Jason Hershmann
Wanderlust Dog Ranch
011 Eagle Park East Drive
Eagle, CO 81631

June 9, 2022

Re: **Wanderlust Dog Ranch Parking and Trip Generation Rate Analysis**
          Eagle, Colorado

Purpose:

This memorandum was developed to give a recommendation for the parking and trip generation rates for a dog care facility located in Eagle Colorado. The recommendation is based upon examination of the following methodologies, and an analysis of onsite collected data.

- Institute of Transportation Engineers' (ITE) parking demand data
- ITE Trip Generation data

Facility Description:

The Wanderlust Dog Ranch is a dog care facility that offers daycamps and overnight (kennel) operations for dogs. Typically, customers drop off their four-legged friends in the morning hours for the day camps and pick them up in the afternoon/evening. Daycamp drop-offs must be before 10am, and overnight drop-offs cannot occur until after noon. The operating area of the facility is 11,383 square feet. The facility hours of operation are Monday through Friday from 7:30am to 6pm, and on Saturday and Sunday from 9am to 5pm.

National Parking Rate:

The Institute of Transportation Engineers' *Parking Generation Manual*[1] is a commonly used reference for the determination of parking demand for a given land use. The 5th Edition of the *Parking Generation Manual* contains over 1,700 study sites for approximately 120 various land uses. The land uses are categorized by their type. Upon inspection of these land uses, there is not a land use within the database that characterizes Wanderlust's operations. As a result, the data and associated land uses provided within the *Parking Generation Manual* cannot be used to estimate parking and trip generation rates for the Wanderlust facility.

Observed Local Parking Rate:

As stated in the *Parking Generation Manual*, "The quality and quantity of parking demand data vary significantly by land use code. The *Parking Generation Manual* should be considered only the beginning point of information to be used in estimating parking demand. Local conditions and area type can

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[1] *Parking Generation Manual*, 5th Edition, Institute of Transportation Engineers, 2019

influence parking demand. The wide array of data in the manual blends many site conditions and may not best reflect a particular local condition. Therefore, a survey of a site in a comparable local condition should always be considered as one potential means to estimate parking demand."

Therefore, local data provides the best representation of parking for the Wanderlust facility.

Data Collection:

On site parking counts were collected on Friday, January 28, 2022, between the hours of 6:30am and 8:30pm. A video camera was positioned to capture the parking lot. Data was summarized for the following categories:

- An inventory of the parking lot's occupied parking spaces
- Vehicle dwell time calculations for the above mentioned 2-hour AM and PM windows
- Inbound and outbound vehicle trips for 2 hours in the morning (7am-9am) and 2 hours in the evening (4pm-6pm) to determine the peak hour of operations

All data summaries are available in the **Appendix** of the memorandum. Additionally, all 14 hours of video are available online at the link provided in the **Appendix**.

On the observation day, January 28, 2022, the Wanderlust facility had a total of 47 daycamp dogs and 29 overnight dogs for a total of 76 dogs at the facility. The permitted capacity of the Wanderlust facility is 80 dogs. Therefore, the facility was operating at 95% of full capacity on the observation day. **Table 1** summarizes the observation date and the 2021 averages as reported by the Wanderlust facility.

Table 1: Summary of Facility Capacity

Time	Daycamp Dogs	Overnight Dogs	Total Dogs	% of Capacity (80 Dogs Max.)
January 28, 2022 (Observation Date)	47	29	76	95%
2021 Averages	40.8	26.5	67.3	84%

Data Summary:

Occupied Parking Spaces

The number of parking spaces was inventoried during the entire observation period. Results and summaries of the parking data are shown in **Table 2**.

Table 2: Summary of Parking Count Data

Item	Morning Observation (6:30AM-12:00PM)	Evening Observation (12:00PM-8:30PM)
Minimum Parking Occupancy	1 Vehicle	2 Vehicles
Maximum Parking Occupancy	6 Vehicles	12 Vehicles
Average Parking Occupancy	4.3 Vehicles	4.8 Vehicles

