CORONERS COURT
OF NEW SOUTH WALES

Inquest:	Inquests into the deaths of Robin MacDonald, Colin Webb and Brian Wilson
Hearing dates:	28-31 August 2017
Date of findings:	29 September 2017
Place of findings:	State Coroner's Court, Glebe
Findings of:	**Deputy State Coroner, Magistrate Teresa O'Sullivan**
Catchwords:	CORONIAL LAW – Cause and manner of death Drowning Flood Flood plans
File numbers:	2015/120808; 2015/120752; 2015/120931
Representation:	Mr Mark Cahill, Counsel Assisting, instructed by Ms Johanna Geddes on behalf of the Crown Solicitor Ms Kristina Stern SC and Ms Kirsten Edwards for NSW State Emergency Service (SES) Dr Peggy Dwyer for the Bureau of Meteorology (BoM) Mr Simon Hunt for the Dungog Shire Council Mr Paul Madden for Mr Matthew Too Mr David Jordan for Mr Clayton Shean

Findings in relation to Robin MacDonald:	**Identity of deceased**: The deceased person was Robin MacDonald **Date of death**: Ms MacDonald died on 21 April 2015 **Place of death**: Ms MacDonald died at 44 Hooke Street, Dungog, NSW **Cause of death:** Presumed freshwater drowning **Manner:** Ms MacDonald became trapped in the front bedroom at 44 Hooke Street, Dungog, by rapidly rising floodwaters and, as a consequence, Ms MacDonald drowned
Findings in relation to Colin Webb:	**Identity of deceased:** The deceased person was Colin Webb **Date of death:** Mr Webb died on 21 April 2015 **Place of death:** Mr Webb died at Alison Court, Unit 18, 27 Brown Street, Dungog, NSW **Cause of death:** Presumed freshwater drowning **Manner:** Mr Webb drowned when he became trapped in rapidly rising floodwaters, on the patio at the front of Alison Court, Unit 18, 27 Brown Street, Dungog, NSW
Findings in relation to Brian Wilson:	**Identity of deceased:** The deceased person was Brian Wilson **Date of death:** Mr Wilson died on 21 April 2015 **Place of death:** Mr Wilson died at Unit 1, 30 Brown Street, Dungog, NSW **Cause of death:** Presumed freshwater drowning **Manner:** Mr Wilson drowned when he became trapped in rapidly rising floodwaters on the verandah at the front of Unit 1, 30 Brown Street, Dungog, NSW

Recommendations:	**To the Minister for Emergency Services NSW, Minister for Environment and Energy (Cth), and the General Manager of Dungog Shire Council** That the NSW State Emergency Service, the Bureau of Meteorology and the Dungog Shire Council work together to convene a technical advisory group involving representatives from each organisation, and liaise with any officer of the Office of Environment and Heritage, and any consulting engineer(s) and local flood expert(s) engaged from time to time, to look at solutions for warning and responding to flood and flash flood events in Dungog (including the Myall Creek catchment): (i) On an interim basis while an automated flood warning system is developed; and (ii) On a long term basis, to consider developing an automated flood warning system designed to use a combination of rainfall and riverine water levels relevant to flood in the Myall Creek and its tributaries. **To the Minister for Emergency Services NSW** That further consideration be given to providing the NSW State Emergency Service with access to an out-posted meteorologist from the Bureau of Meteorology for ongoing planning and consultation, on a part-time basis, as well as assistance during weather events.

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The Coroners Act 2009 (NSW) *in s. 81(1) requires that when an inquest is held, the coroner must record in writing his or her findings as to various aspects of the death.*

These are the findings of inquests into the deaths of Robin MacDonald, Colin Webb and Brian Wilson.

Introduction:

1. This hearing consists of three inquests concerning the deaths of Robin MacDonald, Colin Webb and Brian Wilson.

2. In the early hours of 21 April 2015, between about 5.00am and about 7.00am, a major tragedy in the history of the State of New South Wales was unfolding in the township of Dungog.

3. This was an event that had a devastating impact on the entire township of Dungog; a devastating physical impact and an even more devastating impact on the human fabric, the community of Dungog.

4. The tragedy which unfolded in the early hours of 21 April 2015 in the township of Dungog involved unprecedented levels of flooding across the whole of the township.

5. In the days leading up to 21 April 2015 an east coast low formed off the NSW Coast.

6. Overnight between 20 April and 21 April 2015, the township of Dungog was affected by severe weather conditions and in particular, heavy rain.

7. Between 5:00am and 7:00am on 21 April 2015 Dungog experienced a sudden, apparently unprecedented flood event during which Ms MacDonald, Mr Webb and Mr Wilson lost their lives; numerous persons were displaced; 46 premises were damaged by inundation; four (4) houses were washed away in the flood waters; and six (6) businesses were also inundated.

8. This extraordinary weather event was matched by the extraordinary conduct of the residents of Dungog; in many cases their conduct was nothing short of heroic.

9. In preparing these findings I have been greatly assisted by the extremely thorough submissions of Counsel Assisting, Mr Mark Cahill.

The Evidence:

Dungog Shire:

10. Dungog Shire is a Local Government Area located in the Hunter Region of New South Wales. It is bounded by Great Lakes Shire to the East; Singleton Shire to the West, Scone Shire to the North and Port Stephens Shire and the City of Maitland to the South.

11. The Dungog Shire covers approximately 2,251 km^2.

12. The area is adjacent to Barrington Tops and consists predominantly of very rugged to hilly country which becomes less rugged from north to south. The area also incorporates: the Paterson River and the Allyn River to the west; and the Williams River to the east; together with rural land, consisting principally of farming and grazing land, and the towns and villages of Dungog, Clarence Town, Gresford, East Gresford, Vacy, Martins Creek, Hilldale and Paterson.

13. For emergency management purposes, the Dungog Local Government Area is located in the Hunter Central Coast Emergency Management District and falls within the Hunter State Emergency Service Regional command.

14. At the time of the 2011 Census the Shire of Dungog had a population of 8,500 people. The township of Dungog had a population of 2,131 people.

Structure of the NSW State Emergency Service as at 20 April 2015

15. The State Emergency Service (SES) is established pursuant to s.7 of the *State Emergency Service Act* 1989 (NSW).

16. Pursuant to s. 8(1)(a) the SES is the designated combat agency for controlling floods and to coordinate the rescue, evacuation and welfare of affected communities. In this role, SES responsibilities include:

    - to protect persons from danger to their safety and health; and
    - to protect property from destruction or damage, arising from floods, storms and tsunamis.

17. Relevantly, the SES is divided into 229 local Units and 17 regions based on the major NSW river systems.

18. Each region has a Region Controller who is responsible for the operation of management and coordination of emergency, flood and storm response, including planning, training and operational support within an SES Region.

19. The Shire of Dungog falls within the SES Hunter Region and the SES regional headquarters are located in Metford.

20. SES Hunter Region has oversight over 15 units: Aberdeen; Cessnock City; City of Newcastle; Cooranbong; Denman; Dungog; Lake Macquarie City; Maitland; Merriwa; Murrurundi; Muswellbrook; Port Stephens; Scone; Singleton and Tomaree.

21. As at 20 April 2015, as the designated combat agency for flood and storm, the Dungog SES Unit was responsible for flood and storm preparedness and response throughout the Dungog Shire.

22. As at 20 April 2015, the Dungog SES Unit was responsible for monitoring for, and responding to, floods associated with both the Paterson River and the Williams River; including responsibility for the provision of evacuation services and, where necessary, flood rescue services throughout the Dungog Shire, including, in particular, the population centres of:
    - Dungog and Clarence Town on the Williams River;
    - Gresford and Paterson on the Paterson River;
    - East Gresford on the Allyn River; and
    - Vacy on the confluence of the Allyn River and the Paterson River.

23. The Dungog SES Unit was responsible, also, for monitoring the impact of flooding on roads and bridges throughout the Dungog Shire; and the opening and closing of roads and bridges affected by floodwaters.

SES Incident Management Systems as a 20 April 2015

24. As at 20 April 2015 the SES had adopted the Australasian Inter-Service Incident Management System (AIIMS) as its incident management system for the management of all incidents, including flood response and storm response.

25. At this time it was usual practice for flood preparation and incident management, including flood and storm response, to be carried out at an SES unit level unless specific orders were issued elevating response and coordination to a regional or state level.[1]

SES Unit Dungog – Combat Preparedness – 20 April 2015

26. The Dungog Local Unit headquarters on Clarence Town Road, Dungog consisted of a single storey building with a three garage area. The Unit

[1] NSW State Flood Sub Plan 2009 at paragraph 6.1.1 f

had two 4WD vehicles, two trailers with storm/flood equipment and one flood boat housed within the garage area.

27. As at 20 April 2015 the Dungog SES Unit consisted of eight members, and six were ultimately available:

    i. Matthew Too – SES Local Controller and Unit Controller;
    ii. Clayton Shean – SES Deputy Local Controller and Deputy Unit Controller;
    iii. Ron Studdert – Unit Member;
    iv. Andrew Studdert – Unit Member;
    v. Charlie Shean – Unit Member;
    vi. Kathleen Shean – Unit Member/Administration;
    vii. Dawn Studdert- on sick leave and unable to attend; and
    viii. Michael Wilson- unavailable due to attendance to duties with the Dungog Rural Fire Service.

28. Kathleen Shean provided administrative support and was not available to conduct flood response duties in the field.

29. Matthew Too had been appointed, by the SES Commissioner, as Dungog SES Local Controller in late January/early February 2015. At that time the SES did not have in place a Local or Unit Controller Course available to members, state wide.

30. As at 20 April 2015 Matthew Too had approximately 3.5 years' experience as an SES member and had been the Dungog Local Controller and the Dungog Unit Controller for approximately 3 months.

31. As at 20 April 2015 Matthew Too had not received:
    i. a formal handover briefing;
    ii. training in the role of Local Controller and/or the Unit Controller;
    iii. training in relation to the Dungog Shire Local Flood Plan 2011;
    iv. any specific training in the Dungog SES Unit Flood Acti-Cards regarding responses to flooding in the Paterson and Williams Rivers; or
    v. any AIIMS training, including training to perform the AIIMS Incident Management Role of "Incident Controller".

32. As at 20 April 2015 the SES did not offer:
    i. a system for conducting a handover briefing for in-coming and out-going Local Controllers and/or Unit Controllers; or
    ii. routine provision of AIIMS training, in particular for the role of the AIIMS Incident Management Role of "Incident Controller".

33. As at 20 April 2015, Clayton Shean was the Dungog SES Deputy Local Controller. Clayton Shean joined the Dungog SES Unit in or about 2009. He had acted as Local Controller from about mid-2014, due to Dawn Studdert's ill health. He was appointed as Deputy Controller in late January/early February 2015.

34. A Deputy Local Controller or Deputy Unit Controller may be appointed pursuant to s.17C of the *State Emergency Service Act 1989* by the SES Region Controller in consultation with a Local Controller. The appointment is at the discretion of the SES Region Controller.

35. A Deputy Local Controller or Deputy Unit Controller is authorised by s.17C(4) to exercise the functions of a Local Controller during any absence of a Local Controller or Unit Controller.

36. When Clayton Shean was appointed to the role of Deputy Local Controller, the SES did not have in place a Deputy Local Controller or Deputy Unit Controller course available to members, state wide.

37. As at 20 April 2015 Clayton Shean had not been provided with training as the SES Dungog Deputy Local Controller and/or Deputy Unit Controller; or with AIIMS training, including training in relation to the performance of the AIIMS Incident Management Role of "Incident Controller".

The Dungog Shire Local Flood Plan 2011

38. In June 2009 the Williams River Flood Study was published by BMT WBM Pty Ltd. It had been prepared for the Port Stephens and Dungog Councils.

39. The Williams River Flood Study 2009 states that:

> "The model is aimed at representing long duration flood events dominated by Williams River flows and subsequent back-up in tributaries and not the finer scale flood behaviour and deeper flood gradients but small tributary inflows".[2]

40. The Dungog Shire Local Flood Plan 2011 was developed in response to the 2009 Williams River Flood Study. It was issued in May 2011 pursuant to the *State Emergency and Rescue Management Act 1989* (NSW) and the *State Emergency Service Act 1989* (NSW). It was also accepted by the Hunter SES Region Controller and the Dungog Local Emergency Management Committee (LEMC).

41. The Dungog Shire Local Flood Plan 2011 covers the Dungog Shire Council Local Government area and includes the town of Dungog and the villages of Gresford, Paterson, Vacy, Martins Creek, Clarence Town and Hilldale.

42. The Dungog Shire Local Flood Plan 2011 provides that:

- The SES is the primary combat agency to manage responses to flood or storm activity in the area;

[2] BMT WBM Pty Ltd, Williams River Flood Study 2009: Vol 4 Tab 120

- the SES is to maintain Local Headquarters at Clarence Town Road, Dungog; and
- the SES is to attend to "preparedness" for flooding as detailed in the NSW State Flood Plan and the Dungog Shire Local Flood Plan 2011.

43. As at 20 April 2015, no flood modelling had been undertaken in relation to the Myall Creek and the local catchments for the township of Dungog.

44. In relation to heavy rainfall over the township of Dungog and the Myall Creek catchment causing local flooding, the Dungog Shire Local Flood Plan 2011 provided:

> "Under these circumstances approximately nine houses, two businesses and four aged care units in Hooke, Dowling and Brown Streets Dungog may require evacuation. Flooding in these areas may be made worse by high flows on the Williams River which restrict the discharge of Myall Creek. Evacuations from these areas during Williams River flooding may be required when peaks of approximately 7.0 metres or greater are predicted on the Dungog gauge."

45. As at 20 April 2015, the Williams River was monitored by automated river height telemetry gauges upstream of the township of Dungog at Glen Martin (Mill Dam Falls gauge 210010) and at the Dungog gauge (210903). The NSW Office of Water (NOW) collected data relating to river heights and shared that data with the Bureau of Meteorology (the BoM).

46. In evidence, Mr Perkins (National Manager of Flood Forecasting and Warning, BoM) stated that NOW operates the river height gauges for purposes unrelated to the provision of flood warnings. The gauges are remotely monitored, providing data to NOW. The river height gauges take readings every 15 minutes and data is aggregated and transmitted, electronically, to NOW every hour. The BoM then obtains access to the river height data via NOW for the purposes of flood forecasting and the provision of flood watches and flood warnings. As a consequence, on Mr Perkin's evidence, there is a delay in the BoM obtaining access to the river height data. That delay may be between about one hour to one and half hours.

47. Mr Perkins also stated in evidence that the BoM owns, operates and remotely monitors rain gauges, such as the rain gauge at Upper Myall Creek and the Dungog Post Office. The BoM's rain gauges provide rainfall data to the BoM on a near real time basis.

48. The BoM provided flood warning services, incorporating height-time predictions, in relation to the Williams River.

49. The Myall Creek joins the Williams River downstream of the town of Dungog; with the confluence with the Williams River lying to the east of Dungog.

50. The Myall Creek has a number of minor tributaries which also pass through the township of Dungog.

51. As at 20 April 2015 there was no gauge in the Myall Creek and the flood levels in Myall Creek and its tributaries were not monitored by the BoM. The BoM did not provide flood warning services in relation to the Myall Creek and its tributaries.

52. As at 20 April 2015 rainfall was monitored by gauges at the Dungog Post Office (61017) and the Upper Myall Creek (61415). Each of these continuous rainfall gauges falls within the catchment of the Myall Creek..[3]

53. In relation to preparation for and the conduct of flood evacuations within the township of Dungog, the Dungog Shire Local Flood Plan 2011 stated:

> "On the receipt of flood warnings predicting peak heights of 7.0 metres and above at the Dungog gauge; the Dungog SES Local Controller will consult as necessary to determine the level of the threat and the need to consider evacuations…"

54. As at 20 April 2015, the SES had in place a "Flood Intelligence Card" dated 21 October 2008 for the automated river height telemetry gauge on the Williams River at Dungog ("the Dungog gauge").

55. The SES also had a "Flood Action Card" that provided a simplified tactical guide for an Incident Controller or planner to prepare for and respond to a forecast of imminent flooding. The relevant Flood Action Card, associated with flood intelligence specific to the Dungog gauge, identified minor flooding at 4.9 metres, moderate flooding at 7.60 metres and major flooding at 8.50 metres.

56. The Flood Action card noted that:

> "The majority of the flood effects in the town of Dungog are the result of localised flooding along Myall Creek. This can flood areas of Dungog independent of riverine flooding. However, observations indicate that the discharge from the Myall Creek and other local watercourses is restricted when the Williams River reaches about 6.0 on the gauge. This can exacerbate local flooding in and around town."

57. At 4.9 metres on the Dungog gauge, the Flood Action Card identified the following actions:

[3] BMT WBM Pty Ltd, Post Event Flood Behaviour Analysis and Review of Flood Intelligence, Dungog Township Myall Creek Catchment and Tributaries Report", 2015: Vol 5 tab 124 pages 12-13.

- Monitor Windeyer Street, Dungog. River rises occur behind houses in this location.
- Ensure Ferndale Park and Williams River Caravan Park have moved campers to higher ground
- Notify Sheltons Bus Company to move buses to higher ground.

58. At 6.00 metres on the Dungog gauge, the Flood Action Card identified the following actions:

"Monitor the creek from this height with particular attention on the Reliance Motor Company Garage, the Sheltons Bus Service and the houses at 55, 57 and 59 Hooke Street as well as the houses at 294, 296, 298 and 230 Dowling Street. Sandbag as required."

59. At 7.40 metres on the Dungog gauge, the Flood Action Card noted that in a previous event, at a peak height of 7.40 metres, a list of properties were evacuated, being four in Dowling Street, four in Hooke Street, one in Brown Street, four units in the Alison Court retirement village and one residential property in Duke Street, Clarence Town. The Flood Action Card did not provide for an evacuation order to issue at 7.40 metres on the Dungog gauge.

60. At 8.51 metres on the Dungog gauge, the Action Card noted that:

> "If this height is predicted to be reached or exceeded, the three houses at 55, 57 and 59 Hooke Street may need to be evacuated before this height is reached. 3 homes in Dowling Street may also require evacuation before this height is reached. The first home affected would be number 300, then 298 then 296 Dowling Street."

61. As the Dungog gauge is upstream of the confluence of the Myall Creek and the Williams River, the readings on that gauge provide guidance as to the effect of river height on the Myall Creek. However, the readings at the Dungog gauge are not readings of the water levels in the Myall Creek or its tributaries, including Commons Creek.

62. The 2009 Williams River Flood Study provides information regarding flood risk to Dungog that is principally based upon riverine flood risk associated with the Williams River; the Williams River flood plain; and the indirect effects on the township via back up of the Myall Creek causing localised flooding primarily in the vicinity of Hooke Street and the lower end of Dowling Street.

63. However, the Williams River Flood Study 2009 did not model the overland flow paths within Dungog, tributaries of Myall Creek or their hydraulic interaction with Myall Creek.

The East Coast Low – April 2015

64. On 17 April 2015 the SES received notification from the BoM that a weather system was developing which would affect the Hunter forecast district and southern areas of the North Coast forecast district in the period commencing Sunday 19 April through to about Wednesday 22 April 2015.

65. At 2:30pm on 17 April 2015 the SES issued Briefing Note 159/1415 in relation to "Weather Outlook from Friday 17/04/2015". In summary it stated that:

- The development of a low pressure system was predicted off the NSW coast between the Hunter and southern parts of the North Coast forecast districts.
- The low pressure system was predicted to develop on Monday 20 April 2015 with widespread rain along the coastal fringe of 25-50mm and to persist from the Hunter to the southern areas of the North Coast forecast districts on Tuesday 21 April 2015 with modelling suggesting 25-50mm of rain which could increase to 80-100mm in some areas.
- The BoM was monitoring the need for warning products and it was anticipated that if required they would be released either on Sunday 19 April 2015 or Monday 20 April 2015.

66. At 2pm on Saturday 18 April 2015 the SES Hunter Region issued Briefing Note 160/1415 as an update to Briefing Note 159/1415. In summary it stated that:

- A low pressure system was predicted to form off the Mid North Coast and that the low pressure was likely to deepen and remain slow moving through Monday night/Tuesday with localised heavy rain periods, strong to possibly gale-force winds along the coast and an increasing swell.
- The BoM was predicting widespread rainfall of up to 50mm with localised falls of 100mm possible around the coastal parts of the Hunter and the Mid North Coast.
- Rainfall was predicted to continue, with widespread rainfall of up to 50mm and localised falls of 100+mm possible on Tuesday 21 April 2015.
- A Flood Watch was likely to be issued early Monday, with a risk of flooding on Tuesday 21 April 2015.

67. A Flood Watch issued by the BoM provides advice of potential riverine flooding. It is issued when the combination of forecast rainfall and catchment or other hydrological conditions indicate that there is the potential for flooding. Flood watches are issued up to 24-36 hours in

advance of likely flooding and will include an estimate of the magnitude in terms of recognised flood classifications.

68. At 1.00pm on 19 April 2015 the SES Hunter Region issued Briefing Note 162/1415 as an update Briefing Note 160/1415, in relation to the Weather Outlook from Monday 20 April 2015 to Wednesday 22 April. It stated that:

> "On Monday a low pressure system is expected to form off the Mid North Coast, and is likely to deepen and remain slow moving through Monday night/Tuesday with localised heavy rain periods, strong to possible gale-force winds along the coast and an increasing swell. The low is expected to start to move to the south east on Wednesday."

69. This briefing note also stated that:
- The BoM has advised that a Severe Weather Warning for damaging winds will be issued at approximately 16:00 hours today for the Illawarra, Sydney Metropolitan, Hunter and Mid North Coast (southern parts).
- An assessment will be made overnight/tomorrow regarding the timing for inclusion of heavy rainfall in the Severe Weather Warning.
- A Flood Watch is likely to be issued tomorrow for catchments around the border area of the Hunter and Mid North Coast forecast districts, with a risk of flooding occurring on Tuesday. The BoM hydrology section are planning to staff the Flood Desk overnight on Monday.

70. At 4:31am on 20 April 2015 the BoM issued a Severe Weather Warning for damaging winds for people in the Metropolitan, Hunter and Illawarra Forecast Districts in relation to damaging winds along the coastal fringe commencing later Monday 20 April 2015:

> "A strengthening high pressure ridge over the southern Tasman Sea combined with a developing low off the New South Wales coast is expected to produce gale-force south easterly winds along the central part of the coast later Monday. The low is likely to deepen and move towards the Hunter or the southern Mid North Coast during Tuesday with gale-force winds continuing and seas rising further.
>
> Damaging winds averaging 55 to 65km/h with gusts to about 100km/h are forecast to develop along the coastal fringe of the Metropolitan, Hunter (including the Central Coast) and Illawarra forecast districts Monday afternoon and evening. Dangerous surf conditions are also expected to develop later today, and localised heavy rain is possible.
>
> State Emergency Service advises people should:
> - Move vehicles under cover away from trees.
> - Secure or put away lose items around your house, yard and balcony.

- Keep clear of fallen power lines…"

71. At 9:01am on 20 April 2015 the BoM issued a Flood Watch that "A low pressure cell is expected to cause heavy rainfall … over the next two days." It also stated that there was a greater than 70% chance of flooding in the Paterson and Williams Rivers (lower Hunter Valley), with that flooding predicted as "moderate to major".

72. At about 11:00am on 20 April 2015 the BoM conducted a weather event briefing for the SES that was attended by the Hunter Region Controller, Amanda Williamson, and the Hunter Region Deputy Controller, Ken Speer. In summary the advice was that:

- the BoM was predicting approximately 300mm of rain over the ensuing 24 hours period with the prospect of "nuisance flooding"; and
- The BoM was predicting that the weather situation would not really develop until Tuesday 21 April 2015.

73. At 11:39am on 20 April 2015 the BoM issued a Severe Weather Warning for Damaging Winds and Heavy Rain along the Coastal Fringe later Monday continuing Tuesday. The warning stated:

> "Rainfall across all areas east of the range from about Wollongong to Taree will be widespread for Monday and Tuesday and as rainfall totals build up local flooding is possible. The heaviest rain for this event is likely to be over the Hunter Valley into the southern Mid North Coast".

74. At 1.00pm on 20 April 2015 the SES Hunter Region issued SES Briefing Note 163/1415 in relation to a 48 hours outlook concerning the onset of Severe Weather in NSW. This briefing note stated that:

- "A developing low off the NSW coast is expected to produce gale-force south easterly winds along the central part of the coast later Monday. The low is likely to deepen and move towards the Hunter or southern Mid North Coast during Tuesday with gale-force winds continuing and seas rising further".
- Current warnings included a Severe Weather Warning and a Flood Watch that included moderate to major flooding of the Paterson River and Williams River.

75. At 3:00pm on 20 April 2015 the SES issued Operation Update Number 1 that stated relevantly:

> "Severe Weather Warning and a Flood Watch are currently in place for storms affecting various parts of the State… Operations are being conducted at Unit Level, supported by Region and State Operations."

76. At 4:38pm on 20 April 2015 the BoM issued an updated Severe Weather Warning that predicted:

> "Rainfall across all areas east of the ranges from about Jervis Bay to Taree will be widespread for Monday and Tuesday and as rainfall totals build up local flooding is possible. The heaviest rain for the event is likely to be over the Hunter Valley into the southern Mid North Coast."

77. It was not until 11:51pm on 20 April 2015 that the BoM issued the first flood warning, as distinct from a flood watch. At this time the flood warning was a "Minor to Moderate Flood Warning for the Paterson and Williams Rivers in the Hunter Forecast District". The prediction for Dungog was a minor flood level (4.9 metres) around 11.00am Tuesday, with moderate flooding expected on Wednesday. The flood warning noted that at 10:45pm the height of the Williams River was 1.29 metres.

78. The BoM issued a further flood warning for the Paterson and Williams Rivers at 3:25am on 21 April 2015. At that time moderate to major flooding was expected on these rivers. The prediction for Dungog was to exceed the minor flood level (4.9 metres) around 8.00am that day and with forecast rain to reach 8.5 metres around midnight tonight causing major flooding.

21 April 2015 - Locating the events in time

79. There is a substantial variance between the observations of witnesses about the timing of the events which occurred in the early hours of the morning on 21 April 2015 and the times at which telephone calls, principally telephone calls to the Emergency Services, via 000, were recorded.

80. In making my findings about the timing of the events on the morning of 21 April 2015, I have relied upon the times of telephone calls, as recorded, electronically, in the records of the Emergency Services and, also, in records of various telephone services used to make relevant calls. The times of these calls on 21 April 2015, have provided an objective and accurate framework into which I have been able to place the evidence of the various witnesses.

81. In particular, based on all of the evidence, I am satisfied that the deaths of Ms MacDonald, Mr Webb and Mr Wilson each occurred in the period between about 6.30 am and 7.00 am on the morning of 21 April 2015.

Rain Event 20-21 April 2015

82. Associated with the slow moving, low intensity East Coast Low weather system that had formed on 20 April, the township of Dungog experienced an unprecedented rainfall event.

83. The threshold for the BoM to issue Severe Weather Warnings is "Heavy Rainfall". Continuous rainfall gauges at the Upper Myall Creek and the Dungog Post Office provide relevant rainfall data. As at 20 April 2015:

- the "Heavy Rainfall" threshold for Dungog Post Office gauge was 46.9mm/hour.

- the "Heavy Rainfall" threshold for the Upper Myall Creek gauge was of 43.7mm/hour.

84. In the 24 hours to 5:00am on 21 April, rainfall across the Myall Creek catchment was relatively consistent but it did not exceed the "Heavy Rainfall" threshold for the Dungog Post Office or the Upper Myall Creek gauges. Rain up to 5.00am nevertheless provided a "wetting up" period for the Myall Creek catchment which led to higher run-off during the period of maximum rainfall between 5:00am and 7:00am on 21 April 2015. This was a precondition that increased the risk of localised flash flooding in Dungog.

85. The BoM has recorded that in the 24 hours to 9:00am on 21 April 2015, the Dungog Post Office gauge recorded 312mm of rain. Significantly, in the two hour period from 5:00am to 7:00am 166.7mm of rain was measured at the Dungog Post Office, with 116.7mm of this measure occurring between about 5:00am and 6:00am.

86. According to Ann Farrell (Regional Director for NSW, BoM) data from the Dungog Post Office rain gauge reveals that rainfall between 5:00am to 7:00am exceeded the "Heavy Rainfall" threshold in all analysed durations from 3 minutes to 2 hours.

The Death of Ms Robin MacDonald

87. At 4:57am on 21 April 2015 Ms Robin MacDonald, resident at 44 Hooke Street, Dungog, called the Dungog SES for assistance in moving items in her home due to rising water.

88. At 5:01am Ms MacDonald's request for assistance was entered into the SES computerised task management database "beacon".

89. At 5:29:17am a call was made from the Dungog SES Unit landline to Ms MacDonald's mobile phone.

90. Between about 5:00am and 5:30am Dungog SES Unit members Mr Ron Studdert, Mr Andrew Studdert, and Mr Charlie Shean attended Ms MacDonald's home which is on the corner of Hooke and Lord Streets, Dungog. At that time the flood waters were described to be over the front fence on the Hooke Street frontage and rising slowly but not flowing.

91. The three SES officers spent about 10 to 15 minutes moving electrical items off the floor of Ms MacDonald's home. Ron Studdert says by the time he left Ms MacDonald's home the water had risen about "18 inches". He spoke to Ms MacDonald about leaving however she declined to leave. Ms MacDonald was advised to call the Dungog SES if she required further assistance.

92. At 6:58am an entry was made in the SES beacon database regarding a rescue at the neighbouring premises of 46 Hooke Street, Dungog.

93. At about 9:00am on 21 April 2015 police officer Senior Constable Hanna, Dungog Rural Fire Service officer Matthew Thompson and Fire and Rescue officer Renae Thompson entered Ms MacDonald's home. When they entered the flood waters were at about "thigh height" and the water was described as still. There were water markings within about "an inch and a half of the ceiling".

94. In the course of searching Ms MacDonald's home, a white dog was first found in the lounge room and taken out to be cared for by a neighbour. Then the body of Robyn MacDonald was located, face down in the flood waters, in the front room of the house.

95. In the course of the search the water level reportedly receded from about "thigh height" to about "knee height".

The Death of Mr Colin Webb

96. On 21 April 2015, Mr Allan Cherry, who was living Unit 17/27 Brown Street, Dungog, woke to the sound of his toilet gurgling. When he looked out the window in the direction of his car, he saw flood waters up to the bumper of his car. He got dressed in a matter of minutes and looked out the window again to see water above the bonnet of his car, having risen about 18 inches.

97. Mr Cherry left his unit walked Colin Webb's unit next door at Unit 18/27 Brown Street, Dungog. When Mr Cherry reached the front door he saw the flood waters 18 inches up the door. The front door to the premises was locked so Mr Cherry called to Mr Webb but there was no response. Mr Cherry left and walked out of the flood waters to higher ground. He attempted to call the SES but his calls were cut off.

98. At 6:31:33am on 21 April 2015 Mr Trevor Richardson, who also lived in the Alison Court units, called Triple 0 and his call was put through to the NSW Police call centre. The entry in ICEMS stated:

> "Alison Court Aged Care, Lot 7/236 Dowling St, Brown St, Dungog… Flooding water at AA. M Desc 57 (sic) – 80 old who lives at AA Inft can not find him and they are concerned he is still in his unit. Water level height 4m. Ambo declined."

99. At 6:38:46am on 21 April 2015 Mr Cherry called Triple 0 and his call was put through to the NSW Police call centre. While he was connected to Triple 0, Mr Cherry handed his mobile phone to another resident Ms Lynne Dickson. Mr Cherry re-entered the flood waters in an attempt to rescue Mr Webb, who was on the patio at the front of his home.

100. Before Mr Cherry could reach him, Mr Webb became submerged in the flood waters. Mr Cherry went under the water, recovered Mr Webb and swam with him to higher ground. After placing Mr Webb on the ground, Mr Cherry saw that Mr Webb's lips were blue, his eyes were closed and he gave no response.

101. At the time Mr Webb's body was recovered from the floodwaters, Ms Lynette Dickson was still on the phone to the NSW Police call centre. She reported his death during the call. The report in ICEMS states:

> "27 Brown Street, Dowling St, Dungog… Flood waters have almost reached the roof of the unit, everybody is outside now. M Cole (sic) Webb 70 old, not conscious not breathing."

102. In the course of the call, Ms Dickson also reported the possibility that persons were trapped in other units located lower down and on the other side of Brown Street, Dungog. As well towards the end of the call, which ended at 6:41:55am, she told the operator that the water was still rising within the Alison Court unit complex.

103. Mr Cherry estimates that the flood waters rose from being the level of his car bonnet to the gutters on Mr Webb's unit within about 20 minutes.

104. At 6:44am on 21 April 2015 Ms Joy Atchison called Triple 0 and her call was put through to the NSW Police Call Centre. The report in ICEMS stated:

> "Alison Court, 27 Brown Street, Dungog …
> [Private] Unit 12 of 27 Brown Street Dungog – Alison Court – Reports of bottom level of units flooded – persons in the water possibly not accounted for."

105. At 6:58am on 21 April 2015 the SES beacon database contains an entry in relation to a rescue at Alison Court Aged Care 7/236 Dowling Street, Dungog (cross street – Brown).

The Death of Mr Brian Wilson

106. At about 5.00am Mr Matthew Finney, then residing with his parents at 28 Brown Street, got up and got ready to go to work. At about 5:30am he began driving to work in Stratford. Approximately two kilometres out of Dungog, he saw a truck with an orange flashing light parked in the middle of the road. A man from the truck informed Mr Finney there was water over the road and he could not get through.

107. Mr Finney returned home. At 5.56am Mr Finney sent a text to his brother about the rain, including an observation that "[the] rain was as bad as I've ever seen, even in the Territory."

108. Mr Finney had been at home for about 15 minutes when his mother called out to him from the front verandah of 28 Brown Street. Mr Finney walked onto the verandah and saw water right across Brown Street and across the paddock to the bottom units of Alison Court. Mr Finney returned to the front of the home and saw that his motorcycle was standing in about "18 inches of water".

109. Mr Finney says he returned inside, put on his orange "high vis" and navy blue raincoat, grabbed his keys and walked out to his motorcycle and moved it to higher ground. He then saw that the flood waters "...had risen about a foot in the space of about 5 minutes or so".

110. The unit complex at 30 Brown Street, Dungog, comprised two buildings separated by a carport. The front building was single storey and contained one bedroom units, being units 1 to 4. The rear building was also single storey and contained two further one bedroom units, being units 5 and 6.

111. As at 21 April 2015, the resident of the 30 Brown Street units were:
    i. Mr Brian Wilson in Unit 1;
    ii. Mr Michael Winters in Unit 2;
    iii. Ms Barbara Kolb and Mr John Burt in Unit 3;
    iv. Ms Doreen Miners in Unit 4;
    v. Mr Steven Micevski in Unit 5; and
    vi. Ms Cheryl Wilkinson in Unit 6.

112. In a statement, Mr Micevski says he was in his unit when flood waters started coming under both the front and rear doors. He heard a woman calling for help and assumed it was his neighbour Cheryl Wilkinson. He walked onto his front verandah and called out to Ms Wilkinson. He heard no reply and waded through the flood waters towards the carport area of the premises. When Mr Micevksi reached the carport, he saw Ms Wilkinson by the rear fence of 30 Brown Street. He asked her whether she was alright then returned to the other units to check on the occupants.

113. When Mr Micevski arrived at the front building, being units 1 to 4 at 30 Brown Street, the building was under water by about “2 feet to a metre”. He checked on Ms Miners in unit 4, who was awake and aware of what was happening. He checked unit 2 and Mr Michael Winters came to the front of his unit. He checked unit 3 and Ms Kolb and Mr Burt came to the front of their unit, but they had some difficulty opening the front door of because of rising water.

114. At 06:30:14 Mr John Burt called triple 0 and spoke to the Fire and Rescue NSW call centre. In the course of the call Mr Burt stated:

- he was calling from 30 Brown Street, Dungog;
- 30 Brown Street is a group of “half a dozen flats”;
- everybody is at least half a metre underwater in their flats;
- the water outside the flats is at least a metre deeper – 2 metres deep outside the flats; and
- a number of people are concerned for their safety in terms of getting out.

115. Mr Micevski attempted to call 112, this being the emergency number for mobile telephones. After unsuccessful attempts to get through to Police, Mr Micevski requested Fire and Rescue NSW. Mr Micevski provided the address and sought assistance. By the time Mr Micevski had made the call, he was standing on the verandah of units 2 and 3 along with Mr Winters, Ms Kolb and Mr Burt, in about waist deep water.

116. Mr Micevski than swam to unit 1 to check on Mr Brian Wilson. He knocked on the door and heard Mr Wilson attempting to open the front door. Eventually Mr Wilson open the door and came onto his front verandah. As the flood waters were continuing to rise, Mr Micevski tried unsuccessfully to find something that Mr Wilson could stand on. He then helped Mr Wilson climb onto the base of the verandah railing so Mr Wilson had “a couple of extra inches”. Mr Micevksi told Mr Wilson to hang on to the top rail. As he left Mr Wilson the water was up to Mr Wilson’s chest.

117. Mr Micevski swam back to check on the other residents outside units 2 and 3. Mr Micevski assisted Mr Walters, Ms Kolb and Mr Burt onto the verandah railing outside units 2 and 3, then swam to unit 4 to check on Ms Miners.

118. At about this time, Mr Micevksi saw Mr Matthew Finney standing on the fence between 30 Brown Street and the neighbouring property. Mr Micevski told Mr Finney that the residents of 30 Brown Street required assistance. Mr Micevski said he would stay with Ms Miners and asked Mr Finney to help the other residents, Mr Wilson at unit 1 and Mr Walters, Ms Kolb and Mr Burt who were outside units 2 and 3.

119. A short time before, Mr Finney had heard a female yelling out “Help me, Help me. I need help.” He walked to the rear of 28 Brown Street and found Ms Cheryl Wilkinson (resident of unit 6, 30 Brown Street) by the

fence. Mr Finney estimates that the side fence was about 1.8 metres high and at that time the flood waters exceeded the height of the fence. Mr Finney climbed on top of the fence and while he was there noticed the water continuing to rise on his legs.

120. Mr Finney saw a wheelie bin in the flood waters and used the bin to recover Ms Wilkinson from the flood waters.

Mr Finney locates Mr Brian Wilson's body

121. Subsequently, Mr Finney heard Mr Steven Micevski calling for assistance. After speaking with Mr Micevski and ascertaining that the remaining unit complex residents were trapped in the flood waters, Mr Finney returned to his parents' home at 28 Brown Street and asked his mother to ring triple 0.

122. At 06:31:45 Mrs Finney called triple 0 and requested Fire and Rescue NSW. Before the call could be put through the call dropped out. The operator reported that the caller said a woman was trapped in flood waters on neighbouring premises.

123. At 06:34:36 Mrs Finney rang triple 0 again and her call was put through to the Fire and Rescue NSW call centre. Mrs Finney reported that a woman was trapped by flood waters in neighbouring premises at 30 Brown Street, Dungog. The call is identified as a repeat call because Mr Burt's call had already been received, logged and allocated. The Operator informed Mrs Finney that Fire and Rescue were on their way.

124. Mr Finney re-entered the flood waters, recovered another empty wheelie bin and swam to the neighbouring unit complex. As he swam Mr Finney noticed that the water appeared to flowing slowly down Brown Street but the flow of the water was not strong enough to hinder his swimming. He swam to the verandah of unit 1 and could not see anyone. Mr Finney felt around in the water over the front verandah and found the body of Mr Brian Wilson. When Mr Finney raised Mr Wilson's head to the surface of the water, Mr Finney saw that Mr Wilson's eyes were open and there were no signs of life.

125. Mr Finney was aware of a number of elderly residents still in the flood waters who needed assistance. As a consequence, Mr Finney released his hold on Mr Wilson's body and Mr Wilson's body disappeared back under the water over the front verandah of unit 1.

126. Mr Finney used the wheelie bin to assist Ms Miners, Ms Kolb, Mr Winters and Mr Micevski to safety. Each rescue involved Mr Finney swimming back to the unit complex at 30 Brown Street and then, with the assistance

of the wheelie bin, swimming each of Ms Miners, Ms Kolb, Mr Winters and Mr Micevski to higher ground on Brown Street.

127. Between about 8.00amand about 9.00am on 21 April 2015, Mr Wilson's body was located face down in receding flood waters on the front verandah of his home.

Intensity of storm at Dungog between 5:00-7:00am on 21 April 2015

128. What occurred between about 05:00hours and 07:00hours on 21 April 2015 was an entirely unpredicted, localised weather anomaly involving an extreme rain event centred over the southern part of the Myall Creek Catchment, including the township of Dungog.

129. On the evidence, it is highly likely that the flooding which occurred in Dungog on the morning of 21 April 2015 reached levels equal to and possibly greater than a flood event in Dungog with an Annual Exceedance Probability (AEP) of 0.1% or Annual Recurrence Index (ARI) of 1 in 1000 years.

130. By comparison, the previous peak flood within the town, associated with the Pasha Bulka event in 2007, had an Average Recurrence Incidence (ARI) of 1 in 20 years.[4]

131. The measure of rainfall recorded at the Dungog Post Office of 166.7mm between 5:00am and 7:00am was nearly twice the 1% Annual Exceedance Probability (AEP) or a once in 100 year Average Recurrence Interval (ARI).

132. As noted previously, evacuation triggers in the 2011 Dungog Shire Local Flood Plan were based on Williams River levels. The plan provided for evacuation where possible "before inundation occurs"; and stated that evacuation may be required from certain low lying properties on Hooke, Dowling and Brown Streets when peaks of approximately 7.0 metres or greater were predicted on the Dungog gauge.

133. On 21 April 2015 the Williams River height (according to the Dungog gauge) at 5.00am was 5.57 metres, at 6.00am was 6.93 metres (this being just below the trigger to consider evacuation); and at 7.00am the Williams River height (according to the Dungog gauge) was 8.0 metres, when flood waters in the town were reported to be receding.

134. On 21 April 2015 (according to the Dungog gauge) the Williams River peaked at 10.30am at a height of 8.68 metres. (A Williams River peak of 8.68 metres corresponds to an Annual Exceedance Probability (AEP) of 20% or an Average Recurrence Interval (ARI) of once in 5 years. The

[4] Royal Haskoning DHV report: Vol 4 Tab 121B at page 26.

peak on the Williams River was of significantly less magnitude than the peak levels of localised flooding and flooding from the Myall Creek experienced within the township of Dungog.)

135. Hence, the Williams River reached its flood peak after the flash flood event that resulted in the deaths of Ms MacDonald, Mr Webb and Mr Wilson.

Flash Flooding

136. For the purposes of the State Flood Sub Plan, the definition of "flash flooding" is "flooding which is sudden and often unexpected because it is caused by sudden local or nearby heavy rainfall. It is sometimes defined as flooding which occurs within six hours of the rain that causes it."

137. On 20-21 April 2015 in Dungog, the pre-conditions for localised flash flooding were met:

- Heavy consistent rainfall causing pre-wetting; and
- An extreme rainfall event.

138. Witness statements indicate that the intense rainfall leading up to the flood event involved unprecedented levels of water runoff including heavy runoff on roadways, playing fields and "walls of water" feet deep. Also consistent with a flash flood, witnesses describe rapid increases in water depth, for example water rising at the rate of a foot per minute.

139. As at 20 April 2015 there are a number of things to note:
    i. The Myall Creek Catchment was not defined as a "flash flood catchment" for the purposes of the NSW State Flood Sub Plan 2009;
    ii. The NSW State Flood Plan did not require the BoM to provide a flash flood warning service for the Myall Creek catchment;
    iii. The Dungog Shire Local Flood Plan 2011 did not contain information or planning for flash flooding;
    iv. The Dungog Shire Local Flood Plan 2011 did not provide for a local flash flood alert and/or warning system; and
    v. The SES did not have a policy on evacuation in flash floods.

Recognition of Flood Risk from the Williams River and Myall Creek

140. At the time of the 21 April 2015 flood, flood planning for Dungog was centred on risks associated with flooding of the Williams and Paterson Rivers, albeit the 2011 Dungog Shire Local Flood Plan referred to

possible flooding from the Williams River and from the Myall Creek; or a combination of both.

141. In evidence before me were a number of very instructive flood studies and reports, including the:

1. 2009 Williams River Flood Study published by BMT WBM (previously discussed);
2. 2015 Post Event Flood Behaviour Analysis and Review of Flood Intelligence, Dungog Township Myall Creek Catchment and Tributaries Report" published by BMT WBM;
3. Independent Review of the NSW State Emergency Service Operational Response East Coast Low & Flooding Dungog Local Government Area, April 2015, being a report commissioned by the SES and authored by David Owens;
4. Two 2017 reports by Royal Haskoning DHV ("the Royal Haskoning Reports") that had been commissioned by the Dungog Shire Council and the NSW Office and Environment and Heritage:
    i. "Dungog Flood Study" dated 14 February 2017; and
    ii. "Dungog Floodplain Risk Management Study & Plan" dated 14 June 2017

142. I also had the benefit of oral evidence from an author of the Royal Haskoning Reports, Rohan Hudson.

143. In light of the 20-21 April 2015 flood in Dungog and relevant flood reports, it is now known that Dungog is at risk of flooding from the Williams River, the Myall Creek and from Dungog local township catchments. The mechanism for flooding from the Myall Creek is either from extreme flows in the Myall Creek or from a combination of high flows in the Myall Creek and backwater effects from high flows in the Williams River, that is, flows in excess of 6 metres at the Dungog gauge.

144. The Myall Creek Flood Mechanism is defined as follows:

- Myall Creek drains 74.5 km2 of catchment upstream, this being to the north of the township.
- Myall Creek flows to the north of the town before passing under the Bennett Bridge and the Myall Creek Rail Bridge and then discharges into the Williams River east of the township.
- The critical duration of the Myall Creek Catchment is 9 hours.

145. Further, from flood modelling it has been determined that Myall Creek flooding is exacerbated by afflux, that is increased water levels upstream of a structure due to floodplain constriction. For example the Myall Creek Rail Bridge and the Bennett Bridge, together with its associated crash barrier, caused significant constriction of the floodplain. The resulting afflux caused the formation of a significant backwater influence in the

lower areas of Dungog. The influence extends upstream of Bennett Bridge to about McKay Street.

146. This flood intelligence is able to inform flood planning for Dungog going forward.

Was the nature and intensity of the Dungog flood predictable?

147. An issue considered at inquest was whether the nature and intensity of the flood at Dungog on 20-21 April 2015 was predictable.

148. It is clear that an east coast low forming off the Newcastle/Central Coast was predicted and notice was given.

149. However, I am satisfied on all of the evidence, and in particular the oral evidence of Ms Ann Farrell from the BoM, that the extent of rain over the township of Dungog and the catchment of the Myall Creek, and the resultant flooding, was an unpredictable and unpredicted weather anomaly.

150. Ms Farrell gave evidence that the rainfall which fell over the township of Dungog and in the Myall Creek catchment in the 24 hours to 5.00am on 21 April 2015, whilst heavy at times, was unremarkable. On Ms Farrell's evidence the rainfall in the 24 hours to 5.00am "wetted" up the township and the Myall Creek catchment establishing the pre-conditions for increased water run-off and increased inflow into the Myall Creek and its tributaries in and around the township.

151. However, on Ms Farrell's evidence, there was nothing about the rainfall or the behaviour of the weather system in the 24 hours up to 5.00am that provided any basis on which to predict the weather anomaly that developed over the township of Dungog and the southern portion of the Myall Creek catchment at or shortly after 5.00am on the 21st.

152. Ms Farrell also confirmed in her evidence that the "weather radar" for the Hunter Region provided no basis on which to predict the formation of the anomaly.

Actions of the Dungog SES Local Controller and Deputy Local Controller

153. Another issue that was considered at inquest was the actions taken by the Dungog Local Controller and Deputy Local Controller in relation to the 20-21 April 2015 flood in Dungog.

154. Between about 9.00pm and 11.00pm on Monday 20 April 2015 the SES Dungog Unit met for training. Matthew Too, the Local Controller, provided an "operational briefing" to members of the Unit based on information received from the Region Commander. This included that the weather

event was predicted to develop slowly, that rain of about 150mm was expected over the next 24 hours and that flooding was expected to be slow. Crew members were directed to put kit bags in the Unit 4WDs and to make sure the Flood Boat was fuelled and "ready to go if required".

155. Overnight Mr Too gave the Deputy Local Controller, Clayton Shean, command. Mr Too first returned to SES duty the following morning at about 5.30am.

156. Dungog SES officers gave no evacuation warnings and issued no evacuation orders in relation to the 20-21 April 2015 flood.

157. The evidence of Ms Farrell (BoM) establishes that the peak rainfall over Dungog occurred between about 5:00am and 6:16am on 21 April 2015.

158. Further, having regard to all of the evidence, the significant flood effects which occurred on the morning of 21 April 2015, all occurred, effectively without warning, in the period between about 6:16am and about 7.00 am that morning.

159. In the circumstances, on all of the evidence, there is no basis to conclude that either Mr Too or Mr Shean should have given an evacuation warning or issued an evacuation order any time before about 6.16am on 21 April 2015.

160. In the absence of an early flood warning system and well established evacuation procedures and routes, I am satisfied there is no basis on which to conclude that an evacuation order should have been given prior to about 6:16 am on the morning of 21 April 2015.

Lessons learnt and changes made

161. As noted above, Mr Perkins gave evidence regarding the delay in the transmission of river height data to the BoM. Mr Perkins indicated in evidence that the issue of the transmission and monitoring of river height data in near real time is an issue already under consideration by the National Flood Infrastructure Working Group. Mr Perkins also indicated that this is an issue which will be taken to the next meeting of the Working Group.

162. In the circumstances, there is no need for consideration to be given to the making of any recommendations in relation to the review of river height monitoring and the provision of data in near real time.

163. A number of properties in Dungog have been identified as low lying and vulnerable to flooding. Steps have been taken to reduce the risk to life associated with these properties, namely:

i. The Dungog Shire Council, with funding assistance from the NSW Office of Environment and Heritage, has purchased five properties in Dowling Street. The houses on four of these properties were washed away in the 20-21 April flood and the fifth was significantly damaged. Consequently these properties have been removed from private ownership.

ii. Dungog Shire Council has developed a new 'Flood Planning Area' that incorporates part of the Alison Court units that were inundated in the April 2015 flood. Six units in particular were inundated and Council has supported demolition of these six units on the basis that aged care units should not be permitted within the newly designated Flood Planning Area.

