

TRAFFIC AND PARKING IMPACT ASSESSMENT OF A PROPOSED METAL RECYCLING FACILITY

84 Percival Road in Smithfield

Traffic and Parking Impact Report

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1. INTRODUCTION

Motion Traffic Engineers was commissioned by Arif Muradi to undertake a traffic and parking impact assessment of a proposed metal recycling facility at 84 Percival Road in Smithfield.

The vehicle access and egress to the car park is via Percival Road. The site is currently an industrial development (plastering supply store).

This traffic report focuses on the proposed alteration and additions as well as changes in car usage and car park utilisation and additional trips from the proposed alteration and additions.

In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the development examined, and all relevant traffic and parking data collected and analysed.

2. BACKGROUND AND EXISTING CONDITIONS OF THE PROPOSED LOCATION

2.1 Location and Land Use

The proposed metal recycling facility is located to the west of Cumberland Highway and is in the area which is a primarily industrial. Residential buildings are primarily located to the north of the site.

Currently the site is located in a General industrial zone (IN1).

Figures 1 and 2 shows the location of the metal recycling site from the aerial and street map perspective respectively.

Figures 3 shows the existing site.





Figure 1: Location of the Subject Site on Aerial





Figure 2: Street Map of the Location of the Metal recycling site





Figure 3: Metal recycling site (84 Percival Road in Smithfield)

2.2 Road Network

This section describes the roads near the proposed metal recycling facility. The entrance to the metal recycling site is from Percival Road.

Percival Road is a collector road with one lane each with parking on each side of the road. There is generally no time restrictions for the on street parking. The default speed limit is 50km/hr. Figure 4a shows the photograph of Percival Road facing south

Woodpark Road is a collector road with one lane each way with a sigh posted speed limit of 60km/hr. On-street parking is permitted on both sides of the road. Figure 4b shows the photograph of Woodpark Road.

Cumberland Highway is an arterial road with three lanes each way on a divided carriageway at the mid-block and a sign posted speed limit of 70 km/hr. Extra short turn lanes are available on both northbound and southbound of Cumberland Highway near the intersection of Cumberland Highway/Percival Road. No onstreet parking is permitted on either side of the road. Figure 4c shows the photograph of Cumberland Highway.





Figure 4a: Percival Road (facing south)



Figure 4b: Woodpark Road(facing west)

Proposed metal recycling facility at 84 Percival Road in Smithfield Traffic report_84 Percival Road Smithfield





Figure 4c: Cumberland Highway (facing south)

2.3 Public Parking Opportunities

The metal recycling site is located in a general industrial zone. Unrestricted onstreet parking is available on both sides of Percival Street and Woodpark Road near the site.

Site visits show that there are vacant car spaces on Percival Road but a driver needs to circulate to find a vacant car space on Percival Road.

2.4 Intersection Description

As part of this traffic impact assessment two intersections is assessed:

- Priority-controlled intersection of Woodpark Road with Percival Road
- Signalised intersection of Cumberland Highway with Percival Road

External traffic travelling to and from the site will most likely need to travel through the above intersections.

The priority-controlled intersection of Woodpark Road with Percival Road is a four-leg intersection with all turn movements permitted. Drivers on Percival Road



need to give way to traffic on Woodpark Road. Figure 5 shows a layout of the intersection using SIDRA – an industry standard intersection assessment software.

The signalised Intersection of Cumberland Highway with Percival Road and a local road is a four-leg intersection with all movements permitted. Pedestrian crossings are provided on all approaches except for the west leg. A left slip lane is provided for turning into and from the local road. Figure 6 shows a layout of the intersection using SIDRA. The number on the lane represent the length of a short lanes in metres.



Figure 5: Priority-controlled intersection of Woodpark Road with Percival Road (SIDRA)





Figure 6: Signalised Intersection of Cumberland Highway with Percival Road (SIDRA)

2.5 Existing Traffic Volumes

As part of the traffic assessment, traffic counts have been undertaken at the intersection for the weekday AM and PM peak hour period. The peak hour is 8:00am to 9:00am and 5pm to 6pm for the weekday AM and PM peak hour respectively.

