



# TRIP GENERATION AND PARKING DEMAND SURVEYS OF FAST FOOD OUTLETS ANALYSIS REPORT

FOR  
ROADS AND MARITIME SERVICES NSW

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## 1. INTRODUCTION

### 1.1 BACKGROUND

Bitzios Consulting has been commissioned by Roads and Maritime Services (RMS), NSW to undertake a traffic generation and parking demand survey and analysis of fast food outlets. Previous trip generation and parking demand surveys were undertaken in 1980 (Fast Food Outlets) and 1992 (Drive-through Fast Food Outlets). These studies were based on two fast food franchises, namely McDonalds and KFC, with the results showing considerable variation between franchises with McDonalds experiencing almost twice the number of visitation to KFC. RMS recognises that an update to this data and analysis is required as considerable changes have occurred since the 80's and 90's that may influence the trip and parking generation for fast food outlets. These include:

- recognition that previous surveys did not adequately reflect differences in regional areas;
- increased trading hours (i.e. 24-hour trading, including earlier morning trade), and variety of product;
- changing demographics with an aging population and smaller average household sizes;
- housing affordability causing some younger people to stay living in the family home longer;
- higher residential densities;
- increase in car ownership;
- impacts of higher fuel costs;
- new players in the market (e.g. Oporto, Red Rooster and Hungry Jacks)
- greater numbers of fast food outlets with reduced catchments;
- increasing number of drive-through outlets;
- co-location of fast food outlets with services stations; and
- changing lifestyles and education towards healthier living.

### 1.2 SCOPE

The scope of this study can be summarised as follows:

- identify a suitable sample of fast food outlets in greater Sydney and NSW regional areas, of a sufficient number and scope to provide confidence in the results;
- collect relevant data for each site (e.g. building area, access points, drive-through lane capacity, seating provision, on-site parking availability);
- survey each site to collect all-mode trip generation data, hourly usage patterns and service times;
- gather information on the daily variability of at least seven of the selected sites over a full seven-day week, with the remaining sites surveyed for one weekday and one week-end day for at least thirteen sites;
- assemble information on all-mode trip generation and parking demand data;
- tabulate and analyse the collected data to establish key statistical relationships;
- report on the findings, suggesting and justifying suitable values for inclusion in the Guide; and
- comment on the need or otherwise for further study of this land use, taking into account the quality & spread of the collected data and the observed traffic impacts of the developments.

This report presents the results of the analyses, provides conclusions and recommendations. This report refers to data collected from the survey sites together with key derived statistics and observations and should be read in conjunction with the Data Report.

## 2. SITE SELECTION

### 2.1 CANDIDATE SITES

A total of 40 candidate sites were selected, comprising 22 within Sydney metropolitan areas and 18 in regional areas to be shortlisted to 14 metropolitan sites and 12 regional sites that were to satisfy the following criteria:

- business to have been operating for at least one year;
- the selection provides a reasonable geographic spread;
- there is a range of Gross Floor Area (GFA) sizes;
- the sites are easily isolated from other developments to ensure that survey data is isolated to the outlet; and
- other relevant information is available such as GFA, capacity of drive-through lanes and number of ordering booths.

### 2.2 SELECTION BASIS

Selection of sites was based on research to establish the market share of key drive-through fast food outlets. This strategy was to ensure that the surveys targeted the most common drive-through fast food outlets. Of the top 10 fast food “brands” *with drive-through facilities*, there were five that had a significant number of outlets. Table 2.1 below shows the proportion of trade of these five brands, which was used as a guide (with rounding and adjustments) to determine the number of outlets of each brand to include in the study for both Sydney metropolitan and NSW regional outlets.

**Table 2.1 Site Selection Based on Proportion of Trade**

Drive-through Fast Food Brand	Market Share Customer Visits (%)	No. Selected Sites Sydney Metropolitan	No. Selected Sites NSW Regional	Total Each Brand
McDonalds	40	5	5	10
KFC	27	4	3	7
Hungry Jacks	18	2	2	4
Red Rooster	11	2	1	3
Oporto	4	1	1	2
<b>Total</b>	100	14	12	26

Management of each of the brands were contacted to seek agreement for these surveys together with their guidance on the most appropriate sites to survey, and agreement, cooperation and assistance was received from all brands.

### 3. SURVEY PROCEDURE

#### 3.1 SURVEY SCHEDULE

There were a total of 92 days of surveys comprising 48 days in the Sydney metropolitan area and 44 days in seven different NSW regional areas. The size of the survey task together with the geographical spread of survey sites presented challenges in programming surveys. Surveys commenced on 11 February 2016 and concluded on 30 April 2016 ensuring surveys were not conducted on public holidays or during NSW school holidays within this period.

One metropolitan site and one regional site from each of McDonalds, KFC, Hungry Jacks and Red Rooster, totalling eight sites were surveyed for a period of seven days. Store opening times of day vary for each brand with McDonalds, Hungry Jacks and Oporto outlets open throughout the day including early morning and in some cases are open 24 hours every day, whilst KFC and Red Rooster are not open during the mornings. The purpose of these surveys was to establish diurnal and weekly patterns. The seven-day surveys for McDonalds and Hungry Jacks were done for 14 hour periods each day from 6:00 am to 8:00 pm while the seven-day surveys for KFC and Red Rooster were done from as early as they were open (varying between 10:00 am to 11:00 am) to 8:00 pm.

Based on data obtained from the 1993 study, it was unclear what times of the day the site peaks were. Therefore, the seven-day surveys were conducted first to establish the diurnal pattern to provide an indication of the most suitable times of day to conduct the two-day surveys. The two-day surveys were conducted on a week-day and a weekend day for each site.

Prior to the early seven-day results becoming available, some of the two-day surveys for KFC and Red Rooster were conducted from 12:00 noon to 2:00 pm and 5:30 pm to 8:00 pm. Early survey results from the seven-day surveys indicated that there was an afternoon increase in trade around 3:30 pm, which may be attributed to school pick times as well as some different patterns during weekends. Therefore, the remaining two-day surveys were conducted (wherever outlets were open during these times) as follows:

**Table 3.1 Two-day Survey Times**

Brand	Weekdays				Saturday or Sunday			
	Start Time	End Time	Start Time	End Time	Start Time	End Time	Start Time	End Time
McDonalds	7:00 am	9:00 am	3:00 pm	7:00 pm	11:00 am	3:00 pm	5:00 pm	7:00 pm
KFC 1	12:00 noon	2:00 pm	5:30 pm	8:00 pm	12:00 noon	2:00 pm	5:30 pm	8:00 pm
KFC	12:30 pm	6:30 pm			11:00 am	3:00 pm	5:00 pm	7:00 pm
Hungry Jacks	7:00 am	9:00 am	3:00 pm	7:00 pm	11:00 am	3:00 pm	5:00 pm	7:00 pm
Red Rooster 1	12:00 noon	2:00 pm	5:30 pm	8:00 pm	12:00 noon	2:00 pm	5:30 pm	8:00 pm
Red Rooster	12:30 pm	6:30 pm			11:00 am	3:00 pm	5:00 pm	7:00 pm
Oporto	7:00 am	9:00 am	3:00 pm	7:00 pm	11:00 am	3:00 pm	5:00 pm	7:00 pm

*1 Initial surveys for KFC and Red Rooster*

The weekday times were designed to capture the AM network peak hour, mid-afternoon spike and PM network peak hour for McDonalds, Hungry Jacks and Oporto, and to capture lunchtime, mid-afternoon spike and PM network peak hour for KFC and Red Rooster.

The weekend times were designed to capture the network peak hour during the middle of the day, lunchtime and evening peak for all outlets.

The survey dates and times for each outlet are included in Appendices A to E.

### 3.2 DATA COLLECTION SURVEYS

A range of data was collected during the on-site surveys to achieve the study objectives. To facilitate analysis and presentation of data in the appropriate time segmentation a number of pro forma survey data collection sheets were used for the on-site surveys. The following data was collected during the on-site surveys:

- number of site entry and exit points;
- frontage roads AM and PM peaks;
- drive-through lane capacity (length available for queuing);
- on-site parking availability (including bikes);
- number of waiting bays;
- seating provision - internal and external;
- number of ordering booths or terminals;
- number of collection points;
- tandem booths i.e. two booths - one for food & drink collection & one for payment;
- record of the time that a vehicle enters the site;
- record of the time that the same vehicle exits the site;
- number of entering and exiting vehicles (cars/HVs) (15 minute blocks);
- number of vehicle occupants (15 minute blocks);
- number of pedestrians and cyclists (15 min blocks);
- number of queued vehicles (every 5 minutes); and
- number of on-site parked vehicles relevant to the site (every 15 minutes)

In addition to the above data, a selection of customers who were driving through or parking and walking in were asked three brief questions aimed at determining trip origin and percentage of passing trade. Where it was uncertain how walk-in/dine-in customers arrived, they were asked the third question, otherwise only the first two questions were asked. The questions were:

1. "Have you made the trip here just for the meal OR have you dropped in on your way to somewhere else?"
2. "Can I have the suburb you came from please?"
3. If unsure of transport mode - "Did you arrive by car?"

Only one outlet, Red Rooster in Port Macquarie did not wish to have customers surveyed, however the quantum of data gathered from other outlets was sufficient to establish conclusions.

### 3.3 SITE INFORMATION

The following additional site data and operational information was gathered prior to the on-site survey to record details relating to the outlet's physical structure, layout, operational characteristics and facilities, with the objective of establishing relationships between various site operational characteristics:

- building area;
- number of employees on a typical shift;
- range of products available;
- operating times;
- year opened;
- surrounding land use; and
- relevant local issues.

#### 4. SURVEY DATA AND PRELIMINARY FINDINGS

From the survey data collected, preliminary analysis was conducted on key outputs including factors that impact the road network such as the times of site peaks and their correspondence to network peaks, which have been summarised below.

Additionally, the survey data has been compared to previous studies where possible, to check for consistencies and to identify erroneous data. Table 4.1 shows a comparison of trip generation rates for previous studies.

**Table 4.1 Comparison of average trip generation during PM\* peak hour with previous studies**

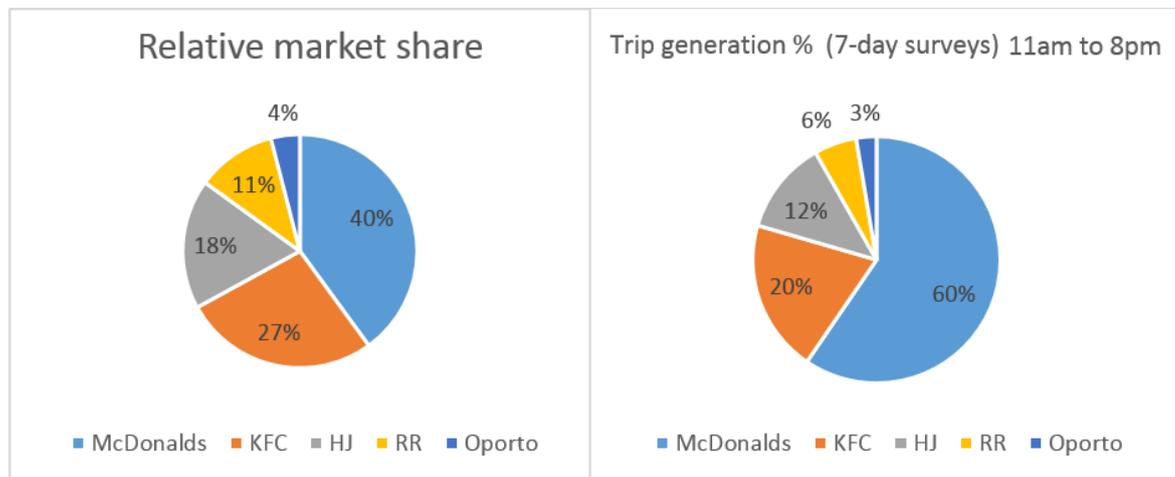
Food Type	Brand	Average Trip Generation		
		1980	1993	2016
Chicken	KFC	136	100	73
	Red Rooster		N/A	35
	Oporto		N/A	41
Hamburgers	McDonalds	107	108	183
	Hungry Jacks	Refer Note 1 and 2 below	N/A	61

1 AM peak trip generations were not recorded in 1980 and 1993, hence there was no basis for comparison.

2 The 1980 Hamburger takeaway restaurant trip generation surveys were carried out only on the weekend at some sites, hence this trip generation average value contains both weekend and weekdays.

Takeaway chicken has steadily declined while takeaway hamburger restaurants have steadily increased as shown in Table 4.1. Only KFC and McDonalds surveys were available for 1993, while the 1980 survey did not distinguish brand, and only described the food type sold.

Based on the results of the survey, relative market share comparison was found. Relative trip generation percentages from the survey data were compared to a survey conducted by Roy Morgan Research in 2013, and the results are shown in Figure 4.1 below.



**Figure 4.1 Relative Market share (left) and Relative Trip Generation from 11am-8pm (right)**

The charts in Figure 4.1 show that the traffic survey performed in this study captures the ranking of the market shares, with McDonalds dominating the market, followed by KFC, Hungry Jacks, Red Rooster and Oporto. It is important to note that the survey conducted by Roy Morgan Research asked people surveyed if they had visited any of these establishments in the last month. A host of uncertainties are present in this type of survey, with demographics of people being surveyed, location, inconsistencies in recalling visits etc. The traffic data used for this comparison identifies physical trips to each of these establishments from 11:00am - 8:00pm and thus is likely to better represent market share. It is important to note that the market share breakdown reflected by the trip generation from this study will be conservative for McDonalds and Hungry Jacks since some outlets provide 24/7 service.

## 4.1 HUNGRY JACKS

### 4.1.1 Sydney Metropolitan

Based on the surveys conducted at Hungry Jacks locations in the Sydney Metropolitan area the following key trends were identified:

- weekday site peaks generally correspond with lunch and dinner time, with the dinner time peak occasionally coinciding with network evening peak periods; and
- weekend site peaks occur at lunch time, and coincides with network peaks.

### 4.1.2 Regional

Based on the surveys conducted at Hungry Jacks locations in Regional NSW the following key trends were identified:

- weekday site peaks generally occur in the afternoon, coinciding with school traffic;
- weekend site peaks occur at lunch (slightly later on Sunday), and coincide with network peaks; and
- site peak generally does not coincide with network peak hour on weekdays.

## 4.2 KFC

### 4.2.1 Sydney Metropolitan

Based on the surveys conducted at KFC locations in the Sydney Metropolitan area the following key trends were identified:

- major weekday site peaks generally correspond with lunch and dinner time, with the dinner time peak generally occurring after network evening peak periods;
- minor weekday site peak occurs during the afternoon, coinciding with school traffic;
- weekend site peaks occur at lunch and dinner time;
- site peaks generally do not correspond with network peaks; and
- passing trade percentage was observed to be lower than that of 1993 study.

### 4.2.2 Regional

Based on the surveys conducted at KFC locations in Regional NSW the following key trends were identified:

- weekday site peaks generally correspond with lunch and dinner time, with the dinner time peak generally occurring after the network peak hour; and
- weekend site peaks occur at lunch time, and coincides with network peaks.

## 4.3 McDONALDS

### 4.3.1 Sydney Metropolitan

Based on the surveys conducted at McDonalds locations in the Sydney Metropolitan area the following key trends were identified:

- major weekday site peaks generally occur in the afternoon and correspond with school pick up, occurring before network evening peak periods;
- minor weekday site peaks occur during lunch and dinner time;
- weekend site peaks coincide with network peaks;
- weekday site peaks generally do not correspond with network peaks; and
- passing trade percentage was observed to be higher than that of 1993 study.

#### 4.3.2 Regional

Based on the surveys conducted at McDonalds locations in Regional NSW the following key trends were identified:

- weekday site peaks occur in the morning (breakfast), lunch time, afternoon (coinciding with school traffic) or dinner time, with the dinner time peak generally coinciding with the network peak hour; and
- weekend site peaks occur at lunch time, and coincides with network peaks.

#### 4.4 OPORTO

##### 4.4.1 Sydney Metropolitan

Based on the surveys conducted at Oporto locations in the Sydney Metropolitan area the following key trends were identified:

- weekday site peaks generally occur in the afternoon and correspond with school pick up, occurring before network evening peak periods; and
- weekend site peaks occur at lunch time, and coincides with network peaks.

##### 4.4.2 Regional

Based on the surveys conducted at Oporto locations in Regional NSW the following key trends were identified:

- weekday site peaks generally occur at dinner time occurring after network evening peak periods; and
- weekend site peaks occur at lunch time, and coincides with network peaks.

