NSW GOVERNMENT | Public Works Advisory

Ivanhoe Water Treatment Plant Upgrade

Review of Environmental Factors

Report Number: DC17046

November 2021

Prepared for Central Darling Shire Council

Central Darling Shire

Report Number: DC17046

Document Control

Version	Author	Reviewer	Approved for Issue	
			Name	Date
Draft v1	Kristen Parmeter	Anastasia Assargiotis	Lara Hess	24.8.17
Draft v2	Kristen Parmeter	Anastasia Assargiotis	Lara Hess	14.11.18
Final	Kristen Parmeter	Anastasia Assargiotis	Lara Hess	04.03.20
Final v2	Kristen Parmeter	Anastasia Assargiotis	Liz Mathieson	11.11.21
Final v2	Kristen Parmeter	Anastasia Assargiotis	Liz Mathieson	26.11.21

Kristen Parmeter

Environmental Scientist

4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150

Locked Bag 5022, Parramatta NSW 2124

p 02 9240 8803

e kristen.parmeter@finance.nsw.gov.au | **w** www.publicworksadvisory.nsw.gov.au

Cover Image: SIX Maps Viewer, 2020

Declaration

This Review of Environmental Factors (REF) has been prepared by Public Works Advisory, Department of Regional NSW on behalf of the Central Darling Shire Council. The report presents the assessment of potential environmental impacts associated with the proposal to construct a replacement Water Treatment Plant in Ivanhoe at the existing WTP site (the Proposal).

Central Darling Shire Council is a public authority and is the nominated determining authority as defined in the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Proposal satisfies the definition of an activity under the Act, and as such Central Darling Shire Council must assess and consider the environmental impacts of the Proposal before determining whether to proceed.

This REF has been prepared in accordance with Sections 5.5 and 5.7 of the EP&A Act and Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Reg).

This REF provides a true and fair assessment of the proposed activity in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed activity.

On the basis of the information presented in this REF it is concluded that:

(1) the proposed activity is not likely to have a significant impact on the environment and therefore an Environmental Impact Statement is not required.

(2) the proposed activity is not likely to significantly affect threatened species, populations, ecological communities, or critical habitat. Therefore, a Species Impact Statement (SIS) is not required

(3) the proposed Activity is not likely to affect any Commonwealth land, is not being carried out on Commonwealth land, or significantly affect any Matters of National Environmental Significance.

Subject to implementation of the measures to avoid, minimise or manage environmental impacts listed in this REF, the proposed activity is recommended to proceed.

Name of Author and Qualifications	Kristen Parmeter. B.Sc. (Hons)
Designation	Environmental Scientist
Name of Reviewer and Qualifications	Anastasia Assargiotis, B.Env. Sc (Hons)
Designation	Senior Environmental Scientist
Organisation	Public Works Advisory, Department of Regional NSW
Signature	
Date	26/11/2021

Verification and Determination

Verifier

I have examined this REF and the Declaration by Kristen Parmeter (the author) and accept the report on behalf of Central Darling Shire Council (the proponent).

Name	
Designation	
Organisation	
Signature	

Determination

I determine that the activity is approved and may proceed.

Name	
Designation	
Organisation	
Signature	

Executive Summary

Public Works Advisory, on behalf of Central Darling Shire Council (CDSC), has prepared a Review of Environmental Factors (REF) for a proposal to construct a new Water Treatment Plant (WTP) at the existing WTP site located at Ivanhoe, NSW (within Lot 1 DP 815263).

This REF has been prepared to assess the potential environmental impacts of the proposed works in accordance with the requirements of Part 5 of the *Environmental Planning and Assessment Act* 1979.

Ivanhoe is a town in Central Western NSW, approximately 650 km north-west of Sydney and 300km south east of Broken Hill. The proposed site for the new replacement WTP is located approximately 1 km to the south-east of the township of Ivanhoe, within the existing WTP property.

The existing Ivanhoe WTP is owned and operated by CDSC and was constructed in 1985. It is now past its technological and economic life in terms of performance and structural integrity and needs to be replaced.

The proposed works would involve:

- Construction of a new 0.4 ML/d treated water capacity WTP at the existing Ivanhoe WTP site
- Refurbishment and upgrade of two existing sedimentation (sludge) lagoons
- Construction of a new onsite carpark and access road
- New gates and fencing (as required)

Planning Context

The applicable environmental planning instrument for the Proposal is *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP). Clause 125(3A) of ISEPP allows development for the purpose of water treatment facilities to be carried out by or on behalf of a public authority without consent on land within a RU1 Primary Production land zoning.

The Proposal meets the requirements of clause 125(3A) and CDSC would be the determining authority for the Proposal. It has therefore been assessed under Part 5 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) and an REF has been prepared.

Environmental Impacts

The new WTP site is located within the existing WTP site that is currently owned by Council. A number of environmental impacts associated with the construction and operation of the WTP have been identified and are summarised below.

Minor vegetation clearing would be required for the construction of the new WTP. The vegetation to be cleared is low quality manicured grass and shrubs located in a highly disturbed site. The Proposal would not result in a significant impact to threatened species, populations, ecological communities or their habitat.

The construction works would involve ground disturbance for the foundations for the new plant building. Excavation works may result in the temporary generation of dust; however, this is not likely to cause a significant impact to the amenity of the surrounding area.

Post construction, the new WTP would produce water of a high quality consistent with the Australian Drinking Water Guidelines. The Proposal would overcome the work health and safety concerns

associated with the operation of the existing plant, and high turbidity and algal load in the water at the intake site. The Proposal would therefore have a positive benefit to the Ivanhoe community.

On the basis of the information presented in this REF, it is concluded that by adopting the safeguards identified in this assessment there would be no significant adverse environmental impacts associated with the proposed works.