Figures 7 and 8 presents in vehicle numbers the existing weekday AM and PM peak hour traffic volumes respectively. Bracketed numbers represent trucks or business. Un-bracketed are the number of cars.





Figure 7: Existing Weekday Traffic Volumes AM Peak Hour





Figure 8: Existing Weekday Traffic Volumes PM Peak Hour



2.6 Intersection Assessment

An intersection assessment has been undertaken for:

- Priority-controlled intersection of Woodpark Road with Percival Road
- Signalised intersection of Cumberland Highway with Percival Road

The existing intersection operating performance was assessed using the SIDRA software package (version 8) to determine the Degree of Saturation (DS), Average Delay (AVD in seconds) and Level of Service (LoS) at each intersection. The SIDRA program provides Level of Service Criteria Tables for various intersection types. The key indicator of intersection performance is Level of Service, where results are placed on a continuum from 'A' to 'F', as shown in Table 1.

LoS	Traffic Signal / Roundabout	Give Way / Stop Sign / T-Junction control						
А	Good operation	Good operation						
В	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity						
С	Satisfactory	Satisfactory, but accident study required						
D	Operating near capacity	Near capacity & accident study required						
Е	At capacity, at signals incidents will cause excessive delays.	At capacity, requires other control mode						
F	Unsatisfactory and requires additional capacity, Roundabouts require other control mode	At capacity, requires other control mode						

Table 1: Intersection Level of Service

The Average Vehicle Delay (AVD) provides a measure of the operational performance of an intersection as indicated below, which relates AVD to LOS. The AVD's should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner-city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.



LoS	Average Delay per Vehicles (seconds/vehicle)
А	Less than 14
В	15 to 28
С	29 to 42
D	43 to 56
Е	57 to 70
F	>70

Table 2: Intersection Average Delay (AVD)

The degree of saturation (DS) is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1. It is usual to attempt to keep DS to less than 0.9. Degrees of Saturation in the order of 0.7 generally represent satisfactory intersection operation. When DS exceed 0.9 queues can be anticipated.

The result of the intersection analysis is as follows:

Priority-controlled intersection of Woodpark Road with Percival Road

- All turn movements have LoS A of B for the AM and PM peak hour
- There is a spare capacity at this intersection

Signalised intersection of Cumberland Highway with Percival Road

- The overall intersection has a LoS B for AM and PM peak hour
- There is spare capacity at this intersection.

The full SIDRA results are presented in Appendix A.

2.7 Public Transport

The proposed general industrial zone is located 150 metres from the nearest bus stop. 821 buses provide transport from Smithfield, Warren, Woodpark and Guildford West.

Figure 10 shows public transport network map. The site has access to public transport.





Figure 9: Public Transport Network Map

2.8 Conclusions on the Existing Conditions

The proposed metal recycling facility is in an area where there are ample vacant car spaces on Percival Road and Woodpark Road.

The nearby intersections have spear capacities to accommodate additional traffic of the metal recycling site.

The local area is serviced by the buses.



3. PROPOSED METAL RECYCLING FACILITY

The details of the metal recycling facility are as follows:

Car Spaces

• The car park is located in front of the building with nine car spaces provided included one disabled car space

A weigh bride is provided on the outbound truck movement.

The metal loading bays are located to the rear of the building with nine bays provided. The floor space of the loading bay area is 1090m2. An open factory area is located on the first floor and has a floor space of 1194m2.

Office areas are provided on the ground (157m2) and first floor (89.2m2).

The expected number of staff will be four in the office and up to five staff will be managing the weigh bride and the metal loading bays, soring the metal and compacting the metals in bins to be transferred to foundries where the metal will be melted for further use.

