Roads and Maritime Services Trip Generation Surveys

Car Wash & Cafés

Analysis Report - WCAG

Roads and Maritime Services

4th December 2019

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Document Issue History:

Report File Name: P4001.001R RMS Trip Generation Surveys – Car Wash & Cafés Analysis Report, Prepared by S. Seeney / B. James, Reviewed by, B. James / S. Brooke, Issued by B. James, Date: 24/10/2019, Issued to Vince Taranto <vince.TARANTO@rms.nsw.gov.au>

Report File Name: P4001.002R RMS Trip Generation Surveys – Car Wash & Cafés Analysis Report, Prepared by S. Seeney / B. James, Reviewed by, B. James / S. Brooke, Issued by B. James, Date: 19/11/2019, Issued to Vince Taranto <vince.TARANTO@rms.nsw.gov.au>

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1. INTRODUCTION

1.1 Background

Roads and Maritime Services (Roads and Maritime), NSW commissioned Bitzios Consulting to undertake a trip generation and parking demand survey and analysis of Car Wash Café sites (i.e. car washes with cafés attached). The *Roads and Maritime Guide to Traffic Generating Developments – 2002* (hereafter referred to as the *Guide*), contains traffic generation and parking demand information based on surveys completed in 1980 and regularly requires updating.

Roads and Maritime recognised that many new and emerging business types are not adequately represented in the Guide, including Car Wash Cafés. As this is a relatively new land use, Roads and Maritime have not undertaken any traffic generation or parking demand surveys / studies to date. It has also been identified that other early trip generation studies were too focussed on Sydney and did not adequately reflect potential differences in regional areas. As such, other key considerations for this study include:

- Retail hours have changed, Saturday is the peak and Sunday trading is now the norm rather than the exception
- The demographics are changing due to the aging population and the average household size is decreasing
- There are increases in car ownership as the cost of new vehicles continues to fall
- With new technologies work and leisure patterns are changing based on the effects of more flexible/ extended working hours
- There is a much higher residential density in some areas of Sydney
- Changes to levels of car washing due to increasing water restrictions levels and potential increases to the attractiveness of commercial car washes
- Increases in the average age of first drivers licence suggesting that young people are choosing not to drive and the ageing population driving less
- Standard car washes are predominately private-vehicle-based, the addition of the cafés on the site has the potential to attract additional customers who may use alternate transport modes.

This study has solely focused on car wash sites that have cafés to determine a trip generation rate for this specific land use.

1.2 Scope

The scope of this Analysis Report includes:

- Identifying a suitable sample of car wash cafés that are within greater Sydney and NSW regional areas, with a sufficient sample size and development variety to provide confidence in the results;
- Summary of all collected relevant and available background data for each site (e.g. site area, number of car wash bays and on-site parking provisions)
- Surveying each site to collect all-mode trip generation data;
- Assembling information on all-mode trip generation and parking demand data;
- Tabulating and analysing the collected data to establish key statistical relationships;
- Presenting the results and recommendations in a Data Report and Analysis Report.
- Presentation of three (3) day surveys for each site, including all-mode trip generation data and frontage road data.

1.3 Definition of Key Terms

GFA – Gross Floor Area (m^2)

Site Area –includes on-site café, office, service areas & wash bays (m^2)

Roads and Maritime – Roads and Maritime Services NSW

Trip Generation – Generation of trips undertaken by individuals, including pedestrian, cyclist or persons. It should be noted that a 'trip' is the movement of a vehicle or person from origin to destination (i.e. a 'complete' visit to the shops would equate to two (2) trips, 1 to the site and 1 from the site).

Traffic Generation – Individual vehicle trips regardless of number of persons within the vehicle

Occupied Site Area – Total site area of the building based on aerial imagery

Manual Car Wash – Cars are washed by staff members of the Car wash

Automated Car Wash – Cars are washed using an automatic system/machine

Self-Serve Car Wash – Car wash bays and tools are provided for customer to wash cars themselves

Frontage Traffic – Traffic fronting a surveyed site that has the ability to access that site (i.e. where a median exists in the frontage road only one-way traffic volumes are applied).

1.4 Project Challenges and Responses

Table 1.1 summarises challenges that occurred throughout the course of the project and the steps taken to address them.

Table 1.1: Addressing Project Challenges

Challenges	Responses
Contacting site mangers to gain permission to undertake surveys and receiving approval.	Multiple attempts were made to contact the potential survey sites using various forms of communication. Following five (5) or more attempts at a large number of preferred sites, and limited positive responses, an alternate survey method was developed (as below).
Ensuring a *typical* day was surveyed for each site. Rain and bad weather impact the operation and usual trip generation of car washes.	Affected survey days were rescheduled to later days and data analysis process was expedited to ensure a timely delivery of the project.
Obtaining suitable site information. Some sites provided limited datasets while others did not respond to the request for data.	A manual estimation method was used to determine the relevant site information from the most recent aerial imagery available, available online details and surveyor observations.
There is no existing available survey data or research for Car Wash Cafés which could be used for comparison with the survey results.	A search was completed to find any national or international studies with no success. However, it was noted that some studies included car washes as part of multipurpose development

Initially, 24 potential sites were chosen using the site selection criteria and presented to Roads and Maritime for review. Of these, 21 were approved for further investigation and contacted. Only one (1) site provided permission to undertake a complete survey and two (2) sites approved an alternate (reduced) survey method with no on-site data collection (i.e. customer surveys). Several attempts to contact other potential sites via phone calls and emails, resulted in either negative or no responses.

Through collaboration with Roads and Maritime an **alternate survey method** was developed to ensure an assessable level of data could be collected. This was a major challenge for the project and impacted the detail of survey data collected for this study.

Alternate Survey Methodology

The alternate survey method applied to collect data (detailed in Section 3) included:

- Estimating some site details (i.e. parking bays) from available aerial imagery and Google Street
- Survey sites strategically selected to collect only anonymous trip movement data automatically by observing the public road network
- No customer questionnaire or parking data was collected.

2. SITE SELECTION

2.1 Roads and Maritime Criteria

The selection of the sites was based on the following criteria provided by Roads and Maritime:

- A mix of automated, manual and self-serve car washing facilities
- All with on-site café area with seating
- On-site parking provision
- Some on major arterial roads, others on local roads
- Reasonable geographic spread
- Ease in isolating the site from other nearby developments (office, strip retail, residential, etc) for survey purposes and collecting the required trip information (i.e. no shared driveways).

2.2 Candidate Site Selection

The candidate sites were selected by manually reviewing aerial imagery (Google maps and Nearmaps) to include a range of sites based on the Roads and Maritime criteria. Following the manual review of aerial imagery and online car wash café searches, each was checked via the Roads and Maritime criteria for the sites for suitability.

Approximately 24 sites were reviewed, with a total of 21 sites approved for further consideration by Roads and Maritime. As outlined in Section 1.4, the majority of selected sites did not wish to participate in the surveys. As such, 15 new survey sites were selected and approved Roads and Maritime, these sites had an alternate automated survey method applied (detailed in Section 3).

2.3 Selection Basis

In order to ensure a comprehensive dataset for analysis, selected sites varied in size, type and location across Sydney and NSW. The surveys were undertaken on a Friday, Saturday and Sunday as it was anticipated that these days would have a higher demand/ turnover of customers compared to other weekdays. The number of surveys selected by region is summarised in Table 2.1.

Table 2.1: Proposed Surveys and Location Summary

Survey Days	Sydney		Regional		Total
		Newcastle	Wollongong	Other	
3 days (Friday, Saturday, Sunday)	10	1	2	2	15

2.4 Selected Survey Sites

A summary of each selected survey site and its location are provided in Table 2.2 and Figure 2.1 respectively.

Table 2.2: Selected Survey Sites

Site No.	Region	Suburb	Site Name	Address	Type of Car Wash
1	Regional	Muswellbrook	Blue Flame Car Wash	42 – 50 Sydney Street	Manual
2	Sydney	Blacktown	CARSPA Auto Wash Café	2/1190 Old Windsor Road	Manual and Automated
3	Sydney	Georges River	Lugarno Café Car Wash	1052 Forest Road	Manual
4	Sydney	Redfern	Wax Car Wash	375 Cleveland Street	Manual and Self-Serve
5	Regional	Wollongong	Hands on Car Wash	118/120 Balgownie Road	Manual
6	Regional	Newcastle	Stella Hand Car Wash & Table1	89 – 93 City Road	Manual
7	Sydney	Thornleigh	Blanc Noire Hand Wash Café	169 – 171 Pennant Hills Road	Manual
8	Sydney	Auburn	Xibit Car Wash Café	212 Parramatta Road	Manual
9	Sydney	Miranda	Aqua Car Wash	109 Miranda Street	Manual
10	Regional	Wollongong	Professional Car Wash	10 – 12 Flinders Street	Manual
11	Sydney	Sydney	Gold Car Wash Café	44 O'Riordan Street	Manual
12	Sydney	Canterbury-Bankstown	Zoom Car Wash Café	1518 Canterbury Rd	Manual
13	Regional	Penrith	Elegance Carwash	35 Henry Street	Manual
14	Sydney	Canada Bay	Rainbow Hand Car Wash and Café	120 Victoria Road	Manual
15	Sydney	Ryde	Sydney Car Wash Café	750 Victoria Road	Manual and Self-Serve

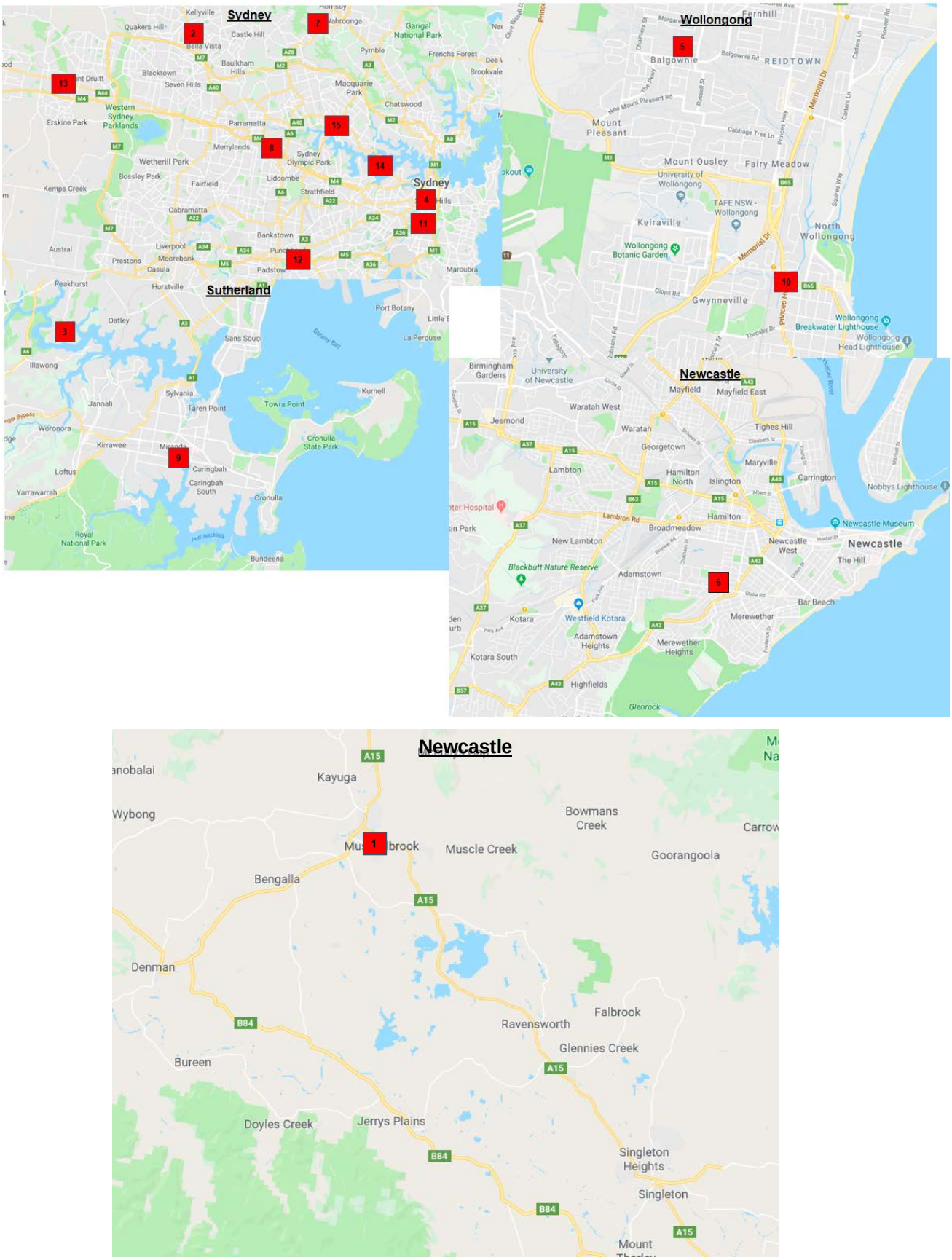


Figure 2.1: Survey Site Locations

3. SURVEY PROCEDURE

3.1 Survey Schedule

All the surveys were undertaken over three (3) days from Friday – Sunday. The duration of the surveys was based on the span of the site's opening hours. This varied from site to site and ranged from 6:00AM - 7:00PM.

Frontage Road traffic count data was also collected for each of the sites standard working hours. Table 3.1 summarises each site's operating hours and surrounding road network.

Table 3.1: Survey Site Schedule and Notes

Site Number	Survey Dates	Opening Hours	Approximate Year Built	Notes
1	29th – 31st March 2019	6:00AM – 7:00PM	2012	The site is bounded by two arterial roads, Sydney Street and the New England Highway, surrounded by a highly trafficked mining region. Surrounding developments include residential, tyre shops, service station and other retail uses.
2	14th – 16th June 2019	7:00AM – 5:30PM	2009	The site is next to Parklea Markets and Parklea Public School. In proximity to the major Old Windsor Road / Miami Street / Balmoral Road intersection. Old Windsor Road is an arterial road and site access is gained via the front and back of the site.
3	14th – 15th June & 28th July 2019	8:00AM – 5:00PM	2004	This site is surrounded by low density residential with a service station adjacent and a bus stop fronting the site. Forest Road is a key collector road that runs north – south through the area.
4	14th – 15th June & 28th July 2019	7:00AM – 6:00PM	2003	This site is located amongst retail and commercial uses in the heart of Surry Hills. Adjacent to a Coles, the site is accessed via Cleveland Street which is a key collector road that runs east to west to the University of Sydney.
5	14th – 15th June & 28th July 2019	9:00AM – 5:00PM	2008	The site is surrounded by low density residential developments with access via Balgownie Road which is a key collector road that runs east to west through the area. There is a bus stop fronting the site and is located at the Balgownie Road / Foothills Road roundabout.
6	14th – 16th June 2019	7:30AM – 5:00PM	2007	The site is located within a medium density residential area bounded by the Pacific Highway which is an arterial road that runs into Newcastle from the south west.
7	14th – 15th June & 28th July 2019	8:00AM – 5:30PM	2003	The site is located on the outskirts of the key retail area surrounded by medium density residential. The site is accessed via the Cumberland Highway which is an arterial road that runs east to west through the area.

Site Number	Survey Dates	Opening Hours	Approximate Year Built	Notes
8	14th – 15th June & 28th July 2019	8:00AM – 5:30PM (weekdays) 8:00AM – 5:00PM (weekends)	2003	The site is within a retail precinct with surrounding residential areas. The site gains access via the Great Western Highway which is an arterial road that runs east to west from Sydney city to the western suburbs.
9	14th – 15th June & 28th July 2019	7:30AM – 5:00PM (weekdays) 8:00AM – 5:00PM (weekends)	2003	The site is a part of a small shopping village, surrounded by low density residential. The site is bounded by President Avenue to the south which is key collector road that roads east to west.
10	14th – 15th June & 28th July 2019	8:00AM – 5:00PM	2008	The site is located amongst retail and medium density residential uses. Access is gained via the Princes Highway which is an arterial road that runs north to south through Wollongong.
11	14th – 16th June 2019	6:00AM – 7:00PM	2009	The site is located within the retail and commercial precinct and is located on the corner of a key collector road that runs from the north – south from Sydney Airport.
12	14th – 15th June & 28th July 2019	8:00AM – 6:00PM	2007	The site is located within a medium density residential area that is bounded by an arterial road that runs east to west through the area.
13	14th – 15th June & 28th July 2019	8:00AM – 4:00PM	2007	The site is located amongst retail and residential developments on the outskirts of Penrith. Access is gained via a local road and the railway line runs north of the site.
14	14th – 15th June & 28th July 2019	8:00AM – 4:45PM	2003	The site is located on the key arterial road that runs through the island and is surrounded by retail and residential uses.
15	14th – 16th June 2019	8:00AM – 6:00PM	2003	The site is located amongst retail and residential uses and is accessed via the key arterial road that runs east to west.

3.2 Data Collection Surveys

The following data was collected during the surveys:

- Number of entering and exiting vehicles (cars/heavy vehicles) (in 15-minute periods)
- Number of vehicle occupants (in 15-minute periods) – **where possible**
- Number of pedestrians and cyclists (in 15-minute periods)
- An automatic tube count of all vehicles along the principal frontage access road, to allow for the determination of the relevant 1-hour AM and PM background traffic peak periods.

In addition to the above data, customers surveys were undertaken at **Site 1 only** and included five (5) questions aimed at determining customer mode of transport and trip purpose. The questions included:

1. “What mode of transport did you use to get here? (Car – Driver/ Passenger, Bus, Train, Taxi/Uber, Walking or Cycling)
2. “If arrived by car, is the vehicle parked on site or elsewhere?”

3. “Are you a customer or staff?”
4. “Have you visited, or will you visit any other venues before and /or after the car wash/café?”
5. “How long is your visit to the car wash today? (i.e. 5-10mins, 10-30mins, 30-1hr, 1-2hr, 2-5hrs)”.

3.3 Site Information

The following site information was collected for each site (where available):

- Breakdown of on-site car parking allocation and provisions
- Available off-street parking
- Site area
- Café floor area
- Type and number of car wash bays
- Number of entry/ exist points
- Approximate café seating

3.3.1 Collection Methods

The data was collected using three (3) different sources, as follows:

- By contacting the centre manager / owner
- By manually researching information and reviewing aerial imagery
- Through survey information collected by Traffic and Data Control (TDC).

A limited range of information and data about each site was collected due to a lack of survey participation from the sites. Subsequently, the majority of site information relies on publicly available Development Application documents and aerial/street-view imagery.

Owners of Site 1 provided some additional information regarding on-site operations, including the observation that their café provides for a significant ‘rush’ or ‘peak’ of coffee and breakfast demand early in the morning (around 6am) due to the beginning/end of shift work at the large nearby mines in Muswellbrook.

3.3.2 Survey Data

During the collection of survey data, it rained on Sunday 16th June 2019 resulting in many sites being either partially or fully closed for the day with limited customers. The surveys were therefore retaken on Sunday 28th July 2019 in Fine weather. After the resurveying of sites, the survey data for Friday, Saturday and Sunday adequately represented the typical operations and traffic volumes for the site locations.

Appendix A summarises the site-specific data collected.

