Appendix E

Traffic Impact Assessment

Edify Energy Pty Ltd

Darlington Point Solar Farm

Traffic Impact Assessment

254766_REP_TIA01

Final | 7 March 2018

Job number 254766-00

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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 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*.

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)'.

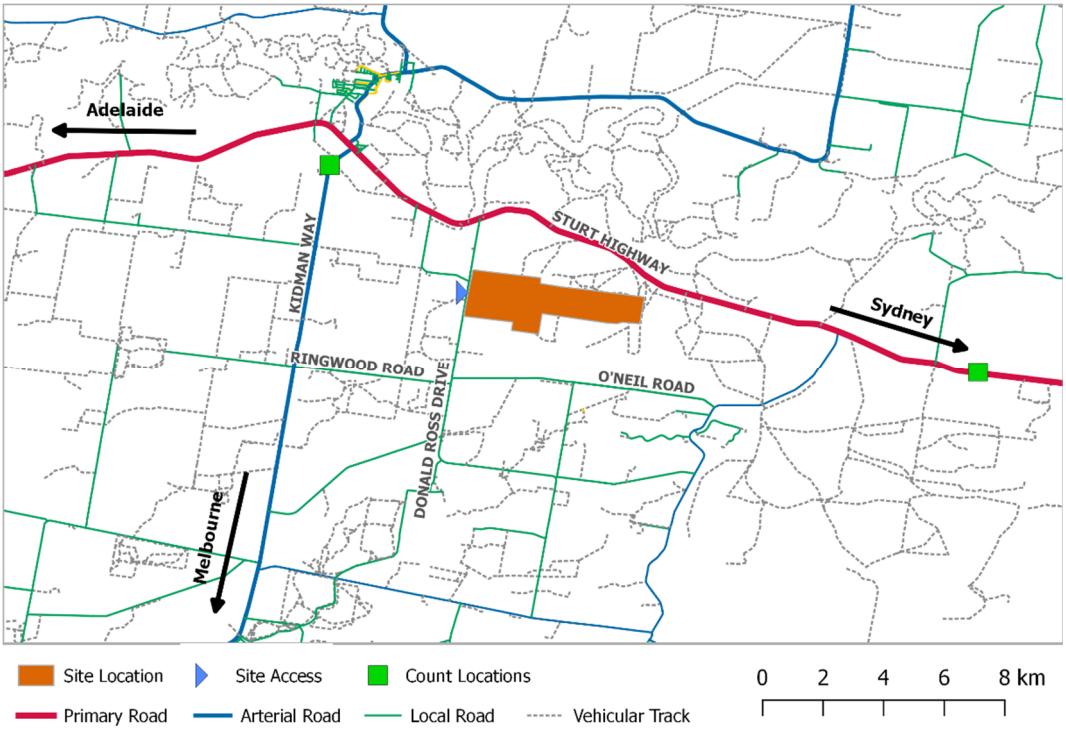


Figure 1: Site location

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.

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.

Kidman Way is a north-south orientated state-controlled sealed two-lane road. Site access 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 provided 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

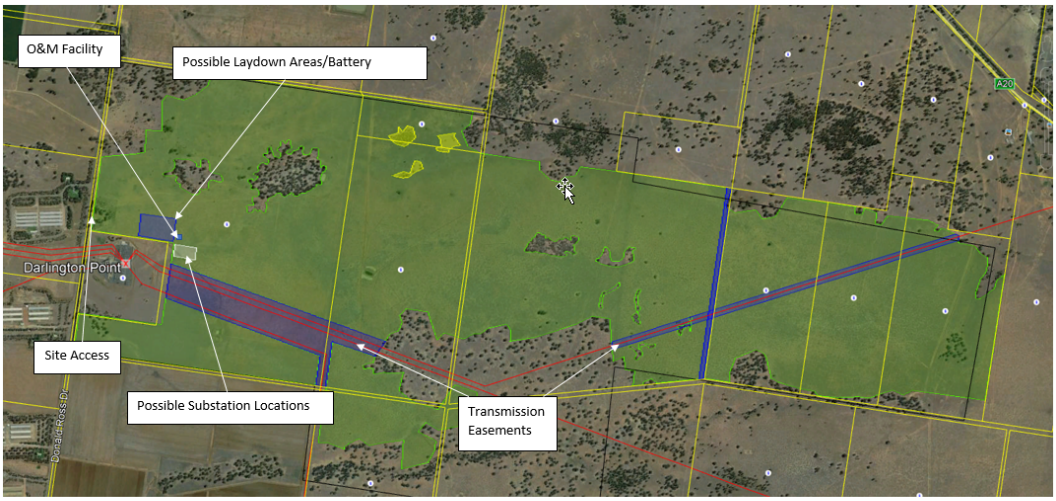
3.1 Development Site Plan

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
- 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
- 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. 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.



Notes:

- The area highlighted in green on the proposed array are consisting of arrays, inverters and internal access roads. This is the maximum area and a firebreak/buffer of 20m will be left between any retained vegetation and panels. Roads may be located in the buffer.
- The transmission line easement will not be used for panel inverters but access roads and buried cables will be routed through the easements.
- The yellow areas to the north are no go areas.
- Indicative locations have been shown but the assessment should allow these to be located elsewhere as not expected to effect the development impact.
- In terms of traffic access, any laydown areas would be located within the developed area indicated and internal road ways will allow for parking, unloading and turning of trucks fully within the site developed area. The laydown area will likely be used for the location of a battery energy storage facility in future stages.

Figure 2: Preliminary site access and plan *(Source: Edify Energy 27 October 2017)*

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. Piling - Months 5-8
4. Underground Cables - Months 5-8
5. Assembly of frames - Months 6-9
6. Installation of modules - Months 7 - 10
7. Substation Installation - Months 8-10
8. 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 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) the site via Donald Ross Drive, and approximately 30 - 50 heavy vehicles delivering to the site each day.

Construction haulage routes for the delivery of materials and equipment will include Kidman Way (northbound from Melbourne) and the Sturt Highway (eastbound from Adelaide and westbound from Sydney / Wollongong).

Delivery of PV modules, tracking systems, transformers, 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 potentially 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. As such, they will have no significant ongoing impacts on the road system.

Construction of the BESS facility would follow immediately after the 12 month 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. The majority of equipment and deliveries are expected to be shipped to major ports in Melbourne, Sydney or Wollongong and transported to site via road.

3.2.2 Operational Stage

The operation of the site is anticipated to involve five full-time staff who would attend the site on most days. An unsealed car parking area for staff and visitors is to be designed and located adjacent to the operations and maintenance building.

A network of internal access tracks in the form of unsealed gravel roads will provide access to the arrays. The location of the roads is anticipated to be along 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 operation for the site will be Monday to Friday from 7am to 6pm and Saturday from 8am to 1pm. 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's other solar farm developments which have recently been constructed in Queensland .

As detailed in Section 3.2.1, during the peak of construction, it is estimated that there will be in the order of 300 light vehicles transporting workers to and from mostly Darlington Point and Griffith, and surrounds such as Coleambally and approximately 30 - 50 heavy vehicles delivering to the site each 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 on most days.

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	No. Vehicles per day	Total Daily Trips	Proportion veh arrive / depart during peak	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
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. Edify Energy propose to use a park-and-ride system to transport construction workers to and from the site. A number of options are currently being assessed by Edify Energy to use a parking area within close proximity to the DPSF site. The EPC Contractor would be responsible for operating the transport mode (e.g. bus charter) to and from the site during construction of the DPSF.

Once operational, the subject site is expected to generate a total of five vehicles per hour.

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 township of Darlington Point and Griffith. It has been assumed that 80% of light vehicle trips will therefore access from the Sturt Highway (west of Donald Ross Drive).

Heavy vehicle trips will be generated from hauling plant and materials from Sydney (Sturt Highway eastbound), Melbourne (Kidman Way southbound) and Adelaide (Sturt Highway westbound). For the purpose of this assessment, an even distribution between these three city centres for haulage routes has been adopted.

The resultant trip distribution adopted was:

- Sturt Highway (west of Donald Ross Drive): 80% LV, 33% HV
- Sturt Highway (east of Donald Ross Drive): 10% LV, 33% HV
- Kidman Way (south of Ringwood Road): 10% LV, 33% 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 2018.

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 of 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 7.0 with the existing geometry and lane configurations and 2018 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 (2018 Post Development)

Time Period	Maximum DOS (%)	Maximum Average Delay (sec)	Maximum 95%ile Queue (m)
Sturt Hwy / Donald Ross Drive			
AM Peak	16%	8.8	5.1
PM Peak	23%	7.0	7.4
Donald Ross Drive / Site Access			
AM Peak	14%	8.6	1.4
PM Peak	20%	9.1	5.4
Kidman Way / Ringwood Road / Boondilla Road			
AM Peak	6%	6.4	1.6
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.

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

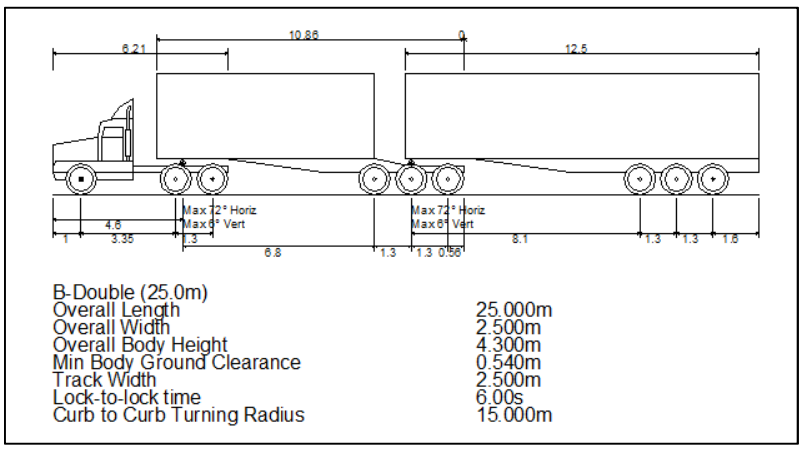


Figure 3: B-Double Vehicle Profile

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.

Kidman Way / Ringwood Road

The swept path of a B-Double entering and exiting Ringwood Road from Kidman Way (South) is presented below in Figure 8.

Figure 8: Kidman Way / Ringwood Road (B-Double)

As shown, a B-Double is able to manoeuvre in / out of Ringwood Road from Kidman Way (South) within the existing intersection pavement extents.

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	1326 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.
- A construction Traffic Management Plan will be developed for the project and implemented during construction.

- Edify Energy propose to use a park-and-ride system to transport construction workers to and from the site. A number of options are currently being assessed by Edify Energy to use a parking area within close proximity to the DPSF site. The EPC Contractor would be responsible for operating the transport mode (e.g. bus charter) to and from the site during construction of the DPSF.

6 Conclusions and Recommendations

This report has assessed the traffic impact of the construction and operation and decomissioning of the proposed solar farm 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 (up to ~12 months). Traffic generated during this phase will consist of construction related heavy vehicle movements and employee transport between the site and accommodation facilities in Darlington Point and Griffith.

The road link assessment and intersection analysis completed for 2018 (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 intersections of Sturt Highway / Donald Ross Drive and Kidman Way / Ringwood Road can cater for the swept path of a B-Double design vehicle, during the construction and decommissioning phases.