164. According to documentary evidence and the evidence of Hunter Region Controller Stephen Hart, the SES has made a number of changes at various levels following the Dungog flood of 21 April 2015, including:

i. A formal handover document has been developed at a local level to be used when a new Local Controller takes over;
ii. On 11 February 2017 a Hunter region workshop was conducted for all Local Controllers;
iii. Matthew Too and Clayton Shean have each had training in AIIMs, this being incident management training;
iv. Dungog SES Local Unit has 15 members following efforts at recruitment;
v. Dungog SES Local Unit now has seven trained boat operators;
vi. In 2017 a new draft of the Dungog Local Flood Plan has been prepared, although I note that the draft that was in evidence preceded the release of findings and recommendations in the second Royal Haskoning DHV report; and
vii. A draft Flood Action and Response Card has been prepared in relation Dungog- Myall Creek Flash Flooding.

165. Three lives were lost in Dungog on 21 April 2015 as a result of a flood event that occurred without adequate warning for residents. Overwhelmingly the evidence demonstrates the need for an automated flash flood/flood early warning system for Dungog:

- the evidence indicates that existing riverine flood monitoring systems do not provide adequate warnings in relation to the flood risks associated with the Myall Creek and its tributaries and/or the local township catchment;
- the development of an automated flash flood/flood early warning system is recommended in the second Royal Haskoning DHV report, being a report in relation to flood risk management;
- the development of an automated flash flood/flood early warning system as part of an integrated community flash flood/flood response

management system was recommended in evidence by Mr Perkins from the BOM;

- the development of an automated flash flood/early warning system received support in the evidence from the SES.

166. On the evidence, particularly the evidence of Mr Perkins, the early warning system should be of a hybrid nature, deriving data from both rainfall and river levels. Such a system requires development that also involves detailed flood evacuation plans and community engagement.

167. In April 2017 Dungog Shire Council submitted an application seeking a grant from the Office of Environment and Heritage (OEH) for two thirds of the costs involved in the design, installation and operation of a flood warning system for Dungog.

168. The first recommendation I have made is for a technical advisory group to develop a system for warnings and responses to floods in Dungog on an interim basis, and ultimately to develop an automated flood warning system.

169. The recommendation proposed by Counsel Assisting received general support; although Senior Counsel for the SES expressed some reservation regarding the proposed direction for the development of an automated flash flood/flood early warning system as opposed to a recommendation that the working group consider the development of such a system.

170. I am satisfied on the evidence that a flash flood/flood early warning system is required.

171. Between 23 May 2016 and 30 June 2016 the BoM and the SES conducted a trial in which a meteorologist from the BoM worked at the SES headquarters in Wollongong. The meteorologist briefed the SES on significant weather events and this included assisting during an East Coast Low forecast for 4 to 7 June 2016. The evidence before me was that the trial was successful and the assistance to the SES was "extremely beneficial". The second recommendation I have made is for the SES to further consider having an out-posted meteorologist from the BoM on an ongoing but part time basis, as a valuable consultant for both planning and responding to live weather events.

Acknowledgment

172. In closing, I would like to acknowledge the following:

    i. the courageous efforts of the residents of Dungog. Were it not for the conduct of a number of people, it is likely that more lives would have been lost;

ii. the involvement of emergency services officers involved in the flood response across the Hunter region, including from NSW Police, Fire and Rescue NSW and the SES;

iii. the assistance from the Bureau of Meteorology in the preparation of the matter for hearing;

iv. the assistance of Fire and Rescue NSW in the preparation of Ms Rabey's statement;

v. the approach of co-operation and assistance adopted by the SES and Council during this inquest;

vi. the hard work of Detective Senior Sergeant Wheatley in conducting a substantial investigation.

173. I would like to thank my Counsel Assisting, Mr Mark Cahill and his instructing solicitor, Johanna Geddes from the Crown Solicitor's Office for their tireless efforts before, during and after this inquest.

174. Finally, I would like to acknowledge those who lost their lives during the flood. In the heat of an inquest it is sometimes very easy to lose sight of the fact that an inquest is an inquiry centred on the death of a person - in this case not just one person but three people.

175. These three people were cherished members of families; three people who were treasured by their friends; three people who were important and respected members of their community.

176. Robin MacDonald was a long term resident of Dungog who was well known and well-loved in her community. In particular, Ms MacDonald had a long history of active involvement in the community life of Dungog with a 20 year history of service in the SES.

177. During the inquest I heard evidence regarding Mr Alan Cherry's heroic efforts to rescue his neighbour and friend, Mr Colin Webb. Mr Cherry's actions reflect the strength of the bond of friendship between these two men.

178. It is also apparent from the comments made in the statements obtained from other residents of Alison Court the high regard in which Mr Webb was held by his community.

179. In his statement, Mr Webb's brother-in-law, Sidney Milne, describes a man who was much loved by his family and his friends; a man who lived a somewhat peripatetic country life – a bit of a Bushie; a bit of a wanderer; a man who finally settled in Dungog and put down his roots in the community at Alison Court.

180. Mr Wilson, too, was a much loved and respected member of his community; a husband, a father and a friend.

181. It is important that these very human and very personal aspects of the tragic events of 21 April 2015 not be forgotten.

Recommendations:

To the Minister for Emergency Services NSW,
Minister for Environment and Energy (Commonwealth), and
the General Manager of Dungog Shire Council

That the NSW State Emergency Service, the Bureau of Meteorology and the Dungog Shire Council work together to convene a technical advisory group involving representatives from each organisation, and liaise with any officer of the Office of Environment and Heritage, and any consulting engineer(s) and local flood expert(s) engaged from time to time, to look at solutions for warning and responding to flood and flash flood events in Dungog (including the Myall Creek catchment):

(i) On an interim basis while an automated flood warning system is developed; and

(ii) On a long term basis, to consider developing an automated flood warning system designed to use a combination of rainfall and riverine water levels relevant to flood in the Myall Creek and its tributaries.

To the Minister for Emergency Services NSW

That further consideration be given to providing the NSW State Emergency Service with access to an out-posted meteorologist from the Bureau of Meteorology for ongoing planning and consultation, on a part-time basis, as well as assistance during weather events.

Findings required by s. 81(1)

As a result of considering all of the documentary evidence and the oral evidence heard at the inquests, I am able to confirm that the deaths occurred and make the following findings in relation to them.

The identity of the deceased

The deceased person was Robin MacDonald

Date of death

Ms MacDonald died on 21 April 2015

Place of death

Ms MacDonald died at 44 Hooke Street, Dungog, NSW

Cause of death

Presumed freshwater drowning

Manner of death

Ms MacDonald became trapped in the front bedroom at 44 Hooke Street, Dungog, by rapidly rising floodwaters and, as a consequence, Ms MacDonald drowned

The identity of the deceased

The deceased person was Colin Webb

Date of death

Mr Webb died on 21 April 2015

Place of death

Mr Webb died at Alison Court, Unit 18, 27 Brown Street, Dungog, NSW

Cause of death

Presumed freshwater drowning

Manner of death

Mr Webb drowned when he became trapped in rapidly rising floodwaters, on the patio at the front of Alison Court, Unit 18, 27 Brown Street, Dungog, NSW

The identity of the deceased

The deceased person was Brian Wilson

Date of death

Mr Wilson died on 21 April 2015

Place of death

Mr Wilson died at Unit 1, 30 Brown Street, Dungog, NSW

Cause of death

Presumed freshwater drowning

Manner of death

Mr Wilson drowned when he became trapped in rapidly rising floodwaters on the verandah at the front of Unit 1, 30 Brown Street, Dungog, NSW

I close this inquest.

Magistrate Teresa O'Sullivan
Deputy State Coroner
Date: 29 September 2017