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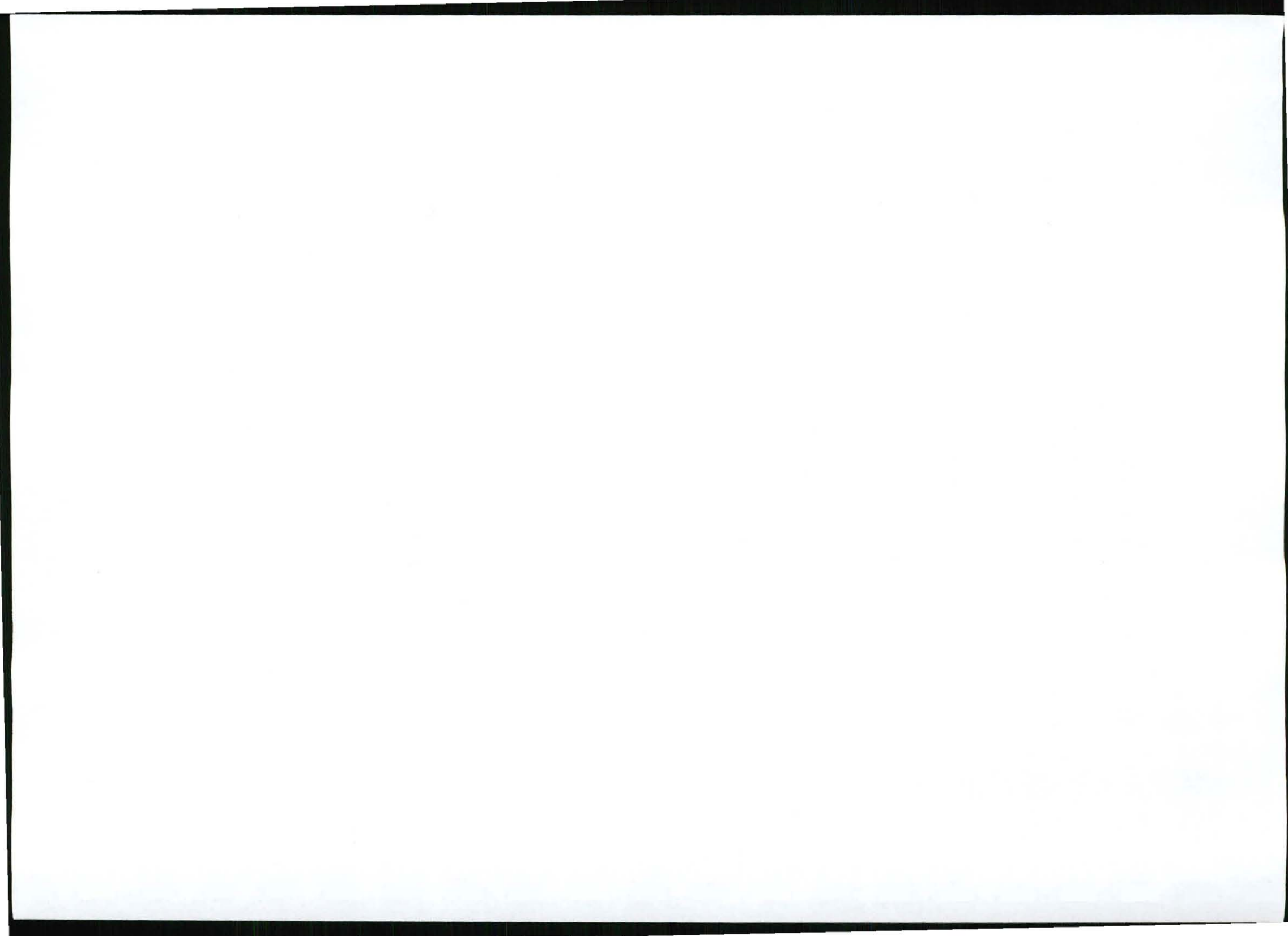
GEOTECHNICAL REPORT INTO THE SUBSOIL CONDITIONS AT THE PROPOSED DEVELOPMENT OF AREENA RIVENDELL ESTATE & ISLAND VIEW RESORT , ON THE SUBDIVIDED & REZONED AREA OF PORTION 2 OF FARM 965, EAST LONDON, FOR AREENA RESORT TRUST

TABLE OF CONTENTS :

1. INTRODUCTION
2. LOCATION
3. GEOLOGY
4. TOPOGRAPHY
5. SOILS
6. GEOTECHNICAL CONSIDERATIONS :
 - 6.1 Slope Stability
 - 6.2 Erosion
 - 6.3 Soil Activity
 - 6.4 Earthworks
 - 6.5 Stormwater Drainage
 - 6.6 On-Site Effluent Disposal
 - 6.7 Building Foundations
 - 6.8 Road Construction Materials
7. CONCLUSION

CIVIL & STRUCTURAL ENGINEER

D.E. WALTERS Pr Eng. BSc(ENGR/UCT) BEng(Hons) (Mech) MSAICE



GEOTECHNICAL REPORT INTO THE SUBSOIL CONDITIONS AT THE PROPOSED DEVELOPMENT OF AREENA RIVENDELL ESTATE & ISLAND VIEW RESORT , ON THE SUBDIVIDED & REZONED AREA OF PORTION 2 OF FARM 965, EAST LONDON, FOR AREENA RESORT TRUST

1. INTRODUCTION :

NPM Planning CC (Mr D Poortman) requested that Walters & Associates (Mr D Walters), Consulting Civil Engineers from East London, prepare an Geotechnical Report into the proposed Subdivision & Rezoning of a portion of land on behalf of the Developer, Messrs Areena Resort Trust (Mr Ed Rathbone). It is the intention of the Developer to establish a country lifestyle estate development on the property, called the Areena Rivendell Estate and Island View Resort, on a total area of 23,0 ha, situated within the Great Kei Municipal area. The proposal is to establish a low density residential development comprising 46 Residential Zone 1 units, and a Resort Zone 3 residential resort of 20 double storey dwelling units. The application consists of the Subdivision and Rezoning of the Land Development Area to create the above properties, including Open Space and Agricultural components.

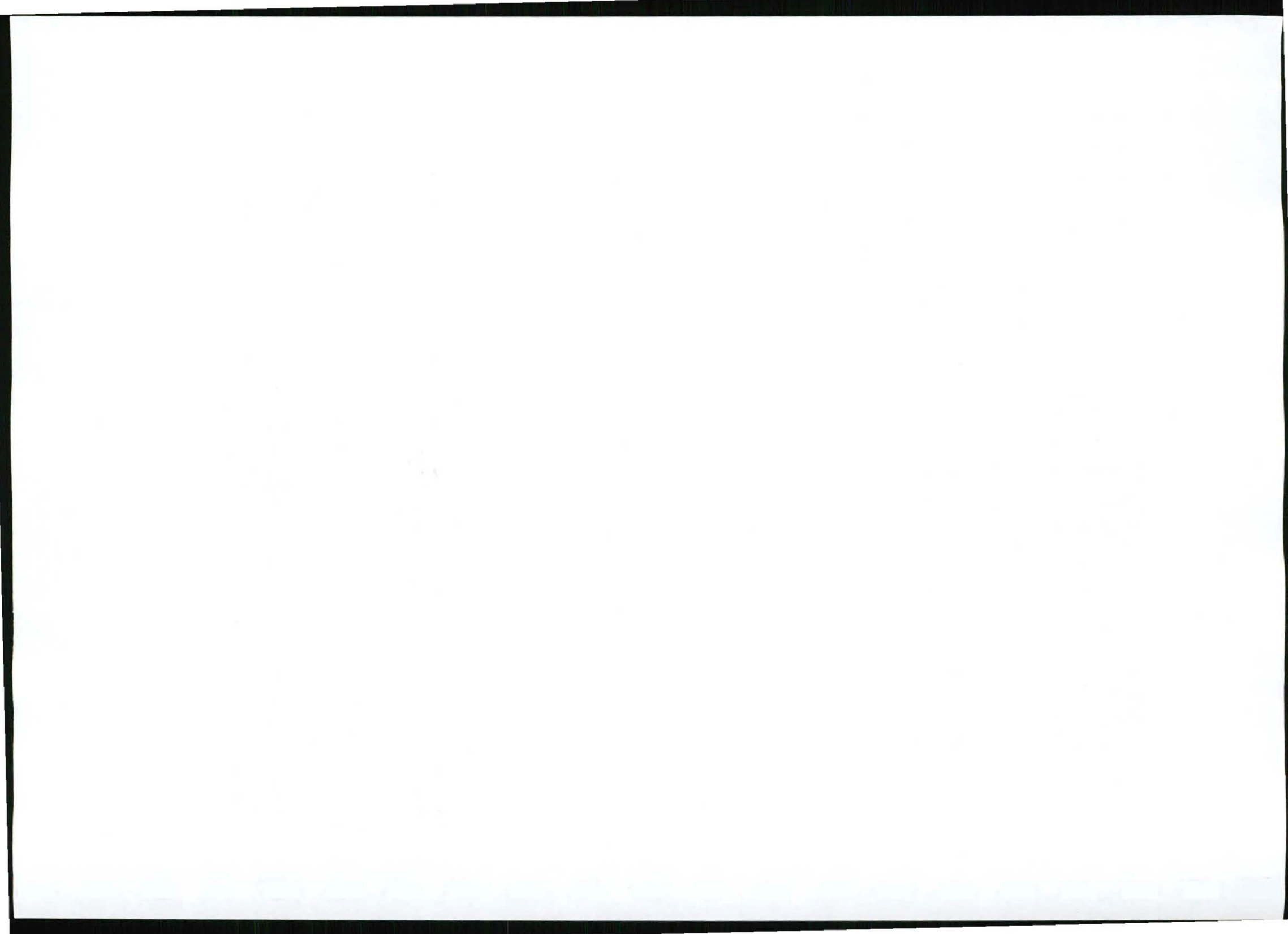
The proposed development falls within the jurisdiction of the Great Kei Municipality and the Amatole District Municipality. The layout of the proposed development has been prepared by the Town Planners, Messrs NPM Planning CC, and the environmental impact assessment has been prepared by an Environmentalist of Messrs Arcus Gibb, both of East London.

2. LOCATION :

The proposed development area borders on to the east bank of the Kwelera river 2,0 km upstream from the mouth of the Kwelera river, and approximately 20 km northeast of East London along the Indian Ocean coastline. Access to the site is directly off the tarred so-called 'East Coast Resorts' District Road (DR02730); also called 'Schafli Road', opposite the intersection of the tarred road District Road (DR02737), to Glengariff at Balugha and Kwelera Mouth. From this intersection, a proclaimed Minor Road EL 201 takes traffic down to the resort on the banks of the Kwelera river. The proposed development area also borders directly on to the existing and well known Areena Riverside Resort.

3. GEOLOGY :

The Kwelera river and its immediate surrounds in the region of the proposed development area, falls within the south eastern Cape Coastal Zone, and is dominated by the great sedimentary deposits of the Karoo Supergroup, and in particular, the Balfour Formation of the Adelaide Subgroup. Rocks younger than Cretaceous form a thin veneer in the coastal zone, but nevertheless, form an important component of the geology.



The coastal region is not well known for its igneous rocks, however, there are igneous formations of secondary importance, ie, Karoo dykes and sills. The structural fabric of the eastern Cape Coastal Zone is controlled by two major features, the Karoo Supergroup and the fracture system formed during the breakup of Gondwana.

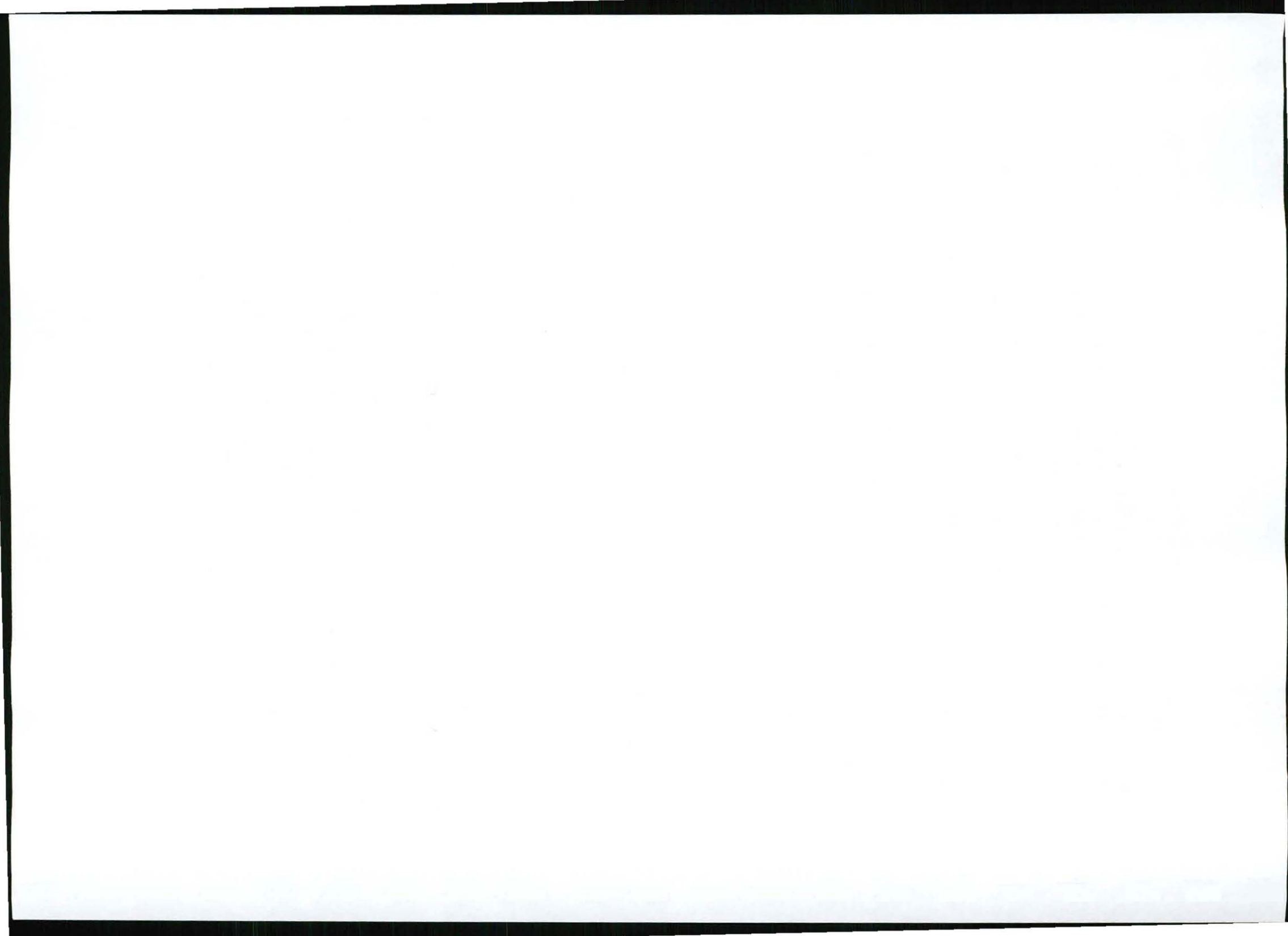
Towards East London and up to the Kei river the beds of the Karoo Supergroup are gently tilted, faulted and intruded by dykes and sills. While in the vicinity of the Kwelera river and surrounds, the Beaufort Group as the top sequence of the Karoo Supergroup predominates. Because of the general northerly and north-easterly dip of the beds, the Beaufort beds are exposed continuously along the Cape Coastal Zone, where they are not covered by sand dunes and beaches, and Cretaceous deposits.

The Beaufort Group, unlike the underlying Ecca Group stratigraphically, is easily recognised by its mudstone beds, and is characterised by reddish-purple and mottled greenish and khaki mudstone deposits. Beaufort mudstone slakes readily in the humid climate of the eastern Cape Coastal Zone, producing a rolling, hilly landscape with a veneer of clayey soil. In the drier inland areas, the hill slopes are essentially rocky mudstone exposures. Stream beds tend to be bare rock. The sandstone beds are cliff formers, as may be seen in the vicinity of the consolidated farm, as the three-dimensional lenticular shapes of the channel-fill sandstone causes cliffs to vary in size. The fractured sandstone beds are frequently exposed along the coastline, and are normally good aquifers.

In places the slope of dolerite intrusions alternates between a near-vertical, dyke-like shape, to inclined sheet-like and near horizontal sheet-like shape (sill). Near-horizontal, intrusive, dolerite sheets occur along the lower reaches of the great Kei river, and in the vicinity of Komga, at the headwaters of the Kwelera river. The outcrop pattern of near-horizontal sheets tends to follow topographical contours along the river valley sides, as may be seen upstream of the subdivided farm.

In the Eastern Cape, fresh unweathered dolerite is rare in natural outcrops. Where quarried for aggregate and road material, the fresh dolerite ('iron stone') displays its distinctive bluish-black to dark grey colour and fine-grained crystalline texture. Natural dolerite outcrops show a characteristically brown speckled, hard rock that commonly shows a well developed spheroidal ('onion skin') weathering pattern. An egg box-like joint network in the dolerite causes weathering by groundwater to proceed, initially, more rapidly along the cracks, attacking, especially, the rock at the corner intersections. This leads to a systematic pattern of rounded core stones, each enveloped by layers of progressively weathered rock with a distinctive yellow-brown (khaki) colour. This is clearly seen in many road cuttings excavated through dolerite.

Freshly crushed, unweathered dolerite is extensively used for concrete aggregate, and for the bituminous surfacing layer on roads. Dolerite produces swelling clays as a weathering product, which leads to foundation failure in cases of under designed structures built on decomposed dolerite.

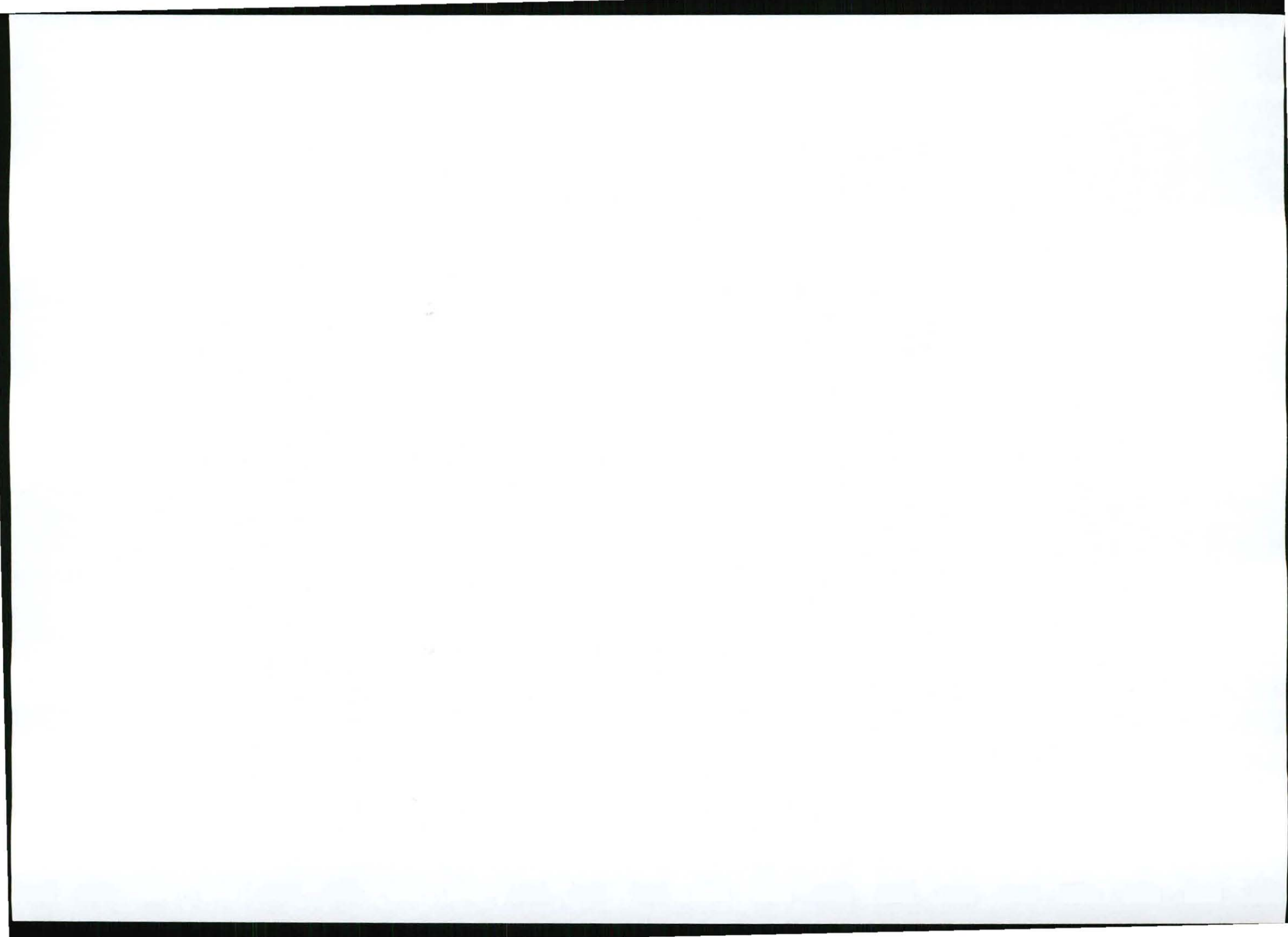


Dolerite dykes are generally good aquifers, storing water at their side walls and in the joint fractures. Because it was originally at temperatures of up to 1000°C, the dolerite magma baked (by thermal metamorphism) the Beaufort mudstone along the contact zone to produce hornfels, and the sandstone into quartzites.

It has been determined that the varying mode of weathering of rocks and the associated variation in performance of weathered rocks in road construction, for example, are related to climate. Dr HH Weinert developed the N-value, a function of rainfall and evaporation, with contours of $N = 5$ being the division between humid ($N < 5$) and arid regions ($N > 5$). The N-value at the subdivided resort is 1,6 which indicates an increase in the thickness of residual soil cover, commonly fine-grained and clayey, with chemical decomposition being the dominant mode of weathering of the crystalline rocks. With minor exceptions, smectite minerals; notably montmorillonite in the form of grey to black highly active clays, are the final product of decomposition of basic crystalline rocks such as dolerite. The weathering of dolerite is determined primarily by climate and secondarily by topographical aspect and internal drainage; which control the 'soil climate'.

Sandstones comprise a large proportion of the Karoo sediments, and are generally closely intercalated with mudrocks. This results in the alternating arenaceous and argillaceous sediments so characteristic of the Karoo Sequence. The term mudrock is used here to include all sedimentary rocks which are composed predominantly of silt-sized or smaller clay particles. For general purposes only, the terms mud-shale or *shale* (for the stratification or lamination variety) and *mudstone* (for the massive variety) are used to differentiate in the classification of mudrocks. One of the most troublesome properties of most Karoo mudrocks is their tendency to break down rapidly after exposure on excavation, the so-called "slaking" process. From an engineering point of view, these shales and/or mudrocks should not be used as aggregate in any form of structural concrete, in gabion work, or as aggregate / stonework in rubble masonry concrete work, because they disintegrate in position. Only hard, durable sandstone and quartzitic sandstone should be used instead.

Material deposited by rivers goes through a process of sorting according to its mass, and to a certain degree also the shape of the grains. As a result the deposited material gets finer with increasing distance of transport and it eventually becomes clay when the speed of flow has decreased sufficiently. Where the water flows fast, only the heaviest and least weatherable rocks and minerals are deposited and highly siliceous materials are more likely to be concentrated in such deposits than others. The other frequently occurring rock-forming minerals decompose in the presence of water at temperatures normally encountered in Southern Africa. During this process they eventually change into clay minerals which are transported over a longer distance than the more compact debris until they are deposited as alluvial clays in slowly flowing or stagnant water. The appended soil tests on the Alluvial soils of the proposed development indicate the percentage of clay varying between 18 and 35%.



4. TOPOGRAPHY :

The development area is situated on the alluvial river terrace sloping gently upwards from the water's edge of the tidal Kwelera River, becoming steeper, at an even slope, the further one moves away from the river, and is underlain by transported alluvial deposits of silty clay material in a matrix with rounded sandstone cobbles.

5. SOILS :

Recent excavations on the enlarging of an earth dam, called dam 'C', in the centre of the development area to a depth of more than 3,0 metres, indicates the extent and depth of the localised alluvial formation, which is uniform throughout the alluvial plain, containing rounded sandstone cobbles and boulders within a uniform matrix of light brown-yellow silty clayey soil, as indicated by the soil profile. Using the method of Jennings & Brink to describe the alluvial soil formation, a soil profile of the dam 'C' excavation / enlargement is appended, as trial hole number one.

6. GEOTECHNICAL CONSIDERATIONS :

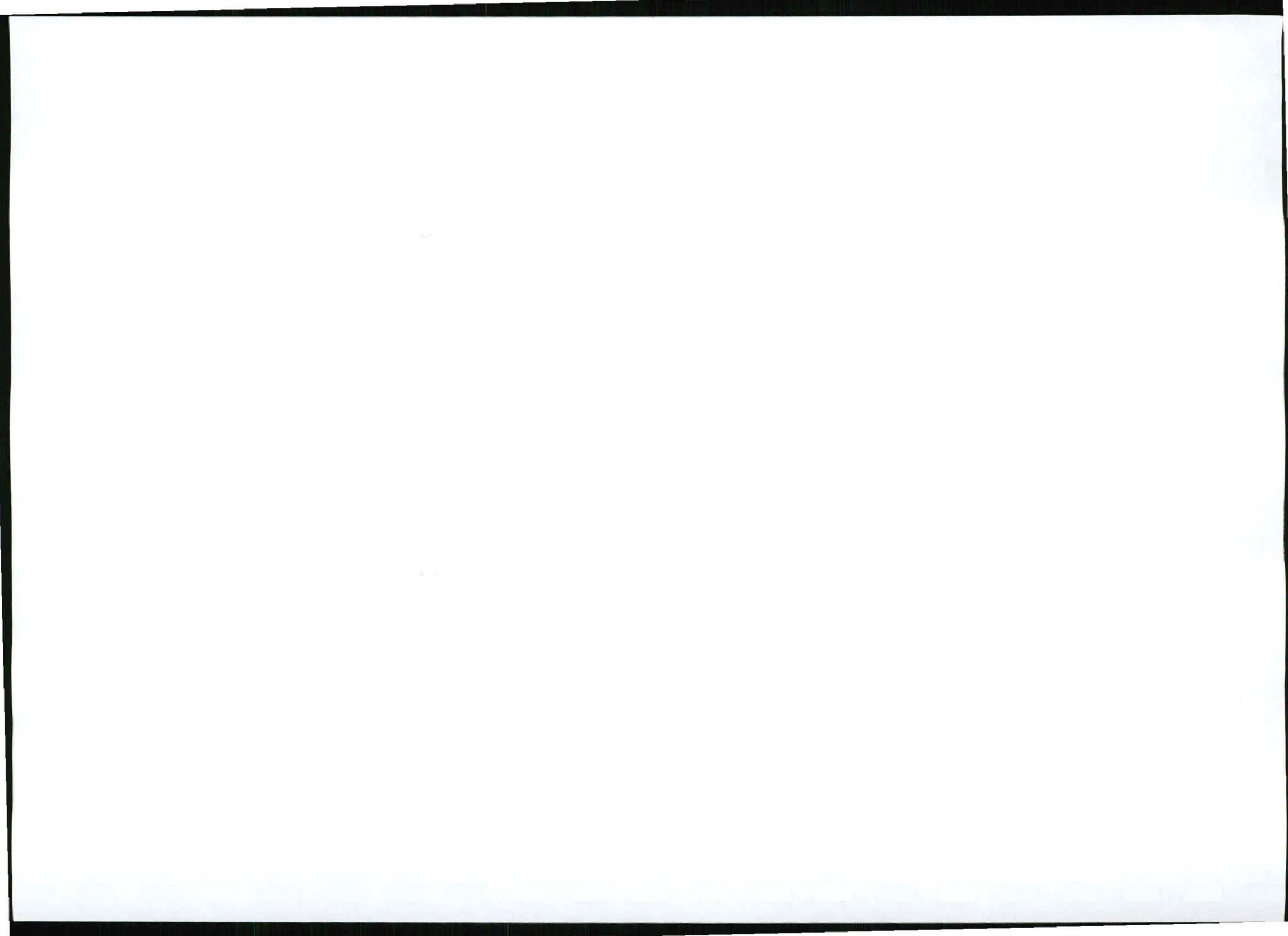
6.1 Slope Stability There are no obvious signs of recent or past instability on the river banks, as would be expected, in addition residents are not permitted to build within the 100-year floodline, which will obviously protect the river bank. No construction will be undertaken against the higher reaches of the development.

6.2 Erosion The relatively high silt and clay content of the alluvium soils make them less vulnerable to erosion than say sandy soils. However, higher up the slope towards the hill, the mudstone derived soils can be slightly dispersive, ie, they are prone to internal erosion caused by their chemical decomposition, as may be seen by some of the erosion channels across the upper reaches of the surrounding areas. Care should be taken with indiscriminate discharge and concentration of stormwater runoff on the unconsolidated fine soils that cover the site.

6.3 Soil Activity In terms of the Van der Merwe Activity Chart, the appended soil tests show that the alluvial and colluvium soils found on the site have a low activity rating, and are therefore not subject to significant swelling/heaving on saturation.

6.4 Earthworks No significant major roadworks that would require special attention are envisaged for the development, as all the access roads to the development are complete. It remains for the few internal roads to be constructed. These roads would typically comprise of two 150mm layers of imported material and a black-top bitumen surface, as to be found throughout the adjacent Areena Resort.

6.5 Stormwater Drainage It is recommended that all stormwater runoff from dwellings, driveways and roads be collected within the development and piped and channelled to discharge into attenuation ponds and dams on the property.



6.6 On-Site Effluent Disposal The sewage disposal system currently operating at Areena Riverside Resort is a typical smallbore sewerage system, comprising numerous septic tanks, with outlet pipes discharging by gravity into sumps, and from which sewage pumps pump the 'grey water' effluent in rising mains up to a proposed "Clearedge" bio-filter type package plant.

6.7 Building Foundations Normal concrete strip footings of dimensions 600mm x 250mm in cross sectional area may be used for single storey buildings, and 750mm x 250mm footings for double-storey buildings. Regarding the riverside row of proposed dwellings, the problem arises when the front part of the building, closest to the river, will overlay soft saturated alluvium soil from the raised water table of the Kwelera river. Here the danger of differential settlement may occur. For this situation, a reinforced concrete raft foundation system should be installed for these houses, designed by a suitable Geotechnical Engineer.

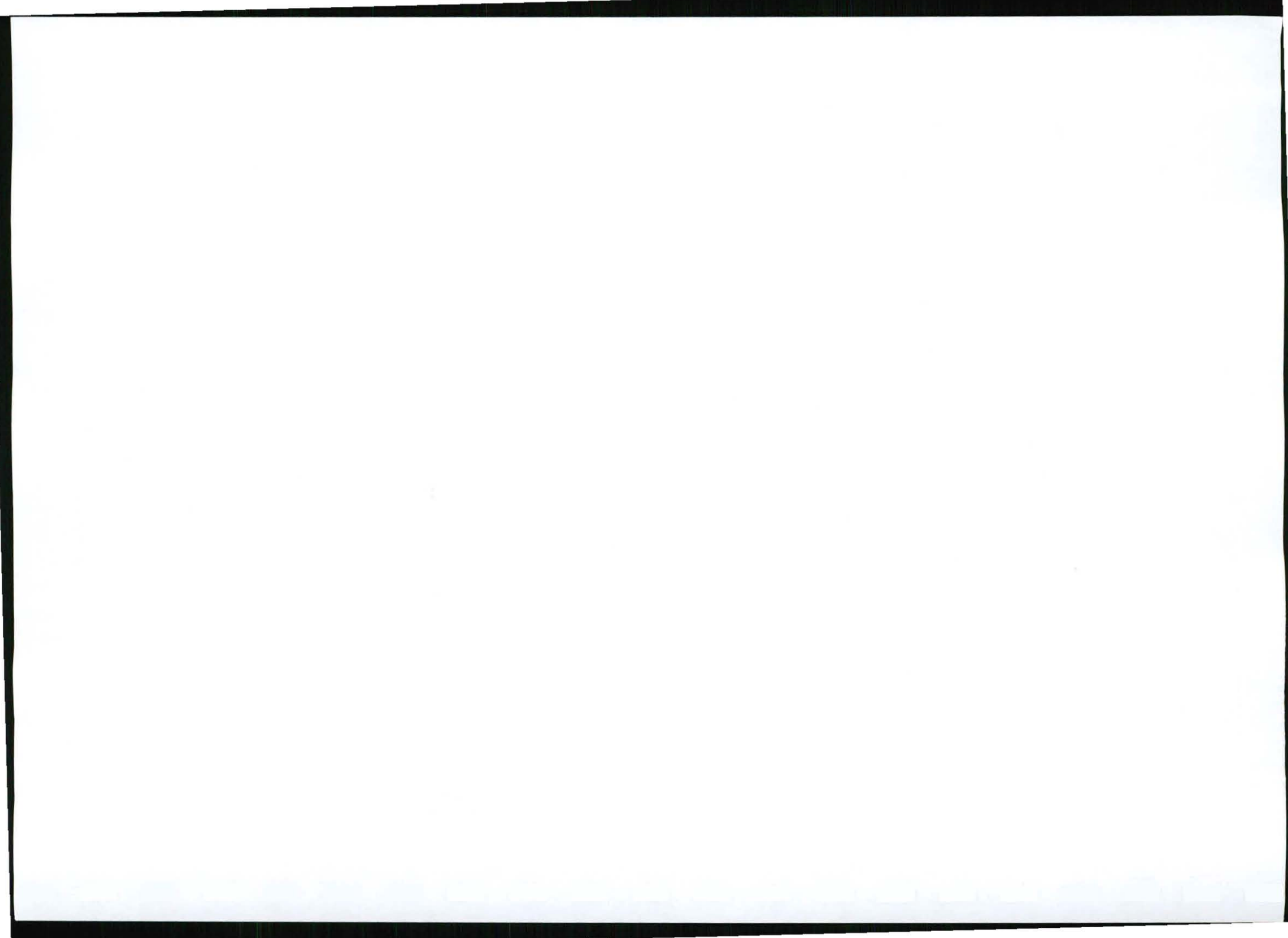
6.8 Road Construction Materials The road making properties of the in-situ mudstone materials as found within the upper reaches of the development and surrounding area are generally acceptable as fill and subbase, when in a relatively coarse state. If used as gravel wearing course or base layer, the material should be stabilised with ordinary portland cement, in the proportions of at least 4,0% cement content by weight. On no account should the 'slaking' mudstone be used as wearing course on the roads, as the surfaces will turn into 'soap' during rainy and wet weather. Wearing course material should rather be imported for all internal roads. The internal roads will have bitumen tarred surfaces. The basecourse layer should be a G4 material with a CBR >80, while the subbase layer should be a G6 with a CBR >25. Layer works material will need to be imported for all internal roads. Any roads constructed at gradients greater/steeper than 1 : 6 should be surfaced.

7. CONCLUSION :

The development of the subdivided and rezoned Portion 2 of Farm 965, East London, the proposed Areena Rivendell Estate and Island View Resort development, is considered feasible provided the recommendations set out in the above report are strictly adhered to as they amount to no more than good engineering practice. In addition, the requirements and regulations as outlined in the National Building Regulations and the National Home Builders Registration Council (NHBRC) manuals which will have to be adhered to during building construction operations, have been formulated to protect the new Home Owner against unscrupulous building contractors.