Based on the swept path analysis of the Kidman way 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

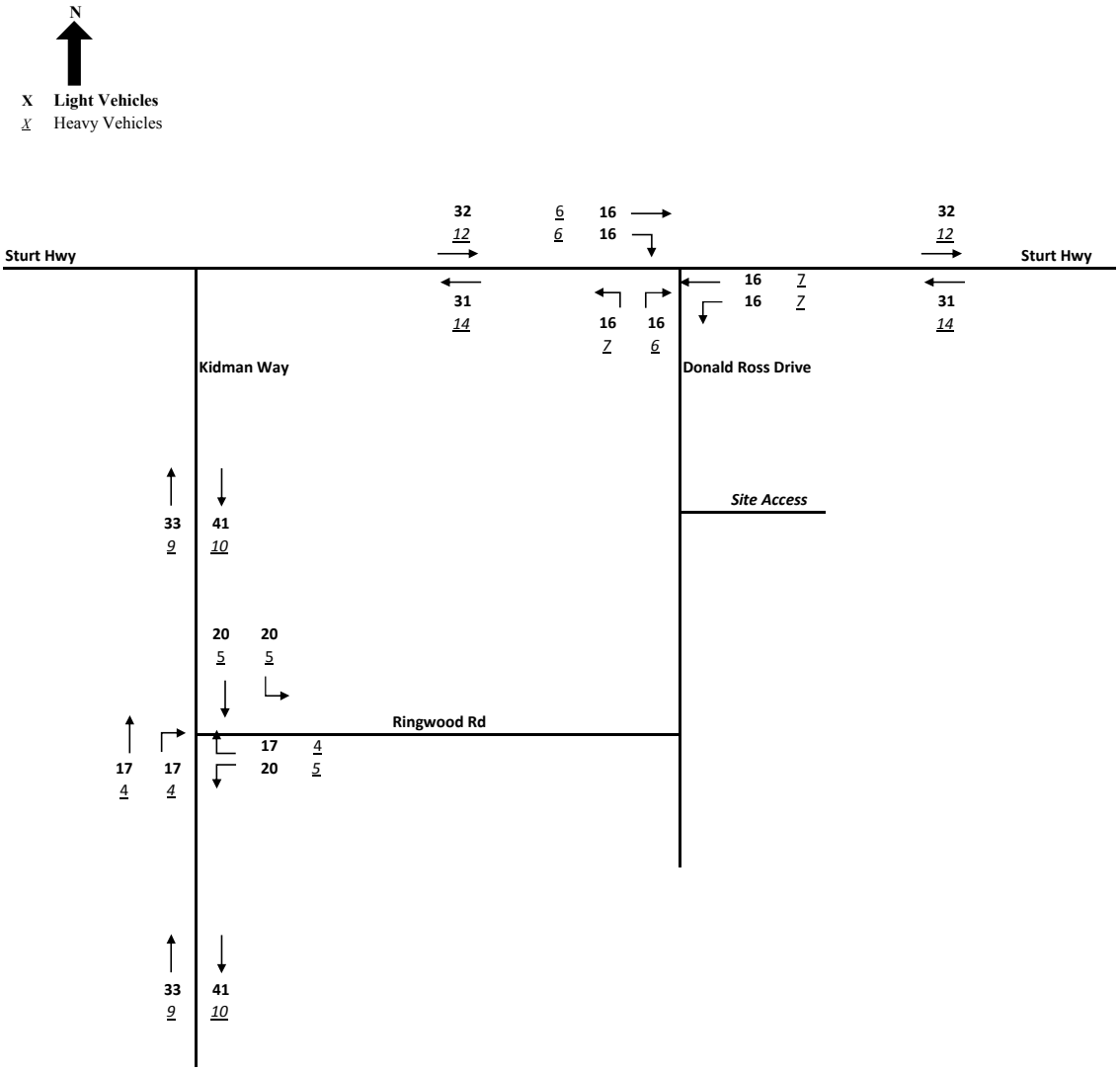
Kidman Way Traffic Volumes

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

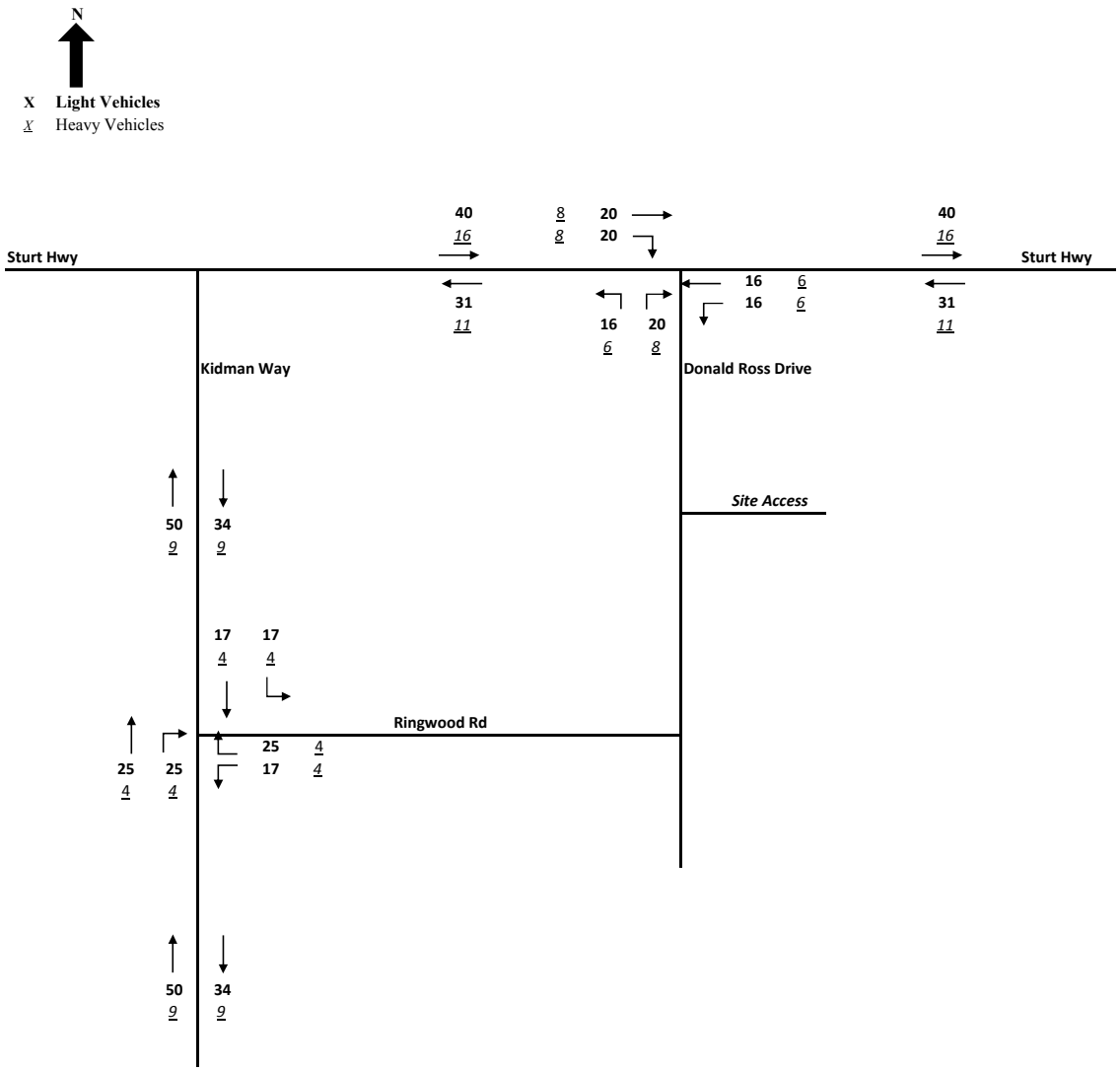
Sturt Hwy Traffic Volumes

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



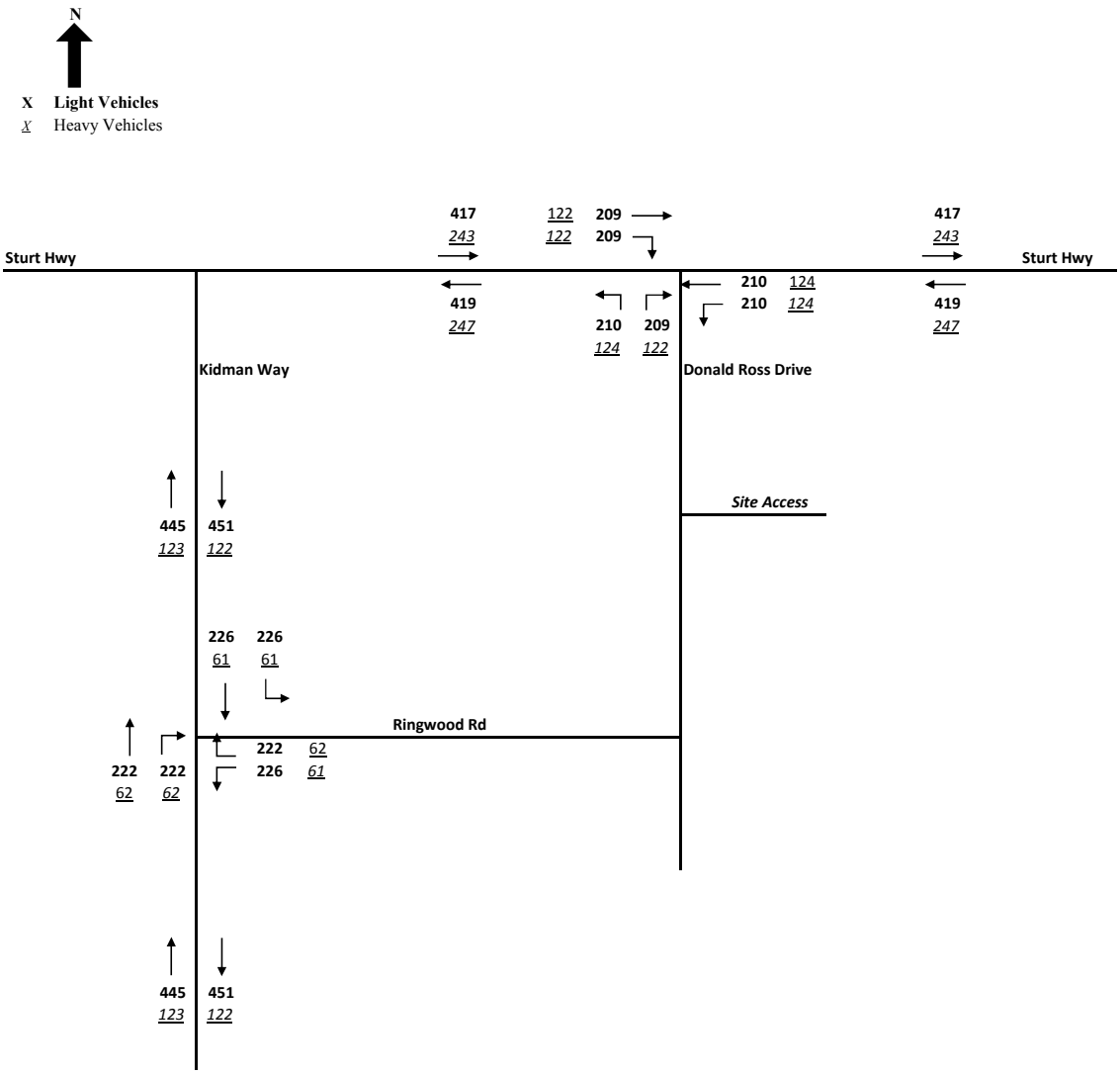
254766-00 | Darlington Point Solar Farm EIS

