WASTE CONNECTIONS OF CANADA

Ridge Landfill Expansion: Assessment of Potential Bird Hazards to Aircraft Safety

Appendix D4

January 2020

Errata Sheet

Ridge Landfill Environmental Assessment Report: Appendix D4 – Assessment of Bird Hazard to Aviation Safety

The Draft Ridge Landfill Environmental Assessment (EA) Report and supporting documentation (appendices) were provided for review and comment to the MECP, Stakeholders, Indigenous Communities and Organizations on July 22, 2019. The final version of the Ridge Landfill Environmental Assessment was revised where appropriate, to address the comments received. All revised versions of the final environmental assessment report and supporting documentation are posted on the website for the Ridge Landfill, www.ridgelandfill.com/our-future-plans.

As there were minimal changes required from the review for this particular document, it has not been reprinted for the final version. The changes to the document as described below, have been incorporated into the on-line and DVD versions.

Revisions to Appendix D4 – Assessment of Bird Hazard to Aviation Safety:

Errata No.	Section	Revision
1	All	Date changed – from July 2019 to January 2020
2	All	Report name changed - Draft Ridge Landfill EA to Ridge Landfill EA

Appendix D4

Ridge Landfill Expansion - Assessment of Potential Bird Hazards to Aircraft Safety

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LGL Report No. FA0099-1

13 May 2019

Ridge Landfill Expansion – Assessment of Potential Bird Hazards to Aircraft Safety

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EXECUTIVE SUMMARY

BACKGROUND

The Ridge Landfill is located near the community of Blenheim in southwestern Ontario, in the Municipality of Chatham Kent. The site has been in operation since 1966 and is currently owned and operated by Waste Connections of Canada Inc. The landfill accepts non-hazardous industrial, commercial and institutional waste from across the province, as well as local residential waste. The facility is undertaking an Individual Environmental Assessment (EA) under Ontario's *Environmental Assessment Act* to seek approval for expansion.

An airport zoning regulation is in place at the Chatham-Kent Municipal Airport; it includes a provision which specifically prohibits the disposal of any waste that is edible by, or attractive to, birds within lands including the existing landfill and the proposed expansion area. However, because the landfill was in operation before the regulation was enacted, the landfill has been exempted from the provision of the zoning regulation, subject to the condition that extensions of the waste disposal site do not increase bird hazards to aircraft safety. As discussed later, the owner of the landfill will, in fact, reduce bird hazards by operating an upgraded bird control program.

TECHNICAL STUDY

To assess the potential for the expansion of the landfill to increase the bird hazard to aircraft safety at the airport, a detailed technical study of bird population levels, flight paths, and behaviour at the landfill and in the surrounding area was conducted and the results are presented below. The study used the same methods as used in 1995-96 in support of a previous expansion of the Ridge Landfill. This allowed a comparison of the changes in the regional bird populations and the effectiveness of the mitigation measures that were implemented after the previous expansion was approved. The present study also included an evaluation of present aircraft numbers and flight patterns at the Chatham-Kent Municipal Airport.

MAIN FINDINGS

Three groups of large flocking bird species occur in the vicinity of the landfill and the airport: gulls (Ring-billed Gull and Herring Gull), American Crow, and Turkey Vulture. Gulls are strongly attracted to landfills throughout North America and are the main species of concern at Ridge Landfill. The study found that present gull behaviour was similar to that in the 1990s with peak numbers at the landfill occurring in August to early October. Daily behaviour was unchanged with the birds flying south to roost at night on Lake Erie and returning to the landfill area in the early morning. These daily flights take the gulls away from the airport, which is north of the landfill. The numbers of gulls using the landfill are lower than during 1995 study. This reduction is a function of the bird control plan implemented at the landfill. It is not possible to precisely quantify the amount of the reduction in numbers. However, it should be noted that even though

there has been a significant reduction in gull numbers there are still substantial numbers of gulls using the landfill.

There are large numbers of American Crows present in southwestern Ontario during late fall and winter. Most of these birds roost at night in trees along the Thames River in Chatham. During the day, thousands of crows spread out through the agricultural fields south of Chatham. Some of these crows visit the Ridge Landfill but most of them do not feed on the waste at the landfill. The numbers and distribution of crows in the region during winter is similar to the situation in the 1990s.

The Turkey Vulture is a large carrion-feeding bird that has been increasing in eastern North America over the past 40-50 years. Some vultures are attracted to the vicinity of the landfill in summer and fall. They sometimes feed along the edge of the active waste disposal area but they are generally wary of human activity and avoid close approach. The vultures also sometimes soar on updrafts created by the wind forced upward by the presence of the raised landfill.

EXISTING BIRD HAZARD TO AIRCRAFT SAFETY

The most direct method of evaluating bird hazards is to examine the reports of bird/aircraft strikes at the Chatham-Kent Municipal Airport. During 24-year period from 1995 to 2018, there were 53 reported bird strikes at the airport. None of the strikes involved potentially hazardous species Turkey Vultures or American Crows. Over the 24-year period, there were six strike incidents involving gulls. Three of these occurred before there was a gull control program at the landfill (1995, 1997, and 2002). More recently, reported gull strikes occurred on 1 November 2012, 4 June 2014, and 28 July 2014. None of these strikes reportedly caused any damage to the aircraft. There have been no reported gull strikes in the last nearly 5 years.

Even though there were only a few non-damaging bird strikes, there were substantial numbers of gulls attracted to the landfill at certain periods. Some of these gulls also occurred at the airport where they needed to be scared away by airport personnel. There were 99 records of gulls at the airport in 2017 and 102 records in 2018. Over the two-year period, control was instituted by airport personnel in 70% of these situations. In many cases, the estimated numbers of gulls were quite large. There were 36 cases, 18% of the total, when the estimated numbers present were at least 1,000 gulls with the highest numbers of 7,000 in 2017 and 5,000 in 2018.

It is concluded that the bird control at the landfill and the airport has been sufficient, to date, to protect aircraft using the Chatham-Kent Municipal Airport. However, the numbers of gulls attracted to the area pose a residual risk to aircraft safety.

POTENTIAL BIRD HAZARDS ASSOCIATED WITH THE REQUESTED LANDFILL EXPANSION

The proposed expanded landfill will be operated in the same way as the existing landfill is operated and the expanded landfill will provide the same attractions for potentially hazardous birds. For that reason, the expansion of the landfill will not increase potential bird hazards to the safety of aircraft using the Chatham-Kent Municipal Airport. In fact, there will be a reduction in the residual risk because of planned improvements to the existing bird control program at the landfill and coordination with the control efforts at the airport.

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1.0 INTRODUCTION

The Ridge Landfill is located near the community of Blenheim in southwestern Ontario, in the Municipality of Chatham Kent. The site is owned and operated by Waste Connections of Canada Inc. (formerly Progressive Waste Solutions Ltd. And before that BFI Canada Inc.). The landfill accepts non-hazardous industrial, commercial and institutional waste from across the province, as well as local residential waste. The site has been operating since 1966 and has undergone periodic expansions since operations began. Given that the facility is expected to reach its current capacity in 2022, Waste Connections is undertaking an Individual Environmental Assessment (EA) under Ontario's *Environmental Assessment Act* to seek approval for expansion.

An airport zoning regulation has been in place at the Chatham-Kent Municipal Airport since 1991 that includes a provision which specifically prohibits the disposal of any waste that is edible by, or attractive to, birds within lands including the existing landfill and proposed expansion area. However, because the landfill was in operation before the regulation was enacted, the landfill has been exempted from the provision of the zoning regulation, subject to the condition that if an extension of the waste disposal site is identified to pose a possible threat to the safe operation of aircraft at the municipal airport, the owner of the landfill will be liable for controlling the bird hazard so that there is no danger to air traffic (Davis et al. 1996).

1.1 STUDY AREA

The broader geographical area within which the landfill is located (as shown in Figure 1) includes the shoreline of Lake Erie (approximately 6 km south of the site) and a landscape dominated by agriculture. The site is located 5 km west of the town of Blenheim. The Chatham-Kent Municipal Airport is located 800 m to the northwest of the landfill site and the Approach/Departure Path to the main 5,500 ft (1,667 m) runway is adjacent to the northern border of the landfill site.

The study area is primarily under agricultural use and includes an extensive system of drains and channels bordering fields and cutting across the landscape. The site identified for landfill expansion is dominated by lands under active agriculture. The Blenheim Sewage Treatment Lagoon is located 2.5 km to the east from the landfill.

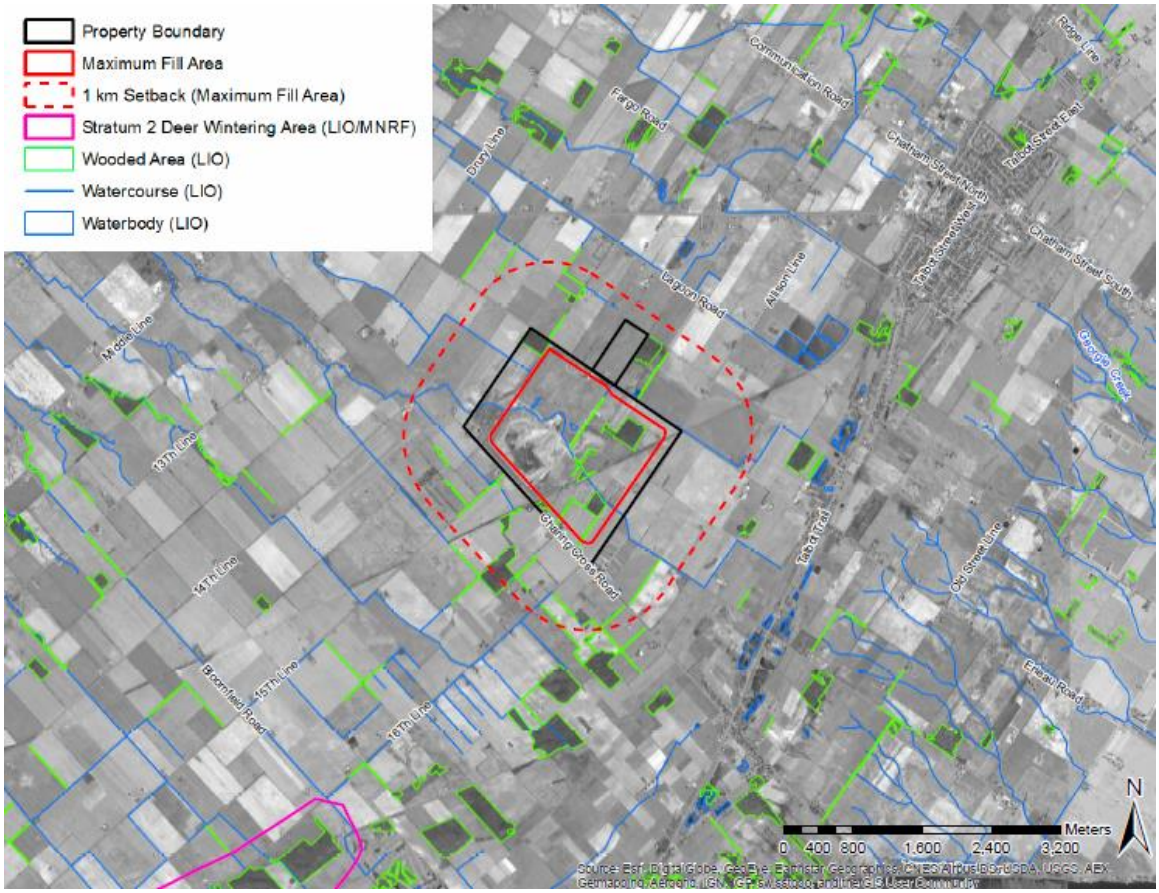


Figure 1. Natural Features in proximity to the Ridge Landfill

2.0 METHODS

The present report is designed to complement the bird hazard to aviation study completed for a previous expansion in 1996. The present study provides documents any changes to existing conditions, given that the previous study was completed 20 years ago. To accomplish this, biologists from LGL Limited conducted field investigations of birds that presently occur in notable congregations within, and in proximity to, the landfill.

