

**QFCI**

Date:

11/11/11

JM

Exhibit Number:

1013

**STATEMENT OF GRAHAM MARK BROWN**

Graham Mark Brown of Level 8, 295 Ann Street, Brisbane in the State of Queensland, General Manager - Network Regional in the employ of Queensland Rail Limited solemnly and sincerely affirms and declares:

**Background**

1. This statement is provided to the Queensland Floods Commission of Inquiry (the Commission) in response to the requirement to provide a statement to the Commission dated 11 October 2011 (the "Requirement") directed to me, Mr Graham Brown.
2. I have sought to answer each of the questions posed by the Commission in the Requirement in providing the following account.

**Question 1: My role and position within Queensland Rail.**

3. I have been an employee of the entity which is now Queensland Rail Limited since 1984 and the General Manager Network Regional since July 2010.
4. As General Manager – Network Regional I am responsible for asset management of the Queensland Rail Network outside the South East Queensland corner.

**Question 2: The principles and processes attaching to the development of new rail network infrastructure:**

5. In relation to question 2, I am informed by [REDACTED] General Manager Environment Queensland Rail, and verily believe that the principles and processes attaching to the development of new rail network infrastructure within Queensland Rail have a statutory basis as found in the following key laws, policies and schemes: *Sustainable Planning Act 2009 (Qld)* ("SPA"), *Sustainable Planning Regulation 2009 (Qld)* ("SPR"), *Transport*

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*Infrastructure Act 1994 (Qld) (“TIA”), State Planning Policy 1/03 Mitigating the adverse impacts of flood, bushfire and landslide (“SPP 1/03”) and various local government planning schemes (“Planning Scheme”).*

6. In relation to questions 2(a) to 2(c) of the Requirement, I am further informed by [REDACTED] and verily believe the following matters.

**Question 2(a): The applicable legislative framework, state planning instruments (including State Planning Policy 1/03) and developmental approval requirements:**

7. Under SPA, development is defined to include various aspects. Two aspects are particularly relevant to land use planning and the adverse impacts of flooding: ‘carrying out operational work’ (“OPW”) and ‘making a material change of use of premises’ (“MCU”) (s7 SPA). Both making a material change of use of premises and carrying out operational work are further defined in SPA (s10 SPA).
8. SPA includes an Integrated Development Assessment System (“IDAS”) and binds all persons including the State. Under IDAS there are various categories of development including ‘exempt development’ and ‘assessable development’. Regulation may further prescribe assessable development as requiring code or impact assessment.
9. Development can be made assessable development either through regulation or through a Planning Scheme. Schedule 4 of SPR further defines development that cannot be declared to be development (exempt development).
10. Of relevance to Queensland Rail, exempt development includes:
- a. OPW carried out by a public sector entity authorised under a State law;
  - b. OPW performed by a railway manager;

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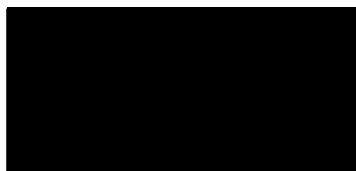
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- c. All aspects of development associated with rail transport (or “network” in the context of this question) infrastructure as defined in Schedule 6 of TIA.
11. Exempt development is not subject to assessment under IDAS or local planning schemes.
  12. Although the definition of rail transport infrastructure is broad in context, some network infrastructure (such as maintenance facilities) are not covered by this definition. Any development of such infrastructure (an MCU) may be assessable development meaning consideration of the provisions of any relevant Planning Scheme(s) against the assessment type would be necessary as per schedule 3 SPR. Local planning schemes may often prescribe that an MCU for a “public utility” or similar definition encompassing new railway development is exempt development. If no such exemption is provided (or not adequate) proposed development may be referred for Community Infrastructure Designation (“**CID**”) or accepted as assessable development for referral under the local government Planning Scheme.
  13. CID is currently carried out by the Minister for the Queensland Department of Transport and Main Roads (“**DTMR**”).
  14. The Coordinator-General (“**CG**”) may declare a proposal to be a Significant Project under the *State Development and Public Works Organisation Act 1971* (“**SDPWOA**”). Not having the lead coordination role for transport planning in Queensland (this would normally be the DTMR), Queensland Rail is rarely the proponent of such Significant Projects and therefore, has no jurisdiction over such transport infrastructure planning. Once the CG conditions for a rail transport infrastructure Significant Project has been issued, Queensland Rail is only responsible for incorporating them into the design, construction and operations. This is via the Environmental Design Review (“**EDR**”) and the Environmental Management Plan (“**EMP**”) steps outlined in Queensland Rail’s Environmental and Planning Processes Manual (“**EPPM**”). Further detail in this regard is provided at question 2(c) below.

