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Your Ref: Khoisan Bay Development
Our Ref: iCE/B/923
Date: 10 May 2012

Plan Active
6 Magnolia Avenue
Hermanus
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Attention: Merike Lerm

Sir

TRAFFIC IMPACT ASSESSMENT FOR THE KHOISAN BAY DEVELOPMENT, ERF 712, DE KELDERS

1. BACKGROUND

Divine Inspiration Trading 329 (Pty) Ltd, the owners of the above mentioned property, appointed iCE Group (Boland) to conduct an investigation into the traffic impact of the proposed development on Erf 712 in De Kelders. The property is located just northwest of the R43 and to the northeast of Guthrie Street, as shown on the attached ***Locality Plan***.

2. DEVELOPMENT PROPOSAL

The Khoisan Bay development is expected to be completed by 2018. The development will entail the following:

- 118 High income single residential units
- 179 Town housing units
- 175 Group housing units
- A church
- Approximately 5783m^2 of commercial space.

3. EXISTING AND PLANNED ROADS

It is expected that traffic to the Khoisan Bay development will travel along the R43 (Class 3), Guthrie Street (Class 4), De Villiers Street (Class 4), Main Road (Class 4), Eden Street (Class 4) and Normandie Street (Class 4).

The main access for traffic from Gansbaai and Stanford to and from the new development will be located approximately 1,1 km northeast of Guthrie Street on the R43. The proposed road network of the Khoisan Bay development will also join up with the existing De Kelders road network at three points. At the eastern side of the development, Main Road will serve as access to the development. To the north the development will join up to the existing De Kelders road network at Storm Street and Eden Street.

4. EXISTING TRAFFIC AND SERVICE LEVELS

De Kelders and surrounding towns are mainly vacation destinations and the highest traffic volumes on the internal and surrounding roads are observed in vacation periods. For a worst case scenario, counts that were used for the study were taken in the December 2011 vacation. Traffic counts were done at the Guthrie Street / R43 and Cove Street / R43 intersections on 22 December 2011.

The intersections were analysed by means of the SIDRA software suite. The analysis indicates that all movements at the Guthrie Street / R43 intersection operate at a level of service B or better during both the AM and PM peak hours.

All movements at the Cove Street / R43 intersection also operate at a level of service B or better for both the AM and PM peak hours.

Please refer to ***Figure 1*** for 2011 traffic volumes and levels of service.

5. BACKGROUND TRAFFIC

The traffic counts that were done on the R43 were used as background information for the Khoisan Bay development. These counts were increased by 3% per annum to obtain expected 2018 background traffic volumes.

Guthrie Street / R43 intersection: The SIDRA analysis of 2018 background traffic volumes at this intersection shows that all movements operate at a level of service B or better during both the AM and PM peak hours.

Cove Street / R43 intersection: The SIDRA analysis of 2018 background traffic volumes at this intersection shows that all movements operate at a level of service B or better during both the AM and PM peak hours.

Please refer to ***Figure 2*** for expected 2018 background traffic volumes and levels of service.

6. TRIP GENERATION

Trip generation rates were obtained from the latest edition of the South African Trip Generation Rates document. Weekday AM peak hour trip generation rates for the retail component was obtained from the United States Trip Generation Rates document.

6.1 Residential

A rate of 1,5 trips per unit was used for the single residential units, while a rate of 1,1 trips per unit was used for the group housing and town housing units. A 75:25 in:out split was used for all the residential units. The residential component will generate 567 trips (425 out, 142 in) during the AM peak hour and vice versa during the PM peak hour.

6.2 Commercial

It was assumed that the commercial component would include 2024m^2 GLA (gross lettable area) of retail space.

A trip generation rate of 2,83 trips per 100m^2 GLA was used for the AM peak hour, whilst a rate of 16,9 trips per 100m^2 GLA was calculated for the PM peak hour.

Based on the size of the proposed Khoisan Bay development in relation to the existing number of erven in De Kelders, it was estimated that 40,2% of trips generated by the commercial component of the Khoisan Bay development would originate from inside the development and will therefore be seen as internal trips. Only a small volume of trips (2.4%) generated by the commercial component would originate inside the development and make use of the external De Kelders road network. Please refer to paragraph 7.2 for the commercial component's trip distribution.

Pass-by trips from the R43 to the commercial component will also be very restricted due to its local function. The commercial site is also not clearly visible from the R43.

Tables 1 and 2 show a summary of the Khoisan Bay development's total trip generation potential.

Table 1: AM Peak hour trip generation potential of Erf 712 De Kelders (Khoisan Bay)

Land use	Units / Area	GLA (m^2)	TGR	%In	%Out	Total trips	Trips in	Trips out
Single res units	118.00		1.50	25%	75%	177	44	133
Group housing	175.00		1.10	25%	75%	193	48	144
Town Housing	179.00		1.10	25%	75%	197	49	148
Commercial		2024.00	2.83	53%	47%	57	30	27
Total:						**624**	**172**	**452**

Table 2: PM Peak hour trip generation potential of Erf 712 De Kelders (Khoisan Bay)

Land use	Units / Area	GLA (m^2)	TGR	%In	%Out	Total trips	Trips in	Trips out
Single res units	118.00		1.50	75%	25%	177	133	44
Group housing	175.00		1.10	75%	25%	193	144	48
Town Housing	179.00		1.10	75%	25%	197	148	49
Commercial		2024.00	16.90	50%	50%	342	171	171
Total:						908	596	313

7. TRIP DISTRIBUTION

7.1 Residential trip generation

The Khoisan Bay development consists of 4 clusters of residential units. The trips for these clusters were distributed to the nearest entrances on the R43. It was assumed that very few trips from the Khoisan Bay development's residential units would travel to the northern existing De Kelders road network.

The trips generated by cluster B, which is situated on the most western side of the development, will make use of Guthrie Street to access the R43. Directional splits at the Guthrie Street / R43 intersection were based on existing traffic splits.

The trips generated by clusters A, C and D will make use of the proposed access on the R43 to the east. Directional splits at the proposed access / R43 intersection were also based on the existing Guthrie Street / R43 intersection's traffic splits.

7.2 Commercial trip distribution

The trips generated by the commercial development were distributed to originate between the existing residential node to the north and northwest of the development (638 residences) and the new residential units of the Khoisan Bay development (472 units).

The number of residential units in each direction from the commercial node was used to determine the potential number of trips that will travel to and from the commercial development in that direction. Table 3 shows the distribution of new trips to and from the commercial development via which street. The percentage of trips from the southeast is internal trips from the Khoisan Bay development's residential units as well as a few pass by trips from the R43.

Table 3: Trip distribution of commercial development

Direction	Percentage of trips	Trips			
		AM		PM	
		In	Out	In	Out
Via Normandie Street	1.5%	0	0	3	3
Via Eden Street	8.7%	3	2	15	15
Via De Villiers Street	46.6%	14	13	79	79
From Southeast	43.2%	13	12	74	74
Total:	**100.0%**	**30**	**27**	171	171

Please refer to ***Figure 3*** for the distribution of trips generated by the Khoisan Bay Development.

8. TRAFFIC IMPACT

R43 / Cove Street Intersection: The analysis of this intersection shows that all movements operate at a level of service C or better during both the AM and PM peak hours.

R43 between Cove Street and Guthrie Street: With 2018 background traffic volumes, this section of road will operate at a level of service B for the AM peak hour and a level of service C for the PM peak hour. With the addition of the Khoisan Bay Development's traffic volumes, the level of service for the AM peak hour will deteriorate to a level of service C. The level of service for the PM peak hour will remain at a level of service C.

R43 / Guthrie Street Intersection: The analysis of this intersection shows that all movements will operate at a level of service B or better during both the AM and PM peak hours.

R43 between Guthrie Street and Proposed Khoisan Bay Access: With 2018 background traffic volumes, this section of road will operate at a level of service C for both the AM and PM peak hours. With the addition of the Khoisan Bay Developments traffic volumes, the levels of service for the AM and PM peak hours will remain at a level of service C.

R43 / Proposed Khoisan Bay Access intersection: All movements at this intersection will operate at a level of service B or better during both the AM and PM peak hours.

It is expected that low volumes of traffic from the Khoisan Bay development will make use of the existing De Kelders road network. The intersections at the access points which connect the Khoisan Bay development with the existing De Kelders road network will therefore not be affected to a great extent. Good levels of service for both the AM and PM peak hours for all these stop controlled intersection are expected.

Please refer to ***Figure 4*** for expected 2018 background traffic volumes and levels of service.

8. GEOMETRY

9.1 Turning Lanes and Tapers

Although the SIDRA analysis indicates that all 2018 movements on the R43 / Cove Street, R43 / Guthrie and R43 / Proposed Khoisan Bay intersections operate at levels of service C or better during both the AM and PM peak hours, the Road Access Guidelines indicate that some intersections require additional turning lanes for safety reasons.

R43 / Cove Street Intersection: The existing layout consists of a T-junction between the two-lane R43 and the two-lane Cove Street. The Road Access Guidelines require that a left turn lane be added to the southern leg of the intersection on the R43. A right turn lane is also required for the northern leg of the R43.

R43 / Guthrie Street Intersection: The existing layout consists of the R43 with one north eastbound lane and two south westbound lanes with a through lane and a through-right turn lane. The third leg of the intersection is formed by the two-lane Guthrie Street. The road Access Guidelines indicates that a left turn lane is required for the northeast bound travelling traffic on the R43 at this intersection. For the southwest bound traffic travelling on the R43 in the direction of Gansbaai, a right turn lane is required, but the existing layout makes provision for this with the through and through-right turn lanes. Figure 1 shows the R43 / Guthrie Street stop controlled intersection with its turning lanes.

Figure 1: Looking west along the R43 across the R43 / Guthrie Intersection

R43 / Proposed Access Intersection: The analysis for this intersection was done with only a two lane R43 and a two lane access road. All movements with this layout will operate at a level of service B or better for both the AM and PM peak hours. The Road Access Guidelines indicates for safety reasons that a left turn lane is required for traffic travelling northeast bound on the R43 towards Stanford for this intersection. For the southwest bound traffic on the R43, a right turn lane is also required at this intersection.

All the intersections to the north of the Khoisan Bay Development which forms at the points where the existing De Kelders road network meets the proposed development will require no additional turning lanes or tapers.

9.3 Internal roads

It is recommended that internal roads should have a 13-metre reserve with 5,5 metres surfaced widths, whereas access and internal link roads should have a minimum reserve width of 16 metres; preferably 20 metres, and a surfaced width of 7,4 metres.

9.4 Parking

The Site Development Plan does not show any on-street parking for the residential component, which means that parking will be provided on the individual erven. The parking requirement for the commercial component will be 4 bays per 100m^2 Gross Lettable Area for offices and service industries (laundries, hairdressers, etc.), 2 bays per 100m^2 for industrial activities and 6 bays per 100m^2 for retail activities (convenience stores). Parking bays should be dimensioned as per the SA Parking Guidelines requirements.

9. PUBLIC TRANSPORT

It is expected that the Khoisan Bay Development will attract some public transport trips. It is suggested that the provision of a public transport embayment should be investigated near the commercial node of the Khoisan Bay Development.

10. NON-MOTORISED TRANSPORT

The Khoisan Bay development will generate some pedestrian and cycling traffic. No improvements are suggested on the existing road network, but it is recommended that a sidewalk should be provided on at least one side of the eastern internal access road, which links the new commercial development to the R43.

11. CONCLUSIONS

The conclusions drawn from the traffic impact assessment for Erf 712, De Kelders, may be summarised as follows:

- The development will be known as Khoisan Bay;
- The full development is expected to be completed by 2018;
- The Khoisan Bay Development will entail the provision of 472 residential units, a church and 2 024m^2 lettable retail space;
- The development will join up with the existing De Kelders road network at three points and access to and from the R43 will be obtained through one of these as well as a proposed access to the eastern side of the development.
- The R43 / Proposed Access intersection will be stop controlled.

- The full development will generate 624 trips (172 in, 452 out) during the AM peak hour and 908 trips (596 in, 313 out) during the PM peak hour.
- These trips were distributed to the three access points to the north of the development. The majority of trips were however distributed to the accesses which link the development to the R43.
- The commercial component's trips were distributed between the Khoisan Bay's residential component and the existing residential component of De Kelders. The commercial component has a local function and does not generate many by-pass trips.
- All movements on the R43 / Cove Street intersection will operate at a level of service C or better for both the AM and PM peak hours.
- All movements on the R43 / Cove Street intersection will operate at a level of service C or better for both the AM and PM peak hours.
- The R43 between Cove Street and Guthrie Street will operate at a level of service C during both the AM and PM peak hours.
- All movements on the R43 / Guthrie Street intersection will operate at a level of service B or better during both the AM and PM peak hours.
- The R43 between Guthrie Street and the Proposed Khoisan Bay Development Access will operate at a level of service C or better during both the AM and PM peak hours.
- All movements on the R43 / Proposed Khoisan Bay Development Access will operate at a level of service B or better during both the AM and PM peak hours.
- For safety reasons, the Provincial Road Access Guidelines indicate that right and left turning lanes should be added to the R43 at the R43 / Cove Street, R43 / Guthrie Street and R43 / Proposed Access intersections.