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Figure 1 shows the occupied parking spaces plotted over the course of the observed day. **Figure 2** shows the same data in a histogram format, indicating the relative frequency of occupied parking spaces that occurred during the observation period. **Figure 3** shows the same data in a box plot. Box plots show that 25th percentile value on the bottom of the box, and the 75th percentile value on the top of the box. The top and bottom lines ("whiskers") represent ±150% of the range between the 25th and 75th percentiles respectively. Outlier points are also shown outside of these lines.
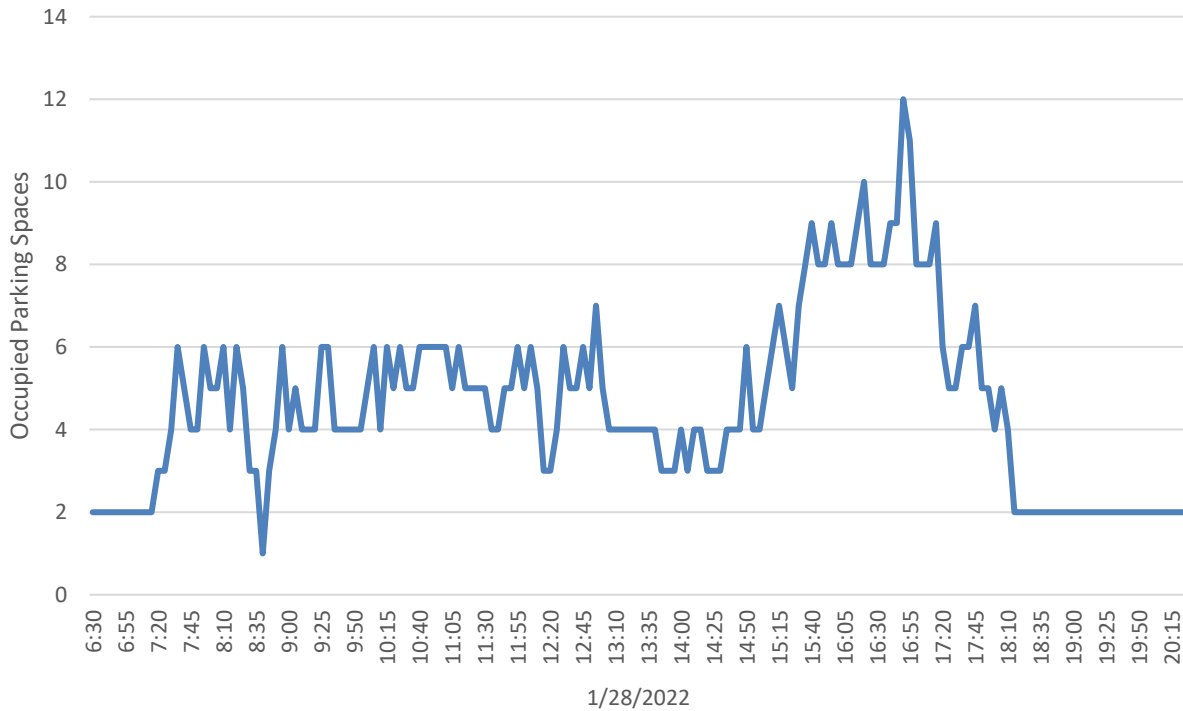
Figure 1: Occupied Parking Spaces

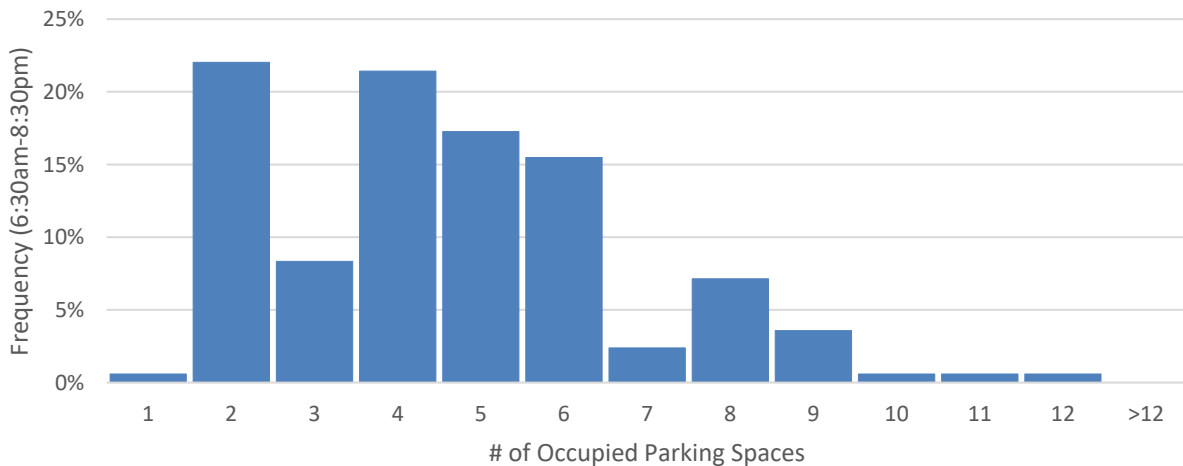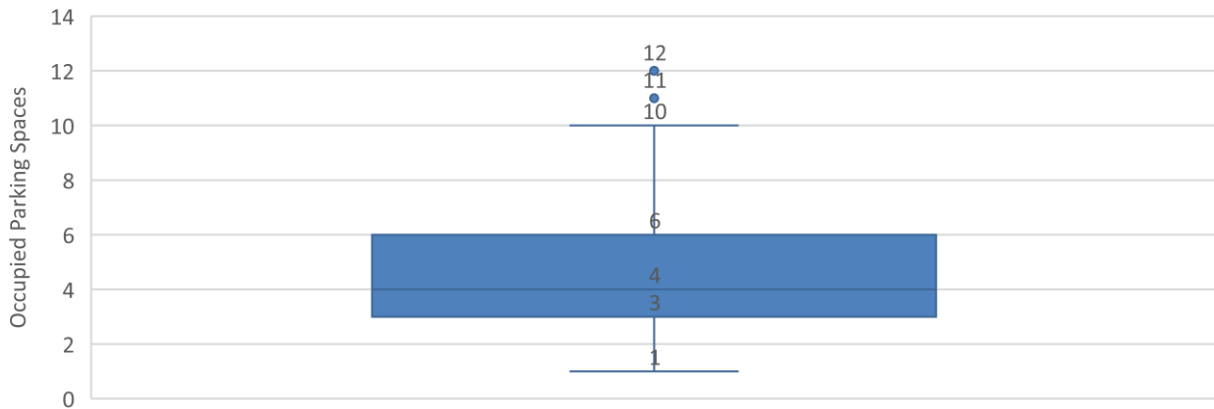*Figure 2: Histogram for Occupied Parking Spaces*

