Appendix C

Traffic Impact Assessment

Edify Energy Pty Ltd

Darlington Point Solar Farm

Traffic Impact Assessment

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Appendices

1 Introduction

Edify Energy Pty Ltd (Edify Energy) is proposing to develop, construct and operate a large-scale solar farm approximately 10 km south of Darlington Point within the Murrumbidgee Local Government Area (LGA) in Western New South Wales.

This study investigates the traffic impacts of the proposed Darlington Point Solar Farm (DPSF) during the construction and operational phases of the project.

1.1 Scope

The purpose of this traffic impact assessment is to analyse the effect that the construction, operation and decommissioning of the proposed solar farm development is likely to have on the operation of the road network, and demonstrate how these identified impacts can be avoided, reduced, managed or mitigated.

The scope of this traffic impact assessment includes the following:

- Review of the with and without development conditions of the surrounding road network; and
- Assessment of the likely construction and operational traffic generation and impacts;
- Proposed mitigations if required

The analysis described in this report has been carried out in accordance with the *Guide to Traffic Generating Developments* (RTA) and Austroads *Guide to Traffic Management Part 12: Traffic Impacts of Developments*.

1.2 Background

A development application (SSD-8392) for the proposed Darlington Point Solar Farm has been previously submitted to Department of Planning and Environment, to which Roads and Maritime Services (RMS) and Murrumbidgee Council were referral agencies.

In support of this development application, a Traffic Impact Assessment (TIA01 dated 7 March 2018) was prepared and submitted by Arup, and which was placed on public exhibition as part of the wider Environmental Impact Statement (EIS) from 22 May to 20 June 2018. During this exhibition period, formal submissions on the proposal were provided by both RMS (dated 15 June 2015) and Council (dated 31 July 2018).

This revised Traffic Impact Assessment (TIA02) has been further developed in order to respond to RMS' comments which also reflect Council's views and to provide an updated analysis based on any traffic related changes to the application since the previous submission.

2 Existing Conditions

2.1 Site Location and Surrounding Road Network

The proposed Darlington Point Solar Farm (DPSF) site is located approximately 10 km south of the township of Darlington Point along Donald Ross Drive (3.5 km south of the Sturt Highway / Donald Ross Drive intersection, see Figure 1).

According to the Murrumbidgee Local Environmental Plan 2013 (Murrumbidgee LEP), the subject site (including adjacent lots) is currently zoned as 'Primary Production (RU1)'.

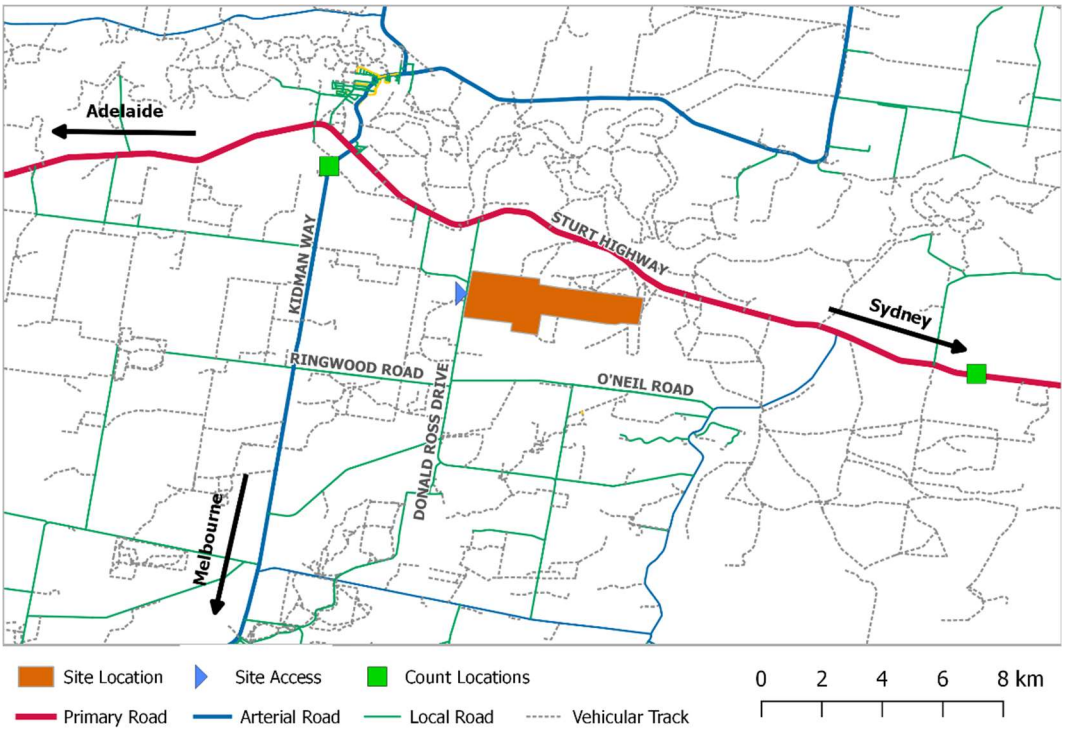


Figure 1: Site location

The site is accessed from Donald Ross Drive. Donald Ross Drive is a north-south orientated sealed two-lane local road (posted speed limit of 100 km/h) which can be directly accessed via the Sturt Highway from the north and the Kidman Way / Ringwood Road intersection from the west. Donald Ross Drive is an approved B-Double restricted route. The current restrictions that apply to this roadway are that B-Doubles travel with a maximum of 80km/h speed limit, no access during school bus times, maximum 20 tonne tri-axle loading, no movements during wet weather, and no movements for a minimum of 48 hours after rain has ceased (Source: NSW Combined Higher Mass Limits and Restricted Access Vehicle Map, Roads and Maritime Services, 2018).

The Sturt Highway is an east-west orientated sealed two-lane national highway with a posted speed limit of 110 km/h. The intersection of Sturt Highway and Donald Ross Drive is a priority-controlled T-intersection. From the east, access to

Donald Ross Drive includes a 120 m auxiliary left-turn treatment (AUL), while from the west a 50 m auxiliary right-turn treatment (AUR) is provided. The Sturt Highway is an approved B-Double route with no restrictions.

Kidman Way is a north-south orientated state-controlled sealed two-lane road. Alternate site access for light vehicles is via the Kidman Way / Ringwood Road priority-controlled T-intersection to the west of Donald Ross Drive. Basic left- (BAL) and right-turn (BAR) treatments are currently provided at this intersection for the northern and southern approaches.

2.2 Traffic Volumes

Traffic volumes for Sturt Highway (April 2017) and Kidman Way (February 2006 - Feb 2011) have been sourced from the Roads and Maritime Services (RMS) online traffic volume viewer service.

A summary of the average daily traffic volumes, including heavy vehicle percentages, for Kidman Way and Sturt Highway are included in Table 1 and Table 2 respectively.

Table 1: Kidman Way average daily traffic volumes

Count Year	Average daily traffic volumes (vpd)		% Heavy vehicles		Annual growth
	Northbound	Southbound	Northbound	Southbound	
2006	503	511	22%	24%	-
2007	521	532	24%	26%	3.8%
2010	530	536	22%	21%	0.4%
2011	477	526	-	-	-5.9%

Table 2: Sturt Highway average daily traffic volumes

Count Year	Average daily traffic volumes (vpd)		% Heavy vehicles		Annual growth
	Westbound	Eastbound	Westbound	Eastbound	
2015	582	578	33%	31%	-
2017	666	660	37%	37%	3.9%

As shown there is no constant historic growth rate available based on the above data. Therefore, in order to forecast future traffic volumes, a conservative value of 1% annual compound growth rate has been adopted.

At the time of preparing this report, no traffic volumes for Donald Ross Drive or Ringwood Road were available. Therefore, in order to estimate the existing traffic volumes on these local roads for the purposes of this assessment, it has been conservatively assumed that the local roads generate up to a maximum of 50% of the major road traffic:

- Donald Ross Drive: 50% of westbound traffic on Sturt Highway
- Ringwood Road: 50% of northbound traffic on Kidman Way.

The resultant predicted existing (2017) traffic volumes on the road network are presented in Appendix A.

3 Proposed Development Details

3.1 Development Site Plan

The proposed Darlington Point Solar Farm will have the potential to accommodate up to 275 MW (AC) of solar generated electricity, including the provision for battery technology for energy storage (battery energy storage system – BESS) and resupply during peak demand.

A detailed infrastructure layout will be developed following the completion of further environmental and technical investigations; however key features would include:

- Photovoltaic (PV) solar panels
- Steel mounting frames with piled foundations
- A single-axis tracking system
- Direct current (DC) / alternating current (AC) inverter stations
- A 33/132kV switchyard and internal switchroom
- Medium voltage electrical reticulation network
- A battery yard (BESS facility), consisting of individual power pack cubicles or skid-mounted/containerised power packs and modular inverters and MV transformers, including a connection to the above switchyard
- Internal access tracks for operational maintenance and housekeeping
- Security fencing
- Staff car park and small amenities building.

The site's sole access point during construction and operation will be via the existing ingress on Donald Ross Drive, which will be modified in consultation with and to the satisfaction of Council - this site access modification is the only modification envisaged to the local road network; RMS has opined that the Sturt Highway / Donald Ross Drive intersection has appropriate turn treatments. The subject site has no other road or street frontage. A temporary laydown area (close to the site access point) will cater for all parking, servicing and manoeuvring of vehicles (see Figure 2). It is envisaged that access tracks will be associated with the bushfire buffer zones around the perimeter of the development and along the existing transmission easements and potentially some minor access tracks within the site to be determined during detailed design.

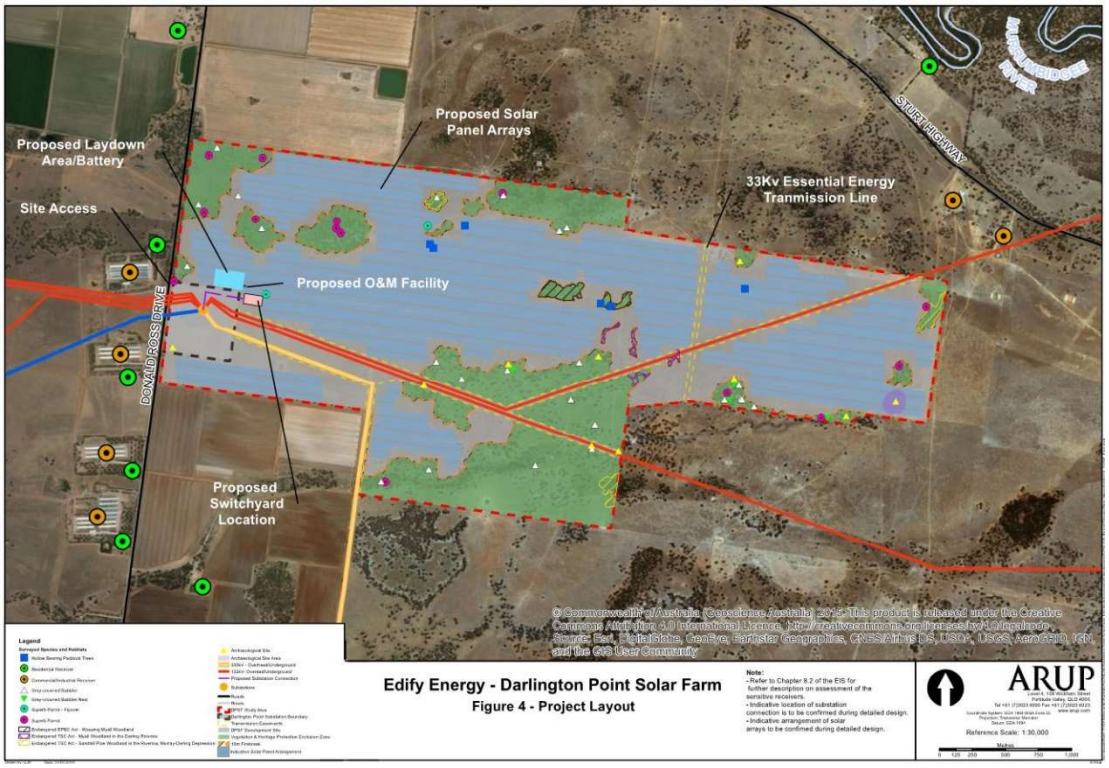


Figure 2: Indicative site access and layout plan *(Source: Arup, DPSF EIS, 16 May 2018)*

3.2 Development Operations

The operations of the site during both the construction phase and the operational phase, as advised by Edify Energy, are detailed in the following sections of the report. As demonstrated, the major traffic generating activities of the site are anticipated to be carried out during the construction stage of the development.

3.2.1 Construction Stage

Construction of the solar farm is likely to take approximately 12 months. The approximate timing for the major construction activities is outlined below and has been used to forecast potential construction traffic.

Construction Staging:

1. Site Surveys - Months 1 -2
2. Access Roads and Construction Compound - Months 3-4
3. Switchyard Benching - Months 3-4
4. Piling - Months 5-8
5. Underground Cables - Months 5-8
6. Assembly of frames - Months 6-9
7. Installation of modules - Months 7 - 10
8. Switchyard Installation - Months 8-10
9. Electrical connection and commissioning - Months 11-12

As shown, the initial stages of construction will comprise the construction of the access and access roads and establishment of offices and laydown areas.

During the construction activities, the hours of operation for the site, unless otherwise agreed with DPE and Council, will be:

- Monday to Friday - 7 am to 6 pm
- Saturday - 7 am to 1 pm.

In general, no construction activities will occur over night, on Sundays or public holidays, however, exceptions to these hours may be required on limited occasions, for example:

- The delivery of materials as requested by the NSW Police Force or other authorities for safety reasons and/or to minimise disruption to local traffic;
- Augmentation works to the TransGrid substation, which may require a temporary power outage, such that the impact on power supplies to the local community is minimised; and
- Emergency work to avoid the loss of life, property and/or material harm to the environment.

The local council, surrounding landholders and other relevant authorities will be notified of any exceptions prior to the works being undertaken.

The peak of the construction period will be approximately for 4 - 5 months. During the peak of construction, it is expected that there will be in the order of 300 light vehicles transporting workers to and from Darlington Point / Griffith (i.e. north-west of the site) to the site via Donald Ross Drive, and an average of approximately 50 heavy vehicles with an absolute maximum of 80 heavy vehicles delivering to the site each day.

In order to minimise light vehicle traffic accessing the site, a multiple coach (i.e. approximately 50 seats each) pick-up / drop-off service from Griffith to the DPSF has been considered. The coach service would operate from Griffith via Kidman Way, to Carrington Street in Darlington Point, and then via the Sturt Highway and onto Donald Ross Drive (intermediate pick-up locations between Griffith and DPSF would likely occur in Darlington Point township and/or at the Waddi Roadhouse). Provision of coaches for this service could significantly reduce the light vehicle traffic generation during the construction phase of the project. However, in order to provide a worse-case assessment, the traffic analysis has considered the scenario of an additional 300 light vehicles accessing the site daily and no coach service.

The main construction haulage route for the delivery of plant and equipment will be via Kidman Way (northbound from Melbourne as the preferred port of entry) and onto the Sturt Highway and Donald Ross Drive. Locally sourced materials and supplies such as aggregates and construction/potable water etc will also access the site via the Sturt Highway / Donald Ross Drive intersection i.e. no bulk equipment delivery vehicle turning movements at the Kidman Way / Ringwood Road intersection.

Delivery of PV modules, piles, tracking systems, inverters and transformers, cables, battery storage and related equipment is anticipated to utilise various large vehicles, ranging from standard container (20ft) trucks or 19m articulated vehicles (largely for the delivery of the PV modules and tracking), and/or B-Doubles.

Heavy construction vehicles (e.g. earth and pile driving machinery) will be required to travel to site and will remain onsite until completion of civil and structural works. As such, they will have no significant ongoing impacts on the road system.

Construction of the BESS facility would follow as soon as reasonably practicable subject to economic viability after the solar farm construction period, and would run for a period of 3 to 6 months (e.g. Q3 to Q4 (August to December) 2020). For the construction of the BESS facility, it is expected that 10 to 20 personnel, reaching a peak of 20 personnel, would be required over the 3 to 6 month period. Construction equipment would include earthmoving equipment (e.g. grader, roller), crane, and miscellaneous site construction vehicles. Equipment and deliveries are expected to be shipped to the major port in Melbourne. As per the construction phase, all heavy vehicle deliveries will access the site via the Sturt Highway / Donald Ross Drive intersection during this stage of works.

3.2.2 Operational Stage

The operation of the site is anticipated to involve five full-time staff who would attend the site frequently. An unsealed car parking area for staff and visitors is to be designed and located adjacent to the operations and maintenance building, with identified disabled parking as requested by Council.

A network of internal access tracks in the form of unsealed roads will provide access to the arrays and inverters. The location of the roads is anticipated to be along perimeter firebreaks and within the existing transmission easements as well as additional minor access tracks within the arrays to be determined during the detailed design stage of the development.

During this stage of development, the hours of operational activities for the site will be Monday to Friday from 7am to 6pm and Saturday from 8am to 1pm; noting that the solar farm itself will operate automatically during all daylight hours. Outside of emergencies or major asset inspection or maintenance programs, night works or work on Sundays or public holidays would be minimised.

4 Development Traffic

4.1 Traffic Generation and Distribution

4.1.1 Trip Generation

There are limited published traffic generation rates for the construction and operation of solar farms. As such, a first principle's approach has been adopted in order to estimate the traffic generation of the proposed development, and the traffic estimates are in line with those associated with Edify Energy's other solar farm developments which have recently been constructed in Queensland and Victoria.

As detailed in Section 3.2.1, during the peak of construction, it is estimated that there will be in the order of up to 300 light vehicles transporting workers to and from mostly Darlington Point and Griffith, and surrounds such as Coleambally. It is estimated that an average of 50 heavy vehicles will deliver to the site each day, with an absolute maximum of 80 heavy vehicle deliveries on a day. For the purpose of this assessment, it is assumed that 80% of light vehicles will arrive / depart during the peak hour. Additionally, it is assumed that heavy vehicles will arrive / depart evenly throughout the day.

The operation of the site will involve five full-time staff who would attend the site frequently.

A summary of the trips generated by the subject site during both the construction and operational phases of development is presented below in Table 3 and Table 4.

Table 3: Total trip generation summary

Class of vehicle	Average No. Vehicles per day	Average Daily Trips	Proportion veh arrive / depart during peak	Average No. vehicle trips per hour (in / out)
CONSTRUCTION PHASE				
Light vehicle	300	600	80%	240
Heavy vehicles	50	100	9%	9
OPERATIONAL PHASE				
Light vehicles	5	10	80%	4

Table 4: Peak hour trip generation summary

Class of vehicle	In (%)	In (vph)	Out (%)	Out (vph)
CONSTRUCTION PHASE – AM PEAK				
Light vehicle	90%	216	10%	24
Heavy vehicles	50%	5*	50%	5*
CONSTRUCTION PHASE – PM PEAK				
Light vehicle	10%	24	90%	216

Class of vehicle	In (%)	In (vph)	Out (%)	Out (vph)
CONSTRUCTION PHASE – AM PEAK				
Heavy vehicles	50%	5*	50%	5*

* All volumes have been rounded

As demonstrated, the proposed development is anticipated to generate up to 249 vehicles per hour during the morning and evening peak hour periods during construction. Daily traffic volumes generated by the site are anticipated to be in the order of 700 vehicles (of which 14% are heavy vehicles).

The traffic assessment conducted in this study is based on an average of 50 heavy vehicles per day. It has been assumed that on days where the number of deliveries exceeds this figure, wherever practicable, the additional traffic will be scheduled outside of peak hour so that the impacts are mitigated. This will be included in the construction traffic management plan.

Once operational, the subject site is expected to generate a total of five vehicles per hour and up to approximately 10 vehicle trips per day, which may be marginally increased at times of maintenance activities such as mowing/landscaping and panel cleaning.

4.1.2 Trip Distribution

As detailed in Section 3.2 of this report, light vehicle trips will be mostly due to transporting staff to / from the townships of Darlington Point and Griffith. It has been assumed that 80% of light vehicle trips will therefore access the site from the Sturt Highway (west of Donald Ross Drive).

The majority of heavy vehicle trips will be generated from hauling plant and equipment from Melbourne (Kidman Way northbound) and onto Sturt Highway and Donald Ross Drive). Local deliveries via heavy vehicles are also anticipated from the Sturt Highway east and west of Donald Ross Drive. For the purpose of this assessment, the following distribution for haulage routes has been adopted. Note the traffic distribution assumes that all heavy vehicle deliveries will access the site from the Sturt Highway / Donald Ross Drive intersection only i.e. no heavy vehicle deliveries from the Kidman Way / Ringwood Road intersection to meet RMS requirements.

The resultant trip distribution adopted was:

- Sturt Highway (west of Kidman Way): 80% LV, 10% HV
- Sturt Highway (east of Donald Ross Drive): 10% LV, 10% HV
- Kidman Way (south of Sturt Highway): 10% LV, 80% HV

The development traffic profiles during the morning and evening peak periods at the construction phase is presented in Appendix B.

5 Traffic Impact Assessment

5.1 Construction Traffic

5.1.1 With and Without Development Volumes

As outlined in Section 2.2, traffic count volumes for the Sturt Highway and Kidman Way were sourced from RMS. With these volumes having been collected in 2015 and 2010 respectively, an annual growth rate of 1% was applied to forecast the existing background volumes to the anticipated peak construction year, being 2019.

To forecast the post development traffic volumes, the pre development traffic profiles and the development traffic profiles were summed together. The pre development and post development (construction) traffic volumes are presented in Appendix C.

5.1.2 Road Link Assessment

During construction, it is understood that up to 700 vehicles per day will be generated by the proposed development. Given the surrounding major road network (i.e. Sturt Highway and Kidman Way) both carry less than 1,200 vehicles per day (two-way), construction activities would be expected to increase existing daily volumes by greater than 5%, the threshold beyond which a road link analysis is recommended (Austroads *Guide to Traffic Management Part 12*). Due to this volume increase impact, a road link analysis based on the Transportation Research Board *Highway Capacity Manual* (HCM 2016) has been carried out for the key road links of the Sturt Highway and Kidman Way to determine their resultant pre and post development Level of Service (LOS) during the peak construction period.

According to the HCM 2016, at LOS A, motorists experience high operating speeds and little difficulty in passing. At LOS B, passing demand and passing capacity is balanced. Once a road link reaches LOS E, the demand is observed to approach capacity. LOS F exists whenever demand flow in one or both directions exceeds the segment's capacity. Operating conditions are unstable, and heavy congestion exists. According to Austroads *Guide to Traffic Management Part 12*, it is preferred that new rural road projects operate at LOS A or B at opening.

The LOS results of the road link analysis are highlighted in Table 5 and further elaborated upon in Appendix D.

Table 5: Road link analysis result summary (Construction Phase)

Level of Service (LOS)	AM Peak		PM Peak	
	Pre Development	During Construction Phase	Pre Development	During Construction Phase
Sturt Highway (west of Donald Ross Drive)				
Eastbound	A	A	A	A
Westbound	A	A	A	A
Kidman Way (south of Ringwood Road)				
Northbound	A	A	A	A
Southbound	A	A	A	A

The results show that on both Sturt Highway and Kidman Way, the LOS is anticipated to remain at LOS A even with the addition of development construction-related traffic. Therefore, the proposed development, during the peak construction period is not expected to impact significantly on the operation of the surrounding key road network.

5.1.3 Intersection Assessment

The following intersections have been assessed as part of this analysis:

- Kidman Way / Ringwood Road
- Sturt Highway / Donald Ross Drive
- Donald Ross Drive / Site Access

The performance of the intersections has been undertaken using SIDRA Intersection 8.0 with the existing geometry and lane configurations and 2019 traffic volumes (i.e. peak construction period). In order to quantify the intersection performance, the following performance measures of each intersection has been reported as per Austroads *Guide to Traffic Management Part 12* and RTA *Guide to Traffic Generating Developments*:

- Degree of saturation (DOS) (%) – the ratio of demand flow to capacity. For priority junctions, the DOS for any movement should not exceed 0.80
- Average delay (sec) – the average delay per vehicle in seconds incurred by vehicles over the modelled time period. Average delay exceeding 42 seconds is considered near / at capacity and other control modes should be considered.
- 95th percentile queue – a queue length measured in metres of which only 5% of queues are greater than or equal to.

The fourth approach at the intersection of Kidman Way / Ringwood Road is Boondilla Road. Boondilla Road is currently an unsealed local road and is anticipated to carry minimal traffic volumes. For the purpose of this assessment a nominal value of 10 vehicles per hour to each turning movement in / out of Boondilla Road has been adopted.

Table 6: Intersection performance overview (2019 Post Development)

Time Period	Maximum DOS (%)	Maximum Average Delay (sec)	Maximum 95%ile Queue (m)
Sturt Hwy / Donald Ross Drive			
AM Peak	16%	8.7	5.2
PM Peak	23%	7.0	7.5
Donald Ross Drive / Site Access			
AM Peak	14%	8.3	1.2
PM Peak	20%	7.6	5.4
Kidman Way / Ringwood Road / Boondilla Road			
AM Peak	6%	6.6	1.7
PM Peak	7%	6.4	2.1

The analysis results show that the intersections all function within the acceptable limits of operation in both the AM and PM peak periods during the peak construction period even with the addition of development related trips.

SIDRA output summaries for each scenario and intersection assessed is provided in Appendix E.

It is noted that Edify Energy are currently considering provision of a staff coach pick-up / drop-off service to transport staff from Griffith and Darlington Point to the DPSF site. Introduction of this service would reduce the total traffic generation of the site during the peak hour periods and further minimise the intersection operational impact of the construction phase of the proposed development. The EPC Contractor would be responsible for the operation of the transport mode (e.g. coach charter) to and from the site during construction of the DPSF. This would be assessed further by Edify Energy and its appointed EPC Contractor within the Traffic Management Plan.

5.1.4 Swept Path Analysis

During the construction period, delivery of equipment is anticipated to utilise various large vehicles, ranging from standard container (20ft) trucks or 19m articulated vehicles (largely for the delivery of the PV modules and tracking) and/or B-Doubles.

In order to confirm that the surrounding road network can cater physically for the manoeuvring of the construction vehicles attracted to the site, swept path analysis using a B-Double design vehicle has been carried out at the key intersections. It is proposed that light vehicles will use Ringwood Road to access or leave the site; heavy vehicles will only be sent to access the site via the Sturt Highway /Donald Ross Drive intersection. As such, swept path analysis of B-Double movements has been undertaken at the Sturt Highway / Donald Ross Drive and Donald Ross Drive / Site Access intersections only.

The vehicle characteristics and profile adopted for the analysis is presented in Figure 3.

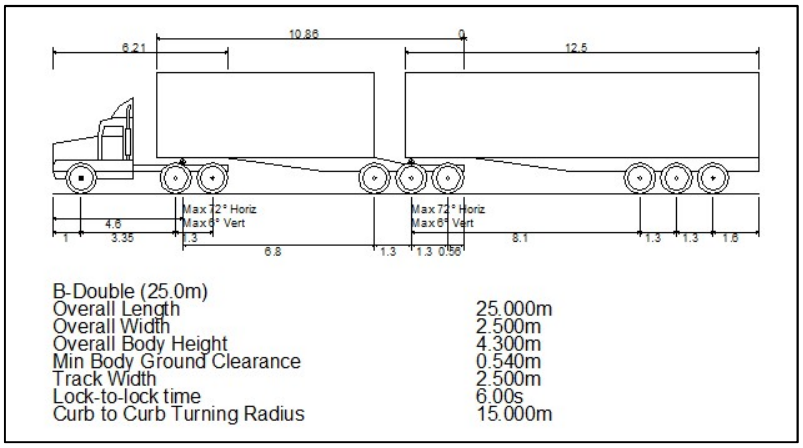


Figure 3: B-Double Vehicle Profile

Sturt Highway / Donald Ross Drive

The swept path of a B-Double entering and exiting Sturt Highway is presented below in Figure 4 and Figure 5 respectively.

Figure 4: Sturt Highway / Donald Ross Drive (Entering Sturt Highway: B-Double)

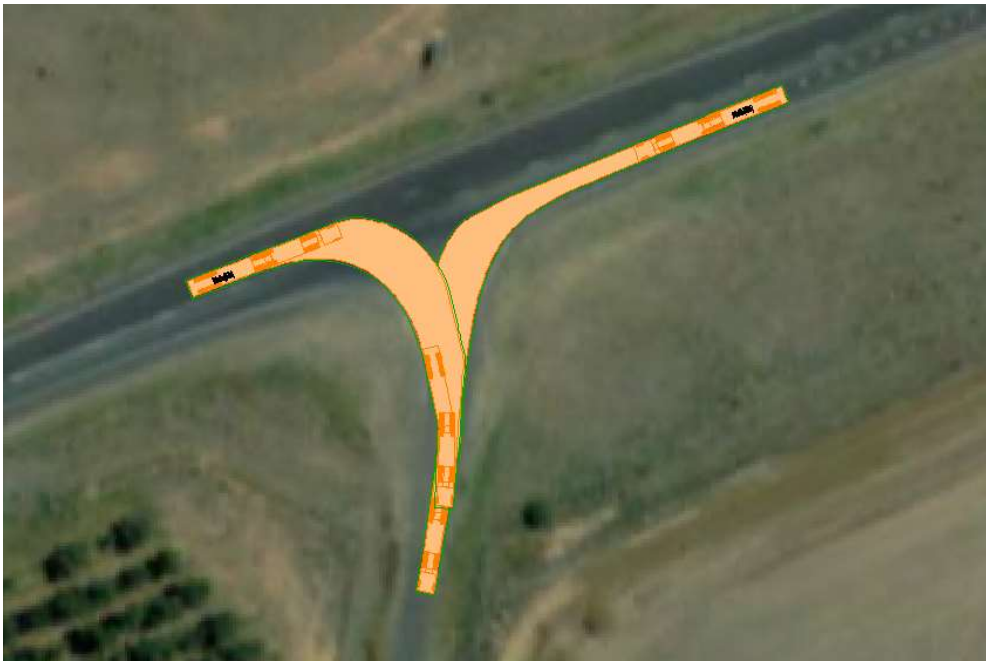


Figure 5: Sturt Highway / Donald Ross Drive (Exiting Sturt Highway: B-Double)

As shown, a B-Double is able to manoeuvre in / out of Donald Ross Drive from the Sturt Highway within the existing intersection pavement extents.

Donald Ross Drive / Site Access

The swept path of a B-Double entering and exiting the proposed Site Access is presented below in Figure 6 and Figure 7 respectively.

Figure 6: Donald Ross Drive / Site Access (Entering Site Access: B-Double)

Figure 7: Donald Ross Drive / Site Access (Exiting Site Access: B-Double)

It is recommended that during the initial stages of construction i.e. when the access roads within the site are constructed, that the access is upgraded to enable the swept paths of a B-Double as shown above in Figure 6 and Figure 7.

5.2 Operational Traffic Impact Assessment

During operation, it is understood that up to five staff may be required onsite for operational management and maintenance. For the purpose of this assessment, it has been assumed that all arrive / depart the site from the Sturt Highway. The resultant impact of development once operational on the external road link is presented in Table 7.

Table 7: Operational Phase Traffic Impact

Road	2017 AADT	Daily development vehicle trips	Impact
Sturt Highway	1,326 vpd	10 vpd	0.8%

As shown, the operational traffic impact due to the project is deemed to be insignificant, as the additional levels will be less than 5% of existing daily traffic levels. The level of operational activity is therefore considered to have an insignificant traffic impact on the Sturt Highway in the vicinity of the site.

Construction of the BESS facility

Construction of the BESS facility is proposed to run from Q3 to Q4 (August to December) 2020, once the solar farm is in operation (expected commencement of solar farm operation is Q3/Q4 2019). An approximate 156 vehicle deliveries for the battery powerpacks and inverters, cables, crane movements, and concrete deliveries would be expected over the BESS facility construction period (Q3 to Q4 2020). A further 10 to 20 personnel (peak of 20 vehicles) would attend site during the BESS construction period.

From this, the expected number of vehicles attending the site during the BESS construction period would be approximately 176 vehicles over the period, which is significantly less than that expected for the construction period of the solar farm (e.g. up to 249 vehicles per hour during the morning and evening peak hour periods). On this basis, it is anticipated that the construction of the BESS facility would not impact significantly on the operation of the surrounding road network.

5.3 Decommissioning Phase Traffic Impact Assessment

The traffic generation for the decommissioning phase of the project is expected to be similar or less than for the construction phase, with vehicles utilising the same routes.

On this basis, it is anticipated that the decommissioning phase of the project will not impact significantly on the operation of the surrounding road network.

The BESS facility life is likely to be 15 years, so may require replacement halfway through the solar farm's 30 year design life at year-15. This would involve the removal and replacement of battery cubicles only. Approximately 90 to 100 battery cubicle deliveries would occur over a two to three month window at year-15.

