Australian Government
Bureau of Meteorology

Water Information
DATA › INFORMATION › INSIGHT

South East Queensland Floods

May 2009

1	
2	3

1. Caboolture River – Photo by Cyndie Britten
2. Neurum Creek nr Kilcoy - Photo by Peter Good
3. Flood waters at Laidley Showground Weir – Photo by Joshua Kelly

Note:

1. Data in this report has been operationally quality controlled but errors may still exist.

2. This product includes data made available to the Bureau by other agencies. Separate approval may be required to use the data for other purposes. See Appendix 1 for DNRW Usage Agreement.

3. This report is not a complete set of all data that is available. It is a representation of some of the key information.

Table of Contents

South East Queensland Floods
May 2009

1 Introduction

Intense rainfall occurred during Wednesday 20th May across South East Queensland as a low pressure system moved south across the region. The runoff resulted in major flooding in many catchments. Creeks around Ipswich and North Brisbane were particularly badly affected during the evening of May 20th.

Affected catchments covered an area from the Sunshine Coast to the Gold Coast, however the resulting flooding varied considerably. The Caboolture River and Kedron Brook were notable large catchments affected but most of the flood impacts took place in smaller creek catchments. During such events, such creeks can rise very quickly and cause significant inundation of streets and houses.

A series of troughs developed in the three days prior to the formation of a low pressure system on Wednesday May 20th. During May 19th, rain had increased during the evening period reducing catchment losses and increasing runoff throughout the region and as the low pressure system crossed the region, heavy rain and strong winds moved south from Cape Moreton to the Gold Coast.

Homes were flooded and transport links severed throughout the region including rail links and the Pacific Highway at Caboolture. Lutwyche Road was cut by flooding from Breakfast Creek and trains were held at Ferny Grove due to flooding of the line.

SES crews rescued many people trapped in vehicles throughout the region.

This report provides a summary and analysis of the meteorology and hydrology of the South East Queensland Floods of May 2009.

2 Meteorological Summary

2.1 Meteorological Analysis

On Monday 18th May 2009 a significant upper trough and associated surface trough sat over south-western Queensland while a firm high was in the western Tasman Sea. Moist onshore winds and increasing instability saw showers and rain areas over southeast Queensland

On Tuesday 19th May the upper trough and original surface trough remained over southwest Queensland while a separate trough or ‘dip’ formed offshore from the southeast coast, increasing winds and rain during the day.

On the morning of Wednesday 20th May very heavy rainfall fell over much of the southeast coast district as a low pressure system formed over Cape Moreton and moved south during the day, taking the heaviest rain with it. With a 500hPa trough sitting in southern-central Queensland, a 200hPa trough and jet stream over southeast Queensland, and the surface trough/low providing surface convergence, all the ingredients were present for very heavy rainfall. Damaging winds were also observed in the southeast, especially near the low pressure system as it made its way south. Figure 2.1.1, the aerological diagram from 9am on Wedesnday 20th May shows a moist profile and winds backing with height, conducive to heavy rainfall.

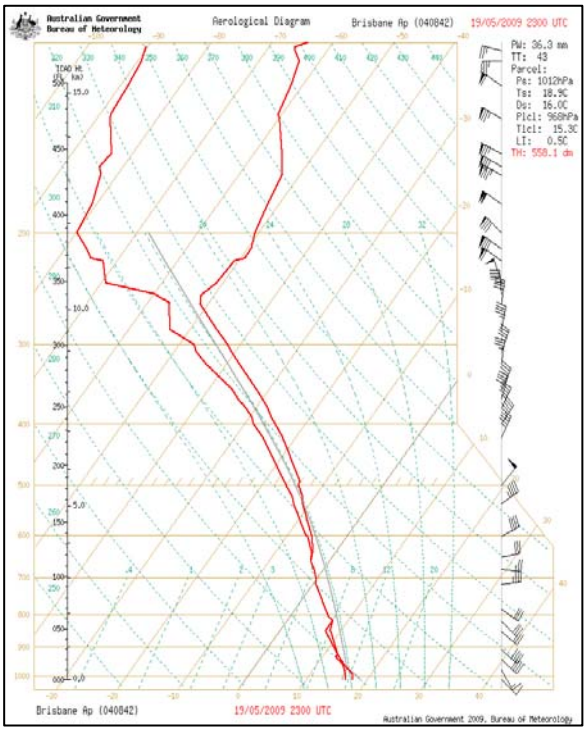
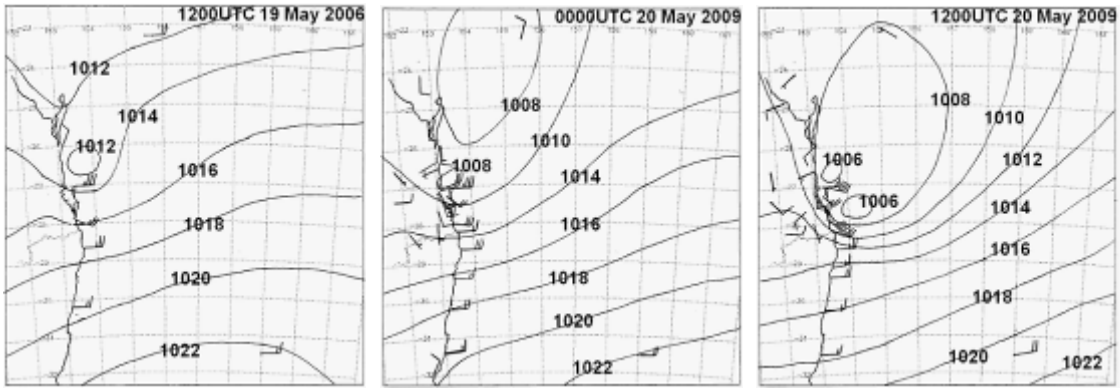


Figure 2.1.1 The Brisbane Airport Aerological diagram (F160) from 9am Wednesday morning

Thursday 21st May saw the main low pressure system move offshore and extended a vigorous trough across the Gold Coast. With the upper trough still over the southeast rain areas continued in the south near this surface trough. As the low moved offshore a significant fetch of storm force winds developed to its south, as a result large swells and damaging winds developed about the exposed coasts of southeast Queensland.

The period between Friday 22nd May and Monday 25th May saw the surface low pressure system move out to sea and the upper trough move to the east, causing rain areas to ease to showers. A significant fetch of gale force winds was maintained to the south of the surface low and as a result large swells continued to be felt around coastal beaches. Astronomical tides were also increasing during this period.



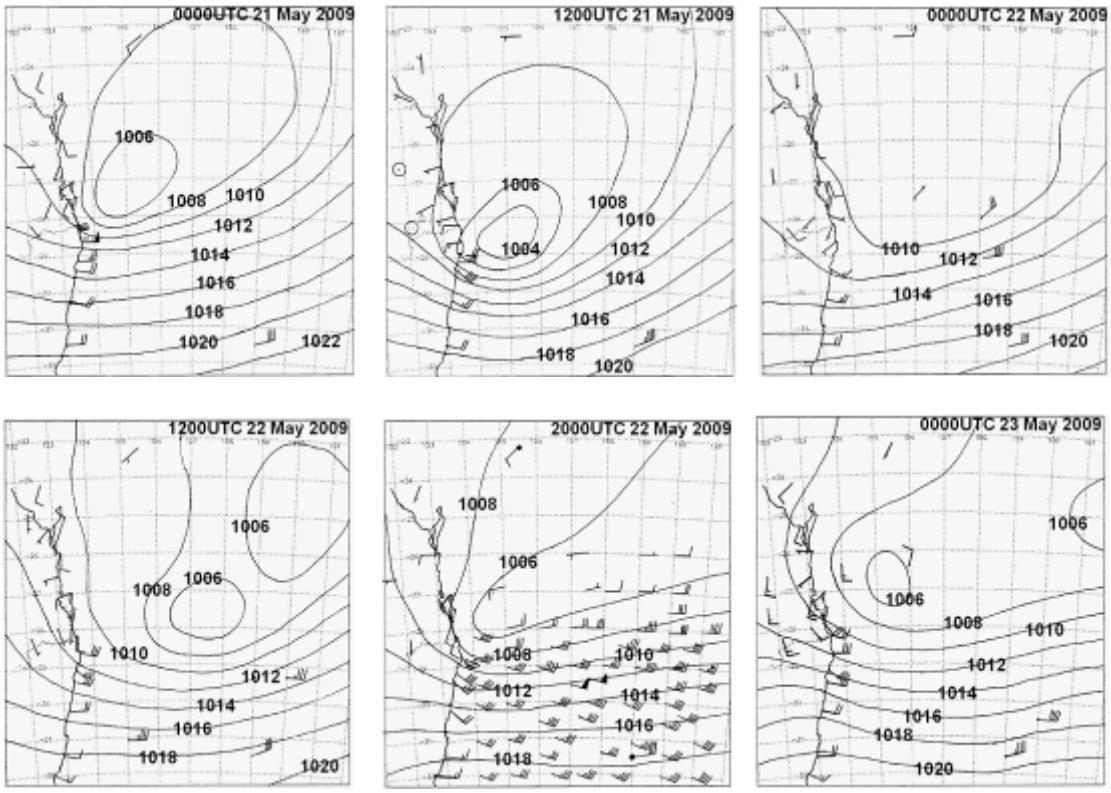


Figure 2.1.2 - MSLP charts from 19 – 23 May showing the evolution of the surface low.

2.1.1 Rainfall Impacts

Heavy rainfall on Tuesday night and Wednesday had a serious impact around southeast Queensland with a broad area declared a state of emergency. The highest fall was 302mm at Caboolture, while over 200mm was recorded in areas near the southern Sunshine Coast, Ipswich, Brisbane and the Gold Coast hinterland. Local extreme rainfall was not a common issue with this event, the most intense rainfall being 137mm in 2 hours(>100 year ARI) recorded at Parreara Weir Alert on the Sunshine Coast. Extreme rainfall rates were observed at much fewer locations than the Ipswich floods of November 2008, though the duration and extent of rainfall was greater for this event. Figure 2.1.3 shows widespread falls of over 200mm with many locations recording over 400mm during the seven days to Sunday May 24th.

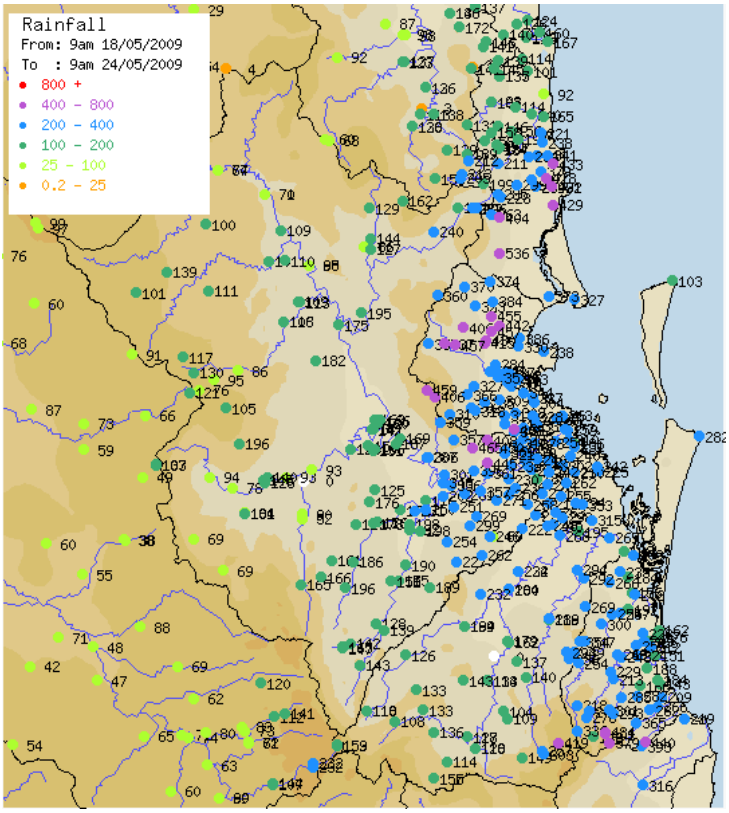


Figure 2.1.3 - Rainfall totals for SE QLD between Monday 18/5 and Sunday 24/5.

Flash flooding occurred throughout the southeast coast with many road closures and rail cancellations. This included the closure of the Bruce Highway between Brisbane and the Sunshine Coast. Several schools were closed in the following days as they were cut off by local flooding. Citycat services were also cancelled for a day as debris in the Brisbane river made navigation dangerous.

Figure 2.1.4 – Flash Flooding at Bowen Bridge Rd near The Royal Brisbane Hospital.
(source: Courier Mail)

2.1.2 Damaging Wind Impacts

Damaging winds were felt about the exposed coasts between Wednesday 20/5 and Saturday 23/5. The strongest recorded wind gust was 117 km/h at Gold Coast Seaway, followed by 106km/hr recorded at Cape Moreton, both on the 20th of May. Power outages affected 40,000 homes as minor structural damage was caused by strong winds in many exposed areas. A man was killed on the Gold Coast when debris picked up by strong winds flew through a window.

2.1.3 Large Seas and High Tide Impacts

Storm tide data below shows the Gold Coast Seaway, Brisbane and Mooloolaba gauges all exceeded the Highest Astronomical Tide of the year (HAT) during the week, up to 6 days consecutively for the Brisbane City gauge.

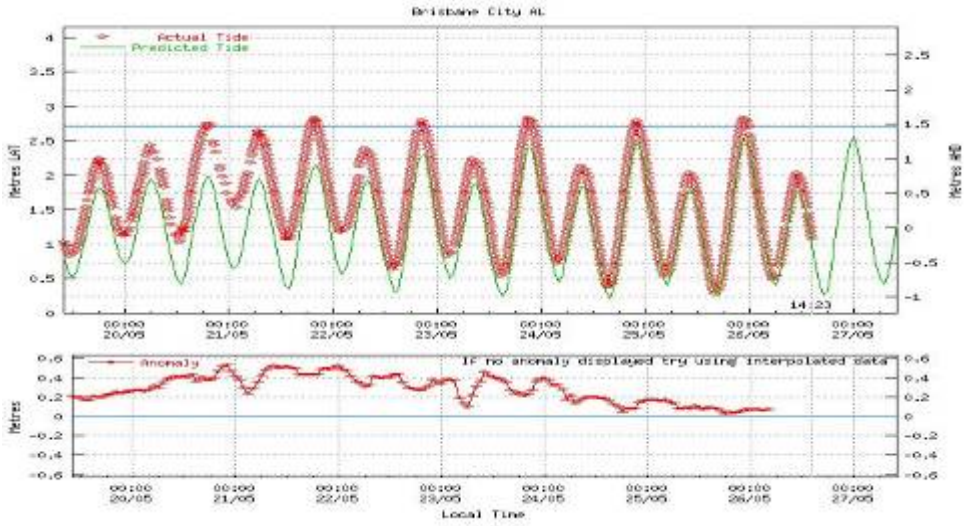


Figure 2.1.5 – Storm tide gauge data from the Brisbane City Alert, exceeding HAT.

EPA Waverider buoy data showed swells peaking at up to 11metres with values of up to 6 metres and peak period of 14 seconds.

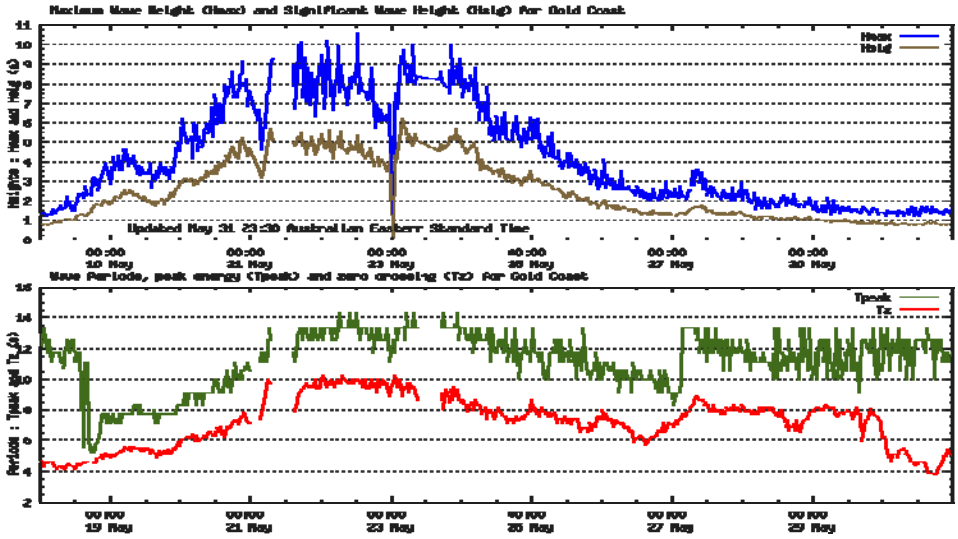


Figure 2.1.6 - Waverider Buoy data from the Gold Coast. (source: QLD EPA)

While HAT was only exceeded by around 10 to 20cm on these gauges, located in protected areas or out to sea, wave runup and setup, caused by the large swells, resulted in very severe coastal erosion, particularly on the Gold Coast. Scarps of up to 5 metres were observed on the northern Gold Coast, and debris washed from rivers was pushed onto beaches by large surf, making conditions hazardous for all beach users. A car was also swept into the surf from the Currumbin Surf Lifesaving Club carpark, and houses were only metres away from scarps at Palm Beach.

Figure 2.1.7 – Large seas and high tides around the southeast coast.