The expected car trips are as follows:

Staff Car Trips (weekday and a Saturday):

Morning

- five car arrivals between 5:30am to 6am for staff working in the metal loading bays
- Four office staff arrivals between 7am to 8am

Afternoon

- five car departures between 6pm to 6:30pm for staff working in the metal loading bays
- Four office staff departures between 4pm to 5pm
- •

Peak Truck Trips hourly on a weekday:

- one small rigid trucks up to 7 metres in length (one arrivals and one departure)
- One medium (8.8 metre) or large rigid truck (one arrival and one departure)



The above information was provided by the owner of the metal recycling business who currently runs an existing recycling business in Sydney from 109 Woodpark Road Smithfield.

The additional trips do not generally occur only in the weekday commuter peak hours.

All truck and car parking demand will be met within the metal recycling premises.

A full scaled plan of the proposed skip bin business expansion is provided as part of the Development Application.



4. CAR PARKING CONSIDERATIONS

4.1 Holroyd Development Control Plan 2013

Car parking rates are published in *Holroyd Development Control Plan 2014, for* many landuses but not for a metal recycling business.

The parking demand for the metal recycling business is based on an existing recycling business located at 109 Woodpark Road Smithfield.

The estimated peak parking demand is as follows:

- Nine car spaces for staff
- Three truck loading bays

Nine car spaces and nine loading bays are provided. All car and truck parking demand will be met on site.



5. VEHICLE TRAFFIC IMPACT CONSIDERATIONS

5.1 Traffic Generation for the Proposed metal recycling facility

The *NSW RTA Guide to Traffic Generating Developments* publishes trip generation rates for most landuses but not for a metal recycling facility for the weekday peak hour assessment.

The proposed expansion will generate additional car and truck trips as follows in the weekday AM and PM peak hour as presented in Section 3 and 4:

• Two truck movements (two arrivals and two departures)

5.2 Traffic Volumes

The additional development trips are assigned onto the local traffic network. Figure 10 presents the existing with the development trips (in red for destination and blue for origin trips) for the AM peak hour.

The additional development trips represent a small proportion of the existing traffic volumes.





Figure 10: Weekday AM Peak Hour Traffic Volumes with Metal Recycling Trips





Figure 11: Weekday PM Peak Hour Traffic Volumes with Metal Recycling Trips



5.3 Intersection Assessment

An intersection assessment has been undertaken for the surveyed intersection.

The results of the intersection analysis are as follows:

Priority-controlled intersection of Woodpark Road with Percival Road

- All turn movements have LoS A or B for the AM and PM peak hour
- The additional trips do not change the LoS for any turn movement

Signalised intersection of Cumberland Highway with Percival Road

- The overall intersection has a LoS B for AM and PM peak hour
- The additional trips do not change the LoS for any turn movement or the overall intersection.

The full SIDRA results with the metal recycling traffic are presented in Appendix B. The existing intersection performance



6. CONCLUSIONS

Based on the considerations presented in this report, it is considered that:

Parking

• The proposed metal recycling facility provides sufficient on-site car and truck spaces to ensure all parking demand is met on site

Traffic

- The proposed alterations and additions to the existing development are generating low trips in the weekday AM and PM peak hours.
- The additional trips from the proposed metal recycling facility can be accommodated at the nearby intersection without significantly affecting intersection performance, delays or queues.
- There are no traffic engineering reasons why a planning permit for the proposed alterations and additions to the industrial development at 83 Percival Road in Smithfield should be refused.



APPENDIX A

SIDRA Intersection Results for Existing Traffic Conditions

Movement Performance - Vehicles												
Mov	Turn	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average
ID	rum	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed
		veh/h	%	v/c	sec		veh	m				km/h
South:	Perciv	al Road										
1	L2	66	4.8	0.076	5.9	LOS A	0.3	2.2	0.21	0.57	0.21	55.5
2	T1	1	0.0	0.076	5.9	LOS A	0.3	2.2	0.21	0.57	0.21	50.3
3	R2	19	16.7	0.076	8.6	LOS A	0.3	2.2	0.21	0.57	0.21	51.7
Approa	ach	86	7.3	0.076	6.5	LOS A	0.3	2.2	0.21	0.57	0.21	54.9
East: \	Noodpa	ark Road										
4	L2	139	0.0	0.143	5.6	LOS A	0.2	1.6	0.06	0.35	0.06	55.2
5	T1	102	0.0	0.143	0.1	LOS A	0.2	1.6	0.06	0.35	0.06	58.2
6	R2	25	0.0	0.143	5.7	LOS A	0.2	1.6	0.06	0.35	0.06	53.9
Approa	ach	266	0.0	0.143	3.5	NA	0.2	1.6	0.06	0.35	0.06	56.7
North:	Perciva	al Road										
7	L2	1	0.0	0.052	5.8	LOS A	0.2	1.4	0.42	0.65	0.42	51.5
8	T1	25	16.7	0.052	6.9	LOS A	0.2	1.4	0.42	0.65	0.42	48.9
9	R2	13	0.0	0.052	7.6	LOS A	0.2	1.4	0.42	0.65	0.42	54.6
Approa	ach	39	10.8	0.052	7.1	LOS A	0.2	1.4	0.42	0.65	0.42	51.8
West:	Woodp	ark Road										
10	L2	1	0.0	0.125	6.5	LOS A	0.6	4.5	0.34	0.35	0.34	56.3
11	T1	81	6.5	0.125	0.8	LOS A	0.6	4.5	0.34	0.35	0.34	57.8
12	R2	109	7.7	0.125	6.5	LOS A	0.6	4.5	0.34	0.35	0.34	56.0
Approa	ach	192	7.1	0.125	4.0	NA	0.6	4.5	0.34	0.35	0.34	56.8
All Veł	nicles	583	4.2	0.143	4.4	NA	0.6	4.5	0.20	0.40	0.20	56.2

 Table A1: Weekday Intersection Performance of Woodpark Road with Percival Road AM Peak

 Hour



Movement Performance - Vehicles												
Mov	Turn	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average
ID	Turn	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed
		veh/h	%	v/c	sec		veh	m				km/h
South	: Local	Road										
1	L2	5	0.0	0.021	33.4	LOS C	0.2	1.2	0.89	0.63	0.89	24.1
2	T1	1	0.0	0.007	37.8	LOS C	0.0	0.3	0.94	0.55	0.94	26.5
3	R2	8	0.0	0.060	43.7	LOS D	0.3	2.2	0.95	0.66	0.95	35.7
Appro	ach	15	0.0	0.060	39.6	LOS C	0.3	2.2	0.93	0.64	0.93	32.5
East:	Cumbei	land Highv	vay									
4	L2	11	0.0	0.010	13.6	LOS A	0.2	1.2	0.45	0.63	0.45	48.0
5	T1	1667	3.8	0.377	3.0	LOS A	6.8	49.2	0.34	0.31	0.34	57.8
6	R2	43	12.2	0.381	30.8	LOS C	1.5	11.2	0.81	0.76	0.81	43.4
Appro	ach	1721	4.0	0.381	3.8	LOS A	6.8	49.2	0.35	0.32	0.35	57.2
North:	Perciva	al Road										
7	L2	98	9.7	0.414	41.3	LOS C	3.7	28.1	0.96	0.77	0.96	39.7
8	T1	1	0.0	0.414	35.7	LOS C	3.7	28.1	0.96	0.77	0.96	24.9
9	R2	149	7.0	0.615	42.9	LOS D	5.8	43.4	0.99	0.82	1.03	29.3
Appro	ach	248	8.1	0.615	42.2	LOS C	5.8	43.4	0.98	0.80	1.00	34.4
West:	Cumbe	rland High	way									
10	L2	111	7.6	0.081	7.9	LOS A	1.0	7.6	0.25	0.64	0.25	48.6
11	T1	1991	2.2	0.632	12.6	LOS A	18.1	128.9	0.72	0.65	0.72	51.7
12	R2	1	0.0	0.006	17.9	LOS B	0.0	0.2	0.54	0.61	0.54	31.8
Appro	ach	2102	2.5	0.632	12.3	LOS A	18.1	128.9	0.70	0.65	0.70	51.6
All Vel	hicles	4086	3.5	0.632	10.7	LOS A	18.1	128.9	0.57	0.52	0.57	52.5

Table A2: Weekday Intersection Performance of Cumberland Highway with Percival Road AM Peak Hour



Movement Performance - Vehicles												
Mov	Turn	Demand F	lows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average
ID	Turri	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed
		veh/h	%	v/c	sec		veh	m				km/h
South	: Perciv	al Road										
1	L2	112	2.8	0.196	5.9	LOS A	0.8	5.6	0.23	0.59	0.23	55.4
2	T1	4	0.0	0.196	5.7	LOS A	0.8	5.6	0.23	0.59	0.23	50.1
3	R2	92	2.3	0.196	7.6	LOS A	0.8	5.6	0.23	0.59	0.23	52.2
Approa	ach	207	2.5	0.196	6.7	LOS A	0.8	5.6	0.23	0.59	0.23	54.3
East: \	Woodpa	ark Road										
4	L2	97	4.3	0.105	5.6	LOS A	0.1	0.6	0.03	0.31	0.03	55.4
5	T1	87	3.6	0.105	0.0	LOS A	0.1	0.6	0.03	0.31	0.03	58.4
6	R2	8	0.0	0.105	5.9	LOS A	0.1	0.6	0.03	0.31	0.03	54.3
Approa	ach	193	3.8	0.105	3.1	NA	0.1	0.6	0.03	0.31	0.03	57.1
North:	Perciva	al Road										
7	L2	9	0.0	0.037	5.9	LOS A	0.1	0.9	0.31	0.60	0.31	51.9
8	T1	8	0.0	0.037	5.7	LOS A	0.1	0.9	0.31	0.60	0.31	50.1
9	R2	16	0.0	0.037	7.5	LOS A	0.1	0.9	0.31	0.60	0.31	54.8
Approa	ach	34	0.0	0.037	6.6	LOS A	0.1	0.9	0.31	0.60	0.31	53.4
West:	Woodp	ark Road										
10	L2	5	0.0	0.100	6.1	LOS A	0.3	2.3	0.18	0.18	0.18	57.5
11	T1	123	5.1	0.100	0.3	LOS A	0.3	2.3	0.18	0.18	0.18	58.7
12	R2	47	0.0	0.100	6.1	LOS A	0.3	2.3	0.18	0.18	0.18	57.3
Appro	ach	176	3.6	0.100	2.0	NA	0.3	2.3	0.18	0.18	0.18	58.3
All Vel	hicles	609	3.1	0.196	4.2	NA	0.8	5.6	0.16	0.39	0.16	56.5

Table A3: Weekday Intersection Performance of Woodpark Road with Percival Road PM PeakHour



Move	Movement Performance - Vehicles												
Mov	Turn	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average	
ID	Turri	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed	
		veh/h	%	v/c	sec		veh	m				km/h	
South:	Local	Road											
1	L2	11	10.0	0.044	36.2	LOS C	0.4	2.7	0.92	0.63	0.92	22.3	
2	T1	1	0.0	0.007	37.8	LOS C	0.0	0.3	0.94	0.55	0.94	26.5	
3	R2	23	9.1	0.177	44.8	LOS D	0.9	6.8	0.97	0.70	0.97	35.2	
Approa	ach	35	9.1	0.177	42.0	LOS C	0.9	6.8	0.95	0.68	0.95	32.5	
East: 0	Cumbei	rland Highv	vay										
4	L2	8	25.0	0.009	11.8	LOS A	0.1	1.0	0.39	0.62	0.39	49.0	
5	T1	2141	1.6	0.477	3.4	LOS A	9.8	69.8	0.39	0.35	0.39	57.5	
6	R2	112	3.8	0.761	38.7	LOS C	4.9	35.7	0.88	0.98	1.27	40.7	
Approa	ach	2261	1.8	0.761	5.2	LOS A	9.8	69.8	0.41	0.38	0.43	56.2	
North:	Perciva	al Road											
7	L2	57	3.7	0.426	46.7	LOS D	2.3	16.8	0.99	0.75	0.99	38.2	
8	T1	1	0.0	0.426	41.1	LOS C	2.3	16.8	0.99	0.75	0.99	23.1	
9	R2	96	3.3	0.704	49.2	LOS D	4.1	29.2	1.00	0.85	1.20	27.5	
Approa	ach	154	3.4	0.704	48.2	LOS D	4.1	29.2	1.00	0.81	1.12	32.4	
West:	Cumbe	rland High	way										
10	L2	133	4.8	0.095	7.9	LOS A	1.2	9.0	0.26	0.64	0.26	48.7	
11	T1	1745	2.1	0.495	8.6	LOS A	12.5	89.2	0.58	0.52	0.58	54.1	
12	R2	5	0.0	0.039	17.4	LOS B	0.1	0.8	0.53	0.65	0.53	32.2	
Approa	ach	1883	2.3	0.495	8.6	LOS A	12.5	89.2	0.56	0.53	0.56	53.8	
All Veł	nicles	4333	2.1	0.761	8.5	LOS A	12.5	89.2	0.50	0.46	0.51	53.9	

Table A4: Weekday Intersection Performance of Cumberland Highway with Percival Road PM PeakHour



APPENDIX B

SIDRA Intersection Results for Existing Conditions with the Metal recycling traffic

Movement Performance - Vehicles												
Mov	Turn	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average
ID	Turri	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed
		veh/h	%	v/c	sec		veh	m				km/h
South	Perciv	al Road										
1	L2	66	4.8	0.079	5.9	LOS A	0.3	2.3	0.21	0.57	0.21	55.4
2	T1	1	0.0	0.079	6.0	LOS A	0.3	2.3	0.21	0.57	0.21	50.2
3	R2	20	21.1	0.079	8.9	LOS A	0.3	2.3	0.21	0.57	0.21	51.5
Appro	ach	87	8.4	0.079	6.6	LOS A	0.3	2.3	0.21	0.57	0.21	54.8
East: V	Woodpa	ark Road										
4	L2	152	8.3	0.154	5.7	LOS A	0.2	1.6	0.05	0.36	0.05	54.8
5	T1	102	0.0	0.154	0.1	LOS A	0.2	1.6	0.05	0.36	0.05	58.2
6	R2	25	0.0	0.154	5.7	LOS A	0.2	1.6	0.05	0.36	0.05	53.9
Appro	ach	279	4.5	0.154	3.6	NA	0.2	1.6	0.05	0.36	0.05	56.5
North:	Perciva	al Road										
7	L2	1	0.0	0.052	5.8	LOS A	0.2	1.4	0.43	0.66	0.43	51.4
8	T1	25	16.7	0.052	7.0	LOS A	0.2	1.4	0.43	0.66	0.43	48.8
9	R2	13	0.0	0.052	7.6	LOS A	0.2	1.4	0.43	0.66	0.43	54.5
Appro	ach	39	10.8	0.052	7.2	LOS A	0.2	1.4	0.43	0.66	0.43	51.7
West:	Woodp	ark Road										
10	L2	1	0.0	0.126	6.5	LOS A	0.6	4.6	0.36	0.36	0.36	56.3
11	T1	81	6.5	0.126	0.8	LOS A	0.6	4.6	0.36	0.36	0.36	57.7
12	R2	109	7.7	0.126	6.5	LOS A	0.6	4.6	0.36	0.36	0.36	56.0
Appro	ach	192	7.1	0.126	4.1	NA	0.6	4.6	0.36	0.36	0.36	56.8
All Vel	nicles	597	6.3	0.154	4.5	NA	0.6	4.6	0.20	0.41	0.20	56.1

 Table B1: Weekday Intersection Performance of Woodpark Road with Percival Road AM Peak

 Hour with the Metal recycling traffic



Move	Movement Performance - Vehicles												
Mov	T	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average	
ID	Turri	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed	
		veh/h	%	v/c	sec		veh	m				km/h	
South:	Local I	Road											
1	L2	5	0.0	0.021	33.4	LOS C	0.2	1.2	0.89	0.63	0.89	24.1	
2	T1	1	0.0	0.007	37.8	LOS C	0.0	0.3	0.94	0.55	0.94	26.5	
3	R2	8	0.0	0.060	43.7	LOS D	0.3	2.2	0.95	0.66	0.95	35.7	
Approa	ach	15	0.0	0.060	39.6	LOS C	0.3	2.2	0.93	0.64	0.93	32.5	
East: 0	Cumber	land Highv	vay										
4	L2	11	0.0	0.010	13.6	LOS A	0.2	1.2	0.45	0.63	0.45	48.0	
5	T1	1667	3.8	0.377	3.0	LOS A	6.8	49.2	0.34	0.31	0.34	57.8	
6	R2	43	12.2	0.382	30.8	LOS C	1.5	11.2	0.81	0.76	0.81	43.4	
Approa	ach	1721	4.0	0.382	3.8	LOS A	6.8	49.2	0.35	0.32	0.35	57.2	
North:	Perciva	al Road											
7	L2	98	9.7	0.414	41.3	LOS C	3.7	28.1	0.96	0.77	0.96	39.7	
8	T1	1	0.0	0.414	35.7	LOS C	3.7	28.1	0.96	0.77	0.96	24.9	
9	R2	151	7.7	0.622	43.0	LOS D	5.9	44.0	0.99	0.82	1.04	29.2	
Approa	ach	249	8.4	0.622	42.3	LOS C	5.9	44.0	0.98	0.80	1.01	34.3	
West:	Cumbe	rland High	way										
10	L2	112	8.5	0.082	7.9	LOS A	1.0	7.7	0.25	0.64	0.25	48.5	
11	T1	1991	2.2	0.633	12.6	LOS A	18.1	129.0	0.72	0.65	0.72	51.7	
12	R2	1	0.0	0.006	17.9	LOS B	0.0	0.2	0.54	0.61	0.54	31.8	
Approa	ach	2103	2.6	0.633	12.3	LOS A	18.1	129.0	0.70	0.65	0.70	51.6	
All Veh	nicles	4088	3.5	0.633	10.7	LOS A	18.1	129.0	0.57	0.52	0.57	52.5	

 Table B2: Weekday Intersection Performance of Cumberland Highway with Percival Road AM

