

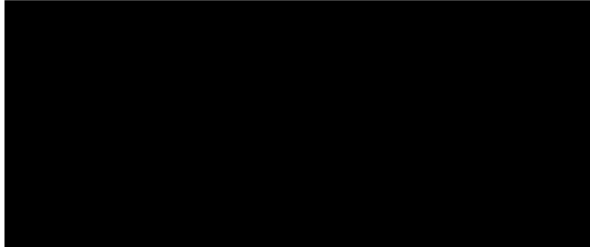


National Headquarters

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29 March 2019



Information Request – Waimarama fire

I refer to your official information request dated 12 March 2019 asking for the following information:

- Can you tell me if the Waimarama Fire matter is resolved and whether Fire and Emergency is seeking reimbursement from Unison for costs related to the fire?
- If not, can you tell me if the matter was settled and how and when this occurred?
- Can I now obtain a copy of the report into the fire?

Fire and Emergency can confirm that it is currently in discussions with Unison regarding reimbursement of fire suppression costs for the Waimarama fire.

Please find attached a copy of the investigation report into the fire. Please note that some redactions have been made under section 9(2)(a) of the Official Information Act to protect the privacy of natural persons.

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Note also that this response (with your personal details removed) may be published on the Fire and Emergency website.

Yours sincerely

A handwritten signature in black ink, appearing to read "Bella Sutherland".

Bella Sutherland
Acting Deputy Chief Executive, Office of the Chief Executive

encl

National Rural Fire Authority

Rural Fire Investigation Report



Fire Authority: Hastings District Council Rural Fire Authority

Fire Name: Waimarama Fire

Fire Date: 13 February 2017

Report Date: 26 May 2017

NZFS ICAD: F2245215

Report Completed By: Chris Millson

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Part 1: Wildfire Investigating Officer

Chris Millson

I am a specialist rural fire investigator.

I have completed the National Rural Fire Authority training course 'Determining Origin and Cause Vegetation Fires' and completed the required qualification competencies.

I have over 25 years' experience with fires in rural areas, with considerable experience in senior fire management positions and fire investigation. My rural fire history, management and investigation background includes the following:

- National Diploma in Fire & Rescue Services – Vegetation Fire Fighting Management (gained in September 2006).
- Deputy controller/controller with the Glen-Hira Voluntary Rural Fire Force 1991-95
- Held the position of fire management officer for Baigents/Carter Holt Harvey in 1993-1998. This position involved management and issue of fire burn permits. This often involved physical inspection and giving advice on how a burn off could be managed in a safe manner. Fire training, fire management, equipment maintenance and mitigation were other responsibilities
- From 1997 to 2008, I was the Principal Rural Fire Officer (PRFO) for the Waimea Rural Fire Authority (WRFA), which included attending and investigating approximately eight to twelve significant fires within the region annually.
- Since 2008, have continued to provide services as a rural fire investigator to various Rural Fire Authorities around the country. I have carried out investigations from Dunedin to Northland.
- I have been deployed in senior fire management positions in the United States and twice in Australia, including the 2007 Victoria Bushfires. These positions were rural fire planning and operational roles which required significant understanding of fire behaviour. The positions required the ability to predict elements of fire behaviour (such as varying intensity, speed of travel and growth rates of both perimeter and area) and therefore the ability to mitigate the effects of fire.
- I held a position as a member of NRFA's National Incident Management Team. I was selected to be a member because of my extensive experience in rural fire management and planning. The team is comprised of members selected from New Zealand's top rural fire management personnel.
- I was extensively involved in the Forest Research Institute - Rural Fire Research projects from 1996–2007. The projects looked at the science of various aspects of rural fire behaviour. The purpose of the projects were to help develop working models for fire managers and identify various aspects of fire behaviour and co-relationships with weather, environment, topography and different fuel types. Fire behaviour knowledge is a critical factor in establishing the cause and origin of vegetation fires.

Part 2: Executive Summary

Location 597 Waimarama Rd, - HASTINGS

Date of Ignition 13 February 2017

**Time & Date
Fire was
Reported** 13 Feb 2017 1044 hrs

Area (ha) 164 Hectares

**Specific Point
of Origin** GPS Co-Ordinates S 39 43.271' E176 55.865'

**Impact of Fire
on
Environment &
Property** The fire burned on land used for lifestyle residential, farming and forestry operations.
Numerous land holdings were affected.
One house and a significant amount of production forestry was damaged by the fire with some farmland, fences and associated infrastructure.

The fire started on land belonging to Matarua Trustee Company Ltd

**Cause of
Ignition** **Power line conductors clashing and arcing due to the high wind conditions dropping molten droplets which have ignited the cured fuel bed below.**

**Party
Responsible for
Fire** Unison Lines

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Part 3: Process of Investigation

On Thursday 13 February 2017 the New Zealand Fire Service received an emergency 111 call reporting a vegetation fire on Waimarama Road Hastings

The call was received at 1044 hrs.

The call quickly escalated to a 5th Alarm, which due to the fire conditions, resulted in a significant fire response.

Resources were mobilised from surrounding communities and brigades from across the Hawkes Bay region.

Aircraft from another nearby fire were immediately diverted to Waimarama.

The fire was reportedly burning in grassland, growing rapidly and with high winds.

The Rural fire Authority were managing the nearby Colin White Road Fire so were able to swiftly implement infrastructure and management processes for an Incident Management Team to participate in the fire management and support.

The fire investigation was initiated on February 14 2017 with the objective of identifying the specific point of origin, ignition source and if possible the party responsible. Mr Craig Chambers Level 2 Vegetation Fire Investigator provided assistance and valuable input to the investigation process and the field investigation.

The physical investigation began on February 15 on the fire site.

There are two parts of the investigation.

The internal investigation involves looking at the fire behaviour indicators on the site to establish how the fire spread and identifying precisely where the fire originated from.

The external examination is based upon factors and evidence gathered from outside of the fire area, such as witness accounts, operational factors and activities, weather data, historical information etc.

This evidence is collated reviewed and then used to draw conclusions as to the potential fire cause.

The internal investigation was implemented looking at the topography, weather conditions and general fire behaviour indicators.

The external investigation provided contributing information and verified observations made on site identifying the general area of origin.

The general area of origin was examined in detail studying the fire behaviour indicators to locate the specific area of origin.

Once the specific area of origin had been identified the detail from the external examination was reviewed and broadened to obtain some specialist input in the form of an Electrical Engineer.

This information provided the evidence that was used to draw the conclusion and confirm the fire cause.

Part 4: Fire Spread and Behaviour

External Examination

The external examination began with a contract briefing from Deputy PRFO Gordon Foster.

Information for the external examination in this case included fire weather data, New Zealand Fire Service SMS report, witness observations and fire incident management team reports and services including mapping.

Mr. Foster was also one of the first responders to the site so was able to provide some valuable information as to where the Fire Perimeter was when he arrived, and the initial suppression actions taken.

Internal Examination

The fire scene examination was carried out by myself (Chris Millson) in conjunction with Mr. Craig Chambers.

Mr. Chambers and I after travelling from out of town both reported to the Hastings District Council EOC and then met on the fire site to proceed with the site examination.

We were briefed by Mr. Gordon Foster who, as well as being Deputy PRFO, was also one of the first responders.

The information that we were looking to collate would help to identify a 'general area of origin'.

This is the main area of focus for the internal fire behaviour and spread examination.

The following objective would be to then locate the specific area of origin then the specific point of origin.

Areas that had been burnt outside of the general area of origin were also checked to verify the direction of spread and the burning characteristics including fire intensity and speed.

Fire behaviour indicators are the physical signs and burn patterns left by a fire.

The fire behaviour indicators were used to identify the directional spread of the fire which included the main head of the fire, transition zones, flanks and the lower intensity backing fire. A flagging system was used to assist with the identification of the FBI's. The red flags indicate the higher intensity head fire, yellow flags the transition from the head to a flank (lesser intensity) fire and the blue flags show the lower intensity fire characteristics generally exhibited by a backing fire.



The flagging system being used, red flags can be seen, which identify the main fire run.

The head fire and main run was identified, although the fire had initially moved through some broken fuel and topographical features. The fire flanks and transition zones were apparent, with good clear indicators and also strong indicators were observed when the fire was backing into the wind.

The area that these vectors meet is referred to as the specific area of origin.

Within this area there is the point where the fire started. The clues, fire behaviour indicators and characteristic properties within this area become far more subtle and micro indicators are used to continue to focus and converge on the actual point where the fire started

Photographs were taken showing fire behaviour indicators observed with the critical areas identified and marked as well as pictures taken of the specific point where the fire started.

(Photo Log Field Notes – Craig Chambers)

General Area of Origin

The general area of origin was able to be identified and confirmed from witness observations and pictures. These included two of the Power Authority crews working in the area, the 1st 111 caller, [REDACTED], a digger operator working nearby, and [REDACTED], who took a picture from lot 8 above.

This provided enough information to identify a 'general area of origin'.

Fire behaviour indicators were observed around the perimeters of the General Area and further out in the fire ground to both confirm the witness observations and get some information regarding the fire intensity and fuel loading in the fire ground.

A GPS track log was made during the investigation movements around the fire area.

General Area of Origin and witness references



Weather Factors

Weather conditions were measured at various weather stations around the fire location. Bridge Pa weather station was the nearest station recording and calculating Fire Weather Data. Bridge Pa is approx. 17 km generally west of the fire location.

The midday temperature on the day and very close to the time of the fire was 32 degrees with a relative humidity of 37% and wind speed 28 km from 300 degrees (NW) direction.

Havelock North recorded 15 km/hr gusting to 24 at 10.44 am (fire report time).

Wind gusts were regularly reaching plus 20km/hr over average wind speeds throughout the region (Ref www.wunderground.com).

- Fuel Factors** Fuel Moisture Codes across the range were very high.
- Daily fire danger levels were rated extreme for scrubland, grassland and forestry.
- The Fine Fuel Moisture Code (FFMC), of 90 shows fine fuels were very dry and highly receptive to ignition.
- The Duff Moisture Code of 64 indicates a high level of fuel is available for combustion.
- The Drought Code of 631 indicates a severe drought condition and very deep seated drying.
- Grasslands in the area were highly cured.
- The Build Up Index (BUI) summarises the overall condition of the hazardous fuels.
- Fire Weather Data** The BUI of 102 tells fire managers there is a serious pending fire hazard.
- The chart below shows the midday observations from some local weather stations, Bridge Pa being highlighted.

Eastern North Island - 13/02/2017 - Observed close

DISCLAIMER: Regional summary FWSYS Observed Data retrieved from the NRFA EcoConnect Fire Weather System updated daily between 1-3pm.