2.1.4 Records

The wettest single day rainfall figures were 332 mm at Godwin Beach, 301.8 mm at Beerburrum Forest Station, 274 mm at Narangba - Browns Crk Road, 257 mm at Morayfield Alert and 254 mm at Deception Bay Alert, all on the 20th. Some sites had their highest May daily rainfall on record:

	Record highest May daily rainfall				
	Highest daily rainfall in May 2009 (mm)		Previous highest for May		Years of record
Texas Post Office	58.6	on the 22nd	52.1	on the 30th in 1921	113
Alderley	206.2	on the 21st	193.2	on the 2nd in 1996	103
Peachester	207.0	on the 20th	182.0	on the 2nd in 1996	93
Lake Manchester	187.0	on the 21st	120.0	on the 3rd in 1996	92
Pechey Forestry	113.6	on the 20th	95.6	on the 3rd in 1996	83
Somerset Dam	147.6	on the 20th	121.2	on the 3rd in 1996	72
Amberley AMO	142.2	on the 21st	121.0	on the 9th in 1980	68
Meandarra Post Office	105.8	on the 20th	95.3	on the 26th in 1938	68
Beerburrum Forest Station	301.8	on the 20th	203.2	on the 31st in 1903	63
Ballandean Post Office	79.2	on the 22nd	60.6	on the 9th in 1980	43
Namarah	74.8	on the 20th	68.4	on the 1st in 1996	38
Glenlyon Dam	58.0	on the 22nd	53.0	on the 9th in 1980	35
Strathpine Colonial Drive	206.0	on the 20th	196.4	on the 2nd in 1996	33

The wettest overall was 567.8 mm at Beerburrum Forest Station, followed by 515.9 mm at Springbrook Road, followed by 494.8 mm at Daradgee, 488.4 mm at Glengaven, and 486.0 mm at Morayfield Alert. Some sites had their highest total May rainfall on record:

Record highest total May rainfall

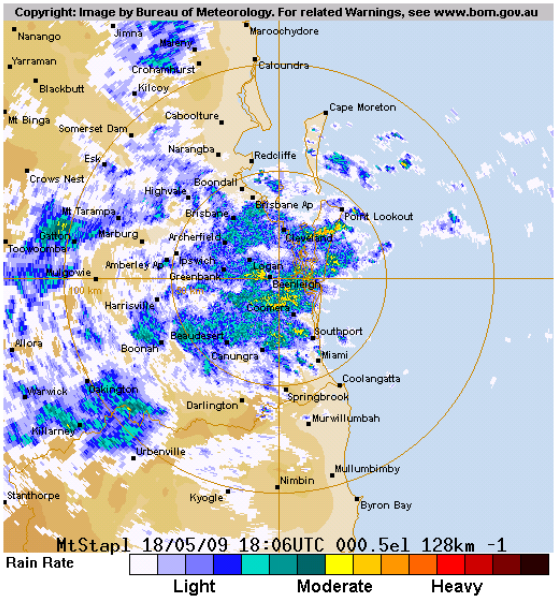
	Total rainfall for May 2009 (mm)	Previous highest for May		Years of record	Average for May
Beerburrum Forest Station	567.8	478.6	in 1903	60	125.6
Highvale	322.6	318.8	in 1980	42	85.3

2.2 Radar Imagery Analysis

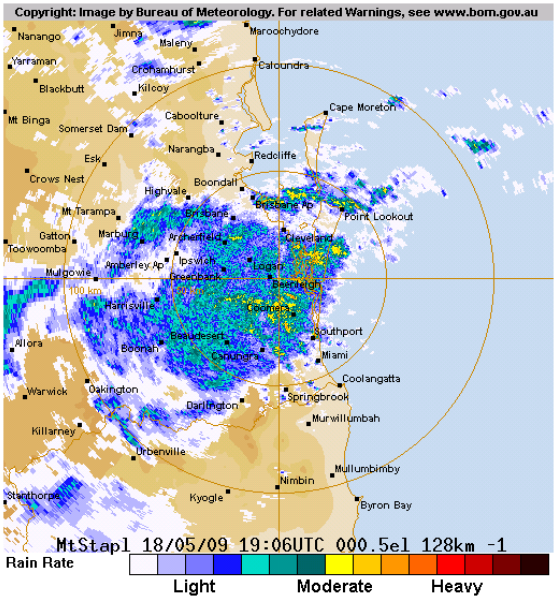
The following radar imagery shows the location and intensity of rain in relation to local features such as coastlines. Colours are used to depict rainfall intensity with the lightest rain shown as white to light blue and the heaviest rain shown as red to brown.

Imagery from the Mt Stapleton radar was used to monitor this heavy rainfall event over southeast Queensland. A broad area of rain with embedded thunderstorms first developed to the south of Brisbane during the early morning of Tuesday the 19th of May as shown in Figure 2.2.1a. The rainband, with embedded thunderstorms moved slowly north during the morning to be generally north of Brisbane by 9am and extending along the Sunshine Coast by 5pm Tuesday afternoon, see Figure 2.2.1c and 2.2.1d.

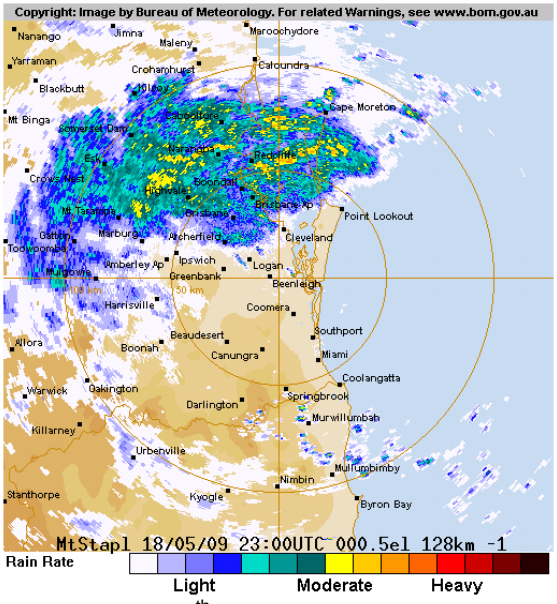
Figure 2.2.1. Radar Imagery from Mt Stapleton on the 19th of May 2009.



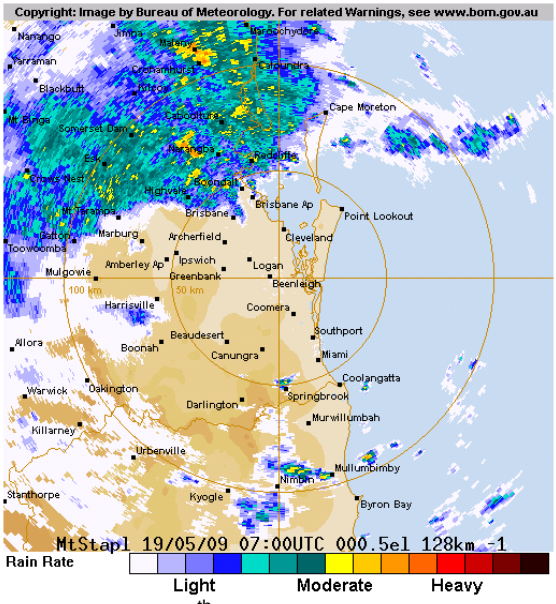
a. 4am on the 19th May 2009



b. 5am on the 19th May 2009



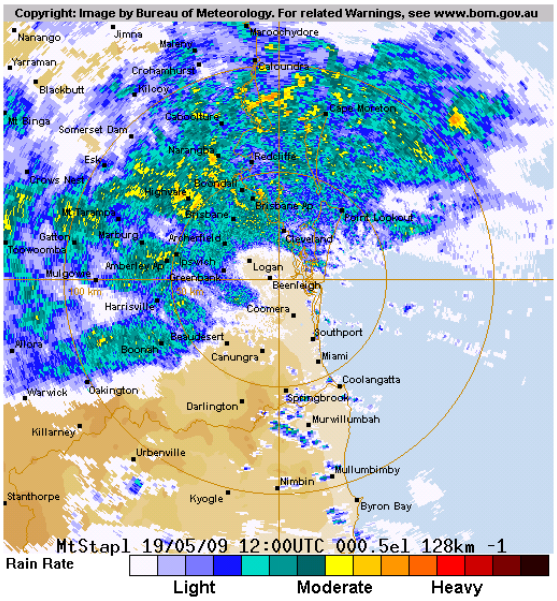
c. 9am on the 19th May 2009



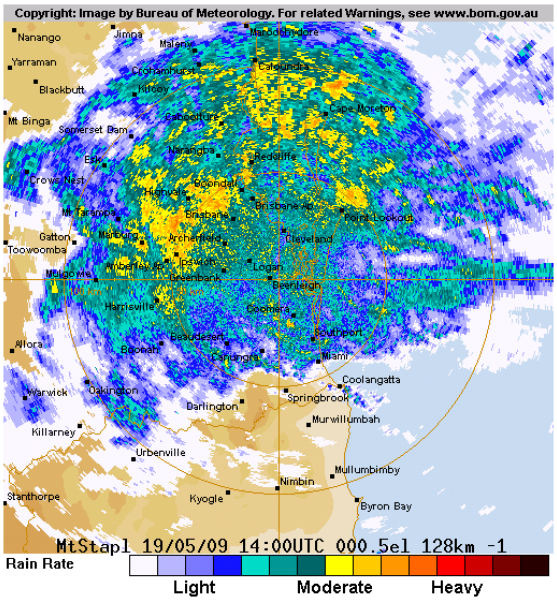
d. 5pm on the 19th May 2009

Rain and thunderstorms persisted about the Sunshine Coast throughout the evening of the 19th of May before extending back southward over Brisbane by 10pm, as is shown in Figure 2.2.2a. Rainfall intensity increased and by midnight on the 19th of May, thunderstorm activity was widespread between Caloundra and Redcliffe extending inland to Marburg. See Figure 2.2.2b. The heaviest rainfall then persisted about this axis throughout the early morning and as is evident from radar imagery at 7am on the 20th of May, rainfall intensities around Caboolture had increased. High intensity rainfall then persisted about this area for the next 2 to 3 hours and resulted in 24-hour rainfall totals to 9am on the 20th of May of 302mm at Beerburrum, 274mm at Narangba and other falls in the area in excess of 200mm.

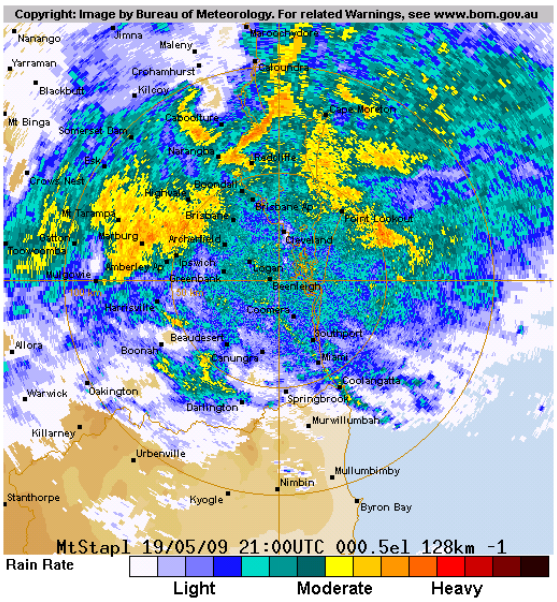
Figure 2.2.2. Radar Imagery from Mt Stapylton on the 19th and early on the 20th of May 2009.



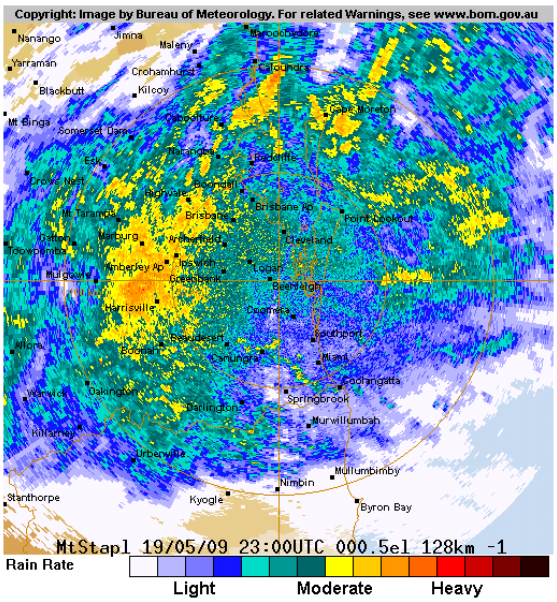
a. 10pm on the 19th May 2009



b. Midnight on the 19th May 2009



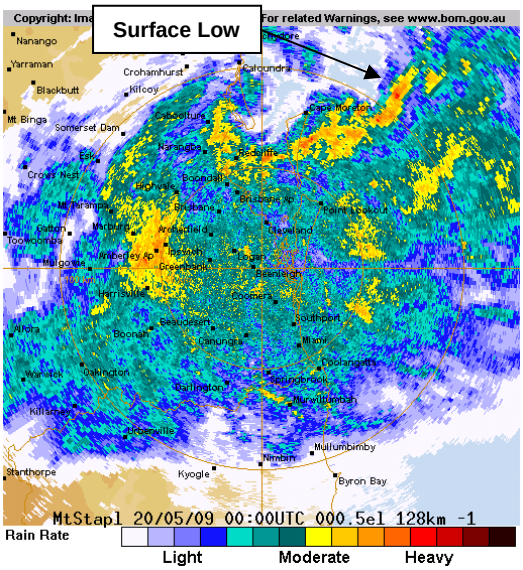
c. 7am on the 20th May 2009



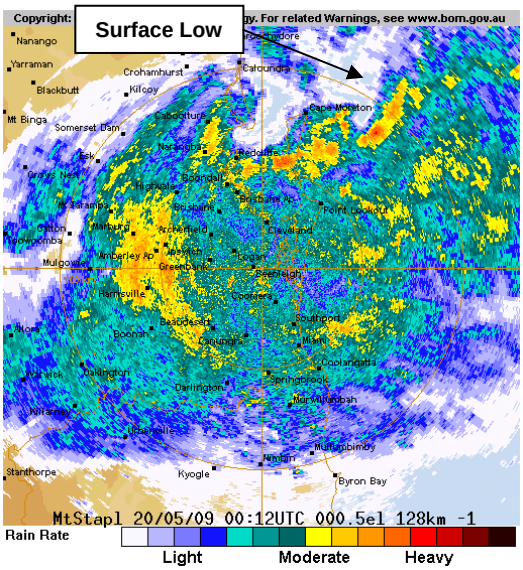
d. 9am on the 20th May 2009

By 9am on the morning of the 20th of May the surface low to the near north of Cape Moreton became clearly evident, as shown in the sequence of radar imagery from 10am to 11am on the 20th of May, Figure 2.2.3.

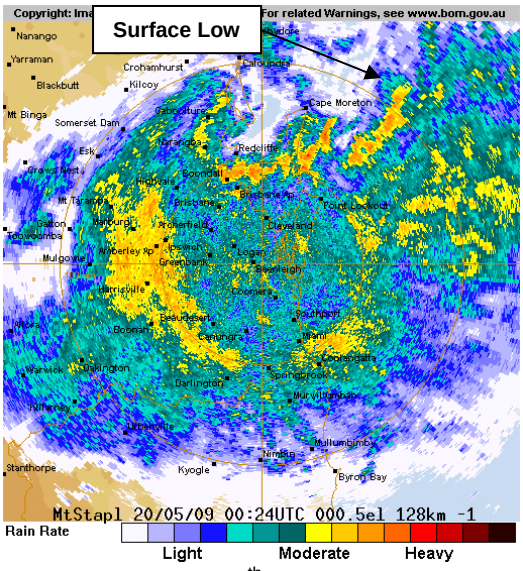
Figure 2.2.3 Radar Imagery from Mt Stapylton on the 20th of May 2009.



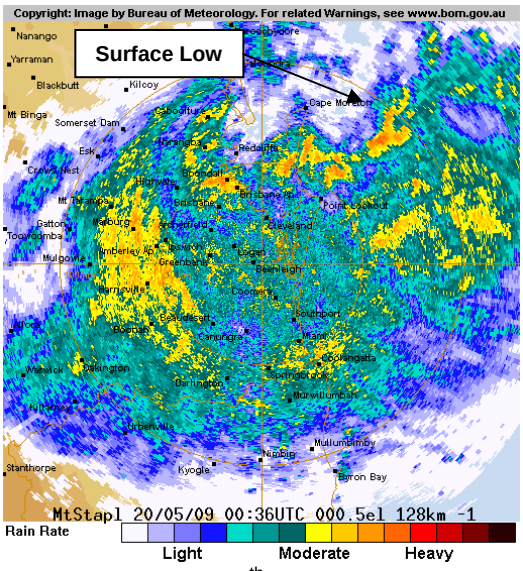
a. 10:00am on the 20th May 2009



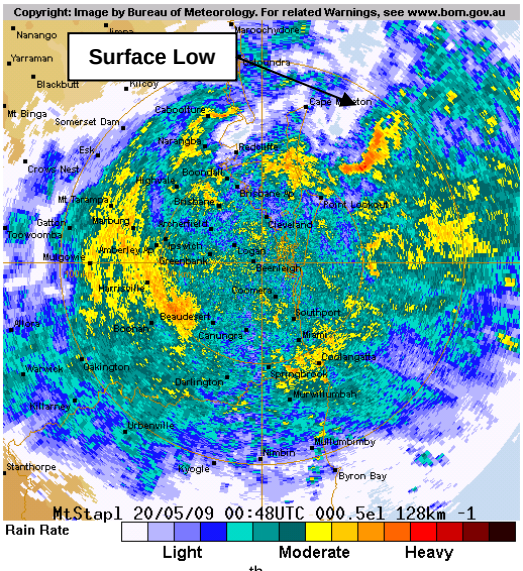
b. 10:12am on the 19th May 2009



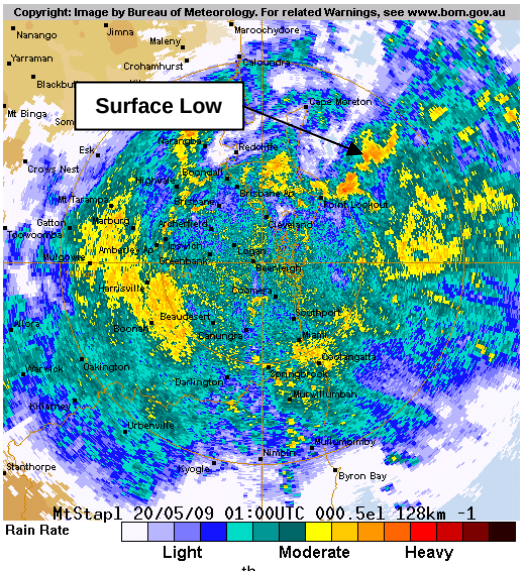
c. 10:24am on the 20th May 2009



d. 10:36am on the 20th May 2009



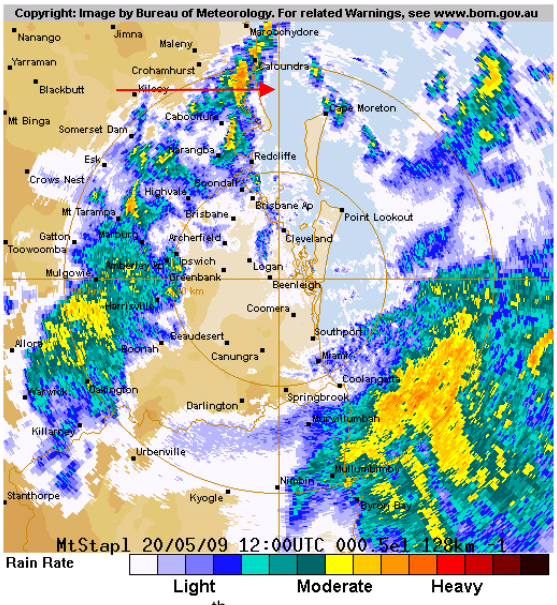
e. 10:48am on the 20th of May 2009



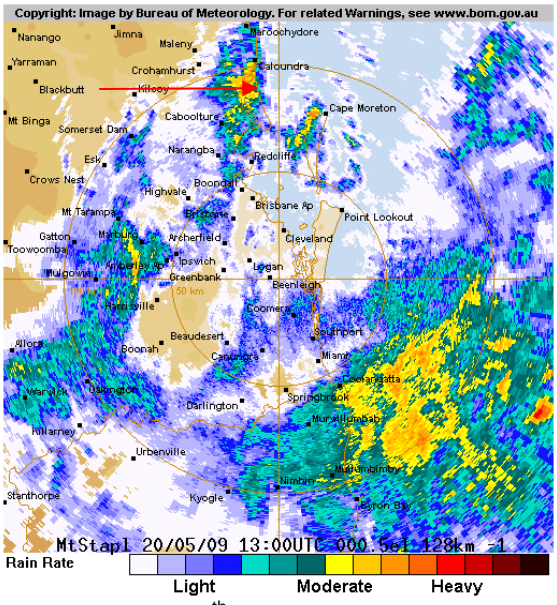
f. 11:00am on the 20th of May 2009

The low tracked rapidly southward during the day causing the heavy band of rain to clear south of Springbrook by 2pm and south of the border by 5pm. However, very unstable conditions continued over southeast Queensland during the evening and overnight on the 20th of May. Of note was an area of thunderstorms that developed and remained stationary over Caloundra throughout the evening and overnight. The sequence of radar imagery in 2.2.4 shows persistent thunderstorms over Caloundra from 10pm on the 20th to 1am on the 21st of May (highlighted by the red arrow), producing a 24-hour rainfall total to 9am on the 21st of May of 264mm at Caloundra WTP.

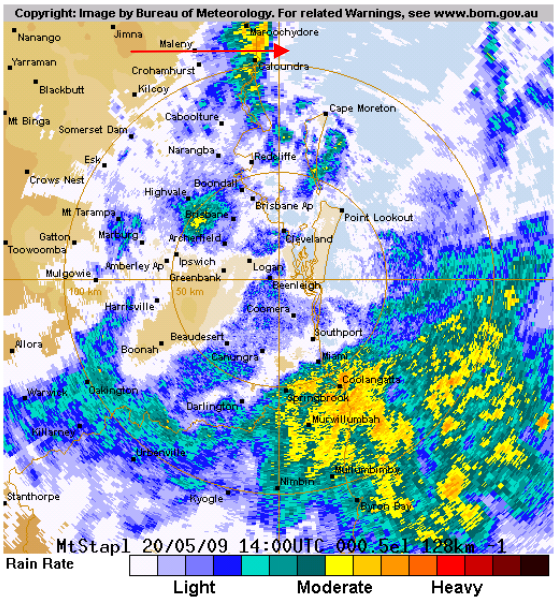
Figure 2.2.4. Radar Imagery from Mt Stapylton overnight on the 20th of May 2009.



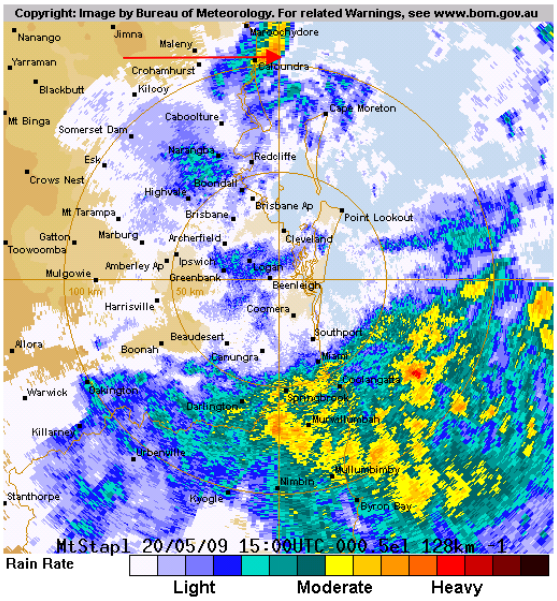
a. 10pm on the 20th May 2009



b. 11pm on the 20th May 2009



c. Midnight on the 20th May 2009



d. 1am on the 21st May 2009

3 Hydrology

The flooding in the region on Wednesday 20th May, 2009 caused widespread damage and although not generally comparable to the 1974 floods were the most significant and widespread event since that time. As Table 3.1.1 shows, over one third of the stations in South East Queensland recorded a value ranked in the top three levels with six stations recording new records.

In the inner north of Brisbane, flooding was serious on Breakfast and Ithaca Creeks. Bowen Hills Alert and Ithaca Alert recorded a new record and the 3rd highest total on record respectively. In the case of Ithaca Creek, the second highest on record was in November 2008. Both have records going back to 1994.

In the Ipswich area, Bundamba Creek equalled the second highest level achieved in November 2008 and on the Purga Creek, Washpool Alert recorded a new record whilst Loamside Alert recorded the second highest on record after the 1974 event.

Figures 3.2.1 to 3.2.8 show the levels recorded during the event for notable stations.

3.1 Peak River Heights

Figure 3.1.1 Peak Flood Height Map for Queensland 16-23 May 2009

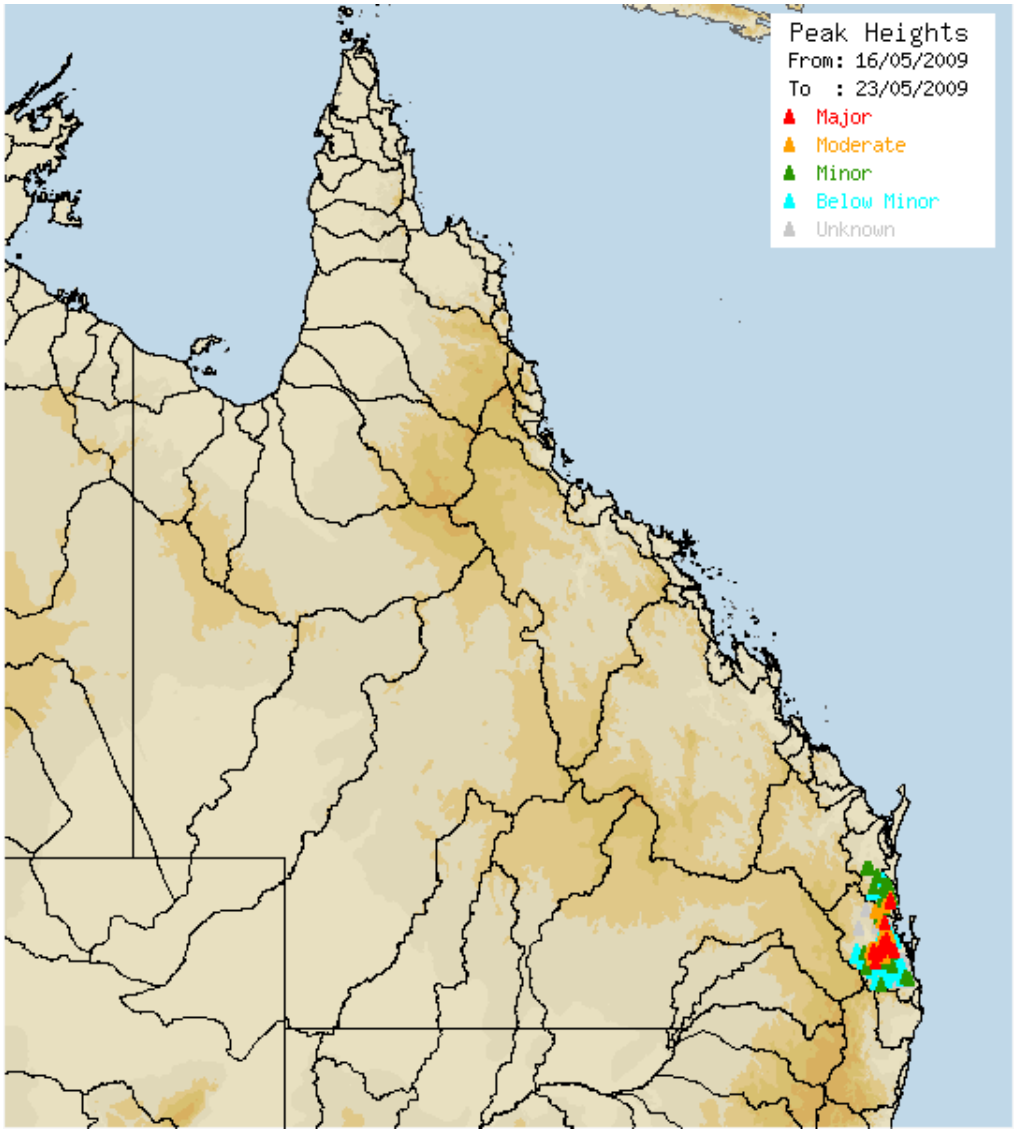


Figure 3.1.2 Peak Flood Height Map for South East Queensland 16-23 May 2009

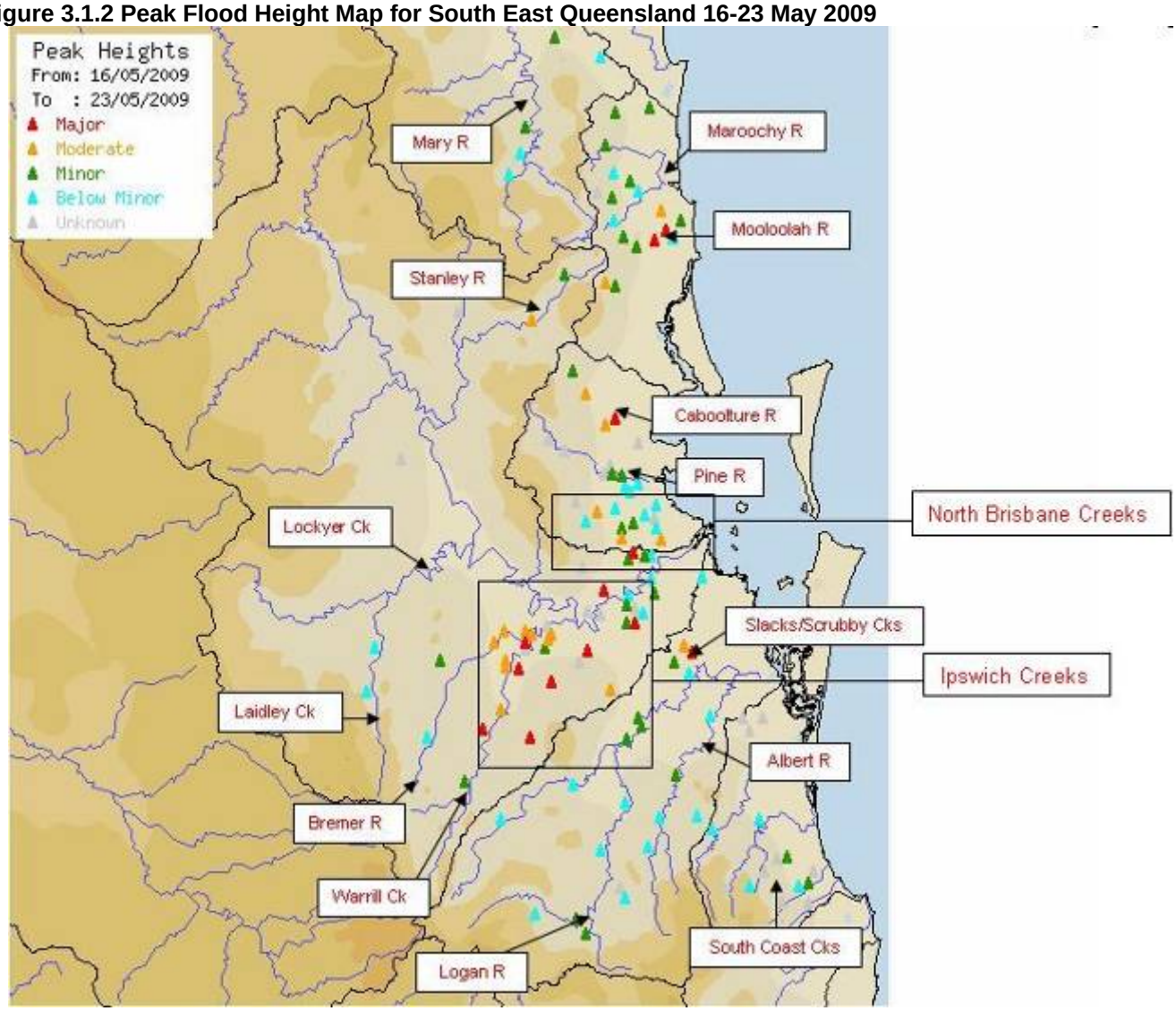


Figure 3.1.3 Peak Flood Height Map of Ipswich Creeks 16-23 May 2009

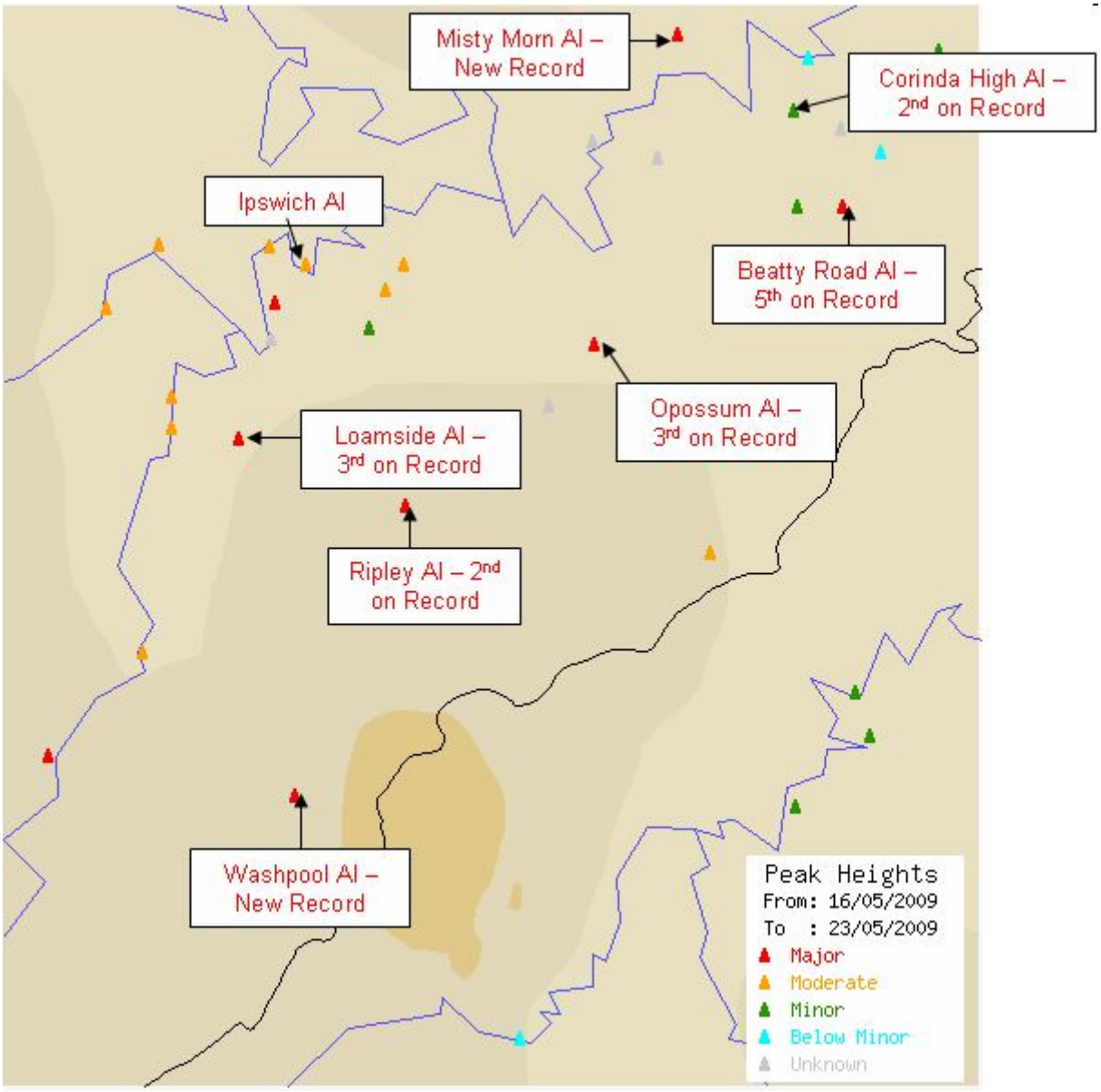
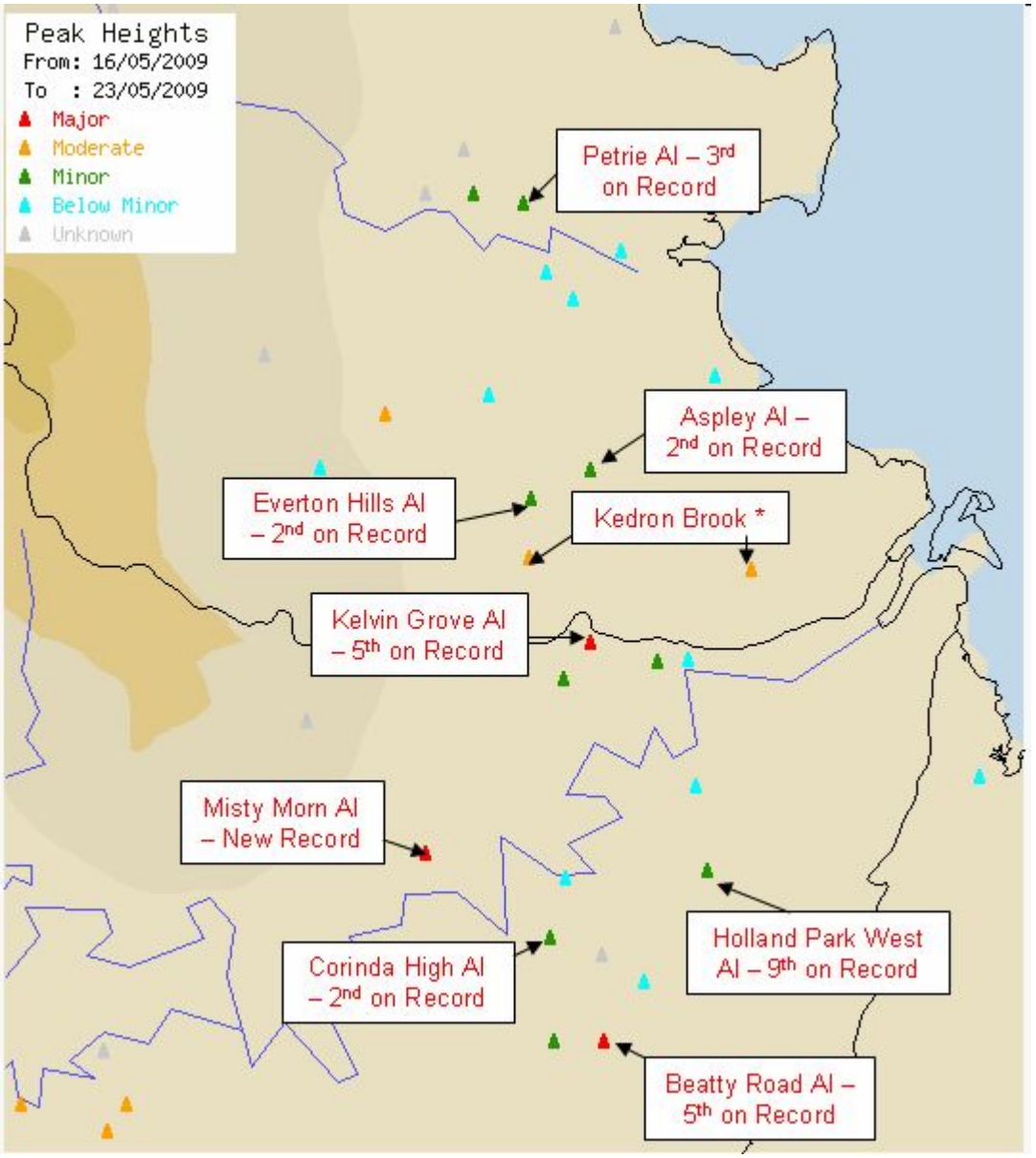


Figure 3.1.4 Peak Flood Height Map of North Brisbane Creeks 16-23 May 2009



* The levels reached in the Kedron Brook cannot be related back to previous peak flood heights due to the construction of the new Brisbane Airport in the early 1970's. A series of engineered tidal channels were built to direct flow from Kedron Brook to Moreton Bay. In May 1997, the floodway was re-dredged to its original profile, to assist with flood mitigation and as such, the levels reached during May 2009 are not comparable to other peak flood levels.

