



TOWN OF QUALICUM BEACH

Parking & Traffic Survey Report 2021



1.0 Introduction

1.1 Background

Qualicum Beach is situated on Vancouver Island's eastern coast near Mount Arrowsmith, about 120 kilometers northwest of Metro Vancouver. Qualicum Beach and surrounding oceanside areas are popular destinations during the summer months for beach and nature access. Visitors to Qualicum Beach tend to be from other British Columbia areas, nearby provinces, and from abroad. Summer in Qualicum Beach is considered peak season.

Over recent years, Qualicum Beach has been growing considerably in terms of tourism traffic. In the wake of COVID-19 and the suspension of international travel, many British Columbians have opted to travel within the province. As the popularity of the area grows, municipalities such as Qualicum Beach will experience increasing vehicle traffic volumes and visitors. In addition, new commercial and residential developments in surrounding areas such as Parksville and Nanaimo will increase traffic to Qualicum Beach.

Parking studies were previously completed for the Town of Qualicum in 2007 and 2016. The 2007 study provide the town with a detailed breakdown of the on-street and off-street parking areas. The 2016 survey incorporated aerial aspects in a parking survey, on a broad scope. The 2007 parking survey includes a detailed breakdown of the Qualicum Beach off-street and on-Street parking.

The goal of the 2021 Parking Survey is to incorporate a detailed parking analysis using Remotely Piloted Aircraft Systems (RPAS) with a traffic survey to outline key demand and parking behaviours.

1.2 Study Objectives

The objectives of this parking study for the Town of Qualicum Beach are as follows:

- Document the available public parking supply within the Town of Qualicum Beach and current parking constraints.
- Document parking demand within the Town of Qualicum Beach over 4 weekdays during the summer.
- Document traffic demand within the Town of Qualicum Beach in select intersections / areas.

1.3 Study Areas & Periods

The following diagram outlines the areas studied throughout the Town of Qualicum Beach. The Town of Qualicum Beach is broken down into 12 zones. Both off-street and on-street segments were analyzed:

Figure 1.1: Analyzed Zones



Traffic data was collected at peak intervals throughout the Town of Qualicum at four intersections. The following intersections were studied at peak periods during the day for 10-minute intervals.

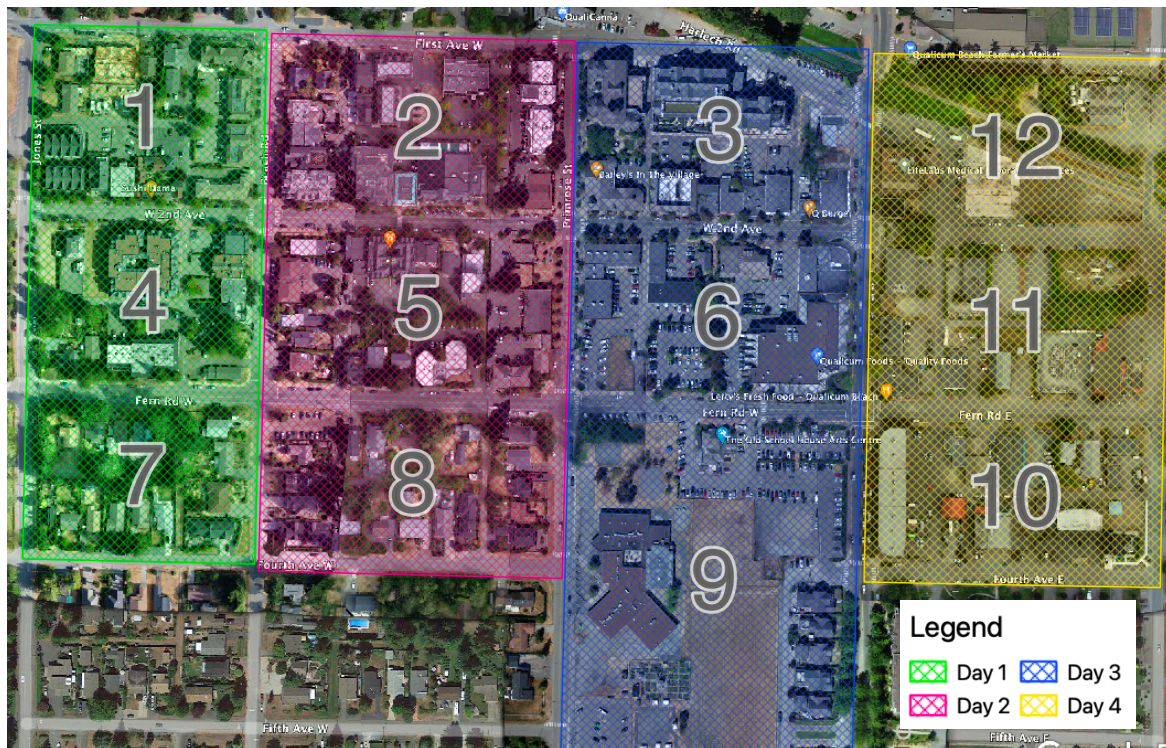
- **Memorial Ave & Fern Road**
- **Memorial Ave & Highway 19**
- **Highway 19 & Village Way**
- **Memorial Ave & First Avenue**

2.0 Methodology

2.1 Parking Study

During the parking study period from August 17th to 20th, aerial data was collected from 8:00 AM to 4:00 PM for a total of approximately 45 hours of data collected (Figure 2.1). After imagery collection was completed, approximately 10,000 individual images were stitched together to create georeferenced orthomosaics for 12 zones. This zoning criteria was chosen based on past parking survey studies so that comparison could be conducted. The orthomosaics were then used to conduct parking analysis. Each of these orthomosaics were then analyzed and tagged for specific vehicle counts.

Figure 2.1: Analyzed Zone – Days



The orthomosaics were then used to conduct a parking analysis that examined the key performance indicators (KPI). Each of the following KPIs were chosen based on other conducted parking studies:

Occupancy Rates

Defined as a percentage of the number of occupied parking spaces at any given time during the day. This is broken out by Zone, Off-Street, On-Street, and Street.

Peak Utilization %

Defined as the period during the day where a zone/street experience the highest parking demand.

Peak Hours

Defined as when the parking occupancy reaches its peak period by Zone, On-Street, Off-Street, and Street. Peak hour occurs between the time of the initial collection and the time of the next collection period, i.e., from 10 AM to 12 PM.

Hours Over 80% Utilization

Defined as a time in a day where a zone/street experiences > 80% occupancy.

2.2 Margin of Error

Parking studies present some challenges when it comes to data collection. Some of the challenges include observation time gap, and human error. With any parking study or collection of data there will be a small margin of error. In the future, observation time gap can be reduced by implementing hourly flights over 2-hour intervals. This could look like flying every single hour throughout the analyzed period. As an example:

Current: (8AM, 10AM, 12PM, 2PM, 4PM)

Future: (8AM, 9AM, 10AM, 11AM, 12PM, 1PM, 2PM, 3PM, 4PM)

This would result in more accurate analysis by counting for more periods throughout the day. Another way to increase accuracy would be to conduct more surveys across different months to get a broader representation of parking fluctuations. Doing data collection in the months such as June, July, and August could help to portray a broader representation.

For example, vehicles could come and go between creating a margin of error. To minimize any human error, we had multiple people counting during the data processing phase. In the future we are looking at opportunities to introduce machine learning / AI to minimize errors.

2.3 Traffic Analysis

Traffic data was collected at peak intervals throughout the Town of Qualicum in designated zones for a duration of 10 minutes per intersection. Peak intervals are described as during before / after school rush hours. The following 4 intersections were studied at peak periods during day based on their significance for traffic leaving and coming into the Town of Qualicum. Morning peak periods is defined as 7:30 AM to 8:00 AM when school / businesses are opening. Evening peak periods is defined as 2:30 PM – 3:30 PM when school is ending.

- **Memorial Ave & Fern Road – 2:30 PM**
- **Memorial Ave & Highway 19 – 3:30 PM**
- **Highway 19 and Village Way – 7:45 AM**
- **Memorial Ave & First Avenue – Georeferenced – 3:00 PM**

There are several types of vehicles that we analyzed during the analysis period. The following key traffic performance indicators describe the type of vehicles analyzed:

- **Pedestrians** - Stationary and moving people
- **Bicycle** - Any type of pedal cycles, e-bikes.
- **Motorcycle** - Any type of motorcycle vehicle, scooters.
- **Car** - Sedan, Hatchback, SUV, Coupe, Pick-up, or any similar-size vehicle with usually five or fewer seats.
- **Medium Vehicle** – Medium-size vehicle with box body, such as cars for cargo transport. This category includes small, medium, large-size vans, large combi/crew vans, small motorhomes, smaller supply cars, or ambulances.
- **Heavy Vehicle** - Three and more axle truck, single-unit or multi-trailer, excavators. Agricultural or forestry tractor with their trailer is defined as a heavy vehicle as well.
- **Bus** - Passengers-carrying large buses, school buses for more than 8 passengers.

Highway 4 & First Avenue was chosen and analyzed and tested using georeferenced data. This allows for exact speed in km/h and acceleration in km/h of tracked objects. It also allows for additional metrics such as safety analysis.

Highway 4 & First Avenue were analyzed for key risks or safety concerns. Safety concerns were analyzed through an AI engine that can identify different key concerns based on a set of criteria. The following safety factors were analyzed:

- Speeding
- Uncontrolled Pedestrian Crossing
- Heavy Breaking
- Fast de-acceleration

The criteria are preset on each of the safety factors. For instance, speeding can be determined by setting a speed factor. This speed factor can be changed based on speed limits of each analyzed intersection. Pedestrian crossing, heavy breaking, and fast de-acceleration is pre-set by the AI engine, however, can be customized to specific criteria.

To show traffic flow into different parts of the intersection, virtual gates were set up to count traffic flow. These gates are set up to show the number of objects entering and exiting different parts of a point of an intersection. For instance, a gate can be established to just show objects entering an area or just leaving an area. This is a way to quantify fluctuations in traffic in different parts of the analyzed intersection.

3.0 Results – Parking Survey

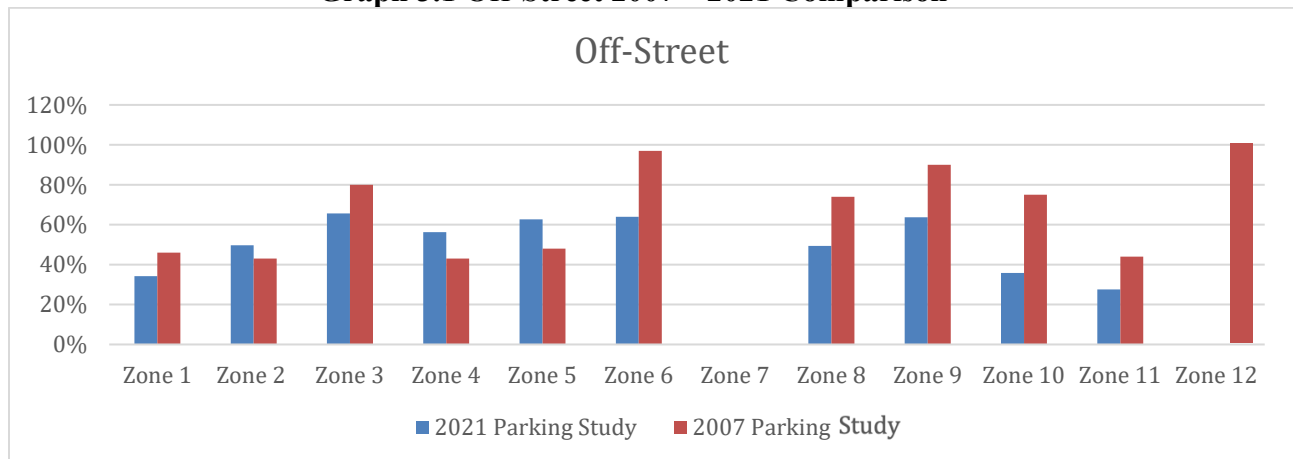
The following table provides a comparison of the parking inventories from 2007, 2016, and 2021. It is important to note that parking stall inventory for the 2021 study year are based on a detailed estimate:

Table 3.1 Parking Inventory

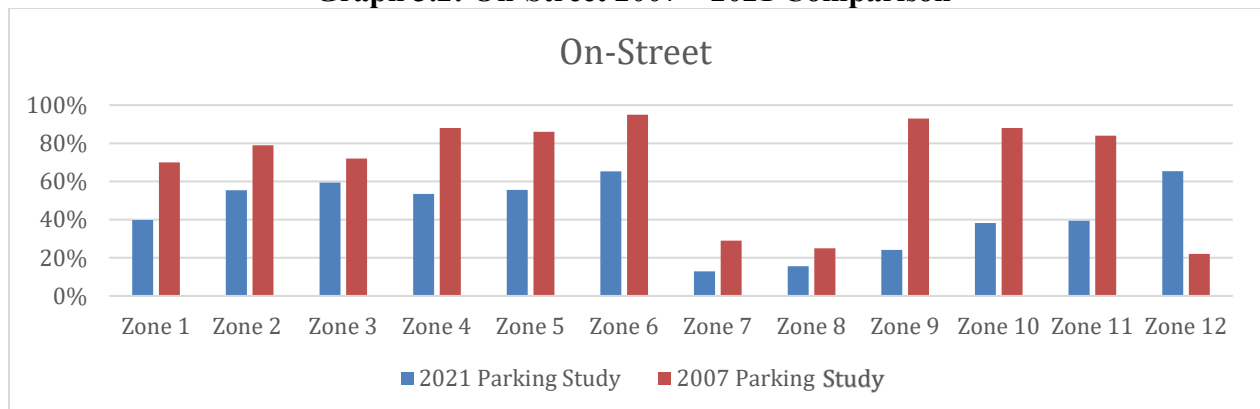
| Study Period | 2007 Parking Study Zones 1 - 12 | 2016 Parking Study | 2021 Parking Study Zones 1-12 |
|--------------------|------------------------------------|-----------------------|----------------------------------|
| Off-Street Parking | 1057 | N/A | 882 |
| On-Street Parking | 358 | N/A | 687 |

In a side-by-side comparison it is shown that there is large variation in parking from 2007 to 2021. The 2021 numbers reflect better actual statistics through verifiable imagery. Aerial imagery allowed for parking stall count verification of parking counts was conducted. It is also important to note that underground parking was not inventoried as it would require a manual classification process. **See Appendix A for imagery.**

Graph 3.1 Off-Street 2007 – 2021 Comparison

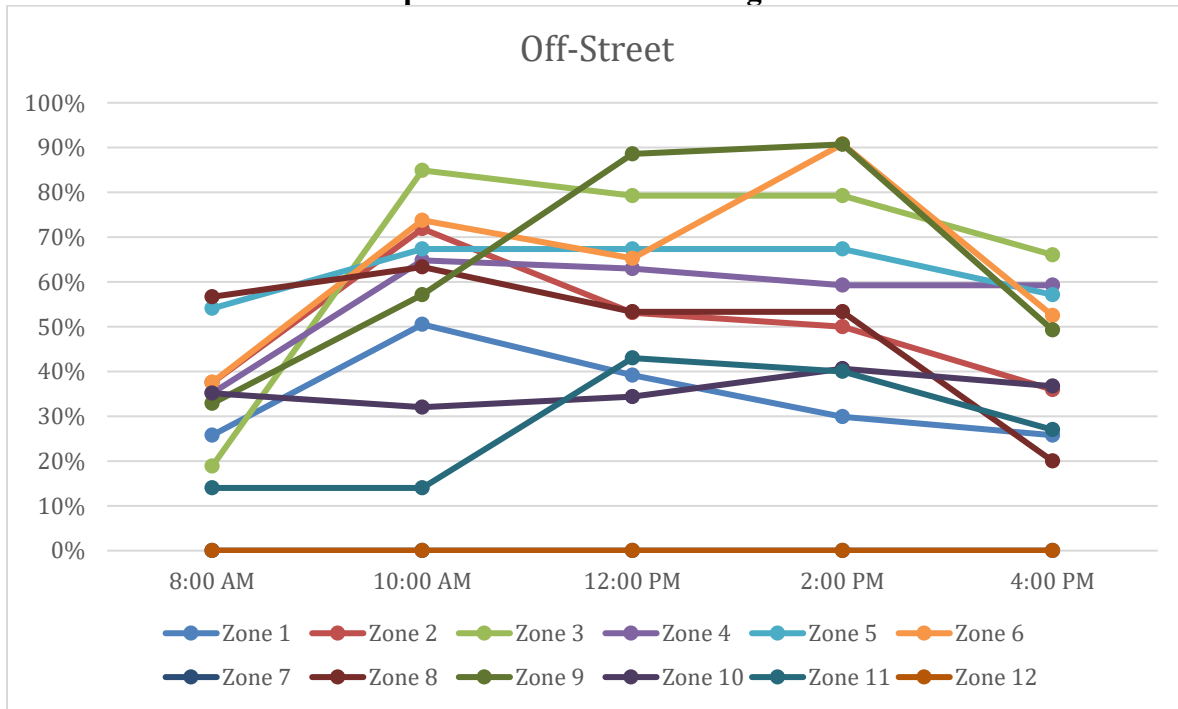


Graph 3.2: On-Street 2007 – 2021 Comparison

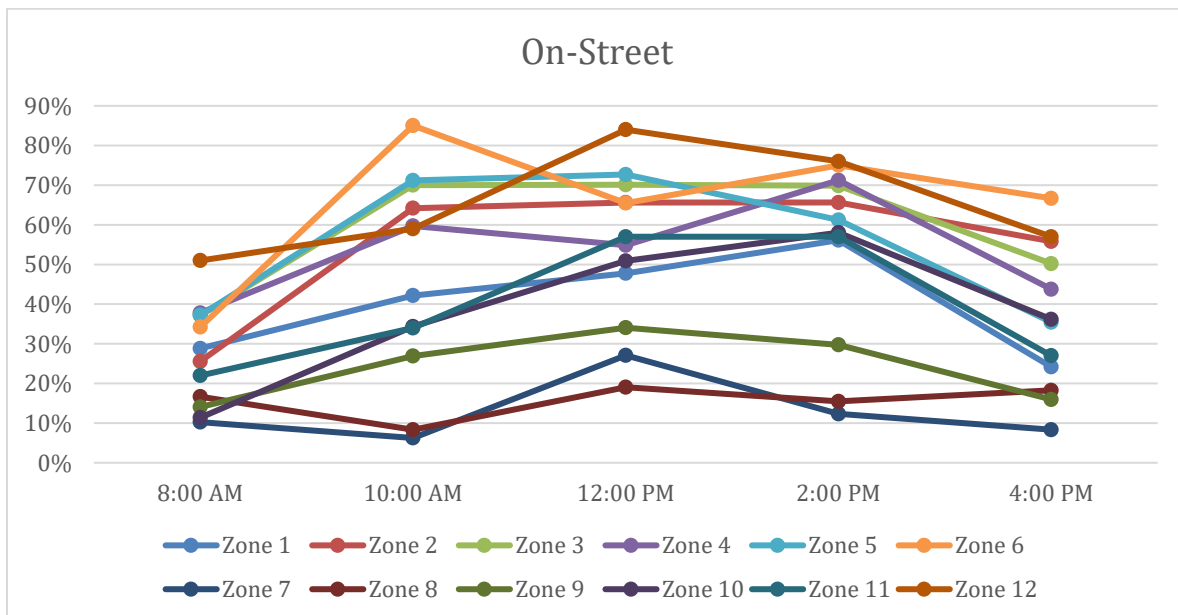


3.1 Parking Survey Overview

Graph 3.3: Off-Street Parking Utilization



Graph 3.4: On-Street Parking Utilization



Zone 1 – Qualicum Beach



Zone 1 – Qualicum Beach

Graph 3.5: Zone 1 Off-Street / On-Street

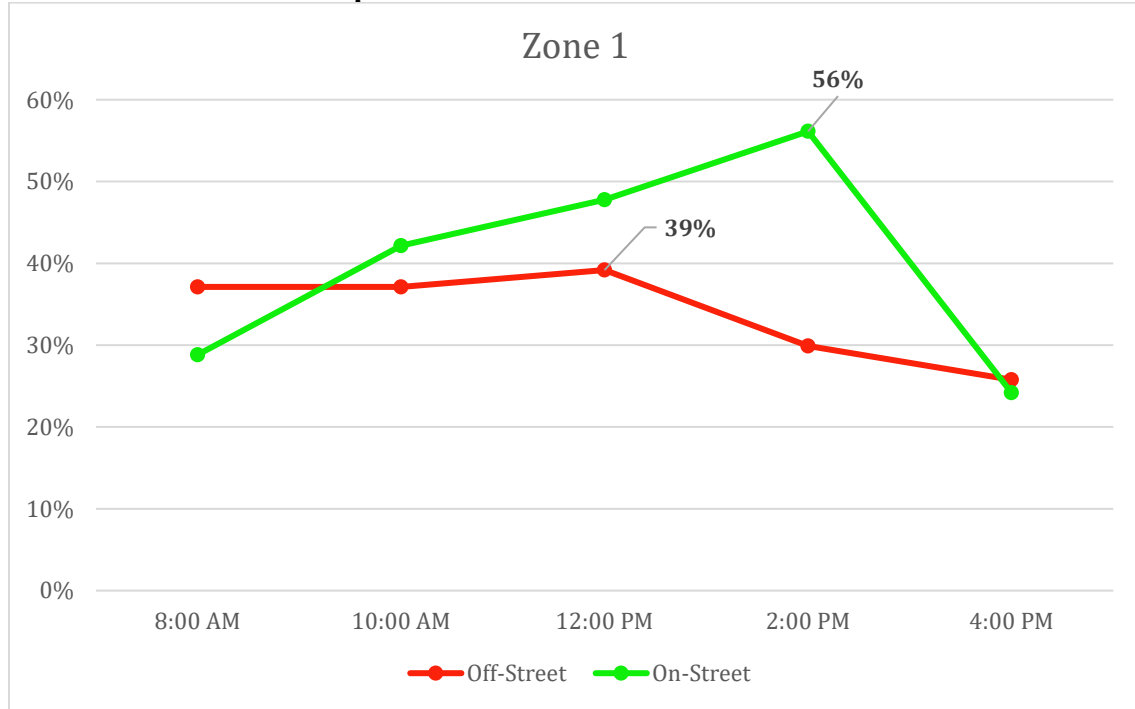


Table 3.2: Zone 1 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|---------------------------|------------|-----------|
| Occupancy Avg (%) | 34% | 40% |
| Peak Occupancy (%) | 39% | 56% |
| Peak Time | 12:00 PM | 2:00 PM |
| Hours over 80% | 0 | 0 |

Zone 1 – Qualicum Beach

Graph 3.6: Zone 1 - Off-Street

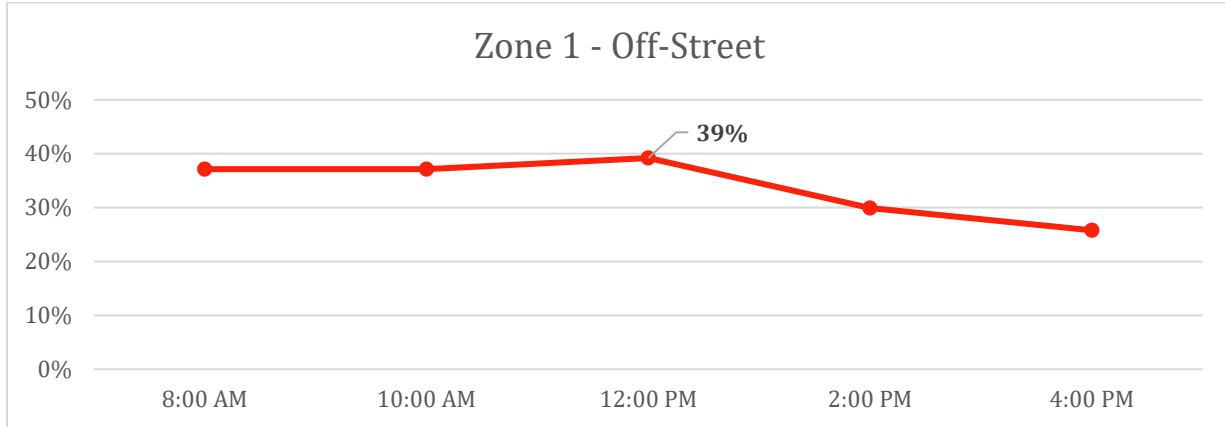


Table 3.3: Zone 1 Off-Street Summary

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 37% | 37% | 39% | 30% | 26% | 32% |

Graph 3.7: Zone 1 – On-Street

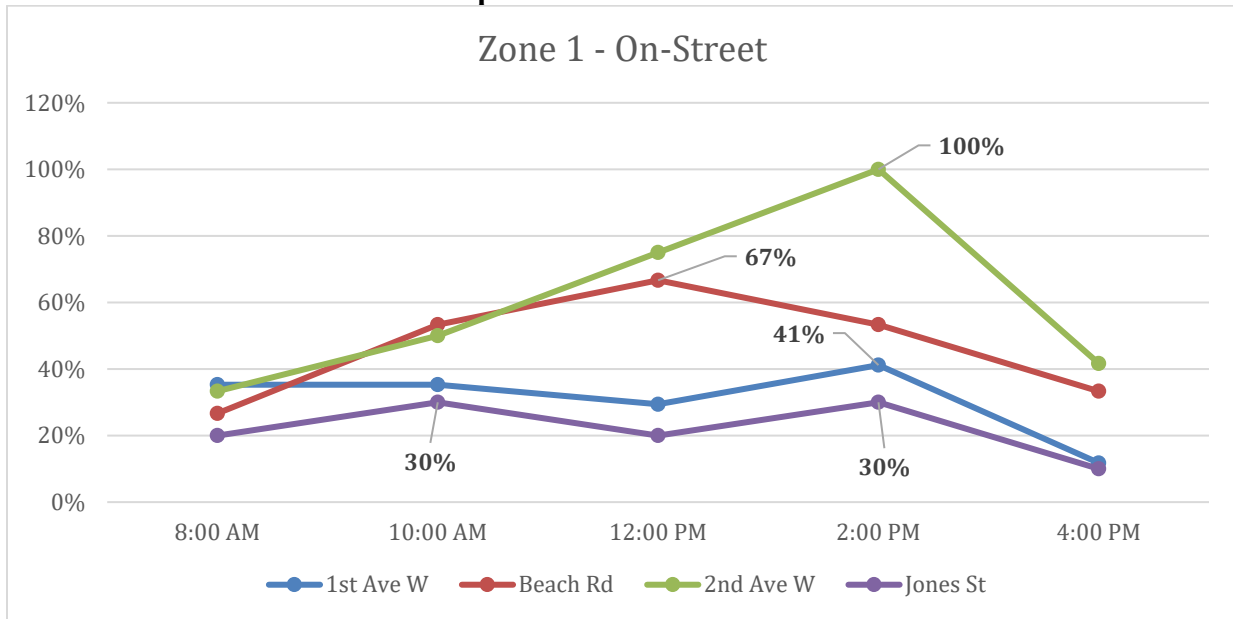


Table 3.4: Zone 1 On-Street Summary

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|-----------------------|---------|----------|----------|---------|---------|-----------------------------|
| 1 st Ave W | 35% | 35% | 29% | 41% | 12% | 31% |
| 2 nd Ave W | 27% | 53% | 67% | 53% | 33% | 47% |
| Beach Rd | 33% | 50% | 75% | 100% | 42% | 60% |
| Jones St | 20% | 30% | 20% | 30% | 10% | 22% |

