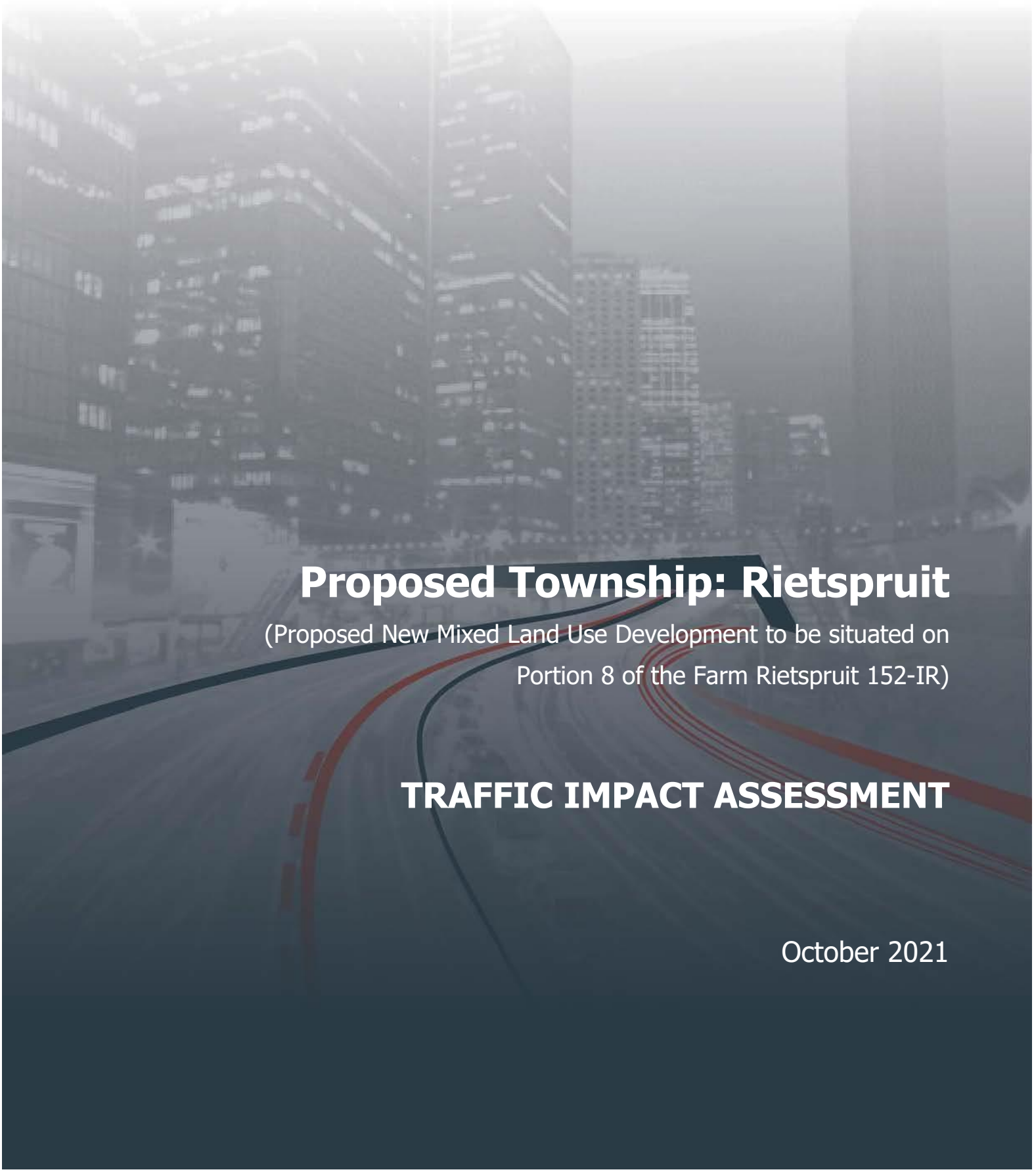

Proposed Township: Rietspruit

(Proposed New Mixed Land Use Development to be situated on Portion 8 of the Farm Rietspruit 152-IR)

TRAFFIC IMPACT ASSESSMENT

October 2021

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1. Introduction

Dhubecon Consulting Engineers (Pty) Ltd have been appointed to undertake this Traffic Impact Assessment (TIA) as part of the township application for a proposed new mixed land-use development, which is to be situated on Portion 8 of the Farm Rietspruit 152-IR. The proposed new township will be known as Rietspruit. The site location is shown in **Figure 1** and **Figure 2** and falls under the jurisdiction of Midvaal Local Municipality.

The subject site, as a whole, is approximately 163ha in extent. With reference to the Town Planner's proposed Township Layout Plan in **Annexure A**, Rietspruit will be a mixed land-use development and will comprise a total of 3,782 single residential erven ('Residential 1'). Provision is also made for 'Institutional' land uses in the form of two new public primary schools and one new public secondary school, given the large extent of the residential component. The proposed township layout also makes provision for erven with 'Community Facility' and 'Utilities' zonings, as well as ample public open spaces/ parks. It can be noted that the subject site is bordered by the Watervalspruit Townships (also known as Sky City) to the north-west, which has the same developer as the proposed development. Similar to these neighbouring Watervalspruit Townships, the proposed development is expected to mostly cater for lower income households and it is anticipated that a similar housing product will be developed, with erf sizes ranging between 155m² and 202m². The proposed development is not planned to be security controlled at this stage. These houses on the single residential stands are typically known as "charter housing", which is the lowest level where households qualify for a home loan.

This study investigates the impact of the additional traffic to be generated by the proposed development of Rietspruit onto the immediate surrounding road network and determines whether it is necessary to implement any road and/ or intersection improvements to mitigate the anticipated traffic impact. New traffic counts had been undertaken at identified key intersections in the study area in order to quantify and assess the traffic flow operations. The study also investigates the proposed site layout, the site access arrangements and provides comments with respect to non-motorised and public transport.

2. Site Location & Surrounding Road Network

2.1 SITE LOCATION

With reference to **Figures 1 and 2**, the subject site is situated approximately 1.5km south-east of the existing intersection between Heidelberg Road (R550/ Future K154) and the K91, which does not currently have another name. The site itself falls just within the borders of the Midvaal Local Municipality, however, the primary roads that will be utilized to provide access to the site falls within the jurisdiction of the City of Ekurhuleni (CoE), Southern Region. The subject site is bordered by an existing Transnet Freight Rail (TFR) railway line to the south and will be bordered by the future Watervalspruit Townships (also known as Sky City) to the north. It can also be seen that the Rietspruit River traverses the southern portion of the site.

The following existing and planned future roads are relevant and key to the study area:

2.2 EXISTING ROAD NETWORK

Heidelberg Road (R550 / K154/ Road D64): This is an existing east-west Class 2 provincial road (major arterial), which is located about 650m north of the closest corner of the subject site. Currently this road comprises a 2-lane single carriageway road in the vicinity of the site, with additional turning lanes at most of its intersections, most notably in this case with the K91 and Kingfish Street / Garthview Street. Further east of the site, Heidelberg Road forms an access interchange with the N3-freeway and travels to areas such as Tsakane and Nigel, while further to the west of the site, Heidelberg Road forms an access interchange with the R59-freeway. According to the recent surveys, the traffic volumes along the section of Heidelberg Road directly north of the subject site are in the order of 600vph and 710vph (total both directions) during the weekday AM and PM peak hours, respectively.

Road K91: is an existing Class 2 provincial road (major arterial), which runs north-south and connects areas such as Palm Ridge with Heidelberg Road. The road is currently a 2-lane single carriageway road along the majority of its length, with additional turning lanes at its T-intersection with Cosmopolitan Drive. The K91 currently forms a 4-legged, priority stop controlled intersection with Heidelberg Road about 1.5km north-west of the subject site. The southern leg of this intersection, which is also currently known as the K91, forms a T-intersection with Edge Road, which is a local collector road for the surrounding plot erven in the area. In the vicinity of the above-mentioned intersection with Heidelberg Road, the current traffic volumes on the K91 are in the order of 810vph and 860vph (total both directions) during the weekday AM and PM peak hours, respectively.

Cosmopolitan Drive: is a Class 3 minor arterial road that intersects with the K91 about 1.8km north of the subject site and runs parallel to Heidelberg Road (i.e. east-west). This road was constructed as part of the first phases of the neighbouring Watervalspruit Townships and currently serves as the primary east-west distributor road in these townships. It is a single carriageway (2-lanes undivided) along its length and connects the K91 with Kingfish Street. The extension of this road to the east of the K91 was only recently completed. A number of traffic circle controlled intersections are formed with this road along its length, including one with Kingfish Street. The current traffic volumes on this road, in the vicinity of its intersection with the K91, are in the order of 780vph and 1,020vph (total both directions) during the weekday AM and PM peak hours, respectively. These volumes have increased considerably over the years as a result of the ongoing development of the neighbouring Watervalspruit Townships.

Kingfish Street: is also a Class 3 minor arterial road, which intersects with Heidelberg Road approximately 2.2km north-west of the subject site. This road directly connects above-mentioned Cosmopolitan Drive with Heidelberg Road. It was also constructed as part of the first phases of the Watervalspruit Townships and is currently the primary north-south distributor road in these townships. This road is a single carriageway (2-lanes undivided) along its length, with an additional turning lane at

its 4-legged, signalised intersection with Heidelberg Road and Garthview Street. In the vicinity of this intersection, the current traffic volumes on Kingfish Street are in the order of 910vph and 620vph (total both directions) during the weekday AM and PM peak hours, respectively. These volumes have also increased considerably over the years as a result of the ongoing development of the neighbouring Watervalspruit Townships.

2.3 PLANNED FUTURE ROAD NETWORK

2.3.1 Provincial Road Network

An extract of Gautrans' Strategic Major Road Network (2007) is shown in **Figure 3**, which indicates several planned future K-routes in the vicinity of the site. The most relevant ones are:

- **Future K154**: This road will follow the existing alignment of Heidelberg Road (R550 or D64). Along its length, this road is primarily still a single carriageway; the future upgrade to full K-route standards would imply doubling of the existing 2-lane road to a 4-lane dual carriageway road. It must be noted that there are preliminary designs/ basic planning for the relevant section of this road in the vicinity of the site, which have been accepted by the MEC of the Gauteng Department of Roads and Transport (GPDRT).

- **Future K91**: This road is currently a single carriageway past the neighbouring Watervalspruit Townships and will also be upgraded in future to a 4-lane dual carriageway road, when the demand arises. The current road is already constructed in the correct position and will become an important future north-south carriageway. The portion of future road to the south of its existing intersection with Heidelberg Road (K154) is yet to be constructed and is expected to be triggered with increased development to the south of Heidelberg Road. It must be noted that there are preliminary designs/ basic planning for the relevant section of this road in the vicinity of the site, which have also been accepted by the MEC of GPDRT.

- **Future PWV18**: This future east-west Class 1 road/ free-way is planned to traverse the subject site more or less through the middle and will subsequently split the site into a northern and southern portion. This road is planned to extend further west of the site, past the R59-freeway and further to the east of the site, past the N3-freeway.

  It must be noted that this planned future route is still in its Route Determination phase, i.e. no basic/ preliminary designs are in place for this route as yet. Given the significant impact of this planned future route on the subject site, Dhubecon was tasked to undertake a first preliminary design for this route, with specific focus on the section of the PWV18 extending between the future K91 and the future K154 (see **Figure 3**). This was necessary to determine the horizontal and vertical alignment of the future PWV18 through the subject site, which in turn determines the necessary road reserves that must be accommodated. It is confirmed that meetings and discussions were held with Gautrans in this regard and the preliminary design has subsequently been accepted by Gautrans. This will be addressed in more detail in a separate Section 7 report, which will be submitted to Gautrans for approval in due course.

  It can be seen that the proposed Township Layout Plan, as enclosed in **Annexure A**, has taken full account of the future PWV18, based on the preliminary design undertaken by Dhubecon, and has accommodated the necessary road reserves accordingly.

At this stage it is not known when future routes K154 and K91 will be upgraded to full K-route standards. Sections of the K154 and K91 are anticipated to become important in about 5-10 years' time and it is recommended that Gautrans undertake the necessary budget planning to implement the upgrades by then. The PWV18 is not expected to be implemented in the foreseeable future, but possibly only in the much longer term.

2.3.2 Local Road Network

With regards to the local road network, it can be mentioned that both the City of Ekurhuleni and the Midvaal Local Municipality have no formal local road master planning in the study area, which lies to the south of Heidelberg Road (R550/ future K154) and to the east of the K91. In this particular case, the road network is largely determined by the approved townships of the neighbouring Watervalspruit Townships (i.e. Sky City), as well as the Palm Ridge Townships to the north of the subject site.

Given the lack of proper local road master planning in the study area, accessibility to the subject site becomes an issue. Dhubecon were therefore requested by the client/ developer to investigate a proposed local road master planning that will allow for feasible accesses to the subject site, integrate with existing and planned future provincial roads and also enable access to surrounding properties in future. Our proposed road master plan is shown conceptually in attached **Figure 4** and some of the key aspects of this proposal are briefly discussed below:

- It can be seen that access to the subject site will have to be provided via the internal road network of the future phase of the Watervalspruit Townships to the south of Heidelberg Road, which will border the subject site to the north-west. It must be noted that there is already a Township Layout Plan in place for this future phase adjacent to the subject site, but which has not been proclaimed yet and will be amended to accommodate the proposed road network, as per **Figure 4**. This is also indicated on the township layout in **Annexure A**.
- With further reference to **Figure 4** and **Annexure A**, there are a number of constraints in the study area that had to be taken into account during the compilation of the proposed road master plan. These include the Rietspruit River, which traverses the southern portion of the site, the existing Transnet Freight Rail (TFR) railway line directly south of the site, a north-south TFR railway servitude that traverses the north-western corner of the subject site and the future planned PWV18, which runs through the middle of the site in an east-west direction, as discussed in *Section 2.3.1* above. It is confirmed that all of these factors have been accommodated and that the proposed township layout, as enclosed in **Annexure A**, has also made provision for the relevant TFR railway servitudes and the wetland buffers and flood lines of the Rietspruit River.
- It is proposed that a Class 3 road, within a 30m road reserve, should travel through the middle of the site, as per **Figure 4** and **Annexure A**, which will serve as the main internal collector and distributor road of the proposed township and which can be extend further to the south in future in order to become an important minor arterial in the study area. For the purposes of this TIA, this Class 3 road will be referred to as 'Road A', given that there is no official street name as yet. The alignment of this road, through the middle of the site, is ideal given for the predominantly residential development proposed and will also enable an easier conversion to security controlled complexes in future, if/ when the need arises.

  It can be seen that this proposed Class 3 road will not only be beneficial to the proposed development itself, but will also integrate effectively with the rest of the proposed road master plan, while allowing for ample future access opportunities to adjacent properties via its planned intersections with east-west Class 4 collector roads (refer to **Figure 4** and **Annexure A**).
- Although some of the proposed new roads are more indicative than others, it is evident that the proposed road master plan will integrate with existing local and provincial roads, as well as planned future provincial roads. It will also integrate with Dhubecon's proposed road master planning to the north of Heidelberg Road, which is also indicated on **Figure 4** and which has been accepted by the City of Ekurhuleni in principle. Furthermore, access can be provided to all surrounding properties in the relevant study area, even when taking into account the constraints posed by the rivers and railway lines, as the proposed planning allows for easy integration when more new roads need to be determined in the study area in future.

It is confirmed that the proposed local road master plan, as per **Figure 4**, has been discussed with the relevant official(s) at the Midvaal Local Municipality, who confirmed their support of the proposal in principle.

3. Proposed Development & Site Access

3.1 PROPOSED DEVELOPMENT

The subject site for the proposed new township is situated on Portion 8 of the Farm Rietspruit 152-IR and extends a total of approximately 172ha. The proposed new township will be known as Rietspruit. The site location is shown in **Figure 1** and **Figure 2** and falls under the jurisdiction of Midvaal Local Municipality.

With reference to the Town Planner's proposed Township Layout Plan in **Annexure A**, Rietspruit will be a mixed land-use development and will comprise **a total of 3,782 single residential erven** (zoned 'Residential 1'). Provision is also made for 'Institutional' land uses in the form of two new public primary schools and one new public secondary school, given the large extent of the residential component. Without the necessary details with regards to the sizes of the proposed schools at this stage, it was assumed in this study that the proposed public primary schools would each have a capacity of 800 students (thus 1,600 students in total), while the proposed public secondary school would have a capacity of 1,200 students. The proposed township layout also makes provision for a 'Community Facility' erf, which will mostly be utilized as an informal trade area and also make provision for erven with 'Utilities' zonings, which will accommodate engineering services (given the shortage thereof in the vicinity of the subject site). Provision has furthermore been made for ample erven with 'Public Open Space' zonings, which include the Rietspruit River (and it buffer area) that traverses the subject site. The existing cemeteries located on the subject site have also been protected and accommodated on the proposed township layout.

It can be noted that the subject site is bordered by the Watervalspruit Townships (also known as Sky City) to the north-west, which has the same developer as the proposed development. Similar to these neighbouring Watervalspruit Townships, the proposed development is expected to mostly cater for lower income households and it is anticipated that a similar housing product will be developed, with erf sizes ranging between 155m² and 202m². The proposed development is not planned to be security controlled at this stage. These houses on the single residential stands are typically known as "charter housing", which is the lowest level where households qualify for a home loan.

3.2 PROPOSED SITE ACCESS INTERSECTIONS

Given the lack of proper (formal/ paved) roads in the study area, it is proposed that the subject township gain access via the future internal road network of the neighbouring Watervalspruit Townships (as mentioned in *Section 2.3.2*), which border the subject site to the north-west. Access to these townships, and therefore the subject townships, will be provided via two (2) new access intersections with Heidelberg Road (R550/ future K154), as indicated in attached **Figure 2**. The positions of the proposed site access intersections are also reflected on the proposed local road master plan in **Figure 4**.

The proposed access roads that will intersect with Heidelberg Road will be known as Silver Dory Street and Yellow Jack Street, respectively, with Silver Dory Street being the road closest to the K91. The main north-south collector and distributor road through the subject township, which will essentially be the future extension of Yellow Jack Street, is referred to as 'Road A' for now in this TIA (as mentioned in *Section 2.3.2*).

It is confirmed that the locations of the proposed two site access intersections with Heidelberg Road, as mentioned above, are in line with the location on Gautrans' latest preliminary design of the future K154, past the site, which has been accepted by the MEC of GPDRT (as mentioned in *Section 2.3.1*). The proposed Township Layout Plan for the neighbouring Watervalspruit Townships has taken full cognisance of the road reserve of the future K154, including the necessary splays for these proposed site access intersections. However, it must be noted that the internal layout of the neighbouring

Watervalspruit Townships to the south of Heidelberg Road (i.e. bordering the subject site) is not fixed yet and will be adjusted to accommodate the proposed internal road network of the subject township, as indicated in **Annexure A**.

3.3 INTERNAL TOWNSHIP LAYOUT & ROAD NETWORK

Given the fairly large extent of the subject township, this study focusses on access provision at a township level, instead of at a micro level for individual erven. For the other uses, such as the schools, separate Site Development Plans (SDP's) will be submitted for each site at a later stage, which will provide the necessary access details of those developments. Should it be necessary, the Traffic Engineer will provide more inputs and also liaise with the relevant council officials at that stage.

As can be noted from **Annexure A**, a complete new network of local Class 3, 4 and 5 public roads and access streets are proposed as part of the township development, in order to provide vehicular access to all individual stands. The following comments are relevant:

- **Minor Arterial Road (Class 3)**: These are typically all proposed roads within 25-32m wide road reserves; in this case 'Road A' is the only major north-south collector street that will have a Class 3 status, within a proposed 30m road reserve. This road will traverse the entire site from north-south and provide a link between the development portions north and south of the future PWV18. This road is also planned to bridge over the existing railway line along the southern border of the subject site and will therefore serve as a minor arterial for surrounding areas in future as well. It can be seen in **Annexure A** that the proposed Township Layout Plan has made provision for the necessary bridge sections (including batters) over the future PWV18 and the TFR railway line south of the site. Generally, no direct accesses to individual erven will be allowed off this road; it will only serve as the main collector and distributor for the subject township. In order to discourage speeding along 'Road A', traffic circles can be implemented at the intersections as traffic calming measures. This road will also serve as the primary public transport route through the proposed township (see *Section 7*).

- **Major Collector Streets (Class 4a)**: These are typically all the proposed roads with 25m wide road reserves; in this case the portion of proposed 'Road C' to east of the proposed secondary school is the only collector street that will have a Class 4a status. 'Road B' is one of four proposed east-west Class 4 roads that will intersect with 'Road A' (see also **Figure 2**). To note is that no direct access to individual residential erven is allowed off this road. In order to discourage speeding along 'Road B', speed humps (where necessary) and roundabouts can be implemented, but which will only be necessary in future if/ when this road is extended further to the east.

- **Minor Collector Streets (Class 4b)**: These are typically all the proposed roads with 20m wide road reserves; in this case they are 'Roads B, D and E' (see also **Figure 2**). These are all east-west Class 4b roads that will intersect with 'Road A', as mentioned above. Direct access off these roads will be provided to the proposed school erven and possibly some residential erven - note that direct access to individual properties are allowed off Class 4b roads, which are in line with the *UTG 5* guidelines for urban collector streets. In order to discourage speeding along the Class 4b roads, speed humps and mini roundabouts can be considered.

- **Access Streets (Class 5):** All other streets in the township will be Class 5 local access streets with road reserve widths typically ranging between 10m, 13m and 16m. These roads will provide direct access to all single residential erven of the proposed townships.

It is confirmed that, from a traffic engineering point of view, inputs have already been provided with regards to the proposed township layout in **Annexure A**. It is therefore confirmed that the proposed internal road network of the subject township is supported in this TIA. Where necessary or requested, continued input will be provided to the township layout.

To that is that the proposed township is not planned to be security controlled upon completion and therefore stacking distance requirements become less relevant at this stage. It can be noted, however, that the proposed township layout makes provision for the implementation of security control in future, if required.

4. Traffic Flows & Development Trip Generation

4.1 EXISTING TRAFFIC FLOWS & OPERATION

Given the location and extent of the proposed development, new detailed traffic surveys were carried out at identified key intersections during the critical peak periods, namely the weekday AM and PM peak hour periods, on 23, 24 and 26 August 2021. The surveys comprised manual traffic counts at the nearby key intersections listed below. Note that for ease of reference and consistency, the intersection numbers given below correspond with those numbers of the previously approved Master TIA of the neighbouring Watervalspruit Townships (May 2015).

- Heidelberg Road (R550/K154) & K91 [Intersection 5];
- Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12];
- K91 / Cosmopolitan Drive [Intersection 13]; and
- New traffic counts were also carried out at identified key intersections within the neighbouring Watervalspruit Townships, in order to estimate the actual trip generations of these neighbouring townships. Given that the subject township will cater for the same income market as the neighbouring Watervalspruit Townships (i.e. similar products to be developed), this will provide useful data that can be compared with the (theoretical) trip rates that are normally applied in the study area.

Classified traffic counts were conducted at the latter two intersections (i.e. 12 and 13), in order to also quantify public transport availability in the vicinity of the site. The current 2021 weekday morning (AM) and afternoon (PM) peak hour traffic volumes at this intersection are summarised in **Figure 5**. The respective peak hours occurred at 06:30-07:30 and 16:30-17:30.

From a traffic engineering perspective, it is acknowledged that the Covid-19 pandemic has also had an impact on the traffic volumes on the roads in general, with the Covid-19 lockdown regulations resulting in less traffic overall on the roads. However, at the time these traffic surveys were conducted, the majority of industries, businesses and schools had been fully operational again, with the resultant effect that the traffic volumes were considered sufficiently representative for this study. These traffic counts had also been compared to previous traffic counts that were conducted at the same 3x intersections in 2019 and February 2020, before the Covid-19 lockdown, and it is confirmed that the latest 2021 traffic counts indicated considerable traffic growth overall at these key intersections.

4.2 FUTURE BACKGROUND TRAFFIC FLOWS

Apart from the current 2021 traffic flows, two future base traffic flow scenarios have been considered in this report, namely future 2026 and 2031. These future scenarios are in line with the proposed 'Service Plan Stages' of the neighbouring Watervalspruit Townships, which have been included as latent rights in this report (see *Section 4.2.2*). These future scenarios comprise different escalations of the existing 2021 peak hour traffic flows, at the different growth rates discussed in *Section 4.2.1* below.

4.2.1 Traffic Growth

The *THM16, Volume 1, South African Traffic Impact and Site Traffic Assessment Manual (Committee Draft, October 2019)* suggests that for developments which generate more than 50 peak hour trips, it is necessary to undertake a full traffic impact assessment which must also include traffic growth and/ or the potential traffic generations of other nearby approved developments that still need to realise.

In order to make provision for other developments in the area and increases in traffic along the main routes, traffic growth is added. In this case the traffic growth makes provision for those other developments not accounted for in *Section 4.2.2* below.

For the purposes of this study, it has been assumed that the background traffic would increase at the rate of 2.5% per annum for 5 years to 2026 and 2% per annum for 10 years to 2031. These growth rates are considered reasonable and typical to that used in most traffic studies in Gauteng and is also in line with was applied in the approved Master TIA of the neighbouring Watervalspruit Townships (May 2015). It can be added that the traffic growth is applied in addition to the extensive latent rights/ other developments which have been included in this study, as discussed below.

4.2.2 Trip Generations from 'Other Developments' (Latent Rights)

As indicated in attached **Figure 2**, three (3) other nearby developments in this case have been included as latent rights developments, which are discussed below:

- **Palm Ridge Extensions 10, 12 and 13**. This is a low-cost, RDP housing development which is located about 1km north of the subject site (this development is located directly north-east of the neighbouring Watervalspruit Townships). To note is that this is a Ministerial Project, which is overseen by the City of Ekurhuleni and the Gauteng Department of Human Settlements (DHS). Although the development mainly comprises RDP housing, it will also comprise educational facilities, social nodes and public open spaces. The breakdown of the land use rights, quantities and trip generation data for this development was obtained from the approved TIA conducted by MPA Consulting Engineers (Pty) Ltd in March 2016, entitled *Palm Ridge Ext. 10, 12 & 13, Ekurhuleni RDP Housing Development.* Based on this TIA, the development, as a whole, will comprise a total of 6,063 'Residential 1' erven, 886 'Residential 4' units and 220 duplex dwelling units/row housing. It was also conservatively assumed that the schools would have 2,000 primary school students and 1,000 secondary school students between them. With regards to trip generations, it was estimated in the TIA that the Palm Ridge development, as a whole, would generate approximately 2,262 trips during the weekday AM and PM peaks.

  To date, approximately 4,000 'Residential 1' erven have been constructed and occupied. The trips that are generated by these occupied units are already included in the existing 2021 traffic counts. For latent rights purposes, only the remaining trips during the weekday AM and PM peak were therefore considered, and added to the road network. Attached **Figure 6a** indicates the expected trips to be generated by the remainder of the Palm Ridge development through the subject study area, during the weekday AM and PM peak hours.

- **Watervalspruit Ext. 54**. This proposed township is situated on Portion 43 of the Farm Waterval No. 150-IR, approximately 3.5km north-west of the subject site. The breakdown of the land use rights, quantities and trip generation data for this development was obtained from the approved TIA conducted by Dhubecon Consulting Engineers in July 2020. Based on this TIA, the proposed township will be a mixed land-use development that will comprise of a total of 1,529 single residential stands ('Residential 1'). Provision is also made for two new public schools, a community facility and ample public open spaces. Without the necessary details with regards to the proposed new schools, it was assumed in this study that the schools would be combined primary and secondary public schools, with the two schools having a combined capacity of approximately 2,000 learners.

  With regards to trip generations, it was estimated in the TIA that Watervalspruit Ext. 54, as a whole, would generate approximately 604 trips and 514 trips during the weekday AM and PM peak hours, respectively. No development has occurred to date and therefore the full trips have been taken into account in this TIA as part of latent rights. Attached **Figure 6e** indicates the estimated total trips to be generated by Watervalspruit Ext. 54 through the subject study area, during the weekday AM and PM peak hours.

- **Remainder of Watervalspruit Townships (Sky City)**: The remaining extent of the neighbouring Watervalspruit Townships development, which border the subject site directly to the north-west, has also been included as latent rights in this report (see **Figure 2**). It can be noted

that Dhubecon undertook a full Master TIA for the Watervalspruit Townships (dated May 2015), which had been approved by the City of Ekurhuleni (CoE) and Gautrans (GPDRT). Given the large extent of this development as a whole, the townships were grouped together into six (6) 'Service Plan Nodes' in the approved Master TIA. Those 6 'Service Plan Nodes' were then further grouped into three (3) 'Service Plan Stages' in order to split the development as a whole into three main parts. To note is that considerable development has taken place since the approved Master TIA of 2015 and the extents of the service nodes have changed over time, however, the same principle was applied for the purposes of this TIA.

Table 1 below provides the composition of the updated 'Service Plan Nodes' and 'Service Plan Stages' used in this TIA, for the purposes of latent rights. Note that the remaining extents/ quantities are indicated for 'Service Plan Nodes 1-3', since the majority of construction has already taken place in these Nodes. It is then further assumed that the three 'Service Plan Stages' will each take approximately 5 years to develop. Since 'Service Plan Stage 1' (Node 1 and 2) is close to completion, 2021 was selected as the year when it will be fully operational / completed. This TIA therefore uses two horizon stages when the two (2) remaining 'Service Plan Stages' of the neighbouring Watervalspruit Townships will be operational, namely at 2026 and 2031.

Table 1: Neighbouring Watervalspruit Townships - Service Plan Nodes (Latent Rights)

Service Plan Node	Watervalspruit Townships (Sky City)	Service Plan Stage (For Roads)	Residential (Res 2 & 4)	Business/ Retail/ Special	Educational
1*	Watervalspruit Proper Watervalspruit Ext. 1 Watervalspruit Ext. 9	1	91 Erven	19,009 m^2 GLA (Shopping Centre) 13,532 m^2 GLA (Big Box Retail)	2 x Primary School
2*	Watervalspruit Ext. 10-13, 21, 27 and 28				
3*	Watervalspruit Ext. 16-20	2	2,931 Erven 1,845 Units	5,387 m^2 GLA (Convenience Retail) Filling Station 11,803 m^2 GLA (Special)	4 x Primary School
4	Watervalspruit Ext. 35, 37, 38, 47, 48, 50, 51 & 55				
	Palm Ridge Ext. 31-33				
Future	Watervalspruit Ext. 14, 15, 22-26, 31-33 and 39-46	3	5,976 Erven 1,040 Units	-	4 x Primary School 2 x Primary & Secondary School Combined
TOTAL			**8,998 Erven 2,885 Units**	**49,731 m^2 GLA (Retail & Special)**	**12 x schools**

*The remaining development extents are indicated, since construction and occupation is already far along for these Nodes.

Attached **Figures 6b-d** shows the expected trips to be generated by 'Service Plan Stage 1, 2 and 3', respectively, of the neighbouring Watervalspruit Townships, through the key intersections during the weekday AM and PM peaks. Note that the 'Service Plan Stage 2' trips (as per **Figure 6c**) include the 'Service Plan Stage 1' trips (as per **Figure 6b**), while the 'Service Plan Stage 3' trips (as per **Figure 6d**) represent the total trips that will be generated by the Watervalspruit Townships (as a whole) and therefore includes the 'Service Plan Stage 1 and 2' trips (as per **Figure 6c**).

Given all of the above-mentioned developments that have been included as latent rights in this TIA, the following must be noted:

- The Watervalspruit Townships (i.e. Sky City) will have to be fully developed before Watervalspruit Ext. 54 and the subject township can be developed, given that the accessibility of these two townships will be dependent on the future road network of the Watervalspruit Townships. For the purposes of this TIA, it was assumed that the Watervalspruit Townships would be fully developed by 2026 (along with the Palm Ridge Townships), while Watervalspruit Ext. 54 and the subject township would be fully developed by 2031.
- Therefore, the total future 2026 background traffic presented and investigated in this TIA, as summarised in **Figure 7**, comprises of three components, namely the background traffic growth over 5 years (at 2.5% p.a.), the total latent rights trips from Palm Ridge Ext. 10, 12 and 13 (**Figure 6a**) and the neighbouring Watervalspruit Townships (i.e. 'Service Plan Stage 3'), as per **Figure 6d**.
- Similarly, the total future 2031 background traffic presented and investigated in this TIA, as summarised in **Figure 8**, comprises of three components, namely the background traffic growth over 10 years (at 2.0% p.a.), the total latent rights trips from Palm Ridge Ext. 10, 12 and 13 (**Figure 6a**) and the neighbouring Watervalspruit Townships (i.e. 'Service Plan Stage 3'), as per **Figure 6d**, as well as the total latent rights trips from Watervalspruit Ext. 54 (**Figure 6e**).

4.3 DEVELOPMENT TRIP GENERATION

In order to determine the expected trip generations of the proposed development, the latest and most relevant guideline, entitled *TMH 17 Volume 1, South African Trip Data Manual (Committee Draft 2.0, May 2018*) was used as a basis, which is based on a more comprehensive data base and which makes provision for the different types of residential developments, as well different income levels of developments, vehicle ownership and availability of public transport services.

Since Rietspruit is a proposed mixed land use development is was necessary to consider each of the different (primary) land uses separately, allowing for the necessary adjustments of each land use and then add all the separate land uses together.

4.3.1 Residential Trip Generation

Given the type of development proposed (as per Section 3.1), the lower income market is being targeted, which is generally synonymous with a lower vehicle ownership and consequently the trip generation characteristics are different. Apart from a lower vehicle ownership itself, many of these residents still find it more affordable to use public transport for commuting instead of their own private vehicles.

The *Trip Data Manual* allows for '*Single Dwelling Units*' ('Residential 1'), with adjustments in terms of vehicle ownership and the availability of public transport. As noted in Section 3.1 of this report and the proposed township layout in **Annexure A**, the majority of the proposed township will comprise of single residential erven (i.e. 'Residential 1').

The following assumptions and notes are relevant with respect to the trip generation calculations:

- Standard trip rate for '*Single Dwelling Units*' is 1.00 trips/ unit during the weekday AM and PM peaks;
- '*Single Dwelling Unit*' adjustment factor allowed for low vehicle ownership is 40% and that for very low vehicle ownership is 70% - in this case 60% had been applied;
- For '*Transit Nodes or Corridors*' (i.e. availability of public transport) a maximum adjustment of 15% is allowed. In this instance the maximum value of 15% had been applied, given the significant public transport availability and usage in the study area; and
- For '*Mixed Land Use*' a maximum adjustment of 10% is allowed for '*Single Dwelling Units*'. However, since the residential component is viewed as the main land use, no such reduction had been applied in this case.

With the above assumptions, the reduced trip rate has been calculated as follows:

- 'Residential 1' 1.00 x 0.40 x 0.85 = **0.340 trips/unit**

To note is that the above residential trip rate is slightly more conservative than the trip rate that was applied in the approved Master TIA for the neighbouring Watervalspruit Townships (May 2015), as well as in the approved TIA for Watervalspruit Ext. 54 (July 2020), which have been approved by both CoE and Gautrans. It is also slightly more conservative than trip rates that were applied in the previously approved TIA for Palm Ridge Ext. 10, 12 & 13, which is included as latent rights in this study.

By applying the above calculated trip rate to the total number of erven proposed, the maximum number of peak hour trips is estimated at:

- For 3,782 single residential erven ('Residential 1') = **1,286 trips**

The estimated residential trips during the weekday AM and PM peak hours for the proposed township are summarised in **Table 2** below, given the directional splits (IN:OUT) of 25:75 and 70:30 for the weekday AM and PM peaks, respectively.

Table 2: Estimated Development Trips – Residential

Peak	Development Trips (vph)		
	IN	OUT	TOTAL
Weekday AM Peak hr	322	964	**1,286**
Weekday PM Peak hr	900	386	**1,286**

4.3.2 Educational Trip Generation

It can be argued that the proposed schools are a direct result of the dominantly large residential component. With the development catering for the lower income market, it is expected that learners would typically walk to and from school. In the case of some vehicle trips, most of those would be internal trips (i.e. parents dropping children off at school), except for some students and teachers from outside the area that may use private vehicle transport. It is also expected that minibus taxis and buses will be utilized to drop off and pick up students at the proposed schools.

As mentioned in *Section 3.1* of this TIA, it was assumed in this study that the proposed public primary schools would each have a capacity of 800 students (thus 1,600 students in total), while the proposed public secondary school would have a capacity of 1,200 students. Similar to the residential component, the following additional assumptions and notes are relevant with respect to the trip generation rate calculations:

For the proposed public primary and secondary schools, the following average base trip rates are recommended in the *TMH 17 Volume 1 (Committee Draft 2.0, May 2018)*:

- Public Primary School - 0.85 trips/ student and 0.30 trips/ student for the weekday AM and PM peak hours, respectively; and
- Public Secondary School - 0.75 trips/ student and 0.25 trips/ student for the weekday AM and PM peak hours, respectively

❖ Since this is a mixed land use development, of which the largest overall component by far is residential, it would be reasonable to assume that the proposed school would, to a large extent, be dependent on the proposed residential component. Therefore a '*Mixed-use Development*' reduction was applied which accounts for internal trips, i.e. trips made by vehicles originating from inside the proposed township. In this study 50% had been applied;

❖ The maximum adjustment factor allowed for '*Very Low Vehicle Ownership'* is 80%. In this instance the maximum value of 80% had been applied; and

❖ For '*Transit nodes or Corridors*' (i.e. availability of public transport) a maximum adjustment of 15% is allowed. The considerable existing public transport presence in the vicinity of the site justifies an adjustment factor and in this case the maximum 15% had been applied.

Based on the above assumptions, the estimated (reduced) trip rates for the different school types during the weekday AM and PM peak hours are summarised in **Table 3** below:

Table 3: Estimated School Trip Rates

Proposed School Type	Trips Generated (per Student)	
	Weekday AM Peak hr	Weekday PM Peak hr
Public Primary	0.072	0.026
Public Secondary	0.064	0.021

To note is that the above trip rates are in line with the trip rates which were applied in the previously approved Master TIA of the neighbouring Watervalspruit Townships (May 2015), given the similar nature of the subject development.

Based on the above trip rates, it is estimated that the proposed three schools will generate a combined total of about **192 trips and 66 trips** during the weekday AM and PM peak hours, respectively. Using directional splits (IN:OUT) of 50:50 for the weekday AM and PM peaks, the estimated educational trips are summarised below in **Table 4**.

Table 4: Estimated Development Trips - Educational

Peak	Development Trips (vph)		
	IN	OUT	TOTAL
Weekday AM Peak hr	96	96	**192**
Weekday PM Peak hr	33	33	**66**

4.3.3 Other Land Use Trip Generations

The other proposed land uses such as the community facilities, utilities erven and public open spaces are viewed as ancillary to the main residential and institutional land uses, with trip generations resulting from these land uses expected to be mostly internal. For the purposes of this document, the trip

generations of these land uses are therefore viewed as negligible and have been discarded from the traffic projections and analyses.

4.3.4 TOTAL Development Trips

The total (combined) development trips during the weekday AM and PM peak hours, which consist of the primary trips to be generated by the proposed township, as a whole, are summarised in **Table 5** below.

Table 5: Estimated TOTAL Development Trips – Proposed Township: Rietspruit

Land Use	AM Peak Hour (vph)			PM Peak Hour (vph)		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Residential	322	964	1,286	900	386	1,286
Educational	96	96	192	33	33	66
TOTAL	**418**	**1,060**	**1,478**	**933**	**419**	**1,352**

It is confirmed that the theoretical trip generations of the neighbouring Watervalspruit Townships (based on the trip rates applied in the approved TIA) had been compared with the actual trip generations (based on the traffic counts mentioned in *Section 4.1*), given the existing overall development extent, which had been confirmed by the client/ developer. It was found that, overall, the theoretical and actual trip generations are very similar and given that a slightly more conservative residential trip rate had been applied in this TIA, the estimation of the total trips that will be generated by the subject township, as a whole, is viewed as representative/ adequate.

4.4 TRIP DISTRIBUTION & ASSIGNMENT

Assumptions on the expected trip distribution were based on the location of the proposed site access intersections in relation to the surrounding road network, existing traffic volumes and patterns in the study area, the type of development in relation to employment as well as our knowledge of the area and involvement in other surrounding developments.

Attached **Figures 9a-b** depict the expected trip distributions of the residential and educational components (i.e. main land uses) of the proposed township.

Given the above distributions, **Figures 10a-b** summarise the corresponding development trips at the key intersections for the proposed township and **Figure 11** indicates the estimated TOTAL development weekday AM and PM peak hour trips at the key intersections.

4.5 ASSESSMENT TRAFFIC FLOWS WITH DEVELOPMENT

Figure 12 shows the projected future 2031 base traffic volumes with the estimated traffic generations of the proposed development (as a whole), plus the total latent rights trips from Palm Ridge Ext. 10, 12 and 13, 'Service Plan Stage 3' of the neighbouring Watervalspruit Townships and Watervalspruit Ext. 54 (i.e. total latent rights trips). This figure represents the summation of **Figures 8** and **11**.

In this report **Figures 5**, **7**, **8** and **12** had been used for assessing the current traffic conditions, as well as the traffic impact of the proposed development, other nearby developments (i.e. latent rights) and future background traffic growth, onto the surrounding road network (see *Section 5* on the following page).

5. Road / Intersection Capacity

Capacity analyses had been undertaken in order to quantify the anticipated traffic impact of the proposed development rights. For this purpose, *PTV Vistro 2020* and *SIDRA Intersection 9* traffic engineering software had been used to undertake capacity analyses at the various key intersections.

With reference to the analyses of various scenarios, this section comments on the current traffic operations without the additional development traffic, as well as the likely traffic flow conditions with the additional development traffic. Where necessary and feasible, intersection improvements have identified that would mitigate the likely traffic impact and/or improve current traffic flow conditions.

The following key intersections have been analysed for potential traffic impact, namely:

1. Heidelberg Road (R550/K154) & K91 [Intersection 5];
2. Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12];
3. K91 / Cosmopolitan Drive [Intersection 13];
4. Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14];
5. Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15];

Note that for ease of reference, the relevant intersection numbers have also been indicated, as per the approved Master TIA of the neighbouring Watervalspruit Townships (May 2015).

The following scenarios were analysed, namely:

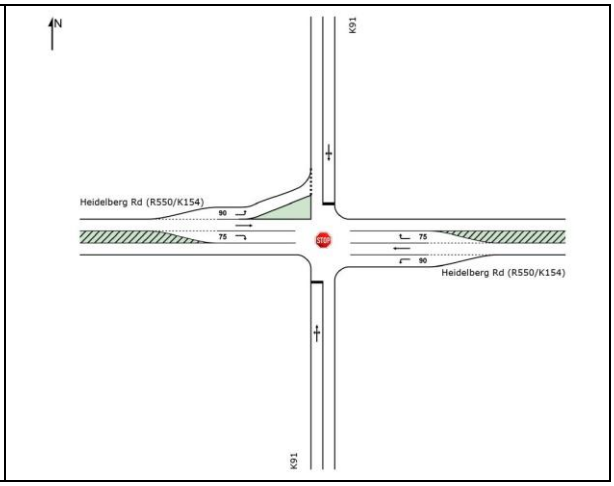
- **Scenario 1:** Existing 2021 weekday AM and PM peak hour traffic volumes without the proposed development (as per **Figure 5**);
- **Scenario 2:** Future 2026 base weekday AM and PM peak hour traffic volumes *PLUS* Palm Ridge Ext. 10, 12 & 13 latent rights trips *PLUS* Watervalspruit 'Service Plan Stage 3' latent rights trips, but WITHOUT the proposed development (as per **Figure 7**);
- **Scenario 3:** Future 2031 base weekday AM and PM peak hour traffic volumes *PLUS* Palm Ridge Ext. 10, 12 & 13 latent rights trips *PLUS* Watervalspruit 'Service Plan Stage 3' latent rights trips *PLUS* Watervalspruit Ext. 54 latent rights trips, but WITHOUT the proposed development (as per **Figure 8**);
- **Scenario 4:** Future 2031 base weekday AM and PM peak hour traffic volumes *PLUS* Palm Ridge Ext. 10, 12 & 13 latent rights trips *PLUS* Watervalspruit 'Service Plan Stage 3' latent rights trips *PLUS* Watervalspruit Ext. 54 latent rights trips *PLUS* total development trips (as per **Figure 13**);

Results of the *SIDRA Intersection 9*capacity analyses at the various intersections are discussed in the following sub sections, with the details of the outputs enclosed in **Annexure B**. It must be noted that for all signalized intersections, optimised traffic signal phasing had been used during the traffic analyses.

5.1 HEIDELBERG ROAD (R550/K154) & K91 [INTERSECTION 5]

Existing Geometry & Control:

- 4-Legged;
- Priority stop controlled intersection with free-flow conditions prevailing along Heidelberg Road;
- **North**: One shared through, left-turning and right-turning lane (single lane approach);
- **East**: One through lane, one short right-turning lane and one short left-turning lane;
- **South**: One shared through, left turning and right turning lane (single lane approach); and
- **West**: One through lane, one short right-turning lane and one short left-turning slip lane.



Analysis Results & Conclusion Intersection: **Heidelberg Road & K91**

Detailed Results: **Annexures B1.1 to B1.12**

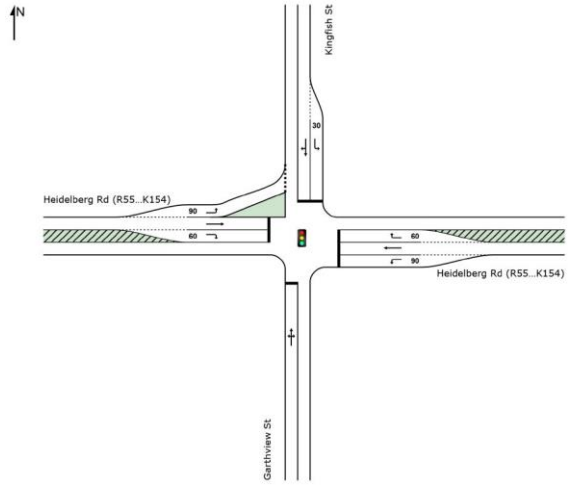
Scenario	Geometry & Control	Peak	'Worst Case' Stop / Overall			Comment
			LOS	Delay(s)	v/c_{max}	
Scenario 1	Existing geometry	AM	F	>200	1.214	Very poor level of operation
Scenario 2	Upgraded geometry	AM	F	124	1.295	Very poor overall level of operation
Scenario 2	Phase 1 geometry	AM	C	32	0.875	Acceptable overall level of operation
Scenario 3	Phase 1 geometry	AM	D	35	0.921	Acceptable overall level of operation
Scenario 4	Phase 1 geometry	AM	F	171	1.409	Very poor overall level of operation
Scenario 4	Phase 2 geometry	AM	D	38	0.904	Acceptable overall level of operation
Scenario 1	Existing geometry	PM	F	>200	1.292	Very poor level of operation
Scenario 2	Upgraded geometry	PM	D	41	1.024	Poor overall level of operation
Scenario 2	Phase 1 geometry	PM	C	21	0.844	Acceptable overall level of operation
Scenario 3	Phase 1 geometry	PM	C	22	0.862	Acceptable overall level of operation
Scenario 4	Phase 1 geometry	PM	F	189	1.083	Very poor overall level of operation
Scenario 4	Phase 2 geometry	PM	C	25	0.896	Acceptable overall level of operation

Conclusion:	This intersection already operates over capacity during the weekday AM and PM peak hours and is set to be upgraded in due course (discussed in more detail in *Section 6*). However, by the time the full extent of the neighbouring Watervalspruit Townships has realized, additional upgrades will be required to this intersection and these form part of the first phase of upgrades identified in this TIA. These upgrades are represented by *Phase 1 geometry* above. Further upgrades will also be required as part of the proposed development and is represented by *Phase 2 geometry* above. The primary reason for the above upgrades is to mitigate the conflicting movement between the large through volumes along Heidelberg Road and the large turning volumes on the K91 northern approach.
Upgrade Required:	Yes, as per **Drawing No. 0573/CL/01/01a - 01c**
Upgrade Responsibility:	Developer – to be split proportionally between the subject development (Rietspruit) and the neighbouring Watervalspruit Townships (Sky City).

5.2 HEIDELBERG ROAD (R550/K154) / KINGFISH STREET / GARTHVIEW STREET [INTERSECTION 12]

Existing Geometry & Control:

- 4-Legged;
- Signalised Intersection;
- **North**: One shared through and right-turning lane and one short left-turning lane;
- **East**: One through lane, one short right-turning lane and one short left-turning lane;
- **South**: One shared through, left turning and right turning lane (single lane approach); and
- **West**: One through lane, one short right-turning lane and one short left-turning slip lane.



Analysis Results & Conclusion | Intersection: **Heidelberg Rd / Kingfish St / Garthview St**

Detailed Results: **Annexures B2.1 to B2.12**

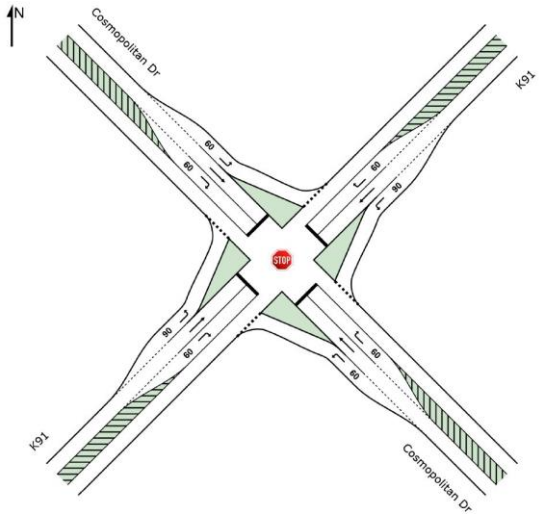
Scenario	Geometry & Control	Peak	Overall			Comment
			LOS	Delay(s)	v/c_{max}	
Scenario 1	Existing geometry	AM	D	53	0.967	Acceptable overall level of operation
Scenario 2	Existing geometry	AM	F	>200	1.897	Very poor overall level of operation
Scenario 2	Phase 1 geometry	AM	D	40	0.919	Acceptable overall level of operation
Scenario 3	Phase 1 geometry	AM	E	65	1.006	Poor overall level of operation
Scenario 4	Phase 1 geometry	AM	F	114	1.109	Very poor overall level of operation
Scenario 4	Phase 2 geometry	AM	D	40	0.907	Acceptable overall level of operation
Scenario 1	Existing geometry	PM	B	11	0.519	Good overall level of operation
Scenario 2	Existing geometry	PM	F	106	1.280	Very poor overall level of operation
Scenario 2	Phase 1 geometry	PM	B	16	0.819	Good overall level of operation
Scenario 3	Phase 1 geometry	PM	C	22	0.846	Acceptable overall level of operation
Scenario 4	Phase 1 geometry	PM	D	41	1.003	Poor overall level of operation
Scenario 4	Phase 2 geometry	PM	B	19	0.773	Good overall level of operation

Conclusion:	This intersection currently operates adequately during the weekday AM and PM peak hours, but by the time the full extent of the neighbouring Watervalspruit Townships has realized, additional upgrades will be required to this intersection and these form part of the first phase of upgrades identified in this TIA. Further upgrades will also be required as part of the proposed development and these form part of the second phase of upgrades identified in this TIA. Both phases of the proposed upgrades to this intersection are discussed in more detail in *Section 6*.
Upgrade Required:	Yes, as per **Drawing No. 0573/CL/01/02a – 02b**
Upgrade Responsibility:	Developer – to be split proportionally between the subject development (Rietspruit) and the neighbouring Watervalspruit Townships (Sky City).

5.3 K91 / COSMOPOLITAN DRIVE [INTERSECTION 13]

Existing Geometry & Control:

- 4-Legged;
- Allow stop controlled intersection (to be signalized in future);
- **North-East**: One through lane, one short right-turning lane and one short left-turning slip lane;
- **South-West**: One through lane, one short right-turning lane and one short left-turning slip lane;
- **North-West**: One through lane, one short right-turning lane and one short left-turning slip lane; and
- **South-East**: One through lane, one short right-turning lane and one short left-turning slip lane.



Analysis Results & Conclusion | Intersection: **K91 / Cosmopolitan Dr**

Detailed Results: **Annexures B3.1 to B3.10**

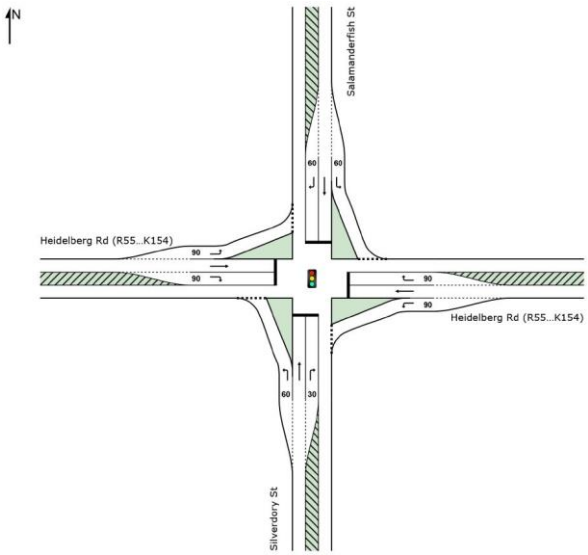
Scenario	Geometry & Control	Peak	Overall			Comment
			LOS	Delay(s)	v/c_{max}	
Scenario 1	Existing geometry	AM	B	11	0.331	Good overall level of operation
Scenario 2	Signalized	AM	F	145	1.394	Very poor overall level of operation
Scenario 2	Phase 1 geometry	AM	C	24	0.864	Acceptable overall level of operation
Scenario 3	Phase 1 geometry	AM	C	26	0.858	Acceptable overall level of operation
Scenario 4	Phase 2 geometry	AM	D	42	0.964	Acceptable overall level of operation
Scenario 1	Existing geometry	PM	B	15	0.602	Good overall level of operation
Scenario 2	Signalized	PM	F	153	1.500	Very poor overall level of operation
Scenario 2	Phase 1 geometry	PM	C	25	0.918	Acceptable overall level of operation
Scenario 3	Phase 1 geometry	PM	E	73	1.158	Poor overall level of operation
Scenario 4	Phase 2 geometry	PM	D	42	0.975	Acceptable overall level of operation

Conclusion:	This intersection currently operates adequately during the weekday AM and PM peak hours, but by the time the full extent of the neighbouring Watervalspruit Townships has realized, additional upgrades will be required to this intersection and these form part of the first phase of upgrades identified in this TIA. Further upgrades will also be required as part of the proposed development and these form part of the second phase of upgrades identified in this TIA. Both phases of the proposed upgrades to this intersection are discussed in more detail in *Section 6*.
Upgrade Required:	Yes, as per **Drawing No. 0573/CL/01/03a – 03b**
Upgrade Responsibility:	Developer – to be split proportionally between the subject development (Rietspruit) and the neighbouring Watervalspruit Townships (Sky City).

5.4 HEIDELBERG ROAD (R550/K154) / SILVER DORY STREET / SALAMANDERFISH STREET [INTERSECTION 14]

Proposed Geometry & Control:

- **Note**: For PHASE 1 upgrades;
- 4-Legged;
- Signalized;
- **North**: One through lane, one short right-turning lane and one short left-turning slip lane;
- **South**: One through lane, one short right-turning lane and one short left-turning slip lane;
- **East**: One through lane, one short right-turning lane and one short left-turning slip lane; and
- **West**: One through lane, one short right-turning lane and one short left-turning slip lane.



Analysis Results & Conclusion | Intersection: **Heidelberg Rd / Silver Dory St / Salamanderfish St**

Detailed Results: **Annexures B4.1 to B4.8**

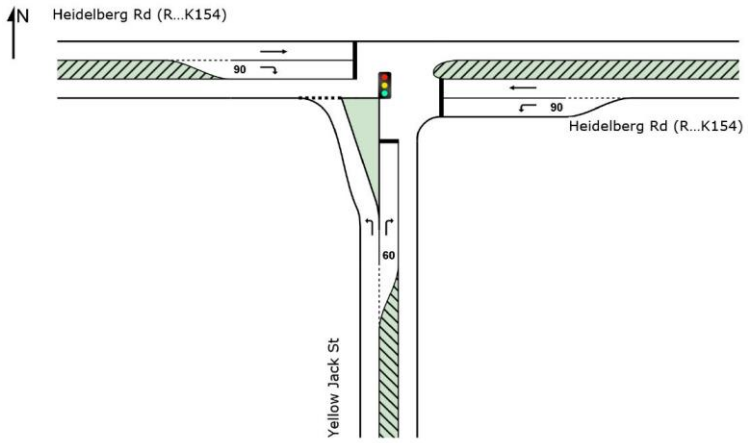
Scenario	Geometry & Control	Peak	Overall			Comment
			LOS	Delay(s)	v/c_{max}	
Scenario 2	Phase 1 geometry	AM	B	14	0.791	Good overall level of operation
Scenario 3	Phase 1 geometry	AM	B	16	0.842	Good overall level of operation
Scenario 4	Phase 1 geometry	AM	F	154	1.244	Very poor overall level of operation
Scenario 4	Phase 2 geometry	AM	B	18	0.805	Good overall level of operation
Scenario 1	Phase 1 geometry	PM	B	13	0.820	Good overall level of operation
Scenario 2	Phase 1 geometry	PM	B	14	0.838	Good overall level of operation
Scenario 3	Phase 1 geometry	PM	F	153	1.243	Very poor overall level of operation
Scenario 5	Phase 2 geometry	PM	B	16	0.792	Good overall level of operation

Conclusion:	The proposed geometry for this intersection, as depicted above, forms part of the first phase of upgrades identified in this TIA, which will be required by the time the full extent of the neighbouring Watervalspruit Townships has realized. Further upgrades will also be required as part of the proposed development and these form part of the second phase of upgrades identified in this TIA. Both phases of the proposed upgrades to this intersection are discussed in more detail in *Section 6*.
Upgrade Required:	Yes, as per **Drawing No. 0573/CL/01/04a – 04b**
Upgrade Responsibility:	Developer – to be split proportionally between the subject development (Rietspruit) and the neighbouring Watervalspruit Townships (Sky City).

5.5 HEIDELBERG ROAD (R550/K154) / YELLOW JACK STREET [INTERSECTION 15]

Proposed Geometry & Control:

- **Note**: For PHASE 1 upgrades;
- 3-Legged (T-intersection);
- Signalized;
- **South**: One short right-turning lane and one short left-turning slip lane;
- **East**: One through lane and one short left-turning lane; and
- **West**: One through lane and one short right-turning lane.



Analysis Results & Conclusion	Intersection: **Heidelberg Rd / Yellow Jack St**					
Detailed Results: **Annexures B5.1 to B5.8**						
Scenario	**Geometry & Control**	**Peak**	**Overall**			**Comment**
			LOS	**Delay(s)**	**v/c_{max}**	
Scenario 2	Phase 1 geometry	AM	A	7	0.580	Very good overall level of operation
Scenario 3	Phase 1 geometry	AM	A	8	0.643	Very good overall level of operation
Scenario 4	Phase 1 geometry	AM	F	94	1.210	Very poor overall level of operation
Scenario 4	Phase 2 geometry	AM	B	20	0.869	Good overall level of operation
Scenario 1	Phase 1 geometry	PM	A	9	0.625	Very good overall level of operation
Scenario 2	Phase 1 geometry	PM	A	9	0.656	Very good overall level of operation
Scenario 3	Phase 1 geometry	PM	F	106	1.287	Very poor overall level of operation
Scenario 5	Phase 2 geometry	PM	B	19	0.755	Good overall level of operation

Conclusion:	The proposed geometry for this intersection, as depicted above, forms part of the first phase of upgrades identified in this TIA, which will be required by the time the full extent of the neighbouring Watervalspruit Townships has realized. Further upgrades will also be required as part of the proposed development and these form part of the second phase of upgrades identified in this TIA. Both phases of the proposed upgrades to this intersection are discussed in more detail in *Section 6*.
Upgrade Required:	Yes, as per **Drawing No. 0573/CL/01/05a – 05b**
Upgrade Responsibility:	Developer – to be split proportionally between subject development (Rietspruit) and the neighbouring Watervalspruit Townships (Sky City) development.

6. Road and/or Intersection Upgrades

Based on the estimated additional traffic generations of the proposed development (as a whole) and the projected trip distribution onto the surrounding road network during the weekday AM and PM peak hours, the impact of other nearby developments (i.e. latent rights), the capacity analyses in Section 5 as well as on-site observations during the peaks, the road/ intersection upgrades as outlined in this section are proposed.

Important to note is that all of the required upgrades at the external key intersections have been split into two (2) phases, as indicated in *Section 5* above. The first phase of upgrades will be required as part of the complete development of the neighbouring Watervalspruit Townships, i.e. when the total trips from these townships have realized. The second phase of upgrades will be required as part of the development of the proposed Rietspruit Township, which is only expected to happen after the neighbouring Watervalspruit Townships have been completed. Therefore, the first phase of upgrades are based on the traffic volumes summarized in **Figure 7** (or Scenario 2 in *Section 5*), while the second phase of upgrades are based on the traffic volumes summarized in **Figure 12** (or Scenario 4 in *Section 5*). The external intersection upgrades required as part of the Watervalspruit Ext. 54 Township have also been taken into account; however, the majority of these upgrades are expected to already be catered for by the time the neighbouring Watervalspruit Townships have been fully developed. These upgrades are therefore not shown/ highlighted individually.