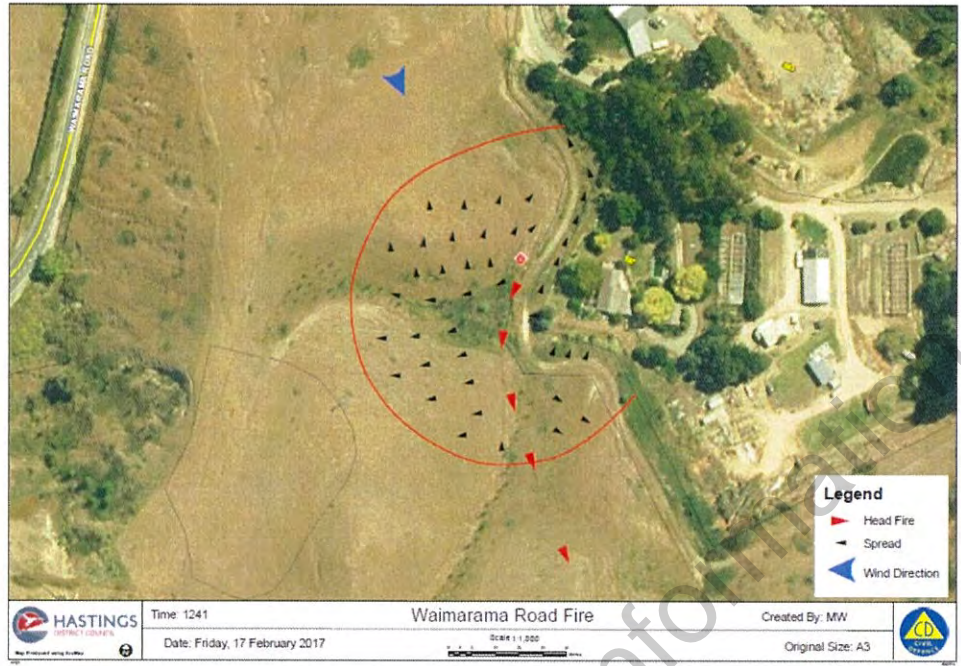
STATION NAME	FOREST	SCRUB	GRASS	FFMC	ISI	FWI	TEMP	RH	DIR	WSP	RN24	DMC	DC	BUI	GC%	STAT
Poroporo	VH	E	E	87	16.2	30.7	23.6	65	290	35	0.0	29	394	49	95	Aut
Te Haroto	VH	E	E	84	13.7	26.8	21.3	67	328	39	0.0	27	468	47	99	Aut
Te Pohue	H	E	VH	86	8.7	18.2	24.6	57	312	24	0.0	25	297	41	99	Aut
Kaiwaka	M	E	H	85	5.5	9.8	23.3	61	344	18	0.0	14	286	25	99	Aut
Waihau	H	E	VH	88	7.9	19.6	27.3	49	285	17	0.0	32	410	54	99	Aut
Crownthorpe	E	E	E	91	15.6	38.9	29.3	41	-	24	0.0	53	536	84	99	Sub
Bridge Pa	E	E	E	92	22.6	53.7	32.0	37	300	28	0.0	64	631	102	99	Aut
Gwavas	H	E	H	89	6.8	18.1	27.3	48	306	13	0.0	34	432	57	95	Aut
Te Apiti Road	H	E	VH	91	8.5	17.2	32.1	38	300	11	0.0	21	397	38	99	Aut
Ongaonga	E	E	E	90	28.3	54.4	28.8	47	270	38	0.0	46	575	77	99	Aut
Waipukurau	E	E	E	92	22.3	54.1	30.9	36	309	28	0.0	64	731	105	99	Aut

Topographical Factors Broken coastal hill country with moderate and steep slopes and in some cases difficult access.

Burn and Char Patterns Burn and char patterns were used to confirm the directional spread around the perimeter of the general area of origin then, once the General Area of Origin had been confirmed also to identify precisely where the fire had originated from and the specific point of origin.

The Fire Behaviour Indicators observed included: protection, degree of damage, angle of char, depth of char, sooting, leaf freeze, cupping and incomplete combustion.

General area of origin – shows wind direction and fire spread



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Part 5: Visual and Physical Evidence

Fire behaviour indicators and any other items of interest were photographed and have been catalogued.

The FBI's clearly showed the burning characteristics for the main or head fire, flanks and transition zones where the fire behaviour changes and the backing fire which generally is a lower intensity slower moving fire.

An unburnt area of fuel clearly showed the suppression action taken by the responding crews to protect No 597 from the backing fire.

While undertaking the area of origin examination, marks were observed on the adjacent power lines that looked like they had been clashing and possibly arcing.

There was also significant damage to the tree foliage on the property boundary of 597 that raised the question of a potential fire start there.

Unison crews had been commissioned to trim trees on the property and came back only days after the fire ignition to resume the pruning. This seemed strange considering the fire was still burning in some other areas and could pose a risk of reigniting any embers that may still be smoldering below.

There was an old electric fence running through the General Area of Origin.

Trees were observed to touch power lines both where the Unison crew were pruning and further up the power line toward Lot 8 above. (Ref CM Photos 15th Feb).



**Witness
Observations**

██████████ ██████████ ██████████ and the two Unison crews provided information of where the fire was first located. ██████████ took a photo to support the information provided by witnesses.

None of the witnesses were able to provide any information regarding what may have caused the fire.

The information provided did allow the investigation team to identify areas that were unburnt when the initial suppression action commenced.

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Part 6: Origin and Cause

Determination of the specific area and point of origin

Once the general area of origin had been identified a detailed scene examination was undertaken.

Craig Chambers and I moved through this area in conjunction and cross referenced observations and indicators observed.

The fire behaviour indicators were very clear and strong for the main head fire with the flanking fire also very apparent both from the clear change in the intensity and the fire behaviour indicators.

The backing fire again was clearly identifiable with its associated low intensity and incomplete combustion and consumption of fuel.

The high wind conditions experienced on the site made the main direction indicators and transitions very apparent and clear.

The specific area of origin was identified and again examined in finer detail now looking at micro indicators as well as the previously observed macro indicators.

This area was approx. 2 metres x 2metres square.

Within the specific area of origin the specific point of origin was able to be located. A fine brush and grid system was used to work through this area.

No evidence of an ignition source was found in the area examined.

Specific Point of Origin - GPS Co-Ordinates S 39 43.271' E176 55.865'

Directly above the identified point of origin were some overhead power lines.

During the field investigation it had been observed there were markings on the lines that looked like they had been clashing together and potentially arcing.

On 22 Feb Mr Ian Alaxander, Consulting Electrical Engineer was engaged to investigate the likelihood and potential for the powerlines to have caused the fire.

Elimination of Possible Causes

- **Discarded Cigarette Butt:-** The fire started 7 metres from the nearby farm track – too far to discard a cigarette. No people were observed using the track and no evidence of a discarded cigarette was found at the point of ignition. Humidity threshold 22% not present. **ELIMINATED**
- **Children playing with matches:-** No evidence of children playing in this area, the vegetation and access to where the fire started are not conducive to supporting this theory. **ELIMINATED**

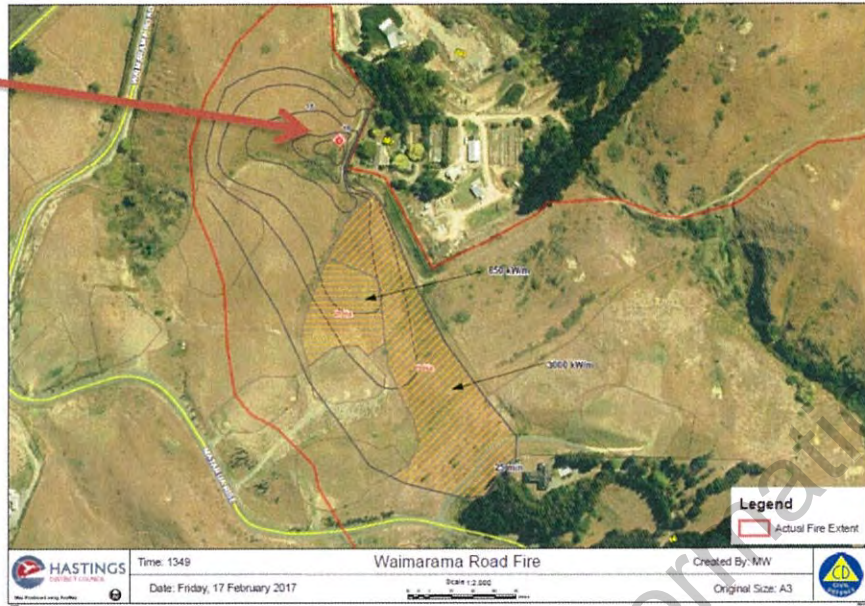
- **Electric fence arcing:-** There was no fence present at the ignition point. **ELIMINATED**
- **Glass or refraction:-** No evidence of bottle or glass present. **ELIMINATED**
- **Arson:-** No evidence present at ignition point, fire started away from track edge. **HIGHLY UNLIKELY**
- **Trees touching powerlines:-** Observed in at least two places very close to the fire start point. Fire Behaviour Indicators observed by the rural investigation team discounted the fire originating from either of these locations. **ELIMINATED**

Specific point of origin



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Map identifies the specific point of origin and the fire spread characteristics based on the field observations and fire behaviour indicators observed by the team.



GPS tracking of field investigation (general area of origin) track log on google maps



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Part 7: Electrical Investigation Findings

Mr Ian Alaxanders report concludes:

4. CONCLUSIONS

- 4.1 There is evidence of the d power line conductors clashing due to the high wind conditions in the span between poles 125760 and 155487.

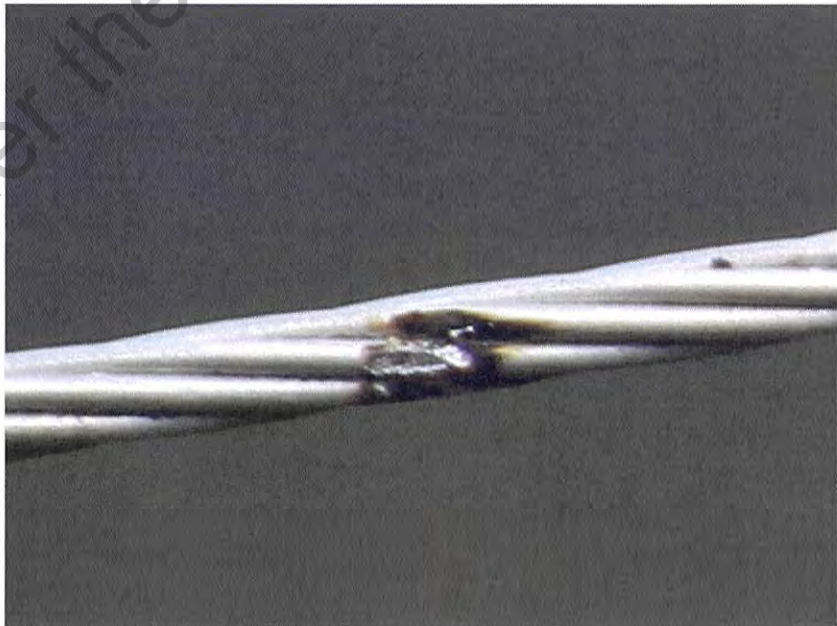
The arcing resulting from the conductors clashing has produced aluminium particles that were burning, or sufficiently hot, to set fire to the vegetative material below.

It is my finding based on the evidence obtained from the site, combined with the Research material tabled, that the aluminium particles produced from the conductor clashes would have fallen and reached the ground being sufficiently hot to ignite a fire if they fell onto a cured fuel bed (as they did in the Research material tabled).

- 4.2 If Unison had fitted spacers at intervals along the power line span (between poles 125760 and 155487) to maintain the separation of the conductors, the probability of the power line conductors clashing (and arcing) would be negligible.

- 4.3 It is possible that on the morning that the fire occurred the overhead conductors may have made contact with the four trees designated A to D under the overhead line. However, due to the thin nature of the affected branches, these momentary contacts are extremely unlikely to have set fire to the branch material, and therefore this mechanism is not considered a plausible fire cause.

Example of the arching observed on the powerlines from the adjacent bank.



Conclusions:

- Fire Weather conditions were severe with high winds, high temperature and low humidity.
- The fine ignition fuels were extremely dry and highly susceptible to ignition.
- A ignition point was identified from the rural fire field investigation
- A potential ignition source was identified as overhead powerlines and arcing marks could be seen on the conductors above the identified point of origin.
- An electrical engineer was engaged and can verify the potential for the lines overhead to have caused the fire.
- No other plausible causes could be identified
- **It is consequently my finding that this fire was caused by the Unison Power Lines clashing and arcing dropping super-heated material igniting the vegetation below.**

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Investigation Report Statement:

This is not an authorised copy unless signed.

This report has been completed under the guidelines, rules and practices outlined in the Wildfire Origin & Cause Determination Handbook April 2007 NZ edition

Chris Millson

Investigating Officer

Date: 6 June 2017



Received by



Principal Rural Fire Officer

Hastings District Council

Date: 12 June 2017,

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Reference Documentation:

- NZFS ICAD Report F2245215
- Photo Log and Photos – Craig Chambers
- C Millson Photo's
- C Millson Fire investigation and initial spread sketch
- [REDACTED] Photo's
- I J Alexander Consulting Electrical Engineers Report
- Incident Management Team Maps and Photos
- Weather data files: Bridge Pa, Tukituki.
- Hastings District Council reference mapping.
- National Rural Fire Authority Investigation best practice guide
- National Rural Fire Authority Fire Behaviour Documentation

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