

AMPANG (AMG) LINE EXTENSION PROJECT



**The Engineering, Procurement, Construction, Testing and Commissioning
of System Works**

Technical Evaluation Report

**Rev. 01
September 2011**

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PRASARANA

AMPANG (AMG) LINE EXTENSION PROJECT

**The Engineering, Procurement, Construction,
Testing and Commissioning of System Works**

Tender No: PRASARANA/CPD/E/AMG-EPC/129/212/2010

Technical Evaluation Report

September 2011

HSS Integrated Sdn Bhd

Halcrow Consultants Sdn Bhd

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Halcrow Consultants Sdn Bhd

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PRASARANA AMPANG (AMG) LINE EXTENSION PROJECT

**The Engineering, Procurement, Construction,
Testing and Commissioning of System Works**

Technical Evaluation Report

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PRASARANA

AMPANG (AMG) LINE EXTENSION PROJECT

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Testing and Commissioning of System Works**

Technical Evaluation Report

Contents Amendment Record

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1 Executive Summary

The Technical Evaluation of the AMG System Works Technical Proposals took place between 2 June 2011 and 29 July 2011 at the offices of Prasarana, Menara UOA, Bangsar, the results of which are contained in this Technical Evaluation Report. The Technical evaluation was carried out in complete isolation to the Commercial and Financial Evaluations which took place in parallel. This Report assumes therefore that all Tender Prices were equal and that all Conditions of Contract were compliant. This Report makes no recommendation and is limited to assessing and reporting on the ranking of Tenderers in respect of their Technical Proposals and providing a commentary on the Tenderers' assessed technical competence to successfully deliver the AMG System Works.

Eight Technical Proposals were fully evaluated by a Technical Evaluation Panel comprising a team of technical specialists from the AMG DDC's Systems Sub-consultant, Halcrow, supported by members of the Employer's Representative, OPUS-AV and representatives of Prasarana.

The Technical Evaluation was a three-stage process, Stage 1 being an assessment of Technical Compliance, Stage 2 an initial evaluation of the 'Top Ten' Technical Specification items considered to be critical to the successful implementation of the AMG System Works Contract and Stage 3 being a detailed Technical Evaluation of 15 key Technical Elements comprising the Employer's Requirements. Stage 2 contributed 30% of the scores and Stage 3 contributed 70%. It was the suggestion of the Technical Evaluation Panel, following the completion of Stage 2, to filter out of the Technical Evaluation, those Tenderers who had achieved low scores and who, in the opinion of the Technical Evaluation Panel, were unlikely to demonstrate the required competence in being able to successfully deliver the Technical Elements of the AMG System Works Contract. However following an interim review on Friday 17 June 2011, the Technical Evaluation Panel was instructed by Prasarana that the Technical Proposals of all eight Tenderers should undergo a full Technical Evaluation.

The Stage 1 assessment of technical compliance uncovered some areas where there were considered to be potentially significant non-compliances. These areas included new Depot designs that were either too big or too small, declining to act as overall Project system integrators, refusal to take over responsibility for the alignment for the detail design stage, proposed CBTC systems of unproven origin and a non-compliant stray current collection system. These are all of such significance as to call into question the ability of those Tenderers to deliver to time and budget and they present significant risk of claim and variation based upon the evidence presented in the Technical Proposals.

The Stage 2 'Top Ten' scoring was based solely on the Technical Submission and resulted in a wide range of scores that went some way towards identifying the difference in quality between the eight Technical Proposals. It was at this stage that

the Technical Evaluation Panel recommended that the four lowest scoring Tenderers be filtered out of the Technical Evaluation. However the Panel was instructed by Prasarana that all eight Tenderers be subject to a full Technical Evaluation in Stage 3. The Stage 2 Evaluation contributed to the scoring with an overall weighting of 30%.

Stage 3 was based upon a more detailed Technical and broader Evaluation of the Tenders and produced a similar range of scores to stage 2. Some differences in the ranking were noted due to the different criteria adopted at each stage. The Stage 3 Evaluation contributed to the scoring with an overall weighting of 70%.

The combined Stage 2 and Stage 3 final percentage scores, together with the ranking of Tenderers are summarized in the table below:

TENDERER	COMBINED FINAL SCORES	
T4	80.10%	Balfour Beatty-Invensys
T6	72.73%	Emrail/Leighton/Ansaldo
T8	68.84%	Siemens
T7	65.85%	Samsung-LG-Thales
T3	55.17%	George Kent - Wijet-Thales
T5	51.84%	Colas-CMC-Thales
T1	50.88%	Posco-Sojitz-Daewoo
T2	43.61%	SNC-WW-Bombardier
MEAN	61.13%	

Figure 1: Summary of Combined Final Percentage Scores

Full details of the Technical Evaluation process, scoring mechanism and final results are contained in this Technical Evaluation Report and Appendices. The following Table indicates the principle strengths and weaknesses of the four top ranking Tenderers:

RANK	TENDERER	STRENGTHS	WEAKNESSES
1	T4	Fully Comprehensive submission with no significant non-compliances, totally understood the key issues, especially migration, added value additions both in the area of equipment, (in the provision of a complete replacement of the Public	Single unit train-borne CBTC equipment, brief Track section, sketchy details of the Power Conductor Rail section and the omission of the Technical Proposal for Lightning and Surge Protection.

		Address System) and personnel, being the only Tenderer to identify and appoint an Independent Safety Advisor for the Project. Thorough and convincing presentation.	
2	T6	Good general systems approach, Strong track design and installation methodology. Reasonably good Migration Strategy. Strong Communications proposal and comprehensive Quality Assurance document.	Single unit train-borne CBTC equipment, unproven in CBTC application (used in ERTMS application only) and non-compliant use of 'leaky feeder' in the CBTC system. Refusal to take on responsibility for final alignment. Weak coverage of interface and integration. Poor performance at their Presentation especially on project management and integration aspects. Some significant non-compliances and qualifications to their Proposal.
3	T8	Good CBTC proposal with novel, innovative approach to the signalling system (intermittent train control - ITC) which, however, could be also a weakness, as it relies on a piggy-backed solution on the Existing Line as an interim solution. Reasonably good migration strategy and understands the integration process. Good new Depot proposals, if a little over-specified.	Unwilling to act as overall Project Systems Integrator. Interim signaling system, unworkable stray current collection system, very heavily caveated proposal to the point where the Technical Evaluation Panel has doubts that an integrated system could be delivered as specified. An average Communications Proposal with insufficient provision of radio base stations and a very poor track work proposal. Very poor performance on this aspect at their Presentation.
4	T7	CBTC system produced by Thales and is for what it covers, very competent and with a well thought through migration strategy for the LRV control system. Good Quality Assurance System described if somewhat generic.	Poor understanding of Project, basically repeating back the RFP, non-compliant, oversized new Depot, poor relevant experience of automated rail systems apart from that of their CBTC subcontractor. Poor understanding of Project management and integration systems. Stray current collection system which could actually create stray current problems. English language communication could be

			a major barrier to delivery of the Project with this team.
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In conclusion, the Technical Evaluation Panel has determined Tenderer T4 to be the clear leader in respect of the Technical Evaluation. Furthermore, the Technical Evaluation Panel have sufficient reservations in respect of the second and third ranked Tenderers (T6 and T8) to create some doubt as to their ability to deliver the AMG System Works Contract to either time or budget, without the prior resolution of the issues highlighted in both of their Technical Proposals.

In making its assessment, the Technical Evaluation Panel placed great emphasis on the highest areas of risk to the successful delivery of the AMG System Works Contract. These were the safe implementation of a Communication-Based Train Control (CBTC) system on the entire AMG Line, the decommissioning of the legacy system and the testing, commissioning and migration of the communications systems from the existing OCC to the new OCC, both seamlessly and with minimal disruption to revenue services. In addition, attention was given to arrangements proposed by Tenderers for systems integration, both internal to the System Works Contract and externally, with Related Works Contractors (i.e. the LRV Contractor etc.) and finally the strength and degree of integration of the proposed overall management team. All of these risk areas will require further discussion and resolution with the shortlisted Tenderer(s) prior to award of contract.

As noted above, the Technical Evaluation uncovered a number of potential non-compliance or technical issues across all of the Tenderers' Technical Proposals during the course of the Technical Evaluation. These issues have technical implications and possible commercial implications. In the time available, and due to the number of Tenderers under evaluation, it has not been possible to close out all of these issues. The Technical Evaluation Panel strongly recommends that pre-contract negotiations take place with the shortlisted Tenderer(s), in order that any outstanding technical issues can be closed out prior to award of the AMG System Works Contract.

to the Vancouver Skytrain system and in general there was no demonstration of either a grasp of the systems integration issues particular to the AMG Project, or of any particular approach to resolving them.

6.3.3

Tenderer T3

Whilst there were elements of the proposed systems integration process that were well described, Tenderer T3's Technical Proposal does very little to define the whole system integration process and says little on how the identified integration issues with respect to the AMG Line would be managed or resolved.

Furthermore it appeared that the Tenderer's whole approach was to rectify any integration issues as a fault-finding exercise, rather than to actively plan the engineering in order to manage the integration issues by design. On questioning the Tenderer at their Presentation, it was apparent that not only was there a lack of understanding or aptitude for the systems integration process, but that their proposed integration consultant neither understood the requirements, integration or configuration issues, nor how to manage them. Tender T3 is also very heavily caveated in respect of their ability to act as the overall Systems Integrator for the Project, which is an important requirement of the System Works Contractor.

6.3.4

Tenderer T4

A general comment here is that the Technical Proposal by Tenderer T4 in respect of Systems Integration is comprehensive and fulfils all requirements. All aspects of the AMG Project have been addressed and this was reflected in their Presentation, which was also comprehensive. Tenderer T4 has demonstrated a clear understanding of the challenges of this complex Project and in his Technical Proposal, has proceeded to systematically identify and propose a resolution to each of them. Tenderer T4 has, without qualification, undertaken to act as overall Systems Integrator for the Project, supported by evidence of past experience of delivering similar roles globally, with sample matrices and outputs and clearly written text and diagrams. Tenderer T4, in addition, was unique in identifying the need for, and appointing, an Independent Safety Advisor.

6.3.5

Tenderer T5

Tenderer T5 is one of four Tenderers who have nominated the same signalling/train control sub-contractor (Thales). However, strangely Tenderer T5 has not included all of the material supplied by Thales to the other three Tenderers that are proposing to implement the Thales signalling system on the AMG Line. They have instead, opted to provide only excerpts from the Thales documentation, combined with what can only be described as a very high level document, which could actually be a straight download from the internet, so generic was its content. However the most serious aspect of this section was the qualification to the Technical Proposal which specifically limited their responsibility in terms of overall Systems Integration, solely to those component parts which Tenderer T5 was actually proposing to supply

6.4.2 *Tenderer T2*

This Tender provided something akin to a dictionary definition of what an assurance system is and how one is generically constructed, but with no reference as to how this would be applied in the case of the AMG Project. There was no commitment given to meet any of the required standards or KPI's for the Project. The performance of T2 at their Presentation was better, but in the time available it was not really possible to gain sufficiently detailed information to give the Technical Evaluation Panel the required level of confidence that Tenderer T2 could deliver the AMG Project to these targets and that they would have the required level of proficiency, despite having prior knowledge of their work of a similar nature elsewhere.

6.4.3 *Tenderer T3*

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The information provided in Tenderer T3's Technical Proposal is very generic and non-project specific. Although there is a statement in the short section covering the area of systems assurance, in order to meet the required KPI's for this project, there is insufficient detail to provide any confidence that there is any real understanding of the requirements, nor a demonstration of how they would attempt to deliver and manage each stage of this highly complex Project. This impression was reinforced by a very poor showing at their subsequent Presentation.

6.4.4 *Tenderer T4*

Tenderer T4's Technical Proposal is both compliant and comprehensive, to the point of being virtually an object lesson in how the systems assurance process should be undertaken; it identifies the particular challenges in the AMG Project and makes suggestions as to how they would propose to manage them. Tenderer T4 has met and exceeded expectations in the application of the required RAMS, Project and Technical Assurance regimes and processes, with sample documents etc. supplied. Tenderer T4 also included in their Technical Proposal and brought to the Presentation, their Independent Safety Verification Engineer from Parsons Brinkerhoff in HK, a senior professional of some standing in the industry and when they presented their outline approach, went some way beyond expectations in this particular area. This was significantly better than anything presented by any other Tenderer and demonstrates an understanding of the requirements of the AMG Project.