It must further be mentioned that the Heidelberg Road (R550 / K154) and K91 intersection is due for the upgrades shown separately in **Drawing No. 0573/CL/01a**. These upgrades have been approved by the relevant road authorities and a Wayleave is already in place for construction to commence in due course. Therefore, the proposed first and second phase upgrades (as mentioned above) are taken as additional upgrades to these upgrades that will be implemented in the near future.

The proposed road and intersection upgrades for each of the two phases are summarized below. All of the proposed upgrades on Heidelberg Road (future K154) and the K91 are to be implemented to Gautrans' minimum design standards.

6.1 EXTERNAL ROAD & INTERSECTION UPGRADES

6.1.1 Phase 1 Upgrades

(Required as part of the neighbouring Watervalspruit Townships)

- **Heidelberg Road (R550/ K154) / K91 [Intersection 5]:**

  Refer to **Drawing No. 0573/CL/01b**

  - Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;
  - Additional receiving lane to be added on the eastern and western legs of Heidelberg Road;
  - Additional short right turning lane to be added on the northern approach of the K91;
  - The short, shared through and left turning slip lane on the northern approach of the K91 (as per **Drawing No. 0573/CL/01a**) to be upgraded to a short through lane with a separate short left turning slip lane; and
  - Updated traffic signal layout and signal timing plans.

- **Heidelberg Road (R550/ K154) / Kingfish Street / Garthview Street [Intersection 12]:**

  Refer to **Drawing No. 0573/CL/02a**

  - Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;

- Additional receiving lane to be added on the eastern and western legs of Heidelberg Road;
- Existing shared through and right turning lane on the Kingfish Street approach to be converted to a dedicated right turning lane;
- Additional short right turning lane to be added on the Kingfish Street approach;
- Existing short left turning lane on the Kingfish Street approach to be extended and upgraded to a short, shared through and left turning slip lane;
- Additional short right turning lane to be added on the Garthview Street approach, with the existing approach lane to be converted to a shared through and left turning lane only; and
- Updated signal layout and signal timing plans.

⌗ **K91 / Cosmopolitan Drive [Intersection 13]:**

Refer to **Drawing No. 0573/CL/03a**

- Additional through lane to be added on the south-western approach of the K91;
- Additional receiving lane to be added on the north-eastern leg of the K91;
- Additional short right turning lane to be added on the north-eastern approach of the K91;
- Additional short receiving lane to be added on the north-western leg of Cosmopolitan Drive;
- Existing left turning slip lane (with yield control) on the north-western approach of Cosmopolitan Drive to be upgraded to a continuous slip lane with a short receiving lane on the K91 (north-eastern leg); and
- Updated traffic signal layout and signal timing plans.

⌗ **Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]:**

Refer to **Drawing No. 0573/CL/04a**

- Proposed new 4-legged intersection with separate short right turning and left turning slip lanes on all 4 approaches; and
- Signalization of the intersection, when warranted.

⌗ **Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]:**

Refer to **Drawing No. 0573/CL/05a**

- Proposed new T-intersection with separate turning lanes on the eastern and western approaches of Heidelberg Road;
- Southern approach of Yellow Jack Street to comprise a dedicated left turning slip lane and a short right turning lane; and
- Signalization of the intersection, when warranted.

6.1.2 Phase 2 Upgrades

(Required as part of the proposed Rietspruit Township)

⌗ **Heidelberg Road (R550/ K154) / K91 [Intersection 5]:**

Refer to **Drawing No. 0573/CL/01c**

- Additional through lane to be added on the eastern and western approaches of Heidelberg Road;
- Additional receiving lane to be added on the eastern and western legs of Heidelberg Road;
- Additional short right turning lane to be added on the eastern approach of Heidelberg Road and the existing short right turning lane to be extended;
- Additional receiving lane to be added on the northern leg of the K91; and

- Updated traffic signal layout and signal timing plans.

⌗ **Heidelberg Road (R550/ K154) / Kingfish Street / Garthview Street [Intersection 12]:**

Refer to **Drawing No. 0573/CL/02b**

- Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;
- Additional receiving lane to be added on the eastern and western legs of Heidelberg Road; and
- Updated signal layout and signal timing plans.

⌗ **K91 / Cosmopolitan Drive [Intersection 13]:**

Refer to **Drawing No. 0573/CL/03b**

- Additional through lane to be added on the north-eastern approach of the K91;
- Additional receiving lane to be added on the south-western leg of the K91; and
- Updated traffic signal layout and signal timing plans.

⌗ **Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]:**

Refer to **Drawing No. 0573/CL/04b**

- Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;
- Additional receiving lane to be added on the eastern and western legs of Heidelberg Road; and
- Updated signal layout and signal timing plans.

⌗ **Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]:**

Refer to **Drawing No. 0573/CL/05b**

- Additional short right turning lane to be added on the western approach of Heidelberg Road;
- Additional short receiving lane to be added on Yellow Jack Street;
- Additional through lane to be added on the eastern approach of Heidelberg Road;
- Additional receiving lane on the western leg of Heidelberg Road; and
- Updated signal layout and signal timing plans.

6.2 INTERNAL ROAD & INTERSECTION UPGRADES

All of the proposed upgrades outlined below are required as part of the proposed Rietspruit Township and are shown in attached **Drawing No. 0573/CL/06**.

⌗ **'Road A' (Extension of Yellow Jack Street):**

- New Class 3 public road of approximately 2150m (2.15km) in length.

⌗ **'Road A' / 'Road B' Intersection:**

- Proposed new traffic circle (approximately 18m inscribed diameter) with a single circulating lane and painted splitter islands.

⌗ **'Road A' / 'Road C' Intersection:**

- Proposed new traffic circle (approximately 20m inscribed diameter) with a single circulating lane and painted splitter islands.

- **'Road A' / 'Road D' Intersection:**
  - Proposed new traffic circle (approximately 18m inscribed diameter) with a single circulating lane and painted splitter islands.
- **'Road A' / 'Road E' Intersection:**
  - Proposed new 4-legged priority stop controlled intersection, with free-flow conditions prevailing along 'Road A'.

In the event of bulk engineering contributions payable with respect to roads and stormwater, it is recommended that at least part of the contribution be off-set against the proposed road and intersection upgrades, as outlined above, since the upgrades will also benefit other future developments and the relevant road authorities. It is acknowledged that the off-setting of costs against provincial roads could be a problem in terms of the legislation, but it is recommended that the CoE, Midvaal Local Municipality and Gautrans come to some agreement in this respect.

7. Non-Motorised & Public Transport

7.1 AVAILABILITY OF SERVICES & FACILITIES

On-site observations revealed that Heidelberg Road (R550/K154) and Road K91, which are both located in close proximity to the subject site, are popular public transport routes for minibus-taxis and buses. These roads are serving and connecting several low income townships to the north of Heidelberg Road such as Vosloorus, Katlehong, Thokoza and Palm Ridge. To note is that there are several bus stops along these routes and their intersections. Cosmopolitan Drive and Kingfish Street, which had been constructed as part of the neighbouring Watervalspruit Townships, have also become popular public transport routes in recent years.

The classified traffic counts undertaken at the Cosmopolitan Drive / K91 intersection indicated that of all vehicles at this intersection during the weekday AM and PM peak hours, approximately 16% and 11%, respectively, were minibus-taxis. Similar counts at the Heidelberg Road (R550) / Kingfish Street / Garthview Street intersection confirmed percentages of about 8% and 6% during the weekday AM and PM peaks, respectively. Buses accounted for about 1-2% of all vehicles at these intersections during the weekday AM and PM peaks. Considering the traffic volumes at these intersections (refer to **Figure 5**), these percentages suggest a considerable public transport presence in the study area.

Given the undeveloped status of the subject site and surrounding properties, the site itself is not currently served by public transport services, nor is there any proper public transport facilities in place (such as walkway and laybys). However, the implementation of the proposed new public roads will connect the subject site to such services and facilities and it is expected that the proposed development, together with other developments such as the neighbouring Watervalspruit Townships and the Palm Ridge Townships, will further stimulate the demand for public transport services as they develop over time and it is expected that particularly minibus taxis would respond to this demand by providing more services. It is also expected that 'Road A' will become an important north-south public road in future, while Heidelberg Road (K154) and Road K91 are expected to become even more popular public transport routes in the future.

It can therefore be concluded that the subject site will be well located with respect to the availability of public transport facilities and -services in future.

7.2 PROPOSED FACILITIES

In order to make provision for the users of public transport that will be generated by the proposed development, the following facilities are proposed:

1. **Public Transport Laybys**: Since a notable number of residents and employees associated with the proposed development (e.g. domestic workers and maintenance personnel) are expected to make use of public transport services, it is suggested that public transport laybys be constructed at the following locations:

    - Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street Intersection: A set of Gautrans standard bus laybys along Heidelberg Road, upstream and downstream of the intersection, as per **Drawing No. 0573/CL/04a & 04b**
    - Heidelberg Road (R550/K154) / Yellow Jack Street Intersection: A set of Gautrans standard bus laybys along Heidelberg Road, upstream and downstream of the intersection, as per **Drawing No. 0573/CL/05a & 05b**

    In addition, public transport laybys are also proposed at the following locations inside the subject township development:

- 'Road A' / 'Road B' Intersection: A set of laybys along 'Road A', upstream and downstream of the intersection, as per **Drawing No. 0573/CL/06**
- 'Road A' / 'Road C' Intersection: A set of laybys along 'Road A', upstream and downstream of the intersection, as per **Drawing No. 0573/CL/06**
- 'Road A' / 'Road D' Intersection: A set of laybys along 'Road A', upstream and downstream of the intersection, as per **Drawing No. 0573/CL/06**

The final location of these laybys can be discussed with Midvaal Local Municipality at design stage.

2. **Paved Sidewalks**: In order to ease and formalize the movement of pedestrians to and from the subject township, it is proposed to construct paved pedestrian sidewalks of at least 1.8m wide along both sides of 'Road A', as indicated in **Drawing No. 0573/CL/06**.

More details of the above would be submitted as part of the final Site Development Plans (where relevant) and/or detail designs of the external road and intersection upgrades.

8. Summary, Conclusions & Recommendations

Based on the content of this document, the following key conclusions and recommendations are relevant:

1. This Traffic Impact Assessment (TIA) has been undertaken as part of the township application for a proposed new mixed land-use development, which is to be situated on Portion 8 of the Farm Rietspruit 152-IR. The proposed new township will be known as Rietspruit. The site location is shown in **Figure 1** and **Figure 2** and falls under the jurisdiction of Midvaal Local Municipality.

2. The subject site, as a whole, is approximately 163ha in extent. With reference to the Town Planner's proposed Township Layout Plan in **Annexure A**, Rietspruit will be a mixed land-use development and will comprise **a total of 3,782 single residential erven** (zoned 'Residential 1'). Provision is also made for 'Institutional' land uses in the form of two new public primary schools and one new public secondary school, given the large extent of the residential component. Without the necessary details with regards to the sizes of the proposed schools at this stage, it was assumed in this study that the proposed public primary schools would each have a capacity of 800 students (thus 1,600 students in total), while the proposed public secondary school would have a capacity of 1,200 students. The proposed township layout also makes provision for erven with 'Community Facility' and 'Utilities' zonings, as well as ample public open spaces/ parks.

3. It can be noted that the subject site is bordered by the Watervalspruit Townships (also known as Sky City) to the north-west, which has the same developer as the proposed development. Similar to these neighbouring Watervalspruit Townships, the proposed development is expected to mostly cater for lower income households and it is anticipated that a similar housing product will be developed, with erf sizes ranging between 155m² and 202m². The proposed development is not planned to be security controlled at this stage. These houses on the single residential stands are typically known as "charter housing", which is the lowest level where households qualify for a home loan.

4. **PROPOSED SITE ACCESS INTERSECTIONS**: Given the lack of proper (formal/ paved) roads in the study area, it is proposed that the subject township gain access via the future internal road network of the neighbouring Watervalspruit Townships, which border the subject site to the north-west. Access to these townships, and therefore the subject townships, will be provided via two (2) new access intersections with Heidelberg Road (R550/ future K154), as indicated in attached **Figure 2**. The positions of the proposed site access intersections are also reflected on the proposed local road master plan in **Figure 4**, which has been accepted by Midvaal Local Municipality in principle. The proposed access roads that will intersect with Heidelberg Road will be known as Silver Dory Street and Yellow Jack Street, respectively. The main north-south collector and distributor road through the subject township, which will essentially be the future extension of Yellow Jack Street, is referred to as 'Road A' for now in this TIA.

   It is confirmed that the locations of the proposed two site access intersections with Heidelberg Road, as mentioned above, are in line with the location on Gautrans' latest preliminary design of the future K154, past the site, which has been accepted by the MEC of GPDRT. The proposed Township Layout Plan for the neighbouring Watervalspruit Townships has taken full cognisance of the road reserve of the future K154, including the necessary splays for these proposed site access intersections. However, it must be noted that the internal layout of the neighbouring Watervalspruit Townships to the south of Heidelberg Road (i.e. bordering the subject site) is not fixed yet and will be adjusted to accommodate the proposed internal road network of the subject township, as indicated in **Annexure A**.

5. **INTERNAL TOWNSHIP LAYOUT & ROAD NETWORK**: Given the fairly large extent of the subject township, this study focusses on access provision at a township level, instead of at a micro level for individual erven. As can be noted from **Annexure A**, a complete new network of local Class 3, 4 and 5 public roads and access streets are proposed as part of the township development, in order to provide vehicular access to all individual stands.

   It is confirmed that, from a traffic engineering point of view, inputs have already been provided with regards to the proposed township layout in **Annexure A**. It is therefore confirmed that the proposed internal road network of the subject townships is supported in this TIA. Where necessary or requested, continued input will be provided to the township layout. To that is that the proposed township is not planned to be security controlled upon completion and therefore stacking distance requirements become less relevant at this stage. It can be noted, however, that the proposed township layout makes provision for the implementation of security control in future, if required.

6. **DEVELOPMENT TRIP GENERATION:** It is estimated that the proposed development of Rietspruit, as a whole, will generate a total of approximately **1,478** and **1,352 new trips** (total IN plus OUT) during the weekday AM and PM peak hours, respectively.

   It is confirmed that the theoretical trip generations of the neighbouring Watervalspruit Townships (based on the trip rates applied in the approved TIA) had been compared with the actual trip generations (based on the recent traffic counts), given the existing overall development extent, which had been confirmed by the client/ developer. It was found that, overall, the theoretical and actual trip generations are very similar and given that a slightly more conservative residential trip rate had been applied in this TIA, the estimation of the total trips that will be generated by the subject township, as a whole, is viewed as representative/ adequate.

7. **PROPOSED ROAD & INTERSECTION UPGRADES**: Based on the estimated additional traffic generations of the proposed development (as a whole) and the projected trip distribution onto the surrounding road network during the weekday AM and PM peak hours, the impact of other nearby developments (i.e. latent rights), the capacity analyses as well as on-site observations during the peaks, the road/ intersection upgrades as discussed further below are proposed. Important to note is that all of the required upgrades at the external key intersections have been split into two (2) phases. The first phase of upgrades will be required as part of the complete development of the neighbouring Watervalspruit Townships. The second phase of upgrades will be required as part of the development of the proposed Rietspruit Township, which is only expected to happen after the neighbouring Watervalspruit Townships have been completed. The external intersection upgrades required as part of the Watervalspruit Ext. 54 Township have also been taken into account.

   It must further be mentioned that the Heidelberg Road (R550 / K154) and K91 intersection is due for the upgrades shown separately in **Drawing No. 0573/CL/01a**. These upgrades have been approved by the relevant road authorities and a Wayleave is already in place for construction to commence in due course. Therefore, the proposed first and second phase upgrades (as mentioned above) are taken as additional upgrades to these upgrades that will be implemented in the near future. All of the proposed upgrades on Heidelberg Road (future K154) and the K91 are to be implemented to Gautrans' minimum design standards.

   PHASE 1 UPGRADES: Required as part of the neighbouring Watervalspruit Townships

   - Heidelberg Road (R550/ K154) / K91 [Intersection 5]:

     Refer to **Drawing No. 0573/CL/01b**

     - Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;

- Additional receiving lane to be added on the eastern and western legs of Heidelberg Road;
- Additional short right turning lane to be added on the northern approach of the K91;
- The short, shared through and left turning slip lane on the northern approach of the K91 (as per **Drawing No. 0573/CL/01a**) to be upgraded to a short through lane with a separate short left turning slip lane; and
- Updated traffic signal layout and signal timing plans.

⌗ Heidelberg Road (R550/ K154) / Kingfish Street / Garthview Street [Intersection 12]:

Refer to **Drawing No. 0573/CL/02a**

- Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;
- Additional receiving lane to be added on the eastern and western legs of Heidelberg Road;
- Existing shared through and right turning lane on the Kingfish Street approach to be converted to a dedicated right turning lane;
- Additional short right turning lane to be added on the Kingfish Street approach;
- Existing short left turning lane on the Kingfish Street approach to be extended and upgraded to a short, shared through and left turning slip lane;
- Additional short right turning lane to be added on the Garthview Street approach, with the existing approach lane to be converted to a shared through and left turning lane only; and
- Updated signal layout and signal timing plans.

⌗ K91 / Cosmopolitan Drive [Intersection 13]:

Refer to **Drawing No. 0573/CL/03a**

- Additional through lane to be added on the south-western approach of the K91;
- Additional receiving lane to be added on the north-eastern leg of the K91;
- Additional short right turning lane to be added on the north-eastern approach of the K91;
- Additional short receiving lane to be added on the north-western leg of Cosmopolitan Drive;
- Existing left turning slip lane (with yield control) on the north-western approach of Cosmopolitan Drive to be upgraded to a continuous slip lane with a short receiving lane on the K91 (north-eastern leg); and
- Updated traffic signal layout and signal timing plans.

⌗ Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]:

Refer to **Drawing No. 0573/CL/04a**

- Proposed new 4-legged intersection with separate short right turning and left turning slip lanes on all 4 approaches; and
- Signalization of the intersection, when warranted.

⌗ Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]:

Refer to **Drawing No. 0573/CL/05a**

- Proposed new T-intersection with separate turning lanes on the eastern and western approaches of Heidelberg Road;
- Southern approach of Yellow Jack Street to comprise a dedicated left turning slip lane and a short right turning lane; and

- Signalization of the intersection, when warranted.

PHASE 2 UPGRADES: Required as part of the proposed Rietspruit Township)

- Heidelberg Road (R550/ K154) / K91 [Intersection 5]:

  Refer to **Drawing No. 0573/CL/01c**

  - Additional through lane to be added on the eastern and western approaches of Heidelberg Road;
  - Additional receiving lane to be added on the eastern and western legs of Heidelberg Road;
  - Additional short right turning lane to be added on the eastern approach of Heidelberg Road and the existing short right turning lane to be extended;
  - Additional receiving lane to be added on the northern leg of the K91; and
  - Updated traffic signal layout and signal timing plans.

- Heidelberg Road (R550/ K154) / Kingfish Street / Garthview Street [Intersection 12]:

  Refer to **Drawing No. 0573/CL/02b**

  - Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;
  - Additional receiving lane to be added on the eastern and western legs of Heidelberg Road; and
  - Updated signal layout and signal timing plans.

- K91 / Cosmopolitan Drive [Intersection 13]:

  Refer to **Drawing No. 0573/CL/03b**

  - Additional through lane to be added on the north-eastern approach of the K91;
  - Additional receiving lane to be added on the south-western leg of the K91; and
  - Updated traffic signal layout and signal timing plans.

- Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]:

  Refer to **Drawing No. 0573/CL/04b**

  - Additional through lane to be added on both the eastern and western approaches of Heidelberg Road;
  - Additional receiving lane to be added on the eastern and western legs of Heidelberg Road; and
  - Updated signal layout and signal timing plans.

- Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]:

  Refer to **Drawing No. 0573/CL/05b**

  - Additional short right turning lane to be added on the western approach of Heidelberg Road;
  - Additional short receiving lane on Yellow Jack Street;
  - Additional short through lane to be added on the eastern approach of Heidelberg Road;
  - Additional receiving lane on the western leg of Heidelberg Road; and
  - Updated signal layout and signal timing plans.

INTERNAL ROAD & INTERSECTION UPGRADES: All of the proposed upgrades outlined below are required as part of the proposed Rietspruit Township and are shown in attached **Drawing No. 0573/CL/06**.

- 'Road A' (Extension of Yellow Jack Street):
  - New Class 3 public road of approximately 2150m (2.15km) in length.
- 'Road A' / 'Road B' Intersection:
  - Proposed new traffic circle (approximately 18m inscribed diameter) with a single circulating lane and painted splitter islands.
- 'Road A' / 'Road C' Intersection:
  - Proposed new traffic circle (approximately 20m inscribed diameter) with a single circulating lane and painted splitter islands.
- 'Road A' / 'Road D' Intersection:
  - Proposed new traffic circle (approximately 18m inscribed diameter) with a single circulating lane and painted splitter islands.
- 'Road A' / 'Road E' Intersection:
  - Proposed new 4-legged priority stop controlled intersection.

8. In the event of bulk engineering contributions payable with respect to roads and stormwater, it is recommended that at least part of the contribution be off-set against the proposed road and intersection upgrades, as outlined above, since the upgrades will also benefit other future developments and the relevant road authorities. It is acknowledged that the off-setting of costs against provincial roads could be a problem in terms of the legislation, but it is recommended that the CoE, Midvaal Local Municipality and Gautrans come to some agreement in this respect.

9. **NON-MOTORISED & PUBLIC TRANSPORT:** Heidelberg Road (R550/K154) and Road K91, which are both located in close proximity to the subject site, are known to be very popular public transport routes for minibus-taxis and buses. Cosmopolitan Drive and Kingfish Street, which had been constructed as part of the neighbouring Watervalspruit Townships, have also become popular public transport routes in recent years. Given the undeveloped status of the subject site and surrounding properties, the site itself is not currently served by public transport services, nor is there any proper public transport facilities in place (such as walkway and laybys). However, the implementation of the proposed new public roads will connect the subject site to such services and facilities and it is expected that the proposed development, together with other developments in the area, will further stimulate the demand for public transport services as they develop over time and it is expected that particularly minibus taxis would respond to this demand by providing more services. It is also expected that 'Road A' will become an important north-south public road in future, while Heidelberg Road (K154) and Road K91 are expected to become even more popular public transport routes in the future. It can therefore be concluded that the subject site will be well located with respect to the availability of public transport facilities and -services in future.

10. In order to make provision for the users of public transport that will be generated by the proposed development, the following facilities are proposed:

    - Public Transport Laybys: Since a notable number of residents and employees associated with the proposed development are expected to make use of public transport services, it is suggested that public transport laybys be constructed at the following locations:
      - Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street Intersection: A set of Gautrans standard bus laybys along Heidelberg Road, upstream and downstream of the intersection, as per **Drawing No. 0573/CL/04a & 04b**

- Heidelberg Road (R550/K154) / Yellow Jack Street Intersection: A set of Gautrans standard bus laybys along Heidelberg Road, upstream and downstream of the intersection, as per **Drawing No. 0573/CL/05a & 05b**

In addition, public transport laybys are also proposed at the following locations inside the subject township development:

- 'Road A' / 'Road B' Intersection: A set of laybys along 'Road A', upstream and downstream of the intersection, as per **Drawing No. 0573/CL/06**
- 'Road A' / 'Road C' Intersection: A set of laybys along 'Road A', upstream and downstream of the intersection, as per **Drawing No. 0573/CL/06**
- 'Road A' / 'Road D' Intersection: A set of laybys along 'Road A', upstream and downstream of the intersection, as per **Drawing No. 0573/CL/06**

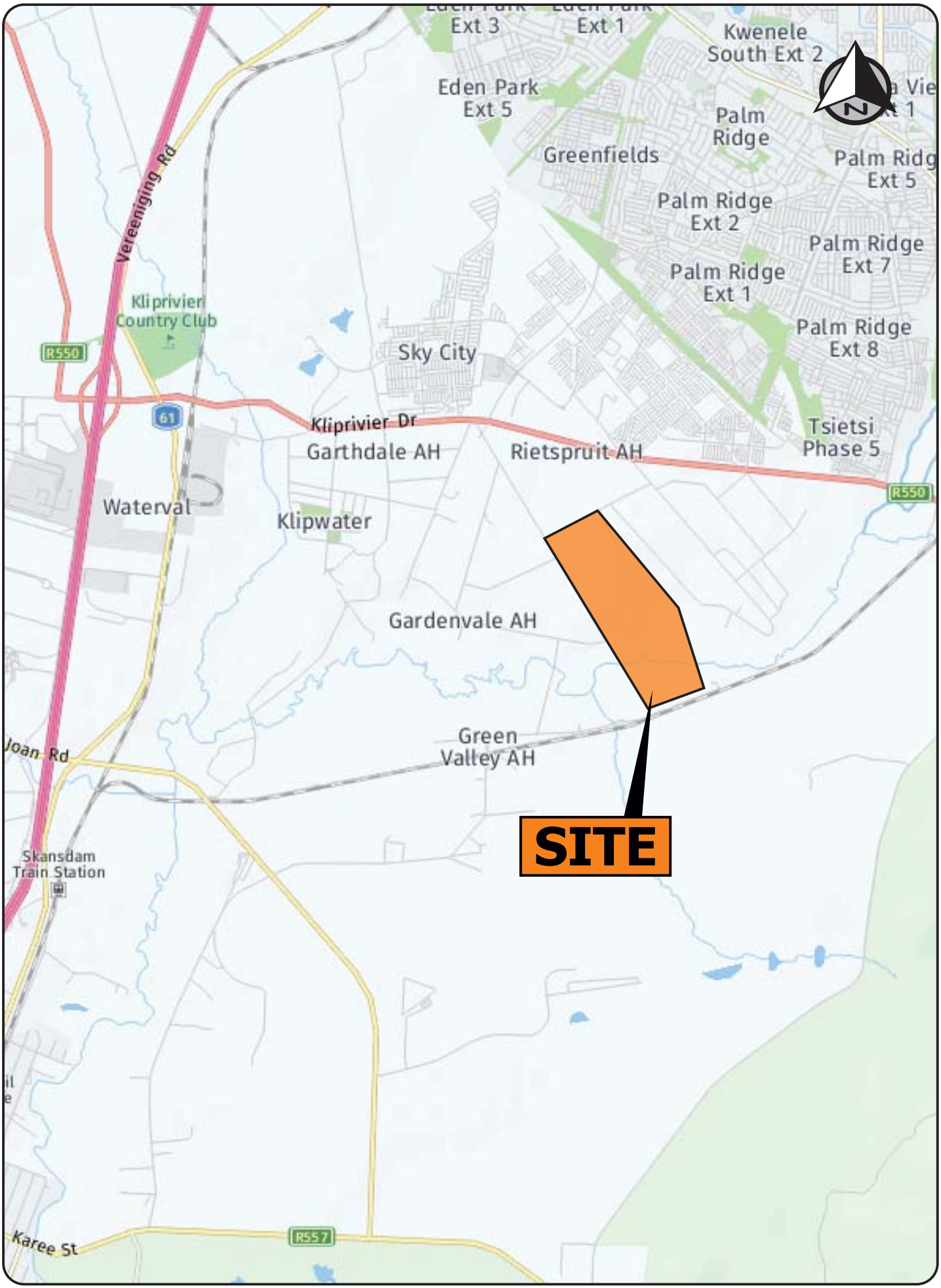
The final location of these laybys can be discussed with Midvaal Local Municipality at design stage.

- Paved Sidewalks: In order to ease and formalize the movement of pedestrians to and from the subject township, it is proposed to construct paved pedestrian sidewalks of at least 1.8m wide along both sides of 'Road A', as per **Drawing No. 0573/CL/06**.

More details of the above would be submitted as part of the final Site Development Plans (where relevant) and/or detail designs of the external road and intersection upgrades.

From a traffic engineering perspective, the proposed new mixed land-use township known as Rietspruit is supported, provided that the proposed site access intersections and internal roads, external road- and intersection upgrades and public transport- and non-motorized facilities as proposed in this TIA are implemented to the relevant design standards of the Midvaal Local Municipality, the City of Ekurhuleni (CoE) and Gautrans.

Figures



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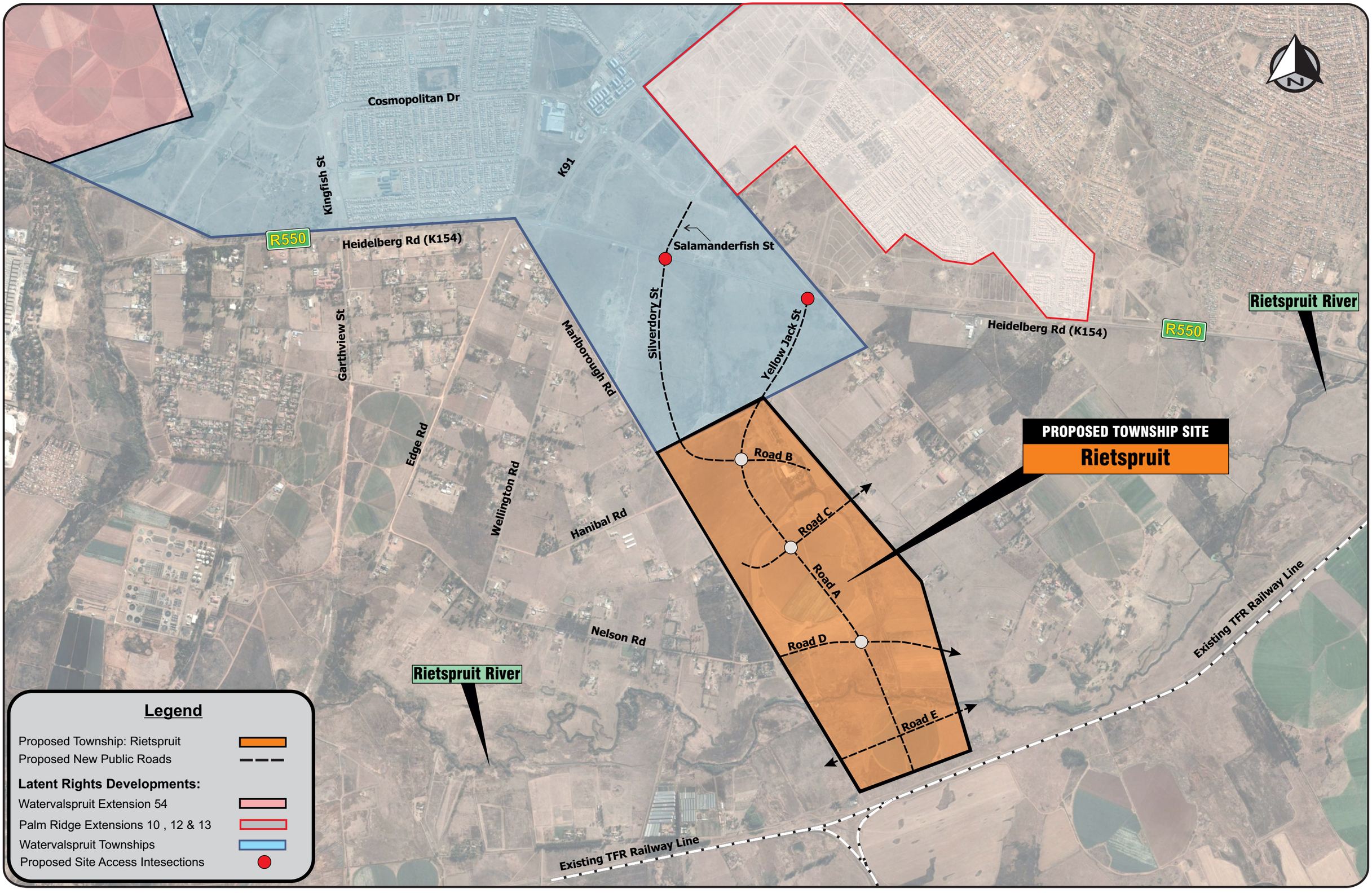
Project Name	Proposed Township: Rietspruit	Proj Ref. P0573
Description	**Locality Plan**	Figure **1**



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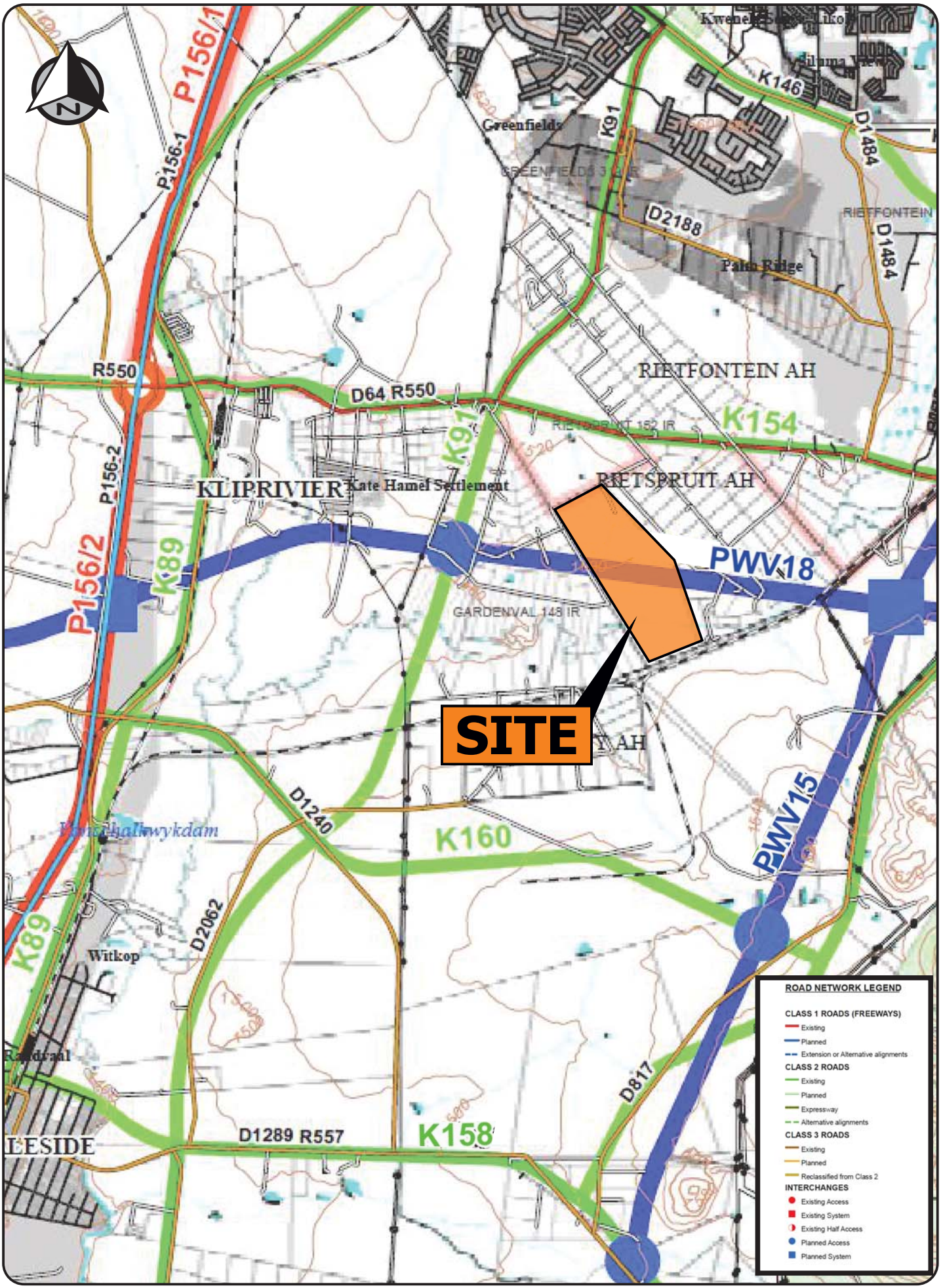
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Site Aerial View & Key Plan	**2**



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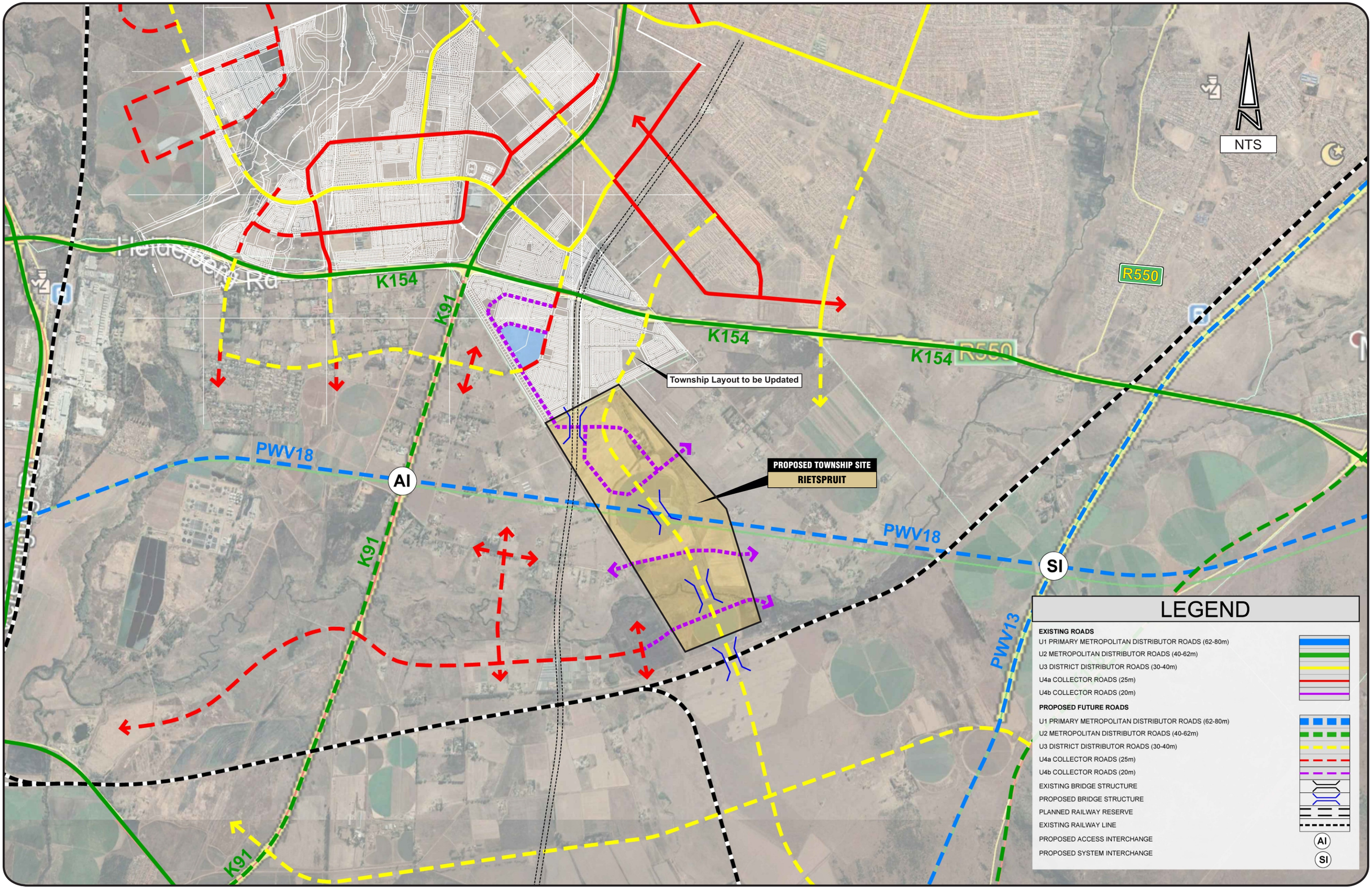
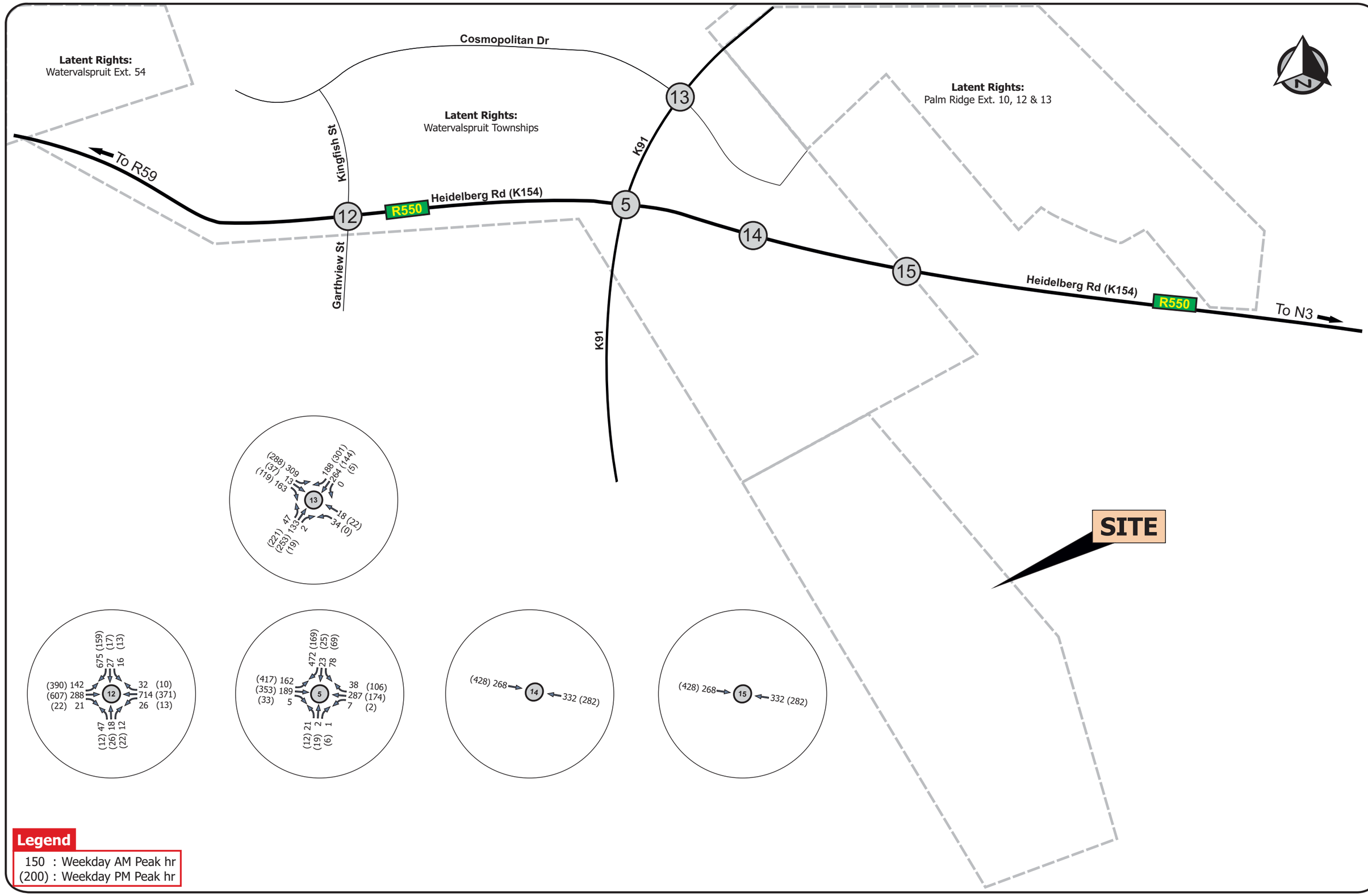
Project Name	Proposed Township: Rietspruit	Proj Ref. P0573
Description	**Extract of Gautrans' Strategic Major Road Network (2007)**	Figure **3**



dhubecon consulting engineers

Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Proposed Local Road Master Planning	**4**



Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

dhubecon consulting engineers

Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Existing 2021 Peak Hour Traffic Volumes	**5**

Latent Rights:
Watervalspruit Ext. 54

Cosmopolitan Dr

Latent Rights:
Watervalspruit Townships

Latent Rights:
Palm Ridge Ext. 10, 12 & 13

To R59

Kingfish St

Garthview St

Heidelberg Rd (K154)

R550

K91

K91

Heidelberg Rd (K154)

R550

To N3

12

5

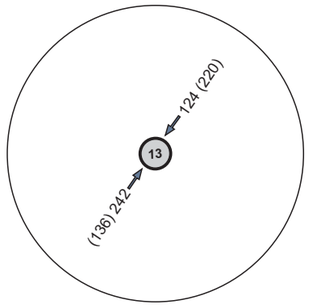
13

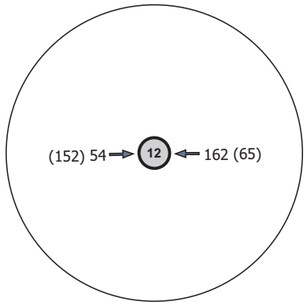
14

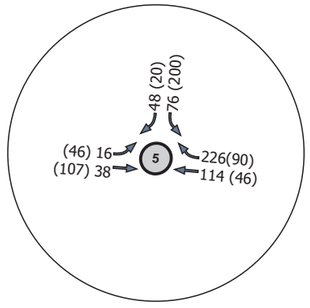
15

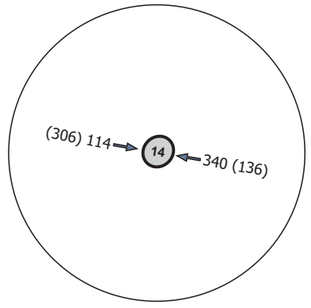
N

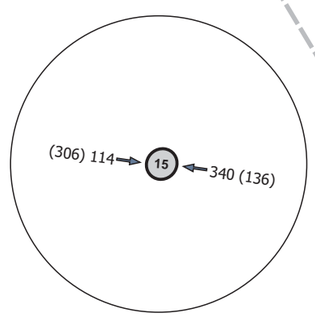
SITE











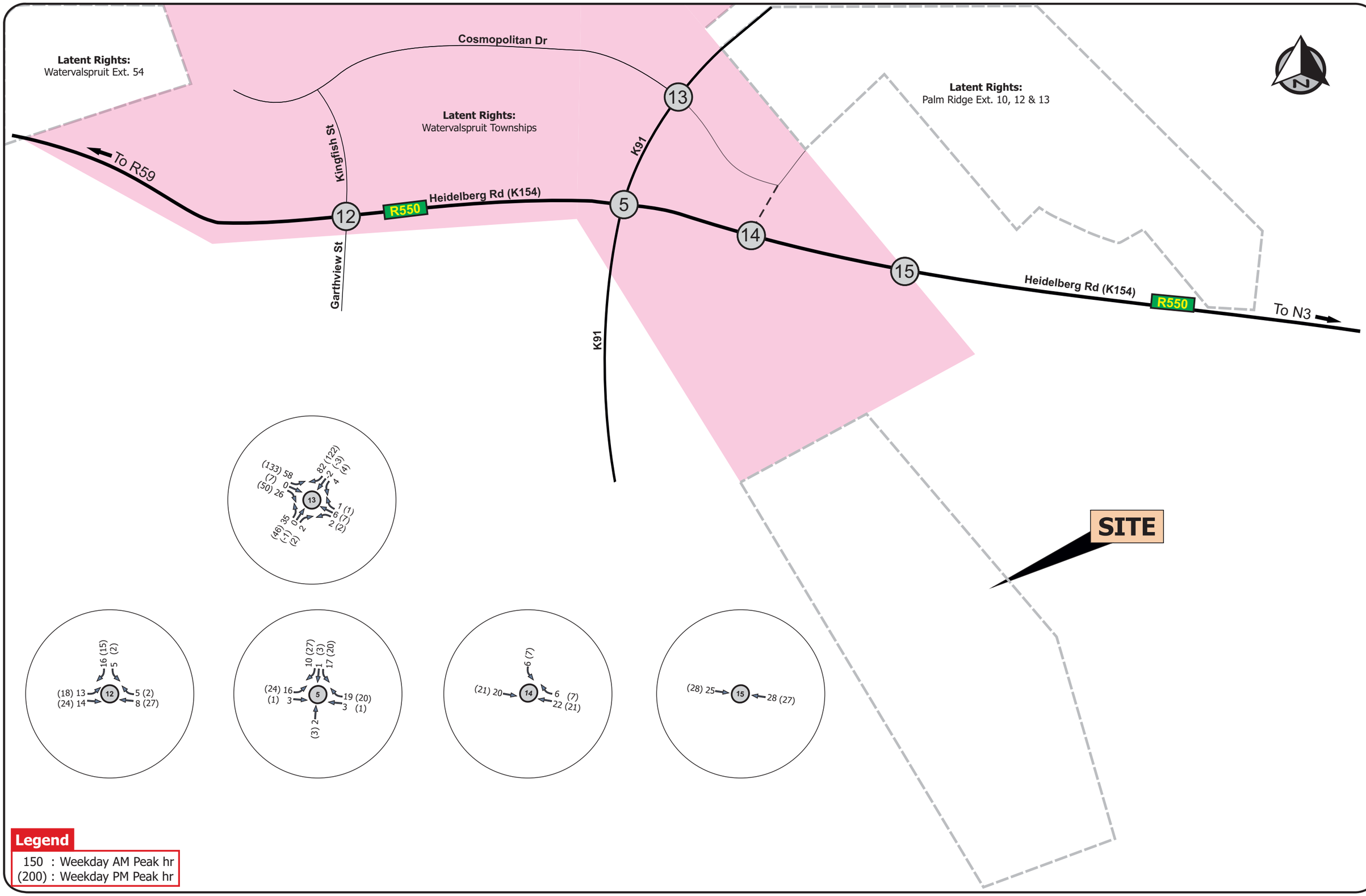
Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

dhubecon consulting engineers

Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Latent Rights: Palm Ridge Ext. 10, 12 & 13 Trips	**6a**



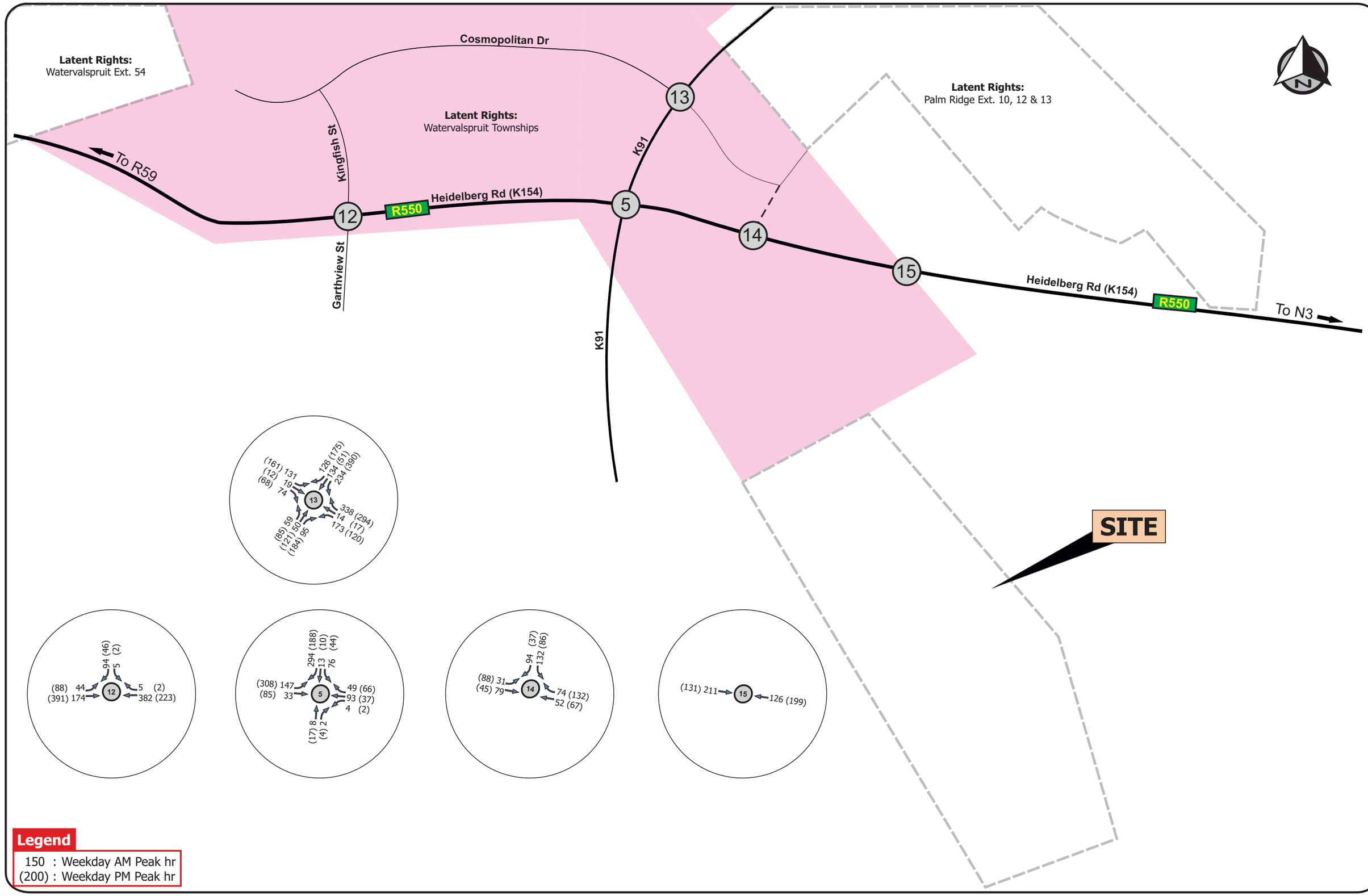
Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

dhubecon consulting engineers

Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Latent Rights: Watervalspruit Townships - Service Plan Stage 1 Remaining Trips	**6b**



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Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Latent Rights: Watervalspruit Townships - Service Plan Stage 2 Remaining Trips	**6c**

Latent Rights:
Watervalspruit Ext. 54

Cosmopolitan Dr

Latent Rights:
Watervalspruit Townships

Latent Rights:
Palm Ridge Ext. 10, 12 & 13

To R59

Kingfish St

Heidelberg Rd (K154)

R550

K91

Garthview St

Silverdory St

Yellow Jack St

To N3

12

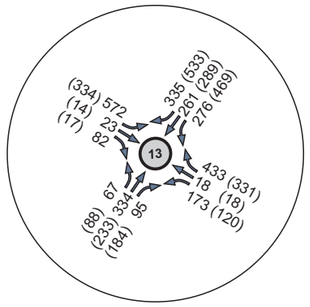
13

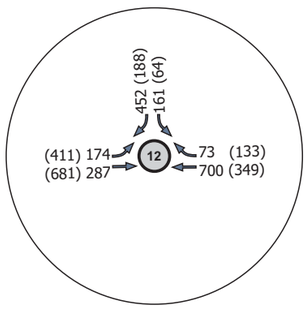
5

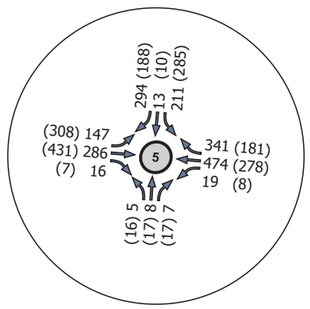
14

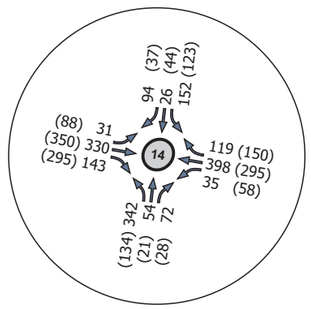
15

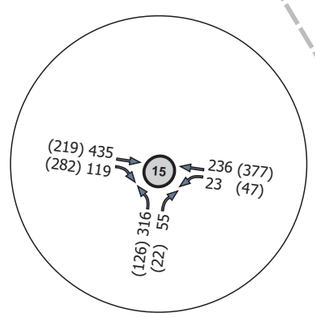
SITE











Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

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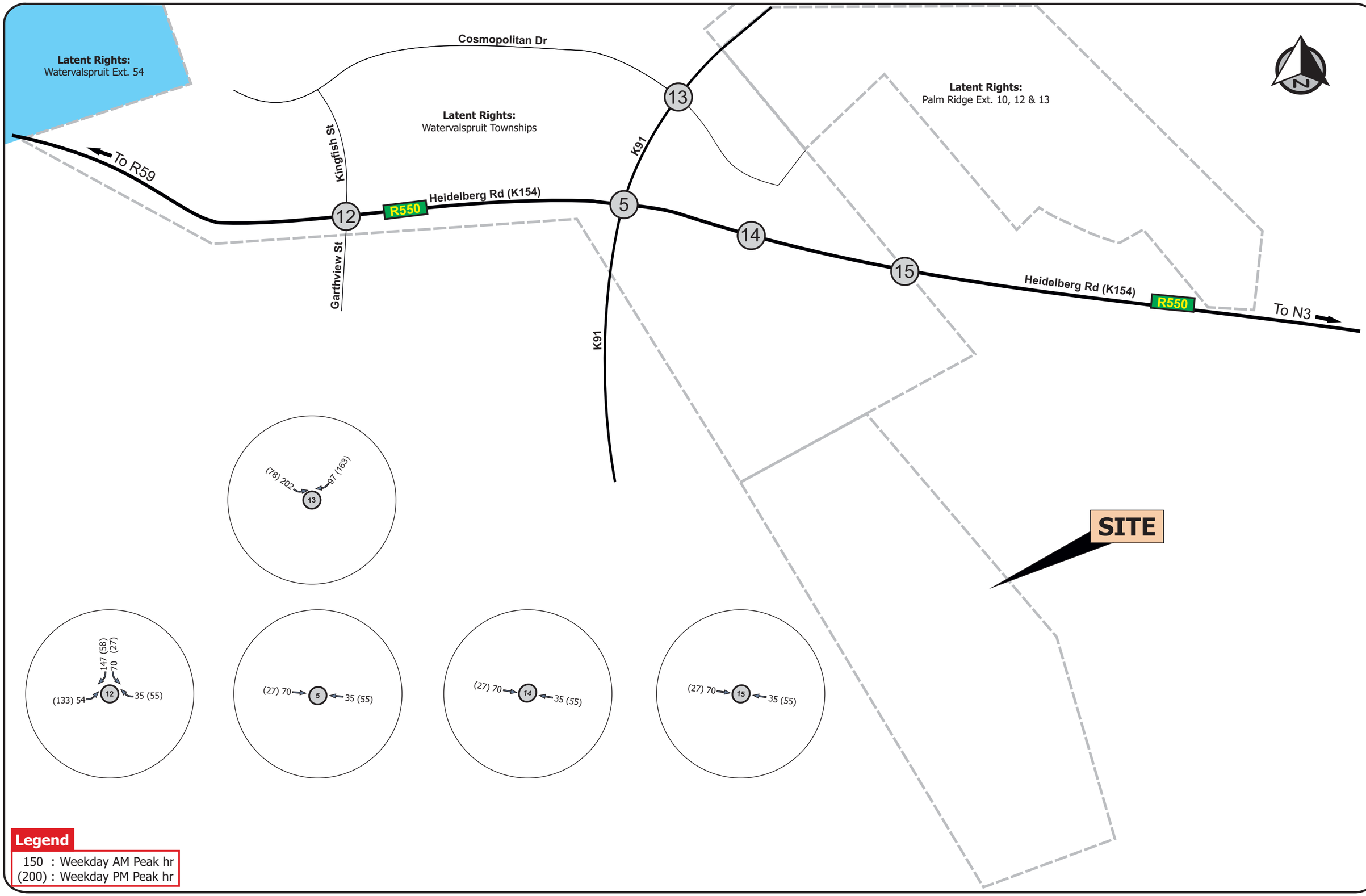
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Latent Rights: Watervalspruit Townships - Service Plan Stage 3 Trips	**6d**



Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

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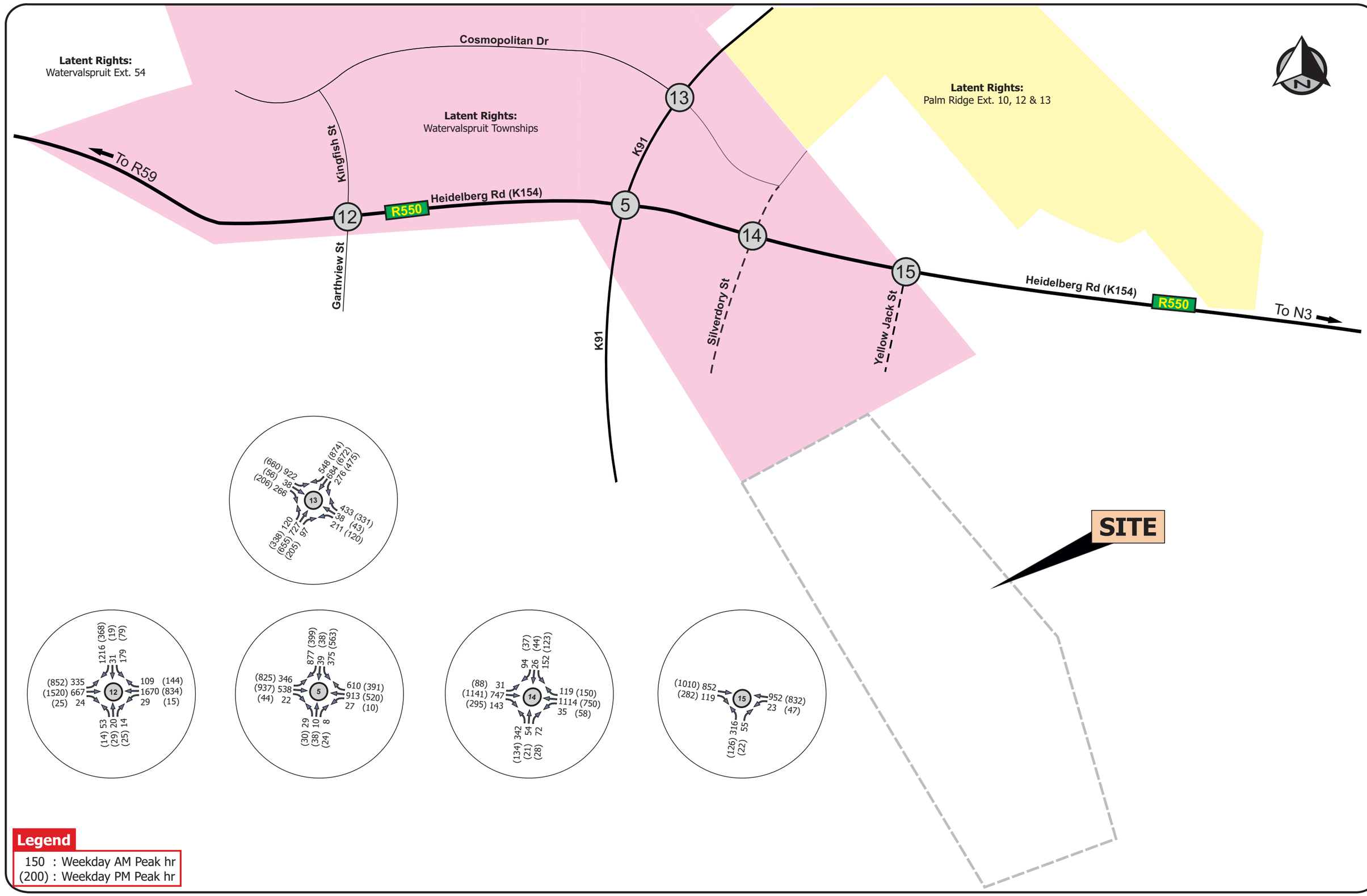
Client	Notes

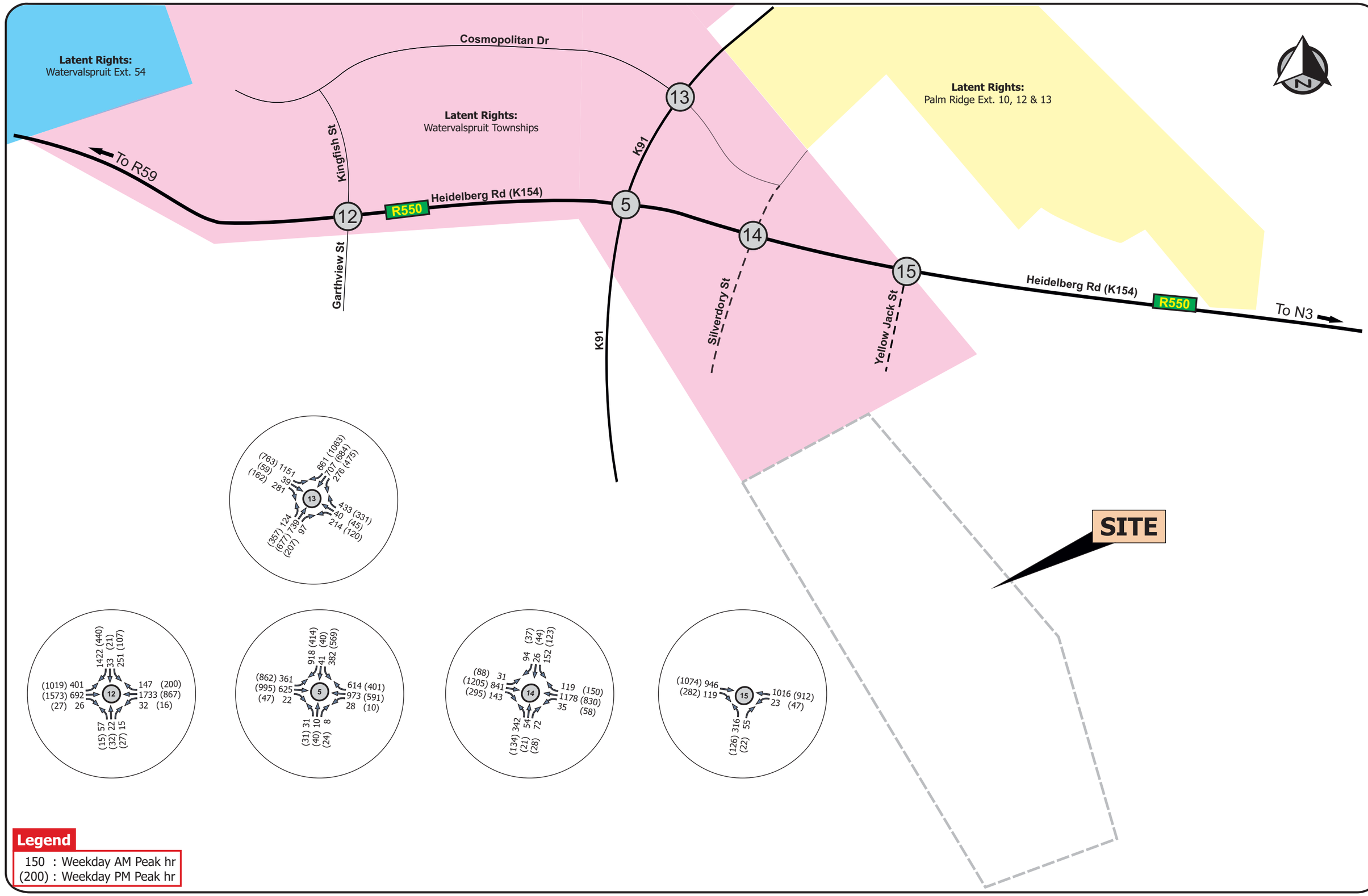
Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Latent Rights: Watervalspruit Ext. 54 Trips	**6e**



dhubecon consulting engineers

Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description **Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Service Plan Stage 3 Trips**	Figure **7**



Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

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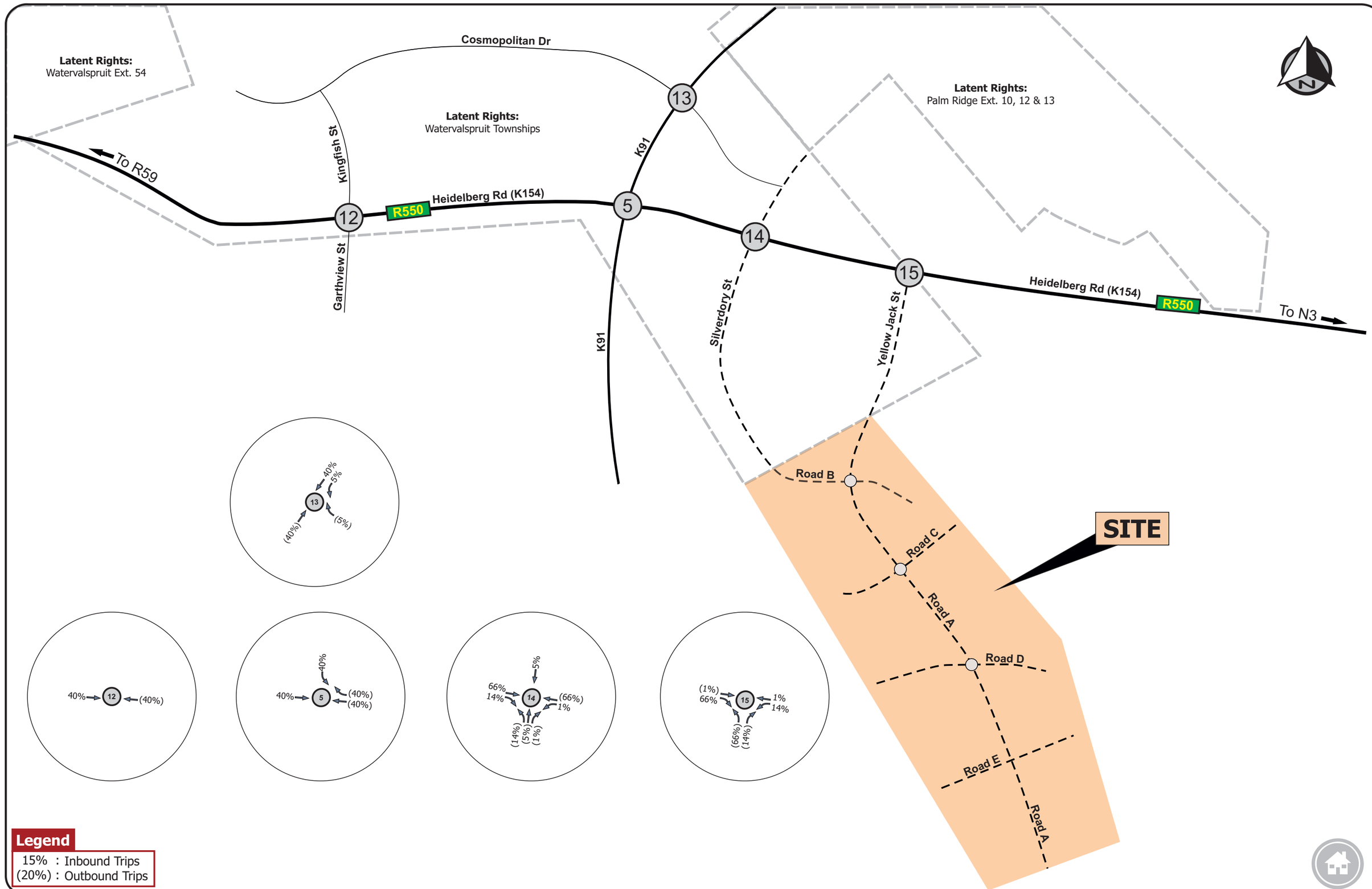
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Future 2031 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Service Plan Stage 3 Trips + Watervalspruit Ext. 54 Trips	**8**



Legend

15% : Inbound Trips
(20%) : Outbound Trips

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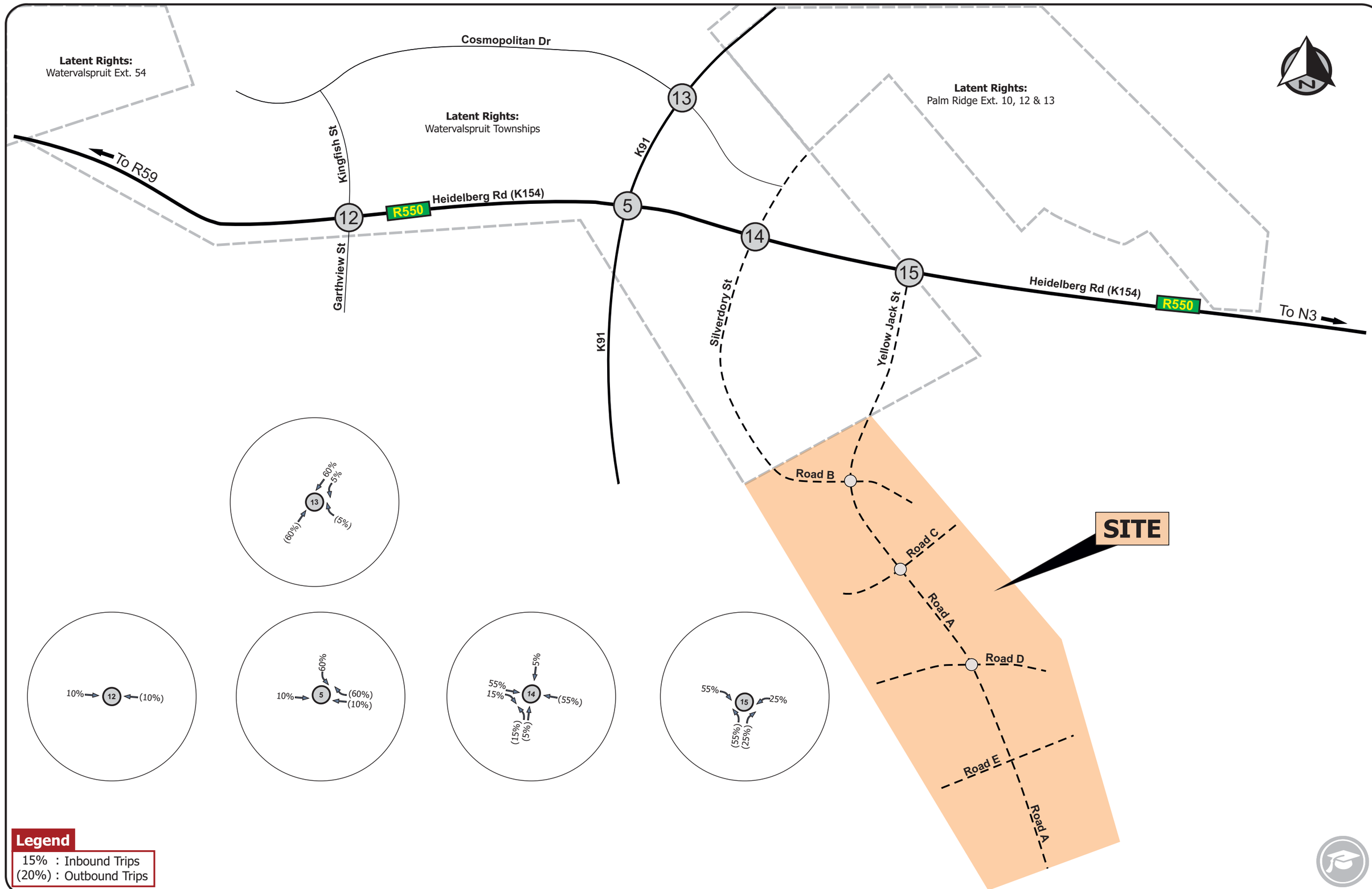
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Expected Development Trip Distribution: Residential	**9a**



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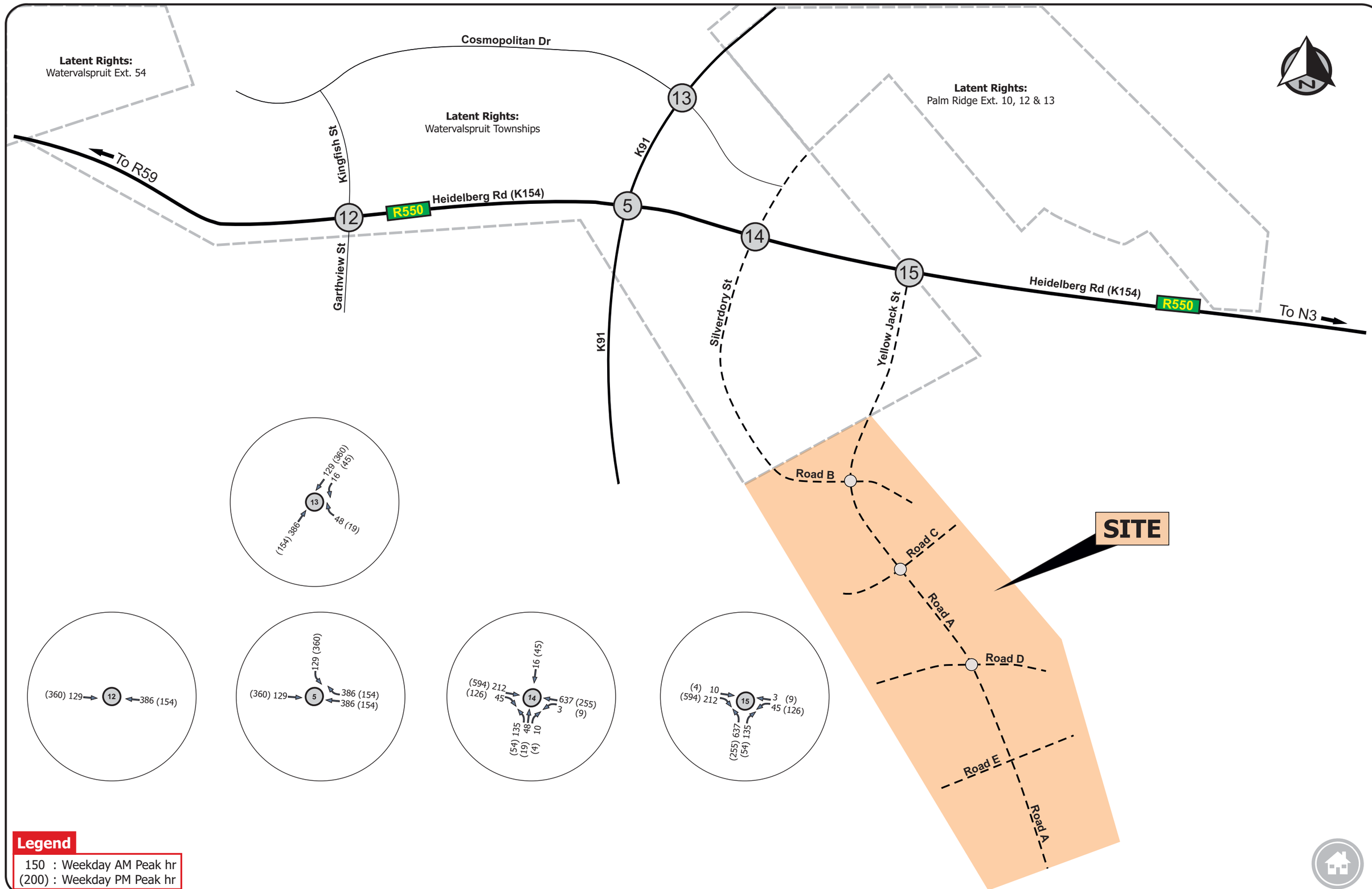
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Expected Development Trip Distribution: Educational	**9b**



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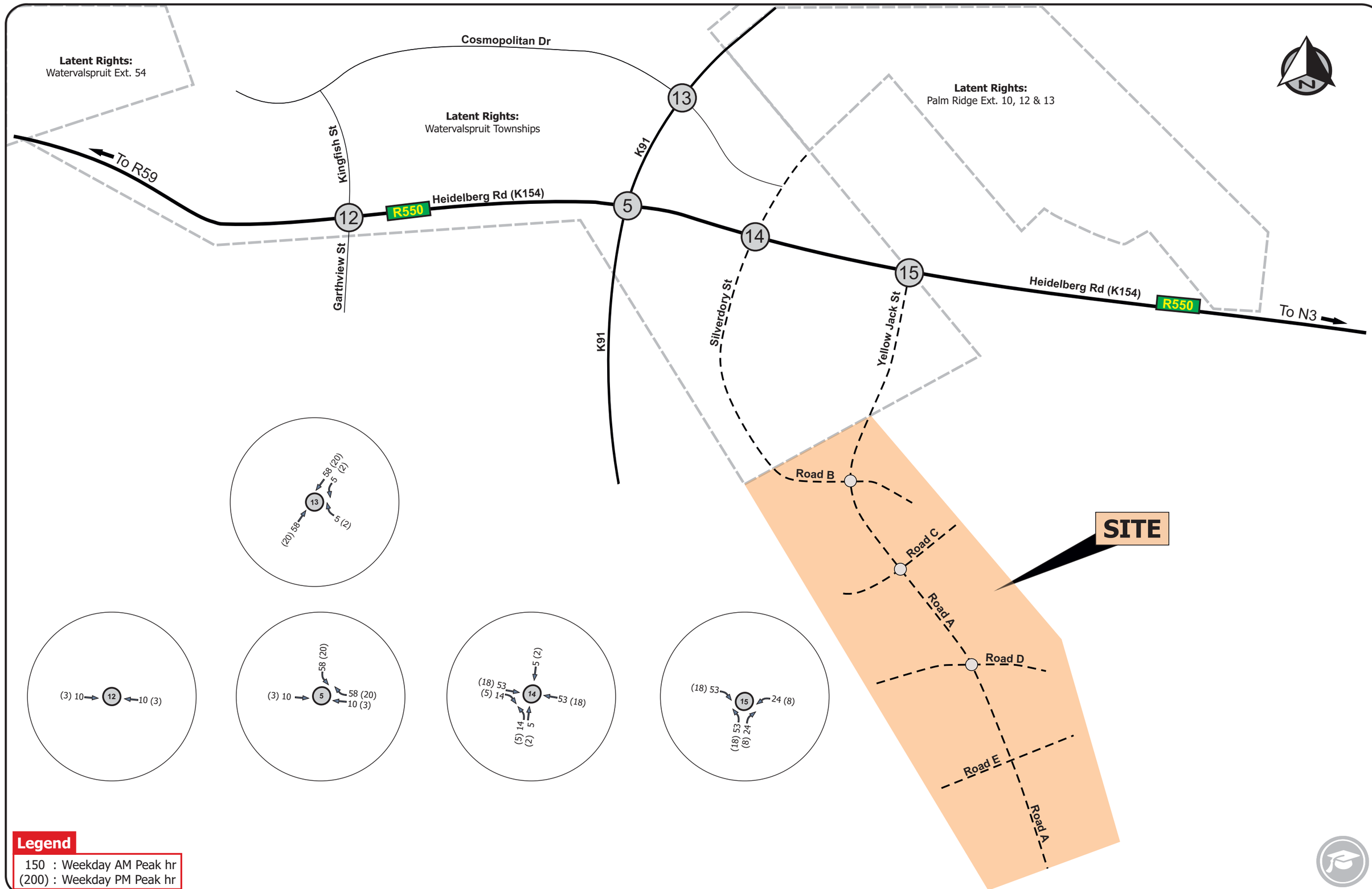
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Estimated Development Trips: Residential	**10a**



Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

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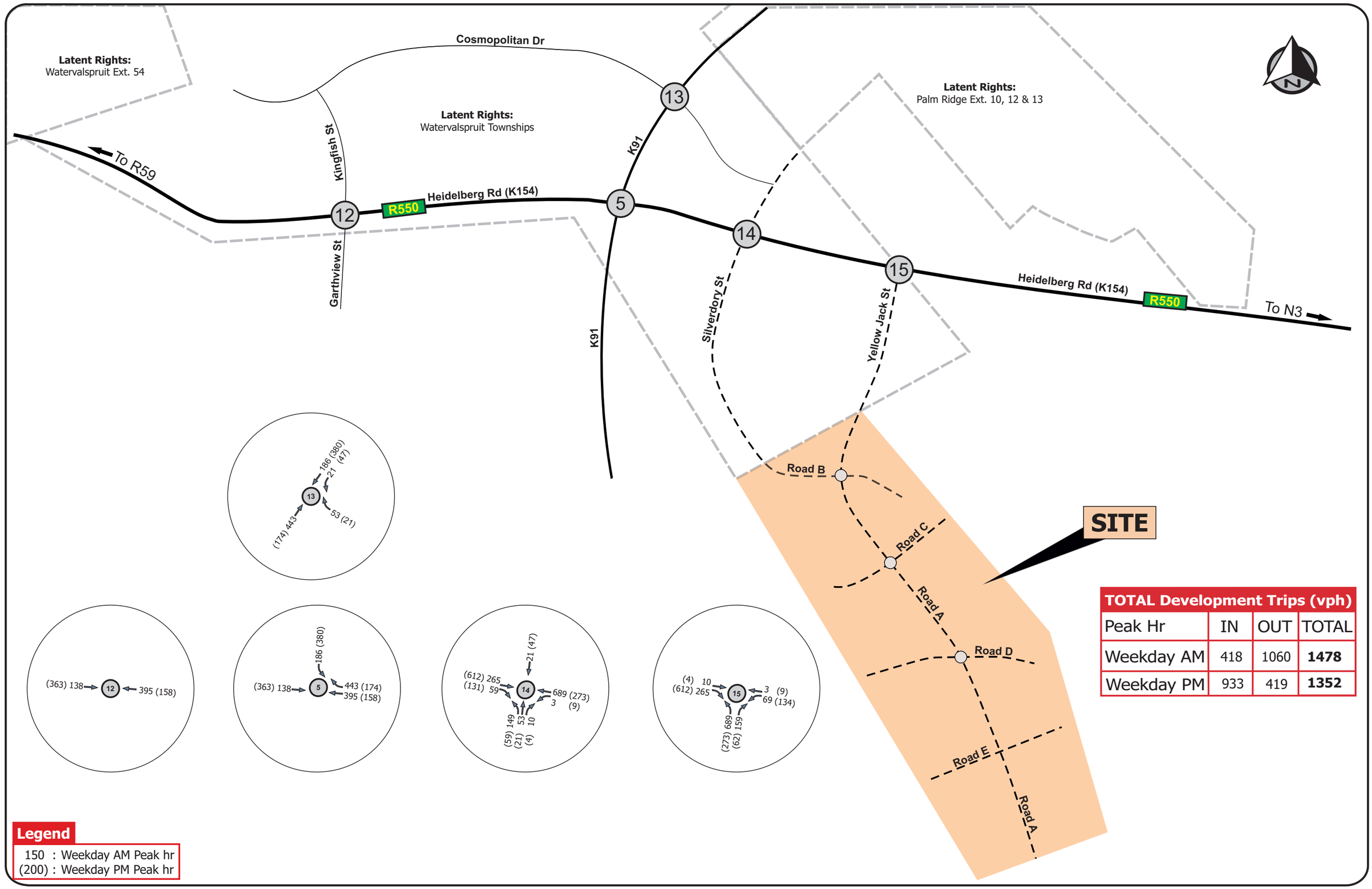
Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	**Figure**
Estimated Development Trips: Educational	**10b**



TOTAL Development Trips (vph)			
Peak Hr	IN	OUT	TOTAL
Weekday AM	418	1060	**1478**
Weekday PM	933	419	**1352**

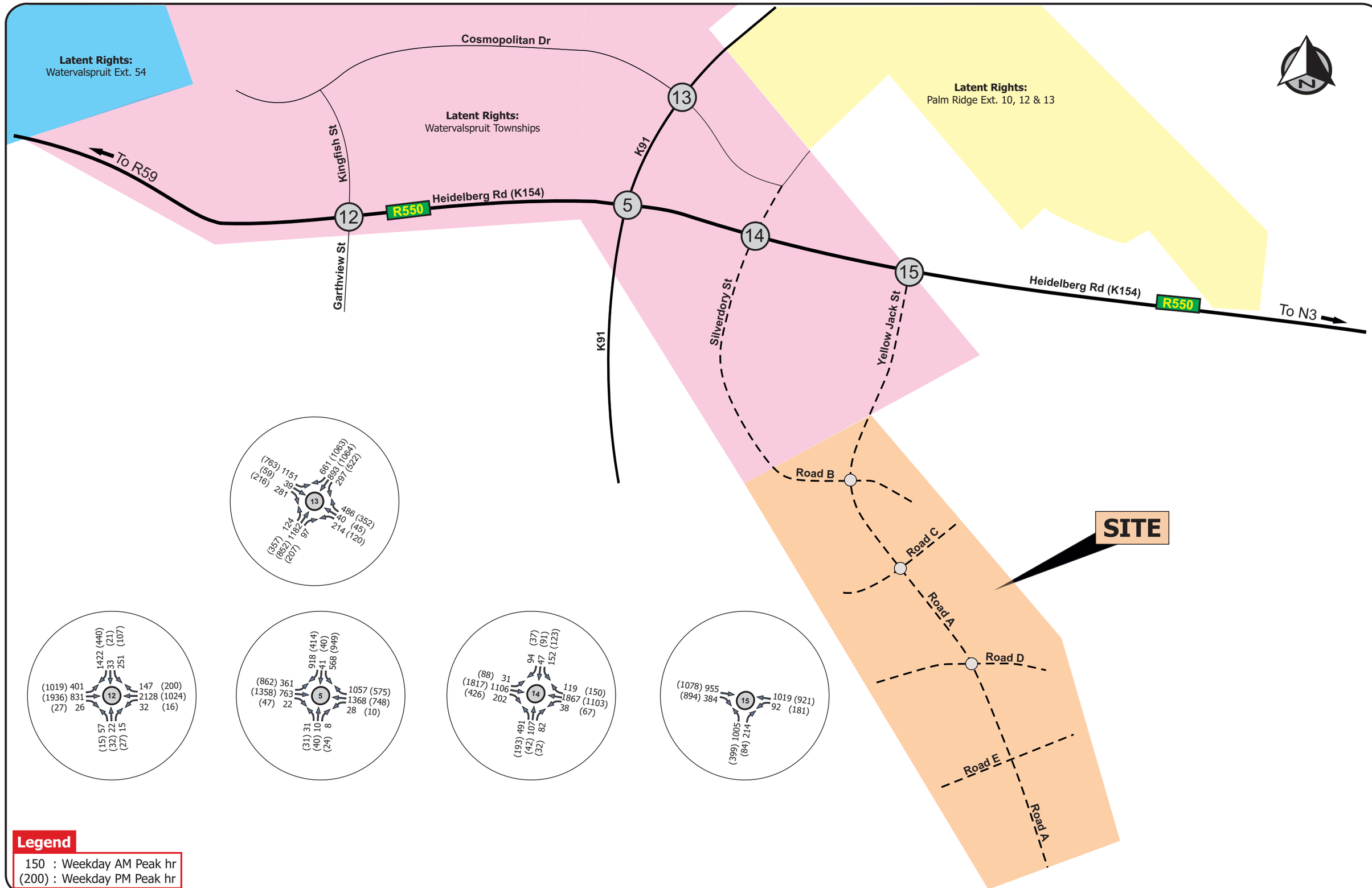
Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

dhubecon consulting engineers

Client	Notes

Project Name	Proj Ref.
Proposed Township: Rietspruit	P0573
Description	Figure
Estimated Total Development Trips	**11**



Legend

150 : Weekday AM Peak hr
(200) : Weekday PM Peak hr

dhubecon consulting engineers

Client	Notes

Project Name	Proposed Township: Rietspruit	Proj Ref. P0573
Description	**Future 2031 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Service Plan Stage 3 Trips + Watervalspruit Ext. 54 Trips + Estimated Total Development Trips**	Figure **12**

Drawings

Drawing No. 0573/CL/01a	Approved Intersection Upgrade: Heidelberg Road (R550/K154) / K91 [Intersection 5]
Drawing No. 0573/CL/01b	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / K91 [Intersection 5]: PHASE 1
Drawing No. 0573/CL/01c	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / K91 [Intersection 5]: PHASE 2
Drawing No. 0573/CL/02a	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12]: PHASE 1
Drawing No. 0573/CL/02b	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12]: PHASE 2
Drawing No. 0573/CL/03a	Proposed Intersection Upgrade: K91 / Cosmopolitan Drive [Intersection 13]: PHASE 1
Drawing No. 0573/CL/03b	Proposed Intersection Upgrade: K91 / Cosmopolitan Drive [Intersection 13]: PHASE 2
Drawing No. 0573/CL/04a	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]: PHASE 1
Drawing No. 0573/CL/04b	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]: PHASE 2
Drawing No. 0573/CL/05a	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]: PHASE 1
Drawing No. 0573/CL/05b	Proposed Intersection Upgrade: Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]: PHASE 2
Drawing No. 0573/CL/06	Proposed Internal Road Network Layout

REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

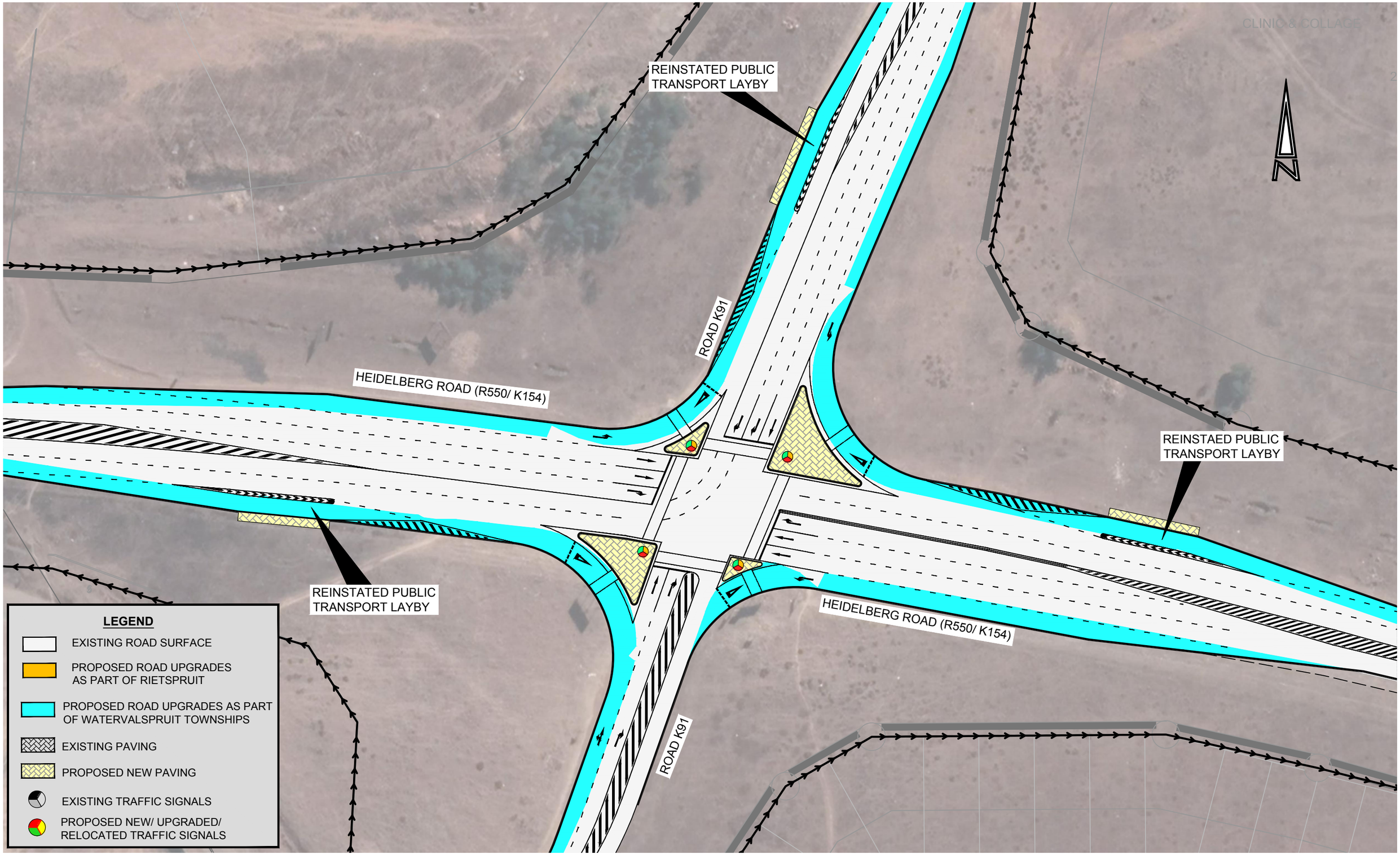
Dhubecon Consulting Engineers
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Approved Intersection Upgrade:** Heidelberg Road (R550/K154) / K91 [Intersection 5]

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27
PROJECT No:	DRAWING No:	REV:
P0573	0573/CL/01a	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

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Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

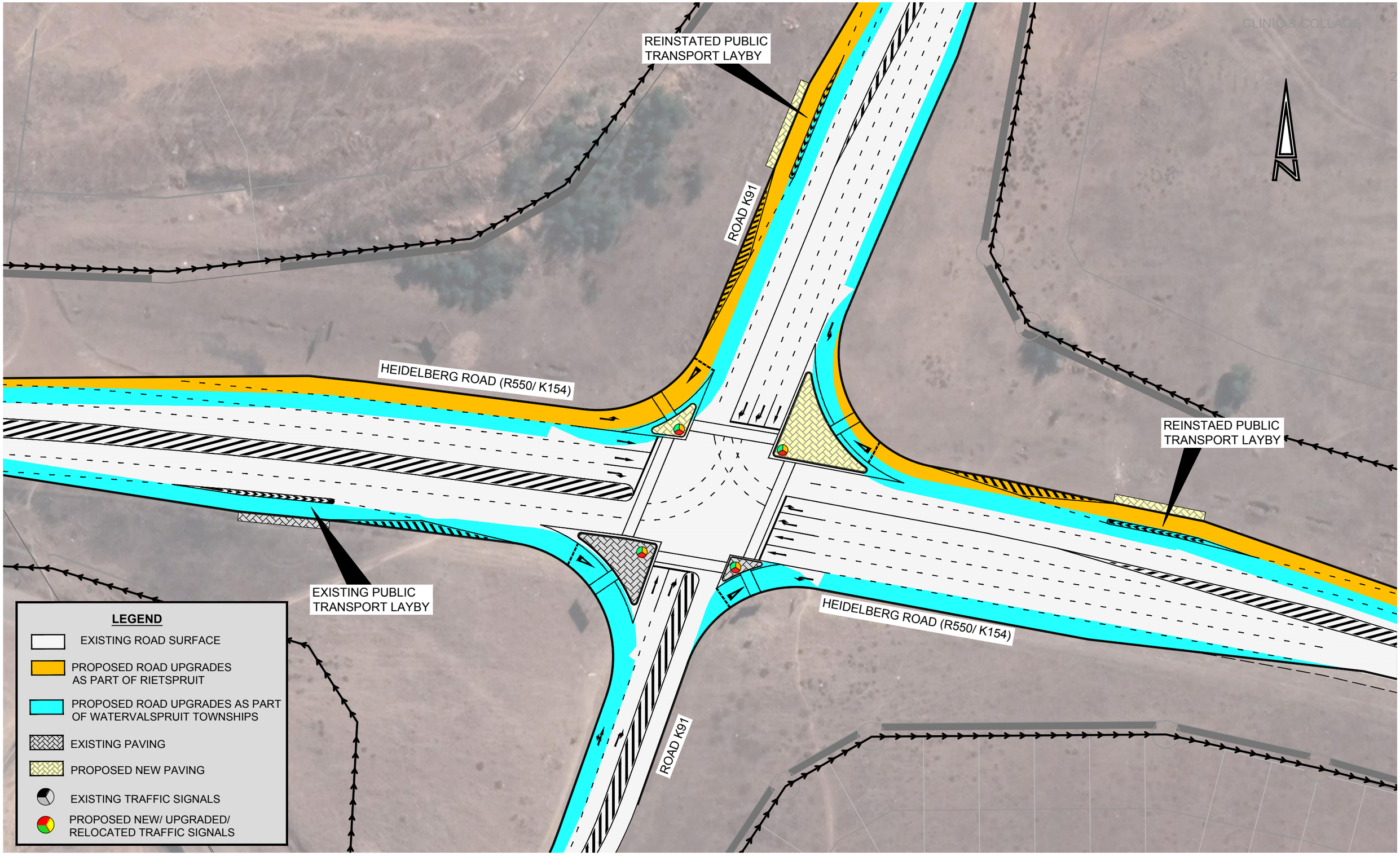
dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:** Heidelberg Road (R550/K154) / K91 [Intersection 5]: PHASE 1

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27

PROJECT No:	DRAWING No:	REV:
P0573	0573/CL/01b	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

Dhubecon Consulting Engineers
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE:
Proposed Intersection Upgrade:
Heidelberg Road (R550/K154) / K91 [Intersection 5]: PHASE 2

SCALE :	CHECKED:	APPROVED:
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DESIGN:	DRAWN:	DATE:
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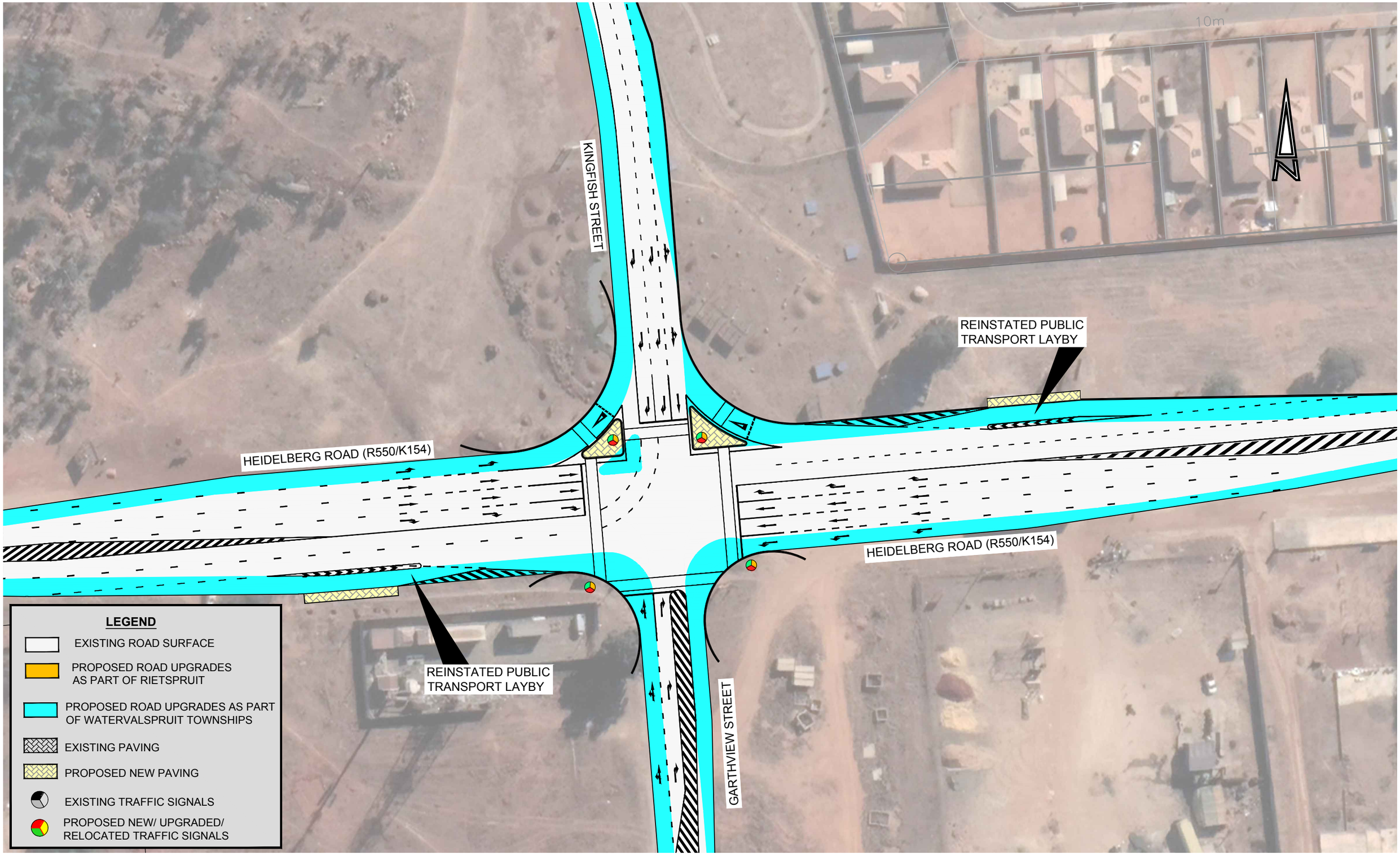
PROJECT No:	DRAWING No:	REV:
P0573	**0573/CL/01c**	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

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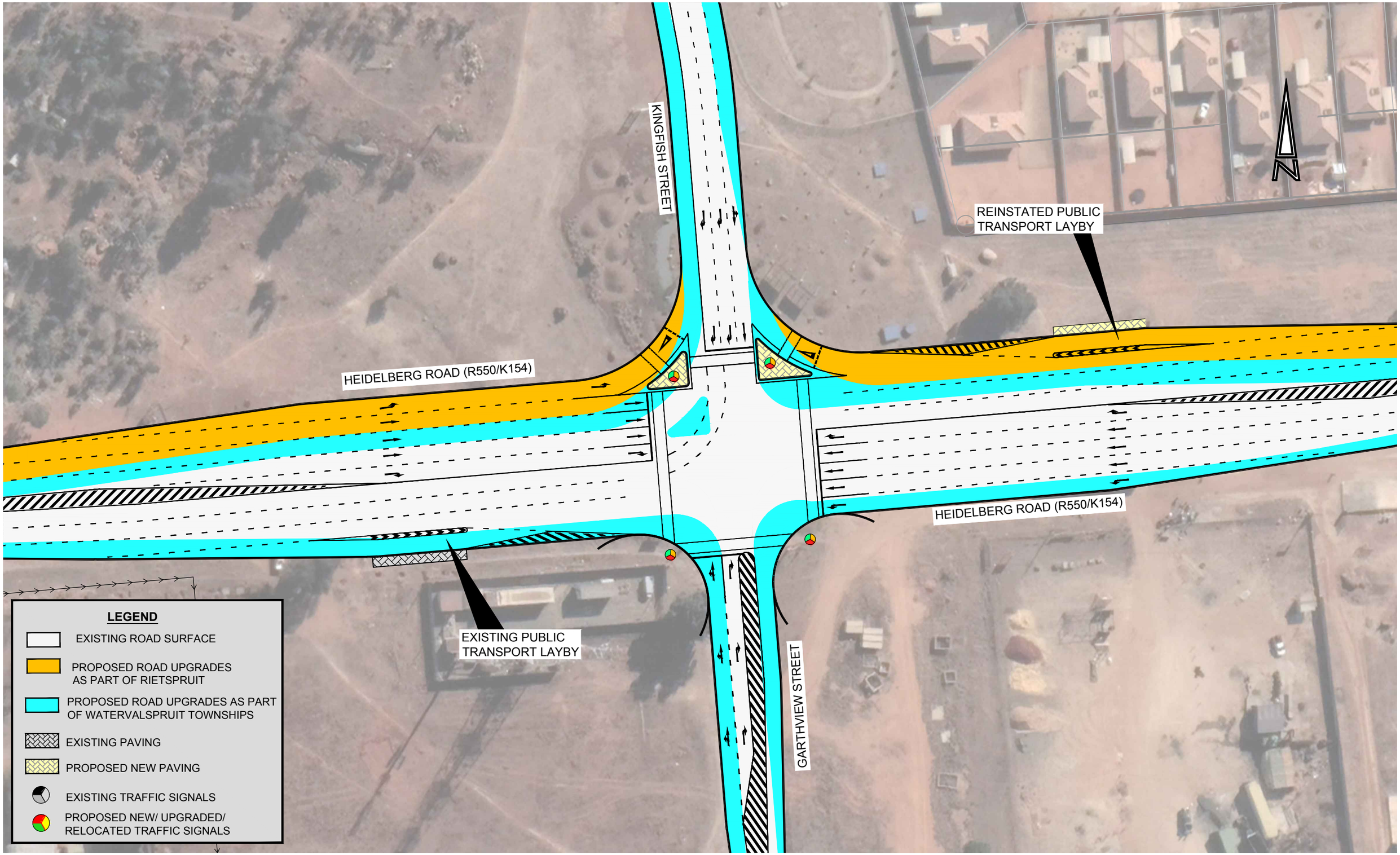
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:** Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12]: PHASE 1

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27
PROJECT No:	DRAWING No:	REV:
P0573	**0573/CL/02a**	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

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41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:** Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12]: PHASE 2

SCALE :	CHECKED:	APPROVED:
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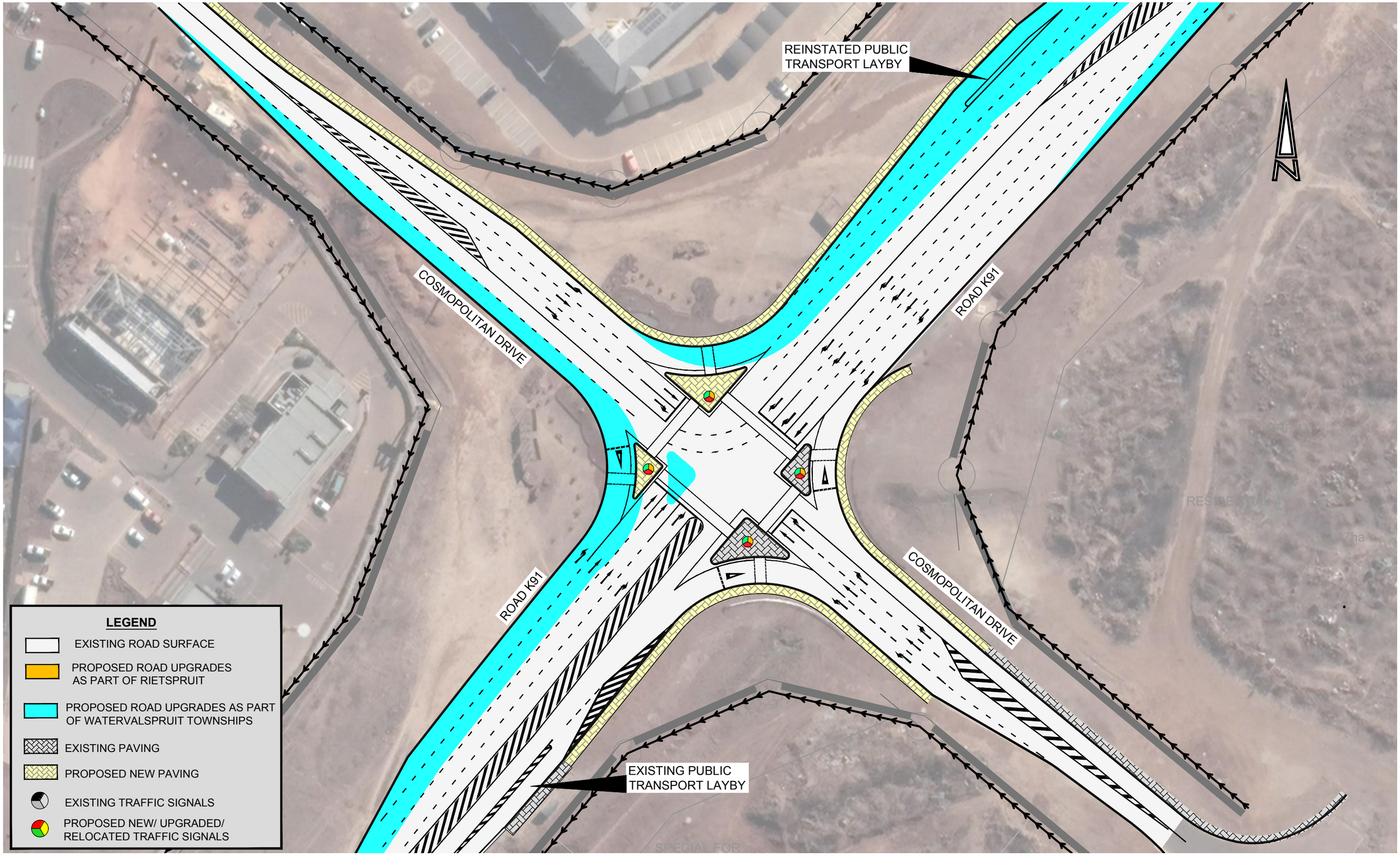
DESIGN: -	DRAWN: V MTHOMBENI	DATE: 2021/10/27
PROJECT No: **P0573**	DRAWING No: **0573/CL/02b**	REV: -



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

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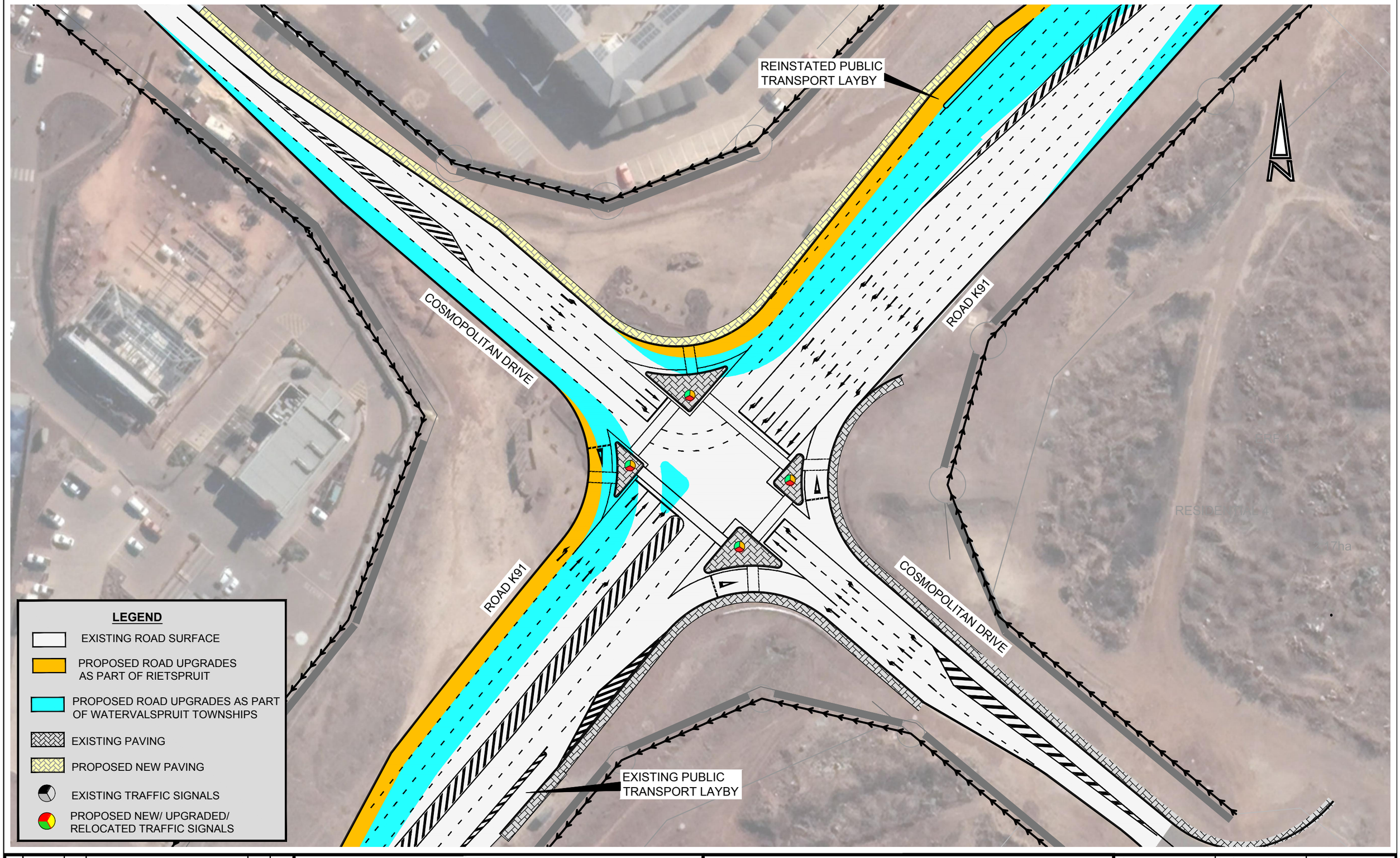
Dhubecon Consulting Engineers
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:**
K91 / Cosmopolitan Drive [Intersection 13]: PHASE 1

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27
PROJECT No:	DRAWING No:	REV:
P0573	0573/CL/03a	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

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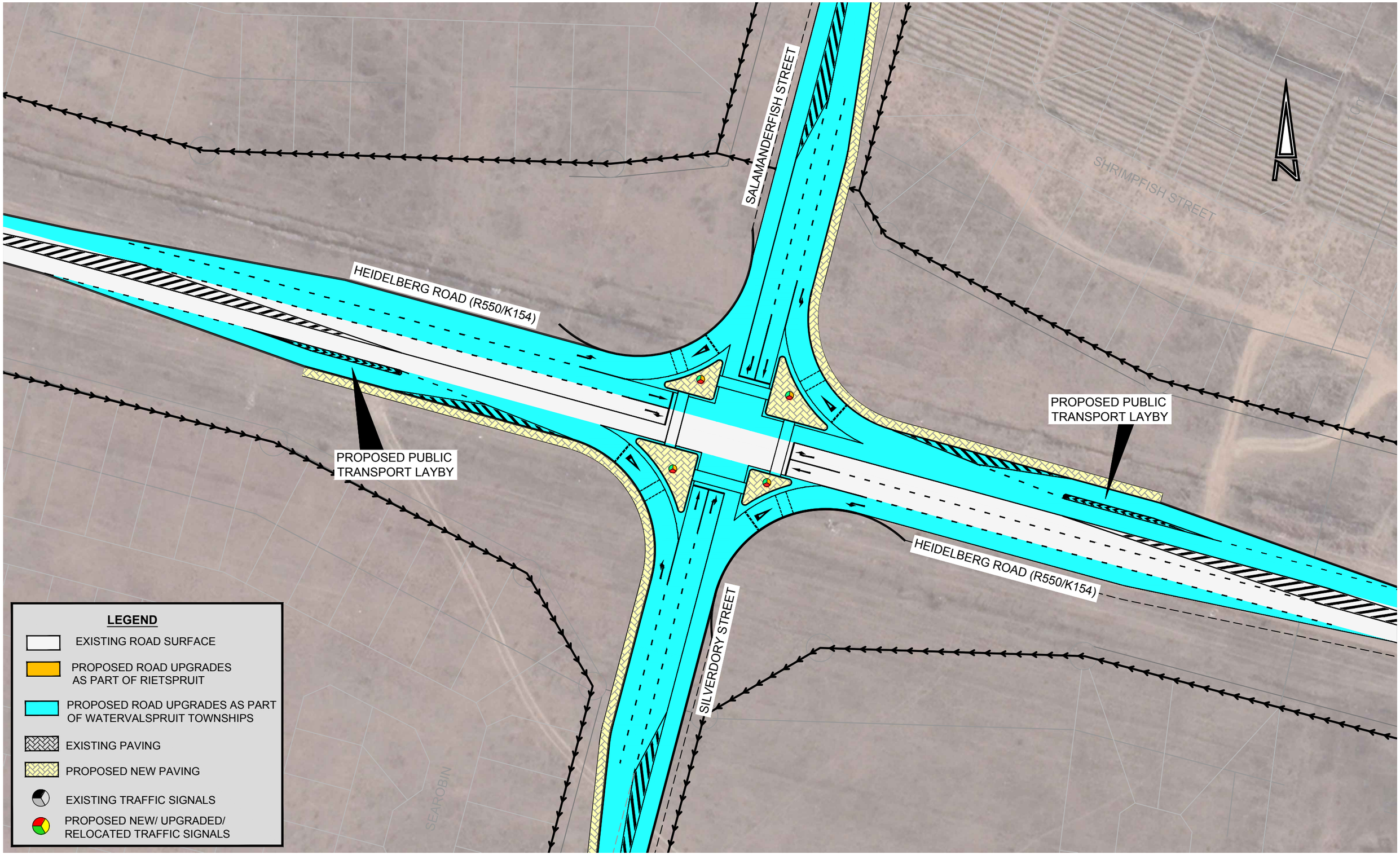
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:** K91 / Cosmopolitan Drive [Intersection 13]: PHASE 2

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN: -	DRAWN: V MTHOMBENI	DATE: 2021/10/27
PROJECT No: **P0573**	DRAWING No: **0573/CL/03b**	REV: -



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

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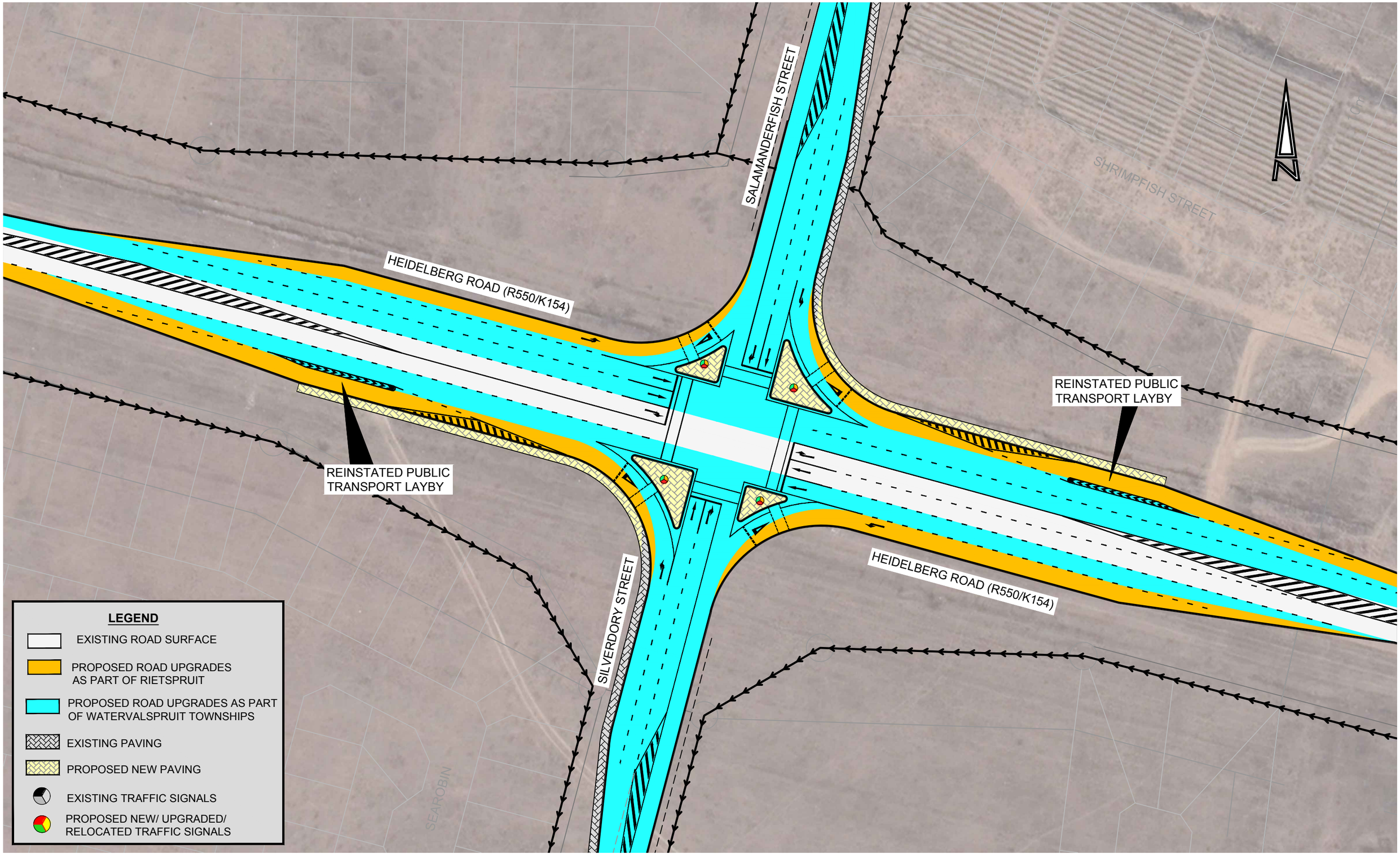
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:** Heidelberg Road (R550/K154) / Silverdory Street / Salamanderfish Street [Intersection 14]: PHASE 1

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27
PROJECT No:	DRAWING No:	REV:
P0573	0573/CL/04a	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

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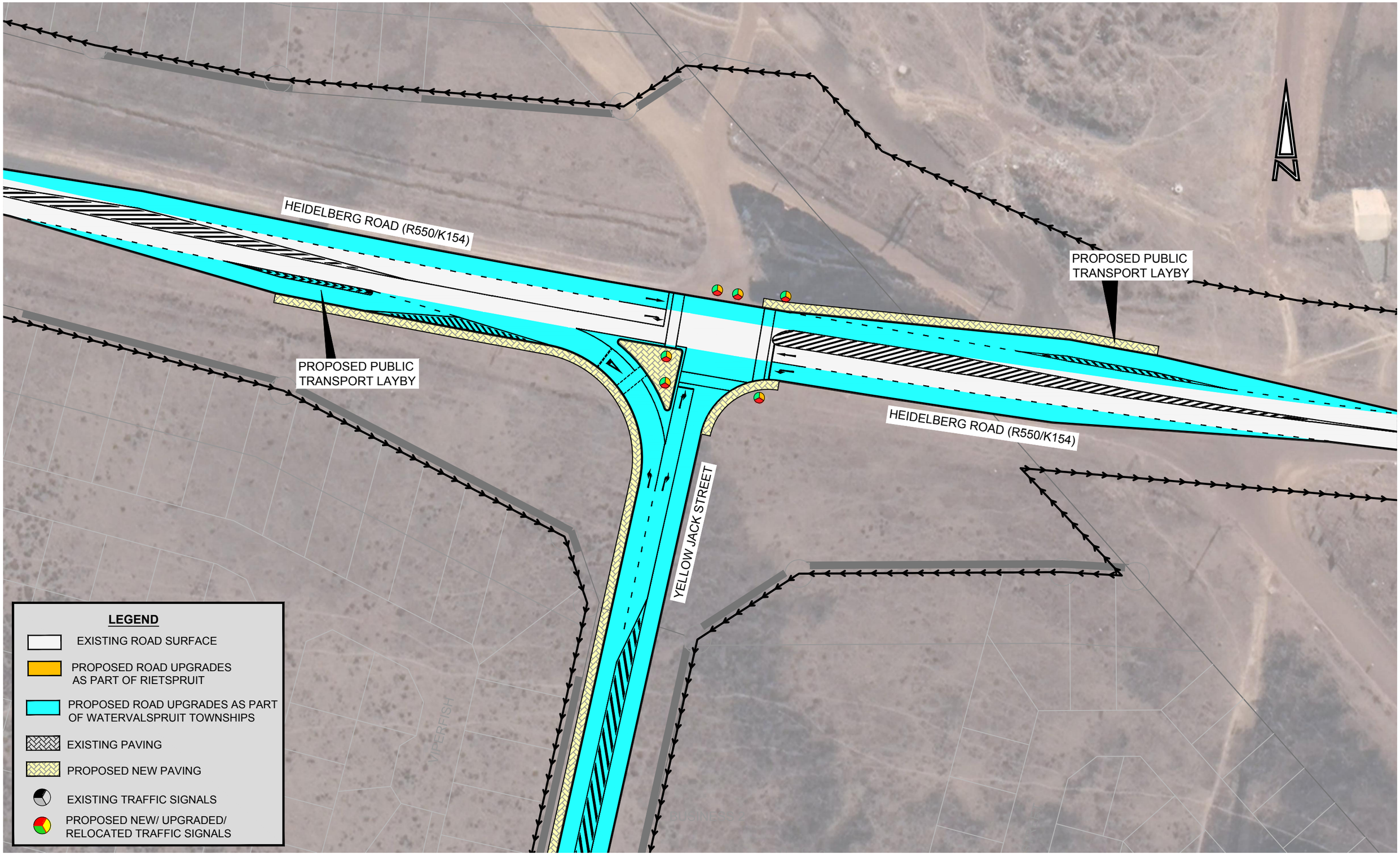
dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:** Heidelberg Road (R550/K154) / Silverdory Street / Salamanderfish Street [Intersection 14]: PHASE 2

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN: -	DRAWN: V MTHOMBENI	DATE: 2021/10/27
PROJECT No: P0573	DRAWING No: 0573/CL/04b	REV: -



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

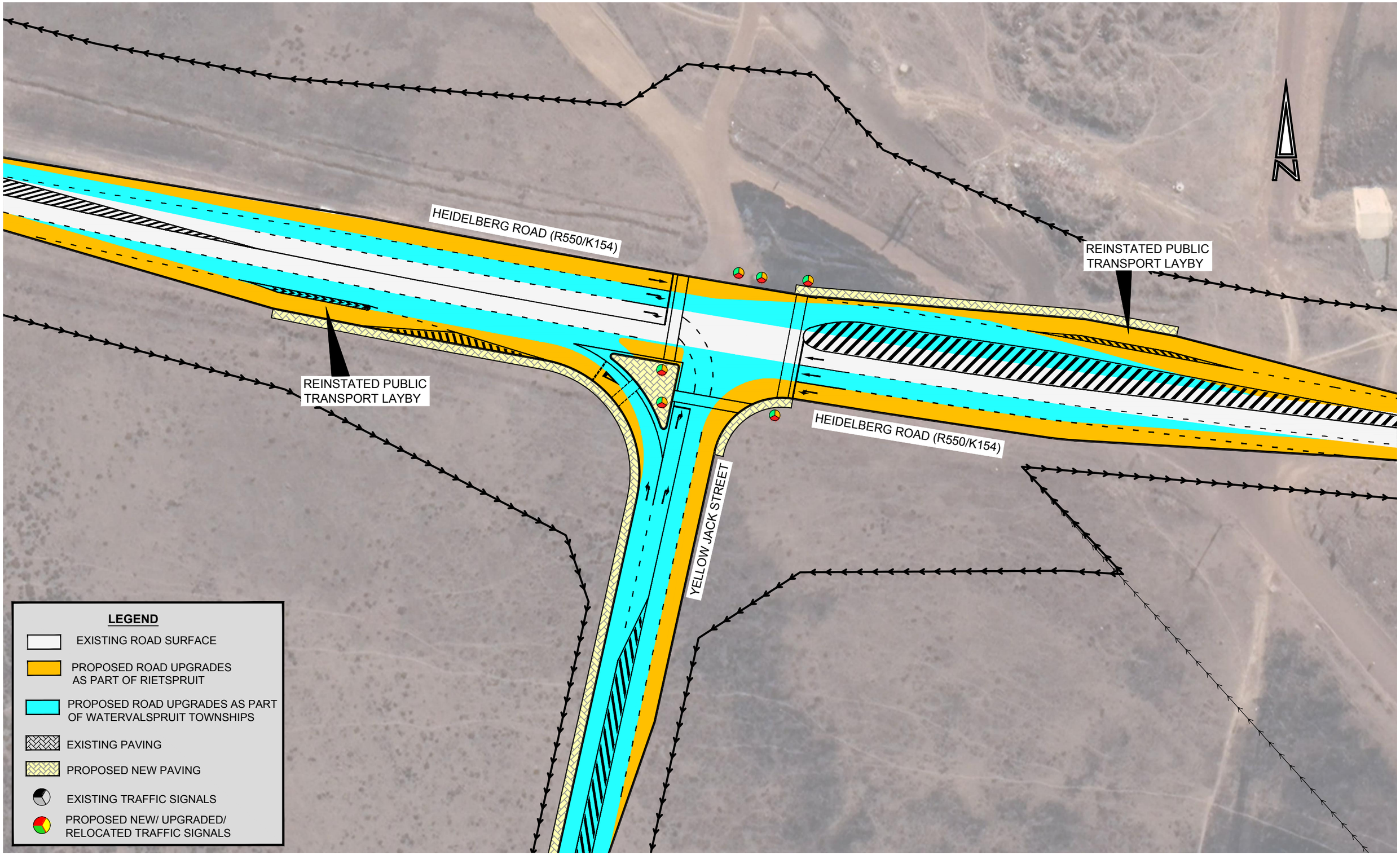
Dhubecon Consulting Engineers
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:**
Heidelberg Road (R550/K154) / Yellow Jack Street
[Intersection 15]: PHASE 1

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27
PROJECT No:	DRAWING No:	REV:
P0573	**0573/CL/05a**	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

Dhubecon Consulting Engineers
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

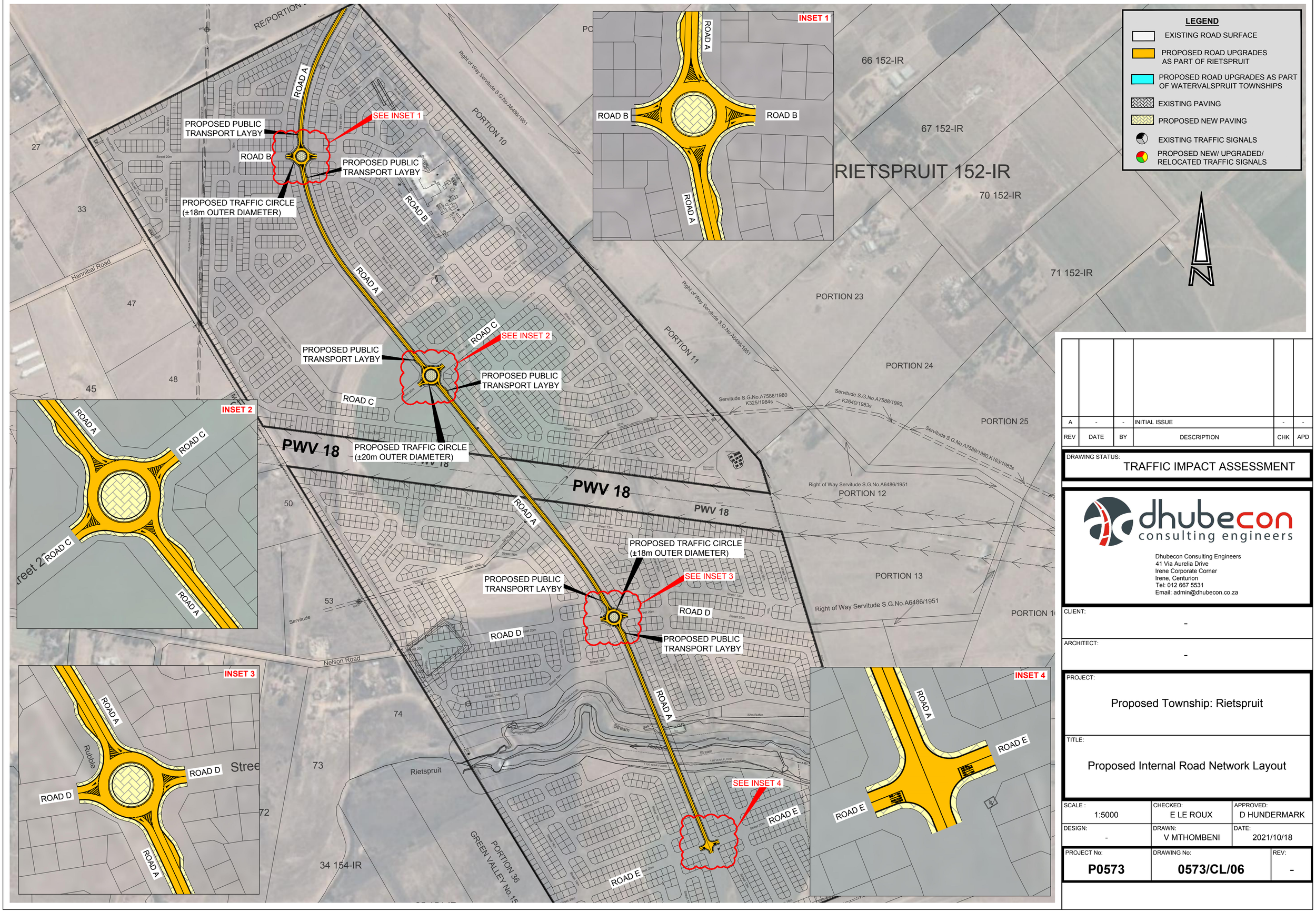
dhubecon consulting engineers

PROJECT: Proposed Township: Rietspruit

TITLE: **Proposed Intersection Upgrade:**
Heidelberg Road (R550/K154) / Yellow Jack Street
[Intersection 15]: PHASE 2

SCALE :	CHECKED:	APPROVED:
1:750	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/27

PROJECT No:	DRAWING No:	REV:
P0573	**0573/CL/05b**	-



REV	DATE	BY	DESCRIPTION	CHK	APD
A	-	-	INITIAL ISSUE	-	-

DRAWING STATUS: TRAFFIC IMPACT ASSESSMENT

dhubecon consulting engineers

Dhubecon Consulting Engineers
41 Via Aurelia Drive
Irene Corporate Corner
Irene, Centurion
Tel: 012 667 5531
Email: admin@dhubecon.co.za

CLIENT: -

ARCHITECT: -

PROJECT: Proposed Township: Rietspruit

TITLE: Proposed Internal Road Network Layout

SCALE :	CHECKED:	APPROVED:
1:5000	E LE ROUX	D HUNDERMARK
DESIGN:	DRAWN:	DATE:
-	V MTHOMBENI	2021/10/18

PROJECT No:	DRAWING No:	REV:
P0573	0573/CL/06	-

Annexures

Annexure A	Town Planner's Proposed Township Layout Plan
Annexure B	Relevant Outputs of the SIDRA Intersection 9 Capacity Analyses

Annexure A

Town Planner's Proposed Township Layout Plan

PROPOSED TOWNSHIP

RIETSPRUIT

Situated on Part of Portion 8 of the farm

RIETSPRUIT 152-IR

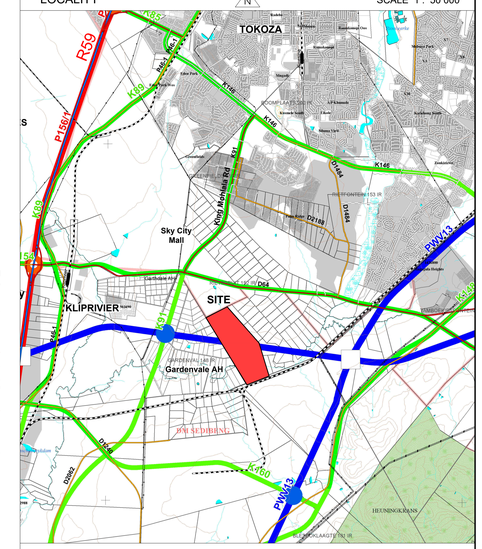
USES	No. OF ERVEN	ERF NUMBERS	AREA (ha)	%
Residential 1	3782	1-3782	72,5267	44.64
Institutional	3	3783-3785	10,6737	6.57
Utilities	27	3786-3812	4,7179	2.91
Community Facility	1	3813	0,8137	0.50
Cemetery	2	3814-3815	3,4317	2.11
Transport (Railway)	2	3816-3817	1,8181	1.12
Open Space	11	3818-3828	12,9647	7.98
Transport (Public Road)			55,5136	34.17
TOTAL	3828		162,4601	100.00

NOTES:

1.) All measurements are approximate.
2.) Township boundary
3.) 100 year FLOOD Line
50 year FLOOD Line
32m Buffer
4.) Line of No Access

LOCALITY

SCALE 1 : 50 000



GEOTECHNICAL INVESTIGATION BY INTRACONSULT,
CONSULTING ENGINEERING GEOLOGISTS
DATE: AUGUST 2021 REF.NO: IR1733

PRESUMED BOUNDARY OF SITE CLASS SUB-AREA

2(H1(H2)/C/S) PRELIMINARY NHBRC SITE CLASS

TP1 TRIAL HOLES POSITION AND NUMBER

25/10/2021

DR. D BUTTRICK Date

CONTOURS
The contours were obtained from: E.G. SWART, SVR LAND SURVEYORS
Contour Interval: 0,5 m
Datum Plan: WGS84

FLOOD LINE:
In terms of the Regulations of Article 144 (Act 36 of 1998), it is hereby stated that this township is affected by a flood with an expected frequency of one every 50 years and one every 100 years in the public stream.

1:50 YR ANN. & 100 YR FLOODLINES HEREWITH CERTIFIED
Pr.ENGINEER M. JANSEN, INFRACONSULT ENGINEERING
2006/80/91
ECSA Pr.Eng No.
DATE 12/09/2021

Sonja Meissner-Roloff
Town & Environmental Planning
P.O. Box 7194
Centurion
0046
Highveld Office Park
Charles de Gaulle Crescent
Highveld
Centurion
Cell: 082 451 9585
Tel: (012) 665-2330
E-mail: smeissner@icon.co.za

PLAN NUMBER: SMR577 / p5 DATE: OCTOBER 2021

SCALE: 1 : 3 000 (A0)

0 100m 200m 300m

Annexure B

Relevant Outputs of the SIDRA Intersection 9 Capacity Analyses:

B1 Heidelberg Road (R550/K154) & K91 [Intersection 5]

B2 Heidelberg Road (R550/K154) / Kingfish Street / Garthview Street [Intersection 12]

B3 K91 / Cosmopolitan Drive [Intersection 13]

B4 Heidelberg Road (R550/K154) / Silver Dory Street / Salamanderfish Street [Intersection 14]

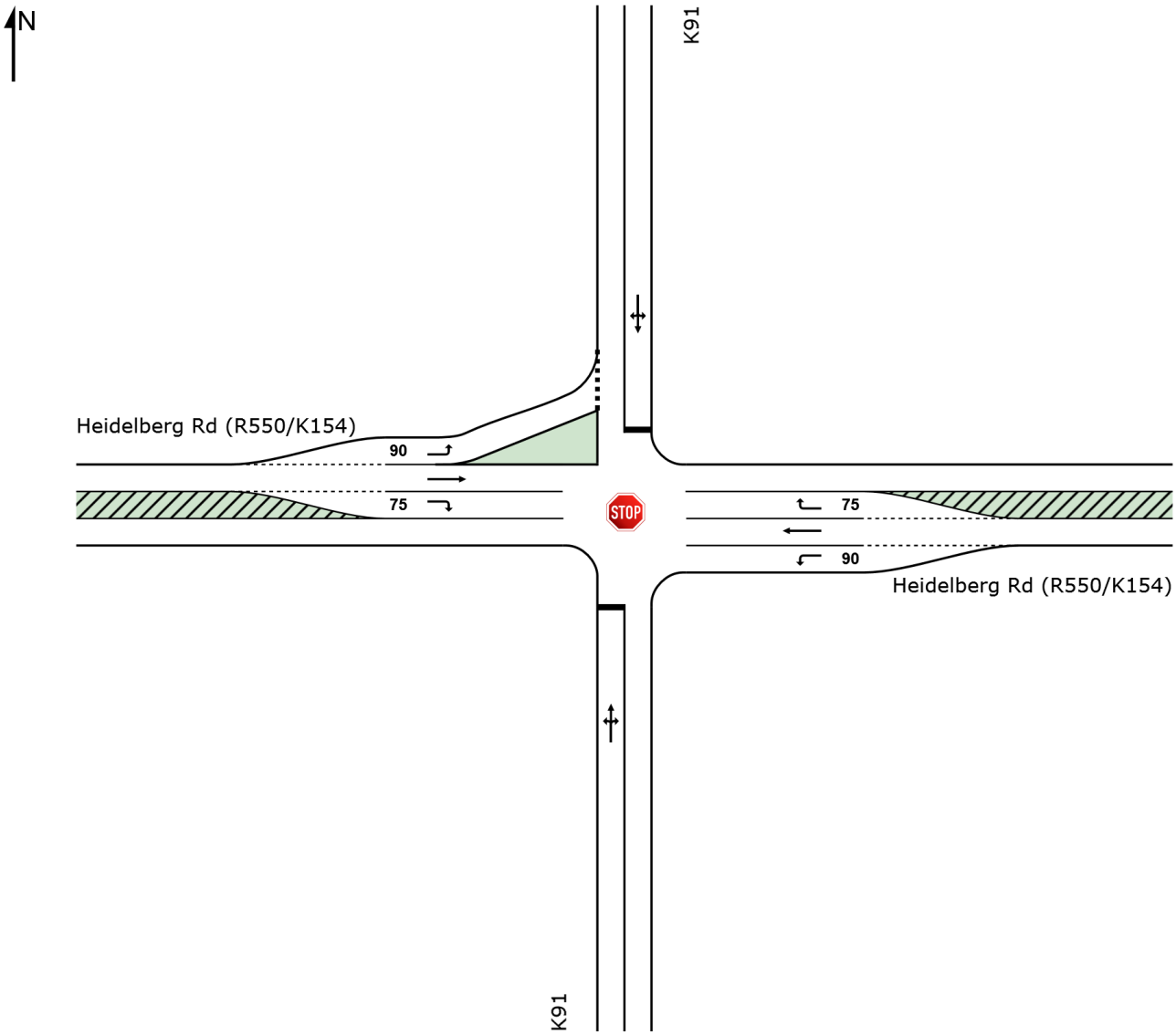
B5 Heidelberg Road (R550/K154) / Yellow Jack Street [Intersection 15]

ANNEXURE B1: SITE LAYOUT

Existing Intersection Geometry

New Site
Site Category: (None)
Stop (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B1.1: MOVEMENT SUMMARY

Site: [Scenario 1 AM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	21	0.0	22	0.0	0.036	9.6	LOS A	0.1	0.9	0.42	0.88	0.42	50.6
2	T1	2	0.0	2	0.0	0.036	15.6	LOS C	0.1	0.9	0.42	0.88	0.42	50.6
3	R2	1	0.0	1	0.0	0.036	20.0	LOS C	0.1	0.9	0.42	0.88	0.42	50.7
Approach		24	0.0	25	0.0	0.036	10.5	LOS B	0.1	0.9	0.42	0.88	0.42	50.6
East: Heidelberg Rd (R550/K154)														
4	L2	7	0.0	7	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
5	T1	287	0.0	302	0.0	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	38	0.0	40	0.0	0.027	6.0	LOS A	0.1	0.8	0.30	0.56	0.30	52.4
Approach		332	0.0	349	0.0	0.147	0.8	NA	0.1	0.8	0.03	0.08	0.03	58.8
North: K91														
7	L2	78	0.0	82	0.0	1.214	205.4	LOS F	73.3	513.1	1.00	4.45	12.67	13.8
8	T1	23	0.0	24	0.0	1.214	241.4	LOS F	73.3	513.1	1.00	4.45	12.67	13.8
9	R2	472	0.0	497	0.0	1.214	201.6	LOS F	73.3	513.1	1.00	4.45	12.67	13.8
Approach		573	0.0	603	0.0	1.214	203.7	LOS F	73.3	513.1	1.00	4.45	12.67	13.8
West: Heidelberg Rd (R550/K154)														
10	L2	162	0.0	171	0.0	0.108	5.7	LOS A	0.5	3.2	0.12	0.52	0.12	53.9
11	T1	189	0.0	199	0.0	0.096	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	5	0.0	5	0.0	0.005	6.7	LOS A	0.0	0.1	0.37	0.57	0.37	52.2
Approach		356	0.0	375	0.0	0.108	2.7	LOS A	0.5	3.2	0.06	0.24	0.06	56.9
All Vehicles		1285	0.0	1353	0.0	1.214	92.0	NA	73.3	513.1	0.48	2.09	5.68	23.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ANNEXURE B1.2: MOVEMENT SUMMARY

Site: [Scenario 1 PM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	12	0.0	13	0.0	0.120	8.9	LOS A	0.4	2.9	0.56	0.93	0.56	46.3
2	T1	19	0.0	20	0.0	0.120	19.9	LOS C	0.4	2.9	0.56	0.93	0.56	46.4
3	R2	6	0.0	6	0.0	0.120	26.7	LOS D	0.4	2.9	0.56	0.93	0.56	46.5
Approach		37	0.0	39	0.0	0.120	17.4	LOS C	0.4	2.9	0.56	0.93	0.56	46.4
East: Heidelberg Rd (R550/K154)														
4	L2	2	0.0	2	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
5	T1	174	0.0	183	0.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	106	0.0	112	0.0	0.089	6.8	LOS A	0.4	2.7	0.44	0.64	0.44	52.0
Approach		282	0.0	297	0.0	0.089	2.6	NA	0.4	2.7	0.16	0.25	0.16	56.6
North: K91														
7	L2	69	0.0	73	0.0	1.292	291.8	LOS F	47.3	331.1	1.00	3.83	11.00	9.9
8	T1	25	0.0	26	0.0	1.292	311.5	LOS F	47.3	331.1	1.00	3.83	11.00	9.9
9	R2	169	0.0	178	0.0	1.292	309.8	LOS F	47.3	331.1	1.00	3.83	11.00	9.9
Approach		263	0.0	277	0.0	1.292	305.3	LOS F	47.3	331.1	1.00	3.83	11.00	9.9
West: Heidelberg Rd (R550/K154)														
10	L2	417	0.0	439	0.0	0.300	6.1	LOS A	1.5	10.6	0.28	0.55	0.28	53.3
11	T1	353	0.0	372	0.0	0.180	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	33	0.0	35	0.0	0.029	6.2	LOS A	0.1	0.8	0.29	0.57	0.29	52.4
Approach		803	0.0	845	0.0	0.300	3.5	LOS A	1.5	10.6	0.16	0.31	0.16	56.0
All Vehicles		1385	0.0	1458	0.0	1.292	61.0	NA	47.3	331.1	0.33	0.98	2.23	29.6

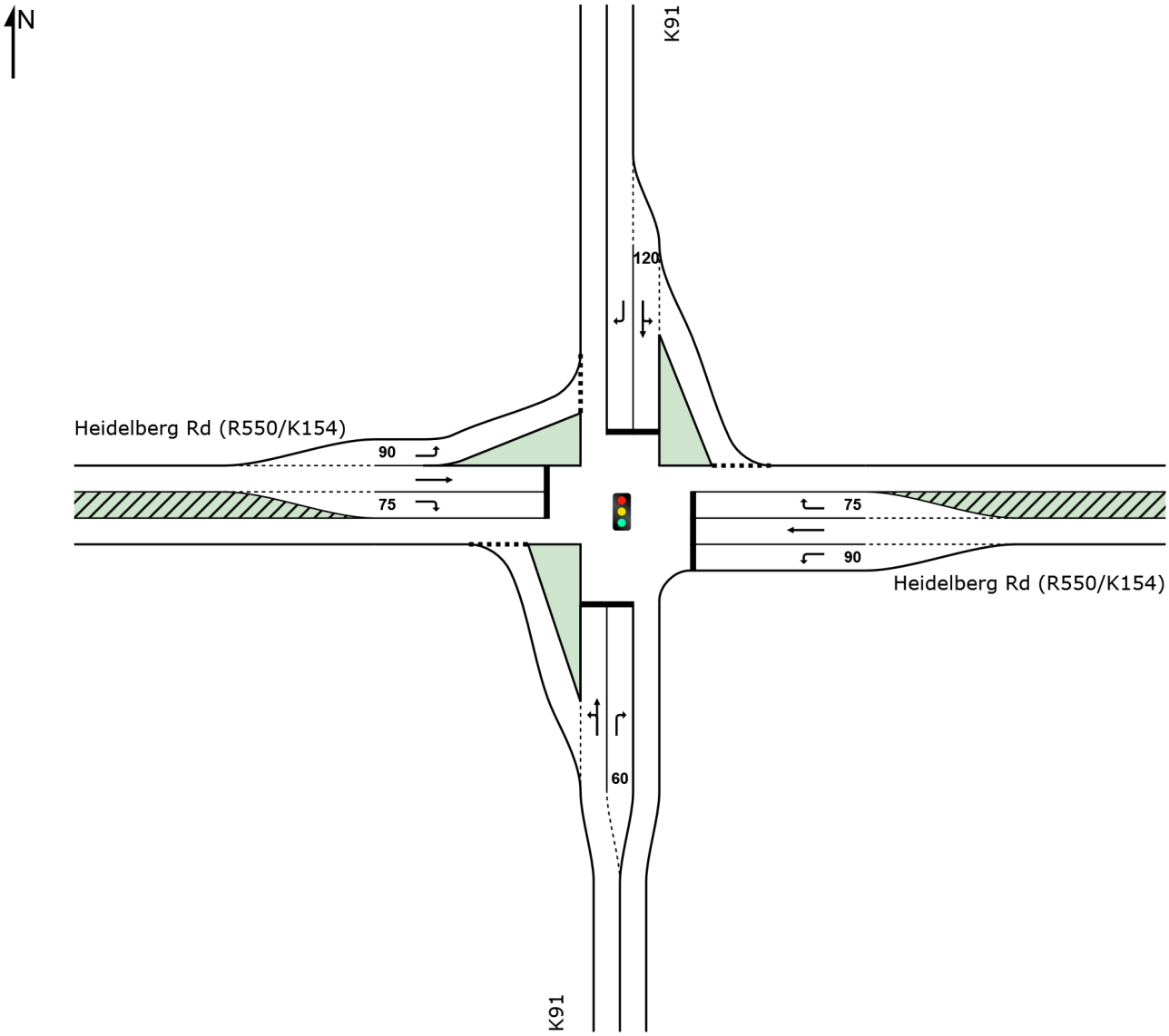
Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ANNEXURE B1: SITE LAYOUT

Upgraded Intersection Geometry (Approved & to be Constructed in Due Course)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B1.3: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (Approved & to be Constructed in Due Course))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	29	0.0	29	0.0	0.149	24.8	LOS C	0.9	6.0	0.92	0.70	0.92	43.0
2	T1	10	0.0	10	0.0	0.149	19.2	LOS B	0.9	6.0	0.92	0.70	0.92	43.4
3	R2	8	0.0	8	0.0	0.013	22.5	LOS C	0.2	1.4	0.63	0.65	0.63	43.1
Approach		47	0.0	47	0.0	0.149	23.2	LOS C	0.9	6.0	0.87	0.69	0.87	43.1
East: Heidelberg Rd (R550/K154)														
4	L2	27	0.0	27	0.0	0.029	19.4	LOS B	0.6	4.3	0.58	0.67	0.58	44.5
5	T1	913	0.0	913	0.0	0.951	48.6	LOS D	51.0	357.2	1.00	1.21	1.38	33.3
6	R2	610	0.0	610	0.0	* 1.295	303.5	LOS F	80.2	561.5	1.00	1.88	3.68	9.4
Approach		1550	0.0	1550	0.0	1.295	148.4	LOS F	80.2	561.5	0.99	1.46	2.27	16.7
North: K91														
7	L2	375	0.0	375	0.0	0.346	9.2	LOS A	5.2	36.5	0.39	0.63	0.39	51.8
8	T1	39	0.0	39	0.0	0.346	3.6	LOS A	5.2	36.5	0.39	0.63	0.39	52.5
9	R2	877	0.0	877	0.0	* 1.123	167.6	LOS F	89.1	623.7	1.00	1.55	2.52	15.7
Approach		1291	0.0	1291	0.0	1.123	116.6	LOS F	89.1	623.7	0.80	1.25	1.83	20.2
West: Heidelberg Rd (R550/K154)														
10	L2	346	0.0	346	0.0	0.253	9.8	LOS A	4.4	31.1	0.45	0.69	0.45	51.1
11	T1	538	0.0	538	0.0	* 1.111	153.8	LOS F	51.1	357.8	1.00	1.84	2.50	16.7
12	R2	22	0.0	22	0.0	0.199	50.5	LOS D	0.9	6.6	0.99	0.69	0.99	32.2
Approach		906	0.0	906	0.0	1.111	96.3	LOS F	51.1	357.8	0.79	1.37	1.68	22.9
All Vehicles		3794	0.0	3794	0.0	1.295	123.6	LOS F	89.1	623.7	0.88	1.36	1.96	19.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.3: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (Approved & to be Constructed in Due Course))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

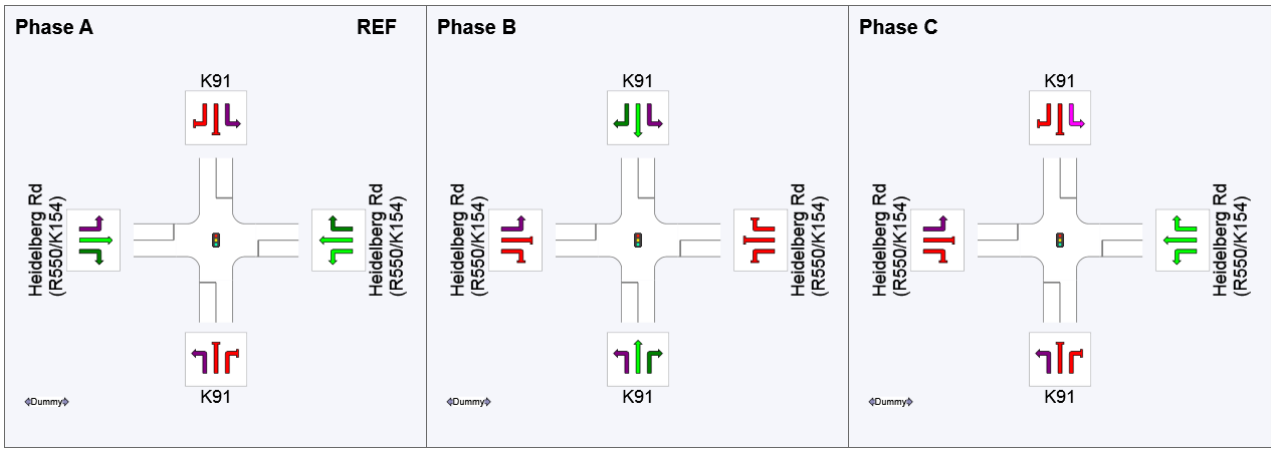
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

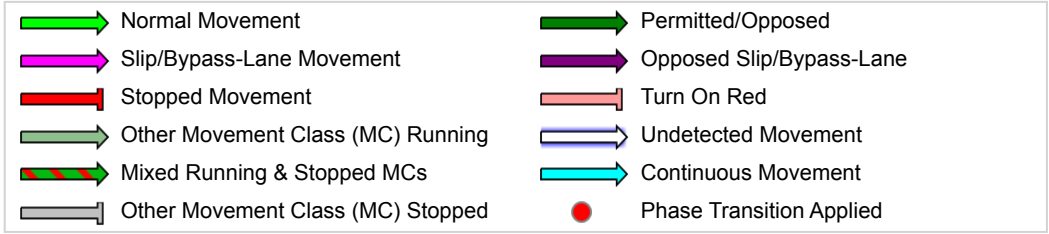
Phase	A	B	C
Phase Change Time (sec)	0	23	63
Green Time (sec)	19	33	15
Phase Time (sec)	26	40	19
Phase Split	31%	47%	22%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B1.4: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (Approved & to be Constructed in Due Course))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	30	0.0	30	0.0	0.250	33.1	LOS C	2.4	17.0	0.89	0.71	0.89	39.9
2	T1	38	0.0	38	0.0	0.250	27.5	LOS C	2.4	17.0	0.89	0.71	0.89	40.3
3	R2	24	0.0	24	0.0	0.067	41.5	LOS D	1.0	6.9	0.83	0.70	0.83	35.2
Approach		92	0.0	92	0.0	0.250	33.0	LOS C	2.4	17.0	0.88	0.71	0.88	38.7
East: Heidelberg Rd (R550/K154)														
4	L2	10	0.0	10	0.0	0.007	12.3	LOS B	0.2	1.2	0.37	0.62	0.37	48.8
5	T1	520	0.0	520	0.0	0.370	9.0	LOS A	12.1	84.6	0.50	0.44	0.50	52.2
6	R2	391	0.0	391	0.0	* 1.024	88.5	LOS F	23.5	164.6	1.00	1.17	1.83	20.7
Approach		921	0.0	921	0.0	1.024	42.8	LOS D	23.5	164.6	0.71	0.75	1.06	31.7
North: K91														
7	L2	563	0.0	563	0.0	0.742	28.8	LOS C	18.6	130.4	0.86	0.97	0.86	40.6
8	T1	38	0.0	38	0.0	0.742	23.2	LOS C	18.6	130.4	0.86	0.97	0.86	41.0
9	R2	399	0.0	399	0.0	* 0.974	83.1	LOS F	28.3	198.0	1.00	1.10	1.57	25.1
Approach		1000	0.0	1000	0.0	0.974	50.2	LOS D	28.3	198.0	0.92	1.02	1.15	32.7
West: Heidelberg Rd (R550/K154)														
10	L2	825	0.0	825	0.0	0.598	11.3	LOS B	15.3	107.2	0.60	0.76	0.60	50.1
11	T1	937	0.0	937	0.0	* 0.962	56.2	LOS E	61.9	433.0	1.00	1.18	1.33	31.2
12	R2	44	0.0	44	0.0	0.094	21.8	LOS C	1.2	8.7	0.58	0.70	0.58	43.2
Approach		1806	0.0	1806	0.0	0.962	34.9	LOS C	61.9	433.0	0.81	0.98	0.98	38.0
All Vehicles		3819	0.0	3819	0.0	1.024	40.8	LOS D	61.9	433.0	0.81	0.93	1.04	34.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.4: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (Approved & to be Constructed in Due Course))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

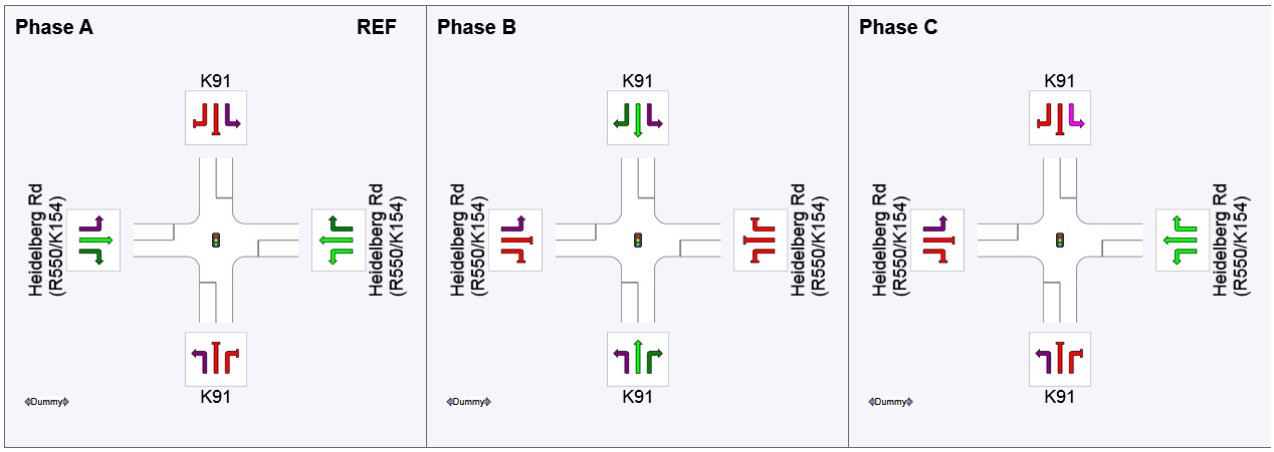
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

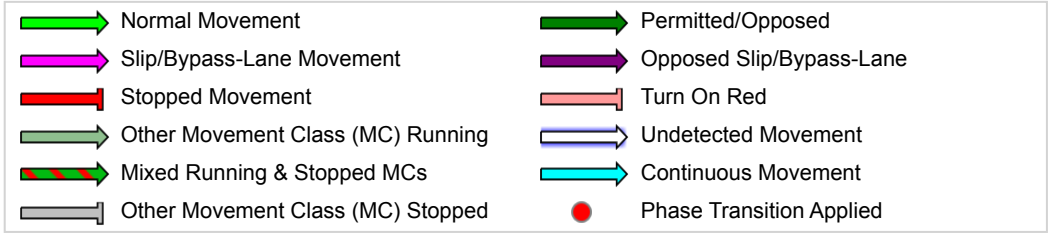
Phase	A	B	C
Phase Change Time (sec)	0	54	84
Green Time (sec)	50	23	14
Phase Time (sec)	57	30	18
Phase Split	54%	29%	17%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

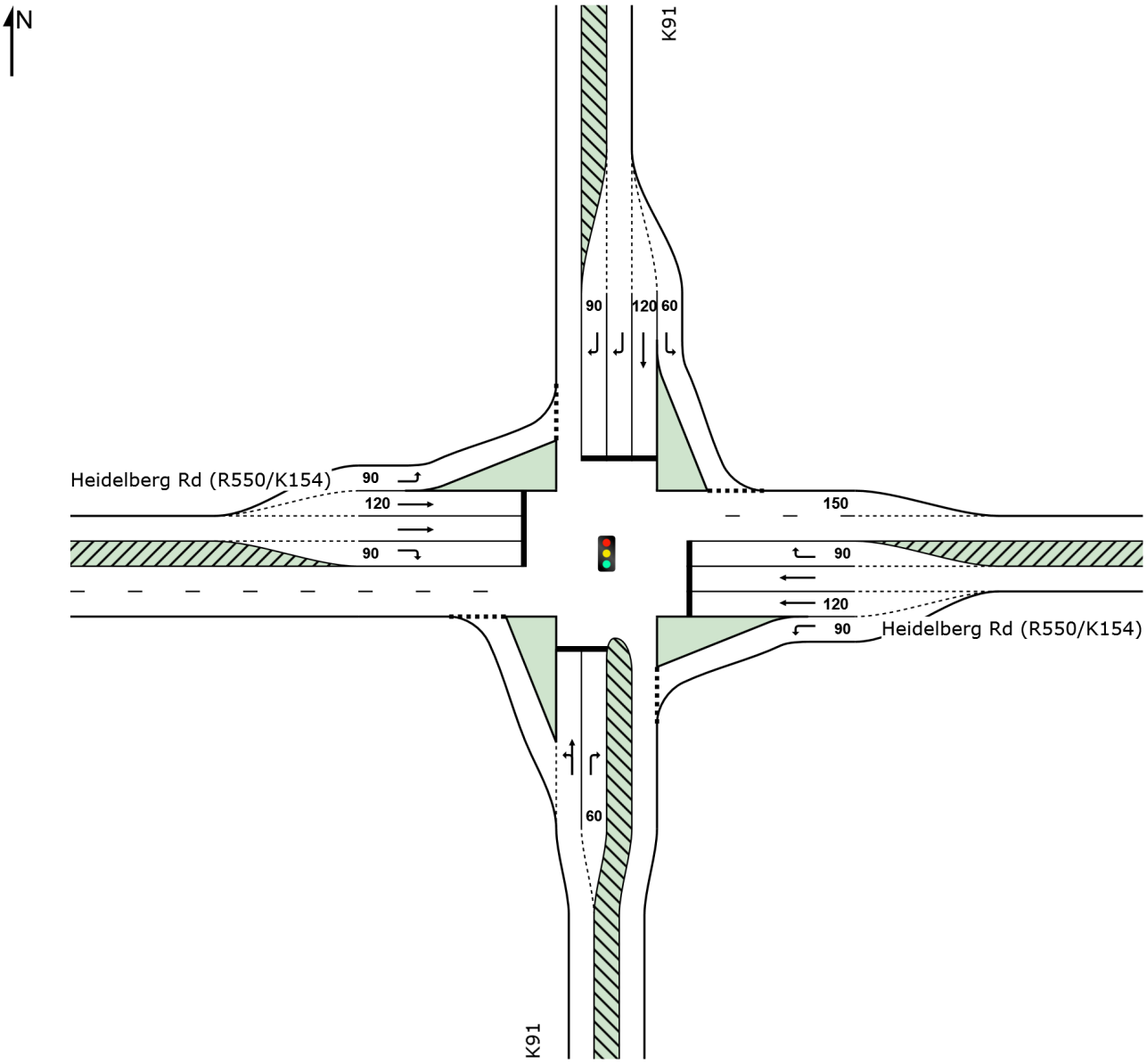


ANNEXURE B1: SITE LAYOUT

Upgraded Intersection Geometry (PHASE 1)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B1.5: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 95 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	29	0.0	29	0.0	0.093	21.3	LOS C	0.8	5.5	0.80	0.68	0.80	44.9
2	T1	10	0.0	10	0.0	*0.093	15.7	LOS B	0.8	5.5	0.80	0.68	0.80	45.3
3	R2	8	0.0	8	0.0	0.051	51.1	LOS D	0.4	2.5	0.95	0.66	0.95	32.4
Approach		47	0.0	47	0.0	0.093	25.2	LOS C	0.8	5.5	0.83	0.67	0.83	42.2
East: Heidelberg Rd (R550/K154)														
4	L2	27	0.0	27	0.0	0.018	6.3	LOS A	0.1	0.7	0.18	0.58	0.18	53.7
5	T1	913	0.0	913	0.0	0.425	16.3	LOS B	13.4	93.7	0.69	0.60	0.69	47.4
6	R2	610	0.0	610	0.0	*0.871	38.3	LOS D	26.4	184.8	1.00	0.97	1.18	36.6
Approach		1550	0.0	1550	0.0	0.871	24.8	LOS C	26.4	184.8	0.80	0.75	0.87	42.5
North: K91														
7	L2	375	0.0	375	0.0	0.267	8.8	LOS A	3.8	26.6	0.30	0.64	0.30	52.5
8	T1	39	0.0	39	0.0	0.050	21.1	LOS C	1.2	8.1	0.68	0.51	0.68	44.7
9	R2	877	0.0	877	0.0	*0.875	52.3	LOS D	22.7	159.2	1.00	0.97	1.25	32.0
Approach		1291	0.0	1291	0.0	0.875	38.7	LOS D	22.7	159.2	0.79	0.86	0.96	36.5
West: Heidelberg Rd (R550/K154)														
10	L2	346	0.0	346	0.0	0.382	13.1	LOS B	5.6	39.5	0.63	0.74	0.63	48.9
11	T1	538	0.0	538	0.0	*0.853	46.9	LOS D	14.9	104.4	1.00	0.93	1.18	34.1
12	R2	22	0.0	22	0.0	0.135	44.5	LOS D	0.9	6.5	0.89	0.72	0.89	34.2
Approach		906	0.0	906	0.0	0.853	34.0	LOS C	14.9	104.4	0.86	0.86	0.96	38.6
All Vehicles		3794	0.0	3794	0.0	0.875	31.7	LOS C	26.4	184.8	0.81	0.81	0.92	39.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.5: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 95 seconds (Site Optimum Cycle Time - Minimum Delay)

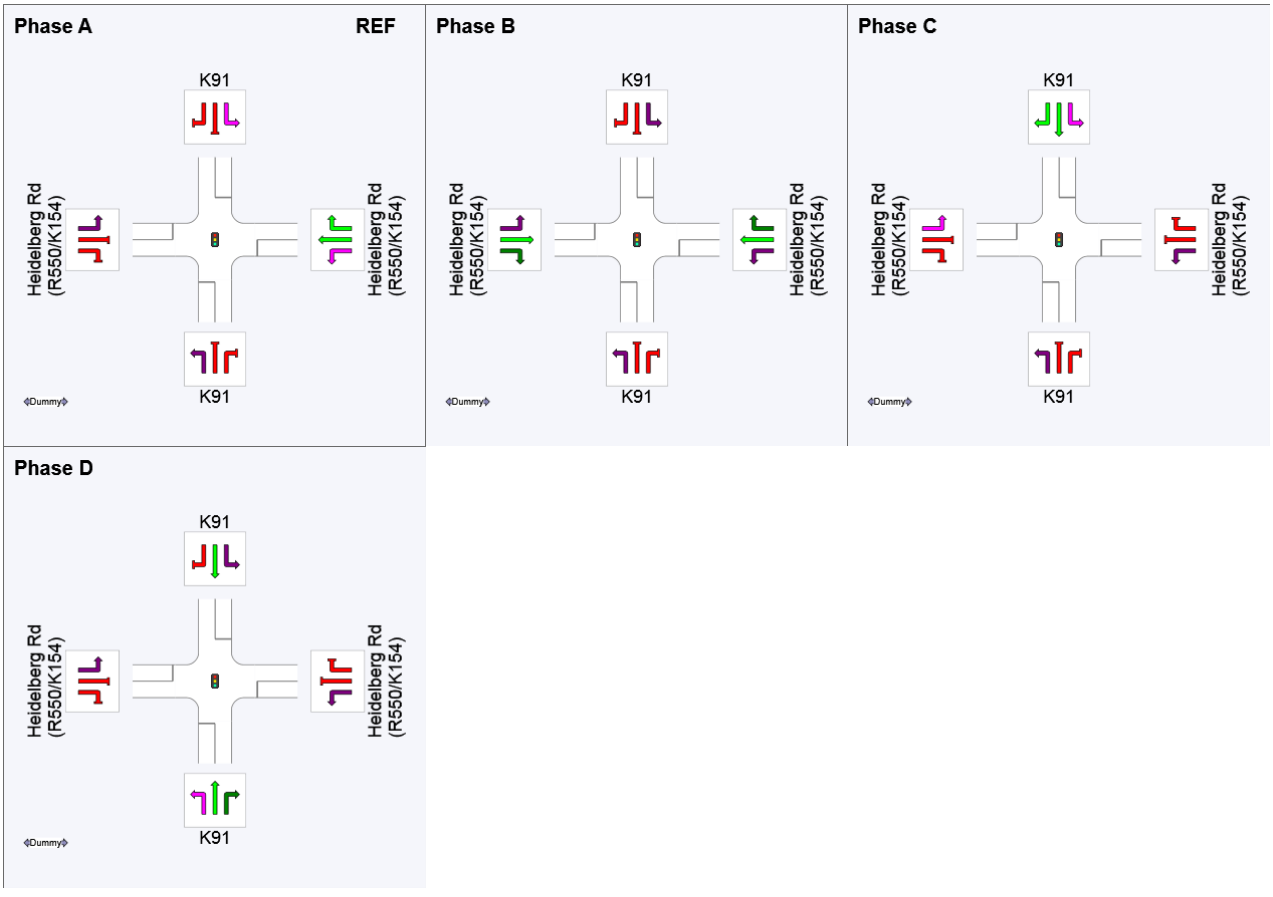
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	35	54	84
Green Time (sec)	28	15	23	7
Phase Time (sec)	32	22	27	14
Phase Split	34%	23%	28%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1.6: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	30	0.0	30	0.0	0.219	22.0	LOS C	1.5	10.2	0.90	0.70	0.90	45.4
2	T1	38	0.0	38	0.0	*0.219	16.4	LOS B	1.5	10.2	0.90	0.70	0.90	45.9
3	R2	24	0.0	24	0.0	0.112	37.8	LOS D	0.8	5.5	0.94	0.70	0.94	36.7
Approach		92	0.0	92	0.0	0.219	23.8	LOS C	1.5	10.2	0.91	0.70	0.91	42.9
East: Heidelberg Rd (R550/K154)														
4	L2	10	0.0	10	0.0	0.007	6.5	LOS A	0.0	0.3	0.22	0.58	0.22	53.5
5	T1	520	0.0	520	0.0	0.226	9.4	LOS A	4.7	33.0	0.57	0.48	0.57	52.0
6	R2	391	0.0	391	0.0	*0.745	22.0	LOS C	8.7	60.8	0.97	0.87	1.07	43.7
Approach		921	0.0	921	0.0	0.745	14.7	LOS B	8.7	60.8	0.74	0.65	0.78	48.1
North: K91														
7	L2	563	0.0	563	0.0	0.495	16.1	LOS B	7.4	51.9	0.57	0.76	0.57	50.0
8	T1	38	0.0	38	0.0	0.064	20.4	LOS C	1.0	6.8	0.77	0.57	0.77	45.0
9	R2	399	0.0	399	0.0	*0.844	45.2	LOS D	7.8	54.3	1.00	0.98	1.40	34.2
Approach		1000	0.0	1000	0.0	0.844	27.9	LOS C	7.8	54.3	0.75	0.84	0.91	42.0
West: Heidelberg Rd (R550/K154)														
10	L2	825	0.0	825	0.0	0.643	9.6	LOS A	10.9	76.2	0.62	0.76	0.62	51.2
11	T1	937	0.0	937	0.0	*0.821	29.7	LOS C	18.3	128.4	0.97	0.91	1.08	41.4
12	R2	44	0.0	44	0.0	0.126	26.1	LOS C	1.1	8.0	0.77	0.72	0.77	41.2
Approach		1806	0.0	1806	0.0	0.821	20.4	LOS C	18.3	128.4	0.81	0.84	0.86	45.3
All Vehicles		3819	0.0	3819	0.0	0.844	21.1	LOS C	18.3	128.4	0.78	0.79	0.85	45.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.6: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

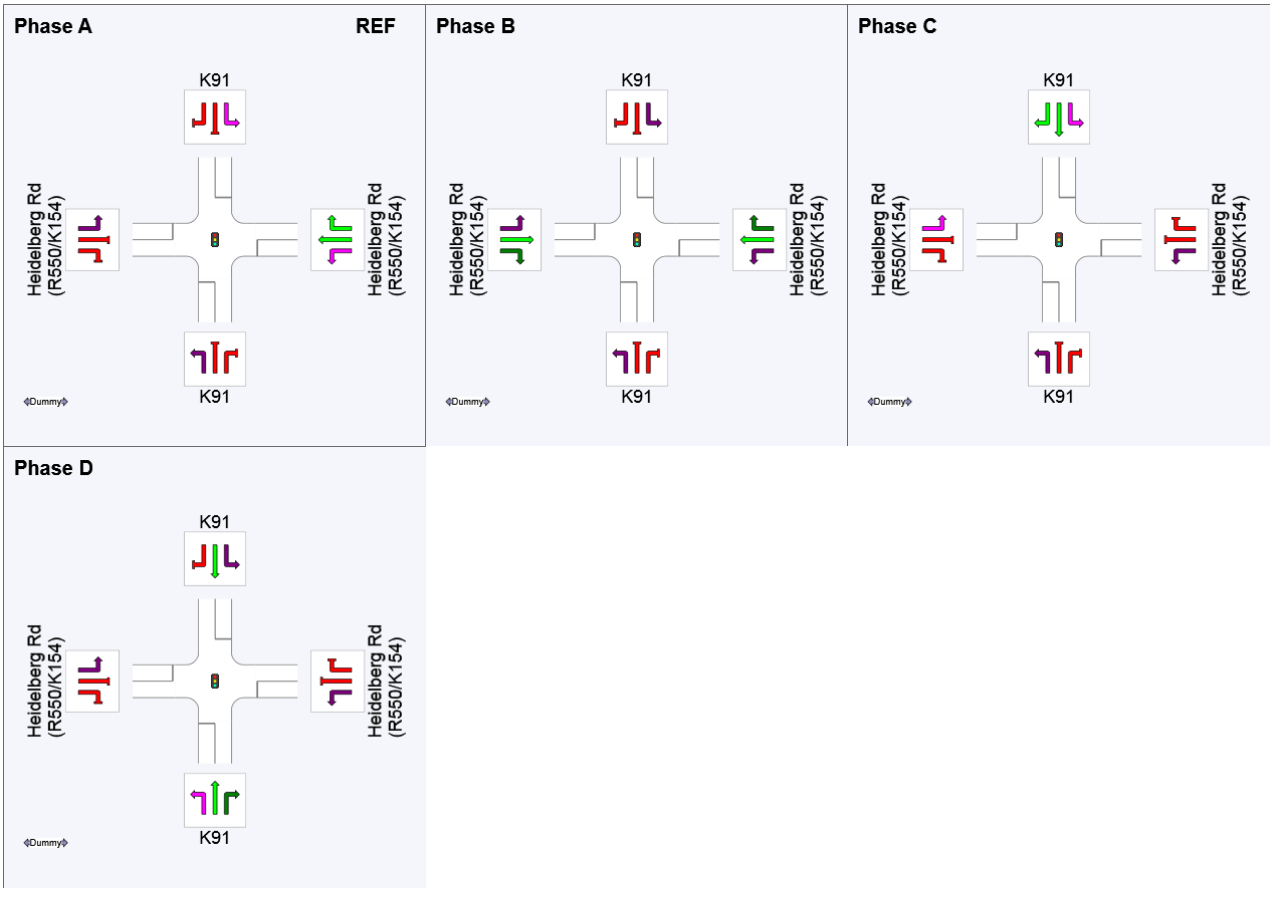
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	20	44	59
Green Time (sec)	13	20	8	7
Phase Time (sec)	17	27	12	14
Phase Split	24%	39%	17%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1.7: MOVEMENT SUMMARY

Site: [Scenario 3 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	31	0.0	31	0.0	0.098	22.3	LOS C	0.9	6.2	0.81	0.68	0.81	44.3
2	T1	10	0.0	10	0.0	*0.098	16.7	LOS B	0.9	6.2	0.81	0.68	0.81	44.8
3	R2	8	0.0	8	0.0	0.053	53.9	LOS D	0.4	2.6	0.96	0.66	0.96	31.6
Approach		49	0.0	49	0.0	0.098	26.3	LOS C	0.9	6.2	0.83	0.68	0.83	41.7
East: Heidelberg Rd (R550/K154)														
4	L2	28	0.0	28	0.0	0.019	6.4	LOS A	0.1	0.9	0.18	0.58	0.18	53.6
5	T1	973	0.0	973	0.0	0.448	17.1	LOS B	15.1	105.7	0.69	0.61	0.69	46.9
6	R2	614	0.0	614	0.0	*0.904	46.4	LOS D	30.6	214.5	1.00	1.01	1.24	33.9
Approach		1615	0.0	1615	0.0	0.904	28.1	LOS C	30.6	214.5	0.80	0.76	0.89	41.0
North: K91														
7	L2	382	0.0	382	0.0	0.276	9.7	LOS A	4.4	30.9	0.32	0.64	0.32	52.1
8	T1	41	0.0	41	0.0	0.052	22.1	LOS C	1.3	9.0	0.68	0.51	0.68	44.1
9	R2	918	0.0	918	0.0	*0.887	55.4	LOS E	25.4	177.6	1.00	0.98	1.26	31.2
Approach		1341	0.0	1341	0.0	0.887	41.4	LOS D	25.4	177.6	0.80	0.87	0.97	35.6
West: Heidelberg Rd (R550/K154)														
10	L2	361	0.0	361	0.0	0.393	13.6	LOS B	6.4	44.9	0.63	0.75	0.63	48.6
11	T1	625	0.0	625	0.0	*0.921	53.9	LOS D	20.0	139.7	1.00	1.01	1.28	32.1
12	R2	22	0.0	22	0.0	0.139	45.4	LOS D	1.0	6.7	0.88	0.72	0.88	33.9
Approach		1008	0.0	1008	0.0	0.921	39.3	LOS D	20.0	139.7	0.87	0.91	1.04	36.6
All Vehicles		4013	0.0	4013	0.0	0.921	35.3	LOS D	30.6	214.5	0.82	0.83	0.95	37.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.7: PHASING SUMMARY

Site: [Scenario 3 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

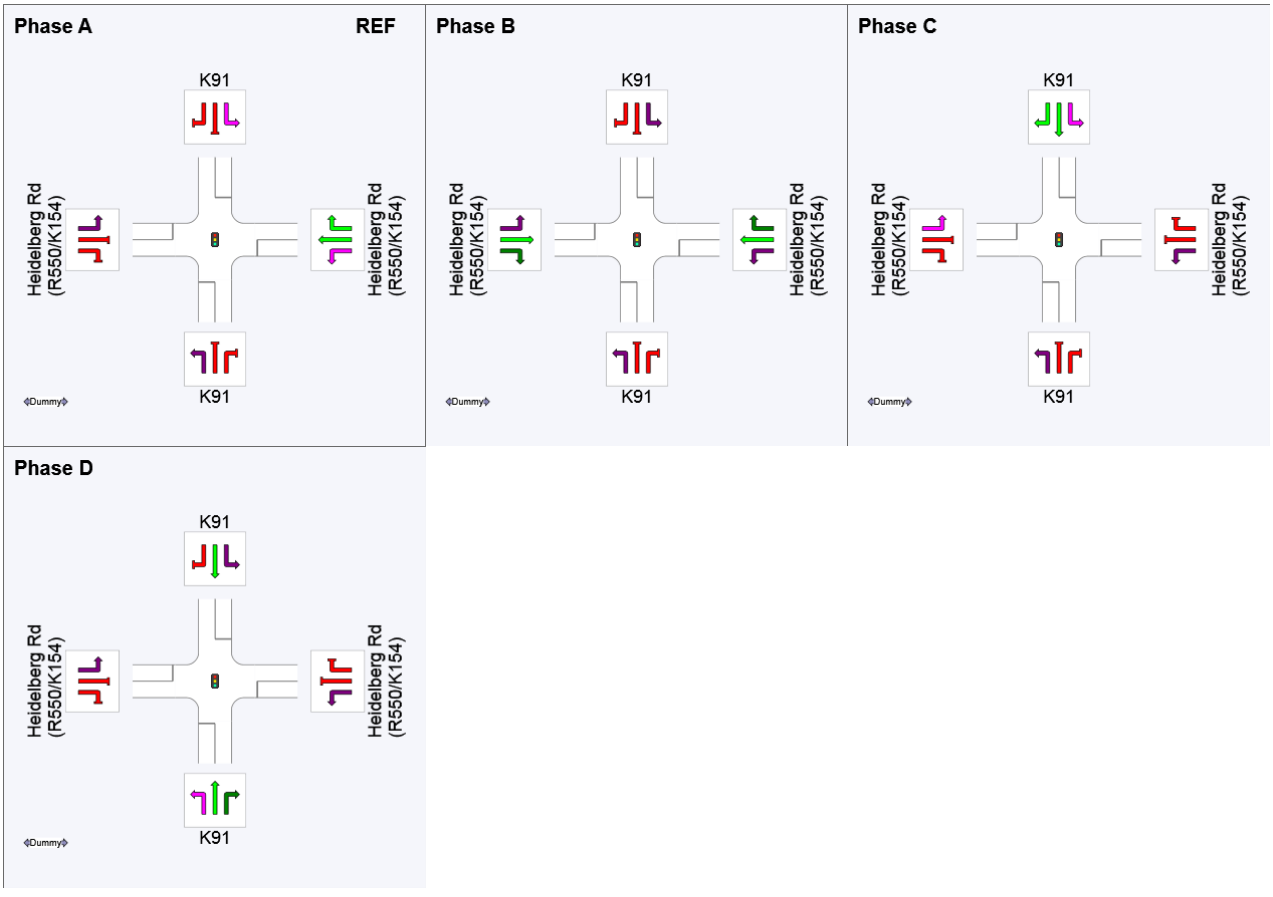
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	36	57	89
Green Time (sec)	29	17	25	7
Phase Time (sec)	33	24	29	14
Phase Split	33%	24%	29%	14%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1.8: MOVEMENT SUMMARY

Site: [Scenario 3 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	31	0.0	31	0.0	0.229	21.7	LOS C	1.5	10.4	0.90	0.71	0.90	45.6
2	T1	40	0.0	40	0.0	*0.229	16.1	LOS B	1.5	10.4	0.90	0.71	0.90	46.1
3	R2	24	0.0	24	0.0	0.112	37.8	LOS D	0.8	5.5	0.94	0.70	0.94	36.7
Approach		95	0.0	95	0.0	0.229	23.4	LOS C	1.5	10.4	0.91	0.70	0.91	43.1
East: Heidelberg Rd (R550/K154)														
4	L2	10	0.0	10	0.0	0.007	6.6	LOS A	0.0	0.3	0.24	0.58	0.24	53.4
5	T1	591	0.0	591	0.0	0.264	10.2	LOS B	5.6	39.5	0.60	0.51	0.60	51.4
6	R2	401	0.0	401	0.0	*0.862	29.1	LOS C	10.9	76.4	1.00	0.98	1.31	40.3
Approach		1002	0.0	1002	0.0	0.862	17.8	LOS B	10.9	76.4	0.76	0.70	0.88	46.3
North: K91														
7	L2	569	0.0	569	0.0	0.508	18.0	LOS B	7.8	54.7	0.59	0.78	0.59	49.5
8	T1	40	0.0	40	0.0	0.064	19.6	LOS B	1.0	7.0	0.76	0.56	0.76	45.5
9	R2	414	0.0	414	0.0	*0.778	41.8	LOS D	7.6	53.5	1.00	0.92	1.24	35.3
Approach		1023	0.0	1023	0.0	0.778	27.7	LOS C	7.8	54.7	0.76	0.83	0.86	42.4
West: Heidelberg Rd (R550/K154)														
10	L2	862	0.0	862	0.0	0.649	8.9	LOS A	9.7	67.6	0.59	0.76	0.59	51.8
11	T1	995	0.0	995	0.0	*0.831	29.9	LOS C	19.6	137.5	0.97	0.92	1.08	41.5
12	R2	47	0.0	47	0.0	0.138	25.5	LOS C	1.2	8.5	0.76	0.72	0.76	41.6
Approach		1904	0.0	1904	0.0	0.831	20.3	LOS C	19.6	137.5	0.79	0.84	0.85	45.6
All Vehicles		4024	0.0	4024	0.0	0.862	21.6	LOS C	19.6	137.5	0.78	0.80	0.86	44.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.8: PHASING SUMMARY

Site: [Scenario 3 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

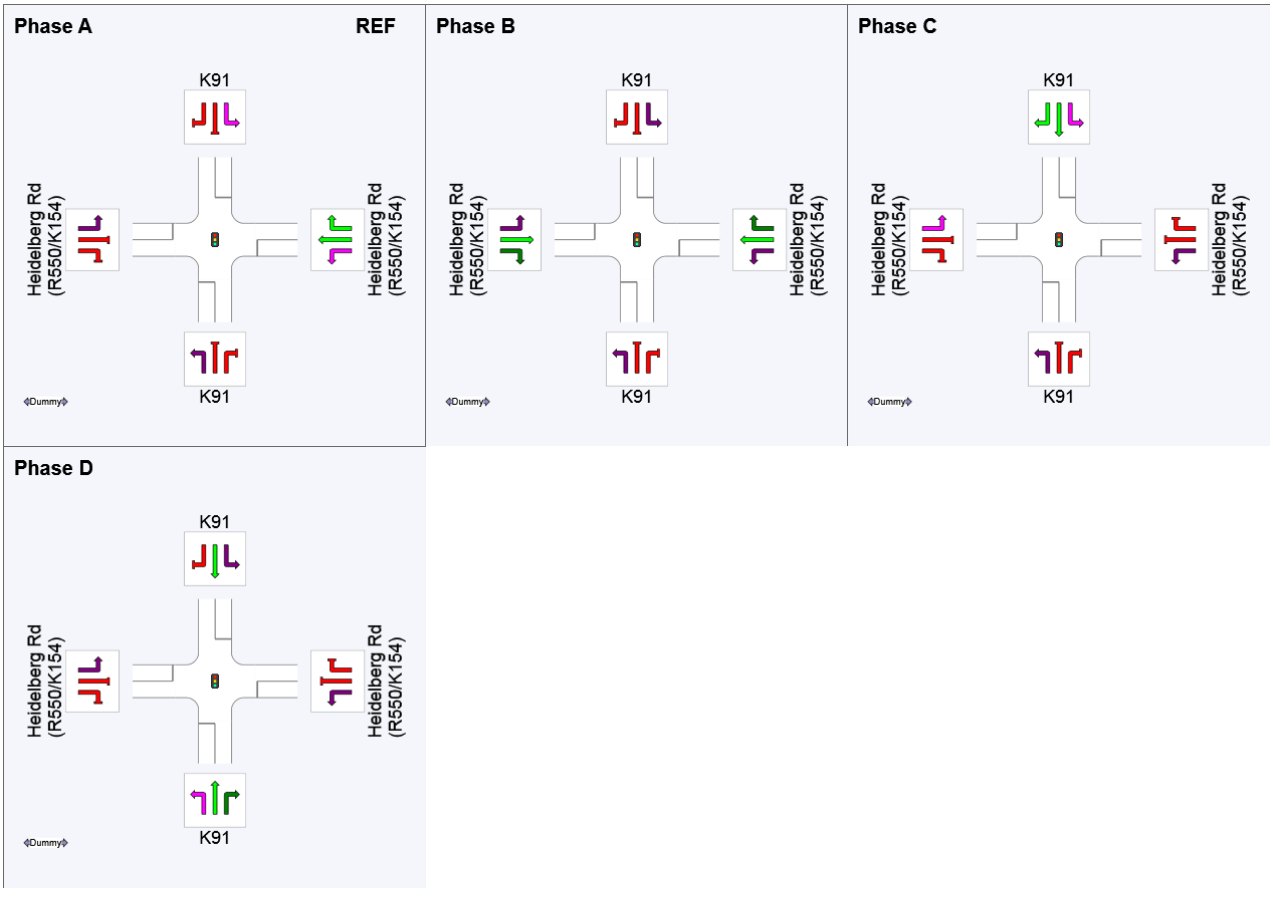
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	18	43	59
Green Time (sec)	11	21	9	7
Phase Time (sec)	15	28	13	14
Phase Split	21%	40%	19%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1.9: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	31	0.0	31	0.0	0.108	24.9	LOS C	1.0	6.8	0.83	0.69	0.83	43.0
2	T1	10	0.0	10	0.0	* 0.108	19.3	LOS B	1.0	6.8	0.83	0.69	0.83	43.4
3	R2	8	0.0	8	0.0	0.059	59.4	LOS E	0.4	2.9	0.96	0.66	0.96	30.2
Approach		49	0.0	49	0.0	0.108	29.4	LOS C	1.0	6.8	0.85	0.68	0.85	40.3
East: Heidelberg Rd (R550/K154)														
4	L2	28	0.0	28	0.0	0.018	6.3	LOS A	0.1	0.8	0.16	0.58	0.16	53.7
5	T1	1374	0.0	1374	0.0	0.527	13.6	LOS B	21.2	148.2	0.63	0.57	0.63	49.1
6	R2	1063	0.0	1063	0.0	* 1.409	414.8	LOS F	184.6	1292.3	1.00	2.01	3.54	7.4
Approach		2465	0.0	2465	0.0	1.409	186.5	LOS F	184.6	1292.3	0.79	1.19	1.88	14.3
North: K91														
7	L2	570	0.0	570	0.0	0.416	11.3	LOS B	6.9	48.3	0.34	0.68	0.34	51.7
8	T1	41	0.0	41	0.0	0.069	31.5	LOS C	1.6	11.3	0.77	0.58	0.77	39.7
9	R2	918	0.0	918	0.0	* 1.284	316.2	LOS F	70.2	491.6	1.00	1.79	3.07	9.4
Approach		1529	0.0	1529	0.0	1.284	194.9	LOS F	70.2	491.6	0.75	1.34	1.99	14.0
West: Heidelberg Rd (R550/K154)														
10	L2	361	0.0	361	0.0	0.394	20.1	LOS C	10.6	74.5	0.65	0.74	0.65	44.7
11	T1	765	0.0	765	0.0	* 1.171	155.7	LOS F	51.5	360.8	1.00	1.55	2.11	16.7
12	R2	22	0.0	22	0.0	0.190	51.2	LOS D	1.1	7.6	0.90	0.73	0.90	32.1
Approach		1148	0.0	1148	0.0	1.171	111.1	LOS F	51.5	360.8	0.89	1.28	1.63	21.1
All Vehicles		5191	0.0	5191	0.0	1.409	170.8	LOS F	184.6	1292.3	0.80	1.25	1.85	15.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.9: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

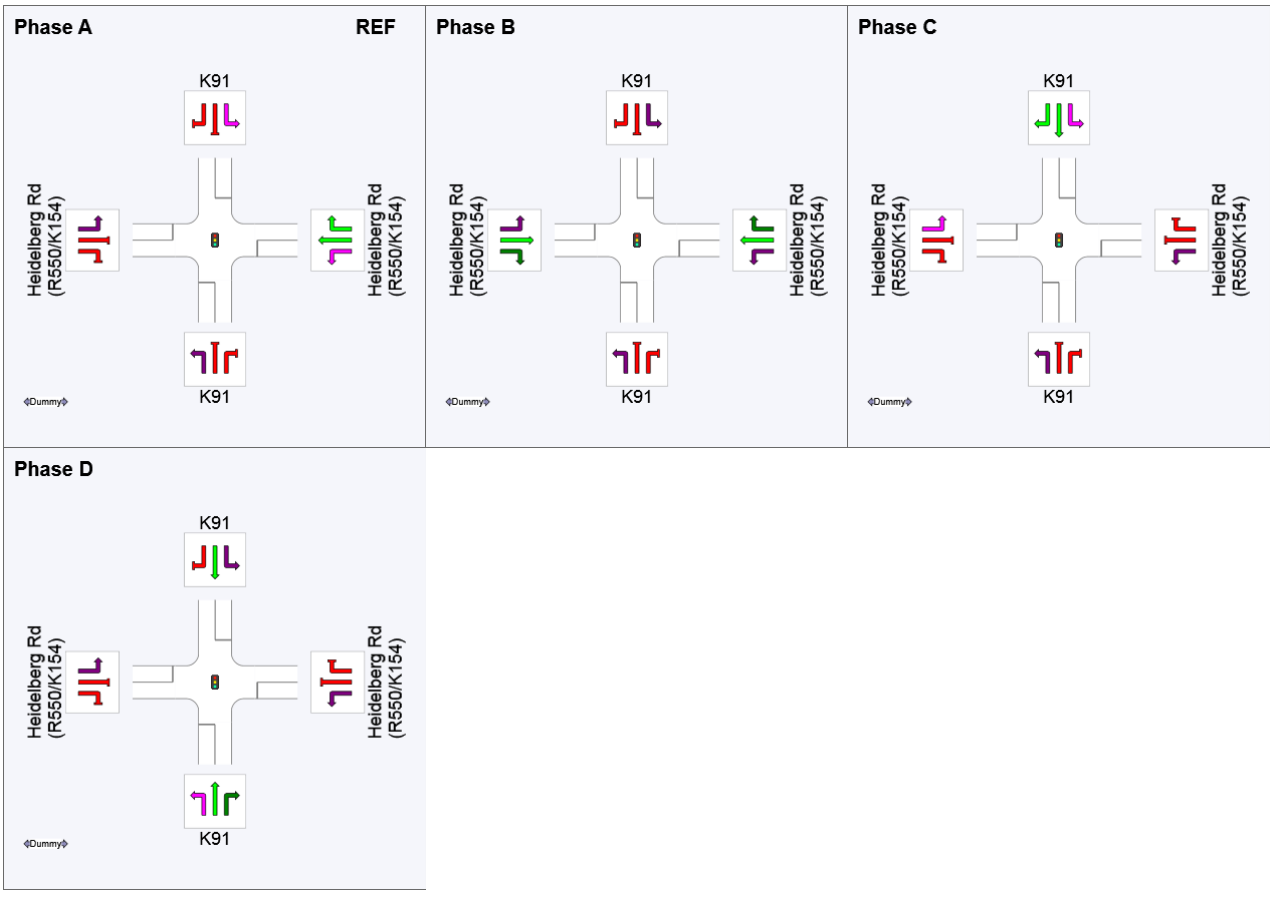
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	51	73	99
Green Time (sec)	44	18	19	7
Phase Time (sec)	48	25	23	14
Phase Split	44%	23%	21%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1.10: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	31	0.0	31	0.0	0.295	29.2	LOS C	2.1	14.6	0.94	0.73	0.94	41.7
2	T1	40	0.0	40	0.0	*0.295	23.6	LOS C	2.1	14.6	0.94	0.73	0.94	42.1
3	R2	24	0.0	24	0.0	0.144	49.1	LOS D	1.0	7.2	0.96	0.70	0.96	33.0
Approach		95	0.0	95	0.0	0.295	31.9	LOS C	2.1	14.6	0.95	0.72	0.95	39.3
East: Heidelberg Rd (R550/K154)														
4	L2	10	0.0	10	0.0	0.007	6.6	LOS A	0.0	0.3	0.21	0.58	0.21	53.5
5	T1	750	0.0	750	0.0	0.277	8.2	LOS A	7.4	51.7	0.49	0.42	0.49	52.9
6	R2	577	0.0	577	0.0	*0.990	74.2	LOS E	34.1	238.6	1.00	1.23	1.65	27.0
Approach		1337	0.0	1337	0.0	0.990	36.7	LOS D	34.1	238.6	0.71	0.77	0.99	37.4
North: K91														
7	L2	954	0.0	954	0.0	0.924	494.8	LOS F	46.4	324.5	0.98	1.12	1.22	35.2
8	T1	40	0.0	40	0.0	0.083	29.9	LOS C	1.4	9.8	0.82	0.61	0.82	40.4
9	R2	414	0.0	414	0.0	*1.001	88.2	LOS F	13.5	94.5	1.00	1.23	1.94	24.4
Approach		1408	0.0	1408	0.0	1.001	362.0	LOS F	46.4	324.5	0.98	1.13	1.42	31.2
West: Heidelberg Rd (R550/K154)														
10	L2	862	0.0	862	0.0	0.682	14.1	LOS B	17.3	120.9	0.68	0.82	0.68	48.2
11	T1	1363	0.0	1363	0.0	*1.083	288.0	LOS F	72.1	504.4	0.98	1.49	1.79	23.3
12	R2	47	0.0	47	0.0	0.152	28.1	LOS C	1.5	10.3	0.72	0.73	0.72	40.3
Approach		2272	0.0	2272	0.0	1.083	178.7	LOS F	72.1	504.4	0.86	1.22	1.35	29.3
All Vehicles		5112	0.0	5112	0.0	1.083	189.3	LOS F	72.1	504.4	0.86	1.07	1.27	31.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.10: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

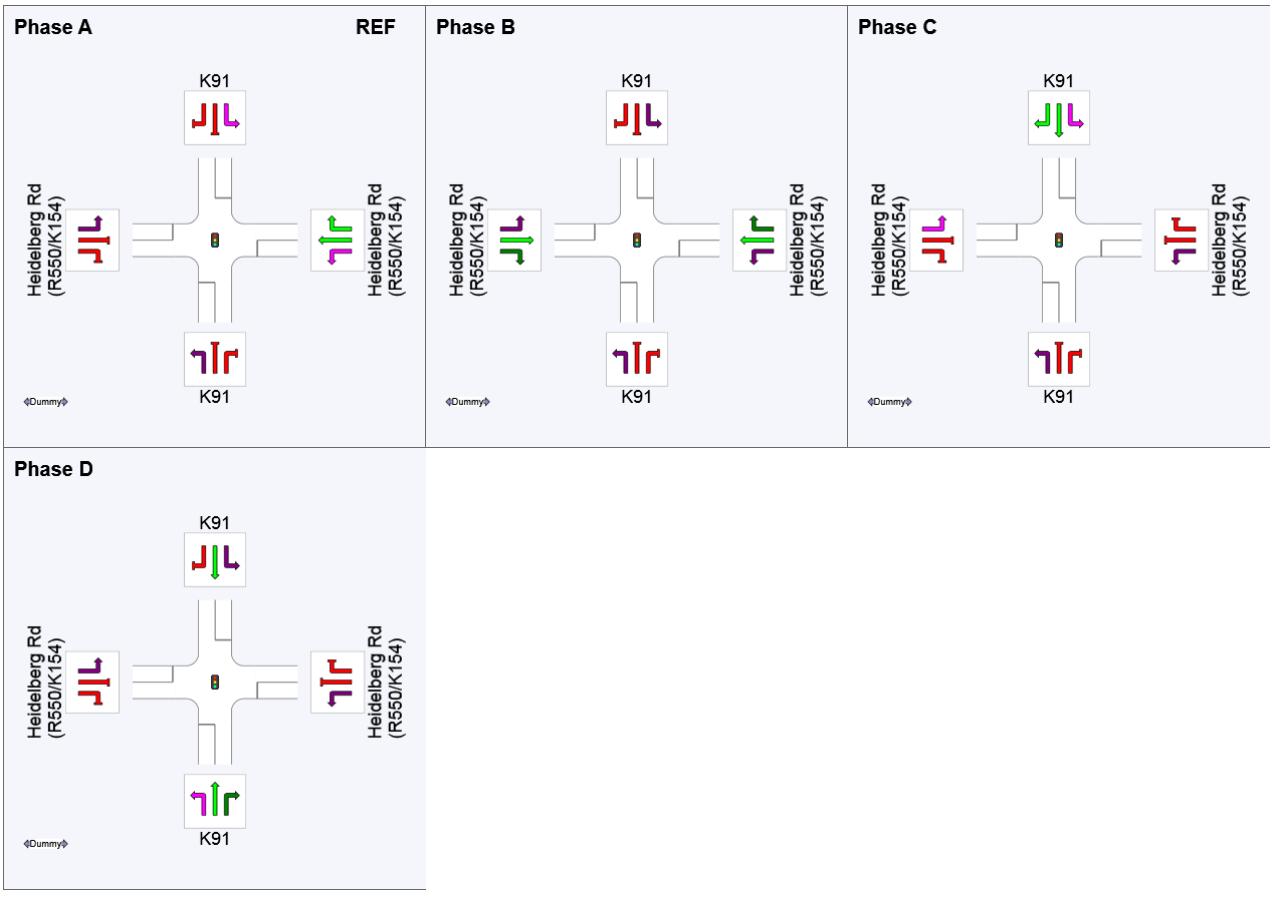
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	28	63	79
Green Time (sec)	21	31	9	7
Phase Time (sec)	25	38	13	14
Phase Split	28%	42%	14%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



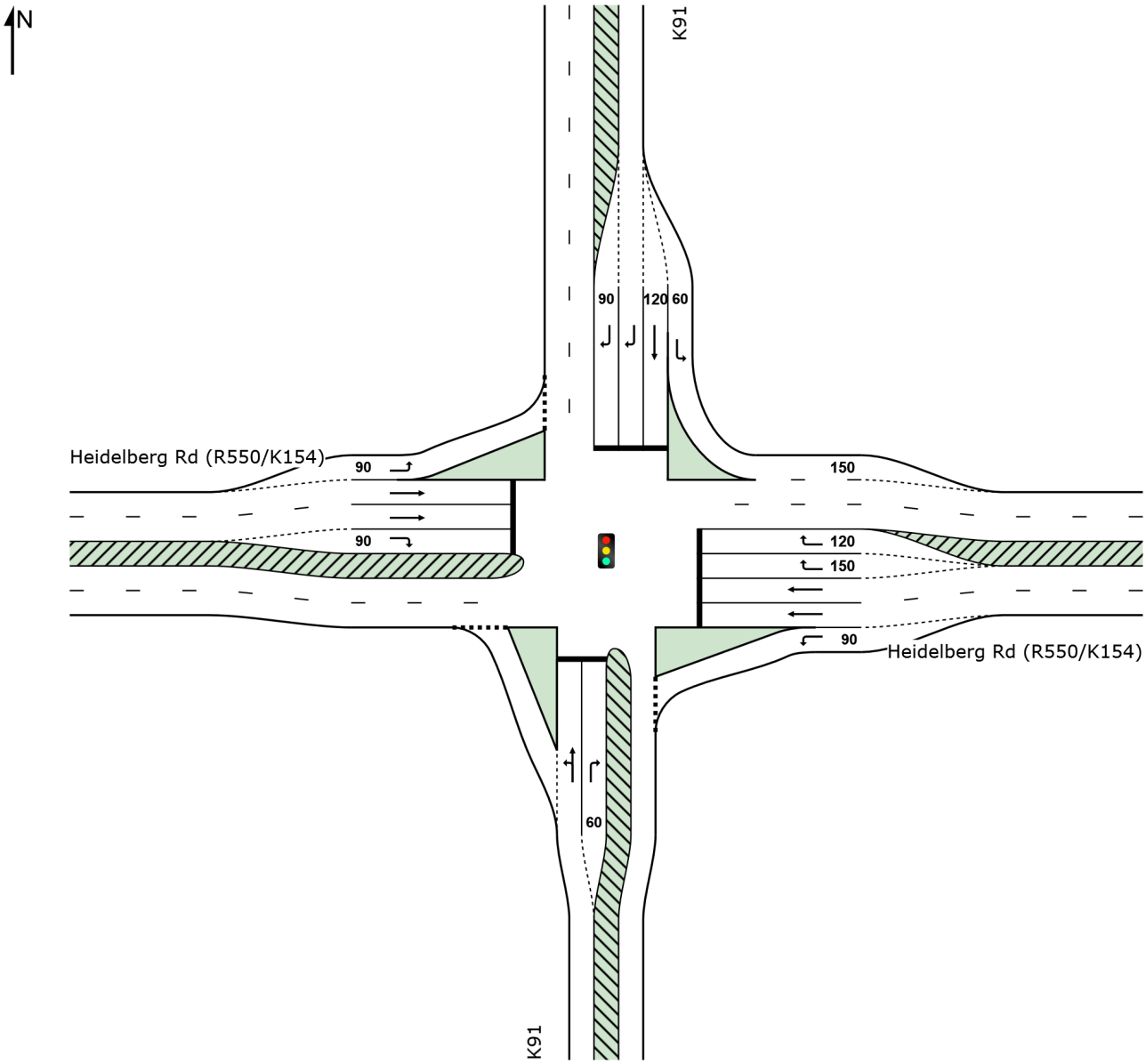
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1: SITE LAYOUT

Upgraded Intersection Geometry (PHASE 2)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B1.11: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	31	0.0	31	0.0	0.104	24.8	LOS C	1.1	7.7	0.82	0.69	0.82	43.0
2	T1	10	0.0	10	0.0	*0.104	19.2	LOS B	1.1	7.7	0.82	0.69	0.82	43.5
3	R2	8	0.0	8	0.0	0.056	56.7	LOS E	0.4	2.8	0.96	0.66	0.96	31.0
Approach		49	0.0	49	0.0	0.104	28.9	LOS C	1.1	7.7	0.84	0.68	0.84	40.5
East: Heidelberg Rd (R550/K154)														
4	L2	28	0.0	28	0.0	0.019	6.3	LOS A	0.1	0.9	0.17	0.58	0.17	53.7
5	T1	1374	0.0	1374	0.0	0.602	19.0	LOS B	24.5	171.4	0.76	0.68	0.76	45.8
6	R2	1063	0.0	1063	0.0	*0.899	56.9	LOS E	31.1	217.9	1.00	0.99	1.25	31.0
Approach		2465	0.0	2465	0.0	0.899	35.2	LOS D	31.1	217.9	0.86	0.82	0.96	38.0
North: K91														
7	L2	570	0.0	570	0.0	0.276	6.9	LOS A	0.0	0.0	0.00	0.53	0.00	54.9
8	T1	41	0.0	41	0.0	0.054	23.7	LOS C	1.4	9.5	0.69	0.52	0.69	43.4
9	R2	918	0.0	918	0.0	*0.904	60.3	LOS E	27.3	191.0	1.00	1.00	1.29	30.0
Approach		1529	0.0	1529	0.0	0.904	39.4	LOS D	27.3	191.0	0.62	0.81	0.79	36.5
West: Heidelberg Rd (R550/K154)														
10	L2	361	0.0	361	0.0	0.268	11.4	LOS B	6.7	47.2	0.42	0.67	0.42	49.9
11	T1	765	0.0	765	0.0	*0.903	57.2	LOS E	22.6	158.4	1.00	1.06	1.32	31.1
12	R2	22	0.0	22	0.0	0.175	46.4	LOS D	1.0	7.1	0.87	0.73	0.87	33.6
Approach		1148	0.0	1148	0.0	0.903	42.6	LOS D	22.6	158.4	0.82	0.93	1.03	35.3
All Vehicles		5191	0.0	5191	0.0	0.904	38.0	LOS D	31.1	217.9	0.78	0.84	0.93	37.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.11: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

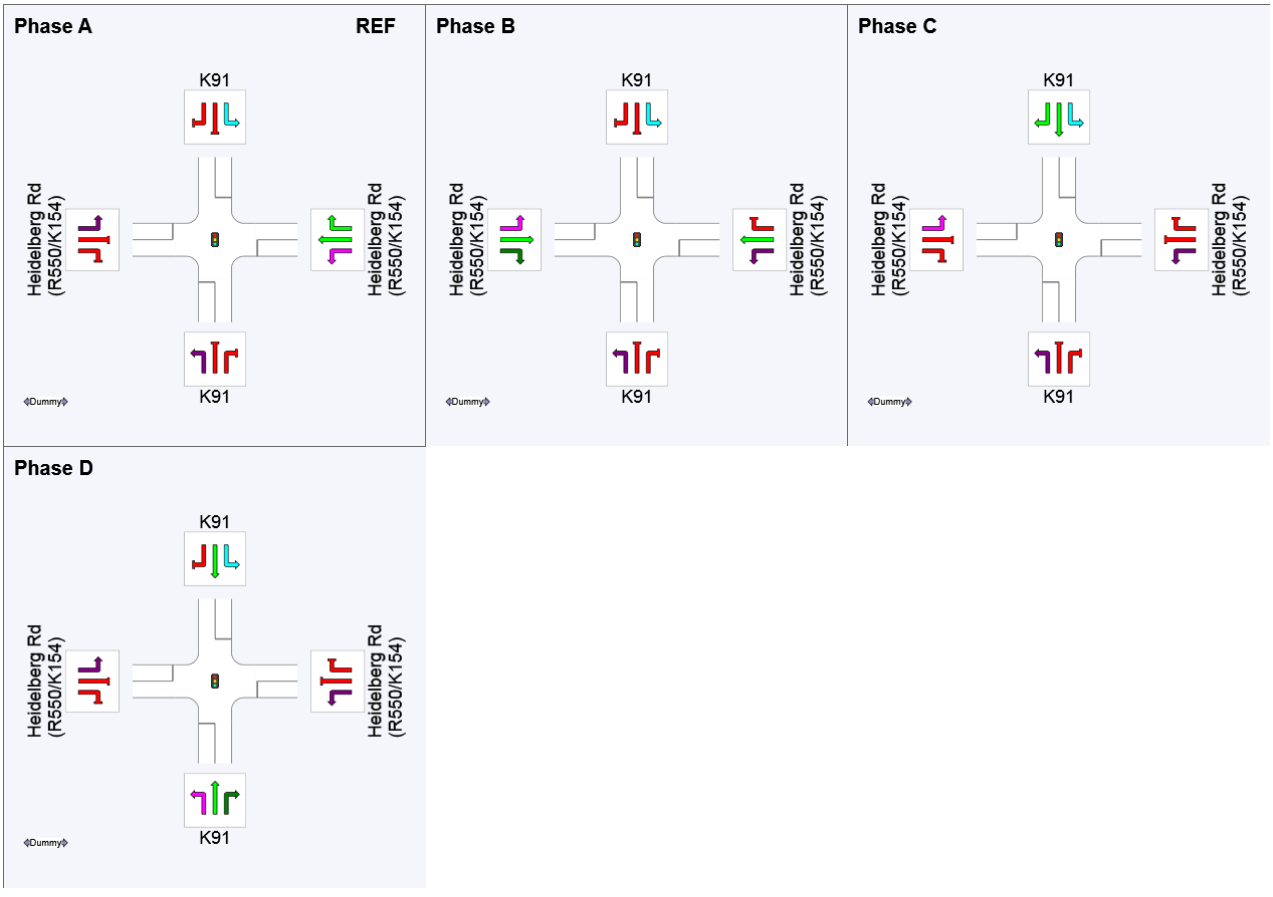
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	37	61	94
Green Time (sec)	30	20	26	7
Phase Time (sec)	34	27	30	14
Phase Split	32%	26%	29%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B1.12: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: K91														
1	L2	31	0.0	31	0.0	0.295	29.2	LOS C	2.1	14.6	0.94	0.73	0.94	41.8
2	T1	40	0.0	40	0.0	*0.295	23.6	LOS C	2.1	14.6	0.94	0.73	0.94	42.2
3	R2	24	0.0	24	0.0	0.144	49.1	LOS D	1.0	7.2	0.96	0.70	0.96	33.1
Approach		95	0.0	95	0.0	0.295	31.9	LOS C	2.1	14.6	0.95	0.72	0.95	39.3
East: Heidelberg Rd (R550/K154)														
4	L2	10	0.0	10	0.0	0.007	6.6	LOS A	0.0	0.3	0.21	0.58	0.21	53.5
5	T1	750	0.0	750	0.0	0.288	9.2	LOS A	7.8	54.8	0.52	0.45	0.52	52.2
6	R2	577	0.0	577	0.0	*0.896	57.5	LOS E	14.9	104.2	1.00	1.03	1.41	30.8
Approach		1337	0.0	1337	0.0	0.896	30.0	LOS C	14.9	104.2	0.72	0.70	0.90	40.2
North: K91														
7	L2	954	0.0	954	0.0	0.461	12.6	LOS B	0.0	0.0	0.00	0.53	0.00	54.7
8	T1	40	0.0	40	0.0	0.075	28.1	LOS C	1.3	9.4	0.80	0.60	0.80	41.3
9	R2	414	0.0	414	0.0	*0.819	53.0	LOS D	9.9	69.2	1.00	0.93	1.26	31.9
Approach		1408	0.0	1408	0.0	0.819	25.0	LOS C	9.9	69.2	0.32	0.65	0.39	44.9
West: Heidelberg Rd (R550/K154)														
10	L2	862	0.0	862	0.0	0.551	9.0	LOS A	13.5	94.4	0.45	0.69	0.45	51.5
11	T1	1363	0.0	1363	0.0	*0.837	30.4	LOS C	30.0	210.2	0.94	0.92	1.05	40.2
12	R2	47	0.0	47	0.0	0.135	24.4	LOS C	1.3	9.4	0.67	0.72	0.67	42.1
Approach		2272	0.0	2272	0.0	0.837	22.2	LOS C	30.0	210.2	0.75	0.83	0.81	43.9
All Vehicles		5112	0.0	5112	0.0	0.896	25.2	LOS C	30.0	210.2	0.63	0.74	0.72	43.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B1.12: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

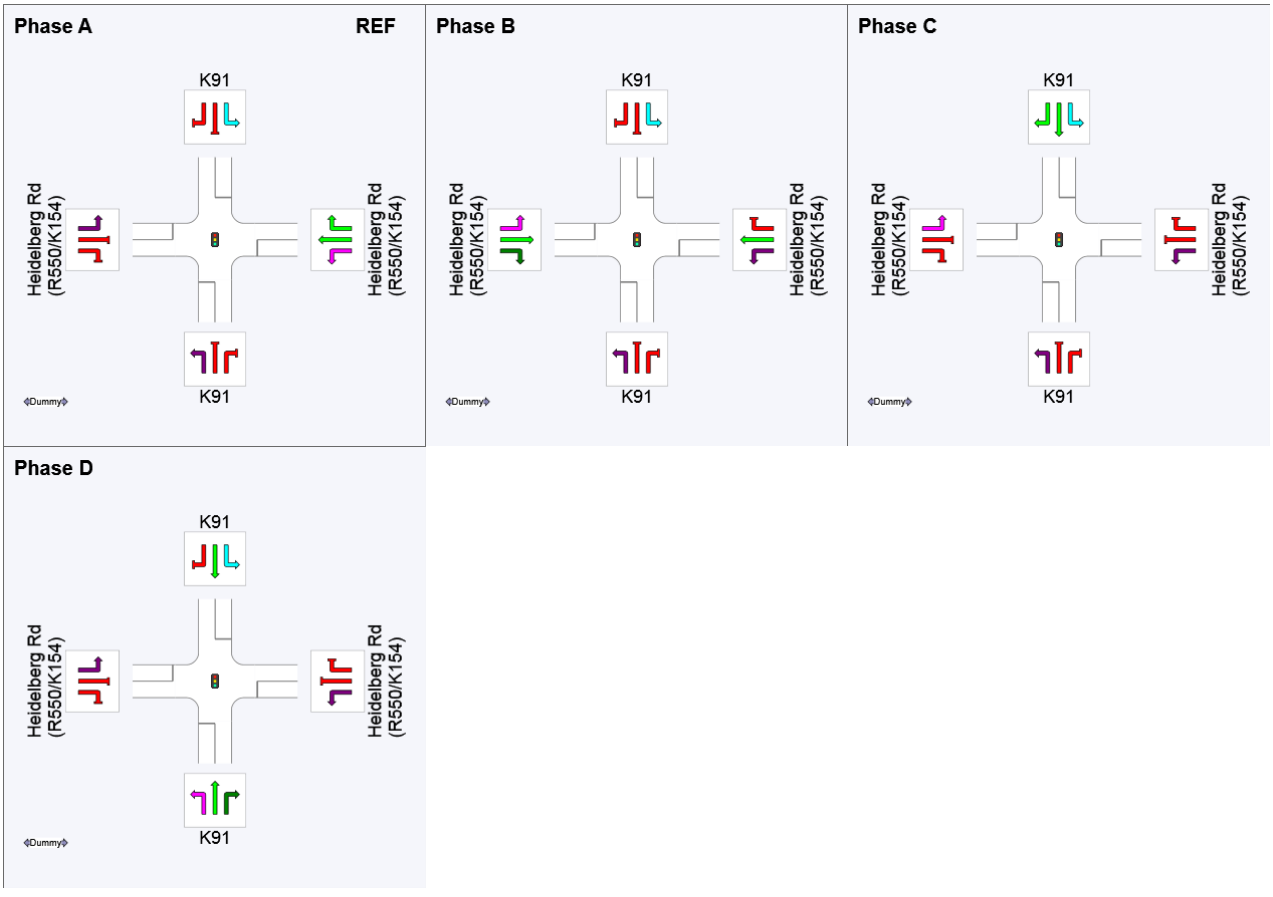
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	21	61	79
Green Time (sec)	14	36	11	7
Phase Time (sec)	18	43	15	14
Phase Split	20%	48%	17%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



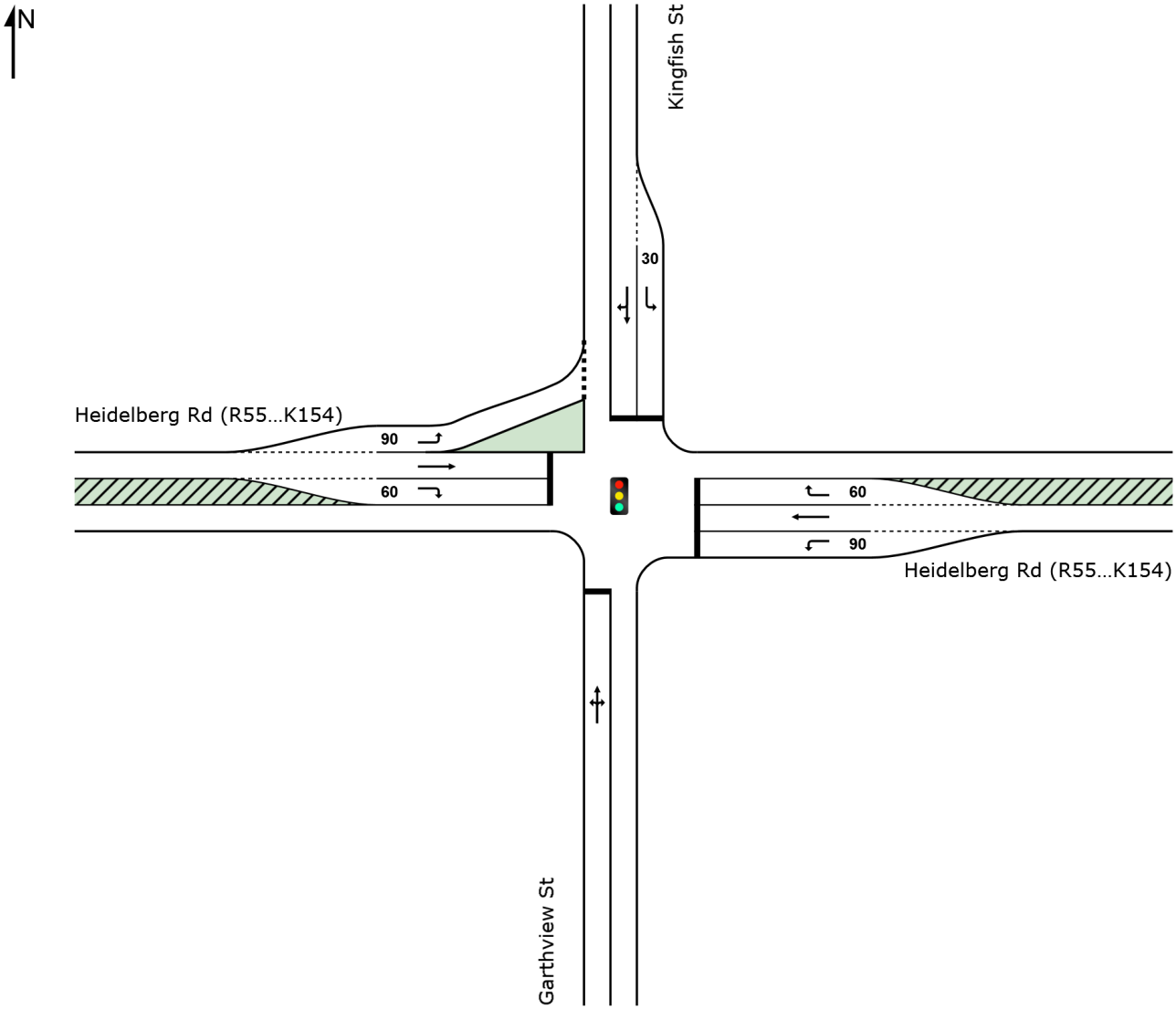
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B2: SITE LAYOUT

Existing Intersection Geometry

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B2.1: MOVEMENT SUMMARY

Site: [Scenario 1 AM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	47	0.0	49	0.0	0.079	19.6	LOS B	2.1	15.0	0.53	0.63	0.53	45.2
2	T1	18	0.0	19	0.0	0.079	14.0	LOS B	2.1	15.0	0.53	0.63	0.53	46.2
3	R2	12	0.0	13	0.0	0.079	19.6	LOS B	2.1	15.0	0.53	0.63	0.53	45.3
Approach		77	0.0	81	0.0	0.079	18.3	LOS B	2.1	15.0	0.53	0.63	0.53	45.4
East: Heidelberg Rd (R550 / K154)														
4	L2	26	0.0	27	0.0	0.036	29.3	LOS C	0.9	6.5	0.67	0.69	0.67	39.8
5	T1	714	0.0	752	0.0	*0.967	67.2	LOS E	53.8	376.8	1.00	1.21	1.39	28.5
6	R2	32	0.0	34	0.0	0.097	38.7	LOS D	1.4	9.6	0.79	0.72	0.79	36.0
Approach		772	0.0	813	0.0	0.967	64.8	LOS E	53.8	376.8	0.98	1.17	1.34	29.0
North: Kingfish St														
7	L2	16	0.0	17	0.0	0.016	19.0	LOS B	0.4	3.0	0.50	0.65	0.50	44.8
8	T1	27	0.0	28	0.0	*0.953	59.3	LOS E	53.0	371.2	1.00	1.07	1.35	29.1
9	R2	675	0.0	711	0.0	0.953	64.9	LOS E	53.0	371.2	1.00	1.07	1.35	28.8
Approach		718	0.0	756	0.0	0.953	63.6	LOS E	53.0	371.2	0.99	1.06	1.33	29.0
West: Heidelberg Rd (R550 / K154)														
10	L2	142	0.0	149	0.0	0.103	6.2	LOS A	0.6	4.4	0.16	0.59	0.16	53.7
11	T1	288	0.0	303	0.0	0.384	27.6	LOS C	11.9	83.5	0.79	0.67	0.79	41.3
12	R2	21	0.0	22	0.0	0.271	66.0	LOS E	1.2	8.7	1.00	0.68	1.00	28.2
Approach		451	0.0	475	0.0	0.384	22.7	LOS C	11.9	83.5	0.60	0.65	0.60	43.5
All Vehicles		2018	0.0	2124	0.0	0.967	53.2	LOS D	53.8	376.8	0.88	0.99	1.14	31.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.1: PHASING SUMMARY

Site: [Scenario 1 AM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

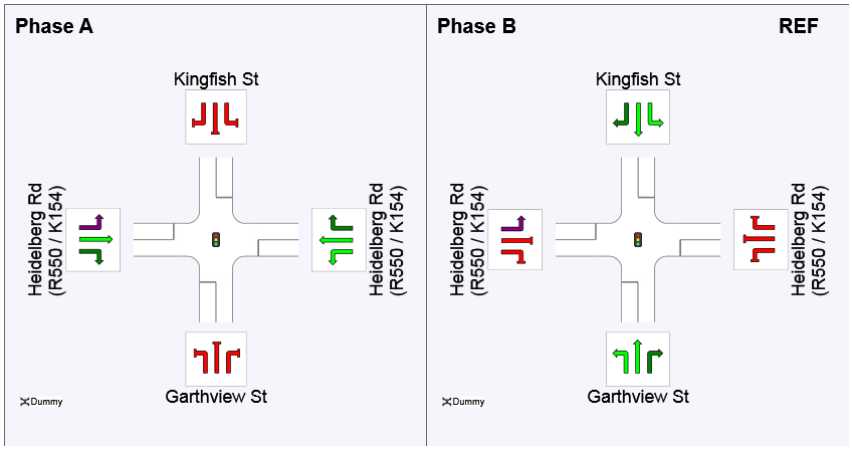
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	64	0
Green Time (sec)	40	57
Phase Time (sec)	47	63
Phase Split	43%	57%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B2.2: MOVEMENT SUMMARY

Site: [Scenario 1 PM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	12	0.0	13	0.0	0.155	26.7	LOS C	1.5	10.8	0.85	0.70	0.85	42.1
2	T1	26	0.0	27	0.0	0.155	21.1	LOS C	1.5	10.8	0.85	0.70	0.85	42.9
3	R2	22	0.0	23	0.0	0.155	26.7	LOS C	1.5	10.8	0.85	0.70	0.85	42.2
Approach		60	0.0	63	0.0	0.155	24.3	LOS C	1.5	10.8	0.85	0.70	0.85	42.5
East: Heidelberg Rd (R550 / K154)														
4	L2	13	0.0	14	0.0	0.012	11.5	LOS B	0.2	1.2	0.45	0.63	0.45	49.3
5	T1	371	0.0	391	0.0	0.317	7.4	LOS A	6.0	42.2	0.56	0.49	0.56	53.5
6	R2	10	0.0	11	0.0	0.027	17.5	LOS B	0.2	1.3	0.63	0.66	0.63	45.5
Approach		394	0.0	415	0.0	0.317	7.8	LOS A	6.0	42.2	0.56	0.50	0.56	53.1
North: Kingfish St														
7	L2	13	0.0	14	0.0	0.031	25.7	LOS C	0.3	2.2	0.81	0.67	0.81	41.4
8	T1	17	0.0	18	0.0	*0.491	23.2	LOS C	5.0	34.9	0.92	0.79	0.92	41.0
9	R2	159	0.0	167	0.0	0.491	28.8	LOS C	5.0	34.9	0.92	0.79	0.92	40.3
Approach		189	0.0	199	0.0	0.491	28.1	LOS C	5.0	34.9	0.92	0.79	0.92	40.5
West: Heidelberg Rd (R550 / K154)														
10	L2	390	0.0	411	0.0	0.291	6.6	LOS A	1.9	13.4	0.30	0.64	0.30	53.2
11	T1	607	0.0	639	0.0	*0.519	8.6	LOS A	11.5	80.5	0.66	0.59	0.66	52.6
12	R2	22	0.0	23	0.0	0.040	14.3	LOS B	0.4	2.5	0.55	0.68	0.55	47.1
Approach		1019	0.0	1073	0.0	0.519	8.0	LOS A	11.5	80.5	0.52	0.61	0.52	52.7
All Vehicles		1662	0.0	1749	0.0	0.519	10.8	LOS B	11.5	80.5	0.59	0.61	0.59	50.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.2: PHASING SUMMARY

Site: [Scenario 1 PM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

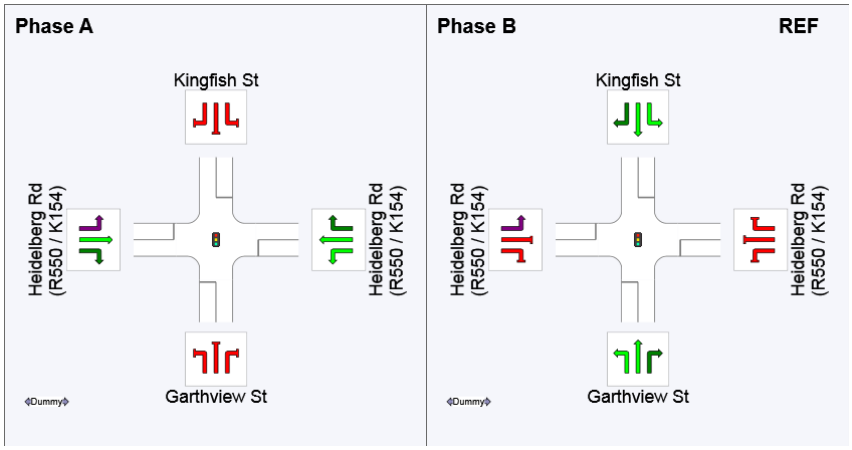
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

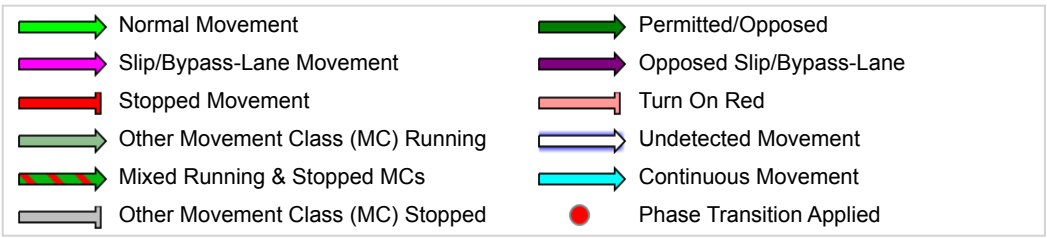
Phase	A	B
Phase Change Time (sec)	20	0
Green Time (sec)	34	13
Phase Time (sec)	41	19
Phase Split	68%	32%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B2.3: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	53	0.0	53	0.0	0.099	23.1	LOS C	2.6	18.0	0.59	0.66	0.59	43.3
2	T1	20	0.0	20	0.0	0.099	17.5	LOS B	2.6	18.0	0.59	0.66	0.59	44.2
3	R2	14	0.0	14	0.0	0.099	23.1	LOS C	2.6	18.0	0.59	0.66	0.59	43.4
Approach		87	0.0	87	0.0	0.099	21.8	LOS C	2.6	18.0	0.59	0.66	0.59	43.5
East: Heidelberg Rd (R550 / K154)														
4	L2	29	0.0	29	0.0	0.034	26.0	LOS C	0.9	6.4	0.62	0.68	0.62	41.2
5	T1	1670	0.0	1670	0.0	* 1.897	850.7	LOS F	427.4	2991.7	1.00	4.10	4.97	3.9
6	R2	109	0.0	109	0.0	0.667	57.0	LOS E	6.0	41.9	0.99	0.85	1.09	30.5
Approach		1808	0.0	1808	0.0	1.897	789.7	LOS F	427.4	2991.7	0.99	3.85	4.66	4.2
North: Kingfish St														
7	L2	179	0.0	179	0.0	0.183	23.2	LOS C	5.4	38.1	0.61	0.73	0.61	42.6
8	T1	31	0.0	31	0.0	1.895	853.9	LOS F	321.8	2252.7	1.00	2.66	4.98	3.9
9	R2	1216	0.0	1216	0.0	* 1.895	859.5	LOS F	321.8	2252.7	1.00	2.66	4.98	3.9
Approach		1426	0.0	1426	0.0	1.895	754.4	LOS F	321.8	2252.7	0.95	2.42	4.43	4.4
West: Heidelberg Rd (R550 / K154)														
10	L2	335	0.0	335	0.0	0.239	7.4	LOS A	3.1	22.0	0.27	0.63	0.27	52.8
11	T1	667	0.0	667	0.0	0.764	29.6	LOS C	30.3	212.1	0.92	0.82	0.92	40.4
12	R2	24	0.0	24	0.0	0.293	66.1	LOS E	1.4	9.5	1.00	0.69	1.00	28.2
Approach		1026	0.0	1026	0.0	0.764	23.2	LOS C	30.3	212.1	0.71	0.76	0.71	43.3
All Vehicles		4347	0.0	4347	0.0	1.897	581.8	LOS F	427.4	2991.7	0.90	2.59	3.57	5.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.3: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

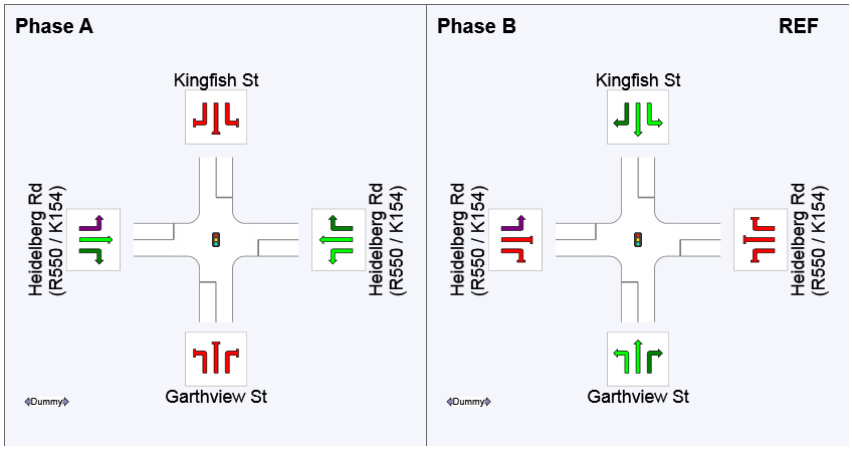
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

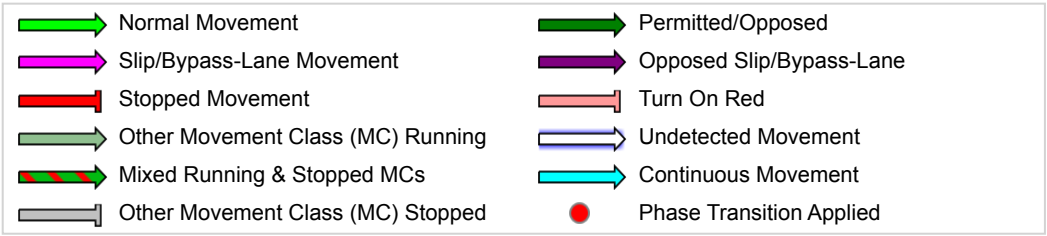
Phase	A	B
Phase Change Time (sec)	59	0
Green Time (sec)	45	52
Phase Time (sec)	52	58
Phase Split	47%	53%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B2.4: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	14	0.0	14	0.0	0.193	34.9	LOS C	2.3	15.8	0.87	0.71	0.87	38.4
2	T1	29	0.0	29	0.0	0.193	29.4	LOS C	2.3	15.8	0.87	0.71	0.87	39.1
3	R2	25	0.0	25	0.0	0.193	34.9	LOS C	2.3	15.8	0.87	0.71	0.87	38.5
Approach		68	0.0	68	0.0	0.193	32.6	LOS C	2.3	15.8	0.87	0.71	0.87	38.7
East: Heidelberg Rd (R550 / K154)														
4	L2	15	0.0	15	0.0	0.011	11.1	LOS B	0.2	1.5	0.38	0.63	0.38	49.6
5	T1	834	0.0	834	0.0	0.655	9.1	LOS A	19.0	132.7	0.64	0.58	0.64	52.2
6	R2	144	0.0	144	0.0	1.280	297.8	LOS F	19.3	135.1	1.00	1.74	3.89	9.9
Approach		993	0.0	993	0.0	1.280	51.0	LOS D	19.3	135.1	0.69	0.75	1.10	32.1
North: Kingfish St														
7	L2	79	0.0	79	0.0	0.191	34.7	LOS C	2.6	18.3	0.87	0.75	0.87	37.6
8	T1	19	0.0	19	0.0	* 1.237	259.6	LOS F	49.2	344.5	1.00	1.98	3.55	11.0
9	R2	368	0.0	368	0.0	1.237	265.2	LOS F	49.2	344.5	1.00	1.98	3.55	11.0
Approach		466	0.0	466	0.0	1.237	225.9	LOS F	49.2	344.5	0.98	1.77	3.09	12.4
West: Heidelberg Rd (R550 / K154)														
10	L2	852	0.0	852	0.0	0.526	7.2	LOS A	6.2	43.4	0.39	0.69	0.39	52.9
11	T1	1520	0.0	1520	0.0	* 1.136	164.1	LOS F	159.1	1113.6	1.00	2.23	2.62	16.1
12	R2	25	0.0	25	0.0	0.083	21.3	LOS C	0.6	4.3	0.63	0.70	0.63	43.2
Approach		2397	0.0	2397	0.0	1.136	106.9	LOS F	159.1	1113.6	0.78	1.66	1.80	21.6
All Vehicles		3924	0.0	3924	0.0	1.280	105.6	LOS F	159.1	1113.6	0.78	1.43	1.76	21.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.4: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Existing Intersection Geometry)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

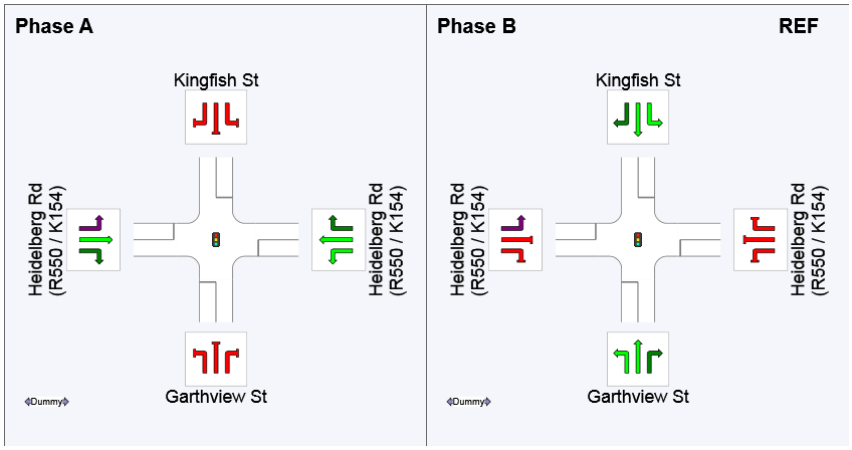
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	23	0
Green Time (sec)	51	16
Phase Time (sec)	58	22
Phase Split	73%	28%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

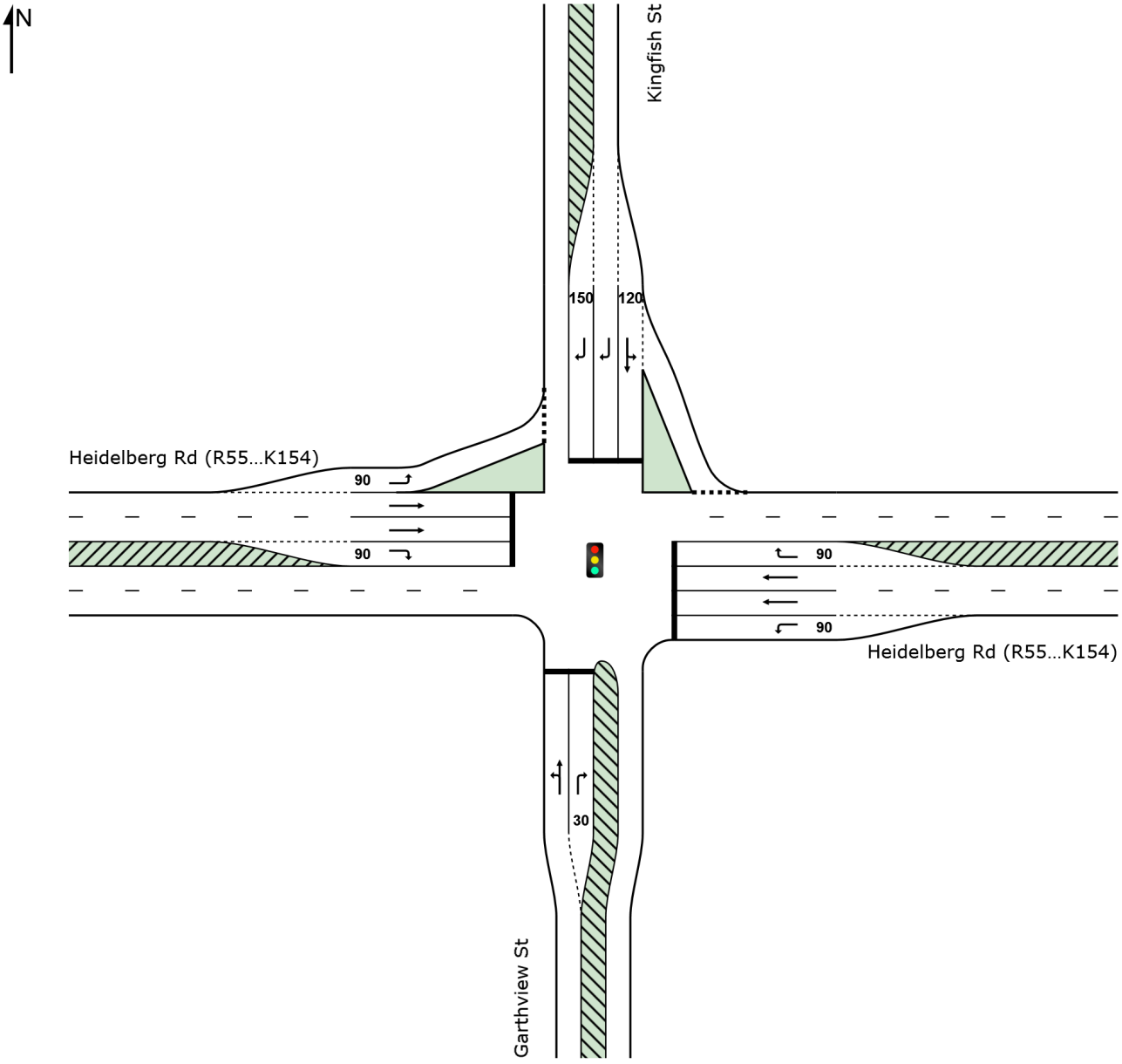
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B2: SITE LAYOUT

