



Waste Management of Canada Corporation

Environmental Assessment for a New Landfill Footprint at the West Carleton Environmental Centre

TRANSPORTATION EXISTING CONDITIONS REPORT

Prepared by:

AECOM

302 - 1150 Morrison Drive 613 820 8282 tel
Ottawa, Ontario K2H 8S9 613 820 8338 fax
www.aecom.com

Project Number:

60191228

Date:

October, 2011

Table of Contents

	Page
1. Introduction.....	1
1.1 Documentation.....	2
1.2 Transportation Study Team.....	3
2. Landfill Footprint Study Areas	3
3. Methodology	4
3.1 Available Secondary Source Information Collection and Review.....	5
3.2 Process Undertaken	6
4. Existing Transportation Conditions.....	7
4.1 Road Network, Geometrics and Traffic Controls	7
4.1.1 Carp Road.....	7
4.1.2 Highway 417	8
4.1.3 Richardson Side Road.....	8
4.1.4 William Mooney Road.....	8
4.1.5 Signage and Pavement Markings.....	8
4.1.6 Pedestrians and Cyclists	9
4.2 Traffic Volumes and Mix.....	9
4.3 Vehicular Operating Speeds	9
4.4 Historical Collision Records	10
4.5 Site Traffic.....	12
4.6 Gull Activity, Management and Airport Operations	12
4.7 Results.....	15
4.7.1 Road Network.....	15
4.7.2 Traffic Operations.....	16
4.7.3 Collisions.....	18
4.7.4 Airport Operations	18
5. Conclusions	19
6. Recommendations / Further Work.....	19
7. References	20



List of Figures

- Figure 1. Study Areas for Effects from Truck Transportation along Access Roads
- Figure 2. Study Areas for Effects on Airport Operations
- Figure 3. City of Ottawa 2011 Rural Truck Route Map Excerpt
- Figure 4. Balanced 2011 Traffic Volumes
- Figure 5. Yearly Collisions in Study Area
- Figure 6. Vehicle Type
- Figure 7. Collision Types
- Figure 8. Environmental Conditions

List of Tables

Table 1. WCEC Loads Delivered in 2010 by Month.....	12
Table 2. Summary of Bird Strikes Reported at Carp Airport 1999-2009.....	15
Table 3. Level of Service Criteria	16
Table 4. Intersection Analysis Results (Signalized Intersections)	17
Table 5. Intersection Analysis Results (Unsignalized Intersections)	17

Appendices

- Appendix A. Traffic Data Used in the Assessment of Existing Transportation Conditions
- Appendix B. Traffic Operations Detailed Analysis Results



1. Introduction

This report provides an overview of the existing transportation conditions associated within the study area for the West Carleton Environmental Centre (WCEC) Environmental Assessment (EA). The Minister-approved Terms of Reference (ToR) included a preliminary description of the existing environmental conditions on-site as well as within the site vicinity (See Section 7 of the approved ToR, August 2010). The ToR made a commitment that the description of the existing conditions would be expanded during the EA¹. With this in mind, investigative studies of the following environmental components were carried out for the purposes of generating a more detailed description and understanding of the environment for use in the assessment and evaluation of alternative landfill footprint options during the EA:

- Atmospheric;
- Geology and Hydrogeology;
- Surface Water;
- Biology – Terrestrial and Aquatic;
- Cultural Heritage Resources;
- Transportation;
- Land Use;
- Agriculture;
- Socio-economic; and,
- Site Design and Operations.

Each of the above disciplines also prepared draft work plans that were presented in Appendix C of the approved ToR. The work plans presented the scope of work required to complete the EA, including the scope of technical studies for each of the environmental components, including the existing conditions. The specific work plan tasks for completing the existing conditions for the transportation component were provided in Attachment 9 and are provided here for reference.

The transportation environmental component has the sub-components of airport and access roads. The following tasks will be undertaken to characterize existing environmental conditions:

- Compile information from background sources including:
 - Traffic volumes and mix;
 - Vehicular operating speeds;

¹ During the EA, and following approval of work plans by the GRT, the project team will collect further information and conduct studies (desktop and field) to describe components and sub-components of the environment identified in the ToR that may be affected by the undertaking (Approved ToR, Section 7.4, p. 41).



- Roadway and intersection geometrics (including horizontal and vertical curves; passing zones; turning radii, etc.);
 - Traffic controls as well as regulatory signage and pavement markings;
 - Historical collision records;
 - Trip generation information from other comparable landfill sites operated by Waste Management;
 - Active and passive methods successfully used by Waste Management and other landfill operators for bird control at sites within close proximity to airports.
- Refine the study area for each sub-component based on the expected influence area. In the case of the road network, impacts on the road geometrics and operations will be assessed for an area that includes roads (independent of classification or jurisdiction) that directly link the site to the nearest interchange on the provincial highway system. In the case of airport operations, the study area will extend to an appropriate distance relative to the airport facility.
 - Undertake necessary liaison with members of the Government Review Team (GRT) to achieve early consensus on study area; extent of impact (e.g., trip generation rate, collision frequency/severity); and expected effectiveness of potential mitigation measures (e.g., bird control strategies).

During the Government Review Team review of the TOR, the Ministry of Transportation of Ontario (MTO) commented that the Study Area for the transportation work should include Highway 417. Data collection and analysis included the interchange ramps, ramp terminal intersections and the merge-diverge locations between the ramps and the highway where impacts could potentially occur.

1.1 Documentation

The results of these individual studies will be documented in separate stand-alone technical memorandums during the EA. The final Existing Conditions will form a chapter of the EA Report with each of the stand-alone memorandums becoming supporting documents/appendices to the EA Report.



1.2 Transportation Study Team

The Transportation study team consisted of AECOM staff. The actual individuals and their specific roles are provided as follows:

- **Valerie McGirr** – Transportation Lead;
- **Vanessa Skelton** – Senior Transportation Engineer;
- **James Kamstra** – Senior Biologist (Birds).

AECOM support staff in Ottawa assisted with the collection of traffic data (turning movement counts). In addition, automatic traffic data collection on Carp Road and Richardson Side Road was undertaken by Ritchie Traffic Services.

2. Landfill Footprint Study Areas

In accordance with the approved ToR, the generic On-Site and Site-Vicinity study areas for the proposed new landfill footprint at the WCEC are listed below:

On-Site	the lands owned or optioned by WM and required for the new landfill. The Site is bounded by Highway 417, Carp Road and Richardson Side Road;
Site-Vicinity	the lands in the vicinity of the site extending about 500 metres (m) in all directions; and,
Regional	the lands within approximately 3-5 kilometres (km) of the Site for those disciplines that require a larger analysis area (i.e., socio-economic, odour, etc.).

The study areas identified above were presented in the approved ToR with the commitment that these generic study areas would be modified during the EA to suit the requirements of each environmental component.

For the transportation component, the On-Site study area is as defined above. For the transportation component (effects from truck transportation along access roads), the boundary of the Site-Vicinity study area is:

- South of the eastbound ramps and ramp terminals on the south side of Highway 417;



- East of Carp Road, the westbound off ramp and eastbound on ramp;
- North of Richardson Side Road;
- West of William Mooney Boulevard, the westbound on ramp and the eastbound off ramp.

This Site-Vicinity study area was chosen to include all of the Carp Road interchange and Highway 417 in the vicinity of the interchange, the signalized and unsignalized intersections along Carp Road from the interchange to Richardson Side Road as well as Richardson Side Road between Carp Road and William Mooney Road and William Mooney Road south of Richardson Side Road. In particular, the interchange and Carp Road have been identified as the roads most directly affected by truck transportation along access roads.

The On-Site study area and Site-Vicinity study areas for the Transportation component (effects from truck transportation along access roads) are illustrated in **Figure 1**.

There are no Regional study areas associated with the transportation component as the area of potential effects is contained within the Site-Vicinity study area. Most of the truck traffic is oriented to and from Highway 417 where it is a minor contribution to overall traffic operations and safety on the highway. Assessment of merge and diverge movements at ramps will be appropriate to assess the impact of truck traffic from the site on highway operations. The proportion of site-related truck traffic on Carp Road north of Richardson Side Road and south of the eastbound ramps will be small under anticipated operations.