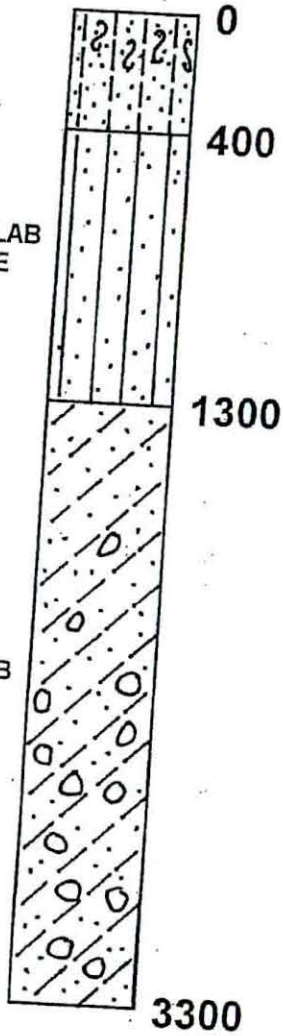


WALTERS & ASSOCIATES
July 2009



TRIAL HOLE #1

100m FROM KWELERA RIVERS EDGE
IN ENLARGED DAM



SLIGHTLY MOIST, LIGHT BROWN, FIRM, INTACT, SILTY SAND
TOPSOIL WITH GRASS ROOTS, ALLUVIUM.

MOIST, FIRM, LIGHT BROWN, INTACT, CLAYEY SILT, ALLUVIUM.

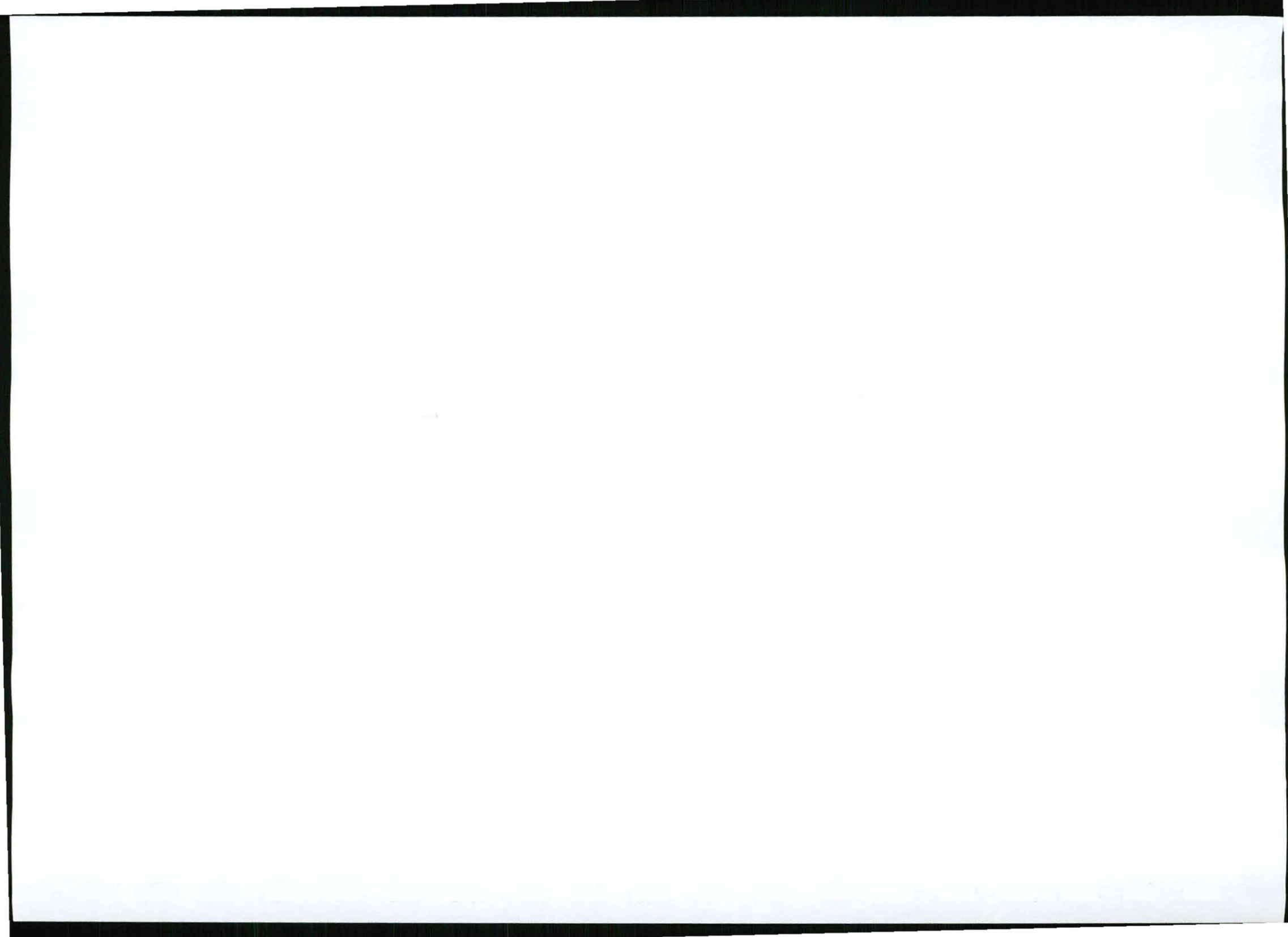
MOIST, FIRM, LIGHT BROWN, INTACT, SILTY CLAY WITH
ROUNDED COBBLES, ALLUVIUM.

BOTTOM OF DAM

AREENA RIVENDELL ESTATE

WA WALTERS & ASSOCIATES
CONSULTING ENGINEERS

SCALE 1:25



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T0308

OTHER BRANCH OFFICES: Cape Town, Kokstad, Mthatha, Port Elizabeth

CLIENT: Walters & Associates
97 Chamberlain Road
VINCENT
5247

PROJECT: ARENA PROJECT

DATE RECEIVED: 2009-07-14

DATE TESTED: 2009-07-17

DATE REPORTED: 2009-07-20

ATT: Mr D Walters

TEST REPORT NO.: 48531

FOUNDATION INDICATOR REPORT

NON-ACCREDITED TEST

SAMPLE NO	5476	5477			
POSITION	Sample A	Sample B			
DESCRIPTION	lt Br	lt Br			
	cly s	sdv cl			

SIEVE ANALYSIS % PASSING SIEVES: Method :TMH1 A1(a) & A5

% PASSING	75 mm				
	37.5 mm				
	19 mm		100		
	9.5 mm	100	98		
	4.75 mm	99	97		
	2.36 mm	98	97		
	1.18 mm	98	97		
	0.600 mm	98	97		
	0.425 mm	97	97		
	0.300 mm	95	96		
	0.150 mm	73	88		
	0.075 mm	48.7	69.9		

HYDROMETER ANALYSIS: Method ASTM D422

	0.06 mm	43	60		
	0.02 mm	29	41		
	0.006 mm	21	29		
	0.002 mm	18	26		

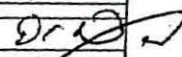
ATTERBERG LIMITS: Method: TMH1 A2 ; A3 & A4

LIQUID LIMIT	26	34		
PLASTICITY INDEX	12	13		
LINEAR SHRINKAGE	6.0	7.0		

Prediction of Heave: Van Der Merwe Method (3.4) TRH9

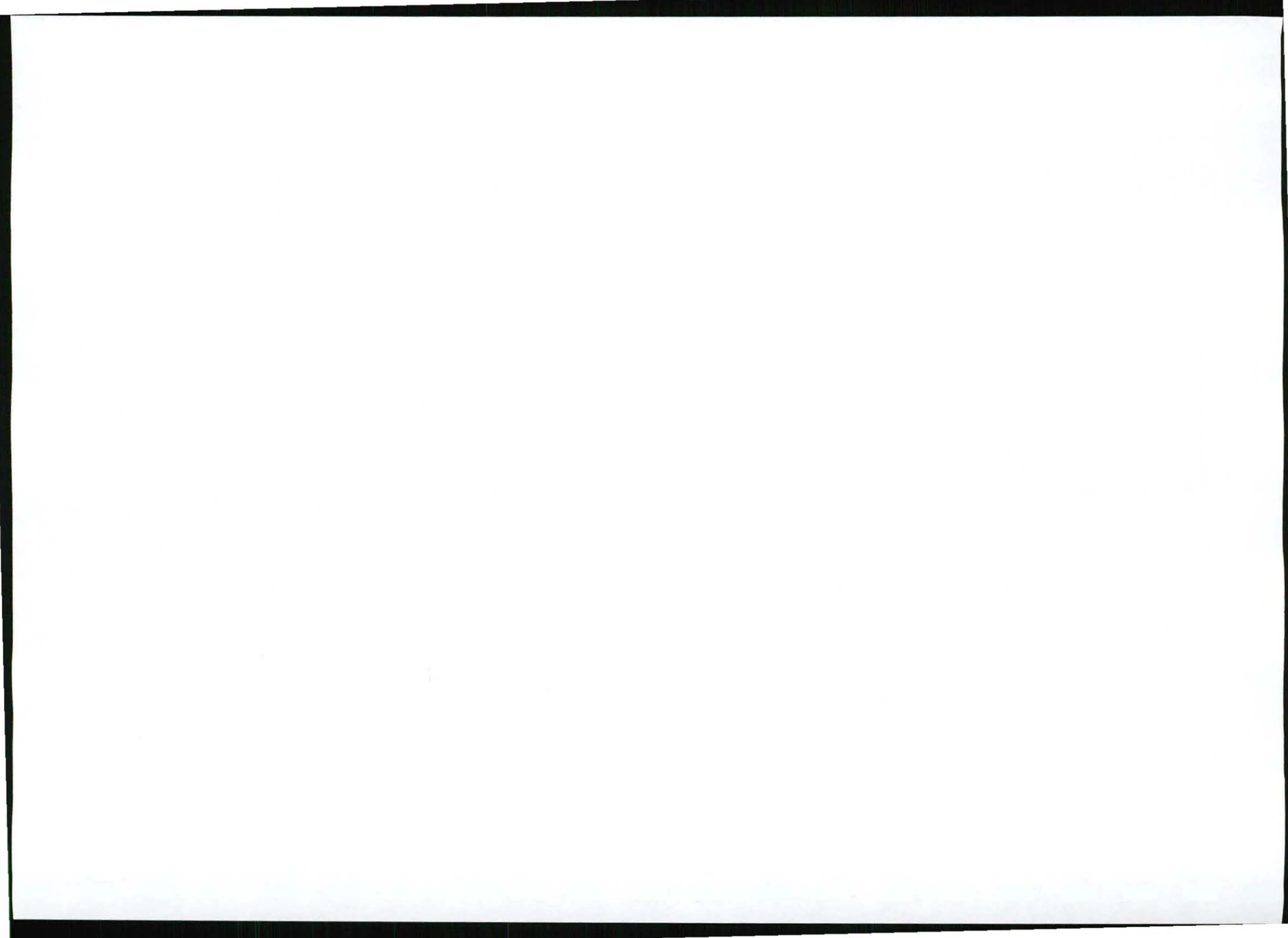
PI WHOLE SAMPLE	11.0	13.0		
ACTIVITY	0.6	0.5		
POTENTIAL EXPANSIVENESS	LOW	MED		

The above test results are pertinent to the samples received and tested only.
While the tests are carried out according to recognized standards Controlab shall not be liable for erroneous testing or reporting thereof. This report may not be reproduced except in full without prior consent of Controlab.

Technical Signatory: 
RS Nichol

Remarks:

Sample Delivered by Customer
Sampled by Controlab



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ISO/IEC 17025:2005 Accredited Laboratory

OTHER BRANCH OFFICES: Cape Town, Kokstad, Mthatha, Port Elizabeth

CLIENT: Walters & Associates
97 Chamberlain Road
VINCENT
5247

ATT: Mr D E Walters

PROJECT: AREENA PROJECT

DATE RECEIVED: 2009-07-09

DATE TESTED: 2009-08-10

DATE REPORTED: 2009-07-13

TEST REPORT NO.: 48398

O/N:

MATERIALS TEST REPORT

SAMPLE NO:	5387				
POSITION / CHAINAGE					
DEPTH					
DESCRIPTION	lt Y O				
	Ss + sty s				

Sieve Analysis (Wet Preparation) TMH1 - Method A1 (a)

% PASSING 75 mm					
63 mm					
53 mm					
37.5 mm					
26.5 mm					
19 mm					
13.2 mm	100				
4.75 mm	96				
2.00 mm	94				
0.425 mm	92				
0.075 mm	33.1				

Soil Mortar Analysis - TMH1 - Method A5

COURSE SAND (%)	2				
FINE SAND (%)	63				
SILT / CLAY (%)	35				
GRADING MODULUS	0.81				

Atterberg Limits - TMH1 - Methods A2, A3, A4

LIQUID LIMIT (%)	23				
PLASTICITY INDEX (%)	9				
LINEAR SHRINKAGE (%)	2.0				

Maximum Dry Density & Optimum Moisture Content - TMH1 - Method A7 / California Bearing Ratio - TMH1 - Method A8

Maximum Dry Density (kg/m ³)					
Optimum Moisture Content (%)					
C.B.R. @ 100% COMPACTION					
C.B.R. @ 98 % COMPACTION					
C.B.R. @ 95 % COMPACTION					
C.B.R. @ 93 % COMPACTION					
C.B.R. @ 90 % COMPACTION					
SWELL @ 100% COMP. (%)					

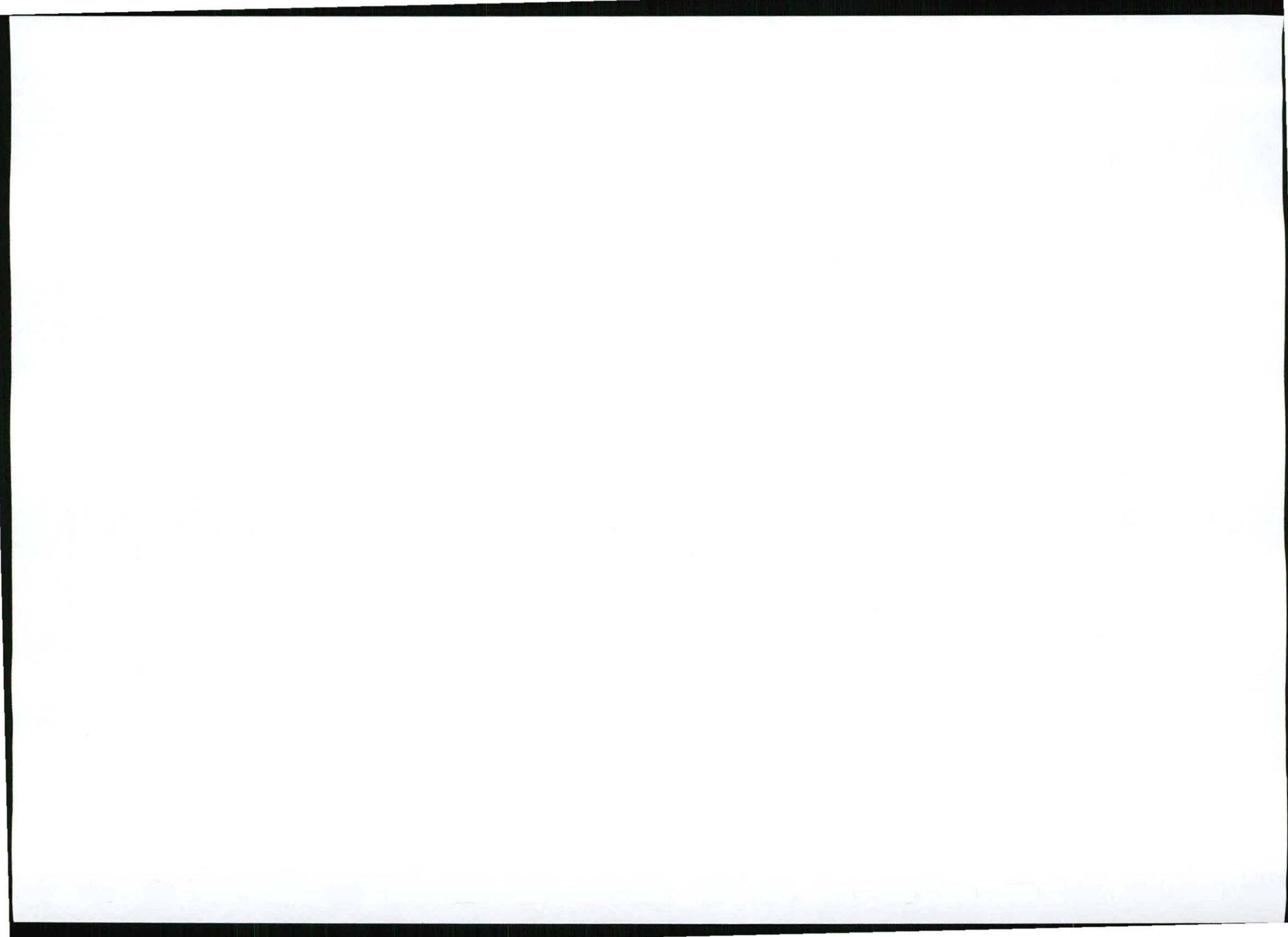
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Technician Signatory:

RS Nichol

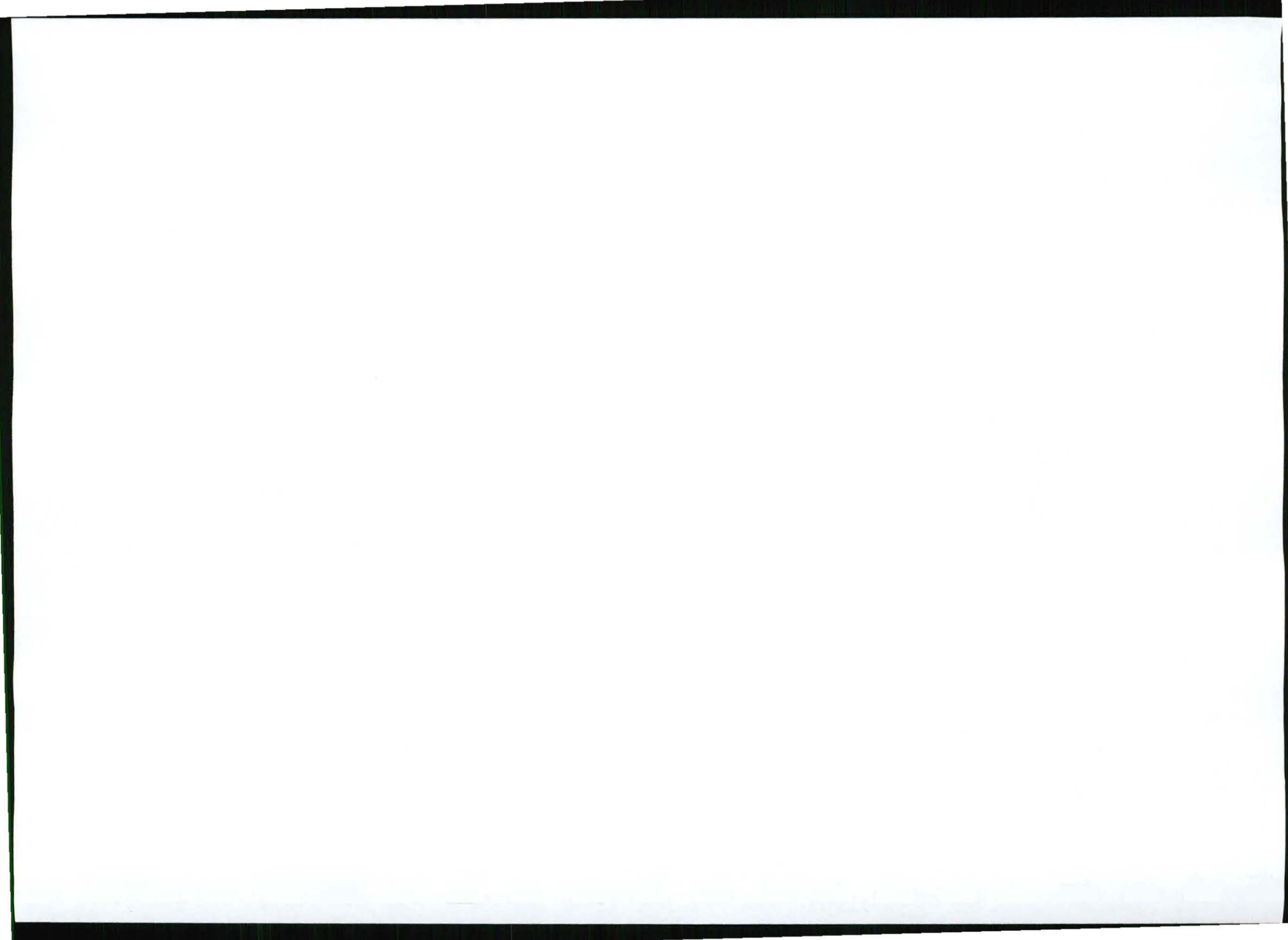
Remarks:

Sample Delivered by Customer
Sampled by Controlab



ANNEXURE J

Traffic Impact Assessment



**TRAFFIC IMPACT ASSESSMENT
REPORT INTO THE ENTRANCE
INTERSECTION
TO THE PROPOSED DEVELOPMENT
OF AREENA RIVENDELL ESTATE &
ISLAND VIEW RESORT
ON THE SUBDIVIDED & REZONED
AREA OF PORTION 2
OF FARM 965, EAST LONDON
FOR AREENA RESORT TRUST**

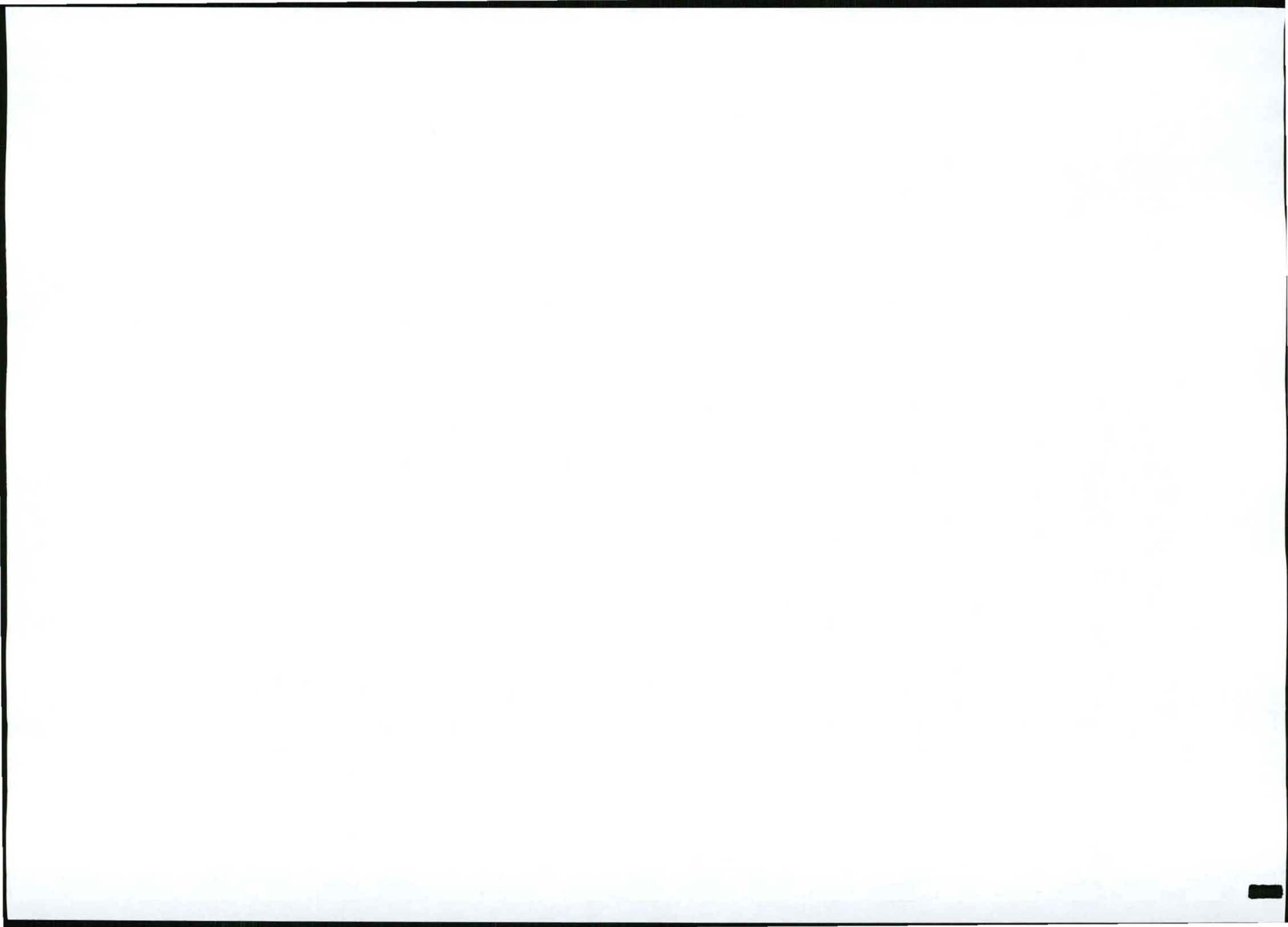
DEVELOPER :

**AREENA RESORT TRUST
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(043) 734 3055**

ENGINEER :

**WALTERS & ASSOCIATES
Consulting Civil Engineers
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AUGUST 2009

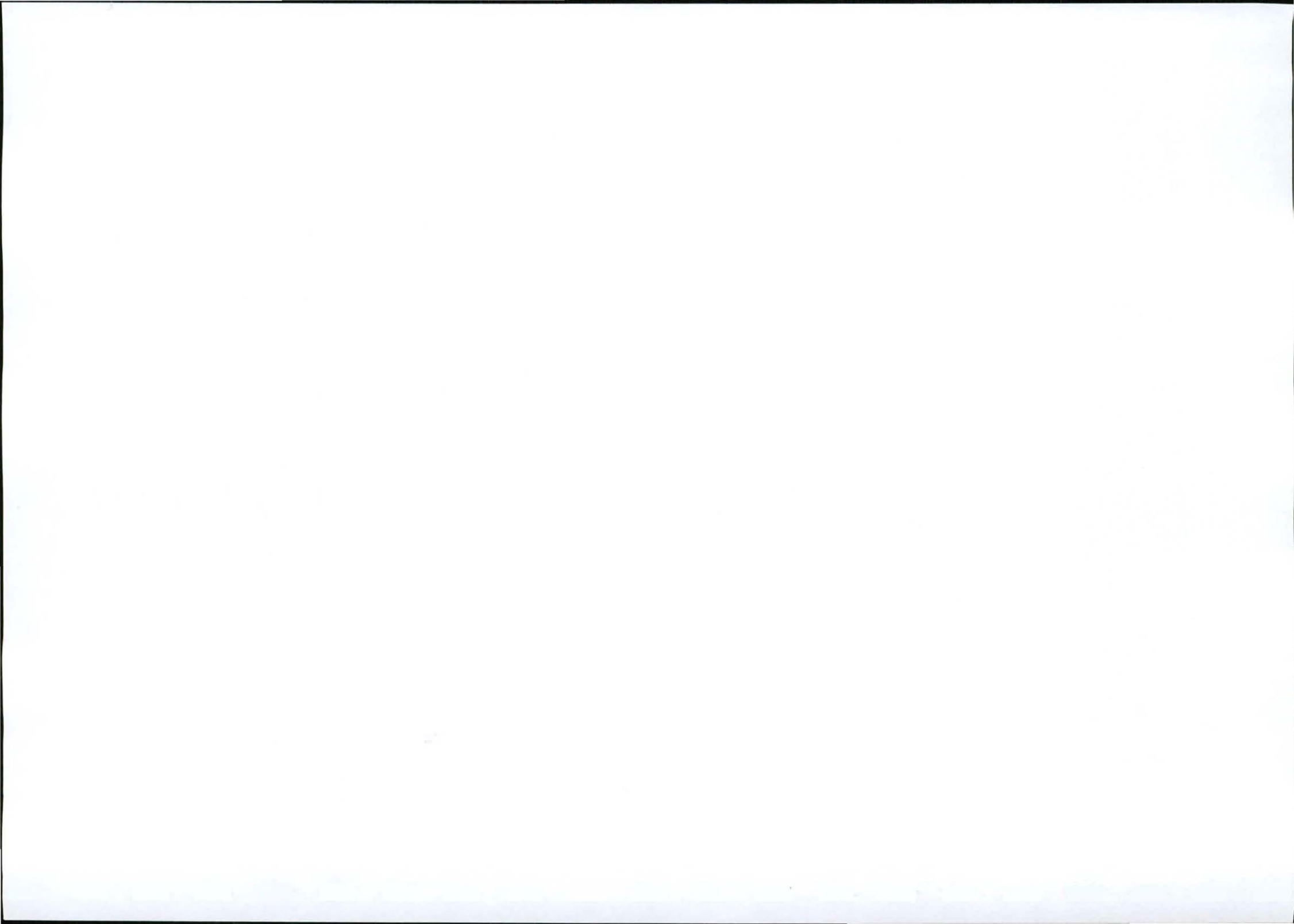


**TRAFFIC IMPACT ASSESSMENT REPORT INTO THE ENTRANCE
INTERSECTION TO THE PROPOSED DEVELOPMENT OF AREENA
RIVENDELL ESTATE & ISLAND VIEW RESORT , ON THE SUBDIVIDED
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FOR AREENA RESORT TRUST**

TABLE OF CONTENTS :

1. INTRODUCTION
 2. DETAILS OF PROPOSED DEVELOPMENT.
 3. EXISTING ROAD NETWORK
 4. EXISTING TRAFFIC FLOWS
 5. PREDICTED TRAFFIC FLOWS

 - 5.1 Existing Traffic Escalation
 - 5.2 Proposed Development Generated Traffic
 6. SIDRA COMPUTER ANALYSIS
 7. THE ANALYSIS
 - Existing AM Peak Hour Weekday 06h45 - 07h45
 - Existing PM Peak Hour Weekday 16h45 - 17h45
 8. FUTURE TRAFFIC
 - Future AM Peak Hour Weekday 06h45 - 07h45
 - Future PM Peak Hour Weekday 16h45 - 17h45
 9. CONCLUSION
- APPENDIX



TRAFFIC IMPACT ASSESSMENT REPORT INTO THE ENTRANCE INTERSECTION TO THE PROPOSED DEVELOPMENT OF AREENA RIVENDELL ESTATE & ISLAND VIEW RESORT , ON THE SUBDIVIDED & REZONED AREA OF PORTION 2 OF FARM 965, EAST LONDON, FOR AREENA RESORT TRUST

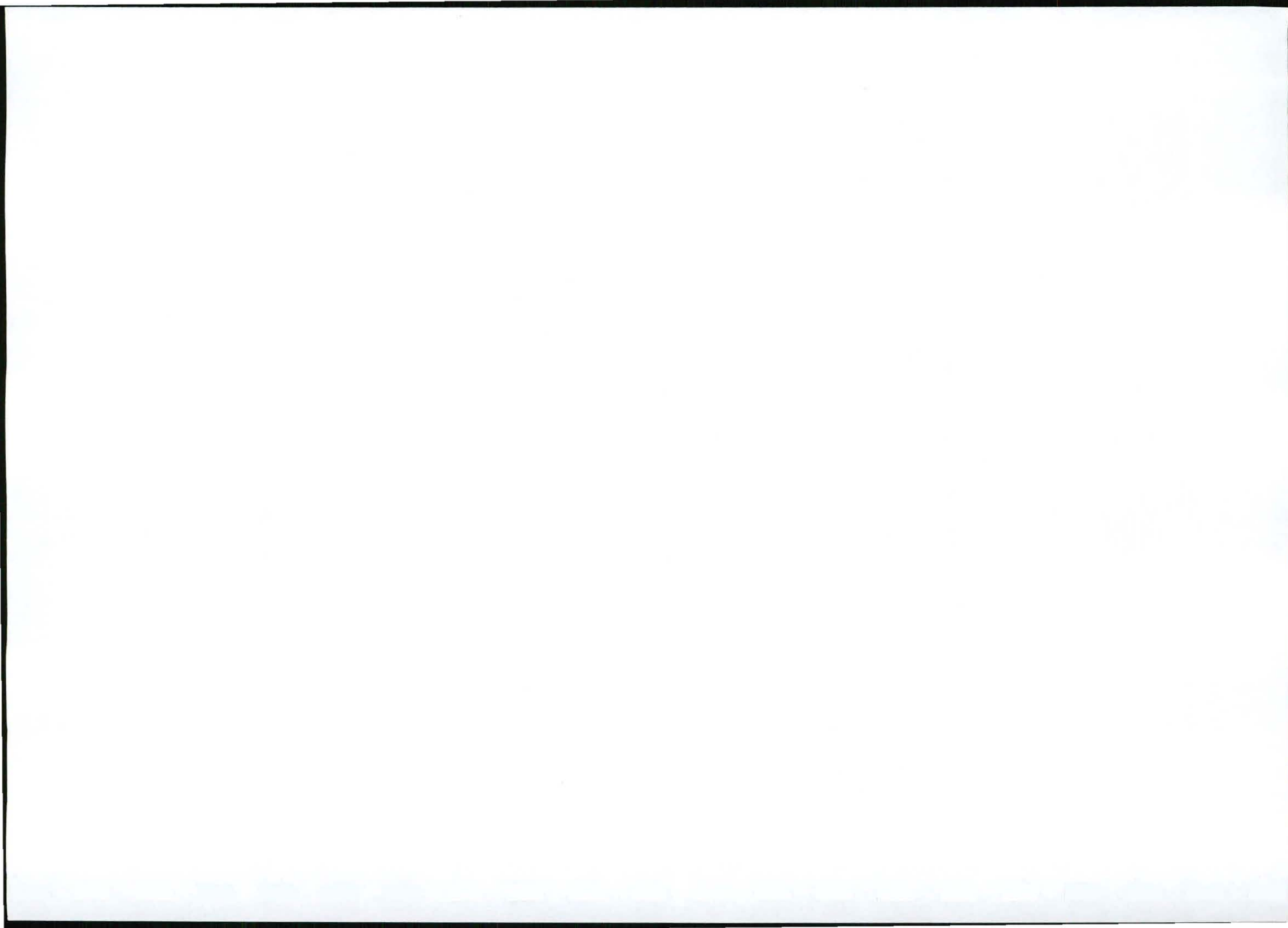
1. INTRODUCTION

NPM Planning CC requested that Mr D Walters Pr Eng of Walters & Associates, Consulting Civil Engineers of East London, prepare a Traffic Impact Assessment (TIA) Report on the existing entrance intersection into the Areena Riverside Resort. This intersection takes off from the so-called 'East Coast Resorts Road' District Road DR 02730, also called 'Schafli Road' between Gönubie and Cintsa, and on to the tarred District Road DR02737, to Glengariff at Balugha River Mouth, and Yellow Sands Resort at Kwelera River Mouth, and is detailed on the locality diagram figure 1.

The TIA definition quoted from NDoT is as follows: "A traffic impact study may be considered as a procedure to determine the effect that a change in land use or transportation infrastructure may have on existing and future traffic flows". The two NDoT publications, "Manual for traffic impact studies" report RR93/635 and "South African trip generation rates" report R92/228 have been used to compile this report

2. DETAILS OF PROPOSED DEVELOPMENT

The proposed development area borders on to the east bank of the tidal Kwelera river 2,0 km upstream from the mouth of the Kwelera river, and approximately 20 km northeast of East London along the Indian Ocean coastline. Access to the site is directly off the tarred so-called 'East Coast Resorts' District Road (DR02730), also called 'Schafli Road', opposite the intersection of the tarred road District Road (DR02737), to Glengariff at Balugha and Kwelera Mouth. From this intersection, a proclaimed Minor Road EL 201 takes traffic 550 metres down to the resort on the banks of the Kwelera river. The proposed development area also borders directly on to the existing and well known Areena Riverside Resort and Areena Game Farm.



An application has been made to subdivide and rezone a portion of land on behalf of the Developer, Messrs Areena Resort Trust. It is the intention of the Developer, Mr Ed Rathbone, to establish a country lifestyle estate development on the property, called the Areena Rivendell Estate and Island View Resort situated within the Great Kei Municipal area. The proposal is to establish a low density residential development comprising 46 Residential Zone 1 units, and a Resort Zone 3 residential resort of 20 double storey dwelling units. The application consists of the Subdivision and Rezoning of the Land Development Area to create the above properties, including Open Space and Agricultural components.

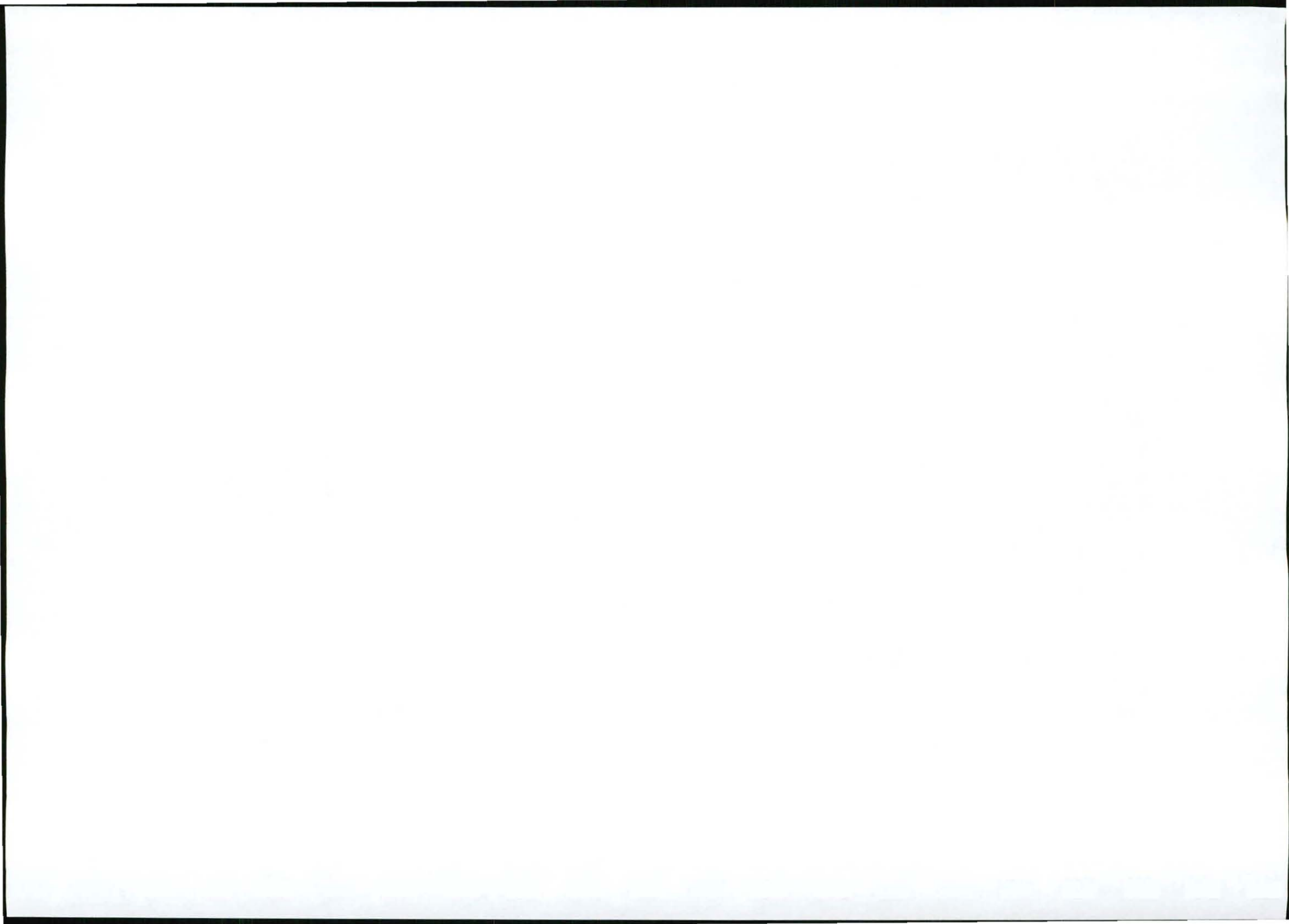
It is anticipated that the proposed development will have a minor impact on the existing road network. This very rural development is of a holiday resort nature, catering mainly for holiday peaks during the year.

3. EXISTING ROAD NETWORK

The East Coast Resorts District Road (DR02730), also called 'Schafli Road', that runs from Gonubie in the west to Cintsa in the east, and the tarred District Road DR02737, from the intersection to Glengariff at Balugha River Mouth, and Yellow Sands Resort at Kwelera River Mouth, are both 7,4m wide two-laned tarred roads with gravel shoulders, while the 550 metre long, proclaimed Minor Road EL 201, that takes traffic down to the Areena Resort, is a tarred 6,0 metre wide road.

4. EXISTING TRAFFIC FLOWS

To carry out a detailed analysis of the current and future traffic flow, physical traffic counts were undertaken. Detailed three-hour traffic counts were undertaken on Tuesday 21 July 2009 at the above mentioned intersection. These traffic counts were taken from 06h00 to 09h00, and again from 16h00 to 19h00, and are included in the appendix, as figures 2 and 3. These traffic counts are illustrated graphically for the weekday morning and evening peak hours respectively.



However the traffic situation during peak holiday periods will be significantly different. As an example, various locations in the Western Cape have found that peak Easter traffic volumes are often equivalent to the 30th Highest Hour. Based on historical long term traffic counts, the variation in daily traffic volumes between the average weekday and the peak periods in December could be as high as double the average daily volumes.

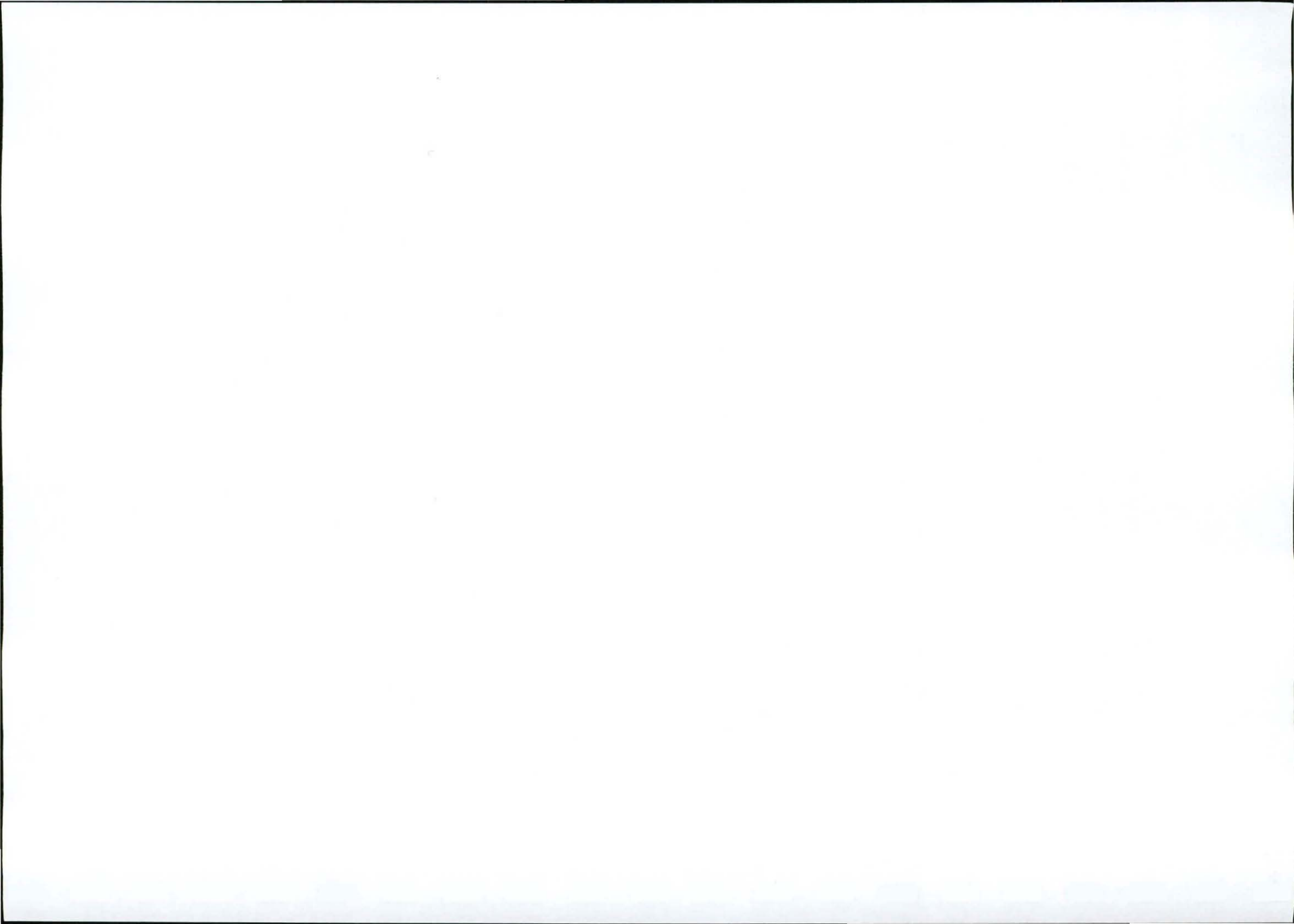
5. PREDICTED TRAFFIC FLOWS

5.1 Existing Traffic Escalation

In order to allow for natural growth on the surrounding road network a 2,5% per annum compound growth factor for a five year projected horizon is normally applied to South African cities. However it is felt that with various approved (Balugha River Estate with 80 erven) and other proposed developments feeding off the DR02737, a five year growth factor of 4,0% would be more appropriate. It is interesting to compare our weekday traffic counts with one done at Crossways intersection in June 1998, for traffic travelling along DR02730, where AM peak of 221 vehicles at Crossways vs 261 at Areena (18% increase), and PM peak 121 vehicles at Crossways vs 262 at Areena (217% increase).

5.2 Proposed Development Generated Traffic

Using Google Earth an estimate of dwellings that would currently use the DR02730 / DR02737 intersection amounts to a total of approximately 330** units, made up of Glengariff 50du, Yellow Sands 80du, Areena 120du, (**less undeveloped Balugha Estate 80du). While the proposed development extension at Areena Rivendell & Island View amounts to 66 new dwelling units. The number of persons expected to use the development has to be estimated. The trip generation process aims at predicting the total number of trips generated and attracted to each zone of the study area.



Current Trip Generation :

Development Area	No. Units	Trip Rate	Total Trips	AM In	AM Out	PM In	PM Out
Areena/Glengariff/YellowSands	250	1,10	275	35	95	100	45

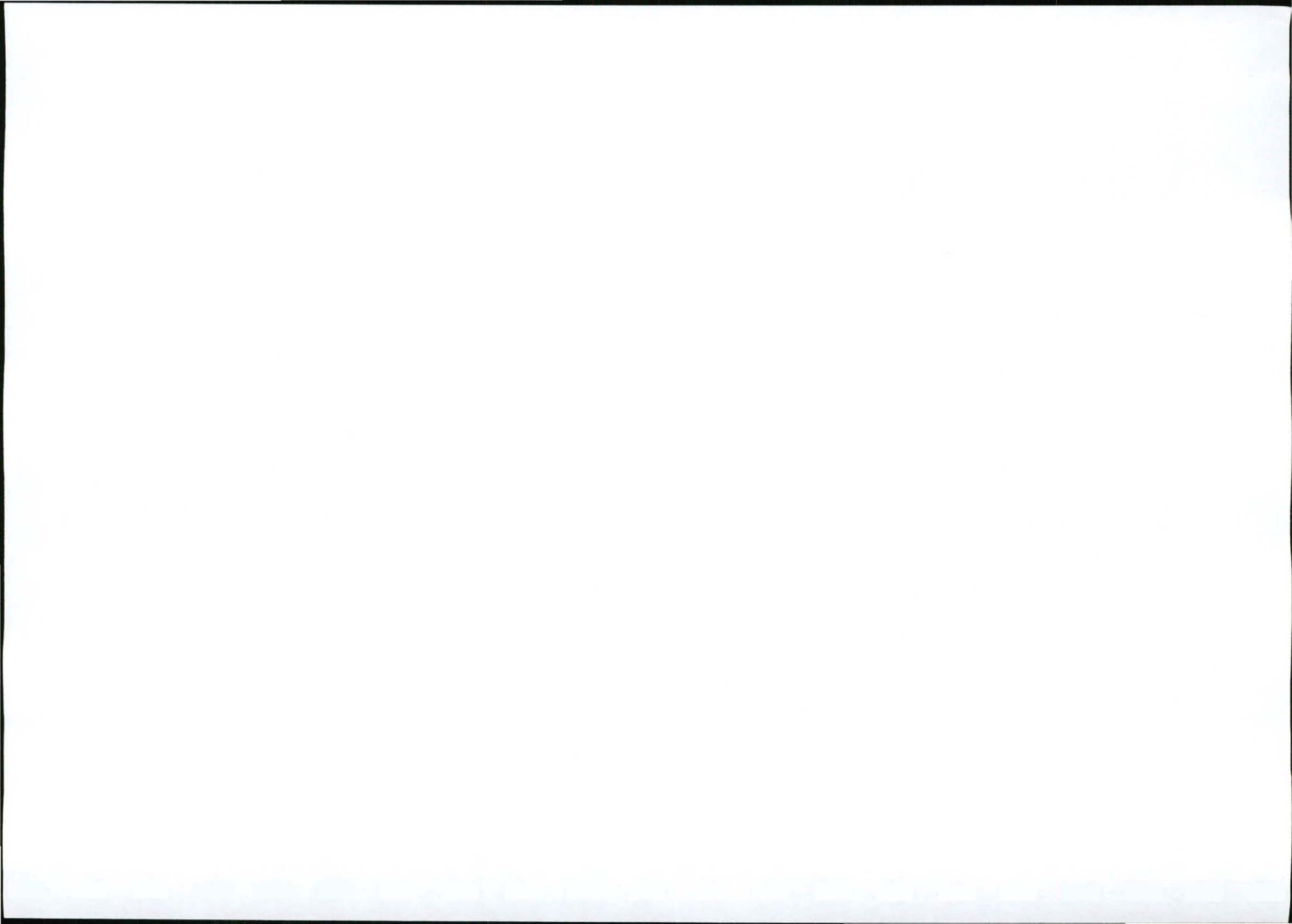
Future Trip Generation :

Development Area	No. Units	Trip Rate	Total Trips	AM In	AM Out	PM In	PM Out
Areena/Glengariff/YellowSands	400	1,10	440	60	160	150	70

A trip generation rate of 1,1 vehicles per hour per unit in the peak for cluster residential developments was used with weekday AM peak hour directional split of 27 : 73 (in :out) and weekday PM peak hour directional split of 69 : 31 (in : out).

6. SIDRA COMPUTER ANALYSIS

The computer program SIDRA (Signalised Intersection Design and Research Aid), designs and evaluates isolated signalised, roundabout, and other unsignalised intersections, it is a junction / intersection model that is used to quantify the efficiency (eg. traffic delays and related slowdown effects) of an isolated intersection. The input to the program includes the road geometry, traffic counts, turning movements, and speed of the vehicles, while the software analyses the data and the output provides nineteen measures of the effectiveness (MOE's) from which the performance of the roadway can be determined.



This SIDRA analysis is of the existing traffic volumes as counted at the intersection of DR02730 and DR02737. Additional analysis was also carried out for a five year future horizon to determine the effects of future traffic volumes at this intersection. The Minor Road EL201 to the Areena Resort is approximately 10 metres away from the DR02730 centreline to centreline. It is not considered possible to analyse this intersection in isolation and therefore traffic from this road was combined with traffic volumes on the DR02737.

7. THE ANALYSIS

Existing AM Peak Hour Weekday - [2009] - 06h45 - 07h45

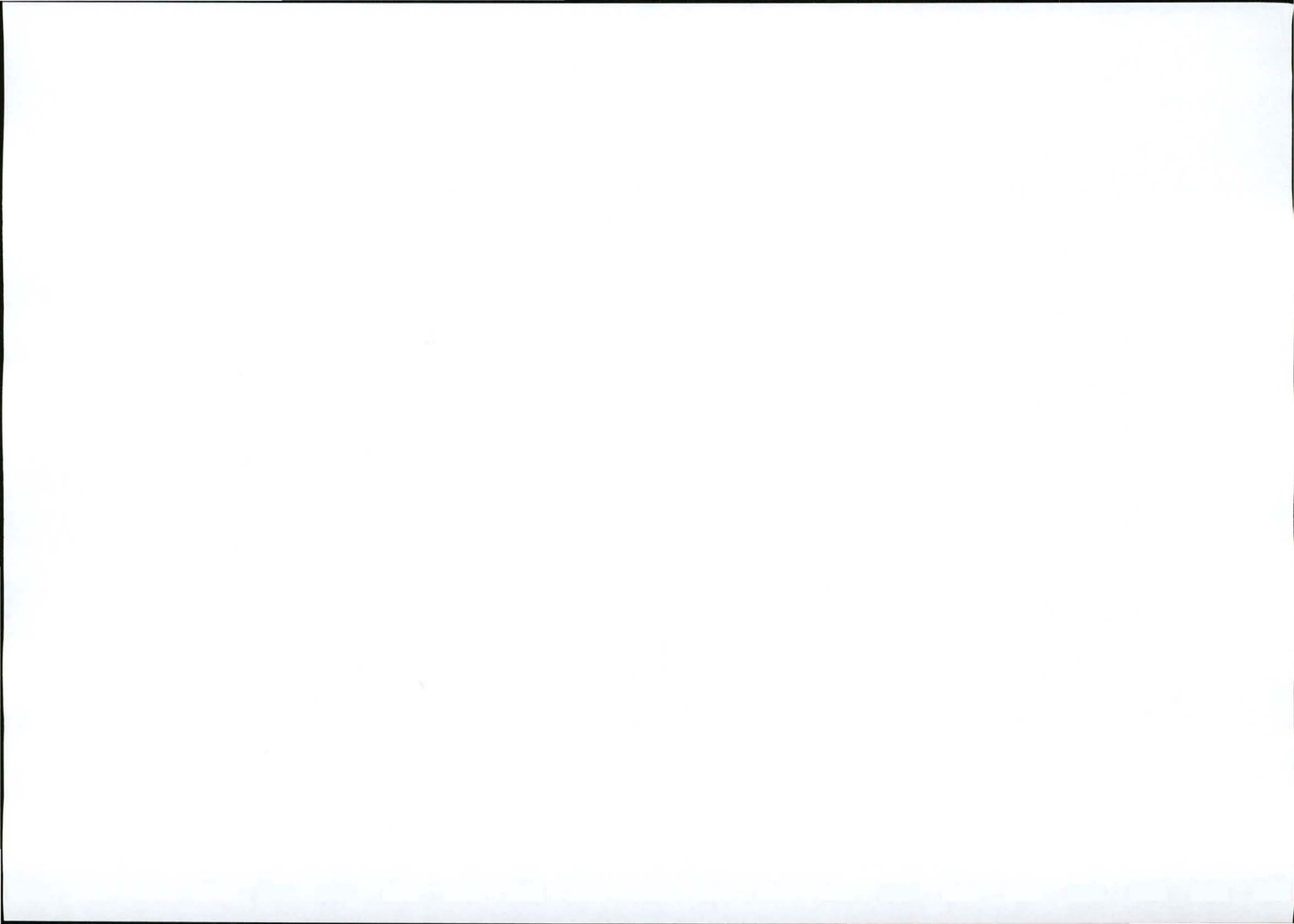
The traffic counts indicates that the highest traffic volume during this period are on the DR02730, heading towards East London. SIDRA analysis of these volumes indicates that an overall Level of Service (LOS) 'A' can be expected at this intersection under existing conditions. This is considered the highest LOS and it is therefore expected that traffic using this intersection will not experience delays under current conditions. The two turning movements from the DR02737 onto DR 02730 experience a LOS 'B' which is considered acceptable with limited delays

In terms of Volume versus Capacity (v/c ratio) the analysis indicates that there is sufficient capacity available at the intersection under current conditions

Expected queues are limited in length and therefore have no impact on any intersections in close proximity

Existing PM Peak Hour Weekday - [2009] - 16h45 - 17h45

The traffic counts indicates that the highest traffic volume during this period are on the DR02730, heading towards Cintsa, away from East London. SIDRA analysis of these volumes indicates that an overall Level of Service (LOS) 'A' can be expected at



this intersection under existing conditions. This is considered the highest LOS and it is therefore expected that traffic using this intersection will not experience delays under current conditions. The two turning movements from the DR02737 onto DR 02730 experience a LOS 'B' which is considered acceptable with limited delays

In terms of Volume versus Capacity (v/c ratio) the analysis indicates that there is sufficient capacity available at the intersection under current conditions

Expected queues are limited in length and therefore have no impact on any intersections in close proximity.

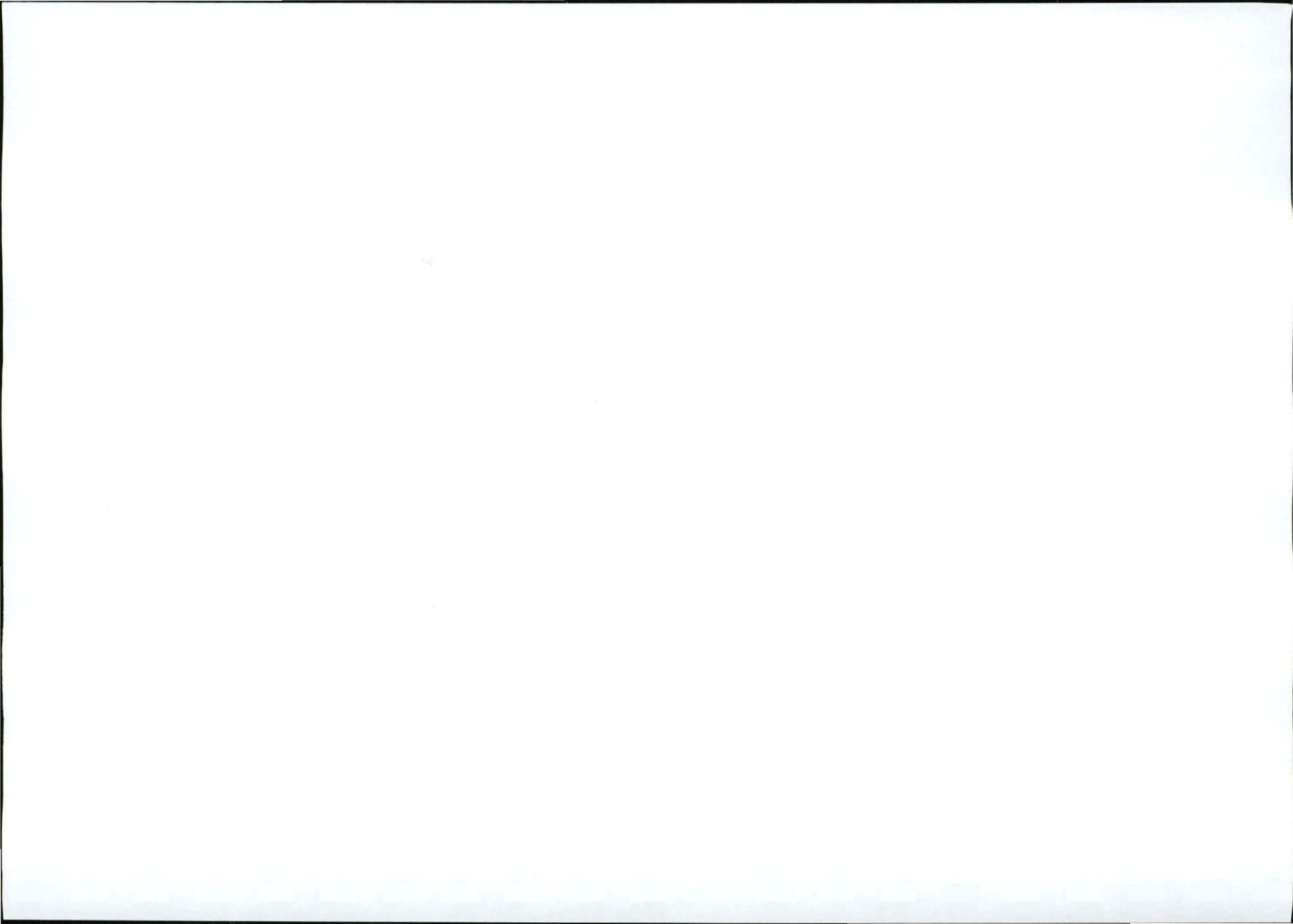
8. FUTURE TRAFFIC

Future traffic volumes are generally calculated and analysed to determine what the future effects of traffic growth are on an intersection before development generated traffic is added. This analysis is normally based on a five year future horizon, and in South African cities a growth rate of 2,5% per annum is generally applied. For this particular analysis it was felt that a growth rate of 4.0% per annum be applied due to the number of proposed and approved developments in the area, ie, Balugha River Estate, and Areena Rivendell & Island View developments, etc.

Future AM Peak Hour Weekday - [2014] - 06h45 - 07h45

The SIDRA analysis of these future traffic volumes indicate that an overall Level of Service (LOS) 'A' can be expected at this intersection under projected/expected conditions. This is considered the highest LOS and it is therefore anticipated that traffic using this intersection will not experience delays under projected/expected future conditions. Three turning movements will experience a LOS 'B' which is considered quite acceptable

In terms of Volume versus Capacity (v/c ratio) the analysis indicates that there is sufficient capacity available at the intersection under future conditions



Expected queues are limited in length and therefore have no impact on any intersections in close proximity

Future PM Peak Hour Weekday - [2014] - 16h45 - 17h45

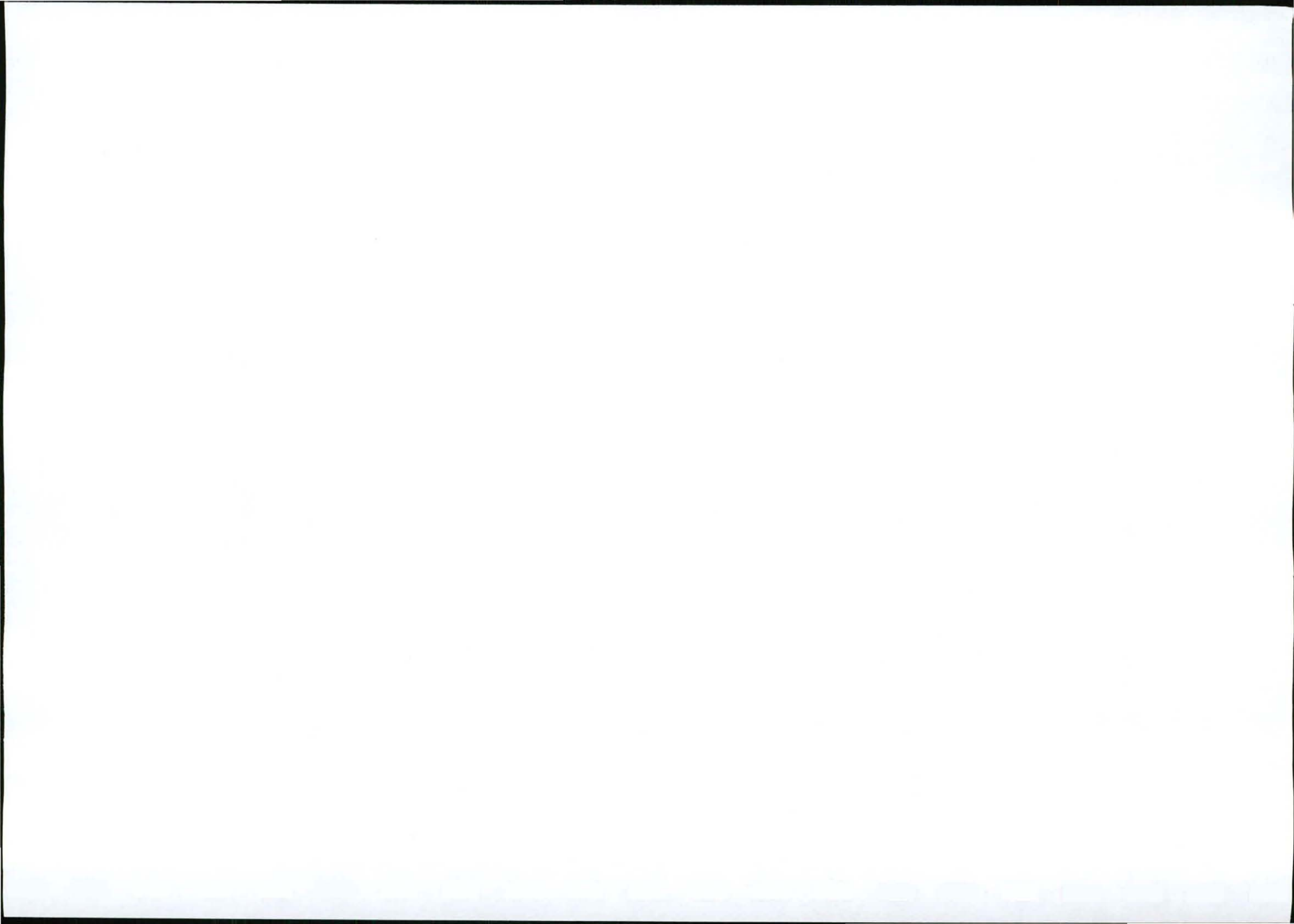
The SIDRA analysis of these future traffic volumes indicate that an overall Level of Service (LOS) 'A' can be expected at this intersection under projected/expected future conditions. This is considered the highest LOS and it is therefore anticipated that traffic using this intersection will not experience delays under projected/expected future conditions. The two turning movements from DR02737 onto DR02730 will experience a LOS 'B' which is considered quite acceptable

In terms of Volume versus Capacity (v/c ratio) the analysis indicates that there is ~~sufficient capacity available at the intersection under future conditions~~


Expected queues are limited in length and therefore have no impact on any intersections in close proximity

9. CONCLUSION

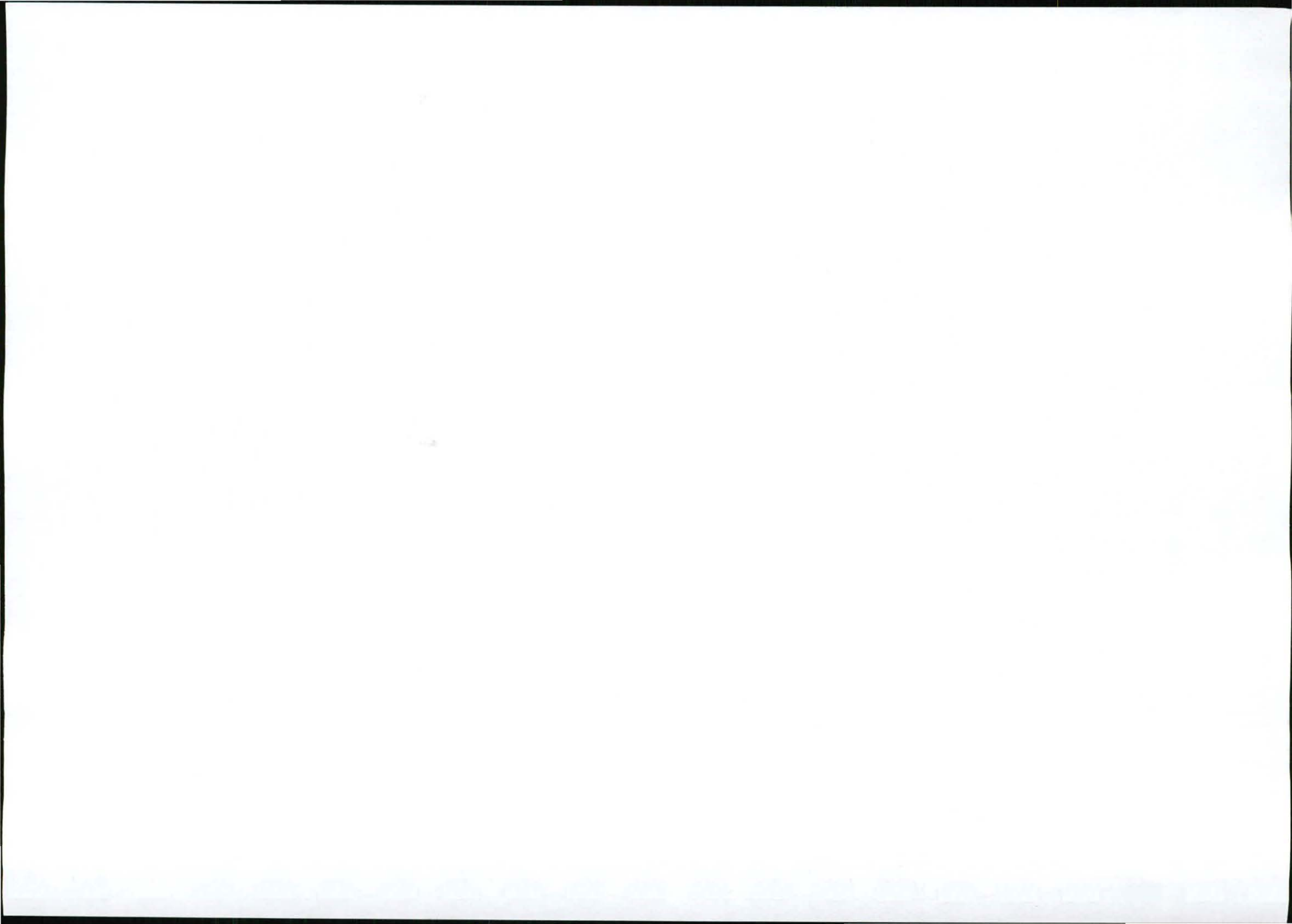
From the above analysis, the intersection has an acceptable Level of Service, in that delays will be less than 10 seconds on average, and that the intersection has sufficient capacity to accommodate the additional traffic volumes generated by the proposed development. As stated the traffic volumes that were used for the existing and future scenarios are projections to the year 2014. The methods used to arrive at these figures are based on assumptions and it may be a long time before these projected traffic levels occur, because the area served mainly comprises of holiday accommodation, which is dependent on the vagaries of the economic development of the region. The levels of service in the immediate future may thus be better than those obtained in the analysis. The trip generation rate of 1,1 trips per residential unit may be considered to be quite conservative, whereas a rate of less than unity may be more appropriate, given the seasonal nature of these coastal, holiday resort developments.

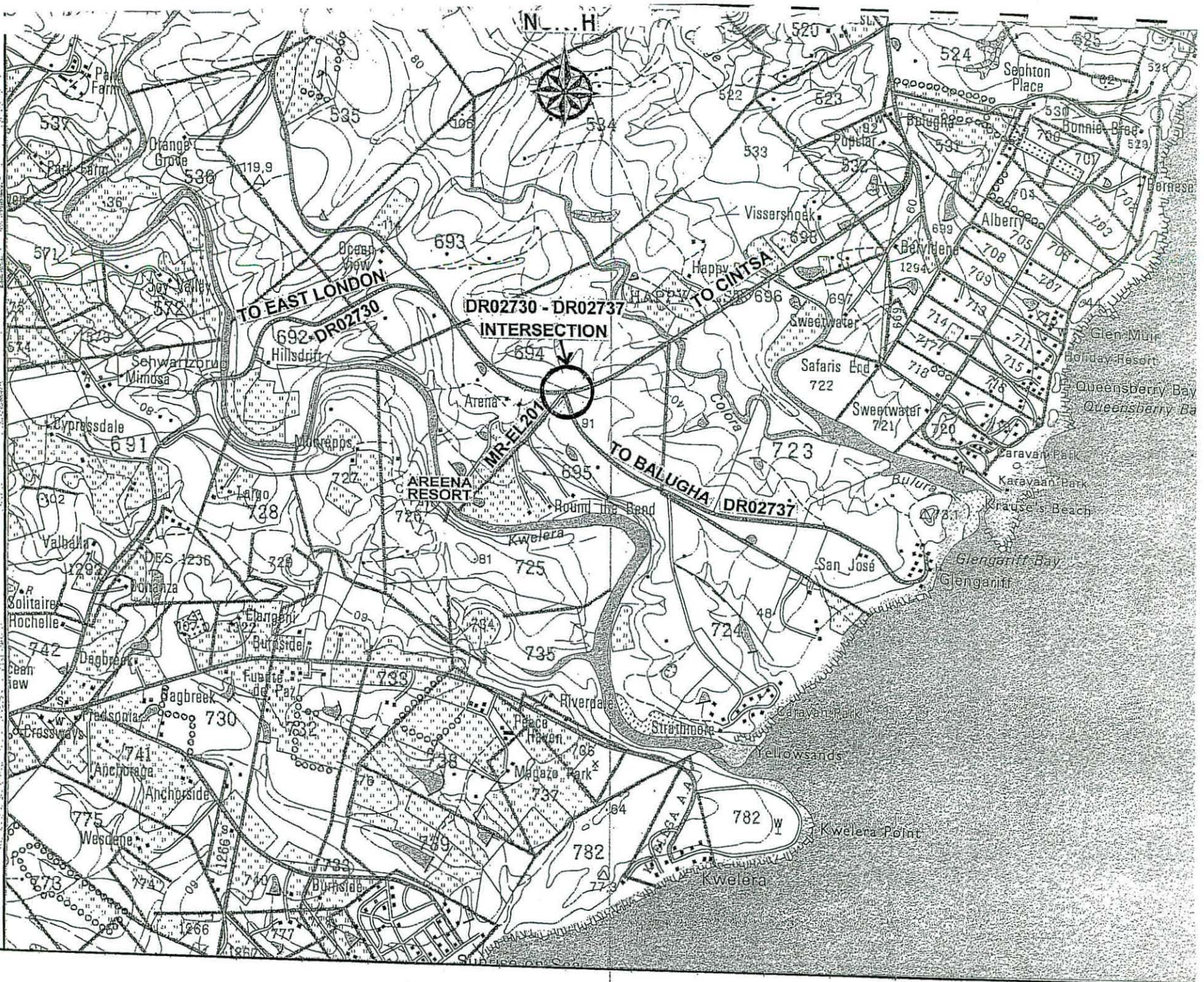


No additional improvements are required to the intersection or adjoining roads, such as lane widening, etc. There is sufficient site distance at the intersection from all three directions. The second minor leg of the DR02730/DR02737 intersection comprises the proclaimed Minor Road EL201 and serves as the entrance to the tarred access road down to the Kwelera River and the Areena Resort, with negligible traffic volumes.



WALTERS & ASSOCIATES
Consulting Engineers
EAST LONDON
August 2009





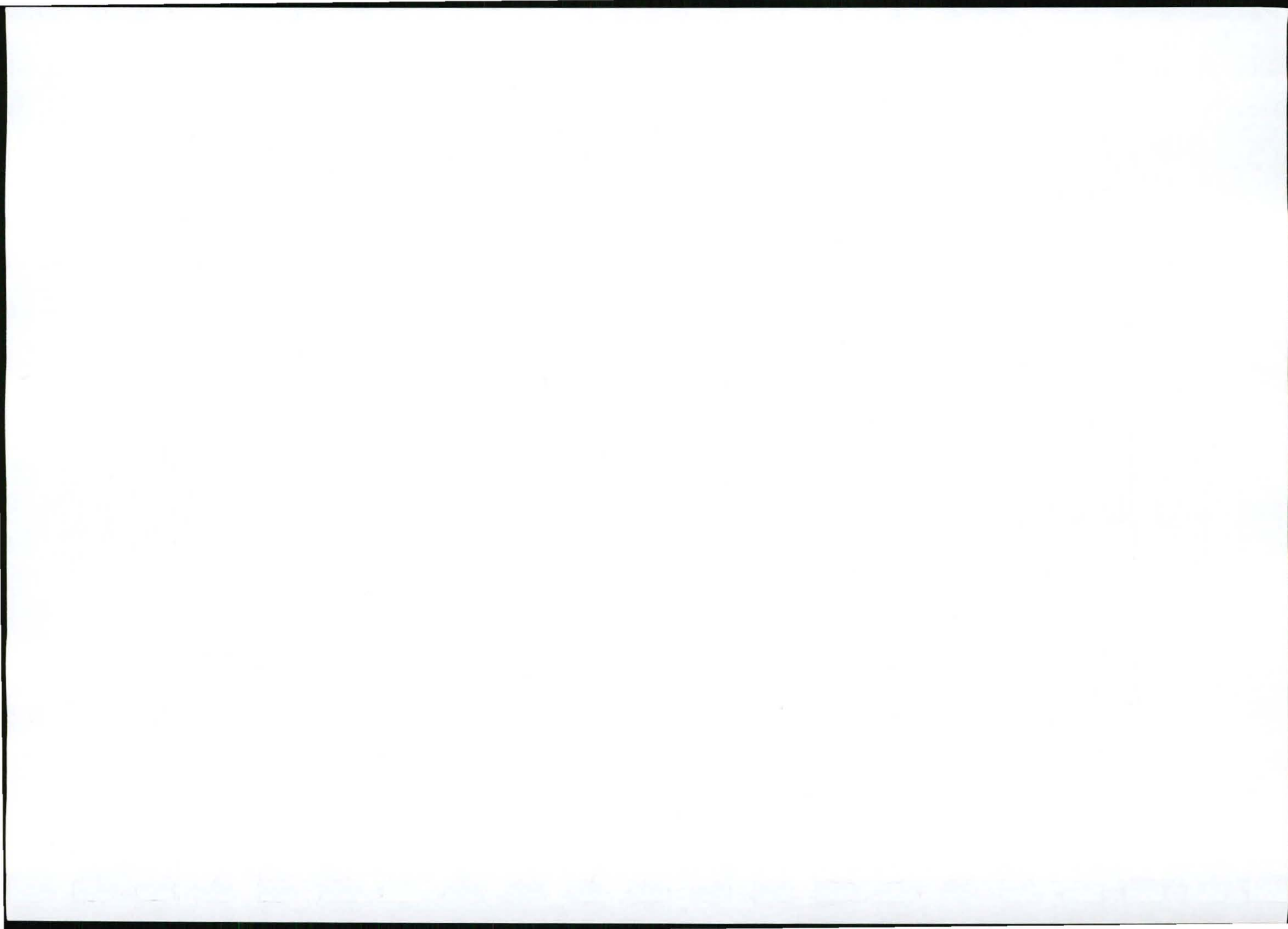
TRAFFIC IMPACT ASSESSMENT - AREENA RESORT

INTERSECTION DR02730-DR02737 - LOCALITY DIAGRAM

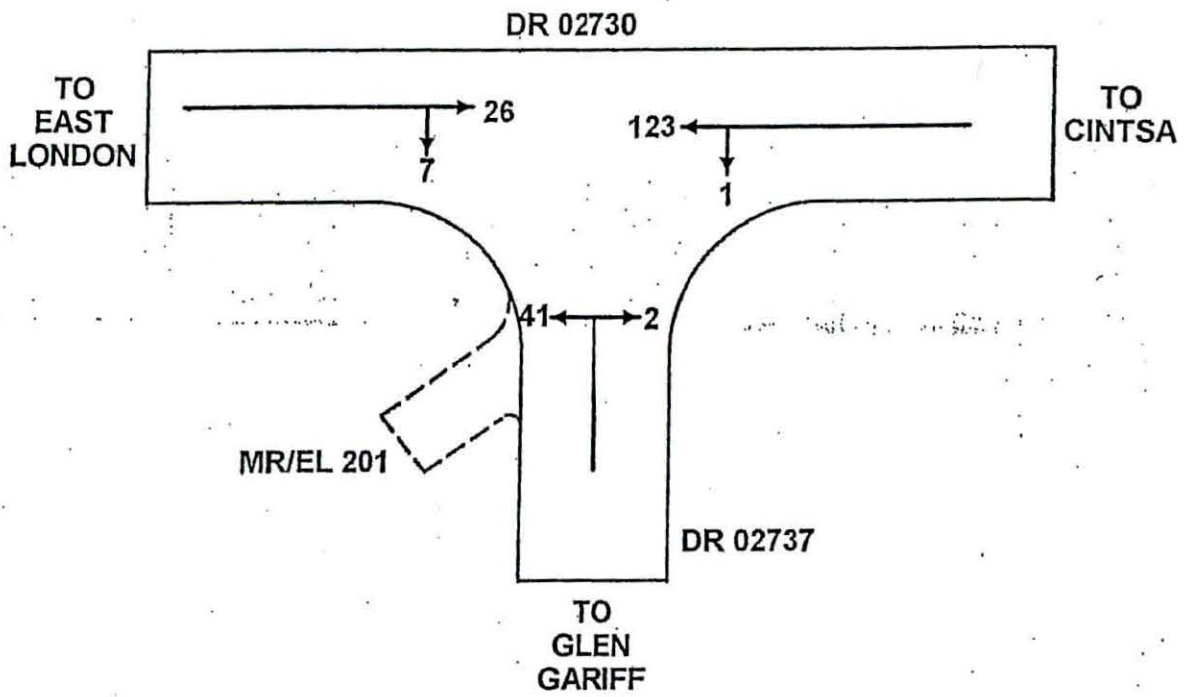
WALTERS & ASSOCIATES
CONSULTING ENGINEERS

JULY 2009

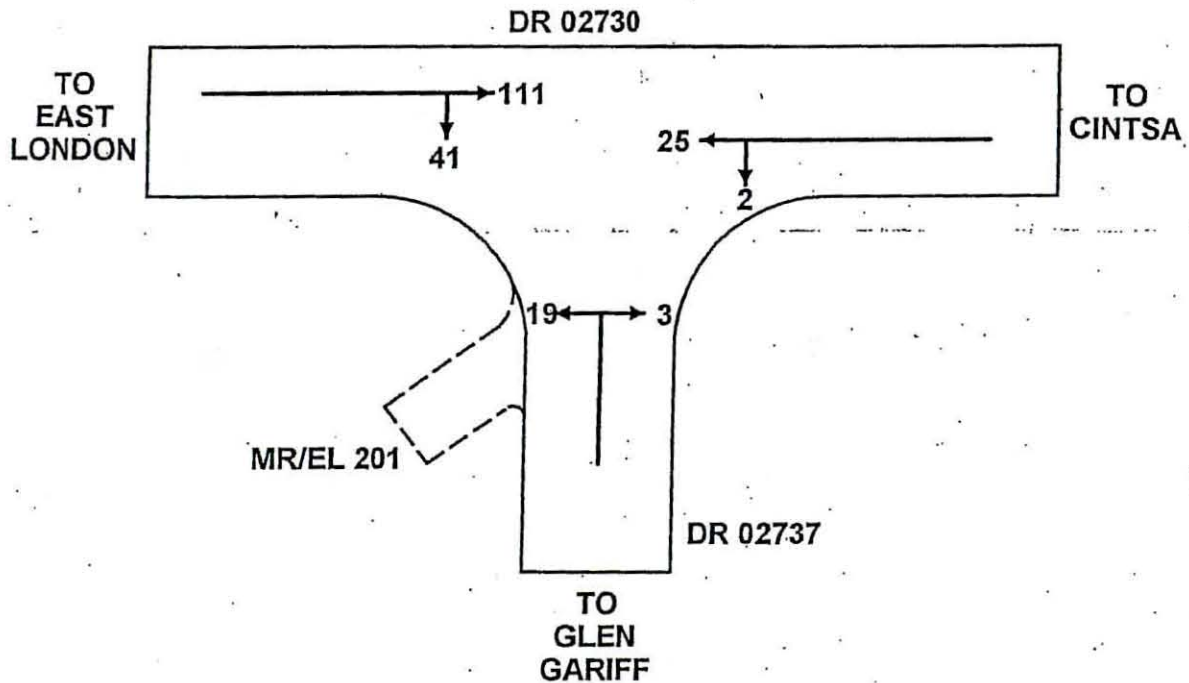
FIGURE 1



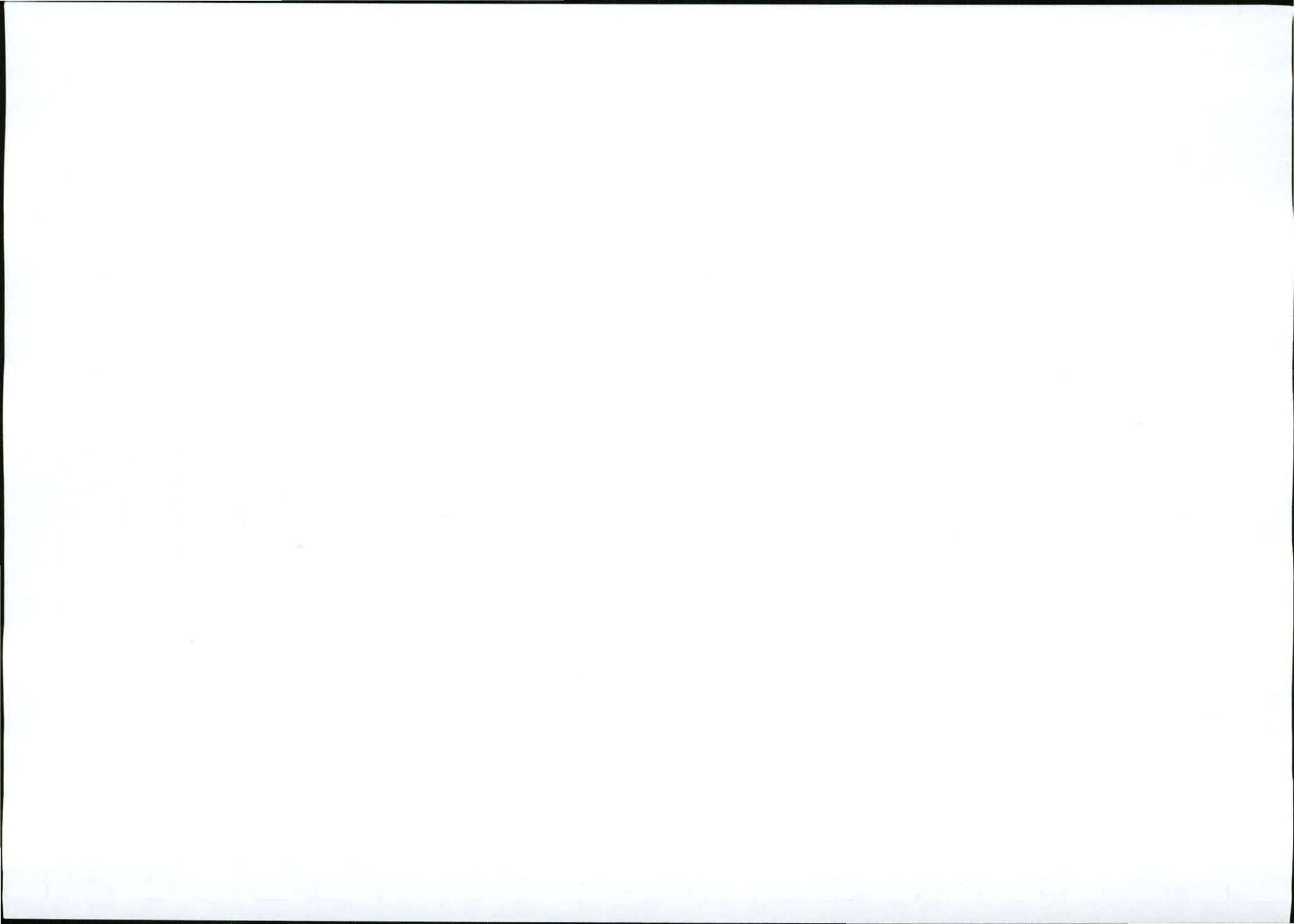
PEAK AM (WEEKDAY) 6h45 - 7h45



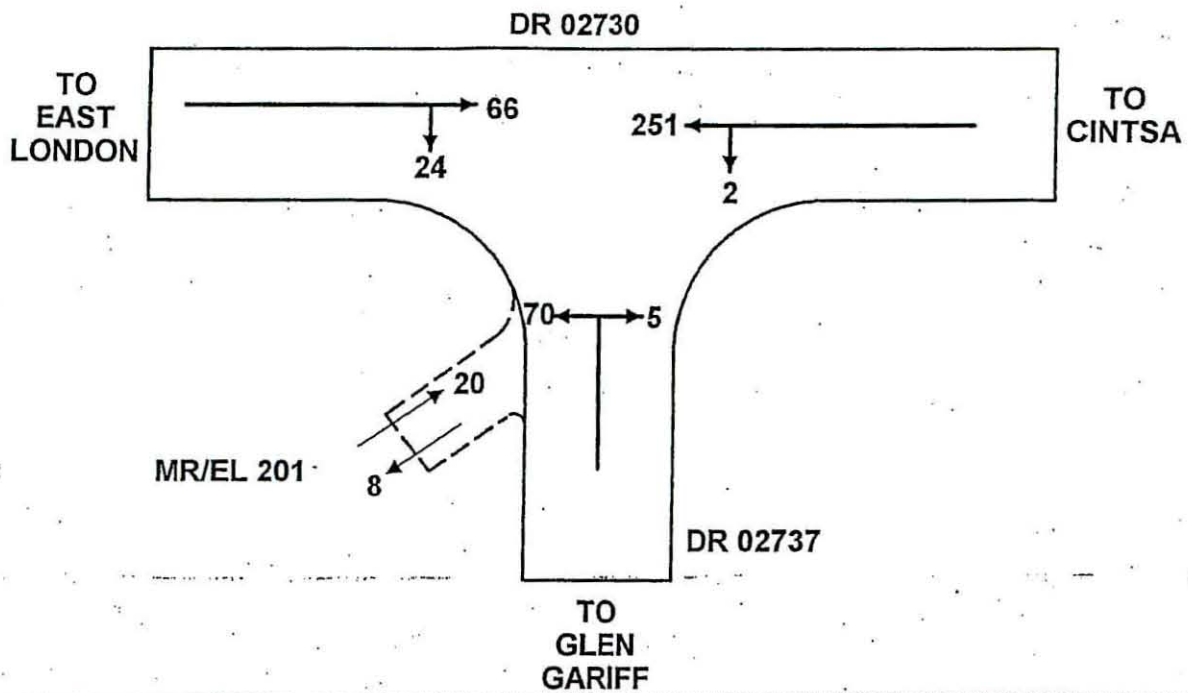
PEAK PM (WEEKDAY) 16h45 - 17h45



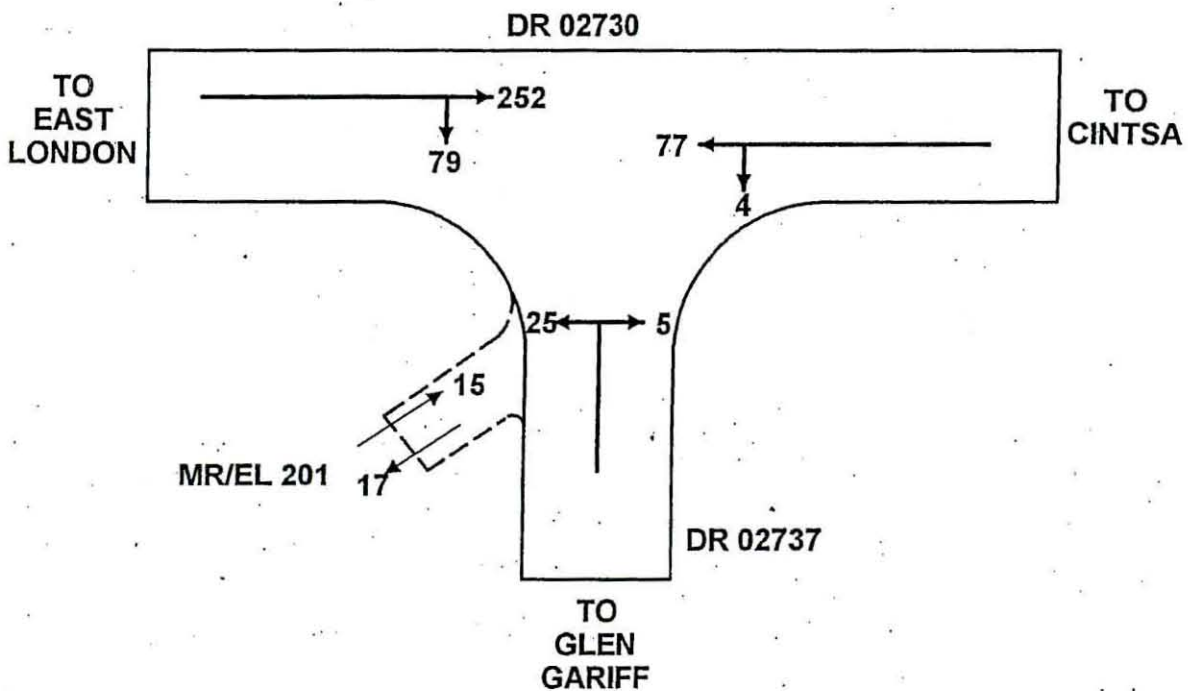
**TRAFFIC IMPACT ASSESSMENT - AREENA RESORT
INTERSECTION DR02730 - DR02737**



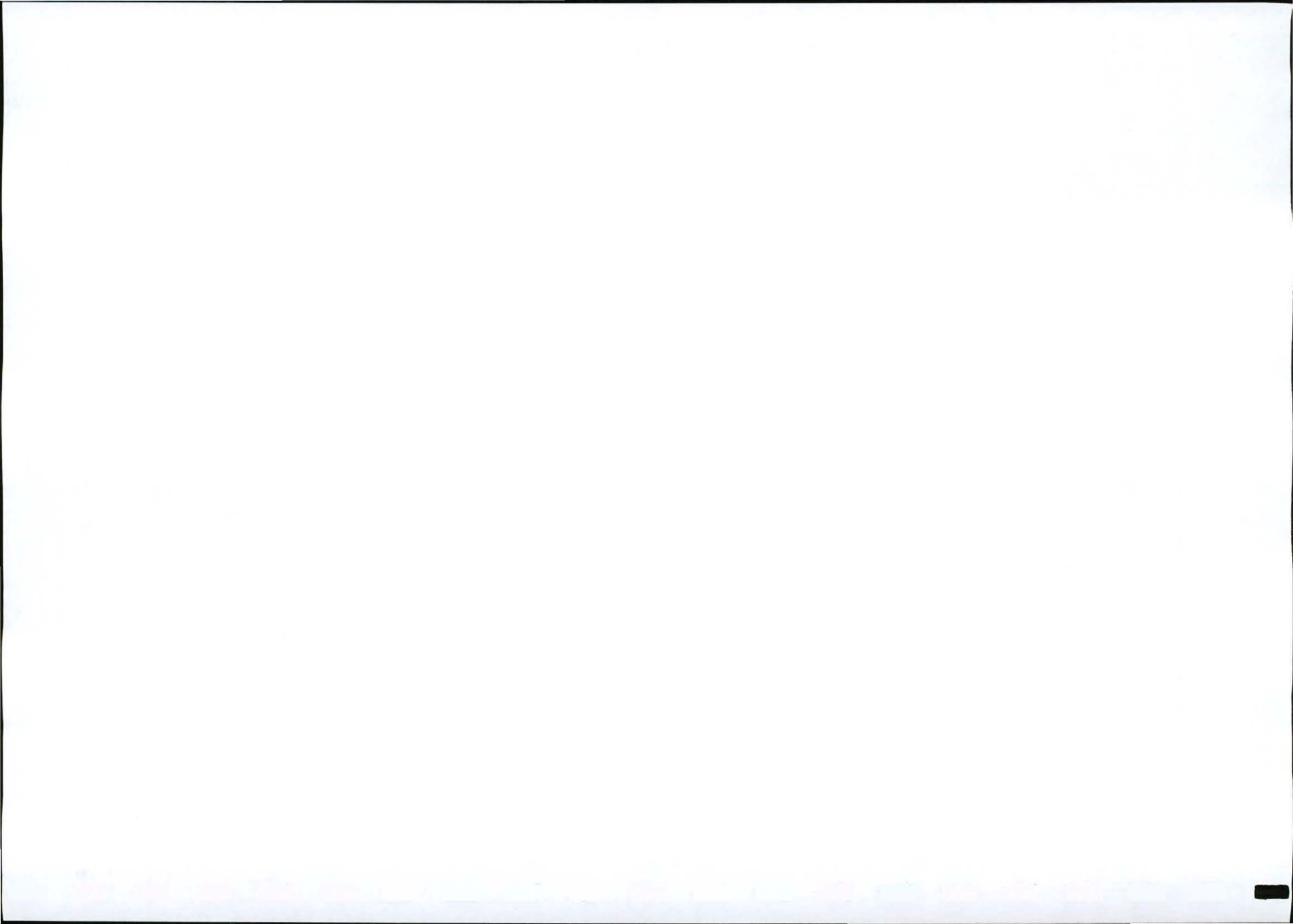
OVERALL AM (WEEKDAY) 6h00 - 9h00



OVERALL PM (WEEKDAY) 16h00 - 19h00



**TRAFFIC IMPACT ASSESSMENT - AREENA RESORT
INTERSECTION DR02730 - DR02737**



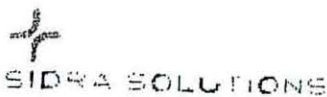
SIDRA
INTERSECTION

Intersection Summary

DR2730/DR2737

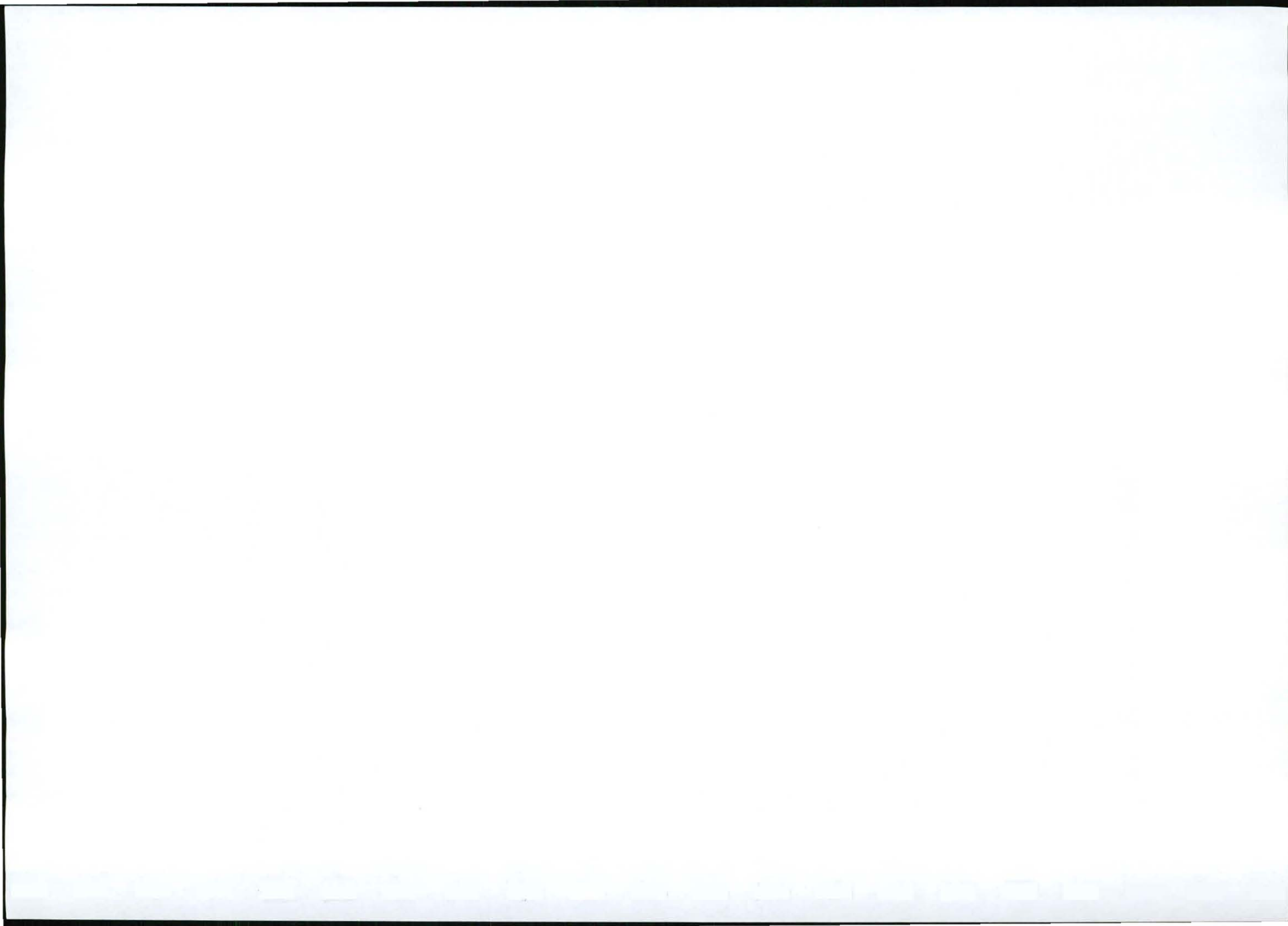
Existing am peak

Performance Measure	Vehicles	Persons
Demand Flows - Total	199 veh/h	299 pers/h
Percent Heavy Vehicles	4.0 %	
Degree of Saturation	0.067	
Effective Intersection Capacity	2966 veh/h	
95% Back of Queue (m)	1 m	
95% Back of Queue (veh)	0.2 veh	
Control Delay (Total)	0.16 veh-h/h	0.23 pers-h/h
Control Delay (Average)	2.8 s/veh	2.8 s/pers
Level of Service	Not Applicable	
Level of Service (Worst Movement)	LOS B	
Total Effective Stops	42 veh/h	63 pers/h
Effective Stop Rate	0.21 per-veh	0.21 per-pers
Proportion Queued	0.09	0.09
Travel Distance (Total)	120.7 veh-km/h	181.1 pers-km/h
Travel Distance (Average)	607 m	607 m
Travel Time (Total)	2.2 veh-h/h	3.3 pers-h/h
Travel Time (Average)	39.3 secs	39.3 secs
Travel Speed	55.5 km/h	55.5 km/h
Operating Cost (Total)	285 R/h	285 R/h
Fuel Consumption (Total)	11.1 L/h	
Carbon Dioxide (Total)	27.9 kg/h	
Hydrocarbons (Total)	0.040 kg/h	
Carbon Monoxide (Total)	1.38 kg/h	
NOX (Total)	0.055 kg/h	



Site: AM peak base year
C:\Documents and Settings\leem\DR2730DR2737.aap
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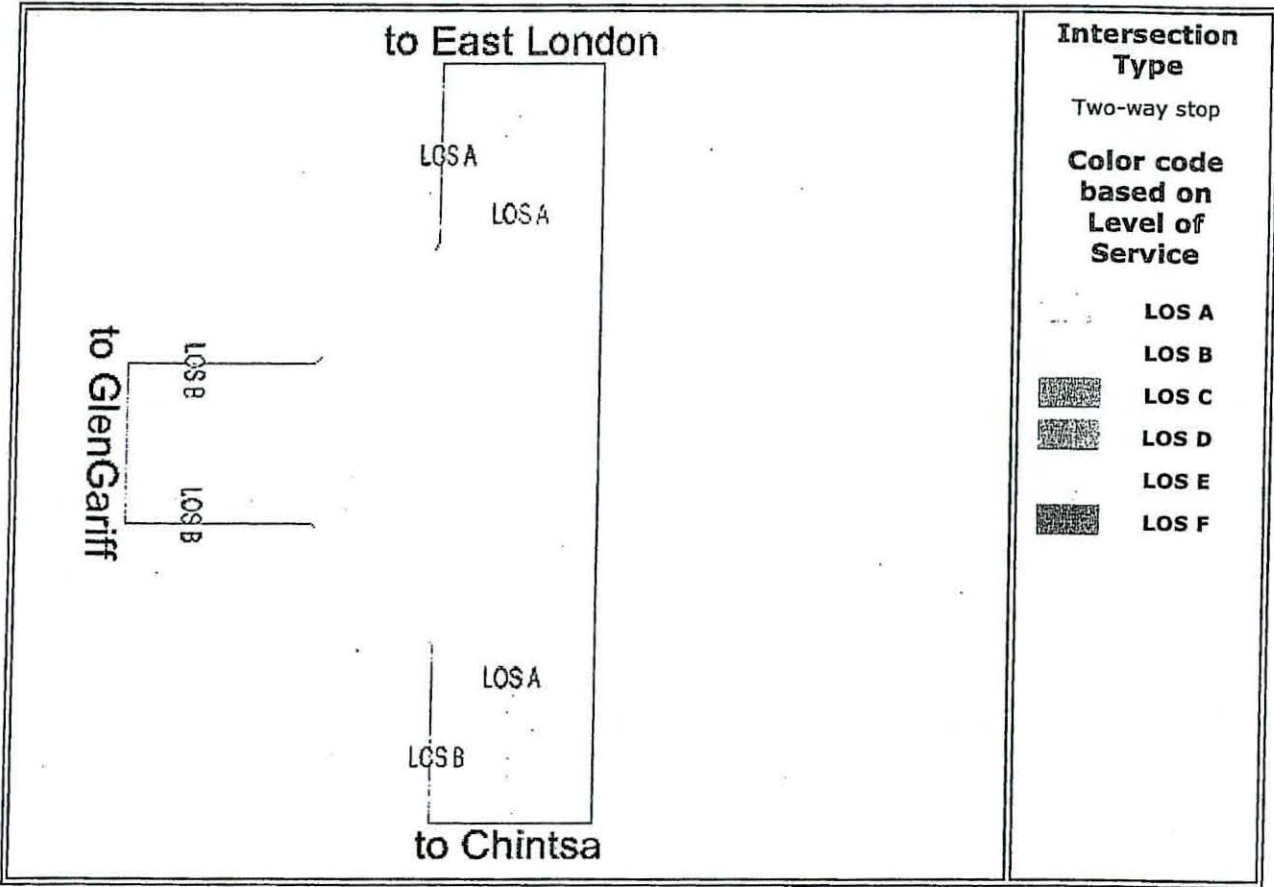
SIDRA
INTERSECTION

Level of Service

Based on Delay (HCM method)

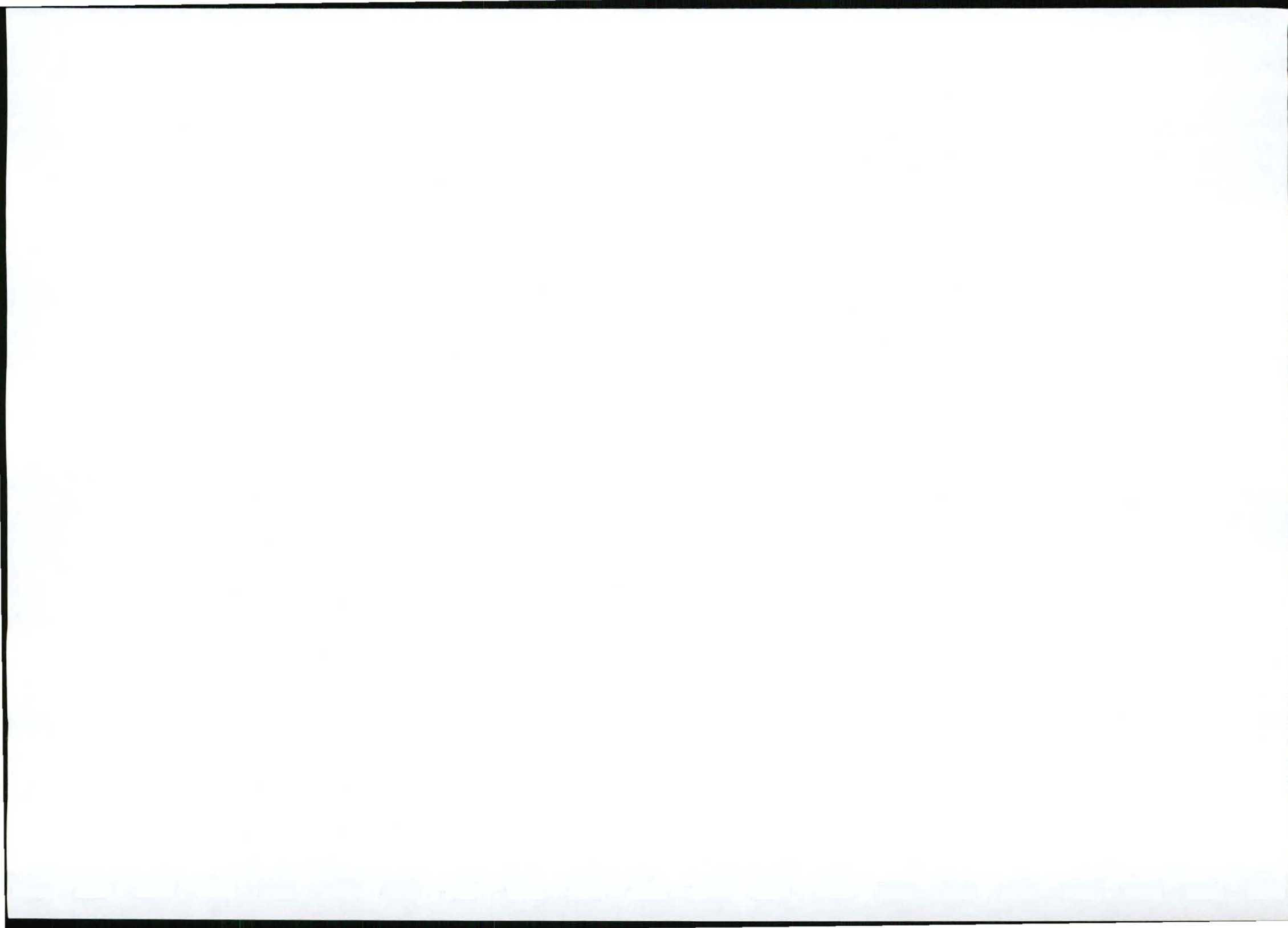
DR2730/DR2737

Future am peak



Site: AM peak future 2014
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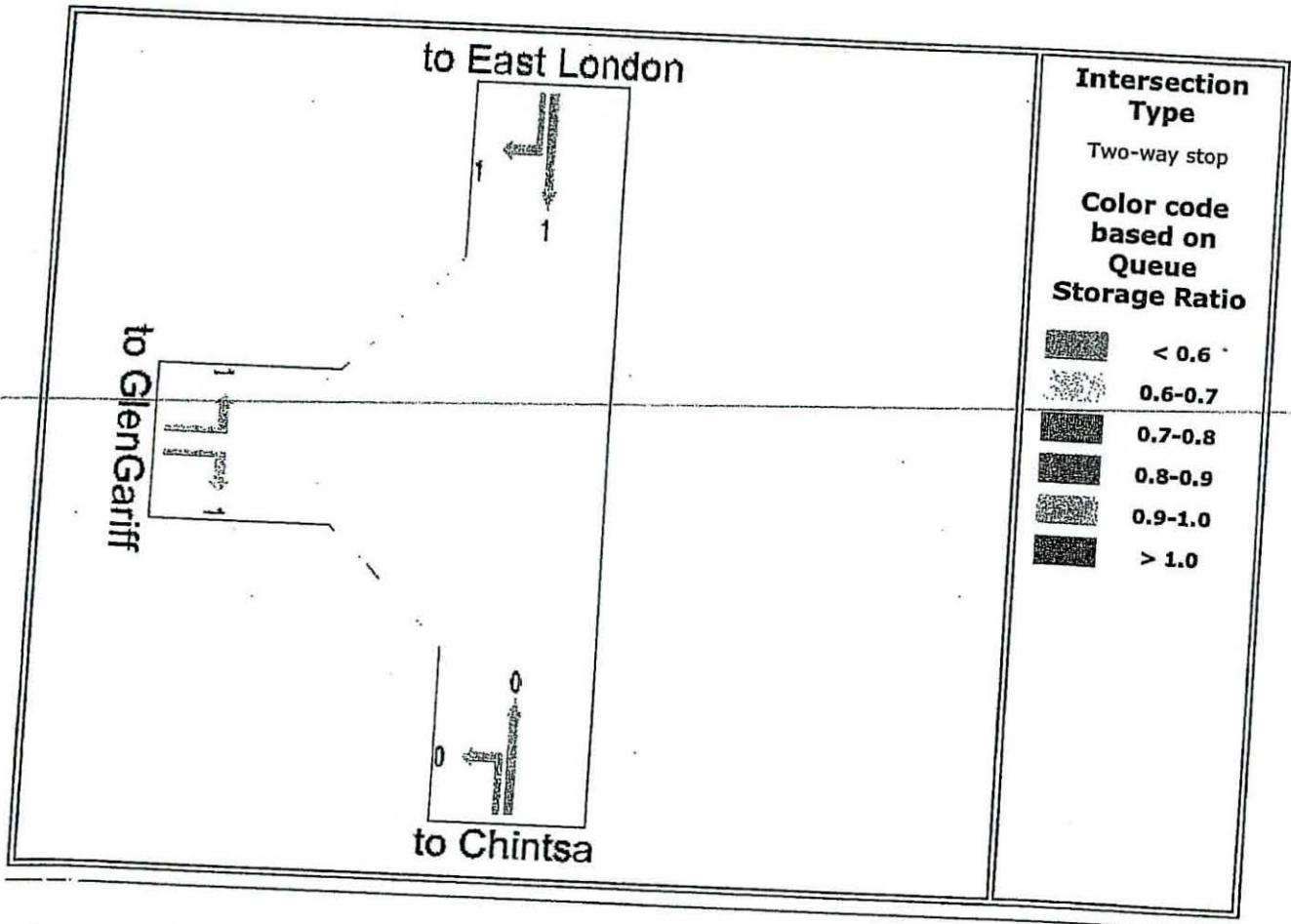
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INTERSECTION

Queue Distance

Largest 95% Back of Queue for any lane used by movement (metres)

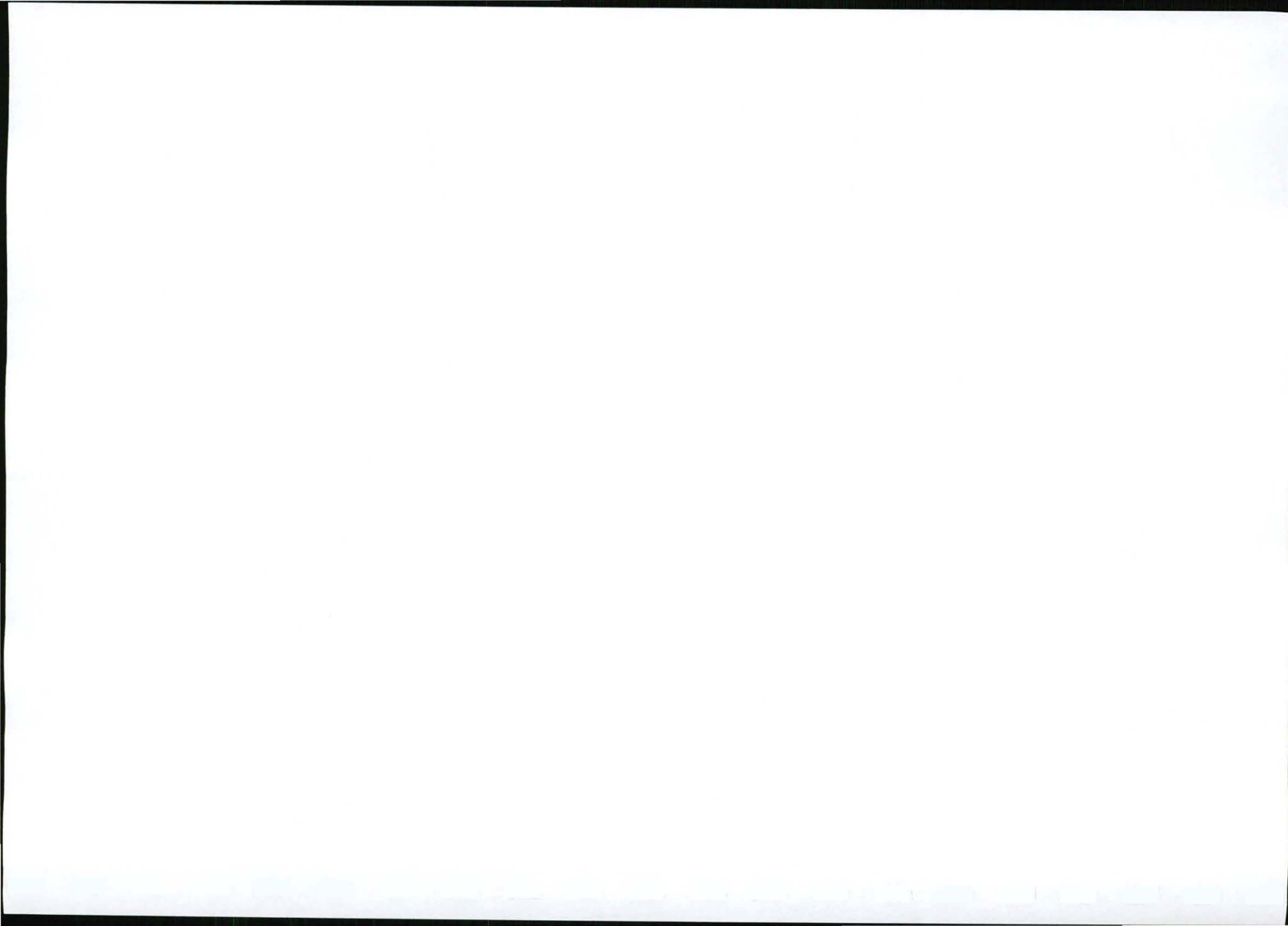
DR2730/DR2737

Existing am peak



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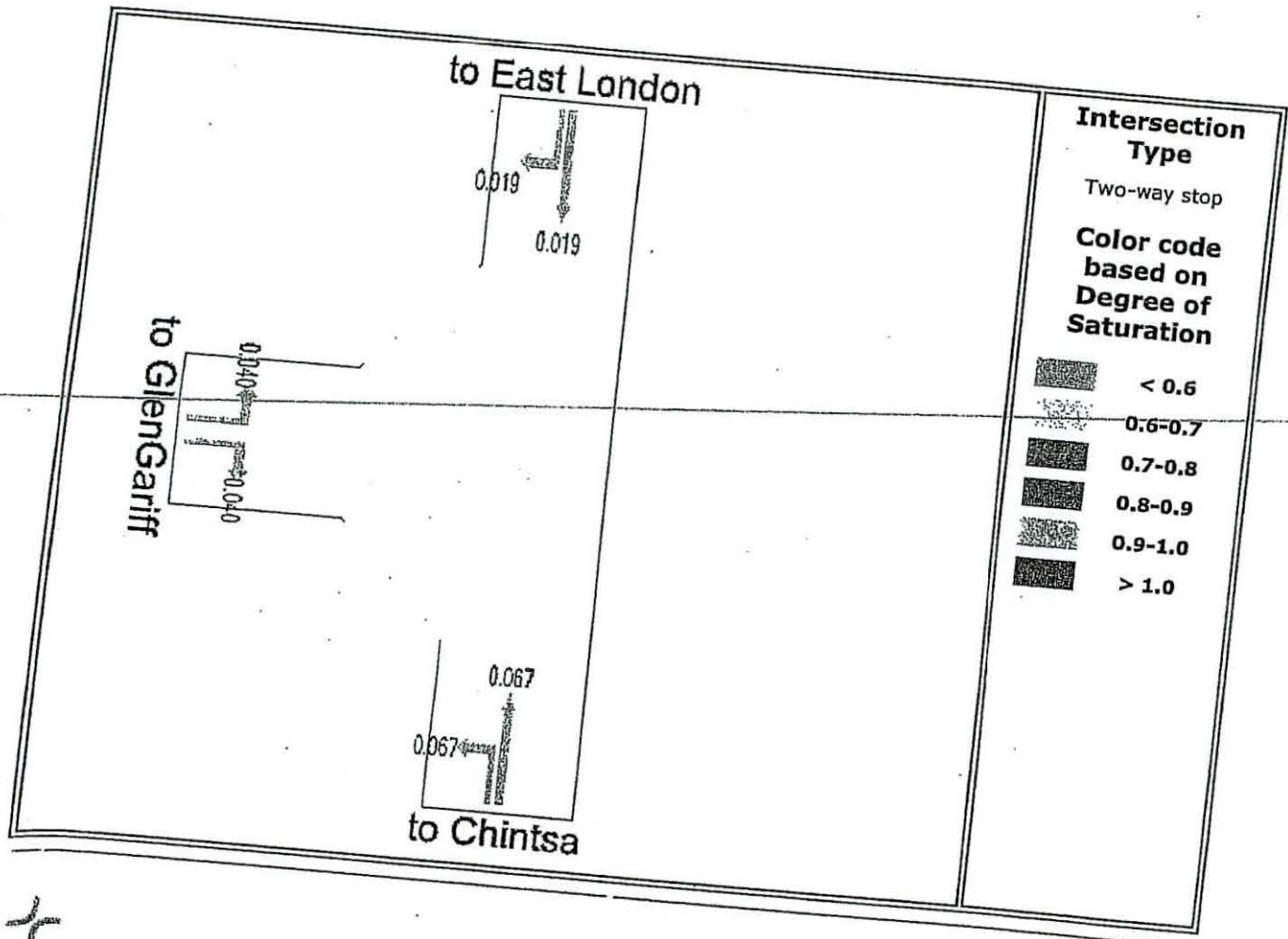
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INTERSECTION


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

DR2730/DR2737

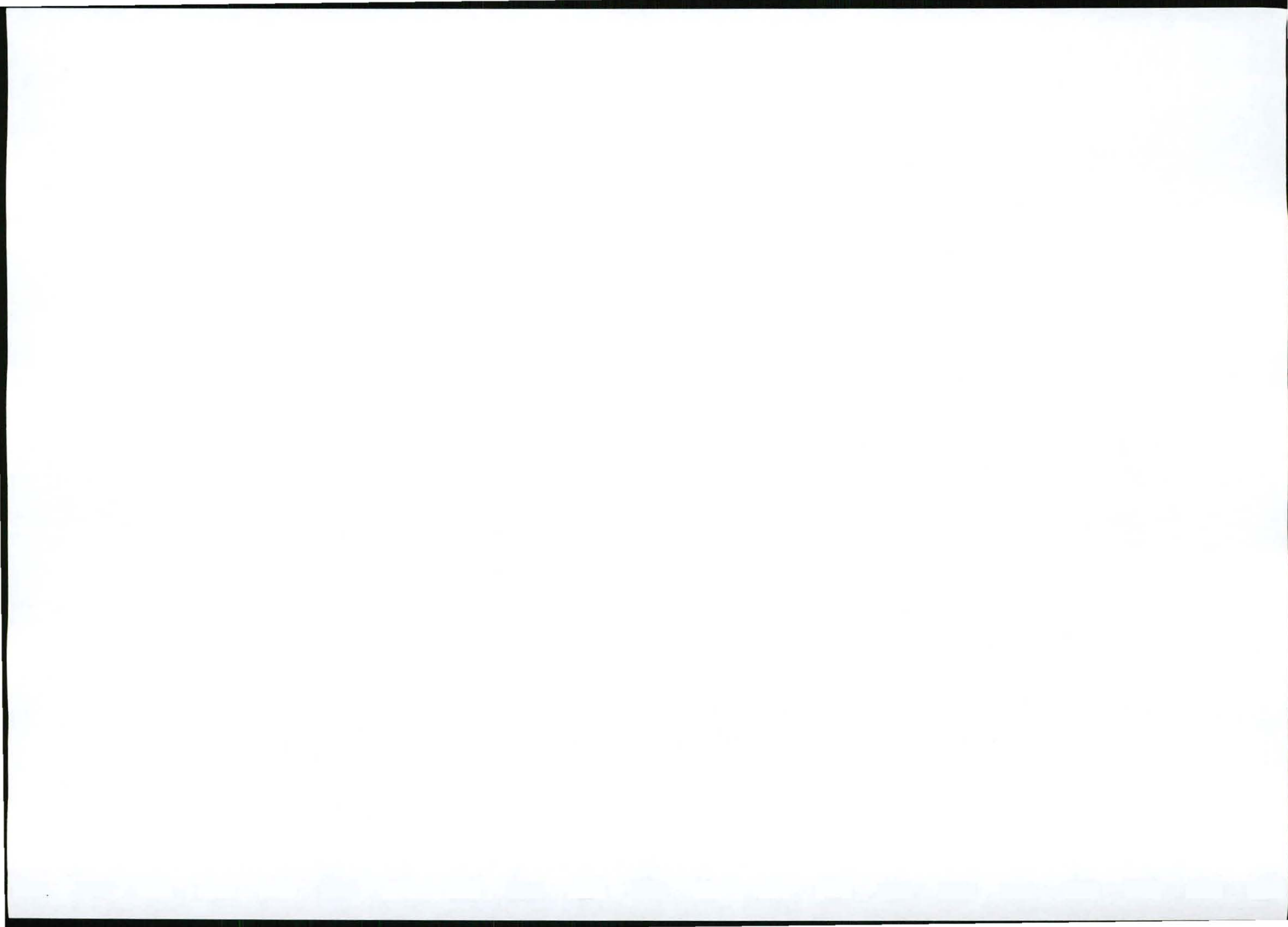
Existing am peak




SIDRA SOLUTIONS

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INTERSECTION

Intersection Summary

DR2730/DR2737

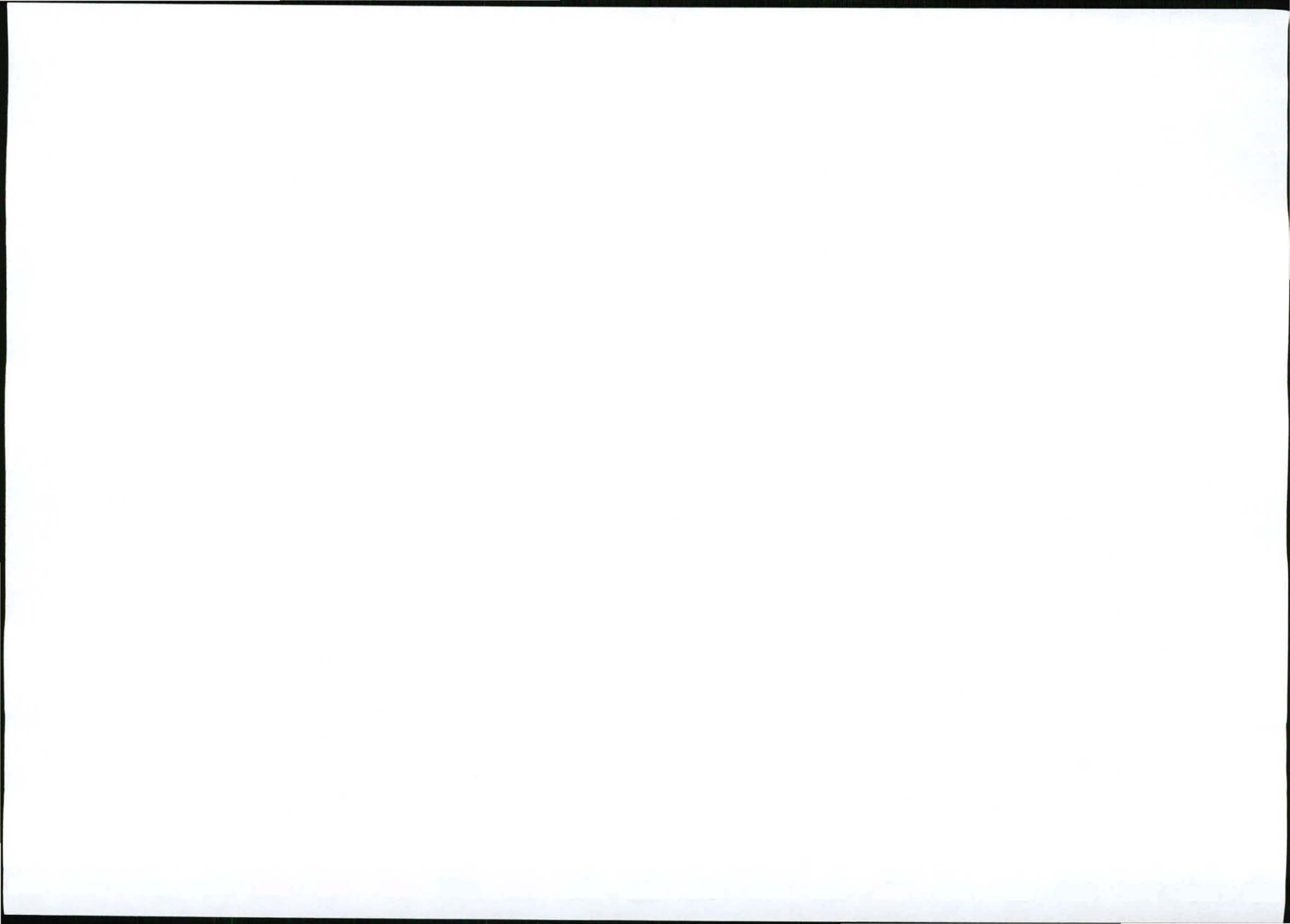
Existing pm peak

Performance Measure	Vehicles	Persons
Demand Flows - Total	194 veh/h	291 pers/h
Percent Heavy Vehicles	2.6 %	
Degree of Saturation	0.085	
Effective Intersection Capacity	2290 veh/h	
95% Back of Queue (m)	4 m	
95% Back of Queue (veh)	0.6 veh	
Control Delay (Total)	0.15 veh-h/h	0.22 pers-h/h
Control Delay (Average)	2.7 s/veh	2.7 s/pers
Level of Service	Not Applicable	
Level of Service (Worst Movement)	LOS B	
Total Effective Stops	41 veh/h	62 pers/h
Effective Stop Rate	0.21 per veh	0.21 per pers
Proportion Queued	0.09	0.09
Travel Distance (Total)	117.4 veh-km/h	176.1 pers-km/h
Travel Distance (Average)	605 m	605 m
Travel Time (Total)	2.1 veh-h/h	3.2 pers-h/h
Travel Time (Average)	39.5 secs	39.5 secs
Travel Speed	55.1 km/h	55.1 km/h
Operating Cost (Total)	276 R/h	276 R/h
Fuel Consumption (Total)	10.7 L/h	
Carbon Dioxide (Total)	26.7 kg/h	
Hydrocarbons (Total)	0.039 kg/h	
Carbon Monoxide (Total)	1.40 kg/h	
NOX (Total)	0.054 kg/h	

3 . 3 . UTIO .

Site: PM peak base year
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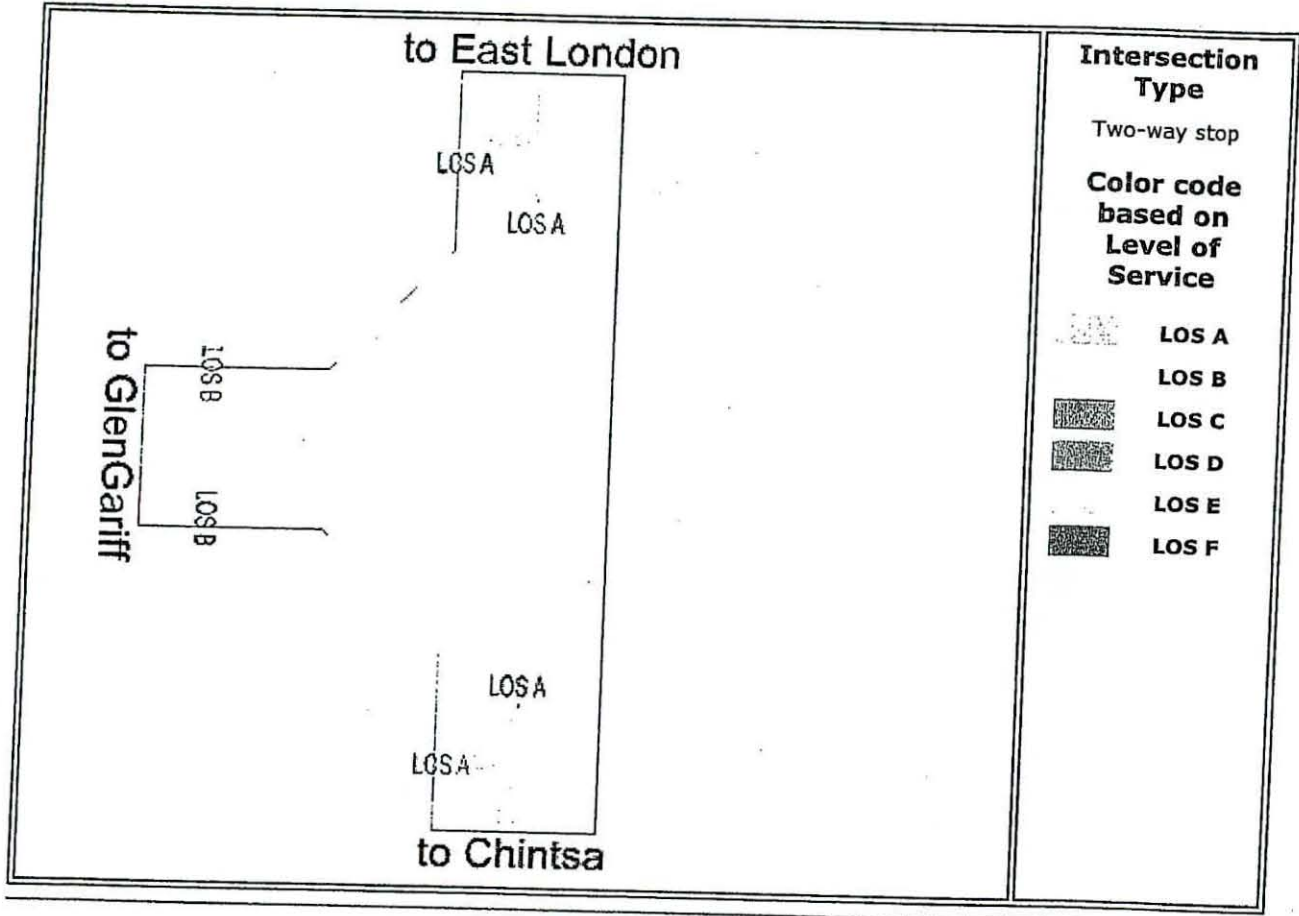
SIDRA
INTERSECTION

Level of Service

Based on Delay (HCM method)

DR2730/DR2737

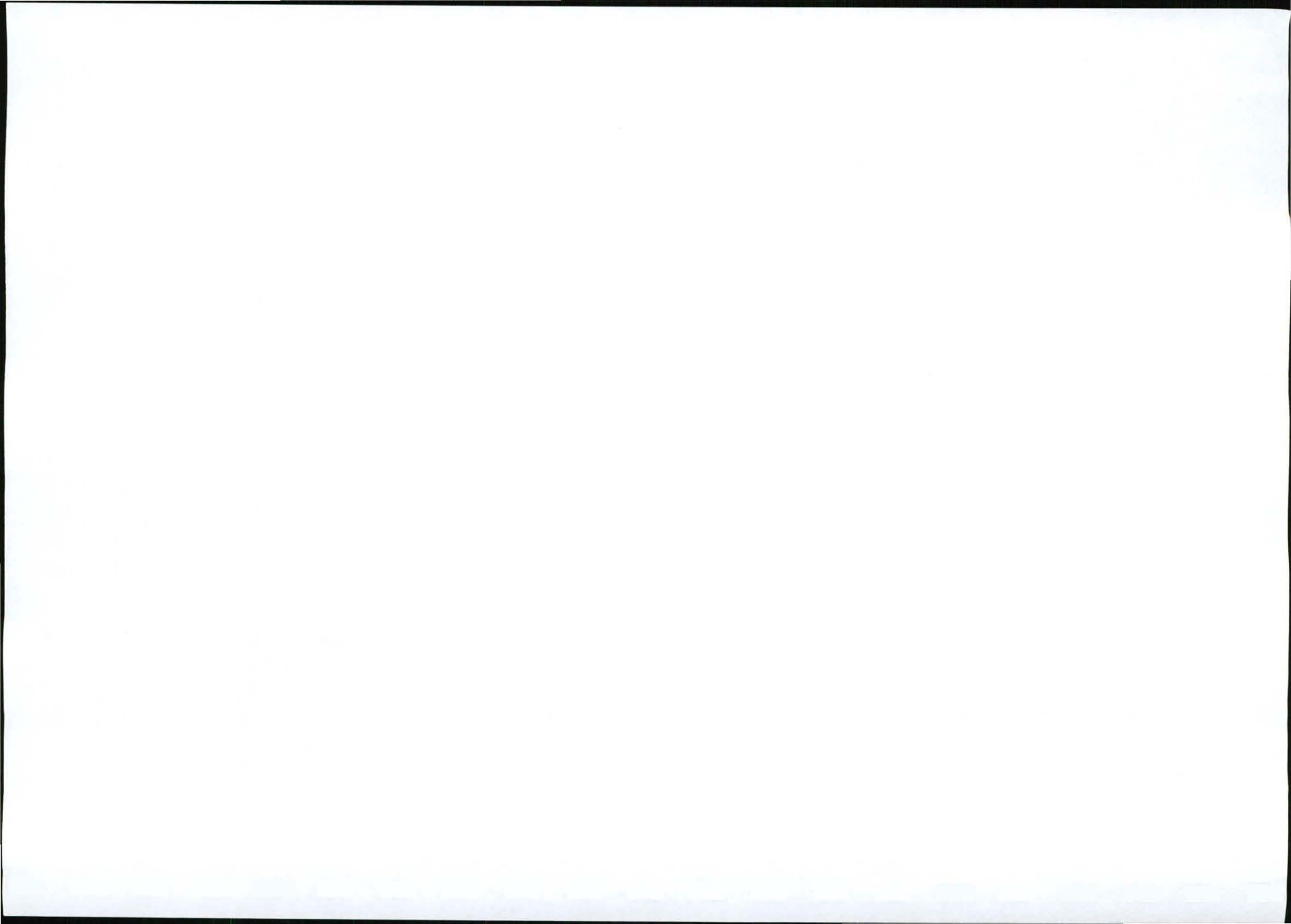
Existing pm peak



IE - OUTPUT

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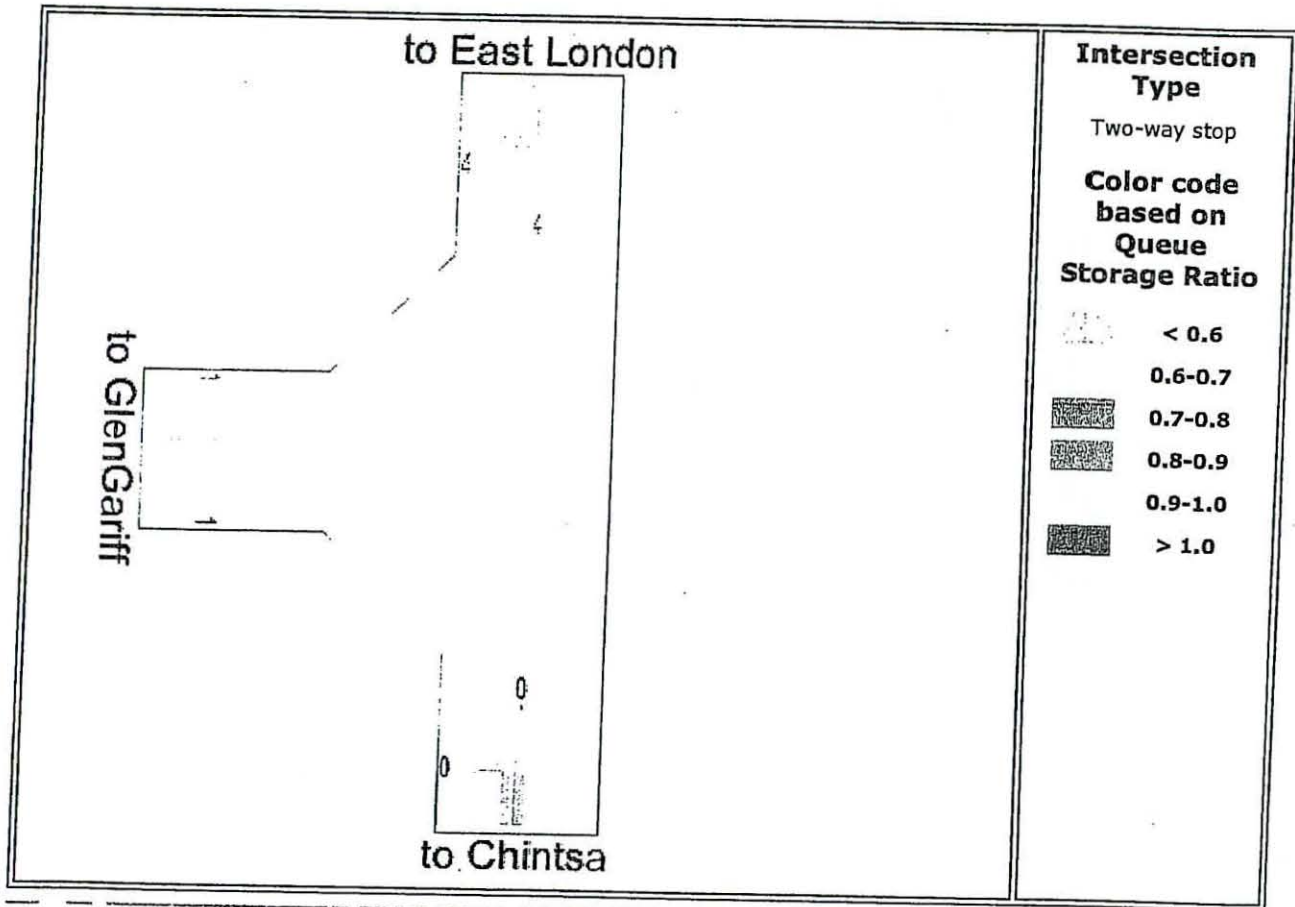
SIDRA
INTERSECTION

Queue Distance

Largest 95% Back of Queue for any lane used by movement (metres)

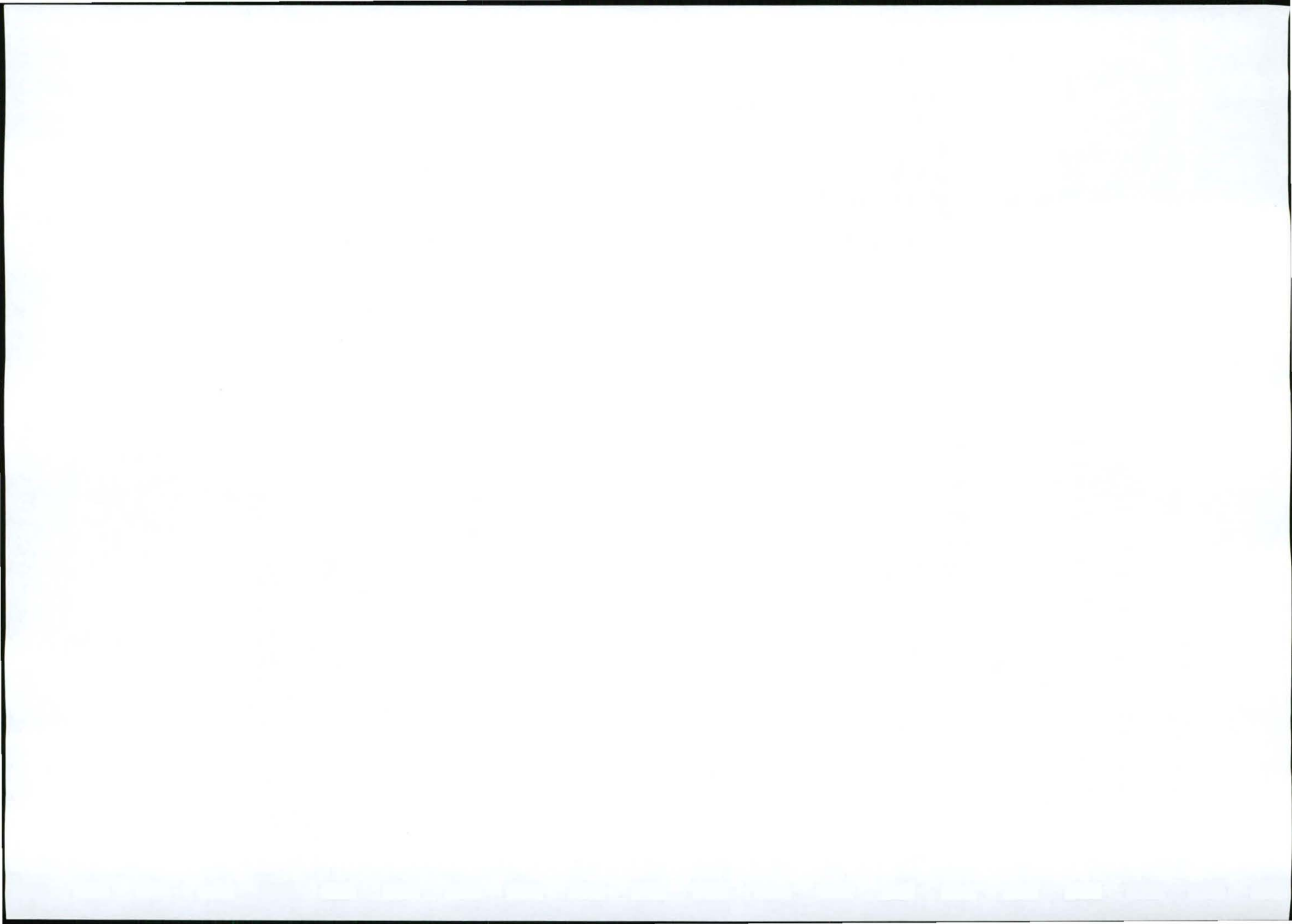
DR2730/DR2737

Existing pm peak



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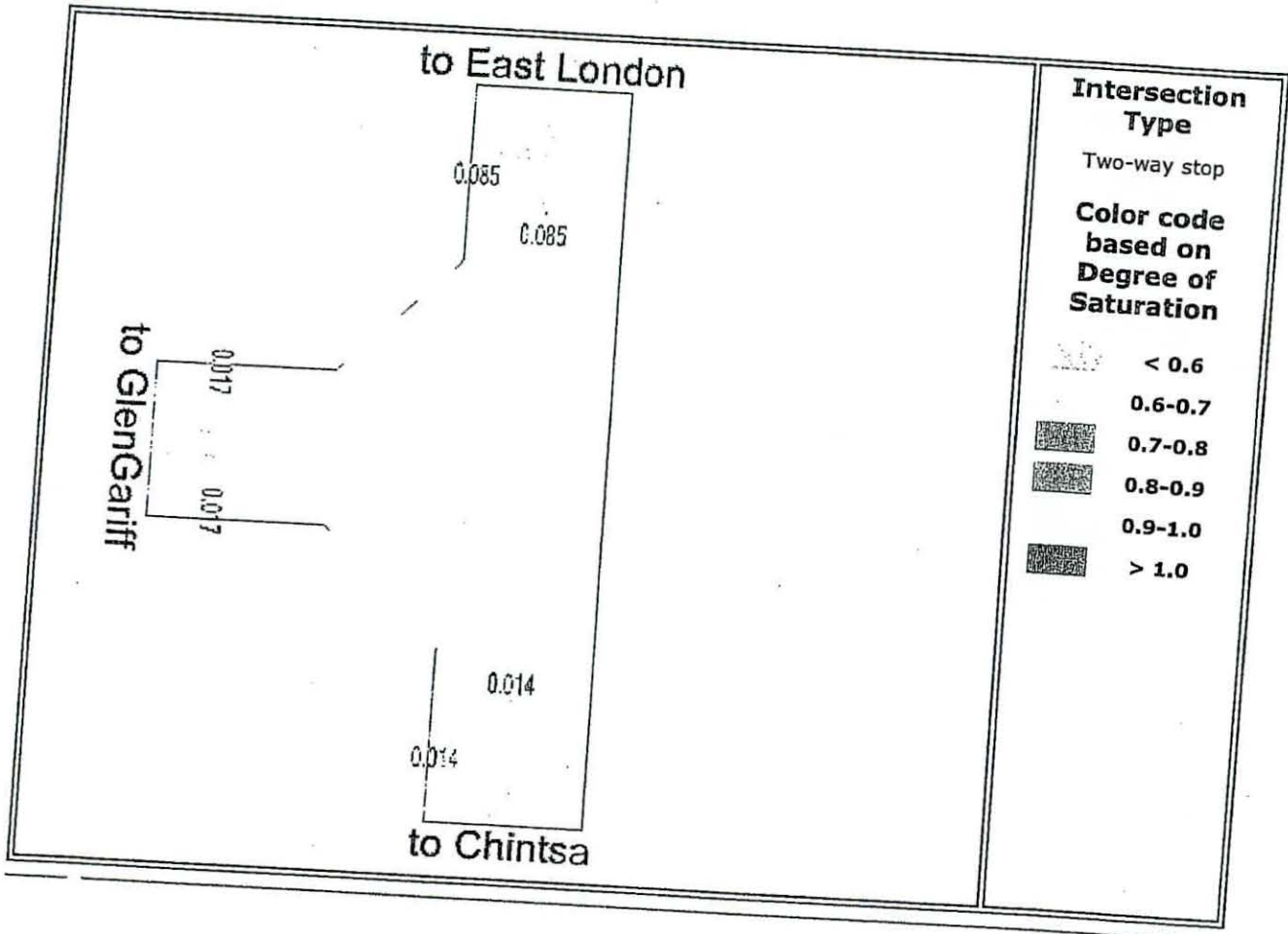
SIDRA
INTERSECTION

Degree of Saturation

Demand Volume / Capacity (v/c) ratio

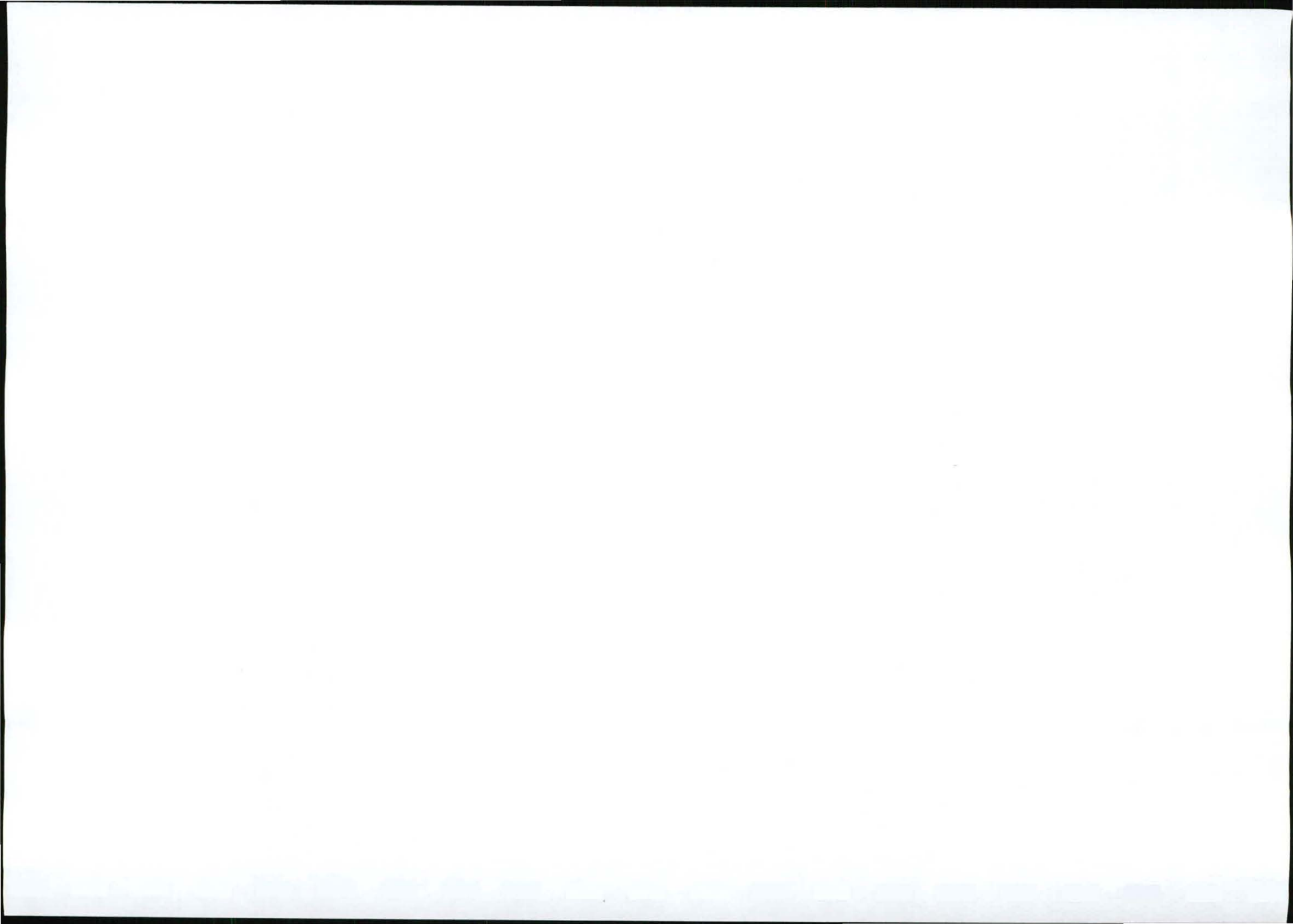
DR2730/DR2737

Existing pm peak



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Intersection Summary

SIDRA
INTERSECTION

Intersection Summary

DR2730/DR2737

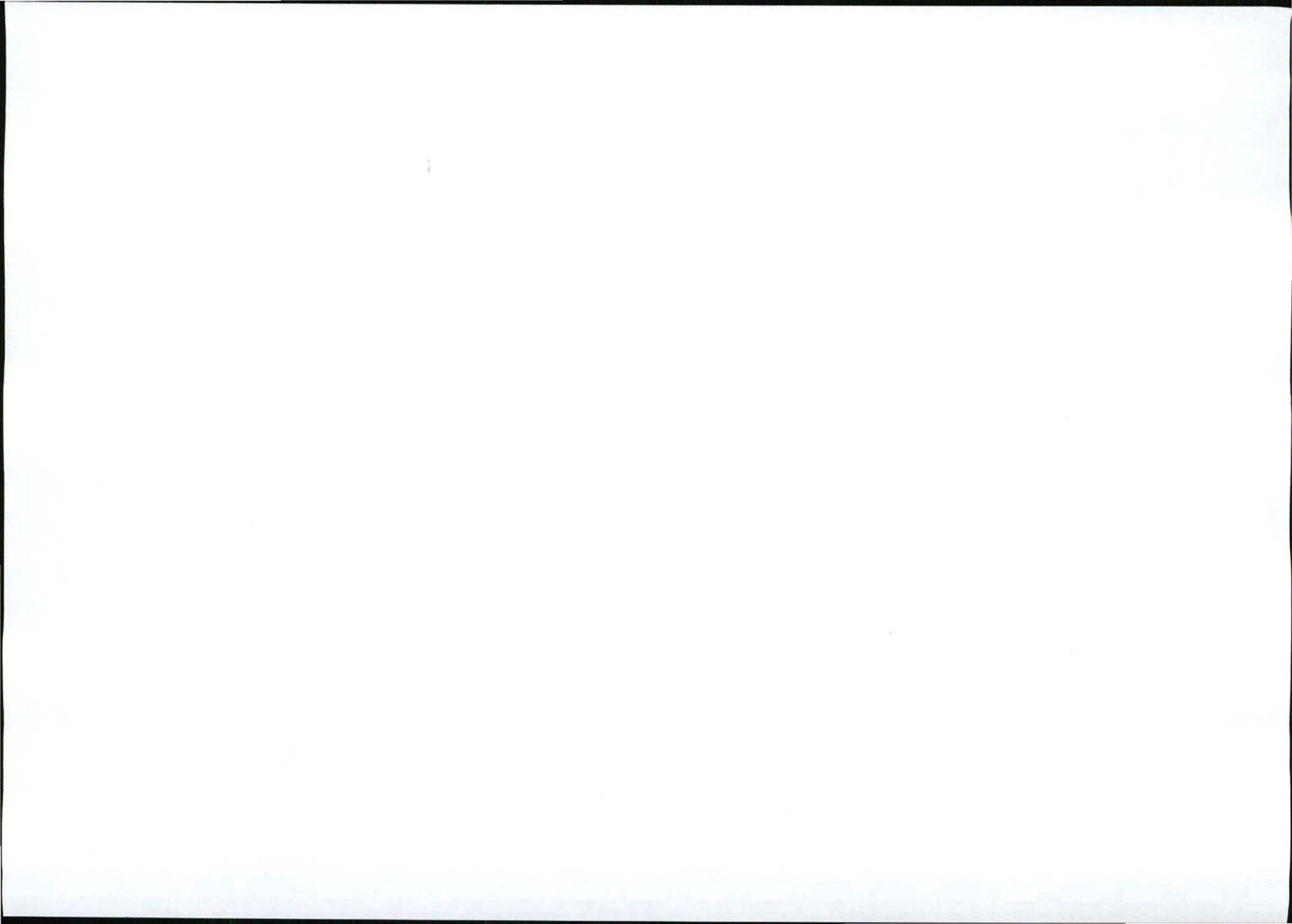
Future Am peak

Performance Measure	Vehicles	Persons
Demand Flows - Total	238 veh/h	357 pers/h
Percent Heavy Vehicles	4.6 %	
Degree of Saturation	0.104	
Effective Intersection Capacity	2293 veh/h	
95% Back of Queue (m)	5 m	
95% Back of Queue (veh)	0.7 veh	
Control Delay (Total)	0.19 veh-h/h	0.29 pers-h/h
Control Delay (Average)	2.9 s/veh	2.9 s/pers
Level of Service	Not Applicable	
Level of Service (Worst Movement)	LOS B	
Total Effective Stops	51 veh/h	76 pers/h
Effective Stop Rate	0.21 per veh	0.21 per pers
Proportion Queued	0.10	0.10
Travel Distance (Total)	144.1 veh-km/h	216.1 pers-km/h
Travel Distance (Average)	605 m	605 m
Travel Time (Total)	2.6 veh-h/h	3.9 pers-h/h
Travel Time (Average)	39.7 secs	39.7 secs
Travel Speed	54.9 km/h	54.9 km/h
Operating Cost (Total)	355 R/h	355 R/h
Fuel Consumption (Total)	14.1 L/h	
Carbon Dioxide (Total)	35.3 kg/h	
Hydrocarbons (Total)	0.051 kg/h	
Carbon Monoxide (Total)	1.95 kg/h	
NOX (Total)	0.073 kg/h	

SIDRA SOLUTIONS

Site: PM peak future 2014 year
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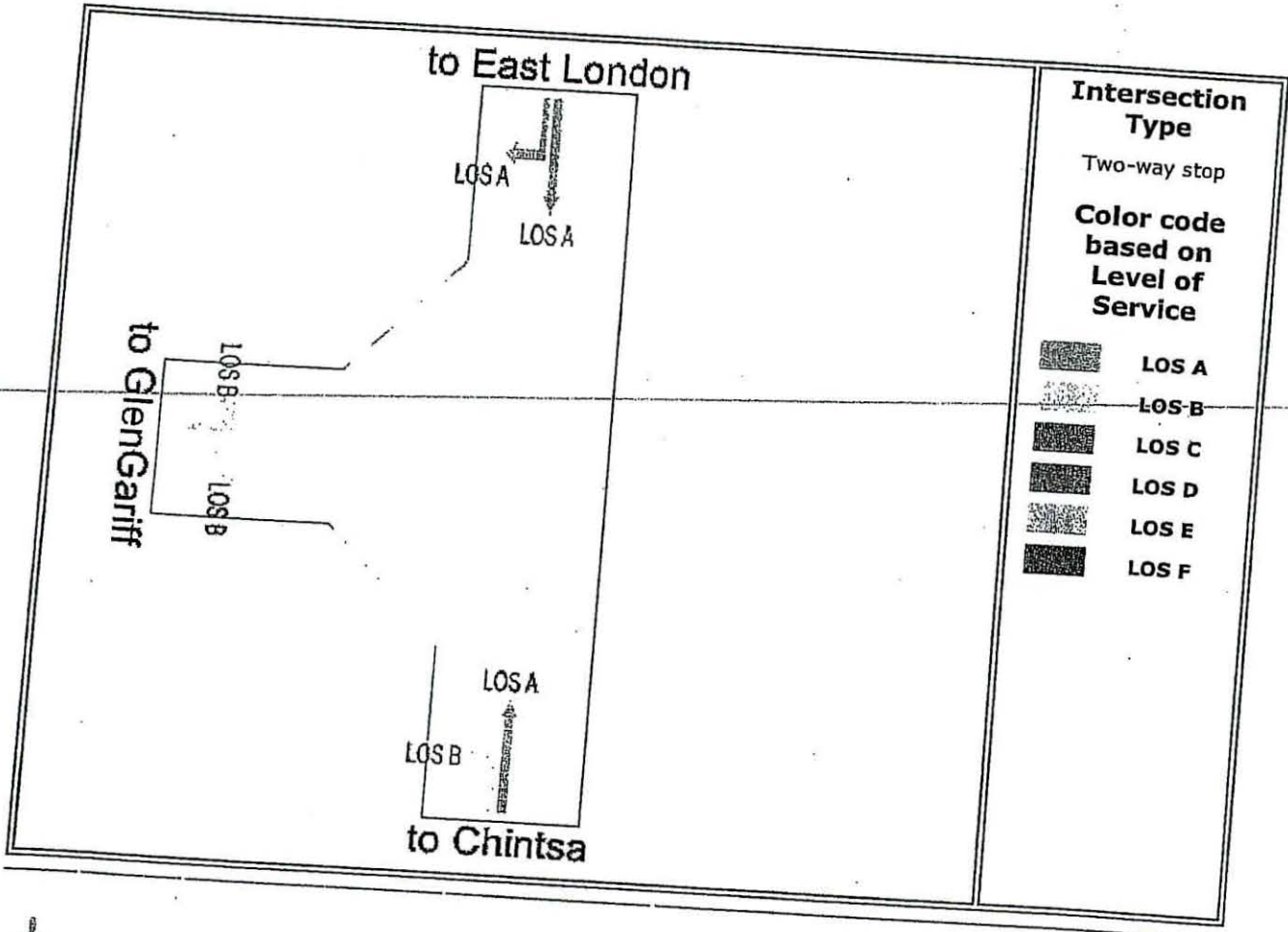
SIDRA
INTERSECTION

Level of Service

Based on Delay (HCM method)

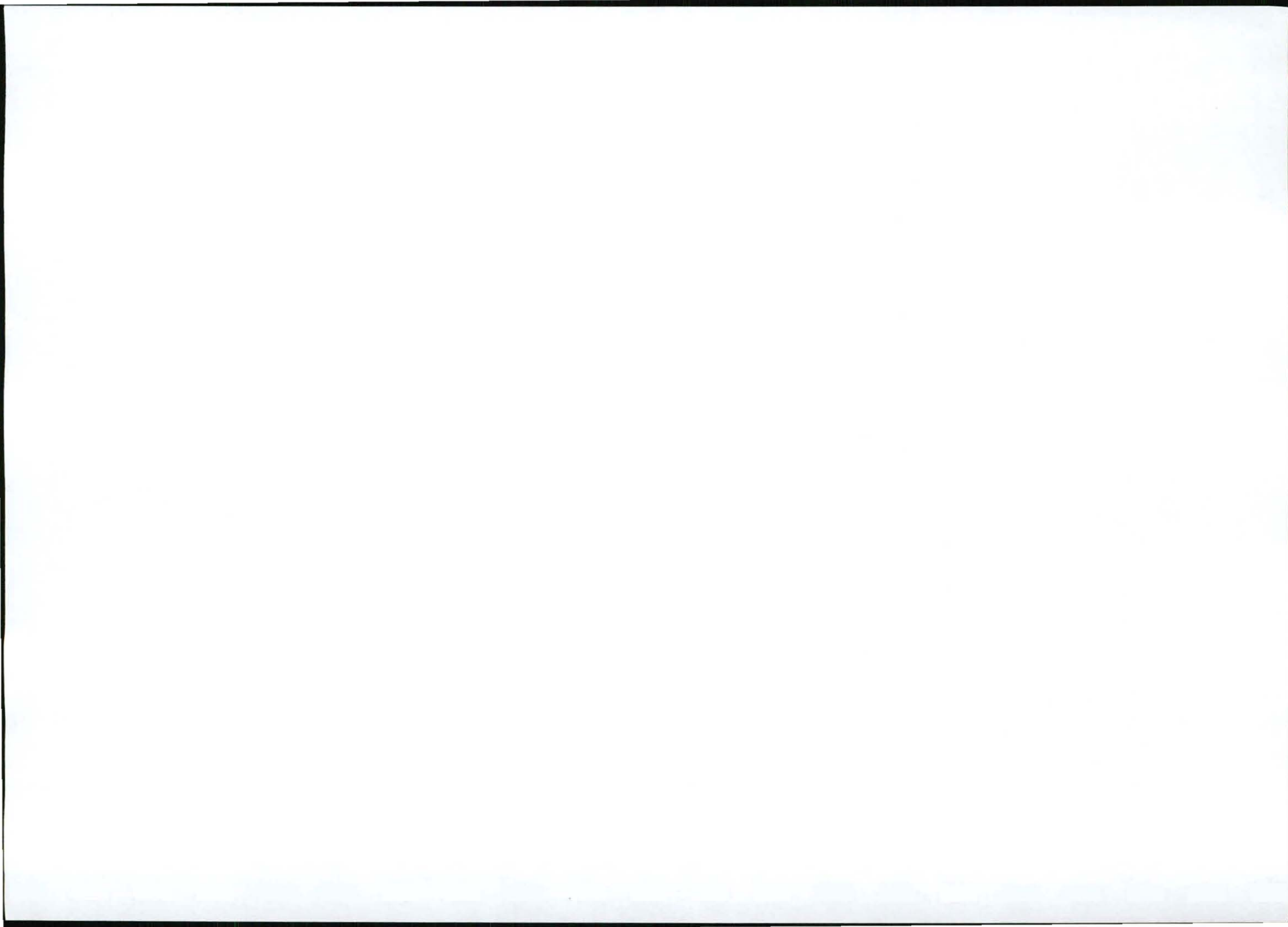
DR2730/DR2737

Existing am peak



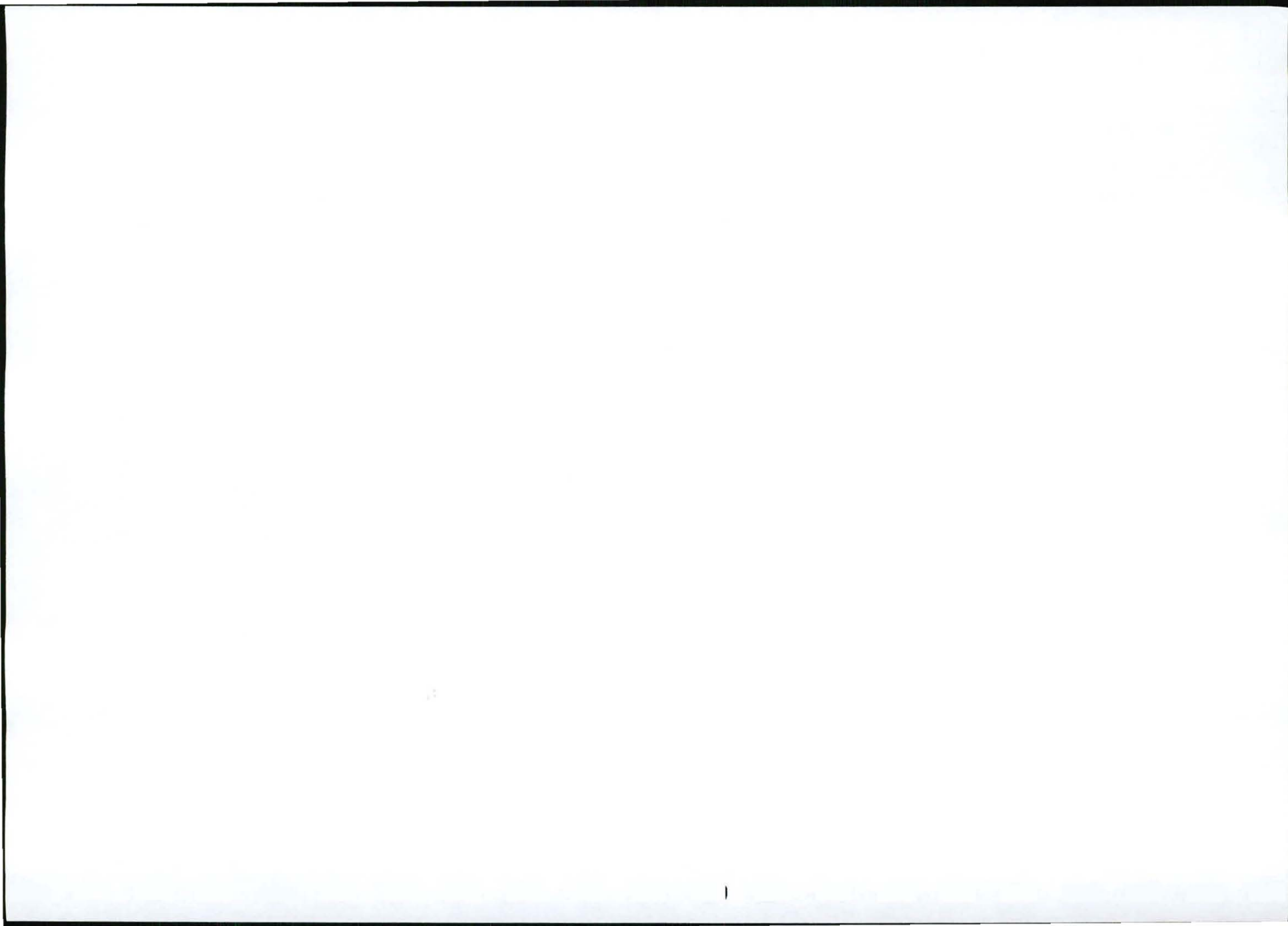
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ANNEXURE K

Agricultural Basic Assessment Report



AREENA RIVENDELL & ISLAND VIEW ESTATE

AGRICULTURAL DESKTOP STUDY

12 October 2009

CONSULTANT

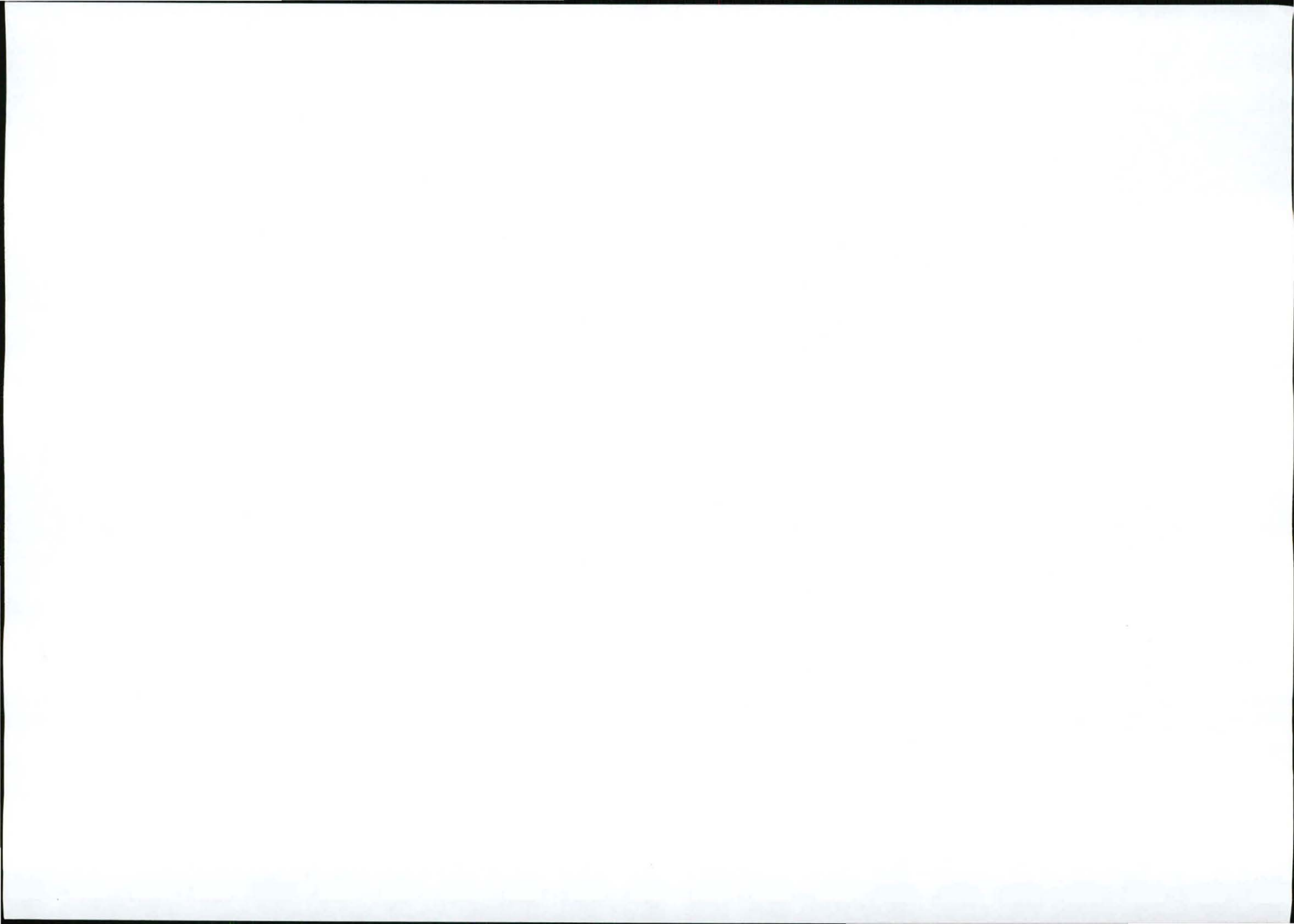
Isi-Xwlba Consulting CC (C J Bradfield)
P. O. Box 175
Kel Mouth
5260

Tel: (043) 841 1488
Fax: (043) 841 1497
Email: isi-xwlba@tbnpartner.co.za

CLIENT

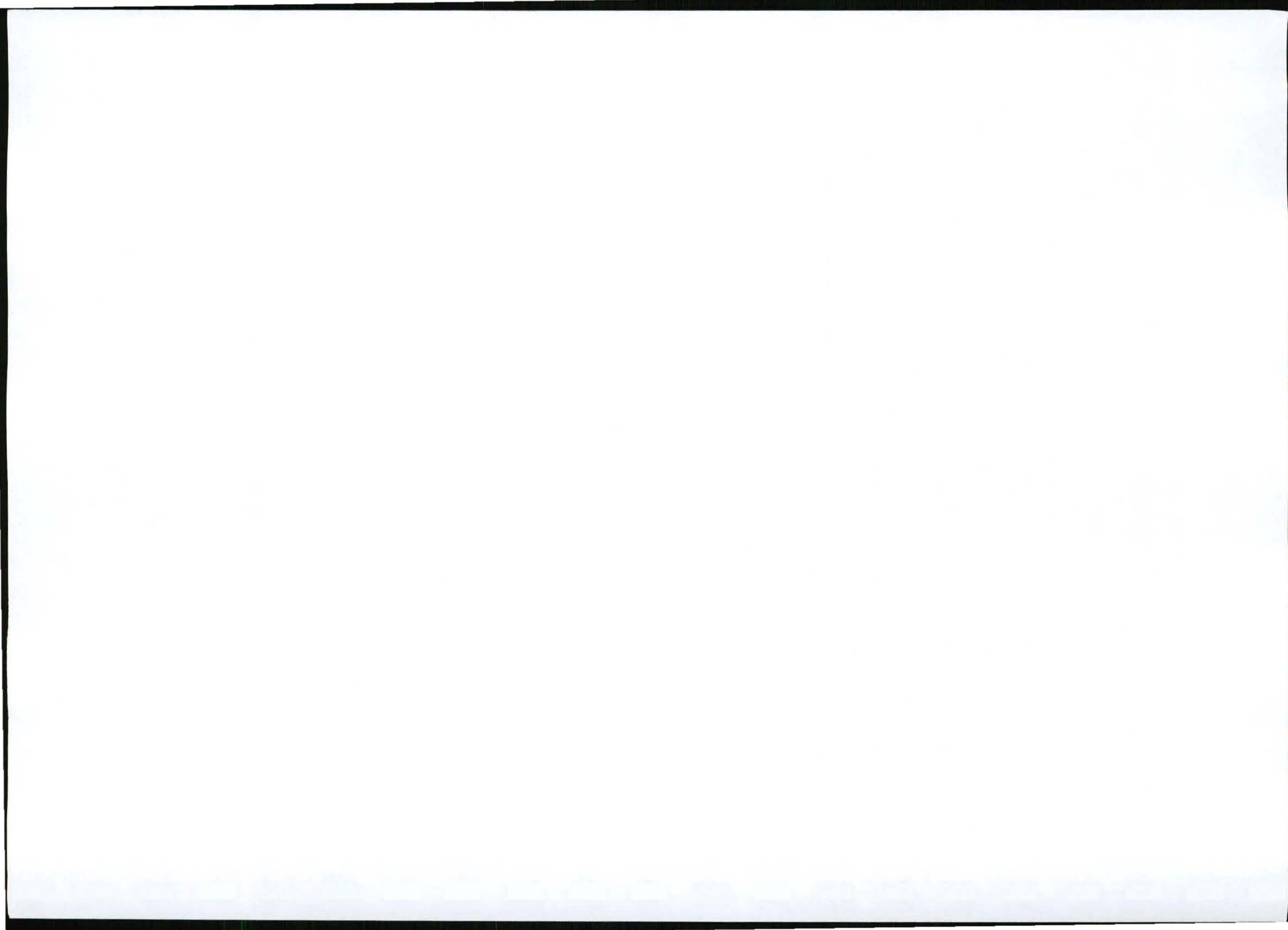
Areena Resort Trust
c/o NPM PLANNING
PO Box 19345
Tecoma
5214

Tel: (043) 722 2935
Fax: 086 509 3487
Contact : Mr D Poortman



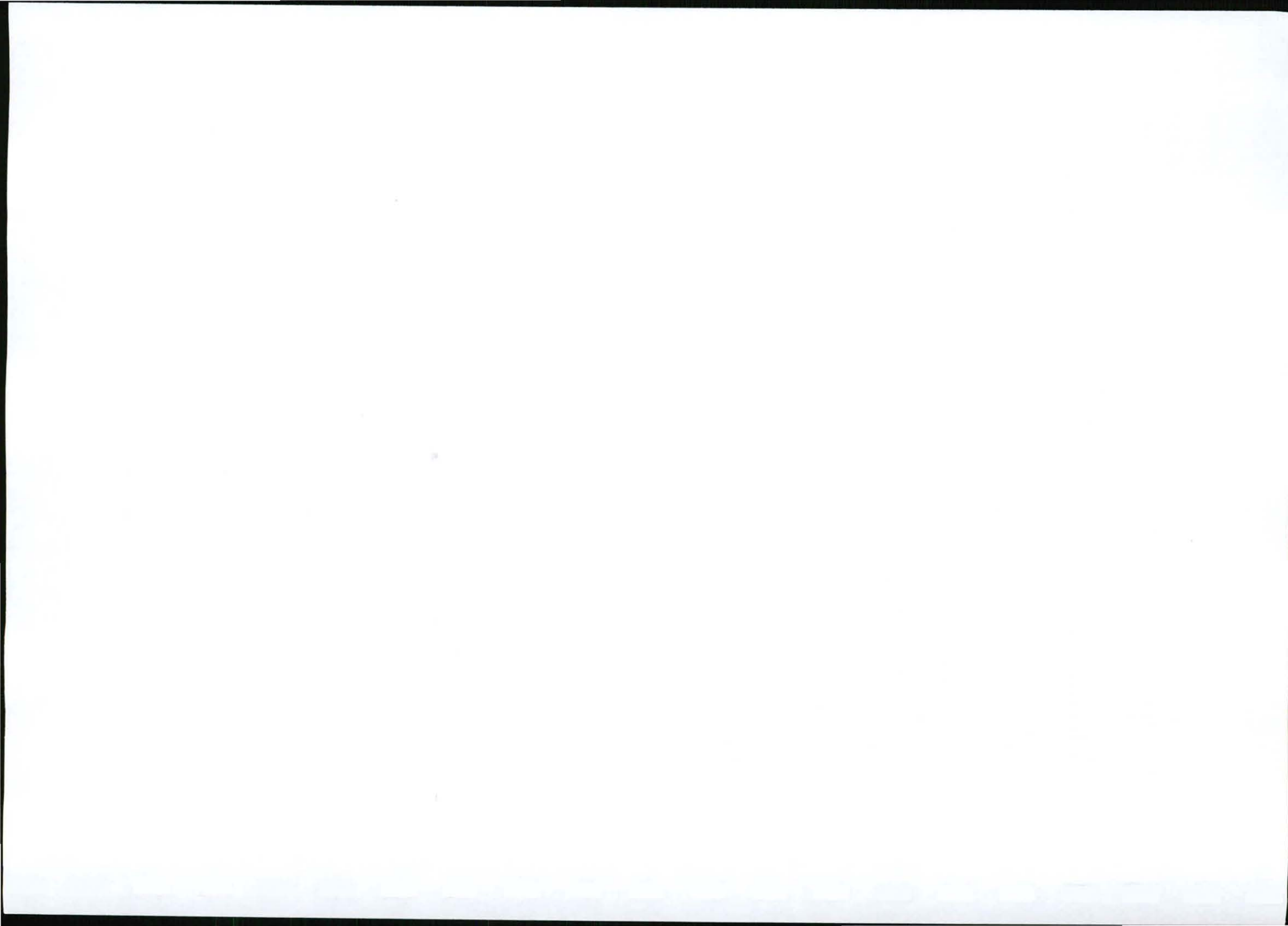
PROJECT DETAILS

TITLE	Areena Rivendell & Island View Estate Agricultural Desktop Study
AUTHOR	Chris Bradfield
CLIENT	Areena Resort Trust
REPORT STATUS	Agricultural Desktop Study
REPORT NUMBER	1
SUBMISSION DATE	12 October 2009



CONTENTS

	Project details	1
	Contents	2
1	INTRODUCTION AND BACKGROUND.....	3
	1.1 Introduction	3
	1.2 Terms of reference.....	3
	1.3 Assumptions and limitations.....	3
2	CLIMATE AND NATURAL RESOURCES.....	4
	2.1 Introduction	4
	2.2 Climate.....	4
	2.3 Soils.....	4
	2.4 Water	5
	2.5 Vegetation.....	6
3	CURRENT LAND USE.....	8
4	OPINION	9
5	REFERENCES.....	10



1 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

NPM Planning have been appointed by Areena Resort Trust to submit the necessary applications for the subdivision and rezoning of the farms listed hereunder.

