# HACKHAM CODE AMENDMENT

## TRANSPORT INVESTIGATIONS REPORT

CIRQA™

## DISCLAIMER



## DOCUMENT CONTROL

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## 1. EXECUTIVE SUMMARY

CIRQA has been engaged to undertake transport investigations to inform the Hackham Code Amendment by the Chief Executive (of the Attorney-General's Department). This investigations report builds upon preliminary investigations previously prepared for the rezoning area and supersedes previous reports.

Specifically, this report contains advice in response to the following matters identified in the Proposal to Initiate an Amendment to the Planning and Design Code, Hackham Code Amendment, dated 16 July 2021:

- site access – finalisation of site access points, in particular along Main South Road;
- internal road network volumes – analysis of internal road network volumes based on the preferred South Road access arrangement;
- public transport – exploration of the possibility of expanding existing public transport routes into the affected area; and
- walking and cycling – consideration of the need for expanded pedestrian and cycling network opportunities.

Discussions have been held with the Department of Infrastructure and Transport (DIT) to agree a preferred site access arrangement and with regards to public transport, pedestrian and cycling routes.

An assessment of the potential traffic generation and distribution of the potential development of the affected area has been undertaken. The assessment has included consideration of the distribution of traffic to/from Main South Road and the Southern Expressway as well as other key adjacent lower order roads (such as Piggott Range Road, Patapinda Road and Church Hill Road).

The forecast future traffic movements have then been analysed using SIDRA intersection modelling software. The modelling analysis has identified the following key outcomes:

- the existing intersection of the River Road Access and Main South Road is already at capacity and is a constraint for the distribution of movements to the south of the site to access the Southern Expressway. There is therefore warrant for its upgrade (or an alternative arrangement) regardless of the rezoning and development of the affected area. This capacity constraint has been taken into account with the distribution of volumes and assessment of the performance of the intersections analysed;

- the development of the 'Northern Area' would require signalisation of the intersection of Hepenstal Road/Main South Road and, desirably, an additional opportunity for right-in movements at the southern end of the 'Northern Area' (as there would not be sufficient road width to accommodate dual right turns into Hepenstal Road without land acquisition). It is anticipated that Melsetter Road could accommodate the Northern Area volumes without signalisation;
- the traffic volumes generated by the development of the 'Central/Southern Area' would be accommodated with the signalisation of Hepenstal Road/Main South Road, Melsetter Road/Main South Road and a new signalised intersection (between Hepenstal Road and the Expressway – potentially aligned with Brodie Road). Desirably, however, the capacity constraint at the River Road Access Road/Main South Road intersection would be addressed which would reduce the extent of intersection treatment required at the above locations.

On the basis of the transport investigations, it is considered that adequate access provisions can be implemented and staged for the Northern and Central/Southern Area. Nevertheless, noting potential for additional development further south (such as Aldinga), there will be additional pressure on the River Road Access/Main South Road intersection and Southern Expressway/Main South Road intersection. This will require ongoing discussions with the Department for Infrastructure and Transport would be desirable to further consider broader upgrade requirements and opportunities for cost sharing between stakeholders.

## 2. BACKGROUND

### 2.1 AFFECTED AREA

The affected area comprises a number of separate allotments located on the eastern side of Main South Road at Hackham. For the purposes of the transport investigations detailed in this report, the affected area has been separated into two parcels, namely:

- the "Northern Area" – the northern portion of land (located immediately south of Hepenstal Road);
- the "Central/Southern Area" – the southern section of land south of the "Northern Area" and north of Piggott Range Road.

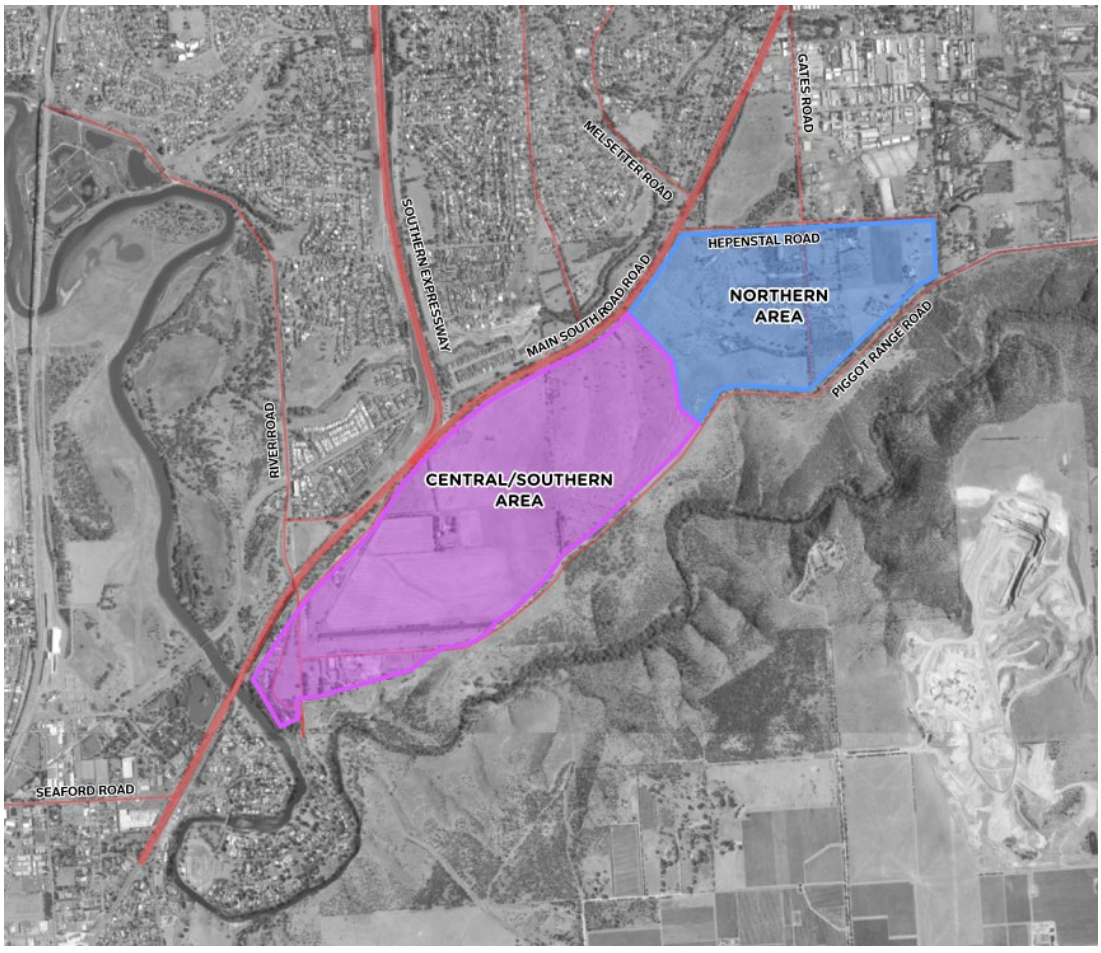



*Figure 1 – Affected area and associated 'parcels'*

The Planning and Design Code identifies that the Northern and Central/Southern Areas are primarily within a Rural Zone with the exception of a small portion of land (either side of Piggott Range Road) in the southern corner which is within an Employment Zone.

## 2.2 ADJACENT ROAD NETWORK

Main South Road is an arterial road under the care and control of the Department for Infrastructure and Transport (DIT). Adjacent the site, Main South Road generally comprises two traffic lanes in each direction separated by a raised central median (additional turn lanes are provided at side road intersections). Traffic data obtained from DIT indicates that the section north of the Southern Expressway has an Annual Average Daily Traffic (AADT) volume in the order of 30,900 vehicles per day (vpd). This increases to 47,700 vpd south of the Expressway. Adjacent the site, an 80 km/h speed limit applies for the majority of the road adjacent the site (albeit this reduces to 60 km/h north of Hepenstal Road).

Adjacent the Central/Southern Area, Main South Road forms an intersection with the southern end of the Southern Expressway. The intersection accommodates significant traffic flows between the Southern Expressway and southern leg of Main South Road. The intersection does not accommodate right turn movements from the northern approach of Main South Road to the Expressway. Drivers wishing to access the Expressway from north of this intersection are required to travel further south to the River Road 'interchange' to then turn left on to the Expressway or head further north on Main South Road and access the Expressway via Beach Road.

Hepenstal Road is a local road under the care and control of the City of Onkaparinga. The road comprises an approximately 8.0 m wide two-way carriageway. The default speed limit of 50 km/h applies on Hepenstal Road. Data identified in previous assessments prepared by Frank Siow & Associates for the Onkaparinga Views development indicate an existing daily traffic volume of approximately 300 vpd on Hepenstal Road. Hepenstal Road and Main South Road form a priority controlled (unsignalised) T-intersection. The intersection includes separate left-in and right-in deceleration/storage lanes on Main South Road.

Patapinda Road provides access from Main South Road to the southern portion of the affected land. The section of Patapinda Road adjacent the site (between Main South Road and Church Hill Road/River Road) is under the care and control of DIT, whereas the remaining section (to the south) is under the care and control of the City of Onkaparinga. Adjacent the affected area, Patapinda Road forms a two-way 6 m wide (approximate) carriageway. The speed limit is 80 km/h along the northern section of Patapinda Road which then reduces to 60km/h on approach to Church Hill Road and River Road. Data identified by DIT indicate an existing daily traffic volume of approximately 2,100 vpd on Patapinda Road.

Church Hill Road is a local road under the care and control of the City of Onkaparinga. The road comprises an approximately 7.5 m wide two-way

carriageway. The default speed limit of 50 km/h applies on Church Hill Road. Data identified by DIT indicate an existing daily traffic volume of approximately 700 vpd on Church Hill Road. In the vicinity of the affected area, Church Hill Road forms a four-way, priority (Give-Way) controlled intersection with Patapinda Road and River Road.

Piggott Range Road bounds the eastern side of the subject site. The road is under the care and control of the City of Onkaparinga. The road is currently unmade for the majority of the affected area's frontage. Towards the north-eastern end of the affected area, Piggott Range Road terminates approximately 300 m west of River Heights Rise (east of this point, the road comprises a sealed, two-way carriageway of approximately 6 m width). Towards the southern end of the affected land, Piggott Range Road is accessible for the first 110 m from Church Hill Road (access beyond is restricted by a secured gate).

## 2.3 PUBLIC TRANSPORT

There are no existing public transport services operating within the subject site (given it is generally undeveloped). The closest current services operate north of the site (744/743 services within Huntfield Heights) and to the west (745/747 services within Noarlunga Downs/Old Noarlunga). Figure 2 illustrates the existing routes in respect to the location of the affected area.

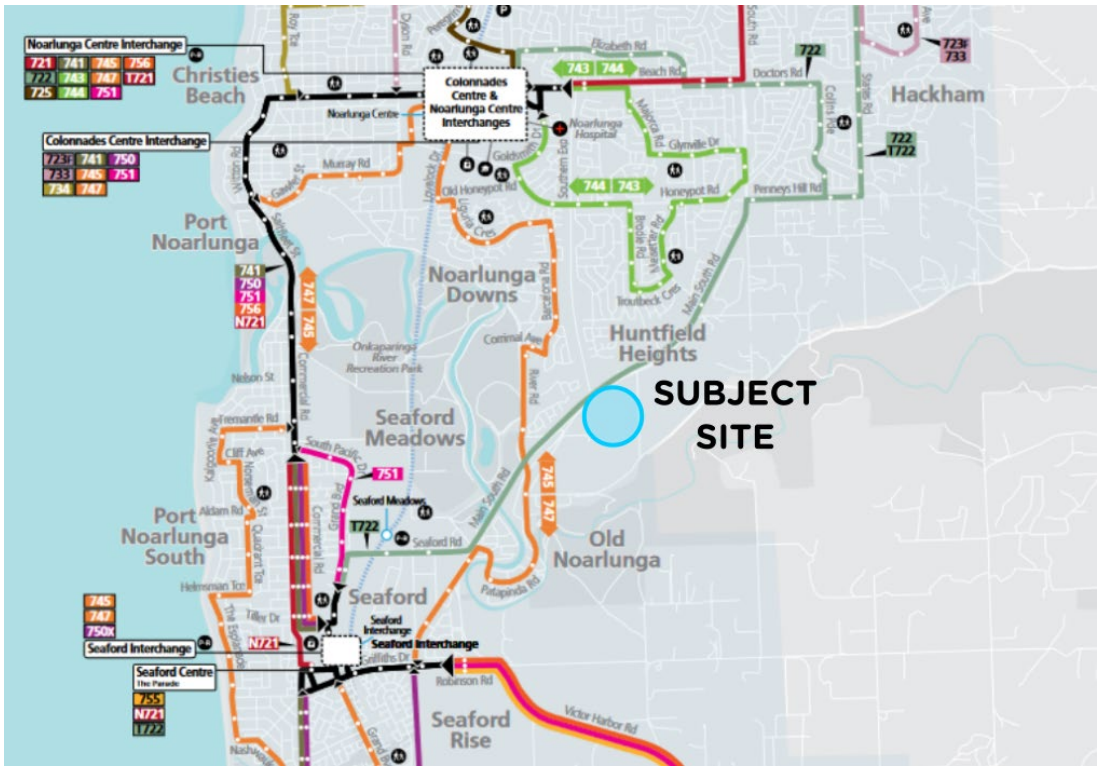



*Figure 2 - Public transport routes in the vicinity of the site* (after *Adelaide Metro, 2021*)

## 2.4 WALKING AND CYCLING

There are no formal walking or cycling facilities within the affected area. The adjacent roads generally do not include formalised pedestrian or cyclist facilities. However, there are a number of walking and cycling facilities within the broader area. These include the Patrick Jonker Veloway (which generally aligns with the Southern Expressway), the Coast to Vines Trail (which extends south from the Veloway), Golden Wattle Way Shared Path (generally located adjacent Melsetter Road) and Tom Roberts Trail (which utilises Piggott Range Road adjacent the affected area). In addition, surrounding established residential areas generally include footpaths on at least one side of the roads.