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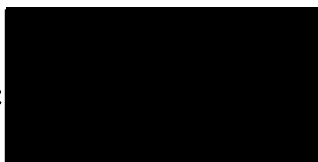
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15. Before designating land for a CID, the Minister (or a delegate) must be satisfied of certain matters as prescribed in SPA. Certain matters include, amongst others, evidence that an adequate environmental assessment has been carried out, that proper consideration has been directed to relevant State planning policies (including SPP 1/03) and relevant local Planning Schemes. An adequate environmental assessment is taken to have been carried out if it is conducted in accordance with the Queensland Government Department of Local Government, Planning, Sport and Recreation, '*Guidelines about Environmental Assessment and Public Consultation Procedures for Designating Land for Community Infrastructure*' December 2006, Version 1.1 (the "**Guideline**"). The Guideline provides for an initial assessment report which includes an assessment of the environmental effects of development for the proposed community infrastructure and ways proposed for managing those effects. This involves a consideration of a check list to the Guidelines set out in schedule 2 which in the present case includes reference to natural hazards and specific reference to SPP 1/03.
16. If none of the above exempt development triggers apply and development is assessable development under a planning scheme, then Queensland Rail will provide assessment reports and mitigation in accordance with the assessment manager requirements, including requests for further information.
17. If development of new rail infrastructure is declared to be exempt development under the above statutory mechanism, Queensland Rail undertakes its own environmental assessment process. This process is intended to identify and assess both environmental and planning risks, including natural hazards, and propose ways to ensure they are adequately managed.
18. These processes are described in further detail below. Rail transport (or in this context "network") infrastructure development can also be declared as a CID and therefore, an exempt development for the purpose of a Planning Scheme. Chapter 5 of SPA provides a clear description of the process required for a CID - for which "*railway lines, stations and associated facilities*" and

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*“miscellaneous transport infrastructure under the Transport Infrastructure Act...”* are identified as community infrastructure.

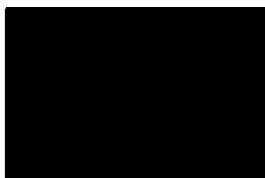
19. Further detail around Queensland Rail’s assessment processes is provided in Section 2(c) of this Statement.
20. It should be noted that in some instances the DTMR, in its capacity as leader in the role for transport planning, may undertake the first stages of environmental assessment prior to handing over to Queensland Rail for design and construction.

**Question 2(b): The types and sources of information relied upon to assess whether the development is taking place on flood-prone land:**

21. Schedule 2 to the Guideline identifies key sources of advice or information in relation to flood prone land. Enquiries with the relevant local councils including review of any available local mapping or assessment report, is also utilized, as appropriate, as a reliable basis for determining whether development will occur on land subject to inundation in a flood of less magnitude than a 1% Average Recurrence Interval flood (“ARI”).
22. Queensland Rail’s internal assessment process also considers local planning schemes, including flood mapping, and all available historical corporate knowledge. If the development in question is adjacent to an existing railway, Queensland Rail’s available flood history data will also be used.
23. As a standard design requirement, Queensland Rail utilises best practice drainage manuals (e.g. Main Roads Drainage Design Manual, Australian Rainfall and Runoff 2007 (“AR&R”), Queensland Urban Drainage Manual (“QUDM”)) as acceptable hydrological modelling methodologies and as sources of performance criteria.
24. In relation to question 2(c), I am further informed by Ms Moss, and verily believe the following matters.