Upgraded Intersection Geometry (PHASE 1)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B2.5: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	53	0.0	53	0.0	0.547	62.6	LOS E	4.0	28.3	1.00	0.76	1.01	29.6
2	T1	20	0.0	20	0.0	*0.547	57.1	LOS E	4.0	28.3	1.00	0.76	1.01	30.0
3	R2	14	0.0	14	0.0	0.102	59.9	LOS E	0.7	5.1	0.97	0.68	0.97	30.1
Approach		87	0.0	87	0.0	0.547	60.9	LOS E	4.0	28.3	1.00	0.75	1.01	29.8
East: Heidelberg Rd (R550 / K154)														
4	L2	29	0.0	29	0.0	0.031	23.5	LOS C	0.9	6.0	0.59	0.67	0.59	42.4
5	T1	1670	0.0	1670	0.0	*0.919	44.4	LOS D	53.7	375.8	0.96	1.03	1.16	34.7
6	R2	109	0.0	109	0.0	0.338	34.3	LOS C	4.4	30.8	0.78	0.77	0.78	37.9
Approach		1808	0.0	1808	0.0	0.919	43.4	LOS D	53.7	375.8	0.95	1.01	1.13	35.0
North: Kingfish St														
7	L2	179	0.0	179	0.0	0.181	8.2	LOS A	2.3	16.4	0.33	0.60	0.33	53.0
8	T1	31	0.0	31	0.0	0.181	2.5	LOS A	2.3	16.4	0.33	0.60	0.33	53.6
9	R2	1216	0.0	1216	0.0	*0.903	56.4	LOS E	37.2	260.4	1.00	0.99	1.22	30.9
Approach		1426	0.0	1426	0.0	0.903	49.2	LOS D	37.2	260.4	0.90	0.93	1.09	33.0
West: Heidelberg Rd (R550 / K154)														
10	L2	335	0.0	335	0.0	0.249	7.3	LOS A	3.2	22.7	0.24	0.62	0.24	52.9
11	T1	667	0.0	667	0.0	0.337	21.1	LOS C	11.5	80.5	0.70	0.60	0.70	44.6
12	R2	24	0.0	24	0.0	0.272	61.7	LOS E	1.3	9.2	0.98	0.72	0.98	29.4
Approach		1026	0.0	1026	0.0	0.337	17.5	LOS B	11.5	80.5	0.56	0.61	0.56	46.4
All Vehicles		4347	0.0	4347	0.0	0.919	39.6	LOS D	53.7	375.8	0.84	0.88	0.98	36.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.5: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

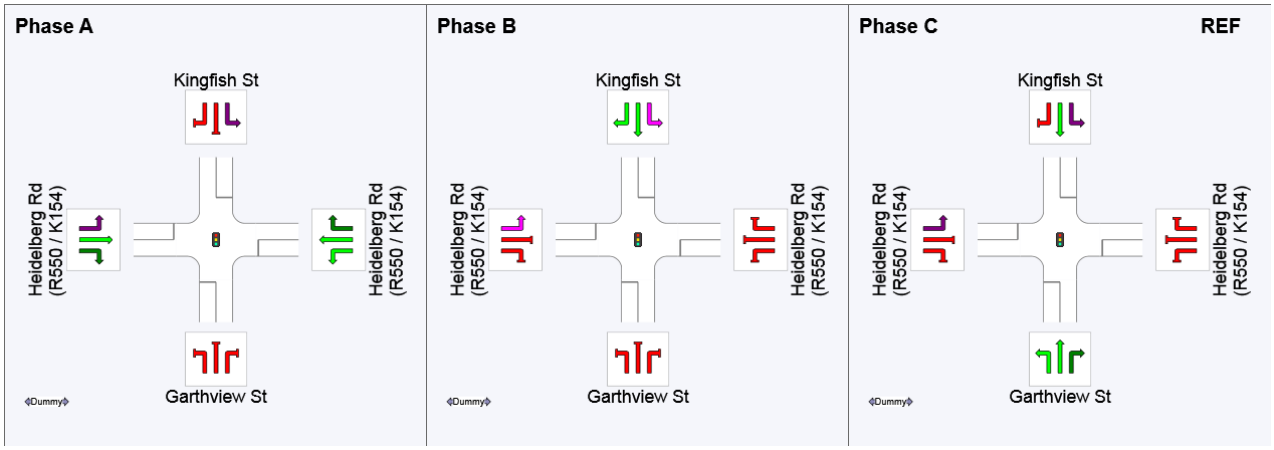
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase C
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

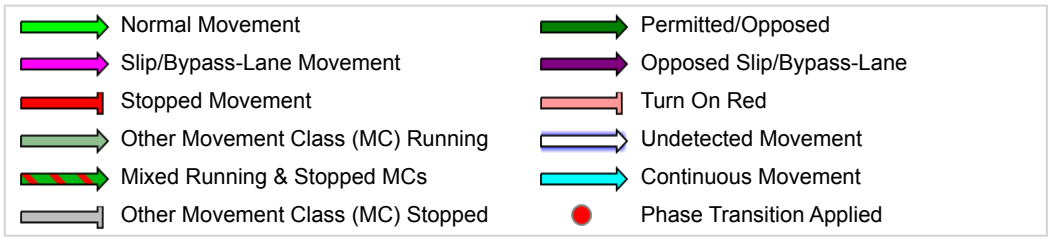
Phase	A	B	C
Phase Change Time (sec)	11	67	0
Green Time (sec)	49	36	7
Phase Time (sec)	56	40	14
Phase Split	51%	36%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B2.6: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	14	0.0	14	0.0	0.172	32.6	LOS C	1.2	8.4	0.93	0.70	0.93	40.0
2	T1	29	0.0	29	0.0	*0.172	27.1	LOS C	1.2	8.4	0.93	0.70	0.93	40.8
3	R2	25	0.0	25	0.0	0.099	32.2	LOS C	0.7	4.8	0.92	0.70	0.92	38.9
Approach		68	0.0	68	0.0	0.172	30.1	LOS C	1.2	8.4	0.93	0.70	0.93	39.9
East: Heidelberg Rd (R550 / K154)														
4	L2	15	0.0	15	0.0	0.016	14.7	LOS B	0.2	1.6	0.56	0.65	0.56	47.3
5	T1	834	0.0	834	0.0	0.402	11.4	LOS B	8.1	56.4	0.70	0.60	0.70	50.6
6	R2	144	0.0	144	0.0	*0.819	40.1	LOS D	5.1	35.9	1.00	1.01	1.51	35.8
Approach		993	0.0	993	0.0	0.819	15.6	LOS B	8.1	56.4	0.74	0.66	0.82	47.7
North: Kingfish St														
7	L2	79	0.0	79	0.0	0.127	11.9	LOS B	1.4	9.6	0.57	0.65	0.57	50.3
8	T1	19	0.0	19	0.0	0.127	6.3	LOS A	1.4	9.6	0.57	0.65	0.57	50.9
9	R2	368	0.0	368	0.0	*0.762	37.3	LOS D	5.9	41.2	1.00	0.91	1.26	36.9
Approach		466	0.0	466	0.0	0.762	31.7	LOS C	5.9	41.2	0.91	0.85	1.11	39.1
West: Heidelberg Rd (R550 / K154)														
10	L2	852	0.0	852	0.0	0.670	10.1	LOS B	12.3	85.9	0.65	0.76	0.65	50.7
11	T1	1520	0.0	1520	0.0	0.733	14.6	LOS B	18.6	130.0	0.87	0.79	0.89	48.4
12	R2	25	0.0	25	0.0	0.076	20.1	LOS C	0.5	3.6	0.69	0.70	0.69	44.2
Approach		2397	0.0	2397	0.0	0.733	13.1	LOS B	18.6	130.0	0.79	0.78	0.80	49.2
All Vehicles		3924	0.0	3924	0.0	0.819	16.2	LOS B	18.6	130.0	0.79	0.76	0.85	47.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.6: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

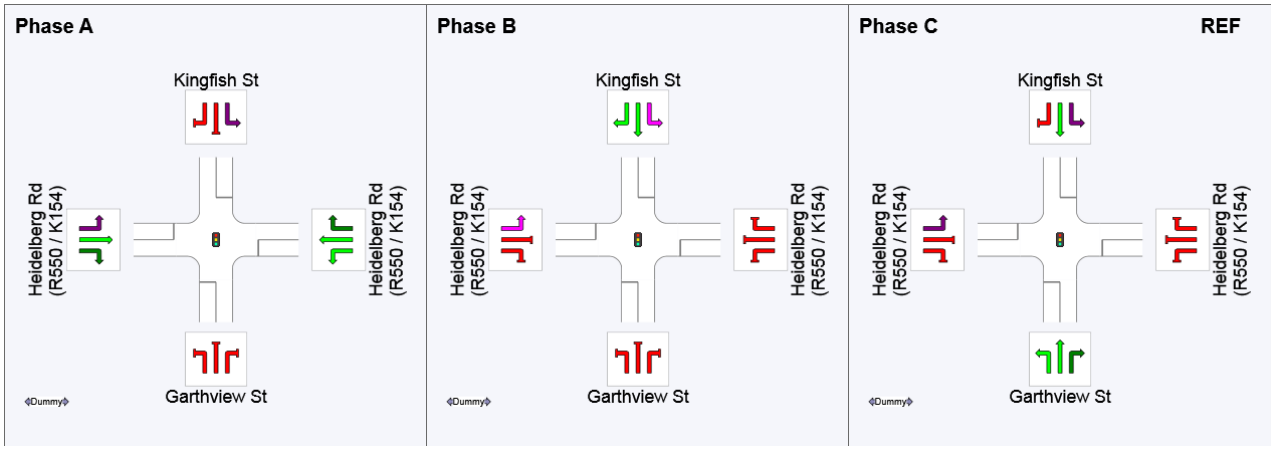
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase C
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

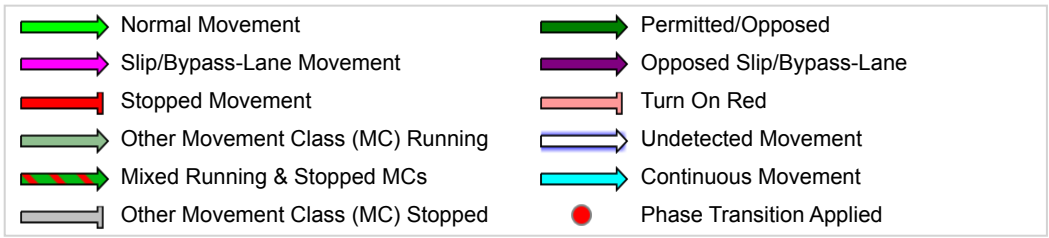
Phase	A	B	C
Phase Change Time (sec)	11	46	0
Green Time (sec)	28	7	7
Phase Time (sec)	35	11	14
Phase Split	58%	18%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B2.7: MOVEMENT SUMMARY

Site: [Scenario 3 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	57	0.0	57	0.0	0.565	60.0	LOS E	4.2	29.2	1.00	0.77	1.03	30.2
2	T1	22	0.0	22	0.0	*0.565	54.4	LOS D	4.2	29.2	1.00	0.77	1.03	30.7
3	R2	15	0.0	15	0.0	0.103	57.1	LOS E	0.8	5.3	0.97	0.68	0.97	30.8
Approach		94	0.0	94	0.0	0.565	58.2	LOS E	4.2	29.2	0.99	0.76	1.02	30.4
East: Heidelberg Rd (R550 / K154)														
4	L2	32	0.0	32	0.0	0.038	25.1	LOS C	1.0	6.7	0.62	0.68	0.62	41.7
5	T1	1733	0.0	1733	0.0	*1.002	82.0	LOS F	70.4	492.9	1.00	1.34	1.54	25.6
6	R2	147	0.0	147	0.0	0.402	29.8	LOS C	5.0	35.1	0.87	0.77	0.87	39.8
Approach		1912	0.0	1912	0.0	1.002	77.0	LOS E	70.4	492.9	0.98	1.28	1.47	26.5
North: Kingfish St														
7	L2	251	0.0	251	0.0	0.211	8.2	LOS A	3.5	24.5	0.31	0.60	0.31	52.7
8	T1	33	0.0	33	0.0	0.211	2.5	LOS A	3.5	24.5	0.31	0.60	0.31	53.4
9	R2	1422	0.0	1422	0.0	*1.006	93.2	LOS F	58.4	408.9	1.00	1.17	1.60	23.6
Approach		1706	0.0	1706	0.0	1.006	78.9	LOS E	58.4	408.9	0.89	1.07	1.39	26.0
West: Heidelberg Rd (R550 / K154)														
10	L2	401	0.0	401	0.0	0.273	6.4	LOS A	2.3	16.3	0.20	0.61	0.20	53.6
11	T1	692	0.0	692	0.0	0.564	35.1	LOS D	15.2	106.6	0.91	0.78	0.91	38.1
12	R2	26	0.0	26	0.0	0.303	63.4	LOS E	1.4	9.8	1.00	0.69	1.00	29.0
Approach		1119	0.0	1119	0.0	0.564	25.5	LOS C	15.2	106.6	0.66	0.72	0.66	42.2
All Vehicles		4831	0.0	4831	0.0	1.006	65.4	LOS E	70.4	492.9	0.87	1.07	1.25	28.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.7: PHASING SUMMARY

Site: [Scenario 3 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

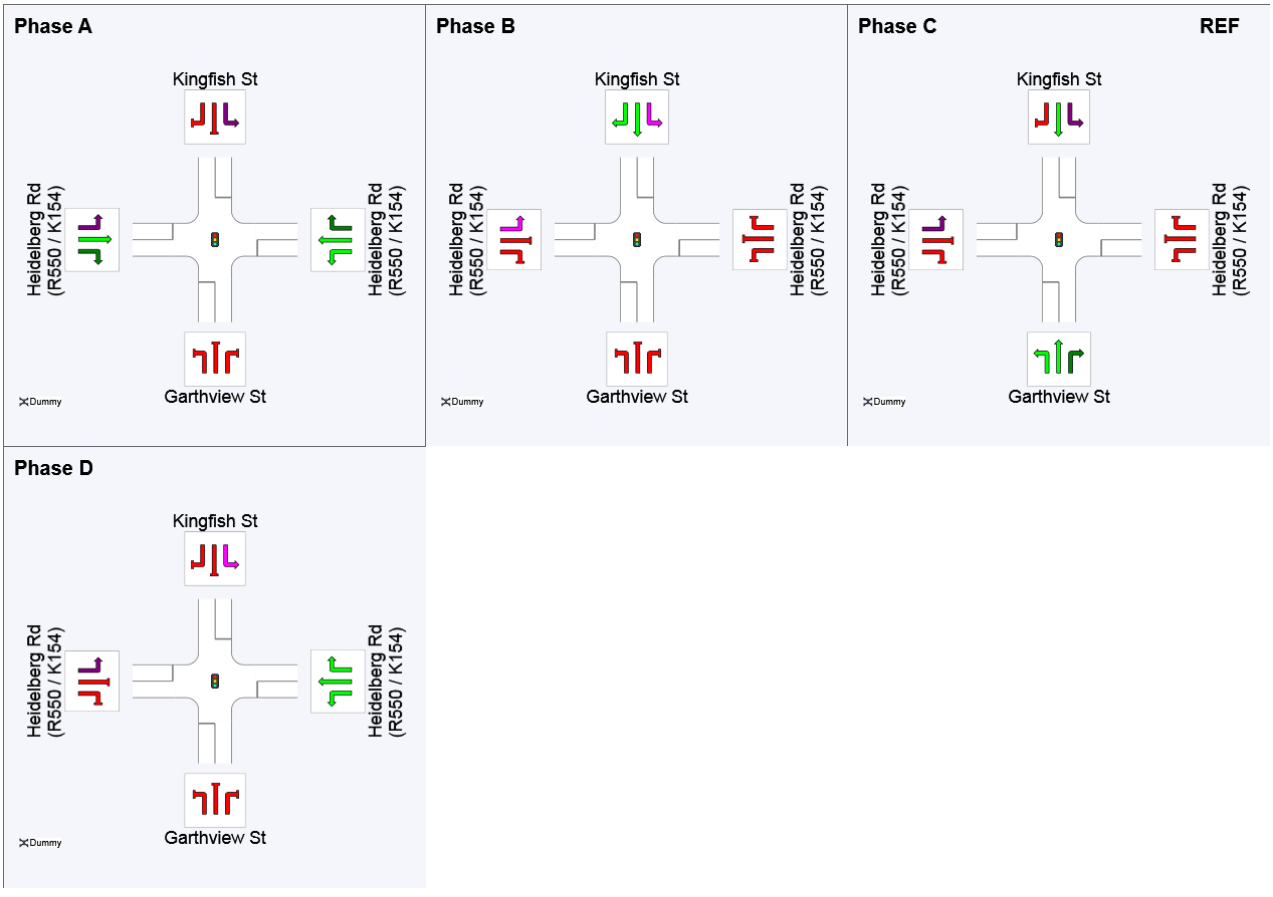
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase C
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	28	61	0	11
Green Time (sec)	29	37	7	10
Phase Time (sec)	36	41	14	14
Phase Split	34%	39%	13%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B2.8: MOVEMENT SUMMARY

Site: [Scenario 3 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	15	0.0	15	0.0	0.283	49.9	LOS D	2.1	14.4	0.98	0.72	0.98	33.7
2	T1	32	0.0	32	0.0	*0.283	44.4	LOS D	2.1	14.4	0.98	0.72	0.98	34.2
3	R2	27	0.0	27	0.0	0.159	49.2	LOS D	1.2	8.1	0.97	0.71	0.97	32.9
Approach		74	0.0	74	0.0	0.283	47.3	LOS D	2.1	14.4	0.97	0.72	0.97	33.6
East: Heidelberg Rd (R550 / K154)														
4	L2	16	0.0	16	0.0	0.013	13.5	LOS B	0.3	2.0	0.43	0.64	0.43	48.0
5	T1	867	0.0	867	0.0	0.331	10.0	LOS B	9.6	67.0	0.55	0.48	0.55	51.5
6	R2	200	0.0	200	0.0	*0.727	28.0	LOS C	5.2	36.7	1.00	0.87	1.13	40.6
Approach		1083	0.0	1083	0.0	0.727	13.4	LOS B	9.6	67.0	0.63	0.55	0.65	49.0
North: Kingfish St														
7	L2	107	0.0	107	0.0	0.148	15.3	LOS B	2.8	19.8	0.55	0.66	0.55	48.0
8	T1	21	0.0	21	0.0	0.148	9.7	LOS A	2.8	19.8	0.55	0.66	0.55	48.5
9	R2	440	0.0	440	0.0	*0.798	51.3	LOS D	10.3	72.2	1.00	0.91	1.21	32.3
Approach		568	0.0	568	0.0	0.798	43.0	LOS D	10.3	72.2	0.90	0.86	1.06	34.9
West: Heidelberg Rd (R550 / K154)														
10	L2	1019	0.0	1019	0.0	0.715	9.6	LOS A	16.1	112.9	0.62	0.78	0.62	51.3
11	T1	1573	0.0	1573	0.0	*0.846	26.7	LOS C	35.5	248.4	0.90	0.89	0.99	41.8
12	R2	27	0.0	27	0.0	0.077	20.1	LOS C	0.7	4.7	0.58	0.69	0.58	44.2
Approach		2619	0.0	2619	0.0	0.846	19.9	LOS B	35.5	248.4	0.78	0.84	0.84	45.1
All Vehicles		4344	0.0	4344	0.0	0.846	21.8	LOS C	35.5	248.4	0.76	0.77	0.83	44.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.8: PHASING SUMMARY

Site: [Scenario 3 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

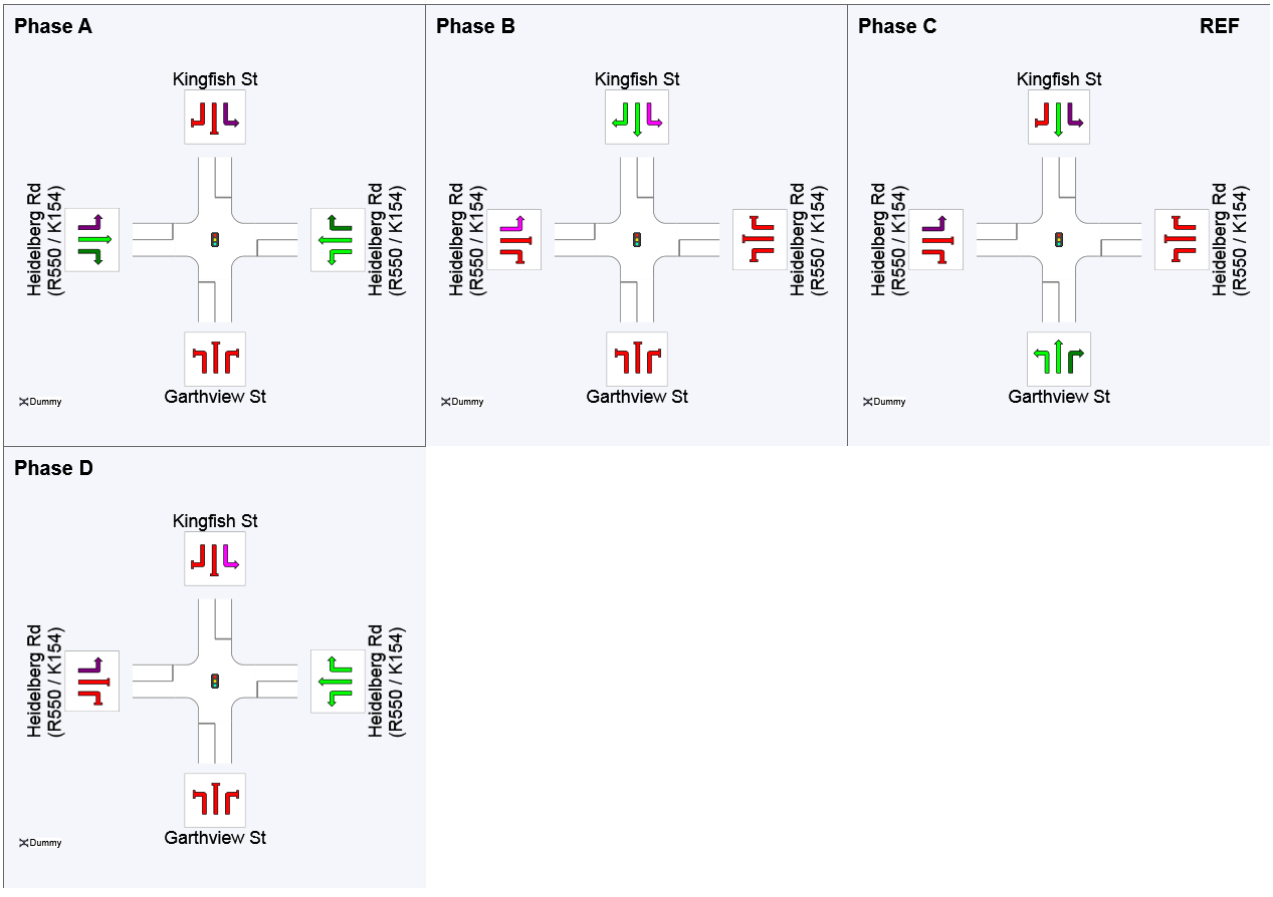
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase C
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	25	71	0	11
Green Time (sec)	42	12	7	7
Phase Time (sec)	49	16	14	11
Phase Split	54%	18%	16%	12%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B2.9: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	57	0.0	57	0.0	0.592	63.0	LOS E	4.4	30.8	1.00	0.78	1.05	29.5
2	T1	22	0.0	22	0.0	*0.592	57.5	LOS E	4.4	30.8	1.00	0.78	1.05	29.9
3	R2	15	0.0	15	0.0	0.108	59.9	LOS E	0.8	5.5	0.97	0.68	0.97	30.1
Approach		94	0.0	94	0.0	0.592	61.2	LOS E	4.4	30.8	1.00	0.76	1.03	29.7
East: Heidelberg Rd (R550 / K154)														
4	L2	32	0.0	32	0.0	0.034	23.0	LOS C	0.9	6.5	0.58	0.68	0.58	42.7
5	T1	2134	0.0	2134	0.0	*1.109	156.4	LOS F	122.2	855.4	1.00	1.77	2.07	16.6
6	R2	147	0.0	147	0.0	0.398	28.0	LOS C	4.8	33.8	0.85	0.77	0.85	40.6
Approach		2313	0.0	2313	0.0	1.109	146.4	LOS F	122.2	855.4	0.98	1.69	1.97	17.4
North: Kingfish St														
7	L2	251	0.0	251	0.0	0.224	9.0	LOS A	4.3	30.3	0.35	0.62	0.35	52.1
8	T1	33	0.0	33	0.0	0.224	3.4	LOS A	4.3	30.3	0.35	0.62	0.35	52.7
9	R2	1422	0.0	1422	0.0	*1.105	165.2	LOS F	79.3	555.4	1.00	1.40	2.12	15.9
Approach		1706	0.0	1706	0.0	1.105	139.1	LOS F	79.3	555.4	0.89	1.27	1.82	18.0
West: Heidelberg Rd (R550 / K154)														
10	L2	401	0.0	401	0.0	0.273	6.4	LOS A	2.3	16.3	0.20	0.61	0.20	53.6
11	T1	832	0.0	832	0.0	0.588	33.7	LOS C	18.7	130.7	0.90	0.78	0.90	38.6
12	R2	26	0.0	26	0.0	0.318	66.3	LOS E	1.5	10.3	1.00	0.69	1.00	28.4
Approach		1259	0.0	1259	0.0	0.588	25.7	LOS C	18.7	130.7	0.68	0.72	0.68	42.1
All Vehicles		5372	0.0	5372	0.0	1.109	114.3	LOS F	122.2	855.4	0.88	1.31	1.61	20.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.9: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

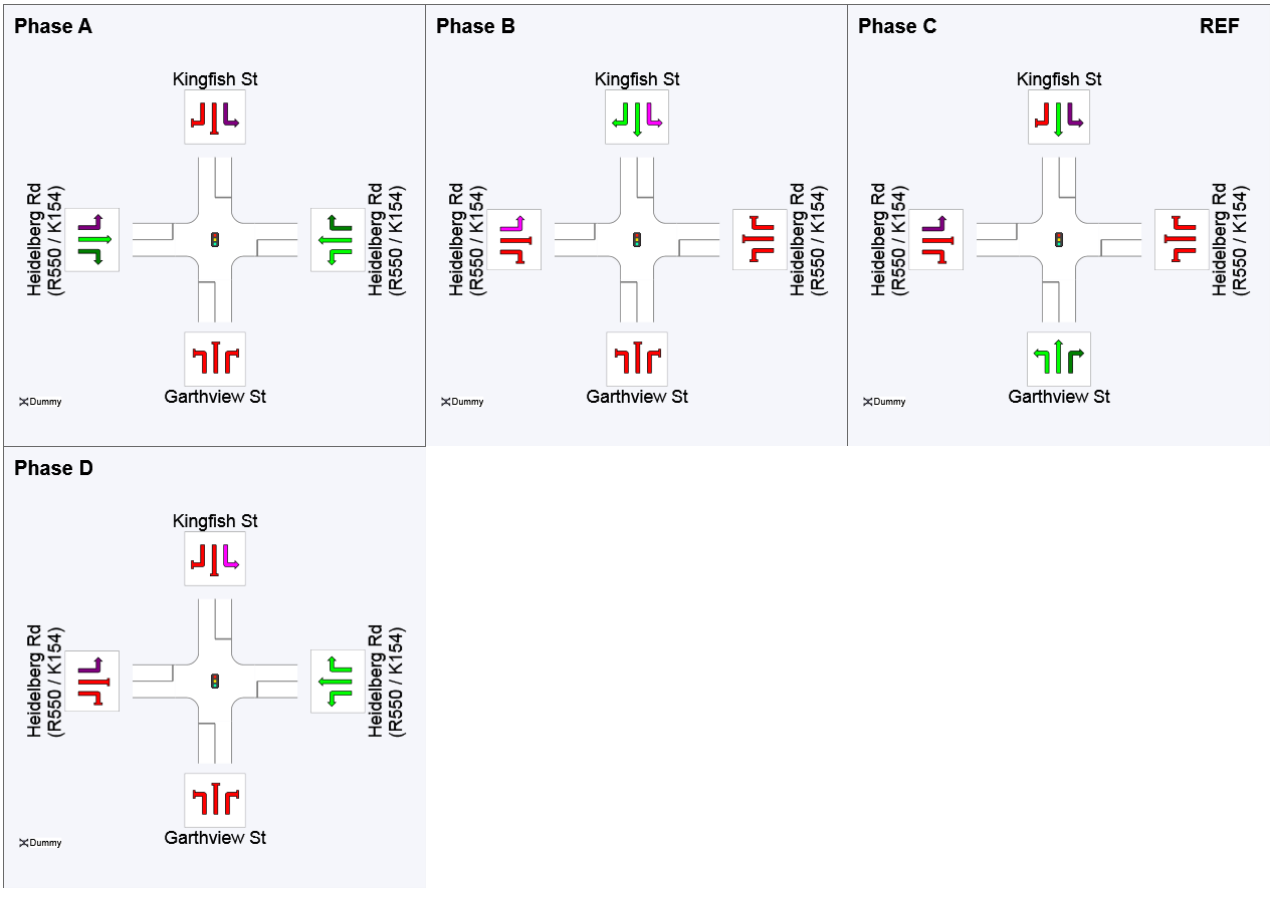
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase C
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	29	68	0	11
Green Time (sec)	35	35	7	11
Phase Time (sec)	42	39	14	15
Phase Split	38%	35%	13%	14%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B2.10: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	15	0.0	15	0.0	0.377	67.2	LOS E	2.8	19.5	1.00	0.74	1.00	29.1
2	T1	32	0.0	32	0.0	*0.377	61.7	LOS E	2.8	19.5	1.00	0.74	1.00	29.5
3	R2	27	0.0	27	0.0	0.212	66.2	LOS E	1.6	11.0	0.99	0.71	0.99	28.6
Approach		74	0.0	74	0.0	0.377	64.5	LOS E	2.8	19.5	0.99	0.73	0.99	29.1
East: Heidelberg Rd (R550 / K154)														
4	L2	16	0.0	16	0.0	0.011	11.8	LOS B	0.3	2.0	0.33	0.63	0.33	49.1
5	T1	1026	0.0	1026	0.0	0.338	8.2	LOS A	12.0	84.3	0.44	0.40	0.44	52.9
6	R2	200	0.0	200	0.0	*1.003	85.7	LOS F	13.6	95.0	1.00	1.13	1.80	20.5
Approach		1242	0.0	1242	0.0	1.003	20.7	LOS C	13.6	95.0	0.53	0.52	0.66	42.1
North: Kingfish St														
7	L2	107	0.0	107	0.0	0.196	29.7	LOS C	5.3	37.3	0.73	0.73	0.73	40.4
8	T1	21	0.0	21	0.0	0.196	24.1	LOS C	5.3	37.3	0.73	0.73	0.73	40.8
9	R2	440	0.0	440	0.0	*0.982	96.1	LOS F	17.1	119.7	1.00	1.11	1.65	23.2
Approach		568	0.0	568	0.0	0.982	80.9	LOS F	17.1	119.7	0.94	1.02	1.44	25.7
West: Heidelberg Rd (R550 / K154)														
10	L2	1019	0.0	1019	0.0	0.677	9.6	LOS A	17.1	119.7	0.54	0.75	0.54	51.3
11	T1	1942	0.0	1942	0.0	*0.974	57.6	LOS E	87.6	613.0	0.86	1.05	1.18	30.9
12	R2	27	0.0	27	0.0	0.081	17.0	LOS B	0.7	4.8	0.45	0.67	0.45	46.0
Approach		2988	0.0	2988	0.0	0.974	40.9	LOS D	87.6	613.0	0.74	0.94	0.95	35.9
All Vehicles		4872	0.0	4872	0.0	1.003	40.8	LOS D	87.6	613.0	0.72	0.84	0.93	35.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.10: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

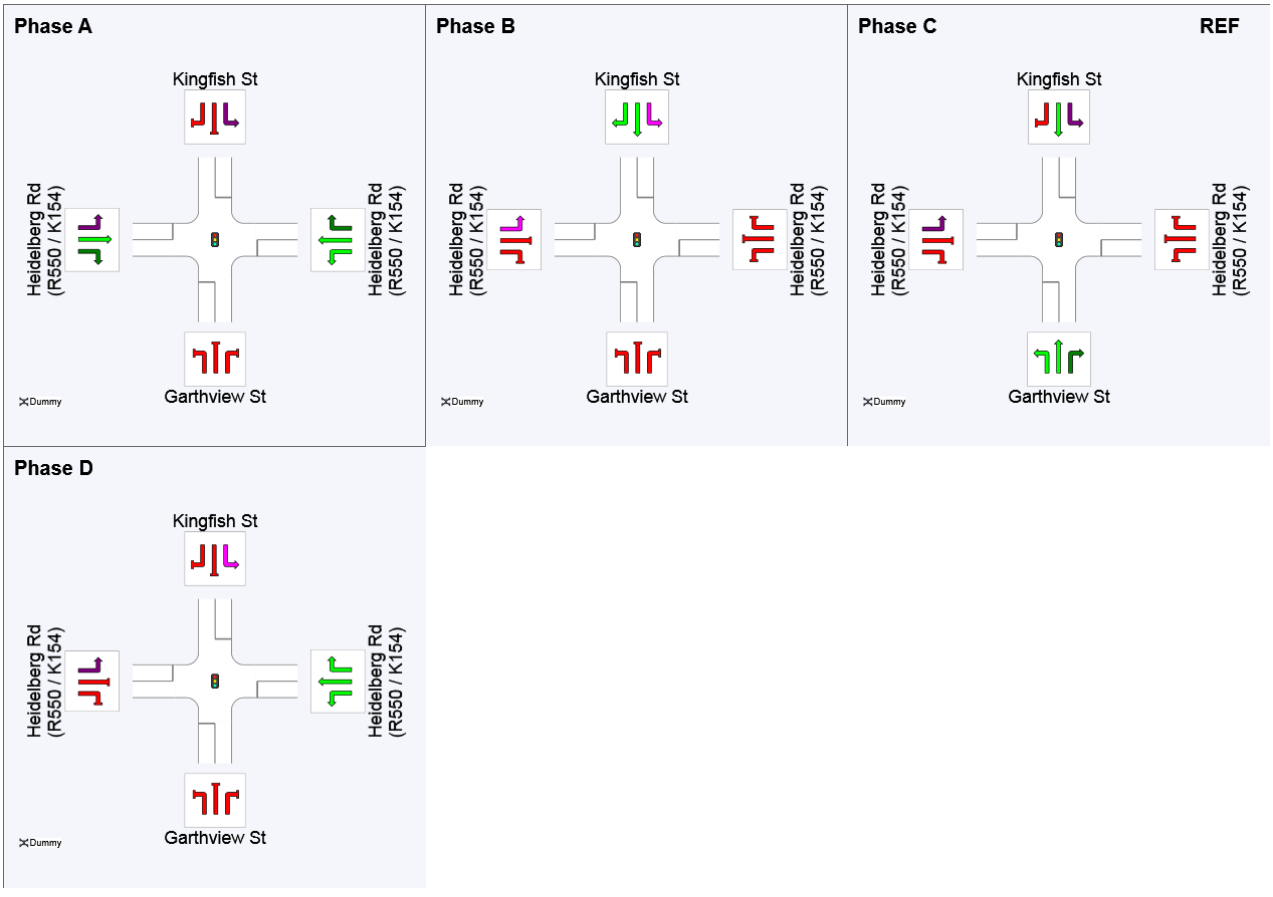
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase C
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	25	100	0	11
Green Time (sec)	71	13	7	7
Phase Time (sec)	78	17	14	11
Phase Split	65%	14%	12%	9%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



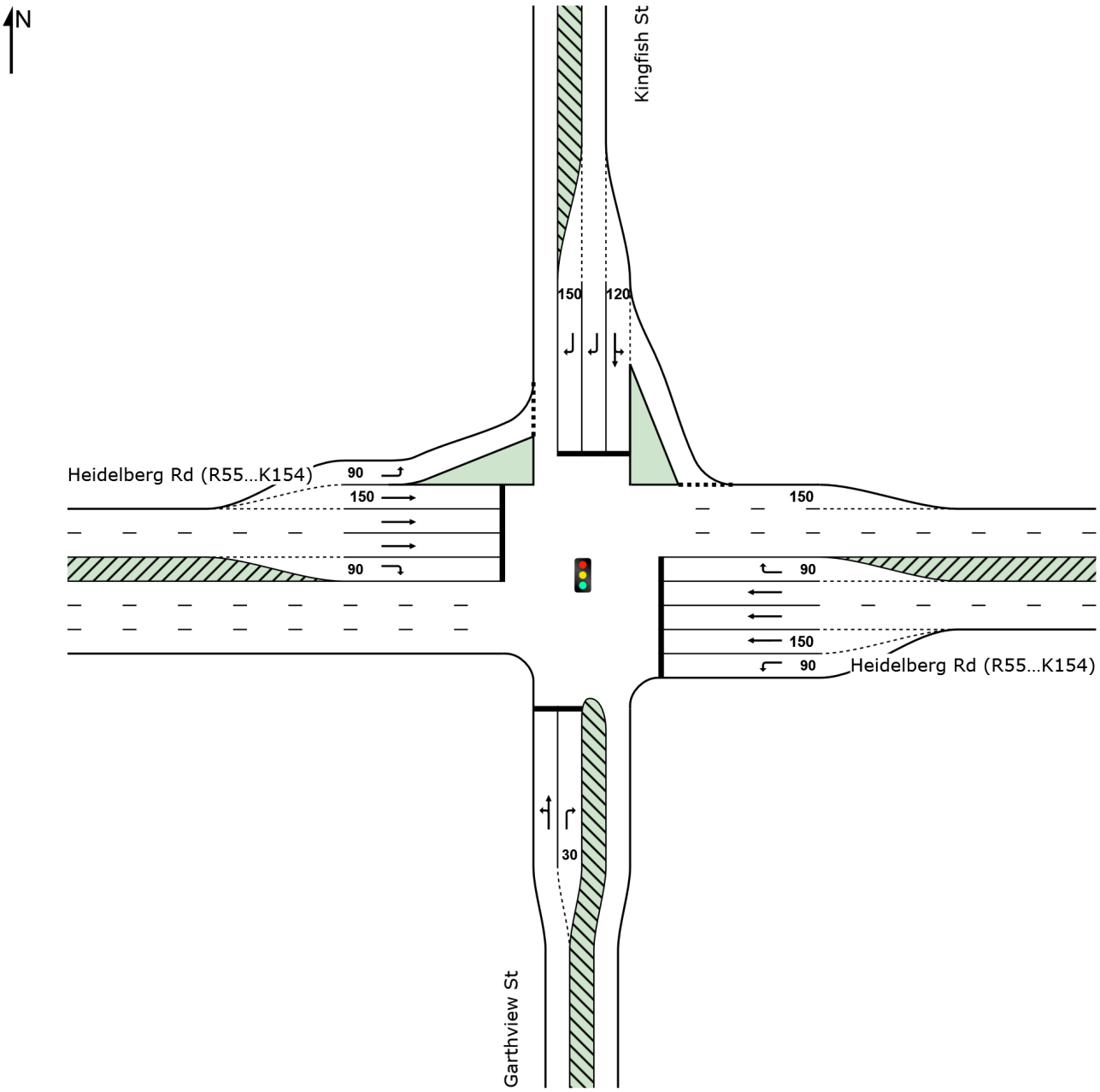
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B2: SITE LAYOUT

Upgraded Intersection Geometry (PHASE 2)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B2.11: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	57	0.0	57	0.0	0.592	63.0	LOS E	4.4	30.8	1.00	0.78	1.05	29.5
2	T1	22	0.0	22	0.0	*0.592	57.5	LOS E	4.4	30.8	1.00	0.78	1.05	29.9
3	R2	15	0.0	15	0.0	0.109	59.9	LOS E	0.8	5.5	0.97	0.68	0.97	30.2
Approach		94	0.0	94	0.0	0.592	61.3	LOS E	4.4	30.8	1.00	0.76	1.03	29.7
East: Heidelberg Rd (R550 / K154)														
4	L2	32	0.0	32	0.0	0.041	28.0	LOS C	1.1	7.4	0.65	0.69	0.65	40.3
5	T1	2134	0.0	2134	0.0	*0.907	46.5	LOS D	44.9	314.3	0.98	1.03	1.18	34.1
6	R2	147	0.0	147	0.0	0.593	43.1	LOS D	7.0	49.3	0.91	0.82	0.91	34.9
Approach		2313	0.0	2313	0.0	0.907	46.0	LOS D	44.9	314.3	0.97	1.01	1.15	34.2
North: Kingfish St														
7	L2	251	0.0	251	0.0	0.224	8.7	LOS A	3.6	25.3	0.31	0.61	0.31	52.9
8	T1	33	0.0	33	0.0	0.224	2.4	LOS A	3.6	25.3	0.31	0.61	0.31	53.5
9	R2	1422	0.0	1422	0.0	*0.906	52.4	LOS D	44.2	309.2	0.99	0.99	1.19	32.2
Approach		1706	0.0	1706	0.0	0.906	45.0	LOS D	44.2	309.2	0.88	0.93	1.04	34.4
West: Heidelberg Rd (R550 / K154)														
10	L2	401	0.0	401	0.0	0.319	9.1	LOS A	5.9	41.0	0.36	0.67	0.36	51.5
11	T1	832	0.0	832	0.0	0.348	25.8	LOS C	11.2	78.1	0.75	0.64	0.75	42.3
12	R2	26	0.0	26	0.0	0.308	63.1	LOS E	1.4	10.1	0.99	0.72	0.99	29.2
Approach		1259	0.0	1259	0.0	0.348	21.3	LOS C	11.2	78.1	0.63	0.65	0.63	44.4
All Vehicles		5372	0.0	5372	0.0	0.907	40.2	LOS D	44.9	314.3	0.86	0.90	0.99	36.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.11: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

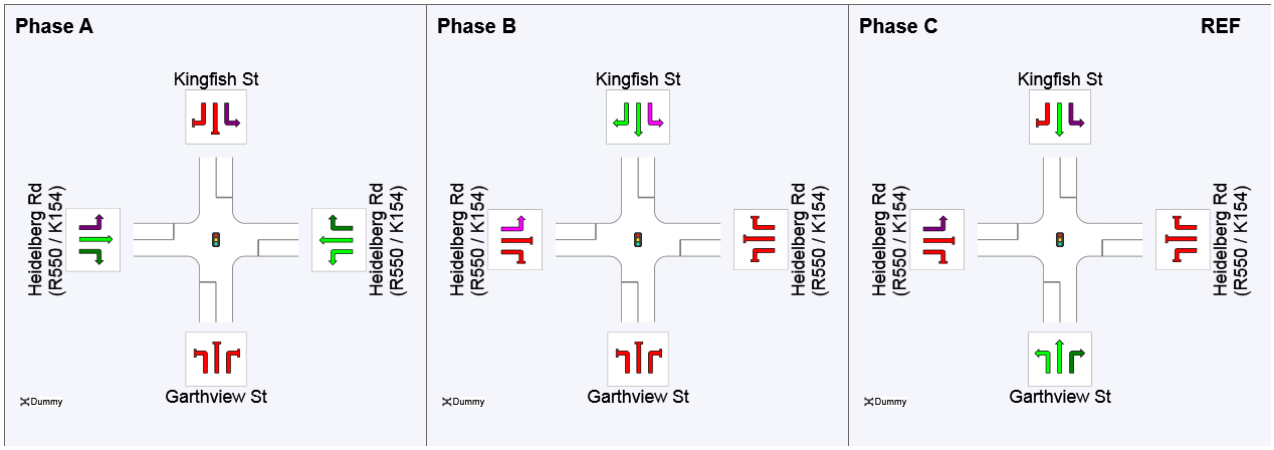
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase C
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

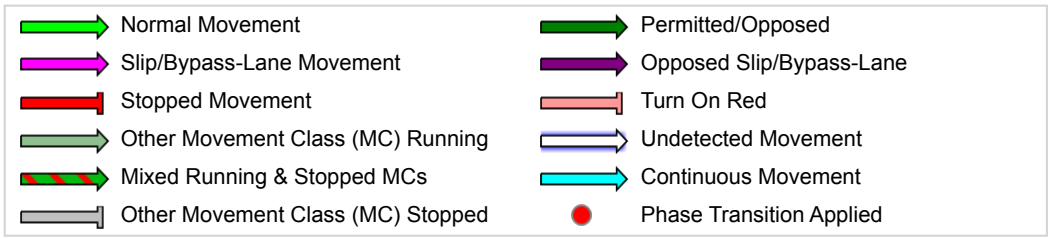
Phase	A	B	C
Phase Change Time (sec)	11	60	0
Green Time (sec)	42	43	7
Phase Time (sec)	49	47	14
Phase Split	45%	43%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B2.12: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Garthview St														
1	L2	15	0.0	15	0.0	0.251	44.2	LOS D	1.8	12.6	0.97	0.72	0.97	35.6
2	T1	32	0.0	32	0.0	*0.251	38.6	LOS D	1.8	12.6	0.97	0.72	0.97	36.2
3	R2	27	0.0	27	0.0	0.142	43.6	LOS D	1.0	7.1	0.95	0.70	0.95	34.9
Approach		74	0.0	74	0.0	0.251	41.5	LOS D	1.8	12.6	0.96	0.71	0.96	35.6
East: Heidelberg Rd (R550 / K154)														
4	L2	16	0.0	16	0.0	0.014	14.1	LOS B	0.3	1.9	0.47	0.64	0.47	47.6
5	T1	1026	0.0	1026	0.0	0.280	10.2	LOS B	7.0	49.1	0.57	0.49	0.57	51.4
6	R2	200	0.0	200	0.0	*0.652	23.0	LOS C	4.3	30.3	0.96	0.83	1.01	43.1
Approach		1242	0.0	1242	0.0	0.652	12.3	LOS B	7.0	49.1	0.63	0.54	0.64	49.8
North: Kingfish St														
7	L2	107	0.0	107	0.0	0.140	15.6	LOS B	2.1	15.0	0.49	0.64	0.49	50.2
8	T1	21	0.0	21	0.0	0.140	6.3	LOS A	2.1	15.0	0.49	0.64	0.49	50.8
9	R2	440	0.0	440	0.0	*0.773	45.6	LOS D	9.1	63.7	1.00	0.91	1.19	34.2
Approach		568	0.0	568	0.0	0.773	38.5	LOS D	9.1	63.7	0.89	0.85	1.03	36.9
West: Heidelberg Rd (R550 / K154)														
10	L2	1019	0.0	1019	0.0	0.725	8.4	LOS A	12.3	86.3	0.57	0.76	0.57	52.1
11	T1	1942	0.0	1942	0.0	*0.752	22.6	LOS C	23.3	163.2	0.89	0.80	0.91	44.4
12	R2	27	0.0	27	0.0	0.091	21.5	LOS C	0.7	4.7	0.64	0.69	0.64	43.7
Approach		2988	0.0	2988	0.0	0.752	17.7	LOS B	23.3	163.2	0.78	0.79	0.79	46.7
All Vehicles		4872	0.0	4872	0.0	0.773	19.1	LOS B	23.3	163.2	0.76	0.73	0.78	45.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B2.12: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

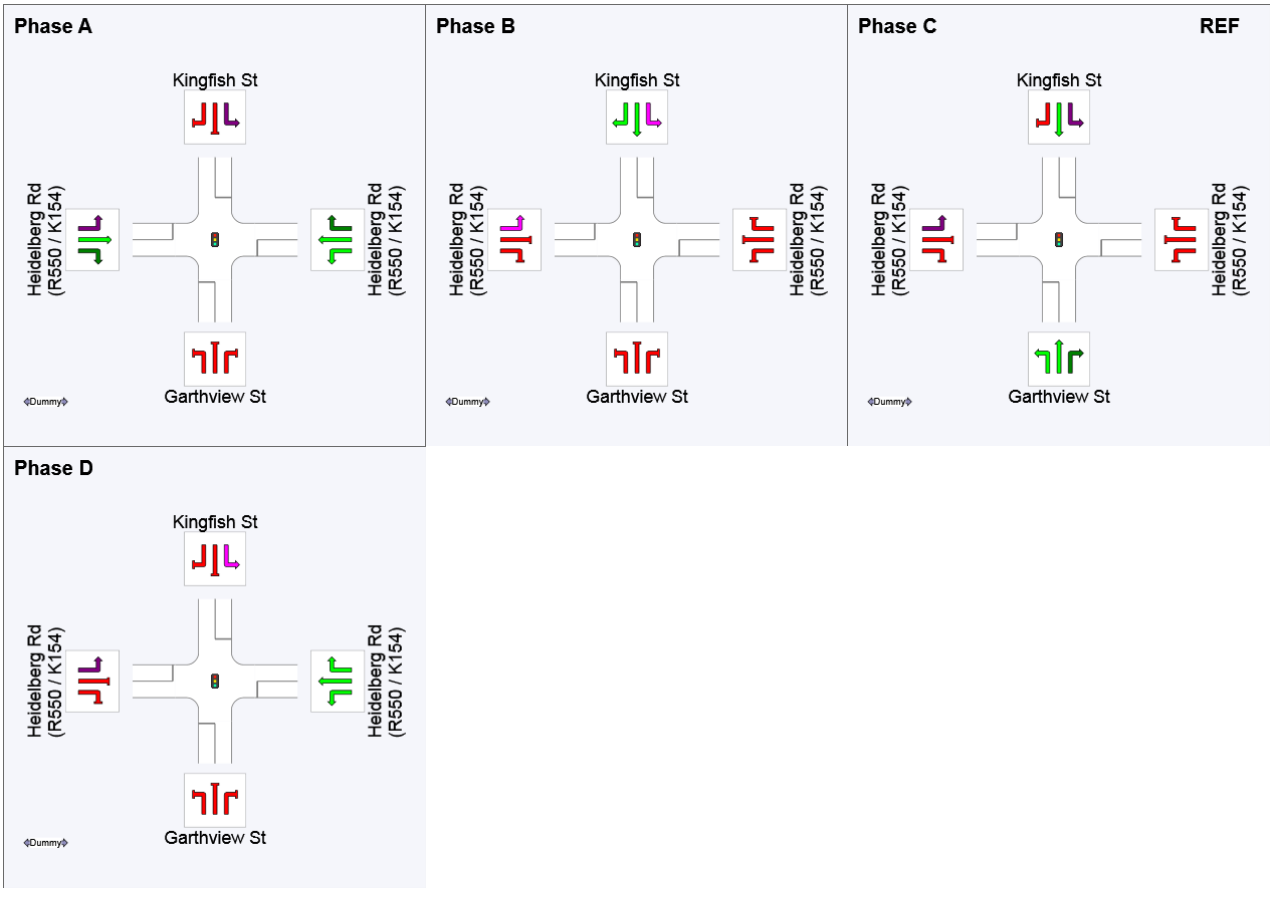
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase C
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	25	62	0	11
Green Time (sec)	33	11	7	7
Phase Time (sec)	40	15	14	11
Phase Split	50%	19%	18%	14%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



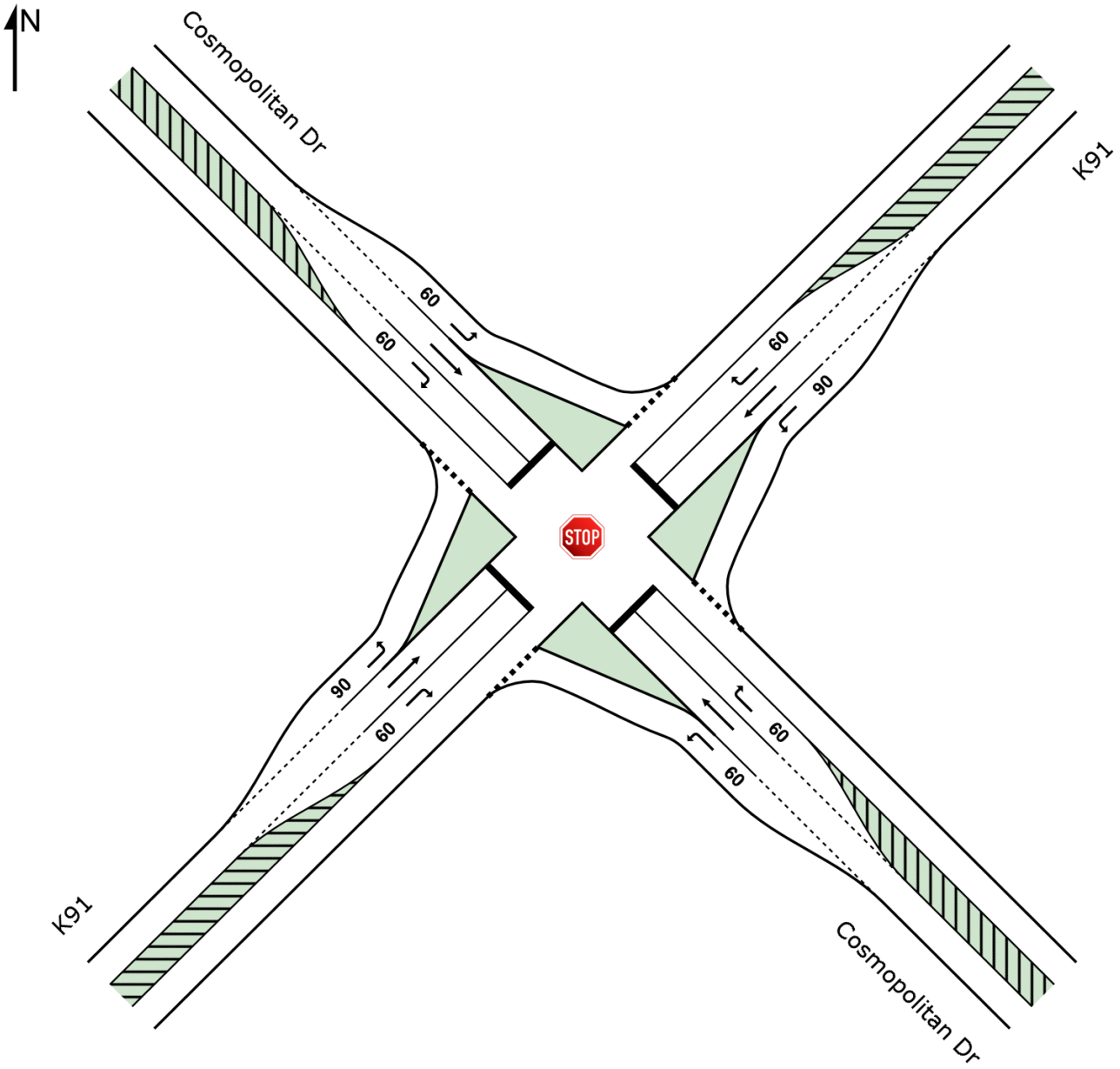
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3: SITE LAYOUT

Existing Intersection Geometry

Site Category: -
Stop (All-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B3.1: MOVEMENT SUMMARY

Site: [Scenario 1 AM (Site Folder: Existing Intersection Geometry)]

Site Category: -
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	34	0.0	36	0.0	0.032	7.1	LOS A	0.1	0.8	0.44	0.62	0.44	52.7
22	T1	18	0.0	19	0.0	0.021	9.6	LOS A	0.1	0.5	0.36	0.86	0.36	51.2
23	R2	1	0.0	1	0.0	0.002	12.3	LOS B	0.0	0.0	0.52	0.83	0.52	49.7
Approach		53	0.0	56	0.0	0.032	8.1	LOS A	0.1	0.8	0.41	0.71	0.41	52.2
NorthEast: K91														
24	L2	1	0.0	1	0.0	0.001	5.6	LOS A	0.0	0.0	0.06	0.52	0.06	54.1
5	T1	264	0.0	278	0.0	0.275	9.3	LOS A	1.2	8.4	0.34	0.89	0.34	51.4
6	R2	188	0.0	198	0.0	0.331	12.9	LOS B	1.5	10.2	0.56	1.04	0.67	49.4
Approach		453	0.0	477	0.0	0.331	10.8	LOS B	1.5	10.2	0.43	0.95	0.48	50.5
NorthWest: Cosmopolitan Dr														
7	L2	309	0.0	325	0.0	0.222	6.1	LOS A	1.0	7.2	0.27	0.55	0.27	53.3
28	T1	13	0.0	14	0.0	0.013	8.9	LOS A	0.0	0.3	0.26	0.86	0.26	51.5
9	R2	163	0.0	172	0.0	0.278	12.1	LOS B	1.1	7.8	0.53	1.01	0.58	49.8
Approach		485	0.0	511	0.0	0.278	8.2	LOS A	1.1	7.8	0.36	0.71	0.37	52.0
SouthWest: K91														
10	L2	47	0.0	49	0.0	0.036	6.2	LOS A	0.1	1.0	0.29	0.54	0.29	53.2
11	T1	133	0.0	140	0.0	0.121	8.4	LOS A	0.5	3.3	0.12	0.92	0.12	51.7
32	R2	2	0.0	2	0.0	0.003	10.1	LOS B	0.0	0.1	0.39	0.83	0.39	51.0
Approach		182	0.0	192	0.0	0.121	7.9	LOS A	0.5	3.3	0.17	0.82	0.17	52.1
All Vehicles		1173	0.0	1235	0.0	0.331	9.1	NA	1.5	10.2	0.36	0.82	0.38	51.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ANNEXURE B3.2: MOVEMENT SUMMARY

Site: [Scenario 1 AM (Site Folder: Existing Intersection Geometry)]

Site Category: -
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	1	0.0	1	0.0	0.001	6.4	LOS A	0.0	0.0	0.33	0.50	0.33	53.1
22	T1	22	0.0	23	0.0	0.022	8.9	LOS A	0.1	0.6	0.25	0.87	0.25	51.6
23	R2	1	0.0	1	0.0	0.002	13.9	LOS B	0.0	0.1	0.61	0.83	0.61	48.8
Approach		24	0.0	25	0.0	0.022	9.0	LOS A	0.1	0.6	0.27	0.85	0.27	51.5
NorthEast: K91														
24	L2	5	0.0	5	0.0	0.003	5.8	LOS A	0.0	0.1	0.13	0.51	0.13	53.8
5	T1	144	0.0	152	0.0	0.152	9.2	LOS A	0.6	4.1	0.32	0.89	0.32	51.4
6	R2	301	0.0	317	0.0	0.602	17.3	LOS C	3.9	27.0	0.72	1.17	1.26	46.8
Approach		450	0.0	474	0.0	0.602	14.6	LOS B	3.9	27.0	0.59	1.07	0.95	48.2
NorthWest: Cosmopolitan Dr														
7	L2	288	0.0	303	0.0	0.231	6.6	LOS A	1.0	7.3	0.38	0.60	0.38	52.9
28	T1	37	0.0	39	0.0	0.048	10.2	LOS B	0.2	1.2	0.42	0.89	0.42	50.9
9	R2	119	0.0	125	0.0	0.230	12.9	LOS B	0.8	5.9	0.56	1.01	0.58	49.3
Approach		444	0.0	467	0.0	0.231	8.6	LOS A	1.0	7.3	0.43	0.74	0.44	51.7
SouthWest: K91														
10	L2	221	0.0	233	0.0	0.189	6.9	LOS A	0.8	5.6	0.42	0.63	0.42	52.8
11	T1	253	0.0	266	0.0	0.227	8.3	LOS A	1.0	6.9	0.10	0.93	0.10	51.7
32	R2	19	0.0	20	0.0	0.024	9.4	LOS A	0.1	0.6	0.31	0.87	0.31	51.4
Approach		493	0.0	519	0.0	0.227	7.7	LOS A	1.0	6.9	0.25	0.79	0.25	52.2
All Vehicles		1411	0.0	1485	0.0	0.602	10.2	NA	3.9	27.0	0.42	0.87	0.53	50.7