Zone 2 – Qualicum Beach



Zone 2 – Qualicum Beach

Graph 3.8: Zone 2 Off-Street / On-Street

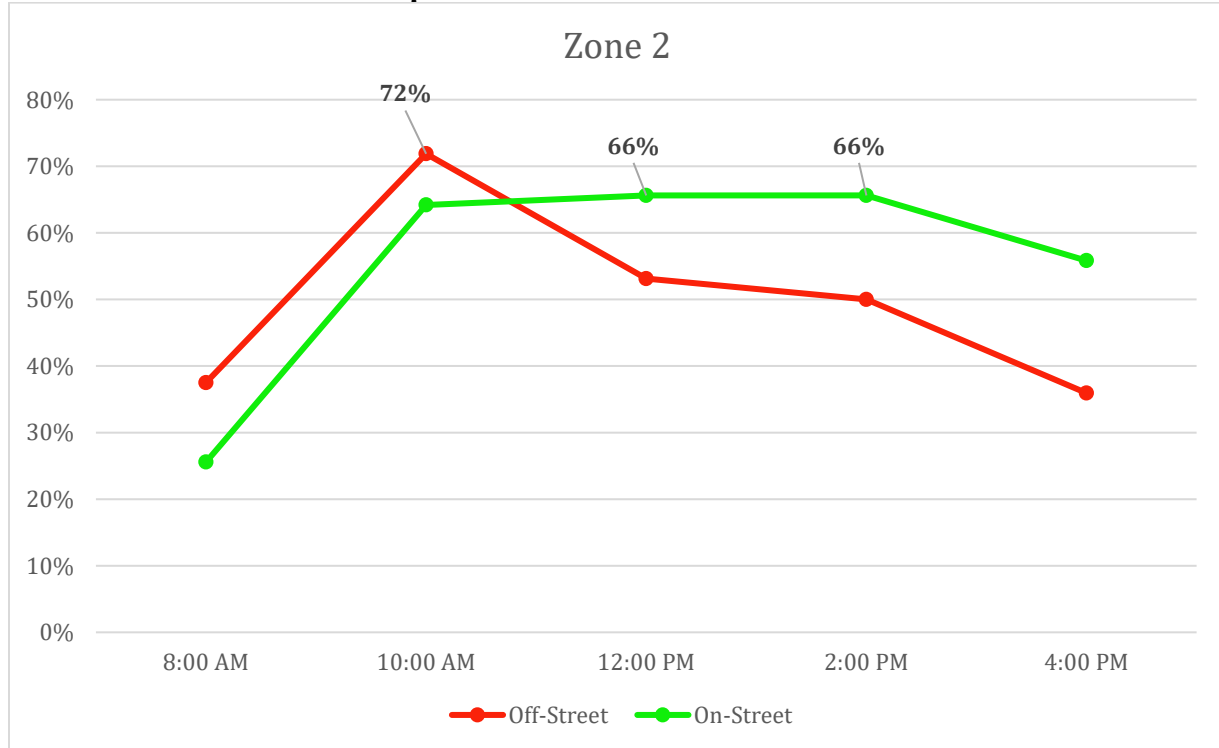


Table 3.5: Zone 2 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-------------------|
| Occupancy Avg (%) | 50% | 53% |
| Peak Occupancy (%) | 72% | 66% |
| Peak Time | 10:00 AM | 12:00 PM, 2:00 PM |
| Hours over 80% | 0 | 0 |

Zone 2 – Qualicum Beach

Graph 3.9: Zone 2 - Off-Street

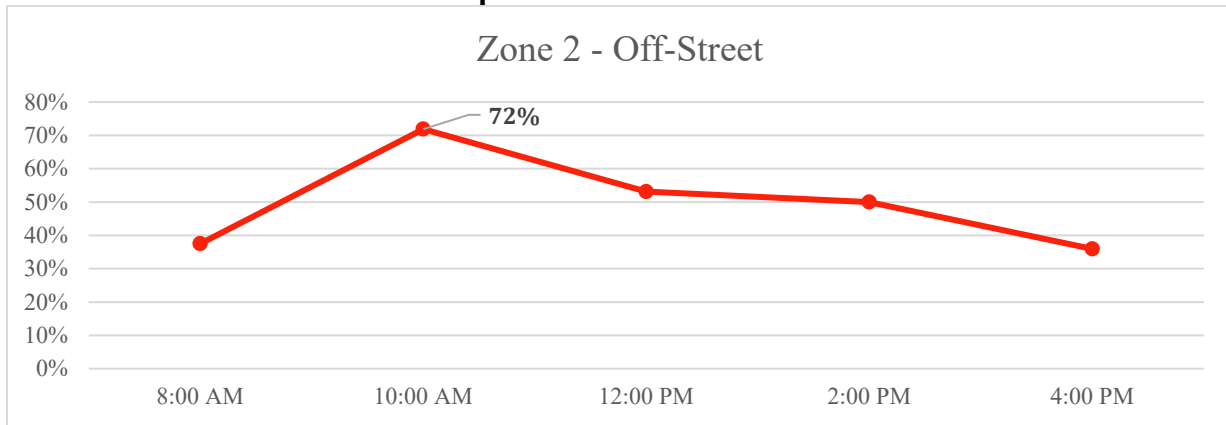


Table 3.6: Zone 2 - Off-Street Summary

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 38% | 72% | 53% | 50% | 36% | 50% |

Graph 3.10: Zone 2 – On-Street

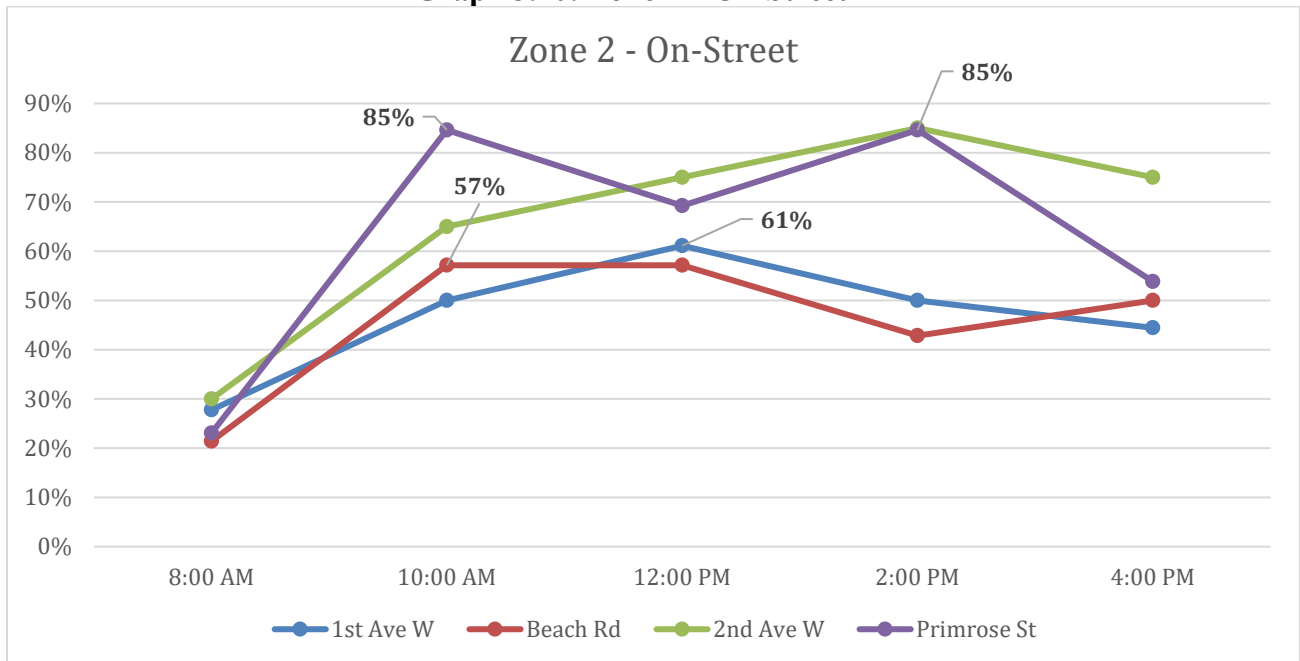


Table 3.7: Zone 1 On-Street Summary

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|-------------|---------|----------|----------|---------|---------|-----------------------------|
| 1st Ave W | 28% | 50% | 61% | 50% | 44% | 47% |
| Beach Rd | 21% | 57% | 57% | 43% | 50% | 46% |
| 2nd Ave W | 30% | 65% | 75% | 85% | 75% | 66% |
| Primrose St | 23% | 85% | 69% | 85% | 63% | 63% |

Zone 3 – Qualicum Beach



Zone 3 – Qualicum Beach

Graph 3.11: Zone 3 Off-Street / On-Street

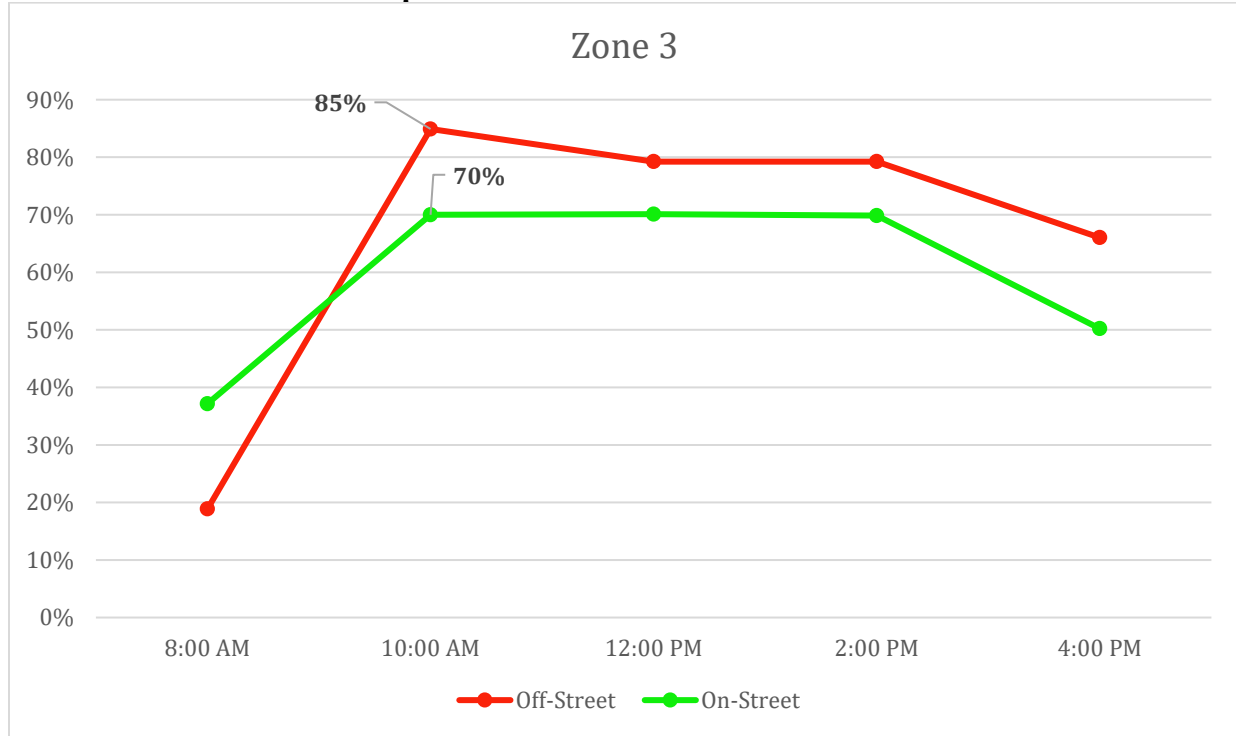


Table 3.8: Zone 3 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|---------------------------|-------------------|------------------|
| Occupancy Avg (%) | 66% | 59% |
| Peak Occupancy (%) | 85% | 70% |
| Peak Time | 10:00AM | 2:00 PM |
| Hours over 80% | 2 | 0 |

Zone 3 – Qualicum Beach

Graph 3.12: Zone 3 - Off-Street

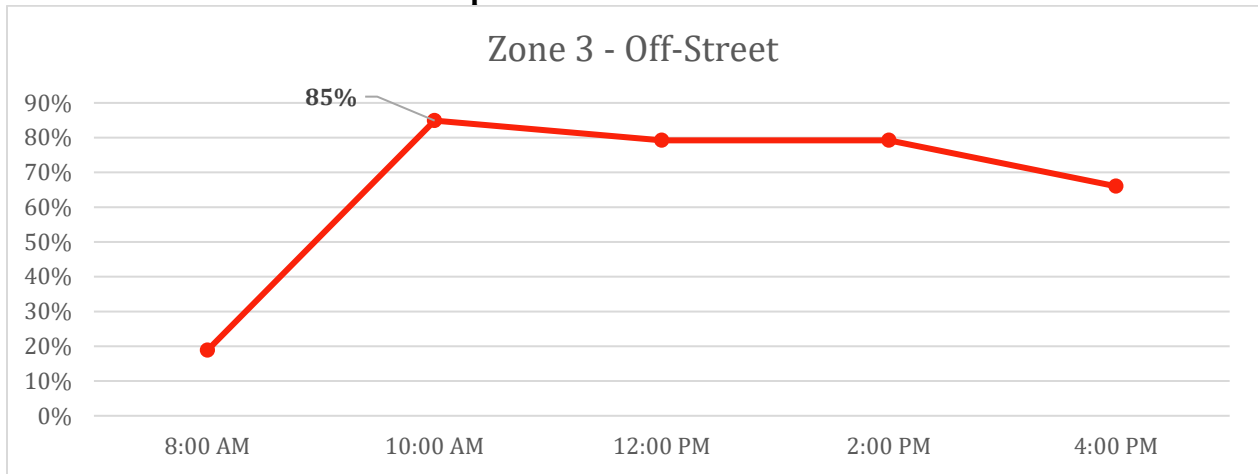


Table 3.9: Zone 3 - Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 19% | 85% | 79% | 79% | 66% | 66% |

Graph 3.13: Zone 3 - On-Street

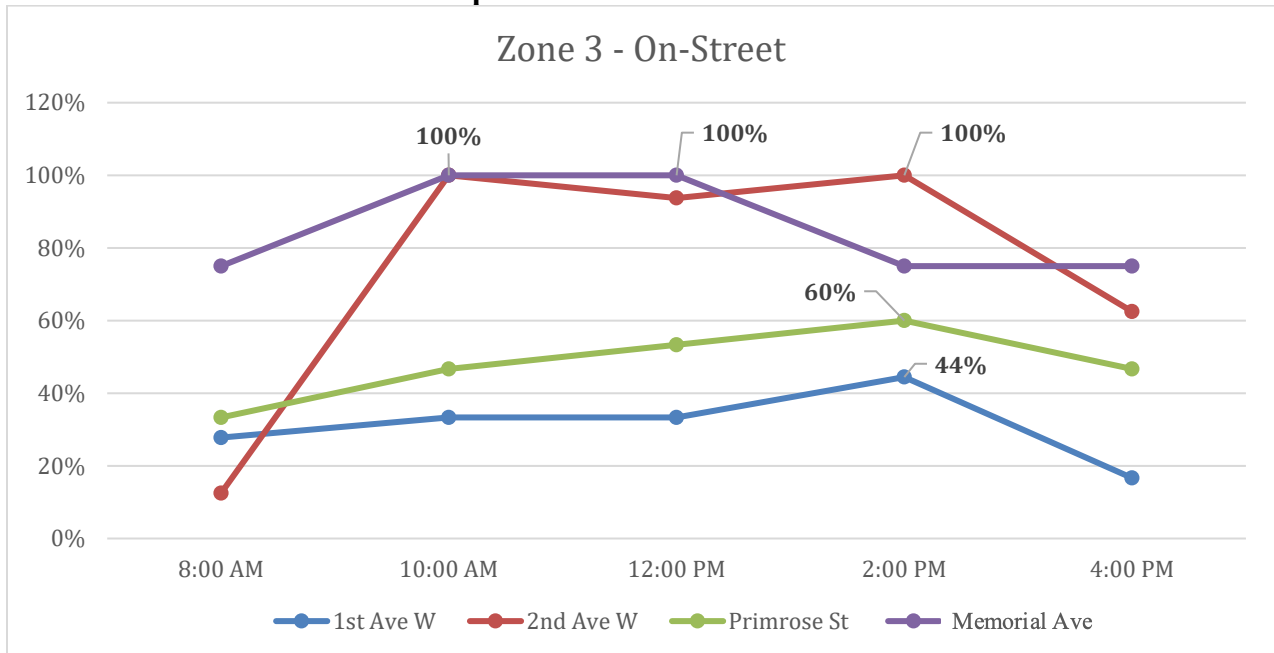
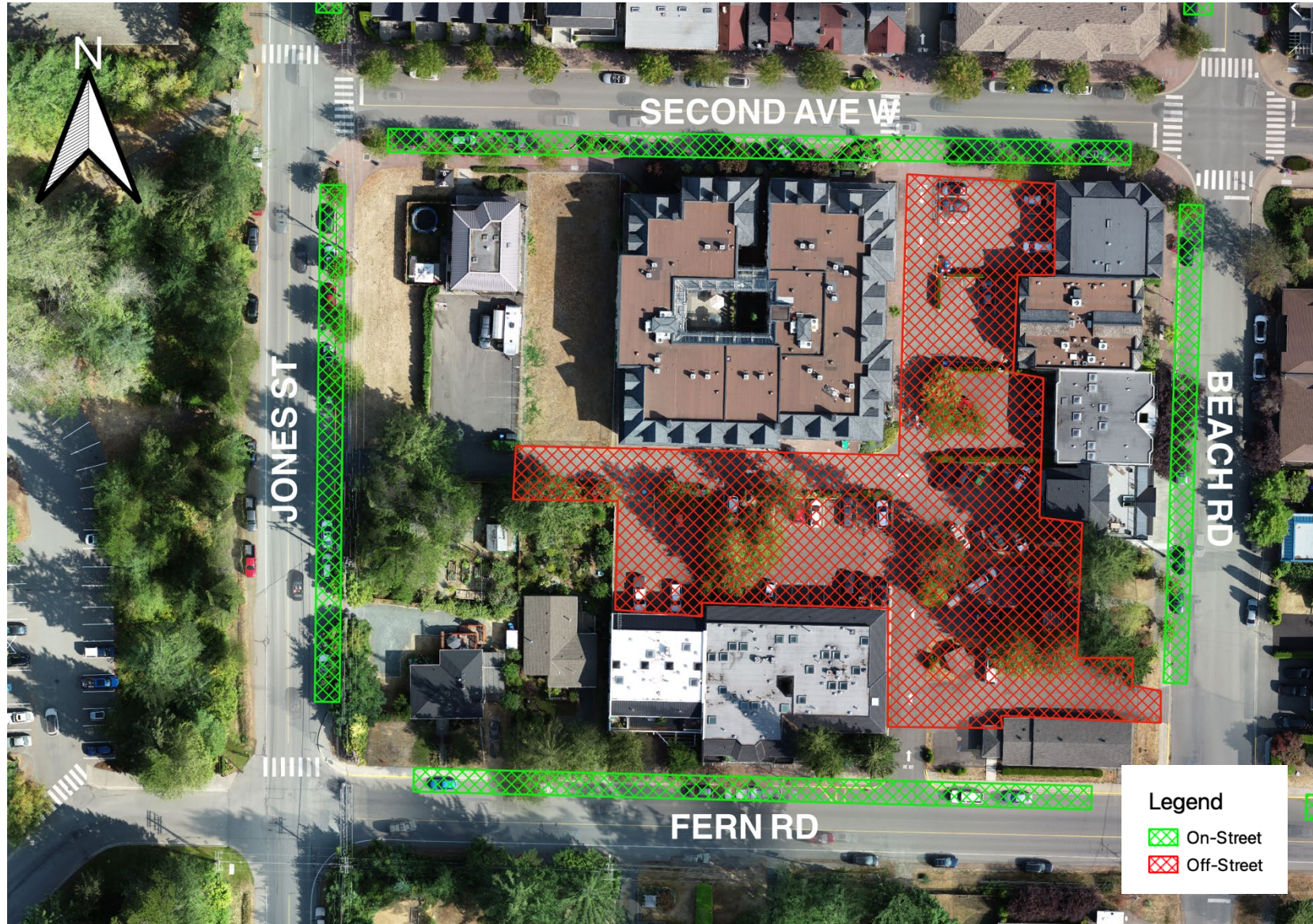


Table 3.10: Zone 3 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|--------------|---------|----------|----------|---------|---------|-----------------------------|
| 1st Ave W | 28% | 33% | 33% | 44% | 17% | 31% |
| 2nd Ave W | 13% | 100% | 94% | 100% | 63% | 75% |
| Primrose St | 33% | 47% | 53% | 60% | 45% | 48% |
| Memorial Ave | 75% | 100% | 100% | 75% | 75% | 85% |

Zone 4 – Qualicum Beach



Zone 4 – Qualicum Beach

Graph 3.14: Zone 4 Off-Street / On-Street

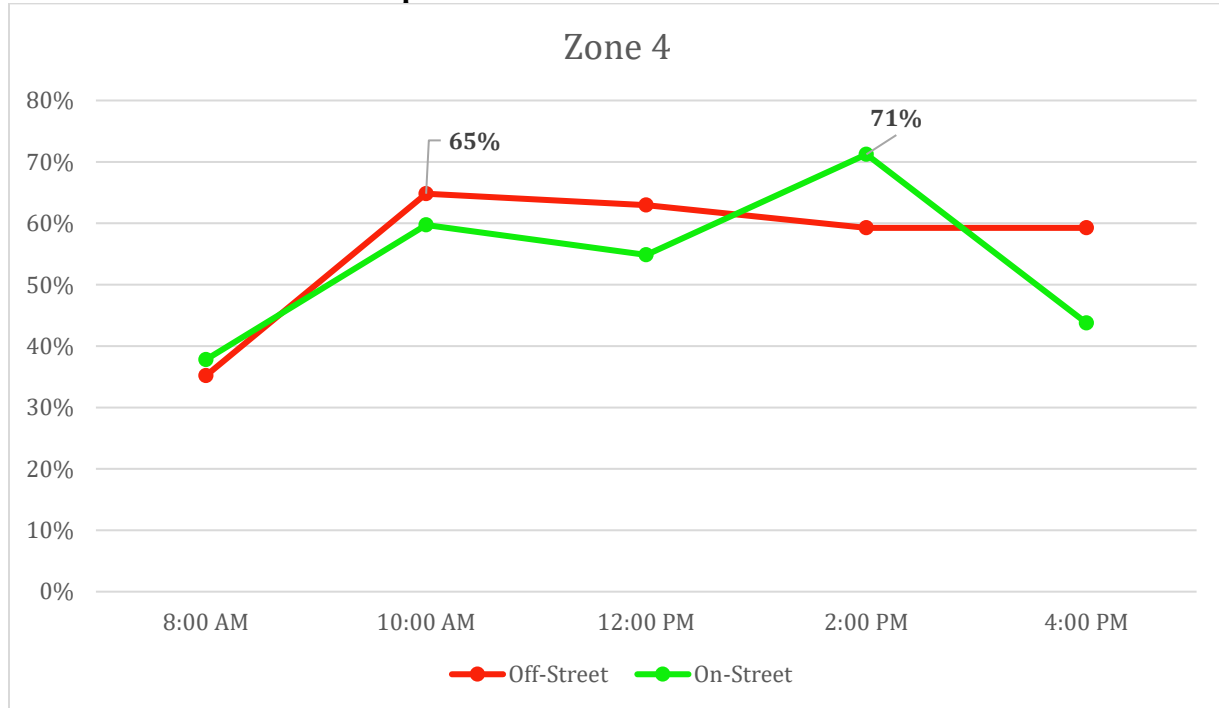


Table 3.11: Zone 4 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | 56% | 53% |
| Peak Occupancy (%) | 65% | 71% |
| Peak Time | 10:00 AM | 2:00 PM |
| Hours over 80% | 0 | 0 |

Zone 4 – Qualicum Beach

Graph 3.15: Zone 4 - Off-Street

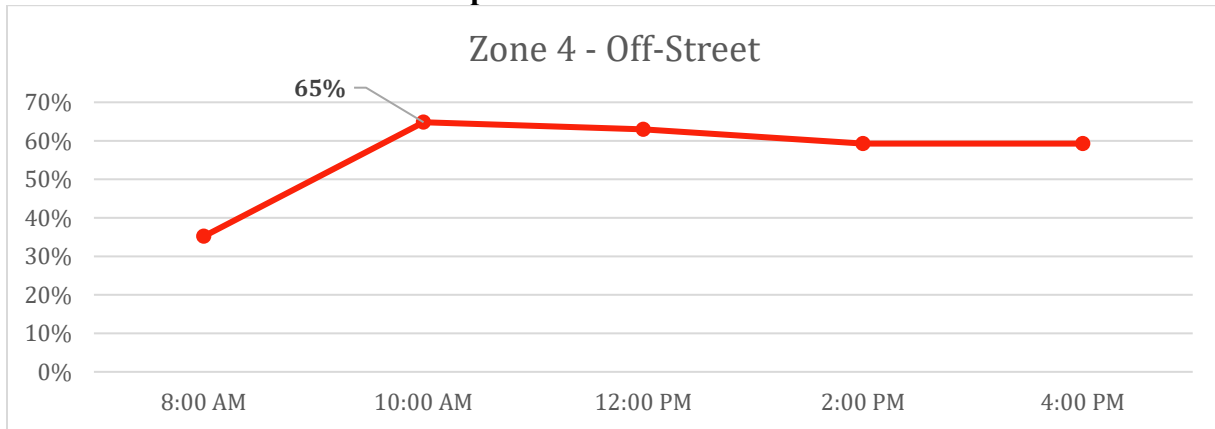


Table 3.12: Zone 4 - Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 35% | 65% | 63% | 59% | 59% | 59% |