Figure 3 illustrates the general location of the above key paths and trails (as well as additional recreational trails in the general vicinity). The figure also provides information from Strava Heat Maps for cycling journeys within the study area. The key trails (particularly Patrick Jonker Veloway and Coast to Vines Trail) are shown as having high levels of use. Notably, Piggott Range Road/Tom Roberts Trail also appears to have a reasonable level of use (despite its unmade nature for much of the section adjacent the site).

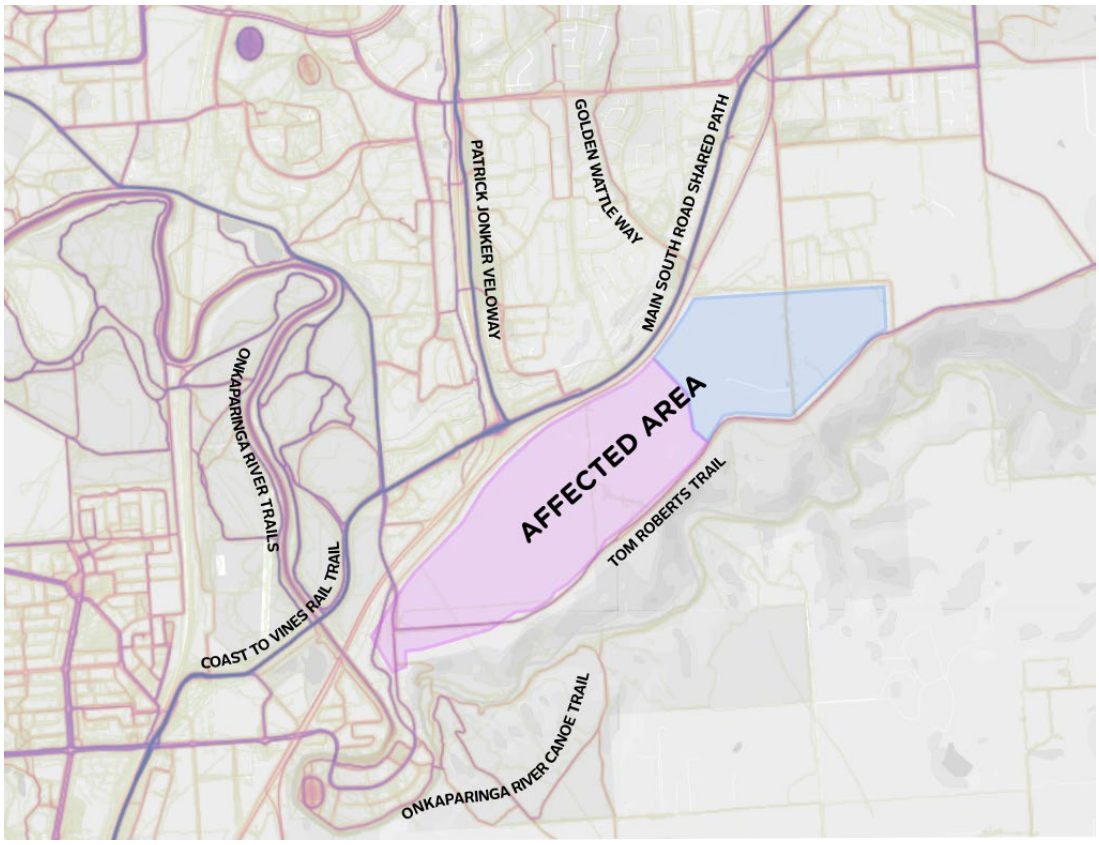



*Figure 3 - Key walking and cycling trails/path and Strava Heat Map for cycling*

(after Strava Heat Maps, 2021)

## 3. POTENTIAL REZONING AND FUTURE DEVELOPMENT

The affected area (Northern Area and Central/Southern Area) is proposed to be rezoned to accommodate primarily residential development. For the purposes of these investigations, it has been assumed that these two areas would accommodate up to 2,000 dwellings.

For the purposes of the transport investigations, the following yields have been adopted:

- Northern Area
  - 880 residential dwellings;
- Central/Southern Area
  - 1,120 residential dwellings;
  - 6000 m² of retail floor area; and
  - a 400-student primary school.

It should be noted that the above yields are assumptions based on planning investigations to date, however further investigations would be required in the future to confirm the assumptions (particularly in relation to the retail area and primary school enrolment adopted).

For the purposes of the following assessments, noting the development of other adjacent land to the north, it has been assumed that the Northern Area would be developed first, followed by the Central/Southern Area (i.e. development stages would generally progress from north to south). However, there would be opportunity for alternative staging arrangements subject to associated infrastructure provisions.

# 4. TRANSPORT INVESTIGATIONS

Traffic impact analysis has been prepared in relation to the potential developments on the subject parcels. Specifically, this has been prepared in order to inform the due diligence assessment for the rezoning of the Northern Area and Central/Southern Area.

## 4.1 TRIP GENERATION

The assessment of the traffic generation associated with future development of the three parcels has been based on the following trip generation assumptions:

- a daily traffic generation rate of eight trips per dwelling with 10% occurring in both the am and pm peak hours;
- a retail trip generation rate of nine trips per 100 m² during the pm commuter peak hour (with 50% discount to this rate for the am commuter peak hour). It is assumed that 50% of the generated trips remaining internal to the study areas); and
- 0.5 trips per student for the primary school and that 50% of these trips remain internal to the study area.

Based on these rates, it is forecast that the two portions of the affected area would generate the following traffic volumes on to the external road network:

- Northern Area – 704 am and 704 pm commuter peak hour trips; and
- Central/Southern Area – 1,366 am and 1,636 pm commuter peak hour trips.

In addition to the above, the analysis also includes consideration of previous forecasts identified for the development of land immediately north of Hepenstal Road (namely, 290 am and 370 pm commuter peak hour trips).

## 4.2 TRIP DISTRIBUTION

The distribution of the forecast peak hour volumes has been prepared taking into account existing constraints and likely future access arrangements. While there is some variance between options assessed, the following initial assumptions were made in relation to the general distribution of movements:

- 63% of movements are to/from the north via Main South Road, the Expressway or Gates Road;
- 15% of movements are to/from the south via Main South Road;
- 15% of movements are to/from the west via Melsetter Road, Brodie Road and River Road; and

- 7% of movements are to/from the east via Piggott Range Road.

Some variance to these distributions has been undertaken on the basis of capacity constraints identified through the modelling assessment.

## 4.3 ACCESS OPTIONS

In order to assess the traffic impacts associated with the future development of the affected area, consideration has been given to a number of potential access arrangements.

Access options for the affected area have previously been considered as part of the assessment prepared for development of the land immediately north of Hepenstal Road. As part of previous assessment, consideration was given to options for the provision of a new connection to Main South Road opposite Melsetter Road (with either a four-way signalised intersection or a roundabout). Following discussions with key land owners, it was apparent that access to the required land to create such a four-way intersection would not be desired by the land owners (and would likely require compulsory acquisition process). As a result, the previous assessment identified that the land to the north would need to be serviced by either the Hepenstal Road/Main South Road intersection and/or an additional intersection south of Hepenstal Road (with access through the affected area). Such provisions (discussed further below) would also service development of the Northern Area and Investigations Area. Notwithstanding the above, there may opportunity to revisit the connection to Melsetter Road with the relevant land owner and, if so, the Hepenstal Road signalisation discussed below would effectively 'relocated' to a four-way intersection with Melsetter Road. Nevertheless, the following assessment assumes a Hepenstal Road signalisation as it essentially presents the worst-case for northern access to the land (of these two options).

In relation to the southern end of the affected area, access can be achieved via the existing Church Hill Road/River Road 'interchange' with Main South Road. Analysis has, however, been undertaken to review capacity of the key intersections and potential requirements for upgrades. Such upgrades could include conversion of the existing Church Hill Road/River Road/Patapinda Road and River Road/River Road Access intersections to include separated turn lanes or roundabouts as well as potential alteration to the River Road Access intersection with Main South Road (discussed further below).

In addition to the northern and southern access arrangements, consideration has also been given to the opportunity and need for an additional central access. DIT representatives were open to consideration of an additional access (new public intersection) on Main South Road, albeit there was not an appetite to upgrade the existing Southern Expressway/Main South Road intersection to

accommodate additional turning movements. Therefore, the analysis has focussed on the provision of a new central signalised T-intersection or a signalised four-way with an existing side street (such as Brodie Road).

There will also be opportunity to provide connections between development of the affected area and Piggott Range Road. Generally, this would be best accommodated via the existing made portions of Piggott Range Road at its southern and northern ends (adjacent the affect area), albeit further connections could be considered the road is extended/upgraded accordingly (albeit full connection from east to west is not considered warranted or necessary to accommodate the development of the Affected Area). There may some demand associated with movements to/from areas to the north-east (such as States Road and surrounding schools) as well as connection to Church Hill Road at the southern end (for access to the Southern Expressway, Main South Road and areas to the west, south-west and north-west.

In addition, there would be opportunities to improve accessibility to the Southern Expressway to minimise impact of distribution of movements to Main South Road and Beach Road (i.e. accommodate relatively direct access to the Expressway). High level options for Expressway access have been discussed with DIT but will require further strategic planning review and ongoing discussions. Nevertheless, additional discussion in respect to these options is provided in Section 4.4.3 below.

## 4.4 INTERSECTION ANALYSIS

SIDRA intersection analysis software has been utilised to assess the impacts of the future traffic volumes on the adjacent road network and inform decisions regarding the future access requirements. The modelling has been based on progressive development stages associated with three parcels of land. The following sections detail the key findings for each stage. SIDRA output results are provided in Appendices A to B. It should be noted that the assessment has also considered the additional traffic volumes associated with development of land to the north of Hepenstal Road.

### 4.4.1 NORTHERN AREA

Modelling was previously undertaken for the unsignalised intersection of Hepenstal Road/Main South Road (as part of the assessment for development of the land north of Hepenstal Road). The previous assessment confirmed that the development of the Northern Area (with no allowance for internal connection to the south) would exceed the capacity of the current Hepenstal Road/Main South Road intersection. The analysis indicated that the intersection would exceed capacity under such a scenario and require upgrade or an alternative access arrangement.

Modelling has therefore been undertaken of a potential signalisation of Hepenstal Road to improve capacity and accommodate the forecast volumes. The SIDRA analysis indicates that such a signalisation would adequately accommodate the forecast volumes. A review of the available road reserves at the Hepenstal Road intersection indicates the required upgrade could generally be achieved within the existing provisions without land acquisition requirements.

The modelling also indicates that Melsetter Road could continue to operate as a unsignalised intersection and accommodate the additional movements generated by development of the Northern Area.

The modelling has also included consideration of the capacity constraint at the River Road Access/Main South Road intersection and that the majority of movements distributed to the north would need to be via a right-out from the subject area to utilise Beach Road for Expressway access or continue north on Main South Road. If improved accessibility to the Southern Expressway cannot be achieved by the completion of development of the Northern Area, the Hepenstal Road/Main South Road intersection would still be able to accommodate a higher level of right-out movements (rather than left-out to the Expressway via River Road), albeit there would be greater levels of queuing and delay on the Hepenstal Road approach.

### 4.4.2 NORTHERN AREA AND THE CENTRAL/SOUTHERN AREA

The ultimate scenario for the affected area has been modelled assuming a northern signalised intersection is provided (i.e. at Hepenstal Road), an internal connection is provided for access to/from the River Road interchange (via the southern end of Piggott Range Road and/or a new connection to Church Hill Road) and a new central signalised intersection is provided.

The modelling indicates that the Melsetter Road/Main South Road intersection would need to be signalised to adequately service turning movements as a result of the increased volumes on Main South Road associated with development of the Central/Southern Area.

Consideration was given to a new left-in/left-out/right-in on Main South Road (in lieu of a full signalised intersection), however given constraints with access to the Southern Expressway and the forecast volumes it is considered that an additional opportunity for signalised right turn (out) movements is required to service the ultimate development yields. The modelling suggests that dual right-out movements may be required if adequate capacity cannot be achieved for movements from River Road to Main South Road/Southern Expressway. The location of such a central intersection should be located to achieve sufficient separation between the intersections of Main South Road with Hepenstal Road and the Southern Expressway. Figure 4 illustrates the general locality in which it

is considered that a new intersection could be achieved. Depending on ultimate location adopted, there would be opportunity for the intersection to form a T-intersection or a four-way intersection with connection to/from Bride Road (either where it currently intersects Main South Road or further east along the main alignment of the road). This would require further consideration from Council as this would likely require upgrade of Brodie Road and the connection would primarily be of benefit to the residential area north of Main South Road (rather than the affected area).

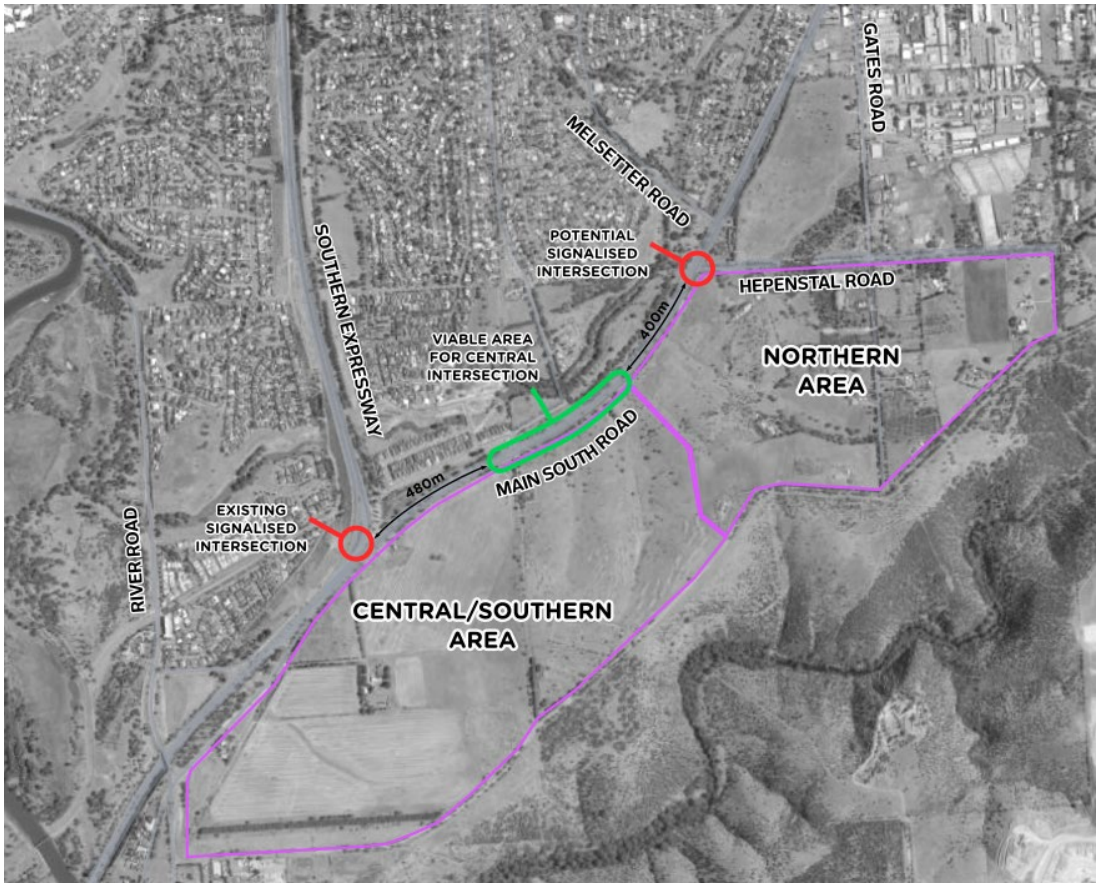



*Figure 4 - General location for new central intersection*

The initial modelling of this scenario indicates that the intersection of River Road/River Road Access would accommodate the future ultimate volumes. The intersection of Church Hill Road/Patapinda Road/River Road would, however, require upgrade to a roundabout if improved access to the Southern Expressway is achieved (alternatively, if the majority of northbound traffic is accommodated via Main South Road and Beach Road with minimal distribution to the Expressway, the existing intersection layout would be acceptable).

As noted above, the modelling has indicated that the left-out movement from River Road Access to Main South Road is already at capacity (current volumes). This is a significant constraint on the ability to distribute traffic from the site to

the Southern Expressway (primarily associated with am peak period northbound movements). An upgrade to the River Road Access to Main South Road or alternative solution is therefore desirable (regardless of the subject development sites) as well as the need for an additional access (with right turn movements) located centrally along the affected area's frontage.

There are various options which could be considered and have been discussed (in a preliminary manner) with DIT. However, given the strategic importance of both the Southern Expressway and Main South Road, this will require further review by and liaison with DIT. The potential solutions include:

- Realignment of the River Access Road to 'loop' around the south of the existing bridge. This would allow a significant improvement in the separation between the left-out on to Main South Road and the turn lanes for the adjacent Expressway. Such an upgrade could allow sufficient room for a full acceleration lane to be provided but may require widening underneath the River Road bridge. Preliminary discussions with DIT have indicated this option may be complicated by a future need to extend additional traffic lanes between this area and the Main South Road/Seaford Road intersection.
- Creation of an additional connection from the River Road Access Road direct to the Southern Expressway (before merging into the northbound lanes on the Expressway). The existing left-out to Main South Road could be retained to accommodate drivers seeking to heading north-east via Main South Road. Figure 5 illustrates the potential connection.

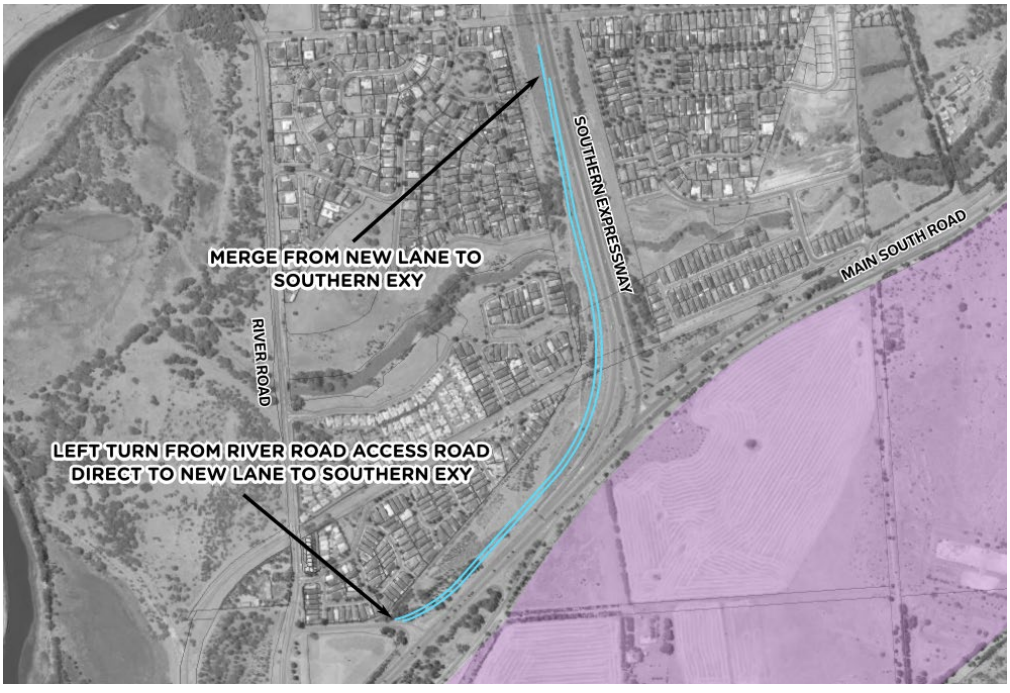



*Figure 5 - Potential direct connection between River Road Access Road and the Southern Expressway*

- Signalise northbound movements on Main South Road and the left-out from River Road Access. This would achieve sufficient capacity for drivers to exit River Road Access, however would increase delays and travel time for north-bound drivers on Main South Road and may not be desirable to DIT in terms of overall network impact. However, southbound traffic would not need to be signalised (i.e. the impact would only be in one direction).
- Upgrade the Southern Expressway/Main South Road intersection to either accommodate right turns from Main South Road (northern approach). DIT has advised that such an option would be unlikely to be supported (given it would reduce Levels of Service for other existing movements at the intersection).

Should a significant improvement in the capacity of the connection from the Affected Area to the Southern Expressway be achieved, it would likely negate the requirement for two signalised intersections to service development of the Northern and Central/Southern Areas. However, this would require that staging of both the provision of a new signalised intersection (either upgrade of the Hepenstal Road/Main South Road intersection, Melsetter Road/Main South Road/New Access Road intersection or the new central intersection) as well as the improved connection to the Southern Expressway would be required relatively early on in the development staging (as well as the internal road connections to facilitate access between the developed areas and these primary access locations).

Further liaison will be required with DIT (as well as the City of Onkaparinga) to explore the above options as well as staging of associated infrastructure interventions. In addition, identification of specific access arrangements desired by all parties, negotiations on cost contributions would also be desirable (in particular, noting that DIT's River Road Access/Main South Road is already at or over capacity and should desirably be addressed regardless of the development of the subject parcels of land).

## 4.5 PUBLIC TRANSPORT

Preliminary liaison was undertaken with the South Australian Public Transport Authority (SAPTA) in relation to the rezoning proposal. SAPTA has advised that an extension of public transport services to the affected area would most likely be undertaken via an extension of the 743/744 routes (currently operating to the north of the site). SAPTA has advised that such an extension may require buses to turn right on to Main South Road and that this would only be accepting under a signalised arrangement. SAPTA has also noted there is no current funding for extension of the services and that this would need to be addressed in the future if development of the site proceeds.

In addition to the above, SAPTA has noted that the internal layout of future development of the land should ensure that the road network includes adequate provisions for access by public transport vehicles. This includes (but it not limited to) consideration of bus stop locations (taking into account driveways etc.), provision of appropriate geometric alignments (to accommodate swept paths) and appropriate pedestrian linkages to/from services. Generally, it is considered that a central collector route through the affected area would enable accommodation of bus services. With bus stop spacings every 300 to 350 m (as per standard SAPTA arrangements), the majority of the land could be within 400 m walking distance of a bus stop (refer Figure 6).

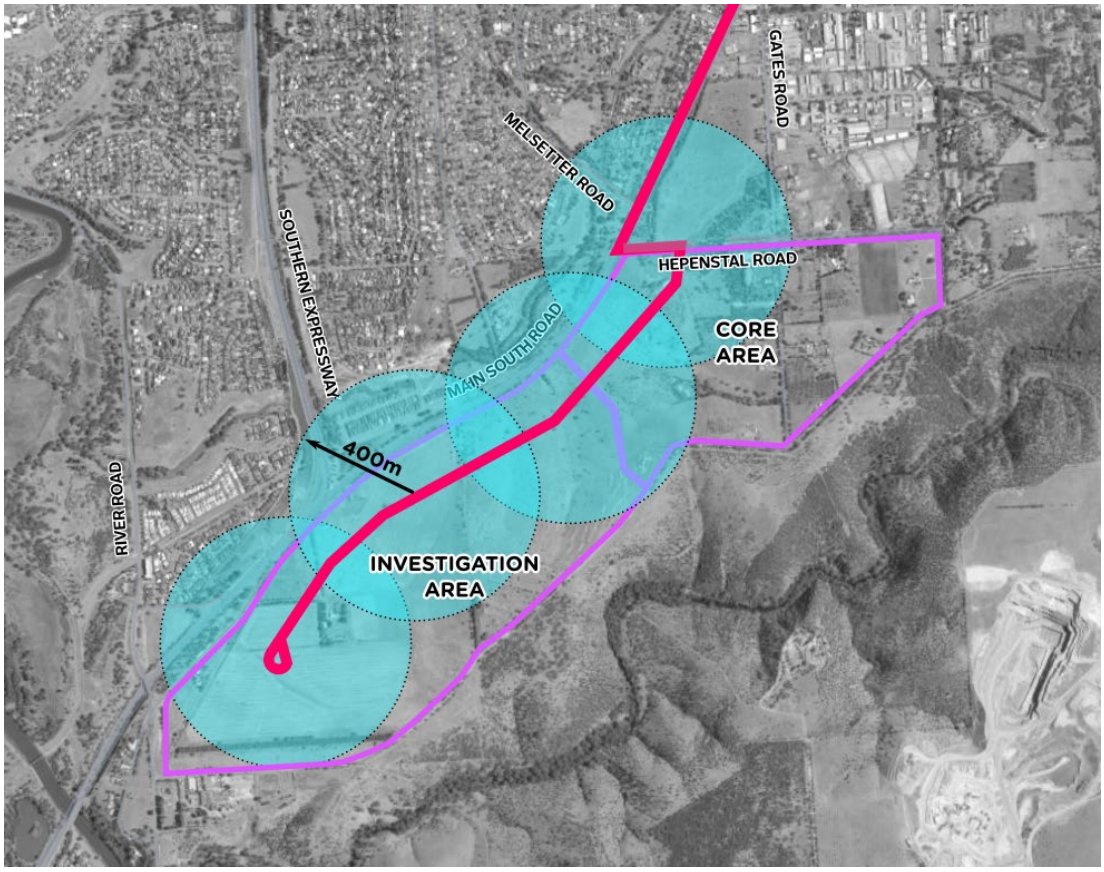



*Figure 6 - Walking catchment for potential central bus route within the affected area*

## 4.6 WALKING AND CYCLING

A high degree of connectivity for pedestrians and cyclists will be desirable within the site. The provision of pedestrian and cyclist facilities will need to take into account the topography of the site. New networks within the site should seek to provide connectivity between future residential allotments and key destinations within the site (such as retail centres, the potential school, bus services and open space) as well as external destinations and facilities (including the existing shared path on the opposite side of Main South Road, the Patrick Jonker Veloway and the other surrounding trails and paths). Figure 7 illustrates a high level review

of general connectivity for walking and cycling to/from the site. Importantly, new access provisions on Main South Road and the future upgrade of the Hepenstal Road intersection should include pedestrian and cyclist connections to the shared path on the opposite side of Main South Road (as this path provides connections to the other paths and trails to the north, west and south).

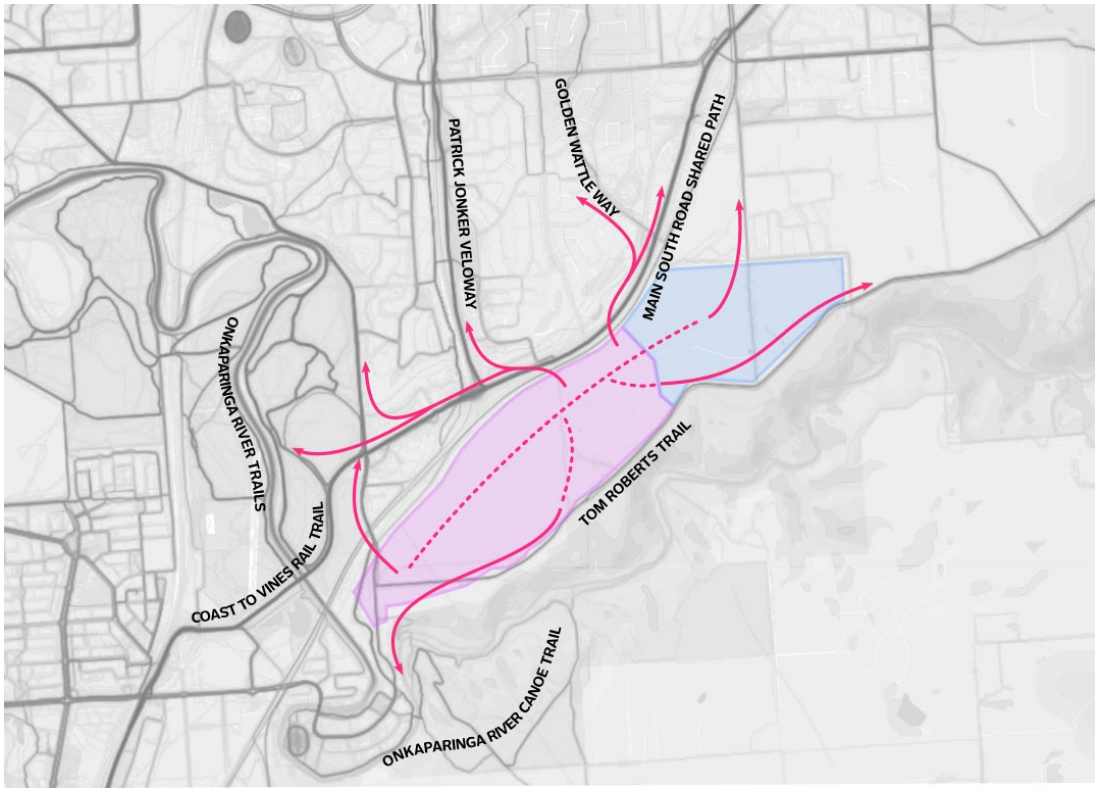



*Figure 7 - High level connections for walking and cycling facilities*

# APPENDIX A

## SIDRA ANALYSIS – NORTHERN AREA

# APPENDIX A.1

## MELSETTER ROAD/MAIN SOUTH ROAD

# MOVEMENT SUMMARY

## Site: 1 [Melsetter Rd Stage 1 (Minor Road) - AM North (Site Folder: General)]

## Network: N101 [Melsetter Rd/South Rd - AM North (Network Folder: General)]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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: South Rd (S) | | | | | | | | | | | | | | |
| 4 | L2 | 105 | 2.0 | 105 | 2.0 | 0.074 | 5.7 | LOS A | 0.3 | 2.2 | 0.04 | 0.53 | 0.04 | 54.1 |
| 5 | T1 | 794 | 5.0 | 794 | 5.0 | 0.208 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 899 | 4.6 | 899 | 4.6 | 0.208 | 0.7 | LOS A | 0.3 | 2.2 | 0.00 | 0.06 | 0.00 | 59.1 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 12 | R2 | 6 | 2.0 | 6 | 2.0 | 0.011 | 10.3 | LOS B | 0.0 | 0.3 | 0.60 | 0.71 | 0.60 | 50.2 |
| Approach | | 6 | 2.0 | 6 | 2.0 | 0.011 | 10.3 | NA | 0.0 | 0.3 | 0.60 | 0.71 | 0.60 | 50.2 |
| West: Melsetter Road (W) | | | | | | | | | | | | | | |
| 1 | L2 | 172 | 2.0 | 172 | 2.0 | 0.225 | 13.0 | LOS B | 1.7 | 12.2 | 0.54 | 0.36 | 0.60 | 49.4 |
| 2 | T1 | 46 | 2.0 | 46 | 2.0 | 0.225 | 16.7 | LOS C | 1.7 | 12.2 | 0.54 | 0.36 | 0.60 | 42.4 |
| Approach | | 218 | 2.0 | 218 | 2.0 | 0.225 | 13.8 | NA | 1.7 | 12.2 | 0.54 | 0.36 | 0.60 | 48.4 |
| All Vehicles | | 1123 | 4.1 | 1123 | 4.1 | 0.225 | 3.3 | NA | 1.7 | 12.2 | 0.11 | 0.12 | 0.12 | 56.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 2 [Melsetter Rd Stage 2 (Median) - AM North (Site Folder: General)]

## Network: N101 [Melsetter Rd/South Rd - AM North (Network Folder: General)]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: South Rd (N) | | | | | | | | | | | | | | |
| 11 | T1 | 629 | 5.0 | 629 | 5.0 | 0.164 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 629 | 5.0 | 629 | 5.0 | 0.164 | 0.0 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| West: Median Storage Area | | | | | | | | | | | | | | |
| 3 | R2 | 46 | 2.0 | 46 | 2.0 | 0.056 | 2.3 | LOS A | 0.2 | 1.0 | 0.46 | 0.40 | 0.46 | 49.8 |
| Approach | | 46 | 2.0 | 46 | 2.0 | 0.056 | 2.3 | LOS A | 0.2 | 1.0 | 0.46 | 0.40 | 0.46 | 49.8 |
| All Vehicles | | 676 | 4.8 | 676 | 4.8 | 0.164 | 0.2 | NA | 0.2 | 1.0 | 0.03 | 0.03 | 0.03 | 59.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 1 [Melsetter Rd Stage 1 (Minor Road) - PM North (Site Folder: General)]

## Network: N101 [Melsetter Rd/South Rd - PM North (Network Folder: General)]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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: South Rd (S) | | | | | | | | | | | | | | |
| 4 | L2 | 60 | 2.0 | 60 | 2.0 | 0.050 | 6.3 | LOS A | 0.2 | 1.4 | 0.28 | 0.54 | 0.28 | 53.2 |
| 5 | T1 | 716 | 5.0 | 716 | 5.0 | 0.188 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 776 | 4.8 | 776 | 4.8 | 0.188 | 0.5 | LOS A | 0.2 | 1.4 | 0.02 | 0.04 | 0.02 | 59.3 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 12 | R2 | 172 | 2.0 | 172 | 2.0 | 0.271 | 10.7 | LOS B | 1.2 | 8.3 | 0.63 | 0.87 | 0.70 | 49.9 |
| Approach | | 172 | 2.0 | 172 | 2.0 | 0.271 | 10.7 | NA | 1.2 | 8.3 | 0.63 | 0.87 | 0.70 | 49.9 |
| West: Melsetter Road (W) | | | | | | | | | | | | | | |
| 1 | L2 | 69 | 2.0 | 69 | 2.0 | 0.406 | 20.2 | LOS C | 2.7 | 19.0 | 0.83 | 0.67 | 1.13 | 45.2 |
| 2 | T1 | 119 | 2.0 | 119 | 2.0 | 0.406 | 20.1 | LOS C | 2.7 | 19.0 | 0.83 | 0.67 | 1.13 | 36.7 |
| Approach | | 188 | 2.0 | 188 | 2.0 | 0.406 | 20.1 | NA | 2.7 | 19.0 | 0.83 | 0.67 | 1.13 | 40.8 |
| All Vehicles | | 1136 | 3.9 | 1136 | 3.9 | 0.406 | 5.3 | NA | 2.7 | 19.0 | 0.25 | 0.27 | 0.31 | 54.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 2 [Melsetter Rd Stage 2 (Median) - PM North (Site Folder: General)]

## Network: N101 [Melsetter Rd/South Rd - PM North (Network Folder: General)]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: South Rd (N) | | | | | | | | | | | | | | |
| 11 | T1 | 962 | 5.0 | 962 | 5.0 | 0.250 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 962 | 5.0 | 962 | 5.0 | 0.250 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| West: Median Storage Area | | | | | | | | | | | | | | |
| 3 | R2 | 119 | 2.0 | 119 | 2.0 | 0.211 | 5.1 | LOS A | 0.7 | 3.9 | 0.66 | 0.68 | 0.69 | 46.3 |
| Approach | | 119 | 2.0 | 119 | 2.0 | 0.211 | 5.1 | LOS A | 0.7 | 3.9 | 0.66 | 0.68 | 0.69 | 46.3 |
| All Vehicles | | 1081 | 4.7 | 1081 | 4.7 | 0.250 | 0.6 | NA | 0.7 | 3.9 | 0.07 | 0.07 | 0.08 | 58.8 |

