | 0.67 | 0.52 | 44.0 |
| North Leinster Road (N) | | | | | | | | | | | |
| 7 | L | 97 | 2.0 | 0.059 | 7.9 | LOS A | 0.4 | 2.8 | 0.12 | 0.63 | 49.1 |
| 8 | T | 40 | 2.0 | 0.068 | 24.8 | LOS C | 1.9 | 13.6 | 0.76 | 0.57 | 34.2 |
| 9 | R | 237 | 2.0 | 0.422 | 36.0 | LOS D | 10.2 | 72.6 | 0.88 | 0.81 | 30.3 |
| Approach | | 374 | 2.0 | 0.422 | 27.5 | LOS C | 10.2 | 72.6 | 0.66 | 0.73 | 34.1 |
| West Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 189 | 2.0 | 0.148 | 8.0 | LOS A | 0.8 | 5.8 | 0.13 | 0.63 | 49.1 |
| 11 | T | 1019 | 2.0 | 0.415 | 10.2 | LOS B | 13.3 | 94.7 | 0.57 | 0.51 | 44.9 |
| 12 | R | 91 | 2.0 | 0.291 | 23.5 | LOS C | 3.5 | 25.2 | 0.83 | 0.77 | 38.5 |
| Approach | | 1299 | 2.0 | 0.415 | 10.8 | LOS B | 13.3 | 94.7 | 0.51 | 0.54 | 44.8 |
| All Vehicles | | 2033 | 2.0 | 0.422 | 12.4 | LOS B | 13.3 | 94.7 | 0.54 | 0.58 | 42.7 |

MOVEMENT SUMMARY

**Site: 2-4 Alan Paton/Leinster 2015 Fri
PM-Peak Exist**

**2 - Alan Paton Ave / Leinster Rd 2015 Background Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 90 seconds**

| Movement | Phase | Volume | Speed | Queue | LOS | Delay | Stop | Start | End | Start | End |
|---------------------------------|-------|--------|-------|-------|------|-------|------|-------|------|-------|------|
| South Leinster Road (S) | | | | | | | | | | | |
| 1 | L | 132 | 2.0 | 0.078 | 8.0 | LOS A | 0.6 | 3.9 | 0.13 | 0.63 | 49.1 |
| 2 | T | 47 | 2.0 | 0.129 | 32.1 | LOS C | 2.8 | 20.1 | 0.86 | 0.65 | 30.3 |
| 3 | R | 5 | 2.0 | 0.130 | 40.2 | LOS D | 2.8 | 20.1 | 0.86 | 0.78 | 29.8 |
| Approach | | 184 | 2.0 | 0.129 | 15.1 | LOS B | 2.8 | 20.1 | 0.33 | 0.64 | 41.8 |
| East Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 7 | 2.0 | 0.345 | 14.3 | LOS B | 10.4 | 73.7 | 0.44 | 1.00 | 44.8 |
| 5 | T | 973 | 2.0 | 0.348 | 6.1 | LOS A | 10.4 | 73.7 | 0.44 | 0.39 | 49.6 |
| 6 | R | 121 | 2.0 | 0.800 | 50.0 | LOS D | 8.1 | 57.4 | 0.92 | 1.02 | 25.4 |
| Approach | | 1101 | 2.0 | 0.801 | 10.9 | LOS B | 10.4 | 73.7 | 0.49 | 0.46 | 44.8 |
| North Leinster Road (N) | | | | | | | | | | | |
| 7 | L | 98 | 2.0 | 0.061 | 7.9 | LOS A | 0.4 | 2.9 | 0.12 | 0.63 | 49.1 |
| 8 | T | 46 | 2.0 | 0.113 | 32.0 | LOS C | 2.5 | 17.8 | 0.85 | 0.64 | 30.6 |
| 9 | R | 306 | 2.0 | 0.785 | 48.9 | LOS D | 15.2 | 108.4 | 1.00 | 0.81 | 25.7 |
| Approach | | 449 | 2.0 | 0.785 | 38.2 | LOS D | 15.2 | 108.4 | 0.79 | 0.82 | 29.2 |
| West Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 227 | 2.0 | 0.179 | 8.0 | LOS A | 1.0 | 7.1 | 0.13 | 0.63 | 49.0 |
| 11 | T | 1555 | 2.0 | 0.664 | 8.5 | LOS A | 23.9 | 170.2 | 0.62 | 0.57 | 46.2 |
| 12 | R | 86 | 2.0 | 0.663 | 16.8 | LOS B | 18.8 | 133.6 | 0.62 | 0.94 | 43.0 |
| Approach | | 1868 | 2.0 | 0.664 | 8.9 | LOS A | 23.9 | 170.2 | 0.56 | 0.60 | 46.3 |
| All Vehicles | | 3908 | 2.0 | 0.801 | 13.5 | LOS B | 23.9 | 170.2 | 0.66 | 0.69 | 42.5 |



WSP SA Civil and Structural Engineers PM 14
Private

TRAFFIC IMPACT STUDY

327982

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

Revision 1

Annexure C2.4

MOVEMENT SUMMARY

Site: 2-7 Alan Paton/Leinster 2018 Sat
AM-Peak Exst + Develop

2 - Alan Paton Ave / Leinster Rd 2015 Background + Development Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 70 seconds

| Approach | Direction | Volume | Speed | Delay | LOS | Queue | SA | SA | SA | SA | |
|----------------------------------|-----------|--------|-------|-------|------|-------|------|-------|------|------|------|
| South: Leinster Road (S) | | | | | | | | | | | |
| 1 | L | 109 | 2.0 | 0.123 | 11.4 | LOS B | 1.7 | 12.3 | 0.46 | 0.70 | 45.9 |
| 2 | T | 54 | 2.0 | 0.107 | 19.2 | LOS B | 2.3 | 18.5 | 0.76 | 0.68 | 37.2 |
| 3 | R | 8 | 2.0 | 0.107 | 27.9 | LOS C | 2.3 | 16.5 | 0.76 | 0.81 | 36.8 |
| Approach | | 172 | 2.0 | 0.123 | 14.6 | LOS B | 2.3 | 16.5 | 0.57 | 0.67 | 42.2 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 7 | 2.0 | 0.600 | 28.3 | LOS C | 13.9 | 98.8 | 0.87 | 0.89 | 36.8 |
| 5 | T | 867 | 2.0 | 0.599 | 20.1 | LOS C | 13.9 | 98.8 | 0.87 | 0.76 | 36.6 |
| 6 | R | 194 | 2.0 | 0.577 | 21.9 | LOS C | 5.2 | 36.9 | 0.91 | 0.80 | 37.5 |
| Approach | | 1068 | 2.0 | 0.599 | 20.5 | LOS C | 13.9 | 98.8 | 0.86 | 0.76 | 36.8 |
| North: Leinster Road (N) | | | | | | | | | | | |
| 7 | L | 151 | 2.0 | 0.147 | 11.4 | LOS B | 2.6 | 18.4 | 0.43 | 0.70 | 45.7 |
| 8 | T | 48 | 2.0 | 0.661 | 27.5 | LOS C | 9.9 | 70.7 | 0.96 | 0.83 | 31.1 |
| 9 | R | 439 | 2.0 | 0.661 | 35.8 | LOS D | 9.9 | 70.7 | 0.96 | 0.86 | 30.5 |
| Approach | | 638 | 2.0 | 0.661 | 29.4 | LOS C | 9.9 | 70.7 | 0.83 | 0.82 | 33.2 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 177 | 2.0 | 0.200 | 8.8 | LOS A | 1.6 | 10.6 | 0.27 | 0.66 | 48.3 |
| 11 | T | 849 | 2.0 | 0.650 | 20.6 | LOS C | 15.2 | 107.9 | 0.89 | 0.78 | 36.3 |
| 12 | R | 84 | 2.0 | 0.236 | 20.5 | LOS C | 2.3 | 16.3 | 0.81 | 0.75 | 38.4 |
| Approach | | 1211 | 2.0 | 0.650 | 18.8 | LOS B | 15.2 | 107.9 | 0.80 | 0.76 | 37.8 |
| All Vehicles | | 2036 | 2.0 | 0.631 | 21.4 | LOS C | 15.2 | 107.9 | 0.82 | 0.77 | 36.6 |

MOVEMENT SUMMARY

Site: 2-9 Alan Paton/Leinster 2018 Fri
PM-Peak Exst + Develop

2 - Alan Paton Ave / Leinster Rd 2015 Background + Development Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 90 seconds

| Approach | Direction | Volume | Speed | Delay | LOS | Queue | SA | SA | SA | SA | |
|----------------------------------|-----------|--------|-------|-------|------|-------|------|-------|------|------|------|
| South: Leinster Road (S) | | | | | | | | | | | |
| 1 | L | 129 | 2.0 | 0.163 | 11.4 | LOS B | 2.4 | 16.8 | 0.42 | 0.70 | 45.9 |
| 2 | T | 56 | 2.0 | 0.118 | 26.9 | LOS C | 3.0 | 21.2 | 0.79 | 0.61 | 32.8 |
| 3 | R | 5 | 2.0 | 0.118 | 35.0 | LOS D | 3.0 | 21.2 | 0.79 | 0.81 | 31.9 |
| Approach | | 191 | 2.0 | 0.163 | 16.6 | LOS B | 3.0 | 21.2 | 0.64 | 0.67 | 40.7 |
| East: Alan Paton Road (E) | | | | | | | | | | | |
| 4 | L | 7 | 2.0 | 0.496 | 26.2 | LOS C | 15.9 | 113.4 | 0.75 | 0.89 | 36.8 |
| 5 | T | 953 | 2.0 | 0.503 | 17.9 | LOS B | 15.9 | 113.5 | 0.75 | 0.66 | 36.3 |
| 6 | R | 177 | 2.0 | 0.738 | 30.7 | LOS C | 6.4 | 46.8 | 0.99 | 0.89 | 32.6 |
| Approach | | 1137 | 2.0 | 0.739 | 20.0 | LOS B | 15.9 | 113.5 | 0.79 | 0.69 | 37.3 |
| North: Leinster Road (N) | | | | | | | | | | | |
| 7 | L | 132 | 2.0 | 0.151 | 8.2 | LOS A | 0.9 | 6.5 | 0.18 | 0.64 | 48.8 |
| 8 | T | 53 | 2.0 | 0.756 | 39.3 | LOS D | 13.2 | 93.8 | 0.99 | 0.91 | 26.6 |
| 9 | R | 451 | 2.0 | 0.757 | 47.8 | LOS D | 13.2 | 93.8 | 0.99 | 0.91 | 26.2 |
| Approach | | 635 | 2.0 | 0.757 | 38.7 | LOS D | 13.2 | 93.8 | 0.82 | 0.86 | 29.1 |
| West: Alan Paton Road (W) | | | | | | | | | | | |
| 10 | L | 220 | 2.0 | 0.252 | 8.7 | LOS A | 1.9 | 13.5 | 0.23 | 0.66 | 48.5 |
| 11 | T | 1505 | 2.0 | 0.789 | 23.1 | LOS C | 29.2 | 207.7 | 0.91 | 0.84 | 34.8 |
| 12 | R | 84 | 2.0 | 0.247 | 19.8 | LOS B | 2.5 | 17.7 | 0.70 | 0.75 | 38.9 |
| Approach | | 1809 | 2.0 | 0.789 | 21.2 | LOS C | 29.2 | 207.7 | 0.82 | 0.82 | 36.2 |
| All Vehicles | | 3772 | 2.0 | 0.789 | 23.5 | LOS C | 29.2 | 207.7 | 0.80 | 0.78 | 35.3 |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

327582

Revision 1

Annexure C3.1

MOVEMENT SUMMARY

Site: 3-1 New England/Woodhouse
2010 Sat AM-Peak Exist

3 - Woodhouse Rd / New England Rd 2010 Existing Traffic Volumes Saturday AM-Peak
Stop (Two-Way)

| Worksheet Performance - Vehicles | | | | | | | | | | | | |
|----------------------------------|-----|--------|-----|-------|-------|-------|-------|-------|-------|------|------|------|
| Count | Way | Choice | Rd | Q | Flow | Speed | LOS | Delay | Queue | Stop | Time | |
| 1 | L | 5 | 2.0 | 0.142 | 8.6 | LOS A | 1.2 | 8.3 | 0.19 | 1.72 | 49.8 | |
| 2 | T | 283 | 2.0 | 0.141 | 0.3 | LOS A | 1.2 | 8.3 | 0.19 | 0.00 | 56.4 | |
| 3 | R | 16 | 2.0 | 0.014 | 9.0 | LOS A | 0.1 | 0.5 | 0.32 | 0.61 | 47.6 | |
| Approach | | | 284 | 2.0 | 0.141 | 0.9 | LOS A | 1.2 | 8.3 | 0.20 | 0.07 | 55.7 |
| East New England Road (E) | | | | | | | | | | | | |
| 4 | L | 111 | 2.0 | 0.119 | 12.0 | LOS B | 0.8 | 4.0 | 0.34 | 0.69 | 45.9 | |
| 5 | T | 1 | 2.0 | 0.117 | 12.4 | LOS B | 0.6 | 4.0 | 0.34 | 0.98 | 45.5 | |
| 6 | R | 36 | 2.0 | 0.088 | 17.1 | LOS C | 0.4 | 2.8 | 0.57 | 0.97 | 41.8 | |
| Approach | | | 147 | 2.0 | 0.119 | 13.2 | LOS C | 0.6 | 4.0 | 0.40 | 0.91 | 44.8 |
| North Woodhouse Road (N) | | | | | | | | | | | | |
| 7 | L | 19 | 2.0 | 0.125 | 8.3 | LOS A | 0.9 | 6.6 | 0.02 | 1.66 | 49.0 | |
| 8 | T | 209 | 2.0 | 0.128 | 0.1 | LOS A | 0.9 | 6.8 | 0.02 | 0.00 | 59.6 | |
| 9 | R | 1 | 2.0 | 0.132 | 8.5 | LOS A | 0.9 | 6.8 | 0.02 | 1.11 | 48.7 | |
| Approach | | | 229 | 2.0 | 0.128 | 0.8 | LOS A | 0.9 | 6.8 | 0.02 | 0.14 | 58.5 |
| West New England Road (W) | | | | | | | | | | | | |
| 10 | L | 2 | 2.0 | 0.011 | 12.8 | LOS B | 0.0 | 0.3 | 0.50 | 0.62 | 44.3 | |
| 11 | T | 1 | 2.0 | 0.011 | 15.8 | LOS C | 0.0 | 0.3 | 0.50 | 0.87 | 42.8 | |
| 12 | R | 2 | 2.0 | 0.011 | 15.3 | LOS C | 0.0 | 0.3 | 0.50 | 0.90 | 43.1 | |
| Approach | | | 5 | 2.0 | 0.011 | 14.4 | LOS C | 0.0 | 0.3 | 0.50 | 0.78 | 43.5 |
| All Vehicles | | | 686 | 2.0 | 0.141 | 3.7 | NA | 1.2 | 8.3 | 0.19 | 0.20 | 63.8 |

MOVEMENT SUMMARY

Site: 3-2 New England/Woodhouse
2010 Fri PM-Peak Exist

3 - Woodhouse Rd / New England Rd 2010 Existing Traffic Volumes Friday PM-Peak
Stop (Two-Way)

| Worksheet Performance - Vehicles | | | | | | | | | | | | |
|----------------------------------|-----|--------|-----|-------|-------|-------|-------|-------|-------|------|------|------|
| Count | Way | Choice | Rd | Q | Flow | Speed | LOS | Delay | Queue | Stop | Time | |
| 1 | L | 1 | 2.0 | 0.175 | 8.6 | LOS A | 1.5 | 10.6 | 0.24 | 1.70 | 50.1 | |
| 2 | T | 325 | 2.0 | 0.170 | 0.4 | LOS A | 1.5 | 10.6 | 0.24 | 0.00 | 65.6 | |
| 3 | R | 16 | 2.0 | 0.014 | 9.2 | LOS A | 0.1 | 0.6 | 0.35 | 0.62 | 47.5 | |
| Approach | | | 342 | 2.0 | 0.170 | 0.9 | LOS A | 1.5 | 10.6 | 0.24 | 0.03 | 65.1 |
| East New England Road (E) | | | | | | | | | | | | |
| 4 | L | 158 | 2.0 | 0.176 | 12.3 | LOS B | 0.9 | 6.1 | 0.38 | 0.90 | 45.8 | |
| 5 | T | 1 | 2.0 | 0.175 | 12.7 | LOS B | 0.9 | 6.1 | 0.38 | 1.00 | 45.3 | |
| 6 | R | 20 | 2.0 | 0.057 | 18.8 | LOS C | 0.3 | 1.8 | 0.62 | 0.87 | 40.5 | |
| Approach | | | 179 | 2.0 | 0.176 | 13.0 | LOS C | 0.9 | 6.1 | 0.41 | 0.91 | 45.0 |
| North Woodhouse Road (N) | | | | | | | | | | | | |
| 7 | L | 46 | 2.0 | 0.159 | 8.3 | LOS A | 1.2 | 8.5 | 0.02 | 1.43 | 49.0 | |
| 8 | T | 229 | 2.0 | 0.159 | 0.0 | LOS A | 1.2 | 8.5 | 0.02 | 0.00 | 59.6 | |
| 9 | R | 1 | 2.0 | 0.159 | 8.5 | LOS A | 1.2 | 8.5 | 0.02 | 1.06 | 48.7 | |
| Approach | | | 277 | 2.0 | 0.159 | 1.5 | LOS A | 1.2 | 8.5 | 0.02 | 0.24 | 57.5 |
| West New England Road (W) | | | | | | | | | | | | |
| 10 | L | 1 | 2.0 | 0.008 | 14.5 | LOS B | 0.0 | 0.2 | 0.57 | 0.63 | 42.8 | |
| 11 | T | 1 | 2.0 | 0.008 | 17.5 | LOS C | 0.0 | 0.2 | 0.57 | 0.87 | 41.5 | |
| 12 | R | 1 | 2.0 | 0.008 | 17.0 | LOS C | 0.0 | 0.2 | 0.57 | 0.91 | 41.8 | |
| Approach | | | 3 | 2.0 | 0.008 | 16.3 | LOS C | 0.0 | 0.2 | 0.57 | 0.80 | 42.0 |
| All Vehicles | | | 991 | 2.0 | 0.176 | 3.8 | NA | 1.5 | 10.6 | 0.26 | 0.31 | 63.2 |

TRAFFIC IMPACT STUDY

327692

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4348 PIETERMARITZBURG FT

Revision 1

Annexure C3.2

MOVEMENT SUMMARY

Site: 3-3 New England/Woodhouse
2010 Sat AM-Peak Exist + Develop

3 - Woodhouse Rd / New England Rd 2010 Existing + Development Traffic Volumes Saturday AM-Peak Roundabout

| Approach | Direction | Volume | Speed | Delay | LOS | Queue | Stop | Start | Stop | Start | Stop | |
|----------------------------------|-----------|--------|-------|-------|------|-------|------|-------|------|-------|------|--|
| South Woodhouse Road (S) | | | | | | | | | | | | |
| 1 | L | 114 | 2.0 | 0.101 | 6.6 | LOS A | 0.6 | 4.5 | 0.41 | 0.56 | 49.3 | |
| 2 | T | 116 | 2.0 | 0.103 | 6.3 | LOS A | 0.7 | 4.7 | 0.40 | 0.48 | 50.3 | |
| 3 | R | 14 | 2.0 | 0.103 | 12.2 | LOS B | 0.7 | 4.7 | 0.40 | 0.83 | 46.6 | |
| Approach | | 242 | 2.0 | 0.103 | 6.3 | LOS B | 0.7 | 4.7 | 0.40 | 0.53 | 49.6 | |
| East New England Road (E) | | | | | | | | | | | | |
| 4 | L | 104 | 2.0 | 0.163 | 8.2 | LOS A | 1.3 | 9.0 | 0.70 | 0.73 | 47.7 | |
| 5 | T | 41 | 2.0 | 0.163 | 8.1 | LOS A | 1.3 | 9.0 | 0.70 | 0.68 | 47.6 | |
| 6 | R | 36 | 2.0 | 0.085 | 16.7 | LOS B | 0.4 | 2.9 | 0.68 | 0.80 | 42.2 | |
| Approach | | 181 | 2.0 | 0.163 | 10.6 | LOS B | 1.3 | 9.0 | 0.70 | 0.73 | 46.4 | |
| North Woodhouse Road (N) | | | | | | | | | | | | |
| 7 | L | 14 | 2.0 | 0.391 | 8.3 | LOS A | 3.1 | 21.9 | 0.67 | 0.72 | 47.6 | |
| 8 | T | 148 | 2.0 | 0.392 | 7.3 | LOS A | 3.1 | 21.9 | 0.67 | 0.66 | 47.6 | |
| 9 | R | 186 | 2.0 | 0.392 | 14.2 | LOS B | 3.1 | 21.9 | 0.67 | 0.84 | 44.7 | |
| Approach | | 348 | 2.0 | 0.392 | 11.0 | LOS B | 3.1 | 21.9 | 0.67 | 0.76 | 45.9 | |
| West New England Road (W) | | | | | | | | | | | | |
| 10 | L | 183 | 2.0 | 0.509 | 6.6 | LOS A | 4.6 | 32.7 | 0.47 | 0.53 | 48.8 | |
| 11 | T | 40 | 2.0 | 0.508 | 6.8 | LOS A | 4.6 | 32.7 | 0.47 | 0.48 | 48.9 | |
| 12 | R | 388 | 2.0 | 0.509 | 12.4 | LOS B | 4.6 | 32.7 | 0.47 | 0.70 | 45.3 | |
| Approach | | 621 | 2.0 | 0.509 | 10.2 | LOS B | 4.6 | 32.7 | 0.47 | 0.64 | 46.4 | |
| All Vehicles | | 1589 | 2.0 | 0.583 | 8.0 | LOS A | 4.6 | 32.7 | 0.64 | 0.68 | 48.2 | |

MOVEMENT SUMMARY

Site: 3-4 New England/Woodhouse
2010 Fri PM-Peak Exist + Develop

3 - Woodhouse Rd / New England Rd 2010 Existing + Development Traffic Volumes Friday PM-Peak Roundabout

| Approach | Direction | Volume | Speed | Delay | LOS | Queue | Stop | Start | Stop | Start | Stop | |
|----------------------------------|-----------|--------|-------|-------|------|-------|------|-------|------|-------|------|--|
| South Woodhouse Road (S) | | | | | | | | | | | | |
| 1 | L | 89 | 2.0 | 0.113 | 6.6 | LOS A | 0.7 | 4.8 | 0.37 | 0.64 | 49.7 | |
| 2 | T | 301 | 2.0 | 0.221 | 6.1 | LOS A | 1.5 | 10.8 | 0.36 | 0.48 | 50.6 | |
| 3 | R | 15 | 2.0 | 0.221 | 12.0 | LOS B | 1.5 | 10.8 | 0.36 | 0.84 | 46.7 | |
| Approach | | 405 | 2.0 | 0.221 | 6.7 | LOS B | 1.5 | 10.8 | 0.36 | 0.49 | 50.2 | |
| East New England Road (E) | | | | | | | | | | | | |
| 4 | L | 153 | 2.0 | 0.160 | 8.3 | LOS A | 1.4 | 10.1 | 0.64 | 0.69 | 48.0 | |
| 5 | T | 37 | 2.0 | 0.191 | 7.1 | LOS A | 1.4 | 10.1 | 0.64 | 0.64 | 48.0 | |
| 6 | R | 20 | 2.0 | 0.033 | 15.3 | LOS B | 0.2 | 1.4 | 0.61 | 0.74 | 43.3 | |
| Approach | | 209 | 2.0 | 0.190 | 8.8 | LOS B | 1.4 | 10.1 | 0.63 | 0.69 | 47.5 | |
| North Woodhouse Road (N) | | | | | | | | | | | | |
| 7 | L | 39 | 2.0 | 0.367 | 7.3 | LOS A | 2.9 | 20.5 | 0.58 | 0.64 | 48.4 | |
| 8 | T | 186 | 2.0 | 0.369 | 6.4 | LOS A | 2.9 | 20.5 | 0.58 | 0.58 | 48.5 | |
| 9 | R | 128 | 2.0 | 0.368 | 13.3 | LOS B | 2.9 | 20.5 | 0.58 | 0.81 | 45.7 | |
| Approach | | 353 | 2.0 | 0.368 | 8.9 | LOS B | 2.9 | 20.5 | 0.58 | 0.67 | 47.4 | |
| West New England Road (W) | | | | | | | | | | | | |
| 10 | L | 124 | 2.0 | 0.428 | 7.4 | LOS A | 3.3 | 23.2 | 0.58 | 0.65 | 47.8 | |
| 11 | T | 35 | 2.0 | 0.429 | 6.5 | LOS A | 3.3 | 23.2 | 0.58 | 0.58 | 47.9 | |
| 12 | R | 289 | 2.0 | 0.428 | 13.4 | LOS B | 3.3 | 23.2 | 0.58 | 0.79 | 45.0 | |
| Approach | | 428 | 2.0 | 0.429 | 11.1 | LOS B | 3.3 | 23.2 | 0.58 | 0.73 | 48.0 | |
| All Vehicles | | 1496 | 2.0 | 0.429 | 8.6 | LOS A | 3.3 | 23.2 | 0.63 | 0.64 | 47.7 | |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

327822

Revision 1

Annexure C3.3

MOVEMENT SUMMARY

Site: 3-6 New England/Woodhouse

3 - Woodhouse Rd / New England Rd 2015 Existing Traffic Volumes Saturday AM-Peak

| Approach | Direction | Volume | Speed (km/h) | LOS | Delay (s) | Queue (m) | Stop (s) | Accel (m/s²) | Decel (m/s²) | Stop (s) | |
|----------------------------------|-----------|--------|--------------|-------|-----------|-----------|----------|--------------|--------------|----------|------|
| South Woodhouse Road (S) | | | | | | | | | | | |
| 1 | L | 8 | 2.0 | 0.204 | 8.6 | LOS A | 1.8 | 12.7 | 0.22 | 1.69 | 50.0 |
| 2 | T | 377 | 2.0 | 0.201 | 0.4 | LOS A | 1.8 | 12.7 | 0.22 | 0.00 | 65.9 |
| 3 | R | 18 | 2.0 | 0.016 | 9.2 | LOS A | 0.1 | 0.8 | 0.35 | 0.62 | 47.5 |
| Approach | | 401 | 2.0 | 0.201 | 0.9 | LOS A | 1.8 | 12.7 | 0.22 | 0.05 | 65.4 |
| East New England Road (E) | | | | | | | | | | | |
| 4 | L | 128 | 2.0 | 0.144 | 12.3 | LOS B | 0.7 | 4.9 | 0.38 | 0.90 | 45.7 |
| 5 | T | 1 | 2.0 | 0.150 | 12.8 | LOS B | 0.7 | 4.9 | 0.33 | 1.00 | 45.8 |
| 6 | R | 41 | 2.0 | 0.129 | 20.4 | LOS C | 0.6 | 4.1 | 0.88 | 1.00 | 38.4 |
| Approach | | 171 | 2.0 | 0.144 | 14.3 | LOS C | 0.7 | 4.9 | 0.45 | 0.92 | 44.0 |
| North Woodhouse Road (N) | | | | | | | | | | | |
| 7 | L | 22 | 2.0 | 0.145 | 8.4 | LOS A | 1.1 | 8.0 | 0.02 | 1.68 | 49.0 |
| 8 | T | 243 | 2.0 | 0.146 | 0.1 | LOS A | 1.1 | 8.0 | 0.02 | 0.00 | 69.7 |
| 9 | R | 1 | 2.0 | 0.150 | 8.5 | LOS A | 1.1 | 8.0 | 0.02 | 1.12 | 49.5 |
| Approach | | 266 | 2.0 | 0.146 | 0.8 | LOS A | 1.1 | 8.0 | 0.02 | 0.14 | 58.5 |
| West New England Road (W) | | | | | | | | | | | |
| 10 | L | 1 | 2.0 | 0.012 | 18.5 | LOS C | 0.1 | 0.4 | 0.63 | 0.67 | 41.2 |
| 11 | T | 1 | 2.0 | 0.012 | 19.5 | LOS C | 0.1 | 0.4 | 0.63 | 0.69 | 40.1 |
| 12 | R | 2 | 2.0 | 0.012 | 19.0 | LOS C | 0.1 | 0.4 | 0.63 | 0.93 | 40.3 |
| Approach | | 4 | 2.0 | 0.012 | 18.5 | LOS C | 0.1 | 0.4 | 0.63 | 0.85 | 40.5 |
| All Vehicles | | 642 | 2.0 | 0.141 | 3.7 | NA | 1.8 | 12.7 | 0.21 | 0.23 | 50.4 |

MOVEMENT SUMMARY

Site: 3-6 New England/Woodhouse

3 - Woodhouse Rd / New England Rd 2015 Existing Traffic Volumes Friday PM-Peak

| Approach | Direction | Volume | Speed (km/h) | LOS | Delay (s) | Queue (m) | Stop (s) | Accel (m/s²) | Decel (m/s²) | Stop (s) | |
|----------------------------------|-----------|--------|--------------|-------|-----------|-----------|----------|--------------|--------------|----------|------|
| South Woodhouse Road (S) | | | | | | | | | | | |
| 1 | L | 1 | 2.0 | 0.211 | 8.7 | LOS A | 1.8 | 12.7 | 0.27 | 1.57 | 50.2 |
| 2 | T | 377 | 2.0 | 0.197 | 0.5 | LOS A | 1.8 | 12.7 | 0.27 | 0.00 | 58.1 |
| 3 | R | 18 | 2.0 | 0.017 | 9.5 | LOS A | 0.1 | 0.8 | 0.39 | 0.64 | 47.8 |
| Approach | | 398 | 2.0 | 0.197 | 0.9 | LOS A | 1.8 | 12.7 | 0.27 | 0.03 | 54.7 |
| East New England Road (E) | | | | | | | | | | | |
| 4 | L | 183 | 2.0 | 0.214 | 12.7 | LOS B | 1.1 | 7.5 | 0.43 | 0.92 | 45.4 |
| 5 | T | 1 | 2.0 | 0.211 | 13.0 | LOS B | 1.1 | 7.5 | 0.43 | 1.00 | 45.0 |
| 6 | R | 23 | 2.0 | 0.078 | 21.1 | LOS C | 0.3 | 2.4 | 0.89 | 1.00 | 38.8 |
| Approach | | 207 | 2.0 | 0.214 | 13.8 | LOS C | 1.1 | 7.5 | 0.46 | 0.93 | 44.8 |
| North Woodhouse Road (N) | | | | | | | | | | | |
| 7 | L | 54 | 2.0 | 0.184 | 8.3 | LOS A | 1.4 | 10.1 | 0.02 | 1.43 | 49.0 |
| 8 | T | 268 | 2.0 | 0.184 | 0.0 | LOS A | 1.4 | 10.1 | 0.02 | 0.00 | 59.8 |
| 9 | R | 1 | 2.0 | 0.175 | 8.5 | LOS A | 1.4 | 10.1 | 0.02 | 1.06 | 48.7 |
| Approach | | 321 | 2.0 | 0.184 | 1.5 | LOS A | 1.4 | 10.1 | 0.02 | 0.24 | 57.5 |
| West New England Road (W) | | | | | | | | | | | |
| 10 | L | 1 | 2.0 | 0.008 | 18.4 | LOS C | 0.0 | 0.3 | 0.62 | 0.66 | 41.3 |
| 11 | T | 1 | 2.0 | 0.008 | 19.3 | LOS C | 0.0 | 0.3 | 0.62 | 0.88 | 40.2 |
| 12 | R | 1 | 2.0 | 0.008 | 18.9 | LOS C | 0.0 | 0.3 | 0.62 | 0.93 | 40.4 |
| Approach | | 3 | 2.0 | 0.008 | 18.2 | LOS C | 0.0 | 0.3 | 0.62 | 0.93 | 40.4 |
| All Vehicles | | 827 | 2.0 | 0.214 | 4.0 | NA | 1.8 | 12.7 | 0.23 | 0.31 | 52.6 |



WSP SA Civil and Structural Engineers P.O.M.
Pretoria

Annexure C3.4

MOVEMENT SUMMARY

Site: 3-7 New England/Woodhouse
2015 Sat AM-Peak Exct + Develop

3 - Woodhouse Rd / New England Rd 2015 Background + Development Traffic Volumes Saturday AM-Peak Roundabout

| Movement | Priority | Volume | Speed (km/h) | Delay (s) | Queue Length (m) | LOS | Delay (s) | Queue Length (m) | Delay (s) | Queue Length (m) | Delay (s) |
|-----------------------------------|----------|--------|--------------|-----------|------------------|-------|-----------|------------------|-----------|------------------|-----------|
| South: Woodhouse Road (S) | | | | | | | | | | | |
| 1 | L | 116 | 2.0 | 0.121 | 7.0 | LOS A | 0.7 | 5.3 | 0.44 | 0.57 | 49.1 |
| 2 | T | 252 | 2.0 | 0.216 | 6.4 | LOS A | 1.5 | 10.6 | 0.44 | 0.49 | 50.0 |
| 3 | R | 16 | 2.0 | 0.216 | 12.3 | LOS B | 1.5 | 10.6 | 0.44 | 0.84 | 46.7 |
| Approach | | 382 | 2.0 | 0.216 | 6.2 | LOS B | 1.5 | 10.6 | 0.44 | 0.63 | 49.6 |
| East: New England Road (E) | | | | | | | | | | | |
| 4 | L | 122 | 2.0 | 0.192 | 9.6 | LOS A | 1.5 | 11.0 | 0.74 | 0.76 | 47.4 |
| 5 | T | 41 | 2.0 | 0.192 | 8.4 | LOS A | 1.5 | 11.0 | 0.74 | 0.72 | 47.2 |
| 6 | R | 41 | 2.0 | 0.078 | 17.1 | LOS B | 0.5 | 3.6 | 0.71 | 0.82 | 41.9 |
| Approach | | 204 | 2.0 | 0.192 | 10.9 | LOS B | 1.5 | 11.0 | 0.73 | 0.76 | 45.1 |
| North: Woodhouse Road (N) | | | | | | | | | | | |
| 7 | L | 17 | 2.0 | 0.443 | 6.4 | LOS A | 3.8 | 26.8 | 0.72 | 0.74 | 47.3 |
| 8 | T | 182 | 2.0 | 0.448 | 7.5 | LOS A | 3.8 | 26.8 | 0.72 | 0.66 | 47.1 |
| 9 | R | 186 | 2.0 | 0.448 | 14.4 | LOS B | 3.8 | 26.8 | 0.72 | 0.66 | 44.7 |
| Approach | | 385 | 2.0 | 0.448 | 10.9 | LOS B | 3.8 | 26.8 | 0.72 | 0.77 | 45.9 |
| West: New England Road (W) | | | | | | | | | | | |
| 10 | L | 185 | 2.0 | 0.600 | 6.3 | LOS A | 6.2 | 44.5 | 0.69 | 0.71 | 47.1 |
| 11 | T | 40 | 2.0 | 0.597 | 7.4 | LOS A | 6.2 | 44.5 | 0.69 | 0.68 | 47.0 |
| 12 | R | 400 | 2.0 | 0.600 | 14.3 | LOS B | 6.2 | 44.5 | 0.69 | 0.81 | 44.4 |
| Approach | | 625 | 2.0 | 0.600 | 12.1 | LOS B | 6.2 | 44.5 | 0.69 | 0.77 | 45.3 |
| All Vehicles | | 1697 | 2.0 | 0.306 | 16.2 | LOS B | 6.2 | 44.5 | 0.64 | 0.71 | 46.5 |

MOVEMENT SUMMARY

Site: 3-8 New England/Woodhouse
2016 Fri PM-Peak Exct + Develop

3 - Woodhouse Rd / New England Rd 2016 Background + Development Traffic Volumes Friday PM-Peak Roundabout

| Movement | Priority | Volume | Speed (km/h) | Delay (s) | Queue Length (m) | LOS | Delay (s) | Queue Length (m) | Delay (s) | Queue Length (m) | Delay (s) |
|---------------------------------------|----------|--------|--------------|-----------|------------------|-------|-----------|------------------|-----------|------------------|-----------|
| South: Woodhouse Road (S) | | | | | | | | | | | |
| 1 | L | 89 | 2.0 | 0.127 | 6.6 | LOS A | 0.8 | 5.5 | 0.37 | 0.54 | 49.7 |
| 2 | T | 353 | 2.0 | 0.260 | 5.2 | LOS A | 1.8 | 12.6 | 0.37 | 0.46 | 50.5 |
| 3 | R | 17 | 2.0 | 0.261 | 12.0 | LOS B | 1.8 | 12.6 | 0.37 | 0.84 | 46.7 |
| Approach | | 459 | 2.0 | 0.260 | 5.7 | LOS B | 1.8 | 12.6 | 0.37 | 0.49 | 50.2 |
| East: New England Road (E) | | | | | | | | | | | |
| 4 | L | 178 | 2.0 | 0.223 | 8.6 | LOS A | 1.7 | 12.3 | 0.67 | 0.72 | 47.8 |
| 5 | T | 37 | 2.0 | 0.223 | 7.5 | LOS A | 1.7 | 12.3 | 0.67 | 0.67 | 47.7 |
| 6 | R | 23 | 2.0 | 0.039 | 15.7 | LOS B | 0.2 | 1.7 | 0.63 | 0.75 | 43.0 |
| Approach | | 238 | 2.0 | 0.224 | 8.1 | LOS B | 1.7 | 12.3 | 0.67 | 0.71 | 47.2 |
| North: Woodhouse Road (N) | | | | | | | | | | | |
| 7 | L | 46 | 2.0 | 0.414 | 7.4 | LOS A | 3.4 | 24.0 | 0.60 | 0.66 | 48.3 |
| 8 | T | 233 | 2.0 | 0.413 | 6.5 | LOS A | 3.4 | 24.0 | 0.60 | 0.59 | 48.3 |
| 9 | R | 128 | 2.0 | 0.413 | 13.4 | LOS B | 3.4 | 24.0 | 0.60 | 0.82 | 45.6 |
| Approach | | 407 | 2.0 | 0.413 | 8.8 | LOS B | 3.4 | 24.0 | 0.60 | 0.67 | 47.4 |
| West: Proposed Development (W) | | | | | | | | | | | |
| 10 | L | 124 | 2.0 | 0.448 | 7.8 | LOS A | 3.4 | 24.2 | 0.62 | 0.69 | 47.6 |
| 11 | T | 35 | 2.0 | 0.451 | 6.8 | LOS A | 3.4 | 24.2 | 0.62 | 0.62 | 47.5 |
| 12 | R | 269 | 2.0 | 0.448 | 13.7 | LOS B | 3.4 | 24.2 | 0.62 | 0.82 | 44.9 |
| Approach | | 428 | 2.0 | 0.448 | 11.4 | LOS B | 3.4 | 24.2 | 0.62 | 0.76 | 45.8 |
| All Vehicles | | 1533 | 2.0 | 0.446 | 8.7 | LOS A | 3.4 | 24.2 | 0.56 | 0.66 | 47.7 |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4348 PIETERMARITZBURG FT

327692

Revision 1

Annexure C4.1

MOVEMENT SUMMARY

Site: 4-1 Woodhouse/Boshoff 2010 Sat
AM-Peak Excl

4 - Woodhouse Rd / Boshoff St 2010 Existing Traffic Volumes Saturday AM-Peak
Signal - Fixed Time Cycle Time = 60 seconds

| Approach | Phase | Volume | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) |
|--------------------------------------|-------|--------|-----|-----------|-------------|-------|-----------|-------------|------|-----------|-------------|
| South East: Boshoff St (SE) | | | | | | | | | | | |
| 21 | L | 3 | 2.0 | 0.279 | 15.4 | LOS B | 8.1 | 43.6 | 0.55 | 0.98 | 44.2 |
| 22 | T | 302 | 2.0 | 0.277 | 7.2 | LOS A | 6.1 | 43.6 | 0.55 | 0.47 | 47.9 |
| 23 | R | 87 | 2.0 | 0.304 | 25.3 | LOS C | 3.0 | 21.1 | 0.78 | 0.78 | 35.3 |
| Approach | | 393 | 2.0 | 0.304 | 11.3 | LOS B | 6.1 | 43.6 | 0.60 | 0.54 | 44.4 |
| North East: Woodhouse Rd (NE) | | | | | | | | | | | |
| 24 | L | 101 | 2.0 | 0.494 | 30.5 | LOS C | 7.4 | 52.8 | 0.91 | 0.82 | 33.8 |
| 25 | T | 118 | 2.0 | 0.494 | 22.3 | LOS C | 7.4 | 52.8 | 0.91 | 0.75 | 34.2 |
| 26 | R | 60 | 2.0 | 0.247 | 34.0 | LOS C | 2.6 | 17.4 | 0.82 | 0.75 | 30.9 |
| Approach | | 279 | 2.0 | 0.494 | 27.8 | LOS C | 7.4 | 52.8 | 0.92 | 0.78 | 39.2 |
| North West: Boshoff St (NW) | | | | | | | | | | | |
| 27 | L | 82 | 2.0 | 0.646 | 17.9 | LOS B | 15.6 | 110.8 | 0.73 | 0.93 | 42.5 |
| 28 | T | 644 | 2.0 | 0.644 | 9.6 | LOS A | 15.6 | 110.8 | 0.73 | 0.66 | 44.6 |
| 29 | R | 107 | 2.0 | 0.210 | 17.4 | LOS B | 2.6 | 18.7 | 0.56 | 0.76 | 40.5 |
| Approach | | 814 | 2.0 | 0.644 | 11.3 | LOS B | 15.6 | 110.8 | 0.71 | 0.69 | 43.9 |
| South West: Woodhouse Rd (SW) | | | | | | | | | | | |
| 30 | L | 77 | 2.0 | 0.436 | 30.2 | LOS C | 6.6 | 47.0 | 0.90 | 0.82 | 33.9 |
| 31 | T | 117 | 2.0 | 0.436 | 21.9 | LOS C | 6.6 | 47.0 | 0.90 | 0.73 | 34.5 |
| 32 | R | 88 | 2.0 | 0.362 | 34.9 | LOS C | 3.6 | 25.7 | 0.94 | 0.77 | 30.6 |
| Approach | | 282 | 2.0 | 0.436 | 28.2 | LOS C | 6.6 | 47.0 | 0.91 | 0.77 | 33.0 |
| All Vehicles | | 1707 | 2.0 | 0.614 | 16.6 | LOS B | 15.6 | 110.8 | 0.78 | 0.69 | 39.0 |

MOVEMENT SUMMARY

Site: 4-2 Woodhouse/Boshoff 2010 Fri
PM-Peak Excl

4 - Woodhouse Rd / Boshoff St 2010 Existing Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 70 seconds

| Approach | Phase | Volume | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) |
|--------------------------------------|-------|--------|-----|-----------|-------------|-------|-----------|-------------|------|-----------|-------------|
| South East: Boshoff St (SE) | | | | | | | | | | | |
| 21 | L | 7 | 2.0 | 0.404 | 15.2 | LOS B | 10.1 | 72.1 | 0.54 | 0.98 | 44.3 |
| 22 | T | 489 | 2.0 | 0.407 | 7.0 | LOS A | 10.1 | 72.1 | 0.54 | 0.47 | 48.2 |
| 23 | R | 126 | 2.0 | 0.541 | 30.5 | LOS C | 5.2 | 36.9 | 0.86 | 0.81 | 32.6 |
| Approach | | 623 | 2.0 | 0.541 | 11.8 | LOS B | 10.1 | 72.1 | 0.60 | 0.55 | 43.9 |
| North East: Woodhouse Rd (NE) | | | | | | | | | | | |
| 24 | L | 115 | 2.0 | 0.633 | 37.2 | LOS D | 9.6 | 68.2 | 0.97 | 0.84 | 30.5 |
| 25 | T | 125 | 2.0 | 0.632 | 29.0 | LOS C | 9.6 | 68.2 | 0.97 | 0.82 | 30.7 |
| 26 | R | 62 | 2.0 | 0.429 | 43.9 | LOS D | 3.2 | 22.7 | 0.99 | 0.75 | 27.1 |
| Approach | | 302 | 2.0 | 0.632 | 35.2 | LOS D | 9.6 | 68.2 | 0.97 | 0.81 | 29.8 |
| North West: Boshoff St (NW) | | | | | | | | | | | |
| 27 | L | 48 | 2.0 | 0.713 | 17.7 | LOS B | 20.9 | 148.9 | 0.73 | 0.95 | 42.8 |
| 28 | T | 822 | 2.0 | 0.714 | 9.4 | LOS A | 20.9 | 148.9 | 0.73 | 0.67 | 44.9 |
| 29 | R | 143 | 2.0 | 0.331 | 19.1 | LOS B | 4.1 | 29.1 | 0.61 | 0.78 | 39.3 |
| Approach | | 1014 | 2.0 | 0.714 | 11.2 | LOS B | 20.9 | 148.9 | 0.71 | 0.70 | 43.9 |
| South West: Woodhouse Rd (SW) | | | | | | | | | | | |
| 30 | L | 108 | 2.0 | 0.688 | 38.3 | LOS D | 10.6 | 75.1 | 0.98 | 0.87 | 30.2 |
| 31 | T | 154 | 2.0 | 0.688 | 30.0 | LOS C | 10.6 | 75.1 | 0.98 | 0.86 | 30.4 |
| 32 | R | 102 | 2.0 | 0.645 | 45.2 | LOS D | 5.1 | 36.4 | 1.00 | 0.82 | 26.7 |
| Approach | | 364 | 2.0 | 0.688 | 36.8 | LOS D | 10.6 | 75.1 | 0.99 | 0.85 | 29.2 |
| All Vehicles | | 2303 | 2.0 | 0.714 | 19.9 | LOS B | 20.9 | 148.9 | 0.78 | 0.70 | 38.5 |

Annexure C4.2

MOVEMENT SUMMARY

Site: 4-3 Woodhouse/Boshoff 2010 Sat AM-Peak Exist+Develop

4 - Woodhouse Rd / Boshoff St 2010 Existing plus Development Traffic Volumes Saturday AM-Peak
 Signals - Fixed Time Cycle Time = 50 seconds

| Approach | Phase | Volume | Speed (km/h) | AVT | AVT (Sec) | LOS | AVT (Sec) | AVT (Sec) | AVT (Sec) | AVT (Sec) | AVT (Sec) |
|--------------------------------------|-------|--------|--------------|-------|-----------|-------|-----------|-----------|-----------|-----------|-----------|
| South East: Sunny Rd (SA) | | | | | | | | | | | |
| 21 | L | 20 | 2.0 | 0.331 | 17.0 | LOS B | 6.3 | 44.6 | 0.66 | 0.92 | 43.0 |
| 22 | T | 288 | 2.0 | 0.331 | 8.8 | LOS A | 6.3 | 44.6 | 0.66 | 0.56 | 45.8 |
| 23 | R | 84 | 2.0 | 0.344 | 27.5 | LOS C | 2.8 | 19.7 | 0.88 | 0.78 | 34.1 |
| Approach | | 393 | 2.0 | 0.344 | 13.2 | LOS B | 6.3 | 44.6 | 0.71 | 0.62 | 42.5 |
| North East: Woodhouse Rd (NS) | | | | | | | | | | | |
| 24 | L | 87 | 2.0 | 0.446 | 24.8 | LOS C | 6.5 | 46.6 | 0.87 | 0.83 | 37.0 |
| 25 | T | 141 | 2.0 | 0.446 | 16.6 | LOS B | 6.5 | 46.6 | 0.87 | 0.72 | 37.8 |
| 26 | R | 56 | 2.0 | 0.254 | 30.8 | LOS C | 2.0 | 14.6 | 0.83 | 0.75 | 32.5 |
| Approach | | 286 | 2.0 | 0.446 | 22.0 | LOS C | 6.5 | 46.6 | 0.86 | 0.76 | 36.4 |
| North West: Boshoff St (NW) | | | | | | | | | | | |
| 27 | L | 60 | 2.0 | 0.727 | 20.8 | LOS C | 15.5 | 110.4 | 0.86 | 0.95 | 40.6 |
| 28 | T | 616 | 2.0 | 0.727 | 12.5 | LOS B | 15.5 | 110.4 | 0.86 | 0.80 | 41.7 |
| 29 | R | 167 | 2.0 | 0.387 | 20.3 | LOS C | 4.7 | 33.6 | 0.76 | 0.80 | 36.6 |
| Approach | | 863 | 2.0 | 0.727 | 14.8 | LOS B | 15.5 | 110.4 | 0.83 | 0.81 | 40.9 |
| South West: Woodhouse Rd (SW) | | | | | | | | | | | |
| 30 | L | 175 | 2.0 | 0.616 | 26.0 | LOS C | 9.0 | 64.0 | 0.92 | 0.85 | 36.0 |
| 31 | T | 152 | 2.0 | 0.616 | 17.7 | LOS B | 9.0 | 64.0 | 0.92 | 0.79 | 36.6 |
| 32 | R | 140 | 2.0 | 0.488 | 29.6 | LOS C | 4.6 | 32.8 | 0.84 | 0.79 | 33.0 |
| Approach | | 468 | 2.0 | 0.616 | 24.4 | LOS C | 9.0 | 64.0 | 0.83 | 0.81 | 35.2 |
| All Vehicles | | 2018 | 2.0 | 0.727 | 17.8 | LOS B | 15.5 | 110.4 | 0.84 | 0.77 | 36.0 |

MOVEMENT SUMMARY

Site: 4-4 Woodhouse/Boshoff 2010 Fri PM-Peak Exist+Develop

4 - Woodhouse Rd / Boshoff St 2010 Existing plus Development Traffic Volumes Friday PM-Peak
 Signals - Fixed Time Cycle Time = 60 seconds

| Approach | Phase | Volume | Speed (km/h) | AVT | AVT (Sec) | LOS | AVT (Sec) | AVT (Sec) | AVT (Sec) | AVT (Sec) | AVT (Sec) |
|--------------------------------------|-------|--------|--------------|-------|-----------|-------|-----------|-----------|-----------|-----------|-----------|
| South East: Sunny Rd (SA) | | | | | | | | | | | |
| 21 | L | 22 | 2.0 | 0.454 | 16.4 | LOS B | 10.3 | 73.2 | 0.83 | 0.95 | 43.5 |
| 22 | T | 478 | 2.0 | 0.455 | 8.2 | LOS A | 10.3 | 73.2 | 0.83 | 0.55 | 46.5 |
| 23 | R | 123 | 2.0 | 0.585 | 32.9 | LOS C | 4.9 | 35.0 | 0.94 | 0.84 | 31.5 |
| Approach | | 623 | 2.0 | 0.685 | 13.4 | LOS B | 10.3 | 73.2 | 0.69 | 0.82 | 42.4 |
| North East: Woodhouse Rd (NE) | | | | | | | | | | | |
| 24 | L | 113 | 2.0 | 0.572 | 31.0 | LOS C | 8.5 | 60.8 | 0.94 | 0.83 | 33.4 |
| 25 | T | 141 | 2.0 | 0.572 | 22.6 | LOS C | 8.5 | 60.8 | 0.94 | 0.78 | 33.9 |
| 26 | R | 61 | 2.0 | 0.409 | 39.1 | LOS D | 2.7 | 19.5 | 0.99 | 0.75 | 28.8 |
| Approach | | 315 | 2.0 | 0.572 | 26.9 | LOS C | 8.5 | 60.8 | 0.96 | 0.78 | 32.6 |
| North West: Boshoff St (NW) | | | | | | | | | | | |
| 27 | L | 47 | 2.0 | 0.774 | 21.0 | LOS C | 21.7 | 154.3 | 0.83 | 0.97 | 40.5 |
| 28 | T | 804 | 2.0 | 0.775 | 12.7 | LOS B | 21.7 | 154.3 | 0.83 | 0.80 | 41.7 |
| 29 | R | 200 | 2.0 | 0.472 | 22.7 | LOS C | 6.0 | 42.5 | 0.77 | 0.81 | 36.9 |
| Approach | | 1052 | 2.0 | 0.775 | 15.0 | LOS B | 21.7 | 154.3 | 0.82 | 0.81 | 40.7 |
| South West: Woodhouse Rd (SW) | | | | | | | | | | | |
| 30 | L | 166 | 2.0 | 0.761 | 34.6 | LOS C | 11.9 | 84.6 | 0.99 | 0.83 | 31.6 |
| 31 | T | 171 | 2.0 | 0.761 | 26.5 | LOS C | 11.9 | 84.6 | 0.99 | 0.82 | 31.8 |
| 32 | R | 116 | 2.0 | 0.567 | 37.8 | LOS D | 4.8 | 34.2 | 0.99 | 0.80 | 29.4 |
| Approach | | 452 | 2.0 | 0.761 | 32.4 | LOS C | 11.9 | 84.6 | 0.99 | 0.80 | 31.1 |
| All Vehicles | | 2441 | 2.0 | 0.775 | 19.8 | LOS B | 21.7 | 154.3 | 0.88 | 0.77 | 37.7 |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

327502

Revision 1

Annexure C4.3

MOVEMENT SUMMARY

Site: 4-5 Woodhouse/Boshoff 2015 Sat AM-Peak Exist

4 - Woodhouse Rd / Boshoff St 2015 Background Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 60 seconds

| Approach | Phase | Volume | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) |
|-------------------------------------|-------|--------|-----|-----------|-------------|-------|-----------|-------------|------|-----------|-------------|
| South East Corner Rd (SE) | | | | | | | | | | | |
| 21 | L | 3 | 2.0 | 0.328 | 15.6 | LOS B | 7.1 | 50.7 | 0.56 | 0.96 | 44.0 |
| 22 | T | 351 | 2.0 | 0.321 | 7.4 | LOS A | 7.1 | 50.7 | 0.56 | 0.49 | 47.6 |
| 23 | R | 101 | 2.0 | 0.446 | 30.5 | LOS C | 3.9 | 27.4 | 0.89 | 0.80 | 32.6 |
| Approach | | 455 | 2.0 | 0.446 | 12.6 | LOS B | 7.1 | 50.7 | 0.64 | 0.56 | 43.2 |
| North East Woodhouse Rd (NE) | | | | | | | | | | | |
| 24 | L | 117 | 2.0 | 0.572 | 31.0 | LOS C | 8.5 | 60.8 | 0.94 | 0.83 | 33.4 |
| 25 | T | 137 | 2.0 | 0.572 | 22.8 | LOS C | 8.5 | 60.8 | 0.94 | 0.78 | 33.6 |
| 26 | R | 69 | 2.0 | 0.314 | 35.4 | LOS D | 2.9 | 20.6 | 0.94 | 0.76 | 30.4 |
| Approach | | 323 | 2.0 | 0.572 | 28.5 | LOS C | 8.5 | 60.8 | 0.94 | 0.79 | 32.9 |
| North West Boshoff St (NW) | | | | | | | | | | | |
| 27 | L | 72 | 2.0 | 0.747 | 19.8 | LOS B | 19.7 | 140.4 | 0.81 | 0.85 | 41.3 |
| 28 | T | 746 | 2.0 | 0.746 | 11.4 | LOS B | 19.7 | 140.4 | 0.81 | 0.75 | 42.8 |
| 29 | R | 124 | 2.0 | 0.253 | 18.3 | LOS B | 3.2 | 22.6 | 0.61 | 0.77 | 39.9 |
| Approach | | 942 | 2.0 | 0.746 | 12.9 | LOS B | 19.7 | 140.4 | 0.78 | 0.77 | 42.3 |
| South West Woodhouse Rd (SW) | | | | | | | | | | | |
| 30 | L | 89 | 2.0 | 0.507 | 30.6 | LOS C | 7.8 | 54.2 | 0.92 | 0.83 | 33.7 |
| 31 | T | 136 | 2.0 | 0.506 | 22.4 | LOS C | 7.8 | 54.2 | 0.92 | 0.76 | 34.2 |
| 32 | R | 102 | 2.0 | 0.505 | 37.3 | LOS D | 4.3 | 30.4 | 0.98 | 0.78 | 29.8 |
| Approach | | 327 | 2.0 | 0.507 | 29.3 | LOS C | 7.6 | 54.2 | 0.94 | 0.78 | 32.5 |
| All Vehicles | | 2247 | 2.0 | 0.743 | 17.5 | LOS B | 16.7 | 140.4 | 0.80 | 0.76 | 35.8 |

MOVEMENT SUMMARY

Site: 4-5 Woodhouse/Boshoff 2015 Fri PM-Peak Exist

4 - Woodhouse Rd / Boshoff St 2015 Background Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 70 seconds

| Approach | Phase | Volume | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) | LOS | Delay (s) | Queue (veh) |
|-------------------------------------|-------|--------|-----|-----------|-------------|-------|-----------|-------------|------|-----------|-------------|
| South East Corner Rd (SE) | | | | | | | | | | | |
| 21 | L | 8 | 2.0 | 0.478 | 15.6 | LOS B | 12.0 | 85.2 | 0.57 | 0.96 | 44.1 |
| 22 | T | 567 | 2.0 | 0.471 | 7.4 | LOS A | 12.0 | 85.2 | 0.57 | 0.51 | 47.7 |
| 23 | R | 146 | 2.0 | 0.660 | 51.9 | LOS D | 8.1 | 57.9 | 1.00 | 1.07 | 24.7 |
| Approach | | 722 | 2.0 | 0.660 | 16.5 | LOS B | 12.0 | 85.2 | 0.66 | 0.63 | 40.1 |
| North East Woodhouse Rd (NE) | | | | | | | | | | | |
| 24 | L | 133 | 2.0 | 0.732 | 39.4 | LOS D | 11.3 | 80.6 | 0.99 | 0.90 | 29.6 |
| 25 | T | 145 | 2.0 | 0.732 | 31.1 | LOS C | 11.3 | 80.6 | 0.99 | 0.89 | 29.6 |
| 26 | R | 72 | 2.0 | 0.502 | 46.9 | LOS D | 3.8 | 27.0 | 1.00 | 0.79 | 28.1 |
| Approach | | 349 | 2.0 | 0.732 | 37.5 | LOS D | 11.3 | 80.6 | 0.99 | 0.87 | 28.9 |
| North West Boshoff St (NW) | | | | | | | | | | | |
| 27 | L | 58 | 2.0 | 0.829 | 22.9 | LOS C | 30.3 | 216.1 | 0.84 | 1.00 | 39.1 |
| 28 | T | 953 | 2.0 | 0.827 | 14.6 | LOS B | 30.3 | 216.1 | 0.84 | 0.83 | 40.3 |
| 29 | R | 166 | 2.0 | 0.366 | 21.1 | LOS C | 6.2 | 36.7 | 0.68 | 0.79 | 37.9 |
| Approach | | 1175 | 2.0 | 0.827 | 15.9 | LOS B | 30.3 | 216.1 | 0.82 | 0.83 | 39.9 |
| South West Woodhouse Rd (SW) | | | | | | | | | | | |
| 30 | L | 125 | 2.0 | 0.796 | 41.7 | LOS D | 12.7 | 90.3 | 1.00 | 0.95 | 28.8 |
| 31 | T | 178 | 2.0 | 0.796 | 33.5 | LOS C | 12.7 | 90.3 | 1.00 | 0.95 | 28.0 |
| 32 | R | 118 | 2.0 | 0.679 | 52.5 | LOS D | 6.4 | 45.4 | 1.00 | 1.00 | 24.5 |
| Approach | | 421 | 2.0 | 0.679 | 41.2 | LOS D | 12.7 | 90.3 | 1.00 | 0.97 | 27.5 |
| All Vehicles | | 2997 | 2.0 | 0.878 | 22.9 | LOS C | 33.3 | 216.1 | 0.82 | 0.83 | 33.6 |