Graph 3.16: Zone 4 - On-Street

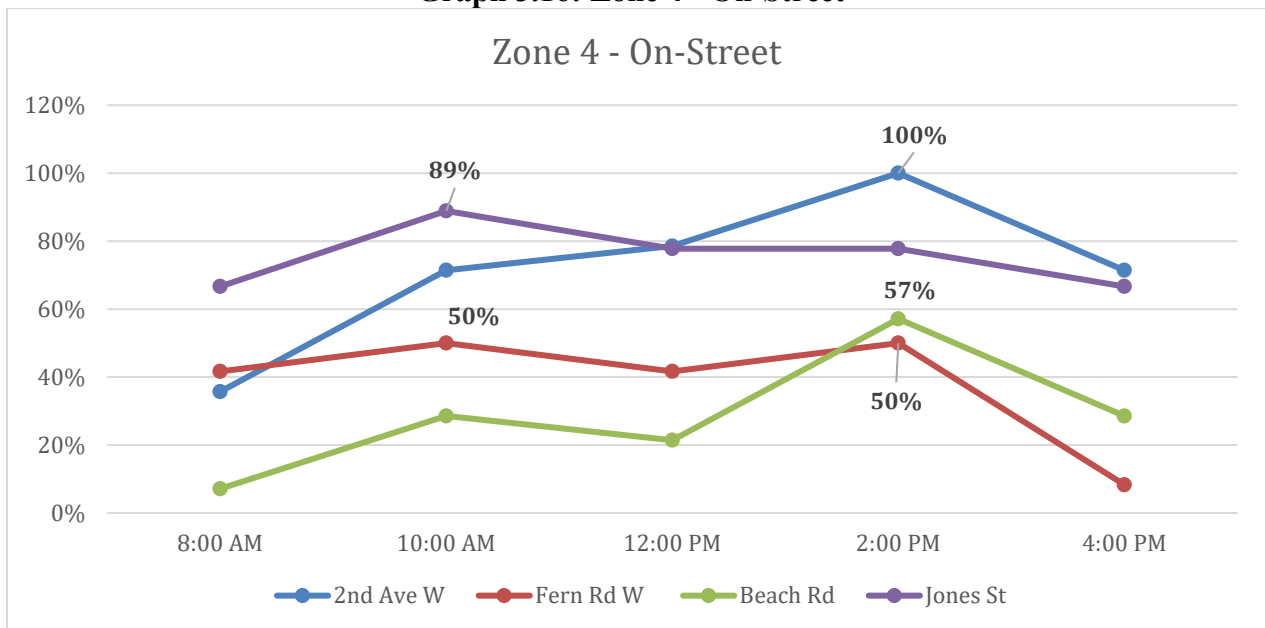


Table 3.13: Zone 4 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|------------------|---------|----------|----------|---------|---------|-----------------------------|
| 2nd Ave W | 36% | 71% | 79% | 100% | 71% | 71% |
| Fern Rd W | 42% | 50% | 42% | 50% | 8% | 38% |
| Beach Rd | 7% | 29% | 21% | 57% | 29% | 29% |
| Jones St | 67% | 89% | 78% | 78% | 67% | 76% |

Zone 5 – Qualicum Beach



Zone 5 – Qualicum Beach

Graph 3.17: Zone 5 Off-Street / On-Street

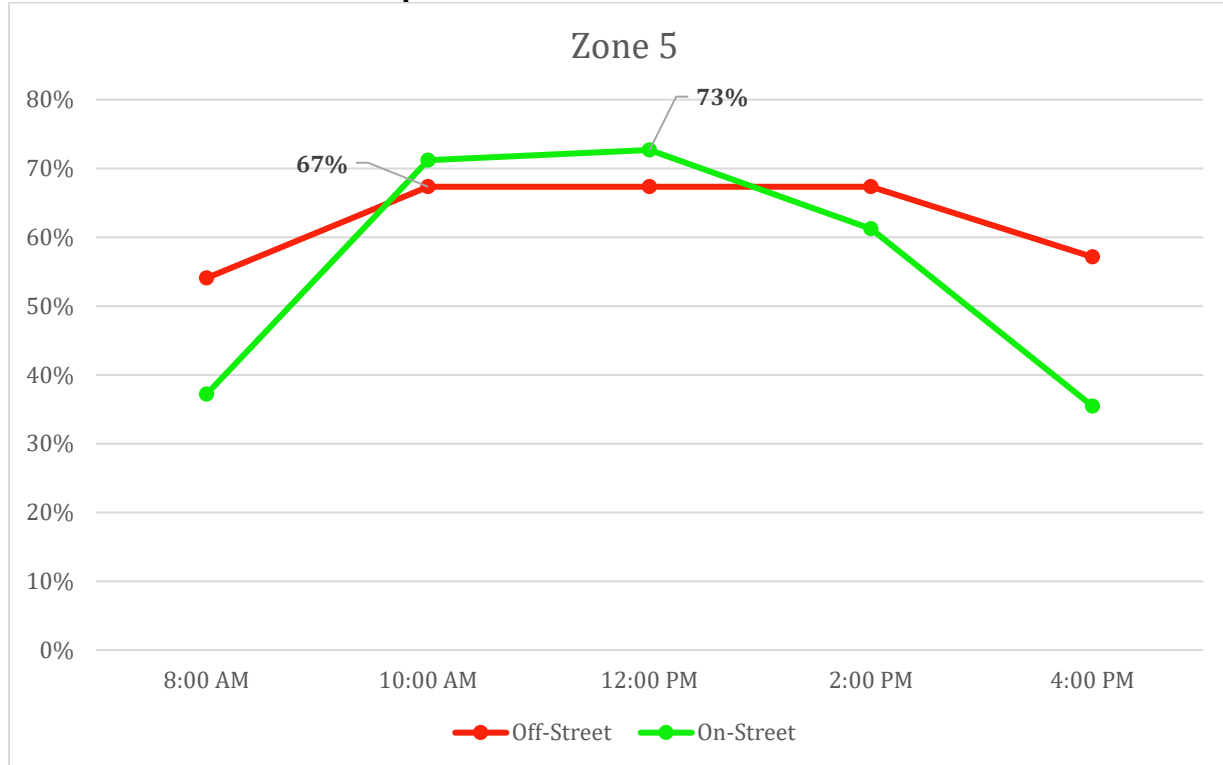


Table 3.14: Zone 5 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | 63% | 56% |
| Peak Occupancy (%) | 67% | 73% |
| Peak Time | 10:00 AM | 12:00 PM |
| Hours over 80% | 0 | 0 |

Zone 5 – Qualicum Beach

Graph 3.18: Zone 5 Off-Street

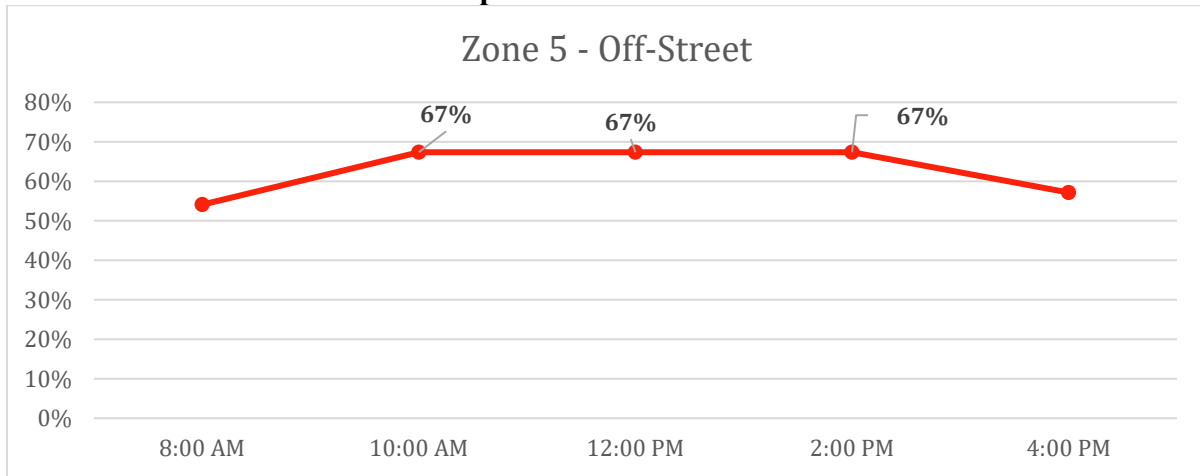


Table 3.15: Zone 5 - Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 54% | 67% | 67% | 67% | 57% | 63% |

Graph 3.19: Zone 5 - On-Street

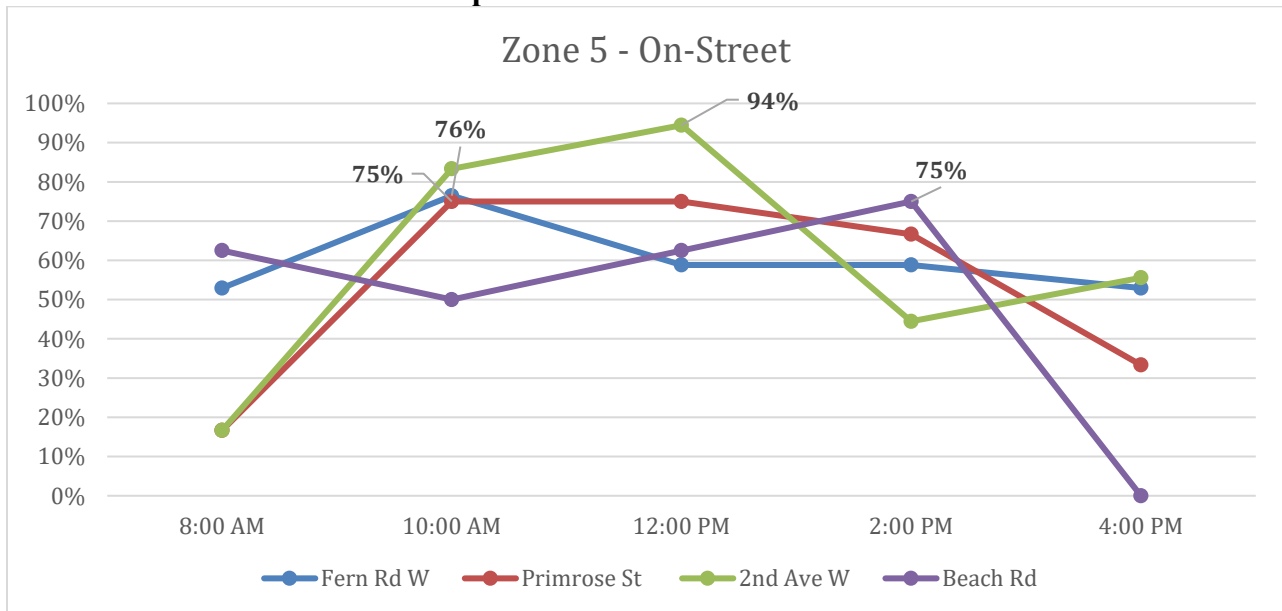


Table 3.16: Zone 5 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|--------------------|---------|----------|----------|---------|---------|-----------------------------|
| Fern Rd W | 53% | 76% | 59% | 59% | 53% | 60% |
| Primrose St | 17% | 75% | 75% | 67% | 33% | 53% |
| 2nd Ave W | 17% | 83% | 94% | 44% | 56% | 59% |
| Beach Rd | 63% | 50% | 63% | 75% | 0% | 50% |

Zone 6 – Qualicum Beach



Zone 6 – Qualicum Beach

Graph 3.20: Zone 6 Off-Street / On-Street

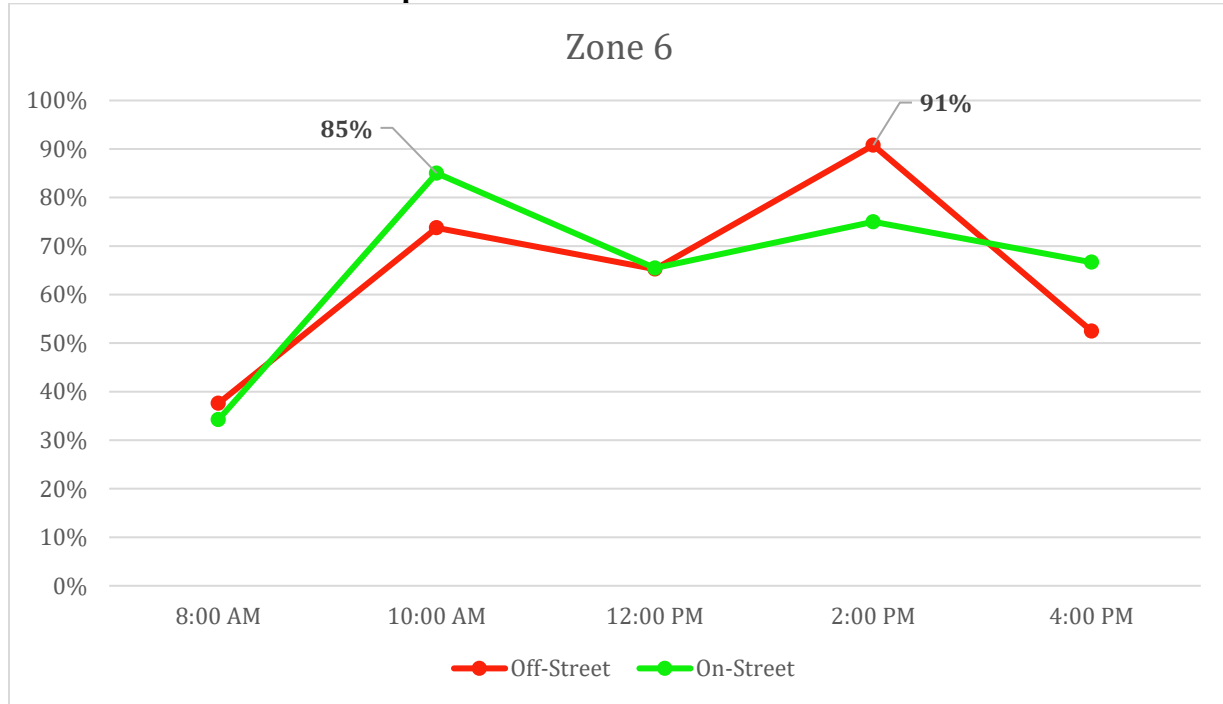


Table 3.17: Zone 6 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | 64% | 65% |
| Peak Occupancy (%) | 91% | 85% |
| Peak Time | 2:00 PM | 10:00 AM |
| Hours over 80% | 2 | 2 |

Zone 6 – Qualicum Beach

Graph 3.21: Zone 6 Off-Street

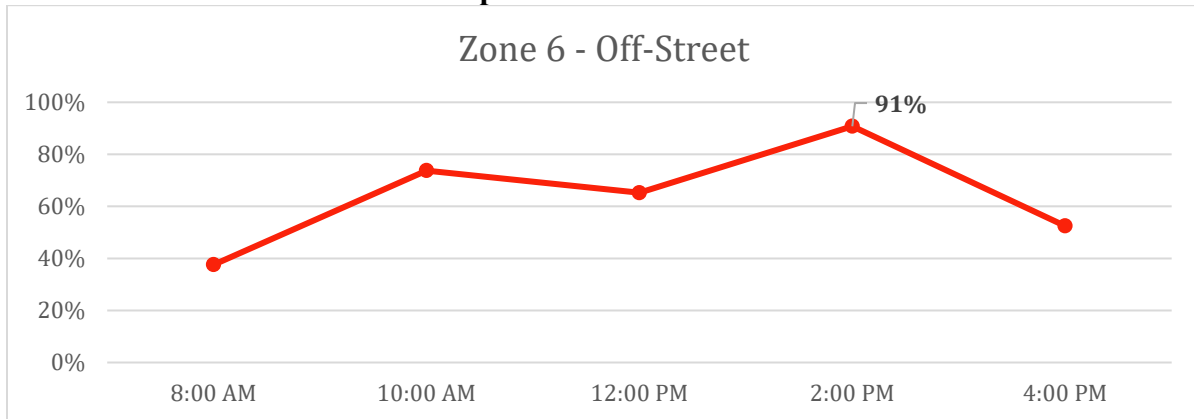


Table 3.18: Zone 6 - Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 38% | 74% | 65% | 91% | 52% | 64% |

Graph 3.22: Zone 6 Off-Street

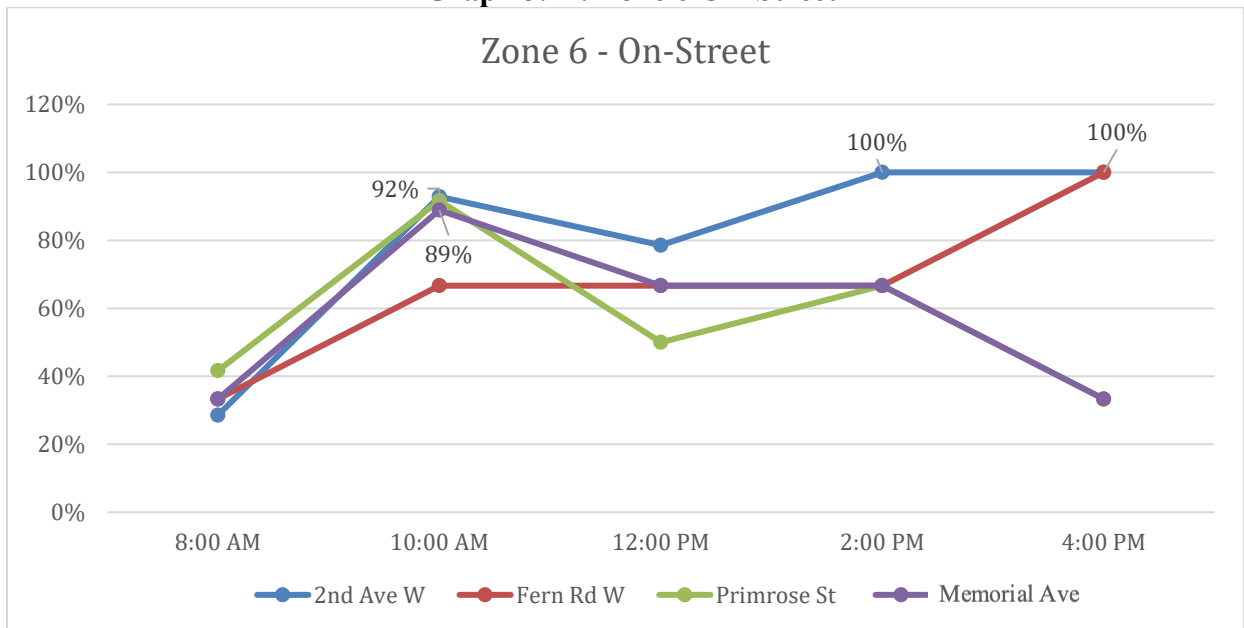
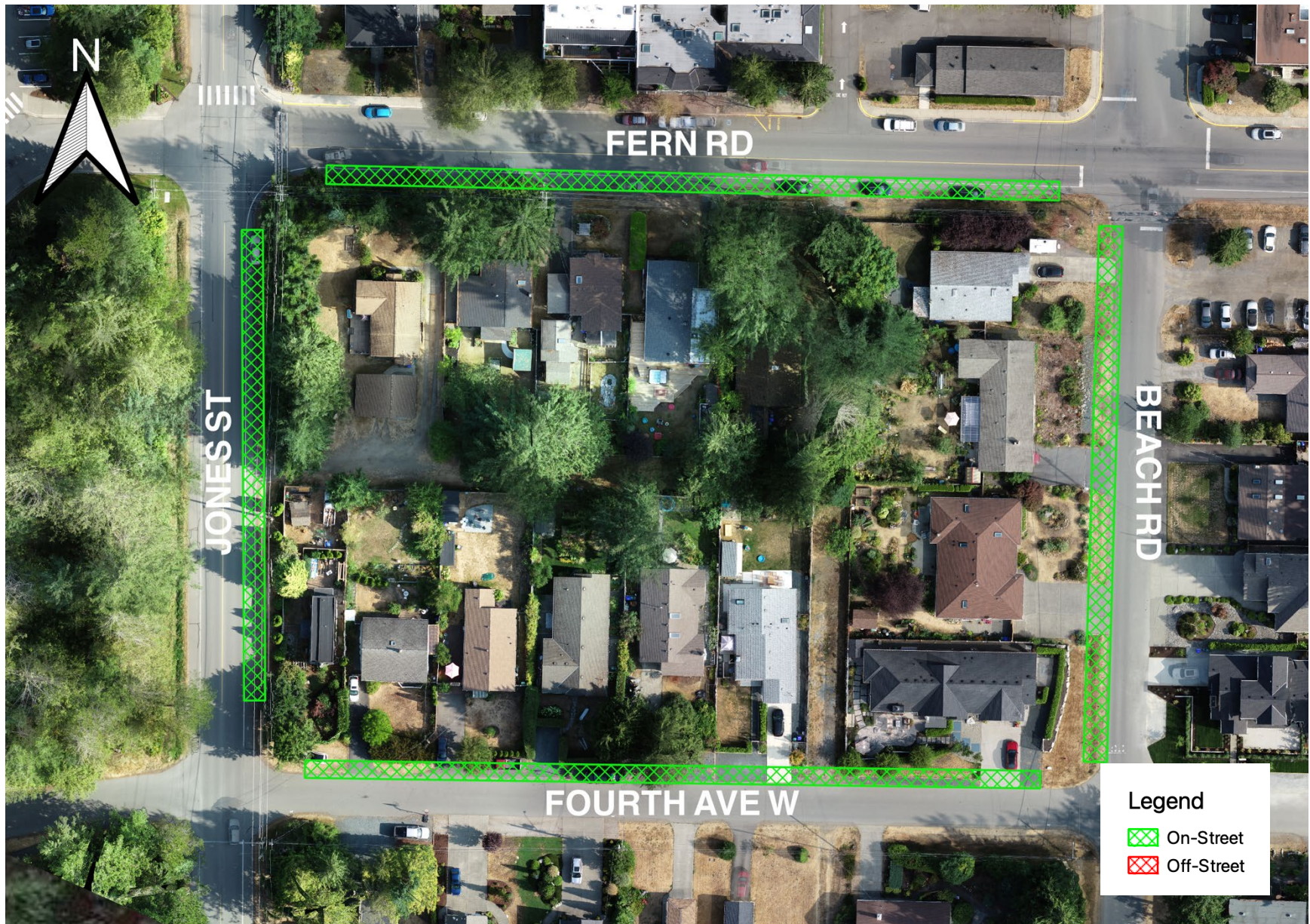


Table 3.19: Zone 6 - Off-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------------------|---------|----------|----------|---------|---------|-----------------------------|
| 2nd Ave W | 29% | 93% | 79% | 100% | 100% | 80% |
| Fern Rd W | 29% | 57% | 100% | 57% | 86% | 66% |
| Primrose St | 42% | 92% | 50% | 67% | 33% | 57% |
| Memorial Ave | 33% | 89% | 67% | 67% | 33% | 58% |

Zone 7 – Qualicum Beach



Zone 7 – Qualicum Beach

Graph 3.23: Zone 7 Off-Street / On-Street

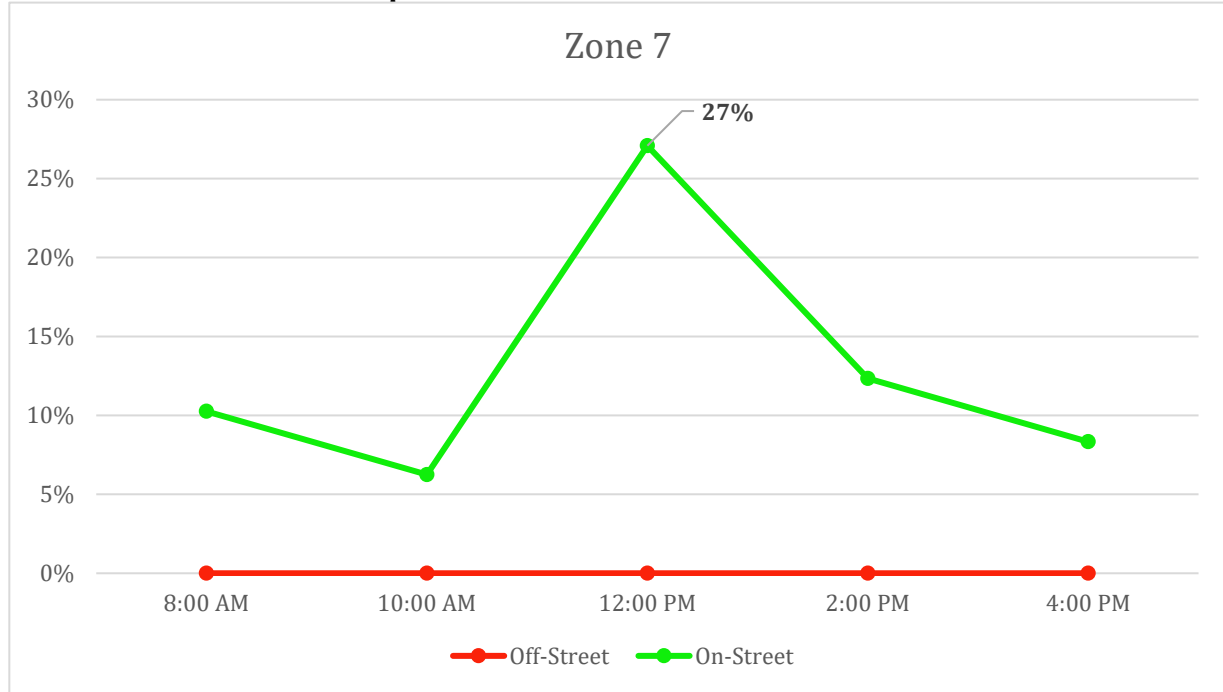


Table 3.20: Zone 7 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | N/A | 12% |
| Peak Occupancy (%) | N/A | 27% |
| Peak Time | N/A | 12:00 PM |
| Hours over 80% | N/A | 0 |

