Parsons Brinckerhoff Australia Pty Limited
ABN 80 078 004 798

Level 27, Ernst & Young Centre
680 George Street
SYDNEY NSW 2000
GPO Box 5394
SYDNEY NSW 2001
Australia
Telephone +61 2 9272 5100
Facsimile +61 2 9272 5101
Email sydney@pb.com.au

Certified to ISO 9001; ISO 14001; AS/NZS 4801
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22 March 2011

Ms Nicole Woodrow
Landcom
Level 2
330 Church Street
Parramatta NSW 2150

Dear Ms Woodrow

North Penrith Development - Testing of RTA and Penrith Council Requested Intersection Changes and Parking Strategy

A Transport Mobility and Accessibility Plan was produced to support an application made in October 2010 under Part 3A of the EP&A Act for a Concept Plan and Project Application for the North Penrith Development (NPD). Responses to the application and the TMAP have been received from residents and government agencies, including the Roads and Traffic Authority (RTA) and Penrith City Council (PCC). These latter two responses, amongst other issues, requested the following amendments:

- the upgrading of the intersection of Castlereagh Road, Grace Drive and Peachtree Road to permit all traffic movements (RTA and PCC)
- the installation of a one lane roundabout at the new intersection of Daniel Woodriff Drive and Grace Drive (RTA and PCC)
- an on-street parking strategy (PCC).

The results of our additional analysis to respond adequately to these requests are contained in this letter.

1. Full access at the intersection of Castlereagh Road, Peachtree Road and Grace Drive

The RTA and PCC have requested that the intersection of Castlereagh Road and Peachtree Road, which is currently restricted to left in/left out on the incomplete eastern approach, be upgraded to enable all traffic movements (excluding U-turns) when Grace Drive is extended through to connect Castlereagh Road and Daniel Woodriff Drive. This upgrade would improve access to the Commuter Car Park, as well as the NPD.

Allowing the additional traffic movements would have the following flow-on consequences:

- increased traffic on Grace Drive
- reduced traffic using the Castlereagh Road/Coreen Avenue/Mullins Street roundabout
- higher turning movements at the new intersection of Daniel Woodriff Drive and Grace Drive
- reduced turning movements at the intersection of Coreen Avenue and Daniel Woodriff Drive.

These roads, and the affected intersections, are shown in Figure 1.1.

Figure 1.1 North Penrith Development map showing intersections for further investigation

For the intersection of Castlereagh Road, Peachtree Road and Grace Drive itself, allowing the additional turns would:

- reduce the green-time available for the heavy southbound through-movement on Castlereagh Road
- require more complex phasing due to the opposing right turn movements on Peachtree Road and Grace Drive.

To test the impact of allowing the additional turning movements, the spreadsheets used to forecast traffic flows for the Transport Mobility and Accessibility Plan (TMAP) for the NPD Part 3A Application were adjusted to divert traffic along the new paths potentially created by the upgrade. It was assumed that all commuter car park traffic travelling via Castlereagh Road would use the Peachtree Road intersection instead of travelling via Coreen Avenue as motorists would save time and avoid congestion. Similarly, NPD generated traffic was also assumed to use the Grace Drive/Peachtree Road intersection if it provided a shorter travel distance for their trip.

Two traffic volume scenarios were assessed (as was done in the TMAP):

- 2026 existing traffic, plus base traffic growth, plus traffic from other developments and traffic generated by the North Penrith Development
- 2026 existing traffic, plus base traffic growth and traffic generated by the North Penrith Development.

The second traffic scenario was tested as developments included in the first scenario in the vicinity of North Penrith are not guaranteed to proceed. If they do not proceed, traffic forecasts including traffic from these developments, would be too high and may result in excessive road upgrades contrary to the traffic management targets in central Penrith.

The resulting traffic volumes were modelled in the SIDRA intersection analysis software. The intersection layouts assumed were:

- Castlereagh Road, Coreen Avenue and Mullins Street:
  - existing two-lane roundabout
- Castlereagh Road, Peachtree Road and Grace Drive:
  - add 150 m long right turn bay on Castlereagh Road, northbound
  - remove traffic island preventing right turns
  - delineate one left turn lane and one right turn lane on Grace Drive.

The results of the preliminary SIDRA modelling are shown in Table 1.1 for 2026 AM and PM peaks. Detailed results are provided in Appendix A.

Table 1.1 SIDRA intersection model results - 2026

Intersection	Intersection control	Time period	DoS	Average Delay (sec/veh)	LoS	95th %ile Queue (m)
2026 Base + Other Development + North Penrith Development traffic						
Castlereagh Road/ Coreen Avenue	Roundabout	AM	1.83	820	LoS F	> 200
		PM	1.41	827	LoS F	> 200
Castlereagh Road/ Peachtree Road	Signals	AM	1.33	222	LoS F	> 200
		PM	1.14	94	LoS F	> 200
2026 Base + North Penrith Development traffic						
Castlereagh Road/ Coreen Avenue	Roundabout	AM	1.00	112	LoS F	140
		PM	0.83	20	LoS B	110
Castlereagh Road/ Peachtree Road	Signals	AM	0.92	38	LoS C	> 200
		PM	0.81	33	LoS C	> 200

The results for both intersections in the '2026 Base + Other Development + NPD' scenario indicate poor performance and long delays. A closer inspection of the traffic volumes forecast on Castlereagh Road show that they are too high to be accommodated in two lanes with interruptions to the flow at the intersections. This is due to the traffic generated by other developments, such as Penrith Lakes and Lakes Environs. These high flows would require the addition of an additional through lane in each direction at both intersections.

The results also show that the intersection of Castlereagh Road, Coreen Avenue and Mullins Street is experiencing excessive delays during the morning peak under the '2026 Base + NPD' scenario. The detailed results show that the Coreen Avenue approach is experiencing long delays, forecasting future poor performance. This is due to the large traffic volume southbound on Castlereagh Road. The volumes on Mullins Street, and the northbound right turn on Castlereagh Road, are not large enough to create sufficient gaps in the southbound flow for Coreen Avenue traffic to join the flow.

Our earlier analysis did not recommend this solution for the intersection because our original results indicated that it would delay the heavy southbound traffic movement, and it would not reduce the magnitude of the intersection upgrade required at the intersection of Castlereagh Road and Coreen Avenue. Allowing all movements at the Castlereagh Road/Peachtree Road intersection would have the benefits of reducing traffic on other roads and improving access to the Commuter Car Park and NPD (including the supermarket for semi-trailers). However, if this measure is to be added to the project, the following intersection upgrades would be required to reduce the forecast delays and achieve acceptable intersection performance. The proposed treatments to address the problems forecast from the requested upgrade would include:

2026 Base + Other Development + North Penrith Development traffic scenario

- Castlereagh Road, Coreen Avenue and Mullins Street:

- convert two-lane roundabout to traffic signals
- additional through lanes on Castlereagh Road in each direction, 100 m on approach and departure around the intersection
- two 150 m long right turn bays on Castlereagh Road northbound
- one through lane, one 75 m long left turn bay and one 150 m long right turn bay on Coreen Avenue
- one 150 m long left turn slip lane and one 70 m long right turn bay on Castlereagh Road southbound
- one shared through right lane and one 60 m long shared left through lane on Mullins Road

- Castlereagh Road, Peachtree Road and Grace Drive:
  - additional through lanes on Castlereagh Road in each direction, 100 m on approach and departure
  - add 150 m long right turn bay on Castlereagh Road, northbound
  - remove traffic island preventing right turns
  - linemark one left turn lane and one right turn lane on Grace Drive.

2026 Base + North Penrith Development traffic scenario

- Castlereagh Road, Coreen Avenue and Mullins Street:
  - retain two-lane roundabout
  - install roundabout metering on northern approach (Castlereagh Road) to create gaps for Coreen Avenue traffic
  - install queue detector loops on Coreen Avenue to trigger metering
  - install queue detector loops on Castlereagh Road, southbound to cancel metering if queues grow too far.

The roundabout metering described above would prolong the life of the roundabout without the need for an expensive conversion to traffic signals. The problem of excessive delays on Coreen Avenue was only forecast to occur during the morning peak. For the rest of the day, the roundabout was estimated to remain effective.

The results of SIDRA intersection modelling with the upgrades listed above in place is shown in Table 1.2. Detailed results are provided in Appendix B.

Table 1.2 SIDRA intersection model results – 2026 with upgrades

Intersection	Intersection control	Time period	DoS	Average Delay (sec/veh)	LoS	95th %ile Queue (m)
2026 Base + Other Development + North Penrith Development traffic						
Castlereagh Road/ Coreen Avenue	Roundabout	AM	0.84	30	LoS C	> 200
		PM	0.91	39	LoS C	> 200
Castlereagh Road/ Peachtree Road	Signals	AM	0.94	44	LoS D	> 200
		PM	0.86	31	LoS C	> 200
2026 Base + North Penrith Development traffic						
Castlereagh Road/ Coreen Avenue	Roundabout (Metering)	AM	0.82	50	LoS D	> 200
		PM	0.84	23	LoS B	> 200

2. New intersection of Daniel Woodriff Drive and Grace Drive

This intersection would be located on the existing commuter car park access road (renamed Daniel Woodriff Drive) where the Peachtree Road extension (Grace Drive) connects. This intersection has been planned with a four-way give-way controlled intersection, with Daniel Woodriff receiving priority. PCC and the RTA have expressed concern that a roundabout would be required to adequately control traffic.

Upgrading the Castlereagh Road, Peachtree Road and Grace Drive intersection to permit all movements, is forecast to increase the turning volumes at this intersection.

The intersection has been modelled in SIDRA with both give-way and one-lane roundabout control. The results are shown in Table 2.1 (detailed results included in Appendix A and B respectively).

Table 2.1 SIDRA intersection model results – 2026 for the Daniel Woodriff Drive and Grace Drive intersection

Intersection	Intersection control	Time period	DoS	Average Delay (sec/veh)	LoS	95th %ile Queue (m)
Daniel Woodriff Drive/ Grace Drive	Give-way sign	AM	0.59	16	LoS B	41
		PM	0.38	14	LoS A	17
Daniel Woodriff Drive/ Grace Drive	Roundabout	AM	0.25	12	LoS A	14
		PM	0.28	11	LoS A	18

The results show that the intersection can operate well with give-way or roundabout control, and hence upgrading this intersection to a one-lane roundabout is not justified on traffic performance grounds.

Installing a one-lane roundabout at this intersection would have advantages and disadvantages, including:

Advantages

- speed reduction along the straight Daniel Woodriff Drive
- if built large enough to accommodate the turning movements of semi-trailers, it could provide improved access for servicing the new supermarket.

Disadvantages:

- less safety for pedestrians and cyclists
- additional cost
- increased land-take, in both Landcom land and the adjoining property.

3. Road network upgrade costing

A concept level engineering cost estimate has been prepared for each of the upgrades proposed. The rates, contingencies and method used are the same as for the TMAP. The estimated costs are shown in Table 3.1.

These are concept level budget costs only, prepared using standard unit rates based on previous projects. Rates for small-scale projects assume that they would be undertaken as part of a wider works program.

In addition, we have allowed a 77% mark-up to cover overheads, margin and contingency, as follows:

Traffic Control	8%
Public utility plant relocation and/or protection	5%
Contractor's Overheads	18%
Contractor's margin	10%
Design	4%
Project Management	7%
Risk and Contingency	25%
Total % allowance	77%

No allowance has been made for the cost of land acquisition or on-going maintenance costs (due to lack of information). All costs are in $Australian dollars and are in 2010 values.

The estimates are based upon information made available to Parsons Brinckerhoff (PB) at the time of preparing the estimates. The estimates have been prepared for this specific Client and Project, and should not be used or relied on for any other use. PB accepts no liability for actual costs varying from those estimated.

Table 3.1 Description and estimated cost of intersection upgrades

Intersection	Recommended upgrades (in addition to existing layout)	Estimated cost
2026 Base + Other Development + North Penrith Development traffic		
Castlereagh Road/ Coreen Avenue	■ convert two-lane roundabout to traffic signals; ■ additional through lanes on Castlereagh Road in each direction, 100 m on approach and departure ■ two 150 m long right turn bays on Castlereagh Road northbound ■ one through lane, one 75 m long left turn bay and one 150 m long right turn bay on Coreen Avenue ■ one 150 m long left turn slip lane and one 70 m long right turn bay on Castlereagh Road southbound ■ one shared through right lane and one 60 m long shared left through lane on Mullins Road	$3,240,000
Castlereagh Road & Peachtree Road	■ additional through lanes on Castlereagh Road in each direction, 100 m on approach and departure ■ add 150 m long right turn bay on Castlereagh Road, northbound ■ remove traffic island preventing right turns ■ delineate one left turn lane and one right turn lane on Grace Drive	$1,540,000
2026 Base + North Penrith Development traffic		
Castlereagh Road/ Coreen Avenue	■ retain two lane roundabout ■ install roundabout metering on northern approach (Castlereagh Road) to create gaps for Coreen Avenue traffic ■ install queue detector loops on Coreen Avenue to trigger metering ■ install queue detector loops on Castlereagh Road, southbound to cancel metering if queues grow too far	$170,000
Castlereagh Road & Peachtree Road	■ add 150 m long right turn bay on Castlereagh Road, northbound ■ remove traffic island preventing right turns ■ delineate one left turn lane and one right turn lane on Grace Drive	$350,000
Both traffic scenarios		
Daniel Woodriff Drive/ Grace Drive	■ install new in one lane roundabout (in comparison to the cost of the give-way intersection)	+ $350,000

The need for these infrastructure upgrades is driven by several sources, including background growth, other developments, the expansion of the commuter car park and the NPD. For the 2026 Base + Other Development + North Penrith Development traffic scenario, the relative percentage of all three sources are used to calculate the contribution proportion. For the 2026 Base + North Penrith Development traffic scenario, only background growth and NPD traffic are used in the calculations. Both options have been calculated with no contribution from existing sources of traffic.

The need for the roundabout upgrade at the intersection of Daniel Woodriff Drive and Grace Drive has not been established on traffic capacity grounds, as a give-way controlled intersection would work just as well. The roundabout would be used by NPD and commuter car park traffic, so the contribution has been apportioned based on the amount of NPD traffic compared to total traffic. The remaining contribution would be made by PCC on behalf of the commuter car park traffic. The funding contributions for the additional upgrades are shown in Table 3.2.

Table 3.2 Contribution to road and intersection upgrades

Upgrade	Cost estimate	Apportionment	Contribution
2026 Base + Other Development + North Penrith Development traffic			
Castlereagh Road/ Coreen Avenue	$3,240,000	10%	$318,000
Castlereagh Road & Peachtree Road	$1,540,000	14%	$223,000
2026 Base + North Penrith Development traffic			
Castlereagh Road/ Coreen Avenue	$170,000	38%	$65,000
Castlereagh Road & Peachtree Road	$350,000	57%	$199,000
Both traffic scenarios			
Daniel Woodriff Drive/ Grace Drive (Roundabout)	$350,000	56%	$196,000

The full set of road upgrades for the 2026 Base plus NPD traffic scenario are shown in Table 3.3.

Table 3.3 Contribution to road and intersection upgrades

Upgrade	Cost estimate	Apportionment	Contribution
2026 Base + North Penrith Development traffic			
Parker Street/Oxford Street/Coreen Avenue & Richmond Road	$300,000	40%	$122,000
Coreen Avenue & Coombes Drive	$25,000	58%	$15,000
Coreen Avenue & Site Boulevard	$770,000	100%	$770,000
Coreen Avenue & Daniel Woodriff Drive	$30,000	100%	$30,000
Castlereagh Road/ Coreen Avenue	$170,000	38%	$65,000
Castlereagh Road & Peachtree Road	$350,000	57%	$199,000
Daniel Woodriff Drive/ Grace Drive (Roundabout)	$350,000	56%	$196,000
Total	$1,645,000	73%	$1,199,000

For comparison, the previous contribution for this scenario (estimated at the time of the TMAP production) was $1,057,000.

4. NPD on-street parking strategy

The TMAP discussed a strategy for public off-street, private off-street and on-street parking. PCC have asked for a more substantial plan for on-street parking. The section below proposes an on-street parking strategy that restricts use by commuters, creates parking turn-over for businesses and allows for visitors to residential properties. The ultimate authority on parking decisions rests with the Penrith City Council and the local traffic committee.

The on-street parking strategy is built on the following objectives:

- provide for regulatory No Stopping zones
- provide for the needs of public transport services (bus stops and taxi ranks)
- loading activities will be accommodated off-street
- provide short-stay parking for people shopping, undertaking personal business or attending meetings
- protect on-street parking from being inefficiently taken up by long-stay commuters using Penrith Station.

The attached map shows the proposed on-street parking space distribution. This would need to be reviewed and submitted to the local traffic committee before being prepared and implemented during the construction of the estate. A description of the on-street parking types is provided in Table 4.1.

Table 4.1 On-street parking types

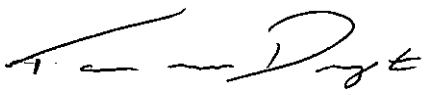
Parking type	Description
No Stopping	Statutory requirements and roads with limited width
Bus Zone	At bus stops
Taxi Zone	At taxi rank alongside Station Square
5 Minute Parking	Passenger drop-off
2 hour limit 8.30 pm–6.00 pm Monday to Friday, 8.30 am to 12.30 pm Saturday	Promote parking turn-over, activate village centre streets, support reduced off-street private parking provision
Loading Zone 8.30 pm–6.00 pm Monday to Friday, 8.30 am to 12.30 pm Saturday	On-street servicing requirements
4 hour limit 8.30 am–6.00 pm Monday to Friday	Parking adjacent to residential areas, allows visitors, tradespeople but discourages commuter parking

Further information on the parking strategy was presented in the TMAP. It was originally proposed that the residential streets outside the Village Centre have unrestricted parking, with the possible application of 4 hour parking during weekday business hours if commuter parking intrusion became a problem. To avoid problems before they eventuate, a parking designation of 4 hour limit 8.30 am–6.00 pm Monday to Friday, unrestricted at other times, could be applied from the outset. This could be supplemented by a resident parking scheme, if this conforms with Council practice.

Parking within the Village Centre (on-street and public off-street parking) is recommended to be controlled by a 2 hour limit 8.30 pm–6.00 pm Monday to Friday, 8.30 am to 12.30 pm Saturday. Metered parking is not current practice in Penrith Town Centre, but could be introduced in the future. It is envisioned that parking meters would be utilised for on-street kerbside parking to manage excess parking demand once they were endorsed for use generally.

Please let me know if you have any questions regarding this information.

Yours sincerely



Tom van Drempt
Senior Transport Engineer
Parsons Brinckerhoff Australia Pty Limited

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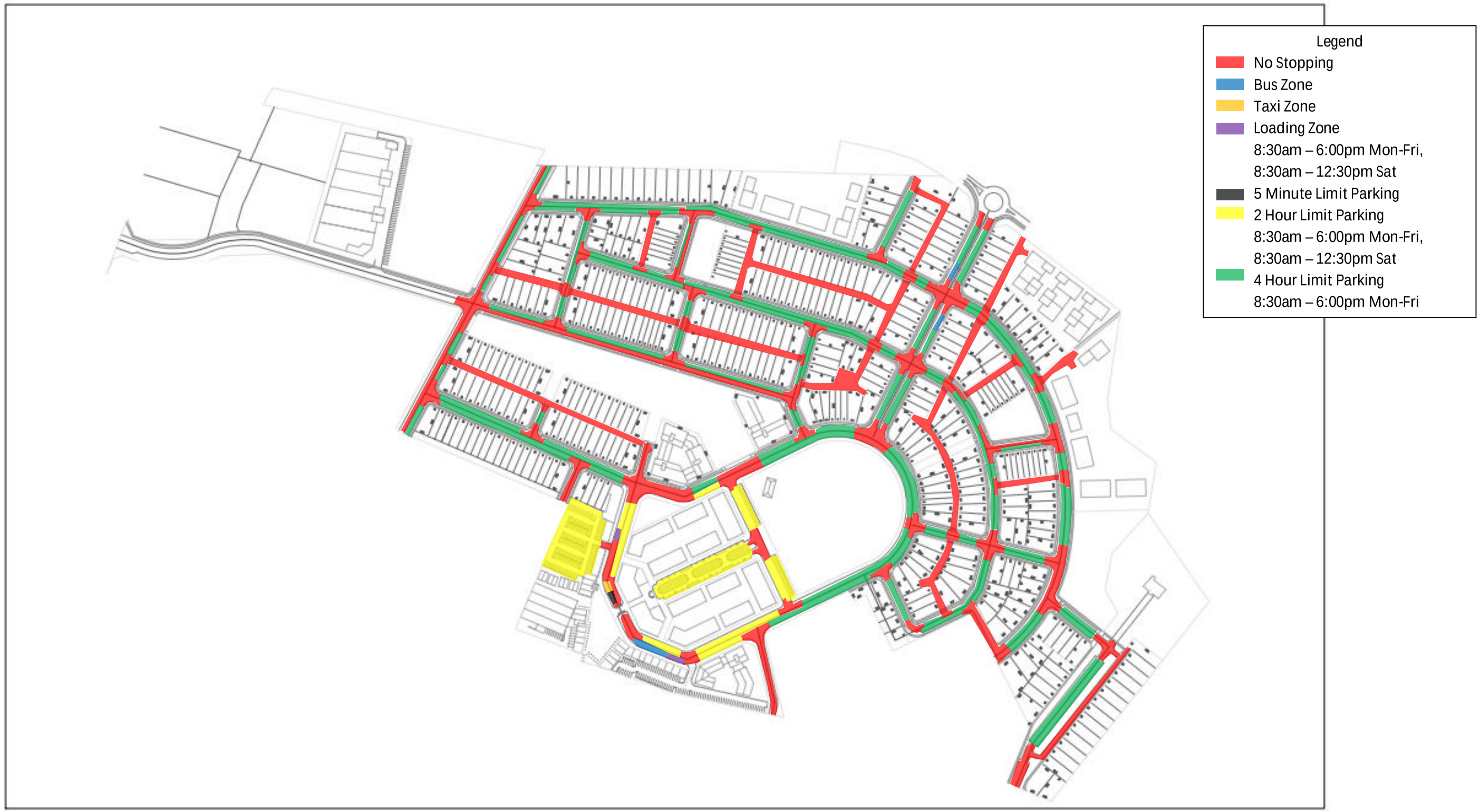
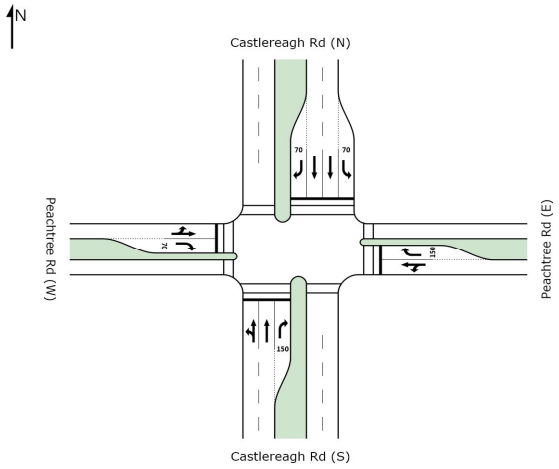


On-street Parking Plan

Appendix A – SIDRA Results – No Upgrades

Castlereagh Rd / Peachtree Rd



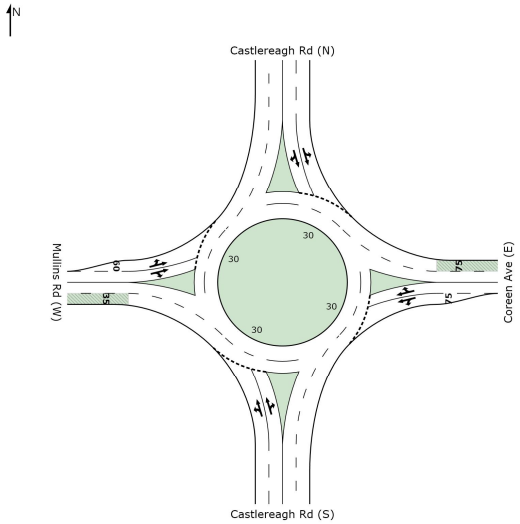
AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	118	5.4	0.937	37.7	LOS C	54.5	399.2	0.84	1.05	30.8
2	T	1594	5.4	0.936	27.6	LOS B	56.0	410.2	0.85	0.87	32.4
3	R	189	4.3	1.310	377.0	LOS F	34.0	246.6	1.00	1.56	5.3
Approach		1901	5.3	1.310	62.9	LOS E	56.0	410.2	0.86	0.95	21.4
East: Peachtree Rd (E)											
4	L	133	4.0	0.275	54.1	LOS D	9.3	67.6	0.83	0.79	24.1
5	T	1	0.0	0.275	45.8	LOS D	9.3	67.6	0.83	0.68	24.6
6	R	28	3.7	0.393	89.0	LOS F	3.2	22.8	1.00	0.72	17.5
Approach		162	3.9	0.393	60.2	LOS E	9.3	67.6	0.86	0.78	22.6
North: Castlereagh Rd (N)											
7	L	140	3.8	0.299	19.0	LOS B	5.2	37.6	0.41	0.73	39.5
8	T	2857	3.8	1.325	357.6	LOS F	270.8	1957.0	1.00	2.22	5.5
9	R	122	3.4	0.562	77.1	LOS F	10.3	74.1	0.99	0.89	19.2
Approach		3119	3.8	1.325	331.5	LOS F	270.8	1957.0	0.97	2.10	5.9
West: Peachtree Rd (W)											
10	L	38	8.3	0.086	53.2	LOS D	3.1	23.3	0.79	0.74	24.4
11	T	1	0.0	0.086	44.6	LOS D	3.1	23.3	0.79	0.60	23.4
12	R	40	7.9	0.569	90.6	LOS F	4.4	32.6	1.00	0.75	17.3
Approach		79	8.0	0.569	72.0	LOS F	4.4	32.6	0.90	0.75	20.2
All Vehicles		5261	4.4	1.325	222.2	LOS F	270.8	1957.0	0.93	1.63	8.4

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	77	2.7	1.130	149.2	LOS F	129.2	928.1	1.00	1.38	12.0
2	T	2322	3.0	1.135	143.3	LOS F	158.6	1139.3	1.00	1.49	11.9
3	R	114	2.8	1.040	150.6	LOS F	13.6	97.6	1.00	1.15	11.7
Approach		2513	3.0	1.135	143.8	LOS F	158.6	1139.3	1.00	1.47	11.9
East: Peachtree Rd (E)											
4	L	229	2.8	0.504	59.8	LOS E	15.7	112.8	0.91	0.83	22.7
5	T	1	0.0	0.490	51.5	LOS D	15.7	112.8	0.91	0.77	23.0
6	R	115	2.8	0.859	92.3	LOS F	10.9	78.1	1.00	0.93	17.0
Approach		345	2.7	0.859	70.6	LOS F	15.7	112.8	0.94	0.86	20.4
North: Castlereagh Rd (N)											
7	L	73	1.4	0.146	17.3	LOS B	2.6	18.7	0.37	0.71	40.7
8	T	1791	2.9	0.845	29.7	LOS C	54.0	387.1	0.91	0.85	31.5
9	R	91	2.3	0.826	92.0	LOS F	8.9	63.6	1.00	0.90	17.0
Approach		1954	2.8	0.845	32.1	LOS C	54.0	387.1	0.90	0.84	30.5
West: Peachtree Rd (W)											
10	L	163	2.6	0.370	57.8	LOS E	11.8	84.3	0.87	0.81	23.2
11	T	6	0.0	0.370	49.5	LOS D	11.8	84.3	0.87	0.72	22.1
12	R	142	2.9	1.060	165.0	LOS F	17.1	122.9	1.00	1.19	10.9
Approach		311	2.7	1.060	106.5	LOS F	17.1	122.9	0.93	0.98	15.3
All Vehicles		5122	2.9	1.135	94.0	LOS F	158.6	1139.3	0.95	1.16	16.4

Castlereagh Rd / Coreen Ave



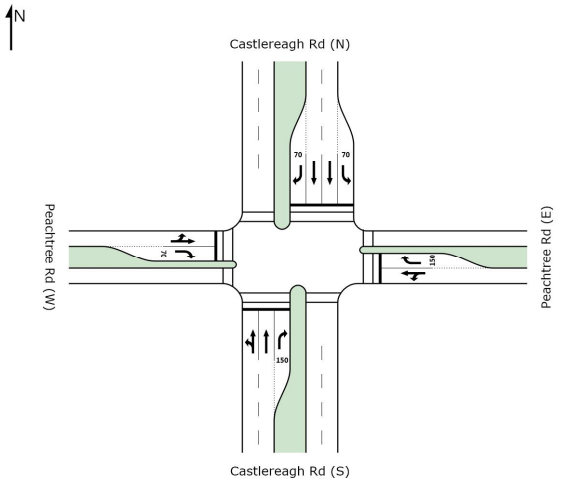
AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	85	8.6	0.618	7.3	LOS A	7.7	56.6	0.65	0.61	48.5
2	T	1487	5.9	0.616	5.9	LOS A	7.7	56.6	0.65	0.53	48.4
3	R	208	6.1	0.617	12.8	LOS A	7.7	56.5	0.65	0.74	46.2
Approach		1781	6.1	0.616	6.8	LOS A	7.7	56.6	0.65	0.55	48.1
East: Coreen Ave (E)											
4	L	170	15.9	1.134	271.1	LOS F	25.6	203.4	1.00	2.32	7.1
5	T	104	3.0	1.828	820.8	LOS F	91.5	685.5	1.00	3.53	2.6
6	R	161	11.1	1.830	827.9	LOS F	91.5	685.5	1.00	3.49	2.7
Approach		444	11.1	1.828	612.3	LOS F	91.5	685.5	1.00	3.04	3.5
North: Castlereagh Rd (N)											
7	L	366	4.0	1.156	155.6	LOS F	164.0	1199.2	1.00	4.20	11.4
8	T	2709	5.5	1.156	154.5	LOS F	164.0	1200.0	1.00	4.20	11.5
9	R	51	18.8	1.148	162.5	LOS F	163.1	1200.0	1.00	4.08	12.0
Approach		3126	5.6	1.156	154.8	LOS F	164.0	1200.0	1.00	4.19	11.5
West: Mullins Rd (W)											
10	L	41	5.1	0.149	17.0	LOS B	1.0	7.4	0.90	0.95	41.1
11	T	32	6.7	0.255	17.1	LOS B	1.7	12.9	0.90	0.94	40.1
12	R	42	12.5	0.255	24.4	LOS B	1.7	12.9	0.91	0.98	37.8
Approach		115	8.3	0.255	19.8	LOS B	1.7	12.9	0.90	0.96	39.5
All Vehicles		5466	6.2	1.828	140.9	LOS F	164.0	1200.0	0.88	2.84	12.5

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	98	3.2	1.419	381.8	LOS F	311.6	2234.5	1.00	8.11	5.2
2	T	2571	2.8	1.411	381.2	LOS F	311.6	2234.5	1.00	7.90	5.3
3	R	286	7.7	1.410	389.1	LOS F	269.4	1948.0	1.00	7.54	5.6
Approach		2955	3.3	1.410	382.0	LOS F	311.6	2234.5	1.00	7.87	5.3
East: Coreen Ave (E)											
4	L	157	3.4	0.498	17.5	LOS B	3.6	26.0	0.91	1.02	40.6
5	T	127	6.6	0.801	23.8	LOS B	9.0	65.4	1.00	1.24	35.6
6	R	242	3.9	0.802	30.6	LOS C	9.0	65.4	1.00	1.24	34.2
Approach		526	4.4	0.801	25.1	LOS C	9.0	65.4	0.97	1.18	36.2
North: Castlereagh Rd (N)											
7	L	234	2.7	0.823	11.4	LOS A	14.5	104.6	0.89	0.90	46.6
8	T	1595	3.4	0.822	10.7	LOS A	14.5	104.6	0.90	0.92	46.3
9	R	58	5.5	0.827	18.6	LOS B	14.3	103.1	0.92	1.00	42.5
Approach		1886	3.3	0.822	11.0	LOS B	14.5	104.6	0.90	0.92	46.2
West: Mullins Rd (W)											
10	L	102	2.1	0.580	37.6	LOS C	4.4	31.5	0.97	1.10	29.5
11	T	85	2.5	0.508	24.6	LOS B	4.6	33.1	1.00	1.09	35.4
12	R	60	3.5	0.508	31.5	LOS C	4.6	33.1	1.00	1.09	34.1
Approach		247	2.6	0.581	31.6	LOS C	4.6	33.1	0.99	1.09	32.5
All Vehicles		5615	3.4	1.410	208.5	LOS F	311.6	2234.5	0.96	4.61	9.0

Castlereagh Rd / Peachtree Rd



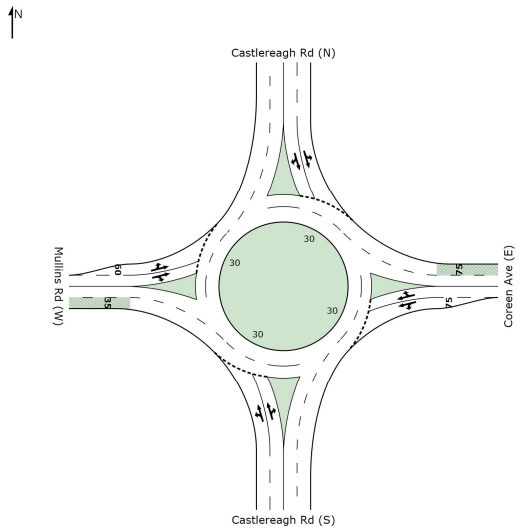
AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	118	5.4	0.680	19.1	LOS B	16.5	120.7	0.35	1.01	40.4
2	T	1194	5.7	0.681	9.5	LOS A	17.5	128.5	0.36	0.35	46.1
3	R	221	4.3	0.920	95.5	LOS F	19.8	143.3	1.00	0.99	16.6
Approach		1533	5.5	0.920	22.7	LOS B	19.8	143.3	0.46	0.50	36.4
East: Peachtree Rd (E)											
4	L	133	4.0	0.233	48.2	LOS D	8.8	63.7	0.78	0.79	25.8
5	T	1	0.0	0.237	39.8	LOS C	8.8	63.7	0.78	0.64	26.5
6	R	28	3.7	0.393	89.0	LOS F	3.2	22.8	1.00	0.72	17.5
Approach		162	3.9	0.393	55.3	LOS D	8.8	63.7	0.82	0.77	23.8
North: Castlereagh Rd (N)											
7	L	140	3.8	0.334	22.4	LOS B	5.9	42.6	0.47	0.74	37.2
8	T	1791	3.4	0.914	47.0	LOS D	67.3	485.2	1.00	1.00	25.1
9	R	122	3.4	0.565	74.5	LOS F	10.2	73.2	0.98	0.80	19.7
Approach		2053	3.4	0.914	46.9	LOS D	67.3	485.2	0.96	0.97	25.3
West: Peachtree Rd (W)											
10	L	38	8.3	0.075	48.4	LOS D	2.9	22.0	0.75	0.74	25.8
11	T	1	0.0	0.075	39.8	LOS C	2.9	22.0	0.75	0.57	24.8
12	R	40	7.9	0.569	90.6	LOS F	4.4	32.6	1.00	0.75	17.3
Approach		79	8.0	0.569	69.6	LOS E	4.4	32.6	0.88	0.74	20.6
All Vehicles		3826	4.4	0.920	38.0	LOS C	67.3	485.2	0.75	0.77	28.6

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	77	2.7	0.757	25.5	LOS B	22.9	164.7	0.58	0.99	36.6
2	T	1256	3.1	0.756	15.0	LOS B	23.7	170.5	0.59	0.55	40.7
3	R	114	2.8	0.812	79.2	LOS F	9.5	68.2	1.00	0.90	18.9
Approach		1446	3.1	0.812	20.6	LOS B	23.7	170.5	0.62	0.60	37.1
East: Peachtree Rd (E)											
4	L	229	2.8	0.425	47.5	LOS D	13.2	94.9	0.85	0.82	26.0
5	T	1	0.0	0.425	39.2	LOS C	13.2	94.9	0.85	0.72	26.5
6	R	115	2.8	0.630	71.2	LOS F	9.0	64.5	1.00	0.81	20.4
Approach		345	2.7	0.630	55.4	LOS D	13.2	94.9	0.90	0.81	23.8
North: Castlereagh Rd (N)											
7	L	73	1.4	0.148	19.1	LOS B	2.7	19.1	0.43	0.72	39.3
8	T	1423	2.9	0.806	32.3	LOS C	38.6	277.1	0.93	0.85	30.3
9	R	91	2.3	0.644	74.7	LOS F	7.6	54.0	1.00	0.80	19.7
Approach		1586	2.8	0.805	34.1	LOS C	38.6	277.1	0.91	0.84	29.7
West: Peachtree Rd (W)											
10	L	163	2.6	0.304	45.8	LOS D	9.7	69.3	0.82	0.80	26.5
11	T	1	0.0	0.297	37.5	LOS C	9.7	69.3	0.82	0.67	25.3
12	R	146	2.9	0.804	76.3	LOS F	11.5	82.8	1.00	0.90	19.4
Approach		311	2.7	0.804	60.1	LOS E	11.5	82.8	0.90	0.84	22.6
All Vehicles		3688	2.9	0.812	33.0	LOS C	38.6	277.1	0.79	0.74	30.6

Castlereagh Rd / Coreen Ave



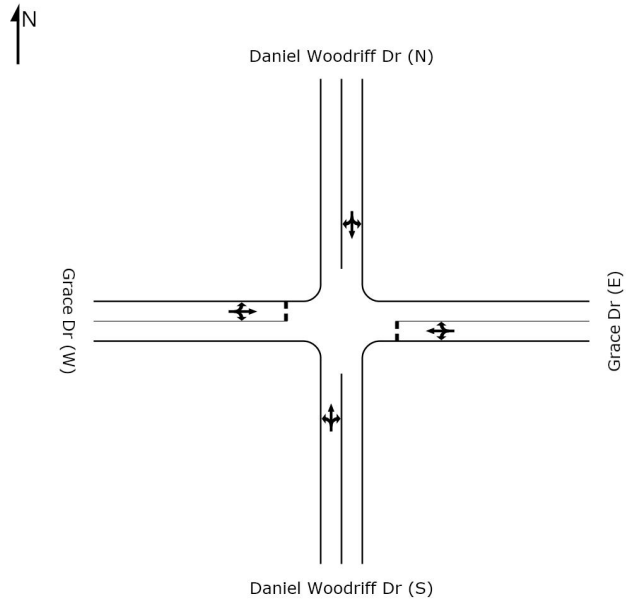
AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	85	8.6	0.561	8.0	LOS A	6.4	47.3	0.75	0.67	48.0
2	T	1120	5.9	0.561	6.6	LOS A	6.4	47.3	0.75	0.59	47.6
3	R	208	6.1	0.562	13.5	LOS A	6.4	47.2	0.75	0.78	45.9
Approach		1414	6.1	0.562	7.7	LOS A	6.4	47.3	0.75	0.63	47.3
East: Coreen Ave (E)											
4	L	179	15.9	0.788	50.0	LOS D	7.6	60.7	0.98	1.27	25.5
5	T	104	3.0	1.002	104.4	LOS F	18.8	140.9	1.00	1.86	15.5
6	R	154	11.6	0.998	111.5	LOS F	18.8	140.9	1.00	1.84	15.8
Approach		437	11.3	1.001	84.6	LOS F	18.8	140.9	0.99	1.62	18.5
North: Castlereagh Rd (N)											
7	L	280	3.4	0.733	9.1	LOS A	11.3	82.6	0.82	0.74	47.5
8	T	1643	5.1	0.733	8.0	LOS A	11.4	83.5	0.82	0.72	47.2
9	R	51	18.8	0.732	16.0	LOS B	11.4	83.5	0.82	0.86	44.8
Approach		1974	5.2	0.733	8.3	LOS B	11.4	83.5	0.82	0.72	47.2
West: Mullins Rd (W)											
10	L	41	5.1	0.117	14.0	LOS A	0.8	6.1	0.88	0.92	43.6
11	T	32	6.7	0.200	13.8	LOS A	1.4	10.6	0.89	0.93	42.7
12	R	42	12.5	0.200	21.0	LOS B	1.4	10.6	0.89	0.98	40.0
Approach		115	8.3	0.200	16.5	LOS B	1.4	10.6	0.89	0.95	41.9
All Vehicles		3939	6.3	1.001	16.8	LOS B	18.8	140.9	0.81	0.79	40.1

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	98	3.2	0.830	11.5	LOS A	15.4	109.8	0.92	0.91	46.7
2	T	1505	2.4	0.833	10.7	LOS A	15.4	109.8	0.93	0.92	46.0
3	R	286	7.7	0.832	18.4	LOS B	15.0	109.1	0.95	0.99	42.1
Approach		1889	3.3	0.832	11.9	LOS B	15.4	109.8	0.93	0.93	45.4
East: Coreen Ave (E)											
4	L	157	3.4	0.364	12.3	LOS A	2.5	17.9	0.85	0.95	45.0
5	T	127	6.6	0.475	10.4	LOS A	3.9	28.8	0.90	0.98	45.7
6	R	157	4.7	0.475	17.2	LOS B	3.9	28.8	0.90	1.03	42.6
Approach		441	4.8	0.475	13.5	LOS B	3.9	28.8	0.88	0.99	44.2
North: Castlereagh Rd (N)											
7	L	226	2.8	0.718	10.4	LOS A	9.9	71.0	0.84	0.88	47.4
8	T	1227	3.3	0.717	9.6	LOS A	9.9	71.0	0.84	0.88	47.0
9	R	58	5.5	0.715	17.4	LOS B	9.6	68.9	0.85	1.00	43.3
Approach		1512	3.3	0.718	10.0	LOS B	9.9	71.0	0.84	0.89	46.9
West: Mullins Rd (W)											
10	L	102	2.1	0.391	18.5	LOS B	2.7	19.2	0.92	1.00	39.8
11	T	85	2.5	0.364	13.3	LOS A	2.9	20.8	0.96	1.00	43.3
12	R	60	3.5	0.364	20.2	LOS B	2.9	20.8	0.96	1.02	40.7
Approach		247	2.6	0.392	17.1	LOS B	2.9	20.8	0.94	1.00	41.2
All Vehicles		4089	3.4	0.832	11.7	LOS A	15.4	109.8	0.89	0.93	45.5

Daniel Woodriff Dr / Grace Dr



AM Movement Summary

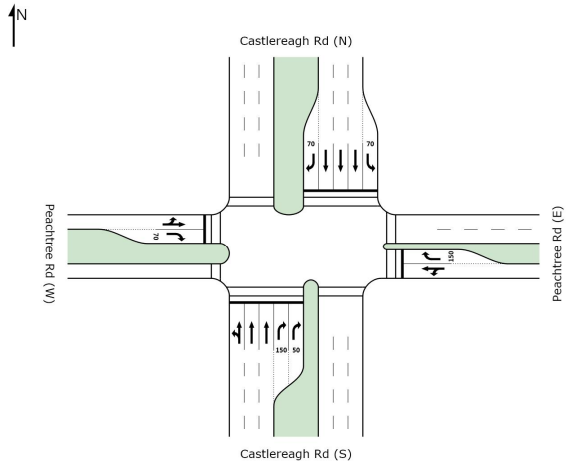
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Daniel Woodriff Dr (S)											
1	L	111	0.0	0.086	7.2	LOS A	0.7	4.8	0.55	0.31	41.9
2	T	49	0.0	0.086	0.8	LOS A	0.7	4.8	0.55	0.00	42.6
3	R	1	0.0	0.088	7.6	LOS A	0.7	4.8	0.55	0.67	42.0
Approach		161	0.0	0.086	5.3	LOS A	0.7	4.8	0.55	0.21	42.1
East: Grace Dr (E)											
4	L	1	0.0	0.048	10.1	LOS B	0.2	1.7	0.51	0.63	40.5
5	T	26	0.0	0.049	8.9	LOS A	0.2	1.7	0.51	0.66	41.1
6	R	1	0.0	0.048	10.5	LOS B	0.2	1.7	0.51	0.75	40.4
Approach		28	0.0	0.049	9.0	LOS B	0.2	1.7	0.51	0.66	41.1
North: Daniel Woodriff Dr (N)											
7	L	1	0.0	0.132	7.1	LOS A	1.0	7.2	0.31	0.58	43.0
8	T	196	0.0	0.132	0.7	LOS A	1.0	7.2	0.31	0.00	46.1
9	R	38	0.0	0.132	7.5	LOS A	1.0	7.2	0.31	0.83	42.9
Approach		235	0.0	0.132	1.8	LOS A	1.0	7.2	0.31	0.14	45.5
West: Grace Dr (W)											
10	L	3	0.0	0.632	15.8	LOS C	5.9	41.1	0.70	0.78	36.0
11	T	12	0.0	0.579	14.5	LOS B	5.9	41.1	0.70	1.01	36.4
12	R	296	0.0	0.592	16.1	LOS C	5.9	41.1	0.70	1.09	36.0
Approach		311	0.0	0.592	16.1	LOS C	5.9	41.1	0.70	1.08	36.0
All Vehicles		735	0.0	0.592	8.9	NA	5.9	41.1	0.54	0.57	40.1

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Daniel Woodriff Dr (S)											
1	L	288	0.0	0.227	7.1	LOS A	2.0	14.0	0.51	0.33	42.0
2	T	139	0.0	0.227	0.7	LOS A	2.0	14.0	0.51	0.00	43.1
3	R	1	0.0	0.211	7.5	LOS A	2.0	14.0	0.51	0.67	42.1
Approach		428	0.0	0.227	5.0	LOS A	2.0	14.0	0.51	0.23	42.3
East: Grace Dr (E)											
4	L	1	0.0	0.033	12.4	LOS B	0.2	1.1	0.55	0.57	38.8
5	T	13	0.0	0.033	11.1	LOS B	0.2	1.1	0.55	0.71	39.4
6	R	1	0.0	0.033	12.7	LOS B	0.2	1.1	0.55	0.75	38.7
Approach		15	0.0	0.033	11.3	LOS B	0.2	1.1	0.55	0.70	39.3
North: Daniel Woodriff Dr (N)											
7	L	1	0.0	0.081	8.6	LOS A	0.8	5.6	0.53	0.42	42.8
8	T	142	0.0	0.078	2.2	LOS A	0.8	5.6	0.53	0.00	43.9
9	R	4	0.0	0.078	8.9	LOS A	0.8	5.6	0.53	0.90	42.7
Approach		147	0.0	0.078	2.4	LOS A	0.8	5.6	0.53	0.03	43.8
West: Grace Dr (W)											
10	L	36	0.0	0.377	13.2	LOS B	2.5	17.4	0.61	0.82	37.8
11	T	20	0.0	0.377	11.9	LOS B	2.5	17.4	0.61	0.86	38.4
12	R	137	0.0	0.377	13.5	LOS B	2.5	17.4	0.61	0.94	37.8
Approach		193	0.0	0.377	13.3	LOS B	2.5	17.4	0.61	0.91	37.8
All Vehicles		783	0.0	0.377	6.7	NA	2.5	17.4	0.54	0.36	41.3

Appendix B – SIDRA Results – With Upgrades

Castlereagh Rd / Peachtree Rd



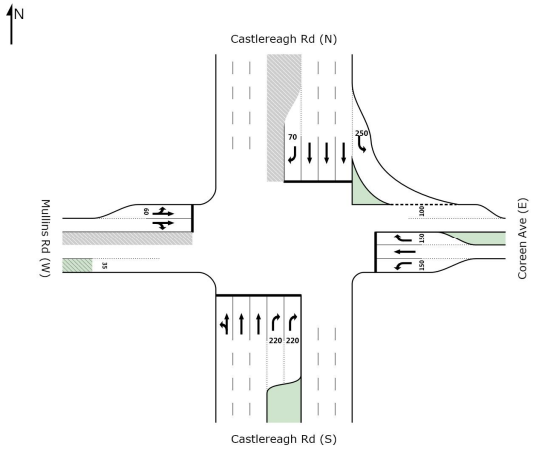
AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	118	5.4	0.656	27.7	LOS B	19.9	145.6	0.51	0.99	35.1
2	T	1562	5.4	0.656	16.3	LOS B	20.5	150.2	0.52	0.48	39.9
3	R	221	4.3	0.920	100.3	LOS F	11.0	80.1	1.00	1.00	16.0
Approach		1901	5.3	0.920	26.8	LOS B	20.5	150.2	0.57	0.57	33.8
East: Peachtree Rd (E)											
4	L	133	4.0	0.285	53.5	LOS D	9.8	71.0	0.83	0.80	24.4
5	T	11	0.0	0.286	45.1	LOS D	9.8	71.0	0.83	0.68	24.8
6	R	28	3.7	0.393	88.8	LOS F	3.2	22.8	1.00	0.72	17.6
Approach		172	3.7	0.393	58.8	LOS E	9.8	71.0	0.86	0.78	22.9
North: Castlereagh Rd (N)											
7	L	140	3.8	0.321	21.1	LOS B	5.6	40.7	0.44	0.73	38.1
8	T	2857	3.8	0.938	52.8	LOS D	76.9	556.0	1.00	1.04	23.5
9	R	122	3.4	0.632	79.5	LOS F	10.4	75.2	1.00	0.90	18.9
Approach		3119	3.8	0.938	52.4	LOS D	76.9	556.0	0.98	1.02	23.7
West: Peachtree Rd (W)											
10	L	38	8.3	0.145	58.2	LOS E	4.8	34.8	0.84	0.77	23.3
11	T	21	0.0	0.145	49.6	LOS D	4.8	34.8	0.84	0.65	22.3
12	R	40	7.9	0.569	90.3	LOS F	4.4	32.6	1.00	0.75	17.4
Approach		99	6.4	0.569	69.3	LOS E	4.8	34.8	0.90	0.74	20.3
All Vehicles		5291	4.4	0.938	43.7	LOS D	76.9	556.0	0.83	0.85	26.4

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	77	2.7	0.861	27.2	LOS B	36.1	259.0	0.66	1.00	35.8
2	T	2322	3.0	0.860	16.0	LOS B	37.1	266.8	0.67	0.64	39.8
3	R	114	2.8	0.520	85.5	LOS F	5.7	41.0	1.00	0.75	18.0
Approach		2513	3.0	0.860	19.5	LOS B	37.1	266.8	0.69	0.65	37.6
East: Peachtree Rd (E)											
4	L	229	2.8	0.508	57.6	LOS E	16.7	119.2	0.90	0.83	23.3
5	T	21	0.0	0.509	49.3	LOS D	16.7	119.2	0.90	0.76	23.6
6	R	115	2.8	0.675	82.0	LOS F	10.2	73.0	1.00	0.82	18.6
Approach		365	2.6	0.675	64.8	LOS E	16.7	119.2	0.93	0.83	21.6
North: Castlereagh Rd (N)											
7	L	73	1.4	0.161	20.0	LOS B	3.0	21.1	0.42	0.72	38.7
8	T	1791	2.9	0.641	30.4	LOS C	32.3	231.7	0.81	0.73	31.4
9	R	91	2.3	0.826	91.9	LOS F	8.9	63.6	1.00	0.90	17.1
Approach		1954	2.8	0.826	32.8	LOS C	32.3	231.7	0.80	0.74	30.4
West: Peachtree Rd (W)											
10	L	163	2.6	0.343	54.3	LOS D	11.7	83.6	0.84	0.81	24.1
11	T	11	0.0	0.342	46.0	LOS D	11.7	83.6	0.84	0.70	23.0
12	R	146	2.9	0.861	90.2	LOS F	13.3	95.1	1.00	0.94	17.4
Approach		320	2.6	0.861	70.4	LOS E	13.3	95.1	0.92	0.87	20.4
All Vehicles		5152	2.9	0.861	30.9	LOS C	37.1	266.8	0.76	0.71	31.5

Castlereagh Rd / Coreen Ave



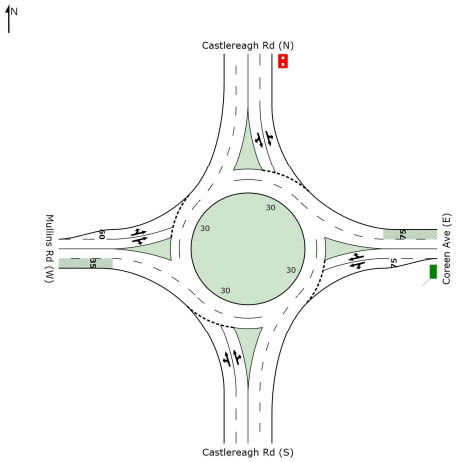
AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	85	8.6	0.489	27.3	LOS B	20.7	152.9	0.66	0.93	35.8
2	T	1487	5.9	0.489	18.7	LOS B	20.9	154.0	0.66	0.59	37.9
3	R	207	6.1	0.837	76.8	LOS F	10.7	79.0	1.00	0.87	19.4
Approach		1780	6.1	0.837	25.9	LOS B	20.9	154.0	0.70	0.64	34.0
East: Coreen Ave (E)											
4	L	179	15.9	0.820	75.5	LOS F	13.7	108.6	1.00	0.91	19.6
5	T	104	3.0	0.417	57.1	LOS E	7.9	56.6	0.96	0.76	22.5
6	R	160	11.2	0.711	69.6	LOS E	11.9	91.0	1.00	0.85	20.8
Approach		443	11.2	0.820	69.1	LOS E	13.7	108.6	0.99	0.85	20.7
North: Castlereagh Rd (N)											
7	L	366	4.0	0.237	9.0	LOS A	4.6	33.6	0.21	0.66	48.2
8	T	2709	5.5	0.836	25.8	LOS B	47.2	345.8	0.90	0.84	33.4
9	R	35	15.2	0.236	70.7	LOS F	3.1	24.6	0.97	0.73	20.5
Approach		3111	5.4	0.836	24.4	LOS B	47.2	345.8	0.82	0.81	34.4
West: Mullins Rd (W)											
10	L	41	5.1	0.546	78.9	LOS F	4.3	31.3	1.00	0.75	19.0
11	T	32	6.7	0.840	75.5	LOS F	6.4	49.0	1.00	0.89	18.5
12	R	41	12.8	0.839	84.4	LOS F	6.4	49.0	1.00	0.91	18.5
Approach		114	8.3	0.839	79.9	LOS F	6.4	49.0	1.00	0.84	18.7
All Vehicles		5447	6.2	0.839	29.7	LOS C	47.2	345.8	0.80	0.76	32.0

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	98	3.2	0.873	45.8	LOS D	50.5	362.6	0.97	0.97	27.8
2	T	2571	2.8	0.872	34.1	LOS C	53.8	385.5	0.95	0.92	29.5
3	R	285	7.7	0.854	45.4	LOS D	9.4	70.5	0.99	0.87	26.9
Approach		2954	3.3	0.872	35.6	LOS C	53.8	385.5	0.96	0.92	29.2
East: Coreen Ave (E)											
4	L	157	3.4	0.562	64.3	LOS E	11.1	79.8	0.98	0.81	21.7
5	T	127	6.6	0.443	54.7	LOS D	9.2	67.8	0.95	0.77	23.1
6	R	241	3.9	0.868	75.8	LOS F	18.0	130.0	1.00	0.96	19.6
Approach		525	4.4	0.867	67.3	LOS E	18.0	130.0	0.98	0.87	21.0
North: Castlereagh Rd (N)											
7	L	234	2.7	0.162	9.9	LOS A	3.9	27.9	0.25	0.66	47.3
8	T	1595	3.4	0.647	32.3	LOS C	27.2	195.6	0.86	0.77	30.4
9	R	45	4.7	0.527	78.3	LOS F	4.3	30.9	1.00	0.74	19.1
Approach		1874	3.3	0.647	30.7	LOS C	27.2	195.6	0.79	0.75	31.4
West: Mullins Rd (W)											
10	L	102	2.1	0.659	74.0	LOS F	8.3	59.3	1.00	0.81	19.7
11	T	85	2.5	0.909	78.4	LOS F	12.2	87.5	1.00	1.02	18.2
12	R	59	3.6	0.909	86.2	LOS F	12.2	87.5	1.00	1.02	18.3
Approach		246	2.6	0.910	78.5	LOS F	12.2	87.5	1.00	0.93	18.8
All Vehicles		5599	3.4	0.910	38.8	LOS C	53.8	385.5	0.91	0.86	28.1

Castlereagh Rd / Coreen Ave



AM Movement Summary

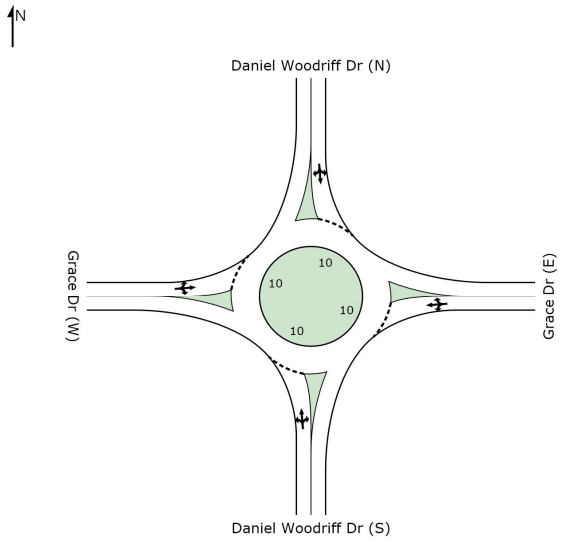
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	85	8.6	0.520	7.4	LOS A	5.5	40.6	0.63	0.62	48.6
2	T	1120	5.9	0.519	6.0	LOS A	5.5	40.6	0.63	0.54	48.4
3	R	208	6.1	0.518	12.9	LOS A	5.5	40.5	0.63	0.75	46.0
Approach		1414	6.1	0.519	7.1	LOS A	5.5	40.6	0.63	0.58	48.0
East: Coreen Ave (E)											
4	L	179	15.9	0.568	30.8	LOS C	6.9	54.8	1.00	1.11	32.8
5	T	104	3.0	0.739	42.6	LOS D	11.4	85.6	1.00	1.29	27.3
6	R	154	11.6	0.741	49.7	LOS D	11.4	85.6	1.00	1.30	26.9
Approach		437	11.3	0.741	40.3	LOS D	11.4	85.6	1.00	1.22	29.1
North: Castlereagh Rd (N)											
7	L	280	3.4	0.821	14.6	LOS B	55.9	406.9	0.92	0.80	43.6
8	T	1643	5.1	0.821	13.5	LOS A	55.9	407.0	0.93	0.79	43.8
9	R	51	18.8	0.818	21.5	LOS B	55.4	407.0	0.93	0.87	40.8
Approach		1974	5.2	0.821	13.8	LOS F	55.9	407.0	0.93	0.80	43.7
West: Mullins Rd (W)											
10	L	41	5.1	0.105	13.4	LOS A	0.7	5.2	0.85	0.87	44.1
11	T	32	6.7	0.179	13.1	LOS A	1.2	9.0	0.86	0.90	43.4
12	R	42	12.5	0.180	20.3	LOS B	1.2	9.0	0.86	0.97	40.4
Approach		115	8.3	0.180	15.8	LOS B	1.2	9.0	0.85	0.92	42.4
All Vehicles		3939	6.3	0.821	14.4	LOS A	55.9	407.0	0.83	0.77	42.6

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Castlereagh Rd (S)											
1	L	98	3.2	0.838	11.6	LOS A	15.3	109.4	0.92	0.89	46.6
2	T	1505	2.4	0.835	10.8	LOS A	15.3	109.4	0.93	0.90	46.0
3	R	286	7.7	0.834	18.5	LOS B	14.9	108.1	0.94	0.97	42.1
Approach		1889	3.3	0.835	12.0	LOS B	15.3	109.4	0.93	0.91	45.3
East: Coreen Ave (E)											
4	L	157	3.4	0.342	12.2	LOS A	2.6	18.9	0.88	0.94	45.1
5	T	127	6.6	0.460	10.6	LOS A	4.3	31.3	0.93	0.98	45.4
6	R	157	4.7	0.460	17.4	LOS B	4.3	31.3	0.93	1.00	42.5
Approach		441	4.8	0.460	13.6	LOS B	4.3	31.3	0.92	0.97	44.2
North: Castlereagh Rd (N)											
7	L	226	2.8	0.807	16.0	LOS B	46.4	333.9	0.94	0.96	42.4
8	T	1227	3.3	0.807	15.3	LOS B	46.4	333.9	0.94	0.97	42.2
9	R	58	5.5	0.807	23.3	LOS B	40.6	292.8	0.94	1.03	39.2
Approach		1512	3.3	0.807	15.7	LOS F	46.4	333.9	0.94	0.97	42.1
West: Mullins Rd (W)											
10	L	102	2.1	0.391	18.1	LOS B	2.5	18.0	0.90	0.99	40.1
11	T	85	2.5	0.365	13.0	LOS A	2.8	20.2	0.95	0.99	43.5
12	R	60	3.5	0.364	20.0	LOS B	2.8	20.2	0.95	1.02	40.8
Approach		247	2.6	0.391	16.8	LOS B	2.8	20.2	0.93	1.00	41.4
All Vehicles		4089	3.4	0.835	13.8	LOS A	46.4	333.9	0.93	0.95	43.7

Note: Due to a reporting problem in SIDRA, the Castlereagh Rd (N) approach is reported with an overall Level of Service F. The actual Level of Sevrice forecast is LoS A

Daniel Woodriff Dr / Grace Dr



AM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Daniel Woodriff Dr (S)											
1	L	111	0.0	0.127	6.0	LOS A	1.0	6.7	0.24	0.53	43.1
2	T	49	0.0	0.127	5.1	LOS A	1.0	6.7	0.24	0.44	43.6
3	R	1	0.0	0.132	9.3	LOS A	1.0	6.7	0.24	0.72	41.0
Approach		161	0.0	0.127	5.7	LOS A	1.0	6.7	0.24	0.50	43.2
East: Grace Dr (E)											
4	L	1	0.0	0.036	9.1	LOS A	0.3	1.8	0.63	0.66	41.4
5	T	26	0.0	0.037	8.2	LOS A	0.3	1.8	0.63	0.62	41.7
6	R	1	0.0	0.036	12.4	LOS B	0.3	1.8	0.63	0.77	39.4
Approach		28	0.0	0.037	8.4	LOS B	0.3	1.8	0.63	0.63	41.6
North: Daniel Woodriff Dr (N)											
7	L	1	0.0	0.263	7.9	LOS A	1.9	13.5	0.57	0.67	42.1
8	T	196	0.0	0.247	7.1	LOS A	1.9	13.5	0.57	0.62	42.1
9	R	38	0.0	0.248	11.3	LOS B	1.9	13.5	0.57	0.79	40.1
Approach		235	0.0	0.247	7.8	LOS B	1.9	13.5	0.57	0.65	41.7
West: Grace Dr (W)											
10	L	3	0.0	0.226	5.9	LOS A	1.9	13.1	0.23	0.49	43.0
11	T	12	0.0	0.227	5.1	LOS A	1.9	13.1	0.23	0.41	43.5
12	R	296	0.0	0.228	9.2	LOS A	1.9	13.1	0.23	0.64	40.7
Approach		311	0.0	0.228	9.1	LOS A	1.9	13.1	0.23	0.63	40.8
All Vehicles		735	0.0	0.247	7.9	LOS A	1.9	13.5	0.35	0.61	41.6

PM Movement Summary

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Daniel Woodriff Dr (S)											
1	L	288	0.0	0.278	5.7	LOS A	2.5	17.7	0.13	0.53	43.6
2	T	139	0.0	0.278	4.8	LOS A	2.5	17.7	0.13	0.43	44.2
3	R	1	0.0	0.263	9.0	LOS A	2.5	17.7	0.13	0.75	41.2
Approach		428	0.0	0.278	5.4	LOS A	2.5	17.7	0.13	0.50	43.8
East: Grace Dr (E)											
4	L	1	0.0	0.015	7.2	LOS A	0.1	0.7	0.47	0.57	42.4
5	T	13	0.0	0.015	6.4	LOS A	0.1	0.7	0.47	0.51	42.6
6	R	1	0.0	0.015	10.6	LOS B	0.1	0.7	0.47	0.72	40.5
Approach		15	0.0	0.015	6.8	LOS B	0.1	0.7	0.47	0.53	42.4
North: Daniel Woodriff Dr (N)											
7	L	1	0.0	0.132	6.6	LOS A	1.0	7.1	0.40	0.59	42.7
8	T	142	0.0	0.135	5.8	LOS A	1.0	7.1	0.40	0.51	43.0
9	R	4	0.0	0.136	10.0	LOS A	1.0	7.1	0.40	0.76	41.0
Approach		147	0.0	0.135	5.9	LOS A	1.0	7.1	0.40	0.52	42.9
West: Grace Dr (W)											
10	L	36	0.0	0.170	6.6	LOS A	1.3	8.8	0.37	0.54	42.4
11	T	20	0.0	0.169	5.7	LOS A	1.3	8.8	0.37	0.47	42.7
12	R	137	0.0	0.170	9.9	LOS A	1.3	8.8	0.37	0.67	40.4
Approach		193	0.0	0.170	8.8	LOS A	1.3	8.8	0.37	0.63	41.0
All Vehicles		783	0.0	0.278	6.4	LOS A	2.5	17.7	0.24	0.53	42.9