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Figure 3: Occupied Parking Spaces Box Plot

Dwell Times

Dwell times for vehicles in the parking lot were also calculated for two hours in both the morning and evening peak drop off and pick up times. The data was screened, and long-term parked vehicles (employee vehicles) were removed from the dataset. **Figure 4** shows a box plot of the dwell times, and **Table 3** summarizes the average dwell times for the morning and evening vehicles.

Figure 4: Dwell Time Box Plot
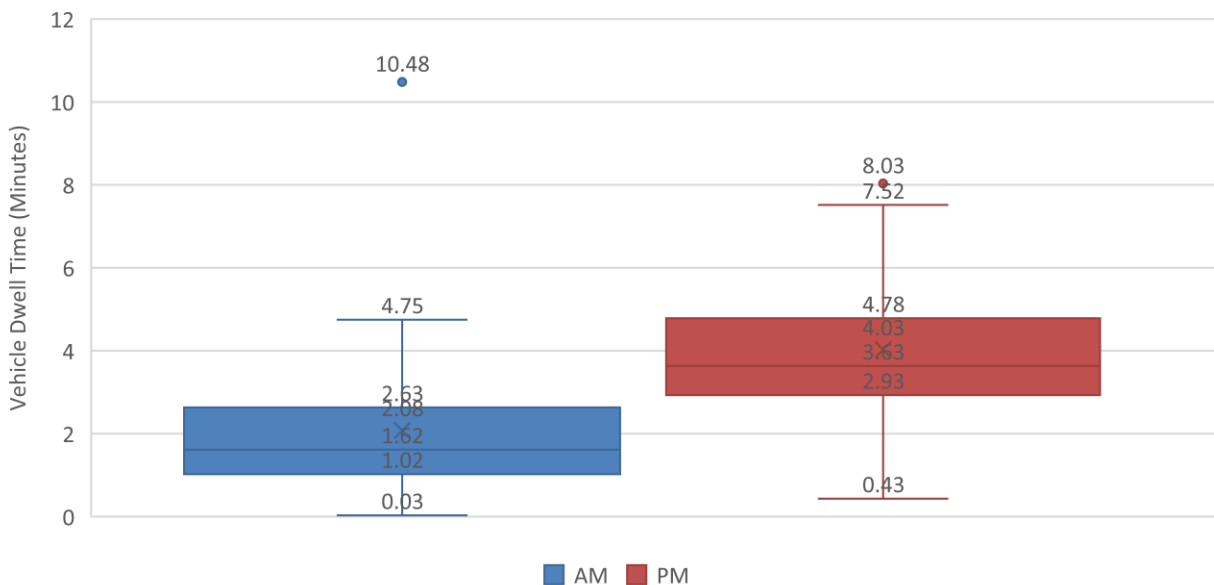
Table 3: Summary of Average Dwell Times

Time	Average Dwell Time (Minutes)
AM Summary(7am-9am)	2.08
PM Summary (4pm-6pm)	4.03

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Inbound and Outbound Vehicle Trips

Table 4 summarizes the peak hour operations for inbound and outbound vehicle trips.

