

September 19, 2022 (revised 12/6/2022)

City of Billings Engineering Department
2224 Montana Avenue
Billings, MT 59101

RE: Blue Creek Car Wash Queuing Analysis

To whom it may concern,

The purpose of this letter is to summarize the queue storage analysis performed for the proposed Blue Creek Car Wash (BCCW) site located in Lot 1 of Blue Creek Storage Subdivision, Section 20, Township 01 South, Range 26 East. The project is located on the southeast corner of the intersection of Blue Creek Road and Santiago Boulevard. A map showing the location of the property is shown below.

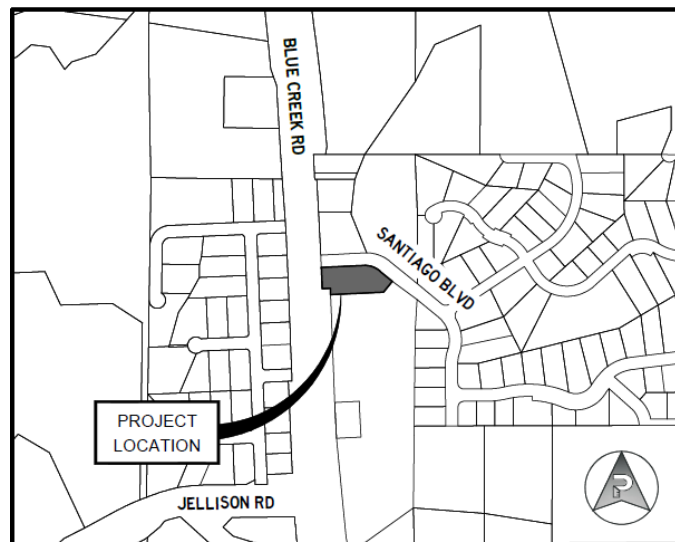


Figure 1: Vicinity Map

The proposed BCCW building includes the construction of four (4) manual car wash bays and two (2) automatic bays. The building will be classified as a car wash facility. Access to the site will be provided by an approach located on the north side of the property off Santiago Boulevard.

Performance Engineering (PE) performed a service count on a similarly sized car wash facility on Broadwater Avenue (“Car & RV Wash”) for a queuing analysis as part of a previous and separate car wash facility project (“Rocky Mountain Car Wash”) in the City of Billings. Calculations for single channel queuing from the Rocky Mountain Car Wash project were used in conjunction with the BCCW queuing calculations. This approach was agreed upon through discussions with the City of Billings Engineering Department. Data was collected from 9/19/19-9/22/19. Observed times were 11AM-6PM Thursday to Saturday and 7AM-1130AM on Sunday. Results from this analysis are included as reference with this letter.

Findings from the study conducted on the Car and RV Wash on Broadwater Avenue indicate the following:

- **Maximum Number of Trips Per Day Recorded = 170**
 - Manual Wash Bay - 102 trips
 - Auto Wash Bay - 54 trips
 - Other Uses (vacuum, coin dispenser) - 14 trips
- **Peak Hour Trip Generation = 18 vehicles**
 - Manual Bay - 9 vehicles
 - Auto Bay - 8 vehicles
 - Other - 1 vehicle

These findings appear to validate those values provided by ITE’s Trip Generation Manual, 9th Edition, for Land Use: 947 (Self-Service Car Wash) and Land Use: 948 (Automated Car Wash). As such, it is verified the number of trips generated by the proposed car wash facility is anticipated to be far less than the 500 trips necessitated to conduct a traffic study.

This study evaluated the available queue storage based on the proposed layout of the BCCW site. The proposed site provides adequate storage for 13-vehicles in the automatic bay wait line. The manual bays have a capacity to hold 1-vehicle in queue per bay (8 total spaces) and it is assumed no other vehicles will stack due to the relative “passer-by” nature of manual car washes. This “passer-by” nature was observed during the traffic camera footage of the Car and RV Wash on Broadwater Avenue when, in multiple instances, customers arriving to use the manual bays noted each bay was full and left immediately rather than waiting in queue to utilize the facilities. It was not noted during the period studied that any customers queued to utilize the manual wash bays. An exhibit displaying the maximum queue storage for the site is included with this document.