Table of Contents

Review of Environmental Factors i
EXECUTIVE SUMMARY .....
LIST OF ABBREVIATIONS II
1 INTRODUCTION 1
1.1 Background 1
1.2 Proposal Objectives 1
1.3 Overview of the Proposed Works 1
1.4 Land Ownership 1
2 STATUTORY PLANNING FRAMEWORK 3
2.1 Central Darling Local Environmental Plan 2012 3
2.2 State Environmental Planning Policies 3
2.3 Relevant Legislation 4
2.4 Relevant Policies, Guidelines and Standards 7
2.5 Summary of Statutory Approvals 7
2.6 Consultation 7
3 PROJECT JUSTIFICATION 11
3.1 Existing Water Supply Infrastructure 11
3.2 Justification 12
3.3 Option Evaluation 12
4 THE PROPOSAL 15
4.1 Proposed Treatment Process 15
4.2 Description of the Works 18
4.3 Construction Methodology 22
4.4 Construction Environmental Management 22
5 ENVIRONMENTAL ASSESSMENT 24
5.1 Assessment Methodology 24
5.2 Land Use 24
5.3 Soils 26
5.4 Water Quality 27
5.5 Aboriginal Heritage 29
5.6 Historic Heritage 31
5.7 Biodiversity 32
5.8 Noise and Vibration 34
5.9 Air Quality 36
5.10 Traffic and Access 38
5.11 Waste Management 39
5.12 Hazards and Risks 41
5.13 Bushfire 42
5.14 Visual Amenity 44
6 ENVIRONMENTAL MANAGEMENT 45
7 CONCLUSIONS 58
8 REFERENCES 59
APPENDIX A – CONSIDERATION OF CLAUSE 228 60
APPENDIX B – CONSULTATION RESPONSES 63

APPENDIX C – WTP LAYOUT PLANS **64**
APPENDIX D – DATABASE SEARCHES **65**

LIST OF TABLES

Table 2-1 Summary of Approvals 7
Table 2-2 Agency Consultation 8
Table 4-1: Ivanhoe WTP Water Quality Goals 17
Table 5-1 Aboriginal Heritage Desktop - Database Search Results 29
Table 5-2 Historic Heritage Desktop Database Search Results 31
Table 5-3 Construction Equipment Sound Power Level 34
Table 6-1 Construction Environmental Management Plan Structure 45

LIST OF FIGURES

Figure 1-1 Central Darling Shire Council Local Government Area 2
Figure 1-2 WTP location in relation to the township of Ivanhoe 2
Figure 4-1: Ivanhoe WTP process flow diagram 20
Figure 4-2: Proposed Ivanhoe WTP Site Layout 21
Figure 5-1 Bushfire Prone Land Map Extract 43

List of Abbreviations

ADG Code	Australia Dangerous Goods Code
ADWG	Australian Drinking Water Guidelines
BC Act	*Biodiversity Conservation Act 2016*
CDSC	Central Darling Shire Council
CEMP	Construction Environmental Management Plan
CIP	Clean in Place
DPI Fisheries	Department of Primary Industries - Fisheries
DPIE – (agency)	Department of Planning, Industry and Environment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning And Assessment Regulation 2000*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and Sediment Control Plan
GAC	Granular Activated Carbon
LEP	Local Environmental Plan
LGA	Local Government Area
NPW Act	*National Parks and Wildlife Act* 1974
OEH	Office Of Environment and Heritage (Now DPIE- Biodiversity, Conservation and Science)
CEMP	Construction Environmental Management Plan
POEO Act	*Protection of The Environment Operations Act 1997*
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
TMP	Traffic Management Plan
UF	Ultra Fine

WH&S	Work, Health and Safety
WLL	Western Lands Lease
WTP	Water Treatment Plant

1 Introduction

This section provides an overview of the Proposal and its objectives.

1.1 Background

Ivanhoe is located in central western NSW, approximately 650km north-west of Sydney and 300km south east of Broken Hill, and is within the Central Darling Shire Council (CDSC) Local Government Area (LGA) (Figure 1-1).

The existing Ivanhoe Water Treatment Plant (WTP) is owned and operated by CDSC and was constructed in 1985. It is now past its technological and economic life in terms of performance and structural integrity as it is still operated with original plant equipment.

The Lake Morrison Storage which supplies Ivanhoe has been known to dry up during drought conditions, requiring water to be carted in or sourced from bores that in some cases only provide a limited water supply. Spikes in salinity and blue-green algae outbreaks has also been an issue faced by this town, and deteriorating water treatment plants present a serious risk to public health. As a result, CDSC proposes to construct a new upgraded WTP within the existing WTP site with a treated water capacity of 0.4 ML/day (the Proposal).

1.2 Proposal Objectives

The Proposal objectives are to:

- Replace the WTP with a modern plant that will have the capacity to supply 0.4 ML/day of treated (potable) drinking water that is safe and aesthetically pleasing for human consumption
- Eliminate the existing work health and safety issues associated with continuing to use the existing outdated WTP.

1.3 Overview of the Proposed Works

The proposed location for the replacement Ivanhoe WTP is approximately 1 km south east of Ivanhoe and 150 m east of the Cobb Highway within the previously developed existing WTP site (see Figure 1-2). The WTP would be located within Lot 1 DP 815263.

The proposed WTP facility would consist of the following:

- New WTP infrastructure and plant building (including control and plant rooms, laboratory, dosing and chlorine rooms and new oxidation, flocculation, clarification, filtration units and tanks and new clearwater tank and pumps),
- Two (2) upgraded sedimentation lagoons (sludge lagoons) with increased capacity, approximately 12.5 m x 25 m area (per lagoon) in plan,
- New onsite access ring road and car park, and
- New gates and fencing (as required).

1.4 Land Ownership

The proposed WTP site is wholly located within Lot 1 DP 815263. The WTP site is owned by Central Darling Shire Council.