TRAFFIC IMPACT STUDY

WOODBURN SHOPPING CENTRE - PORTION 5 OF ERF 4346 PIETERMARITZBURG FT

327882

Revision 1

Annexure C4.4

MOVEMENT SUMMARY

Site: 4-7 Woodhouse/Boshoff 2015 Sat
AM-Peak Exist + Develop

4 - Woodhouse Rd / Boshoff St 2015 Background + Development Traffic Volumes Saturday AM-Peak
Signals - Fixed Time Cycle Time = 50 seconds

| Approach | Phase | Volume | Cycle Time | Flow Ratio | LOS | Delay | Queue | Stop Time | Stop Distance | Stop Time |
|--------------------------------------|-------|--------|------------|------------|-------|-------|-------|-----------|---------------|-----------|
| South East: Survey Rd (SE) | | | | | | | | | | |
| 21 | L | 20 | 2.0 | 0.382 | LOS B | 7.3 | 51.0 | 0.68 | 0.82 | 42.9 |
| 22 | T | 337 | 2.0 | 0.383 | LOS A | 7.3 | 51.8 | 0.68 | 0.58 | 45.4 |
| 23 | R | 98 | 2.0 | 0.485 | LOS C | 3.5 | 24.9 | 0.87 | 0.78 | 31.9 |
| Approach | | 455 | 2.0 | 0.485 | LOS B | 7.3 | 51.8 | 0.74 | 0.64 | 41.0 |
| North East: Woodhouse Rd (NE) | | | | | | | | | | |
| 24 | L | 113 | 2.0 | 0.511 | LOS C | 7.5 | 53.2 | 0.89 | 0.84 | 36.7 |
| 25 | T | 180 | 2.0 | 0.511 | LOS B | 7.5 | 53.2 | 0.89 | 0.74 | 37.5 |
| 26 | R | 67 | 2.0 | 0.323 | LOS C | 2.4 | 17.3 | 0.85 | 0.75 | 31.8 |
| Approach | | 340 | 2.0 | 0.511 | LOS C | 7.5 | 53.2 | 0.80 | 0.77 | 36.0 |
| North West: Boshoff St (NW) | | | | | | | | | | |
| 27 | L | 48 | 2.0 | 0.827 | LOS C | 20.8 | 147.9 | 0.93 | 1.04 | 37.3 |
| 28 | T | 723 | 2.0 | 0.829 | LOS B | 20.8 | 147.8 | 0.93 | 0.68 | 37.9 |
| 29 | R | 204 | 2.0 | 0.458 | LOS C | 5.4 | 38.2 | 0.79 | 0.81 | 37.7 |
| Approach | | 976 | 2.0 | 0.829 | LOS B | 20.8 | 147.9 | 0.90 | 0.84 | 37.8 |
| West West: Woodhouse Rd (WW) | | | | | | | | | | |
| 30 | L | 187 | 2.0 | 0.675 | LOS C | 10.0 | 71.5 | 0.94 | 0.86 | 35.5 |
| 31 | T | 171 | 2.0 | 0.675 | LOS B | 10.0 | 71.5 | 0.94 | 0.84 | 35.8 |
| 32 | R | 154 | 2.0 | 0.583 | LOS C | 6.2 | 37.0 | 0.97 | 0.82 | 32.2 |
| Approach | | 512 | 2.0 | 0.675 | LOS C | 10.0 | 71.5 | 0.95 | 0.85 | 34.6 |
| All Vehicles | | 2232 | 2.0 | 0.675 | LOS C | 20.8 | 147.9 | 0.93 | 0.83 | 37.4 |

MOVEMENT SUMMARY

Site: 4-8 Woodhouse/Boshoff 2015 Fri
PM-Peak Exist + Develop

4 - Woodhouse Rd / Boshoff St 2015 Background + Development Traffic Volumes Friday PM-Peak
Signals - Fixed Time Cycle Time = 70 seconds

| Approach | Phase | Volume | Cycle Time | Flow Ratio | LOS | Delay | Queue | Stop Time | Stop Distance | Stop Time |
|--------------------------------------|-------|--------|------------|------------|-------|-------|-------|-----------|---------------|-----------|
| South East: Survey Rd (SE) | | | | | | | | | | |
| 21 | L | 23 | 2.0 | 0.485 | LOS B | 12.8 | 91.3 | 0.81 | 0.98 | 43.1 |
| 22 | T | 558 | 2.0 | 0.487 | LOS A | 12.8 | 91.3 | 0.81 | 0.65 | 48.2 |
| 23 | R | 143 | 2.0 | 0.902 | LOS E | 8.4 | 59.5 | 1.00 | 1.12 | 23.1 |
| Approach | | 722 | 2.0 | 0.901 | LOS B | 12.8 | 91.3 | 0.89 | 0.87 | 38.5 |
| North East: Woodhouse Rd (NE) | | | | | | | | | | |
| 24 | L | 131 | 2.0 | 0.871 | LOS D | 11.2 | 79.9 | 0.87 | 0.87 | 31.0 |
| 25 | T | 181 | 2.0 | 0.871 | LOS C | 11.2 | 79.9 | 0.87 | 0.84 | 31.2 |
| 26 | R | 71 | 2.0 | 0.823 | LOS D | 3.8 | 26.8 | 1.00 | 0.78 | 25.9 |
| Approach | | 382 | 2.0 | 0.871 | LOS C | 11.2 | 79.9 | 0.87 | 0.84 | 29.9 |
| North West: Boshoff St (NW) | | | | | | | | | | |
| 27 | L | 55 | 2.0 | 0.853 | LOS C | 32.9 | 234.0 | 0.88 | 1.03 | 36.8 |
| 28 | T | 935 | 2.0 | 0.850 | LOS B | 32.9 | 234.0 | 0.88 | 0.90 | 37.8 |
| 29 | R | 223 | 2.0 | 0.675 | LOS C | 7.6 | 54.3 | 0.80 | 0.83 | 35.7 |
| Approach | | 1213 | 2.0 | 0.850 | LOS B | 32.9 | 234.0 | 0.87 | 0.90 | 37.2 |
| South West: Woodhouse Rd (SW) | | | | | | | | | | |
| 30 | L | 183 | 2.0 | 0.871 | LOS D | 18.4 | 116.8 | 1.00 | 1.06 | 27.3 |
| 31 | T | 195 | 2.0 | 0.871 | LOS D | 18.4 | 116.8 | 1.00 | 1.06 | 27.4 |
| 32 | R | 131 | 2.0 | 0.813 | LOS D | 6.7 | 47.6 | 1.00 | 0.95 | 25.7 |
| Approach | | 508 | 2.0 | 0.871 | LOS D | 16.4 | 116.8 | 1.00 | 1.03 | 26.9 |
| All Vehicles | | 2895 | 2.0 | 0.801 | LOS C | 32.9 | 234.0 | 0.86 | 0.85 | 34.1 |

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LEGEND:

| | |
|-------------------------|---------------|
| UPGRADES BY AUTHORITIES | (Red line) |
| UPGRADES BY DEVELOPER | (Yellow line) |

| | | | | | |
|-------------|--------|--------------|-------------|--------------|---------------|
| SCALE: | 1:2000 | DESIGNED BY: | R. RAVEN | APPROVED BY: | H. SCHREIBERS |
| PROJECT NO: | 327592 | DESIGNED BY: | R. RAVEN | DATE: | 2010/01/14/2 |
| DRAWING NO: | 2 | DESIGNED BY: | NO. MOKANBI | REV: | B |

PROJECT: WOODBURN BOULEVARD PIETERMARITZBURG
 TITLE: ROAD WIDENING AND ACCESS LAYOUT PLAN

WSP
 WSP SA Civil and Structural Engineers (Pty) Ltd
 34 Newlands Road, Newlands, Johannesburg
 Private Bag 115, Pretoria, South Africa, 0001
 Tel: +27(0)11-835-4141 Fax: +27(0)11-835-4142

CLIENT: VENTURE PROPERTIES

| REV | DATE | BY | INITIALS/ISSUE | DESCRIPTION | CHK | APP |
|-----|------|----|----------------|-------------|-----|-----|
| A | | | | | | |

FOR INFORMATION

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Appendix E:

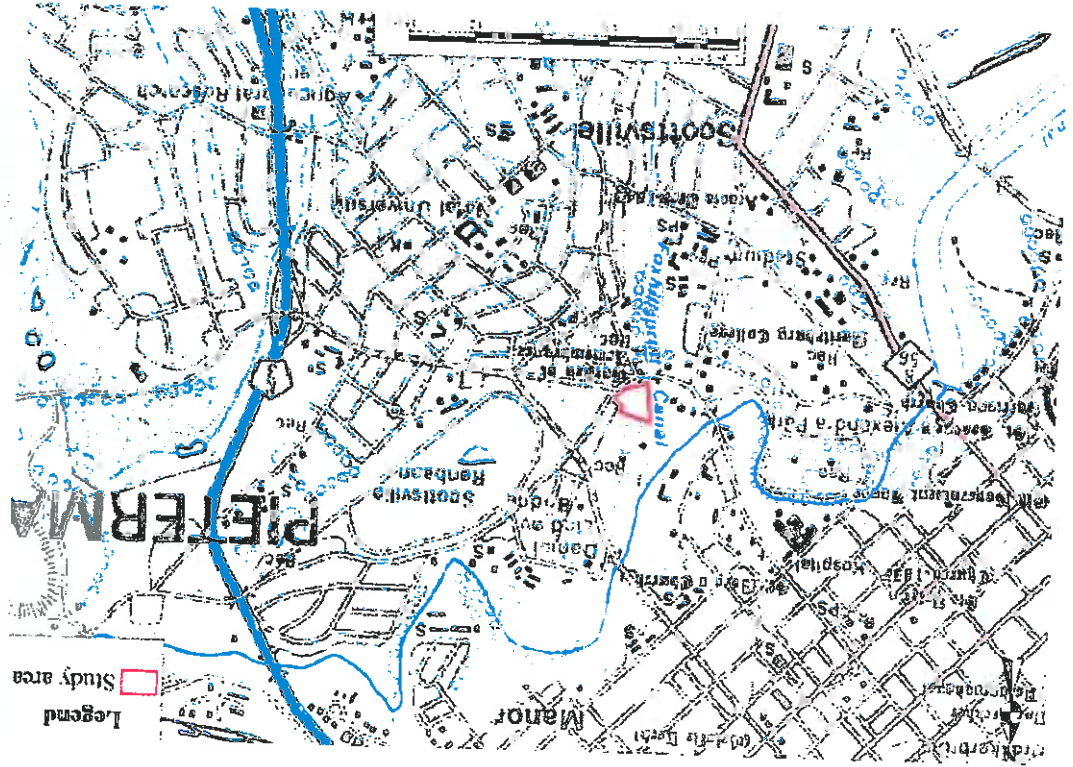
Public Participation

Appendix E1:

Advert and Notices

Draft Basic Assessment Report for Review

Woodburn Boulevard Shopping Centre



All interested and affected parties are invited to review the development information and to register any issues and concerns to be included and addressed in the Final Basic Assessment Report.

Venue: Msunduzi Municipal Library

Physical Address: 260 Church St,
Pietermaritzburg

Tel: 033 392 2683

Date: 15 August 2012 – 25 September 2012

Website: www.bokamoso.net

Please do not hesitate to contact us if there are any questions in connection with the above-mentioned development.

Contact Person: Juanita De Beer

Tel (012) 346 3810

Fax (086) 570 5659

E-mail: izelle@rmweb.co.za

Website: www.bokamoso.net

Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 02:57 PM
To: 'afromatz@telkomsa.net'
Subject: Review Invitation
Attachments: Review Notice.pdf

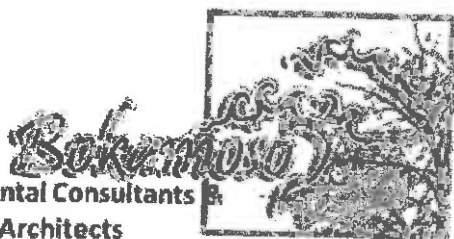
Flag Status: Flagged

Dear Interested and Affected Party,

Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre**.

Kind Regards/Vriendelike Groete

Juanita De Beer



**Environmental Consultants &
Landscape Architects**

11, 12 & 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 02:58 PM
To: 'bookings@kznwildlife.com'
Subject: Review Invitation
Attachments: Review Notice.pdf

Flag Status: Flagged

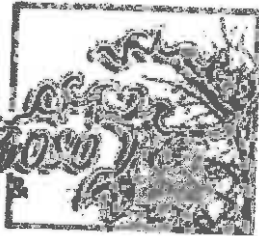
Dear Interested and Affected Party,

Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre.**

Kind Regards/Vriendelike Groete

Juanita De Beer

**Environmental Consultants &
Landscape Architects**



14, 27-12-357 3101 E 27 St, 3571 eJubba, Durban
24 Edward Road Ashburton, Durban, 3101

Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 02:58 PM
To: 'zama.sibisi@eskom.co.za'
Subject: Review Invitation
Attachments: Review Notice.pdf

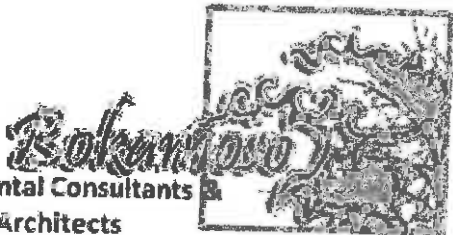
Flag Status: Flagged

Dear Interested and Affected Party,

Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre.**

Kind Regards/Vriendelike Groete

Juanita De Beer


**Environmental Consultants &
Landscape Architects**
P.O. Box 1234, 2010, Cape Town, South Africa
Tel: +27 (0)21 461 2233 Fax: +27 (0)21 461 2234
www.bokamoso.co.za

Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 02:59 PM
To: 'sindisiwe.kumalo@eskom.co.za'
Subject: Review Invitation
Attachments: Review Notice.pdf

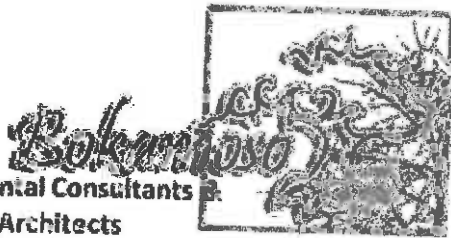
Flag Status: Flagged

Dear Interested and Affected Party,

Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre.**

Kind Regards/Vriendelike Groete

Juanita De Beer



**Environmental Consultants &
Landscape Architects**

11, 27/12/1968 (BIO) P.O. Box 1099, Edendale, Johannesburg
1015, South Africa. Tel: 011 461 2200 Fax: 011 461 2201

Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 03:00 PM
To: 'bernadetp@amasapmb.co.za'
Subject: Review Invitation
Attachments: Review Notice.pdf

Flag Status: Flagged

Dear Interested and Affected Party,

Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre.**

Kind Regards/Vriendelike Groete

Juanita De Beer


**Environmental Consultants &
Landscape Architects**
Pretoria, South Africa
15 Federal Road, Avila Gardens, Pretoria

Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 03:06 PM
To: 'noel.stevens@davislangdon.co.za'; 'noel.stevens@aecom.com'; 'gashul@somta.co.za'; 'nqobile@pmfever.co.za'; 'sandals@webmail.co.za'; 'BarnarJB@eskom.co.za'; 'abrie@booyens.net'; 'hicksmarglynn@gmail.com'; 'lynnmac@futurenet.co.za'; 'royphyll@absamail.co.za'; 'ivaneeden@oldmutualpfa.com'; 'helgab@dihlase.co.za'; 'juliang@futurenet.co.za'; 'atwaru@vodamail.co.za'; 'sashenc@spanafrica.co.za'; 'nac@pmbtrust.org'
Subject: Review Invitation
Attachments: Review Notice.pdf
Flag Status: Flagged

Dear Interested and Affected Party,

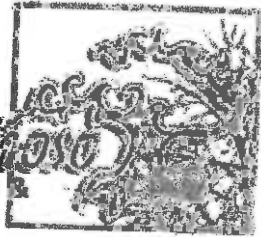
Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre**.

Kind Regards/Vriendelike Groete

Juanita De Beer

**Environmental Consultants &
Landscape Architects**

PO Box 117, 1601 Boksburg, 2010
1601 Boksburg, 2010
1601 Boksburg, 2010



Juanita

From: User3 <user3@bokamoso.net>
Sent: 08 August 2012 02:56 PM
To: 'wayne.evans@kzntransport.gov.za'
Subject: Review Invitation
Attachments: Review Notice.pdf

Flag Status: Flagged

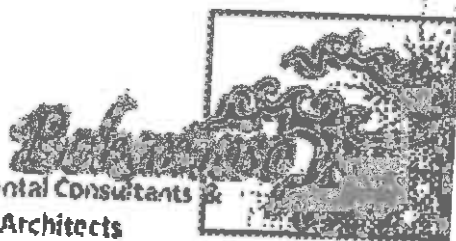
Dear Interested and Affected Party,

Please refer to the attached Invitation for Review regarding the proposed **Draft Basic Assessment Report Woodburn Boulevard Shopping Centre**.

Kind Regards/Vriendelike Groete

Juanita De Beer


**Environmental Consultants &
Landscape Architects**
Tel: 021 21 21 21 | Fax: 021 21 21 21 | Email: info@bokamoso.co.za
36 E. 1st Avenue, Sandton, 2146



**Environmental Consultants &
Landscape Architects**

P.O. Box 117, 216 Nyland, Cape Town, South Africa
26 Sekhamba Road Ashlea Gardens, Pretoria

From: Mluleki Phungula [mailto:mluleki.phungula@pmbfever.co.za]

Sent: 10 November 2011 10:25 AM

To: Lizelle Gregory

Subject: Maritzburg Fever (Mirror)

Hi Lizelle Gregory

Please see below proof of your advert.
Advert size 11cm top to bottom x 9cm across.
Advert amount R1015.74 including vat.

Many Thanks
Lou

From: Dumisani Mithembu
Sent: 09 November 2011 04:18 PM
To: Mluleki Phungula
Subject: Sent from Snipping Tool

NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

Notice is given of an application for environmental authorisation that was submitted to the KwaZulu-Natal Department of Agriculture, Environmental Affairs and Rural Development, in terms of Regulation no. R543 published in the *Government Notice No. 33306* of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment procedures (Notice 1 and 3 – Governing Notice R544 & R546) for the following activity:

Name of project: Woodburn Boulevard Shopping Centre.

Project description: The proposed project will entail the development of a 6 500 sq m Shopping Centre in the city of Pietermaritzburg, KwaZulu-Natal.

Property description: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 4346, Pietermaritzburg.

The application was submitted for the following activities in terms of the Government Notice R. 544, R. 545 and R. 546, 18 June 2010:

| | |
|----------------------|-------------|
| R. 544, 18 June 2010 | Activity 8 |
| R. 544, 18 June 2010 | Activity 11 |
| R. 544, 18 June 2010 | Activity 18 |
| R. 544, 18 June 2010 | Activity 27 |
| R. 544, 18 June 2010 | Activity 30 |

Extent: The total study area is approximately 1,7885 ha in extent.

Name of the proponent: O & T DEVELOPMENT (PTY) LTD.

Location: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 4346 Pietermaritzburg. When travelling South on the N3 through the town of Pietermaritzburg one could take the New England Road exit to the left. Follow this road for approximately 1,4 km until reaching Woodhouse Road. The study area is located on the corner of Woodhouse Road and Alan Paton Drive.

Date of notice: 9 November 2011

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants

George Gerichs

P.O. Box 11375

Isiroekana 0161

www.bokamoso.net

Tel: 012 346 3810

Fax: 080 670 6069

email: gzollag@nwweb.co.za

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above within 40 days of publication of this advertisement.

This email and its contents are subject to an email legal notice that can be viewed at: <http://www.naspers.com/email/disclaimer.html> Should you be unable to access the link provided, please email us for a copy at Helpdesk@Media24.com.

Hierdie e-pos en sy inhoud is onderhewig aan 'n regskenninggewing oor elektroniese pos wat gelees kan word by <http://www.naspers.com/epos/vrywaring.html> 'n Afskrif kan aangevra word by Helpdesk@Media24.com.

This email and its contents are subject to an email legal notice that can be viewed at: <http://www.naspers.com/email/disclaimer.html> Should you be unable to access the link provided, please email us for a copy at Helpdesk@Media24.com.

Hierdie e-pos en sy inhoud is onderhewig aan 'n regskenninggewing oor elektroniese pos wat gelees kan word by <http://www.naspers.com/epos/vrywaring.html> 'n Afskrif kan aangevra word by Helpdesk@Media24.com.

George Gericke

From: Ontvangs
Sent: 24 November 2011 09:13 AM
To: George Gericke
Subject: FW: CONTACT DETAILS FOR SHOPPING CENTRE @ WOODBURN PIETERMARITZBURG

-----Original Message-----

From: sandra hemingway [mailto:sandals@webmail.co.za]
Sent: 24 November 2011 08:44 AM
To: lizelleg@web.co.za
Subject: CONTACT DETAILS FOR SHOPPING CENTRE @ WOODBURN PIETERMARITZBURG

24 November 2011

Dear George,

Thank You so much for taking my call. I would be most grateful if you could supply me with contact details regarding application for opening a shop in the Woodburn Shopping Mall.

My name is Sandy Hemingway
Phone 083-231 0738
Please reply on this email

Kind Regards
Sandy

South Africas premier free email service - www.webmail.co.za

For super low premiums, click here. <http://www.dialdirect.co.za/?vdn=15828>

| Nr | Registered Parties | Contact details | Address |
|----|--------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1 | Noel Stevens | noel.stevens@davislangdon.co.za noel.stevens@aecom.com 033 345 8371 084 588 8788 | |
| 2 | Simon Gushu | gushul@somta.co.za | |
| 3 | Ngobile Mtolo Maritzburg Fever Reporter | ngobile@pmfever.co.za 033 355 1170 072 629 7287 | |
| 4 | Sandy Hemingway | sandals@webmail.co.za 083 231 0738 | |
| 5 | Jenny Barnard | BamarJB@eskom.co.za 033 395 3854 Fax: 086 665 8153 Cell : 084 774 3073 | 1 Portland Rd Mkondeni |
| 6 | Abrie Bower | abrie@booyens.net Cell: 076 812 1806 Tel: 033 342 4909 Fax: 033 342 4905 | 80 Roberts Road Clarendon Pietermaritzburg PO Box 2370 Pietermaritzburg 3200 |
| 7 | Larry and Lynn Hicks | hicksmarolynn@gmail.com | 23 Woodhouse Road Scottsville |
| 8 | Jenny Barnard | bamarjb@eskom.co.za BARNARJB@eskom.co.za Tel: 033 394 2073 | Sheila Dyer 17 Woodhouse Road Scottsville Pietermaritzburg 3201 |
| 9 | Sheila Dyer Jenny Barnard (Daughter) | bamarib@eskom.co.za Tel: 033 294 2073 Tel: 033 395 3854 Cell: 084 774 3073 | 17 Woodhouse Road Scottsville Pietermaritzburg, 3201 |
| 10 | N.A. McDonald | lynnmac@futurenet.co.za Tel: 033 342 8454 Cell: 082 677 0234 | 8 New England Road Scottsville Pietermaritzburg, 3201 |

NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

Notice is given of an application for Environmental authorization that was submitted to the Kwazulu- Natal Department of Agriculture, Environmental Affairs & Rural Development, in terms of regulation no. R543 published in the Government Notice no. 33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment procedures (Notice 1 and 3 – Governing Notice R544 & R546) for the following activity:

Name of project: Woodburn Boulevard Shopping Centre

Project description: The proposed project will entail the development of 6500m² Shopping Centre in the city of Pietermaritzburg, KwaZulu-Natal.

Property description: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 4346, Pietermaritzburg.

The application was submitted for the following activities in terms of the Government Notice R. 544, R. 545 & R. 546, 18 June 2010:

| | |
|----------------------|-------------|
| R. 544, 18 June 2010 | Activity 9 |
| R. 544, 18 June 2010 | Activity 11 |
| R. 544, 18 June 2010 | Activity 18 |
| R. 544, 18 June 2010 | Activity 37 |
| R. 546, 18 June 2010 | Activity 39 |

Extent: The total study area is approximately 1.7885 ha in extent.

Name of the proponent: O & T DEVELOPMENT (PTY) LTD

Location: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 4346 Pietermaritzburg. When travelling South on the N3 through the town of Pietermaritzburg one could take the New England Road exit to the left. Follow this road for approximately 1.4 km until reaching Woodhouse Road. The study area is located on the corner of Woodhouse Road and Alan Paton Drive.

Date of notice: 11 November 2011

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants

George Gericke

P.O. Box 11375

Maroelana 0161

www.bokamoso.net

Tel: (012) 346 3810

Fax: 086 570 5659

email: lizelleg@mweb.co.za

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above **on or before 31 January 2012.**

Woodburn Boulevard Shopping Centre

NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

Notice is given of an application for Environmental authorization that was submitted to the KwaZulu-Natal Department of Agriculture, Environmental Affairs & Rural Development, in terms of regulation no. R543 published in the Government Notice no. 33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment procedures (Notice 1 and 3 – Governing Notice R544 & R546) for the following activity:

Name of project: Woodburn Boulevard Shopping Centre

Project description: The proposed project will entail the development of 6500m² Shopping Centre in the city of Pietermaritzburg, KwaZulu-Natal.

Property description: The study area is located on the corner of Woodhouse Road and Alton Paton Drive on Portion 5 of Erf 4346, Pietermaritzburg.

The application was submitted for the following activities in terms of the Government Notice R. 544, R. 545 & R. 546, 18 June 2010:

R. 544, 18 June 2010 Activity 9 R. 544, 18 June 2010 Activity 11 R. 544, 18 June 2010 Activity 18
R. 544, 18 June 2010 Activity 37R. 544, 18 June 2010 Activity 39

Extent: The total study area is approximately 1,7885 ha in extent.

Name of the proponent: O & T DEVELOPMENT (PTY) LTD

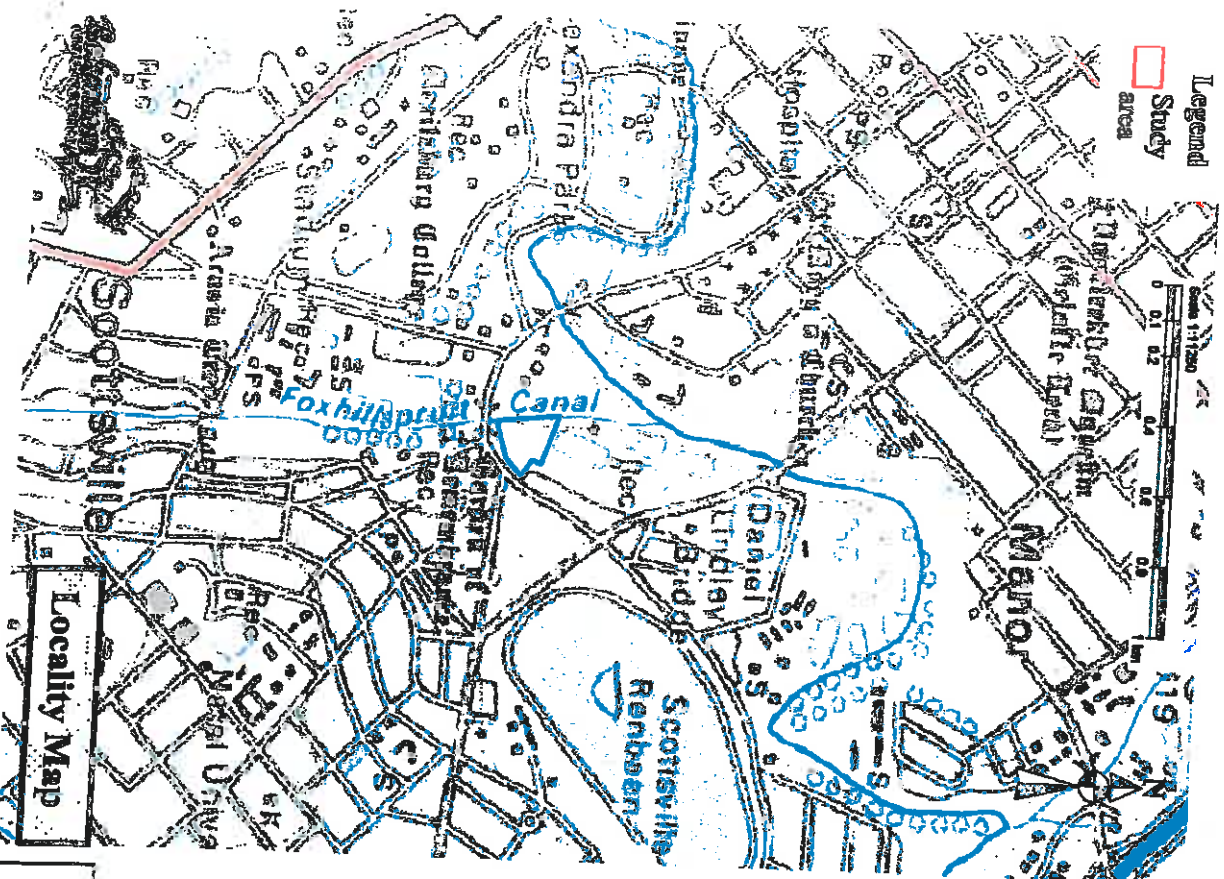
Location: The study area is located on the corner of Woodhouse Road and Alton Paton Drive on Portion 5 of Erf 4346 Pietermaritzburg. When travelling South on the N3 through the town of Pietermaritzburg one could take the New England Road exit to the left. Follow this road for approximately 1,4 km until reaching Woodhouse Road. The study area is located on the corner of Woodhouse Road and Alton Paton Drive.