Information for the present report was gathered primarily by field observations on four visits to the study area in key seasons. These visits included late-summer (13-14 September 2016), fall migration (23-24 November 2016), winter (27-28 February 2017), and spring migration (5-7 April 2017). There is now a gull control program at the landfill that is provided by Predator Bird Services. They have maintained records of control efforts and estimated daily gull numbers, which are provided to the landfill. These records were also used in the present analyses and provided daily estimates of gull numbers across all seasons from 2011 to 2018.

2.1 COUNTING, IDENTIFYING AND AGEING GULLS

The numbers of gulls at the Ridge Landfill and other day-use areas were determined either by direct count or by estimation. Direct counts were usually made when numbers were low (up to ~100 gulls). Gull numbers were estimated when larger flocks were encountered. Numbers were estimated by counting the gulls in small units, usually 10 or 20 gulls (for example, 10, 20, 30, 40…). The accuracy of the 'eyeball' estimates of 10- or 20-gull units was checked regularly by direct counts of 10 or 20 gulls.

The species and ages of gulls were determined by plumage characteristics and other standard field marks (Sibley 2000), using 8.5 X binoculars or a 20-40X spotting scope. This study used the same limited number of age classes used by the previous study (Davis et al. 1996). Ring-billed Gulls were classified into two age categories: <1 year and ≥1 year. Herring Gulls and other large gull species were classified into three age categories: <1 year, 1 year, and ≥ 2 years.

2.2 OBSERVATIONS AT RIDGE LANDFILL

The numbers, movements, distribution and 3ehavior of birds at the Ridge Landfill were recorded during each of the four visits to the study area. The fieldwork was comprised of observations of gulls and crows arriving and departing the landfill early and late in the day, mid-day censuses of birds, counts of birds in the ponds on site and maximum counts of birds at the site.

2.2.1 Arrivals and Departures

Observations of gulls arriving at, or flying over or past the Ridge Landfill were made during the early morning on four dates: 14 September 2016, 23 November 2016, 27 February 2017 and 7 April 2017. Observations of gulls departing the landfill in the late afternoon were made on 23-24 November 2016 and 6 April 2017.

2.2.2 Mid-day Censuses and Daily Maximums

During the 1996/1997 surveys, mid-day censuses were done on most days in order to capture the peak numbers of gulls present at the landfill. However, during these surveys the presence of an active control program meant that the maximum numbers of gulls on site often occurred before 9:00 AM when the control program started. Mid-day counts were done on 14 September 2016, 27 February 2017 and 6 April 2017. Daily maximum counts were recorded on all days that the landfill was visited.

2.2.3 Distribution and Movements of Birds

During all visits to the landfill, the movements of birds, especially gulls, on and around the site were noted. In addition, the locations of bird concentrations on and near the landfill were recorded. The locations and movements of gulls around the site could be important, given the close proximity of the aircraft flight paths for the Chatham-Kent Municipal Airport. During the

early morning, observations of arriving gulls were made to determine flight direction in relation to the landfill and airfield, and where they landed. On most visits, a sketch of the site was made to note where concentrations of birds were located.

2.3 REGIONAL SURVEYS

2.3.1 Roost and Flightline Surveys

Gulls

Surveys were conducted to determine whether the location(s) of the major gull night roost(s) and pre-roost congregation areas in the study area had changed since 1995. In addition, flight paths used by gulls commuting between the night roost and the Ridge Landfill were determined. Observations were made from the landfill in the early morning and near sunset, from agricultural areas in the late afternoon, and from several locations along the shore of Lake Erie around sunset. Notes were made on locations, times, flight directions and altitudes, flock movements and numbers, and notable congregations.

American Crows

The 1995 surveys found that the numbers of crows visiting the Ridge Landfill was significantly higher in the late autumn. Observations were made during the November and February visits to investigate the numbers and movements of crows in the area, to discover the locations of the night roost and the flightlines between the night roost and the landfill.

Turkey Vultures

Turkey Vultures are commonly attracted to landfills. They are very large birds can be significant hazards to aircraft. Observations were made to determine the location of their night roost and what flightlines were used between the roost and the landfill. Surveys were done on 13 September 2016 and 5 April 2017. Vultures are not present in the area during the winter.

2.3.2 Surveys of Agricultural Fields

Gulls, vultures, crows and starlings were counted along a 41 km roadside survey route in the agricultural countryside surrounding the Ridge Landfill and the Chatham-Kent Municipal Airport. This survey was conducted on four dates: 14 September 2016, 23 November 2016, 28 February 2017 and 6 April 2017 (Table 1). The survey route is illustrated in Figure 2.

2.3.3 Chatham-Kent Municipal Airport

Observations were made of gulls and other bird species on or flying over, the Chatham-Kent Municipal Airport. Observations were made from 14th Line on the north side of the airport during the surveys of agricultural fields and occasionally from the top of the landfill, which provided a good view of the airfield.

Table 1. Outline of the field observation program, September 2016 – April 2017.

Field Task	September 2016		November 2016		February 2017		April 2017		
	13th	14th	23rd	24th	27th	28th	5th	6th	7th
Ridge Landfill									
- early AM gull flights		X	X		X				X
- early AM crow flights			X		X	X			
- mid-day counts		X			X			X	
- pond counts	X		X		X			X	
- PM gull flights			X	X	X			X	
Field Survey		X	X			X		X	
Erieau Surveys	X	X	X		X				X
Airport	X		X	X		X		X	X
Gull Flightlines and roost	X		X		X				
Vulture Flightlines roost	X						X		
Crow Flightlines and roost			X	X		X	X		

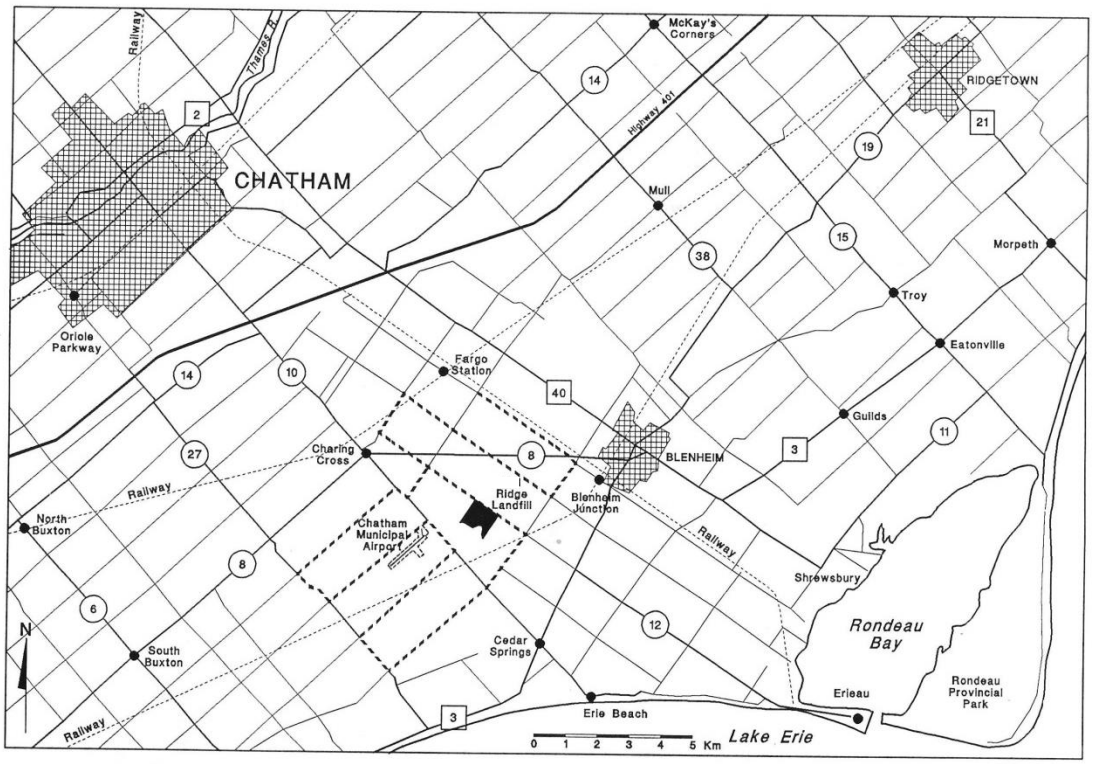


Figure 2. Study area showing Ridge Landfill, Chatham Municipal Airport and the agricultural field survey.

2.3.4 Lake Erie Shoreline

The numbers, species and age composition of gulls were recorded on the Lake Erie shoreline at the entrance to Rondeau Bay, along the breakwall in Erieau, and along Erieau Beach. This survey was conducted in the evening on five dates: 13-14 September 2016, 23 November 2016, 27 February 2017, and 7 April 2017 (Table 1).

3.0 RESULTS AND DISCUSSION

3.1 RIDGE LANDFILL

3.1.1 Numbers of Gulls

The numbers, species and ages of gulls at the Ridge Landfill were determined on six surveys conducted during 4 field trips. These data are presented in Table 2. The maximum numbers of gulls ranged from 12 (April 6 2017) to 2,028 (November 23 2016). These counts do not include Bonaparte's Gulls. On 6 April 2017, there were 47 Bonaparte's Gulls seen from the landfill and on 7 April 2017 there were 92 seen from the landfill but these birds flew past the landfill without showing any interest in the landfill itself; they continued on to ponds or wet fields in the surrounding area. Unlike most other gull species, Bonaparte's Gulls rarely feed at landfills (Burger and Gochfield 2002).

Ring-billed Gulls made up the majority of the gulls observed at the landfill (Table 2; 83%-98%), although there were always Herring Gulls present as well (3%-12%). Other large gull species observed included Great Black-backed Gull (3 sightings), Lesser Black-backed Gull (1 sighting), and Glaucous Gull (1 sighting). The latter gulls were present on only three of the surveys and made up a very small percentage of the total gulls observed.

