Australian Government

Department of Defence

SPACE SURVEILLANCE TELESCOPE FACILITIES

Harold E Holt Naval Communications Station
Exmouth, Western Australia

STATEMENT OF EVIDENCE
TO THE
PARLIAMENTARY STANDING COMMITTEE
ON PUBLIC WORKS

Canberra, Australian Capital Territory
August 2014

[This page intentionally blank]

Contents

Need for the Works

Purpose of Works

Cost-Effectiveness and Public Value

Attachments

1. Location Plan
2. Harold E Holt Communications Station General Area Plan and Access Route
3. Stakeholder List
4. Space Surveillance Telescope – Site Plan
5. Space Surveillance Telescope – Enclosure and Support Building Elevations
6. Space Surveillance Telescope – Perspective Section
7. Space Surveillance Telescope − Enclosure and Support Building Ground Floor Plan
8. Space Surveillance Telescope – Enclosure Maintenance Floor Plan
9. Space Surveillance Telescope – Enclosure Observation Level Floor Plan
10. Space Surveillance Telescope – Telescope Viewing Angles
11. Space Surveillance Telescope - Perspective Section
12. Space Surveillance Telescope - Equipment Building Ground Floor Plan

Space Surveillance Telescope Facilities

Need for the Works

Identified Need

1. Since 1957, when the first man-made object was placed into earth's orbit, space has increasingly become a key enabler for nearly all military, governmental, commercial, and individual operations. From mobile phones to precision weapons, the explosion of electronics into almost all facets of modern life has placed increasingly greater importance on space-based capabilities. Military forces around the world are increasingly reliant on space based capabilities for communications, positioning, timing, and surveillance to enable the delivery of their primary effects. At the same time, space based capabilities are becoming increasingly heavily integrated into the daily lives of civilians around the globe. From navigation and communications to Automatic Teller Machine transactions and meteorological observations, space based capabilities pervade many aspects of our daily lives, often to a greater extent than many people realise. However, space is becoming increasingly congested with active satellites and discarded space junk. Currently, the United States tracks approximately 17,000 objects in orbit, with an estimated half a million additional objects too small to track. Maintaining an awareness of the position and trajectory of these objects is important when the relative speed of closure between objects can be as high as 14 kilometres per second. At such speeds, even objects smaller than one centimetre in diameter can cause serious damage to operational satellites or manned space missions. The vulnerability of a space asset to a collision with even a minute piece of space junk makes Space Situational Awareness an absolute necessity to successful operations in the space domain.

2. Space Situational Awareness provides the operators of space-based capabilities the ability to anticipate the influence of other space objects and take action to ensure continued and unimpeded operation of space vehicles. This can include manoeuvring spacecraft to reduce the probability of a collision with another object in orbit. With the very long lead times and huge costs often associated with placing satellites into orbit,

the capability to predict and avoid potential collisions is extremely valuable. From a military perspective, commanders and decision makers use Space Situational Awareness to leverage the capabilities of space-based systems while exploiting the associated vulnerabilities of an adversary. Space Situational Awareness is provided through the tracking, classification, and identification of space-based objects.

3. Currently, the Australian Defence Force (ADF) possesses very limited capability to obtain knowledge of space-based threats, relying heavily on the United States for Space Situational Awareness. In order to develop an ADF space surveillance and situational awareness capability, the Australian and United States Governments have agreed to the establishment of a surveillance capability in Australia. Most recently, this has been given practical expression through a decision to relocate a US Space Surveillance Telescope to Australia from the United States, proposed to be accommodated in facilities specifically designed and constructed to suit the purpose. The facilities proposal to support the Telescope is the focus of this Submission.

4. Before the Telescope surveillance proposal had established itself, a proposal (referred to as JP3029 Space Surveillance) was included in the Defence Capability Plan 2012. Its purpose was to establish as Phase 1 of the Space Surveillance project an initial radar capability in Australia. The defined purpose was to gain and maintain an awareness of activities in space and determine whether these activities will affect Australia's national interest, consistent with the Australian Defence Force Posture Review of 2012. Australia and the United States signed a Memorandum of Understanding in 2012, to enhance the Space Situational Awareness Partnership established in 2010. This would occur initially with the re-location of a C-Band Radar to Australia, to be hosted by the Harold E Holt Naval Communications Station near Exmouth, Western Australia, under joint operational arrangements. The Phase 1 project is in the delivery phase, and intended to come on line in 2016.

5. It was during the 2012 Australia-US dialogue that a joint commitment was made to work towards the relocation of a highly advanced optical Space Surveillance Telescope to Australia. This intention was given added emphasis in the 2013 Defence White Paper, where it was observed that space surveillance was of increasing significance and importance in Defence and National security. A Memorandum of Understanding to relocate the Telescope to the Harold E Holt Naval Communications Station area from

the United States was signed on 20 November 2013 in Washington, where Governments agreed that the US would relocate and own the Telescope, and that Australia would build and operate the facilities.

6. Original development of the telescope began in the United States in 2002, when the US Space Surveillance Telescope program was implemented. Recognising that there was a gap in conventional coverage, the US Defense Advanced Research Projects Agency (DARPA) developed and built the Space Surveillance Telescope at its New Mexico, US site, incorporating new technology to achieve significant improvements in field of view and scanning for deep space surveillance. Through 2010 and 2011, the 80-tonne telescope assembly and its systems underwent extensive readiness preparations, leading to demonstration testing and evaluation through to August 2012. Since then, the telescope has successfully undergone a Military Utility Assessment, however it is not yet operational as a contributing sensor to the US Global Space Surveillance Network.

7. The Telescope is expected to be operational in Australia by end 2016 for Southern Hemisphere observations, when it would begin contributing to the US Global Space Surveillance Network. This leads then to an accelerated facilities delivery schedule in readiness to receive the Telescope, and for its subsequent testing and demonstration activities.

8. The relocation of the telescope is intended to strengthen the global surveillance ability to identify, track, and characterise space assets and debris. This will contribute to the global public good by providing the information required by both military and civilian satellite operators to respond to potential threats. This includes the ability to provide satellite operators around the world with warnings of possible collisions between space objects, thereby reducing the danger posed by increasing congestion and space debris to space capabilities upon which many civilian and military functions rely.

9. As the Space Surveillance Telescope in New Mexico is currently undergoing operational testing, with the entire capability subject to ongoing performance assessment, the US host facility has provided a robust basis upon which to define requirements for the new Australian facility at the Harold E Holt site. The proposed facility comprises three complementary components:

   a. Dome structure - to enclose the telescope and its intrinsic operating equipment;

b. Operational Support structure - to accommodate supporting functions, equipment and computing capacity to operate the Telescope and to communicate; and

c. Ancillary or Equipment Building (s) - to provide the services and building plant support, sufficiently distanced from the Dome to remove vibration influence.

Options Considered to Fulfil the Identified Need

10. **Capability.** Development of an ADF Space Situational Awareness capability will be streamlined by building on the existing security alliance with the US. The establishment of US assets in Australia for shared operation makes use of existing US technology, allowing the ADF to rapidly acquire a space surveillance capability whilst avoiding the time and cost premiums associated with developing an independent ADF capability. Relocating US assets to Australia also addresses the limited coverage currently available in the Southern Hemisphere. This outcome could not be achieved by placing ADF personnel in existing US facilities, which would also offer little towards the development of a sustained Australian capability.

11. **Location Options.** A number of siting options existed to construct the jointly operated facility. At the strategic level, initial siting surveys were conducted in 2012 and 2013 to identify an appropriate site for the Telescope. As a Defence asset, the Telescope was intended to be hosted within a Defence area, and be remote from the possibility of light interference during its operational life. On this basis, three potential locations in Australia were identified:

a. The Jindalee ‘Over The Horizon Radar’ receiver site near Alice Springs, Northern Territory;

b. The Australian Defence Satellite Communications System site, Geraldton, Western Australia; and

c. The Harold E Holt Naval Communications Station near Exmouth, Western Australia (Attachment 1).

12. An assessment of these strategic level siting options was undertaken, involving US and Australian technical personnel. Based on this assessment against a range of technical factors, the team concluded that the site offering the best geographical location and

weather conditions to enable the telescope to obtain the maximum possible quantity of useful data was the Exmouth option.

13. Within the Harold E Holt Naval Communications Station area, two operational siting options were then identified and considered. The basic requirement was that the site would need to be away from the base administrative centre and developed areas to avoid light interference, but proximate enough to base services for beneficial cost and environmental factors. The two sites identified, and as shown at Attachment 2, is one accessed from Borefield Well 18, and the other accessed from the Borefield Well 16. The Borefield Well 16 option was not considered viable for long term access to the site due to the steeply graded landscape. As a result, the site accessed from Borefield Well 18 was selected as the preferred site within Harold E Holt for its comparatively easy access.

14. **Facility Options.** Due to the specialised and unique nature of the capability, and the premise that it is a replication of the US space surveillance telescope capability in New Mexico, there was only one facility option available to develop. The facility is being developed based on the design of the US New Mexico facility but including adaptations to comply with relevant Australian building standards and codes, cyclone protection, and a number of design improvements that have been identified from the New Mexico facility design.

Historical Background of the Site

15. In September 1960, the US Navy conducted siting investigations for a Very Low Frequency and High Frequency communications station. The site on the tip of the North West Cape in Western Australia was selected, comprising an overall area of about 8700 hectares. Initially commissioned as the “United States Naval Communications Station North West Cape” in 1967, it was renamed on 20 September 1968 as the “United States Naval Communications Station Harold E Holt” in memory of the late Australian Prime Minister the Hon. Harold E. Holt. Its development also drove that of the nearby Exmouth township.

16. The Base comprises three areas – A, B and C. Area C is the High Frequency receiver facility, located south of RAAF Base Learmonth. Areas A and B (as shown in Attachment 2) are respectively :

    a. The Very Low Frequency transmission towers, at the northern end of the Cape; and

    b. The Administration area (including the nearby borefields upon which the Base depends for water) and the High Frequency transmission facilities.

17. From January 1975, the station was jointly manned by US and Australian Navy personnel, and renamed again, to "Naval Communications Station Harold E Holt". At its peak, the working population on the Base numbered about 600 personnel. By 1992, personnel numbers had been drawn down as command of the Base transitioned to the Royal Australian Navy (RAN). Although the Base continues to provide communications for the ADF (particularly to the RAN), a number of facilities on the Base have become redundant, with some being leased out to private operators. One such facility is the existing Sea Breeze Resort, a hotel operating out of one of the bases accommodation buildings.

18. In December 2002, control of the Harold E Holt Naval Communications Station was transferred to the Defence Materiel Organisation. Currently the base hosts fewer than 150 personnel, including the Defence Material Organisation staff, contract and support staff, an Australian Federal Police contingent, and elements of the Pilbara Regiment. The Base is also host now to the related C-Band Radar space surveillance capability presently undergoing its installation phase.

Environment and Heritage Assessment Process

19. The Project involves works on Commonwealth land, near to the heritage listed Cape Range National Park, in the North West Cape area. In order to better appreciate the heritage and environmental impacts attached to the proposed works, a heritage impact assessment and an initial environmental review were undertaken by consultants on behalf of Defence.

20. Informed by the outcome of the studies, and following Defence policy guidance on the management of the construction and operations of such facilities, environmental management plans are to be in place before construction and use are commenced.

Heritage Considerations

21. The Heritage Impact Assessment undertaken by Defence's consultants noted that the risk of impact to potential non-indigenous heritage was low, and that no Aboriginal archaeological sites were identified during the survey of the study area.

22. The assessment observed that although there is a low potential for sub-surface Aboriginal archaeological sites to exist in the study area, this risk can be mitigated by maintaining diligence during the works. Relevant protocols will be included in the Environmental Clearance Certificate as conditions to promote diligence during works, and in reporting matters if identified.

Environmental Impact Assessments

23. The Defence Engineering and Environment Branch has considered the proposed works against the Commonwealth's *Environment Protection and Biodiversity Conservation Act* 1999 (Cth) and has determined that a referral under the Act will not be required for this project.

24. An Initial Environmental Review completed by Defence concluded that there were unlikely to be any significant impacts on Matters of National Environmental Significance or on the adjacent Ningaloo Coast National Heritage Place. In noting that the study area has a high likelihood of subterranean fauna occurrence, the Review also observed that as no dewatering or groundwater contamination is anticipated, the threat to any such fauna is minimal. Similarly, habitat interference of the listed threatened terrestrial fauna species, the Black Flanked Rock Wallaby, can be avoided with appropriate site management during construction, when increased traffic might be anticipated.

25. The Space Surveillance Project will be managed in accordance with the Defence Environmental Management framework. The building contractor will be required to produce a Construction Environmental Management Plan (CEMP) to articulate how the contractor will control environmental measures during construction, and avoid

activities that may threaten subterranean fauna or the Black Flanked Wallaby habitat. Furthermore, the building contractor's CEMP is a contractual requirement and compliance with the CEMP will be periodically audited throughout the project. The building contractor will not be able to commence construction activities until a Defence Environmental Clearance Certificate is issued.

Key Legislation

26. The following key legislation is relevant to this project:

    a. *Defence Act 1903* (Cth)

    b. *Environment Protection and Biodiversity Conservation Act 1999* (Cth);

    c. *Native Title Act 1993* (Cth)

    d. *Aborigine and Torres Strait Islander Heritage Protection Act 1984* (Cth);

    e. *Building and Construction Industry Improvement Act 2005* (Cth);

    f. *Work Health and Safety Act 2011* (Cth);

    g. *Occupational Safety and Health Act 1984* (WA);

    h. *Disability Discrimination Act 1992* (Cth);

    i. *Fair Work Act 2009* (Cth); and

    j. *Fair Work (Building Industry) Act 2012* (Cth).

27. The design will comply with all relevant and current Defence Standards, Australian Standards, Codes and Guidelines including, but not limited to, the following:

    a. National Construction Code 2013;

    b. Building Code 2013;

    c. Defence Manual of Fire Protection Engineering; and

    d. Defence Estate Quality Management System (DEQMS).

Impacts on Local Community

28. Defence has remained cognisant of its potential impact on the local Exmouth community, as the township had seen some decline when the US Navy presence

effectively concluded in 1992. While there has been resurgence on the back of the tourism industry and growing visitor interest in the Ningaloo Coast, the proposed Defence works also confirm that the Harold E Holt Base shall remain an important Defence asset and a feature of the Exmouth area into the medium term at least.

29. This proposal will generate short-term employment opportunities in the Exmouth area, mainly in the building and construction market. It is expected that approximately 40 personnel will be directly employed for the duration of the construction activities, which will also generate some off-site job opportunities through the manufacture and distribution of specialist materials over the construction period. This will provide a positive economic impact, ultimately to local small and medium enterprises. Details on the positive economic impacts within the area are discussed under the 'Public Value' section of this Statement of Evidence.

30. The need to site the telescope away from light sources would complement a preference to reduce the visual impact on the surrounding Cape Range area. Increased consultation with the Exmouth council will occur to manage the effects, if any, of future township development on Telescope operations.

Consultation with Stakeholders

31. Consultation is intended to occur with the list of stakeholders as detailed at Attachment 3. Defence will arrange a community consultation evening at Exmouth in September 2014, in conjunction with the Exmouth Council, to facilitate direct access of the local community to Defence project staff.

Purpose of Works

Project Objectives

32. The aim of the project is to provide the facilities and supporting infrastructure necessary to support the operations of the Space Surveillance Telescope. The project will develop an ADF space surveillance capability, enhance the global surveillance capability, and provide an increased ability to track space debris. The project will also demonstrate an increased Australian and US commitment to closer space cooperation,

and provides further practical expression to the 2010 Space Situational Awareness partnership.

Details and Reasons for Site Selection

33. The proposed Harold E Holt site (accessed from Borefield Well 18) for the construction of the Telescope facilities is on Commonwealth land.

34. Site selection was a filtering process from a strategic level assessment of national sites to operational assessment of localised base options. Initial site surveys in March 2012 and January/February 2013 had narrowed the preferred site choice to three locations, being near Alice Springs, near Geraldton, and at the Harold E Holt Communications Station, Exmouth. A further site option assessment in February 2013 favoured Harold E Holt as the preferred strategic level option, and identified two possible sites within Harold E Holt. A site survey undertaken in May 2013 confirmed that the two possible sites were credible options and identified the site accessed from the Harold E Holt Borefield Well 18 as the preferred site.

35. Informed by subsequent environmental, heritage and geotechnical assessments of the preferred site, a site selection board was convened late 2013. The preferred site was confirmed, and approved December 2013, as the basis for subsequent planning for the Telescope installation.

Detailed Description of the Proposed Scope of Works

Project Location

36. The location of the proposed works is at the Harold E Holt Naval Communications Station base area, at a site approximately one kilometre north-west of Base Borefield Well 18.

Scope Elements

37. The proposed facility to accommodate the Telescope will comprise the dome enclosure structure (the observatory), an operations support centre (connecting to the dome structure), and one or more equipment structures (for supporting services). Attachment

4 is indicative of the site layout and main scope elements. Attachments 5 to 12 describe the proposed facility in more detail.

a. **Enclosure**. The Enclosure is a critical part of the facility as it houses the Telescope. The structure, approximately 18 metres diameter x 20 metres high, is designed to exacting standards that ensure the stability of the telescope. In the closed position, the Enclosure protects the telescope and its instruments against adverse weather conditions. In the open position, the Enclosure allows the telescope a free field of view by means of a large slit in the structure. The Enclosure is connected directly to the Support Building. The Enclosure base serves as a foundation and stationary floor for the rotating Enclosure and also provides for storage and an equipment room. Due to the requirement to minimise vibration, the connected dome and Support Building requires significant foundation and concrete slab works.

b. **Support Building**. The Support Building, measuring approximately 19 metres x 23 metres, comprises three functional areas for telescope related activities, utilities infrastructure and personnel related functions. The Support Building is connected directly adjacent to the Enclosure.

c. **Equipment Building(s)**. The Equipment Building(s) house large mechanical and electrical equipment that support the Enclosure and the Support Building. The electrical service entrance is located at the Equipment Building, as well as the transformer, switchgear, fluid coolers and chillers. Fire protection equipment for the facilities is located in a room within the Equipment Building. A back-up generator is also located within the Equipment Building to ensure power continuity. The Equipment Building is to be completely enclosed and protected against adverse weather conditions, subject only to ventilation requirements for the generator operation. It will be located on the site but set at a distance from the Enclosure and Support Buildings.

38. Other scope requirements include the following:

a. access track to connect the proposed site to the existing Base road and track network;

b. establishment of a communications link back to the Base, for security observation and for data distribution as required from the existing Base infrastructure;

c. connection to existing Base HV power, water, and sewerage services (with provision for stored fire services water on site);

d. installation of uninterrupted back-up power supply (for operational continuity and protection of sensitive equipment);

e. security fencing, with sufficient enclosed area to allow manoeuvre of cranage and construction traffic on site; and

f. car parking for five vehicles.

Public Transport

39. There are no new permanent staffing obligations associated with the project when operational. As such there are no proposed changes to public transport arrangements.

Local Road and Traffic Concerns

40. The Base is serviced by Murat Road, connecting it to the tip of the Cape, and south towards the main road junction to Carnarvon. As the permanent base staffing is not expected to increase, there will be no added permanent traffic loading on Murat Road.

41. Although works are substantial, they are contained within the Base area, so there is no significant impact anticipated on local traffic arrangements during works except for, supply. Notwithstanding this, Defence will require that the Contractor maintain a Traffic Management Plan for the management of local traffic. Conditions of roads, local traffic, pedestrian safety and related issues will be considered prior to construction commencing.

42. A significant traffic related activity during later stages of construction will be the movement to the site of the main Telescope assembly and supporting cranage. This activity is outside the scope of this facilities proposal and the main Contractor's expected obligations, but may involve the Contractor providing assistance in traffic coordination with local government agencies and in safe movement to the site.

Zoning and Local Approvals

43. The proposed works are contained entirely within Commonwealth owned, Defence controlled land, and using Defence services infrastructure. The works are consistent with the relevant current Defence zone and precinct plans. The proposed works do not require acquisition of additional land nor involve land disposal aspects.

Master and Site Planning

44. The site selection has been undertaken in accordance with Defence Estate Planning Policy requirements. The Site Selection Board was convened to assess the appropriate location from two Harold E Holt site options in accordance with Defence policies, including environment, heritage and operational requirements. The selected location for the proposed facilities was agreed in December 2013, and is consistent with Defence's Zone Planning principles, the technical requirements of the Telescope, and both US and ADF operational requirements. Its siting is consistent with existing Base use and zone planning.

Planning and Design Concepts

45. The fundamental approach adopted for the design of the proposed facilities is to replicate existing New Mexico facilities as far as practically possible, taking into account compliance with Australian building standards and Australian Defence standards, and the performance lessons arising from operation of the New Mexico site. The general philosophy will also incorporate the following considerations:

    a. provision of cost effective and functional facilities of energy efficient design suitable for the climate of the site and the operational routine of the Telescope;

    b. adoption, where practicable, of conventional construction techniques and materials, in particular those commonly used by the construction industry and consistent with the relative remoteness of North West Cape;

    c. maximum use of existing Base infrastructure and facilities to minimise capital costs;

d. where possible, utilisation of readily available and durable materials that combine long life consistent with Telescope life-of-type, while minimising maintenance; and

e. specific site constraints, security requirements and functional relationships to existing facilities.

Structural Design

46. As the integrity and stability of the site foundation is critical to Telescope precision, structural design will be informed fundamentally by site geotechnical conditions and cyclone wind loadings. Geotechnical assessments were undertaken in order to identify the preferred site, guided by the existing US facility design characteristics where the telescope is supported on shallow foundations with a central pier to support the telescope assembly, and predominantly a concrete and steel structure.

47. The design will be in accordance with all relevant Australian Standards, the National Construction Code 2014 and building regulations. The designs will have sufficient strength to support not only wind, dead and live loads, but also the added dynamic loading that is associated with dome acceleration and deceleration. It will so need to achieve a durable design, with absolute minimal internal vibration and building movement being permitted.

Materials and Furnishings

48. Where applicable, materials and furnishings will be consistent with Australian and Defence standards relevant to specific intended use within the proposed facilities. As the proposed facilities shall exist to support operation of the Space Surveillance Telescope, often remotely controlled, those selected will be based on functionality, durability and low maintenance, and for their Ecologically Sustainable Development (ESD) properties.

Mechanical Services

49. Unique to this project are the very precise tolerances required of the mechanical equipment supporting the dome rotation, upon which Telescope accuracy

fundamentally depends. The design and fabrication will be informed by the New Mexico experiences in production and installation.

50. The mechanical services systems will provide mandatory ventilation, thermal comfort and air quality facilities in accordance with specific use and the requirements of the National Construction Code 2014. The mechanical services will be designed for the function and needs of each zone in the dome and operational support buildings. In the dome building, the internal temperature control is a function of both the external temperature and the internal temperature limits that can be tolerated by the Telescope itself.

51. To the extent that is practicable, the mechanical equipment and services will be energy efficient and environmentally effective. The aim is to comply with Defence requirements, the National Construction Code 2014 and its referenced standards and other required or relevant standards, codes and guidelines.

Hydraulic Services

52. Hydraulic services works for water supply and sewerage will involve extension of existing infrastructure from within the Base Administrative area to the site. They shall be installed in accordance with legislative and Australian Standards requirements, the National Construction Code 2014, relevant work health and safety requirements, and the Defence Safety Manual. There is presently sufficient potable water capacity from the 18 bores supporting the Base, with associated treatment and storage, without the need to sink another bore (with associated quality, maintenance and management obligations). The Base wastewater treatment capacity is also sufficient without the need to treat at the site (where the risk of contamination, albeit a small loading, would arise). Consideration may extend to onsite wastewater storage, for periodic removal.

Electrical Services

53. All Harold E Holt electrical power is generated onsite. Sufficient capacity and generating reliability exists to absorb the proposed facility requirements. Connection shall occur in the vicinity of the existing Base Administrative area substation, and be carried to the site in buried conduits. At the site, power shall also be conditioned for Telescope, control and computing requirements. A back-up emergency generating

capacity will also be installed on site to maintain Telescope operations for not less than a 24-hour period. Its purpose is not only to ensure operational continuity, but to protect precision Telescope componentry from any power disruptions. Meters installed will be monitored through a Building Management System to facilitate an energy management program.

54. Lighting and power protection at the site shall be in accordance with, where practicable:

    a. all applicable legislation, regulations, codes of practice, State guidance publications, and the Base generating authority directions; and

    b. all relevant Australian Standards and Defence engineering requirements, noting the generated power at the Base (and that largely required at the Telescope) is 110v.

Fire Protection

55. The scope of fire detection and protection services shall comply with the requirements of the Defence Manual of Fire Protection Engineering, the National Construction Code 2014, and the Defence Manual for Infrastructure Electrical Engineering. Fire systems shall be integrated into the existing Base systems for monitoring and reaction.

56. The requirement for a bushfire management plan will be confirmed during design. If required, the plan will be developed for the new facilities during the construction period, in accordance with the requirements of the Defence Manual of Fire Protection Engineering.

Acoustics

57. The proposed facilities will comply with the National Construction Code 2014 and Australian standards for noise and acoustics.

Landscaping

58. Landscaping works will be compliant with the relevant Australian Standards including the National Construction Code 2014 and any local site requirements. External civil

works are to be limited primarily to the track access corridor and for site levelling. These areas will be kept clear for future maintenance access and emergency purposes.

59. Construction Environmental Management Plans are to be developed by contractors before the road and site works commence. The Plans will require that the contractors avoid damage to the natural landscape.

In-Ground Communications and Security

60. Cabling shall run from the site to the Base Administrative communications centre, for the purposes of monitoring and managing remotely the Telescope environment and operations. The infrastructure to be installed is proposed to be buried along the track access corridor, and will comply with operational Defence requirements and Australian Standards for communications and security.

Environmental Sustainability of the Project

61. The Commonwealth is committed to ESD and the reduction of greenhouse gas emissions. Defence reports annually to Parliament on its energy management performance and on its progress in meeting the energy efficiency targets established by the government as part of its commitment to improve ESD. However, the observation level of the dome must interact with the external environment during night-time observation periods (and moderate the closed dome environment shortly before and after opening for technical reasons). As a result, some energy inefficiency may arise for operational reasons.

62. 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.

Energy Targets

63. All facilities will be designed, constructed, operated and maintained to ensure that they use energy efficiently to the greatest extent possible. Design will be based on promoting compliance with:

    a. the National Construction Code 2014;

b. Defence Building Energy Performance Manual;

c. the Energy Efficiency in Government Operations policy (whereby all new and refurbished office buildings of greater than 2000m^2 are to comply); and

d. the NABERS Energy rating system, if and where this can be applied.

64. Office areas in the proposed facilities are substantially less than the 2000m2 threshold relevant to the Government Operations policy with the overall area being of mixed-use. Nevertheless, these facilities will be subject to energy monitoring, and energy efficiency measures introduced into the Operational Support facility and elsewhere where practicable.

Measures to Reduce Energy and Water Use

65. ESD measures for the project will be balanced with other requirements for Defence buildings, including security, heritage and work health and safety considerations, to ensure that Defence operational capability is not compromised.

66. Acknowledging that the North West Cape area is a harsh climate, and a region subject to extended high temperatures, and that the facility is infrequently manned, the proposed facility is to be modelled to predict energy consumption levels, which determine the design targets based on the building classification. Energy management is a key aspect in the design of the new facilities. Energy management initiatives which have been, or shall be, considered include:

a. installing a Building Management System (BMS), with the capability to link in to a future site wide Regional Utilities Management System;

b. in-building load control devices such as motion sensors where practical;

c. natural ventilation and mixed mode systems wherever feasible and cost effective;

d. installation of ceiling fans in selected areas to enhance comfort without the use of air conditioning;

e. separate digital energy metering for the communications/control areas;

f. energy efficient lighting supplemented by energy efficiency techniques such as occupancy sensing and after-hours automatic shut-off controls; and

g. energy efficient appliances.

67. Efficient water use is a critical feature of design for a remotely controlled facility, to ensure that scarce water resources are not overused. Water saving measures for the proposed facilities will include consideration of:

a. tapware and fittings being compliant with the Water Efficiency Labelling Standards scheme, to provide a minimum of a 3-star water conservation rating;

b. Pressure limiting valves to limit water flow to all appliances; and

c. Metering of the main water supply to the facilities, and sub-metering where feasible.

Details of Compliance with Local, State and Commonwealth Water and Energy Policies

68. The proposed facilities will be designed, constructed, operated and maintained to promote efficient energy use, in compliance with the National Construction Code 2014, the Energy Efficiency in Government Operations policy and the NABERS Energy rating system to the best practicable extent.

Re-Use of Existing Structures

69. There were no existing facilities that are suitable for adaptive re-use to meet the unique requirements of the Space Surveillance Telescope capability.

Demolition and Disposal of Existing Structures

70. There are no facilities intended within the proposed Harold E Holt scope of works for demolition or disposal. Works that may occur to existing infrastructure will be that relevant to supporting the Telescope site, and is presently limited to connection to existing services without the need to undertake remediation or upgrade works on the Base itself.

Provisions for People with Disabilities

71. To the extent that the facility is to comply when it is to be largely a remote operation, these works will comply with required provisions for disabled access detailed in the

Disability Discrimination Act 1992 (Cth), the National Construction Code 2014, Australian Standard AS1428 (Design for Access and Mobility) and Defence's policy Disabled Access and Other Facilities for Disabled Person.

Childcare Provisions

72. The Space Surveillance Telescope facilities and the subsequent surveillance operations are not expected to add to the existing personnel numbers at the Harold E Holt Base. There is, therefore, no requirement for additional childcare facilities on the Base as a result of this project.

Work, Health and Safety Measures

73. The proposed facilities to be provided under this project will comply with the Department of Defence Occupational Health and Safety policy, the *Work Health and Safety Act 2011* (Cth), Occupational Health and Safety (Commonwealth Employment - National Standards) Regulations and the Defence Occupational Health and Safety manual.

74. In accordance with section 35(4) of the *Building and Construction Industry Improvement Act 2005* (Cth), building contractors will be required to hold full occupational health and safety accreditation from the Office of the Federal Safety Commissioner under the Australian Government Building and Construction Occupational Health and Safety Accreditation Scheme. The construction site will be appropriately secured to prevent unauthorised access during the construction period. No special or unusual public safety risks have been identified.

Cost Effectiveness and Public Value

Cost Effectiveness

Project Budget

75. The estimated cost for the project is $63.0 million, excluding Goods and Services Tax. The project budget incorporates all construction costs, management and design fees, furniture and fittings, equipment, contingencies and an escalation allowance. As the

telescope remains US property, the budget excludes the cost of the Telescope, its transport and its installation into the facility's enclosure.

Details of Project Delivery System

76. The proposed method of delivery is the traditional Head Contract approach. This involves the engagement of a designer, giving Defence maximum control over the design of the facility. Facility design will be progressed through to 100%, allowing a Head Contractor, also to be engaged by Defence, to price the construction works. From a design perspective, this facilitates a considered informed approach to a unique design requirement, building on the experiences of the New Mexico design effort and lessons learned during construction. It also allows the Head Contractor to apply its skills to the challenges of delivery in a remote site to exacting work quality standards, and then to manage its activities collaterally with those of the Telescope installer.

77. A Project Manager / Contract Administrator has been engaged to represent Defence as its Agent in the development phase of the project. Subject to satisfactory performance and negotiation outcomes for the construction phase, the Project Manager / Contract Administrator may be re-engaged to continue to provide Project Management and Contract Administration services for the construction phase.

78. A Design Services Consultant has been engaged to prepare design documentation and cost estimates for the proposed facilities in the development phase. Subject to satisfactory performance and negotiation outcomes, the Design Services Consultant may be re-engaged to provide design services for the construction phase.

Construction Program

79. With the approval of the PWC, preliminary works to facilitate access to the site commenced in early September. Subject to Parliamentary approval, the main works are intended to commence by early 2015, with all major works expected for completion by mid 2016.

Public Value

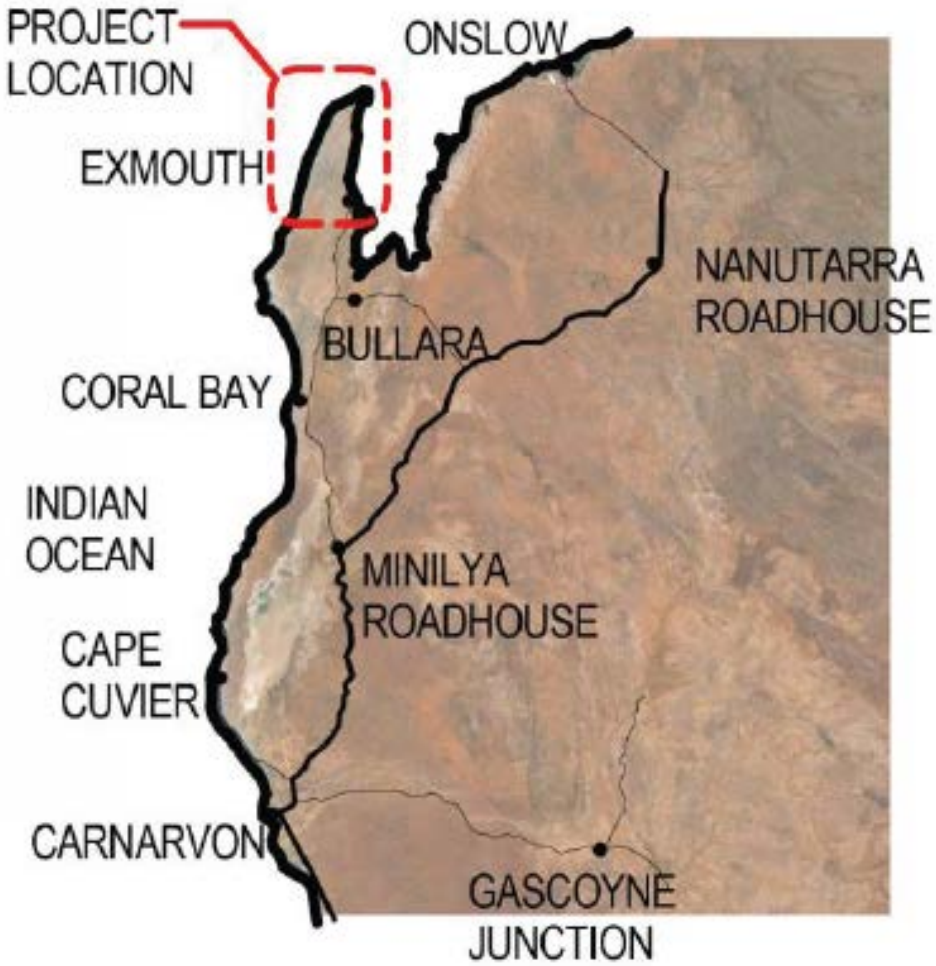
80. The project is a major enabler in securing an ADF space surveillance capability, and will assist in protection of Australian satellite resources by avoidance of space debris.

This developing ADF capability will be secured in a cost-effective manner; namely, though Australian and US operational use of the Telescope capability, underpinned by shared investment in new facilities (Australian funded) and the Telescope (US funded), and better utilisation of the existing infrastructure established by the US at the Harold E Holt Naval Communications Station.

81. The capability flowing from the Space Surveillance Telescope operations at Harold E Holt will add materially to the US Global Space Surveillance network. It will augment network observation capability from the Southern Hemisphere, and provide benefit in more comprehensive monitoring of space debris and the public sharing of data acquired by the Space Surveillance Telescope.

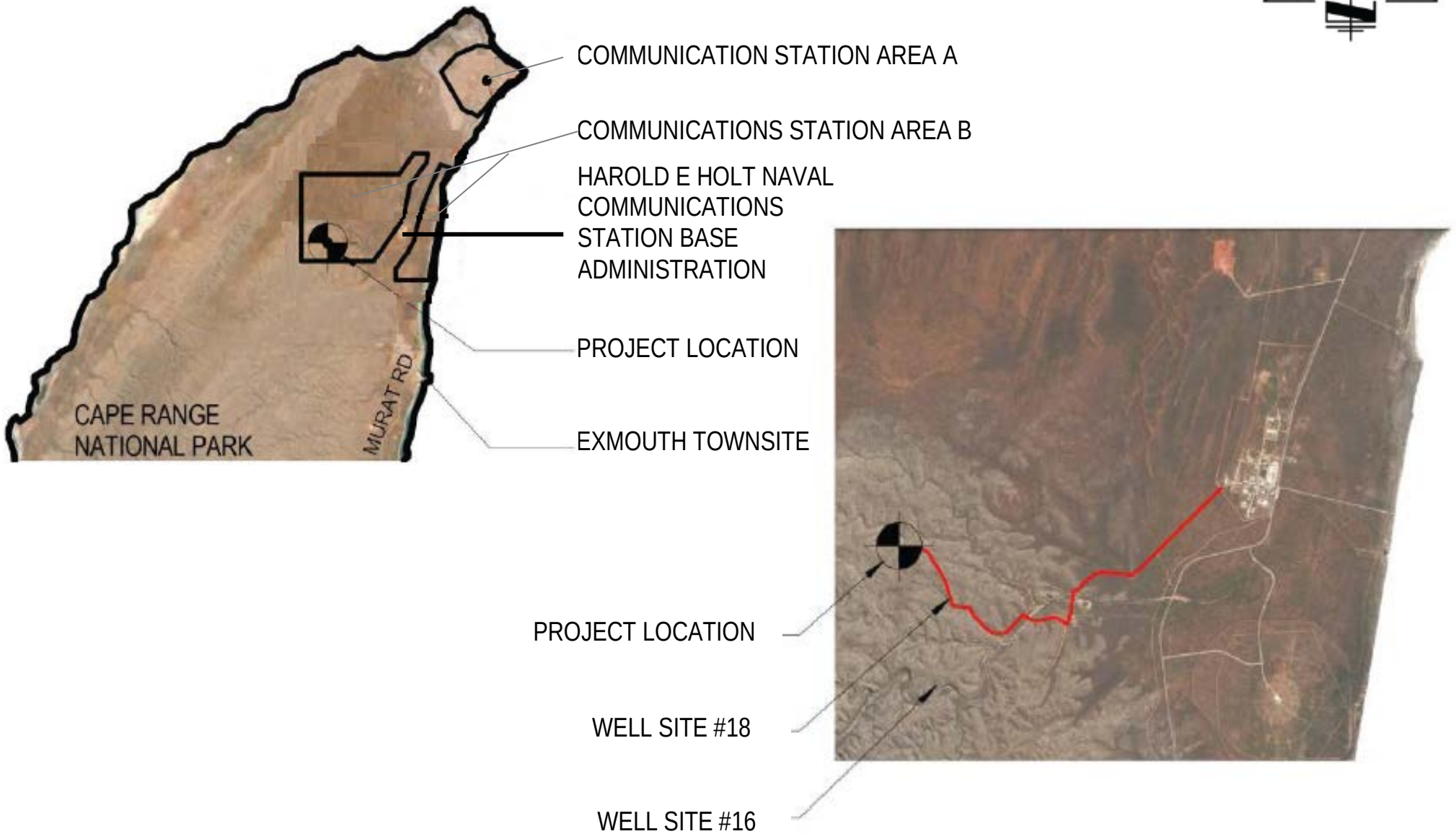
Revenue

82. No revenue will derive from the proposed Space Surveillance Telescope operations, as much of the effort is for Defence purposes. Collateral benefits in debris monitoring will be shared.



ATTACHMENT 1 – LOCATION PLAN

Space Surveillance Telescope – J0116-SST

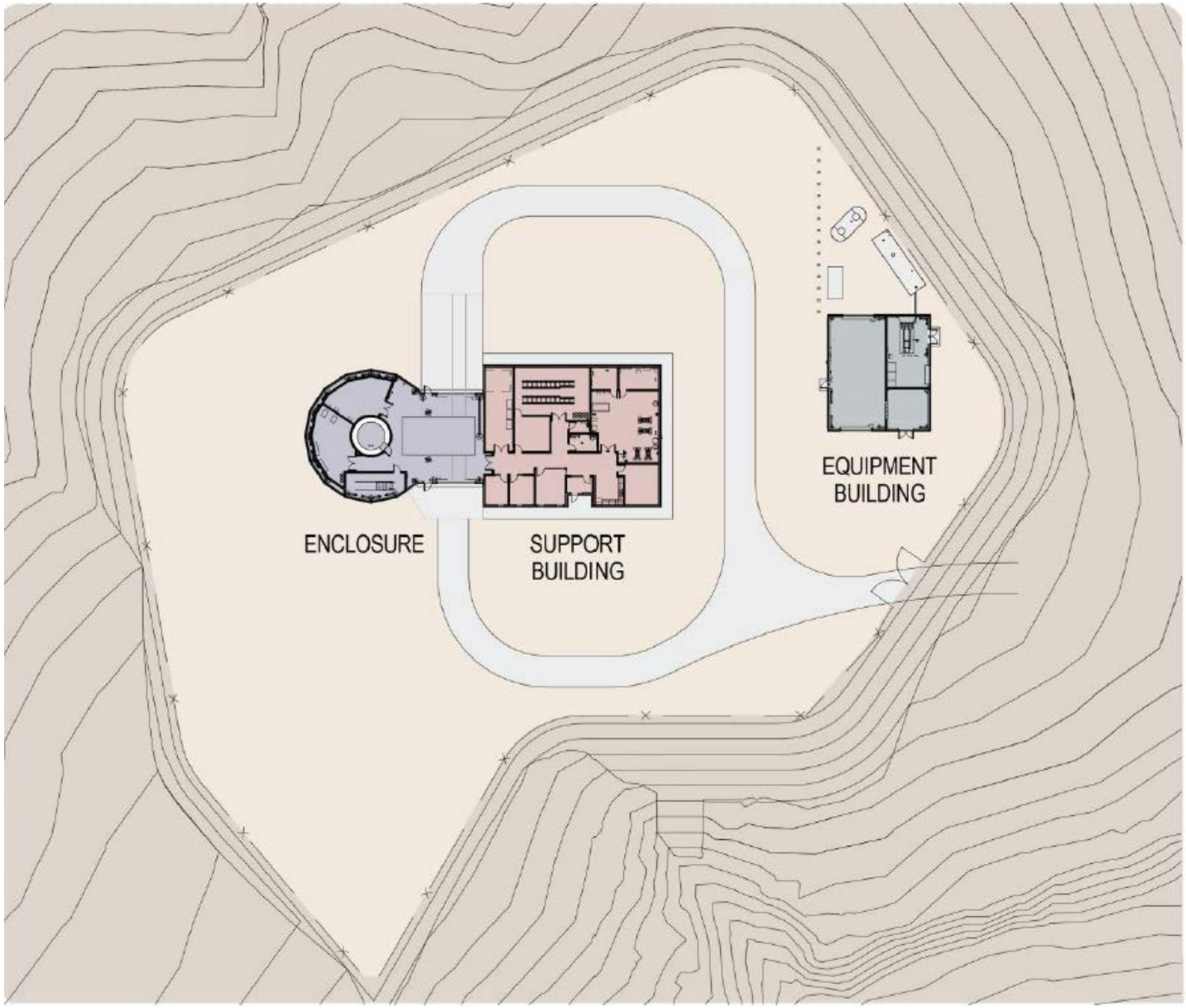


ATTACHMENT 2 – HAROLD E HOLT NAVAL COMMUNICATIONS STATION GENERAL AREA PLAN & ACCESS ROUTE

Space Surveillance Telescope – J0116-SST

Stakeholder List

- The Honourable Melissa Price MP, Federal Member for Durack
- Mr Vincent Catania MLA, Western Australia State Member for North West Central District
- Shire of Exmouth
- North West Cape Exmouth Aboriginal Corporation
- Gascoyne Development Commission
- Water Corporation
- Western Power – Horizon Power
- Department of Fire and Rescue Services (WA) (Exmouth DFES Volunteer Brigade)
- Department of Planning and Infrastructure (WA)
- Department of Environment (Cth)

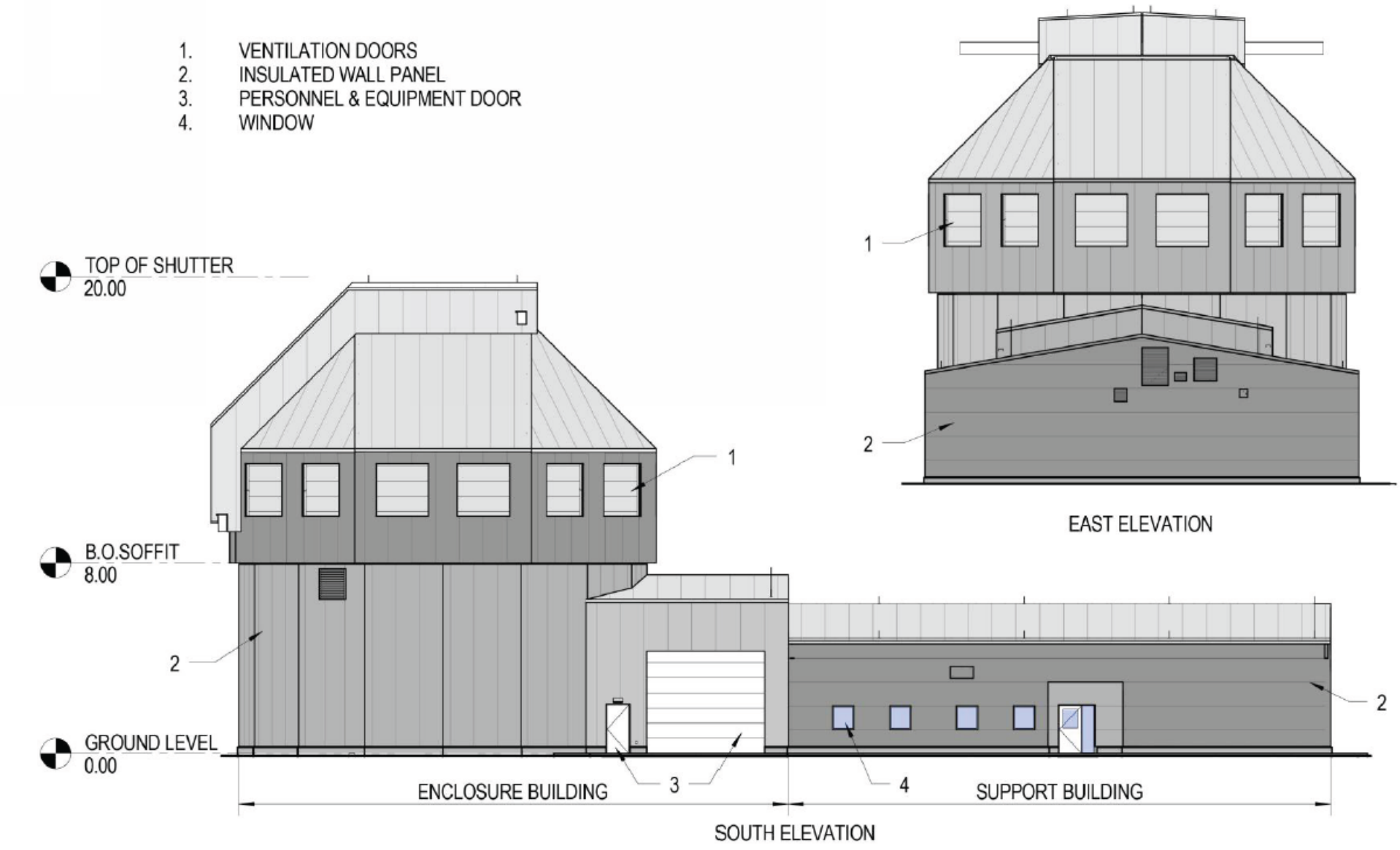


10 0 10 20 30 m

SCALE 1:700
(Original Sheet A4)

ATTACHMENT 4 – SITE PLAN

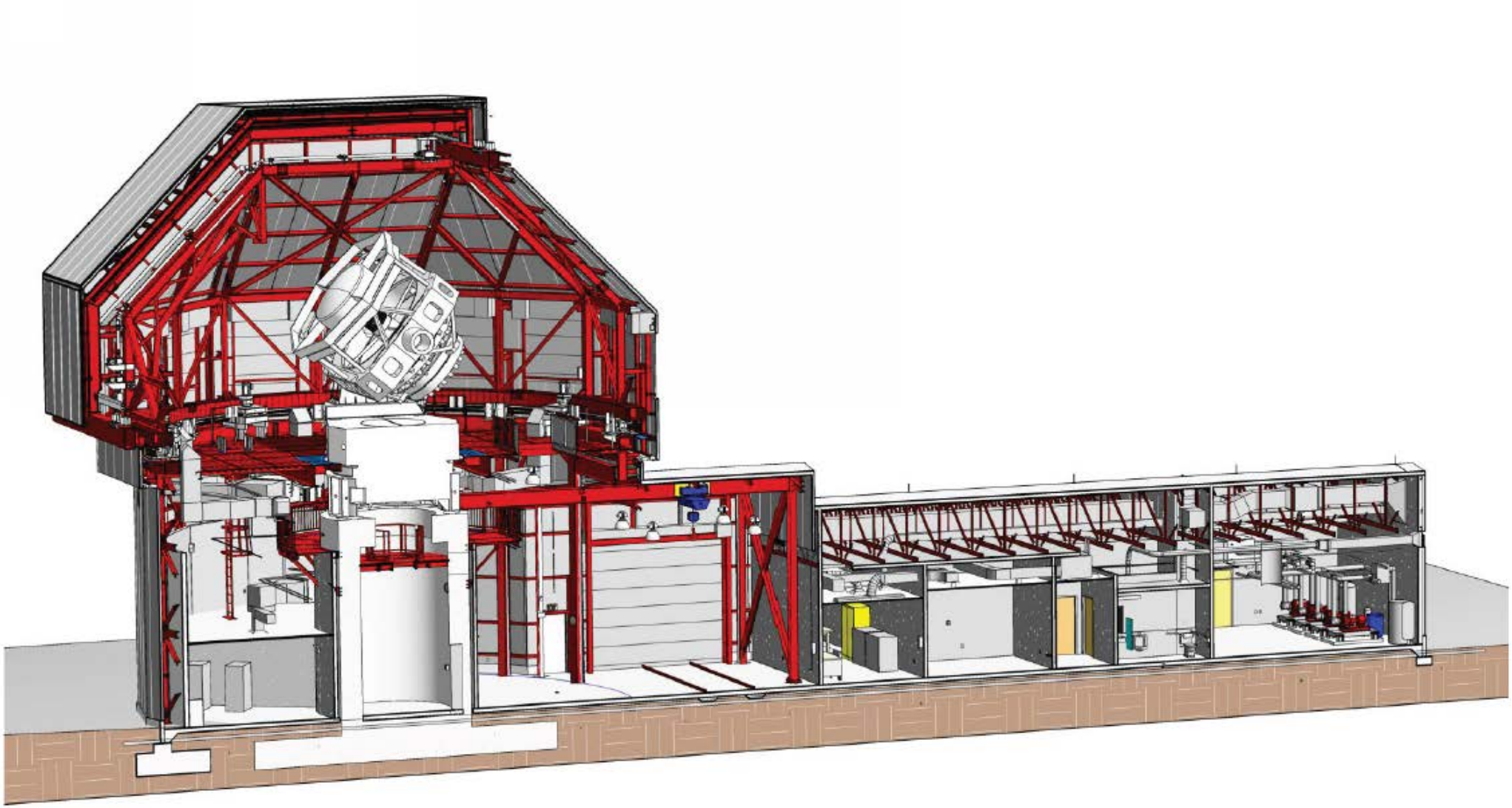
Space Surveillance Telescope – J0116-SST



SCALE 1:200
(Original Sheet A4)

ATTACHMENT 5 – ENCLOSURE AND SUPPORT BUILDING ELEVATIONS

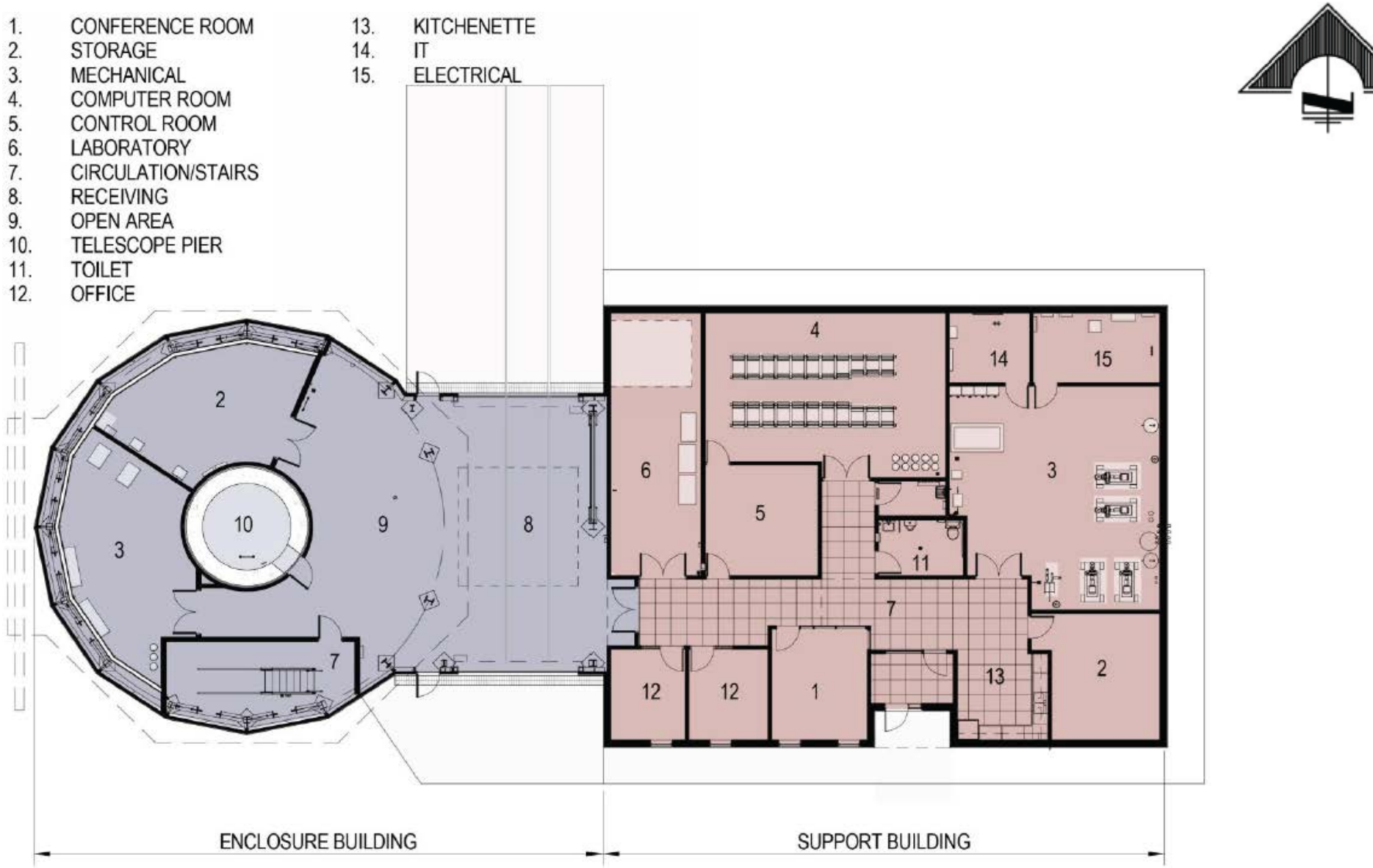
Space Surveillance Telescope – J0116-SST



ATTACHMENT 6 – PERSPECTIVE SECTION

Space Surveillance Telescope – J0116-SST

1. CONFERENCE ROOM
2. STORAGE
3. MECHANICAL
4. COMPUTER ROOM
5. CONTROL ROOM
6. LABORATORY
7. CIRCULATION/STAIRS
8. RECEIVING
9. OPEN AREA
10. TELESCOPE PIER
11. TOILET
12. OFFICE
13. KITCHENETTE
14. IT
15. ELECTRICAL

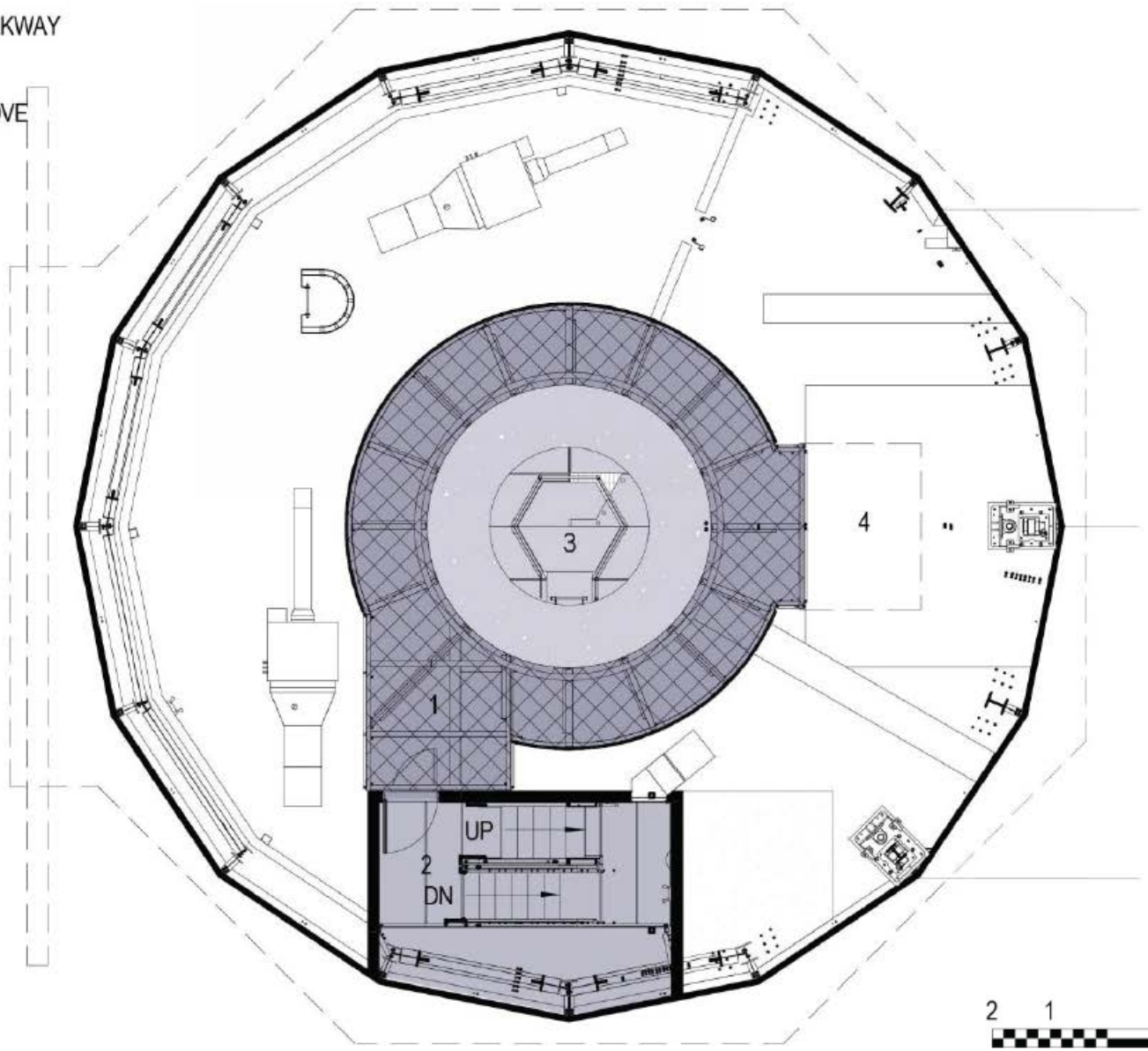


SCALE 1:200
(Original Sheet A4)

ATTACHMENT 7 – ENCLOSURE AND SUPPORT BUILDING GROUND FLOOR PLAN

Space Surveillance Telescope – J0116-SST

1. MAINTENANCE WALKWAY
2. STAIRS
3. TELESCOPE PIER
4. ACCESS DOOR ABOVE



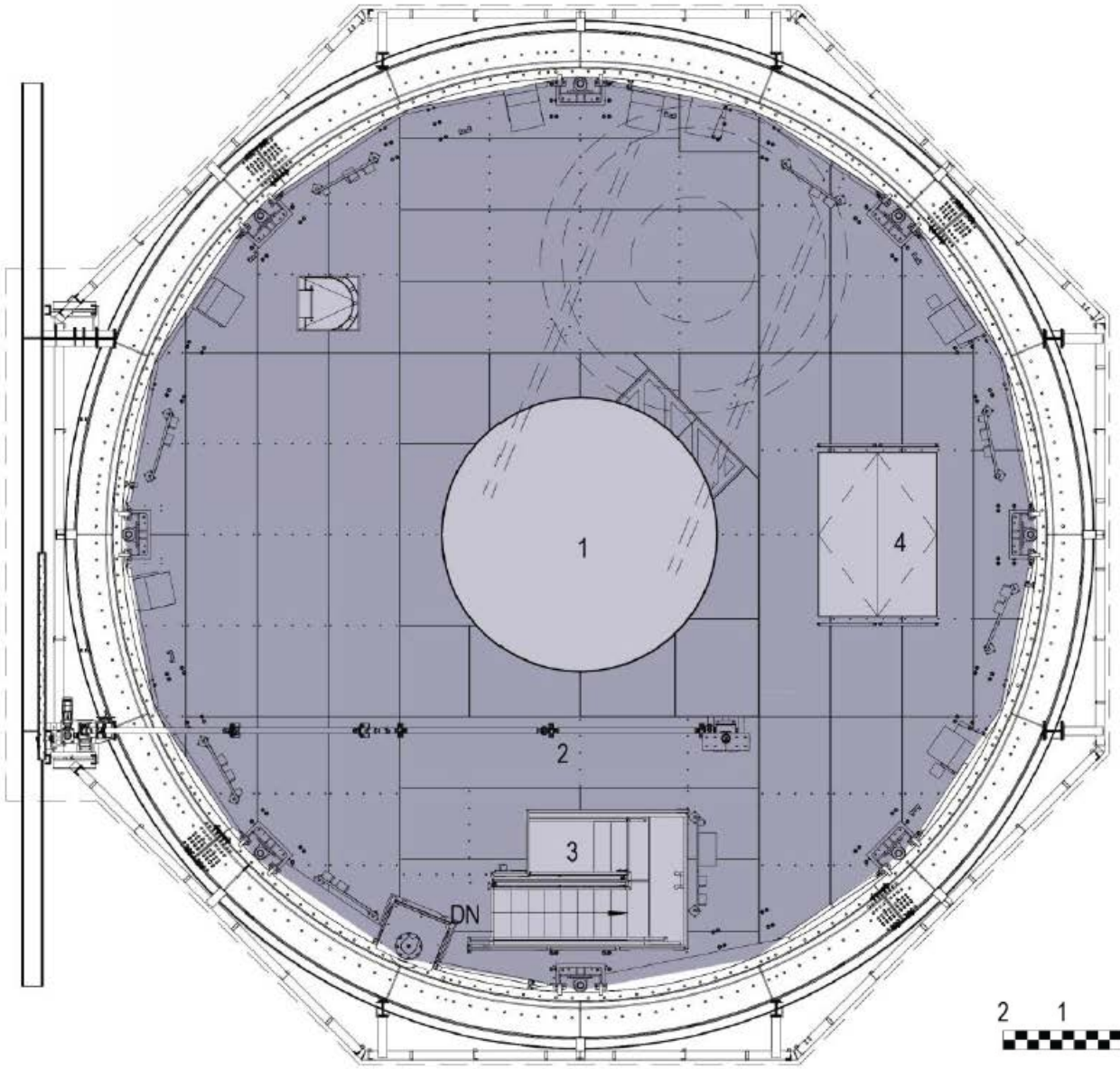
2 1 2 4 m

SCALE 1:100
(Original Sheet A4)

ATTACHMENT 8 – ENCLOSURE MAINTENANCE FLOOR PLAN

Space Surveillance Telescope – J0116-SST

1. TELESCOPE PIER
2. OBSERVATION DECK
3. STAIRS
4. ACCESS HATCH



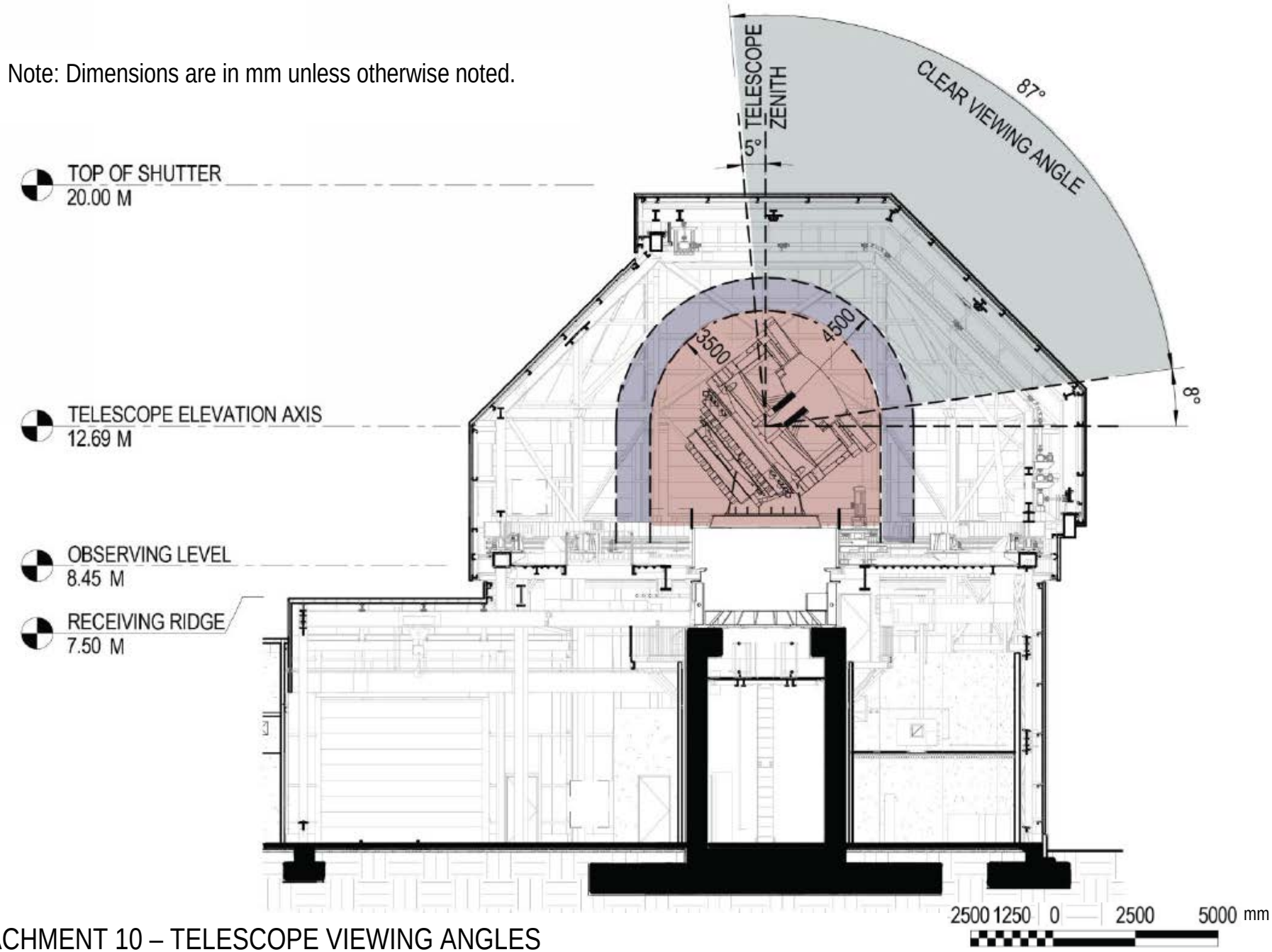
2 1 2 4 m

SCALE 1:100
(Original Sheet A4)

ATTACHMENT 9 – ENCLOSURE OBSERVATION LEVEL FLOOR PLAN

Space Surveillance Telescope – J0116-SST

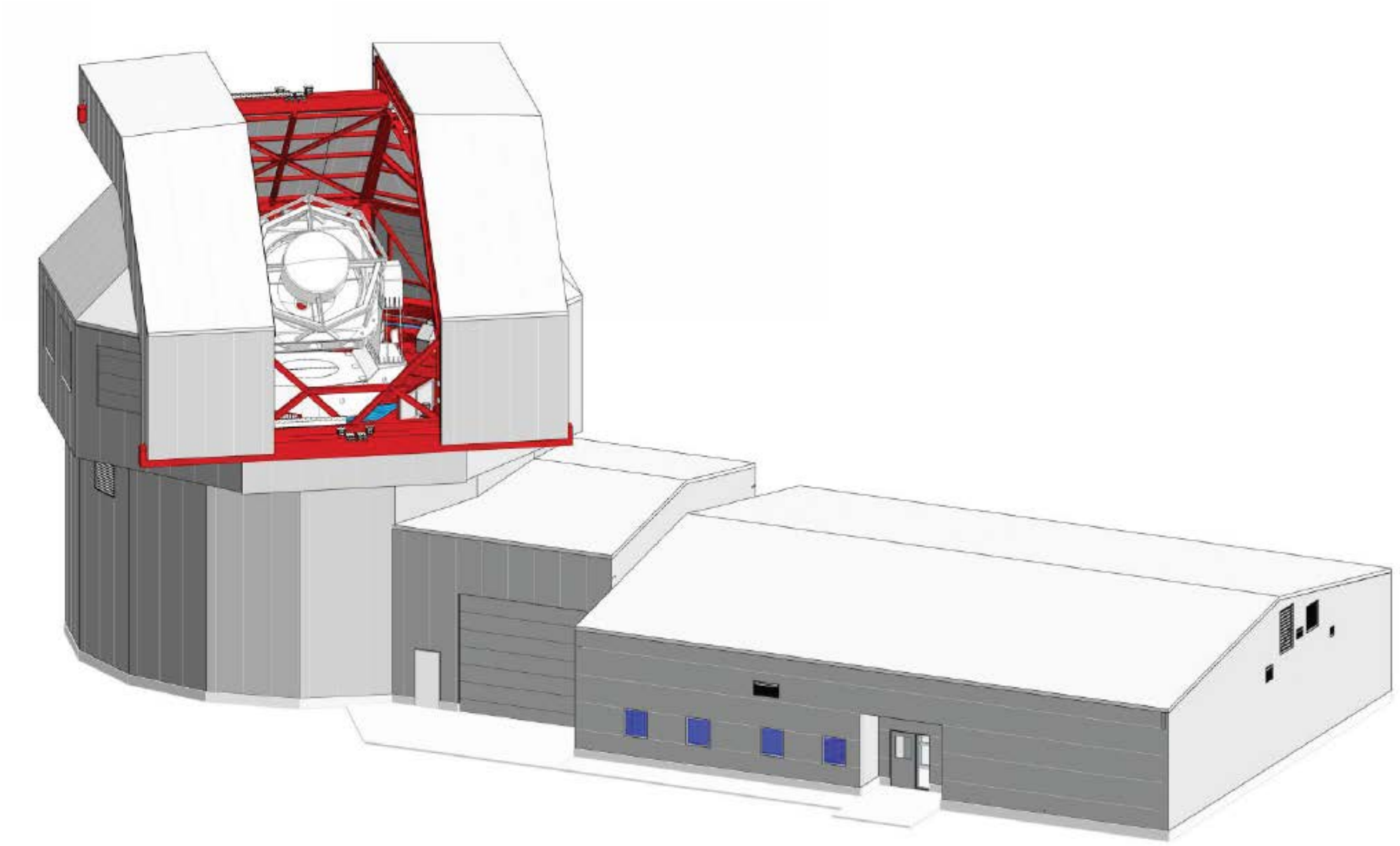
Note: Dimensions are in mm unless otherwise noted.



SCALE 1:100
(Original Sheet A4)

ATTACHMENT 10 – TELESCOPE VIEWING ANGLES

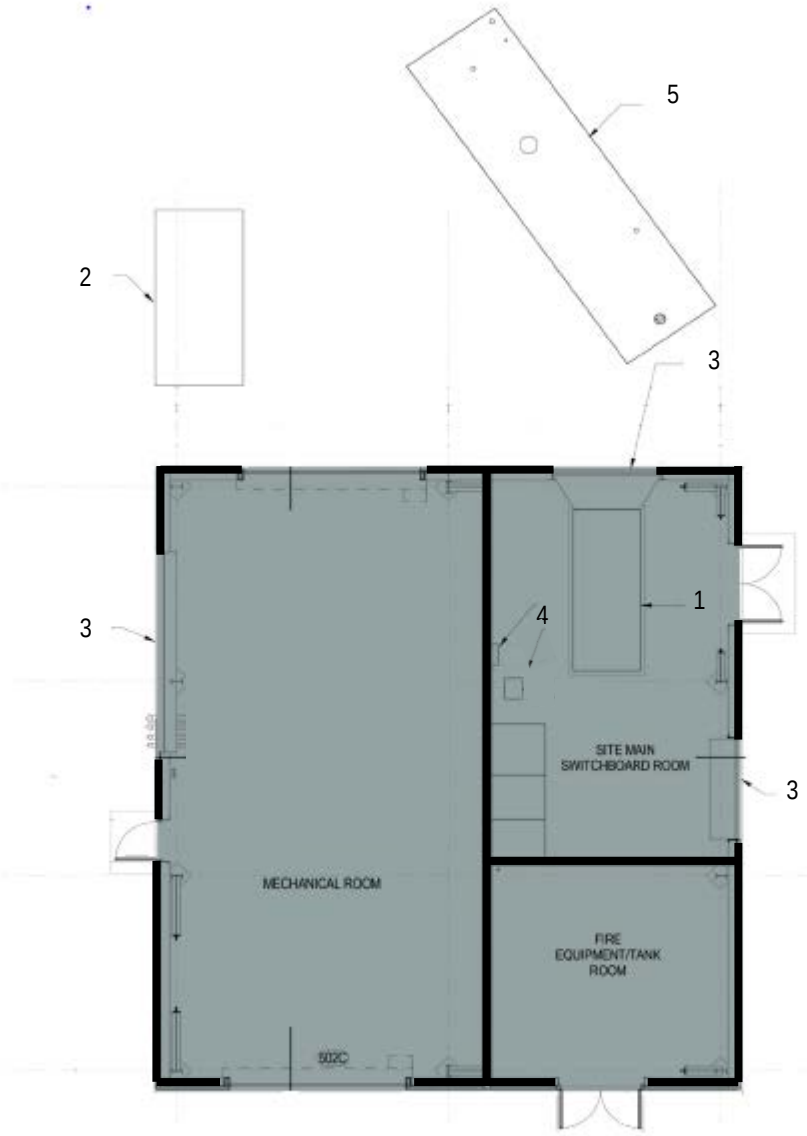
Space Surveillance Telescope – J0116-SST



ATTACHMENT 11 – PERSPECTIVE VIEW

Space Surveillance Telescope – J0116-SST

1 – Generator
2 – Transformer
3 – Mechanical Louvre
4 – Electrical Panel
5 – Above Ground Storage Tank



2500 1250 0 2500 5000 mm

SCALE 1:150
(Original Sheet A4)

ATTACHMENT 12 – EQUIPMENT BUILDING GROUND FLOOR PLAN

Space Surveillance Telescope – J0116-SST