 Peak Hour with the Metal recycling traffic with the Metal recycling traffic



Movement Performance - Vehicles												
Mov	Turn	Demand F	lows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average
ID	Turri	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed
		veh/h	%	v/c	sec		veh	m				km/h
South:	Perciv	al Road										
1	L2	112	2.8	0.198	5.9	LOS A	0.8	5.7	0.23	0.60	0.23	55.4
2	T1	4	0.0	0.198	5.8	LOS A	0.8	5.7	0.23	0.60	0.23	50.1
3	R2	93	3.4	0.198	7.7	LOS A	0.8	5.7	0.23	0.60	0.23	52.1
Approa	ach	208	3.0	0.198	6.7	LOS A	0.8	5.7	0.23	0.60	0.23	54.2
East: \	Noodpa	ark Road										
4	L2	98	5.4	0.106	5.6	LOS A	0.1	0.6	0.03	0.31	0.03	55.3
5	T1	87	3.6	0.106	0.0	LOS A	0.1	0.6	0.03	0.31	0.03	58.4
6	R2	8	0.0	0.106	5.9	LOS A	0.1	0.6	0.03	0.31	0.03	54.3
Approa	ach	194	4.3	0.106	3.1	NA	0.1	0.6	0.03	0.31	0.03	57.1
North:	Perciva	al Road										
7	L2	9	0.0	0.037	5.9	LOS A	0.1	0.9	0.31	0.60	0.31	51.9
8	T1	8	0.0	0.037	5.7	LOS A	0.1	0.9	0.31	0.60	0.31	50.1
9	R2	16	0.0	0.037	7.5	LOS A	0.1	0.9	0.31	0.60	0.31	54.8
Approa	ach	34	0.0	0.037	6.6	LOS A	0.1	0.9	0.31	0.60	0.31	53.4
West:	Woodp	ark Road										
10	L2	5	0.0	0.100	6.1	LOS A	0.3	2.3	0.18	0.18	0.18	57.5
11	T1	123	5.1	0.100	0.3	LOS A	0.3	2.3	0.18	0.18	0.18	58.7
12	R2	47	0.0	0.100	6.1	LOS A	0.3	2.3	0.18	0.18	0.18	57.3
Approa	ach	176	3.6	0.100	2.0	NA	0.3	2.3	0.18	0.18	0.18	58.3
All Veł	nicles	612	3.4	0.198	4.2	NA	0.8	5.7	0.16	0.39	0.16	56.4

Table B3: Weekday Intersection Performance of Woodpark Road with Percival Road PM PeakHour with the Metal recycling traffic



Move	Movement Performance - Vehicles												
Mov	T	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Aver. No.	Average	
ID	Turri	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Cycles	Speed	
		veh/h	%	v/c	sec		veh	m				km/h	
South:	Local	Road											
1	L2	11	10.0	0.044	36.2	LOS C	0.4	2.7	0.92	0.63	0.92	22.3	
2	T1	1	0.0	0.007	37.8	LOS C	0.0	0.3	0.94	0.55	0.94	26.5	
3	R2	23	9.1	0.177	44.8	LOS D	0.9	6.8	0.97	0.70	0.97	35.2	
Approa	ach	35	9.1	0.177	42.0	LOS C	0.9	6.8	0.95	0.68	0.95	32.5	
East: (Cumbei	rland Highv	vay										
4	L2	8	25.0	0.009	11.8	LOS A	0.1	1.0	0.39	0.62	0.39	49.0	
5	T1	2141	1.6	0.477	3.4	LOS A	9.8	69.8	0.39	0.35	0.39	57.5	
6	R2	112	3.8	0.762	38.8	LOS C	5.0	35.8	0.88	0.98	1.27	40.7	
Approa	ach	2261	1.8	0.762	5.2	LOS A	9.8	69.8	0.41	0.38	0.43	56.2	
North:	Perciva	al Road											
7	L2	57	3.7	0.426	46.7	LOS D	2.3	16.8	0.99	0.75	0.99	38.2	
8	T1	1	0.0	0.426	41.1	LOS C	2.3	16.8	0.99	0.75	0.99	23.1	
9	R2	97	4.3	0.717	49.4	LOS D	4.1	29.9	1.00	0.85	1.22	27.4	
Approa	ach	155	4.1	0.717	48.4	LOS D	4.1	29.9	1.00	0.81	1.14	32.3	
West:	Cumbe	rland High	way										
10	L2	134	5.5	0.097	7.9	LOS A	1.2	9.1	0.26	0.64	0.26	48.7	
11	T1	1745	2.1	0.495	8.6	LOS A	12.5	89.3	0.58	0.52	0.58	54.1	
12	R2	5	0.0	0.039	17.4	LOS B	0.1	0.8	0.53	0.65	0.53	32.2	
Approa	ach	1884	2.3	0.495	8.6	LOS A	12.5	89.3	0.56	0.53	0.56	53.8	
All Vel	nicles	4335	2.2	0.762	8.5	LOS A	12.5	89.3	0.50	0.46	0.51	53.9	

Table B4: Weekday Intersection Performance of Cumberland Highway with Percival Road PM PeakHour with the Metal recycling traffic