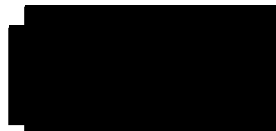
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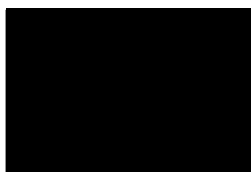


**Question 2(c): The means of assessing the likely effects of the new rail network infrastructure on any adjacent communities (particularly as to any increased risk of flooding) and the measures employed to address these effects):**

25. Queensland Rail assesses likely effects associated with new rail infrastructure utilising the environmental assessment requirements established via the CID process or its own internal assessment process.
26. Responsible Project Managers refer projects to resources within Queensland Rail's Environment and/or Property sections for environment and town planning advice and subsequent assessment. The requirement for assessment may be outsourced to suitably qualified and experienced consultants, particularly where detailed studies may be required.
27. The EPPM describes the framework and processes for assessment, managing and mitigation of environmental and planning impacts and requirements, including statutory approval requirements. EPPM provides for a series of phases, summarised as:
  - a. Preliminary assessment (initial scoping);
  - b. Detailed studies;
  - c. Design review (including compliance checks);
  - d. Construction Environmental Management Planning; and
  - e. Operational Environmental Management Planning.
28. A flow diagram depicting the process is shown at Figure 1 (page 0.5 of 5) of the EPPM. A full copy of the EPPM is at **Annexure 1** hereto.
29. The intent of EPPM is that risks, such as flooding, will be flagged for subsequent detailed assessment (including hydro geological studies if necessary) and detailed design by qualified engineers. Each phase of the environmental and planning assessment requires flooding impacts, along with many other matters, to be considered and as necessary triggers further assessment and mitigation through design, construction or operation.

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30. In relation to question 2(d), I am informed by [REDACTED] Principal Engineer – Civil & Structures Queensland Rail and verily believe the following matters.

**Question 2(d): The means of achieving or maximising the flood immunity of the new rail network infrastructure (including relevant engineering or design standards and features) and any constraints upon the use of these means.**

### **Constraints**

31. Major expenditure associated with the development of new rail network infrastructure (“RNI”) with a view to improving flood immunity of the network is limited by the amount of funding available to Queensland Rail either through its own recurrent capital works program or by additional monies made available by the Queensland Government for infrastructure upgrades.
32. It is conceivable that the entire Queensland Rail network could be made flood free but the cost of achieving that outcome is beyond any reasonable expectation of expenditure by the Queensland Government.
33. Queensland Rail works with the Queensland Government in balancing its priorities for new works against available funding to achieve the best possible outcome for Queensland Rail’s stakeholders.
34. Queensland Rail routinely undertakes a cost/benefit analysis in determining how it approaches the prioritization of new infrastructure projects taking into account such things such as customer/staff safety and the economic benefits likely to flow from the proposed infrastructure.

### **Principles**

35. In relation to a new RNI designed to be either “flood free” or “flood proof”:
- a. When constructing new RNI, Queensland Rail adopts the principle that wherever possible, RNI should be above the Q100 flood level height.

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Queensland Rail classifies RNI built above Q100/1% ARI as “flood free”.

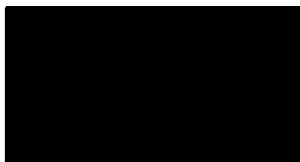
- b. Where it is not cost effective to achieve flood free status for the construction of new RNI, Queensland Rail, to the greatest extent possible, designs the new RNI to make it “flood proof”. From Queensland Rail’s perspective, “flood proof” means that although the RNI may be over-topped during major flood events, that infrastructure is quickly and easily re-commissioned as it was designed to withstand the water flows associated with a range of flood events.
- c. When designing new RNI to be either flood free or flood proof, Queensland Rail and its external consultants refer to the industry standard document for engineers namely the “Australian Rainfall and Runoff – A Guide to Flood Estimation” produced by the Institute of Engineers Australia (“AR&R”). The AR&R provides Australian engineers/designers with the best available information on design flood estimation.

36. Queensland Rail adopts design principles such that bridges, culverts, pipes and other water crossings are designed so that they:

- a. allow appropriate water flows to minimize afflux upstream and scouring downstream; and
- b. are resistant to damage notwithstanding high water velocities during times of extreme flooding.
  - i. An example of the types of design principles adopted by Queensland Rail and its consultants in improving the flood immunity of the rail network is the Australian Standard for Bridge Design (AS5100.1 – 2004) (“AS-5100”). Attached at **Annexure 2** hereto is an extract of that standard relating to waterways and flood design.
  - ii. The AS-5100 states that a range of factors shall be taken into account by bridge designers. Queensland Rail, in its design

