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Ms Janelle Saffin MP
Chair
Parliamentary Standing Committee on Public Works
Parliament House
CANBERRA ACT 2600

Dear Ms Saffin,

EXPANSION AND CLARIFICATION OF INFORMATION PROVIDED TO THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS ON 8 AUGUST 2012 - LIVERPOOL MILITARY AREA HIGH VOLTAGE ELECTRICAL DISTRIBUTION UPGRADE PROJECT

The Liverpool Military Area High Voltage Electrical Distribution Upgrade (LMA HVU) project was referred to the Parliamentary Standing Committee on Public Works (the PWC) on 20 June 2012, with public and in camera hearings subsequently conducted by the PWC on 8 August 2012.

The purpose of this letter is to provide the PWC with further information on a number of questions posed by the PWC, the answers provided by Defence and the subsequent issues identified by the PWC during the conduct of the 8 August 2012 hearings. In particular, this letter will address the following issues:

- the need for the proposed project;
- the benefits the proposed project will realise, both within the LMA and for Defence more broadly;
- the impact on Defence should the proposed project not proceed;
- the disadvantages of the options recommended, and the level to which such options will secure an energy supply to and within the LMA;
- the other risks identified by Defence in developing the recommended options, and how such risks are to be managed by Defence;
- the 'value for money' proposition; and
- the level of consultation undertaken by Defence.

Immediately prior to the conduct of the 8 August 2012 hearings, Defence provided the PWC with a project brief (a copy of which is provided for your reference at attachment 1), which

noted that the proposed project constitutes a major upgrade to the electrical supply and distribution within the LMA and that the project aims to:

- ensure a stable and adequate electrical supply to service the growing LMA demand, and
- provide an upgraded electrical distribution network at Holsworthy Barracks with sufficient redundancy to support the existing infrastructure as well as planned additional facilities.

As also noted within attachment 1, the following benefits are expected to be derived from the proposed project:

- better risk mitigation for supply and distribution of power, in that an upgraded and reconfigured power distribution network will help mitigate the risk of power supply being affected by single points of failure;
- improved operational capability for facilities and units located within LMA, in that Defence will be able to expand the facilities on the base and provide new or enhanced facilities for current and future needs; and
- the retention of Defence personnel through the ability to retain an operational base near a major population centre, in that a confirmed power supply will mean Holsworthy Barracks remains viable as an enduring base for Defence into the foreseeable future.

To expand upon these aims, expected benefits and to confirm Defence's need for the proposed project the following details are provided for your consideration:

- The LMA and in particular Holsworthy Barracks, supports the development and delivery of a diverse range of Defence capabilities for the Australian Government, inclusive but not limited to special operations, aviation, communications, engineering, medical and high readiness reserve. As such the requirement to undertake the proposed project arises from a need to assure the development and delivery of these capabilities.
- Over the last five years a number of major capital facilities projects have been delivered within Holsworthy Barracks to support a growth in both special operations and aviation capabilities. As a consequence of these projects the demand for electrical power within the LMA has increased to 13.5 Mega Volt Amps (MVA), which although is being currently met by Defence's electrical supplier (Endeavour Energy), leaves no excess supply to support further growth.
- Over the next five years a number of additional major capital facilities projects are proposed for development within the LMA, which will result in a further increase to Defence's overall demand for electrical power. The proposed projects and their impact on demand for electrical power are as follows:
  - The proposed relocation of the Defence National Storage and Distribution Centre (DNSDC) by the end of 2014 from a leased site at Moorebank to Commonwealth owned land situated in the north-west corner of the LMA, nominally referred to as West Wattle Grove, is the first package of works arising out of the Defence Logistics Transformation Program (DLTP), a component of Defence's wider Strategic Reform Program. The maximum demand for electrical power for this project is forecast to be 8 MVA.

