CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

CAA OCCURRENCE 19/6687

TECNAM P2002 SIERRA RG

ZK-SGO

COLLISION WITH TERRAIN

TARARUA RANGE, 8NM WEST OF EKETAHUNA

29 SEPTEMBER 2019

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Foreword

New Zealand's legislative mandate to investigate an accident or incident are prescribed in the Transport Accident Investigation Commission Act 1990 (the TAIC Act) and Civil Aviation Act 1990 (the CA Act).

Following notification of an accident or incident, TAIC may open an inquiry. CAA may also investigate subject to Section 72B(2)(d) of the CA Act which prescribes the following:

72B Functions of Authority

(2) The Authority has the following functions:

(d) To investigate and review civil aviation accidents and incidents in its capacity as the responsible safety and security authority, subject to the limitations set out in section 14(3) of the Transport Accident Investigation Commission Act 1990

The purpose of a CAA safety investigation is to determine the circumstances and identify contributory factors of an accident or incident with the purpose of minimising or reducing the risk to an acceptable level of a similar occurrence arising in the future. The safety investigation does not seek to ascribe responsibility to any person but to establish the contributory factors of the accident or incident based on the balance of probability.

A CAA safety investigation seeks to provide the Director of Civil Aviation with the information required to assess which, if any, risk-based regulatory intervention tools may be required to attain CAA safety objectives.

Contents

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Glossary of abbreviations:

ARFOR	Area forecast
CAA	Civil Aviation Authority
CAR	Civil Aviation Rule(s)
GPS	Global Positioning System
m	metres
NM	nautical miles
NZFP	Foxpine aerodrome
NZFT	Flat Point aerodrome
SIGMET	Significant Meteorology
UTC	Coordinated Universal Time

Data summary

Aircraft type, serial number and registration:	Costruzioni Aeronautiche Tecnam S.r.l, s/n 362, ZK-SGO
Number and type of engines:	One, Bombardier-Rotax Gmbh 912 ULS
Year of manufacture:	2008
Date and time of accident:	29 September 2019, 1441 hours[1]
Location:	8NM west of Eketahuna Latitude[2]: 40°39'28.80"S Longitude: 175°32'4.80"E
Type of flight:	Dual training - private
Persons on board:	2
Injuries:	2 fatal
Nature of damage:	Aircraft destroyed
Instructor licence:	Microlight Instructor Certificate (Aeroplane)
Instructor total flying experience:	910 hours[3] approximately, 7.50 hours on type
Student licence:	Microlight Novice Certificate (Aeroplane)
Student total flying experience:	25.38 hours 25.38 hours on type
Investigator in charge:	Mr PG Stevenson-Wright

1 All times in this report are NZDT (UTC + 13 hours) unless otherwise specified.

2 WGS-84 co-ordinates.

3 Estimated hours. The instructor's logbook had no entries after May 2019.

Executive summary

The aircraft departed Paraparaumu aerodrome (NZPP) on Sunday 29 September 2019 at approximately 1336 hours on a dual training flight to Foxpine aerodrome (NZFP). Family members reported the aircraft overdue later that same evening and a search was begun.

The Civil Aviation Authority (CAA) was notified of the missing aircraft that evening. The Transport Accident Investigation Commission was in turn notified and chose not to open an inquiry.

Aircraft wreckage was located at approximately 0730 hours the following morning on the eastern side of the Tararua Range. Rescue personnel were winched into the accident site and confirmed the aircraft was ZK-SGO and that both occupants were deceased.

A CAA field investigation was commenced and ultimately determined that the aircraft encountered an area of strong downdraught conditions that exceeded the aircraft's performance capabilities and led to a collision with terrain.

The CAA has engaged with the Recreational Aircraft Association of New Zealand and Flying New Zealand to encourage them to promote the safety actions in this report, with specific attention to CAR 91.217 *Preflight action* (CAA Action 22A259) and CAR 91.311 *Minimum heights for VFR flights* (CAA Action 22A265).

1. Factual information

1.1 History of the flight

1.1.1 The objective of the flight on 29 September 2019 was to complete the student's training requirements prior to issue of a Microlight Intermediate Certificate.

1.1.2 The instructor and student exchanged several text messages the previous day regarding the weather and decided that the flight would go ahead on the day of the accident. Family members believed the flight was to be NZPP to NZFP to NZPP.

1.1.3 The student advised the NZPP Airways Aerodrome Flight Information Service (AFIS) by radio of their intention to fly to NZFP. The aircraft departed NZPP at 1336 hours.

1.1.4 The aircraft's GPS information showed it initially climbed to approximately 760 feet above mean sea level[4] during its departure to the north.

1.1.5 The aircraft's GPS information also showed it tracked along the coastline approximately 160 metre (m) offshore and that it descended to approximately 380 feet[5] as it passed Waikanae Beach.

1.1.6 The aircraft later climbed to approximately 3100 feet near Levin while en route to NZFP, where it completed four circuits.

1.1.7 After departing NZFP the flight deviated from the known plan and tracked towards Flat Point aerodrome (NZFT). The direct track NZFP to NZFT was found loaded into the aircraft's GPS unit (refer Figure 1).

1.1.8 After departing NZFP the aircraft tracked south-east and climbed to approximately 3500 feet before entering the Tararua Range, approximately three nautical miles (NM) south of Shannon.

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4 All heights are in feet above mean sea level unless otherwise stated.

5 Civil Aviation Rule 91.311(2)(i) *Minimum height for VFR flights* describes minimum heights and horizontal distance requirements from congested areas and terrain. See Appendix Three.

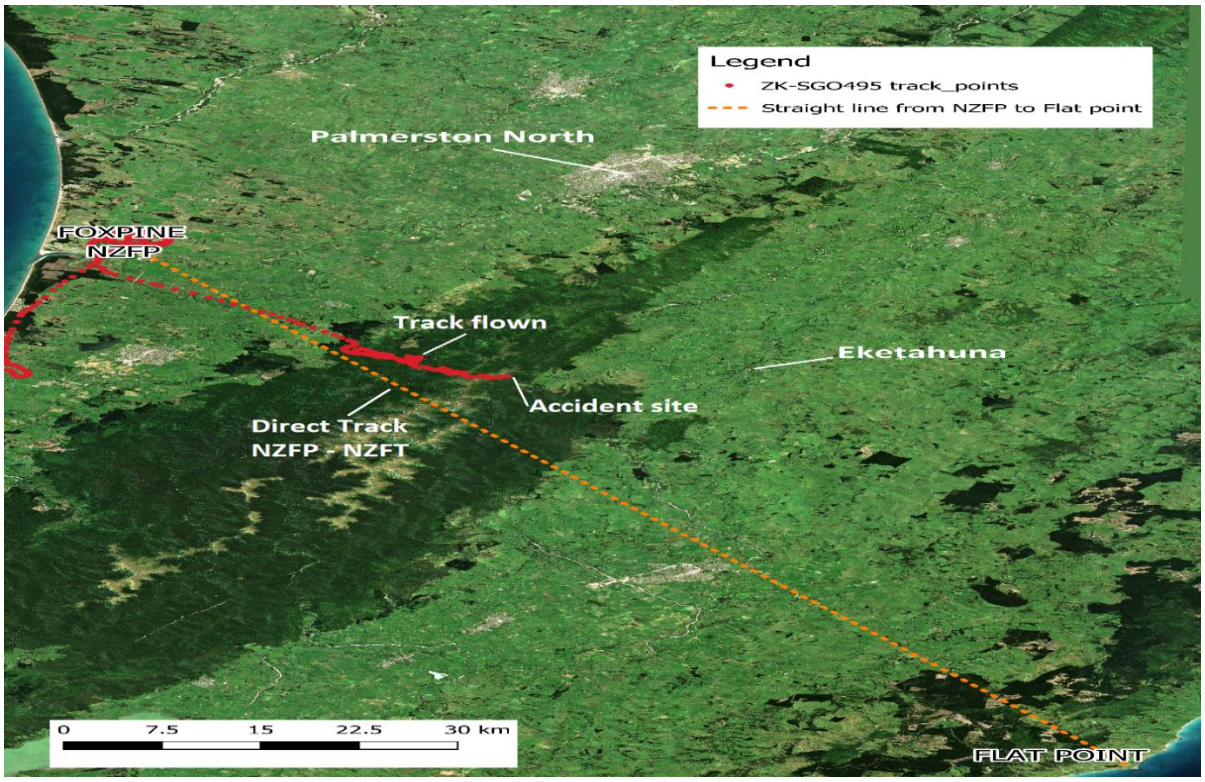

Figure 1. Direct track NZFP to NZFT as loaded in aircraft's GPS unit. Track flown in red. Garmin495 ™.

1.1.9 The aircraft collided with terrain approximately 90 seconds after crossing the main divide of the Tararua Range (refer Figure 2).

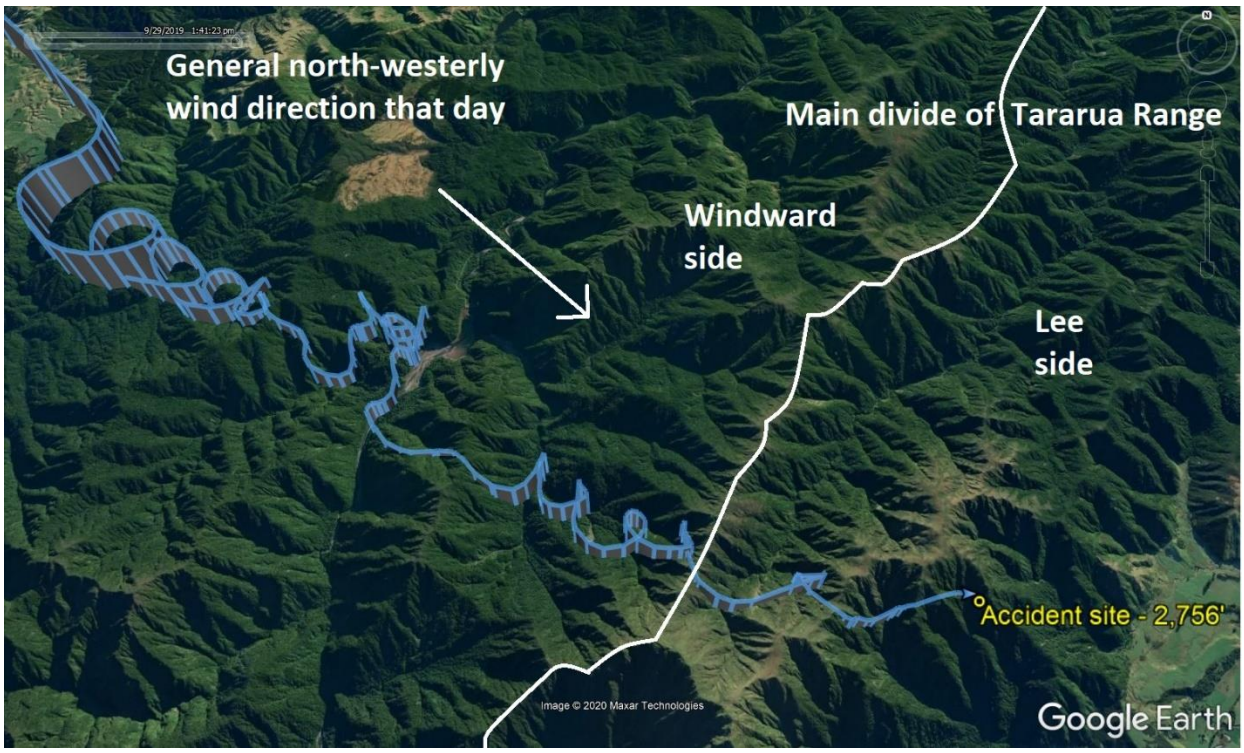

Figure 2. Track flown and accident site location, overlaid in Google Earth™.

1.1.10 The accident occurred in daylight, at approximately 1441 hours, eight NM west of Eketahuna in the Tararua Range, at an elevation of approximately 2756 feet.

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Other*
Fatal	2	0	0

Table 1: Injuries to persons.

1.3 Damage to aircraft

1.3.1 The aircraft was destroyed.

1.4 Other damage

1.4.1 Nil.

1.5 Personnel information

1.5.1 The instructor was the pilot-in-command of this flight and therefore responsible for the safety of the flight. He was appropriately qualified, certificated and rated.

1.5.2 The instructor had previously owned and flew a Jabiru J120-C microlight aircraft for almost 10 years. This included operations in the Central Otago mountains and many flights into and through the Tararua Range.

1.5.3 The instructor's flight hours could not be accurately determined as there were no entries in his logbook after 10 May 2019. His logbook recorded that he had approximately 910 hours total flying time up to this date. Approximately 500 hours were in microlight aircraft flown in New Zealand.

1.5.4 The instructor anticipated the student would fulfil the requirements for the issue of a Microlight Intermediate Certificate after the accident flight was completed.

1.5.5 The student purchased ZK-SGO in February 2019 with the intention of learning to fly and began flight training on 23 February 2019. He had accrued approximately 25 hours total flight time prior to the accident, all in ZK-SGO.

1.5.6 The student was appropriately certificated, rated, and current.

1.6 Aircraft information

1.6.1 An annual aircraft condition inspection on 25 February 2019 recorded no defects.

1.6.2 The aircraft was maintained in accordance with the manufacturer's maintenance program.

1.7 Meteorological information

1.7.1 The New Zealand Meteorological Service (MetService) mean sea level analysis chart showed that a ridge of high pressure lay north of the country, while a trough lay over the mid Tasman Sea.

1.7.2 These two systems contributed to the development of a strong north-west airflow over central New Zealand (refer Figure 3).