2017 AM Peak Existing Traffic Volumes



254766-00 | Darlington Point Solar Farm EIS

2017 PM Peak Existing Traffic Volumes

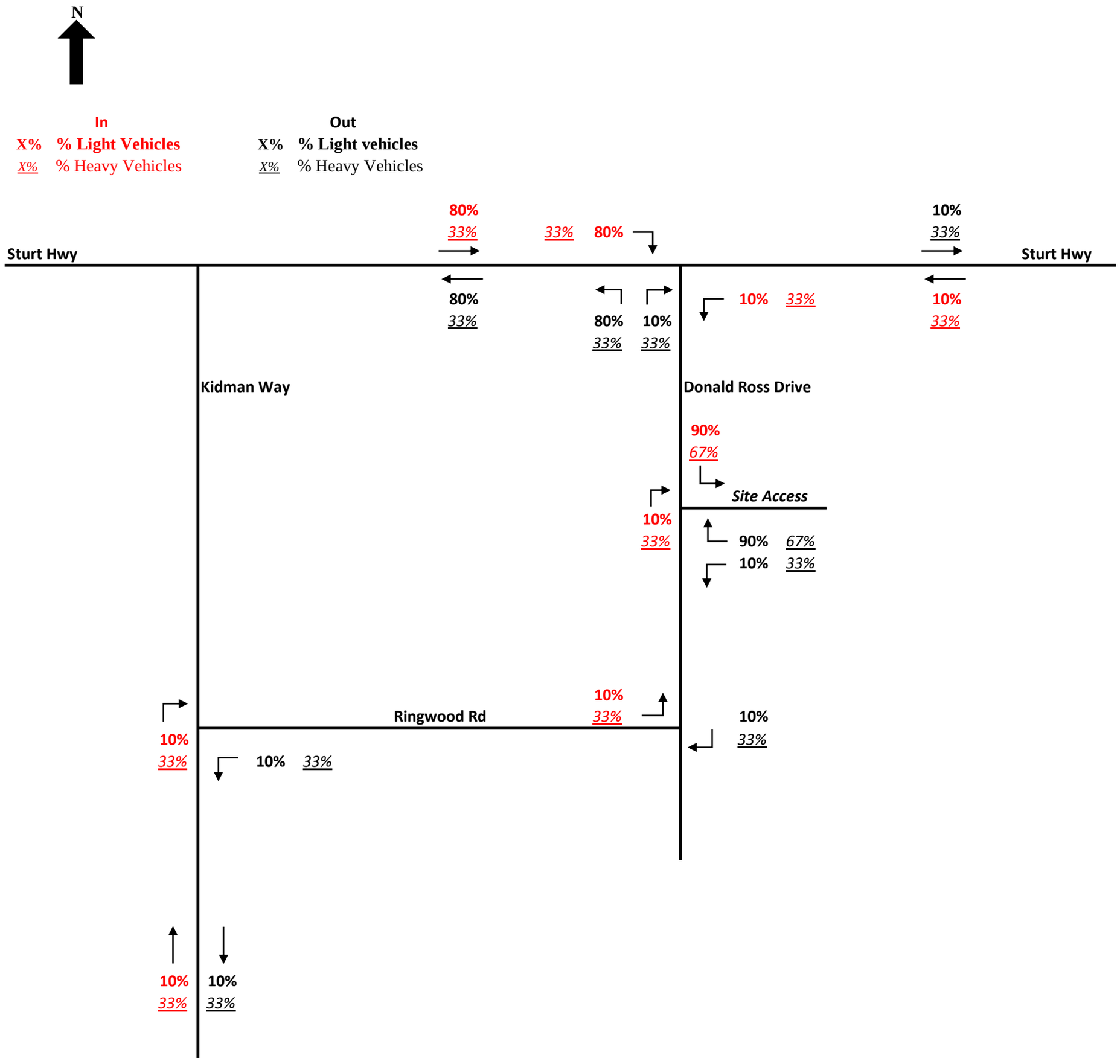


254766-00 | Darlington Point Solar Farm EIS

2017 Daily Existing Traffic Volumes

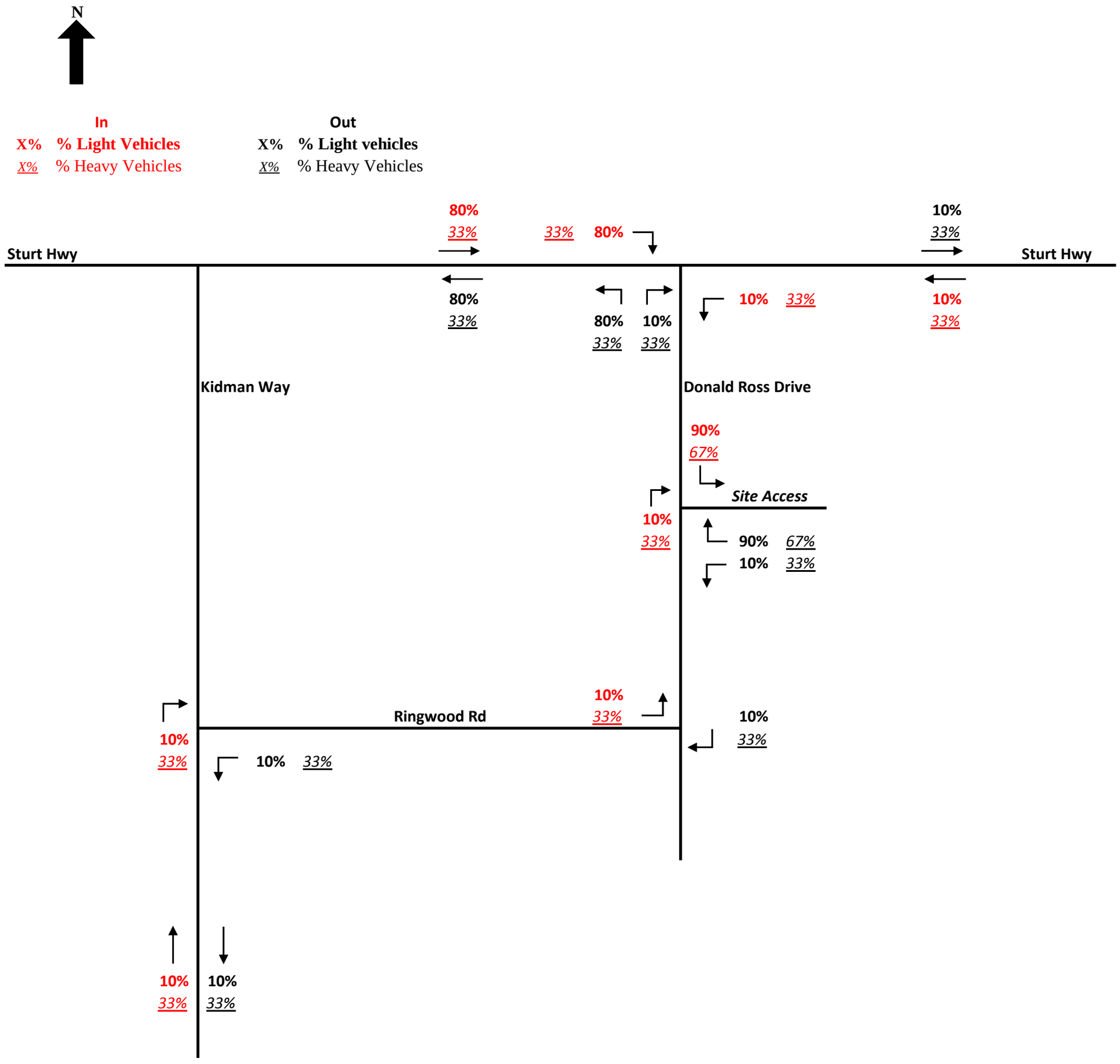
Appendix B

Development Traffic Volumes (Construction)



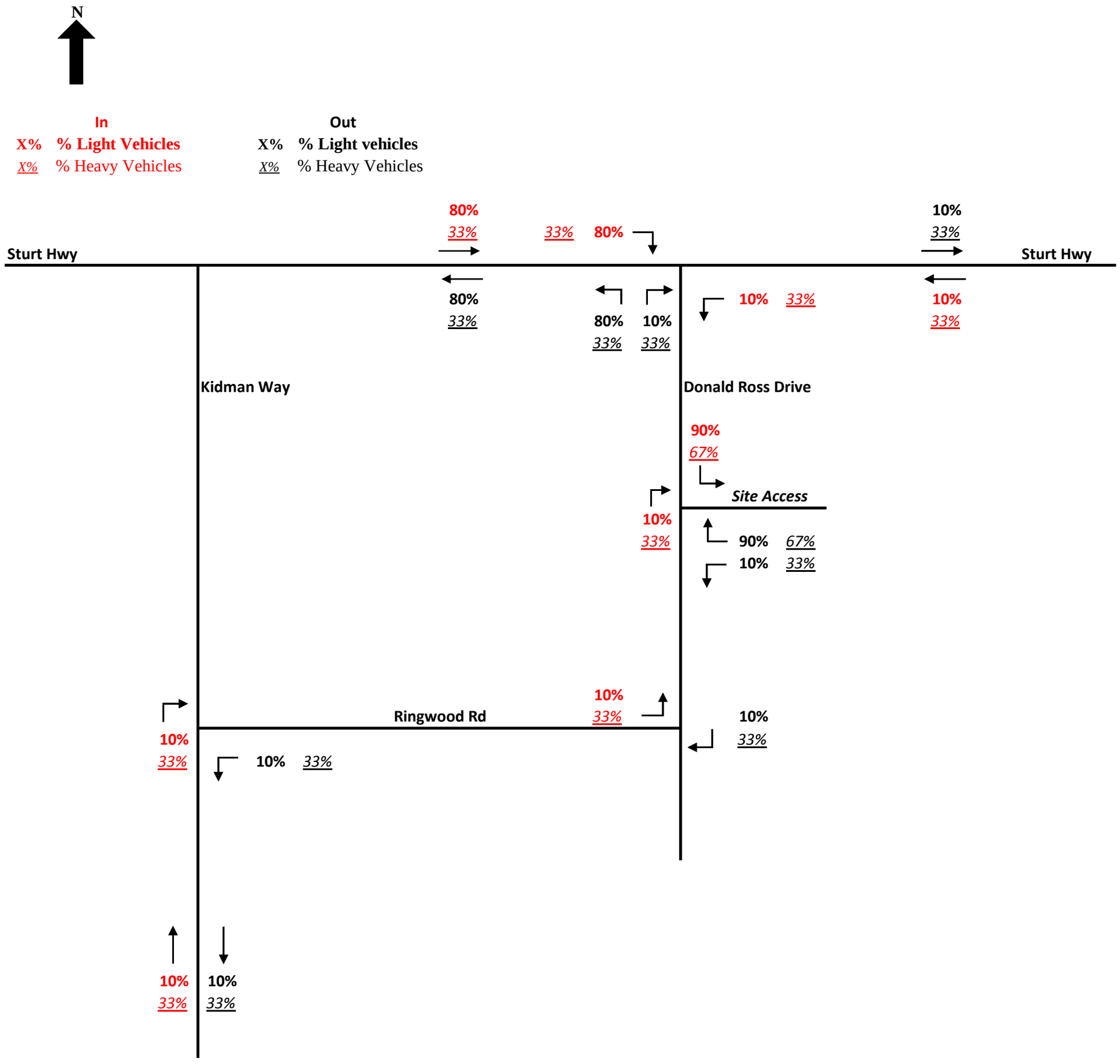
254766-00 | Darlington Point Solar Farm EIS