#### 4.5 RED ROOSTER

##### 4.5.1 Sydney Metropolitan

Based on the surveys conducted at Red Rooster locations in the Sydney Metropolitan area the following key trends were identified:

- weekday site peaks generally correspond with lunch and dinner time, with the dinner time peak generally occurring after network evening peak periods; and
- weekend site peaks occur at lunch and dinner time, with the lunch time peak generally coinciding with weekend peak periods.

##### 4.5.2 Regional

Based on the surveys conducted at Red Rooster locations in Regional NSW the following key trends were identified:

- weekday site peaks generally occur at lunch time;
- weekend site peaks generally occur at lunch time, and coincide with network peaks; and
- weekday site peaks generally do not coincide with network peak hour on weekdays.

## 5. ANALYSIS METHODOLOGY

Relationships between various independent and dependent variable data were tested to determine relevant linkages between various parameters and the trip generation of the fast food outlets. Additional analysis has been conducted to test if there is any relationship between independent variables and the demand on parking.

The statistical method used for analysis was linear regression, which has the following equation:

$$Y = a_0 + a_1X_1 + a_2X_2 + \dots + a_kX_k$$

The above equation shows Y as the dependent variable, the parameter the equation will predict, and shows  $X_1$  to  $X_k$  as the independent variables, used for the prediction. Additionally, it is important to note that the equation above is only valid when the prediction (Y) falls within the ranges of the independent variables used ( $X_1$  to  $X_k$ ).

The following analysis processes were used for the survey data:

- correlation matrix – matrices which indicate the level of relationship between independent and dependent variables, based on R;
- linear regression – matrices indicate the mathematical relationship between one independent variable and one dependent variable, based on  $R^2$ ; and
- multiple linear regression - results indicate the mathematical relationship between multiple independent variables and one dependent variable, based on  $R^2$ .

The correlation matrix gives an 'R' that compares the correlation of all dependent and independent variables. This matrix, when squared, will give the linear regression ( $R^2$ ). The main objective of the correlation matrix is to identify independent variables which are correlated, as they should not be used in multiple regression. Multiple regression stipulates that the different independent variables used to describe the dependent variable should not be described by other independent variables in the same regression analysis. Distinct independent variables have to come together to describe the dependent variable.

The accuracy of the linear regression is given by the coefficient  $R^2$ .  $R^2$  represents the percentage of variation in the dependent variable and therefore how much of the variation is based on the independent variables. For example, a  $R^2$  result of 1.0 indicates that 100% of variation in the dependent variable is associated with the independent variable, therefore as the  $R^2$  value approaches 100% the more accurate the results become. Values of  $R^2$  less than 0.8 are not considered accurate enough to indicate a significant relationship between the dependent and independent variable.

The above statistical analyses were conducted for each of the five (5) fast food brands to determine the level of relationship between the independent and dependent variables. The results of each step of the analysis process is provided in the following Section.

## 6. DATA ANALYSIS

Preliminary analysis of the data detailed in the Data Report shows that **there are clear differences between trip generation rates, times of opening, business models and operation of each of the brands. It is therefore inappropriate to attempt to derive conclusions relating to traffic impacts by combining brand data.** This section provides the outcomes of the data analyses and describes the findings for each of the five brands.

Tables for each brand containing summaries of all data gathered, including derived figures such as trip generation, passing trade, maximum queue lengths and parking rates appear in Appendices A to E.

Preliminary analysis of data for all brands shows that the critical period in relation to the impact of trip generation on the road network is the PM peak hour for week-days. Whilst the afternoon trade peaks do not always coincide with the PM network peak hour, calculations to derive **the maximum impact on the road network, that is, the summation of network traffic and site generated traffic less the passing trade trips, show that the maximum impact on the road network occurs during the PM network peak hour.** Therefore, all analysis testing was carried out using data occurring within the PM network peak hour.

It should be noted that due to the fact that there were only two Oporto outlets that were surveyed for two days each, there is not enough data to conduct regression analyses, however the key outputs such as trip generation, passing trade, parking demand and queue lengths can be derived.

The independent variables tested include:

- total lane capacity including waiting bays;
- on-site parking bays;
- seating inside;
- seating outside;
- total seating;
- total service booths;
- average service time for drive-through; and
- PM network peak hour two-way road frontage traffic.

The dependent variables that were tested are:

- the total PM network peak hour trip generation, which includes drive-through and park and walk-in/dine-in; and
- the PM network peak hour trip generation of vehicles that were parked for a period of greater than ten (10) minutes.

The objective for testing relationships for park and walk-in/dine-in for vehicles parked longer than ten minutes was to establish possible linkages with independent variables such as GFA and seating. The decision to adopt the threshold of ten minutes was made based on an analysis of the times-of-stay of all park and walk-in/dine-in vehicles. The graph in Figure 6.1 shows the time-of-stay for all park and walk-in/dine-in customers up to one-hour duration for all seven days' surveyed for the McDonalds store at Liverpool. The pattern of this data is similar to the other seven-day surveys for other brands. The graph shows that there is a considerable number of patrons who, because of the short duration, obviously elect to park, walk in to order and take away. The graph also shows that there is no clear dip that would clearly indicate a cut-off time that people would take-away or eat on the premises. Therefore, the decision to adopt ten minutes as the cut-off time was based on a reasonable estimate as to what the shortest possible duration would be for anyone parking, walking in, waiting to order, waiting for order, eating on the premises, walking back to the vehicle and then driving out.

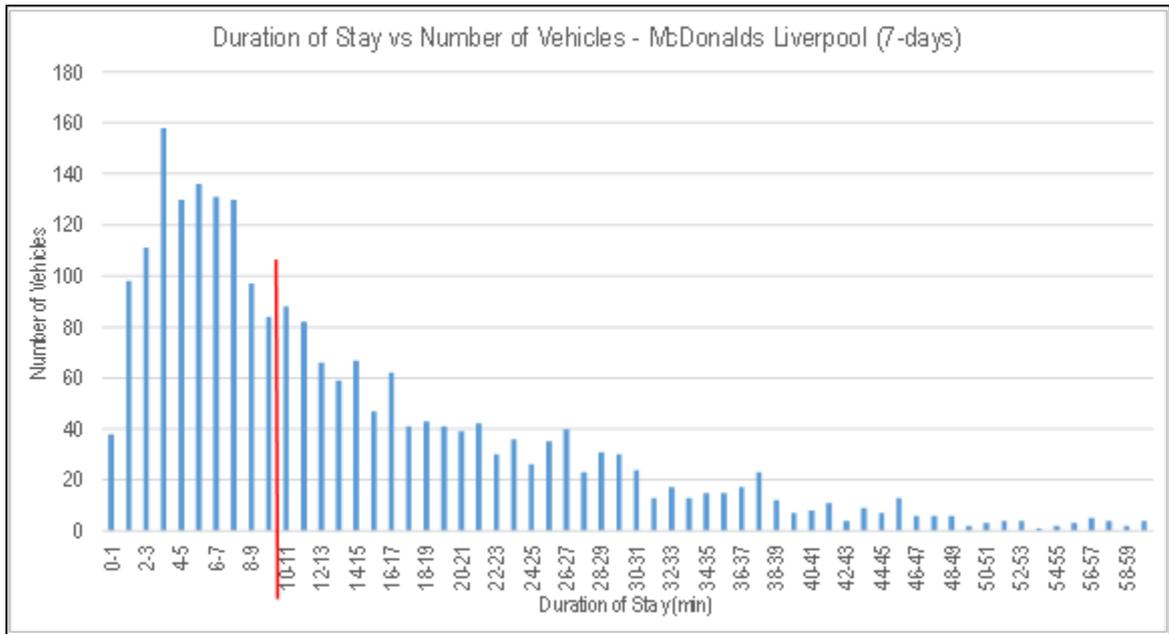


Figure 6.1 Duration of Stay for Park and Walk-in/dine-in McDonalds Liverpool

Other dependent variables that have been evaluated and presented as average figures include:

- passing trade for drive-through;
- passing trade for park and walk-in/dine-in;
- weighted total passing trade;
- maximum number of queued vehicles; and
- maximum number of parked vehicles.

Note that weighted passing trade was calculated by combining drive through and dine in passing trades weighted with their respective total trip generation through the survey period.

The following sections present the outcomes of analyses for each of the brands. A correlation matrix will be presented with any relationships identified, followed by a matrix that shows single linear regression results, and finally multiple regression analyses that combines the most likely independent variables to identify if there is any mathematical relationship with the dependent variable.

Please note: Any regressions which have a negative R value and are not intuitive have been excluded from the analysis, while they might seemingly have a high R<sup>2</sup>, since the negative is lost in the process of squaring.

## 6.1 HUNGRY JACKS DATA ANALYSIS

### 6.1.1 Correlation Matrix

Correlation (R)	Independent Variables				Seating			Trip gen during PM Network Peak					Passing Trade			Max Queue	Max Parked Veh					
	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen - Drive Through	Trip Gen - Park & Dine	Trip Gen - Park & Dine >10min	Trip Gen - Total			Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted		
GFA	1.00																					
Employees	-	1.00																				
Years open	-0.05	-	1.00																			
Drive Through capacity (inc. waiting bays)	-0.08	-		1.00																		
On-site parking bays	0.05	-		0.77	1.00																	
Seating-Indoor	0.17	-		-0.59	0.47	1.00																
Seating-Outdoor	-0.81	-		0.08	-0.04	0.36	1.00															
Seating-Total	-0.77	-		0.03	0.00	0.35	0.38	1.00														
Total booths	-0.41	-		-0.88	0.94	-0.81	0.33	0.21	0.23	1.00												
Drive Through Service time	0.23	-		-0.25	0.32	-0.77	-0.58	-0.75	-0.77	0.26	1.00											
Frontage traffic	-0.87	-		0.52	-0.38	0.24	-0.52	0.65	0.60	-0.05	-0.20	1.00										
Trip Gen - Drive Through	-0.64	-		0.69	-0.55	0.22	-0.81	0.31	0.24	-0.27	0.08	0.92	1.00									
Trip Gen - Park & Dine	-0.79	-		-0.42	0.48	-0.15	0.45	0.86	0.87	0.68	-0.45	0.42	0.04	1.00								
Trip Gen - Park & Dine >10min	-0.51	-		-0.28	0.26	0.24	0.73	0.87	0.91	0.37	-0.80	0.20	-0.20	0.87	1.00							
<b>Trip Gen - Total</b>	<b>-0.92</b>	<b>-</b>	<b>0.40</b>	<b>-0.26</b>	<b>0.12</b>	<b>-0.50</b>	<b>0.66</b>	<b>0.61</b>	<b>0.08</b>	<b>-0.14</b>	<b>0.99</b>	<b>0.89</b>	<b>0.50</b>	<b>0.23</b>	<b>1.00</b>							
Passing Trade - Drive Through	0.26	-		-0.27	0.33	-0.77	-0.55	-0.77	-0.79	0.26	1.00	-0.24	0.04	-0.47	-0.81	-0.18	1.00					
Passing Trade - Park & Dine	0.31	-		0.54	-0.49	-0.03	-0.88	-0.69	-0.73	-0.52	0.66	0.08	0.47	-0.82	-0.95	<b>0.03</b>	0.66	1.00				
Passing Trade - Weighted	0.33	-		0.14	-0.08	-0.44	-0.78	-0.81	-0.85	-0.14	0.92	-0.10	0.27	-0.71	-0.97	<b>-0.09</b>	0.91	0.91	1.00			
Max Queue	-0.66	-		-0.34	0.50	-0.74	-0.42	0.13	0.09	0.70	0.56	0.48	0.44	0.43	-0.08	<b>0.58</b>	0.53	0.09	0.33	1.00		
Max Parked Veh	0.58	-		-0.38	0.71	0.57	0.00	0.04	-0.57	-0.66	-0.48	-0.52	-0.26	0.25	<b>-0.57</b>	-0.63	-0.27	-0.49	-0.98	-0.98	1.00	

Trip Gen selected for multiple regression

Trip Gen Park & Dine >10 selected for multiple reg.

Some Correlation - intuitively expected

Some Correlation - not relevant and/or intuitive. Or associated factor already considered (Seating indoor when Seating total already considered)

Figure 6.2 Hungry Jacks Correlation Matrix

The correlation matrix for Hungry Jacks shown in Figure 6.2 shows the correlation between all variables, assisting in choosing the variables suitable for combining in multiple regression by eliminating correlated independent variable combinations.

In the matrix, a multitude of other possible correlations between variables which are logical have also been noted:

- greater drive through capacity – higher number of booths
- more onsite parking bays – higher maximum parked vehicles
- higher indoor/outdoor seating – greater dine in trip generation (duration of stay >10min)
- higher frontage traffic – higher drive through trip generation

## 6.1.2 Linear Regression

Linear Regression (R <sup>2</sup> )		Independent Variables			Seating			Trip gen during PM Network Peak				Passing Trade								
Hungry Jacks	GFA	Employees	Years open	Drive Through capacity	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service	Frontage traffic	Trip Gen - Drive Through	Trip Gen - Park & Dine	Trip Gen - Park & Dine >10min	Trip Gen - Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh
GFA	1.00																			
Employees	-	1.00																		
Years open	0.00	-	1.00																	
Drive Through capacity (inc. waiting bays)	0.01	-	0.97	1.00																
On-site parking bays	0.00	-	0.60	0.71	1.00															
Seating-Indoor	0.03	-	0.34	0.22	0.00	1.00														
Seating-Outdoor	0.65	-	0.01	0.00	0.13	0.10	1.00													
Seating-Total	0.60	-	0.00	0.00	0.12	0.14	0.99	1.00												
Total booths	0.16	-	0.77	0.89	0.66	0.11	0.04	0.05	1.00											
Drive Through Service time	0.05	-	0.06	0.10	0.59	0.33	0.56	0.60	0.07	1.00										
Frontage traffic	0.76	-	0.27	0.15	0.06	0.27	0.42	0.35	0.00	0.04	1.00									
Trip Gen - Drive Through	0.41	-	0.47	0.30	0.05	0.65	0.09	0.06	0.07	0.01	0.84	1.00								
Trip Gen - Park & Dine	0.62	-	0.18	0.23	0.02	0.21	0.73	0.75	0.46	0.20	0.18	0.00	1.00							
Trip Gen - Park & Dine >10min	0.26	-	0.08	0.07	0.06	0.53	0.76	0.82	0.13	0.64	0.04	0.04	0.75	1.00						
<b>Trip Gen - Total</b>	<b>0.85</b>	-	<b>0.16</b>	<b>0.07</b>	<b>0.01</b>	<b>0.25</b>	<b>0.43</b>	<b>0.37</b>	<b>0.01</b>	<b>0.02</b>	<b>0.98</b>	<b>0.79</b>	<b>0.25</b>	<b>0.05</b>	<b>1.00</b>					
Passing Trade - Drive Through	0.07	-	0.07	0.11	0.59	0.30	0.60	0.63	0.07	1.00	0.06	0.00	0.22	0.65	<b>0.03</b>	1.00				
Passing Trade - Park & Dine	0.10	-	0.29	0.24	0.00	0.77	0.47	0.54	0.27	0.44	0.01	0.22	0.67	0.90	<b>0.00</b>	0.43	1.00			
Passing Trade - Weighted	0.11	-	0.02	0.01	0.20	0.60	0.65	0.72	0.02	0.84	0.01	0.07	0.50	0.93	<b>0.01</b>	0.83	0.82	1.00		
Max Queue	0.43	-	0.11	0.25	0.54	0.18	0.02	0.01	0.49	0.31	0.23	0.19	0.18	0.01	<b>0.34</b>	0.28	0.01	0.11	1.00	
Max Parked Veh	0.34	-	0.05	0.14	0.51	0.33	0.00	0.00	0.33	0.43	0.23	0.27	0.07	0.06	<b>0.33</b>	0.40	0.08	0.24	0.96	1.00

Selected for multiple regression with Trip Gen  
 Selected for multiple regression with Park and Dine  
 Trip Gen with duration of stay > 10 mins

Figure 6.3 Hungry Jacks Linear Regression

The linear regression matrix shown in Figure 6.3 has all the values in the correlation matrix squared to give R<sup>2</sup>.

Multiple regression for total trip generation has the following independent variables selected for testing:

- seating (total); and
- years since opening.

The analysis shows that frontage traffic is very closely related with trip generation with R<sup>2</sup> = 0.98. It is reasonable to expect that higher frontage road traffic volumes would result in higher trip attraction to drive through fast food outlets due to an increase in exposure for opportunistic drop-in trade. Since the correlation is very high, other variables were not added with frontage traffic for a multiple regression, because that would result in unnecessarily complicating the model where there is no requirement for improving the regression analysis result.