Zone 7 – Qualicum Beach

Graph 3.23: Zone 7 Off-Street / On-Street

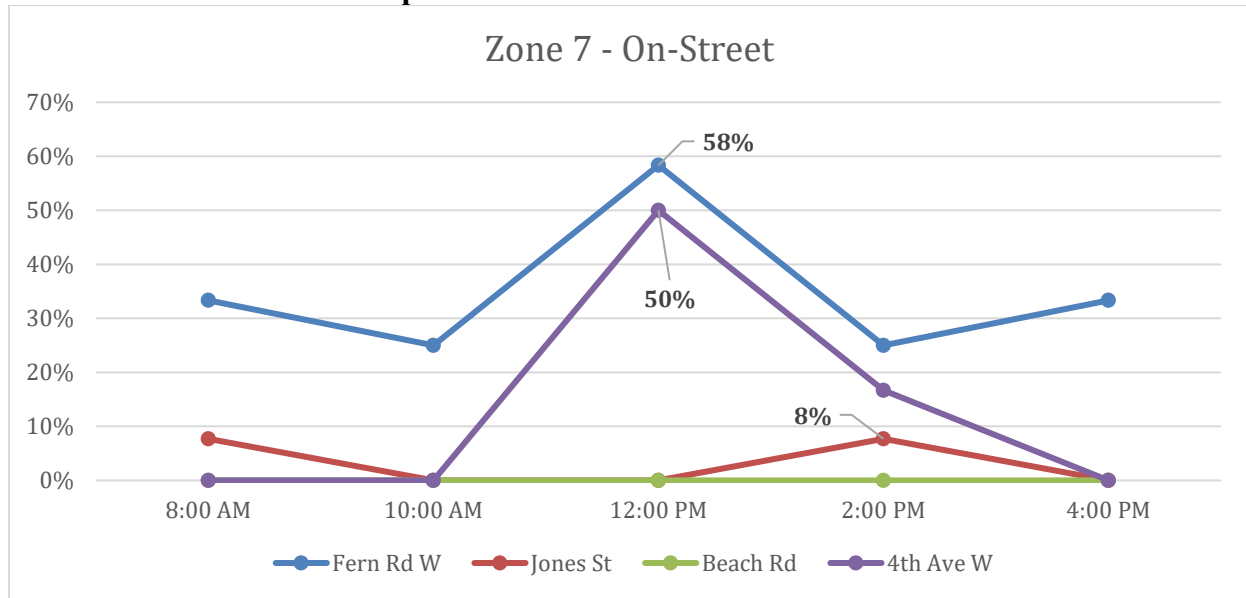
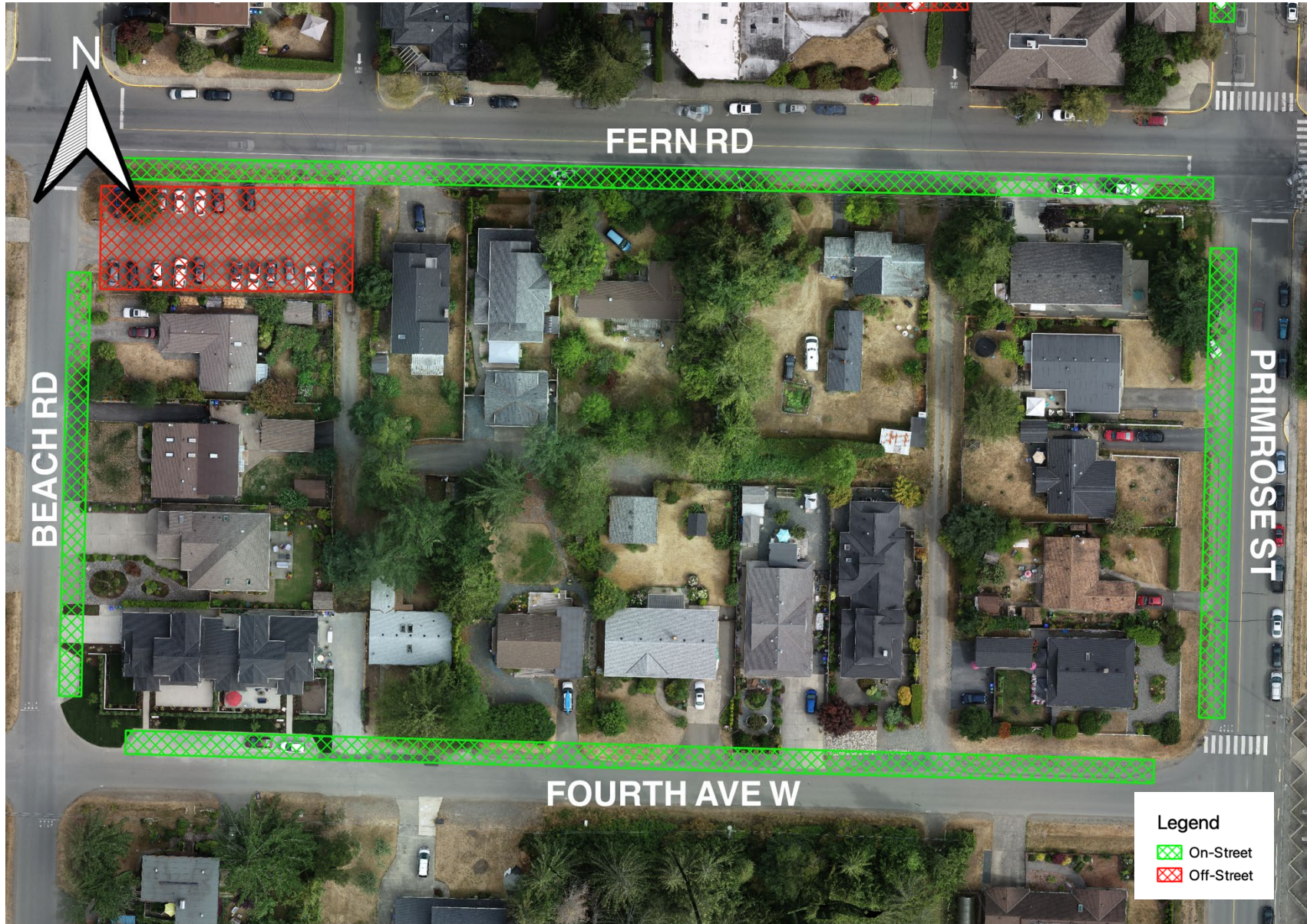


Table 3.21: Zone 7 - On-Street Summary

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|------------------|---------|----------|----------|---------|---------|-----------------------------|
| Fern Rd W | 33% | 25% | 58% | 25% | 33% | 35% |
| Jones St | 8% | 0% | 0% | 8% | 0% | 3% |
| Beach Rd | 0% | 0% | 0% | 0% | 0% | 0% |
| 4th Ave W | 0% | 0% | 50% | 17% | 0% | 13% |

Zone 8 – Qualicum Beach



Zone 8 – Qualicum Beach

Graph 3.25: Zone 8 Off-Street / On-Street

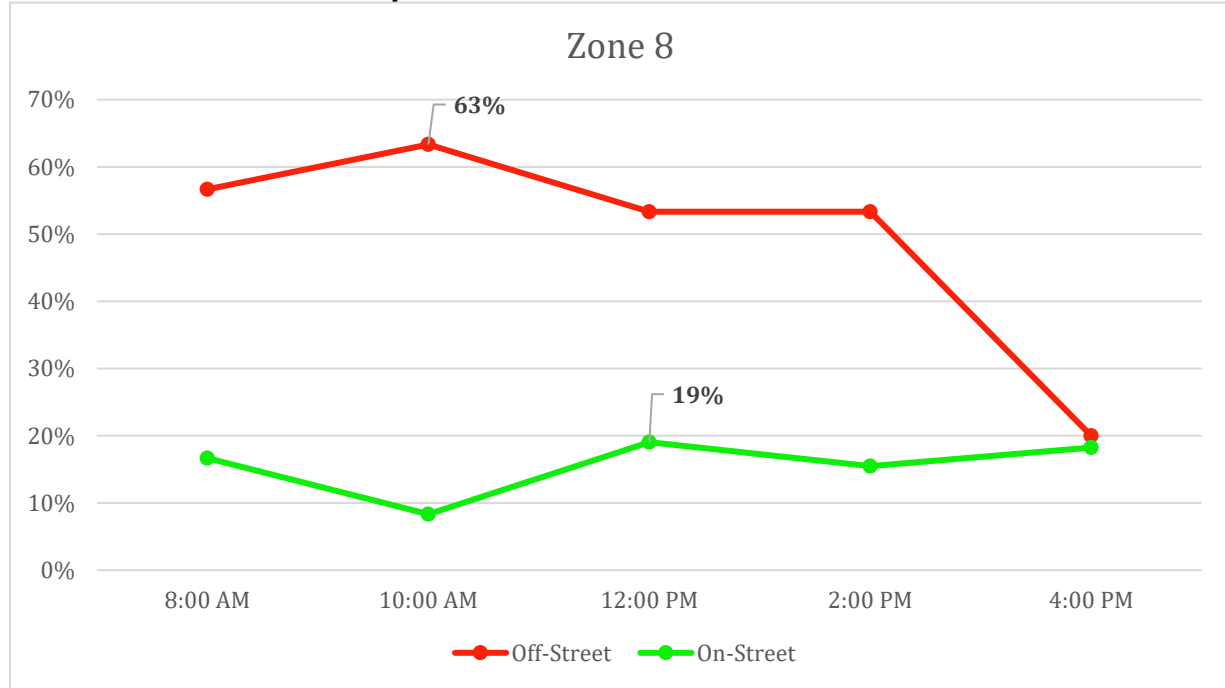


Table 3.22: Zone 8 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|---------------------------|-------------------|------------------|
| Occupancy Avg (%) | 49% | 15% |
| Peak Occupancy (%) | 63% | 19% |
| Peak Time | 10:00 AM | 12:00 PM |
| Hours over 80% | 0 | 0 |

Zone 8 – Qualicum Beach

Graph 3.26: Zone 8 Off-Street / On-Street

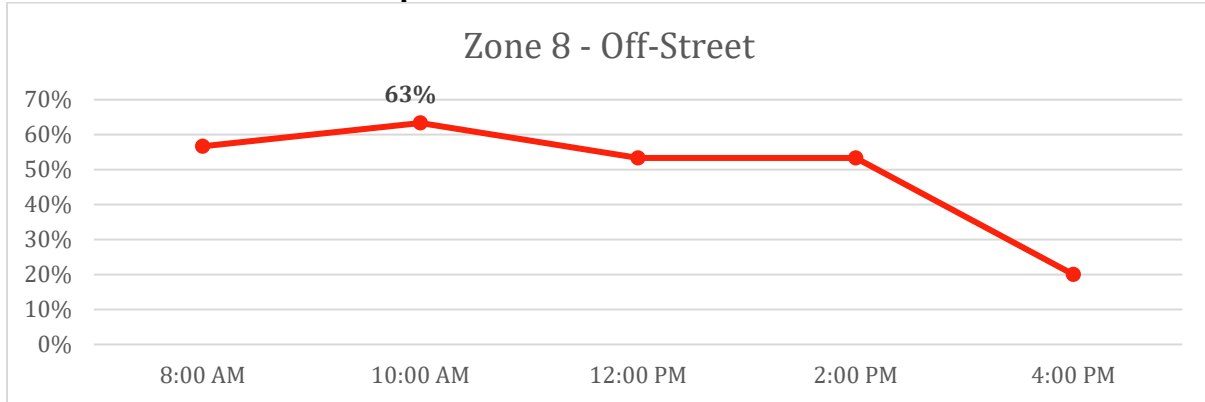


Table 3.23: Zone 8 - Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 57% | 63% | 53% | 53% | 20% | 49% |

Graph 3.27: Zone 8 - On-Street

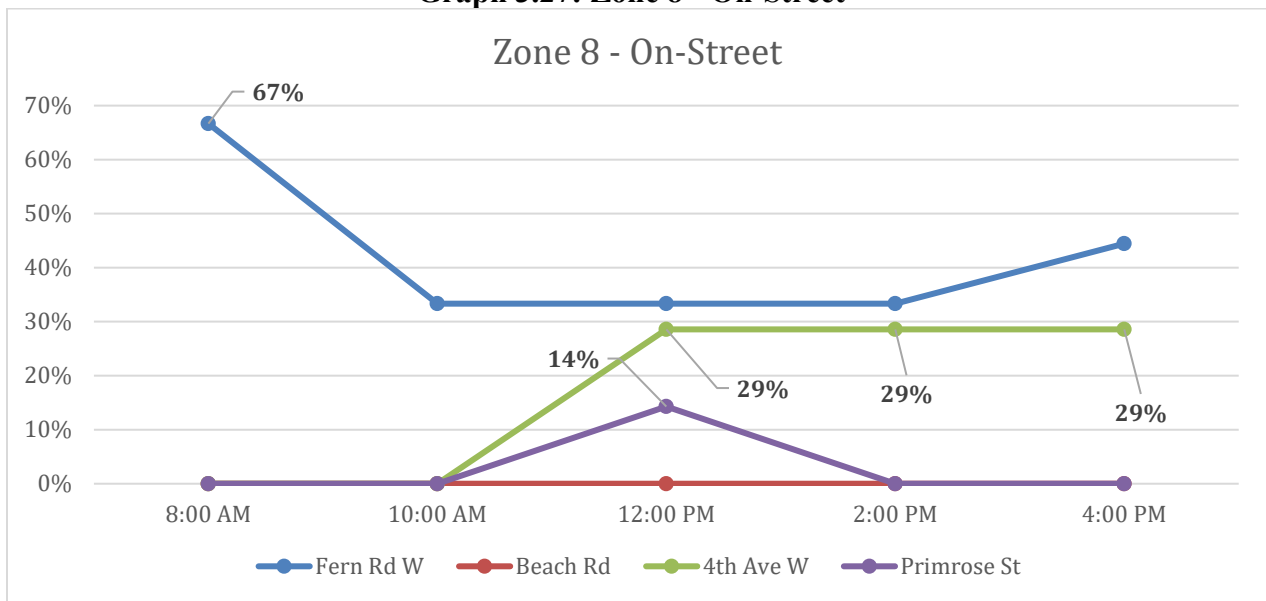
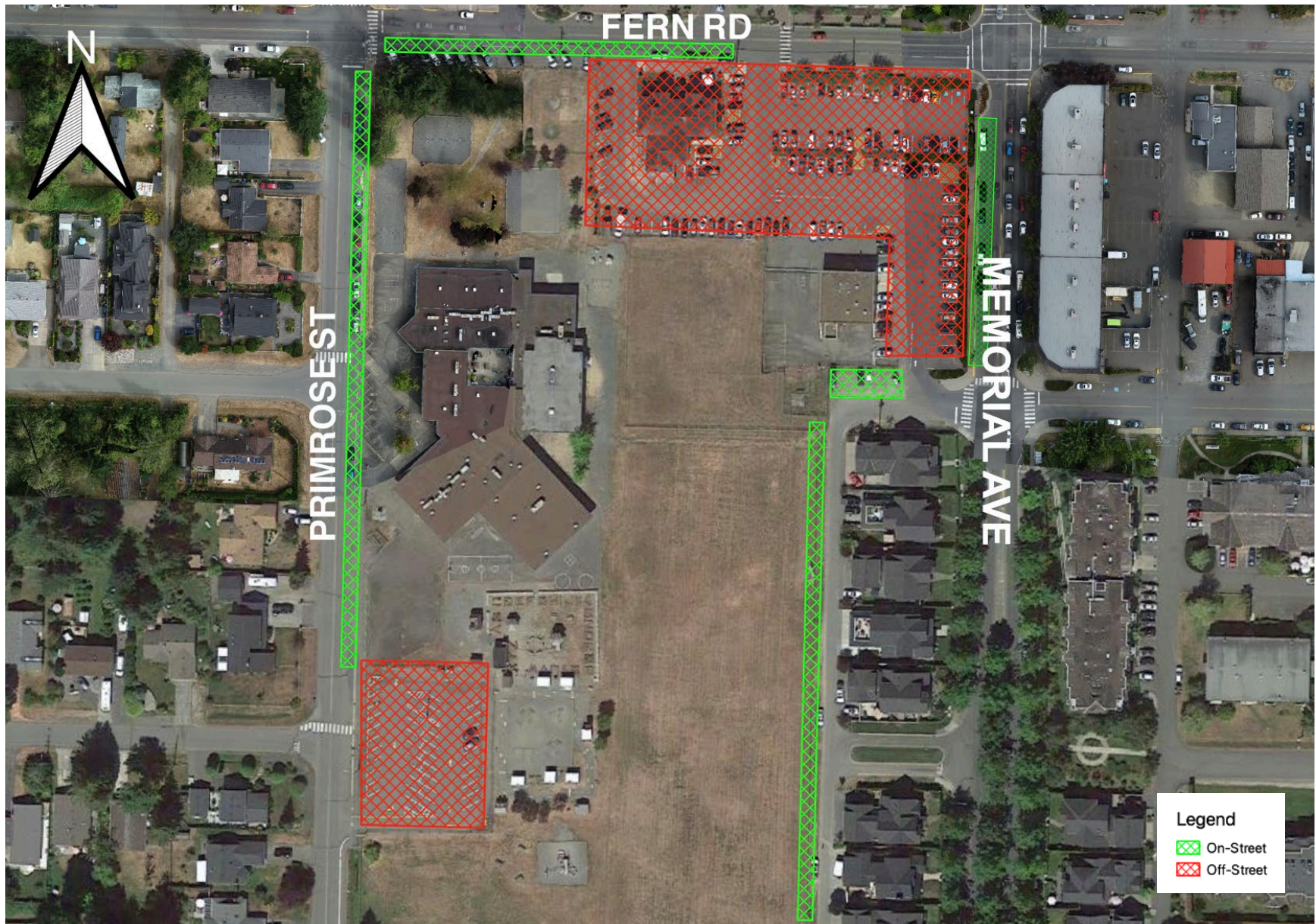


Table 3.24: Zone 8 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|-----------------------------|---------|----------|----------|---------|---------|-----------------------------|
| Fern Rd W | 67% | 33% | 33% | 33% | 44% | 42% |
| Beach Rd | 0% | 0% | 0% | 0% | 0% | 0% |
| 4th Ave W | 0% | 0% | 29% | 29% | 29% | 17% |
| Primrose St | 0% | 0% | 14% | 0% | 0% | 3% |

Zone 9 – Qualicum Beach



Zone 9 – Qualicum Beach

Graph 3.28: Zone 9 Off-Street / On-Street

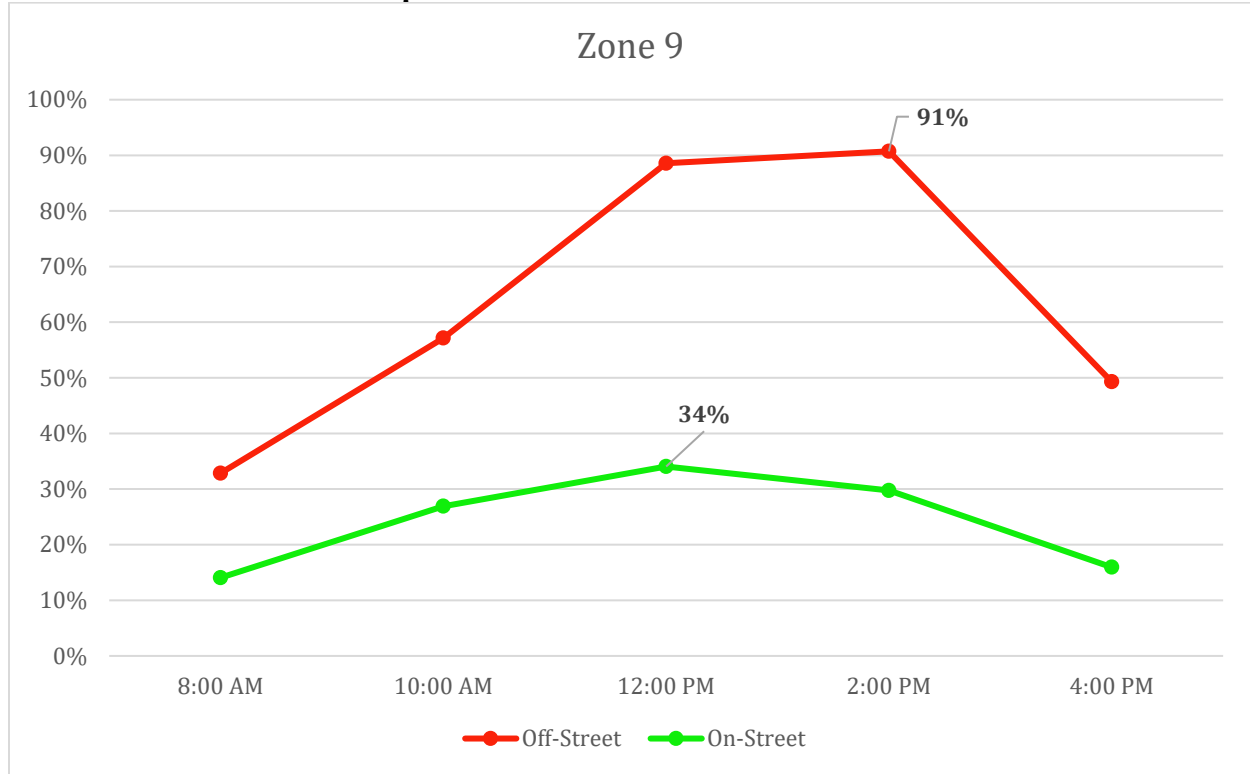


Table 3.25: Zone 9 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | 64% | 24% |
| Peak Occupancy (%) | 91% | 34% |
| Peak Time | 2:00 PM | 12:00PM |
| Hours over 80% | 4 | 0 |

Zone 9 – Qualicum Beach

Graph 3.29: Zone 9 - Off-Street

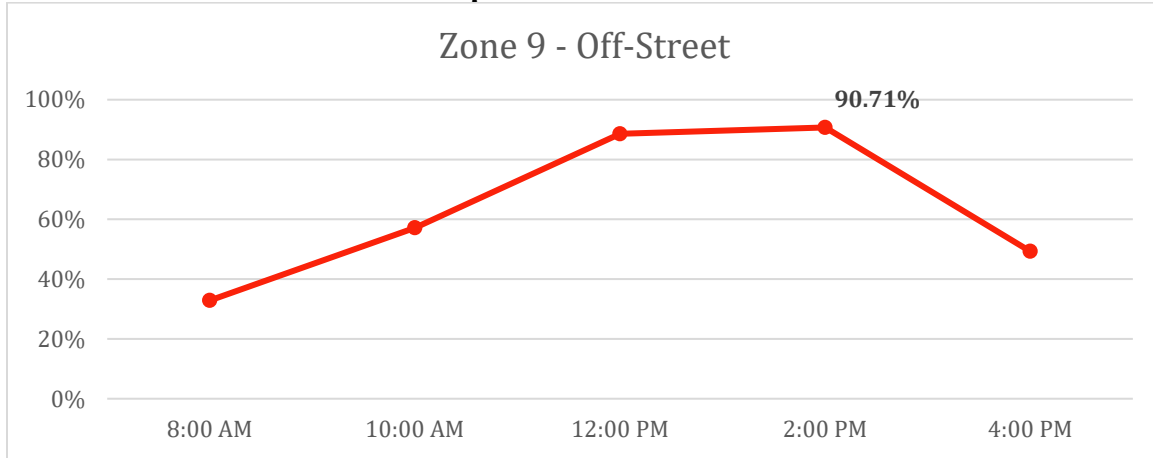


Table 3.26: Zone 9 - Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 33% | 57% | 89% | 91% | 49% | 64% |

Graph 3.30: Zone 9 - On-Street

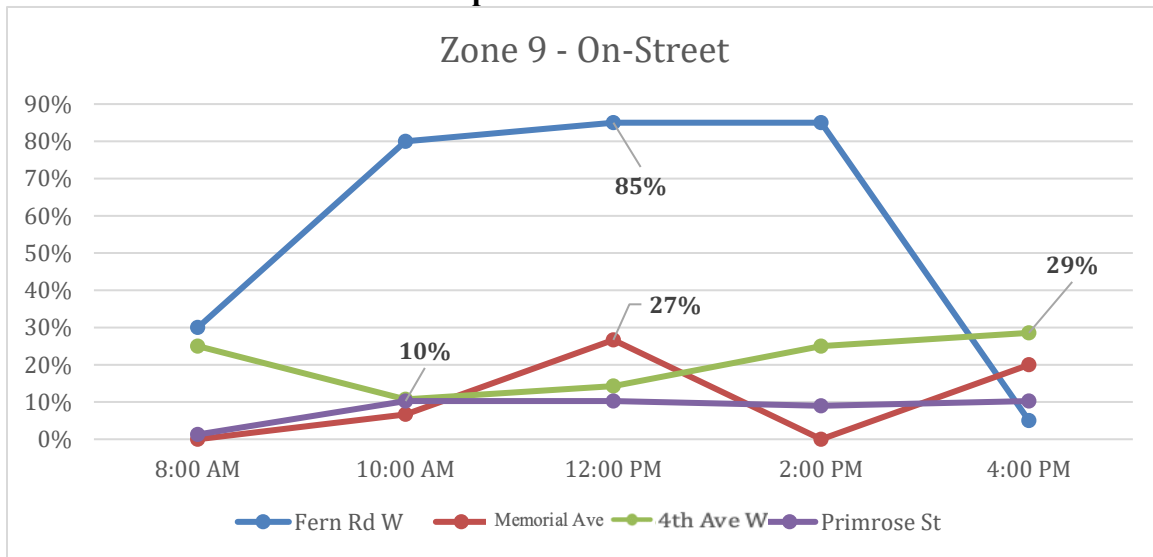
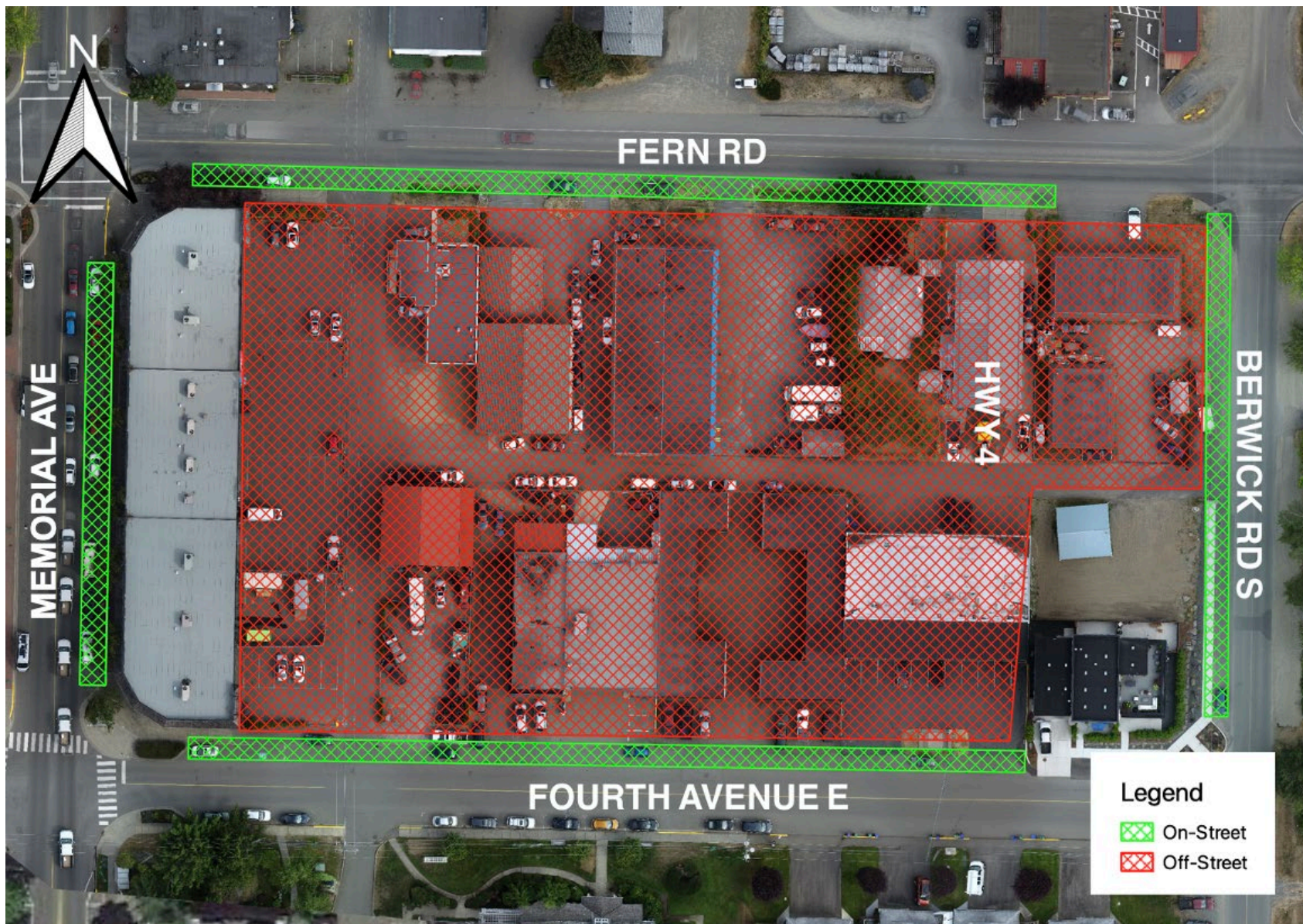


Table 3.27: Zone 9 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2: 00 PM | 4:00 PM | Daily Average Occupancy (%) |
|-----------------------------|---------|----------|----------|----------|---------|-----------------------------|
| Fern Rd W | 30% | 80% | 85% | 85% | 5% | 57% |
| Memorial Ave | 0% | 7% | 27% | 0% | 20% | 11% |
| 4th Ave W | 25% | 11% | 14% | 25% | 29% | 21% |
| Primrose St | 1% | 10% | 10% | 9% | 10% | 8% |

