



Our Reference : 24721 L01  
Your Reference : N11/4/3-4/5X-1

November 27, 2018

**SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED**

**Northern Region**

38 Ida Street  
Menlo Park  
0081

**Attention: Mr. Izak van der Linde**

**BY COURIER**

**PROPOSED MIXED-USE DEVELOPMENT ON REMAINDER OF PORTION 12 OF THE FARM WEMMERHUIS 379-JT AND REMAINDER OF FARM BERGENDAL 981-JT, BELFAST – ADDENDUM TO TRAFFIC IMPACT ASSESSMENT**

**1. BACKGROUND**

Our traffic impact assessment (TIA) reports dated December 2015 and September 2016 as well as response letters from SANRAL dated 13 May 2016, 18 May 2016, 26 June 2017 and 8 May 2018 (copies of letters attached hereto as **Annexure A**) and various meetings with SANRAL and Emakhazeni Local Municipality refers.

The relevant outstanding matters, as pointed at a meeting held between SANRAL, Apil & Associates and WSP on 21 November 2018 are addressed in this addendum report. This addendum report must be read in conjunction with the original reports.

**2. PROPOSED ACCESS**

It was agreed that access to the proposed development will be granted directly opposite the R33. The access is situated approximately 350m from the southern terminal of the N4 and R33/Road D1477 interchange. It was requested that the intersection layout be a “butterfly” configuration with free flow movement on R33/Road D1477. In addition, it was agreed that the southern leg of R33/Road D1477 (gravel road) will be closed. The proposed intersection layout is indicated on **Drawing 24721 SKC001 Rev C**.

The proposed access will be the only access to the development. The amended traffic volumes for 2020 background plus Phase 1 to 4 development traffic are shown on **Figure 1**. Capacity analysis was undertaken and the results indicate that double right turning lanes will be required on the site access. Safety aspects of the proposed double right turning lanes will be investigated during the detail design stage.

Capacity analysis results are indicated on **Table 1** below. Detailed Sidra results are attached in **Annexure B**.

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**Table 1: Capacity Analysis – Road D1477/R33 and Site Access – 2020 Peak Hour Background Plus Phase 1 to 4 Development Traffic**

APPROACH		AM PEAK HOUR			PM PEAK HOUR			COMMENTS
		V/C	DELAYS (SEC)	LOS	V/C	DELAYS (SEC)	LOS	
SOUTH								<p><b>AM Peak Hour</b> Acceptable operating conditions expected with overall v/c ratio of below 1 and acceptable delays.</p> <p><b>PM Peak Hour</b> Acceptable operating conditions expected on the northern and western approaches with overall v/c ratio of below 1 and acceptable delays. LOS F expected on the eastern approach (site access).</p>
EAST	LEFT							
	THROUGH	0.041	12.8	B	0.121	12.8	B	
	RIGHT	0.545	19.2	C	1.470	292.0	F	
	APPROACH	0.545	18.8	C	1.470	272.5	F	
NORTH	LEFT	0.218	5.8	A	0.279	6.2	A	
	THROUGH							
	RIGHT	0.097	5.8	A	0.045	5.8	A	
	APPROACH	0.218	5.8	A	0.279	6.2	A	
WEST	LEFT	0.046	5.8	A	0.001	5.8	A	
	THROUGH	0.045	10.9	B	0.137	10.5	B	
	RIGHT							
	APPROACH	0.046	7.6	A	0.137	10.5	B	
ALL VEHICLES		0.545	9.9	NA	1.470	148.6	NA	

Note: NA = Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movement.

### 3. R33/ROAD D1477 AND N4 OFF-RAMP (NORTHERN TERMINAL)

Capacity analysis was undertaken at this intersection considering a few geometric layouts as indicated on **Table 2** below.

Table 2: Capacity Analysis – Road D1477 and N4 Off-Ramp (Northern Terminal) – 2020 Peak Hour Background Plus Phase 1 to 4 Development Traffic

TRAFFIC SCENARIO	GEOMETRIC LAYOUT	OVERALL INTERSECTION OPERATING CONDITIONS								
		Approach	AM PEAK HOUR				PM PEAK HOUR			
			LOS	v/c	Delay(s)	COMMENTS	LOS	v/c	Delay(s)	COMMENTS
1	With Existing Intersection Layout	South	NA	0.289	1.6	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.	NA	0.579	3.5	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.
		East	-	-	-		-	-	-	
		North	NA	0.494	0.4		NA	0.533	0.7	
		West	F	5.365	818.3		F	23.860	3009.9	
		OVERALL	NA	5.365	120.7		NA	23.860	673.5	
2	With All-Way Stop Layout	South	F	1.090	89.2	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.	F	2.052	444.6	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.
		East	-	-	-		-	-	-	
		North	F	1.772	352.9		F	1.902	390.3	
		West	D	0.564	27.7		F	1.535	223.7	
		OVERALL	F	1.772	220.7		F	2.052	357.2	
3	With Traffic Signals	South	A	0.413	5.4	Intersection operating below capacity with acceptable overall v/c ratios and delays.	C	0.946	28.8	Intersection operating below capacity with acceptable overall v/c ratios and delays.
		East	-	-	-		-	-	-	
		North	A	0.733	6.2		A	0.713	4.8	

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	West	B	0.601	17.9		B	0.867	15.6	
	<b>OVERALL</b>	<b>A</b>	<b>0.733</b>	<b>7.7</b>		<b>B</b>	<b>0.946</b>	<b>17.0</b>	

Note: NA = Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movement.

#### 4. ROAD D1477 AND N4 OFF-RAMP (SOUTHERN TERMINAL)

Capacity analysis was undertaken at this intersection considering a few geometric layouts as indicated on **Table 3** below.

**Table 3: Capacity Analysis – Road D1477 and N4 Off-Ramp (Southern Terminal) – 2020 Peak Hour Background Plus Phase 1 to 4 Development Traffic**

TRAFFIC SCENARIO	GEOMETRIC LAYOUT	OVERALL INTERSECTION OPERATING CONDITIONS								
		Approach	AM PEAK HOUR				PM PEAK HOUR			
			LOS	v/c	Delay(s)	COMMENTS	LOS	v/c	Delay(s)	COMMENTS
1	With Existing Intersection Layout	South	NA	0.268	1.2	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.	NA	0.583	1.6	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.
		East	F	6.067	4658.8		F	25.513	22165.6	
		North	NA	0.418	2.1		NA	0.935	26.4	
		West	F	3.932	2740.8		F	15.269	12929.3	
		OVERALL	NA	6.067	510.3		NA	25.513	2466.4	
2	With Existing Intersection Layout Plus Slip Lane	South	NA	0.268	1.2	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.	NA	0.583	1.6	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.
		East	F	6.067	4658.8		F	25.513	22165.6	
		North	NA	0.418	2.1		NA	0.935	26.4	
		West	F	3.817	1212.8		F	14.035	5908.6	
		OVERALL	NA	6.067	400.4		NA	25.513	1981.1	



<b>3</b>	With All-Way Stop Layout	South	F	1.269	271.6	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.	F	2.730	1420.0	Intersection operating at unacceptable overall v/c ratios and delays. Road upgrades are required.
		East	F	0.676	68.8		F	1.083	220.1	
		North	F	1.966	683.3		F	2.176	815.2	
		West	F	1.329	458.8		F	1.862	900.0	
		<b>OVERALL</b>	<b>F</b>	<b>1.966</b>	<b>507.4</b>		<b>F</b>	<b>2.730</b>	<b>1045.9</b>	
<b>4</b>	With Traffic Signal Plus Slip Lane	South	A	0.390	4.9	Intersection operating at acceptable overall v/c ratios and delays.	C	0.904	26.1	Intersection operating at acceptable overall v/c ratios and delays.
		East	C	0.595	33.0		E	0.867	70.2	
		North	A	0.657	7.2		B	0.805	12.6	
		West	B	0.334	18.9		D	0.711	37.3	
		<b>OVERALL</b>	<b>A</b>	<b>0.657</b>	<b>9.1</b>		<b>C</b>	<b>0.904</b>	<b>24.3</b>	

Note: NA = Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movement.



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## 5. PROPOSED NON-MOTORIZED TRANSPORT (NMT) FACILITIES

Due to the expected higher reliance on public transport and higher volumes of pedestrians to the proposed development, the following public transport and non-motorized transport (NMT) facilities are proposed:

- An on-site multi-modal public transport facility
- Paved sidewalks along R33/Road D1477 and pedestrian crossings at the N4/R33/Road D1477 and N4/Belfast One-Stop interchange as indicated on **Drawing 24721 SKC001 Rev C**.

The design and capacity of the proposed on-site multi-modal public transport facility will be dealt with during the SDP submission stage.

## 6. AMENDED ROAD MASTER PLAN

The amended road master plan is indicated on **Drawing 20744 SKC002 Rev C**.

## 7. OTHER ITEMS DISCUSSED DURING THE MEETING OF 21 NOVEMBER 2018

The following additional items were discussed during the meeting:

- No interaction will be allowed between the proposed development and the existing Belfast One-Stop Filling Station. Noted and agreed.
- Availability of power supply and maintenance of traffic signals at the terminals and street lights from town to the proposed access to be discussed with Applicant. Noted and agreed.
- Building lines to be adhered to as prescribed (20m from site boundary line) also taking into consideration a portion of land to be sold to SANRAL by Mlangeni Family Trust (the Applicant) along the N4. Noted and agreed.
- The act regulating the advertisements visible from the highway were discussed. Noted and agreed.
- A preliminary storm water plan to be undertaken. Noted and agreed.
- Boundary wall/physical barrier to be built prior to any construction. Noted and agreed.
- Proposed access to be constructed first with possibility of constructing services and/or the first phase of the mall concurrently. Noted and agreed.
- The approval of the access detailed design drawings will be dealt with according to rules and regulations of SANRAL. Noted and agreed
- Approval (with conditions) to be in place before 14 December 2018. Noted and agreed.

## **8. CONCLUSIONS**

The subject development is supported from a traffic engineering viewpoint, provided that the recommendations made in this addendum report are implemented.

Should you need more information please do not hesitate to contact the undersigned.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Phahlane', written over a horizontal line.

**Herbert Phahlane (Pr. Tech. Eng)**

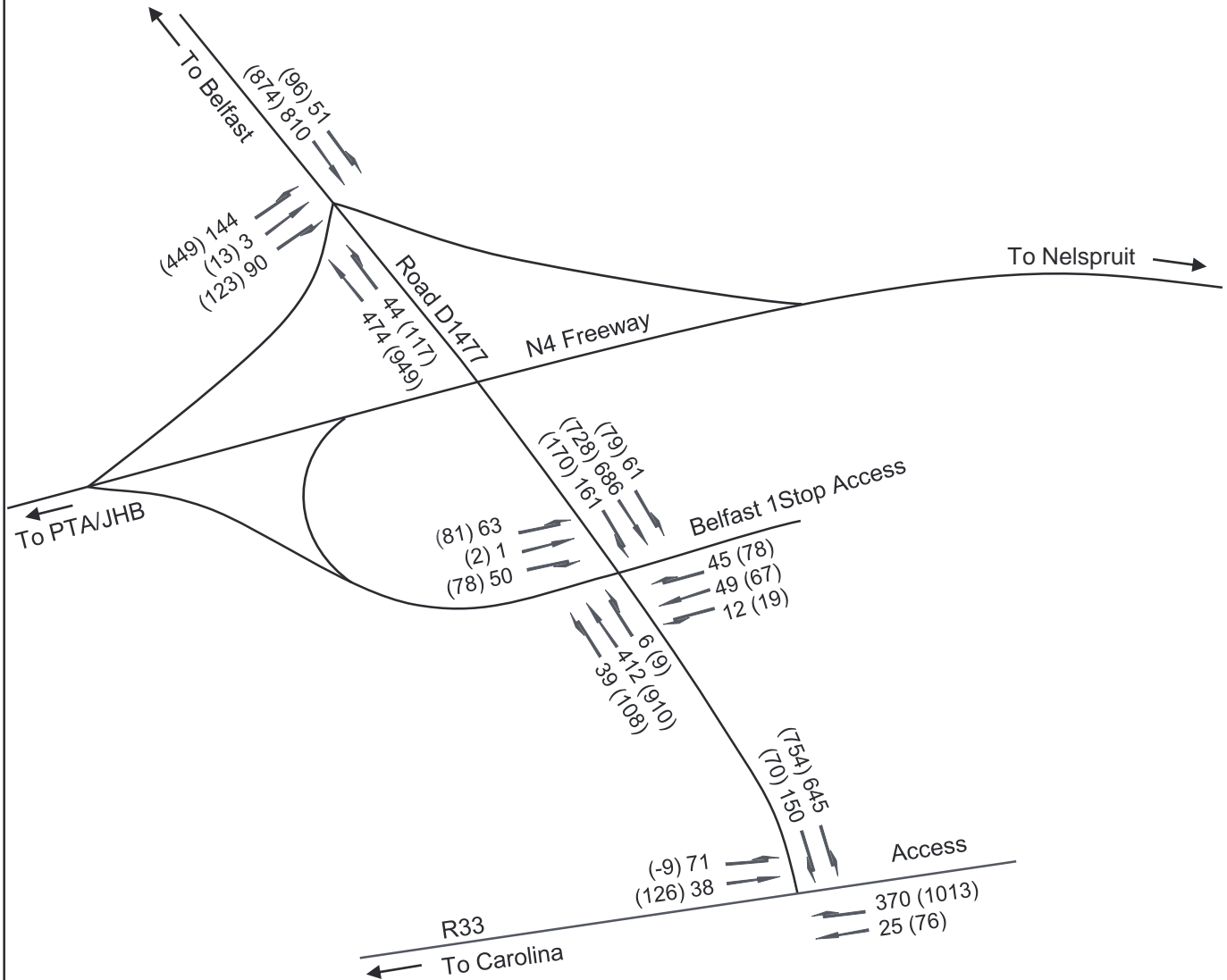
**Director: Traffic and Transportation**