Multiple regression for park and dine-in trip generation (with duration of stay >10mins) has the following independent variables selected for testing:

- onsite parking bays; and
- total seating.

With a greater number of seats and a higher parking capacity, a higher dine in trip generation might be expected, hence it is logical to consider these variables for dine-in trip generation. Any values which showed a correlation which were not intuitive have been excluded from the multiple regression. In this case, GFA was not included, as the correlation showed a negative coefficient, implying higher trip generation of dine in (>10mins) correlated with a lower GFA.

### 6.1.3 Multiple Linear Regression

In the first multiple regression, as selected above, years open and total seating were tested against total trip generation. Service time will not be included in any of the multiple regressions to follow for any of the brands due to its unreliability, since outlets will use more staff at short notice to manage increased customer demands which will skew service time. Selected independent variables will be grouped to see if together they can better describe the dependent variable.

Years open	Seating-Total	Trip Gen - Total
15	120	68
16	72	70
11	60	42
6	96	62

#### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.715320351
R Square	0.511683204
Adjusted R Square	-0.464950388
Standard Error	15.48430001
Observations	4

#### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	251.2364532	125.6182266	0.52392546	0.698796677
Residual	1	239.7635468	239.7635468		
Total	3	491			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	22.82758621	37.77695531	0.604272791	0.653961925	-457.1741422	502.8293147	-457.1741422	502.8293147
Years open	1.073891626	1.967584132	0.545791973	0.681940471	-23.9266352	26.07441845	-23.9266352	26.07441845
Seating-Total	0.284893268	0.33616454	0.847481617	0.552437077	-3.9864822	4.556268735	-3.9864822	4.556268735

Figure 6.4 Hungry Jacks Multiple Regression - Total Trip Generation

From Figure 6.4,  $R^2 = 0.52$  is not sufficient to draw conclusions with an acceptable level of significance. There are no other variables of any significance to be analysed in the multiple regression against total trip generation. The following multiple regression for Hungry Jacks is to test the chosen independent variables against Park and Dine trip generation (stay>10mins).

On-site parking bays	Seating-Total	Trip Gen - Park dine >10min
40	120	14
33	72	6
34	60	8
27	96	12

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.909717221
R Square	0.827585421
Adjusted R Square	0.482756264
Standard Error	2.626134639
Observations	4

ANOVA

	df	SS	MS	F	Significance F
Regression	2	33.10341686	16.55170843	2.399986788	0.415228345
Residual	1	6.896583144	6.896583144		
Total	3	40			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.893849658	9.780745973	0.0913887	0.941981311	-123.3823111	125.1700105	-123.3823111	125.1700105
On-site parking bays	-0.062414579	0.304446323	-0.205010124	0.87127019	-3.930771896	3.805942739	-3.930771896	3.805942739
Seating-Total	0.128701595	0.060903597	2.113201874	0.281380454	-0.645151974	0.902555163	-0.645151974	0.902555163

Figure 6.5 Hungry Jacks Multiple Regression - Park and Dine Trip Generation (stay>10mins) – Total seating and On-site parking bays

From Figure 6.5, an  $R^2 = 0.83$  shows some evidence that the dine in trip generation is linked to the independent variables. However, since Seating by itself had an  $R^2$  of 0.82, there is negligible difference in the regression while unnecessary complexity is added to the model. It should also be noted that the dine in trip generation (stay>10mins) have trip numbers of 14, 6, 8 and 12. These numbers are close, and thus the multiple regression is not necessarily reliable. However, intuitively it is logical that Hungry Jacks will provide higher number of seating if they expect a larger customer visitation.

#### 6.1.4 Analysis Findings

For total trip generation in the PM peak hour period, there was a high linear regression with frontage road traffic volumes. While this is intuitively expected (higher number of vehicles on the road will result in more people visiting a drive through fast food outlet), this is not observed across all brands. Since it is not observed across all brands, it is not advisable to extrapolate for predicting trip generations based on frontage road traffic volumes. It is considered more appropriate to use the trip generation recommended in Section 8, while noting that high frontage volumes will impact trip generation.

For dine in (stay>10mins) trip generation in the PM peak hour period, the linear regression was an  $R^2 = 0.82$  between total seating and dine in trip generation. It is logically expected that the Hungry Jacks outlets that expect more customers will provide higher seating capacity. While a correlation was observed, it is not practical to obtain data of stay>10mins to determine trip generation.

For passing trade, queue length and parking demand, no high regression that can generate a predictive model was apparent.

Therefore, our conclusions relating to estimates of trip generation, passing trade, queue lengths and parking demand will be primarily based on the survey data results. This will be discussed further in Sections 7.1 and 8.

## 6.2 KFC DATA ANALYSIS

### 6.2.1 Correlation Matrix

KFC	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen Drive Through	Trip Gen - Park & Dine	Trip Gen - Park & Dine >10min	Trip Gen - Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh	
GFA	1.00																				
Employees	-	1.00																			
Years open	-0.80	-	1.00																		
Drive Through capacity (inc. waiting bays)	0.62	-	-0.70	1.00																	
On-site parking bays	0.15	-	-0.30	-0.19	1.00																
Seating-Indoor	0.69	-	-0.63	0.32	0.39	1.00															
Seating-Outdoor	0.84	-	-0.83	0.49	0.45	0.54	1.00														
Seating-Total	0.87	-	-0.82	0.45	0.47	0.89	0.86	1.00													
Total booths	-	-	-	-	-	-	-	-	1.00												
Drive Through Service time	0.18	-	-0.24	0.18	-0.23	0.17	-0.21	-0.01	-	1.00											
Frontage traffic	0.09	-	-0.58	0.57	0.06	-0.14	0.23	0.04	-	0.32	1.00										
Trip Gen - Drive Through	0.45	-	-0.61	0.51	0.20	0.00	0.79	0.42	-	-0.45	0.50	1.00									
Trip Gen - Park & Dine	-0.38	-	-0.12	0.06	0.06	-0.05	-0.04	-0.05	-	-0.36	0.39	0.30	1.00								
Trip Gen - Park & Dine >10min	-0.20	-	-0.05	0.49	-0.08	-0.52	-0.03	-0.33	-	-0.17	0.67	0.45	0.26	1.00							
<b>Trip Gen - Total</b>	<b>0.26</b>	-	<b>-0.56</b>	<b>0.45</b>	<b>0.19</b>	<b>-0.02</b>	<b>0.66</b>	<b>0.34</b>	-	<b>-0.50</b>	<b>0.55</b>	<b>0.95</b>	<b>0.58</b>	<b>0.47</b>	<b>1.00</b>						
Passing Trade - Drive Through	0.52	-	-0.85	0.41	0.45	-0.03	0.86	0.60	-	0.95	0.97	0.88	0.36	0.47	<b>0.90</b>	1.00					
Passing Trade - Park & Dine	0.53	-	-0.38	0.90	-0.62	0.03	0.30	0.17	-	0.15	0.31	0.41	-0.19	0.38	<b>0.27</b>	0.12	1.00				
Passing Trade - Weighted	0.92	-	-0.92	0.88	-0.17	0.14	0.96	0.75	-	0.89	0.89	0.98	0.09	0.61	<b>0.93</b>	0.79	0.70	1.00			
Max Queue	0.42	-	-0.42	0.13	-0.07	0.38	0.08	0.27	-	0.92	0.21	-0.31	-0.42	-0.42	<b>-0.40</b>	0.79	0.08	0.65	1.00		
Max Parked Veh	0.62	-	-0.61	0.46	0.45	0.10	0.75	0.46	-	-0.03	0.45	0.70	-0.32	0.39	<b>0.49</b>	0.80	0.30	0.79	0.09	1.00	

Trip Gen selected for multiple regression

Trip Gen Park & Dine >10 selected for multiple reg.

Some Correlation - intuitively expected

Some Correlation - not relevant and/or intuitive. Or associated factor already considered (Seating indoor when Seating total already considered)

Figure 6.6 KFC Correlation Matrix

The correlation matrix for KFC shown in Figure 6.6 shows the correlation between all variables, assisting in choosing the variables suitable for combining in multiple regression by eliminating correlated independent variable combinations.

In the matrix, a multitude of other possible correlation between variables which are logical have also been noted:

- greater GFA – higher drive through capacity
- greater GFA – higher total number of seats
- greater GFA – higher maximum parked vehicles
- greater outdoor seating – higher maximum parked vehicles
- higher drive through service time – higher maximum queue lengths

## 6.2.2 Linear Regression

Linear Regression (R <sup>2</sup> )		Independent Variables				Seating				Trip gen during PM Network Peak				Passing Trade						
KFC	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen - Drive Through	Trip Gen - Park & Dine	Trip Gen - Park & Dine >10min	Trip Gen - Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh
GFA	1.00																			
Employees	-	1.00																		
Years open	0.64	-	1.00																	
Drive Through capacity (inc. waiting bays)	0.39	-	0.49	1.00																
On-site parking bays	0.02	-	0.09	0.04	1.00															
Seating-Indoor	0.48	-	0.40	0.10	0.15	1.00														
Seating-Outdoor	0.71	-	0.68	0.24	0.20	0.29	1.00													
Seating-Total	0.76	-	0.68	0.21	0.23	0.80	0.74	1.00												
Total booths	-	-	-	-	-	-	-	-	1.00											
Drive Through Service time	0.03	-	0.06	0.03	0.05	0.03	0.04	0.00	-	1.00										
Frontage traffic	0.01	-	0.34	0.33	0.00	0.02	0.05	0.00	-	0.10	1.00									
Trip Gen - Drive Through	0.21	-	0.37	0.26	0.04	0.00	0.62	0.17	-	0.20	0.25	1.00								
Trip Gen - Park & Dine	0.14	-	0.01	0.00	0.00	0.00	0.00	0.00	-	0.13	0.15	0.09	1.00							
Trip Gen - Park & Dine >10min	0.04	-	0.00	0.24	0.01	0.27	0.00	0.11	-	0.03	0.45	0.20	0.07	1.00						
<b>Trip Gen - Total</b>	<b>0.07</b>	-	<b>0.31</b>	<b>0.20</b>	<b>0.04</b>	<b>0.00</b>	<b>0.44</b>	<b>0.12</b>	-	<b>0.25</b>	<b>0.31</b>	<b>0.90</b>	<b>0.34</b>	<b>0.22</b>	<b>1.00</b>					
Passing Trade - Drive Through	0.27	-	0.72	0.17	0.20	0.00	0.74	0.35	-	0.90	0.95	0.78	0.13	0.23	<b>0.82</b>	1.00				
Passing Trade - Park & Dine	0.28	-	0.15	0.82	0.38	0.00	0.09	0.03	-	0.02	0.09	0.17	0.04	0.15	<b>0.07</b>	0.01	1.00			
Passing Trade - Weighted	0.84	-	0.86	0.78	0.03	0.02	0.92	0.56	-	0.80	0.78	0.97	0.01	0.38	<b>0.87</b>	0.62	0.49	1.00		
Max Queue	0.17	-	0.18	0.02	0.00	0.15	0.01	0.08	-	0.85	0.04	0.09	0.17	0.17	<b>0.16</b>	0.63	0.01	0.42	1.00	
Max Parked Veh	0.38	-	0.37	0.21	0.20	0.01	0.57	0.21	-	0.00	0.20	0.49	0.11	0.15	<b>0.24</b>	0.64	0.09	0.63	0.01	1.00

Selected for multiple regression with Trip Gen  
 Selected for multiple regression with Park and Dine  
 Trip Gen with duration of stay > 10 mins

Figure 6.7 KFC Linear Regression

The linear regression matrix shown in Figure 6.7 has all the values in the correlation matrix squared to give R<sup>2</sup>.

Multiple regression for total trip generation has the following independent variable selected for testing:

- GFA;
- drive through capacity;
- seating – outdoor; and
- frontage traffic.

Multiple regression for park and dine in trip generation (stay>10mins) has the following independent variables selected for testing:

- frontage traffic; and
- drive through capacity.

### 6.2.3 Multiple Linear Regression

In the first multiple regression as selected above, outdoor seating and frontage traffic were initially tested against total trip generation. Selected independent variables will be grouped to see if together they can better describe the dependent variable.

#### Frontage + Outdoor Seating

##### SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.776483564
R Square	<b>0.602926725</b>
Adjusted R Square	0.404390087
Standard Error	16.62075661
Observations	7

Frontage traffic	Seating-Outdoor	Trip Gen - Total
2309	0	64
1036	0	60
3473	34	102
3629	32	96
1790	48	68
1355	32	80
2478	0	40

##### ANOVA

	df	SS	MS	F	Significance F
Regression	2	1677.858942	838.9294711	3.03685371	0.157667186
Residual	4	1104.998201	276.2495501		
Total	6	2782.857143			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	39.45570803	17.22794917	2.290215025	0.083837221	-8.376747114	87.28816318	-8.376747114	87.28816318
Frontage traffic	0.009133264	0.007024129	1.300269917	0.263367729	-0.010368845	0.028635374	-0.010368845	0.028635374
Seating-Outdoor	0.596154045	0.344511251	1.73043418	0.158602002	-0.360362533	1.552670623	-0.360362533	1.552670623

Figure 6.8 KFC Multiple Regression - Total Trip Generation – Frontage traffic and outdoor seating

From Figure 6.8,  $R^2 = 0.6$  when combining frontage traffic and outdoor seating to generate a model for total trip generation. While this is greater than any of the  $R^2$  values from the linear regression, it is not sufficiently high to be considered statistically significant. Next, drive through capacity will be added in as a third independent variable in the multiple regression.

**Drive Through Capacity + Frontage + Outdoor Seating**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.781606128
R Square	<b>0.610908139</b>
Adjusted R Square	0.221816277
Standard Error	18.99813206
Observations	7

Drive Through capacity (inc. waiting bays)	Frontage traffic	Seating-Outdoor	Trip Gen - Total
7	2309	0	64
10	1036	0	60
11	3473	34	102
16	3629	32	96
12	1790	48	68
8	1355	32	80
10	2478	0	40

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	1700.070077	566.6900258	1.570087168	0.359954074
Residual	3	1082.787066	360.9290218		
Total	6	2782.857143			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	44.94695941	29.62733681	1.517077276	0.226524496	-49.34044915	139.234368	-49.34044915	139.234368
(inc. waiting bays)	-0.892088235	3.596113065	-0.24807013	0.820090994	-12.33652497	10.5523485	-12.33652497	10.5523485
Frontage traffic	0.010407898	0.009532225	1.091864505	0.354732897	-0.019927896	0.040743691	-0.019927896	0.040743691
Seating-Outdoor	0.644732157	0.439791788	1.465994078	0.238906961	-0.754881595	2.044345909	-0.754881595	2.044345909

**Figure 6.9 KFC Multiple Regression - Total Trip Generation - Frontage traffic, outdoor seating and drive through capacity**

From Figure 6.9,  $R^2 = 0.61$  when combining frontage traffic, outdoor seating and drive through capacity to generate a model for total trip generation. This multiple regression has an imperceptible change from the previous one in Figure 6.8. The final independent variable which will be added to this multiple regression is GFA.

**GFA+Drive Through Capacity+ Frontage+Outdoor Seating**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.963961336
R Square	<b>0.929221457</b>
Adjusted R Square	0.78766437
Standard Error	9.923874609
Observations	7

GFA	Drive Through capacity (inc. waiting bays)	Frontage traffic	Seating-Outdoor	Trip Gen - Total
140	7	2309	0	64
220	10	1036	0	60
280	11	3473	34	102
330	16	3629	32	96
420	12	1790	48	68
300	8	1355	32	80
270	10	2478	0	40

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	2585.890568	646.4726421	6.56428781	0.136547484
Residual	2	196.9665745	98.48328726		
Total	6	2782.857143			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	93.46477631	22.38795817	4.174778941	0.052867525	-2.862833029	189.7923857	-2.862833029	189.7923857
GFA	-0.358651813	0.119586302	-2.999104462	0.095515078	-0.873190142	0.155886517	-0.873190142	0.155886517
Drive Through capacity (inc. waiting bays)	4.27568929	2.549066056	1.677355234	0.235471584	-6.692056734	15.24343531	-6.692056734	15.24343531
Frontage traffic	-0.000439025	0.00615416	-0.071337994	0.949620477	-0.026918237	0.026040186	-0.026918237	0.026040186
Seating-Outdoor	1.707933213	0.422433955	4.043077489	0.056078797	-0.109653395	3.525519822	-0.109653395	3.525519822

**Figure 6.10 KFC Multiple Regression - Total Trip Generation - Frontage traffic, outdoor seating, drive through capacity and GFA**

From Figure 6.10,  $R^2 = 0.93$  when combining frontage traffic, outdoor seating, drive through capacity and GFA to generate a model for total trip generation. This is a very high regression, and the combination of these four factors has resulted in a very good model for trip generation. However, there was no notable increase in regression from the first to the second multiple regression (0.6 to 0.61). A re-examination of the multiple regression was carried out by sequentially excluding one of the three initial independent variables to simplify the model and retain a high regression. Exclusion of drive through capacity gave an  $R^2$  of 0.83, exclusion of outdoor seating gave an  $R^2$  of 0.35 and exclusion of frontage gave an  $R^2$  of 0.93. Thus, inclusion of frontage does not improve the regression and unnecessarily complicates the model. Below, in Figure 6.11, is the simplest model which provides the highest regression.