For the transportation component (effects on airport operations) the On-Site study is defined as above and specifically those features such as the landfill footprint area and surface water ponds which may serve as potential attractions for gulls. The Regional study area extends to include observed local movement patterns of gulls to/from the existing landfill including the Carp Airport, surrounding agricultural fields, the adjacent quarry, the Ottawa River and other local resting spots.

The On-Site and Regional study areas for the Transportation component (effects on airport operations), are illustrated in **Figure 2**.

3. Methodology

Based on the work plans presented in Appendix C of the approved ToR, and re-stated in Section 1 of this memorandum, the following sections outline the methodology for detailing the Transportation existing conditions.



3.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Transportation Team to determine existing transportation conditions within the study area(s). The following sources of secondary information were collected and reviewed:

Agency	Information Obtained
Ontario Ministry of Transportation	Carp Road Interchange ramp designation diagram
	Automatic Traffic Recorder (ATR) counts for: <ul style="list-style-type: none"> • Carp Road Interchange (Aug. 29, 2010 to Sep. 5, 2010); • E-NS off ramp; • NS-W on ramp; • S-E on ramp; • N-E on ramp; • W-NS off ramp; • Highway 417 – 1.2 km west of Terry Fox Drive (Jul. 2, 2009 to Jul. 8, 2009); • Highway 417 – 3.4 km West of Hwy 7 (Mar. 23, 2009 to Mar. 30, 2009) (Jul. 10, 2009 to Jul. 16, 2009) (Sep. 18, 2009 to Sep. 24, 2009); and, • Highway 7 – 1.2 km West of Hwy 417 (Mar. 30, 2009 to Apr. 6, 2009 – Eastbound [EB] only) (Jul. 23, 2009 to Jul. 29, 2009 – EB only) (Sep. 21, 2009 to Sep. 27, 2009 Westbound [WB] only).
	Collision data from 2006 through 2009
	Provincial Highways Traffic Volumes 1988 - 2007, downloaded April 2011 from: http://www.mto.gov.on.ca/english/pubs/trafficvolumes.shtml
	Ontario Road Safety Annual Report 2007, downloaded April 2011 from: http://www.mto.gov.on.ca/english/safety/orsar/orsar07
	Design and Construction Report, Highway 417 Expansion from Eagleson Road to Highway 7, February 2011, McCormick Rankin Corporation
City of Ottawa	2009 Collision Statistics Report, Operations, Engineering and Technical Support, Public Works, May 2010
	Spot Speed Surveys undertaken: August 26, 2002; February 14, 2006; June 5, 2009; March 2, 2009; Traffic Management and Operational Support
	Intersection Turning Movement Counts for: <ul style="list-style-type: none"> • Carp Road and Highway 417 North side ramps undertaken: Jun. 16, 2009; Jul. 10, 2008; Jun. 22, 2006; Jul. 13, 2005; Aug. 3, 2001; and, • Carp Road and Richardson Side Road undertaken: May 4, 2006; Jul. 24, 2002; Jul. 30, 1999; Jul. 23, 1998.
	Signal timing plans for Carp Road and Richardson Side Road and for Carp Road and the Highway 417 westbound ramps (current as of March 2011)
	Collision data from 2006 through 2009
	Rural Truck Routes, 2011 downloaded March 2011 from: http://www.ottawa.ca/residents/onthemove/driving/road_sidewalk/seasonal_roads_en.html
	Transportation Master Plan, November 2008 downloaded March 2011 from: http://www.ottawa.ca/city_hall/master_plans/tmp/index_en.html
	Ottawa Cycling Plan, January 2008, MMM Group and Stantec
Waste Management	Draft Integrated Wildlife Management Plan – January 2009
	Carp Airport Wildlife Management Plan – December 2010
	Truck data for 2008-2010 for the site



Data used in the assessment of existing conditions is provided in **Appendix A**.

3.2 Process Undertaken

The tasks undertaken to assess the existing transportation conditions for the effects from truck transportation along access roads were:

- Reviewed Draft Transportation Existing Conditions Report dated 2006 and identified areas requiring updating;
- Compiled traffic data from secondary sources (MTO and City of Ottawa) and collected additional traffic data in the field to provide an adequate foundation for the analysis. Data collected to supplement secondary sources included: 24 hour classification counts from noon April 4 to noon April 6, 2011 at three locations (Richardson Side Road west of Carp Road and Carp Road north and south of Highway 417); turning movement counts in the AM and PM peak periods at Carp Road and Richardson Side Road, at Carp Road and Highway 417 westbound ramps (north side of Highway 417) and at Carp Road and Highway 417 eastbound ramps (south side of Highway 417);
- Reviewed the road network and obtained information on the design and timing for improvements to the transportation network in the study area by the City (Carp Road widening from Highway 417 southerly) and the MTO (interchange reconstruction and highway widening);
- Contacted MTO to confirm that the analysis planned for the study meets the requirements set out in their comments on the EA Terms of Reference;
- Developed balanced traffic volumes, including percentage of trucks, and developed a model of intersections along Carp Road for use in Synchro traffic analysis software;
- Developed ramp and highway traffic volumes/characteristics for ramp merge and diverge analysis using Highway Capacity Software;
- Assessed level of service for operations under existing conditions and for existing traffic with City-MTO planned improvements in place;
- Review collision data in Site-Vicinity study area and identify any locations or characteristics where concerns have been noted.



The tasks undertaken to assess existing conditions for the effects on airport operations were:

- Review of historical assessment of gull activity at existing landfill site and movements within the regional area;
- Review of active and passive methods successfully used by Waste Management at the existing landfill site for bird control and as documented;
- Review of Carp Airport Wildlife Management Plan; and
- Review of Transport Canada historical wildlife strike data for the Carp Airport.

4. Existing Transportation Conditions

4.1 Road Network, Geometrics and Traffic Controls

4.1.1 Carp Road

In the vicinity of the West Carleton Environmental Centre (WCEC) site, Carp Road (Ottawa Road 5) is a two-lane undivided roadway with a posted speed of 80 km/h north of Highway 417 and 60 km/h south of Highway 417. Carp Road is designated as a rural arterial in the City's Transportation Master Plan and is also designated as a truck route. As shown in **Figure 3** full loads are permitted on Carp Road throughout the year. Full loads are permitted on all red coloured roads in the Figure and also on provincial highways.

In the City's Official Plan, a right-of-way width of 30 m is protected along Carp Road from Richardson Side Road northerly while a right-of-way width of 37.5 m is protected from Richardson Side Road southerly to the urban boundary. The Transportation Master Plan includes the widening of Carp Road from Highway 417 to Hazeldean Road as a future project to accommodate growth.

Traffic control signals are in operation at the intersections of Carp Road and Richardson Side Road and Carp Road and the Highway 417 westbound off ramp. Other intersections are stop sign controlled with stop signs on the side streets only.

The primary entrance to the WCEC is found on the west side of Carp Road, approximately 600 m north of the westbound Highway 417 ramp terminal intersection. A corresponding one-way exit is located about 150 m south of the entrance. (There is also an access to the WCEC property located on William Mooney Road; however, this access is not used by Waste Management trucks.)



4.1.2 Highway 417

Highway 417 is the route used by many of the vehicles accessing the WCEC. Currently Highway 417 is a four lane, divided, controlled-access, provincial highway. The MTO has plans to widen Highway 417 to six lanes in the next few years. The structure carrying Carp Road over Highway 417 will be rehabilitated at that time and some intersection improvements will be made to improve operations.

4.1.3 Richardson Side Road

Richardson Side Road in the vicinity of the WCEC is a two-lane, undivided roadway with a posted speed limit of 80 km/h and is designated as a rural collector. While not designated as a truck route, as noted in the Traffic and Parking By-law, heavy vehicles are permitted to use any road to: “(a) make a delivery to premises not abutting a truck route; (b) perform services requiring the heavy vehicle at premises not abutting a truck route; (c) house, store or have the heavy vehicle repaired at a garage or other premises not abutting a truck route, or (d) perform a service for the City of Ottawa”.