The volume of vehicles to make these deliveries is not expected to have a significant impact on the operation of the surrounding road network, as the vehicle volumes would be significantly less than for the construction phase, and vehicles would utilise the same routes.

5.4 Recommended mitigation measures

The following mitigation measures are recommended to address traffic and access to and from the DPSF site:

- To enable the swept paths of a B-Double (as shown in Figure 6 and Figure 7) to adequately enter and exit the DPSF site, the site access would be upgraded during the initial stages of construction. This will be addressed during the detailed design phase of the project and included in the construction Traffic Management Plan. The design will be submitted to Murrumbidgee Shire Council for review prior to commencement of construction.

- A construction Traffic Management Plan will be developed by the EPC contractor prior to the commencement of construction of the project, for implementation during construction. The plan would be finalised in consultation with the relevant road authorities (e.g. Roads and Maritime and Murrumbidgee Council). The appointed transport contractor(s) shall be involved in the preparation of this plan. The plan shall address all light and heavy vehicle traffic generation to the development site and detail the potential impacts associated with the development, the mitigation measures to be implemented, and the procedures to monitor and ensure compliance. Wherever practicable, additional traffic beyond the average of 50 heavy vehicles per day

will be scheduled outside of peak hour. As recommended by RMS, the plan shall address, but not necessarily be limited to the following:

i. Finalise details of haulage, including transport routes, volumes, vehicle type and length, timing and frequency

ii. Finalise details of any required road-specific mitigation measures

iii. Require that all vehicular access to the site be via the approved access routes

iv. Details of measures to be employed to ensure safety of road users and minimise potential conflict with project generated traffic

v. Proposed hours for construction activities, as night time construction presents additional traffic related issues to be considered

vi. The management and coordination of the movement of vehicles for construction and worker related access to the site and to limit disruption to other motorists, emergency vehicles, school bus timetables and school zone operating times. The management of construction staff access to the works site is to include strategies and measures employed to manage the risks of driver fatigue and driver behaviour

vii. Measures to address adverse climatic conditions that may affect road safety for vehicles used during construction, operation and decommissioning of the facility (e.g. fog, dust, wet weather)

viii. Procedures for informing the public where any road access will be restricted as a result of the project

ix. Any proposed precautionary measures such as signage to warn road users such as motorists about the construction activities for the project

x. A Driver Code of Conduct to address such items as; appropriate driver behaviour including adherence to all traffic regulations and speed limits, safe overtaking and maintaining appropriate distances between vehicles, etc

xi. Details of procedures for receiving and addressing complaints from the community concerning traffic issues associated with truck movements to and from the site.

- Edify Energy will develop the traffic management plan for approval by the relevant authorities that will consider the use of a bus service for workers, rather than a park and ride facility, for the construction phase of the project. This would minimise the number of light vehicles accessing the site.
- Preparation of a road dilapidation survey by the EPC contractor prior to construction for the road from the DPSF site along Donald Ross Drive to its intersection with Sturt Highway
- In the event of glint or glare from the solar plant being demonstrated to be evident from a public road (e.g. Donald Ross Drive), glare mitigation measures

such as construction of a barrier (e.g. vegetation or fence) or other approved device to remove any nuisance, distraction and/or hazard caused as a result of glare from the solar panels, would be implemented.

6 Conclusions and Recommendations

This report has assessed the traffic impact of the construction and operation and decomissioning of the proposed DPSF development near the township of Darlington Point.

The traffic impact assessment has demonstrated that the greatest traffic impact of the project will occur during the construction period of the development (circa ~12 months). Traffic generated during this phase will consist of construction related heavy vehicle haulage movements, and employee transport between the site and accommodation facilities in Darlington Point, Coleambally and Griffith.

The road link assessment and intersection analysis completed for 2019 (peak construction period) indicates that all road links and intersections are expected to operate well within acceptable limits of operation (i.e. LOS A) even with the addition of development related trips.

Swept path analysis demonstrates that the existing Sturt Highway and Donald Ross Drive intersection can cater for the swept path of a B-Double design vehicle, i.e. the largest design vehicle anticipated to be used during the construction and decommissioning phases.

Based on the swept path analysis of the Donald Ross Drive site access, it is recommended that the site access be upgraded within the initial stages of construction to cater for the swept paths of a B-Double heavy vehicles. This will be addressed during the detailed design phase of the project and included in the construction traffic management plan.

During the operational phase, the traffic impact due to the project is deemed to be insignificant, as the additional levels will be less than 5% of existing daily traffic levels.

Traffic generated during the decommissioning phase is not expected to impact significantly on the surrounding key road network.

The proposed development is not expected to create an overall significant adverse impact on the performance on the development related intersections and road links involving the Sturt Highway, Kidman Way and Donald Ross Drive.

Appendix A

Existing (2017) Traffic Volumes

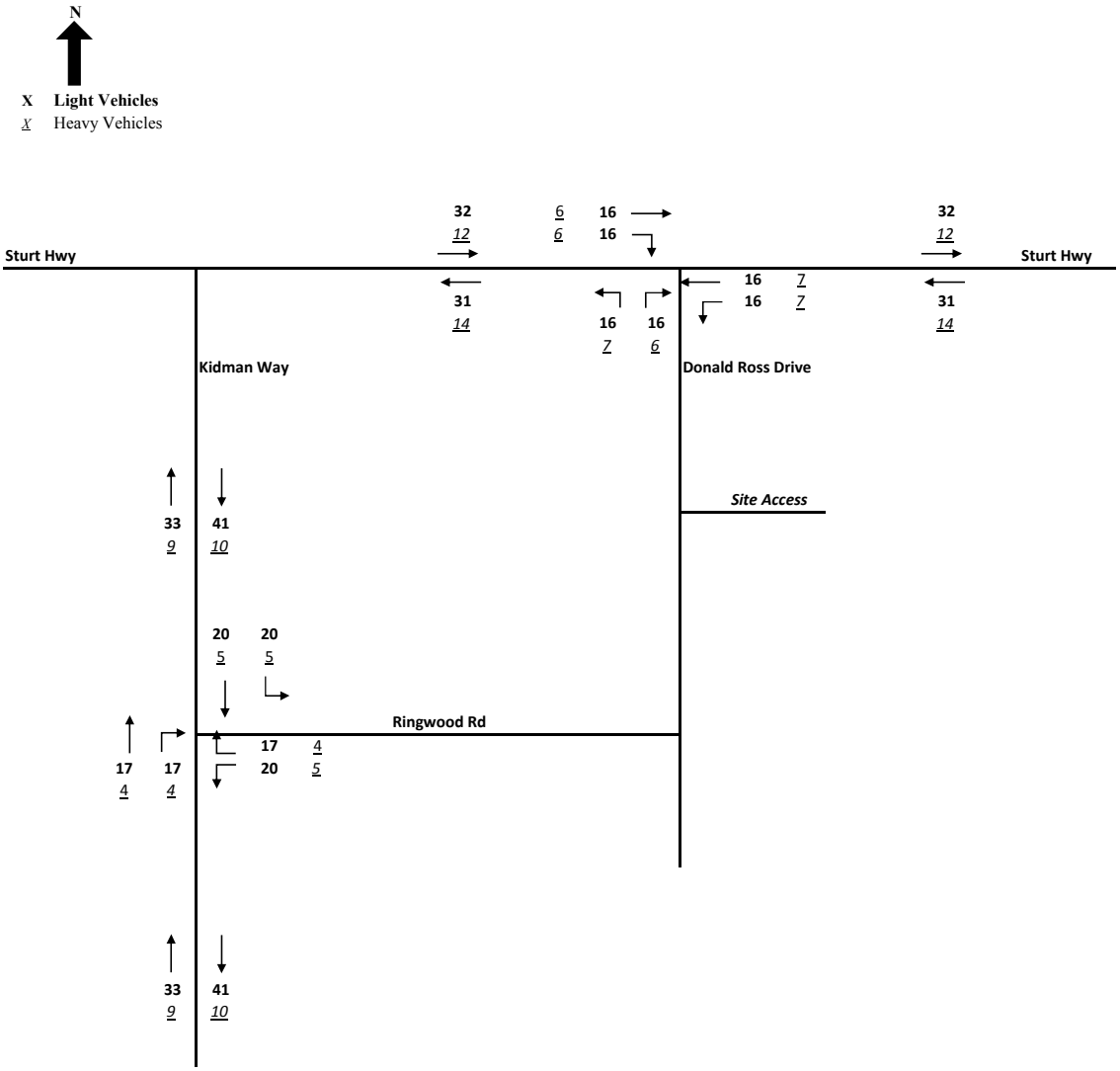
Kidman Way Traffic Volumes

year	date	cardinal_directi	hour_00	hour_01	hour_02	hour_03	hour_04	hour_05	hour_06	hour_07	hour_08	hour_09	hour_10	hour_11	hour_12	hour_13	hour_14	hour_15	hour_16	hour_17	hour_18	hour_19	hour_20	hour_21	hour_22	hour_23	public_hol	school_holiday
2006	Northbour	Light Vehicles	2	2	2	1	2	2	7	13	24	29	28	27	27	27	33	35	42	33	23	13	9	7	5	4	0	0
2006	Northbour	Heavy Vehicles	2	2	2	2	2	3	4	7	7	9	8	8	8	8	8	8	9	7	6	5	4	4	4	3	3	0	0
2006	Northbour	All Vehicles	4	3	2	2	2	4	10	19	31	38	35	35	35	35	41	43	49	38	28	17	12	10	8	6	0	0
2006	Southbour	Light Vehicles	2	2	1	1	3	9	21	31	30	28	25	24	24	27	27	29	28	27	19	12	8	7	5	4	0	0
2006	Southbour	Heavy Vehicles	2	2	2	2	2	2	4	6	9	9	8	9	9	10	9	8	8	7	6	5	4	3	3	2	0	0
2006	Southbour	All Vehicles	3	2	1	2	4	11	24	37	38	37	33	33	32	36	36	36	36	33	25	17	11	10	7	5	0	0
2007	Northbour	Light Vehicles	3	2	2	2	1	3	7	14	25	30	27	28	27	26	33	34	40	30	24	15	10	7	6	4	0	0
2007	Northbour	Heavy Vehicles	3	2	2	2	3	3	4	7	7	9	8	9	8	9	8	9	8	6	6	5	4	4	4	3	0	0
2007	Northbour	All Vehicles	5	3	2	2	3	5	11	20	32	38	36	36	34	35	42	43	48	36	29	20	15	11	9	6	0	0
2007	Southbour	Light Vehicles	2	2	1	1	3	10	24	30	30	27	27	23	23	27	27	28	27	29	20	12	8	7	5	3	0	0
2007	Southbour	Heavy Vehicles	2	2	2	2	2	3	5	7	10	10	10	9	9	10	9	8	8	8	7	5	4	4	3	3	0	0
2007	Southbour	All Vehicles	3	3	2	2	5	12	28	37	40	37	37	32	32	38	37	36	35	36	27	17	12	10	8	5	0	0
2010	Northbour	Light Vehicles	2	2	2	1	2	2	9	15	28	31	30	28	30	28	33	36	47	34	23	13	9	7	5	4	0	0
2010	Northbour	Heavy Vehicles	3	2	2	1	1	2	4	7	7	8	8	8	8	8	9	9	8	6	6	5	4	4	3	3	0	0
2010	Northbour	All Vehicles	4	2	1	2	2	3	12	22	35	39	37	36	37	36	41	45	55	39	28	17	13	10	7	6	0	0
2010	Southbour	Light Vehicles	2	2	1	3	4	7	23	35	31	28	27	25	26	28	31	32	32	30	22	12	8	7	5	3	0	0
2010	Southbour	Heavy Vehicles	2	2	2	2	1	2	4	6	9	9	9	8	8	8	7	7	8	7	5	5	4	3	2	2	0	0
2010	Southbour	All Vehicles	3	2	1	4	4	8	27	41	40	37	36	33	33	36	38	39	40	37	27	17	11	10	7	4	0	0
2011	Northbour	All Vehicles	4	2	2	1	2	4	9	16	27	31	34	33	34	31	37	42	52	34	29	18	13	11	8	5	0	1
2011	Southbour	All Vehicles	3	2	2	4	7	8	25	37	31	31	34	32	32	37	35	37	38	39	31	19	14	11	9	5	0	1

*NB no data provided for 2011 for light and heavy vehicles

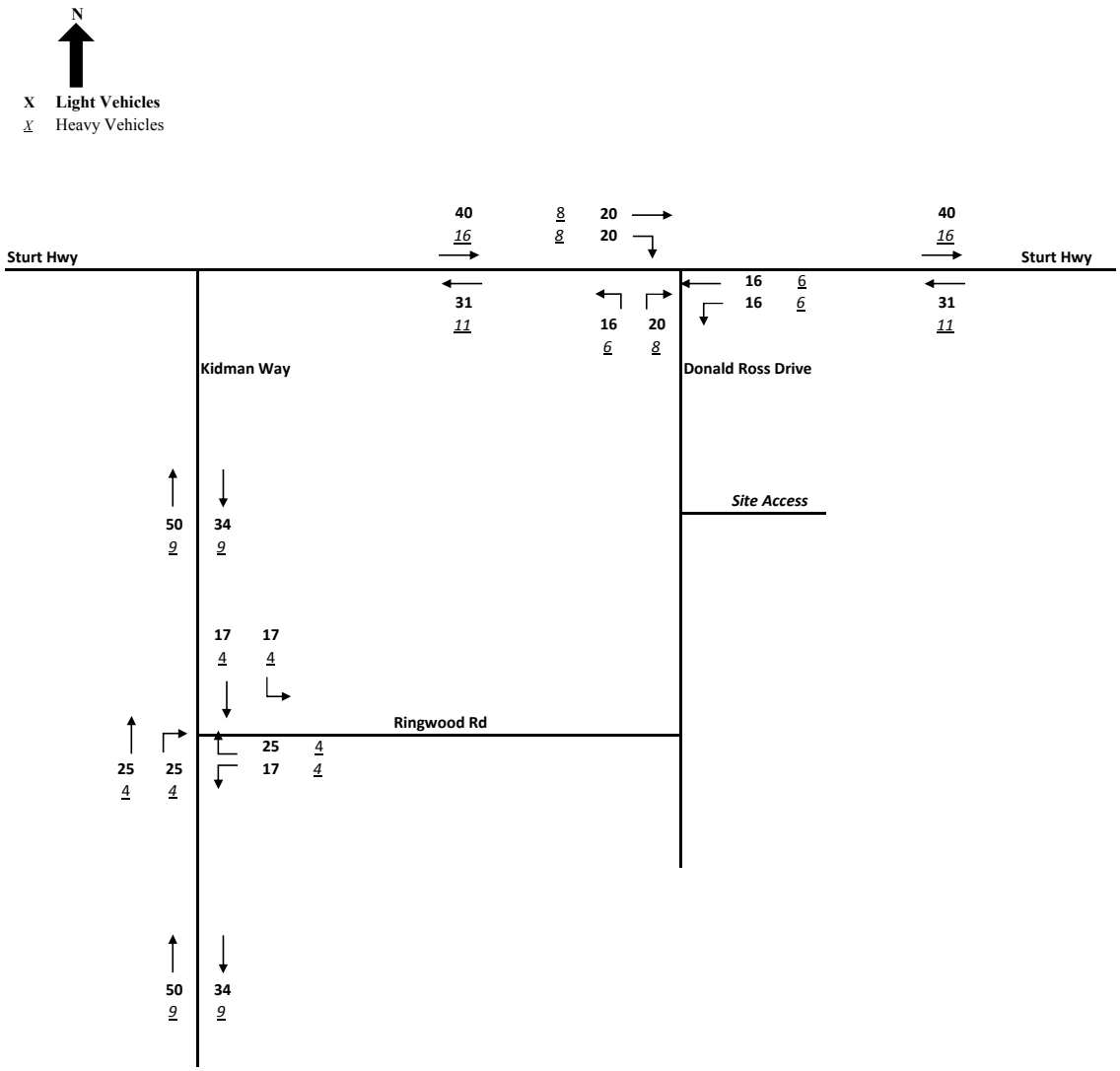
Sturt Hwy Traffic Volumes

year	cardinal_d	classificati	hour_00	hour_01	hour_02	hour_03	hour_04	hour_05	hour_06	hour_07	hour_08	hour_09	hour_10	hour_11	hour_12	hour_13	hour_14	hour_15	hour_16	hour_17	hour_18	hour_19	hour_20	hour_21	hour_22	hour_23	daily_total
2015	Westboun	Light Vehic	2	2	2	2	2	4	10	17	26	29	28	29	29	28	30	31	28	24	17	10	7	5	4	3	369
2015	Westboun	All Vehicle	6	6	6	8	10	12	21	29	39	42	41	40	40	38	41	42	39	34	26	19	15	12	10	7	583
2015	Westboun	Heavy Veh	5	5	6	8	8	9	11	12	13	13	13	13	12	11	12	12	12	11	10	9	8	7	7	5	232
2016	Westboun	Heavy Veh	5	6	7	9	8	10	13	14	15	14	14	14	12	12	13	12	11	11	10	10	8	8	7	6	249
2016	Westboun	Light Vehic	3	2	2	2	3	7	17	19	27	29	29	30	29	28	31	31	31	25	18	11	8	6	4	3	395
2016	Westboun	All Vehicle	6	6	7	9	9	16	29	33	41	43	42	43	40	40	43	43	41	36	27	20	15	13	11	8	621
2017	Eastbound	Heavy Veh	5	4	4	5	6	6	7	9	10	11	12	12	13	15	17	15	16	15	12	12	13	10	8	6	243
2017	Eastbound	Light Vehic	3	2	3	2	2	4	7	15	26	32	32	30	30	32	35	38	40	30	20	13	8	6	4	3	417
2017	Eastbound	All Vehicle	6	5	5	5	7	9	12	23	35	42	44	42	43	47	51	53	55	44	32	24	20	15	11	8	638
2017	Westboun	All Vehicle	6	6	6	9	10	18	31	33	43	42	44	45	44	42	45	44	42	39	28	22	16	13	10	8	646
2017	Westboun	Heavy Veh	5	5	6	8	8	10	12	14	15	14	14	14	13	13	13	12	11	11	10	10	9	8	6	6	247
2017	Westboun	Light Vehic	3	2	2	2	3	9	20	20	28	28	31	31	31	30	32	33	31	28	19	13	8	6	5	4	419