**GFA + Drive Through Capacity+ Outdoor seating**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.963867915
R Square	0.929041357
Adjusted R Square	0.858082714
Standard Error	8.11311216
Observations	7

GFA	Drive Through capacity (inc. waiting bays)	Seating-Outdoor	Trip Gen - Total
140	7	0	64
220	10	0	60
280	11	34	102
330	16	32	96
420	12	48	68
300	8	32	80
270	10	0	40

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	2585.389376	861.7964587	13.09271593	0.031397044
Residual	3	197.4677667	65.82258891		
Total	6	2782.857143			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	92.72711343	16.23371503	5.712008203	0.010645017	41.064187	144.3900399	41.064187	144.3900399
GFA	-0.353638226	0.079101284	-4.47070144	0.020853102	-0.605373816	-0.101902636	-0.605373816	-0.101902636
Drive Through capacity (inc. waiting bays)	4.145005397	1.449110989	2.860378141	0.064556954	-0.466712517	8.756723311	-0.466712517	8.756723311
Seating-Outdoor	1.693909102	0.305679349	5.541457441	0.011584865	0.721100988	2.666717216	0.721100988	2.666717216

**Figure 6.11 KFC Multiple Regression - Total Trip generation - GFA, drive through capacity, outdoor seating**

From Figure 6.11,  $R^2 = 0.93$  when combining drive through capacity, GFA and outdoor seating to generate a model for total trip generation.

It is important to note that a higher GFA, outdoor seating or drive through capacity are not necessarily generating higher number of trips, but rather are provided by KFC to cater for higher anticipated volumes.

Next, multiple regression analysis on dine in (stay>10mins) trip generation will be carried out.

**Frontage traffic + Drive through capacity**

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.682858274
R Square	0.466295422
Adjusted R Square	0.199443133
Standard Error	4.348377945
Observations	7

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	66.08072269	33.04036135	1.747391503	0.284840576
Residual	4	75.63356302	18.90839076		
Total	6	141.7142857			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.668886184	6.622603464	-0.101000488	0.924410191	-19.05618115	17.71840879	-19.05618115	17.71840879
Frontage traffic	0.00285171	0.002177413	1.309677916	0.26046063	-0.003193758	0.008897179	-0.003193758	0.008897179
Drive Through capacity	0.254800297	0.73699769	0.345727402	0.746965005	-1.791433333	2.301033926	-1.791433333	2.301033926

Frontage traffic	Drive Through capacity (inc. waiting bays)	Trip Gen - Park & Dine >10min
2309	7	12
1036	10	6
3473	11	8
3629	16	18
1790	12	4
1355	8	6
2478	10	6

Figure 6.12 KFC Multiple Regression – Park and Dine Trip Generation (stay>10mins) - Frontage traffic and Drive through capacity

From Figure 6.12, R<sup>2</sup> = 0.466 when combining frontage traffic and drive through capacity to generate a mode for park and dine trip generation (stay>10mins). This is not sufficiently high to be considered statistically significant, and thus no conclusions can be drawn.

#### 6.2.4 Analysis Findings

For total trip generation in the PM peak hour period, linear regression was not high for any one independent variable. Multiple regression analysis concluded that a combination of GFA, outdoor seating and drive through capacity had a very high regression with total trip generation. This is potentially due to KFC anticipating higher visitation based on location, and providing a higher GFA, outdoor seating and drive through capacity to cater for the higher demand. As such, it is not advisable to extrapolate for predicting trip generations based on the equation from the multiple regression. It is considered more appropriate to use the trip generation recommended in this report, while noting that higher GFA, outdoor seating and drive through capacity will tend to coincide with higher trip generation.

For dine in (stay>10 mins) trip generation in the PM peak hour period, the linear regression was not sufficiently high to be considered statistically significant, and thus no conclusions can be drawn.

For passing trade and parking demand, no high regression that can generate a logical predictive model was apparent. For queue length, there was a high linear regression with service time. Due to the unpredictable nature of service time with its fluctuations being influenced by staff being brought in to cater for additional demand in the short term, it is difficult to generate a predictive model based on service time which will indicate adequate drive through capacity.

Therefore, our conclusions relating to estimates of trip generation, passing trade, queue lengths and parking demand will be primarily based on the survey data results. This will be discussed further in Sections 7.2 and 8.

## 6.3 McDONALDS DATA ANALYSIS

### 6.3.1 Correlation Matrix

Correlation (R)	Seating										Trip gen during PM Network Peak			Passing Trade						
	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen - Drive Through	Trip Gen - Park & Dine	Trip Gen - Park & Dine >10min	Trip Gen - Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh
GFA	1.00																			
Employees	-0.26	1.00																		
Years open	-	-	1.00																	
Drive Through capacity (inc. waiting bays)	-0.13	0.30	-	1.00																
On-site parking bays	-0.28	0.04	-	0.41	1.00															
Seating-Indoor	0.67	-0.28	-	0.41	0.03	1.00														
Seating-Outdoor	-0.21	-0.39	-	-0.23	0.56	-0.34	1.00													
Seating-Total	0.61	-0.47	-	0.32	0.29	0.90	0.10	1.00												
Total booths	-0.14	-0.20	-	0.04	-0.22	0.23	-0.09	0.20	1.00											
Drive Through Service time	0.31	-0.07	-	0.22	0.18	0.01	0.14	0.08	-0.77	1.00										
Frontage traffic	-0.25	0.07	-	-0.08	-0.21	-0.06	-0.04	-0.08	0.50	-0.71	1.00									
Trip Gen - Drive Through	0.16	0.33	-	0.42	0.37	0.39	-0.14	0.35	-0.27	0.30	-0.58	1.00								
Trip Gen - Park & Dine	-0.12	0.04	-	-0.27	-0.06	-0.42	-0.14	-0.51	-0.58	0.46	-0.45	-0.12	1.00							
Trip Gen - Park & Dine >10min	0.09	-0.01	-	-0.16	-0.11	-0.33	-0.14	-0.41	-0.51	0.58	-0.63	-0.14	0.86	1.00						
<b>Trip Gen - Total</b>	<b>0.08</b>	<b>0.32</b>	-	<b>0.24</b>	<b>0.31</b>	<b>0.13</b>	<b>-0.20</b>	<b>0.04</b>	<b>-0.56</b>	<b>0.52</b>	<b>-0.77</b>	<b>0.85</b>	<b>0.42</b>	<b>0.32</b>	<b>1.00</b>					
Passing Trade - Drive Through	-0.12	0.15	-	0.30	0.58	0.05	-0.12	0.01	-0.54	0.29	-0.08	0.04	0.52	0.45	<b>0.28</b>	1.00				
Passing Trade - Park & Dine	-0.28	0.26	-	0.31	0.03	-0.41	-0.14	-0.50	-0.59	0.53	-0.18	-0.18	0.47	0.56	<b>0.08</b>	0.52	1.00			
Passing Trade - Weighted	-0.32	0.16	-	0.54	0.48	0.12	-0.19	0.06	-	-0.28	0.54	-0.27	0.08	-0.08	<b>-0.24</b>	0.93	0.58	1.00		
Max Queue	0.42	0.28	-	0.54	0.30	0.40	-0.09	0.38	-0.48	0.72	-0.66	0.79	-0.01	0.14	0.72	0.10	0.14	-0.20	1.00	
Max Parked Veh	0.47	0.07	-	0.36	0.45	0.59	-0.08	0.59	0.00	0.16	-0.54	0.63	-0.16	0.08	0.49	0.16	-0.30	0.01	0.60	1.00

Trip Gen selected for multiple regression  
 Trip Gen Park & Dine >10 selected for multiple reg.  
 Some Correlation - intuitively expected  
 Some Correlation - not relevant and/or intuitive. Or associated factor already considered (Seating indoor when Seating total already considered)

Figure 6.13 McDonalds Correlation Matrix

The correlation matrix for McDonalds shown in Figure 6.13 shows the correlation between all variables, assisting in choosing the variables suitable for combining in multiple regression by eliminating correlated independent variable combinations.

In the matrix, a multitude of other possible correlations between variables which are logical have also been noted:

- greater GFA – higher indoor seating and total seating
- higher number of service booths – lower service time
- higher drive through service time – higher maximum queue length

### 6.3.2 Linear Regression

Linear Regression (R <sup>2</sup> )	Independent Variable					Seating				Trip gen during PM Network Peak				Passing Trade						
	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen - Drive Through	Trip Gen - Park & Dine	Trip Gen - Park & Dine >10min	Trip Gen - Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh
GFA	1.00																			
Employees	0.07	1.00																		
Years open	-	-	1.00																	
Drive Through capacity (inc. waiting bays)	0.02	0.09	-	1.00																
On-site parking bays	0.08	0.00	-	0.17	1.00															
Seating-Indoor	0.44	0.08	-	0.17	0.00	1.00														
Seating-Outdoor	0.04	0.15	-	0.06	0.31	0.12	1.00													
Seating-Total	0.37	0.22	-	0.10	0.09	0.81	0.01	1.00												
Total booths	0.02	0.04	-	0.00	0.05	0.05	0.01	0.04	1.00											
Drive Through Service time	0.10	0.00	-	0.05	0.03	0.00	0.02	0.01	0.60	1.00										
Frontage traffic	0.06	0.00	-	0.01	0.04	0.00	0.00	0.01	0.25	0.50	1.00									
Trip Gen - Drive Through	0.02	0.11	-	0.18	0.14	0.15	0.02	0.12	0.07	0.09	0.34	1.00								
Trip Gen - Park & Dine	0.01	0.00	-	0.08	0.00	0.18	0.02	0.26	0.34	0.21	0.20	0.01	1.00							
Trip Gen - Park & Dine >10min	0.01	0.00	-	0.02	0.01	0.11	0.02	0.17	0.26	0.33	0.39	0.02	0.73	1.00						
<b>Trip Gen - Total</b>	<b>0.01</b>	<b>0.10</b>	-	<b>0.06</b>	<b>0.09</b>	<b>0.02</b>	<b>0.04</b>	<b>0.00</b>	<b>0.31</b>	<b>0.27</b>	<b>0.59</b>	<b>0.72</b>	<b>0.18</b>	<b>0.10</b>	<b>1.00</b>					
Passing Trade - Drive Through	0.01	0.02	-	0.09	0.33	0.00	0.01	0.00	0.30	0.09	0.01	0.00	0.27	0.20	<b>0.08</b>	1.00				
Passing Trade - Park & Dine	0.08	0.07	-	0.10	0.00	0.17	0.02	0.25	0.35	0.28	0.03	0.03	0.22	0.31	<b>0.01</b>	0.27	1.00			
Passing Trade - Weighted	0.10	0.03	-	0.29	0.23	0.02	0.04	0.00	-	0.08	0.29	0.07	0.01	0.01	<b>0.06</b>	0.87	0.34	1.00		
Max Queue	0.18	0.08	-	0.29	0.09	0.16	0.01	0.15	0.23	0.51	0.44	0.63	0.00	0.02	<b>0.52</b>	0.01	0.02	0.04	1.00	
Max Parked Veh	0.22	0.01	-	0.13	0.21	0.35	0.01	0.35	0.00	0.03	0.29	0.40	0.02	0.01	<b>0.24</b>	0.03	0.09	0.00	0.36	1.00

Selected for multiple regression with Trip Gen  
 Selected for multiple regression with Park and Dine  
 Trip Gen with duration of stay > 10 mins

Figure 6.14 McDonalds Linear Regression

The linear regression matrix shown in Figure 6.14 has all the values in the correlation matrix squared to give R<sup>2</sup>.

Multiple regression for total trip generation has the following independent variables selected for testing:

- GFA;
- Drive through capacity; and
- On-site parking bays.

While the frontage R<sup>2</sup> shows some correlation with total trip generation, it is important to note that the negative coefficient present in the correlation matrix between these two variables is lost in producing the R<sup>2</sup>. The correlation matrix indicates that a higher frontage traffic volume corresponds to a lower trip generation, which is intuitively incorrect. This is likely due to other factors such as locality influencing the trip generation of the McDonalds to offset the expected higher trip generations from higher frontage road volumes.

Multiple regression will not be carried out for park and dine in trip generation as there are no feasible independent variable combinations for analysis.

### 6.3.3 Multiple Linear Regression

#### Drive Through Capacity + Onsite Parking bays

##### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.329579907
R Square	0.108622915
Adjusted R Square	-0.146056252
Standard Error	51.59416236
Observations	10

##### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	2270.696871	1135.348435	0.426508837	0.668675064
Residual	7	18633.70313	2661.95759		
Total	9	20904.4			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	121.3792502	70.93368125	1.711165247	0.130787862	-46.35225271	289.1107532	-46.35225271	289.1107532
Drive Through capacity (inc. waiting bays)	0.908332538	2.61272911	0.347656607	0.738317322	-5.269790078	7.086455155	-5.269790078	7.086455155
On-site parking bays	1.340232744	2.112232578	0.634510024	0.545918098	-3.654403635	6.334869123	-3.654403635	6.334869123

Drive Through capacity (inc. waiting bays)	On-site parking bays	Trip Gen - Total
11	41	188
15	46	112
14	33	172
14	34	152
11	18	108
15	42	222
13	30	208
36	44	206
15	41	260
15	26	206

Figure 6.15 McDonalds Multiple Regression - Total Trip Generation - Drive through capacity and on-site parking bays

From Figure 6.15,  $R^2 = 0.11$  is not sufficient to draw conclusions with an acceptable level of significance. Next, GFA will be added into the multiple regression.

**GFA + Drive Through Capacity + On-site parking bays**

SUMMARY OUTPUT

<i>Regression Statistics</i>					
Multiple R	0.373399371				
R Square	0.13942709				
Adjusted R Square	-0.290859365				
Standard Error	54.75667438				
Observations	10				
<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	2914.639666	971.5465552	0.324033185	0.808440123
Residual	6	17989.76033	2998.293389		
Total	9	20904.4			

GFA	Drive Through capacity (inc. waiting bays)	On-site parking bays	Trip Gen Total
270	11	41	188
350	15	46	112
400	14	33	172
350	14	34	152
660	11	18	108
710	15	42	222
450	13	30	208
390	36	44	206
500	15	41	260
370	15	26	206

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	83.51564416	111.0973596	0.751733834	0.480648603	-188.3298018	355.3610901	-188.3298018	355.3610901
GFA	0.06258784	0.135052735	0.4634326	0.659388834	-0.267874298	0.393049978	-0.267874298	0.393049978
Drive Through capacity (inc. waiting bays)	0.925029761	2.773112828	0.333570907	0.750052346	-5.860532883	7.710592404	-5.860532883	7.710592404
On-site parking bays	1.614782924	2.318664772	0.696427937	0.512223569	-4.058785384	7.288351233	-4.058785384	7.288351233

**Figure 6.16 McDonalds Multiple Regression - Drive through capacity, on-site parking bays and GFA**

From Figure 6.16,  $R^2 = 0.14$  has only improved very marginally over the previous regression, and is not sufficient to draw any conclusions. Finally, number of employees will be added into the multiple regression.

**Drive Through Capacity + Onsite Parking bays + Employees + GFA**

SUMMARY OUTPUT

<i>Regression Statistics</i>					
Multiple R		0.50468213			
R Square		0.254704052			
Adjusted R Square		-0.341532706			
Standard Error		55.82107956			
Observations		10			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	5324.435384	1331.108846	0.427186094	0.784886642
Residual	5	15579.96462	3115.992923		
Total	9	20904.4			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	10.08572574	140.7096966	0.071677546	0.945637296	-351.6200643	371.7915158	-351.6200643	371.7915158
Employees	3.847578085	4.375176317	0.879410978	0.419429396	-7.399170683	15.09432685	-7.399170683	15.09432685
GFA	0.096293881	0.14291349	0.673791407	0.530330515	-0.271076939	0.463664702	-0.271076939	0.463664702
Drive Through capacity (inc. waiting bays)	0.091673464	2.981616754	0.030746227	0.976661466	-7.572816404	7.756163333	-7.572816404	7.756163333
On-site parking bays	1.964878493	2.397026807	0.81971486	0.449672914	-4.196875077	8.126632063	-4.196875077	8.126632063

Employees	GFA	Drive Through capacity (inc. waiting bays)	On-site parking bays	Trip Gen - Total
10	270	11	41	188
14	350	15	46	112
10	400	14	33	172
23	350	14	34	152
10	660	11	18	108
13	710	15	42	222
18	450	13	30	208
18	390	36	44	206
18	500	15	41	260
20	370	15	26	206

**Figure 6.17 McDonalds Multiple Regression - Total Trip Generation - Drive through capacity, on-site parking bays, GFA and employees**

Figure 6.17,  $R^2 = 0.25$  is not sufficient to draw conclusions with an acceptable level of significance. Since there are no more variables chosen to include in the multiple regression against total trip generation, that concludes the multiple regression analysis for total trip generation. Since there are no feasible variables to test against park and dine (stay>10mins), that concludes the multiple regression analysis for McDonalds.

#### 6.3.4 Analysis Findings

As can be seen from the analyses indicated by  $R^2$ , there are no mathematically significant singular independent relationships with the dependent variable, nor is there any groupings of independent variables to improve the  $R^2$  value. Therefore, our conclusions relating to estimates of trip generation, passing trade, queue lengths and parking demand will be primarily based on the survey data results. This will be discussed further in Sections 7.3 and 8.

### 6.4 OPORTO DATA ANALYSIS

As discussed earlier, as there were only two outlets surveyed for a period of two days each, there is not sufficient data to adequately conduct regression analyses for Oporto. However, the data is sufficient to allow reasonable estimates to be made of the key outputs, such as trip generation, parking demand, queue lengths and passing trade. Please refer to Sections 7.4 and 8 for conclusions and recommendations for Oporto outlets.

#### 6.4.1 Analysis Findings

Since there is insufficient data to run a multiple regression analysis, trip generation, passing trade, queue lengths and parking demand will be recommended in Sections 7.4 and 8.

## 6.5 RED ROOSTER DATA ANALYSIS

### 6.5.1 Correlation Matrix

Correlation (R)	Seating											Trip gen during PM Network Peak				Passing Trade				
	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen Drive Through	Trip Gen Park & Dine	Trip Gen Park & Dine >10min	Trip Gen Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh
GFA	1.00																			
Employees	0.91	1.00																		
Years open	-	-	1.00																	
Drive Through capacity (inc. waiting bays)	0.81	0.50	-	1.00																
On-site parking bays	0.99	0.87	-	0.87	1.00															
Seating-Indoor	0.86	0.58	-	1.00	0.91	1.00														
Seating-Outdoor	0.75	0.41	-	0.99	0.81	0.98	1.00													
Seating-Total	0.84	0.55	-	1.00	0.89	1.00	0.99	1.00												
Total booths	-	-	-	-	-	-	-	-	1.00											
Drive Through Service time	-0.71	-0.94	-	-0.16	-0.64	-0.26	-0.06	-0.22	-	1.00										
Frontage traffic	-1.00	-0.94	-	-0.77	-0.99	-0.83	-0.70	-0.81	-	0.75	1.00									
Trip Gen - Drive Through	1.00	0.94	-	0.76	0.98	0.82	0.69	0.79	-	-0.77	-1.00	1.00								
Trip Gen - Park & Dine	0.91	0.65	-	0.98	0.94	1.00	0.96	0.99	-	-0.35	-0.88	0.87	1.00							
Trip Gen - Park & Dine >10min	0.81	0.50	-	1.00	0.87	1.00	0.99	1.00	-	-0.16	-0.77	0.76	0.98	1.00						
Trip Gen - Total	<b>0.97</b>	<b>0.79</b>	-	<b>0.93</b>	<b>0.99</b>	<b>0.96</b>	<b>0.89</b>	<b>0.95</b>	-	<b>-0.52</b>	<b>-0.95</b>	<b>0.94</b>	<b>0.98</b>	<b>0.93</b>	<b>1.00</b>					
Passing Trade - Drive Through	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00					
Passing Trade - Park & Dine	-1.00	-1.00	-	-	-1.00	-1.00	1.00	-1.00	-	1.00	1.00	-1.00	-1.00	-	-1.00	-	1.00			
Passing Trade - Weighted	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00		
Max Queue	0.14	-0.28	-	0.69	0.24	0.62	0.76	0.65	-	0.60	-0.08	0.05	0.54	0.69	<b>0.38</b>	-	1.00	-	1.00	
Max Parked Veh	0.97	0.79	-	0.93	0.99	0.96	0.89	0.95	-	-0.52	-0.95	0.94	0.98	0.93	<b>1.00</b>	-	-1.00	-	0.38	1.00

Figure 6.18 Red Rooster Correlation Matrix

The correlation matrix for Red Rooster shown in Figure 6.18 shows the correlation between all variables, assisting in choosing the variables suitable for combining in multiple regression by eliminating correlated independent variable combinations.

Given the limited dataset for red rooster (only 3 sites), many highly correlated apparent relationships can be seen. Due to the sample size, this should be treated with caution. The general trend for total trip generation reflected by the correlation matrix shows higher GFA, drive through capacity, parking bays and seating correspond to higher trip generation. This is intuitively expected; however, the frontage traffic shows an inverse correlation (higher frontage volumes corresponding to lower trip generation). This is most likely a result of the small sample size, as well as other influencing factors such as locality of the store.

Trip generation for park and dine (stay>10mins) does not have sufficient data to draw any conclusions.

## 6.5.2 Linear Regression

Linear Regression (R <sup>2</sup> )						Seating			Trip gen during PM Network Peak				Passing Trade			Max Queue	Max Parked Veh				
Red Rooster	GFA	Employees	Years open	Drive Through capacity (inc. waiting bays)	On-site parking bays	Seating-Indoor	Seating-Outdoor	Seating-Total	Total booths	Drive Through Service time	Frontage traffic	Trip Gen Drive Through	Trip Gen Park & Dine	Trip Gen Park & Dine >10min	Trip Gen Total	Passing Trade - Drive Through	Passing Trade - Park & Dine	Passing Trade - Weighted	Max Queue	Max Parked Veh	
GFA	1.00																				
Employees	0.83	1.00																			
Years open	-	-	1.00																		
Drive Through capacity (inc. waiting bays)	0.65	0.25	-	1.00																	
On-site parking bays	0.99	0.75	-	0.75	1.00																
Seating-Indoor	0.74	0.34	-	0.99	0.83	1.00															
Seating-Outdoor	0.56	0.17	-	0.99	0.66	0.96	1.00														
Seating-Total	0.71	0.30	-	1.00	0.80	1.00	0.97	1.00													
Total booths	-	-	-	-	-	-	-	-	1.00												
Drive Through Service time	0.51	0.88	-	0.03	0.40	0.07	0.00	0.05	-	1.00											
Frontage traffic	1.00	0.88	-	0.59	0.97	0.69	0.49	0.65	-	0.57	1.00										
Trip Gen - Drive Through	0.99	0.89	-	0.57	0.96	0.67	0.47	0.63	-	0.59	1.00	1.00									
Trip Gen - Park & Dine	0.82	0.43	-	0.96	0.89	0.99	0.92	0.98	-	0.12	0.77	0.75	1.00								
Trip Gen - Park & Dine >10min	0.65	0.25	-	1.00	0.75	0.99	0.99	1.00	-	0.03	0.59	0.57	0.96	1.00							
<b>Trip Gen - Total</b>	<b>0.94</b>	<b>0.62</b>	-	<b>0.86</b>	<b>0.98</b>	<b>0.92</b>	<b>0.79</b>	<b>0.90</b>	-	<b>0.27</b>	<b>0.91</b>	<b>0.89</b>	<b>0.96</b>	<b>0.86</b>	<b>1.00</b>						
Passing Trade - Drive Through	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00					
Passing Trade - Park & Dine	1.00	1.00	-	-	1.00	1.00	1.00	1.00	-	1.00	1.00	1.00	1.00	-	<b>1.00</b>	-	1.00				
Passing Trade - Weighted	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00			
Max Queue	0.02	0.08	-	0.48	0.06	0.38	0.58	0.42	-	0.36	0.01	0.00	0.30	0.48	<b>0.14</b>	-	1.00	-	1.00		
Max Parked Veh	0.94	0.62	-	0.86	0.98	0.92	0.79	0.90	-	0.27	0.91	0.89	0.96	0.86	<b>1.00</b>	-	1.00	-	0.14	1.00	

Figure 6.19 Red Rooster Linear Regression

The linear regression matrix shown in Figure 6.19 has all the values in the correlation matrix squared to give R<sup>2</sup>.

A large number of the independent variables have a high regression with total trip generation, likely as a result of the small sample size. As such, it is not advisable to perform multiple regression, as the conclusions drawn from them would be skewed by natural variation in the small sample size.

## 6.5.3 Analysis Findings

As a result of the low sample size, multiple regression was not carried out. There was a high linear regression for trip generation from the independent variables of GFA, drive through capacity, on-site parking bays and seating. However, due to the small sample size it is not advisable to extrapolate for predicting trip generation based on relationships with these variables. It is considered more appropriate to use the trip generation recommended in Section 8, while noting the correlation with these variables.

## 7. CONCLUSIONS

### 7.1 HUNGRY JACKS

Hungry Jacks had similar trip generation between regional and metropolitan areas. Weekend lunch had the highest site trip generation, but the weekday PM trip generation during network peak hour is the critical value for the network. There are observable lunchtime, after school and dinner peaks during weekdays.

The linear regression showed possible relationships:

- higher indoor/ outdoor seating – greater dine in trip generation (stay>10mins);
- higher frontage traffic – higher drive through trip generation;

Multiple regression showed no combination of selected variables which significantly improved R<sup>2</sup> in describing total trip generation or park and dine (stay>10mins) trip generation.

### 7.2 KFC

KFC had slightly higher trip generation in regional than in metropolitan areas. Weekend regional during the evening had the highest site trip generation, but weekday PM trip generation during network peak hour is the critical value for the network. There are defined lunchtime and dinner time peaks during weekdays and weekends.

The linear regression showed no statistically significant relationships that described trip generation.

Multiple regression for total trip generation showed a combination of GFA, drive through capacity and outdoor seating gave a high regression with an R<sup>2</sup> = 0.93. It is important to note that a higher GFA, outdoor seating or drive through capacity are not necessarily generating higher number of trips, but rather are provided by KFC to cater for higher anticipated volumes.

Multiple regression for park and dine (stay>10mins) showed no statistically significant relationship.

### 7.3 McDONALDS

McDonalds had significantly higher trip generation in regional than in metropolitan areas. This is likely due to the concentration of McDonalds outlets in metropolitan areas allowing them to distribute customers from one locality into multiple outlets, while regional outlets being sparser attract visitation from a larger population catchment.

Weekend lunch had the highest site trip generation, but the weekday PM trip generation during network peak hour is the critical value for the network. There are defined morning, lunch, afterschool and evening peaks in trip generation.

The linear regression and multiple regression showed no statistically significant relationships that described trip generation.

### 7.4 OPORTO

Since only two Oporto outlets were surveyed (2-day surveys), there is very limited data to draw significant conclusions. The metropolitan outlet had significantly higher trip generation than regional.

Metropolitan weekend lunch had the highest trip generation, but the weekday PM trip generation during network peak hour is the critical value for the network.

### 7.5 RED ROOSTER

Since only three Red Rooster outlets were surveyed (1x2-day and 2x7-day surveys), there is limited data to draw significant conclusions. Regional trip generation was significantly higher than metropolitan. Weekend and weekday had similar trip generations, with lunchtime in regional generating the highest site trips. However, weekday PM peak hour period is the critical value for the network. There are defined lunchtime and dinner peaks in trip generation. The linear regression indicated GFA, drive through capacity, on-site parking bays and seating all had a strong relationship with trip generation, but the small sample size should be noted when considering these regressions. No multiple regression analysis was carried out since the linear regression was showing significantly high relationships and multiple regression would not be reliable given the sample size.

## 8. RECOMMENDATIONS

### 8.1 HUNGRY JACKS RECOMMENDED RATES

The following summarises the key traffic impact base rates for **Hungry Jacks** during the PM network peak hour:

- baseline trip generation rate of **61 PM network peak hour trips**;
- passing trade in the order of 54%;
- maximum queue lengths of 8;
- average queue length of 5.5;
- maximum number of parked vehicles of 18; and
- average number of parked vehicles of 13.8

It is recommended that, due to the diversity of site characteristics, when determining the appropriate trip generation rate, expected queue length, parking demand and passing trade, consideration should be given to the following:

- indoor/outdoor expected seating numbers
- exposure to frontage road traffic;
- visible exposure to passing traffic;
- ease of access to the site; and
- ease of site egress.

### 8.2 KFC RECOMMENDED RATES

The following summarises the key traffic impact base rates for **KFC** during the PM network peak hour:

- baseline trip generation rate of **73 PM network peak hour trips**;
- passing trade in the order of 43%;
- maximum queue lengths of 11;
- average queue length of 6.3;
- maximum number of parked vehicles of 13; and
- average number of parked vehicles of 9.4

In the multiple regression analysis, a high correlation ( $R^2 = 0.93$ ) for peak hour trip generation was observed with drive through capacity, GFA and outdoor seating.

Equation for trip generation:

$$\text{Trip generation} = 92.73 - 0.354 * \text{GFA} + 4.145 * (\text{drive through capacity}) + 1.694 * (\text{outdoor seating})$$

It should however be noted this is not a consistent observation across other brands and should be treated with caution.

It is recommended that, due to the diversity of site characteristics, when determining the appropriate trip generation rate, expected queue length, parking demand and passing trade, consideration should be given to the following:

- Gross Floor Area
- Drive through capacity
- Outdoor seating
- exposure to frontage road traffic;
- visible exposure to passing traffic;
- ease of access to the site; and
- ease of site egress.

### 8.3 McDONALDS RECOMMENDED RATES

The following summarises the key traffic impact base rates for **McDonalds** during the PM network peak hour:

- baseline trip generation rate of **183 PM network peak hour trips**;
- passing trade in the order of 51%;
- maximum queue lengths of 17;
- average queue length of 11.4;
- maximum number of parked vehicles of 39; and
- average number of parked vehicles of 21.1

It is recommended that, due to the diversity of site characteristics, when determining the appropriate trip generation rate, expected queue length, parking demand and passing trade, consideration should be given to the following:

- exposure to frontage road traffic;
- visible exposure to passing traffic;
- ease of access to the site; and
- ease of site egress.

### 8.4 OPORTO RECOMMENDED RATES

The following summarises the key traffic impact base rates for **Oporto** in the PM network peak hour:

- baseline trip generation rate of **41 PM network peak hour trips**;
- passing trade – insufficient data
- maximum queue lengths of 6;
- average queue length of 4;
- maximum number of parked vehicles of 6; and
- average number of parked vehicles of 6.

Note that the above Oporto values are based on limited data.

It is recommended that, due to the diversity of site characteristics, when determining the appropriate trip generation rate, expected queue length, parking demand and passing trade, consideration should be given to the following:

- exposure to frontage road traffic;
- visible exposure to passing traffic;
- ease of access to the site; and
- ease of site egress.

### 8.5 RED ROOSTER RECOMMENDED RATES

The following summarises the key traffic impact base rates for **Red Rooster** in the PM network peak hour:

- baseline trip generation rate of **35 PM network peak hour trips**;
- passing trade in the order of 51%;
- maximum queue lengths of 7;
- average queue length of 5.3;
- maximum number of parked vehicles of 11; and
- average number of parked vehicles of 6.7

It is recommended that, due to the diversity of site characteristics, when determining the appropriate trip generation rate, expected queue length, parking demand and passing trade, consideration should be given to the following:

- GFA
- Drive through capacity
- On-site parking bays
- Indoor/outdoor seating
- exposure to frontage road traffic;
- visible exposure to passing traffic;
- ease of access to the site; and
- ease of site egress.