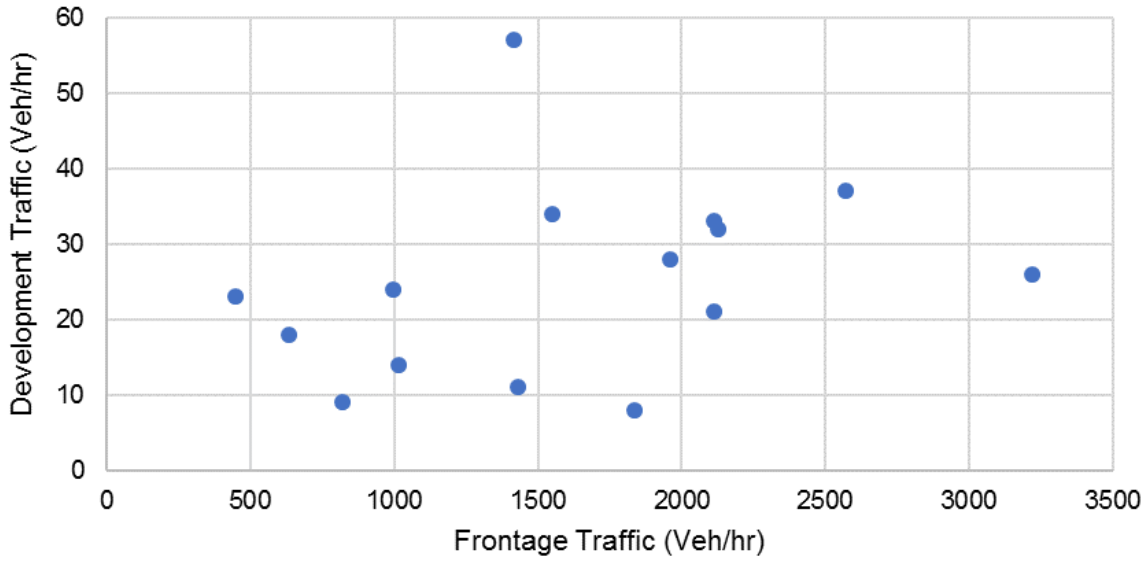
4. SUMMARY DATA AND GENERAL FINDINGS

4.1 Weekday

Preliminary analysis conducted on all sites found that trip generation rates appear inconsistent across all sites with no clear trends. A summary of data results is provided below for trips per frontage road traffic volume and trips per car wash bay. It should be noted that frontage road volumes include only vehicles capable of entering/leaving the site, accounting for any local access restrictions (e.g. medians). Further data and details provided within the corresponding Data Report (*P4004.001R*).

Figure 4.1: Friday Vehicle Trip Rate (per Frontage Traffic) PM Peak Period

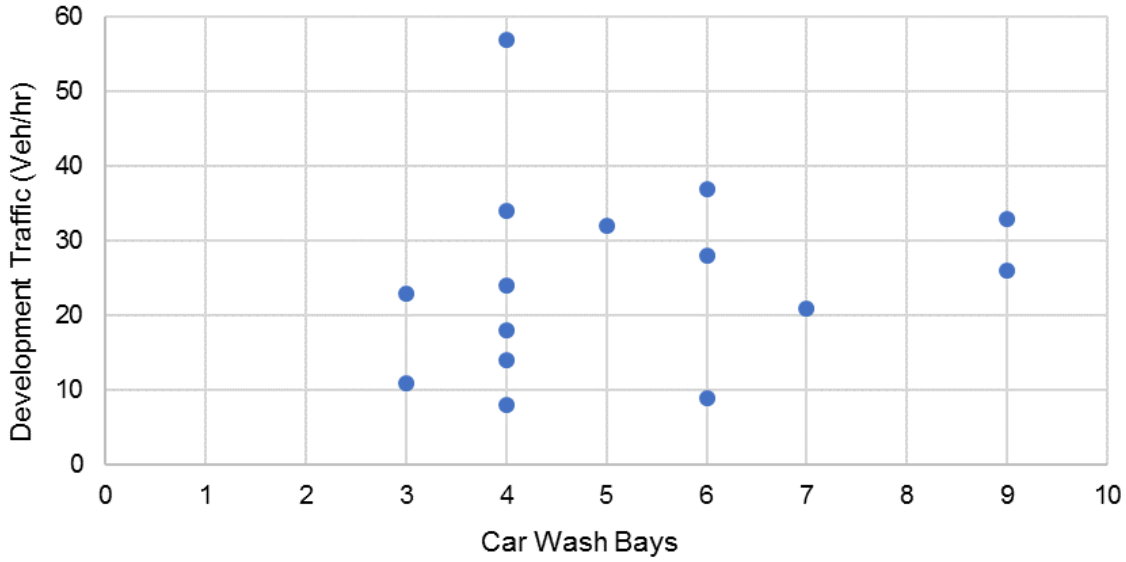
shows the peak development trips vs peak frontage traffic for the Friday peak period (PM peak hour).



Note: Site 1 shows the highest number of development trips and is somewhat atypical due to high coffee/meal sales

Figure 4.1: Friday Vehicle Trip Rate (per Frontage Traffic) PM Peak Period

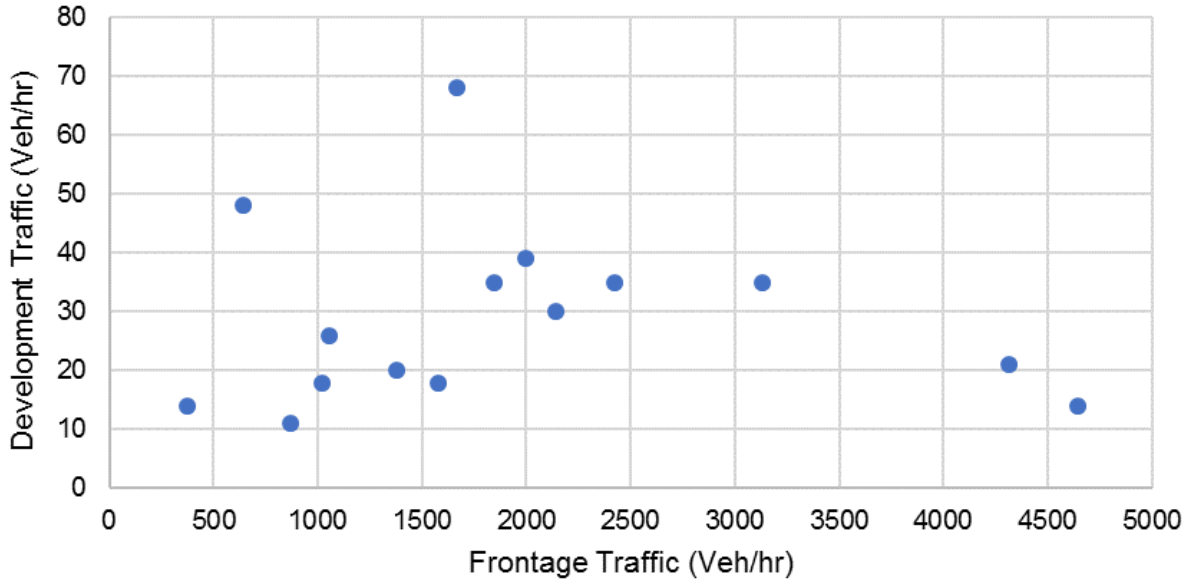
Figure 4.2 shows the peak development trips per car wash bay for the Friday PM period.



Note: Site 1 shows the highest number of development trips and is somewhat atypical due to high coffee/meal sales

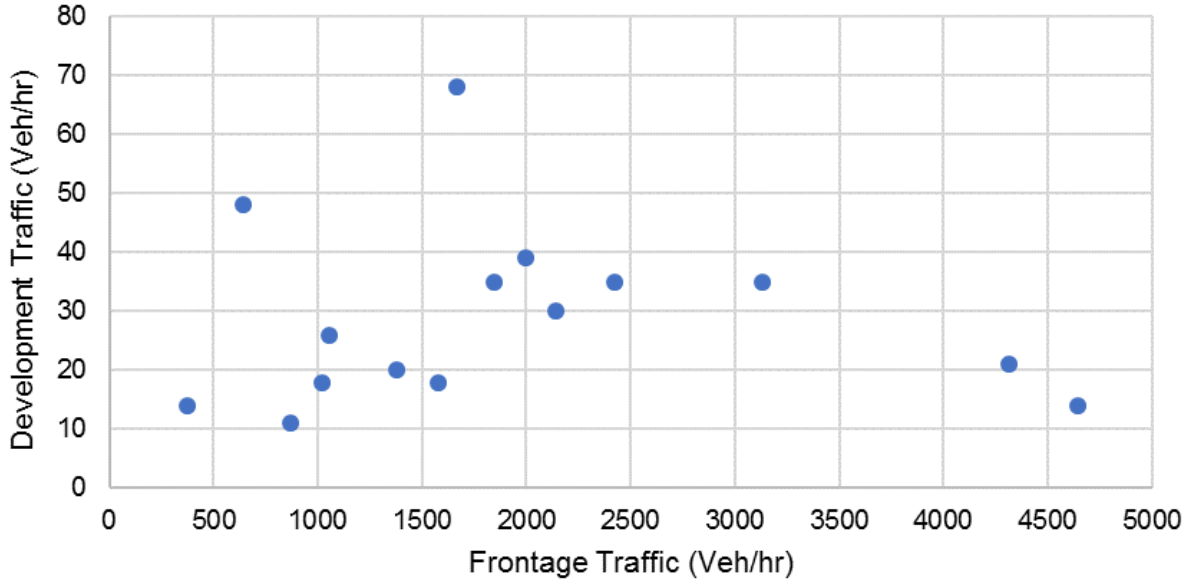
Figure 4.2: Friday Vehicle Trip Rate (per Car Wash Bay) PM Peak Period

4.2 Weekend



Note: Site 1 shows the highest number of development trips and is somewhat atypical due to high coffee/meal sales

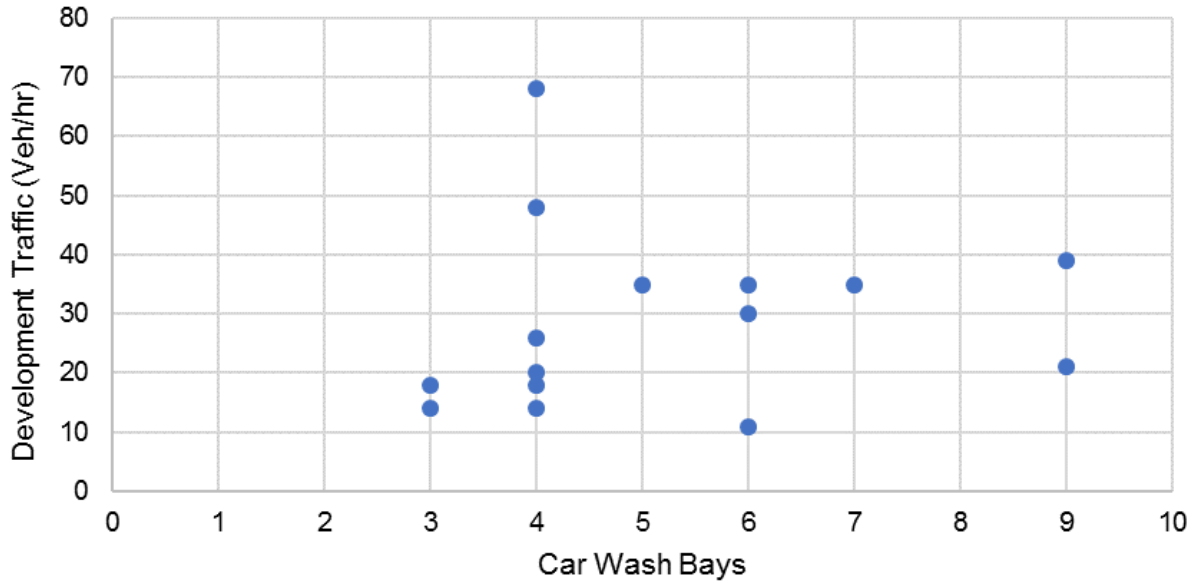
Figure 4.3 shows the peak development trips per peak frontage traffic for the Saturday peak period.



Note: Site 1 shows the highest number of development trips and is somewhat atypical due to high coffee/meal sales

Figure 4.3: Saturday Vehicle Trip Rate (per Frontage Traffic) Peak Period

Figure 4.4 shows the peak development trips per car wash bay for the Saturday peak period.



Note: Site 1 shows the highest number of development trips and is somewhat atypical due to high coffee/meal sales

Figure 4.4: Saturday Vehicle Trip Rate (per Car Wash bay) Peak Period

4.3 Summary

In summary the traffic data analysis found:

- A common trend across all sites and survey days is the reduction of trip volumes into the afternoon (including the atypical Site 1 in Muswellbrook)
- Trip generation rates appear inconsistent across all sites with no clear trends
- During the weekends, sites show higher vehicle trip generation on average than the weekday peak periods
- Site 1 and 6 are have significantly higher trip generation rates compared to other sites based on the high number of total vehicle trips and the low number of car wash bays
- Site 1 has a significantly higher trip generation rate in the AM on Friday and Saturday compared to the other sites due to the low number of vehicles on the frontage road and localised traffic trends (i.e. early morning mine shift change movements).

Based on the data gathered, there are many contributing factors that influence trip generation and as such, no definite trend was established during the preliminary analysis stage.

5. SURVEY DATA VERIFICATION

5.1 Overview

The survey data collected for this project was compared to surveys from other sources to identify similarities, inconsistencies or errors. As there is no direct comparative data available for Car Wash Cafes or car washes in Australia, a comparison between trip generation rates of standalone car washes from international sources has been undertaken.

ITE Trip Generation Manual is an online database for traffic generation rates for a range of different land uses. In lieu of Car Wash Café trip generation rates and survey data, the 10th edition of the Trip Generation Manual by ITE provides a small amount of trip data on Car Washes. Although this dataset is limited, it has been compared with this project's average survey data to gain an understanding of any benchmarks within this land use type.

5.2 ITE Dataset Comparison

The range of trips for surveyed car washes similar in type and number of wash bays to those presented within ITE are compared in Table 5.1.

Table 5.1: ITE and RMS Survey Comparison – Peak Hour Trips

Site Number	Time Period	ITE	ITE	RMS Survey	RMS Survey
		Wash Bays	Vehicle Trips	Wash Bays	Vehicle Trips
Self Service Car Wash					
1	Saturday Peak	5	150	5 - 7	11 - 35
2	Saturday Peak	5	50	5 - 7	11 - 35
3	Saturday Peak	6	40	5 - 7	11 - 35
Automated Car Wash					
1	Weekday Frontage Road Peak	2*	200	3	18 - 21
2	Weekday Frontage Road Peak	1*	150	3	18 - 21
Manual Car Wash					
1	Weekday AM Peak	5	75	5 - 7	35

**Noted in ITE as "Car Wash Tunnels" – Automatic Car Washes*

The car wash sites surveyed by ITE generate a higher number trips during peak hours than the RMS surveyed Car Wash Café sites. In particular the automated car washes surveyed by ITE showed a significantly larger number of trips to any Car Wash Café site surveyed. This may be due to numerous factors, including location, demographic or cultural differences, water restrictions, cost, efficiency, type of wash, etc.

Self Service and Manual car washes appear to have only slightly higher levels of traffic, with the exception of one ITE survey that shows 150 trips during the weekend peak hour period.

6. DATA ANALYSIS METHODOLOGY

Various independent variables were tested to investigate the relationships between variables and the trip generation of the car wash cafés surveyed. This analysis was undertaken for daily and peak hour data sets, for both weekdays and weekends.

Two (2) methods were used for analysis of trip generation. Single-variable and multi-variable linear regression. The following general form was used for both:

$$Y = a_0 + a_1 \ \ X_1 + a_2 \ \ X_2 + \ldots + \ \ a_k X_k$$

Where Y is the trip generation rate, X_1 to X_k are the independent variables, and a_o, to a_k are the regression outputs.

A correlation matrix and single linear regression summary was created for each set of compared data with a summary of results and key relationships identified. Following this, the multiple regression analyses were prescribed combining the most likely independent variables to identify if there are any valid relationships with each dependent variable. Should no acceptable model be determined using linear regression methods, an alternative solution shall be provided.

The accuracy of linear regression is generally guided by the coefficient R^2, which 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 'model' becomes. Typically, **linear regression** values of R^2 **greater than 0.8 are considered accurate** enough to indicate a significant relationship between the dependent and independent variables.

Following a review of both Single and multiple Linear relationships the 'best' models were selected for each peak and daily trip generation period. Where no significant relationship could be found (i.e. R^2 less than 0.8) for linear regression models, an alternate method was investigated.

For reference, Figure 6.1 shows a sufficient example of Single Linear regression which has been derived from *P3497.004R Small Suburban Shopping Centres – Trip Generation Surveys Analysis Report,* as well as an example of a poor Single Linear regression of the Car Wash Café sites.

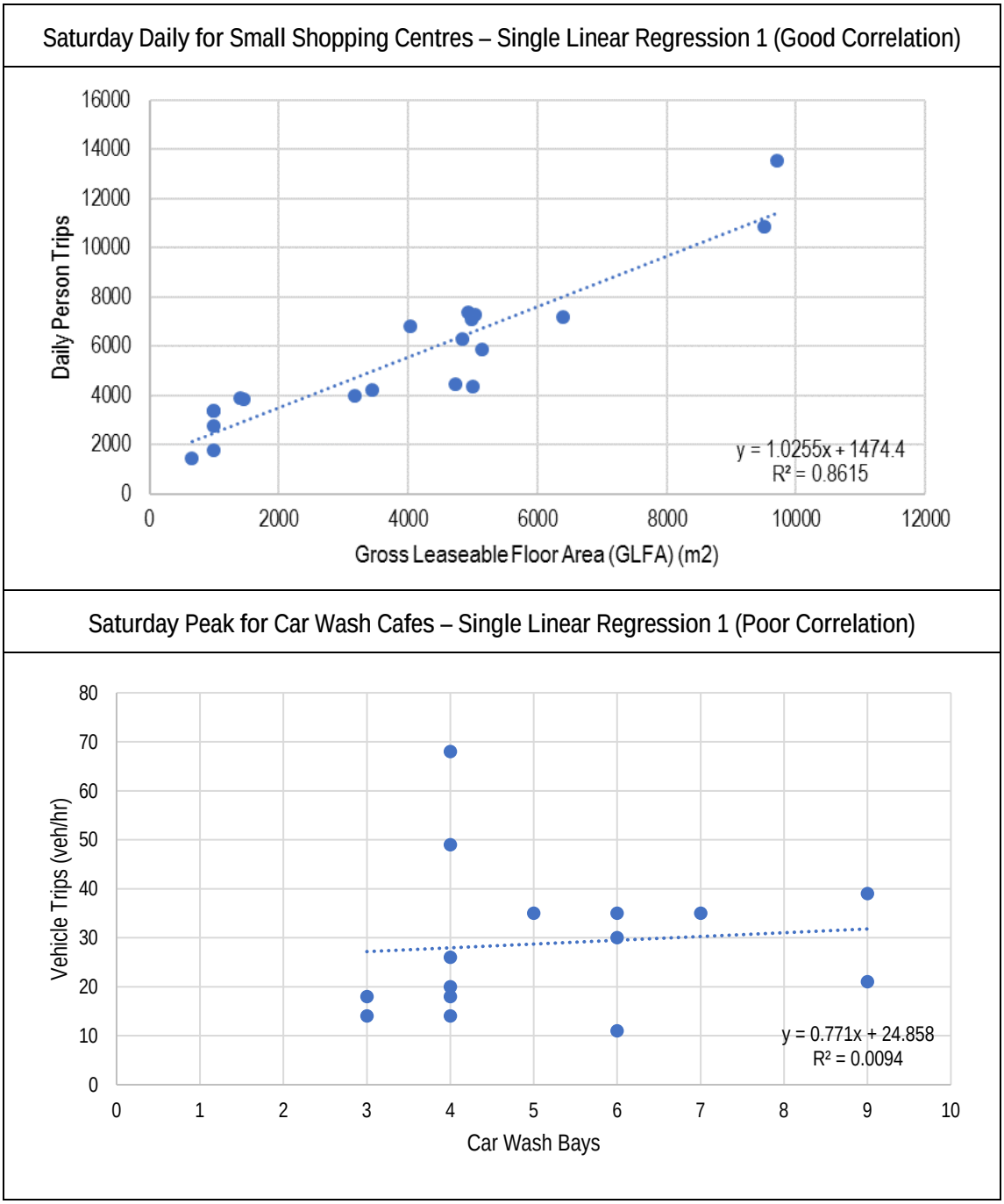


Figure 6.1: Example of Single Linear Regression with a Good and a Poor R^2 Value

Note: Outliers indicate the site is atypical for coffee visits during the survey period

Various regression analysis scenarios were tested based on aggregated data sets across all sites to determine if there were any significant relationships. No appropriate regression models could be formulated.

Subsequently, an alternate way of estimating trip generation was applied. Including undertaking a review of each of the surveyed sites' characteristics and site-specific trip generation influences. The aim of this was to provide a guide for estimating trip generation. It should be noted that case by case applications of rates do not provide a high level of confidence for estimation due to their site specific nature and the limited sample size.