Figure 1-1 Central Darling Shire Council Local Government Area
Source Google Maps, 2017

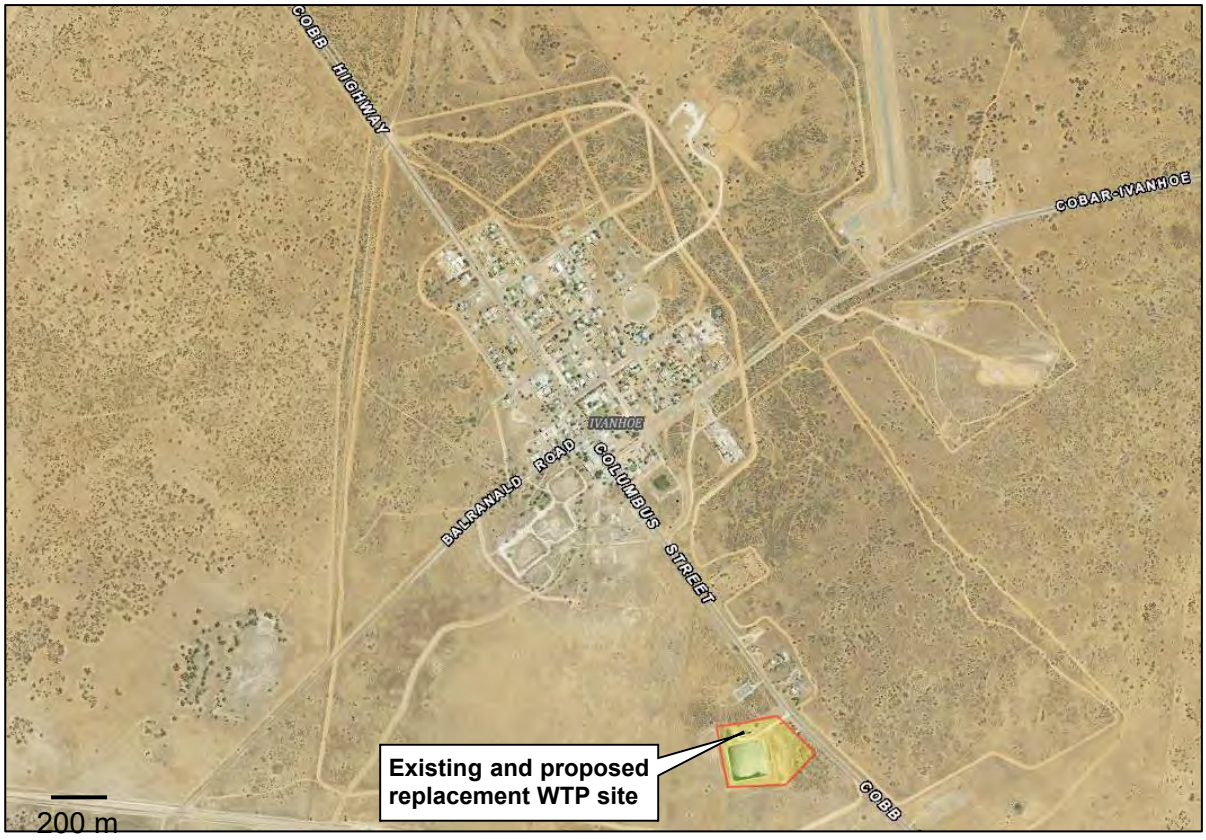


Figure 1-2 WTP location in relation to the township of Ivanhoe
Source: SIX Maps Viewer, 2016

2 Statutory Planning Framework

This section presents the statutory planning and strategic policy context for the Proposal and a summary of the consultation undertaken.

2.1 Central Darling Local Environmental Plan 2012

Under the Central Darling Council Local Environment Plan (LEP) 2012, the land area upon which the Ivanhoe WTP site is located is zoned RU1 – Primary Production.

The LEP lists the objectives of the RU1 zone as:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

Whilst the Proposal is not necessarily consistent with the aims of the LEP zoning, the proposed works would be permitted without consent under the *State Environmental Planning Policy (Infrastructure) 2007* (see Section 2.2.1 below). The development controls contained within the LEP therefore would not be applicable to the proposed development.

2.2 State Environmental Planning Policies

2.2.1 State Environmental Planning Policy SEPP (Infrastructure) 2007

Clause 125(3A) of *State Environmental Planning Policy (Infrastructure) 2007* (SEPP (Infrastructure) 2007) allows development for the purpose of water treatment facilities to be carried out by or on behalf of a public authority without consent on certain land zonings. This includes land zoned RU1 Primary Production.

A water treatment facility is defined under the *Standard Instrument – Principal Local Environmental Plan* (Standard Instrument) to mean a building or place used for the treatment of water, and includes residuals treatment, storage and disposal facilities. The proposed new Ivanhoe WTP meets the definition of a water treatment facility under the SEPP (Infrastructure) 2007 and would be located on land zoned RU1 Primary Production under the Central Darling LEP. Therefore, the proposed works can be undertaken without development consent.

The Proposal has therefore been assessed under Part 5 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) and an REF has been prepared.

2.2.2 State Environmental Planning Policy (Koala Habitat Protection) 2021

State Environmental Planning Policy (Koala Habitat Protection) 2021 (SEPP (Koala Habitat Protection)) aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. The SEPP

does not apply to proposals assessed under Part 5 of the EP&A Act, however it has been taken into consideration for this REF.

Given the disturbed nature of the WTP site, it is unlikely that the area would constitute core or potential Koala Habitat and therefore SEPP (Koala Habitat Protection) is not considered to apply.

2.3 Relevant Legislation

2.3.1 Environmental Planning and Assessment Act 1979

The relevant environmental planning instrument for the Proposal is SEPP (Infrastructure) 2007 which removes the requirement to obtain development consent. Therefore, the Proposal has been assessed under Part 5 of the *Environmental Planning and* Assessment *Act* 1979 (EP&A Act). Central Darling Shire Council would be the determining authority for the development.

This REF has been prepared in accordance with Section 5.5 of the EP&A Act, which requires that the proponent take into account to the fullest extent possible all matters affecting or likely to affect the environment due to the proposed activity. Consideration of the factors listed under Clause 228 of the *Environmental Planning and Assessment Regulation* 2000 (EP&A Regulation) has been used to assist in assessing the significance of the Proposal, and is provided in Appendix A.