## APPENDIX A

### HUNGRY JACKS DATA SUMMARY

Survey Data Summary - Hungry Jacks

Sydney Metropolitan / Regional	Sydney Metropolitan														Regional					
Site Number	1							2							15				16	
Site Location	South Wentworthville							Granville							Tamworth				Newcastle	
Survey day	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Sun	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Fri	Sat		
Survey dates	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	10-Mar	13-Mar	13-Mar	14-Mar	15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	29-Apr	30-Apr		
Operating Times	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	06:00-23:00	06:00-23:00	06:00-22:00	06:00-22:00	06:00-22:00	06:00-22:00	06:00-22:00	06:00-22:00	06:00-22:00	06:00-23:00	06:00-23:00		
Product range	Breakfast, burgers, sides, desserts, drinks							Breakfast, burgers, sides, desserts, drinks							Breakfast, burgers, sides, desserts, drinks				Breakfast, burgers, sides, desserts, drinks	
Surrounding land use if relevant	Commercial							Commercial/Residential							Commercial				Commercial	
Approximate GFA m <sup>2</sup>	340	340	340	340	340	340	340	350	350	400	400	400	400	400	400	400	340	340		
Average employees per shift	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
Number of years open as at June 2016	15	15	15	15	15	15	15	16	16	11	11	11	11	11	11	11	6	6		
No. entry points	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	1 combined entry / exit	2 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit							
No. exit points	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2	2	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit							
Drive-thru lane capacity (dist/ 6) equivalent vehicles	12	12	12	12	12	12	12	10	10	11	11	11	11	11	11	11	13	13		
No. waiting bays	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2		
Total lane capacity + waiting bays	12	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	15	15		
On-site parking bays	40	40	40	40	40	40	40	33	33	34	34	34	34	34	34	34	27	27		
Seating inside	60	60	60	60	60	60	60	56	56	60	60	60	60	60	60	60	60	60		
Seating outside	60	60	60	60	60	60	60	16	16	0	0	0	0	0	0	0	36	36		
Total seating	120	120	120	120	120	120	120	72	72	60	60	60	60	60	60	60	96	96		
No. ordering booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2		
No. payment booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2		
No. collection points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Total booths	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5		
Average service time drive through (m:ss)	3:18	3:39	3:26	2:47	2:56	3:32	3:17	4:23	4:30	3:16	3:16	4:33	4:17	4:01	4:10	4:22	4:14	5:58		
AM survey period	06:00-12:00	06:00-12:00	06:00-15:00	06:00-15:00	06:00-12:00	06:00-12:00	06:00-12:00	07:00-09:00	11:00 - 15:00	06:00-15:00	06:00-12:00	06:00-12:00	06:00-12:00	06:00-12:00	06:00-12:00	06:00-15:00	07:00-09:00	11:00-15:00		
AM Site peak hour times	11:00-12:00	11:00-12:00	12:30-13:30	12:45-13:45	10:00-11:00	10:30-11:30	11:00-12:00	07:45-08:45	13:30-14:30	14:00-15:00	10:15-11:15	09:15-10:15	11:00-12:00	11:00-12:00	10:30-11:30	12:30-13:30	08:00-09:00	12:00-13:00		
AM Site peak trip generation (twice vehicles served)	62	74	138	110	42	48	52	28	104	110	72	60	64	78	76	110	62	110		
AM Site peak road frontage traffic	2182	2249	2613	2144	1965	1982	2002	2754	2747	969	1118	878	892	906	976	1122	2573	2195		
AM Network peak hour times during survey	06:15-07:15	06:45-07:45	12:15-13:15	12:00-13:00	06:45-07:45	07:00-08:00	07:15-08:15	07:15-08:15	13:15-14:15	12:00-13:00	08:00-09:00	08:00-09:00	08:00-09:00	08:00-09:00	08:00-09:00	12:00-13:00	08:00-09:00	11:15-12:15		
AM Network peak trip generation (twice vehicles served)	18	20	134	78	18	14	16	18	92	96	22	22	28	24	40	98	62	94		
AM Network peak two-way road frontage traffic	2756	2746	2664	2241	2644	2519	2604	2963	2833	1045	2255	1352	1386	1412	1338	1209	2573	2359		
PM survey period	12:00-20:00	12:00-20:00	15:00-20:00	15:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	15:00-19:00	17:00-19:00	15:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	15:00-20:00	15:00-19:00	17:00-19:00		
PM Site peak hour times	17:45-18:45	15:15-16:15	16:30-17:30	19:00-20:00	17:45-18:45	13:00-14:00	12:30-13:30	16:00-17:00	18:00-19:00	16:00-17:00	17:15-18:15	12:30-13:30	15:15-16:15	15:15-16:15	15:15-16:15	15:15-16:15	15:15-16:15	17:00-18:00		
PM Site peak trip generation (twice vehicles served)	116	112	106	76	104	114	98	126	90	90	102	96	118	100	90	124	66			
PM Site peak road frontage traffic	2161	3145	2349	2536	3228	2042	2102	3326	2374	829	1553	945	1278	1362	1326	837	2469	1435		
PM Network peak hour times during survey	16:00-17:00	16:00-17:00	17:30-18:30	19:00-20:00	17:15-18:15	17:15-18:15	17:00-18:00	17:30-18:30	17:15-18:15	16:00-17:00	15:15-16:15	16:45-17:45	16:15-17:15	16:30-17:30	16:45-17:45	15:45-16:45	16:45-17:45	17:00-18:00		
PM Network peak two-way road frontage traffic	3524	3380	2430	2536	3364	3035	3299	3473	2444	829	1786	1460	1414	1512	1373	868	2639	1435		
PM Network peak trip generation drive through only	54	44			50	26	66	54			56	32	52	46	28		36			
PM Network peak trip generation park & walk-in only	28	24	Not Calculated				24	24	26	16	Not Calculated	Not Calculated	24	16	28	28	14	Not Calculated	26	Not Calculated
PM Network peak trip generation park > 10 mins only	18	14			8	16	8	6			18	4	24	10	8		12			
PM Network peak total trip generation	82	68	80	76	74	50	92	70	88	90	80	48	80	74	42	80	62	66		
Passing trade drive through	53%	0%	37%	25%	69%	69%	31%	78%	49%	35%	20%	63%	44%	47%	58%	27%	63%	47%		
Passing trade park and walk-in	22%	0%	46%	48%	41%	71%	44%	79%	72%	3%	38%	55%	35%	48%	38%	40%	0%	21%		
Weighted passing trade	39%	0%	41%	37%	56%	70%	38%	78%	57%	22%	29%	60%	40%	47%	49%	33%	33%	36%		
Maximum queue (No. vehicles)	6	4	7	4	4	5	7	7	7	6	5	6	5	6	3	5	8	10		
Maximum queue/Total queue	50%	33%	58%	33%	33%	42%	58%	58%	58%	46%	38%	46%	38%	46%	23%	38%	53%	67%		
Maximum parked vehicles	10	17	21	16	12	14	13	10	12	20	14	12	15	16	18	24	10	20		
Maximum parked vehicles/Total parking bays	25%	43%	53%	40%	30%	35%	33%	30%	36%	59%	41%	35%	44%	47%	53%	71%	37%	74%		
AM Trips per 100 square meters GFA	5	6	39	23	5	4	5	5	26	24	6	6	7	6	10	25	18	28		
AM Trips per seat	0.15	0.17	1.12	0.65	0.15	0.12	0.13	0.25	1.28	1.6	0.37	0.37	0.47	0.4	0.67	1.63	0.65	0.98		
PM Trips per 100 square meters GFA	24	20	24	22	22	15	27	20	25	23	20	12	20	19	11	20	18	19		
PM Trips per seat	0.68	0.57	0.67	0.63	0.62	0.42	0.77	0.97	1.22	1.5	1.33	0.8	1.33	1.23	0.7	1.33	0.65	0.69		
Site and/or survey observations and comments																				

Footnotes:

1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions

**Independent Variables**

**Dependent Variables**

Denotes <10 surveys

Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends.

It is important to note that Trips/100m<sup>2</sup> GFA and Trips per seat are not reliable metrics since they are highly variable among sites and brands.

## APPENDIX B

### KFC DATA SUMMARY

Survey Data Summary - KFC

Sydney Metropolitan / Regional	Sydney Metropolitan													
Site Number	3							4		5		6		
Site Location	Asquith							Earlwood		Granville		Frenchs Forrest		
Survey day	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Sat	Thur	Sun	Thur	Sat	
Survey dates	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	03-Mar	05-Mar	10-Mar	13-Mar	03-Mar	05-Mar	
Operating Times	11:00-23:00	11:00-23:00	11:00-23:00	11:00-23:00	11:00-23:00	11:00-23:00	11:00-23:00	10:30-21:00	10:30-21:00	10:30-22:00	10:30-22:00	10:00-23:00	10:00-23:00	
Product range	Chicken, burgers, wraps, drinks, shakes, sides							Chicken, burgers, wraps, drinks, shakes, sides		Chicken, burgers, wraps, drinks, shakes, sides		Chicken, burgers, wraps, drinks, shakes, sides		
Surrounding land use if relevant	Commercial/Residential							Commercial/Residential		Commercial/Residential		Commercial/Residential		
Approximate GFA m <sup>2</sup>	140	140	140	140	140	140	140	220	220	280	280	330	330	
Average employees per shift	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	
Number of years open as at June 2016	47	47	47	47	47	47	47	45	45	7	7	14	14	
No. entry points	1	1	1	1	1	1	1	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	1	1	
No. exit points	1	1	1	1	1	1	1	3	3	2 combined entry / exit	2 combined entry / exit	1	1	
Drive-thru lane capacity (dist/ 6) equivalent vehicles	7	7	7	7	7	7	7	10	10	11	11	15	15	
No. waiting bays	0	0	0	0	0	0	0	0	0	0	0	1	1	
<b>Total lane capacity + waiting bays</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>10</b>	<b>10</b>	<b>11</b>	<b>11</b>	<b>16</b>	<b>16</b>	
<b>On-site parking bays</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>15</b>	<b>15</b>	<b>26</b>	<b>26</b>	<b>19</b>	<b>19</b>	
<b>Seating inside</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>56</b>	<b>56</b>	<b>60</b>	<b>60</b>	<b>40</b>	<b>40</b>	
<b>Seating outside</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>32</b>	
<b>Total seating</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>56</b>	<b>56</b>	<b>94</b>	<b>94</b>	<b>72</b>	<b>72</b>	
No. ordering booths	1	1	1	1	1	1	1	1	1	1	1	1	1	
No. payment booths	1	1	1	1	1	1	1	1	1	1	1	1	1	
No. collection points	1	1	1	1	1	1	1	1	1	1	1	1	1	
<b>Total booths</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	
<b>Average service time drive through (m:ss)</b>	<b>3:13</b>	<b>2:32</b>	<b>2:34</b>	<b>2:32</b>	<b>4:06</b>	<b>5:16</b>	<b>3:04</b>	<b>2:18</b>	<b>3:38</b>	<b>3:22</b>	<b>4:30</b>	<b>3:09</b>	<b>3:03</b>	
AM survey period	N/A	N/A	11:00-15:00	11:00-15:00	N/A	N/A	N/A	N/A	N/A	12:00-14:00	N/A	11:00-15:00	N/A	12:00-14:00
AM Site peak hour times	N/A	N/A	11:45-12:45	13:00-14:00	N/A	N/A	N/A	N/A	N/A	12:30-13:30	N/A	13:15-14:15	N/A	12:30-13:30
AM Site peak trip generation (twice vehicles served)	N/A	N/A	110	104	N/A	N/A	N/A	N/A	62	N/A	120	N/A	158	
AM Site peak road frontage traffic	N/A	N/A	1909	1461	N/A	N/A	N/A	N/A	394	N/A	2833	N/A	4096	
AM Network peak hour times during survey	N/A	N/A	11:15-12:15	11:30-12:30	N/A	N/A	N/A	N/A	12:00-13:00	N/A	13:15-14:15	N/A	12:00-13:00	
AM Network peak trip generation (twice vehicles served)	N/A	N/A	92	70	N/A	N/A	N/A	N/A	50	N/A	120	N/A	126	
AM Network peak two-way road frontage traffic	N/A	N/A	1940	1646	N/A	N/A	N/A	N/A	456	N/A	2833	N/A	4159	
PM survey period	11:00-20:00	11:00-20:00	15:00-20:00	15:00-20:00	11:00-20:00	11:00-20:00	11:00-20:00	12:00-14:00 & 17:30-20:00	17:30-20:00	12:30-18:30	17:00-19:00	12:00-14:00 & 17:30-20:00	17:30-20:00	
PM Site peak hour times	18:30-19:30	18:30-19:30	18:45-19:45	18:00-19:00	11:30-12:30	11:45-12:45	11:45-12:45	18:45-19:45	19:00-20:00	17:00-18:00	18:00-19:00	12:00-13:00	18:30-19:30	
PM Site peak trip generation (twice vehicles served)	122	140	116	104	66	106	112	78	78	114	122	138	118	
PM Site peak road frontage traffic	1622	1626	1156	1256	1235	1253	1192	819	663	3379	2374	2818	2142	
PM Network peak hour times during survey	16:30-17:30	16:30-17:30	17:00-18:00	17:00-18:00	16:45-17:45	16:30-17:30	17:00-18:00	17:30-18:30	17:30-18:30	17:30-18:30	17:15-18:15	17:30-18:30	17:30-18:30	
<b>PM Network peak two-way road frontage traffic</b>	<b>2253</b>	<b>2309</b>	<b>1638</b>	<b>1567</b>	<b>2008</b>	<b>1959</b>	<b>1998</b>	<b>1036</b>	<b>835</b>	<b>3473</b>	<b>2444</b>	<b>3629</b>	<b>2883</b>	
PM Network peak trip generation drive through only	58	40			18	24	48	34		68		74		
PM Network peak trip generation park & walk-in only	8	24	Not Calculated	Not Calculated	12	6	12	26	Not Calculated	34	Not Calculated	22	Not Calculated	
PM Network peak trip generation park > 10 mins only	2	12			0	0	4	6		8		18		
PM Network peak total trip generation	66	64	74	66	30	30	60	60	62	102	100	96	102	
Passing trade drive through	65%	52%	35%	39%	53%	63%	56%	31%	47%	71%	45%	64%	60%	
Passing trade park and walk-in	14%	6%	33%	25%	31%	19%	31%	44%	52%	31%	74%	75%	63%	
Weighted passing trade	45%	35%	34%	34%	44%	43%	46%	35%	49%	58%	55%	68%	61%	
Maximum queue (No. vehicles)	5	4	3	3	4	5	4	4	6	7	9	5	5	
Maximum queue/Total queue	71%	57%	43%	43%	57%	71%	57%	40%	60%	64%	82%	31%	31%	
Maximum parked vehicles	12	9	10	7	5	6	8	4	8	9	9	13	10	
Maximum parked vehicles/Total parking bays	38%	28%	31%	22%	16%	19%	25%	27%	53%	35%	35%	68%	53%	
AM Trips per 100 square meters GFA	N/A	N/A	65.71	50.00	N/A	N/A	N/A	N/A	22.73	N/A	42.86	N/A	38.18	
AM Trips per seat	N/A	N/A	3.07	2.33	N/A	N/A	N/A	N/A	0.89	N/A	1.28	N/A	1.75	
PM Trips per 100 square meters GFA	0.47	0.46	52.86	47.14	21.43	21.43	42.86	27.27	28.18	36.43	35.71	29.09	30.91	
PM Trips per seat	2.20	2.13	2.47	2.20	1.00	1.00	2.00	1.07	1.11	1.09	1.06	1.33	1.42	
Site and/or survey observations and comments										5 cars reversed out of drive thru due to traffic jams between 3:30pm-4:00pm				

Footnotes:

1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions

Independent Variables

Dependent Variables

Denotes <10 Surveys

Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends.

Survey Data Summary - KFC

Sydney Metropolitan / Regional	Regional										
Site Number	17							18		19	
Site Location	Mayfield, Newcastle							Taree		Grafton	
Survey day	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Fri	Sat	Fri	Sat
Survey dates	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	29-Apr	30-Apr	29-Apr	30-Apr
Operating Times	10:00-23:00	10:00-23:00	10:00-23:00	10:00-23:00	10:00-23:00	10:00-23:00	10:00-23:00	10:00-22:00	10:00-22:00	10:00-23:00	10:00-23:00
Product range	Chicken, burgers, wraps, drinks, shakes, sides							Chicken, burgers, wraps, drinks, shakes, sides		Chicken, burgers, wraps, drinks, shakes, sides	
Surrounding land use if relevant	Commercial/Residential							Commercial		Residential	
Approximate GFA m <sup>2</sup>	420	420	420	420	420	420	420	300	300	270	270
Average employees per shift	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16	6-16
Number of years open as at June 2016	6	6	6	6	6	6	6	36	36	31	31
No. entry points	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	3 combined entry / exit	3 combined entry / exit	1 combined entry / exit	1 combined entry / exit
No. exit points	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	3 combined entry / exit	3 combined entry / exit	1 combined entry / exit	1 combined entry / exit
Drive-thru lane capacity (dist/ 6) equivalent vehicles	12	12	12	12	12	12	12	8	8	10	10
No. waiting bays	0	0	0	0	0	0	0	0	0	0	0
<b>Total lane capacity + waiting bays</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>10</b>	<b>10</b>
<b>On-site parking bays</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>22</b>	<b>22</b>	<b>16</b>	<b>16</b>
<b>Seating inside</b>	<b>98</b>	<b>98</b>	<b>98</b>	<b>98</b>	<b>98</b>	<b>98</b>	<b>98</b>	<b>34</b>	<b>34</b>	<b>46</b>	<b>46</b>
<b>Seating outside</b>	<b>48</b>	<b>48</b>	<b>48</b>	<b>48</b>	<b>48</b>	<b>48</b>	<b>48</b>	<b>32</b>	<b>32</b>	<b>0</b>	<b>0</b>
<b>Total seating</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>146</b>	<b>66</b>	<b>66</b>	<b>46</b>	<b>46</b>
No. ordering booths	1	1	1	1	1	1	1	1	1	1	1
No. payment booths	1	1	1	1	1	1	1	1	1	1	1
No. collection points	1	1	1	1	1	1	1	1	1	1	1
<b>Total booths</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>Average service time drive through (m:ss)</b>	<b>3:40</b>	<b>5:34</b>	<b>2:57</b>	<b>2:45</b>	<b>2:56</b>	<b>3:38</b>	<b>3:37</b>	<b>1:49</b>	<b>1:10</b>	<b>6:32</b>	<b>4:59</b>
AM survey period	10:00-15:00	10:00-15:00	N/A	N/A	N/A	N/A	N/A	N/A	11:00-15:00	N/A	11:00-15:00
AM Site peak hour times	12:15-13:15	12:00-13:00	N/A	N/A	N/A	N/A	N/A	N/A	12:15-13:15	N/A	12:45-13:45
AM Site peak trip generation (twice vehicles served)	122	126	N/A	N/A	N/A	N/A	N/A	N/A	134	N/A	106
AM Site peak road frontage traffic	1446	1314	N/A	N/A	N/A	N/A	N/A	N/A	1045	N/A	1545
AM Network peak hour times during survey	10:30-11:30	12:00-13:00	N/A	N/A	N/A	N/A	N/A	N/A	11:00-12:00	N/A	11:00-12:00
AM Network peak trip generation (twice vehicles served)	42	126	N/A	N/A	N/A	N/A	N/A	N/A	74	N/A	60
AM Network peak two-way road frontage traffic	1552	1314	N/A	N/A	N/A	N/A	N/A	N/A	1225	N/A	1983
PM survey period	15:00-20:00	15:00-20:00	10:00-20:00	10:00-20:00	10:00-20:00	10:00-20:00	10:00-20:00	12:30-18:30	17:00-19:00	12:30-18:30	17:00-19:00
PM Site peak hour times	18:30-19:30	18:15-19:15	17:30-18:30	11:45-12:45	12:15-13:15	18:15-19:15	11:45-12:45	17:15-18:15	17:45-18:45	12:45-13:45	17:15-18:15
PM Site peak trip generation (twice vehicles served)	214	126	112	124	136	138	140	134	114	142	120
PM Site peak road frontage traffic	1065	1025	1540	1383	1376	1202	1470	1036	690	2169	1177
PM Network peak hour times during survey	17:15-18:15	17:45-18:45	16:45-17:45	16:45-17:45	16:45-17:45	16:30-17:30	15:15-16:15	16:15-17:15	17:30-18:30	15:00-16:00	17:00-18:00
<b>PM Network peak two-way road frontage traffic</b>	<b>1239</b>	<b>1136</b>	<b>1839</b>	<b>1876</b>	<b>1878</b>	<b>1803</b>	<b>1790</b>	<b>1355</b>	<b>743</b>	<b>2478</b>	<b>1199</b>
PM Network peak trip generation drive through only			76	52	98	66	52	64		26	
PM Network peak trip generation park & walk-in only	Not Calculated	Not Calculated	10	16	12	10	16	16	Not Calculated	14	Not Calculated
PM Network peak trip generation park > 10 mins only			6	12	2	8	4	6		6	
PM Network peak total trip generation	194	106	86	68	110	76	68	80	106	40	49
Passing trade drive through	24%	23%	Data Not Collected	3%	12%	Data Not Collected	50%				
Passing trade park and walk-in	40%	33%	30%	28%	30%	36%	36%	0%	19%	43%	71%
Weighted passing trade	32%	25%	N/A	N/A	N/A	N/A	N/A	N/A	14%	N/A	58%
Maximum queue (No. vehicles)	11	11	7	5	10	11	8	5	3	11	7
Maximum queue/Total queue	92%	92%	58%	42%	83%	92%	67%	63%	38%	110%	70%
Maximum parked vehicles	7	33	10	10	8	11	12	11	6	8	12
Maximum parked vehicles/Total parking bays	21%	97%	29%	29%	24%	32%	35%	50%	27%	50%	75%
AM Trips per 100 square meters GFA	10	30	N/A	N/A	N/A	N/A	N/A	N/A	25	N/A	22
AM Trips per seat	0.29	0.86	N/A	N/A	N/A	N/A	N/A	N/A	1.12	N/A	1.3
PM Trips per 100 square meters GFA	46	25	20	16	26	18	16	27	35	15	18
PM Trips per seat	1.33	0.73	0.59	0.47	0.75	0.52	0.47	1.21	1.61	0.87	1.07
Site and/or survey observations and comments										Manager requested no surveys at Drive Thru	

Footnotes:

1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions

**Independent Variables**

**Dependent Variables**

Denotes <10 Surveys

**Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends.**

**It is important to note that Trips/100m<sup>2</sup> GFA and Trips per seat are not reliable metrics since they are highly variable among sites and brands.**

## APPENDIX C

### MCDONALDS DATA SUMMARY

P2414 RMS Trip Generation for Fast Food Outlets  
 Survey Data Summary - McDonalds

Sydney Metropolitan / Regional	Sydney Metropolitan														
Site Number	7							8		9		10		11	
Site Location	Liverpool							Northmead		Rosehill		Stanmore		Haberfield	
Survey day	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Fri	Sat	Fri	Sat	Fri	Sat	Thu	Sun
Survey dates	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	11-Mar	12-Mar	11-Mar	12-Mar	11-Mar	12-Mar	10-Mar	13-Mar
Operating Times	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	06:00-23:00	24 Hours	24 Hours	24 Hours	24 Hours	05:00-00:00	05:00-00:00
Product range	Burgers, Fries, Drinks - Includes McCafe							Burgers, Fries, Drinks - Includes McCafe		Burgers, Fries, Drinks - Includes McCafe		Burgers, Fries, Drinks - Includes McCafe		Burgers, Fries, Drinks - Includes McCafe	
Surrounding land use if relevant	Commercial/Residential							Residential		Commercial/Residential		Commercial		Residential	
Approximate GFA m <sup>2</sup>	270	270	270	270	270	270	270	350	350	400	400	350	350	660	660
Average employees per shift	10	10	10	10	10	10	10	14	14	10	10	23	23	10	10
Number of years open as at June 2016	45	45	45	45	45	45	45	-	-	-	-	-	-	4	4
No. entry points	1	1	1	1	1	1	1	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	2 combined entry / exit	2 combined entry / exit
No. exit points	1	1	1	1	1	1	1	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	2 combined entry / exit	2 combined entry / exit
Drive-thru lane capacity (dist/ 6) equivalent vehicles	11	11	11	11	11	11	11	14	14	13	13	12	12	10	10
No. waiting bays	0	0	0	0	0	0	0	1	1	1	1	2	2	1	1
Total lane capacity + waiting bays	11	11	11	11	11	11	11	15	15	14	14	14	14	11	11
On-site parking bays	41	41	41	41	41	41	41	46	46	33	33	34	34	18	18
Seating inside	54	54	54	54	54	54	54	41	41	40	40	20	20	108	108
Seating outside	58	58	58	58	58	58	58	72	72	40	40	30	30	26	26
Total seating	112	112	112	112	112	112	112	113	113	80	80	50	50	134	134
No. ordering booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No. payment booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No. collection points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total booths	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Average service time drive through (m:ss)	3:31	3:55	3:12	3:14	3:03	3:51	3:32	3:21	5:53	4:51	4:32	3:14	11:12	4:18	5:27
AM survey period	06:00-15:00	06:00-15:00	06:00-12:00	06:00-12:00	06:00-12:00	06:00-12:00	06:00-12:00	07:00-09:00	11:00-15:00	07:00-09:00	11:00-15:00	07:00-09:00	11:00-15:00	07:00-09:00	11:00-15:00
AM Site peak hour times	12:45-13:45	12:45-13:45	07:15-08:15	07:00-08:00	07:45-08:45	09:15-10:15	07:30-08:30	07:00-08:00	13:45-14:45	07:15-08:15	13:00-14:00	07:45-08:45	12:45-13:45	07:45-08:45	11:00-12:00
AM Site peak trip generation (twice vehicles served)	254	174	118	138	142	142	140	150	242	98	240	154	388	148	250
AM Site peak road frontage traffic	2156	2460	2559	2423	2713	2386	2540	3269	3156	1319	3902	1371	3842	3492	3411
AM Network peak hour times during survey	10:30-11:30	12:00-13:00	08:15-09:15	08:30-09:30	08:00-09:00	08:15-09:15	08:15-09:15	07:00-08:00	11:15-12:15	08:00-09:00	11:30-12:30	07:30-08:30	14:00-15:00	07:00-08:00	12:00-13:00
AM Network peak trip generation (twice vehicles served)	98	164	96	98	132	112	112	150	158	92	162	122	242	122	126
AM Network peak two-way road frontage traffic	2856	2650	2794	2676	2767	2713	2782	3269	3680	1405	1407	3996	3971	3612	3637
PM survey period	15:00-20:00	15:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	12:00-20:00	15:00-19:00	17:00-19:00	15:00-19:00	17:00-19:00	15:00-19:00	17:00-19:00	15:00-19:00	17:00-19:00
PM Site peak hour times	17:30-18:30	16:45-17:45	15:15-16:15	15:15-16:15	15:00-16:00	14:30-15:30	15:00-16:00	15:00-16:00	17:45-18:45	15:15-16:15	17:00-18:00	15:00-16:00	17:15-18:15	15:00-16:00	18:00-19:00
PM Site peak trip generation (twice vehicles served)	114	128	190	202	272	234	212	160	152	194	118	214	238	148	126
PM Site peak road frontage traffic	1888	2170	3060	2958	3002	2775	3114	3559	2374	1342	1311	3908	3781	3585	2872
PM Network peak hour times during survey	15:00-16:00	15:00-16:00	17:00-18:00	16:15-17:15	17:00-18:00	15:30-16:30	15:15-16:15	16:00-17:00	17:00-18:00	15:45-16:45	17:45-18:45	16:45-17:45	17:15-18:15	16:45-17:45	17:00-18:00
PM Network peak two-way road frontage traffic	2400	2304	3061	3076	3218	3083	3246	3660	2995	1357	1359	4014	3781	3861	3274
PM Network peak trip generation drive through only			68	76	112	38	124	96		84		82		68	
PM Network peak trip generation park & walk-in only	Not Calculated	Not Calculated	54	50	72	76	64	16	Not Calculated	88	Not Calculated	70	Not Calculated	40	Not Calculated
PM Network peak trip generation park > 10 mins only			14	26	38	34	18	12		84		44		28	
PM Network peak total trip generation	148	132	118	126	184	114	188	112	148	172	114	152	238	108	98
Passing trade drive through	47%	54%	86%	75%	71%	66%	69%	67%	75%	Data Not Collected	Data Not Collected	75%	53%	47%	59%
Passing trade park and walk-in	47%	30%	41%	48%	40%	25%	36%	63%	41%	80%	30%	62%	75%	57%	51%
Weighted passing trade	47%	45%	68%	65%	58%	46%	57%	66%	62%	-	-	70%	60%	50%	56%
Maximum queue (No. vehicles)	13	10	7	6	9	9	7	8	11	9	8	8	10	9	12
Maximum queue/Total queue	118%	91%	64%	55%	82%	82%	64%	53%	73%	64%	57%	57%	71%	82%	109%
Maximum parked vehicles	22	13	16	19	33	18	13	20	24	22	23	17	24	12	21
Maximum parked vehicles/Total parking bays	54%	32%	39%	46%	80%	44%	32%	43%	52%	67%	70%	50%	71%	67%	117%
AM Trips per 100 square meters GFA	36	61	36	36	49	41	41	43	45	23	41	35	69	18	19
AM Trips per seat	0.88	1.46	0.86	0.88	1.18	1	1	1.33	1.4	1.15	2.03	2.44	4.84	0.91	0.94
PM Trips per 100 square meters GFA	55	49	44	47	68	42	70	32	42	43	29	43	68	16	15
PM Trips per seat	1.32	1.18	1.05	1.13	1.64	1.02	1.68	0.99	1.31	2.15	1.43	3.04	4.76	0.81	0.73
Site and/or survey observations and comments															

Footnotes:  
 1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions  
**Independent Variables**  
 Dependent Variables