7. DATA ANALYSIS

7.1 Overview

Preliminary analysis of the data does not show any clear trends with trip generation rates across the sites. Testing was firstly based on the data aggregated for all the surveyed sites and undertaken for Weekday AM, Weekday PM and Weekend peak hours as well as for daily trip generation (Friday, Saturday and Sunday).

Questionnaires undertaken at Site 1, collected data relating to the number of 'linked' vehicle trips and the average duration of stay which is also included in the analysis.

7.2 Variables Testing Considerations

The independent variables tested to establish any relationship to traffic generation were:

- Total number of on-site parking bays
- Total number of car wash bays
- Café floor area
- Occupied site area
- Frontage road traffic volumes (*Note: Frontage traffic includes only traffic with access to each site. Frontage roads with a median in place were adjusted appropriately*).

The dependent variables for trip and traffic generation were:

- Weekday AM peak vehicle trips (Friday)
- Weekday PM peak vehicle trips (Friday)
- Weekend peak vehicle trips (Saturday and Sunday).

For each regression analysis method:

- Any results that produced a negative 'R' value or were counter-intuitive were excluded from the analysis
- The regression analysis initially allowed for a 'constant' in the regression equation. When reasonable explanatory variables were identified using this process, the models were tested to determine if the intercept value (the constant) could be set to zero and not significantly comprise the quality of the relationship between the dependent and independent variables (s). This testing determined whether it is:
  - better to have a zero constant (which is generally preferred for trip generation equations applied at the lower end of the range of the independent variable), or
  - better to maintain a constant and define an independent variable range for which the formula applies (e.g. for > 100 parking spaces).

Where the constant value of an acceptable model was identified as contributing to more than 20% of the total trips generated by a site (when applying the model) the model was discarded for sites of that size range.

The use of a constant is contrary to the premise that, *should the independent variable be 'zero' then number of generated trips should also be 'zero'.* However, including the constant often provides a more accurate overall model of the surveyed dataset when using linear regression. For example, should the model be forced to 'zero', the resulting formula may under-represent smaller sites and over-represent larger sites. That is, the error/useability range tests such as the t-statistic are worse.

As shown in Figure 7.1 the R-square result for the single variable linear regression model reduces when forcing the constant to 'zero', indicating a less accurate model testing.

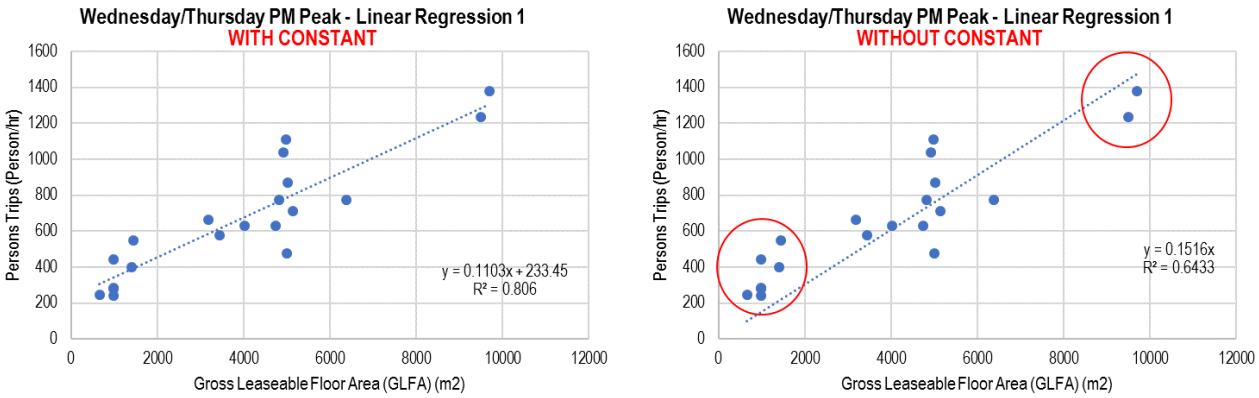


Figure 7.1: Example of Single Linear Regression at Small Shopping Centres (Good and a Poor R^2 Value)

Although the example shown (Figure 7.1) relates to shopping centres, the theory is applicable to all trip generation regression analyses.

Multiple Linear Regression showed an increase in the R-square for each model, however the error/useability range tests such as the t-statistic show that the resulting formula often under-represents the smaller sites and over-represents the larger sites. An example of Multiple Linear Regression models with and without a 'zero' constant are shown in Figure 7.2.

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 1

SUMMARY OUTPUT With Constant

Regression Statistics	
Multiple R	0.853019356
R Square	0.727642022
Adjusted R Square	0.682249025
Standard Error	11.56184769
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	4285.61747	2142.808735	16.02983014	0.00040817
Residual	12	1604.115864	133.676322		
Total	14	5889.733333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-20.63171961	11.97432004	-1.722997175	0.110534475	-46.72152175	5.458082525	-46.72152175	5.458082525
Car Wash Bay	-2.155627545	1.649778395	-1.306616423	0.215830382	-5.750185879	1.438930789	-5.750185879	1.438930789
Occupied Site Area (m2)	0.053564197	0.009462029	5.660963106	0.000105434	0.032948207	0.074180188	0.032948207	0.074180188

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 1

SUMMARY OUTPUT Without Constant

Regression Statistics	
Multiple R	0.935937216
R Square	0.875978472
Adjusted R Square	0.789515277
Standard Error	12.40646028
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	14133.03666	7066.518332	45.91025566	2.38445E-06
Residual	13	2000.963336	153.9202566		
Total	15	16134			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Car Wash Bay	-3.583326875	1.530808132	-2.340807317	0.035834626	-6.890436782	-0.276216969	-6.890436782	-0.276216969
Occupied Site Area (m2)	0.042546001	0.007483466	5.685333841	7.474E-05	0.026378956	0.058713045	0.026378956	0.058713045

T-stat higher for 'without' scenario, indicating higher level of error / line of best fits distance from data-points

Figure 7.2: Multiple Linear Regression Model Testing at Small Shopping Centres (With Constant vs Without Constant)

7.3 Correlation and Single Variable Linear Regression Analysis

A correlation assessment of dependent and independent variables was undertaken for all surveyed sites to determine which variables were appropriate to consider in further modelling. The results of this assessment are shown in Figure 7.3.

Correlation Matrix (R^2 Value)

Correlation Matrix (R Values)		Total Car Wash Bays	Approx Café Floor Area	Occupied Site Area (m2)	Parking Spaces	Peak Frontage Road Traffic: Peak Frontage Traffic AM	Peak Frontage Traffic PM	Peak Frontage Traffic Saturday	Peak Traffic Fronatge Sunday	Daily Frontage Road Traffic: Daily Fronatge Traffic Friday	Daily Frontage Traffic Saturday	Daily Frontage Traffic Sunday
	Total Car Wash Bays	1.000										
	Approx Café Floor Area	0.075	1.000									
	Occupied Site Area (m2)	0.250	0.387	1.000								
	Parking Spaces	0.026	0.599	0.624	1.000							
	Peak Frontage Traffic AM	0.696	-0.032	0.251	0.268	1.000						
	Peak Frontage Traffic PM	0.717	-0.006	0.389	0.338	0.940	1.000					
	Peak Frontage Traffic Saturday	0.664	-0.040	0.171	0.298	0.958	0.901	1.000				
	Peak Traffic Fronatge Sunday	0.531	-0.038	0.085	0.257	0.889	0.870	0.882	1.000			
	Daily Fronatge Traffic Friday	0.724	0.068	0.399	0.308	0.945	0.970	0.882	0.835	1.000		
	Daily Frontage Traffic Saturday	0.695	-0.057	0.139	0.189	0.977	0.909	0.971	0.858	0.921	1.000	
	Daily Frontage Traffic Sunday	0.663	-0.130	0.044	0.108	0.966	0.893	0.947	0.916	0.904	0.977	1.000
Friday 1-hr AM Peak	AM Vehicle Trips	0.017	0.386	0.830	0.592	-0.016	0.222	-0.112	-0.021	0.211	-0.133	-0.163
Friday 1-hr PM Peak	PM Vehicle Trips	0.185	0.319	0.656	0.517	0.060	0.334	-0.020	0.058	0.304	-0.013	-0.038
Friday Daily (8.30am-6pm)	Daily Vehicle Trips	0.152	0.352	0.709	0.448	0.003	0.276	-0.092	0.002	0.276	-0.083	-0.102
Saturday 1-hr Peak	Peak Vehicle Trips	0.097	0.621	0.670	0.664	0.144	0.265	0.014	0.146	0.323	0.033	0.013
Saturday Daily (8.30am-5pm)	Daily Vehicle Trips	0.302	0.544	0.664	0.543	0.244	0.431	0.116	0.243	0.472	0.151	0.133
Sunday 1-hr Peak	Peak Vehicle Trips	-0.098	0.660	0.609	0.789	0.050	0.158	-0.041	0.113	0.162	-0.081	-0.101
Sunday Daily (8.30am-5pm)	Daily Vehicle Trips	0.024	0.474	0.538	0.636	0.109	0.276	0.018	0.227	0.239	-0.017	0.000

Figure 7.3: Correlation Matrix (R^2 values)

The correlation matrix shows a poor correlation between most variables and trip generation values. The best correlation is highlighted in red in Figure 7.3 and is between Occupied Site Area and Friday AM Vehicle Trips. The only other high correlation was found between Parking Spaces and Sunday Vehicle Trips which indicates that these variables are not 'dependent' on each other. This result is expected based on the preliminary analysis demonstrating no clear trip generation trends.

Single Variable Linear Regression

Single variable linear regression R^2 results are shown in Figure 7.4.

Linear Regression (R^2)		Total Car Wash Bays	Approx Café Floor Area	Occupied Site Area (m2)	Parking Spaces	Peak Frontage Traffic AM	Peak Frontage Traffic PM	Peak Frontage Traffic Saturday	Peak Traffic Fronatge Sunday	Daily Fronatge Traffic Friday	Daily Frontage Traffic Saturday	Daily Frontage Traffic Sunday
	Total Car Wash Bays	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Approx Café Floor Area	0.006	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Occupied Site Area (m2)	0.063	0.150	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Parking Spaces	0.001	0.359	0.389	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Peak Frontage Traffic AM	0.484	0.001	0.063	0.072	1.000	0.000	0.000	0.000	0.000	0.000	0.000
	Peak Frontage Traffic PM	0.514	0.000	0.152	0.115	0.884	1.000	0.000	0.000	0.000	0.000	0.000
	Peak Frontage Traffic Saturday	0.441	0.002	0.029	0.089	0.917	0.813	1.000	0.000	0.000	0.000	0.000
	Peak Traffic Fronatge Sunday	0.282	0.001	0.007	0.066	0.791	0.756	0.778	1.000	0.000	0.000	0.000
	Daily Fronatge Traffic Friday	0.524	0.005	0.160	0.095	0.892	0.941	0.778	0.696	1.000	0.000	0.000
	Daily Frontage Traffic Saturday	0.483	0.003	0.019	0.036	0.954	0.826	0.943	0.735	0.849	1.000	0.000
	Daily Frontage Traffic Sunday	0.440	0.017	0.002	0.012	0.933	0.798	0.897	0.839	0.816	0.955	1.000
Friday 1-hr AM Peak	AM Vehicle Trips	0.000	0.149	0.689	0.350	0.000	0.049	0.012	0.000	0.045	0.018	0.027
Friday 1-hr PM Peak	PM Vehicle Trips	0.034	0.102	0.430	0.267	0.004	0.111	0.000	0.003	0.093	0.000	0.001
Friday Daily (8.30am-6pm)	Daily Vehicle Trips	0.023	0.124	0.503	0.201	0.000	0.076	0.008	0.000	0.076	0.007	0.010
Saturday 1-hr Peak	Peak Vehicle Trips	0.009	0.386	0.448	0.441	0.021	0.070	0.000	0.021	0.105	0.001	0.000
Saturday Daily (8.30am-5pm)	Daily Vehicle Trips	0.091	0.295	0.441	0.295	0.059	0.186	0.013	0.059	0.223	0.023	0.018
Sunday 1-hr Peak	Peak Vehicle Trips	0.010	0.435	0.371	0.622	0.002	0.025	0.002	0.013	0.026	0.007	0.010
Sunday Daily (8.30am-5pm)	Daily Vehicle Trips	0.001	0.225	0.289	0.404	0.012	0.076	0.000	0.052	0.057	0.000	0.000

Figure 7.4: Single Linear Regression (R^2 Values)

No suitable variables for single linear regression models were identified in the correlation analysis. The two (2) highest R^2 values for each dependent variable is presented in red in Figure 7.4, although neither demonstrate a suitable relationship. Those values in grey text are considered to be poor variables for further use. A summary of the best performing models for variable linear regression analysis are presented in

Figure 7.5. Figure 7.6 and Figure 7.7.

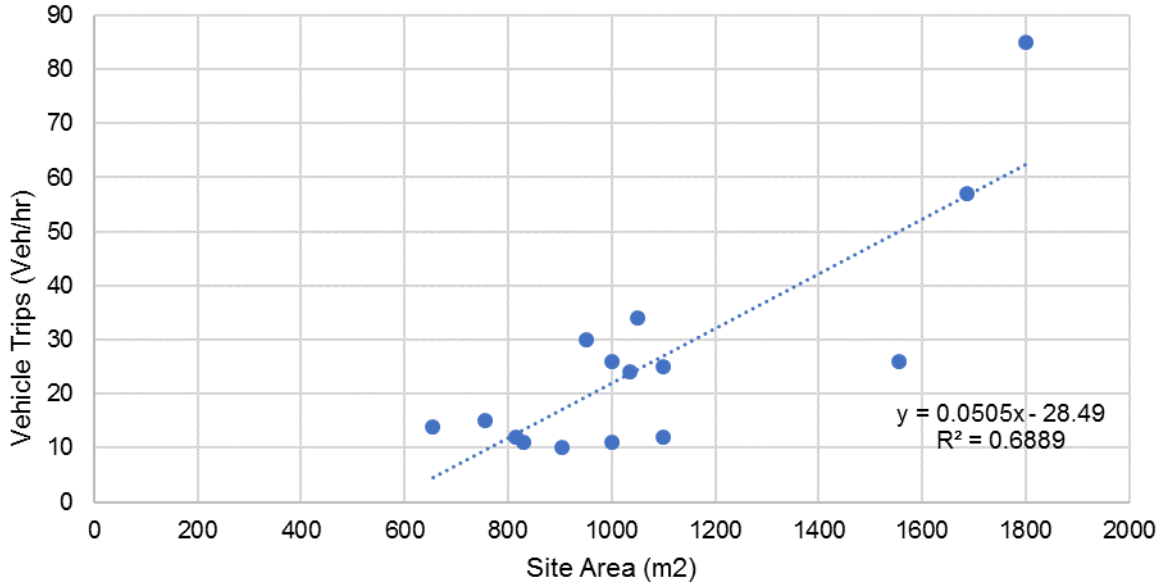


Figure 7.5: Friday AM Peak Vehicle Trips and Site Area Linear Regression

The Friday AM peak linear regression for site area resulted in an R^2 value of 0.688 which is one of the best performing regressions of the analysis.

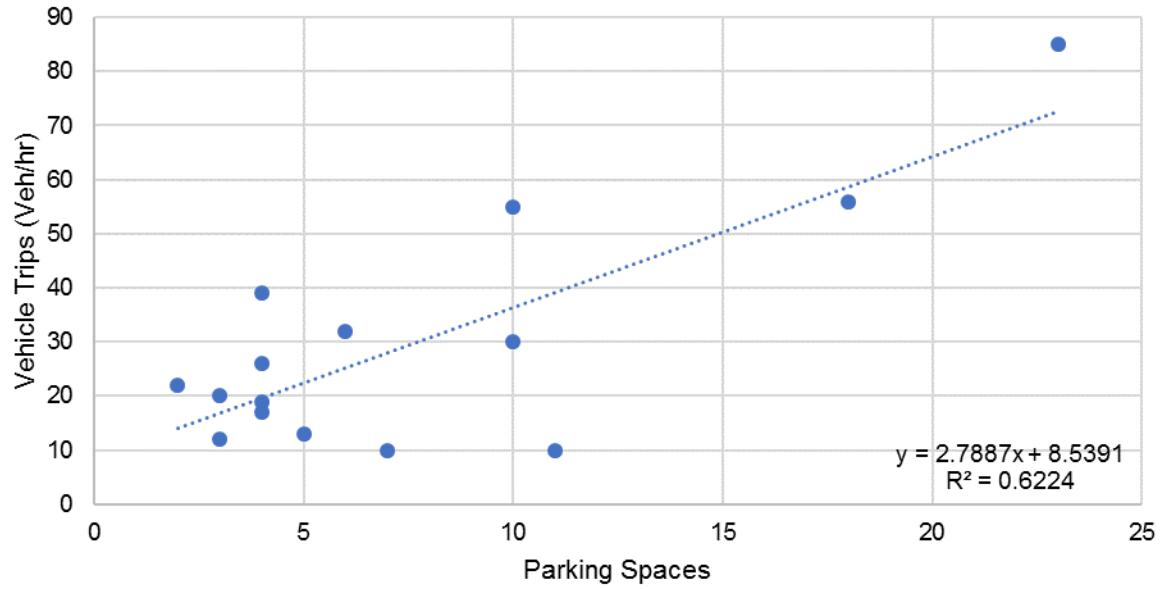


Figure 7.6: Sunday Peak Vehicle Trips and Parking Spaces Linear Regression

The Sunday peak linear regression for parking spaces resulted in an R^2 value of 0.622. While this falls below the accuracy required of 0.8, the result is one of the best performing models tested.

To demonstrate the comparison between a well performing models and a poor performing models (i.e. low R^2 value), an example of two poor performing linear regression is shown in Figure 7.7 and Figure 7.8.

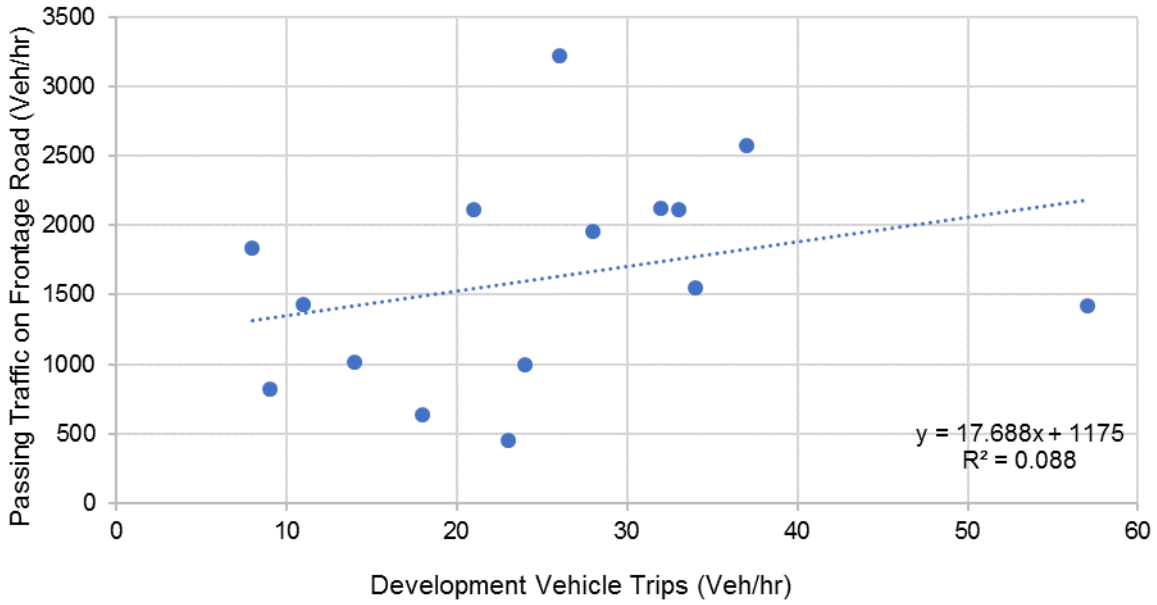


Figure 7.7: Friday Peak Frontage Road vs Development Trips Linear Regression

The Friday peak linear regression for frontage road trips and development trips resulted in a poor R^2 value of 0.088.