2.3.2 Local Government Act 1993

Section 60 of the *Local Government Act 1993* (LG Act) states that approval is required from the Department of Planning, Industry and Environment – Water (DPIE - Water) to construct or extend water treatment works. A section 60 approval for the works would therefore be required.

2.3.3 Protection of the Environment Operations Act 1997

The Environment Protection Authority (EPA) is responsible for the administration of the *Protection of the Environment Operations Act* 1997 (POEO Act). The POEO Act regulates air, noise, land and water pollution in NSW. Activities listed under Schedule 1 of the POEO Act are scheduled activities which require an Environment Protection Licence (EPL).

There are no planned discharges of supernatant or chemical waste from the new Ivanhoe WTP. The Proposal does not constitute a scheduled activity as listed under Schedule 1 of the POEO Act and therefore an EPL is not required. Furthermore, as management measures would be implemented to prevent water pollution, it is considered unlikely that a licence would be required under Section 120 of the POEO Act for the pollution of waters.

2.3.4 Protection of the Environment Operations (Waste) Regulation 2014

The *Protection of the Environment Operations (Waste) Regulation 2014* sets out the provisions with regards to non-licensed waste activities and non-licensed waste transporting, in relation to the way in which waste must be stored, transported, and the reporting and record-keeping requirements. The proposed works (e.g. removal of spoil) would be undertaken to be consistent with the requirements of this regulation.

2.3.5 Work Health and Safety Act 2011 & Regulation 2017

The new WTP involves the use of soda ash (sodium carbonate) or caustic soda (sodium hydroxide), and liquefied chlorine gas which are all classified as dangerous goods under the *Australian Dangerous Good Code* (National Transport Commission 2017) (ADG Code). The storage and handling of dangerous goods is regulated under Part 7.1 of the *Work Health and Safety Regulation 2017.* SafeWork NSW must be notified if any dangerous goods, stored and handled above statutory defined quantities are to be used (as per clause 328 of the Regulation). If the proposed Ivanhoe WTP is likely to exceed the storage threshold of 100 kg of dangerous goods, notification to SafeWork NSW would be required.

The *Work Health and Safety Regulation 2017* requires that a register of hazardous chemicals used, handled or stored at the workplace must be kept. The register is to include:

- A list of hazardous chemicals used, handled or stored, and
- The current safety data sheet for each hazardous chemical listed.

2.3.6 Water Management Act 2000

The objects of the *Water Management Act* 2000 (WM Act) are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations. It is considered that the proposed augmentation does not require any approvals under the WM Act.

Water sharing plans under the WM Act govern the sharing of water in a particular water source between water users and the environment and rules for the trading of water in a particular water source. Water access licences (WALs) entitle licence holders to specified shares in the available water within a particular water management area or water source (the share component), and to take water at specified times, rates or circumstances from specified areas or locations (the extraction component). WALs may be granted to access the available water governed by a water sharing plan under the WM Act.

An amendment of the existing WAL is not required in accordance with Section 60A of the WM Act, as the Proposal would not take water from beyond Council's existing entitlement. Any water taken above the current entitlement would require Council's licence to be modified under Section 89 of the WM Act.

2.3.7 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* specifies the requirements for biodiversity assessment for applications for development consent under Part 4, environmental assessment of an activity under Part 5, or approval of State significant infrastructure under Part 5.1, of the *Environmental Planning and Assessment Act 1979*. For Part 5 assessment, the proponent of an activity that is likely to significantly affect threatened species will have the option of providing a biodiversity development assessment report or a Species Impact Statement.

Due to the small works footprint and previously disturbed nature of the WTP site, it is considered that the Proposal would not have a significant effect on a threatened species, population or ecological communities or their habitat and therefore the preparation of a Species Impact Statement or biodiversity development assessment report under the *Biodiversity Conservation Act 2016* would not be required. Impacts to threatened flora and fauna have been assessed in Section 5.7.

2.3.8 National Parks and Wildlife Act 1974 (NPW Act)

The *National Parks and Wildlife Act* 1974 (NPW Act) provides for the statutory protection of Aboriginal cultural heritage places, objects and features. Part 6 of the NPW Act provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. It is a defense against prosecution for unintentionally harming Aboriginal Objects if due diligence had been exercised to determine that no Aboriginal object would be harmed, or the harm or desecration was authorised by an Aboriginal heritage impact permit (AHIP). Approvals under Parts 4 and 5 of the EP&A Act 1979 do not absolve the proponent of their obligations under the NPW Act 1979.

An Aboriginal Heritage Information Management Systems (AHIMS) database search did not identify any Aboriginal sites or places in or near the WTP site. The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010) has been considered in assessing the likelihood of encountering items of Aboriginal cultural heritage during the construction works (Refer to Section 5.5).

2.3.9 Heritage Act 1977

The *Heritage Act* 1977 provides legislative protection of items or state or local historical heritage significance and establishes the Heritage Council of NSW. The Heritage Council's role is to advise the government on the protection of heritage assets, make listing recommendations to the Minister in relation to the State Heritage Register, and assess/approve/decline proposals involving modification to heritage items or places listed on the Register.

Automatic protection is afforded to 'relics', defined as 'any deposit or material evidence relating to the settlement of the area that comprised New South Wales, not being Aboriginal settlement, and which holds state or local significance'. Excavation of land on which it is known or where there is reasonable cause to suspect that 'relics' will be exposed, moved, destroyed, discovered or damaged is prohibited unless ordered under an excavation permit.

A search of the State Heritage Register did not identify any items located within or in close proximity to the WTP site (Refer to Section 5.5).

2.3.10 Rural Fires Act 1997

A section of the WTP site is identified as bushfire prone land on the Bushfire Prone Land Map, certified by the NSW Rural Fire Services (RFS) (refer to Figure 5-1). Section 100B of the *Rural Fires Act 1997* requires RFS approval for development on bush fire prone land for a special fire protection purpose.

However, development for the purpose of a water treatment plant does not constitute a special fire protection purpose. The Proposal would not affect the bushfire hazard at the site, assuming the implementation of management measures provided in Section 5.13.4.

2.3.11 Environment Protection and Biodiversity Conservation Act 1999

The *Commonwealth Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) provides for Commonwealth involvement in development assessment and approval in circumstances where there exist 'matters of national environmental significance'. Matters of national environmental significance include:

- World Heritage properties

- National Heritage places
- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.
- The environment, where actions proposed are on, or would affect Commonwealth land and the environment
- The environment, where Commonwealth agencies are proposing to take an action

It is not anticipated that any matters of national environmental significance as listed under the EPBC Act would be significantly impacted by the Proposal (See Section 5.7).

2.4 Relevant Policies, Guidelines and Standards

The following policies, guidelines and standards would need to be considered as part of the Proposal and should be addressed in the REF;

- *Interim Construction Noise Guidelines* (DECC, 2009)
- *Managing Urban Stormwater: Soils and Construction - Volume 1, 4th Edition* (Landcom, 2004)
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010)

2.5 Summary of Statutory Approvals

The following table provides a summary of the approvals required for the Proposal.

Table 2-1 Summary of Approvals

Agency	Requirements	Reference
Central Darling Shire Council	Determination of the Proposal	Part 5 of EP&A Act
DPIE - Water	Approval to construct water treatment works	Section 60 LG Act

2.6 Consultation

Relevant government agencies were consulted during the preparation of the REF. A list of agencies contacted and a summary of their response is provided in Table 2-2 below. Copies of the responses received are contained in Appendix B.

Table 2-2 Agency Consultation

Agency	Summary of Comments	Where / how Addressed (Section)
NSW Environment Protection Authority (EPA)	The EPA advised that the proposal does not constitute a scheduled activity as per Schedule 1 of the POEO Act and therefore an EPL is not required.	2.3.3
	The EPA requested the following matters are addressed in the REF: • Proposed measures to manage dust from all sources; • Identification of potential noise impacts from the construction works and operation of the water treatment plants and where required, proposed noise mitigation measures; • Details on the proposed management of backwash water from the plants once in operation; and • Where works are proposed instream at the Willandra Creek intake location, identify any water quality impacts from the proposed works and identify mitigation measures, including sediment and erosion controls to ensure waters are protected.	5.9 5.8 5.4 5.3 and 5.4
	EPA suggested contacting the Department of Primary Industries to determine if any approvals are required for working within close proximity to waterways.	See below
Department of Planning, Industry and Environment – Water (DPIE Water)	DPIE Water requested that the following requirements to be addressed in the Review of Environmental Factors: • Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project. • Assessment of any approval requirements under the *Water Management Act 2000* • Assessment of impacts on surface and ground water sources • Annual volumes of surface water and groundwater proposed to be taken by	2.3.6 2.3.6 5.4 Volumes would remain

Agency	Summary of Comments	Where / how Addressed (Section)
	the activity	unchanged from existing requirements and entitlements
	• The identification of an adequate and secure water supply for the life of the project.	1.1
	• Proposed surface and groundwater monitoring activities and methodologies.	5.4
	• Ivanhoe Water Treatment Plants annual and peak daily production rate should be outlined	4.1 5.11
	• Outline waste water management systems	5.12
	• Outline safe storage and management of chemicals	4
	• Outline compliance or non-compliance with the Australian Drinking Water Guidelines (2011)	5.11
	• Outline strategies for onsite management of storm water and sanitary waste	Energy sources are as per the existing the WTP power supply.
	• Provide energy sources, including the reliability, availability and if alternatives will be required	2
	• Consideration of relevant policies and guidelines.	
Ivanhoe Local Aboriginal Land Council	No comments received	-

Agency	Summary of Comments	Where / how Addressed (Section)
Office of Environment and Heritage (OEH) **Now NSW Environment, Energy and Science**	OEH's key information requirements for the proposal include an adequate assessment of: • Impacts to Aboriginal cultural heritage objects; • Impacts on flora, fauna, threatened species, populations, communities and their habitats.	5.5 5.7
	This assessment should include consideration of direct and indirect impacts as a result of both construction and operation of the project.	5
	Assessment of any cumulative impacts of this and other developments in the area would be essential.	Clause 228 Assessment (Appendix A)
Local Land Services (LLS), Western Region	LLS advised they are supportive of the project proceeding. The positive impacts to the local communities are consistent with LLS own goals in this area. LLS noted that the development is effectively within the existing footprints of current facilities and had no specific comments on the proposal.	Noted
NSW Health – Far West Local Health District (FWLHD)	The FWLHD advised that they support the construction of the new WTP which will enable CDSC to provide safe and reliable drinking water to these communities and consistently meet the standards required by the Australian Drinking Water Guidelines.	Noted

3 Project Justification

This section provides the justification for the Proposal and a summary of the water supply options considered.

3.1 Existing Water Supply Infrastructure

Ivanhoe has a dual reticulated water supply scheme. The township receives both treated drinking water and untreated raw water.

The Ivanhoe WTP receives bulk raw water supply from surface water and bore water supply sources. Surface water is sourced from a weir on Willandra Creek; the water is diverted through an intake culvert and then passes through a 3 ML silt trap. Water is then pumped into a 450 ML in-ground storage dam (Morrison's Storage), before being pumped through a 30 km pipeline to a Raw Water Storage with a capacity of about 50 ML at the Ivanhoe WTP. The raw water is fed from there to the WTP under gravity or as non-potable water to the town.

During times of low or no flow in Willandra Creek, raw bore water is sourced from Ivanhoe Borefield, whereby water is pumped into two reservoir tanks (one for filtered water use and the other for raw water).

The bore water is classified as an emergency supply to be used only when there is no useable water in the in-ground storages or if there is an emergency, such as a power failure, and supply from the creek is not available.

Two bores were constructed in 2005, and three additional bores have recently been drilled due to high salinity levels in the water (from the same aquifer). Bore water is pumped into the WTP Storage (50 ML) or directly to the Raw Water Reservoir (0.5 ML) at Ivanhoe WTP.

The existing Ivanhoe WTP is a conventional filtration plant with a treated water capacity of 0.6 ML/d which was constructed in 1985, is owned and manually operated by Central Darling Shire Council. Currently the WTP produces up to 0.2 ML in summer.

The treatment process for drinking water supply sourced from the Willandra Creek tributary comprises the following:

- initial settling (in ground storage tanks)
- powdered activated carbon dosing, if required
- coagulation
- flocculation
- sedimentation
- filtration
- pH correction
- disinfection via chlorination

The sludge from the sedimentation process and the waste wash water is disposed of into the sedimentation (sludge) lagoons.

The treatment process for drinking water supply sourced from the Ivanhoe Borefield comprises the following general process:

- aeration
- filtration
- disinfection, and
- pH correction

Chlorine and soda ash are dosed to filtered water. Treated water is transferred to the treated water reservoir (0.5 ML) at the WTP. Water is then supplied from the treated water reservoir to the reticulation network, including a public pool. The Ivanhoe water storages are also owned and managed by Central Darling Shire Council.

3.1.1 Current Issues

A Scoping Study was prepared by NSW Public Works in June 2016, *Ivanhoe, White Cliffs and Wilcannia Water Supply Upgrades – Scoping Study" (Report No: WSR16047)* to investigate the water treatment options for Ivanhoe and evaluate the options.

The following water treatment issues in relation to the existing WTP facility were identified in the scoping report:

- There is a regular occurrence of algae in the raw water storages which cannot be treated with the current WTP process.
- The filter media is expected contain a lot of mud balls as there is no air scouring in the backwash cycle. The filter also needs to be refurbished.
- High levels of organic carbon have also been reported in the raw water which again cannot be treated with the current WTP process. This will result in the presence of high trihalomethanes (THMs), which are carcinogenic, in the reticulated water.

3.2 Justification

The existing WTP is past its technological and economic life in terms of performance and structural integrity as it is still manually operated with original plant equipment that has been in operation well beyond its useful life span.

There are work health and safety issues and water supply security issues associated with the current WTP due to ongoing significant structural deterioration.

As a result of the above structural, safety and health concerns, Central Darling Shire Council have determined that it is necessary to construct a new WTP at the existing site to address these concerns.

3.3 Option Evaluation

3.3.1 Do Nothing

The do nothing option means that no augmentation to the town's water security would occur in the foreseeable future with the current inadequate supply left to face potential climate change impacts for the Ivanhoe population. Adoption of this option would result in an already insecure water supply becoming more even more insecure water supply.

- Although adoption of this option offers the advantage of avoiding up front capital contributions, it carries the following disadvantages or areas of concern that Council would need to address:
    - Significant “operational costs” in those years of emergency supply and water restrictions.
    - Very high risk profile for Council.
    - An unacceptable option for the community.

The Do Nothing option is therefore not considered acceptable.

3.3.2 Upgrade Existing WTP

This option would involve upgrade of the existing WTP to address current issues described in Section 3.1.1.

The Scoping Study (NSW Public Works, 2016) identified the following prohibitive factors in relation to an upgrade of the existing WTP:

- Council would not be able to maintain an uninterrupted supply of potable water to the community to carry out some of these works such as an upgrade to the sand filter etc.
- Improvement of the existing plant is not a long-term solution as the basic infrastructure is more than 30 years old
- There are several Work Health and Safety and structural issues with the existing chemical dosing building
- The plant is a manual plant requiring a high degree of operator intervention to maintain the treated water quality
- The existing treatment process cannot effectively remove algae and associated taste and odour issues
- The existing treatment process cannot remove the organic carbon in the raw water.

Based on the above factors, it was concluded that an upgrade or improvement of the existing WTP was not an acceptable option.

3.3.3 Construct a New WTP

The Scoping Study prepared by Public Works Advisory also evaluated the option of the construction of a new WTP to supply potable water to Ivanhoe.

A new WTP would provide the following benefits:

- It can be constructed without interrupting the supply with the new plant being commissioned and put into service before the old plant is de-commissioned.
- The new plant would be a fully automated plant requiring minimal operator intervention and also having the option to acknowledge and reset alarms remotely. This is important when the operator at Ivanhoe is not available.
- The new plant would be able to treat for algae and organic matter in the raw water.
- A new plant would provide a long term solution for the next 30+ years and would therefore provide better value for money.

- Where possible some of the existing water treatment plant processes and equipment can be incorporated into a new plant, saving on costs.
- The new plant would produce water of a high quality consistent with the Australian Drinking Water Guidelines and would overcome the work health and safety concerns associated with the operation of the existing plant.

In light of the above factors and those issues with the existing WTP identified in the *Ivanhoe Water Treatment Plant Audit*, by City Water Technology in May 2016; the scoping study by NSW Public Works recommended construction of a new water treatment plant (WTP) at the existing Ivanhoe WTP site, rather than an upgrade of the existing facility.

3.3.4 Preferred Option

The preferred option is to construct a new replacement WTP at the existing WTP site. The do nothing and the upgrade/improvement options are not considered acceptable (as described in Section 3.3.1 and 3.3.2 above) and therefore the preferred option is a new WTP to completely replace the existing ageing infrastructure. The preferred option is described further in Section 4.

4 The Proposal

This section provides a description of the Proposal.

4.1 Proposed Treatment Process

The proposed new WTP would be designed to operate at a fixed treated water production rate of 0.4 ML/d (6.1 L/s raw water flow rate). It would be required to produce treated water that meets or betters the Australian Drinking Water Guidelines (ADWG). WTP layout plans are provided in Appendix C.

Raw water for the new WTP would be taken from the Willandra Creek Reservoir, or the Ivanhoe Borefields only as an emergency supply.

The new WTP would involve the following general treatment process:

- Raw water supply flow control
- Oxidation with chlorine (gas) dosing for iron and manganese removal
- Pre-soda ash dosing for pH adjustment
- Oxidation contact tank
- Coagulant dosing for coagulation
- Flocculation
- Clarification (lamella clarifier)
- Ultra Fine (UF) Filtration
- Granular Activated Carbon (GAC) Filtration
- Ultraviolet (UV) disinfection
- Disinfection chlorine dosing
- Chlorine contact tank (clear water storage tank)
- Post soda ash dosing for pH adjustment (if required)
- Trim chlorine (gas) dosing for disinfection

A process flow diagram is provided in Figure 4-1 and the process is also described below.

Raw water for the new Membrane Filtration WTP would be obtained from new raw water rising main into the WTP site. Raw water would first be pumped into an oxidation tank where pre-dose chemicals such as chlorine gas and soda ash would be dosed.

The water treatment plant process would consist of chemical pre-dosing, coagulation, flocculation, and clarification followed by UF filtration and GAC filtration, UV treatment, chlorination and pH correction, as necessary. Treated water would then be pumped to a poly clear water storage tank and town reservoir for use.

Backwash/wash wastewater and clarifier sludge generated in the WTP would be collected for settling in one of the two existing upgraded sedimentation lagoons and supernatant would be returned to WTP inlet works. The dried sludge cake in the lagoons would be removed mechanically, as required.

The proposed water treatment plant would be designed to produce a nett treated water throughput of 0.4 ML per day, exclusive of all losses, plant usage, plant downtime and wastewater generated, and regardless of water quality and temperature.

Based on the available water quality data the proposed new WTP would be able to treat for the following requirements as shown in Table 4-1 below. The main components of the WTP are described further in Section 4.2 below.

Table 4-1: Ivanhoe WTP Water Quality Goals

Parameter	Unit	Requirement	
		95th percentile	Absolute
True Colour	Hazen Units (HU)	≤ 5	≤ 10
Turbidity	Nephelometric Turbidity Unit (NTU)	≤ 0.2	≤ 0.3
pH	-	7.6 ±0.4	7.0 – 8.2
Chlorine	mg/L	0.5	-
Total Iron	mg/L	≤ 0.08	≤ 0.1
Total Manganese	mg/L	≤ 0.02	≤ 0.05
Total Aluminium	mg/L	≤ 0.01	≤ 0.2
Total Alkalinity	mg/L $CaCO_3$	≥ 30	≥ 40
Calcium Carbonate Precipitation Potential (CCPP)	-	-	-5 to 0
Total Dissolved Solids	mg/L	-	< 500
E. Coli or thermotolerant coliforms (CFU/100mL)	-	-	< 1
Pathogens	≥ 3 log inactivation of *Crypto* across the entire process		
Total trihalomethanes	mg/L	≤ 0.15	≤ 0.25
Nitrates	mg/L	-	≤ 10
Hardness	mg/L	-	150
Hydrogen Sulphide	mg/L	≤ 0.02	≤ 0.05
Taste and Odour	-	Acceptable to most people	
Pesticides	-	Comply with ADWG (2011)	

4.2 Description of the Works

The proposed WTP facilities would consist of the following:

- Plant building – single storey and approximately 20 m x 10 m in plan accommodating new water treatment equipment
- Oxidation tank
- Flocculation tanks
- Lamella clarifier
- UF filter feed tank and pumps
- GAC filters
- A new 50 kL clearwater tank and two pumps (20 kL/hour)
- Two (2) upgraded sedimentation lagoons (sludge lagoons) with increased capacity, approximately 12.5 m x 25 m area (per lagoon) in plan
- Car park and onsite access road (ring road)
- Gates and fencing (as required)

The layout plan for the new WTP is shown in Figure 4-2.

4.2.1 Plant Building

The main WTP building would comprise a Colorbond single storey building (approx. 20 m x 10 m) constructed on a concrete slab. The plant would be suitable for unattended operation, designed for a fail safe operation, and during power failure would restart automatically on restoration of power.

This building and plant would comprise the following facilities:

- Control room (including thermal insulation and air-conditioning and electrical switch boards and control panel for the WTP);
- UF filtration;
- GAC filtration;
- Plant room - including mechanical equipment including air blowers, air compressors, feed pumps; etc.
- Powder dosing and storage room;
- Chlorination room;
- Chemical storage;
- Laboratory space;
- Amenities (accessible toilet, and a wash basin).

4.2.2 Clarification

The clarification process would be carried out by a lamella plate clarifier with a design raw water flow rate of 402 m^3/day. The overall clarifier dimensions would be approximately 2.2 m long x 3.1 m wide x 3.1 m high.

4.2.3 Tanks and Pumps

An new oxidation tank would be provided to assist with flow control to the flocculator and clarifier. A new 30 kL filter feed tank would be required to receive water from the clarifier and new pump system would be required to transfer water from the filter feed tank

A poly clear water tank with a minimum capacity of 50 kL would be provided at the WTP site to balance the flow distribution from the WTP to the town reservoir. Two new 20 kL/h clear water pumps would be provided to pump the treated water from the WTP to the town reticulation network. Clear water pumps would be connected to the existing clearwater rising main by cutting into the pipeline at a suitable location.

A new pump would also be required to transfer water from the sedimentation lagoons back to the WTP inlet works.

4.2.4 Sedimentation (Sludge) Lagoons

The two existing sedimentation lagoons for water treatment wastewater collection purposes would be refurbished and upgraded to increase their total storage capacity to 1,010 m^3 (approx. 12.5 m (w) x 25 m (l) x 1.8 m (d) area, per lagoon). The existing lagoons are located the west of the new WTP in the north western corner of the WTP site, as shown in Figure 4-2.