PE performed calculations for the automatic wash bays assuming the queue would follow a single-channel queuing model. An arrival rate of 5.5 vehicles per hour and an average service rate of 7.5 minutes/vehicle (in line with that noted at the RV and Car Wash on Broadwater Avenue as well as verified by proposed wash machine supplier) were used. The model results show a probability of 31.25% that the queue would be exactly zero vehicles. The resulting queue calculations show that the peak total vehicles for the automatic wash bays are 11 vehicles. Based on the calculations and visual analysis it is not anticipated that the queue will back up and interfere with traffic along Blue Creek Road or Santiago Boulevard. Calculations for the single-channel queue analysis are provided.

Patrons of the car wash are anticipated to exit wash bays and head west along the southern portion of the project to planned vacuums, prior to exiting the site along the west side of the car wash building onto Santiago Boulevard.

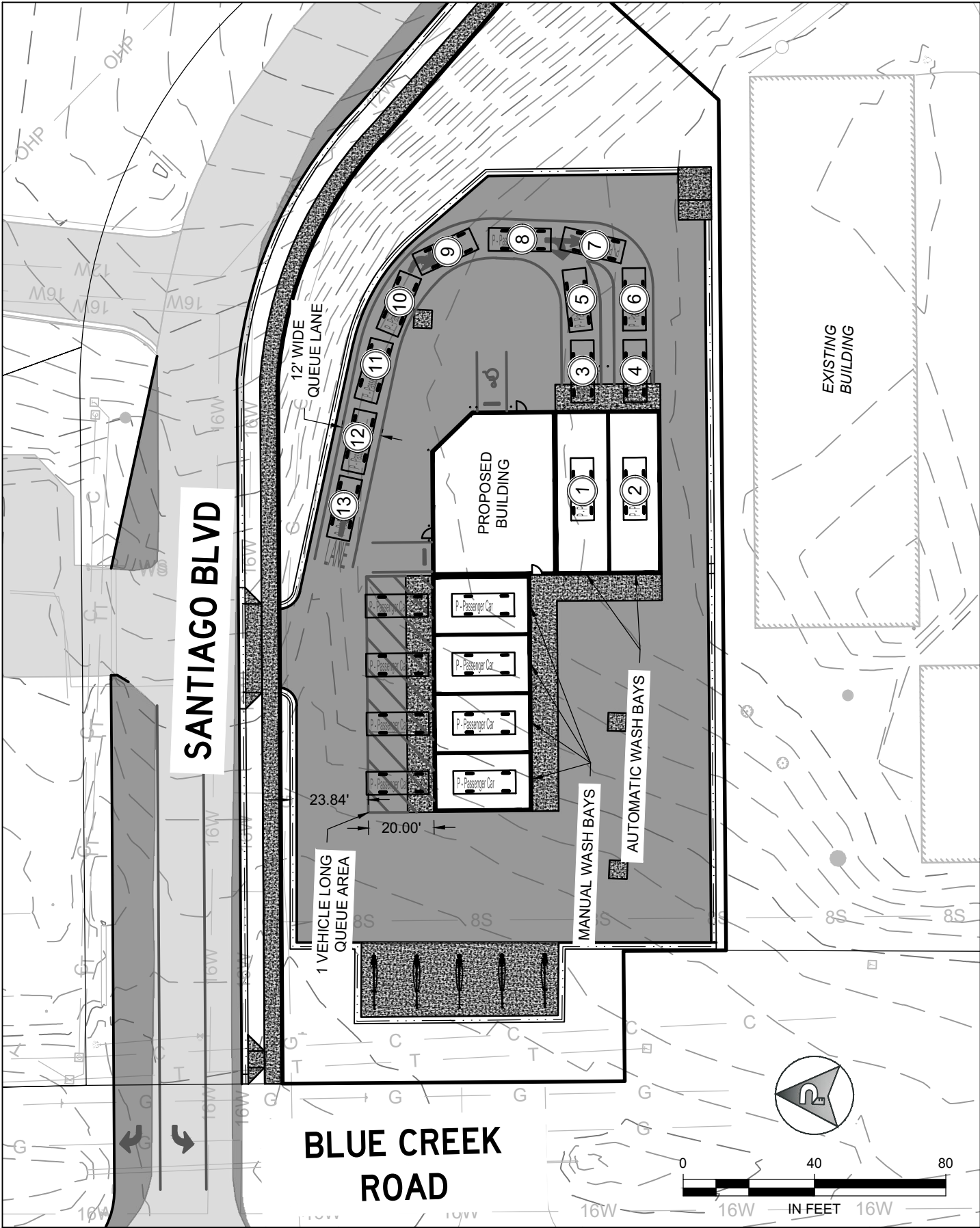
Should you have any questions please contact Taylor Kasperick at (406) 384-0080 or by email at taylor@performance-ec.com.