Construction Traffic Distribution (%) - AM Peak



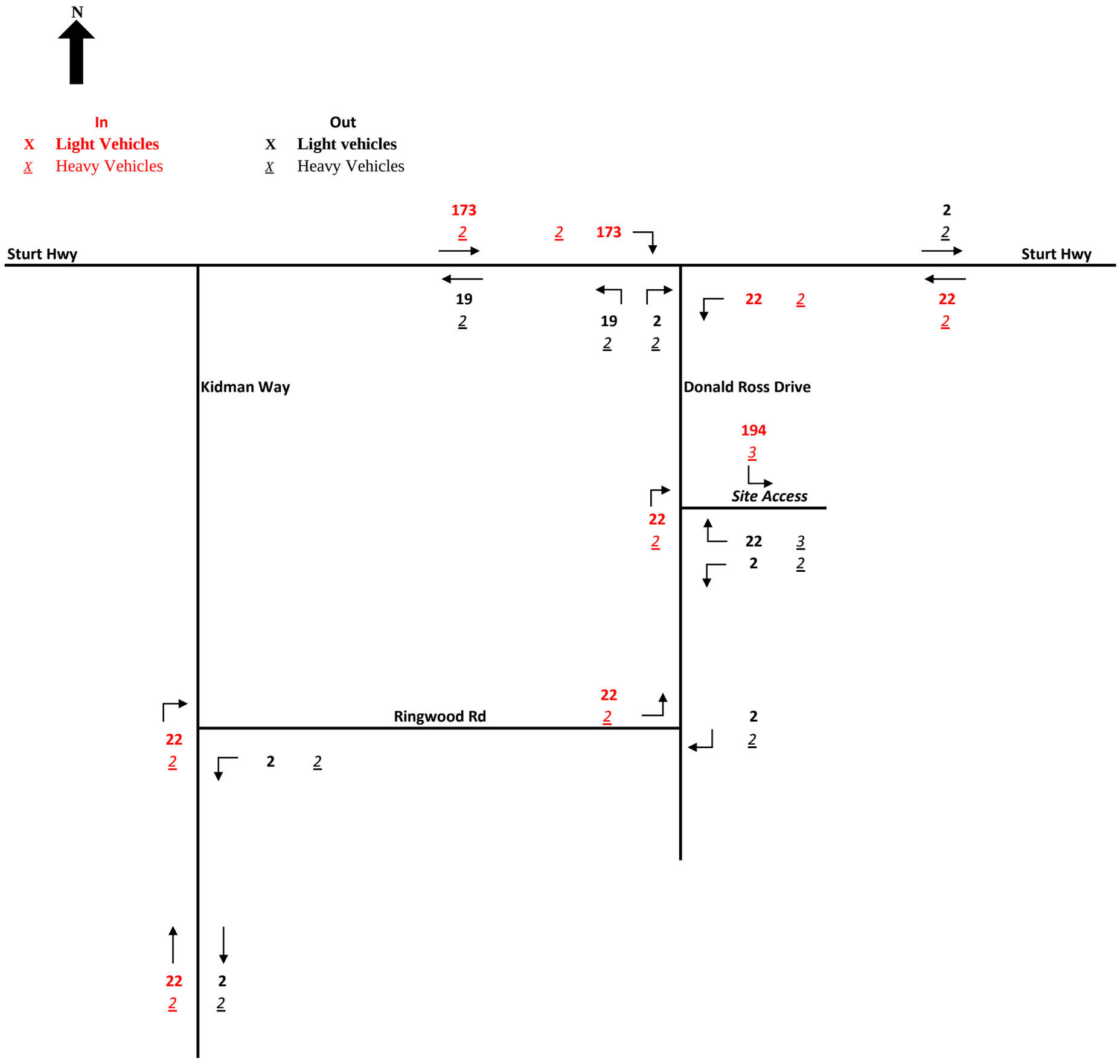
254766-00 | Darlington Point Solar Farm EIS

Construction Traffic Distribution (%) - PM Peak



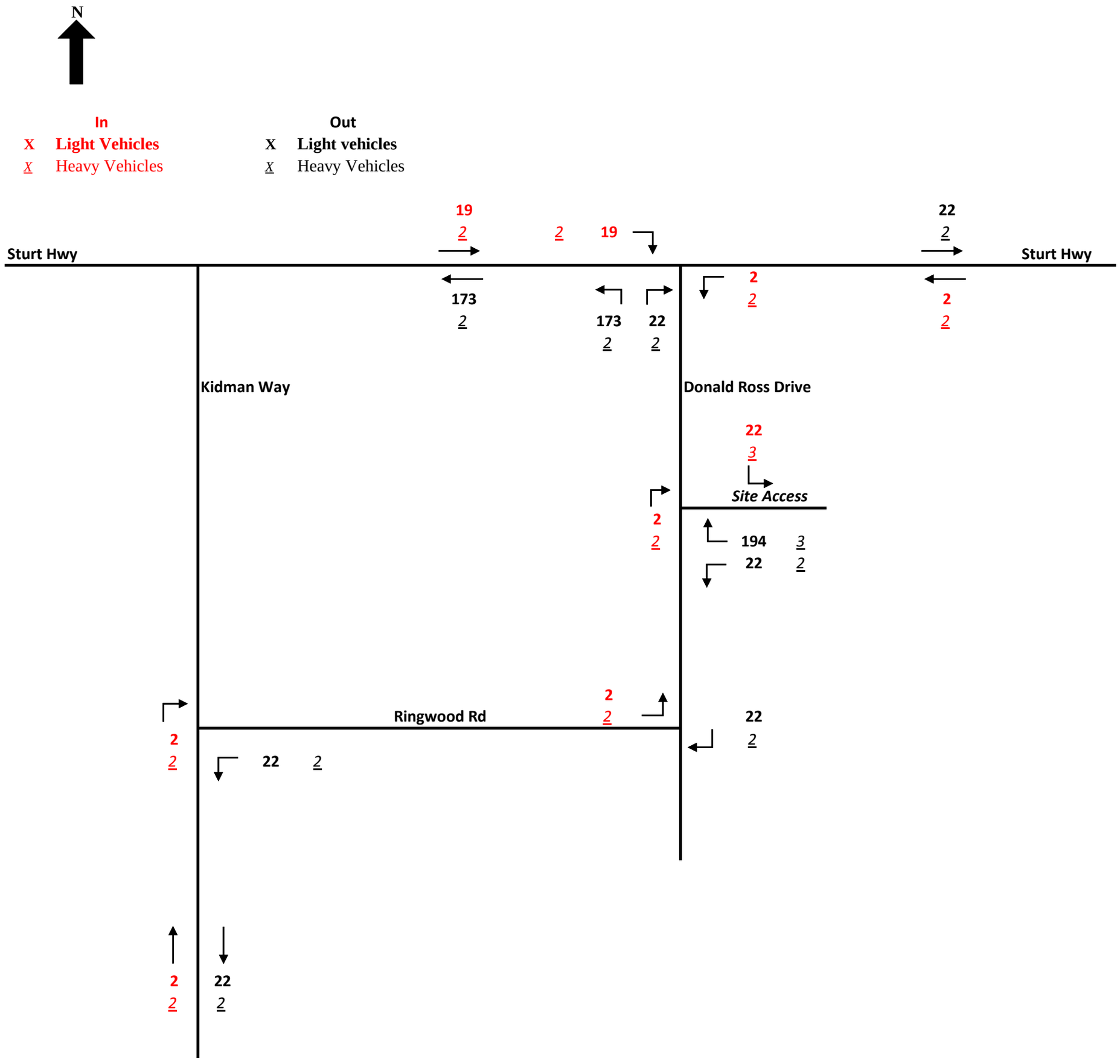
254766-00 | Darlington Point Solar Farm EIS

Construction Traffic Distribution (%) - Daily



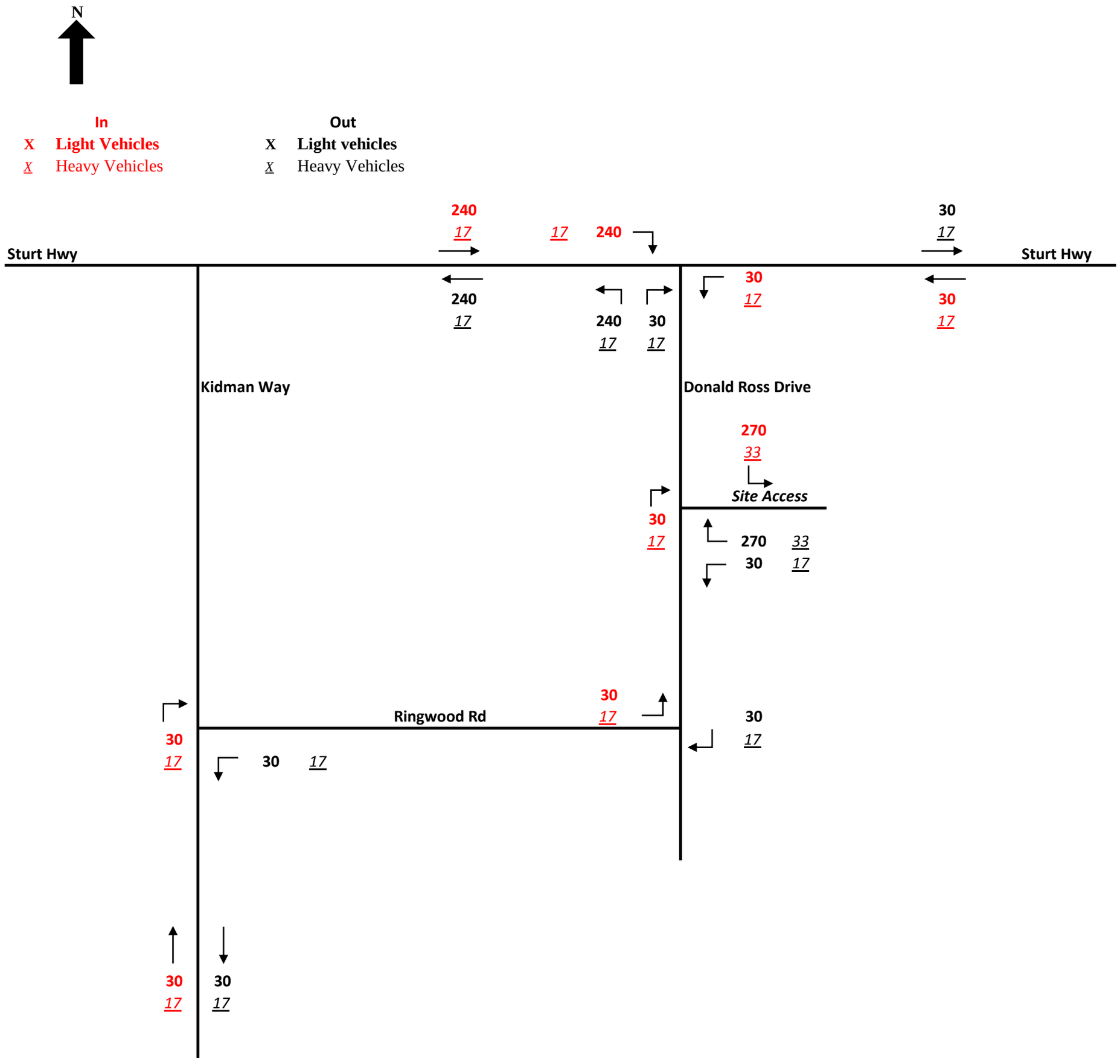
254766-00 | Darlington Point Solar Farm EIS