Table 4: Summary of Inbound and Outbound Vehicle Trips

Time	Inbound Traffic (vehicles per hour)	Outbound Traffic (vehicles per hour)	Total Traffic Generated (vehicles per hour)
AM Peak **(7:30am-8:30am)**	22	23	45
PM Peak **(4:45pm-5:45pm)**	22	22	44

Proposed Parking Rate:

Parking Spaces per Dog:

By using an independent variable of the number of dogs, a parking rate of **0.16** parking spaces per dog can be calculated based upon the maximum spaces occupied at the Wanderlust facility. Applying the same calculation using the removal of statistical outliers (per **Figure 3**) gives a parking rate of **0.13** parking spaces per dog. **Table 5** summarizes these calculations:

Table 5: Proposed Parking Rate Calculations – Per Dog

Method	Occupied Parking Spaces	# of Dogs at facility	Parking Rate (parking spaces per dog)
Using Maximum Observed Parking	12	76	**0.16**
Using Observed Parking with Outliers Removed	10	76	**0.13**

Therefore, a range of **0.13 to 0.16** is recommended for a parking rate based upon the observed data from operations at the Wanderlust facility if the independent variable of dogs is chosen.

Parking Spaces per Area:

By using an independent variable of the Gross Floor Area (GFA), measured in 1,000 square feet (ksf), a parking rate of **1.05** parking spaces per GFA (ksf) can be calculated based upon the maximum spaces occupied at the Wanderlust facility. Applying the same calculation using the removal of statistical outliers (per **Figure 3**) gives a parking rate of **0.88** parking spaces per GFA (ksf). **Table 6** summarizes these calculations:

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Table 6: Proposed Parking Rate Calculations – Per Area

Method	Occupied Parking Spaces	Gross Floor Area (ksf)	Parking Rate (parking spaces per GFA ksf)
Using Maximum Observed Parking	12	11.383	**1.05**
Using Observed Parking with Outliers Removed	10	11.383	**0.88**

Therefore, a range of **0.88 to 1.05** is recommended for a parking rate based upon the observed data from operations at the Wanderlust facility if the independent variable of Gross Floor Area is chosen.

Proposed Trip Generation Rate:

Trip Generation Rate per Dog:

Similar to the *Parking Generation Manual's* directive to choose an appropriate land use code, *the ITE Trip Generation Manual, 11th Edition*[2] does not have an appropriate land use code for the Wanderlust facility. Therefore, trip generation rates and directional distributions have been calculated by using the observed AM and PM peak hour counts and dividing by the number of dogs at the Wanderlust facility. **Table 7** shows the trip generation rates, and **Table 8** shows the directional distribution.

Table 7: Trip Generation Rates – Per Dog

Time	Total Traffic Generated (vehicles per hour or day)	# of Dogs at facility	Trip Generation Rate
AM Peak	45	76	**0.59**
PM Peak	44	76	**0.58**

Table 8: Directional Distribution for use with Trip Generation Rates

Time	Inbound Directional Distribution	Outbound Directional Distribution
AM Peak	48%	52%
PM Peak	50%	50%

Trip Generation Rate per Area:

By using an independent variable of the Gross Floor Area (GFA), measured in 1,000 square feet (ksf), trip generation rates can be calculated as shown in **Table 9**.

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[2] Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, 2021

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Table 9: Trip Generation Rates – Per Area

Time	Total Traffic Generated (vehicles per hour or day)	Gross Floor Area (ksf)	Trip Generation Rate
AM Peak	45	11.383	**3.95**
PM Peak	44	11.383	**3.87**

Summary:

Parking Generation and Trip Generation Rates per Dog:

Based upon the observed data, a parking generation rate between **0.13** and **0.16** parking spaces per dog is recommended.

A trip generation rate of **0.59** for the morning peak, and **0.58** for the evening peak. The units are vph per dog. Directional distributions of 48%/52% (inbound/outbound) and 50%/50% are recommended for the morning and evening peaks respectively.

Parking Generation and Trip Generation Rates per Area:

Alternatively, a parking generation rate between **0.88** and **1.05** parking spaces per Gross Floor Area (expressed in ksf, 1000 Square Feet) could be utilized. A trip generation rate of **3.95** for the morning peak, and **3.87** for the evening peak could be utilized, where the units are vph per Gross Floor Area in ksf.

Please call if you would like any additional information or have any questions regarding this matter.

Sincerely,
McDowell Engineering, LLC

Greg Schroeder, PE
Traffic Engineer

Enc: On Site Parking Data Videos (downloadable web link)
          On Site Parking Data from January 28, 2022

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Videos from the data collection on Friday, January 28, 2022

There are a total of fourteen videos, each approximately 1 hour long. Videos are available at the following links for downloading:

https://drive.google.com/drive/folders/10YCw0qXMQngky8TS0zQUi_no8Z9gbXXj?usp=sharing

OR

https://bit.ly/20220128WanderlustVideo

QR Code for Videos: