Memorandum

To:	Sean Kearney	**At:**	Doma Group
From:	Benjamin Park	**At:**	SLR Consulting Australia Pty Ltd
Date:	22 October 2020	**Ref:**	620.30106-M01-v2.0 42HSD Traffic Engineering Response 2020 10 22.docx
Subject:	42 Honeysuckle Drive Hotel Development Response to Submissions Traffic Engineering Matters		

1 Introduction

SLR Consulting Pty Ltd (SLR) has been engaged by Doma Holdings (Honeysuckle) Pty Limited (DOMA) to provide traffic and transport advice with respect to 42 Honeysuckle Drive Newcastle and the application to modify the existing development approval.

1.1 Background

An application for the subject development was lodged with NSW Government Major Projects (reference SSD-8440) in November 2017 and was subsequently approved on 25 June 2019. A number of modifications and new standalone applications relating to changes in the approved development built-form and land use were made were subsequently made over the site. These were either approved or withdrawn.

It is understood that the most recent application to which this advice relates proposes a variation to the land uses originally approved in June 2019 to reflect changed market conditions and a more appropriate integration of uses within the surrounding Honeysuckle Precinct.

The purpose of this memorandum is to provide supplementary technical reporting to the previously submitted Traffic Impact Assessment (TIA) prepared by Intersect Traffic in February 2020 which informed the original project application to NSW Government.

This advice has also been prepared to address the traffic and transport items raised in the following assorted planning authority requests' for information:

- City of Newcastle submission dated 24 April 2020 (reference PB2020/03143).
- NSW Planning, Industry & Environment request dated 27 May 2020 (no reference).
- Transport for New South Wales submission dated 23 March 2020 (reference CR2020/001776).

This letter has been updated as version 2 (v2.0) and incorporates additional responses to comments made by TfNSW which were not included in the previous version submitted to the State (v1.0 dated 17 September 2020). Table 1 summarises the location within this memorandum where responses have been prepared to the items addressed above.

Submission Reference	Description	Response Location
City of Newcastle		
Item 1	*Carparking* *The EIS has considered the permissibility of the car park of the development and concluded it is an ancillary component of the hotel and office premises. According to the Traffic Impact Assessment (Pg.11) it is proposed 'that the excess car parking within the development will be utilised for paid public parking.' It is recommended the applicant is required to provide further justification to demonstrate how the operation of the car park will be subordinate or subservient to the hotel and office premises and not serve its own purpose. Such information is to include whether the car park will be operated by a third party.*	**Section 2.1**
Item 3	*Car Parking* *The Newcastle Development Control Plan (NDCP) 2012 provides that parking for developments, other than residential in the City Centre, are calculated based on a 'flat' parking rate of 1 space per 60m2 of Gross Floor (GFA) area. Based on a GFA of 12,510m2 and the above parking rate the development requires 209 spaces. The submitted plans provide a total of 173 spaces, and therefore equates to a deficiency of 36 spaces.* *The Traffic Impact Assessment (Amended Feb 2020), prepared by Intersect Traffic Pty Ltd has calculated the required parking for the hotel based on a parking rate for outside the City Centre, that is, 1 space per 2 staff plus a minimum 0.5 spaces per room and a maximum 1 space per room. Based on this ratio, the hotel component requires 100 parking spaces compared with 119 spaces based on the City Centre rate.* *For the commercial component, it is argued that a rate of 1 space per 75m2 GFA is appropriate given the same rate was accepted by CN for a development (DA2018/01107) comprising a 12 storey commercial development with ground floor retail and basement car park at 6 Stewart Avenue Newcastle. It is also stated that the basis for the proposed concession, as detailed in the supporting traffic report, was also accepted by the Hunter and Central Coast Joint Regional Planning Panel (HCCJRPP).* *An examination of the above development application documentation does not support such claims. The CN's Assessment Report dated 28 February 2018 to the HCCJRPP identifies the parking deficiency of the development as one of the primary concerns of CN staff in respect of traffic and parking. It was recommended that this concern be addressed by the imposition of an appropriate condition on the consent. Accordingly, condition C21 of the development consent granted by the HCCJRPP required the provision of 278 onsite parking spaces as required by the NDCP. Given the above circumstances, it is considered that the EIS has not satisfactorily justified the variation from the above City Centre parking rate and it is recommended the applicant amend the design to ensure satisfactory compliance with the requirements of the NDCP.*	**Section 3**
	Bicycle Storage *The development includes a bicycle storage area for up to 48 bicycle spaces on the ground floor. According to the Traffic Impact Assessment (TIA), the NDCP requires 63 spaces and therefore the development has a deficiency of 15 bicycle spaces. It is argued that the NDCP parking rate 'is not appropriate for the size of the development proposed and that the generation rate for such a large development should be less than the DCP requirement.' No supporting evidence is provided to validate this statement.* *It is also argued that the hotel is unlikely to generate much demand for bicycle parking. The TIA does not indicate how many of the proposed spaces are allocated to the non-residential uses and the hotel. Based on the NDCP rate of 1 space per 20 units the hotel requires 9 spaces. According to the EIS (Pg14), the number of hotel rooms has increased from the previously approved development as a direct growth in the tourist sector. Given the city centre location of the development and proximity to the harbour foreshore cycleway it is considered desirable that hotel guests have access to non-car modes of transport to explore the city.* *Given the above circumstances, it is recommended more bicycle storage is provided in the development.*	**Section 2.2**

Submission Reference	Description	Response Location
Item 4	*Servicing* *is noted that the ground floor of the development will be accessed by service and waste collection vehicles with Medium Rigid Vehicles (MRV) being the largest vehicle expected on-site. The application is not supported with vehicular manoeuvring plans which demonstrate that an MRV can manoeuvre within the ground floor service area to enter/exit in a forward direction.* *The Traffic Impact Assessment indicates that a 3.9m height clearance is provided and should be adequate for MRVs. This height does not meet the minimum height of 4.5m required for MRVs by Australian Standard AS2890.2. accordingly, it is recommended the applicant be required to amend the design of the development to ensure compliance.*	**Section 4**
NSW Planning		
Item 7	*Traffic Impacts* *Please provide a calculation of the predicted number of additional trips generated in both the AM and PM peak periods.*	**Section 5**
Item 8	*Car parking assessment* *The Department notes that the traffic study attached to the application has relied on the car parking rate permitted at 6 Stewart Avenue, Newcastle.* *The EIS states that the arguments raised are valid for this proposal as well. Please outline the nature of this argument in reference to 42 Honeysuckle Drive.* *Please provide detailed car parking calculations to refer to the rates identified in the NDCP 2012.*	**Section 3**
Item 9	*Car park operated by third party* *The Department notes the car park is proposed to be used, in part, as a commercial car park This is not considered to be ancillary to the proposed uses at the site.*	**Section 2.1**
Item 10	*Bicycle Parking* *Please provide an assessment of the proposed bicycle parking provision in reference with the NDCP2012.* *Please also allocate the bicycle parking spaces according to their intended use.*	**Section 2.2**
Transport for New South Wales		
N/A	*The intersection of Hannell Street and Honeysuckle Drive has been observed to operate poorly particularly in the PM peak. TfNSW does not consider that the modelling provided within the TIA has been adequately calibrated as the queuing regularly extends several hundred metres.* *TfNSW have previously recommended to both the City of Newcastle (Council) and HCCDC that a study be undertaken to determine the impact of continuing intensification of the Honeysuckle catchment on the Hannell Street and Honeysuckle Drive intersection, and Hannell Street.* *It is noted that the upgrade of Honeysuckle Drive is underway which will increase vehicle storage on approach to the Hannell Street Traffic Control Signals (TCS), likely improving the operation of the TCS.* *TfNSW consider that the subject development will be a smaller contributor to the overall congestion than the remaining development sites along Honeysuckle Drive, and raise no objection to the proposal.*	**Section 6**
N/A	*DPIE should have consideration for appropriate sight line distances in accordance with Section 3 of the Austroads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections) and the relevant Australian Standards (i.e. AS2890:1:2004) and should be satisfied that the location of the proposed driveway promotes safe vehicle movements.*	**Section 7**

1.2 Site Location

The location of the subject development site with respect to the surrounding Honeysuckle Precinct, road network, and proximate public transport connections is identified in Figure 1.

Figure 1 Site Context

The proposed development is well located within a 300m walk from the nearby Honeysuckle light rail station and a 500m walk from the heavy rail station at the Newcastle Interchange.

2 Proposed Development

The development is proposed to include a number of land-uses inclusive of the following:

- Commercial office space.
- Little National Hotel .
- Gym / Health Facility.
- Ground Floor Cafe.

Based on the plans of the development, the proposal will result in a net GFA of approximately 11,816 m^2 and a provision of 177 car parking spaces. Table 1 below details the propose yields for each of the component land uses.

Table 1 Summary of Proposed Development

Land Use	Yield
Commercial (office)	**5442m^2 GFA**
Hotel	**187 rooms (5929m^2 GFA)**
Gym / Health Facility (ancillary to Hotel)	**370m^2 GFA**
Cafe	**75m^2 GFA**
Total	**11,816m^2 GFA**

The proposed office component is intended to be operated as a Little National Hotel operation. The chain primarily targets business travellers. Compared to traditional hotels which typically cater for families and recreational/ leisure users travelling on weekends and holidays, the proposed hotel is projected to generate its highest demand on weeknights.

There are a number of ancillary uses proposed as a part of the development including a small café, health facility and a private lounge serving refreshments to hotel guests. The latter two are understood to only be accessible by hotel guests (i.e. no public access), and the café is anticipated to service both commercial and hotel patrons as well as a small amount of passing trade.

2.1 Vehicle Parking Supply

The development proposed to provide a total of **177 on-site parking spaces** as detailed within the architectural drawings provided as a part of the response package. A comprehensive assessment of the parking demands forecast to be generated by the development is detailed in Section 3.

It is no longer proposed to operate the site as a paid public carpark facility to utilise spare carparking for surrounding tenants as identified in previous development application documents.

2.2 Bicycle Parking Supply

The bicycle parking facilities required under the provisions of the current DCP are summarised in Table 2. The adopted rates are in accordance with those described in Table 1 of the *Transport, parking and access* Development Control Plan.

Table 2 Proposed Bicycle Parking Provision

Land Use	Yield	Parking Rate	Requirement
Commercial (office)	5,442m^2 GFA	1 space per 200m^2 GFA	28 spaces
Hotel (incl. Gym)	187 rooms (6,299m^2 GFA)	1 space per 20 rooms	9 spaces
Café	75m^2 GFA	1 space per 100m^2 GFA	1 space
Total	**11,816m^2 GFA**	-	**38 spaces**

The DCP classifies bicycle parking into three use groups.

- Class 1 – high security level (i.e. secured storage locker for personal use);
- Class 2 – medium security level (i.e. public-use internal storage room with racks);
- Class 3 – low security level (i.e. public-use external rack).

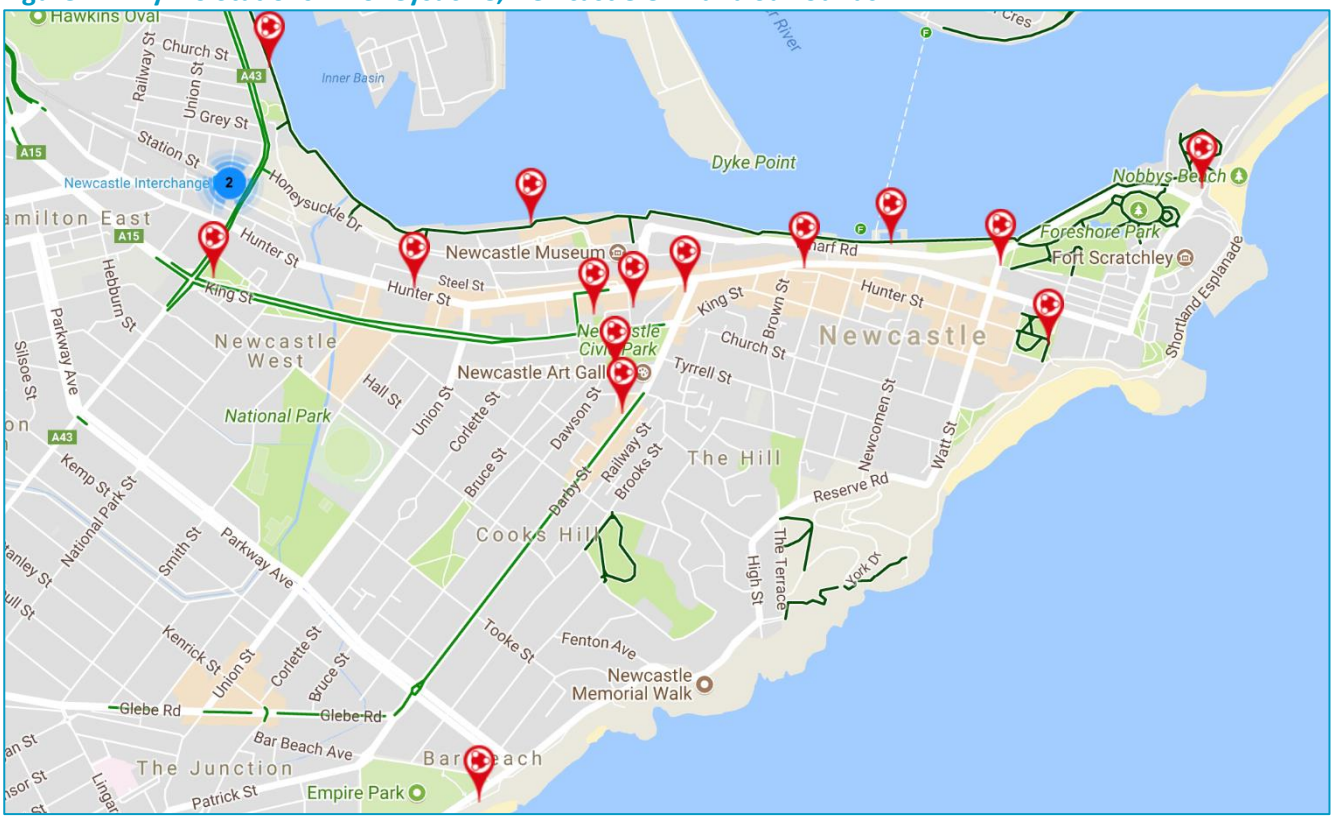
The current development scheme proposes a total of 50 bicycle parking spaces of varying user class types to service employee and visitor demand generated by the development. The location and allocation of these spaces are described in Table 3.

Table 3 Proposed Bicycle Parking Provision

User Class	Location	Allocated Land Use Type	Bicycle Parking Provided
2	Secure within carpark to meet relevant Greenstar criteria	Commercial Employees	35 spaces
3	Within carpark basement levels	Hotel / Café Staff and Guests	9 spaces
3	Outside development in public areas	Visitors	6 spaces
-	-	-	**50 spaces**

Furthermore, surrounding the subject site are a number of shared electric bike stations operated by Bykko which, combined with the nearby light rail, provide employees and guests of the proposed development with a number of high-quality non-vehicle travel modes. Figure 2 illustrates the location of the surrounding stations within roughly 4kms of the subject site.

Figure 2 Bykko Stations – Honeysuckle, Newcastle CBD and Surrounds



Source: Bykko

The nearest Bykko shared bike station is located on Hunter Street approximately 350m walk from the subject site, which facilitates travel to the surrounding 15+ stations throughout Newcastle and surrounding suburbs.

3 Car Parking Supply Review

Table 4 references specific objectives of the Newcastle DCP 2012 which recommend the use of a parking review to inform any departure from DCP rates. These points are understood to provide a mechanism for applicants to propose a departure from the standard parking rates.

Table 4 Newcastle DCP TPA Objectives 2012

Objective Reference	Outcome
DCP 7.03 Overall Aim #1	To ensure that parking and service provision is adequate relative to the likely demand.
7.03.01 – Traffic study objective	Justify any departure from the parking rates set out in Table 1 – Parking Rates.
7.03.02 – Parking provision (Section A – Parking rates)	Objective 1. Ensure an appropriate level and mix of parking provision, having regard to the likely demand and the impacts of over/undersupply of parking.
	Control 13. The total number of parking spaces for a mixed-use development is generally calculated on the basis of the sum of the required car parking spaces in respect of each use, unless it is demonstrated that an overlap of car parking demand is likely to occur.
7.03.02 – Parking provision (Section B – Variations to parking rates)	Allow variations to on site provision of parking.

Based on the outcomes summarised in Table 4, there is a mechanism by which Council can consider the provision of alternative parking rates so long as the proposed supply can reasonably accommodate the forecast demand of the development without compromising external network operation including public parking facilities and traffic operations.

Whilst previous reporting has identified precedents of existing, approved developments which feature parking supply rates lower than what is required under the DCP, SLR has conducted a multi-faceted desktop-level review of the potential parking demand projected specifically in relation to the subject development and surrounding locale. Table 5 summarises the data references and relevant sections of discussion made herein.

Table 5 Parking Assessment Consideration

Report Section	Data Reference	Objective
Section 5.1	DCP 7.03 Parking Requirements	Establish benchmark supply requirements under Council's Development Control Plan
Section 5.2	First Principles Assessment	Quantify a first-principles parking demand based on anticipated traffic demands related to proposed yield.
Section 5.3	Dynamic Parking Assessment	Using historical parking accumulation surveys, develop a dynamic parking forecast model that recognises the different peak parking profile associated with each proposed use.
Section 5.4	Summary of Review	Utilise above data to inform the departure from Council's standard rates.

3.1 DCP Rates

Table 6 summarises the explicit car parking requirements outlined in the DCP for the proposed land use types within the Newcastle City Centre.

Table 6 DCP Parking Requirements – within Newcastle City Centre

Land Use	Yield	Parking Rate	Requirement
Commercial (office)	5,442m^2 GFA	1 space per 60m^2 GFA	90.7 spaces
Hotel (incl. Gym)	187 rooms (6,299m^2 GFA)		104.8 spaces
Café	75m^2 GFA		1.2 spaces
Total	**11,816m^2 GFA**		**197 spaces**
Spaces Proposed			*177 spaces*

Source: Newcastle Development Control Plan 2012 – 7.03 Traffic, Parking and Access

The parking supply proposed as part of the latest application represents a shortfall of 20 spaces less than the supply calculated strictly in accordance with the DCP. It is worth noting that since the DCP was written in 2012, TfNSW has constructed and commenced operations of the adjacent light-rail line which connects the heavy rail-line further east through Honeysuckle and Newcastle CBD areas. As a result, it is not expected that the current DCP rates reflect the mode-share targets and travel patterns since the light-rail connection has been operating.

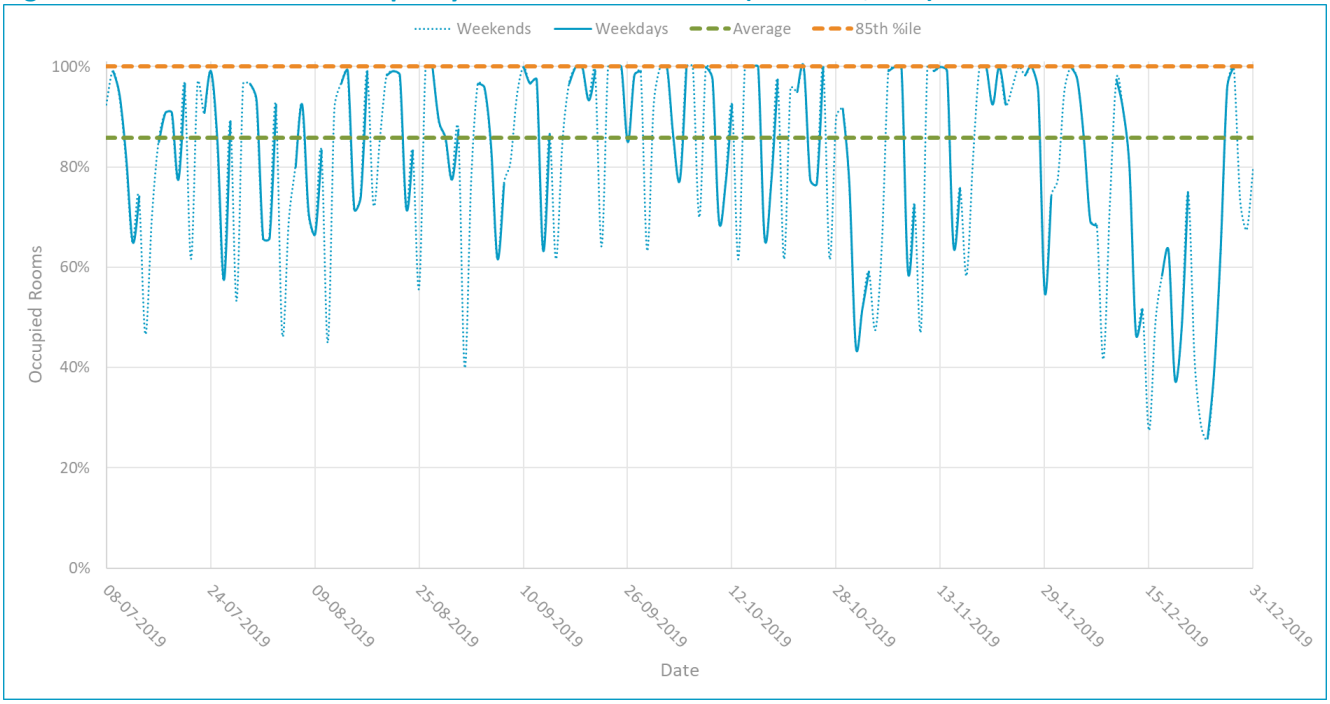
3.2 First Principles Assessment

SLR has conducted additional static parking demand analysis using parking rates based on a first principles assessment, which refer to relevant assumptions and external data sources to forecast parking demand. This parking demand is expected to be slightly more representative than the requirements dictated by the Council DCP. The proposed parking rates have been based off the following data:

- **Commercial:** The Council DCP rate has been adopted unchanged. Parking for the commercial component will be allocated for individual tenants who have specific space allocation provided by the building operator under a licence agreement. Accordingly, parking is not free, nor is it provided 'as of right' to users of the building. This limitation of freely accessible parking on-site should therefore reduce the number of trips made by private vehicle and encourage alternate travel modes via active of public transport.
- **Hotel:** DOMA has provided 6 months of historical occupancy data from one of their existing Little National Hotel developments located in Canberra, ACT. This existing site caters for a similar business user as targeted for in the proposed development and is expected to provide a representative source typical design occupancy. It is important to note that this existing development does not share the same high level of public transport connectivity that is featured at the subject site; therefore, the use of this data should provide a conservative insight into travel patterns.
- **Ancillary Uses**: Because these land use components s are primarily going to be accessed and used by hotel guests, building tenants, and local walk-up trade, it is estimated that these uses will not generate any parking demand over and above what is captured in the other two key uses.
- **Café:** The Council DCP rate has been adopted unchanged for the café use to consider likely staff parking demands.

Figure 3 illustrates the historical hotel occupancy for the Little National Hotel in Canberra for the period between July and December 2019.

Figure 3 Historical Hotel Occupancy – Little National Hotel (Canberra, ACT)



This data suggests that the existing hotel (located in Canberra) is regularly at full capacity with the lower occupancy typically occurring over the weekends. The following parking assessment has therefore considered a 100% occupancy assumption as the representative design scenario.

Whilst no historical data is available that provides insight to the proportion of hotel guests that use on-site carparking, observations by hotel staff (i.e. via guest queries about how to access the carpark) suggest that no more than 50% of guests travel by private vehicles and park overnight with very few guests staying during typical weekday business hours. The remainder of guests travel by either taxi, rideshare, public transport or are companions with other guests of the hotel travelling by shared car. Table 7 provides a summary of the first principles calculations relevant to the hotel component of the proposed development.

Table 7 First Principles Parking Calculation – Hotel Component (Typical Weekdays)

Component	Assumption
Visitors	
Yield	187 rooms
Occupancy	100%[1]
Travel by car	50%
Parking Demand	**93 spaces**
Staff	
Number of Staff	20 staff[2]
Travel by car	50%
Parking Demand	**10 spaces**

[1] Hotel room occupancy typically drops by 70-80% by 9am on weekdays.
[2] Whilst 75% of hotel staff depart before 6pm after room turnover and daily tasks have been completed, all staff have been included in this assessment to ensure a worst-case scenario is captured.

It is worth noting that the first principles approach yields a result that is comparable to that derived with the DCP rate for hotels located outside of the Newcastle City Centre. That is, the parking requirement is determined by the number of rooms and staff employed within the hotel. Whilst the non-City Centre rate allows a range of parking allocated for each room (minimum 0.5 spaces, maximum 1 space per room), it is considered that the central location of the proposed development in context of the nearby light and heavy rail connections would support the lower end provision such to discourage unnecessary vehicle trips through the City Centre.

Furthermore, it is understood that other hotels throughout the Newcastle CBD charge guests between $25-$35 to park vehicles overnight. To match this market charge, a similar pricing scheme is likely to be introduced and managed as a part of this development. This is anticipated to control or reduce customer parking demand.

Table 9 summarises the first principles parking demand which would potentially be generated by the proposed development.

Table 8 First Principle Parking Demand – Total Development

Land Use	Parking Demand
Commercial (office)	90.7 spaces
Hotel	103.5 spaces
Café	1.2 spaces
Total	**195 spaces**

This represents a parking demand generally consistent with the DCP provision, although there is no consideration of the time at which parking is required for each individual use.

3.3 Dynamic Parking Assessment

A dynamic parking assessment was undertaken which specifically considers how the parking demands associated with each individual tenancy type would differ across the day and week, rather than simplistically assuming that the peak demand for each tenancy / land use type directly coincide. In the case of the proposed development, a dynamic parking approach specifically accounts for the fact that hotels (particularly those focusing on business and corporate customers) typically generate their peak parking demands on a weekday between 6pm and 6am whilst commercial development generates peak parking demands during the inverse (6am to 6pm) 12 hour period on weekdays.

Additionally, the majority of staff servicing the hotel (i.e. cleaners and administrative staff) do so during typical business hours when guests are not in their rooms. The following assessment has therefore been undertaken for just weekday periods, as the commercial component is not anticipated to generate any significant parking demand on weekends.

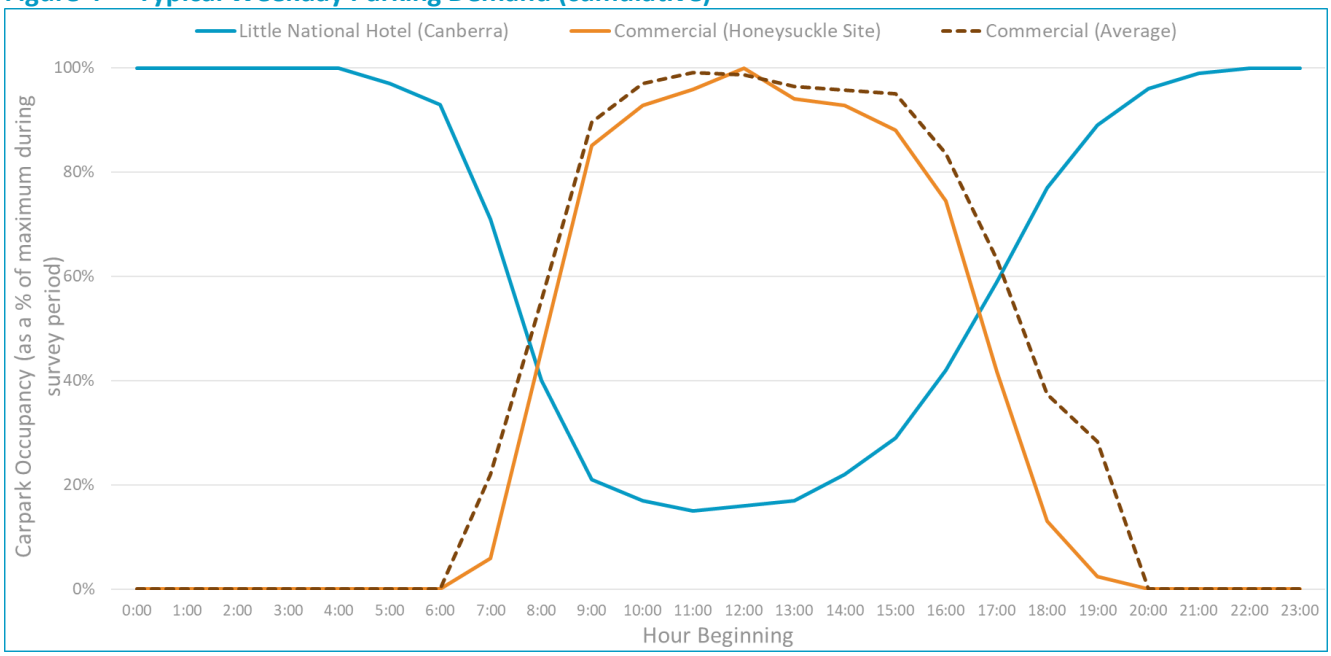
3.3.1 Representative Land Use Demand Profiles

To inform the dynamic parking demand assessment, SLR has reviewed and interrogated the following data sources:

- **Commercial Component:** Trip Generation and Parking Generation Surveys (Office Blocks) This document was prepared by GTA Consultants in 2010 for the of Roads and Traffic Authority to inform the latest update to Guide to Traffic Generating Developments which was ultimately released by RMS in August 2013. These parking surveys were performed on 11 sites of varying yields throughout metropolitan and regional NSW, however it notably included a site proximate to the proposed development located at 22 Honeysuckle Drive, Newcastle.
- **Hotel Component:** DOMA has also provided 6 months of historical check-in and check-out data from Little National Hotel, Canberra. This data informs a representative parking occupancy curve based on when guests are likely to enter and depart the site.

The activity profile data relied upon is consistent with anecdotal experience and therefore considered suitable to inform the assessment. Figure 4 illustrates the daily parking occupancy profiles associated with each of these two key uses, including the RMS profile across all surveyed sites, as well as the isolated site at 22 Honeysuckle Drive.

Figure 4 Typical Weekday Parking Demand (cumulative)

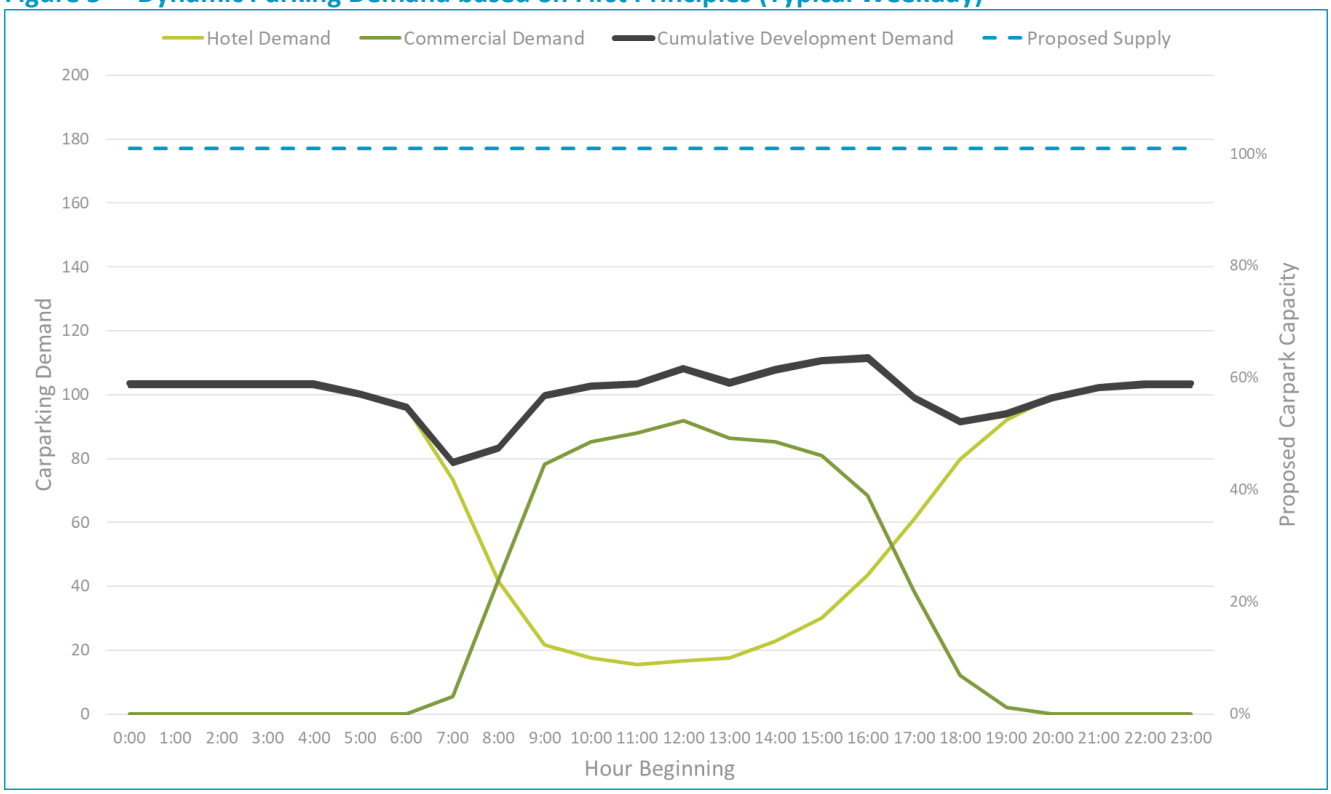


It is evident that based on the available data, the proposed land uses will generate peak parking demands at complementary (different) times of the day. If on-site parking were to be provided strictly in accordance with the Newcastle DCP, which does not consider temporal differences in complementary uses, there would likely be a substantial number of unused parking spaces within the proposed development. To reflect the travel behaviour patterns specific to Newcastle and Honeysuckle, SLR has only used the parking occupancy data from the site at 22 Honeysuckle Drive hereon due to its local context.

3.3.2 Temporal Parking Results

Using the first principles parking demand rates as a baseline parking demand for each land use as summarised in Section 3.2 were applied to the demand profile illustrated in Figure 4 to ascertain what the cumulative parking demand of the site would likely be. The results of this dynamic parking assessment are illustrated in Figure 5.

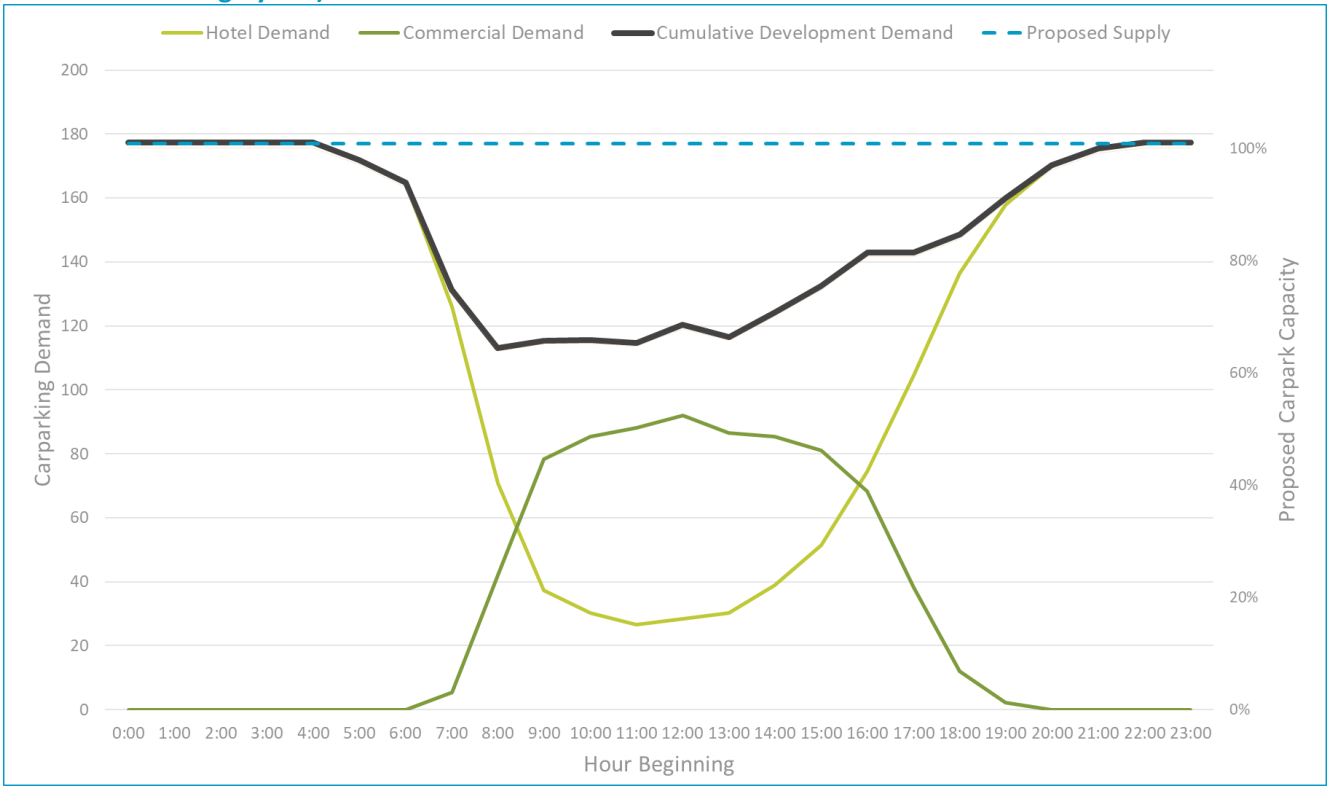
Figure 5 Dynamic Parking Demand based on First Principles (Typical Weekday)



This assessment suggests that if the proposed development were to provide parking in-line with the minimum rates suggested in the Newcastle DCP, the demand would not exceed 112 spaces which equates to approximately 63% of the proposed carpark capacity during weekdays.

As an additional sensitivity, SLR has interpolated the results of the dynamic parking assessment above to understand what design scenario would be reflected by a fully occupied carpark. Assuming that the commercial parking demand remains constant (i.e. these spaces will be allocated for specific tenants under license agreements), Figure 6 illustrates the maximum proportion of hotel guests arriving by private vehicle accommodated by the proposed design.

Figure 6 Dynamic Parking Demand based on First Principles (Typical Weekday with 90% of Hotel Guests Arriving by Car)



This demonstrates that the proposed carparking supply of 177 spaces would accommodate up to 90% of guests arriving by vehicle (and requiring an on-site parking space). This is significantly higher than what would reasonably be generated by the proposed development and is understood to represent a very conservative assessment of parking demands and is very unlikely to occur during typical weekdays.

3.4 Summary of Review

Based on the assessments conducted in Sections 3.1, 3.2 and 3.3, it is evident that the proposed reduction in on-site parking can be justified based the likely demand data (parking supply and time at which parking for each proposed use is required) summarised herein. Table 9 summarises the potential parking demand forecast as a part of each assessment methodology.

Table 9 Summary of Parking Assessment

Parking Demand Methodology	Parking Provision	Summary Comments
DCP Rates (within City Centre)	197 spaces	Flat rate parking rate for all non-residential development within the Newcastle City Centre. No provision for different demand peaks between each use.
First Principles Assessment	195 spaces	High-level estimate of the development parking demand potential using quantifiable metrics (i.e. number of rooms, anticipated vehicle travel mode split, number of staff, etc). No provision for different demand peaks between each use.
Dynamic Parking Assessment	112 spaces	Factors in the temporal peak parking demand associated with each land use using a combination of base demands identified above.
Proposed Supply	**177 spaces**	**Allows for an upper higher parking demand than what is anticipated to be generated by the site, slightly lower than the strict parking requirement described within the DCP.**

On the basis of the above, it is considered that the proposed parking supply of 177 spaces should adequately service the forecast shared carparking demands associated with the proposed development throughout a typical weekday period.

This aligns with the overarching objectives and goals of the Newcastle DCP as detailed in Table 4, particularly Item 13 of 7.03.02 – Parking provision (Section A – Parking rates) which states "*The total number of parking spaces for a mixed-use development is generally calculated on the basis of the sum of the required car parking spaces in respect of each use, unless it is demonstrated that an overlap of car parking demand is likely to occur".*

To provide Council with confidence that the proposed arrangement will operate as detailed in this assessment, it is understood that DOMA, as the ultimate building operator, will manage parking demands for hotel guests as well as draft the commercial tenant contracts for on-site parking. These licence agreements for tenant parking (including the hotel staff) would detail when and where parking can be utilised during typical weekdays to ensure that peak cumulative parking can be accommodated throughout the day.

If ultimately required by Council, a green travel plan may also be conditioned as a part of the determination. This will include further details of the final parking assignment and signage required to accommodate the cumulative parking demand and could be submitted prior to final occupation, consistent with other developments in the surrounding Honeysuckle precinct.

4 Servicing

An internal loading dock located on the ground floor carpark is proposed to facilitate the majority of servicing demands associated with the development. Following a structural re-design of the building levels since the initial application was made, Bates Smart (the project architect) has advised that the vertical clearance at the carpark entry has increased to approximately ~4.2m, which is restricted by an overhead transfer beam across the entry aisle.

The on-site loading dock (which measures 11m x 4.7m) has been designed to meet the minimum horizontal special requirements for an MRV as identified in AS2890.2, however it is acknowledged that the minimum height of 4.2m designed in the ground floor carpark does not meet the 4.5m minimum required for MRV access.

Whilst not strictly required under the Newcastle DCP, the primary purpose of providing a larger loading bay suitable for an MRV is to facilitate refuse collection directly adjacent to the waste storage areas. The developer has advised that the remaining business as usual (BAU) servicing deliveries are to occur via smaller vehicles as per the servicing summary included in Table 10.

Table 10 Development Servicing Summary – BAU Daily Deliveries

Delivery Type	Associated Land Use	Indicative Vehicle Type	Approx. Length & Height
Linen Collection	Hotel	Vans	5m x 2.5m
Food Delivery	Café / Hotel Lounge	Vans	5m x 2.5m
Cleaning supplies	Hotel / Office	Vans	5m x 2.5m
Stationary supplies	Office	Vans	5m x 2.5m
Couriers	All	Vans	5m x 2.5m
Catering deliveries	Office	Vans	5m x 2.5m
Document shredding	Office	Small Rigid Vehicle (SRV)	6.6m x 2.5m
Trade vehicles	All	B99 Car	5m x 2m
Waste collection	All	Refuse Collection Vehicle	9.8m x 3.4m (see below)

SLR understands that the ultimate upgrade of Honeysuckle Drive (which is currently underway and expected to be completed prior to the opening of the proposed development) will include a 12m long on-street loading zone suitable to accommodate vehicles up to and including an MRV/HRV. This loading zone was not formally conditioned as a part of previous approvals, however the use of an on-street bay by the proposed development was supported in principle by Hunter Development Corporation (HDC) and TfNSW, subject to review and amendments by Council's Newcastle City Traffic Committee (NCTC).

Included at Attachment B is the latest concept design of the frontage road section prepared by Northrop Consulting Engineers, including a mark-up of advice and amendments provided by the NCTC in April 2019.

Should any non-BAU servicing be required by vehicles that exceed the ~4.2m height restriction attributed to the proposed internal loading area, these vehicles could utilise the new on-street loading zone immediately fronting the development to perform deliveries. It is expected that this would be very infrequent compared to the BAU deliveries.

Medium rigid vehicles, as described within AS2890.2. two-axel rigid trucks with a maximum dimension of 8.8m long x 2.5m wide. Table 11 provides a summary of vehicles that fit within this classification from a number of manufactures which typically do not exceed 3.8m which is a standard height of storage containers featured on rigid trucks this size.

Table 11 Example of MRV Dimensions

Make and Model	Vehicle Length	Vehicle Height
Fuso Fighter 4x2	8779mm	3734mm (with load)
Fuso Rosa 25 seat bus	7730mm	2755mm(without load)
Izuzu F-series 4x2 FTR34UU	7405mm	Detail not provided (approx. 3m)
HINO 500 Series 4x2	6660mm	2450mm(without load)

This guidance has not been prepared to confirm that all vehicles accessing the proposed development will not exceed the maximum height clearance, however it instead suggests that the minimum dimensions required for a MRV under AS2890.2 represent the 'worst-case' for this vehicle type and the majority of vehicles feature significantly reduced dimensions.

The final operator/manager of the hotel and office will prepare service contracts for BAU deliveries and collections to ensure that the vehicles can access the site safely and efficiently. This is consistent with typical hotel and commercial logistics.

The developer has advised that the likely private waste contractor that will perform on-site waste collection following completion of the development will do so via a standard rear-lift refuse collection vehicle (or similar). Based on a vehicle specification sheet provided by DOMA, this design refuse collection vehicle is understood to have a maximum manoeuvring and operating height of 3.4m, which is less than the minimum ~4.2m attributed to the internal loading area. This is different to Council's standard waste collection vehicle.

SLR has prepared multiple swept path assessment (included in Appendix A) demonstrating that both the design refuse collection vehicle and standard 8.8m MRV (refer to Table 11) are able to enter and exit the site in a forward motion with adequate clearances provided throughout the internal manoeuvring areas (excluding discussion of vertical clearances as detailed above). This arrangement is considered to be appropriate for the proposed development based on the type of vehicles anticipated to regularly service the land uses on the site.

5 Traffic Demands

TfNSW has requested confirmation of the peak-hour traffic demands expected to be generated by the proposed development. Traffic impacts have been addressed in TIA (prepared by Intersect Traffic, February 2020), submitted as a part of the current application.

The development yield has been amended slightly since the original TIA was submitted, and as a result, Table 12 provides a summary of the updated peak-hour demands anticipated to be generated by the proposed development.

Table 12 Updated Traffic Generation Forecasts

Use	Yield	Adopted RTA/RMS Generation Rate		Forecast Traffic Demands
		Max Generation Rate	Source	
Hotel	187 rooms	0.4vph/room	RTA 2002 (Motel)	74.8vph
Commercial	5442m^2 GFA	1.6vph/100m^2 GFA	RMS 2013 (Office Block)	87vph
Cafe	75m^2 GFA	5vph/100m^2 GFA	RTA 200 (Restaurant)	3.75vph
Total	-	-	-	**165.25vph**
Previous Estimate – Current Application (reported by Intersect Traffic, February 2020)				*182vph*

The traffic generation forecasts for the latest development yield as summarised above indicate a peak traffic demand approximately 17vph less than what was previously reported in the original TIA submission (prepared by Intersect Traffic, February 2020).

6 Traffic Analysis – Hannell Street / Honeysuckle Drive

TfNSW has identified that Hannell Street / Honeysuckle Drive intersection assessment presented in the original TIA (prepared by Intersect Traffic, February 2020) was not accurately representing the queue lengths during PM peak periods. SLR has revised this traffic analysis on the subject intersection to better replicate existing conditions as reported by TfNSW, and also accounting for the updated development traffic generation highlighted in Section 5

SLR has reviewed the analysis submitted in the original TIA (prepared by Intersect Traffic, February 2020) and identified that the underrepresentation of queue lengths is likely caused by incorrect phasing arrangements and cycle times. The following analysis incorporates updates to the phasing arrangements to better reflect the longer queue lengths observed and raised by TfNSW. Phasing information for each of the assessed scenarios are provided with the detailed SIDRA outputs in Appendix C.

It is noted that the Honeysuckle Drive approach of the subject intersection is currently undergoing realignment and upgrade works as a part of the wider Honeysuckle redevelopment, expected to be completed by 2021. All future year scenarios adopt the ultimate intersection configuration featured as a part of these upgrade works.

6.1 Traffic Assumptions

The adopted directional split is presented in Table 13. Note that these assumptions are consistent with distributions adopted in the previous TIA.

Table 13 Directional Distribution

Land Use	AM		PM	
	In	Out	In	Out
Hotel	20%	80%	80%	20%
Commercial	70%	30%	30%	70%
Café	20%	80%	80%	20%

The adopted external distribution is presented in Table 15.

Table 14 External Distribution

Direction	External Split
North	45%
East	10%
South (via Hannel Street/Stewart Avenue)	22.5%
South (via Steele Street)	22.5%

6.2 Background Traffic Demand Growth

SLR has reviewed the NSW Traffic Volume Viewer to establish historical traffic growth patterns along Hannell Street. The nearest permanent count site is located at the intersection of Pacific Highway / Parry Street / King Street / Stewart Avenue (Station ID 7212). This count site is located approximately 400m south of the subject intersection and is considered to appropriately reflect traffic growth patterns of the surrounding area, with data available between 2015 and 2020.

Acknowledging that the most recent 2020 count is likely skewed by changes in travel behaviour patterns as a result of the COVID-19 pandemic, growth from 2015 to 2019 indicates a 1.3% p.a. increase in traffic demands along the corridor. A 1.5% linear background traffic growth rate was therefore conservatively adopted for the purposes of the assessment. This rate is applied to all movements at the subject intersection and is consistent with growth assumptions in the previous TIA.

The road network performance was assessed for the weekday AM (Thursday) and PM (Wednesday) peak periods using the 2017 baseline traffic surveys reported in the previous TIA. This data is considered to be the most representative intersection survey data available as any new survey conducted in 2020 would likely capture non-typical traffic conditions caused by COVID-19 impacts and the current upgrade works along Honeysuckle Drive which includes is currently under traffic control and may result in potential detours and or delays.

No weekend assessment was completed as the traffic demands (development and background) are generally lower on the weekend.

6.3 Analysis Scenarios

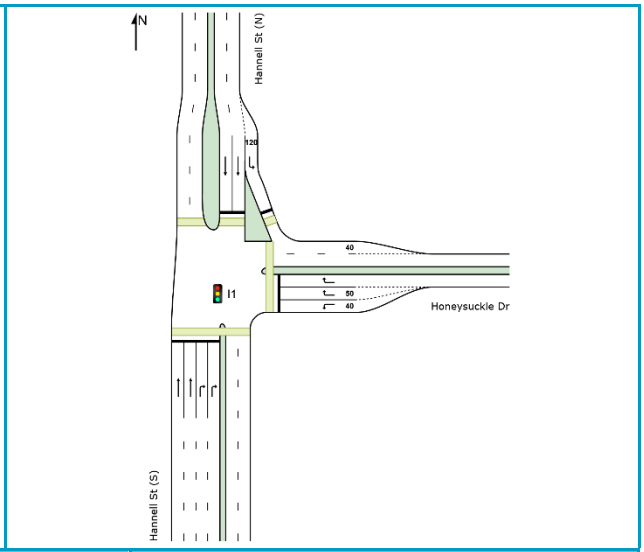
The following road network scenarios were assessed, and the findings reported herein:

- **2020 'Existing Conditions'**: To establish the current operational performance in the absence of the subject development and to calibrate existing queues observed by TfNSW.
- **2022 'Background'**: To establish the current operational performance in the absence of the subject development following completion of the Hannell Street / Honeysuckle Drive intersection upgrade works.
- **2022 'With Development'**: To identify the incremental development impacts for the opening year of development.
- **2032 'Background'**: To establish the baseline intersection performance for a 10-year design horizon, in absence of the proposed development.
- **2032 'With Development'**: To identify the incremental development impacts for the 10-year design horizon.