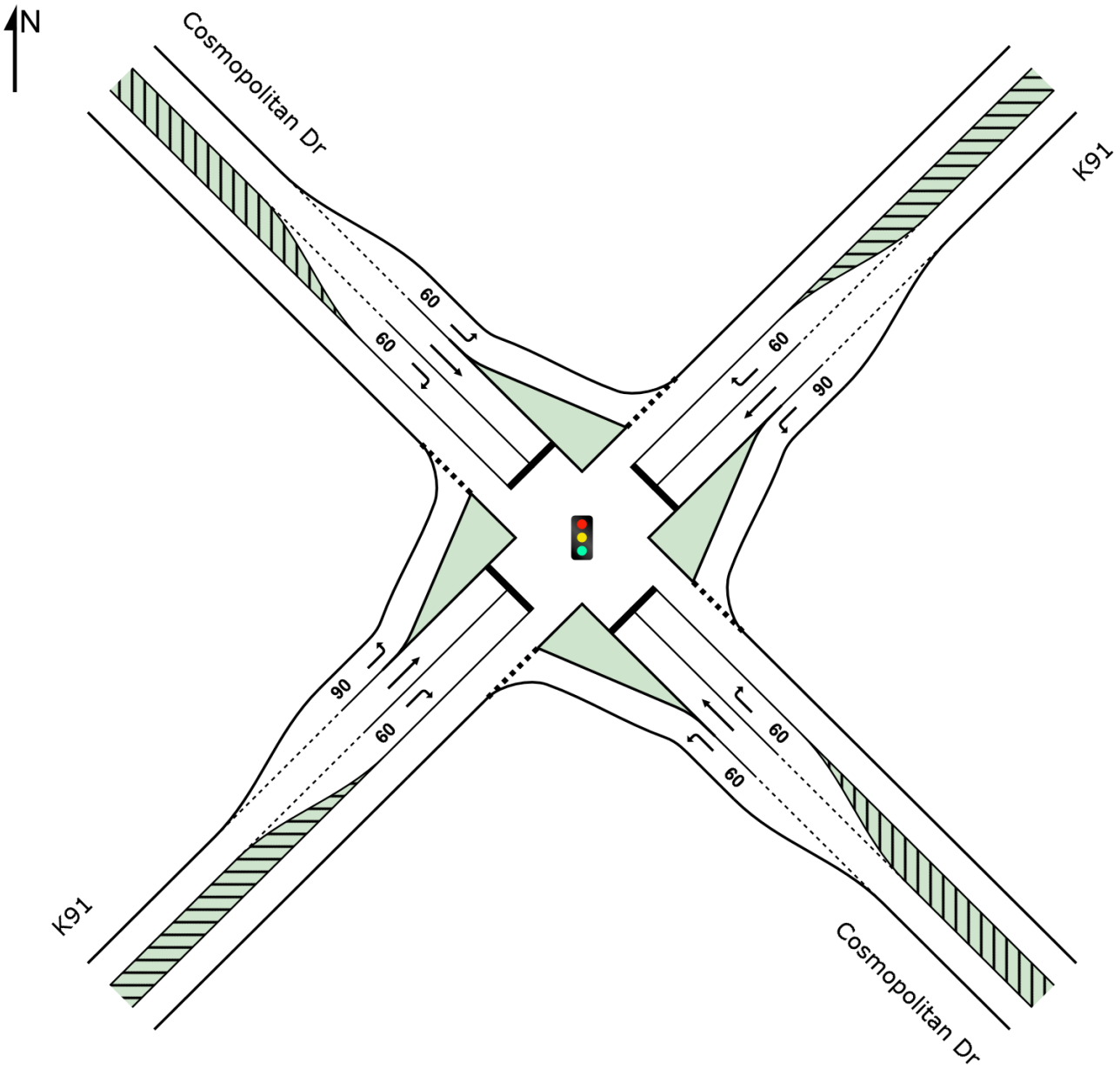
Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ANNEXURE B3: SITE LAYOUT

Signalized Intersection (Existing Geometry)

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B3.3: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Signalized Intersection (Existing Geometry))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 65 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	211	0.0	211	0.0	0.227	13.2	LOS B	3.3	23.1	0.59	0.71	0.59	48.7
22	T1	38	0.0	38	0.0	*0.162	29.8	LOS C	1.1	8.0	0.94	0.68	0.94	40.3
23	R2	433	0.0	433	0.0	*0.824	32.5	LOS C	13.6	95.1	1.00	0.98	1.22	38.5
Approach		682	0.0	682	0.0	0.824	26.4	LOS C	13.6	95.1	0.87	0.88	1.01	41.3
NorthEast: K91														
24	L2	276	0.0	276	0.0	0.197	6.8	LOS A	1.6	11.1	0.29	0.63	0.29	53.2
5	T1	684	0.0	684	0.0	0.824	19.4	LOS B	19.6	137.5	0.82	0.84	0.97	45.5
6	R2	548	0.0	548	0.0	*1.394	382.5	LOS F	77.6	543.4	1.00	2.49	5.19	7.9
Approach		1508	0.0	1508	0.0	1.394	149.1	LOS F	77.6	543.4	0.79	1.40	2.38	16.8
NorthWest: Cosmopolitan Dr														
7	L2	922	0.0	922	0.0	1.218	229.2	LOS F	96.4	674.8	1.00	2.16	3.80	12.0
28	T1	38	0.0	38	0.0	0.162	29.8	LOS C	1.1	8.0	0.94	0.68	0.94	40.3
9	R2	266	0.0	266	0.0	0.506	25.2	LOS C	6.9	48.4	0.91	0.80	0.91	41.7
Approach		1226	0.0	1226	0.0	1.218	178.8	LOS F	96.4	674.8	0.98	1.82	3.09	14.6
SouthWest: K91														
10	L2	120	0.0	120	0.0	0.088	7.6	LOS A	0.8	5.8	0.34	0.63	0.34	52.7
11	T1	727	0.0	727	0.0	*1.210	227.0	LOS F	81.6	571.0	1.00	2.62	3.76	12.5
32	R2	97	0.0	97	0.0	0.367	28.8	LOS C	2.7	19.0	0.87	0.77	0.87	40.1
Approach		944	0.0	944	0.0	1.210	178.7	LOS F	81.6	571.0	0.90	2.18	3.03	15.1
All Vehicles		4360	0.0	4360	0.0	1.394	144.7	LOS F	96.4	674.8	0.88	1.61	2.51	17.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.3: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Signalized Intersection (Existing Geometry))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 65 seconds (Site Optimum Cycle Time - Minimum Delay)

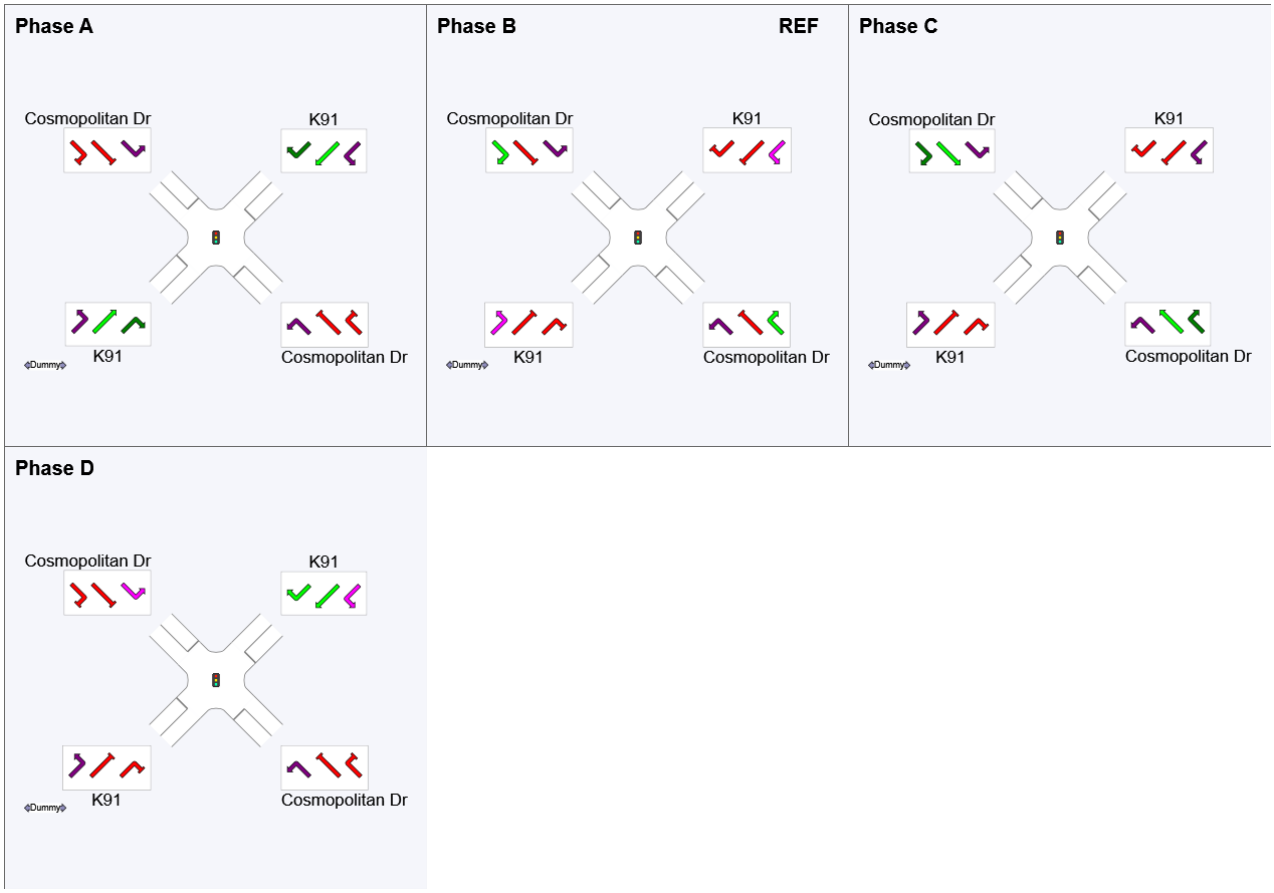
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	42	0	17	28
Green Time (sec)	19	10	7	8
Phase Time (sec)	26	14	13	12
Phase Split	40%	22%	20%	18%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3.4: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Signalized Intersection (Existing Geometry))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	120	0.0	120	0.0	0.129	14.4	LOS B	2.3	16.0	0.51	0.67	0.51	48.0
22	T1	43	0.0	43	0.0	0.240	41.3	LOS D	1.8	12.3	0.97	0.71	0.97	35.8
23	R2	331	0.0	331	0.0	* 0.864	46.6	LOS D	14.3	100.0	1.00	1.01	1.30	33.6
Approach		494	0.0	494	0.0	0.864	38.3	LOS D	14.3	100.0	0.88	0.90	1.08	36.4
NorthEast: K91														
24	L2	475	0.0	475	0.0	0.323	6.6	LOS A	3.0	21.1	0.25	0.62	0.25	53.4
5	T1	672	0.0	672	0.0	* 1.154	188.6	LOS F	72.7	509.2	1.00	2.11	2.77	14.4
6	R2	874	0.0	874	0.0	* 1.500	485.6	LOS F	150.4	1053.1	1.00	2.35	4.72	6.4
Approach		2021	0.0	2021	0.0	1.500	274.3	LOS F	150.4	1053.1	0.82	1.86	3.02	10.6
NorthWest: Cosmopolitan Dr														
7	L2	660	0.0	660	0.0	0.762	23.5	LOS C	16.3	113.8	0.85	0.94	0.87	43.0
28	T1	56	0.0	56	0.0	* 0.313	41.7	LOS D	2.3	16.1	0.98	0.73	0.98	35.6
9	R2	206	0.0	206	0.0	0.525	36.1	LOS D	7.5	52.6	0.95	0.80	0.95	37.1
Approach		922	0.0	922	0.0	0.762	27.4	LOS C	16.3	113.8	0.88	0.90	0.90	41.0
SouthWest: K91														
10	L2	338	0.0	338	0.0	0.293	12.2	LOS B	5.8	40.6	0.52	0.70	0.52	49.4
11	T1	655	0.0	655	0.0	1.112	154.8	LOS F	63.3	443.3	1.00	1.92	2.48	16.7
32	R2	205	0.0	205	0.0	0.308	18.5	LOS B	3.8	26.7	0.80	0.76	0.80	45.2
Approach		1198	0.0	1198	0.0	1.112	91.2	LOS F	63.3	443.3	0.83	1.38	1.64	23.7
All Vehicles		4635	0.0	4635	0.0	1.500	152.7	LOS F	150.4	1053.1	0.84	1.44	2.04	16.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.4: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Signalized Intersection (Existing Geometry))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

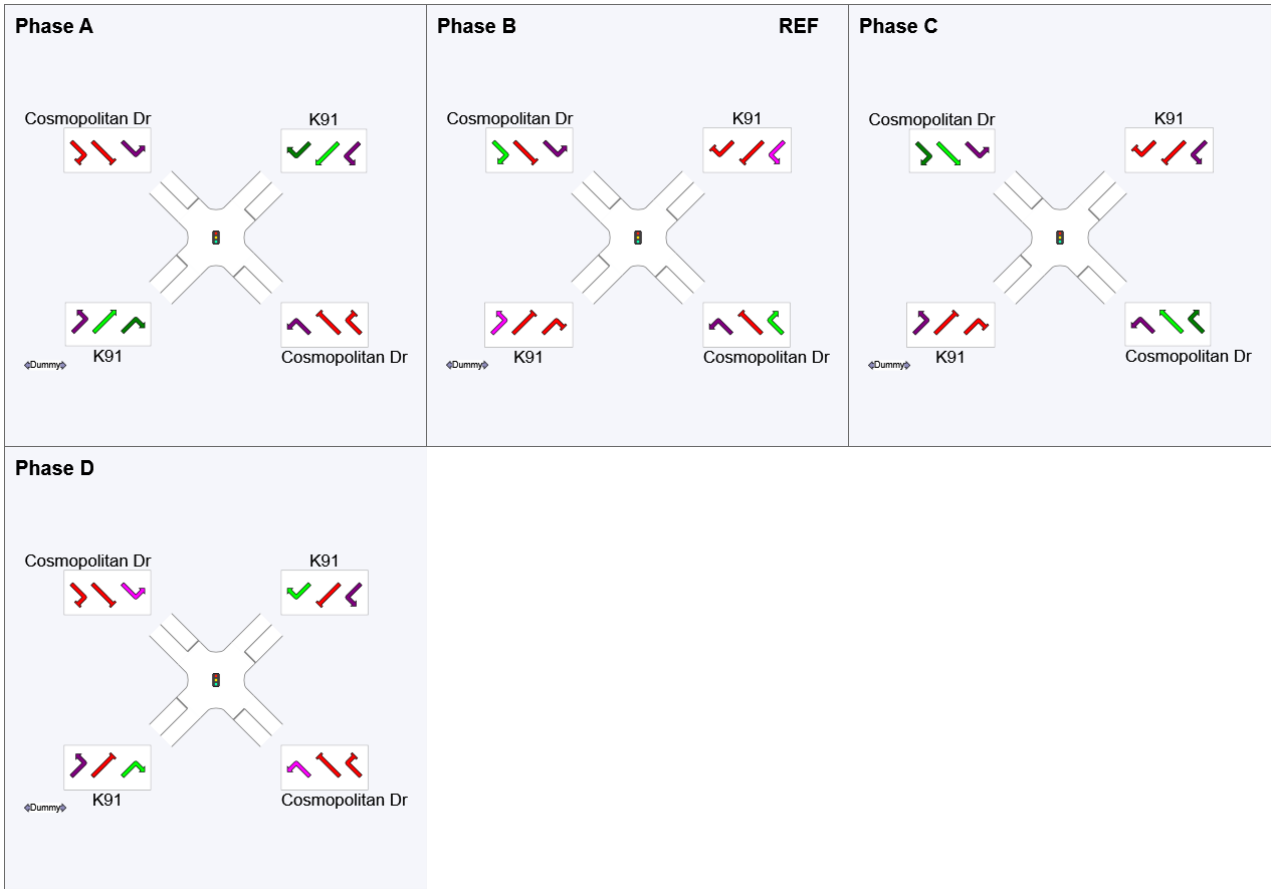
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	57	0	17	28
Green Time (sec)	24	10	7	23
Phase Time (sec)	31	14	13	27
Phase Split	36%	16%	15%	32%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



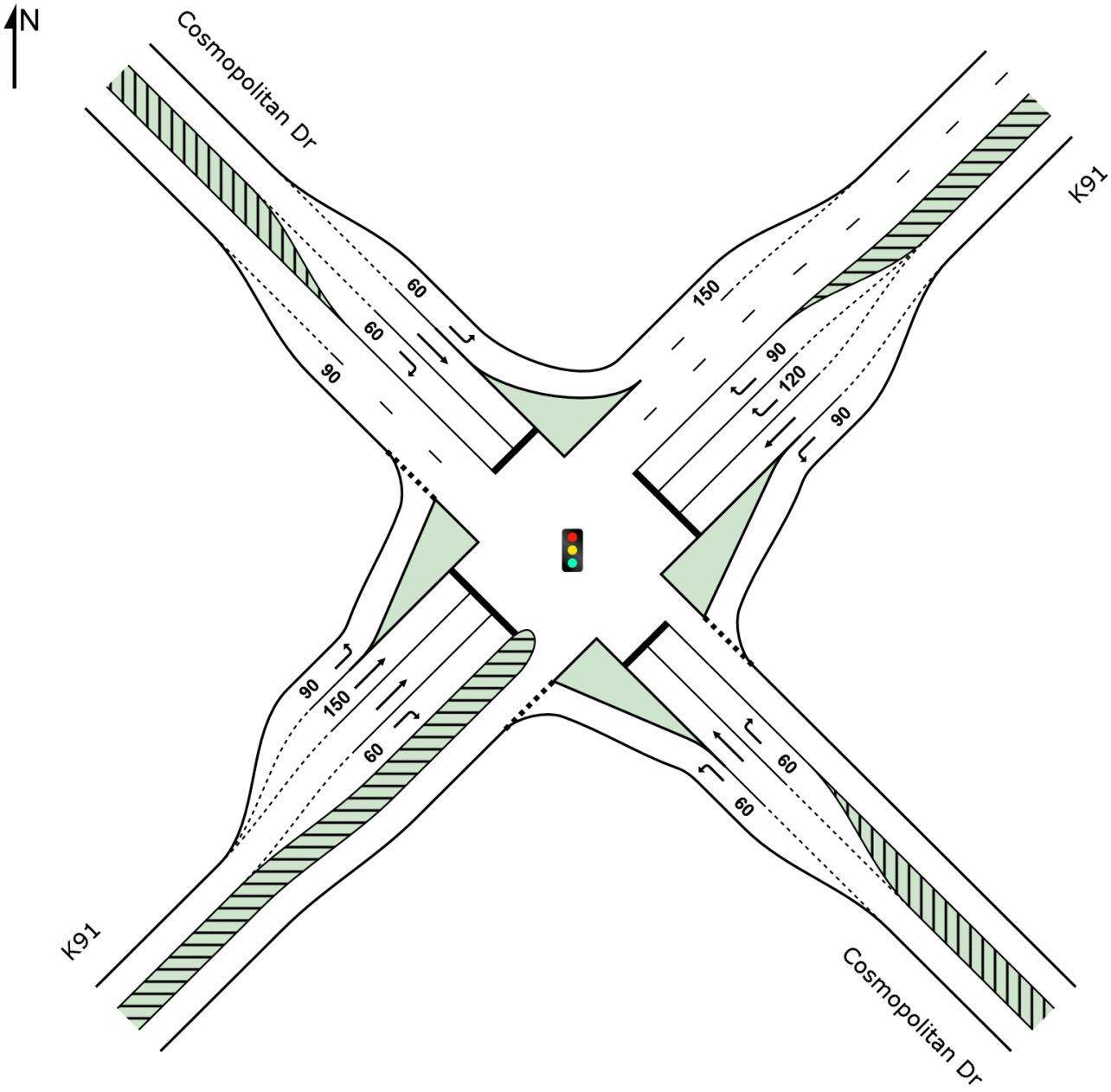
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3: SITE LAYOUT

Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B3.5: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	211	0.0	211	0.0	0.236	14.7	LOS B	4.0	28.2	0.58	0.71	0.58	47.8
22	T1	38	0.0	38	0.0	*0.200	39.1	LOS D	1.4	10.1	0.96	0.70	0.96	37.0
23	R2	433	0.0	433	0.0	*0.661	27.6	LOS C	13.7	95.9	0.92	0.83	0.92	40.8
Approach		682	0.0	682	0.0	0.661	24.3	LOS C	13.7	95.9	0.82	0.79	0.82	42.5
NorthEast: K91														
24	L2	276	0.0	276	0.0	0.195	7.1	LOS A	2.0	14.3	0.28	0.63	0.28	53.0
5	T1	684	0.0	684	0.0	0.700	19.0	LOS B	21.4	150.0	0.86	0.77	0.86	45.8
6	R2	548	0.0	548	0.0	*0.864	43.9	LOS D	15.8	110.5	0.98	0.92	1.17	34.7
Approach		1508	0.0	1508	0.0	0.864	25.9	LOS C	21.4	150.0	0.80	0.80	0.87	42.0
NorthWest: Cosmopolitan Dr														
7	L2	922	0.0	922	0.0	0.446	8.0	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
28	T1	38	0.0	38	0.0	0.200	38.3	LOS D	1.4	10.1	0.96	0.70	0.96	37.0
9	R2	266	0.0	266	0.0	0.406	25.5	LOS C	7.6	53.2	0.83	0.79	0.83	41.9
Approach		1226	0.0	1226	0.0	0.446	12.7	LOS B	7.6	53.2	0.21	0.59	0.21	50.6
SouthWest: K91														
10	L2	120	0.0	120	0.0	0.082	8.9	LOS A	1.2	8.1	0.31	0.62	0.31	52.3
11	T1	727	0.0	727	0.0	*0.837	39.2	LOS D	15.4	108.0	1.00	0.99	1.23	36.6
32	R2	97	0.0	97	0.0	0.445	37.7	LOS D	3.5	24.7	0.92	0.79	0.92	36.5
Approach		944	0.0	944	0.0	0.837	35.2	LOS D	15.4	108.0	0.90	0.92	1.08	38.0
All Vehicles		4360	0.0	4360	0.0	0.864	23.9	LOS C	21.4	150.0	0.66	0.76	0.72	43.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.5: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 4
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	60	0	26	37
Green Time (sec)	16	19	7	16
Phase Time (sec)	23	23	14	20
Phase Split	29%	29%	18%	25%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3.6: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	120	0.0	120	0.0	0.118	11.8	LOS B	1.7	11.9	0.50	0.68	0.50	49.7
22	T1	43	0.0	43	0.0	0.198	35.5	LOS D	1.4	9.9	0.95	0.70	0.95	39.2
23	R2	331	0.0	331	0.0	*0.860	40.8	LOS D	11.9	83.0	1.00	1.06	1.35	35.6
Approach		494	0.0	494	0.0	0.860	33.3	LOS C	11.9	83.0	0.87	0.93	1.11	38.6
NorthEast: K91														
24	L2	475	0.0	475	0.0	0.364	9.2	LOS A	5.5	38.7	0.46	0.70	0.46	51.5
5	T1	672	0.0	672	0.0	0.570	11.4	LOS B	15.2	106.1	0.71	0.64	0.71	50.6
6	R2	874	0.0	874	0.0	*0.918	41.0	LOS D	25.0	175.2	0.96	0.98	1.24	35.9
Approach		2021	0.0	2021	0.0	0.918	23.7	LOS C	25.0	175.2	0.76	0.80	0.88	43.2
NorthWest: Cosmopolitan Dr														
7	L2	660	0.0	660	0.0	0.319	6.9	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
28	T1	56	0.0	56	0.0	*0.258	33.0	LOS C	1.9	13.0	0.96	0.71	0.96	39.1
9	R2	206	0.0	206	0.0	0.523	30.7	LOS C	6.2	43.7	0.95	0.79	0.95	39.5
Approach		922	0.0	922	0.0	0.523	13.8	LOS B	6.2	43.7	0.27	0.60	0.27	49.4
SouthWest: K91														
10	L2	338	0.0	338	0.0	0.279	13.7	LOS B	4.8	33.9	0.50	0.69	0.50	50.2
11	T1	655	0.0	655	0.0	0.812	34.3	LOS C	12.1	84.5	1.00	0.96	1.23	38.5
32	R2	205	0.0	205	0.0	*0.911	53.8	LOS D	9.3	65.4	1.00	1.13	1.69	31.5
Approach		1198	0.0	1198	0.0	0.911	31.8	LOS C	12.1	84.5	0.86	0.91	1.10	39.6
All Vehicles		4635	0.0	4635	0.0	0.918	24.8	LOS C	25.0	175.2	0.70	0.80	0.84	42.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.6: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 4
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	53	0	14	25
Green Time (sec)	13	7	7	21
Phase Time (sec)	20	11	14	25
Phase Split	29%	16%	20%	36%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3.7: MOVEMENT SUMMARY

Site: [Scenario 3 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	214	0.0	214	0.0	0.238	15.6	LOS B	4.6	31.9	0.57	0.71	0.57	47.2
22	T1	40	0.0	40	0.0	*0.237	45.2	LOS D	1.7	12.1	0.97	0.71	0.97	35.0
23	R2	433	0.0	433	0.0	*0.701	31.9	LOS C	15.9	111.2	0.94	0.84	0.95	38.9
Approach		687	0.0	687	0.0	0.701	27.6	LOS C	15.9	111.2	0.83	0.80	0.83	40.9
NorthEast: K91														
24	L2	276	0.0	276	0.0	0.192	7.2	LOS A	2.2	15.3	0.26	0.63	0.26	53.0
5	T1	707	0.0	707	0.0	0.686	18.6	LOS B	23.4	163.6	0.82	0.73	0.82	46.0
6	R2	661	0.0	661	0.0	*0.852	44.5	LOS D	20.6	144.0	0.97	0.90	1.10	34.6
Approach		1644	0.0	1644	0.0	0.852	27.1	LOS C	23.4	163.6	0.78	0.78	0.84	41.4
NorthWest: Cosmopolitan Dr														
7	L2	1151	0.0	1151	0.0	0.556	9.8	LOS A	0.0	0.0	0.00	0.53	0.00	54.6
28	T1	39	0.0	39	0.0	0.231	44.0	LOS D	1.7	11.8	0.97	0.71	0.97	35.0
9	R2	281	0.0	281	0.0	0.451	29.5	LOS C	9.4	65.5	0.86	0.80	0.86	40.1
Approach		1471	0.0	1471	0.0	0.556	14.5	LOS B	9.4	65.5	0.19	0.58	0.19	50.4
SouthWest: K91														
10	L2	124	0.0	124	0.0	0.089	10.3	LOS B	1.5	10.7	0.34	0.63	0.34	51.5
11	T1	739	0.0	739	0.0	*0.858	45.0	LOS D	18.0	126.2	1.00	1.01	1.25	34.6
32	R2	97	0.0	97	0.0	0.471	41.8	LOS D	4.0	27.9	0.93	0.79	0.93	35.1
Approach		960	0.0	960	0.0	0.858	40.2	LOS D	18.0	126.2	0.91	0.94	1.10	36.2
All Vehicles		4762	0.0	4762	0.0	0.858	25.9	LOS C	23.4	163.6	0.63	0.75	0.69	42.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.7: PHASING SUMMARY

Site: [Scenario 3 AM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 4
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	68	0	28	39
Green Time (sec)	18	21	7	22
Phase Time (sec)	25	25	14	26
Phase Split	28%	28%	16%	29%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3.8: MOVEMENT SUMMARY

Site: [Scenario 3 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	120	0.0	120	0.0	0.128	15.8	LOS B	2.8	19.3	0.49	0.67	0.49	47.1
22	T1	45	0.0	45	0.0	0.311	56.3	LOS E	2.3	16.2	0.99	0.73	0.99	32.3
23	R2	331	0.0	331	0.0	*0.872	55.1	LOS E	17.7	124.2	1.00	0.98	1.27	31.3
Approach		496	0.0	496	0.0	0.872	45.7	LOS D	17.7	124.2	0.88	0.88	1.05	34.2
NorthEast: K91														
24	L2	475	0.0	475	0.0	0.323	6.7	LOS A	3.7	25.7	0.24	0.63	0.24	53.3
5	T1	684	0.0	684	0.0	*1.149	192.6	LOS F	80.3	562.2	1.00	1.97	2.42	14.2
6	R2	1063	0.0	1063	0.0	*1.158	144.6	LOS F	80.3	561.8	0.97	1.29	1.89	17.6
Approach		2222	0.0	2222	0.0	1.158	129.9	LOS F	80.3	562.2	0.82	1.36	1.70	18.9
NorthWest: Cosmopolitan Dr														
7	L2	763	0.0	763	0.0	0.369	7.2	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
28	T1	59	0.0	59	0.0	*0.407	53.4	LOS D	3.1	21.4	1.00	0.74	1.00	32.2
9	R2	216	0.0	216	0.0	0.555	43.7	LOS D	9.7	68.1	0.96	0.81	0.96	34.7
Approach		1038	0.0	1038	0.0	0.555	17.4	LOS B	9.7	68.1	0.26	0.60	0.26	47.3
SouthWest: K91														
10	L2	357	0.0	357	0.0	0.290	18.9	LOS B	8.5	59.7	0.52	0.70	0.52	47.3
11	T1	677	0.0	677	0.0	0.564	35.2	LOS D	14.9	104.4	0.91	0.78	0.91	38.1
32	R2	207	0.0	207	0.0	0.281	19.7	LOS B	4.4	30.5	0.76	0.75	0.76	44.5
Approach		1241	0.0	1241	0.0	0.564	27.9	LOS C	14.9	104.4	0.77	0.75	0.77	41.4
All Vehicles		4997	0.0	4997	0.0	1.158	72.9	LOS E	80.3	562.2	0.70	1.00	1.11	27.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.8: PHASING SUMMARY

Site: [Scenario 3 PM (Site Folder: Upgraded Intersection Geometry (PHASE 1))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 3
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	72	0	21	32
Green Time (sec)	29	14	7	33
Phase Time (sec)	36	18	14	37
Phase Split	34%	17%	13%	35%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

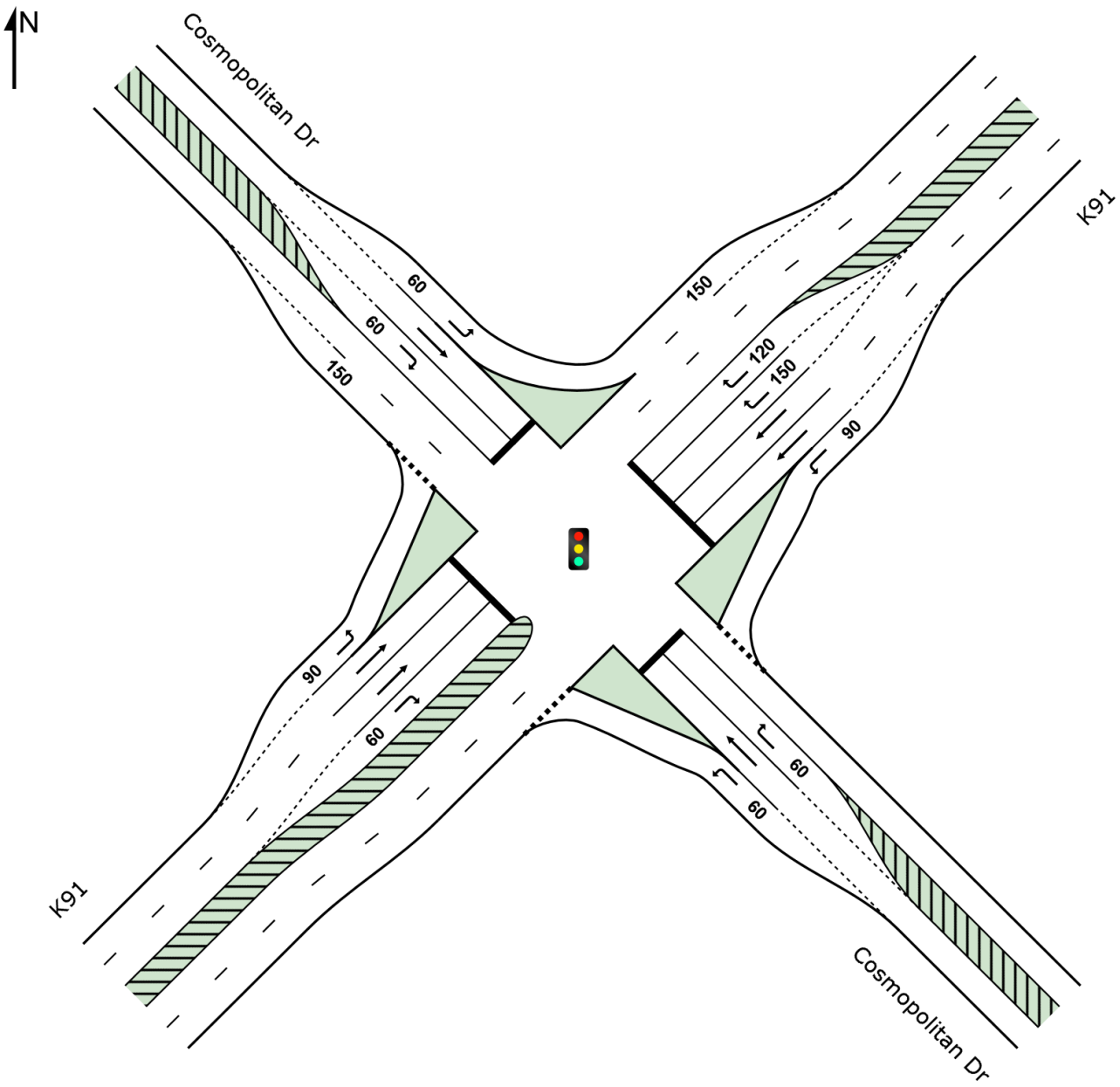
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3: SITE LAYOUT

Upgraded Intersection Geometry (PHASE 2))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B3.9: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	214	0.0	214	0.0	0.216	12.4	LOS B	4.2	29.5	0.43	0.67	0.43	49.3
22	T1	40	0.0	40	0.0	*0.289	56.4	LOS E	2.2	15.1	0.99	0.72	0.99	31.6
23	R2	487	0.0	487	0.0	*0.786	40.5	LOS D	23.2	162.4	0.97	0.88	1.02	35.9
Approach		741	0.0	741	0.0	0.786	33.2	LOS C	23.2	162.4	0.81	0.81	0.85	38.7
NorthEast: K91														
24	L2	297	0.0	297	0.0	0.196	6.2	LOS A	1.4	9.9	0.16	0.60	0.16	53.7
5	T1	895	0.0	895	0.0	0.671	36.3	LOS D	21.0	147.2	0.94	0.81	0.94	37.7
6	R2	661	0.0	661	0.0	*0.953	68.6	LOS E	24.6	172.4	1.00	1.00	1.33	28.2
Approach		1853	0.0	1853	0.0	0.953	43.0	LOS D	24.6	172.4	0.84	0.84	0.95	35.1
NorthWest: Cosmopolitan Dr														
7	L2	1151	0.0	1151	0.0	0.556	22.8	LOS C	0.0	0.0	0.00	0.53	0.00	54.6
28	T1	39	0.0	39	0.0	0.282	55.5	LOS E	2.1	14.7	0.99	0.72	0.99	31.6
9	R2	281	0.0	281	0.0	0.441	34.4	LOS C	11.3	79.2	0.85	0.80	0.85	38.0
Approach		1471	0.0	1471	0.0	0.556	25.9	LOS C	11.3	79.2	0.19	0.58	0.19	49.6
SouthWest: K91														
10	L2	124	0.0	124	0.0	0.081	9.7	LOS A	1.6	11.2	0.29	0.62	0.29	51.8
11	T1	1187	0.0	1187	0.0	*0.964	69.6	LOS E	42.1	295.0	1.00	1.22	1.43	28.1
32	R2	97	0.0	97	0.0	0.190	23.2	LOS C	2.7	18.6	0.77	0.74	0.77	42.9
Approach		1408	0.0	1408	0.0	0.964	61.1	LOS E	42.1	295.0	0.92	1.13	1.28	30.0
All Vehicles		5473	0.0	5473	0.0	0.964	41.7	LOS D	42.1	295.0	0.68	0.84	0.82	36.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.9: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 3
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	73	0	35	46
Green Time (sec)	33	28	7	20
Phase Time (sec)	40	32	14	24
Phase Split	36%	29%	13%	22%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

ANNEXURE B3.10: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Cosmopolitan Dr														
21	L2	120	0.0	120	0.0	0.121	14.3	LOS B	2.5	17.6	0.46	0.66	0.46	48.1
22	T1	45	0.0	45	0.0	0.311	57.0	LOS E	2.3	16.2	0.99	0.73	0.99	32.4
23	R2	352	0.0	352	0.0	*0.778	44.9	LOS D	16.9	118.2	1.00	0.89	1.09	34.4
Approach		517	0.0	517	0.0	0.778	38.9	LOS D	16.9	118.2	0.87	0.82	0.93	36.6
NorthEast: K91														
24	L2	522	0.0	522	0.0	0.352	6.7	LOS A	4.2	29.5	0.24	0.62	0.24	53.3
5	T1	1069	0.0	1069	0.0	*0.971	72.2	LOS E	40.2	281.5	1.00	1.24	1.50	27.5
6	R2	1063	0.0	1063	0.0	*0.975	67.0	LOS E	41.2	288.6	1.00	1.02	1.32	28.9
Approach		2654	0.0	2654	0.0	0.975	57.2	LOS E	41.2	288.6	0.85	1.03	1.18	31.1
NorthWest: Cosmopolitan Dr														
7	L2	763	0.0	763	0.0	0.369	7.9	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
28	T1	59	0.0	59	0.0	*0.407	53.4	LOS D	3.1	21.4	1.00	0.74	1.00	32.2
9	R2	216	0.0	216	0.0	0.462	39.6	LOS D	9.1	63.9	0.92	0.80	0.92	36.1
Approach		1038	0.0	1038	0.0	0.462	17.1	LOS B	9.1	63.9	0.25	0.60	0.25	47.8
SouthWest: K91														
10	L2	357	0.0	357	0.0	0.275	17.8	LOS B	7.7	54.0	0.48	0.69	0.48	48.5
11	T1	854	0.0	854	0.0	0.760	39.3	LOS D	21.9	153.1	0.97	0.87	1.02	36.6
32	R2	207	0.0	207	0.0	0.309	21.5	LOS C	4.8	33.8	0.80	0.75	0.80	43.7
Approach		1418	0.0	1418	0.0	0.760	31.3	LOS C	21.9	153.1	0.82	0.81	0.85	40.0
All Vehicles		5627	0.0	5627	0.0	0.975	41.6	LOS D	41.2	288.6	0.73	0.88	0.90	35.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B3.10: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Upgraded Intersection Geometry (PHASE 2))]

Future 2026 Base Peak Hour Traffic Volumes + Palm Ridge Ext. 10, 12 & 13 Trips + Watervalspruit Ext. 54 Trips + Watervalspruit Service Plan Stage 2 Remaining Trips + Estimated Total Development Trips
Site Category: -
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 3
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	73	0	25	36
Green Time (sec)	28	18	7	30
Phase Time (sec)	35	22	14	34
Phase Split	33%	21%	13%	32%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

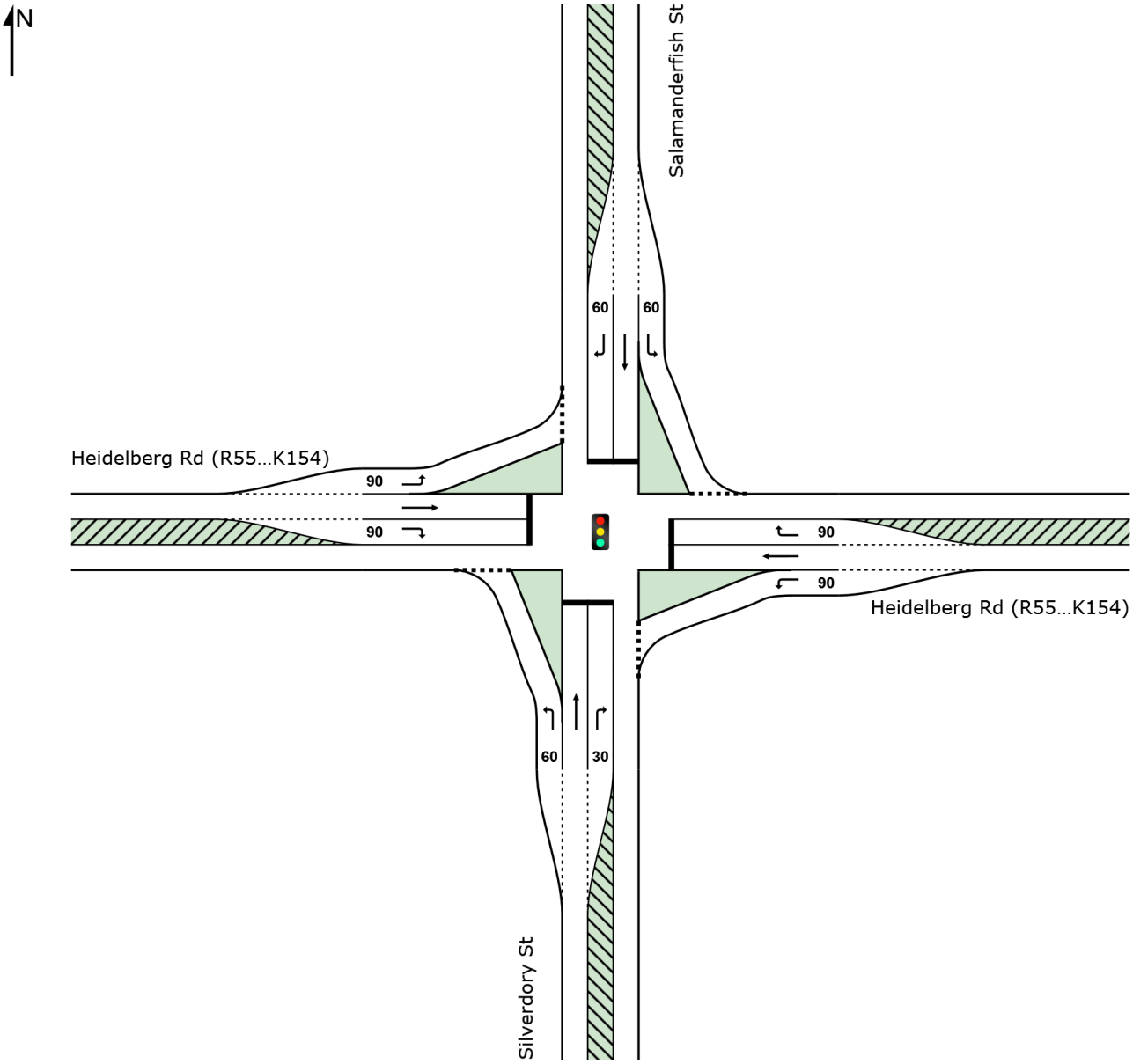
REF: Reference Phase
VAR: Variable Phase

ANNEXURE B4: SITE LAYOUT

Proposed Intersection Geometry (PHASE 1)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B4.1: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	342	0.0	342	0.0	0.774	25.6	LOS C	9.5	66.7	1.00	0.98	1.21	41.9
2	T1	54	0.0	54	0.0	0.186	26.0	LOS C	1.5	10.3	0.92	0.69	0.92	42.1
3	R2	72	0.0	72	0.0	0.276	32.2	LOS C	2.0	14.0	0.94	0.75	0.94	38.7
Approach		468	0.0	468	0.0	0.774	26.7	LOS C	9.5	66.7	0.98	0.91	1.13	41.4
East: Heidelberg Rd (R550 / K154)														
4	L2	35	0.0	35	0.0	0.029	8.4	LOS A	0.3	1.9	0.41	0.63	0.41	52.1
5	T1	1114	0.0	1114	0.0	0.791	9.6	LOS A	24.9	174.3	0.78	0.74	0.81	51.9
6	R2	119	0.0	119	0.0	0.300	16.8	LOS B	2.3	15.9	0.66	0.74	0.66	46.2
Approach		1268	0.0	1268	0.0	0.791	10.2	LOS B	24.9	174.3	0.76	0.74	0.79	51.3
North: Salamanderfish St														
7	L2	152	0.0	152	0.0	0.230	9.5	LOS A	1.6	11.0	0.51	0.69	0.51	51.3
8	T1	26	0.0	26	0.0	0.090	25.5	LOS C	0.7	4.9	0.91	0.65	0.91	42.3
9	R2	94	0.0	94	0.0	* 0.390	33.7	LOS C	2.7	19.0	0.97	0.76	0.97	38.1
Approach		272	0.0	272	0.0	0.390	19.4	LOS B	2.7	19.0	0.71	0.71	0.71	45.0
West: Heidelberg Rd (R550 / K154)														
10	L2	31	0.0	31	0.0	0.026	7.3	LOS A	0.2	1.2	0.33	0.61	0.33	52.9
11	T1	747	0.0	747	0.0	0.529	6.0	LOS A	11.6	81.5	0.57	0.52	0.57	54.6
12	R2	143	0.0	143	0.0	* 0.686	30.7	LOS C	4.4	30.7	0.94	0.90	1.15	39.3
Approach		921	0.0	921	0.0	0.686	9.9	LOS A	11.6	81.5	0.62	0.58	0.66	51.4
All Vehicles		2929	0.0	2929	0.0	0.791	13.6	LOS B	24.9	174.3	0.75	0.71	0.79	48.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.1: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

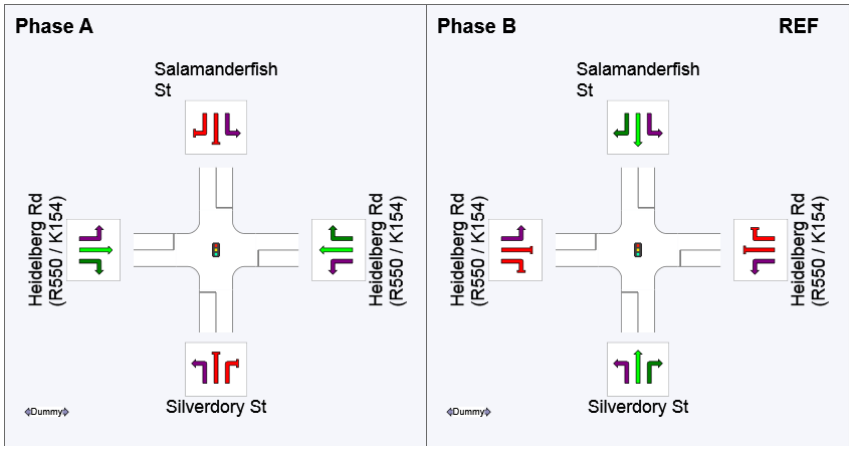
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

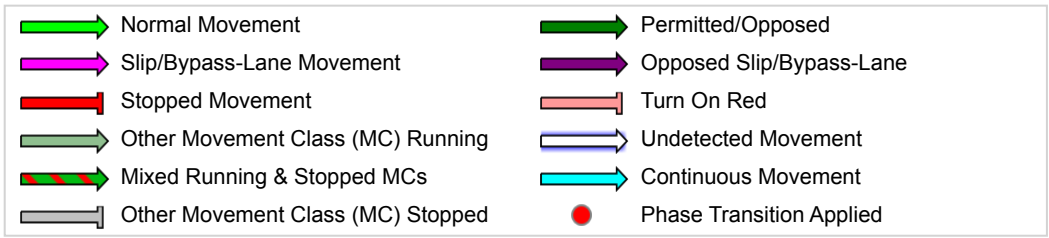
Phase	A	B
Phase Change Time (sec)	15	0
Green Time (sec)	39	8
Phase Time (sec)	46	14
Phase Split	77%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B4.2: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 95 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	134	0.0	134	0.0	0.176	8.8	LOS A	1.6	11.2	0.36	0.65	0.36	51.8
2	T1	21	0.0	21	0.0	0.131	46.2	LOS D	0.9	6.6	0.97	0.68	0.97	34.2
3	R2	28	0.0	28	0.0	0.217	53.8	LOS D	1.3	9.1	0.98	0.71	0.98	31.5
Approach		183	0.0	183	0.0	0.217	20.0	LOS B	1.6	11.2	0.53	0.67	0.53	44.8
East: Heidelberg Rd (R550 / K154)														
4	L2	58	0.0	58	0.0	0.052	8.1	LOS A	0.5	3.5	0.33	0.62	0.33	52.3
5	T1	750	0.0	750	0.0	0.512	8.2	LOS A	17.0	119.2	0.54	0.49	0.54	52.9
6	R2	150	0.0	150	0.0	0.480	20.8	LOS C	4.3	30.1	0.84	0.80	0.84	43.9
Approach		958	0.0	958	0.0	0.512	10.2	LOS B	17.0	119.2	0.57	0.55	0.57	51.2
North: Salamanderfish St														
7	L2	123	0.0	123	0.0	0.228	17.2	LOS B	3.1	21.8	0.63	0.73	0.63	46.4
8	T1	44	0.0	44	0.0	* 0.275	47.1	LOS D	2.0	14.2	0.98	0.72	0.98	33.9
9	R2	37	0.0	37	0.0	0.254	52.8	LOS D	1.7	12.0	0.98	0.72	0.98	31.8
Approach		204	0.0	204	0.0	0.275	30.1	LOS C	3.1	21.8	0.77	0.73	0.77	39.9
West: Heidelberg Rd (R550 / K154)														
10	L2	88	0.0	88	0.0	0.067	8.2	LOS A	0.8	5.9	0.33	0.63	0.33	52.3
11	T1	1141	0.0	1141	0.0	* 0.820	11.3	LOS B	35.8	250.7	0.75	0.70	0.75	50.6
12	R2	295	0.0	295	0.0	* 0.563	12.3	LOS B	5.0	34.9	0.64	0.76	0.64	48.9
Approach		1524	0.0	1524	0.0	0.820	11.3	LOS B	35.8	250.7	0.70	0.70	0.70	50.4
All Vehicles		2869	0.0	2869	0.0	0.820	12.8	LOS B	35.8	250.7	0.65	0.65	0.65	49.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.2: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 95 seconds (Site Optimum Cycle Time - Minimum Delay)

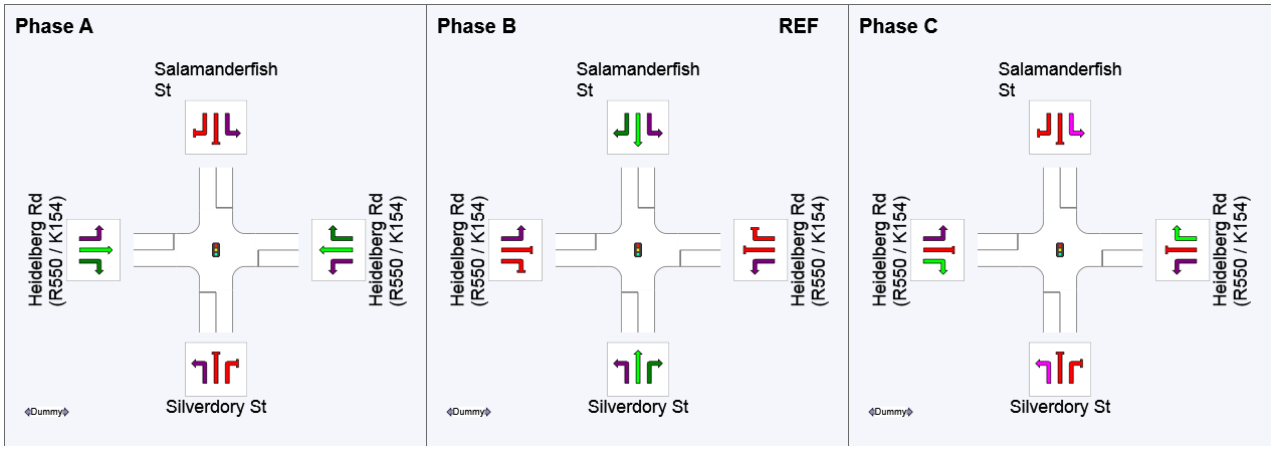
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	27	0	14
Green Time (sec)	64	7	7
Phase Time (sec)	71	13	11
Phase Split	75%	14%	12%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B4.3: MOVEMENT SUMMARY

Site: [Scenario 3 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	342	0.0	342	0.0	0.821	30.8	LOS C	10.2	71.2	1.00	1.04	1.31	39.6
2	T1	54	0.0	54	0.0	0.186	26.0	LOS C	1.5	10.3	0.92	0.69	0.92	42.1
3	R2	72	0.0	72	0.0	0.276	32.2	LOS C	2.0	14.0	0.94	0.75	0.94	38.7
Approach		468	0.0	468	0.0	0.821	30.5	LOS C	10.2	71.2	0.98	0.95	1.21	39.7
East: Heidelberg Rd (R550 / K154)														
4	L2	35	0.0	35	0.0	0.028	8.4	LOS A	0.3	1.9	0.41	0.63	0.41	52.1
5	T1	1178	0.0	1178	0.0	0.842	13.2	LOS B	31.0	216.9	0.83	0.85	0.93	49.3
6	R2	119	0.0	119	0.0	0.353	18.5	LOS B	2.5	17.3	0.71	0.76	0.71	45.2
Approach		1332	0.0	1332	0.0	0.842	13.6	LOS B	31.0	216.9	0.81	0.83	0.90	49.0
North: Salamanderfish St														
7	L2	152	0.0	152	0.0	0.255	10.4	LOS B	1.8	12.6	0.56	0.71	0.56	50.7
8	T1	26	0.0	26	0.0	0.090	25.5	LOS C	0.7	4.9	0.91	0.65	0.91	42.3
9	R2	94	0.0	94	0.0	* 0.390	33.7	LOS C	2.7	19.0	0.97	0.76	0.97	38.1
Approach		272	0.0	272	0.0	0.390	19.9	LOS B	2.7	19.0	0.73	0.72	0.73	44.7
West: Heidelberg Rd (R550 / K154)														
10	L2	31	0.0	31	0.0	0.026	7.5	LOS A	0.2	1.3	0.35	0.62	0.35	52.8
11	T1	841	0.0	841	0.0	0.596	6.4	LOS A	14.0	98.3	0.62	0.56	0.62	54.3
12	R2	143	0.0	143	0.0	* 0.759	35.3	LOS D	4.8	33.5	0.98	0.96	1.33	37.4
Approach		1015	0.0	1015	0.0	0.759	10.5	LOS B	14.0	98.3	0.66	0.62	0.71	51.0
All Vehicles		3087	0.0	3087	0.0	0.842	15.7	LOS B	31.0	216.9	0.78	0.77	0.87	47.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.3: PHASING SUMMARY

Site: [Scenario 3 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

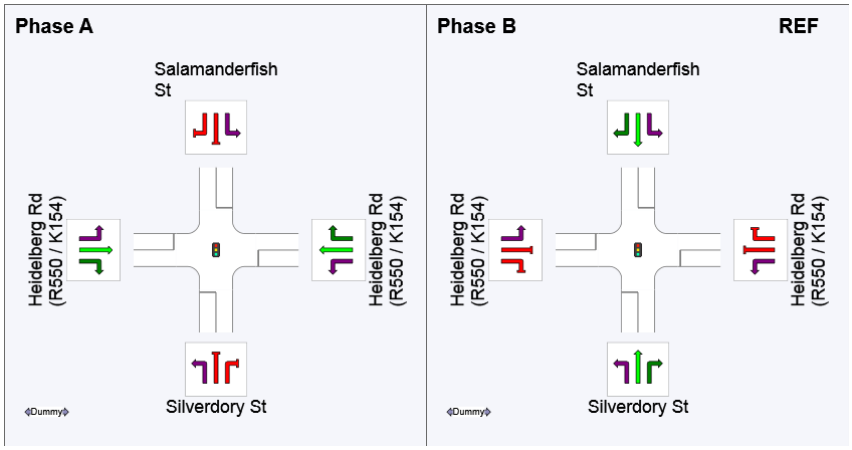
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	15	0
Green Time (sec)	39	8
Phase Time (sec)	46	14
Phase Split	77%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B4.4: MOVEMENT SUMMARY

Site: [Scenario 3 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	134	0.0	134	0.0	0.190	9.5	LOS A	2.0	13.8	0.37	0.66	0.37	51.3
2	T1	21	0.0	21	0.0	0.152	54.7	LOS D	1.1	7.8	0.98	0.68	0.98	31.7
3	R2	28	0.0	28	0.0	0.261	63.5	LOS E	1.5	10.8	1.00	0.71	1.00	29.1
Approach		183	0.0	183	0.0	0.261	22.9	LOS C	2.0	13.8	0.53	0.67	0.53	43.2
East: Heidelberg Rd (R550 / K154)														
4	L2	58	0.0	58	0.0	0.054	9.5	LOS A	0.7	5.1	0.37	0.63	0.37	51.4
5	T1	830	0.0	830	0.0	0.546	8.4	LOS A	21.2	148.2	0.53	0.48	0.53	52.7
6	R2	150	0.0	150	0.0	0.487	24.5	LOS C	5.6	39.0	0.88	0.82	0.88	42.1
Approach		1038	0.0	1038	0.0	0.546	10.8	LOS B	21.2	148.2	0.57	0.54	0.57	50.8
North: Salamanderfish St														
7	L2	123	0.0	123	0.0	0.245	20.2	LOS C	3.9	27.2	0.66	0.75	0.66	44.7
8	T1	44	0.0	44	0.0	* 0.318	55.7	LOS E	2.4	16.6	0.99	0.73	0.99	31.4
9	R2	37	0.0	37	0.0	0.299	62.4	LOS E	2.0	14.1	0.99	0.72	0.99	29.3
Approach		204	0.0	204	0.0	0.318	35.5	LOS D	3.9	27.2	0.79	0.74	0.79	37.7
West: Heidelberg Rd (R550 / K154)														
10	L2	88	0.0	88	0.0	0.070	10.0	LOS A	1.2	8.6	0.37	0.64	0.37	51.0
11	T1	1205	0.0	1205	0.0	* 0.838	11.7	LOS B	42.7	299.0	0.74	0.69	0.74	50.3
12	R2	295	0.0	295	0.0	* 0.594	13.5	LOS B	6.7	47.1	0.66	0.77	0.66	48.2
Approach		1588	0.0	1588	0.0	0.838	12.0	LOS B	42.7	299.0	0.70	0.70	0.70	50.0
All Vehicles		3013	0.0	3013	0.0	0.838	13.8	LOS B	42.7	299.0	0.65	0.65	0.65	48.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.4: PHASING SUMMARY

Site: [Scenario 3 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

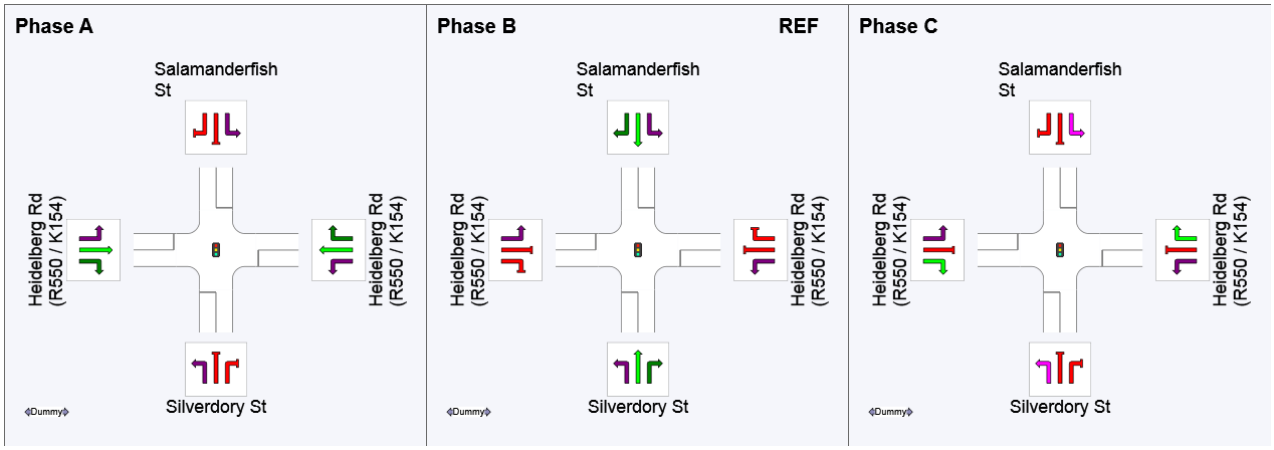
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	29	0	14
Green Time (sec)	77	7	9
Phase Time (sec)	84	13	13
Phase Split	76%	12%	12%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B4.5: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	493	0.0	493	0.0	1.244	254.0	LOS F	65.4	457.9	1.00	1.53	2.88	10.3
2	T1	108	0.0	108	0.0	0.684	57.3	LOS E	6.0	42.3	1.00	0.82	1.11	30.9
3	R2	82	0.0	82	0.0	0.688	65.2	LOS E	4.7	32.8	1.00	0.81	1.14	28.7
Approach		683	0.0	683	0.0	1.244	200.3	LOS F	65.4	457.9	1.00	1.33	2.39	12.6
East: Heidelberg Rd (R550 / K154)														
4	L2	38	0.0	38	0.0	0.023	7.0	LOS A	0.3	2.0	0.21	0.59	0.21	53.2
5	T1	1876	0.0	1876	0.0	* 1.236	254.7	LOS F	277.4	1941.6	1.00	2.32	2.71	11.5
6	R2	119	0.0	119	0.0	0.383	17.8	LOS B	3.2	22.1	0.70	0.76	0.70	45.6
Approach		2033	0.0	2033	0.0	1.236	236.2	LOS F	277.4	1941.6	0.97	2.20	2.55	12.2
North: Salamanderfish St														
7	L2	152	0.0	152	0.0	0.307	16.4	LOS B	4.1	28.9	0.62	0.74	0.62	46.9
8	T1	47	0.0	47	0.0	0.297	54.3	LOS D	2.5	17.5	0.98	0.73	0.98	31.7
9	R2	94	0.0	94	0.0	* 1.213	254.6	LOS F	12.5	87.4	1.00	1.37	2.90	11.2
Approach		293	0.0	293	0.0	1.213	98.9	LOS F	12.5	87.4	0.80	0.94	1.41	22.3
West: Heidelberg Rd (R550 / K154)														
10	L2	31	0.0	31	0.0	0.024	7.9	LOS A	0.3	1.8	0.29	0.61	0.29	52.6
11	T1	1109	0.0	1109	0.0	0.732	10.0	LOS B	34.7	242.6	0.65	0.60	0.65	51.5
12	R2	203	0.0	203	0.0	* 0.951	71.5	LOS E	11.1	77.8	1.00	1.13	1.58	27.3
Approach		1343	0.0	1343	0.0	0.951	19.3	LOS B	34.7	242.6	0.69	0.68	0.78	45.5
All Vehicles		4352	0.0	4352	0.0	1.244	154.4	LOS F	277.4	1941.6	0.88	1.51	1.90	16.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.5: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

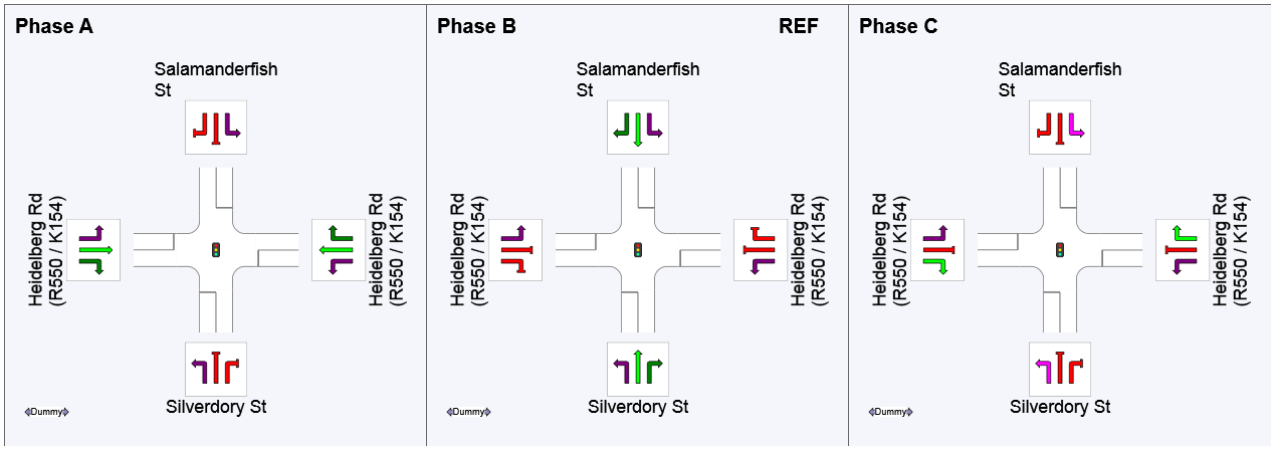
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	28	0	15
Green Time (sec)	78	8	7
Phase Time (sec)	85	14	11
Phase Split	77%	13%	10%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B4.6: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	194	0.0	194	0.0	0.359	17.9	LOS B	6.1	42.5	0.67	0.77	0.67	46.0
2	T1	42	0.0	42	0.0	0.304	55.6	LOS E	2.3	15.8	0.99	0.72	0.99	31.4
3	R2	32	0.0	32	0.0	0.425	67.1	LOS E	1.8	12.8	1.00	0.70	1.00	28.2
Approach		268	0.0	268	0.0	0.425	29.7	LOS C	6.1	42.5	0.76	0.75	0.76	40.1
East: Heidelberg Rd (R550 / K154)														
4	L2	67	0.0	67	0.0	0.080	18.7	LOS B	1.6	11.0	0.66	0.69	0.66	45.5
5	T1	1106	0.0	1106	0.0	0.759	10.6	LOS B	35.6	248.9	0.67	0.62	0.67	51.1
6	R2	150	0.0	150	0.0	0.597	47.1	LOS D	6.5	45.8	0.99	0.84	0.99	33.4
Approach		1323	0.0	1323	0.0	0.759	15.2	LOS B	35.6	248.9	0.70	0.65	0.70	47.9
North: Salamanderfish St														
7	L2	123	0.0	123	0.0	0.285	40.8	LOS D	5.3	37.4	0.85	0.76	0.85	35.8
8	T1	91	0.0	91	0.0	* 0.658	58.1	LOS E	5.1	35.8	1.00	0.81	1.10	30.7
9	R2	37	0.0	37	0.0	0.340	63.8	LOS E	2.0	14.3	1.00	0.72	1.00	29.0
Approach		251	0.0	251	0.0	0.658	50.4	LOS D	5.3	37.4	0.93	0.77	0.96	32.7
West: Heidelberg Rd (R550 / K154)														
10	L2	88	0.0	88	0.0	0.052	6.6	LOS A	0.6	3.9	0.19	0.60	0.19	53.5
11	T1	1826	0.0	1826	0.0	* 1.243	261.7	LOS F	273.4	1913.8	1.00	2.35	2.75	11.2
12	R2	428	0.0	428	0.0	* 1.243	278.6	LOS F	61.0	426.7	1.00	1.73	2.94	10.1
Approach		2342	0.0	2342	0.0	1.243	255.2	LOS F	273.4	1913.8	0.97	2.17	2.69	11.3
All Vehicles		4184	0.0	4184	0.0	1.243	152.6	LOS F	273.4	1913.8	0.87	1.51	1.83	16.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.6: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

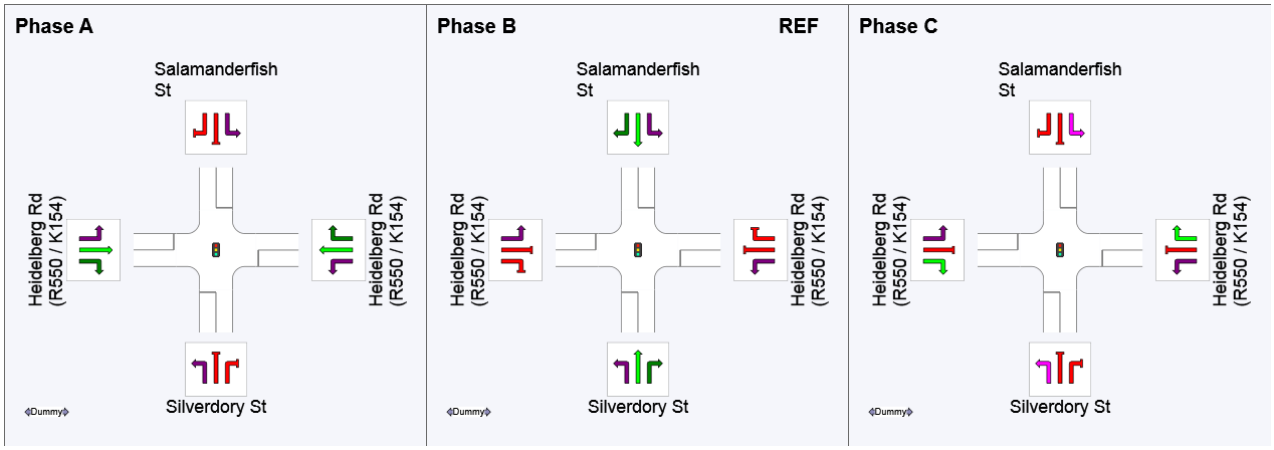
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	29	0	14
Green Time (sec)	77	7	9
Phase Time (sec)	84	13	13
Phase Split	76%	12%	12%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

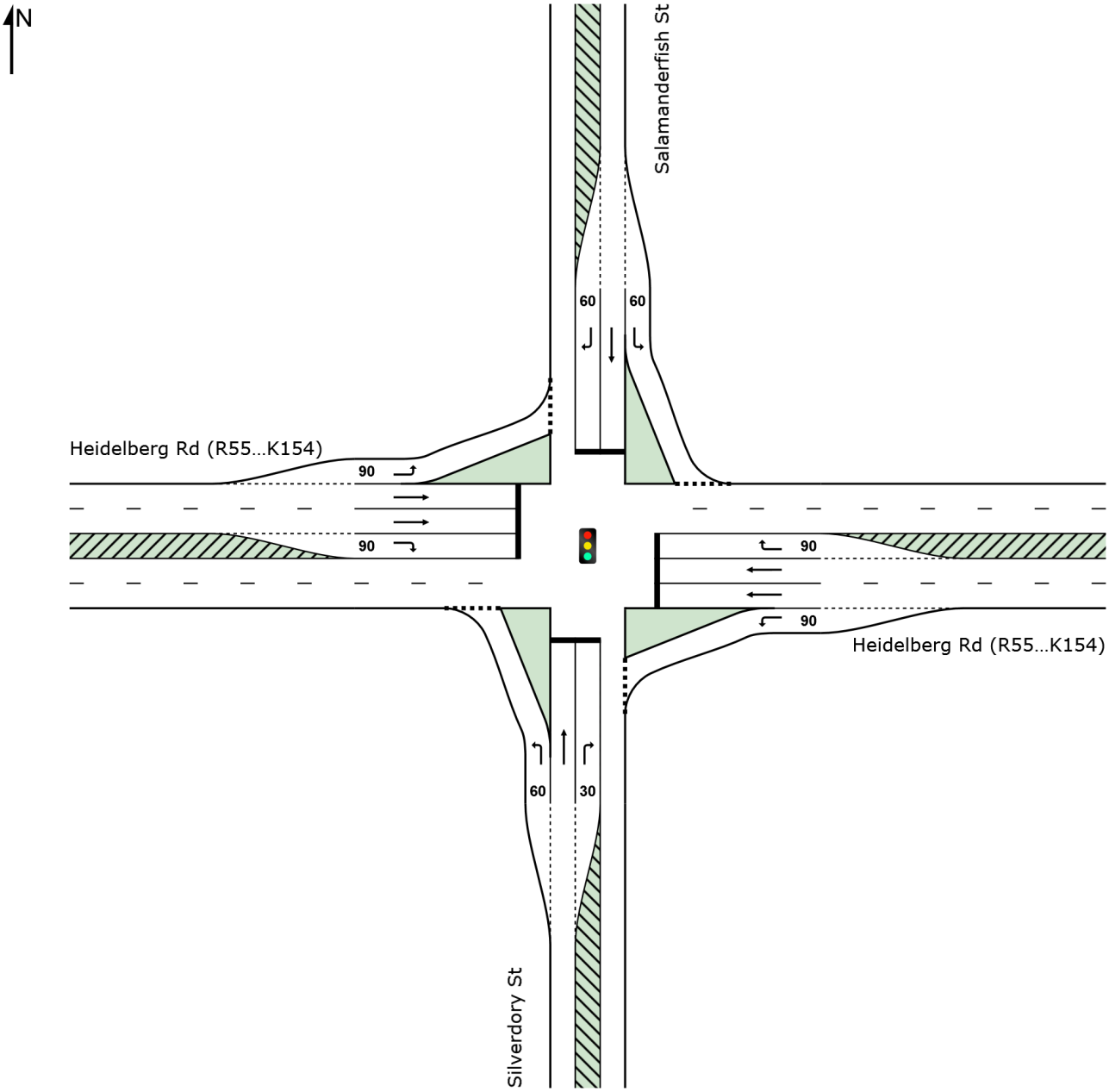
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B4: SITE LAYOUT

Proposed Intersection Geometry (PHASE 2)

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B4.7: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 75 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	493	0.0	493	0.0	0.805	33.1	LOS C	15.0	104.7	0.97	1.06	1.12	38.6
2	T1	108	0.0	108	0.0	*0.533	37.1	LOS D	4.0	28.1	1.00	0.77	1.00	37.4
3	R2	82	0.0	82	0.0	0.483	43.7	LOS D	3.1	21.5	1.00	0.76	1.00	34.7
Approach		683	0.0	683	0.0	0.805	35.0	LOS C	15.0	104.7	0.98	0.98	1.09	37.9
East: Heidelberg Rd (R550 / K154)														
4	L2	38	0.0	38	0.0	0.031	8.7	LOS A	0.3	2.4	0.40	0.63	0.40	51.9
5	T1	1876	0.0	1876	0.0	*0.801	15.5	LOS B	29.0	203.1	0.84	0.79	0.88	47.9
6	R2	119	0.0	119	0.0	0.244	11.2	LOS B	1.4	9.6	0.57	0.70	0.57	49.8
Approach		2033	0.0	2033	0.0	0.801	15.1	LOS B	29.0	203.1	0.81	0.79	0.85	48.0
North: Salamanderfish St														
7	L2	152	0.0	152	0.0	0.200	8.4	LOS A	1.5	10.4	0.41	0.67	0.41	52.1
8	T1	47	0.0	47	0.0	0.232	35.7	LOS D	1.7	11.7	0.96	0.71	0.96	38.0
9	R2	94	0.0	94	0.0	0.733	47.9	LOS D	3.8	26.5	1.00	0.84	1.25	33.3
Approach		293	0.0	293	0.0	0.733	25.5	LOS C	3.8	26.5	0.69	0.73	0.77	42.0
West: Heidelberg Rd (R550 / K154)														
10	L2	31	0.0	31	0.0	0.024	6.9	LOS A	0.2	1.2	0.25	0.60	0.25	53.2
11	T1	1109	0.0	1109	0.0	0.456	10.4	LOS B	11.9	83.4	0.63	0.56	0.63	51.2
12	R2	203	0.0	203	0.0	*0.573	20.1	LOS C	5.0	34.7	0.96	0.83	0.96	44.5
Approach		1343	0.0	1343	0.0	0.573	11.8	LOS B	11.9	83.4	0.67	0.60	0.67	50.1
All Vehicles		4352	0.0	4352	0.0	0.805	17.9	LOS B	29.0	203.1	0.79	0.76	0.83	46.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.7: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 75 seconds (Site Optimum Cycle Time - Minimum Delay)

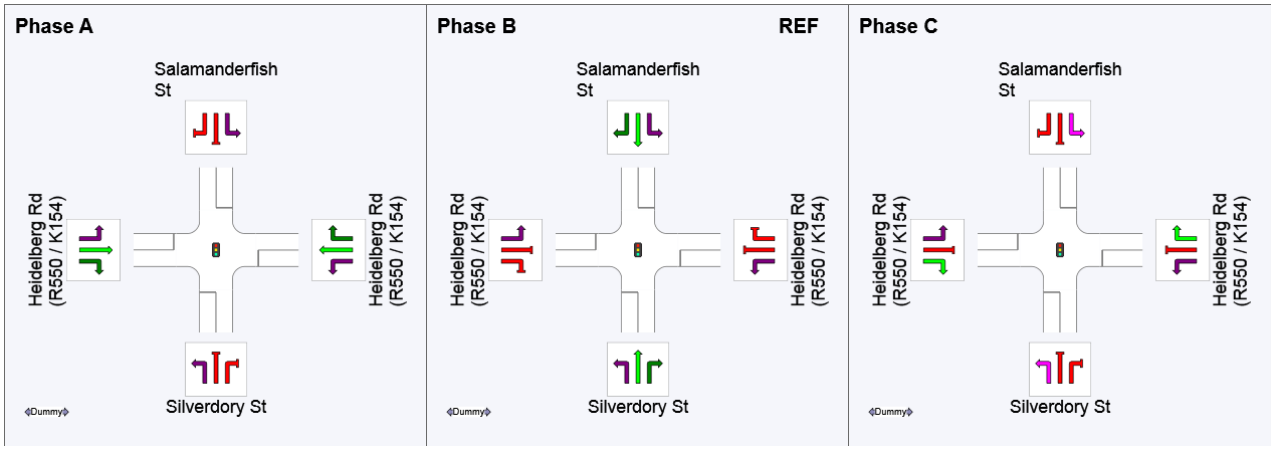
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	29	0	14
Green Time (sec)	42	7	8
Phase Time (sec)	49	14	12
Phase Split	65%	19%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B4.8: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Silverdory St														
1	L2	194	0.0	194	0.0	0.257	8.1	LOS A	2.3	16.0	0.34	0.66	0.34	52.4
2	T1	42	0.0	42	0.0	0.276	49.9	LOS D	2.0	14.3	0.98	0.72	0.98	33.1
3	R2	32	0.0	32	0.0	0.359	60.8	LOS E	1.7	11.6	1.00	0.70	1.00	29.8
Approach		268	0.0	268	0.0	0.359	20.9	LOS C	2.3	16.0	0.52	0.67	0.52	44.3
East: Heidelberg Rd (R550 / K154)														
4	L2	67	0.0	67	0.0	0.116	23.8	LOS C	1.9	13.0	0.76	0.71	0.76	42.8
5	T1	1106	0.0	1106	0.0	0.411	10.2	LOS B	13.5	94.6	0.55	0.49	0.55	51.4
6	R2	150	0.0	150	0.0	0.395	21.4	LOS C	5.0	34.8	0.88	0.82	0.88	43.8
Approach		1323	0.0	1323	0.0	0.411	12.2	LOS B	13.5	94.6	0.60	0.54	0.60	49.9
North: Salamanderfish St														
7	L2	123	0.0	123	0.0	0.209	17.0	LOS B	3.4	24.0	0.64	0.74	0.64	46.4
8	T1	91	0.0	91	0.0	* 0.598	51.8	LOS D	4.6	32.2	1.00	0.79	1.05	32.6
9	R2	37	0.0	37	0.0	0.302	57.1	LOS E	1.8	12.9	0.99	0.72	0.99	30.8
Approach		251	0.0	251	0.0	0.598	35.5	LOS D	4.6	32.2	0.82	0.76	0.84	37.8
West: Heidelberg Rd (R550 / K154)														
10	L2	88	0.0	88	0.0	0.074	10.5	LOS B	1.2	8.7	0.42	0.65	0.42	50.6
11	T1	1826	0.0	1826	0.0	* 0.792	13.6	LOS B	34.3	240.0	0.72	0.66	0.72	49.1
12	R2	428	0.0	428	0.0	* 0.790	22.5	LOS C	17.0	118.8	1.00	0.96	1.10	43.2
Approach		2342	0.0	2342	0.0	0.792	15.1	LOS B	34.3	240.0	0.76	0.72	0.78	47.9
All Vehicles		4184	0.0	4184	0.0	0.792	15.8	LOS B	34.3	240.0	0.70	0.66	0.71	47.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B4.8: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

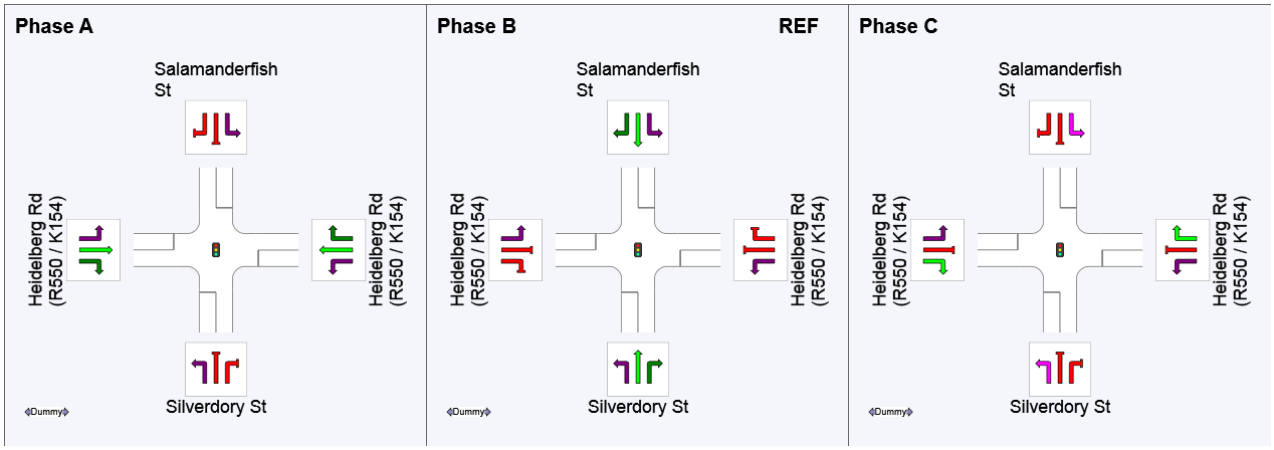
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	34	0	14
Green Time (sec)	62	7	13
Phase Time (sec)	69	14	17
Phase Split	69%	14%	17%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

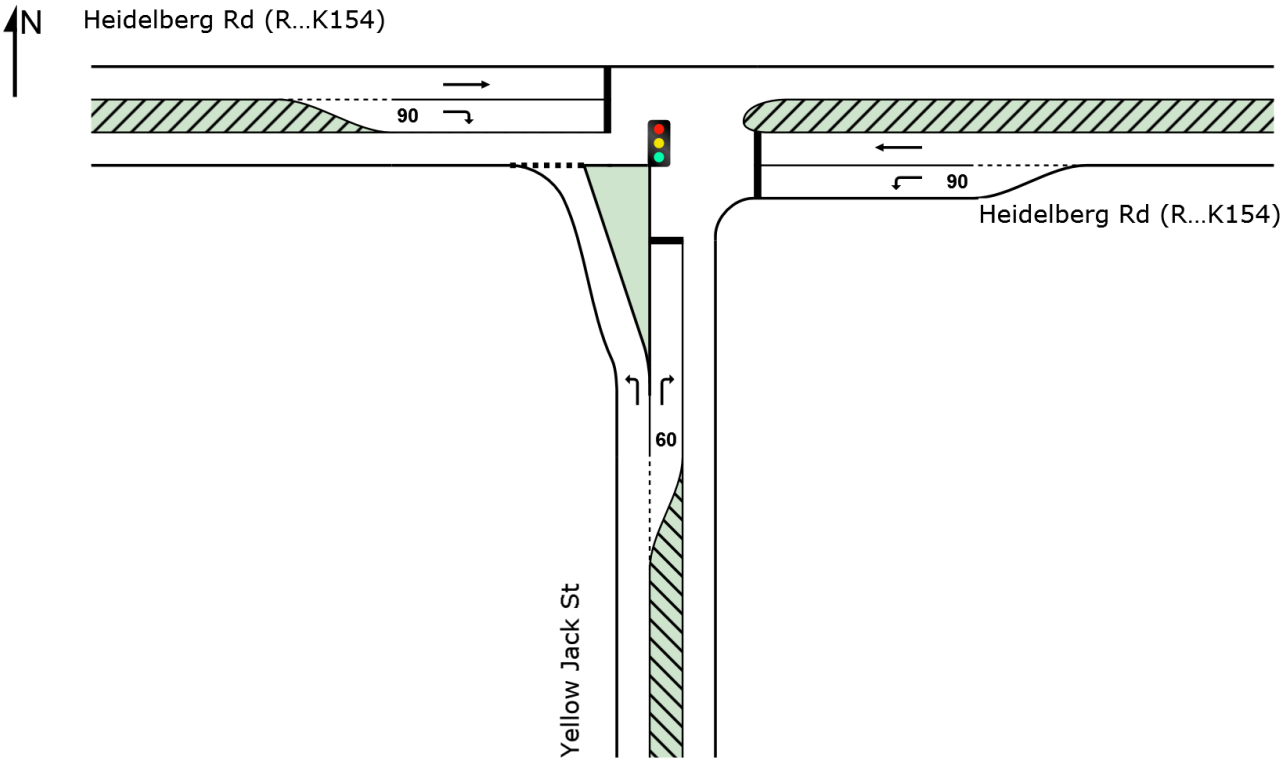
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

ANNEXURE B5: SITE LAYOUT

Site: [Scenario 2 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



ANNEXURE B5.1: MOVEMENT SUMMARY

Site: [Scenario 2 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	316	0.0	316	0.0	0.580	12.2	LOS B	7.9	55.0	0.62	0.76	0.62	49.4
3	R2	55	0.0	55	0.0	*0.302	53.4	LOS D	2.6	18.4	0.97	0.74	0.97	31.4
Approach		371	0.0	371	0.0	0.580	18.3	LOS B	7.9	55.0	0.67	0.76	0.67	45.6
East: Heidelberg Rd (R550 / K154)														
4	L2	23	0.0	23	0.0	0.015	8.1	LOS A	0.2	1.7	0.23	0.61	0.23	51.7
5	T1	952	0.0	952	0.0	*0.575	4.6	LOS A	18.2	127.1	0.43	0.40	0.43	55.8
Approach		975	0.0	975	0.0	0.575	4.7	LOS A	18.2	127.1	0.43	0.41	0.43	55.7
West: Heidelberg Rd (R550 / K154)														
11	T1	852	0.0	852	0.0	0.515	4.3	LOS A	15.0	104.7	0.40	0.37	0.40	56.1
12	R2	119	0.0	119	0.0	0.378	16.6	LOS B	3.1	21.4	0.54	0.73	0.54	46.0
Approach		971	0.0	971	0.0	0.515	5.8	LOS A	15.0	104.7	0.42	0.41	0.42	54.6
All Vehicles		2317	0.0	2317	0.0	0.580	7.3	LOS A	18.2	127.1	0.46	0.47	0.46	53.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.1: PHASING SUMMARY

Site: [Scenario 2 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

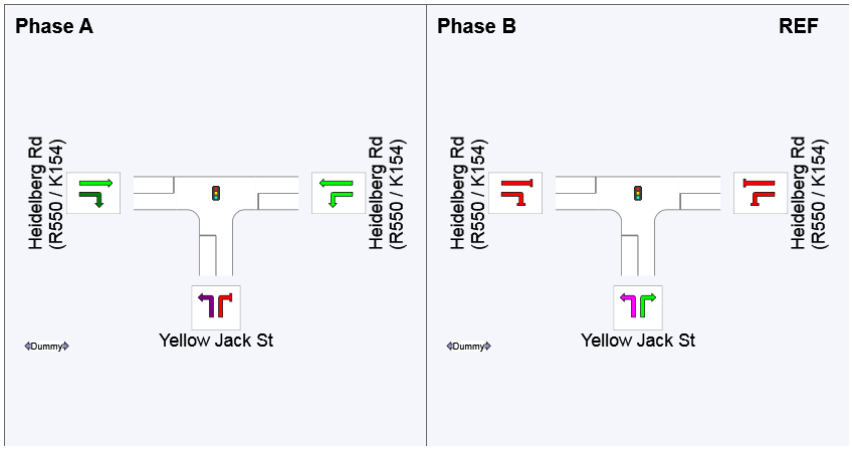
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

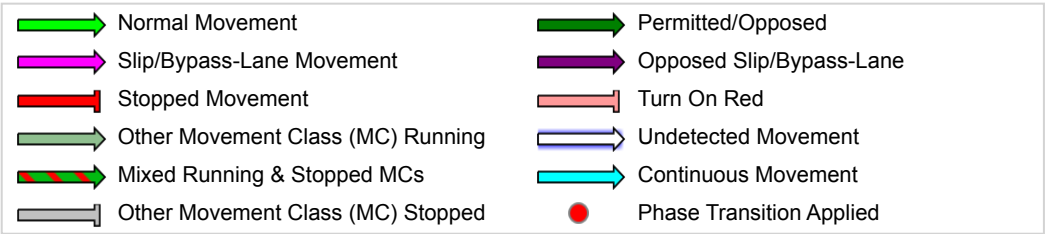
Phase	A	B
Phase Change Time (sec)	16	0
Green Time (sec)	78	9
Phase Time (sec)	85	15
Phase Split	85%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B5.2: MOVEMENT SUMMARY

Site: [Scenario 2 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	126	0.0	126	0.0	0.158	10.1	LOS B	1.8	12.3	0.43	0.67	0.43	50.9
3	R2	22	0.0	22	0.0	*0.132	46.3	LOS D	0.9	6.2	0.96	0.70	0.96	33.5
Approach		148	0.0	148	0.0	0.158	15.5	LOS B	1.8	12.3	0.51	0.68	0.51	47.2
East: Heidelberg Rd (R550 / K154)														
4	L2	47	0.0	47	0.0	0.037	11.6	LOS B	0.7	5.0	0.39	0.65	0.39	49.2
5	T1	832	0.0	832	0.0	*0.617	9.9	LOS A	20.5	143.3	0.65	0.59	0.65	51.6
Approach		879	0.0	879	0.0	0.617	10.0	LOS A	20.5	143.3	0.64	0.60	0.64	51.5
West: Heidelberg Rd (R550 / K154)														
11	T1	1010	0.0	1010	0.0	0.622	4.8	LOS A	18.5	129.7	0.49	0.45	0.49	55.6
12	R2	282	0.0	282	0.0	*0.625	14.7	LOS B	5.7	39.7	0.78	0.80	0.78	47.1
Approach		1292	0.0	1292	0.0	0.625	6.9	LOS A	18.5	129.7	0.55	0.53	0.55	53.5
All Vehicles		2319	0.0	2319	0.0	0.625	8.6	LOS A	20.5	143.3	0.58	0.56	0.58	52.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.2: PHASING SUMMARY

Site: [Scenario 2 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

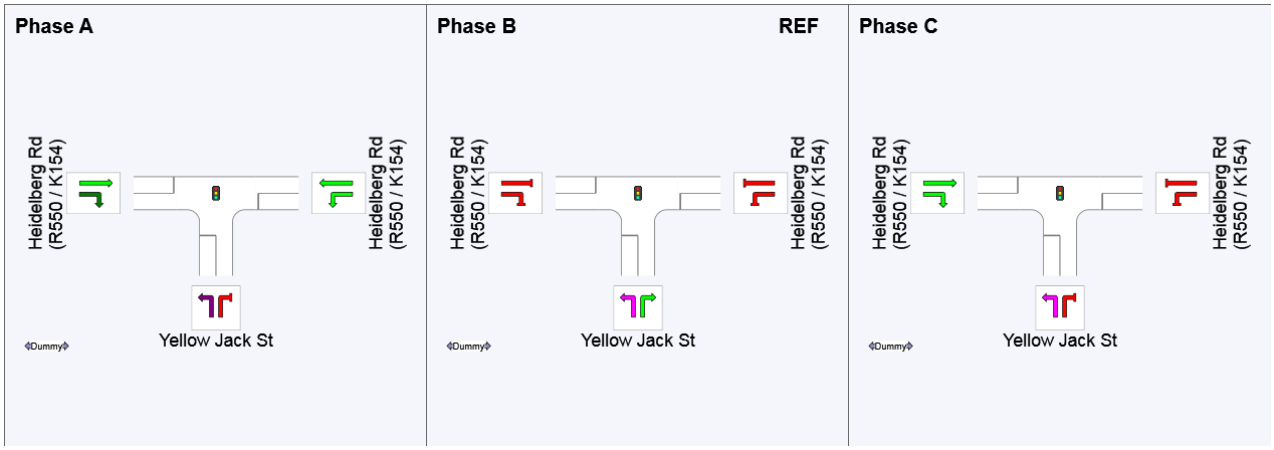
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

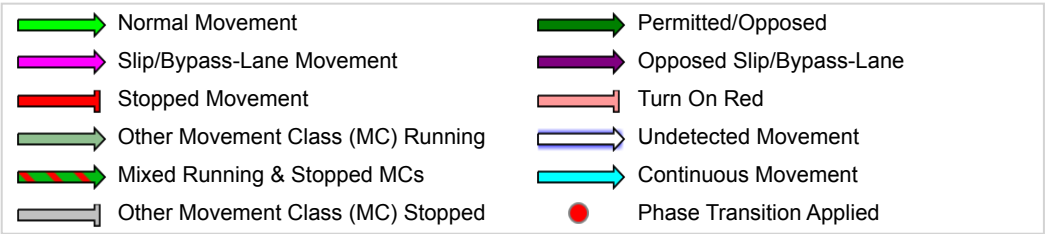
Phase	A	B	C
Phase Change Time (sec)	27	0	14
Green Time (sec)	54	7	7
Phase Time (sec)	61	13	11
Phase Split	72%	15%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B5.3: MOVEMENT SUMMARY

Site: [Scenario 3 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	316	0.0	316	0.0	0.643	14.7	LOS B	8.3	58.1	0.79	0.82	0.79	47.8
3	R2	55	0.0	55	0.0	*0.311	44.6	LOS D	2.1	14.9	0.97	0.74	0.97	34.0
Approach		371	0.0	371	0.0	0.643	19.2	LOS B	8.3	58.1	0.82	0.81	0.82	45.1
East: Heidelberg Rd (R550 / K154)														
4	L2	23	0.0	23	0.0	0.015	8.2	LOS A	0.2	1.5	0.26	0.62	0.26	51.6
5	T1	1016	0.0	1016	0.0	*0.638	5.1	LOS A	18.8	131.5	0.52	0.48	0.52	55.4
Approach		1039	0.0	1039	0.0	0.638	5.2	LOS A	18.8	131.5	0.52	0.48	0.52	55.3
West: Heidelberg Rd (R550 / K154)														
11	T1	946	0.0	946	0.0	0.594	4.8	LOS A	16.4	115.1	0.49	0.45	0.49	55.6
12	R2	119	0.0	119	0.0	0.430	18.8	LOS B	3.0	21.1	0.65	0.76	0.65	44.8
Approach		1065	0.0	1065	0.0	0.594	6.4	LOS A	16.4	115.1	0.51	0.49	0.51	54.2
All Vehicles		2475	0.0	2475	0.0	0.643	7.8	LOS A	18.8	131.5	0.56	0.53	0.56	53.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.3: PHASING SUMMARY

Site: [Scenario 3 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

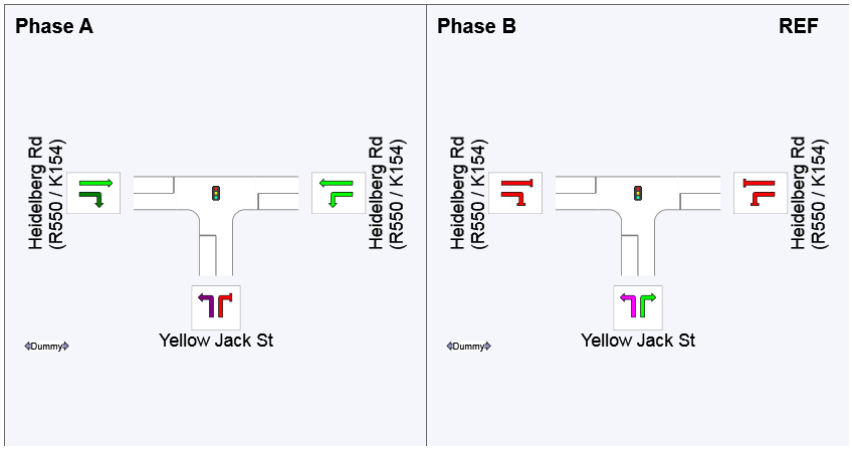
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

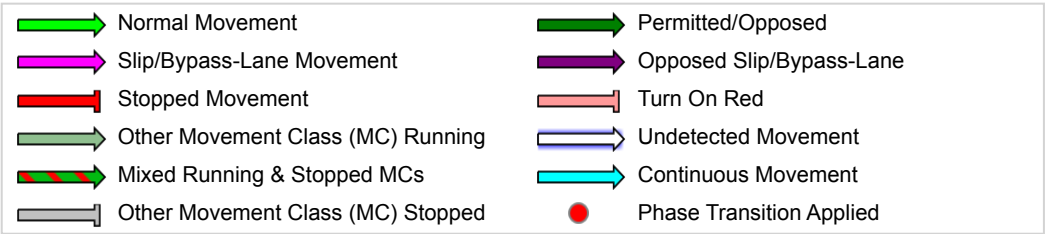
Phase	A	B
Phase Change Time (sec)	14	0
Green Time (sec)	60	7
Phase Time (sec)	67	13
Phase Split	84%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B5.4: MOVEMENT SUMMARY

Site: [Scenario 3 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	126	0.0	126	0.0	0.166	11.9	LOS B	2.4	17.0	0.44	0.68	0.44	49.7
3	R2	22	0.0	22	0.0	*0.171	60.5	LOS E	1.2	8.2	0.98	0.70	0.98	29.6
Approach		148	0.0	148	0.0	0.171	19.1	LOS B	2.4	17.0	0.52	0.68	0.52	45.2
East: Heidelberg Rd (R550 / K154)														
4	L2	47	0.0	47	0.0	0.035	12.2	LOS B	0.8	5.9	0.36	0.65	0.36	48.9
5	T1	912	0.0	912	0.0	*0.656	11.5	LOS B	28.3	198.3	0.64	0.59	0.64	50.4
Approach		959	0.0	959	0.0	0.656	11.6	LOS B	28.3	198.3	0.63	0.59	0.63	50.4
West: Heidelberg Rd (R550 / K154)														
11	T1	1074	0.0	1074	0.0	0.619	3.9	LOS A	20.7	145.1	0.40	0.38	0.40	56.4
12	R2	282	0.0	282	0.0	*0.587	17.6	LOS B	8.8	61.6	0.81	0.82	0.81	45.4
Approach		1356	0.0	1356	0.0	0.619	6.7	LOS A	20.7	145.1	0.49	0.47	0.49	53.7
All Vehicles		2463	0.0	2463	0.0	0.656	9.3	LOS A	28.3	198.3	0.54	0.53	0.54	51.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.4: PHASING SUMMARY

Site: [Scenario 3 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

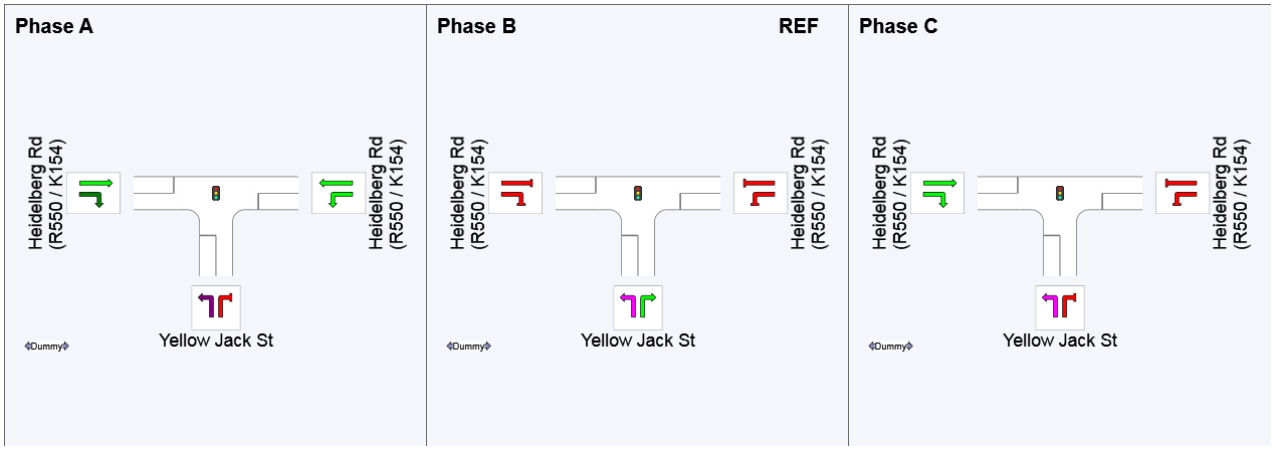
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

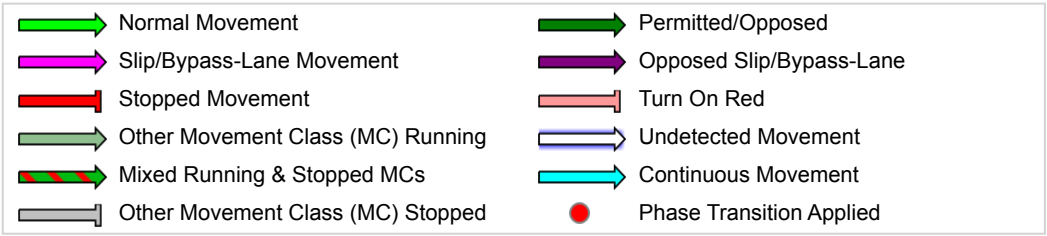
Phase	A	B	C
Phase Change Time (sec)	33	0	14
Green Time (sec)	73	7	13
Phase Time (sec)	80	13	17
Phase Split	73%	12%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B5.5: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	1014	0.0	1014	0.0	1.210	224.9	LOS F	113.5	794.6	1.00	1.72	2.99	11.9
3	R2	216	0.0	216	0.0	*0.641	44.6	LOS D	9.2	64.3	0.98	0.83	1.01	34.0
Approach		1230	0.0	1230	0.0	1.210	193.2	LOS F	113.5	794.6	1.00	1.57	2.64	13.4
East: Heidelberg Rd (R550 / K154)														
4	L2	93	0.0	93	0.0	0.088	16.9	LOS B	2.0	14.1	0.53	0.69	0.53	46.0
5	T1	1019	0.0	1019	0.0	*0.961	50.5	LOS D	60.5	423.5	1.00	1.21	1.37	32.8
Approach		1112	0.0	1112	0.0	0.961	47.7	LOS D	60.5	423.5	0.96	1.17	1.30	33.6
West: Heidelberg Rd (R550 / K154)														
11	T1	955	0.0	955	0.0	0.810	9.8	LOS A	24.7	172.6	0.61	0.58	0.63	51.6
12	R2	387	0.0	387	0.0	*1.070	114.8	LOS F	26.9	188.5	1.00	1.31	2.24	18.1
Approach		1342	0.0	1342	0.0	1.070	40.1	LOS D	26.9	188.5	0.73	0.79	1.10	33.7
All Vehicles		3684	0.0	3684	0.0	1.210	93.5	LOS F	113.5	794.6	0.89	1.16	1.67	22.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.5: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

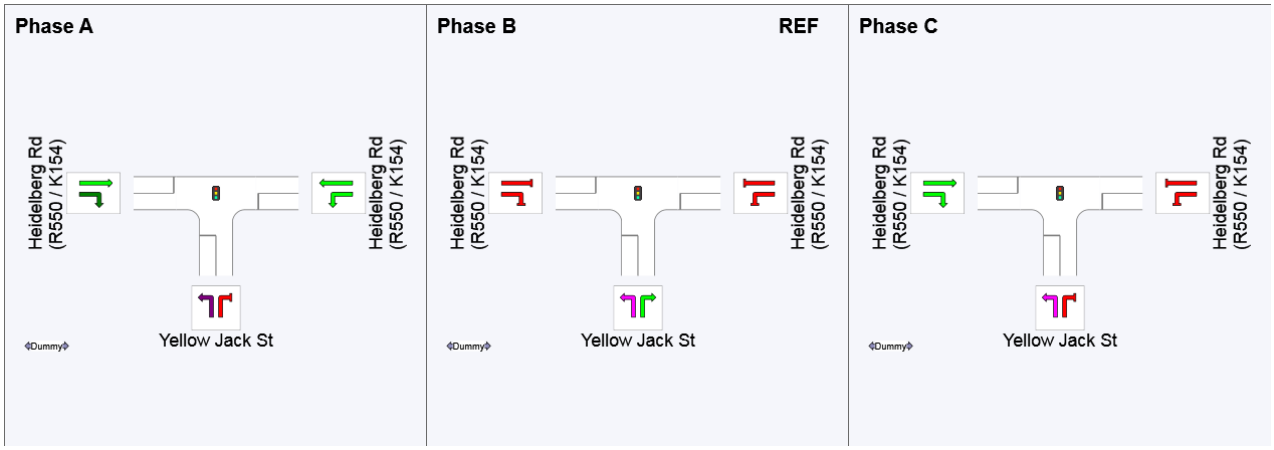
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

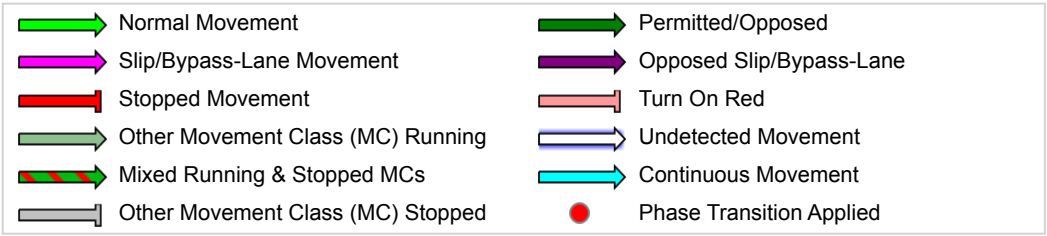
Phase	A	B	C
Phase Change Time (sec)	39	0	22
Green Time (sec)	47	15	11
Phase Time (sec)	54	21	15
Phase Split	60%	23%	17%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B5.6: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	402	0.0	402	0.0	0.422	25.6	LOS C	11.7	81.6	0.70	0.86	0.70	42.0
3	R2	85	0.0	85	0.0	*0.631	60.8	LOS E	4.6	31.9	1.00	0.80	1.08	29.6
Approach		487	0.0	487	0.0	0.631	31.7	LOS C	11.7	81.6	0.75	0.85	0.77	39.1
East: Heidelberg Rd (R550 / K154)														
4	L2	183	0.0	183	0.0	0.194	22.9	LOS C	5.4	37.9	0.62	0.74	0.62	42.7
5	T1	921	0.0	921	0.0	*1.029	97.1	LOS F	80.3	562.4	1.00	1.45	1.68	23.0
Approach		1104	0.0	1104	0.0	1.029	84.8	LOS F	80.3	562.4	0.94	1.33	1.50	24.9
West: Heidelberg Rd (R550 / K154)														
11	T1	1078	0.0	1078	0.0	0.628	4.1	LOS A	20.9	146.4	0.42	0.39	0.42	56.2
12	R2	903	0.0	903	0.0	*1.287	295.0	LOS F	117.8	824.4	1.00	1.66	3.12	9.4
Approach		1981	0.0	1981	0.0	1.287	136.7	LOS F	117.8	824.4	0.69	0.97	1.65	17.2
All Vehicles		3572	0.0	3572	0.0	1.287	106.3	LOS F	117.8	824.4	0.77	1.07	1.48	20.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.6: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 1))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site Optimum Cycle Time - Minimum Delay)

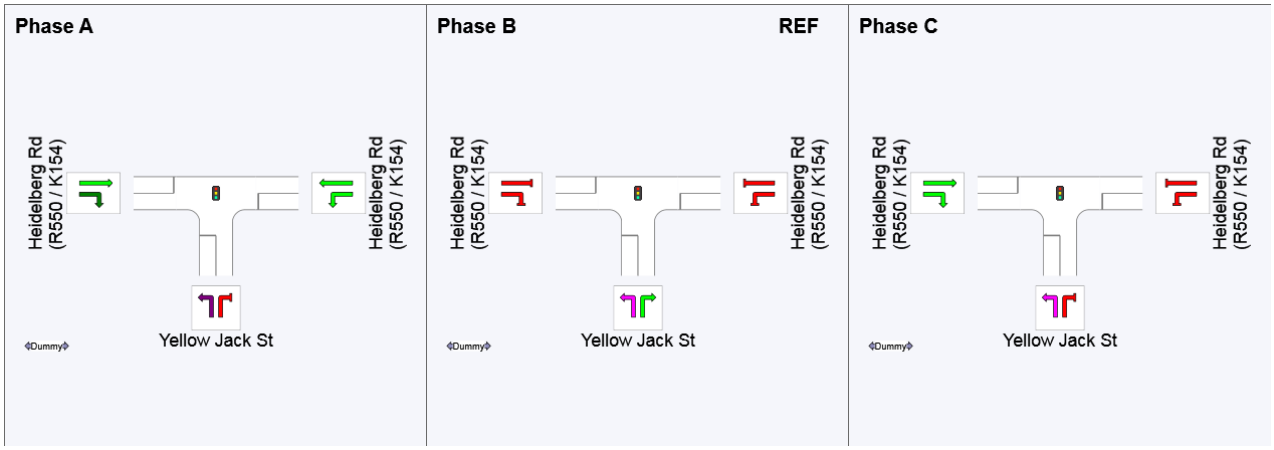
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 1
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

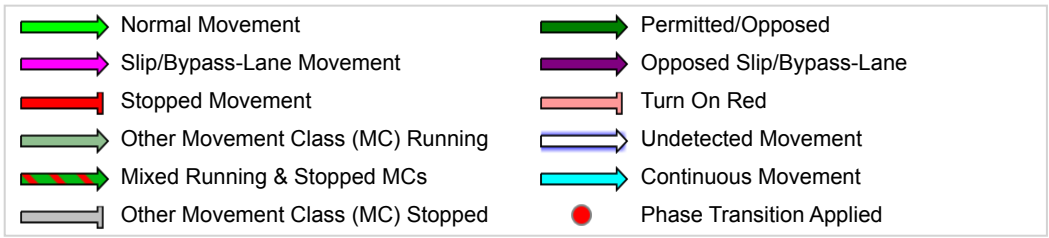
Phase	A	B	C
Phase Change Time (sec)	52	0	14
Green Time (sec)	49	7	32
Phase Time (sec)	56	13	36
Phase Split	53%	12%	34%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

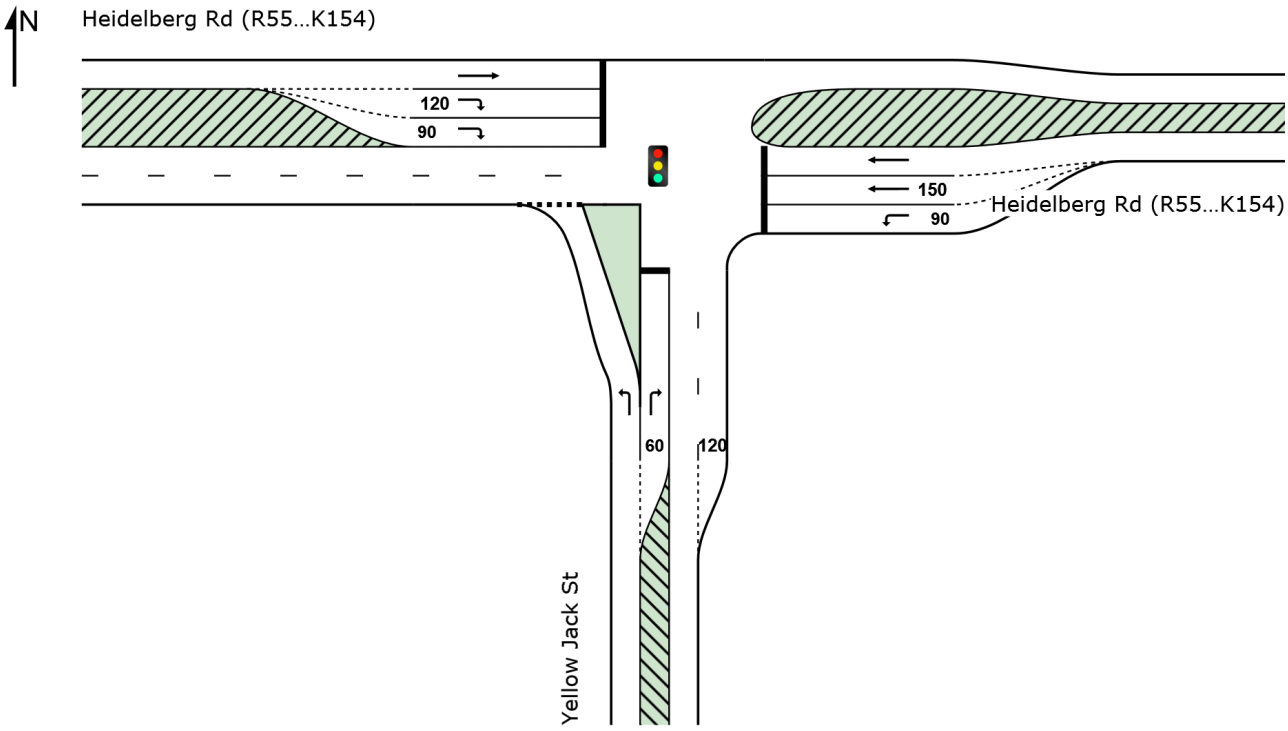


ANNEXURE B5: SITE LAYOUT

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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ANNEXURE B5.7: MOVEMENT SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	1014	0.0	1014	0.0	0.869	24.9	LOS C	26.9	188.2	0.92	1.04	1.11	42.3
3	R2	216	0.0	216	0.0	*0.713	34.6	LOS C	6.6	46.3	1.00	0.88	1.15	37.8
Approach		1230	0.0	1230	0.0	0.869	26.6	LOS C	26.9	188.2	0.93	1.02	1.11	41.4
East: Heidelberg Rd (R550 / K154)														
4	L2	93	0.0	93	0.0	0.138	21.2	LOS C	1.9	13.5	0.73	0.73	0.73	43.9
5	T1	1019	0.0	1019	0.0	0.720	20.3	LOS C	13.8	96.9	0.94	0.85	0.99	45.0
Approach		1112	0.0	1112	0.0	0.720	20.4	LOS C	13.8	96.9	0.92	0.84	0.97	44.9
West: Heidelberg Rd (R550 / K154)														
11	T1	955	0.0	955	0.0	*0.711	7.9	LOS A	18.7	130.7	0.72	0.66	0.72	53.1
12	R2	387	0.0	387	0.0	0.496	27.6	LOS C	6.1	43.0	0.90	0.79	0.90	40.7
Approach		1342	0.0	1342	0.0	0.711	13.6	LOS B	18.7	130.7	0.77	0.70	0.77	48.8
All Vehicles		3684	0.0	3684	0.0	0.869	20.0	LOS B	26.9	188.2	0.87	0.85	0.95	44.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.7: PHASING SUMMARY

Site: [Scenario 4 AM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

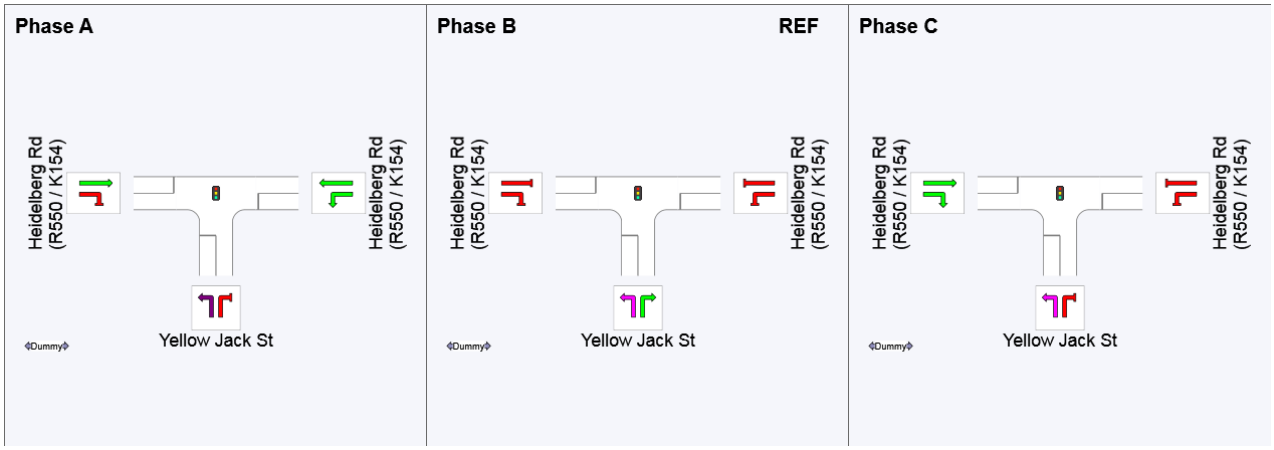
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

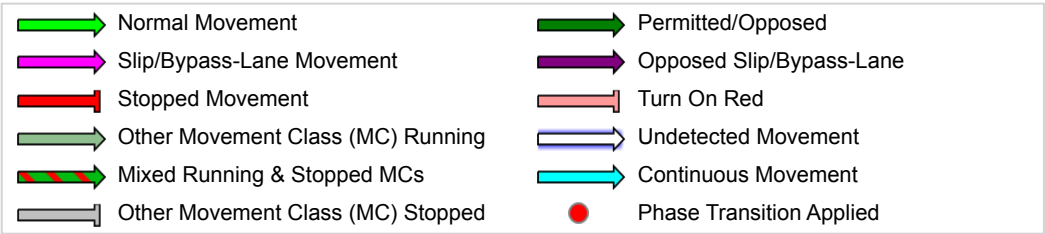
Phase	A	B	C
Phase Change Time (sec)	36	0	16
Green Time (sec)	20	9	14
Phase Time (sec)	27	15	18
Phase Split	45%	25%	30%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



ANNEXURE B5.8: MOVEMENT SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Yellow Jack St														
1	L2	402	0.0	402	0.0	0.318	9.5	LOS A	5.1	35.7	0.49	0.70	0.49	51.3
3	R2	85	0.0	85	0.0	*0.421	39.5	LOS D	2.9	20.3	0.98	0.76	0.98	36.0
Approach		487	0.0	487	0.0	0.421	14.7	LOS B	5.1	35.7	0.57	0.71	0.57	47.7
East: Heidelberg Rd (R550 / K154)														
4	L2	183	0.0	183	0.0	0.302	28.2	LOS C	4.9	34.2	0.81	0.77	0.81	41.2
5	T1	921	0.0	921	0.0	*0.723	25.0	LOS C	14.8	103.3	0.95	0.86	1.00	42.5
Approach		1104	0.0	1104	0.0	0.723	25.6	LOS C	14.8	103.3	0.93	0.84	0.97	42.3
West: Heidelberg Rd (R550 / K154)														
11	T1	1078	0.0	1078	0.0	0.711	6.2	LOS A	21.2	148.6	0.63	0.58	0.63	54.5
12	R2	903	0.0	903	0.0	*0.755	28.0	LOS C	17.5	122.3	0.90	0.86	0.94	40.7
Approach		1981	0.0	1981	0.0	0.755	16.2	LOS B	21.2	148.6	0.75	0.71	0.77	47.2
All Vehicles		3572	0.0	3572	0.0	0.755	18.9	LOS B	21.2	148.6	0.78	0.75	0.81	45.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

ANNEXURE B5.8: PHASING SUMMARY

Site: [Scenario 4 PM (Site Folder: Proposed Intersection Geometry (PHASE 2))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

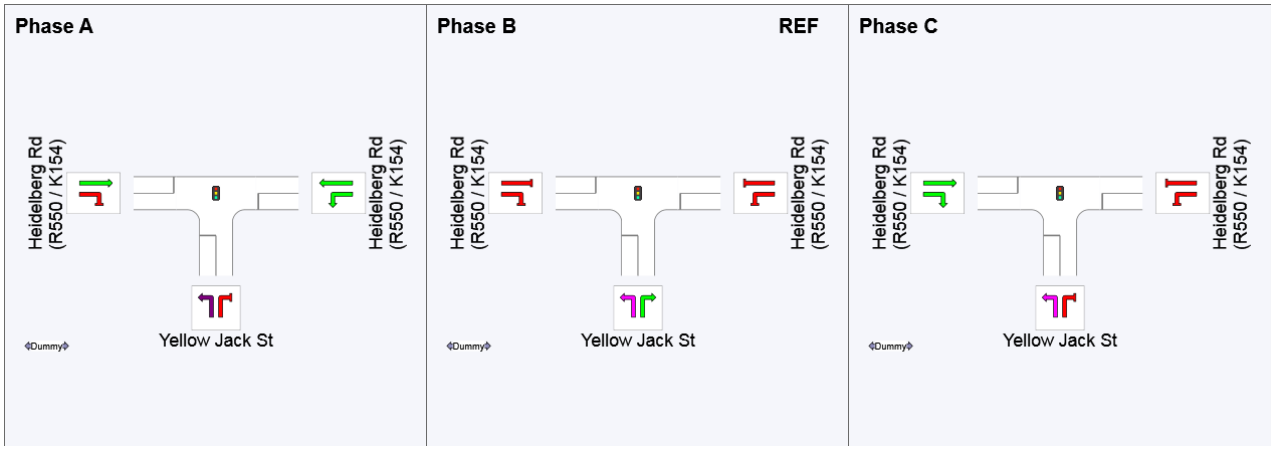
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Option 2
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	45	0	14
Green Time (sec)	21	7	25
Phase Time (sec)	28	13	29
Phase Split	40%	19%	41%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase