

Notice of Advice

Attention	Graham Phelan and Stephen Wisenthal	NOA No.	NOA03
Company	Queensland Competition Authority	Date	RevA: 18-September-2017 RevB: 26-September-2017
CC		Project No.	60533190
Project Name	Engineering Assessment of Aurizon network's 2015-16 Capital Claim	Client Ref	QCA-Documents.FID54360
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Service	AECOM Assessment		

On 31 July 2017 AECOM submitted a final version of our *Engineering Assessment of Aurizon Network's 2015-16 Capital Expenditure Claim* ('the report'), and the QCA invited submissions on the report from interested parties. Two submissions were received in relation to the Report, only one of which (from Aurizon Network) requires a response.

Three topics were raised by Aurizon Network in their response:

1. The use of sub-standard material for repairing damage to the capping layer at Moura East (Aurizon Network's project **A.03742**, reviewed in our report in Section 4.1.6).
 Aurizon Network provided a written commentary on this issue in their submission, and requested that our assessment be revised after consideration of their commentary. No additional information was provided.
2. Future rework associated with autotransformer replacement (Aurizon Network's project **IV.00028**, reviewed in our report in Section 5.2.11).
 Aurizon Network accepted that there is a requirement to consider oil containment and explosion or fire treatment as part of major site upgrade works, and provided a written commentary on their proposed approach to resolving the issue, and requested that our assessment be revised after consideration of their commentary. New documents were provided separately in support of the submission.
3. Our assessment of the quality of documentation provided by Aurizon Network in relation to Project Pluto (Aurizon Network's project **A.03980**, reviewed in our report in Section 6.1.1).
 Aurizon Network provided a brief written commentary, but also submitted a set of supporting documents that had not been previously provided.

This Notice of Advice has been prepared at the request of the QCA in response to Aurizon Network's submission dated 4 September 2017 and feedback received 25 September 2017.

A.03742 Moura East (AECOM Report Section 4.1.6)

Issues raised

AECOM's review of the documents provided for the evaluation of the project standard identified that the capping layer material used for the flood repairs did not comply with the specification for the Moura East project or Aurizon standards. Aurizon Network's document *Non-conforming capping layer material on SP2 on Moura Line* (dated 23 January 2015) notes that the capping layer material used for the flood repairs did not comply with the specification for the project or Aurizon's standards current at the time. An independent report written by engineering geologists Jamstone, appended to the aforementioned report, notes an estimate of a "70% to 50% reduction in service life" compared to fully compliant materials.

Based on this documentation, we recommended that a deduction of between 50% and 70% be made to the \$2.7 million flood works claim to reflect the expected reduction in service life due to the use of non-standard materials. As the FY15/16 Claim was capped at \$1.1 million, less than 50% of the \$2.7 million claim, our suggestion was that the \$1.1 million was declined in its entirety.

Aurizon Network disagrees with the findings in the Jamstone report, and comments that "*based on experience, it is difficult to ascertain a likely reduction in life, if any, particularly so early in the life of the particular asset.*" Aurizon Network asserts that the impact of the capping layer installation is currently unknown and therefore the reduction in service life of the asset is also unknown.

Aurizon Network notes that a number of options were considered to manage the installed sub-standard capping material and, after weighing up all factors, implemented an annual program to monitor:

- any pumping of the capping layer into the ballast layer on an annual basis and during regular track inspections from hi-rail vehicles;
- track condition information such as track geometry information, resurfacing occurrence reports, speed restriction information and ground-penetrating radar test results.

Aurizon Network proposes that ballast and sleepers will be able to be reused. A fix-on-fail strategy will be adopted via spots repairs, rather than a complete replacement.

AECOM's Response

After considering Aurizon Network's comments, the following points are noted:

- No evidence has been provided to AECOM of an Aurizon Network response to the Jamstone Report. This assessment is therefore based on the Jamstone report.
- Aurizon Network has agreed that the capping layer is sub-standard, has rejected ballast-filled trenches as unsuitable and ineffective, and concluded in its *Variation to a Standard Practice report* (VSP-CIV-2015-007, 23 January 2015) that the existing track should be accepted as is and that it should "*plan for long-term formation renewal when early failures commences*".
- Aurizon Network's document *Non-conforming capping layer material on SP2 on Moura Line* notes that 45% of Moura East (Table 7 *Segment 3 – Variation Civ Eng report*) has non-conforming degradation factor test results. As a result, it is expected that 45% of Moura East will require early intervention (approximately 0.9km).

A fix-on-fail-approach for poor formation areas has been adopted by Aurizon Network in other locations. The NR Formation Renewal project (IV.00048) refers to progressive repair of poor formation areas in the Blackwater System and was reviewed as part of the FY15/16 claim. In FY15/16 that project was delivered for [REDACTED], compared with a budget of [REDACTED], and achieved value for money.

If the delivered rate is applied to the areas of Moura East with non-conforming degradation factor test results, the cost of formation renewal would be [REDACTED]. We believe that our suggestion to reject \$1.1 million is a conservative figure.

¹ This rate was derived in AECOM's Assessment from the length of work completed in the 2015/2016 year compared with the value claimed.

No other information is available on the extent of sub-standard material and no evidence has been provided to confirm that the material used prior to the floods complied with the specification for the project or Aurizon's standards.

- Aurizon Network has indicated that it intends to reuse Pandrol Sleepers. As all sleepers on Moura East are Pandrol sleepers, we accept Aurizon Network's intention to reuse sleepers in the future, but we note that an intention is not binding.

We note and accept that Aurizon Network intends to reuse ballast, although we did not see evidence of ballast screening equipment in our review of in the NR Formation Renewal project. In AECOM's opinion, it is highly likely that significant ballast contamination will occur before the formation is replaced because the prioritised worksites have poor, very poor or unsafe formation (*Capital Funding – IV48 Formation*). This will result in some wastage of the ballast in Moura East.

We conclude that no change needs to be made to the report and its findings.

IV.00028 Autotransformer Replacement Program (AECOM report Section 5.2.11)

Issues raised

AECOM's assessment of the IV.00028 Autotransformer Renewal Program addresses the requirements for bunding and fire containment of the replacement autotransformers, and recommends that replacement autotransformers be installed in accordance with AS2067 with regard to:

- the containment of the increased amount of oil.

Aurizon Network has agreed with the assessment for the oil containment requirements in accordance with AS2067 and has identified a program to retrofit this onto the sites which have undergone autotransformer replacements. Aurizon Network's response states that there was no civil component in the original project works and that there will be no extra mobilisation, civil, or demobilisation costs associated in any retrospective oil containment installation works. Because of this Aurizon Network believes that it will not incur any rework cost and that AECOM should reconsider the proposed deduction of \$100,000 (which was intended to cover rework that would not otherwise have been needed).

- the provision of fire and explosion protection.

Aurizon Network notes in its submission that a review of the risk of explosion at remote trackside autotransformer sites has been carried out, and believes that the results of the risk assessment adequately address the requirements of the Standard. Aurizon Network's *Explosion Risk at Autotransformer Sites Risk Assessment Report Revision A*, issued on 21 August 2017 provides details of its assessment process to determine the explosion risk at the sites. The report makes reference to another Aurizon Network report titled *Analysis of Fire, Explosion & Oil Spillage for Existing Feeder Stations* and to AS2067:2016.

AECOM's Response

After considering the two Aurizon Network reports, we note that:

- Reference is made to AS2067:2016, which was issued after the completion of the FY16 Autotransformer Renewal Program. The version referenced in the report should have been 2067:2008, which reflects the standards at the time the project was undertaken.
- The Aurizon Network *Analysis of Fire, Explosion and Oil Spillage for Existing Feeder Stations* report was written for a feeder station site, not an autotransformer site, and should not have been used as justification:
 - The existing arrangement is described to be having "autotransformers 3.4 metres apart and the bunded areas are 1.37 metres apart." Our investigations have demonstrated that there are no bunds present on the autotransformer sites and no oil collection tanks, both of which are essential in managing fire and explosion risk (in particular risks associated with lightning strikes, where oil on the ground could extend the fire zone).

- The autotransformer sites do not include the MiCOM protection relays and circuit breakers used in feeder stations, as noted in Section 1.7 of the *Feeder Station* report. Autotransformer stations can be up to 50km from the feeder station, introducing fault clearing times which the Standard requires to be considered for this type of fault. We have not sighted evidence that Aurizon has complied with this requirement.
- The risk assessment (for feeder stations) was carried out in accordance with Section 6.7.2 of AS2067 to determine whether the fire risk zone extends to include other buildings, parts of the same building that house the high voltage installation, fire escape routes, or other fire sensitive locations and facilities. The risk assessment was performed on the assumption that the sites had lightning arresters to prevent impact from direct lightning strikes, autotransformers contained bunds and that oil collection tanks were in place. The oil containment and collection systems are not in place and there no evidence has been provided of any lightning arrestors, therefore making the risk evaluation for risks numbers 1, 2, 3 and 5 more severe than the 'Low' evaluation.

Clause 6.7.13 of AS2067 states that the fire protection requirements for transformers shall be determined in accordance with a risk management process, developed by the network operator or owner, which in this case is Aurizon Network. The risk assessment should have identified that the fire risk zone is extended as a result of the positioning of the equipment. It is AECOM's view that the risk management process was not carried out correctly because it did not reflect the existing site arrangements with regard to physical arrangement and oil containment.
- The proposed deduction was intended to cover technical services such as earth grid testing; earth grid re-design and related engineering design, which will be required and will be rework. This provision was considered to be conservative, since we thought it likely that Aurizon Network would absorb civil works costs. With the proposed deduction, these costs should be fully claimable in the future when the works have been completed.

We conclude that no change is required to our report and findings.

A.03980 Project Pluto (AECOM report Section 6.1.1)

Issues raised

Aurizon Network has requested that AECOM consider revising their comments relating to documentation quality for this project.

Only Phase 2 of A.03980 Project Pluto was delivered in FY15/16 (Phases 1 and 3 will be delivered in the future). The objective of Phase 2 was to improve the efficiency of decision making in day-of-operations train control management in the Aurizon Network Train Control Centre.

AECOM's review of the documents identified that the total cost of the three phases of the project was expected to increase from [REDACTED]. Although the project cost appeared to have increased significantly from the original budget, the \$14.4 million claim was less than the original budget outlined in the FIAR. In the absence of any detail of this cost, and bearing in mind that this is a project in progress, we recommended that the QCA accept this first claim, but apply scrutiny when evaluating future claims for Project Pluto in light of the significant cost overrun. Since evidence was not provided to explain the change in project scope or to demonstrate approval of any variations involved, we assessed the documentation quality to inform the assessment of scope and cost as low.

Aurizon Network provided 21 change request documents and a change-control flowchart in its submission consideration by AECOM.

AECOM's Response

After considering the documents, we note that:

- No link is shown from the change requests to approved budget increases and scope changes.
- The cost impacts (outlined in Section 6 – Impact Summary) for the provided change requests account for less than [REDACTED] of the expected budget increase.

While the documents provide some evidence of a formal change management process with changes in scope clearly articulated, we consider them insufficient to change our existing assessment of documentation quality for Project Pluto.

We conclude that no change is required to our report and findings.