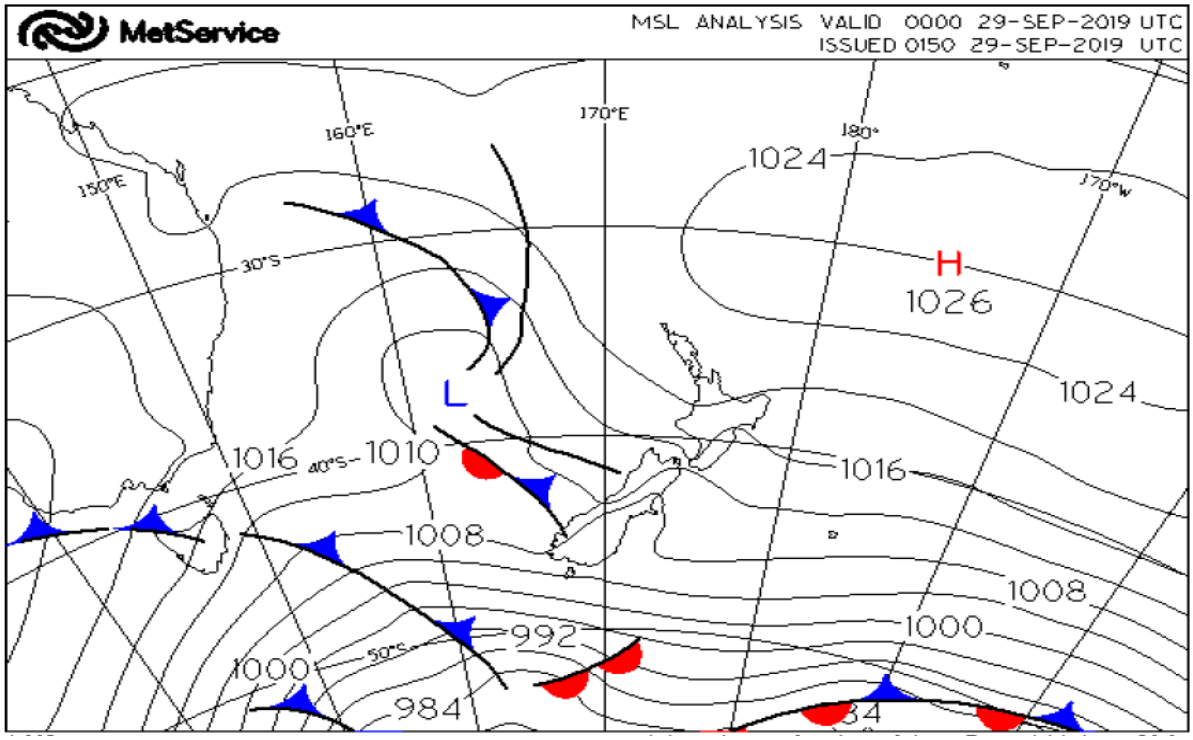

Figure 3. Mean sea level analysis at 0000 UTC 29 Sep 2019 - Diagram from MetService.

1.7.3 Both pilots logged on to the MetService General Aviation Weather Briefing service the morning of the flight but only requested the Straits Area Forecast (ST ARFOR) weather briefing (refer Figure 4).

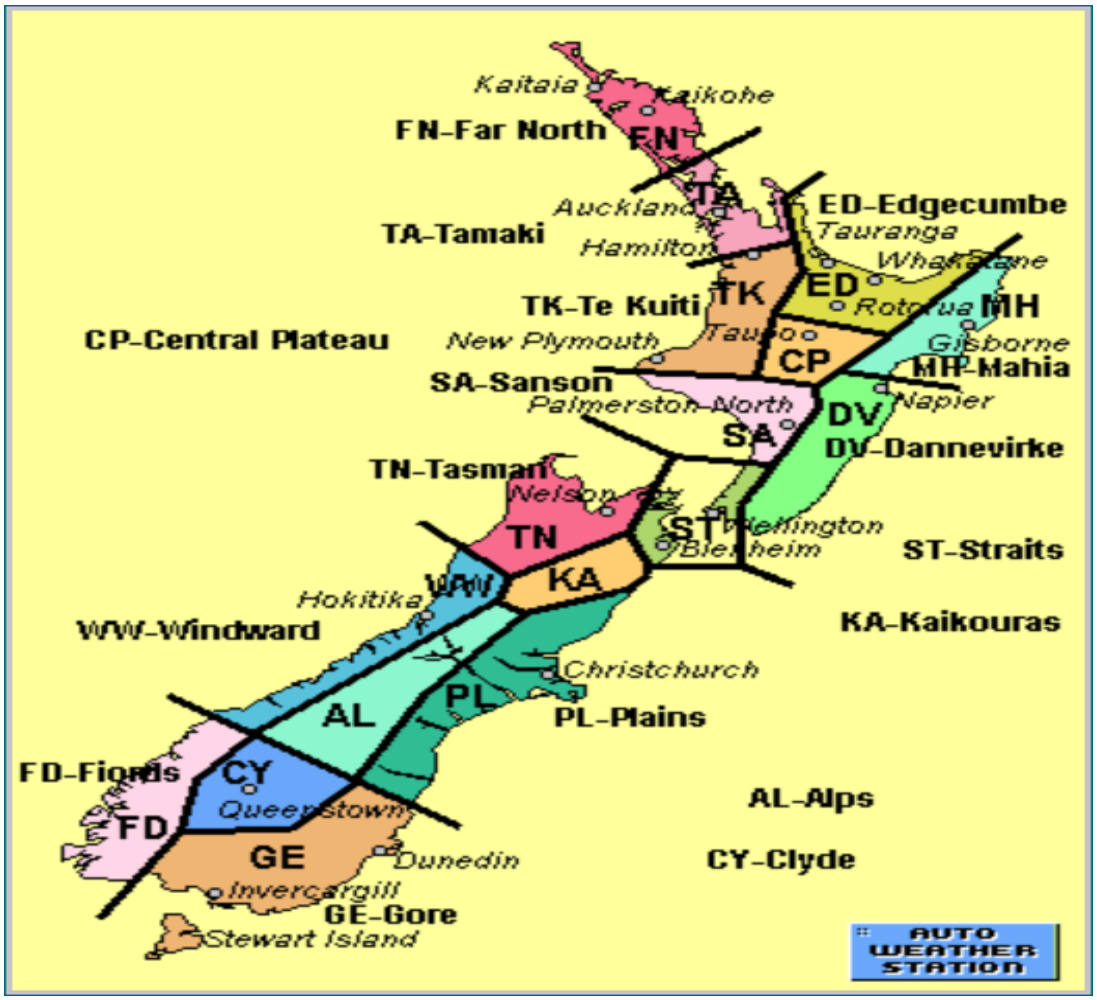

Figure 4. New Zealand ARFOR areas. Only the ST ARFOR was requested (MetService©).

1.7.4 By default, unless intentionally deselected by the user, all ARFOR requests include other New Zealand-wide meteorological information as described below:

- Sigmet listings[6] for NZZC and NZZO [NZZC is New Zealand, NZZO is South Pacific]
- Graphical Sigmet Monitor[6] (GSM) for NZZC and NZZO
- Graphical NZ Significant Weather (GNZSIGWX)
- Graphical Aviation Forecast (GRAFOR)
- Aviation Area Winds (AAW) [for ST only]
- Aerodrome forecasts (TAF) [for NZWB, NZWN and NZPP][7]

6 The student did not receive these products as he used an outdated web browser version on his computer. However, he did receive the GNZSIGWX illustration and the four other weather elements described.

7 NZWB is Woodbourne aerodrome, NZWN is Wellington aerodrome, NZPP is Paraparaumu aerodrome.

- Aerodrome reports (METAR) [for NZWB, NZWN and NZPP]

1.7.5 The ST ARFOR weather briefing forecast moderate turbulence over the North Island south of a line between Tauranga and New Plymouth and included information about severe turbulence east of the Ruahine and Tararua Ranges. It also forecast strong west to north-westerly winds in its area. The ST ARFOR weather briefing is included in Appendix One of this report.

1.7.6 A Palmerston North-based flight training provider and a Wairarapa-based helicopter operator said they suspended flying operations that day due to strong winds.

1.7.7 Several local witnesses living in the area east of the accident site commented on the strong windy conditions that day.

1.8 Aids to navigation

1.8.1 The aircraft was fitted with a Garmin 495 GPS which was mounted in the instrument panel.

1.8.2 The GPS information was analysed by a forensic data specialist who estimated the accuracy of the GPS data to be +/- 5m horizontally and +/- 15m vertically.

1.9 Communications

1.9.1 Radio transmissions from ZK-SGO were recorded by Airways AFIS on departure from NZPP. These calls were all of an expected nature for a VFR flight departure.

1.9.2 Standard radio calls were heard by the aerodrome operator at NZFP as the aircraft approached and then conducted four circuits at the aerodrome.

1.9.3 NZFP is within and shares the same radio frequency as the Manawatu Common Frequency Zone (CFZ). Radio calls within CFZ's are not formally recorded.

1.9.4 There were no other reports of radio calls heard from ZK-SGO on the day of the accident.

1.10 Aerodrome information

1.10.1 Nil.

1.11 Flight recorders

1.11.1 Nil.

1.12 Wreckage and impact information

1.12.1 The aircraft cut a swathe through a tree-covered ridge and collided with the terrain at an altitude of approximately 2756 feet, on a heading of approximately 140° True. The general direction of the ridge was approximately 165° True.

1.12.2 Observations and bearings taken with reference to the damaged trees indicate the aircraft was banked approximately 35° to the right while in a 10° nose down attitude (refer Figure 5).

Figure 5. Accident site indicating aircraft entry angles and track cut through the bush canopy (CAA photo).

1.12.3 Aircraft wreckage and impact signatures were consistent with a high-speed collision with terrain.

1.12.4 Post-accident inspections established flight control integrity and found no evidence of any pre-existing defects or indications of an engine failure.

1.13 Medical and pathological information

1.13.1 Post-mortem examination showed that both pilots died of multiple injuries consistent with a high-energy impact.

1.13.2 There was no indication of any pre-existing conditions that could have resulted in incapacitation or affected either pilot's ability to fly the aircraft.

1.13.3 There were no other relevant medical findings in the respective pathology and toxicological reports.

1.13.4 Family members reported that both pilots had rested adequately before the flight.

1.14 Fire

1.14.1 A small post-accident fuel-fed fire caused minor localised burning and scorching damage to the rear of the engine.

1.15 Survival aspects

1.15.1 The aircraft seatbelts restrained the occupants in their seats.

1.15.2 The aircraft was not fitted with an emergency locator transmitter, nor was it required to be. However, a personal locator beacon was carried in the aircraft.

1.15.3 The investigation found no evidence to indicate the pilots advised anyone of the change to a new destination. Family members believed the flight was to be from NZPP to NZFP and return to NZPP. They expected the flight to be completed within a few hours.

1.15.4 When the aircraft was reported overdue, there was a delay in directing the Search and Rescue (SAR) response as the search area was not defined. A VFR flight plan was not required for this type of flight. However, if one was filed it would have included the pilot's destination and nominated SAR time. If that plan was not terminated at or prior to the nominated time, a SAR response would be started immediately.

1.15.5 Despite this delay, the accident was not survivable.

1.16 Tests and research

1.16.1 The engine was disassembled and inspected by a maintenance provider under CAA supervision. The maintenance provider concluded there was no evidence of any pre-impact abnormality that would have affected the engine's ability to produce power.

1.16.2 The following fatal accident reports are all examples where pilots have flown into either forecast bad weather or encountered bad weather en route. It is likely that most of these accidents could have been prevented with thorough flight planning, or by making an inflight decision to turn back or divert.

- ZK-FRU 1F CAA report ZK-FRU 99/1609
- ZK-FGS 2F CAA report ZK-FGS 05/2471
- ZK-MAD 1F CAA report ZK-MAD 09/4406
- ZK-SML 1F CAA report ZK-SML 11/1504
- ZK-CMV 4F CAA report ZK-CMV 15/1129
- ZK-TJE 2F CAA report ZK-TJE 17/1635
- ZK-TNB 1F CAA report ZK-TNB 18/6476

1.17 Organisational and management information

1.17.1 Microlight activities in New Zealand are administered by an aviation recreation organisation (ARO). The Director of Civil Aviation delegates authority for the issue of pilot certificates and authorisation of microlight inspections to a nominated senior person in Part 149 ARO.

1.18 Additional information

1.18.1 The CAA has several meteorology-related products available to pilots. These help pilots decode, collate, and interpret general weather information. CAA also

publishes Good Aviation Practice (GAP) booklets regarding mountain flying in general, and operations into certain aerodromes located in mountainous areas. These are:

- GAP booklet titled *VFR Met*. This describes weather in general and VFR flight requirements.
- GAP booklets titled *Mountain Flying*; *In, Out and Around Milford*; *In, Out and Around Queenstown*; and *In, Out and Around Mount Cook.* These booklets are all relevant for flight into mountainous areas.
- *Weather Card/Met Abbreviations.* These describe abbreviations, codes, products [Metar, Grafor, TAF, etc], issue times and validity periods.
- *Weather-related indicators*. These provide reminders of which weather elements to monitor for change during a flight (cloud base, cloud type, cloud colour, visibility, rain, wind speed, wind direction, etc).
- *VFR MET Minima* [flip side of above card]. This card pictorially shows horizontal and vertical distance requirements from cloud in various altitude blocks.

1.19 Useful or effective investigation techniques

1.19.1 Nil.

2. Analysis

2.1 The intention of the flight was to complete the student's Microlight Intermediate Certificate training. The instructor also wanted the student to experience flying in difficult weather conditions. They exchanged numerous text messages that included reference to the weather conditions and the likelihood of signing off the flight. The instructor said in a message sent on 21 September, "one more hour in more difficult weather and we are done" and in another message, sent the day before the accident, "Tomorrow's weather is what you need to fly in for our last hour. Then I could give you your licence".

2.2 The aircraft most likely entered an area of strong downdraughts on the lee side of the Tararua Range that exceeded the aircraft's performance capabilities which caused it to collide with terrain.

2.3 The crew did not request all the weather that was required for the flight NZPP to NZFP or update the weather that was obtained that morning. CAR 91.217 *Preflight action* states, 'Before commencing a flight, a pilot-in-command of an aircraft must obtain and become familiar with all information concerning that flight including—(1) where practicable, the current meteorological information' (see Appendix Two).

2.4 The instructor received the ST ARFOR aviation weather briefing at 07:56 hours on the morning of the accident. Several elements in that briefing described strong west to north-westerly winds of 25 to 35 knots at altitudes between 1000 and 3000 feet. Additionally, the GSM map specifically warned of severe turbulence east of the Ruahine and Tararua Ranges while the GNZSIGWX map advised of moderate turbulence over the lower North Island.

2.5 The Sanson (SA) and Dannevirke (DV) ARFORs were not obtained by the instructor. These also contained important information regarding high wind speeds from 25 to 30 knots between 1000 and 3000 feet in their respective areas.

2.6 The diagram below illustrates the basic interaction of wind flow over a mountain range and includes some of the phenomena that can be associated with it. This diagram is copied from the GAP booklet *Mountain Flying* (refer Figure 6).

2.7 MetService analysis of the weather that day including a weather balloon sounding flight launched from NZPP that morning, identified a stable layer of air at approximately 7000 feet. Their analysis said the stable layer of air acted like a ceiling that effectively squeezed the wind between the ceiling and the terrain which in turn produced a strong accelerating wind, possibly in excess of 50 knots, to flow down the lee side of the Tararua Range.

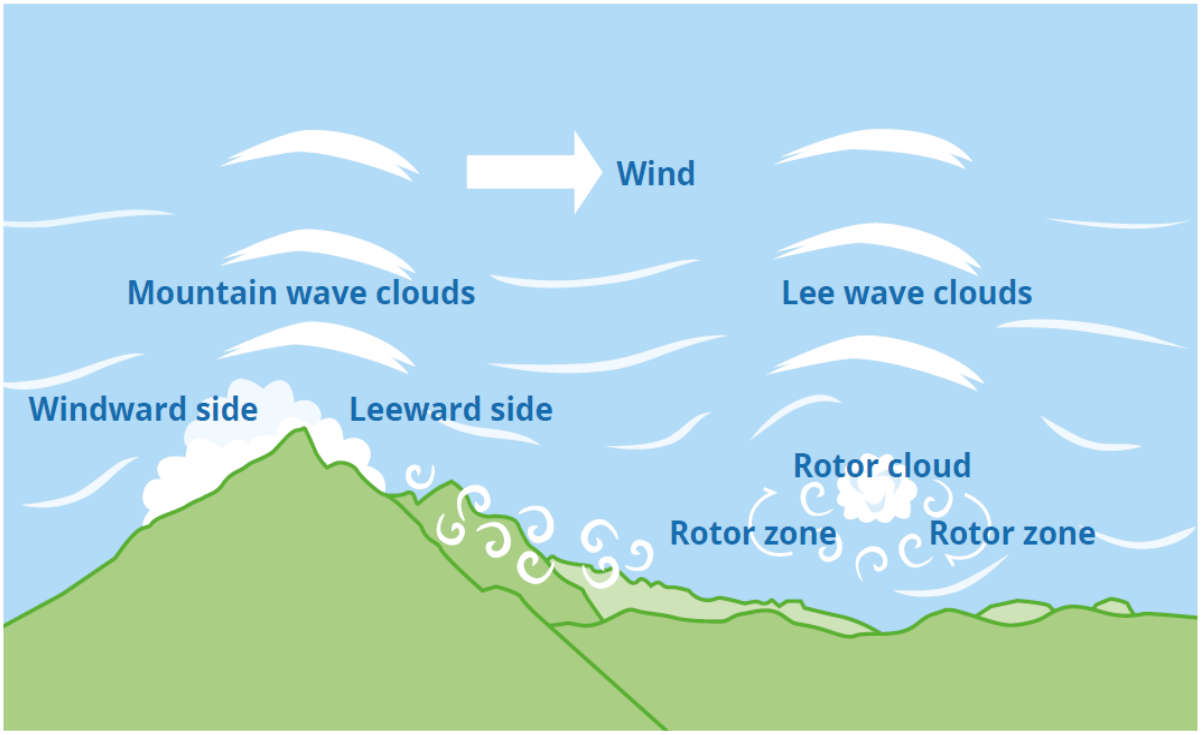

Figure 6. Diagram illustrating the wind flow over a mountain range (CAA GAP Mountain Flying)

2.8 Analysis of the forecast weather conditions triggered concerns with other operators who decided not to fly that day.

2.9 It's likely the crew of ZK-SGO decided to fly to NZFT based on visual observations made while the aircraft was operating in the Manawatu and Horowhenua areas. This is supported by the fact that the direct track NZFP to NZFT was found entered in the aircraft's GPS unit and the actual track flown by the aircraft closely followed the direct GPS track. It is unknown if the instructor and student fully appreciated the effects of the forecast weather along the new route.

2.10 The instructor had operated in, and flown through, the Tararua Range on many occasions and had flown in the mountainous areas around Central Otago. He therefore had experience of flying in mountainous terrain. It's not known, however, in what weather conditions this experience was gained.

2.11 The flight operated in the Tararua Range for approximately 12 minutes and carried out 13 turn manoeuvres as it continued eastwards (refer Figure 2). This suggests that flying conditions were suitable enough for the pilots because they did not turn back. There was plenty of opportunity to do so if conditions were not suitable.

2.12 After the aircraft crossed the main divide to the lee (eastern) side, it experienced four rapid height loss events in approximately 90 seconds (refer Figure 7).

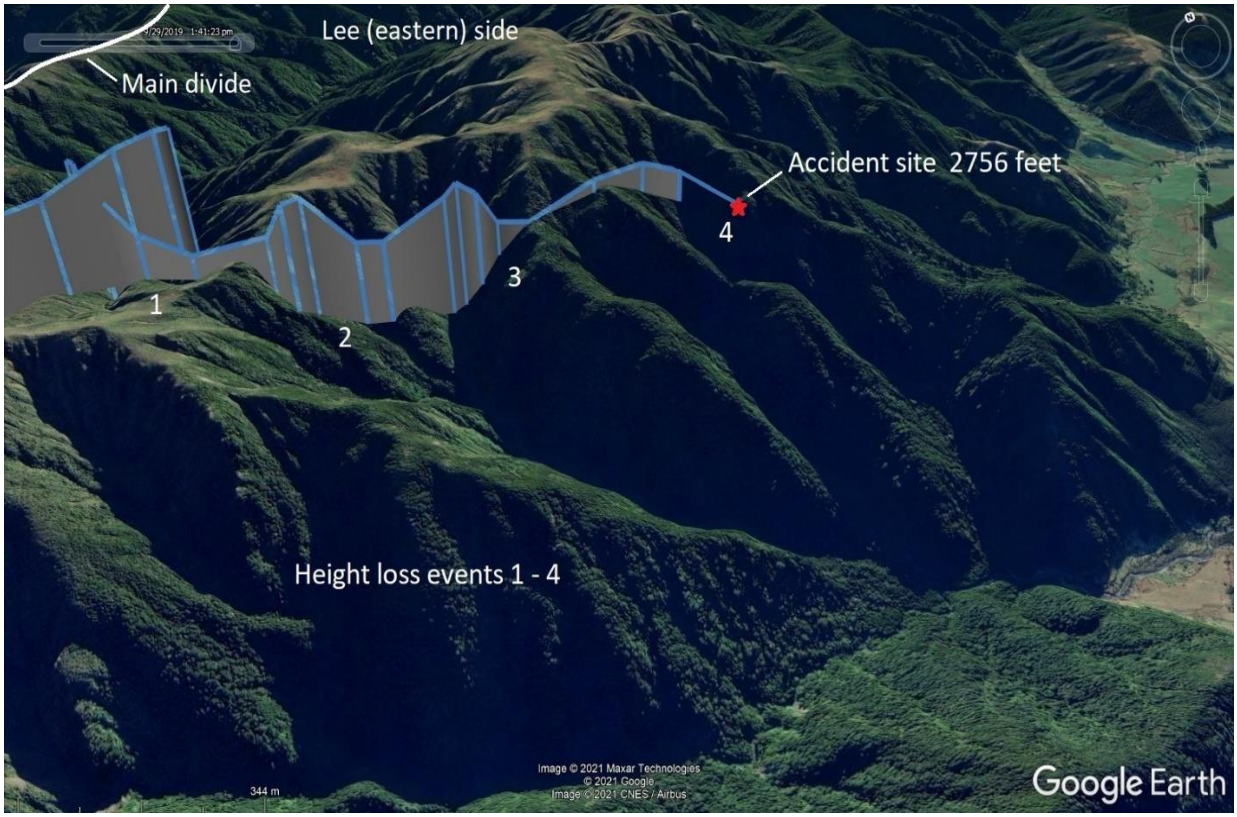

Figure 7. Last 90 seconds on lee side showing four rapid height loss events 1 - 4. Google Earth™

2.13 The estimated rates of descent for each height loss event (rounded down to nearest 100 feet) were calculated as follows.

- Height loss event 1: 5000 feet per minute
- Height loss event 2: 5600 feet per minute
- Height loss event 3: 3000 feet per minute
- Height loss event 4: 2300 feet per minute

The aircraft's published rate of climb is 1200 feet per minute.

2.14 On the third event the aircraft appears to have narrowly avoided colliding with terrain during recovery from that height loss event (refer Figure 8).

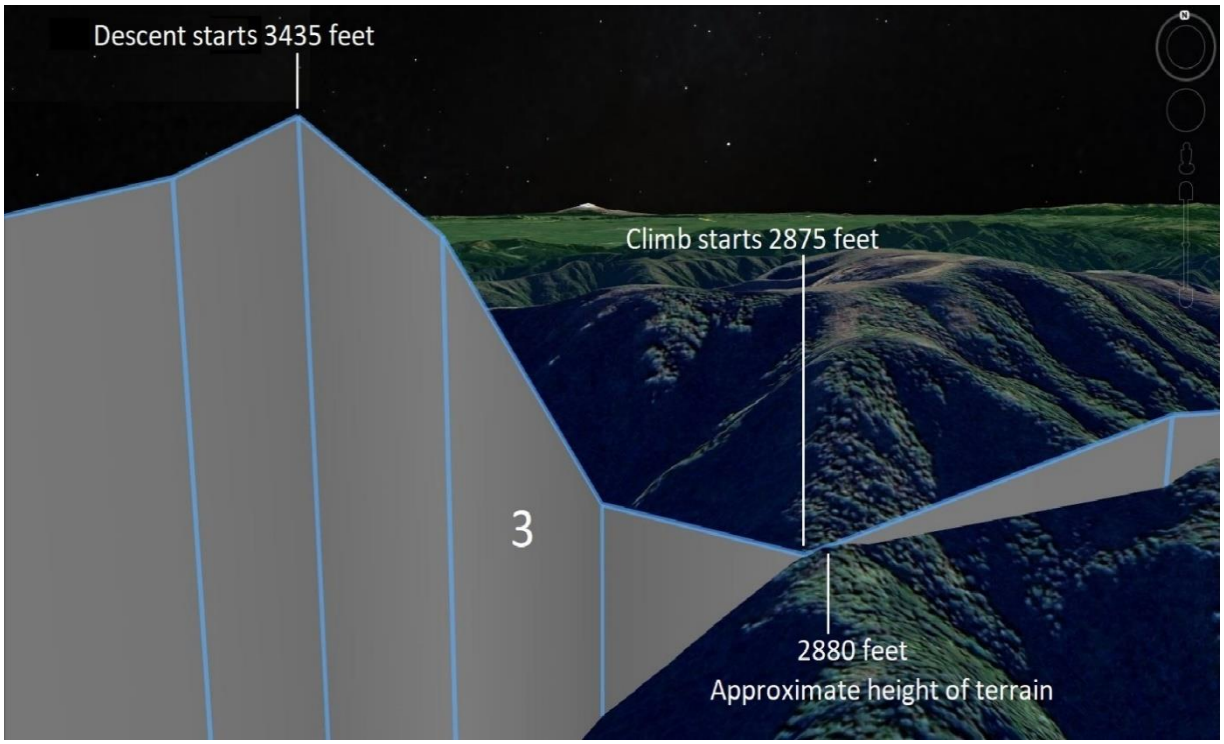

Figure 8. Height loss event three showing approximate recovery altitude and terrain height. Google Earth™

2.15 Light aircraft are generally more influenced by strong downdraughts and turbulence due to their light weight and performance limitations. This includes microlight aircraft[8]. Most pilots therefore tend to avoid areas where these conditions might be encountered, such as in the lee side of significant terrain.

2.16 Analysis of the aircraft's GPS track identified that the flight did not comply with CAR 91.311 (a) (1) (2) *Minimum heights for VFR* as it flew past Waikanae beach. The aircraft operated as low as approximately 380 feet in this area. Given the local weather at the time, it is considered likely that this was to avoid flying into cloud. The aircraft also operated approximately 180m horizontally away from the residential area at its closest point. CAR 91.311 requires aircraft to be at least 600 m horizontally away from residential areas and 1000 feet above ground level.

[8] A two-seat aircraft with maximum gross weight that does not exceed 600kg (for land-based aircraft) with a stall speed in the landing configuration that does not exceed 45 knots (For more information refer to Advisory Circular AC103-1 *Microlight aircraft operating rules*, 1 *General*)

3. Conclusions

3.1 The aircraft appeared to be airworthy at the time and there were no known pre-existing defects.

3.2 Both the pilots were appropriately certificated to carry out the flight.

3.3 Both pilots were rested and there were no pre-existing medical conditions that could have impaired their ability to fly the aircraft.

3.4 The instructor used an outdated weather forecast for the entire flight. This was in contravention of CAR 91.217 *Preflight action.*

3.5 Thorough analysis of all the available weather forecasts should have precluded flight operations through the Tararua Range.

3.6 The aircraft descended below the minimum height for VFR flight soon after departing NZPP. This was in contravention of CAR 91.311 *Minimum heights for VFR*.

3.7 When the decision was made to fly to NZFT, there was no new planning or weather updates obtained. This was also in contravention of CAR 91.217 *Preflight action.*

3.8 Actual flight conditions in the Tararua Range did not appear to concern the pilots as the flight continued eastwards towards NZFT.

3.9 The aircraft entered an area of strong downdraughts that most likely exceeded the aircraft's performance capabilities, and it collided with a ridge.

3.10 There was a delay to the search and rescue operation because the new destination was unknown. However, the accident was not survivable.

4. Safety Actions

4.1 CAR 91.217 *Preflight action* should be re-applied if a pilot decides to change to a new destination at any time. This is the responsibility of the pilot in command.
A CAA safety action has been raised to encourage the Recreational Aircraft Association of New Zealand (RAANZ) and Flying New Zealand (FNZ) to promote to their memberships the importance of CAR 91.217 (CAA Action 22A259).

4.2 The CAA reminds all pilots of CAR 91.311 *Minimum heights for VFR.* Non-compliance with this CAR has been identified in many other fatal accidents.
A CAA safety action has been raised to encourage the RAANZ and FNZ to promote to their memberships the importance of CAR 91.311 (CAA Action 22A265).

4.3 An article titled "Flight planning not a quick once-over" was published in CAA's *Vector* magazine in the Spring 2020 issue. The article aimed to raise awareness of the importance of proper prefight preparation to minimise the risks of the flight going awry (CAA Action 22A260).
https://www.aviation.govt.nz/assets/publications/vector/Vector-Magazine-Spring-2020.pdf

4.4 The CAA reminds all pilots of the need to carefully interpret and fit all the 'pieces' of available weather information together when prefight planning. Having all this information will help pilots 'see and understand' the broader weather picture.
A CAA safety action has been raised to encourage the RAANZ and FNZ to promote to their membership all the available weather information tools (CAA Action 22A261).

4.5 While there was no evidence to suggest the flight in the Tararua Range was a 'pseudo' mountain flying training flight, the CAA would recommend that microlight pilots obtain and read all the GAP booklets that relate to mountain flying. These publications collectively describe many of the potential hazards of flying in and around mountainous terrain. These can be obtained from a local flying club or aero club, downloaded directly from CAA at www.aviation.co.nz or requested as hardcopies by emailing publications@caa.govt.nz.

A CAA safety action has been raised to encourage the RAANZ and FNZ to promote to their memberships the availability of these publications (CAA Action 22A262).

4.6 Given the mountainous topography of New Zealand, the CAA encourages microlight pilots who choose to operate frequently in these environments, to improve their knowledge by completing the 'Aeroplane terrain and weather awareness syllabus' for private pilots[9]. Pilots can contact an approved training organisation to conduct this training.

A CAA safety action has been raised to encourage the RAANZ and FNZ to promote awareness of this training opportunity to their respective members (CAA Action 22A266).

4.7 The safety messages in this report are similar to the safety messages from many other fatal accident reports over time. The CAA will therefore produce an Online Vector article detailing the observation and commonalities found in many fatal and non-fatal accident since 2000. A CAA safety action has been raised within CAA to help facilitate the publication of this article prior to the 2022 summer flying season (CAA Action 22A264).

9 The syllabus is described in AC61.3 Appendix IV and is further supported by additional material in the CAA Mountain Flying Training Standards Guide.

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08/12/2021

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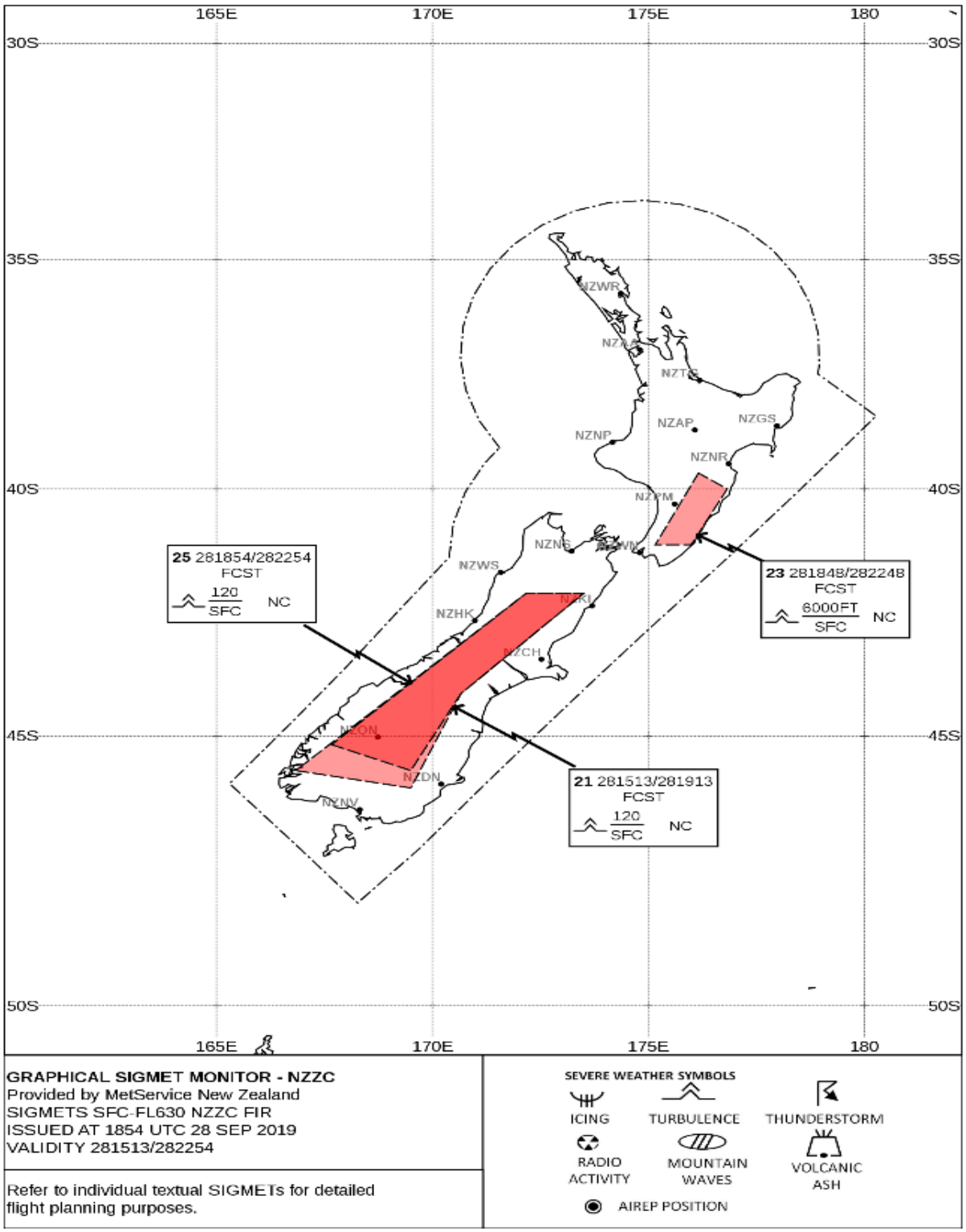
Appendix One MetFlight General Aviation Weather Briefing

Weather obtained by the instructor and student early the accident morning.

Graphical Sigmet Monitor (GSM) NZZC

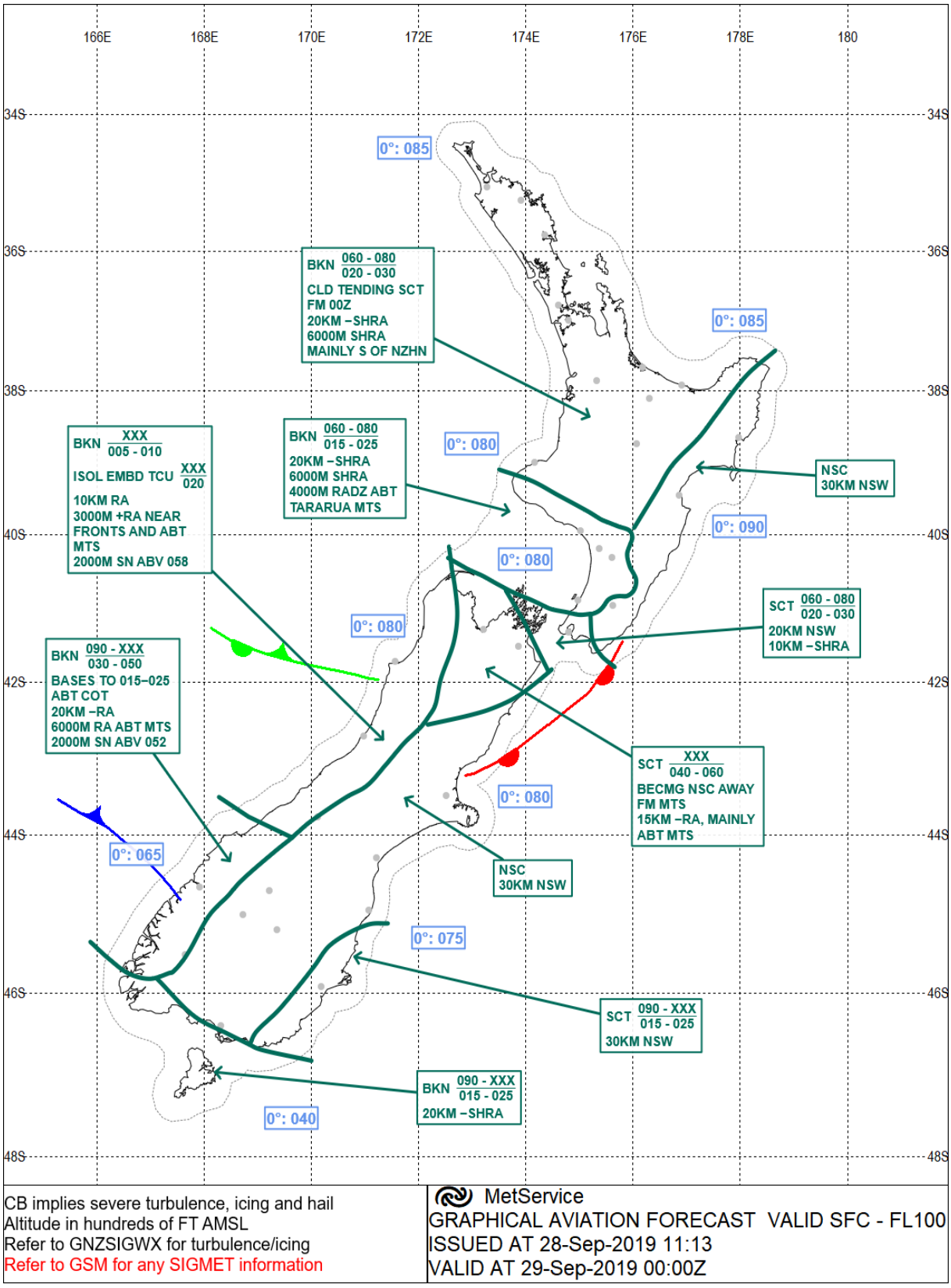
Note: this map was <u>not received</u> by the student.



Graphical Aviation Forecast Chart (GRAFOR)

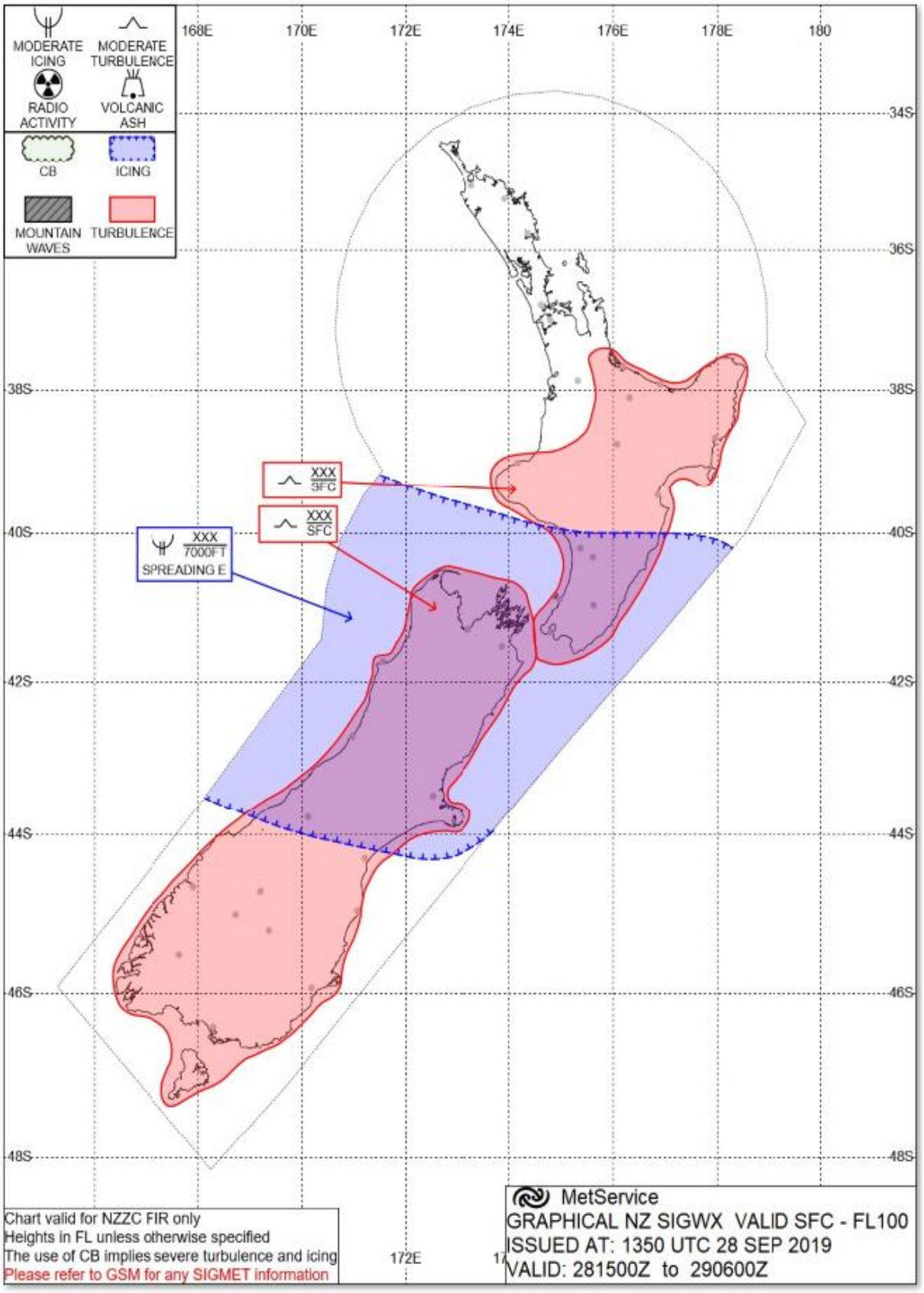
Note: The series of three maps was received by both pilots.

This map was valid during the flight. All three GRAFOR maps included the same statement about visibility in Tararua MTS.



Graphical NZ Significant Weather (GNZSIGWX)

Note: This map was received by both pilots.



SIGMET

NZZC SIGMET 23 VALID 281848/282248 NZKL-

NZZC NEW ZEALAND FIR SEV TURB FCST WI S3940 E17610 - S4110 E17510 - S4110 E17600 - S4000 E17650 - S3940 E17610 SFC/6000FT STNR NC=

Note: This SIGMET information was <u>not received</u> by the student.

The South Island and NZZO SIGMETs were not relevant so omitted from this appendix.

ST ARFOR (Straits Area Forecast)

Valid:1200 TO 0600 UTC, Issued: 28 Sep 2019 18:37 UTC

BECOMING		1800-1900		2200-2300	
1000	29020				
3000	27025			31035	
5000	26015	PS05	27030	PS04	29040 PS05
7000	26020	PS01	28030	PS02	29040
10000	25030	MS04			

NZPP TAF (Paraparaumu Terminal Aerodrome Forecast)

Issued: 28 Sep 2019 16:55 UTC, TAF AMD NZPP 2816/2906

34015G25KT 20KM -SHRA SCT015 BKN020

2000FT WIND 32030KT

BECMG 2822/2900 32040KT

TAF's contain forecast weather information within an 8km radius of the named aerodrome.

Note: All QNH ranges omitted. NZWN, NZWB TAFs removed, as they were less relevant.

NZPP METAR (Paraparaumu Met. Aerodrome Reports)

NZPP 281830Z 33010KT 280V020 20KM BKN019 BKN024 BKN030 13/10 Q1016

NZPP 281900Z 31010KT 240V350 20KM BKN019 BKN029 BKN043 14/11 Q1016

METAR reports provide <u>actual</u> weather conditions at the named aerodrome. Their wind velocity information is the <u>surface</u> wind at that aerodrome.

Note: The NZWN and NZWB METARs have been removed as they were the less relevant.

Appendix Two CAR 91.217 *Preflight action*

Before commencing a flight, a pilot-in-command of an aircraft must obtain and become familiar with all information concerning that flight including—

(1) where practicable, the current meteorological information; and

(2) the fuel requirements; and

(3) the alternatives available if the planned flight cannot be completed; and

(4) any known or likely traffic delays that have been notified by ATS; and

(5) the status of the communication and navigation facilities intended to be used; and

(6) the current conditions of the aerodrome and runway lengths at aerodromes of intended use; and

(7) any take-off and landing distance data contained in the aircraft flight manual; and

(8) in the case of aircraft powered by two or more engines— (i) engine inoperative procedures; and (ii) one engine inoperative performance data.

Appendix Three CAR 91.311 *Minimum heights for VFR flights*

(a) A pilot-in-command of an aircraft must not operate the aircraft under VFR—

(1) over any congested area of a city, town, or settlement, or over any open-air assembly of persons at a height of less than 1000 feet above the surface or any obstacle that is within a horizontal radius of 600 metres from the point immediately below the aircraft; or

(2) over any other area—

(i) at a height of less than 500 feet above the surface; or

(ii) at a height of less than 500 feet above any obstacle, person, vehicle, vessel, or structure that is within a horizontal radius of 150 metres from the point immediately below the aircraft; and

(3) for any operation, at a height less than that required to execute an emergency landing in the event of engine failure without hazard to persons or property on the surface.