Date of notice: 17 November 2011

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants
Georgia Gercke
P.O. Box 11375
Midrand 0161
www.bokamoso.net

Tel: (012) 346 3810
Fax: 086 570 5659
email: izelleg@mweb.co.za



In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above on or before **31 January 2012**.

NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

The Department of Environmental Protection (DEP) is conducting an Environmental Basic Assessment (EBA) for the proposed project. The purpose of the EBA is to identify and evaluate potential environmental impacts of the project and to develop measures to avoid, minimize, and compensate for those impacts.

Name of project: [Illegible]

Project location: [Illegible]

Project description: [Illegible]

Project sponsor: [Illegible]

Project start date: [Illegible]

Project end date: [Illegible]

Project status: [Illegible]

Project objectives: [Illegible]

Project goals: [Illegible]

Project impacts: [Illegible]

Project benefits: [Illegible]

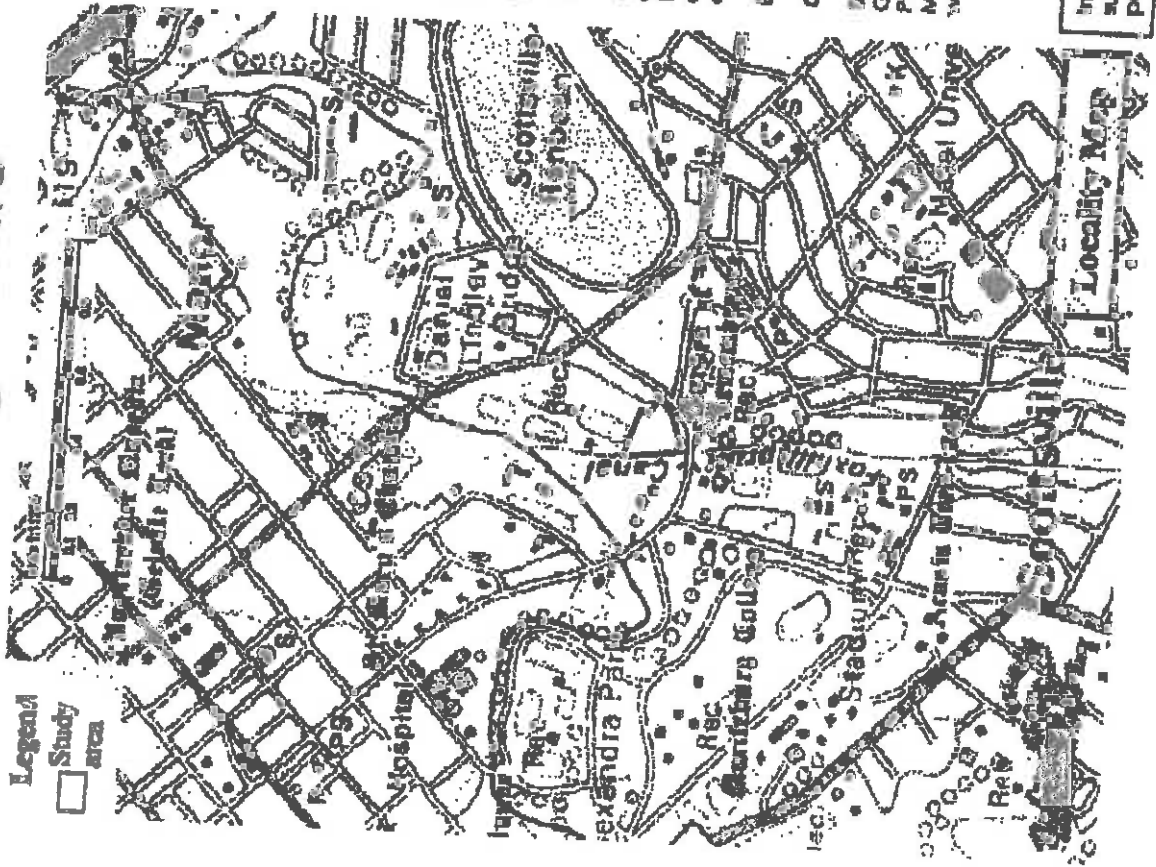
Project risks: [Illegible]

FOR ATTENTION

GEORGE GERICKE

FAX No 086 570 5659

Woodburn Boulevard Shopping Centre



NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

Notice is given of an application for Environmental authorisation that was submitted to the KwaZulu-Natal Department of Agriculture, Environmental Affairs & Rural Development, in terms of regulation no. R513 published in the Government Notice no. 33306 of 15 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment procedures (Notice 1 and 3 - Governing Notice R541 & R542) for the following activity:

Name of project: Woodburn Boulevard Shopping Centre
Project description: The proposed project will entail the development of 6500m² Shopping Centre in the city of Pietermaritzburg, KwaZulu-Natal.
Proposed developer: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 1346, Pietermaritzburg.

The application was submitted for the following activities in terms of the Government Notice R. 544, R. 545 & R. 546, 18 June 2010:
 R. 544, 10 June 2010 Activity 9 R. 544, 18 June 2010 Activity 11 R. 544, 18 June 2010 Activity 18
Exhaust: The total study area is approximately 1,7885 ha in extent.

Name of the proponent: O & I DEVELOPMENT (PTY) LTD

Location: The study area is located on the corner of Woodhouse Road and Alan Paton Drive Pietermaritzburg one could take the New England Road exit to the left, follow this road for approximately 1,4 km until reaching Woodhouse Road. The study area is located on the corner of Woodhouse Road and Alan Paton Drive.

Date of notice: 17 November 2011

Queries regarding the matter should be referred to:

Recreational Landscape Architects and Environmental Consultants
 George Gedcke
 P.O. Box 11975
 Marolana 0181
 www.batamasa.net

* MR HENTIE STEIGER
 1 NEW ENGLAND ROAD
 SCOTTSVILLE
 083 232 3756
 I LIVE ACROSS THE ROAD FROM THE PROPOSED DEVELOPMENT

Text: (012) 346 3870
 Fax: 086 570 5659
 email: info@oimweb.co.za

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above on or before 31 January 2012.

N.A. MCDONALD
8 NEW ENGLAND ROAD
SCOTTSVILLE
PIETERMARITZBURG
3201

TELEPHONE: 033 3428454
MOBILE: 0826770234
EMAIL: lynnmac@futurenet.co.za

18.01.2012

BOKAMOSO LANDSCAPE
ARCHITECTS AND ENVIRONMENTAL
CONSULTANTS

ATTENTION : George Gericke

FAX NUMBER: 0065705359

RE : WOODBURN BOULEVARD SHOPPING CENTRE

Dear Sir

I would like to be identified as an interested and/or affected party as my property is some 200 metres from the proposed location.

I am particularly concerned regarding the vehicular entrances and exits, the activities proposed, the environmental impact on the area and building design in relation to the surrounding properties.

Yours sincerely



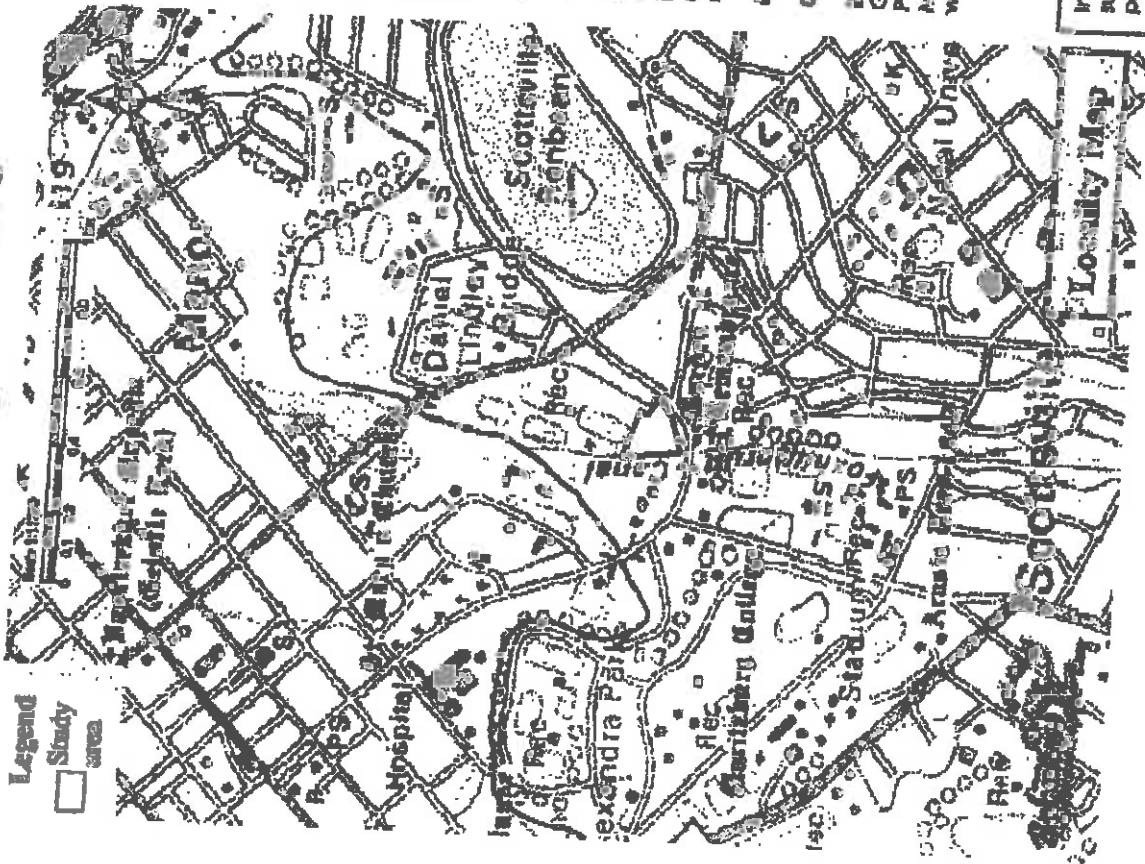
N.A. MCDONALD

FOR ATTENTION

GEORGE GERICKE

FAX No 086 570 5659

Woodburn Boulevard Shopping Centre



NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

Notice is given of an application for Environmental authorization that was submitted to the KwaZulu-Natal Department of Agriculture, Environmental Affairs & Rural Development, in terms of regulation no. R543 published in the Government Notice no. 33903 of 18 June 2010 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment procedures (Notice 1 and 3 - Governing Notice R544 & R546) for the following activity:

Name of project: Woodburn Boulevard Shopping Centre
Project description: The proposed project will entail the development of 6500m² Shopping Centre in the city of Pietermaritzburg, KwaZulu-Natal.
Property description: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 4346, Pietermaritzburg.

The application was submitted for the following activities in terms of the Government Notice R. 544, R. 545 & R. 546, 18 June 2010:
 R. 544, 18 June 2010 Activity 9 R. 544, 18 June 2010 Activity 11 R. 544, 18 June 2010 Activity 18
 R. 544, 18 June 2010 Activity 37R, 544, 18 June 2010 Activity 39

Extent: The total study area is approximately 1,7855 ha in extent.

Name of the proponent: O & T DEVELOPMENT (PTY) LTD

Location: The study area is located on the corner of Woodhouse Road and Alan Paton Drive on Portion 5 of Erf 4346 Pietermaritzburg. When travelling South on the N3 through the town of Pietermaritzburg one could take the New England road exit to the left. Follow this road for approximately 1.4 km until reaching Woodhouse Road. The study area is located on the corner of Woodhouse Road and Alan Paton Drive.

Date of notice: 17 November 2011

Offices regarding this matter should be referred to:

Richard Lembeke Architects and Environmental Consultants
 George Gafate
 P.O. Box 11375
 Marolana 614
 www.bokamoso.net

* MR BV NA1000
 18 WOODHOUSE ROAD
 SCOTTSVILLE
 0829034153

Tel: (012) 346 3810
 Fax: 086 570 5659
 email: lbe@bokamoso.co.za
 THE PROPOSED DEVELOPMENT

In order to ensure that you are identified or an interested or affected party please submit your name, contact information and/or interested and/or affected party please person given above on or before 31 January 2012.

User3

From: Ontvangs
Sent: 09 December 2011 09:33 AM
To: George Gericke
Subject: FW: Assessment - Woodhouse Road

Follow Up Flag: Follow up
Flag Status: Flagged

From: lynn hicks [<mailto:hicksmarglynn@gmail.com>]
Sent: 09 December 2011 09:22 AM
To: lizelleg@mweb.co.za
Subject: Assessment - Woodhouse Road

Good morning

We have read your article on the environmental assessment on Woodburn shopping centre & would like to submit our names as affected and interested residences of the area.

Thank you

Larry and Lynn Hicks
23 Woodhouse Road
Scottsville

User3

From: Ontvangs
Sent: 24 November 2011 09:13 AM
To: George Gericke
Subject: FW: CONTACT DETAILS FOR SHOPPING CENTRE @ WOODBURN PIETERMARITZBURG

-----Original Message-----

From: sandra hemingway [<mailto:sandals@webmail.co.za>]
Sent: 24 November 2011 08:44 AM
To: lizelleg@mweb.co.za
Subject: CONTACT DETAILS FOR SHOPPING CENTRE @ WOODBURN PIETERMARITZBURG

24 November 2011

Dear George,

Thank You so much for taking my call. I would be most grateful if you could supply me with contact details regarding application for opening a shop in the Woodburn Shopping Mall.

My name is Sandy Hemingway
Phone 083-231 0738
Please reply on this email

Kind Regards
Sandy

South Africas premier free email service - www.webmail.co.za

For super low premiums, click here. <http://www.dialdirect.co.za/?vdn=15828>

Users

From: Ontvangs
Sent: 12 September 2011 10:53 AM
To: George Gericke
Subject: FW: Fwd: Woodburn - Pietermaritzburg Application Form

From: Garth Jager - RAN Technologies [<mailto:rantechnologies@gmail.com>]
Sent: 12 September 2011 10:13 AM
To: lizelleg@mweb.co.za
Subject: Re: Fwd: Woodburn - Pietermaritzburg Application Form

Hi George,

I have passed on all your requests for information to Tony Stathakis (ventureprop@icon.co.za). I will be out of the country for the next month but you can mail me any time. However, any information you may need you have to ask Tony.

Regards,
Onne

On 02/09/2011 11:50 PM, Onne Jager wrote:

----- Original Message -----

Subject: Woodburn - Pietermaritzburg Application Form
Date: Fri, 2 Sep 2011 14:45:41 +0200
From: Lizelle Gregory <lizelleg@mweb.co.za>
To: <level@acenet.co.za>

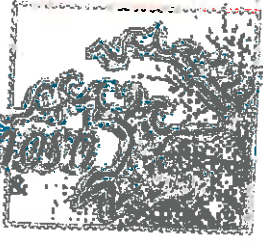
Middag Onne

Vind asb. aangeheg die aansoekvorm vir die Woodburn projek. Ek het 'n paar goed in die vorm in oranje ge'highlight'. Kan jy dit net asb. vir ons invul en seker maak al julle details is korrek. Sodra jy dit terugstuur dien ons hom in dank an ons begin met die public participation.

Groete

George Gericke

Bekamun



**Environmental Consultants &
Landscape Architects**

© www.bekamun.co.za | P.O. Box 2806 | 2013 | 011 490 56 56
36 Lechamba Road Ashlea Gardens, Pretoria

User3

From: Ontvangs
Sent: 16 November 2011 04:15 PM
To: George Gericke
Subject: FW: Media Enquiry - Woodburn Boulevard Shopping Centre
Importance: High

From: Ngobile Mtolo [<mailto:ngobile@pmbfever.co.za>]
Sent: 16 November 2011 04:04 PM
To: lizelleg@mweb.co.za
Subject: Media Enquiry - Woodburn Boulevard Shopping Centre
Importance: High

Greetings

I am a reporter for the Maritzburg Fever community newspaper and I recently read from the Pietermaritzburg Chamber of Business website that a new shopping centre is proposed on the corner of Woodhouse Road and Alan Paton Avenue.

I would like to find out more about the project in the sense that:

1. Who is spearheading the proposal and how is the property suitable for building a mall?
2. The proposed project will entail the development of 6 500m² retail space – how will the mall benefit the community. How many job opportunities are likely to be created?
3. While conducting research for the need of a shopping mall in this area, was the community involved in the process, especially residents who live closer to the site?
4. During research was Msunduzi Municipality contacted and will there be any partnerships, should the proposal go ahead?
5. What would be the proposed budget for the project and how many shops are likely to be located inside the mall?
6. What is the current stand of the proposal?

I would welcome your response before 16:30pm this coming Friday. Your help is very much appreciated.

Thank you.

Ngobile Mtolo
Maritzburg Fever Reporter
033 3551170 (tel.)
033 3551164 (fax)
072 6297287

Hierdie e-pos en sy inhoud is onderhewig aan 'n regskenninggewing oor elektroniese pos wat gelees kan word by <http://www.naspers.com/epos/vrywaring.html> 'n Afskrif kan aangevra word by Helpdesk@Media24.com.

User3

From: Thabang Hlongwane
Sent: 17 January 2012 08:28 AM
To: George Gericke
Subject: FW: Request to be on Tender list for Woodburne Boulevard

From: Ontvangs
Sent: 17 January 2012 08:24 AM
To: Thabang Hlongwane
Subject: FW: Request to be on Tender list for Woodburne Boulevard

From: Abrie Bouwer [<mailto:abrie@booyens.net>]
Sent: 16 January 2012 04:30 PM
To: lizelleg@mweb.co.za
Subject: Request to be on Tender list for Woodburne Boulevard

Hi Juanita

Dankie vir jou hulp vroeer.

Onder is al my besonderhede om my in die hande te kry.

Net om jou te herinner ons doen die volgende:

- 1) Refrigeration
- 2) Air conditioning
- 3) Ventilation
- 4) Heat recovery installations (taking the heat from your refrigeration unit and heating your water)
- 5) Under floor heating

En nog baie ander dinge!

Baie dankie!

Abrie

Booyens
REFRIGERATION

Abrie Bouwer
PROJECT MANAGER • REFRIGERATION CONTRACTING
80 Roberts Road • Claremont • Pretoria
• PO Box 2377 • Pietermaritzburg • 3200
Telephone 033 342 4809 • Facsimile 033 342 4805 • Cell 076 812 1806
abrie@booyens.net

Just call.

we'll get it right!

User3

From: Ontvangs
Sent: 27 January 2012 11:46 AM
To: User3
Subject: FW: Woodburn Boulevard Shopping Centre

Importance: High

From: Helga Barnard [<mailto:helgab@dihlase.co.za>]
Sent: 27 January 2012 11:26 AM
To: lizelleg@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre
Importance: High

Good morning,

I reside in Woodhouse Road, Pietermaritzburg, adjacent to the proposed development. Please add my details to your list of affected parties and keep me informed accordingly.

Thank you,

Helga Barnard
P O Box 101081
SCOTTSVILLE
3209

Tel: 033 – 342 4658
Cell: 083 231 2298

User3

From: Ontvangs
Sent: 27 January 2012 11:06 AM
To: User3
Subject: FW: Woodburn Boulevard Shopping Centre

Follow Up Flag: Follow up
Flag Status: Flagged

From: Leonard Johannes van Eeden [<mailto:lvaneeden@oldmutualpfa.com>]
Sent: 27 January 2012 10:57 AM
To: izelleg@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre

Good day

In response to your Notice re. the Woodburn Boulevard Shopping Centre, we hereby give notice as interested and/or affected parties.

Name: LJ van Eeden
Email: lvaneeden@oldmutualpfa.co
Cell: 0827810820
Owner: Woodhouse Road 25

Regards

en van Eeden

User3

From: Ontvangs
Sent: 23 January 2012 08:03 AM
To: George Gericke
Subject: FW: WOODBURN BOULEVARD SHOPPING CENTRE : NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

From: roy phyll [<mailto:royphyll@absamail.co.za>]
Sent: 22 January 2012 08:40 AM
To: lizelleg@mweb.co.za
Subject: WOODBURN BOULEVARD SHOPPING CENTRE : NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS

Dear Mr Gericke

A copy of your Notice with map in connection with the proposed Woodburn Boulevard Shopping Centre to be located at the intersection of Alan Paton Avenue, Woodhouse Road and New England Road in Pietermaritzburg, has just been handed to me by one of my neighbours.

I write to advise that I am an interested and affected party by virtue of the fact that I am the owner of the following properties, namely:

- * Sectional units 1, 2, 3, 4, 5, 6, 7 & 8 "Wendy Court" - 7 New England Road;
- * 5 New England Road and
- * 3 New England Road

which are in close proximity to your proposed development. I am accordingly interested in obtaining more information about your proposed development.

My name and contact details are as set out at the foot of this e-mail.

Regards
Roy Geyser

Roy Geyser

5 New England Road, Scottsville, Pietermaritzburg, 3201, KwaZulu-Natal, Republic of South Africa

Tel: 033 342 4316

Fax: 086 578 0753

Cell: 083 270 0041

e-Mail: royphyll@absamail.co.za

GPS: S. 29° 36.782 E. 030° 23.591

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User3

From: Ontvangs
Sent: 13 January 2012 03:46 PM
To: George Gericke
Subject: FW: Woodburn Boulevard Shopping Centre: Sheila Dyer
Attachments: 20120112_Sheila_Dyer_letter.docx

From: Jenny Barnard [<mailto:BarnarJB@eskom.co.za>]
Sent: 13 January 2012 03:15 PM
To: lizelleg@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre: Sheila Dyer

Good Afternoon

My mother asked me to forward the attached letter – a hand-written copy of which she has already posted to you - so that you can send correspondence via e-mail should you so wish.

Thank you

Regards

JENNY BARNARD
Specialist Advisor: GIS
MSc GIS - PGP0129
1 Portland Rd, Mkondeni
033 395 3854 / 8311 3854
Fax: 086 665 8153
Cell: 084 774 3073

[I'm part of the 49Million initiative.](#)

<http://www.49Million.co.za>

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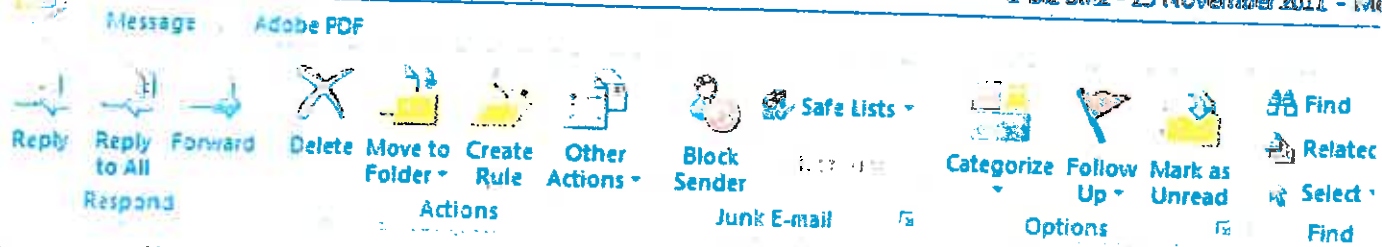
User3

From: Ontvangs
Sent: 15 November 2011 10:25 AM
To: George Gericke
Subject: FW: Woodburn Boulevard Shopping Centre,

From: Stevens, Noel [<mailto:Noel.Stevens@davislangdon.co.za>]
Sent: 15 November 2011 10:16 AM
To: lizelleg@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre,

Hi George,

Please can you send us more info on the Woodburn Boulevard Shopping Centre project



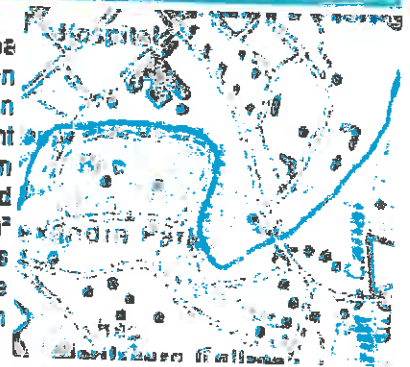
From: Pietermaritzburg Chamber of Business [news@pcb.org.za]
To: Stevens, Noel
Cc:
Subject: E-Biz Blitz - 15 November 2011

[Click here to view online or for a print](#)



NEW SHOPPING CENTRE FOR WOODBURN

A new shopping centre is proposed on the corner of Woodhouse Road and Alan Paton Drive, according to a notification for an Environmental Impact Assessment (EIA). Provisionally named the Woodburn Boulevard Shopping Centre, the proposed project will entail the development of 6 500m² retail space. The property in question measures 1.7665 hectares and is directly adjacent to the Woodburn Stadium and the Allan Wilson Bowling Club.



The locality map of the proposed Woodburn Boulevard Shopping Centre.

It is understood the developer is O & T Development and that all enquiries should be directed to Architects and Environmental Consultants. The contact person is George Gerich at lizelleo@mweb.co.za

COMMUNITY

AMAZING RACE IN HOSPITAL CORRIDORS

In celebration of the unusual 11/11/11 date convergence, Midlands Medical Centre Private Hospital hosted its very own "Amazing Race". A representative from every department was nominated to solve riddles, sing nursery rhymes and hunt for the management team hidden throughout the hospital. It was an exciting and fun-filled event with the Pharmacy department emerging the winner.



The participants in the MMC Amazing Race.

NEW APPOINTMENT TO BOOST PDC

Pressure Die Castings has welcomed Andre Lourens (right) to the team. Lourens is responsible for the sale of PDC range of products to stockists in the Cape area. Having grown up in the retail industry, he has spent the last 12 years in the retail industry.

NEWS WORTH KNOWING

VULINDLELA HOUSING DEVELOPMENT IN THE SPOTLIGHT



Regards

Noel Stevens

Executive, Africa Region

D +27 (0) 33 345 8371 M +27 (0) 84 588 8788

noel.stevens@davislangdon.co.za

noel.stevens@aecom.com

Davis Langdon, An AECOM Company

300 Jabu Ndlovu Street, Pietermaritzburg, 3201

P.O Box 980, Pietermaritzburg, 3200

KwaZulu-Natal, South Africa

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www.davislangdon.com

www.aecom.com

AECOM Davis Langdon SA (Pty) Ltd

Registration No. 2010/013644/07 VAT number 4370256515

Registered Address: 10 Fricker Road, Rivvo Boulevard, Johannesburg, 2196

Directors: I Pillay (MD) H Ntene D Gan* R Osborne* (*USA)

*Level 4 contributor to B-BBEE ISO 9001:2008 CERTIFIED
ISO 14001:2004 CERTIFIED OHSAS 18001:2007 CERTIFIED*

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 Please consider the environment before printing this email

User3

From: Ontvangs
Sent: 30 January 2012 09:35 AM
To: User3
Subject: FW: woodburn boulevard shopping centre

From: JULIAN GOLDACRE [<mailto:juliang@futurenet.co.za>]
Sent: 30 January 2012 09:21 AM
To: lizelleg@mweb.co.za
Subject: woodburn boulevard shopping centre

Hi Lizelle,

Please can you note me down as a party who will be effected by the above.

My contact details are:

JULIAN GOLDACRE
27 WOODHOUSE ROAD
TEL: 033 345 8900 (H)
CELL: 083 558 4852

Thanks and regards
Julian Goldacre
GHI

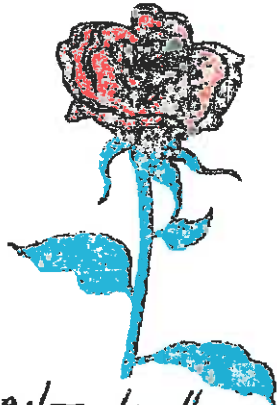
Find us on Facebook: Goldacres Garden Creations

Tel: 033 345 3832

Fax: 086 695 1358

PO Box 1551, PMB, 3200

BE GREEN, READ FROM THE SCREEN.



Sheila Dyer
17 Woodhouse Road
Scottsville
Pietermaritzburg
3201

Tel 033 394 2073

9th January, 2012.

E Mail - lizelle9@mweb.co.za

George Jeriche
P.O. box 11375
MAROELANA 0161

Re Woodburn Boulevard Shopping Centre

Dear Mr. Jeriche,

Further to my conversation with you on the 9th December in connection with the registered letter sent to me about the above project, I am sending you my daughter Jenny Barnard's E-Mail address so that I can receive through her or at the above address my correspondence about Woodburn Boulevard.

Your E Mail address is

BARNARJB@eskom.co.za.

Sincerely,
Sheila Dyer

User3

From: George Gericke
Sent: 13 January 2012 04:27 PM
To: 'BarnarJB@eskom.co.za'
Subject: RE: Woodburn Boulevard Shopping Centre: Sheila Dyer

Dear Jenny,

Thank You for updating me in connection with your contact details. You will be updated in the future.

Kind Regards

Juanita De Beer

From: Ontvangs
Sent: 13 January 2012 03:46 PM
To: George Gericke
Subject: FW: Woodburn Boulevard Shopping Centre: Sheila Dyer

From: Jenny Barnard [<mailto:BarnarJB@eskom.co.za>]
Sent: 13 January 2012 03:15 PM
To: lizelleg@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre: Sheila Dyer

Good Afternoon

My mother asked me to forward the attached letter – a hand-written copy of which she has already posted to you - so that you can send correspondence via e-mail should you so wish.

Thank you

Regards

JENNY BARNARD
Specialist Advisor: GIS
MSc GIS - PGP0129
1 Portland Rd, Mkondeni
033 395 3854 / 8311 3854
Fax: 086 665 8153
Cell: 084 774 3073

[I'm part of the 49Million initiative.](#)

<http://www.49Million.co.za>

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From: User3
Sent: 27 January 2012 02:39 PM
To: 'helgab@dihlase.co.za'
Subject: RE: Woodburn Boulevard Shopping Centre
Dear Helga Barnard,

Thank you for the previous email in connection of the Woodburn Boulevard Mall project.

You are now registered as an Interested and Affected Party.

We will keep you updated in the process.

Have a wonderful day!

Kind Regards

Juanita De beer



From: Helga Barnard [mailto:helgab@dihlase.co.za]
Sent: 27 January 2012 11:26 AM
To: lizelleg@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre
Importance: High

Good morning,

I reside in Woodhouse Road, Pietermaritzburg, adjacent to the proposed development. Please add my details to your list of affected parties and keep me informed accordingly.

Thank you,

Helga Barnard
P O Box 101081
SCOTTSVILLE
3209

User3

From: User3
Sent: 27 January 2012 02:34 PM
To: 'lvaneeden@oldmutualpfa.com'
Subject: RE: Woodburn Boulevard Shopping Centre

Dear Len van Eeden,

Thank you for the previous email in connection of the Woodburn Boulevard Mall.

You are now registered as an Interested and Affected Party.

We will keep you updated in the process.

Have a wonderful day!

Kind Regards

Juanita De beer



**Environmental Consultants &
Landscape Architects**
e: lizelle@mweb.co.za t: 011 462 9200 f: 011 462 9201
26 Leinster Road Ashbur Gardens, Pretoria

From: Leonard Johannes van Eeden [<mailto:lvaneeden@oldmutualpfa.com>]
Sent: 27 January 2012 10:57 AM
To: lizelle@mweb.co.za
Subject: Woodburn Boulevard Shopping Centre

Good day

In response to your Notice re. the Woodburn Boulevard Shopping Centre, we hereby give notice as interested and/or affected parties.

Name: LJ van Eeden
Email: lvaneeden@oldmutualpfa.co
Cell: 0827810820

Owner: Woodhouse Road 25

Regards

Len van Eeden

User3

From: Lizelle Gregory <lizelleg@mweb.co.za>
Sent: 30 January 2012 11:42 AM
To: 'juliang@futurenet.co.za'
Subject: RE: woodburn boulevard shopping centre

Dear Julian Goldacre,

Thank you for the previous email in connection of the K56 project.

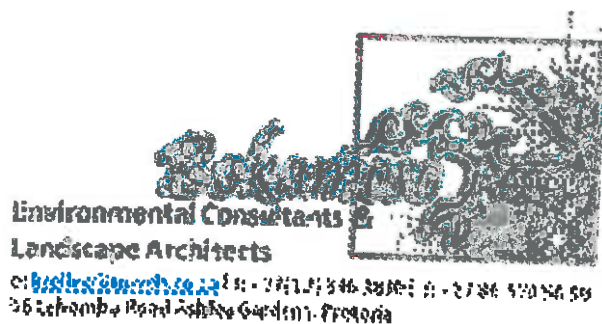
You are now registered as an Interested and Affected Party.

We will keep you updated in the process.

Have a wonderful day!

Kind Regards

Juanita De beer



From: JULIAN GOLDACRE [<mailto:juliang@futurenet.co.za>]
Sent: 30 January 2012 09:21 AM
To: lizelleg@mweb.co.za
Subject: woodburn boulevard shopping centre

Hi Lizelle,

Please can you note me down as a party who will be effected by the above.

My contact details are:

JULIAN GOLDACRE
27 WOODHOUSE ROAD
TEL: 033 345 8900 (H)
CELL: 083 558 4852

Thanks and regards
Julian Goldacre

GHI

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Tel: 033 345 3832

Fax: 086 695 1358

PO Box 1551, PMB, 3200

BE GREEN, READ FROM THE SCREEN.

User3

From: Lizelle Gregory <lizelleg@mweb.co.za>
Sent: 14 February 2012 09:01 AM
To: 'sashenc@spanafrica.co.za'
Subject: Registered

Dear Sashen Chetty,

Thank you for the previous email in connection of the Woodburn Boulevard Mall.

You are now registered as an Interested and Affected Party.

We will keep you updated in the process.

Have a wonderful day!

Kind Regards

Juanita De beer



**Environmental Consultants &
Landscape Architects**
P: lizelleg@mweb.co.za F: +27 (0) 21 96 30 00 C: +27 82 920 56 59
36 Leventhor Road Ashlea Gardens, Pretoria

User3

From: Lizelle Gregory <lizelleg@mweb.co.za>
Sent: 22 November 2011 01:30 PM
To: 'noel.stevens@davislangdon.co.za'; 'noel.stevens@aecom.com';
'gushul@somta.co.za'; 'nqobile@pmfever.co.za'
Subject: Woodburn Boulevard Shopping Centre - I&APs
Attachments: Public Notice BA.pdf

To whom it may concern

Thank you for your correspondence regarding the proposed **Woodburn Boulevard Shopping Centre** project. Please note that you were registered as an Interested and/or Affected Party (I&APs) for the proposed project, and that we will inform you of any public meetings or draft reports that will be made available to all I&APs as soon as possible. Also refer to the attached public notice for more information on the project.

Please don't hesitate to contact our offices for any additional queries in this regard.

Kind regards,

George Gericke


Environmental Consultants &
Landscape Architects

© www.ecs.co.za Tel: +27 11 546 3900 Fax: +27 11 546 3901
56 Le-Rambouille Road Ashlea Gardens, Pretoria

User3

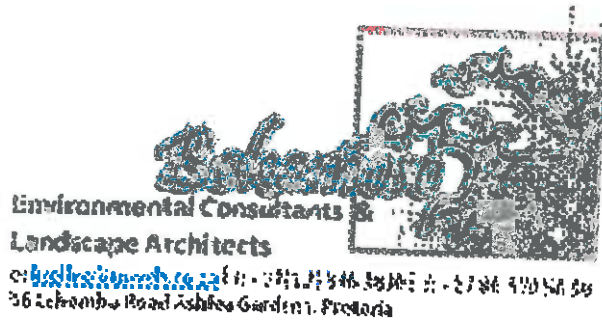
From: Lizelle Gregory <lizelleg@mweb.co.za>
Sent: 14 November 2011 07:23 AM
To: 'atwaru@vodamail.co.za'; 'mm@umdm.gov.za'; 'lmathenjwa@kzn.sahra.org.za';
'badenhorstt@dwa.gov.za'; 'masefielda@dwa.gov.za'; 'reddyj@dwa.gov.za';
'MkhizeV@dwa.gov.za'; 'gabotha@geoscience.org.za';
'pdlamini@geoscience.org.za'; 'schmidk@nra.co.za'; 'hemsonc@gmail.com';
'margaret@burgerip.co.za'; 'cborresen@iburst.co.za'; 'pcb@pcb.org.za'
Subject: Woodburn Boulevard Shopping Centre - Public Notice
Attachments: Public Notice BA.pdf

To whom it may concern

Please refer to the attached public notice for the proposed **Woodburn Boulevard Shopping Centre** project.

Please don't hesitate to contact our offices for any additional information or queries.

Kind regards
George Gericke



| Nr | Registered Parties | Contact details | Address |
|----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1 | Noel Stevens | noel.stevens@davislangdon.co.za noel.stevens@aecom.com 033 345 8371 084 588 8788 | |
| 2 | Simon Gushu | gushul@somta.co.za | |
| 3 | Ngobile Mtolo Maritzburg Fever Reporter | ngobile@pmfever.co.za 033 355 1170 072 629 7287 | |
| 4 | Sandy Hemingway | sandals@webmail.co.za 083 231 0738 | |
| 5 | Jenny Barnard | BarnarJB@eskom.co.za 033 395 3854 Fax: 086 665 8153 Cell : 084 774 3073 | 1 Portland Rd Mkondeni |
| 6 | Abrie Boucher | abrie@booyens.net Cell: 076 812 1806 Tel: 033 342 4909 Fax: 033 342 4905 | 80 Roberts Road Clarendon Pietermaritzburg PO Box 2370 Pietermaritzburg 3200 |
| 7 | Larry and Lynn Hicks | hicksmarglynn@gmail.com | 23 Woodhouse Road Scottsville |
| 8 | Jenny Barnard | barnarjb@eskom.co.za BARNARJB@eskom.co.za Tell: 033 394 2073 | Sheila Dyer 17 Woodhouse Road Scottsville Pietermaritzburg 3201 |
| 9 | Sheila Dyer Jenny Barnard (Daughter) | barnarjb@eskom.co.za Tel: 033 294 2073 Tel: 033 395 3854 Cell: 084 774 3073 | 17 Woodhouse Road Scottsville Pietermaritzburg, 3201 |
| 10 | N.A. McDonald | lynnmac@futurenet.co.za Tel: 033 342 8454 Cell: 082 677 0234 | 8 New England Road Scottsville Pietermaritzburg, 3201 |

| | | | |
|----|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 11 | Roy Geysers | royphyll@absamail.co.za Tel: 033 342 4316 Fax: 086 578 0753 Cell: 083 270 0041 | 7 New England Road 5 New England Road 3 New England Road |
| 12 | Len van Eeden | lvaneeden@oldmutualpfa.com Cell: 082 781 0820 | Woodhouse Road 25 |
| 13 | Helga Barnard | helgab@dihlase.co.za Tel: 033 342 4658 Cell: 083 231 2298 | PO Box 101081 Scottsville, 3209 |
| 14 | Julian Goldacre | juliang@futurenet.co.za Tel: 033 345 8900 Cell: 083 558 4852 | 27 Woodhouse Road |
| 15 | B.V. Naidoo | Cell: 082 903 4153 Fax: 033 394 2152 | 18 Woodhouse Road Scottsville |
| 16 | Hentie Steiger | Cell: 083 232 3756 | 1 New England Road Scottsville |
| 17 | Naleni Atwaru | atwaru@vodamail.co.za Cell: 076 515 1919 Tel: 033 345 5750 Fax: 033 394 4005 | |
| 18 | Sashen Chetty | sashenc@spanafrica.co.za Cell: 082 806 4112 Tel: 033 346 2555 Fax: 033 346 1242 Direct Fax: 086 516 7670 | |
| 19 | Nora Choveaux | nac@pmbtrust.org Cell: 082 771 6324 Tel: 033 396 3344 Fax: 086 210 5819 | |
| 20 | Bianca Torre | BiancaT@l2b.co.za Cell: 086 083 6337 | |
| 21 | Shannon Farnsworth | shannon.farnsworth@msunduzi.gov.za | P.O Box 321 Pietermaritzburg 3200 |
| 22 | Bianca Torre | BiancaT@l2b.co.za Tel: 086 083 6337 | |
| 23 | Dominic Wieners Ezemvelo KZN Wildlife | wienersd@kznwildlife.com Tel: 033 845 1455 | |

| | | | |
|----|--------------------------|------------------------------------------------------------------|--|
| 24 | Councillor Naleni Atwaru | atwaru@vodamail.co.za | |
| | | Cell: 076 515 1919 | |
| | | Tel: 033 345 5750 | |
| | | | |
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| Nr | Registered Parties | Contact details | Address |
|----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1 | Noel Stevens | noel.stevens@davislangdon.co.za noel.stevens@aecom.com 033 345 8371 084 588 8788 | |
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Appendix E2:

Comments and Inputs received from Authorities

Lizelle Gregory

From: Ryk Joubert <ryk@brava.co.za>
Sent: 09 May 2012 11:09 AM
To: 'Lizelle Gregory'
Subject: RE: Woodburn Shopping Centre - Portion 5 of Erf 4346
Attachments: Draft Infrastructure report.pdf

Hi Lizelle

Kyk asb na hierdie verslaggie van my en laat weet of dit meeste van die vrae beantwoord

Groete

Ryk

From: Lizelle Gregory [<mailto:lizelleg@mweb.co.za>]
Sent: 08 May 2012 10:46 AM
To: 'Ryk Joubert'
Subject: RE: Woodburn Shopping Centre - Portion 5 of Erf 4346

Ryk,

Dankie – dit lyk reg.

Ek het ook bevestiging nodig dat die stormwaterafdeling van die Stadsraad dat hulle die stormwaterbestuurs-konsep ondersteun en dat hulle bevestig dat hulle die ontwikkeling se afval kan ontvang. (Die "Waste Afdeling").

Groete,

Lizelle

Elsa Viviers
Namens/on behalf of
Lizelle Gregory



Environmental Consultants &
Landscape Architects

Tel: 011 461 4611 | F: 011 461 4611 | 082 354 3281
e: info@bekommas.co.za | info@bekommas.co.za | info@bekommas.co.za

From: Ryk Joubert [<mailto:ryk@brava.co.za>]
Sent: 25 April 2012 12:52 PM
To: 'Lizelle Gregory'
Subject: FW: Woodburn Shopping Centre - Portion 5 of Erf 4346

128 0 2012

Sal die onderstaande response van die stadsraad voldoende wees indien ek daarna verwys in my services report?

Groete

Ryk

From: Dhamendra Ragoonandan [<mailto:Dhamendra.Ragoonandan@msunduzi.gov.za>]
Sent: 25 April 2012 12:16 PM
To: Ryk Joubert
Cc: Rodney Colling; Brenden Sivparsad
Subject: RE: Woodburn Shopping Centre - Portion 5 of Erf 4346

This email and all contents are subject to the following disclaimer:
http://www.msunduzi.gov.za/Email_Disclaimer.pdf or send a blank e-mail to disclaimer@msunduzi.gov.za to have the document e-mailed to you.

Hello Ryk

As per our telephonic conversation on the 20/04/2012.

As long as the water and sewerage demand remains the same as the previous application the city can sustain the water and sanitation demand.

As per your request this is purely for EIA purposes.

Any other requirements from this business unit shall be addressed in the service level agreement.

PS Rodney please take note of this.



DHAMENDRA RAGOONANDAN
MANAGER PLANNING & DESIGN (ACTING)
WATER & SANITATION
TEL : 033 3922115
FAX : 033 3922588
CELL : 083 2950970
email : dhamendra.ragoonandan@msunduzi.gov.za



Thank you for your attention

From: Ryk Joubert [<mailto:ryk@brava.co.za>]
Sent: 25 April 2012 08:48 AM
To: Dhamendra Ragoonandan
Subject: FW: Woodburn Shopping Centre - Portion 5 of Erf 4346

Hi Dees

Any chance that you can still get around to this request of mine before the end of the week?

Regards

Ryk

From: Ryk Joubert [<mailto:ryk@brava.co.za>]
Sent: 20 April 2012 11:54 AM
To: 'dhamendra.ragoonandan@msunduzi.gov.za'
Subject: Woodburn Shopping Centre - Portion 5 of Erf 4346

Hi Dees

As per our telephone discussion this morning herewith the information I need for a new EIA being prepared for the Woodburn Shopping centre

Tony Statakis is still working on the shopping centre development at Woodburn & has commissioned a new EIA as the present one has expired. In order to finalise this report I need to update my services report. The scope of the development hasn't changed and he is still looking at a 6500m².

All that I need is confirmation from the city that:

- That city will/can provide a sewer connection to the site (should not be a problem as a main outfall sewer already crosses the site)
- The city will/can provide a water connection to the site (should also not be a problem as there is water in close proximity to the site and being a commercial development the water demand is fairly low)
- The city can provide solid waste removal services to the development – I don't know if you can help with this but maybe you can point me towards the right person.

I have already spoken to the roads & stormwater branch & have the city's requirements from Hoessein Essop which I will work into my report.

I already have confirmation of the above, but the EIA process requires confirmation to these facts that isn't older than 6 mths, so hence my request for updated confirmation.

The electrical engineer is dealing with the electrical supply.

Regards

Ryk

Ryk Joubert PrEng

Brava Engineers (Pty) Ltd.
57 Braid Street, Pietermaritzburg 3201, South Africa
PO Box 681, Pietermaritzburg, 3200, South Africa
Tel: +27 33 345 0502 Fax: +27 33 342 7513
Cel: +27 82 552 1743 email: ryk@brava.co.za

SUSTAINABLE DEVELOPMENT & CITY
ENTERPRISES DEPARTMENT

Environmental Management Unit

P O Box 31
Pietermaritzburg
3200

MSUNDUZI
MUNICIPALITY



Enq:Ms S.Farnsworth

Tel:033-392 3243

Fax:0862190368

Email:shannon.farnsworth@msunduzi.gov.za

Date: 15th August 2012

BOKAMOSO ENVIRONMENTAL CONSULTANTS & LANDSCAPE ARCHITECTS
PO Box 11375
Maroelana
0161

Attention: Ms Lizelle Gregory

Dear Lizelle,

**RE: DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED WOODBURN
BOULEVARD SHOPPING CENTRE ON THE CORNER OF WOODHOUSE ROAD AND ALAN
PATON DRIVE (ON PORTION 5 OF ERF 4346, PIETERMARITZBURG**

With reference to the above Draft BAR dated July 2012 the following comments are submitted for your information and consideration:

1. Page 12 makes reference to 'the service agreement between the local authority and the developer will be finalized as soon as the EIA authorization is issued'. Written confirmation from all relevant departments within the Msunduzi Municipality (i.e. Water and Sanitation, Electricity) is needed as part of the BAR and environmental authorization process in order to confirm that each department has the capacity to service the proposed development.
2. The proposed development site is zoned 'special residential' and falls under special area 30 which lists business premises, restaurants and shops as permissible development or uses of land for that area. Therefore activity 24 under listing notice one (R. 544, 18 June 2010) of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) will not be triggered as the proposed site is not zoned open space.

3. Page 25 mentions that 'the National Water Act also required that (where applicable) the 1:50 and 1:100 year flood line be indicated on all the development drawings (even the development drawings for the external services) that are being submitted for approval'. However the ground floor plan (drawing no. 2502-100) does not indicate these flood lines.
4. Page 34 mentions 'the area adjacent to the river however has high ecological potential and should be rehabilitated as part of the development project'. Is the developer [O & T Development (Pty) Ltd] willing to consider this as an offset option? If so a rehabilitation program should be implemented in consultation with this unit.
5. Page 42 makes reference to a 'plan to erect a conservation fence on the conservation line' however there is no indication of the conservation line location; this line should be indicated on all development drawings and fenced off prior to any construction taking place.
6. Page 43 mentions 'the wetland area which is situated to the south and west of the site'; wetland zones need to be clearly shown on the development plans. Further more on page 45 it states that 'where possible avoid any work within 1m from the wetland buffer'; the extent of the wetland buffer needs to be specified and included on all development drawings. A site visit was conducted on the 10th of August 2012 and no wetland areas were identified on site, hence further clarity on the above is needed.
7. This unit requires a copy of the follow up geotechnical survey that is to be done during the rainy season in order to identify perched water conditions (page 48).
8. Correction on page 50, Matlosana Local Municipality must be changed to Msunduzi Local Municipality.
9. Page 53 makes reference to the planting of embankments with grass to stop any excessive soil erosion and scouring of the landscape. A list of indigenous grass species that will be used is to be submitted to this unit for approval prior to planting taking place.
10. With regards to the landscape plan, page 49 under point 12 mentions 'in cases where exotic species are to be used, such species must be non-invasive' however page 55 under point 6 says 'no plants not indigenous to the area should be introduced in the communal landscaping of the proposed site', this unit encourages the design of landscape plans to be fully complied of indigenous species. The landscape site development plan (H L 0005 Site Plan) done by Habitat Landscape Architects dated 04 August 2010 seems to show the incorrect location of the cell phone tower towards the east of the site when in fact this tower is situated to the south of the site. The plan makes use of *Acacia xanthophloea* in the car park, this is not recommended as these trees drop thorny branches, provide little shade and the root systems will lift paving. The landscape plan also only includes 7 plant species within a repeated design, more variety and colour should be encouraged. This unit requests that future landscape plans be done in consultation with this unit and a copy of the draft landscape plan is to be submitted to this unit for comment and approval prior to commencement.
11. Page 59 makes reference to 'a rehabilitation plan for the construction phase'. This plan must be submitted to this unit prior to construction works commencing.
12. If during construction any new evidence of archaeological sites or artifacts are found, operations must be stopped and the relative competent authority, Amafa aKwaZulu-Natali, must be contacted immediately as opposed to SAHRA.
13. The section 21 Water Use Licenses application (page 71) must be submitted to this unit.
14. This development is required to be flood neutral and hence a stormwater management plan must be undertaken and submitted to the Msunduzi Municipality for approval prior to construction

commencing. Page 3 under section 3.1.3 Stormwater Management, it mentions that 'it is necessary to attenuate runoff by constructing a detention facility above the 1:50 year flood line'. This should be depicted on development drawings as well as forming part of the stormwater management plan.

15. Page 14 of the EMP mentions that 'fires shall only be permitted in specifically designed areas and under controlled circumstances', what materials are intended to be burned on site? The burning of waste material, rubbish and garden refuse on site is prohibited.
16. The appointed ECO must register with this unit, providing contact details and audit reports, site visits should be conducted at least every 10 working days.
17. The appointed ECO is to provide basic environmental awareness training to all staff working on site prior to the commencement of any construction activities.
18. Construction staffs are to make use of facilities provided for them, as opposed to alternatives. Using surrounding areas as a toilet facility is strongly prohibited. .
19. Chemical toilets should be placed outside 32m from any watercourse i.e. the Foxhillspruit. A registered chemical waste company is to be used to remove waste from the chemical toilets on site. Documentation for this must be kept by the contractor for review purposes by the ECO if needed.
20. Construction staff shall not be permitted to use any watercourse adjacent to the site for the purposed of bathing or washing of clothing.
21. The contractor shall not in any way modify or damage the banks of the adjacent watercourse, unless required as part of the dissipation structures at the stormwater outlet points.
22. All concrete mixing is to take place on mixing boards to prevent contamination of groundwater.
23. All equipment must be checked regularly for oil and fuel leaks before being operated.
24. Contaminated wastewater must be managed by the site manager to ensure existing water resources in the vicinity of the site are not contaminated.
25. The following measures must be included as part of the management of the site during the operational phase:
 - : monitoring stormwater exit points
 - : fill in and re-vegetate eroded areas
 - : regularly maintain stormwater structures to maintain efficiency.
26. All building plans must be submitted to and approved by the Msunduzi Municipality for approval prior to construction commencing.



For: MANAGER: ENVIRONMENTAL MANAGEMENT
draft BAR for Woodburn shopping centre (DC22/0059/2011)

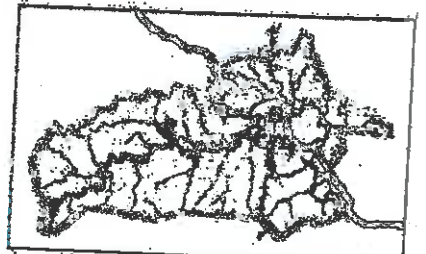
ESP: Woodburn Site Vicinity

Legend

- Public Open Space - Untransformed
- Dist. HOSS (PLUSA methodology)
- HOSS Class**
- Practical Area
- Key Area
- Erosion Corridor
- Watershed
- Regional Open Space - Untransformed
- Regional Open Space - Restored
- Regional Open Space - Restored and Public Open Space
- Regional Open Space - Restored and Public Open Space (Untransformed)
- Key Area and Transport Corridor
- Key Area and Open Space
- Key Area, District Corridor and Public Open Space (Untransformed)
- City Area and Public Open Space (Untransformed)
- Regional Corridor and Public Open Space (Untransformed)
- Regional Corridor and Public Open Space (Untransformed)
- Preferred Site



0 45 90 180
Meters





PETERMARITZBURG
MSUNDUZI

MSUNDUZI MUNICIPALITY

Umgungundlovu District

-Laad

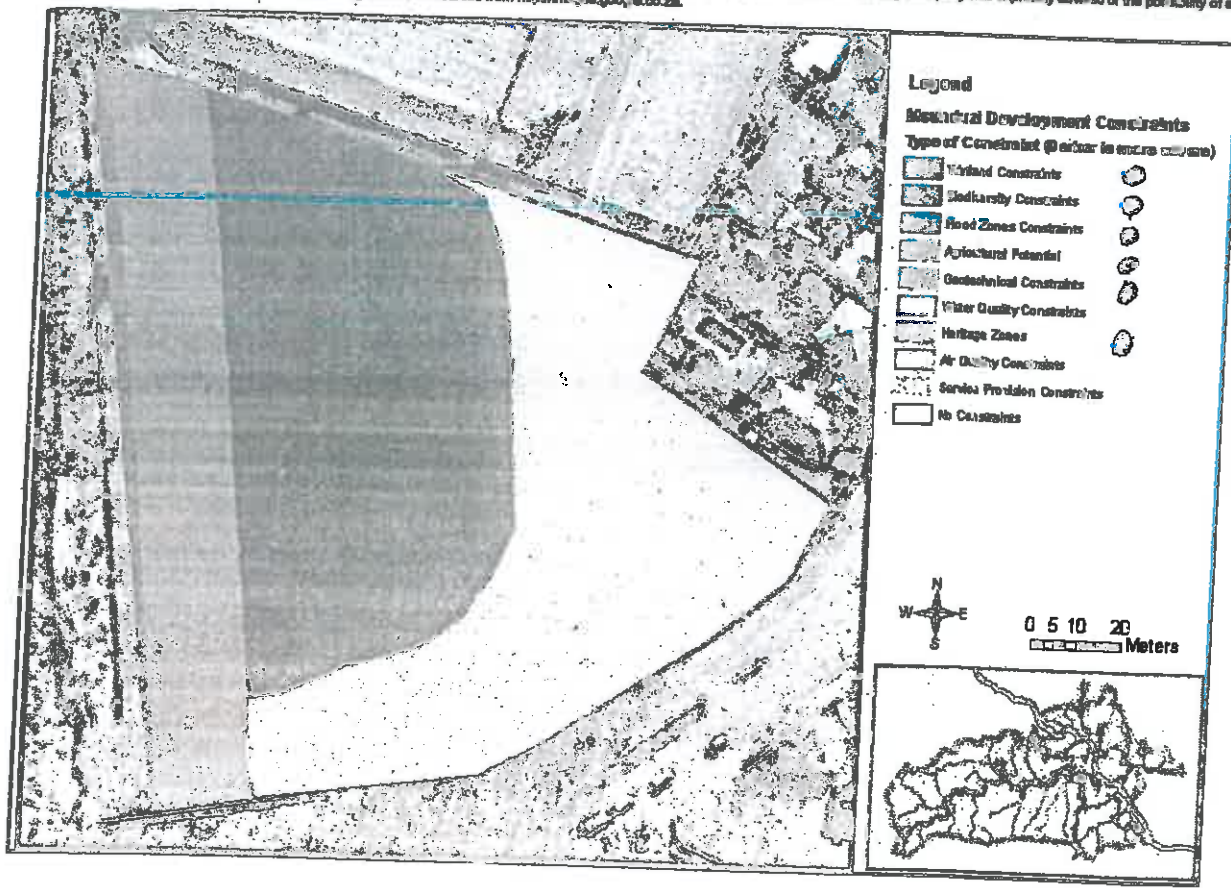
SELECTION REPORT 2010/11/08 08:25:04 AM



Prepared for the DEA, DAEARD and Msunduzi Municipality by:
SRK Consulting Contact: (033) 346 6311
Project Partner: Mr. M.J. Morris (Pr.Eng.)
Environmental Scientist: Ms. P. Emanuel (Pr.Sci.Nat.)
GIS Operator: Mr. K.Alan

PLEASE NOTE: LAYOUT MUST BE SET TO LANDSCAPE, BEFORE PRINTING THIS DOCUMENT

DISCLAIMER: Use of this report are entirely at the user's own risk. The user assumes full responsibility for the risk or loss resulting from the use and the user's reliance on information contained within this report. In no event will SRK or any third party be liable for any damages, whether direct, indirect, special, incidental, or consequential whatsoever relating to the user's use or the information contained on this report or the damage. Images used for the constraints reporting have been sourced from <http://images.google.co.za>.



Conservation Significance

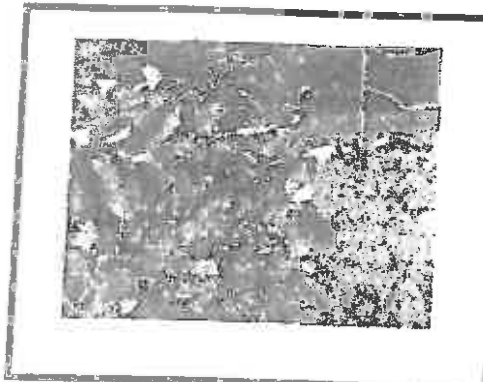


Conservation Significance: High Wetland Development Constraint

Wetland areas are prized for the ecosystem goods and services that they provide in the form of water management and biodiversity conservation. Wetlands are deemed to be no-go areas in terms of development on site. Further specialist investigations including wetland delineation and functionality assessments should be undertaken to inform any proposed development application process on or within a reasonable distance of any wetland area.