- The proposed Moorebank Units Relocation (MUR) project has been developed to support the Australian Government's commitment to facilitate the delivery of a Moorebank Intermodal Terminal by mid 2017 on a site currently occupied by Defence. The maximum demand for electrical power for this project is forecast to be 5 MVA.
- The proposed Holsworthy Barracks Redevelopment Stage 2 (HBRS2) project aims to provide new facilities and upgrade infrastructure to support the relocation and consolidation of Special Forces (SF) units and Army Reserve units to Holsworthy Barracks from 2018 and will complement the works proposed for development under the MUR project. The maximum demand for electrical power for this project is forecast to be 3 MVA.

- Defence's overall demand for electrical power within the LMA is therefore forecast to grow to 28 MVA (with 8 MVA required for the new DNSDC site at West Wattle Grove and 20 MVA required for Holsworthy Barracks). This includes allowances for the forecast demands for future projects and a 3.5 MVA reduction due to the vacation of the Moorebank sites as part of the DLTP and MUR projects. A 2 MVA increase for additional growth within Holsworthy Barracks out to 2030 has also been included.
- Noting that the maximum electrical power supply that can be provided to Defence from its supplier is currently 13.5 MVA, this then leaves a deficit of 14.5 MVA, which if not provided through the LMA HVU project would result in the requirement for Defence to provide the additional supply through generators, similar in nature to a Central Emergency Power Station (CEPS).
- Compounding the LMA electrical power supply issue, the current 11 kilo volt (kV) connection voltage within the LMA, although suitable for local distribution of loads is a highly inefficient voltage by which to transmit large electrical loads over the distances that exist within the LMA. As an example, the voltage loss across the existing five kilometre 11 kV supply cable is 4%, however with a 33 kV cable across the same distance there is only a 1% loss. Purchasing electrical power at 33 kV also attracts lower tariffs for Defence when compared to an 11 kV connection.
- The final issue is the existing LMA electrical distribution system, which over many years has been developed in a piecemeal and inefficient manner. The existing electrical distribution system also lacks an adequate level of inherent redundancy to effectively manage and ensure power distribution, particularly during times when there is a reduced supply to the system or there are outages within the system. The rectification of this redundancy problem is critical to Defence's ability to assure the delivery and development of capability from within the LMA.

Should the proposed LMA HVU project not proceed, then the existing electrical supply, connection and distribution problems within the LMA will not be addressed and will result in the following capability and cost impacts to Defence:

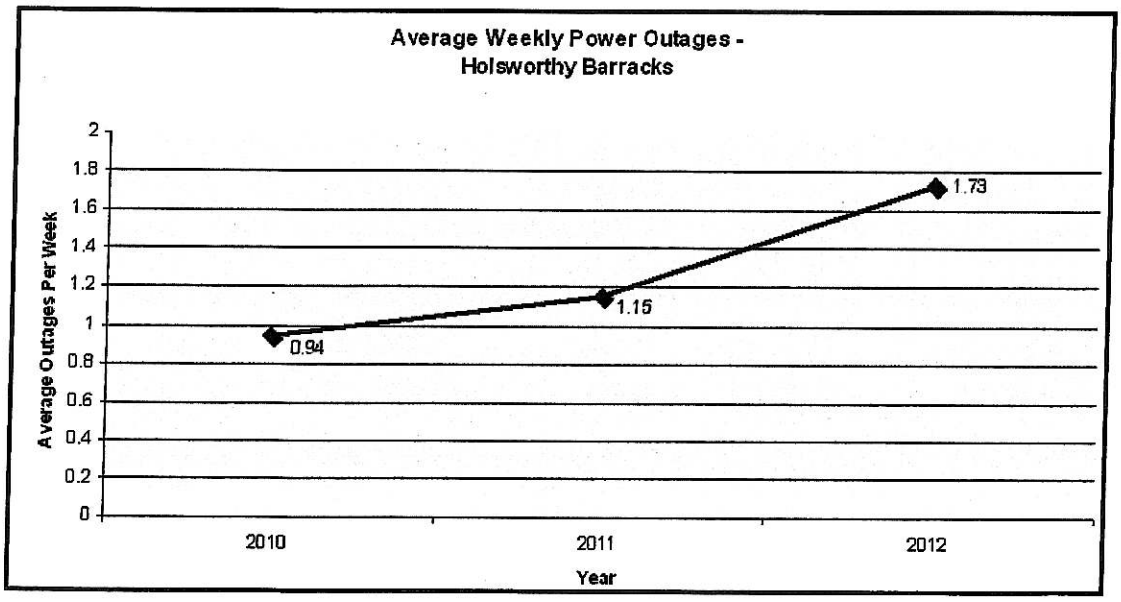
- If the current available electrical power supply to Holsworthy Barracks was not increased to 20 MVA through the proposed 33 kV connection from the ANZAC Village Zone Sub Station (AVZSS) and the construction of two intake switching stations (inclusive of minor works to relocate existing high voltage switchboards),

Defence will not be able to adequately raise, train and sustain mandated capabilities from within the LMA, which will impact on Defence's ability to meet the delivery of such mandated capabilities as required by the Australian Government.

- If Defence was subsequently required to provide its own power supply within Holsworthy Barracks through the provision of generators in order to meet the increased demand and assure the delivery of these critical capabilities, it is estimated that this would result in an additional operating cost to Defence of $7.5 million per year.[1]

- If the current 11 kV connection voltage within the LMA was not upgraded to the proposed 33 kV connection, the transmission of large electrical loads within the LMA would continue to be undertaken in a highly inefficient manner with voltage losses in the order of 4%. Given these losses and as based on current tariffs for the provision of power at 11kV versus 33 kV, it is estimated that Defence would forgo a potential saving in operating costs of $0.5 million per year.[2]

- If the current 11 kV line main and multiple spur electrical distribution system was not upgraded to the proposed seven parallel ring mains, a majority of which will be underground, Holsworthy Barracks will remain vulnerable to outages from any single point of failure and Defence will remain limited in its options to provide power to only a small number of critical facilities that are equipped with local emergency generators (LEGs). As such, it is anticipated that the current trend in all power outages within Holsworthy Barracks (see graph below) will continue to increase at an estimated cost to Defence of approximately $0.2 million per year.[3]



[1] This estimation is based on historical data for the operation of a number of hired generators at Holsworthy Barracks over the period 2009 to 2010.

[2] The basis for this estimation is included in the Value for Money Assessment which has been provided to the PWC under separate cover.

[3] This estimation is based on an average of 0.5 unplanned high voltage outages per week that require rectification / repair across a 52 week period at an average cost to Defence of approximately $7700 per call out to rectify the outage. Under current arrangements the rectification of all outages within the electrical distribution system is undertaken by a Comprehensive Maintenance Contractor who is contracted to Defence by public tender for a fixed term.

With respect to the disadvantages of the options recommended, and the level to which such options will secure an energy supply to and within the LMA the following details are provided for your consideration:

- The main disadvantage with the recommended supply option is that there is no redundancy in supply. Endeavour Energy has advised that the supply risk on an above ground 33 kV feeder as per existing is '1 fault in 8 years'. Although this is a low failure rate, supply via one feeder does not provide a level of physical supply redundancy. However, the proposed delivery of a new Holsworthy Zone Sub Station by 2018 will provide Defence the opportunity to secure an additional 33 kV feeder at an estimated cost of $2.0 million (in 2012 terms). The addition of a second feeder from an alternate Zone Sub Station close to Holsworthy Barracks will provide Defence with a level of redundancy and will decrease the risk to supply from '1 fault in 8 years' to less than '1 fault in 20 years'.
- The main disadvantage with the recommended connection option is that there is a high initial capital cost to establish the two intake switching stations at Holsworthy Barracks, which will include transformers to convert the 33 kV supply to an 11 kV supply for distribution within Holsworthy Barracks. However, by adopting a 33 kV connection, Defence is increasing the efficiency of the supply through decreasing the resistance of the feeder that will supply power to Holsworthy Barracks.
- The main disadvantage with the recommended distribution option is that not all of the proposed new ring mains will be established underground, with parts of two of the seven ring mains remaining either partially or completely above ground. Although this represents a residual risk to the distribution of power to unit facilities located on these ring mains, this risk has been largely mitigated through the inclusion of the two intake switching stations, their interconnection and the resultant ability for Defence to redirect power via multiple ring mains.

With respect to other risks identified by Defence in developing the recommended options, and how such risks are to be managed by Defence, the following details are provided for your consideration:

- Under the normal operation of the barracks, outages will occur as specific parts of the electrical infrastructure, such as distribution sub-stations, transformers and switchgear, are maintained. These outages are referred to as 'planned outages' and can be forecast well in advance, which allows them to be programmed during periods of reduced demand. Such outages occur on average once per year for each element of the distribution network and are staggered so that the disruption is minimised. Details for these outages are advised in advance to all units within the barracks to enable training and other activities to be rescheduled if possible. Where units advise that it is not possible to reschedule such activities, the planned outages are subsequently rescheduled.
- An outage that occurs as a result of an incident other than planned maintenance is referred to as an 'unplanned outage' and can be attributed to some form of failure within the electrical system. A number of different failure modes were assessed during the development of the proposed design. Details of each failure mode assessed are at attachment 2.

- From the analysis of likely causes of failure it was identified that the most frequent failure mode within the Defence system was failure of the 33kV feed from the AVZSS. Accordingly, the proposed design adopted a frequency of one unplanned site-wide outage across Holsworthy Barracks every eight years. Methods proposed to mitigate this risk, and as approved by Endeavour Energy, include:
  - Construction of the feeder to meet both Defence and commercial electrical distribution standards, including the use of concrete poles and increased elevation of the above ground lengths to reduce possible tree strike by raising the aerial cable above the local vegetation height, and the use of an earthing wire placed above the 33kV feeder cable to reduce the possibility and consequence of a lightning strike.
  - Ongoing routine maintenance of the service corridor, such as tree trimming and ground line maintenance, to ensure the required stand-off distances from vegetation and the feeder are maintained, reducing the risk of bushfire damage.

- Defence also has a number of management plans and procedures in place to enable a rapid response to an unplanned power outage within Holsworthy Barracks. These include the Base Emergency Management Plan and Unit Standing Orders, which aim to minimise disruption.

- The proposed design for this project will allow power to be managed by individual ring mains, thereby allowing Defence to proactively manage the issue and redirect power from lower priority rings to higher priority rings until the fault is repaired and electrical services are restored.

- Should an unplanned outage occur outside of normal duty hours, duty personnel will implement the call out procedures for electrical repair. Should the outage occur during operational hours, the unit's administrative personnel will engage the same process through the local Defence Support Group office. All requests are then prioritised according to the capabilities impacted, size and urgency of the fault and are repaired / rectified accordingly.

- The risk management activities undertaken during the design process were focussed on ensuring reliability of electrical supply through increasing redundancy within the system as well as ensuring the provision of power to facilities within Holsworthy Barracks that are critical to operational capability. These included:
  - a number of command nodes for the resident SF units;
  - a command node for aviation operations in support of SF capability;
  - a command node for barracks defence and security operations; and
  - the barracks medical facilities.

- These facilities have all been fitted with LEGs, which ensure that they can continue to function even when the remainder of the base is suffering a complete power outage. The remaining facilities within Holsworthy Barracks are dependent on mains power and as such do not have any back up in the event of an outage. This is a risk which Defence has accepted.

- The ring mains proposed to be developed through the LMA HVU project have also been prioritised according to the number of facilities critical to operational capability that are located on each ring main.
- In order to further reduce the likelihood of all other failure methods, the following additional risk mitigation measures have also been adopted:
  - Use of underground cabling where feasible to reduce the risk of outage due to tree strike, lightning strike, bushfire, or vehicle collision with poles.
  - Use of two switchboards within the proposed HV switchroom to receive the incoming 33kV feeder at Holsworthy Barracks. These switchboards are separated by a brick blast wall within the switchboard room to reduce the risk of simultaneous damage to both switchboards.
  - Regular maintenance and monthly testing of all LEGs by local maintenance staff to ensure they are functional at all times.
  - Regular maintenance of all transformers and switchgear to ensure all assets remain operational for their entire design life.
  - Design and siting of all buildings to comply with the Defence Manual of Fire Protection Engineering and the Holsworthy Bushfire Management Plan. Specifically, a Defence Site Selection Board was conducted in 2010 to locate the permanent infrastructure to be delivered by this project.
  - The two proposed intake switching stations and the high voltage switchboard room were sited in areas that complied with the Bushfire Management Plan and met minimum requirements for stand-off from vegetation and access to water for a fire fighting response.
  - The proposed intake switching stations have also been designed to meet Australian Standards for fire protection and are to be constructed of pre-cast concrete walls and a concrete roof to further minimise the risk of fire damage.

With respect to the 'value for money' proposition of the recommended options for supply, connection and distribution, a detailed and 'commercial-in-confidence' assessment has been provided to you for your consideration under separate cover.

As a summary comparison of the recommended options for supply, connection and distribution against two other possible options, the following 'first order' total cost estimates (including both capital and operating costs without escalation, and excluding goods and services tax across an operating period out to 2030) are provided for your consideration:

- The 'recommended option', where supply is provided from the AVZSS along an existing 33 kV feeder, a 33 kV connection is made into Holsworthy Barracks and the existing electrical distribution is upgraded to seven rings mains (two of which are to be funded separately by the proposed MUR project) a majority of which will be underground, is estimated to result in a total cost of $21.1 million.
- A 'do nothing option', where the increased power supply to Holsworthy Barracks is met through the provision of hired generators and there is no upgrade to the electrical distribution system, is estimated to result in a total cost of $123.0 million.

- An 'outsource option' where all Defence owned electrical infrastructure within the LMA will be privatised and all electrical power will be purchased at retail costs (as opposed to wholesale costs vide the recommended option) is estimated to result in a total cost of $58.5 million.

In comparing these alternative option 'first order' cost estimates against the recommended option cost estimate, it should be noted that there are other less quantifiable costs that would be incurred by Defence if any of these options were to be adopted that given the vagaries, have not been included.

Most notable of these would be the additional costs incurred by Defence if Defence were to become a retail customer and as a consequence, have to provide easements over Commonwealth land for a retail electrical distribution system together with the access requirements granted by these easements for the conduct of retail repairs and maintenance. Under current Defence security requirements, all personnel entering Defence bases must be security cleared or escorted at all times. Given the reactive nature of repair work this would represent a significant increase in overheads for Defence.

As can be seen, and despite not including the less quantifiable costs, the 'recommended option' is the most cost effective option for Defence. This cost effectiveness combined with the associated benefits of increased efficiency and an increased level of redundancy suggests that the recommended option provides a 'value for money' proposition.

With respect to the concerns raised by the Committee in the level of consultation undertaken by Defence, I can advise that in addition to the consultation activities advised through Defence Supplementary Submission 1.2 dated 27 July 2012, I have written to the Federal Member for Hughes, Mr Craig Kelly, MP advising him of the proposed LMA HVU project and offering him the opportunity to be provided with a detailed project briefing.

Finally, I would like to thank the Committee for the opportunity to expand upon and clarify the information as previously provided and I trust that this information will assist the Committee in its consideration of the proposed LMA HVU project.

Yours sincerely,

D.S. Naumann
Brigadier
Director General Capital Facilities and Infrastructure

17 August 2012

Attachments:

1. LMA HVU Project Brief to the PWC dated 8 August 2012
2. Assessment of Methods of Failure in Electrical Distribution System