Table 2. Species and maximum numbers of gulls recorded at the Ridge Landfill, 2016-2017.

			Estimated Numbers				Other Gull Species (total counts)		
			Ring-billed Gull		Herring Gull				
Survey Date	Total # of Gulls	% sampled for species ID	Number	%	Number	%	Great Black-backed	Lesser Black-backed	Glaucous Gull
Sep 13	120	62%	117	97%	4	3%			
Sep 14	56	59%	49	88%	7	12%			
Nov 23	2,028	48%	1917	95%	111	5%			
Feb 27	450	47%	431	96%	18	4%	1		
Feb 28	228	100%	213	93%	12	5%	1	1	1
Apr 06	12	100%	10	83%	1	8%	1		
Apr 07	52	100%	44	85%	8	15%			

On most dates, the majority of Ring-billed Gulls observed were adults (86%-98%), however on 6 April 2017, when there were only 10 Ring-billed Gulls, only 50% were adults. Herring Gulls were generally present in lower numbers and it is less meaningful to extrapolate in cases where there were only a handful of Herring Gulls identified to age class. On 27 February 2017, the age composition of Herring Gulls present was 63% ≥ 2 years and 37% < 1 year (8 birds sampled); on 28 February 2017, the age composition was 67% ≥ 2 years/33% < 1 year (12 birds sampled). Age classes were not determined on 23 November 2016.

3.1.2 Distribution and Movements of Gulls

During the September 2016 fieldwork, there were relatively few gulls at the landfill. At this time, the active area was on the south side of the landfill. In the morning of 13 September 2016 there were 41 gulls loafing on dirt piles on the southwest side of the landfill. These were flushed shortly after 9:00 AM. Some of these may have relocated to Pond #5 on the north side of the landfill, where 14 gulls were observed shortly afterward. In the afternoon (3:00-4:00 PM) there were 72 Ring-billed Gulls and 2 Herring Gulls loafing along the edges of Pond #5 and an additional 46 gulls on top of the landfill, near the active area. Many gulls were leaving the landfill during this period and by 3:40 PM the gulls had departed from Pond #5 and the only gulls remaining were roughly 70 that were found loafing on a flat area atop the landfill, near the active area.

Midday observations on 14 September 2016 found 33 gulls loafing on the northwest slope of the landfill at 12:00 PM. Shortly after this, 56 gulls flew from the landfill mound over to an area on site under active excavation, immediately southeast of the landfill area. The gulls settled in the centre of this area.

Gulls were much more numerous at the landfill during the November 2016 fieldwork. There were two active waste disposal areas in operation at this time, one on the south side of the landfill and one on the northwest side, roughly 200 metres apart. On 23 November 2016, gulls were arriving from the south and were landing in a field on the northeast side of the landfill from 7:25 AM to 7:40 AM. During this time, 415 gulls arrived at this field from the south. At 7:45 AM there were an estimated 880 – 1,100 gulls in the active area of the landfill. Bird control started at 8:45 AM and the gulls and crows were flushed off the active area by pyrotechnics. At 9:10 AM, there were no gulls on the landfill itself but there were 1,060 in a field immediately to the south of the landfill property and 968 in a field immediately to the north. By 9:30 AM, roughly 150 gulls had returned to the active area on the northwest side of the landfill; the bird controller was evidently occupied at the other active area.

On 24 November 2016, 250 gulls were observed flying over the landfill at 8:05 AM but they continued on north-northeast toward Chatham. There was a heavy rain overnight so there appeared to be more gulls feeding in the fields of the surrounding area than at the landfill.

During flightline observations on 27 February 2017, 223 gulls arrived from the south or southeast. Most of these bypassed the landfill on either side and 185 settled on the field immediately north of the landfill. By 8:00 AM there was a flock of 320 Ring-billed and Herring Gulls loafing in this field. They flushed from the field and most of them relocated to the airport; 275 of them settled on or beside the runway. At 8:05 AM an airport employee came out and flushed the gulls off the airfield using pyrotechnics; initially they headed southwest but most eventually circled back to the landfill (128), to a field just west of the landfill (180), and to the field they started in. At 8:15 AM the gulls moved to the top of the landfill where 132 of them gathered in a flat open area away from the active face. Gulls continued to arrive until there were roughly 350 birds present. They got up from where they were gathering and moved to the active area to feed at 8:30 AM. At 8:49 AM, all of the gulls were flushed from the active area, possibly by the arrival of the bird controller. The gulls relocated to the newly excavated cell on the southeast side of the property. Later that day, there were still 450 gulls around the landfill, loafing in the field immediately south of the landfill at 2:25 PM. Some of these gulls later moved up to the landfill or over to the new cell. Over the next hour there were always some gulls at one of the two active areas on the landfill. The bird controller was not able to cover both areas simultaneously so gulls were able to consistently feed at whichever area the controller was not present. On 28 February 2017, gulls were again found loafing in the new cell and on the fields just north and south of the landfill, in addition to birds on the active disposal area.

There were relatively few gulls present during the April surveys. During early morning surveys at the landfill on 7 April 2017, only 44 Ring-billed Gulls and 8 Herring Gulls were observed arriving from the south, southwest and west. In addition, there were 60-90 Bonaparte's Gulls that also arrived from the south. Most of these settled in the field immediately to the north of the landfill.

3.1.3 Numbers of Crows, Starlings and Vultures

Maximum numbers of non-gull species that could also pose hazards to aircraft safety were also recorded. These species primarily included American Crows, European Starlings, and Turkey Vultures. Table 3 presents the maximum numbers of these species recorded at the Ridge Landfill. There were also a number of waterfowl species observed in the ponds around the landfill site.

American Crows were most abundant in the late fall and winter. None were recorded during the September 2016 visits and only 2 were observed on 6 April 2017. However, during the November 2016 and February 2017 visits there were hundreds of crows visiting the landfill. American Crows generally avoided the active disposal area while there were vehicles present but were spread widely across the site, on the inactive areas of the top and along the sides of the landfill.

Table 3. Maximum numbers of American Crows, European Starlings and Turkey Vultures recorded at the Ridge Landfill.

Survey Date	Crows	Starlings	Turkey Vultures
13-Sep-16	0	225	39
14-Sep-16	0	2000	76
23-Nov-17	613	200	0
27-Feb-17	238	150	1
06-Apr-17	2	20	6

Starlings were most abundant around the base of the landfill, often gathering in the trees along the north side of the landfill and near the equipment buildings. The largest numbers were observed on a mid-day count on 14 September when an estimated 2,000 starlings were in the trees and on the ground near the equipment building. On most visits, there were fewer than 250 starlings. Starlings were also frequently observed outside the landfill property, along Charing Cross Road.

Turkey Vultures typically arrived at the landfill after 10:00 AM and left in the late afternoon. They were most abundant during the September surveys. According to the controller from Predator Bird Services, Turkey Vultures left the area in mid-November (C. Peltier, pers. Comm.). On 13 September 2016, between 3:00 PM and 4:00 PM, there were 10 Turkey Vultures circling over the landfill and 29 on the ground, around the edge of the active area although some distance from the path of the trucks. Some of the birds on the ground appeared to simply be resting but some were feeding. On 14 September 2016, there were 76 Turkey Vultures circling over the landfill during a mid-day count (12:00-12:30 PM). Circling Turkey Vultures were typically seen flying an estimated 100-300 feet above ground level. One Turkey Vulture was seen at the landfill on 27 February 2017, a relatively early date for them to return to the area. Only 6 were seen at the landfill in April 2017, however by this time there were at least 18 coming to the nearby roost site.

There are five ponds located around the edge of the landfill property. Waterfowl were observed in the ponds. There are five ponds located around the edge of the landfill property. Waterfowl were observed in the ponds on the north side of the property on all pond surveys. Pond #5, beside the gatehouse, often had large flocks of Canada Geese present with a high count of 338 on 23 November 2016. During the surveys in late February and early April 2017 there was also an area of flooded fields immediately north of Pond #4 which held various species of dabbling ducks, with total waterfowl counts up to 195 birds (on 27 February 2016).

3.2 NIGHT ROOSTS AND FLIGHTLINES

3.2.1 Gulls

Flightline observations were conducted from the top of the landfill beginning at 7:00 AM on 14 September 2016. Very few gulls were observed with only 12 gulls (8 Ring-billed, 4 unidentified) seen flying in. All gulls arrived from the southeast and all were flying at estimated altitudes of 100-300 feet above ground level. On 23 November 2016, 415 gulls were observed arriving in the vicinity of the landfill from the south. Flightline observations were also conducted on 27 February 2017, beginning at the landfill at 6:47 AM (sunrise at 7:10 AM). Between 7:15 AM and 7:32 AM, 223 gulls arrived from the south or southeast, in groups of 6 to 38 birds. These gulls were flying at estimated altitudes of 100-800 feet above ground level.

During the flightline surveys on 7 April 2017, 44 Ring-billed Gulls and 8 Herring Gulls were observed arriving from the south, southwest and west. In addition, there were 60-90 Bonaparte's Gulls which seemed to follow the same general flightline as the other gulls, although these were not attracted to the landfill specifically, and continued to the fields to the north.

Gulls were observed leaving the landfill on the afternoon of 23 November 2016 and were followed to the night roost (Figure 3). Some gulls headed south down Charing Cross Road toward the lake, while others first headed west along 15th Line (south of the airfield), stopping to loaf in agricultural fields briefly, before continuing south to Lake Erie, roughly due south from Cedar Springs. This roost is roughly in the same location as the roost located during the 1996 study (Davis et al 1996). In the afternoon of 27 February 2017, up to 1,500 gulls gathered in wet fields between Erieau Road, Bisnett Line and Erieau Shores Drive. Gulls arrived at this location throughout the afternoon; as sunset approached a few gulls trickled out to the lake in small groups. At 6:17 PM, 2 minutes before sunset, all of the gulls took off and flew out to the lake in large, tight groups.

3.2.2 American Crows

During the winter months, large numbers of crows gather in communal night roost sites along the Thames River in Chatham. During the winter, the crows arrive at the landfill in the morning from the north. On 23 November 2016, crows were observed flying into the landfill from the northeast in flocks of 20-90 birds. They were all flying quite low over the fields, typically less than 100 ft. above ground level. They were observed arriving at the landfill in a similar fashion on 27 February 2017. Crows typically began arriving at the landfill shortly after first light and tended to leave by mid-afternoon.

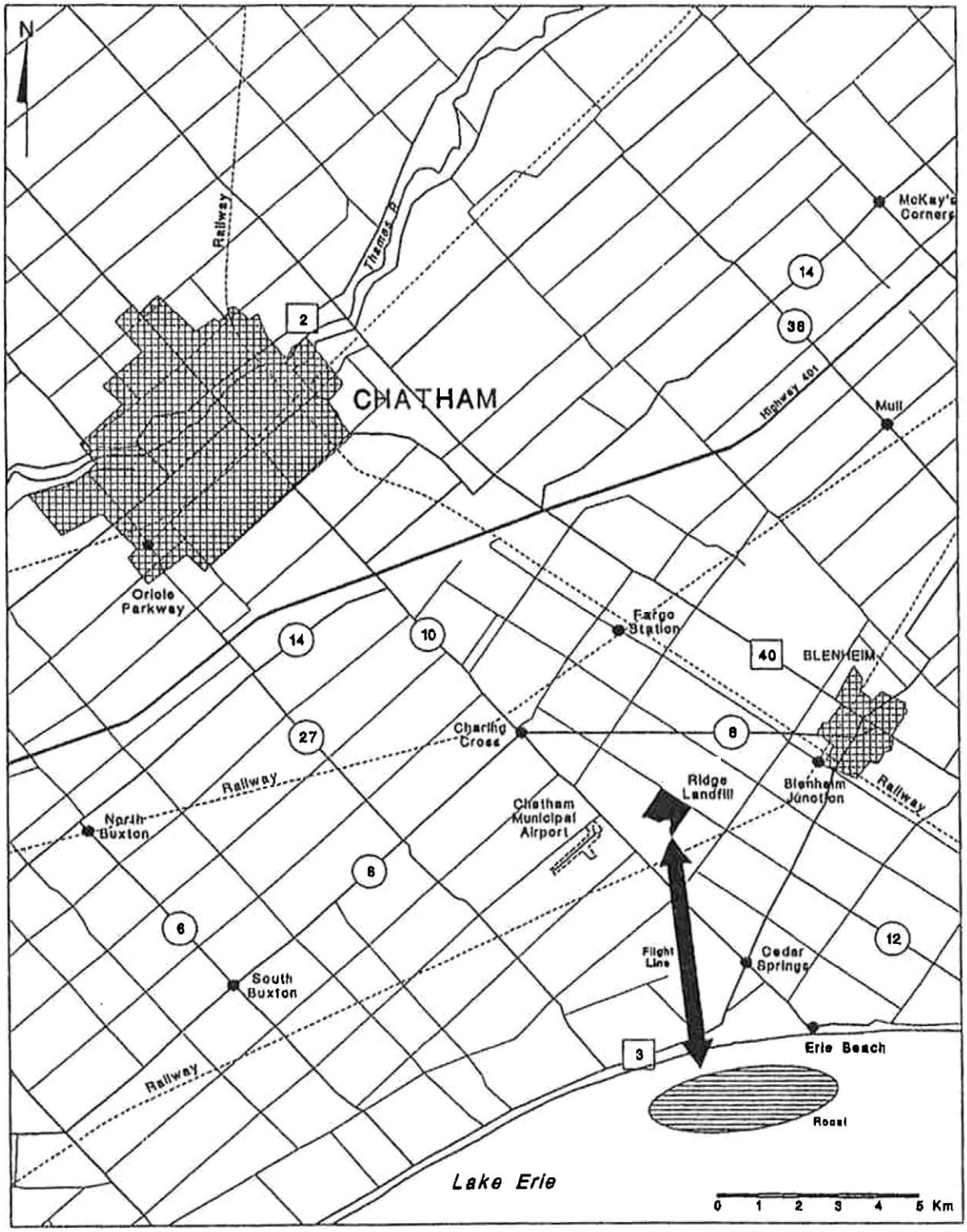


Figure 3. Generalized flightline and roost site of gulls during 1995 study and 2016/2017 study.

On 28 February 2017, a survey of the area north of the landfill was conducted to discover crow flightlines to the landfill. Roughly 500 crows were seen moving in small groups from the general direction of Chatham. It is likely that not all were heading directly to the landfill but most were moving southeast. The crows flew low across fields or moved along hedgerows, stopping frequently along their route. That evening crows were followed to their night roost in Chatham. At 5:00 PM a major pre-roost concentration of 1,400 crows was found in a field on Bloomfield Road, just south of Highway 401. From there crows were followed into Chatham where they were converging on the trees along the Thames River, in the vicinity of the Kiel Drive Bridge. Crows were also found roosting in a woodlot behind a factory on Richmond Street, roughly 500 metres southwest of Kiel Drive Bridge. There were approximately 5,000 crows roosting in these two locations (Figure 4).

3.2.3 Vultures

On the evening of 13 September 2016, Turkey Vultures began leaving the landfill at around 6:30 PM (sunset at 7:44 PM) and headed south-southeast, roughly parallel to Charing Cross Road. These birds were followed to a woodlot on the Lake Erie shoreline at the end of Douglas Road, just south of Highway 3, about 5 km south of the landfill (Figure 4). Birds arrived at this location from the surrounding area; a total of 46 were counted before they settled into the woodlot to roost for the night. Turkey Vultures were not present in the area in any significant numbers during the November and February surveys. On 5 April 2017, Turkey Vultures were again observed roosting in this area, this time in a woodlot on the north side of Highway 3, across from Douglas Road. At that time, a total of 18 were observed at the roost site.

3.3 REGIONAL SURVEYS

3.3.1 Surveys of Agricultural Fields (Figure 2)

Agricultural fields can be very attractive to gulls and other potentially hazardous species. At certain times of year substantial numbers of gulls forage in agricultural fields. Fields that are being ploughed or worked are especially attractive because soil invertebrates are brought closer to The surface. This also occurs after a rainfall at which time ploughed fields and fields (or lawns) with short grass will have earthworms at the surface. Other species that could be hazardous such as crows or large flocks of starlings are also common in agricultural areas.

Gulls were observed on three of the four roadside surveys conducted. On 23 November 2016, there were several large flocks of gulls feeding or loafing in fields in the area, totaling 1,945 gulls. The largest was a flock of 950 observed in a field that was being ploughed along Allison Road, roughly 2 km east of the landfill. Other groups of 109, 114 and 700 gulls were observed in recently ploughed fields and on a sod field on 16th Line to the west of the landfill. It was raining during this survey.

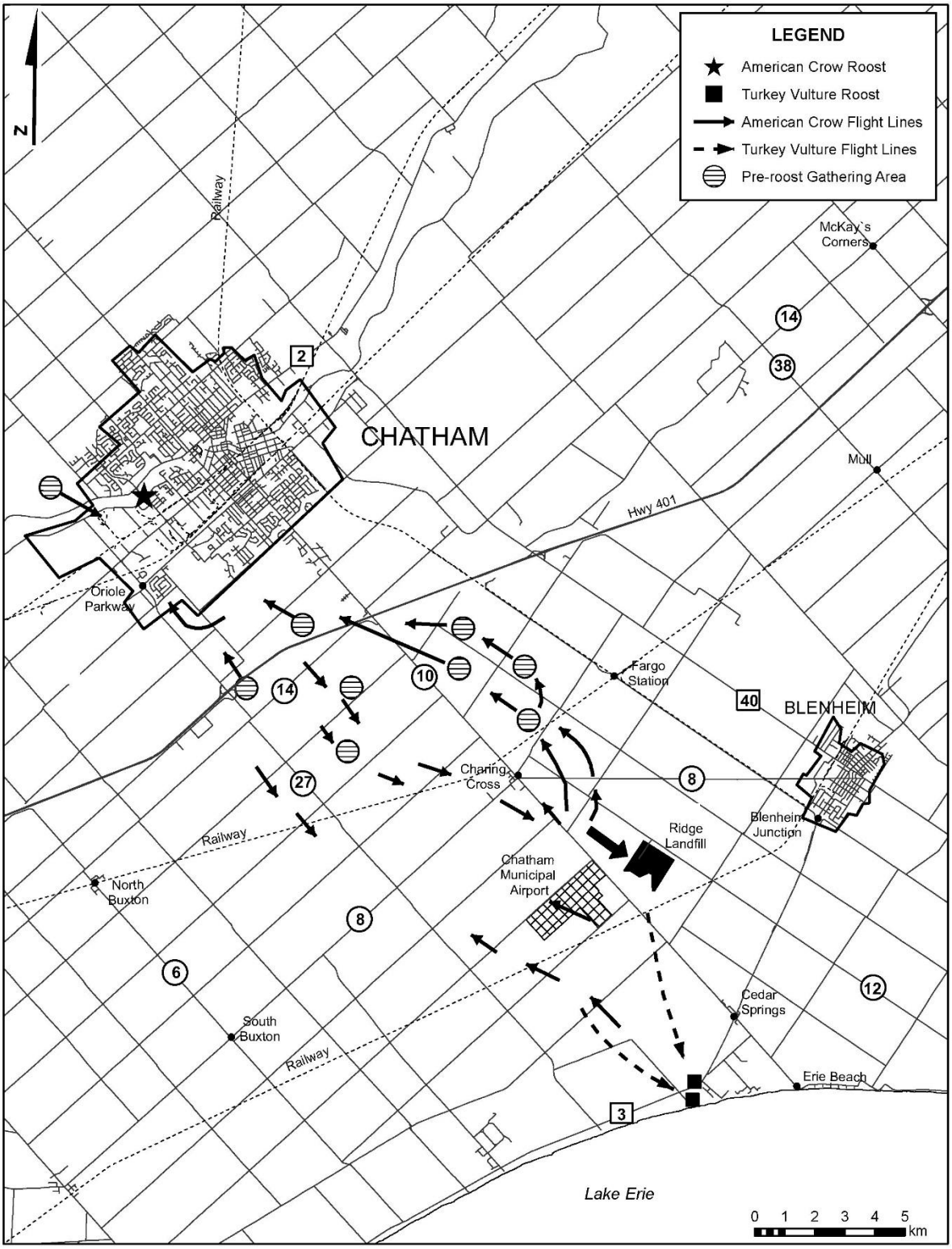


Figure 4. Flightlines and night roost sites used by American Crows and Turkey Vultures in 2016-2017.

The second greatest numbers of gulls were recorded during the 28 February 2017 survey where 1,111 gulls were noted. These were in several groups, the largest being 345 gulls in a wet field on Allison Road, 130 gulls in the field north of the landfill on Erieau Road, 160 gulls in a field just south of the landfill on 16th Line, and 215 in a field on 15th Line. Most of the gulls observed were Ring-billed Gulls. Although none of the fields were being worked during this survey it had been raining earlier in the day and it had been unseasonably warm for several weeks prior with very spring-like conditions throughout much of February.

Gulls were also recorded on the 6 April 2017 roadside survey but in much lower numbers. A total of 194 gulls were recorded during this survey, 152 of which were migrating Bonaparte's Gulls. The Bonaparte's Gulls were feeding and loafing in wet fields on Allison Line (50) and the 15th Line (102). There were no gulls recorded during the roadside surveys on 14 September 2016.

Crows were only observed on two of the four roadside surveys; during the late fall and winter visits. During the winter, the number of crows in the area increases substantially as migrants from other areas arrive to overwinter around Chatham. On 23 November 2016, 229 crows were recorded on the roadside survey route. The crows were in two large flocks, 144 on a field on Fargo Line and 85 flying along Erieau Road near the landfill. The 28 February 2017 survey recorded 102 crows, most of which were along Charing Cross Road near the landfill.

Turkey Vultures were recorded on the September and April surveys; they were largely absent from the area in November and February. In September, there were 37 Turkey Vultures recorded on the roadside survey; 20 of these were in the vicinity of the landfill. Only 6 Turkey Vultures were recorded on the April survey, these were scattered across the area.

3.3.2 Chatham-Kent Municipal Airport

Some observations of birds at the Chatham-Kent Municipal Airport were made on most days of surveying. Gulls were seen at the airport on three dates. On 23 November 2016, there were 5 Ring-billed Gulls on the runway at 2:15 PM. On the morning of 27 February 2017 there was a flock of 320 Ring-billed and Herring Gulls loafing in a field just north of the landfill. At roughly 8:00 AM they flushed from the field and most of them relocated to the airport; 275 of them settled on or beside the runway. At 8:05 AM, an airport employee came out and flushed the gulls off the airfield using pyrotechnics; initially they headed southwest but most eventually circled back to the landfill, to the field they started in and a field just west of the landfill. During a 10-minute watch at the airport later that day (10:07 AM) there were 96 gulls in a field alongside the runway and 32 more were seen flying in from the east. There were also 135 gulls in the field right at the west end of the runway.

At 3:35 PM on 5 April 2017 there were 60 Bonaparte's Gulls flycatching over the runway and the field to the south the runway and 266 were loafing in the fields just north of the airport.

Later that day (6:05 PM) there were 440 Bonaparte's Gulls loafing in the fields north of the airport. During the April surveys, there were a large number of Bonaparte's Gull observed in fields throughout the region.

American Crows (51) were observed in the trees near the airport buildings and in the grass along the runway (14) on 23 November 2016. Starlings were observed on the wires along Charing Cross Road, just east of the airport on 13 September 2016. In addition, there were some bird species observed around the airport that are not associated with the landfill. There was a Red-tailed Hawk nest in a tree across Charing Cross Road from the airport and Red-tailed Hawks were often observed in the area. On 23 November 2016, there was a flock of 300 Snow Buntings in the field next to the runway. On 7 April 2017, there were 80 Lapland Longspurs and 12 Horned Larks in the fields next to the runway.

3.3.3 Lake Erie Shoreline

During the September surveys, there were large numbers of gulls along the Erieau Beach, the breakwall, and on the tip of Rondeau across from the harbour. On 13 September 2016 at 5:00 PM, there were 2,073 gulls on the beach at Erieau (1,850 Ring-billed Gulls, 19 Herring Gulls, 3 Great Black-backed Gulls and 201 Bonaparte's Gulls), 102 gulls at the breakwall in Erieau Harbour (98 Herring Gulls and 4 Great Black-billed Gulls), and 205 gulls on the tip of Rondeau (190 Ring-billed Gulls and 15 Herring Gulls). On 14 September 2016, the numbers were similar with 1,600 gulls on the beach, 500 on the breakwall, and 700 on the tip of Rondeau, for a total of 2,800.

The surveys during other seasons found far fewer gulls along the shoreline. On 23 November 2016, there were 54 Herring Gulls, 7 Ring-billed Gulls, 4 Great Black-backed Gulls, and 9 Bonaparte's Gulls along the beach. Similar numbers were found on 27 February 2017 when 40 Herring Gulls and 2 Great Black-backed Gulls were on the breakwall. However, at the time of this survey there were up to 1,500 gulls loafing in a wet field just north of Erieau. On 7 April 2017, there were 5 Ring-billed Gulls, 16 Herring Gulls and 5 Great Black-backed Gulls on the breakwall.

3.4 COMPARISON OF RESULTS FROM 2016 – 2017 WITH 1995

The basic elements of bird numbers and behaviour in 2016-2017 were very similar to those in 1995. Gulls roosted at night in the same part of Lake Erie in both periods and the flightlines between the roost and the Ridge Landfill were the same in both periods. The main difference was that there were fewer gulls at the Ridge Landfill in 2016-2017. The highest numbers at the landfill were 11,000-13,000 at mid-day in the August-September period in 1995. The peak mid-day number in the 2016-2017 study was a little over 2,000 in November 2016. Higher numbers were present before the bird controller arrived on site at about 09:00 AM.

The numbers of American Crows at the landfill and in the general area were similar during the two periods. The peak number at the landfill on the 1995 surveys was 527 on 25 November whereas the peak in 2016-2017 was 613 crows on 23 November. Peak numbers occurred during fall-winter in both periods and the main night roost was along the Thames River in Chatham. The numbers of starlings at the landfill were similar during both periods. The numbers of Turkey Vultures were higher in 2016-2017 with 76 at the landfill on 14 September 2016. The peak in 1995 was 11 on 22 September. This difference is a reflection of the continuing general increase in Turkey Vulture numbers in eastern North America over the past 30-40 years. The vultures used a night roost near the Lake Erie shore in the summer and fall.

4.0 BIRD CONTROL PROGRAM

The current bird control program at the Ridge Landfill is provided since 2011 by Predator Bird Services, of London, Ontario. Mr. Cory Peltier of Predator has been the controller for the last 5 years. The controller generally works from 9:00 AM to 5:00 PM., Monday to Friday, with slight variations depending on season. There is no control in the off hours or on the weekends.

The bird control is primarily based on falconry but pyrotechnics are also a major component of the program. The falconer uses two Gyrfalcon/Saker Falcon hybrids and two Harris's Hawks. The two falcons are the primary birds used on gulls. Most of the time the falcons are flown to lure and primarily frighten the target gulls. On occasion, the raptors kill a gull during the course of the control activity. This reinforces the effectiveness of the falcons on the remaining gulls. The gulls are taken under a permit issued by the Canadian Wildlife Service that allows the taking of one Ring-billed Gull and one Herring Gull per day. Over the years, the data supplied by Predator Bird Services to the landfill indicate that there was an average of 0.33 gulls per day taken by the falcons over the seven years from 2011 to 2018. There were no data for 2014.

5.0 AVIATION

5.1 OVERVIEW OF THE CHATHAM-KENT MUNICIPAL AIRPORT

The Chatham-Kent Municipal Airport (airport) is located at N42°18.37' / W82°4.90' about 12 km southeast of the City of Chatham. The centre point of the Airport, based on the stated geographic coordinates and the existing 1,677 m long paved runway is 1.5 km west of the centre point of the existing Ridge Landfill site. The northeast end of this main paved runway is calculated to be 750 m west of the closest point of the west boundary of the landfill site property. Reference elevation at the airport is 196.3 meters above mean sea level (mASL)[1].

The Airport is owned by the Municipality of Chatham-Kent and is managed and operated by Z-3 Aviation. The Airport is categorized by Transport Canada as a "Certified" facility, which means that the Municipality is required to maintain and operate the Airport in accordance with Transport Canada standards, which include a requirement for the Airport to have in effect a detailed Airport Wildlife Planning and Management Plan. Regular inspections are conducted by Transport Canada to confirm compliance.

In terms of operating facilities, in addition to the main runway, there are adjacent to the south edge of the main runway, two grass runways that are used primarily by the Air Cadet gliding program for tow-aircraft and glider take-offs and landings. These two runways are:

- A 1,067 m long facility located immediately adjacent to and paralleling the main paved runway.

- A short 610 m facility at 90 degrees to the parallel runway and located in a southeast orientation to the paved runway.

Over the last 20 years, there have been two key changes to the Airport and its operations, as follows:

- A lengthening of the main paved runway from the original 1,170 m to the current 1,677 m length.

- Cancellation of the two non-directional beacon published instrument approach procedures and replacement of these with two new published global positioning system (GPS) aircraft instrument approach procedures. The original two GPS approaches have been upgraded to the designation LPV (Localizer Performance with Vertical Guidance), and they have

[1] Transport Canada, *Chatham Airport Zoning Regulations*, SOR/91-173, current to January 30, 2019

received approval by Nav Canada and are published in the official Canada Air Pilot document for use by aircraft.

In terms of aviation activity at the Airport, information provided in the Airport's 2017 Annual Meeting report indicates a relatively stable level of just under 7,000 annual aircraft movements over the past five years made up of a mix of piston aircraft, helicopters and turboprops, turbofan and turbojets, and gliders.

In order to provide additional insights on the scope of the aircraft operations at the Airport, interviews and meetings were conducted with the Airport management as well as four parties representing the main classes of flight operations at the Airport:

1. A Citation CJ3 corporate jet operated by Sothebys for various charter clients and to various destinations.

2. A Beechcraft King Air A350 corporate turboprop aircraft operated primarily for Union Gas to various destinations.

3. St. Thomas Flight Centre operating several light general aviation aircraft, such as the Cessna 172 and 152 and a twin-engine Piper Apache, housed mainly at St. Thomas Airport but operated frequently at Chatham-Kent Airport for ab initio and cross-country flight training, as well as instrument flying practice and proficiency.

4. A Royal Canadian Air Cadet towing and gliding operation, using one light tow aircraft and two gliders, all based at Chatham. Operations are mainly conducted in the spring and autumn, using the two grass runways and with two practice areas to the southeast and southwest, as described later in Figure 7.

In terms of the implications with respect to bird hazard, it is anticipated that aircraft approach for landings on runway 24 will now be at the approved approach height of 272 m ASL in the vicinity of Charing Cross Roadt.

5.2 AVIATION IN VICINITY OF RIDGE LANDFILL

To assist in describing the aviation environment at the Chatham Airport, we have prepared three topographic maps at a scale of 1:50,000. On all three maps, the location and layout of the proposed Ridge Landfill expansion is shown, as well as the three runways that are in use at the Airport, as previously described.

Figure 5 (Map A) is based on Airport Zoning Regulations (AZR)[2] that are in effect and current to 12 December 2018. Based on discussions with representatives of Transport Canada, it was ascertained that periodic changes in the date shown do not necessarily reflect amendments to the Zoning Regulations, rather are just administrative items such as reflecting periodic reviews. Figure 5 shows the protected zoned surfaces, as described in the Airport Zoning Regulation. The Ridge Landfill site is within the Outer Surface that has an upper limit of 45 m above the Airport reference elevation of 196.3 m above sea level (ASL). The Outer Surface Elevation is therefore 241.3 m ASL, and as stated in the Regulation, a structure cannot be erected within the area of this surface that will exceed 241.3 m ASL.

The apparent northwest boundary of the Ridge Landfill is just at the east side boundary of the sloping zoned approach surface extending to the northeast from the east end of the main paved runway. This designated approach surface to the runway from the northeast represents an inclined plane that extends outward and upward from the northeast end of the runway at a ratio of 1 m measured vertically to 40 m measured horizontally, for the surface length of 1,792 m measured horizontally from the end of the runway strip. Therefore, at its full outer length of 1,792 m, this surface will have risen by 44.8 m above the northeast end elevation of the runway, or to a total elevation of 241 m ASL.

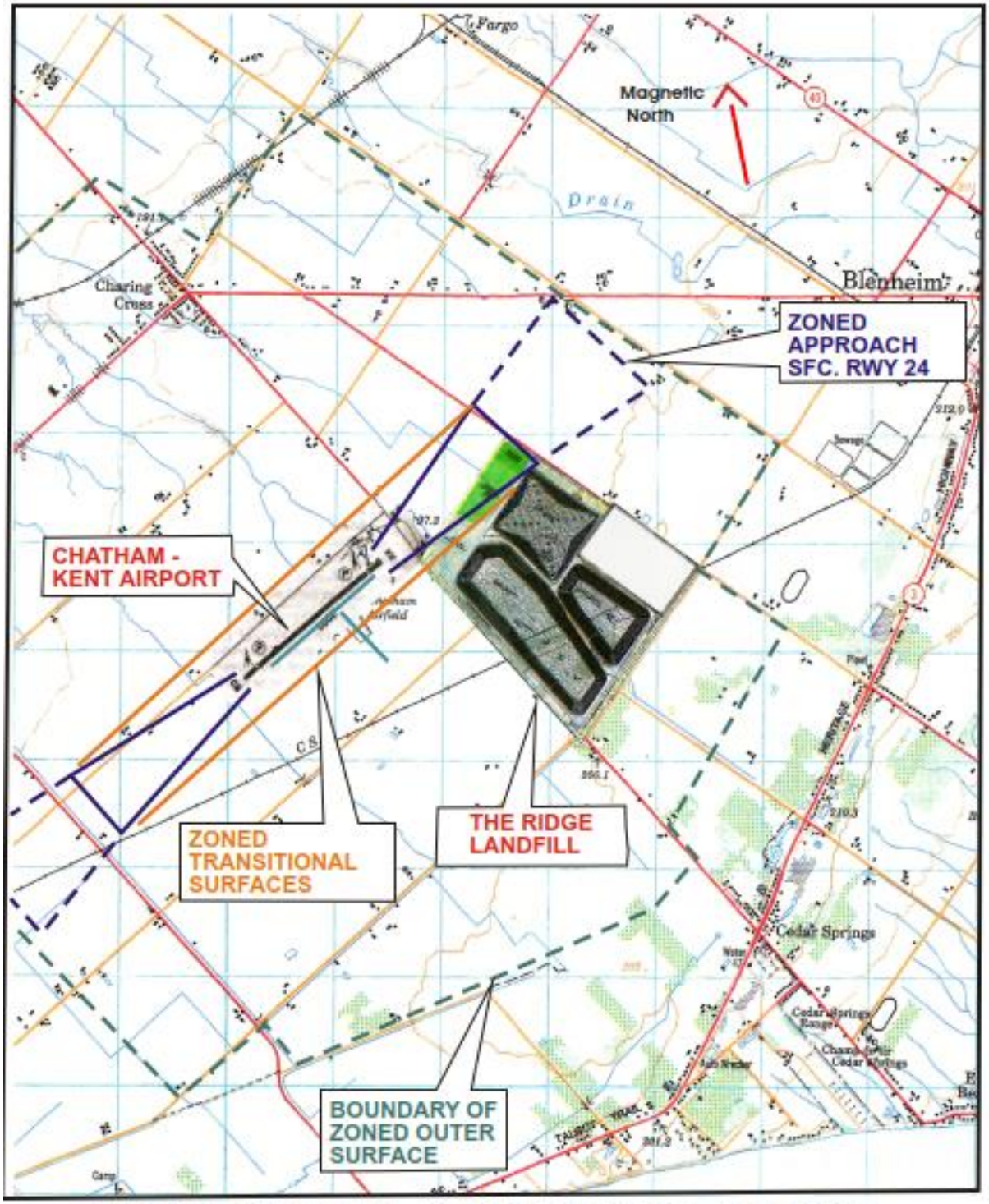
At a position about half-way along this approach surface and where the property of the Ridge Landfill comes up against this surface, it is calculated that the surface will be in the order of 22 m above the elevation of the northeast end of the paved runway, or 218.5 m ASL (Figure 5, Map A). Also, with respect to the elevation of this approach surface adjacent to Charing Cross Road, it is calculated that the surface will be at a height of approximately 208.5 m ASL at the northeast end of the runway. This also means that the Landfill operations to the northwest and along the east side of Charing Cross Road are limited to an elevation of just over 213.4 m ASL so as not to violate the zoned approach surface.

Figure 6 (Map B) illustrates the details of two flight related items:

- The protected surfaces associated with instrument flight procedures established at the Airport are in accordance the provisions contained in federal publication TP308/GPH 309 "Criteria for the Development of Instrument Procedures"[3]. These protected areas shown on Map "B"

[2] Airport zoning (AZRs) are regulations legislated under section 5.4 of the Aeronautics Act that restricts the height of buildings, structures and objects.

[3] Government of Canada publication TP 308/GPH 209, "Criteria for the Development of Instrument Procedures" TP 308/GPH 309 – Change 7, published by Transport Canada and Department of National Defence Canada, January 5, 2017



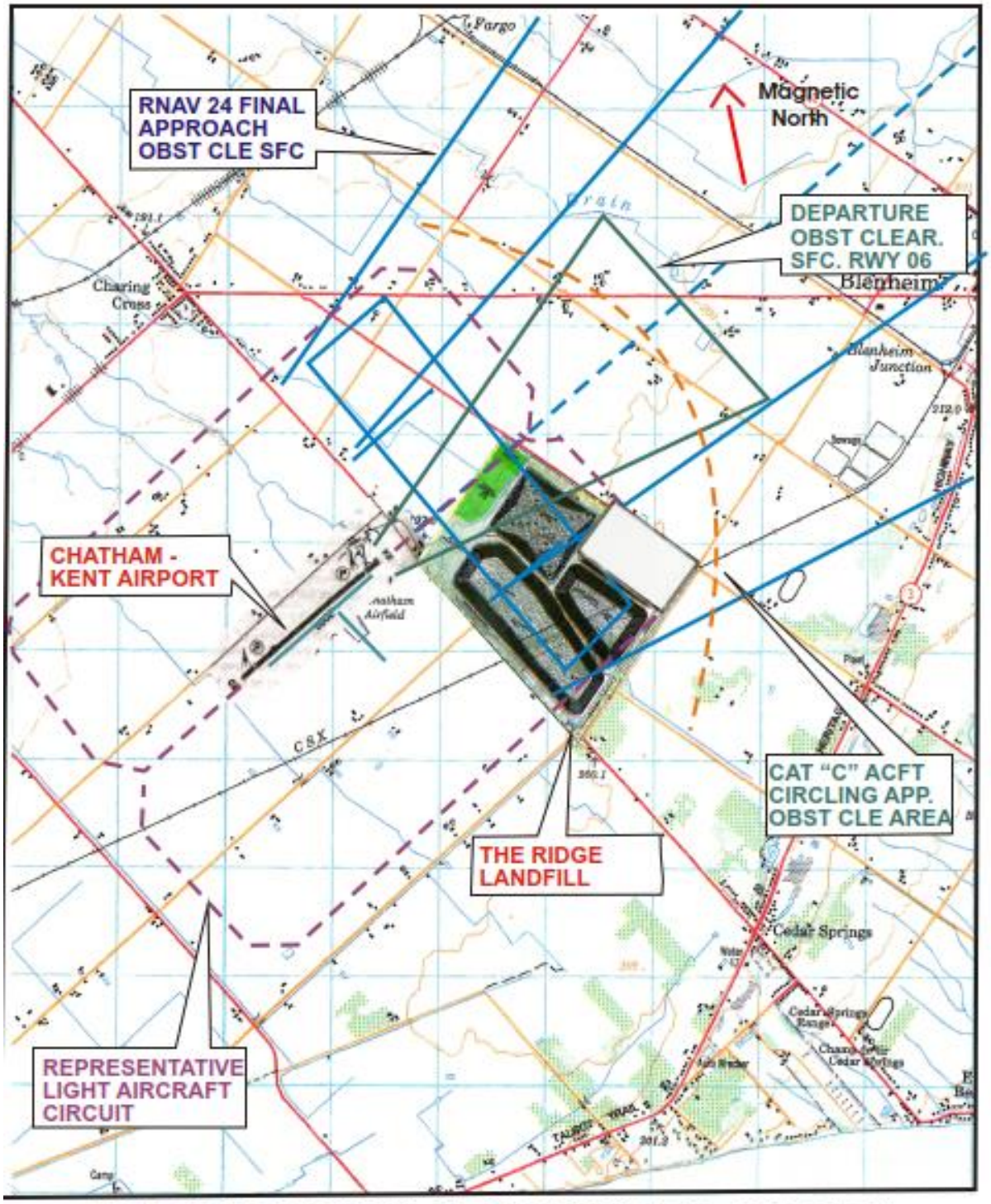
MAP "A" CHATHAM- KENT MUNICIPAL AIRPORT AND AIRPORT REGISTERED ZONING

(As Of February 23, 2019)

Scale 1 :50 000 Échelle

Kilometres 1 0 1 2 3 4 Kilomètres

Miles 1 0 1 2 3 Miles



MAP "B" CHATHAM- KENT MUNICIPAL AIRPORT AND FLIGHT PROTECTED SURFACES

(As Of February 23, 2019)

Scale 1 :50 000 Échelle

Kilometres 1 0 1 2 3 4 Kilomètres

Miles 1 0 1 2 3 Miles

include the RNAV Runway 24 Final Approach Obstacle Clearance Surface, as well as the Departure Obstacle Clearance Surface Area for instrument departures using runway 6.

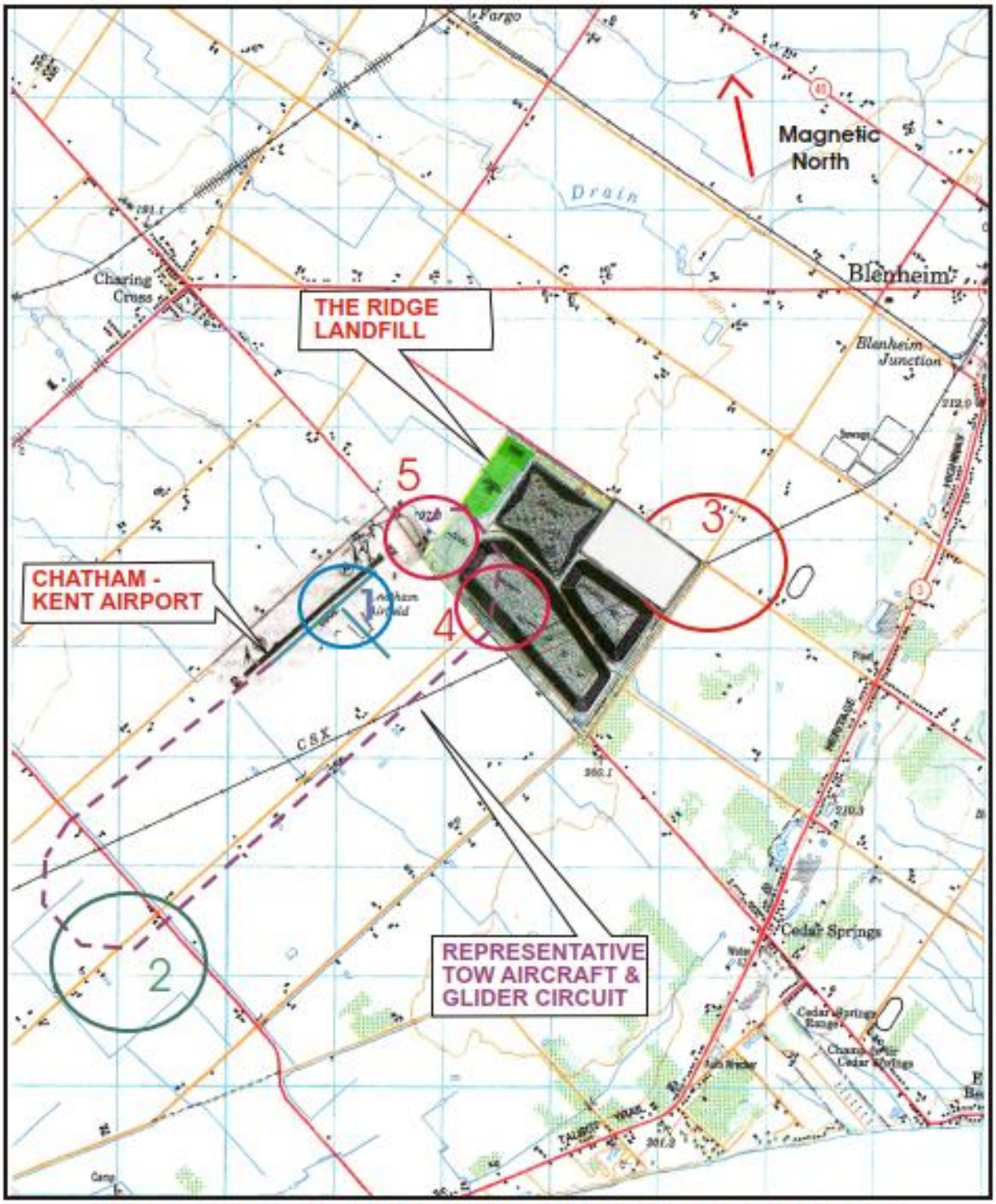
- Specifically, with respect to the RNAV Runway 24 Final Approach Obstacle Clearance Surface for instrument approaches to runway 24, it is made up of three components – a central primary area that is located immediately on both sides of the approach centerline that extends from the northeast end of the runway, and two secondary areas that lay adjacent to the outer boundaries of the primary area – the minimum required obstacle in the primary area is 76 m, and in the secondary areas is 76 m at the inner edge boundary with the primary area tapering uniformly to zero m at the outer edge.

As shown in Figure 6 (Map B), the majority of the Ridge Landfill is located in the area covered by the runway 24 RNAV approach obstacle clearance areas. It is in keeping with the required protections for the existing published RNAV instrument approach. The RNAV approaches were upgraded to LPV versions as previously stated, whereby the Approach Obstacle Clearance Surfaces (OCS) are now made up of a central "W" OCS that lines up on each side of the central approach centerline and that is bounded on each side by "X" and "Y" OCSs that slant up and away horizontally adjacent to the side boundaries of the "W" OCS.

As for the indicated Departure Obstacle Clearance Surface (OCS) from runway 6, it begins at the departure end of the runway, and has a beginning width of 152 m each side of the runway ends, and then splays out at 15 degrees on each side of the runway for a distance of 3.7 km from the runway end. From the end of runway 6, this surface rises in the direction of aircraft departure at a ratio of 1:40 so that at the outer limit the surface will be 92.5 m above the elevation of the departure end of the runway, or 288.5 m ASL. On the Ridge Landfill site, the landfill cells that are located within the Departure OCS are located approximately 1,600 m from the runway end. With the surface rising at a ratio of 1:40, the surface will have risen by approximately 40 m, therefore the maximum elevation permitted for landfilling in this OCS is estimated to be 236.5 m ASL.

Figure 6 (Map B) illustrates a Representative Light Aircraft Circuit area for the paved runway in both directions, normally flown at 305 m above ground, when in the downwind abeam the runway, except for the climbing turns after take-off, or the final turns prior to landing. Pilots are aware of the wildlife caution as contained in the Chatham-Kent Airport listing in the Canada Flight Supplement. The representatives of the St. Thomas Flight Centre did indicate that much of the training and sight-seeing flying is done away from the vicinity of the Chatham Kent Airport and at heights above the 305 m circuit height (Figure 6, Map B).

Figure 7 (Map C) outlines the various operating aspects of the Air Cadet flight towing and gliding operations, which consist of familiarization flying in the spring followed by the main operations that take place from September to November, with shut down over the winter. All flight operations normally take place south of the runway. On the map is shown the representative circuit pattern for tow aircraft and glider take-offs and landings on the parallel grass runway, that is beside and just south of the main paved runway.



MAP "C" CHATHAM- KENT MUNICIPAL AIRPORT
AIR CADET FLIGHT PROCEDURES
(As Of February 23, 2019)

Scale 1 :50 000 Échelle

Kilometres 1 0 1 2 3 4 Kilomètres

Miles 1 0 1 2 3 Miles

Five (5) coloured and numbered circles on Figure 7 (Map C) highlight key aspects of the glider operation:

- Blue circle 1 shows the approximate start of the takeoffs on the grass parallel runway.
- Green circle 2 shows the location of the release of the gliders at 701 m altitude following take-off on runway 24 and a climbing left-hand turn in the vicinity of Bloomfield Road.
- Red circle 3 shows the location of the release of the gliders at 701 m altitude following take-off on runway 06 and a climbing right hand turn over Charing Cross Road to arrive in the vicinity of Erieau Road and Allison Line.
- Red circle 4 shows the location of the left turn to base leg at 152 m above ground for both tow aircraft and gliders for landing on the grass 24 runway.
- Red circle 5 shows the location of the turn to final at 91 m above ground for landing for both the tow aircraft and glider on the grass runway 24.

Of note is that circles 3, 4 and 5 are in close proximity to the landfill, although the representative for the Air Cadets did not express particular concern about risks associated with the bird populations and flight activities, and added that the birds tend to avoid the glider operations.

6.0 BIRD HAZARD ASSESSMENT

The first part of this report discussed the current populations and the behaviour of potentially hazardous birds in the vicinity of the Ridge Landfill and Chatham-Kent Municipal Airport. The patterns were found to be very similar to the situation found during the 1995 studies associated with a previous landfill expansion. The bird hazard assessment first evaluates the history of bird strikes at the airport. It then evaluates the numbers of birds seen at and around the airport. This is followed by an assessment of the effectiveness of the existing bird control program at the landfill and the relationship between the numbers of gulls at the landfill and the airport.

6.1 BIRD STRIKES AT CHATHAM-KENT AIRPORT

Staff at the airport report bird strikes to Transport Canada every year. Transport Canada considers that any dead bird found within 200 feet of the runway centre-line to be caused by a collision with an aircraft. The Airport Wildlife Management Plan presents a list of the reported bird strikes at the airport during the period 1995 to 2016. The list was supplemented by lists of strikes provided by Airport Manager, Marion Smith, for 2017 and 2018.

During this 24-year period, there were 53 reported bird strikes at the airport. None of the strikes involved potentially hazardous species Turkey Vultures or American Crows that are also attracted to the Ridge Landfill. The third group that is attracted to the landfill is gulls, primarily Ring-billed Gulls with a few Herring Gulls during the winter. Over the 24-year period, there were

six strike incidents involving gulls. Three of these occurred before there was a gull control program at the landfill (1995, 1997, and 2002). More recently, reported gull strikes occurred on 1 November 2012, 4 June 2014, and 28 July 2014. None of these strikes reportedly caused any damage to the aircraft. There have been no reported gull strikes in the last nearly 5 years.

6.2 SIGHTINGS OF HAZARDOUS BIRDS AT CHATHAM-KENT AIRPORT

Personnel at the airport watch for birds on and around the airport and they record their observations. In addition, the airport has deployed a series of nine cameras that record the presence of birds and mammals on airport property. In addition, any control measures applied by airport personnel are quantified and recorded. The Airport Manager kindly provided lists of these sightings for 2017 and 2018 for our review. There were 546 observations in 2017 and 638 in 2018. The three species that are attracted to the landfill and could provide a hazard to aircraft safety are discussed below.

There were 9 observations of Turkey Vultures in 2017 and only 2 in 2018. In 7 cases, the vultures were frightened away using pyrotechnics. There were far more records of American Crows: 112 in 2017 and 76 in 2018. Sightings were concentrated in the winter (December-March): 90% in 2017 and 51% in 2018. In 2017, 76% of the incidents required control by use of pyrotechnics, primarily, and horns and vehicles. Control was implemented on only 22% of the incidents in 2018. There were no strikes of crows during the 24 years with reported strike data.

The main species-group attracted to the Ridge Landfill is gulls. Gulls were often seen at and near the airport, sometimes in large numbers. There were 99 records of gulls in 2017 and 102 records in 2018. Over the two-year period, control was instituted in 70% of these situations. In many cases, the estimated numbers of gulls were quite large. There were 36 cases, 18% of the total, when the estimated numbers present were at least 1,000 gulls. The highest numbers were 7,000 in 2017 and 5,000 in 2018. These estimates were not made by experienced biologists but clearly there were instances with large numbers of gulls present at or near the airport.

6.3 DAILY GULL NUMBERS AT RIDGE LANDFILL

Records of control efforts and estimated daily gull numbers are provided to Ridge Landfill by Predator Bird Services, the bird control firm on contract to the landfill. Information recorded includes the numbers of gulls present when the controller arrived in the morning (9:00 AM), the average size of the gull flock throughout the day, and the numbers of gulls present at the end of the day (i.e. when the controller leaves at 5:00 PM). Also recorded is the number of ‘attempts’, that is, the number of times during the day that the gulls attempt to feed on the waste and the number of gulls taken by their hawks or falcons. The bird control records are valuable because they provide estimates of gull numbers across all seasons from 2011 through March 2019, although there are no data for 2014.

Data from 2016 and 2017 were selected for analysis here. The data for 2018 were incomplete with records for only 128 days and they were not included in the analysis. Records were available for 243 days in 2016 and 244 days in 2017 (the controller did not work on weekends or holidays). In most cases, the largest number of gulls was recorded when the controller first arrived, which indicates that birds were able to feed at the landfill before the controller arrived. The estimates made by the Predator controller appears to match up well to estimates by the LGL biologist on the same days.

2016

Across the entire year, the average number of gulls present at the landfill when the controller arrived was 1,197 gulls in 2016. This number varied considerably from season to season, ranging from 50 to 5,500 (Figure 8). The highest numbers were present from mid-July to mid-August, with substantial numbers (up to 3,000) through October-December. The lowest numbers occurred during late May to late June, during the nesting season. There are no major gull colonies in the central basin of Lake Erie and no Ring-billed Gull colonies on the Canadian side of the western basin of Lake Erie (C. Weseloh, Canadian Wildlife Service, pers comm.), so it is likely that only a few non-breeding birds would frequent the landfill at this time.

The lower panel in Figure 8 shows the numbers of gulls present at the Ridge Landfill when the controller left for the day at 5:00 PM. As expected, after a day with bird control all day, the numbers at the end of the shift were lower than at the start of the shift. Again, the highest numbers were in the July-August period (up to 3,500) with numbers up to 1,000 in the October-December period. The presence of these large numbers of gulls at the end of the control period are an indication that the control program has not been fully effective.

2017

The daily controller records for 2017 are presented in Figure 9. The Peak numbers at the start of the controller's shift at 9:00 AM were again in the July-August or early September period with numbers up to 5,000 gulls present at the landfill. Numbers were also high (up to 4,000) during the October-December period (upper panel). The numbers of gulls during the first half of 2017 were lower than in 2016. This is probably a result of the controller arriving on the site earlier in the day, often before the gulls arrived.

The numbers of gulls at the landfill at the end of the controller's shift at 5:00 PM were low for the first half of the year but increased during the July-early September period, as in 2016, with numbers reaching 2,000 to 2,500 (see lower panel). Substantial numbers remained during the October-December period, up to 2,000.

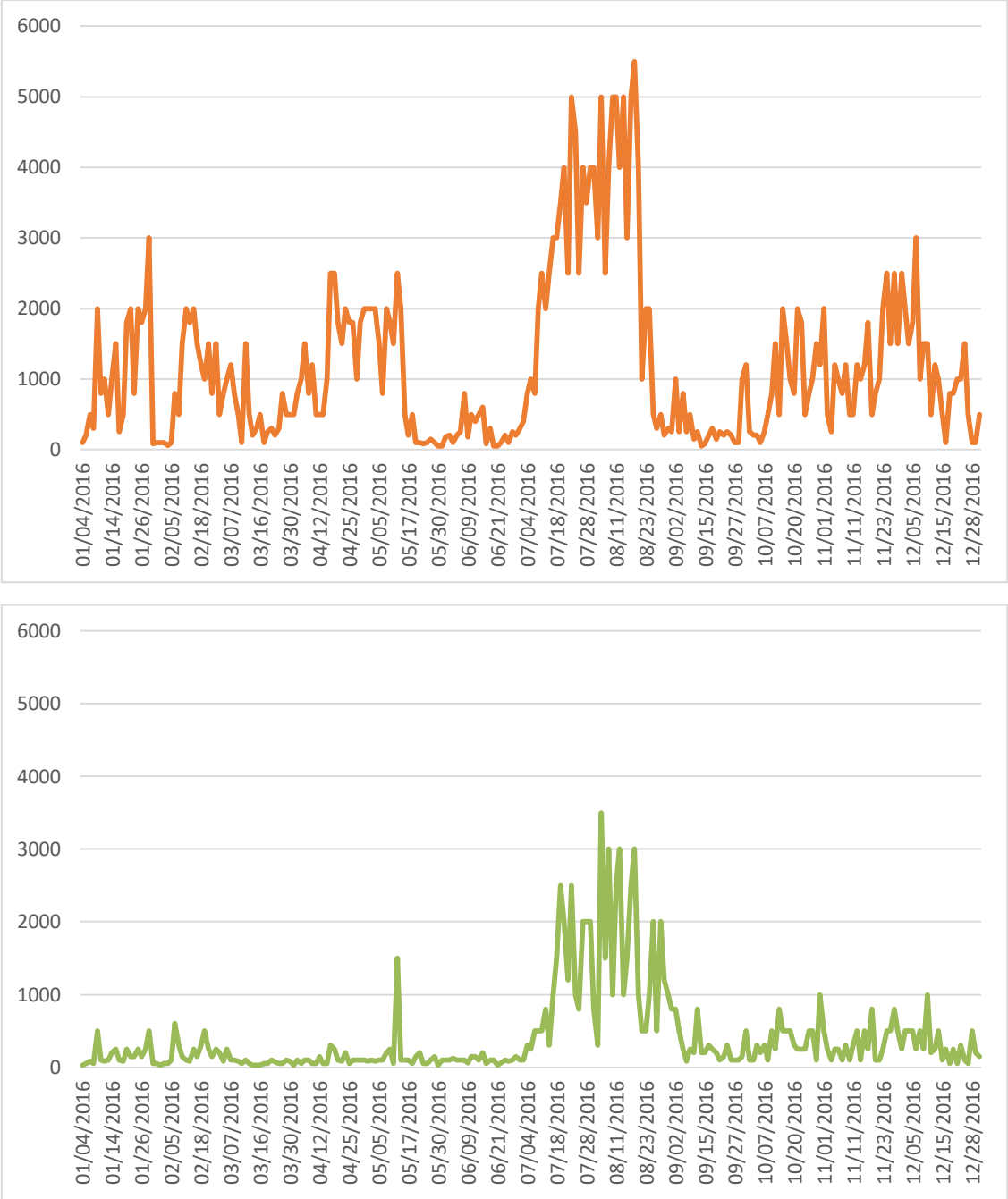


Figure 8. Number of gulls present at Ridge Landfill in 2016 when the controller arrived on site in the morning at 9:00 AM(upper panel) and number of gulls present when the controller left for the day at 5):00 (lower panel).

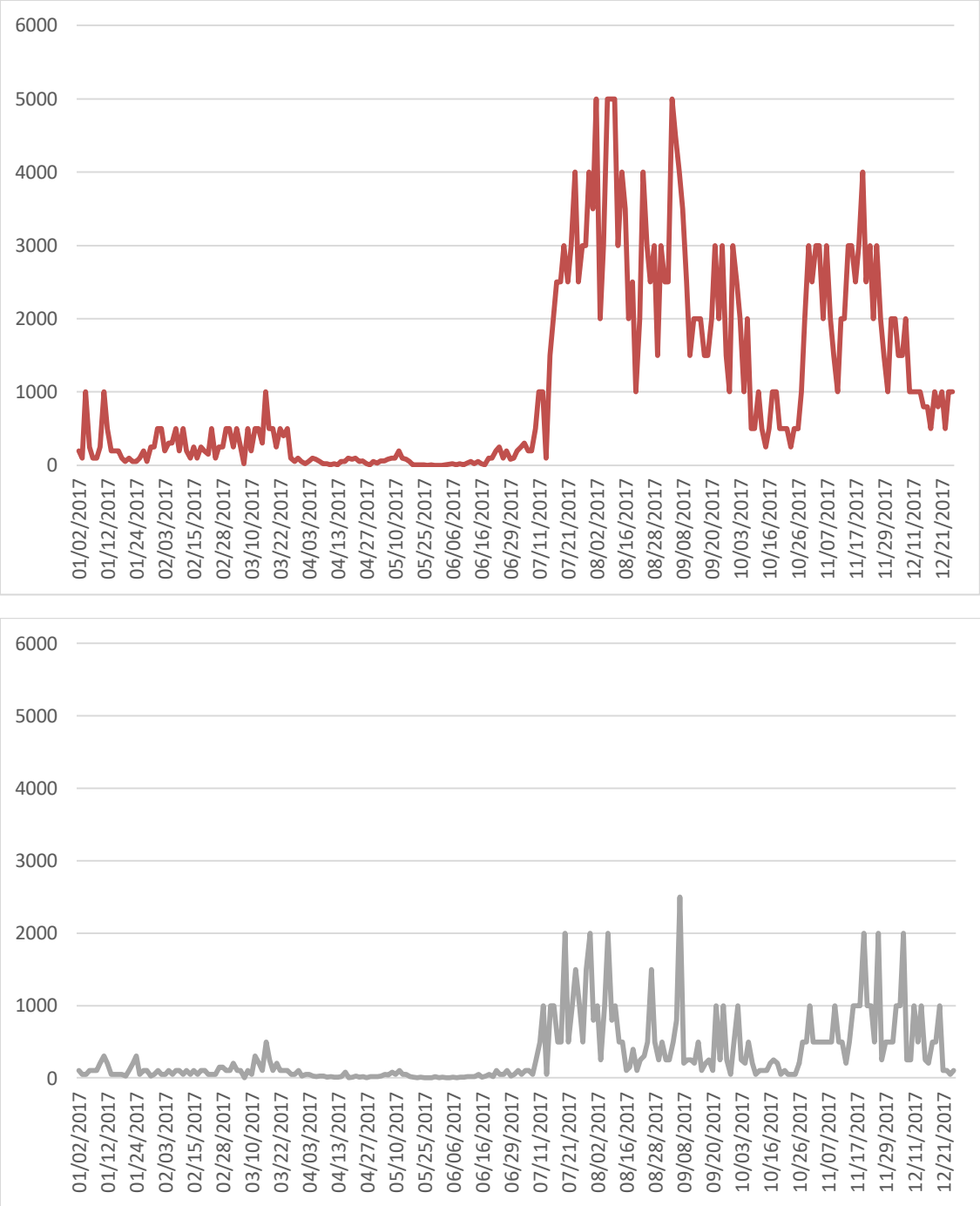


Figure 9. Number of gulls present at Ridge Landfill in 2017 when the controller arrived on site in the morning at 9:00 AM (upper panel) and number of gulls present when the controller left for the day at 5:00 PM (lower panel).

Analysis

The presence of gulls at the landfill before control began in the morning and after control was completed for the day indicates that gulls were returning to the landfill every day and that they were feeding there. It is estimated that a gull can obtain enough food at a municipal solid waste landfill in 20-30 minutes. Thus, gulls are able to sustain themselves at landfills unless they are prevented from feeding there for the whole day. This is not possible to insure unless there is control present from dawn to dusk. This requires more than one controller for certain periods with longer day length. If gulls cannot feed at a landfill for a few days, then they stop returning to the landfill and look for food elsewhere.

7.0 DISCUSSION

The Chatham-Kent Municipal Airport has about 6,000 to 7,000 aircraft movements per year. There have been 3 gull strike incidents at the airport since the current bird control program was instituted at the landfill in 2011; no damage resulted. There were no strikes involving Turkey Vultures or American Crows. Data collected by airport staff indicated that there were substantial numbers of gulls on and around the airport and airport staff was required to scare the gulls away on numerous occasions. Observations in the present study indicated that gulls occasionally moved between the landfill and the airport.

Even with the bird control program in place at the landfill, significant numbers of gulls visited the landfill on a daily basis. When the birds were harassed by the falcons or by pyrotechnics, they did not always leave the area but often moved to different parts of the landfill site or to surrounding fields, sometimes near the airport. Thus, there is a need to control gulls on the airport to reduce the residual hazard to aircraft safety.

To reduce the residual bird hazard to aircraft safety there is a need to upgrade the bird control program at the landfill. Proven measures are available that when implemented will reduce the bird numbers at the landfill. The proponent plans to implement such measures at the Ridge Landfill.

8.0 CONCLUSION

The presence of the Ridge Landfill has not created an unacceptable hazard to aircraft safety over the past few years. However, it is apparent that many of the gulls around the airport were there because of the presence of the landfill. Those numbers will be reduced through planned refinements to the bird control program at the landfill.

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