Zone 10 – Qualicum Beach



Zone 10 – Qualicum Beach

Graph 3.31: Zone 10 Off-Street / On-Street

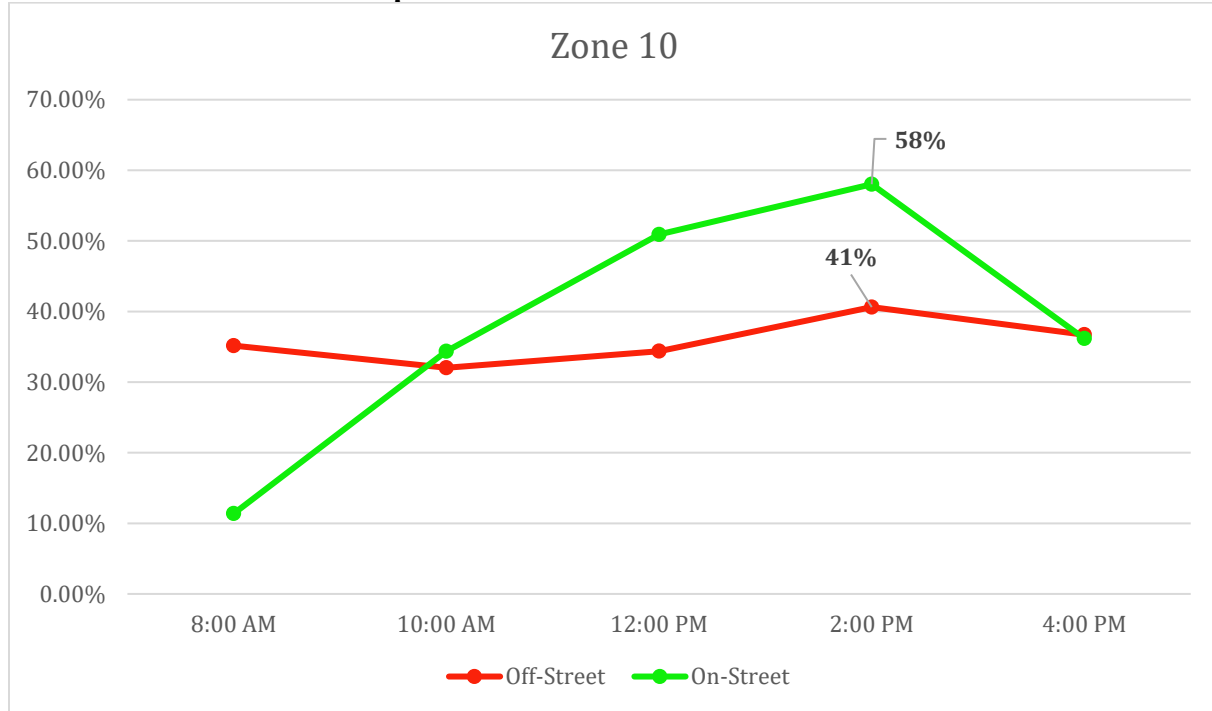


Table 3.28: Zone 10 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | 36% | 38% |
| Peak Occupancy (%) | 41% | 58% |
| Peak Time | 2:00 PM | 2:00 PM |
| Hours over 80% | 0 | 0 |

Zone 10 – Qualicum Beach

Graph 3.32: Zone 10 - Off-Street

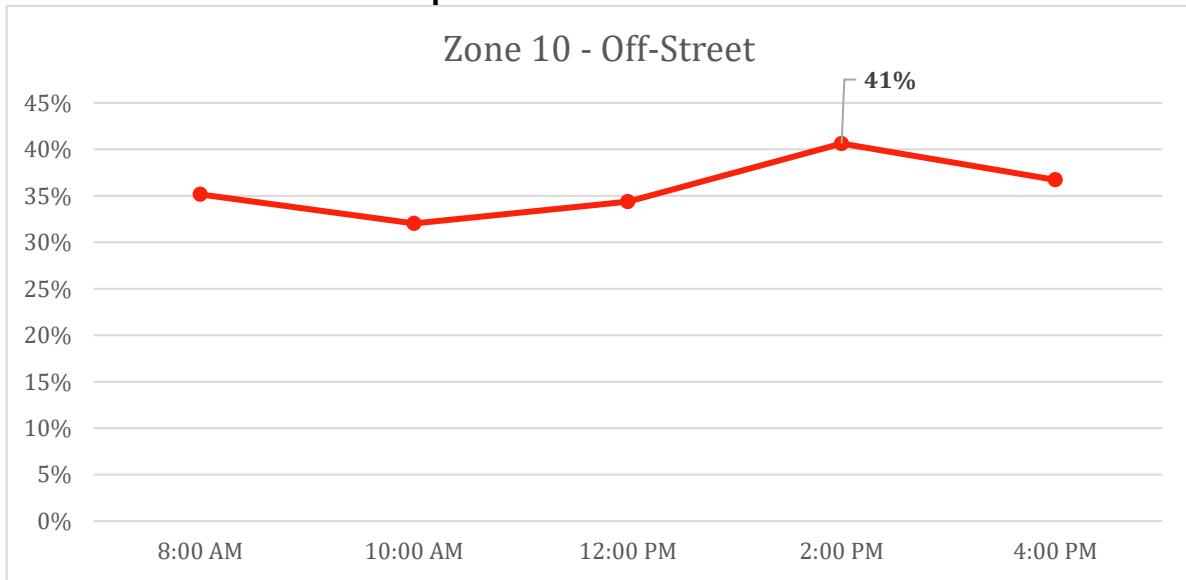


Table 3.29: Zone 10 Off-Street

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 35% | 32% | 34% | 41% | 37% | 36% |

Graph 3.33: Zone 10 - On-Street

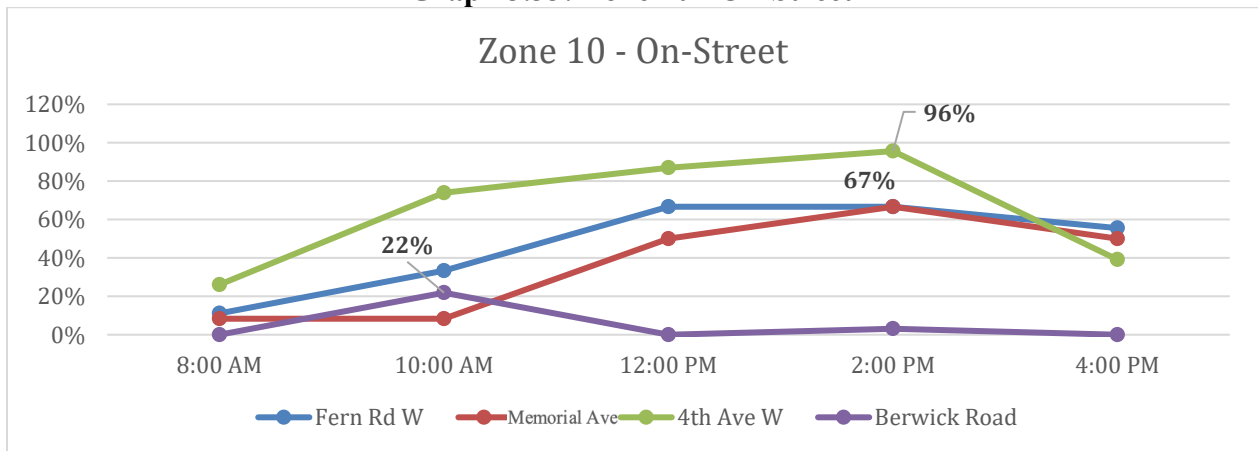


Table 3.30: Zone 10 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|-----------------------------|---------|----------|----------|---------|---------|-----------------------------|
| Fern Rd W | 11% | 33% | 67% | 67% | 56% | 47% |
| Memorial Ave | 8% | 8% | 50% | 67% | 50% | 37% |
| 4th Ave W | 26% | 74% | 87% | 96% | 39% | 64% |
| Berwick Rd | 0% | 22% | 0% | 3% | 0% | 5% |

Zone 11 – Qualicum Beach



Zone 11 – Qualicum Beach

Graph 3.34: Zone 11 Off-Street / On-Street

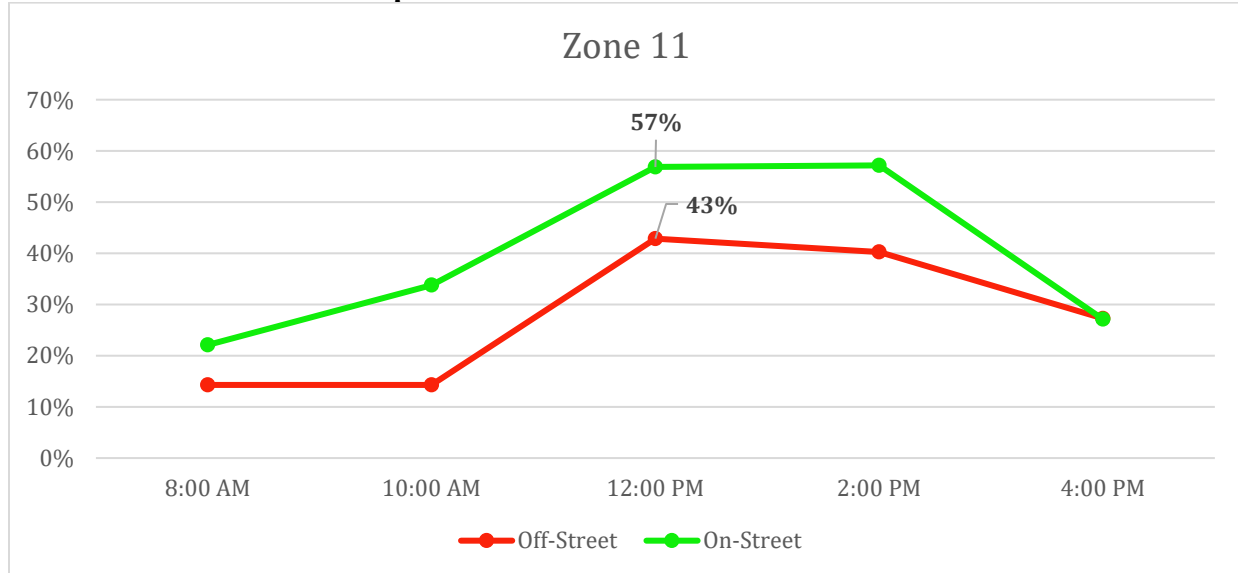


Table 3.31: Zone 11 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|---------------------------|------------|-----------|
| Occupancy Avg (%) | 28% | 39% |
| Peak Occupancy (%) | 57% | 43% |
| Peak Time | 12:00 PM | 12:00 PM |
| Hours over 80% | 0 | 0 |

Zone 11 – Qualicum Beach

Graph 3.35: Zone 11 - Off-Street

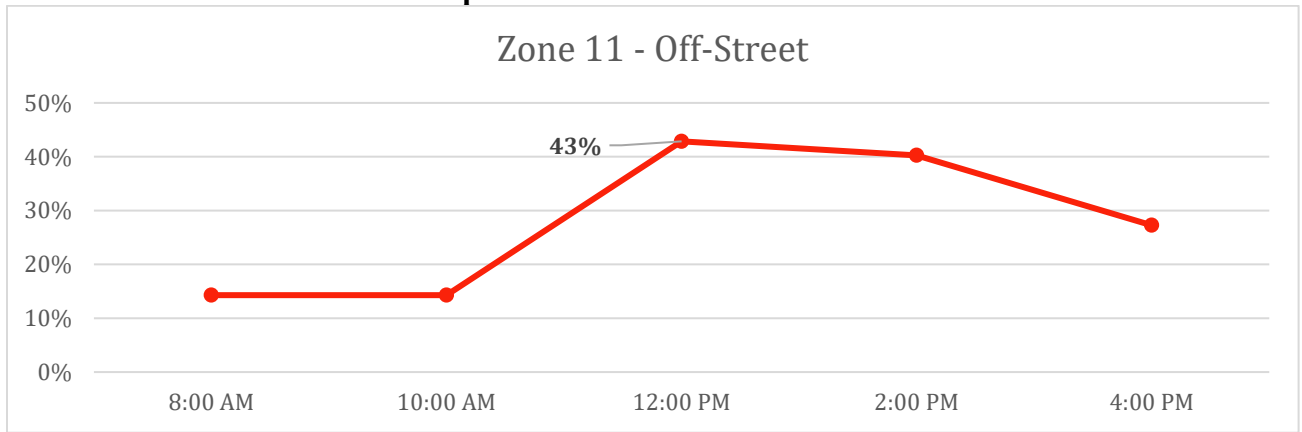


Table 3.32: Zone 11 Off-Street / On-Street Summary

| 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------|----------|----------|---------|---------|-----------------------------|
| 14% | 14% | 43% | 40% | 27% | 28% |

Graph 3.35: Zone 11 - On-Street

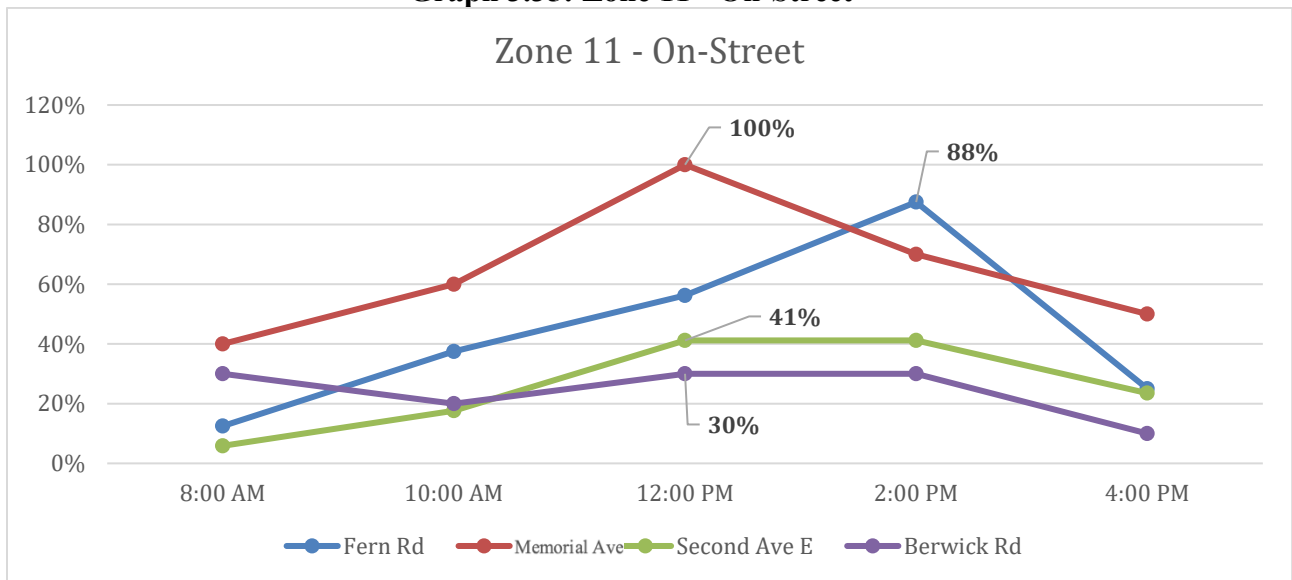


Table 3.33: Zone 11 - On-Street

| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|-----------------------------|---------|----------|----------|---------|---------|-----------------------------|
| Fern Rd W | 13% | 38% | 56% | 88% | 25% | 22% |
| Memorial Ave | 40% | 60% | 100% | 70% | 50% | 34% |
| 2nd Ave E | 6% | 18% | 41% | 41% | 24% | 57% |
| Berwick Rd | 30% | 20% | 30% | 30% | 10% | 57% |

Zone 12 – Qualicum Beach



Zone 12 – Qualicum Beach

Graph 3.36: Zone 12 Off-Street / On-Street

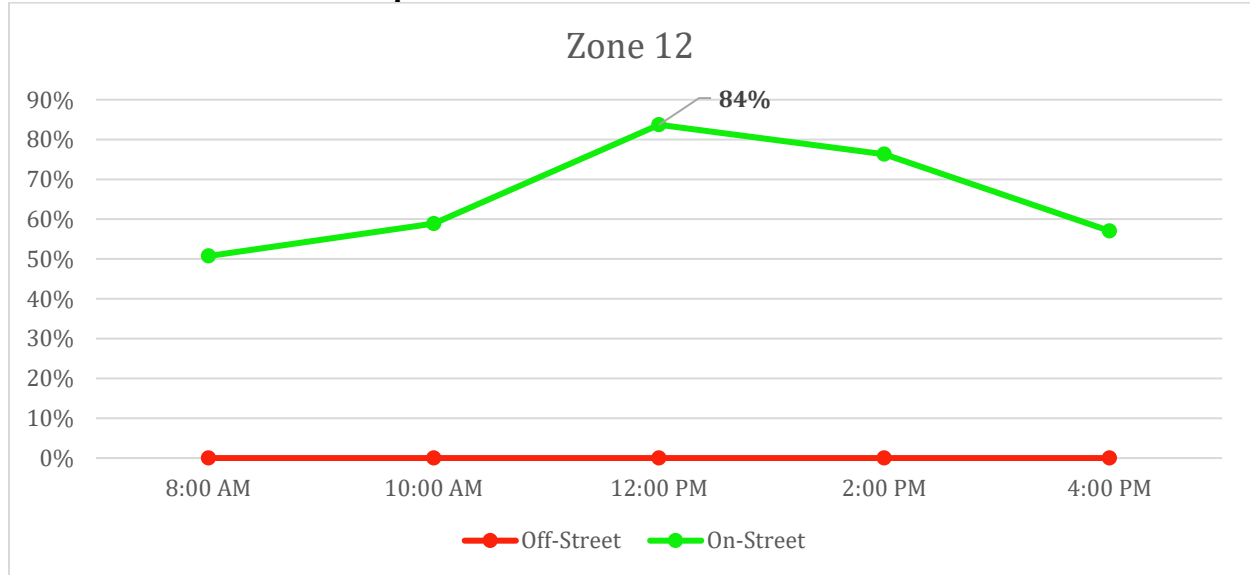


Table 3.34: Zone 12 Off-Street / On-Street Summary

| | Off-Street | On-Street |
|--------------------|------------|-----------|
| Occupancy Avg (%) | N/A | 65% |
| Peak Occupancy (%) | N/A | 84% |
| Peak Time | N/A | 12:00 PM |
| Hours over 80% | N/A | 0 |

Zone 12 – Qualicum Beach

Graph 3.37: Zone 12 - On-Street

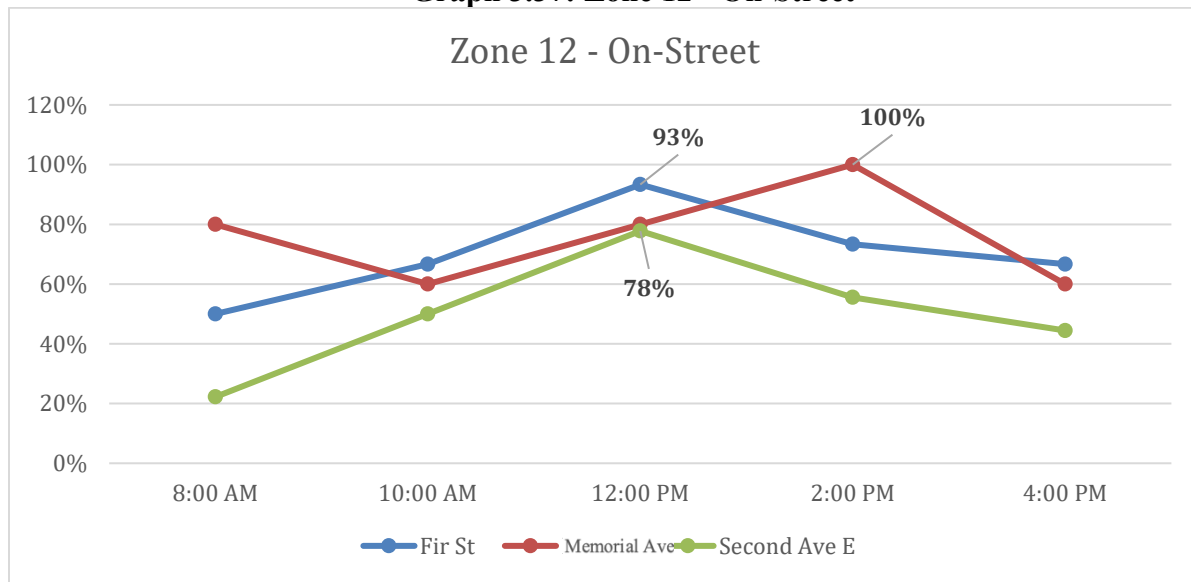


Table 3.35: Zone 12 – On-Street

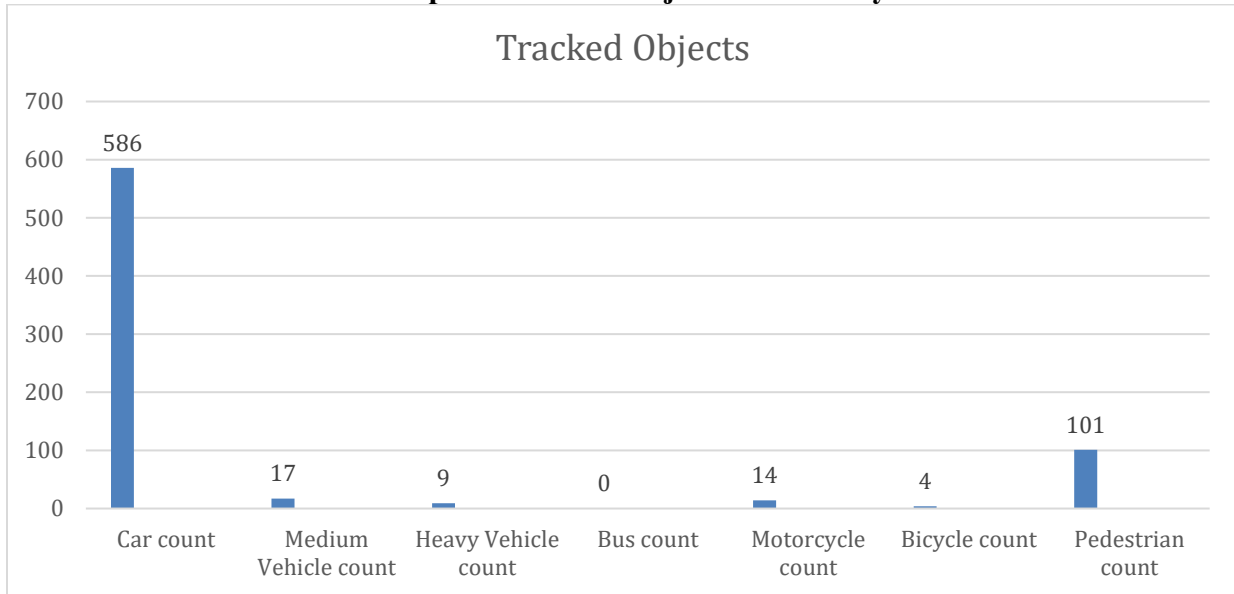
| | 8:00 AM | 10:00 AM | 12:00 PM | 2:00 PM | 4:00 PM | Daily Average Occupancy (%) |
|---------------------|---------|----------|----------|---------|---------|-----------------------------|
| Fir St | 50% | 67% | 93% | 73% | 67% | 70% |
| Memorial Ave | 80% | 60% | 80% | 100% | 60% | 76% |
| Second Ave E | 22% | 50% | 78% | 56% | 44% | 50% |

4.0 Results - Traffic Survey

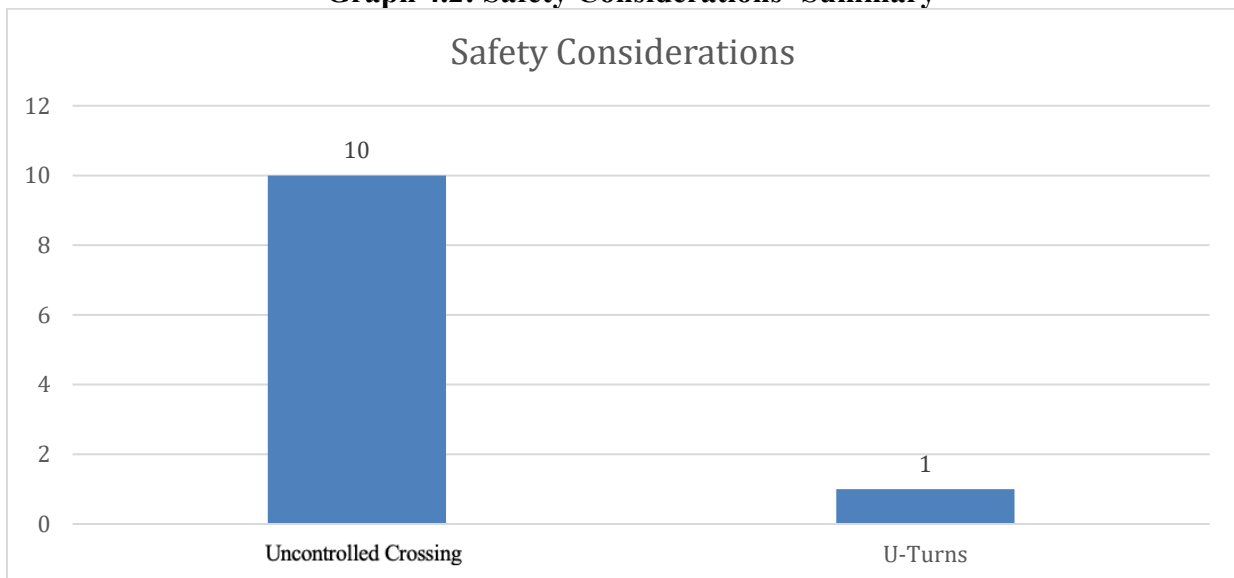
4.1 Traffic Overview

The following analysis depicts, and outlines identifies objects and some the potential safety considerations within the observed intersections.

Graph 4.1: Track Objects - Summary



Graph 4.2: Safety Considerations- Summary

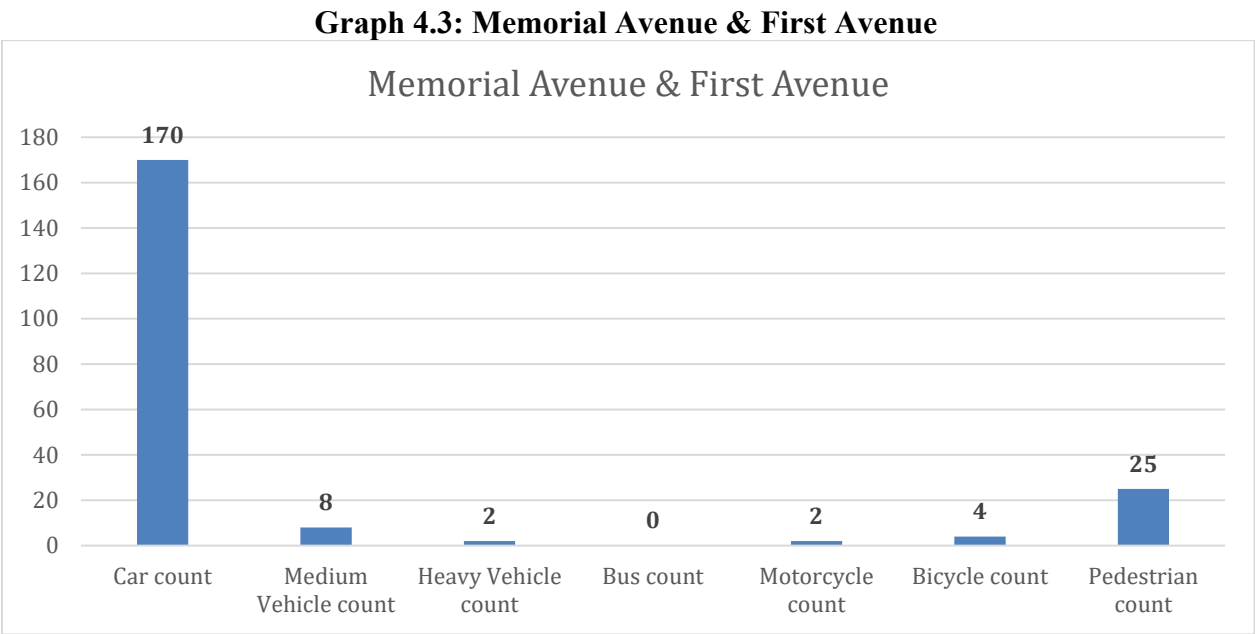


Memorial Avenue & First Avenue

The intersection of Memorial Avenue and First Avenue is the gateway into the Town of Qualicum Beach and is the direct route for individuals heading towards the beach. Highway 4 and First Avenue also crosses the popular Dollymount trail. Notably in this intersection several popular businesses are located close to the intersection such as Naked Naturals and Petro Canada. Most locals heading into town will pass through this intersection and tourists heading towards the beach.

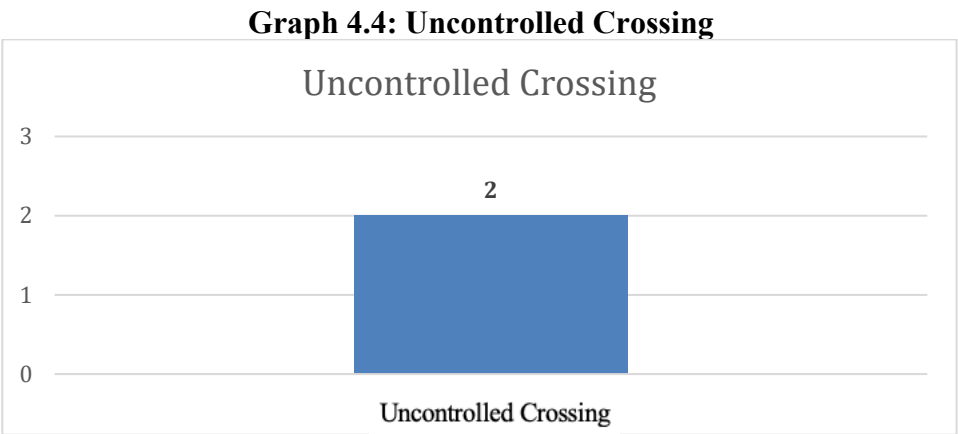
Because of the above reasons, Memorial Avenue & First Avenue was used as a test bed for georeferencing a video. From this, additional metrics and statics have been able to be pulled including, speed, acceleration, safety metrics, and more.

The following graph illustrates summary of tracked vehicle statistics for the intersection:



From the collected results, Memorial Ave & First Avenue saw the second highest vehicle and pedestrian traffic. Of the tracked objects within this intersection, the majority were cars (170). This was then followed by pedestrians (25), medium vehicle (8), Bicycles (4), heavy vehicles (2), and motorcycle (2). From these results, safety consideration can be identified.

The following graph illustrates summary of safety statistics for the intersection:



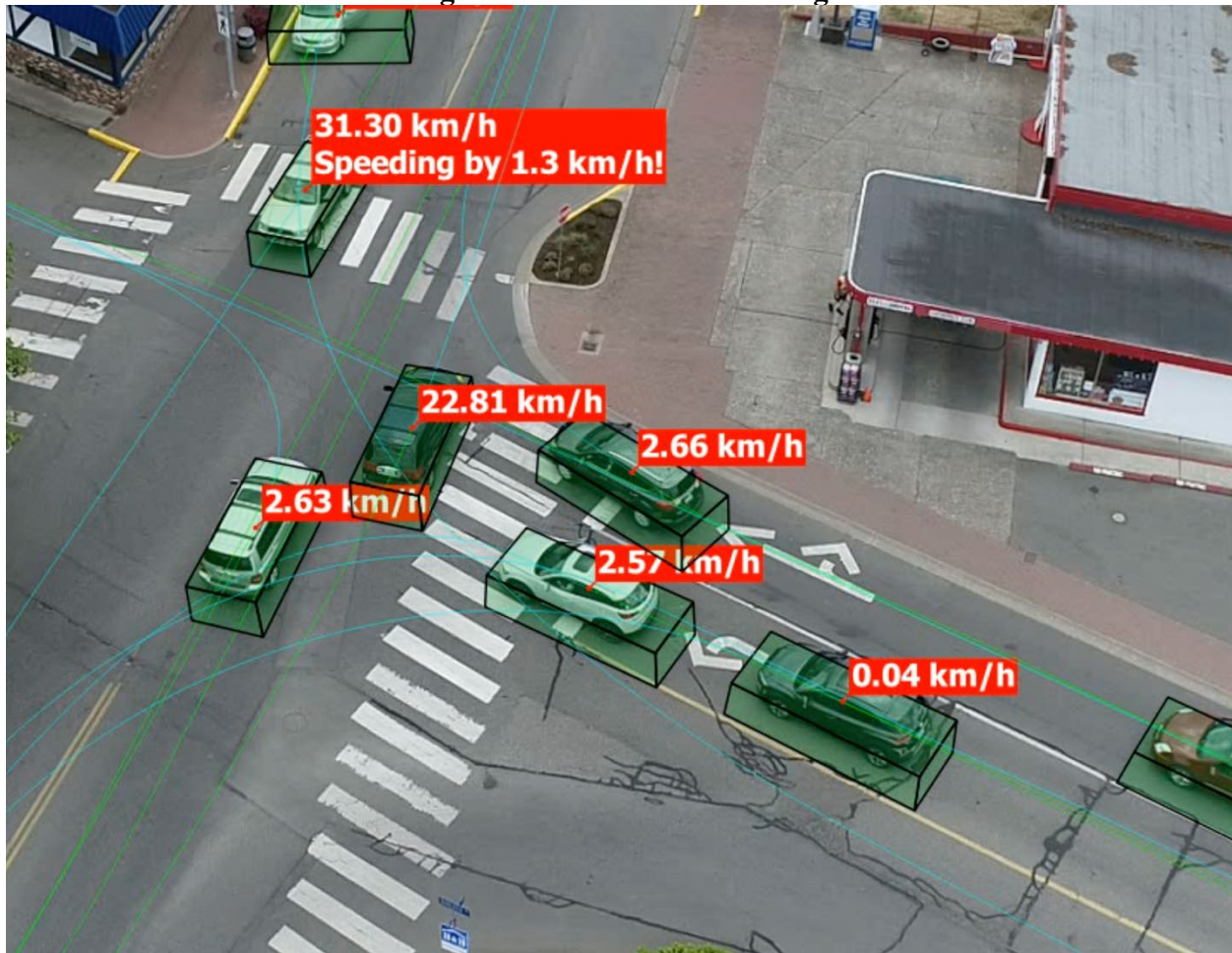
At 48 seconds it is observed that 2 uncontrolled crossing were made at intersection as shown below. In this case, a vehicle turning right heading south on Memorial Ave could have hit these pedestrians. It is also noted that there were instances that vehicles entered this intersection at an excess of 35 km/h.

Figure 4.1: Uncontrolled Crossing Safety Concern



Additionally, speeding metrics were pulled. There were no instances of actual speeding observed, however, to showcase this feature a speeding metric of +30 km/h was used.

Figure 4.2: Unsafe Car Passing



At 2 minutes and 27 second as seen in the photo above it is observed that a vehicle illegally passed another car turning left on First Avenue. This could have many implications such as the car turning right onto Memorial Ave could collide with vehicle passing.

Video 1 – Safety Analysis: <https://www.youtube.com/watch?v=B-fMO8CKK4E>

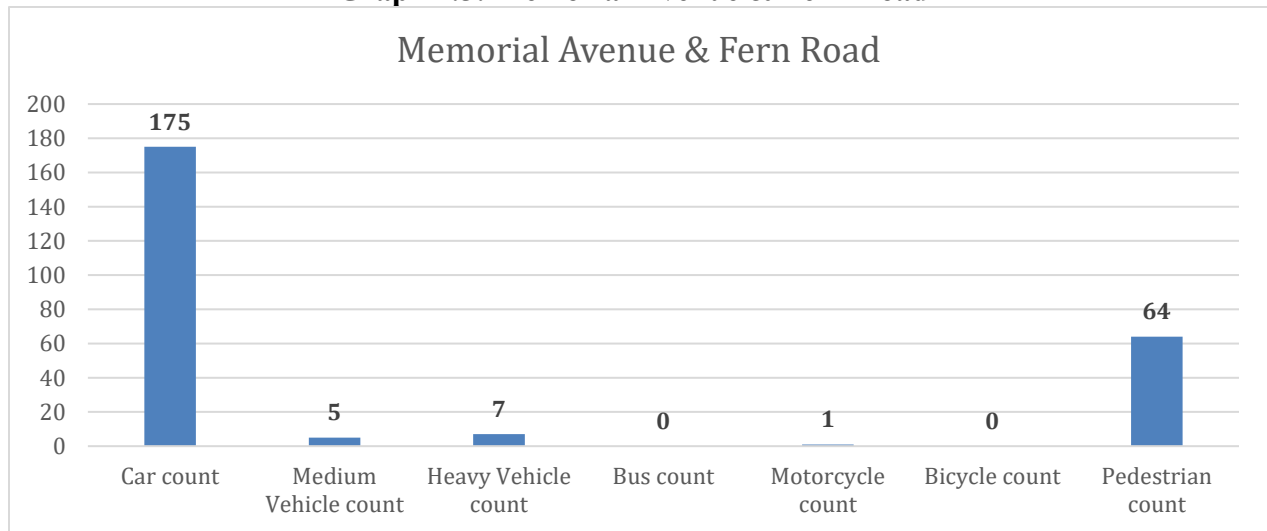
Video 2 – Gates: <https://www.youtube.com/watch?v=kGwZ0AXCf5Q>

Memorial Avenue & Fern Road

The intersection of Highway 4 and Fern Road is located near Qualicum Beach's town center and is the only intersection in Qualicum Beach with a traffic light. Several popular businesses are located close to the intersection such as Qualicum Food, Pharmasave, and Lefty's. Additionally, it acts as a major traffic hub for the rest of the community. As a result, most people entering and leaving Qualicum Beach will pass through this intersection.

The following graph illustrates summary of tracked vehicle statistics for the intersection:

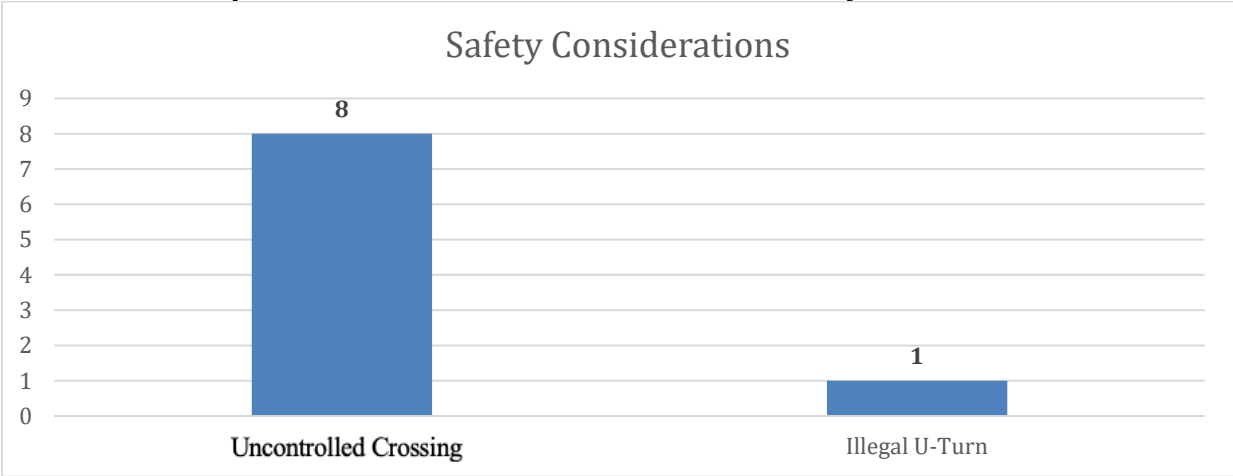
Graph 4.5: Memorial Avenue & Fern Road



From the collected results, Memorial Avenue & Fern Road saw that highest vehicle and pedestrian traffic. Due to the proximity to Qualicum Foods and surrounding businesses this is not surprising. Of the tracked objects within this intersection, the majority were cars (175). This was then followed by pedestrians (64), heavy vehicles (7), medium vehicle (5), and motorcycle (1). From these results, safety consideration can be identified.

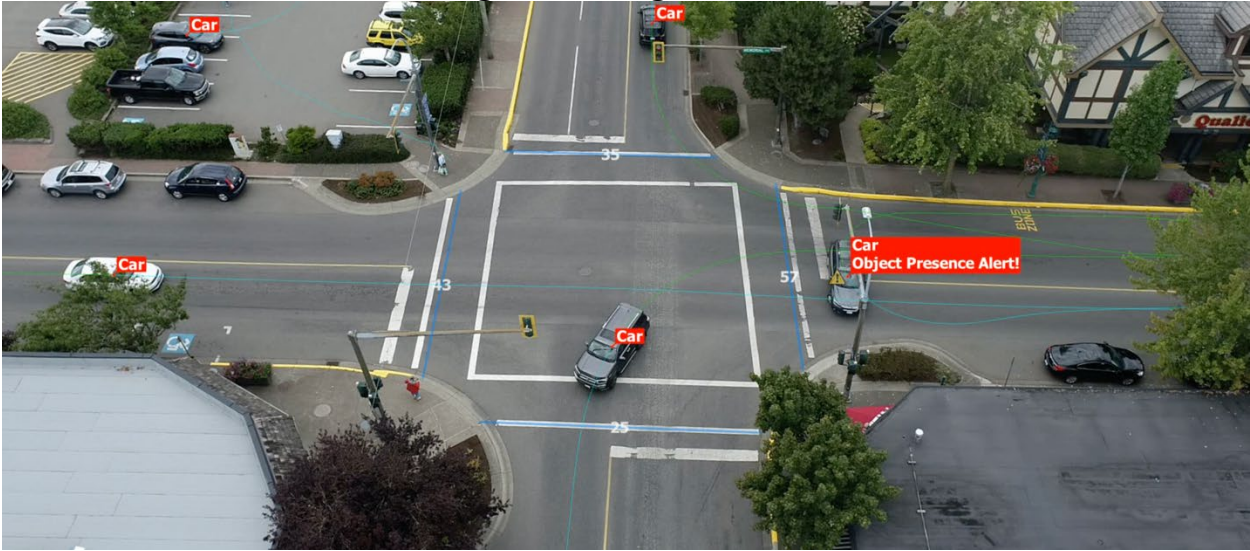
The following graph illustrates summary of safety statistics for the intersection:

Graph 4.6: Memorial Avenue & Fern Road Safety Considerations



From an analysis, observations showed that, at 4 minutes and 2 seconds a grey Subaru heading southbound on Memorial Ave made an illegal U-turn right before the Memorial Avenue & Fern Road intersection. A U-turn in this instance is an illegal maneuver that could have resulted in a serious accident.

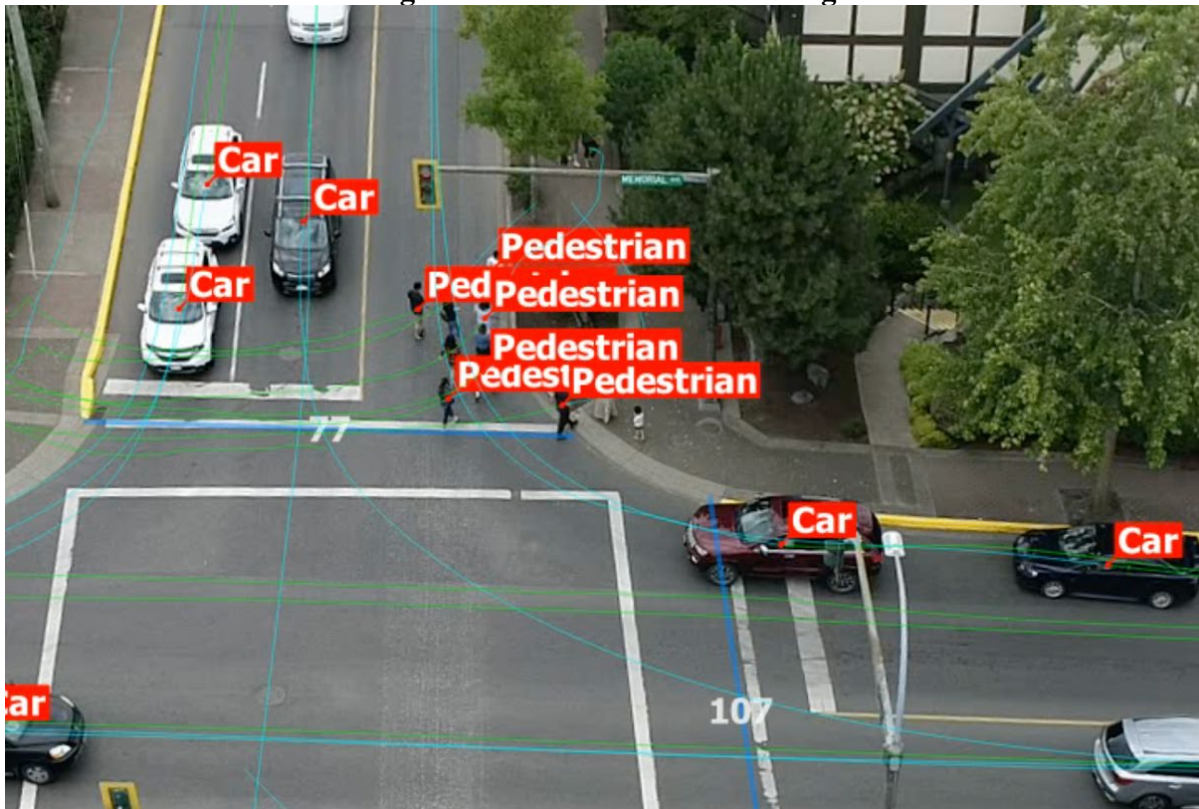
Figure 4.3: Illegal U-Turn



As shown in the above image, this U-turn was directly in front of a cross walk and had vehicles approaching (White car).

At 8 minutes and thirty seconds, it was observed that a group of pedestrians crossed a crosswalk and walked into the street to cut a corner. As show below, in this case, a vehicle could have either turned right onto Fern Road hitting the group of pedestrians.

Figure 4.4: Uncontrolled Crossing

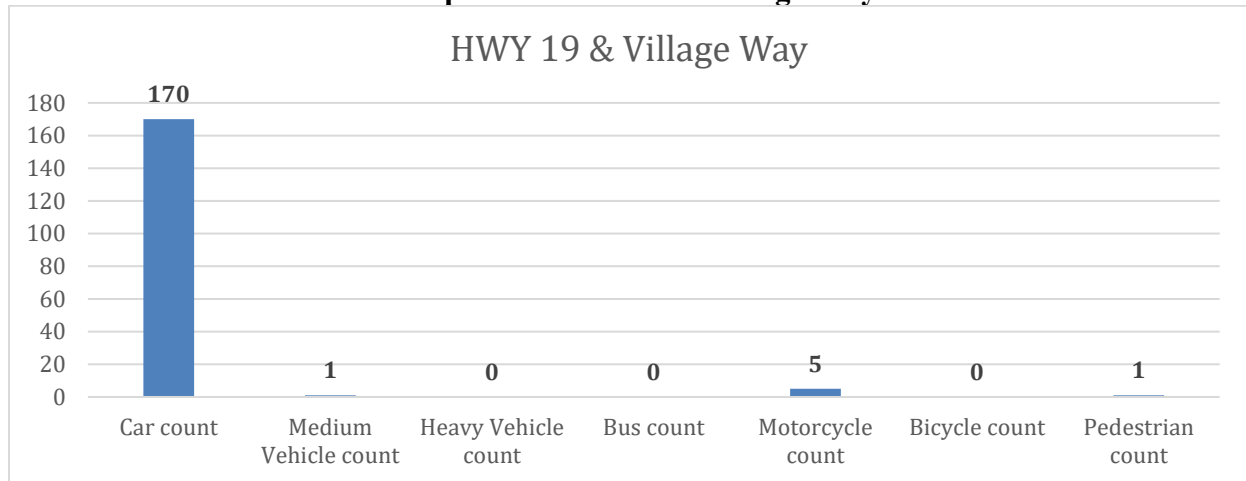


Video 3: <https://youtu.be/IEWGXHibP0c>

HWY 19 & Village Way

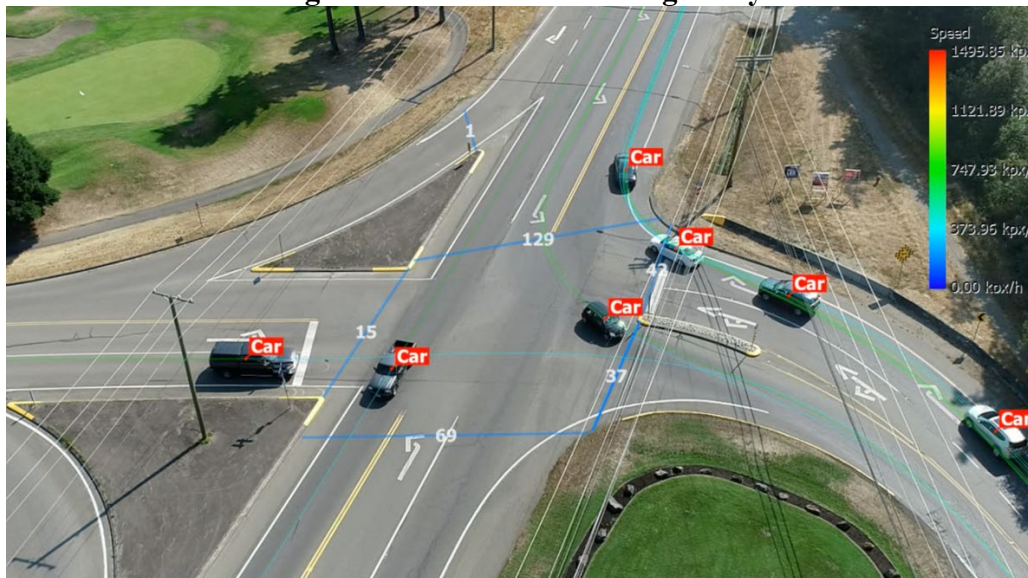
The intersection of HWY 19 and Village Way is located near Eagle Crest Golf course. This intersection is a main intersection for traffic from Parksville entering into Qualicum Beach or leaving Qualicum beach. Near this intersection are establishments such as Arrowsmith Elementary School and Eagle Crest Golf Course.

Graph 4.7: HWY 19 & Village Way



Of the tracked objects within this intersection, the majority were cars (170). This was then followed by motorcycle's (11), Pedestrians (1) and Medium Vehicles (1). Within this area, there were no traffic infraction or major safety concerns observed.

Figure 4.5: HWY 19 & Village Way

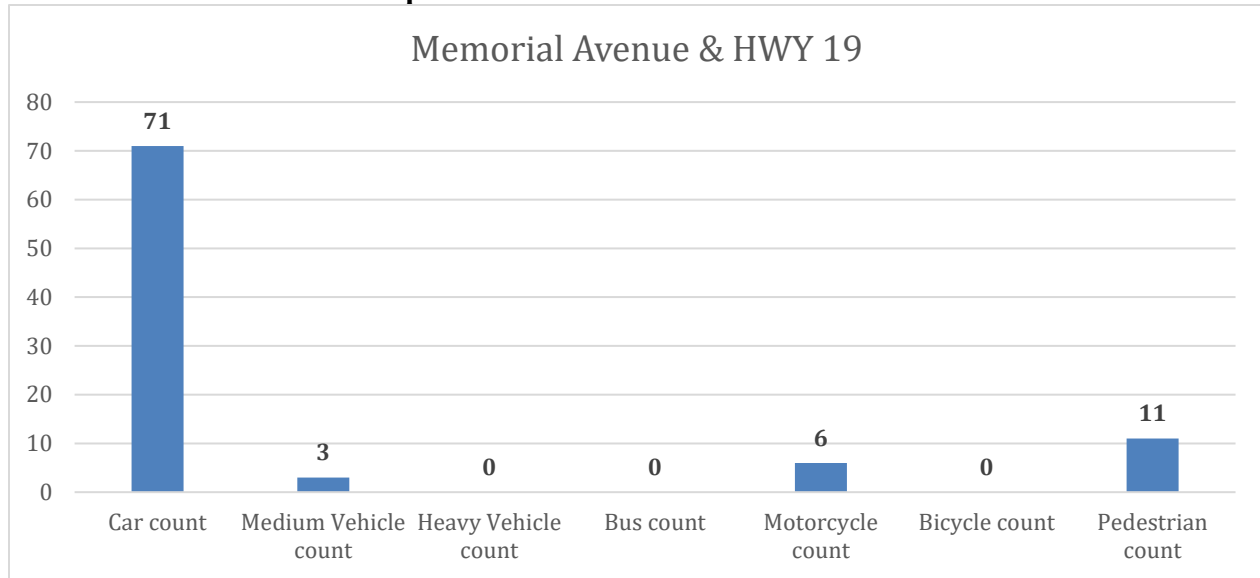


Video 4: <https://www.youtube.com/watch?v=P6e8LXthdK0>

Memorial Avenue & HWY 19

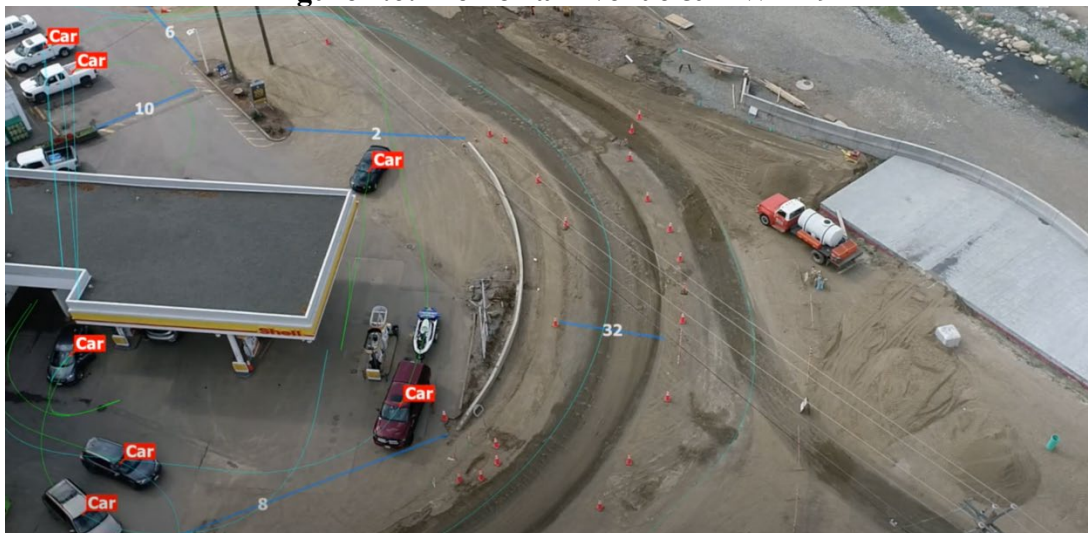
From the collected results Memorial Avenue & HWY 19 saw the lowest in total traffic volume. This is largely due to the ongoing construction within that area. This intersection saw a few pedestrians. No notable traffic infractions were observed.