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

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

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

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

# APPENDIX A.2

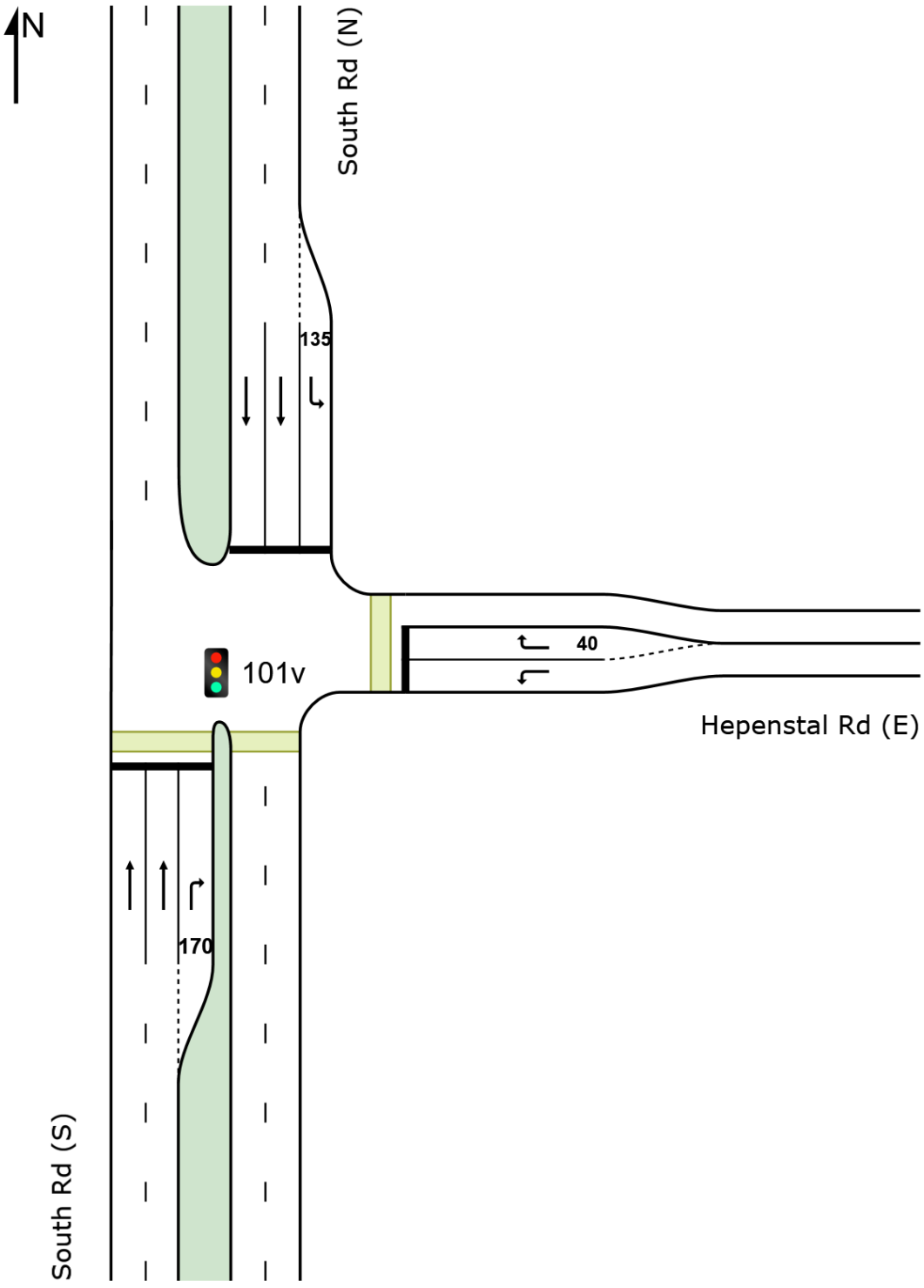
## HEPENSTAL ROAD/MAIN SOUTH ROAD

# SITE LAYOUT

## Site: 101v [South Rd/Hepenstal Rd - PM North Area (Site Folder: General)]

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.



# MOVEMENT SUMMARY

## Site: 101v [South Rd/Hepenstal Rd - AM North Area (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 120 seconds (Site User-Given Cycle Time)

**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: South Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 680 | 5.0 | 716 | 5.0 | 0.257 | 5.5 | LOS A | 6.7 | 49.3 | 0.35 | 0.31 | 0.35 | 71.4 |
| 3 | R2 | 205 | 2.0 | 216 | 2.0 | 0.304 | 34.5 | LOS C | 8.7 | 62.2 | 0.74 | 0.79 | 0.74 | 38.7 |
| Approach | | 885 | 4.3 | 932 | 4.3 | 0.304 | 12.2 | LOS B | 8.7 | 62.2 | 0.44 | 0.42 | 0.44 | 59.7 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | | | |
| 4 | L2 | 469 | 2.0 | 494 | 2.0 | * 0.519 | 18.5 | LOS B | 15.6 | 110.8 | 0.59 | 0.74 | 0.59 | 44.6 |
| 6 | R2 | 88 | 2.0 | 93 | 2.0 | 0.304 | 52.5 | LOS D | 4.8 | 34.4 | 0.92 | 0.77 | 0.92 | 31.6 |
| Approach | | 557 | 2.0 | 586 | 2.0 | 0.519 | 23.9 | LOS C | 15.6 | 110.8 | 0.64 | 0.75 | 0.64 | 41.9 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 109 | 2.0 | 115 | 2.0 | 0.122 | 22.8 | LOS C | 3.4 | 24.2 | 0.55 | 0.73 | 0.55 | 44.2 |
| 8 | T1 | 560 | 5.0 | 589 | 5.0 | * 0.515 | 37.4 | LOS D | 14.3 | 104.3 | 0.88 | 0.75 | 0.88 | 43.9 |
| Approach | | 669 | 4.5 | 704 | 4.5 | 0.515 | 35.0 | LOS D | 14.3 | 104.3 | 0.83 | 0.75 | 0.83 | 44.0 |
| All Vehicles | | 2111 | 3.8 | 2222 | 3.8 | 0.519 | 22.5 | LOS C | 15.6 | 110.8 | 0.62 | 0.61 | 0.62 | 48.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: South Rd (S) | | | | | | | | | | | | |
| P11 | Stage 1 | 50 | 53 | 47.8 | LOS E | 0.2 | 0.2 | 0.89 | 0.89 | 71.9 | 31.3 | 0.44 |
| P12 | Stage 2 | 50 | 53 | 25.4 | LOS C | 0.1 | 0.1 | 0.65 | 0.65 | 46.9 | 28.0 | 0.60 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 34.6 | LOS D | 0.1 | 0.1 | 0.76 | 0.76 | 59.1 | 31.9 | 0.54 |
| All Pedestrians | | 0 | 158 | 35.9 | LOS D | 0.2 | 0.2 | 0.77 | 0.77 | 59.3 | 30.4 | 0.51 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [South Rd/Hepenstal Rd - PM North Area (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 120 seconds (Site User-Given Cycle Time)

**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: South Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 618 | 5.0 | 651 | 5.0 | 0.210 | 2.5 | LOS A | 4.1 | 30.1 | 0.24 | 0.21 | 0.24 | 75.8 |
| 3 | R2 | 479 | 2.0 | 504 | 2.0 | * 0.654 | 37.0 | LOS D | 23.5 | 167.4 | 0.86 | 0.85 | 0.86 | 37.7 |
| Approach | | 1097 | 3.7 | 1155 | 3.7 | 0.654 | 17.6 | LOS B | 23.5 | 167.4 | 0.51 | 0.49 | 0.51 | 52.6 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | | | |
| 4 | L2 | 213 | 2.0 | 224 | 2.0 | 0.223 | 19.2 | LOS B | 6.6 | 47.0 | 0.55 | 0.70 | 0.55 | 44.2 |
| 6 | R2 | 62 | 2.0 | 65 | 2.0 | * 0.428 | 63.5 | LOS E | 3.8 | 27.1 | 0.99 | 0.76 | 0.99 | 28.8 |
| Approach | | 275 | 2.0 | 289 | 2.0 | 0.428 | 29.2 | LOS C | 6.6 | 47.0 | 0.65 | 0.72 | 0.65 | 39.5 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 191 | 2.0 | 201 | 2.0 | 0.228 | 26.1 | LOS C | 6.7 | 47.9 | 0.62 | 0.76 | 0.62 | 42.5 |
| 8 | T1 | 812 | 5.0 | 855 | 5.0 | * 0.640 | 35.1 | LOS D | 20.9 | 152.5 | 0.90 | 0.79 | 0.90 | 45.2 |
| Approach | | 1003 | 4.4 | 1056 | 4.4 | 0.640 | 33.3 | LOS C | 20.9 | 152.5 | 0.84 | 0.78 | 0.84 | 44.7 |
| All Vehicles | | 2375 | 3.8 | 2500 | 3.8 | 0.654 | 25.6 | LOS C | 23.5 | 167.4 | 0.67 | 0.64 | 0.67 | 47.2 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: South Rd (S) | | | | | | | | | | | | |
| P11 | Stage 1 | 50 | 53 | 54.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 | 78.3 | 31.3 | 0.40 |
| P12 | Stage 2 | 50 | 53 | 22.9 | LOS C | 0.1 | 0.1 | 0.62 | 0.62 | 44.4 | 28.0 | 0.63 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 30.2 | LOS D | 0.1 | 0.1 | 0.71 | 0.71 | 54.7 | 31.9 | 0.58 |
| All Pedestrians | | 0 | 158 | 35.8 | LOS D | 0.2 | 0.2 | 0.76 | 0.76 | 59.2 | 30.4 | 0.51 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# APPENDIX B

## SIDRA ANALYSIS – NORTHERN AREA AND CENTRAL/SOUTHERN AREA

# APPENDIX B.1

## MELSETTER ROAD/MAIN SOUTH ROAD

# MOVEMENT SUMMARY

## Site: 1 [Melsetter Rd Stage 1 (Minor Road) - AM North + Central/South (Site Folder: General)]

## Network: N101 [Melsetter Rd/ South Rd - AM North + Central/South (Network Folder: General)]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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: South Rd (S) | | | | | | | | | | | | | | |
| 4 | L2 | 177 | 2.0 | 177 | 2.0 | 0.132 | 5.9 | LOS A | 0.6 | 4.1 | 0.18 | 0.52 | 0.18 | 53.6 |
| 5 | T1 | 936 | 4.2 | 936 | 4.2 | 0.245 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 1113 | 3.9 | 1113 | 3.9 | 0.245 | 1.0 | LOS A | 0.6 | 4.1 | 0.03 | 0.08 | 0.03 | 58.8 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 12 | R2 | 69 | 2.0 | 69 | 2.0 | 0.150 | 12.6 | LOS B | 0.5 | 3.8 | 0.71 | 0.87 | 0.71 | 48.7 |
| Approach | | 69 | 2.0 | 69 | 2.0 | 0.150 | 12.6 | NA | 0.5 | 3.8 | 0.71 | 0.87 | 0.71 | 48.7 |
| West: Melsetter Road (W) | | | | | | | | | | | | | | |
| 1 | L2 | 172 | 2.0 | 172 | 2.0 | 0.545 | 28.5 | LOS D | 6.0 | 42.6 | 1.00 | 0.43 | 1.54 | 41.0 |
| 2 | T1 | 104 | 2.0 | 104 | 2.0 | 0.545 | 29.9 | LOS D | 6.0 | 42.6 | 1.00 | 0.43 | 1.54 | 31.6 |
| Approach | | 276 | 2.0 | 276 | 2.0 | 0.545 | 29.0 | NA | 6.0 | 42.6 | 1.00 | 0.43 | 1.54 | 38.3 |
| All Vehicles | | 1458 | 3.4 | 1458 | 3.4 | 0.545 | 6.8 | NA | 6.0 | 42.6 | 0.24 | 0.19 | 0.35 | 53.6 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 2 [Melsetter Rd Stage 2 (Median) - AM North + Central/ South (Site Folder: General)]

## Network: N101 [Melsetter Rd/ South Rd - AM North + Central/South (Network Folder: General)]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: South Rd (N) | | | | | | | | | | | | | | |
| 11 | T1 | 715 | 4.5 | 715 | 4.5 | 0.185 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 715 | 4.5 | 715 | 4.5 | 0.185 | 0.0 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| West: Median Storage Area | | | | | | | | | | | | | | |
| 3 | R2 | 104 | 2.0 | 104 | 2.0 | 0.138 | 3.0 | LOS A | 0.5 | 2.5 | 0.51 | 0.51 | 0.51 | 48.9 |
| Approach | | 104 | 2.0 | 104 | 2.0 | 0.138 | 3.0 | LOS A | 0.5 | 2.5 | 0.51 | 0.51 | 0.51 | 48.9 |
| All Vehicles | | 819 | 4.2 | 819 | 4.2 | 0.185 | 0.4 | NA | 0.5 | 2.5 | 0.07 | 0.07 | 0.07 | 59.0 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 1 [Melsetter Rd Stage 1 (Minor Road) - PM North + Central/South (Site Folder: General)]

## Network: N101 [Melsetter Rd/ South Rd - PM North + Central/South (Network Folder: General)]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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: South Rd (S) | | | | | | | | | | | | | | |
| 4 | L2 | 140 | 2.0 | 140 | 2.0 | 0.116 | 6.4 | LOS A | 0.5 | 3.4 | 0.30 | 0.56 | 0.30 | 53.2 |
| 5 | T1 | 826 | 4.2 | 826 | 4.2 | 0.216 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 966 | 3.9 | 966 | 3.9 | 0.216 | 1.0 | LOS A | 0.5 | 3.4 | 0.04 | 0.08 | 0.04 | 58.8 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 12 | R2 | 172 | 2.0 | 172 | 2.0 | 0.314 | 12.5 | LOS B | 1.4 | 9.9 | 0.70 | 0.92 | 0.85 | 48.7 |
| Approach | | 172 | 2.0 | 172 | 2.0 | 0.314 | 12.5 | NA | 1.4 | 9.9 | 0.70 | 0.92 | 0.85 | 48.7 |
| West: Melsetter Road (W) | | | | | | | | | | | | | | |
| 1 | L2 | 69 | 2.0 | 69 | 2.0 | 1.167 | 200.8 | LOS F | 34.8 | 247.5 | 1.00 | 2.39 | 9.12 | 13.9 |
| 2 | T1 | 219 | 2.0 | 219 | 2.0 | 1.167 | 200.3 | LOS F | 34.8 | 247.5 | 1.00 | 2.39 | 9.12 | 8.0 |
| Approach | | 288 | 2.0 | 288 | 2.0 | 1.167 | 200.4 | NA | 34.8 | 247.5 | 1.00 | 2.39 | 9.12 | 9.6 |
| All Vehicles | | 1426 | 3.3 | 1426 | 3.3 | 1.167 | 42.7 | NA | 34.8 | 247.5 | 0.32 | 0.65 | 1.97 | 33.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 2 [Melsetter Rd Stage 2 (Median) - PM North + Central/ South (Site Folder: General)]

## Network: N101 [Melsetter Rd/ South Rd - PM North + Central/South (Network Folder: General)]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: South Rd (N) | | | | | | | | | | | | | | |
| 11 | T1 | 1128 | 4.5 | 1128 | 4.5 | 0.292 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 1128 | 4.5 | 1128 | 4.5 | 0.292 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| West: Median Storage Area | | | | | | | | | | | | | | |
| 3 | R2 | 220 | 2.0 | 190 | 2.0 | 0.418 | 8.8 | LOS A | 1.7 | 9.3 | 0.79 | 0.95 | 1.06 | 42.5 |
| Approach | | 220 | 2.0 | 190 N1 | 2.0 | 0.418 | 8.8 | LOS A | 1.7 | 9.3 | 0.79 | 0.95 | 1.06 | 42.5 |
| All Vehicles | | 1348 | 4.1 | 1319 N1 | 4.2 | 0.418 | 1.3 | NA | 1.7 | 9.3 | 0.11 | 0.14 | 0.15 | 58.0 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

# APPENDIX B.2

## HEPENSTAL ROAD/MAIN SOUTH ROAD

# MOVEMENT SUMMARY

## Site: 101v [South Rd/Hepenstal Rd - AM North + Central/ South Area (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 120 seconds (Site User-Given Cycle Time)

**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: South Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 867 | 4.2 | 913 | 4.2 | 0.305 | 3.9 | LOS A | 7.5 | 54.1 | 0.31 | 0.27 | 0.31 | 73.7 |
| 3 | R2 | 205 | 2.0 | 216 | 2.0 | * 0.412 | 44.6 | LOS D | 10.3 | 73.0 | 0.86 | 0.81 | 0.86 | 35.0 |
| Approach | | 1072 | 3.8 | 1128 | 3.8 | 0.412 | 11.7 | LOS B | 10.3 | 73.0 | 0.41 | 0.38 | 0.41 | 60.8 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | | | |
| 4 | L2 | 276 | 2.0 | 291 | 2.0 | 0.407 | 27.5 | LOS C | 11.0 | 78.2 | 0.70 | 0.76 | 0.70 | 40.2 |
| 6 | R2 | 85 | 2.0 | 89 | 2.0 | * 0.419 | 59.3 | LOS E | 5.0 | 35.8 | 0.97 | 0.77 | 0.97 | 29.8 |
| Approach | | 361 | 2.0 | 380 | 2.0 | 0.419 | 35.0 | LOS C | 11.0 | 78.2 | 0.76 | 0.76 | 0.76 | 37.1 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 143 | 2.0 | 151 | 2.0 | 0.134 | 17.1 | LOS B | 3.6 | 25.6 | 0.44 | 0.72 | 0.44 | 47.5 |
| 8 | T1 | 681 | 4.4 | 717 | 4.4 | * 0.416 | 23.7 | LOS C | 14.0 | 101.9 | 0.72 | 0.63 | 0.72 | 52.6 |
| Approach | | 824 | 4.0 | 867 | 4.0 | 0.416 | 22.6 | LOS C | 14.0 | 101.9 | 0.68 | 0.65 | 0.68 | 51.6 |
| All Vehicles | | 2257 | 3.6 | 2376 | 3.6 | 0.419 | 19.4 | LOS B | 14.0 | 101.9 | 0.56 | 0.54 | 0.56 | 52.1 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: South Rd (S) | | | | | | | | | | | | |
| P11 | Stage 1 | 50 | 53 | 53.3 | LOS E | 0.2 | 0.2 | 0.94 | 0.94 | 77.4 | 31.3 | 0.40 |
| P12 | Stage 2 | 50 | 53 | 33.8 | LOS D | 0.1 | 0.1 | 0.75 | 0.75 | 55.4 | 28.0 | 0.51 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 22.3 | LOS C | 0.1 | 0.1 | 0.61 | 0.61 | 46.8 | 31.9 | 0.68 |
| All Pedestrians | | 0 | 158 | 36.5 | LOS D | 0.2 | 0.2 | 0.77 | 0.77 | 59.9 | 30.4 | 0.51 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [South Rd/Hepenstal Rd - PM North + Central/ South Area (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 120 seconds (Site User-Given Cycle Time)

**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: South Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 776 | 3.4 | 817 | 3.4 | 0.261 | 2.7 | LOS A | 5.4 | 39.2 | 0.25 | 0.22 | 0.25 | 75.6 |
| 3 | R2 | 479 | 2.0 | 504 | 2.0 | * 0.727 | 41.6 | LOS D | 25.3 | 180.0 | 0.92 | 0.87 | 0.92 | 36.0 |
| Approach | | 1255 | 2.9 | 1321 | 2.9 | 0.727 | 17.5 | LOS B | 25.3 | 180.0 | 0.51 | 0.47 | 0.51 | 53.2 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | | | |
| 4 | L2 | 130 | 2.0 | 137 | 2.0 | 0.147 | 21.1 | LOS C | 4.2 | 29.7 | 0.56 | 0.69 | 0.56 | 43.2 |
| 6 | R2 | 66 | 2.0 | 69 | 2.0 | * 0.455 | 63.7 | LOS E | 4.1 | 28.9 | 0.99 | 0.76 | 0.99 | 28.8 |
| Approach | | 196 | 2.0 | 206 | 2.0 | 0.455 | 35.5 | LOS D | 4.2 | 29.7 | 0.71 | 0.72 | 0.71 | 37.0 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 239 | 2.0 | 252 | 2.0 | 0.263 | 23.6 | LOS C | 8.0 | 56.8 | 0.59 | 0.76 | 0.59 | 43.8 |
| 8 | T1 | 1042 | 3.4 | 1097 | 3.4 | * 0.726 | 33.2 | LOS C | 27.1 | 195.6 | 0.91 | 0.81 | 0.91 | 46.3 |
| Approach | | 1281 | 3.1 | 1348 | 3.1 | 0.726 | 31.4 | LOS C | 27.1 | 195.6 | 0.85 | 0.80 | 0.85 | 45.8 |
| All Vehicles | | 2732 | 2.9 | 2876 | 2.9 | 0.727 | 25.3 | LOS C | 27.1 | 195.6 | 0.68 | 0.64 | 0.68 | 48.1 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: South Rd (S) | | | | | | | | | | | | |
| P11 | Stage 1 | 50 | 53 | 54.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 | 78.3 | 31.3 | 0.40 |
| P12 | Stage 2 | 50 | 53 | 26.1 | LOS C | 0.1 | 0.1 | 0.66 | 0.66 | 47.6 | 28.0 | 0.59 |
| East: Hepenstal Rd (E) | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 26.7 | LOS C | 0.1 | 0.1 | 0.67 | 0.67 | 51.3 | 31.9 | 0.62 |
| All Pedestrians | | 0 | 158 | 35.7 | LOS D | 0.2 | 0.2 | 0.76 | 0.76 | 59.1 | 30.4 | 0.51 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# APPENDIX B.3

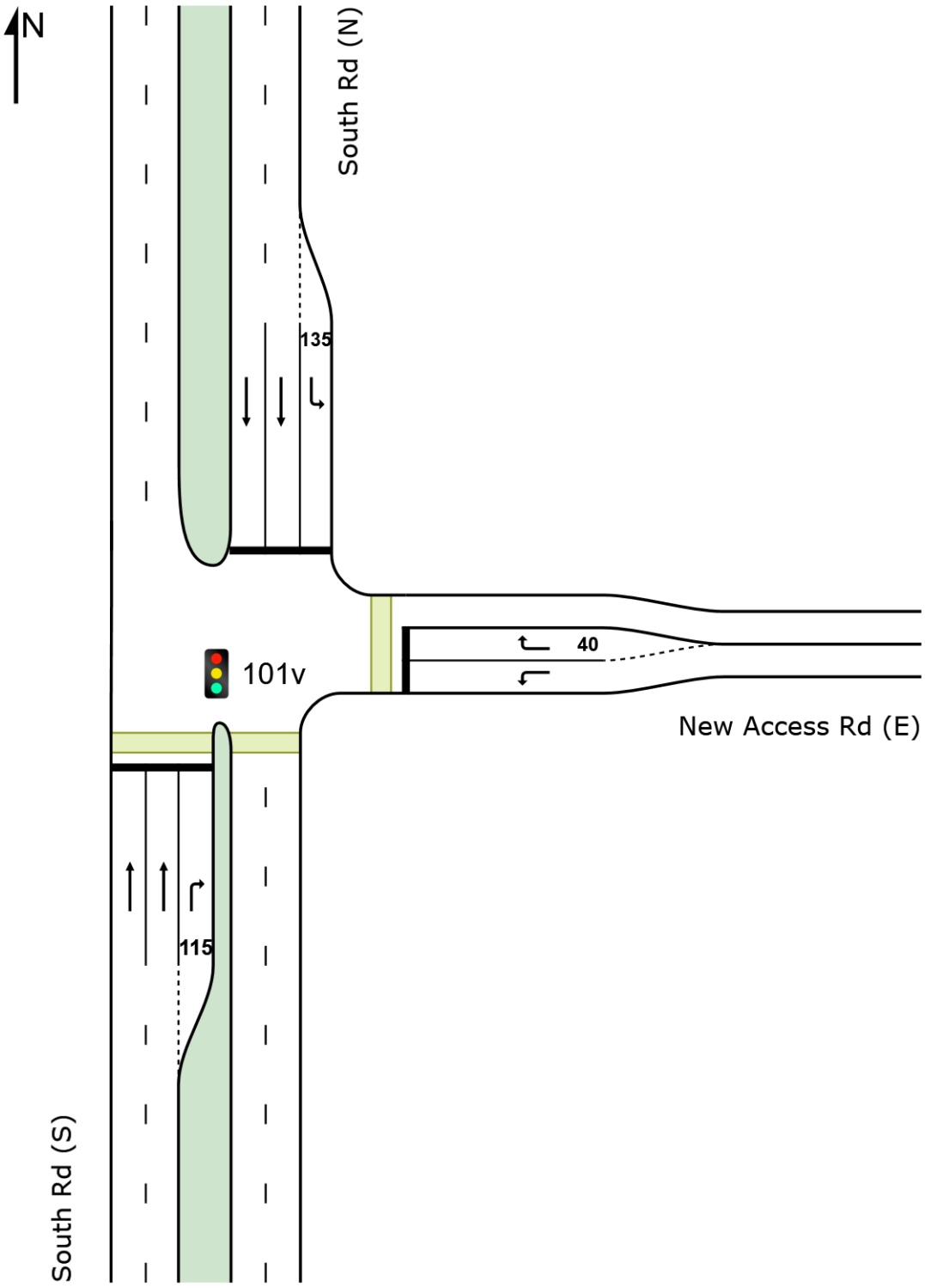
## NEW INTERSECTION/MAIN SOUTH ROAD

# SITE LAYOUT

## Site: 101v [South Rd/New Access Rd - AM North + Central/ South Area (Site Folder: October 20211020)]

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.



# MOVEMENT SUMMARY

## Site: 101v [South Rd/New Access Rd - AM North + Central/ South Area (Site Folder: October 20211020)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 120 seconds (Site User-Given Cycle Time)

**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: South Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 856 | 4.1 | 901 | 4.1 | 0.337 | 7.4 | LOS A | 10.2 | 73.7 | 0.42 | 0.38 | 0.42 | 68.8 |
| 3 | R2 | 97 | 2.0 | 102 | 2.0 | * 0.442 | 60.9 | LOS E | 5.7 | 40.6 | 0.97 | 0.78 | 0.97 | 30.3 |
| Approach | | 953 | 3.9 | 1003 | 3.9 | 0.442 | 12.9 | LOS B | 10.2 | 73.7 | 0.48 | 0.42 | 0.48 | 60.9 |
| East: New Access Rd (E) | | | | | | | | | | | | | | |
| 4 | L2 | 220 | 2.0 | 232 | 2.0 | 0.337 | 33.2 | LOS C | 9.6 | 68.5 | 0.76 | 0.77 | 0.76 | 37.8 |
| 6 | R2 | 151 | 2.0 | 159 | 2.0 | * 0.434 | 50.4 | LOS D | 8.3 | 58.8 | 0.92 | 0.79 | 0.92 | 32.2 |
| Approach | | 371 | 2.0 | 391 | 2.0 | 0.434 | 40.2 | LOS D | 9.6 | 68.5 | 0.83 | 0.78 | 0.83 | 35.3 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 97 | 2.0 | 102 | 2.0 | 0.072 | 10.3 | LOS B | 1.4 | 9.8 | 0.25 | 0.68 | 0.25 | 52.0 |
| 8 | T1 | 856 | 3.9 | 901 | 3.9 | * 0.447 | 18.7 | LOS B | 16.1 | 116.6 | 0.67 | 0.59 | 0.67 | 56.7 |
| Approach | | 953 | 3.7 | 1003 | 3.7 | 0.447 | 17.9 | LOS B | 16.1 | 116.6 | 0.62 | 0.60 | 0.62 | 56.2 |
| All Vehicles | | 2277 | 3.5 | 2397 | 3.5 | 0.447 | 19.4 | LOS B | 16.1 | 116.6 | 0.60 | 0.55 | 0.60 | 52.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: South Rd (S) | | | | | | | | | | | | |
| P11 | Stage 1 | 50 | 53 | 44.3 | LOS E | 0.2 | 0.2 | 0.86 | 0.86 | 68.4 | 31.3 | 0.46 |
| P12 | Stage 2 | 50 | 53 | 49.6 | LOS E | 0.2 | 0.2 | 0.91 | 0.91 | 71.2 | 28.0 | 0.39 |
| East: New Access Rd (E) | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 17.1 | LOS B | 0.1 | 0.1 | 0.53 | 0.53 | 41.6 | 31.9 | 0.77 |
| All Pedestrians | | 0 | 158 | 37.0 | LOS D | 0.2 | 0.2 | 0.77 | 0.77 | 60.4 | 30.4 | 0.50 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 101v [South Rd/New Access Rd - PM North + Central/ South Area (Site Folder: October 20211020)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 120 seconds (Site User-Given Cycle Time)

**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: South Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 1113 | 3.0 | 1172 | 3.0 | 0.411 | 6.1 | LOS A | 12.5 | 89.8 | 0.40 | 0.36 | 0.40 | 70.6 |
| 3 | R2 | 168 | 2.0 | 177 | 2.0 | * 0.521 | 55.4 | LOS E | 9.5 | 67.7 | 0.95 | 0.81 | 0.95 | 31.7 |
| Approach | | 1281 | 2.9 | 1348 | 2.9 | 0.521 | 12.5 | LOS B | 12.5 | 89.8 | 0.47 | 0.42 | 0.47 | 60.8 |
| East: New Access Rd (E) | | | | | | | | | | | | | | |
| 4 | L2 | 126 | 2.0 | 133 | 2.0 | 0.185 | 30.0 | LOS C | 5.0 | 35.8 | 0.69 | 0.73 | 0.69 | 39.1 |
| 6 | R2 | 142 | 2.0 | 149 | 2.0 | * 0.516 | 55.5 | LOS E | 8.2 | 58.4 | 0.97 | 0.80 | 0.97 | 30.8 |
| Approach | | 268 | 2.0 | 282 | 2.0 | 0.516 | 43.5 | LOS D | 8.2 | 58.4 | 0.84 | 0.77 | 0.84 | 34.2 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 173 | 2.0 | 182 | 2.0 | 0.139 | 12.6 | LOS B | 3.3 | 23.3 | 0.34 | 0.70 | 0.34 | 50.4 |
| 8 | T1 | 999 | 3.6 | 1052 | 3.6 | * 0.537 | 21.2 | LOS C | 20.5 | 148.2 | 0.73 | 0.65 | 0.73 | 54.6 |
| Approach | | 1172 | 3.4 | 1234 | 3.4 | 0.537 | 19.9 | LOS B | 20.5 | 148.2 | 0.67 | 0.66 | 0.67 | 54.0 |
| All Vehicles | | 2721 | 3.0 | 2864 | 3.0 | 0.537 | 18.8 | LOS B | 20.5 | 148.2 | 0.59 | 0.56 | 0.59 | 53.7 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: South Rd (S) | | | | | | | | | | | | |
| P11 | Stage 1 | 50 | 53 | 48.7 | LOS E | 0.2 | 0.2 | 0.90 | 0.90 | 72.8 | 31.3 | 0.43 |
| P12 | Stage 2 | 50 | 53 | 43.4 | LOS E | 0.2 | 0.2 | 0.85 | 0.85 | 65.0 | 28.0 | 0.43 |
| East: New Access Rd (E) | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 18.2 | LOS B | 0.1 | 0.1 | 0.55 | 0.55 | 42.7 | 31.9 | 0.75 |
| All Pedestrians | | 0 | 158 | 36.8 | LOS D | 0.2 | 0.2 | 0.77 | 0.77 | 60.2 | 30.4 | 0.51 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# APPENDIX B.4

## CHURCH HILL ROAD/PATAPINDA ROAD

# MOVEMENT SUMMARY

## Site: 101 [Patapinda Rd/Church Hill Rd/River Rd - AM North + Central/Southern (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Church Hill Rd (SE) | | | | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 1 | 0.0 | 0.440 | 6.9 | LOS A | 2.1 | 15.3 | 0.66 | 0.92 | 0.94 | 49.6 |
| 2 | T1 | 240 | 2.0 | 253 | 2.0 | 0.440 | 11.1 | LOS B | 2.1 | 15.3 | 0.66 | 0.92 | 0.94 | 49.7 |
| 3 | R2 | 1 | 0.0 | 1 | 0.0 | 0.440 | 16.6 | LOS C | 2.1 | 15.3 | 0.66 | 0.92 | 0.94 | 49.3 |
| Approach | | 242 | 2.0 | 255 | 2.0 | 0.440 | 11.1 | LOS B | 2.1 | 15.3 | 0.66 | 0.92 | 0.94 | 49.7 |
| NorthEast: Patapinda Rd (NE) | | | | | | | | | | | | | | |
| 4 | L2 | 49 | 1.6 | 52 | 1.6 | 0.398 | 5.9 | LOS A | 2.7 | 19.2 | 0.01 | 0.56 | 0.01 | 54.4 |
| 5 | T1 | 21 | 9.5 | 22 | 9.5 | 0.398 | 0.0 | LOS A | 2.7 | 19.2 | 0.01 | 0.56 | 0.01 | 55.1 |
| 6 | R2 | 596 | 2.3 | 627 | 2.3 | 0.398 | 5.5 | LOS A | 2.7 | 19.2 | 0.01 | 0.56 | 0.01 | 53.3 |
| Approach | | 666 | 2.5 | 701 | 2.5 | 0.398 | 5.4 | NA | 2.7 | 19.2 | 0.01 | 0.56 | 0.01 | 53.5 |
| NorthWest: River Rd (NW) | | | | | | | | | | | | | | |
| 7 | L2 | 121 | 2.7 | 127 | 2.7 | 0.267 | 5.6 | LOS A | 1.0 | 7.5 | 0.00 | 0.57 | 0.00 | 51.5 |
| 8 | T1 | 47 | 2.4 | 49 | 2.4 | 0.267 | 9.3 | LOS A | 1.0 | 7.5 | 0.00 | 0.57 | 0.00 | 51.7 |
| 9 | R2 | 29 | 13.8 | 31 | 13.8 | 0.267 | 18.1 | LOS C | 1.0 | 7.5 | 0.00 | 0.57 | 0.00 | 50.7 |
| Approach | | 197 | 4.3 | 207 | 4.3 | 0.267 | 8.3 | LOS A | 1.0 | 7.5 | 0.00 | 0.57 | 0.00 | 51.4 |
| SouthWest: Patapinda Rd (SW) | | | | | | | | | | | | | | |
| 10 | L2 | 38 | 5.3 | 40 | 5.3 | 0.078 | 11.4 | LOS B | 0.3 | 2.0 | 0.51 | 0.75 | 0.51 | 50.1 |
| 11 | T1 | 1 | 0.0 | 1 | 0.0 | 0.078 | 5.6 | LOS A | 0.3 | 2.0 | 0.51 | 0.75 | 0.51 | 50.8 |
| 12 | R2 | 1 | 0.0 | 1 | 0.0 | 0.078 | 5.6 | LOS A | 0.3 | 2.0 | 0.51 | 0.75 | 0.51 | 49.4 |
| Approach | | 40 | 5.0 | 42 | 5.0 | 0.078 | 11.1 | NA | 0.3 | 2.0 | 0.51 | 0.75 | 0.51 | 50.1 |
| All Vehicles | | 1145 | 2.8 | 1205 | 2.8 | 0.440 | 7.3 | NA | 2.7 | 19.2 | 0.16 | 0.65 | 0.22 | 52.1 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# MOVEMENT SUMMARY

## Site: 101 [Patapinda Rd/Church Hill Rd/River Rd - PM North + Central/South (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Church Hill Rd (SE) | | | | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 1 | 0.0 | 0.135 | 5.6 | LOS A | 0.5 | 3.5 | 0.42 | 0.66 | 0.42 | 52.9 |
| 2 | T1 | 107 | 1.9 | 113 | 1.9 | 0.135 | 6.4 | LOS A | 0.5 | 3.5 | 0.42 | 0.66 | 0.42 | 53.0 |
| 3 | R2 | 1 | 0.0 | 1 | 0.0 | 0.135 | 10.4 | LOS B | 0.5 | 3.5 | 0.42 | 0.66 | 0.42 | 52.6 |
| Approach | | 109 | 1.9 | 115 | 1.9 | 0.135 | 6.5 | LOS A | 0.5 | 3.5 | 0.42 | 0.66 | 0.42 | 53.0 |
| NorthEast: Patapinda Rd (NE) | | | | | | | | | | | | | | |
| 4 | L2 | 113 | 1.6 | 119 | 1.6 | 0.275 | 5.9 | LOS A | 1.6 | 11.1 | 0.01 | 0.55 | 0.01 | 54.4 |
| 5 | T1 | 24 | 8.3 | 25 | 8.3 | 0.275 | 0.1 | LOS A | 1.6 | 11.1 | 0.01 | 0.55 | 0.01 | 55.2 |
| 6 | R2 | 312 | 1.7 | 328 | 1.7 | 0.275 | 5.5 | LOS A | 1.6 | 11.1 | 0.01 | 0.55 | 0.01 | 53.4 |
| Approach | | 449 | 2.0 | 473 | 2.0 | 0.275 | 5.3 | NA | 1.6 | 11.1 | 0.01 | 0.55 | 0.01 | 53.8 |
| NorthWest: River Rd (NW) | | | | | | | | | | | | | | |
| 7 | L2 | 151 | 2.4 | 159 | 2.4 | 0.260 | 5.6 | LOS A | 1.1 | 8.0 | 0.00 | 0.57 | 0.00 | 52.8 |
| 8 | T1 | 68 | 3.3 | 72 | 3.3 | 0.260 | 6.6 | LOS A | 1.1 | 8.0 | 0.00 | 0.57 | 0.00 | 53.0 |
| 9 | R2 | 47 | 6.4 | 49 | 6.4 | 0.260 | 9.7 | LOS A | 1.1 | 8.0 | 0.00 | 0.57 | 0.00 | 52.3 |
| Approach | | 266 | 3.3 | 280 | 3.3 | 0.260 | 6.6 | LOS A | 1.1 | 8.0 | 0.00 | 0.57 | 0.00 | 52.7 |
| SouthWest: Patapinda Rd (SW) | | | | | | | | | | | | | | |
| 10 | L2 | 48 | 4.2 | 51 | 4.2 | 0.050 | 7.4 | LOS A | 0.2 | 1.4 | 0.37 | 0.61 | 0.37 | 52.9 |
| 11 | T1 | 1 | 0.0 | 1 | 0.0 | 0.050 | 1.7 | LOS A | 0.2 | 1.4 | 0.37 | 0.61 | 0.37 | 53.7 |
| 12 | R2 | 1 | 0.0 | 1 | 0.0 | 0.050 | 5.6 | LOS A | 0.2 | 1.4 | 0.37 | 0.61 | 0.37 | 52.1 |
| Approach | | 50 | 4.0 | 53 | 4.0 | 0.050 | 7.2 | NA | 0.2 | 1.4 | 0.37 | 0.61 | 0.37 | 52.9 |
| All Vehicles | | 874 | 2.5 | 920 | 2.5 | 0.275 | 6.0 | NA | 1.6 | 11.1 | 0.08 | 0.57 | 0.08 | 53.3 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# APPENDIX B.5

## RIVER ROAD/RIVER ROAD ACCESS ROAD

# MOVEMENT SUMMARY

## Site: 101 [River Rd/River Road Access - AM North + Central/ South (Site Folder: General)]

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

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | 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: River Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 55 | 5 | 58 | 9.1 | 0.647 | 3.1 | LOS A | 8.7 | 62.6 | 0.60 | 0.73 | 0.84 | 52.8 |
| 3 | R2 | 819 | 24 | 862 | 2.9 | 0.647 | 8.7 | LOS A | 8.7 | 62.6 | 0.60 | 0.73 | 0.84 | 51.0 |
| Approach | | 874 | 29 | 920 | 3.3 | 0.647 | 8.3 | NA | 8.7 | 62.6 | 0.60 | 0.73 | 0.84 | 51.1 |
| East: River Rd Access Noarlunga (E) | | | | | | | | | | | | | | |
| 4 | L2 | 21 | 1 | 22 | 4.8 | 0.754 | 16.1 | LOS C | 4.1 | 29.5 | 0.85 | 1.17 | 1.83 | 40.2 |
| 6 | R2 | 196 | 8 | 206 | 4.1 | 0.754 | 29.3 | LOS D | 4.1 | 29.5 | 0.85 | 1.17 | 1.83 | 40.0 |
| Approach | | 217 | 9 | 228 | 4.1 | 0.754 | 28.0 | LOS D | 4.1 | 29.5 | 0.85 | 1.17 | 1.83 | 40.0 |
| North: River Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 60 | 4 | 63 | 6.7 | 0.131 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.15 | 0.00 | 56.7 |
| 8 | T1 | 176 | 8 | 185 | 4.5 | 0.131 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.15 | 0.00 | 58.6 |
| Approach | | 236 | 12 | 248 | 5.1 | 0.131 | 1.5 | NA | 0.0 | 0.0 | 0.00 | 0.15 | 0.00 | 58.1 |
| All Vehicles | | 1327 | 50 | 1397 | 3.8 | 0.754 | 10.3 | NA | 8.7 | 62.6 | 0.53 | 0.70 | 0.85 | 49.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# MOVEMENT SUMMARY

## Site: 101 [River Rd/River Road Access - PM North + Central/ South (Site Folder: General)]

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

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | 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: River Rd (S) | | | | | | | | | | | | | | |
| 2 | T1 | 85 | 2 | 89 | 2.4 | 0.339 | 1.2 | LOS A | 2.0 | 14.1 | 0.45 | 0.53 | 0.45 | 54.5 |
| 3 | R2 | 382 | 11 | 402 | 2.9 | 0.339 | 6.8 | LOS A | 2.0 | 14.1 | 0.45 | 0.53 | 0.45 | 52.6 |
| Approach | | 467 | 13 | 492 | 2.8 | 0.339 | 5.7 | NA | 2.0 | 14.1 | 0.45 | 0.53 | 0.45 | 52.9 |
| East: River Rd Access Noarlunga (E) | | | | | | | | | | | | | | |
| 4 | L2 | 49 | 2 | 52 | 4.1 | 0.306 | 6.9 | LOS A | 1.2 | 8.9 | 0.51 | 0.79 | 0.59 | 50.3 |
| 6 | R2 | 149 | 1 | 157 | 0.7 | 0.306 | 10.7 | LOS B | 1.2 | 8.9 | 0.51 | 0.79 | 0.59 | 50.1 |
| Approach | | 198 | 3 | 208 | 1.5 | 0.306 | 9.8 | LOS A | 1.2 | 8.9 | 0.51 | 0.79 | 0.59 | 50.2 |
| North: River Rd (N) | | | | | | | | | | | | | | |
| 7 | L2 | 31 | 0 | 33 | 0.0 | 0.137 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 57.7 |
| 8 | T1 | 219 | 9 | 231 | 4.1 | 0.137 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 59.2 |
| Approach | | 250 | 9 | 263 | 3.6 | 0.137 | 0.7 | NA | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 59.0 |
| All Vehicles | | 915 | 25 | 963 | 2.7 | 0.339 | 5.2 | NA | 2.0 | 14.1 | 0.34 | 0.46 | 0.36 | 53.8 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# APPENDIX B.6

## MAINS SOUTH ROAD/RIVER ROAD

# MOVEMENT SUMMARY

## Site: 101 [River Road Access/South Rd - AM existing (Site Folder: General)]

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

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | 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: South Rd (S) | | | | | | | | | | | | | | |
| 1b | L3 | 197 | 8 | 207 | 4.1 | 0.120 | 9.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.64 | 0.00 | 64.3 |
| 2 | T1 | 2805 | 97 | 2953 | 3.5 | 0.758 | 0.4 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 78.5 |
| Approach | | 3002 | 105 | 3160 | 3.5 | 0.758 | 1.0 | NA | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 77.4 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 8 | T1 | 1436 | 98 | 1512 | 6.8 | 0.398 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 79.7 |
| Approach | | 1436 | 98 | 1512 | 6.8 | 0.398 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 79.7 |
| SouthWest: River Rd Access (SW) | | | | | | | | | | | | | | |
| 30a | L1 | 115 | 9 | 121 | 7.8 | 2.127 | 1082.1 | LOS F | 46.1 | 344.3 | 1.00 | 2.91 | 9.55 | 3.1 |
| Approach | | 115 | 9 | 121 | 7.8 | 2.127 | 1082.1 | LOS F | 46.1 | 344.3 | 1.00 | 2.91 | 9.55 | 3.1 |
| All Vehicles | | 4553 | 212 | 4793 | 4.7 | 2.127 | 28.0 | NA | 46.1 | 344.3 | 0.03 | 0.10 | 0.24 | 48.5 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# MOVEMENT SUMMARY

## Site: 101 [River Road Access/South Rd - PM existing (Site Folder: General)]

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

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | 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: South Rd (S) | | | | | | | | | | | | | | |
| 1b | L3 | 151 | 1 | 159 | 0.7 | 0.090 | 9.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.64 | 0.00 | 65.3 |
| 2 | T1 | 1677 | 60 | 1765 | 3.6 | 0.454 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 79.6 |
| Approach | | 1828 | 61 | 1924 | 3.3 | 0.454 | 0.9 | NA | 0.0 | 0.0 | 0.00 | 0.05 | 0.00 | 78.1 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 8 | T1 | 2826 | 55 | 2975 | 1.9 | 0.759 | 0.4 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 78.5 |
| Approach | | 2826 | 55 | 2975 | 1.9 | 0.759 | 0.4 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 78.5 |
| SouthWest: River Rd Access (SW) | | | | | | | | | | | | | | |
| 30a | L1 | 58 | 0 | 61 | 0.0 | 0.149 | 12.2 | LOS B | 0.5 | 3.4 | 0.73 | 0.88 | 0.73 | 53.0 |
| Approach | | 58 | 0 | 61 | 0.0 | 0.149 | 12.2 | LOS B | 0.5 | 3.4 | 0.73 | 0.88 | 0.73 | 53.0 |
| All Vehicles | | 4712 | 116 | 4960 | 2.5 | 0.759 | 0.7 | NA | 0.5 | 3.4 | 0.01 | 0.03 | 0.01 | 77.9 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# MOVEMENT SUMMARY

## Site: 101 [River Road Access/South Rd - AM North + Central/South (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (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: South Rd (S) | | | | | | | | | | | | | | |
| 1b | L3 | 217 | 3.8 | 228 | 3.8 | 0.132 | 9.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.64 | 0.00 | 64.4 |
| 2 | T1 | 2882 | 3.4 | 3034 | 3.4 | 0.779 | 0.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 78.3 |
| Approach | | 3099 | 3.4 | 3262 | 3.4 | 0.779 | 1.1 | NA | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 77.1 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 8 | T1 | 1624 | 6.1 | 1709 | 6.1 | 0.448 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 79.6 |
| Approach | | 1624 | 6.1 | 1709 | 6.1 | 0.448 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 79.6 |
| SouthWest: River Rd Access (SW) | | | | | | | | | | | | | | |
| 30a | L1 | 922 | 2.5 | 971 | 2.5 | 18.471 | 15740.3 | LOS F | 619.9 | 4432.5 | 1.00 | 4.04 | 14.95 | 0.2 |
| Approach | | 922 | 2.5 | 971 | 2.5 | 18.471 | 15740.3 | LOS F | 619.9 | 4432.5 | 1.00 | 4.04 | 14.95 | 0.2 |
| All Vehicles | | 5645 | 4.0 | 5942 | 4.0 | 18.471 | 2571.5 | NA | 619.9 | 4432.5 | 0.16 | 0.68 | 2.44 | 1.4 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

# MOVEMENT SUMMARY

## Site: 101 [River Road Access/South Rd - PM North + Central/South (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (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: South Rd (S) | | | | | | | | | | | | | | |
| 1b | L3 | 198 | 1.1 | 208 | 1.1 | 0.119 | 9.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.64 | 0.00 | 65.2 |
| 2 | T1 | 1837 | 3.4 | 1934 | 3.4 | 0.496 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 79.5 |
| Approach | | 2035 | 3.2 | 2142 | 3.2 | 0.496 | 1.0 | NA | 0.0 | 0.0 | 0.00 | 0.06 | 0.00 | 77.8 |
| North: South Rd (N) | | | | | | | | | | | | | | |
| 8 | T1 | 2942 | 1.9 | 3097 | 1.9 | 0.789 | 0.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 78.2 |
| Approach | | 2942 | 1.9 | 3097 | 1.9 | 0.789 | 0.5 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 78.2 |
| SouthWest: River Rd Access (SW) | | | | | | | | | | | | | | |
| 30a | L1 | 413 | 1.8 | 435 | 1.8 | 1.293 | 290.0 | LOS F | 69.6 | 494.4 | 1.00 | 4.96 | 16.04 | 10.4 |
| Approach | | 413 | 1.8 | 435 | 1.8 | 1.293 | 290.0 | LOS F | 69.6 | 494.4 | 1.00 | 4.96 | 16.04 | 10.4 |
| All Vehicles | | 5390 | 2.4 | 5674 | 2.4 | 1.293 | 22.9 | NA | 69.6 | 494.4 | 0.08 | 0.40 | 1.23 | 52.1 |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.