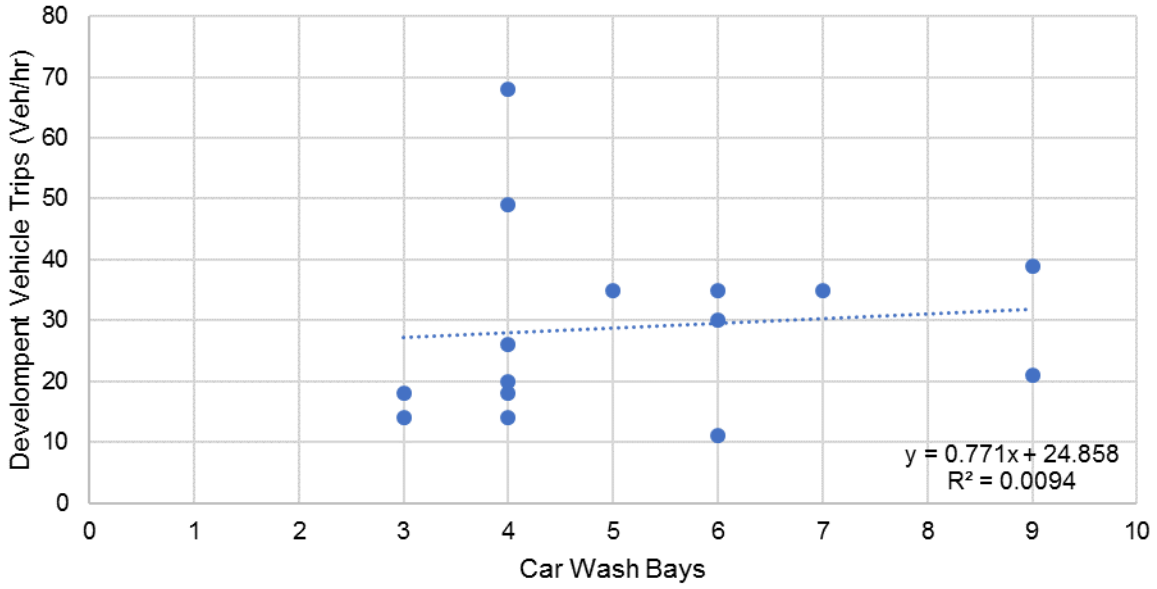


Figure 7.8: Saturday Peak Vehicle Trips and Car Wash Bays Linear Regression

The Saturday peak linear regression for car wash bays resulted in a poor R^2 value of 0.009.

All tested single variable linear regression models are provided in **Appendix B.**

Based on the results of all the single variable linear regression models, it can be reasonably concluded that there are poor dependent and independent variable relationships and no accurate conclusions or relationships can be drawn.

7.4 Multiple Linear Regression Analysis

Variable combinations selected for multiple linear regression analysis were informed by the variable correlation analysis and the single variable linear regression results. A range of independent variables were not included in the multiple linear regression analysis due to their high correlation with other variables, for example 'Occupied Site Area' and 'Café Floor Area'.

The multiple linear regression scenarios that were tested are shown in **Appendix C**. The best performing variables for all tested scenarios are shown in Table 7.1.

Table 7.1: Multiple Linear Regression Tested Scenarios

Time	Scenario[1]	Primary Aspect	Independent Value (X)	R^2 Value	Valid Analysis[2]
Friday	1	AM Peak Vehicle Trips	Car Wash Bay	0.682	No
Friday	1	AM Peak Vehicle Trips	Occupied Site Area	0.682	No
Friday	2	AM Peak Vehicle Trips	Parking Spaces	0.647	No
Friday	2	AM Peak Vehicle Trips	Occupied Site Area	0.647	No
Friday	1	Daily Vehicle Trips	Car Wash Bay	0.420	No
Friday	1	Daily Vehicle Trips	Occupied Site Area	0.420	No
Friday	2	Daily Vehicle Trips	Parking Spaces	0.420	No
Friday	2	Daily Vehicle Trips	Occupied Site Area	0.420	No
Friday	3	Daily Vehicle Trips	Daily Frontage Traffic	0.420	No
Friday	3	Daily Vehicle Trips	Occupied Site Area	0.420	No
Saturday	2	Peak Vehicle Trips	Parking Spaces	0.472	No
Saturday	2	Peak Vehicle Trips	Occupied Site Area	0.472	No
Saturday	4	Peak Vehicle Trips	Parking Spaces	0.438	No
Saturday	4	Peak Vehicle Trips	Café Floor Area	0.438	No
Sunday	1	Peak Vehicle Trips	Parking Spaces	0.585	No
Saturday	1	Peak Vehicle Trips	Occupied Site Area	0.585	No
Saturday	2	Peak Vehicle Trips	Parking Spaces	0.622	No
Saturday	2	Peak Vehicle Trips	Café Floor Area	0.622	No

1. Scenario numbers are as per the order tested, refer Appendix C.
2. Adjusted R^2 from multiple regression model. This is an R^2 value that has been adjusted to allow for multiple variable dataset inputs.

As shown above, the R^2 values are not considered accurate enough to indicate a significant relationship between the dependent and independent variable. The highest R^2 value is 0.68 based on the multiple regression of Car Wash Bays and Occupied Site Area for the AM peak traffic for Friday. No valid regression models were found.

7.5 Additional Data Analysis

Additional analysis was conducted on the survey data to investigate trip splits, linked trips, customer duration of stay and transport mode utilisation. Linked trip and customer duration of stay data was only available for Site 1.

7.5.1 Directional Split Data (IN/OUT Trip Generation)

Table 7.2 summarises the average maximum, minimum and variance of inbound trips during the AM, Midday (10am – 1pm) and PM periods for Friday, Saturday and Sunday.

Table 7.2: Average Inbound Trip Percentages and Variances

Friday	Friday	Friday	Friday	Saturday	Saturday	Saturday	Sunday	Sunday	Sunday
IN	**Max**	**Min**	**Var**	**Max**	**Min**	**Var**	**Max**	**Min**	**Var**
AM	66%	51%	±15%	63%	51%	12%	63%	45%	±18%
Midday	55%	41%	±14%	52%	42%	10%	55%	40%	±15%
PM	50%	18%	±32%	51%	22%	29%	58%	22%	±36%

The IN trip splits show some variability across all surveys days however are more consistent during the AM and Midday periods compared to the PM period. Saturday has the lowest variance during the AM, midday and PM periods.

Additional detail and data comparisons are available within the *Data Report.*

7.5.2 Mode Share Comparisons

Each site was survey collected some modal share data for site access. Due to limitations of survey data, mode share is split into the following three categories:

- Private Vehicle (Car Driver or Passenger)
- Pedestrian
- Cyclist.

A proportion of pedestrian traffic may utilise public transport. However, based on the full survey data obtained at Site 1, there were no trips made by customers or staff to the Car Wash Café via public transport. Mode share comparisons for all the surveyed sites are provided in Figure 7.9, Figure 7.10 and Figure 7.11 respectively.

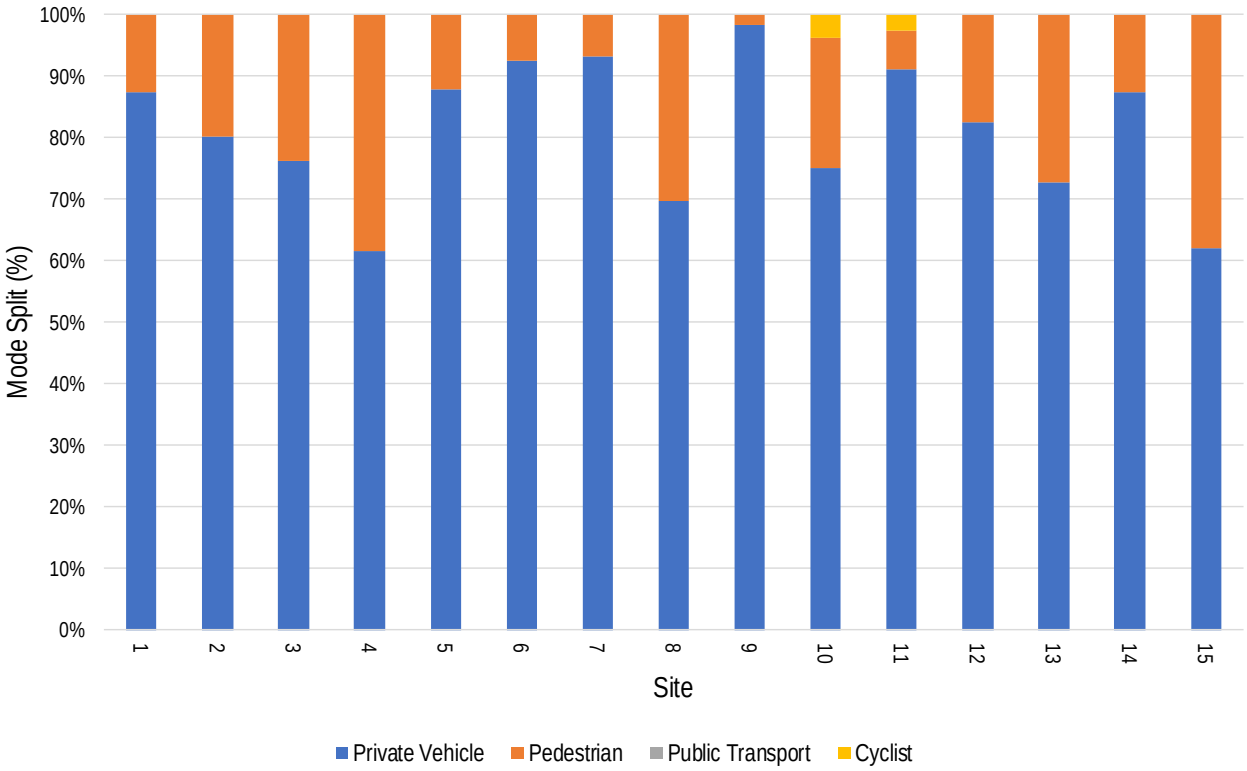


Figure 7.9: Friday Mode Share

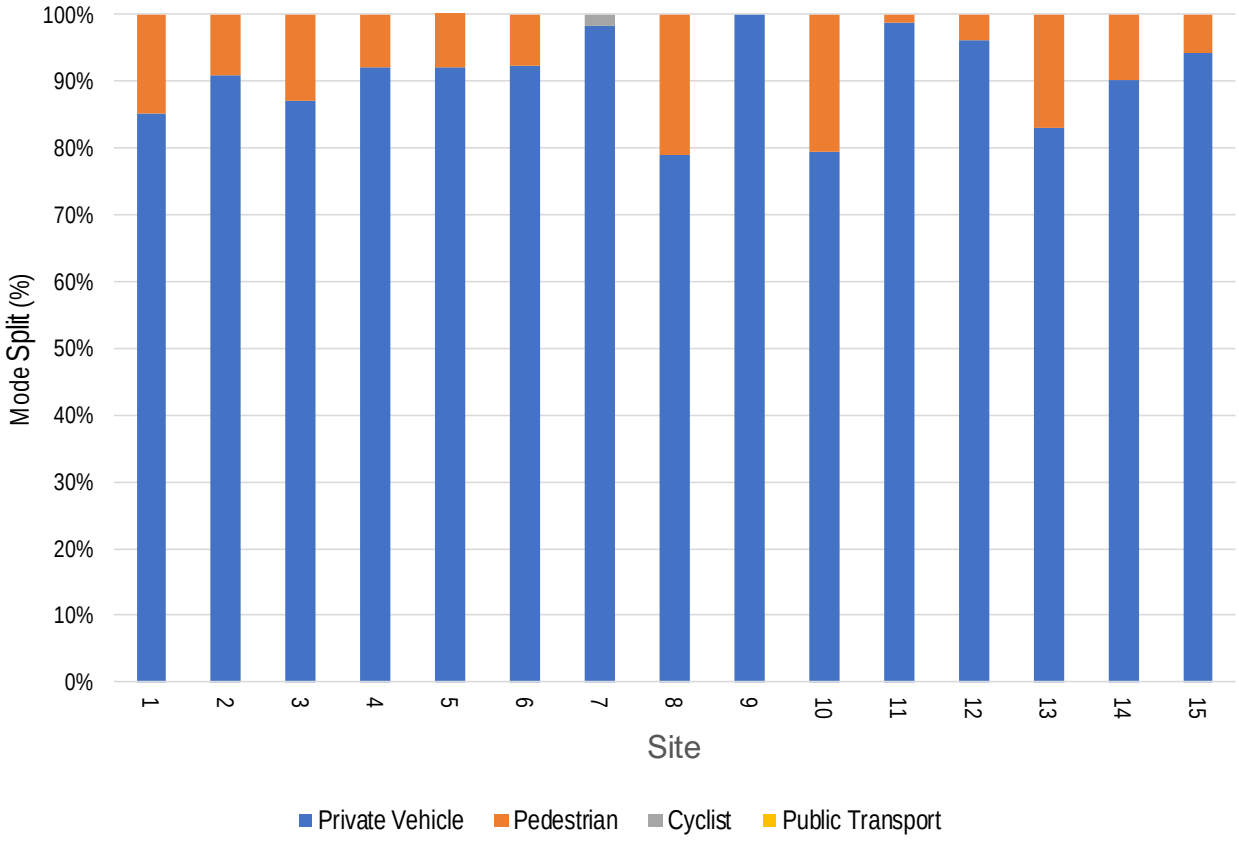


Figure 7.10: Saturday Mode Share

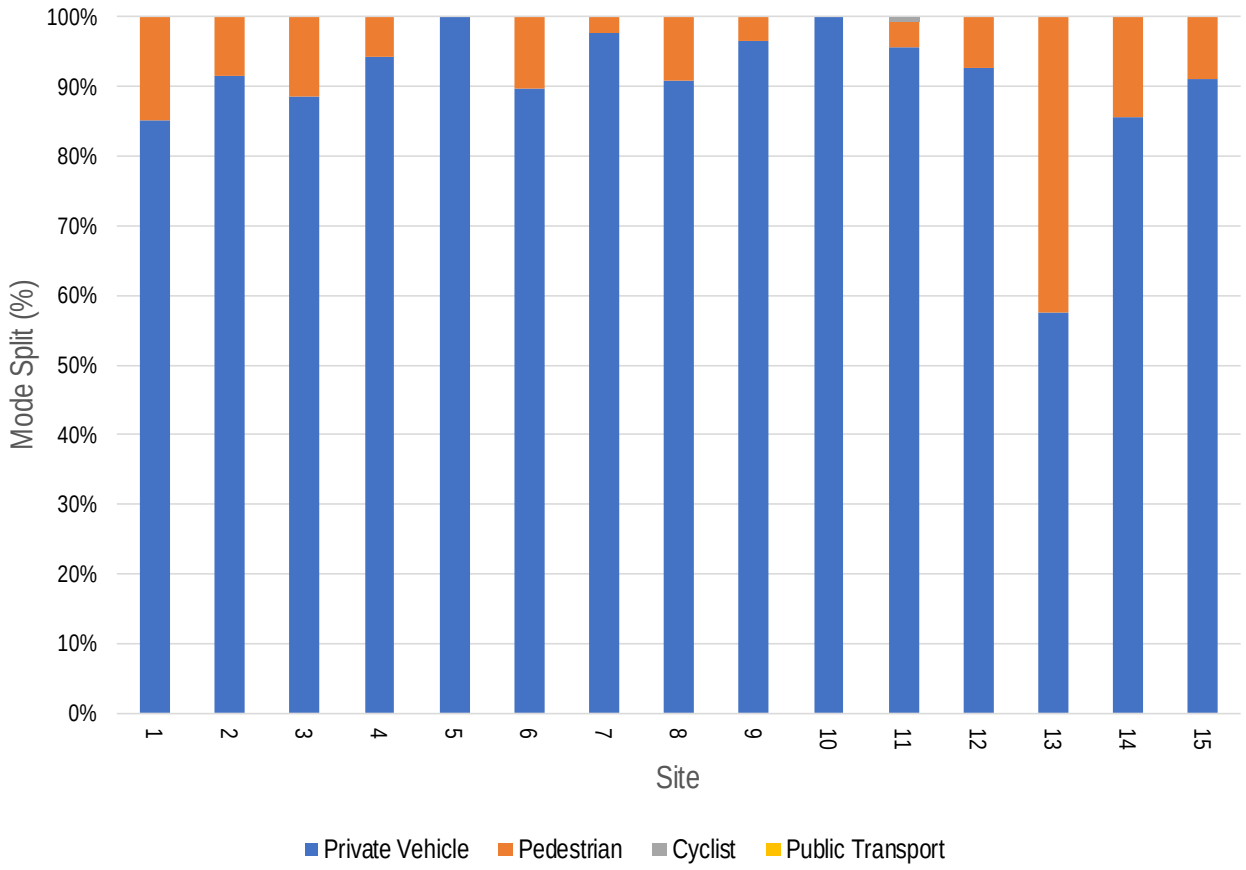


Figure 7.11: Sunday Mode Share

As shown above, the most predominate mode of transport is private vehicles which is expected at Car Wash sites. However, there is a portion of walk-up trade likely due to the trips generated by the Cafés. It is noted that there is an overall higher percentage of pedestrians on Friday compared to the weekend.

7.5.3 Linked Trips and Duration of Stay Analysis

A 'linked trip' is defined as a journey where a customer was on the way to/from another destination as part of the trip to the Café/Car Wash. Due to survey limitations linked trip and duration of stay data was only obtained at Site 1 (Muswellbrook). Table 7.3 summarises the linked trip percentages of Site 1 across the three (3) survey days.

Table 7.3: Site 1 Linked Trips

Survey Day	Linked Trips (%)	Sole Purpose (%)
Friday	75%	25%
Saturday	67%	33%
Sunday	81%	19%

As shown above, each day demonstrates a high percentage of linked trips with Sunday having the highest percentage.

The average duration of stay for Site 1 was calculated and is summarised in Table 7.4.

Table 7.4: Site 1 Duration of Stay

Length of Stay	Friday	Saturday	Sunday
0 – 10 mins	88%	93%	93%
10 – 30 mins	3%	0%	4%
30 – 60 mins	6%	0%	4%
5+ hours	3%	7%	0%

As shown above, the duration of stay most common across all three (3) survey days is 0 – 10 mins. This is due to the high percentage of customers visiting Site 1 for a coffee which results in a short stay. The small percentage of stays which were 5+ hours is expected to be due to staff of operations.

Site 1 is considered atypical; this trend is not expected to be conventional for most Car Wash Cafes.

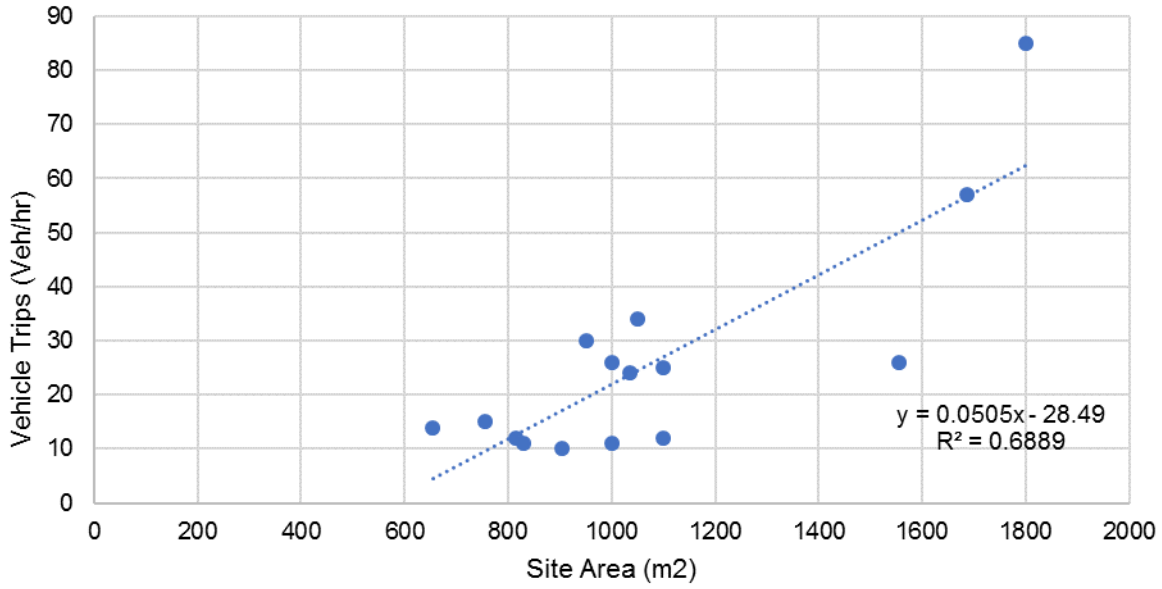
7.6 Resulting Trip Generation Models

7.6.1 Summary of the Process

Comparison of both single and multiple linear regression models found that neither method demonstrated a significant relationship between the dependent and independent variables. This is due to the linear regression values of R^2 being less than 0.8 and therefore do not demonstrate a high confidence.