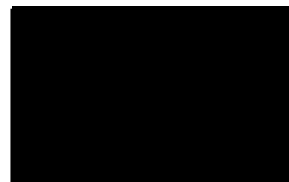
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briefs adopts AS-5100 and takes into account those factors including:

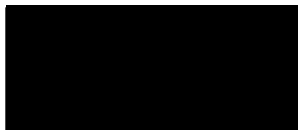
- A. The serviceability requirements of bridges, including frequency and duration of submersion by floods and the level of community dependency on the link;
  - B. The serviceability requirements of the surrounding land. Land usage requirements will determine the permissible levels of afflux during floods;
  - C. The serviceability requirements of the bridge, which shall remain structurally sound under the design serviceability flood effects. The effects of debris are also considered; and
  - D. The strength and stability of the bridge structure, which shall not collapse under any flood up to and including the "*design ultimate limit state flood effects, including debris and scour*".
37. In relation to flood resistant track design, where new RNI is installed, track design incorporates various features seeking to make the track resistant to water damage (e.g. the utilisation of gabions (rock filled baskets) and flood rock (large boulders)) which are designed to keep the track and ballast in place when the track is subject to scouring caused by flooding.

#### Processes

38. In relation to project prioritisation:
- a. Queensland Rail has an ongoing program for the planning and prioritization of new projects. Queensland Rail works with the Queensland Government and DTMR in determining which projects are of the highest priority having regard to budgetary constraints.
39. In relation to processes for major projects:

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- a. On major projects, Queensland Rail usually engages external consultants (including engineers) to assist in designing the project to meet Queensland Rail's required standards.
  - i. The consultant's brief on new projects specifies a range of design criteria including:
    - A. the required level of flood immunity;
    - B. the requirement to adopt Queensland Rail's specified design requirements to enhance flood immunity.

Attached at **Annexure 3** is Queensland Rail's standard specifications for the flood protection of embankments;
    - C. consultants are required to design all new infrastructure taking into account the AR&R;
    - D. any bridges are required to be designed in accordance with AS-5100; and
    - E. all major works are required to include an environmental impact statement which also takes into account flooding issues.

40. In relation to processes for minor projects:

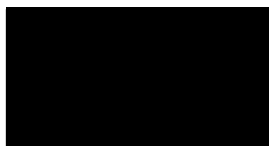
- a. Queensland Rail usually undertakes the design of minor projects internally; and
- b. Queensland Rail adopts the same design requirements and specifications as those imposed on external consultants in relation to substantive minor projects and in particular undertakes internal flood modeling adopting the AR&R in determining the flood immunity of the proposed upgraded railway infrastructure.

**Question 3: The principles and processes attaching to the betterment of existing rail network infrastructure:**

41. In relation to questions 3, I am advised by Ms Moss and verily believe that:

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- a. The principles and processes attaching to the betterment of existing rail network infrastructure are the same as the principles and processes identified in answer to question 2 above.
  - b. Schedule 4 of SPR specifically declares all aspects of development for the maintenance, repair, upgrading, augmentation or duplication of rail transport infrastructure as not assessable development of a particular type under local government planning schemes and/or IDAS.
42. In relation to question 3(a) and 3(b), I am further advised by Ms Caroline Moss and verily believe as follows.

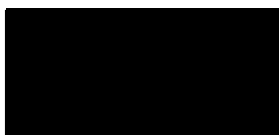
**Question 3(a): The applicable legislative framework, state planning instruments (including State Planning Policy 1/03) and development approval requirements:**

43. In relation to question 3(a), the applicable legislative framework to betterment, including upgrades and maintenance to existing infrastructure is broadly the same as detailed in question 2(a) above.

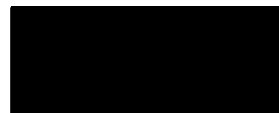
**Question 3(b): The means of assessing the likely effects of the upgrade, including during construction, on any adjacent communities (particularly as to any increased risk of flooding) and the measures employed to address these effects:**

44. The means of assessing likely impacts associated with the betterment of the rail infrastructure are consistent with that detailed in response 2(b) above.
45. Being more aligned to maintenance and upgrades, betterment of rail transport (or in this context, “network”) infrastructure however is considered to be a more standard on-going requirement for a rail manager.
46. As noted above at paragraph 10, OPW carried out by Queensland Rail as Railway Manager is exempt development and is not subject to assessment under IDAS or local planning schemes. However, the EPPM process is broadly followed by Queensland Rail in the case of any substantive OPW/upgrade works, including preliminary assessment, detailed studies (if required), construction management planning, assessment and management.

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47. Potential environmental issues associated with betterment are more so addressed through organizational risk assessments, procedures, tools and training. Regardless, key to such risk assessments is to demonstrate compliance with legislative and policy obligations. This reflects the differences in legislative/approval triggers for betterment of existing infrastructure compared to new development as outlined in question 2 above.
48. Assessment and management is also provided for by a variety of guidelines and codes rather than formal approvals, an example being the Queensland Department of Environment & Resource Management's ("DERM") 'Guideline - Activities in a watercourse, lake or spring carried out by an entity' as provided for under the *Water Act 2000*.
49. Similarly to that which is described in the response to question 2(c) above, requirements stemming from assessment or standard procedures feed into detailed design by qualified engineers.
50. In relation to question 3(c), I am advised by [REDACTED] and verily believe the following:

**Question 3(c): The means of achieving or maximising the flood immunity of the rail network infrastructure to be upgraded (including relevant engineering or design standards and features) and any constraints upon the use of these means.**

#### **Constraints**

51. Expenditure on the upgrading existing rail network infrastructure is limited in the same way as expenditure for new RNI (see paragraphs 31 to 34 above).

#### **Principles**

52. The principles attaching to the betterment of existing rail network infrastructure with respect to the means of achieving or maximizing the flood immunity of rail network infrastructure are the same as those specified at paragraphs 35 to 37 above.

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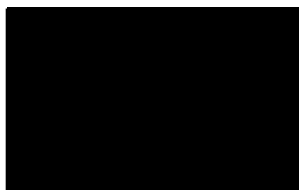
53. That is, all substantive “betterment” works adopt the same design principles and processes during the course of any upgrade works to existing RNI as is adopted for new RNI.

### Processes

54. Once again, the processes to be applied in the upgrading of existing RNI include all of those mentioned at paragraphs 38 to 40 above, but also utilise the following further processes:
- a. Structure and track monitoring programs
    - i. Queensland Rail’s safety programs includes a structure monitoring program which is recorded in the document titled “Civil Engineering Structures Standard Module 1 – Structure Monitoring – SAF/STD/0080/CIV” (“Structure Monitoring Module”). A copy of this document is provided at **Annexure 4** hereto.
    - ii. This document is a key safety document within Queensland Rail’s operations as it sets out the expected standards for:
      - A. monitoring;
      - B. assessing condition; and
      - C. actioning repairs;for Queensland Rail’s civil infrastructure over and adjacent to its tracks.
    - iii. The Structure Monitoring Module sets out in detail things such as:
      - A. the monitoring processes (see section 1.2);
      - B. a register of hazard locations (see section 1.3.5);

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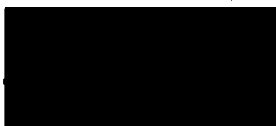


- C. the requirement to report infrastructure irregularities including those associated with damage caused by flood (see section 1.3.7);
- D. the requirement for more frequent inspections during times where this is a greater potential for washouts or inundations (section 1.4.3);
- E. the requirement to undertake under-bridge inspections for factors that may increase the likelihood of flooding such as inspections for silting, scouring or erosion from the existence of live or dead trees which may constitute a danger during flooding, debris endangering structures etc (section 1.6.3D); and
- F. the requirement to inspect culverts, pipes, drains and flood openings (section 1.9).

55. Assessment of surrounding development:

- a. Some of Queensland Rail's rail infrastructure was designed and constructed in the 19<sup>th</sup> century. This older infrastructure is subject to changing external conditions and development that have the potential to reduce the flood immunity of RNI.
- b. Wherever possible, Queensland Rail seeks to be consulted on any proposed new development works that are taking place adjacent to Queensland Rail RNI. Queensland Rail endeavors to liaise with the approving authorities and the developer of adjoining developments to try to achieve an acceptable outcome in preserving the flood immunity of the existing RNI.
- c. Sometimes new development can occur many kilometers upstream without Queensland Rail's knowledge. Queensland Rail seeks to determine increased impacts from non-adjacent developments through its State-wide track inspection program. Queensland Rail's Structure Monitoring Module requires the Rail Infrastructure Manager to,

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(amongst other things) identify and report areas of RNI which have been subjected to changed conditions during time of flood and heavy rainfall and are at risk during floods or heavy rain events.