Table 3.1.1 Flood Peak Height Comparison to Records.

Gauging Station	May 09 Peak	Start of Record	Rank	Highest Since	Highest on Record
South Coast Rivers					
Mudgeeraba Creek					
540254 – Mudgeeraba Alert	3.12m	1991	10th	Jan 2008	Jan 2008 4.42m
Tallebudgera Creek					
540320 – Coplicks Bridge Alert	2.39m	2001	4th	June 2005	June 2005 4.16m
Logan/Albert Rivers					
Albert River					
040938 – Bromfleet Alert	9.29m	1927	67th	Jan 2008	Jan 1974 16.36m
Logan River					
040946 – Rathdowney Alert	4.10m	1947	58th	Jan 2008	Jan 1947 14.50m
040945 – Round Mountain Alert	5.97m	1957	76th	Jan 2008	Feb 1976 16.98m
040940 – Yarrahapinni Alert	11.62m	1969	31st	Jan 2008	Jan 1974 20.75m
540214 – South Maclean TM	9.92m	1994	3rd	May 1996	May 1996 12.96m
040542 – Meaclean Bridge	11.33m	1887	34th	Jan 2008	Jan 1887 22.30m
Running Creek					
040943 – Dieckman 's Bridge Alert	3.11m	1965	39th	Jan 2008	Jan 2008 8.26m
Slacks Creek					
540079 – Slacks Ck (Res Pk) Alert	9.20m	1993	5th	Nov 2008	Mar 2001 10.90m
540091 – Slacks Ck (Loganlea Rd) Alert	5.30m	1993	2nd	Nov 2004	Nov 2004 10.50m
Scrubby Creek					
540078 – Marsden (First Av) Alert	9.65m	1993	1st	New Record	New Record
Brisbane River					
Stanley River					
540059 – Peachester Alert	6.83m	1927	29th	April 2009	July 1954 9.75m
540338 – Woodford Alert-B	6.73m	1890	29th	Feb 1999	Feb 1893 11.73m
Western Creek					
540194 – Kuss Road Alert	6.75m	1974	16th	Nov 2008	Jan 1974 8.07m
Warrill Creek					
540151 – Kalbar Weir Alert	2.36m	1998	12th	Nov 2008	Feb 2008 4.05m
540154 – Harrisville Alert	5.00m	1893	28th	May 1996	Feb 1893 8.33m
Bremer River					
540147 – Walloon Alert-P	6.77m	1974	11th	Nov 2008	Jan 1974 8.70m
040836 – One Mile Bridge Alert	15.13m	1974	7th	Nov 2008	Jan 1974 25.10m

Table 3.5.1 Flood Peak Height Comparison to Records (continued).

Gauging Station	May 09 Peak	Start of Record	Rank	Highest Since	Highest on Record

Brisbane River (continued)					
Bremer River (continued)					
540316 – Churchbank Weir Alert	2.65m	1953	12th	Feb 2008	Feb 1959 3.99m
540180 – Amberley Alert-P	6.30m	1974	12th	May 1996	Jan 1974 10.18m
540180 – Amberley DNR TM	7.32m	1961	13th	May 1996	Jan 1974 11.08m
040831 – Ipswich Alert	***9.60m****	1840	31st	Nov 2008	Feb 1976 13.65m
Purga Creek					
540195 – Washpool Alert	4.80m	1994	1st	New Record	New Record
540062 – Loamside Alert	8.27m	1973	3rd	Jan 1974	Jan 1974 9.26m
Bundamba Creek					
040792 – Ripley Alert	54.30m	1974	=2nd	Nov 2008	Jan 1974 58.85m
040873 – Harding Street Alert	24.73m	1974	4th	Nov 2008	Jan 1974 25.20m
040872 – Blackstone Bridge Alert	20.24m	1974	3rd	Dec 1991	Jan 1974 21.50m
040875 – Bundamba School Alert	16.93m	1974	5th	Nov 2008	Jan 1974 20.60m
Woogaroo Creek					
040795 – Opossum Alert	24.70m	1974	3rd	Dec 1991	Jan 1974 27.77m
040719 – New Beith TM	5.09m	1976	3rd	Dec 1991	Apr 1990 5.27m
Blunder Creek					
040789 – Durack King Av Alert	8.03m	1975	12th	Dec 1991	Jan 1974 11.09m
Oxley Creek					
040796 – Beatty Road Alert	6.89m	1973	5th	Apr 1990	Jan 1974 10.13m
540071 – Corinda High Alert	4.00m	1992	2nd	Mar 1992	Mar 1992 4.09m
Norman Creek					
540134 – Holland Park West Alert	17.52m	1994	9th	Dec 2004	Mar 2001 18.49m
Moggill Creek					
540061 – Misty Morn Alert	10.91m	1995	1st	New Record	New Record
Enoggera Creek					
540118 – Kelvin Grove Alert	6.82m	1994	5th	Jan 1974	Jan 1974 8.60m
Ithaca Creek					
540116 – Ithaca Alert	14.44m	1994	3rd	Nov 2008	Jan 1974 15.49m
Breakfast Creek					
540130 – Bowen Hills Alert	2.43m	1994	1st	New Record	New Record

Note: Ipswich AL – Height taken from survey of flood debris as automatic gauge was faulty during event.

Table 3.5.1 Flood Peak Height Comparison to Records (continued).

Gauging Station	May 09 Peak	Start of Record	Rank	Highest Since	Highest on Record
Pine/Caboolture Rivers (continued)					
Kedron Brook					
540111 – Mitchelton (Osborne Rd) Alert	33.73m	1974	2nd	Jan 1974	Jan 1974 35.07m

Schultz Canal					
540131 – Toombul (Nudgee Rd) Alert	2.96m	1994	1st	New Record	New Record
Cabbage Tree Creek					
540121 – Everton Hills Alert	44.27	1994	2nd	Mar 2001	Mar 2001 44.29m
Little Cabbage Tree Creek					
540113 – Aspley (Stringy Bark Rd) Alert	28.80	1994	3rd	Mar 2001	Mar 2001 29.71m
South Pine River					
540205 – Drapers Crossing Alert	5.97	1965	8th	Apr 1989	Jan 1974 7.44m
North Pine River					
540203 – Petrie Alert	4.79	1974	2nd	Jan 1974	Jan 1974 5.10m
Burpengary Creek					
540245 – Burpengary (Rowley Rd) Alert	20.05	1972	4th	Feb 1999	Feb 1972 20.30m
540242 – Burpengary (Dale St) Alert	10.79	1972	3rd	Apr 1989	Feb 1972 11.15m
Waraba Creek					
540244 – Wamuran Alert	29.02	1972	5th	Apr 2009	Feb 1972 30.61
Caboolture River					
540357 – Upper Caboolture Alert	10.29	1965	4th	Dec 1991	Dec 1991 11.76m
Maroochy/Noosa Rivers					
Coochin Creek					
540342 – Old Gympie Rd Alert	3.50	2005	2nd	Apr 1989	Apr 1989 4.80m
540343 – Beerwah Alert	4.55	2005	2nd	Apr 1989	Apr 1989 6.90m
Mooloolah River					
540300 – Mooloolah TM	4.72	1971	29th	Apr 2009	Apr 1989 5.83m
540346 – Ewen Maddock Dam Alert	0.65	2005	2nd	Apr 2009	Apr 2009 0.83m
540344 – Jordan Street Alert	5.05	2005	=2nd	Apr 2009	Apr 2009 5.15m
540350 – Palmview Alert	4.84	2005	1st	New Record	New Record
Mountain Creek					
540220 – Mountain Ck Alert	3.15	1996	=8th	Apr 2009	May 1999 3.53m
North Maroochy River					
540093 – Eumundi Alert	4.62	1982	32nd	Apr 2009	Apr 1989 7.29m
South Maroochy River					
540092 – Yandina Alert	2.43	1982	=50th	Apr 2009	June 1983 5.15m

Table 3.5.1 Peak Height Comparison to Records (continued).

Gauging Station	May 09 Peak	Start of Record	Rank	Highest Since	Highest on Record
Noosa/Maroochy Rivers (continued)					
Doonan Creek					
540218 – Doonan Creek Alert	4.15	1996	6th	Apr 2009	Apr 2009 4.45m
Paynter Creek					

540083 – Diddillibah Alert	3.21	1994	=9th	Apr 2009	Aug 2007 4.11m
Mary River					
Mary River					
540330 – Moy Pocket Alert	7.55	2002	56th	Apr 2009	Feb 1999 16.80m
540215 – Gympie Weir TM	7.19	1995	17th	Apr 2009	Feb 1999 22.36m
040824 – Fishermans Pocket TM	8.21	1968	52nd	Apr 2009	Feb 1992 23.15m
Six Mile Creek					
540327 – Lake Macdonald Drive Alert	3.95	2003	7th	Apr 2009	June 2008 5.70m
540326 – Cooran Alert	6.57	1981	41st	Apr 2009	Feb 1992 11.94m

3.2 Flood Hydrographs for South East Qld Creeks and The Caboolture River.

Figure 3.2.1 Hydrograph of Washpool Alert between the 17-27 May 2009.

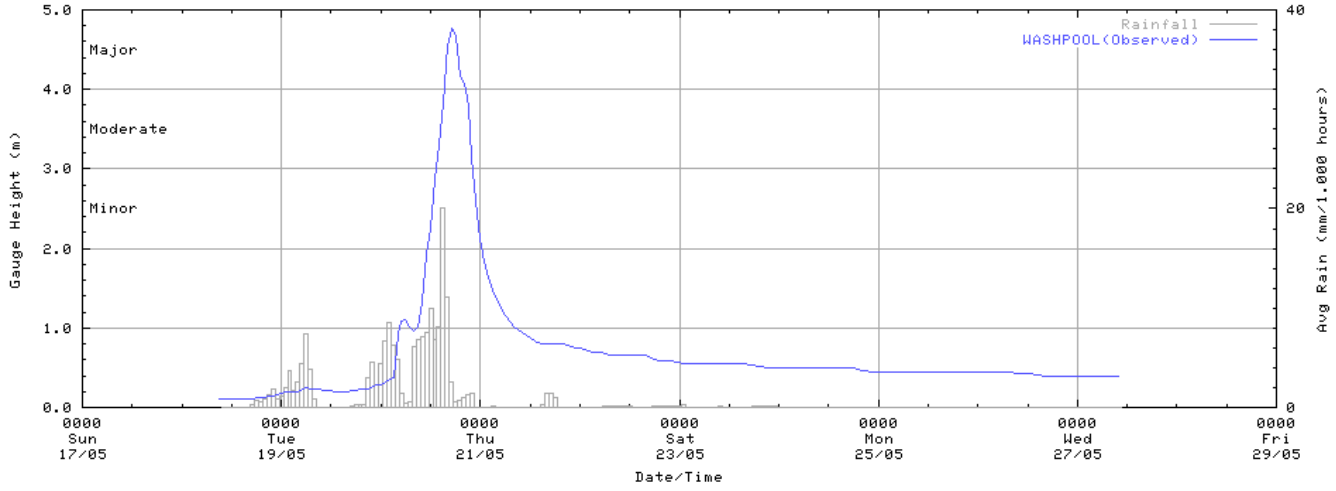


Figure 3.2.2 Hydrograph of Loamside Alert between the 17-27 May 2009.

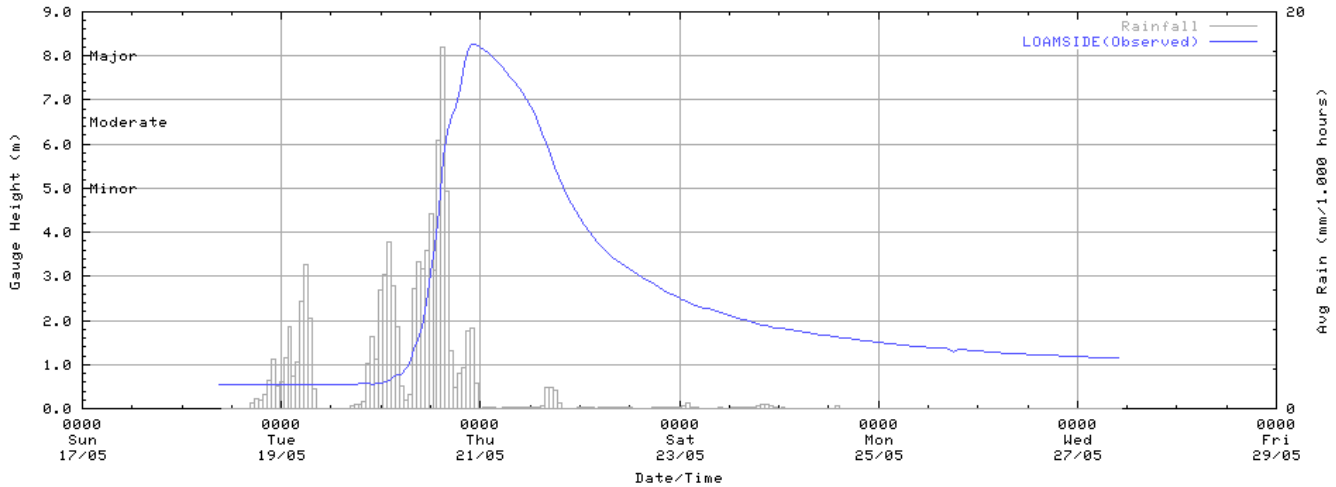


Figure 3.2.3 Hydrograph of Ripley Alert between the 17-27 May 2009.

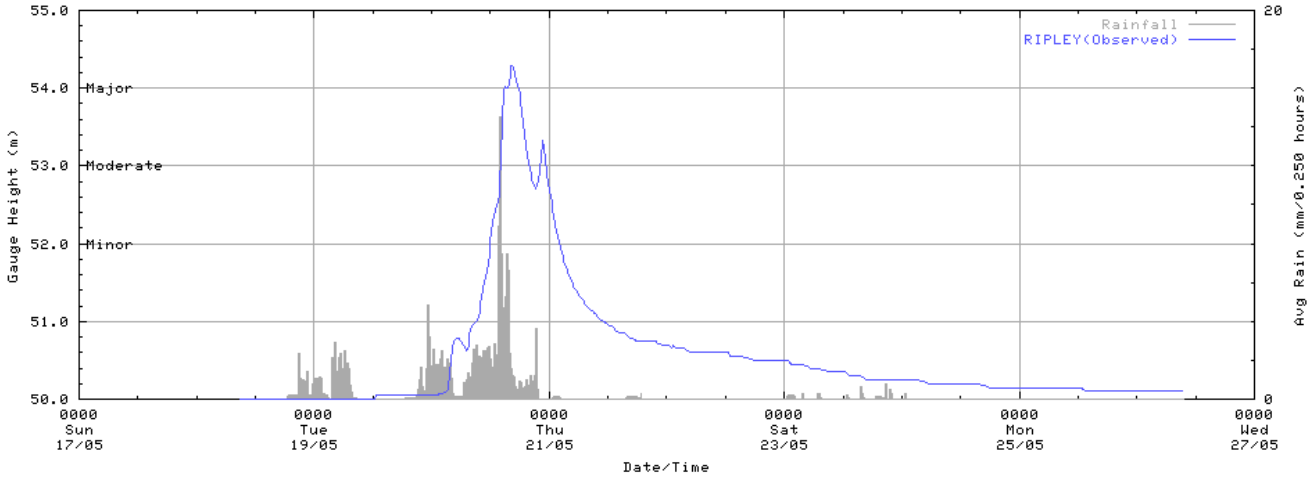


Figure 3.2.4 Hydrograph of Opossum Alert between the 17-27 May 2009.

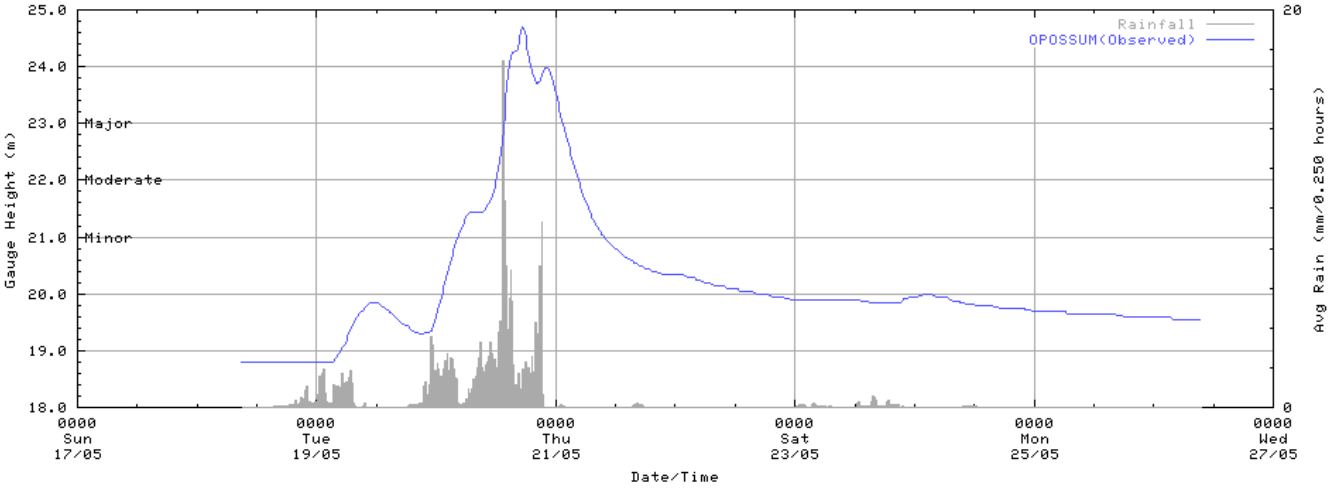


Figure 3.2.5 Hydrograph of Misty Morn between the 17-27 May 2009.

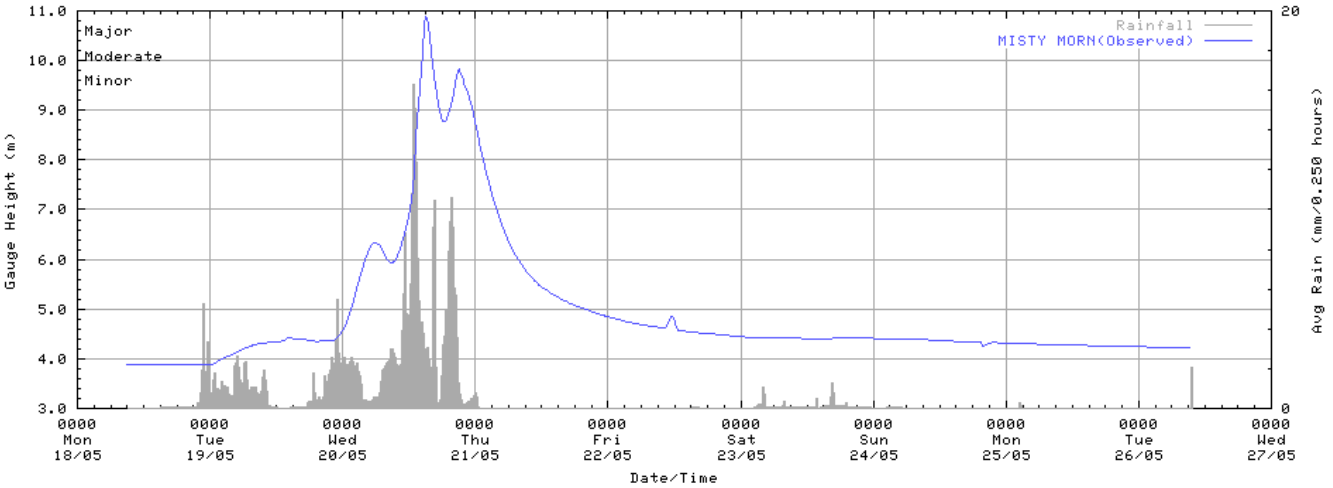


Figure 3.2.6 Hydrograph of Beatty Road Alert between the 17-27 May 2009.

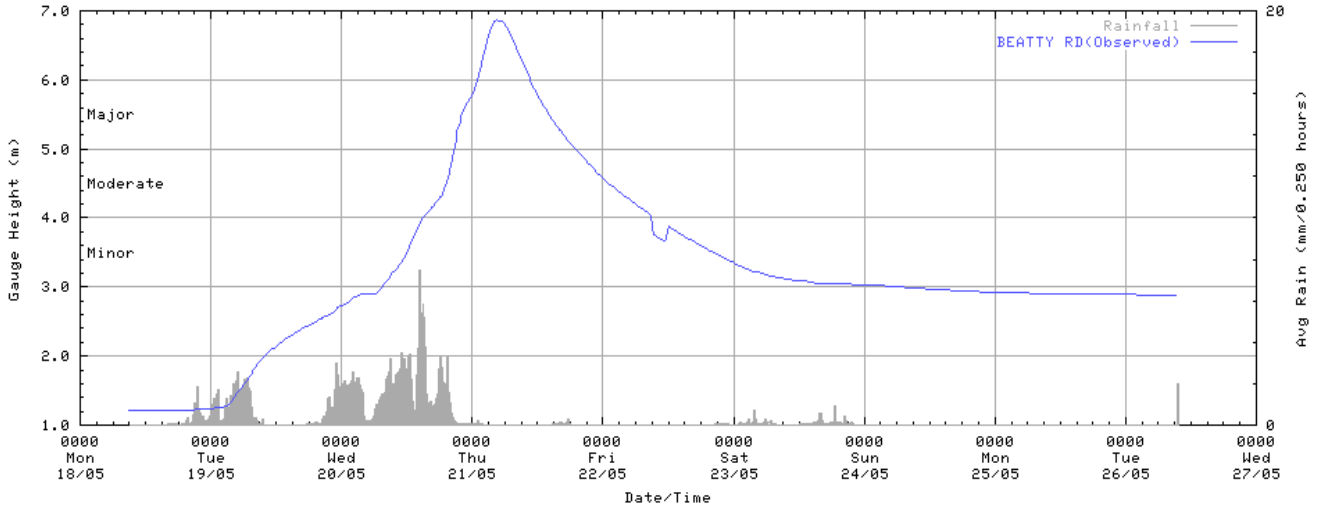


Figure 3.2.7 Hydrograph of Loganlea Road Alert between the 17-27 May 2009.

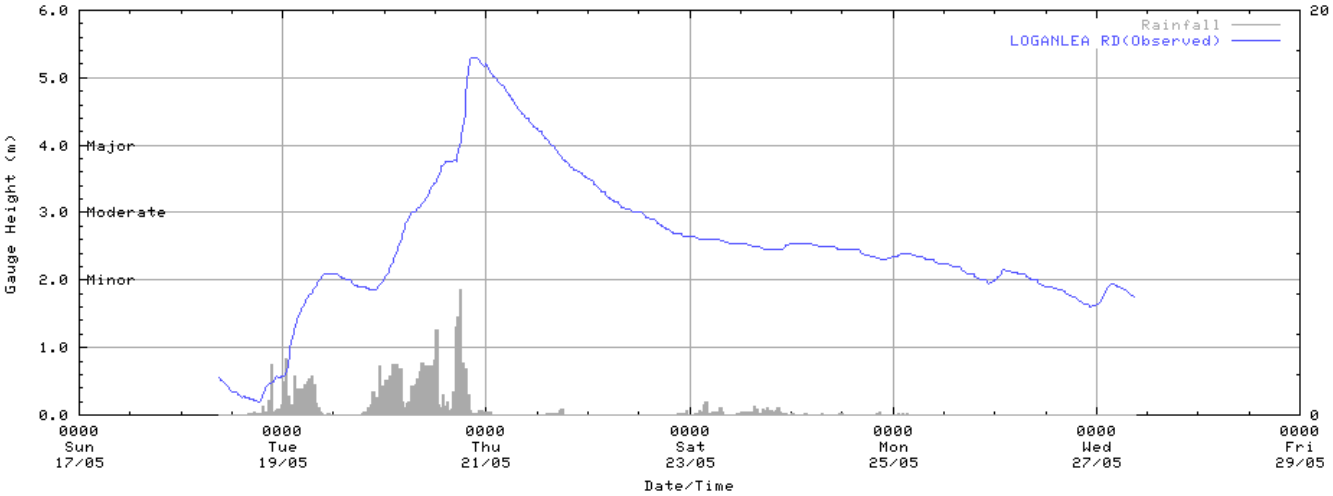
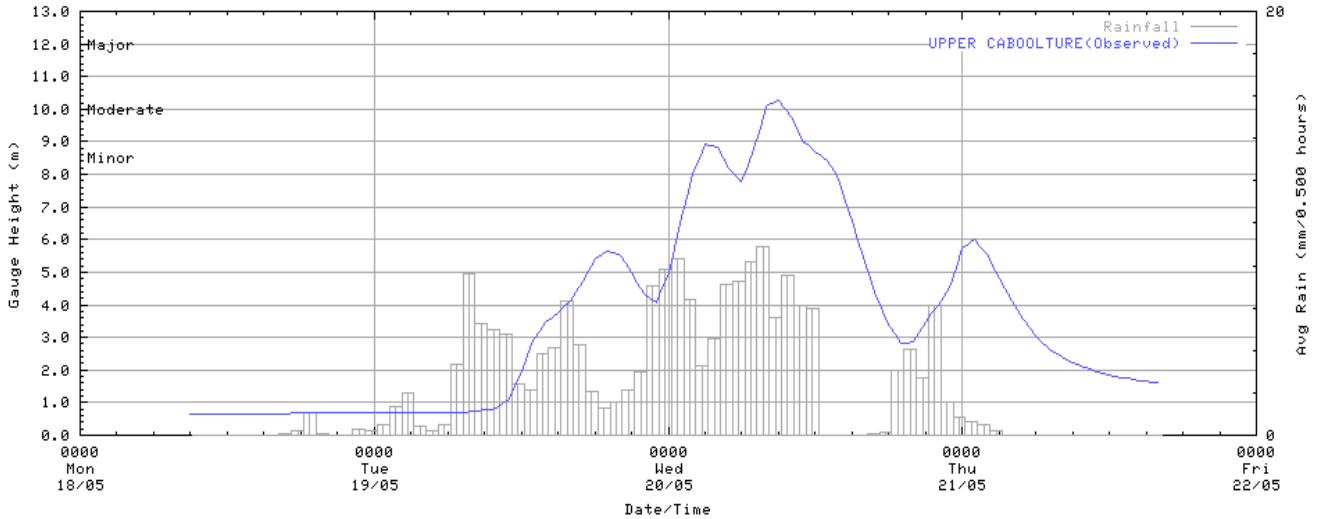


Figure 3.2.8 Hydrograph of Upper Caboolture Alert between the 17-27 May 2009.



3.3 Rainfall Maps

Figure 3.3.1 Rainfall Map of Queensland for the 7 days to 25 May 2009.

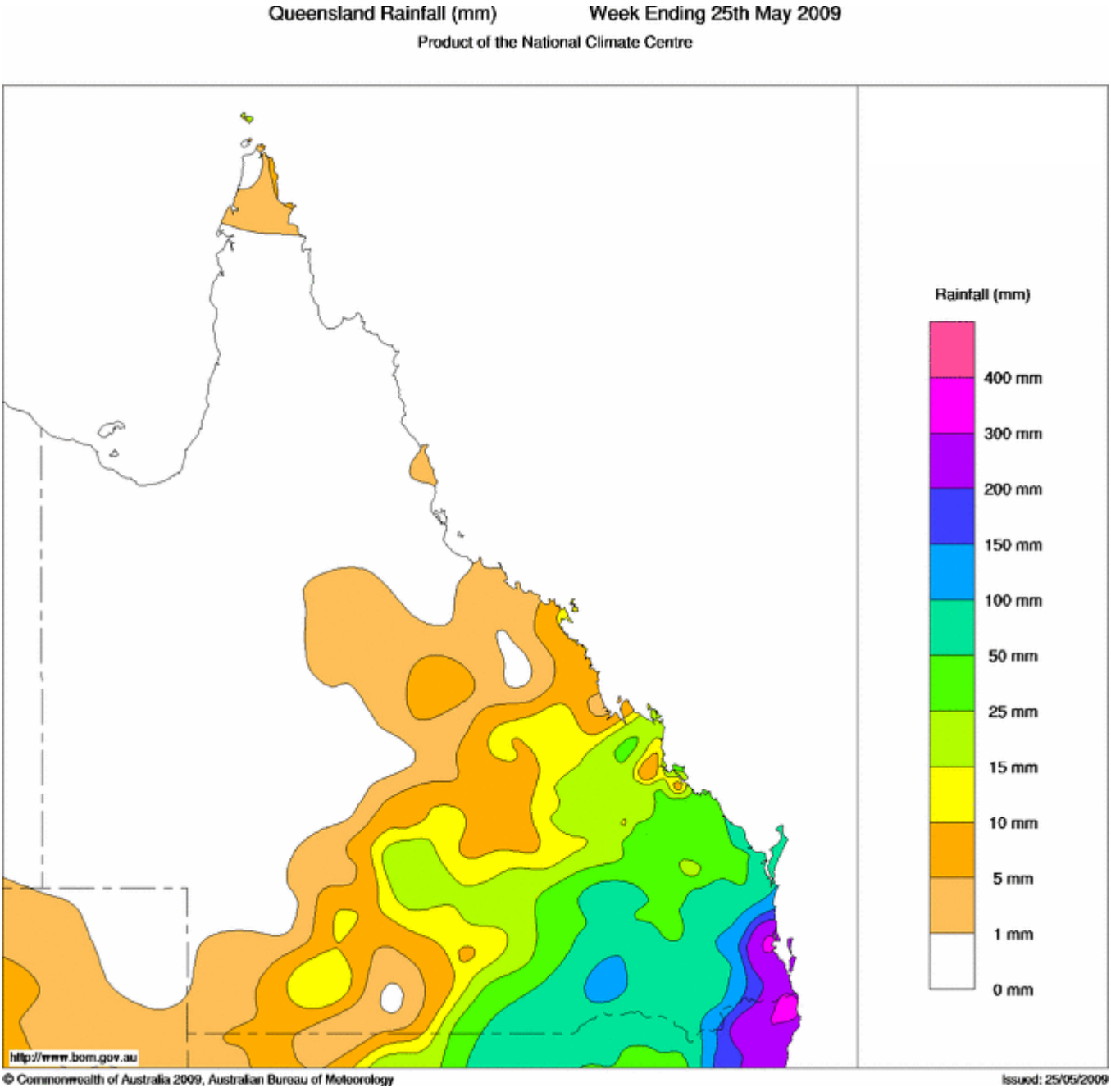
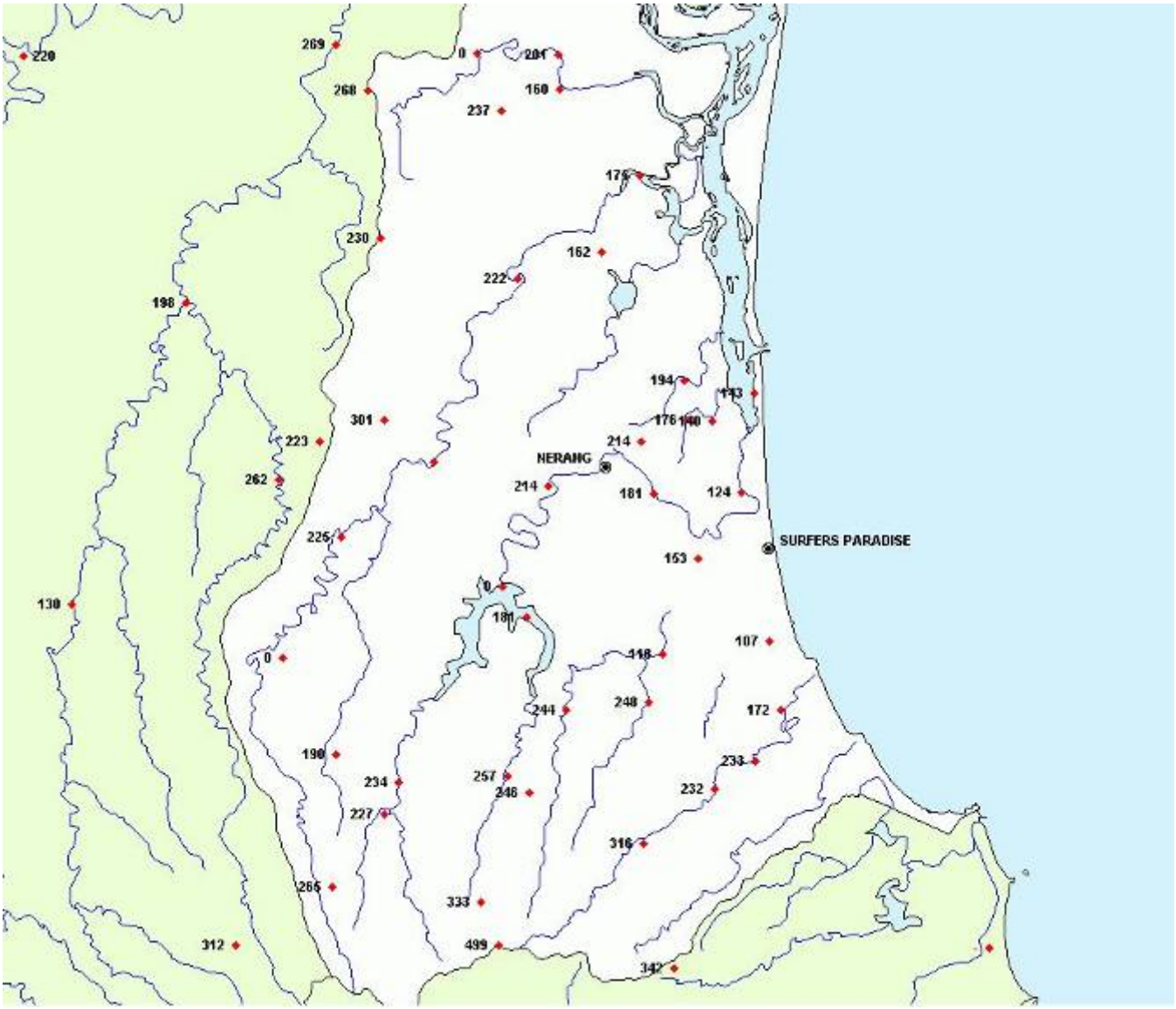


Figure 3.3.1 graphically demonstrates the rainfall event with a wide area recording in excess of 300mm in the seven days to May 25th.

Figure 3.3.2 Rainfall Map of the Gold Coast streams.



Constant and steady rainfall was recorded catchment wide during the 96 hours to 9am on the 22 May. Upper Springbrook Alert achieved the highest total of 499mm during this period, as well as the highest daily total of 236mm in the 24 hours to 9am on the 21st of May. Rainfall totals can be viewed in Table 3.5.1. , Table 3.5.2. and in Table 3.5.3.

Figure 3.3.3 Rainfall Map of the Brisbane Metropolitan area.