Sincerely,



Taylor Kasperick, PE

Attached: Queue Exhibit, Queue Calculation, RV and Car Wash Traffic Analysis



| | | | |
|---------------|---------------------|------------|--------|
| PROJECT TITLE | BLUE CREEK CAR WASH | DRAWN BY | APN |
| SHEET TITLE | QUEING ANALYSIS MAP | DATE | 8/2022 |
| | | CHECKED BY | TJK |

CLIENT
KE CONSTRUCTION

PERFORMANCE ENGINEERING
 608 NORTH 29TH STREET
 BILLINGS, MT 59101
 (406) 384-0080
 www.performance-ec.com

EXHIBIT
A
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Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering

Date of Study: 9/19/19 - 9/22/19

| | Total Visits | Auto Visits | Auto Service Time (avg) ** | Manual Visits | Manual Service Time (avg) | Peak Hour | Peak Hour Total Visits | Peak Auto Visits | Peak Manual Visits |
|----------------|--------------|-------------|----------------------------|---------------|---------------------------|-------------|------------------------|------------------|--------------------|
| 9/19/2019 | 170 | 27 | 07:28.0 | 51 | 14:26.2 | 1pm - 2pm | 18 | 8 | 9 |
| 9/20/2019 | 54 | 6 | 06:00.0 | 17 | 12:54.3 | 2pm - 3pm | 8 | 4 | 3 |
| 9/21/2019 | 132 | 18 | 08:17.1 | 39 | 15:43.8 | 2pm - 3pm | 10 | 2 | 7 |
| 9/22/2019 | 64 | 10 | 08:00.0 | 18 | 13:30.0 | 10am - 11am | 10 | 3 | 5 |
| Average | 105 | 15 | 07:26.3 | 31 | 14:08.6 | | 10 | 4 | 6 |

**Note: Only auto wash occurrences noted as being serviced under ten minutes were included for determination of average service time. This was determined as the auto wash cycle is pre-programmed, so service times in excess of ten minutes are attributed to other activities including such as vacuuming or drying unassociated with the queing maneuver.

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering
 Date of Study: 9/19/2019
 Study Performed: 1030am - 610 pm

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 170 | 0:07:28 | 0:14:26 | 1pm - 2pm | 8 | 27 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 18 | 9 | 51 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|----------------|-------|--------------|
| 10:39:00 AM | 10:40:00 AM | Coin Dispenser | | 01:00.0 |
| 10:41:00 AM | 10:47:00 AM | Manual | | 06:00.0 |
| 10:42:00 AM | 10:58:00 AM | Manual | | 16:00.0 |
| 10:45:00 AM | 11:05:00 AM | Manual | | 20:00.0 |
| 10:54:00 AM | 11:08:00 AM | Manual | | 14:00.0 |
| 10:54:00 AM | 10:56:00 AM | Manual | | 02:00.0 |
| 11:03:00 AM | 11:09:00 AM | Manual | | 06:00.0 |
| 11:10:00 AM | 11:16:00 AM | Manual | | 06:00.0 |
| 11:10:00 AM | 11:14:00 AM | Manual | | 04:00.0 |
| 11:14:00 AM | 11:17:00 AM | Coin Dispenser | | 03:00.0 |
| 11:14:00 AM | 11:22:00 AM | Auto | | 08:00.0 |
| 11:23:00 AM | 11:35:00 AM | Manual | | 12:00.0 |
| 11:25:00 AM | 11:36:00 AM | Auto | | 11:00.0 |
| 11:26:00 AM | 11:37:00 AM | Manual | | 11:00.0 |
| 11:36:00 AM | 11:44:00 AM | Auto | | 08:00.0 |
| 11:41:00 AM | 11:53:00 AM | Manual | | 12:00.0 |
| 12:07:00 PM | 12:36:00 PM | Manual | | 29:00.0 |
| 12:08:00 PM | 12:17:00 PM | Auto | | 09:00.0 |
| 12:10:00 PM | 12:22:00 PM | Manual | | 12:00.0 |
| 12:10:00 PM | 12:31:00 PM | Vacuum | | 21:00.0 |
| 12:15:00 PM | 12:31:00 PM | Manual | | 16:00.0 |
| 12:16:00 PM | 12:23:00 PM | Auto | | 07:00.0 |
| 12:23:00 PM | 1:27:00 PM | Manual | | 04:00.0 |
| 12:27:00 PM | 12:51:00 PM | Manual | | 24:00.0 |
| 12:36:00 PM | 12:55:00 PM | Auto | | 19:00.0 |
| 12:51:00 PM | 12:58:00 PM | Auto | | 07:00.0 |
| 1:02:00 PM | 1:16:00 PM | Manual | | 14:00.0 |

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering
 Date of Study: 9/19/2019
 Study Performed: 1030am - 610 pm

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 170 | 0:07:28 | 0:14:26 | 1pm - 2pm | 8 | 27 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 18 | 9 | 51 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|-----------|-----------------------------|--------------|
| 1:05:00 PM | 1:21:00 PM | Manual | | 16:00.0 |
| 1:09:00 PM | 1:50:00 PM | Manual | | 41:00.0 |
| 1:09:00 PM | 1:43:00 PM | Auto | | 34:00.0 |
| 1:11:00 PM | 1:25:00 PM | Vacuum | | 14:00.0 |
| 1:15:00 PM | 1:47:00 PM | Manual | | 32:00.0 |
| 1:16:00 PM | X | Manual | Not sure where left | X |
| 1:18:00 PM | 1:26:00 PM | Auto | | 08:00.0 |
| 1:25:00 PM | 1:33:00 PM | Auto | | 08:00.0 |
| 1:26:00 PM | 1:39:00 PM | Auto | | 13:00.0 |
| 1:31:00 PM | 1:47:00 PM | Manual | | 16:00.0 |
| 1:32:00 PM | 1:53:00 PM | Manual | | 21:00.0 |
| 1:39:00 PM | 1:59:00 PM | Auto | | 20:00.0 |
| 1:45:00 PM | 1:52:00 PM | Auto | | 07:00.0 |
| 1:48:00 PM | 1:54:00 PM | Auto | | 06:00.0 |
| 1:50:00 PM | 2:11:00 PM | Manual | | 21:00.0 |
| 1:52:00 PM | 2:02:00 PM | Manual | | 10:00.0 |
| 1:59:00 PM | 2:08:00 PM | Auto | | 09:00.0 |
| 2:00:00 PM | X | Manual | Not sure where left | X |
| 2:03:00 PM | 2:30:00 PM | Manual | | 27:00.0 |
| 2:09:00 PM | 2:16:00 PM | Manual | | 07:00.0 |
| 2:17:00 PM | 2:24:00 PM | Auto | | 07:00.0 |
| 2:37:00 PM | X | Manual | Green Pickup, queued & left | X |
| 2:39:00 PM | 2:57:00 PM | Manual | | 18:00.0 |
| 2:43:00 PM | 2:46:00 PM | Manual | | 03:00.0 |
| 3:00:00 PM | 3:11:00 PM | Auto | | 11:00.0 |
| 3:05:00 PM | 3:17:00 PM | Auto | | 12:00.0 |
| 3:06:00 PM | 3:15:00 PM | Manual | | 09:00.0 |
| 3:09:00 PM | X | Auto | Not sure where left | X |
| 3:11:00 PM | 3:24:00 PM | Vacuum | | 13:00.0 |
| 3:21:00 PM | 3:37:00 PM | Manual | | 16:00.0 |
| 3:26:00 PM | 3:35:00 PM | Manual | | 09:00.0 |
| 3:39:00 PM | 3:46:00 PM | Auto | | 07:00.0 |
| 3:41:00 PM | 4:07:00 PM | Auto | | 26:00.0 |
| 3:43:00 PM | 3:58:00 PM | Manual | | 15:00.0 |
| 3:48:00 PM | 3:57:00 PM | Vacuum | | 09:00.0 |
| 3:49:00 PM | 4:07:00 PM | Manual | | 18:00.0 |
| 4:00:00 PM | 4:16:00 PM | Manual | | 16:00.0 |
| 4:04:00 PM | 4:17:00 PM | Manual | | 13:00.0 |