**E-mail Address:** Herbert.Phahlane@wspgroup.co.za

**Mobile Number:** 083 445 6907

## Figures

**Figure 1: 2020 Peak Hour Background Plus Phase 1 to 4 Traffic Volumes**



#### GENERAL LEGEND:

255 - AM Peak Hour Trips  
(255) - PM Peak Hour Trips  
Date of Survey: 11 September 2015

Not to scale - Diagrammatic only

Checked by : H. Phahlane Pr. Tech. Eng

20744R. Belfast Development\_2020 Peak Hour Background Plus Phase 1-4 Development Traffic Volumes\_1



Project:  
**PROPOSED BELFAST MIXED USE  
DEVELOPMENT**

Figure:  
**2020 PEAK HOUR BACKGROUND PLUS PHASE 1-4  
DEVELOPMENT TRAFFIC VOLUMES**

No:  
**1**




## Drawings

**Drawing 24721 SKC001 Rev C: Proposed Road Upgrades and NMT Facilities**

**Drawing 20744 SKC002 Rev C: Road Master Plan**





				LOCAL AUTHORITY :  EMAKHAZENI LOCAL MUNICIPALITY		CLIENT:  EKANGALA DISTRICT MUNICIPALITY		  WSP Group Africa (Pty) Ltd Commercial Civils 314 Glenwood Road, Lynnwood Park, Pretoria, 0081 PostNet Suite 287, Private Bag X025, Lynnwood Ridge, 0040 Tel: +27(0)12-762-1200 Fax: +27(0)12-762-1301 www.wsp.com		PROJECT:  BELFAST MALL DEVELOPMENT		SCALE @ A1: 1:1250		CHECKED: H PHAHLANE		APPROVED: H PHAHLANE	
										TITLE:  PROPOSED ROAD UPGGRADES AND NMT FACILITIES		DESIGN: -		DRAWN: T JOUBERT		DATE: 2018/11/27	
												PROJECT No: 24721		DRAWING No: SKC001		REV: C	



If drawing status = construction, a signed copy of this drawing (either in hardcopy or electronic format) is available at the office of origin and at the office of issue.

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ARCHITECT:

TITLE:

SCALE @ A1:	CHECKED:	APPROVED:
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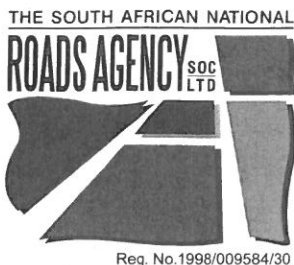
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## Annexure A

SANRAL Letters dated 13 May 2016, 18 May 2016, 26 June 2017 and 8 May 2018

F



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Contact Person:	Izak van der Linde	Website:	<a href="http://www.nra.co.za">www.nra.co.za</a>
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Attention: Eben Kotze

**PROPOSED MIXED USE DEVELOPMENT IN BELFAST - TRAFFIC  
IMPACT STUDY (REMAINDER OF PORTION 12 WEMMERHUIS 379 JT  
AND REMAINDER OF BERGENDAL 981JT)**

Your letter 20744 L01-CB dated 30 November 2015 together with the Traffic Impact Study (TIS) dated November 2015, refers.

The South African National Roads Agency SOC Limited hereby comments as follows:

- The COTO manual, TMH 16 Vol 1, states that traffic assessments cannot be undertaken in isolation without reference to the greater development and transportation planning of the relevant Municipality. In order to enable SANRAL to consider this application it must be provided with the roads master plan for the area. Such master planning must make provision for an alternative crossing of the N4 other than the existing interchange.
- SANRAL, furthermore, requires a copy of the Emakhazeni Municipality SDF for this area and written confirmation by the Municipality that the proposed development aligns therewith. In SANRAL's opinion this development constitutes urban sprawl due to its location being south of the N4 and some 3km removed from the existing town of Belfast. This makes the provision of services and the movement of people and goods problematic and expensive.

- This development will generate a significant number of trips, in the order of 1900 plus in the PM peak hour. This is substantially higher than the existing traffic volumes through the interchange. (SANRAL is not in agreement with the application of the low vehicle ownership reduction factor in this case. This is not a low cost housing development nor are there a high level of transit services present)
- It is a common principle that the full traffic impact of a development must be mitigated by providing additional capacity. It must be noted that the spare capacity that might currently exist on the surrounding road network should be reserved for background traffic growth and is thus not available to accommodate this development traffic. The Traffic study only proposes localised road upgrades which are not deemed sufficient for this purpose.
- It is expected that there are a large percentage of heavy vehicles on the road network surrounding this development. This has to be investigated and the traffic split between heavy vehicles and light vehicles needs to be analysed. Heavy vehicles require more time to turn into traffic (gap acceptance) and this will influence the capacity and operations of the affected intersections.

The above comments relates to the Traffic Impact Study as submitted. Approval in terms of Section 49 of Act 7 of 1998 of the town planning application will only be considered once the above comments are addressed to SANRAL's satisfaction.

I trust you will find the above in order.

Yours faithfully



For REGIONAL MANAGER: NORTHERN REGION



**Northern Region**

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Reference:	N11/4/3-4/5X-1	Fax Number:	+27 (0) 12 348 0883
Date:	18 May 2016	Direct Line:	+27 (0) 12 426 6269
Contact Person:	Tiyiselani Mashele	Website:	<a href="http://www.nra.co.za">www.nra.co.za</a>
Email:	<a href="mailto:mashelet@nra.co.za">mashelet@nra.co.za</a>		

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**KORSMAN & ASSOCIATES TOWN PLANNERS**

**Private Bag X 7294**

**Suite 295**

**WITBANK**

**1035**

For attention: Ms Laurette Swarts

Dear Madam

**N4/5X: PROPOSED TOWNSHIP ESTABLISHMENT ON REMAINDER OF THE FARM BERGENDAL 981 & REMAINDER OF PORTION 12 OF THE FARM WEMMERHUIS 379; MIXED USE DEVELOPMENT IN BELFAST**

Your application dated 4 December 2015 and the motivating memorandum in support together with the traffic impact study by WSP Parsons Brinckerhoff dated November 2015 have reference.