The intersections of Cardevco and William Mooney Road along Richardson Side Road have stop controls for the side streets.

4.1.4 William Mooney Road

William Mooney Road south of Richardson Side Road in the vicinity of the WCEC is a two-lane, undivided rural collector with a gravel surface. It is a dead end, terminating just north of Highway 417. North of Richardson Side Road William Mooney Road is paved and provides access to rural residential and other local land uses.

4.1.5 Signage and Pavement Markings

Regulatory signage and pavement markings are in accordance with City of Ottawa and MTO requirements. MTO will be updating the signage and pavement markings in the vicinity of the interchange during the planned construction to widen Highway 417 and improve the interchange. Similarly, the City of Ottawa will update the signage and pavement markings during the future widening of Carp Road.



4.1.6 Pedestrians and Cyclists

Observations during turning movement counts by the City of Ottawa and AECOM indicated very low volumes of pedestrians and cyclists on Carp Road. Carp Road and Richardson Side Road are designated in the Ottawa Cycling Plan, 2008, as bicycle routes to have paved shoulders as part of the primary Spine System of bicycle routes. The City will consider the Ottawa Cycling Plan during future improvements to the roadways in the area.

4.2 Traffic Volumes and Mix

In addition to the traffic volumes obtained from the City of Ottawa, the MTO and Waste Management, current traffic data was collected in March-April of 2011. Classification counts were completed using Automatic Traffic Recorders (ATRs) for a period of 48 hours at three locations:

- Richardson Side Road west of Carp Road;
- Carp Road north of Highway 417;
- Carp Road south of Highway 417.

In addition, turning movement counts were completed by observers during the AM and PM peak periods at the intersections of:

- Richardson Side Road and Carp Road;
- Carp Road and the westbound Highway 417 ramp terminal;
- Carp Road and the eastbound Highway 417 ramp terminal.

The data collected is provided in **Appendix A**. Using the current traffic data, balanced volumes for the AM and PM peak hours were developed to assess existing conditions. **Figure 4** illustrates the 2011 balanced traffic volumes as well as the daily percentage of truck traffic (from the ATR counts).

4.3 Vehicular Operating Speeds

Relevant to the Site Vicinity Study Area, the City of Ottawa has conducted spot speed surveys on Richardson Side Road west of William Mooney Road and on William Mooney Road north of Richardson Side Road.

The posted speed on Richardson Side Road is 80 km/h. Spot speed surveys were completed on Tuesday February 14, 2006 from 14:30 to 15:00 (63 vehicles) and on Friday June 5, 2009 from 08:30 to 09:30 (122 vehicles). The average speed measured during the two speed studies was 84 to 88 km/h. The 85th percentile speed, which is commonly used as an indication of the maximum speed chosen by “reasonable” drivers, was 95 to 99 km/h.



The posted speed limit on William Mooney Road north of Richardson Side Road is 80 km/h. Spot speed surveys were completed on Monday March 2, 2009 from 07:00 to 09:00 (28 vehicles) and on Monday August 26, 2002 from 06:15 to 08:00 (21 vehicles). Traffic volumes were not considered sufficient to provide confidence in the statistical analysis. The average speed measured during the two speed studies was 72 to 76 km/h. The 85th percentile was 82 to 88 km/h.

4.4 Historical Collision Records

Collision data for the four years from January 1, 2006 to December 31, 2009 were obtained from the City of Ottawa and the MTO for the following locations:

- The intersection of Carp Road and the eastbound Highway 417 ramp terminals;
- The intersection of Carp Road and the westbound Highway 417 ramp terminals;
- The intersection of Carp Road and Richardson Side Road;
- The intersection of Richardson Side Road and Cardevco Road;
- The intersection of Richardson Side Road and William Mooney Road;
- The section of Carp Road between Highway 417 and Richardson Side Road;
- The section of Richardson Side Road between Carp Road and William Mooney Road.

During the four year period 2006-2009, 36 collisions were reported at these locations (as compared with 34 collisions in the previous 3 year period reported in the 2006 Existing Transportation Conditions Report). **Figure 5** illustrates the number of collisions per year using data from the 2006 report and the current report.

For intersections and road segments under the jurisdiction of the City of Ottawa, the City reported that there were:

- 10 collisions at the intersection of Carp Road and Richardson Side Road;
- 1 collision at the intersection of Richardson Side Road and Cardevco Road;
- No collisions at the intersection of Richardson Side Road and William Mooney Road;
- 11 collisions on Carp Road between the Highway 417 interchange and Richardson Side Road;
- 8 collisions on Richardson Side Road between Carp Road and William Mooney Road.



For collisions in the vicinity of Carp Road under the jurisdiction of the MTO, the Ministry reported that there were:

- 3 collisions at the intersection of the Highway 417 westbound off-ramp and Carp Road (signalized);
- 3 collisions at the intersection of the Highway 417 eastbound off-ramp and Carp Road (unsignalized);
- 8 collisions on the ramps themselves;
- 14 collisions on the Highway 417 mainline.

For the purposes of this analysis, collisions on the Highway 417 mainline and ramps were not included. In summary, 36 collisions were included in the analysis as follows:

- Carp Road and the eastbound Highway 417 ramp terminal.....3
- Carp Road and the westbound Highway 417 ramp terminal2
- Carp Road and Richardson Side Road.....10
- Richardson Side Road and Cardevco Road.....1
- Richardson Side Road and William Mooney Road.....0
- Carp Road between the Highway 417 interchange and Richardson Side Road12
- Richardson Side Road between Carp Road and William Mooney Road8

The characteristics of the 36 collisions included in the analysis from 2006 to 2009 are illustrated in the following tables and charts.

- **Vehicle Type** – Because of the prevalence of trucks in the area, the types of vehicles involved in collisions were examined. A total of 59 vehicles were involved in the 36 collisions reported. Of these 91% were automobiles, passenger vans and light trucks. **Figure 6** illustrates the proportion of different vehicle types involved in the collisions.
- **Collision Type** – Collision types vary from one location to another. At intersections, turning, angle and rear-end collisions dominate while along road sections single vehicle collisions form the majority. **Figure 7** illustrates collision types. At mid-block locations, single vehicle collisions comprise 65% of all collisions.
- **Environmental Conditions** – The condition of the road surface, the lighting (time of day) and the weather all have potential influence on collisions. These characteristics are illustrated in **Figure 8**.



4.5 Site Traffic

Site traffic for the WCEC in 2010 is provided in **Table 1** below. Future site traffic volumes will be estimated based on the expected level of activity and experience at similar landfill sites elsewhere.

Table 1. WCEC Loads Delivered in 2010 by Month

Month	Number of Days	Month Total		Average Day		Maximum Day	
		Loads	Tonnage	Loads	Tonnage	Loads	Tonnage
January	20	172	824	8.6	41	14	64
February	19	134	724	7.1	38	16	61
March	23	213	1009	9.3	44	16	119
April	21	358	1726	17.0	82	33	232
May	21	534	4853	25.4	231	50	817
June	22	1090	19349	49.5	880	81	1762
July	23	1128	13113	49.0	570	82	1646
August	23	899	6665	39.1	290	62	675
September	22	647	4065	29.4	185	48	617
October	21	677	5494	32.2	262	55	918
November	22	911	10453	41.4	475	131	2398
December	23	541	4836	23.5	210	67	1078
2010 Total	260	7,304	73,110				

4.6 Gull Activity, Management and Airport Operations

The Carp Airport is a local commute airport situated approximately 4.5 km north of the existing WM landfill site. Gull activity at the landfill facility, local gull movements and aircraft flight patterns observed may create a potential hazard to safe aircraft operations at the Carp Airport. Seasonal gull activity and use of the study area has been confirmed by reconnaissance level field investigations. This included a survey at the landfill and surrounding area. The primary focus of the field activities was the existing waste management facility and sites of key potential gull attractants (**Figure 2**). This included the landfill site, Carp Airport, Ottawa River, adjacent agricultural fields and other nearby land uses.