7.6.2 Best Performing Models

The best performing models from both the single linear regression are shown in Figure 7.12.



Note: Site 1 appears as a data outlier due to a high number of coffee/meal related trips

Figure 7.12: Best Performing Single Linear Regression – Friday AM Peak (Site Area)

As shown above the Friday AM Peak and Site Area resulted in an R^2 value of 0.68 for the single linear regression.

As Site 1 is a data outliner, it was removed to test its impact on the adjusted R^2 value. The result of excluding Site 1 is shown in Figure 7.13.

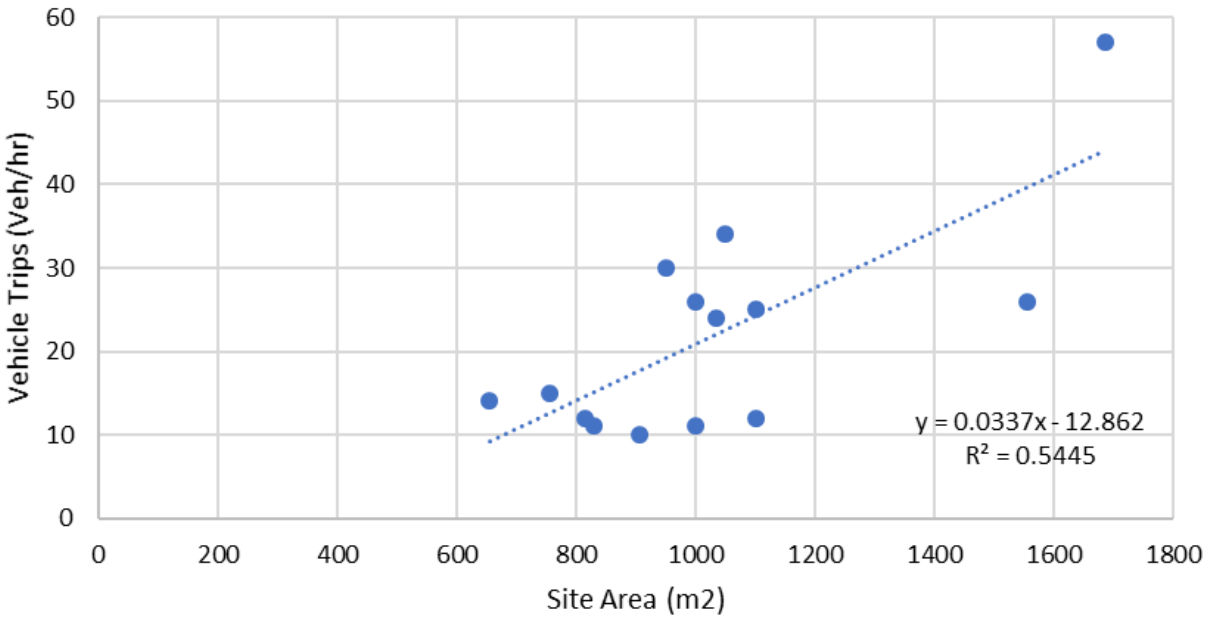


Figure 7.13: Best Performing Single Linear Regression – Friday AM Peak (Site Area) Excluding Site 1

By removing Site 1 from the dataset the R^2 value decreased and resulted in 0.54. This shows there is less of a relationship between vehicle trips and site area when Site 1 is excluded. This result also demonstrates that the linear relationships are not consistent and therefore unable to provide a solid basis for trip rate prediction.

The best performing multiple linear regression model is shown in Figure 7.14.

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.853019356
R Square	0.727642022
Adjusted R Square	0.682249025
Standard Error	11.56184769
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	4285.61747	2142.808735	16.02983014	0.00040817
Residual	12	1604.115864	133.676322		
Total	14	5889.733333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-20.6317196	11.97432004	-1.72299718	0.110534475	-46.72152175	5.458082525
Car Wash Bay	-2.15562754	1.649778395	-1.30661642	0.215830382	-5.750185879	1.438930789
Occupied Site Area (m2)	0.053564197	0.009462029	5.660963106	0.000105434	0.032948207	0.074180188

Figure 7.14: Best Performing Multiple Regression – Friday AM Peak (Wash Bay + Site Area)

As shown above the Friday AM peak, Car Wash Bay and Site Area resulted in an R^2 value of 0.68 for the multiple linear regression.

As Site 1 is a data outliner, it was removed to test its impact on the adjusted R^2 value. The Friday AM peak, Car Wash Bay and Site Area resulted in an R^2 value of 0.46. Similarly, the exclusion of Site 1 resulted in a decrease of the R^2 value and demonstrates the non-linear relationship between dependent and independent variables.

Although these are the best performing models, they still do not demonstrate a high confidence (>0.8) and therefore an alternate trip generation estimation method has been proposed.

7.7 Alternate Trip Generation method

Due to the lack of relationships between the dependent and independent variables in the regression models, an alternate method to estimate trip generation on a case by case basis is recommended. Considering this, the sites within this survey have been reviewed and summarised to include:

- Trip rates based on site area (100m^2), car wash bay and frontage road traffic volumes (100 vehicles)
- Aerial imagery
- Surrounding land uses
- Opening times
- Café floor area
- Café differences (e.g. serving capacity)
- Café seating capacity
- Number of car wash bays
- Average daily frontage road traffic volumes
- Locality (e.g. regional or city).

These site-specific details allow for a customised application of trip data based on individual characteristics of each site.

8. RECOMMENDATIONS

As the above analysis demonstrated no clear trends, no trip generation rates could be determined for Car Wash Cafes. This result is likely due to the high variation in trip generation rates as demonstrated by the survey data and above regression analysis.

A high variation of trip rates at Car Washes might be explained by a number of highly variable local factors including locality, marketing, water restrictions, rainy weather, price and accessibility. For example, low level restrictions on water usage may result in commercial car washes being exempt which increases the demand for car washes, or severe restrictions in place may result in car washes no longer able to operate.

It is therefore recommended to have a more bespoke methodology to estimating trips at Car Wash Cafes, which aims to provide a proposed site with data directly comparable in order to construct and justify a tailored trip generation rate. The survey sample undertaken for this study only focuses on three (3) surveyed days across 15 sites, a much larger database will be required in the future to adequately undertake direct comparisons.

The current survey sample has been summarised to include site-specific details over the following section. However, as this study only focuses on three (3) surveyed days across 15 sites and many sites had limited information available (i.e. are based on estimations or online data), **the following site rates should be used as a guide only**.

It is anticipated that the use of the below “guide sites” will assist in the development of tailored trip generation rates for new Car Wash Café developments.

Site 1 – Blue Flame Café & Car Wash, Muswellbrook NSW

Details:

- Site area 1800m^2
- 12 car wash bays
- Average daily frontage road volumes - 12,600 vehicles
- Café area 120m^2
- Café open from 6:00AM – 7:00PM and car wash open 8:00AM – 5:00PM, 7 days a week
- Next to a petrol station and mechanic
- Located in a regional area of Muswellbrook.

The site is bounded by two arterial roads, Sydney Street and the New England Highway surrounded by residential and other retail uses. During the preliminary analysis, it was noted that there is an unusually high peak period from 6:00AM – 7:00AM. This is due to the surrounding areas population demographics as many miners travel through the area early in the morning. It is therefore noted that Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	4.7	3.1	2.7	3
Car Wash Bay	21.2	14.2	4	4.5
100 vehicles on Frontage Road	14.8	4.0	16.9	7.6

Site 2 - CARSPA Autowash Café, Parklea NSW

Details:

- Site area 1555m^2
- 9 car wash bays
- Average daily frontage road volumes - 33,100 vehciles
- Café area 95m^2
- Café seating for approximately 22 people outside
- Next to a petrol station
- Open 7:30AM – 5:30PM Monday – Friday & 7:00AM – 5:30PM Saturday – Sunday
- The café serves Breakfast and Lunch with a range of hot and cold food / beverages
- Located in western suburbs of Sydney.

The site is next to Parklea Markets and Parklea Public School. It's in proximity to the major Old Windsor Road / Miami Street / Balmoral Road intersection. Old Windsor Road is an arterial road and site access is gained via both the front and back of the site. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1.6	1.6	1.3	6.4
Car Wash Bay	2.8	2.8	2.3	1.1
100 vehicles on Frontage Road	0.8	0.8	0.4	0.4

Site 3 – Lugarno Café Car Wash, Lugarno NSW

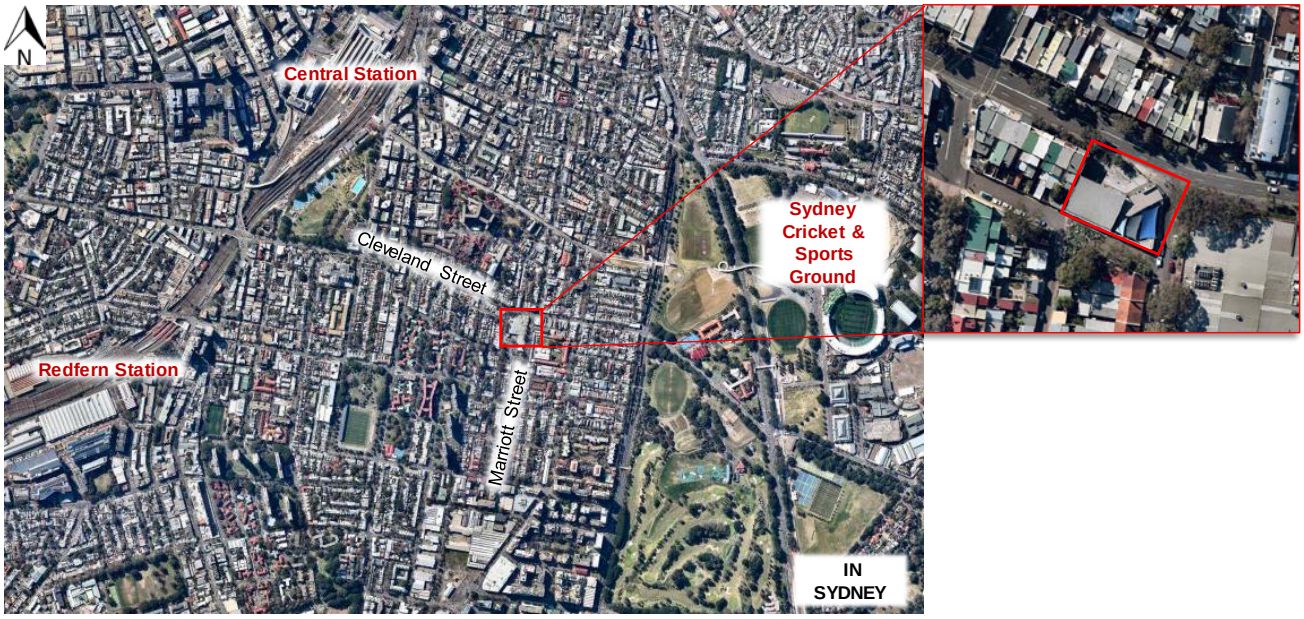
Details:

- Site area 755m^2
- 9 car wash bays
- Average daily frontage road volumes - 6000 vehicles
- Café area 180m^2
- Café seating for approximately 29 people outside
- The café serves Breakfast and Lunch with a range of hot and cold food/ beverages
- Next to a mechanic
- Open 8:00AM – 5:00PM 7 days a week
- Located in the south western suburbs of Sydney.

This site is surrounded by low density residential with a service station adjacent and a bus stop fronting the site. Forest Road is a minor arterial road that runs north – south through the area. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1.9	2.3	3.4	3.4
Car Wash Bay	3.7	4.5	6.5	6.5
100 vehicles on Frontage Road	2.3	2.8	2.4	3

Site 4 - Wax Car Wash, Redfern NSW



Details:

- Site area 950m^2
- 5 car wash bays
- Average daily frontage road volumes - 21,000 vehicles
- Café area 105m^2
- Café seating for approximately 16 people outside
- Open 7:00AM – 7:00PM 7 days a week
- The café serves a range of hot and cold food/beverages
- Located in Sydney.

This site is located amongst retail and commercial uses in the heart of Surry Hills. Adjacent to a Coles, the site is accessed via Cleveland Street which is a key collector road that runs east to west to the University of Sydney. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	3.1	3.3	3.6	4.1
Car Wash Bay	6	6.4	7	7.8
100 vehicles on Frontage Road	1.5	1.5	1.8	1.9

Site 5 - Hands on Car Wash, Balgownie NSW

Details:

- Site area 655m^2
- 3 car wash bays
- Café area 85m^2
- Average daily frontage volumes - 3000 vehicles
- Café seating for approximately 4 people outside
- Next to a mechanic
- Open 8:00AM – 5:00PM Monday – Friday, 8:00AM – 4PM Saturday and 9:00AM – 3:00PM Sunday
- Located in regional area of Wollongong.

The site is surrounded by low density residential with access via Balgownie Road. There is a bus stop fronting the site and its located on the corner of the Balgownie Road / Foothills Road roundabout. Balgownie Road is a sub-arterial road that runs east to west through the area. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	2.1	3.5	2.1	1.5
Car Wash Bay	4.6	7.6	4.6	3.3
100 vehicles on Frontage Road	3.9	5.1	3.7	2.9

Site 6 - Stella Hand Car Wash & Table1, Merewether NSW

Details:

- Site area 1685m^2
- 4 car wash bays
- Café area 295m^2
- Average daily frontage road volumes - 14,200 vehicles
- Open 7:30AM – 5:00PM Monday – Friday and 7:30AM – 3:30PM Saturday – Sunday
- Café seating of approximately 30 people inside and 20 people outside
- Café has an extensive menu of breakfast and lunch options with a range of hot and cold food / beverages
- Located in the regional area of Newcastle.

The site is located within a medium density residential area bounded by the Pacific Highway which is an arterial road that runs into Newcastle from the south west. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Frida	Saturday	Sunday
	AM	PM		
100m^2 Site Area	3.3	2	4	5
Car Wash Bay	14.2	8.5	17	21.2
100 vehicles on Frontage Road	3.6	2.1	4	6

Site 7 - Blanc Noire Hand Wash Café, Thornleigh NSW

Details:

- Site area 815m^2
- 4 car wash bays
- Café area 75m^2
- Average daily frontage road volumes - 30,000 vehicles
- Café seating of approximately 16 people outside
- Open 8:00AM – 5:30PM Monday – Sunday
- Located in the northern suburb of Sydney.

The site is located on the outskirts of the key retail area surrounded by medium density residential. The site is accessed via the Cumberland Highway which is an arterial road that runs east to west through the area. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1.4	0.9	1.7	1.5
Car Wash Bay	3	2	3.5	3.2
100 vehicles on Frontage Road	0.3	0.2	0.3	0.2

Site 8 - Xibit Car Wash Café, Auburn NSW

Details:

- Site area 1000m^2
- 4 car wash bays
- Café area 70m^2
- Average daily frontage road volumes - 23,000 vehicles
- Café seating of approximately 30 people including outside seating
- Café offers a small range of cold food, coffee and other beverages
- Open 8:00AM – 5:30PM Monday – Friday. 8:00AM – 5:00PM Saturday – Sunday
- Located in western suburb of Sydney.

The site is within a retail precinct with surrounding residential areas. The site gains access via the Great Western Highway which is an arterial road that runs east to west from Sydney city to the western suburbs. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1.1	1.4	2	1.9
Car Wash Bay	2.7	3.5	5	4.7
100 vehicles on Frontage Road	0.4	0.6	0.7	0.7

Site 9 - Aqua Car Wash, Sutherland NSW

Details:

- Site area 1000m^2
- 6 car wash bays
- Café area 70m^2
- Average daily frontage road volumes - 23,000 vehicles
- Café seating of approximately 14 people inside
- Café offers free coffee with every car wash and serves other cold food/ beverages
- Open 7:30AM – 5:00PM Monday – Friday & 8:00AM – 5:00PM Saturday – Sunday
- Located in southern suburbs of Sydney.

The site is a part of a small shopping village, surrounded by low density residential. The site is bounded by President Avenue to the south which is key collector road that runs east to west through the area. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	3.2	3.5	3.3	5.3
Car Wash Bay	5.6	6.1	5.8	9.3
100 vehicles on Frontage Road	1.6	1.4	1.1	2.2

Site 10 – Professional Car Wash & Café, Wollongong NSW

Details:

- Site area 830m^2
- 4 car wash bays
- Café area 65m^2
- Average daily frontage road volumes - 23,000 vehicles
- Café seating of approximately 14 people inside
- Café offers free coffee with every car wash and serves other cold food/ beverages
- Open 7:30AM – 5:00PM Monday – Friday & 8:00AM – 5:00PM Saturday – Sunday

The site is located amongst retail and medium density residential uses. Access is gained via the Princes Highway which is an arterial road that runs north to south through Wollongong. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1.3	2.8	2.1	2.4
Car Wash Bay	2.7	6	4.5	5
100 vehicles on Frontage Road	0.5	1.2	0.8	1.3

Site 11 – Gold Car Wash Café, Alexandria NSW

Details:

- Site area 1000m^2
- 9 car wash bays
- Café area 185m^2
- Average daily frontage road volumes - 52,800 vehicles
- Café seating of approximately 35 people inside
- Café offers a breakfast and lunch menu with a range of hot and cold food/ beverages
- Open 24 hours a day, 7 days a week
- Located in Sydney.

The site is located within the retail and commercial precinct and is located on the corner of a key collector road that runs from the north – south from Sydney Airport. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	2.6	3.3	3.9	2.2
Car Wash Bay	2.8	3.6	4.3	2.4
100 vehicles on Frontage Road	1.4	1.5	1.9	1.2

Site 12 – Zoom Car Wash Café, Punchbowl NSW

Details:

- Site area 1035m^2
- 7 car wash bays
- Café area 55m^2
- Average daily frontage road volumes - 20,600 vehicles
- Café seating of approximately 15 people inside
- Café offers a small range of cold food and coffee/ beverages
- Open 8:00AM – 5:00PM 7 days a week
- Located in western suburbs of Sydney.

The site is located within a medium density residential area that is bounded by Canterbury Road which is an arterial road that runs east to west through the area. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	2.3	2	3.3	3
Car Wash Bay	3.4	3	5	4.5
100 vehicles on Frontage Road	1.2	0.9	1.4	1.4

Site 13 – Elegance Car Wash, Penrith NSW

Details:

- Site area 1100m^2
- 6 car wash bays
- Café area 180m^2
- Average daily frontage road volumes - 6,400 vehicles
- Café seating of approximately 50 people inside
- Café offers a breakfast and lunch menu with a large range of hot and cold food available. The café is licensed and serves hot/cold beverages
- Open 8:00AM – 4:00PM 6 days a week, closed on Tuesdays
- Located in the regional area of Penrith.

The site is located amongst retail and residential uses on the outskirts of Penrith. Access is gained via a local road and the railway line runs north of the site. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1	0.8	1	1.5
Car Wash Bay	2	1.5	1.8	2.8
100 vehicles on Frontage Road	1.4	1	1.2	2.2

Site 14 – Rainbow Hand Car Wash & Café, Canada Bay NSW

Details:

- Site area 1100m^2
- 6 car wash bays
- Café area 130m^2
- Average daily frontage road volumes - 34,200 vehicles
- Café seating of approximately 10 people outside
- Café offers a free coffee with every car wash and offers a small range of cold food/beverages
- Open 8:00AM – 4:45PM 7 days a week
- Located in Sydney.