- d. As a result of that ongoing track inspection program, any areas of track that are subject to increased risks during heavy rainfall events are programmed for upgrades where appropriate.

56. In relation to question 4, I am advised by Mr Phillips and verily believe as follows.

**Question 4: In relation to any design features employed to protect rail network infrastructure from the effects of flooding, the processes by which the adequacy of these features is assessed and their effectiveness maintained.**

**Maintaining effectiveness**

57. Once again, I refer to the State-wide track inspection programs undertaken by Queensland Rail. Of particular relevance is the Structure Monitoring Module discussed above at paragraph 54(a). Some of the means to maintaining the effectiveness of rail network infrastructure are as follows:

- a. Inspections prior to the flood season:
  - i. Queensland Rail undertakes a recurrent program of inspecting its infrastructure which is at risk during flooding and major rain events prior to each wet season. Queensland Rail undertakes various activities including:
    - A. debris removal; and
    - B. assessment of sediment build up,

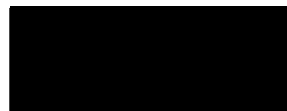
to determine where there is an increased risk of restrictions to water flows which may impact on the flood immunity of Queensland Rail RNI.

- b. Post flood works:
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After a high rainfall or flood event has occurred, Queensland Rail will be informed by its regional managers and inspection crews as to the location of risk areas to RNI and any recommendations as to upgrading of various Queensland Rail flood management infrastructure.

#### **Assessing effectiveness**

58. As mentioned earlier, Queensland Rail staff across the State are required to undertake regular and detailed monitoring of RNI during heavy rainfall and flood events with a view to assessing the adequacy of that infrastructure in maintaining flood immunity. Where certain infrastructure is reported as not adequately coping with rain and flooding events, recommendations are made to Queensland Rail management for appropriate infrastructure upgrades which are then prioritized into the Network Maintenance Plan or the Capital Plan if considered appropriate.
59. In relation to questions 5 and 6 below, I have been informed of the information provided in relation to the South East Queensland Network by [REDACTED] [REDACTED] Acting General Manager Network South East Queensland, Queensland Rail, and I verily believe those matters.

**Question 5(a): Any works undertaken subsequent to the rail network being submerged in the 2010/2011 floods (with specific reference to Rockhampton and Emerald), including whether those works incorporated any measures to improve the flood immunity of the network at the relevant locations and if there were such measures, the nature of those measures and the expected improvements in the level of flood immunity:**

60. What was significant about the 2010/2011 flood event was the scale of the inundation in Queensland. The flood event as it eventuated in Brisbane, and in particular, in the Lockyer Valley (including Toowoomba and Grantham) were events the like of which Queensland Rail had rarely seen before. However, in Regional Queensland the particular instances of Regional flooding were not exceptional or unknown to Queensland Rail. Rather, it was the fact that the

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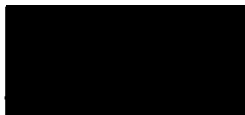
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entirety of Regional Queensland was flooded at the same time that was exceptional rather than the level of flooding in any particular area.

61. Queensland Rail expects and prepares for flooding of parts of its Regional infrastructure on a semi-regular basis. This meant that it was a matter of business-as-usual for Queensland Rail to attend to Regional rectification works after the floods and to restore the Rail Network to operational status. The reparation works required in this instance were much more widespread than in a usual wet-season, with flooding experienced across the whole Network, but the repairs themselves were completed in a business-as-usual fashion.
  62. The main issue for Queensland Rail in and around Brisbane was the protection of assets such as electrical equipment and signal boxes rather than inundation of railway lines.
  63. A detailed description of the works that were undertaken in Regional and South East Queensland subsequent to the Rail Network being submerged in the 2010/2011 floods is attached at **Annexure 6** hereto.
  64. The works undertaken by Queensland Rail subsequent to the floods incorporated measures to improve flood immunity as follows:
    - a. Measures to enhance “flood proofing” of RNI were taken where possible to enhance the ability of the network to emerge from any future inundation unscathed or with minimal damage. This was done in accordance with Queensland Rail policies as discussed at answers to questions 2 and 3 above;
    - b. The Network was restored to the same “flood-free” status as before the floods but, as discussed above in relation to question 2(d), making the entire Network “flood free” is not presently viable for budgetary reasons; and
    - c. As noted specifically in **Annexure 5**, some assets have been relocated to higher ground to protect them from future flood events, particularly in the Brisbane metropolitan area.
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*Works undertaken to improve flood immunity at Rockhampton*

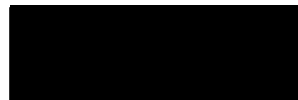
65. In relation to the Rockhampton (Rocklands) to Mackay Corridor, specifically at Yamba to Glen Geddes, Queensland Rail did not identify that any measures were required to improve flood immunity. Rather, Queensland Rail undertook works to restore the railway line to operational function as quickly as safely possible (see item 10 at **Annexure 6** hereto). The dominant concern of Queensland Rail in the aftermath of a flood event is always to recommence the supply of emergency supplies and other life essentials as soon as it is safe to do so.

*Works undertaken to improve flood immunity at Emerald*

66. In relation to Emerald, Queensland Rail recognised that due to altered land use over a period of time, including an increase in agricultural farming and the use of drains in this area as irrigation channels, the water discharge in this area had been altered. As a result, Queensland Rail has:
- a. installed ten (10) additional pipes to carry excess water. The reason for the installation of the pipes is to increase the natural water flow during floods under the rail line to prevent a back flow of water over the rail line (causing scouring); and
  - b. is consulting with the Central Highlands Regional Council in relation to flood modelling, drainage design and evacuation plans.
67. Queensland Rail recognised that there was a need for upgraded drainage in the area and acted accordingly. In addition, Queensland Rail is consulting with the Central Highlands Regional Council in completing its hydrological study into the local area and will act in accordance with the results of this study when made available.

**Question 5(b): If there were no such measures, the reason/s why not.**

68. At Queensland Rail we try to manage the network to be flood free, but this is impractical in all cases. Therefore, we manage the rail network so that it can
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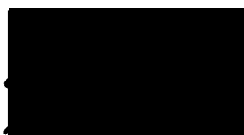
be inundated with water during a flood event, but when the waters recede, the rail Network line can be made operational in a short period of time. This is the difference between having a “flood free” and a “flood proof” network. A “flood free” network would mean that the railway line is totally immune from flooding. An example of a “flood free” network is the Brisbane Airport line which is raised on concrete pillars far above the floodplains. For the reasons expressed above, it is not viable for Queensland Rail in a budgetary sense to convert the whole of its network to “flood Free” status. It is viable however, for Queensland Rail to seek to “flood proof” its network. A rail line that is “flood proof” can be restored to operational capacity quickly after a flood event with only minor works undertaken (for example, it may be necessary to remove flood debris from the railway line, repair scouring and resurface tracks). Queensland Rail has an ongoing practise of “flood proofing” its network as best as possible as inspections and maintenance take place in the usual course.

69. In my opinion, it would not be practical in Queensland to have a “flood free” network as the North Coast Line runs up the Coast along floodplains between the Great Dividing Range and the sea. To raise this line in order to “flood free” it would be cost prohibitive.
70. Other than the flood immunity measures outlined in paragraph 66 above, Queensland Rail did not identify a need to make specific improvements to its rail infrastructure in Regional Queensland as a result of the 2010/2011 floods. This situation is however being continually reassessed.
71. Queensland Rail did not identify a need to make improvements to its track infrastructure in the Brisbane/Metropolitan Region as a result of the 2010/2011 flood event. We did as discussed above, identify that there were certain assets that could be better protected from future flood events. Further consideration for asset plans is continuing.

**Question 6(a): Any works undertaken where the rail network was damaged or destroyed in the 2010/2011 floods (with specific reference to the North Coast**

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Signed:



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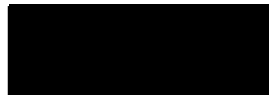


**Line at Yamba – Glen Geddes and the Toowoomba Range Line at Spring Bluff), including whether those works incorporated any measures to improve the flood immunity of the network at the relevant locations and if there were such measures, the nature of those measures and the expected improvement in the level of flood immunity:**

72. As discussed above, Annexure 6 contains a detailed review of the works undertaken by Queensland Rail to repair damage to the network subsequent to the floods. With the exception of the Toowoomba Range line, Queensland Rail's network was not destroyed and it was a matter of business-as-usual for Queensland Rail to repair damage and restore lines to operation status. To a large extent, the speed with which Queensland Rail was able to restore its lines to operational status was a testament to:
- a. the expertise and capacity of its local experts; and
  - b. its practise of "flood proofing" rail lines where possible.
73. As discussed above, the restoration of the North Coast Line at Yamba – Glen Geddes was a matter of business as usual for Queensland Rail. The line here was not destroyed but damaged and repaired by Queensland Rail.

*Works undertaken to improve flood immunity on the Toowoomba Range line*

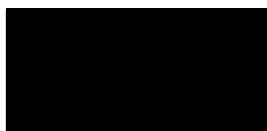
74. Unlike the flooding in the rest of the State, the flooding in the Lockyer Valley was exceptional, and Queensland Rail did not operate on a business-as-usual basis. The Toowoomba Range line was significantly destroyed by the floods.
75. The focus for Queensland Rail was to safely but urgently restore the Rosewood to Toowoomba line to active service because many of its mine customers utilise this line to transport coal to port for shipping. The line was restored to operational status within 12 weeks which was an exceptional result. Some observers had suggested that it could take many months to repair. Attached at **Annexure 6** is a copy of a presentation I gave in relation to the significant scope of work completed by Queensland Rail on the Toowoomba Range Line and the results achieved.



76. The extensive reparation works undertaken to the railway line in the Lockyer Valley did not fundamentally improve the flood immunity of the line. Rather, the works undertaken restored the line to its existing status prior to the floods. Flood flows however would be enhanced through all drainage structures due the waterways being cleaned. The reason flood immunity measures were not enhanced whilst the line was restored was the need for a detailed study to be undertaken and consultation with the greater Lockyer Valley community in relation to flood mapping and land use.
77. Queensland Rail is now participating in a whole of community study in the Lockyer Valley (the Lockyer Creek Flood Risk Management Study that is being carried out by SKM) as to the effects of the flooding of the Lockyer Creek on the Lockyer Valley. An outcome of this Study will be to understand the impact of rail and other infrastructure on flooding and to identify whether future amendments need to be made to any regional infrastructure in order to mitigate future flood events. It is important that this is done as a whole of community study because one of the issues for Queensland Rail is that a railway line is a static piece of infrastructure and that amendments and changes to the use of land surrounding a rail line over the years after the rail line's construction will often have a significant impact upon flooding in the local area. For example, agricultural land use, irrigation of agricultural crops, housing, residential and commercial developments, land clearing and other land uses all have an impact upon the flow of water across land. Changes to railway drainage structures are best done in consideration of the full network of waterways on a floodplain.

**Question 6(b): If there were no such measures, the reason/s why not.**

78. As above, the only part of Queensland Rail infrastructure that was destroyed as a result of the floods was the Toowoomba Range line and the damage that occurred here was largely a result of scour caused by extreme water flows. The difficult terrain on the range makes it virtually impossible to design for such extreme weather events. Some waterways were enhanced during the



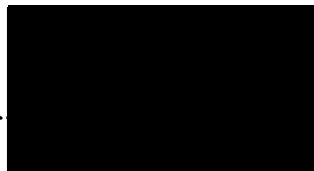
79. extensive rebuild, all were cleaned out and in many cases protection was improved. Once the Lockyer Creek Flood Risk Management Study is completed Queensland Rail will reassess any steps which may be taken to improve the level of flood immunity.
80. All the facts and circumstances herein deposed to are within my own knowledge save such as are deposed to and from information only and my means of knowledge and sources of information appear on the face of this my statement.

Affirmed by Graham Mark Brown on 18 October 2011

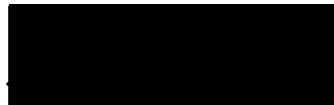
At Melbourne

in the presence of:

Signed: .



Deponent



Solicitor

**THOMAS WILLIAM COGHLAN**  
525 Collins Street, Melbourne  
An Australian Legal Practitioner within the  
meaning of the Legal Profession Act 2004