Graph 4.8: Memorial Avenue & HWY 19



Of the tracked objects within this intersection, the majority were cars (71). This was then followed by motorcycle's (11), motorcycles (6) and Medium Vehicles (3). Within this area, there were no traffic infraction or major safety concerns observed.

Figure 4.6: Memorial Avenue & HWY 19



Video 5: <https://www.youtube.com/watch?v=xb2vv0kzTU4>

5.0 Summary of Findings

Typically, parking occupancy is affected the most when a business is the busiest or has parking nearby. This can create periods of high parking use and localize this demand in specific areas in Qualicum Beach. There may be instances where the demand for parking exceeds the supply in each area depending on the availability of parking stalls.

The following tables outline the peak on-street and off-street zones that saw the largest utilization throughout the day. This can be further analyzed as areas of potential concern.

Table 5.1: Off-Street Peak zones

| | Time | Number of Stalls | Number of Used Stalls | Utilization % |
|---------------|---------|------------------|-----------------------|---------------|
| Zone 6 | 2:00 PM | 141 | 128 | 90.78% |
| Zone 9 | 2:00 PM | 140 | 127 | 90.71% |

Table 5.2: On-Street Peak

| | Time | Street | Number of Stalls | Number of Used Stalls | Utilization % |
|----------------|----------|--------------|------------------|-----------------------|---------------|
| Zone 1 | 2:00 PM | Beach Rd | 12 | 12 | 100% |
| Zone 3 | 10:00 AM | 2nd Ave W | 16 | 16 | 100% |
| Zone 3 | 12:00 PM | 2nd Ave W | 16 | 15 | 94% |
| Zone 3 | 2:00 PM | 2nd Ave W | 16 | 16 | 100% |
| Zone 4 | 2:00 PM | 2nd Ave W | 14 | 14 | 100% |
| Zone 6 | 2:00 PM | 2nd Ave W | 14 | 14 | 100% |
| Zone 6 | 4:00 PM | 2nd Ave W | 14 | 14 | 100% |
| Zone 6 | 4:00 PM | Fern Rd W | 6 | 6 | 100% |
| Zone 6 | 10:00 AM | Primrose St | 12 | 11 | 92% |
| Zone 10 | 2:00 PM | 4th Ave W | 23 | 22 | 96% |
| Zone 11 | 2:00 PM | Memorial Ave | 10 | 10 | 100% |
| Zone 12 | 12:00 PM | Memorial Ave | 5 | 5 | 100% |

Using this information, it is possible to outline zones that see the most frequent high utilization. Primary zone users were determined based on surrounding residents and business. The following identified zones represent the areas with the highest cause for concern:

Zone 3

Primary Zone User Types: Town Center Visitors / Shoppers, Town Center Employees / Business Owners

Off-Street: The off-street parking in zone 3 is primarily comprised of commercial parking. Zone 2 reached peak occupancy at 10:00 AM with concentrations of the parking around the Town Hall and RBC. Parking utilization at 10:00 AM is quite high with 84.91%.

Overall average occupancy is 65.66%.

On-Street: The on-street parking in zone 3 is mostly comprised of visitor parking. Second Ave W and Memorial Ave utilization rates exceed 100%. Around are several key businesses such as RBC, Café's, and more.

Overall average occupancy is 59.47%

Summary: Zone 3 needs some parking management attention. Traffic could be redirected from on-street parking for Second Ave W and Memorial Ave to other zones with lower utilization.

Zone 6

Primary Zone User Types: Town Center Visitors / Shoppers, Town Center Employees / Business Owners

Off-Street: The off-street parking in zone 6 is primarily comprised of visitor / shopper parking and business employee / owner parking. High parking utilization was seen at 2:00 PM with utilization exceeding 90%. Parking buildup is focused in the Qualicum Foods Parking lot and the B.C. Liquor Parking Lot.

Overall average occupancy is 63.97%.

On-Street: The on-street parking in zone 6 is mostly of visitor / shopper parking. Second Ave W, Fern Rd, Primrose and Memorial Ave saw utilization rates exceed 85%. Around are businesses such as Qualicum Foods, B.C. Liquor, and Qualicum Bakery.

Overall average occupancy is 65.04%

Summary: Zone 6 needs parking management attention. Off-street and On-street traffic could be directed from zone 6 to other under-utilized zones.

Zone 9

Primary Zone User Types: Town Center Visitors / Shoppers, Town Center Employees / Business Owners

Off-Street: The off-street parking in zone 9 is primarily comprised of visitor / shopper parking and business employee / owner parking. High parking utilization was seen at 2:00 PM with utilization exceeding 90%. Parking buildup is focused as extra parking for Qualicum Foods visitors and staff.

Overall average occupancy is 63.71%.

On-Street: The on-street parking in zone 9 is mostly of visitor / shopper parking. Fern Rd saw high utilization across the day with 6 hours exceeding 80% occupancy. This is largely due to Qualicum Foods.

Overall average occupancy is 24.15%

Summary: Zone 9 needs parking management attention. Off-street traffic could be directed from zone 6 to other under-utilized zones.

Appendix A – Aerial Imagery

Zone 1

Aerial Imagery

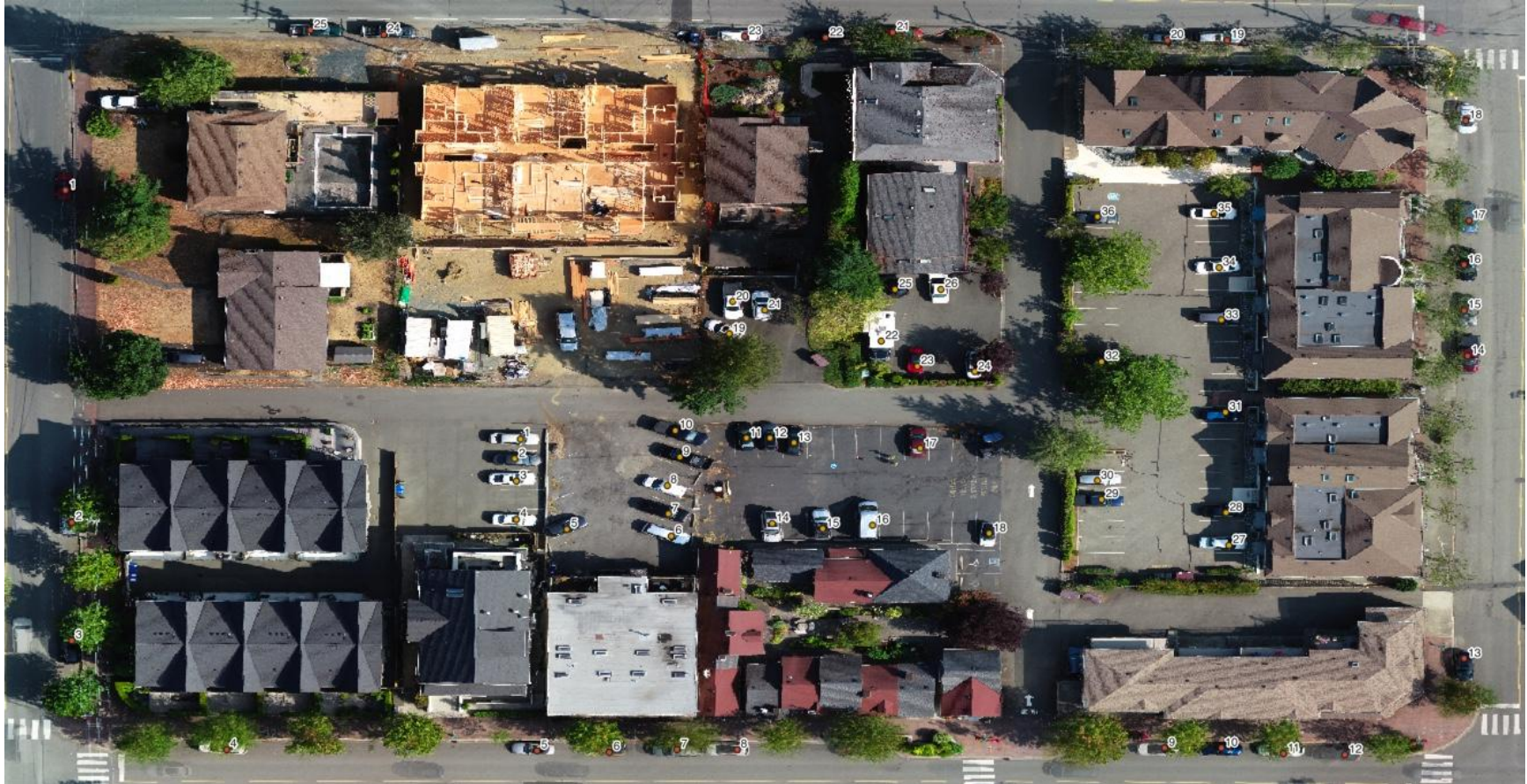
Zone 1 - 8AM

Roads: Top: 1st Avenue, **Right:** Beach Street, **Bottom:** 2nd Avenue, **Left:** Jones Street



Zone 1 - 10AM

Roads: **Top:** 1st Avenue, **Right:** Beach Street, **Bottom:** 2nd Avenue, **Left:** Jones Street



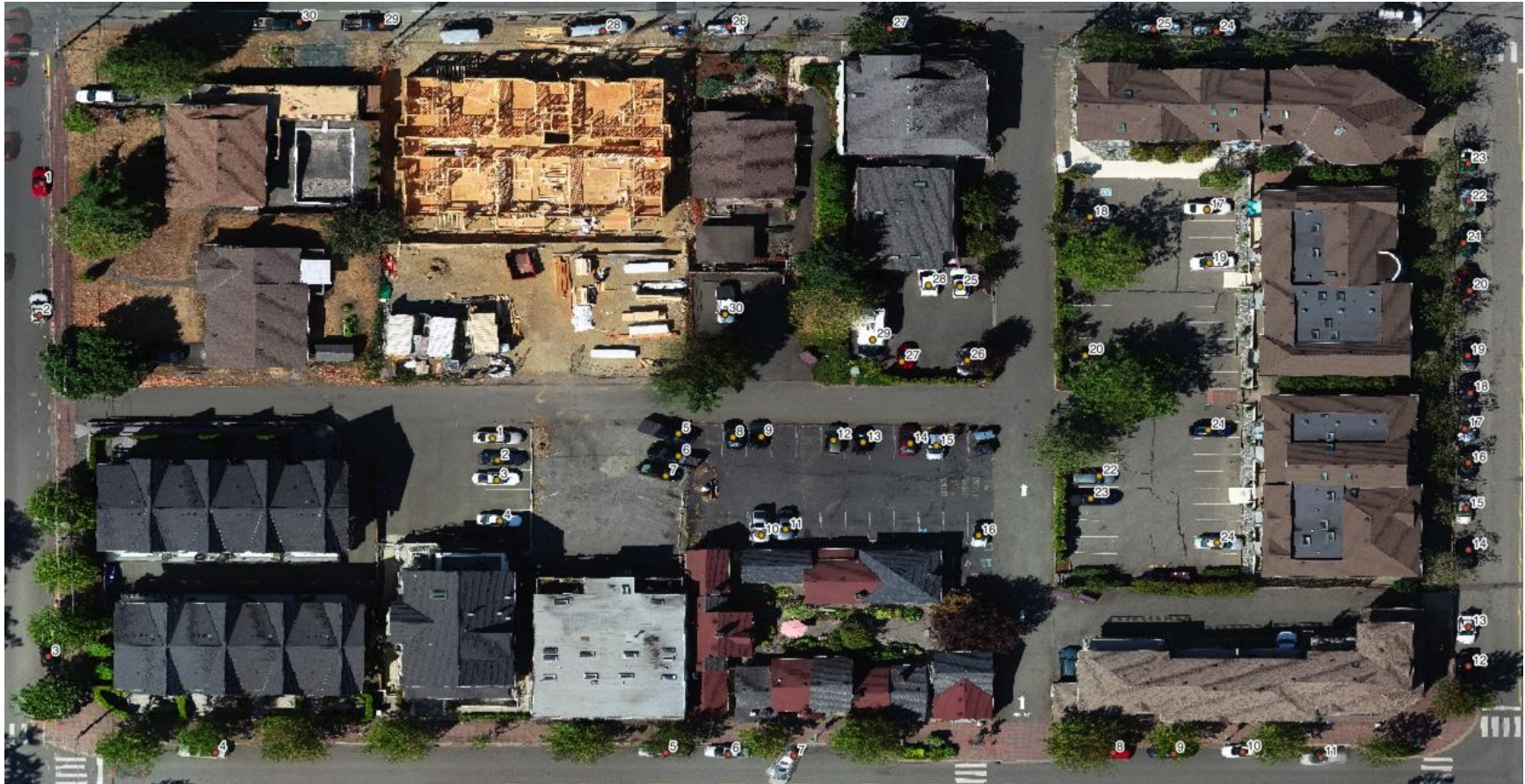
Zone 1 - 12PM

Roads: **Top:** 1st Avenue, **Right:** Beach Street, **Bottom:** 2nd Avenue, **Left:** Jones Street



Zone 1 - 2PM

Roads: **Top:** 1st Avenue, **Right:** Beach Street, **Bottom:** 2nd Avenue, **Left:** Jones Street



Zone 1 - 4PM

Roads: **Top:** 1st Avenue, **Right:** Beach Street, **Bottom:** 2nd Avenue, **Left:** Jones Street



Zone 2

Aerial Imagery

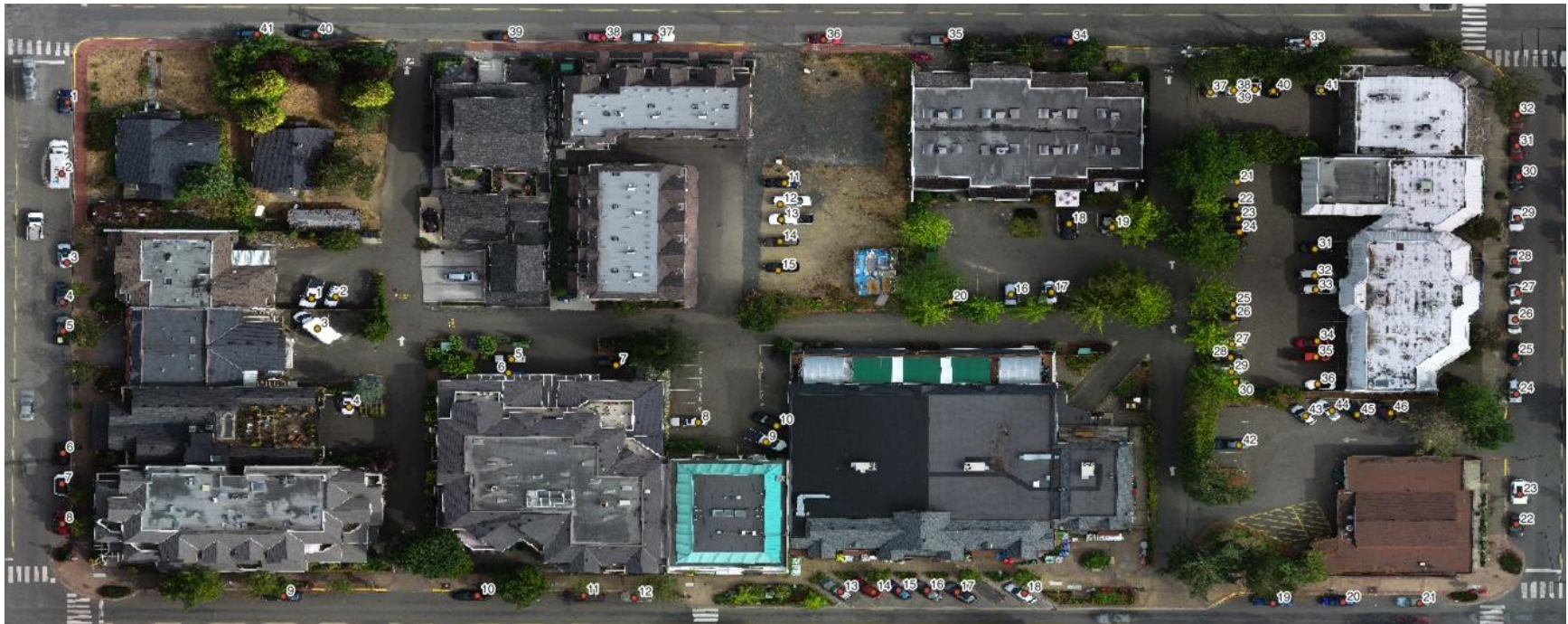
Zone 2 - 8AM

Roads: **Top:** 1st Avenue, **Right:** Primrose Street, **Bottom:** 2nd Avenue, **Left:** Beach Street



Zone 2 - 10AM

Roads: **Top:** 1st Avenue, **Right:** Primrose Street, **Bottom:** 2nd Avenue, **Left:** Beach Street



Zone 2 - 12PM

Roads: **Top:** 1st Avenue, **Right:** Primrose Street, **Bottom:** 2nd Avenue, **Left:** Beach Street



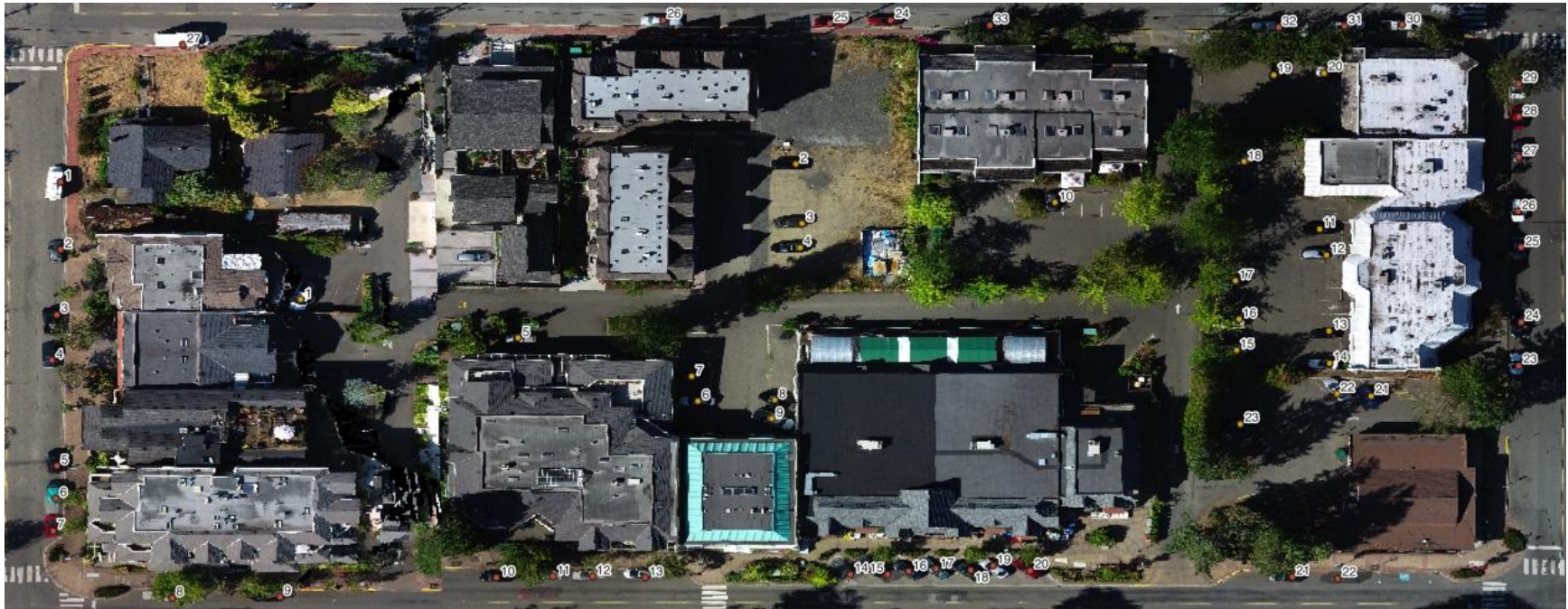
Zone 2 - 2PM

Roads: **Top:** 1st Avenue, **Right:** Primrose Street, **Bottom:** 2nd Avenue, **Left:** Beach Street



Zone 2 - 4PM

Roads: **Top:** 1st Avenue, **Right:** Primrose Street, **Bottom:** 2nd Avenue, **Left:** Beach Street

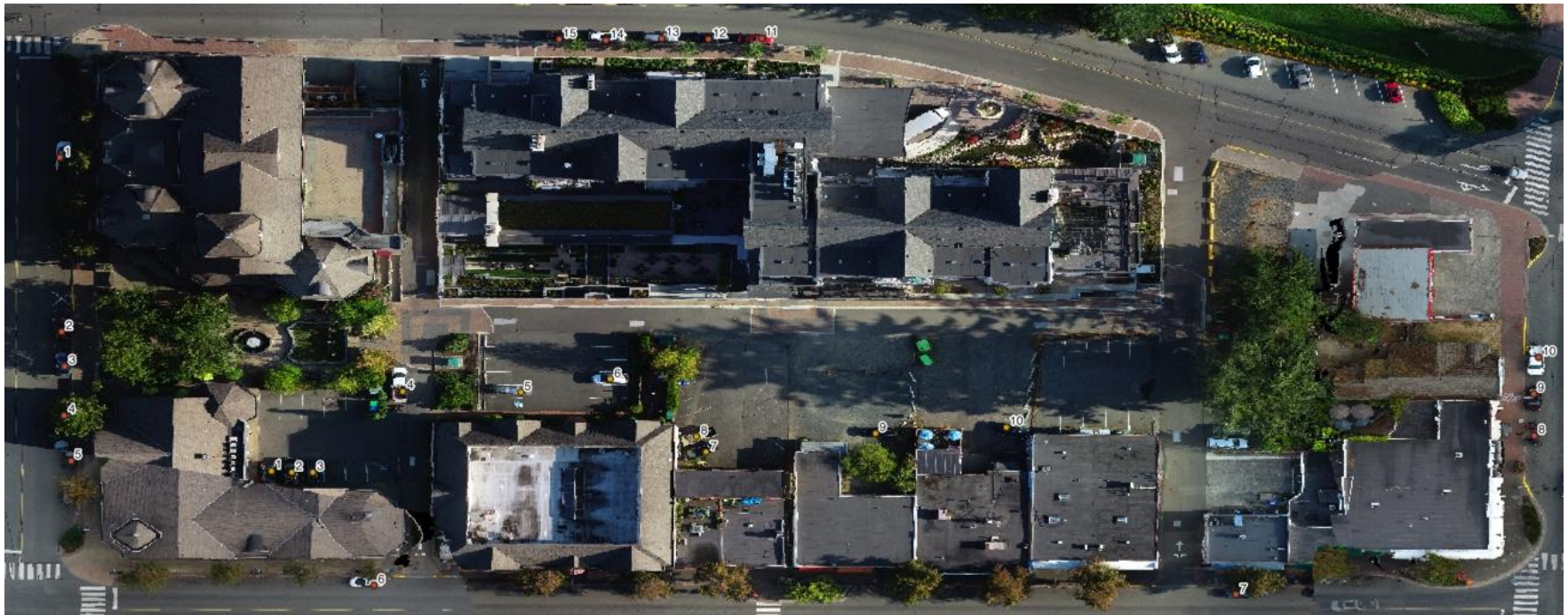


Zone 3

Aerial Imagery

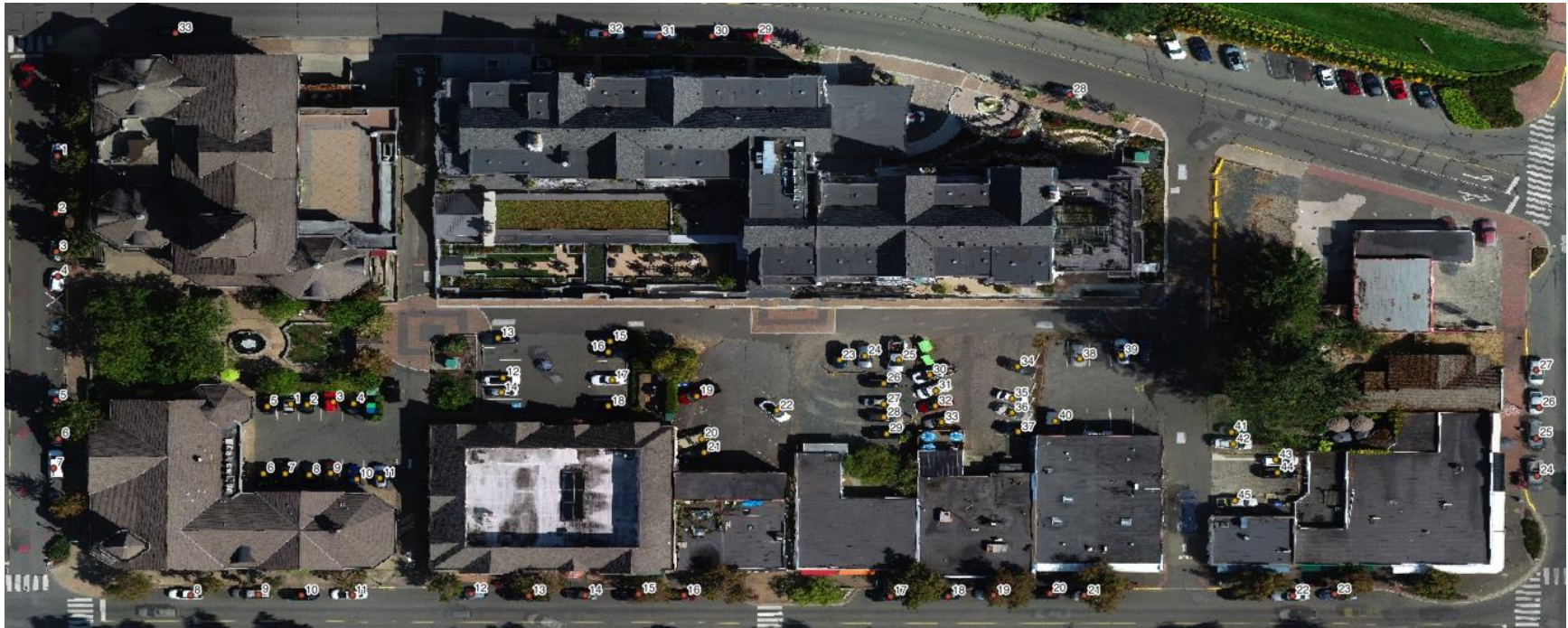
Zone 3 - 8AM

Roads: **Top:** 1st Avenue, **Right:** Memorial Ave, **Bottom:** 2nd Avenue, **Left:** Primrose Street



Zone 3 - 10AM

Roads: **Top:** 1st Avenue, **Right:** Memorial Avenue, **Bottom:** 2nd Avenue, **Left:** Primrose Street



Zone 3 - 12PM

Roads: **Top:** 1st Avenue, **Right:** Memorial Avenue, **Bottom:** 2nd Avenue, **Left:** Primrose Street



Zone 3 - 2PM

Roads: **Top:** 1st Avenue, **Right:** Memorial Avenue, **Bottom:** 2nd Avenue, **Left:** Primrose Street



Zone 3 - 4PM

Roads: **Top:** 1st Avenue, **Right:** Memorial Avenue, **Bottom:** 2nd Avenue, **Left:** Primrose Street

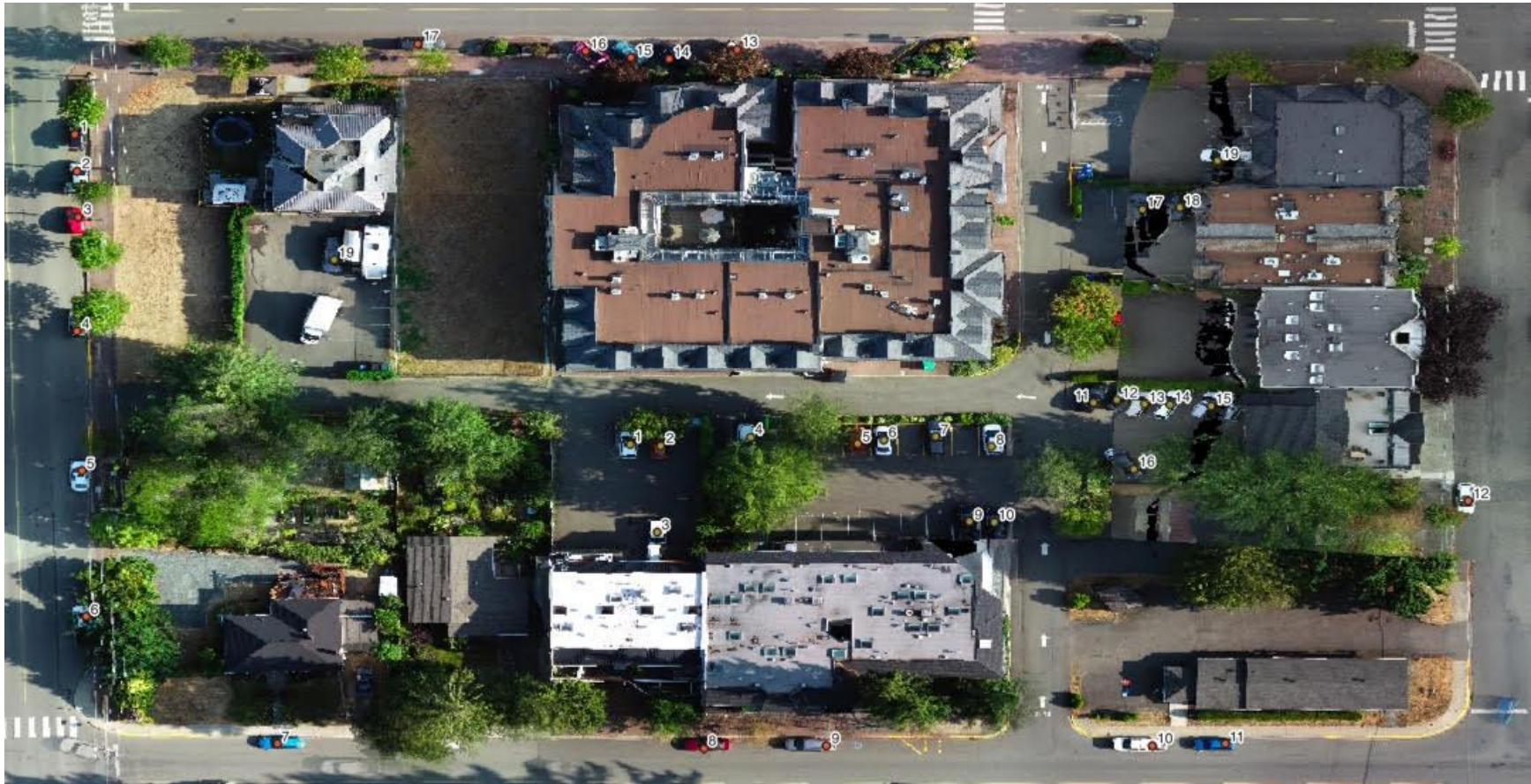


Zone 4

Aerial Imagery

Zone 4 - 8AM

Roads: **Top:** 2nd Avenue, **Right:** Beach Road, **Bottom:** Fern Road, **Left:** Jones Street



Zone 4 - 10AM

Roads: **Top:** 2nd Avenue, **Right:** Beach Road, **Bottom:** Fern Road, **Left:** Jones Street



Zone 4 - 12PM

Roads: **Top:** 2nd Avenue, **Right:** Beach Road, **Bottom:** Fern Road, **Left:** Jones Street



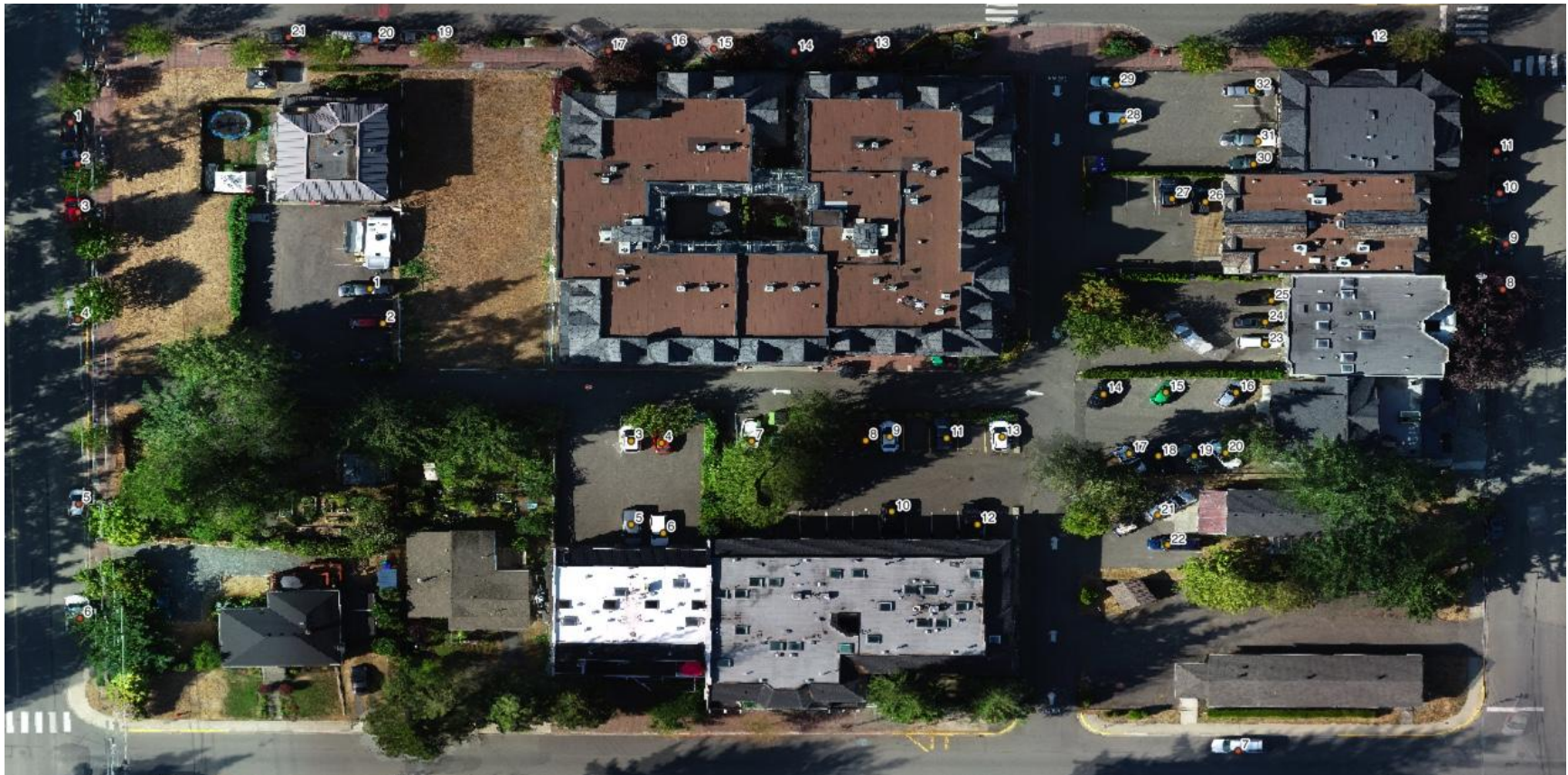
Zone 4 - 2PM

Roads: **Top:** 2nd Avenue, **Right:** Beach Road, **Bottom:** Fern Road, **Left:** Jones Street



Zone 4 - 4PM

Roads: **Top:** 2nd Avenue, **Right:** Beach Road, **Bottom:** Fern Road, **Left:** Jones Street



Zone 5

Aerial Imagery

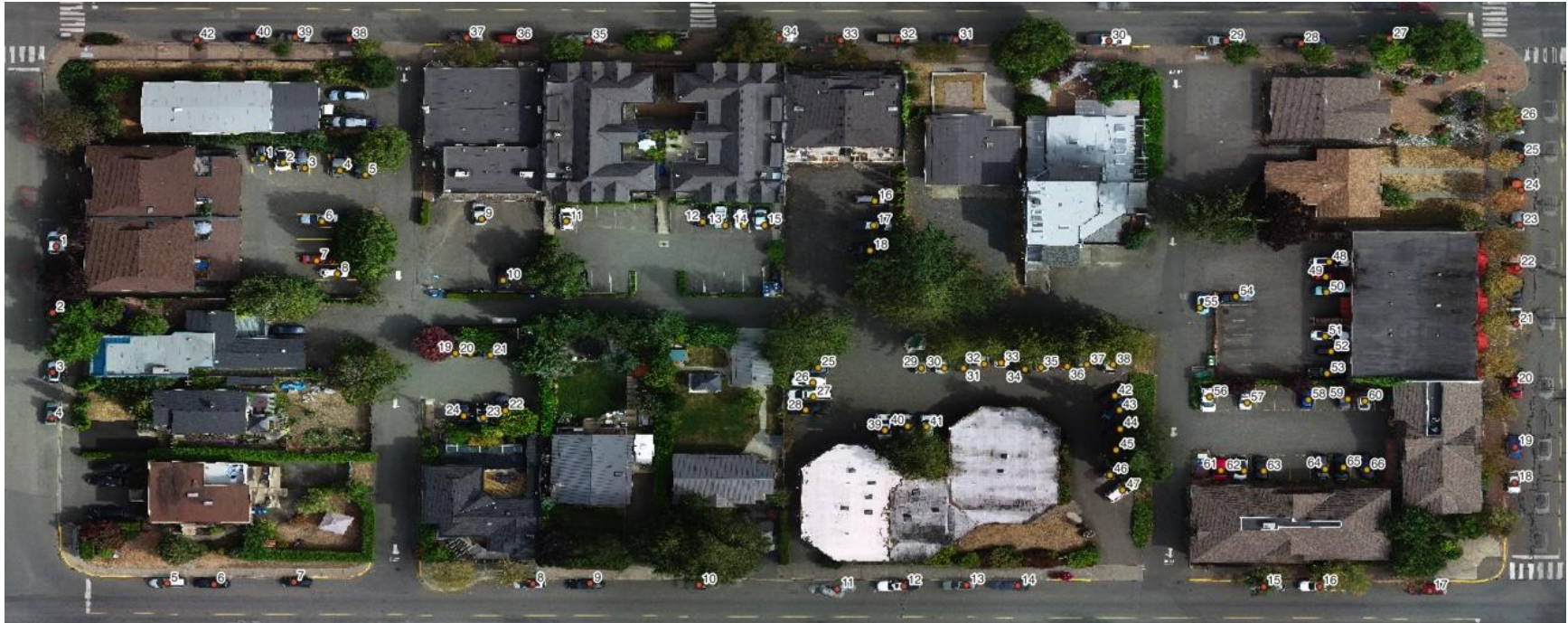
Zone 5 - 8AM

Roads: Top: 2nd Avenue, Right: Primrose Street, Bottom: Fern Road, Left: Beach Road



Zone 5 - 10AM

Roads: **Top:** 2nd Avenue, **Right:** Primrose Street, **Bottom:** Fern Road, **Left:** Beach Road



Zone 5 - 12PM

Roads: **Top:** 2nd Avenue, **Right:** Primrose Street, **Bottom:** Fern Road, **Left:** Beach Road



Zone 5 - 2PM

Roads: Top: 2nd Avenue, Right: Primrose Street, Bottom: Fern Road, Left: Beach Road



Zone 5 - 4PM

Roads: Top: 2nd Avenue, **Right:** Primrose Street, **Bottom:** Fern Road, **Left:** Beach Road



Zone 6

Aerial Imagery

Zone 6 - 8AM

Roads: Top: 2nd Avenue, **Right:** Memorial Ave, **Bottom:** Fern Road, **Left:** Primrose Street



Zone 6 - 10AM

Roads: **Top:** 2nd Avenue, **Right:** Memorial Ave, **Bottom:** Fern Road, **Left:** Primrose Street



Zone 6 - 12PM

Roads: **Top:** 2nd Avenue, **Right:** Memorial Ave, **Bottom:** Fern Road, **Left:** Primrose Street



Zone 6 - 2PM

Roads: **Top:** 2nd Avenue, **Right:** Memorial Ave, **Bottom:** Fern Road, **Left:** Primrose Street



Zone 6 - 4PM

Roads: **Top:** 2nd Avenue, **Right:** Memorial Ave, **Bottom:** Fern Road, **Left:** Primrose Street



Zone 7

Aerial Imagery

Zone 7 - 8AM

Roads: **Top:** Fern Road, **Right:** Beach Street, **Bottom:** 4th Avenue, **Left:** Jones Street



Zone 7 - 10AM

Roads: **Top:** Fern Road, **Right:** Beach Street, **Bottom:** 4th Avenue, **Left:** Jones Street



Zone 7 - 12PM

Roads: Top: Fern Road, Right: Beach Street, Bottom: 4th Avenue, Left: Jones Street



Zone 7 - 2PM

Roads: Top: Fern Road, **Right:** Beach Street, **Bottom:** 4th Avenue, **Left:** Jones Street



Zone 7 - 4PM

Roads: **Top:** Fern Road, **Right:** Beach Street, **Bottom:** 4th Avenue, **Left:** Jones Street



Zone 8

Aerial Imagery

Zone 8 - 8AM

Roads: **Top:** Fern Road, **Right:** Primrose Road, **Bottom:** 4th Avenue, **Left:** Beach Road



Zone 8 - 10AM

Roads: Top: Fern Road, **Right:** Primrose Road, **Bottom:** 4th Avenue, **Left:** Beach Road



Zone 8 - 12PM

Roads: **Top:** Fern Road, **Right:** Primrose Road, **Bottom:** 4th Avenue, **Left:** Beach Road



Zone 8 - 2PM

Roads: **Top:** Fern Road, **Right:** Primrose Road, **Bottom:** 4th Avenue, **Left:** Beach Road



Zone 8 - 4PM

Roads: **Top:** Fern Road, **Right:** Primrose Road, **Bottom:** 4th Avenue, **Left:** Beach Road



Zone 9

Aerial Imagery

Zone 9 - 8AM

Roads: **Top:** Fern Road, **Right:** Memorial Ave, **Left:** Primrose Road



Zone 9 - 10AM

Roads: **Top:** Fern Road, **Right:** Memorial Ave, **Left:** Primrose Road



Zone 9 - 12PM

Roads: Top: Fern Road, Right: Memorial Ave, Left: Primrose Road



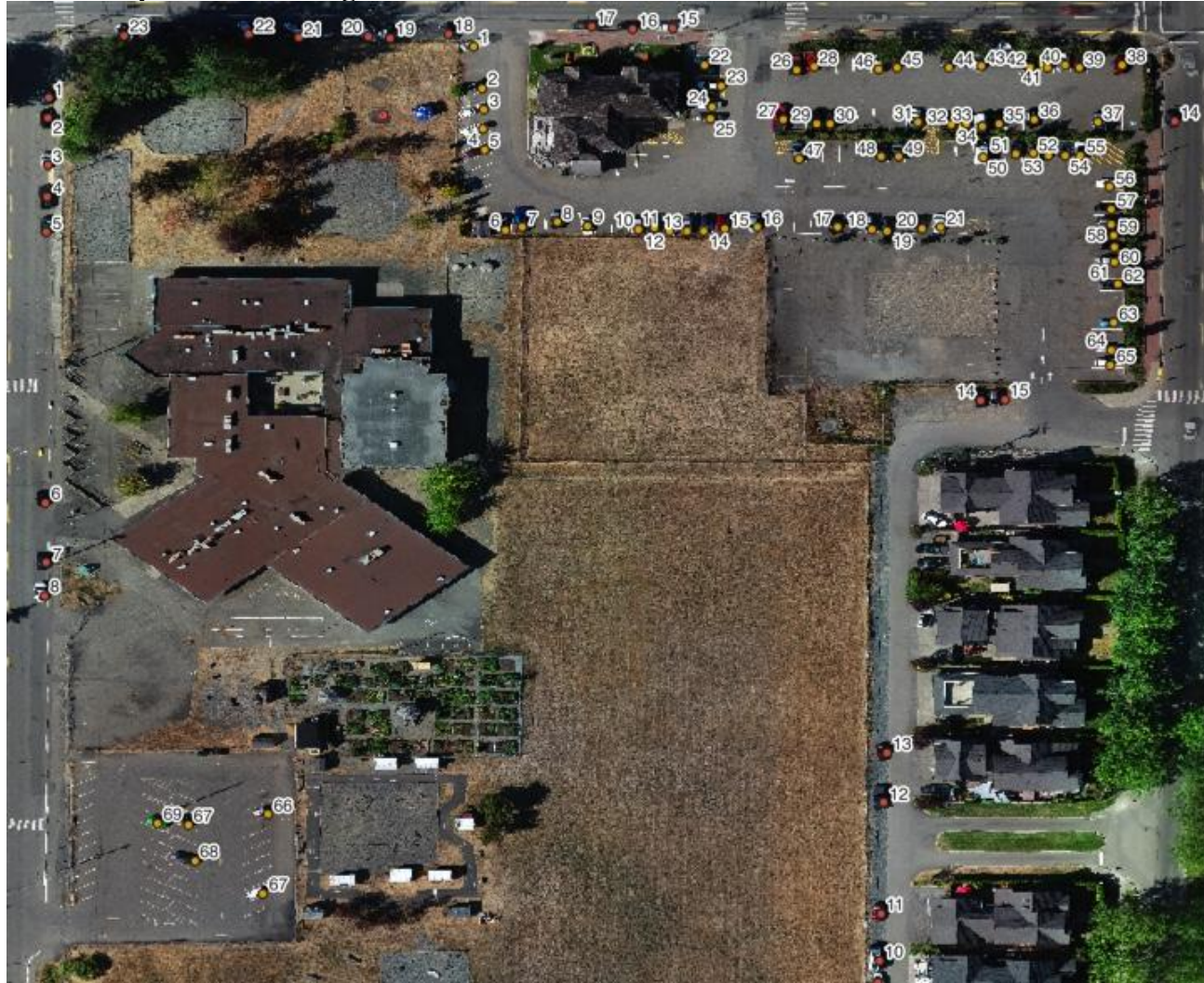
Zone 9 - 2PM

Roads: Top: Fern Road, Right: Memorial Ave, Left: Primrose Road



Zone 9 - 4PM

Roads: **Top:** Fern Road, **Right:** Memorial Ave, **Left:** Primrose Road

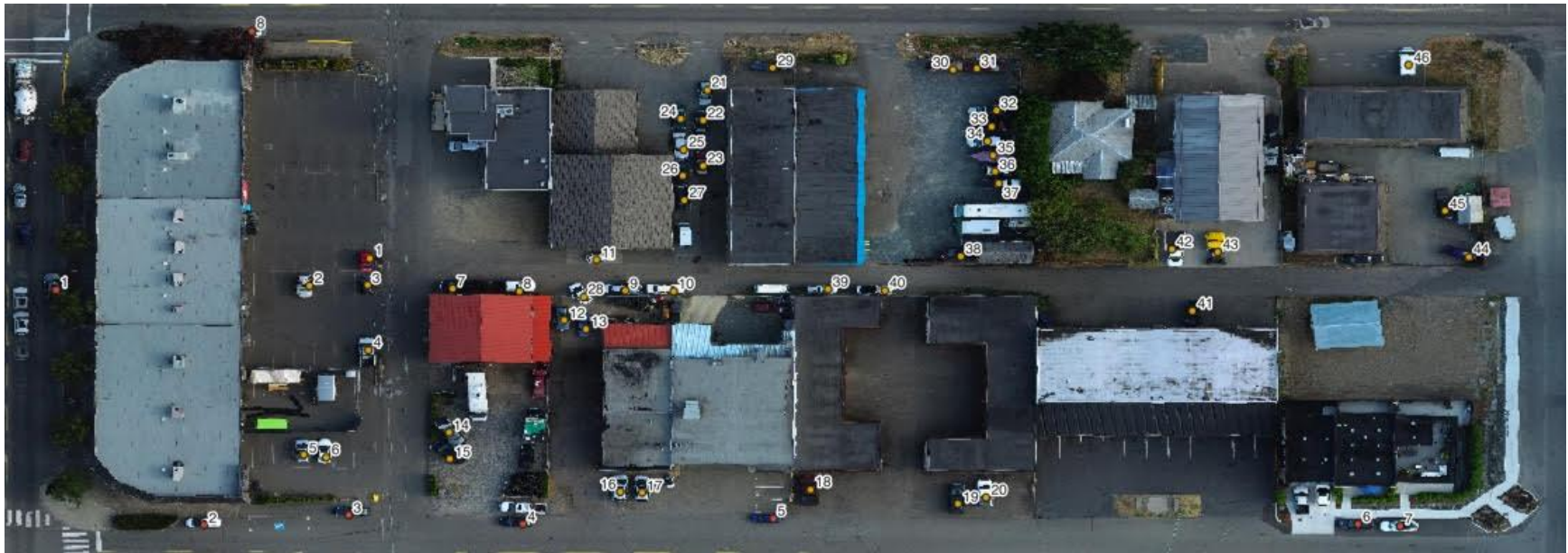


Zone 10

Aerial Imagery

Zone 10 - 8AM

Roads: **Top:** Fern Road, **Right:** Memorial Ave, **Left:** Primrose Road



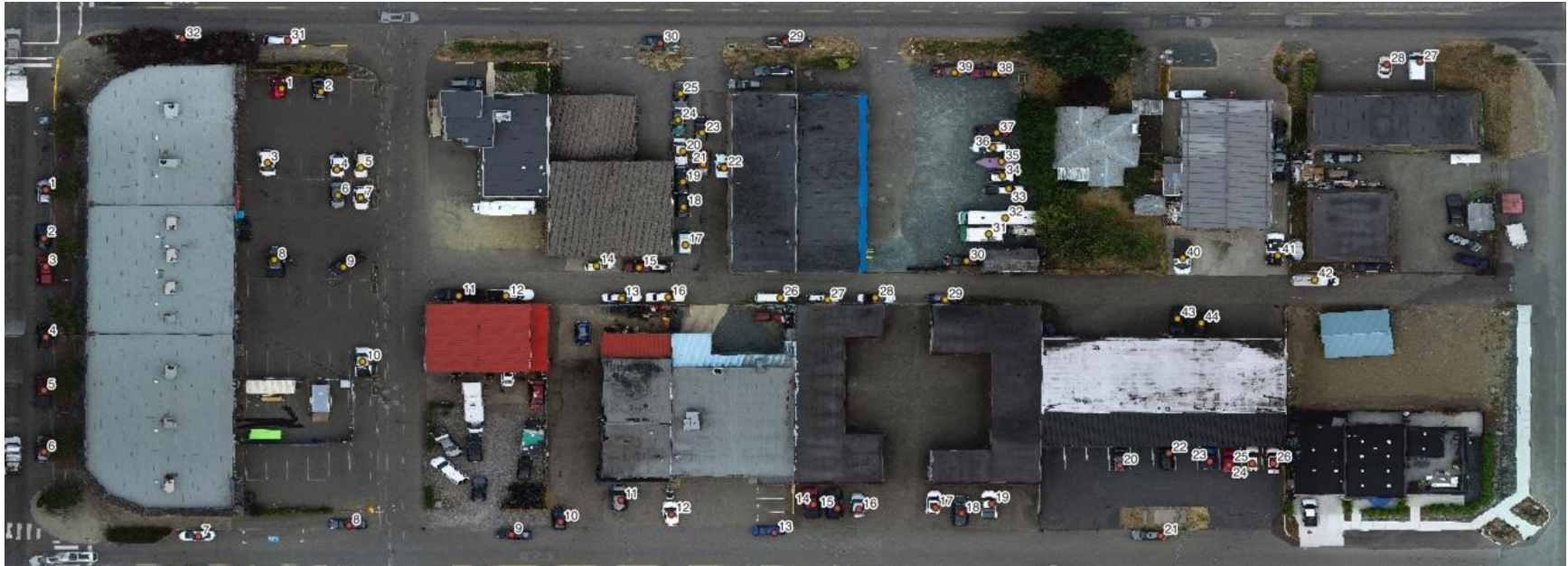
Zone 10 - 10PM

Roads: Top: Fern Road, **Right:** Berwick Road, **Bottom:** 4th Avenue, **Left:** Memorial Ave



Zone 10 - 12PM

Roads: **Top:** Fern Road, **Right:** Berwick Road, **Bottom:** 4th Avenue, **Left:** Memorial Ave



Zone 10 - 2PM

Roads: **Top:** Fern Road, **Right:** Berwick Road, **Bottom:** 4th Avenue, **Left:** Memorial Ave



Zone 10 - 4PM

Roads: **Top:** Fern Road, **Right:** Berwick Road, **Bottom:** 4th Avenue, **Left:** Memorial Ave



Zone 11

Aerial Imagery

Zone 11 - 8AM

Roads: Top: Second Ave E, **Right:** Berwick Rd, **Bottom:** Fern Rd, **Left:** Memorial Ave



Zone 11 - 10AM

Roads: Top: Second Ave E, Right: Berwick Rd, Bottom: Fern Rd, Left: Memorial Ave



Zone 11 - 12PM

Roads: Top: Second Ave E, **Right:** Berwick Rd, **Bottom:** Fern Rd, **Left:** Memorial Ave



Zone 11 - 2PM

Roads: Top: Second Ave E, **Right:** Berwick Rd, **Bottom:** Fern Rd, **Left:** Memorial Ave



Zone 11 - 4PM

Roads: **Top:** Second Ave E, **Right:** Berwick Rd, **Bottom:** Fern Rd, **Left:** Memorial Ave



Zone 12

Aerial Imagery

Zone 12 – 8AM

Roads: Top: Fir Street, Bottom: Second Ave E, Left: Memorial Ave



Zone 12 – 10AM

Roads: **Top:** Fir Street, **Bottom:** Second Ave E, **Left:** Memorial Ave



Zone 12 – 12PM

Roads: Top: Fir Street, Bottom: Second Ave E, Left: Memorial Ave



Zone 12 – 2PM

Roads: Top: Fir Street, Bottom: Second Ave E, Left: Memorial Ave



Zone 12 – 4PM

Roads: **Top:** Fir Street, **Bottom:** Second Ave E, **Left:** Memorial Ave



References:

1. *Banff View Points* (2020). Retrieved from <https://banff.ca/1117/Banff-Viewpoints-Public-Input>.