Queensland Floods Commission of Inquiry

CROWN LAW–(DERM – Steven Jacoby)
Response to Req. Ref# 1739950
#11762205 File 539877/1
Volume 1 of 1 ORIGINAL

Statement of Steven Kenneth Jacoby

October 2011
DERM

QUEENSLAND FLOODS COMMISSION OF INQUIRY

STATEMENT OF STEVEN KENNETH JACOBY

I, **STEVEN KENNETH JACOBY** of c/o- Level 9, Landcentre, 867 Main Street, Woolloongabba, Brisbane in the State of Queensland, General Manager, Spatial Information, Department of Environment and Resource Management (DERM), solemnly and sincerely affirm and declare:

Requirement from Queensland Floods Commission of Inquiry

1. I have seen a copy of a letter dated 7 October 2011, which is attachment **SKJ-01**, from the Commissioner, Queensland Floods Commission of Inquiry to me requiring a written statement under oath or affirmation, and which details the topics my statement should cover.

Role

2. I am currently General Manager, Spatial Information within DERM, where I lead the Spatial Information Group which is the lead agency within the Queensland Government for spatial information. Spatial information is any information that can be related to a location on (below or above) the surface of the Earth. In my role I have responsibilities for spatial policy and strategy, administration of the *Survey and Mapping Infrastructure Act 2003,* coordination and maintenance of key spatial datasets and systems, as well as the provision of spatial products and services to a range of clients including government, business and the public.

3. In my current position, I report directly to the Assistant Director-General, Land and Indigenous Services Division of DERM.

4. I have been employed by DERM and its predecessors for a period of more than 8 years. Prior to taking up my current role I was General Manager, Information Policy for 6 years.

5. Since 1 December 2010 I have been on leave for the following periods:
   - 24 December 2010 to 31 December 2010
   - 27 April 2011 to 29 April 2011
   - 20 May 2011
   - 16 June 2011 to 24 June 2011
   - 6 July 2011
   - 19 August 2011
   - 27 September 2011

Qualifications

6. I am the holder of a Bachelor of Applied Science degree (Cartography) from RMIT and a Masters, Surveying Science from the University of Melbourne.

Item 1: The involvement of the Department of Environment and Resource Management (DERM) in flood-related mapping projects for the Queensland Reconstruction Authority (QRA) in 2011

7. DERM has assisted the QRA with 3 significant flood-related mapping projects:
    a. 2010 – 2011 spatial imagery acquisition and flood line mapping;
    b. Mapping to support Brisbane City Council's temporary local planning instrument;
    c. Interim Floodplain Assessment Overlay

8. The Spatial Information Group (SIG) in conjunction with Emergency Management Queensland (EMQ) began acquiring spatial imagery from 31 December 2010, consisting of satellite imagery (optical & radar) as well as aerial photography in support of the response and recovery efforts for the Queensland floods.

9. Aerial photography was acquired in key areas, commencing with towns in the Fitzroy Basin and the Condamine-Balonne Basins where significant or record floods were expected and as close to or after the flood peak as weather permitted. This was done to ensure an accurate spatial record of the floods' extent was made and as an aid to both the recovery efforts and to inform future (general) planning. As the extent of the floods expanded, so did the spatial imagery program.

10. The department as lead agency for spatial information in Queensland is responsible for coordinating the acquisition of spatial imagery on behalf of government agencies. This is achieved normally through competitive tendering to the private sector. The department works with other agencies to determine priorities, contract work and ensure standards and whole-of government licensing is achieved to maximise the use of this imagery.

11. During the 2011 flood events the department has acquired aerial imagery through direct contracting, purchasing or sharing rights to imagery collected by several local governments and aerial imaging contractors and through cooperation with the of the Australian Defence Forces (ADF) aerial imaging resources.

12. Upon acquiring aerial photography, SIG commenced the digitising of the flood line. Using aerial photography taken at and/or shortly after the peak allows the water or debris line to be clearly seen and accurately mapped. This was performed by SIG's staff skilled in photo-interpretation examining the flood line property by property. It was a manual and labour intensive task.

13. In particular, the SIG worked closely with Brisbane City Council (BCC) and the Land Use Planning team in the Queensland Reconstruction Authority (QRA) to ensure that there was only one agreed flood extent map produced. This was both to avoid duplication of effort amongst agencies and minimise risk of competing data sets purporting to represent the 2011 floods. DERM's flood line and mapping was used to support BCC's Temporary Local Planning Instrument, see http://www.brisbane.qld.gov.au/planning-building/tools-forms/TLPI/Interim-flood-maps/index.htm and refer to SKJ-02 for an example. This product was significantly aided by the availability of high resolution Lidar data which provides

for 25cm contours in this urban area.

14. Priority was assigned to completing flood lines and flood extent maps in the most populated areas first and as soon as possible after spatial imagery became available. Aerial photography was acquired for 187 towns and suburbs in Queensland and flood lines produced for 115 (Refer to SKJ-03). DERM attempted to map flood lines from all aerial photography taken but in many cases a flood line could not be discerned. This was usually due to the imagery being acquired too long after the flood peak (after a week it became difficult and after two weeks almost impossible, particularly if it had rained in that period). However, having current aerial photography of flood affected communities was still considered useful.

15. In order to provide a flood extent map as quickly as possible a 2D interpretation has been made using the available aerial photography. This technique permitted a low cost, fast acquisition of the 2011 flood lines. A higher quality, but significantly more costly and time consuming approach would have involved a 3D interpretation (viewing the photography stereoscopically). This would have assisted where a clear view of the ground surface was obscured by tree canopies and built infrastructure. Feedback and ground checking by the department and other agencies assisted in validating the (2D) flood extent maps.

16. DERM is the custodian (owner) of the flood extent mapping and data and released it under a standard Creative Commons attribution licence as per the Queensland Government's information licensing policy (at no cost).

17. Maps, showing natural disaster affected towns before and after the 2011 events were published on the QRA's website from 26 February 2011, see www.qldreconstruction.org.au A complete copy of this mapping in hardcopy and digital form has been made available to the Floods Commission by DERM (a total of 548 maps were provided as detailed in SKJ-25). Aerial photography and the digital dataset of the flood lines are also available in an interactive map on the same website and the actual data can be downloaded from the Information Queensland website administered by DERM see www.information.qld.gov.au

18. Feedback on the accuracy of the flood lines mapped by DERM was encouraged via the QRA's interactive map. A total of 174 feedback items have been received to date from the public and each was investigated by DERM. 12 have resulted in a change or amendment to the flood line for example, see SKJ-28.

19. The department also acquired imagery from a number of satellite systems during the 2011 floods. This imagery came from existing programs and through the provision of commercial imagery (at no cost) through the activation of the International Charter Space and Major Disasters (see www.disasterscharter.org/web/charter/map). DERM activated this Charter through Geoscience Australia on 3 January 2011. This was the first time that this Charter had been activated for Australia. It was again activated for Tropical Cyclone Yasi in February 2011.

20. Imagery outputs from these satellite systems were used to map flood extents at small scales, typically at river sub basin levels, where the department did not have aerial photography coverage. The primary purpose of this mapping was to assist in the broad identification of rural and regional lands affected by inundation. An example of a 2010 / 11 flood extent sub basin map is attached as SKJ-04.

21. Limitations with this approach arose where the (optical) satellite imagery was affected by cloud and where the coverage and cycle of the satellites meant that some areas were not acquired or were acquired at times prior to or well after the flood peak. The various resolutions of the imagery used and its reliability to detect inundated areas as opposed to saturated or wet ground was also a factor in determining its usefulness. These factors resulted in only 14 sub basins being mapped for the 2010 / 11 floods by DERM.

Item 2: DERM's activities with respect to the interim floodplain mapping released to the public by the QRA and available at www.qld.gov.au/floodcheck including:

a) the instructions given to DERM by the QRA
b) the timeline for the work set by the QRA
c) how, and by whom, it was decided which areas were priority areas for interim floodplain mapping
d) how, and by whom, it was decided what to show on the map (i.e. Q100, historical flood, whole of the floodplain, or other)
e) details of any other options for what was to be shown on the map considered by DERM or the QRA
f) how, and by whom, it was decided which data to use in the mapping process
g) what data sources were used to create the maps and how they were used
h) how the mapping was performed
i) details of any briefings given by DERM to any Minister regarding the maps

22. The QRA's first contact with DERM with regard to what is now described as the Interim Floodplain Mapping project was in late May 2011 (Refer to SKJ-05) where we were asked whether we could 'piece' together these initial basin maps (as per example SKJ-04) into a state-wide layer. Subsequent scoping clarified that the QRA were seeking mapping that may be able to be adopted by Councils on an interim basis as a Natural Hazard Management Area (flood).

23. During the first two weeks in June, several meetings and discussions took place between DERM and QRA staff (Refer to SKJ-06) to determine the feasibility and assessing potential techniques for creating a state-wide floodplain map (DERM staff had confirmed that such a dataset did not exist).

24. A meeting was convened on 15 June 2011 attended by myself, Mr Brendan Nelson (General Manager, Land Use Planning – QRA) and a number of our agencys' staff to review requirements for the Interim Floodplain Mapping project (including product specifications and methodologies).

25. A pilot area was selected in the Dawson River sub basin including the towns of Taroom and Theodore and it was agreed that two techniques would be evaluated. Both would utilise the best available state-wide datasets including, elevation, drainage, imagery, DERM gauging stations, 2011 aerial imagery and flood lines, 2011 satellite imagery and flood lines as well as pre-clear vegetation and soils (alluvium systems) datasets. One technique would aim to automate the extraction of a floodplain layer from this information and the other would utilise manual interpretation.

26. Further meetings took place with the QRA on the 23rd June, 27th June, 30th June and 4th July 2011 to review progress, develop map product specifications and methodology. A product specification (version 4 dated 14th July 2011, refer to SKJ-07) was utilised for production of mapping for the full extent of the Dawson River sub basin. This utilised the manual interpretation technique as we were not able to satisfactorily automate the process to produce the Interim Floodplain Mapping area.

27. The Interim Floodplain Mapping products to be produced included an overview map of each sub basin (Refer to SKJ-08), a digital layer which was the floodplain area (shown in all products) and an A3 size mapbook for the sub basin depicting the floodplain area with an imagery backdrop and the digital cadastral map base at a scale of 1:50,000 (Refer to SKJ-09).

28. The Interim Floodplain Mapping products for the Dawson River sub basin were completed and presented to the Banana Shire Council on 20 July 2011 by the QRA for comment and review. Following minor cartographic amendments and adjustments to the mapbook template the mapping specification (including all products) was signed off on 21 July 2011 by the QRA (Refer to SKJ-10) and production was cleared to commence the following day. The Dawson River sub basin mapping products effectively became the specification template for the remaining production run.

29. A detailed description of DERM's methodology used to produce the agreed products, based upon manual, cartographic interpretation of the relevant state-wide datasets is attached (Refer to SKJ-11).

30. The custodianship (ownership) of the floodplain area dataset resides with the QRA. The mapping products were produced by DERM for the QRA and are also QRA owned products. The conditions, manner and timing of release for these products remain a matter for the QRA.

31. The Spatial Information Group, and to my knowledge DERM did not brief any Minister on the Interim Floodplain Mapping project. The Acting Assistant Director-General, Land & Indigenous Services was initially briefed on the project on 27 June 2011 and the Acting Director-General, DERM, was briefed on 30 June 2011. DERM's Executive Management Group was briefed on 1 August 2011 by myself and the QRA.

32. Presentations and briefings on the project have been made by the QRA and / or DERM in a number of forums with a view to raising awareness and seeking

feedback on the project. As at 17 October 2011, the following information sessions had been run:

a. Banana Shire Council, Biloela (20 July 2011)
b. State Agency Briefing, Brisbane (21 July 2011)
c. North West Regional Planning Committee (Flinders, Richmond, McKinlay, Cloncurry and Mt Isa Councils), Hughenden (26 July 2011)
d. South West Regional Planning Committee (Murweh, Quilpie, Paroo, Bulloo), St George (28 July 2011)
e. Maranoa –Balonne Regional Planning Committee (Maranoa, Balonne Councils), St George (28 July 2011)
f. Emergency Response & Recovery Conference, Brisbane (28 July 2011)
g. National Flood Modelling Workshop, Canberra (29 July 2011)
h. DERM Executive Management Group (1 Aug 2011)
i. Central Queensland University Property Conference, Rockhampton (12 Aug 2011)
j. LGAQ Briefing, Brisbane (18 Aug 2011)
k. Queensland Design Council, (19 Aug 2011)
l. Far North Qld Planning Symposium, Cairns (19 Aug 2011)
m. LGAQ Briefing, Brisbane (25 Aug 2011)
n. Natural Disaster Insurance Review Workshop, Sydney (26 Aug 2011)
o. SEQ Post Flood Science Review & Planning Forum, Brisbane (2 Sep 2011)
p. LGAQ Briefing, Brisbane (8 Sep 2011)
q. Queensland Chief Scientist Briefing, Brisbane (9 Sep 2011)
r. Toowoomba Regional Council, Toowoomba (14 Sep 2011)
s. National Emergency Management Council Land Use Planning and Building Code Taskforce Meeting, Canberra (16 Sep 2011)
t. Queensland Spatial Information Council (19 Sep 2011)
u. CSIRO Briefing, Brisbane (20 Sep 2011)
v. Inter-Departmental Committee – SPP1/03 Review, Brisbane (21 Sep 2011)
w. Planning Institute of Australia, Queensland Division, Toowoomba (22 Sep 2011)
x. International River Symposium, Brisbane (26 Sep 2011)
y. Urban Development Institute of Australia (Qld Division), Brisbane (28 Sep 2011)
z. State Agencies Briefing, Brisbane (3 Oct 2011)
aa. Engineers Australia, Water Panel, Brisbane (5 Oct 2011)
bb. Central Highlands Regional Council, Emerald (7 Oct 2011)
cc. Spatial Information Officers Conference, Brisbane (10 Oct 2011)
dd. South Burnett Regional Council, Kingaroy (10 Oct 2011)
ee. Southern Downs Regional Council, Warwick (11 Oct 2011)
ff. Goondiwindi Regional Council, Goondiwindi (11 Oct 2011)
gg. PSMA (Public Sector Mapping Agencies) Australia Board Meeting, Canberra (11 Oct 2011)
hh. North Burnett Regional Council, Gayndah (11 Oct 2011)
ii. Gympie Regional Council, Gympie (11 Oct 2011)
jj. ANZLIC (Australia New Zealand Land Information Council) Meeting, Canberra (12 Oct 2011)
kk. Balonne Shire Council, St George (12 Oct 2011)
ll. Paroo Shire Council, Cunnamulla (13 Oct 2011)

mm. Murweh Shire Council, Charleville (13 Oct 2011)
nn. Maranoa Regional Council, Roma (14 Oct 2011)
oo. National Flood Risk Advisory Meeting, Brisbane (17 Oct 2011)

33. The priority areas to be mapped, subject to a successful Dawson pilot, were identified by the QRA and conveyed to DERM on 21 June 2011 (Refer to SKJ-12). The list was based on Planning Scheme Areas that had been reviewed by the QRA and found to contain no current flood hazard mapping. This list of planning schemes was translated into a list of whole river sub basins. It was estimated that DERM could complete this task (27 sub basins) by the end of July based on the Dawson pilot and available data. This was adopted as Phase 1 of the Interim Floodplain Mapping.

34. At the end of July (Phase 1), DERM had completed 24 of the 27 river sub basins and delivered these to the QRA.

35. Phase 2 was developed following a categorisation of all planning schemes by population into 3 sectors. The highest priority sector contained schemes with a population of greater than 50,000. The lowest priority sector contained schemes with a population of less than 4,000. Those remaining sub basins in the two highest priority areas were included in Phase 2 (a further 39 sub basins). The remaining sub basins were placed in Phase 3. In total there are 129 river sub basins in Queensland.

36. DERM will complete Phase 2 on 19th October 2011, a total of 63 sub basins and 2504 map book pages (Refer to SKJ-26 for a map showing the Phase 2 coverage). Phase 3 is estimated for conclusion in late December 2011 (total 116 full or part sub basins will be mapped under this project – 13 basins will not be mapped as they are either not required, islands or have been mapped at better scales see, SKJ-23).

Item 3: his understanding of what constitutes the interim floodplain area in terms of flood risk, previous flood occurrence, future likely flood occurrence or any other measure able to be understood by members of the public

37. The Interim Floodplain Mapping area is a graphical representation of the floodplain derived through the methodology referenced in SKJ-11. It forms one part of the QRA's toolkit "Planning for stronger, more resilient floodplains". Importantly, the Floodplain Mapping may be adopted or amended as a Natural Hazard Management Area (Flood) and then incorporated as an overlay within a Council's planning scheme. The overlay works to trigger any new applications within its area against a Council's Floodplain code.

38. It does not represent a defined flood event, a probable maximum flood or attempt to map to any flood annual recurrence interval, such as a Q100. It is designed for small and medium scale use and should not be used at scales larger than 1:50,000 which DERM considers to be the reasonable working limits of the datasets used to generate the mapping.

39. Information related to previous floods was used to create the Interim Floodplain area. This information included aerial photography and satellite imagery of the 2010/2011 flood event and highest recorded data from DERM gauging stations. It also includes evidence of vegetation and soils typically associated with floodplains. The methodology expects that these data inputs would be contained within the Interim Floodplain Mapping area unless conflicts are detected (the methodology describes how conflicts in the data are resolved).

40. In my view, noting that I am not a hydrological engineer, I would expect future flood occurrence to fall within the Interim Floodplain area, however, it is possible for larger floods to exceed this area. A Local Authority's knowledge and verification / amendment of the mapping is very important given the methodology used and noting that it has not been checked in the field. The QRA's toolkit "Planning for stronger, more resilient floodplains" (refer to SKJ-27) makes it clear (page 9) that the Floodplain Mapping should be considered as Level 1 in a flood maturity mapping model, where Level 0 is a Council with no flood mapping. Level 2 would be achieved by a Council verifying and validating the mapping. This could include incorporation of higher quality data (eg where it existed in towns) and / or amending the Floodplain Mapping Area through the application of local knowledge.

41. It is important to note that the methodology ignores headwater streams (eg. order 1 streams as per the Strahler system, refer to SKJ-24 & SKJ-27 (p.10). Flash flooding in particular does and will occur in these streams. An example of this was the flash flooding in Toowoomba's East and West creeks on the 10th January 2011. These are both class 1 ordered streams.

I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the *Oaths Act 1867*.

Signed [redacted]
Steven Kenneth Jacoby

Taken and declared before me, at Brisbane this 17th day of October 2011

[redacted]
. . . . . .
Solicitor/~~Barrister/Justice of the Peace/Commissioner for Declarations~~

Our ref: Doc 1741598

7 October 2011

[redacted]
Assistant Crown Solicitor
Crown Law
GPO Box 5221
BRISBANE QLD 4001

Dear [redacted]

Please find enclosed a Requirement to Provide Statement addressed to Mr Steven Jacoby of the Department of Environment and Resource Management.

The return date for the Requirement is 4 pm, Monday 17 October 2011.

If you require further information or assistance, please contact [redacted] on telephone [redacted].

We thank you for your assistance.

Yours sincerely

[redacted]
Jane Moynihan
Executive Director

Encl.

400 George Street Brisbane
GPO Box 1738 Brisbane
Queensland 4001 Australia
Telephone **1300 309 634**
Facsimile **+61 7 3405 9750**
www.floodcommission.qld.gov.au
ABN 82 696 762 534

Our ref: Doc 1739950

7 October 2011

Mr Steven Jacoby
General Manager, Spatial Information
Department of Environment and Resource Management
GPO Box 2454
BRISBANE QLD 4001

REQUIREMENT TO PROVIDE STATEMENT TO COMMISSION OF INQUIRY

I, Justice Catherine E Holmes, Commissioner of Inquiry, pursuant to section 5(1)(d) of the *Commissions of Inquiry Act 1950* (Qld), require Mr Steven Jacoby to provide a written statement, under oath or affirmation, to the Queensland Floods Commission of Inquiry, in which the said Mr Jacoby gives an account of:

1. the involvement of the Department of Environment and Resource Management (DERM) in flood-related mapping projects for the Queensland Reconstruction Authority (QRA) in 2011

2. DERM's activities with respect to the interim floodplain mapping released to the public by the QRA and available at www.qld.gov.au/floodcheck, including:

    a. the instructions given to DERM by the QRA
    b. the timeline for the work set by the QRA
    c. how, and by whom, it was decided which areas were priority areas for interim floodplain mapping
    d. how, and by whom, it was decided what to show on the map (i.e. Q100, historical flood, whole of the floodplain, or other)
    e. details of any other options for what was to be shown on the map considered by DERM or the QRA
    f. how, and by whom, it was decided which data to use in the mapping process
    g. what data sources were used to create the maps and how they were used
    h. how the mapping was performed
    i. details of any briefings given by DERM to any Minister regarding the maps

3. his understanding of what constitutes the interim floodplain area in terms of flood risk, previous flood occurrence, future likely flood occurrence or any other measure able to be understood by members of the public

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www.floodcommission.qld.gov.au
ABN 82 696 762 534

Mr Jacoby should attach to his statement:

- documentation evidencing the instructions and timeline given to DERM by the QRA
- notes and minutes of meetings involving DERM and the QRA regarding the interim floodplain maps
- any briefing notes produced by DERM for its Director-General, the QRA or any Minister regarding the interim floodplain mapping
- correspondence with the QRA evidencing decisions or deliberations relevant to any of the topics listed in 2. above.
- any explanatory documents produced by DERM for the QRA, any Minister, any other Department or the general public regarding the interim floodplain mapping

In addressing these matters, Mr Jacoby is to:

- provide all information in his possession and identify the source or sources of that information;
- make commentary and provide opinions he is qualified to give as to the appropriateness of particular actions or decisions and the basis of that commentary or opinion.

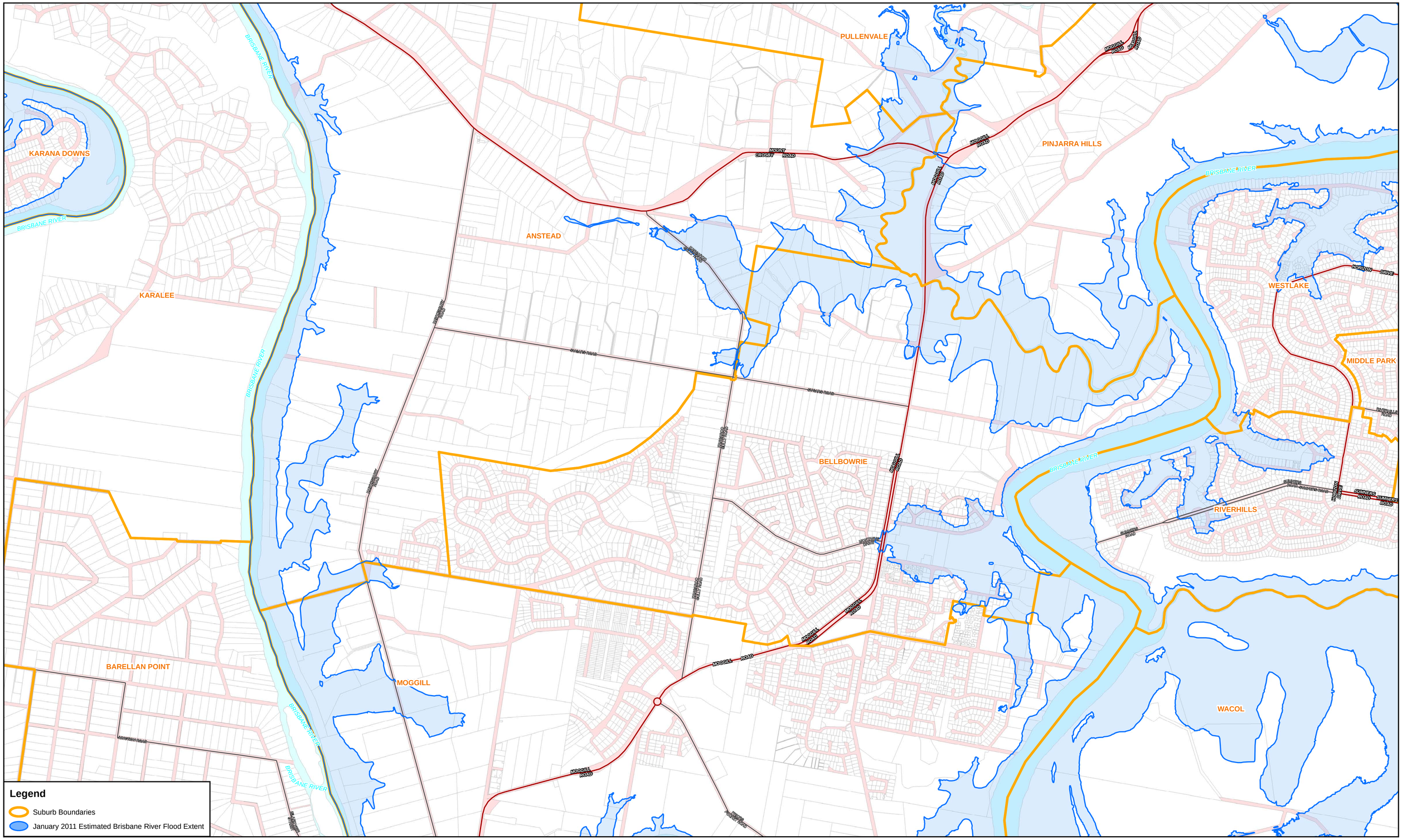
Mr Jacoby may also address other topics relevant to the Terms of Reference of the Commission in the statement, if he wishes.

The statement is to be provided to the Queensland Floods Commission of Inquiry by 4 pm, 17 October 2011.

The statement can be provided by post, email or by arranging delivery to the Commission by emailing info@floodcommission.qld.gov.au.

C. Holmes

Commissioner
Justice C E Holmes



Note: The flood line was created by the Department of Environment and Resource Management with input from Brisbane City Council. The flood line was created using aerial flood imagery that was flown over a number of days between the 13th to 15th January and pre-flood aerial imagery. This line was verified against digital elevation models and contours(Lidar). The completeness of the data is dependant on image quality and the ability to identify feature detail. Inaccuracies may exist particularly in the Brisbane CBD area due to high rise buildings, areas of heavy vegetation along the river banks and also low lying flat areas such as near the mouth of the Brisbane River. For the purpose of this Temporary Local Planning Instrument, the interim flood line is fixed.

MAP INFORMATION

Cadastre:	Shown as black lines. Digital Cadastral Database (DCDB) is current at April 2011. Positional accuracy representing the 'maximum error' has been calculated at ± 1.5 metres.
Local Authority:	Brisbane City Council
Locality:	As Shown
Datum:	Horizontal - Geocentric Datum of Australia 1994 (GDA94) Vertical - Australian Height Datum (AHD) 1971
Projection:	Horizontal - Map Grid of Australia (MGA94), which is a standard Universal Transverse Mercator (UTM) projection in Zone 56 with Central Meridian 153° East

0 75 150 300 450 600 750 900

Metres

Scale - 1:10000 (at A1)

KEY TO SHEETS

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10	11	12	13	14
15	16	17	18	19
		20	21	22

BRISBANE SUBURBS

TEMPORARY LOCAL PLANNING INSTRUMENT

BRISBANE INTERIM FLOOD RESPONSE

DRAWING NUMBER

LGA1000-0025-1

SHEET 17

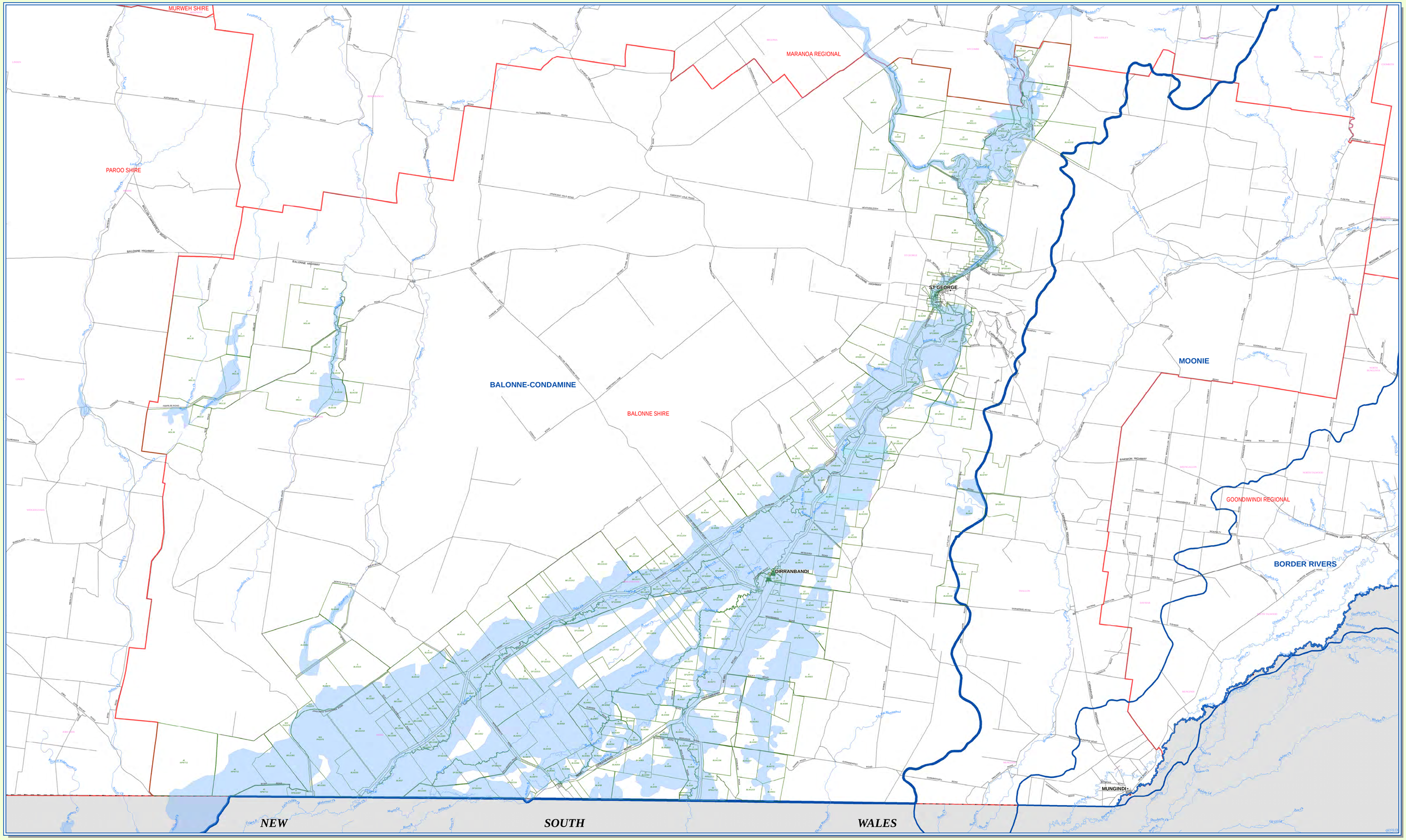
DATE: 19th APRIL 2011

\\Mpimagerympsv\CLIENT MAPPING\FLOOD MAPS 2011\Phase 2 Town Mapping\Brisbane_Brisbane\LGA1000_0025_1_QRA_TLPI_BrisbaneSuburbs.mxd Produced 19/04/2011.

Town List

	Imagery captured	Floodline generated	Town	Imagery captured	Floodline generated
Allora	Yes	No	Meandarra	Yes	No
Baralaba	Yes	Yes	Miles	Yes	No
Biloela	Yes	No	Millmerran	Yes	No
Brisbane	Yes	Yes	Mitchell	Yes	No
Bundaberg	Yes	Yes	Moreton Bay R C	Yes	No
Cecil Plains	Yes	No	Moura	Yes	Yes
Cherbourg	Yes	Yes	Mundubbera	Yes	No
Chinchilla	Yes	Yes	Mungallala	Yes	No
Condamine	Yes	Yes	Oakey	Yes	Yes
Dalby	Yes	Yes	Pratten	Yes	No
Dirranbandi	Yes	Yes	Rockhampton	Yes	Yes
Eidsvold	Yes	No	Rolleston	Yes	No
Emerald	Yes	Yes	Roma	Yes	Yes
Emu Vale	Yes	No	St George	Yes	No
Esk	Yes	No	Stanthorpe	Yes	No
Flinton	Yes	No	Surat	Yes	Yes
Locker Valley	Yes	Yes	Tallwood	Yes	Yes
Goondiwindi	Yes	Yes	Taroom	Yes	Yes
Gympie	Yes	No	Thallon	Yes	Yes
Helidon	Yes	No	Theodore	Yes	Yes
Hebel	Yes	Yes	Toowoomba	Yes	No
Injune	Yes	No	Wallumbilla	Yes	No
Ipswich	Yes	Yes	Wandoan	Yes	No
Jambin	Yes	No	Warra	Yes	No
Jandowae	Yes	Yes	Warwick	Yes	No
Jondaryan	Yes	No	Woodford	Yes	No
Killarney	Yes	No	Wowan	Yes	No
Kingaroy	Yes	No	Yuleba	Yes	No
Laidley	Yes	No			

BALONNE CONDAMINE BASIN (Balonne Shire) - 2011 FLOOD



Queensland Reconstruction Authority

1800 110 841

www.qldreconstruction.org.au

Queensland Reconstruction Authority

N
W E
S

DATUM:
Horizontal - Geocentric Datum of Australia 1994 (GDA94)
Vertical - Australian Height Datum (AHD) 1971

PROJECTION:
Horizontal - Map Grid of Australia (MGA94), which is a standard Universal Transverse Mercator (UTM) projection in Zone 55 with Central Meridian 147° East

0 5 10 20 30 40 50
Kilometres

Produced by the Department of Environment and Resource Management (2011).

Technical enquiries:
The Manager
GIS Mapping Services (Client Outcomes)
Department of Environment and Resource Management
GPO Box 2454, Brisbane, QLD 4001

QUEENSLAND FLOOD MAPPING SERIES

BALONNE CONDAMINE BASIN 2011 FLOOD

EDITION 1

Queensland Government

From: [redacted]
Sent: Thursday, 2 June 2011 12:36 PM
To: [redacted]
Cc: [redacted] Jacoby Steven
Subject: RE: Statewide Flood Layer

From: [redacted]
Sent: Thursday, 26 May 2011 12:04 PM
To: [redacted]
Cc: [redacted]
Subject: RE: Statewide Flood Layer

Hi [redacted]

The Land Use Planning team has been asked by the CEO to start looking into policy improvements regarding flood plain management. To really commence this process we are keen to understand from a catchment or drainage perspective the extent of the recent flooding. We have already received some great basin scaled maps from DERM and therefore keen to "piece" these together to start looking at the combined statewide flood layer. I certainly appreciate that this will evolve and that there are existing gaps. We appreciate that a number of rural LGAs and gulf LGAs won't actually have any specific data and we can determine how best to deal with this.

If you can send across what you have to date we can start looking at how this fits into the overall project and how we can start to look at filling in the gaps.

Thanks,

[redacted]

[redacted]
Director - Planning
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
GPO Box 15428 City East Q 4002
P [redacted]
M [redacted]
E kat[redacted]

Timeline of key interactions between DERM & the QRA with respect to the Interim Floodplain Mapping project (2011)

Personnel: **DERM**
SJ – Steven Jacoby
[redacted]

QRA
BN – Brendan Nelson
[redacted]

26th May - Email [redacted] QRA) to [redacted] DERM) re potential to develop a state-wide flood map following 2011 flood maps produced by SIG at a basin level

2nd June - Difficulties identified in developing a state-wide flood layer – brought to [redacted]s (DERM) attention [Email SKJ-13 BM (DERM) to [redacted] (QRA)]

9th June - DERM Basin mapping meeting [redacted])

10th June - Email SKJ-14 [redacted] (DERM) to [redacted] (DERM)] flagging QRA's growing demands for basin mapping
- Email SKJ-15 [redacted] (DERM) to BN (QRA)] seeking meeting to discuss QRA's requirements for basin mapping

15th June - Landcentre meeting with QRA re Flood Plain mapping requirements [redacted] staff with BN, [redacted] (QRA)]

21st June - Priority list provided SKJ-12 [Email [redacted] (QRA) to SJ (DERM)]

23rd June - Landcentre meeting with QRA re proposed Flood Plain mapping approach [SJ & [redacted] staff and BN & QRA staff]

27th June - DERM commenced work on Dawson River sub basin pilot
- SJ (DERM) briefed DERM [redacted] G with [redacted] (QRA) on the project & resourcing implications

30th June - SJ (DERM) Briefed DERM [redacted] with [redacted] (QRA) and [redacted] on the project & resourcing implications

4th July - QRA Offices – meeting to discuss specification [SJ (DERM), BN, [redacted] (QRA)]
- Internal [redacted] project meeting

6th July - Internal [redacted] project meeting

13th July - Landcentre meeting with QRA to discuss progress [redacted] (DERM) and [redacted] (QRA)]

14th July - Draft Product Specification – Interim Floodplain Assessment Overlay (v4) SKJ- 7

15th July	- QRA Offices – meeting to confirm specification / methodology - Locked down specification for Dawson pilot
18th July	- QRA Offices – briefing on progress with CEO, BN, [redacted] (QRA) & SJ (DERM)
19th July	- Landcentre meeting with QRA re Dawson Flood Plain mapping products
20th July	- QRA presentation to Banana Shire Council on project – feedback on mapping very positive [Email SKJ-16 BN (QRA) to SJ (DERM)], minor cartographic changes requested
21st July	Emails SKJ-10 [SJ (DERM) to BN / [redacted] (QRA)] seeking to lock down specification BN – SJ confirming specification and authorising production
25th July	- Production commenced on Phase 1 mapping
26th July	- Phase 2 priority list received [Email SKJ-17 [redacted] (QRA) to SJ (DERM)]
29th July	- 24 sub basins delivered to QRA (Phase 1)
1st Aug	EMG Briefing [SJ (DERM) &[redacted] (QRA)]
8th Aug	- Landcentre - Meeting with QRA re phase 2 ([redacted])
16th Aug	- Internal SI meeting
25th Aug	- Supplied 4 sub-basins + extensions to 2 previously supplied
1st Sep	- Advice of 9 further sub-basins (Email SKJ-18 [redacted] to [redacted] (actually supplied 10)
8th Sep	- Internal SI Meeting
13th Sep	- Internal SI Meeting
16th Sep	- Supplied Lockyer sub-basin, extended Lower Burnett and updated Nogoa
17th Sep	- Premier launches 'Planning for stronger, more resilient floodplains' toolkit
19th Sep	- Advice of 11 further sub-basins (Email SKJ-19 [redacted] to [redacted]
4th Oc	- Advice of 7 further sub-basins (Email SKJ-20 [redacted] to [redacted]
6th Oct	- Internal SI Meeting re participation on QRA visits to LGA's
mid Oct	- 6 further sub-basins to be supplied, bringing total to 63 (Email SKJ-21).
end Dec	- Striving to complete a further 52 sub-basins, but subject to support needed to QRA in implementation phase

Product Specification -- Interim Floodplain Assessment Overlay

Purpose

This brief has been prepared by the Queensland Reconstruction Authority (QldRA) to define the background and specification for the *"Interim Floodplain Assessment Overlay" spatial* product(s) to be developed by the Department of Environment and Resource Management (DERM) on behalf of the QldRA.

Background - Overall Project

The QldRA continues to work on the flood plain management project where the proposed deliverables of this project are to:

- Undertake an audit of planning schemes for selected flood affected local governments – completed.
- Provide interim flood plain management controls for local governments not adequately protected - underway.
- Develop standard planning scheme provisions to enable consistency in application of flood plain management controls and regulation across Queensland - underway.
- Provide guidance and support for local government in the development of templates – on-going.

The QldRA has completed a desktop review of all planning schemes (124) in effect across the State. As a result, a series of guidelines – Planning for a stronger, more resilient flood plain is proposed to assist Councils in the adoption of both interim and long term protection provisions. The first guide will be targeted towards those Councils who based on the audit, do not seem to be adequately protected. The guide will provide assistance as to what interim provisions can be brought into their existing schemes whilst the new amalgamated planning scheme is prepared.

Banana Shire will be used as a case study to roll out the interim provisions, a flood study and the long term provisions in the new planning scheme. The Shire has been allocated funding through Department of Community Safety for the Flood Study.

The QldRA is working closely with DERM to prepare state-wide "*Interim Floodplain Assessment Overlay" maps* based on available historical data and that captured during the recent 2010 – 2011 flood events.

The QldRA is working closely with Building Codes Queensland to ensure that the templates are reflective of the requirements to support the proposed new National Flood Code currently under consideration from the Australian Building Code Board.

Background - Spatial Products.

The QldRA is developing an interim solution to support Local Government Authorities (LGAs) and requires spatial information product(s) to assist relevant LGAs take flooding issues into account when considering development applications. The intent is to provide relevant LGAs with an initial map showing where flooding issues may need to be considered, together with guidelines (developed by QldRA) for how to consider flooding

issues. This will not trigger additional assessable development. It will only provide an additional consideration for proposals which are assessable.

The aim is to provide those LGAs without flood mapping with an initial "*Interim Floodplain Assessment Overlay*" product. LGAs may choose to adopt this area or can amend this product using local knowledge and information to improve it, including additional products provided by the QldRA. As part of a longer term approach, LGAs may further undertake a risk assessment to identify areas for more detailed flood studies. The *Interim Floodplain Assessment Overlay* product will be a regulatory tool under the *Sustainable Planning Act 2009*.

Priorities / Staging

Stage 1: The attached schedule is based on LGAs with no current flood hazard mapping and sets out the priority by planning scheme for the preparation of the desired product.
Stage 2: -The situation and approach will be reviewed after stage 1 to determine the most appropriate product for elsewhere in the State.

Product

The QldRA requires by 30 July 2011, that for Stage 1 priority planning schemes a spatial data set be developed using the best available information which delineates the floodplain area appropriate to trigger consideration of flooding issues by Council.. The data set will be developed using the following principles: The process is,

- to be suitable for a statewide approach;
- to use a consistent approach;
- to be able to be repeated if more accurate data is available in the future;
- eevidential and justifiable.

The *Interim Floodplain Assessment Overlay* will be derived from overlaying available state-wide information sources, including:

- The best available drainage location information (typically 1:100,000 or 1:250,000)[1]
- A standard drainage classification system to determine similar orders of importance
- The best available contour information (typically 10 metre contours)[2]
- The best available satellite imagery (typically Landsat 5), as a standard base layer
- Where other datasets exist and can aid visual interpretation, the following will be used:
    - datasets which provide evidence of historical flooding.
        - Interpreted or actual flood information from 2010/2011 events
        - DERM gauging station information
    - Other data layers as available over the various drainage basins or river sub-basins to provide further informative information for visual interpretation:

[1] Positional accuracy of this data is typically 1mm at map scale (eg 100m +/- at 1:100,000 scale)

[2] Horizontal contour accuracy is typically +/- half a contour interval (relevant to gradient at any given location)

- Preclear Vegetation Mapping of Landzone 3 (Alluvium) and Landzone 1 Estuarine) and SALI Soil Flooding Limitation Mapping

The data set will be in a format suitable for provision to local authorities. To support local authorities to understand the provided dataset, DERM will make available the data sets used in the interpretation (subject to any licensing conditions under which the department acquired the data).

DERM also understands that the QldRA will require visualisations (eg. PDF's or paper products) of the dataset, overlaid on other data sets to support communication activities. These products will be agreed with QldRA. It is understood that these visualisations will include:

- Initially for the Dawson Valley, showing of cross section information related to the gauging station showing the location of the highest recorded flood.
- A DCDB layer to enable identification of individual parcels and relationship with the flood hazard area

The product will be used to identify individual properties or parts of properties located within a *Interim Floodplain Assessment Overlay area.*.

The intent is to have the product prepared for major sub-basins covered by the priority LGAs, based upon the experience from the Dawson Valley pilot study.

The products for Stage 1 will be

- A sub basin overview sheet
- A map book for each identified sub-basin
- Digital data sets used to compile the *Interim Floodplain Assessment Overlay* will be made available if required

Acknowledged Assumptions

The QldRA acknowledges that

- The Landsat5 imagery has not necessarily captured the extent of the peak flood from 2010 /2011 in respective river catchments
- Not all the river catchments in the priority list received significant flooding
- This is a desk top only exercise with no on-ground validation
- The product may not represent the highest recorded flood or maximum possible flood
- More detailed data will be available for many towns following the completion of the current Lidar program underway.
- LGAs will be encouraged to ground truth the limits of the Flood Hazard Area
- To provide a common and consistant approach across sub basins, more accurate project data, eg detailed contours, digital elevation data or aerial photography will not been used in this initial product due to meet the time constraints for this project.

Project Governance

The QldRA will sign off on the Dawson Valley pilot product and other options as presented by DERM to give the QldRA confidence in the product and methodology developed.

The QldRA is the client, the decision maker, and “owner” of the mapping product(s). DERM is the provider.

DERM will liaise with the QldRA to consider any new or additional data sets that are found and may be useful for the purpose of providing LGAs with relevant data upon which to consider flooding issues.

Custodianship

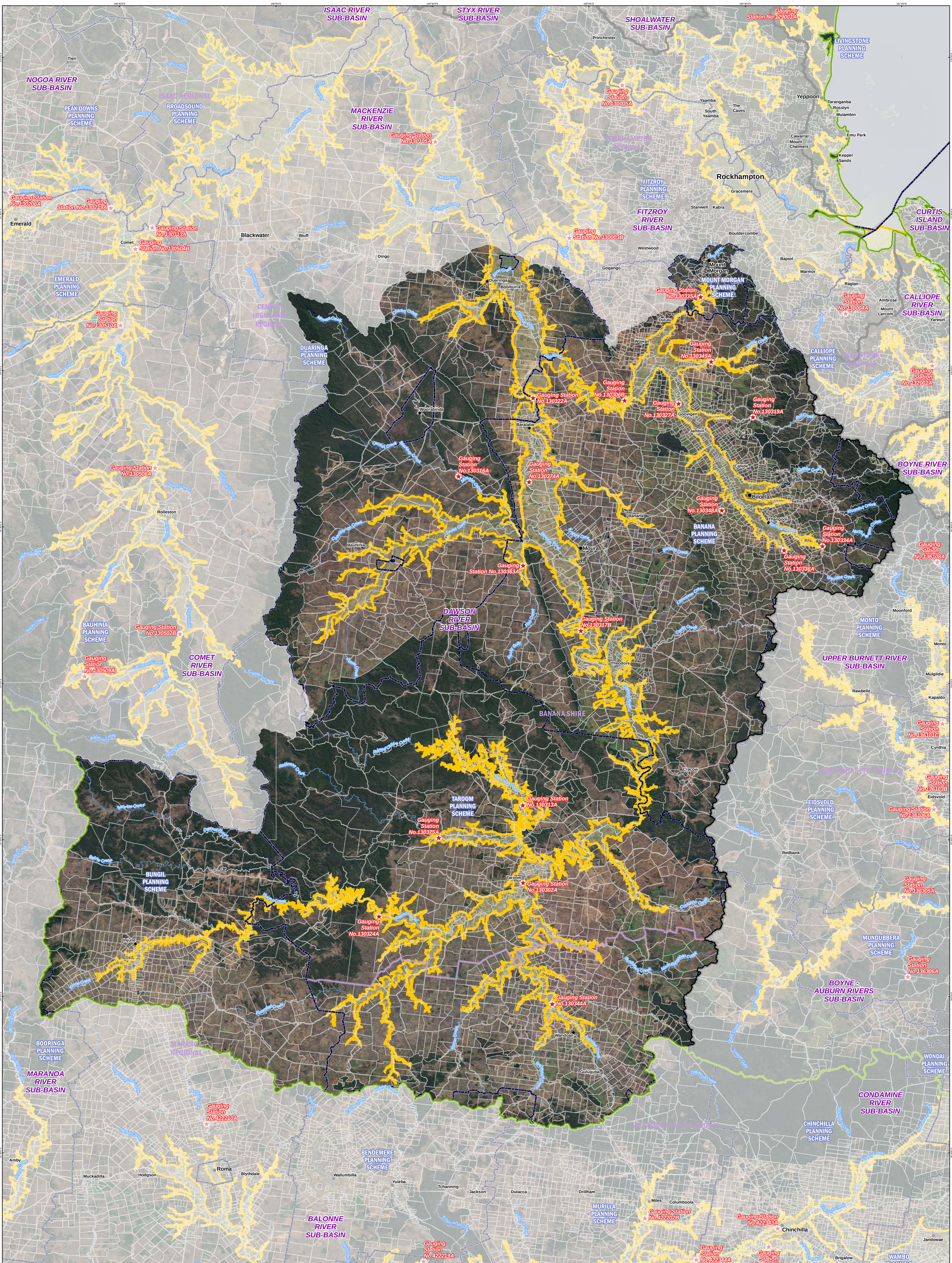
- Custodian ship of this product will reside with QldRA
- Maintenance responsibilities reside with the custodian. The Qld RA may engage DERM to provide update service to support Councils who require edits to respective product(s)

Project Risks

- There is no control over how the mapping product(s) will be used beyond the intended purpose of providing LGAs with a basis for considering flood issues in development applications.
- There may be unintended consequences for land valuations and insurance purposes, especially when the product(s) are not ground truthed and does not relate to a standard defined flood recurrence interval nor a defined flood line.
- Ideally these flood hazard area mapping products would be used to identify flood risk areas for which more detailed flood studies would be undertaken. This would provide greater certainty of exposure to flood risk on the ground and significantly reduce the risk of adverse unintended valuation and insurance consequences.

This can be mitigated by having the respective flood hazard areas related to the recent events and for this to be clearly communicated, the primary target being Regional Planning Committees as the coordinating mechanism for LGA planning. – The issue is that the recent events have not been completely captured across the state.

****



INTERIM FLOODPLAIN ASSESSMENT OVERLAY
DAWSON RIVER SUB-BASIN
2011 V1.0

0 1 2 3 4 5 10 15 20 25 30 35 40
Kilometers

SCALE 1:600000

Original Size is A1

Produced for the Queensland Reconstruction Authority by the Department of Environment and Resource Management, July 2011.

Queensland Reconstruction Authority

Queensland Government

LEGEND

- Gauging Station
- Drainage Divisions
- Drainage Basins
- Planning Scheme Boundaries
- Current Local Government Boundaries
- Cadastre
- Interim Floodplain Assessment Overlay
- Major Watercourses

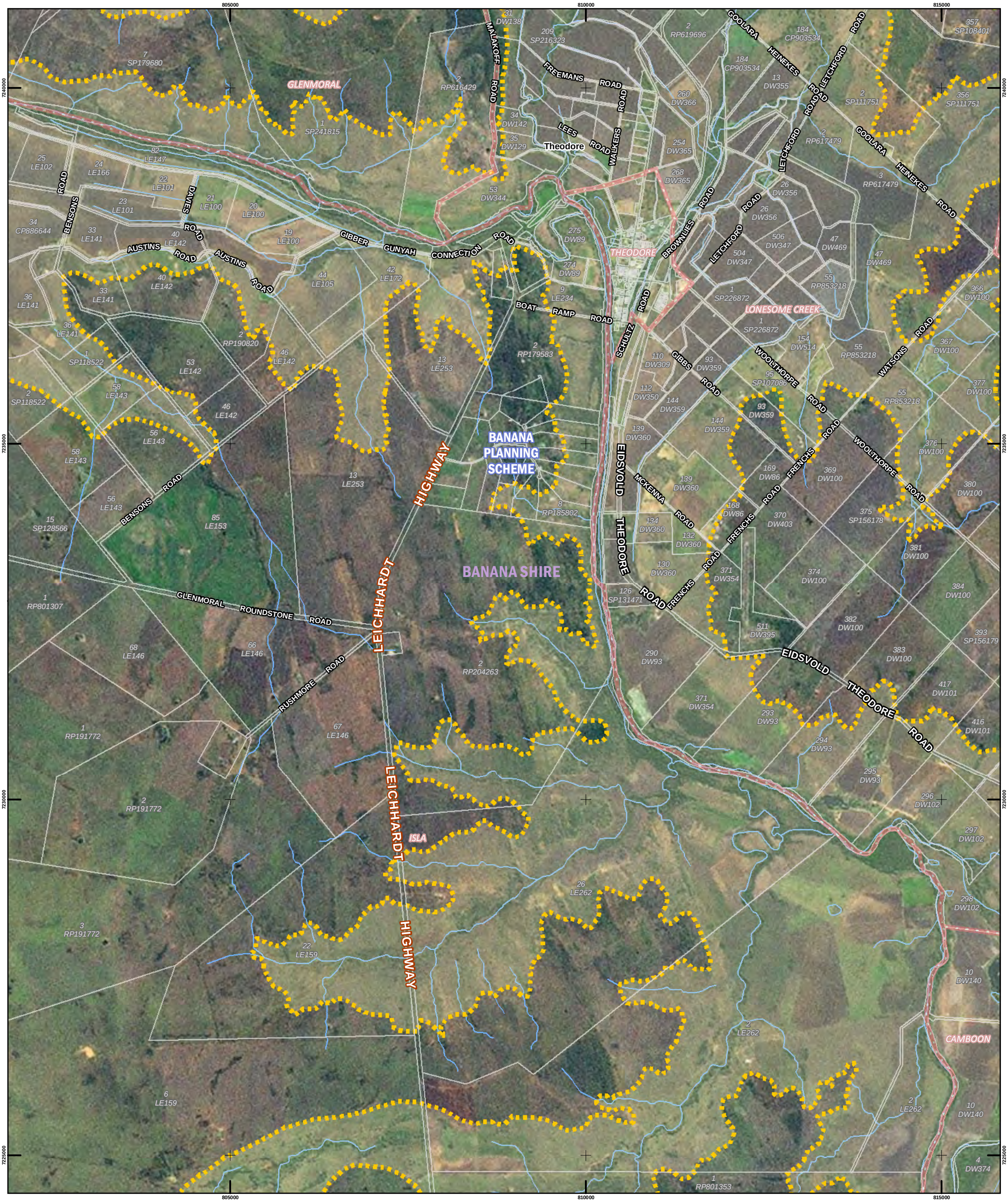
MAP INFORMATION

Imagery:	ESRI ArcGIS Online Imagery Basemap
Cadastre:	Digital Cadastral Database (DCDB) is current at July 2011. Positional accuracy representing the 'maximum error' has been calculated at ± 57 metres.
Floodplain Assessment Overlay:	For more information regarding the capture of this line please see the Foreword at the front of the sub-basin atlases.
Watercourses:	The average accuracy of the data is plus or minus 25 metres in the horizontal position.
Drainage Sub-Basin:	Dawson River
Drainage Basin:	Fitzroy
Drainage Division:	North East Coast
Datum:	Horizontal - Geocentric Datum of Australia 1994 (GDA94)
Projection:	Horizontal - Geocentric Datum of Australia 1994 (GDA94)
Graticule:	Graticule lines are at 30 minute intervals

Technical enquiries:
The Manager
GIS Mapping Services (Client Outcomes), Spatial Information Group
Department of Environment and Resource Management
GPO Box 2454, Brisbane QLD 4001

While every care is taken to ensure the accuracy of this data, the Department of Environment and Resource Management, and/or contributors to this publication, makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way or for any reason.

Map No.:
1303.OV



Queensland Reconstruction Authority

INTERIM FLOODPLAIN ASSESSMENT OVERLAY
DAWSON RIVER SUB-BASIN
MAP 62 2011 V1.0

Technical enquiries:
The Manager
GIS Mapping Services (Client Outcomes)
Department of Environment and Resource Management
GPO Box 2454, Brisbane QLD 4001

Produced for the Queensland Reconstruction Authority by the Department of Environment and Resource Management, July 2011.

LEGEND

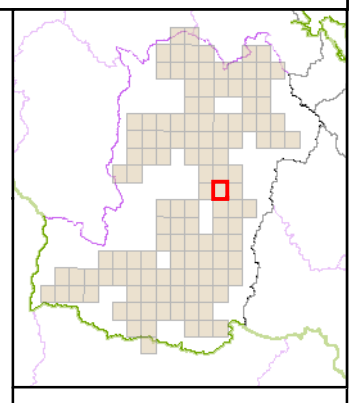
- Interim Floodplain Assessment Hazard Line
- Cadastre
- Planning Scheme Boundaries
- Locality Boundaries
- Current Local Government Boundaries
- Drainage Divisions
- Drainage Basins
- Watercourses
- Gauging Station
- Approx Gauging Station Cross Sections - DERM Highest Recorded Value

MAP INFORMATION

Imagery:	Flying date of aerial photography: Unknown Photo details: ESRI ArcGIS Online Imagery Basemap Pixel Sample Distance: Unknown
Cadastre:	Digital Cadastral Database (DCDB) is current at July 2011. Positional accuracy representing the 'maximum error' has been calculated at ± 57 metres.
Gauging Stations:	Maximum Flood Height lines at gauging stations has been intrepreted manually using elevation contours. Their accuracy is unknown and should be viewed as indicative only.
Drainage Sub-Basin:	Dawson River
Drainage Basin:	Fitzroy
Drainage Division:	North East Coast
Datum:	Horizontal - Geocentric Datum of Australia 1994 (GDA94) Vertical - Australian Height Datum (AHD) 1971
Projection:	Horizontal - Map Grid of Australia (MGA94), which is a standard Universal Transverse Mercator (UTM) projection in Zone 55 with Central Meridian 147° East
Grid:	Grid lines are at 5 kilometres intervals

0 200 400 600 800 1000 2000 3000 4000
Meters

SCALE 1:50000
Original Size is A3



Queensland Government

From: Brendan Nelson [Brendan.Nel[redacted]
Sent: Thursday, 21 [redacted] M
To: Jacoby Steven[redacted]
Cc: [redacted]
Subject: Re: Flood Plain Mapping

Steve
I confirm the arrangements below.
Regards
Brendan

----- Original Message -----
From [redacted] <Steven.J[redacted]
To: [redacted] Brendan Nelson
Cc: [redacted]
Sent: Thu Jul 21 16:51:56 2011
Subject: Re: Flood Plain Mapping

Confirming that we can do all of the below - except the adjoining sheet labels (these must be done manually and it would mean we wouldn't be able to meet timelines).

Also locking in Portrait layout.

If that is ok, we'll move into production from tomorrow morning. If can confirm we'll kick it all off.

Regards,
Steve

----- Original Message -----
From [redacted]
Sent: Thursday, July 21, 2011 12:37 PM
To: Jacoby Steven; Brendan Nelson <Brendan.Nels[redacted]
Cc: [redacted]
Subject: RE: Flood Plain Mapping

Brendan

My notes from yesterday

* index sheet - bigger dots for towns
* map sheet number bigger and in the bottom right hand side -- swap "Qld Gov" logo and "title and map number" info
* If possible show adjoin map sheet on all four edges
* have each map sheet uniquely numbered across the mapping program - this would need a numbering system identifying the respective sub basin (check with Greg Long - the gauging station numbering system is sub basin based?)

[redacted]

-----Original Message-----
From: Jacoby Steven[redacted]
Sent: Thursday, 21 July 2011 12:10 PM
To: Brendan Nelson
Cc: [redacted]
Subject: RE: Flood Plain Mapping
Importance: High

Brendan,

Please find attached an example landscape layout for your review.

Regards,

STEVE JACOBY
General-Manager, Spatial Information

Te[redacted] 3708 Fax[redacted] Mob[redacted]
Email: [redacted]
www.derm.qld.gov.au

Spatial Information Group
Department of Environment and Resource Management Queensland Government Level 9, Landcentre Cnr Main & Vulture Streets Woolloongabba, Qld 4102 Locked Bag 40 Coorparoo DC, Qld 4151

-----Original Message-----
From: Brendan Nelson[redacted]
Sent: Wednesday, 20 July 2011 5:56 PM
To: Jacoby Steven
Cc: [redacted]
Subject: Re: Flood Plain Mapping

Thanks Steve
The format wasn't a major issue today.... Would be keen to see an alternative in landscape and we can advise... Keen to sign off on the spec tomorrow and allow your team to finalise... We have done a review of the priority areas and will forward that to you tomorrow as well...
Nothing major bit more based on population thresholds following our meeting with Graeme earlier this week.
Thanks
Brendan

----- Original Message -----
From: Jacoby Steven[redacted]
To: Brendan Nelson
Cc: [redacted]
Sent: Wed Jul 20 17:29:13 2011
Subject: Re: Flood Plain Mapping

Thanks Brendan,

Appreciate the feedback, the team have worked hard to get it to where it is.

Keen to lockdown the spec asap - a key issue is portrait or landscape layout...

Will look forward to hearing from you.

Regards,
SJ

----- Original Message -
From: Brendan Nelson[redacted]
Sent: Wednesday, July 20, 2011 04:53 PM
To: Jacoby Steven
Cc: [redacted]
Subject: Flood Plain Mapping

Hi Steve,
Just wanted to drop a quick line to say the mapping was really well received today. Not many comments... Council are reviewing over the next day or so and will come back to us. I'm not expecting any issues... The engineers in the room we're positive and the only comments were maybe a cm or two here or there on a couple of maps.... Nothing significant and well within scope... Will let you know when we receive feedback... To be honest, they were blown away... Cheers bn

+--+
Think B4U Print
1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere
3 sheets of A4 paper = 1 litre of water
+--+

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Interim Floodplain Assessment Overlay Mapping Methodology

Introduction

Part 1 of the Queensland Reconstruction Authority's Guideline *"Planning for stronger, more resilient floodplains"* provides Councils with a toolkit enabling the adoption of interim measures to support floodplain management in existing planning schemes. A key component of the toolkit is a mapping product. This document explains in detail how that mapping was created, but it is important for users of this mapping product to read the Guideline to understand its purpose.

The Department of Environment and Resource Management (DERM) was approached by the Queensland Reconstruction Authority (QldRA) in June 2011, to develop a mapping product that would be of assistance in raising awareness and improving floodplain management across Queensland through the land use planning process. An audit by the QldRA had found a significant lack of flood mapping in local planning schemes (more than 60%). DERM was asked whether a state-wide map of floodplains suitable for inclusion as a planning assessment overlay (to trigger consideration of assessment for a development's compatibility to withstand flood) existed, or could be created. The department's view was that such a state-wide dataset didn't exist.

The QldRA confirmed that the mapping would be required over all of Queensland (excluding the metropolitan and urban areas where existing flood mapping was available, eg Brisbane, Ipswich, Gold Coast, etc). The mapping would also need to be made available within months to be useful and it would have to be produced at a scale where it could be related to cadastral boundaries (ie land parcels) sourced from the digital cadastral database (DCDB). The latter would allow the location of development applications referenced by a 'lot / plan' or street address to be determined with respect to the floodplain mapping. The mapping being requested was not intended to replace existing flood studies, but to complement these studies where no studies had created mapping.

These criteria, in particular the tight timeframe, led the department to conclude that it would need to rely on existing datasets (it couldn't commence new data acquisition programs in the time available) and it would need to use data that had state-wide or close to state-wide coverage (it would not have the time or resources to collate existing project data that would have been created using different methodologies and over small areas such as individual towns).

The following principles were agreed in developing the mapping product:

- suitability for a state-wide approach;
- a consistent approach;
- a repeatable approach if more accurate data is available in the future;
- evidential and justifiable.

Workshops were conducted between QldRA and DERM staff as well as independent planning consultants to develop a potential methodology based on the above criteria. A pilot area was chosen to test a preferred approach. Results from the pilot in the Dawson River sub basin were reviewed by local government staff from Banana Shire.

From the pilot several important requirements emerged:

- the mapping would be conducted on river sub basin units (rather than LGA's or standard series mapping units);
- whole sub basins would be completed where possible;
- prioritisation of the sub basins would be undertaken by the QldRA (based primarily on population);
- an interactive, on-line mapping tool as well as hard copy map books would be outputs; and
- the process will provide for transparency (all inputs would be made available to local authorities) and the mapping would allow for community feedback.

The resources for the mapping work would need to be found from within DERM's existing budget and capabilities (there were no new funds). QldRA would be responsible for developing the interactive mapping tool and printing arrangements for the map books (DERM would only supply the content).

The first 24 sub-basins needed to be completed by end of July 2011, a period of 5 weeks. Attachment 1 provides an overview on the various phases of the project.

Deliverables to Queensland Reconstruction Authority

The following products have been provided to the QldRA:

- digital dataset of the Interim Floodplain Assessment Overlay in a format suitable for use in a geographic information system (GIS);
- a Mapbook (a series of A3 mapsheets covering sub-basins) in electronic format suitable for both printing and display on the QldRA website.

Accuracy limitations

The A3 mapbook product has been produced at a 1:50,000 scale to allow the cadastre to be identifiable so that individual properties or parts of properties can be determined as being located within the IFAO area or not.

Various components that have been used in the process have differing scale dependability. For example drainage data 1:100,000; satellite imagery 1:100,000; aerial photography 1:10,000.

The boundary of the IFAO has been shown as a dashed line in the map books, indicating that it is approximate, rather than absolute, limited by the methodology used and datasets available. While the mapping has been produced at 1:50,000 as requested by the QldRA, the accuracy of the IFAO dataset as a whole is more suited to smaller scale mapping (eg. 1:100,000) due to the nature of the inputs. In parts of the dataset, areas may have higher accuracies as a result of the inputs available in specific areas.

DERM is also aware that users of the interactive map produced by the QldRA may zoom into scales larger than 1:50,000 (eg.1:25,000) for which the dataset is not suitable.

Methodology

The Interim Floodplain Assessment Overlay (IFAO) was derived from overlaying available state-wide spatial data. As stated in the Guideline, DERM utilised a range of datasets to inform staff (the majority with over 30 years experience), who through a visual interpretation determined the Interim Floodplain Assessment Overlay location. The metadata of the individual datasets describes the characteristics of each dataset, including its lineage, while the Guideline contains a summary of the dataset characteristics.

The methodology and data used includes:

1. *Select the drainage sub-basin to be mapped*
    - Identify the sub-basin boundary from the state wide drainage basin data set.

2. *Display satellite imagery as a backdrop*
    - The best available satellite imagery typically will be Landsat 5 or Spot. This imagery has a 30m pixel resolution.
    - Where aerial photography was captured during the floods of 2010/11 this imagery can be used to assist in the delineation of the IFAO.

3. *Overlay dataset showing town locations*
    - This dataset comprises towns which have a history of flooding in Queensland or at possible risk of flooding due to proximity to drainage network.

Figure 1: The Dawson River sub-basin boundary overlaid on Spot imagery

4. *Overlay the Strahler ordered drainage data where available*
   - This data set has a standard drainage classification system to determine drainage hierarchy so as to provide a consistency across all river basins.
   - This data set is the best available drainage location information (eg 1:100,000). Positional accuracy of this data is 1mm at map scale (eg 100m +/- at 1:100,000 scale).
   - This data is only available in the North East Coast and Murray Darling Drainage divisions. For areas outside these drainage divisions, data captured for mapping at 1:250,000 has been used.

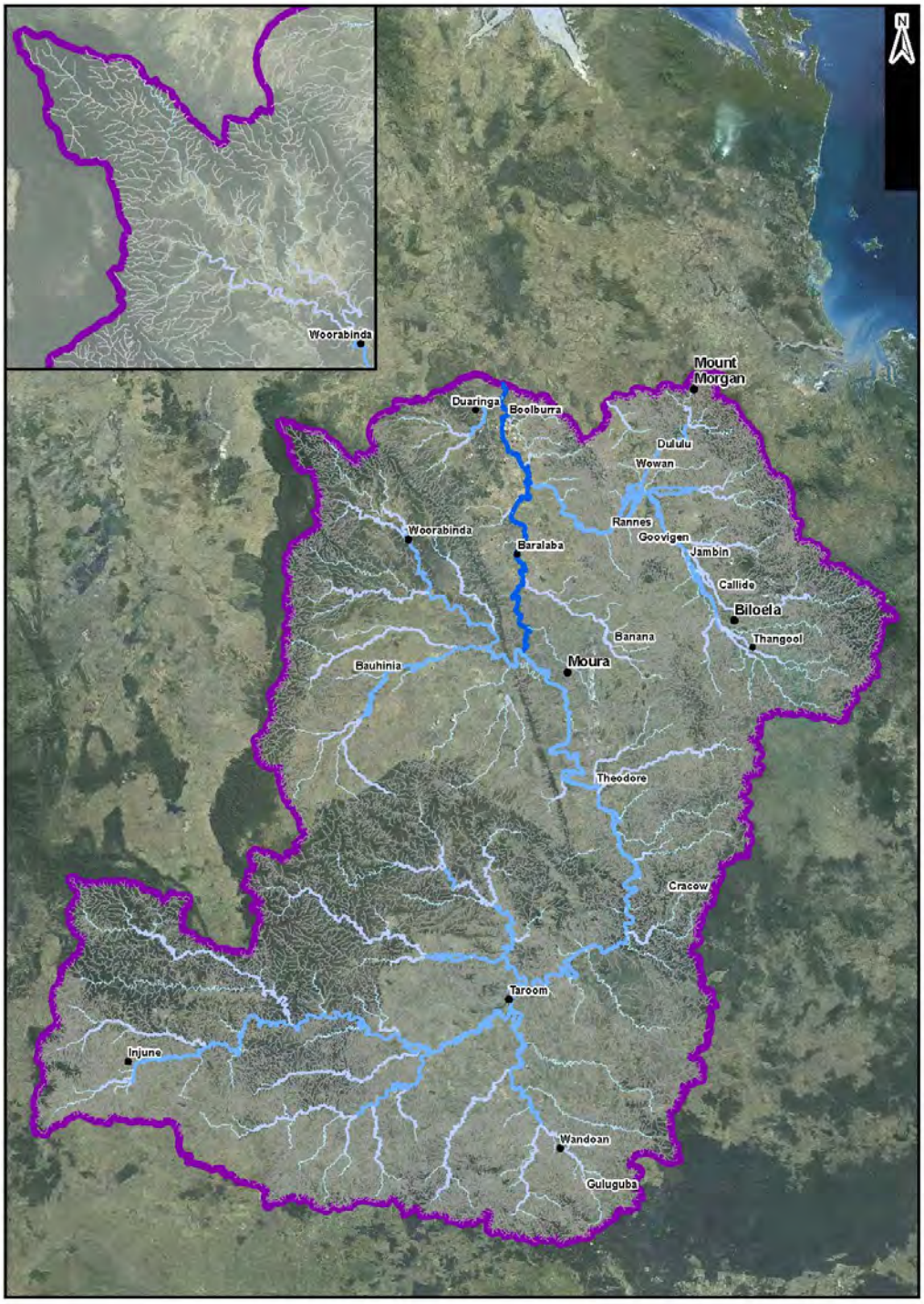


Figure 2: Dawson sub-basin with drainage layer. The complexity of the drainage pattern over the basin is evident, with lighter colours commencing at order 1 and moving through to dark blue as the order increases.

5. Overlay natural resource data sets

- Floodplain data set - a dataset that combines Pre-clear Vegetation Mapping of Landzone 3 (Alluvium), Landzone 1 (Estuarine) and the SALI (Soil Flooding Limitation Mapping) data base. This dataset shows where these natural environment characteristics exist, and like the ordered drainage, was developed for mapping at 1:100,000.

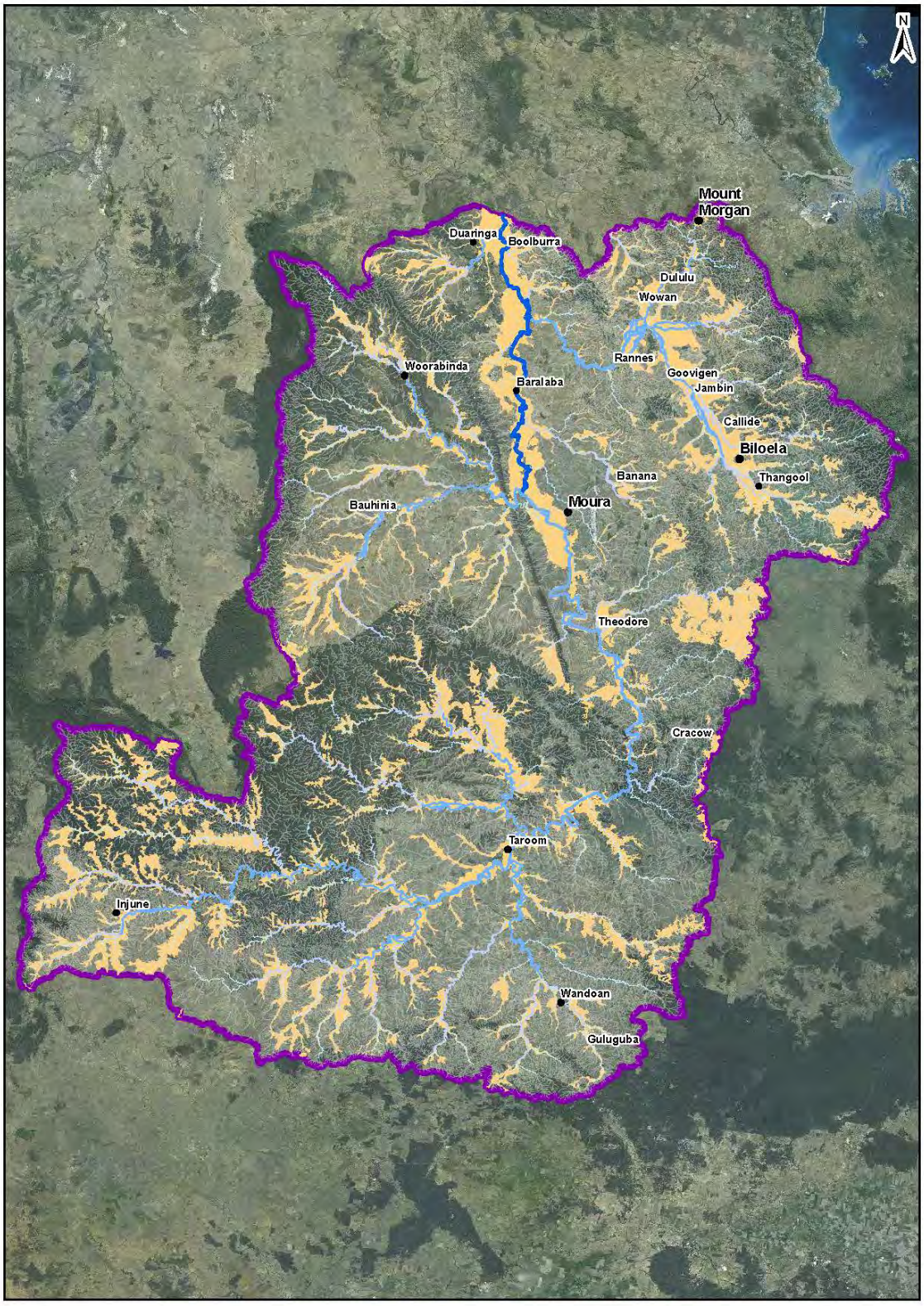


Figure 3: Dawson River sub-basin overlaid with floodplain dataset generated from soil and vegetation information.

6. *Determine the drainage lines that need to be mapped as a minimum*
    - It was determined that to achieve the QldRA objectives and to meet timeframes, it was not possible to map the headwater streams (eg. order 1, 2, etc), unless known events had occurred. The drainage orders to be used needed to be determined for each sub-basin, as smaller coastal sub-basins may only have had 4 or 5 orders, compared to the Dawson River sub-basin which had 9. In all cases order 1 was not mapped, and generally order 2 was not mapped.

In Figure 4, the drainage lines to be mapped as a minimum are shown in blue, while those ordered 1-4 are shown in red. In the case of the Dawson sub-basin, it was determined that only streams 5-9 would be mapped as a minimum.

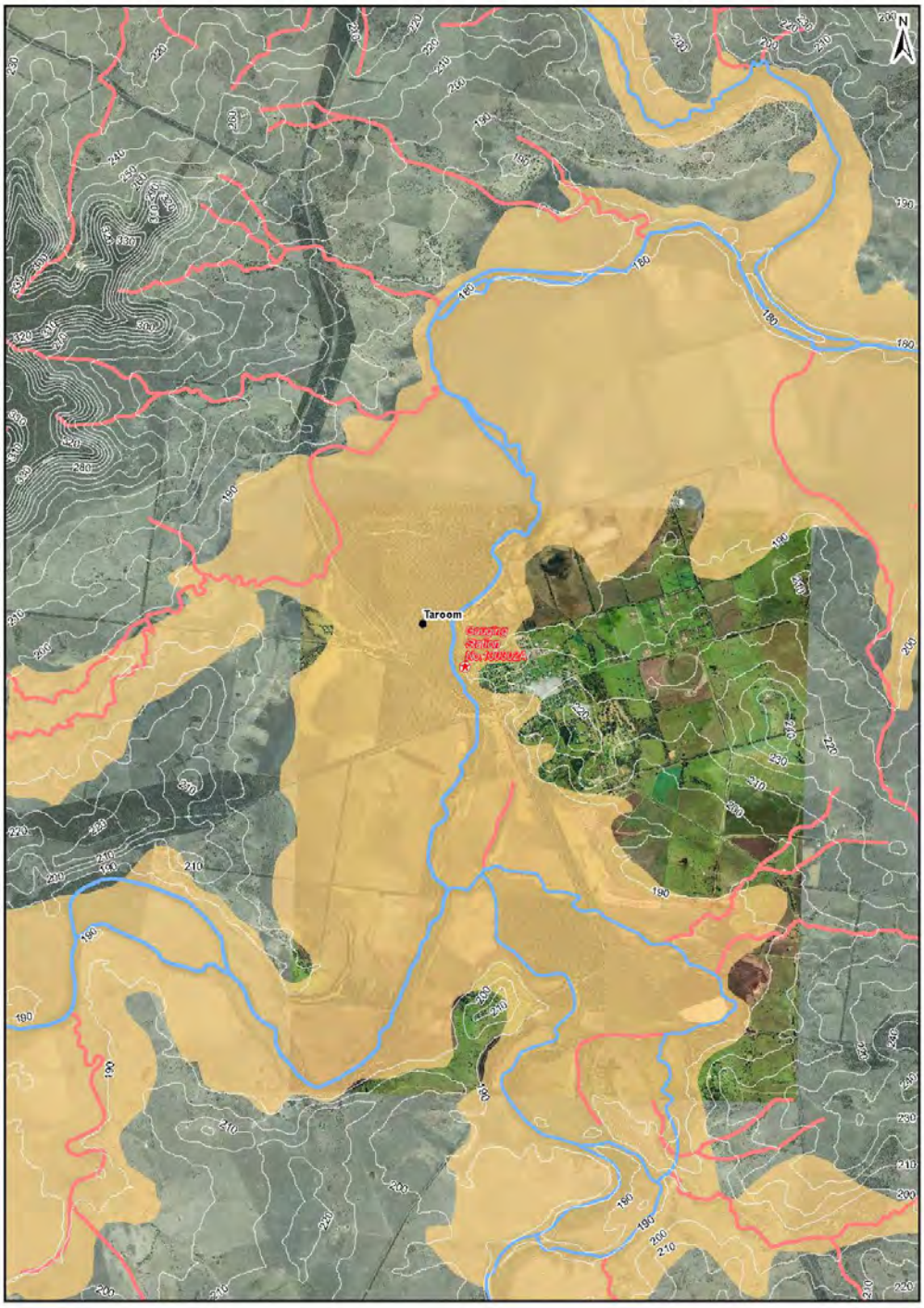


Figure 4: Located on Taroom, the red drainage lines represent those ordered 1-4 and were determined for this sub-basin not to be a priority to map. The drainage lines 5-9 were determined to be the priority to map. The location of the gauging station at Taroom is shown.

7. *Overlay contour data*
   - Typically 10 metre contours will be used (so as to be able to provide state-wide coverage). Horizontal contour accuracy is +/- half a contour interval relevant to gradient at any given location.
   - Where available additional more accurate data was used (eg. for example contours captured from LIDAR technology were used in coastal areas where available. This data has an accuracy of +/- 0.25m.)

8. *Overlay gauging stations data*
   - Gauging stations were identified and their positions were included within the IFAO. The usefulness of gauging stations was related to the immediate vicinity of the gauging station and also to the age of the gauging station and therefore the records available. In the case of the Dawson sub-basin, one station has existed since 1911, while another has only existed since 2005.

The use of gauging stations provides another method of obtaining information about areas that could be subject to flooding. The DERM website (www.watermonitoring.derm.qld.gov.au) provides detailed information on gauging stations including the zero gauge elevation and the maximum gauge level. Figure 5 shows such an example for the gauging station on the Dawson River at Taroom.

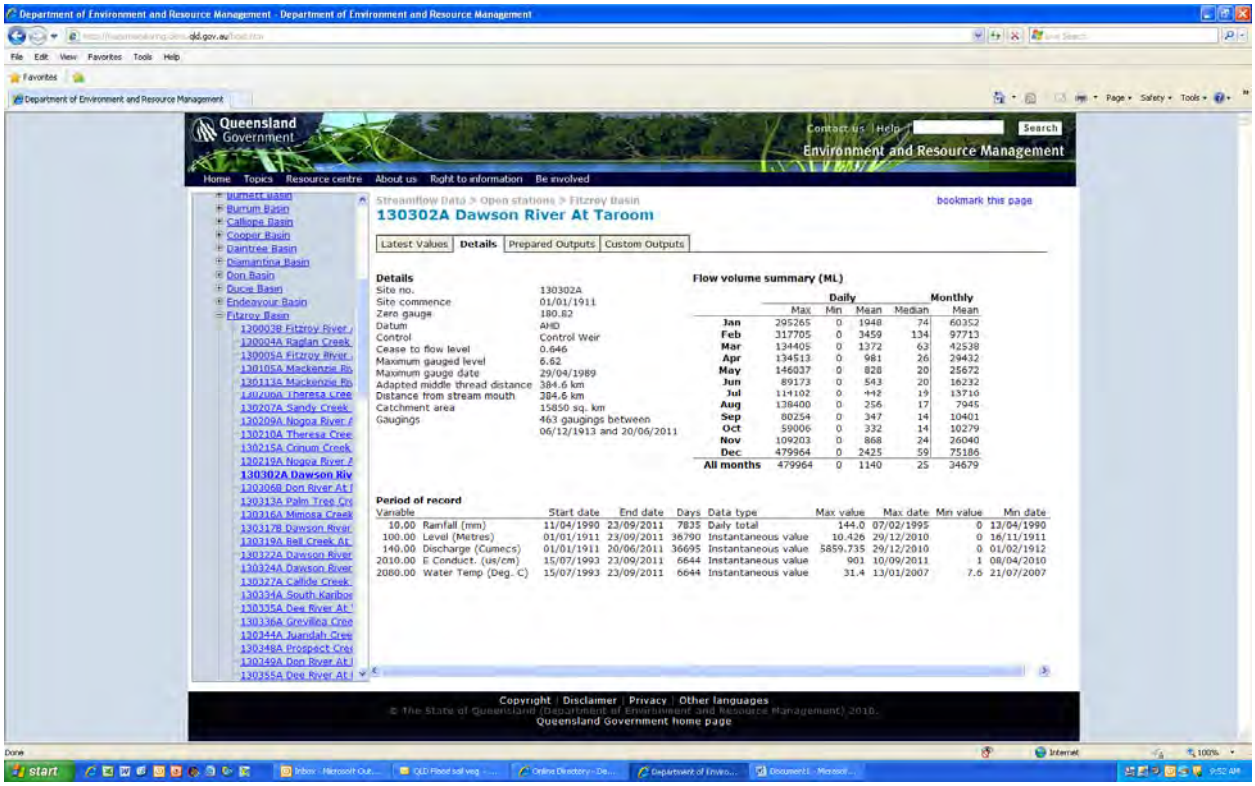


Figure 5: Extract from water monitoring site showing zero gauge to be 180.82 metres, a maximum gauge level of 6.62 metres on 24/4/1989, resulting in peak height of 187.44 metres

9. *Overlay flood lines over towns of actual events from 2011*
    - Ensure that the IFAO includes these flood lines.

10. *Where other datasets exist and can aid visual interpretation, they can be used*
    - Datasets that provide evidence of historical flooding
    - Historical media reports searched on the web have provided documented information and visual information (photographs).

In many parts of Queensland, an analysis from satellite imagery existed for the 2011 events, which identified areas where water was standing or where reflective characteristics of the soil identified soil moisture. In most cases the analysis from satellite imagery exceeded the area mapped from more accurate information, figure 6.

Figure 6: Dark Blue is from mapping of 2011 event from aerial photography, while light blue is from analysis from satellite imagery of the 2011 event.

11. Identify the IFAO line

- Using the gauging stations data above and actual events as a guide, along with visual interpretation of the imagery and other layers to estimate the boundary which represents the actual area of the IFAO at these locations.

Through visual interpretation and spatial skills, the IFAO was extended through other locations where detailed information (eg. actual flooding derived from aerial photography, gauging stations), recognising that progressively the sub-basin lowers in elevation as it heads towards the mouth of the river.

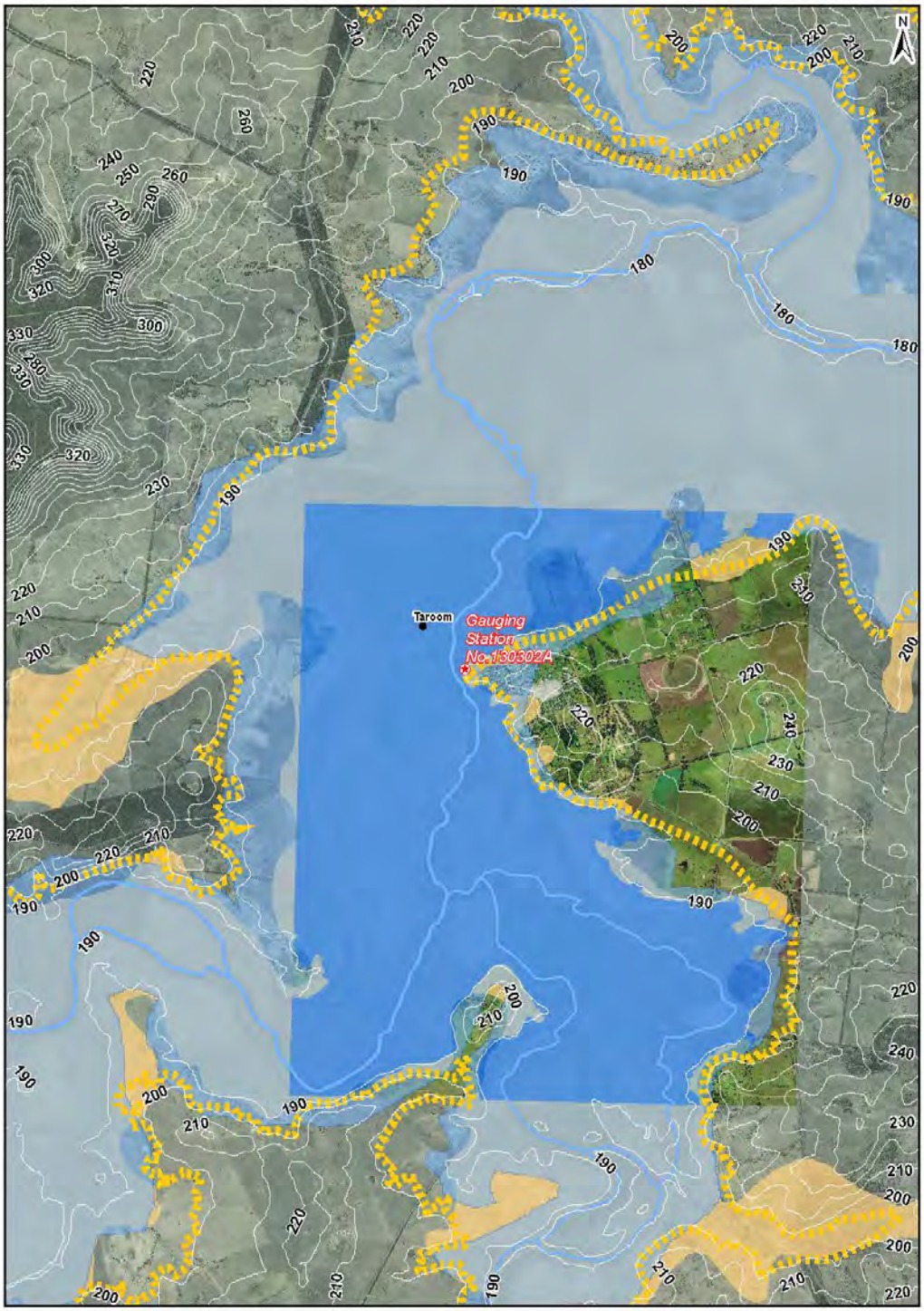


Figure 7: IFAO developed by visual interpretation of multiple data sources using contours to guide location of the IFAO. As the drainage sub-basin reduces elevation, adjustments are made to the boundary of the IFAO.

The visual interpretation to create the IFAO was critical, as relying wholly on individual datasets would have included areas where flooding would not occur. In figure 8, the two circled areas show examples of increasing elevation, where one is covered by the 2011 event as recorded from satellite analysis and the other compiled from soil information. These discrepancies are expected due to the lineage of the datasets.

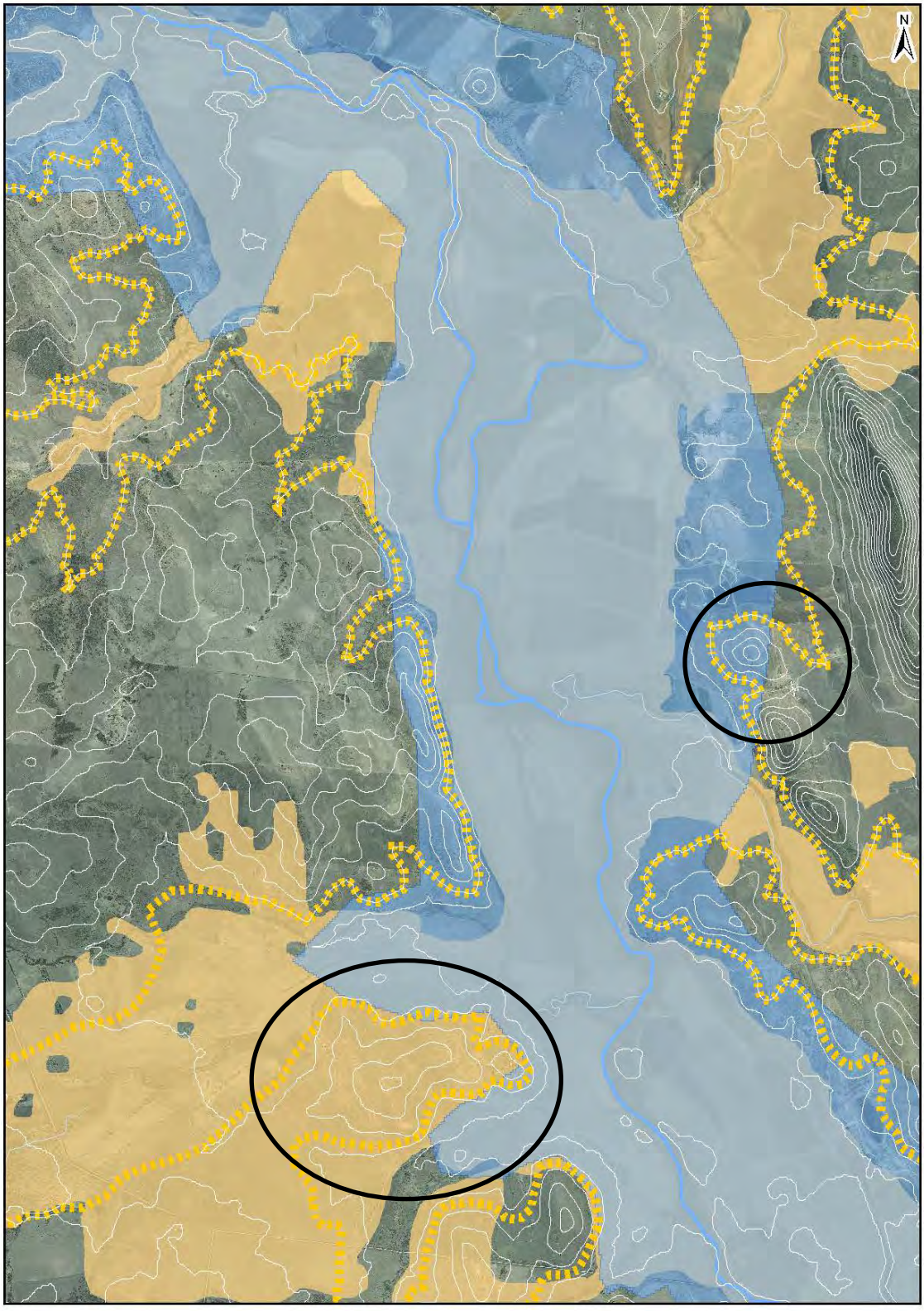


Figure 8: Showing how the IFAO has taken into account inaccuracies in various datasets. The two circled areas show areas of increasing elevation which would not be part of floodplain.

The purpose of this mapping was to identify a floodplain to trigger development application considerations. It needed to be inclusive of known flood events, but not so broad that development applications would be triggered in areas not reasonably on the floodplain. In this example, information still subject to validation indicates a maximum gauge level of 10.43 metres at 7pm on Wednesday 29/12/10 at Taroom, resulting in the peak height of 191.25 metres. The final step of visual interpretation allowed for known events and dataset limitations to be considered in the placement of the IFAO.

Figure 9: In this case the maximum official gauged height was 187.44 metres, with the un-validated 2010 event 191.25 metres. In this case the gauge was established in 1911 and the maximum official gauge height was recorded in 1989. The IFAO is mapped slightly higher than 190 metres near the gauge station.

The methodology did not take into account man-made structures (eg. levees), as no state wide dataset exists, and secondly, the land contained within levee areas are part of the floodplain, meaning they could in the future flood again given the appropriate circumstances.

This methodology allows in the future the use of better quality data or additional data to be included to improve the mapping of the IFAO.

Summary

The Dawson River sub-basin covers 50,903 square kilometres. The area identified as part of the IFAO was 4,849 square kilometres, representing 9.5% of the sub-basin. As shown in figure 10, a total of 136 A3 maps at 1:50,000 were produced to cover the Interim Floodplain Assessment Overlay.

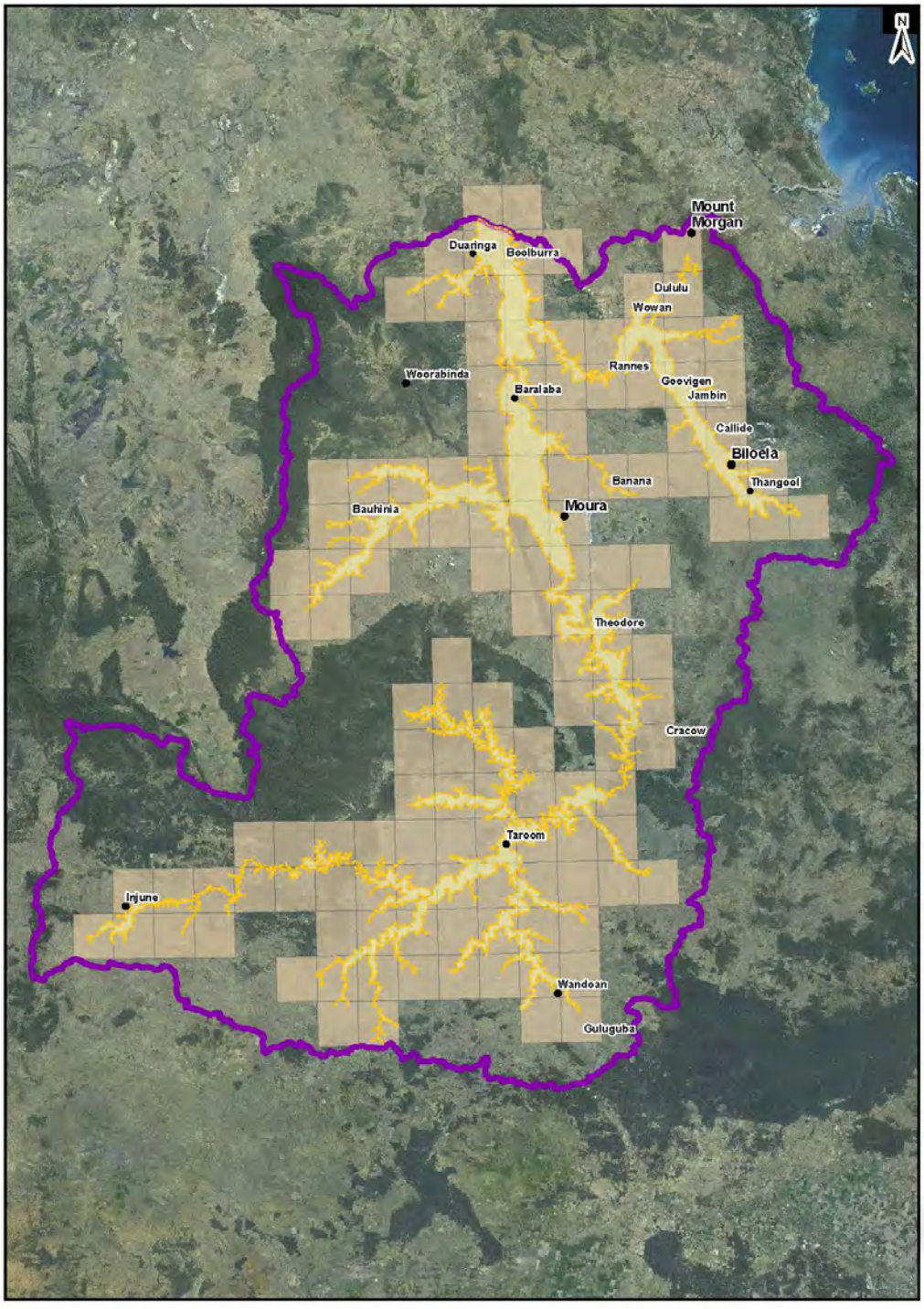


Figure 10: Dawson River sub-basin showing IFAO and A3 map sheets produced

Attachment 1 – Sub-basins in Queensland and proposed schedule

Phase 1 was completed at end of July 2011, phase 2 is due to be completed in mid October 2011 and phase 3 will map relevant areas by mid 2012. Some sub-basins have been excluded due to local government already having mapping available or mapping not considered necessary over the sub-basin.