254766-00 | Darlington Point Solar Farm EIS

2017 AM Peak Existing Traffic Volumes



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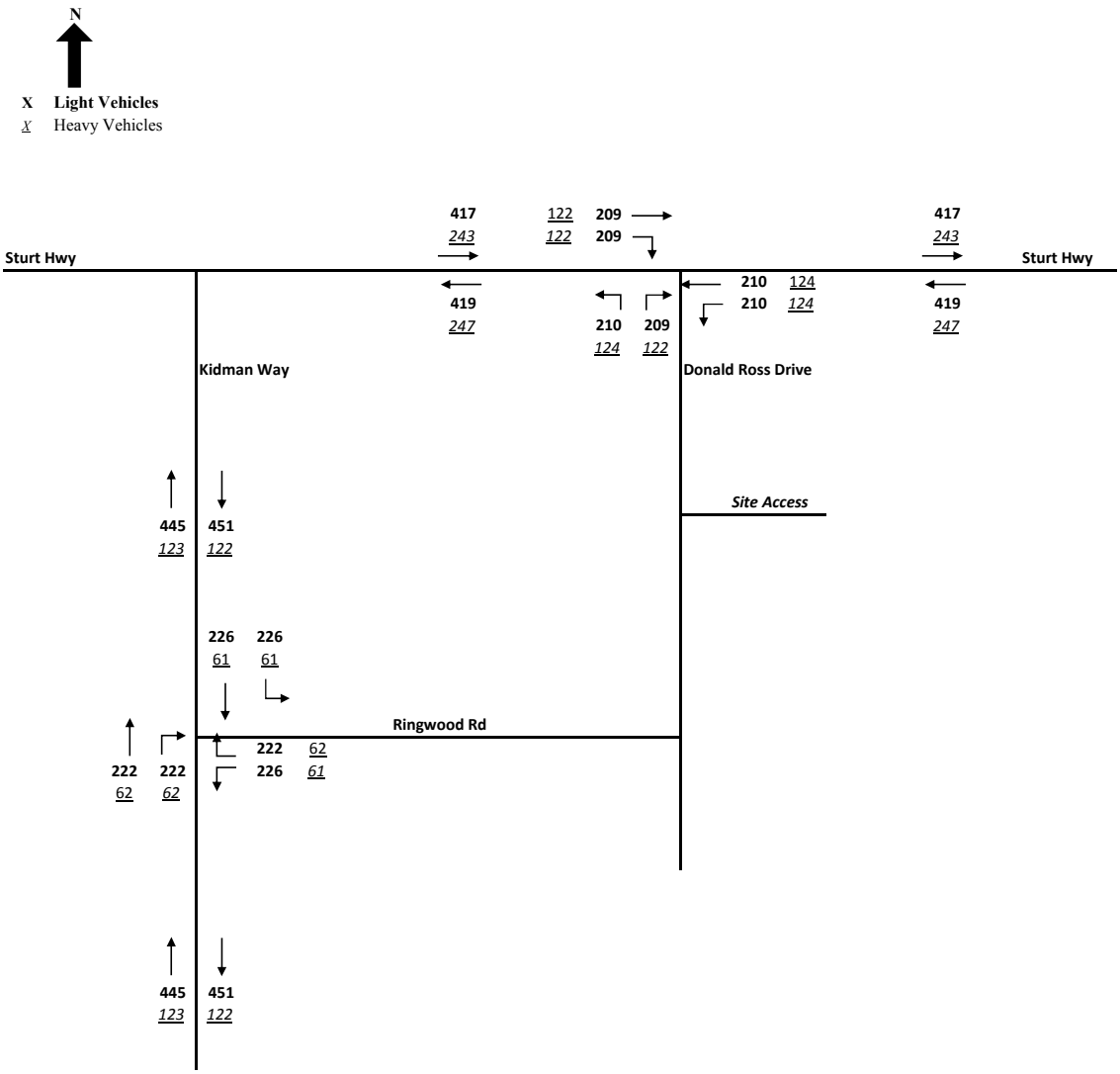
2017 PM Peak Existing Traffic Volumes



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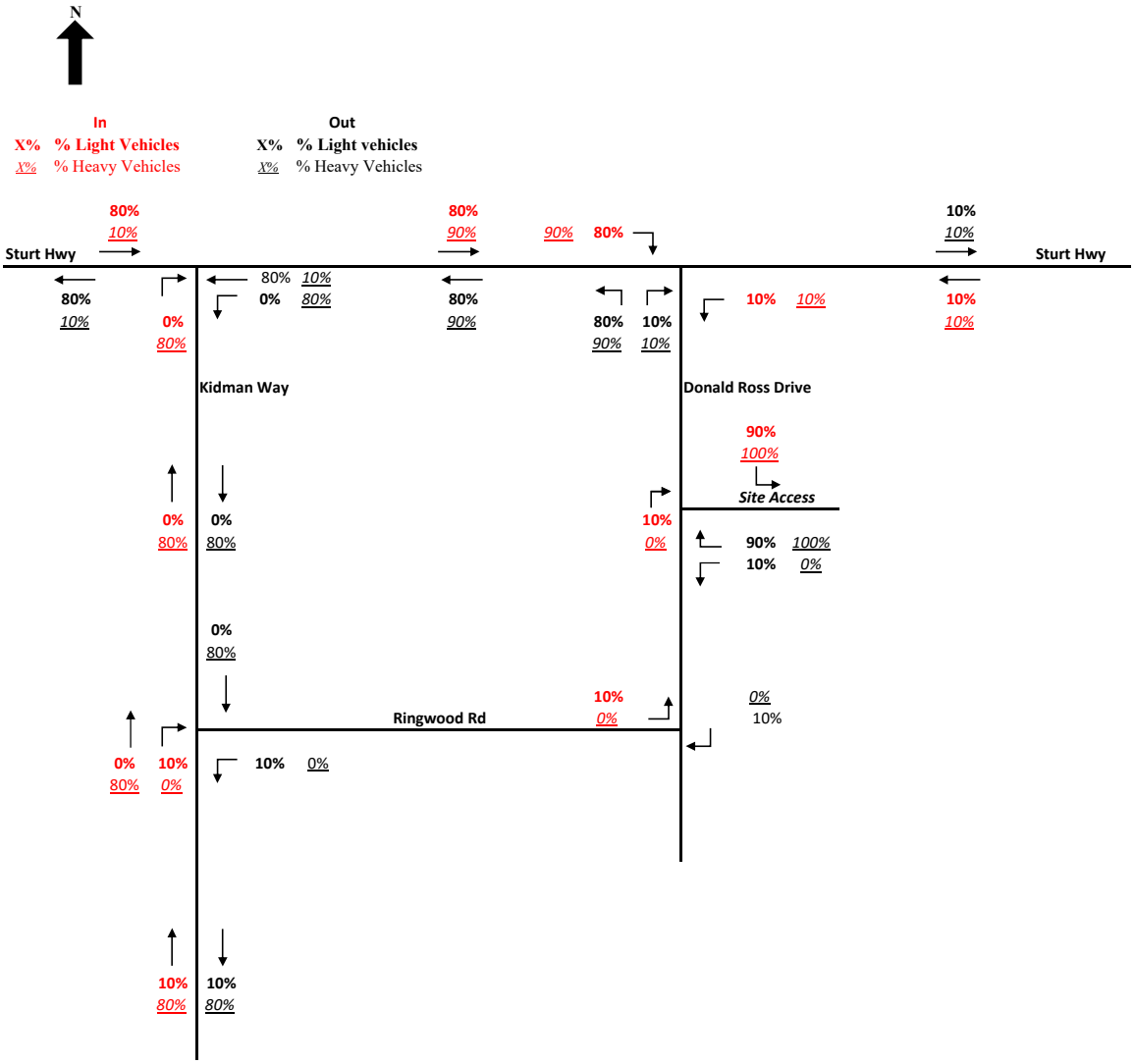
2017 Daily Existing Traffic Volumes

Appendix B

Development Traffic Volumes (Construction)



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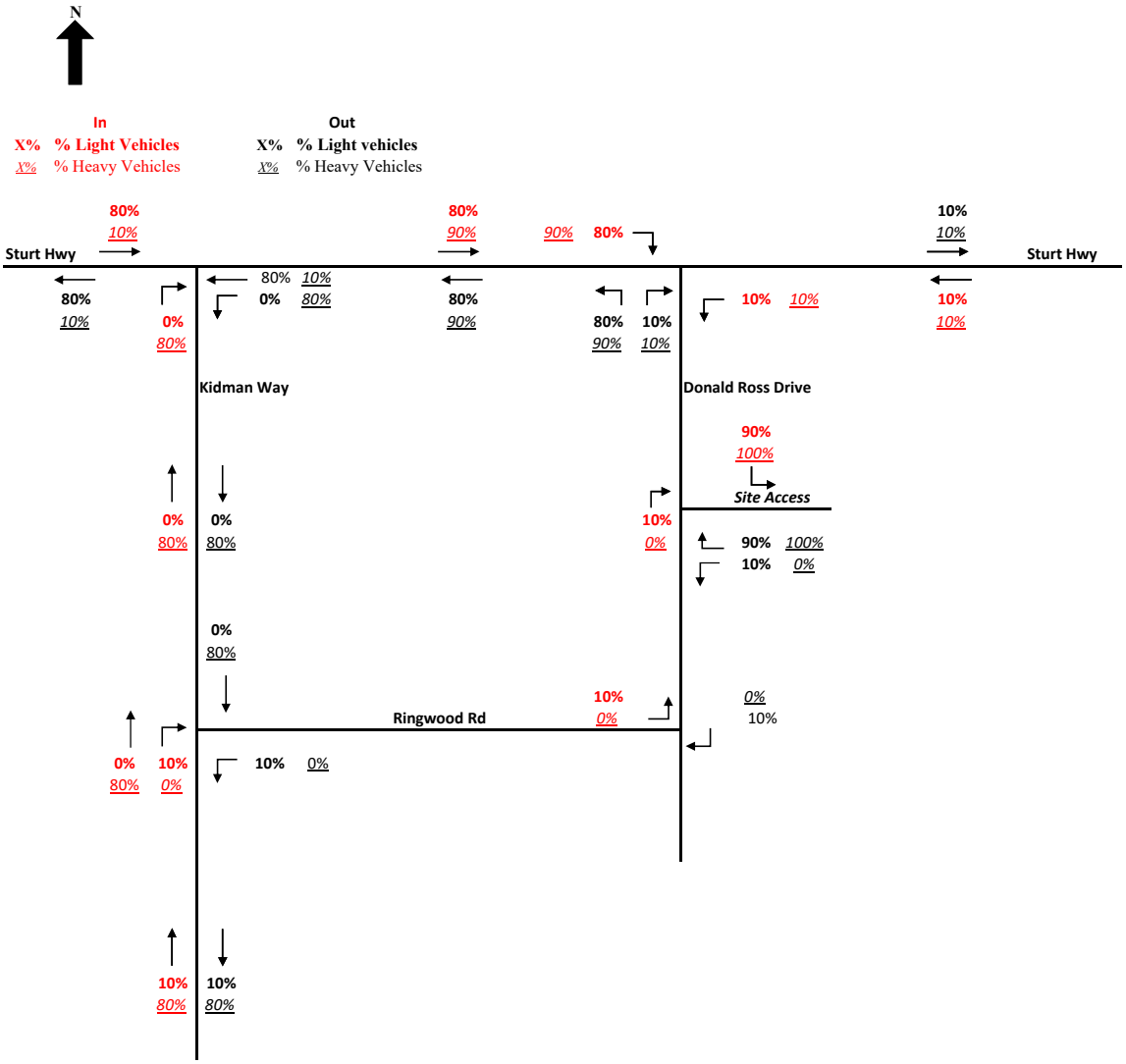
Construction Traffic Distribution (%) - AM Peak



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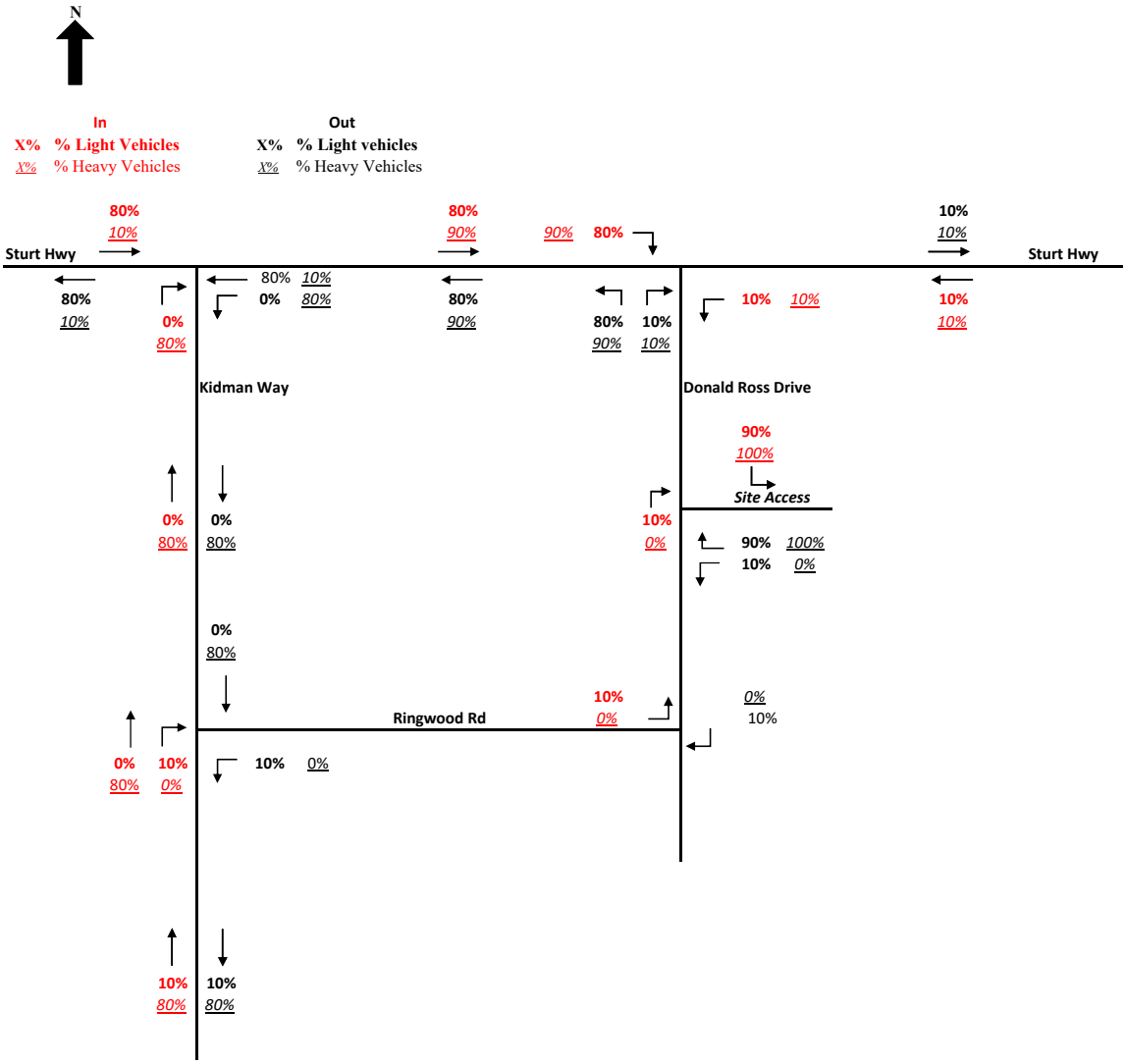
Construction Traffic Distribution (%) - PM Peak