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering
 Date of Study: 9/19/2019
 Study Performed: 1030am - 610 pm

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 170 | 0:07:28 | 0:14:26 | 1pm - 2pm | 8 | 27 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 18 | 9 | 51 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|-----------|------------|--------------|
| 4:19:00 PM | 4:29:00 PM | Manual | | 10:00.0 |
| 4:23:00 PM | 4:32:00 PM | Manual | | 09:00.0 |
| 4:28:00 PM | 4:35:00 PM | Manual | | 07:00.0 |
| 4:30:00 PM | 4:38:00 PM | Manual | | 08:00.0 |
| 4:33:00 PM | 4:40:00 PM | Auto | | 07:00.0 |
| 4:41:00 PM | 4:50:00 PM | Auto | | 09:00.0 |
| 5:01:00 PM | 5:11:00 PM | Auto | | 10:00.0 |
| 5:04:00 PM | 5:09:00 PM | Auto | | 05:00.0 |
| 5:06:00 PM | 5:17:00 PM | Manual | | 11:00.0 |
| 5:13:00 PM | 5:21:00 PM | Manual | | 08:00.0 |
| 5:20:00 PM | 5:49:00 PM | Manual | | 29:00.0 |
| 5:23:00 PM | 5:26:00 PM | Manual | | 03:00.0 |
| 5:31:00 PM | 5:50:00 PM | Manual | | 19:00.0 |
| 5:33:00 PM | 5:54:00 PM | Manual | | 21:00.0 |
| 5:35:00 PM | 5:55:00 PM | Manual | | 20:00.0 |
| 5:32:00 PM | 5:53:00 PM | Manual | | 21:00.0 |
| 5:53:00 PM | X | Auto | Video Ends | X |
| 6:02:00 PM | X | Manual | Video Ends | X |
| 6:07:00 PM | X | Manual | Video Ends | X |
| 6:09:00 PM | X | Auto | Video Ends | X |