The site is located on Victoria Road which is an arterial road that runs through Canada Bay and is surrounded by retail and residential uses. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	2.2	2.5	2.7	2.7
Car Wash Bay	4.1	4.6	5	5
100 vehicles on Frontage Road	0.6	0.7	0.6	0.7

Site 15 – Sydney Car Wash Café, Ryde NSW

Details:

- Site area 905m^2
- 3 car wash bays
- Café area 115m^2
- Average daily frontage road volumes - 69,700 vehicles
- Café seating of approximately 6 people outside
- Café offers a small range of cold food/beverages
- Open 8:00AM – 6:00PM 7 days a week
- Located in south western suburbs of Sydney.

The site is located amongst retail and residential uses and is accessed via Victoria Road which is an arterial road that runs east to west. Surveyed trip generation rates for this site are provided below.

Trips Per	Friday	Friday	Saturday	Sunday
	AM	PM		
100m^2 Site Area	1.1	1.2	1.9	1.3
Car Wash Bay	3.3	3.6	6	4
100 vehicles on Frontage Road	0.4	0.4	0.6	0.4

Appendix A: Data Summary Sheet

P4001.001S - Site Data Summary Sheet

Site No.	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8
Centre Name								
Address/ Location	42-50 Sydney Street, Muswellbrook	2/1190 Old Windsor Road, Parklea Blacktown	1052 Forest Road, Lugarno	375 Cleveland Street, Redfern	118/120 Balgownie Road, Balgownie Road	118/120 Balgownie Road	169 – 171 Pennant Hills Road	212 Parramatta Road
Suburb	Muswellbrook	Parklea Blacktown	Lugarno	Redfern	Wollongong	Newcastle	Thornleigh	Auburn
Dates of survey	29th – 31st March 2019	14th – 16th June 2019	14th – 15th June & 28th July 2019	14th – 15th June & 28th July 2019	14th – 15th June & 28th July 2019	14th – 16th June 2019	14th – 15th June & 28th July 2019	14th – 15th June & 28th July 2019
Days/dates of surveys	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday
Duration of surveys	3	3	3	3	3	3	3	3
Area Characteristics:								
Surrounding land use	Service station, food and drink outlets and residential	Service station, food and drink outlets and residential	Mechanic and Service Station	Residental and Retail	Residential and Commerical	Residential	Residential	Commerical / Residential
Nearby on-street parking regime	No nearby on-street parking	No nearby on-street parking	On-street parking available	On-street parking availble on Marriott Street	On-street parking available	No on-street car parking available	No on-street parking availble	On-street parking available on Braemar Avenue
Principal adjacent road - AM peak period (weekda	11:00 AM - 12:00 PM	07:30 AM - 08:30 AM	08:15 AM - 09:15 AM	08:00 AM - 09:00 AM	09:00 AM - 10:00 AM	07:45 AM - 08:45 AM	10:45 AM - 11:45 AM	11:00 AM - 12:00 PM
Principal adjacent road - PM peak period (weekda	12:00 PM - 01:00 PM	03:15 PM - 04:15 PM	03:45 PM - 04:45 PM	05:00 PM - 06:00 PM	03:00 PM - 04:00 PM	03:30 PM - 04:30 PM	02:30 PM - 03:30 PM	01:30 PM - 02:30 PM
Principal adjacent road - daily peak period (week	11:30 PM - 12:30 PM	12:45PM - 1:45PM	4:30PM - 5:30PM					
Principal adjacent road - Median	No	No	No	No	No	No	Yes	Yes
Building Characteristics:								
Year built	2012	2009	2004	2003	2008	2007	2003	2003
Site Area (m^2)	1800	1555	755	950	655	1685	815	1000
Café Gross Floor Area (GFA) (m^2)	120	95	180	105	85	295	75	70
Café Seating Capacity	Unknown	22	29	16	4	60	16	20
No. of Washing Bays:								
Total	12	9	4	5	3	4	4	4
Automated		1						
Manual	12	8	4	5	3	4	4	4
Self Serve								
Other Tenancies	ma Service Station / Car Servici	Caltex Service Station	The Workshop Auto Centre	NA	Vitex Motors	NA	N/A	Mechanic
On-Site Parking:								
Customer (General Access)	4	10	4	4	7	23	5	4
Disabled								
Staff		1						
Loading Bays								
Other								
Commercial (fee Parking)								
Total	4	11	4	4	7	23	5	4
Opening Hours:								
Weekdays	6:00AM – 7:00PM	7:300AM - 5:30PM	8:00AM – 5:00PM	7:00AM – 7:00PM	9:00AM – 5:00PM	7:30AM – 5:00PM	8:00AM – 5:30PM	8:00AM – 5:30PM
Saturday	6:00AM – 7:00PM	7:00AM - 5:30PM	8:00AM – 5:00PM	7:00AM – 7:00PM	9:00AM – 5:00PM	7:30AM – 5:00PM	8:00AM – 5:30PM	8:00AM – 5:00PM
Sunday	6:00AM – 7:00PM	7:00AM - 5:30PM	8:00AM – 5:00PM	7:00AM – 7:00PM	9:00AM – 5:00PM	7:30AM – 5:00PM	8:00AM – 5:30PM	8:00AM – 5:00PM
Vehicle Trips:								
Peak 1-hour vehicle-trips								
Weekday AM Peak	85	26	15	30	14	57	12	11
Weekday PM Peak	57	26	18	32	23	34	8	14
Saturday Peak	49	21	26	35	14	68	14	20
Sunday Peak	55	10	26	39	10	85	13	19
Peak vehicle-trips per 100m2 Site Area								
Weekday AM Peak	11.30	1.60	1.90	3.10	2.14	3.38	1.47	1.10
Weekday PM Peak	3.10	1.60	2.30	3.30	3.51	2.02	0.98	1.40
Saturday Peak	2.70	1.30	3.40	3.60	2.14	4.04	1.72	2.00
Sunday Peak	3.00	6.40	3.40	4.10	1.53	5.04	1.60	1.90
Peak vehicle-trips per washing bay								
Weekday AM Peak	51.00	2.80	3.70	6.00	4.67	14.25	3.00	2.75
Weekday PM Peak	14.20	2.80	4.50	6.40	7.67	8.50	2.00	3.50
Saturday Peak	4.00	2.30	6.50	7.00	4.67	17.00	3.50	5.00
Sunday Peak	4.50	1.10	6.50	7.80	3.33	21.25	3.25	4.75
Peak vehicle-trips per on-site parking space								
Weekday AM Peak	20.40	2.30	3.70	7.50	2.00	2.48	2.40	2.75
Weekday PM Peak	5.70	2.30	4.50	8.00	3.29	1.48	1.60	3.50
Saturday Peak	12.20	1.90	6.50	8.70	2.00	2.96	2.80	5.00
Sunday Peak	13.70	0.90	6.50	9.70	1.43	3.70	2.60	4.75
Peak vehicle-trips per 100 Vehicles on Frontage Road								
Weekday AM Peak	35.60	0.80	2.30	1.50	3.99	3.70	0.67	0.92
Weekday PM Peak	4.00	0.80	2.80	1.50	5.12	2.19	0.44	1.38
Saturday Peak	16.90	0.40	2.40	1.90	3.74	4.07	0.56	1.45
Sunday Peak	7.60	0.40	3.00	2.00	2.93	6.08	0.54	1.49
Total daily vehicle trips								
Weekday Daily	514.00	163.00	112.00	206.00	102.00	274.00	55.00	83.00
Saturday Daily	331.00	152.00	142.00	224.00	50.00	335.00	62.00	87.00
Sunday Daily	328.00	64.00	170.00	250.00	32.00	330.00	81.00	108.00
Total daily vehicle-trips per 100m2 Site Area								
Weekday Daily	28.50	10.40	14.80	21.60	15.57	16.26	6.75	8.30
Saturday Daily	18.30	9.70	18.80	23.50	7.63	19.88	7.61	8.70
Sunday Daily	18.20	41.20	22.50	26.30	4.89	19.58	9.94	10.80
Total daily vehicle-trips per washing bay								
Weekday Daily	128.50	18.10	28.00	41.20	34.00	68.50	13.75	20.75
Saturday Daily	27.50	16.80	35.50	44.80	16.67	83.75	15.50	21.75
Sunday Daily	27.30	7.10	42.50	50.00	10.67	82.50	20.25	27.00
Total Daily trips per 100 Vehicles on Frontage Road								
Weekday Daily	4.00	0.40	1.70	0.90	3.13	1.50	0.30	0.74
Saturday Daily	56.80	0.30	1.70	1.00	1.75	2.37	0.31	0.76
Sunday Daily	40.00	0.20	2.40	1.20	1.29	3.17	0.39	0.95
Total daily vehicle-trips per on-site parking space								
Weekday Daily	51.40	14.80	28.00	51.50	3.13	1.50	0.14	0.36
Saturday Daily	82.70	13.80	35.50	56.00	1.75	2.37	0.15	0.38
Sunday Daily	82.00	5.80	42.50	62.50	1.29	3.17	0.19	0.48
Vehicle-trips during adjacent road Frontage Road								
Weekday AM Peak	34.00	12.00	12.00	18.00	8.00	37.00	11.00	8.00
Weekday PM Peak	46.00	13.00	12.00	6.00	20.00	5.00	5.00	10.00
Saturday Daily	30.00	19.00	5.00	19.00	8.00	40.00	13.00	8.00
Sunday Daily	16.00	6.00	24.00	15.00	6.00	50.00	7.00	15.00
% of total trips by car (driver / passanger):								
Weekday	88%	80%	76%	62%	88%	93%	93%	70%
Saturday	85%	91%	87%	92%	92%	92%	98%	79%
Sunday	85%	91%	89%	94%	100%	90%	98%	91%
% of total trips by active transport (Walk / Cycle)								
Weekday	13%	20%	24%	38%	12%	7%	7%	30%
Saturday	15%	9%	13%	8%	17%	8%	2%	21%
Sunday	15%	9%	11%	6%	0%	10%	2%	9%
% of total trips by public transport (train / bus / other)								
Weekday	0%	0%	0%	0%	0%	0%	0%	0%
Saturday	0%	0%	0%	0%	0%	0%	0%	0%
Sunday	0%	0%	0%	0%	0%	0%	0%	0%

P4001.001S - Site Data Summary Sheet

Site No.	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15
Centre Name							
Address/ Location	109 Miranda Street	10 – 12 Flinders Street	44 O'Riordan Street	1518 Canterbury Rd	35 Henry Street	120 Victoria Road	750 Victoria Road
Suburb	Miranda	Wollongong	Sydney	Canterbury-Bankstown	Penrith	Canada Bay	Ryde
Dates of survey	14th – 15th June & 28th July 2019	14th – 15th June & 28th July 2019	14th – 16th June 2019	14th – 15th June & 28th July 2019	14th – 15th June & 28th July 2019	14th – 15th June & 28th July 2019	14th – 16th June 2019
Days/dates of surveys	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday	Friday, Saturday & Sunday
Duration of surveys	3	3	3	3	3	3	3
Area Characteristics:							
Surrounding land use	Residential/ Retail	Retail	Retail and Commerical	Residential	Retail	Retail & Residential	Residential
Nearby on-street parking regime	On-street parking available	No on-street parking available	No on-street car parking	No on-street parking	On-street parking available	On-street parking is available	No on-street parking available
Principal adjacent road - AM peak period (weekda	08:00 AM - 09:00 AM	08:00 AM - 09:00 AM	08:15 AM - 09:15 AM	09:15 AM - 10:15 AM	08:15 AM - 09:15 AM	08:00 AM - 09:00 AM	08:00 AM - 09:00 AM
Principal adjacent road - PM peak period (weekda	03:30 PM - 04:30 PM	03:15 PM - 04:15 PM	03:00 PM - 04:00 PM	03:45 PM - 04:45 PM	03:00 PM - 04:00 PM	03:30 PM - 04:30 PM	04:00 PM - 05:00 PM
Principal adjacent road - daily peak period (week							
Principal adjacent road - Median	No	Yes	No	No	No	Yes	Yes
Building Characteristics:							
Year built	2003	2008	2009	2007	2007	2003	2003
Site Area (m^2)	1050	830	1000	1035	1100	1100	905
Café Gross Floor Area (GFA) (m^2)	185	65	185	55	180	130	115
Café Seating Capacity	14	N/A	35	15	55	25	6
No. of Washing Bays:							
Total	6	4	9	7	6	6	3
Automated							
Manual	6	4	9	7	6	6	3
Self Serve							
Other Tenancies	N/A	N/A	Power Golf	N/A	Family Centre	Eurolife kitchens & wardrobes	NA
On-Site Parking:							
Customer (General Access)	18	3	2	6	4	10	3
Disabled							
Staff							
Loading Bays							
Other							
Commercial (fee Parking)							
Total	18	3	2	6	4	10	3
Opening Hours:							
Weekdays	7:30AM – 5:00PM	8:00AM – 5:00PM	6:00AM – 7:00PM	8:00AM – 6:00PM	8:00AM – 4:00PM	8:00AM – 4:45PM	8:00AM – 6:00PM
Saturday	8:00AM – 5:00PM	8:00AM – 5:00PM	6:00AM – 7:00PM	8:00AM – 6:00PM	8:00AM – 4:00PM	8:00AM – 4:45PM	8:00AM – 6:00PM
Sunday	8:00AM – 5:00PM	8:00AM – 5:00PM	6:00AM – 7:00PM	8:00AM – 6:00PM	8:00AM – 4:00PM	8:00AM – 4:45PM	8:00AM – 6:00PM
Vehicle Trips:							
Peak 1-hour vehicle-trips							
Weekday AM Peak	34	11	26	24	12	25	10
Weekday PM Peak	37	24	33	21	9	28	11
Saturday Peak	35	18	39	35	11	30	18
Sunday Peak	56	20	22	32	17	30	12
Peak vehicle-trips per 100m2 Site Area							
Weekday AM Peak	3.24	1.33	2.60	2.32	1.09	2.27	1.10
Weekday PM Peak	3.52	2.89	3.30	2.03	0.82	2.55	1.22
Saturday Peak	3.33	2.17	3.90	3.38	1.00	2.73	1.99
Sunday Peak	5.33	2.41	2.20	3.09	1.55	2.73	1.33
Peak vehicle-trips per washing bay							
Weekday AM Peak	5.67	2.75	2.89	3.43	2.00	4.17	3.33
Weekday PM Peak	6.17	6.00	3.67	3.00	1.50	4.67	3.67
Saturday Peak	5.83	4.50	4.33	5.00	1.83	5.00	6.00
Sunday Peak	9.33	5.00	2.44	4.57	2.83	5.00	4.00
Peak vehicle-trips per on-site parking space							
Weekday AM Peak	1.89	3.67	13.00	4.00	3.00	2.50	3.33
Weekday PM Peak	2.06	8.00	16.50	3.50	2.25	2.80	3.67
Saturday Peak	1.94	6.00	19.50	5.83	2.75	3.00	6.00
Sunday Peak	3.11	6.67	11.00	5.33	4.25	3.00	4.00
Peak vehicle-trips per 100 Vehicles on Frontage I							
Weekday AM Peak	1.69	1.10	1.49	1.24	1.44	1.63	0.82
Weekday PM Peak	1.44	2.40	1.56	0.99	1.10	1.43	0.77
Saturday Peak	1.12	1.77	1.96	1.44	1.26	1.40	1.14
Sunday Peak	2.23	3.00	1.27	1.48	2.28	1.55	0.88
Total daily vehicle trips							
Weekday Daily	249.00	99.00	285.00	119.00	48.00	174.00	72.00
Saturday Daily	246.00	97.00	298.00	206.00	59.00	183.00	113.00
Sunday Daily	315.00	120.00	151.00	205.00	57.00	201.00	41.00
Total daily vehicle-trips per 100m2 Site Area							
Weekday Daily	23.71	11.93	28.50	11.50	4.36	15.82	7.96
Saturday Daily	23.43	11.69	29.80	19.90	5.36	16.64	12.49
Sunday Daily	30.00	14.46	15.10	19.81	5.18	18.27	4.53
Total daily vehicle-trips per washing bay							
Weekday Daily	41.50	24.75	31.67	17.00	8.00	29.00	24.00
Saturday Daily	41.00	24.25	33.11	29.43	9.83	30.50	37.67
Sunday Daily	52.50	30.00	16.78	29.29	9.50	33.50	13.67
Total Daily trips per 100 Vehicles on Frontage Ro							
Weekday Daily	1.06	1.09	1.13	0.58	0.74	1.11	0.47
Saturday Daily	1.02	0.61	1.40	0.97	0.98	4.40	3.63
Sunday Daily	1.55	0.93	0.79	1.05	1.32	1.41	0.34
Total daily vehicle-trips per on-site parking space							
Weekday Daily	1.06	0.55	1.13	0.58	0.74	4.28	2.03
Saturday Daily	1.02	0.61	1.40	0.97	0.98	1.11	0.71
Sunday Daily	1.55	1.82	0.79	1.05	1.32	0.62	1.86
Vehicle-trips during adjacent road Frontage Road							
Weekday AM Peak	18.00	5.00	19.00	16.00	7.00	13.00	6.00
Weekday PM Peak	27.00	10.00	25.00	10.00	1.00	20.00	5.00
Saturday Daily	33.00	10.00	25.00	25.00	4.00	24.00	5.00
Sunday Daily	35.00	12.00	10.00	19.00	4.00	27.00	5.00
% of total trips by car (driver / passanger):							
Weekday	98%	75%	91%	83%	73%	87%	62%
Saturday	100%	80%	99%	96%	83%	90%	94%
Sunday	97%	100%	96%	93%	58%	86%	91%
% of total trips by active transport (Walk / Cycle)							
Weekday	2%	25%	9%	17%	27%	13%	38%
Saturday	0%	20%	1%	4%	17%	10%	6%
Sunday	3%	0%	4%	7%	42%	14%	6%
% of total trips by public transport (train / bus / other)							
Weekday	0%	0%	0%	0%	0%	0%	0%
Saturday	0%	0%	0%	0%	0%	0%	0%
Sunday	0%	0%	0%	0%	0%	0%	0%

Appendix B: Single Linear Regression Models

Vehicle Trip Linear Regression Datasets

Note: Where linear equation constant is less than 20% of the lowest trips generated by input sites,
the constant has been set to 0 to provide a simpler equation (refer to P4001.001R - Analysis Report for more information)

Friday - AM Peak - LINEAR REGRESSION 1

Friday 1-hr AM Peak		
Site Number	AM Vehicle Trips	Site Area
1	85	1800
2	26	1555
3	15	755
4	30	950
5	14	655
6	57	1685
7	12	815
8	11	1000
9	34	1050
10	11	830
11	26	1000
12	24	1035
13	12	1100
14	25	1100
15	10	905

Sunday Peak - LINEAR REGRESSION 2

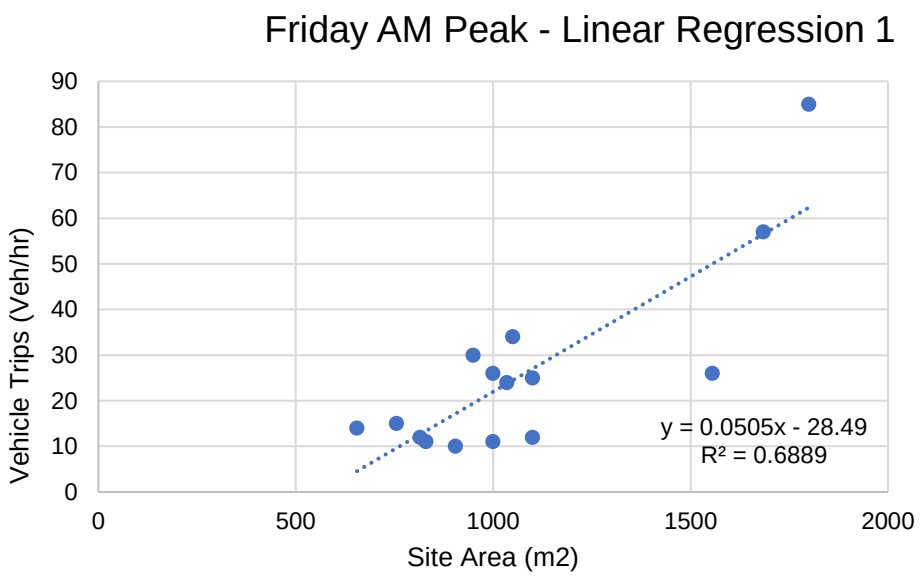
Sunday Peak		
Site Number	Peak Vehicle Trips	Parking Spaces
1	55	10
2	10	11
3	26	4
4	39	4
5	10	7
6	85	23
7	13	5
8	19	4
9	56	18
10	20	3
11	22	2
12	32	6
13	17	4
14	30	10
15	12	3

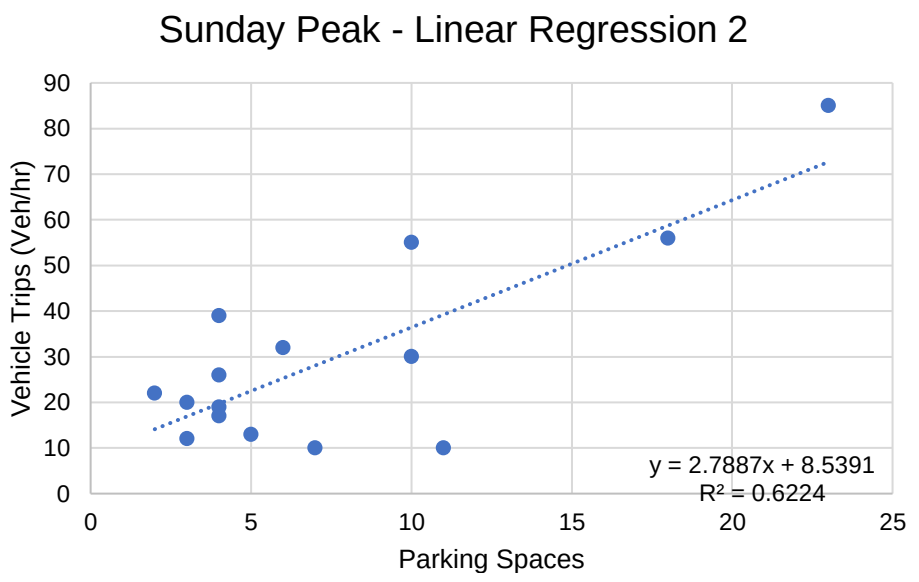
Friday PM Frontage Road - LINEAR REGRESSION 1

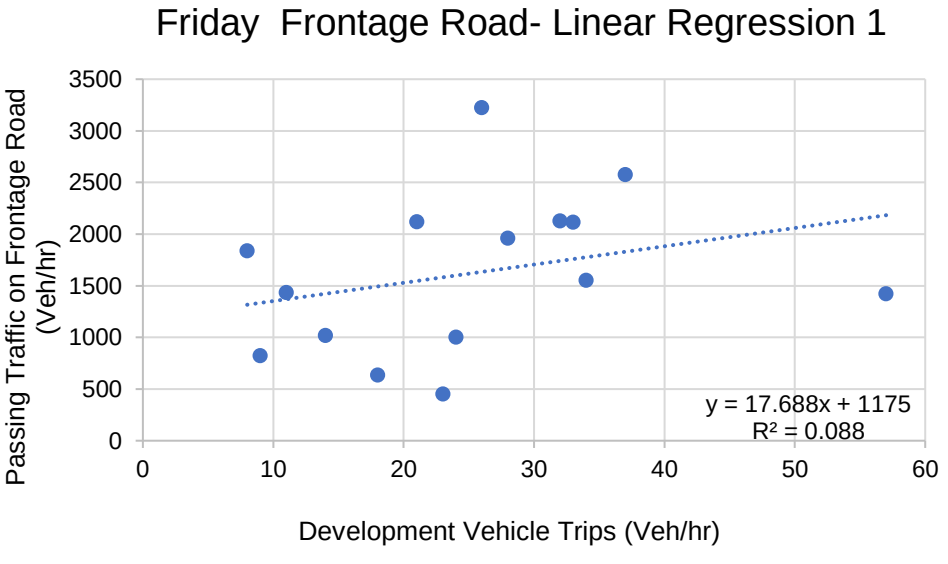
Friday 1-hr PM Peak		
Site Number	Peak Frontage Traffic	Peak Dev Traffic
1	1418	57
2	3220	26
3	634	18
4	2125	32
5	449	23
6	1552	34
7	1836	8
8	1015	14
9	2573	37
10	998	24
11	2113	33
12	2115	21
13	821	9
14	1958	28
15	1431	11

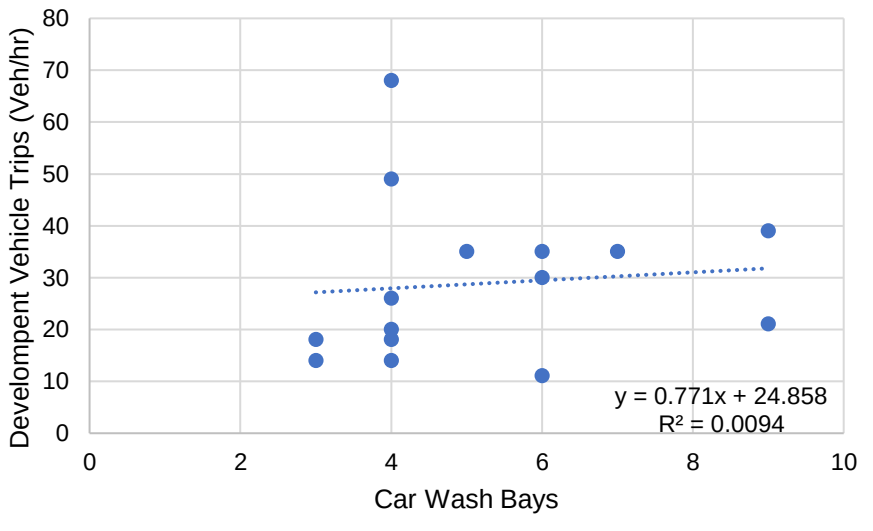
BAD- Saturday Peak - LINEAR REGRESSION 2

Saturday Peak		
Site Number	Peak Vehicle Trips	Car Wash Bays
1	49	4
2	21	9
3	26	4
4	35	5
5	14	3
6	68	4
7	14	4
8	20	4
9	35	6
10	18	4
11	39	9
12	35	7
13	11	6
14	30	6
15	18	3


Friday AM Peak - Linear Regression 1
Vehicle Trips (Veh/hr)
Site Area (m2)
y = 0.0505x - 28.49
R² = 0.6889
0
10
20
30
40
50
60
70
80
90
0
500
1000
1500
2000


Sunday Peak - Linear Regression 2
Vehicle Trips (Veh/hr)
Parking Spaces
y = 2.7887x + 8.5391
R² = 0.6224
0
10
20
30
40
50
60
70
80
90
0
5
10
15
20
25


Friday Frontage Road- Linear Regression 1
Passing Traffic on Frontage Road (Veh/hr)
Development Vehicle Trips (Veh/hr)
y = 17.688x + 1175
R² = 0.088
0
500
1000
1500
2000
2500
3000
3500
0
10
20
30
40
50
60


Saturday Peak - Linear Regression 2
Development Vehicle Trips (Veh/hr)
Car Wash Bays
y = 0.771x + 24.858
R² = 0.0094
0
10
20
30
40
50
60
70
80
0
2
4
6
8
10

Appendix C: Multiple Linear Regression Models

Peak Period Vehicle Trip Multiple Regression Datasets - All Sites

Friday- AM Peak - MULTIPLE REGRESSION 1

Friday 1-hr AM Peak			
Site Number	AM Vehicle Trips	Car Wash Bay	Occupied Site Area (m2)
1	85	4	1800
2	26	9	1555
3	15	4	755
4	30	5	950
5	14	3	655
6	57	4	1685
7	12	4	815
8	11	4	1000
9	34	6	1050
10	11	4	830
11	26	9	1000
12	24	7	1035
13	12	6	1100
14	25	6	1100
15	10	3	905

Friday- AM Peak - MULTIPLE REGRESSION 2

Friday 1-hr AM Peak			
Site Number	AM Vehicle Trips	Parking Spaces	Occupied Site Area (m2)
1	85	10	1800
2	26	11	1555
3	15	4	755
4	30	4	950
5	14	7	655
6	57	23	1685
7	12	5	815
8	11	4	1000
9	34	18	1050
10	11	3	830
11	26	2	1000
12	24	6	1035
13	12	4	1100
14	25	10	1100
15	10	3	905

Excl. Site 1

Friday- AM Peak - MULTIPLE REGRESSION 1

Friday 1-hr AM Peak			
Site Number	AM Vehicle Trips	Car Wash Bay	Occupied Site Area (m2)
2	26	9	1555
3	15	4	755
4	30	5	950
5	14	3	655
6	57	4	1685
7	12	4	815
8	11	4	1000
9	34	6	1050
10	11	4	830
11	26	9	1000
12	24	7	1035
13	12	6	1100
14	25	6	1100
15	10	3	905

Friday- AM Peak - MULTIPLE REGRESSION 3

Friday 1-hr AM Peak			
Site Number	AM Vehicle Trips	Parking Spaces	Café Floor Area (m2)
1	85	10	120
2	26	11	95
3	15	4	180
4	30	4	105
5	14	7	85
6	57	23	295
7	12	5	75
8	11	4	70
9	34	18	185
10	11	3	65
11	26	2	185
12	24	6	55
13	12	4	180
14	25	10	130
15	10	3	115

Friday - PM Peak - MULTIPLE REGRESSION 1

Friday 1-hr PM Peak			
Site Number	PM Vehicle Trips	Occupied Site Area m2	Parking Spaces
1	57	1800	10
2	26	1555	11
3	18	755	4
4	32	950	4
5	23	655	7
6	34	1685	23
7	8	815	5
8	14	1000	4
9	37	1050	18
10	14	830	3
11	33	1000	2
12	21	1035	6
13	9	1100	4
14	28	1100	10
15	11	905	3

Friday - PM Peak - MULTIPLE REGRESSION 2

Friday 1-hr PM Peak			
Site Number	PM Vehicle Trips	Occupied Site Area m2	Car Wash Bay
1	57	1800	4
2	26	1555	9
3	18	755	4
4	32	950	5
5	23	655	3
6	34	1685	4
7	8	815	4
8	14	1000	4
9	37	1050	6
10	14	830	4
11	33	1000	9
12	21	1035	7
13	9	1100	6
14	28	1100	6
15	11	905	3

Friday - PM Peak - MULTIPLE REGRESSION 3

Friday 1-hr PM Peak			
Site Number	PM Vehicle Trips	Café Floor Area m2	Parking Space
1	57	120	10
2	26	95	11
3	18	180	4
4	32	105	4
5	23	85	7
6	34	295	23
7	8	75	5
8	14	70	4
9	37	185	18
10	14	65	3
11	33	185	2
12	21	55	6
13	9	180	4
14	28	130	10
15	11	115	3

Friday - PM Peak - MULTIPLE REGRESSION 4

Friday 1-hr PM Peak			
Site Number	PM Vehicle Trips	Occupied Site Area m2	Frontage Traffic
1	57	1800	1418
2	26	1555	3220
3	18	755	634
4	32	950	2125
5	23	655	449
6	34	1685	1552
7	8	815	1836
8	14	1000	1015
9	37	1050	2573
10	14	830	998
11	33	1000	2113
12	21	1035	2115
13	9	1100	821
14	28	1100	1958
15	11	905	1431

Friday - PM Peak - MULTIPLE REGRESSION 5

Friday 1-hr PM Peak					
Site Number	PM Vehicle Trips	Occupied Site Area m2	Parking Spaces	Frontage Traffic	
1	57	1800	10	###	
2	26	1555	11	###	
3	18	755	4	634	
4	32	950	4	###	
5	23	655	7	449	
6	34	1685	23	###	
7	8	815	5	###	
8	14	1000	4	###	
9	37	1050	18	###	
10	14	830	3	998	
11	33	1000	2	###	
12	21	1035	6	###	
13	9	1100	4	821	
14	28	1100	10	###	
15	11	905	3	###	

Saturday Peak - MULTIPLE REGRESSION 1

Saturday 1-hr Peak			
Site Number	Vehicle Trips	Occupied Site Area m2	Car Wash Bay
1	49	1800	4
2	21	1555	9
3	26	755	4
4	35	950	5
5	14	655	3
6	68	1685	4
7	14	815	4
8	20	1000	4
9	35	1050	6
10	18	830	4
11	39	1000	9
12	35	1035	7
13	11	1100	6
14	30	1100	6
15	18	905	3

Saturday Peak - MULTIPLE REGRESSION 2

Saturday 1-hr Peak			
Site Number	Vehicle Trips	Occupied Site Area m2	Parking Spaces
1	49	1800	10
2	21	1555	11
3	26	755	4
4	35	950	4
5	14	655	7
6	68	1685	23
7	14	815	5
8	20	1000	4
9	35	1050	18
10	18	830	3
11	39	1000	2
12	35	1035	6
13	11	1100	4
14	30	1100	10
15	18	905	3

Saturday Peak - MULTIPLE REGRESSION 3

Saturday 1-hr Peak			
Site Number	Vehicle Trips	Café Floor Area m2	Car Wash Bay
1	49	120	4
2	21	95	9
3	26	180	4
4	35	105	5
5	14	85	3
6	68	295	4
7	14	75	4
8	20	70	4
9	35	185	6
10	18	65	4
11	39	185	9
12	35	55	7
13	11	180	6
14	30	130	6
15	18	115	3

Saturday Peak - MULTIPLE REGRESSION 4

	Saturday 1-hr Peak		
Site Number	Vehicle Trips	Café Floor Area m2	Parking Spaces
1	49	120	10
2	21	95	11
3	26	180	4
4	35	105	4
5	14	85	7
6	68	295	23
7	14	75	5
8	20	70	4
9	35	185	18
10	18	65	3
11	39	185	2
12	35	55	6
13	11	180	4
14	30	130	10
15	18	115	3

Peak Period Vehicle Trip Multiple Regression Datasets - All Sites

Sunday Peak - MULTIPLE REGRESSION 1

	Sunday 1-hr Peak		
Site Number	Vehicle Trips	Occupied Site Area m2	Parking Spaces
1	55	1800	10
2	10	1555	11
3	26	755	4
4	39	950	4
5	10	655	7
6	85	1685	23
7	13	815	5
8	19	1000	4
9	56	1050	18
10	20	830	3
11	22	1000	2
12	32	1035	6
13	17	1100	4
14	30	1100	10
15	12	905	3

Sunday Peak - MULTIPLE REGRESSION 2

	Sunday 1-hr Peak		
Site Number	Vehicle Trips	Café Floor Area m2	Parking Spaces
1	55	120	10
2	10	95	11
3	26	180	4
4	39	105	4
5	10	85	7
6	85	295	23
7	13	75	5
8	19	70	4
9	56	185	18
10	20	65	3
11	22	185	2
12	32	55	6
13	17	180	4
14	30	130	10
15	12	115	3

Friday Peak AM Period Vehicle Trip Multiple Regression Datasets - All Sites

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.853019356
R Square	0.727642022
Adjusted R Square	0.682249025
Standard Error	11.56184769
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	4285.61747	2142.808735	16.02983014	0.00040817
Residual	12	1604.115864	133.676322		
Total	14	5889.733333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-20.63171961	11.97432004	-1.722997175	0.110534475	-46.72152175	5.458082525	-46.72152175	5.458082525
Car Wash Bay	-2.155627545	1.649778395	-1.306616423	0.215830382	-5.750185879	1.438930789	-5.750185879	1.438930789
Occupied Site Area (m2)	0.053564197	0.009462029	5.660963106	0.000105434	0.032948207	0.074180188	0.032948207	0.074180188

without constant

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.935937216
R Square	0.875978472
Adjusted R Square	0.789515277
Standard Error	12.40646028
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	14133.03666	7066.518332	45.91025566	2.38445E-06
Residual	13	2000.963336	153.9202566		
Total	15	16134			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Car Wash Bay	-3.583326875	1.530808132	-2.340807317	0.035834626	-6.890436782	-0.276216969	-6.890436782	-0.276216969
Occupied Site Area (m2)	0.042546001	0.007483466	5.685333841	7.474E-05	0.026378956	0.058713045	0.026378956	0.058713045

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 2
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.83534831
R Square	0.697806799
Adjusted R Square	0.647441266
Standard Error	12.17866087
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	4109.895966	2054.947983	13.85484778	0.000761567
Residual	12	1779.837367	148.3197806		
Total	14	5889.733333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-26.67027818	11.32756663	-2.35445785	0.036416421	-51.35092569	-1.989630676	-51.35092569	-1.989630676
Parking Spaces	0.413103703	0.694371184	0.594932094	0.562939502	-1.099801141	1.926008546	-1.099801141	1.926008546
Occupied Site Area (m2)	0.04588607	0.012346037	3.716663946	0.002944751	0.018986367	0.072785774	0.018986367	0.072785774

Friday - PM Peak Veh
SUMMARY OUTPU

Regressi
Multiple R
R Square
Adjusted R Square
Standard Error
Observations

ANOVA

Regression
Residual
Total

Intercept
Café Floor Area m2
Parking Space

Friday - PM Peak
SUMMARY OUTPU

Regressi
Multiple R
R Square
Adjusted R Square
Standard Error
Observations

ANOVA

Regression
Residual
Total

Intercept
Occupied Site Area
Frontage Traffic

Friday - PM Peak
SUMMARY OUTPU

Regressi
Multiple R
R Square
Adjusted R Square
Standard Error
Observations

ANOVA

Regression
Residual
Total

Intercept
Occupied Site Area
Parking Spaces
Frontage Traffic

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 3
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.59285442
R Square	0.351476364
Adjusted R Square	0.243389091
Standard Error	17.84103715
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	2070.102054	1035.051027	3.251783069	0.074396903
Residual	12	3819.631279	318.3026066		
Total	14	5889.733333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.520145721	10.57046023	0.900636823	0.385500042	-13.51090865	32.5512001	-13.51090865	32.5512001
Parking Spaces	1.922720105	0.993265206	1.93575703	0.076808929	-0.241418869	4.086859079	-0.241418869	4.086859079
Café Floor Area (m2)	0.015467898	0.091810158	0.168476978	0.86901439	-0.184569253	0.215505049	-0.184569253	0.215505049

Friday Peak PM Period Vehicle Trip Multiple Regression Datasets - All Sites

Friday - PM Peak Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.67017321
R Square	0.449132131
Adjusted R Square	0.357320819
Standard Error	10.53419536
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	1085.702071	542.8510354	4.891904093	0.027943748
Residual	12	1331.631263	110.9692719		
Total	14	2417.333333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-1.624602617	9.798023043	-0.165809226	0.871067838	-22.97266093	19.72345569	-22.97266093	19.72345569
Occupied Site Area m2	0.021277679	0.010678971	1.992484022	0.069565849	-0.0019898	0.044545158	-0.0019898	0.044545158
Parking Spaces	0.385315116	0.60061133	0.641538208	0.53323568	-0.923304555	1.693934787	-0.923304555	1.693934787

Friday - PM Peak Vehicles - MULTIPLE REGRESSION 2
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.656290568
R Square	0.430717309
Adjusted R Square	0.335836861
Standard Error	10.70882045
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	1041.187309	520.5936544	4.539579188	0.034038301
Residual	12	1376.146025	114.6788354		
Total	14	2417.333333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-3.881404717	11.0908608	-0.349964244	0.732431086	-28.04631453	20.28350509	-28.04631453	20.28350509
Occupied Site Area m2	0.025331029	0.008763925	2.89037478	0.013566683	0.006236076	0.044425982	0.006236076	0.044425982
Car Wash Bay	0.15348485	1.528058585	0.100444349	0.921650216	-3.175868799	3.482838498	-3.175868799	3.482838498

Saturday Peak Perio

Saturday Peak Ve
SUMMARY OUTPU

Regressi
Multiple R
R Square
Adjusted R Square
Standard Error
Observations

ANOVA

Regression
Residual
Total

Intercept
Occupied Site Area
Car Wash Bay

Saturday Peak Ve
SUMMARY OUTPU

Regressi
Multiple R
R Square
Adjusted R Square
Standard Error
Observations

ANOVA

Regression
Residual
Total

Intercept
Occupied Site Area
Parking Spaces

Saturday Peak Ve
SUMMARY OUTPU

Regressi
Multiple R
R Square
Adjusted R Square
Standard Error
Observations

ANOVA

Regression
Residual
Total

Intercept
Café Floor Area m2
Car Wash Bay

Vehicles - MULTIPLE REGRESSION 3
UT

on Statistics
0.516743381
0.267023722
0.144861009
12.15129619
15

df	SS	MS	F	Significance F
2	645.485344	322.742672	2.185803798	0.155074188
12	1771.847989	147.6539991		
14	2417.333333			

Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
15.49447795	7.199401699	2.152189668	0.052437859	-0.191670834	31.18062674	-0.191670834	31.18062674
0.002958214	0.062530694	0.047308187	0.963045826	-0.133284464	0.139200891	-0.133284464	0.139200891
1.112665754	0.676499892	1.644738997	0.125945953	-0.361300891	2.586632399	-0.361300891	2.586632399

Vehicles - MULTIPLE REGRESSION 4
JT

on Statistics
0.661409046
0.437461927
0.343705581
10.64519467
15

df	SS	MS	F	Significance F
2	1057.491298	528.7456488	4.665944734	0.031689218
12	1359.842036	113.3201696		
14	2417.333333			

Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
-4.37108328	9.901090102	-0.441474952	0.666719113	-25.94370542	17.20153886	-25.94370542	17.20153886
0.024151954	0.009156865	2.637578913	0.021670395	0.004200859	0.044103049	0.004200859	0.044103049
0.001585426	0.00403892	0.392537218	0.701544533	-0.007214624	0.010385477	-0.007214624	0.010385477

Vehicles - MULTIPLE REGRESSION 5
UT

on Statistics
0.673547408
0.453666111
0.30466596
10.95723555
15

df	SS	MS	F	Significance F
3	1096.662213	365.5540712	3.044735909	0.074293775
11	1320.67112	120.0610109		
14	2417.333333			

Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
-2.574666271	10.6655646	-0.241399904	0.813685997	-26.04941569	20.90008315	-26.04941569	20.90008315
0.020439446	0.011449046	1.78525315	0.101787263	-0.004759735	0.045638627	-0.004759735	0.045638627
0.360028249	0.6303122	0.571190354	0.579353463	-1.027279549	1.747336047	-1.027279549	1.747336047
0.001267308	0.004194452	0.302139223	0.768181976	-0.007964617	0.010499234	-0.007964617	0.010499234

od Vehicle Trip Multiple Regression Datasets - All Sites

Vehicles - MULTIPLE REGRESSION 1
UT

on Statistics
0.673589783
0.453723195
0.362677061
12.25618137
15

df	SS	MS	F	Significance F
2	1497.165552	748.5827758	4.983442732	0.026575201
12	1802.567782	150.2139818		
14	3299.733333			

Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
-1.942498249	12.69342429	-0.153031854	0.880916307	-29.59909394	25.71409744	-29.59909394	25.71409744
0.031334777	0.01003026	3.12402422	0.008788872	0.009480716	0.053188837	0.009480716	0.053188837
-0.59721315	1.74885397	-0.341488289	0.73864137	-4.407638618	3.213212318	-4.407638618	3.213212318

Vehicles - MULTIPLE REGRESSION 2
UT

on Statistics
0.740169451
0.547850817
0.47249262
11.15038016
15

df	SS	MS	F	Significance F
2	1807.761602	903.880801	7.269956518	0.008544576
12	1491.971731	124.3309776		
14	3299.733333			

Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
0.429654165	10.37114634	0.041427837	0.967636137	-22.16713255	23.02644088	-22.16713255	23.02644088
0.019021824	0.011303624	1.682807546	0.118226778	-0.005606657	0.043650305	-0.005606657	0.043650305
1.032770834	0.635743351	1.624509062	0.130225589	-0.352394935	2.417936603	-0.352394935	2.417936603

hicles - MULTIPLE REGRESSION 3
JT

on Statistics
0.623280054
0.388478026
0.286557697
12.96745748
15

df	SS	MS	F	Significance F
2	1281.873892	640.9369458	3.811585282	0.052296473
12	2017.859442	168.1549535		
14	3299.733333			

Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
7.87797413	11.69379238	0.673688558	0.513276752	-17.60061073	33.35655899	-17.60061073	33.35655899
0.146080477	0.053563131	2.727257983	0.018359463	0.02937644	0.262784513	0.02937644	0.262784513
0.40300338	1.796460439	0.224331898	0.826273242	-3.511147673	4.317154432	-3.511147673	4.317154432

Saturday Peak Vehicles - MULTIPLE REGRESSION 4
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.720290653
R Square	0.518818624
Adjusted R Square	0.438621728
Standard Error	11.50279033
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	1711.963108	855.9815539	6.469310535	0.012412317
Residual	12	1587.770225	132.3141855		
Total	14	3299.733333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.351165933	6.815174856	1.372109466	0.195134646	-5.497824481	24.20015635	-5.497824481	24.20015635
Café Floor Area m2	0.082382318	0.059193476	1.391746589	0.189258468	-0.046589187	0.211353823	-0.046589187	0.211353823
Parking Spaces	1.16588433	0.640395584	1.820568971	0.093686598	-0.229417785	2.561186445	-0.229417785	2.561186445

Sunday Peak Period Vehicle Trip Multiple Regression Datasets - All Sites

Sunday Peak Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.802907786
R Square	0.644660913
Adjusted R Square	0.585437732
Standard Error	13.65077893
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	4056.808148	2028.404074	10.88528006	0.002013065
Residual	12	2236.125186	186.3437655		
Total	14	6292.933333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-1.256354967	12.69680711	-0.098950465	0.92281135	-28.92032119	26.40761126	-28.92032119	26.40761126
Occupied Site Area m2	0.01200882	0.013838387	0.867790446	0.402529899	-0.018142435	0.042160075	-0.018142435	0.042160075
Parking Spaces	2.367387135	0.778304579	3.04172325	0.010241027	0.671607132	4.063167138	0.671607132	4.063167138

Sunday Peak Vehicles - MULTIPLE REGRESSION 2
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.822635028
R Square	0.676728389
Adjusted R Square	0.622849787
Standard Error	13.02026208
Observations	15

ANOVA

	df	SS	MS	F	Significance F
Regression	2	4258.606638	2129.303319	12.56024408	0.001141315
Residual	12	2034.326695	169.5272246		
Total	14	6292.933333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.920046372	7.714246732	0.119265873	0.907038101	-15.88785338	17.72794612	-15.88785338	17.72794612
Café Floor Area m2	0.09518402	0.067002401	1.420606111	0.18089035	-0.050801671	0.241169711	-0.050801671	0.241169711
Parking Spaces	2.171423729	0.724877886	2.995571765	0.011158143	0.59205049	3.750796967	0.59205049	3.750796967

Excl. Site 1

Friday - AM Peak Vehicles - MULTIPLE REGRESSION 1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.741949711
R Square	0.550489374
Adjusted R Square	0.468760169
Standard Error	9.431824873
Observations	14

ANOVA

	df	SS	MS	F	Significance F
Regression	2	1198.376047	599.1880233	6.735528334	0.012304665
Residual	11	978.5525248	88.95932043		
Total	13	2176.928571			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-11.67675248	10.3355505	-1.129765897	0.282608783	-34.42514576	11.07164079	-34.42514576	11.07164079
Car Wash Bay	-0.562826061	1.473794997	-0.381888975	0.709818214	-3.806626979	2.680974857	-3.806626979	2.680974857
Occupied Site Area (m2)	0.035477912	0.010300411	3.444320148	0.005482715	0.012806861	0.058148963	0.012806861	0.058148963

Daily Vehicle Trip Multiple Regression Datasets - All Sites

Friday- Daily - MULTIPLE REGRESSION 1

	Friday Daily		
Site Number	Daily Vehicle Trips	Occupied Site Area	Car Wash Bays
1	514	1800	4
2	163	1555	9
3	112	755	4
4	206	950	5
5	102	655	3
6	274	1685	4
7	55	815	4
8	83	1000	4
9	249	1050	6
10	99	830	4
11	285	1000	9
12	119	1035	7
13	48	1100	6
14	174	1100	6
15	72	905	3

Friday- Daily - MULTIPLE REGRESSION 2

	Friday Daily		
Site Number	Daily Vehicle Trips	Occupied Site Area	Parking Spaces
1	514	1800	10
2	163	1555	11
3	112	755	4
4	206	950	4
5	102	655	7
6	274	1685	23
7	55	815	5
8	83	1000	4
9	249	1050	18
10	99	830	3
11	285	1000	2
12	119	1035	6
13	48	1100	4
14	174	1100	10
15	72	905	3

Friday- Daily - MULTIPLE REGRESSION 3

	Friday Daily		
Site Number	Daily Vehicle Trips	Daily Frontage Traffic	Occupied Site Area
1	514	12635	1800
2	163	33155	1555
3	112	6341	755
4	206	20969	950
5	102	3259	655
6	274	18319	1685
7	55	18301	815
8	83	11190	1000
9	249	23527	1050
10	99	9060	830
11	285	25143	1000
12	119	20615	1035
13	48	6460	1100
14	174	15670	1100
15	72	15343	905

Friday- Daily - MULTIPLE REGRESSION 4

	Friday Daily			
Site Number	Daily Vehicle Trips	Daily Frontage Traffic	Occupied Site Area	Parking Spaces
1	514	12635	1800	10
2	163	33155	1555	11
3	112	6341	755	4
4	206	20969	950	4
5	102	3259	655	7
6	274	18319	1685	23
7	55	18301	815	5
8	83	11190	1000	4
9	249	23527	1050	18
10	99	9060	830	3
11	285	25143	1000	2
12	119	20615	1035	6
13	48	6460	1100	4
14	174	15670	1100	10
15	72	15343	905	3

Daily Vehicle Trip Multiple Regression Datasets - All Sites

Sunday- Daily - MULTIPLE REGRESSION 1

	Sunday Daily		
Site Number	Daily Vehicle Trips	Occupied Site Area	Car Wash Bays
1	331	1800	4
2	152	1555	9
3	142	755	4
4	224	950	5
5	50	655	3
6	335	1685	4
7	62	815	4
8	87	1000	4
9	246	1050	6
10	97	830	4
11	298	1000	9
12	206	1035	7
13	59	1100	6
14	183	1100	6
15	113	905	3

Sunday- Daily - MULTIPLE REGRESSION 2

	Sunday Daily		
Site Number	Daily Vehicle Trips	Occupied Site Area	Parking Spaces
1	331	1800	10
2	152	1555	11
3	142	755	4
4	224	950	4
5	50	655	7
6	335	1685	23
7	62	815	5
8	87	1000	4
9	246	1050	18
10	97	830	3
11	298	1000	2
12	206	1035	6
13	59	1100	4
14	183	1100	10
15	113	905	3

Sunday- Daily - MULTIPLE REGRESSION 3

	Sunday Daily		
Site Number	Daily Vehicle Trips	Café Floor Area	Car Wash Bays
1	331	120	4
2	152	95	9
3	142	180	4
4	224	105	5
5	50	85	3
6	335	295	4
7	62	75	4
8	87	70	4
9	246	185	6
10	97	65	4
11	298	185	9
12	206	55	7
13	59	180	6
14	183	130	6
15	113	115	3

Sunday- Daily - MULTIPLE REGRESSION 4

	Sunday Daily		
Site Number	Daily Vehicle Trips	Café Floor Area	Parking Spaces
1	331	120	10
2	152	95	11
3	142	180	4
4	224	105	4
5	50	85	7
6	335	295	23
7	62	75	5
8	87	70	4
9	246	185	18
10	97	65	3
11	298	185	2
12	206	55	6
13	59	180	4
14	183	130	10
15	113	115	3

Daily Vehicle Trip Multiple Regression Datasets - All Sites

Friday - Daily Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.70965345
R Square	0.503608018
Adjusted R Square	0.420876022
Standard Error	93.40047023
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	106205.5593	53102.77964	6.087221839	0.014960584
Residual	12	104683.7741	8723.647839		
Total	14	210889.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-102.6005176	96.73255978	-1.060661662	0.309725512	-313.3626599	108.1616247	-313.3626599	108.1616247
Occupied Site Area	0.260522137	0.076437433	3.408305672	0.005189463	0.093979277	0.427064998	0.093979277	0.427064998
Car Wash Bays	-1.738065845	13.32746132	-0.130412372	0.898400863	-30.77610956	27.29997787	-30.77610956	27.29997787

Friday - Daily Vehicles - MULTIPLE REGRESSION 2
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.709199291
R Square	0.502963635
Adjusted R Square	0.42012424
Standard Error	93.46107377
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	106069.6656	53034.83281	6.071551337	0.015077488
Residual	12	104819.6677	8734.97231		
Total	14	210889.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-108.0495845	86.92963469	-1.242954544	0.237623125	-297.4529878	81.35381888	-297.4529878	81.35381888
Occupied Site Area	0.255792343	0.094745545	2.699782258	0.019317148	0.049359533	0.462225152	0.049359533	0.462225152
Parking Spaces	0.201360406	5.328720219	0.037787761	0.970478267	-11.40892357	11.81164439	-11.40892357	11.81164439

Friday - Daily Vehicles - MULTIPLE REGRESSION 3
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.709196101
R Square	0.502959109
Adjusted R Square	0.420118961
Standard Error	93.46149926
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	106068.7112	53034.35561	6.071441424	0.015078312
Residual	12	104820.6221	8735.051843		
Total	14	210889.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-108.2529521	85.79195245	-1.261807769	0.230992987	-295.1775588	78.67165452	-295.1775588	78.67165452
Daily Frontage Traffic	-0.000121985	0.003359259	-0.036313093	0.971629793	-0.007441182	0.007197212	-0.007441182	0.007197212
Occupied Site Area	0.259197359	0.080773471	3.208941677	0.007506937	0.083207083	0.435187634	0.083207083	0.435187634

Friday - Daily Vehicles - MULTIPLE REGRESSION 4
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.709245016
R Square	0.503028492
Adjusted R Square	0.367490808
Standard Error	97.61053874
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	106083.3433	35361.11445	3.711355228	0.045841352
Residual	11	104805.99	9527.817273		
Total	14	210889.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-107.2250834	93.36064455	-1.148504104	0.275122917	-312.7104766	98.26030981	-312.7104766	98.26030981
Daily Frontage Traffic	-0.000133384	0.003520425	-0.037888739	0.970455271	-0.007881788	0.007615019	-0.007881788	0.007615019
Occupied Site Area	0.256879498	0.103028221	2.493292556	0.029860206	0.030115911	0.483643084	0.030115911	0.483643084
Parking Spaces	0.218843405	5.584399869	0.039188348	0.969442424	-12.07233784	12.51002465	-12.07233784	12.51002465

Daily Vehicle Trip Multiple Regression Datasets - All Sites

Saturday - Daily Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.679024695
R Square	0.461074536
Adjusted R Square	0.371253626
Standard Error	77.73924613
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	62044.64867	31022.32433	5.133264995	0.024500346
Residual	12	72520.68466	6043.390389		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-63.45782364	80.51261686	-0.788172415	0.445886849	-238.8797462	111.9640989	-238.8797462	111.9640989
Occupied Site Area	0.182518184	0.063620541	2.868856216	0.014119758	0.043900933	0.321135435	0.043900933	0.321135435
Car Wash Bays	7.35493119	11.0927364	0.663040293	0.519838261	-16.8140652	31.52392758	-16.8140652	31.52392758

Saturday - Daily Vehicles - MULTIPLE REGRESSION 2
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.684355872
R Square	0.46834296
Adjusted R Square	0.379733453
Standard Error	77.21323657
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	63022.72652	31511.36326	5.285470797	0.022583405
Residual	12	71542.60682	5961.883901		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-21.50403244	71.81726228	-0.29942707	0.769737006	-177.9804049	134.97234	-177.9804049	134.97234
Occupied Site Area	0.15495473	0.078274408	1.97963465	0.071148956	-0.015590554	0.325500014	-0.015590554	0.325500014
Parking Spaces	3.437460037	4.402343332	0.780825069	0.450034915	-6.154422095	13.02934217	-6.154422095	13.02934217

Saturday - Daily Vehicles - MULTIPLE REGRESSION 3
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.603533152
R Square	0.364252266
Adjusted R Squ	0.25829431
Standard Error	84.43419811
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	49015.72761	24507.8638	3.437705681	0.066025078
Residual	12	85549.60573	7129.133811		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.656840634	76.14106187	0.008626628	0.993258789	-165.2402818	166.5539631	-165.2402818	166.5539631
Café Floor Area	0.791415535	0.348762278	2.269211967	0.042498419	0.031527809	1.551303261	0.031527809	1.551303261
Car Wash Bays	13.33078529	11.69718095	1.139657953	0.276666828	-12.15518263	38.81675322	-12.15518263	38.81675322

Saturday - Daily Vehicles - MULTIPLE REGRESSION 4
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.607432542
R Square	0.368974294
Adjusted R Squ	0.263803343
Standard Error	84.12004543
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	49651.14881	24825.57441	3.508328962	0.063136763
Residual	12	84914.18452	7076.182043		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	63.7137805	49.83945651	1.278380323	0.225288126	-44.87706676	172.3046278	-44.87706676	172.3046278
Café Floor Area	0.514414881	0.432882609	1.188347305	0.257683519	-0.4287553	1.457585063	-0.4287553	1.457585063
Parking Spaces	5.537968622	4.683220687	1.182512846	0.259903227	-4.665892694	15.74182994	-4.665892694	15.74182994

Daily Vehicle Trip Multiple Regression Datasets - All Sites

Sunday - Daily Vehicles - MULTIPLE REGRESSION 1
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.679024695
R Square	0.461074536
Adjusted R Squ	0.371253626
Standard Error	77.73924613
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	62044.64867	31022.32433	5.133264995	0.024500346
Residual	12	72520.68466	6043.390389		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-63.45782364	80.51261686	-0.788172415	0.445886849	-238.8797462	111.9640989	-238.8797462	111.9640989
Occupied Site A	0.182518184	0.063620541	2.868856216	0.014119758	0.043900933	0.321135435	0.043900933	0.321135435
Car Wash Bays	7.35493119	11.0927364	0.663040293	0.519838261	-16.8140652	31.52392758	-16.8140652	31.52392758

Sunday - Daily Vehicles - MULTIPLE REGRESSION 2
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.684355872
R Square	0.46834296
Adjusted R Squ	0.379733453
Standard Error	77.21323657
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	63022.72652	31511.36326	5.285470797	0.022583405
Residual	12	71542.60682	5961.883901		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-21.50403244	71.81726228	-0.29942707	0.769737006	-177.9804049	134.97234	-177.9804049	134.97234
Occupied Site A	0.15495473	0.078274408	1.97963465	0.071148956	-0.015590554	0.325500014	-0.015590554	0.325500014
Parking Spaces	3.437460037	4.402343332	0.780825069	0.450034915	-6.154422095	13.02934217	-6.154422095	13.02934217

Sunday - Daily Vehicles - MULTIPLE REGRESSION 3
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.603533152
R Square	0.364252266
Adjusted R Squ	0.25829431
Standard Error	84.43419811
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	49015.72761	24507.8638	3.437705681	0.066025078
Residual	12	85549.60573	7129.133811		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.656840634	76.14106187	0.008626628	0.993258789	-165.2402818	166.5539631	-165.2402818	166.5539631
Café Floor Area	0.791415535	0.348762278	2.269211967	0.042498419	0.031527809	1.551303261	0.031527809	1.551303261
Car Wash Bays	13.33078529	11.69718095	1.139657953	0.276666828	-12.15518263	38.81675322	-12.15518263	38.81675322

Sunday - Daily Vehicles - MULTIPLE REGRESSION 4
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.607432542
R Square	0.368974294
Adjusted R Squ	0.263803343
Standard Error	84.12004543
Observations	15

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	49651.14881	24825.57441	3.508328962	0.063136763
Residual	12	84914.18452	7076.182043		
Total	14	134565.3333			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	63.7137805	49.83945651	1.278380323	0.225288126	-44.87706676	172.3046278	-44.87706676	172.3046278
Café Floor Area	0.514414881	0.432882609	1.188347305	0.257683519	-0.4287553	1.457585063	-0.4287553	1.457585063
Parking Spaces	5.537968622	4.683220687	1.182512846	0.259903227	-4.665892694	15.74182994	-4.665892694	15.74182994