



Ensham
R E S O U R C E S



A COLLABORATIVE APPROACH TO RECOVERY FROM AN UNPRECEDENTED NATURAL EVENT

**Presentation to
Fitzroy Flood Forum**

6 August 2008



The purpose of this presentation is to;

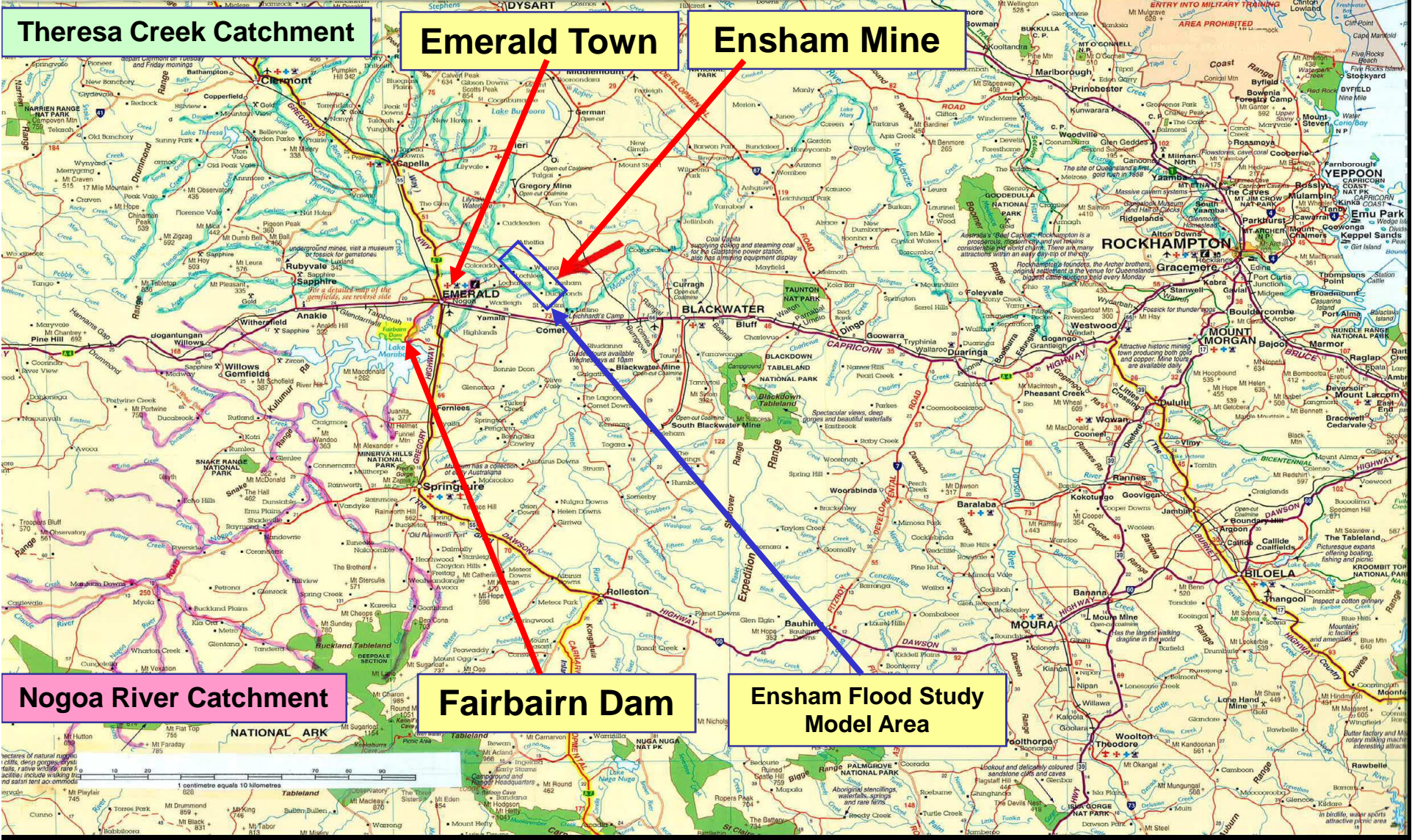
- Provide attendees of the Fitzroy Flood Forum of;
 - The Critical Issues which must be managed ensure the completion of the Flood Recovery Program for Ensham to;
 - Protect safety of Ensham employees from further flooding
 - Recover Ensham production capacity
 - Restore economic contribution to Central Queensland
 - Safeguard more than 3,000 Queensland jobs
 - Minimise loss of Environmental Value



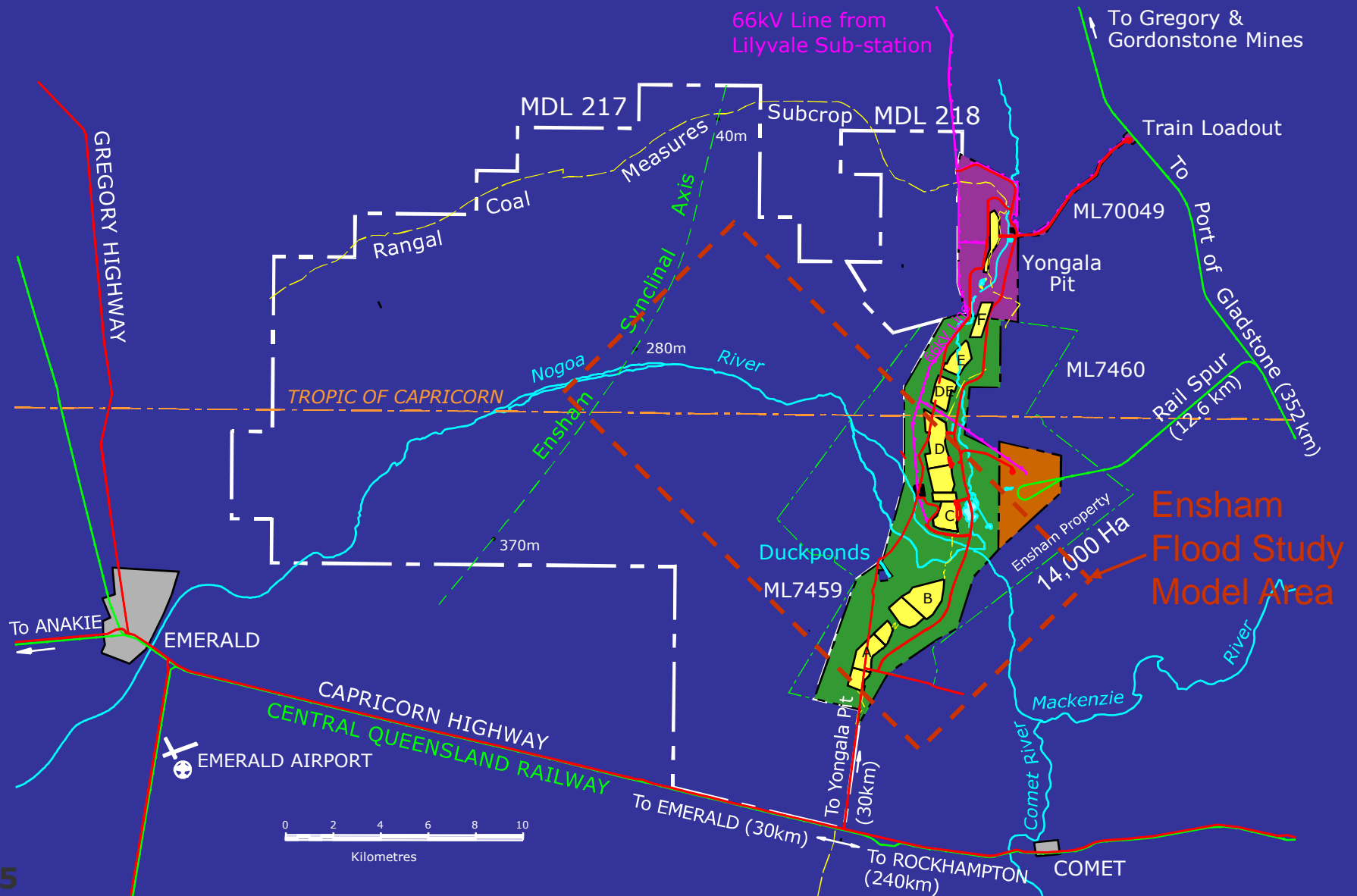
Ensham Coal Mine Location



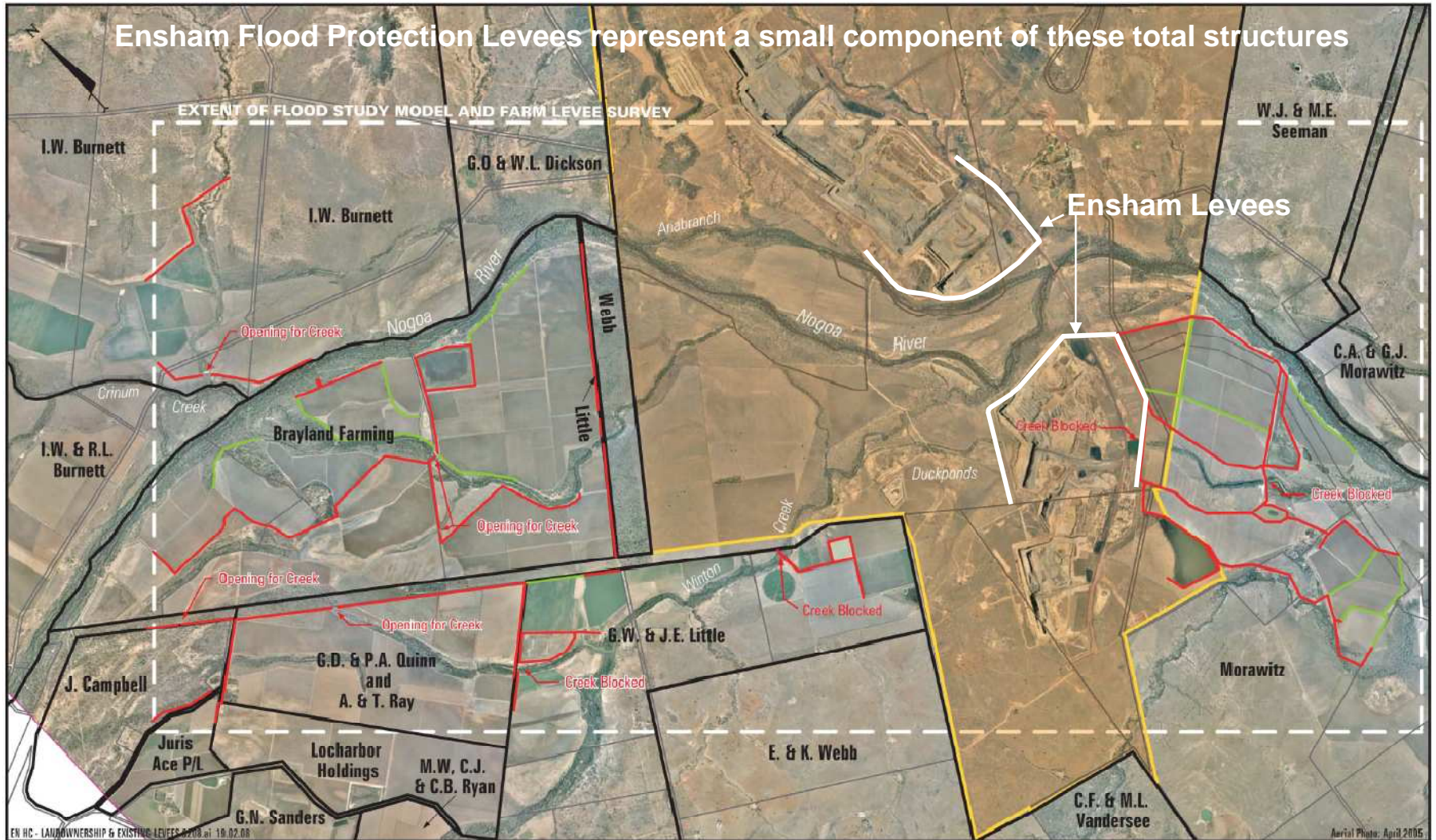
There are two major Water Catchment Systems that feed the Nogoa River



Ensham Mining Tenements



A plethora of levees and similar structures inhabit the flood plain...



LEGEND

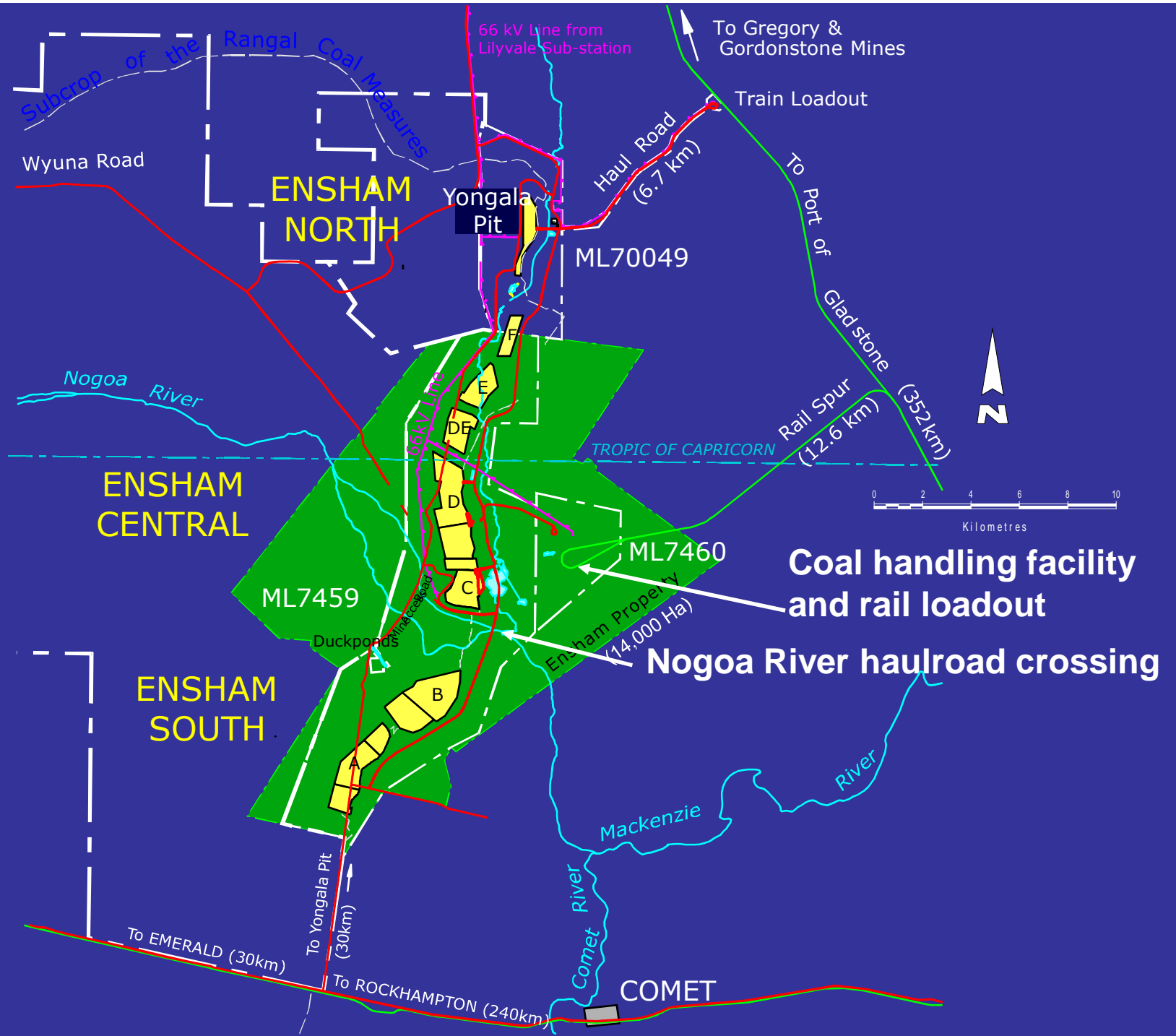
- Ensham owned land
- Significant Levees (surveyed in 2005)
- Minor Levees (surveyed in 2005)

Land Ownership and Existing Farm Levee Structures Adjacent to Ensham Mine

6



Date: 19 February 2008



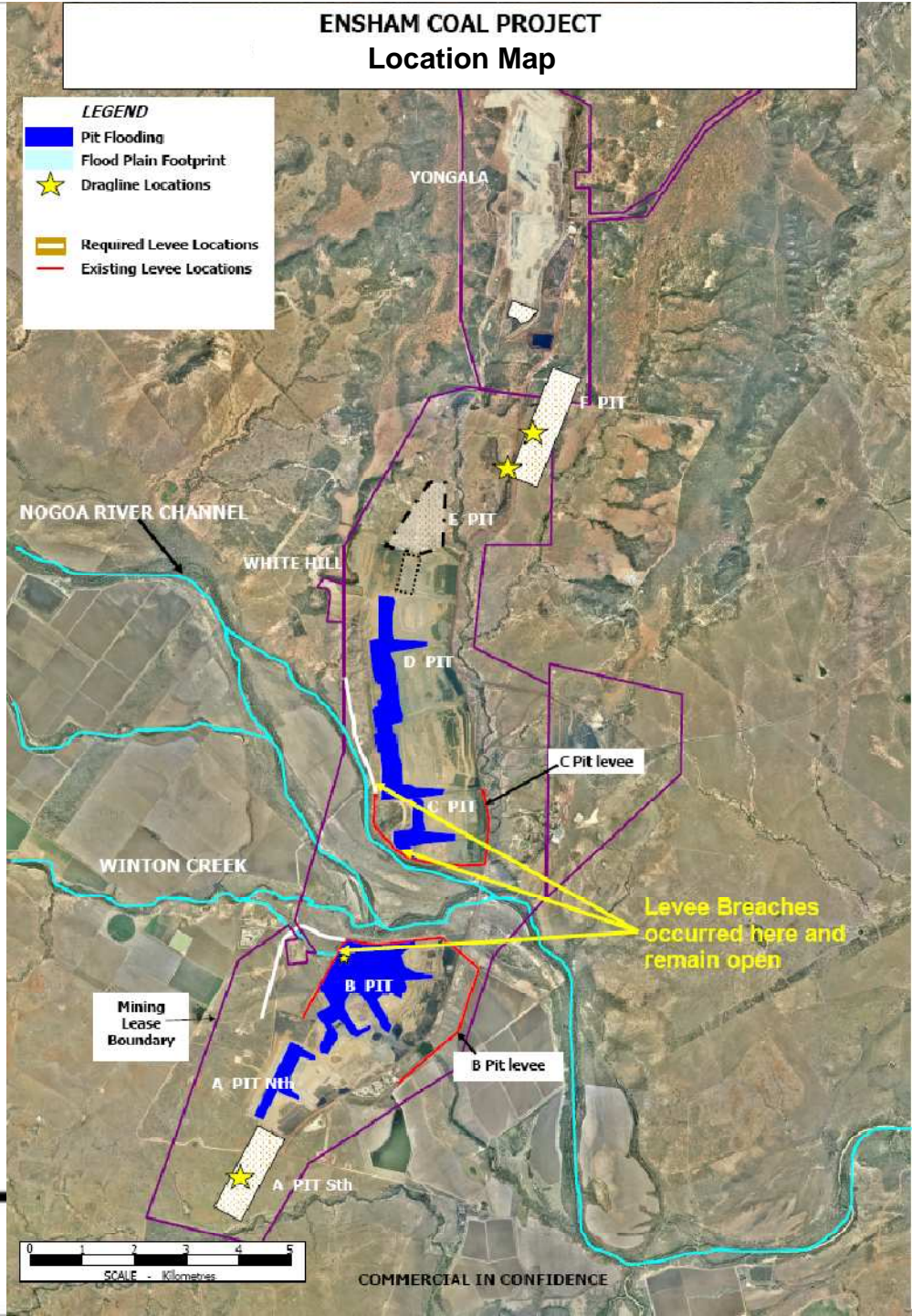
Coal handling facility and rail loadout

Nogoia River haulroad crossing

ENSHAM COAL PROJECT Location Map

LEGEND

- Pit Flooding
- Flood Plain Footprint
- Dragline Locations
- Required Levee Locations
- Existing Levee Locations



Context



Context - 1

- On 19 January 2008 unprecedented flooding occurred at Ensham Export Thermal Coal Mine and the surrounding communities.
- The severity was certainly greater than a “1 in 100 years” event
- Flood protection arrangements at Ensham were designed to rebuff a “1 in 100 years” event
- Levy banks were over-topped and/or breached resulting in:
 - Major flooding of B Pit and C/D Pits >> 110,000 ML, and,
 - Major damage to equipment including Dragline 1
- The Operator has commenced the recovery project having regard to:
 - Ongoing safety & health of employees of Ensham and contractors
 - Minimisation of Damage to production, sales revenue, cash generation and EBIT in 2008
 - Recovery by Ensham in 2009 and later years
 - Continued economic contribution to the Central Highlands region and the State of Queensland
 - Minimise loss of environmental value



The volume of water that has passed down these two systems, though the Ensham Mine was immense

- The flow down the Northern “Theresa Creek System” peaked at 157,000 ML per day, continuing at that rate for more than a week
- Inflow to Fairbairn Dam from the Southern “Nogoa River System” peaked at 350,000 ML per day, averaging 300,000 ML per day.
This flow would fill Fairbairn Dam in about 4 days
- The peak flow through the Nogoa River passing Ensham mine was ~250,000 ML per day
- **110,000 – 150,000** ML of this flow flooded into the Ensham Mining Pits



Of the Immense Volume which passed over the Ensham Mine, only a fraction remained behind...

- The volume of flood water which passed over Ensham Mine was approximately equal to **twice** the volume of Fairbairn Dam
- The amount of water which remained in Ensham Mine after the flood was about **1%** of the volume of Fairbairn Dam

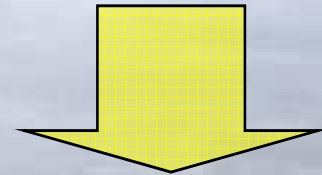


At Ensham on 19 January 2008



When day light on Saturday 19th January 2008, this is what we saw...

Floodwater Cascades over levees as Overtopping commences



**And eventually near the flood level peak of Tuesday 22nd
January 2008 ...**



View of the Nogoia River Floodplain area, looking west towards Emerald , on Saturday 19 January 2008, AFTER the floods overtopped the Ensham levees and Inundated Dragline 1...



View of the Nogoia River Floodplain area, looking east towards Comet, on Saturday 19 January 2008. Flooding of the Nogoia River Anabranh builds up AFTER Dragline 1 was Submerged



View of the Nogoia River Floodplain area, looking West towards Emerald, on Saturday 19 January 2008, AFTER Dragline 1 was Submerged

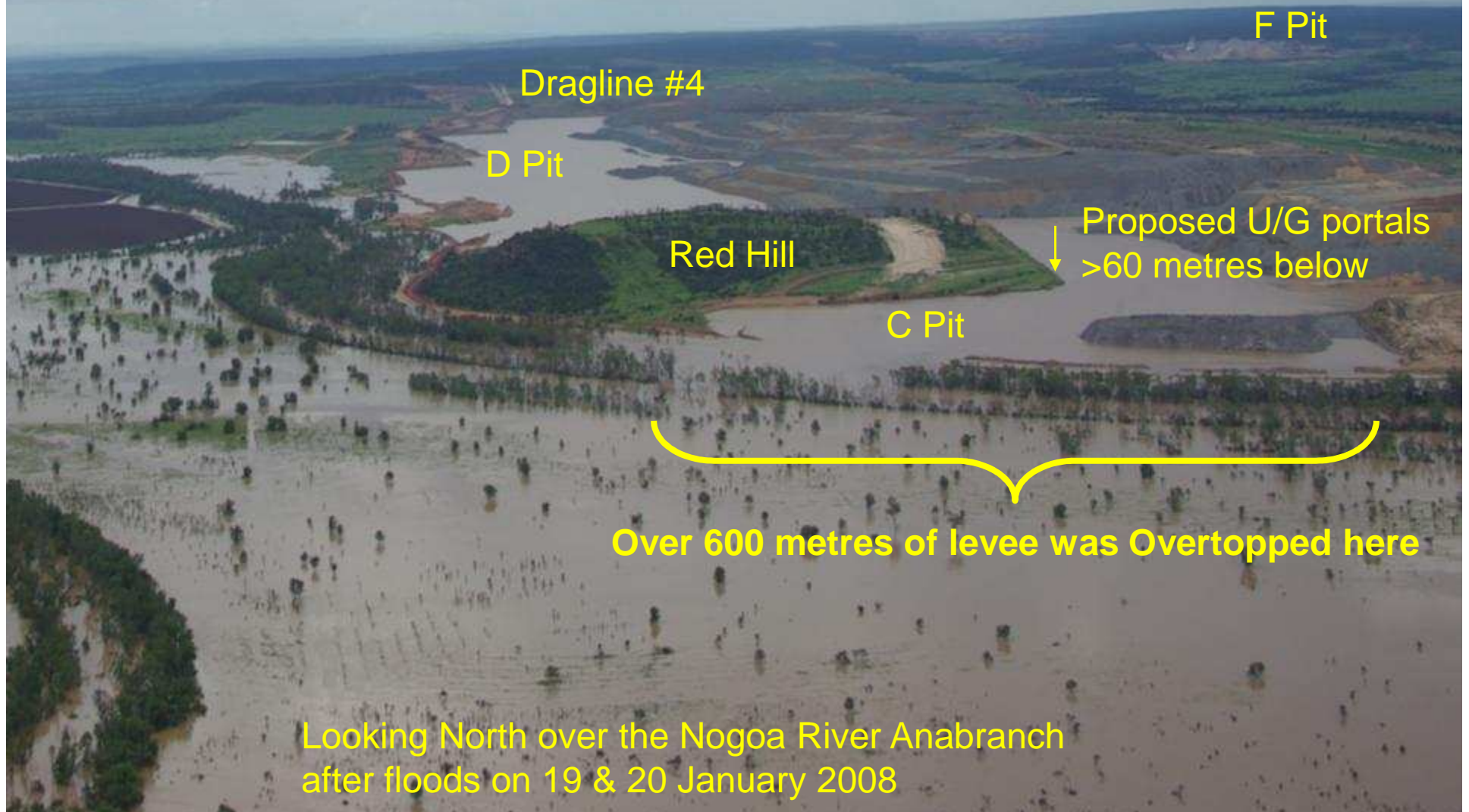


AFTER the Inundation of Dragline 1 the floodwaters continue to rise, threatening the newest Dragline 4

← - - Nogoia River Anabranh ← - -



And eventually, near the peak of the flood AFTER Dragline 1 was Submerged and D Pit was Inundated



And levees in B Pit continued to overtop, as the river continued to rise, AFTER Dragline 1 was Submerged



Looking East over B Pit and the Nogoia River after floods on 19 & 20 January 2008

Context - 2

- **Economic losses in the Emerald region are dominated by Ensham;**

- Ensham	\$300 – 500M
- Agricultural Production	\$ 39M
- On-farm Infrastructure	\$ 46M
- Local Gov't Infrastructure	\$ 59M

Preliminary Estimated loss at 4 February 2008

Source: Ensham and Qld Gov't Ministerial Media Statement

Minister for Emergency Services, The Honourable Neil Roberts

"Impacts of Queensland's 40 days, 40 nights of flooding rains", Monday 4 February 2008



Context - 3

- **Ensham freehold land of 14,000 Ha supports multiple land uses, including;**

- Ensham Coal Mining 8 – 10 Mtpa
- Ensham Cattle Production, carrying 1500 – 2000 head
- Ensham Rotational Cropping
 - ❖ Sorghum
 - ❖ Wheat
 - ❖ Mung Beans



Context - 4

- **Lost production from the inundated pits in 2008 is expected to be around four (4) million tonnes of Ensham's highest quality product**
 - Lost revenue based on current prices \$380M
 - Lost Royalties to State of Queensland \$ 25 - 30M
 - Lost Revenue Rail and Port Authority \$ 33M



The Employees of Ensham Resources, its Contractors and those indirectly employed are at risk from the flooding events

Ensham Resources	200
Golding Contractors	136
HSE Mining	85
Other Site Contractors	171
TOTAL DIRECT SITE EMPLOYEES	592
Queensland Employment Multiplier Effect from Ensham Mining Operations	+ 2,550
TOTAL EMPLOYMENT RESULTING FROM ENSHAM MINING OPERATIONS	3,142

Many of these people are also residents of the Flood Affected town of Emerald and have suffered personal loss



CEO's Critical Issues

- Maintain a safe working environment
- Retain managerial and professional staff
- Retain key low ash, high revenue, reliable customers
- Match available coal quality to customer requirements
- **Return floodwater trapped in B,C and D Pits to the Nogoia River**
- **Minimise the risk of further flooding to B,C and D Pits while recovery proceeds**
- Determine long term requirements to minimise future risk of business interruption
- Retain confidence of key stakeholders (including customers, owners, insurers, employees, communities and Government)



Return of Trapped Floodwater to the Nogoia River

resource



It is critical that the trapped floodwater be removed quickly

- Approximately 120,000 ML of the trapped 150,000 ML of floodwater have been returned to the river so far
- Significant Engineering Resources and Effort have been required to achieve this task
- Pumping is expected to continue for two to three months more
- Some water will be unsuitable for return to the river



Approvals were facilitated in a timely and professional manner

- Conditions of return of water to the river are provided by approvals from the Queensland Environmental Protection Authority
- The “Transitional Environmental Program” approved by EPA provides;
 - Water quality conditions and specifications
 - Water quality sampling frequency, locations and methods
 - Reporting and notification requirements to EPA
 - Engineering requirements for discharge pathways and structures
- Response from EPA officers in negotiating and securing approvals has been timely and professional



Communication with stakeholders is a key part of recovery from any Natural Disaster

Q&A Information Bulletin developed and distributed to;

- Ensham Neighbours
- Regional NRM Organisations
- Qld State Gov't Regulatory Agencies
- Central Highlands Regional Council

JANUARY 2008 FLOOD EXPERIENCES

QUESTIONS & ANSWERS

Information Bulletin July 2008

The Board of the Fitzroy Basin Association (FBA) visited the Ensham Mine on 25th June 2008, to assist with their understanding of the devastation that resulted from the January 2008 flood. The FBA Board was able to view the recovery process first hand. Following that visit, these questions and answers have been prepared to provide more information to the community. During January 2008, Ensham mine, along with other businesses and households, was inundated by flood waters from the Nogoa River. Extensive damage occurred to plant, equipment and infrastructure at the mine site. When the levees at Ensham were overtopped, several of the open cut mine pits were filled with water from the flooding Nogoa River. Mining operations cannot return to peak production until the excess river water has been removed from the pits. In the first half of 2008 to 30 June, the mine produced less than 50% of its annual production capacity.



Pumping of the pits under controlled conditions has been under way since February. The return of river water (release water) from the Ensham mine pits has been approved by the Environmental Protection Agency (EPA), and is conducted under the Agency's supervision. Ensham is required to meet rigorous standards based on the Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines. The water quality levels that Ensham has to comply with are contained in a Transitional Environmental Program (TEP) permit. Approval for pumping under the TEP has been granted until 2nd March 2009 but it is anticipated that the release operations will be completed this year. The TEP includes limits on EC, pH, total suspended solids (sediment in the water) and heavy metals.