The South African National Roads Agency SOC Limited (SANRAL) cannot comment on the above-mentioned application prior to access requirements being addressed. Please see the attached letter from SANRAL dated 13 May 2016.

Yours faithfully

**For REGIONAL MANAGER : NORTHERN REGION**

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Date: 26 June 2017 Direct Line: +27 (0) 12 426 6213  
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Attention: Eben Kotze

**PROPOSED BELFAST MIXED USE DEVELOPMENT, TRAFFIC IMPACT  
ASSESSMENT  
(REMAINDER OF PORTION 12 WEMMERHUIS 379 JT AND  
REMAINDER OF BERGENDAL 981JT)**

Your letter 20744 EDK\_L02 dated 29 September 2016 together with the Traffic Impact Assessment (TIA) dated September 2016, refers.

Please note that the N4 and the R33 are proclaimed national roads under the jurisdiction of the South African National Roads Agency SOC Limited to which the following statutory building restriction areas apply in terms of the South African National Roads Agency Limited and National Roads Act, Act 7 of 1998:

- 60m measured from the road reserve boundary of any national road.
- 500m radius from any point of intersection on any national road.

After perusal of the TIA and due consideration of the proposed development the South African National Roads Agency SOC Limited has no other option but to object to the development based on the following reasons:

- SANRAL has, in its earlier response dated 13 May 2016, requested a copy of the Emakhazeni Municipality SDF for this area as well as written confirmation by the Municipality that the proposed development aligns therewith. This has not been received yet.



SANRAL furthermore requires confirmation that services (water, electricity, sewerage etc.) are available for this development (including public transport and pedestrian facilities).

- At present the town of Belfast is located only on the northern side of the N4, north of the railway line. The proposed development is located approximately 3 kilometres south of the existing CBD, south of the N4. In SANRAL's opinion this development constitutes urban sprawl and should not be allowed.

All interaction (vehicular and pedestrian) between the CBD and the proposed development will have to cross the N4 through the N4/R33 interchange. This will place unnecessary strain on the surrounding road network and will result in unsafe conditions for pedestrians.

- According to the traffic assessment it is expected that the proposed development will generate approximately 2000 additional Friday peak hour trips. All this additional traffic will have to make use of the N4/R33 interchange as the proposed link road towards the north across the N4 is only proposed to be implemented in phase 3 or 4. This is unacceptable and SANRAL requires all road upgrades (once agreed upon) to be implemented prior to commencement with the development.

The assessment furthermore applied a low vehicle ownership reduction factor in calculating the expected traffic volumes. This by implication means higher reliance on public transport and higher volumes of pedestrians. The assessment is silent on how pedestrian movements will be managed, especially across the N4. In terms of public transport the assessment proposes lay-byes only at one location, this will not be sufficient. SANRAL requires a pedestrian management plan as well as a public transport plan if this development is to be considered any further.

- As was mentioned above the N4 and R33 resorts under SANRAL's jurisdiction (please see image "A" attached hereto depicting same in red). The approval of the access on the R33 by the Mpumalanga Department of Public Works, Roads and Transport dated 21 January 2016 is therefore *ultra-virus* and not valid. Due to the close proximity of the 90 degree bend on the R33 to the N4 southern ramp terminal an access at this location will not be allowed. In the road master planning for the area (also requested in SANRAL's earlier response dated 13 May 2016) realignment of the R33 to eliminate the 90 degree bend should be considered where after an intersection position on the R33 located approximately 800m south of the N4 southern ramp terminal could be identified.

The above relates to the Traffic Impact Study as submitted only and SANRAL's response to the town planning application will follow separately.

Yours faithfully

  
For REGIONAL MANAGER: NORTHERN REGION



"A"  
IMAGE



Reference: N11/4/3-4/5X-1  
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Email: [vdlindei@nra.co.za](mailto:vdlindei@nra.co.za)

Direct Line: +27 (0) 12 426 6213  
Contact Person: Izak van der Linde  
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Attention: Herbert Phahlane

Dear Sir

**PROPOSED BELFAST MIXED USE DEVELOPMENT (REMAINDER OF PORTION 12 WEMMERHUIS 379 JT AND REMAINDER OF BERGENDAL 981JT)**

Your letter 24721 CB\_L101 dated 10 April 2018 together with the drawings SKC002 Rev. B and SKC001 Rev. A as well as SANRAL's previous response with regard to this application, refers.

SANRAL hereby confirms receipt of the following documents in this regard to date:

- Traffic Impact Assessment dated November 2015 (WSP).
- Township establishment application dated 4 December 2015 (Korsman & Associates Town Planners).
- Revised Traffic impact Assessment dated September 2016 (WSP).
- Above mentioned letter with drawings:
  - SKC002 Rev. B (Roads master plan)
  - SKC001 Rev. A (Proposed pedestrian walkway layout)

Please note that the "Roads master plan" drawing SKC002 Rev. B does not comply with COTO-TRH 26 in that it indicates an access position to the R33 approximately 350m south of the N4/R33 southern terminal and another access a further 290m to the south. COTO-TRH 26 prescribes intersection spacing of  $\pm 800\text{m}$  along a road such as the R33. COTO-TMH 16 Vol 1 further requires master planning to be approved by the municipality and/or relevant authority.

SANRAL's suggestion, in order to comply with COTO-TRH 26 and achieve the required 800m intersection spacing, namely to consider the realignment of the R33 to eliminate the 90 degree bend where after an intersection position on the R33 located approximately 800m south of the N4 southern ramp terminal could be identified, seems to have been ignored.



In terms of SANRAL's previous letters dated 13 May 2016, 26 June 2017 and 8 February 2018 the following information/documentation were requested and are still outstanding:

- Approved Emakhazeni Municipality Strategic Development Framework (SDF).
- Written confirmation by the Municipality that the proposed development complies with the SDF and that services can be provided (including public transport and pedestrian facilities).
- Pedestrian management plan.
- Public transport plan.
- Updated traffic impact assessment based on acceptable and compliant roads master planning.

As mentioned before, SANRAL will only be able to further consider this application if it is presented with the information/documentation as requested.

I trust that you will find the above in order.

Yours faithfully

A handwritten signature in black ink, appearing to read 'M. L. v. d. Merwe', written in a cursive style.

