



Australian Government



Nuclear-based science benefiting all Australians

STATEMENT OF EVIDENCE TO THE PARLIAMMENTARY STANDING COMMITTEE ON PUBLIC WORKS

Submission 1: ANSTO Waste Management Facilities Extension and Upgrade

December 2015

Table of Contents

1	Introduction	3
2	Purpose of and Need for the Work.....	5
2.1	The Need for the Work	5
2.2	Program Objectives	6
2.3	Scope of Projects	6
2.4	Cost Forecast.....	8
2.5	Schedule	9
2.6	Consultation	10
2.7	Environmental and Heritage Considerations.....	11
2.8	Community Impacts.....	11
3	Technical Information	12
3.1	Project Location	12
3.2	Design Objectives and General Design Principles.....	14
3.3	Responsibilities and Resources.....	14
3.4	Nuclear considerations.....	14
3.5	Quality Assurance	15
3.6	Risk Assessment.....	15
	Attachment A – Conceptual Design of the B27(ILSW) Extension	16
	Attachment B – Conceptual Design of the B20B/B57 (LLSW) Extension	17

1 Introduction

- 1.1 The Australian Nuclear Science and Technology Organisation (ANSTO) is Australia's national nuclear research and development organisation, and the centre of Australian nuclear expertise. Its unique expertise is applied to nuclear medicine production, research into areas of national importance including health, materials engineering and water resource management, as well as helping Australian industries solve complex problems.
- 1.2 At the heart of ANSTO's capabilities is Australia's OPAL reactor, which is one of the world's best multi-purpose research reactors.
- 1.3 The operation of the OPAL reactor generates radioactive waste through the production of:
 - 85 per cent of Australia's potentially life-saving nuclear medicines used in the diagnosis and treatment of numerous heart, liver, bone and kidney conditions as well as a range of cancers. One in two Australians will require a nuclear medicine produced at ANSTO during their lifetime;
 - 30 per cent of the world's irradiated silicon, used by the semi-conductor industry in high-tech applications such as fast trains and hybrid cars; and
 - Neutrons to help scientists study the structure of materials and conduct research into areas of national importance such as water resource management, climate science and better ways to diagnose skin cancer as well as help industry solve complex problems.
- 1.4 In early November 2015, the federal government announced a short list of potential sites for the National Radioactive Waste Management Facility (NRWMF). Once operational, this facility will provide for the centralised and permanent storage of radioactive waste currently stored at more than 100 sites across Australia, including hospitals and medical facilities, scientific organisations such as ANSTO, universities and industrial facilities associated with mining. The facility is anticipated to be operational by 2020.
- 1.5 While the NRWMF is being sited, constructed and licensed, radioactive waste generated from ANSTO's operations will continue to be temporarily stored at its Lucas Heights campus. However, increasing domestic and international demand for the nuclear medicines produced at ANSTO, as well as the need to decommission end-of-life nuclear facilities, mean that ANSTO's available waste storage will be at capacity in early 2017, well before the NRWMF is planned to be operational.

1.6 Consequently, the 2015/16 federal budget provided funding to allow ANSTO to extend and retrofit two co-located existing waste storage facilities at its Lucas Heights campus, providing additional storage for both low level solid waste (LLSW) and intermediate level solid waste (ILSW).

1.7 There are two major components of the works:

- extending and retrofitting its existing storage facility (building 27) for ILSW by early 2017; and
- extending and retrofitting its existing storage facility (building 20B) for LLSW and connecting it to Building 57, increasing its capacity as well as enhancing the process flow of the facility. The facility will also be upgraded with equipment to allow it to condition wastes in preparation for transportation to the NRWMF.

1.8 The two components will be delivered under different timelines in order to meet ANSTO's operational requirements. The ILSW Building 27 facility extension is required by early 2017, whereas the LLSW Building 20B facility extension is not required until mid-2018.

1.9 The entire program, including the design, construction and equipment for both facilities, has been estimated to cost \$22.3million. Detailed costing will be determined upon completion of preliminary design for each component, which is currently underway. The overall program is scheduled to be complete by mid-2018. ANSTO plans to submit an application to the independent nuclear regulator, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), to approve the design, construction and operation of the extension to the facilities by mid-2016.

2 Purpose of and Need for the Work

2.1 The Need for the Work

- 2.1.1 Radioactive waste is a necessary by-product of operating and decommissioning nuclear facilities and the production of life-saving nuclear medicines. As noted above, there are more than 100 locations around Australia where radioactive waste is currently stored. These include hospitals and medical facilities, scientific organisations such as ANSTO, universities and industrial facilities associated with mining and petroleum.
- 2.1.2 Along with being Australia's centre of nuclear expertise, medicine production and research, ANSTO also has significant expertise in managing its own radioactive waste. ANSTO is responsible for the safe on-site management of approximately 40 per cent of Australia's low level waste, and most of Australia's intermediate level waste. Australia has no high level radioactive waste.
- 2.1.3 Ultimately, radioactive waste from various sites around Australia, including ANSTO, will be stored at the NRWMF. As noted above, that facility is not expected to be ready to accept any waste before the end of this decade.
- 2.1.4 Importantly, the establishment of a NRWMF will bring Australia into line with internationally accepted best practice whereby all waste is managed in a centralised national facility. In the meantime, with over 50 years expertise in safely managing nuclear material and its by-products, ANSTO is well equipped to store small amounts of radioactive waste which are produced through its operations on an interim basis.
- 2.1.5 At ANSTO, the bulk of waste generation comes from the operation of the OPAL reactor and the manufacturing of life-saving nuclear medicines. Without additional interim waste storage capacity, ANSTO's ability to operate within its regulatory framework will be compromised when its current waste storage capacity is exhausted in the first half of 2017. At this time, it would have to cease critical business operations, including the production of life-saving nuclear medicines, impacting Australia's health system and patients.
- 2.1.6 Additionally, the works will further enhance both safety and security features, keeping ANSTO in line with current world best practice and maintaining Australia's record in nuclear safety and security.
- 2.1.7 The extension works to Building 20B (LLSW) will also include a comprehensive review of current waste storage methodology and process flow, again enhancing safety arrangements.

2.2 Program Objectives

2.2.1 The funding provided by government will be managed as a program of works involving two separate components for the two different waste streams. The objectives of the program are to:

- increase the current storage capacity for Intermediate Level Solid Waste (ILSW) of Building 27 by designing and constructing an extension to the current facility. The works are to be completed without any major disruptions to the facility's on-going operations; and
- increase the current storage capacity for Low Level Solid Waste (LLSW) of Building 20B by designing and constructing an extension to the current facility which will interface with an adjacent LLSW facility, Building 57. The works are to be completed without any major disruptions to the facility's on-going operations.

2.3 Scope of Projects

2.3.1 The scope of work for the two major components of the project is outlined below.

- Building 27 (ILSW) Extension Project
 - Duplication and upgrade of the current retrievable storage pits, and extending the building towards the east. The new retrievable storage pits within the new extension will utilise current design practices and will have greater storage capacity than the existing pits.
 - Provision of all equipment required to operate the new extension as per current operating procedures of ANSTO Waste Management Services.
 - The façade of the entire facility will be upgraded, enhancing physical security.
 - Upgrade of electronic and physical security of the facility as required.
- Building 20B/57 (LLSW) Extension Project
 - Extension to the current Building 20B facility, connecting it to the existing B57 facility.
 - The extension will increase the storage capacity for standard LLSW being stored in various forms such as standard drums, compressed into overpacks and also storage of decommissioning/demolition waste from across site (excluding the decommissioning of the HIFAR Reactor).

- The process flow of the new and existing facility will be revised, and if possible enhanced in order to centralise site storage of LLSW.
- Provision of a new overhead building crane for material handling.

2.3.2 The project also includes:

- Implementation of works as required for minimising or eliminating any disruptions to the current operation of both facilities;
- Upgrade to active ventilation systems;
- Upgrade to electrical infrastructure as required;
- Minor refurbishments or equipment relocation of the existing facilities to enhance the waste management process flow; and
- Road works as required by the Building Code of Australia and for the passage of heavy vehicles for the eventual loading of stored waste for dispatch to the NRWMF. Those road works will comply with requirements of NSW Roads and Maritime Services (RMS).

2.3.3 Plans of both facility extensions are included in **Attachment A**.

2.4 Cost Forecast

2.4.1 A cost breakdown for the various requirements for each facility extension is summarised below:

No	Description	Total Amount (,000)
A	B27 Extension Project	
1	Security upgrades	\$782
2	Active ventilation requirements	\$589
3	Upgrade to existing retrievable pits	\$280
4	Mechanical components for pits (lids/frames)	\$887
5	Additional shielding for existing pits	\$512
6	Electrical upgrades	\$112
7	Building extension cost (including consultant design fees)	\$4,009
B	Total B27 Extension Project	\$7,171
	B20B/B57 Extension Project	
1	Security Upgrades	\$280
2	Active ventilation bunker	\$281
3	Basement ventilation	\$168
4	Electrical substation upgrades	\$280
5	Equipment and Minor Works	\$608
6	Building extension cost (including consultant design fees)	\$11,499
	Total B20B/B57 Extension Project	\$13,116
C	Total Staff Costs	\$1,913
D	Total ANSTO Strategic Assets Planning Office	\$100
	TOTAL	\$22,300

2.5 Schedule

2.5.1 The two projects are being delivered under different schedules due to ANSTO's operational priorities. As the ILSW storage capacity will be exhausted in early 2017, the B27 (ILSW) extension project is being expedited to deliver the new extension by that time.

2.5.2 The following is the estimated project time schedule for the B27 extension project works:

B27 (ILSW) Extension Project - Design & Construction Schedule																														
		2015					2016												2017											
No.	Stage	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1	Establishment (IRC / URS)																													
2	Facility Detailed Design																													
3	Regulatory Approvals																													
4	Construction Tender																													
5	Facility Construction																													
6	Facility Commissioning																													
7	Project Closure Process																													

Project milestones	Milestone dates
Design (Detail) Completed	End of March 2016
Regulatory Approvals	End of April 2016
Building Tender Completed	May 2016
Building Contract Award	June 2016
Construction Practical Completion	December 2016
Commissioning Completed Project Practical Completion (client to occupy and use facility)	February 2017
Project Closure	April 2017

2.5.3 The following is the estimated project time schedule for the B20B/57 extension project works:

		Solid Waste Stores Program - B20b/B57 D&C Schedule																																	
		2015					2016												2017												2018				
No.	Stage	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
1	Establishment (IRC / URS)																																		
2	Facility Concept Design																																		
3	Facility Detailed Design																																		
4	Design Regulatory Approvals																																		
5	Construction Tender																																		
6	Facility Construction																																		
7	Facility Commissioning																																		
8	Operation Regulatory Approvals																																		
9	Project Closure Process																																		

Project milestones	Milestone dates
Design (Concept) Completed	March 2016
Design (Detail) Completed	July 2016
Regulatory Approvals (Design)	October 2016
Building Tender Completed	October 2016
Building Contract Award	November 2016
Construction Practical Completion	November 2017
Commissioning Completed	January 2018
Project Practical Completion	
Regulatory Approvals (Operation) completed	April 2018
Project and Program Closure	June 2018

2.6 Consultation

2.6.1 Planning for the proposed facility extensions has been developed with extensive consultation across ANSTO, including representatives from Work Health and Safety, Procurement, Radiation Protection Services, Environmental Monitoring, Security and Safeguards and Waste Management Services.

- 2.6.2 Externally, ANSTO has/will engage with specialist architectural consultancies for the facility's conceptual design (B20B/57 only) and preliminary/detailed design. ANSTO will perform all specialised nuclear engineering design with full internal consultation and appropriate approvals.
- 2.6.3 The projects under the overall program will undergo an extensive regulatory review process with the internal safety auditor (Safety Assurance Committee) followed by the independent nuclear regulator, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

2.7 Environmental and Heritage Considerations

- 2.7.1 The proposed extensions will be built on brownfield sites as they are currently within the existing facilities' boundaries.
- 2.7.2 In general, construction of the facility extensions will result in short term, localised, small-scale impact to soils, air quality, flora and fauna, noise, visual amenity and landscape. Management protocols by the principal contractor will restrict any impact on surface runoff and erosion, and mitigate any other environmental effects.
- 2.7.3 There are no heritage considerations for the project. The site is a brown field site and the existing buildings are not heritage listed.
- 2.7.4 ANSTO will comply with the Energy Efficiency in Government Operations (EEGO) Policy.

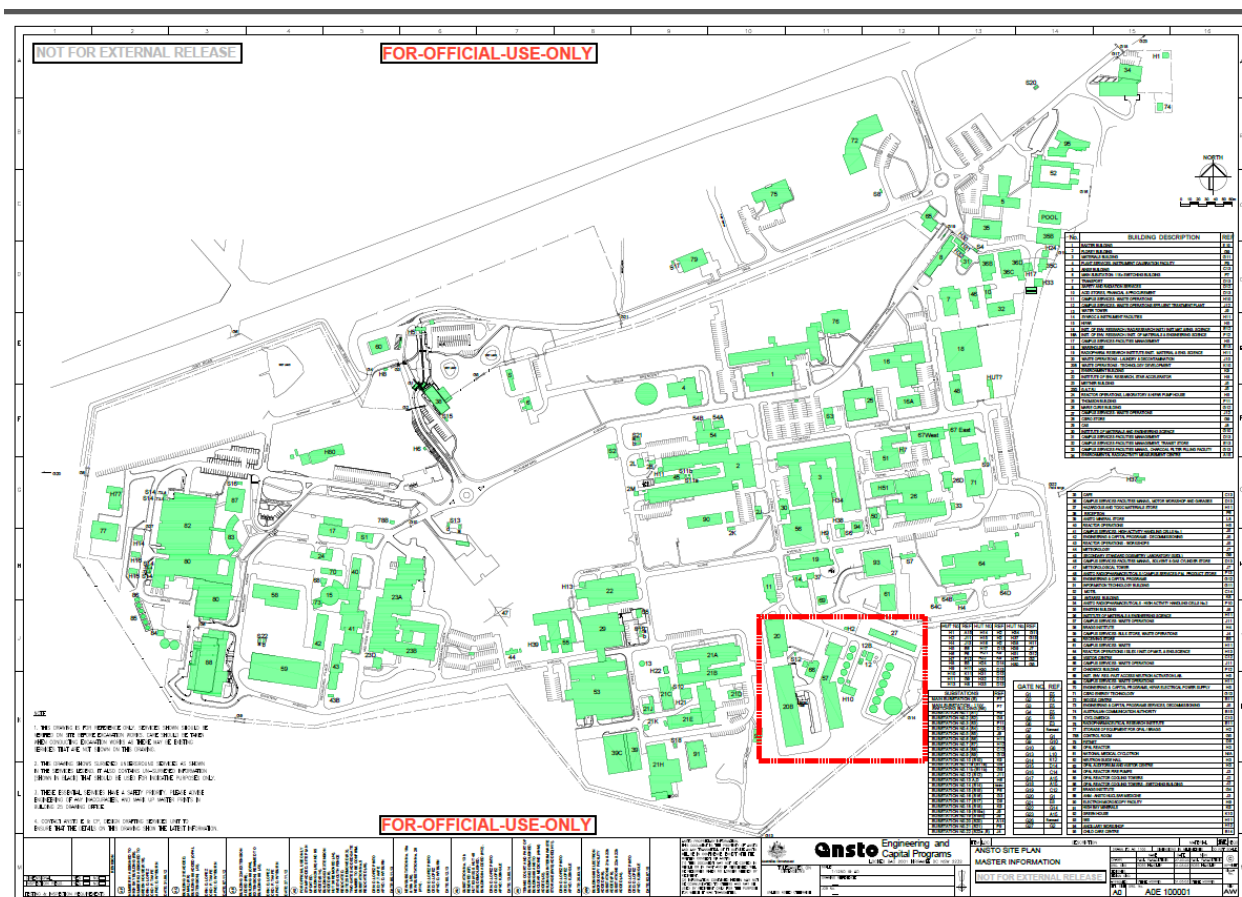
2.8 Community Impacts

- 2.8.1 Location – given the isolated location of the ANSTO site at Lucas Heights, there will be minimal disruption to the local community in surrounding suburbs (Menai-Heathcote) either during the construction period or post-construction. We do not anticipate large numbers of truck movements during the construction phase. There will be no increase to radiation levels at ANSTO or the surrounding suburbs.
- 2.8.2 Employment opportunities – building projects of this nature provide opportunities that the local community can benefit from, and there will be employment opportunities for skilled construction workers in both the local community and the wider Sydney region. The project will also provide a positive economic benefit to small businesses in the Sutherland Shire and adjoining regions.
- 2.8.3 Hours of work - construction activity is expected to be conducted between 7.00 a.m. and 5.00 p.m. Monday through Friday, and on Saturdays by negotiation. The Principal Contractor will be required to provide traffic, environment and site management plans for approval by ANSTO.

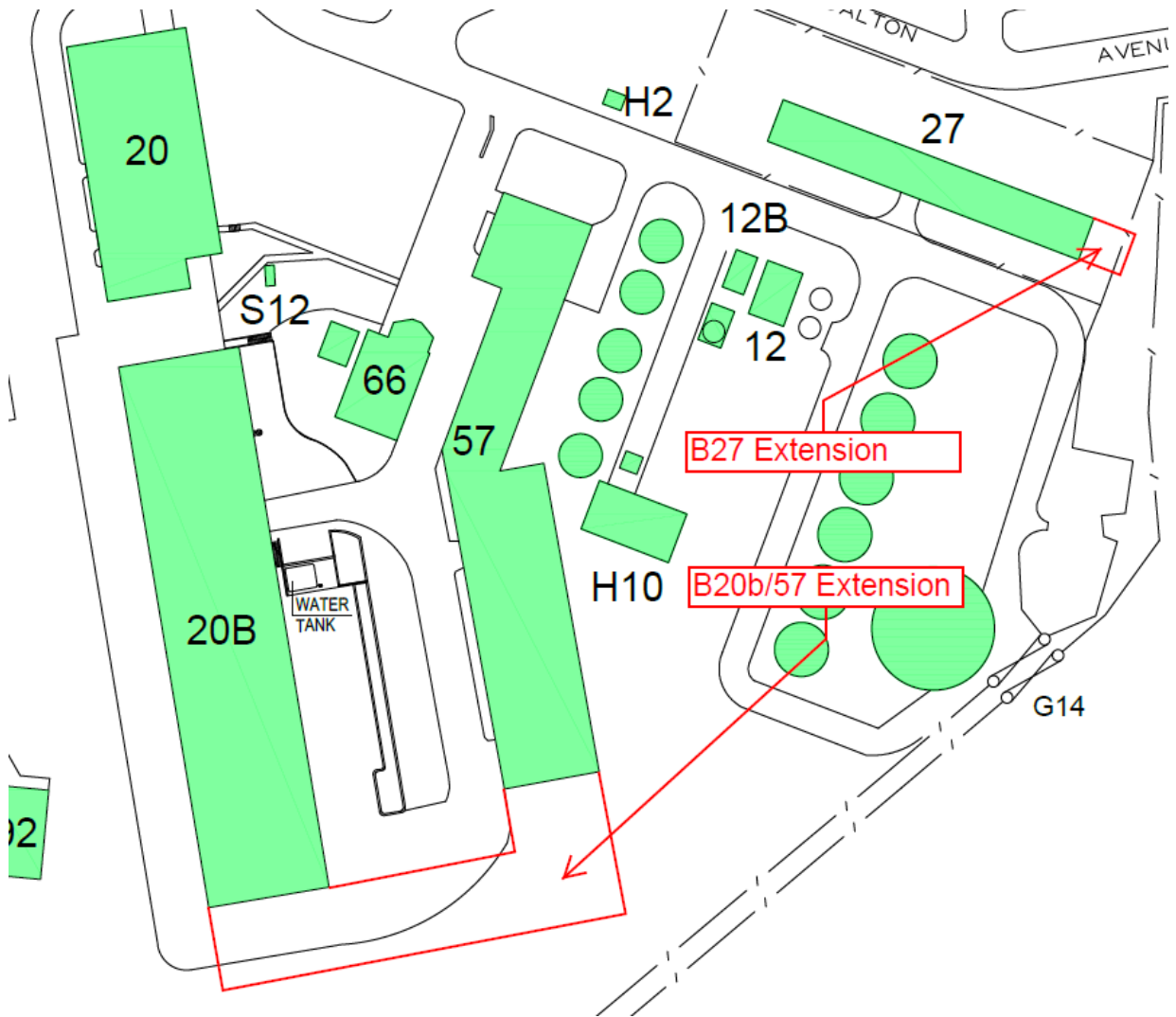
3 Technical Information

3.1 Project Location

3.1.1 ANSTO is situated in the local government area of Sutherland Shire, approximately 35 kilometres south-west of Sydney's central business district. The site for the proposal is within ANSTO's 70 hectare site at Lucas Heights, and is indicated on the map below. The facility is located within the Waste Precinct, and is in line with ANSTO's Infrastructure Planning requirements – *2055 Site Master Plan*.



3.1.2 The planned works are within the Nuclear Operations, Waste Management Services precinct.



3.2 Design Objectives and General Design Principles

- 3.2.1 The detailed design of both facility extensions will be approved by specialised ANSTO engineers prior to construction and will meet the Australian Building Code and all other relevant construction and design standards.
- 3.2.2 ANSTO has performed in-house conceptual design for both facilities, in particular specialised nuclear design aspects such as radiological shielding requirements. The concept stage option study for the B20B/57 extension will be performed by an external architectural consultant in order to better understand the waste process flow, technical and construction challenges and price for the currently proposed options. The B27 Extension does not require an external option study as the location and proposed size of the extension is known based on ANSTO's operational experience.
- 3.2.3 The concept design (see Attachment A) has been completed by architects with extensive experience in designing facilities at ANSTO.
- 3.2.4 ANSTO will design and construct the new facility extensions in accordance with regulatory and international requirements for storing low and intermediate level solid waste, including those set by the International Atomic Energy Agency (IAEA) and ARPANSA.

3.3 Responsibilities and Resources

- 3.3.1 The project funds have been made available by the Federal Government. The disbursement of these funds will be managed through the ANSTO Capital Investment Committee (CIC).
- 3.3.2 ANSTO's in-house Engineering and Capital Programs will be responsible for the overall management of the project, from the development of the concept design through to final completion and commissioning. External consultants have been engaged to carry out some of the design development and detailed design. Procurement for the construction will be done in accordance with the Commonwealth Procurement Guidelines.

3.4 Nuclear considerations

- 3.4.1 ANSTO will provide a full submission to ARPANSA for approval in order to include the new extensions under the current facility licences prior to operation. The extensions will not require a new licence.

- 3.4.2 ANSTO may be required to make appropriate submissions or notifications to the Australian Safeguards and Non-proliferation Office (ASNO) through the Security and Safeguards division of ANSTO.
- 3.4.3 The Intermediate Level Solid Waste (ILSW) will be stored in well-engineered, deep storage pits within the facility with appropriate concrete shielding walls, minimising external radiation to well below safe levels. The pits will be water proof and isolated from the water table, with the added assurance of routine water table sampling from a nearby well by the ANSTO environmental monitoring unit. The ILSW will be retrievable for eventual storage at the NRWMF.
- 3.4.4 The Low Level Solid Waste (LLSW) will be stored as per international best practise in dedicated containers and stacked for routine monitoring and if required, maintenance. The facility shall provide appropriate shielding walls to reduce external radiation dose to well below safe levels.
- 3.4.5 Proposals for any future modifications and/or new construction associated with either facility will require the approval of ANSTO's Safety Assurance Committee and, if significant, of ARPANSA.

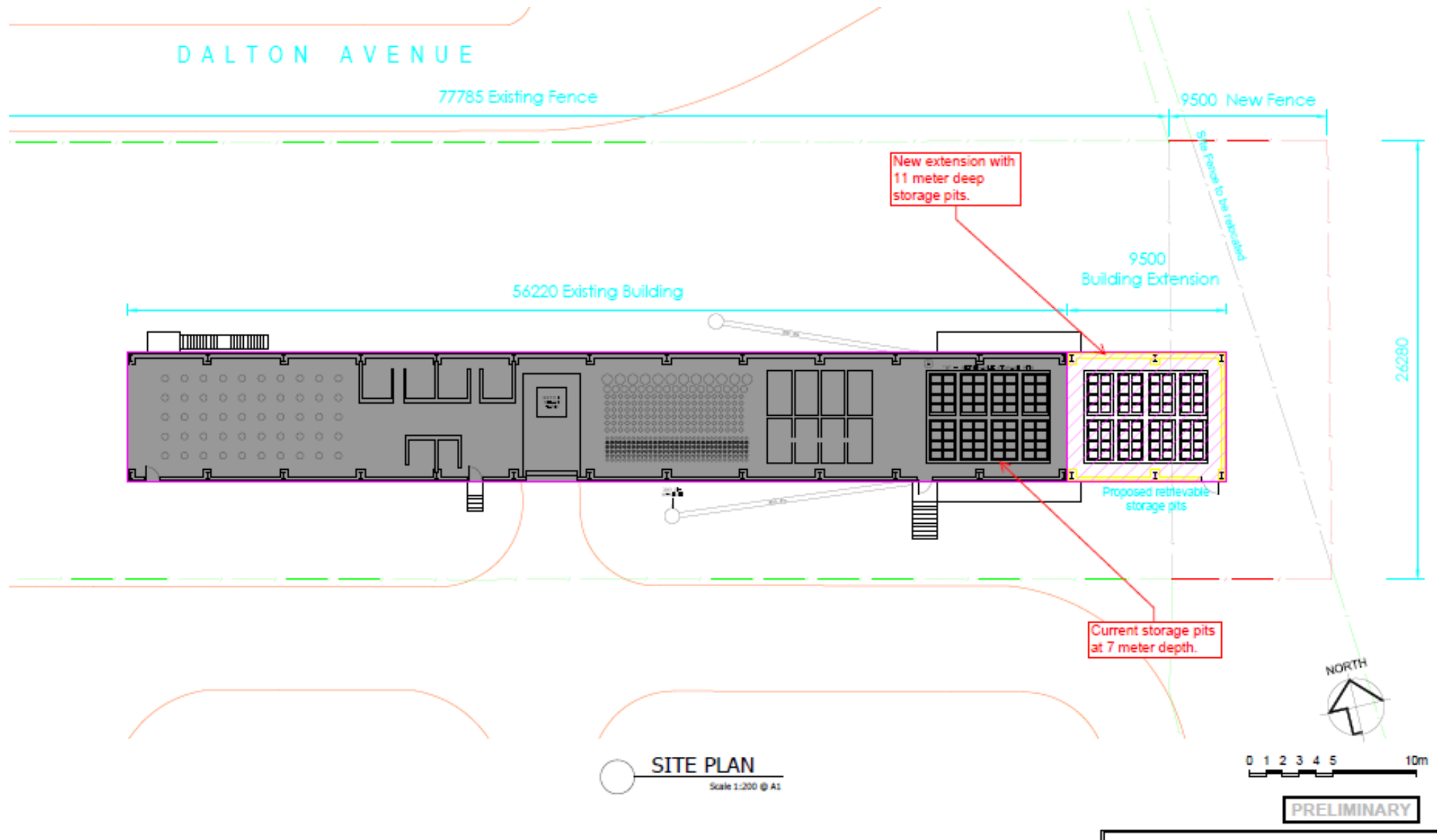
3.5 Quality Assurance

- 3.5.1 As noted above, all procurements associated with this investment will be in line with Commonwealth Procurement Guidelines, as well as ANSTO's internal procurement policies.
- 3.5.2 The construction, commissioning and operation of the facility will be undertaken to meet the requirements of ISO 9000: Quality Assurance and ISO 14001: Environmental Management System. The buildings will also comply with the Building Code of Australia.
- 3.5.3 The work will also be carried out in accordance with the appropriate ANSTO Business Management System Procedures and Instructions.

3.6 Risk Assessment

- 3.6.1 The project is subject to the risk management processes of ANSTO. It is ANSTO policy that all major projects assess risks, identify risk owners and develop action plans to mitigate identified risks. Risks for this project are being assessed for their potential impact on budget, schedule and performance. Risks are discussed on a regular basis at ANSTO project management meetings, and the ANSTO Capital Investment Committee has an oversight role on ANSTO risk management.

Attachment A – Conceptual Design of the B27(ILSW) Extension



Attachment B – Conceptual Design of the B20B/B57 (LLSW) Extension