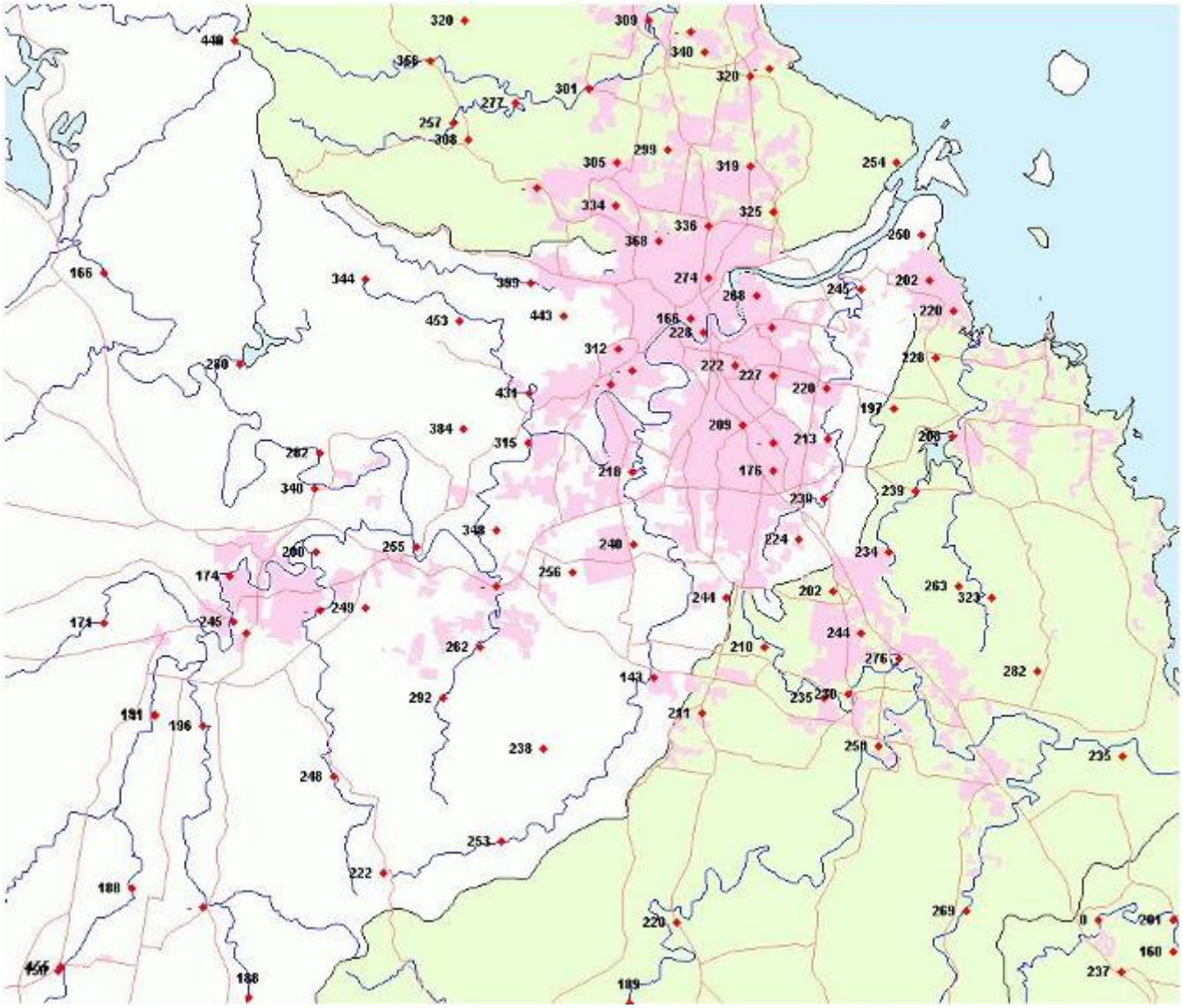


Figure 3.3.3 Rainfalls in the Brisbane Metropolitan area for the 96 hours to 9am on the 22 May were heaviest at Kenmore Hills and Jindalee. This area experienced a severe heavy rainfall event overnight on the 20 May and into the 21 May. 4 day totals of over 400mm in the area were standard with Gold Creek Reservoir Alert achieving the highest with 453mm. The highest daily total however was recorded at Kenmore Hills with 286mm in the 24 hours to 9am on the 21 May. Rainfall totals can be viewed in Table 3.5.4. , Table 3.5.5. , Table 3.5.6. and Table 3.5.7.

Figure 3.3.4 Rainfall Map of the Ipswich Creeks.

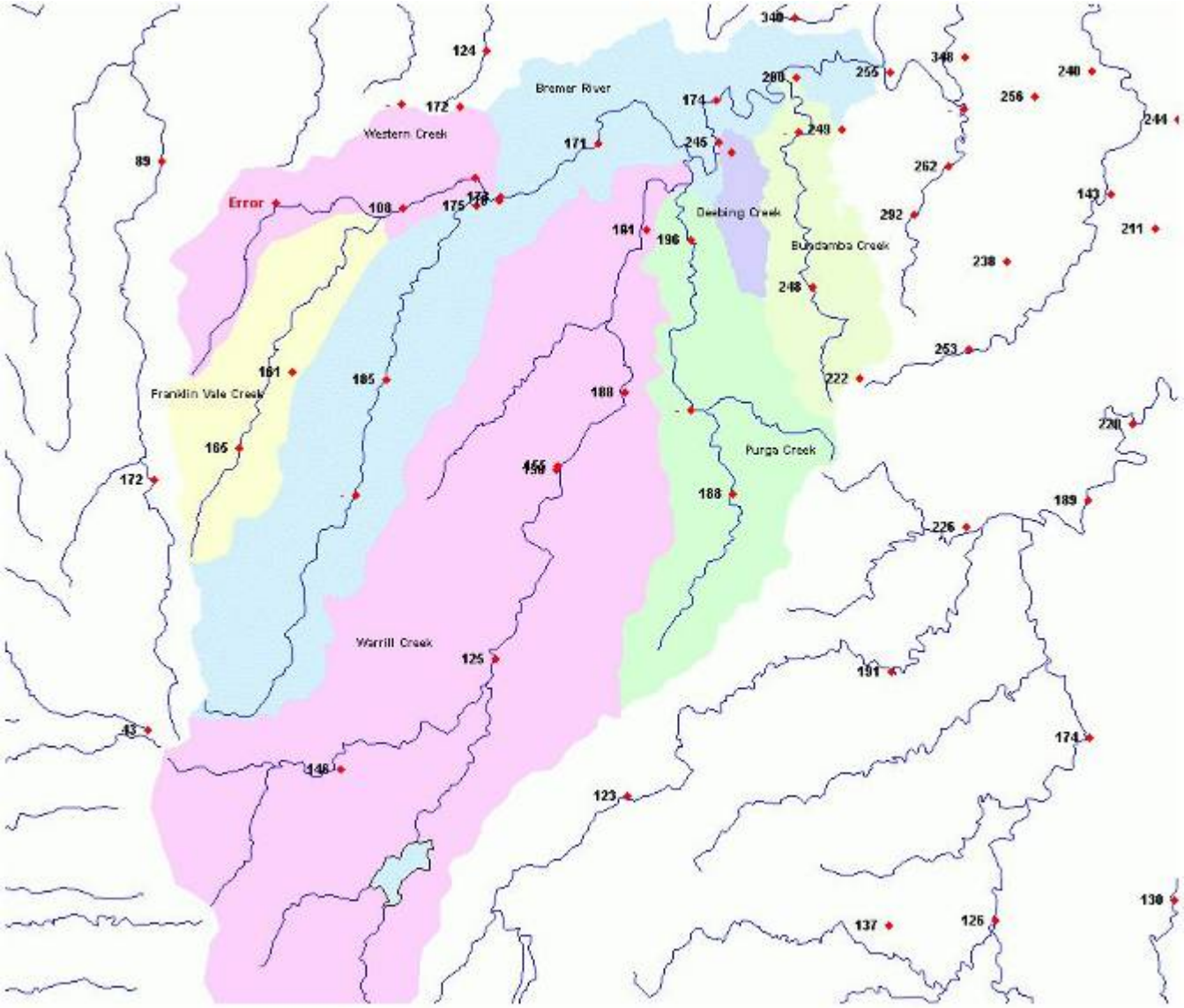


Figure 3.3.4 The largest rainfall totals recorded in the Ipswich Creeks in the 96 hours to 9am on the 22 May was just to the south of Kenmore and Jindalee, at Moggill with 348mm, however the largest 24 hour total was at Wacol which recorded 224mm in the 24 hours to 9am on the 21 May. Rainfall totals can be viewed in Table 3.5.6. and Table 3.5.7.

Figure 3.3.5 Rainfall Map of the Pine/Caboolture Rivers.

Figure 3.3.5 The heaviest rainfall during the 96 hours to 9am on the 22f May was recorded in the Burpengary area. A 4-day total of 524mm was recorded at Beerburrum Automatic Weather Station which also recorded the largest 24 hour total of 302mm. Rainfall totals can be viewed in Table 3.5.8.

Figure 3.3.6 Rainfall Map of the Sunshine Coast Streams.

Figure 3.3.6 The heaviest rainfall recorded in the Sunshine Coast area fell overnight on the 20 May. The highest 4-day (to 9am on the 22 May) total recorded was 491mm at Caloundra Water Treatment Plant. Caloundra WTP also recorded the largest 24-hour rainfall total of 264mm to 9am on the 21 May. Rainfall totals can be viewed in Table 3.5.9. , Table 3.5.10. , Table 3.5.11. and Table 3.5.12.

3.4 Rainfall Intensity

The most intense rainfall in the south east Queensland area occurred between 20-21 May 2009. For some of the key stations in this area, Hourly Hyetographs (Figures 3.4.1 to 3.4.2) and Intensity Frequency Duration (IFD) analyses (Figures 3.4.3 and 3.4.4) have been produced.

The most statistically significant duration rainfall occurred at Kenmore Hills where for the 12, 24 and 48 hour duration totals were assessed as being greater than 1% AEP (100 year Average Recurrence Interval (ARI)) intensity. (Figure 3.4.3)

The Hourly Hyetographs for the Jindalee, Kenmore Hills, Gold Coast Reservoir and Parrearra stations are shown in Figures 3.4.1 to 3.4.4. For each of these stations the time period when the most intense rainfall was recorded is shown. The information contained in this section applies to rainfall only, any statistical analysis of river levels would require a flood frequency analysis.

Figure 3.4.1 Hourly Hyetographs for Jindalee Alert and Kenmore Hills.

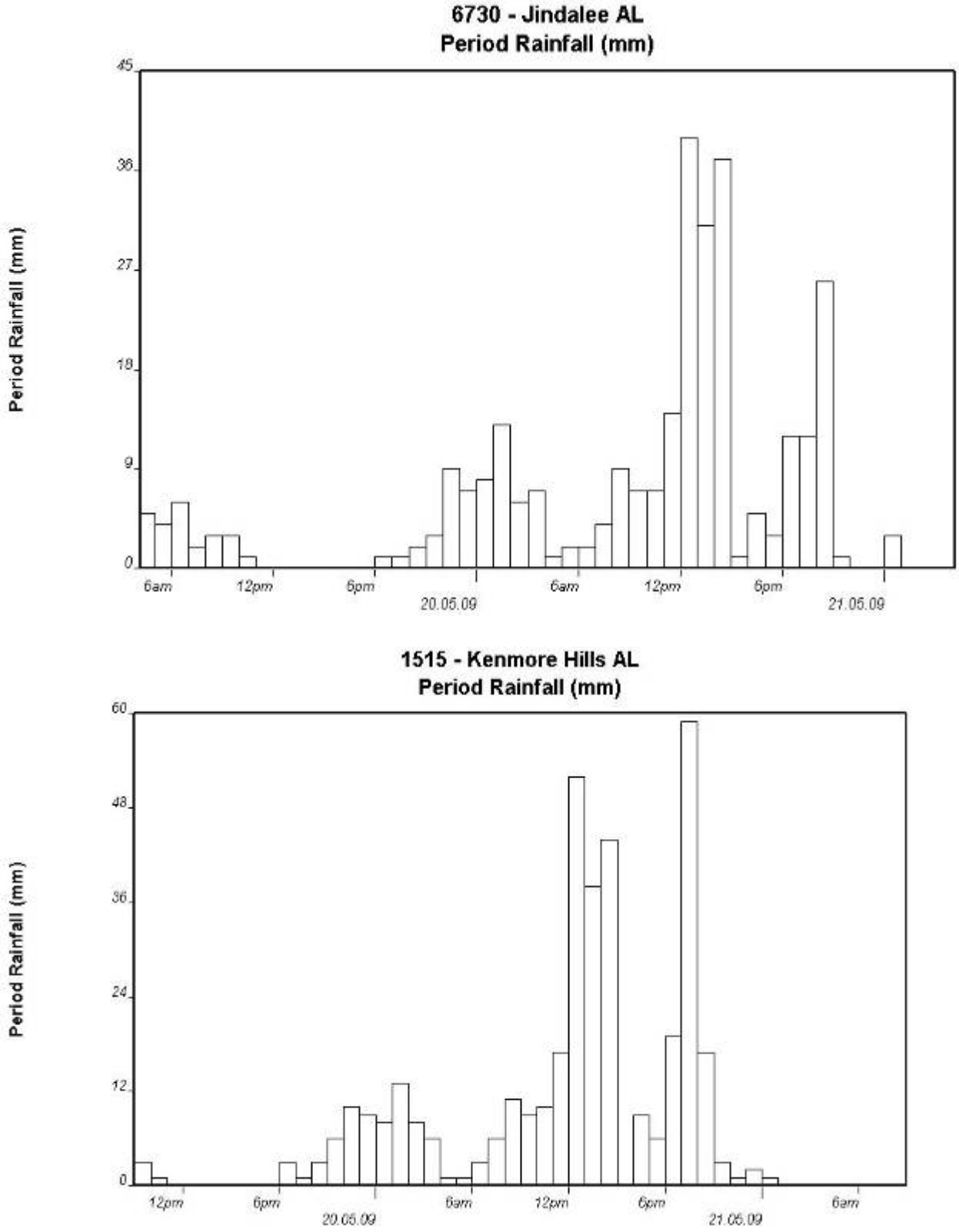


Figure 3.4.2 Hourly Hyetographs for Gold Creek Reservoir Alert and Parrearra Weir Alert.

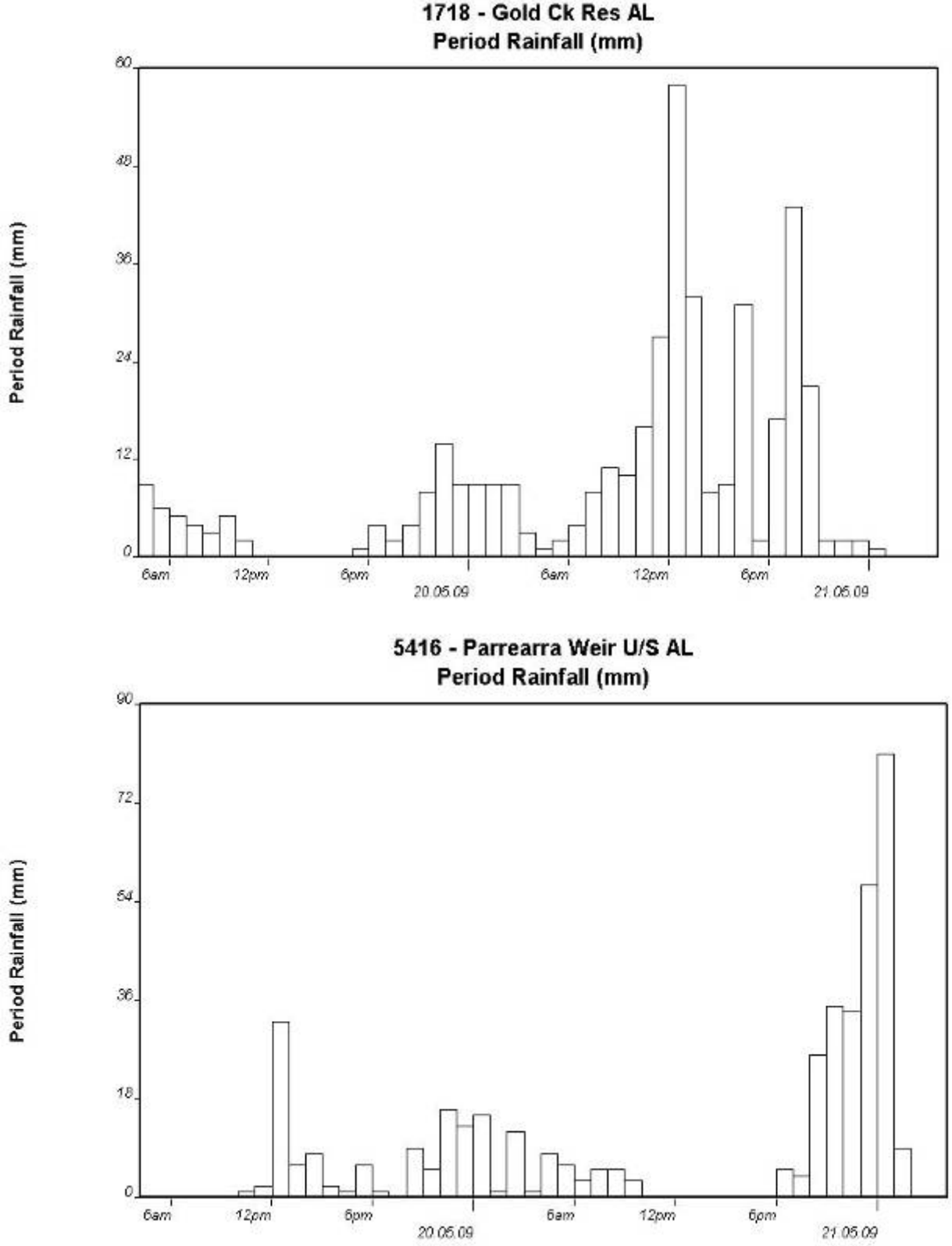
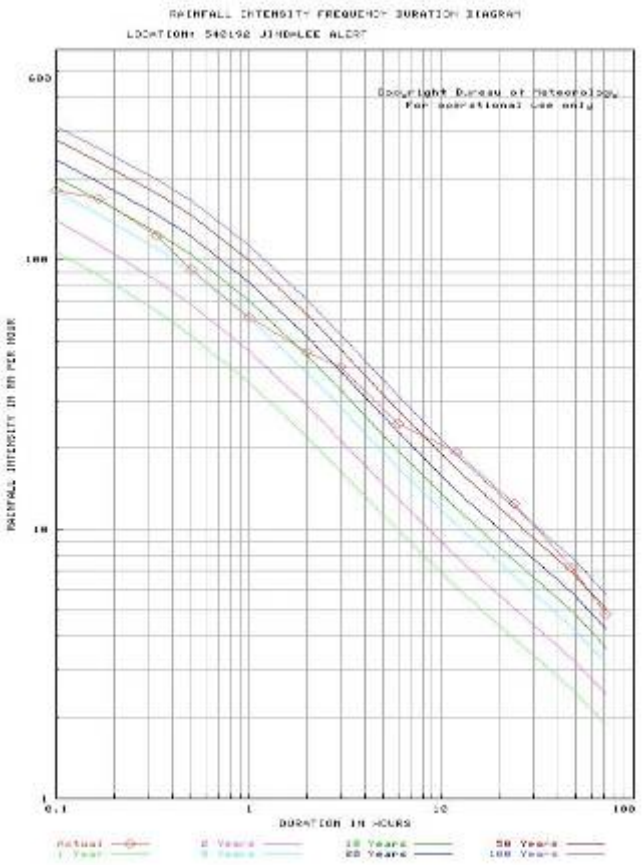


Figure 3.4.3 IFD Rainfall Analysis for Jindalee Alert and Kenmore Hills Alert.

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS LOCATION: 540192 JINDALEE ALERT Analysis of the rainfall for the 108 hours to Fri May 22 12:00:00 2009 hours to Sat Nov 22 10:59:51 2008		
Rainfall (mm)	**Period Ending**	**ARI (years)**
15	5 mins ending at 20:05:00 20/05/2009	5
18	6 mins ending at 20:06:00 20/05/2009	5-10
28	10 mins ending at 20:10:00 20/05/2009	10-20
41	20 mins ending at 20:15:00 20/05/2009	5-10
46	30 mins ending at 20:25:00 20/05/2009	5-10
61	60 mins ending at 13:35:00 20/05/2009	5-10
91	2 hours ending at 14:35:00 20/05/2009	10-20
120	3 hours ending at 14:55:00 20/05/2009	20-50
147	6 hours ending at 14:55:00 20/05/2009	20-50
231	12 hours ending at 20:30:00 20/05/2009	> 100
299	24 hours ending at 20:50:00 20/05/2009	> 100
345	48 hours ending at 22:00:00 20/05/2009	50-100
348	72 hours ending at 00:10:00 21/05/2009	20-50



RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS LOCATION: 540099 KENMORE HILLS ALERT Analysis of the rainfall for the 108 hours to Fri May 22 12:00:00 2009		
Rainfall (mm)	**Period Ending**	**ARI (years)**
10	5 mins ending at 19:55:00 20/05/2009	1-2
11	6 mins ending at 19:56:00 20/05/2009	1-2
18	10 mins ending at 19:55:00 20/05/2009	1-2
30	20 mins ending at 20:00:00 20/05/2009	2-5
41	30 mins ending at 20:05:00 20/05/2009	2-5
63	60 mins ending at 20:05:00 20/05/2009	5-10
101	2 hours ending at 14:25:00 20/05/2009	10-20
134	3 hours ending at 14:40:00 20/05/2009	20-50
169	6 hours ending at 14:40:00 20/05/2009	50-100
283	12 hours ending at 20:35:00 20/05/2009	> 100
364	24 hours ending at 21:15:00 20/05/2009	> 100
426	48 hours ending at 22:45:00 20/05/2009	> 100
431	72 hours ending at 00:25:00 21/05/2009	> 100

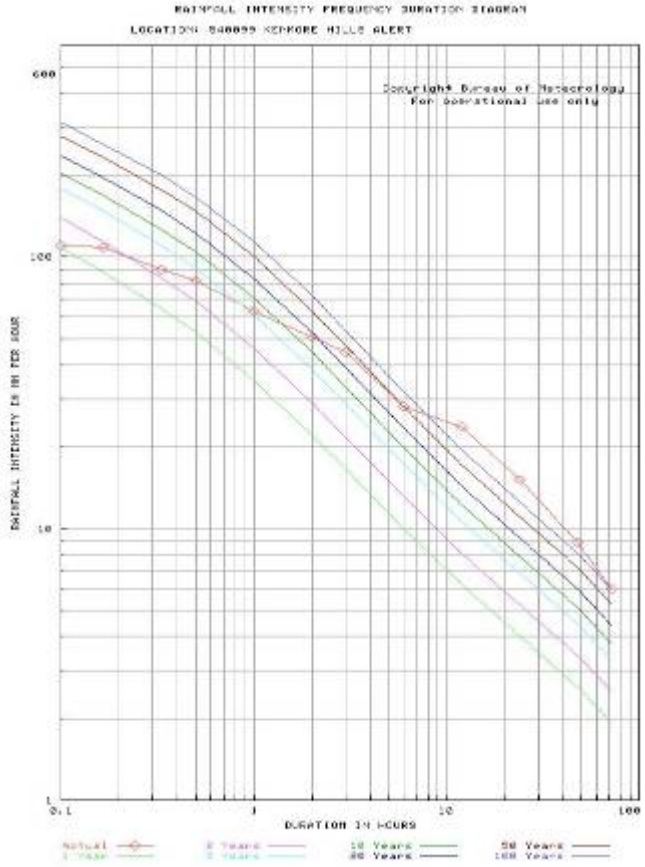


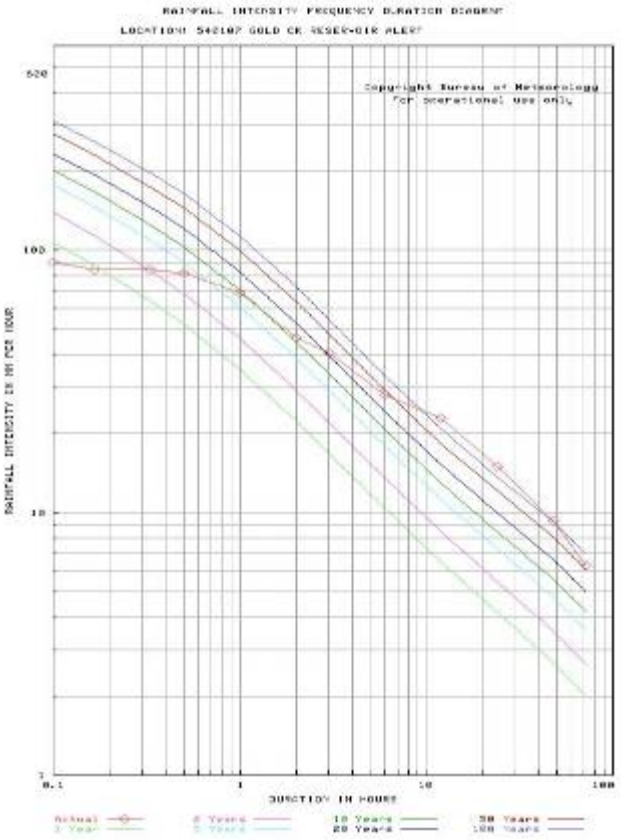
Figure 3.4.4 IFD Rainfall Analysis for Gold Creek Reservoir Alert and Parrearra Weir Alert.

RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS

LOCATION: 540107 GOLD CK RESERVOIR ALERT

Analysis of the rainfall for the 108 hours to Fri May 22 12:00:00 2009

Rainfall (mm)	Period Ending	ARI (years)
8	5 mins ending at 12:50:00 20/05/2009	< 1
9	6 mins ending at 12:51:00 20/05/2009	< 1
14	10 mins ending at 19:35:00 20/05/2009	1
28	20 mins ending at 12:55:00 20/05/2009	2-5
41	30 mins ending at 13:00:00 20/05/2009	2-5
69	60 mins ending at 13:25:00 20/05/2009	5-10
93	2 hours ending at 13:45:00 20/05/2009	10-20
122	3 hours ending at 13:45:00 20/05/2009	20-50
169	6 hours ending at 16:50:00 20/05/2009	20-50
275	12 hours ending at 20:45:00 20/05/2009	> 100
361	24 hours ending at 21:00:00 20/05/2009	> 100
446	48 hours ending at 21:30:00 20/05/2009	> 100
451	72 hours ending at 00:10:00 21/05/2009	50-100

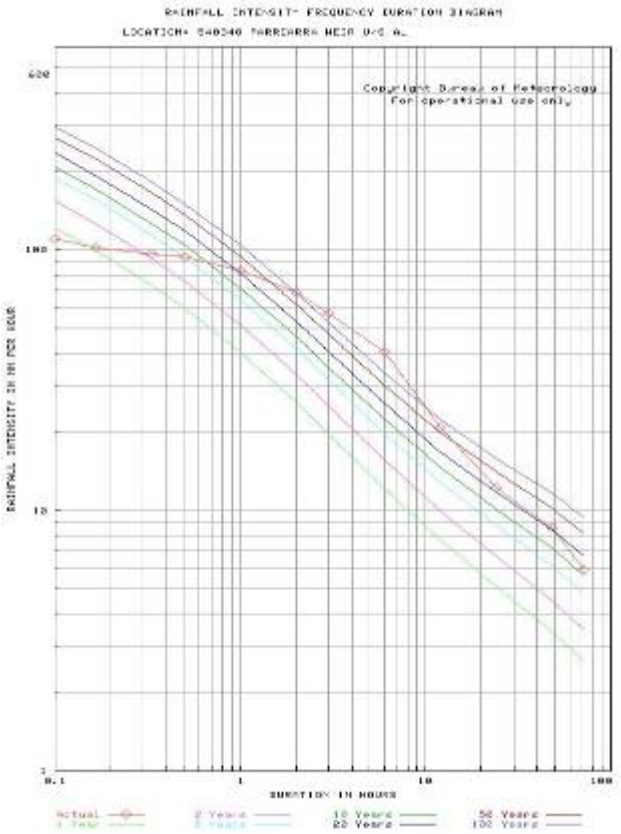


RAINFALL INTENSITY FREQUENCY DURATION ANALYSIS

LOCATION: 540348 PARREARRA WEIR U/S AL

Analysis of the rainfall for the 108 hours to Fri May 22 12:00:00 2009

Rainfall (mm)	Period Ending	ARI (years)
9	5 mins ending at 00:25:00 21/05/2009	< 1
11	6 mins ending at 00:26:00 21/05/2009	< 1
17	10 mins ending at 00:30:00 21/05/2009	1-2
32	20 mins ending at 00:30:00 21/05/2009	2-5
47	30 mins ending at 00:30:00 21/05/2009	5-10
83	60 mins ending at 00:55:00 21/05/2009	20-50
137	2 hours ending at 01:00:00 21/05/2009	> 100
171	3 hours ending at 01:05:00 21/05/2009	> 100
244	6 hours ending at 01:55:00 21/05/2009	> 100
251	12 hours ending at 02:00:00 21/05/2009	50-100
293	24 hours ending at 01:55:00 21/05/2009	20-50
412	48 hours ending at 01:55:00 21/05/2009	20-50
427	72 hours ending at 02:00:00 21/05/2009	10-20



3.5 Rainfall Totals

The abbreviations used in the following tables include:

AL - ALERT Radio Telemetry,
TM - Telephone Telemetry,
AWS - Automatic Weather Station,
SYN - Bureau Synoptic Station

Note: * signifies automatic station

Table 3.5.1 Rainfall totals for the Nerang River.

Station Name	24 hours to 9am on the				Total mm
	19	20	21	22	
Nerang					
Natural Bridge	97	46	249 in 2 days		**392**
Numinbah AL *	65	30	99	33	**227**
Upper Springbrook AL *	140	51	236	72	**499**
Springbrook	98	45	200	60	**403**
Lower Springbrook AL *	95	47	146	45	**333**
Mt Nimmel AL *	82	33	99	31	**245**
Bonogin AL *	90	23	107	28	**248**
Little Nerang Dam AL *	78	45	103	31	**257**
Numinbah Valley TM *	61	36	86	25	**208**
Numinbah Valley AL *	68	39	97	30	**235**
Hinze Dam	80	43	83	23	**229**
Tallai AL *	64	22	74	21	**181**
Nerang	86	37	78	13	**214**
Clearview TM *	105	50	67	14	**236**
Clearview AL *	88	47	65	14	**214**
Carrara AL *	73	28	66	14	**181**
Molendinar AL *	83	46	69	16	**214**
Neranwood AL *	78	32	105	27	**242**
Mudgeeraba AL *	51	10	24	33	**118**
Boobegan Creek Lock AL *	52	18	73	10	**153**
Evandale AL *	60	22	35	7	**124**
Biggera Ck Dam AL *	51	44	88	11	**194**
Loder Ck Dam AL *	54	41	70	11	**176**
Loder Creek AL *	46	31	55	8	**140**
Southport	67	30	73		**170**
Air Sea Rescue AL *	39	28	68	8	**143**
Gold Coast Seaway AWS *	39	29	60	8	**136**
Burleigh Waters AL *	45	7	45	10	**107**
Miami	54	20	95	14	**183**
Tallebudgera Ck Dam AL *	124	24	134	34	**316**
Tallebudgera Ck Rd AL *	75	23	114	20	**232**
Coplicks Bridge AL *	89	13	111	20	**233**
Oyster Creek AL *	60	10	89	13	**174**
Tomewin AL *	102	25	172	43	**342**
Tallowood	126	29	179	43	**377**
Coolangatta AWS *	46	9	108	15	**178**
Murwillumbah SYN	67	20	145	46	**278**

Numerical Average	**75**	**31**	**98**	**24**	**230**
Maximum	**140**	**51**	**236**	**71**	**498**

Table 3.5.2 Rainfall totals for the Coomera River.

Station Name	24 hours to 9am on the 19	20	21	22	Total Mm
Coomera					
Binna Burra AL *	63	37	116	49	**265**
Canungra Army AL *	76	63	66	20	**226**
Beechmont AL *	62	33	74	21	**190**
Mt Tamborine	136	77	81	17	**311**
Mt Tamborine AL *	135	69	80	17	**301**
Wongawallan AL *	76	68	65	21	**230**
Oxenford	69	68	69	7	**213**
Oxenford Weir AL *	79	70	62	11	**222**
Coomera	28	65	62		**155**
Monterey Keys AL *	49	59	51	3	**162**
Coomera Shores AL *	29	76	67	3	**175**
Numerical Average	**73**	**62**	**72**	**17**	**223**
Maximum	**136**	**77**	**116**	**49**	**311**

Table 3.5.3 Rainfall totals for the Pimpama River.

Station Name	24 hours to 9am on the 19	20	21	22	Total Mm
Pimpama					
Luscombe AL *	125	74	62	7	268
Hotham Creek AL *	104	76	53	4	237
Norwell AL *	85	68	40	8	201
Kerkin Road AL *	40	64	53	3	160
Steiglitz Wharf AL *	52	72	49	2	175
Numerical Average	**81**	**71**	**51**	**5**	**208**
Maximum	**125**	**76**	**62**	**8**	**268**

Table 3.5.4 Rainfall totals for the Logan and Albert Rivers.

Station Name	24 hours to 9am on the 19	20	21	22	Total Mm
Logan-Albert					
Ward Road TM *	14	21	55	16	**106**
Darlington AL *	29	30	122	42	**223**
Darlington	24	26	104		**154**
O'reillys AL *	58	41	158	55	**312**
Lumeah AL *	35	32	51	12	**165**
Benobble AL *	107	68	74	13	**262**
Laheys Lookout AL *	91	63	54	15	**223**
Bromfleet AL *	66	55	64	13	**198**
Bromfleet TM *	58	50	55	12	**175**
Wolffdene AL *	96	84	73	16	**269**
Canungra	78	55	66	15	**214**
Forest Home TM *	25	36	56	13	**130**
Maroon Dam	18	24	59	6	**107**
Palen Creek AL *	10	12	78	22	**122**

Rathdowney AL *	20	30	53	17	**121**
Rathdowney TM *	18	26	51	14	**109**
Station Name	**24 hours to 9am on the**				**Total Mm**
	19	**20**	**21**	**22**	
Logan-Albert (continued)					
Dieckmans Bridge AL *	12	23	58	17	**110**
Dieckmans Bridge TM *	12	21	57	17	**107**
Foxley AL *	9	12	67	19	**107**
Rudds Lane AL *	21	17	42	15	**95**
Tramway Lane TM *	23	22	37	11	**93**
Knapps Peak AL *	31	41	50	6	**128**
Cannon Cove TM *	26	43	52	5	**126**
Kooralbyn AL *	37	41	54	5	**137**
Round Mountain TM *	30	34	39	5	**108**
Round Mountain AL *	35	39	46	6	**126**
Beaudesert	43	34	42		**119**
Beaudesert AL *	70	47	49	8	**174**
Wilsons Peak AL *	27	27	61	14	**129**
Wilsons Peak AL-P *	28	26	57	13	**124**
Croftby TM *	24	29	51	2	**106**
Croftby AL *	25	30	55	3	**113**
Boonah AL *	23	47	49	4	**123**
The Overflow TM *	50	58	70	9	**187**
The Overflow AL *	52	60	71	8	**191**
Romani AL *	57	74	87	8	**226**
Yarrahappini TM *	56	63	47	9	**175**
Yarrahappini AL *	60	70	50	9	**189**
Maclean Bridge	84	69	47	13	**213**
Maclean Bridge AL *	87	72	48	13	**220**
Waterford AL *	76	81	87	6	**250**
Stretton(Gowan Rd) AL *	53	73	83	1	**210**
Underwood(Millers Rd) AL *	48	73	81	0	**202**
Slacks Ck(Reserve Pk) AL *	59	78	105	2	**244**
Logan City SYN	86	79	47 in 2 days		**165**
Hillcrest(Wine Glass) AL *	50	75	84	2	**211**
Marsden (First Ave) AL *	60	76	94	5	**235**
Bega Road Quarry AL *	58	75	95	2	**230**
Slacks Ck(Loganlea Rd AL *	64	86	122	4	**276**
Carbrook AL *	85	89	106	2	**282**
Carbrook(Riedel Road) AL *	66	78	89	1	**234**
Priestdale AL *	67	95	100	1	**263**
Burbank AL *	60	98	81	0	**239**
Mt Cotton West AL *	75	100	146	2	**323**
Rochedale South AL *	58	95	81	0	**234**
Leslie Harrison Dam AL *	64	96	48	0	**209**
Numerical Average	**47**	**53**	**69**	**10**	**181**
Maximum	**107**	**100**	**158**	**55**	**323**

Table 3.5.5 Rainfall totals for the Stanley/Upper Brisbane River.

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Stanley/Upper Brisbane					
Peachester	52	207	14		**279**
Peachester AL *	41	118	8	0	**173**
Woodford	43	175	12		**239**
Lindfield	18	98	4		**126**
Mt Kilcoy Weir TM *	17	111	9	0	**142**
Kilcoy		86			**86**
Kilcoy AL *	11	97	15	0	**129**
Somerset Dam	11	148	36		**196**
Blackbutt	10	69	10	0	**91**
Yarraman	6	69			**78**
Yarraman AL *	3	53	0	0	**58**
Cooyar Creek TM *	7	64	1	0	**76**
Cooyar Creek AL *	5	54	0	0	**63**
Linville TM *	9	53	2	0	**67**
Devon Hills AL *	12	89	1	0	**106**
St Aubyns AL *	8	85	6	0	**99**
Mt Binga		114	25		**143**
Nukinenda AL *	8	93	8	0	**109**
Boat Mountain TM *	4	94	1	0	**101**
Glendale TM *	10	94	3	0	**109**
Gregor Ck AL-P *	9	75	1	0	**88**
Gregor Ck AL-B *	10	80	1	1	**95**
Crows Nest	7	108	7		**122**
Crows Nest AL *	10	95	8	0	**113**
Perseverance AL *	8	75	6	0	**89**
Ravensbourne AL *	26	49	21	5	**101**
Cressbrook Dam AL *	12	61	9	0	**82**
Rosentreters Bridge TM *	7	91	6	0	**104**
Rosentreters Bridge AL *	10	84	4	0	**98**
Toogoolawah	12	91	6		**111**
Toogoolawah AL *	10	90	5	0	**106**
Caboonbah AL *	29	124	19	0	**173**
Esk	27	120	22		**169**
Wivenhoe Dam	18	94	46		**158**
Wivenhoe Dam Hw AL-B *	18	91	47	0	**156**
Wivenhoe Dam Tw AL-P *	19	85	49	0	**153**
Numerical Average	**15**	**94**	**12**	**0**	**122**
Maximum	**52**	**207**	**49**	**5**	**279**

Table 3.5.6 Rainfall totals for the Lower Brisbane River.