Drainage Division	Basin Name	Sub-Basin	
		Name	Status
Lake Eyre	Georgina	Eyre Creek	Need to be considered as part of Phase 3
		Georgina River	Need to be considered as part of Phase 3
	Diamantina	Diamantina River	Need to be considered as part of Phase 3
	Cooper Creek	Cooper Creek	Need to be considered as part of Phase 3
		Thomson River	Need to be considered as part of Phase 3
		Barcoo River	Phase 2
	Lake Frome	Lake Frome	Need to be considered as part of Phase 3
	Hay	Hay River	Need to be considered as part of Phase 3
Bulloo	Bulloo	Bulloo River	Need to be considered as part of Phase 3
North East Coast	Jacky Jacky	Jacky Jacky Creek	Need to be considered as part of Phase 3
	Olive-Pascoe	Olive River	Need to be considered as part of Phase 3
		Pascoe River	Need to be considered as part of Phase 3
	Lockhart	Lockhart River	Need to be considered as part of Phase 3
	Stewart	Stewart River	Need to be considered as part of Phase 3
	Normanby	Hann River	Need to be considered as part of Phase 3
		Normanby River	Need to be considered as part of Phase 3
	Jeannie	Jeannie River	Need to be considered as part of Phase 3
	Endeavour	Endeavour River	Need to be considered as part of Phase 3
	Daintree	Daintree River	Phase 2
	Mossman	Mossman River	Phase 2
	Barron	Barron River & Freshwater Creek	Phase 2
	Mulgrave-Russell	Mulgrave River	Phase 2
		Russell River	Phase 2
	Johnstone	North Johnstone River	Phase 2
		South Johnstone River	Phase 2
	Tully	Tully River	Phase 2
	Murray	Murray River	Phase 2
	Hinchinbrook Island	Hinchinbrook Island	Not in scope
	Herbert	Herbert River	Phase 2
	Black	Black River	Phase 2
	Ross	Bohle River	Phase 2
		Ross River	Phase 2
	Haughton	Haughton River	Phase 2
		Barratta Creek	Phase 2
	Burdekin	Lower Burdekin River	Phase 2
		Upper Burdekin River	Phase 2
		Bowen River	Phase 2
		Suttor River	Phase 2
	Don	Don River	Phase 2
	Proserpine	Proserpine River	Phase 2
	Whitsunday Island	Whitsunday Island	Not in scope

Drainage Division	Basin Name	Sub-Basin	
		Name	Status
	O'Connell	O'Connell River	Phase 2
	Pioneer	Pioneer River	Phase 2
	Plane	Plane Creek	Phase 2
	Styx	Styx River	Phase 2
	Shoalwater	Shoalwater	Not in scope
	Waterpark	Waterpark Creek	Phase 2
	Fitzroy	Fitzroy River	Phase 2
		Mackenzie River	Phase 1
		Nogoa River	Phase 1
		Dawson River	Phase 1
		Isaac River	Phase 1
		Comet River	Phase 1
	Curtis Island	Curtis Island	Not in scope
	Calliope	Calliope River	Phase 2
	Boyne	Boyne River	Phase 2
	Baffle	Baffle Creek	Phase 2
	Kolan	Kolan River	Phase 2
	Burnett	Lower Burnett River	Phase 1
		Upper Burnett River	Phase 1
		Barker & Barambah Creeks	Phase 1
		Boyne & Auburn Rivers	Phase 1
	Burrum	Elliott River	Phase 1
		Gregory River	Phase 1
		Isis River	Phase 1
		Burrum River	Phase 1
	Mary	Lower Mary River	Phase 1
		Upper Mary River	Phase 1
	Fraser Island	Fraser Island	Not in scope
	Noosa	Noosa River	Phase 2
	Maroochy	Maroochy River	Not in scope
	Pine	Caboolture River	Not in scope
		North Pine River	Not in scope
		South Pine River	Not in scope
	Brisbane	Brisbane River	Phase 1 (excludes Ipswich & Brisbane LGA)
		Bremer River	Phase 2 (Scencic Rim LGA only)
		Lockyer Creek	Phase 2
		Stanley River	Phase 1
	Moreton Bay Islands	Stradbroke Islands	Not in scope
		Moreton Island	Not in scope
	Logan-Albert	Logan River	Phase 2 (Scenic Rim LGA only)
		Albert River	Phase 2 (Scenic Rim LGA only)
	South Coast	Coomera & Nerang Rivers	Not in scope
Murray Darling	Border Rivers	Macintyre & Weir Rivers	Phase 1
		Dumaresq River	Phase 1
		Macintyre Brook	Phase 1
	Moonie	Moonie River	Phase 1
	Balonne-Condamine	Balonne River	Phase 1

Drainage Division	Basin Name	Sub-Basin Name	Sub-Basin Status
		Condamine River	Phase 1
		Maranoa River	Phase 1
		Wallam Creeks	Phase 2
	Warrego	Warrego River	Phase 2
	Paroo	Paroo River	Need to be considered as part of Phase 3
Gulf	Settlement	Settlement River	Need to be considered as part of Phase 3
		Lagoon Creek	Need to be considered as part of Phase 3
		Eight Mile Creek	Need to be considered as part of Phase 3
		Cliffdale Creek	Need to be considered as part of Phase 3
	Mornington Island	Mornington Island	Need to be considered as part of Phase 3
	Nicholson	Nicholson River	Need to be considered as part of Phase 3
	Leichhardt	Leichhardt River	Need to be considered as part of Phase 3
	Morning	Morning Inlet	Need to be considered as part of Phase 3
		"L" Creek	Need to be considered as part of Phase 3
	Flinders	Flinders River	Need to be considered as part of Phase 3
		Saxby River	Need to be considered as part of Phase 3
		Cloncurry River	Need to be considered as part of Phase 3
	Norman	Norman River	Need to be considered as part of Phase 3
	Gilbert	Gilbert River	Need to be considered as part of Phase 3
		Einasleigh River	Need to be considered as part of Phase 3
	Staaten	Staaten River	Need to be considered as part of Phase 3
	Mitchell	Mitchell River	Need to be considered as part of Phase 3
		Alice River	Need to be considered as part of Phase 3
		Palmer River	Need to be considered as part of Phase 3
		Walsh River	Need to be considered as part of Phase 3
	Coleman	Coleman River	Need to be considered as part of Phase 3
		Edward River	Need to be considered as part of Phase 3
	Holroyd	Holroyd River	Need to be considered as part of Phase 3
		Kendall River	Need to be considered as part of Phase 3
	Archer	Archer River	Need to be considered as part of Phase 3
		Coen River	Need to be considered as part of Phase 3
	Watson	Watson River	Need to be considered as part of Phase 3
	Embley	Embley River	Need to be considered as part of Phase 3
		Mission River	Need to be considered as part of Phase 3
	Wenlock	Wenlock River	Need to be considered as part of Phase 3
	Ducie	Ducie River	Need to be considered as part of Phase 3
		Skardon River	Need to be considered as part of Phase 3
		McDonald River	Need to be considered as part of Phase 3
	Jardine	Jardine River	Need to be considered as part of Phase 3
	Torres Strait Islands	Torres Strait Islands	Not in scope
Misc Other Islands	Misc Other Islands	Misc Other Islands	Not in scope

From: [redacted]
Sent: Tuesday, 21 June 2011 6:17 PM
To: Jacoby Steven; [redacted]
Cc: [redacted] Brendan Nelson; [redacted]
Subject: Priority areas for Mapping

Attachments: Priority LGAs_DERM.docx; Priority LGAs_DERM.pdf
Hi Steve/ Brendan,

Further to our meeting last week, the Authority has now completed a high level desktop audit of all planning schemes across the State. What has eventuated is that there is a number of LGAs where all of the planning schemes in effect within the LGA (in some cases 6 separate schemes) do not seem to have adequate protection or any form of mapping. To support and help your process and priorities internally, attached is a list of these areas. Those highlighted in yellow are seen to be the priorities. At this stage we have sorted through the LGAS, federal drainage division and the nominated river basin. We are working through the nominated catchments for each river basin. This is proving a little bit of a challenge based on inconsistent terminology.

We trust that this list will be able to help you scope the work and any additional resources that you may require to produce the required mapping.

I understand [redacted] is arranging a catch up some time this week where we will be able to discuss resourcing and map production further.

Any questions regarding the priorities please let us know.

Kind Regards,

[redacted]
Director - Planning
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
GPO Box 15428 City East Q 4002
P [redacted] | F [redacted]
M [redacted] 716 213
E kate.isle[redacted]

LGA	Planning Schemes	Drainage Division	River Basin
Balonne	Balonne	IV - Murray-Darling Divison	Balonne-Condamine, Moonie
Banana Shire	Banana	I - Northeast Coast Division	Fitzroy
	Taroom		
Barcaldine Regional	Aramac	X - Lake Eyre Division	Cooper Creek, Burdekin
	Barcaldine		
	Jericho		
Burke Shire	Burke Shire Planning Scheme	IX - Gulf of Carpentaria Division	Leichhardt, Nicholson, Settlement
Burdekin Shire	Burdekin Planning Scheme	I - Northeast Coast Division	Burdekin, Haughton
Carpentaria Shire	Carpentaria Planning Scheme	IX - Gulf of Carpentaria Division	Mitchell, Staaten, Gilber, Norman, Flinders, Morning, Leichhardt
Central Highlands Regional	Bauhina	I - Northeast Coast Division, X - Lake Eyre Division	Fitzroy
	Duaringa		
	Emerald		
	Peak Downs		
Charters Tower Regional	Charters Towers City Council Planning Scheme	I - Northeast Coast Division	Burdekin, Haughton, Flinders
Cook Shire	Dalrymple Shire Council Planning Scheme	I - Northeast Coast Division, IX - Gulf of Carpentaria Division	Coleman, Mitchell, Normanby, hilroyd, Stewart, Jeannie, Endeavour, archer, watson, embley, wenlock, olive-pascoe, ducie, jacky jacky, jardine
	Cook Planning Scheme		
Croydon Shire	Croydon Planning Scheme	IX - Gulf of Carpentaria Division	Norman
Fraser Coast Regional	Hervey Bay	I - Northeast Coast Division	Mary, Noosa
	Maryborough		
	Tiaro		
	Woocoo		
Goondiwindi Regional	Ingelwood	IV - Murray-Darling Division	Moonie, Border Rivers
	Goondiwindi		
	Waggamba		
Gympie Regional	Cooloola	I - Northeast Coast Division	Burnett, Mary, Noosa
	Kilkivan		
	Tiaro		
Isaac Regional	Belyando	I - Northeast Coast Division	Fitzroy,Burdekin
	Nebo		
Maranoa Regional	Bendemere	IV - Murray-Darling Division	Balonne-Condamine, Moonie, Warrego
	Booringa		
	Bungil		
	Roma		
North Burnett Regional	Biggenden	I - Northeast Coast Division	Burnett, Burrum
	Eidsvold		
	Gayndah		
	Monto		
	Munduberra		
	Perry		
Paroo Shire	Paroo	IV - Murray-Darling Division	Paroo, warrego, Balonne-Condamine
Somerset Regional	Esk	I - Northeast Coast Division	Brisbane, Mary
	Kilcoy		
South Burnett Regional	Kingaroy	I - Northeast Coast Division	Burnett, Balonne-Condamine
	Nanango		
	Wondai		
	Murgon		
	Warwick		
Toowoomba Regional	Cambooya	IV - Murray-Darling Division	Brisbane, Balonne-Condamine, Border Rivers
	Clifton		
	Jondaryan		
	Milmerran		
	Rosalie		
	Toowoomba		
Townsville City	Thuringowa Planning Scheme	I - Northeast Coast Division	Black, Ross, Haughton
Western Downs Regional	Chinchilla	IV - Murray-Darling Division	Balonne-Condamine, Moonie, Burnett
	Murilla		
	Taroom		
	Dalby		
	Tara		
	Wambo		

From: [redacted]
Sent: Thursday, 2 June 2011 12:36 PM
To: [redacted]
Cc: [redacted] ; Jacoby Steven
Subject: RE: Statewide Flood Layer

[redacted]

As requested, we are having issues. There are 300,000 polygons in the state wide file, so the aggregation routine is [redacted]g over. I have requested our remote sensing area to generalise the data in a raster format and then re-supply to us as well I have [redacted] cutting up the dataset and attempting to generalise the data tile by tile. The latter approach is providing promising results.

We might not make the original timeframe of tomorrow.

Cheers

[redacted]
Manager, GIS Mapping Services (Client Outcomes)
Spatial Informatio
Telephone [redacted] **Facsimile** [redacted]
Email Brendan [redacted]
www.derm.qld.gov.au

Department of Environment and Resource Management
Level 3 Podium, Landcentre
corner Main and Vulture Streets, Woolloongabba, Q 4102
GPO Brisbane 2454, Brisbane Q 4000

From: [redacted]
Sent: Wednesday, 1 June 2011 8:00 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Statewide Flood Layer

Hi [redacted]

Let me know if you have any issues with producing this map by Friday.

Cheers,

[redacted]

From: [redacted]
Sent: Tuesday, 31 May 2011 2:17 PM
To: [redacted]
Cc: [redacted] Moffat Brendan
Subject: RE: Statewide Flood Layer

[redacted]

I've spoken to [redacted] and he is going to get one of his staff to look at this – hopefully it should be complete by the end of the week.

Please liaise with Brendan.

[redacted]

[redacted]

Manager,

Data Management & Acquisition - Natural Environment Data

Spatial Information Group

Telephone: [redacted] **Facsimile:** [redacted] **Mobile:** [redacted] **192**
Email: lex.irw [redacted]
www.nrw.qld.gov.au

Department of Environment and Resource Management
Cnr Main and Vulture Sts, Woolloongabba Q 4151

GPO Box 2454, Brisbane, Qld, 4001

From: [redacted]
Sent: Monday, 30 May 2011 12:10 PM
To: [redacted]

Cc: [redacted]
Subject: RE: Statewide Flood Layer

Hi [redacted]

Thanks for sending through these plans. I can certainly see where we may have some issues with the interface between the satellite imagery and with the aerial overlays.

How close are you to producing a state wide map or at least say 50% of the State? I appreciate that there will be gaps and a lot of work to be done to ensure accuracy of the data.

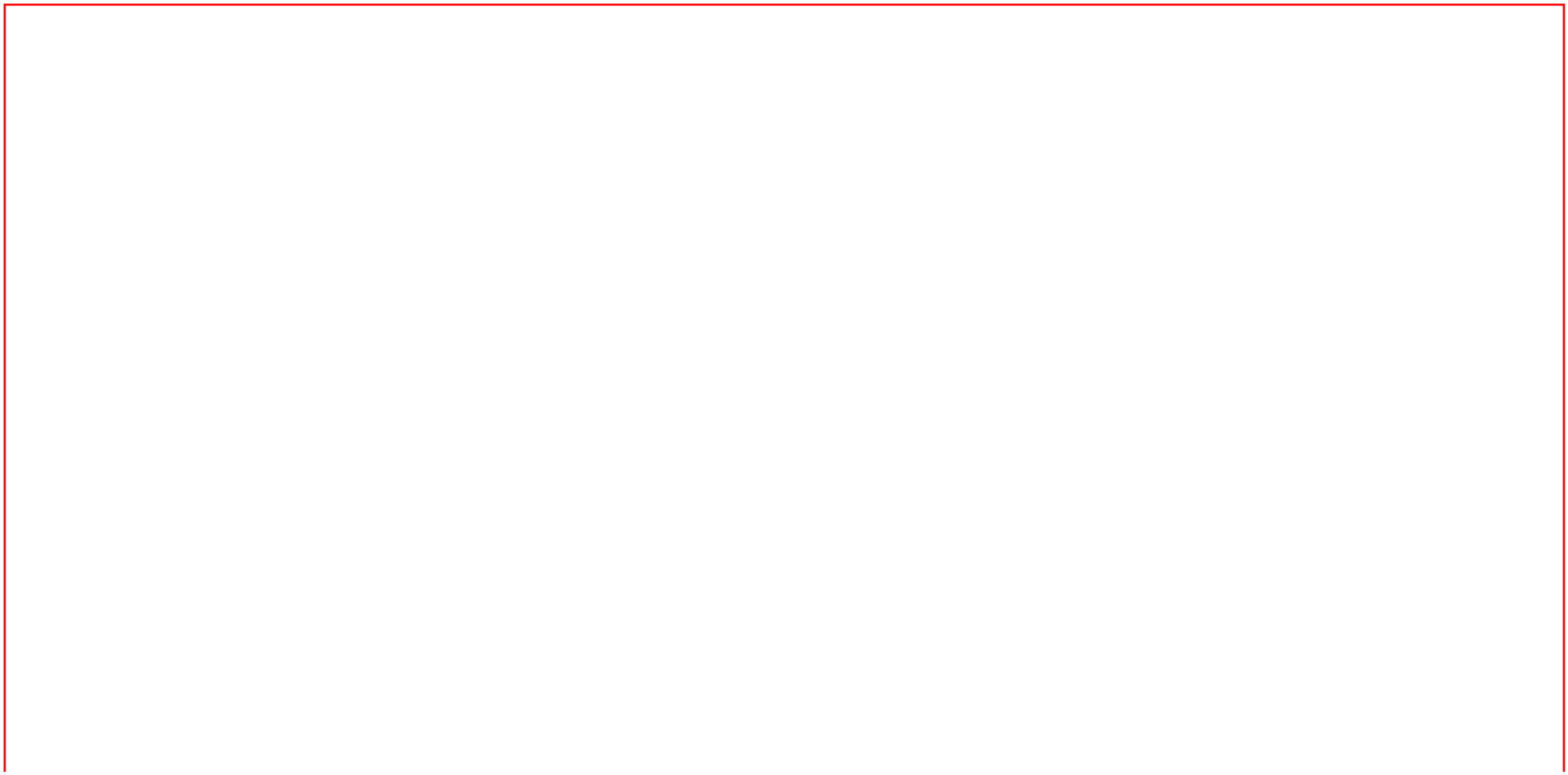
Please be assured that this is all internal work as we start to work through our scoping for policy around flood plain management.

Cheers,

[redacted]

From: [redacted]
Sent: Thursday, 26 May 2011 4:10 PM
To: [redacted]
Subject: FW: Statewide Flood Layer

[redacted]
This screen grab is zoomed over the town of Thallon – the blue is what was captured by satellite imagery and where you can see green is what was captured from aerial photography.



This screen grab is over Rockhampton is okay as it all falls within the satellite capture

[redacted]

Manager,

Data Management & Acquisition - Natural Environment Data

Spatial Information Group

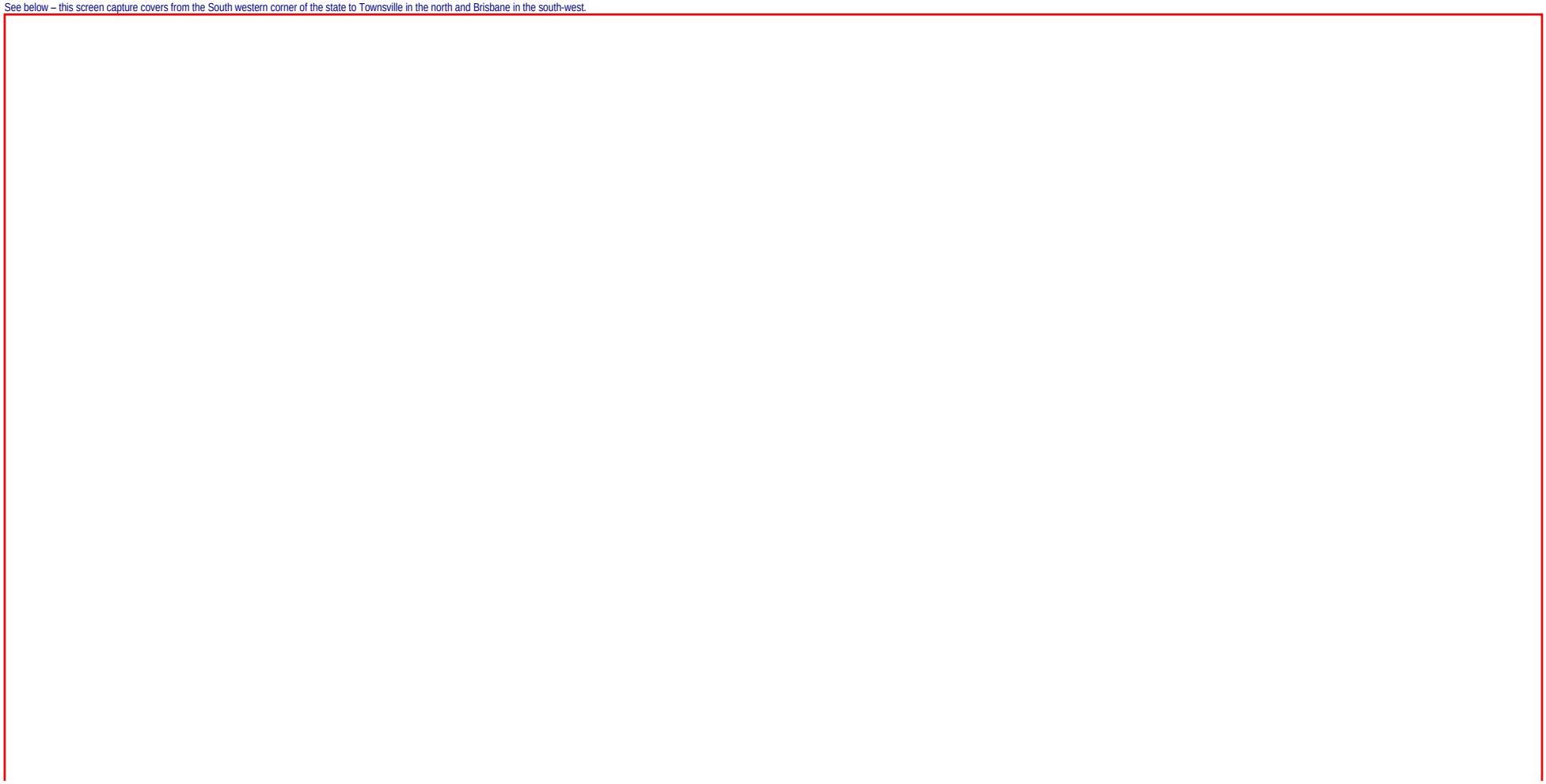
Telephone: [redacted] **Facsimile:** [redacted] **Mobile:** [redacted] **192**
Email: lex.[redacted]
www.nrw.qld.gov.au

Department of Environment and Resource Management
Cnr Main and Vulture Sts, Woolloongabba Q 4151

GPO Box 2454, Brisbane, Qld, 4001

From: [redacted]
Sent: Thursday, 26 May 2011 3:47 PM
To: [redacted]
Cc: [redacted]
Subject: RE: Statewide Flood Layer

[redacted]
We have shape files for the statewide flood line but I have issues in that they are too detailed (the file sizes are over 100 megabytes).
See below – this screen capture covers from the South western corner of the state to Townsville in the north and Brisbane in the south-west.



The next screen capture is zoomed to a very small section near the largest pink area on the south western edge of the first screen capture.

I'll give you a call to discuss.

[redacted]

Manager,

Data Management & Acquisition - Natural Environment Data

Spatial Information Group

Telepho [redacted] mile: [redacted] Mobile: [redacted] 192
Email: [redacted] gov.au

Department of Environment and Resource Management
Cnr Main and Vulture Sts, Woolloongabba Q 4151

GPO Box 2454, Brisbane, Qld, 4001

From: [redacted]
Sent: Thursday, 26 May 2011 12:04 PM
To: [redacted]
Cc: [redacted]
Subject: RE: Statewide Flood Layer

Hi [redacted]

The Land Use Planning team has been asked by the CEO to start looking into policy improvements regarding flood plain management. To really commence this process we are keen to understand from a catchment or drainage perspective the extent of the recent flooding. We have already received some great basin scaled maps from DERM and therefore keen to "piece" these together to start looking at the combined statewide flood layer. I certainly appreciate that this will evolve and that there are existing gaps. We appreciate that a number of rural LGAs and gulf LGAs won't actually have any specific data and we can determine how best to deal with this.

If you can send across what you have to date we can start looking at how this fits into the overall project and how we can start to look at filling in the gaps.

Thanks,

[redacted]

[redacted]
Director - Planning
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
GPO Box 15428 City East Q 4002
P [redacted] | F [redacted]
M [redacted] | [redacted]
[redacted] | [redacted]

From: [redacted]
Sent: Thursday, 26 May 2011 11:55 AM
To: [redacted]
Subject: RE: Statewide Flood Layer

[redacted]
By a statewide flood layer do you mean combination of all the individual town flood lines or a map of the rural areas captured from Satellite imagery?
We can provide the combined statewide flood layer – but it will continue to evolve with updates as the individual towns are reviewed and as more towns are created
As for the rural coverage of the state's flood – I'm having some issue creating this layer and it still isn't finished.
I'll give you a call to discuss.
[redacted]

[redacted]

Manager,

Data Management & Acquisition - Natural Environment Data

Spatial Information Group

Telephone: [redacted] Facsimile: [redacted] Mobile: [redacted]
Email [redacted]

www.nrw.qld.gov.au

Department of Environment and Resource Management
Cnr Main and Vulture Sts, Woolloongabba Q 4151

GPO Box 2454, Brisbane, Qld, 4001

From: [redacted]
Sent: Thursday, 26 May 2011 11:07 AM
To: [redacted]
Subject: Statewide Flood Layer

H[redacted]

[redacted] from our planning team has asked me to enquire when the statewide flood layer will be available.

Thank you
[redacted]

[redacted]
Data Visualisation Specialist
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
PO Box 15428 City East Q 4002
P[redacted] | F 07[redacted]
M[redacted] 964
E[redacted] [redacted]
[redacted] *Strong, Green, Smart, Healthy and Fair"*
www.qldreconstruction.org.au

From: [redacted]
Sent: Friday, 10 June 2011 9:14 AM
To: Jacoby Steven
Subject: FW: Maps for Today
Steve

We are going to have to manage this carefully.

It gets concerning when [redacted] is suggesting what SI staff should be doing.

[redacted]

[redacted]
Director, Client Outcomes
Spatial Information
Telephone [redacted] 5552 **Facsimile** [redacted]
Email: [redacted]

Department of Environment and Resource Management
Level 3, Landcentre, Cnr Main and Vulture Streets, Woolloongabba Q 4012
GPO Box 2454, Brisbane Q 4000

From: [redacted]
Sent: Friday, 10 June 2011 9:07 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Maps for Today

Hi [redacted]

We will endeavour to assist you but there are only so many people who can work on the same map. The basin map has been started by [redacted] We were evacuated yesterday arvo so I am unsure whether [redacted] progressed the maps much further.

I will out of the office this morning with a client, so [redacted] will assist you.

[redacted]

From: [redacted]
Sent: Friday, 10 June 2011 7:52 AM
To: [redacted]
Subject: Maps for Today

[redacted]

I will be over at about 9.30 as discussed

It would be good to have a “mini report” , a one pager setting out details on the source of the various data sets and a statement about resolution at the map sheet scales

It may be a good idea to get say Bruce on the documentation while Simon finishes the sheets???

Confirming the specifications

For the Taroom and Theodore and Dawson Valley “scope”

Sheet1 Land use, topo (contours, major roads, rail townsetc), drainage lines DCDb and the inundated are (blue area), gauging stns, USL
Shhet 2 LGA land planning zones, contours, topo (contours, major roads, rail townsetc), drainage lines, DCDb and the inundated are (blue area), gauging stns, USl
Sheet 3 , topo (contours, major roads, rail townsetc), drainage lines DCDb and the inundated are (blue area), veg and soils / geology, gauging stns, USl

The aim is to have printed out the nine sheets by mid day

Brendan Nelson has asked to see the sheets – PDF to view / print at A3 before finalising

I will have to manage this

See you soon

[redacted]
General Manager, Environment Liaison
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
GPO Box 15428 City East Q 4002
P [redacted] | F [redacted]
M [redacted] 019
E [redacted]

Reconstructing a Resilient Queensland: strong; green; smart; healthy; and, fair

www.towardQ2.qld.gov.au

From: Jacoby Steven
Sent: Friday, 10 June 2011 4:38 PM
To: 'brendan.nels[redacted]
Cc: [redacted] Moffat Brendan
Subject: Discussion re Basin Maps for the QRA

Importance: High

Brendan,

I have had a number of conversations with [redacted] wrt the QRA's requirements for small scale basin maps and think it useful for our teams to meet to discuss further. On my understanding at present my main concerns would be:

- The holes in our 2011 flood line coverage
- The suitability of this and the other datasets involved to produce the desired outcome at the scales required
- Our ability to deliver what I understand to be a statewide solution
- Timeframes (6 weeks?) – given our other work – to complete this in-house

Happy to make time to clarify this task and in particular to reach an agreed understanding of the QRA's requirements – I am available after 3pm on Tuesday and all AM on Wednesday next week.

Regards,

STEVE JACOBY
General-Manager, Spatial Information

Tel: [redacted] **3708 Fax:** [redacted] **Mob:** [redacted] 352 617
Email: steven.jac[redacted]
www.derm.qld.gov.au

Spatial Information Group
Department of Environment and Resource Management
Queensland Government
Level 9, Landcentre
Cnr Main & Vulture Streets Woolloongabba, Qld 4102
Locked Bag 40 Coorparoo DC, Qld 4151

From: Moffat Brendan
Sent: Friday, 10 June 2011 9:07 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Maps for Today

Hi [redacted]

We will endeavour to assist you but there are only so many people who can work on the same map. The basin map has been started by [redacted] We were evacuated yesterday arvo so I am unsure whether [redacted] progressed the maps much further.

I will out of the office this morning with a client, so [redacted] will assist you.

Brendan

From: [redacted]
Sent: Friday, 10 June 2011 7:52 AM
To: Moffat Brendan
Subject: Maps for Today

Brendan

I will be over at about 9.30 as discussed

It would be good to have a "mini report" , a one pager setting out details on the source of the various data sets and a statement about resolution at the map sheet scales

It may be a good idea to get say [redacted] on the documentation while [redacted] finishes the sheets???

Confirming the specifications

For the Taroom and Theodore and Dawson Valley "scope"

Sheet1 Land use, topo (contours, major roads, rail townsetc), drainage lines DCDb and the inundated are (blue area), gauging stns, USL
Shhet 2 LGA land planning zones, contours, topo (contours, major roads, rail townsetc), drainage lines, DCDb and the inundated are (blue area), gauging stns, USl
Sheet 3 , topo (contours, major roads, rail townsetc), drainage lines DCDb and the inundated are (blue area), veg and soils / geology, gauging stns, USl

The aim is to have printed out the nine sheets by mid day

Brendan Nelson has asked to see the sheets – PDF to view / print at A3 before finalising

I will have to manage this

See you soon

[redacted]
General Manager, Environment Liaison
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000

GPO Box 15428 City East Q 4002
P [redacted] | F [redacted]
M [redacted] 019
E Graeme.Millig[redacted]

Reconstructing a Resilient Queensland: strong; green; smart; healthy; and, fair

www.towardQ2.qld.gov.au

From: Jacoby Steven
Sent: W 29 PM
To: [redacted]
Cc: [redacted]
Subject: Re: Flood Plain Mapping

Thanks [redacted]

Appreciate the feedback, the team have worked hard to get it to where it is.

Keen to lockdown the spec asap - a key issue is portrait or landscape layout...

Will look forward to hearing from you.

gards,
[redacted]

----- Original Message -
From: Brendan Nelson [redacted]
Sent: Wednesday, July 20, 2011 04:53 PM
To: Jacoby Steven
Cc: [redacted]
Subject: Flood Plain Mapping

Hi Steve,
Just wanted to drop a quick line to say the mapping was really well received today. Not many comments... Council are reviewing over the next day or so and will come back to us. I'm not expecting any issues... The engineers in the room we're positive and the only comments were maybe a cm or two here or there on a couple of maps.... Nothing significant and well within scope... Will let you know when we receive feedback... To be honest, they were blown away... Cheers bn

From: [redacted]
Sent: Tuesday, 26 July 2011 2:53 PM
To: Jacoby Steven
Cc: Brendan Nelson
Subject: Fw: High, Medium Low map

Attachments: Metadata_FloodplainManagementPriorityAreas.pdf; 158-FloodplainManagementPriorityAreas-20110726.zip

Steve,

Our low, med, high area map is attached in GIS format. Can you overlay the sub basins completed?

Next priorities are to include north Burnett and balance of Fitzroy.

Cheers,

[redacted]

From: [redacted]
To: [redacted]
Cc: Brendan Nelson; [redacted]
Sent: Tue Jul 26 14:47:24 2011
Subject: RE: High, Medium Low map

Hi [redacted],

Attached is the Floodplain Management Priority Areas in GIS format for you to forward on to DERM.

Thank you
[redacted]

From: [redacted]
Sent: Monday, 25 July 2011 9:29 PM
To: [redacted]
Cc: Brendan Nelson
Subject: Fw: High, Medium Low map

Hey [redacted],

Thanks for getting this map together so quickly for us. I now need to get this across to Steve Jacoby in a GIS format so he can

overlay which sub basins have been completed by his team.

Can you get this map across in the GIS format for me?

Cheers,

[redacted]

From: [redacted]
To: [redacted]
Sent: Tue Jul 19 16:31:21 2011
Subject: High, Medium Low map

[redacted]
Data Visualisation Specialist
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
PO Box 15428 City East Q 4002
P [redacted] F [redacted]
M [redacted] 964
E [redacted]
"Reconstructing a confident Queensland: Strong, Green, Smart, Healthy and Fair"
www.qldreconstruction.org.au

From: [redacted]
Sent: Thursday, 1 September 2011 9:27 AM
To: Jacoby Steven; [redacted]
Subject: Floodplain Overlay progress
Steve and [redacted]

Below is the status at close of business last night (end August). There are 9 further sub-basins to be delivered late today or tomorrow (ones in table below with 2- Sep-11). We are creating the optimised PDF's, etc now.

Only 5 sub-basins have not been commenced, and in total 27 remain to be completed.

[redacted] we will liaise directly with [redacted] to arrange collection when drive is ready.

[redacted]

Drainage Division	Basin Name	Sub-Basin Name	Number	Status	Comments	Date expected to be supplied to QRA
Lake Eyre	Georgina	Eyre Creek	0011	Not in scope		
		Georgina River	0012	Not in scope		
	Diamantina	Diamantina River	0021	Not in scope		
	Cooper Creek	Cooper Creek	0031	Not in scope		
		Thomson River	0032	Not in scope		
		Barcoo River	0033	Not in scope		
	Lake Frome	Lake Frome	0040	Not in scope		
	Hay	Hay River	0070	Not in scope		
Bulloo	Bulloo	Bulloo River	0112	Not in scope		
North East Coast	Jacky Jacky	Jacky Jacky Creek	1010	Not in scope		
	Olive-Pascoe	Olive River	1020	Not in scope		
		Pascoe River	1021	Not in scope		
	Lockhart	Lockhart River	1030	Not in scope		
	Stewart	Stewart River	1040	Not in scope		
	Normanby	Hann River	1050	Not in scope		
		Normanby River	1051	Not in scope		
	Jeannie	Jeannie River	1060	Not in scope		
	Endeavour	Endeavour River	1070	Not in scope		
	Daintree	Daintree River	1080	Map book ready for checking		Mid Sep
	Mossman	Mossman River	1090	Map Book complete		2-Sep-11
	Barron	Barron River	1100	Interim floodplain line being worked on		Mid Oct
		Freshwater Creek	1101			Mid Oct
	Mulgrave-Russell	Mulgrave River	1110	Interim floodplain line captured		End Sep
		Russell River	1111	Interim floodplain line captured		End Sep

	Johnstone	North Johnstone River	1120	Map Book complete		2-Sep-11
		South Johnstone River	1121	Map Book complete		2-Sep-11
	Tully	Tully River	1130	Map Book complete		2-Sep-11
	Murray	Murray River	1140	Map Book complete		2-Sep-11
	Hinchinbrook Island	Hinchinbrook Island	1150	Not in scope		
	Herbert	Herbert River	1160	Interim floodplain line captured		Mid Sep
	Black	Black River	1170	Interim floodplain line captured		Mid Sep
	Ross	Bohle River	1180	Interim floodplain line being worked on		Mid Oct
		Ross River	1181	Interim floodplain line being worked on		Mid Oct
	Haughton	Haughton River	1190	Interim floodplain line captured		End Sep
		Barratta Creek	1191	Interim floodplain line captured		End Sep
North East Coast (cont)	Burdekin	Lower Burdekin River	1200			Mid Oct
		Upper Burdekin River	1201	Interim floodplain line being worked on		Mid Oct
		Bowen River	1202	Interim floodplain line captured		End Sep
		Suttor River	1203	Interim floodplain line being worked on		End Sep
	Don	Don River	1210	Interim floodplain line captured		End Sep
	Proserpine	Proserpine River	1220	Interim floodplain line being worked on		Mid Oct
	Whitsunday Island	Whitsunday Island	1230	Not in scope		
	O'Connell	O'Connell River	1240	Interim floodplain line being worked on		Mid Oct
	Pioneer	Pioneer River	1250	Interim floodplain line being worked on		Mid Oct
	Plane	Plane Creek	1260	Interim floodplain line captured		End Sep
	Styx	Styx River	1270	Map Book complete		2-Sep-11
	Shoalwater	Shoalwater	1280	Not in current priority	Not to be progressed unless advised by QRA	
	Waterpark	Waterpark Creek	1290	Map Book complete		2-Sep-11
	Fitzroy	Fitzroy River	1300	Map Book complete		2-Sep-11
		Mackenzie River	1301	Map book & overview map to QRA – phase 1		Delivered
		Nogoa River	1302	Map book & overview map to QRA – phase 1		Delivered
		Dawson River	1303	Map book & overview map to QRA – phase 1		Delivered
		Isaac River	1304	Map book & overview map to QRA – phase 1		Delivered
		Comet River	1305	Map book & overview map to QRA – phase 1		Delivered
	Curtis Island	Curtis Island	1310	Not in scope		
	Calliope	Calliope River	1320	Supplied - phase 2 - 25/8		Delivered
	Boyne	Boyne River	1330	Supplied - phase 2 - 25/8		Delivered
	Baffle	Baffle Creek	1340	Interim floodplain line captured		Mid Sep
	Kolan	Kolan River	1350	Supplied - phase 2 - 25/8		Delivered

	Burnett	Lower Burnett River	1360	Map book & overview map delivered to QRA as part of phase 1 – extra line completed		Mid Sep
		Upper Burnett River	1361	Map book & overview map to QRA – phase 1		Delivered
		Barker & Barambah Creeks	1362	Map book & overview map to QRA – phase 1		Delivered
		Boyne & Auburn Rivers	1363	Map book & overview map to QRA – phase 1		Delivered
	Burrum	Elliott River	1370	Map book & overview map to QRA – phase 1		Delivered
		Gregory River	1371	Map book & overview map to QRA – phase 1		Delivered
		Isis River	1372	Map book & overview map to QRA – phase 1		Delivered
		Burrum River	1373	Map book & overview map to QRA – phase 1		Delivered
North East Coast (cont)	Mary	Lower Mary River	1380	Map book & overview map delivered to QRA as part of phase 1 – extra line completed and supplied - phase 2 - 25/8		Delivered
		Upper Mary River	1381	Map book & overview map to QRA – phase 1		Delivered
	Fraser Island	Fraser Island	1390	Not in scope		
	Noosa	Noosa River	1400	Supplied - phase 2 - 25/8		Delivered
	Maroochy	Maroochy River	1410	Not in current priority	Not to be progressed unless advised by QRA	
	Pine	Caboolture River	1420	Not in current priority	Not to be progressed unless advised by QRA	
		North Pine River	1421	Not in current priority	Not to be progressed unless advised by QRA	
		South Pine River	1422	Not in current priority	Not to be progressed unless advised by QRA	
	Brisbane	Brisbane River	1430	Map book & overview map to QRA – phase 1	Excludes LGA's of Brisbane & Ipswich	Delivered
		Bremer River	1431		Only in Scenic Rim LGA	Mid Oct
		Lockyer Creek	1432	Interim floodplain line being worked on		end Sep
		Stanley River	1433	Map book & overview map to QRA – phase 1		Delivered
	Moreton Bay Islands	Moreton Bay Islands	1440	Not in scope		
	Logan-Albert	Logan River	1450		Only in Scenic Rim LGA	Mid Oct
		Albert River	1451		Only in Scenic Rim LGA	Mid Oct
	South Coast	Coomera & Nerang Rivers	1460	Not in current priority	Not to be progressed unless advised by QRA	
Murray Darling	Border Rivers	Macintyre & Weir Rivers	4162	Map book & overview map to QRA – phase 1		Delivered

		Dumaresq River	4163	Map book & overview map to QRA – phase 1, resupplied 25/8 after line relooked at		Delivered
		Macintyre Brook	4164	Map book & overview map to QRA – phase 1		Delivered
	Moonie	Moonie River	4172	Map book & overview map to QRA – phase 1		Delivered
	Balonne-Condamine	Balonne River	4222	Map book & overview map to QRA – phase 1		Delivered
		Condamine River	4223	Map book & overview map to QRA – phase 1		Delivered
		Maranoa River	4224	Map book & overview map to QRA – phase 1		Delivered
		Wallam Creeks	4225	Interim floodplain line captured		Mid Sep
	Warrego	Warrego River	4232	Map Book complete		2-Sep-11
	Paroo	Paroo River	4242	Not in scope		
Gulf	Settlement	Settlement River	9101	Not in scope		
		Lagoon Creek	9102	Not in scope		
		Eight Mile Creek	9103	Not in scope		
		Cliffdale Creek	9104	Not in scope		
	Mornington Island	Mornington Island	9110	Not in scope		
	Nicholson	Nicholson River	9121	Not in scope		
Gulf (cont)	Leichhardt	Leichhardt River	9130	Not in scope		
	Morning	Morning Inlet	9140	Not in scope		
		“L” Creek	9141	Not in scope		
	Flinders	Flinders River	9150	Not in scope		
		Saxby River	9151	Not in scope		
		Cloncurry River	9152	Not in scope		
	Norman	Norman River	9160	Not in scope		
	Gilbert	Gilbert River	9170	Not in scope		
		Einasleigh River	9171	Not in scope		
	Staaten	Staaten River	9180	Not in scope		
	Mitchell	Mitchell River	9190	Not in scope		
		Alice River	9191	Not in scope		
		Palmer River	9192	Not in scope		
		Walsh River	9193	Not in scope		
	Coleman	Coleman River	9200	Not in scope		
		Edward River	9201	Not in scope		
	Holroyd	Holroyd River	9210	Not in scope		
		Kendall River	9211	Not in scope		
	Archer	Archer River	9220	Not in scope		
		Coen River	9221	Not in scope		
	Watson	Watson River	9230	Not in scope		
	Embley	Embley River	9240	Not in scope		

		Mission River	9241	Not in scope		
	Wenlock	Wenlock River	9250	Not in scope		
	Ducie	Ducie River	9260	Not in scope		
		Skardon River	9261	Not in scope		
		McDonald River	9262	Not in scope		
	Jardine	Jardine River	9270	Not in scope		
	Torres Strait Islands	Torres Strait Islands	9280	Not in scope		

[redacted]
Director, Client Outcomes
Spatial Information
Telephone [redacted] **Facsimile** [redacted]
Email [redacted]
www.derm.qld.gov.au

Department of Environment and Resource Management
Level 3, Landcentre, Cnr Main and Vulture Streets, Woolloongabba Q 4012
GPO Box 2454, Brisbane Q 4000

From: [redacted]
Sent: Monday, 19 September 2011 3:41 PM
To: [redacted]
Subject: Further sub-basins
[redacted]

As discussed, a further 11 sub-basins are due to be supplied tomorrow.

They are:

Mossman River
Mulgrave River
Russell River
Herbert River
Haughton River
Barratta Creek
Don River
Proserpine River
Pioneer River
Plane Creek
Wallam Creeks

[redacted]

[redacted]
Director, Client Outcomes
Spatial Information
Telephone [redacted] 5552 **Facsimile** [redacted]
Email: [redacted]
www.derm.qld.gov.au

Department of Environment and Resource Management
Level 3, Landcentre, Cnr Main and Vulture Streets, Woolloongabba Q 4012
GPO Box 2454, Brisbane Q 4000

From: [redacted]
Sent: Tuesday, 4 October 2011 12:50 PM
To: [redacted]
Cc: Jacoby Steven
Subject: Delivery of further sub-basins
[redacted]

A further 7 sub-basins will be delivered probably tomorrow. They are:

Barron River/Freshwater Creek
Black River
Bohle River
Ross River
Lower Burdekin River
Suttor River
O'Connell River

That leaves 6 to finish and deliver in mid October to finish phase 2 (Barcoo, Upper Burdekin, Bowen, Bremer, Logan, Albert - note last 3 only in Scenic Rim LGA).

Wayne

[redacted]
Director, Client Outcomes
Spatial Information
Telephone [redacted] 5552 **Facsimile** [redacted]
Email: [redacted]

Department of Environment and Resource Management
Level 3, Landcentre, Cnr Main and Vulture Streets, Woolloongabba Q 4012
GPO Box 2454, Brisbane Q 4000

From: [redacted]
Sent: Thursday, 13 October 2011 3:53 PM
To: [redacted]
Cc: [redacted] Jacoby Steven
Subject: RE: New sub-basins

Hi [redacted]

I haven't checked with [redacted] but it appears that the following will be ready for delivery on Monday:

1. Bowen River
2. Logan River
3. Albert River
4. Upper Burdekin River
5. Barcoo River
6. Bremer River

The Upper Burdekin has been the problem. That line should be finished tomorrow – it has been split between 5 people – then the Mapbook will take several hours to compile as it is large.

Cheers

[redacted]
Manager GIS Mapping Services (Client Outcomes)
Spatial Information
Telephone: [redacted]
Facsimile: [redacted]
Email: [redacted]

Department of Environment and Resource Management
Level 3, Cnr Main and Vulture Streets
Woolloongabba Q 4102
Locked Bag 40
GPO Box 24
Brisbane 4001

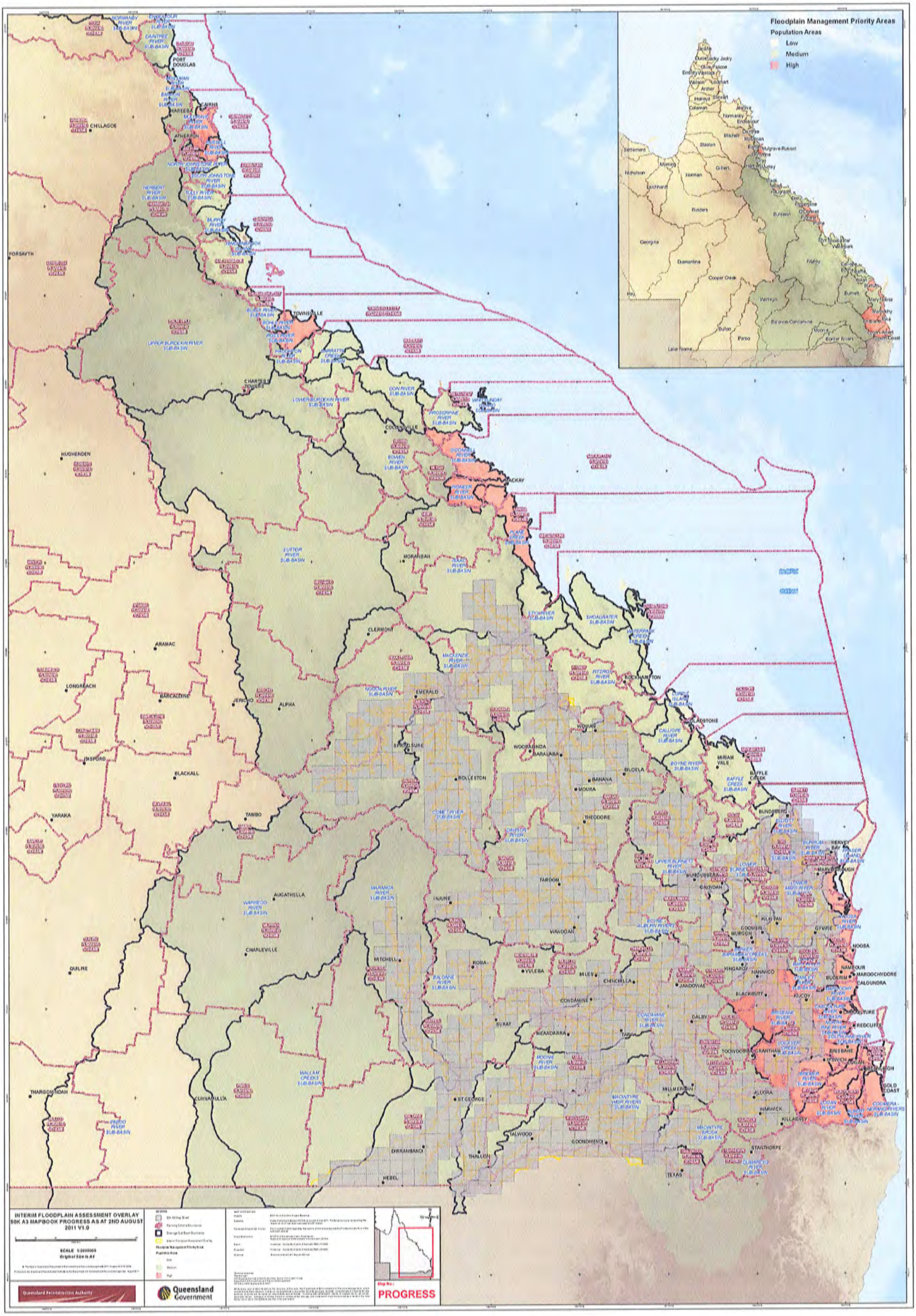
From: [redacted]]
Sent: Thursday, 13 October 2011 3:22 PM
To: [redacted]
Cc: [redacted]
Subject: New sub-basins

Hi [redacted]

Can you please confirm what the next sub-basins are and when we are likely to receive them?

Thanks!

[redacted]
Director - Land Use Planning
Queensland Reconstruction Authority
Level 9, 119 Charlotte Street
Brisbane Q 4000
GPO Box 15428 City East Q 4002
P [redacted] | F [redacted]
M [redacted] 716 213
E [redacted]


Floodplain Management Priority Areas
Population Areas
Low
Medium
High
PACIFIC
OCEAN
PORT DOUGLAS
CAIRNS
MAREEBA
ATHERTON
CHILLAGOE
FORSAYTH
TOWNSVILLE
CHARTERS TOWERS
COLLINSVILLE
MACKAY
HUGHENDEN
MORANBAH
CLERMONT
ARAMAC
LONGREACH
BARCALDINE
JERICHO
ALPHA
EMERALD
ROCKHAMPTON
GLADSTONE
ISISFORD
BLACKALL
YARAKA
TAMBO
SPRINGSURE
ROLLESTON
WOORABINDA
BARALABA
BANANA
MOURA
BILOELA
THEODORE
MIRIAM VALE
BAFFLE CREEK
BUNDABERG
HERVEY BAY
MARYBOROUGH
MUNDUBBERA
GAYNDAH
TAROOM
AUGATHELLA
INJUNE
WANDOAN
CHARLEVILLE
MITCHELL
ROMA
YULEBA
MILES
CHINCHILLA
MURGON
KINGAROY
GYMPIE
NOOSA
NAMBOUR
MAROOCHYDORE
CALOUNDRA
CABOOLTURE
REDCLIFFE
BRISBANE
IPSWICH
GOLD COAST
QUILPIE
CONDAMINE
SURAT
MEANDARRA
TARA
DALBY
TOOWOOMBA
GRANTHAM
JANDOWAE
NANANGO
BLACKBUTT
ESK
MILLMERRAN
ALLORA
WARWICK
KILLARNEY
THARGOMINDAH
CUNNAMULLA
ST GEORGE
TALWOOD
GOONDIWINDI
DIRRANBANDI
THALLON
HEBEL
TEXAS
STANTHORPE
INTERIM FLOODPLAIN ASSESSMENT OVERLAY 50K A3 MAPBOOK PROGRESS AS AT 2ND AUGUST 2011 V1.0
SCALE 1:2000000
Original Size is A4
Queensland Reconstruction Authority
Queensland Government
Map No.:
PROGRESS

Status of Interim Floodplain Assessment Overlay - 14 October 2011

All Queensland Drainage Basins Sub-Basins

	Task							Phase 1 & 2	Phase 3			Total Task	
	Number Sub basins	Number not in scope	Not to be progressed on advice of QRA	Awaiting advice from QRA	To be produced - Full subbasin	To be produced – Part subbasin	Total sub-basins (full or part) to be prepared	Completed	To be commenced	Underway	Phase 3 completed	Completed	Remaining to complete
Lake Eyre	8	0	0	0	8	0	8	1	7	0	0	1	7
Bullo	1	0	0	0	1	0	1	0	1	0	0	0	1
North east coast	74	6	1	3	59	5	64	53	11	0	0	53	11
Murray Darling	10	0	0	0	10	0	10	9	1	0	0	9	1
Gulf	35	2	0	0	33	0	33	0	33	0	0	0	33
Misc Other Islands	1	1	0	0	0	0	0	0	0	0	0	0	0
Totals	129	9	1	3	111	5	116	63	53	0	0	63	53

Ordered drainage 100K - Queensland - digital data for download

This dataset covers the Murray Darling basin and all east coast drainage basins from Cape York to the NSW border and the Eastern Cape York and Normanby Basins which completes the reef catchments current to June 2010. This dataset is based on the GeoScience Australia 1:100,000 drainage network of Queensland (where 1: 100,000 coverage exists) and has streams connected and directionalised with reaches ordered using the Strahler method of stream ordering.

Availability	Price
Queensland Government Information Service	Free

Format:

Digital vector in Shapefile or Tabfile

Author:

Department of Environment and Resource Management
Contact information:
Email QGIS

- Home
- Resource centre
- Maps, imagery, data
- Drainage data
-

Resource centre

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- Fact sheets, reports, publications
- Licences, permits, approvals and resource use
- Professional and technical services
- Searches and registrations
- Recreation and tourism services
- Policies
- Media releases
- Business centres
- Education resources

Topics in this site

- Property, titles and valuations
  - Property
  - Titles for industry professionals
  - Titles for the public
  - Valuations
- National parks, marine parks and forests
  - Find a park or forest
  - Park alerts
  - Activities in parks and forests
  - Managing parks and forests
- Water
  - Accessing and using water
  - Using water wisely
  - Supply strategy and planning
  - Regulating the water industry
  - Monitoring and assessment
- Climate Change
  - Office of Climate Change
  - ClimateSmart Living
  - EzyGreen
- Environmental management
  - Air quality
  - Coal seam gas

    - Underground coal gasification
    - Compliance
    - Contaminated land
    - Cultural heritage
    - Environmental impact assessment
    - Environmental incidents
    - Environmental licences and permits
    - Maps of environmentally sensitive areas
    - Mining
    - Monitoring
    - Petroleum
    - Planning and guidelines
    - Natural resource management
    - State of the environment
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- Biodiversity
    - Biodiversity offsets
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    - Biodiversity in Queensland
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- Wildlife and ecosystems
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    - Native title
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    - Indigenous land
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    - Legislation and policy
    - Vegetation communities
    - Property vegetation management plans
    - Property Maps of Assessable Vegetation (PMAVs)
    - Native forest and quarry resources
- Land management
    - Managing land resources
    - Land degradation
    - Use of state land

Queensland Government home page

Disaster Management Maps

FILE NAME
Town of Allora 2009 optimised
Town of Allora 2011 Flood Edn 2 optimised
Town of Allora 2011Flood optimised
Baralaba_2009_Scale6000_20110218_700x1000_optimised
Baralaba_2010_Flood_Scale6000_20110218_700x1000_optimised
Baralaba_2011_Flood_Scale6000_20110218_700x1000_optimised
Town of Baralaba 2010 Flood Edn 2 optimised
Town_of_ Biloela_2004_optimised
Town_of_Biloela_2011_Flood_optimised
TOWN OF BINGAL BAY 2008 optimised
TOWN OF BINGAL BAY 2011 CYCLONE YASI optimised
boggabilla 2009 optimised
boggabilla 2011 FLOOD optimised
Brisbane River Flood Release Analysis 7000 8000 - Optimised
Brisbane_2009_20110207_700x1000_Map1_10Jan11opt
Brisbane_2009_20110207_700x1000_Map2_10Jan11_opt
Brisbane_2011_Flood_20110207_700x1000_Map1_10Jan11_opt
Brisbane_2011_Flood_20110207_700x1000_Map2_10Jan11_opt
Brisbane_2011_Flood_700x1000_Map1_Edition2_20110406_optimised
Brisbane_2011_Flood_700x1000_Map2_Edition2_20110406_optimised
Bundaberg_2008_Key_optimised
Bundaberg_2008_Sheet_1_optimised
Bundaberg_2008_Sheet_2_optimised
Bundaberg_2008_Sheet_3_optimised
Bundaberg_2008_Sheet_4_optimised
Bundaberg_2010_2011_Flood_Key_optimised
Bundaberg_2010_2011_Flood_Sheet_1_optimised
Bundaberg_2010_2011_Flood_Sheet_2_optimised
Bundaberg_2010_2011_Flood_Sheet_3_optimised
Bundaberg_2010_2011_Flood_Sheet_4_optimised
Bundaberg_2011_Flood_20110302_edition_2_OPTIMISED
TOWN OF CARDWELL 2008_KEY_MAP optimised
TOWN OF CARDWELL 2008_SHEET_1 optimised
TOWN OF CARDWELL 2008_SHEET_2 optimised
TOWN OF CARDWELL 2008_SHEET_3 optimised
TOWN OF CARDWELL 2008_SHEET_4 optimised
TOWN OF CARDWELL 2008_SHEET_5 optimised
TOWN OF CARDWELL 2008_SHEET_6 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_KEY_MAP optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_KEY_MAP_Edn 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET 1 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET 3 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET 4 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET 5 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET 6 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET_1_Edn 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET_2_Edn 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET_3_Edn 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET_4_Edn 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET_5_Edn 2 optimised
TOWN OF CARDWELL 2011 CYCLONE YASI_SHEET_6_Edn 2 optimised

Carruchan 2008_optimised
CARRUCHAN 2011_CYCLONE_YASI_optimised
Town_of_Cecil_Plains_2009_optimised
Town_of_Cecil_Plains_2011_Flood_optimised
Cherbourg 2006 Optimised
Cherbourg 2011 Flood Optimised
Cherbourg 2011 FLOOD_EDN2_18042011_optimised
Town_of_Chinchilla_2009_optimised
Town_of_Chinchilla_2011_Flood_optimised
Condamine_2009_20110210_Scale_2500_Optomised
Condamine_2009_20110210_Scale_7500_Optomised
Condamine_2011_20110210_Flood_Scale_2500_Optomised
Condamine_2011_Flood_20110210_Scale_7500_Optomised
TOWN OF COWLEY BEACH 2008 OPTIMISED
TOWN OF COWLEY BEACH 2011 CYCLONE YASI Edn 2 OPTIMISED
TOWN OF COWLEY BEACH 2011 CYCLONE YASI OPTIMISED
dalby 2011 flood edn 2_optimised
Town of Dalby_2009_optimised
Town of Dalby_2011_flood_optimised
Dirranbandi_2009 optimised
Dirranbandi_2011_Flood Optimised
Balonne - Balonne Condamine Drainage Basin 2011 Flood
Banana - Fitzroy Drainage Basin 2011 Flood
Central Highlands - Fitzroy Drainage Basin 2011 Flood
Gympie - Burnett Drainage Basin 2011 Flood
Isaac - Fitzroy Drainage Basin 2011 Flood
Maranoa - Balonne Condamine Drainage Basin 2011 Flood
Maranoa - Fitzroy Drainage Basin 2011 Flood
North Burnett - Burnett Drainage Basin 2011 Flood
Rockhampton - Fitzroy Drainage Basin 2011 Flood
South Burnett - Burnett Drainage Basin 2011 Flood
Southern Downs - Balonne Condamine Drainage Basin 2011 Flood
Toowoomba - Balonne Condamine Drainage Basin 2011 Flood
Western Downs - Balonne Condamine Drainage Basin 2011 Flood
Western Downs - Burnett Drainage Basin 2011 Flood
Western Downs - Fitzroy Drainage Basin 2011 Flood
DUNK ISLAND 2008 OPTIMISED
DUNK ISLAND 2011 CYCLONE YASI Edn 2 OPTIMISED
DUNK ISLAND 2011 CYCLONE YASI OPTIMISED
TOWN OF EL ARISH 2008 OPTIMISED
TOWN OF EL ARISH 2011 CYCLONE YASI Edn 2 OPTIMISED
TOWN OF EL ARISH 2011 CYCLONE YASIOPTIMISED
ELLERBECK 2008_optimised
ELLERBECK 2011_CYCLONE_YASI_optimised
Emerald 2010 Flood_20110208_700x1000_Optomised
Emerald_2009_20110208_700x1000_Optomised
Emu Vale 2011 Flood optimised
Town of Emu Vale 2009 optimised
Esk_2009_Landscape_optimised
Esk_2011_Flood_Landscape_optimised
FELUGA 2008 OPTIMISED
FELUGA 2011 CYCLONE YASI OPTIMISED
FELUGA 2011 CYCLONE YASI_Edn 2 OPTIMISED
Flinton_2009_optimised
Flinton_2011_Flood_optimised
TOWN OF FLYING FISH POINT - 2008 OPTIMISED

TOWN OF FLYING FISH POINT - 2011 CYCLONE YASI OPTIMISED
TOWN OF FLYING FISH POINT - 2011 CYCLONE YASI_Edn 2 OPTIMISED
Goondiwindi_2009_20110210_Optimised
Goondiwindi_2011_Flood_20110210_optimised
Grantham_2009_20110208_700x1000_Landscape_Optimised
Grantham_2011_Flood_20110208_700x1000_Landscape_Optimised
Grantham_2011_Flood_Edition_2_optimised
Town of GYMPIE_2010_KEY_optimised
Town of GYMPIE_2010_SHEET_1_optimised
Town of GYMPIE_2010_SHEET_2_optimised
Town of GYMPIE_2010_SHEET_3_optimised
Town of GYMPIE_2011_FLOOD_KEY_optimised
Town of GYMPIE_2011_FLOOD_SHEET_1_optimised
Town of GYMPIE_2011_FLOOD_SHEET_2_optimised
Town of GYMPIE_2011_FLOOD_SHEET_3_optimised
TOWN OF HALIFAX 2008 OPTIMISED
TOWN OF HALIFAX 2011 CYCLONE YASI OPTIMISED
TOWN OF HALIFAX 2011 CYCLONE YASI_Edn 2 OPTIMISED
Town of Hebel 2009 optimised
Town of Hebel 2011 Flood Edn 2 optimised
Town of Hebel flood 2011 optimised
Helidon_2009_Landscape optimised
Helidon_2011_Flood_Landscape optimised
Ingham 2011 Cyclone Yasi Key Optimised
Town of Ingham 2008_Sh 1 Optimised
Town of Ingham 2008_Sh 10 Optimised
Town of Ingham 2008_Sh 11 Optimised
Town of Ingham 2008_Sh 12 Optimised
Town of Ingham 2008_Sh 13 Optimised
Town of Ingham 2008_Sh 14 Optimised
Town of Ingham 2008_Sh 15 Optimised
Town of Ingham 2008_Sh 2 Optimised
Town of Ingham 2008_Sh 3 Optimised
Town of Ingham 2008_Sh 4 Optimised
Town of Ingham 2008_Sh 5 Optimised
Town of Ingham 2008_Sh 6 Optimised
Town of Ingham 2008_Sh 7 Optimised
Town of Ingham 2008_Sh 8 Optimised
Town of Ingham 2008_Sh 9 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI KEY_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 1 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 1_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 10 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 10_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 11 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 11_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 12 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 12_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 13 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 13_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 14 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 14_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 15 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 15_Edn 2 OPTIMISED
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 2_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 2Optimised

Town of Ingham 2011 Cyclone Yasi_Sh 3 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 3_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 4 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 4_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 5 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 5_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 6 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 6_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 7 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 7_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 8 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 8_Edn 2 OPTIMISED
Town of Ingham 2011 Cyclone Yasi_Sh 9 Optimised
TOWN OF INGHAM 2011 CYCLONE YASI_Sh 9_Edn 2 OPTIMISED
TOWN OF INNISFAIL_2008_Optimised
TOWN OF INNISFAIL_2011_CYCLONE YASI_Edn 2_Optimised
TOWN OF INNISFAIL_2011_CYCLONE YASI_Optimised
Ipswich_2011_Flood_20110210_700x1000_Landscape_Edn 2_Optimised
Town of Jambin_2009 OPTIMISED
Town of Jambin_2011 FLOOD OPTIMISED
Jandowae_2009_Scale8000_20110211_700x1000_optimised
Jandowae_2011_Flood_Scale8000_20110211_700x1000 optomised
Jondaryan_2009_Scale10000_20110221_700x1000_optimised
Jondaryan_2011_Flood_Scale10000_20110221_700x1000_optimised
Jumbun 2008 Optimised
Jumbun 2011 Cyclone Yasi Optimised
Town of Killarney 2009 OPTIMISED
Town of Killarney 2011 FLOOD OPTIMISED
Kingaroy_2009 Optimised
Kingaroy_2010_Flood Optimised
TOWN OF KURRIMINE_2008_optimised
TOWN OF KURRIMINE_2011_CYCLONE_YASI_Edn 2_optimised
TOWN OF KURRIMINE_2011_CYCLONE_YASI_optimised
LockyerValleyEast_2009_Landscape optimised
LockyerValleyEast_2011_Flood_Landscape optimised
LockyerValleyWest_2009_Landscape optimised
LockyerValleyWest_2011_Flood_Edition_2_optimised
LockyerValleyWest_2011_Flood_Landscape optimised
TOWN OF LUCINDA 2008_Optimized
TOWN OF LUCINDA 2011 CYCLONE YASI_Edn2 Optimised
TOWN OF LUCINDA 2011 CYCLONE YASI_Optimized
Macintyre River 2009 optimised
Macintyre River 2011 FLOOD optimised
Town of Meandarra 2009 OPTIMISED
Town of Meandarra 2011 Flood OPTIMISED
TOWN OF MENA CREEK_2008_optimised
TOWN OF MENA CREEK_2011_CYCLONE_YASI_Edn 2_Optimised
TOWN OF MENA CREEK_2011_CYCLONE_YASI_optimised
Town_of_Millmerran_2009_optimised
Town_of_Millmerran_2011_Flood_optimised
TOWN OF MISSION BEACH 2008_optimised
TOWN OF MISSION BEACH 2011 CYCLONE YASI Edn 2_optimised
TOWN OF MISSION BEACH 2011 CYCLONE YASI_optimised
Moura_2009 Optimised
Moura_2010_Flood Optimisd
Moura_2011_Flood OPTIMISED

Town of Mundubbera 2011 Flood Edn 2 optimised
Town of Mundubbera_2009_optimised
Town of Mundubbera_2011_Flood_optimised
MurphysCreek_2009_Landscape optimised
MurphysCreek_2011_Flood_Landscape_Optimised
Palm Island 2009 Key optimised
Palm Island 2009 Sheet 1 optimised
Palm Island 2009 Sheet 2 optimised
Palm Island 2009 Sheet 3 optimised
Palm Island 2011 CYCLONE YASI Key_Edn 2 optimised
Palm Island 2011 CYCLONE YASI Key optimised
Palm Island 2011 CYCLONE YASI Sheet 1 optimised
Palm Island 2011 CYCLONE YASI Sheet 2 optimised
Palm Island 2011 CYCLONE YASI Sheet 3 optimised
Palm Island 2011 CYCLONE YASI Sheet_1_Edn 2 optimised
Palm Island 2011 CYCLONE YASI Sheet_2_Edn 2 optimised
Palm Island 2011 CYCLONE YASI Sheet_3_Edn 2 optimised
Town of Pratten 2009 OPTIMISED
Town of Pratten 2011 flood OPTIMISED
STC YASI BOM Surface Wind Field Extent and LLCC Track - Optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_10_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_11_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_12_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_13_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_2_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_3_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_4_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_5_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_6_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_7_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_8_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_EDN2_SHEET_9_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_KEY EDN 2_optimised
CITY OF ROCKHAMPTON_2011_FLOOD_KEY optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_11 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_12 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_2 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_3 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_4 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_5 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_6 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_7 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_8 optimised
CITY OF ROCKHAMPTON_2011_FLOOD_SHEET_9 optimised
CITY OF ROCKHAMPTON_ENVIRONS_2011_FLOOD_KEY_Edition_2_optimised
CITY OF ROCKHAMPTON_ENVIRONS_2011_FLOOD_SHEET_1_Edition_2_optimised
CITY OF ROCKHAMPTON_ENVIRONS_2011_FLOOD_SHEET_2_Edition_2_optimised
CITY OF ROCKHAMPTON_ENVIRONS_2011_FLOOD_SHEET_3_Edition_2_optimised
CITY OF ROCKHAMPTON_FITZROY_RIVER_2011_FLOOD_Edition_2_optimised
Town of Rolleston_2009_optimised
Town of Rolleston_2010_Flood_optimised
Town of Roma_2009 OPTIMISED
Town of Roma_2010_Flood OPTIMISED
Town of Roma_2011 flood OPTIMISED
Town of Roma_April_2011_Flood_Optimised
TOWN OF SILKWOOD BEACH 2008 KEY_optimised

TOWN OF SILKWOOD BEACH 2008 Sheet 1_optimised
TOWN OF SILKWOOD BEACH 2008 Sheet 2_optimised
TOWN OF SILKWOOD BEACH 2011 CYCLONE YASI KEY Edn 2_optimised
TOWN OF SILKWOOD BEACH 2011 CYCLONE YASI KEY_optimised
TOWN OF SILKWOOD BEACH 2011 CYCLONE YASI Sheet 1_optimised
TOWN OF SILKWOOD BEACH 2011 CYCLONE YASI Sheet 2_optimised
TOWN OF SILKWOOD BEACH 2011 CYCLONE YASI Sheets 1 Edn 2_optimised
TOWN OF SILKWOOD BEACH 2011 CYCLONE YASI Sheets 2 Edn 2_optimised
SILKY OAK - 2008_KEY_optimised
SILKY OAK - 2008_SHEET_1_optimised
SILKY OAK - 2008_SHEET_2_optimised
SILKY OAK - CYCLONE YASI 2011_KEY_Edn2_optimised
SILKY OAK - CYCLONE YASI 2011_KEY_optimised
SILKY OAK - CYCLONE YASI 2011_SHEET_1_Edn2_optimised
SILKY OAK - CYCLONE YASI 2011_SHEET_1_optimised
SILKY OAK - CYCLONE YASI 2011_SHEET_2_Edn2_optimised
SILKY OAK - CYCLONE YASI 2011_SHEET_2_optimised
TOWN OF SOUTH MISSION BEACH 2008 optimised
TOWN OF SOUTH MISSION BEACH 2011 CYCLONE YASI optimised
StGeorge_2009_20110209_700x1000_Optimised
StGeorge_2011_Flood_20110208_700x1000_Optimised
StGeorge_2011_Flood_201103021_700x1000_Edn_2_Optimised
Town_of_Stanthorpe_2009_optimised
Town_of_Stanthorpe_2011_flood_optimised
Surat_ Flood_2011_Scale9000_20110218_700x1000_optimised
Surat_ Flood_2011_Scale9000_20110318_700x1000_Edn_2_optimised
Surat_2009_Scale9000_20110214_700x1000_optimised
Talwood_2009_09022011_700x1000_Optimised
Talwood_2011_Flood_09022011_700x1000_Optimised
Talwood_2011_Flood_18032011_700x1000_Edn_2_Optimised
TOWN OF TAYLORS BEACH 2008_Optimized
TOWN OF TAYLORS BEACH 2011 CYCLONE YASI_Optimized
Town of Taroom 2009 optimised
Town of Taroom 2010 Flood Edn 2 optimised
Town of Taroom 2010 Flood optimised
TOWN OF TAROOM 2011 FLOOD optimised
TOWN OF TAYLORS BEACH 2011 CYCLONE YASI_Edn 2_Optimised
Thallon_2009_10022011_Optimised
Thallon_Flood_2011_10022011_Optimised
Thallon_Flood_2011_29032011_Edn_2_Optimised
Theodore_2009_20110208_700x1000_Optimised
Theodore_2011_Flood_20110209_700x1000_Optimised
City_of_Toowoomba_2009_Sheet_1_optimised
City_of_Toowoomba_2009_Sheet_2_optimised
City_of_Toowoomba_2011_Flood_Sheet_1_optimised
City_of_Toowoomba_2011_Flood_Sheet_2_optimised
TOWN OF TULLY 2008_KEY optimised
TOWN OF TULLY 2008_SHEET_1 optimised
TOWN OF TULLY 2008_SHEET_2 optimised
TOWN OF TULLY 2008_SHEET_3 optimised
TOWN OF TULLY 2008_SHEET_4 optimised
TOWN OF TULLY 2008_SHEET_5 optimised
TOWN OF TULLY 2008_SHEET_6 optimised
TOWN OF TULLY 2008_SHEET_7 optimised
TOWN OF TULLY 2008_SHEET_8 optimised
TOWN OF TULLY 2008_SHEET_9 optimised

TOWN OF TULLY 2011 CYCLONE YASI_KEY optimised
TOWN OF TULLY 2011 CYCLONE YASI_KEY_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_1 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_1_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_2_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_3 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_3_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_4 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_4_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_5 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_5_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_6 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_6_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_7 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_7_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_8 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_8_Edn 2 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_9 optimised
TOWN OF TULLY 2011 CYCLONE YASI_SHEET_9_Edn 2 optimised
TOWN OF TULLY HEADS 2008 optimised
TOWN OF TULLY HEADS 2008 SHEET 1 OPTIMISED
TOWN OF TULLY HEADS 2008 SHEET 2 OPTIMISED
TOWN OF TULLY HEADS 2008 SHEET 3 OPTIMISED
TOWN OF TULLY HEADS 2011 CYCLONE YASI optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_KEY_Edition_2_optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_SHEET_1 optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_SHEET_1_Edition_2_optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_SHEET_2 optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_SHEET_2_Edition_2_optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_SHEET_3 optimised
TOWN OF TULLY HEADS 2011 CYCLONE YASI_SHEET_3_Edition_2_optimised
Town of Wallumbilla_2009_optimised
Town of Wallumbilla_2011_Flood_optimised
Warra_2002_optimised
Warra_2011_Flood_optimised
Town_of_Warwick_north_2009_optimised
Town_of_Warwick_north_2011_Flood_optimised
Town_of_Warwick_south_2009_optimised
Town_of_Warwick_south_2011_Flood_optimised
TOWN OF WONGALING BEACH 2008 optimised
TOWN OF WONGALING BEACH 2011 CYCLONE YASI optimised
Town_of_Woodford_2009_optimised
Town_of_Woodford_2011_Flood_optimised

Phase 2 Mapping
BALONNE_OPT
LGA1000_00_1_QRA_CoopersPlains_Ortho_optimised
LGA1000_0001_2_QRA_Chelmer_Ortho_optimised
LGA1000_0002_2_QRA_Yeronga_Ortho_optimised
LGA1000_0003_2_QRA_Rocklea_Ortho_optimised
LGA1000_0004_2_QRA_West_End_Ortho_optimised

LGA1000_0005_3_QRA_Oxley_Ortho_optimised
LGA1000_0006_3_QRA_Jindalee_Ortho_optimised
LGA1000_0007_2_QRA_Fairfield_Ortho_optimised
LGA1000_0009_2_QRA_Graceville_Ortho_optimised
LGA1000_0010_2_QRA_JamboreeHeights_Ortho_optimised
LGA1000_0011_2_QRA_Riverhills_Ortho_optimised
LGA1000_0012_2_QRA_MtOmmaney_Ortho_optimised
LGA1000_0013_2_QRA_Westlake_Ortho_optimised
LGA1000_0014_2_QRA_SeventeenMileRocks_Ortho_optimised
LGA1000_0015_2_QRA_Sumner_Ortho_optimised
LGA1000_0016_2_QRA_Corinda_Ortho_optimised
LGA1000_0017_2_QRA_Sherwood_Ortho_optimised
LGA1000_0018_2_QRA_MiddlePark_Ortho_optimised
LGA1000_0019_2_QRA_SinnamonPark_Ortho_optimised
LGA1000_0021_2_QRA_Paddington_Ortho_optimised
LGA1000_0022_2_QRA_RedHill_Ortho_optimised
LGA1000_0023_1_QRA_Milton_Ortho_optimised
LGA1000_0026_1_QRA_AcaciaRidge_Ortho_optimised
LGA1000_0027_1_QRA_Albion_Ortho_optimised
LGA1000_0028_1_QRA_Anstead_Ortho_optimised
LGA1000_0029_1_QRA_Archerfield_Ortho_optimised
LGA1000_0030_1_QRA_Ashgrove_Ortho_optimised
LGA1000_0031_1_QRA_Auchenflower_Ortho_optimised
LGA1000_0032_1_QRA_Balmoral_Ortho_optimised
LGA1000_0033_1_QRA_Banyo_Ortho_optimised
LGA1000_0034_1_QRA_Brookfield_Ortho_optimised
LGA1000_0035_1_QRA_Bellbowrie_Ortho_optimised
LGA1000_0036_1_QRA_Boondall_Ortho_optimised
LGA1000_0037_1_QRA_BowenHills_Ortho_optimised
LGA1000_0038_1_QRA_BrisbaneCity_Ortho_optimised
LGA1000_0039_1_QRA_Bulimba_Ortho_optimised
LGA1000_0040_1_QRA_CannonHill_Ortho_optimised
LGA1000_0041_1_QRA_Carina_Ortho_optimised
LGA1000_0042_1_QRA_Carindale_Ortho_optimised
LGA1000_0043_1_QRA_ChapelHill_Ortho_optimised
LGA1000_0044_1_QRA_Chuwar_Ortho_optimised
LGA1000_0045_1_QRA_Clayfield_Ortho_optimised
LGA1000_0046_1_QRA_EastBrisbane_Ortho_optimised
LGA1000_0047_1_QRA_FigTreePocket_Ortho_optimised
LGA1000_0048_1_QRA_HighgateHill_Ortho_optimised
LGA1000_0049_1_QRA_Indooroopilly_Ortho_optimised
LGA1000_0050_1_QRA_Yeerongpilly_Ortho_optimised
LGA1000_0051_1_QRA_WynnumWest_Ortho_optimised
LGA1000_0052_1_QRA_Woolloongabba_Ortho_optimised
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Town of Oakey_2009_optimised
Town of Oakey_2011_Flood_optimised
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LGA300_0003_1_QRA_Thallon_20110304_OPT
Town of Yuleba_2009_optimised
Town of Yuleba_2011_optimised

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Town / Region Name
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Town of Cherbourg - 2006
Town of Cherbourg - 2011 Flood
Town of Cherbourg - 2011 Flood
Town of Chinchilla - 2009
Town of Chinchilla - 2011 Flood
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Town of Condamine - 2009
Town of Condamine - 2011 Flood
Town of Condamine - 2011 Flood
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Town of Dirranbandi - 2011 Flood
Balonne Condamine Drainage Basin - 2011 Flood (Balonne Shire)
Fitzroy Drainage Basin - 2011 Flood (Banana Shire)
Fitzroy Drainage Basin - 2011 Flood (Central Highlands Regional)
Burnett Drainage Basin - 2011 Flood (Gympie Regional)
Fitzroy Drainage Basin - 2011 Flood (Isaac Regional)
Balonne Condamine Drainage Basin - 2011 Flood (Maranoa Regional)
Fitzroy Drainage Basin - 2011 Flood (Maranoa Regional)
Burnett Drainage Basin - 2011 Flood (Nortrh Burnett Regional)
Fitzroy Drainage Basin - 2011 Flood (Rockhampton Regional)
Burnett Drainage Basin - 2011 Flood (South Burnett Regional)
Balonne Condamine Drainage Basin - 2011 Flood (Southern Downs Regional)
Balonne Condamine Drainage Basin - 2011 Flood (Toowoomba Regional)
Balonne Condamine Drainage Basin - 2011 Flood (Western Downs Regional)
Burnett Drainage Basin - 2011 Flood (Western Downs Regional)
Fitzroy Drainage Basin - 2011 Flood (Western Downs Regional)
Dunk Island - 2008
Dunk Island - 2011 Cyclone Yasi
Dunk Island - 2011 Cyclone Yasi
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TOWN OF EL ARISH 2011 CYCLONE YASI
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ELLERBECK - 2008
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Town of Emerald - 2009
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Town of Emu vale - 2009
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Town of Esk - 2011 Flood
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Feluga - 2011 Cyclone Yasi
Feluga - 2011 Cyclone Yasi
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Flinton - 2011 Flood
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Town of Hebel - 2011 Flood
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Town of Ingham 2011 Cyclone Yasi Key
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Town of Ingham - 2011 Cyclone Yasi Sheet 1
Town of Ingham - 2011 Cyclone Yasi Sheet 10
Town of Ingham - 2011 Cyclone Yasi Sheet 10
Town of Ingham - 2011 Cyclone Yasi Sheet 11
Town of Ingham - 2011 Cyclone Yasi Sheet 11
Town of Ingham - 2011 Cyclone Yasi Sheet 12
Town of Ingham - 2011 Cyclone Yasi Sheet 12
Town of Ingham - 2011 Cyclone Yasi Sheet 13
Town of Ingham - 2011 Cyclone Yasi Sheet 13
Town of Ingham - 2011 Cyclone Yasi Sheet 14
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Town of Ingham - 2011 Cyclone Yasi Sheet 15
Town of Ingham - 2011 Cyclone Yasi Sheet 15
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Town of Ingham - 2011 Cyclone Yasi Sheet 2

Town of Ingham - 2011 Cyclone Yasi Sheet 3
Town of Ingham - 2011 Cyclone Yasi Sheet 3
Town of Ingham - 2011 Cyclone Yasi Sheet 4
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Town of Ingham - 2011 Cyclone Yasi Sheet 5
Town of Ingham - 2011 Cyclone Yasi Sheet 5
Town of Ingham - 2011 Cyclone Yasi Sheet 6
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Town of Ingham - 2011 Cyclone Yasi Sheet 8
Town of Ingham - 2011 Cyclone Yasi Sheet 8
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Town of Ingham - 2011 Cyclone Yasi Sheet 9
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Town of Innisfail - 2011 Cyclone Yasi
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Ipswich City - 2011 Flood
Town of Jambin - 2009
Town of Jambin - 2011 Flood
Town of Jandowae - 2009
Town of Jandowae - 2011 Flood
Town of Jondaryan - 2009
Town of Jondaryan - 2011 Flood
Jumbun 2008
Jumbun 2011 Cyclone Yasi
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Town of Killarney - 2011 Flood
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Town of Kingaroy - 2010 Flood
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Town of Kurramine - 2011 Cyclone Yasi
Town of Kurramine - 2011 Cyclone Yasi
Lockyer Valley East - 2009
Lockyer Valley East - 2011 Flood
Lockyer Valley West - 2009
Lockyer Valley West - 2011 Flood
Lockyer Valley West - 2011 Flood
Town of Lucinda - 2008
Town of Lucinda - 2011 Cyclone Yasi
Town of Lucinda - 2011 Cyclone Yasi
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Macintyre River 2011 FLOOD
Town of Meandarra - 2009
Town of Meandarra - 2011 Flood
Mena Creek - 2008
Mena Creek - 201 Cyclone Yasi
Mena Creek - 201 Cyclone Yasi
Town of Millmerran - 2009
Town of Millmerran - 2011 Flood
Town of Mission Beach - 2008
Town of Mission Beach - 2011 Cyclone Yasi
Town of Mission Beach - 2011 Cyclone Yasi
Town of Moura - 2009
Moura - 2010 Flood
Town of Moura - 2011 Flood

Town of Mundubbera - 2011 Flood
Town of Mundubbera - 2009
Town of Mundubbera - 2011 Flood
Town of Murphys Creek - 2009
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Palm Island - 2009 Key
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BOM Tropical Cyclone Track and Surface Level Wind Field Strength - Severe Tropica
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City of Rockhampton - 2011 Flood Sheet 11
City of Rockhampton - 2011 Flood Sheet 12
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City of Rockhampton - 2011 Flood Sheet 7
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City of Rockhampton - 2011 Flood Sheet 9
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City Of Rockhampton - 2011 Flood Sheet 5
City Of Rockhampton - 2011 Flood Sheet 6
City Of Rockhampton - 2011 Flood Sheet 7
City Of Rockhampton - 2011 Flood Sheet 8
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City of Rockhampton Environs - 2011 Flood Key
City of Rockhampton Environs - 2011 Flood Sheet 1
City of Rockhampton Environs - 2011 Flood Sheet 2
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City of Rockhampton Fitzroy River - 2011 Flood
Town of Rolleston - 2009
Town of Rolleston - 2010 Flood
Town of Roma - 2009
Town of Roma - 2010 Flood
Town of Roma - 2011 Flood
Town of Roma - April 2011 Flood
Town of Silkwood - 2008 Key

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Town of Silkwood - 2008 Sheet 2
Town of Silkwood - 2011 Cyclone Yasi Key
Town of Silkwood - 2011 Cyclone Yasi Key
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Silky Oak - 2008 Key
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Town of South Mission Beach - 2008
Town of South Mission Beach - 2011 Cyclone Yasi
Town of St George - 2009
Town of St George - 2011 Flood
Town of St George - 2011 Flood
Town of Stanthorpe - 2009
Town of Stanthorpe - 2011 Flood
Town of Surat - 2011 Flood
Town of Surat - 2011 Flood
Town of Surat - 2009
Town of Talwood - 2009
Town of Talwood - 2011 Flood
Town of Talwood - 2011 Flood
Town of Taylors Beach - 2008
Town of Taylors Beach - 2011 Cyclone Yasi
Town of Taroom - 2009
TOWN OF TAROOM - 2010 FLOOD
TOWN OF TAROOM - 2010 FLOOD
TOWN OF TAROOM - 2011 FLOOD
Town of Taylors Beach - 2011 Cyclone Yasi
Town of Thallon - 2009
Town of Thallon - Flood 2011
Town of Thallon - 2011 Flood
Town of Theodore - 2009
Town of Theodore - 2011 Flood
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TOWN OF TULLY - 2011 CYCLONE YASI KEY
TOWN OF TULLY - 2011 CYCLONE YASI KEY
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TOWN OF TULLY - 2011 CYCLONE YASI Sheet 1
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TOWN OF TULLY - 2011 CYCLONE YASI Sheet 5
TOWN OF TULLY - 2011 CYCLONE YASI Sheet 6
TOWN OF TULLY - 2011 CYCLONE YASI Sheet 6
TOWN OF TULLY - 2011 CYCLONE YASI Sheet 7
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TOWN OF TULLY - 2011 CYCLONE YASI Sheet 8
TOWN OF TULLY - 2011 CYCLONE YASI Sheet 8
TOWN OF TULLY - 2011 CYCLONE YASI Sheet 9
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Town of Tully Heads - 2008
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Town of Tully Heads - 2011 Cyclone Yasi
Town of Tully Heads - 2011 Cyclone Yasi
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Town of Tully Heads - 2011 Cyclone Yasi
Town of Tully Heads - 2011 Cyclone Yasi Sheet 3
Town of Wallumbilla - 2009
Town of Wallumbilla - 201 Flood
Town of Warra - 2002
Town of Warra - 2011 Flood
Town of Warwick (North) - 2009
Town of Warwick (North) - 2011 Flood
Town of Warwick (South) - 2009
Town of Warwick (South) - 2011 Flood
Town of Wongaling Beach - 2008
Town of Wongaling Beach - 2011 Cyclone Yasi
Town of Woodford - 2009
Town of Woodford - 2011 Flood

Balonne Condamine Basin (Balonne Shire) - 2011 Flood
LGA1000-00-1 Suburb of CoopersPlains
LGA1000-0001-2 Suburb of Chelmer
LGA1000-0002-2 Suburb of Yeronga
LGA1000-0003-2 Suburb of Rocklea
LGA1000-0004-2 Suburb of West_End

LGA1000-0005-3 Suburb of Oxley
LGA1000-0006-3 Suburb of Jindalee
LGA1000-0007-2 Suburb of Fairfield
LGA1000-0009-2 Suburb of Graceville
LGA1000-0010-2 Suburb of JamboreeHeights
LGA1000-0011-2 Suburb of Riverhills
LGA1000-0012-2 Suburb of MtOmmaney
LGA1000-0013-2 Suburb of Westlake
LGA1000-0014-2 Suburb of SeventeenMileRocks
LGA1000-0015-2 Suburb of Sumner
LGA1000-0016-2 Suburb of Corinda
LGA1000-0017-2 Suburb of Sherwood
LGA1000-0018-2 Suburb of MiddlePark
LGA1000-0019-2 Suburb of SinnamonPark
LGA1000-0021-2 Suburb of Paddington
LGA1000-0022-2 Suburb of RedHill
LGA1000-0023-1 Suburb of Milton
LGA1000-0026-1 Suburb of AcaciaRidge
LGA1000-0027-1 Suburb of Albion
LGA1000-0028-1 Suburb of Anstead
LGA1000-0029-1 Suburb of Archerfield
LGA1000-0030-1 Suburb of Ashgrove
LGA1000-0031-1 Suburb of Auchenflower
LGA1000-0032-1 Suburb of Balmoral
LGA1000-0033-1 Suburb of Banyo
LGA1000-0034-1 Suburb of Brookfield
LGA1000-0035-1 Suburb of Bellbowrie
LGA1000-0036-1 Suburb of Boondall
LGA1000-0037-1 Suburb of BowenHills
LGA1000-0038-1 Suburb of BrisbaneCity
LGA1000-0039-1 Suburb of Bulimba
LGA1000-0040-1 Suburb of CannonHill
LGA1000-0041-1 Suburb of Carina
LGA1000-0042-1 Suburb of Carindale
LGA1000-0043-1 Suburb of ChapelHill
LGA1000-0044-1 Suburb of Chuwar
LGA1000-0045-1 Suburb of Clayfield
LGA1000-0046-1 Suburb of EastBrisbane
LGA1000-0047-1 Suburb of FigTreePocket
LGA1000-0048-1 Suburb of' HighgateHill
LGA1000-0049-1 Suburb of' Indooroopilly
LGA1000-0050-1 Suburb of Yeerongpilly
LGA1000-0051-1 Suburb of WynnumWest
LGA1000-0052-1 Suburb of Woolloongabba
LGA1000-0053-1 Suburb of Windsor
LGA1000-0054-1 Suburb of Wilston
LGA1000-0055-1 Suburb of Willawong
LGA1000-0056-1 Suburb of Wacol
LGA1000-0057-1 Suburb of Toowong
LGA1000-0058-1 Suburb of Tennyson
LGA1000-0059-1 Suburb of Teneriffe
LGA1000-0060-1 Suburb of Taringa
LGA1000-0061-1 Suburb of StLucia
LGA1000-0062-1 Suburb of SouthBrisbane
LGA1000-0063-1 Suburb of Salisbury
LGA1000-0065-1Suburb of' Pallara

LGA1000-0066-1 Suburb of Pullenvale
LGA1000-0067-1Suburb of' Pinkenba
LGA1000-0068-1Suburb of' PinjarraHills
LGA1000-0069-1Suburb of' Nundah
LGA1000-0070-1 Suburb of' NudgeeBeach
LGA1000-0071-1 Suburb of' KaranaDowns
LGA1000-0072-1Suburb of' Kenmore
LGA1000-0073-1 Suburb of' Kholo
LGA1000-0074-1 Suburb of' Moggill
LGA1000-0075-1 Suburb of Moorooka
LGA1000-0077-1 Suburb of Coorparoo
LGA1000-0078-1 Suburb of Darra
LGA1000-0079-1 Suburb of Doolandella
LGA1000-0080-1 Suburb of Durack
LGA1000-0081-1 Suburb of DuttonPark
LGA1000-0082-1 Suburb of EagleFarm
LGA1000-0083-1 Suburb of FortitudeValley
LGA1000-0084-1 Suburb of Greenslopes
LGA1000-0085-1 Suburb of Hamilton
LGA1000-0086-1 Suburb of Hawthorne
LGA1000-0087-1 Suburb of Hemmant
LGA1000-0088-1 Suburb of Hendra
LGA1000-0089-1 Suburb of Herston
LGA1000-0090-1 Suburb of Inala
LGA1000-0091-1 Suburb of' KangarooPoint
LGA1000-0092-1 Suburb of KelvinGrove
LGA1000-0096-1 Suburb of Morningside
LGA1000-0097-1 Suburb of MountCrosby
LGA1000-0098-1 Suburb of' Murarrie
LGA1000-0099-1 Suburb of' NewFarm
LGA1000-0100-1 Suburb of' Newmarket
LGA1000-0101-1 Suburb of' Newstead
LGA1000-0102-1 Suburb of' NormanPark
LGA1000-0103-1 Suburb of' Northgate
LGA1000-0104-1 Suburb of' Nudgee
Town of Dirranbandi
Fairbairn Dam to Emerald Outskirts - 2009
Fairbairn Dam to Emerald Outskirts - 2010 Flood
Town of Injune - 2009
Town of Injune - 2011 Flood
LGA3960-0002-1 Suburb of BarellanPt
LGA3960-0003-1 Suburb of Chuwar
LGA3960-0004-1 Suburb of Goodna
LGA3960-0005-1 Suburb of BellbirdPark
LGA3960-0006-1 Suburb of Blackstone
LGA3960-0007-1 Suburb of Booval
LGA3960-0008-1 Suburb of Bundamba
LGA3960-0008-1 Suburb of Bundamba
LGA3960-0009-1 Suburb of Churchill
LGA3960-0010-1 Suburb of CollingwoodPark
LGA3960-0011-1 Suburb of WestIpswich
LGA3960-0012-1 Suburb of NorthIpswich
LGA3960-0013-1 Suburb of Brassall
LGA3960-0013-2 Suburb of Brassall
LGA3960-0014-1 Suburb of Leichhardt
LGA3960-0015-1 Suburb of Karalee

LGA3960-0015-2 Suburb of Karalee
LGA3960-0016-1 Suburb of MooresPocket
LGA3960-0017-1 Suburb of PineMountain
LGA3960-0018-1 Suburb of Ipswich
LGA3960-0019-1 Suburb of EastIpswich
LGA3960-0020-1 Suburb of BasinPocket
LGA3960-0021-1 Suburb of Gailes
LGA3960-0022-1-Locality of Muirlea
LGA3960-0023-1 Suburb of Raceview
LGA3960-0024-1 Suburb of' Redbank
LGA3960-0025-1 Suburb of' RiverView
LGA3960-0026-2 Town of Rosewood
LGA3960-0027-1 Suburb of Silkstone
LGA3960-0028-1 Suburb of Woodend
LGA3960-0029-1 Suburb of Yamanto
LGA3960-0029-2 Suburb of Yamanto
LGA3960-0030-1-Suburb of Amberley
LGA3960-0031-1-Locality of Calvert
LGA3960-0032-1-Suburb of Camira
LGA3960-0033-1-Suburb of Coalfalls
LGA3960-0034-1-Locality of Ebenezer
LGA3960-0035-1-Suburb of Flinders View
LGA3960-0036-1-Town of Grandchester
LGA3960-0037-1-Locality of Karrabin
LGA3960-0038-1-Locality of Lanefield
LGA3960-0039-1-Locality of LowerMountWalker
LGA3960-0040-1-Town of Marburg
LGA3960-0041-1-Locality of MountMort
LGA3960-0042-1-Locality of Mutdapilly
LGA3960-0044-1-Suburb of North Booval
LGA3960-0045-1-Suburb of NorthTivoli
LGA3960-0046-1-Suburb of OneMile
LGA3960-0047-1-Locality of Peak Crossing
LGA3960-0048-1-Locality of Purga
LGA3960-0049-1-Locality of Ripley
LGA3960-0050-1-Suburb of Sadliers Crossing
LGA3960-0051-1-Locality of Swanbank
LGA3960-0052-1-Locality of Tallegalla
LGA3960-0053-1-Locality of Thagoona
LGA3960-0054-1-Suburb of Tivoli
LGA3960-0055-1-Town of Walloon
LGA3960-0056-1-Locality of Willowbank
LGA3960-0057-1-Suburb of Wulkuraka
LGA3960-0058-1-Locality of Jeebropilly
Town of Mitchell - 2008
Town of Mitchell - 2011 Flood
Town of Oakey - 2009
Town of Oakey - 2011 Flood
Town of St George
Town of Surat
Town of Thallon
Town of Yuleba - 2009
Town of Yuleba - 2011 Flood

Flood / Yasi / Community / Phase 2	Completed	PDF
Flood	24/02/2011	PDF
Flood	11/04/2011	PDF
Flood	24/02/2011	PDF
Flood	18/02/2011	PDF
Flood	22/03/2011	PDF
Flood	18/02/2011	PDF
Flood	11/04/2011	PDF
Flood	28/03/2011	PDF
Flood	28/03/2011	PDF
YASI	6/04/2011	PDF
YASI	6/04/2011	PDF
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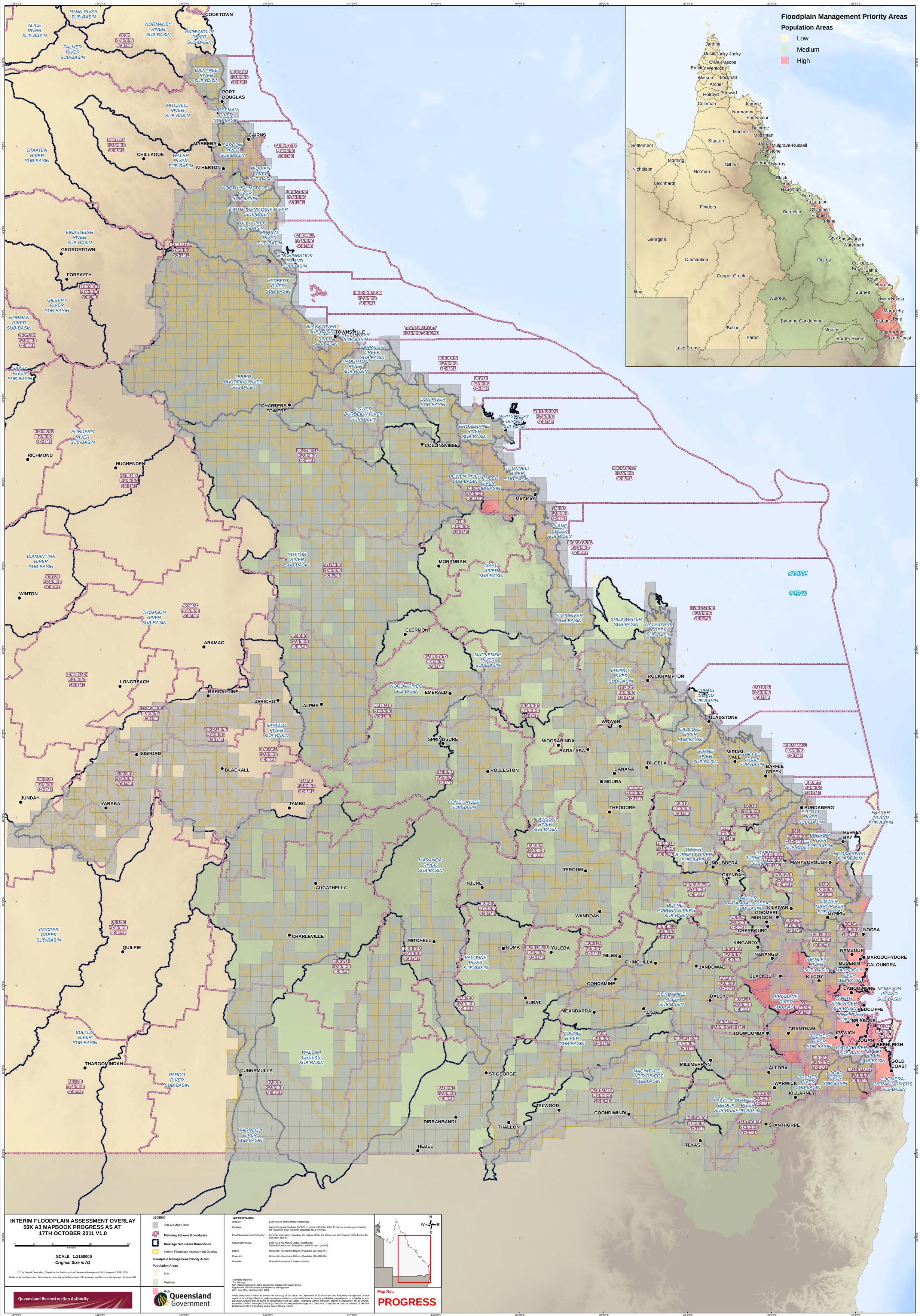
Phase 2 Town Mapping



INTERIM FLOODPLAIN ASSESSMENT OVERLAY 50K A3 MAPBOOK PROGRESS AS AT 17TH OCTOBER 2011 V1.0

0 25 50 100 150
Kilometers

SCALE 1:2150000

Original Size is A1

Queensland Reconstruction Authority

LEGEND

- 50K A3 Map Sheet
- **Planning Scheme Boundaries**
- **Drainage Sub-Basin Boundaries**
- Interim Floodplain Assessment Overlay

Floodplain Management Priority Areas

Population Areas

- Low
- Medium
- High

Queensland Government

MAP INFORMATION

Imagery:	ESRI ArcGIS Online Imagery Basemap
Cadastre:	Digital Cadastral Database (DCDB) is current at October 2011. Positional accuracy representing the 'maximum error' has been calculated at ± 57 metres.
Floodplain Assessment Overlay:	For more information regarding the capture of this line please see the Foreword at the front of the sub-basin atlases.
Ocean Bathymetry:	ETOPO1 1 Arc-Minute Global Relief Model National Oceanic and Atmospheric Administration (NOAA)
Datum:	Horizontal - Geocentric Datum of Australia 1994 (GDA94)
Projection:	Horizontal - Geocentric Datum of Australia 1994 (GDA94)
Graticule:	Graticule lines are at 1 degree intervals

Technical enquiries:
The Manager
GIS Mapping Services (Client Outcomes), Spatial Information Group
Department of Environment and Resource Management
GPO Box 2454, Brisbane QLD 4001

N W E S

Map No.:

PROGRESS

Queensland Reconstruction Authority

Planning for stronger, more resilient floodplains

Part 1 – Interim measures to support floodplain management in existing planning schemes

Australian Government
Geoscience Australia

Queensland Government

In developing this toolkit, the Queensland Reconstruction Authority has consulted more than 10 Local Governments and the Local Government Association of Queensland (LGAQ).

The sheer scope and scale of the weather events which affected Queensland last summer meant that to build and plan stronger, more resilient communities into the future, Councils need more comprehensive data to make informed decisions about how and where we build.

To assist Queensland Councils the Authority has undertaken the single largest floodplain mapping exercise in the State's history. The maps contained in the toolkit - *Planning for Stronger, more Resilient Floodplains* are drawn from evidence of past flooding, including soils, topography and satellite imagery.

They are informed by the 2010/11 summer disasters but do not represent the actual flood line for that period. Why? Because while the whole of Queensland was affected last summer, we know there have been larger floods in some areas in the past. What the maps do show are areas where inundation has previously occurred or is likely to occur. At the conclusion of this mapping exercise, floodplain mapping will be available for the whole of Queensland.

The State's river systems do not stop at local Government boundaries and so for the first time, these floodplain maps have also been developed on a catchment-by-catchment basis. And with them, comes the opportunity for Councils to adopt the floodplain maps and supporting developmental controls into existing planning schemes.

This guideline provides Councils – especially those who have perhaps historically lacked the resourcing capacity to undertake these types of studies - with a ready-made toolkit to help assess future development applications and the opportunity to better align floodplain management and land use planning.

The Queensland Reconstruction Authority wishes to thank in particular the Banana Shire Council and the Fitzroy Basin Association who have made significant contributions to the pilot program and who, along with the LGAQ, have provided input and support for its development.

Banana SHIRE

fba FITZROY BASIN ASSOCIATION

Planning for stronger, more resilient floodplains

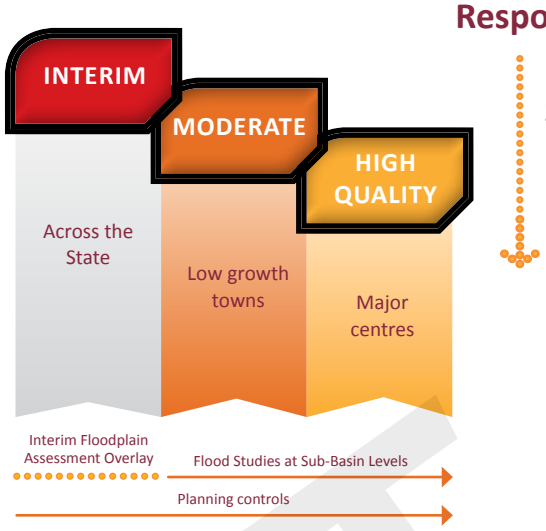
Queensland is a State of meteorological extremes, with floods occurring regularly across many parts of the State. From July to December 2010, this was no better demonstrated as Queensland experienced its wettest spring on record. In total, 13 major river catchments reached their highest recorded peak levels and 210 townships and suburbs were affected by flooding.

Most of our towns and cities are located on floodplains, both inland and coastal. This is an historical fact, principally for reasons associated with water supply, transportation, waste disposal, advantageous points for river crossings, access to productive soils or recreation purposes. Hence, these towns and cities will be subject to flooding from time to time.

Put simply, if we are to use floodplains for these purposes, we need to acknowledge and plan for flooding in a way that improves resilience of our built form and encourages the safety and well being for our communities and individuals.

Seeing significant change in Queensland's floodplains will be generational – the full implementation of this improved resilience will be seen over time through specific shifts in local land use planning policy and development assessment decision-making that take account of the vulnerabilities of development in the floodplain. However, through interim changes to the way development is addressed in these risk areas, real steps can be taken now to ensure new development in Queensland's floodplains considers and responds to adverse flood events.

The key to ensuring our State copes with these flood events is improving the resilience of our communities. In response, the Queensland Reconstruction Authority (the Authority) has prepared this two part guideline ***Planning for stronger, more resilient floodplains.***



Responsibilities

National
State
Region
Local

As demonstrated above, an important aim of ***Planning for stronger, more resilient floodplains*** is to provide a fit for purpose response to help Councils introduce consistent and specific planning controls to manage flood risks in the floodplain assessment area.

Part 1 represents a interim response that can be applied across the entire State. Part 1 includes the development of an *Interim Floodplain Assessment Overlay* incorporating a mapping product and supporting planning scheme provisions. A major driver of this Guideline is the ability to provide low growth Councils with workable products now, in lieu of detailed flood studies which will take significant time and resources to complete across the State. It is recognised that not all Councils will benefit from Part 1 as some Councils are well advanced with flood mapping and planning scheme provisions. However, all Councils can learn from recent events and incorporate the principles of floodplain management in the development and preparation of their new planning schemes.

Floodplain Management

Stronger, more resilient floodplains

Context

2010/2011 events

QldRA Roles and Functions

Understanding 1
- Scale of impact from the 2010/2011 event
- Structure of floodplains and river systems

Analysis 2
- Floodplain Mapping
- Building Code of Australia

Implementation 3
- Toolkit to support Councils
- Mapping
- Code provisions

Delivery 4
- Process for incorporating toolkit into existing planning scheme provisions

The Authority acknowledges the following organisations that have provided their support to this important program of work:

- Geoscience Australia
- Banana Shire Council
- Fitzroy Basin Association
- Bureau of Meteorology
- CSIRO

Key information is provided throughout this Guideline. It is marked with this symbol. It has been provided courtesy of the Queensland Floods Science, Engineering and Technology Panel *Understanding Floods – Questions and Answers.*

A full copy of this document can be downloaded from: www.chiefscientist.qld.gov.au

Introduction

During Summer 2010/2011 Queensland experienced unprecedented events that resulted in the entire State being disaster activated. Whilst flooding in Queensland is not rare, between November 2010 and April 2011, 91 per cent of the State was disaster activated as a result of flooding. The scale of the event of summer 2010/2011 has never before been seen.

The management of our floodplains is complex. Balancing the role of the floodplain from protection of agriculture and the environment, to stimulating economic growth and supporting new population growth is a difficult process to manage. Each has its role and arguably each is as important as the other.

To ensure that Queensland learns from the recent natural disasters the Authority has partnered with the Department of Local Government and Planning (DLGP) including Building Codes Queensland (BCQ), the Department of Environment and Resource Management (DERM) and the Department of Community Safety (DCS) to deliver a body of work supporting greater resilience and understanding of our floodplains and to better inform and influence the land use planning process.

An outcome of this partnership is the development of this Guideline, entitled ***Planning for stronger, more resilient floodplains***. This is a two part Guideline aimed at raising awareness and represents the start of a journey to improve floodplain management throughout Queensland utlising the land use planning process.

To support this process, the Authority has partnered with Banana Shire Council (BSC), a Council that was significantly affected by events in December 2010/ January 2011. Together with the Fitzroy Basin Association (FBA) the BSC will embark on a journey to help improve the management of floodplains through the land use planning process.

Part 1 – ***Interim measures to support floodplain management in existing planning schemes*** delivers a toolkit that includes interim planning scheme measures and supporting mapping to those Councils who currently do not have any floodplain mapping. The mapping has been produced with the support of DERM and the mapping product provided represents an Interim Floodplain Assessment Overlay (Floodplain Maps). The Guideline also identifies a clear implementation path for those Councils that choose to adopt the interim code provisions and mapping.

Part 2 – ***Standard planning scheme provisions and flood study template*** will provide more detailed floodplain assessment guidance to Councils who are looking to prepare their new Planning Schemes under the Sustainable Planning Act 2009 (SPA).

An important aim of this Guideline is to help Councils introduce consistent and specific planning controls to manage flood risks in the floodplain assessment area.

About this Guideline

This Guideline has been developed to support Councils by offering interim fit for purpose measures to ensure that potential flooding impacts can be considered as part of the development assessment process. The Guideline is divided into four key parts:

1 Understanding

- Scale of impact from the 2010/2011 event
- Structure of floodplains and river systems

2 Analysis

- Floodplain planning
- Building Code of Australia

3 Implementation

- Interim Floodplain Assessment Overlay – Mapping
- Interim Floodplain Assessment Overlay – Code provisions

4 Delivery

- Proposed amendment process for existing planning schemes

Part 1 principally focuses on providing Councils with an assessment trigger allowing consideration of a development proposal's potential impact on the floodplain. As an interim solution, this Guideline does not offer a comprehensive solution for managing new or existing development in floodplain areas. It does however, offer those Councils and indeed applicants, additional scheme provisions to ensure that there is due consideration as to what and how a development proposes to respond to a potential flood impact. This toolkit does not replace or override any existing engineering development standards, such as local road design manuals or the *Queensland Urban Drainage Manual*. Critically, it also does not replace or diminish the need for disaster warning and response plans or evacuation procedures. Even after adopting the recommendations in this Guideline, people should not become complacent to the risk of flood.

Objectives

The main objectives of the Guideline are to:

- Promote a greater understanding of the scale and extent of floodplains in Queensland and their management
- Promote a greater correlation between floodplain management and land use planning
- Provide Councils with an information toolkit that they can adopt in a timely manner to provide interim measures to support development assessment
- Support a more resilient built form outcome in flood prone areas through additional interim planning scheme measures.

What will Part 2 contain?

Queensland is in a unique position as the majority of Councils are resolving to prepare new SPA compliant planning schemes.
As Part 1 is an interim measure supporting existing planning schemes, Part 2 will build upon Part 1 to work towards a consistent approach of floodplain management in new planning schemes. To support this approach, Part 2 will address the following matters:

- Fit for purpose flood study template to help inform the strategic planning process developed in partnership with CSIRO and Bureau of Meteorology
- Standardised floodplain management provisions
- Advice on transition strategies for land uses, zoning recommendations and other key land use policy matters which effectively translates flood studies and floodplain management plans into land use plans using the Queensland Planning Provisions (QPP).

2 Analysis

Australia, and in particular Queensland, is prone to a long list of natural hazards, including flooding, cyclones, severe storms, bushfire, landslide and earthquakes.

The recent flood events seen across the State have highlighted the importance of considered land use planning that responds to the risks presented by natural hazards and particularly flooding.

Understanding how our river systems work here in Queensland acknowledges that an integrated approach to land use planning on floodplains is required to bring together the diverse issues and stakeholders that affect, or are affected by, floodplain management. This approach takes flooding behaviour, flood risk and flood hazard into account, along with all other relevant planning factors.

The end product of this process is a floodplain management plan that facilitates the use of the floodplain for appropriate purposes; limits flood hazard, and damage to socially acceptable levels; enhances the waterway and floodplain environment; and fosters flood warning, response, evacuation, clean-up and recovery in the onset and aftermath of a flood.

Floodplain Management in Australia – Best Practice Principles recommends the adoption of an approach to floodplain management at a total catchment (sub-basin) level beyond the LGA boundaries.

This sub-basin perspective is needed in order to manage effectively the result of existing development and the cumulative effects of future development on stormwater and mainstream flooding. This perspective includes both the upstream and downstream implications of proposed land use developments and floodplain management activities.

This approach will require collaboration from many stakeholders to support the ultimate goal of integrated management of our floodplains. This approach should extend beyond the development assessment process.

Traditionally a flood study is a comprehensive technical investigation of flooding behaviour that defines the extent, depth and velocity of floodwaters for floods of various magnitudes.

There are two principle components to a flood study:

Hydrologic analysis or estimation of flood discharges for floods of various magnitudes.

Hydraulic analysis or determination of the extent, depths and velocities of flooding.

This level of detail is not always required to facilitate improved floodplain management. In recognition of the time and cost to prepare detailed flood mapping and studies by Councils, the Authority, with the support of DERM, commenced a mapping exercise in June 2011 to establish interim mapping of floodplains to support Councils' existing planning schemes.

The dataset to inform the interim mapping product to be identified as *Interim Floodplain Assessment Overlay* (Floodplain Maps) was developed using the following overall principles:

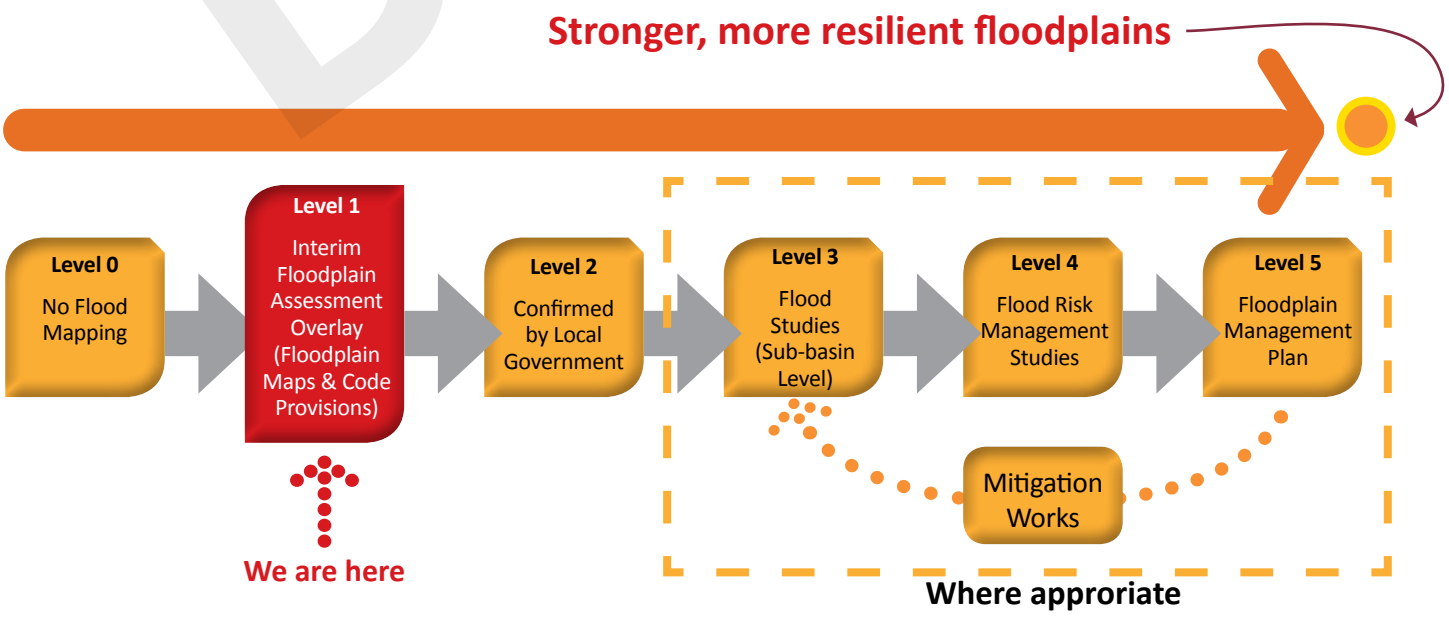
- suitability for a Statewide approach
- a consistent approach
- repeatable if more accurate data is available in the future
- evidential and justifiable

In terms of a maturity model for floodplain mapping, the Floodplain Maps are at level one and provide a framework for communities to decide priorities for more detailed flood studies (*Refer to Figure 4*).

Flood Mapping Maturity Levels

Level 0	No Flood Mapping
Level 1	Sub-Basin 'Interim Floodplain Assessment Overlay Mapping'
Level 2	Confirmed (by local govt) Floodplain Assessment Overlay Mapping. Potential to adopt as equivalent to Probable Maximum Flood defined at Sub-Basin level.
Level 3	Flood Studies completed in priority areas.
Level 4	Flood Risk Management Study
Level 5	Implemented Floodplain Management Plan

Figure 4 – **Flood Maturity Mapping Model**



The following is an overview and summary of each dataset used in the compilation of the floodplain maps:

Land zone 1

general term: estuarine (tidal flats and beaches)

Quaternary estuarine and marine deposits subject to periodic inundation by saline or brackish marine waters. Includes mangroves, saltpans, off-shore tidal flats and tidal beaches. Soils are predominantly Hydrosols (saline muds, clays and sands) or beach sand.

Land zone 3

general term: alluvium (river and creek flats)

Quaternary alluvial systems, including floodplains, alluvial plains, alluvial fans, terraces, levees, swamps, channels, closed depressions and fine textured palaeo-estuarine deposits. Also includes estuarine plains currently under fresh water influence, inland lakes and associated dune systems (lunettes). Excludes talus slopes, colluvial deposits and pediments. Includes a diverse range of soils, predominantly Vertosols and Sodosols, also with Hydrosols in higher rainfall areas.

SALI Soil Limitation Mapping

Refers to a soil type which has a limitation of flooding. Soil qualities and limitations are properties that can be assessed on an individual soil material basis and can affect the viability and sustainability of land uses.

Contours

Contour data with 10 metre vertical intervals available over the whole State has been used. In some selected cases to aid the visual interpretation, other available contour information has been used.

Stream Orders

Starting at the headwater, the stream is assigned number one to be made 1st order. As several 1st order streams converge the resultant stream becomes 2nd order. Two 2nd order streams converging form a 3rd order, etc. This is known as the Strahler Method. The number of orders in Queensland's Sub-Basins vary. The Dawson River sub-basin for example is classified to a 9th order. Flooding can occur in the headwater streams (ie. 1st order), but is more likely to be significant in higher order streams. For each sub-basin the appropriate stream orders have been selected to use in developing the Floodplain Mapping.

Imagery

Aerial imagery across the State is captured using different modes. The most common is through Landsat 5. Landsat 5 is the fifth satellite of the Landsat program. It was launched on 1 March 1984, with the primary goal of providing a global archive of satellite images. The program is managed by United States Geological Survey (USGS), and data from Landsat 5 is collected and distributed from the USGS's Center for Earth Resources Observation and Science. Australia like many countries has an agreement with the USGS where new satellite imagery is downloaded every 16 days and provided to Geoscience Australia. The imagery has a pixel resolution of 30 metres. In addition to Landsat more detailed aerial photography captured at the time of a flood over a town and cities has been used where available. During the summer 2010/2011 events, approximately 100 towns were captured with high resolution aerial imagery.

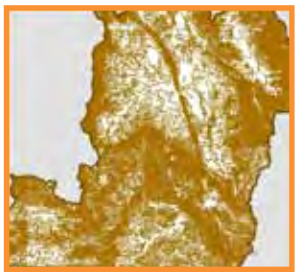
This is the largest mapping exercise currently underway in Australia. The mapping has been undertaken at a sub-basin level. Many Councils may have more than one sub-basin within their Local Government Area.

What are Land Zones?

Land zones represent major differences in geology and in the associated landforms, soils, and physical processes that gave rise to distinctive landforms or continue to shape them (Sattler and Williams 1999). Land zones are generally derived by amalgamating a range of geological, land system and/or soil mapping units at 1:100 000 to 1:250 000 scale. *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 3.1. Updated September 2005. Queensland Herbarium*

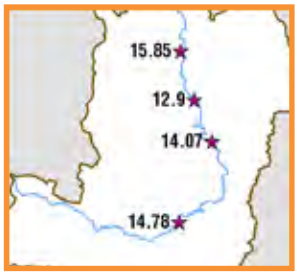
The Interim Floodplain Assessment Overlay (Floodplain Maps) was developed using multiple datasets. An example is shown for the Dawson River sub-basin:

- 10 metre contours
- Landsat imagery
- Gauging stations
- Stream orders 5 – 9
- Flood extent for 2011 generated from aerial photography
- Pre-clear vegetation mapping of Landzones 1 & 3 combined with soil flooding limitation mapping
- Aerial photography taken at or near flood peak



Contours

Landsat



Gauging Heights

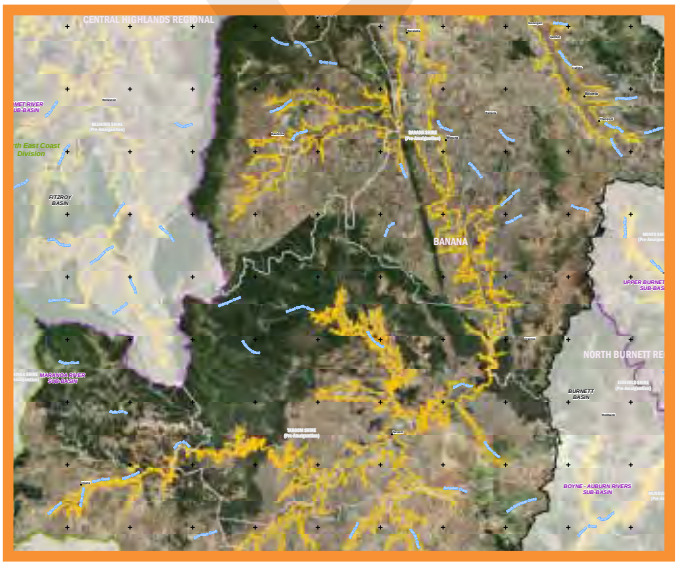
Stream Orders

Pre Clear Mapping

Aerial Taken – Theodore

The mapping product will be provided to Councils as:

- a Mapbook (a series of A3 Mapsheets covering the whole sub-basin) in both electronic and hard copy format;
- digital data compatible with geographic information systems (GIS) and
- interactive lot and plan search
- all mapping is available at www.qld.gov.au/floodcheck
- Until the mapping is locally verified and checked by Council it will remain as interim.



Example: Interim Floodplain Assessment Overlay for the Dawson River Sub-basin

Example: Interim Floodplain Assessment Overlay for the town of Biloela

3 Implementation

Planning for stronger, more resilient floodplains is a journey towards achieving better floodplain management through the land use planning process. Whilst not all Councils require assistance in achieving this objective, some do and may benefit from the use of this Guideline.

Floods are the most manageable of all natural disasters. Unlike other natural disasters, generally there is an understanding of where floods will occur and estimates of the likelihood of flooding, flood behaviour and the consequences of flooding in some cases. On the other hand the unpredictability of Severe Tropical Cyclone Yasi meant it was not known when it would make landfall until just hours before it crossed the coast. Therefore, through a combination of learning from the Yasi experience and analysing its aftermath, we can plan more efficiently for similar events and, at the same time, create more resilient communities.

New Construction Standards

The Australian Building Codes Board has developed a draft national Standard for Construction of Buildings in Flood Hazard Areas (draft Standard), which is scheduled to be introduced into the Building Code of Australia (BCA) in 2013, following appropriate consultation. The scope of the draft Standard is limited to class 1 (houses and townhouses), class 2 (units and flats), class 3 (hotels, motels and backpackers), class 4 (caretakers dwelling), class 9a (health care) and class 9c (aged care) buildings. It provides specific performance requirements and deemed-to-satisfy (DTS) provisions for the design and construction of new buildings in a flood hazard area, as designated by the relevant authority (ie. Local Government).

DLGP is proposing early adoption of the draft Standard as a new mandatory part of the Queensland Development Code (QDC). Additional non-mandatory provisions, which are currently outside the scope of the draft Standard, are also proposed to be included in the QDC to be adopted by Local Governments on a voluntary basis through a planning scheme, Temporary Local Planning Instrument, or by resolution. It is proposed that the new QDC will apply to new buildings and additions to existing buildings, but not generally to building alterations (for example, internal repairs such as adding bathroom or removing a wall).

However, unless there is appropriate mapping to indicate a building is within a flood prone area, these new provisions may not be triggered.

Temporary State Planning Policy

To assist in this process the Authority partnered with DLGP to implement a new Temporary State Planning Policy (TSPP) – Planning for stronger, more resilient floodplains – which creates the statutory mechanism by which a Local Government may look to adopt the Interim Floodplain Assessment Overlay as part of their existing planning scheme.

The TSPP suspends the effect of paragraphs A3.1 and A3.2 of Annex 3 of State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, which identifies the process by which a Local Government may designate a Natural Hazard Management Area (Flood) (NHMA).

The effect of the TSPP is to allow amendments to an existing planning instrument under the SPA for a Natural Hazard Management Area (Flood) to include:

1) land inundated by a Defined Flood Event (DFE) and identified in a planning instrument; or
2) the Interim Floodplain Assessment Overlay mapping and Model Code provided by the Queensland Reconstruction Authority; or
3) the Interim Floodplain Assessment Overlay mapping and Model Code as amended by the relevant Local Government.

The TSPP therefore gives effect for a Local Government to designate a NHMA (Flood) to be adopted either in the current form provided by the Authority or as amended by the Local Government following a visual assessment through a minor planning scheme amendment process, provided that the amendment does not deviate from the intent of the interim provisions and the purpose as outlined in this Guideline and the TSPP. A Temporary Local Planning Instrument (TLPI) may also be an option for adoption of the mapping and code provisions however, preference is for a minor scheme amendment process be followed.

The TSPP remains in effect for a period of 12 months. It is expected that these amendments will be taken into consideration in the review of the SPP1/03 and an amendment of SPP1/03 will be undertaken prior to the expiry of the TSPP.

Interim Toolkit supporting the TSPP

Part 1 of this Guideline provides a voluntary interim toolkit which includes the Interim Floodplain Assessment Overlay (IFAO). The IFAO includes:-

- Interim Floodplain Assessment Overlay Maps (Floodplain Maps) prepared by the Authority in both digital and hard copy; and
- Interim Floodplain Assessment Overlay Model Code (Model Code).

It is acknowledged that not all local governments require this interim tool. Councils with adequate provisions and mapping will not need this Guideline. The response needs to be fit for purpose recognising the differing needs of each local government. However, even for those Councils who feel that there are adequate provisions within their existing scheme, the floodplain maps may help to:

- inform the strategic planning process for the preparation of their new QPP compliant planning scheme; and
- identify an area for the purpose of triggering the relevant building assessment provisions, if their existing flood mapping does not already perform this function.

For those Councils wishing to adopt the interim provisions, this can be done through incorporating a new section into the existing planning scheme, titled “Interim Floodplain Assessment Overlay” and incorporating as a minor amendment to the planning scheme. Alternatively, a Council may use a TLPI however the minor amendment process is preferred given the limited timeframe associated with TLPIs. Further advice in relation to the interim tool and how it can be implemented is provided in section 4 of this Guideline.

The Floodplain Maps provided (as well as an adopted flood level) can also be used by Councils to trigger the relevant building assessment provisions for construction of buildings in flood hazard areas. This applies to both the current suite of building provisions and those soon to be implemented through the proposed amendments to the QDC.

It is also important to note the adoption of the Floodplain Maps is not proposed to alter the level of assessment for development within the overlay area. It simply utilises the existing levels of assessment prescribed in the Table of Development for an area. Therefore, the adopted Floodplain Maps will be used as a trigger for already Assessable Development to be assessed against the Model Code. Any changes to the levels of assessment will require specific consideration by Council and DLGP as part of the amendment process.

Mapping

The Interim Floodplain Assessment Overlay (Floodplain Maps) are being produced across the State. As per section 2 of this Guideline, the Floodplain Maps have been derived by overlaying best available statewide information sources. Individual maps have been designed for display with the cadastre at 1:50,000 scale to allow for properties to be located in respect to the floodplain area.

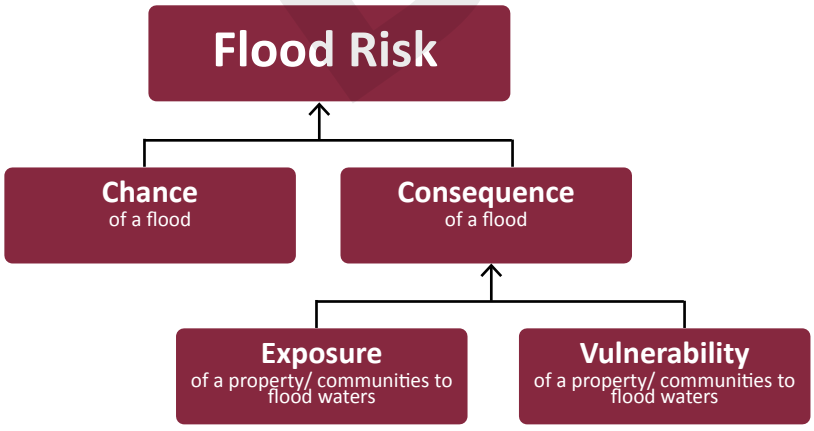
By the end of October 2011, this project will have mapped 40 per cent of the State's area, which when combined with existing flood mapping represents coverage for approximately 90 per cent of the State's population. By mid 2012, Floodplain Maps for relevant areas of the entire State will be available.

Further information on the mapping products, including current coverage and availability can be found at **www.qld.gov.au/floodcheck**

Brisbane River in flood 1974 *Source: Queensland State Archives*

Example:- Interim Floodplain Assessment Overlay for the town of St George in Balonne Shire Council

Brisbane River in flood 2011 *Source: Queensland Reconstruction Authority*



Components of Flood Risk

Source:- Queensland Floods Science, Engineering and Technology Panel Understanding Floods – Questions and Answers

How do we manage flood risks?

Flood risk includes both the chance of an event taking place and its potential impact. Land use planning informed by floodplain management plans can reduce risk for new development areas. Flood risk is harder to manage in existing developed areas; however modification measures such as dams or levees can change the behaviour of floodwaters. Similarly, property modification measures can protect against harm caused by floods to individual buildings, and response modification measures help communities deal with floods.

Planning scheme provisions – Model Code

To support the Floodplain Maps an Interim Floodplain Assessment Overlay Model Code (Model Code) can be applied in assessing any assessable development on land wholly or partially within the area shown on the Floodplain Maps.

The Model Code is provided in ***Schedule 1***.

Councils may decide on the types of development to which the Model Code applies.

The purpose of the code is to manage built form outcomes in the floodplain so that risks to life and property during future flood events are minimised, and to ensure that future development does not increase the potential for flood damage on site or any other property.

For clarity and consistency, all development-related terms defined elsewhere in other Queensland legislation (such as the *Sustainable Planning Act 2009, Dangerous Goods Safety Management Act 2001*) have the same meaning in this Guideline and its Schedules.

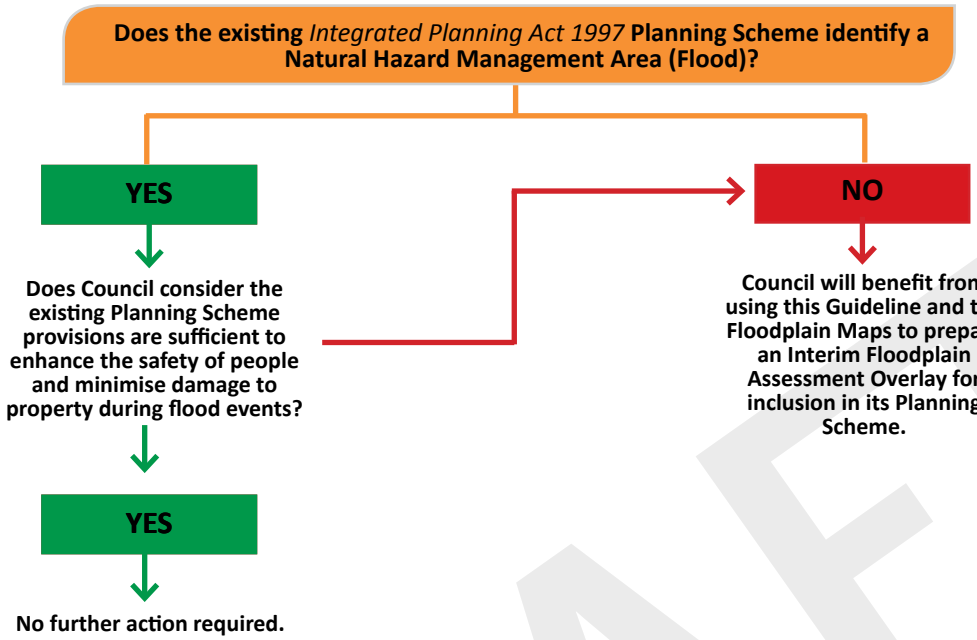
To demonstrate the practical application of the Interim Floodplain Assessment Overlay (including the Floodplain Maps and the Model Code) in a development assessment context, a number of case studies are provided follwing ***Schedule 1*** of this Guideline. This identifies how certain types of assessable development would be assessed against the Model Code.

The traditional 'Queenslander' style home was designed to allow the cool breezes to circulate through the house in the hot summer and to let flood waters flow underneath.

Images sourced from:- Queensland Image Library and Getty Images

4 Delivery

The following flow chart has been prepared to help Councils decide if the interim solution should be considered and adopted within their existing planning scheme.



Understanding the operation of an overlay

The IFAO includes the Floodplain Maps that for already assessable development will trigger assessment against the additional provisions included in the Model Code. The IFAO can be incorporated into the planning scheme as a new section titled "Interim Floodplain Assessment Overlay". In other words, development identified within the specific mapped area (Floodplain Maps) will trigger an additional set of provisions (Model Code) that will be used to assess development applications within the overlay area.

The IFAO does not necessarily change the level of assessment for development within the mapped overlay area. However, Councils can use the IFAO to change levels of assessment if they choose to do so.

Floodplain Maps

+

Performance Outcomes

Acceptable Solutions

Model Code Provisions

= Interim Floodplain Assessment Overlay

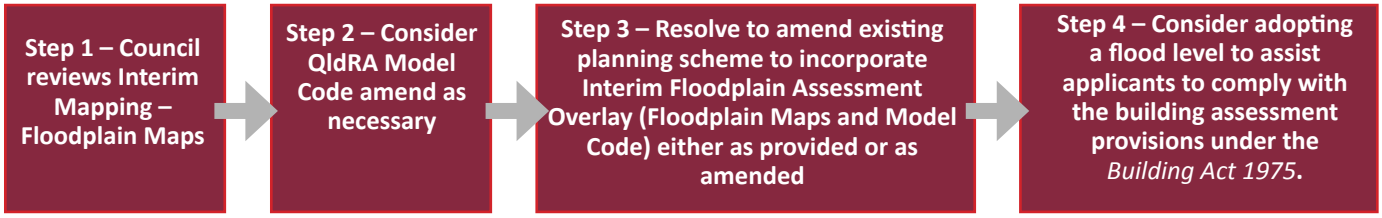
Incorporation into existing Planning Schemes

Existing Planning Schemes in Queensland utilise a number of approaches to trigger additional provisions for certain areas and sensitive development within Local Government areas. The Table below provides a simplified explanation of how the IFAO might be incorporated into different planning schemes across the State.

Existing planning scheme	Incorporation method
Planning Scheme uses overlays which, when assessing development in a particular (mapped) area to which the overlay applies, triggers an additional set of provisions or regulation. *For example some Planning Schemes may include existing overlays such as Acid Sulphate Soils Overlay, Conservation Overlay and Road and Rail Noise Impacts Overlay.*	Include an additional overlay in the 'Overlays' part of the Planning Scheme entitled 'Interim Floodplain Assessment Overlay' which will include reference to the Floodplain Maps and the additional provisions included in the Model Code.
Planning Scheme does not include an 'Overlays' section, rather uses the 'Codes' Part of the planning scheme to identify area codes that are based on mapping and trigger additional provisions for development within that area. *For example some Planning Schemes may include existing area codes such as Biodiversity Code, Heritage Place Code and Aviation Area Code.*	Include an additional code in the "Codes" Part of the Planning Scheme entitled 'Interim Floodplain Assessment Code' which will act as an area code and will include reference to the Floodplain Maps that will trigger the additional provisions included in the new 'Interim Floodplain Assessment Code'.

Process

If Councils decide this Guideline is applicable to their local government area, Councils can follow the steps below to adopt an Interim Floodplain Assessment Overlay within their existing Planning Scheme.



Step 1 Review Interim Floodplain Assessment Overlay – (Floodplain Maps)

The Authority will provide all Local Governments with a copy of the relevant Floodplain Maps for their Local Government Area. The Floodplain Maps have been developed using the best data available statewide to the Authority. More detailed data, information, local knowledge and records may be readily available to Local Governments. Accordingly, while Councils can choose to adopt the Floodplain Maps in their current form, the Authority strongly encourages local governments to consider the Floodplain Maps and ascertain whether they identify all of the areas within the Local Government Area that are potentially subject to flooding.

Councils can amend the Floodplain Maps prior to inclusion in a Planning Scheme.

In particular, it is important to recognise that larger, rarer floods may be experienced which exceed the adopted Floodplain Maps, which might require further consideration by Councils particularly if more detailed local information is available. In reviewing and adopting the IFAO, Councils should have regard to:

- the extent of inundation experienced during the Summer 2010 -2011 flood event
- the extent of inundation experienced during other flood events
- other available data sources such as historic records, flood studies or floodplain modelling.

Step 2 Review Interim Floodplain Assessment Overlay (Model Code)

The Model Code has been prepared by the Authority to provide a standard tool for Assessment Managers to ensure suitable measures are adopted by development in areas potentially at risk of flooding.

The Model Code may be adopted without amendment by Councils as an interim measure for floodplain management. This will be the case particularly for those Councils who currently have no Planning Scheme measures to regulate flooding or floodplain management in their existing Planning Schemes.

Alternatively, Councils may decide to enhance the Model Code with additional or alternative provisions that better reflect their area's local topographical or hydrological circumstances prior to adoption. This is particularly relevant for those Councils that already have an assessment code in their Planning Schemes that deals with flood hazard.

As the Model Code has been oriented to local government areas without flood mapping, Councils with existing Planning Scheme provisions related to flood may in fact have more robust planning provisions than the Model Code for the assessment of flood hazard. It would be prudent for those Councils to consider how the Model Code would integrate into that existing suite of flood hazard provisions. It will be important for those Councils to ensure that the adoption of the Model Code does not in fact reduce the capability of Councils to assess and decide development applications in flood hazard areas.

Step 3 Resolve to amend the Planning Scheme

The IFAO can be incorporated into the planning scheme as a new section titled "Interim Floodplain Assessment Overlay", which includes the Floodplain Maps that trigger assessment of Assessable Development against the Model Code.

To adopt these measures and incorporate them into the planning scheme, Council must resolve to:

1. Adopt the Floodplain Maps either as provided or as amended
2. Adopt the Model Code either as provided or as amended
3. Adopt the Floodplain Maps as a NHMA (Flood)
4. Make an Amendment to the Planning Scheme to include:
    - A new section titled "Interim Floodplain Assessment Overlay" including the Floodplain Maps and the Model Code

The amendment to the Planning Scheme must be undertaken in accordance with the Statutory Guideline 02/09 prepared by the Planning Minister under Section 117 of the SPA (Making and Amending a Local Planning Instrument).

It is acknowledged that a TLPI is an option available for the adoption of the IFAO however, this process is not preferred given timeframes and the need for State Interest Review. It is preferred that Councils follow this Guideline and the intent of the TSPP which supports a Minor Amendment to be considered by the Planning Minister.

Minor Vs Major Amendment

The TSPP allows for Councils to undertake a Planning Scheme amendment that can be considered as a Minor Amendment, in order to adopt the interim provisions as outlined in this Guideline.

It is intended that the amendment to the Planning Scheme will be classified as a "Minor Amendment" where the scope of the amendment does not deviate from the intent of the interim provisions as outlined in this Guideline. Accordingly, following the consultation period of this Guideline, those Councils wishing to adopt the amendments (including changes to the Floodplain Maps and the Model Code) are likely to be able to do so following the Minor Amendment process which can be quickly incorporated into the Planning Scheme.

Where a Council seeks to undertake further amendments to the Planning Scheme, beyond the scope of those outlined in this Guideline, the amendment may be classified as a "Major Amendment". Any change deemed to substantially deviate from the intent will need to undergo the Major Amendment process before being adopted into a Planning Sheme.

Step 4 Adopting a Flood Level

Councils may consider adopting a flood level based on historical highest recorded flood levels (or another level that may be more locally appropriate) across their Local Government area to give greater regulatory coverage to development in flood-prone areas. The adoption of a flood level, and the adoption of the Floodplain Maps which would be amended to reflect the adopted flood level, will trigger the relevant building assessment provisions under the *Building Act 1975* related to flooding – the proposed 'deemed to satisfy' QDC amendments in particular have very detailed flood hazard building requirements that specifically relate to setting habitable floor levels.

Therefore, Councils may adopt a flood level that can be used to assess building applications against the proposed QDC. Council may also wish to set a 'freeboard' level – an additional height above the flood level to provide a factor of safety – if this is to be higher than the minimum 300mm freeboard under the proposed QDC. This will ensure that all structures within the Floodplain Maps will be built to the latest standards.

If a flood level is not or cannot be adopted, it is still important to adopt the Floodplain Maps as this mapping will still trigger the relevant building assessment provisions. In this case, building applications will need to prove, through engineering first principles, that structures are fit for purpose in these flood areas.

The following table may assist in determining how to adopt a level within a Planning Scheme area.

DATA	APPLICATION
Historical Flood Data	Where historical flood data exists, it may be possible to use this information to help inform the adoption of a level. Historical data may include: • formally recorded gauge height records for a number of floods; • formally surveyed peak flood levels throughout the area of interest; • photographs of a historical flood; • 'high-water' marks recorded on public or private property; and • interviews with long-term residents.
Existing Flood Studies	A number of river systems in Queensland have been the subject of a flood study. In many cases, these studies were either limited in their scope or performed a number of years ago. Ideally, they should be updated with current data and techniques and/or extended to cover the full range of floods and incorporate catchment development changes as well as future scenarios.
Topography	There may be circumstances where the topography suggests floods are not an issue (i.e. large elevated areas such as plateaus with no significant watercourses). Care should be taken in making such a determination, as land subject to flood hazards is not always obvious.

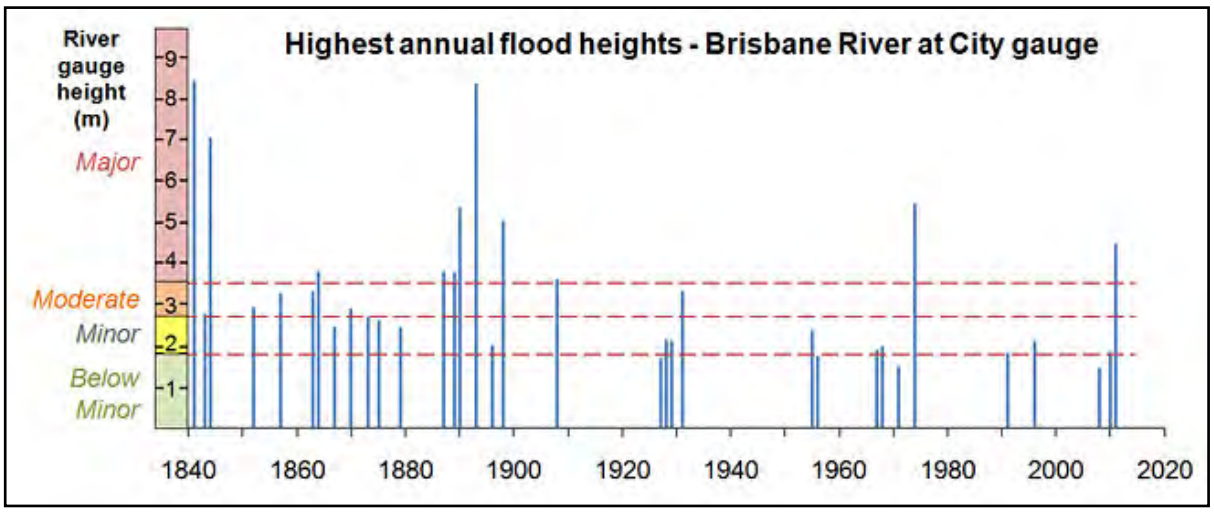
Floods can vary in size

Flood magnitudes are usually classified by their height, and the *Bureau of Meteorology* uses three general categories of flooding related to water level:

Major: This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas, widespread flooding of farmland is likely.

Moderate: This causes the inundation of low lying areas requiring the removal of stock and/or the evacuation of some houses. Main traffic bridges may be closed by floodwaters.

Minor: This causes inconvenience such as closing of minor roads and the submergence of low level bridges and makes the removal of pumps located adjacent to the river necessary.



Source: Bureau of Meteorology

Schedule 1 – Interim Floodplain Assessment Overlay Model Code

1. Application

This Code is an applicable code for assessable development prescribed by a level of assessment table in a zone and/or local plan and involving land wholly or partially within the area identified in the IFAO Floodplain Maps.

This Code is a Queensland Planning Provision (QPP)-compliant Code. For the avoidance of doubt, the following QPP-specific terms in this Code have the following meanings under *Integrated Planning Act 1997* (IPA)-compliant planning schemes:

QPP Compliant Term	Corresponding IPA- compliant Term
Overall Outcome	Overall Outcome
Performance Outcome	Specific Outcome
Acceptable Outcome	Acceptable Solution/Probable Solution
Zone	Area, Precinct, Domain or District or other term commonly understood as a zoning mechanism

Compliance with the Acceptable Outcomes should not be regarded as satisfying all elements of the Performance Outcomes.

The Code must be considered together with other relevant Planning Scheme codes that are applicable to the subject development.

Note: The IFAO Floodplain Maps may also be used to trigger additional design requirements related to flooding for building work assessable under the building assessment provisions, as set out in the Building Act 1975.

2. Purpose

The purpose of the Code is to manage development outcomes in the floodplain so that risk to life, property, community and the environment during future flood events is minimised, and to ensure that development does not increase the potential for flood damage on site or to other property.

3. Overall Outcomes

The purpose of the Code will be achieved through the following overall outcomes:

a) Development maintains the safety of people on the development site from flood events and minimises the potential damage from flooding to property.

b) Development does not result in adverse impacts on people's safety, the environment or the capacity to use land within the floodplain.

4. Performance Outcomes and Acceptable Outcomes

Performance Outcomes	Acceptable Outcomes
PO1. Development siting and layout responds to flooding potential and maintains personal safety at all times.	**For Material Change of Use and Building Work** **AO1.1**. New buildings are: • located outside the overlay area, or; • located on the highest part of the site to minimise entrance of floodwaters; or • elevated; and • provided with clear and direct pedestrian and vehicle evacuation routes off the site. *Note: If part of the site is outside the IFAO Floodplain Mapped area, this is the preferred location for all buildings.*
	For Reconfiguring a Lot **AO1.2.** New lots are: • located outside the overlay area; or • where possible, located on the highest part of the site to minimise entrance of floodwaters. *Note: If part of the site is outside the IFAO Floodplain Mapped area, this is the preferred location for all lots (excluding park or other relevant open space and recreation lots).* *Note: Buildings subsequently developed on the lots created will need to comply with the relevant building assessment provisions under the Building Act 1975.*

Performance Outcomes	Acceptable Outcomes
Cont'd. PO1. Development siting and layout responds to flooding potential and maintains personal safety at all times.	AO1.3. Road and/or pathway layout provides a safe and clear evacuation path: • if a flood level is adopted[1], by locating entry points into the reconfiguration above the flood level and avoiding culs-de-sac or other non-permeable layouts; or • by direct and simple routes to main carriageways.
	AO1.4. Signage is provided on site (regardless of whether land will be public or private ownership): • indicating the position and path of all safe evacuation routes off the site; and • if the site contains or is within 100m of a floodable waterway, hazard warning signage and depth indicators are also provided at key hazard points, such as at floodway crossings or entrances to low-lying reserves.
PO2. Development is resilient to flood events by ensuring design and construction account for the potential risks of flooding.	***For Material Change of Use and Building Work (Residential Uses)*** AO2.1. Residential dwellings are not constructed as single-storey slab on ground. *Note: The highset 'Queenslander'-style house is a resilient low-density housing solution in floodplain areas. Higher density residential development should ensure only non-habitable rooms (e.g garages, laundries) are located on the ground floor.*
	For Material Change of Use and Building Work (Non-Residential Uses) AO2.2. No Acceptable Outcome specified. *Note: The relevant building assessment provisions under the Building Act 1975 apply to all building work within the IFAO Floodplain Mapped area and must take account of the flood potential within the area.* *Note: Resilient building materials for use within the IFAO Floodplain Mapped area should be determined in consultation with Council, in accordance with the relevant building assessment provisions.*
PO3. Development directly, indirectly and cumulatively avoids any significant increase in water flow, velocity or flood level, and does not increase the potential for flood damage either on site or on other properties.	***For Material Change of Use, Building Work, Reconfiguring a Lot and Operational Works*** AO3.1. Works in urban areas[2] associated with the proposed development do not involve: • any physical alteration to a watercourse or floodway including vegetation clearing; or • a net increase in filling. AO3.2. Works in areas other than an urban area[2] either: • do not involve a net increase in filling greater than 50m^3; or • do not result in any reductions of on-site flood storage capacity and contain within the subject site any changes to depth/duration/velocity of flood waters; or • do not change flood characteristics outside the subject site in ways that result in: o loss of flood storage; o loss of/changes to flow paths; o acceleration or retardation of flows; or o any reduction in flood warning times elsewhere on the floodplain.
PO4. Development avoids the release of hazardous materials into floodwaters.	***For Material Change of Use and Building Work*** AO4.1. Materials manufactured or stored on site are not hazardous in nature; or AO4.2 If a flood level is adopted[1], material manufacturing equipment and containers are located above this level, or AO4.3. If a flood level is not adopted, material manufacturing equipment and containers are located on the highest part of the site to enhance flood immunity. *Note: Refer to the Dangerous Goods Safety Management Act 2001 and associated Regulation, the Environmental Protection Act 1994 and the relevant building assessment provisions under the Building Act 1975 for requirements related to the manufacture and storage of hazardous substances.*
PO5. Community Infrastructure is able to function effectively during and immediately after flood events.	***For Material Change of Use*** AO5.1. No Acceptable Outcome specified.

[1] Council has adopted a habitable floor level of Xm AHD (Xm AHD flood level + 0.3m freeboard) for the purposes of this Code and the relevant building provisions of the *Building Act 1975*.

[2] As defined in the *Sustainable Planning Regulation 2009*.

Case Study 1

Material Change of Use – Residential (Six Townhouses)

Site Location:

Substantially within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages higher density residential development

Proposed Development:

6 x 3 storey townhouses with ground floor car accommodation

Assessment against IFAO Model Code:

This proposed development complies with the Model Code, as:

- Council sought a flood/hydraulic study identifying a flood level for the site, which the applicant provided
- Buildings are elevated above this level and development has a simple direct evacuation route off site
- Dwellings are not single storey slab on ground – habitable rooms are elevated through ground floor used as car accommodation
- Site is in urban area and no alteration to watercourse or filling is proposed
- No hazardous materials to be stored on site
- Not a Community Infrastructure item

Application is supported by Council

Case Study 2

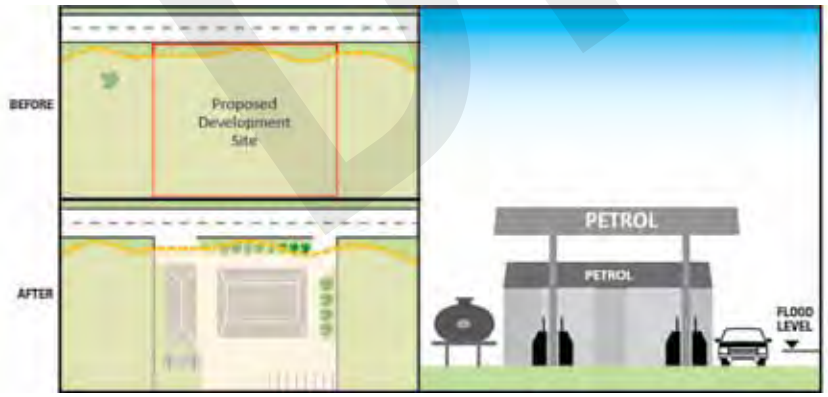
Material Change of Use (Service Station)

Site Location:

Susbtantially within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages service station development



Proposed Development:

Service Station

Assessment againstIFAO Model Code:

This proposed development complies with the Model Code, as:

- Council sought a flood/hydraulic study identifying a flood level for the site, which the applicant provided
- Development located on highest part of site
- Development has simple & direct evacuation route off site
- Site is in urban area and no alteration to watercourse or filling is proposed
- External gas storage (hazardous material) is elevated above flood level and designed in accordance with relevant legislation, while underground tanks are also designed in accordance with relevant legislation
- Service station will have a Business Continuity Plan in place to provide direction on operation during flood events

Application is supported by Council

Case Study 3

Reconfiguring a Lot – Residential (1 into 8)

Site Location:

Part of site within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages residential subdivision

Proposed Development:

Residential Subdivision 1 into 8 lots

Assessment against IFAO Model Code:

This proposed development complies with the Model Code, as:

- Council requested verification of flood level through flood/ hydraulic study during application stage, which applicant provided
- All proposed new lots located outside of IFAO Floodplain Mapped Area, with a balance park within the overlay area – while not mandatory, this is the most appropriate design outcome to ensure house lots will not be inundated
- Road layout is direct & simple to allow for evacuation during flood
- Appropriate signage is provided indicating evacuation routes
- Site is in urban area and no alteration to watercourse or filling is proposed

Application is supported by Council

Case Study 4

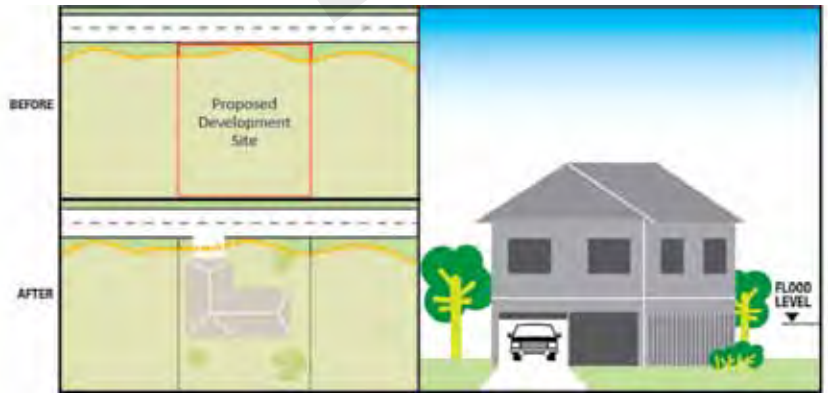
Building Work (New Residential Dwelling)

Site Location:

Substantially within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages low density residential development



Proposed Development:

New residential dwelling that is not assessable development under the Planning Scheme (e.g. exempt or self-assessable)

Assessment:

- Relevant assessment provisions are those under the Queensland Development Code (QDC) (including those for flood hazard triggered by the Floodplain Maps acting as a Natural Hazard Management Area (Flood).
- Interim Floodplain Assessment Overlay Model Code will not apply in this instance.
- Other self-assessable components of the Planning Scheme may still apply as normal (e.g a Residential Zone Code).
- Assessment can be undertaken by private certifier, or Council as required.

Feedback

Planning for stronger, more resilient floodplains has been developed as a toolkit for Councils to support land use planning. The Authority will work closely with Councils during the consultation period to provide advice on both the Guideline and the Floodplain Mapping.

Where mapping has been completed, a hardcopy of the Mapbook and a copy of the digital datasets will be provided to relevant Councils.

The data used in the determination of the "Interim Floodplain Assessment Overlay" is available to Councils via a secure FTP service from the Spatial Information Group within the Department of Environment and Resource Management (DERM). The data consists of a number of whole of state datasets and contour datasets specific to each sub-basin. There are staff members within each Council who currently have access to the DERM FTP service via a secure login and password.

Please contact DERM at productdelivery@derm.qld.gov.au to request access to the datasets via the FTP service.

Feedback on the floodplain mapping can be received by using the feedback button on the interactive mapping website www.qldreconstruction.org.au/maps/interactive-map or via a formal submission during the consultation period.

Councils are invited to contact the Queensland Reconstruction Authority on 07 3008 7200 or alternatively by email to floodplain@qldra.org.au.

Formal submissions during the consultation period can be lodged in the following ways:

Post

Queensland Reconstruction Authority

PO Box 15428

City East Qld 4002

Attention: *Planning for stronger, more resilient floodplains*

Email

floodplain@qldra.org.au

In person

Level 9, 119 Charlotte Street, Brisbane

All submissions are to be received by 11 November 2011.

Rockhampton Source: Queensland Image Library

Queensland Government

SKJ-28

The following two examples show feedback received from members of the public (located at residences marked by the yellow dot). The original flood line recorded by DERM staff is shown as a yellow solid line. Following further investigation, triggered by the feedback, the amended blue solid line was adopted by DERM.

The first example (below) is an urban area in Bellbowrie west of Brisbane.

The second example is a rural area in Walloon west of Ipswich.