6.4 Assessment Results

The updated intersection assessment has been completed in SIDRA Intersection 9.0. Figure 7 illustrates the adopted existing intersection configuration and summarises the results of the existing conditions assessment which reflects the longer queue lengths reported by TfNSW.

Figure 7 Existing Condition Assessment Results



Scenario	AM				PM			
	DOS	Average Delay (s)	LOS	95th %ile Queue (m)	DOS	Average Delay	LOS	95th %ile Queue (m)
Hannell Street (North)	0.82	22.3	B	124.5	0.66	18.3	B	111
Honeysuckle Drive (East)	0.64	36.5	C	52.4	0.77	30.6	C	76.8
Hannell Street (South)	0.85	28.5	B	166.3	0.81	22.9	B	134.2
Total	**0.85**	**26.7**	**B**	**166.3**	**0.81**	**23.2**	**B**	**13**

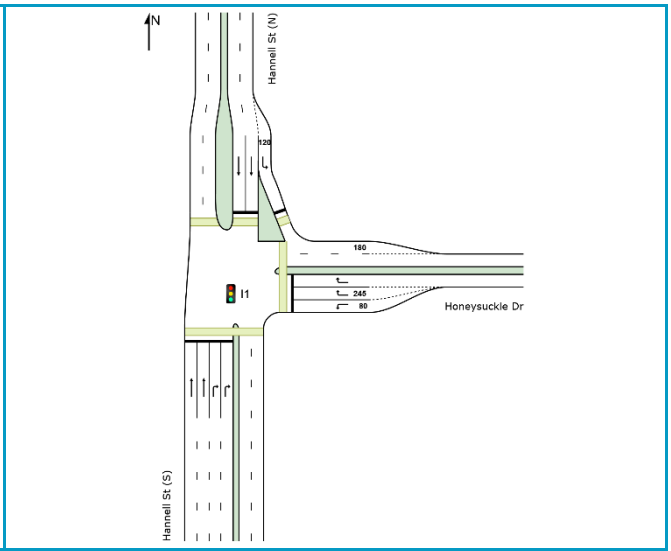
The results summarised above demonstrates that the intersection is operating near capacity (typical DOS of 0.9) with reported 95th percentile queues on the northern and southern approaches of Hannell Street extending between 100m and 200m in peak periods.

It should be noted that these queues may extend further than what is being reported by SIDRA due to downstream effects caused by the light-rail crossing and nearby signalised intersections. Irrespective of these additional factors, the assessment herein only considers incremental development traffic impacts, which are anticipated to be the same with or without consideration of these surrounding network elements.

Detailed SIDRA outputs are provided at Appendix C.

Figure 8 illustrates the adopted upgraded intersection configuration and summarises the results of the future year assessments with and without additional traffic demands generated by the proposed development.

Figure 8 Future Year Assessment Results



Scenario	AM				PM			
	DOS	Average Delay	LOS	95th %ile Queue (m)	DOS	Average Delay	LOS	95th %ile Queue (m)
2022 Background	0.82	22.3	B	130.1	0.84	23.8	B	143.7
2022 With Development *(Increase on Background)*	0.84 -	22.8 *+0.5s*	B -	130.1 -	0.84 -	24.4 *(+0.6s)*	B -	143.7 -
2032 Background	0.84	26.3	B	186.8	0.84	28.2	B	199.6
2032 With Development *(Increase on Background)*	0.84 -	27.1 *(+0.8s)*	B -	186.8 -	0.87 *(+0.03)*	29.4 *(+1.2s)*	C -	210.9 *(+10.3m)*

Based on the results summarised in Table 16, the additional traffic demands generated by the proposed development are considered to have an insignificant impact on intersection operation during all assessed scenarios.

Importantly, the subject intersection will still operate within typical performance thresholds for a signalised intersection (DOS less than 0.9 and maximum LOS of C). As a result, no mitigation measures are considered to be required to support the proposed development.

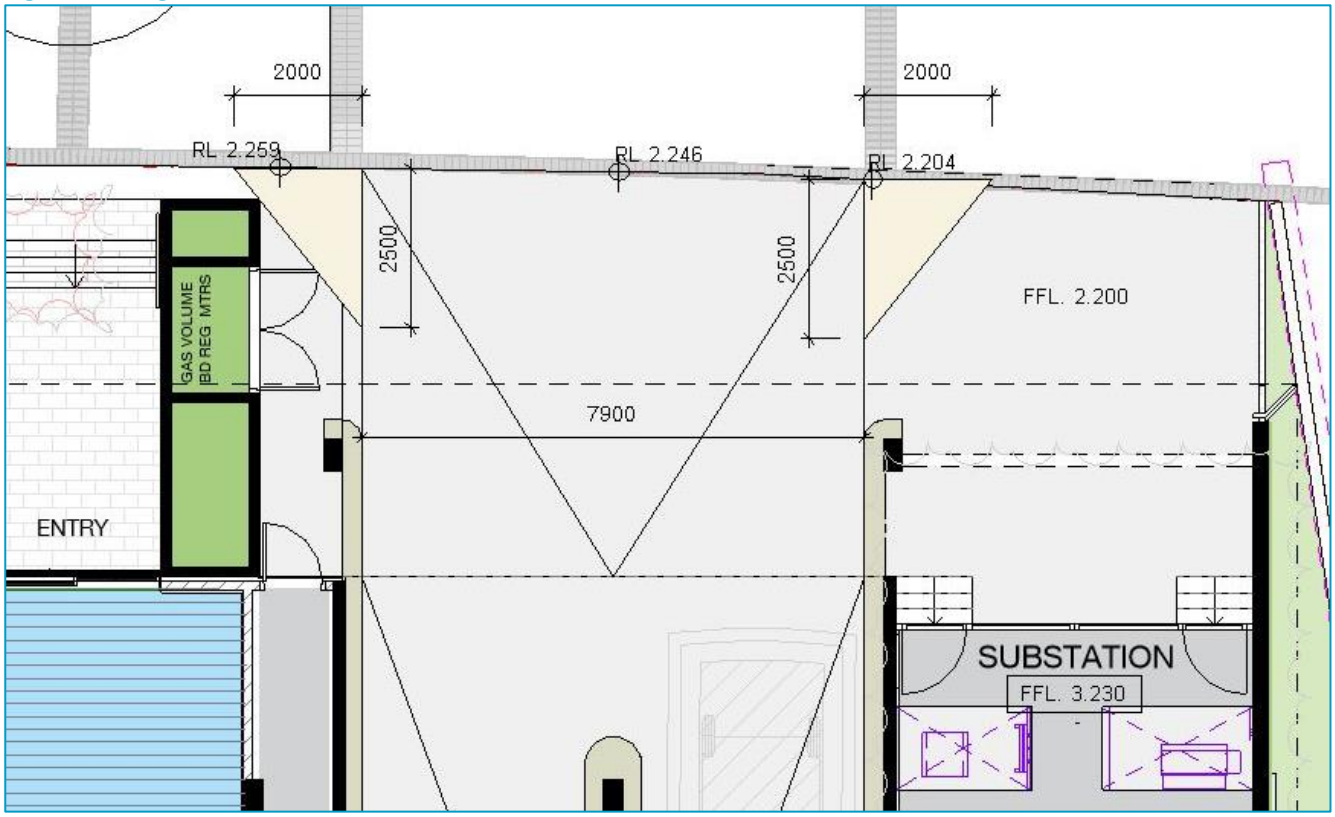
Detailed SIDRA outputs are provided at Appendix C.

7 Sight Distance Assessment

TfNSW has requested confirmation that the development meets the requirements of *AS2890.1 Off-Street Car Parking* with regard to vehicular sight lines for vehicles leaving the development. Specifically, clarifying the development complies with *Section 3.2.4 Sight Distance at Access Driveway Exits* for entering sight distance and sight distance to pedestrians.

Figure 9 shows that the development meets the AS2890.1 requirement for sight distance to pedestrians with two (2) 2m x 2.5m sight triangles on both sides of the access driveway.

Figure 9 Sight Distance to Pedestrians

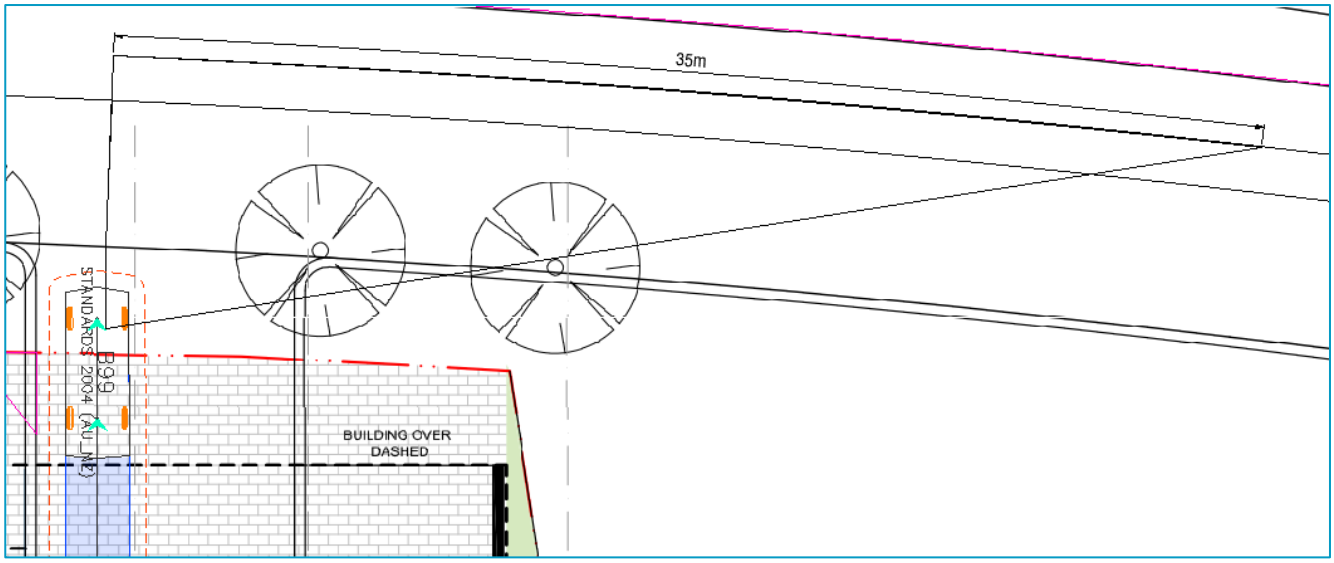


SOURCE: BATES SMART

A sight distance assessment for the access driveway has been completed in accordance with Figure 3.2 of AS2890.1. Due to the concrete median restricting the proposed development driveway to left-in / left-out movements only, this assessment only considers sight distance to the east, where exiting vehicles will have to give way to approaching traffic.

Figure 10 demonstrates the sight requirement (based on 35m of travel along the frontage road) a road frontage speed of 40km/hr in accordance with the standard.

Figure 10 Sight Distance at Access Driveway – Looking East



In order to maintain the desired sight line, no on-road parking should be provided between the development boundary and the eastern limit of the subject driveway. Similarly, if required, limited or no vegetation should be planted in this area that would otherwise obstruct sight lines as above, i.e. shrubs and bushes higher than 0.2-0.3m or foliage lower than 1.5-1.7m. It is understood that the current frontage road design (included at Appendix B) already includes this parking restriction.

It is noted that the section of Honeysuckle Drive fronting the development will have a posted speed of 30km/hr, consistent with the existing speed limit along the eastern sections of the road. This low travel speed, combined with a high number of pedestrian and cycle movements, should increase driver awareness for vehicles travel throughout the future Honeysuckle precinct and minimise potential for conflict. As such, given that the assessment above has been completed for a higher road speed, this represents a conservative requirement for the proposed driveway arrangement.

Given that the proposed development does not proposed to alter or introduce any external road intersections (with Honeysuckle Drive or any other surrounding roads), no assessment has been performed using *Austroads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections).* Compliance with the sight distance requirements of AS2890.1 is considered to be appropriate for the proposed access driveway.

If you require any additional information or clarification in relation to this advice, please do not hesitate to contact me.

Yours sincerely

BENJAMIN PARK

SENIOR CONSULTANT – TRANSPORT ADVISORY

Appendix A

Swept Path Assessment

Prepared by SLR Consulting

CONCEPT ONLY

HONEYSUCKLE DRIVE

RL 3.35

PLANTER Integrate Landscape

BUILDING OVER DASHED

TERRACE

F.S.B

FHBV

slide

CAFE
50m2

RL 3.00
SUB.
5600

office

SWITCH

hotel

7900

3500

3500

Roller Shutter

c.w.m

CW

CW

B.gas

GR

GR

H01

H02

GOODS LIFT

Lift Lobby

Car Park

1800

C02

C01

uni acc

PUMP ROOM

fire sprinkler alarm valves

hyd

slide

SERVICES

Veiola 9.8m Rear Lift
Custom

5900

RL 3.00

1:8

1:4

1:8

EOT
150m2

5700

1 2 3 4

5 6 7 8 9

48 Bicycles

Veiola 9.8m Rear Lift
Custom

REFUSE COLLECTION VEHICLE INGRESS

WASTE STORE

roller door

GROUND

6200

RL 2.77

HONEYSUCKLE DRIVE

RL 3.35

PLANTER Integrate Landscape

BUILDING OVER DASHED

TERRACE

F.S.B

FHBV

slide

CAFE
50m2

RL 3.00
SUB.
5600

office

SWITCH

hotel

7900

3500

3500

Roller Shutter

c.w.m

CW

CW

B.gas

GR

GR

H01

H02

GOODS LIFT

Lift Lobby

Car Park

1800

C02

C01

uni acc

PUMP ROOM

fire sprinkler alarm valves

hyd

slide

SERVICES

5900

RL 3.00

1:8

1:4

1:8

EOT
150m2

5700

1 2 3 4

5 6 7 8 9

48 Bicycles

Veiola 9.8m Rear Lift
Custom

WASTE STORE

roller door

GROUND

6200

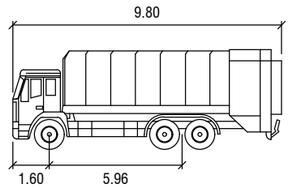
RL 2.77

REFUSE COLLECTION VEHICLE EGRESS

SLR
15 ASTOR TERRACE
SPRING HILL 4000
AUSTRALIA
T: 61 7 3858 4800
www.slrconsulting.com

Project No:	620.30106
Date:	06/08/2020
Drawn by:	BP
Scale:	AS SHOWN
Sheet Size:	A3
Projection:	-

SWEPT PATH LEGEND
- Vehicle Path
- Vehicle Body
- Body Clearance (500mm)



Veiola 9.8m Rear Lift

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 30.2

N

0.0 2.5 5 7.5 10
METRES

SCALE 1:250

DOMA Group

42 Honeysuckle Drive Hotel Development

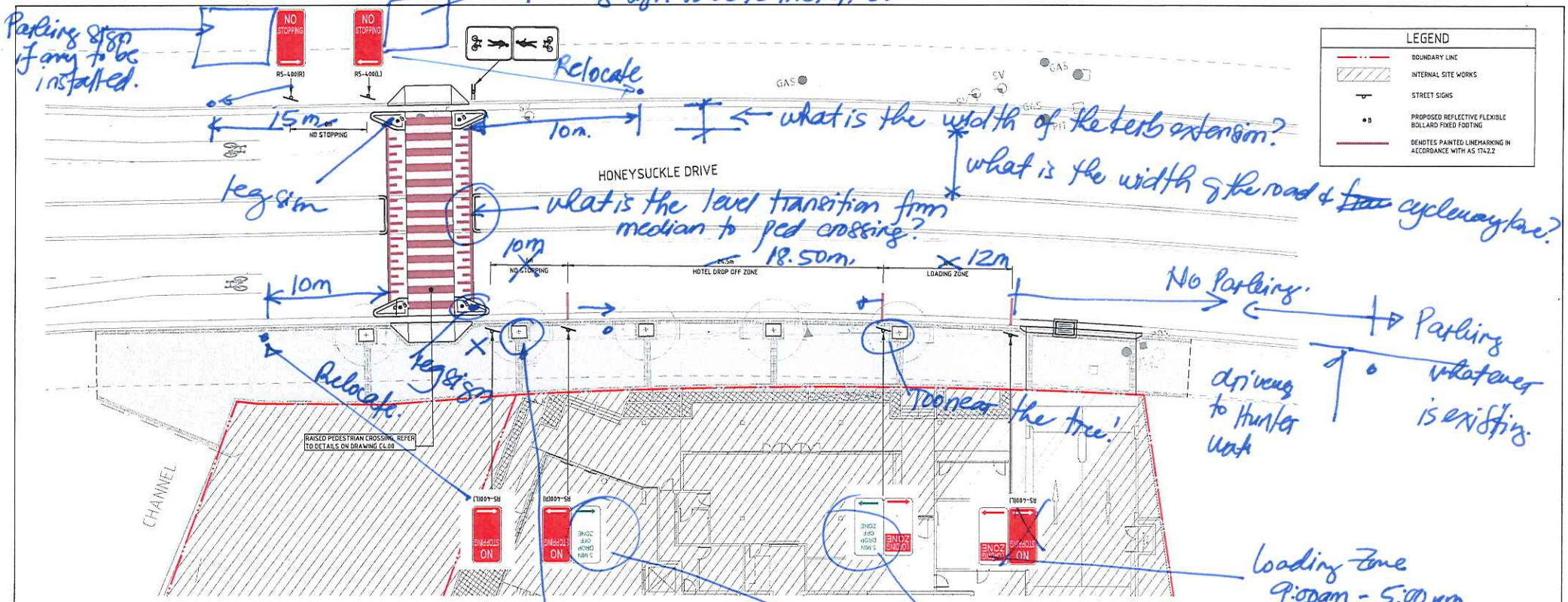
Refuse Collection Swept Path Assessment

FIGURE 1

Appendix B

Honeysuckle Drive Loading Zone

Prepared by Northrop Consulting Engineers (with amendments suggested by the Newcastle Council Traffic Committee)



ISSUE FOR APPROVAL

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR 30% COORDINATION	LS		SC	29.07.18
2	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL	LS	CS	CP	03.08.18
3	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL	LS	CS	CP	13.08.18
4	ISSUED FOR COORDINATION	RG		CP	23.08.18
5	ISSUED FOR CONSTRUCTION CERTIFICATE APPROVAL	RG	CP	RJ	28.08.18

DRAWN L STEEL | DESIGNED S CROFT | JOB MANAGER R. JEANS | VERIFIER C PIPER

CLIENT: DOMAGROUP

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ARCHITECT: BATESSMART.