Construction Traffic Volumes (vph) - AM Peak



254766-00 | Darlington Point Solar Farm EIS

Construction Traffic Volumes (vph) - PM Peak

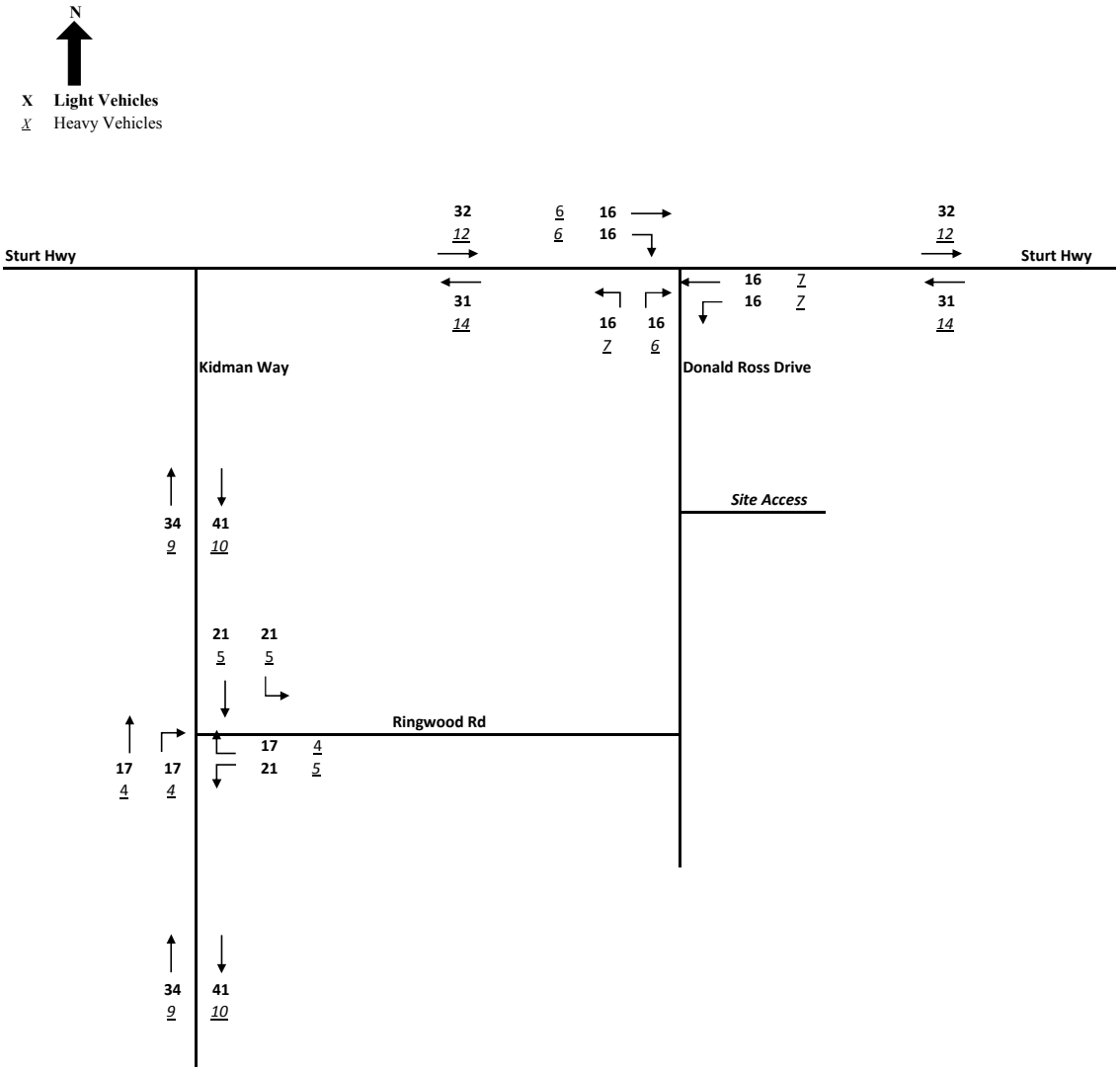


254766-00 | Darlington Point Solar Farm EIS

Construction Traffic Volumes (vpd) - Daily

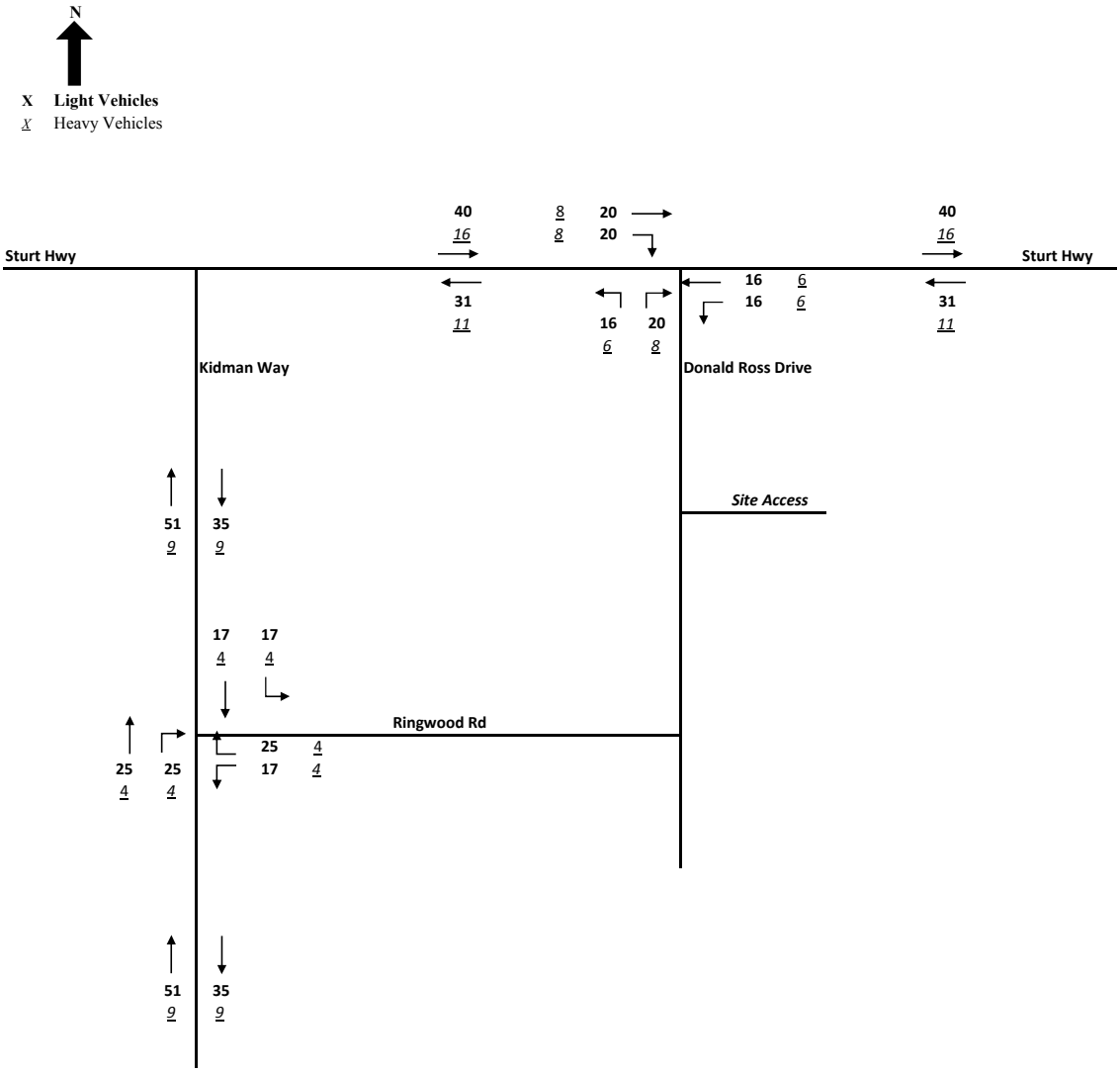
Appendix C

2018 Traffic Volumes (Pre and Post - Construction)



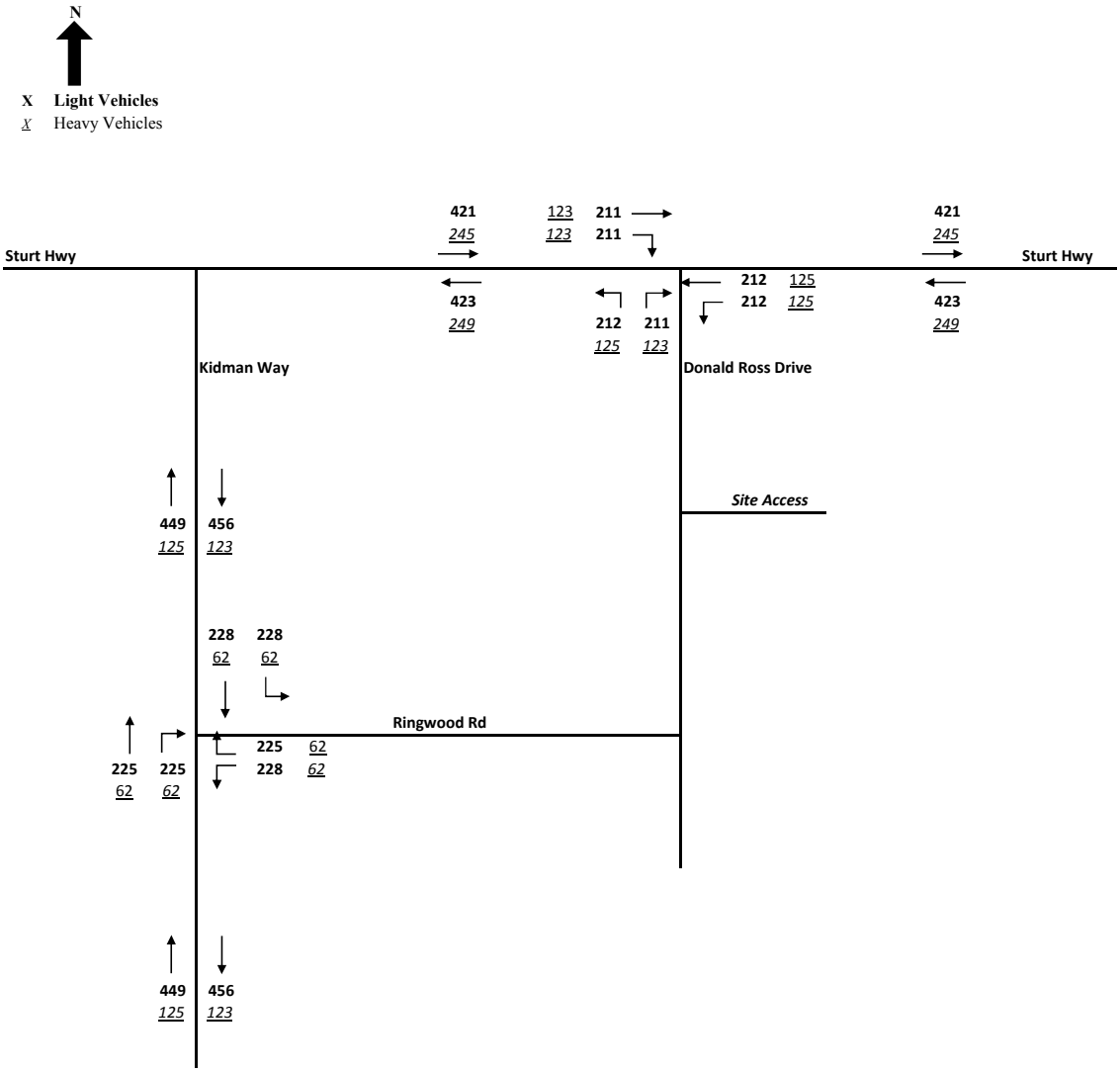
254766-00 | Darlington Point Solar Farm EIS