10. RECOMMENDATIONS

- A public transport embayment should be investigated near the commercial node of the Khoisan Bay Development.
- Adequate sidewalks must be provided for pedestrians and cyclists on the eastern internal access road of the Khoisan Bay Development.
- Right and left turning lanes should be provided on the R43 at the R43 / Cove Street, R43 / Guthrie Street and R43 / Proposed Access intersections;
- A sidewalk should be provided on at least one side of the eastern internal access road, which links the new commercial development to the R43

We trust that you will find this traffic impact assessment in order. Kindly contact the undersigned should you require any additional information.

Yours truly

Douw Louwrens (B. Eng)
On behalf of: iCE Group (Boland)

ANNEXURE A

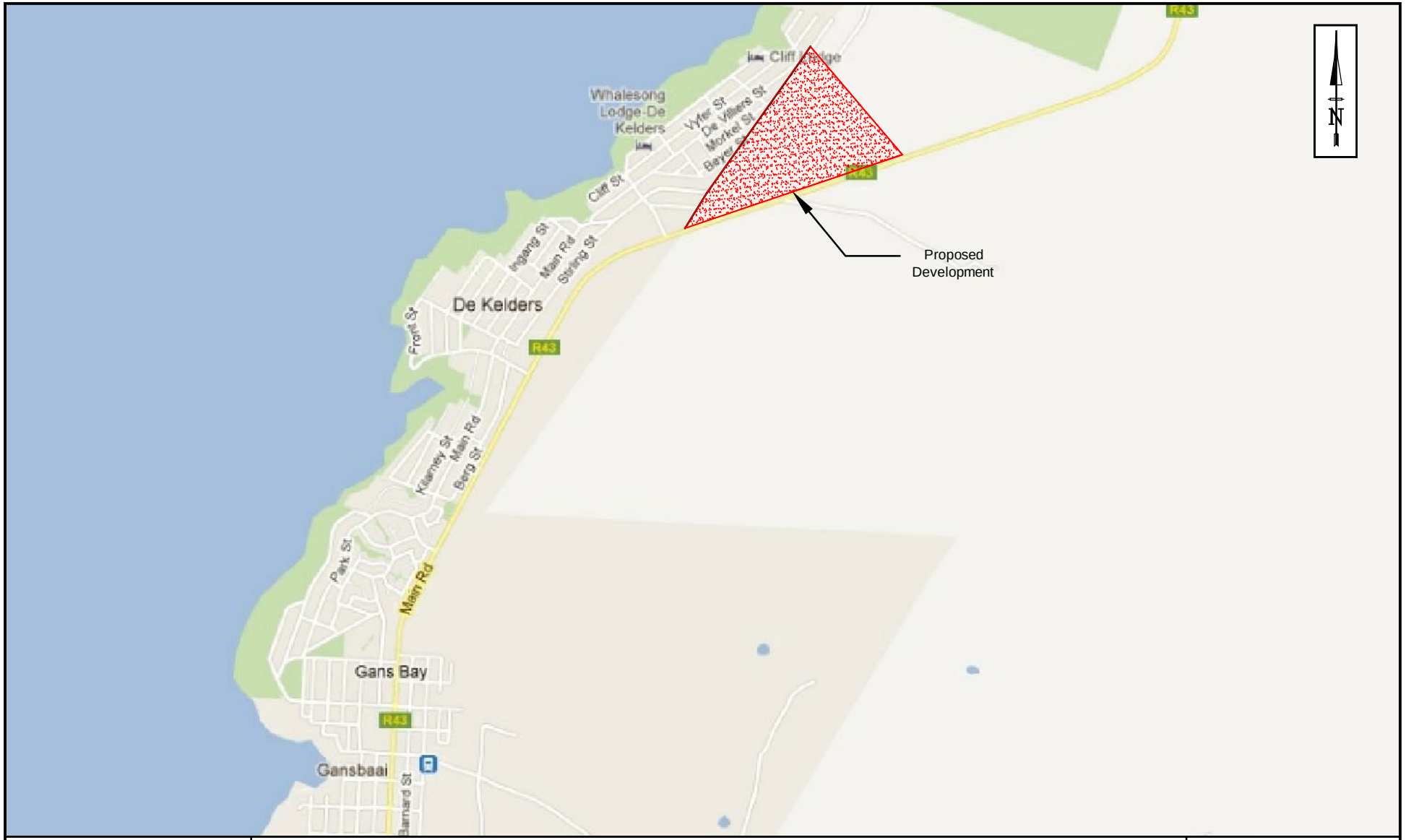
DRAWINGS

Background:

a) Locality plan

Roads and traffic:

b) Figure 1: 2012 Existing traffic volumes and levels of service
c) Figure 2: Expected 2018 background traffic volumes and levels of service
d) Figure 3: Distribution of trips generated by the Khoisan Bay development
e) Figure 4: Expected 2018 traffic volumes and levels of service. (Khoisan Bay traffic included)



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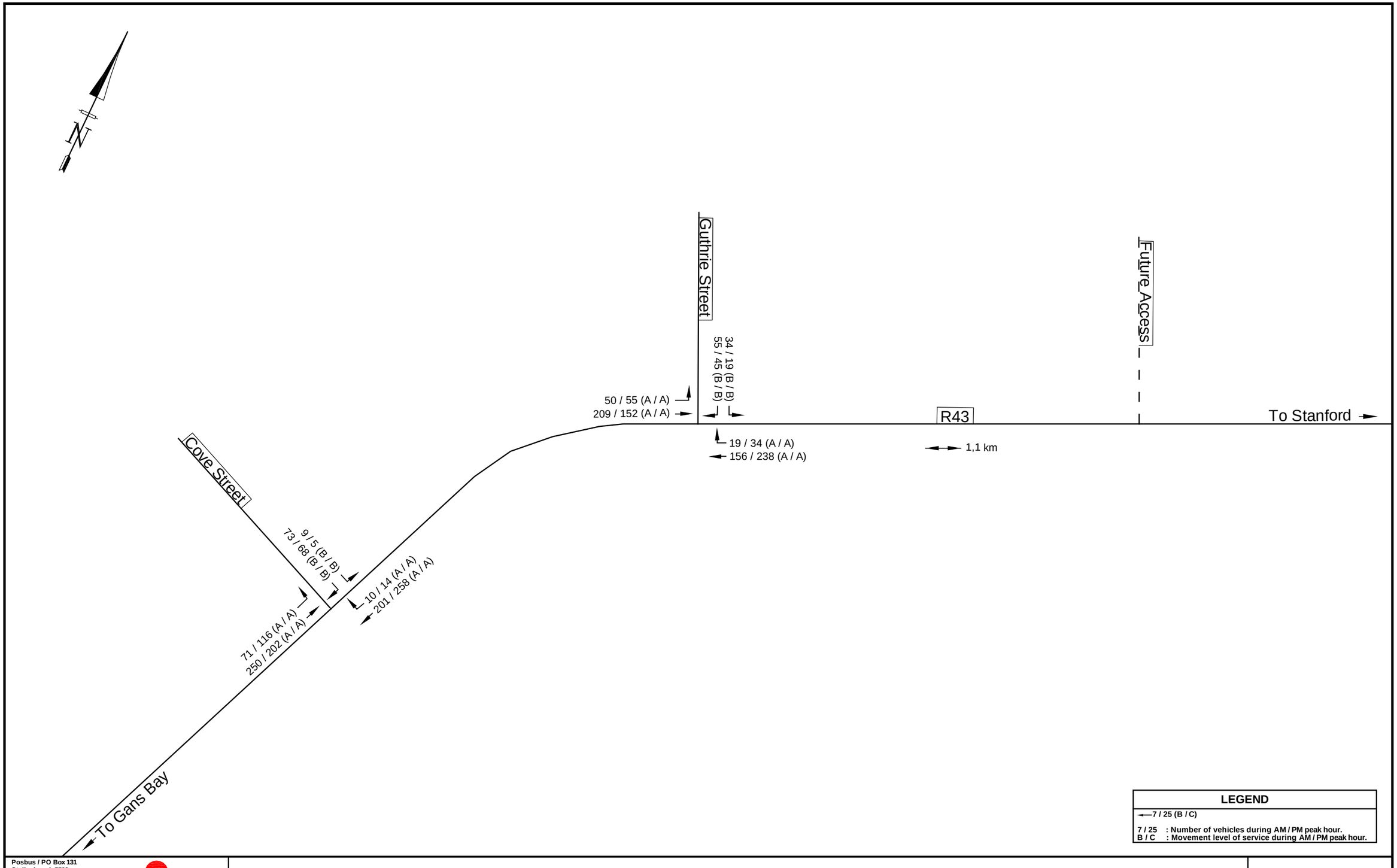
GROUP (Pty) Ltd.

KHOISAN BAY LOCALITY PLAN

NOT TO SCALE



LEGEND
7 / 25 (B / C)
7 / 25 : Number of vehicles during AM / PM peak hour.
B / C : Movement level of service during AM / PM peak hour.

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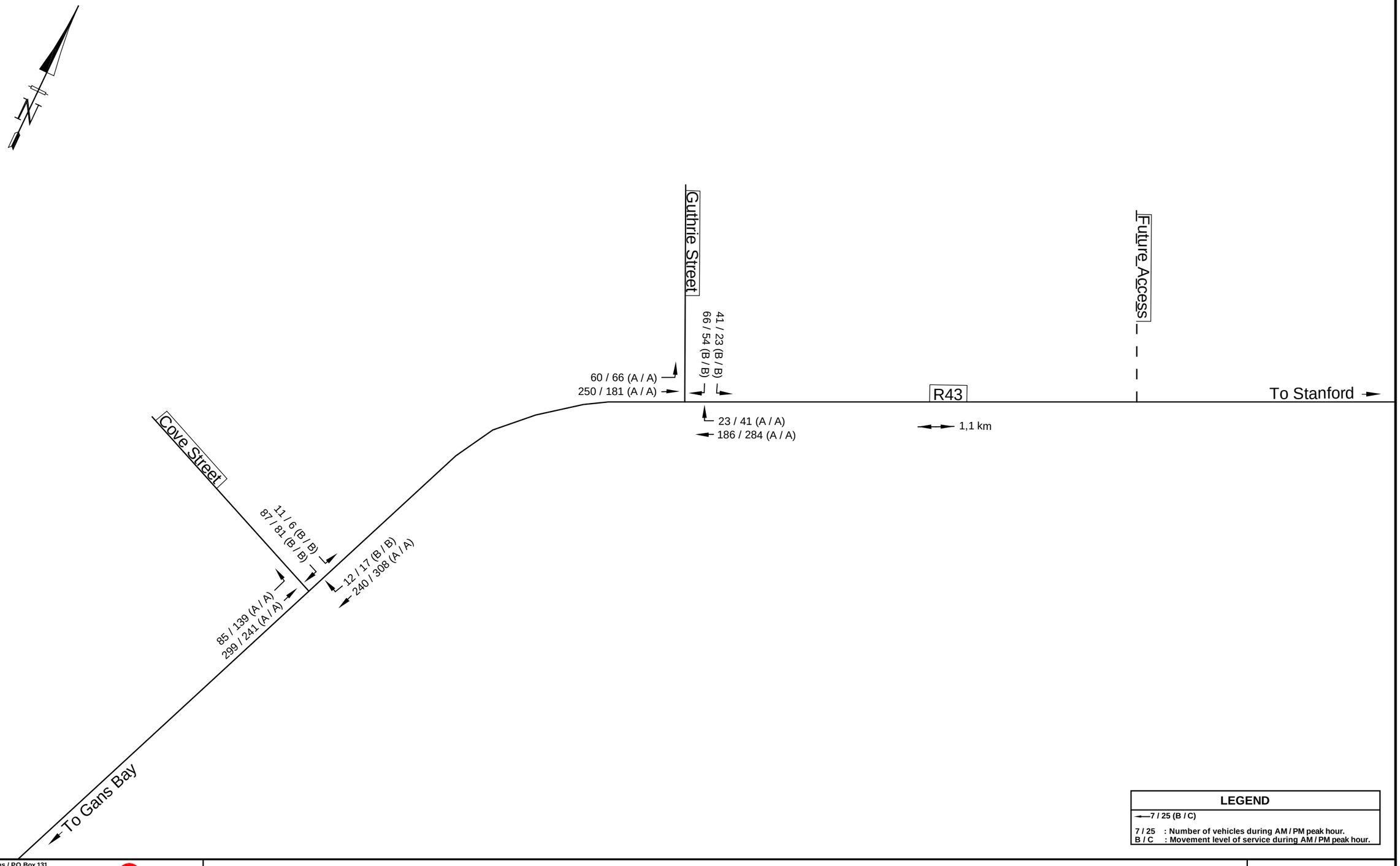
2012 EXISTING TRAFFIC VOLUMES AND LEVELS OF SERVICE

FIGURE 1



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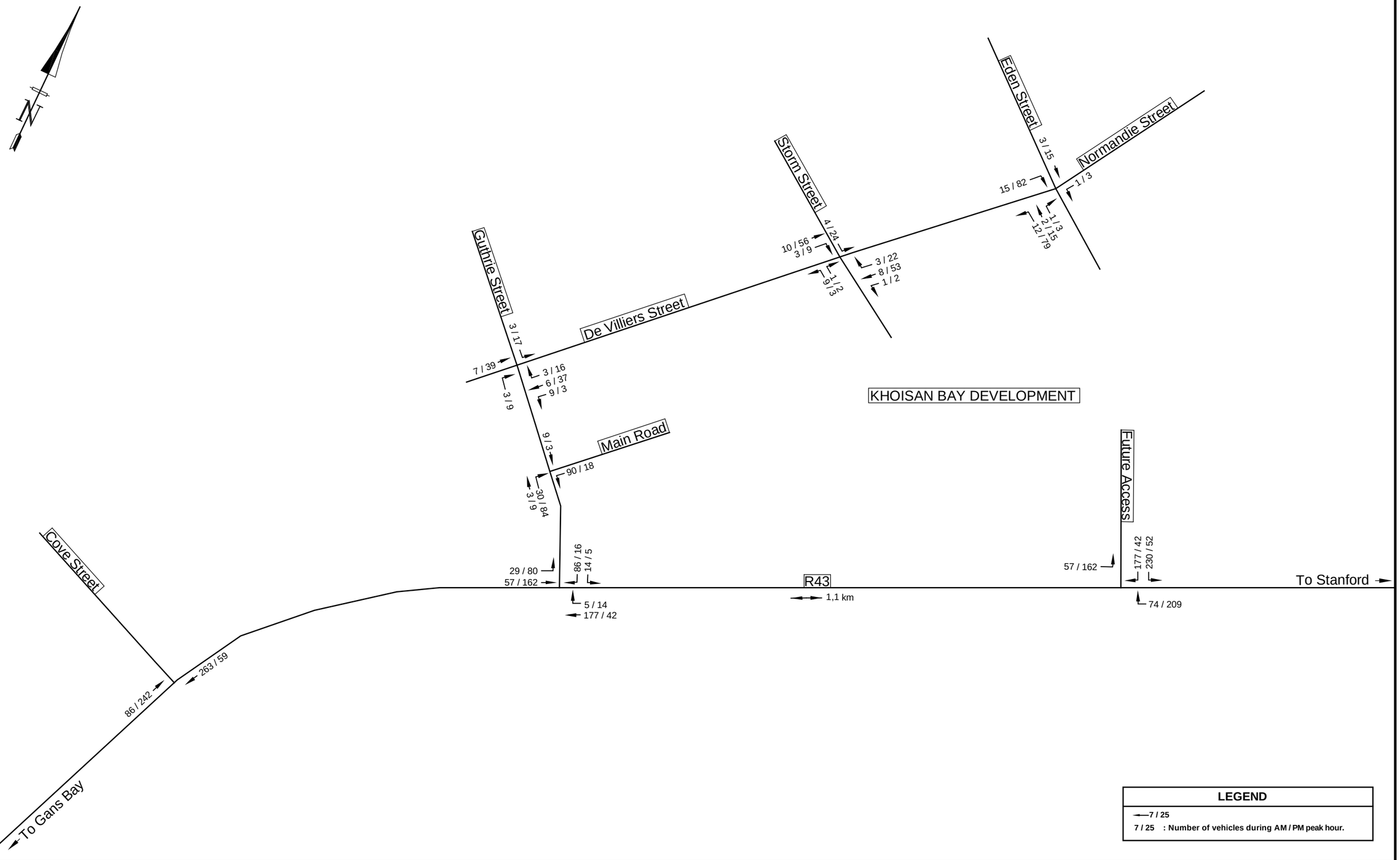
2018 BACKGROUND TRAFFIC VOLUMES AND LEVELS OF SERVICE

FIGURE 2



LEGEND

7 / 25

7 / 25 : Number of vehicles during AM / PM peak hour.

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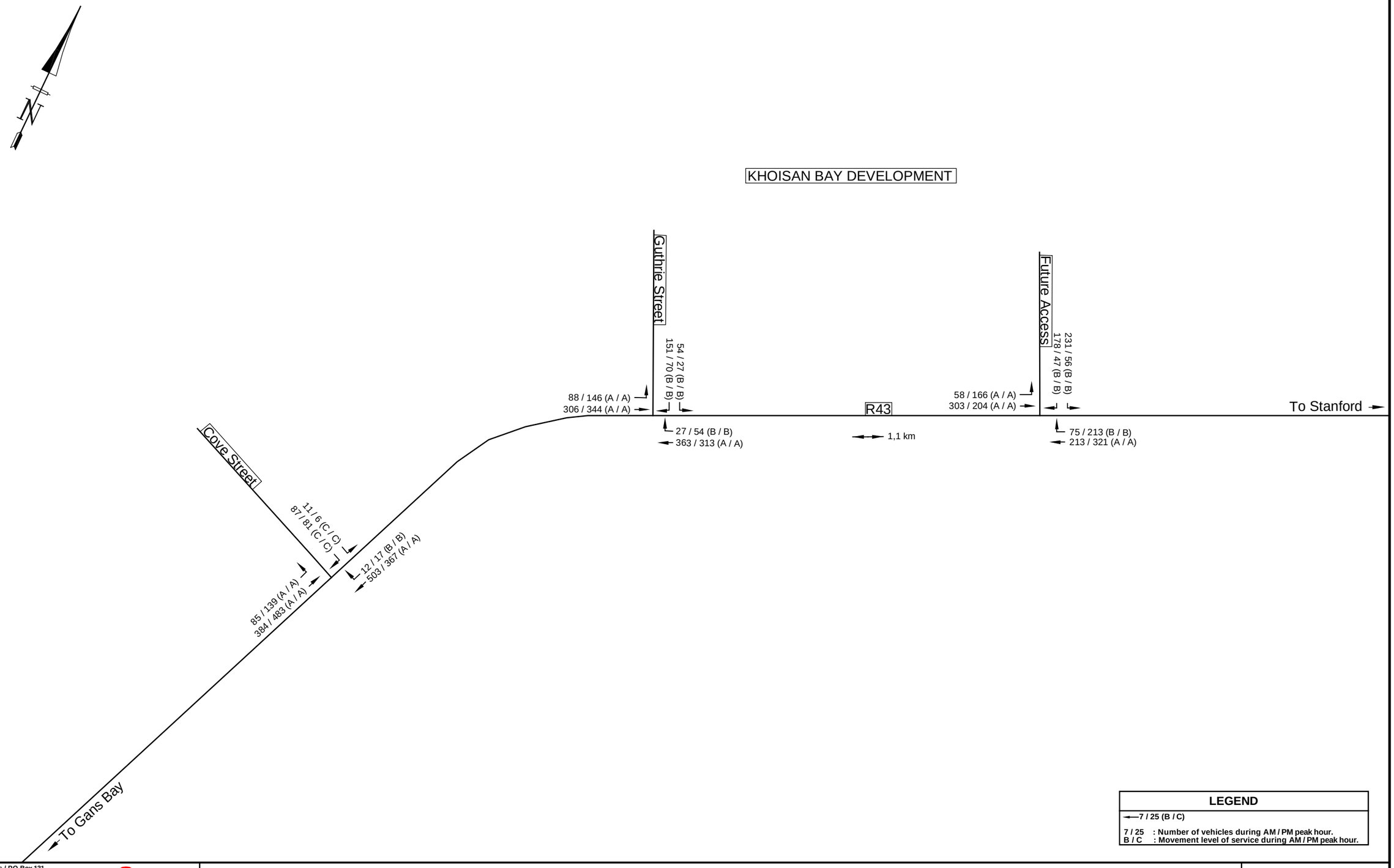
DISTRIBUTION OF TRIPS GENERATED BY THE KHOISAN BAY DEVELOPMENT

FIGURE 3



LEGEND
←7 / 25 (B / C)
7 / 25 : Number of vehicles during AM / PM peak hour. B / C : Movement level of service during AM / PM peak hour.

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2018 TRAFFIC VOLUMES AND LEVELS OF SERVICE (INCLUDING TRAFFIC FROM THE KHOISAN BAY DEVELOPMENT)

FIGURE 4