No land use that will result in the transformation of wetlands is recommended. Wetlands should be retained for the ecosystem goods and services they supply, therefore only rehabilitation and conservation activities are proposed within this zone. There should be no net loss of wetland area or functionality as a result of any proposed development. In cases where wetland impacts cannot altogether be avoided or acceptably mitigated on-site, consideration must be given to establishing off-site wetland offsets that would result in positive impacts for wetland management in the region.

Should it be impossible to avoid the transformation of wetland habitat a suitable off-set area should be identified and conditions pertaining to the rehabilitation of the off-set area included as a condition of any development authorization.



Conservation Significance: High Biodiversity Constraint

Areas of high biodiversity are important for their intrinsic value and the ecosystem goods and services that they provide. These areas were identified by the Msunduzi C-Plan as being necessary to ensuring the persistence of biodiversity in Msunduzi. These areas have very high development constraint and care should be taken to ensure that large scale transformation does not occur and that the ecological functioning of these sites is not lost.

Any development proposed within this zone should be subject to a pre-feasibility assessment which must include all necessary specialist biodiversity investigations and the consideration of alternatives. If the site is confirmed to be highly sensitive and the proposed activity is expected to result in the potential net loss of critical biodiversity elements, then the development should be considered totally flawed from a biodiversity perspective and should not proceed.

Land use that would result in transformation or the net loss of critical biodiversity elements should not be undertaken in this zone.

Land use that is compatible with biodiversity management objectives and that would result in a net increase in biodiversity should be supported. This may be achieved through mitigation measures such as the consideration of alternatives; the reduction of land use density; the commitment to rehabilitation of any degraded areas; and, local indigenous landscaping. In cases where biodiversity impacts cannot altogether be avoided or acceptably mitigated on-site, consideration must be given to establishing suitable off-site biodiversity offsets that would result in positive impacts for biodiversity in the region.

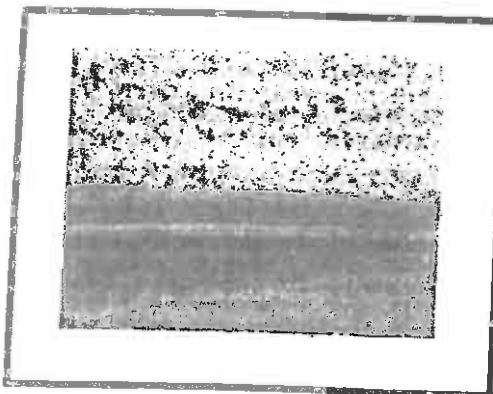


Conservation Significance: High Flood Potential

Any development proposed within a flood-prone zone is in danger of being affected by a river flood and may place people and structures in danger on-site, upstream or downstream of the site. Development within flood-prone areas may also negatively impact the ecology and hydrology. If an application is proposed within a flood zone a detailed flood risk assessment should be conducted to determine the location of the 1:10, 1:50 and 1:100 flood lines for the site prior to the development of any structures.

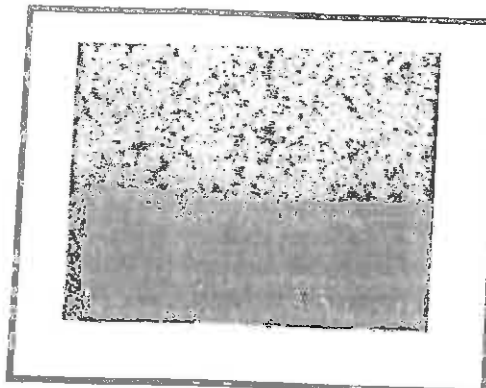
Should development be proposed within an established floodline, provisions must be made to ensure the protection of the structures and any people associated with the development, and, the protection of structures and people from up-and-down-stream of the site. Flood zones are not the ecological limits that set a flood-prone potential for development in proposed within a flood-prone zone, care must be taken to ensure that the flooding of the flood zone does not compromise the ecological and hydrological assessment of the potential impact of any development proposed within the flood zone area since the objective.

Land use that is compatible with flood-prone areas, but does not negatively impact the ecological and hydrological functions of the flood-prone area, should be supported in the flood-prone area. Any development proposed within the flood-prone area should include measures that support the maintenance or that avoid or negatively impact the functioning of the flood-prone area as specified in the flood-prone area. The activities should be associated with these types of land use should ensure the flood-prone area is not degraded in a way that they do not meet the policies of the ecosystem.



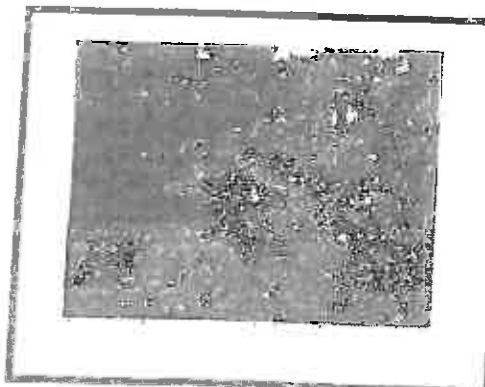
Conservation Significance: Good Agricultural Potential

These areas may have agricultural value, however this can only be determined through more detailed site specific slope and soil analysis. These areas could possibly have high agricultural potential and further investigation of these sites is recommended. If the site is deemed to have high agricultural potential then the management priorities and land use guidelines for the high agricultural potential constraint should be applied.



Conservation Significance: Gentle Slopes (0 - 10 degrees)

Gentle slopes (0-10 degrees) do not constrain development, however geotechnical studies should be undertaken to ensure that the site can accommodate the proposed development. Land use in these areas is not constrained by slope.



Conservation Significance: High Water Quality Constraints

Water quality within this catchment area has been seriously modified. In order for these catchments to be rehabilitated as per municipal requirements, catchment management interventions are required prior to any further development of the catchment. Development (future and present) within water quality constrained catchments should demonstrate how they intend to improve water quality within the catchment. Mechanisms proposed may include improved drainage; tracking and monitoring of legal and illegal discharge; management of agricultural activities; wetland and riverine rehabilitation and management; the improvement of waste services; and, the use of advanced effluent management and treatment systems in the catchment.

Land use in these catchments is severely constrained and only land use that would result in positive impacts to water quality should be undertaken. Monitoring of industrial and sewerage discharges and illegal activities will be critical in this zone. Activities such as recreation which make use of these river systems is also constrained as use of these rivers may result in impacts to human health.



Conservation Significance: High Air Quality constraints

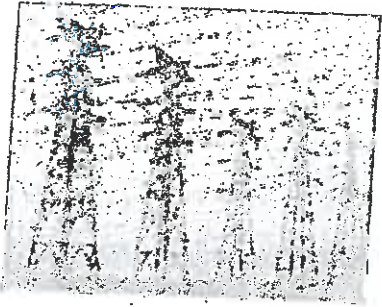
This area is located below the inversion layer in the Municipality and is therefore most sensitive to air pollution emissions. The area has the highest ambient pollutant concentrations. Prior to any development commencing in this zone that will result in air pollutant emissions it is recommended that a Tier 3 Air Quality Assessment be undertaken. It is recommended that existing emitting industry within this zone be encouraged to invest in cleaner production technology in order to reduce emissions. Development that will result in unacceptable air pollutant emissions is not recommended for this area. Development such as schools or social facilities, sensitive to poor air quality is also not recommended for this area, especially in close proximity to air pollution emission sources, if possible.



Conservation Significance: Low Cultural Heritage Significance

No cultural heritage resources have been identified in these areas. It is however acknowledged that the data set used to identify sites and zones of cultural significance is incomplete and focused mainly European cultural heritage sites. Cultural heritage assessments must be undertaken in accordance with the requirements of the KZN Heritage Resources Act. Amafa eKwaZulu-Natali should be consulted prior to any transformation of buildings older than 60 years. If any potential heritage objects are identified during any earthmoving activities, all development activities should immediately cease, and may only proceed with the approval of Amafa eKwaZulu-Natali.

Land use should not negatively impact on the cultural or historic importance of any area or any specific cultural heritage resources identified.



Conservation Significance: Very High Service Provider

This zone has all of the service required for the sustainability of developments. New developments may however exceed the current capacity of the zone and investigations into the capacity and possible upgrading of the services within this zone may be needed. Land use is therefore not limited by the existence of basic services but rather by their capacity. Service capacity, particularly of existing infrastructure, should be considered prior to the approval of any development that would result in increased population density. Opportunities for alternative service options such as biodigesters and renewable energy (solar, wind, cogeneration) should be considered in this zone.

Attribute Information

LAYER: Intersect Result. 10 features selected.

| FID | Name | Pred Sens | Sensi Code | Wetlands | B iversity | Flood Zone | Agric Pot | Geotech | Water Qual | Air Qual | Heritage | Serv Del |
|-----|---------------|-----------|------------|--------------------------------|------------------------------|-------------------|----------------------------------------------------|----------------------------------|--------------------------------------------|-----------------------------|----------|--------------------------|
| 0 | Flood Zones | | 73204 | Identified Wetland Buffer Area | No Biodiversity Constraint | Within Flood Zone | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 1 | Water Quality | | 42205 | Identified Wetland Buffer Area | No Biodiversity Constraint | None | Investigation into Agricultural Potential Required | 0 - 0.5 degrees (Extremely Flat) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 2 | Water Quality | | 42106 | No Wetland Area Identified | No Biodiversity Constraint | None | Investigation into Agricultural Potential Required | 0 - 0.5 degrees (Extremely Flat) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 3 | Wetlands | | 93105 | Identified Wetland Area | No Biodiversity Constraint | None | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 4 | Water Quality | | 42205 | Identified Wetland Buffer Area | No Biodiversity Constraint | None | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 5 | Water Quality | | 42106 | No Wetland Area Identified | No Biodiversity Constraint | None | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 6 | Flood Zones | | 73105 | No Wetland Area Identified | No Biodiversity Constraint | Within Flood Zone | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 7 | Wetlands | | 95103 | Identified Wetland Area | High Biodiversity Constraint | Within Flood Zone | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 8 | Flood Zones | | 73204 | Identified Wetland Buffer Area | No Biodiversity Constraint | Within Flood Zone | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |
| 9 | Wetlands | | 94104 | Identified Wetland Area | No Biodiversity Constraint | Within Flood Zone | Investigation into Agricultural Potential Required | 0.5 - 6 degrees (Moderate Slope) | Catchment Management Intervention Required | High Air Quality Contraints | Base | Very High Service Levels |

Msunduzi Municipality

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SUSTAINABLE DEVELOPMENT & CITY ENTERPRISES DEPARTMENT

Environmental Management Unit

P O Box 321
Pietermaritzburg
3200

Enq: Ms. S. Farnsworth

Tel: 033 - 392 3243

E-mail: shannon.farnsworth@msunduzi.gov.za

Date: 16 May 2013

Our ref: ENV 100

BOKAMOSO ENVIRONMENTAL

PO Box 11375
Maroelana
0161

Attention: Ms Lizelle Gregory

Dear Lizelle,

RE: FINAL BASIC ASSESSMENT REPORT FOR THE PROPOSED WOODBURN BOULEVARD SHOPPING CENTRE ON THE CORNER OF WOODHOUSE ROAD AND ALAN PATON DRIVE (ON PORTION 5 OF ERF 4346, PIETERMARITZBURG DC22/0059/2011

With reference to the above Final BAR dated April 2013 the following comments are submitted for your information and consideration:

1. Page 13 makes reference to 'the service agreement between the local authority and the developer will be finalized as soon as the EIA authorization is issued'. Written confirmation from all relevant departments within the Msunduzi Municipality (i.e. Storm Water Management, Transportation, Roads) is needed as part of the BAR and environmental authorization process in order to confirm that each department has the capacity to service the proposed development.
2. Page 27 states 'the developer of the N12 industrial township (on the remainder of the study area) already appointed another EAP for the relevant external services application'. Please provide some clarity on this as the Municipality is not aware of any proposed industrial townships near the site.
3. Page 32 makes reference to the Msunduzi Municipality C-Plan; this should read Environmental Management Framework (EMF) and not C-Plan.
4. Page 57 under point 3 - Mitigation makes reference to wetland buffers and wetland areas. As mentioned in the *Specialist Wetland Delineation Assessment prepared by Eco-pulse*, there are wetland habitats currently present on the site.
5. A copy of the storm water management plan must be submitted to this Unit as well as to the Storm Water Management Unit of the Msunduzi Municipality for comment prior to construction commencing.
6. A copy of the Decommissioning Plan must be submitted to this Unit.

ECONOMIC DEVELOPMENT SERVICES

Telephone/uCingo: 033 392 2490
Facsimile/iFekisi: 086 770 2951

Private Bag/Isikhwama: X321
Pietermaritzburg/ePietermaritzburg 3201

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7. The applicant should pursue Green Building Designs and Principles such as solar power, orientating the building along an east-west axis where the main façade faces north to promote the use of natural light and thermal regulation etc.
8. Page 18 of the *Storm Water Management Plan and Flood Line Delineation Report prepared by Jeffares & Green Consulting Engineers* states that 'the bowling green and parking lot of the bowls club will be affected by the construction of the retaining wall under the 1:100 year flood conditions'. **It should be brought to the applicants' attention that this site, the Bowling Green directly adjacent to the Foxhill spruit (Erf 752 portion 5, PMB), is currently in the process of a subdivision and rezone application in order to develop a proposed three story eye specialist centre.**
9. The landscape site development plan (H L 0005 Site Plan) done by Habitat Landscape Architects dated 04 August 2010 seems to show the incorrect location of the cell phone tower towards the east of the site when in fact this tower is situated to the south of the site. The plan makes use of *Acacia xanthophloea* in the car park, this is not recommended as these trees drop thorny branches, provide little shade and the root systems will lift paving. The landscape plan also only includes 7 plant species within a repeated design, more variety and colour should be encouraged. This unit requests that future landscape plans be done in consultation with this unit and a copy of the draft landscape plan is to be submitted to this unit for comment and approval prior to commencement.
10. The use of Bioswales for water harvesting should be pursued as part of the final landscape plan. Series of bioswales can be placed between rows in the parking lot, this will allow for slow percolation into the soil and harvesting of excess stormwater which can then be used for irrigation.
11. The following must be included in a revised **Final Environmental Management Programme (EMPr)**:
 - The appointed ECO is to provide basic environmental awareness training to all staff working on site prior to the commencement of any construction activities.
 - Construction staffs are to make use of facilities provided for them, as opposed to alternatives. Using surrounding areas as a toilet facility is strongly prohibited.
 - Chemical toilets should be placed outside 32m from any watercourse i.e. the Foxhillspruit. A registered chemical waste company is to be used to remove waste from the chemical toilets on site. Documentation for this must be kept by the contractor for review purposes by the ECO if needed.
 - Construction staff shall not be permitted to use any watercourse adjacent to the site for the purpose of bathing or washing of clothing.
 - All concrete mixing is to take place on mixing boards to prevent contamination of groundwater.
 - All equipment must be checked regularly for oil and fuel leaks before being operated.
 - During the operational phase the stormwater exit points and structures must be regularly monitored and maintained.
13. A copy of the revised EMPr, if commissioned, must be submitted to this Unit for comment.
14. The appointed ECO must register with this unit, providing contact details, a schedule of site visits and audit reports.
15. As a condition of the Environmental Authorization, if granted, a **Memorandum of Agreement** between the Msunduzi Municipality and the applicant (O & T Development (Pty) Ltd) for the upgrade and rehabilitation of the Foxhill Spruit and its associated open spaces as mentioned on page 25 of the FBAR must be developed.

ECONOMIC DEVELOPMENT SERVICES

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The following must be included in the agreement:

- The alien invasive plant clearing plan and rehabilitation plan should be attached to the revised Final Environmental Management Programme.
- The extent of the area to be rehabilitated must be clearly defined as well as the number of follow-up alien invasive clearings.
- The Environmental Management Unit shall compile a list of alien invasive plants that should be cleared as part of the alien invasive plant clearing plan.
- Compliance with the above plans shall be monitored by the independent Environmental Compliance Officer appointed by O & T Development (Pty) Ltd for the construction and operational phases of the development.

Please feel free to contact this office should you have any further queries.

For: MANAGER: ENVIRONMENTAL MANAGEMENT

FBAR Woodburn Shopping Centre (DC22/0059/2011)

ECONOMIC DEVELOPMENT SERVICES

Telephone/uCingo: 033 392 2490
Facsimile/iFekisi: 086 770 2951

Private Bag/Isikhwama: X321
Pietermaritzburg/ePietermaritzburg 3201

Woodburn Boulevard Shopping Centre, DC22/0059/2011

Our Ref: SAHRIS 13/5/13-08

Enquiries: Bernadet Pawandiwa
Tel: 033 394 6543
Email: bernadetp@amafapmb.co.za
CaseID: 2203

Date: Wednesday June 12, 2013

Page No: 1



Final Comment

In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the KwaZulu-Natal Heritage Act (Act 4 of 2008)

Attention: O & T Development (Pty) Ltd

The proposed project will entail the development of 6500m² Shopping Centre in the city of Pietermaritzburg, Kwazulu-Natal.

We acknowledge receipt of your invitation for comment with regards to the proposed shopping centre.. The object of Amafa is to administer, conserve and protect heritage resources of the Province within the terms of KZN Heritage Act no. 4 (2008) and the National Heritage Resources Act No 25 of 1999. The Amafa Built Environment section was consulted for provision of input on the area of proposed development. They confirmed that the proposed area of development has no known heritage resources that may be damaged.

You are also required to adhere to the below-mentioned recommendations:

Conditions:

1. Amafa should be contacted if any heritage objects are identified during earthmoving activities and all development should cease until further notice.
2. No structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Amafa.
3. No activities are allowed within 50m of a site, which contains rock art.
4. Amafa should be contacted if any graves are identified during construction and the following procedure is to be followed:
 - stop construction
 - report finding to local police station
 - report to Amafa to investigate.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

Bernadet Pawandiwa



Amafa AkwaZulu-Natal
Heritage KwaZulu-Natal
Erienis KwaZulu Natal

P.O. Box 4587, Pietermaritzburg 3201
Tel: 033 394 6543 Fax: 033 394 6547
Email: amafapmb@amafapmb.co.za
Website: www.amafapmb.co.za



**agriculture
& environmental affairs**

Department:
Agriculture
& Environmental Affairs
PROVINCE OF KWAZULU-NATAL

KZN Department of Agriculture & Environmental Affairs
Private Bag X07, Cascades, Pietermaritzburg, 3202
Tel: 033 347 1820 | Fax: 033 347 1825
Enquiries: Kraigen Govindasamy
Reference Number: DC22/0059/2011
Date: 05 July 2013
Website: www.kzn.dae.gov.za

Directorate: Environmental Services: uMgungundlovu District

Bokamoso Landscape Architects and Environmental Consultants
P. O. Box 11375
Maroelana
0161

ATTENTION: Lizelle Gregory
Telephone: (012) 346 3810

Email: lizelleg@mweb.co.za

cc: Mr. Tony Stathakis
O & T Development (Pty) Ltd

Email: ventureprop@icon.co.za

Dear Madam/Sir

RE: DC22/0059/2011: REJECTION OF THE BASIC ASSESSMENT REPORT FOR THE PROPOSED WOODBURN BOULEVARD SHOPPING CENTRE ON THE CORNER OF WOODHOUSE AND ALAN PATON DRIVE ON PORTION 5 OF ERF 5346, LOCATED WITHIN PIETERMARITZBURG, MSUNDUZI MUNICIPALITY.

1. The Basic Assessment Report (BAR) (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) for the abovementioned activity, submitted in terms of the requirements of Regulation 23 (1) of the Environmental Impact Assessment (EIA) Regulations, 2010 refers.
2. Following a review of the BAR and a site visit conducted on 30 May 2013, the Department of Agriculture and Environmental Affairs (herein referred to as "this Department") advises that it is unable to accept the BAR in accordance with Regulation 24 (1) (b) of the EIA Regulations, 2010. The BAR is rejected for the following reasons:
 - 2.1. In terms of the requirements of Regulation 56 (2) of the Environmental Impact Assessment (EIA) 2010 Regulations, before an Environmental Assessment Practitioner (EAP) submits a final report to the Competent Authority, the EAP must give registered Interested and Affected Parties (I&AP's) access to and an opportunity to comment on the report in writing.

In this regard, Ezemvelo KZN Wildlife (EKZNW), as an organ of state, must be afforded the opportunity to comment on the Basic Assessment Report prior to it being submitted to this Department for review. It is noted that the EAP circulated a notification of the availability of the Basic Assessment Report to EKZNW in an attempt to obtain comments but utilised incorrect contact details.

Accordingly to rectify the matter, the Basic Assessment Report (dated April 2013) must be circulated by the EAP to EKZNW for review and comment. The following contact details for

Reference: DC22/0059/2011

Page 1 of 4

EKZNW must be used by the EAP for submitting the documentation required in terms of this letter:

Ezemvelo KZN Wildlife
Queen Elizabeth Park
1 Peter Brown Drive
Montrose
Pietermaritzburg
3202

Fax: (033) 845 1499

Tel: (033) 845 1455

Attention: Mr. D. Wieners

As such the EAP must provide the Department with proof that EKZNW have been notified upon circulation of the BAR. All issues and concerns raised by EKZNW must be addressed prior to submission of the addendum to the BAR to this Department for consideration.

- 2.2. Comment from the Msunduzi Municipality: Infrastructure Development, Service Delivery and Maintenance Management Unit on the Traffic Impact Assessment (prepared by WSP SA Civil and Structural Engineers and dated November 2010) and confirmation on the egress/access points of the proposed development is required.
- 2.3. Correspondence from Bokamoso Landscape Architects and Environmental Consultants dated 15 February 2013 states that a meeting was held with the Department of Water Affairs (DWA) in terms of the proposed development and that the DWA indicated the proposed development would be supported provided that floodline management principles similar to that of the Liberty Mall were applied to the proposed development and that basement parking is incorporated in order to elevate the Shopping Centre to be above the floodline. The EAP further indicated in this correspondence that a Stormwater Management Plan and Floodline Delineation Report (prepared by Jeffares and Green Consulting Engineers and undated) was prepared to meet the requirements of the DWA.

With respect to the abovementioned correspondence received from Bokamoso Landscape Architects and Environmental Consultants, this Department requests that the EAP provide this Department with a copy of the minutes of the meeting held with the DWA.

In addition, this Department requests that the DWA be afforded the opportunity to comment on the Stormwater Management Plan and Floodline Delineation Report and that the EAP must provide this Department with proof that the DWA has been notified of the circulation of the Stormwater Management Plan and Floodline Delineation Report. All issues and concerns raised by the DWA must be addressed and included in the addendum to the BAR submitted to this Department for consideration.

- 2.4.1 Page 71 of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) states that a Record of Decision (RoD) was already issued in terms of the activity alternative (A2) for the proposed development. With respect to the abovementioned correspondence received from (Brava Engineers (Pty) Ltd) and

information contained in the BAR, this Department requires that the EAP provide this Department with a copy of the abovementioned RoD.

2.4.2 In addition, reference is made to the 2001 DFA approval for this proposed development. Kindly provide this Department with a full copy (including layouts etc) of this approval for reference purpose and to ensure consistency in respect of access points and layout etc.

2.5.1 On page 73 of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) the EAP recommends that the delegated authority only approve Activities 9,11,37 and 39 listed in terms of Government Notice No. R.544 of 18 June 2010. However, page 12 of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) indicates that Activity 18 of Government Notice No.R.544 of 18 June 2010 will be triggered as more than 5m³ of material will be excavated from a watercourse during the construction phase of the proposed development. With respect to the above, this Department requests clarity on whether Activity 18 of Government Notice No.R.544 of 18 June 2010 is triggered by the proposed development.

2.5.2 It is also noted on page 74 of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) that it is requested to exclude Activity 24 of Government Notice No.R.544 of 18 June 2010 from the authorisation as the study area is noted zoned open space. Clarity is required on this aspect as this activity does not appear in the application form or BAR listed activities.

2.5.3 The application for Environmental Authorisation (prepared by Bokamoso Landscape Architects and Environmental Consultants and received by this Department on 28 September 2011) must be amended to specify the relevant listed activities triggered by the proposed development and that which require Environmental Authorisation.

2.6. The site layout plan must be revised to illustrate the 1:50 and 1:100 year floodlines of the proposed development site and submitted to this Department for approval. The Ground Floor Plan (prepared by Boogertman and Partners and dated April 2000) included as Appendix A of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) must be used as a baseline for the site layout plan template and revised with reference to the layout plan included as Appendix B of the Stormwater Management Plan and Floodline Delineation Report (prepared by Jeffares and Green consulting engineers and undated).

2.7. A description of all identified alternatives¹ that are feasible and reasonable, including the advantages and disadvantages that the proposed activity will have on the environment and on the community that may be affected by the alternative activity in accordance to Regulation 28(1)(c) of the EIA Regulations, 2010. The alternatives must also include:

- i. alternative sites for the proposed development;
- ii. alternatives in terms of layouts;
- iii. alternatives in terms of alternate uses for the site; and,

¹ "alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to-

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and,
- (f) the option of not implementing the activity.


iv. alternatives in terms of sewage disposal methods.

The alternatives must also provide a description of the environment that may be affected by the proposed development, either on site and the surrounding environment.

3. In accordance with Regulation 24 (2) of the EIA Regulations, 2010, this Department requests that the BAR and the application for Environmental Authorisation must be amended to include the above requirements.
4. Copies of the addendum to the BAR must be circulated to all registered Interested and Affected Parties (I&AP's) for a minimum duration of 21 (twenty-one) days. The issues raised by I&AP's must be addressed in a table format indicating the issue/concern raised and the EAP's response thereto and must include copies of the I&AP's correspondence.
5. The EAP must provide proof that all registered Interested and Affected Parties have been notified of the availability of the amended BAR.
6. On receipt of the addendum to the BAR and the amended application form, this Department will reconsider the report in accordance with Regulation 23 (1) of the EIA Regulations, 2010.
7. Please note that the activities applied for may not commence prior to an Environmental Authorisation being granted by this Department.

Should you have any queries or wish to discuss the points raised above, please do not hesitate to contact the writer.