Numbers of gulls observed at the site have varied over time. Presently gull activity is minimal due to a combination of active management practices combined with relatively low volumes of waste being accepted at the landfill.

In general there were very small numbers of gulls observed at the airport. Gulls were generally not observed on the ground at the airport.



Regional Movement Patterns

In a typical year, adult Ring-billed Gulls arrive in the Ottawa area by mid-March. They often feed on earthworms, in urban areas, and at waste management facilities until they move to breeding colonies on the Ottawa River in early April. There is an influx of one-year-old non-breeding birds into the province from the south during May.

Breeding birds are strongly colonial. Foraging is dependent on the kinds of food that is available locally. Generally they feed their young on fish, invertebrates and small mammals. However, landfill foraging by breeding birds has also been recorded and garbage can appear as a food item for nestlings (Gauthier and Aubry 1996). Colonies are usually vacated at the end of July and the birds disperse throughout the landscape, feeding on a wide range of foods (e.g., invertebrates, fish, crustaceans, garbage, crops and hand-outs from humans). Ring-billed Gulls generally migrate south of Ontario once freezing conditions become established. In a typical year, this southward movement occurs in early November, but may be delayed into early December.

The larger and less numerous Herring Gulls have a somewhat different annual cycle. Herring Gulls will frequently over-winter in the province, especially if winter conditions are not overly severe. Correspondingly, they are also more likely to establish night roosts on large flat rooftops (or perhaps rocky islands in the Ottawa River) or on wind-blown ice (they generally avoid snow). Herring Gulls that have not over-wintered arrive in the province in late February, moving to breeding areas by late-March. Herring Gulls are less prone to feeding on invertebrates and are seldom numerous on agricultural fields. In the spring these gulls regularly visit landfills. In the breeding season they feed on fish and crustaceans and anything they can overpower. In the fall, Herring Gulls generally migrate southwards during November, with varying numbers staying north where food supplies permit (primarily at landfills or other reliable sources of food such as the Niagara River).

Both Ring-billed Gulls and Herring Gulls, if not feeding during the day, will often congregate together and loaf. Loafing sites include almost any open open flat areas, where they can avoid disturbance and easily see potential predators.

Local Movement Patterns

The movement patterns discussed in the following paragraphs are based on empirical observations and on the anticipated behaviour of gulls in the Ottawa area. For clarity, they have been divided into the three primary periods in a gull year: spring, breeding, and fall/winter.

In the short spring season (roughly March), the gulls tend not to follow defined pathways. They can be found throughout agricultural and urban landscapes, as well as at landfills and they quickly move to the breeding colonies.



There are three nesting colonies of gulls in the City of Ottawa. They are at sites on the Ottawa River – on Lemieux Island in Nepean Bay, Deschenes Rapids, and the Parliament Buildings, all located to the southeast of the landfill. During the breeding season (i.e., April through July), the gulls travel from the breeding colonies to feeding locations. Flight lines have been confirmed and noted between the Deschenes Rapids and the landfill in the early morning and departing the landfill in the direction of the breeding colony near sunset. There were insufficient numbers of birds to support a summer flight line.

During the post-breeding fall and winter seasons (September through February), when Lac Dechenes (night roost) is frozen, the relatively smaller numbers of gulls still present roost on the Ottawa River in either the Dechenes Rapids or the Remic Rapids.

At all times local gulls move between large pools of open water (including the nearby quarries), loafing areas on fields and quarry material piles.

When commuting to and from preferred locations, gulls typically fly between 70 m and 100 m AGL (above ground level), except when towering on thermals when gulls can exceed 705 m AGL.

WM Ottawa Landfill Integrated Gull Management Plan

Waste Management has implemented an Integrated Gull Management Program (IGMP) at the existing landfill site which consists of the following key components:

1. Design and operations practices to minimize attractiveness of the site to gulls including daily covering of waste, minimizing the waste tipping area, minimizing standing water on-site, regular litter maintenance and housekeeping.
2. Bird deterrent methods including a propane cannon reinforced with lethal control in a manner to eliminate gull habituation.
3. Staff training and assigned responsibilities.

Following implementation of the IGMP, the use of the landfill site by gulls has been limited.

Carp Airport Wildlife Management Plan

In 2004, Transport Canada introduced the addition of an Airport Wildlife Planning and Management Regulation to the Canadian Aviation Regulations, Part III, Subpart 2 – Airports. The Carp Airport is subject to the regulation because it is certified by Transport Canada and because it lies within 15 km of a waste management facility. The Carp Airport has prepared an Airport Wildlife Management Plan (AWMP) as required.



The AWMP includes measures taken to control bird activity at and around the airport, including the following:

- Keep grass mowed and short around runways;
- Avoid developing any ponds on the airport property;
- Control crops grown on airport property near runway areas; and
- Implement scare tactics and lethal methods, if required.

Bird Strikes at Carp Airport

In the past eleven years, 10 bird incidents were reported to Transport Canada from the Carp Airport. A summary of the available bird strike data for the Carp Airport, included in the Transport Canada Annual Bird Strike Summary Reports, is presented in **Table 2**.

Table 2. Summary of Bird Strikes Reported at Carp Airport 1999-2009

Year	No. of Bird Strikes
2009	0
2008	1
2007	1
2006	0
2005	3
2004	1
2003	1
2002	1
2001	0
2000	0
1999	2

4.7 Results

4.7.1 Road Network

The WCEC site is accessed via a one-way entrance and exit pair from the Ottawa arterial road network off Carp Road just north of provincial, controlled-access Highway 417. Improvements to Carp Road from the westbound ramp terminal southerly, Highway 417 and the Carp Road structure are planned in the near future including roadway widening to accommodate traffic growth. Improvements will consider the designation of Carp Road as a primary bike route. Carp Road is and will remain a truck route.



4.7.2 Traffic Operations

The capacity of a road network is often described in terms of a level of service (LOS) for both intersections and roadways. A level of service is determined based on the average delay that a vehicle experiences in passing through an intersection or along a section of road. LOS “A” designates an excellent level of service with little delay, while LOS “F” indicates a poor level of service and significant delay.

The acceptable length of delay at a stop-controlled intersection is less than the acceptable length of delay at an intersection controlled by traffic signals because vehicles at a stop sign must wait until they find a suitable gap in traffic to enter the main roadway where traffic signals will eventually provide a dedicated phase for drivers to proceed. The lower acceptable delays at stop controlled intersections reflect the fact that long delays at stop signs can cause driver frustration and can lead to aggressive driving behaviour and an increased collision risk. The average vehicle delay time and the corresponding level of service are shown in **Table 3**.

Table 3. Level of Service Criteria

LOS	Control Delay Per Vehicle (seconds)	
	Signalized Intersections	Stop Controlled Intersections
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The intersections in the study area were analyzed using the Synchro version 7 modelling software following the Highway Capacity Manual (HCM) methodology. The traffic volumes and road geometry used in the analysis were as described in section and as shown in **Figure 4**. Traffic signal timing at the intersections was supplied by the City of Ottawa and is included in **Appendix A**. Capacity analysis results for the intersections in the study area are reported in terms of LOS, delay (measured in seconds per vehicle), and volume to capacity ratio (v/c). The overall result for each intersection is presented as well as the results for each lane at the intersections. For an unsignalised intersection, the overall v/c ratio for the intersection is not calculated since the movements without stop-control do not experience any delay and therefore, the average delay and LOS for the intersection as a whole would not reflect the delays experienced by the stop-sign controlled movements. The results of the intersection analysis are summarised in **Table 4** and **Table 5** while the detailed results are presented in **Appendix B**.