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF PRINTED OR COPIED IN BLACK AND WHITE.

PLANS 1:150 0 1.5 3 4.5 6.0 7.5m

NORTHROP
Newcastle
Suite 4, 215 Pacific Hwy, Charlestown NSW 2290
P.O. Box 180, Charlestown NSW 2290
Ph (02) 4943 1777 Fax (02) 4943 1577
Email newcastle@northrop.com.au ABN 81 094 433 100

PROJECT: PROPOSED DEVELOPMENT
42 Honeysuckle Drive,
Newcastle. NSW.

DRAWING TITLE: PAVEMENT, SIGNAGE AND AND LINEMARKING PLAN

JOB NUMBER: NL171278

DRAWING NUMBER: C3.00

REVISION: 5

DRAWING SHEET SIZE = A1

Appendix C

Detailed SIDRA Analysis Results

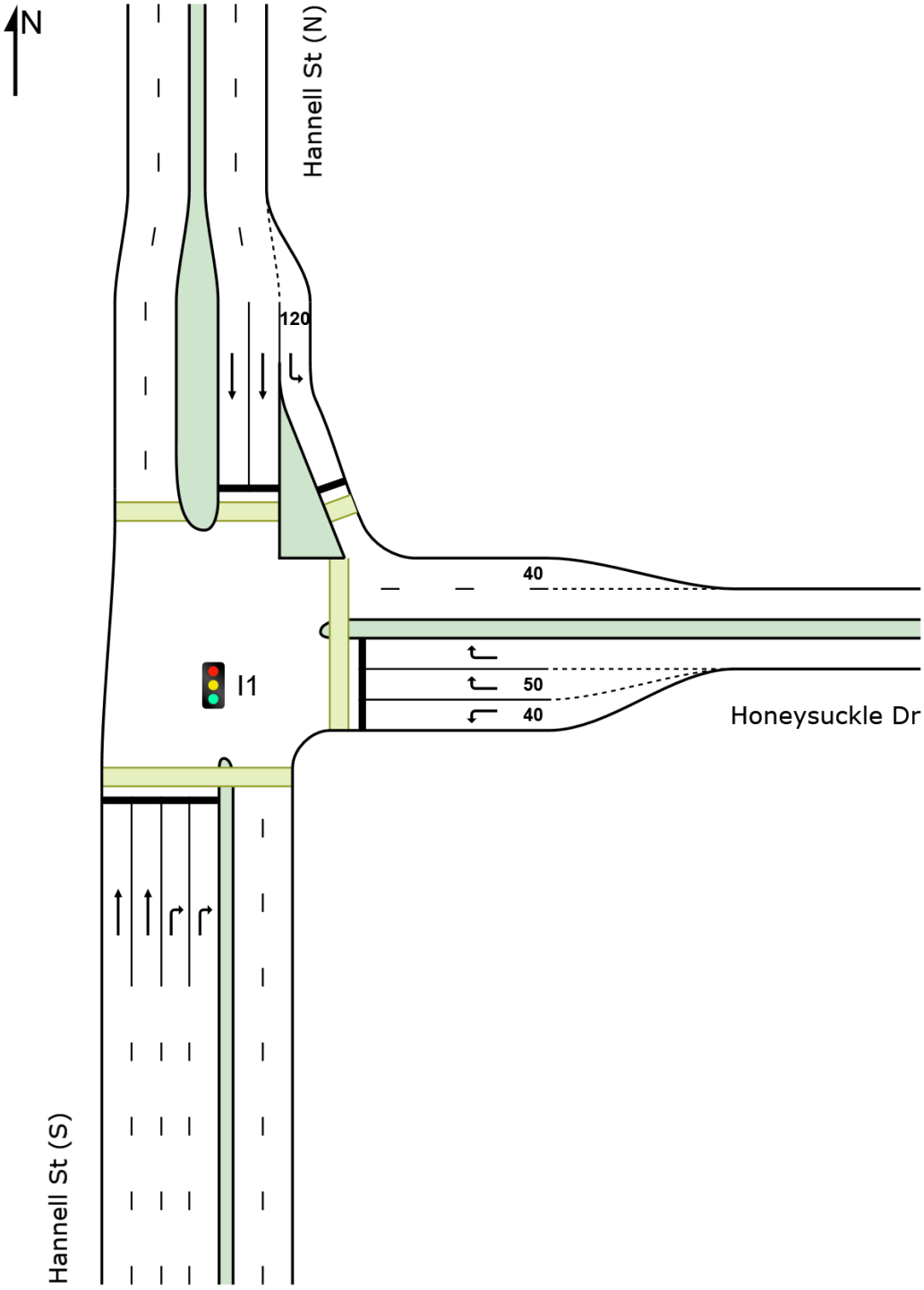
Prepared by SLR Consulting

SITE LAYOUT

Site: I1 [2020 BG AM - Old Layout (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



USER REPORT FOR SITE

All Movement Classes

Project: 620.30106.00000 - Hannell St_Honeysuck dr - 20201020 **Template: Movement & Phasing**

Site: I1 [2020 BG AM - Old Layout (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

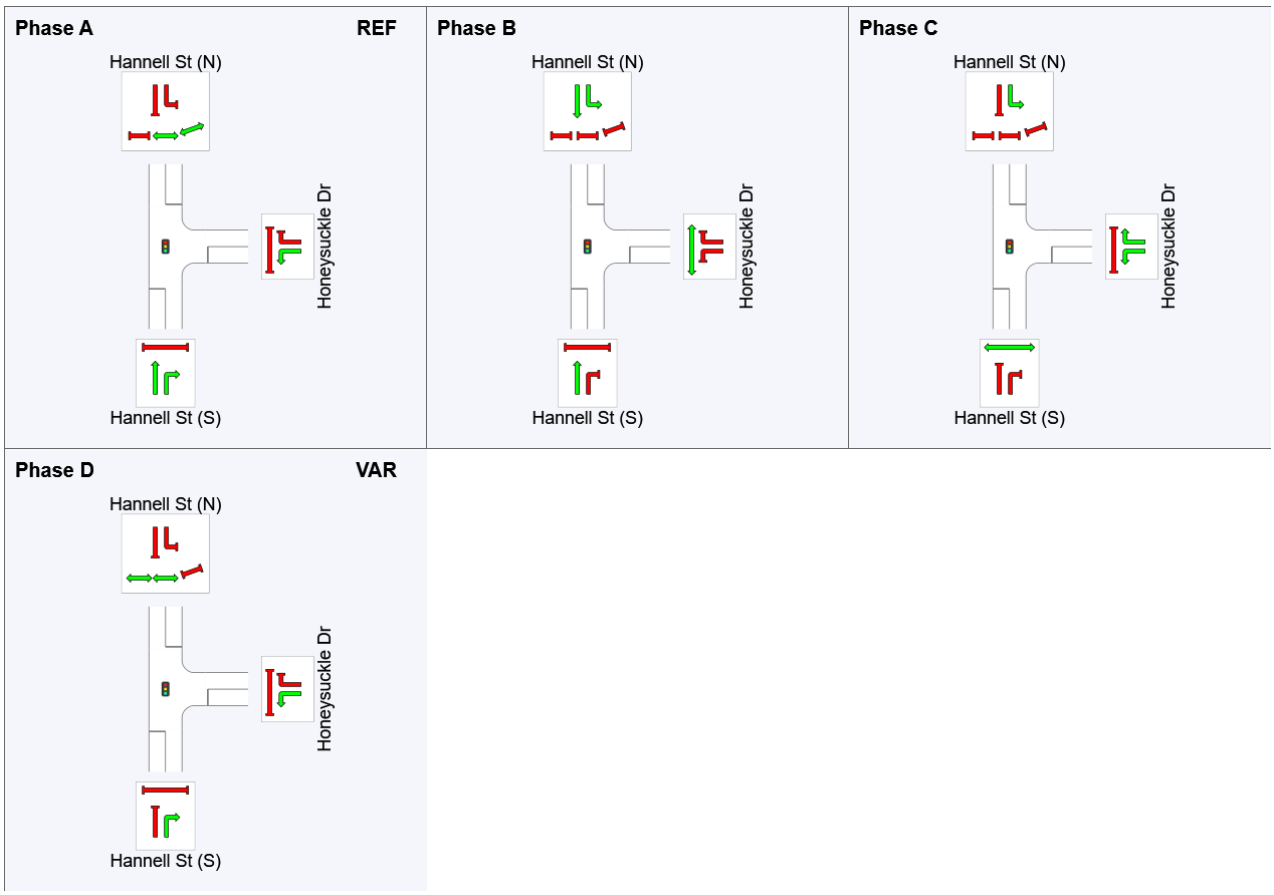
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1147	5.6	1207	5.6	0.629	15.1	LOS B	17.0	124.5	0.77	0.69	0.77	34.0
3	R2	510	0.4	537	0.4	* 0.822	38.5	LOS C	17.3	121.2	0.96	0.90	1.10	26.0
Approach		1657	4.0	1744	4.0	0.822	22.3	LOS B	17.3	124.5	0.83	0.76	0.87	30.2
East: Honeysuckle Dr														
4	L2	89	8.2	94	8.2	0.110	17.5	LOS B	2.0	14.7	0.57	0.70	0.57	35.8
6	R2	347	7.2	365	7.2	* 0.636	41.3	LOS C	7.0	52.4	0.98	0.83	1.03	28.2
Approach		436	7.4	459	7.4	0.636	36.5	LOS C	7.0	52.4	0.90	0.80	0.93	29.2
North: Hannell St (N)														
7	L2	637	2.5	671	2.5	0.639	20.0	LOS B	17.6	125.6	0.72	0.81	0.72	40.4
8	T1	1027	5.0	1081	5.0	* 0.848	33.7	LOS C	22.8	166.3	0.99	1.01	1.19	22.2
Approach		1664	4.0	1752	4.0	0.848	28.5	LOS B	22.8	166.3	0.89	0.93	1.01	29.5
All Vehicles		3757	4.4	3955	4.4	0.848	26.7	LOS B	22.8	166.3	0.87	0.84	0.94	29.7

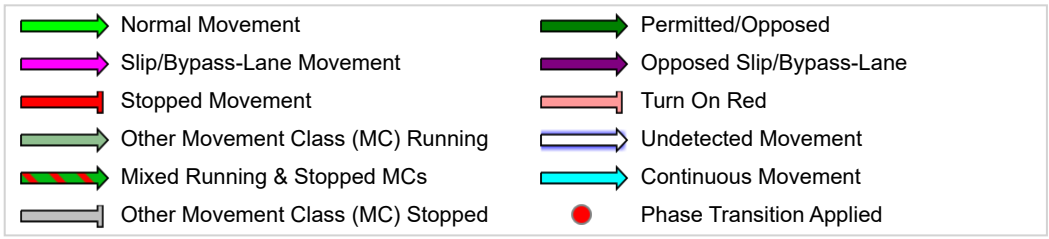
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2020 BG PM - Old Layout (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

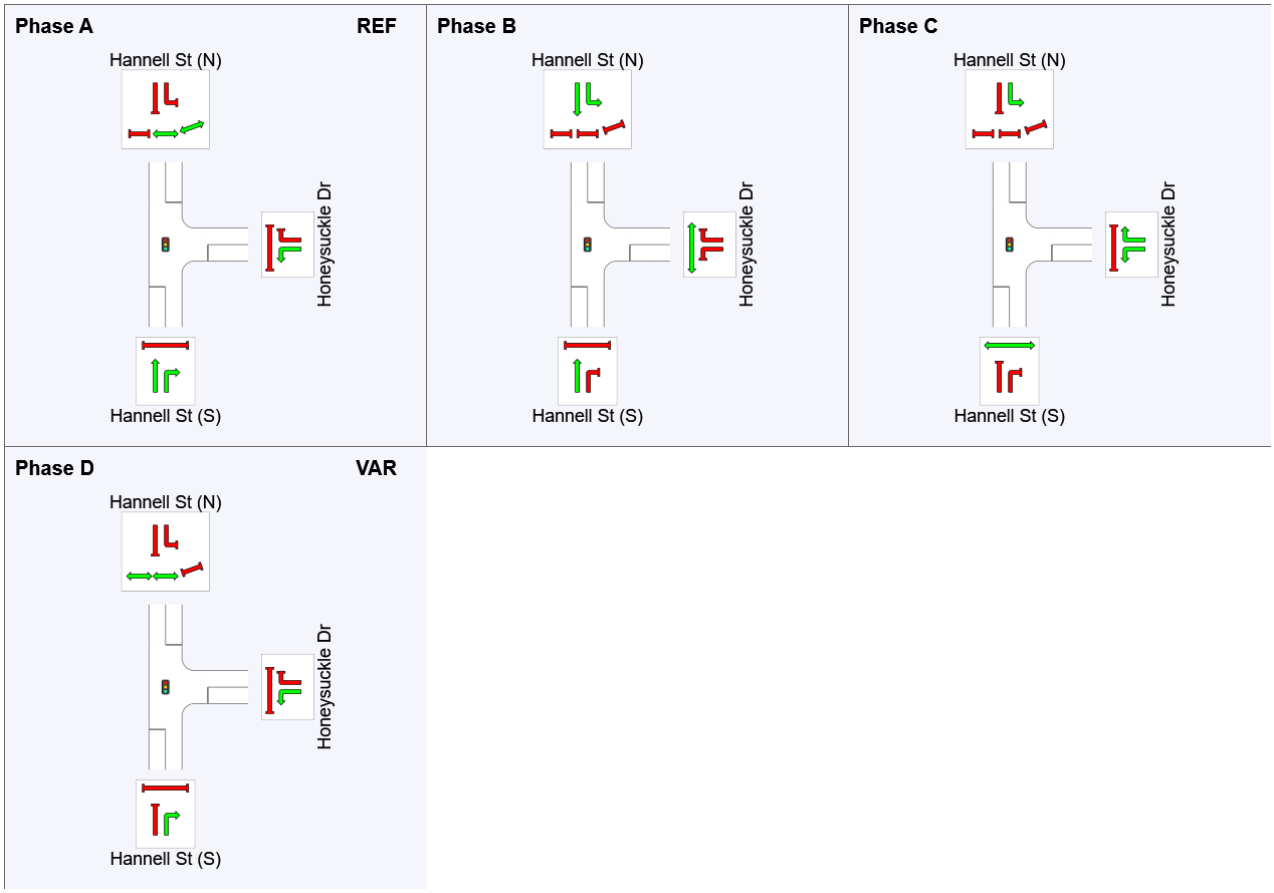
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1129	1.5	1188	1.5	0.656	15.4	LOS B	15.7	111.0	0.82	0.73	0.82	33.8
3	R2	215	2.4	226	2.4	0.520	33.8	LOS C	5.6	40.3	0.93	0.78	0.93	27.7
Approach		1344	1.6	1415	1.6	0.656	18.3	LOS B	15.7	111.0	0.84	0.74	0.84	32.2
East: Honeysuckle Dr														
4	L2	352	0.6	371	0.6	0.438	19.5	LOS B	8.7	60.9	0.72	0.78	0.72	34.5
6	R2	577	1.4	607	1.4	* 0.771	37.4	LOS C	10.8	76.8	1.00	0.91	1.17	29.9
Approach		929	1.1	978	1.1	0.771	30.6	LOS C	10.8	76.8	0.89	0.86	1.00	31.2
North: Hannell St (N)														
7	L2	435	0.5	458	0.5	0.385	12.4	LOS A	7.4	52.0	0.51	0.72	0.51	45.1
8	T1	1028	0.7	1082	0.7	* 0.813	27.3	LOS B	19.1	134.2	0.97	0.96	1.13	25.2
Approach		1463	0.6	1540	0.6	0.813	22.9	LOS B	19.1	134.2	0.84	0.89	0.94	31.5
All Vehicles		3736	1.1	3933	1.1	0.813	23.2	LOS B	19.1	134.2	0.85	0.83	0.92	31.6

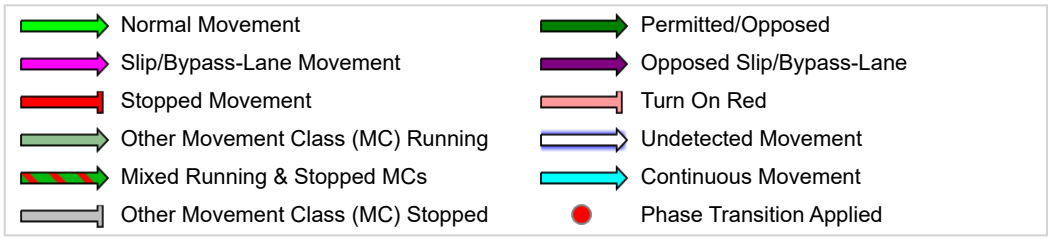
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

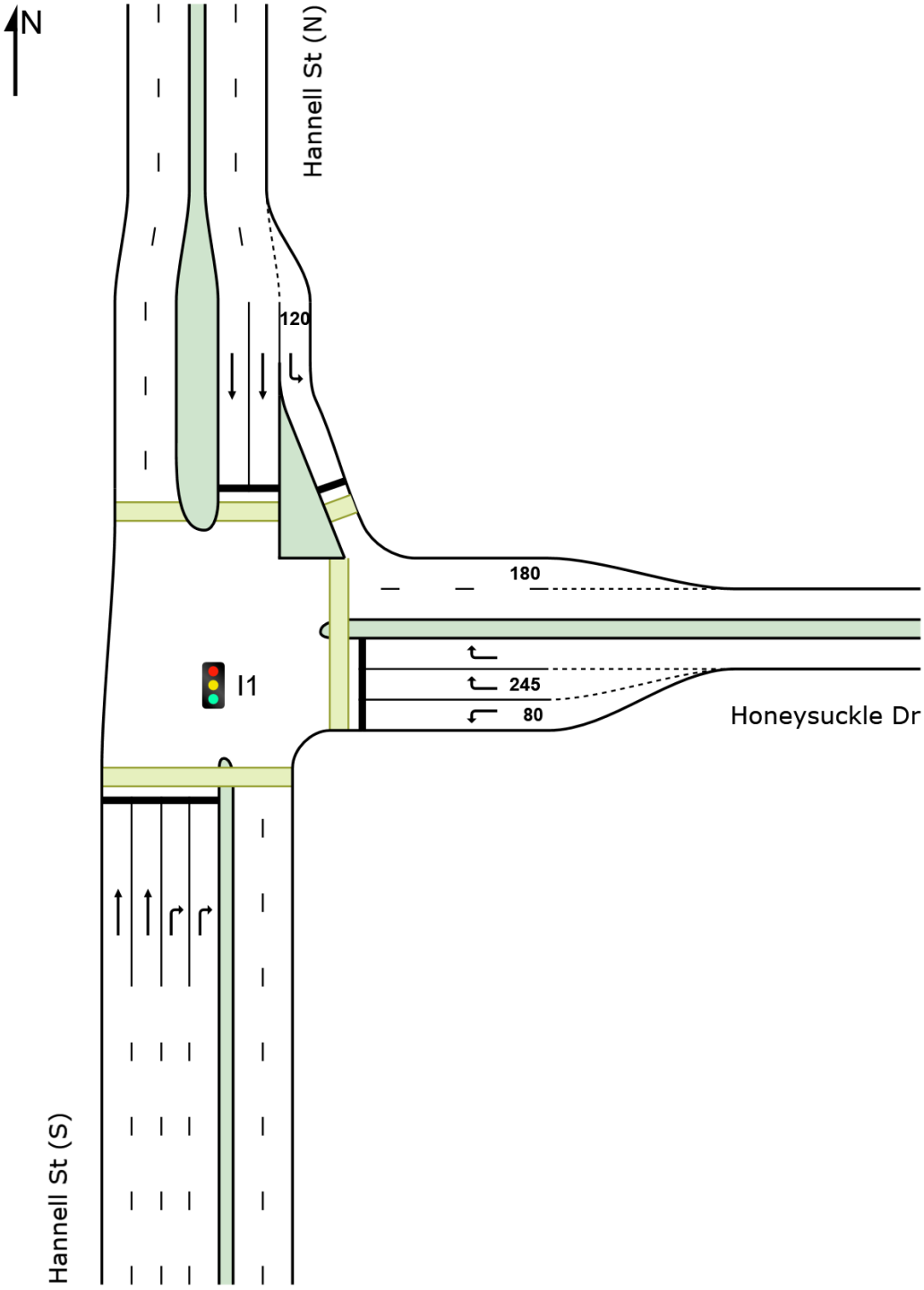


SITE LAYOUT

Site: I1 [2022 BG AM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



USER REPORT FOR SITE

All Movement Classes

Project: 620.30106.00000 - Hannell St_Honeysuck dr - 20201020 **Template: Movement & Phasing**

Site: I1 [2022 BG AM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

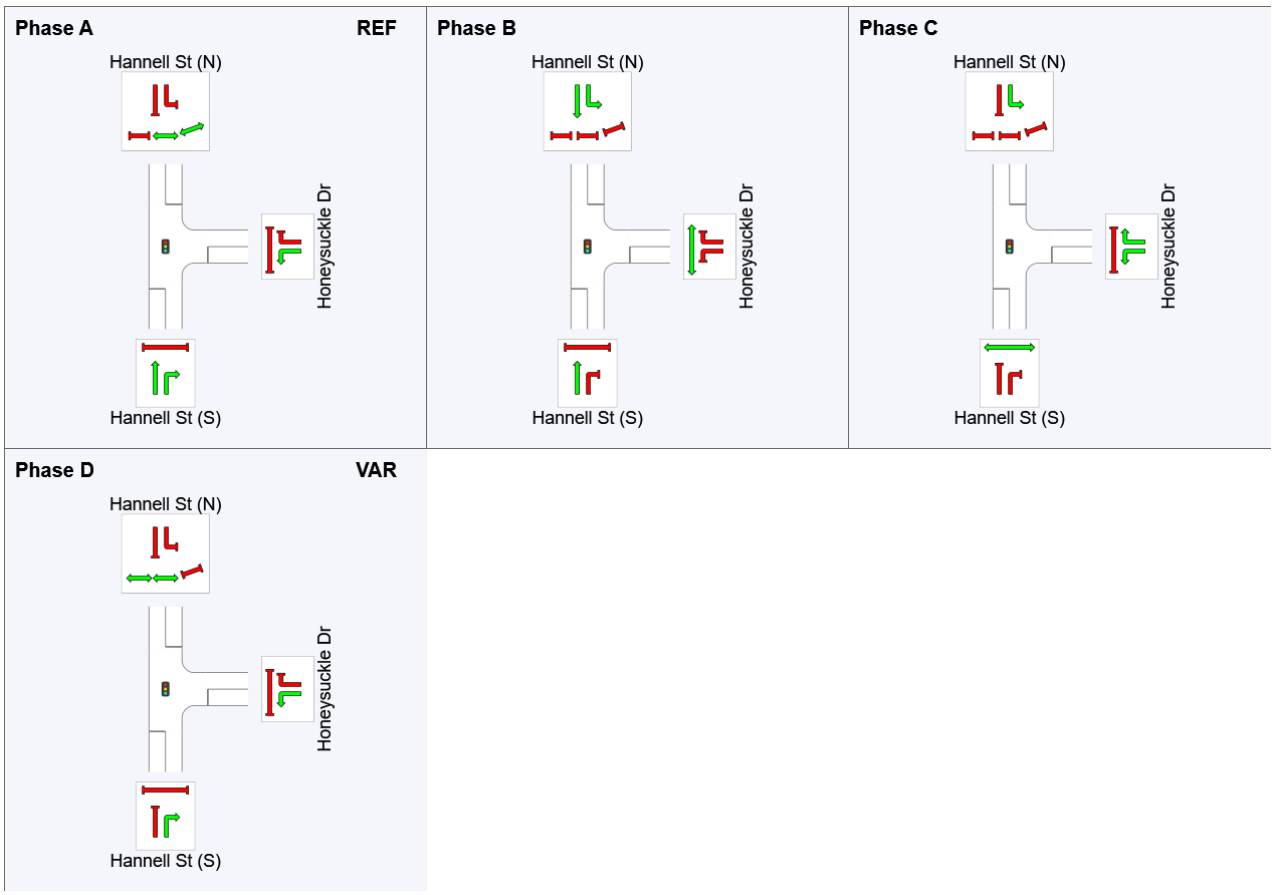
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1180	5.6	1242	5.6	0.645	13.4	LOS A	15.5	113.8	0.78	0.70	0.78	35.8
3	R2	525	0.4	553	0.4	0.816	41.4	LOS C	10.5	73.8	1.00	0.95	1.26	25.1
Approach		1705	4.0	1795	4.0	0.816	22.0	LOS B	15.5	113.8	0.85	0.77	0.93	30.5
East: Honeysuckle Dr														
4	L2	91	8.2	96	8.2	0.132	19.3	LOS B	2.0	15.2	0.65	0.72	0.65	34.5
6	R2	357	7.2	376	7.2	*0.620	36.4	LOS C	6.3	47.0	0.98	0.83	1.02	30.0
Approach		448	7.4	472	7.4	0.620	33.0	LOS C	6.3	47.0	0.91	0.80	0.94	30.6
North: Hannell St (N)														
7	L2	656	2.5	691	2.5	0.589	15.1	LOS B	13.5	96.9	0.62	0.77	0.62	43.9
8	T1	1057	5.0	1113	5.0	*0.764	22.5	LOS B	17.8	130.1	0.93	0.88	1.01	28.0
Approach		1713	4.0	1803	4.0	0.764	19.7	LOS B	17.8	130.1	0.81	0.83	0.86	35.0
All Vehicles		3866	4.4	4069	4.4	0.816	22.3	LOS B	17.8	130.1	0.84	0.80	0.90	32.4

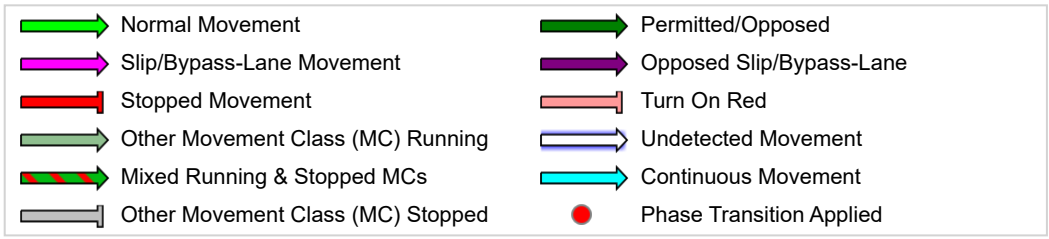
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2022 BG PM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

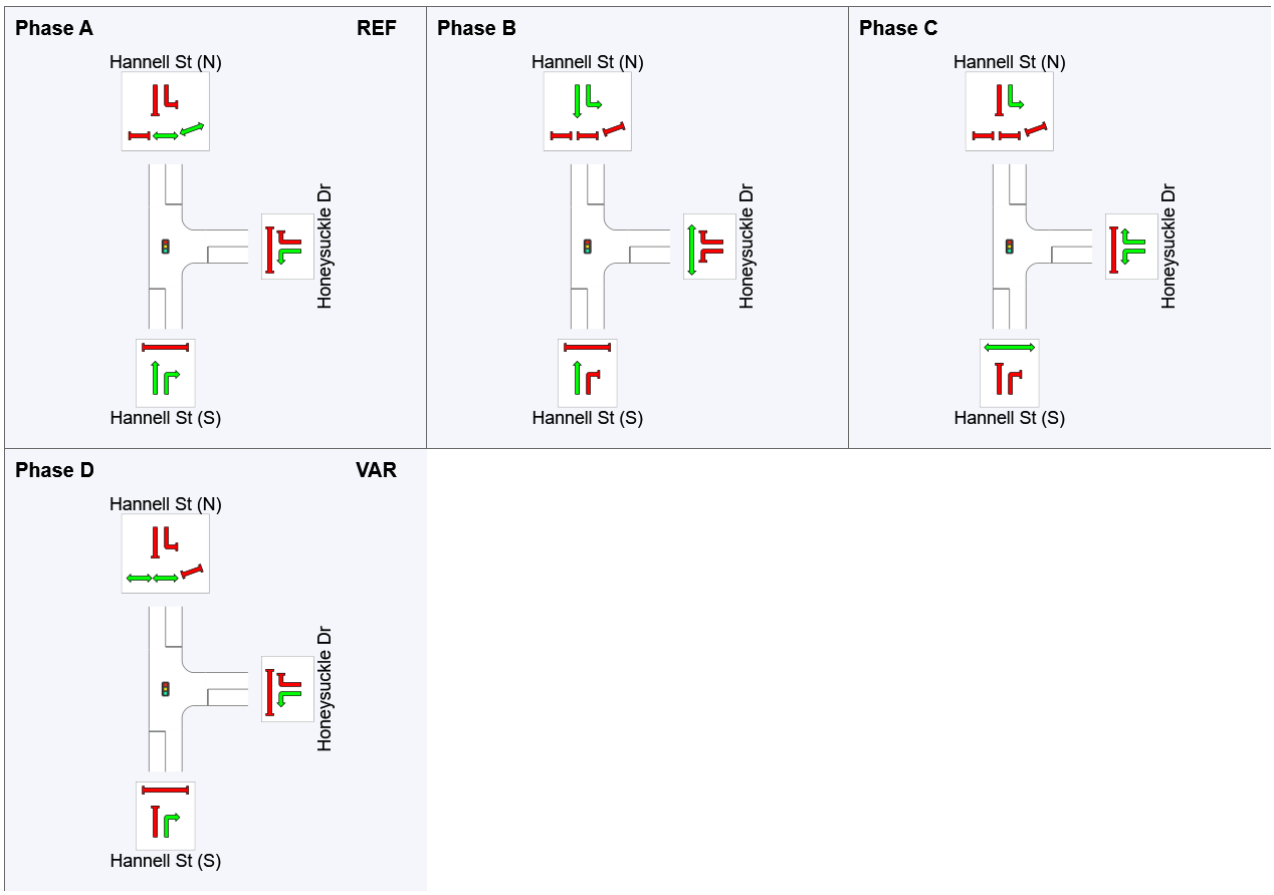
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1161	1.5	1222	1.5	0.675	15.6	LOS B	16.3	115.6	0.83	0.74	0.83	33.6
3	R2	221	2.4	233	2.4	0.348	33.3	LOS C	3.6	26.0	0.91	0.77	0.91	27.9
Approach		1382	1.6	1455	1.6	0.675	18.4	LOS B	16.3	115.6	0.85	0.75	0.85	32.1
East: Honeysuckle Dr														
4	L2	362	0.6	381	0.6	0.451	19.6	LOS B	9.0	63.1	0.73	0.79	0.73	34.4
6	R2	593	1.4	624	1.4	* 0.792	38.3	LOS C	11.4	80.5	1.00	0.93	1.20	29.5
Approach		955	1.1	1005	1.1	0.792	31.2	LOS C	11.4	80.5	0.90	0.88	1.02	30.9
North: Hannell St (N)														
7	L2	447	0.5	471	0.5	0.396	12.3	LOS A	7.7	53.9	0.51	0.72	0.51	45.1
8	T1	1058	0.7	1114	0.7	* 0.837	29.1	LOS C	20.4	143.7	0.99	1.00	1.18	24.3
Approach		1505	0.6	1584	0.6	0.837	24.1	LOS B	20.4	143.7	0.85	0.92	0.98	30.7
All Vehicles		3842	1.1	4044	1.1	0.837	23.8	LOS B	20.4	143.7	0.86	0.84	0.94	31.2

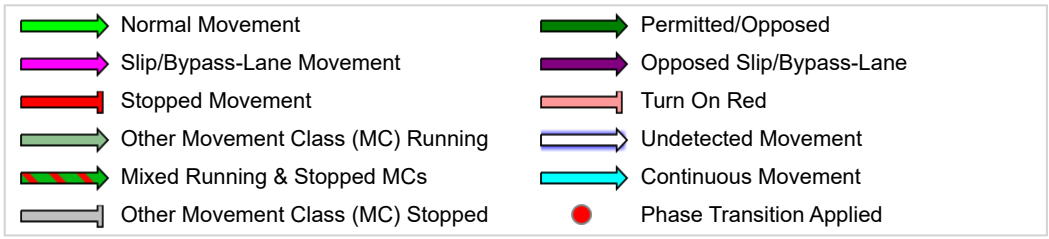
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2032 BG AM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

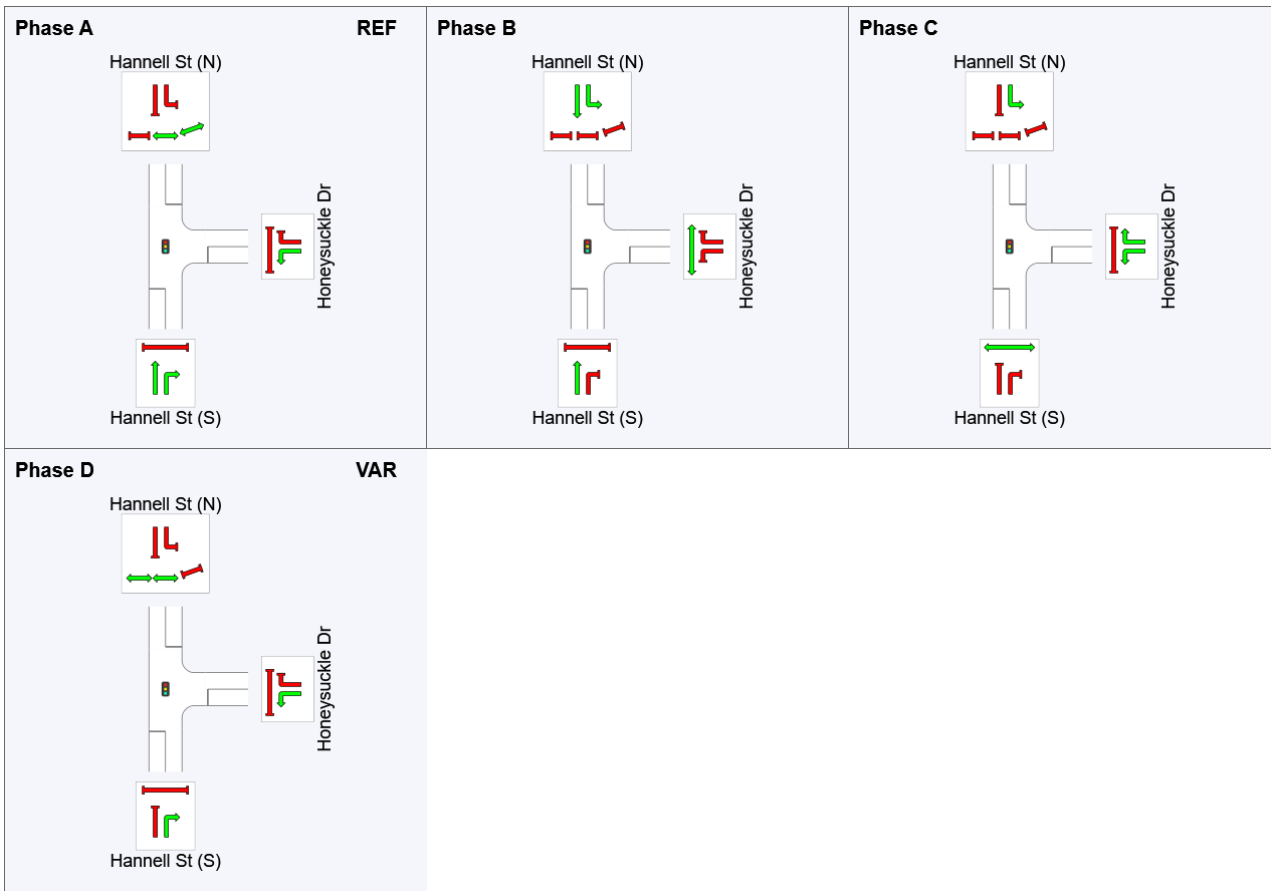
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1345	5.6	1416	5.6	0.704	14.8	LOS B	20.6	150.8	0.80	0.72	0.80	34.3
3	R2	598	0.4	629	0.4	* 0.812	44.4	LOS D	13.3	93.6	1.00	0.93	1.21	24.3
Approach		1943	4.0	2045	4.0	0.812	23.9	LOS B	20.6	150.8	0.86	0.79	0.93	29.4
East: Honeysuckle Dr														
4	L2	104	8.2	109	8.2	0.147	20.8	LOS B	2.6	19.6	0.65	0.72	0.65	33.6
6	R2	407	7.2	428	7.2	* 0.746	43.9	LOS D	8.7	64.9	1.00	0.89	1.16	27.3
Approach		511	7.4	538	7.4	0.746	39.2	LOS C	8.7	64.9	0.93	0.86	1.05	28.2
North: Hannell St (N)														
7	L2	747	2.5	786	2.5	0.676	18.3	LOS B	19.5	139.3	0.69	0.80	0.69	42.2
8	T1	1204	5.0	1267	5.0	* 0.839	29.5	LOS C	25.6	186.8	0.97	0.98	1.12	24.1
Approach		1951	4.0	2054	4.0	0.839	25.2	LOS B	25.6	186.8	0.86	0.91	0.95	31.5
All Vehicles		4405	4.4	4637	4.4	0.839	26.3	LOS B	25.6	186.8	0.87	0.85	0.95	30.1

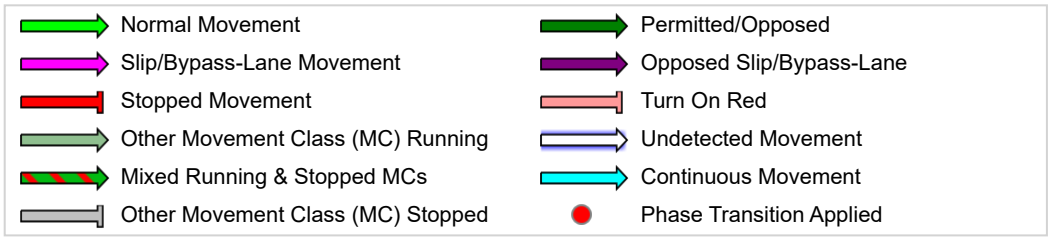
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2032 BG PM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

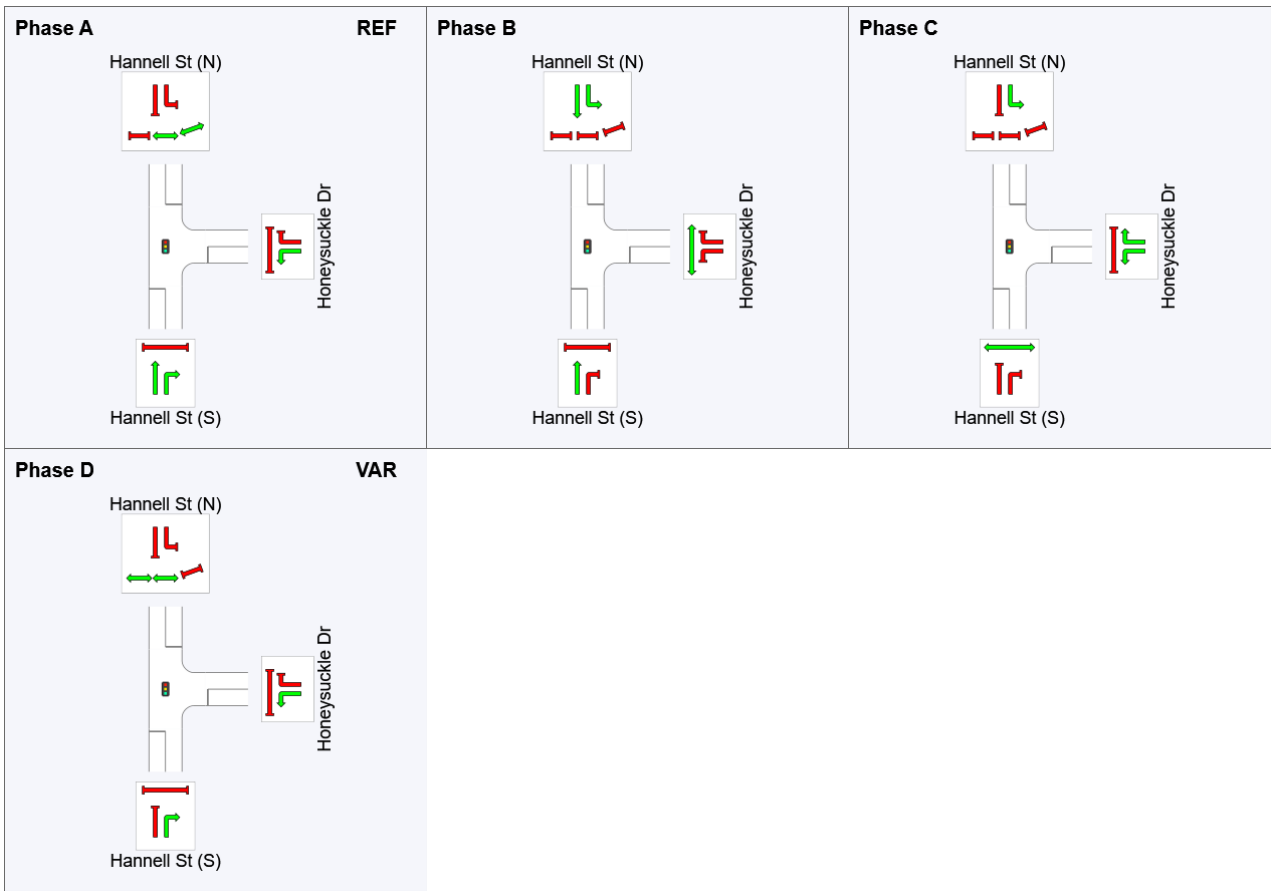
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1323	1.5	1393	1.5	0.725	18.9	LOS B	23.9	169.6	0.85	0.76	0.85	30.7
3	R2	252	2.4	265	2.4	0.415	41.9	LOS C	5.4	38.4	0.93	0.79	0.93	24.6
Approach		1575	1.6	1658	1.6	0.725	22.6	LOS B	23.9	169.6	0.86	0.77	0.86	29.1
East: Honeysuckle Dr														
4	L2	413	0.6	435	0.6	0.516	24.3	LOS B	13.6	95.5	0.76	0.81	0.76	31.6
6	R2	676	1.4	712	1.4	* 0.829	47.4	LOS D	16.8	118.7	1.00	0.94	1.20	26.5
Approach		1089	1.1	1146	1.1	0.829	38.6	LOS C	16.8	118.7	0.91	0.89	1.03	27.9
North: Hannell St (N)														
7	L2	510	0.5	537	0.5	0.421	12.5	LOS A	10.2	71.7	0.47	0.71	0.47	45.0
8	T1	1205	0.7	1268	0.7	* 0.840	32.6	LOS C	28.3	199.6	0.98	0.97	1.10	22.6
Approach		1715	0.6	1805	0.6	0.840	26.6	LOS B	28.3	199.6	0.83	0.89	0.91	29.2
All Vehicles		4379	1.1	4609	1.1	0.840	28.2	LOS B	28.3	199.6	0.86	0.85	0.92	28.7

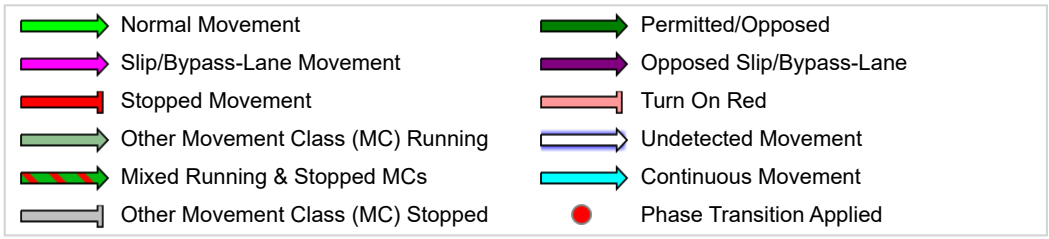
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2022 BG+DEV AM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

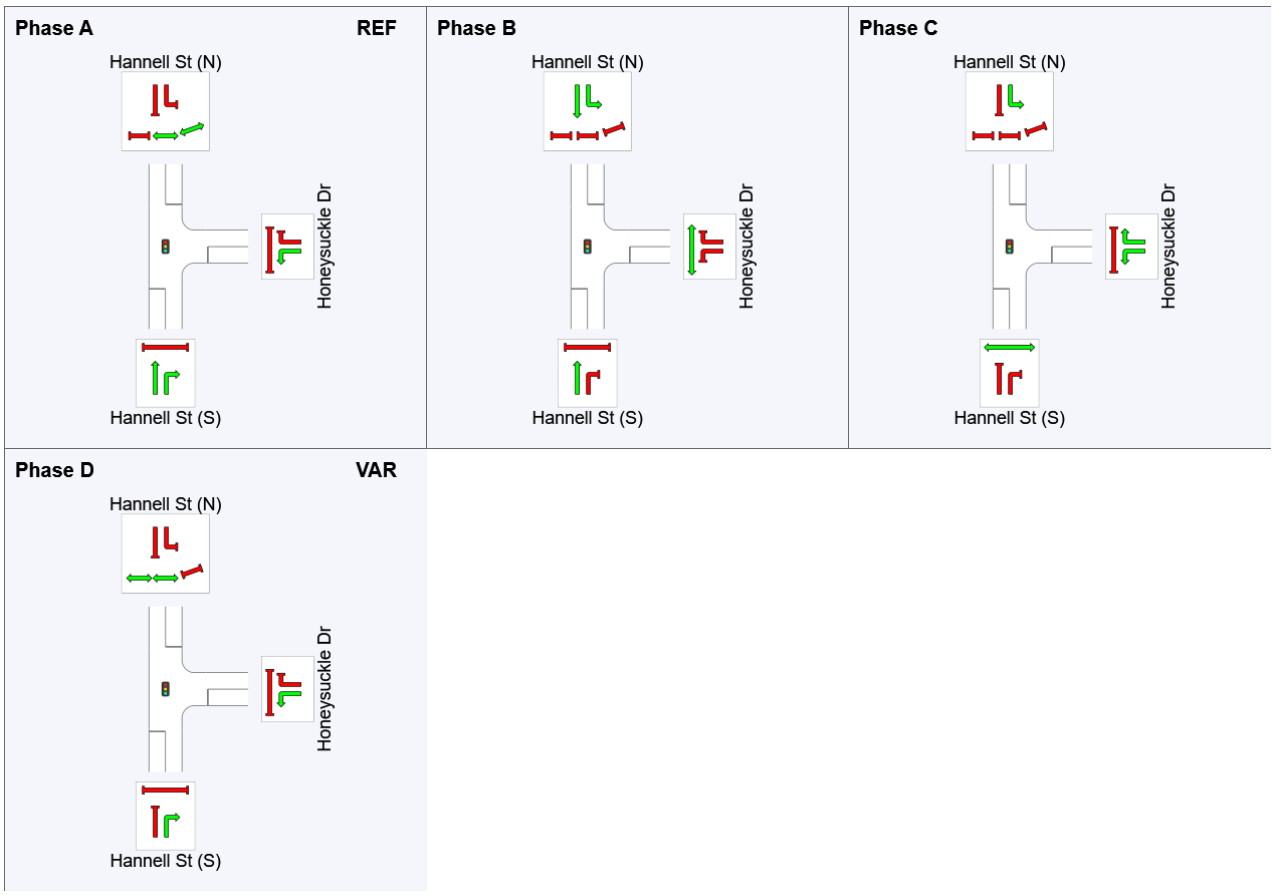
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1180	5.6	1242	5.6	0.645	13.4	LOS A	15.5	113.8	0.78	0.70	0.78	35.8
3	R2	542	0.4	571	0.4	0.843	43.1	LOS D	11.2	78.5	1.00	0.97	1.32	24.6
Approach		1722	4.0	1813	4.0	0.843	22.7	LOS B	15.5	113.8	0.85	0.78	0.95	30.1
East: Honeysuckle Dr														
4	L2	140	8.2	147	8.2	0.203	19.8	LOS B	3.2	24.3	0.67	0.74	0.67	34.2
6	R2	397	7.2	418	7.2	* 0.690	37.7	LOS C	7.3	54.0	0.99	0.86	1.10	29.5
Approach		537	7.5	565	7.5	0.690	33.0	LOS C	7.3	54.0	0.91	0.83	0.99	30.4
North: Hannell St (N)														
7	L2	690	2.5	726	2.5	0.619	15.6	LOS B	14.7	105.2	0.64	0.78	0.64	43.7
8	T1	1057	5.0	1113	5.0	* 0.764	22.5	LOS B	17.8	130.1	0.93	0.88	1.01	28.0
Approach		1747	4.0	1839	4.0	0.764	19.8	LOS B	17.8	130.1	0.82	0.84	0.86	35.1
All Vehicles		4006	4.5	4217	4.5	0.843	22.8	LOS B	17.8	130.1	0.84	0.81	0.92	32.2

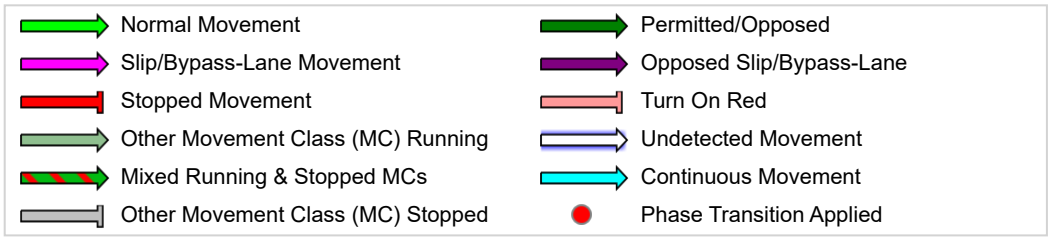
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2022 BG+DEV PM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

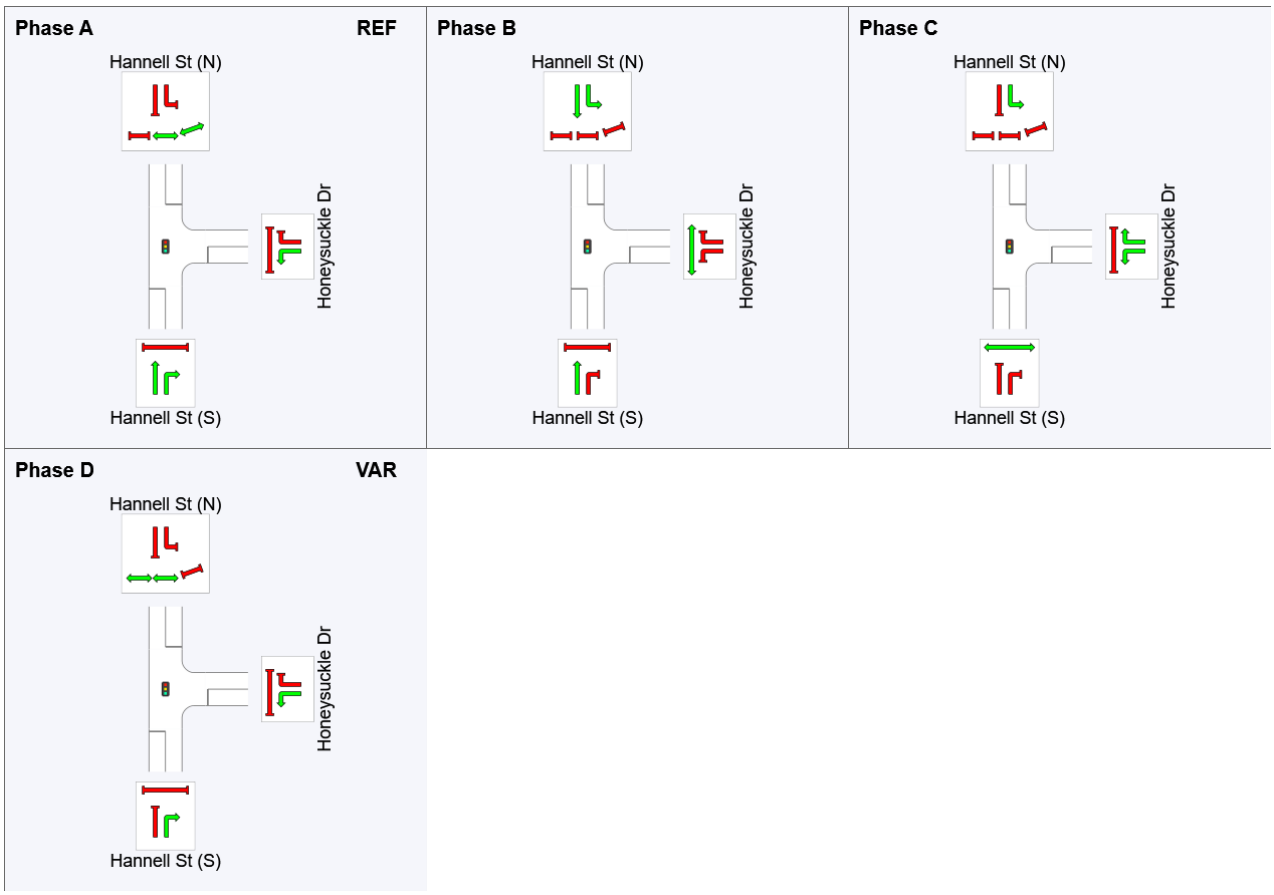
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1161	1.5	1222	1.5	0.675	15.6	LOS B	16.3	115.6	0.83	0.74	0.83	33.6
3	R2	241	2.4	254	2.4	0.380	33.5	LOS C	4.0	28.5	0.92	0.78	0.92	27.8
Approach		1402	1.7	1476	1.7	0.675	18.6	LOS B	16.3	115.6	0.85	0.75	0.85	32.0
East: Honeysuckle Dr														
4	L2	404	0.6	425	0.6	0.503	20.1	LOS B	10.3	72.6	0.75	0.80	0.75	34.2
6	R2	628	1.4	661	1.4	* 0.839	41.0	LOS C	12.7	89.8	1.00	0.97	1.30	28.5
Approach		1032	1.1	1086	1.1	0.839	32.8	LOS C	12.7	89.8	0.90	0.90	1.08	30.2
North: Hannell St (N)														
7	L2	487	0.5	513	0.5	0.431	12.6	LOS A	8.6	60.6	0.53	0.73	0.53	44.9
8	T1	1058	0.7	1114	0.7	* 0.837	29.1	LOS C	20.4	143.7	0.99	1.00	1.18	24.3
Approach		1545	0.6	1626	0.6	0.837	23.9	LOS B	20.4	143.7	0.84	0.91	0.97	31.1
All Vehicles		3979	1.1	4188	1.1	0.839	24.4	LOS B	20.4	143.7	0.86	0.85	0.96	31.0

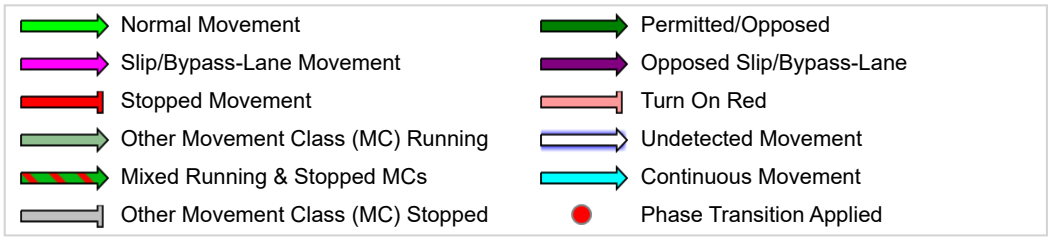
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2032 BG+DEV AM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

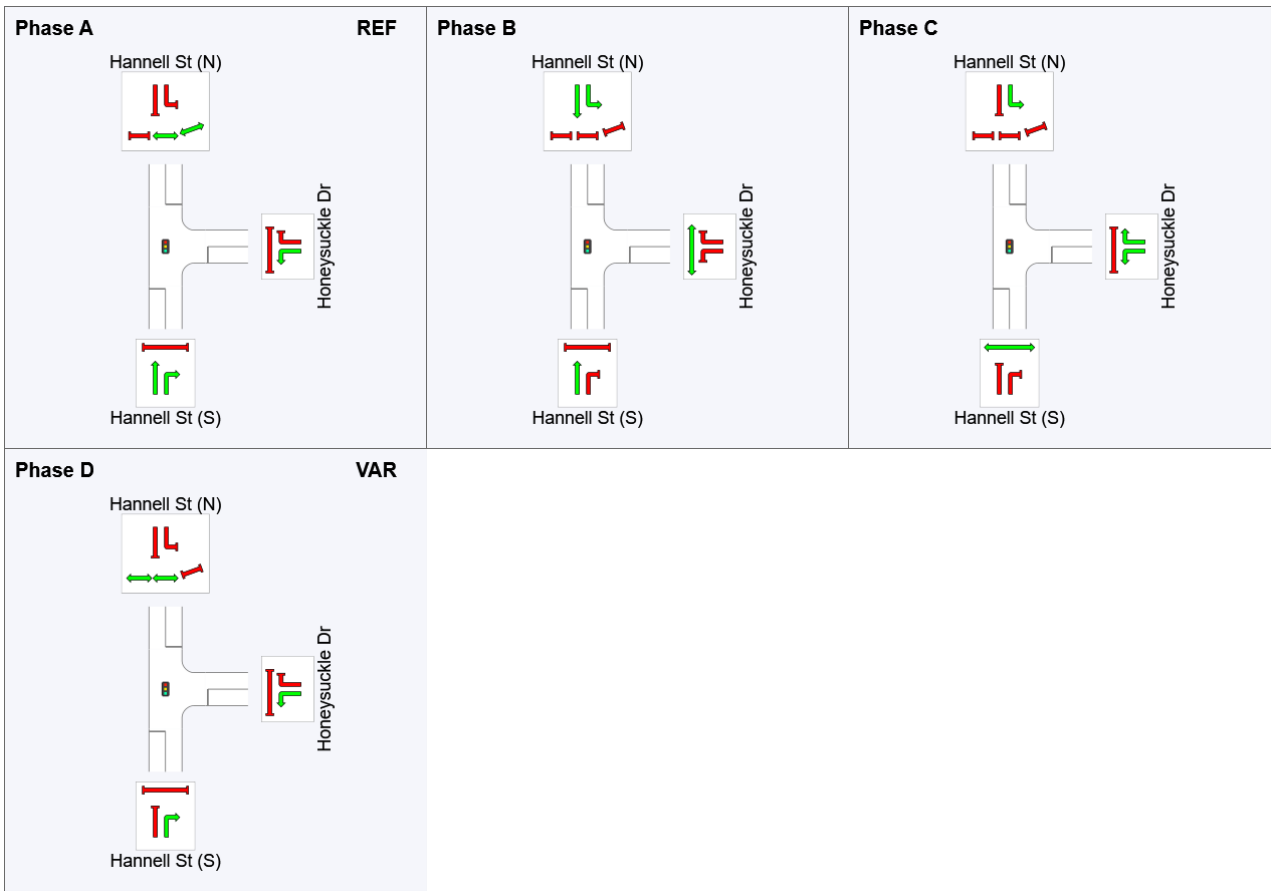
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1345	5.6	1416	5.6	0.704	14.8	LOS B	20.6	150.8	0.80	0.72	0.80	34.3
3	R2	615	0.4	647	0.4	* 0.836	46.1	LOS D	14.1	98.8	1.00	0.95	1.25	23.8
Approach		1960	4.0	2063	4.0	0.836	24.6	LOS B	20.6	150.8	0.86	0.80	0.94	29.0
East: Honeysuckle Dr														
4	L2	153	8.2	161	8.2	0.216	21.3	LOS B	4.0	29.8	0.67	0.74	0.67	33.3
6	R2	447	7.2	471	7.2	* 0.820	47.0	LOS D	10.1	75.2	1.00	0.95	1.28	26.4
Approach		600	7.5	632	7.5	0.820	40.4	LOS C	10.1	75.2	0.92	0.89	1.12	27.6
North: Hannell St (N)														
7	L2	782	2.5	823	2.5	0.708	19.2	LOS B	21.1	151.2	0.72	0.81	0.72	41.9
8	T1	1204	5.0	1267	5.0	* 0.839	29.5	LOS C	25.6	186.8	0.97	0.98	1.12	24.1
Approach		1986	4.0	2091	4.0	0.839	25.4	LOS B	25.6	186.8	0.87	0.91	0.96	31.6
All Vehicles		4546	4.4	4785	4.4	0.839	27.1	LOS B	25.6	186.8	0.87	0.86	0.97	29.8

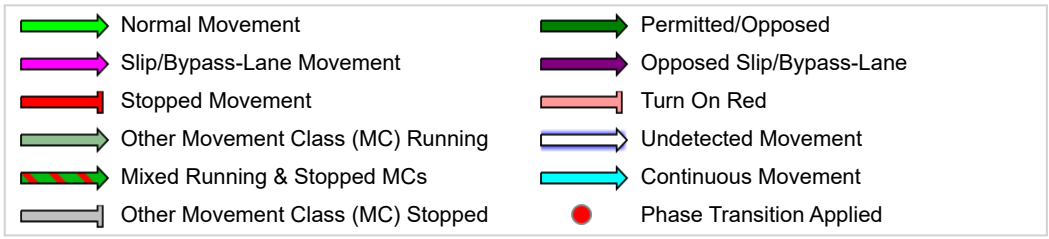
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Site: I1 [2032 BG+DEV PM (Site Folder: I1 - 4 Phase - Delay Optimised 1)]

Intersection: Hannel Street / Honeysuckle Drive (Upgraded)
Prepared by MP
Reviewed by BP
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*
Output Phase Sequence: A, B, C, D*
(* Variable Phase)

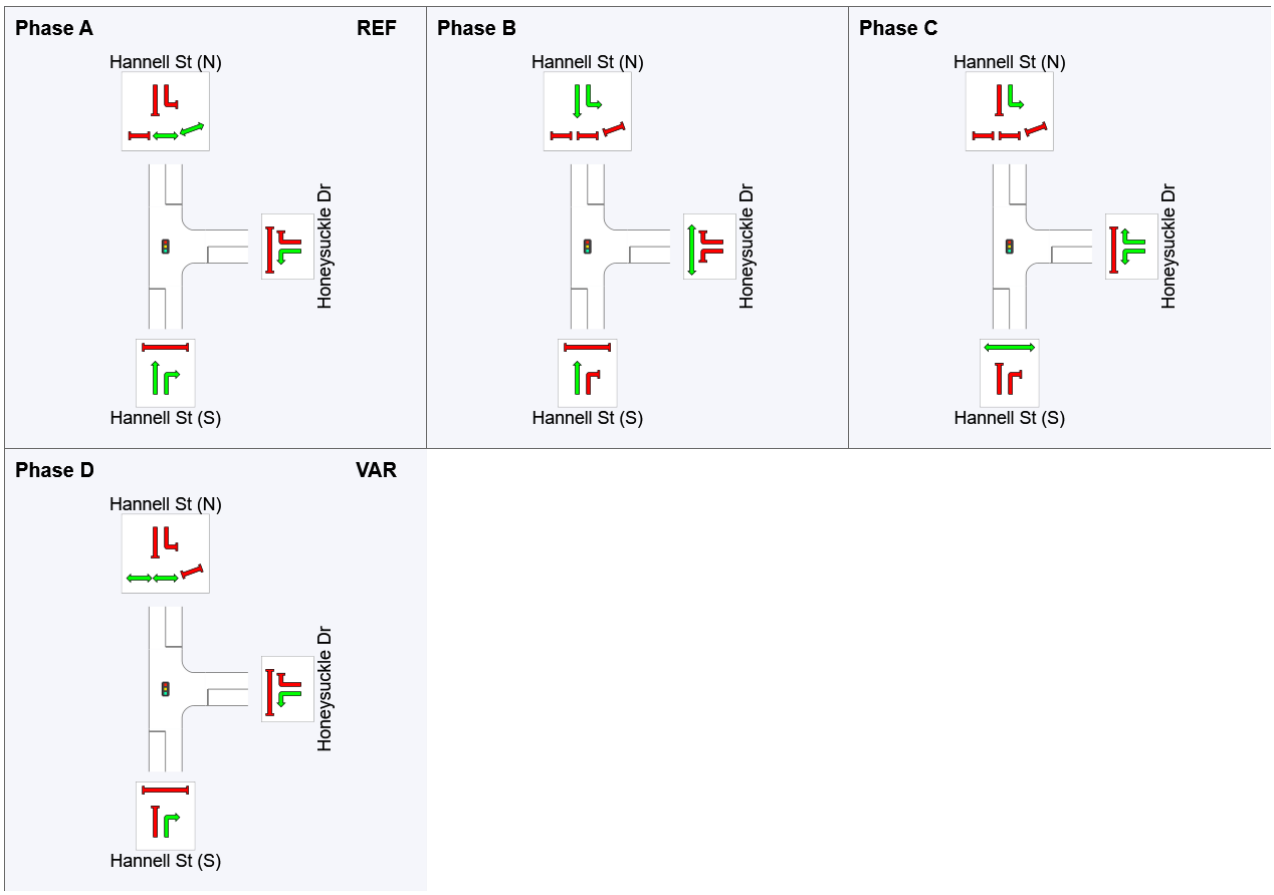
Vehicle Movement Performance

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: Hannell St (S)														
2	T1	1323	1.5	1393	1.5	0.741	19.8	LOS B	24.5	173.5	0.86	0.78	0.86	30.0
3	R2	272	2.4	286	2.4	0.448	42.2	LOS C	5.8	41.8	0.94	0.79	0.94	24.6
Approach		1595	1.7	1679	1.7	0.741	23.6	LOS B	24.5	173.5	0.88	0.78	0.88	28.5
East: Honeysuckle Dr														
4	L2	455	0.6	479	0.6	0.555	24.1	LOS B	15.1	106.4	0.77	0.81	0.77	31.7
6	R2	711	1.4	748	1.4	* 0.833	46.9	LOS D	17.6	124.9	1.00	0.94	1.20	26.6
Approach		1166	1.1	1227	1.1	0.833	38.0	LOS C	17.6	124.9	0.91	0.89	1.03	28.1
North: Hannell St (N)														
7	L2	550	0.5	579	0.5	0.454	12.8	LOS A	11.4	79.9	0.49	0.72	0.49	44.8
8	T1	1205	0.7	1268	0.7	* 0.865	36.1	LOS C	29.9	210.9	0.99	1.02	1.17	21.2
Approach		1755	0.6	1847	0.6	0.865	28.8	LOS C	29.9	210.9	0.84	0.93	0.95	28.3
All Vehicles		4516	1.1	4754	1.1	0.865	29.4	LOS C	29.9	210.9	0.87	0.87	0.95	28.3

Site Level of Service (LOS) Method: Delay (RTA NSW). 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)

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase