

Australian Government

Department of Infrastructure, Transport, Regional Development, Communications and the Arts

COCOS (KEELING) ISLANDS - WEST ISLAND, SEAWATER REVERSE OSMOSIS PLANT PROJECT

Cocos (Keeling) Islands – West Island,

Indian Ocean Territories

Statement of Evidence

to the

Parliamentary Standing Committee

on Public Works

March 2023

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Introduction

1. The purpose of this Statement of Evidence is to provide information to the Australian public to comment on, and the Parliamentary Standing Committee on Public Works (PWC) to inquire into, works proposed under the Cocos (Keeling) Islands (CKI) West Island, Seawater Reverse Osmosis Plant (SWRO) project (the Project).

2. The Project will be delivered on CKI West Island, located in the Indian Ocean, 2,936 kilometres (km) north-west of Perth and 1,270km south-west of Jakarta, Indonesia. CKI comprises 27 coral islands with a total land area of approximately 15.6km2. A location map is shown at Attachment 1. Apart from North Keeling Island, which is 30km from the main group, the islands form a horseshoe-shaped atoll surrounding a lagoon, see Attachment 2. Two islands are occupied, with Home Island home to approximately 400 residents of Cocos-Malay descent. West Island has a residential and commercial population of approximately 140 persons.

3. The Project proposes installing a new permanent water supply on CKI West Island to protect the community's water supply into the future. The location of the existing water source under the airfield runway is subject to possible contamination through hydrocarbon and chemical spills from airport operations, as well as possible seawater intrusion into the groundwater (freshwater lenses/zone). Figure 1 below shows a typical coral Atoll freshwater lens cross-section.

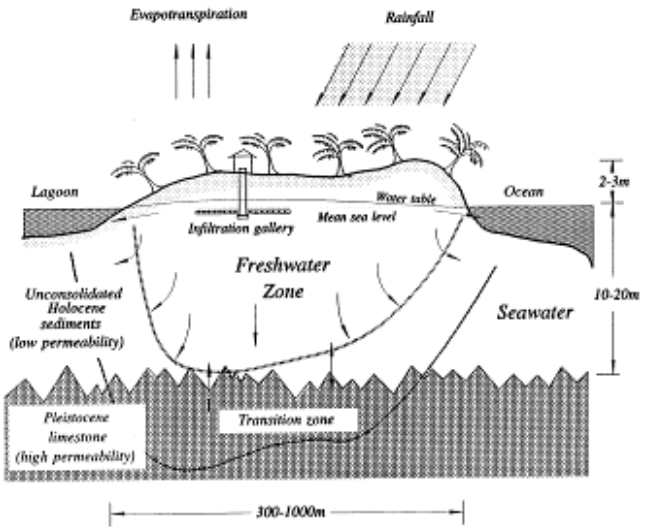


Figure 1: Cross section through a typical freshwater lens showing unconformity between unconsolidated Holocene sediments and Pleistocene limestone (Water Resources Management Review Report Indian Ocean Territories – Christmas and Cocos (Keeling) Islands, Tony Falkland, Island Hydrology Services May 2020.)

4. As the Cocos (Keeling) Islands are administered by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (the Department), the Australian Government has a duty of care to protect people and assets and provide a level of service comparable to similar mainland communities.

5. The proposed works will generate multiple benefits for the CKI West Island community and Australian Government by protecting water security through a sustainable water source, ensuring safer, more liveable communities and continuity of economic activity.

Purpose of the Works

Project Aim

6. The Project aims to reduce the risk of possible contamination of the freshwater lenses located below the operational airfield. This freshwater lens source is currently the only drinking water source available for the local community. The CKI West Island economy is heavily dependent on tourism, which requires a secure freshwater source capability. The installation of a new SWRO plant will remove reliance on the freshwater lens and secure water supply for CKI West Island community and visitors into the future.

7. This Project will enable the Department to meet its obligations to provide essential services and facilities to the non-self-governing communities of Australia's Indian Ocean Territories (IOT).

Project Objectives

8. The Project objectives are as follows:

   a. To construct a new 200 kilolitres per day (kL/day) SWRO plant on CKI West Island to secure the community's drinking water supply. The SWRO plant will replace the existing groundwater source located in freshwater lenses below the airfield runway.

   b. To consider, assess and mitigate environmental and cultural heritage impacts at proposed work sites and any other areas affected by the works.

   c. To ensure the proposed works respond to community concerns and considerations and provide opportunities for local economic activity.

d. To meet the Department's obligations to provide communities in the IOT with access to levels of service comparable to similar mainland communities.

Need for Works

Background

9. The freshwater lens water source on CKI West Island is located below the existing airfield. This means that contamination from the airfield operations is possible, as well as seawater intrusion into the freshwater lenses. The water source is currently considered vulnerable by the Department.

10. The freshwater lens has three 'galleries', where water can be sourced from. They are Galleries A1, A2 and A3. In November 2021, E.coli was detected in Gallery A2, which is one of the two freshwater lenses below the airfield runway. While investigations, treatments and a continued regime of water sampling into the E.coli source are undertaken Gallery A2 has been taken off-line. Gallery A1 has been offline for more than four-years, due to repeated and high microbiological contamination event. This has resulted in:

a. The CKI West Island community's water source only being taken from Gallery A3 which has a capacity of 80kL/day.

b. A communication strategy to CKI West Island residents and accommodation providers regarding water efficiency.

c. Water Corporation conducting a test drill to bring 14kL/day from Home Island to West Island in an iso-container for the community to use 20 Litre refillable bottles for drinking purposes only. Transporting water from Home Island is not a viable long-term solution.

d. Gallery A1 which has been offline for over four-years is being re-investigated as a possible water source and determining what safety measures would need to be put in place if required for use, for example 'water must be boiled before drinking'.

11. The Australian Government is responsible for the delivery of state-type services to local communities living in CKI, including the provision of essential services such as water, wastewater and electricity. This proposal seeks approval to improve water security for the CKI West Island community through the installation of a SWRO plant.

Organisational Basis of the Need

12. Cocos (Keeling) Islands is governed directly by the Australian Government, which fulfils the role of both the federal and state government. The water and wastewater infrastructure on CKI is owned by the Australian Government and is operated and maintained by Water Corporation through an Indian Ocean Territories Service Delivery Arrangement (SDA). Through this SDA, Water Corporation undertakes operation and maintenance of the water, wastewater and power infrastructure, as well as design and construction of capital funded projects for new or upgraded water and wastewater assets.

13. In circumstances where the Australian Government (through the Department) provides services and facilities to the non-self-governing Territories communities, it is likely to be subject to a duty of care to avoid foreseeable harm arising from those undertakings, and breaches are likely to result in an obligation on the Australian Government to pay damages. In addition, under the *Work Health and Safety Act 2011* (Cth) (WHS Act), Australian Government Departmental officers have obligations to ensure safe working conditions. A breach of these WHS obligations could result in criminal prosecution of the Australian Government.

14. The Water Corporation is a statutory body corporate established under the *Water Corporations Act 1995* (WA) of the State of Western Australia. The Water Corporation has established health, safety and environmental requirements for suppliers and contractors, and is also bound by the *Work Health and Safety Act 2020* (WA).

15. Addressing safety risks in the provision of water and wastewater services is a high priority for the Australian Government, given its obligations under the Portfolio Budget Statements – Outcome 4 - *Services to Territories Program 4.1* to deliver essential infrastructure that supports a comparable level of service to the Territories similar to mainland communities.

Existing Potable Water Infrastructure

16. The current CKI West Island water source is a freshwater lens that commonly occurs on coral islands. The freshwater lens is approximately 1km2 in area and sits below the CKI operational airfield runway. The freshwater lens under CKI West Island is highly vulnerable to contamination from both seawater intrusion and pollution sources due the shallow depth to groundwater, sandy porous soils and limited thickness of the lenses. Chemical pollutants, including hydrocarbons, arsenic, lead, pesticides and PFAS have been detected at some

pollution monitoring boreholes across CKI West Island, particularly around the runway, and the light industrial area near the existing water supply.

17. There are three groundwater 'galleries' at CKI West Island (A1, A2, A3). Gallery A1 has been offline for more than four-years, due to repeated and high microbiological contamination events. Gallery A2 has been offline since November 2021 due to an E.coli contamination. Despite investigation and ongoing treatments, the source of contamination has not been identified, resulting in the community water supply being restricted to Gallery A3 which has a capacity of 80kL/day and only just meets the community's water requirements. Galleries A2 and A3 abstract water from an unconsolidated and highly permeable freshwater lens. Due to the connectivity between surface water and groundwater, groundwater vulnerability is considered 'extreme'. Both galleries have urban development within their Well Head Protection Zones (WHPZ) including septic systems and other pathogen sources from surface water runoff. Pathogen sources within a WHPZ are considered an 'extreme' catchment risk. According to the Groundwater Pathogen Risk Assessment (GPRA), galleries A 2 and A 3 have extreme groundwater vulnerability and extreme catchment risks and are therefore a Level four source as determined by Water Corporation.

18. A ground water risk assessment was undertaken to determine the source risk of the current water supply on CKI West Island, using quantitative information (groundwater vulnerability and water quality assessment) and qualitative information (catchment risk assessment). Groundwater sources are categorised into four levels, one being the lowest level of risk, four being the highest level of risk. Generally speaking, Level one sources have low groundwater vulnerability and low catchment risks. Level four sources have high groundwater vulnerability in which groundwater is highly connected to surface water and high catchment risks. The Water Corporation considers Level four sources unsuitable for a community drinking water supply.

19. The Department of Defence is due to commence an extensive upgrade to the CKI West Island airfield runway in mid-2023. The works on the CKI West Island runway will further increase the risk to contamination to the community drinking water supply and is considered an extreme risk to public health and continuity of water supply. Demand for drinking water and construction water during the life of this project will also exceed production capacity, therefore a new source will be required for the community and the Defence project.

Options Considered

Project Elements

20. The proposed works include the construction of a new Seawater Reverse Osmosis (SWRO) plant on CKI West Island.

21. Options to upgrade the existing water supply were examined through separate processes. Analysis was informed by stakeholder consultation, site investigations and existing condition reviews. Opportunities to optimise existing infrastructure were considered alongside new infrastructure solutions.

Options for long-term water security

22. Long-term water security options that will ensure that essential services are maintained, and households and businesses continue to have access to a safe and reliable drinking water source were considered, with qualitative and quantitative assessments used to determine the preferred option.

23. Options analysis considered constructability and costs, environmental and contamination impacts, existing water supply infrastructure, ground conditions, land availability and spatial limitations.

24. Options considered include:

a. **Option 1 – Do Nothing.**

b. **Option 2 – Additional Galleries.** Additional galleries in the existing lens or Northern Lens to increase water production for the duration of the Department of Defence runway upgrade project were considered. However, due to the high vulnerability to groundwater contamination of the CKI West Island airfield and Northern Lens, use of the groundwater from these sources is not considered suitable by Water Corporation and the Western Australia Department of Water and Environmental Regulation for a public drinking water supply.

c. **Option 3 – Seawater Reverse Osmosis Plant.** This option investigated the supply and installation of a 200kL/day water SWRO plant.

Preferred Option

25. **Long-Term Water Security.** If long-term water security is not addressed, critical water shortages on CKI West Island could have significant implications for human health, and impact on the provision of essential services such as healthcare. The emergency provision of water would also be expensive and logistically challenging for the Australian Government to respond to, due to the remoteness of the islands and limited options available to secure other sources of potable water. Transporting water from Home Island to West Island or from the Australian mainland is not a viable long-term option.

26. In addition to the potential implications to human health, water security is an essential precursor for economic diversification and is required to support industries across CKI, including tourism, education and hospitality, as well as attracting investors by providing certainty in the provision of potable water, which will not impede the establishment, maintenance and growth of businesses or industries.

27. All project infrastructure has been designed to have a minimum design life in accordance with Water Corporation's standard document for asset lives: ACA/BIS 02 – ACA Standard Lives and Inspection Intervals.

28. The preferred option to provide long term water security was determined to be:

a. **Seawater Reverse Osmosis plant. Option 3** – Installation of a new 200kL/day SWRO plant. The location, size and capacity of the plant addresses the project objectives that will provide a new water source to mitigate the risk of not having potable water available in the event that the freshwater lenses were contaminated, or the freshwater lenses cannot provide sufficient capacity to meet the Island's current and future human health and economic operational needs.

29. The Department considers that Option 3 represents the best value for money to the Australian Government. It addresses identified needs and enables the Department to fulfil its duties and obligations and is affordable within the Project budget. The preferred option incorporates the critical infrastructure required to mitigate key health and safety risks to the CKI West Island community and visitors.

30. Expected Project benefits include:

a. **safer and more secure community and infrastructure** by ensuring the community has water security through a SWRO plant replacing the reliance on the freshwater lenses below the CKI West Island operational airfield.

b. **more efficient, effective response management** by instilling greater confidence in the provision of essential water services to the CKI West Island community.

c. **unlocked livability potential** by protecting the community from a groundwater source that is at high risk of contamination through airport operations and seawater intrusion, as well as allowing economic development opportunities through the availability of essential services.

d. **reduced total cost of ownership** by providing infrastructure that enables ease of maintenance and minimises sustainment costs.

Scope of Works

Location of the Project

31. The Project will deliver works adjacent to the existing Wastewater Treatment Plant (WWTP) on Part Lot 100 Sydney Highway, CKI West Island as shown in Attachment 3.

Project Scope

32. This Project seeks to manage the long-term water security on CKI West Island through the design and delivery of a new SWRO plant.

Seawater Reverse Osmosis plant Works

33. The SWRO plant will be designed to provide a treated water quality in compliance with the Australian Drinking Water Guidelines and to protect downstream infrastructure.

34. The SWRO plant will be housed in fabricated buildings, one containing the process plant and the other containing an electrical/control room and storeroom. The SWRO plant will be located within a fully fenced site with controlled access to the facility via securable gates. The works will include the installation of a shade structure for components of the plant which cannot be installed inside the containerised buildings.

35. The SWRO plant will include the installation and fit-out of four beach bores (three duty, one standby) to feed the SWRO plant. The drilling of the five beach bores (four for the project and one spare for future use) was completed in November 2022. A new raw water (seawater) feedline from the bore field to the SWRO plant will be installed.

36. The SWRO plant will be fully automated and communications between the bores, desalination plant and the town tanks will be provided. In terms of instrumentation and control the packaged plant shall be fully automated with remote access, however, it should also have the ability to run in manual mode. These features will enable the plant to have a high level of reliability given the remote location and minimise whole-of-life costs.

37. The SWRO plant works will include the supply and installation of a 3km water pressure main from the SWRO plant to the existing CKI West Island ground water tanks (1 and 2) which connect into the Island's main water supply.

38. The works will include supply and installation of optic fibre communications cable from the new SWRO plant to Water Corporation's CKI West Island office.

39. The SWRO plant works will include supply and installation of a brine disposal pump station and disposal pipeline (integrated with the existing WWTP outfall).

40. There will be an upgrade to the existing power supply at the existing site to supply the new SWRO plant.

Design Philosophy

41. The general design philosophy for the Project is that proposed works will:

a. providing cost-effective, functional, low maintenance, energy-efficient design options compatible with proposed functions and existing aesthetics

b. reduce the risk associated with contamination of the groundwater lenses from airport operations and seawater intrusion

c. adopting, where possible, conventional construction techniques and materials commonly used by the construction industry and consistent with those already used

d. promoting, where possible, a sustainable solution responding to local climate, considering the full lifecycle of the facilities and infrastructure

e. use readily available, durable, and long-life materials that minimise maintenance, transportation, and installation cost

f. protect environmental and heritage values, for example, by minimising the clearing of vegetation and aesthetic impact

g. applying appropriate constructability measures to ensure the design can be delivered in a practical way given the remote location of the project

h. meeting the functional requirements for facilities and infrastructure being provided

i. recognise site constraints including existing ground conditions, space limitations and existing services.

Relevant Legislation, Codes and Standards

42. The following key legislation, standards, codes, and guidelines are applicable to the Project:

a. *Building and Construction Industry (Consequential and Transitional Provisions) Act 2016* (Cth)

b. *Building and Construction Industry (Improving Productivity) Act 2016* (Cth)

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

d. *Work Health and Safety Act 2011* (Cth)

e. *Disability Discrimination Act 1992* (Cth)

f. *Fair Work Act 2009* (Cth)

g. *Fair Work (Building Industry) Act 2012* (Cth);

h. National Construction Code 2019

i. Shire of Cocos (Keeling) Islands Local Planning Strategy

j. Our Cocos (Keeling) Islands 2030 Strategic Plan

k. Cocos (Keeling) Islands Town Planning Scheme No. 1

l. Western Australian planning legislation, supported by an Australian Government IOT SDA with the Western Australian Department of Planning, Lands and Heritage.

43. The proposed works will comply with all relevant standards, codes, and guidelines as listed in Attachment 4.

44. Subject to Parliamentary approval, the design will be certified by a Consulting Engineer and reviewed by Water Corporation's Engineering staff. Construction will be inspected by technical staff to ensure compliance. Manufacturers will certify the compliance of prefabricated components.

Land, Zoning and Approvals

45. The Shire of Cocos (Keeling) Islands Town Planning Scheme provides the statutory framework for land use and development on CKI, in accordance with Western Australian planning legislation. No changes to existing land use and water use conditions are proposed by the project.

46. Acquisition of land for the Project has been obtained through a lease with the Shire of Cocos (Keeling) Island (the Shire). The Local Government (Transition) Ordinance 1992 established the Shire by absorbing its predecessor the Cocos (Keeling) Islands Council. By this arrangement, the body corporate called the Shire of Cocos (Keeling) Islands became the trustee for the Land Trust 1984. Decisions relating to the Trust are made by the Shire Council as the decision-making arm of the body corporate.

47. The Land Trust 1984 Deed applies to all parcels of land situated and being above the high-water mark within CKI, including North Keeling Island, but not including parcels of land as described in the First Schedule of the 1984 Trust Deed. This transferred land was to be held by the Council (and later, by its successor, the Shire) 'upon trust for the benefit, advancement and wellbeing of the Cocos (Keeling) Islander's resident in the Territory on land owned by the Council'.

48. On 24 November 2021, the Shire granted development approval for the SWRO plant, bore field and associated infrastructure subject to the submission of final drawings for approval.

Master and Site Planning

49. Proposed works are consistent with the intent of our Cocos (Keeling) Islands 2030 Strategic Plan, the community's plan is to ensure a prosperous, sustainable, and diverse future for all within CKI. This plan supports CKI's overall aim in delivering a sustainable future that

unifies the community, diversifies the economic base and enhances the natural and cultural environment.

50. Site Planning considerations have been taken in to account as the new SRWO plant will be located directly adjacent to the existing WWTP, minimising impacts on the surrounding environment and collocating critical infrastructure facilities to improve maintenance accessibility.

Workplace Health and Safety Measures

51. The project will comply with the *Work, Health and Safety Act 2011* (Cth) and the *Work, Health and Safety Act 2020* (WA). The Water Corporation also has work, health and safety requirements which all contractors and suppliers need to comply with in their service provision.

52. The Department has been in consultation with the Office of the Federal Safety Commissioner (OFSC) regarding the Australian Government Building and Construction Work Health and Safety Accreditation Scheme. The OFSC has advised that it considers that Tendering and Performance of Building Work Amendment Instrument 2022 (Amended Code) applies to this project. This requires the Department to take steps to ensure that all contracts for non-prescribed building work that Water Corporation enters into for delivery of the Project are with OFSC accredited builders.

53. The Water Corporation, and their design team, will employ a safety in design approach to address risk mitigations and document safety measures to be adopted in both construction and operation of the works. The construction contractor will be required to develop and adhere to a safety management plan for the construction phase, which incorporates safety in design mitigations identified by the design team as well as other risk mitigations, prior to commencing any works.

Architectural and Structural Design

54. The Project's architectural and structural services proposed are to provide all structural infrastructure required to support the installation and ongoing operation of the SWRO plant and bore fields. Architectural and structural design items proposed are minor support facilities such as the control room and laboratory, switch room, ablutions, kitchen, meeting and workshops buildings. Structural supports and fixings for safe and compliant installation of plant and equipment, shade structures and security fencing are also proposed. The

architectural and structural design has been informed by site investigations and geotechnical and topographical conditions. Schematic designs for structural elements have been developed by suitably qualified engineers in accordance with Australian Standards and reviewed by Water Corporation's design engineers.

Civil Design

55. The Project's civil works are proposed to include a vehicle and pedestrian access and egress road into and around the new SWRO plant site, hardstand areas to support installation and access and egress around the plant and equipment and to the support buildings. Site wide drainage works are also proposed to ensure the site has free drainage of rainfall off the site. Geotechnical investigations have been undertaken to inform the schematic design process, and civil element schematic designs have been undertaken by suitably qualified engineers in accordance with Australian Standards and reviewed by Water Corporation's design engineers.

Mechanical and Hydraulic Services

56. The Project's mechanical works and hydraulics are proposed to include all of the mechanical and hydraulic plant and equipment required to deliver an operational 200kL/day SWRO plant. The plant and equipment are proposed to include, but may but be limited to, the SWRO plant package units, water and concentrate storage tanks, seawater intake and outlet, pipework and pumps, chlorination module, bore field pumps, support building mechanical and hydraulic engineering services and all associated inground and above ground water reticulation valves and pipework. The schematic design process for the mechanical and hydraulic schematic designs have been undertaken by suitably qualified engineers in accordance with Australian Standards and reviewed by Water Corporation's design engineers.

Electrical, Instrumentation and Control Services

57. The electrical, instrumentation and control services proposed for the works include an upgrade to the local power network to provide adequate power including a redundancy supply to the SWRO plant and bore fields. In addition, general electrical reticulation services are proposed to be provided to supply the SRWO plant and equipment and associated minor buildings. Lighting to minor buildings or structures and external lighting are proposed to be provided to the site to support security measures and provide for safe access and egress after hours. Instrumentation and controls are proposed to be installed to allow for the safe and

efficient operation of the SWRO plant and bore fields to be operated and communications equipment is proposed to allow for the site to be monitored remotely from the CKI West Island Water Corporation depot. The electrical, instrumentation and control schematic design process has been undertaken by suitably qualified engineers in accordance with Australian Standards and reviewed by Water Corporation design engineers

Security Measures

58. The security design for proposed works will address risks associated with controlling unauthorised access, vandalism, or unintended damage, this includes security fencing and lockable vehicle gates to the site.

Materials

59. Materials have been selected for their durability and ease of maintenance in a tropical climate. Where possible, designs adopt materials that can be locally sourced. However, many components are not available on CKI and have therefore been selected on the basis of being prefabricated and lightweight to make transportation and installation easier and safer, and the keeping of critical spares sustainable.

Environmental Sustainability

60. A key Departmental requirement is for the Project to deliver a sustainable outcome for the Australian Government by improving the safety of the Island community and by re-using or upgrading existing infrastructure (where appropriate).

61. The project will improve CKI West Island's environmental sustainability by providing a new secure water source for the community and remove the need to utilise the freshwater lens natural water source which is at risk of contamination.

62. Strategies adopted by the Project to achieve cost-effective, ecologically sustainable development include:

a. **Minimisation of waste.** The SWRO plant is able to be designed whereby a significant portion of the plant will comprise of prefabricated and modular components which will be constructed on the Australian mainland and thereby minimal construction waste will generated on the island. Any waste products from

the project during installation will be transported back to the mainland for disposal.

b. **Considered choice of construction materials.** Materials and finishes will be selected for their functionality, durability, and low-maintenance features to minimise environmental impacts and generate both up front and long-term cost-efficiencies.

c. **Prudent asset management.** An asset management plan will establish the required maintenance and replacement schedule for the assets to optimise the design life and minimise whole-of-life costs of the infrastructure.

Potential Impacts

63. Rigorous assessment has identified potential environmental and community impacts and informed the development of mitigation measures. Results can be summarised as follows:

a. **Visual impacts –** The Project will not expect to cause a material change to the visual character of the sites. The proposed SWRO plant will be located adjacent to the existing WWTP within a fenced area. The bore fields will be located away from beach areas frequented by residents and tourists and their design is consistent with those as installed at the existing SWRO plant on CKI Home Island.

b. **Noise impacts** – Community members may experience some short-term noise impacts during construction from equipment used for clearing, excavation and construction. Community members will be informed of upcoming construction works and likely timeframes. Construction of the SWRO plant will be in Western Australia in a modular format and transported to CKI West Island for installation. There may be some noise and vibration which may temporarily affect local fauna, but it is unlikely to have a permanent impact.

c. **Heritage value** – The proposed site for the SWRO plant and bore field is on land which contains mainly coconut palms. There are no heritage sites in the vicinity of the proposed plant.

d. **Traffic, transportation, and road impacts** – Traffic and population numbers will increase during construction. There is only a small road system on CKI West Island, and Sydney Road is the main road between the settlement and the

Port. A Department approved traffic management plan developed by the construction contractor will be put in place when the plant is delivered from the Port to the site.

e. **Existing local facilities** – The Project is not expected to impact on any existing local facilities. The site is located approximately 3kms away from the CKI West Island settlement.

f. **Environmental impacts** – In 2013, the Home Island SWRO plant was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and deemed not to be a controlled action [EPBC Act 2013/6833]. On 22 November 2022, the CKI West Island SWRO plant was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW). On 13 January 2023, a DCCEW decision advised that the SWRO plant was not a controlled action meaning no further assessment is required and works can start immediately [EPBC Act 2022/09409]. Environmental risks posed by the Project will therefore be managed through site-specific construction environmental management plans.). On 18 October 2021, Water Corporation received advice from the Western Australian Department of Water and Environmental Regulation on secondary approvals:

    - water production bores are considered structures (123848011) and as such clearing for their construction is exempt under Item 1, Regulation 5.
    - a 26D licence to construct the production bores is not required as the bore field is not in a proclaimed area.

g. Water Corporation engaged a consultant to undertake hydrodynamic modelling of the brine discharge to the marine environment and completed an Environmental Impact Assessment (EIA) in February 2022.

h. **Heritage impacts –** There are no know heritage risks associated with the Project and if required can be managed through site-specific cultural heritage management plans.

Related Projects

64. On 7 February 2022, the Public Works Committee approved early works required to inform the design of the SWRO plant. This work included seawater borehole drilling and

exploration, including minor vegetation clearance, predominantly coconut palms, to drill groundwater boreholes to undertake water quality assessments. The works were undertaken during October and November 2022.

65. The Project must consider the interface between these related projects:

a. The Department of Defence is delivering the R8129 – Cocos (Keeling) Islands Airfield Upgrade project on CKI West Island. The project will lengthen, strengthen and widen the existing runway and hardstands, and provide a new Aeronautical Ground Lighting to support the P-8A Poseidon Maritime Surveillance and Response aircraft operations. Subject to Parliamentary approval, the project is due to commence construction on Island in mid-2023 with anticipated completion by mid-2026. This Defence project is dependent on the SWRO plant being completed and operational to allow for main civil works to proceed.

b. The Department of Defence is delivering the R8111 – Air 555 Phase 1 Airborne Intelligence Surveillance Reconnaissance Electronic Warfare Capability Facilities project on CKI West Island. The project will provide minor building facilities in close proximity to the airfield to support the capability. The project received Parliamentary approval in September 2020 and commenced construction on Island in February 2023 and is due for completion by November 2023.

Consultation with Key Stakeholders

66. The Department recognises the importance of providing local residents, statutory authorities, and other interested stakeholders an opportunity to provide input into, or raise concerns relating to, the proposed works. Where practical, community consultation for the Project will be conducted concurrently with consultation for related projects.

67. Key stakeholders have contributed to the Project from its inception by participating in consultation meetings, regular monthly teleconferences, project workshops and review processes for key deliverables.

68. Consultation has been undertaken, and will continue to occur, with the following stakeholders:

a. Australian Government:

(1). Administrator of the Territory of the Cocos (Keeling) Islands

(2). Indian Ocean Territories Administration

(3). Indian Ocean Territories Power Service

(4). Department of Climate Change, Energy, the Environment and Water

(5). Department of Defence

b. Western Australian Government

(1). Department of the Premier and Cabinet

(2). Department of Health (water quality)

(3). Department of Water and Environmental Regulation

(4). Department of Planning, Lands and Heritage

c. Local Government

(1). Shire of Cocos (Keeling) Islands

d. Other stakeholders

(1). Cocos (Keeling) Islands residential and business community

(2). AECOM (Department of Defence contractor)

(3). Fulton Hogan (Department of Defence contractor)

(4). Toll (CKI Airport operator)

(5). Linx (Port operator)

78. Due to the remoteness of CKI, initial consultation with the CKI community has been through an article in the local newsletter, The Atoll. The Water Corporation also has locally based staff on CKI who can assist with questions raised by the community.
In person consultation with key stakeholders will be undertaken on CKI West Island by the Department prior to the PWC Hearing.

Cost Effectiveness and Public Value

Project Costs

69. The estimated out-turned cost of the Project is $19.6 million (excluding Goods and Services Tax). This includes management and design fees, construction costs, contingencies, and a provision for escalation.

70. No increase in operating costs is expected as a result of the proposed works. The maintenance of the new infrastructure will be managed from within the Department's Administered Budget appropriation.

71. Environmentally sustainable design principles have been incorporated into the design, resulting in greater efficiencies and reduced costs over the design life.

Project Delivery System

72. Subject to Parliamentary approval, a Design and Construct Head Contractor form of contract is planned to deliver the works. One Design and Construct Head Contractor will be appointed to deliver the works, with engagement of local subcontractors and suppliers as appropriate. The Design and Construct Head Contractor will be required to complete the detailed design in line with the Department's and Water Corporation's reference design for approval prior to commencing construction.

73. The Design and Construct Head Contractor will deliver the project works in accordance with, but not limited to, all current National Construction Code/Building Code of Australia guidelines, Commonwealth Procurement Rules, Australian Standards, Water Corporation standards, guidelines, policy and procedures, and Work Health and Safety legislation.

74. Water Corporation has been appointed to manage the Project's delivery phase, with regular progress reporting provided to the Department.

Construction Program

75. Subject to Parliamentary approval, construction of the SWRO plant is expected to commence in November 2023, with completion of works occurring by November 2024. Anticipated key milestones are shown in the table below.

Anticipated key milestone dates

Task No.	Task	Completion Target Date
1	Head Contractor engagement	November 2023
2	Construction complete – Mainland fabrication	April 2024
3	Construction complete – CKI West Island installation	November 2024
4	End of Head Contractor defects liability period	November 2025
5	Post Implementation Report to the PWC	December 2025

Public Value

76. The Project was assessed to be in the public interest. It will provide significant benefits to the CKI West Island community by:

a. **Meeting health and safety needs**. The project will reduce risks to life on CKI West Island by reducing the risk of contamination to the community water supply.

b. **Providing employment opportunities for local industry**. The project will generate job opportunities on CKI in the short-term, predominantly in site preparation for the SWRO plant and during the vegetation clearing for the bore field. Water Corporation has an on-Island workforce of 14 personnel providing water, wastewater and power services to the CKI community. Currently 11 Cocos-Malay persons are locally engaged, including one apprentice. Opportunities will exist predominantly in the construction labour market. Off-site job opportunities will also be generated through the manufacture and transportation of materials during construction. This positive economic stimulus is likely to benefit small and medium enterprises.

c. **Economic development**. CKI West Island is a tourism destination and has become more attractive to visitors post the COVID-19 pandemic which has increased the number of visitors from the mainland to the Islands. Certainty in water supply will reinforce the ongoing economic development on-Island as tourist facilities and other supporting business's will have assurance in meeting required health standards and reliability in provision of their services.

77. Although many Project benefits such water as security may be quantified, some benefits were able to be captured by cost-benefit analysis such as the value of preventing loss of life.

Revenue

78. The Australian Government collects revenue for the provision of water and sewerage services to residential and commercial customers on CKI. Fees and charges are reviewed and updated annually in the Cocos (Keeling) Islands Utilities and Services (Water, Sewerage and Building Application Service Fees) Determination 2016.

79. Revenue received for the provision of essential services to CKI, including water and sewerage is remitted monthly by Water Corporation to the *Public Governance, Performance and Accountability Act 2013* (Cth) (IOT Special Account 2014 – Establishment) Determination 02, established on 3 November 2014.

80. The IOT Special Account 2014 allows debits to be made in delivering essential services and infrastructure to the IOT.

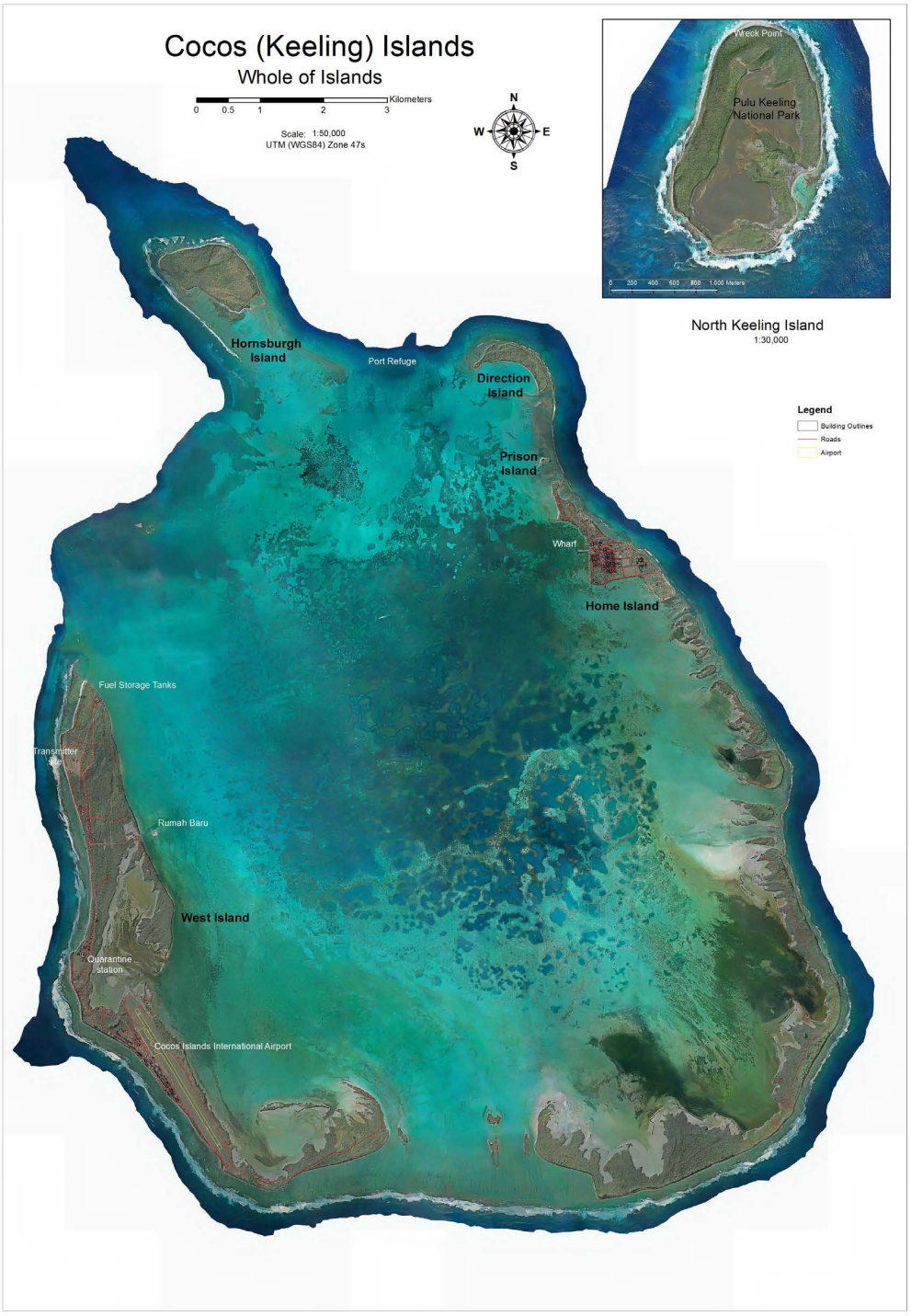
Attachments

1. Cocos (Keeling) Islands location map
2. Cocos (Keeling) Islands Whole-of-Islands map
3. Cocos (Keeling) Islands Part Lot 100 Sydney Highway, West Island Site Plan
4. Design Standards, Guidelines and Codes
5. SWRO plant – Conceptual plant layout

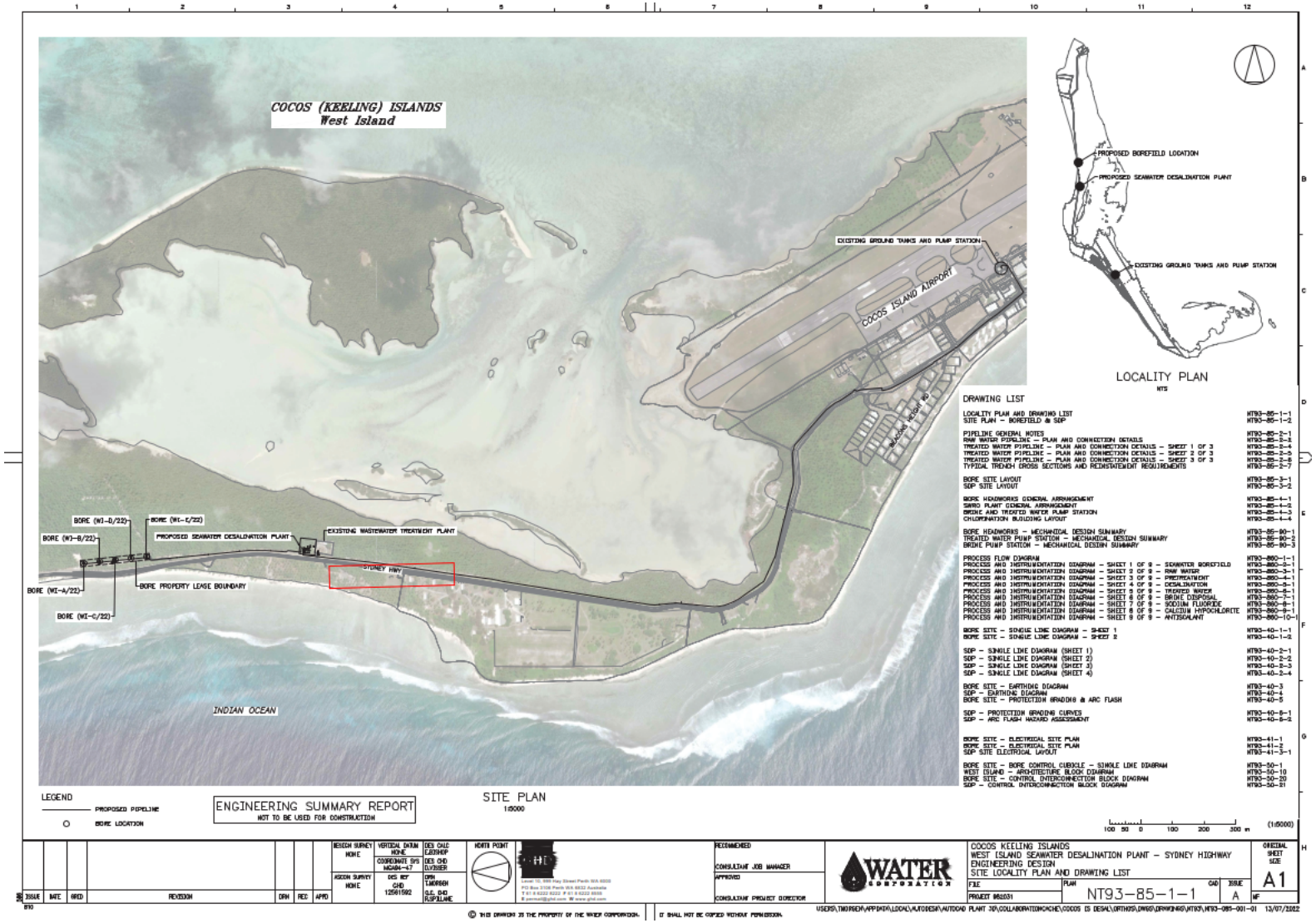
Attachment 1: Cocos (Keeling) Islands location map



Attachment 2: Cocos (Keeling) Islands – Whole-of-Islands Map



Attachment 3: SWRO Plant Site (Location) Plan, Cocos (Keeling) Islands West Island



Attachment 4: Design Standards, Guidelines and Codes

Water Corporation Design Standards, Guidelines and Codes

Electrical

DS 20 Design Process for Electrical Works

DS 21 Major Pump Station Electrical

DS 22 Ancillary Plant and Small Pump Stations Electrical

DS 23 Pipeline AC Interference and Substation Earthing

DS 24 Electrical Drafting

DS 25 – Solar Energy Systems

DS 26 – Type Specifications Electrical Index

DS 28 – Water and Wastewater Treatment Plants Electrical

DS 29 – Arc Flash Hazard Assessment

Electrical Preferred Equipment List

Major Pump Station Standard Electrical Drawings

Small Pump Station Standard Electrical Drawings - MN01

Switchboard Manufacturers Panel Information for Use of Panel

Switchboard Manufacturers Panel Details Summary

Mechanical

DS 30 – Mechanical Design Process

DS 30 – Mechanical Drawing List

DS 30 – Mechanical Drawings

DS 31-01 – Pipework Mechanical

DS 31-02 – Valves and Appurtenances Mechanical

DS 32-01 – Pump Stations Borehole Mechanical

DS 32 – Pump Stations Mechanical

DS 35 – Ancillary Plant Mechanical

DS 35-01 – Surge Vessels

DS 38-01 – Installation Mechanical

DS 38-02 – Flanged Connections

Operational Technology

DS 40 - Design Process for SCADA Works

DS 40-01 - Control Philosophy

DS 40-02 - Naming Convention

DS 40-03 - IO Addressing

DS 40-04 - IO Lists

DS 40-05 - Scheme Control Logic

DS 40-06 - Software Change Control

DS 40-07 - Electrically Actuated Valve Control

DS 40-08 - Standard for the Control of Chemical Dosing

DS 40-09 - Field Instrumentation

DS 41-03 - ClearSCADA Configuration

DS 42-01 - VSAT Installation Standard

DS 42-02 - SCADA Radio Network Design

DS 42-03 - Scheme SCADA Equipment and Installation

DS 42-04 - Communications Power Supply

DS 42-05 - SCADA 4G Link Design and Measurements

DS 43-01 - DNP3 Polling

DS 43-04 - Profinet and Profibus Network Design and Installation

DS 43-06 - Fibre optic network design and installation

DS 45-06 - Treatment Plant Design

F 40-01 - SCADA Requirements for New Additional Sewage Pump Stations

F 41-01 - BaTS LTM PTM Request Requirements Form

F 41-02 - Operations Centre Integration Request Form

F 41-03 - Request for Change or Addition to Standard Code Modules

SCADA AEL (Approved Equipment List)

TB 13-01 - Tags on HMI and OIP mimics

TB 16-01 - Site Surveys for Next G and 4G Installations

TB 18-01 – Retaining setpoints in Schneider PLCs

T 40-01 - Request for ClearSCADA Template Modification

T 42-01 - UHF & SS Design Sheet Template

T 42-02 - UHF Final Design Report Template

T 42-03 - UHF & SS Radio Specification Sheet Template

T 42-04 - NextG Design Sheet Template

T 42-05 - NextG Final Design Report Template

T 42-06 - NextG Specification Sheet Template

WI 42-01 - UHF & SS Measurements

WI 42-02 - NextG Measurements

Wastewater Conveyance

DS 50 – Design and Construction Requirements for Gravity Sewers DN150 to DN600

DS 51 – Design and Construction of Wastewater Pumping Stations and Pressure Mains 4 to 90 litres per second capacity

DS 53 – Vacuum Sewerage Standard

Water Conveyance

DS 60 – Water Supply Distribution Standard

DS 61 – Water Supply Distribution Tanks

DS 63 – Water Reticulation Pipelines DN250 and Smaller

DS 65 – Pipe Fittings Standard Drawings

DS 66 – Urban Main Drainage Standard

DS 100 – Suspended Flooring Grid Mesh and Chequer Plate

S 151 – Prevention of Falls

Guideline for Disposal of Disinfection Water

Disinfection Guidelines for Water Mains

Treatment

Design Guideline - Waste Stabilisation Ponds

DS 110 - Ultraviolet Disinfection Systems

DS 111 - MF UF Design Standard

DS 114 - Granular Medium Filtration Iron and Manganese Removal

DS 33 - Water Treatment Plants Mechanical

DS 34 - Wastewater Treatment Plants Mechanical

DS 81 - Process Engineering

DS 240-01 - Low Risk Reuse - Filtration Equipment

Chemicals

DS 70-01 - Chlorine Buildings

DS 70-02 - Chlorine Leak Detectors

DS 70-03 - Emergency Shutoff Device for use on Chlorine Containers

DS 70-05 - Chlorine Container Floor Scales

DS 70-06 - Chlorine Ancillary Equipment

DS 70-20 - Small Chlorination Systems Water Control Function Description

DS 70-20/30 - Small Chlorination Systems (Water) - Basis of Design

DS 70-25 Drum Sequenced Vacuum System Functional Control Description

DS 70-25 Drum Sequenced Vacuum System Functional Description Overview

DS 70-30 - Small Chlorination Systems Wastewater Control Function Description

DS 71-01 - Fluoro Acid Storage (FSA) Storage and Dosing Facilities

DS 71-02 - Fluorosilicic Acid Storage and Dosing System Control Functional Specification

DS 71 - Drawing List Fluorosilicic Acid Standard Designs

DS 72-01 - Lime Storage Mixing and Dosing System Basis of Design

DS 72-02 - Lime Storage Mixing and Dosing System Control Functional Specification

DS 73-01 - Bulk Sodium Hypochlorite Storage and Dosing System Basis of Design

DS 73-02 - Bulk Sodium Hypochlorite Storage and Dosing System Control Functional Specification

DS 73-10 - Small Sodium Hypochlorite System - Basis of Design

DS 74-01 – Sodium Fluoride Dosing – Basis of Design (DRAFT)

DS 74-02 – Sodium Fluoride Dosing – Functional Control Specification (DRAFT)

DS 79 - Design of Chemical Systems Legislative Requirements and General Principles

DS 79-02 - Emergency Safety Showers and Eyewash Stations

DS 79-03 - Chemical Barrier Protection

DS 79-04 Chemical Signage, Labelling and Markers

DS 79-05 Small Chemical Systems

Chemical Facility Operations Equipment Specifications

Chlorine Analyser Selection Guideline

Chemical Signage Standards

Drawing Management

DS 80 – WCX CAD

Durability

Concrete Structures Condition Assessment Guideline

CR5 – Application of Chemical Resistant Protective Coating on Concrete Bunds in Water and Wastewater Treatment Plants

DS 91 – Selection Design and Monitoring of Cathodic Protection Systems

DS 95 – Standard for Selection Preparation Application Inspection and Testing of Protective Coatings on Water Corporation Assets

A1 – Surface Preparation for the Application of Protective Coatings on Steel or Cast Iron

A2 – Surface Preparation for the Application of Protective Coatings on Stainless Steel

A3 – Surface Preparation for the Application of Protective Coatings on Galvanised Steel

A4 – Surface Preparation for the Application of Protective Coatings on Aluminium

A5 – Surface Preparation for the Application of Protective Coatings on Concrete

A6 – Surface Preparation for the Application of Protective Coatings on Plastics

A7 – Surface Preparation for the Application of Protective Coatings on Fusion Bonded Polyethylene Sintakote®

B1 – Inorganic Zinc Silicate Coating on Steel or Cast Iron

C1 – Zinc Rich Epoxy Primer Coating on Steel or Cast Iron

C2 – Zinc Rich Epoxy Primer Epoxy Mastic Coat Polyurethane Top Coat on Steel or Cast Iron

C2 - Inspection Test Plan

C3 – Zinc Rich Epoxy Primer Epoxy Mastic Coat on Steel or Cast Iron

C4 – Zinc Rich Epoxy Primer Polyurethane Top Coat on Steel or Cast Iron

D1 – High Build Epoxy Coating on Steel or Cast Iron

D1 - Inspection Test Plan

D2 – High Build Epoxy Coating on Butterfly Valves

D3 – High Build Epoxy Coating on New Old Concrete

D4 – Ultra High Build Epoxy Coating on Steel or Cast Iron

E1 – Epoxy Masting Coating on Steel or Cast Iron

E2 – Epoxy Mastic Coating on Non Return Control Valves New and Existing Valves

E3 – Epoxy Mastic Polyurethane Top Coat on Steel or Cast Iron

E4 – Epoxy Mastic Polyurethane Top Coat on Galvanised Steel

E5 – Epoxy Mastic Polyurethane Top Coat on Fusion Bonded Polyethylene Sintakote

F1 – Glass Flake Epoxy Mastic Coating

F1 - Glass Flake Epoxy Coating - Inspection Test Plan

F2 – High Build Ceramic Filled Epoxy Coating on Existing Control Valves

F3 – High Build Ceramic Filled Epoxy Coating on New and Existing Pumps

G1 – Thermostatically Applied Polyester Powder Coating For Aluminium Sheet Metal Cabinets

G2 – Thermal Bonded Polymeric Coating On Valves And Fittings For Water Industry Purposes

H1 – Repair of Galvanised Coating

H2 – Galvanised Coating of Steel Structures

H3 – Repair of Inorganic Zinc Silicate (IZS) Coated Structures

I1 – Elastomeric Polyurethane Protective Coating on Concrete

J1 – Anti Graffiti Coating on New and Old Steel Structures

J2 – Anti Graffiti Coating on New and Old Concrete Structures

K1 – Aesthetic Finish Coating on above Ground PVC Pipes and Fittings

L1 – Tape Wrapping Procedure

L2 – Heat Shrink Sleeve

L2 - Heat Shrink Sleeve - Inspection Test Plan

M1 – Coating Procedure for Pipe Transition Below to Above Ground

M2 – Coating Procedure for Sintakote Pipe and Steel Pipe Joints

M3 – Coating Procedure for Clean Skin Pipe Permanently Exposed to Atmosphere

M4 – Coating Procedure for Coupling Jointed Pipes

M5 – Coating Procedure for Steel Pipe at the Concrete Interface

M6 – Coating Procedure for Sintakote Pipe at the Concrete Interface

M7 – Coating Procedure on Galvanised Steel for the Decorative Purposes

M8 – Cement Mortar Lining Requirement

M9 – Grouting Convex Band in Pipelines

Inspection Guidelines for Condition Assessment of Concrete and Steel Structures Using Unmanned Aerial Vehicles UAVs

Steel Tanks Condition Assessment Guideline

WP – Plastic Lining Welding Audit

WS 1 – Metal Arc Welding

WS 2 – Welding Joining Specification Thermoplastics

Mechanical and electrical services

DS92 – Design Installation Commissioning Operation and Maintenance of Biogas Facilities

HA–ST–01 EEHA Management Plan Standard

HA–ST–02 EEHA Classification Standard

HA–ST–03 EEHA Selection and Installation Standard

HA–ST–04 EEHA Competency Standard

HA–ST–05 EEHA Inspection Standard

HA–ST–06 EEHA Testing Standard

HA–ST–07 EEHA Maintenance Standard

HA–ST–08 EEHA Overhaul Standard

HA–ST–10 EEHA Verification Dossier Standard

HA–ST–11 EEHA Assessment of Non Aus ANZ IECEx Equipment Standard

Guidance manuals

Pipeline Selection Guideline

Product registers

Strategic Product Supply Submission Guidelines

Strategic Products Register

Product specifications

SPS 100 – Steel Pipe for Waterworks Purposes

SPS 106 – Ductile Iron Pipe Fittings for Pressure Applications

SPS 115 – Unplasticised Polyvinylchloride PVCU Pipe for Pressure Applications

SPS 116 – Modified Polyvinylchloride PVCM Pipe for Pressure Applications

SPS 117 – Oriented Polyvinylchloride PVCO Pipe

SPS 125 – Polyethylene and Polypropylene Pipe and Pipe Fittings

SPS 130 – Glass Reinforced Plastics Pipe and Pipe Fittings

SPS 151 – Bolted Mechanical Pipe Couplings and Dismantling Joints for Waterworks Purposes

SPS 152 – Stainless Steel Repair Clamps for Waterworks Pipes

SPS 155 – Metered Standpipes

SPS 200 – Air Valves for Water Supply

SPS 201 – Air Valves for Sewerage

SPS 214 – Double Check Valves

SPS 215 – Reduced Pressure Zone Devices

SPS 220 – Metallic Non Return Valves

SPS 223 – Ductile Iron Swing Check Non Return Valves

SPS 226 – Dual Plate Non Return Valves

SPS 230 – Rapid Response Non Return Valves

SPS 240 – Hydraulically Operated Automatic Control Valves

SPS 241 – Inline (Axial) Control Valves

SPS 245 – Vacuum Interface Valves

SPS 249 – Bladder Surge Vessels

SPS 250 – GRP Filter Vessels

SPS 251 – Mains Tapping Ball Valves

SPS 252 – Metallic Ball Valves for General Purposes

SPS 254 – Meter Ball Valves

SPS 255 – Copper Alloy Gate Valves

SPS 259 – Knife gate Valves

SPS 260 – Butterfly Valves for General Purposes

SPS 261 – Butterfly Valves for Waterworks Purposes

SPS 262 – High Performance Butterfly Valves

SPS 263 – Butterfly Guard Valves

SPS 263 – Advice to users of DS30 Design Standards

SPS 271 – Gate Valves for Waterworks Purposes Metal Seated

SPS 272 – Gate Valves for Waterworks Purposes Resilient Seated

SPS 292 – Screw Down Fire Hydrants

SPS 295 – Penstocks for Waterworks Purposes

SPS 300 - Water Meters - DN20

SPS 497 – Polyethylene Tanks for Chemical Service

SPS 498 – GRP Chemical Storage Tanks

SPS 500 – ISO End Suction Centrifugal Pumps

SPS 501 – End Suction Centrifugal Motor Pumps

SPS 503 – Submersible Sewage Pumps

SPS 506 – Vertical Multi stage Electric Centrifugal Pumps

SPS 507 – Multistage Submersible Electric Borehole Pumps

SPS 515 – Axially Split Casing Centrifugal Pumps

SPS 525 – Progressive Cavity Pumps

SPS 700 – Precast RC Access Chambers

SPS 702 – Precast Concrete Wastewater Pumping Stations

SPS 801 – Access Covers for General Purposes

SPS 802 – Prototype Assisted Lift Access Covers

Safety in Design

Safety in design guideword checklist

Safety in design report template

Safety in design work instruction

Attachment 5: Seawater Reverse Osmosis plant – Concept plan layout