Denotes <10 Surveys

Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends

Survey Data Summary - McDonalds

Sydney Metropolitan / Regional	Regional														
Site Number	20							21		22		23		24	
Site Location	Port Macquarie							Forster		Newcastle		Tamworth		Wyoming, Gosford	
Survey day	Wed	Thur	Fri	Sat	Sun	Mon	Tue	Fri	Sat	Fri	Sat	Sun	Tue	Fri	Sat
Survey dates	02-Mar	03-Mar	04-Mar	05-Mar	06-Mar	07-Mar	08-Mar	29-Apr	30-Apr	29-Apr	30-Apr	20-Mar	22-Mar	29-Apr	30-Apr
Operating Times	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	06:30-22:00	06:30-22:00	24 Hours	24 Hours	05:00-00:00	05:00-00:00	05:00-23:00	05:00-23:00
Product range	Burgers, Fries, Drinks - Includes McCafe							Burgers, Fries, Drinks - Includes McCafe							
Surrounding land use if relevant	Commercial							Commercial		Residential		Commercial		Commercial/Residential	
Approximate GFA m <sup>2</sup>	710	710	710	710	710	710	710	450	450	390	390	500	500	370	370
Average employees per shift	13	13	13	13	13	13	13	18	18	18	18	18	18	20	20
Number of years open as at June 2016	29	29	29	29	29	29	29	20	20	17	17	-	-	19	19
No. entry points	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	3 combined entry / exit	3 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit
No. exit points	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	3 combined entry / exit	3 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit	1 combined entry / exit
Drive-thru lane capacity (dist/ 6) equivalent vehicles	13	13	13	13	13	13	13	12	12	36	36	14	14	13	13
No. waiting bays	2	2	2	2	2	2	2	1	1	0	0	1	1	2	2
Total lane capacity + waiting bays	15	15	15	15	15	15	15	13	13	36	36	15	15	15	15
On-site parking bays	42	42	42	42	42	42	42	30	30	44	44	41	41	26	26
Seating inside	156	156	156	156	156	156	156	40	40	124	124	40	40	70	70
Seating outside	36	36	36	36	36	36	36	50	50	26	26	43	43	0	0
Total seating	192	192	192	192	192	192	192	90	90	150	150	83	83	70	70
No. ordering booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No. payment booths	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
No. collection points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total booths	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3
Average service time drive through (m:ss)	3:51	3:51	4:04	4:02	4:47	3:23	3:39	4:36	9:49	4:55	4:59	6:10	6:46	2:46	3:44
AM survey period	06:00-12:00	06:00-12:00	06:00-12:00	06:00-15:00	06:00-15:00	06:00-12:00	06:00-12:00	07:00-09:00	11:00-15:00	07:00-09:00	11:00-15:00	11:00-15:00	07:00-09:00	07:00-09:00	11:00-15:00
AM Site peak hour times	08:30-09:30	08:30-09:30	08:15-09:15	12:15-13:15	13:00-14:00	09:00-10:00	08:15-09:15	07:45-08:45	11:15-12:15	07:30-08:30	11:00-12:00	11:45-12:45	07:30-08:30	07:45-08:45	11:45-12:45
AM Site peak trip generation (twice vehicles served)	216	238	216	310	256	164	220	214	320	266	246	260	246	296	242
AM Site peak road frontage traffic	1640	1460	1545	1708	1427	1301	1566	1333	1748	2310	2314	836	1087	2467	2425
AM Network peak hour times during survey	09:00-10:00	11:00-12:00	11:00-12:00	10:30-11:30	12:00-13:00	09:45-10:45	08:30-09:30	08:00-09:00	11:45-12:45	08:00-09:00	11:15-12:15	11:45-12:45	08:00-09:00	08:00-09:00	11:15-12:15
AM Network peak trip generation (twice vehicles served)	182	174	206	180	222	132	202	210	246	246	230	260	232	262	230
AM Network peak two-way road frontage traffic	1749	1649	1622	1937	1697	1538	1585	1454	1811	2573	2329	836	1110	2532	2618
PM survey period	12:00-20:00	12:00-20:00	12:00-20:00	15:00-20:00	15:00-20:00	12:00-20:00	12:00-20:00	15:00-19:00	17:00-19:00	15:00-19:00	17:00-19:00	17:00-19:00	15:00-19:00	15:00-19:00	17:00-19:00
PM Site peak hour times	12:15-13:15	15:15-16:15	17:15-18:15	15:15-16:15	15:45-16:45	15:00-16:00	12:00-13:00	15:45-16:45	17:45-18:45	15:15-16:15	17:45-18:45	17:00-18:00	15:00-16:00	17:15-18:15	17:45-18:45
PM Site peak trip generation (twice vehicles served)	246	244	262	222	198	216	244	216	178	242	196	122	264	238	24
PM Site peak road frontage traffic	1612	1558	1175	1340	1084	1548	1623	1576	646	2469	1066	542	1052	2754	1848
PM Network peak hour times during survey	15:00-16:00	12:15-13:15	15:15-16:15	15:15-16:15	15:00-16:00	14:45-15:45	12:00-13:00	15:00-16:00	17:00-18:00	16:45-17:45	17:00-18:00	17:00-18:00	15:15-16:15	15:45-16:45	17:00-18:00
PM Network peak two-way road frontage traffic	1708	1557	1788	1340	1112	1559	1623	1790	883	2639	1435	542	1102	2882	2135
PM Network peak trip generation drive through only	118	168	180	Not Calculated	Not Calculated	156	178	172	Not Calculated	174	Not Calculated	Not Calculated	164	154	Not Calculated
PM Network peak trip generation park & walk-in only	56	70	42			50	66	36		32			96	52	
PM Network peak trip generation park > 10 mins only	54	52	32			38	54	28		22			70	30	
PM Network peak total trip generation	174	238	222	222	186	206	244	208	166	206	176	122	260	206	22
Passing trade drive through	76%	68%	70%	91%	65%	89%	88%	11%	9%	79%	60%	Data Not Collected	100%	Data Not Collected	Data Not Collected
Passing trade park and walk-in	23%	36%	15%	25%	27%	44%	45%	39%	29%	77%	75%		100%	63%	
Weighted passing trade	56%	57%	51%	71%	54%	74%	75%	18%	15%	79%	64%		-	-	
Maximum queue (No. vehicles)	12	15	15	13	17	12	14	15	13*	17	17	14	17	9	15
Maximum queue/Total queue	80%	100%	100%	87%	113%	80%	93%	115%	100%	47%	47%	93%	113%	60%	100%
Maximum parked vehicles	34	34	39	32	21	31	37	21	26	26	43	28	21	20	24
Maximum parked vehicles/Total parking bays	81%	81%	93%	76%	50%	74%	88%	70%	87%	59%	98%	68%	51%	77%	92%
AM Trips per 100 square meters GFA	26	25	29	25	31	19	28	47	55	63	59	52	46	71	62
AM Trips per seat	1.28	1.27	1.36	1.16	1.03	1.13	1.27	2.4	1.98	1.61	1.31	1.47	3.18	3.4	0.34
PM Trips per 100 square meters GFA	25	34	31	31	26	29	34	46	37	53	45	24	52	56	6
PM Trips per seat	0.91	1.24	1.16	1.16	0.97	1.07	1.27	2.31	1.84	1.37	1.17	1.47	3.13	2.94	0.31
Site and/or survey observations and comments															

Footnotes:

1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions

Independent Variables

Dependent Variables

\* Sports Marathon during survey of McDonalds Forster generated queue lengths well in excess of 100% of capacity, which is not expected to be the typical queue length

Denotes <10 Surveys

Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends.

It is important to note that Trips/100m<sup>2</sup> GFA and Trips per seat are not reliable metrics since they are highly variable among sites and brands.

## APPENDIX D

### Oporto Data Summary

P2414 RMS Trip Generation for Fast Food Outlets

Survey Data Summary - Oporto

Sydney Metropolitan / Regional	Sydney Metropolitan		Regional	
Site Number	12		25	
Site Location	Plumpton		Tamworth	
Survey day	Thur	Sun	Sun	Tue
Survey dates	10-Mar	13-Mar	20-Mar	22-Mar
Operating Times	06:00-00:00	06:00-00:00	09:00-22:00	09:00-22:00
Product range	Flame Grilled Chicken and Burgers		Flame Grilled Chicken and Burgers	
Surrounding land use if relevant	Residential		Commercial/Residential	
Approximate GFA m <sup>2</sup>	230	230	300	300
Average employees per shift	-	-	-	-
Number of years open as at June 2016	-	-	8	8
No. entry points	2 combined entry / exit	2 combined entry / exit	1	1
No. exit points	2 combined entry / exit	2 combined entry / exit	1	1
Drive-thru lane capacity (dist/ 6) equivalent vehicles	6	6	10	10
No. waiting bays	2	2	0	0
Total lane capacity + waiting bays	8	8	10	10
On-site parking bays	24	24	22	22
Seating inside	-	-	20	20
Seating outside	-	-	30	30
Total seating	-	-	50	50
No. ordering booths	1	1	1	1
No. payment booths	1	1	1	1
No. collection points	1	1	1	1
Total booths	3	3	3	3
Average service time drive through (m:ss)	4:22	4:25	5:00	4:52
AM survey period	07:00-09:00	11:00-15:00	11:00-15:00	-
AM Site peak hour times	08:00-09:00	12:15-13:15	11:45-12:45	-
AM Site peak trip generation (twice vehicles served)	24	86	58	-
AM Site peak road frontage traffic	1657	1338	837	-
AM Network peak hour times during survey	07:45-08:45	11:45-12:45	11:45-12:45	-
AM Network peak trip generation (twice vehicles served)	22	62	58	-
AM Network peak two-way road frontage traffic	1701	1358	837	-
PM survey period	15:00-19:00	17:00-19:00	17:00-19:00	15:00-19:00
PM Site peak hour times	15:30-16:30	18:00-19:00	17:30-18:30	17:00-18:00
PM Site peak trip generation (twice vehicles served)	82	72	26	34
PM Site peak road frontage traffic	1840	1134	485	951
PM Network peak hour times during survey	15:00-16:00	17:15-18:15	17:00-18:00	15:15-16:15
PM Network peak two-way road frontage traffic	1879	1223	542	1102
PM Network peak trip generation drive through only	42	Not Calculated	Not Calculated	10
PM Network peak trip generation park & walk-in only	14			16
PM Network peak trip generation park > 10 mins only	6			8
PM Network peak total trip generation	56	38	8	26
Passing trade drive through	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected
Passing trade park and walk-in	60%	0%	17%	Data Not Collected
Weighted passing trade	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected
Maximum queue (No. vehicles)	6	5	4	2
Maximum queue/Total queue	75%	63%	40%	20%
Maximum parked vehicles	6	8	7	6
Maximum parked vehicles/Total parking bays	25%	33%	32%	27%
AM Trips per 100 square meters GFA	10	27	19	-
AM Trips per seat	-	-	1.16	-
PM Trips per 100 square meters GFA	24	17	3	9
PM Trips per seat	-	-	0.16	0.52
Site and/or survey observations and comments				Oporto was closed until 9:00am

Footnotes:

1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions

Independent Variables

Dependent Variables

Denotes <10 Surveys

Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends. It is important to note that Trips/100m<sup>2</sup> GFA and Trips per seat are not reliable metrics since they are highly variable among sites and brands.

## APPENDIX E

### RED ROOSTER DATA SUMMARY

Survey Data Summary - Red Rooster

Sydney Metropolitan / Regional	Sydney Metropolitan								Regional									
Site Number	13								14		26							
Site Location	Wentworthville								Lakemba		Port Macquarie							
Survey day	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Sat	Tue	Wed	Thur	Fri	Sat	Sun	Mon		
Survey dates	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	03-Mar	05-Mar	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb	29-Feb		
Operating Times	10:00-22:00	10:00-22:00	10:00-22:00	10:00-22:00	10:00-22:00	10:00-22:00	10:00-22:00	10:00-22:00	10:00-22:00	10:00-21:30	10:00-21:30	10:00-21:30	10:00-21:30	10:00-21:30	10:00-21:30	10:00-21:30		
Product range	Roast Chicken, Burgers and Sides								Roast Chicken, Burgers and Sides	Roast Chicken, Burgers and Sides	Roast Chicken, Burgers and Sides				Roast Chicken, Burgers and Sides	Roast Chicken, Burgers and Sides	Roast Chicken, Burgers and Sides	
Surrounding land use if relevant	Commercial/Residential								Commercial/Residential	Commercial/Residential	Commercial/Residential				Commercial/Residential	Commercial/Residential	Commercial/Residential	
Approximate GFA m <sup>2</sup>	140	140	140	140	140	140	140	270	270	360	360	360	360	360	360	360		
Average employees per shift	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5		
Number of years open as at June 2016	-	-	-	-	-	-	-	-	-	10	10	10	10	10	10	10		
No. entry points	1	1	1	1	1	1	1	1 combined entry / exit	1 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit		
No. exit points	1	1	1	1	1	1	1	1 combined entry / exit	1 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit	2 combined entry / exit		
Drive-thru lane capacity (dist/ 6) equivalent vehicles	5	5	5	5	5	5	5	5	5	12	12	12	12	12	12	12		
No. waiting bays	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total lane capacity + waiting bays	5	5	5	5	5	5	5	5	5	12	12	12	12	12	12	12		
On-site parking bays	16	16	16	16	16	16	16	24	24	32	32	32	32	32	32	32		
Seating inside	7	7	7	7	7	7	7	23	23	200	200	200	200	200	200	200		
Seating outside	4	4	4	4	4	4	4	0	0	20	20	20	20	20	20	20		
Total seating	11	11	11	11	11	11	11	23	23	220	220	220	220	220	220	220		
No. ordering booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
No. payment booths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
No. collection points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Total booths	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
Average service time drive through (m:ss)	5:16	4:47	4:21	5:53	5:06	4:46	4:53	4:17	7:48	4:42	4:36	4:38	5:23	5:49	4:59	4:04		
AM survey period	N/A	N/A	10:00-15:00	10:00-15:00	N/A	N/A	N/A	N/A	12:00-14:00	N/A	N/A	N/A	N/A	10:00-15:00	10:00-15:00	N/A		
AM Site peak hour times	N/A	N/A	11:15-12:15	12:30-13:30	N/A	N/A	N/A	N/A	12:00-13:00	N/A	N/A	N/A	N/A	11:30-12:30	12:15-13:15	N/A		
AM Site peak trip generation (twice vehicles served)	N/A	N/A	22	44	N/A	N/A	N/A	N/A	36	N/A	N/A	N/A	N/A	100	78	N/A		
AM Site peak road frontage traffic	N/A	N/A	2464	2209	N/A	N/A	N/A	N/A	2775	N/A	N/A	N/A	N/A	2019	1632	N/A		
AM Network peak hour times during survey	N/A	N/A	12:15-13:15	12:00-1:00	N/A	N/A	N/A	N/A	12:30-13:30	N/A	N/A	N/A	N/A	11:00-12:00	11:30-12:30	N/A		
AM Network peak trip generation (twice vehicles served)	N/A	N/A	6	32	N/A	N/A	N/A	N/A	32	N/A	N/A	N/A	N/A	86	60	N/A		
AM Network peak two-way road frontage traffic	N/A	N/A	2664	2241	N/A	N/A	N/A	N/A	2932	N/A	N/A	N/A	N/A	2031	1689	N/A		
PM survey period	10:00-20:00	10:00-20:00	15:00-20:00	15:00-20:00	10:00-20:00	10:00-20:00	10:00-20:00	12:00-14:00 & 17:30-20:00	17:30-20:00	10:00-20:00	10:00-20:00	10:00-20:00	10:00-20:00	15:00-20:00	15:00-20:00	10:00-20:00		
PM Site peak hour times	18:00-19:00	12:00-13:00	19:00-20:00	18:30-19:30	18:30-19:30	12:30-13:30	17:30-18:30	12:15-13:15	18:15-19:15	12:00-13:00	12:45-13:45	18:00-19:00	12:15-13:15	16:15-17:15	18:00-19:00	11:45-12:45		
PM Site peak trip generation (twice vehicles served)	44	46	46	38	42	42	46	42	40	96	84	84	102	74	46	84		
PM Site peak road frontage traffic	2019	2325	1777	2344	3050	2080	3056	2516	2370	1940	1859	1407	2009	1301	857	1616		
PM Network peak hour times during survey	16:00-17:00	16:00-17:00	17:30-18:30	19:00-20:00	17:00-18:00	17:15-18:15	17:00-18:00	18:00-19:00	17:30-18:30	16:30-17:30	15:15-16:15	15:30-16:30	15:15-16:15	15:00-16:00	15:00-16:00	15:15-16:15		
PM Network peak two-way road frontage traffic	3524	3380	2430	2536	3105	3035	3299	2718	2432	2223	2286	2275	2364	1438	1269	1826		
PM Network peak trip generation drive through only	22	16	Not Calculated				16	12	26	26	40	8	28	24	Not Calculated		18	
PM Network peak trip generation park & walk-in only	6	4	Not Calculated				16	12	12	8	18	8	16	10	Not Calculated		22	
PM Network peak trip generation park > 10 mins only	2	2	Not Calculated				6	2	4	2	0	2	4	6	Not Calculated		12	
PM Network peak total trip generation	28	20	42	34	32	24	38	34	30	58	16	44	34	10	40	40		
Passing trade drive through	Data Not Collected	Data Not Collected	Data Not Collected	67%	100%	100%	Data Not Collected	63%	50%	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected		
Passing trade park and walk-in	46%	13%	36%	31%	29%	25%	39%	39%	45%	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected	Data Not Collected		
Weighted passing trade	-	-	-	55%	77%	66%	-	51%	48%	-	-	-	-	-	-	-		
Maximum queue (No. vehicles)	6	5	4	6	4	4	5	3	5	5	6	7	6	7	6	6		
Maximum queue/Total queue	120%	100%	80%	120%	80%	80%	100%	60%	100%	42%	50%	58%	50%	58%	50%	50%		
Maximum parked vehicles	3	5	3	4	4	5	3	6	5	12	9	11	11	13	11	10		
Maximum parked vehicles/Total parking bays	19%	31%	19%	25%	25%	31%	19%	25%	21%	38%	28%	34%	34%	41%	34%	31%		
AM Trips per 100 square meters GFA	N/A	N/A	4	23	N/A	N/A	N/A	N/A	12	N/A	N/A	N/A	N/A	24	17	N/A		
AM Trips per seat	N/A	N/A	0.55	2.91	N/A	N/A	N/A	N/A	1.39	N/A	N/A	N/A	N/A	0.39	0.27	N/A		
PM Trips per 100 square meters GFA	20	14	30	24	23	17	27	13	11	16	4	12	9	3	11	11		
PM Trips per seat	2.55	1.82	3.82	3.09	2.91	2.18	3.45	1.48	1.3	0.26	0.07	0.2	0.15	0.05	0.18	0.18		
Site and/or survey observations and comments											Red Rooster Manager did not want interview surveys done	Red Rooster Manager did not want interview surveys done	Red Rooster Manager did not want interview surveys done	Red Rooster Manager did not want interview surveys done			Red Rooster Manager did not want interview surveys done	

Footnotes:  
1. Quantity of data during this period not considered to be sufficient to provide statistically significant conclusions

Independent Variables

Dependent Variables

Denotes <10 Surveys

Please Note: For weekend, AM and PM sections refer to start-3pm and 3pm-end. This is to ensure that the lunch peak is captured entirely when it occurs through noon (e.g. 11:30-12:30), since lunchtime is typically the site peak during weekends. It is important to note that Trips/100m<sup>2</sup> GFA and Trips per seat are not reliable metrics since they are highly variable among sites and brands.