Table 4. Intersection Analysis Results (Signalized Intersections)

Carp/Richardson Side Road		AM			PM		
		v/c ratio	Delay (s)	LOS	v/c ratio	Delay (s)	LOS
Overall Intersection		0.51	12.7	B	0.45	11.6	B
NB	Through	0.45	9.2	A	0.35	7.8	A
NB	Left	0.14	6.8	A	0.38	9.1	A
SB	Through	0.34	8.1	A	0.39	8.1	A
SB	Left	0.15	6.9	A	0.09	6.1	A
EB		0.65	22.1	C	0.29	17.2	B
WB		0.22	16.5	B	0.60	21.1	C

Carp/Highway 417 WB Ramps		AM			PM		
		v/c ratio	Delay (s)	LOS	v/c ratio	Delay (s)	LOS
Overall Intersection		0.73	22.8	C	0.91	48.8	D
NB		0.42	14.4	B	0.76	46.0	D
SB	Through	0.66	19.1	B	0.77	46.2	D
SB	Left	0.07	10.8	B	0.48	43.0	D
WB		0.83	34.3	C	0.99	51.8	D

Table 5. Intersection Analysis Results (Unsignalized Intersections)

William Mooney/ Richardson Side Road		AM			PM		
		v/c ratio	Delay (s)	LOS	v/c ratio	Delay (s)	LOS
NB		0.01	10.0	A	0.02	10.8	B
SB		0.12	14.6	B	0.07	12.0	B
EB		0.01	0.3	A	0.00	0.3	A
WB		0.02	0.9	A	0.00	0.2	A

Carp/Highway 417 EB Ramps		AM			PM		
		v/c ratio	Delay (s)	LOS	v/c ratio	Delay (s)	LOS
NB		0.17	0	A	0.25	0	A
SB		0.40	0	A	0.67	0	A
EB		0.57	26.8	D	0.55	53.2	F

The results of the analysis indicate that the intersection of Carp Road and Richardson Side Road is operating at an acceptable level of service. The intersection of Carp Road and the Highway 417 westbound ramps is approaching capacity in all directions. The Highway 417 eastbound off ramp at Carp Road is operating at an unacceptable level of service (over capacity).



The City of Ottawa Transportation Master Plan, 2008 notes the need for widening of Carp Road from two lanes to four lanes from Highway 417 southerly to Hazeldean Road. The Design and Construction Report for Highway 417 Expansion indicates improvements to the intersection of Carp Road and the westbound off-ramp including a double westbound left turn lane and widening of the bridge over Highway 417 to accommodate two southbound and one northbound lanes. Signalization of the intersection of Carp Road and the Highway 417 eastbound ramp may be examined in conjunction with future improvements by the City of Ottawa.

An operations analysis was performed, using the traffic analysis software HCS, for the ramps to the east of Carp Road. The analysis showed that the diverge movement on the westbound Highway 417 off-ramp operates at a Level of service (LOS) of 'A' in the AM peak period and an LOS of 'B' in the PM peak period. The merge movement on the eastbound Highway 417 on-ramp operates at a LOS of 'B' in both the AM and PM peak hour periods.

4.7.3 Collisions

To understand traffic safety in the area under study, data for the 36 collisions were compared with statistics for all collisions within the City of Ottawa in 2009 (the latest year for which City statistics are available) and within the Province of Ontario for 2007 (the latest year for which provincial statistics are available). This comparison was done with consideration for the small sample size (36 collisions), which makes the calculation for the study area much more coarse than a similar calculation for a larger geographic area (i.e., each of the 36 collisions accounts for about 3% of the sample size). For example, since there was one collision in fog, we calculate that 3% of the collisions occurred in fog, while provincially only 0.6% of collisions occurred in fog and overall in the City of Ottawa 0.4% of collisions occurred in fog.)

Given the small sample size, collision characteristics for the 36 collisions under study are generally similar to those for the overall City of Ottawa.

4.7.4 Airport Operations

Presently, gull activity associated with the existing landfill is minimal due to a combination of active management practices at the site combined with relatively low volumes of waste being accepted at the landfill. Waste Management has implemented an Integrated Gull Management Program (IGMP) at the existing landfill site which has also been a key reason for the limited gull activity at the site.

The Carp Airport has also prepared and implemented an Airport Wildlife Management Plan (AWMP) which includes practices to manage birds. Very few gulls are observed at the Carp Airport. Historically the occurrence of bird strikes at the Carp Airport has also been very limited with one or no occurrences in the majority of the past 11 years.



5. Conclusions

Planned improvements to Carp Road and Highway 417 by the City of Ottawa and the Ministry of Transportation are required to provide an acceptable level of service for existing traffic. No specific improvements were identified from the analysis of collision experience.

6. Recommendations / Further Work

Supplementary ATR counts on Carp Road and Richardson Side Road have been requested for the beginning of June, following the removal of half load restrictions on applicable City roads. These data will be used to confirm the truck volume data used in the analysis and to update the analysis if needed.

Report Prepared By:

AECOM Canada Ltd.

Valerie McGirr

Manager, Ottawa Office Transportation

Report Reviewed By:

Waste Management

Tim Murphy

Project Manager



7. References

1. City of Ottawa, Operations, Engineering and Technical Support, Public Works, 2009 Collision Statistics Report, May 2010.
2. City of Ottawa Publication: 19-82, Transportation Master Plan, November 2008.
3. McCormick Rankin Corporation, Design and Construction Report, Highway 417 Expansion from Eagleson Road to Highway 7, February 2011.
4. Ministry of Transportation of Ontario, Ontario Road Safety Annual Report 2007.
5. Ministry of Transportation of Ontario, Provincial Highways Traffic Volumes 1988 – 2007.
6. MMM Group and Stantec, Ottawa Cycling Plan, January 2008.
7. Carp Airport Wildlife Management Plan, December 2010.



Figures



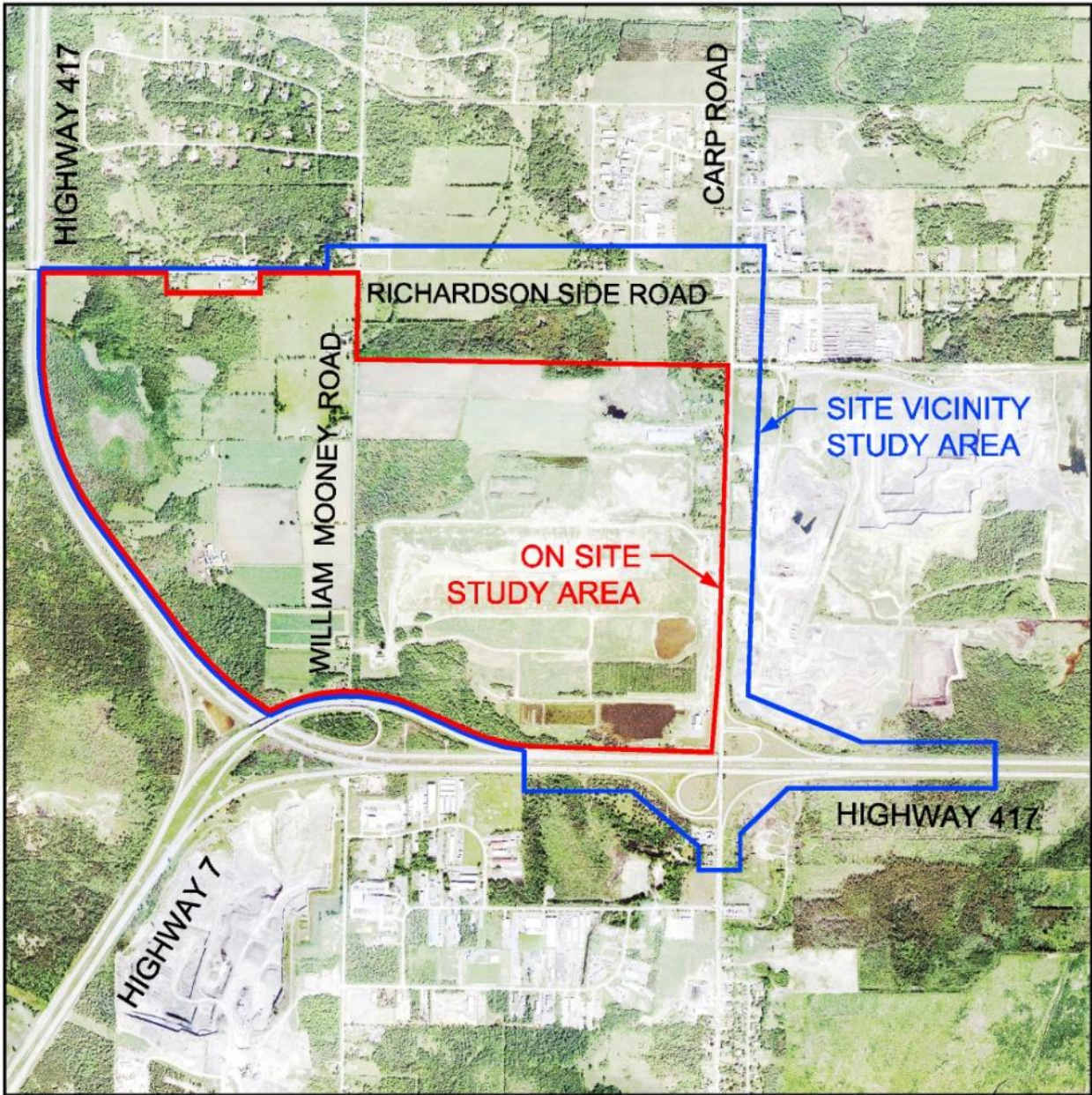
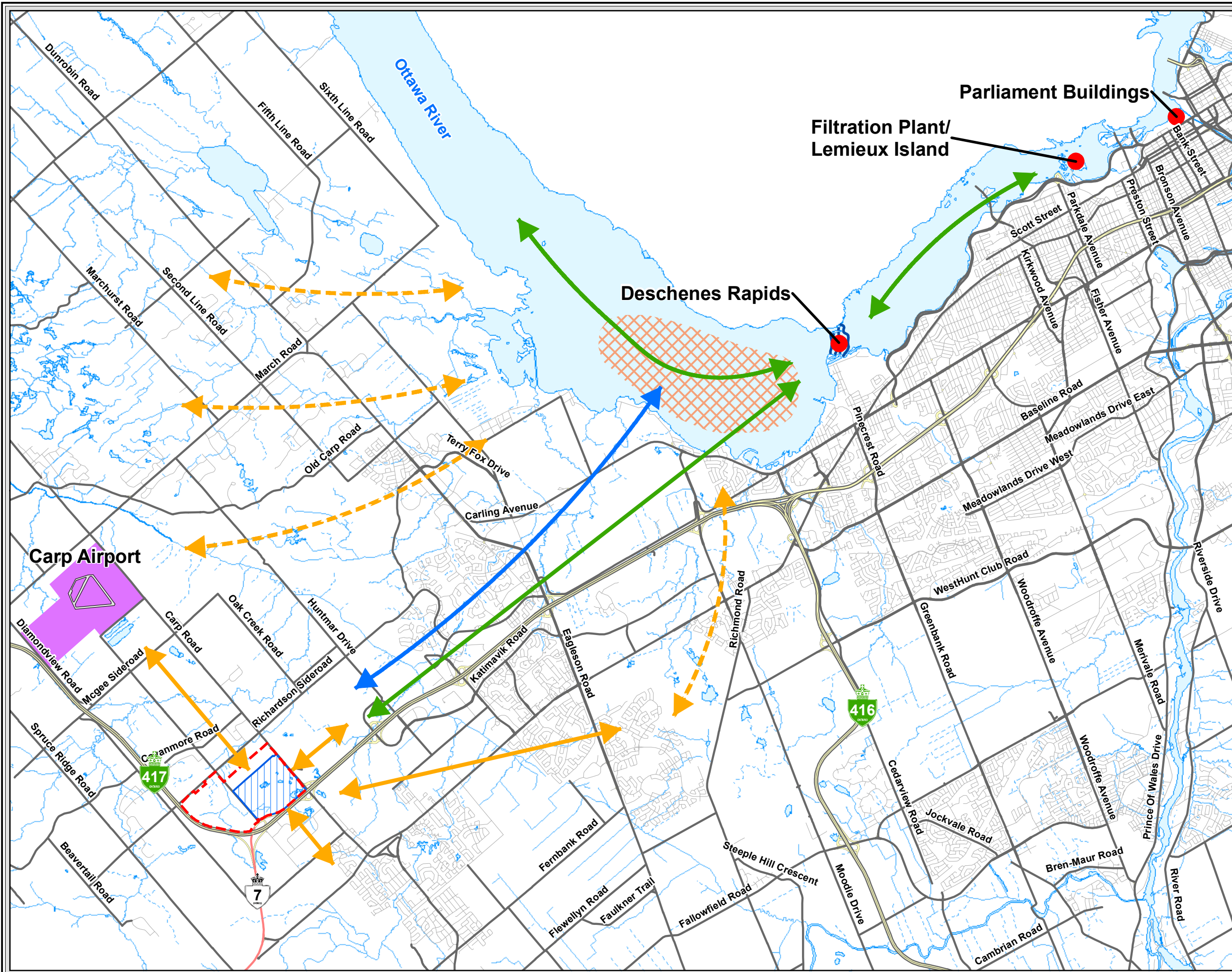


Figure 1. Study Areas for Effects from Truck Transportation Along Access Roads

Map Document: (P:\610191228\000-CADD\050 GIS\WIP\MXD\slWorking\MXDs\610191228\GullMovements.mxd)
 10/17/2011 - 9:33:56 AM



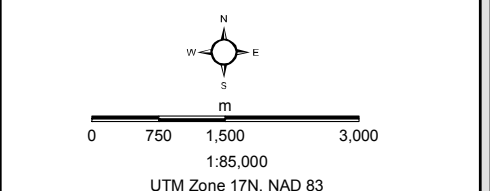
Legend

- Gull Nesting Colony
- Deschenes Rapids
- Gull Night Roost
- Waterbody
- Carp Airport Property
- Subject Site: On-site Study Area
- Existing WM Operations

Gull Movement

- > Spring & Fall (Inferred)
- > Spring & Fall (Observed)
- > Summer (Observed)
- > All Year (Observed)

Basemapping from Ontario Ministry of Natural Resources Orthophotography:



This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.

Ottawa Waste Management Facility

Gull Movement

October 2011
 Project 60191228

AECOM

Figure 2

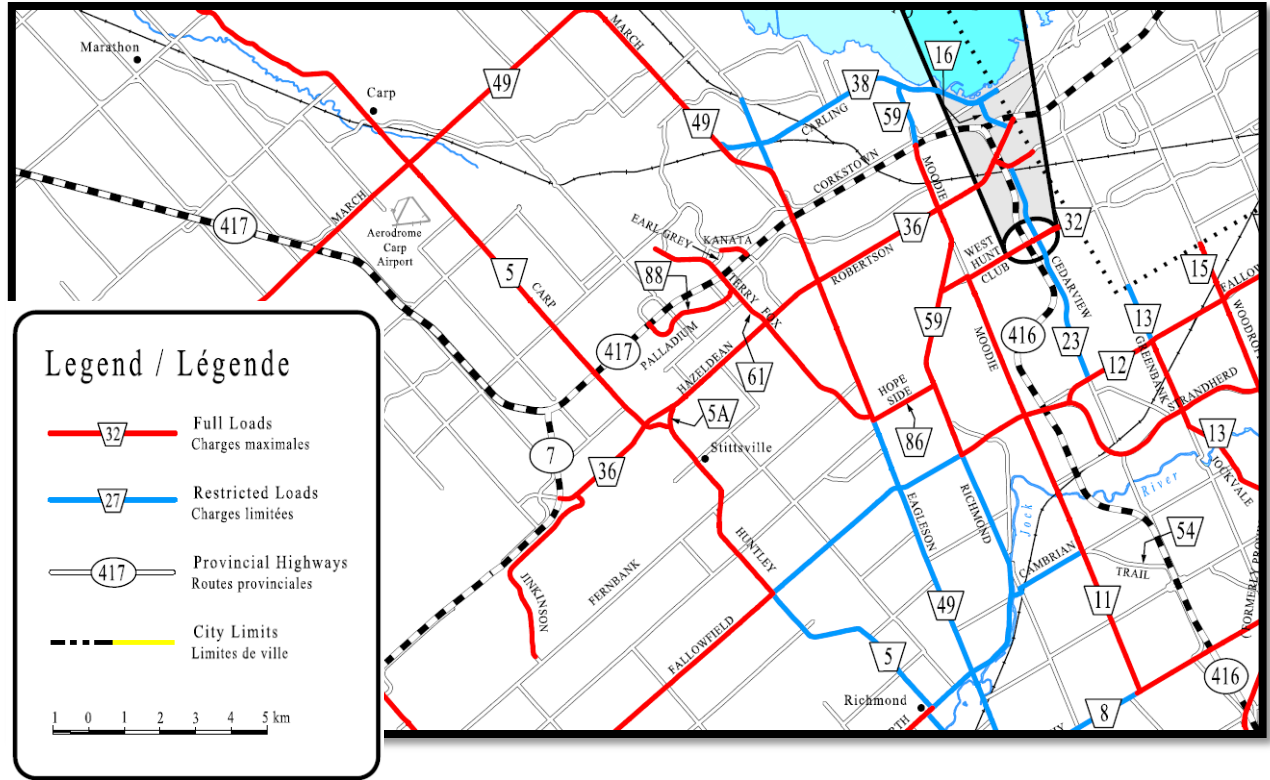


Figure 3. City of Ottawa 2011 Rural Truck Route Map Excerpt

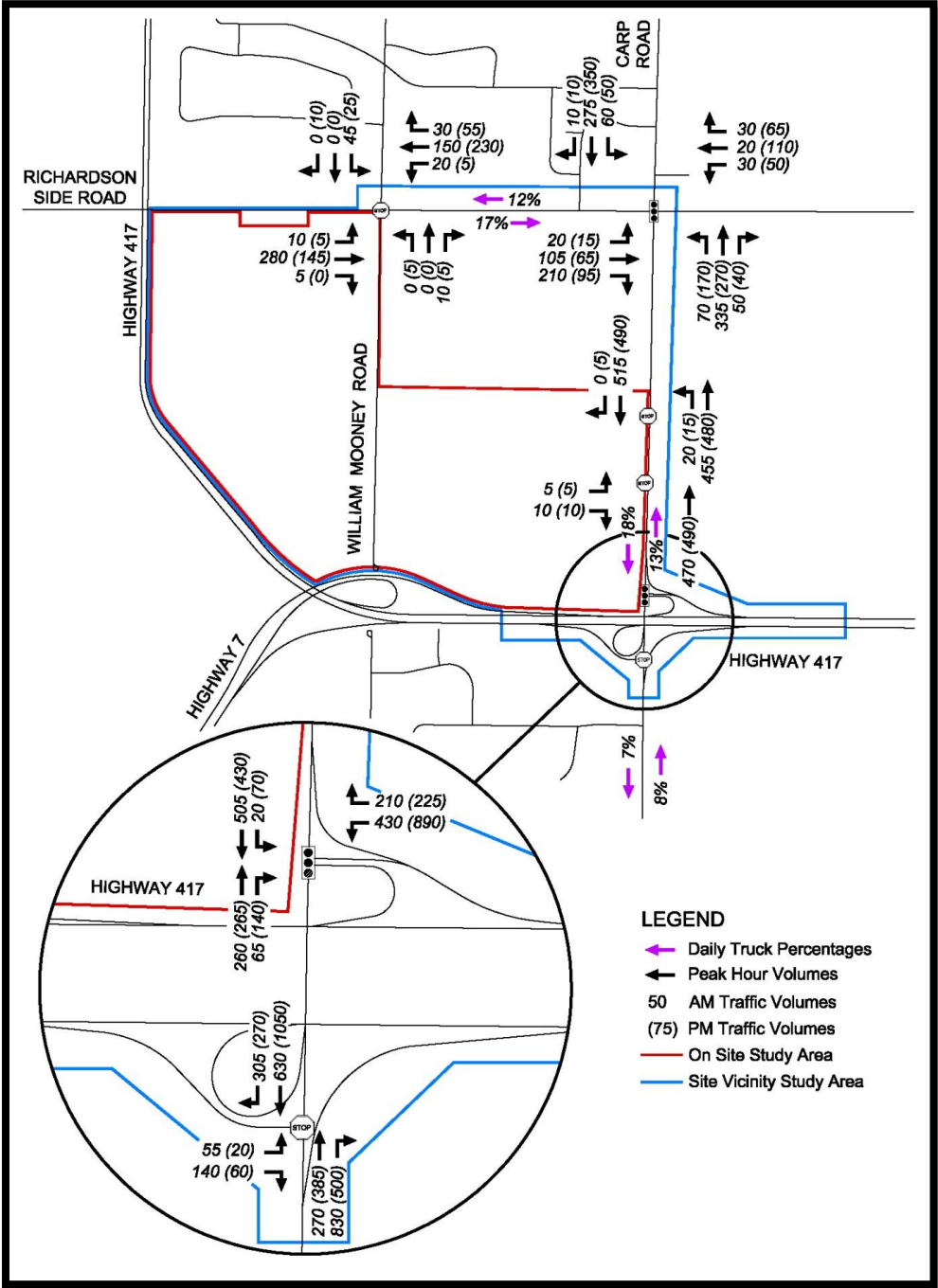


Figure 4. Balanced 2011 Traffic Volumes