REGIONAL MANAGER: SANRAL NORTHERN REGION

## Annexure B

### Capacity Analysis Results

## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & Site Access\_2020 AM Peak Hour Background Plus Phase 1 to 4 Development]

2020 AM Peak Hour Background Plus Phase 1 to 4 Development Traffic  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Site Access											
5	T1	26	3.0	0.041	12.8	LOS B	0.2	1.2	0.55	0.89	49.5
6	R2	389	3.0	0.545	19.2	LOS C	3.4	24.1	0.73	1.12	45.8
Approach		416	3.0	0.545	18.8	LOS C	3.4	24.1	0.72	1.10	46.0
North: Road D1477											
7	L2	679	3.0	0.218	5.8	LOS A	1.0	7.5	0.14	0.52	53.7
9	R2	158	20.0	0.097	5.8	LOS A	0.0	0.0	0.00	0.56	53.0
Approach		837	6.2	0.218	5.8	LOS A	1.0	7.5	0.11	0.53	53.6
West: R33											
10	L2	75	20.0	0.046	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	40	20.0	0.045	10.9	LOS B	0.2	1.6	0.35	0.85	50.3
Approach		115	20.0	0.046	7.6	LOS A	0.2	1.6	0.12	0.63	52.8
All Vehicles		1367	6.4	0.545	9.9	NA	3.4	24.1	0.30	0.71	51.0

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & Site Access\_2020 PM Peak Hour Background Plus Phase 1 to 4 Development]

2020 PM Peak Hour Background Plus Phase 1 to 4 Development Traffic  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Site Access											
5	T1	80	3.0	0.121	12.8	LOS B	0.5	3.6	0.55	0.93	49.5
6	R2	1066	3.0	1.470	292.0	LOS F	140.4	1008.2	0.99	4.90	10.3
Approach		1146	3.0	1.470	272.5	LOS F	140.4	1008.2	0.96	4.63	10.9
North: Road D1477											
7	L2	794	3.0	0.279	6.2	LOS A	1.4	9.9	0.29	0.55	53.1
9	R2	74	20.0	0.045	5.8	LOS A	0.0	0.0	0.00	0.56	53.0
Approach		867	4.4	0.279	6.2	LOS A	1.4	9.9	0.27	0.55	53.1
West: R33											
10	L2	1	20.0	0.001	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	133	20.0	0.137	10.5	LOS B	0.6	5.2	0.30	0.87	50.5
Approach		134	20.0	0.137	10.5	LOS B	0.6	5.2	0.30	0.86	50.5
All Vehicles		2147	4.6	1.470	148.6	NA	140.4	1008.2	0.64	2.75	17.4

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Northern Terminal\_2020 AM Background Plus Phase 1-4 Development Traffic]

2020 AM Background Plus Phase 1-4 Development Traffic  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
2	T1	499	20.0	0.289	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
3	R2	46	20.0	0.161	18.0	LOS C	0.5	4.4	0.81	0.93	44.3
Approach		545	20.0	0.289	1.6	NA	0.5	4.4	0.07	0.08	58.2
North: Road D1477 SB											
7	L2	54	20.0	0.033	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
8	T1	853	20.0	0.494	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		906	20.0	0.494	0.4	NA	0.0	0.0	0.00	0.03	59.4
West: N4 Off-ramp											
10	L2	152	20.0	0.247	10.3	LOS B	1.0	7.8	0.57	0.82	50.3
11	T1	3	20.0	5.365	2064.8	LOS F	39.0	320.1	1.00	1.50	1.6
12	R2	95	20.0	5.365	2069.7	LOS F	39.0	320.1	1.00	1.50	1.6
Approach		249	20.0	5.365	818.3	LOS F	39.0	320.1	0.74	1.09	3.9
All Vehicles		1701	20.0	5.365	120.7	NA	39.0	320.1	0.13	0.20	19.1

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Northern Terminal\_2020 PM Background Plus Phase 1-4 Development Traffic]

2020 PM Background Plus Phase 1-4 Development Traffic  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
2	T1	999	20.0	0.579	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
3	R2	123	20.0	0.561	31.0	LOS D	2.4	19.5	0.92	1.09	38.2
Approach		1122	20.0	0.579	3.5	NA	2.4	19.5	0.10	0.12	56.3
North: Road D1477 SB											
7	L2	101	20.0	0.062	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
8	T1	920	20.0	0.533	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1021	20.0	0.533	0.7	NA	0.0	0.0	0.00	0.06	59.0
West: N4 Off-ramp											
10	L2	473	20.0	2.660	768.0	LOS F	101.4	831.5	1.00	4.24	4.4
11	T1	14	20.0	23.860	10412.3	LOS F	94.8	777.0	1.00	1.21	0.3
12	R2	129	20.0	23.860	10411.4	LOS F	94.8	777.0	1.00	1.21	0.3
Approach		616	20.0	23.860	3009.9	LOS F	101.4	831.5	1.00	3.54	1.2
All Vehicles		2759	20.0	23.860	673.5	NA	101.4	831.5	0.26	0.86	4.8

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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


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## MOVEMENT SUMMARY

 Site: [Road D1477 & N4 Northern Terminal\_2020 AM Background Plus Phase 1-4 Development Traffic\_All-way Stop]

2020 AM Background Plus Phase 1-4 Development Traffic  
Stop (All-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
2	T1	499	20.0	1.090	96.4	LOS F	20.2	165.7	1.00	3.43	23.2
3	R2	46	20.0	0.113	11.4	LOS B	0.4	3.1	0.87	1.28	49.4
Approach		545	20.0	1.090	89.2	LOS F	20.2	165.7	0.99	3.25	24.3
North: Road D1477 SB											
7	L2	54	20.0	0.120	11.8	LOS B	0.4	3.3	0.85	1.28	50.1
8	T1	853	20.0	1.772	374.4	LOS F	84.6	693.5	1.00	7.68	8.4
Approach		906	20.0	1.772	352.9	LOS F	84.6	693.5	0.99	7.30	8.8
West: N4 Off-ramp											
10	L2	152	20.0	0.564	30.0	LOS D	3.0	24.3	1.00	1.52	40.3
11	T1	3	20.0	0.417	24.3	LOS C	1.9	15.2	1.00	1.40	42.8
12	R2	95	20.0	0.417	24.1	LOS C	1.9	15.2	1.00	1.40	42.6
Approach		249	20.0	0.564	27.7	LOS D	3.0	24.3	1.00	1.47	41.2
All Vehicles		1701	20.0	1.772	220.7	LOS F	84.6	693.5	0.99	5.15	12.9

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

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

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

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

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

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

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## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Northern Terminal\_2020 PM Background Plus Phase 1-4 Development Traffic\_All-way Stop]