Station Name	24 hours to 9am				Total mm
	19	20	21	22	
Lower Brisbane					
Toowoomba AL *	20	59	24	0	**103**
Helidon TM *	25	41	25	0	**91**
Upper Sandy Creek AL *	52	103	34	0	**189**
Sandy Creek Road AL *	27	23	26	1	**77**
Little Egypt AL *	19	15	20	14	**68**
West Woodbine AL *	15	14	25	14	**68**
Tenthill TM *	12	25	57	9	**103**
Tenthill AL *	11	20	48	2	**81**
Gatton	27	40			**67**
Gatton AL *	22	34	66	2	**124**
Gatton AWS *	19	36	32	1	**88**
Thornton AL *	48	49	53	14	**164**
Showground Weir AL *	17	31	39	2	**89**
Glenore Grove AL *	14	43	35	0	**92**
Lyons Bridge AL-B *	18	63	43	0	**124**
O'reilly's Weir TM *	17	75	44	0	**136**
O'reilly's Weir AL *	16	73	45	0	**134**
Lowood Pump Stn AL-B *	18	54	51	0	**123**
Lowood	22	70	55		**147**
Lowood AL-P *	25	62	69	0	**156**
Fernvale	26	71	82		**179**
Savages Crossing AL *	23	70	72	0	**165**
Marburg AL *	20	46	57	0	**123**
Lake Manchester	43	76	187		**306**
Lake Manchester AL *	41	72	166	0	**279**
Mt Crosby AL *	29	72	192	0	**293**
Colleges Crossing AL *	32	83	221	4	**340**
Karalee	29	81	215	1	**326**
Adams Bridge TM *	43	53	86	11	**193**
Stokes Crossing AL *	41	46	95	3	**185**
Spressers Bridge AL *	32	51	89	3	**175**
Grey's Plains Road AL *	46	42	67	10	**165**
Franklyn Vale AL *	43	40	73	3	**159**
Kuss Road AL *	22	38	48	0	**108**
Tallegalla AL *	30	54	86	2	**172**
Rosewood AL-B *	31	49	89	4	**173**
Rosewood AL *	10	0			**10**
Walloon AL-P *	23	47	101	0	**171**
Walloon AL-B *	22	47	101	0	**170**
Tarome	35	55	68	6	**164**
Tarome AL-P *	31	48	62	5	**146**
Moogerah Dam	28	34	74	4	**140**
Toohills Crossing TM *	29	50	58	4	**141**
Kalbar TM *	28	53	48	7	**136**
Kalbar Weir AL *	23	48	47	7	**125**
Harrisville	34	33	82	4	**153**

Station Name	24 Hours to 9am on the 19	20	21	22	Total (mm)
Lower Brisbane (continued)					
Harrisville AL *	33	47	66	3	**149**
Harrisville AL-B *	36	49	66	4	**155**
Churchbank Weir AL *	51	45	88	4	**188**
Amberley AL-P *	30	49	108	3	**190**
Amberley AL-B *	21	40	68	1	**130**
Amberley (Dnr) TM *	26	48	121	1	**196**
Amberley AWS *	26	56	142	1	**225**
Washpool AL *	37	60	86	4	**187**
Loamside AL *	33	52	108	3	**196**
One Mile Bridge AL *	28	61	155	1	**245**
Brassall(Hancocks Br) AL *	8	27	139	0	**174**
Moggill AL-P *	29	69	155	2	**255**
Jindalee AL *	39	77	233	1	**350**
Brisbane City AL *	56	92	80	0	**228**
Numerical Average	**28**	**51**	**84**	**3**	**163**
Maximum	**56**	**103**	**233**	**14**	**350**

Table 3.5.7 Rainfall totals for the Ipswich/Brisbane Creeks.

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Ipswich/Brisbane Creeks					
Lyons AL *	51	62	107	1	**221**
Ripley AL *	31	63	151	3	**248**
Bundamba (Barclay St) AL *	25	61	162	0	**248**
Bundamba (Hanlon St) AL *	12	35	153	0	**200**
Bellbird Park AL *	31	73	185	2	**291**
Opossum AL *	29	70	163	0	**262**
Carole Park AL *	41	84	131	0	**256**
Wacol AL *	39	84	224	1	**348**
Jingle Downs AL *	61	62	128	2	**253**
Greenbank Al*	44	81	111	2	**238**
Greenbank	45		178/2	4	**227**
Calamvale AL *	58	80	101	0	**239**
Archerfield AWS *	45	81	95	0	**221**
Inala AL *	44	86	110	0	**240**
Corinda High AL *	46	83	88	1	**218**
Mt Gravatt AL *	56	85	36	0	**177**
Holland Park West AL *	53	88	68	0	**209**
Greenslopes	55	91	72		**218**
Brisbane Rpa Hospital	57	90	77		**224**
East Brisbane AL *	59	91	72	0	**222**
Brisbane AWS *	57	89	76	0	**222**
Eight Mile Plains AL *	53	85	86	0	**224**
Wishart(Greenwood St) AL *	56	88	86	0	**230**
Mansfield AL *	63	93	69	0	**225**
Chandler AL *	60	88	49	0	**197**
Bulimba AL *	74	106	88	0	**268**
Carindale AL *	60	96	63	0	**219**

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Ipswich/Brisbane Creeks (continued)					
Camp Hill AL *	64	96	67	0	**227**
Lytton AL *	92	97	59	1	**249**
Hemmant AL *	74	104	67	0	**245**
Caltex Lytton	87	96	72	0	**255**
Ormiston	75	86	66		**227**
Capalaba	63	98	58		**219**
Ransome AL *	67	103	58	0	**228**
Manly AL *	73	94	52	1	**220**
Wynnum Bowls Club AL *	72	80	50	0	**202**
Pullenvale AL *	43	97	244	0	**384**
Kenmore Hills AL *	51	94	286	0	**431**
Gold Ck Reservoir AL *	66	106	280	1	**453**
Long Pocket	55	92	81		**228**
Toowong AL *	60	87	165	0	**312**
Brisbane (Bcc) AL *	50	66	50	0	**166**
Three Ways AL *	58	114	169	0	**341**
Enoggera Dam AL *	76	108	214	1	**399**
Mt Coot-tha AL *	78	96	268	1	**443**
Kelvin Grove	85	102	110		**297**
Alderley AL *	86	106	176	0	**368**
Bowen Hills AL *	80	97	97	0	**274**
Numerical Average	**58**	**88**	**116**	**1**	**260**
Maximum	**92**	**114**	**286**	**4**	**453**

Table 3.5.8 Rainfall totals for the Pine/Caboolture Rivers.

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Pine/Caboolture					
Mitchelton(Osborne Rd AL *	68	111	155	0	**334**
Alderley	82	111	206		**399**
Gordon Park AL *	91	109	134	0	**334**
Toombul	79	112			**191**
Toombul(Nudgee Rd) AL *	99	114	112	0	**325**
Brisbane Airport AWS *	82	96	66	0	**244**
Luggage Point AL *	89	98	67	0	**254**
Geebung AL *	66	120	133	0	**319**
Boondall	50	132	111		**293**
Everton Hills AL *	59	116	130	0	**305**
Aspley Reservoir AL *	63	118	118	0	**299**
Deagon AL *	61	137	121	0	**319**
Bracken Ridge Res AL *	61	148	130	0	**339**
Mt Glorious	66	225	114		**405**
Mt Glorious AL-P *	75	253	114	0	**442**
Mt Nebo	70	150	128		**348**
Highvale	68	120	116		**304**
Cedar Ck Rd AL *	66	182	108	0	**356**
Samford AL *	58	116	100	0	**275**
Samford Village AL *	49	127	132	0	**308**
Clear Mountain AL *	43	179	98	0	**320**

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Pine/Caboolture (continued)					
Drapers Crossing AL *	59	121	96	1	**277**
Cash's Crossing AL *	60	132	109	0	**301**
Normanby Way AL *	50	175	84	0	**309**
Laceys Creek AL *	46	210	103	1	**362**
Baxters Creek AL *	42	227	161	0	**432**
Dayboro AL *	47	268	137	0	**454**
North Pine Dam AL *	32	65	42	0	**139**
North Pine Dam AL-B *	33	150	43	0	**226**
Narangba	52	274	91		**423**
Browns Creek AL *	53	254	98	0	**410**
Lake Kurwongbah AL *	40	187	50	1	**278**
Youngs Crossing AL *	53	182	59	0	**294**
Strathpine	57	206	79		**342**
Petrie AL *	50	168	60	0	**279**
Lawnton AL *	47	184	71	0	**303**
John Bray Park AL *	54	194	81	1	**331**
Murrumba Downs AL *	56	198	81	1	**337**
Lipscombe Rd AL *	42	226	56	0	**329**
Redcliffe AWS *	32	151	44	3	**240**
Mt Mee AL-P *	53	242	57	0	**362**
Mt Mee AL-B *	53	242	57	0	**362**
Moorina AL *	45	227	118	0	**399**
Burpengary(Rowley Rd) AL *	55	261	126	0	**453**
Burpengary (Dale St) AL *	52	261	118	1	**443**
Deception Bay AL *	60	254	63	0	**386**
Round Mt Reservoir AL *	29	265	74	0	**374**
Wamuran AL *	36	268	59	0	**377**
Upper Caboolture TM *	34	214	74	1	**337**
Upper Caboolture AL *	33	207	71	1	**326**
Caboolture Wtp AL *	26	231	112	0	**391**
Morayfield AL *	42	257	143	1	**456**
Bribie Island AL *	39	239	33	0	**331**
Beerburrum AWS *	90	302	139	0	**542**
Numerical Average	**56**	**184**	**98**	**0**	**333**
Maximum	**99**	**302**	**206**	**3**	**542**

Table 3.5.9 Rainfall totals for the Mooloolah River.

Station Name	24 hours to 9am on the				Total mm
	19	20	21	22	
Mooloolah					
Bald Knob AL *	44	128	20	0	**196**
Ewen Maddock Dam AL *	37	178	62	0	**280**
Jordan St AL *	18	160	121	0	**304**
Caloundra Wtp	23	204	264		**491**
Sugarbag Rd AL *	20	156	242	0	**423**
Palmview AL *	16	191	161	0	**370**
Meridan Way AL *	17	158	240	0	**421**
Parrearra Weir U/s AL *	13	159	253	0	**427**
Tanawha AL *	32	153	58	0	**245**
Bundilla AL *	22	169	142	0	**334**
Mountain Creek AL *	26	144	64	0	**235**
Golden Beach AL *	38	250	130	1	**426**
Landsborough	47/3	190	38		**275**
Landsborough AL *	55	186	35	1	**281**
Hume Lane AL *	57	199	33	0	**295**
Old Gympie Road AL *	31	224	99	0	**359**
Beerwah AL *	36	238	121	0	**399**
Numerical Average	**30**	**182**	**123**	**0**	**339**
Maximum	**57**	**250**	**264**	**1**	**491**

Table 3.5.10 Rainfall totals for the Maroochy River.

Station Name	24 hours to 9am on the				Total mm
	19	20	21	22	
Maroochy					
Eerwah Vale AL *	23	99	1	0	**124**
Ball Lookout AL *	24	106	1	0	**132**
Eumundi	24	100	2		**127**
Eumundi AL *	23	94	0	0	**119**
Eumundi TM *	23	96	1	0	**122**
Mapleton AL *	27	88	2	0	**117**
Yandina TM *	35	64	2	0	**103**
Yandina AL *	33	58	1	0	**94**
Dunethin Rock AL *	21	77	6	0	**108**
Yandina Creek AL *	24	67			**94**
Upper Doonan AL *	18	85	1	0	**108**
Doonan Creek AL *	16	77	2	0	**98**
Coolum AL *	18	68	0	0	**87**

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Maroochy (continued)					
Stoney Wharf Road AL *	15	95	20	1	**136**
West Woombye AL *	25	118	3	0	**149**
Nambour AWS *	33	112	5	0	**150**
Nambour AL *	28	102	4	0	**134**
Palmwoods		136	18		**206**
Palmwoods AL *	29	131	14	1	**175**
Palmwoods Sportsground AL*	27	143	10	1	**181**
Diddillibah AL *	26	105	12	0	**143**
Eudlo AL *	67	110	20	0	**197**
Eudlo Flats Rd AL *	27	126	30	0	**183**
Maroochydore Depot AL *	28	129	71	0	**228**
Picnic Point AL *	38	106	70	0	**214**
Maroochydore AWS *	28	82	41	0	**151**
Numerical Average	**27**	**99**	**13**	**0**	**140**
Maximum	**67**	**143**	**71**	**1**	**229**

Table 3.5.11 Rainfall totals for the Noosa River.

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Noosa					
Rainbow Beach SYN	9	70	1	0	**80**
Coops Corner TM *	9	67	0	0	**76**
Mt Bilewilam AL *	9	54	1	0	**64**
Mount Elliot AL *	24	38	0	0	**62**
Mount Wolvi AL *	46	58	1	0	**105**
Black Pinch Road AL *	28	92	1	0	**121**
Boreen Point AL *	17	93	1	0	**111**
Lake Cooroibah AL *	16	83	1	0	**100**
Lake Cooroibah	23	85	2		**110**
Mount Tinbeerwah AL *	31	94	1	0	**126**
Tewantin AWS *	25	83	2	0	**110**
Tewantin AL *	22	75	1	0	**98**
Noosa Heads AL *	18	120	1	0	**139**
Numerical Average	**21**	**78**	**1**	**0**	**101**
Maximum	**46**	**120**	**2**	**0**	**140**

Table 3.5.12 Rainfall totals for the Mary River.

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Mary					
Maleny AL *	63	125	6	1	**195**
Maleny	73	121	9	0	**203**
Baroon Boat Ramp AL *	40	156	5	0	**201**
Baroon Dam Tw AL *	49	126	2	0	**177**
Obi Lookout AL *	24	107	1	1	**133**
West Bellthorpe AL *	24	117	3	0	**144**
Harper Creek AL *	34	107	2	1	**144**

Station Name	24 hours to 9am on the 19	20	21	22	Total mm
Mary (continued)					
Bellbird Creek AL *	51	75	0	0	**126**
Bellbird Creek TM *	50	74	0	0	**124**
Coolabine Creek AL *	44	87	1	0	**132**
Kenilworth	49	63	1		**113**
Moy Pocket AL *	23	110	0	1	**134**
Moy Pocket TM *	21	103	1	0	**125**
Jimna AWS *	16	43	2	0	**61**
Jimna AL *	14	39	1	0	**54**
Imbil	28	92	1		**121**
Imbil TM *	31	101	1	0	**133**
Oakwood TM *	29	61	0	0	**90**
Kandanga	31	66	1	0	**98**
Kandanga TM *	27	62	0	0	**89**
Zachariah TM *	30	50	0	0	**80**
Cooroy	27	102	1		**130**
Cooroy AL *	30	105	1	0	**136**
Pomona AL *	42	122	1	0	**165**
Cooran TM *	40	87	1	0	**128**
Cooran AL *	42	96	0	1	**139**
Gympie AWS *	23	40	0	0	**63**
Gympie AL *	24	26	1	0	**51**
Fishermans Pocket TM *	21	37	0	0	**58**
Kilkivan TM *	15	34	0	0	**49**
Woolooga	19	48			**67**
Brooyar TM *	20	32	0	0	**52**
Miva	25				**25**
Brooweena	9	30			**39**
Brooweena TM *	8	27	0	0	**35**
Mount Joseph	11	28	2		**41**
Mt Joseph TM *	10	28	1	0	**39**
Mt Kanigan TM *		34	0	0	**34**
Home Park TM *	10	31	0	0	**41**
Tiaro Po	10	37	1	0	**48**
Goomboorian	18	39			**57**
Goomboorian TM *	24	36	0	0	**60**
Toolara AWS *	33	34	0	0	**67**
Teddington Weir Hw TM *	26	35	0	0	**61**
Tinana Barrage Hw TM *	20	39	0	0	**59**
Maryborough AWS	15	43	0	0	**58**
Ghost Hill AL *	17	54	0	0	**71**
Booral Road AL *	17	42	0	0	**59**
Black Swamp Ck AL *	11	40	1	0	**52**
Numerical Average	**27**	**66**	**1**	**0**	**94**
Maximum	**73**	**156**	**9**	**1**	**209**

3.6 Appendix 1. DNRW Usage Agreeme

User Licence for Digital Data

Permitted use:

- You may use the data for your own purposes (including supply to consultants for a specific consultancy project for you, but the consultants must return or destroy the data when the project is finished). You must not sell or distribute the data.
- You must display this copyright notice on any copies of the data, however altered, reformatted or redisplayed, if you supply the data to a consultant or copy it for backup purposes: "© The State of Queensland (Department of Natural Resources and Water) [year]".
- You may create and distribute hardcopy products and non-editable digital images (e.g. pdf files) based on or containing the data, provided all the following conditions are met:
    - The product(s) must be distributed at no charge, and revenue cannot be generated to offset any free distribution (e.g. advertising/sponsorship).
    - You must display this acknowledgment on the product(s): "Based on or contains data provided by the State of Queensland (Department of Natural Resources and Water) [year]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws."
    - You must include metadata with the product(s) and the metadata must incorporate as a minimum the metadata supplied with this data.

Obligations:

- You must not use the data for direct marketing or in breach of the privacy laws.
- If you wish to distribute the data or distribute product(s) for a charge you must organise a different licence, by contacting the Department of Natural Resources and Water (Email: marketing@nrw.qld.gov.au).

Ownership:

The State of Queensland, as represented by the Department of Natural Resources and Water (NRW), is the owner of the intellectual property rights in and to the data, or has the right to make this data available under licence arrangements. External contributors to data are listed on the website www.nrw.qld.gov.au/products.

Disclaimer and indemnity:

You agree to accept all responsibility and risks associated with the use of the data. NRW makes no representations or warranties in relation to the data, and, you agree that, to the extent permitted by law, all warranties relating to accuracy, reliability, completeness, currency or suitability for any particular purpose and all liability for any loss, damage or costs (including consequential damage) incurred in any way (including but not limited to that arising from negligence) in connection with any use of or reliance on the data are excluded or limited. You agree to continually indemnify the State of Queensland and NRW (and their officers and employees) against any loss, cost, expense, damage and liability of any kind (including consequential damage and liability in negligence) arising directly or indirectly from or related to any claim relating to your use of the data or any product made from the data.