



**Australian Government**

**Department of Defence**

**JOINT PROJECT 2008 PHASE 5B2  
WIDEBAND SATELLITE CAPABILITY -  
SATELLITE GROUND STATION - EAST  
FACILITIES PROJECT**

Kapooka Military Area, Wagga Wagga, NSW

**STATEMENT OF EVIDENCE  
TO THE  
PARLIAMENTARY STANDING COMMITTEE  
ON PUBLIC WORKS**

Canberra, Australian Capital Territory

June 2017

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# Contents

<b>Identification of the Need.....</b>	<b>5</b>
Background.....	5
The Need.....	5
Description of the Proposal .....	6
Options Considered to Fulfil the Identified Need .....	7
Environmental and Heritage Assessment .....	8
Key Legislation.....	9
Applicable Codes and Standards .....	9
Consultation with Key Stakeholders .....	9
<b>Purpose of the Works .....</b>	<b>10</b>
Project Objectives.....	10
Site Location and Description .....	10
Description of the Proposed Works.....	10
Public Transport, Local Roads and Traffic.....	12
Zoning and Local Approvals .....	12
Childcare Provisions.....	13
Impact on the Local Community .....	13
Planning and Design Concepts .....	13
Materials .....	14
Structural Design .....	14
Hydraulic Services.....	15
Electrical Services .....	15
Mechanical Services .....	16
Fire Protection .....	16
Acoustics .....	16
Security .....	17
Environmental Sustainability of the Project.....	17
Landscaping.....	18
Energy Targets.....	18
Work Health and Safety .....	18
Provision for People with Disabilities .....	19
<b>Cost Effectiveness and Public Value.....</b>	<b>19</b>
Outline of Project Costs.....	19
Details of the Project Delivery System.....	19
Construction Program.....	20
Public Value .....	20
Revenue .....	20

## **ATTACHMENTS**

1. Site Location – Kapooka Military Area
2. Proposed SGS-E Site Layout – Kapooka Military Area
3. SGS-E Transmission Building Typical Elevations
4. SGS-E Architects Perspective Views
5. SGS-E Site Box-Gum Woodlands

# **JOINT PROJECT 2008 PHASE 5B2**

## **SATELLITE GROUND STATION - EAST**

### **FACILITIES PROJECT**

## **Identification of the Need**

### **Background**

1. The Australian Defence Force (ADF) has a need to communicate with deployed forces around the world in support of Government objectives. Space based communications support global, long-range, high-capacity communication links for the effective and efficient exchange of information between Defence networks, systems and deployed forces that are beyond line-of-sight or in a terrain-constrained environment.
2. To support this communication need, Defence raised the Joint Project 2008 (JP2008) Military Satellite Communications, which is a multi-phased project to provide the ADF with a range of strategic and tactical satellite communication capabilities. As part of JP2008 Phase 4, the Commonwealth signed a Memorandum of Understanding with the United States Government to secure an agreed level of wideband communications satellite capacity and service from the Wideband Global Satellite (WGS) constellation of satellites providing global coverage in X and Ka frequency bands.

### **The Need**

3. JP2008 Phase 5B2 proposes to deliver a Satellite Ground Station (SGS-E) to provide anchoring of WGS satellites visible from the east coast of Australia as well as providing the overarching wideband satellite communications Network Management System (NMS).
4. The facilities and infrastructure required to support capability delivered under the JP2008 Phase 5B2 Project include a facility to house the satellite equipment and associated communications system at a suitable location.
5. In early 2017, JP2008 Phase 5B2 achieved the Second Pass Government Approval, with Initial Operational Capability scheduled for Financial Year 2020/21. This approval included funding for the facilities and infrastructure component.

## Description of the Proposal

6. The JP2008 Phase 5B2 facilities project will deliver fit-for-purpose SGS-E facilities and infrastructure for the strategic anchoring of wideband satellite communications within the Kapooka Military Area (KMA) (refer Attachment 1). These facilities will considerably enhance existing Defence satellite communications capability by delivering an operational east coast wideband satellite ground station capability.
7. SGS-E is proposed to be an unstaffed facility (apart from visits by maintenance personnel) and will include (refer also to Attachments 2 to 4):
  - a. three 13.5 metre dual X / Ka-band satellite Earth Terminals (also known as satellite dishes), including foundation infrastructure supporting the three satellite dishes, including concrete antenna pads and pit and pipe;
  - b. Transmission building of approximately 850 square meters to house the specialised communications and radio frequency equipment; and
  - c. supporting infrastructure including backup generators, heating ventilation and air conditioning, fencing, bulk earthworks to establish stormwater control, the sealing of external roads to site, connection to Base utilities and services and connection to the Defence Terrestrial Communications Network (DTCN).
8. The facilities and infrastructure work that supports SGS-E<sup>1</sup> and will be undertaken at KMA, Wagga Wagga, NSW.
9. The satellite dishes and the communications equipment within the Transmission building are part of the Capability Project materiel acquisition, and as such are separate from the infrastructure and building works required to support the capability.

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<sup>1</sup> The NMS will be hosted on existing Defence networks and infrastructure.

## Options Considered to Fulfil the Identified Need

### Location Options

10. At the strategic level, a detailed site assessment process has been carried out by Defence with input from the Australian Communications and Media Authority (ACMA) to determine the most suitable site for SGS-E. Originally, an existing satellite ground station at HMAS Harman in the Australian Capital Territory (ACT) was proposed to be utilised; however, this was found to be unsuitable due to spectrum restrictions for that site. A number of alternative sites were assessed, including:
  - a. RAAF East Sale, Victoria (VIC);
  - b. Puckapunyal Military Area, VIC;
  - c. Kapooka Military Area, New South Wales (NSW), also known as Blamey Barracks, located approximately 9.5 kilometre south-west of Wagga Wagga;
  - d. High Frequency Modernisation Riverina Transmit site, north west of Wagga Wagga, NSW;
  - e. High Frequency Modernisation Riverina Receive site, north west of Wagga Wagga, NSW; and
  - f. Bandiana Military Area, VIC.
11. Analysis of the site selection criteria identified that the KMA provided the optimal site, primarily based upon security and spectrum considerations (low radio frequency interference levels).
12. Within the KMA, five siting options were identified. Further master planning and feasibility studies identified that the southern KMA site (site Option 3 – see also Attachment 1) was the optimal SGS-E site within the base boundary considering line-of-sight visibility of satellites, the low levels of radio frequency interference, value for money, including access to / availability of utilities and environmental considerations.

## Environmental and Heritage Assessment

### Environmental Impact

13. Environmental impact has been a key consideration in the development of siting options for the location of SGS-E within the KMA. Each site was assessed by environmental consultants for the presence of sensitive ecological areas and heritage value, and extensive consultation has taken place with Defence's regional environmental personnel. This highlighted the presence of Box-Gum Woodland and its associated ecological community in KMA, which is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).
14. The confirmed SGS-E site at the southern extremity of KMA site Option 3 is located adjacent to Box-Gum woodlands, however, the SGS-E site does not encroach on the Box-Gum woodlands (refer Attachment 5). The site has been assessed as unlikely to affect any species, population or ecological community listed as threatened or migratory under the EPBC Act.
15. An ecological / environmental assessment was undertaken. Defence's Director Environmental Protection and Assessment (DEPA) assessed the project did not require referring for approval under the EPBC Act, and would be managed through Defence's Environmental Clearance Certificate process.
16. The project will comply with Defence's internal processes, including environmental clearance certification and the development of site specific Construction Environmental Management Plan, which will take into consideration the delineation of the proposed site and the adjacent endangered Box-Gum and articulate necessary control or mitigation measures.
17. The Construction Site and Environmental Management Plan will also address issues such as traffic management, noise management, waste management, security and site management during construction.



## **Non-Indigenous and Indigenous Heritage**

18. There are no identified Indigenous or Non-Indigenous heritage values associated with the site of the proposed works.

## **Asbestos**

19. There are no known asbestos risks associated with the works.

## **Key Legislation**

20. The following key legislation is relevant to this project:
- a. *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*;
  - b. *Work Health and Safety Act 2011 (Cth)*;
  - c. *Disability Discrimination Act 1992 (Cth)*;
  - d. *Fair Work Act 2009 (Cth)*;
  - e. *Fair Work (Building Industry) Act 2012*; and
  - f. *Defence Act 1903*.

## **Applicable Codes and Standards**

21. The design of the proposed works will comply with all relevant Defence standards, Australian standards, codes and guidelines including, but not limited to:
- a. National Construction Code (Building Code of Australia);
  - b. Defence Security Manual;
  - c. Defence Manual of Infrastructure Engineering – Electrical;
  - d. Defence Manual of Fire Protection Engineering; and
  - e. Defence Estate Quality Management System.

## **Consultation with Key Stakeholders**

22. Defence recognises the importance of providing local residents, statutory authorities and other interested stakeholders an opportunity to provide input into, or raise concerns relating to major projects such as the JP2008 Phase 5B2 facilities project. Defence has engaged with a variety of internal and external stakeholders during the development of this project to date and further consultation will be conducted following the referral of this project to the Parliamentary Standing Committee on Public Works. Key stakeholders to be consulted include:

- a. Office of the Hon. Michael McCormack, Member of the Federal Electorate of Riverina, NSW;
  - b. Office of Mr Daryl William Maguire, NSW Member for Wagga Wagga; and
  - c. Wagga Wagga City Council.
23. Defence will also undertake a community consultation session to allow local residents, statutory authorities and other interested stakeholders, including action groups, an opportunity to provide input into, or raise concerns relating to the project.

## Purpose of the Works

### Project Objectives

24. The purpose of the project is to provide fit for purpose facilities and infrastructure to support the strategic anchoring of wideband satellite communications in the east of Australia.

### Site Location and Description

25. The new facilities are proposed to be constructed at the SGS-E site located close to the southern extremity of the KMA, in an area of open grassland approximately 800 metres south-east of the existing shooting ranges (as shown in Attachment 1).
26. The primary reasons for the selected site includes line-of-sight visibility of geostationary communications satellites, the low levels of radio frequency interference, access to utilities and environmental considerations. The proposed site footprint allows for future expansion to accommodate capability growth, such as adding further satellite dishes as shown at Attachment 2.

### Description of the Proposed Works

27. The proposed works have been separated into the following three work elements:
- a. **Work Element 1:** The Satellite Ground Station (SGS) works;
  - b. **Work Element 2:** DTCN connection to SGS-E; and
  - c. **Work Element 3:** Base Utilities, Services and Roads to SGS-E.
28. A description of each Work Element is included below.

## Work Element 1: SGS

29. Due to the unique facilities requirements for a satellite ground station specific to the capability solution selected, the lowest risk approach for the Commonwealth is for the Defence's Capability Contractor to be fully responsible for the design, construction and operation of the entire ground station capability, including the facilities upon and in which the satellite dishes and communications equipment will be mounted or housed.
30. The project proposes construction of the SGS-E facilities and infrastructure including:
  - a. **Satellite Dish Foundation Infrastructure:** This includes concrete pads and services connections from the proposed location of the three satellite dishes to the Transmission building;
  - b. **Transmission Building:** This is a physically secure facility that houses communications equipment to support satellite communication services (see also Attachment 3). The Transmission building includes facilities for up to three maintenance personnel, including workstations, toilets and a kitchenette; and
  - c. **Supporting Infrastructure:** Includes:
    - i) security fencing for the new SGS-E compound;
    - ii) installation of backup generators and fuel storage;
    - iii) vehicle access roads and parking; and
    - iv) water storage tanks to support fire fighting and on-site water requirements.

## Work Element 2: DTCN Connection to SGS-E

31. SGS-E, as a major Defence strategic beyond-line-of-sight communications bearer, has a requirement to integrate with the DTCN. The DTCN provides the terrestrial communications connectivity needed by SGS-E to project the Defence strategic networks to deployed ADF assets in support of operations. The DTCN at Wagga is currently being upgraded under the JP2047 Terrestrial Communications Project for existing Defence needs.

32. Under this element, JP2008 Phase 5B2 facilities project is proposing to utilise the JP2047 Contractor to undertake the proposed project DTCN connectivity works. This involves off-base pit and pipe installation<sup>2</sup>, fibre optic cabling in the pit and pipe infrastructure to connect SGS-E to dual off-base telephone exchanges.

### **Work Element 3: Base Utilities, Services and Roads to the SGS-E site**

33. Connection of the base water, electricity, fire monitoring, security monitoring and building management services to the SGS-E site, sealing of SGS-E access roads and provision of stormwater protection external to the SGS-E site boundary.
34. This element has linkages with both work elements 1 and 2; however, does not contain any unique, solution specific aspects as found in the other two work elements.

### **Public Transport, Local Roads and Traffic**

35. The SGS-E capability will be maintained by a small number of personnel during the operational life of the system, which will have negligible impacts to the existing roads and traffic. However, during construction there will be an increase to the number of large vehicles that enter the Base to deliver materials to site for construction. Contractual arrangements will mitigate the effects of this on the local road network through the requirement for appropriate traffic management planning documented in the Construction Environmental Management Plan. Additionally, to minimise the impacts to Army recruit training, construction traffic will bypass the majority of the Base by utilising secondary roads from the base entrance along the southern boundary fence to the SGS-E site.

### **Zoning and Local Approvals**

36. The SGS-E site works are contained entirely within Commonwealth owned land and do not involve the acquisition or disposal of any land or property by Defence. There are no required or proposed changes to zoning as a result of this project. The location does not require Local or State Government approval.

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<sup>2</sup> All on-base pit and pipe work is performed as part of Work Element 3

37. To support the SGS-E connection to the DTCN Network, the DTCN Contractor will be required to install several underground fibre optic cables from the KMA boundary to off-base telecommunication exchanges. The DTCN Contractor will obtain relevant approvals for this off-base work.

## **Childcare Provisions**

38. There is no requirement for additional childcare facilities on the base as a result of this project.

## **Impact on the Local Community**

39. Defence has remained cognisant of its potential impact on the local Kapooka and Wagga Wagga community. This facility will provide a number of large satellite communications dishes that may be visible from passing traffic on the Olympic Highway. To minimise the overall impact of the site the design approach will be cognisant of architectural and colour scheme strategies that blend the facility into the surrounds as practically possible (see Attachment 4).
40. Defence has been a longstanding contributor to the local economy and these works confirm that the KMA will remain an important and continuing Defence asset in the region. The proposal will contribute to the local construction economy in the Wagga Wagga area during the construction phase and to the local community during the systems operational life, with SGS-E maintenance personnel planned to be located in the Riverina area.

## **Planning and Design Concepts**

41. The general design philosophy for the proposed facilities incorporates the following considerations:
- a. new construction will be cost-effective, functional, low maintenance, energy efficient design suitable for the climate of the site and of a style compatible with the proposed function;
  - b. conventional construction techniques, mostly those commonly used in the local construction industry will be adopted where practicable;
  - c. maximum use of existing infrastructure and facilities to minimise capital costs;

- d. use of readily available and durable materials that combine long life while minimising maintenance;
- e. infrastructure services planning and structure design taking into account future flexibility, projected demand and Defence policies for reliability and redundancy;
- f. all new utilities and services are underground and placed in easements, usually within road verges;
- g. architecture and colour scheme that blends into the surrounds as practically possible;
- h. recognition of site constraints and security requirements;
- i. minimising the SGS-E site foot print and impact to KMA;
- j. optimising the SGS-E site topography and associated implications for stormwater management, sediment and erosion control; and
- k. minimising environmental impact inclusive of local flora and fauna.

## **Materials**

42. Materials and workmanship will comply with the Building Code of Australia (BCA), the relevant Australian standards and requirements of the relevant local authorities.

## **Structural Design**

43. The structural design of SGS-E will be performed by the JP2008 Phase 5B2 Capability Contractor and will:
- a. comply with the Building Code of Australia (BCA);
  - b. operate and survive without damage for the KMA site environmental conditions;
  - c. comply with geotechnical and structural engineering specifications; and
  - d. comply with the Australian Standards.

## **Hydraulic Services**

44. The facility requires connection to the KMA water supply primarily for fire suppression, but also for the site toilets and kitchenette. Various options were considered to provide the site with potable water; however, due to the remote location of the site, reticulation of a water supply with sufficient pressure for fire-suppression was not cost effective. Therefore, the facility design specifies on-site potable water storage, provided by two large water tanks. The facility will also include rainwater collection, storage and supply for non-potable purposes.
45. Various options were considered for site sewerage requirements. It was determined that since the facility is unstaffed, the low flow volumes would not allow the site to be connected to the base sewerage system. Therefore, the facility design specifies a composting sewerage system for the amenities at site.
46. Hot water services are planned to be provided by solar water heaters installed on the roof of the Transmission building.

## **Electrical Services**

47. An analysis of the KMA high voltage system identified that the following electrical works are required:
  - a. installation of a new kiosk substation at the SGS-E site and the underground connection of the substation to the existing base electricity network;
  - b. upgrades to existing base electrical infrastructure including the extension of the intake switching station switch board, small section of existing above-ground power cables, an existing power pole to facilitate the transition from above-ground power to under-ground power; and
  - c. installation of backup generators at the SGS-E site.
48. All electrical works, lighting and power protection at the proposed facility has been designed in accordance with the relevant codes and standards including the BCA.

## **Mechanical Services**

49. The mechanical services systems of the facilities will provide heating ventilation and air conditioning in accordance with the requirements of the BCA. Air conditioning will be provided primarily for the operation of critical communications equipment within the SGS-E facilities, with the exception of the mechanical plant room which will be externally air cooled. Plant and equipment will be sized to accommodate the heat generated by the equipment within the facilities and to accommodate future expansion requirements. Mechanical equipment includes air cooled split air conditioning units, roof mounted exhaust fans, humidifiers, condensing units, exhaust air grilles, transfer duct grilles, supply air grilles, return air grilles, fans and air heat exchangers.

## **Fire Protection**

50. The scope of fire detection and protection services will comply with the requirements of the BCA, the Defence Manual for Fire Protection Engineering and the Defence Manual for Infrastructure - Electrical Engineering. Fire systems will be integrated into the existing base systems for monitoring and maintenance. Two large water tanks are proposed to be installed onsite to provide the water pressure necessary for the requisite fire suppression systems required by the above codes.
51. A bushfire risk assessment was undertaken for the site based on the location and layout of the facilities which advised a low to medium susceptibility to bushfire, which is standard for all facilities within the KMA. When the project connects to the base water mains, the design will incorporate the installation of several new KMA fire hydrants to future proof KMA fire fighting requirements.

## **Acoustics**

52. The proposed facility will comply with the BCA and Australian Standards for noise and acoustics, including the National Standard for Occupational Noise. The SGS-E mechanical plant room will be acoustically isolated from the main building such that a quiet working environment is maintained in the remainder of the building. The generators will be acoustically treated for compliance with Australian and local Council noise requirements.



## **Security**

53. There is no public access to the SGS-E facility and entry will be through a controlled access point. The proposed facility has been designed to the appropriate security classification, based on a security risk assessment of the operational function of the facility. As such, the facilities meet appropriate Defence security classification requirements.

## **Environmental Sustainability of the Project**

54. The Commonwealth is committed to Ecologically Sustainable Development (ESD) and the reduction in greenhouse gas emissions. Defence reports annually to Parliament on the energy efficiency targets, established by Government, as part of its commitment to improve ESD. Defence also implements policies and strategies in energy, water and waste to improve natural resource efficiency and to support its commitment to the reduction of energy consumption, potable water consumption and waste diversion to landfill.
55. The project has adopted cost effective ESD measures as a key objective in the design and development of project elements. These measures have been incorporated into the design of many aspects of the proposed works and include:
- a. energy metering will be installed and connected to the centralised KMA base management system;
  - b. water metering will be installed and connected to the centralised KMA base management system;
  - c. security and operational lighting will include energy efficient designs like high efficiency fluorescent lamps;
  - d. spare capacity within infrastructure service trenches has been include for future expansion;
  - e. solar hot water system;
  - f. composting sewage system for the SGS-E site amenities;
  - g. bunded storage has been provided for the fuel tanks;

- h. rain water storage for landscape irrigation;
  - i. landscaping will use low maintenance native local flora; and
  - j. the facility and site design will include Green Building opportunities including recycled concrete and steelwork where applicable, recycled PVC cabling and pipework.
56. The ecologically sustainable measures proposed for the project will be balanced with other requirements for Defence buildings, including security and work health and safety considerations, to ensure that Defence's operational capability is not compromised.

## **Landscaping**

57. In accordance with the well-established approach to the Defence sites at KMA, and in a region that is generally dry with low rainfall, landscaping treatments will be minimal, with preference given to indigenous, regionally appropriate, drought tolerant plants and naturally occurring native grasses with low ongoing watering requirements.
58. Landscaping will include considerations for stormwater flow, including provisions for upstream stormwater diversion around the site and protection from local dams and reinstatement of disturbed areas.

## **Energy Targets**

59. The SGS-E facilities will have energy metering installed and connected to the centralised KMA base management system. The facility and site design will seek to use solar power PV cells for supplemented external lighting and solar energy to provide hot water. Due to the SGS-E capability system availability requirements, solar energy can only be used for non-essential services.
60. The building design, where appropriate and practicable, complies with the objectives of the Defence Building Energy Performance Manual (BEPM). Specifically, the technical spaces within the SGS-E Transmission building are designed to Section 3.6 of the BEPM.

## **Work Health and Safety**

61. The proposed facility will comply with the Work Health and Safety (WHS) Act 2011 (Cth) and Defence's WHS policy.

62. In accordance with Section 35(4) of the Building and Construction Industry Improvement Act 2005 (Cth), the construction contractor will also be required to hold full work health and safety accreditation from the Office of the Federal Safety Commissioner under the Australian Government Building and Construction Work Health and Safety Accreditation Scheme.
63. The construction contractor will submit a Construction Work Health and Safety Management Plan to manage workplace hazards and will ensure all personnel who perform work at KMA participate in safety-related training and site induction briefings. Additionally, the Contractor will participate in the Commonwealth's WHS management program for KMA and will attend WHS management meetings.

### **Provision for People with Disabilities**

64. Access for people with disabilities will be provided in accordance with the Building Code of Australia, Australian Standard AS1428 – 2010: Design for access and mobility, and the *Disability Discrimination Act 1992*.

## **Cost Effectiveness and Public Value**

### **Outline of Project Costs**

65. The estimated out-turned cost of this facilities project is \$33.9 million, excluding Goods and Services Tax. The cost estimate includes the construction costs, professional services fees, management fees, contingencies and escalation.
66. The operating costs will increase as a result of the proposed works due to the ongoing operation and support services required by the new facilities.

### **Details of the Project Delivery System**

67. For Work Element 1, Defence conducted an open tender process for the entire JP2008 Phase 5B2 capability, which included the provision of the SGS-E facilities concept design and cost estimates and then a provision for detailed design and delivery of facilities, subject to Parliamentary approval of the facilities part of the project.
68. For Work Element 2, the DTCN Contractor completed a Preliminary Design Study to investigate the feasibility of providing DTCN connectivity through to the SGS-E Site.

69. For Work Element 3, a Project Manager Contract Administrator and Design Services Contractor were appointed by Defence to manage the design development and cost estimates for this work element.
70. Subject to Parliamentary approval, the intention is for:
- a. the Defence Capability Contractor to conduct the Work Element 1 works;
  - b. the J0095 Contractor to deliver the Work Element 2 works; and
  - c. the traditional head contract approach for Work Element 3 works through a competitive tender process.

### **Construction Program**

71. Subject to Parliamentary approval, construction would commence in early 2018, with completion anticipated by late 2019.

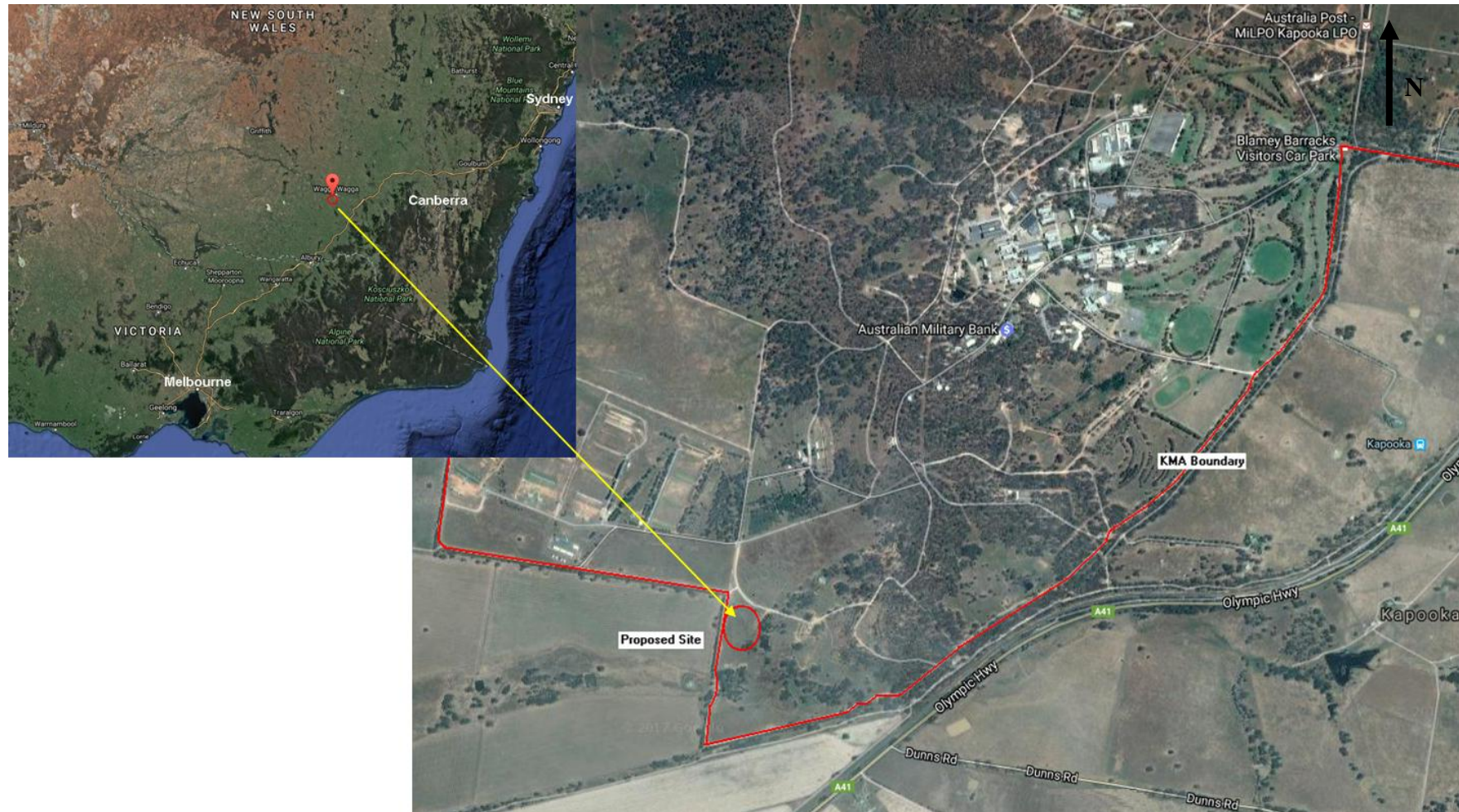
### **Public Value**

72. The project is a major enabler for ADF warfighting in Defence of Australia and its interests. In addition to this, the proposal will contribute to the local construction economy during its construction phase and the local economy during the operational phase, with SGS-E maintenance personnel planned to be located in the Riverina area.

### **Revenue**

73. No revenue will be derived from the proposed facility as it supports Defence purposes only.

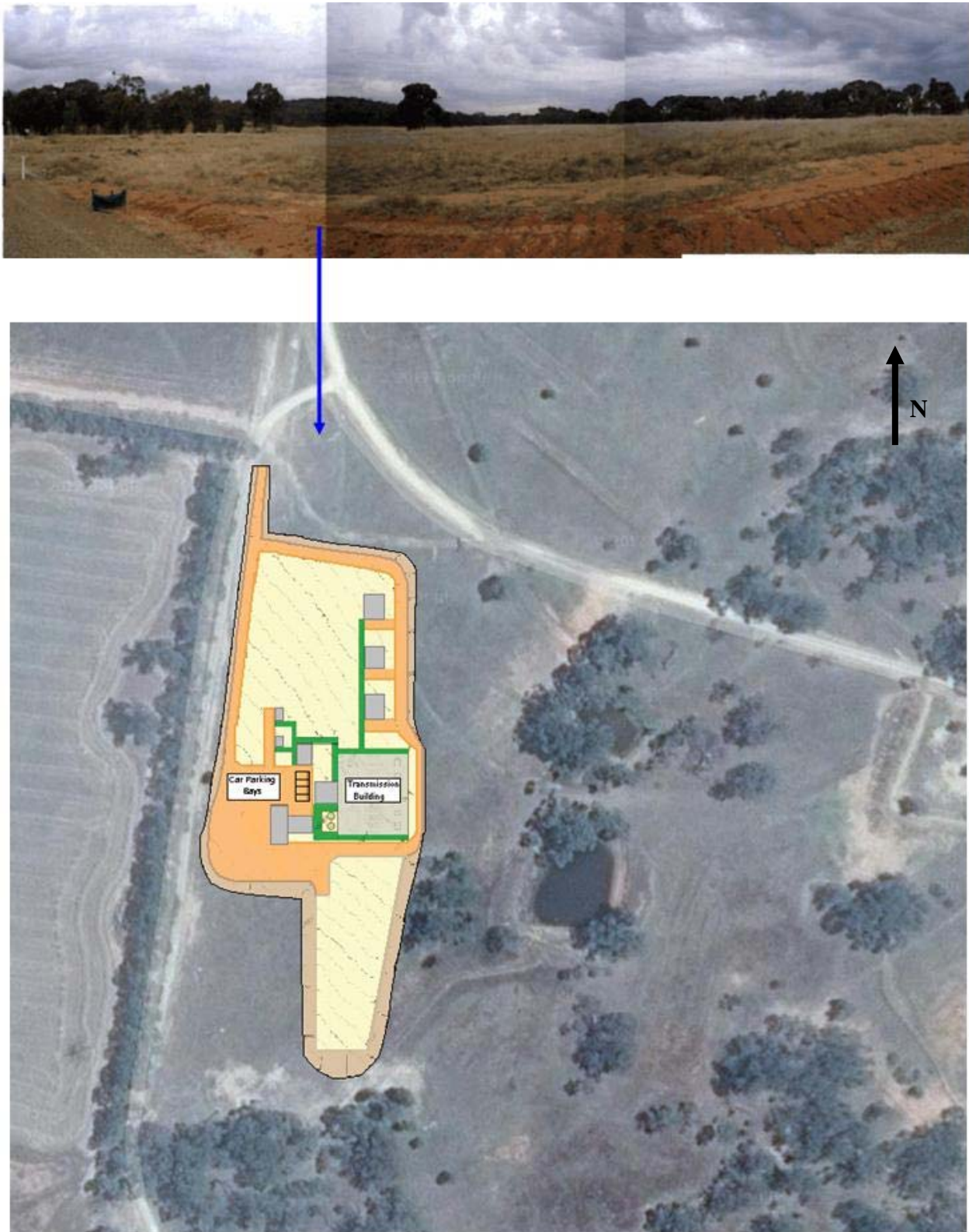
## Attachment 1: Site Location – Kapooka Military Area



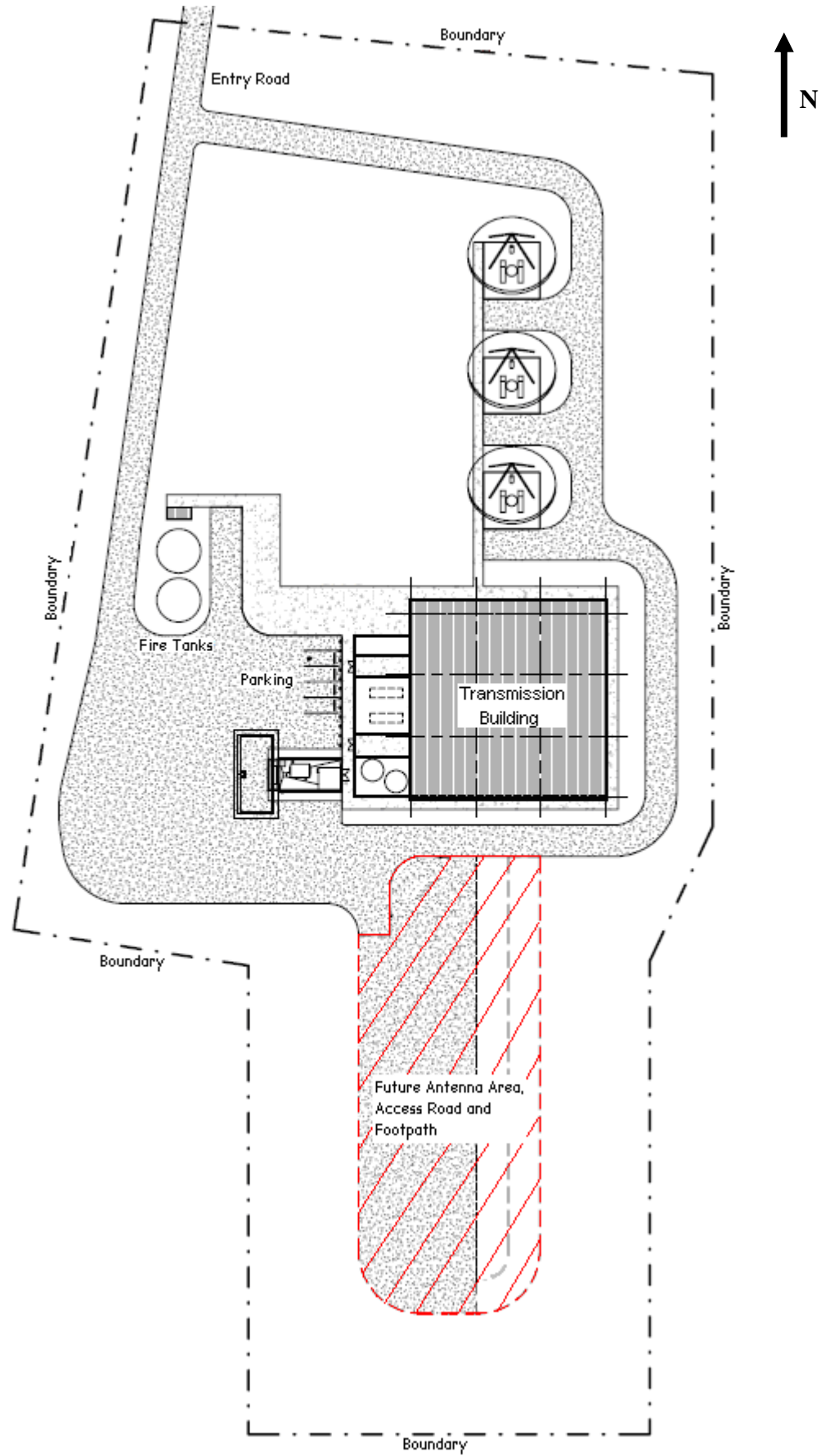
### Proposed SGS-E Facility Location within the KMA Boundary



## Attachment 2: Proposed SGS-E Site Layout – Kapooka Military Area

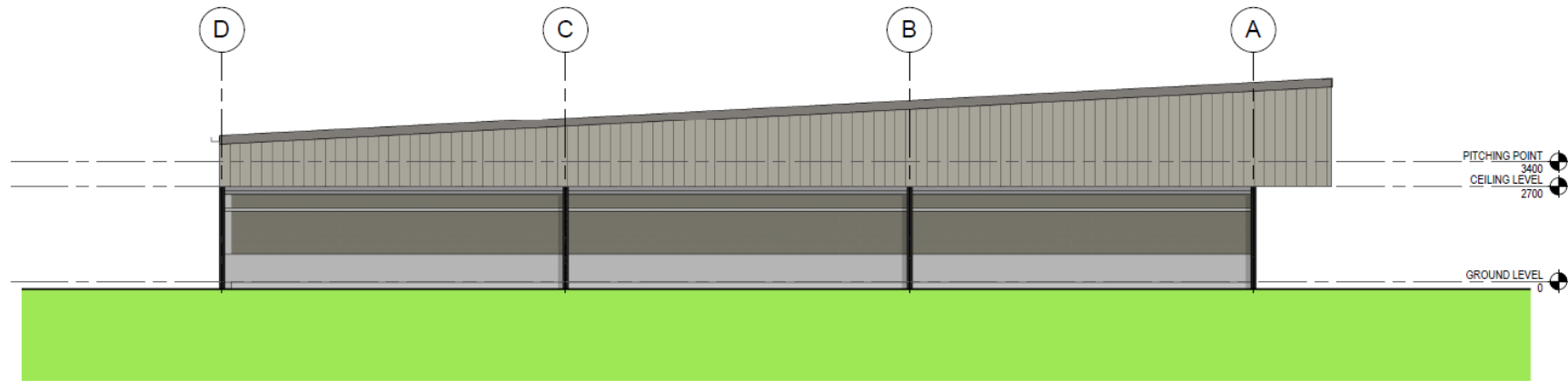


**Proposed SGS-E Site and Conceptual Overlay**

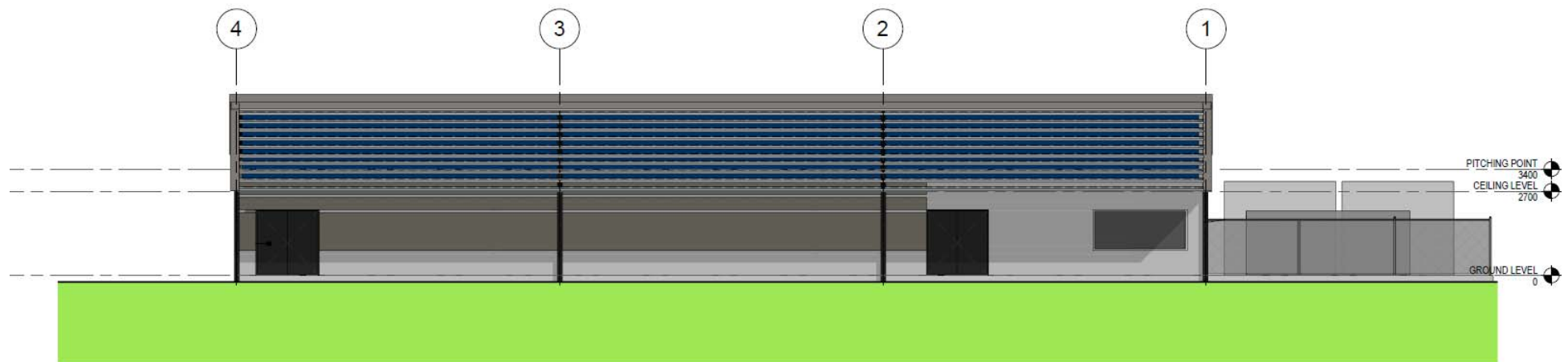


**SGS-E Conceptual Site Layout**

### Attachment 3: SGS-E Transmission Building Typical Elevations

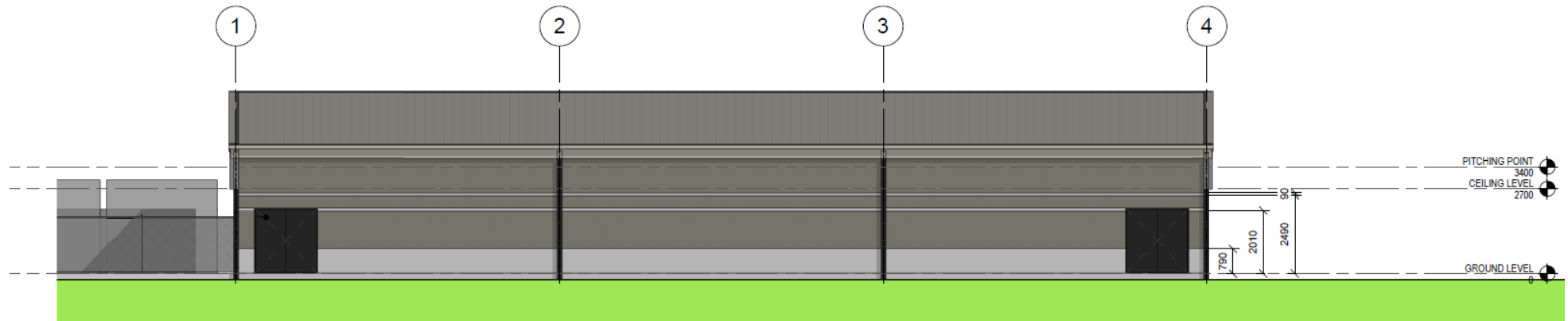


**East Elevation**

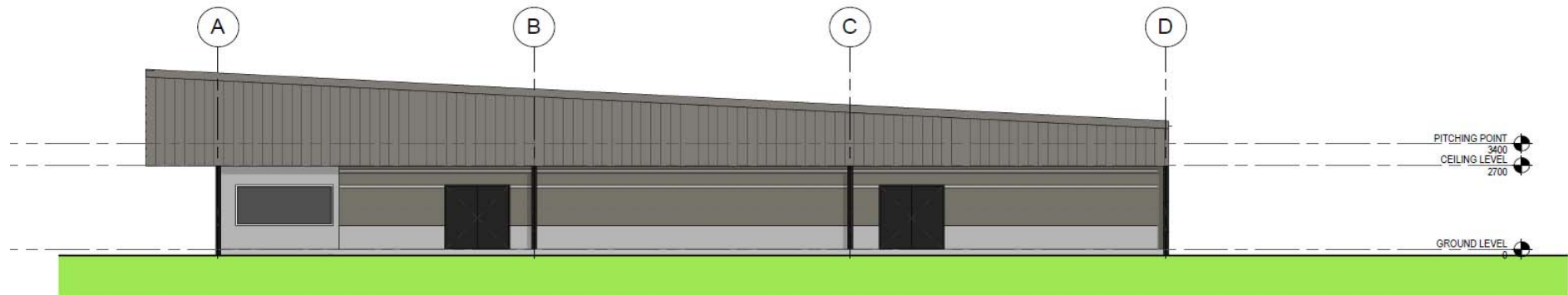


**North Elevation**



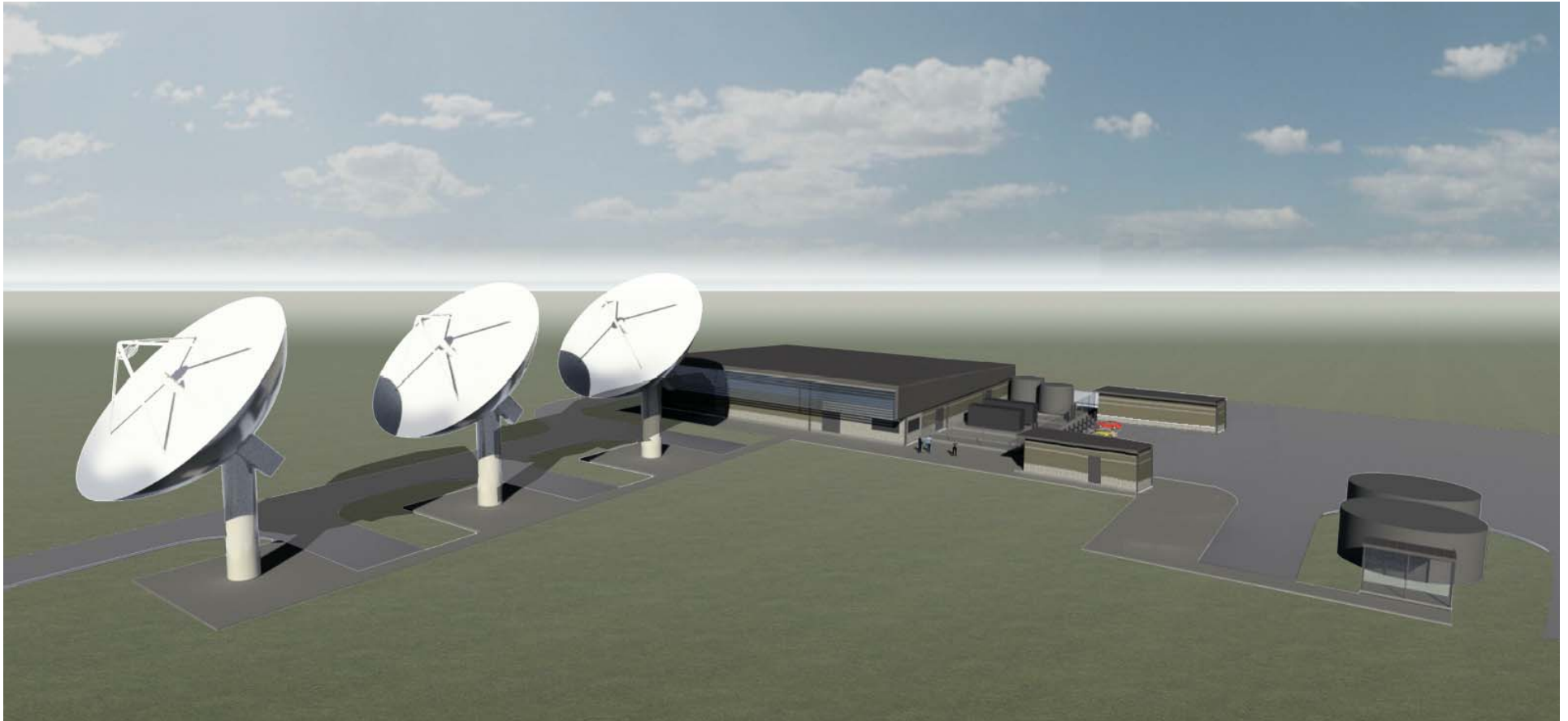


**South Elevation**



**West Elevation**

#### **Attachment 4: SGS-E Architects Perspective Views**

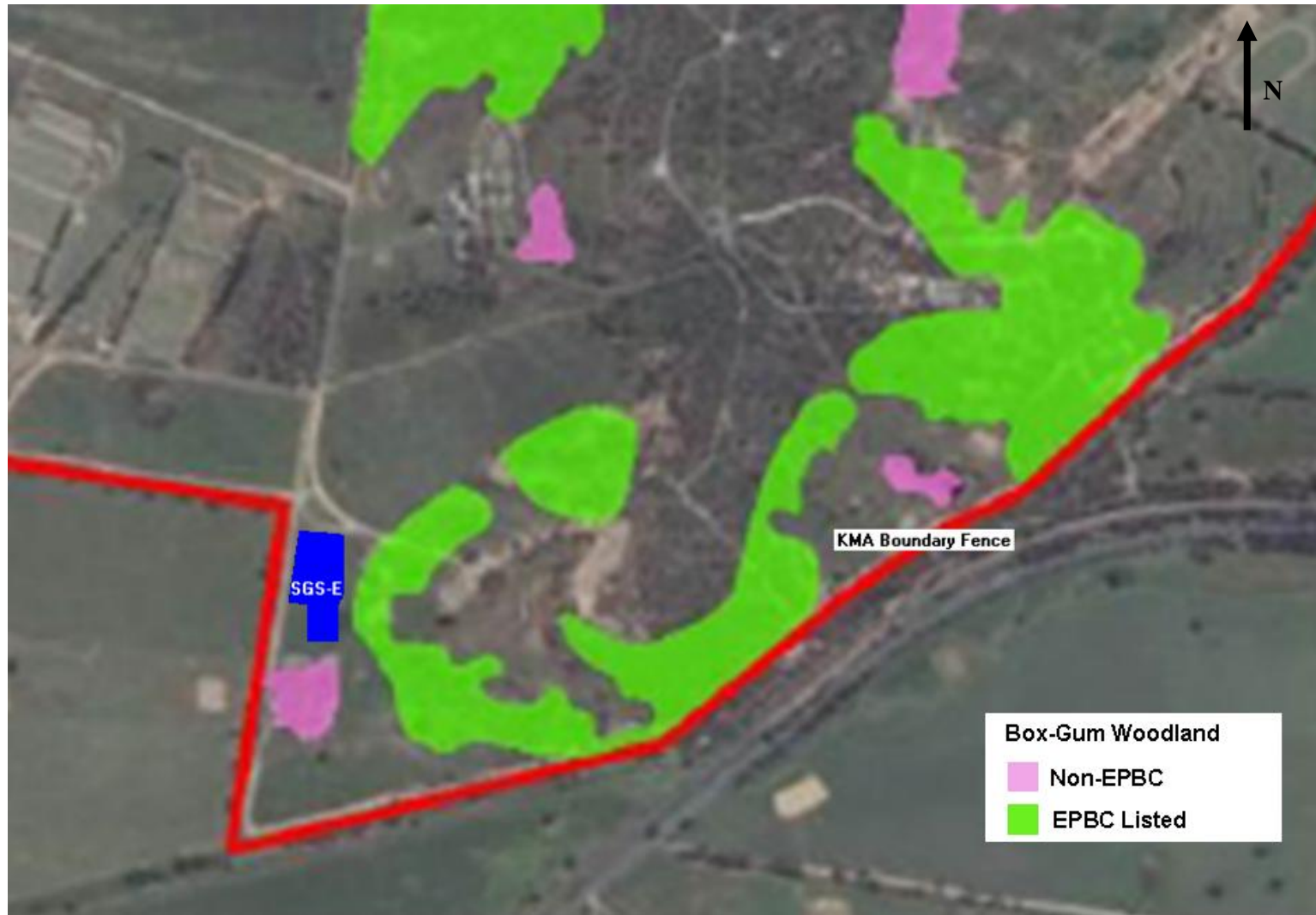


**SGS-E Facility – Architects Perspective**



**SGS-E Hilltop View – Architects Perspective**

### Attachment 5: SGS-E Impact on the KMA Environment



**SGS-E Proximity to the Identified Box-Gum Woodland Areas.**