Case Nos.: 16-036/13-037/16-038/16-039/16-040/16-042

ENVIRONMENTAL REVIEW TRIBUNAL

Exhibit G13

B E T W E E N:

GAIL AND KEVIN ELWOOD AND PRESERVE CLEARVIEW INC

Joint Appellants

- and –

DIRECTOR, MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE

Respondent

JOINT WITNESS STATEMENT OF

William Duncan
123 Garrity Crescent, Nepean, ON K2J 3T4
+1 613 986 0445

Kerry Hutton
96 Acklam Terrace, Kanata, ON K2K 2J1
+1 613 325 5960

INTRODUCTION

1. We have no personal interest in the outcome of this appeal. We intend to appear before the Environmental Review Tribunal and be subject to direct examination and cross-examination. Our evidence will be factual and opinion evidence. We have read the ERT's Practice Direction for Technical and Opinion Evidence and we provide this statement in accordance with that Practice Direction. Attached as **Exhibit "1"** to this witness statement are our completed Form 5 documents separately that we signed in accordance with the ERT's Rules of Practice.

AREA OF EXPERTISE

2. Our area of expertise is aviation safety and flight data analysis, air accident, and incident investigation and aviation animations, aviation accident and incident recreation.

POSITION AND QUALIFICATIONS

3. We are consultants for the aviation industry focusing on flight data analysis, air accident, and incident investigation and aviation animations, aviation accident and incident recreation in relation to the following accidents:

In Aviation

Alitalia Flight AZ631 turbulence encounter at Rome, Italy - October 4th, 2013
Asiana Flight 214 crash at San Francisco, CA - July 6th, 2013
Air France Flight AF447 crash Atlantic Ocean, - June 1st, 2009
Colgan Flight 340 crash at Buffalo, NY - February 12th,2009
Comair Flight 5191 crash at Lexington, KY - August 27th, 2006
Martinair/Circuit City N500AT crash at Pueblo, CO - February 16th, 2005
United Airlines UAL175 crash in New York, NY - September 11th, 2001

In Rail

Amtrak Carolinian collision with Transport at Halifax, NC - March 9th, 2015
Metrolink Collision with Union Pacific at Chatsworth CA, - September 12th, 2008

4. William Duncan graduated from Manchester University, England in 1980 in Aeronautical Engineering Bsc (Hons). Kerry Hutton graduated from Carleton University, Ottawa in 2006 in Aerospace Engineering.

5. A copy of our current *curricula vitae* are attached as **Exhibit "2"** to this our witness statement.

CHRONOLOGY OF INVOLVEMENT AND DOCUMENTS REVIEWED

6. We were contacted by Counsel for the Appellants on 08 March 2016 and asked to provide an opinion in this matter.

7. We have reviewed the documents listed in Schedule "A" attached as **Exhibit "3"** to this witness statement which were provided to me by Counsel for the Appellants.

8. We have reviewed these documents and prepared the following formal report, “Stayner Field Wind Farm Dangers to Airfield Operations, 06APR 2016”, attached as **Exhibit “4”** to this witness statement

08 April 2016	William George Duncan Kerry Hutton
DATE	**NAME OF WITNESS** **TITLE OF WITNESS**

Environment and Land Tribunals Ontario

☒ Environmental Review Tribunal

☐ Niagara Escarpment Hearing Office

☐ Office of Consolidated Hearings

Acknowledgement of Expert's Duty

Case Name and No.:	**16.036**

1. My name is William Duncan. I live at 123 Garrity Crescent, Ottawa in the *(province/state)* of Ontario.

2. I have been engaged by or on behalf of Gowling WLG, Toronto to provide evidence in relation to the above-noted proceeding.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:

   (a) to provide opinion evidence that is fair, objective and non-partisan;

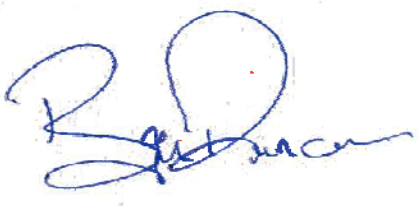
   (b) to provide opinion evidence that is related only to matters that are within my area of expertise;

   (c) to provide opinion evidence in accordance with the Environmental Review Tribunal's Practice Direction for Technical and Opinion Evidence; and

   (d) to provide such additional assistance as the tribunal may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date 07 April 2016



Signature

Appendix F: Form 5

Environment and Land Tribunals Ontario

☒ Environmental Review Tribunal

☐ Niagara Escarpment Hearing Office

☐ Office of Consolidated Hearings

Acknowledgement of Expert's Duty

Case Name and No.:	16-036 Wiggins v Ontario (Ministry of the Environment and Climate Change)

1. My name is __Kerry Hutton_*(name)*. I live at _Ottawa__(*city)* in the __Province_ *(province/state)* of _Ontario_*(name of province/state)*.

2. I have been engaged by or on behalf of Gail Elwood, Kevin Elwood and Preserve Clearview_(*name of party/parties)* to provide evidence in relation to the above-noted proceeding.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:

   (a) to provide opinion evidence that is fair, objective and non-partisan;

   (b) to provide opinion evidence that is related only to matters that are within my area of expertise;

   (c) to provide opinion evidence in accordance with the Environmental Review Tribunal's Practice Direction for Technical and Opinion Evidence; and

   (d) to provide such additional assistance as the tribunal may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date …April 8, 2016……. ……..