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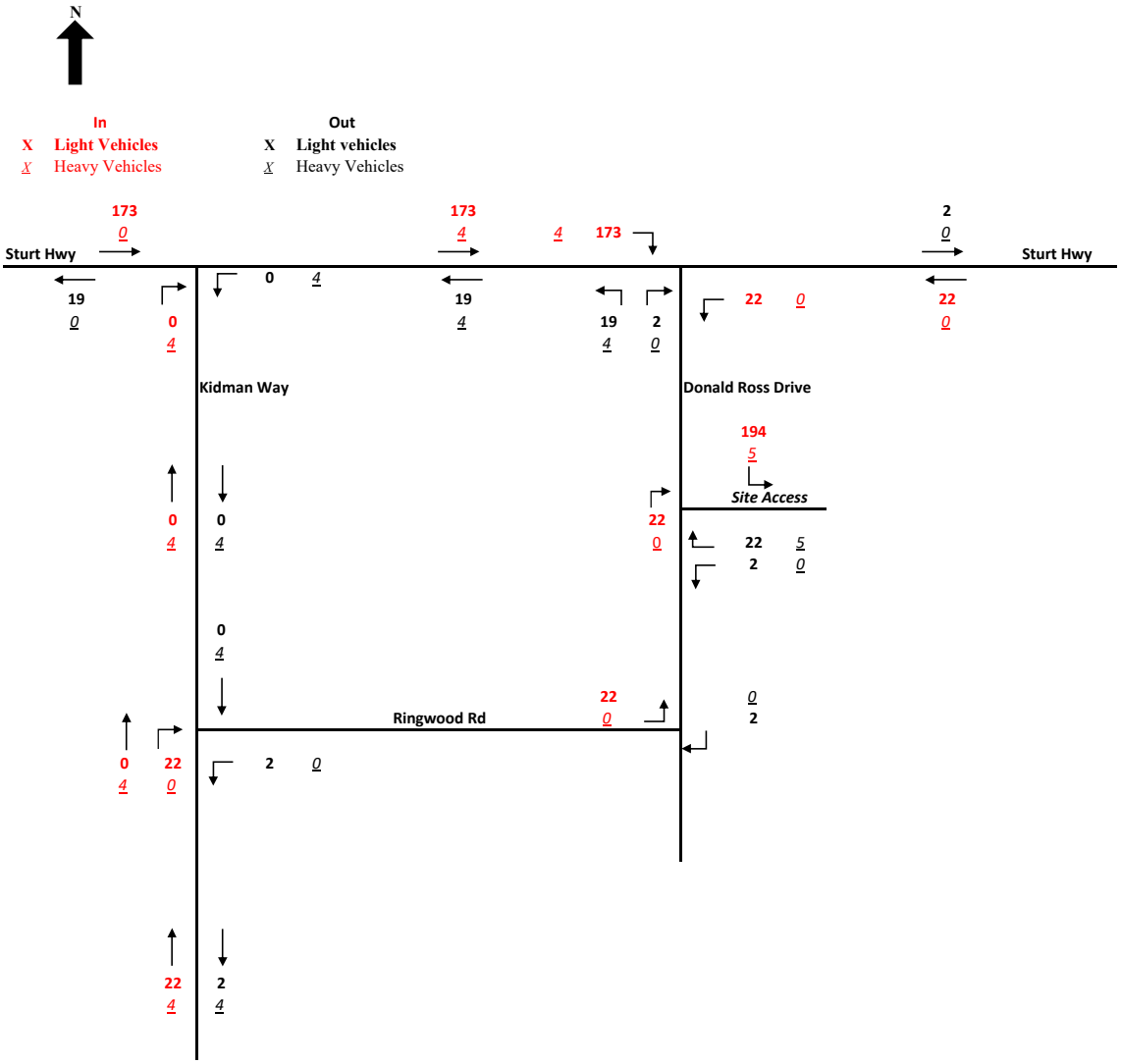
Construction Traffic Distribution (%) - Daily



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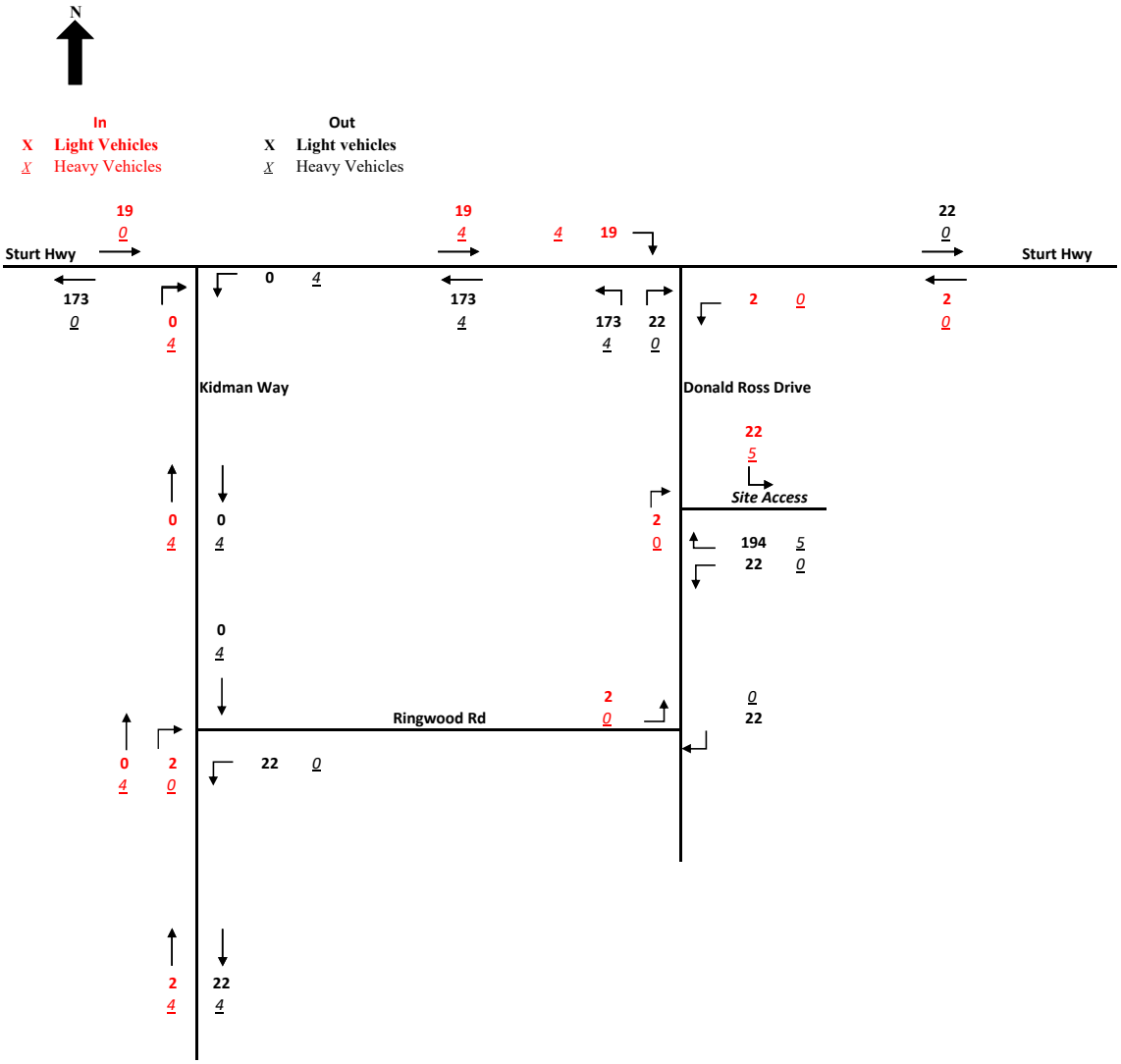
Construction Traffic Volumes (vph) - AM Peak



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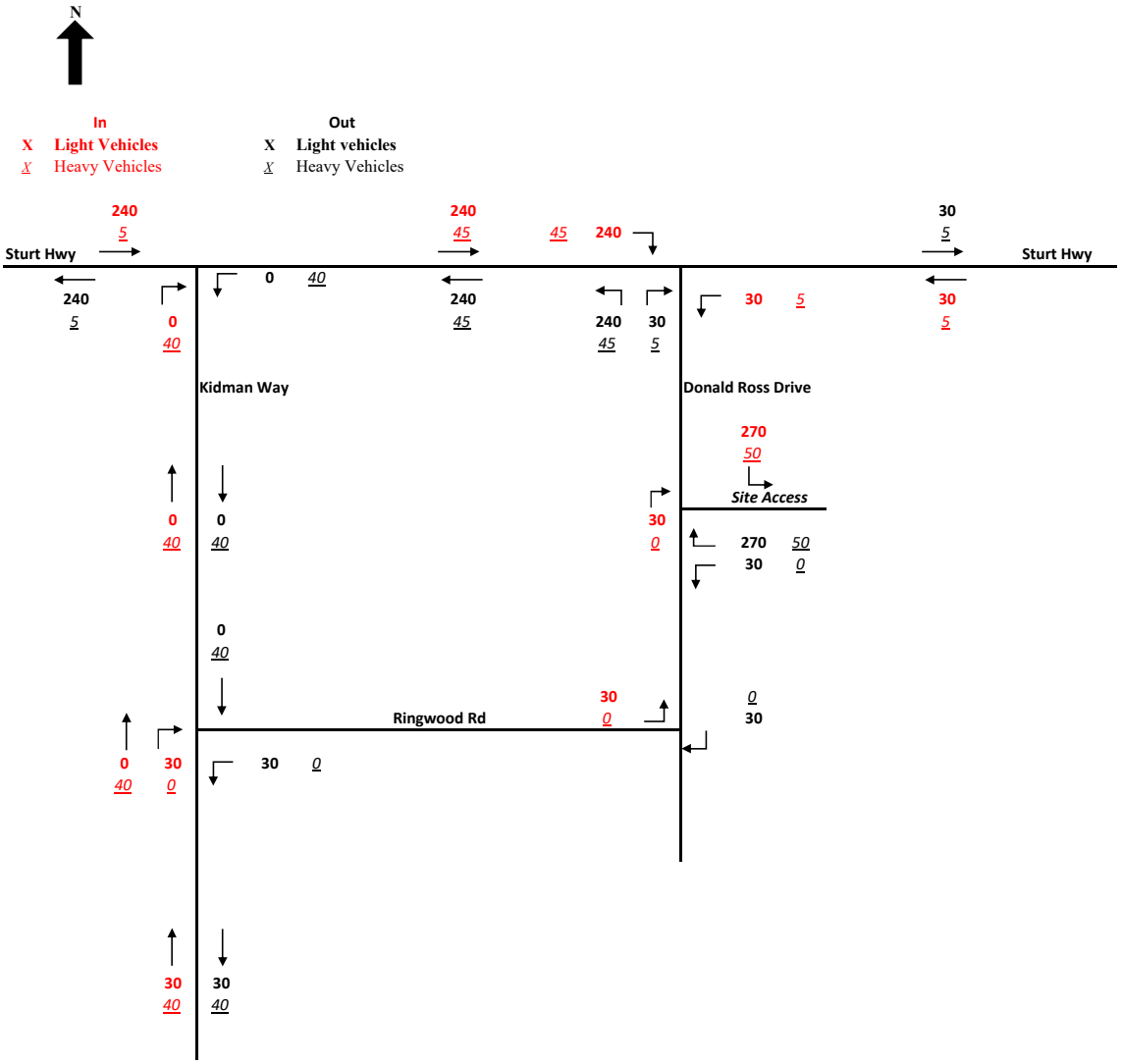
Construction Traffic Volumes (vph) - PM Peak



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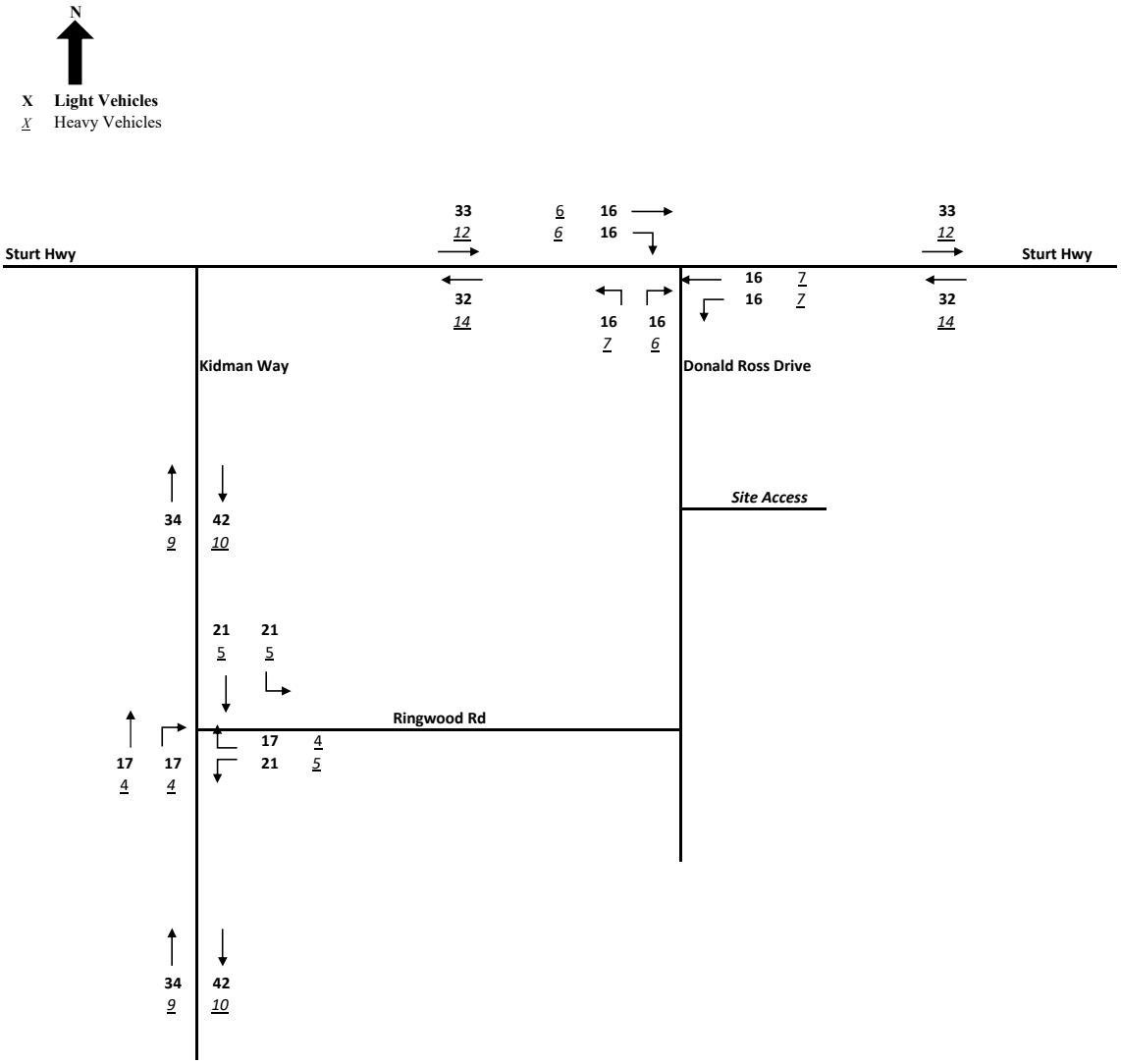
Construction Traffic Volumes (vpd) - Daily

Appendix C

2019 Traffic Volumes (Pre and Post - Construction)



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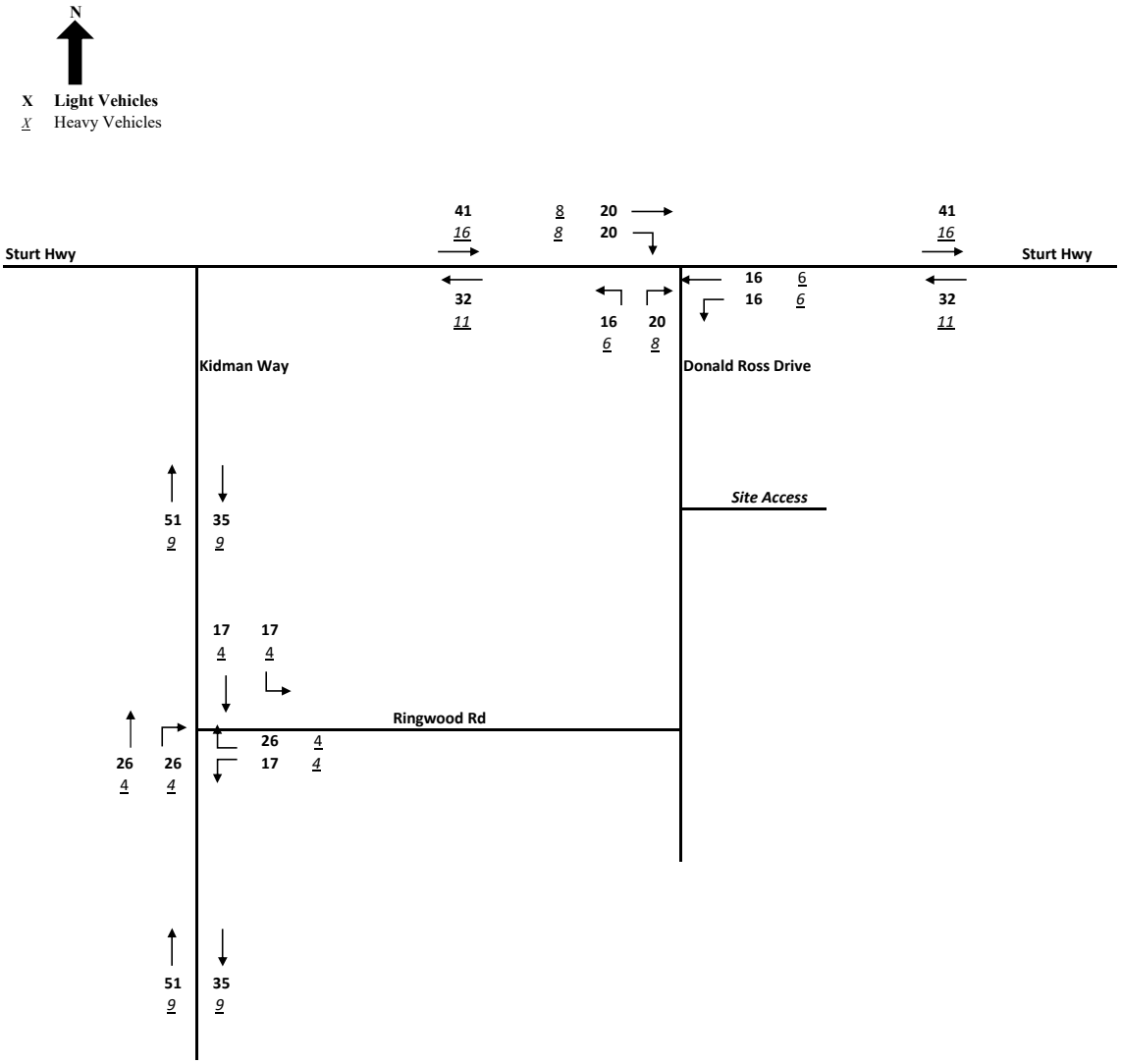
2019 AM Peak Pre Development Traffic Volumes



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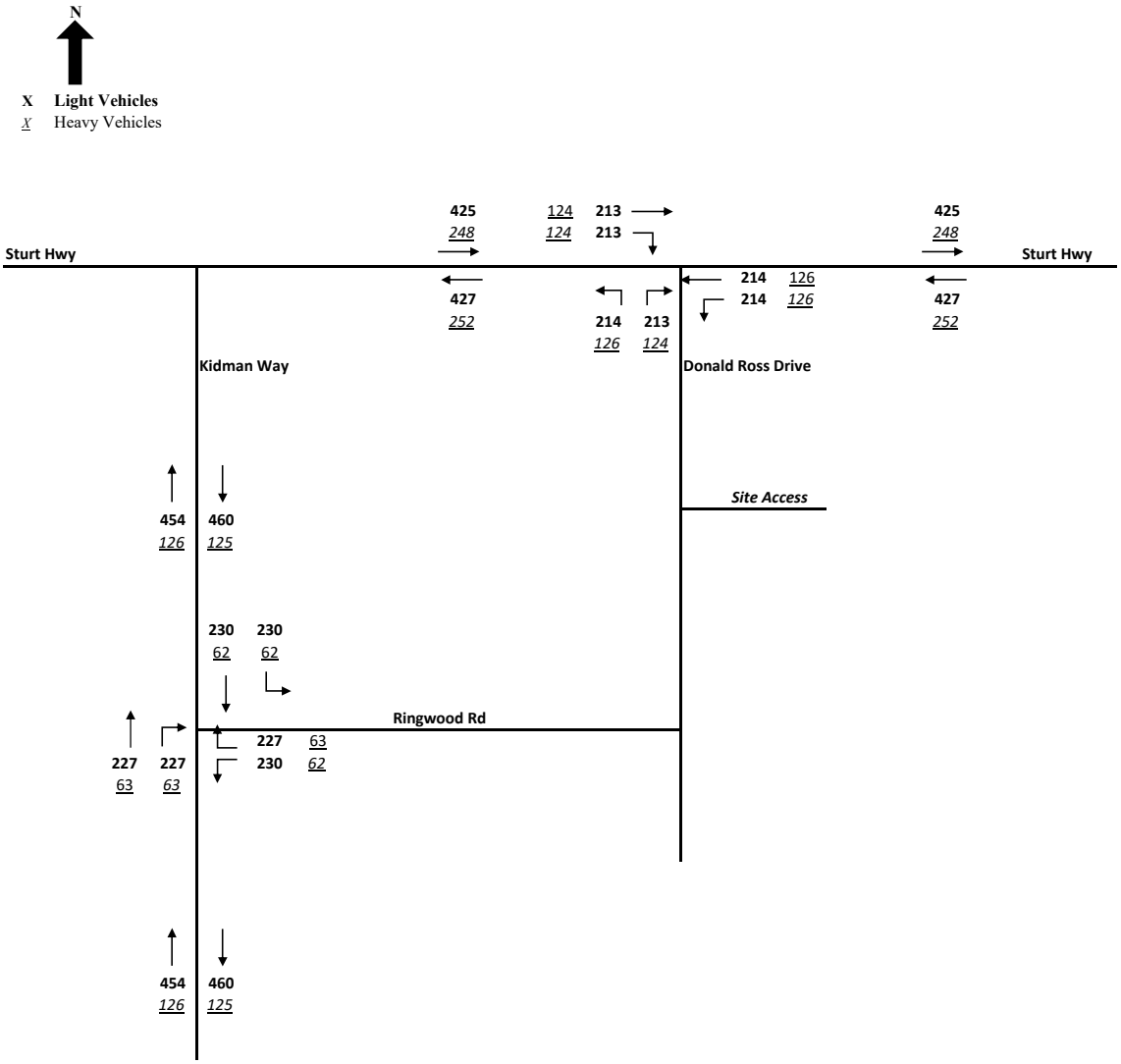
2019 PM Peak Pre Development Traffic Volumes



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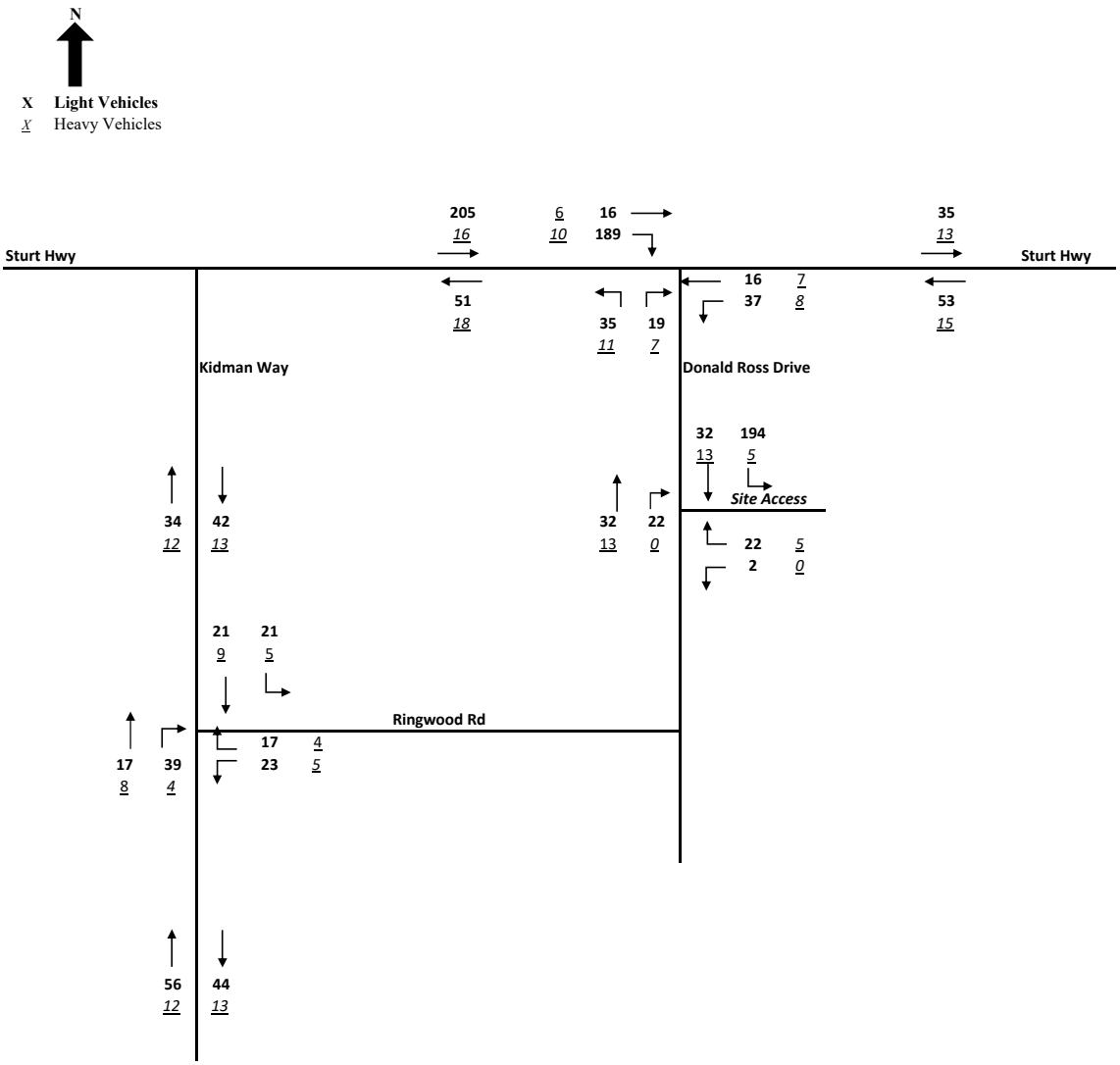
2019 Daily Pre Development Traffic Volumes



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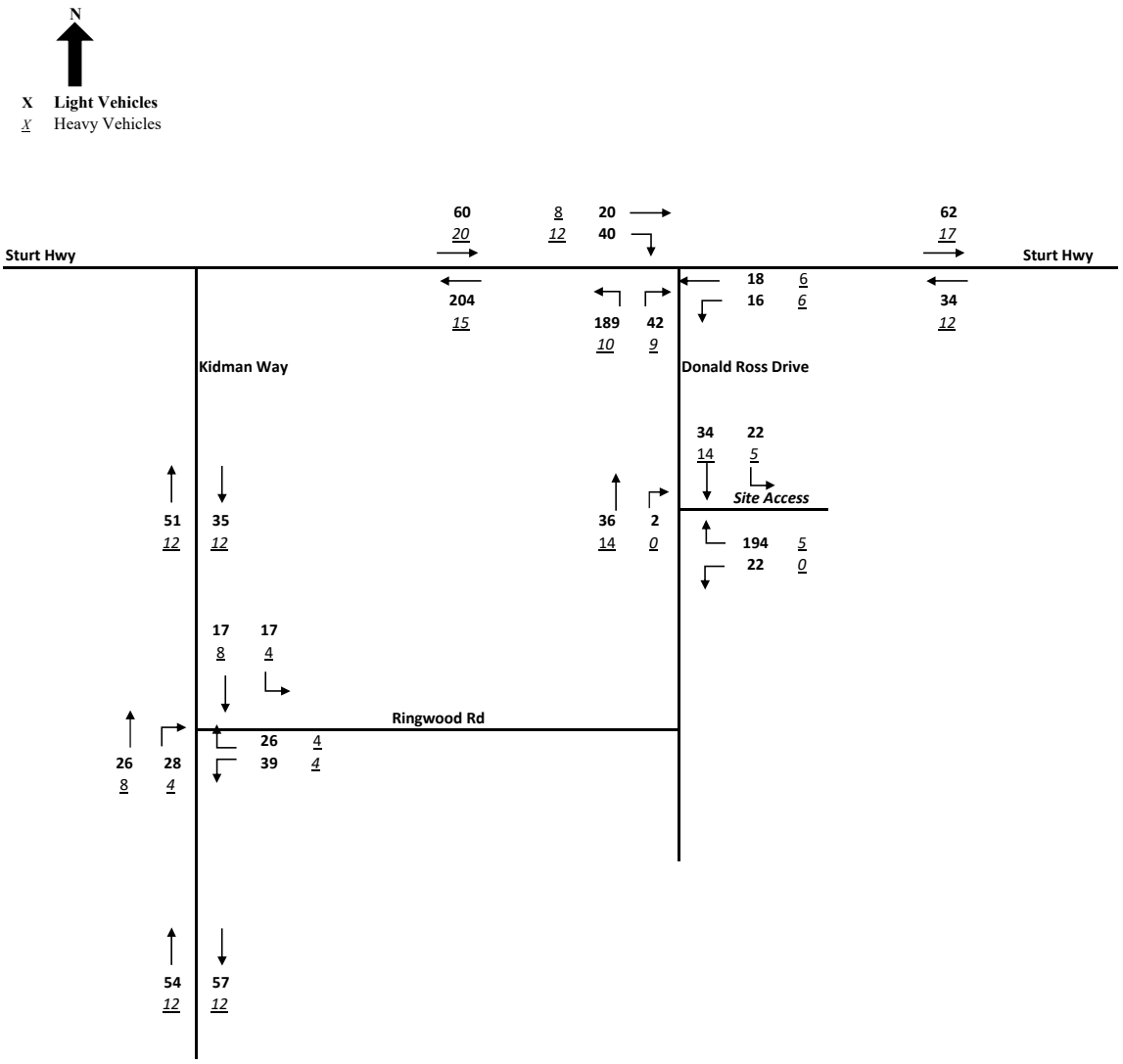
2019 AM Peak With Construction Traffic Volumes



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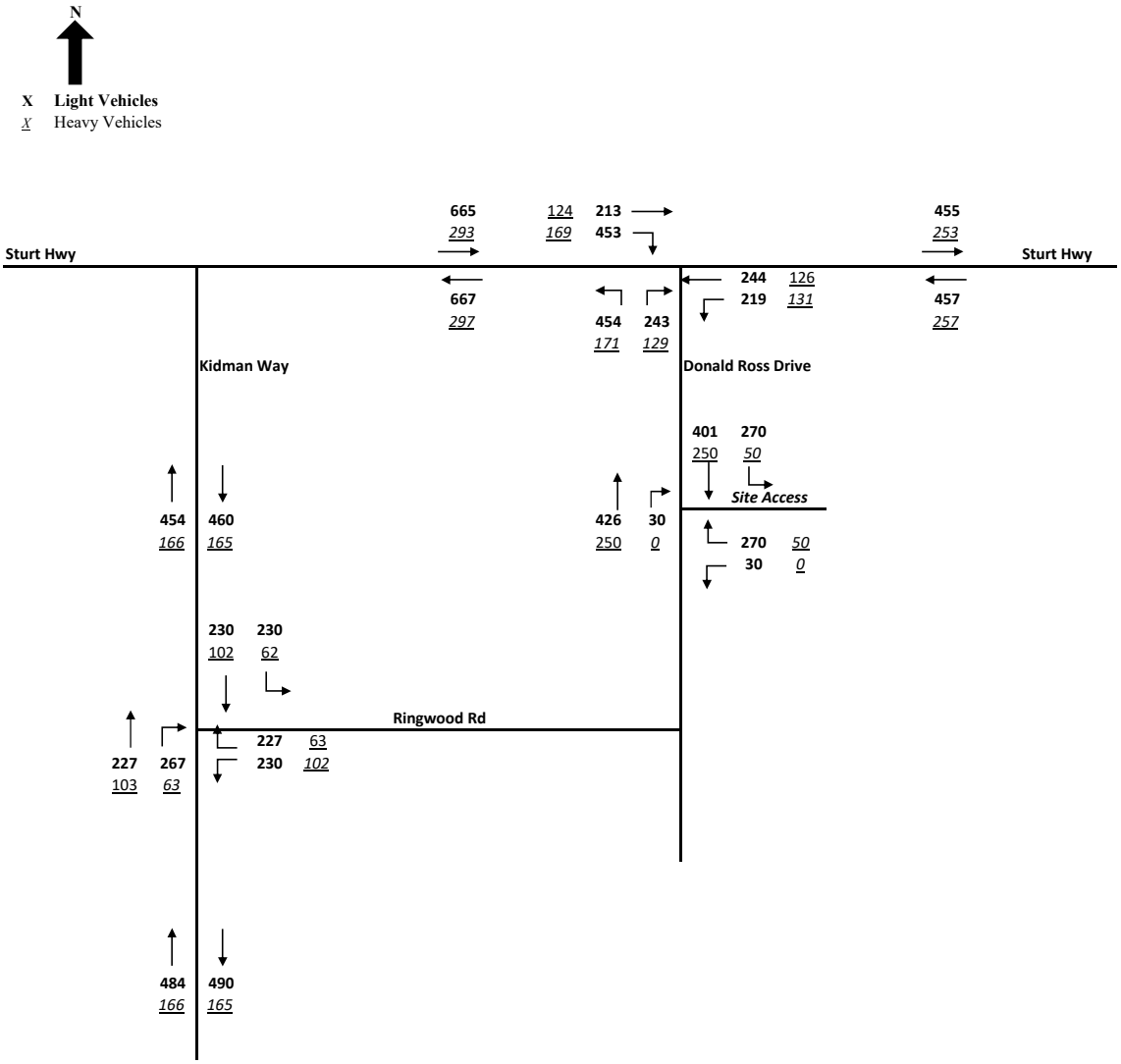
2019 PM Peak With Construction Traffic Volumes



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2019 Daily With Construction Traffic Volumes

Appendix D

Level of Service Assessment

HCM 2016

										1	m to	3.28084	ft
										1	km to	0.621737	miles
	Sturt Highway		Class I Highway							1	km/h to	0.621371	mph
	Base capacity		1700	pc/h in one direction									
			3200	pc/h two-way									
			Sturt Hwy (Donald Ross Drive) WB						Kidman Way (Ringwood Drive) NB				
	Lane width		3.3	m	10.8	ft			3	m	9.8	ft	*sourced from Google Earth
	Shoulder width		1.5	m	4.9	ft			0	m	0.0	ft	*sourced from Google Earth
	Segment Length		13.2	km	8.2	mi			6	km	3.7	mi	*sourced from Google Earth
	Access point density		15	over entire length					2	over entire length			*sourced from Google Earth
			1.8	access points / mi					0.5	access points / mi			
	Terrain Type		Level						Level				*sourced from Google Earth
	Percent no-passing zone		13.2	km passing					6	km passing			*sourced from Google Earth
			0%	no passing					0%	no passing zones			
	Base free flow speed		110	km/h	78.4	mi/h			100	km/h	72.1	mi/h	*sourced from Google Earth = posted speed limit + 10mi/h
	Passing lane length		0	km	0.0	mi			0	km	0.0	mi	*sourced from Google Earth
	Hourly Demand Volume												
2018	AM Peak - Base		45	EB	46	WB	49%		43	NB	51	SB	45% *based on 2018 Pre tab
Total	AM Peak - With Dev		222	EB	69	WB	76%		68	NB	57	SB	54% *based on 2018 Post (Abs. Construction)
Vehs	PM Peak - Base		57	EB	43	WB	57%		60	NB	44	SB	58% *based on 2018 Pre tab
	PM Peak - With Dev		80	EB	220	WB	27%		66	NB	69	SB	49% *based on 2018 Post (Abs. Construction)
	PT - Base		0.31						0.21				* max percentage of HCVs by AM and PM peaks
	PT = With Dev		0.27						0.23				
	Peak Hour Factor		0.88						0.88				*as per HCM default
	Analysis Period Length		60	min					60	min			
	fLS		2.4						6.4				Exhibit 15-7 adjustment factor for lane and shoulder width
	fA		0.5						0.1				Exhibit 15-8 adjustment factor for access point density (interpolated to nearest 0.1)
	FFS		121.5	km/h	75.5	mi/h			105.6	km/h	65.6	mi/h	
Step 3	$f_{g,ATS}$		1	EB	1	WB			1	NB	1	SB	Exhibit 15-9 grade adjustment factor
	PR		0						0				Assumed 0 RVs
	ET	AM Peak - Base	1.9	EB	1.9	WB			1.9	NB	1.9	SB	Exhibit 15-11
		AM Peak - With Dev	1.5	EB	1.9	WB			1.9	NB	1.9	SB	Exhibit 15-11
		PM Peak - Base	1.9	EB	1.9	WB			1.9	NB	1.9	SB	Exhibit 15-11
		PM Peak - With Dev	1.9	EB	1.5	WB			1.9	NB	1.9	SB	Exhibit 15-11
	ER		1						1				Exhibit 15-11
	$f_{HV,ATS}$	AM Peak - Base	0.78	EB	0.78	WB			0.84	NB	0.84	SB	Equation 15-4
		AM Peak - With Dev	0.88	EB	0.81	WB			0.84	NB	0.84	SB	Equation 15-4
		PM Peak - Base	0.78	EB	0.78	WB			0.84	NB	0.84	SB	Equation 15-4
		PM Peak - With Dev	0.81	EB	0.88	WB			0.84	NB	0.84	SB	Equation 15-4
	$v_{i,ATS}$	AM Peak - Base	65	EB	67	WB			57	NB	69	SB	Equation 15-3
		AM Peak - With Dev	285	EB	97	WB			91	NB	77	SB	Equation 15-3
		PM Peak - Base	83	EB	62	WB			81	NB	59	SB	Equation 15-3
		PM Peak - With Dev	113	EB	283	WB			89	NB	93	SB	Equation 15-3
Step 4	$f_{np,ATS}$	AM Peak - Base	1.1	EB	1.1	WB			1.1	NB	1.1	SB	Exhibit 15-15
	*opposing	AM Peak - With Dev	1.1	EB	1.9	WB			1.1	NB	1.1	SB	Exhibit 15-15
		PM Peak - Base	1.1	EB	1.1	WB			1.1	NB	1.1	SB	Exhibit 15-15
		PM Peak - With Dev	2.0	EB	1.2	WB			1.1	NB	1.1	SB	Exhibit 15-15
	ATS_d	AM Peak - Base	73.4	EB	73.4	WB			63.5	NB	63.5	SB	Equation 15-6
		AM Peak - With Dev	71.4	EB	70.6	WB			63.2	NB	63.2	SB	Equation 15-6
		PM Peak - Base	73.3	EB	73.3	WB			63.4	NB	63.4	SB	Equation 15-6
		PM Peak - With Dev	70.5	EB	71.2	WB			63.1	NB	63.1	SB	Equation 15-6

Step 5	$f_{g,PTSF}$		1	EB	1	WB	1	NB	1	SB	Exhibit 15-16 grade adjustment factor		
	ET	AM Peak - Base	1.1	EB	1.1	WB	1.1	NB	1.1	SB	Exhibit 15-18		
		AM Peak - With Dev	1.1	EB	1.1	WB	1.1	NB	1.1	SB	Exhibit 15-18		
		PM Peak - Base	1.1	EB	1.1	WB	1.1	NB	1.1	SB	Exhibit 15-18		
		PM Peak - With Dev	1.1	EB	1.1	WB	1.1	NB	1.1	SB	Exhibit 15-18		
	ER		1				1				Exhibit 15-18		
	$f_{HV,PTSF}$	AM Peak - Base	0.97	EB	0.97	WB	0.98	NB	0.98	SB	Equation 15-8		
		AM Peak - With Dev	0.97	EB	0.97	WB	0.98	NB	0.98	SB	Equation 15-8		
		PM Peak - Base	0.97	EB	0.97	WB	0.98	NB	0.98	SB	Equation 15-8		
		PM Peak - With Dev	0.97	EB	0.97	WB	0.98	NB	0.98	SB	Equation 15-8		
	$v_{i,PTSF}$	AM Peak - Base	53	EB	54	WB	49	NB	60	SB	Equation 15-7		
		AM Peak - With Dev	259	EB	81	WB	79	NB	67	SB	Equation 15-7		
		PM Peak - Base	67	EB	50	WB	70	NB	51	SB	Equation 15-7		
		PM Peak - With Dev	94	EB	256	WB	77	NB	80	SB	Equation 15-7		
Step 6	$BPTFS_d$	AM Peak - Base	6.4	EB	6.5	WB	6.0	NB	7.2	SB	Equation 15-10		
		AM Peak - With Dev	27.5	EB	9.5	WB	9.3	NB	8.0	SB	Equation 15-10		
		PM Peak - Base	8.0	EB	6.1	WB	8.3	NB	6.2	SB	Equation 15-10		
		PM Peak - With Dev	11.0	EB	27.2	WB	9.1	NB	9.5	SB	Equation 15-10		
												Sturt Hwy	Kidman Way Split
	$f_{np,PTSF}$	AM Peak - Base	9.0	EB	9.0	WB	9.0	NB	9.0	SB	Exhibit 15-21	50/50	50/50
		AM Peak - With Dev	7.3	EB	7.3	WB	9.0	NB	9.0	SB	Exhibit 15-21	80/20	50/50
		PM Peak - Base	11.0	EB	11.0	WB	11.0	NB	11.0	SB	Exhibit 15-21	60/40	60/40
		PM Peak - With Dev	10.4	EB	10.4	WB	9.0	NB	9.0	SB	Exhibit 15-21	70/30	50/50
	$PTSF_d$	AM Peak - Base	11	EB	11	WB	10	NB	12	SB	Equation 15-9		
		AM Peak - With Dev	33	EB	11	WB	14	NB	12	SB	Equation 15-9		
		PM Peak - Base	14	EB	11	WB	15	NB	11	SB	Equation 15-9		
		PM Peak - With Dev	14	EB	35	WB	14	NB	14	SB	Equation 15-9		
													ATS PTSF
	$LOS_{,ATS}$	AM Peak - Base	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3	A	55 35
		AM Peak - With Dev	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3	B	50 50
		PM Peak - Base	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3	C	45 65
		PM Peak - With Dev	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3	D	40 80
												E	0 100
	$LOS_{,PTSF}$	AM Peak - Base	A	EB	A	WB	A	NB	A	SB		F	demand exceeds capacity
		AM Peak - With Dev	A	EB	A	WB	A	NB	A	SB			
		PM Peak - Base	A	EB	A	WB	A	NB	A	SB			
		PM Peak - With Dev	A	EB	A	WB	A	NB	A	SB			
Capacity													
	PHF		1								Page 15-27		
	$c_{d,ATS}$	AM Peak - Base	1328	EB	1328	WB	1435	NB	1435	SB	Equation 15-12		
		AM Peak - With Dev	1501	EB	1372	WB	1435	NB	1435	SB	Equation 15-12		
		PM Peak - Base	1328	EB	1328	WB	1435	NB	1435	SB	Equation 15-12		
		PM Peak - With Dev	1372	EB	1501	WB	1435	NB	1435	SB	Equation 15-12		
	$c_{d,PTSF}$	AM Peak - Base	1649	EB	1649	WB	1666	NB	1666	SB	Equation 15-13		
		AM Peak - With Dev	1656	EB	1656	WB	1666	NB	1666	SB	Equation 15-13		
		PM Peak - Base	1649	EB	1649	WB	1666	NB	1666	SB	Equation 15-13		
		PM Peak - With Dev	1656	EB	1656	WB	1666	NB	1666	SB	Equation 15-13		
	Capacity (veph/h)		1328	EB	1328	WB	1435	NB	1435	SB			

Sturt Hwy (Donald Ross Drive)	2656	vehicles per hour (2-way)	LOS	A	Pre	v/c	5%	Pre	Equation 15-18
				B	Post		17%	Post	Equation 15-18
Kidman Way (Ringwood Drive)	2870	vehicles per hour (2-way)	LOS	A	Pre		5%	Pre	Equation 15-18
				A	Post		5%	Post	Equation 15-18

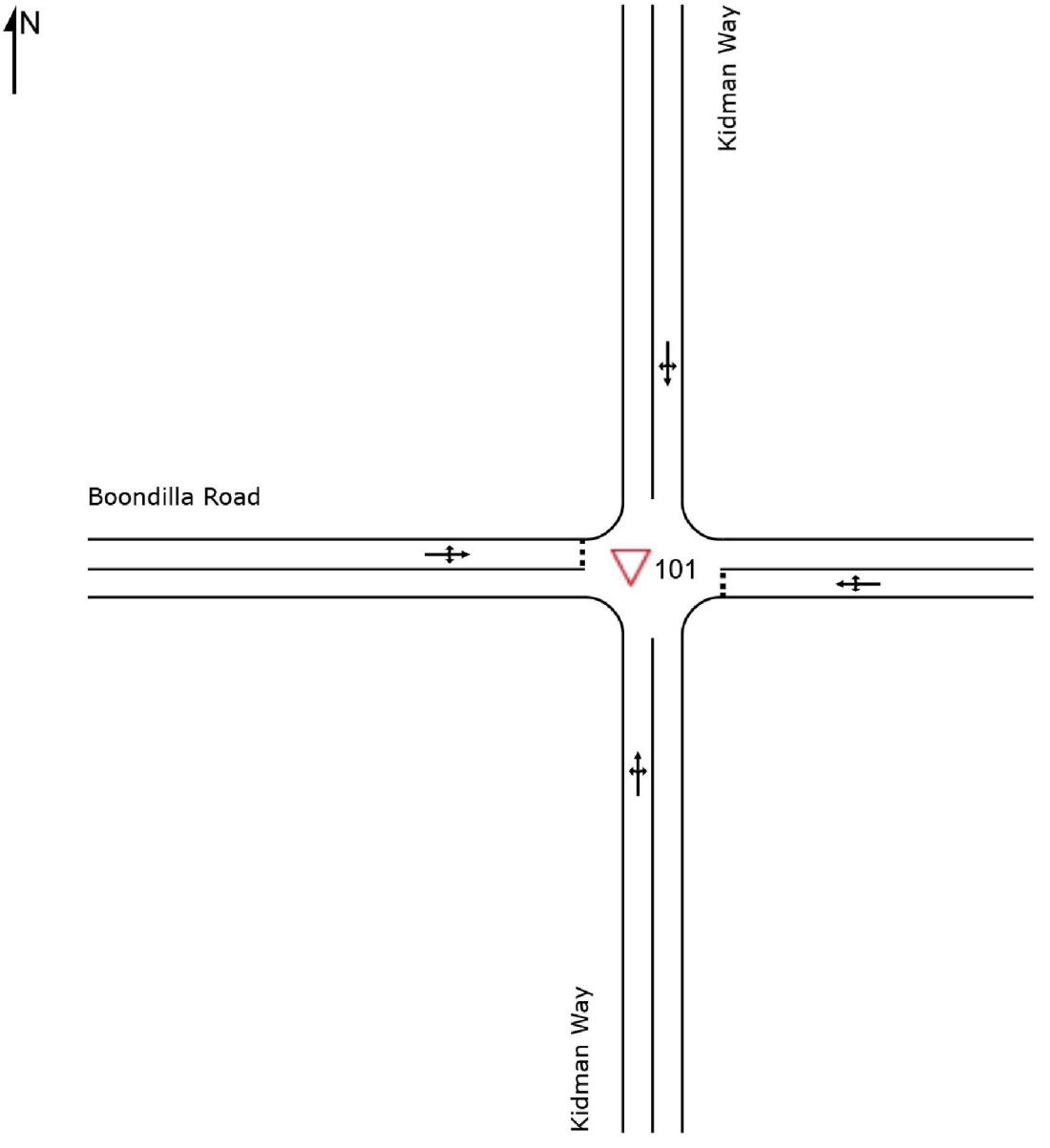
Appendix E

SIDRA Output Summaries

SITE LAYOUT

Site: 101 [Kidman Way | AM | 2019 Post]