6.4.5 *Tenderer T5*

Tenderer T5 has only approached Systems Assurance in very general and generic terms and their Technical Proposal in respect of Systems Assurance was purely a very high level statement of what an assurance regime – any assurance regime – would consist of and makes no specific reference to the AMG Project or the particular requirements of the Project. When questioned at their Presentation, the general thrust of their response was that “we will do a good job” but no specific

difficult Technical Proposal to score highly. However, that said, Tenderer T8 is, by reputation, known to be competent and capable of delivering complex projects of the nature of the AMG Project. The performance of Tenderer T8 at their Presentation was equally competent but the overriding impression of the Technical Evaluation Panel was that the risk-averse and highly caveated approach of Tenderer T8 was so ingrained culturally that it would be difficult to take on face value, any undertaking to deliver the AMG Project in line with the Employer's Requirements and its attendant responsibilities.

6.5 *Technical Element No 4: System Migration Strategy*

In making this assessment the Technical Review Panel considered both the requirement to minimise the impact of the System Works on the existing revenue service and to preserve full safety and operational integrity.


6.5.1 *Tenderer T1*

The Migration Strategy proposed by Tenderer T1 is consistent with the rest of their Technical Proposal in that it is, at best, high level and sparse in its approach. This is something of a surprise as T1 not only has Thales in its team but also Seoul Telecom, although in their Presentation neither organisation appeared to know who was actually responsible for which parts of the systems work; this was exacerbated by the fact that only one of the substantial number of attendees brought to the Presentation, was competent in basic spoken English. The proposed T1 Migration Strategy includes the new OCC (a cut and paste from the Thales document) but there is little clarity as to how migration will be achieved and it was noted that the CBTC and Telecommunications aspects were inconsistent and far from clear.

6.5.2 *Tenderer T2*

The Migration Strategy submitted by Tenderer T2 was based upon extracts from a standard document provided by Bombardier, the proposed Tenderer T2 signalling sub-contractor. While it does cover the CBTC system to some degree, there was little or no mention of the other sub-systems. The performance of Tenderer T2 in their Presentation was somewhat better, but it was clear that the apparent disconnect between Tenderer T2 and their signaling sub-contractor would present a potential risk to delivery of the AMG Project. Based purely on their Technical Proposal however, this was considered to be a poor offering.

6.5.3 *Tenderer T3*


Tenderer T3 submitted no overall project migration plan in his Technical Proposal although there was a 'cut & paste' from the Thales documentation in the integration section. However it does not describe in any detail how this migration will be achieved. Although there is some mention of all the major systems in various sections of the Technical Proposal, it addresses only the scope and not the process or detail. The performance of Tenderer T3 in regard to this matter in their

Presentation, and indeed other areas of the Presentation was of a very poor standard.

6.5.4 *Tenderer T4*

Tenderer T4 has submitted not only detailed and comprehensive Migration Plans in their Technical Submission, detailing how it is proposed that system migration would be achieved (with significant detail of a proposed Risk and Opportunity workshop scheduling etc included), but has also submitted an excellent simulation on DVD showing in simple graphic terms, exactly how the migration process would take place. It also explains the "over and back" concept in detail. Tenderer T4 has confirmed full acceptance of all migration risks without qualification. Their Presentation, led by their signalling JV partner, Invensys, also covered the migration Strategy in some depth without qualification and exhibited a good deal of competence, supported by evidence of where this has been achieved elsewhere.

6.5.5 *Tenderer T5*

Tenderer T5's Technical Proposal contained no real migration plan, with the exception of abridged excerpts from the Thales documentation in respect of their Seltrac signaling system. This was also the case at their Presentation, where, not only was the migration content weak and slightly confused, but this was also compounded by their decision not to bring their proposed signalling sub-contractor to the Presentation.

6.5.6 *Tenderer T6*

A migration strategy at a very high level has been submitted, basically based on an "over and back" type approach, but it is very poorly explained except in terms of the high level logic and it majors mostly on what would be developed post-award, rather than stating what they actually intended to do. At their Presentation Tenderer T6 did somewhat better in this area and gained some points for bringing somebody with experience as an operator, but their migration proposals were still very weak and a 'work in progress' at best.

6.5.7 *Tenderer T7*

The migration strategy proposed in the Tenderer T7's Technical Proposal was considered to be very good in respect of the section provided for the CBTC system by Thales, but discussion on other related areas comprising part of the migration plan was virtually non-existent. This level of inconsistency raised the question of whether Tenderer T7 has sufficient competence to deliver this complex Project.

6.5.8 *Tenderer T8*

The proposed solution by Tenderer T8 to implement an 'Intermittent Train Control System (ITC), is on first sight elegant and innovative; however it relies on piggyback

6.11

Technical Element No 10: List of Past Projects and Experience

A notable concern in this section is that Tenderer T3 has no previous related rail experience and the largest project completed by the Consortium has stated project value of less than RM40 million.

The largest stated capital value of a completed project for each Tenderer is as follows:

Tenderer	MYR
T1	458 m
T2	5 bn
T3	40 m
T4	4 bn
T5	800 m
T6	3 bn
T7	1 bn
T8	1.5 bn

GK

Another area of note is that approximately half of Tenderer T1's past projects were reported as being completed behind schedule.

6.12

Technical Element No 11: List of Current Projects

The List of Current Projects provided by each of the Tenderers was reviewed as follows:

6.12.1

Tenderer T1

Tenderer T1's largest current project has a capital value of just under RM 550 million. Almost all of their projects are reported to be on schedule.

6.12.2

Tenderer T2

Tenderer T2's largest current project has a capital value in excess of RM 2 billion. Most of their projects are reported to be on schedule. Tenderer T2 omitted to provide progress information for 2 of their current projects.

6.12.3

Tenderer T3

Tenderer T3 has no current rail projects.

6.12.4

Tenderer T4

Tenderer T4's largest current project has a capital value in excess of RM 5 billion, although not strictly related to a CBTC project. Tenderer T4 omitted to provide progress information for most of their current projects. T4 has recently undertaken (2006-2010) a major RM262m R-CBTC project for Metro Madrid.

6.12.5 *Tenderer T5*

Tenderer T5's largest current project has a capital value in excess of RM 600 million. Almost all of their projects are reported to be on schedule.

6.12.6 *Tenderer T6*

Tenderer T6's largest current project has a capital value in excess of RM 3 billion. Almost all of their projects are reported to be on schedule.

6.12.7 *Tenderer T7*

Tenderer T7's largest current project has a capital value just under RM 500 million. Almost all of their projects are reported to be on schedule.

6.12.8 *Tenderer T8*

Tenderer T8's largest current project has a capital value just under RM 700 million. Most of their projects are reported to be on schedule. Tenderer T8 omitted to provide completion dates for two of their projects and to state the projects that were delayed.

6.13 *Technical Element No 12: Quality Assurance and Quality Control*

All Tenderers submitted Quality Assurance and Quality Control Documentation, but of varying quality, which is summarised as follows:

- Tenderer T1 submitted a generic Quality Management Manual which adequately covered their proposed approach to QA and QC but this was not project specific.
- Tenderer T2 submitted a brief Quality Assurance and Quality Control Plan which explained their intended approach to QA/QC.
- Tenderer T3 submitted a Quality Assurance and Quality Control Plan which was very poor and lacked the detail to be expected.
- Tenderer T4 submitted a sound Quality Assurance and Quality Control Plan which was contained within a thorough Safety, Health, Environmental and Quality (SHEQ) plan and which addressed all QA/QC issues.
- Tenderer T5 provided a good Quality Assurance and Quality Control Plan.
- Tenderer T6 provided an adequate Quality Assurance and Quality Control Plan, but which was of a much lower standard compared with those of some of the other Tenderers and which was weak in places, resembling a downloaded document rather than something written specifically to manage the specific challenges of the AMG Project.
- Tenderers T7 and T8 both provided comprehensive Quality Assurance and Quality Control Plans.

GK



Presentation. The Presentations were not scored, but served to clarify points raised and to provide an overall impression to the Technical Evaluation Panel of the quality and understanding of the Tenderer's respective teams.

All points of clarification raised at the Presentations were subsequently confirmed as written Requests for Clarification and written responses were received from each of the Tenderers.

The following table summarises the main points of the presentations.

Tenderer	Comments
T1	Glossy presentation that was just a repeated (animated) version of the Employer's RFP. Tenderer T1 was unable to communicate effectively in spoken English.
T2	Good Presentation which was much better than their Technical Proposal.
T3	Very poor showing, Tenderer T3 had very little idea on how to undertake or manage the AMG Project, including their proposed German Integration consultant. So poor, it was difficult to know what questions to ask.
T4	Comprehensive Presentation which covered all aspects of the AMG Project and its delivery, comprehensive video explaining proposed migration strategy. The introduction of the Independent Safety Verification Engineer served as a good example of added-value, which was only provided by this Tenderer.
T5	Very poor Presentation, compounded by the decision to nominate a Presenter who was apparently unfamiliar with the T5 Technical Proposal, (Proposed Testing and Commissioning Manager) and also omitting to invite their proposed CBTC sub contractor, despite this being a central issue for the AMG Project. This rendered them unable to answer most of the technical questions raised.
T6	Reasonable Presentation from this Tenderer except for the issue of the non-compliant new Depot design and their proposals for project management of the project. A strong performance on track and new Depot, but weak in response to their proposed CBTC system, especially the inclusion of a 'leaky feeder' and the lack of any process for project management or integration, particularly the 'Tools' to which the Presentation referred frequently in the slides, which on examination they did not appear to have.
T7	Large delegation that mostly struggled to communicate in English and which resulted in a bland generic Presentation. The proposed new Depot layout was based upon a standard Korean depot design which, it was recommended to be adopted. However this introduced potential land issues and questions as to the feasibility of achieving the required levels for the approach tracks. Tenderer T7's Technical Proposal also included an earth

8 Stage 3 Technical Evaluation – Scoring Results

8.1 Final Stage 3 Percentage Scores

The following Figure 6 shows the Final Percentage Scores for the Stage 3 Technical Evaluation process; these scores are also represented graphically in Figure 7.

Tenderer	Final Stage 3 Score
T4	83.42%
T6	73.03%
T8	69.20%
T7	66.26%
T5	49.11%
T3	48.91%
T1	45.06%
T2	42.98%
MEAN	59.75%

GK

Figure 4: Final Stage 3 Scores

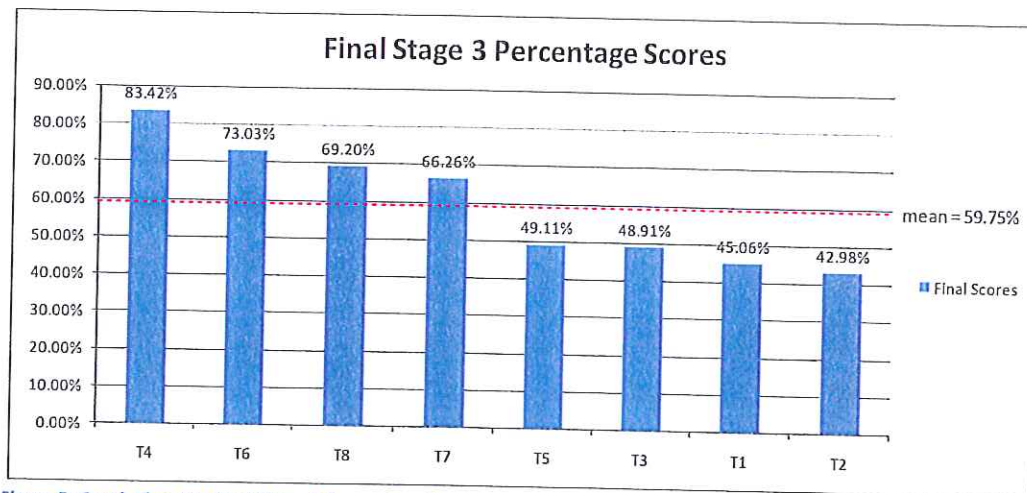


Figure 5: Graph Showing Final Stage 3 Percentage Scores

Evaluation Panel, renders T7 unlikely to successfully deliver the AMG System Works Project.



The remaining four Tenderers (T3, T5, T1 and T2 respectively) all achieved scores well below the mean and, based solely upon their Technical Proposals, the Technical Evaluation Panel have no evidence or confidence that any of these four Tenderers could successfully deliver the AMG System Works Contract.