2018 AM Peak Pre Development Traffic Volumes



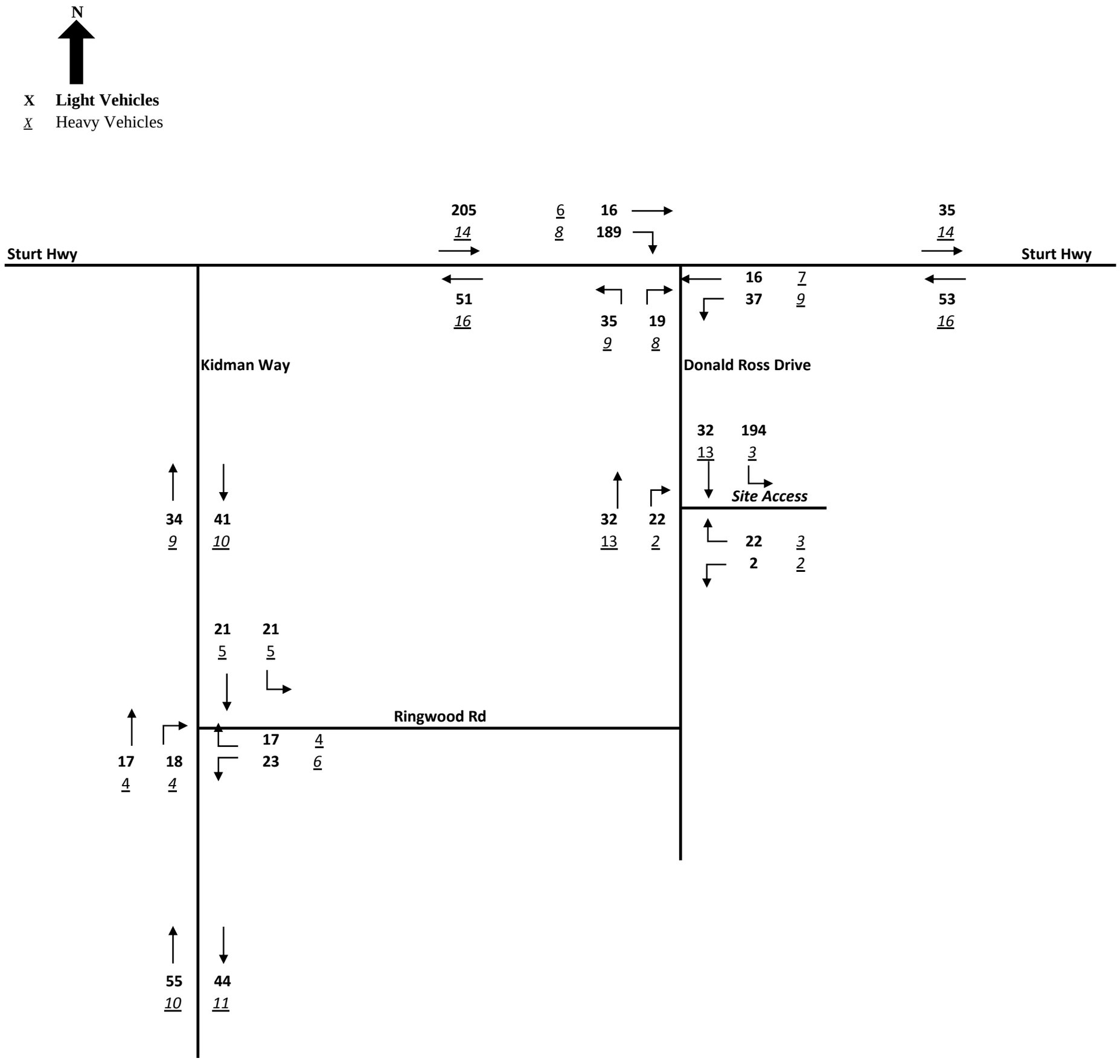
254766-00 | Darlington Point Solar Farm EIS

2018 PM Peak Pre Development Traffic Volumes



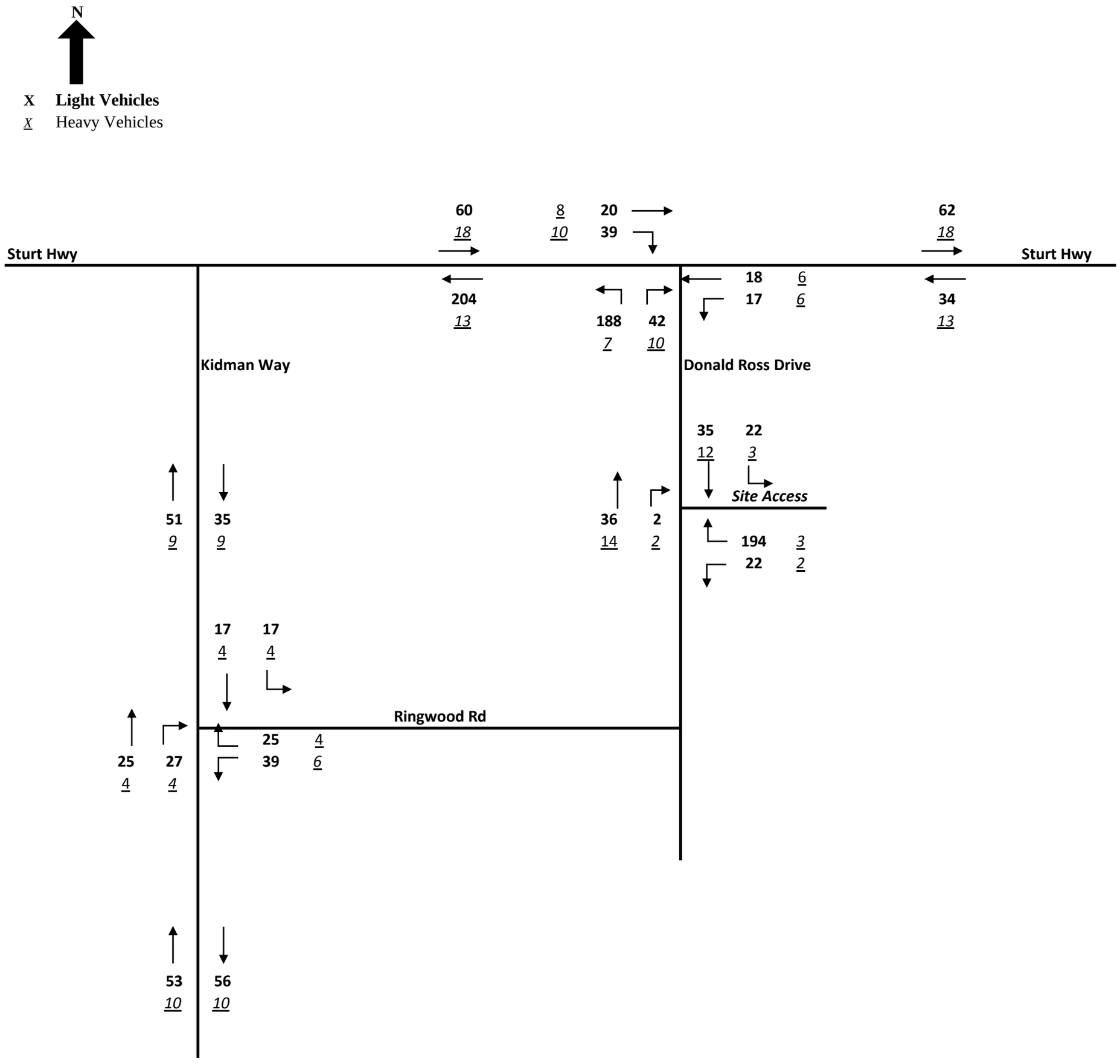
254766-00 | Darlington Point Solar Farm EIS

2018 Daily Pre Development Traffic Volumes



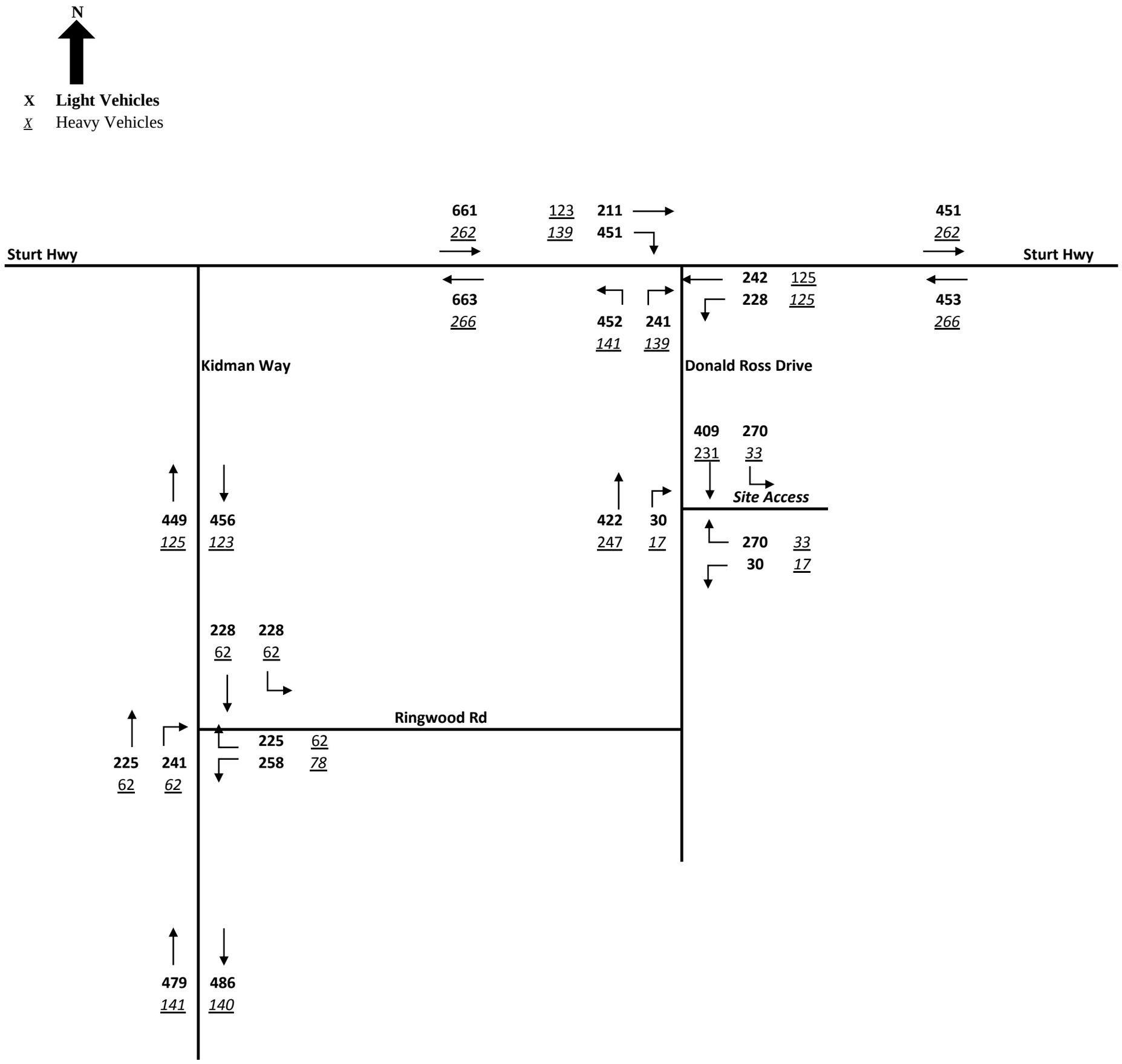
254766-00 | Darlington Point Solar Farm EIS

2018 AM Peak With Construction Traffic Volumes



254766-00 | Darlington Point Solar Farm EIS

2018 PM Peak With Construction Traffic Volumes



254766-00 | Darlington Point Solar Farm EIS

2018 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
1 km/h to 0.621371 mph

Sturt Highway — Class I Highway

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									

		EB	WB		NB	SB		
2018 Total Vehs	AM Peak - Base	44	45	49%	42	51	45%	*based on 2018 Pre tab
	AM Peak - With Dev	219	66	77%	65	55	54%	*based on 2018 Post (Abs. Construction)
	PM Peak - Base	57	42	57%	60	43	58%	*based on 2018 Pre tab
	PM Peak - With Dev	77	217	26%	63	66	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	0.24	0.21		
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	105.6 km/h	65.6 mi/h	

			EB	WB	NB	SB	
Step 3	$f_{g,ATS}$		1	1	1	1	Exhibit 15-9 grade adjustment factor
	PR		0		0		Assumed 0 RVs
	ET	AM Peak - Base	1.9	1.9	1.9	1.9	Exhibit 15-11
		AM Peak - With Dev	1.5	1.9	1.9	1.9	Exhibit 15-11
		PM Peak - Base	1.9	1.9	1.9	1.9	Exhibit 15-11
		PM Peak - With Dev	1.9	1.5	1.9	1.9	Exhibit 15-11
	ER		1		1		Exhibit 15-11
	$f_{HV,ATS}$	AM Peak - Base	0.78	0.78	0.84	0.84	Equation 15-4
		AM Peak - With Dev	0.89	0.82	0.84	0.84	Equation 15-4
		PM Peak - Base	0.78	0.78	0.84	0.84	Equation 15-4
		PM Peak - With Dev	0.82	0.89	0.84	0.84	Equation 15-4
	$v_{i,ATS}$	AM Peak - Base	65	66	57	69	Equation 15-3
		AM Peak - With Dev	278	91	88	74	Equation 15-3
		PM Peak - Base	82	62	80	58	Equation 15-3
		PM Peak - With Dev	107	275	85	89	Equation 15-3
Step 4	$f_{np,ATS}$	AM Peak - Base	1.1	1.1	1.1	1.1	Exhibit 15-15
	*opposing	AM Peak - With Dev	1.1	2.0	1.1	1.1	Exhibit 15-15
		PM Peak - Base	1.1	1.1	1.1	1.1	Exhibit 15-15
		PM Peak - With Dev	2.0	1.2	1.1	1.1	Exhibit 15-15
	ATS_d	AM Peak - Base	73.4	73.4	63.5	63.5	Equation 15-6
		AM Peak - With Dev	71.5	70.7	63.2	63.2	Equation 15-6
		PM Peak - Base	73.3	73.3	63.4	63.4	Equation 15-6
		PM Peak - With Dev	70.6	71.4	63.1	63.1	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	0.98	EB	0.98	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	0.98	EB	0.98	WB	0.98	NB	0.98	SB	Equation 15-8			
	$v_{i,PTSF}$	AM Peak - Base	52	EB	53	WB	49	NB	59	SB	Equation 15-3			
		AM Peak - With Dev	254	EB	77	WB	76	NB	64	SB	Equation 15-3			
		PM Peak - Base	66	EB	50	WB	69	NB	50	SB	Equation 15-3			
		PM Peak - With Dev	90	EB	252	WB	74	NB	77	SB	Equation 15-3			
Step 6	$BPTFS_d$	AM Peak - Base	6.3	EB	6.5	WB	6.0	NB	7.1	SB	Equation 15-10			
		AM Peak - With Dev	27.0	EB	9.1	WB	9.0	NB	7.6	SB	Equation 15-10			
		PM Peak - Base	8.0	EB	6.1	WB	8.3	NB	6.1	SB	Equation 15-10			
		PM Peak - With Dev	10.5	EB	26.8	WB	8.8	NB	9.1	SB	Equation 15-10			
													Sturt Hwy S	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	7.4	EB	7.4	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	7.3	EB	7.3	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	12	EB	32	WB	13	NB	14	SB	Equation 15-9			
	$LOS_{, ATS}$	AM Peak - Base	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3			
		AM Peak - With Dev	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3			
		PM Peak - Base	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3			
		PM Peak - With Dev	A	EB	A	WB	A	NB	A	SB	Exhibit 15-3			
	$LOS_{, PTSF}$	AM Peak - Base	A	EB	A	WB	A	NB	A	SB				
		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				

	ATS	PTSF
A	55	35
B	50	50
C	45	65
D	40	80
E	0	100
F	demand exceeds capacity	

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	1520	EB	1402	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	1402	EB	1520	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	1661	EB	1661	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	1661	EB	1661	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		16%	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

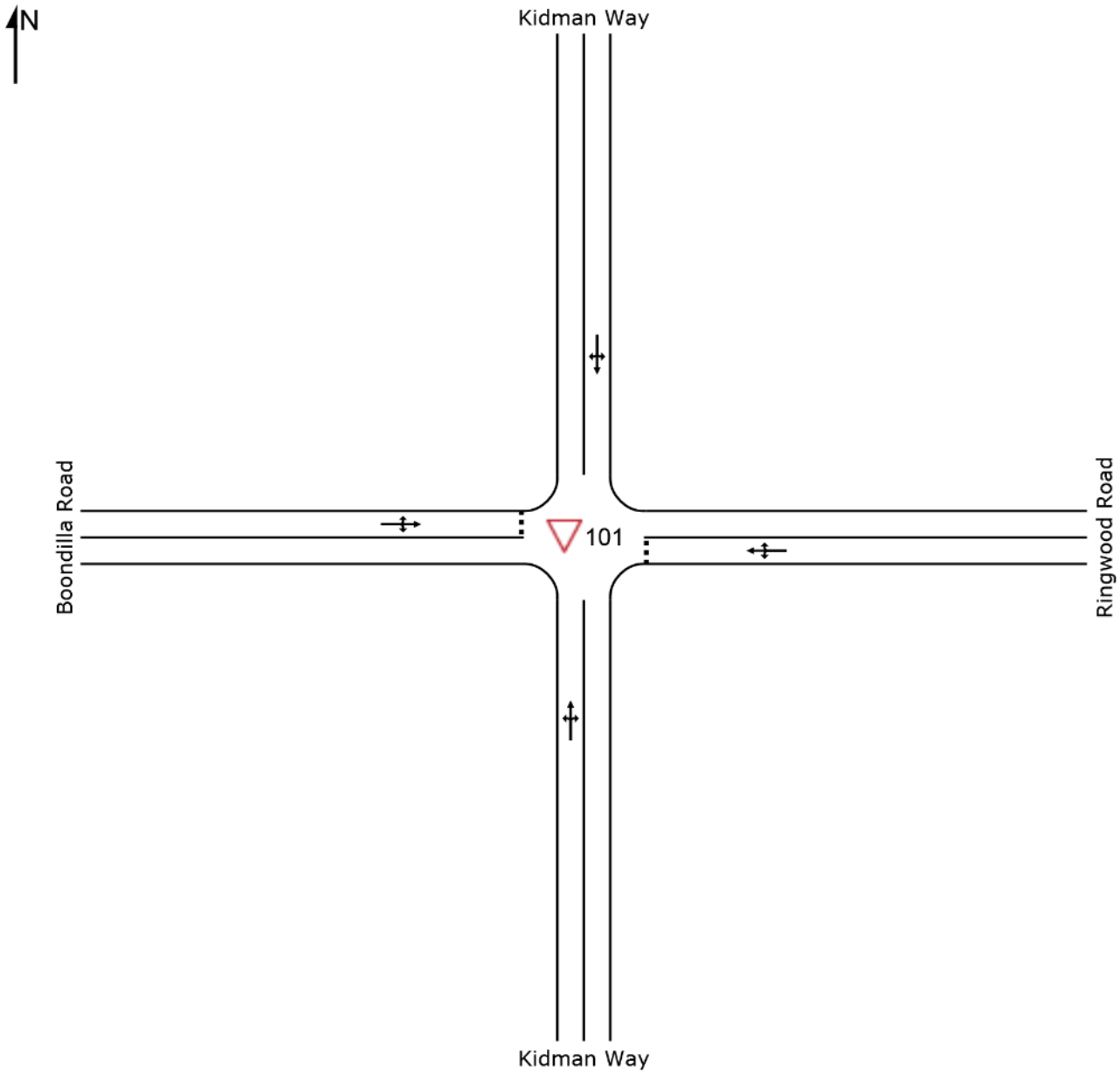
Appendix E

SIDRA Output Summaries

SITE LAYOUT

Site: 101 [Kidman Way | AM | 2018 Post]

Kidman Way and Ringwood Road
AM Peak
2018 Post
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 101 [Kidman Way | AM | 2018 Post]

Kidman Way and Ringwood Road
AM Peak
2018 Post
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kidman Way											
1	L2	11	0.0	0.034	5.7	LOS A	0.1	1.1	0.13	0.33	54.9
2	T1	22	19.0	0.034	0.1	LOS A	0.1	1.1	0.13	0.33	56.3
3	R2	23	18.2	0.034	5.9	LOS A	0.1	1.1	0.13	0.33	53.5
Approach		56	15.1	0.034	3.6	NA	0.1	1.1	0.13	0.33	54.9
East: Ringwood Road											
4	L2	31	20.7	0.055	5.9	LOS A	0.2	1.6	0.11	0.56	52.6
5	T1	11	0.0	0.055	4.6	LOS A	0.2	1.6	0.11	0.56	53.7
6	R2	22	19.0	0.055	6.4	LOS A	0.2	1.6	0.11	0.56	52.1
Approach		63	16.7	0.055	5.8	LOS A	0.2	1.6	0.11	0.56	52.6
North: Kidman Way											
7	L2	27	19.2	0.038	5.8	LOS A	0.1	0.6	0.05	0.33	54.4
8	T1	27	19.2	0.038	0.0	LOS A	0.1	0.6	0.05	0.33	56.8
9	R2	11	0.0	0.038	5.5	LOS A	0.1	0.6	0.05	0.33	54.7
Approach		65	16.1	0.038	3.3	NA	0.1	0.6	0.05	0.33	55.4
West: Boondilla Road											
10	L2	11	0.0	0.026	5.6	LOS A	0.1	0.6	0.10	0.55	53.7
11	T1	11	0.0	0.026	4.6	LOS A	0.1	0.6	0.10	0.55	53.9
12	R2	11	0.0	0.026	6.1	LOS A	0.1	0.6	0.10	0.55	53.2
Approach		32	0.0	0.026	5.4	LOS A	0.1	0.6	0.10	0.55	53.6
All Vehicles		216	13.7	0.055	4.4	NA	0.2	1.6	0.10	0.43	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.

MOVEMENT SUMMARY

Site: 101 [Kidman Way | PM | 2018 Post]

Kidman Way and Ringwood Road
PM Peak
2018 Post
Giveway / Yield (Two-Way)

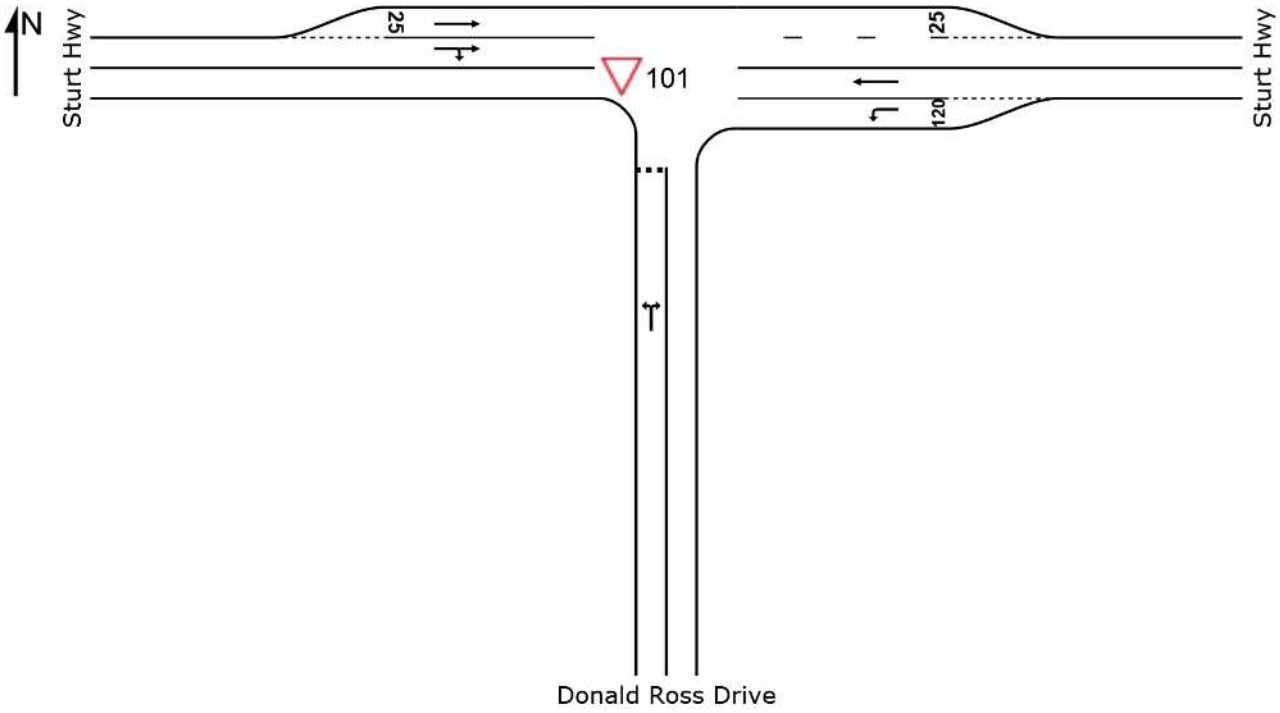
Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kidman Way											
1	L2	11	0.0	0.044	5.7	LOS A	0.2	1.4	0.12	0.33	55.1
2	T1	31	13.8	0.044	0.1	LOS A	0.2	1.4	0.12	0.33	56.5
3	R2	33	12.9	0.044	5.8	LOS A	0.2	1.4	0.12	0.33	53.9
Approach		74	11.4	0.044	3.4	NA	0.2	1.4	0.12	0.33	55.1
East: Ringwood Road											
4	L2	47	13.3	0.074	5.8	LOS A	0.3	2.1	0.09	0.56	52.9
5	T1	11	0.0	0.074	4.6	LOS A	0.3	2.1	0.09	0.56	53.7
6	R2	31	13.8	0.074	6.4	LOS A	0.3	2.1	0.09	0.56	52.4
Approach		88	11.9	0.074	5.8	LOS A	0.3	2.1	0.09	0.56	52.8
North: Kidman Way											
7	L2	22	19.0	0.032	5.8	LOS A	0.1	0.6	0.06	0.34	54.3
8	T1	22	19.0	0.032	0.0	LOS A	0.1	0.6	0.06	0.34	56.6
9	R2	11	0.0	0.032	5.6	LOS A	0.1	0.6	0.06	0.34	54.6
Approach		55	15.4	0.032	3.4	NA	0.1	0.6	0.06	0.34	55.3
West: Boondilla Road											
10	L2	11	0.0	0.027	5.6	LOS A	0.1	0.7	0.13	0.55	53.6
11	T1	11	0.0	0.027	4.6	LOS A	0.1	0.7	0.13	0.55	53.8
12	R2	11	0.0	0.027	6.2	LOS A	0.1	0.7	0.13	0.55	53.1
Approach		32	0.0	0.027	5.5	LOS A	0.1	0.7	0.13	0.55	53.5
All Vehicles		248	11.0	0.074	4.5	NA	0.3	2.1	0.10	0.44	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.

SITE LAYOUT

Site: 101 [Sturt Highway | AM | 2018 Post]

Sturt Highway and Donald Ross Drive
AM Peak
2018 Post
Giveway / Yield (Two-Way)



Organisation: ARUP PTY LTD | Created: Tuesday, 12 December 2017 3:46:38 PM
Project: \\global.arup.com\australasia\SYD\Projects\254000\254766-00 Darlington Point Solar Farm EIS\Work\Internal\Traffic\Darlington_Point_Solar_Farm_ST.sip7

MOVEMENT SUMMARY

Site: 101 [Sturt Highway | AM | 2018 Post]

Sturt Highway and Donald Ross Drive
AM Peak
2018 Post
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Donald Ross Drive											
1	L2	46	20.5	0.085	5.9	LOS A	0.3	2.7	0.10	0.57	51.9
3	R2	28	29.6	0.085	8.8	LOS A	0.3	2.7	0.10	0.57	51.2
Approach		75	23.9	0.085	7.0	LOS A	0.3	2.7	0.10	0.57	51.6
East: Sturt Hwy											
4	L2	48	19.6	0.030	5.8	LOS A	0.0	0.0	0.00	0.57	52.8
5	T1	24	30.4	0.015	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		73	23.2	0.030	3.8	NA	0.0	0.0	0.00	0.38	55.0
West: Sturt Hwy											
11	T1	23	27.3	0.014	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	207	4.1	0.159	5.8	LOS A	0.7	5.1	0.20	0.57	52.4
Approach		231	6.4	0.159	5.3	NA	0.7	5.1	0.18	0.51	53.1
All Vehicles		378	13.1	0.159	5.3	NA	0.7	5.1	0.13	0.50	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 | 2018 Post]

Sturt Highway and Donald Ross Drive
PM Peak
2018 Post
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Donald Ross Drive											
1	L2	205	3.6	0.226	5.7	LOS A	1.0	7.4	0.11	0.55	53.1
3	R2	55	19.2	0.226	7.0	LOS A	1.0	7.4	0.11	0.55	52.2
Approach		260	6.9	0.226	6.0	LOS A	1.0	7.4	0.11	0.55	52.9
East: Sturt Hwy											
4	L2	24	26.1	0.015	5.8	LOS A	0.0	0.0	0.00	0.57	52.5
5	T1	25	25.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		49	25.5	0.015	2.9	NA	0.0	0.0	0.00	0.28	56.1
West: Sturt Hwy											
11	T1	29	28.6	0.049	0.1	LOS A	0.2	1.7	0.06	0.19	58.0
12	R2	52	20.4	0.049	5.9	LOS A	0.2	1.7	0.15	0.46	52.5
Approach		81	23.4	0.049	3.8	NA	0.2	1.7	0.12	0.36	54.4
All Vehicles		391	12.7	0.226	5.1	NA	1.0	7.4	0.10	0.48	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.
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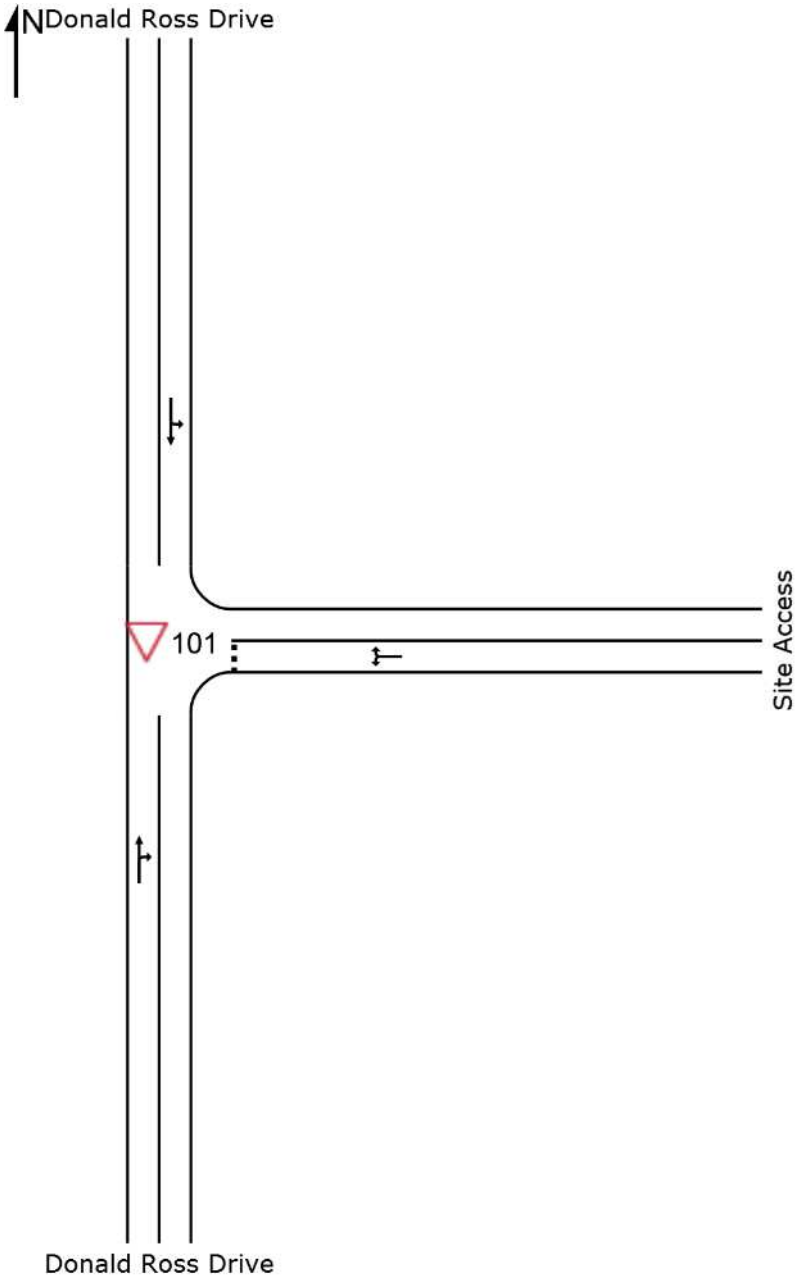
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Donald Ross Drive | AM | 2018 Post]

New Site
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 101 [Donald Ross Drive | AM | 2018 Post]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Donald Ross Drive											
2	T1	47	28.9	0.047	0.5	LOS A	0.2	1.4	0.25	0.24	89.7
3	R2	25	8.3	0.047	8.6	LOS A	0.2	1.4	0.25	0.24	76.3
Approach		73	21.7	0.047	3.3	NA	0.2	1.4	0.25	0.24	84.6
East: Site Access											
4	L2	4	50.0	0.030	6.3	LOS A	0.1	0.8	0.23	0.59	51.0
6	R2	26	12.0	0.030	6.5	LOS A	0.1	0.8	0.23	0.59	51.9
Approach		31	17.2	0.030	6.5	LOS A	0.1	0.8	0.23	0.59	51.8
North: Donald Ross Drive											
7	L2	207	1.5	0.142	5.6	LOS A	0.0	0.0	0.00	0.47	54.2
8	T1	47	28.9	0.142	0.0	LOS A	0.0	0.0	0.00	0.47	55.6
Approach		255	6.6	0.142	4.5	NA	0.0	0.0	0.00	0.47	54.4
All Vehicles		358	10.6	0.142	4.5	NA	0.2	1.4	0.07	0.44	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.
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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 | 2018 Post]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Donald Ross Drive											
2	T1	53	28.0	0.036	0.0	LOS A	0.0	0.3	0.04	0.05	98.4
3	R2	4	50.0	0.036	9.1	LOS A	0.0	0.3	0.04	0.05	65.9
Approach		57	29.6	0.036	0.7	NA	0.0	0.3	0.04	0.05	95.0
East: Site Access											
4	L2	25	8.3	0.199	5.8	LOS A	0.8	5.4	0.22	0.59	52.7
6	R2	207	1.5	0.199	6.0	LOS A	0.8	5.4	0.22	0.59	52.5
Approach		233	2.3	0.199	6.0	LOS A	0.8	5.4	0.22	0.59	52.5
North: Donald Ross Drive											
7	L2	26	12.0	0.045	5.7	LOS A	0.0	0.0	0.00	0.20	55.9
8	T1	49	25.5	0.045	0.0	LOS A	0.0	0.0	0.00	0.20	58.0
Approach		76	20.8	0.045	2.0	NA	0.0	0.0	0.00	0.20	57.2
All Vehicles		365	10.4	0.199	4.3	NA	0.8	5.4	0.14	0.42	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.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.