Kidman Way and Ringwood Road
AM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 101 [Kidman Way | AM | 2019 Post]

Kidman Way and Ringwood Road
AM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: Kidman Way												
1	L2	11	0.0	0.049	5.7	LOS A	0.2	1.7	0.15	0.38	0.15	54.3
2	T1	26	32.0	0.049	0.2	LOS A	0.2	1.7	0.15	0.38	0.15	55.7
3	R2	45	9.3	0.049	5.8	LOS A	0.2	1.7	0.15	0.38	0.15	53.3
Approach		82	15.4	0.049	4.0	NA	0.2	1.7	0.15	0.38	0.15	54.2
East: Ringwood Road												
4	L2	29	17.9	0.055	5.9	LOS A	0.2	1.6	0.13	0.56	0.13	52.7
5	T1	11	0.0	0.055	4.7	LOS A	0.2	1.6	0.13	0.56	0.13	53.6
6	R2	22	19.0	0.055	6.6	LOS A	0.2	1.6	0.13	0.56	0.13	52.1
Approach		62	15.3	0.055	5.9	LOS A	0.2	1.6	0.13	0.56	0.13	52.6
North: Kidman Way												
7	L2	27	19.2	0.042	5.8	LOS A	0.1	0.6	0.05	0.31	0.05	54.4
8	T1	32	30.0	0.042	0.0	LOS A	0.1	0.6	0.05	0.31	0.05	56.8
9	R2	11	0.0	0.042	5.6	LOS A	0.1	0.6	0.05	0.31	0.05	54.7
Approach		69	21.2	0.042	3.1	NA	0.1	0.6	0.05	0.31	0.05	55.5
West: Boondilla Road												
10	L2	11	0.0	0.027	5.6	LOS A	0.1	0.7	0.12	0.55	0.12	53.6
11	T1	11	0.0	0.027	4.7	LOS A	0.1	0.7	0.12	0.55	0.12	53.8
12	R2	11	0.0	0.027	6.2	LOS A	0.1	0.7	0.12	0.55	0.12	53.1
Approach		32	0.0	0.027	5.5	LOS A	0.1	0.7	0.12	0.55	0.12	53.5
All Vehicles		245	15.0	0.055	4.4	NA	0.2	1.7	0.11	0.43	0.11	54.1

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

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

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

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

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

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

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

Project: \\global.arup.com\australasia\SYD\Projects\254000\254766-00 Darlington Point Solar Farm EIS\Work\Internal\Traffic\Darlington_Point_Solar_Farm_V2.sip8

MOVEMENT SUMMARY

Site: 101 [Kidman Way | PM | 2019 Post]

Kidman Way and Ringwood Road
PM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: Kidman Way												
1	L2	11	0.0	0.048	5.7	LOS A	0.2	1.5	0.12	0.31	0.12	55.1
2	T1	36	23.5	0.048	0.1	LOS A	0.2	1.5	0.12	0.31	0.12	56.5
3	R2	34	12.5	0.048	5.8	LOS A	0.2	1.5	0.12	0.31	0.12	53.9
Approach		80	15.8	0.048	3.2	NA	0.2	1.5	0.12	0.31	0.12	55.2
East: Ringwood Road												
4	L2	45	9.3	0.074	5.7	LOS A	0.3	2.1	0.11	0.56	0.11	53.1
5	T1	11	0.0	0.074	4.7	LOS A	0.3	2.1	0.11	0.56	0.11	53.6
6	R2	32	13.3	0.074	6.4	LOS A	0.3	2.1	0.11	0.56	0.11	52.3
Approach		87	9.6	0.074	5.9	LOS A	0.3	2.1	0.11	0.56	0.11	52.9
North: Kidman Way												
7	L2	22	19.0	0.035	5.8	LOS A	0.1	0.6	0.06	0.31	0.06	54.3
8	T1	26	32.0	0.035	0.0	LOS A	0.1	0.6	0.06	0.31	0.06	56.6
9	R2	11	0.0	0.035	5.6	LOS A	0.1	0.6	0.06	0.31	0.06	54.6
Approach		59	21.4	0.035	3.2	NA	0.1	0.6	0.06	0.31	0.06	55.4
West: Boondilla Road												
10	L2	11	0.0	0.027	5.6	LOS A	0.1	0.7	0.14	0.55	0.14	53.6
11	T1	11	0.0	0.027	4.7	LOS A	0.1	0.7	0.14	0.55	0.14	53.7
12	R2	11	0.0	0.027	6.3	LOS A	0.1	0.7	0.14	0.55	0.14	53.0
Approach		32	0.0	0.027	5.5	LOS A	0.1	0.7	0.14	0.55	0.14	53.5
All Vehicles		258	13.1	0.074	4.4	NA	0.3	2.1	0.11	0.42	0.11	54.2

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

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

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

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

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

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

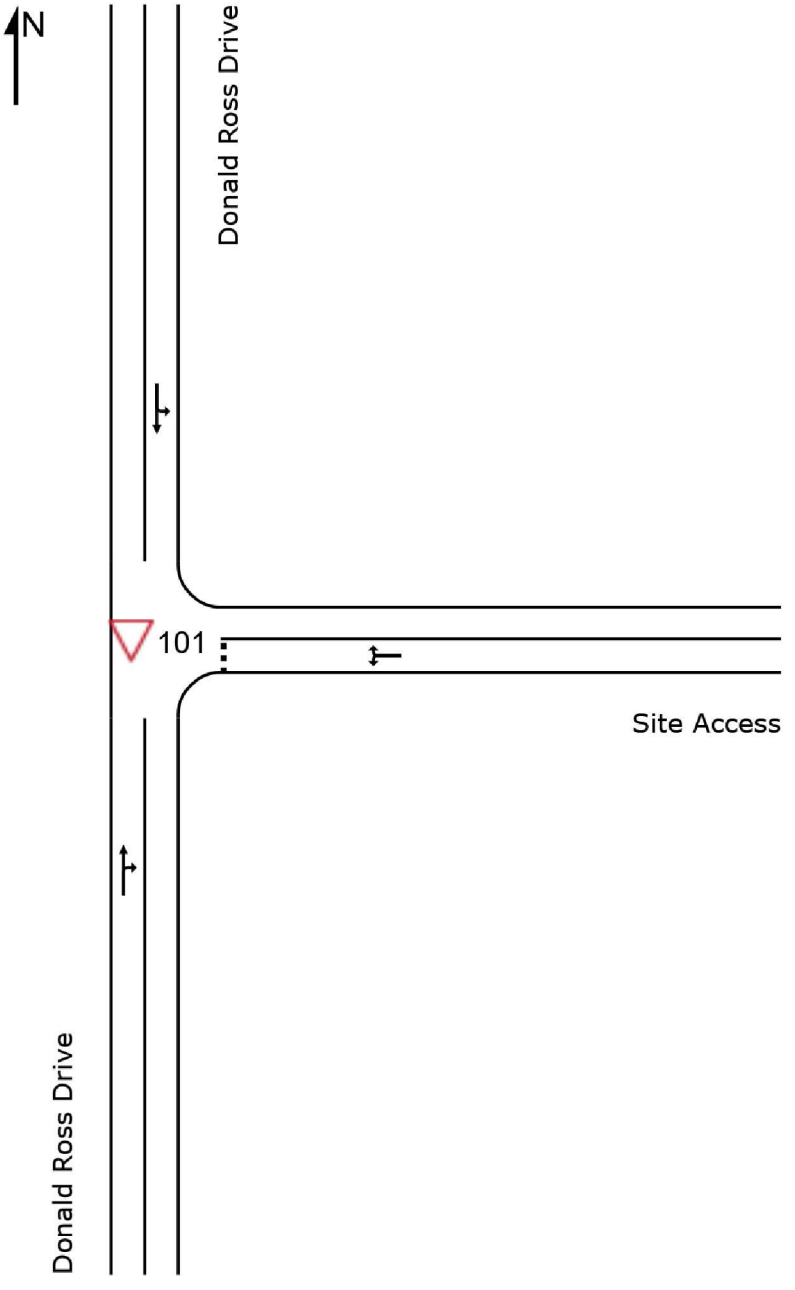
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Project: \\global.arup.com\australasia\SYD\Projects\254000\254766-00 Darlington Point Solar Farm EIS\Work\Internal\Traffic\Darlington_Point_Solar_Farm_V2.sip8

SITE LAYOUT

Site: 101 [Donald Ross Drive | AM | 2019 Post]

Donald Ross Drive and Site Access
AM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)


N
Donald Ross Drive
101
Site Access
Donald Ross Drive

MOVEMENT SUMMARY

Site: 101 [Donald Ross Drive | AM | 2019 Post]

Donald Ross Drive and Site Access
AM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: Donald Ross Drive												
2	T1	47	28.9	0.044	0.4	LOS A	0.1	1.2	0.23	0.23	0.23	89.9
3	R2	23	0.0	0.044	8.3	LOS A	0.1	1.2	0.23	0.23	0.23	80.2
Approach		71	19.4	0.044	3.0	NA	0.1	1.2	0.23	0.23	0.23	86.5
East: Site Access												
4	L2	2	0.0	0.032	5.7	LOS A	0.1	0.8	0.26	0.60	0.26	52.9
6	R2	28	18.5	0.032	6.7	LOS A	0.1	0.8	0.26	0.60	0.26	51.6
Approach		31	17.2	0.032	6.6	LOS A	0.1	0.8	0.26	0.60	0.26	51.7
North: Donald Ross Drive												
7	L2	209	2.5	0.144	5.6	LOS A	0.0	0.0	0.00	0.48	0.00	54.1
8	T1	47	28.9	0.144	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	55.6
Approach		257	7.4	0.144	4.6	NA	0.0	0.0	0.00	0.48	0.00	54.4
All Vehicles		358	10.6	0.144	4.4	NA	0.1	1.2	0.07	0.44	0.07	58.4

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Donald Ross Drive | PM | 2019 Post]

Donald Ross Drive and Site Access
PM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: Donald Ross Drive												
2	T1	53	28.0	0.033	0.0	LOS A	0.0	0.1	0.02	0.03	0.02	98.7
3	R2	2	0.0	0.033	7.6	LOS A	0.0	0.1	0.02	0.03	0.02	87.2
Approach		55	26.9	0.033	0.3	NA	0.0	0.1	0.02	0.03	0.02	98.2
East: Site Access												
4	L2	23	0.0	0.200	5.7	LOS A	0.8	5.4	0.22	0.59	0.22	53.0
6	R2	209	2.5	0.200	6.0	LOS A	0.8	5.4	0.22	0.59	0.22	52.4
Approach		233	2.3	0.200	6.0	LOS A	0.8	5.4	0.22	0.59	0.22	52.5
North: Donald Ross Drive												
7	L2	28	18.5	0.048	5.8	LOS A	0.0	0.0	0.00	0.21	0.00	55.5
8	T1	51	29.2	0.048	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	57.9
Approach		79	25.3	0.048	2.1	NA	0.0	0.0	0.00	0.21	0.00	57.0
All Vehicles		366	10.9	0.200	4.3	NA	0.8	5.4	0.14	0.42	0.14	57.5

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.

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

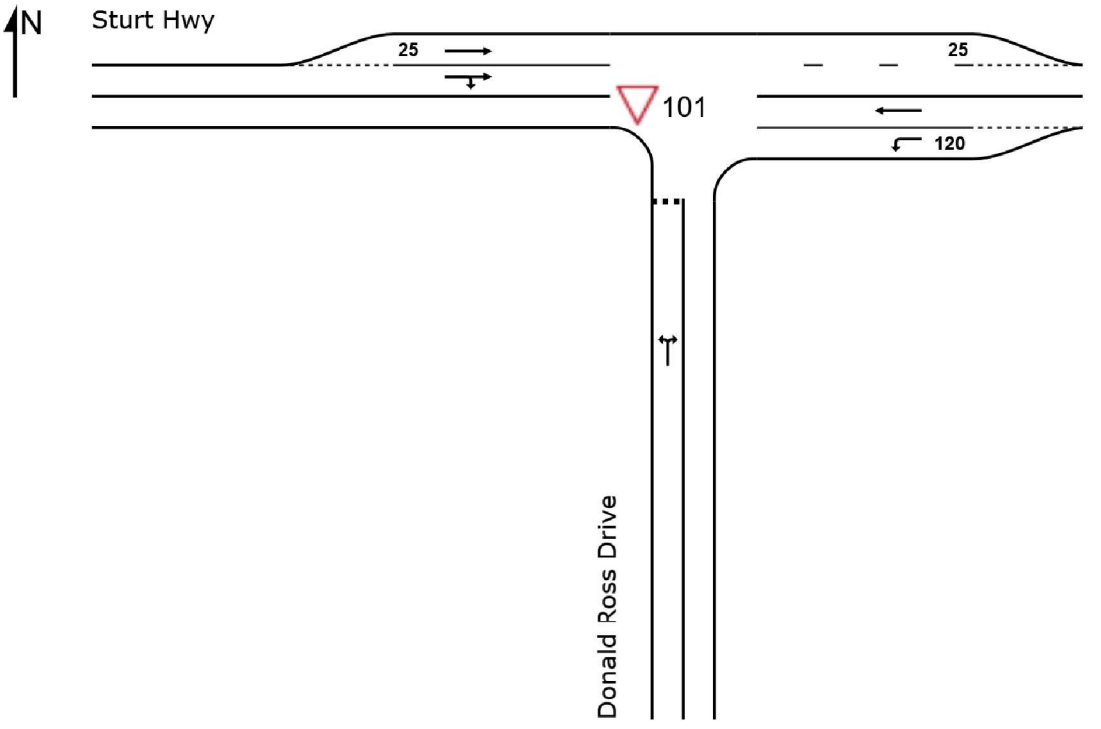
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SITE LAYOUT

Site: 101 [Sturt Highway | AM | 2019 Post]

Sturt Highway and Donald Ross Drive
AM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)



Organisation: ARUP PTY LTD | Created: Thursday, 26 July 2018 8:56:59 AM
Project: \\global.arup.com\australasia\SYD\Projects\254000\254766-00 Darlington Point Solar Farm EIS\Work\Internal\Traffic\Darlington_Point_Solar_Farm_V2.sip8

MOVEMENT SUMMARY

Site: 101 [Sturt Highway | AM | 2019 Post]

Sturt Highway and Donald Ross Drive
AM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: Donald Ross Drive												
1	L2	48	23.9	0.085	5.9	LOS A	0.3	2.8	0.10	0.57	0.10	51.8
3	R2	27	26.9	0.085	8.7	LOS A	0.3	2.8	0.10	0.57	0.10	51.4
Approach		76	25.0	0.085	7.0	LOS A	0.3	2.8	0.10	0.57	0.10	51.6
East: Sturt Hwy												
4	L2	47	17.8	0.029	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.9
5	T1	24	30.4	0.015	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		72	22.1	0.029	3.8	NA	0.0	0.0	0.00	0.38	0.00	55.1
West: Sturt Hwy												
11	T1	23	27.3	0.014	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	209	5.0	0.161	5.9	LOS A	0.7	5.2	0.20	0.57	0.20	52.4
Approach		233	7.2	0.161	5.3	NA	0.7	5.2	0.18	0.51	0.18	53.0
All Vehicles		380	13.6	0.161	5.3	NA	0.7	5.2	0.13	0.50	0.13	53.1

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Sturt Highway | PM | 2019 Post]

Sturt Highway and Donald Ross Drive
PM Peak
2019 Post
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: Donald Ross Drive												
1	L2	209	5.0	0.229	5.7	LOS A	1.0	7.5	0.11	0.55	0.11	53.1
3	R2	54	17.6	0.229	7.0	LOS A	1.0	7.5	0.11	0.55	0.11	52.3
Approach		263	7.6	0.229	6.0	LOS A	1.0	7.5	0.11	0.55	0.11	52.9
East: Sturt Hwy												
4	L2	23	27.3	0.015	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
5	T1	25	25.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		48	26.1	0.015	2.8	NA	0.0	0.0	0.00	0.27	0.00	56.1
West: Sturt Hwy												
11	T1	29	28.6	0.052	0.1	LOS A	0.2	1.8	0.06	0.18	0.06	58.1
12	R2	55	23.1	0.052	6.0	LOS A	0.2	1.8	0.15	0.47	0.15	52.4
Approach		84	25.0	0.052	3.9	NA	0.2	1.8	0.12	0.37	0.12	54.2
All Vehicles		396	13.6	0.229	5.2	NA	1.0	7.5	0.10	0.48	0.10	53.6

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

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

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

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

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

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

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