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering

Date of Study: 9/20/2019

Study Performed: 11am - 630 pm

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 54 | 06:00.0 | 12:54.3 | 2pm - 3pm | 4 | 6 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 8 | 3 | 17 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|----------------|--------------------------|--------------|
| 11:00:00 AM | X | Vacuum | | X |
| 11:01:00 AM | 11:29:00 AM | Auto | Not sure where they left | 28:00.0 |
| 11:19:00 AM | 11:30:00 AM | Auto | | 11:00.0 |
| 11:24:00 AM | 11:51:00 AM | Manual | | 27:00.0 |
| 12:12:00 PM | 12:27:00 PM | Manual | | 15:00.0 |
| 12:17:00 PM | 12:23:00 PM | Manual | | 06:00.0 |
| 12:38:00 PM | 12:54:00 PM | Manual | | 16:00.0 |
| 1:45:00 PM | 2:01:00 PM | Manual | | 16:00.0 |
| 1:46:00 PM | 1:59:00 PM | Manual | | 13:00.0 |
| 1:49:00 PM | X | Manual | Not sure where they left | X |
| 2:00:00 PM | 2:07:00 PM | Auto | | 07:00.0 |
| 2:10:00 PM | 2:28:00 PM | Auto | | 18:00.0 |
| 2:12:00 PM | 2:22:00 PM | Manual | | 10:00.0 |
| 2:20:00 PM | 2:25:00 PM | Auto | | 05:00.0 |
| 2:35:00 PM | 2:46:00 PM | Auto | | 11:00.0 |
| 2:47:00 PM | 3:05:00 PM | Manual | | 18:00.0 |
| 2:49:00 PM | 2:52:00 PM | Vacuum | | 03:00.0 |
| 2:57:00 PM | 3:22:00 PM | Manual | | 25:00.0 |
| 3:12:00 PM | 3:37:00 PM | Manual | | 25:00.0 |
| 3:25:00 PM | 3:29:00 PM | Manual | | 04:00.0 |
| 3:26:00 PM | 3:33:00 PM | Manual | | 07:00.0 |
| 4:08:00 PM | 4:49:00 PM | Manual | | 41:00.0 |
| 4:11:00 PM | 4:16:00 PM | Manual | | 05:00.0 |
| 4:37:00 PM | 4:40:00 PM | Coin Dispenser | | 03:00.0 |
| 4:48:00 PM | 4:52:00 PM | Manual | | 04:00.0 |
| 5:10:00 PM | 5:13:00 PM | Vacuum | | 03:00.0 |
| 6:00:00 PM | 6:14:00 PM | Manual | | 14:00.0 |

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering
 Date of Study: 9/21/2019
 Study Performed: 7:30am - 6:30 pm

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 132 | 08:17.1 | 15:43.8 | 2pm - 3pm | 2 | 18 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 10 | 7 | 39 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|----------------|---------------------------|--------------|
| 8:03:00 AM | 8:18:00 AM | Manual | | 15:00.0 |
| 8:06:00 AM | 8:10:00 AM | Coin Dispenser | | 04:00.0 |
| 8:21:00 AM | 8:25:00 AM | Vacuum | | 04:00.0 |
| 9:43:00 AM | 9:51:00 AM | Manual | | 08:00.0 |
| 9:49:00 AM | 10:29:00 AM | Manual | Went to vacuum first | 40:00.0 |
| 10:35:00 AM | 11:35:00 AM | Manual | | 00:00.0 |
| 10:46:00 AM | X | Manual | Exited right away | X |
| 10:50:00 AM | 11:05:00 AM | Auto | | 15:00.0 |
| 10:52:00 AM | 10:54:00 AM | Manual | Queued and left | 02:00.0 |
| 10:56:00 AM | 11:33:00 AM | Auto | Was at entrance for while | 37:00.0 |
| 11:23:00 AM | 11:40:00 AM | Manual | | 17:00.0 |
| 11:26:00 AM | 11:43:00 AM | Auto | | 17:00.0 |
| 11:28:00 AM | 11:42:00 AM | Manual | | 14:00.0 |
| 11:29:00 AM | 11:52:00 AM | Vacuum | | 23:00.0 |
| 11:36:00 AM | 11:47:00 AM | Manual | | 11:00.0 |
| 11:39:00 AM | 11:54:00 AM | Manual | | 15:00.0 |
| 11:44:00 AM | 11:57:00 AM | Auto | | 13:00.0 |
| 11:58:00 AM | 12:00:00 PM | Coin Dispenser | | 02:00.0 |
| 12:15:00 PM | 12:55:00 PM | Manual | | 40:00.0 |
| 12:24:00 PM | 1:22:00 PM | Manual | | 58:00.0 |
| 12:46:00 PM | 12:55:00 PM | Auto | | 09:00.0 |
| 1:01:00 PM | 1:08:00 PM | Auto | | 07:00.0 |
| 1:04:00 PM | 1:10:00 PM | Vacuum | | 06:00.0 |
| 1:06:00 PM | 1:09:00 PM | Coin Dispenser | | 03:00.0 |
| 1:10:00 PM | 1:19:00 PM | Auto | | 09:00.0 |
| 1:15:00 PM | 1:24:00 PM | Auto | | 09:00.0 |
| 1:16:00 PM | 1:17:00 PM | Manual | Queued and left | 01:00.0 |
| 1:23:00 PM | 2:07:00 PM | Manual | | 44:00.0 |
| 1:35:00 PM | 1:42:00 PM | Auto | | 07:00.0 |
| 1:43:00 PM | 1:54:00 PM | Manual | | 11:00.0 |

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering
 Date of Study: 9/21/2019
 Study Performed: 7:30am - 6:30 pm

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 132 | 08:17.1 | 15:43.8 | 2pm - 3pm | 2 | 18 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 10 | 7 | 39 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|----------------|-----------------------------|--------------|
| 1:46:00 PM | 1:59:00 PM | Manual | | 13:00.0 |
| 1:51:00 PM | 2:00:00 PM | Auto | | 09:00.0 |
| 1:54:00 PM | 1:55:00 PM | Vacuum | | 01:00.0 |
| 1:54:00 PM | 2:08:00 PM | Auto | | 14:00.0 |
| 2:04:00 PM | 2:08:00 PM | Manual | | 04:00.0 |
| 2:05:00 PM | 2:09:00 PM | Manual | | 04:00.0 |
| 2:10:00 PM | 2:12:00 PM | ??? | Met someone in lot and left | 02:00.0 |
| 2:17:00 PM | 2:28:00 PM | Manual | | 11:00.0 |
| 2:17:00 PM | 2:28:00 PM | Manual | | 11:00.0 |
| 2:27:00 PM | 2:47:00 PM | Manual | | 20:00.0 |
| 2:29:00 PM | 2:39:00 PM | Auto | | 10:00.0 |
| 2:30:00 PM | 2:48:00 PM | Manual | | 18:00.0 |
| 2:30:00 PM | 2:53:00 PM | Manual | | 23:00.0 |
| 2:59:00 PM | 3:07:00 PM | Auto | | 08:00.0 |
| 3:08:00 PM | 3:25:00 PM | Manual | | 17:00.0 |
| 3:14:00 PM | 3:40:00 PM | Manual | | 26:00.0 |
| 3:17:00 PM | 3:45:00 PM | Auto | | 28:00.0 |
| 3:44:00 PM | 4:08:00 PM | Manual | | 24:00.0 |
| 3:49:00 PM | 3:59:00 PM | Auto | | 10:00.0 |
| 3:56:00 PM | 4:21:00 PM | Manual | | 25:00.0 |
| 4:20:00 PM | 4:33:00 PM | Manual | | 13:00.0 |
| 4:22:00 PM | 4:34:00 PM | Manual | | 12:00.0 |
| 4:26:00 PM | 4:40:00 PM | Manual | | 14:00.0 |
| 4:30:00 PM | 4:46:00 PM | Manual | | 16:00.0 |
| 4:41:00 PM | 5:05:00 PM | Manual | | 24:00.0 |
| 4:59:00 PM | 5:09:00 PM | Auto | | 10:00.0 |
| 5:02:00 PM | 5:10:00 PM | Manual | | 08:00.0 |
| 5:04:00 PM | 5:07:00 PM | Coin Dispenser | | 03:00.0 |
| 5:05:00 PM | 5:17:00 PM | Manual | | 12:00.0 |
| 5:09:00 PM | 5:41:00 PM | Manual | | 32:00.0 |
| 5:10:00 PM | 5:21:00 PM | Auto | | 11:00.0 |
| 5:12:00 PM | 5:33:00 PM | Auto | | 21:00.0 |
| 5:24:00 PM | 5:38:00 PM | Manual | | 14:00.0 |
| 5:58:00 PM | 6:21:00 PM | Manual | | 23:00.0 |
| 6:05:00 PM | 6:19:00 PM | Manual | Reverse exits | 14:00.0 |
| 6:19:00 PM | X | Manual | Video Ends | X |

Traffic Cam Study - Car and RV Wash (13th and Broadwater)

Performed By: Performance Engineering
 Date of Study: 9/22/2019
 Study Performed: 7am - 1130am

| TOTAL TRIPS | AVG. SERVICE TIME - AUTO (MIN) | AVG. SERVICE TIME- MANUAL (MIN) | Peak Time | Peak Auto Visits | Total Auto Visits |
|-------------|--------------------------------|---------------------------------|------------------|--------------------|---------------------|
| 64 | 08:00.0 | 13:30.0 | 10am - 11am | 3 | 10 |
| | | | Peak Time Visits | Peak Manual Visits | Total Manual Visits |
| | | | 10 | 5 | 18 |

| Arrival Time | Departure Time | Wash Type | Notes | Service Time |
|--------------|----------------|----------------|--------------------------|--------------|
| 7:20:00 AM | 7:22:00 AM | Coin Dispenser | | 02:00.0 |
| 7:39:00 AM | 7:48:00 AM | Manual | | 09:00.0 |
| 7:44:00 AM | 7:57:00 AM | Auto | | 13:00.0 |
| 7:58:00 AM | 8:08:00 AM | Manual | | 10:00.0 |
| 8:06:00 AM | 8:29:00 AM | Manual | Starts at Coin Dispenser | 23:00.0 |
| 8:25:00 AM | 8:41:00 AM | Manual | | 16:00.0 |
| 8:37:00 AM | 8:53:00 AM | Auto | | 16:00.0 |
| 8:38:00 AM | 9:04:00 AM | Manual | | 26:00.0 |
| 8:52:00 AM | 9:11:00 AM | Manual | | 19:00.0 |
| 8:54:00 AM | 8:56:00 AM | Manual | | 02:00.0 |
| 9:03:00 AM | 9:16:00 AM | Manual | | 13:00.0 |
| 9:06:00 AM | 9:07:00 AM | ??? | Pulled through and left | 01:00.0 |
| 9:10:00 AM | 9:17:00 AM | Auto | | 07:00.0 |
| 9:11:00 AM | 9:32:00 AM | Manual | | 21:00.0 |
| 9:18:00 AM | 9:27:00 AM | Auto | | 09:00.0 |
| 9:26:00 AM | 9:42:00 AM | Manual | | 16:00.0 |
| 9:37:00 AM | 9:57:00 AM | Manual | | 20:00.0 |
| 9:49:00 AM | 10:00:00 AM | Manual | | 11:00.0 |
| 9:57:00 AM | 10:10:00 AM | Manual | N | 13:00.0 |
| 9:58:00 AM | 10:15:00 AM | Auto | | 17:00.0 |
| 10:10:00 AM | 10:19:00 AM | Auto | Entered from back | 09:00.0 |
| 10:17:00 AM | 10:33:00 AM | Manual | | 16:00.0 |
| 10:28:00 AM | 10:38:00 AM | Manual | | 10:00.0 |
| 10:31:00 AM | 10:50:00 AM | Manual | | 19:00.0 |
| 10:32:00 AM | 10:56:00 AM | Auto | | 24:00.0 |
| 10:33:00 AM | 10:56:00 AM | Vacuum | | 23:00.0 |
| 10:40:00 AM | 10:48:00 AM | Auto | | 08:00.0 |
| 10:43:00 AM | 10:49:00 AM | Manual | | 06:00.0 |
| 10:44:00 AM | 10:45:00 AM | Manual | Queued and then left | 01:00.0 |
| 10:53:00 AM | 10:55:00 AM | Coin Dispenser | | 02:00.0 |
| 11:01:00 AM | 11:08:00 AM | Auto | | 07:00.0 |
| 11:21:00 AM | X | Auto | Video Ends | X |