Yours sincerely



For: Acting Head of Department

Department of Agriculture and Environmental Affairs

Appendix E3:

Issues and Response Report

**APPENDIX E3: COMMENT AND RESPONSE REPORT-
DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED WOODBURN
BOULEVARD SHOPPING CENTRE ON CORNER OF WOODHOUSE ROAD AND
ALAN PATON DRIVE (ON PORTION 5 OF ERF 4346, PIETERMARITZBURG)**

| Issue | Comments | Date | Response |
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| <p>1. Page 12 makes reference to 'the service agreement between the local authority and the developer will be finalized as soon as the EIA authorization is issued'. Written confirmation from all relevant departments within the Msunduzi Municipality (i.e. Water and Sanitation, Electricity) is needed as part of the BAR and environmental authorization process in order to confirm that each department has the capacity to service the proposed development.</p> <p>2. The proposed development site is zoned 'special residential' and falls under special area 30 which lists business premises, restaurants and shops as permissible development or uses of land for that area. Therefore activity 24 under listing notice one (R. 544, 18 June 2010) of the National Environmental Management Act (NEMA), 1998 (Act No. 107 1998) will not be triggered as the proposed site is not zoned open space.</p> <p>3. Page 25 mentions that 'the National Water Act also required that (where applicable) the 1:50 and 1:100 year flood</p> | <p>S. Farnsworth</p> | <p>15 August 2012</p> | <p>1. According to the appointed engineer Mr. Ryk Joubert of Brava Engineers, all the necessary services will be available for purpose of the proposed development. According to the involved local authority, they are in favor of the proposed development and the EIA Authorization is the only outstanding aspect. Note: The Draft BAR was circulated to the relevant services divisions of the local authority and Bokamoso received positive comments from the water and sanitation division. Refer to Appendix Eii</p> <p>2. This is correct; Bokamoso just wanted to confirm the zoning and decided to rather include that activity as part of the application process because it would have been difficult to include the activity after the process has been completed. Note: This activity has been removed from the final list of activities applied for in the Final BAR.</p> <p>3. A figure, which indicates the flood lines, is included as Appendix Di (Jeffares and Green</p> |

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| <p>avoid any work within 1m from the wetland buffer'; the extent of the wetland buffer needs to be specified and included on all development drawings. A site visit was conducted on the 10th August 2012 and no wetland areas were identified on site, hence further clarity on the above is needed.</p> <p>7. This unit requires a copy of the following geotechnical survey that is to be done during the rainy season in order to identify perched water conditions (page 48).</p> <p>8. Correction on page 50, Matlosana Local Municipality must be changed to Msunduzi Local Municipality.</p> <p>9. Page 53 makes reference to the planting of embankments with grass to stop any excessive soil erosion and scouring of the landscape. A list of indigenous grass species that will be used to be submitted to this unit for approval prior to planting taking place.</p> <p>10. With regards to the landscaping plan, page 49 under point 12 mentions 'in cases where exotic species are to be used, such species must be non-invasive' however page 55 under point 6 says 'no plants not indigenous to the area should be introduced in the communal landscaping of the proposed site', this unit encourages the design of landscape plans to be fully complied of the indigenous species. The landscape site development plan (H L 0005 Site Plan) done by Habitat Landscape Architects dated 4 August 2010 seems to show the incorrect location on the cell phone tower towards the east of the site when in fact this tower is situated to the south of the site. The plan makes use of the <i>Acacia xanthophloea</i> in the car park, this is not recommended as these trees drop thorny branches, provide little shade</p> | | | <p><i>wetland survey.</i></p> <p>7. Request noted. This requirement is incorporated into the EMP. Refer to Appendix F.</p> <p>8. Correction made.</p> <p>9. Requirement included as part of the EMP. Refer to Appendix F</p> <p>10. Requirement noted and incorporated as part of the EMP. Refer to Appendix F.</p> |
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| <p>Municipality for approval prior to construction commencing. Page 3 under section 3.1.3. Storm water Management, it mentions that 'it is necessary to attenuate runoff by construction a detention facility above the 1:50 year flood line'. This should be depicted on the development drawings as well as forming part of the storm water management plan.</p> | | | <p>study area. Refer to Appendix Di for copy Jeffares and Green report. A more detailed storm water management plan will be compiled and submitted to the local authority for approval prior to the construction phase.</p> |
| <p>15. Page 14 of the EMP mentions that 'fires shall not only be permitted in specifically designed areas and under controlled circumstances', what materials are intended to be burnt on site? The burning of waste material, rubbish and garden refuse on site is prohibited.</p> | | | <p>15. The intention was not to cater for the burning of rubbish on the site. We only included these guidelines, because the contract workers often make fires for cooking and heating purposes. We removed this guideline from the FBAR and EMP.</p> |
| <p>16. The appointed ECO must register with this unit, providing contact details and audit reports, site visits should be conducted at least every 10 working days.</p> | | | <p>16. Noted. Requirement included as part of the EMP. Refer to Appendix F.</p> |
| <p>17. The appointed ECO is to provide basic environmental awareness training to all staff working on site prior to the commencement of any construction activities.</p> | | | <p>17. Noted. Requirement included as part of the EMP. Refer to Appendix F.</p> |
| <p>3. Construction staff is to make use of facilities provided for them, as opposed to alternative. Using surrounding arrears as a toilet facility is strongly prohibited.</p> | | | <p>18. Noted. Requirement included as part of the EMP. Refer to Appendix F.</p> |
| <p>19. Chemical toilets should be placed outside 32cm from any watercourse i.e. the Foxhillspruit. A registers chemical waste company is to be used to remove waste from the chemical toilets on site. Documentation for this must be kept by the contractor for review purposes by the ECO if needed.</p> | | | <p>19. Noted. Requirement included as part of the EMP. Refer to Appendix F.</p> |
| <p>20. Construction staff shall not be permitted to use any</p> | | | <p>20. Noted. Requirement included as part of the</p> |

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| <p>Management, Transportation, Roads) is needed as part of the BAR and environmental authorization process in order to confirm that each department has the capacity to service the proposed development.</p> <p>2. Page 27 states 'the developer of the N12 industrial township (on the remainder of the study area) already appointed another EAP for the relevant external services application'. Please provide some clarity on this as the Municipality is not aware of any proposed industrial townships near the site.</p> <p>3. Page 32 makes reference to the Msunduzi Municipality C-Plan; this should read Environmental Management Framework (EMF) and not C-Plan.</p> <p>4. Page 57 under point 3 – Mitigation makes reference to wetland buffers and wetland areas. As mentioned in the Specialist Wetland Delineation Assessment prepared by Eco-pulse, there is wetland habitats currently present on the site.</p> <p>5. A copy of the storm water management plan must be submitted to this Unit as well as to the Storm Water Management Unit of the Msunduzi Municipality for comment prior to construction commencing.</p> <p>6. A copy of the Decommissioning Plan must be submitted to this Unit.</p> <p>7. The applicant should pursue Green Building Designs and Principles such as solar power, orientating the building along an east-west axis where the main façade faces north to promote the use of natural light and thermal regulation etc.</p> <p>8. Page 18 of the Storm Water</p> | | | <p>2. Typing error. Not applicable.</p> <p>3. Correction made.</p> <p>4. No wetland habitats occur on the site.</p> <p>5. This should be made a condition of the ROD.</p> <p>6. This should be made a condition of the ROD.</p> <p>7. Green Building Designs and Principles will be pursued as far as possible.</p> <p>8. Noted</p> |
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| <p>lot, this will allow for slow percolation into the soil and harvesting of excess stormwater which can then be used for irrigation.</p> <p>11. The following must be included in a revised Final Environmental Management Programme (AMPr):</p> <ul style="list-style-type: none"> ▪ The appointed ECO is to provide basic environmental awareness training to all staff working on site to the commencement of any construction activities. ▪ Construction staffs are to make use of facilities provided for them, as opposed to alternatives. Using surrounding areas as a toilet facility is strongly prohibited. ▪ Chemical toilets should be placed outside 32m from any watercourse i.e. the Foxhillspruit. A registered chemical waste company is to be used to remove waste from the chemical toilets on site. Documentation for this must be kept by the contractor for review purposes by the ECO if needed. • Construction staff shall not be permitted to use any watercourse adjacent to the site for the proposed of bathing or washing of clothing. • All concrete mixing is to take place on mixing boards to prevent contamination of groundwater. • All equipment must be checked regularly for oil and fuel leaks before being operated. • During the operational phase the stormwater exit points and structures must be | | | <p>made a condition of the ROD.</p> <p>11. Noted. All requirements have been included in the Revised EMPr. Annexure F.</p> |
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| <p>with regards to the proposed shopping centre. The object of Amafa is to administer, conserve and protect heritage resources of the Province within the terms of KZN Heritage Act no. 4 (2008) and the National Heritage Resources Act No 25 of 1999. The Amafa Built Environment section was consulted for provision of input on the area of proposed development. They confirmed that the proposed area of development has no known heritage resources that may be damaged.</p> <p>You are also required to adhere to the below-mentioned recommendations:</p> <p><u>Conditions:</u></p> <ol style="list-style-type: none"> 1. Amafa should be contacted if any heritage objects are identified during earthmoving activities and all development should cease until further notice. 2. No structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Amafa. 3. No activities are allowed within 50m of a site, which contains rock art. 4. Amafa should be contacted if any graves are identified during construction and the following procedure is to be followed: <ul style="list-style-type: none"> • Stop construction • Report finding to local police station • Report to Amafa to investigate. | <p>Heritages</p> | | <p>1 - 4. Noted. The procedures for environmental incidents are included in the EMPr.</p> |
| <p>1. Sewage and Wastewater</p> | | | |

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| <p>properties downstream of any stormwater discharge.</p> <p>4. Erosion Control</p> <p>4.1 Soil erosion on site must be prevented at all times i.e. pre-, during- and post- construction activities.</p> <p>4.2 Erosion control measures to be implemented in areas sensitive to erosion such as near water supply points, edges of slopes, etc. Such measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation.</p> <p>5. Wetlands, Riparian areas and water resources</p> <p>5.1 It is noted from the Wetland delineation assessment report dated April 2013 by Adam Teixeira-Leite & Douglas Macfarlane that no wetland habitat was identified at the project site.</p> <p>5.2 No development should occur within the 1:100 year floodline due to the risk involved.</p> <p>5.3 Adequate measures must be put in place to protect the water resource(s) that run through the said property from being polluted and/or degraded.</p> <p>5.4 Mr Norman Ward from the Water Resources Management Section of this Department must be contacted on (031) 336 2700 in order to obtain the necessary authorizations (license, etc.), should there be any alteration to the bed, banks, course or characteristics of a watercourse or any impedance or diversion of flow of a water course as well as any abstraction and/or storage of water in terms of section 21 of National Water Act.</p> <p>6. General</p> <p>6.1 The storage of materials, chemicals, fuels etc to be used during the construction phase must not pose a risk to the surrounding environment. Temporary bunds must be</p> | | | <p>4.1 This is included in the EMPr.</p> <p>4.2 This is included in the EMPr.</p> <p>5.1 No wetland habitat occur on site.</p> <p>5.2 This is included as a mitigation measure in the revised EMPr.</p> <p>5.3 This is included as a mitigation measure in the revised EMPr.</p> <p>5.4 Meeting scheduled with Mr. Ward for 10 September 2013.</p> <p>6.1 This is included as a mitigation measure in the revised EMPr.</p> |
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| <p>responsibility rests with the applicant to identify any sources or potential sources of pollution from his undertaking and to take appropriate measures to prevent any pollution of the environment. Failure to comply with the requirements of the National Water Act, 1998 (Act 36 of 1998) could lead to legal action being instituted against the applicant.</p> | | | <p>made a condition of the ROD.</p> |
| <p>1. The Basic Assessment Report (BAR) (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) for the abovementioned activity, submitted in terms of the requirements of Regulation 23 (1) of the Environmental Impact Assessment (EIA) Regulations, 2010 refers.</p> <p>2. Following a review of the BAR and a site visit conducted on 30 May 2013, the Department of Agriculture and Environmental Affairs (herein referred to as "this Department") advises that it is unable to accept the BAR in accordance with Regulation 24 (1) (b) of the EIA Regulations, 2010. The BAR is rejected for the following reasons:</p> <p>2.1. In terms of the requirements of Regulation 56 (2) of the Environmental Impact Assessment (EIA) 2010 Regulations, before an Environmental Assessment Practitioner (EAP) submits a final report to the Competent Authority, the EAP must give registered Interested and Affected Parties (I&AP's) access to and an opportunity to comment on the report in writing.</p> <p>In this regard, Ezemvelo KZN Wildlife (EKZNW), as an organ of state, must be afforded the opportunity to comment on the Basic Assessment Report prior to it being submitted to this Department for review. It is noted that the EAP circulated a notification of the availability of</p> | <p>KZN WILDFLIFE</p> | | <p>1. Noted</p> <p>2.1 The final BAR will be submitted to Ezemvelo KZN Wildlife and all the other I&AP's for a 21day review period;</p> |

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| <p>incorporated in order to elevate the Shopping Centre to be above the floodline.</p> <p>The EAP further indicated in this correspondence that a Stormwater Management Plan and Floodline Delineation Report (prepared by Jeffares and Green Consulting Engineers and undated) was prepared to meet the requirements of the DWA.</p> <p>With respect to the abovementioned correspondence received from Bokamoso Landscape Architects and Environmental Consultants, this Department requests that the EAP provide this Department with a copy of the minutes of the meeting held with the DWA. In addition, this Department requests that the DWA be afforded the opportunity to comment on the Stormwater Management Plan and Floodline Delineation Report and that the EAP must provide this Department with proof that the DWA has been notified of the circulation of the Stormwater Management Plan and Floodline Delineation Report. All issues and concerns raised by the DWA must be addressed and included in the addendum to the BAR submitted to this Department for consideration.</p> <p>2.4.1 Page 71 of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) states that a Record of Decision (RoD) was already issued in terms of the activity alternative (A2) for the proposed development. With respect to the abovementioned correspondence received from (Brava Engineers (Pty) Ltd) and information contained in the BAR, this Department requires that the EAP provide this Department with a copy of the abovementioned RoD.</p> | | | <p>2.4.1 This is an error. Not applicable.</p> |
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| <p>Environmental Consultants and received by this Department on 28 September 2011) must be amended to specify the relevant listed activities triggered by the proposed development and that which require Environmental Authorisation.</p> <p>2.6. The site layout plan must be revised to illustrate the 1:50 and 1:100 year floodlines of the proposed development site and submitted to this Department for approval. The Ground Floor Plan (prepared by Boogertman and Partners and dated April 2000) included as Appendix A of the BAR (prepared by Bokamoso Landscape Architects and Environmental Consultants and dated April 2013) must be used as a baseline for the site layout plan template and revised with reference to the layout plan included as Appendix B of the Stormwater Management Plan and Floodline Delineation Report (prepared by Jeffares and Green consulting engineers and undated).</p> <p>2.7. A description of all identified alternatives¹ that are feasible and reasonable, including the advantages and disadvantages that the proposed activity will have on the environment and on the community that may be affected by the alternative activity in accordance to Regulation 28(1)(c) of the EIA Regulations, 2010. The alternatives must also include:</p> <ul style="list-style-type: none"> i. alternative sites for the proposed development; ii. alternatives in terms of layouts; iii. alternatives in terms of alternate uses for the site; and, iv. alternatives in terms of sewage disposal methods. The alternatives must also provide a description of the environment that may be affected by the proposed development, either on site and the surrounding environment. <p>3. In accordance with Regulation 24</p> | | | <p>2.6 The 1:50 and 1:100 year floodline was incorporated on the ground floor plans and attached as Appendix D of the FBAR.</p> <p>2.7 Discuss the need for additional alternatives with the Department.</p> <p>3. Noted</p> |
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Appendix F:

Final Environmental Management Programme

Environmental Management Programme Report



FOR THE PROPOSED WOODBURN BOULEVARD
SHOPPING CENTRE ON THE CORNER OF
WOODHOUSE AND ALAN PATON DRIVE (ON
PORTION 5 OF ERF 4346, PIETERMARITZBURG)

DECEMBER 2013- DC22/0059/2011



**BOKAMOSO LANDSCAPE ARCHITECTS
& ENVIRONMENTAL CONSULTANTS**

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1 Project Outline

1.1 Background

Bokamoso Environmental Consultants was appointed by **O & T Developments (Pty) Ltd** to compile a Basic Assessment Report for the proposed Woodburn Shopping Centre Development on the corner of Woodhouse and Alan Paton Drive, Pietermaritzburg.

1.2 Project Description

O & T Developments (Pty) Ltd is planning a proposed 6 500m² shopping centre development to be known as the **Woodburn Boulevard Shopping Centre**.

The proposed development will take place on Portion 5 of Erf 4346 KwaZulu-Natal and it is situated within the uMgungundlovi District Municipality Boundaries, approximately 1km to the south-west of the Pietermaritzburg CBD. The site is located on the corner of Woodhouse Road and Alan Paton Drive and the Fox-Hillspruit Canal (a tributary of the Umsumduzi River) runs along the western boundary of the study area. Refer to Figure 1 for Locality Map and Refer to Figure 2 for Aerial Photograph. The site is approximately 17 820m² in extent.

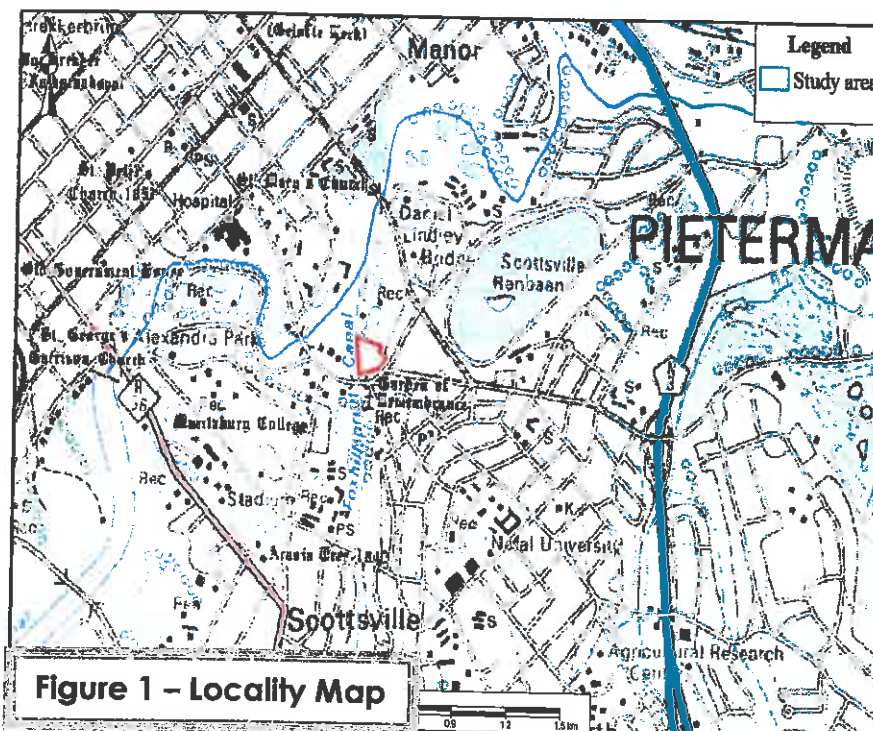
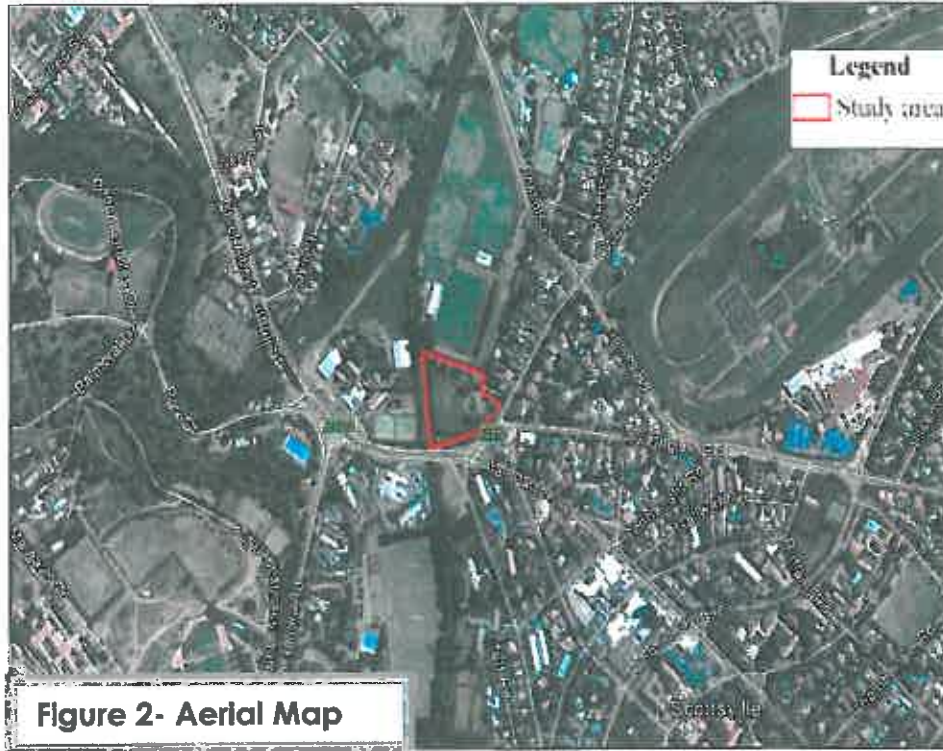


Figure 1 – Locality Map



Timeframe for construction:

Construction will commence as soon as the project is approved. **O & T Developments (Pty) Ltd** will be responsible for the on site activities. The EMP will be a binding document for purposes of compliance.

1.3 Receiving Environment

Hydrology:

- No river or wetlands occur on the study area, but the study area is affected by a floodline and the Foxhill Spruit runs along the southern boundary of the study area.

Fauna and flora:

- No Red Data Listed (RDL) faunal species were observed, directly or indirectly, to inhabit the proposed project area. The vegetation coverage of the study area

has been completely transformed, because it was utilised as a sports field. Lawns were established on an excavated area and lawns and garden trees were established on an embankment, which surrounds the sports field in the form of an amphi-theatre.

Furthermore, the vegetation along the river is also completely disturbed and exotic invaders and weeds ruined whatever was left of the original natural riparian vegetation. This area is also covered with rubble and litter and is regarded as a security and health risk.

It was not regarded as necessary to conduct any detailed fauna and flora studies.

Cultural /Historical:

- No obvious features, sites or artefacts of cultural significance were found on the site.

Visual:

- The study area is visible from the Alan Paton and Woodhouse Roads.

Geology:

- The 1:250 000 geological map of the area reveals that the site is generally underlain by shales of the Pietermaritzburg Formation of the Ecca Group. Extensive alluvial terrace deposits are however associated with the confluences of the major rivers of the area and it is expected that this may occur on this site. The alluvium consists of interlayered dark grey-brown, brown or red-brown silty and sandy clay as well as clayey to silty sands. It varies in thickness from between 2m and 8.5m and some exposures of the alluvial boulder can be expected.

EMP context

This EMP fits into the overall planning process of the project by carrying out the conditions of consent set out by KZNDAE. In addition, all mitigation measures recommended in the Basic Assessment report are included in the EMP.

This EMP addresses the following three phases of the development:

- Pre-construction Planning Phase;
- Construction phase; and
- Operational phase.

2 Monitoring

In order for the EMP to be successfully implemented all the role players involved must have a clear understanding of their roles and responsibilities in the project.

These role players may include the Authorities (A), other Authorities (OA), Developer/proponent (D), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP) and Environmental Site Officer (ESO). Landowners interested and affected parties and the relevant environmental and project specialist's area also important role players.

3 Roles and responsibilities

3.1 Developer (D)

The developer is ultimately accountable for ensuring compliance with the EMP and conditions contained in the environmental approval. The developer must appoint an independent Environmental Control Officer (ECO), for the duration of the pre-construction and construction phases, to ensure compliance with the requirements of this EMP. The developer must ensure that the ECO is integrated as part of the project team. The responsibility of compliance will be carried across to the school as soon as transfer of the erven has taken place. It will be ensured that a copy of this document accompanies the purchase agreements for the erven.

3.2 Project Manager (PM)

The project Manager is responsible for the coordination of various activities and ensures compliance with this EMP through delegation of the EMP to the contractors and monitoring of performance as per the Environmental Control Officer's monthly reports.

3.3 Environmental Control Officer (ECO)

An independent Environmental Control Officer (ECO) shall be appointed, for the duration of the pre-construction and construction phase of the mall, warehouse(s) and the access road, by the developer to ensure compliance with the requirements of this EMP.

After the construction the associated rehabilitation works are completed, the ECO must do a final site inspection and if satisfied with the compliance with the EMP the ECO must issue a certificate of compliance with the EMP to the developer and forward a copy of the compliance certificate to KZNDAE.

- The Environmental Control Officer shall ensure that the contractor and developer are aware of all the specifications pertaining to the project.
- Any damage to the environment must be repaired immediately after consultation between the Environmental Control Officer, Consulting Engineer main Contractor and Relevant Sub- Contractors.
- The Environmental Control Officer shall ensure that the developer and the appointed project team and contractors adhere to all stipulations of the EMP.
- The Environmental Control Officer shall be responsible for monitoring the EMP throughout the project by means of site visits and meetings. This should be documented as part of the site meeting minutes.
- The Environmental Control Officer shall be responsible for the environmental training program.
- The Environmental Control Officer shall ensure that all clean up and rehabilitation or any remedial action required, are completed prior to transfer of properties.
- A post construction environmental audit is to be conducted to ensure that all conditions in the EMP have been adhered to.

3.4 Contractor (C):

The contractors shall be responsible for ensuring that all activities on site are undertaken in accordance with the environmental provisions detailed in this document and that sub-contractor and laborers are duly informed of their roles and responsibilities in this regard.

The contractor will be required, where specified to provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.

The contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the environmental regulations.

3.5 Environmental Site Officer (ESO):

The ESO is appointed by the developer as his/her environmental representative to monitor, review and verify compliance with the EMP by the contractor. The ESO is not an independent appointment but must be a member of the contractor's management team. The ESO must ensure that he/she is involved at all phases of the construction (from site clearance to rehabilitation).

3.6 Authority (A):

The authority is the relevant environmental department that has issued the Environmental Authorisation. The authority is responsible for ensuring that the monitoring of the EMP and other authorization documentation is carried out by means of reviewing audit reports submitted by the ECO and conducting regular site visits.

3.7 Other Authorities (OA):

Other authorities are those that may be involved in the approval process of the EMP.

3.8 Environmental Assessment Practitioner (EAP):

According to Section 1 of NFMA the definition of an environmental assessment practitioner is "the individual responsible for the planning, management and

coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments through regulations”.

4 **Lines of Communication**

The Environmental Control Officer in writing should immediately report any breach of the EMP to the Project Manager. The Project Manager should then be responsible for rectifying the problem on-site after discussion with the contractor. Should this require additional cost, then the developer should be notified immediately before any additional steps are taken.

5 **Reporting Procedures to the Developer**

Any pollution incidents must be reported to the Environmental Control Officer immediately (within 12 hours). The Environmental Control Officer shall report to the Developer on a regular basis (site meetings).

6 **Site Instruction Entries**

The site instruction book entries will be used for the recording of general site instructions as they relate to the works on site. There should be issuing of stop work order for the purposes of immediately halting any activities of the contractor that may pose environmental risk.

7 ESA/ESO (Environmental Site Officer) Diary Entries

Each of these books must be available in duplicate, with copies for the Engineer and Environmental Site Officer. These books should be available to the authorities for inspection or on request. All spills are to be recorded in the ESA/Environmental Site Officer's diary.

8 Methods Statements

Methods statements from the contractor will be required for specific sensitive actions on request of the authorities or ESA/ESO (Environmental Site Officer). All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP document. For each instance wherein it is requested that the contractor submit a method statement to the satisfaction of ESA/ESO, the format should clearly indicate the following:

- What – a brief description of the work to be undertaken
- How- a detailed description of the process of work, methods and materials
- Where- a description / sketch map of the locality of work; and
- When- the sequencing of actions with due commencement dates and completion date estimate.

The contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ESA/ESO.

9 Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ESA/ESO dairy, methods statements etc.) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for two years at any time be available for scrutiny by any relevant authorities.

10 Project activities

10.1 Pre-Construction Phase

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|---------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------|---------------------|
| General | Project contract | To make the EMP enforceable under the general conditions of the contract. | The EMP document must be included as part of the tender documentation. | The EMP is included as part of the tender documentation | Developer | - |
| | Environmental Awareness | To ensure that the staff on site is aware of their natural environment | The appointed ECO is to provide basic environmental awareness training to all staff working on site to the commencement of any construction activities. | | ECO | - |
| Design and planning | Stability of structures and restriction of land use due to geology | To ensure stability of the development structure. | The layout and land must correspond to the stability zonation and development types recommended by the geotechnical engineer. | The land uses and layout corresponds to the recommended stability zonation and development type. | Individual Development Engineer | - |
| | Waste storage | To control the temporary storage of waste. | Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks and these points should not be located in sensitive areas/areas highly visible from the properties of the surrounding land-owners/tenants/in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners. | | Contractor ESO | - |
| | | Ensure waste storage area | Build a bund around waste storage area to avoid occurrence of pollution. | | Contractor | - |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|----------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------|---------------------|
| | | does not generate pollution. | | | | |
| | Visual Impact | To minimize the visual impact of the proposed development. | Architectural guidelines should be compiled for the proposed development and the styles used must promote unity through the use of certain street furniture, planting and paving patterns, colours and textures that do not only blend in tastefully with the character of the area, but are also functional and easy to maintain. | | Architect Contractor. | |
| Preparing the site access | Environmental Integrity | To avoid erosion and disturbance to indigenous vegetation. | Designated routes shall be determined for the construction vehicles and designated areas for storage of equipment. Clearly mark the site access point and routes on the site to be used by construction vehicles and pedestrians. Provide an access map to all contractors whom in turn must provide copies to the construction workers. Instruct all drivers to use access point and determined route. Work should be planned to be restricted to one area at a time. | Access to site is erosion free. | Contractor | Continuous |
| | Fauna and Flora | To give smaller birds, mammals and reptiles a chance to move into other undisturbed areas close to their natural territories. | | | Contractor, Site Manager | |
| | | To prevent the invasion of the area with alien invaders. | Alien invaders must be eradicated before, during and after construction. | | ECO PROJECT MANAGER | |
| | | | The site camp and storage areas shall be established in a disturbed area as indicated by the ECO prior to construction. | | ECO, SITE SUPERVISOR | |
| Geology and Unsuitable | | To prevent | No dolomite was found on the application. | Precautionary | Contractor | - |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
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| soils | Geotechnical conditions | unsuitable Geotechnical conditions | site. | measures implemented | | |

10.2 Construction Phase

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|------|-------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|
| | <p>Pollution of the environment</p> | <p>To prevent unhygienic usage on the site and pollution of the natural assets.</p> | <p>1) Weather proof waste bins must be provided and emptied regularly. 2) The contractor shall provide laborers to clean up the construction site on a daily basis. 3) Temporary waste storage points on the site should be determined. THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT IS ALREADY DISTURBED. These storage points should be accessible by waste removal trucks and these points should be located in already disturbed areas /areas not highly visible from the properties of the surrounding land-owners/ in areas where the wind direction will not carry bad odours across the properties of adjacent landowners. This site should comply with the following:</p> <ul style="list-style-type: none"> • Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • Bunded areas for containment and holding of dry building waste. <p>4) No solid waste may be disposed of on the site. 5) No waste materials shall at any stage be disposed of in the open veld of adjacent properties. 6) The storage of solid waste on the site, until</p> | <p>No waste bins overflowing No litter or building waste lying in or around the site.</p> | <p>Contractor ESO</p> | <p>Daily Weekly</p> |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
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| | | Prevent pollution to the surrounding environment | <p>such time as it may be disposed of, must be in a manner acceptable to the local authority and DWA.</p> <p>1) Construction staff is to make use of facilities provided for them, as opposed to alternatives. Using surrounding areas as a toilet facility is strongly prohibited;</p> <p>2) Chemical toilets should be placed outside 32m from any watercourse i.e. Foxhillspruit. A registered chemical waste company is to be used to remove waste from the chemical toilets on site. Documentation for this must be kept by the contractor for review purposes by the ECO if needed;</p> <p>3) Construction staff shall not be permitted to use any watercourse adjacent to the site for the purpose of bathing or washing of clothing.</p> | | | |
| Waste Management | | Recycle material where possible and correctly dispose of unusable wastes. | <p>1) Waste shall be separated into recyclable and non-recyclable waste, and shall be separated as follows:</p> <ul style="list-style-type: none"> • General waste: including (but not limited to) construction rubble, • Reusable construction material. <p>2) Recyclable waste shall preferably be deposited in separate bins.</p> <p>3) All solid waste including excess spoil (soil, rock, rubble etc) must be removed to a permitted waste disposal site on a weekly basis.</p> <p>4) No bins containing organic solvents such as paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site.</p> <p>5) Keep records of waste reuse, recycling and disposal for future reference. Provide information to ECO.</p> | No visible signs of pollution. | Contractor ESO | Daily Weekly |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|-------------------|-----------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------|---------------------|
| Construction site | | To ensure proper waste management occurs on site | <p>1) Removal and disposal of waste to a permitted waste disposal site is required and this is the responsibility of the applicant;</p> <p>2) Contaminated/hazardous materials must be disposed of at a permitted hazardous landfill site that is authorized to accept such waste material.</p> | | | |
| | Geology and soils | To prevent the damaging of the existing soils and geology. | <p>1) The top layer of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted;</p> <p>2) All surfaces that are susceptible to erosion, shall be protected either by cladding with biodegradable material or with the top layer of soil being seeded with grass seed/planted with a suitable groundcover.</p> | No signs of erosion. | Contractor | Monitor daily |
| | Ground and surface water | To prevent the pollution of groundwater and/or surface water | <p>1) All concrete mixing is to take place on mixing boards to prevent contamination of groundwater;</p> <p>2) All equipment must be checked regularly for oil and fuel leaks before being operated;</p> <p>3) During the operational phase the stormwater exit points and structures must be regularly monitored and maintained;</p> <p>4) All waste stored prior to being safely removed must not cause any surface and groundwater pollution or a health hazard.</p> <p>5) The storage of materials, chemicals, fuels etc to be used during the construction phase must not pose a risk to the surrounding environment;</p> <p>6)</p> | | | |
| | Stormwater Management | To ensure stormwater is properly managed | <p>1) It is important that stormwater is properly managed both during and after construction activities;</p> <p>2) After construction, the site should be</p> | | | |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|---------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------|---------------------|
| | | | <p>contoured to ensure free flow of runoff and to prevent ponding of water;</p> <p>3) Drainage must be controlled to ensure that runoff from the site will not culminate in off-site pollution or result in damage to properties downstream of any stormwater discharge.</p> | | | |
| Social | Construction vehicles | The construction of the proposed development can cause a heavy vehicle traffic increase and construction vehicles will be operating as well during the construction phase. | <p>Barrier tape must be spun around where the proposed development construction will be taking place. Sign boards can also be used to prohibit construction vehicles as machinery to enter the site.</p> <p>Heavy construction vehicles must be instructed to only use the main roads during off-peak hours and only smaller access road to site. Safety signs should be erected around the site to indicate and caution road users about the construction site. A traffic regulator could be used on peak traffic times to regulate the traffic.</p> | Barrier tape is maintained throughout the project timeline. | Contractor, Developer | |
| | Noise impact | To maintain noise levels below "disturbing" as defined in the National Noise Regulations. | <p>1) Site workers must comply with the Provincial noise requirements.</p> <p>2) Noise activities shall only take place during working hours.</p> | No complaints from surrounding residents and I & AP | Contractor | Monitored daily |
| | Dust impact | Minimise dust from the site. | 1) Dust pollution could occur during the construction works, especially during the dry months. Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding environment. | No visible signs of dust pollution No complaints from surrounding residents and I & AP | Contractor | Monitored daily |
| | Safety and security | To ensure the safety and security of the | 1) Although regarded as a normal practice, it is important to erect proper signs indicating | | Contractor ESO | Monitored daily |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|------|-----------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|---------------------|
| | | public. | <p>the operations of heavy vehicles in the vicinity of dangerous crossings and access roads or even in the development site if necessary.</p> <p>2) With the exception of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included)</p> <p>3) Construction vehicles and activities to avoid peak hour traffic times</p> <p>4) Presence of law enforcement officials at strategic places must be ensured</p> <p>5) Following actions would assist in management of safety along the road</p> <ul style="list-style-type: none"> ▪ Adequate road marking ▪ Adequate roadside recovery areas ▪ Allowance for pedestrians and cyclists where necessary ▪ Although regarded as a normal practice, it is important to erect proper signs indicating the danger of the excavation in and around the development site. Putting temporary fencing around excavations where possible. | | | |
| | Visual impact | In order to minimise the visual impact. | The disturbed areas shall be rehabilitated immediately after the involved construction works are completed as the construction vehicle and equipments will be causing visual impact during construction phase. | Visual impacts minimized | Contractor ESO | Monitor daily |
| | Wetland | To protect the sensitive wetland. | <p>1) During the construction phase, no dumping and no stockpiling of materials within the wetland areas and associated buffers should take place;</p> <p>2) No development should occur within the 1:100 year floodline due to the risk involved;</p> <p>3) Adequate measures must be put in place</p> | | Contractor ESO | Monitor daily |

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Performance indicator | Responsibility | Frequency of Action |
|------|-----------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------|---------------------|
| | | | to protect the water resource(s) that run through the said property from being polluted and/or degraded. | | | |
| | Stability of structures due to geology | To ensure stability of structures. | Preventative foundation designs shall be done. Detailed foundation inspections should be carried out at the time of construction to identify any variances and adjust foundation designs accordingly if need to be. The foundation recommendations and geotechnical engineers must be adhered to. | | | |
| | Increased fire risk to site and surrounding areas. | To decrease fire risk. | <p>1) Fires shall only be permitted in specifically designated areas and under controlled circumstances.</p> <p>2) Food vendors shall be allowed within specified areas.</p> <p>3) Fire extinguishers to be provided in all vehicles and fire beaters must be available on site.</p> <p>4) Emergency numbers/contact details must be available on site, where applicable.</p> | No open fires on site that have been left unattended. | Contractor | Monitor daily |
| | Access Roads | To minimise impacts from construction of access road. | Management plans must be compiled to assist in peak traffic hours and also to assist in peak traffic hours and also to prevent access roads works from impacting negatively on the development and surrounding land owners. | | | |

10.3 Operational Phase

| TYPE | Environmental risk or issue | Objective or requirement | Mitigation measure | Responsibility | Frequency of Action |
|------------------------------------|--------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------|
| SITE CLEAN UP AND PREPARED FOR USE | Development construction waste. | Minimize waste | Decontaminate and collect waste in storage area ready for off-site recycling or disposal. Arrange for final collection and removal of excess and waste materials. | Contractor | - |
| MATERIALS FAILURE | Structural damage. Loss of site materials. | | Inspect all structures monthly to detect any cracking or structural problems. Confirm with designer if there are design problems. Rectify with materials to match, or other agreed solution. | Contractor | - |
| SITE AUDIT | Eventual project failure | Successful project establishment. | Routinely audit the works and adjust maintenance schedule accordingly. | Contractor | - |
| GENERAL | Mis-management | Maintenance team in place. | A maintenance team as well as a landscaping team is needed to ensure that the development is well maintained. Open fires and smoking during maintenance works are strictly prohibited. | Developer | - |
| GEOLOGY | Erosion of topsoil | Prevent topsoil erosion | Due to loose topsoil, the soil must be covered by means of re-seeding and vegetation with suitable ground covering. | Contractor Engineer/ Contractor | Once off |

11. Procedures for environmental incidents

11.1 Leakages & spills

- Identify source of problem.
- Stop goods leaking, if safe to do so.
- Contain spilt material, using spills kit or sand.
- Notify Environmental Control Officer
- Remove spilt material and place in sealed container for disposal (if possible).
- Environmental Control Officer to follow Incident Management Plan.

11.2 Failure of erosion/sediment control devices

- Prevent further escape of sediment.
- Contain escaped material using silt fence, hay bales, pipes, etc.
- Notify ECO.
- Repair or replace failed device as appropriate.
- Dig/scrape up escaped material; take care not to damage vegetation.
- Remove escaped material from site.
- ECO to follow Incident Management plan.
- Monitor for effectiveness until re-establishment.

11.3 Bank/slope failure

- Stabilize toe of slope to prevent sediment escape using aggregate bags, silt fence, logs, hay bales, pipes, etc.
- Notify ECO.
- ECO to follow Incident Management plan.

- Divert water upslope from failed fence.
- Protect area from further collapse as appropriate.
- Restore as advised by ECO.
- Monitor for effectiveness until stabilized.

11.4 Discovery of rare or endangered species

- Stop work.
- Notify ECO.
- If a plant is found, mark location of plants.
- If an animal, mark location where sighted.
- ECO to identify or arrange for identification of species and or the relocation of the species if possible.
- If confirmed significant, ECO to liaise with Endangered Wildlife Trust.
- Recommence work when cleared by ECO.

11.5 Discovery of archeological or heritage items

- Stop work.
- Do not further disturb the area.
- Notify ECO.
- ECO to arrange appraisal of specimen.
- If confirmed significant, ECO to liaise with National, Cultural and History Museum.
P.O. Box 28088
SUNNYSIDE
0132
Contact Mr. J. van Schalkwyk
or
Mr. Naude
- Recommence work when cleared by ECO.

12 EMP review

1. The Site supervisor is responsible for ensuring the work crew is complying with procedures, and for informing the work crew of any changes. The site supervisor is responsible for ensuring the work crew is aware of changes that may have been implemented by DACFRD NW before starting any works.
2. If the contractor cannot comply with any of the activities as described above, they should inform the ECO with reasons within 7 working days.

Appendix G:

Enlarged copies of figures



Figure 1:
Locality Map

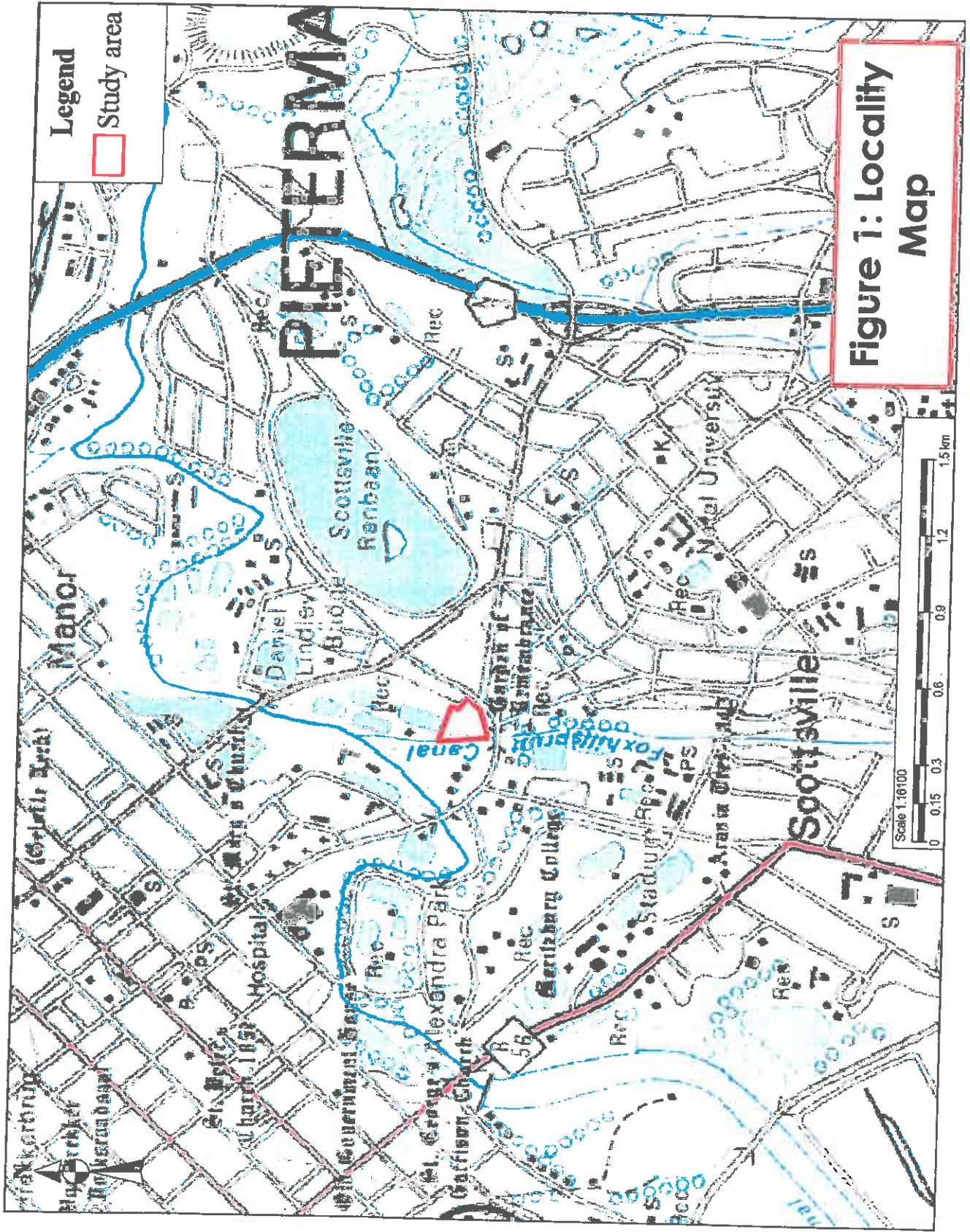
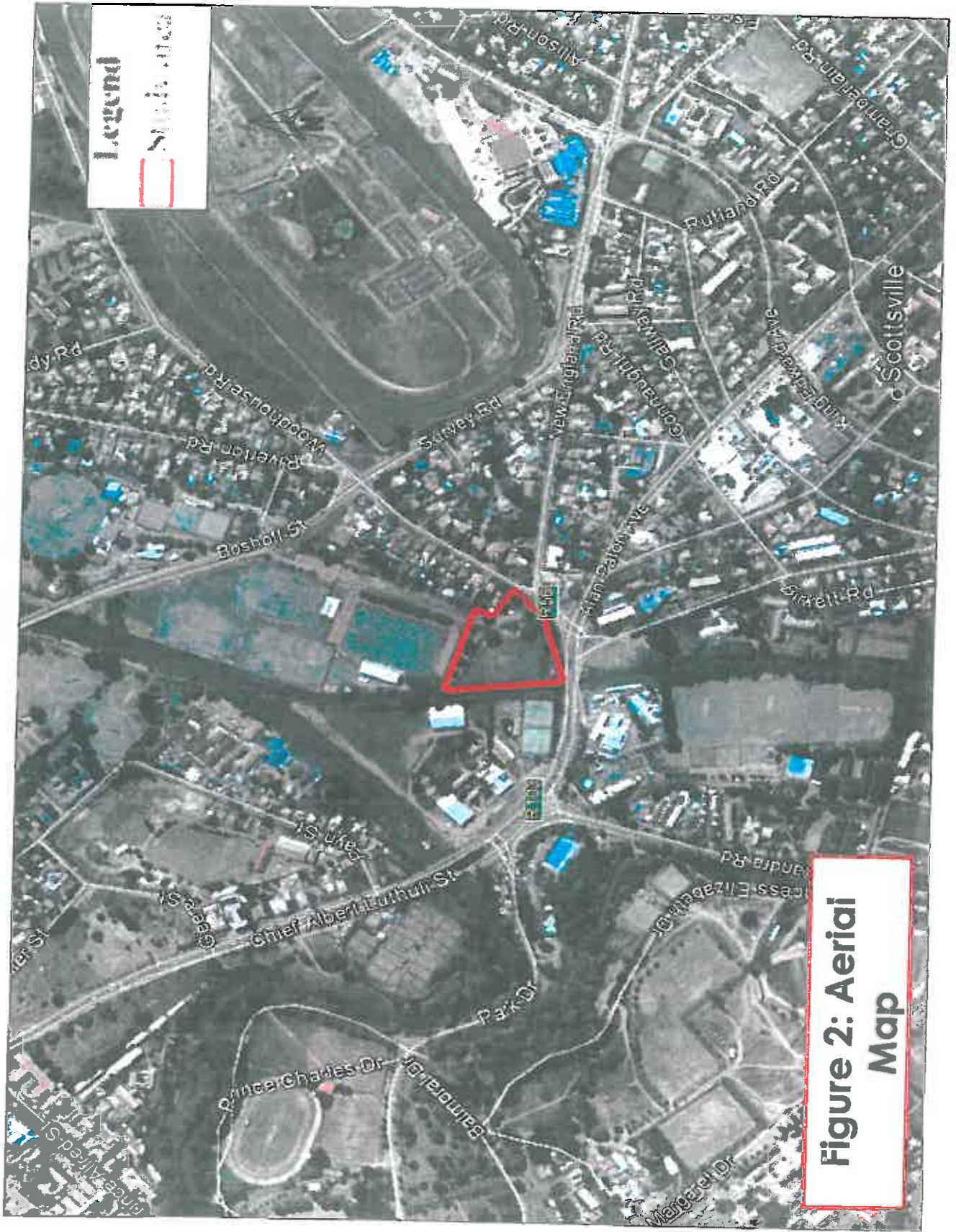


Figure 1: Locality Map

Figure 2:
Aerial Photograph



Legend
Subdivided

Figure 2: Aerial Map

Figure 3:

Access point of proposed new Shopping Centre and proposed development layout

Figure 3: Access Point Of Proposed New Shopping Centre And Proposed Development Layout



Existing Access to Rugby Club will act as access point to the development

Woodhouse Road - to be upgraded

Watercourse/ River

Durban Road/ Alan Paton Drive to be upgraded

Ground Floor Plan
ground

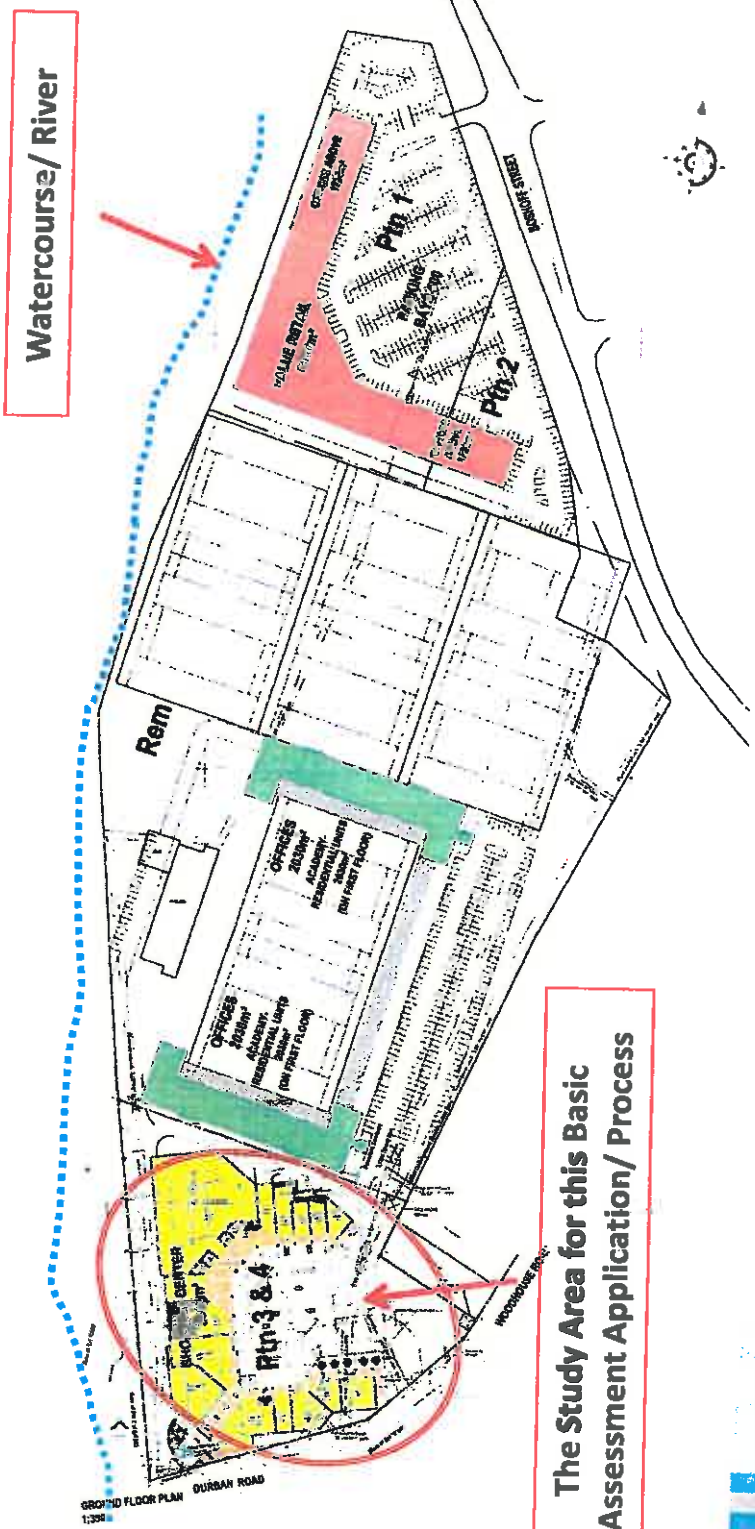
Woodburn Boulevard
Proposed new Shopping Centre



Figure 4:

**Master plan of larger
development already approved by
the KZN Development Tribunal**

Figure 4: Masterplan of Larger Development already approved by the KZN Development Tribunal!



The Study Area for this Basic Assessment Application/ Process

Figure 5:

Description of adjoining properties and proposed development overlaid over the site plan

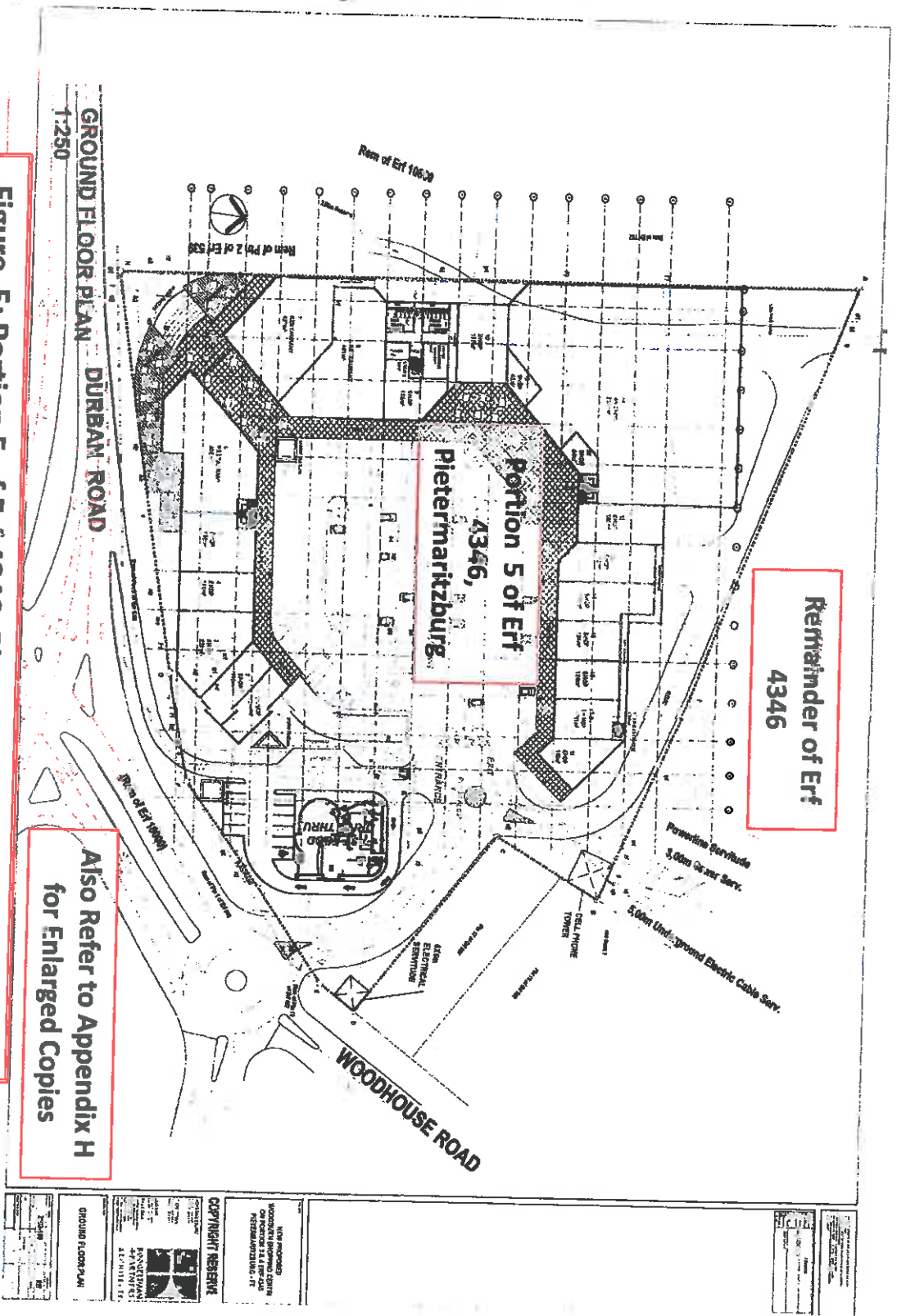


Figure 5: Portion 5 of Erf 4346, Pietermaritzburg (Description of adjoining properties and proposed development overlaid over the site plan)

Also Refer to Appendix H for Enlarged Copies

| | | | |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------|--------------------------|
| <p>NOT TO SCALE</p> <p>WOODHOUSE PROPOSED 2018</p> <p>BY ARCHITECTS S.A. & ASSOCIATES</p> <p>PIETERMARITZBURG, LT</p> | <p>COPYRIGHT RESERVE</p> | <p>INSITUFORM</p> <p>SPRINTING</p> <p>4/20/2018</p> | <p>GROUND FLOOR PLAN</p> |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------|--------------------------|

Figure 6:

The current land use zoning of each of the properties adjoining the site or sites

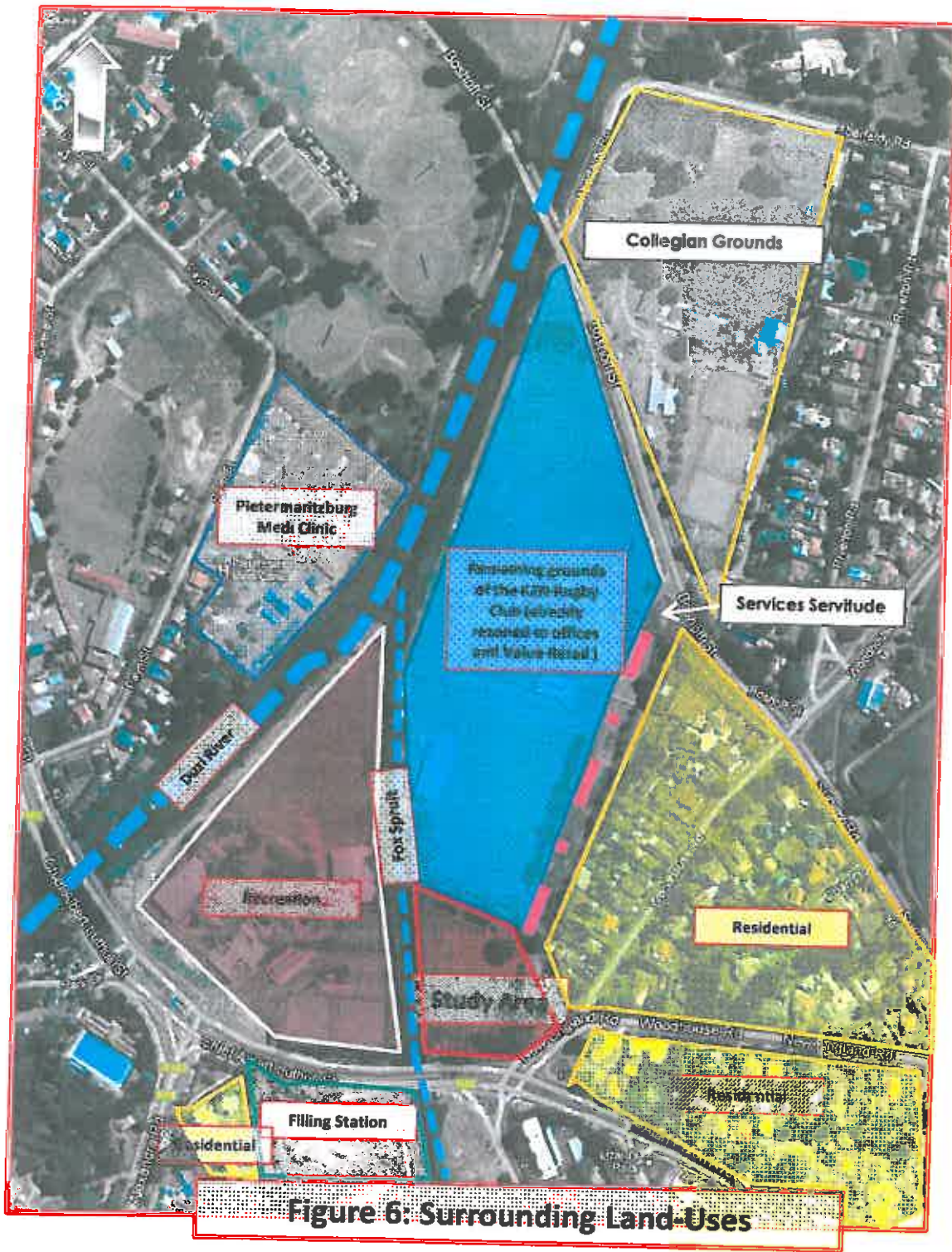


Figure 6: Surrounding Land-Uses

**Figure 7:
Existing Land-use
The Study Area**