Signature

***CURRICULUM VITAE* - William Duncan**

william.george.duncan@gmail.com

BACKGROUND SYNOPSIS

William has spent his all of his professional life in high technology pilot training and aviation safety Managing Director, Executive, Business Management, Strategic Planning and Business Development roles. He has worked within the aviation industry in the design and production of innovative flight crew training, aviation safety, air accident and incident investigation data analysis software systems. He remains committed to continuous improvement and is part of a small group that is a technology driven, energetic and grounded in the practical disciplines of objective data analytics.

CAPABILITIES

- 30 years of experience in International Business Development, Director and Managing Director roles in high technology and creating innovative Civil Airline and Military flight data analysis solutions.
- 16 years developing $66M USD of new business opportunities and accessing new markets for growing software and service industries / companies. 15 years in technology design, International Aviation Authority approvals and certifications in the aerospace, simulation and flight crew training industry.
- 5 years leading and Managing software, research & development, design and production teams. Managing business unit Sales, Marketing, HR, R&D, Production and Support teams of up to 45 staff with 5 direct reports.
- 2 years leading International Civil and Military Market Research programs with broad company-wide mandate.
- High integrity and commitment has been recognized consistently by clients resulting in robust client relationships yielding durable and continuous revenue streams.
- Has lived in Newcastle, Manchester and London, England; Melbourne, Australia; Madrid, Spain; Alexandria, Egypt; Montreal, Canada. Presently located in Ottawa.

ACCOMPLISHMENTS

Ambition and drive resulted in being appointed to the position of **Managing Director of Teledyne's Flight Data Analysis Division, an Officer of the Company and a member of the Executive VP's Staff**.

- Successfully managed **45 line staff and 5 reporting consultants.**
- **Spread across 8 International Time Zones** with technology groups in Ottawa (15 staff); London, UK (18 staff); Los Angeles, CA (4 staff) - software design, services and production.
- From 2007-2009, **turned the Division around** from being a dormant business unit hemorrhaging cash at a rate of some $80K CDN per month, to a **successful, client-focused and profitable** entity with improved and lean software engineering, test and production strategies.

With resourcefulness travelled the world extensively, as the Company's sole representative, to some 120 cities around the world; Middle East, Arab and Israeli countries and territories, China, Japan, Hong Kong, Singapore, Indonesia, Malaysia, Europe, India, Pakistan, Africa and Australasia.

- Successful long term business relationships were built and contracts awarded in those world regions resulting in some **$6-7M USD of long term business revenues**.

As a highly dependable member of both Rediffusion and Ceselsa's Sales and Marketing Team, was responsible for the commercial architecture, bid strategy and technology content for the pilot training systems sales and marketing effort. During this time he **lived in London, England and Madrid, Spain** to support commercial program business efforts from a very senior position.

- Lead the team effort that **won new business with a number of high profile clients**, notably: Cathay Pacific B747-400 FFS ($21M USD), British Airways B747-400 ($18.5M USD), Malaysian Airlines F.50 FFS ($9M USD), Kuwait Airways ($22M USD) and through UK Gvt. Foreign Aid Program funding Merpati Nusantara CN.235 FFS sale ($7M USD).

With a high level of **creativity established an approved Professional Airline Pilot Training Center** supporting Boeing 747-200, B727, Airbus A300B4 and B737NG Ground School and Full Flight Simulator Recurrent and Conversion courses which **from a "standing start" was sold to Boeing with 50 international airline clients.**

- From a **"clean sheet" and no client** base created UK's first independent 3rd Party Training Center ultimately used by some **50 International Airlines – revenues $2M - $3M per annum**.

With a determined effort William lead the team that put together winning strategies and proposal architectures for Spirent and subsequently became the **Manager of Military Programs whilst also holding the position of Director of Civil and Military Sales and Marketing**.

- Won the Company's **largest single US DoD contract worth $4.5M USD** – a 3 year phased program which provided sophisticated flight simulation software analysis systems to support Military fast jet and surveillance electronic warfare, pilot, tactical and weapons systems training.

Recognized at 26 as an innovator and appointed to a Senior Marketing Executive position within Rediffusion Simulation, the **youngest person ever to have achieved such a position at the Company**. During the 80s/90s, Rediffusion employed some 1,800 people and manufactured high technology flight simulators each selling at $18-30M USD.

- Under his Executive direction and responsibility over a 2 ½ year period this team effort resulted in a broad scale change to the equipment's manufacturing processes design and technology content. The re-designed simulator product was re-launched and **opened doors to markets that had been hitherto inaccessible**.

PROFESSIONAL EXPERIENCE

CAE **2011 – present**

Business Development, Product and Strategic Business Planning

Responsible for direction and development of long term Business strategy and the development of key business, client service and product portfolio based relationships essential to moving this business forward in International Civil and Military Markets. This business unit had not made any Tier 1/Flag Carrier wins until my arrival, personal and significant Tier 1 wins with **South African Airways, KLM, LAN and TAM as well as wins with the USAF and US Army.**

QinetiQ, North America **2009 - 2011**

Director Strategic Business Planning - Consultant

Responsible for direction and development of long term Business strategy and moving this business forward in Military International Markets.

Teledyne Controls **2000 - 2009**

Managing Director / Officer – 2007-2009

Reported directly to Exec VP. Responsible for all business, technical, financial and admin. Operations for the London (UK) and Ottawa data analysis software and services Business Units.

Director Sales and Marketing - 2000 – 2007

Worked with Civil Airlines (World-Wide) and with key OEMs and Military Organizations – **Boeing, Airbus, Lockheed Martin, L3, CAE, Thales, UK MoD and US DoD.**

Quadrant Systems Limited **1994 - 1998**

Boeing **1998 - 2000**

Director Training Operations - 1997 - 2000

Sales & Marketing Manager/Director - 1994 - 1997

Created the team that **transformed the company from equipment manufacturer into a Pilot Training Services provider to Civil Airline and Military Organizations**; a move requiring significant and fundamental market led operational changes within the company.

SD-Scicon, Flight Simulation Division (CESELSA) **1989-1994**

Sales & Marketing Manager (UK) & Consultant; Marketing & Business Planning (Spain) & Consultant Marketing

Introduced and extended the company into International Civil and Military Aerospace markets outside of Spain; Business Consultant to the parent's Board.

Developed and established new products aimed at high quality low cost flight simulators for the Pacific Rim, China, India, Europe and LATAM.

Rediffusion Simulation (Hughes, Thales now L3-Link-Simulation) **1980 - 1989**

Marketing Executive - 1987 - 1989

Senior Sales Engineer - 1985 - 1987

Flight Systems Group – Senior Systems Software Design Engineer - 1980 – 1985

EDUCATION **1977 to 1980**

University of Manchester, England - **BSc (Hons.) Degree** Aeronautical Engineering

KERRY S. HUTTON cell: (613)-325-5960

hutton@phlow.ca

CURRICULUM VITAE

EXPERIENCE SUMMARY

- Bachelor of Aerospace Engineering Carleton University 2006.
- Qualified as a Professional Engineer by the province of Ontario 2014.
- 9 years flight safety and flight data analysis experience.
- 6 years aviation litigation animation experience.
- Extensive aircraft flight data recorder experience with FDR, DFDR, QAR, DAR, VADR, DVFDR and rotary wing HUMS data formats.
- Experience with alternative aircraft and operational forensic data sources such as ATC radar data, ATC audio, CVR transcripts, accident scene photographs and recorded video.
- Accident and incident recreation for fixed wing, rotary wing, marine, rail and automobile vehicles.
- Experience providing support, expertise and liaison for CAE Flightscape clients including 42 airline, 13 military and 28 government operators as well as 10 airframe manufacturers that include, Boeing, Airbus, Bell, Sikorsky, ATR and Bombardier.

PROFESSIONAL EXPERIENCE

CAE | Flightscape, Kanata Ontario

Flight Science Analyst, 2014 – present

Flightscape develops software solutions that enable the effective study and understanding of recorded flight data and the production of actionable safety and operational information. As a Flight Science Analyst Kerry acts as a Subject Matter Expert (SME) in the field of recorded flight data. His area of expertise is in the creation of graphics and animation material that relays complex operational, pilot and flight data information in a more easily interpreted form and as such Kerry has worked with a large number of aircraft operators in the production of accident and incident graphics, reports and animations. In addition Kerry was responsible for flight data analysis and reconstruction training courses for CAE clients such as; TSB Canada, US FAA, Japan JTSB, Saudia GACA, Australian RAAF, US Coast Guard and US MAAF.

Configuration Engineer, 2007 – 2010

As a Configuration Engineer Kerry was responsible in the design, development and implementation of aircraft flight data monitoring, analysis and animation software for the aviation industry.

Phlow Forensics, Nepean Ontario

Forensic Investigator and Subject Matter Consultant, **2010 – present**

Phlow provides technical expertise in the field of data driven forensic graphics and animation for aviation subject matter experts, legal teams working in the field of accident litigation. In addition Phlow also supports customers that had previously used a number of CAE's air accident services. Accordingly Phlow has worked with a number of high profile aviation cases; highlights listed below.

Aviation

- Alitalia Flight AZ631 turbulence encounter at Rome, Italy - October 4th, 2013
- Asiana Flight 214 crash at San Francisco, CA - July 6th, 2013
- Air France Flight AF447 crash Atlantic Ocean, - June 1st, 2009
- Colgan Flight 340 crash at Buffalo, NY - February 12th,2009
- Comair Flight 5191 crash at Lexington, KY - August 27th, 2006
- Martinair/Circuit City N500AT crash at Pueblo, CO - February 16th, 2005
- United Airlines UAL175 crash in New York, NY - September 11th, 2001

Rail

- Amtrak Carolinian collision with Transport at Halifax, NC - March 9th, 2015
- Metrolink Collision with Union Pacific at Chatsworth CA, - September 12th, 2008

SCHEDULE "A" and “B”

LIST OF DOCUMENTS REVIEWED WHICH WERE PROVIDED TO ME BY COUNSEL

1. NTSB Aviation Accident Database – On Line http://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx
2. Environmental Review Tribunal Case Nos.: 13-121/13-122 Pitt v. Director, Ministry of the Environment
3. AOPA 24TH JOSEPH T. NALL REPORT General Aviation Accidents in 2012.
4. AOPA Air Safety Institute 2013-2014 GA ACCIDENT SCORECARD.
5. Transport Canada Letter Ref: RDIMS #10115796 November 17, 2014 Attn: Hayley Berlin, Environmental Approvals Access and Service Integration Branch; Ministry of the Environment and Climate Change. Subject: Fairview Wind Farm – Aerodromes.
6. TechnoCanada; Ice Profile Classification, Based on ISO 12494, Presented by: Matthew Wadham-Gagnon, 2013-02-12, WinterWind 2013.
7. Environmental Registry # 012-0614; Ministry of the Environment Ref. # 8250-8XUKKC; Fairview Wind Project; Requesting Comments by 01 February 2014; Submission by Kevin & Gail Elwood.
8. Wind Turbine Wake Encounter Study, Version 1.0, University of Liverpool, Authors: Dr Yaxing Wang & Dr Mark White University of Liverpool, Prof George Barakos Harrison Hughes Building. Liverpool, Date: March 27, 2015.
9. Charles (Chas) Cormier, Aeronautical Information Consultant, March 21, 2013, NAV CANADA AIS, AERODROME CHART - STAYNER (CLEARVIEW FIELD) ON, CLV2.
10. NAV Canada, Aeronautical Information Services, Instrument Procedure Design Unit – Departure / SID Submission Form
11. CLV2_LNAV-16_Final.pdf chart.
12. CLV2_RCAP_Chart_v2.pdf.
13. CLV2_Stayner_OLS_v1.pdf.
14. CLV2Obstacles2015.xls Database.
15. Aerodynamics of wind turbine wakes, Literature review, B. Sanderse ECN-E–09-016, CWI.
16. Turbine Locations – Option B - Crystallized Jun 8, 2011, Paul Deol, Sent: Sunday, May 29, 2011.
17. Gertjan Glabeke, The Influence of wind turbine induced turbulence on ultra light aircraft, a CFD analysis, 2010-2011.
18. IATA Safety Report 2014.

19. 3D-simulation of the turbulent wake behind a wind turbine, IOP Science, Steffen Wußow, Lars Sitzki & Thomas Hahm, TÜV NORD SysTec GmbH & Co. KG, Große Bahnstr. 31, D-22525 Hamburg, Germany.
20. NLR, Netherlands, WIND TURBINES NEAR AIRPORTS, Problems and solutions for wind turbine siting in the vicinity of airports, by Peter J. van der Geest. Circa Dec 2015.
21. RePower Systems MM92 Wind Turbine Brochure.
22. Boeing Statistical Summary of Commercial Jet Airplane Accidents Worldwide Operations | 1959 – 2014; 2014.
23. Defensive Flying for Pilots: An Introduction to Threat and Error Management; Ashleigh Merritt, Ph.D. & James Klinect, Ph.D.; The University of Texas Human Factors Research Project1; The LOSA Collaborative; December 12, 2006.
24. SMS Aviation Safety - Safety Study of the Potential Effect of Wainfleet Wind Energy Project on Burnaby Skydiving Operations; SMS Report No. 1307; SEP 2013.
25. Report No. K-TRAN: KU-13-6 ▪ FINAL REPORT ▪ January 2014; Wind Farm Turbulence Impacts on General Aviation Airports in Kansas. Thomas E. Mulinazzi, Ph.D., P.E., L.S., Zhongquan Charlie Zheng, Ph.D. The University of Kansas.
26. NAV Canada wpd 15-0581 Coords.xls – Detailed Turbine Tower Locations.

SCHEDULE "A"

LIST OF DOCUMENTS REVIEWED WHICH WERE PROVIDED TO ME BY COUNSEL

Airfield and Turbine reference

1. REPower Wind Turbine Brochure-TOR_LAW-8322916-v1
2. 16-0503 Coords
3. 20140123 NEGATIVE EFFECTS TO STAYNER (CLEARVIEW FIELD) AERODROME –-TOR_LAW-8901712-v1
4. Annexe_S1_Courbes_acoustique_MM92,_E-82_E2,_V100
5. CLV2 Aerodrome Chart 21 Mar 13
6. CLV2 RNAV 16_Turbines_v3
7. CLV2 RNAV 16_v4
8. CLV2 VORDME-A WithTurbines
9. CLV2 VORDME-A
10. CLV2 VORDME-A_v3
11. CLV2_LNAV-16_Final
12. CLV2_RCAP_Chart_v2
13. CLV2_Stayner_OLS_v1
14. Collingwood EC Data 2011-2016
15. Fairview Crystallized Turbine Locations 8 Jun 2011
16. wpd 15-0581 Coords
17. Appendices 1a and b turbine specs

Turbulence

18. Wind Farm Turbulence Impacts on General Aviation Airports in Kansas
19. caa_wind_turbine_report

20. e09016 (1)
21. Gertjan Glabeke
22. jpconf7_75_012033
23. Katic-etal-1986
24. NLR-Wind Turbines near Airports-PeterVanDerGeest
25. PTA-Sørensen-etal-2015
26. ris-m-2411-NOJensen
27. wind-turbines-near-airports-summary (1)
28. 4.1.3_Guideline_D_Wind_Turbines
29. 20130701ManagingTheImpactOfWindTurbinesOnAviation_Script_FINAL_V1

Legal notices

30. 13-121 Pitt. v. MOE ERT Decision May 14, 2014-TOR_LAW-8901572-v1
31. 16-0503 Construction Start Notice
32. 16-0503 Letter to proponent
33. 2014-11-17_to MOE from TC
34. 19355 Day 7 Brunskill v2 FNL condensed
35. 19355 Day 7 Brunskill v2 FNL
36. E. Witness Statement of Andrew Brunskill November 11, 2013
37. E1. Acknowledgement of Expert's of Duty Andrew Brunskill November 8, 2013
38. E2. Curriculum Vitae of Andrew Brunskill
39. E3. Exhibit 3 - Preliminary Turbulence Intensity and Wind Analysis at the proposed WW Project by GL Garrad Hassan
40. REA.Feb.11.16.re O

Guidelines

41. CAP764 Issue6 FINAL

42. far_part77

43. TP312_5TH_EDITION_-

_AERODROME_STANDARDS_AND_RECOMMENDED_PRACTICES

EXHIBIT 4

Stayner Field Wind Farm

Dangers to Airfield Operations

Witness Statement Report Prepared by:

William Duncan
Kerry Hutton

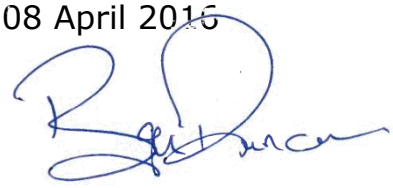
6 April 2016 rev 0

Expert Assistance Ref: Stayner Aerodrome
Environmental Review Tribunal
ERT Case No. 16.036 – Wiggins v. Ontario (MOECC)

Contents

Signed:

William Duncan
08 April 2016



Kerry Hutton
08 April 2016

1. Introduction

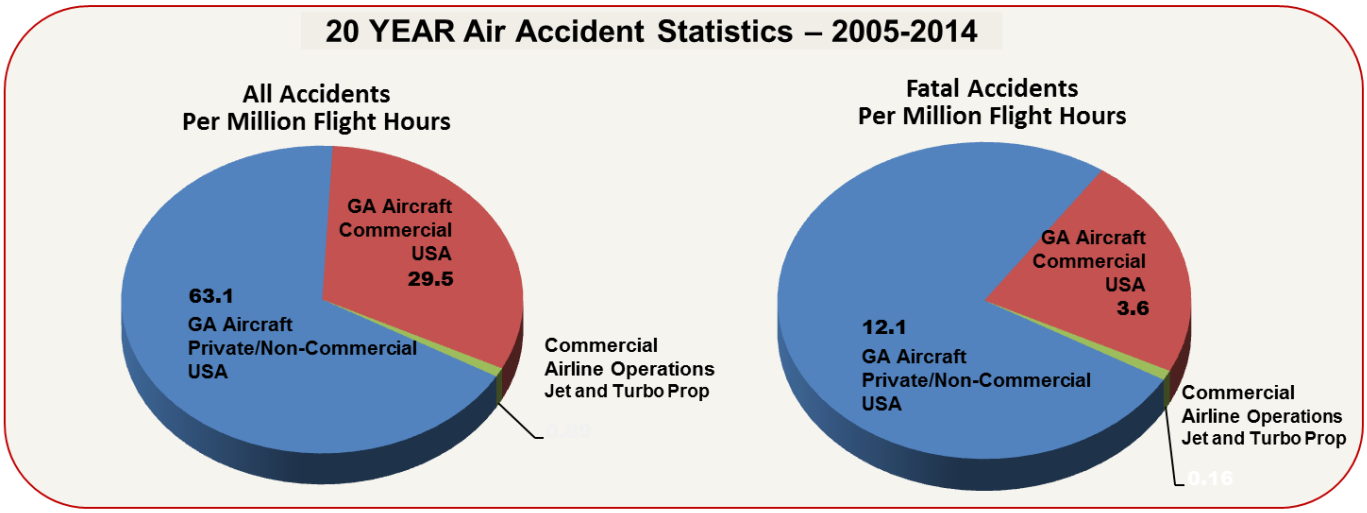
We were commissioned to produce a report that examines the impacts of the wpd Fairview Wind Farm on the safety of aircraft departing or landing at Stayner Aerodrome, based on our expertise in aviation safety, air accident and incident data analysis.

In order to do so, we have examined the aviation industry's safety metrics, how the industry seeks to mitigate systemic risks and the negative effects on operational safety at Stayner Aerodrome of eliminating the Obstacle Limitation Surface safety barrier by locating turbines within these surfaces.

2. So How Safe is General Aviation?

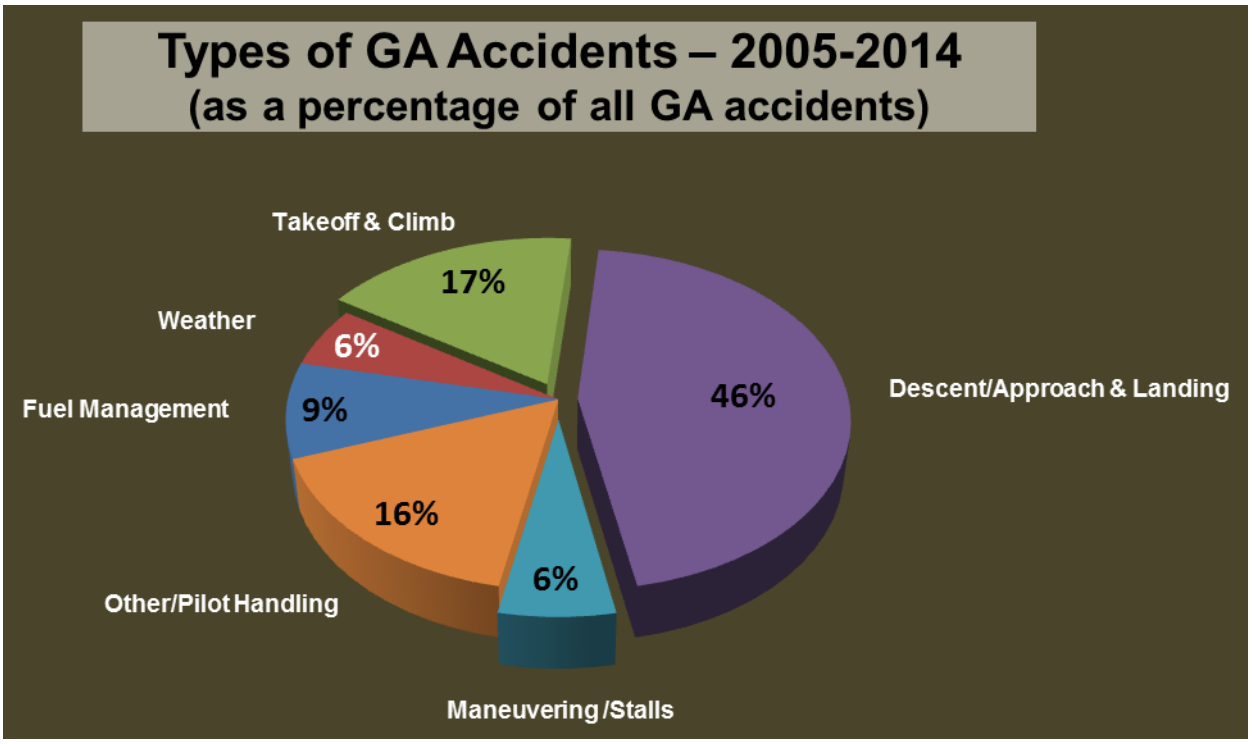
For this study GA aircraft are defined as aircraft weighing 12,500 lbs. or less at maximum certificated take-off weight – MTOW.

- General Aviation (GA) accident rates are very high compared to the Civil Airline industry.
- Private flying (Stayner Airfield) is near 70-75 times more dangerous than flying on a commercial Jet.
- The data below shows the stark contrast.



3. GA Accidents Characterized

The Most Dangerous Flight Phases.



The Fairview Wind Farm will present an increased risk to pilots in flight phases that already account for near to 70% of all GA accident types - Takeoff, climb, descent, approach, landing and low energy (low speed & altitude) maneuvering.

4. Safety Barriers in Aviation

Aviation safety is increased by the rigorous implementation of processes, operational barriers and defenses that safeguard the Aviation system, especially in the most dangerous flight phases.

Civil Aviation is safe because Government Regulations enforce robust operational and safety firewalls – so holes do not line up and safety barriers are not breached. In aviation safety we sometimes refer to the "Swiss cheese model".

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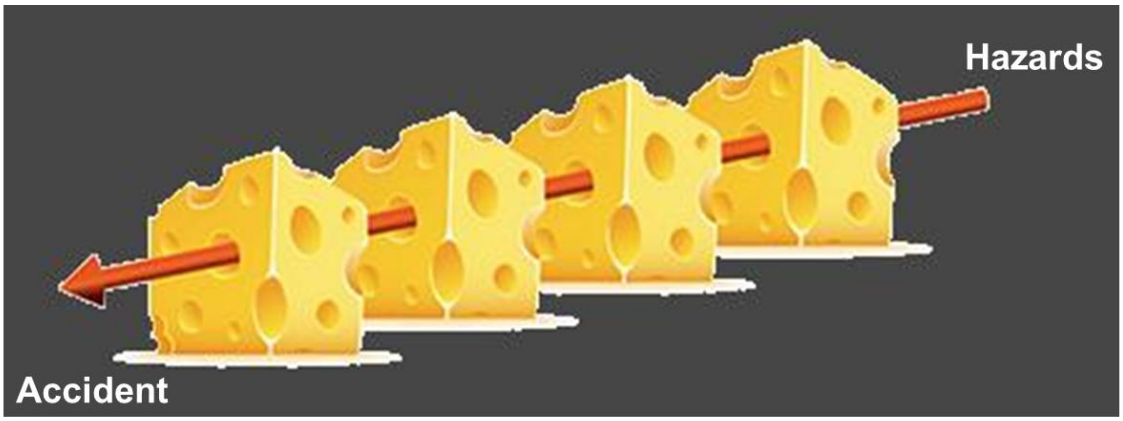
5. Removal of Safety Barriers

Accidents occur when "the holes line up" or when barriers are removed.



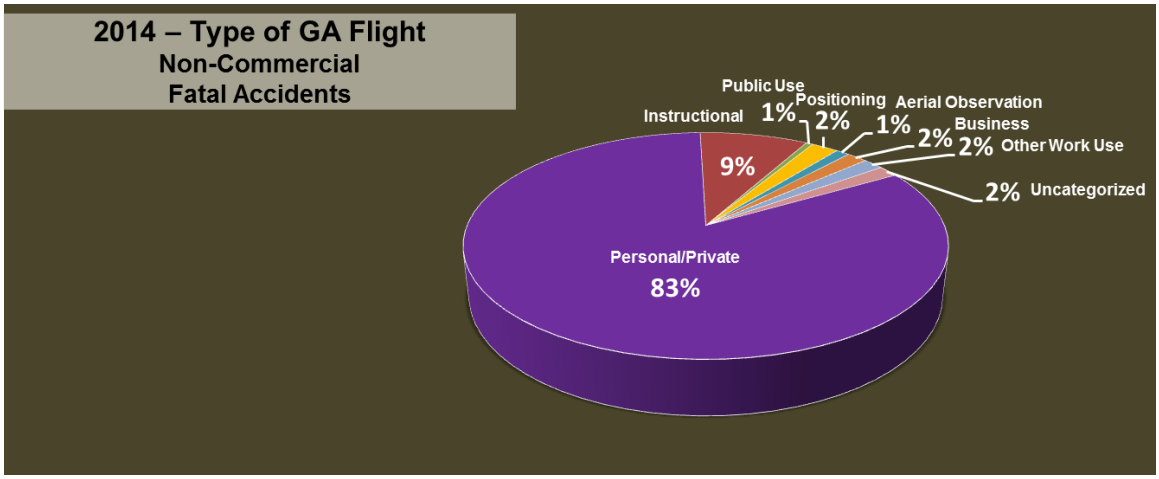
At Clearview Field the penetration of obstacle limitation surfaces by wind turbine towers removes a significant barrier of protection in the most dangerous flight phases, dramatically increasing the opportunity for holes to line up and the risk of a serious accident.

6. GA Accidents – Contributory Factors

- **Broad Operational Scope** - GA pilots conduct a wide range of operations – cross-country practice, sight-seeing, recreational, crop-dusting and banner towing. The opportunity for surprises is large. Less routine than Civil Airline ops.
- **Variability of pilot qualification and experience levels -**Civil Airline aircraft are crewed by highly trained instrument and type rated pilots (Air Transport Pilot Qals).
- **Limited cockpit resources and flight support** - GA pilots handle all aspects of the flight – they are on their own! Civil Airline operations require at least two pilots plus comprehensive ground support.
- **Large variety and variability of airfields** - GA ops. are conducted at about 5,300 public-use and 8,000 private-use airports, while Airlines are confined to only about 600 of the larger public-use airports (USA). The opportunity for surprises is again very large.
- **Light Aircraft Handling Characteristics** – GA light aircraft do not have the mass nor energy to easily penetrate rough air or turbulence. In flight at higher speeds and altitude this risk can be more safely mitigated, but near the ground in landing and take-off phases these risks are not easily mitigated. The same is true when fuel management, engine, incapacitation or flight control problems emerge.
- **GA Pilots conduct significantly more take offs and landings -** During take offs and landings ALL aircraft are close to the ground with low energy (speed-

height disadvantaged), a very vulnerable configuration compared to ANY other flight phase.

- **Less bad weather-tolerant/experienced pilots and aircraft** - GA pilots do not have the luxury of highly automated systems, a "second pair of eyes", nor sophisticated navigation aids. At Stayner the weather-visibility conditions can and do change very rapidly.



Personal/Private flights, the majority of flights into/out of Stayner Airfield, accounted for **83% of 2014 GA Fatal accidents in the USA.**

7. Threat and Error Management

Threat and Error Management (TEM) in the Aviation Industry is a risk mitigation philosophy that is embraced by the industry as a whole. All major and Airline operators, International Civil Aviation Organization (ICAO), the Joint Aviation Authorities, the International Air Transport Association (IATA), the National Air Transport Association (NATSA/USA) and the U.S. Federal Aviation Administration.

In short TEM offers an intuitive and flexible approach to practical risk management for the whole Industry. With regard to pilots and flight crews, whether Civil or Military, TEM does not teach pilots how to fly an airplane; instead, it promotes a proactive philosophy and provides techniques for maximizing safety margins despite the complexity of the immediate flying environment.

In broad terms TEM training can be framed as defensive flying for pilots. Not unlike defense driving on the road. But TEM also applies to the Aviation system as a whole including airfield and airport management and planning.

Threats:

- Events that occur outside the influence of the flight crew, but which require crew attention and management if safety margins are to be maintained.
- Threats increase the complexity of the operation and weaken barriers against errors, especially for single pilot GA flights.

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- Examples include; Observable Threats such as thunderstorms, fog and technical issues; Unexpected Threats such as Engine failure on takeoff, incapacitation, unexpected turbulence or wake vortex encounters.

Errors:

- Actions or inactions by the pilot(s) (or system) that lead to deviations from an indented or expected outcome.
- Traditional thinking has been focused on eliminating error in the cockpit, i.e., Zero Error!
- Contemporary thinking acknowledges that error is a part of life, humans make mistakes! But intentional non-compliance is not an error.
- Examples of flight errors include; Flight handling errors such as poor maneuvering near the ground or unintentional speed deviation; procedural errors such as not correctly performing checklist items from memory, misinterpreting weather information or ATC instructions.

Poor Threat and Error Management within the whole system compromises safety. The wind turbine plans at Stayner Field unfavorably increase the threat level to GA pilots who are known to be much less skilled than professional Civil Airline pilots.

8. GA Accidents – Weather and Degraded Pilot & Aircraft Performance Contributory Factors

There is a familiar 10 year pattern in the following statistics which are nearly identical year-on-year and **little has changed over the past 20 years -** United States 2012 GA figures are used as reference.

- **Visual** - 88% of all GA fixed wing accidents occurred in VMC (Visual Meteorological Conditions) flight (15% fatality rate).
- **Instrument** - Only 3% of all GA fixed wing accidents occurred in IMC (Instrument Meteorological Conditions) BUT with a significantly disproportionate fatality rate (60%). **Prime contributory reasons being:**

  Pilot disorientation / Inexperience

  Loss of control

  Collision with terrain or objects

  Instrument causal accidents typically result in high levels of damage and injury.
- When either the Pilot or Aircraft performance are in any way compromised or degraded adverse safety risk factors balloon.

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9. Stayner Airfield Hazards & Pilot Error

The majority of Aviation mishaps are the result of human error, the US Department of Defence says around 80%, some argue that ALL such mishaps are the result of human error. Such errors that could be attributed to poor threat and error management awareness and training.

Errors in airmanship and the aviation system as a whole are NORMAL. Even a Civil Airline pilot will make numerous mistakes during any given flight, but that system is designed to accommodate cumulative mistakes……. mostly.

The Civil Aviation industry is safe today precisely because it aims, as a system, to mitigate individual errors or reduce the opportunity for errors that can accrue from escalating into incidents, accidents or loss of life.

In knowing and understanding this the Civil Aviation industry is highly regulated and does all that it can to stop accrued system or pilot errors from resulting in an accident or fatality. This is one reason why the erection of the proposed Stayner wind turbine towers would not be allowed at an approved Civil Aviation Airport given their planned location.

The System must be designed to Absorb Human Errors.

- GA has to deal with a significantly more hazardous set of operational issues where, even more than its Civil Aviation counterpart, mounting pilot errors must be absorbed in the whole system which can be done through careful planning, where the objective is to safeguard human life.

The following risks and hazards in GA are already understood and are serious enough "as is":

- The likelihood of an accident within General Aviation in any form is 70 times more likely than its Civil Aviation counterpart.
- As a physical site Stayner Airfield already supports the most hazardous flight phases of GA aircraft operations, approach, landing and take-off, flight regimes where some 70% of accidents occur.
- Private Pilots conducting personal flights are the majority (close to all) of visitors to the Stayner Airfield, such pilots are THE MOST likely (83% of all fatal accidents) to have a fatal accident.
- GA pilots lack the professional training, qualifications and expertise to recover from unusual attitudes caused by wind shear or turbulence near the ground.
- Pilots arriving into the Stayner field are on their own and will often use a combination of Instrument and Visual navigation in weather that would normally be IFR (Instrument Flight Rules) only – a 60% fatality in IMC. Sometimes referred to as flying VFR (Visual Flight Rules) into IFR.

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10. Common Air Accident Factors that Contribute to Cause

Significant factors that could contribute to the cause of a collision with the towers and/or rotors relate to a variety of potential pilot threat, error management or adverse conditions:

- Adverse weather conditions such as fog, strong gusting cross winds, reduced visibility due to heavy rainfall, fog, scud cloud, hail and snow. Local pilots state that all of the above can rapidly develop and dissipate in the Stayner Field area.
- Pilot fatigue and/or near incapacitation (note Stayner Field has been used as an en-route emergency landing spot).
- Improper fuel management.
- Excessive low level/low energy maneuvering.
- Poor ATC communication or poor flight planning.
- Engine and mechanical malfunctions.
- Wake turbulence from turbines: the location, the physical size and large number of wind turbine towers at Stayner Field will create localized turbulence. This presents a real threat since disruptive wake vortices are thrown into the path of approaching GA light aircraft adding significantly to the known landing and take-off hazards.

11. Conclusion

- The most dangerous phase ofany flight is takeoff and landing, more so in GA. **70% of all GA accidents occur in these phases of flight.**
- Stayner Field is "all about" GA take-offs and landings since it primarily supports private or personal pilot flights, this pilot group makes **up 83% of all GA fixed wing accidents.**
- **Pilot errors are the norm in aviation,** it's how pilots and the system cope, absorb or correct such errors that facilitate overall safe operations.
- **Safeguards** are put in place within the aviation system through careful planning so that human errors are not allowed to accumulate in order to avoid accidents, loss of life or serious injury.
- The introduction of the wind turbines and towers in the proposed locations does not constitute careful and responsible planning.
    - It will reduce the system's ability to absorb Pilot errors.
    - Pilot errors are likely.
    - If pilot errors are made and if they are compounded by other system threats related to weather or aircraft performance the safety system as a whole has less ability to comfortably absorb the potential for a serious or fatal accident.

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- In short the planned location of the wind turbines with respect to GA operations at Stayner Field:
    - Removes the capacity of the safety system to absorb errors or adverse factors that can lead to accidents. There will be little room for any error margins in an already accident prone system.
    - If a collision occurs a serious or fatal accident outcome is likely.

12. Animations

The consultants will produce a number of scenarios using aircraft data animation software that specifically examines GA operations into and out of Stayner Field. The animations will show the field in its geophysical context as well as the wind turbines and views of GA aircraft operating into Stayner Field.

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