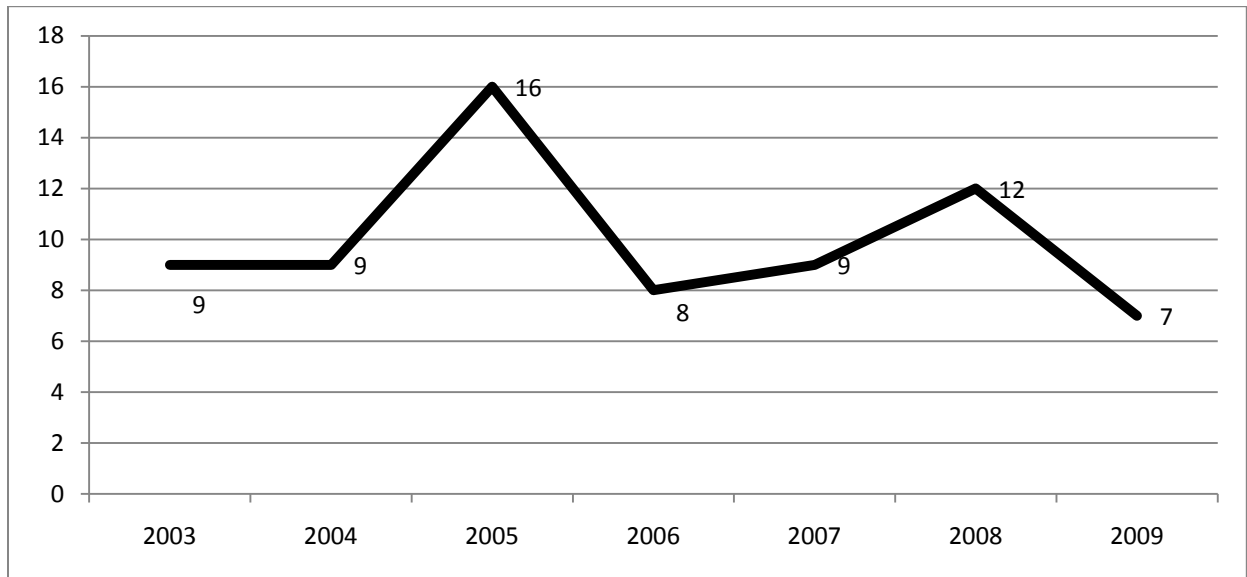


Figure 5. Yearly Collisions in Study Area

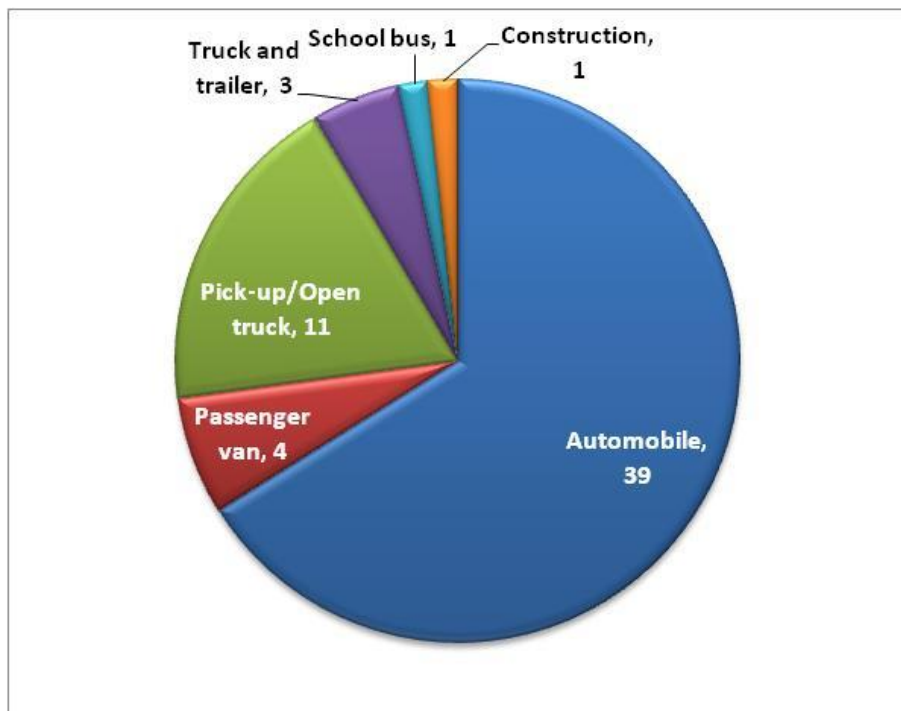


Figure 6. Vehicle Type

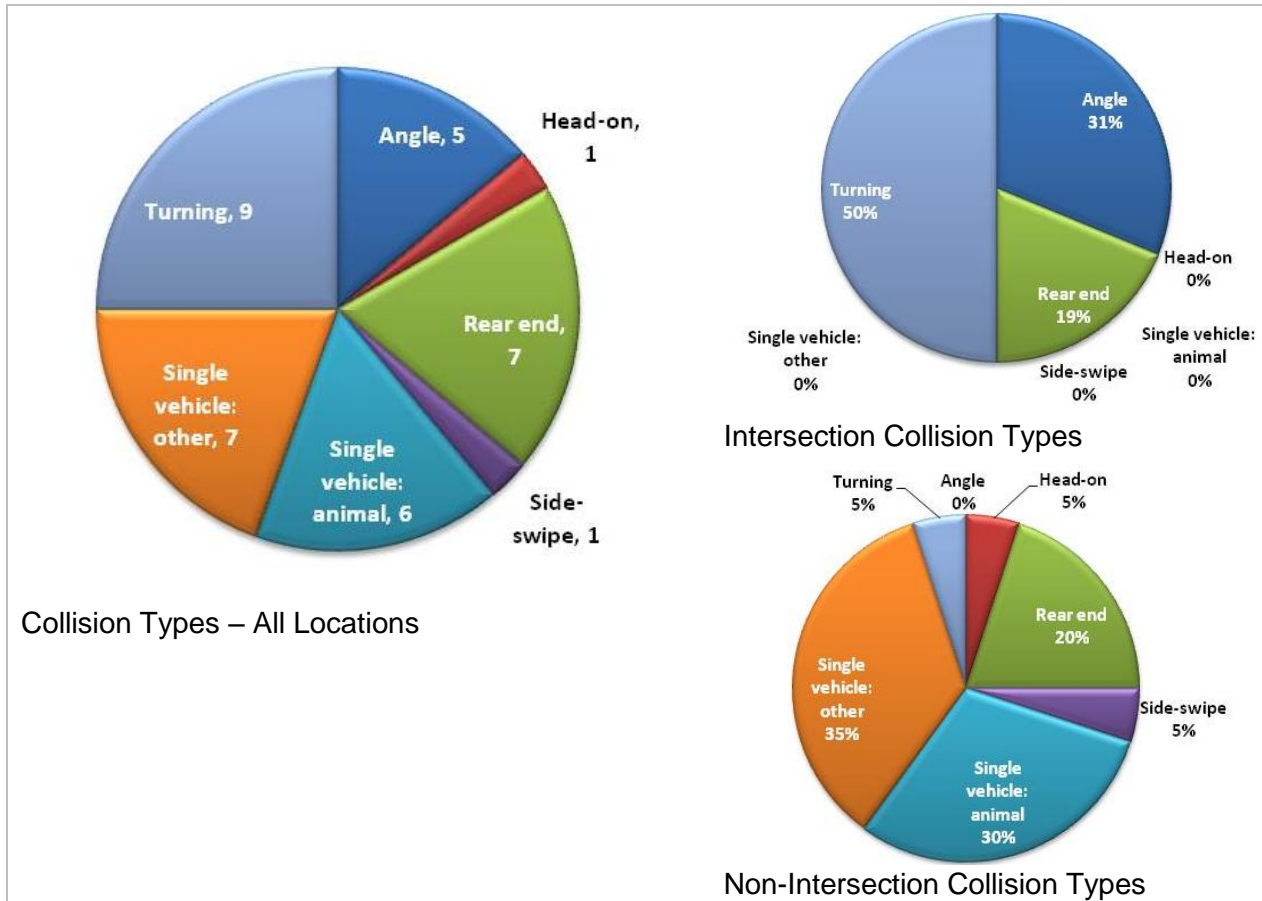


Figure 7. Collision Types

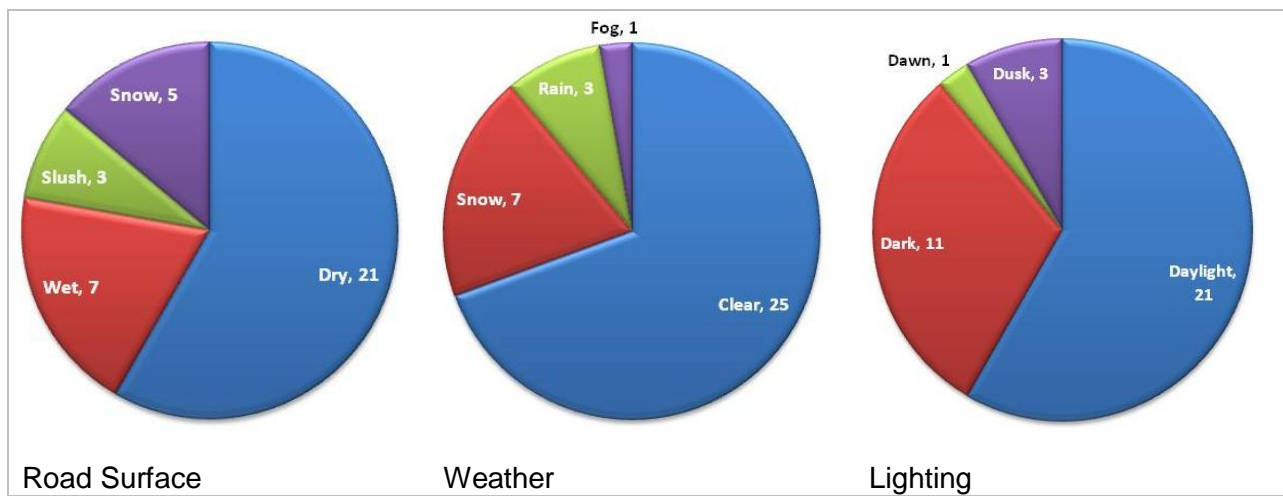


Figure 8. Environmental Conditions