2020 PM Background Plus Phase 1-4 Development Traffic  
Stop (All-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
2	T1	999	20.0	2.052	497.8	LOS F	114.0	934.5	1.00	8.82	6.5
3	R2	123	20.0	0.278	13.1	LOS B	1.1	8.6	0.89	1.34	48.3
Approach		1122	20.0	2.052	444.6	LOS F	114.0	934.5	0.99	8.00	7.2
North: Road D1477 SB											
7	L2	101	20.0	0.231	13.2	LOS B	0.8	6.9	0.88	1.32	49.2
8	T1	920	20.0	1.902	431.7	LOS F	98.1	804.4	1.00	8.24	7.4
Approach		1021	20.0	1.902	390.3	LOS F	98.1	804.4	0.99	7.55	8.1
West: N4 Off-ramp											
10	L2	473	20.0	1.535	283.5	LOS F	41.5	340.4	1.00	4.67	10.6
11	T1	14	20.0	0.525	26.5	LOS D	2.6	21.5	1.00	1.48	41.7
12	R2	129	20.0	0.525	26.3	LOS D	2.6	21.5	1.00	1.48	41.5
Approach		616	20.0	1.535	223.7	LOS F	41.5	340.4	1.00	3.93	12.8
All Vehicles		2759	20.0	2.052	375.2	LOS F	114.0	934.5	0.99	6.93	8.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.  
 Intersection and Approach LOS values are based on average delay for all vehicle movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## MOVEMENT SUMMARY

**Site:** [Road D1477 & N4 Northern Terminal\_2020 AM Background Plus Phase 1-4 Development Traffic]

2020 AM Background Plus Phase 1-4 Development Traffic

Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
2	T1	499	20.0	0.413	4.1	LOS A	6.2	50.7	0.45	0.40	56.2
3	R2	46	20.0	0.207	18.9	LOS B	0.9	7.7	0.67	0.74	43.8
Approach		545	20.0	0.413	5.4	LOS A	6.2	50.7	0.47	0.43	54.9
North: Road D1477 SB											
7	L2	54	20.0	0.047	8.7	LOS A	0.5	4.0	0.32	0.64	50.6
8	T1	853	20.0	0.733	6.1	LOS A	15.1	124.1	0.64	0.59	54.5
Approach		906	20.0	0.733	6.2	LOS A	15.1	124.1	0.62	0.60	54.3
West: N4 Off-ramp											
10	L2	152	20.0	0.093	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	3	20.0	0.601	31.0	LOS C	3.1	25.0	1.00	0.82	37.5
12	R2	95	20.0	0.601	36.7	LOS D	3.1	25.0	1.00	0.82	36.3
Approach		249	20.0	0.601	17.9	LOS B	3.1	25.0	0.39	0.63	45.5
All Vehicles		1701	20.0	0.733	7.7	LOS A	15.1	124.1	0.54	0.55	53.0

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

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

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

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

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

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

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## MOVEMENT SUMMARY

**Site:** [Road D1477 & N4 Northern Terminal\_2020 PM Background Plus Phase 1-4 Development Traffic]

2020 PM Background Plus Phase 1-4 Development Traffic

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
2	T1	999	20.0	0.946	30.1	LOS C	34.3	281.6	0.58	0.82	40.1
3	R2	123	20.0	0.437	18.1	LOS B	2.8	23.0	0.67	0.77	44.2
Approach		1122	20.0	0.946	28.8	LOS C	34.3	281.6	0.59	0.81	40.5
North: Road D1477 SB											
7	L2	101	20.0	0.081	8.1	LOS A	0.9	7.2	0.27	0.64	51.1
8	T1	920	20.0	0.713	4.4	LOS A	15.3	125.1	0.53	0.49	55.9
Approach		1021	20.0	0.713	4.8	LOS A	15.3	125.1	0.50	0.50	55.4
West: N4 Off-ramp											
10	L2	473	20.0	0.288	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	14	20.0	0.867	42.6	LOS D	5.8	47.5	1.00	0.99	33.7
12	R2	129	20.0	0.867	48.3	LOS D	5.8	47.5	1.00	0.99	32.7
Approach		616	20.0	0.867	15.6	LOS B	5.8	47.5	0.23	0.63	47.1
All Vehicles		2759	20.0	0.946	17.0	LOS B	34.3	281.6	0.48	0.66	46.6

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

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

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

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

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

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

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## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Offramp Southern Terminal\_2020 AM Background Plus Phase 1-4 Development Traffic]

2020 AM Background Plus Phase 1-4 Development Traffic  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	41	20.0	0.025	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
2	T1	434	20.0	0.268	0.5	LOS A	0.3	2.5	0.05	0.01	59.3
3	R2	6	20.0	0.268	17.3	LOS C	0.3	2.5	0.05	0.01	56.4
Approach		481	20.0	0.268	1.2	NA	0.3	2.5	0.05	0.06	58.6
East: Belfast One Stop Access											
4	L2	13	20.0	6.067	4629.7	LOS F	73.8	605.5	1.00	2.06	0.8
5	T1	52	20.0	6.067	4655.5	LOS F	73.8	605.5	1.00	2.06	0.8
6	R2	47	20.0	6.067	4670.3	LOS F	73.8	605.5	1.00	2.06	0.8
Approach		112	20.0	6.067	4658.8	LOS F	73.8	605.5	1.00	2.06	0.8
North: Road D1477 NB											
7	L2	64	20.0	0.040	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
8	T1	722	20.0	0.418	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	169	20.0	0.243	9.6	LOS A	1.0	8.3	0.58	0.82	49.8
Approach		956	20.0	0.418	2.1	NA	1.0	8.3	0.10	0.18	57.3
West: N4 Offramp											
10	L2	66	20.0	3.932	2712.7	LOS F	66.7	547.2	1.00	2.95	1.3
11	T1	1	20.0	3.932	2757.8	LOS F	66.7	547.2	1.00	2.95	1.3
12	R2	53	20.0	3.932	2775.8	LOS F	66.7	547.2	1.00	2.95	1.3
Approach		120	20.0	3.932	2740.8	LOS F	66.7	547.2	1.00	2.95	1.3
All Vehicles		1668	20.0	6.067	510.3	NA	73.8	605.5	0.21	0.47	6.2

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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



## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Offramp Southern Terminal\_2020 PM Background Plus Phase 1-4 Development Traffic]

2020 PM Background Plus Phase 1-4 Development Traffic  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	114	20.0	0.070	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
2	T1	958	20.0	0.583	0.9	LOS A	1.0	8.3	0.07	0.01	58.9
3	R2	9	20.0	0.583	29.9	LOS D	1.0	8.3	0.07	0.01	56.0
Approach		1081	20.0	0.583	1.6	NA	1.0	8.3	0.06	0.07	58.1
East: Belfast One Stop Access											
4	L2	20	20.0	25.513	22149.6	LOS F	157.6	1291.9	1.00	1.50	0.2
5	T1	71	20.0	25.513	22168.2	LOS F	157.6	1291.9	1.00	1.50	0.2
6	R2	82	20.0	25.513	22167.4	LOS F	157.6	1291.9	1.00	1.50	0.2
Approach		173	20.0	25.513	22165.6	LOS F	157.6	1291.9	1.00	1.50	0.2
North: Road D1477 NB											
7	L2	83	20.0	0.051	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
8	T1	766	20.0	0.915	16.7	LOS C	25.6	210.1	1.00	0.00	47.0
9	R2	179	20.0	0.935	77.1	LOS F	7.6	62.4	0.99	1.62	25.9
Approach		1028	20.0	0.935	26.4	NA	25.6	210.1	0.92	0.33	41.5
West: N4 Offramp											
10	L2	85	20.0	15.269	12914.1	LOS F	131.3	1076.6	1.00	1.84	0.3
11	T1	2	20.0	15.269	13005.1	LOS F	131.3	1076.6	1.00	1.84	0.3
12	R2	82	20.0	15.269	12943.1	LOS F	131.3	1076.6	1.00	1.84	0.3
Approach		169	20.0	15.269	12929.3	LOS F	131.3	1076.6	1.00	1.84	0.3
All Vehicles		2452	20.0	25.513	2466.4	NA	157.6	1291.9	0.55	0.40	1.4

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

# MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Offramp Southern Terminal\_2020 AM Background Plus Phase 1-4 Development Traffic Plus]

2020 AM Background Plus Phase 1-4 Development Traffic Plus Slip Lane  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	41	20.0	0.025	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
2	T1	434	20.0	0.268	0.5	LOS A	0.3	2.5	0.05	0.01	59.3
3	R2	6	20.0	0.268	17.3	LOS C	0.3	2.5	0.05	0.01	56.4
Approach		481	20.0	0.268	1.2	NA	0.3	2.5	0.05	0.06	58.6
East: Belfast One Stop Access											
4	L2	13	20.0	6.067	4629.7	LOS F	73.8	605.5	1.00	2.06	0.8
5	T1	52	20.0	6.067	4655.5	LOS F	73.8	605.5	1.00	2.06	0.8
6	R2	47	20.0	6.067	4670.3	LOS F	73.8	605.5	1.00	2.06	0.8
Approach		112	20.0	6.067	4658.9	LOS F	73.8	605.5	1.00	2.06	0.8
North: Road D1477 NB											
7	L2	64	20.0	0.040	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
8	T1	722	20.0	0.418	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	169	20.0	0.243	9.6	LOS A	1.0	8.3	0.58	0.81	50.0
Approach		956	20.0	0.418	2.1	NA	1.0	8.3	0.10	0.18	57.3
West: N4 Offramp											
10	L2	66	20.0	0.041	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	1	20.0	3.817	2686.7	LOS F	34.5	282.8	1.00	1.71	1.2
12	R2	53	20.0	3.817	2704.2	LOS F	34.5	282.8	1.00	1.71	1.2
Approach		120	20.0	3.817	1212.8	LOS F	34.5	282.8	0.45	1.05	2.7
All Vehicles		1668	20.0	6.067	400.4	NA	73.8	605.5	0.17	0.33	7.6

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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



## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Offramp Southern Terminal\_2020 PM Background Plus Phase 1-4 Development Traffic Plus]

2020 PM Background Plus Phase 1-4 Development Traffic Plus Slip Lane  
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	114	20.0	0.070	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
2	T1	958	20.0	0.583	0.9	LOS A	1.0	8.3	0.07	0.01	58.9
3	R2	9	20.0	0.583	29.9	LOS D	1.0	8.3	0.07	0.01	56.0
Approach		1081	20.0	0.583	1.6	NA	1.0	8.3	0.06	0.07	58.1
East: Belfast One Stop Access											
4	L2	20	20.0	25.513	22149.6	LOS F	157.6	1291.9	1.00	1.50	0.2
5	T1	71	20.0	25.513	22168.2	LOS F	157.6	1291.9	1.00	1.50	0.2
6	R2	82	20.0	25.513	22167.4	LOS F	157.6	1291.9	1.00	1.50	0.2
Approach		173	20.0	25.513	22165.6	LOS F	157.6	1291.9	1.00	1.50	0.2
North: Road D1477 NB											
7	L2	83	20.0	0.051	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
8	T1	766	20.0	0.915	16.7	LOS C	25.6	210.1	1.00	0.00	47.0
9	R2	179	20.0	0.935	77.1	LOS F	7.6	62.4	0.99	1.62	26.0
Approach		1028	20.0	0.935	26.4	NA	25.6	210.1	0.92	0.33	41.5
West: N4 Offramp											
10	L2	85	20.0	0.052	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	2	20.0	14.035	11949.8	LOS F	79.5	651.6	1.00	1.40	0.3
12	R2	82	20.0	14.035	11883.4	LOS F	79.5	651.6	1.00	1.40	0.3
Approach		169	20.0	14.035	5908.6	LOS F	79.5	651.6	0.50	0.96	0.6
All Vehicles		2452	20.0	25.513	1981.1	NA	157.6	1291.9	0.52	0.34	1.8

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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## MOVEMENT SUMMARY

**STOP** Site: [Road D1477 & N4 Offramp Southern Terminal\_2020 AM Background Plus Development Traffic\_All-]

2020 AM Background Plus Development Traffic Plus All-Way Stop  
Stop (All-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	41	20.0	0.133	14.1	LOS B	0.5	3.8	0.93	1.28	48.7
2	T1	434	20.0	1.269	295.7	LOS F	48.0	393.7	1.00	6.24	10.2
3	R2	6	20.0	1.269	295.6	LOS F	48.0	393.7	1.00	6.24	10.2
Approach		481	20.0	1.269	271.6	LOS F	48.0	393.7	0.99	5.82	11.0
East: Belfast One Stop Access											
4	L2	13	20.0	0.676	68.8	LOS F	4.3	35.1	1.00	1.66	28.2
5	T1	52	20.0	0.676	68.8	LOS F	4.3	35.1	1.00	1.66	28.2
6	R2	47	20.0	0.676	68.9	LOS F	4.3	35.1	1.00	1.66	28.2
Approach		112	20.0	0.676	68.8	LOS F	4.3	35.1	1.00	1.66	28.2
North: Road D1477 NB											
7	L2	64	20.0	0.187	12.7	LOS B	0.7	5.5	0.92	1.30	49.7
8	T1	722	20.0	1.966	898.6	LOS F	155.2	1272.8	1.00	12.23	3.8
9	R2	169	20.0	0.493	20.0	LOS C	2.4	19.7	0.98	1.47	45.0
Approach		956	20.0	1.966	683.3	LOS F	155.2	1272.8	0.99	9.59	4.9
West: N4 Offramp											
10	L2	66	20.0	1.329	458.9	LOS F	19.7	161.8	1.00	2.89	7.0
11	T1	1	20.0	1.329	459.0	LOS F	19.7	161.8	1.00	2.89	7.0
12	R2	53	20.0	1.329	458.7	LOS F	19.7	161.8	1.00	2.89	7.0
Approach		120	20.0	1.329	458.8	LOS F	19.7	161.8	1.00	2.89	7.0
All Vehicles		1668	20.0	1.966	507.4	LOS F	155.2	1272.8	0.99	7.49	6.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.  
 Intersection and Approach LOS values are based on average delay for all vehicle movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

**STOP** Site: v [Road D1477 & N4 Offramp Southern Terminal\_2020 PM Background Plus Development Traffic\_All-]

2020 PM Background Plus Development Traffic Plus All-Way Stop  
Stop (All-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	114	20.0	0.350	18.1	LOS C	1.5	11.9	0.96	1.37	46.3
2	T1	958	20.0	2.730	1584.8	LOS F	263.9	2163.8	1.00	14.80	2.2
3	R2	9	20.0	2.730	1584.8	LOS F	263.9	2163.8	1.00	14.80	2.2
Approach		1081	20.0	2.730	1420.0	LOS F	263.9	2163.8	1.00	13.39	2.5
East: Belfast One Stop Access											
4	L2	20	20.0	1.083	220.0	LOS F	16.1	132.0	1.00	2.90	13.0
5	T1	71	20.0	1.083	220.1	LOS F	16.1	132.0	1.00	2.90	13.0
6	R2	82	20.0	1.083	220.1	LOS F	16.1	132.0	1.00	2.90	13.0
Approach		173	20.0	1.083	220.1	LOS F	16.1	132.0	1.00	2.90	13.0
North: Road D1477 NB											
7	L2	83	20.0	0.259	14.4	LOS B	1.0	8.1	0.95	1.33	48.6
8	T1	766	20.0	2.176	1086.9	LOS F	180.1	1477.1	1.00	12.79	3.2
9	R2	179	20.0	0.557	23.8	LOS C	3.0	24.3	1.00	1.53	42.9
Approach		1028	20.0	2.176	815.2	LOS F	180.1	1477.1	1.00	9.90	4.2
West: N4 Offramp											
10	L2	85	20.0	1.862	900.1	LOS F	39.5	324.0	1.00	3.82	3.8
11	T1	2	20.0	1.862	900.2	LOS F	39.5	324.0	1.00	3.82	3.8
12	R2	82	20.0	1.862	899.9	LOS F	39.5	324.0	1.00	3.82	3.8
Approach		169	20.0	1.862	900.0	LOS F	39.5	324.0	1.00	3.82	3.8
All Vehicles		2452	20.0	2.730	1045.9	LOS F	263.9	2163.8	1.00	10.53	3.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.  
 Intersection and Approach LOS values are based on average delay for all vehicle movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## MOVEMENT SUMMARY

**Site:** [Road D1477 & N4 Offramp Southern Terminal\_2020 AM Background Plus Phase 1-4 Development Traffic Plus]

2020 AM Background Plus Phase 1-4 Development Traffic Plus Slip Lane  
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	41	20.0	0.037	9.1	LOS A	0.4	3.2	0.34	0.64	50.4
2	T1	434	20.0	0.390	4.4	LOS A	5.6	45.8	0.46	0.41	55.9
3	R2	6	20.0	0.390	10.2	LOS B	5.6	45.8	0.46	0.41	53.3
Approach		481	20.0	0.390	4.9	LOS A	5.6	45.8	0.45	0.43	55.3
East: Belfast One Stop Access											
4	L2	13	20.0	0.595	35.7	LOS D	3.4	28.0	0.99	0.81	37.9
5	T1	52	20.0	0.595	29.9	LOS C	3.4	28.0	0.99	0.81	39.0
6	R2	47	20.0	0.595	35.7	LOS D	3.4	28.0	0.99	0.81	37.9
Approach		112	20.0	0.595	33.0	LOS C	3.4	28.0	0.99	0.81	38.4
North: Road D1477 NB											
7	L2	64	20.0	0.058	9.1	LOS A	0.6	5.0	0.35	0.65	50.3
8	T1	722	20.0	0.657	5.6	LOS A	11.6	95.0	0.59	0.53	54.9
9	R2	169	20.0	0.355	13.1	LOS B	2.7	22.3	0.56	0.73	47.7
Approach		956	20.0	0.657	7.2	LOS A	11.6	95.0	0.57	0.57	53.2
West: N4 Offramp											
10	L2	66	20.0	0.041	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	1	20.0	0.334	29.5	LOS C	1.6	13.1	0.97	0.74	38.1
12	R2	53	20.0	0.334	35.3	LOS D	1.6	13.1	0.97	0.74	36.9
Approach		120	20.0	0.334	18.9	LOS B	1.6	13.1	0.43	0.62	44.9
All Vehicles		1668	20.0	0.657	9.1	LOS A	11.6	95.0	0.55	0.55	51.7

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

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

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

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

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

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

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## MOVEMENT SUMMARY

**Site:** [Road D1477 & N4 Offramp Southern Terminal\_2020 PM Background Plus Phase 1-4 Development Traffic Plus]

2020 PM Background Plus Phase 1-4 Development Traffic Plus Slip Lane

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road D1477 NB											
1	L2	114	20.0	0.101	12.6	LOS B	2.2	18.1	0.36	0.66	48.1
2	T1	958	20.0	0.904	27.7	LOS C	50.4	413.1	0.79	0.83	41.2
3	R2	9	20.0	0.904	33.4	LOS C	50.4	413.1	0.79	0.83	39.9
Approach		1081	20.0	0.904	26.1	LOS C	50.4	413.1	0.74	0.81	41.8
East: Belfast One Stop Access											
4	L2	20	20.0	0.867	72.5	LOS E	11.4	93.5	1.00	1.01	27.4
5	T1	71	20.0	0.867	66.8	LOS E	11.4	93.5	1.00	1.01	28.0
6	R2	82	20.0	0.867	72.6	LOS E	11.4	93.5	1.00	1.01	27.4
Approach		173	20.0	0.867	70.2	LOS E	11.4	93.5	1.00	1.01	27.6
North: Road D1477 NB											
7	L2	83	20.0	0.064	8.6	LOS A	1.0	8.5	0.23	0.63	50.7
8	T1	766	20.0	0.645	4.7	LOS A	15.7	128.8	0.39	0.36	55.7
9	R2	179	20.0	0.805	48.3	LOS D	10.0	81.9	1.00	1.00	32.8
Approach		1028	20.0	0.805	12.6	LOS B	15.7	128.8	0.48	0.49	49.3
West: N4 Offramp											
10	L2	85	20.0	0.052	5.8	LOS A	0.0	0.0	0.00	0.52	54.2
11	T1	2	20.0	0.711	63.5	LOS E	5.3	43.1	1.00	0.85	28.1
12	R2	82	20.0	0.711	69.2	LOS E	5.3	43.1	1.00	0.85	27.5
Approach		169	20.0	0.711	37.3	LOS D	5.3	43.1	0.50	0.68	36.7
All Vehicles		2452	20.0	0.904	24.3	LOS C	50.4	413.1	0.63	0.68	42.6

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

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

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

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

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

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

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