Commonly asked questions

Q. How much river water entered the mine pits during the flood?

A. Approximately 150,000ML

Q. How much water has been pumped out to date?

A. Approximately 100,000ML

Q. Will all the remaining water be pumped into the river?

A. If pumping into the river will result in the EPA permit guidelines being exceeded, then alternative methods of managing the water (such as on-site storage) will be implemented.

Q. Is the mine still producing coal?

A. Yes. Currently Ensham has been operating at less than 50% of its normal production capacity due to the closure of the flooded pits.

Q. Who is testing the water being released from Ensham?

A. There are five local companies conducting testing, as well as DNRW and FBA, using NATA accredited laboratories for detailed analysis.

Q. How can the water quality be verified?

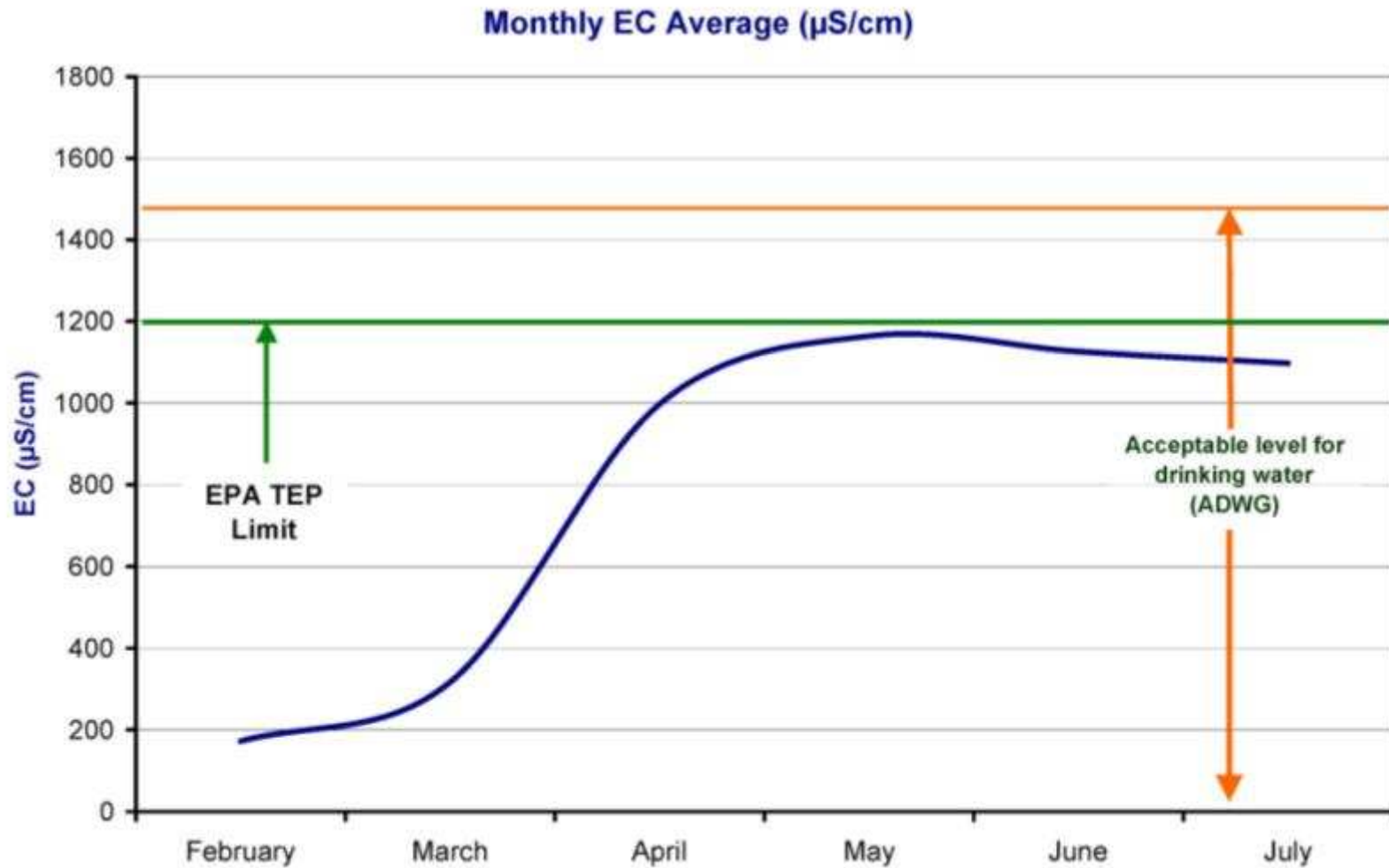
A. Anyone who has the qualifications to correctly sample the water, can take a sample in the river and analyse it or send it to an accredited laboratory.

Q. What other measures are being taken?

A. Discharge areas are being stabilised to prevent stream bank erosion, scouring, slumping and impacts to vegetation from the discharge point through to the bed and banks of all water courses.

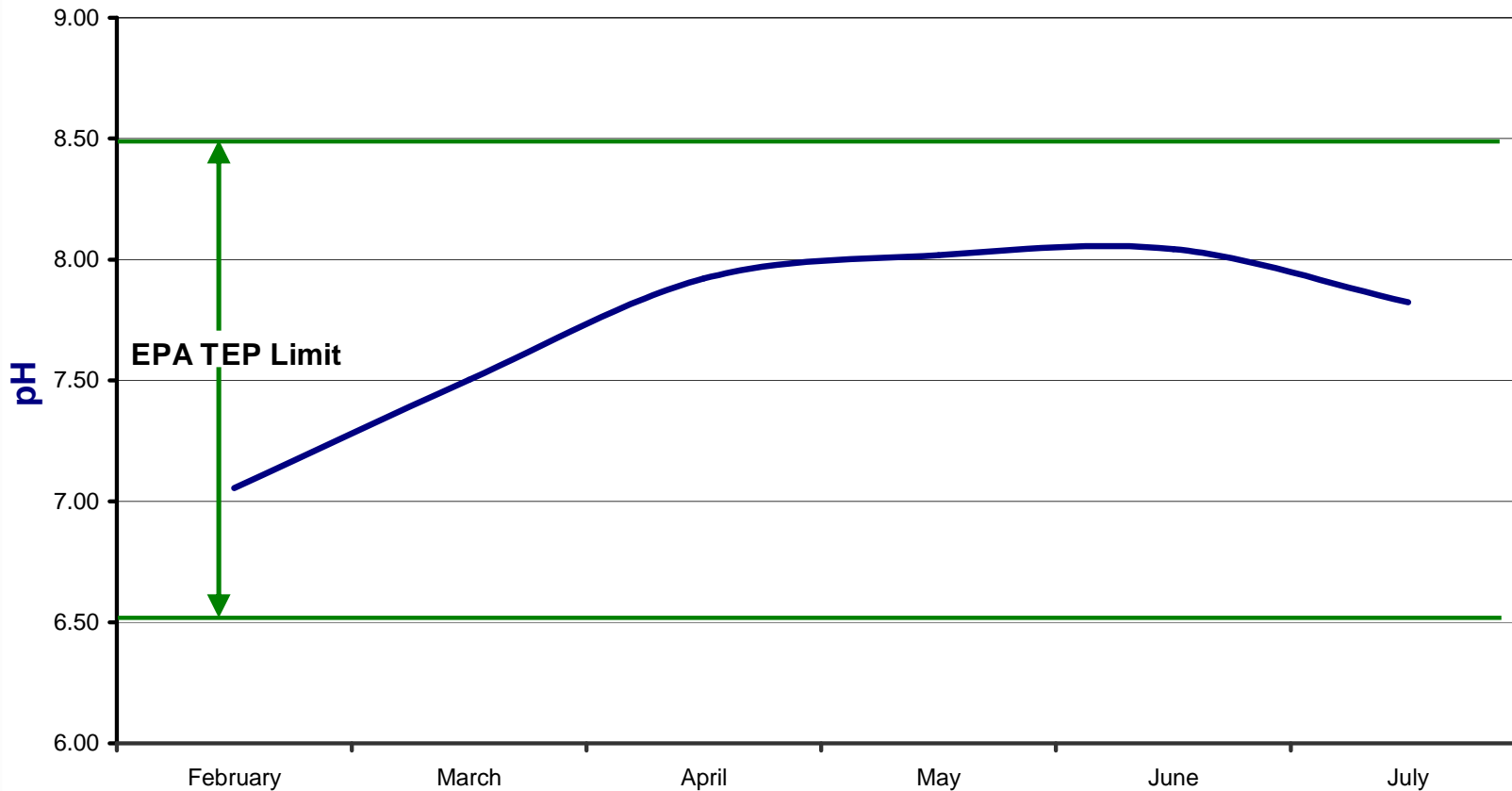


Salinity Management of the "returned riverwater" is a key priority



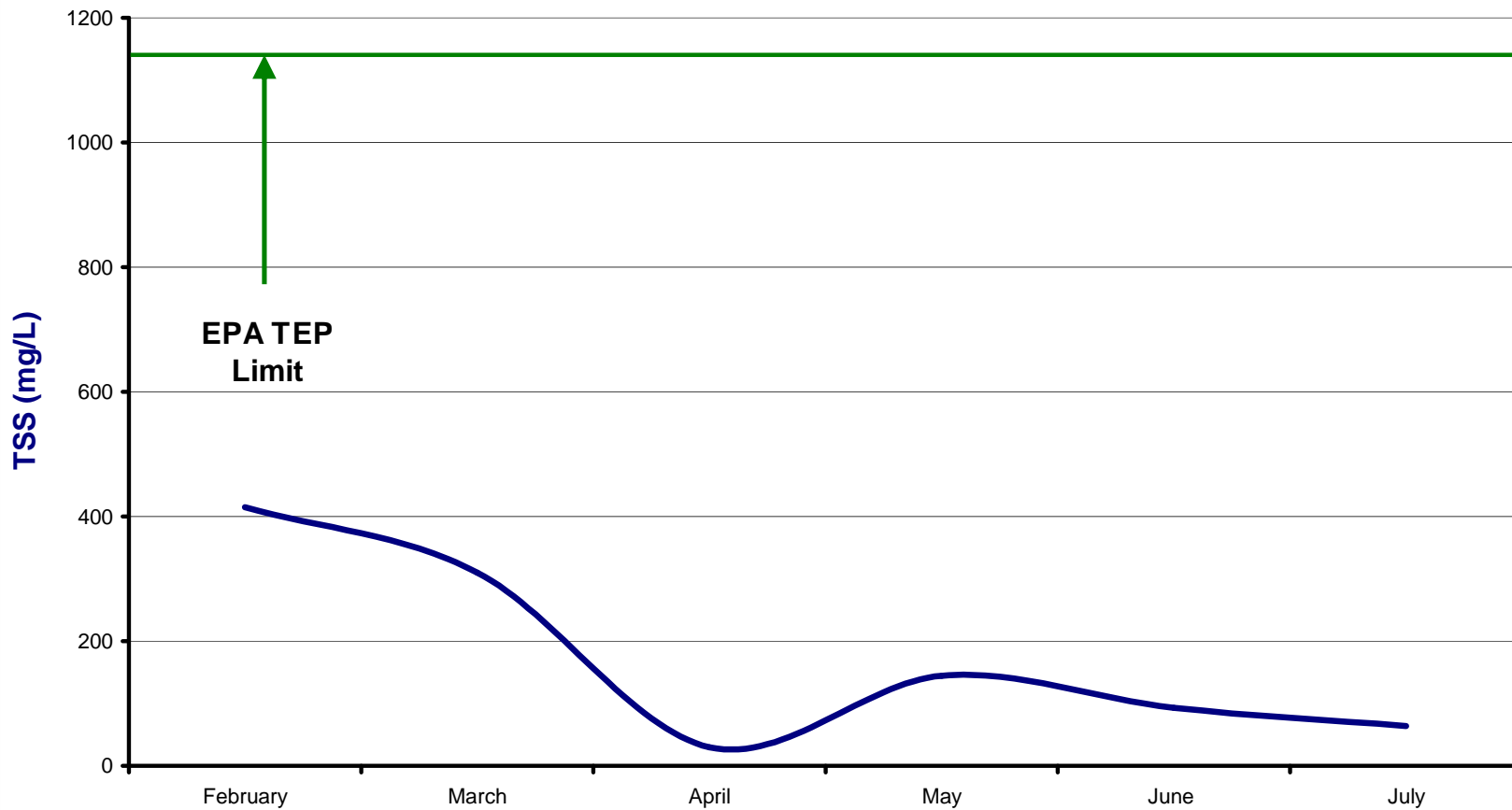
Downstream pH is very stable ...

Monthly pH Average



Settlement of suspended solids in the Mining Pits has resulted in reduced sediment load in the returned flood water ...

Monthly TSS Average



**The Ensham business will recover from this
Unprecedented Natural Event whilst minimising risk
of Harm to the Natural Environment**



Already in excess of \$85 million has been spent/committed on recovery activities, mainly dewatering and dragline parts ...



One of several installations – this “mechanical river” returns river water to the Nogoia River from whence it came:

6 x 450hp = 2,700hp (~2,000kW)

720 Megalitres per day



Careful engineering has been used to protect stream beds and banks and aerate water ...



Ensham has constructed and installed two of the biggest dewatering pumps in Australia



Establishment of On-going Flood Protection

resource



Ongoing Flood Protection is Critical for the recovery of the Ensham Operations

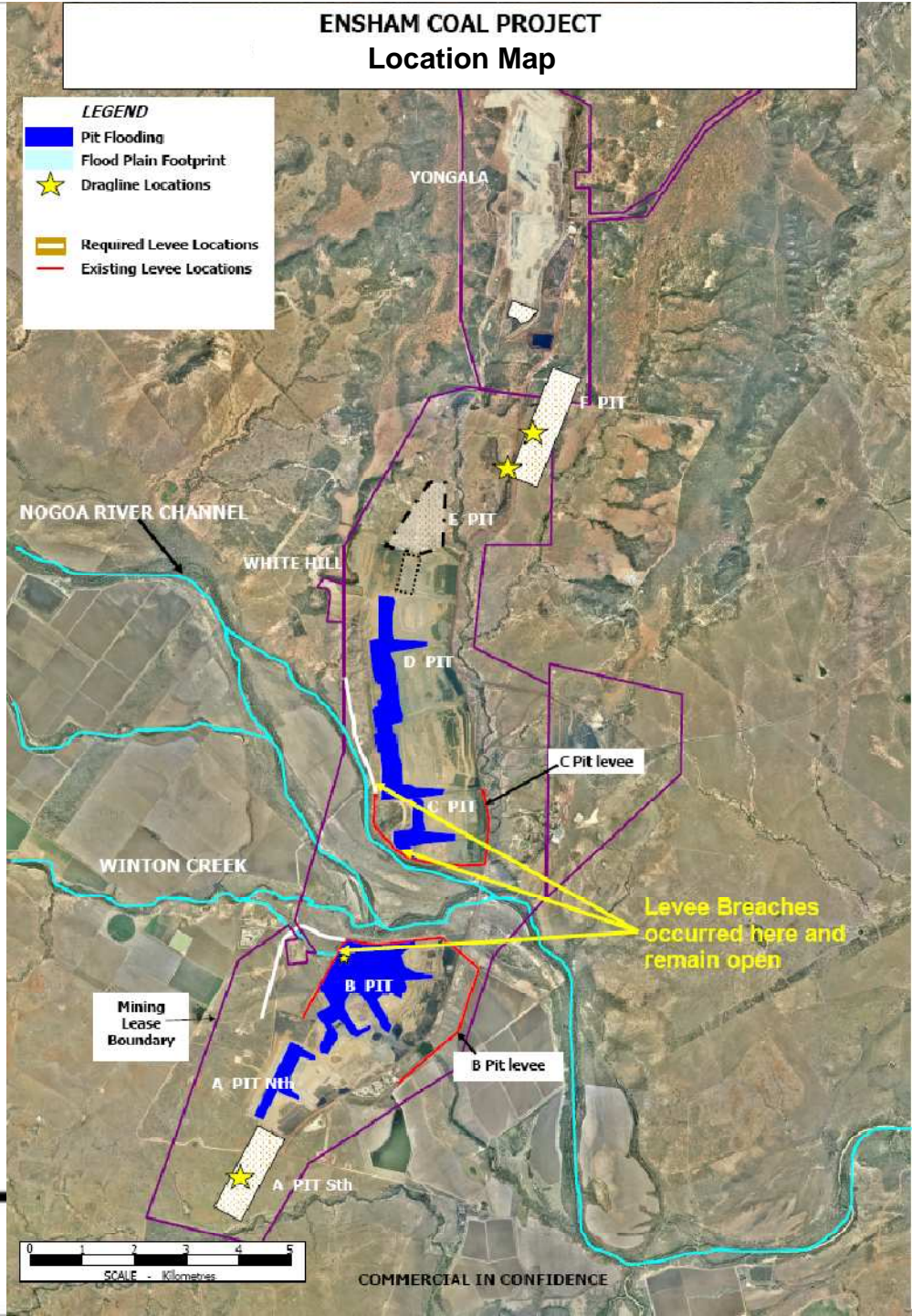
- The B and C/D Pits suffered breaches to their flood protection levees
- Those pits were flooded by inflow of flood waters from the Nogoia River and Theresa Creek
- These levee breaches were substantial and remain open, exposing B and C/D pits to further water inflows during even minor increases in river flow level
- Two such river flow increases have occurred since the major flood event of mid January



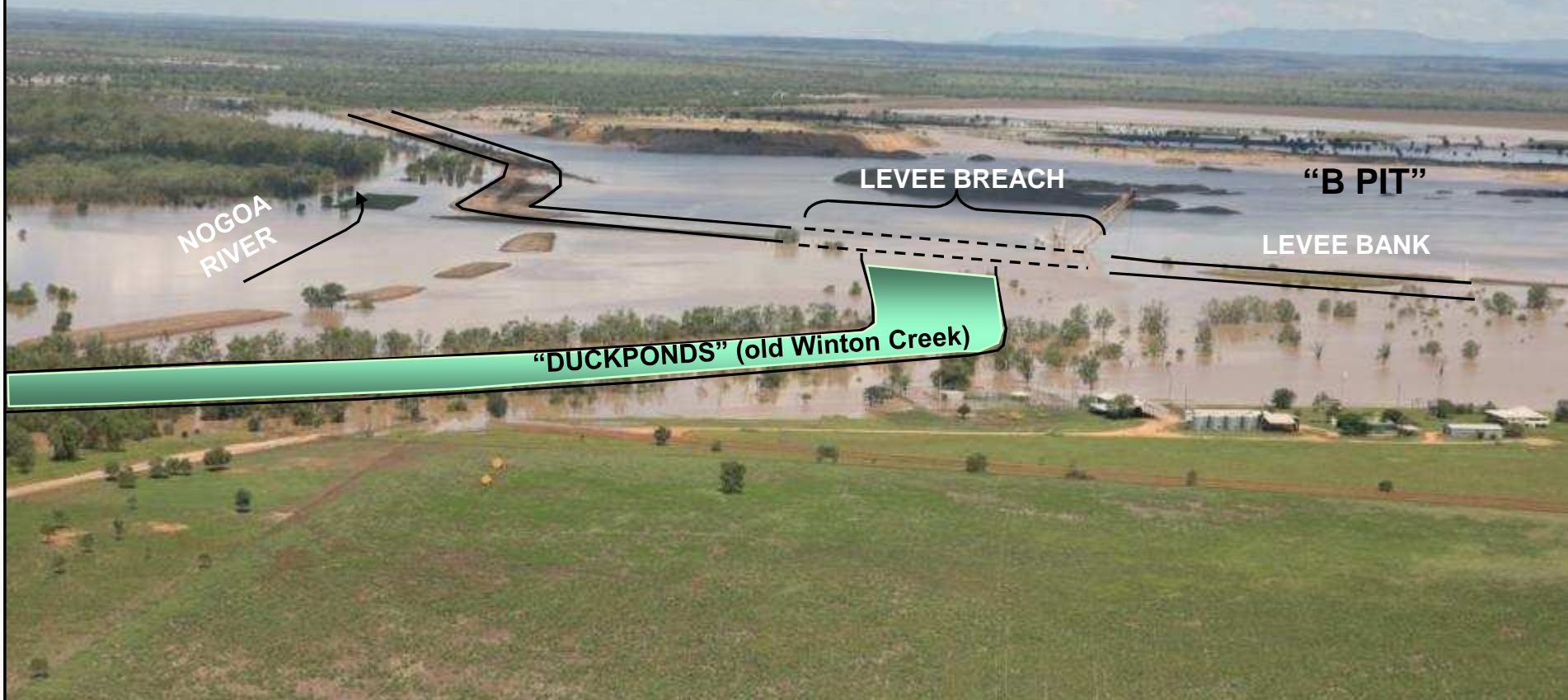
ENSHAM COAL PROJECT Location Map

LEGEND

- Pit Flooding
- Flood Plain Footprint
- Dragline Locations
- Required Levee Locations
- Existing Levee Locations



B, C and D Pits remain exposed to the risk of inflow during even minor increases in level and flow in the Nogoia River and Tributaries



View of "B Pit" looking East



Ongoing Flood Protection

- The approvals required for new flood protection levees must happen *urgently*
- Applications to the various agencies commenced in Mid 2007
- Very little progress was made in the first 6 months due to different inter-Departmental opinions about how to manage tenure and jurisdictional issues
- Coordination of Government Agencies is required to ensure that required approvals are expedited



The urgent recovery of Ensham Mine is critical for all stakeholders

- Ensham Flood recovery declared a “Prescribed Project” by the Queensland Government on April 28 to expedite approvals necessary to ensure the successful recovery of the Ensham Business



Ongoing Flood Protection and dewatering are **CRITICAL** to the recovery schedule and must not be delayed

SOUTHERN AND NORTHERN PITS

Secure On-going Flood Protection

- Complete Levee Design
- Complete Levee Certification
- Obtain approvals for Flood Protection Levees
- Secure Construction Resources
- Construct Flood Protection Levees

SOUTHERN "B" PIT

Dewatering

- Stage 1 - Channel to River
- "High Flow" Pumping
- Stage 2 - "High Head" Pumping

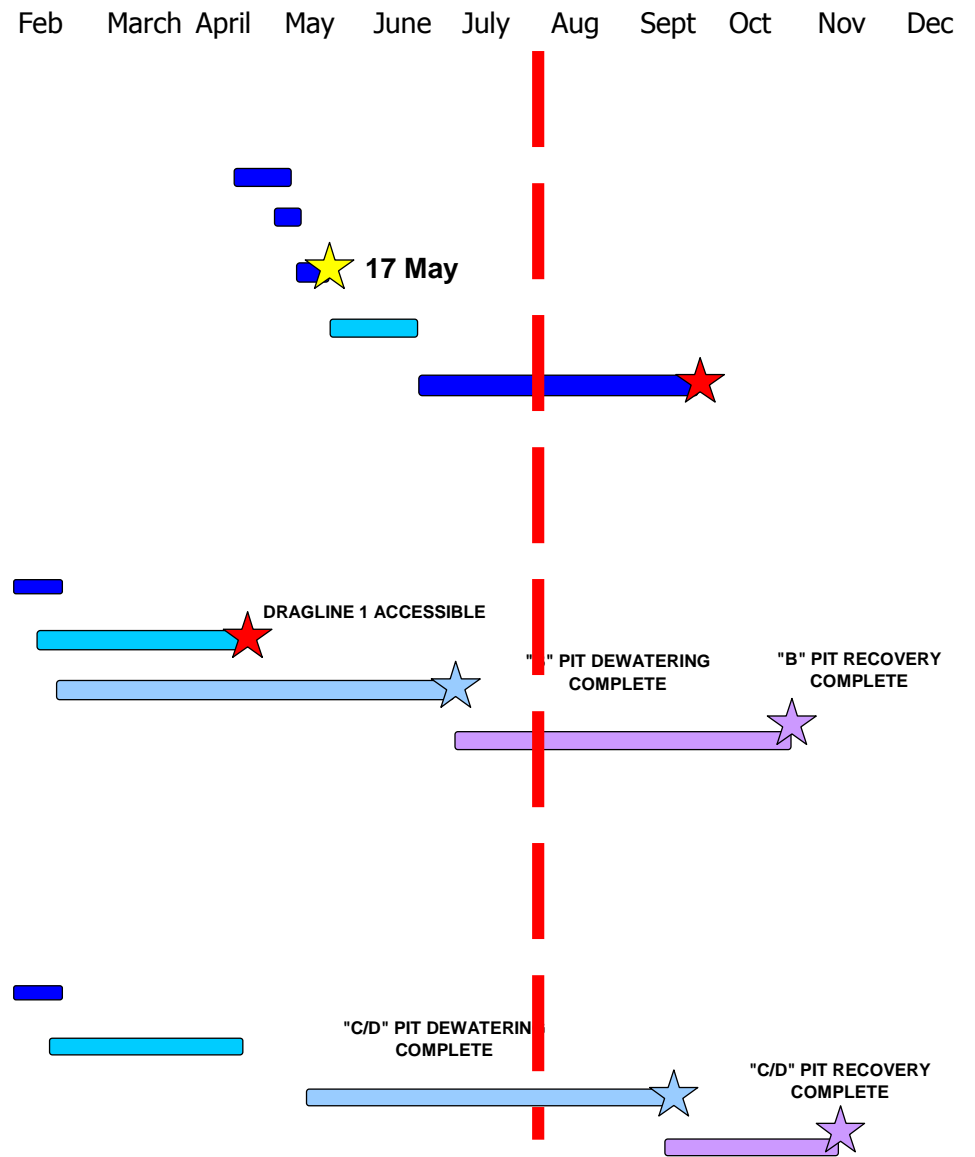
Post Dewatering Material Removal

NORTHERN "C&D" PITS

Dewatering

- Stage 3 - Channel to River
- "High Flow" Pumping
- "High Head" Pumping

Post Dewatering Material Removal



The Origins of the January 2008 Flood Events

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**Lessons learnt about the monitoring and
communications of rainfall events in the
Emerald Region**



We have seen the results of these unprecedented flood events on the Emerald Community, however many questions remain unanswered

- What sort of rainfall caused such unusually large flows in the Nogoia River and Theresa Creek Systems?
- Why were most of the community taken by “surprise” by these flooding events?
- What can be done to better manage this situation in the future?





Central and Western Queensland Floods

January 2008

- The Australian Bureau of Meteorology recently published the report –

"Central and Western Queensland Floods – January 2008"

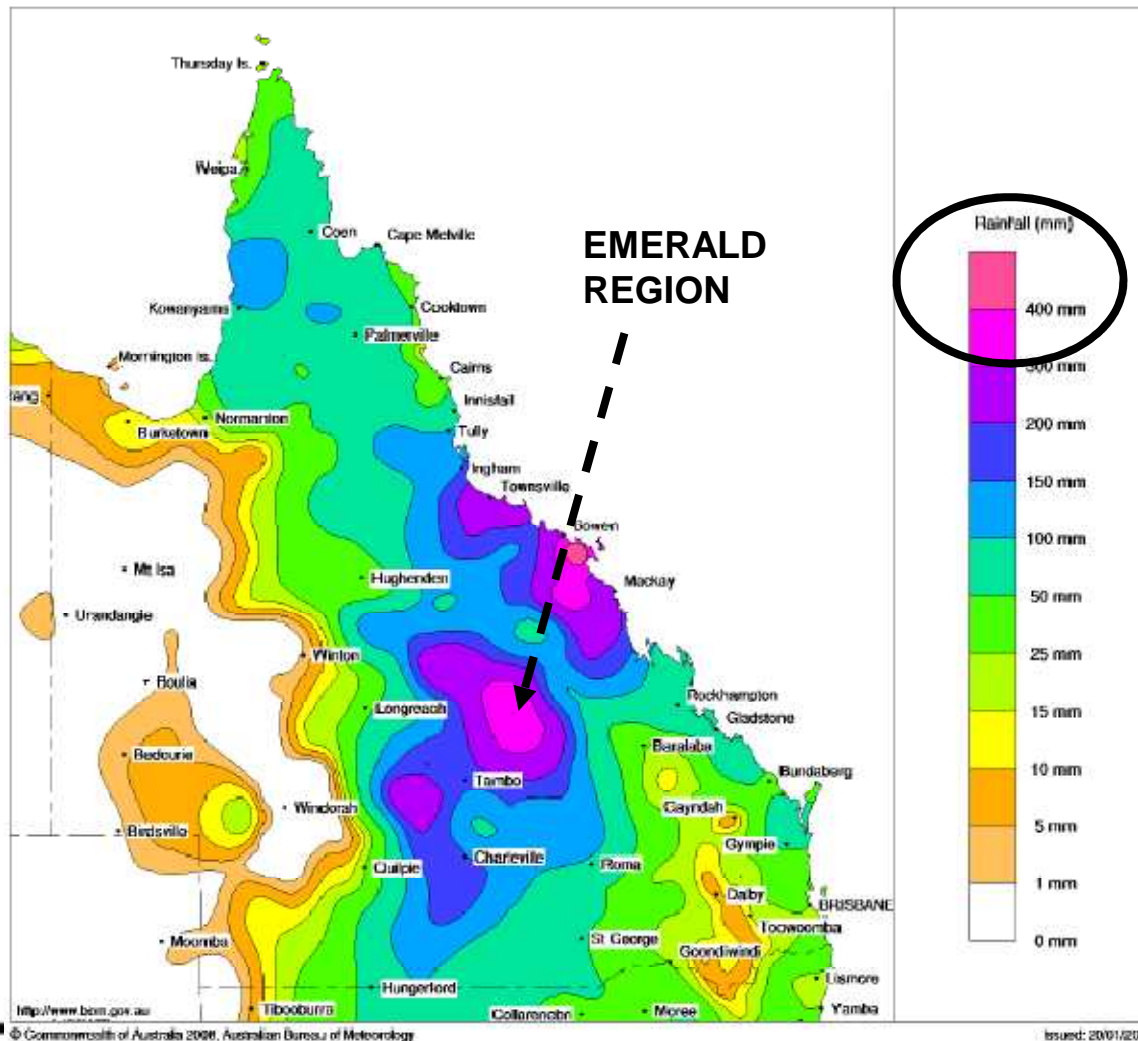


Some of the preliminary conclusions which may be drawn for the “BoM” report including

- Emerald, Ensham and surrounding districts lie at the extreme edges of existing weather radar coverage
- Some “Very Intense” rainfall events, estimated at around 1:500 year recurrence, occurred in sections of the Theresa Creek catchments
- Existing rainfall and stream flow gauging stations did not provide adequate data for “real time” river flow event management
 - Unreliable performance of hardware
 - Insufficient number of gauging stations
 - Inappropriate positioning of gauging stations

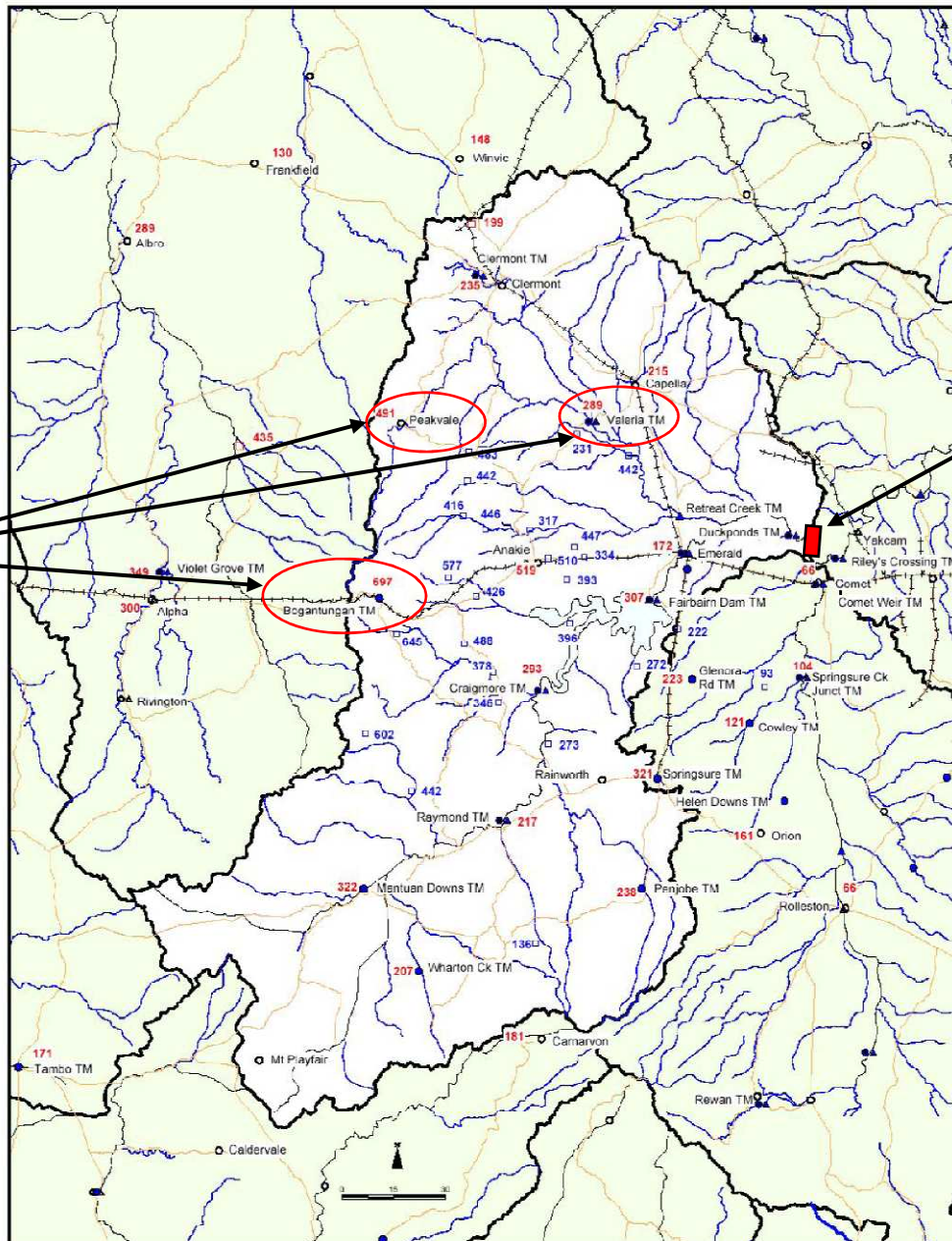


Some "Very Intense" rainfall events occurred in the sections of the Theresa Creek catchments in the 48 hours prior to flooding at Ensham



Very intense rainfall events occurred during the 5 days prior to 19 January 2008

- Bogantungan
- Peakvale
- Valeria
- others



ENSHAM MINE

Source: Australian Government, Bureau of Meteorology-
Central and Western Queensland Floods – January 2008

- Unofficial Rainfall Station
- Daily Reporting Rainfall Station
- △ Manual River Station
- Telemetry Rainfall Station
- ▲ Telemetry River Station

NOGOA RIVER
Five Day Rainfall Ending 0900 20th January 2008
(Official and unofficial rainfall totals compiled after flood.)

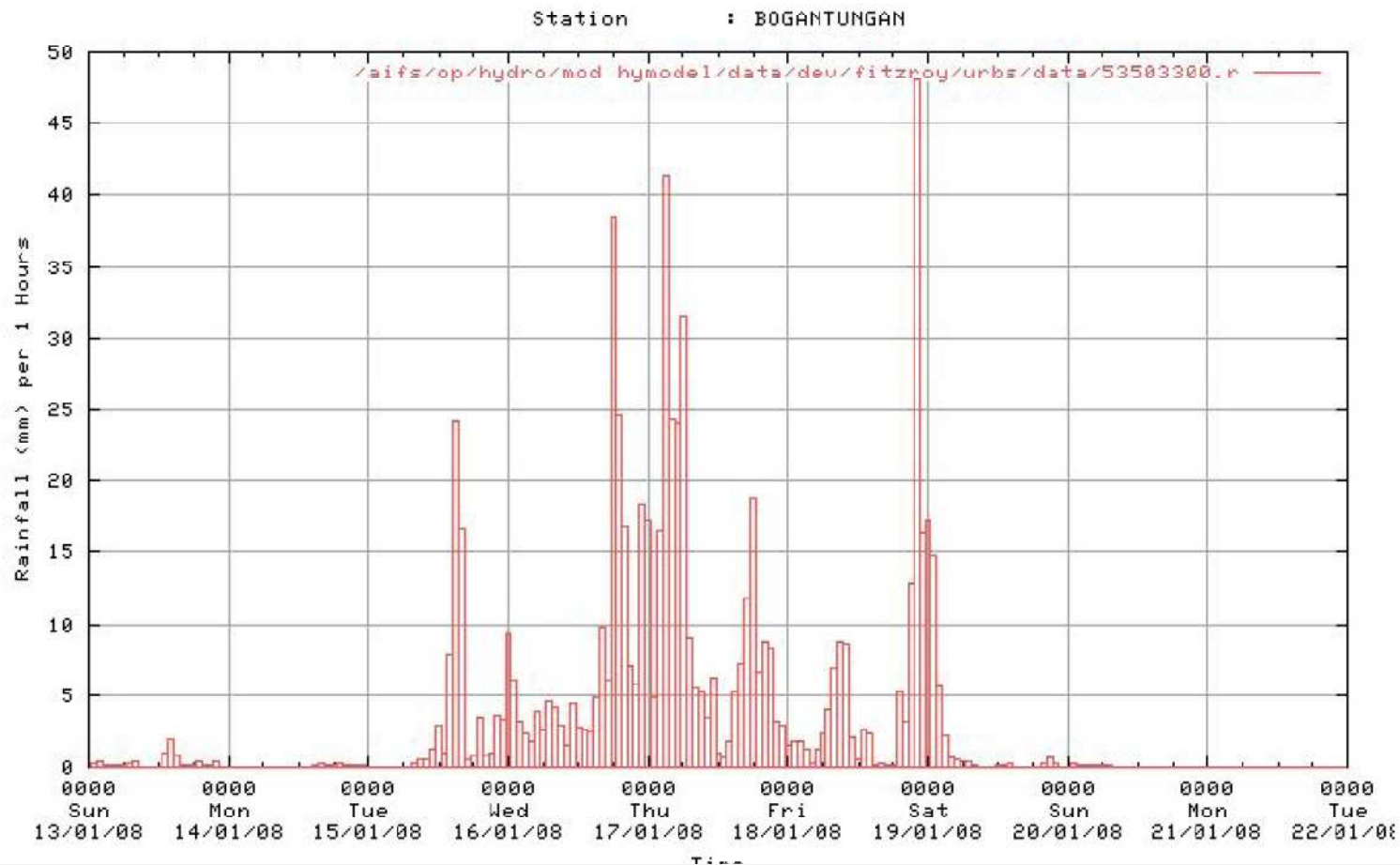
- Major Roads
- ++++ Railway

Revised: March 2008



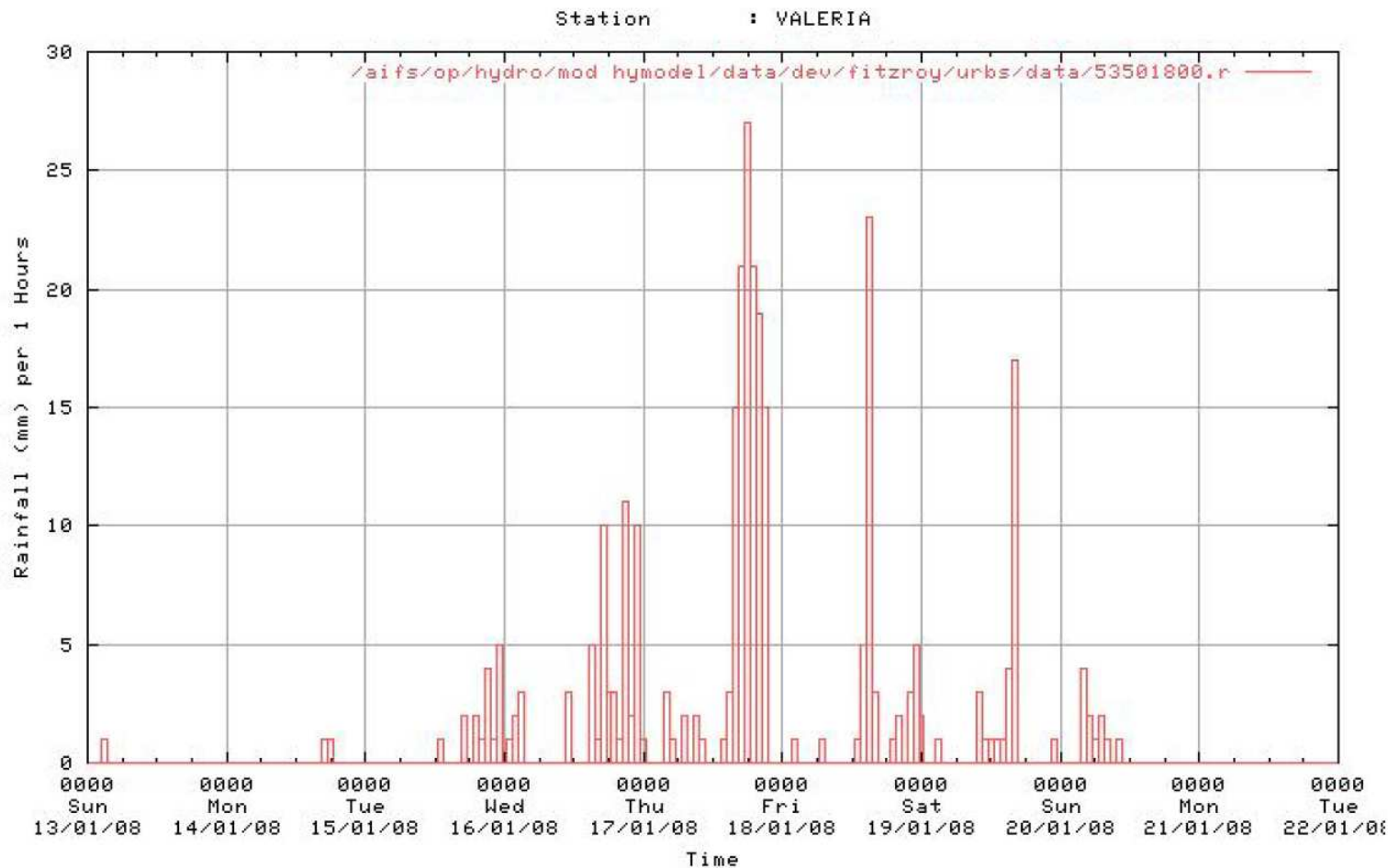
The Intense rainfall events in these Catchments, occurred in the 3 days prior to the Inundation of the Ensham mine – Slide 1

Hourly Hyetographs for Bogantungan

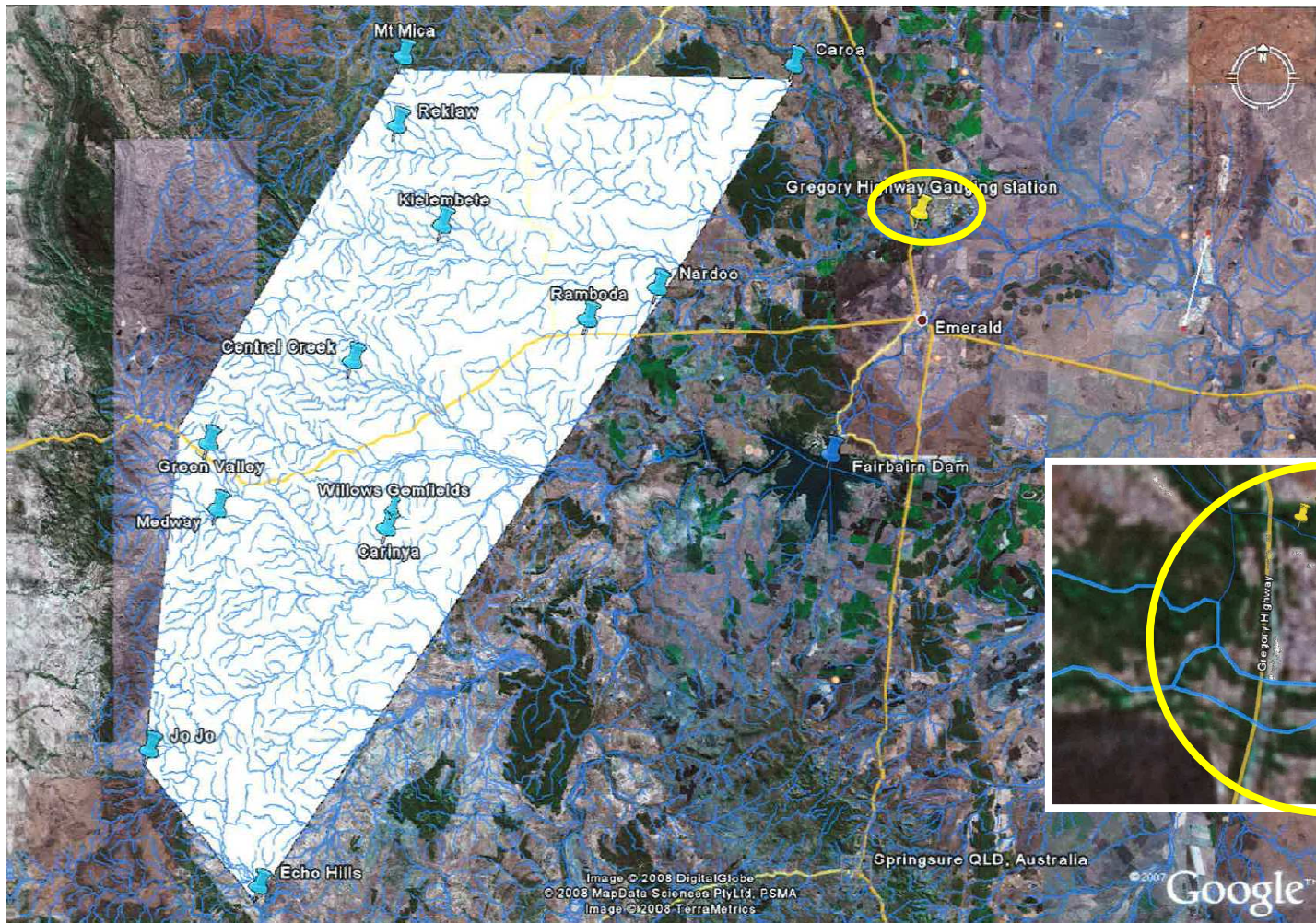


The Intense rainfall events in these Catchments, occurred in the 3 days prior to the Inundation of the Ensham mine – Slide 2

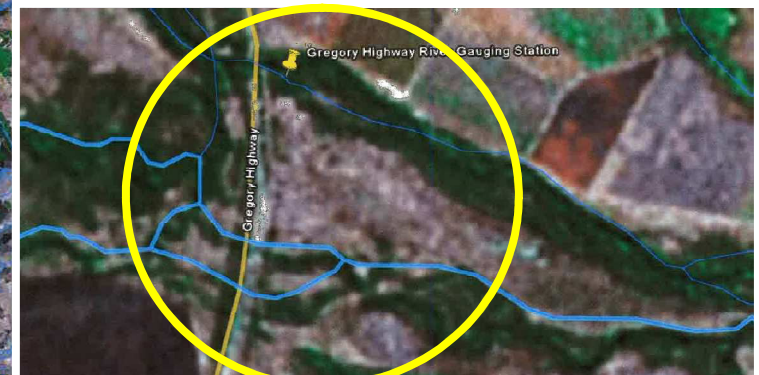
Hourly Hyetographs for Valeria



Ensham is 1 to 2 days downstream of this rainfall event ...

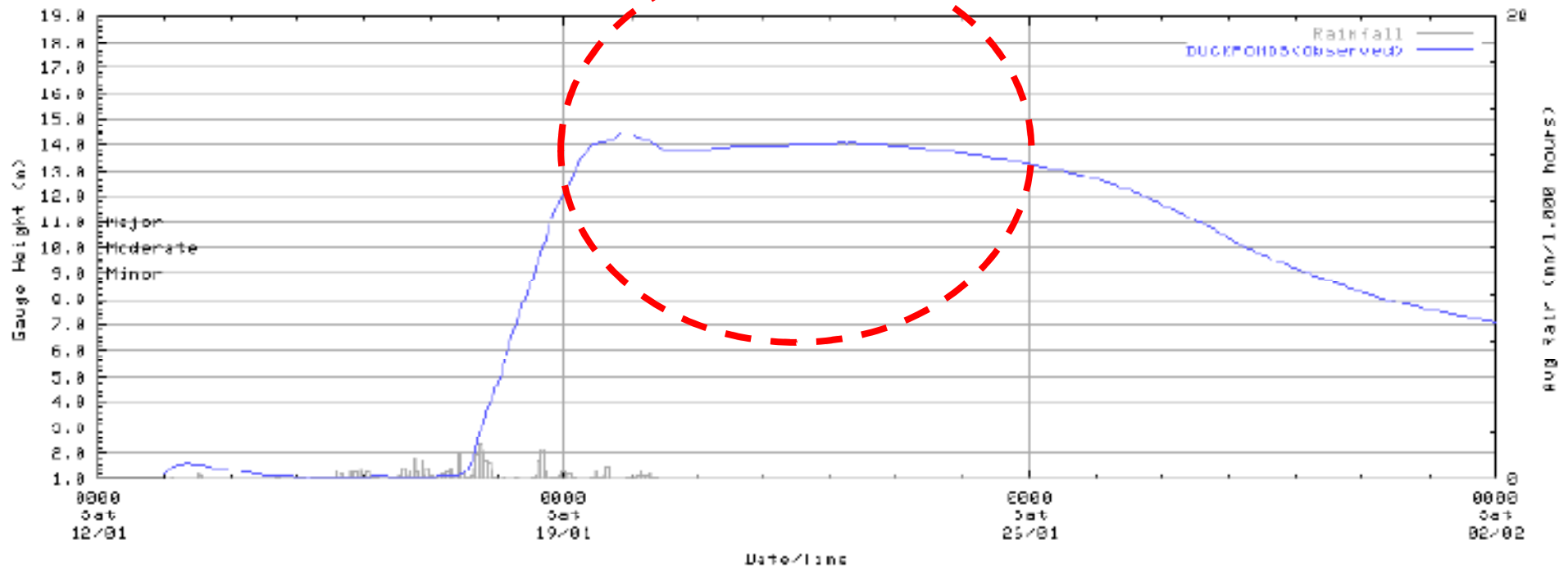


But the Theresa Ck gauging station on the Gregory Highway didn't warn of the severity of this flood because it misses much of the flow from the S-W catchment area



Two “Fairbairns Dams” of water flowed over Ensham for more than one week before the flow started to recede ...

Duckponds – Nogoia River



Some of the preliminary conclusions which may be drawn for the “BoM” report including

- Some rainfall events in the Theresa Creek system would not be expected to be exceeded more than once in **500 years**
- River flows resulting from these rainfall events were unprecedented and in some cases new record flood heights were experienced
- The build up of water in the catchments was very sudden (24 – 48 hours)
- The flooding events and resulting impacts did not discriminate in any way



How might community organisations and businesses respond to these conclusions?

- Provide a focussed and unified lobby to Queensland Government and its relevant agencies to improve systems which will give early warning and “Real Time” management of this size of rainfall and river flow events by;
 - Installing sufficient weather radar coverage of the region
 - Review the distribution and density of rainfall gauging stations in the region
 - Review the distribution and density of stream flow gauging stations in the region
 - Review the communication systems required to provide appropriate early warning to the community of flood events including accountable agencies and processes



Who might lead these types of actions?

- Large industry organisation must provide the leadership for these actions such as;
 - Fitzroy Basin Association
 - Queensland Resource Council
 - Central Highlands Regional Council
 - Central Highland Regional Resource Use Planning Cooperative



Thank you