- i. Portion 2 of Farm 695 – East London
- ii. Portion 7 of Farm 694 – East London
- iii. Portion 5 of Farm 694 – East London
- iv. Portion 6 of Farm 694 – East London
- v. Farm 1419 – East London

None of these properties are used for commercial agriculture purposes at present. A section of the land on portion 7 of Farm 695 has had resort status for a number of years.

The low density resort and estate development is to be implemented in a number of phases. The planned development is more fully described in the proposal prepared by NPM Planning, Town and Regional Planners.

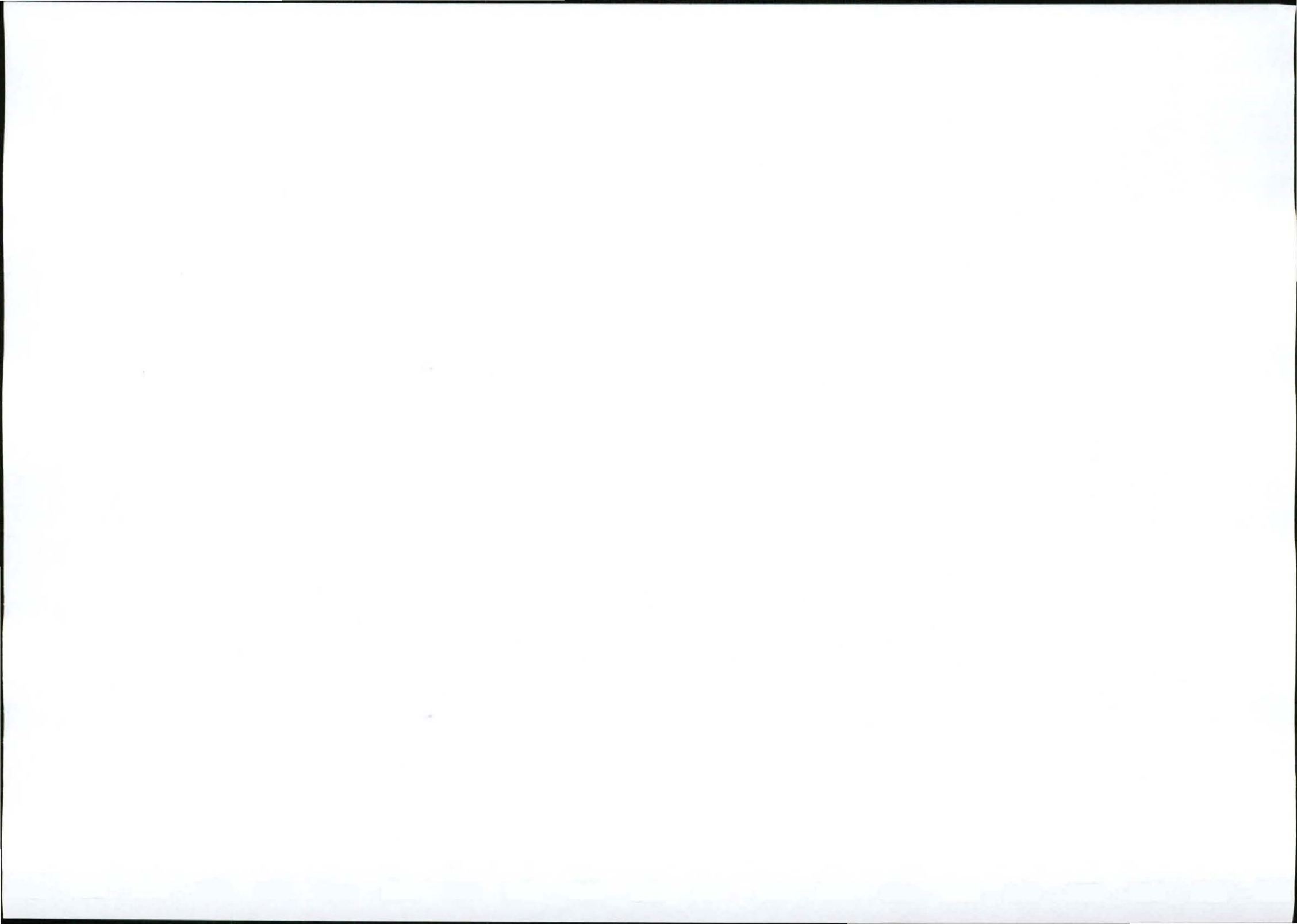
isi-Xwiba Consulting (C J Bradfield) has been appointed by Areena Resort Trust to carry out a agricultural desktop study of the natural resources in terms of agricultural potential, as an entry level assessment to assist with their planning and application. Mr Bradfield's CV is attached hereto.

1.2 TERMS OF REFERENCE

isi-Xwiba Consulting (Mr C. J. Bradfield) was appointed by Areena Resort Trust to undertake a agricultural desktop study, which will encompass an assessment of the natural resources. It is not the purpose of this report to investigate economic viability of farming practises, current or future.

1.3 ASSUMPTIONS AND LIMITATIONS

In undertaking this investigation and compiling the report, it is assumed that the information provided by the client and other role-players is accurate. The content of this report is based on a desktop study only and the information sourced from available material produced by other parties.



2 CLIMATE AND NATURAL RESOURCES

2.1 INTRODUCTION

The study area is located within an elevation of ± 10 m at the Kwelera River to ± 90 m above sea level measured at the highest point on the property. The topography is undulating terrain with steep sided valleys with relatively flat alluvial areas adjacent to the Kwelera River.

2.2 CLIMATE

The area is frost-free. Evaporation is extremely high due to the strong coastal winds and high humidity index. The evaporation rate exceeds the mean annual rainfall.

The mean annual rainfall is in the region of 900 mm pa with a 63% distribution during the Summer months and 37% distribution during the Winter months.

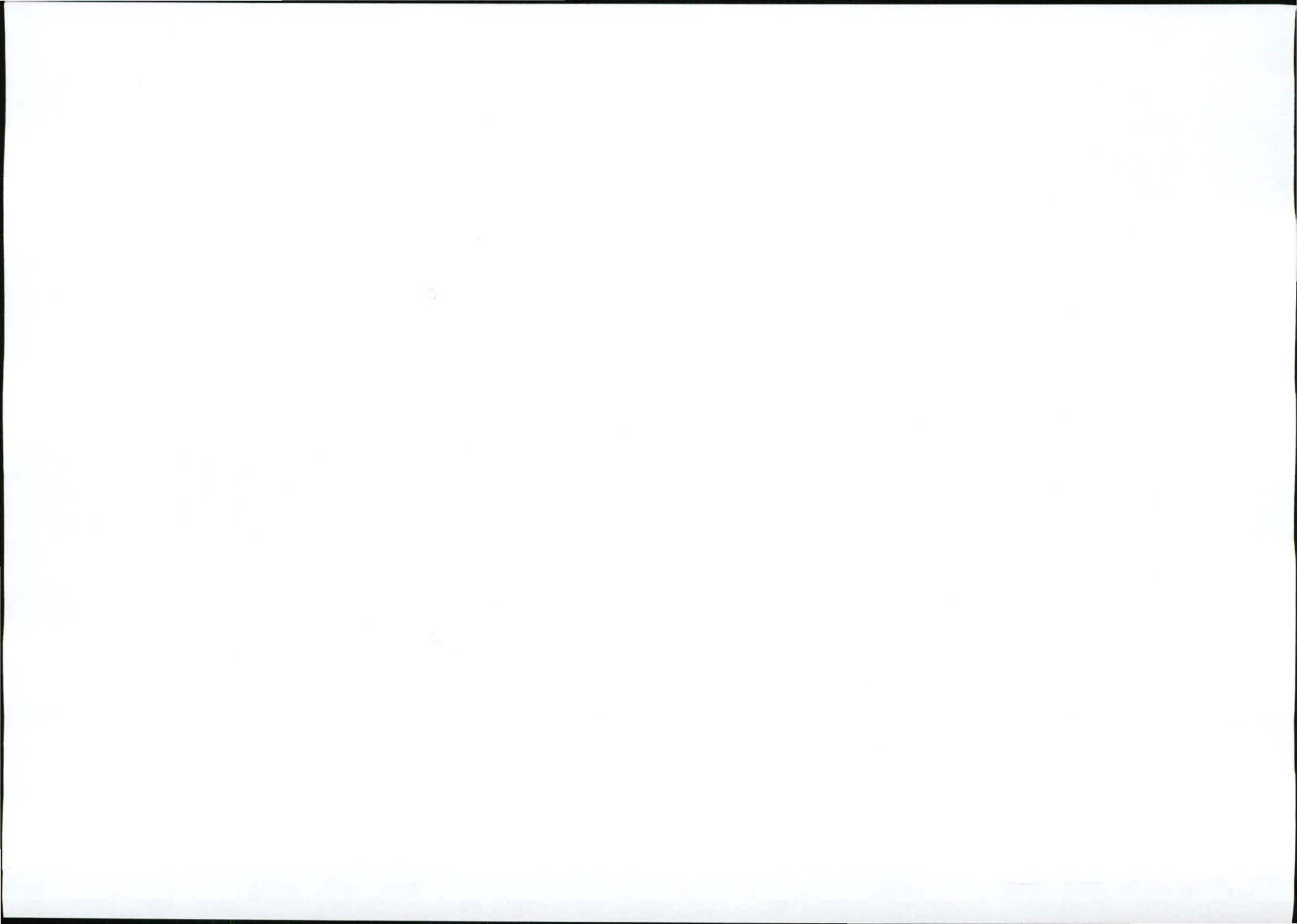
Temperatures are high in Summer (mean range of 14.1 – 25.2 °C) with an extreme maximum of 40.1 °C. Winter temperatures are relatively mild (mean range of 9.9 – 23.1 °C).

2.3 SOILS

The geology is of the Karoo Sequence, Beaufort Group and Katberg Formation. The Lithology is sandstone, with brownish-red and grey mudstone. There are no dolerite intrusions within the confines of the property boundary.

Deep structure-less soil is usually found in the valley bottoms. These areas are generally within the 1 in 100-year flood zone and legislation precludes cultivation in these areas. Soils of the Oakleaf soil form predominate in these localized pockets however the Vilafontes soil form, which has a high erosion hazard rating may occur.

The soils on the remainder of the area are generally shallow, overlying weathered rock, or localised rock outcrops. Typical soil types would be Glenrosa, Mispah and Cartreff soil forms. The topsoil found on these soil forms is usually of a sandy nature with a medium to high erosion hazard rating. The shallow effective depth of these soil forms would place them in the category of low agricultural potential in terms of cropping. Localized areas adjacent to or in close proximity to the study area are known to have soils high in Sodium. This soil type has a high erosion hazard rating.



2.4 WATER

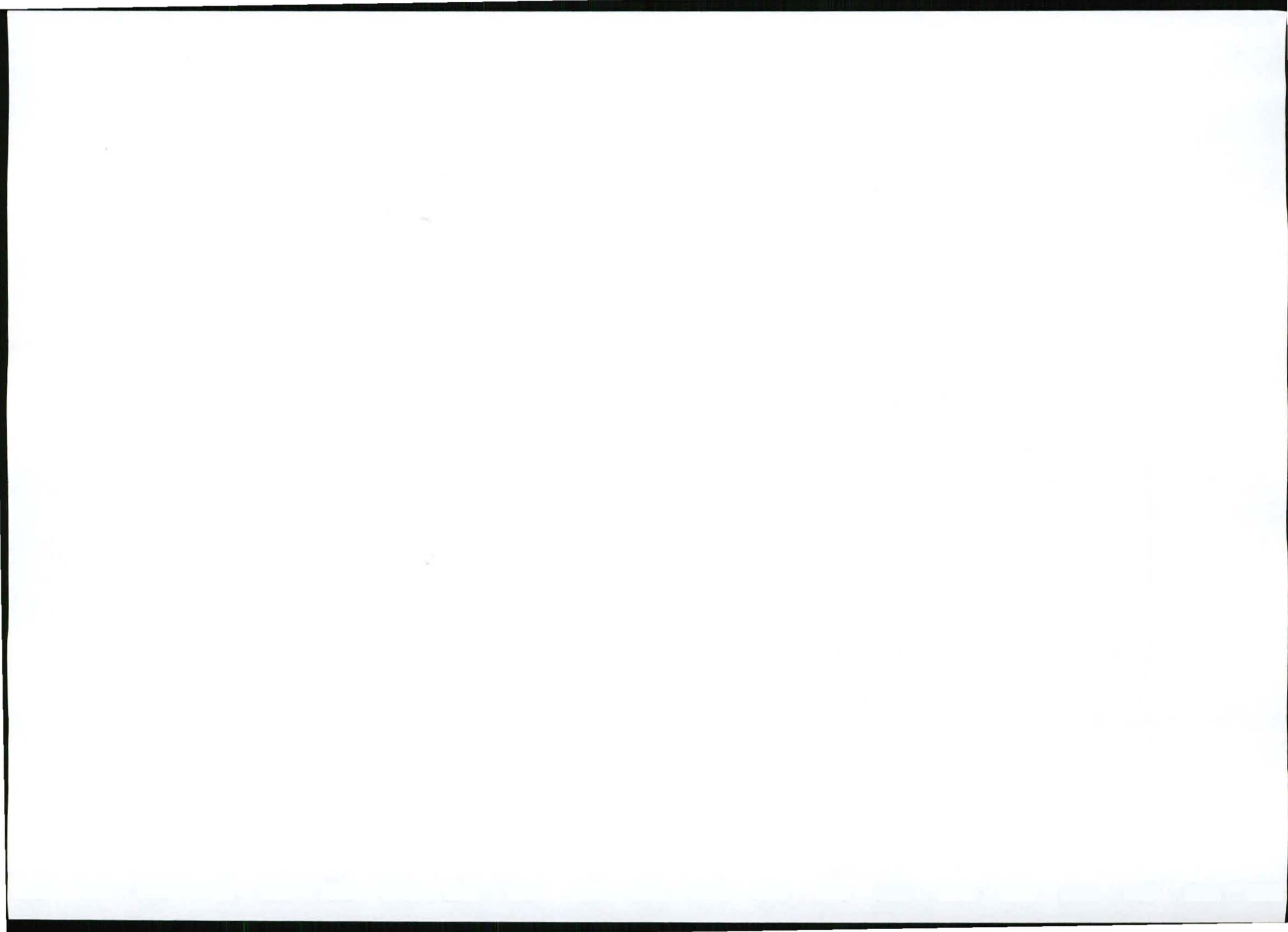
Mr E Rathbone of Areena Resort Trust provided the information hereunder.

- i. The water in the Kwelera River adjacent to the study area has a high salinity content due to the tidal effect;
- ii. Earth dams have been constructed on the land and these form the water source utilized for the current resort activities and these are also used as drinking points by the game species:
and
- iii. There are no boreholes on the property.

Comment:

Farming practises and in particular crop irrigation requirements place a great demand on the water sources due to the high evaporation rate resulting from the strong coastal winds, humidity and summer temperatures. Water, therefore is a very important factor to be taken into consideration when planning an agricultural enterprise.

- a) Water resources within the "ebb and flow" are not suitable for irrigation. The high salinity will build up in the soil profile and result in "brak" soils;
- b) The existing earth dams store run-off water. These dams are not constructed on perennial streams and rely solely on the rainfall from limited catchment areas. This water source was said to be sufficient for the resort and livestock purposes. It is highly unlikely with the limited catchment area that there is sufficient reserve for the irrigation of crops.
- c) Boreholes are generally not a reliable or good source of water in the area. Generally, the borehole water is of poor quality, being high in Sodium and undissolved solids with a poor irrigation rating. There are cases where borehole water has been analysed as unsuitable for poultry and pigs.



2.5 VEGETATION

Vegetation classification maps are generally very broad with the result that small deviations within an area are often not clearly defined. The Acock's or Vegetation Biomes do not provide information in respect of long-term carrying capacities etc. and the author prefers to make use of information from the Department of Agriculture. Map No. 1 presents an aerial view via Google.

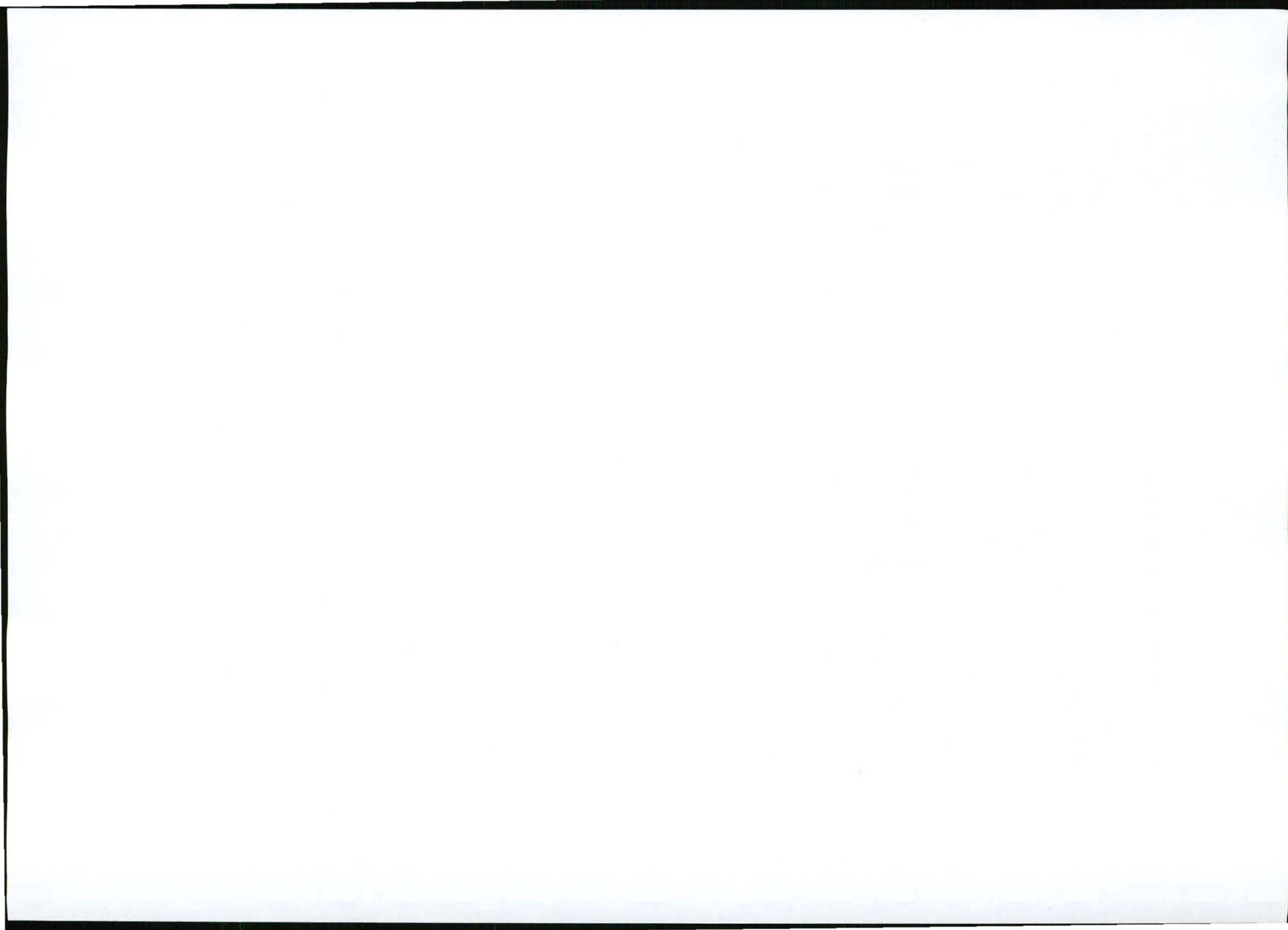
The "Agricultural Development Programme for the Eastern Cape Region, 1986 Department of Agriculture and Water Supply" refers to the study area as being within the East London Coastal area with Mixed grassveld with bush component.

The mixed grassveld with bush component encompasses most of the study area and the presence of *Acacia* enhances year round palatability. Wooded natural watercourses occur. The vegetation commonly found comprises:

- *Themeda triandra*
- *Heteropogon contortus*
- *Tristachya leucothrix*
- *Acacia karroo*
- *Diospyros lycioides* (Bongisa)
- *Scutia myrtina* (Droogie)
- *Rhus* spp. (Blinkblaar and Umntlokotshane etc.)

The long-term carrying capacity of the natural grazing area (mixed grassveld) is 2½ hectare per large stock unit.

Map 1 shows however that there is an indigenous forest/bush component within the study area along the western section of the Kwelera River. This is a steep southern aspect, with a cooler and damper climate than the adjacent area. The area is typical low forest and the bush component is usually semi-palatable with grass species such as *Panicum* and *Stipa*, which do well in shaded areas. This is a very small area and the extremely steep terrain will prevent utilisation by the usual commercial animals. The remainder of the vegetation along the river may very well be a narrow strip of "scrub type forest" impacted upon by flooding and human activity.

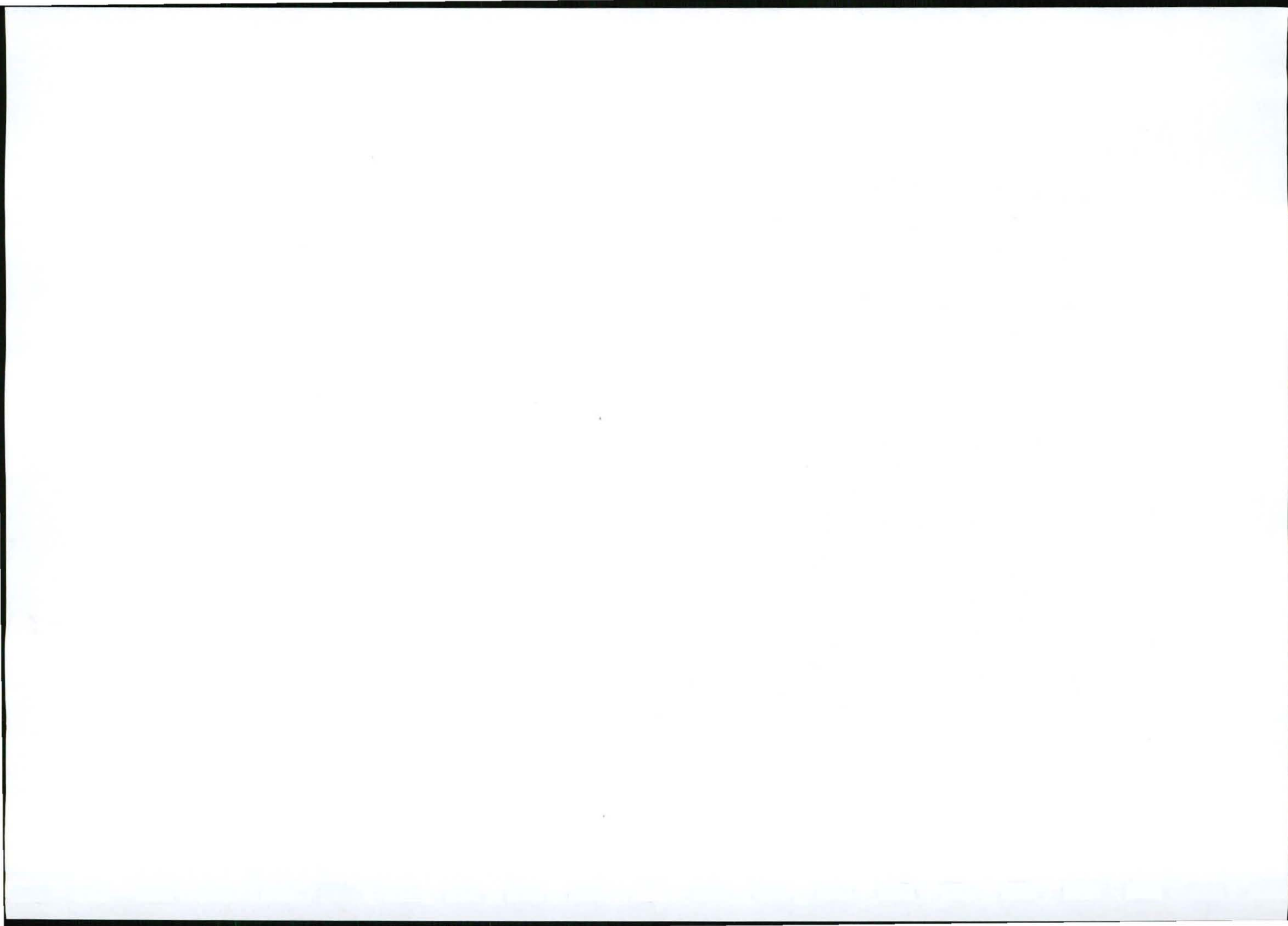


MAP No. 1



Invader (exotic) species impact negatively on the natural resources and those found in the vicinity but not necessarily within the boundaries of the study area, are:

- *Lantana camara*
- *Sesbania*
- Black wattle
- Port Jackson Willow
- Eucalyptus
- Ink Berry



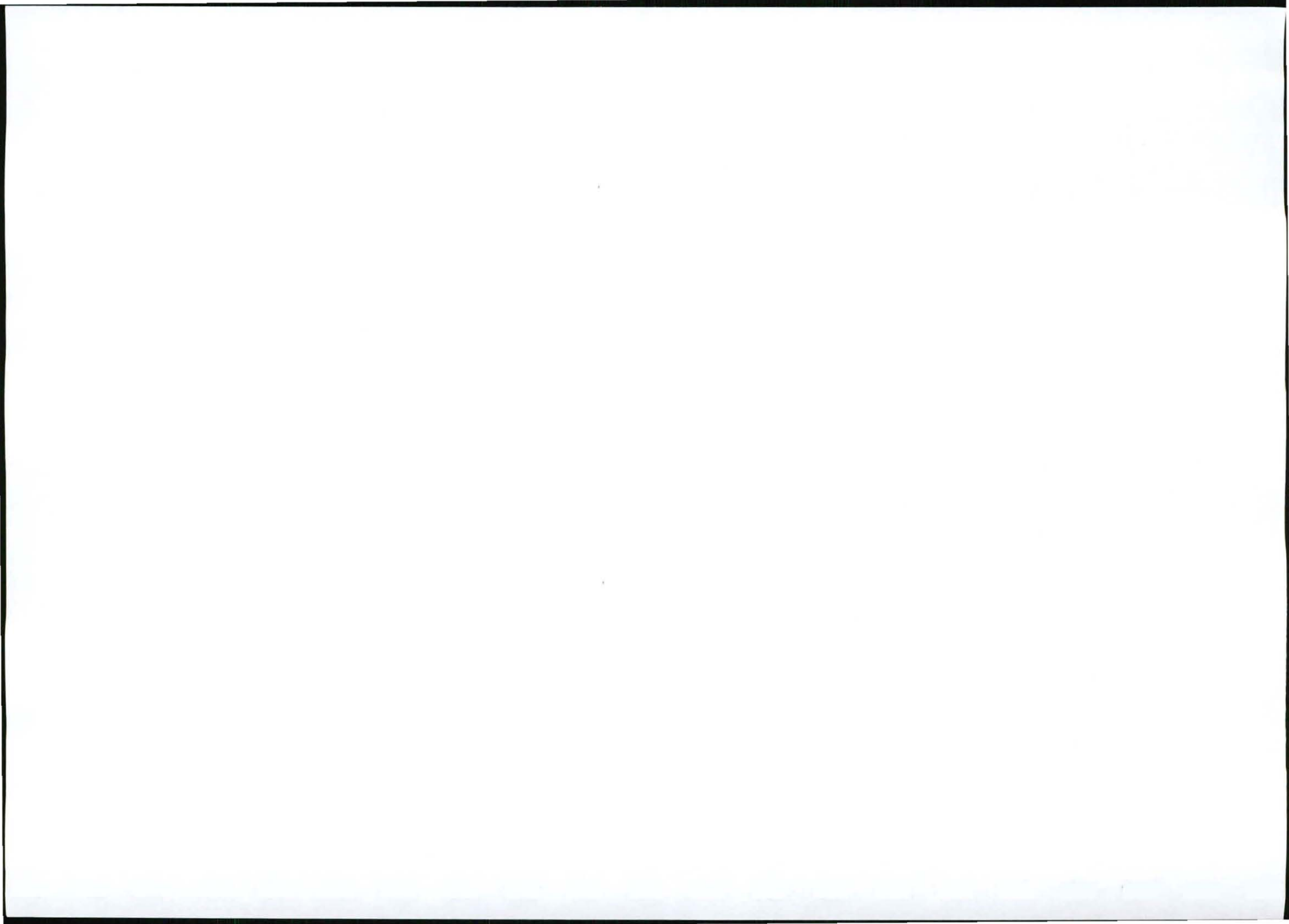
3 CURRENT LAND USE

The study area comprises of a section of land used as a resort with the remainder being game fenced natural grazing land. Approximately 20 ha is used for the already established Areena Resort (7/694) and the balance of ± 230 ha is natural grazing land comprising of mixed grassveld with bush component and the relatively small area of indigenous forest/bush adjacent to the Kwelera River.

The natural grazing area is utilised by a variety of introduced game species.

There is no farming operation carried out in terms of:

- Cultivation, whether dry-land production or under irrigation; or
- Use of the natural grazing by beef, dairy or sheep enterprises.



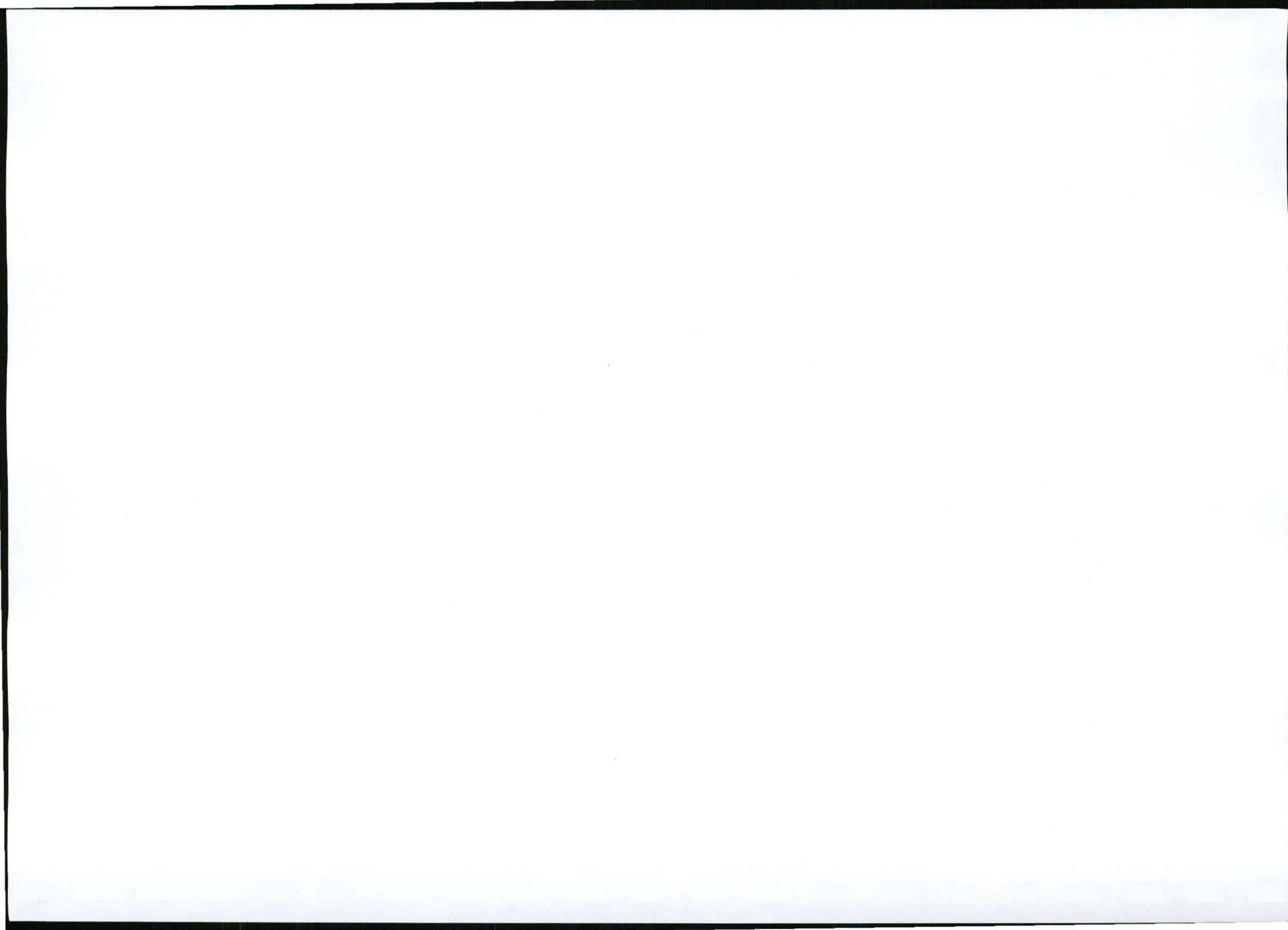
4 OPINION

There is no potential in terms of extensive crop farming due to unavailability of irrigation water. Farming options other than the current game enterprise could include beef or sheep enterprises on the natural grazing area.

The natural grazing area is ± 230 ha in extent. The long-term carrying capacity is $2\frac{1}{2}$ hectare per large stock unit, and this will allow for a maximum of ± 92 large stock units (LSU) on the property.

Intensification of the resources by establishing grass pastures to increase the carrying capacity cannot be considered due to the steep terrain, shallow soils and the erosion hazard rating thereof.

It is the writer's opinion that the properties do not, based on the utilisation of the natural grazing make up a stand-alone viable commercial farming unit. Rezoning of the land to "conservancy" is in line with the current land use practise carried out on the farms. Conservancy management is based on sustainable utilisation practises and should not have any negative impact on the area.

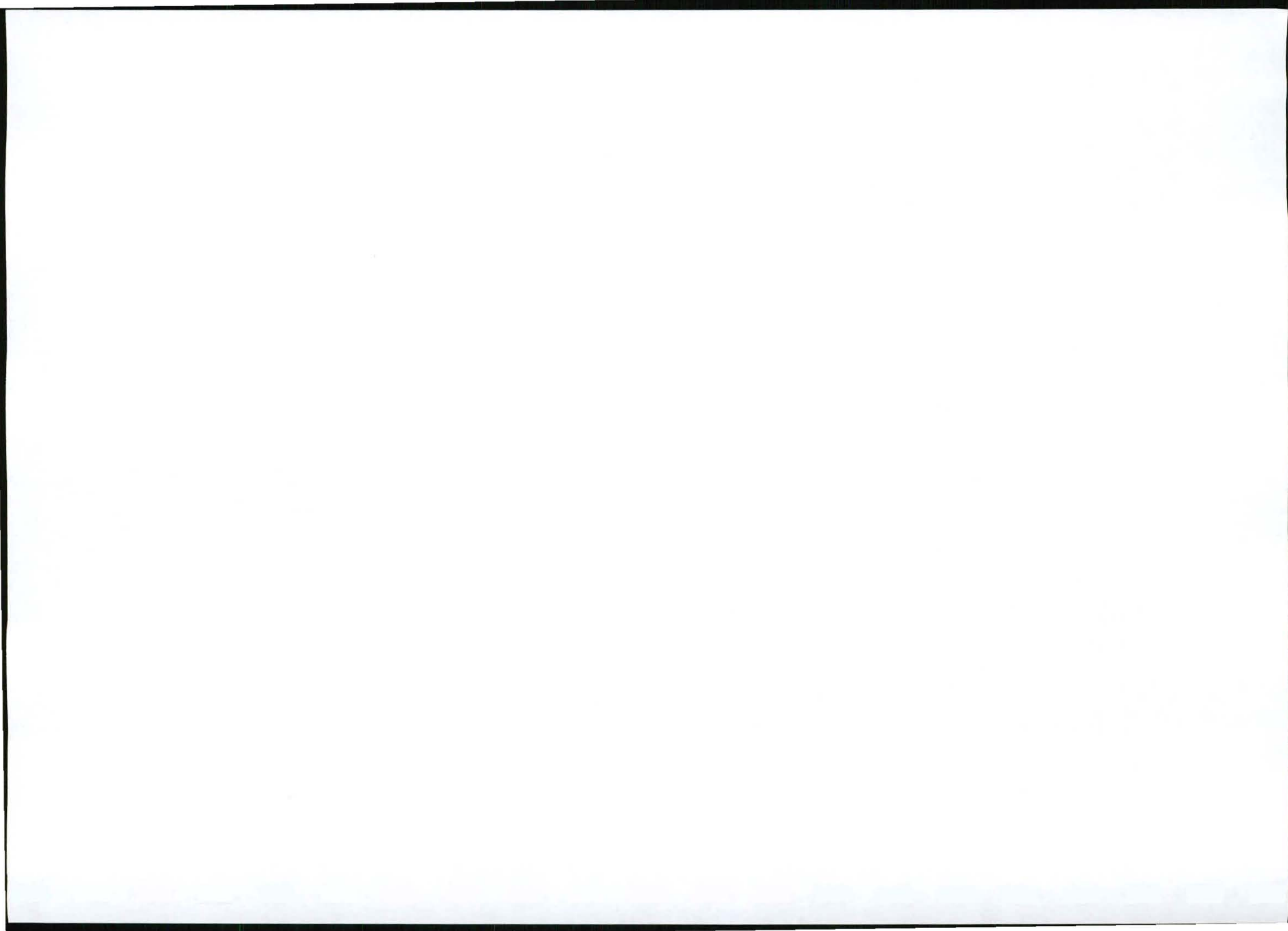


5 REFERENCES

Department of Agriculture and Water Supply - Agricultural Development Programme for the Eastern Cape Region, 1986.

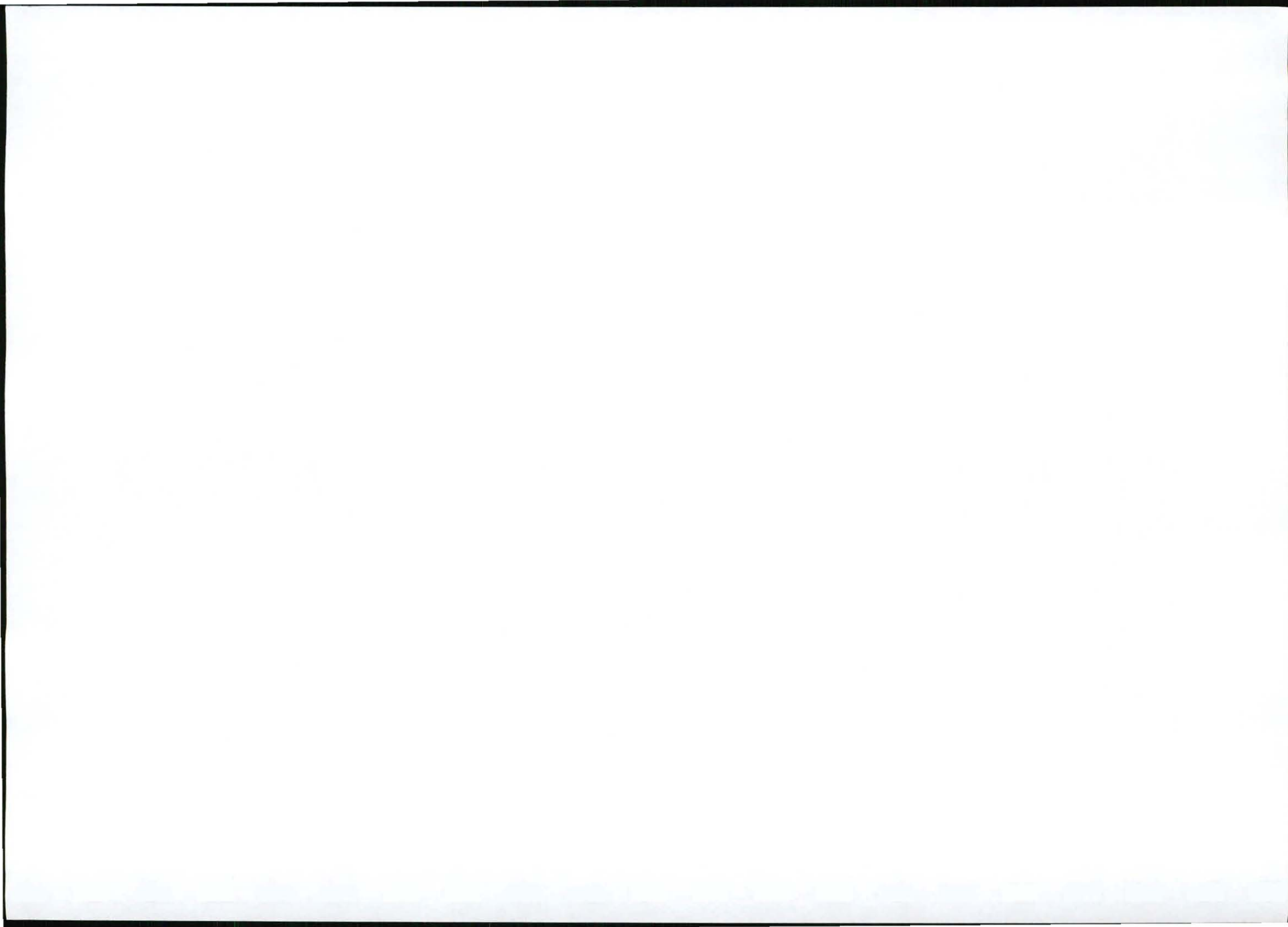
Department of Agriculture – Resource database and comprehensive resource atlas.

Department of Mines 1 : 250 000 Geological Series 3228 Kei Mouth



ANNEXURE L

Environmental Scoping Report



AREENA RIVENDELL ESTATE & AREENA ISLAND VIEW RESORT

**PROPOSED LAND DEVELOPMENT AREA ON PORTION 2 OF FARM 695
EAST LONDON**

DFA Scoping Report

October 2009

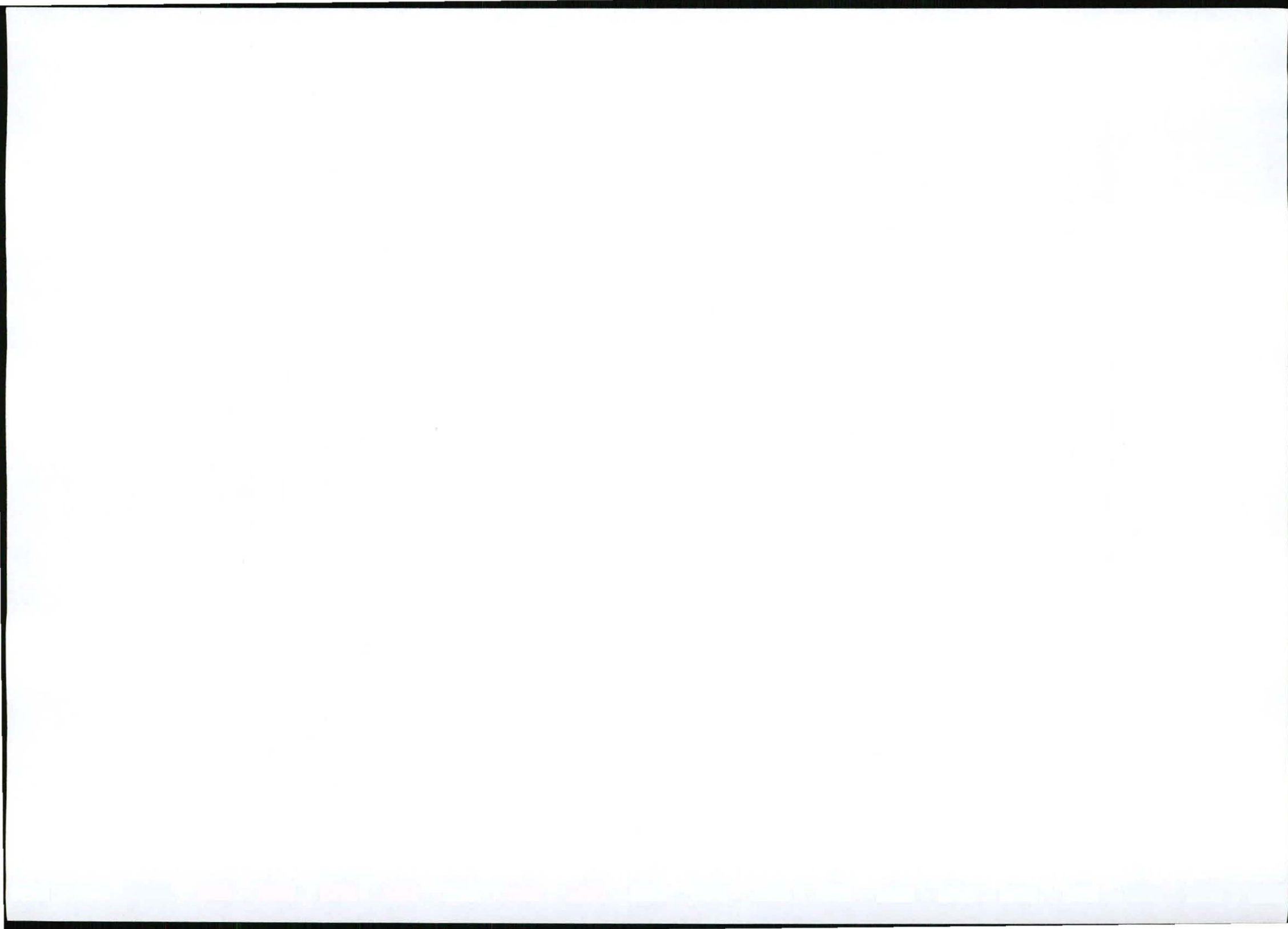
Dirk Prinsloo Environmental Consulting

P.O. Box 72, Kei Mouth, 5260

Phone: 084 4486544

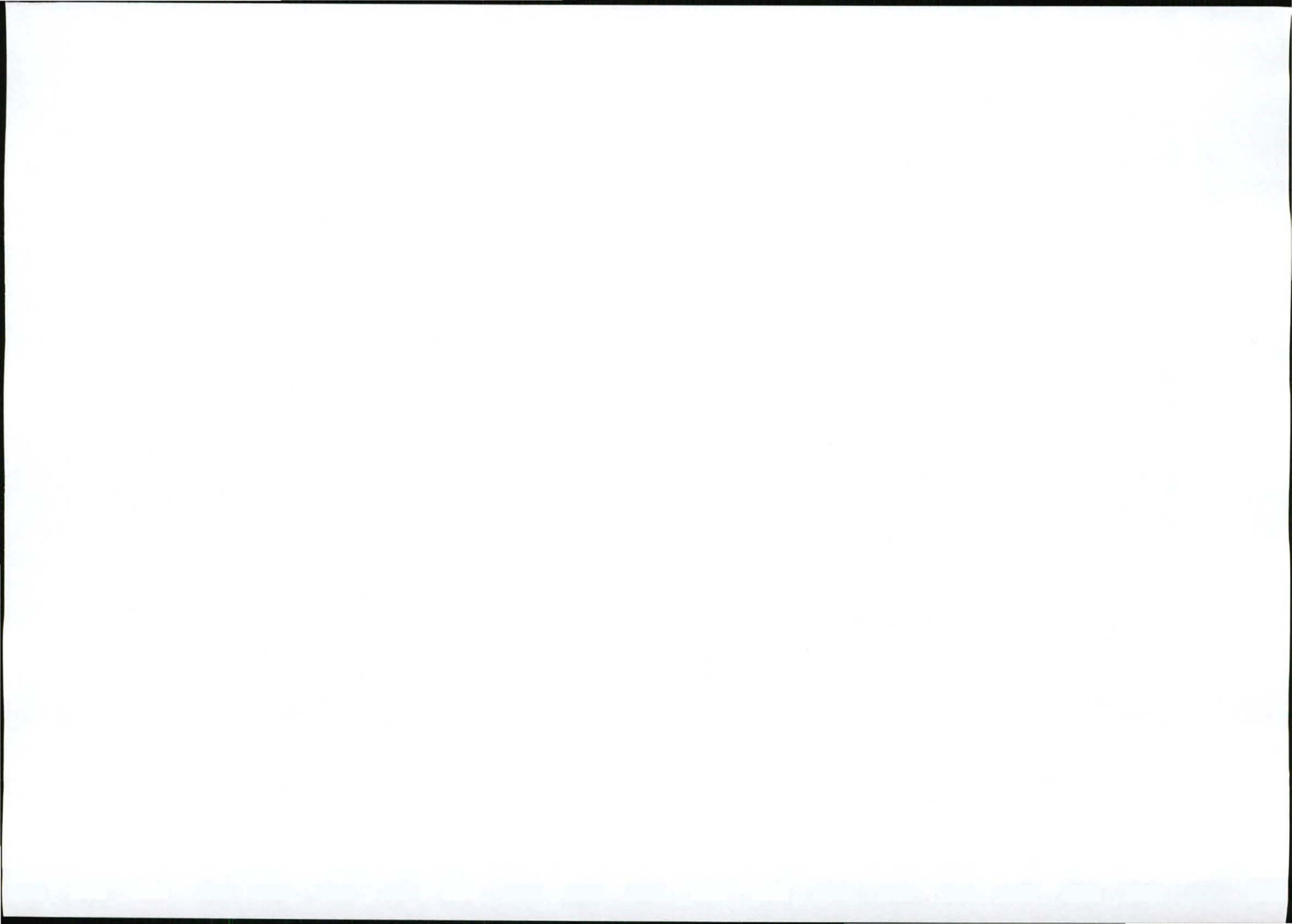
Fax 088 043 8411417

email: dirk.prinsloo@xsinet.co.za



SCOPING REPORT CONTENTS

Chapter	Description	Page
1	INTRODUCTION.....	1
	1.1 Background.....	1
	1.2 Objectives of this Scoping Report.....	1
	1.3 Legal Requirements Applicable to the Proposed Activity.....	2
2	APPROACH TO THE SCOPING STUDY.....	5
	2.1 Introduction.....	5
3	PROJECT DESCRIPTION AND ALTERNATIVES.....	6
	3.1 Project Description.....	6
	3.2 Alternatives.....	7
4	BASELINE ENVIRONMENT.....	8
	4.1 Land use.....	8
	4.2 Climate.....	8
	4.3 Vegetation.....	8
	4.4 Fauna	9
	4.5 Conservation importance of the study area	9
5	ENVIRONMENTAL ISSUES AND POTENTIAL ENVIRONMENTAL IMPACTS.....	10
	5.1 Key issues and responses.....	10
	5.2 Impact Assessment.....	11
	5.3 Biophysical Impacts.....	11
6	CONCLUSION.....	15
7	REFERENCES.....	16

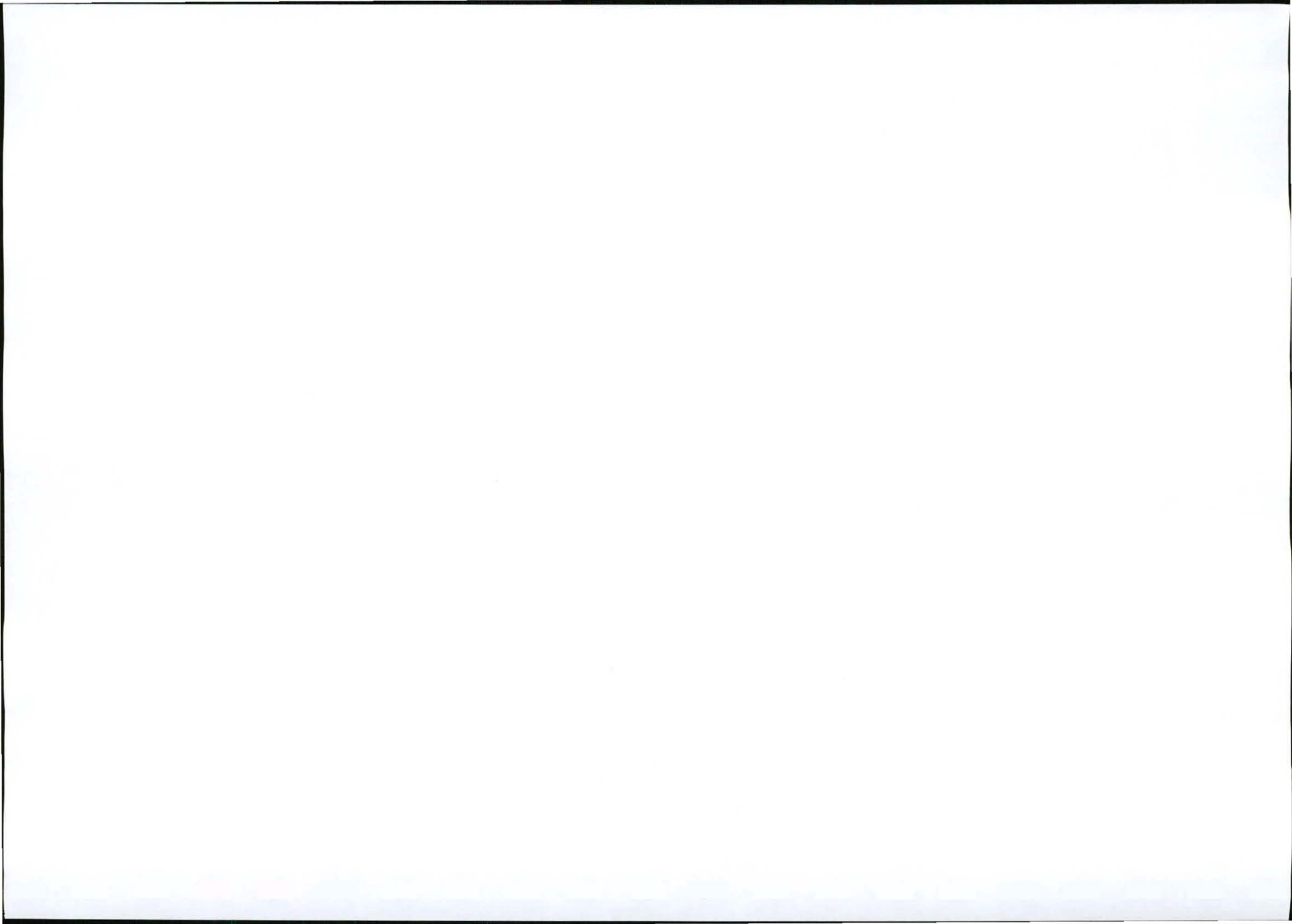


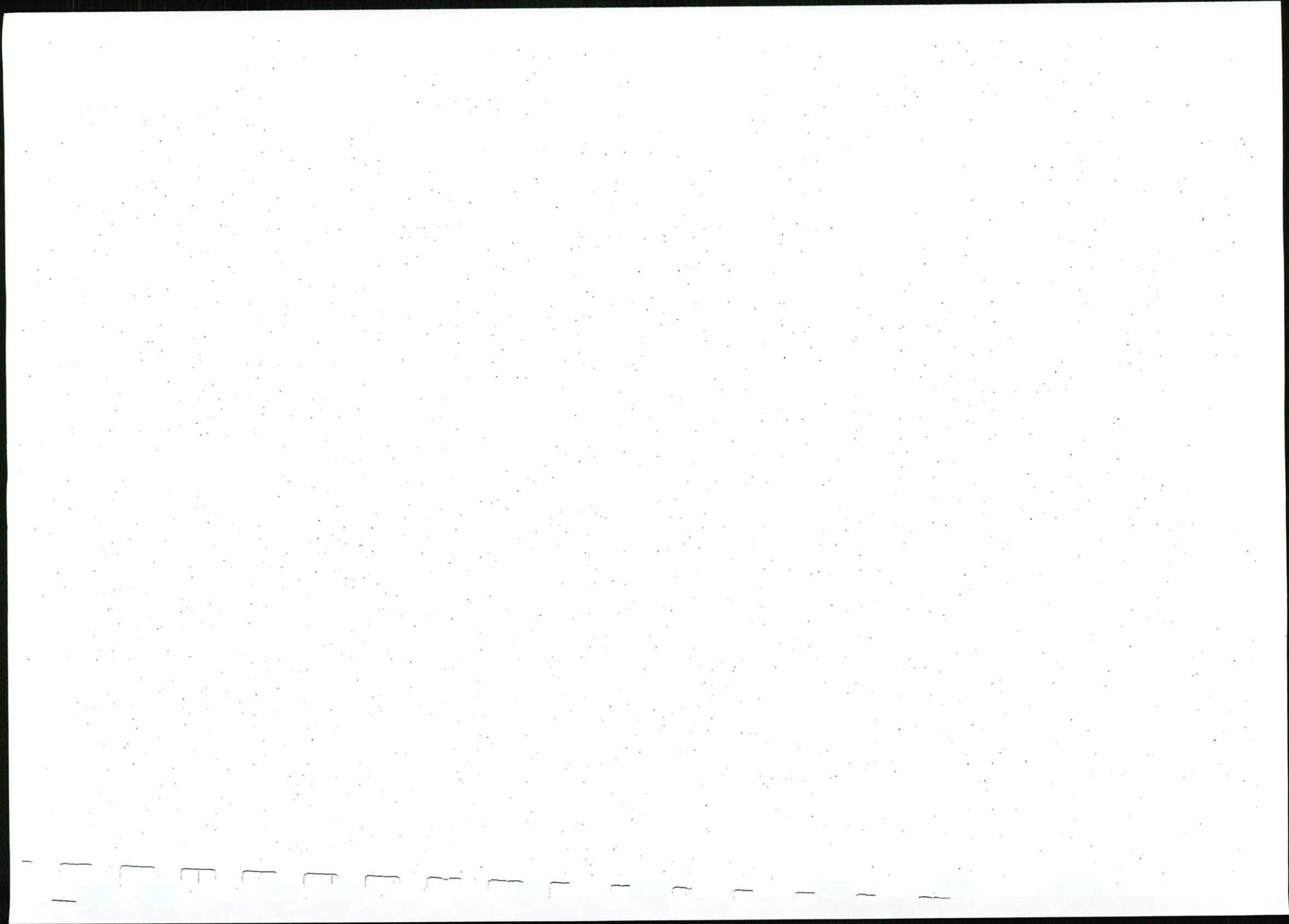
APPENDICES

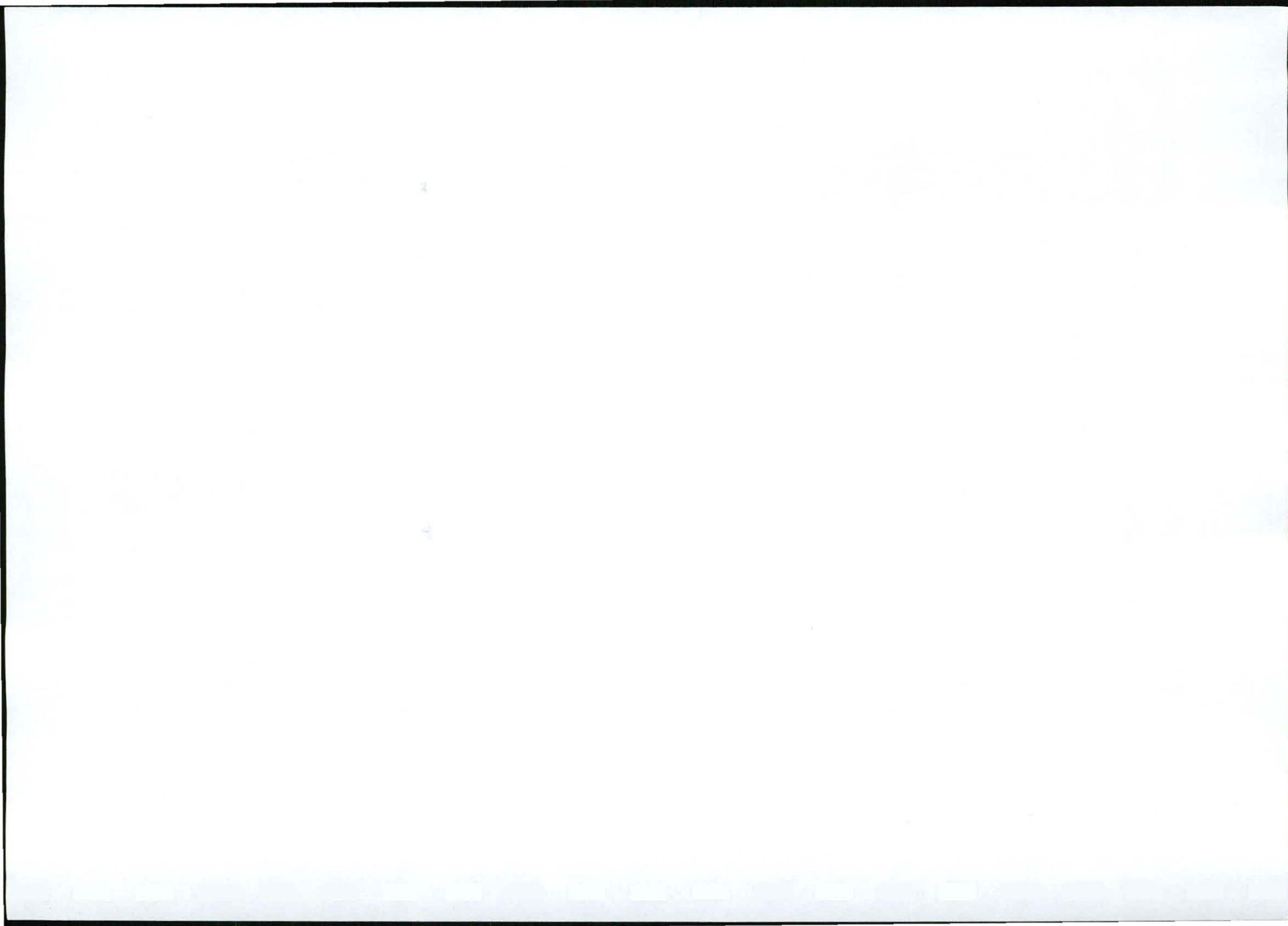
- APPENDIX A** : Land Development Area
APPENDIX B : Technical Specification – GES Plant

ABBREVIATIONS

BAR	Basic Assessment Report
DEDEA	Department of Economic Development and Environmental Affairs
DFA	Development Facilitation Act
ECA	Environment Conservation Act
ECHRA	Eastern Cape Heritage Resources Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
I&AP's	Interested & Affected Parties
NEMA	National Environmental Management Act
ROD	Record of Decision
SDF	Spatial Development Framework
WWTW	Waste Water Treatment Works







1 INTRODUCTION

1.1 Background

Areena Resort Trust is proposing the establishment of a country lifestyle estate development on Portion 2 of Farm 695, East London and to process an application for development rights thereon in terms of the Development Facilitation Act (DFA) No. 67 of 1995

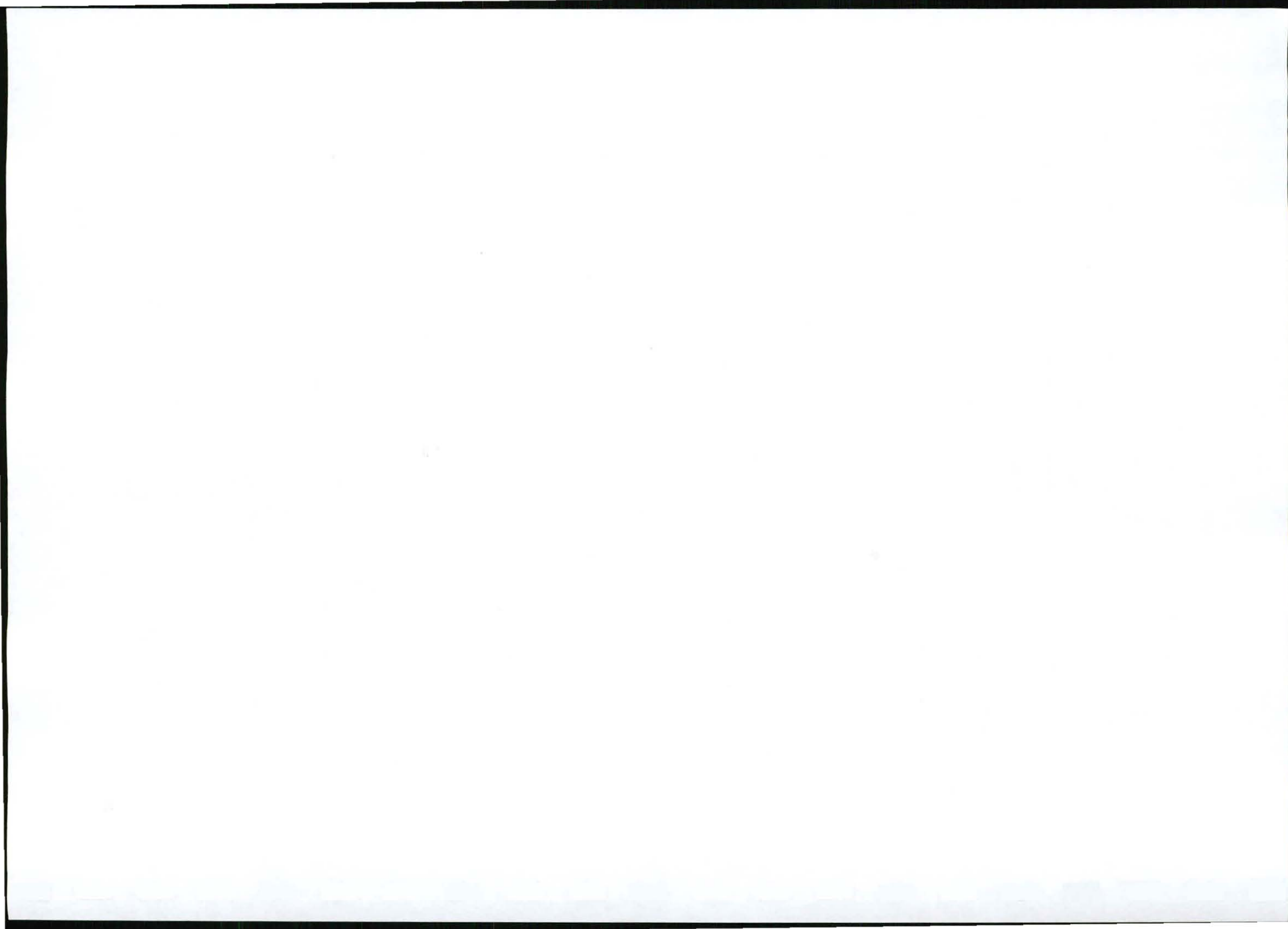
Dirk Prinsloo Environmental Consulting has been appointed as Environmental Assessment Practitioner (EAP) for the undertaking of a Basic Assessment Report for the proposed development.

This document constitutes the Scoping Report as per the DFA requirements for the proposed development.

1.2 Objectives of this Scoping Report

The Scoping Report requirements are defined by the DFA Regulations and will indicate the extent to which the proposed activity or development will impact on the environment, and where appropriate deal with the following specific aspects of the environmental impact:

- a. The physical and landscape characteristics of the land development area and its surroundings;
- b. The ecological characteristics of the land development area and its surroundings;
- c. The current and potential land-uses of the land development area;
- d. Existing significant archaeological, historical and cultural sites in the land development area and its surroundings;
- e. The social and economic impact on communities in the land development area and surroundings;
- f. The existing infrastructure and/or services in or around the land development area;
- g. The existing social and community structures, services and facilities in or around the land development area;
- h. The levels of present and possible pollution, including noise pollution, in the future as a result of the proposed development;
- i. Any risks or hazards to the environment posed by the development;
- j. The health and safety of the public;
- k. The social costs of the proposed development;
- l. The effect of the proposed development on different groups or individuals;
- m. The medium and long term environmental sustainability of the proposed development;
- n. What mitigating measures could be implemented to reduce negative impacts and enhance positive impacts of the aspects described in paragraphs (a) to (m) and,



where appropriate to what extent alternative sites for the development were investigated.

1.3 Legal Requirements Applicable to the Proposed Activity

The National Environmental Management Act (Act 107 of 1998) Section 24(5) stipulates that "listed activities" require environmental authorization by means of a Basic Assessment. Government Notice No. 386 (July 2006 EIA Regulations) identifies the following listed activities, applicable to the proposed development as requiring environmental authorization:

Listed Activity No. 1 (k) – The bulk transportation of sewage and water, including storm water, in pipelines with –

- i. an internal diameter of 0.36 metres or more; or
- ii. a peak throughput of 120 litres per second or more

Listed Activity No. 1 (m) - any purpose in the one in ten year floodline of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including -

- i canals;
- ii channels;
- iii bridges;
- iv dams; and
- v weirs;

Listed Activity No. 1 (s) - the treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres; (Note DEDEA Notification, dated 31 March 2009, prior to Waste Management Regulations.)

Listed Activity No. 2 (g) The construction or earth moving activities in the sea or within 100 metres of the high water mark of the sea in respect of buildings or infrastructure

Listed Activity No. 15 – The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long

Listed Activity No. 16 – The transformation of undeveloped, vacant or derelict land to establish infill development covering an area of 5 hectares or more, but less than 20 hectares; or residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare.

Listed Activity No. 18 - The subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less.

In addition to the Basic Assessment Report Process, NPM Planning cc. has been appointed by the applicant to process an application for development rights on the property in terms of the Development Facilitation Act, No. 67 of 1995.

The following is a list of key national environmental legislation that has direct relevance towards the project.

1.3.1 National Environmental Management Act 107 of 1998 (NEMA)

The National Environmental Management Act (Act 107 of 1998) is intended to enact the environmental policy of South Africa.