All the wastewater produced in the WTP would be collected within the sedimentation lagoons except the Clean in Place (CIP) cleaning waste from the UF filtration system which would be discharged to a dedicated underground sump for further treatment and disposal.

The sedimentation lagoons are designed to operate with one lagoon in operation and the second one drying.

Solids in the Clarifier and UF waste and GAC backwash water would flow to the sludge lagoons via the neutralisation underground pit. During operation, wastewater would be retained in the lagoons to settle particles to the bottom of the lagoon and. the settled solids in the lagoons would be thickened and dewatered over time.

The dried sludge cake in the sedimentation lagoons would be removed mechanically. It is anticipated that supernatant from the lagoons would be returned to the WTP inlet works.

4.2.5 Gates and Fencing

Additional new man proof chain link security fencing and access gate would be provided around the proposed new WTP site, as required.

4.2.6 Car Park and Site Access

A new sealed all-weather car park and ring road would be constructed within the WTP site around the new plant building. The car park and access would be designed to accommodate the loadings and access requirements for commercial and passenger vehicles and also to accommodate larger chemical delivery trucks.

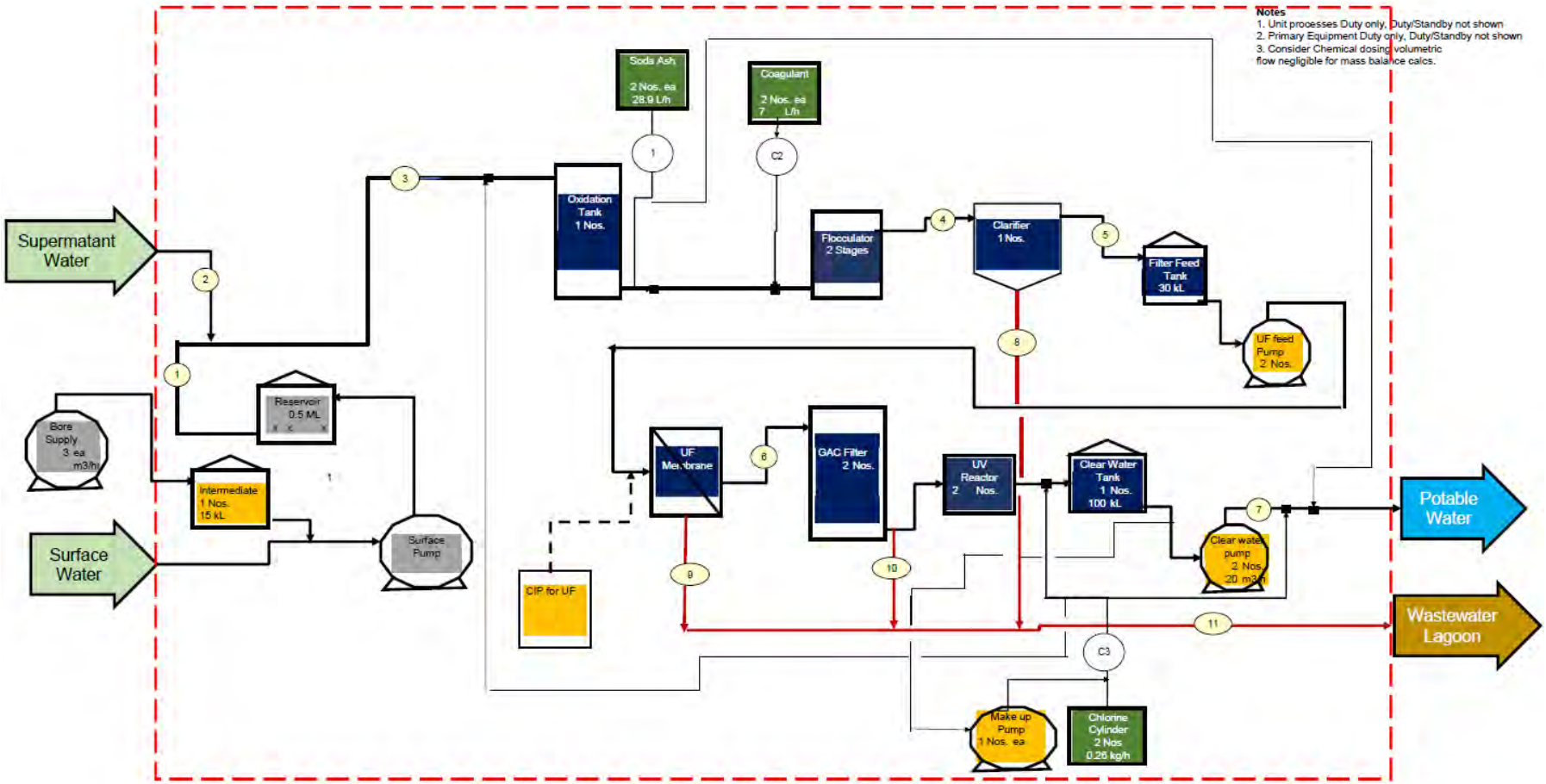


Figure 4-1: Ivanhoe WTP process flow diagram

Source: Membrane Systems Australia, 2021

Figure 4-2: Proposed Ivanhoe WTP Site Layout

Source: Membrane Systems Australia, 2021

4.3 Construction Methodology

The proposed construction method would depend on a number of factors including the contractor's method, chosen plant and equipment and program. The contractor would be required to submit a Work Method Statement and Construction Environmental Management Plan (CEMP) to Council prior to commencement.

The methodology for the WTP is likely to involve the following steps:

- Establish worker compound, storage and set down areas
- Establish environmental and traffic controls
- Upgrade and refurbish sedimentation (sludge) lagoons
- Erect WTP main building and new tanks (clear water and process water)
- Erect clarifier, oxidation and feeder tanks
- Stockpile excavated topsoil
- Erect car park fencing and signage.
- Backfill, stabilise and restore disturbed areas.
- Make good/repair any damage caused to assets during the construction process;
- Removal of storage containers and equipment from site; and
- Clean-up site and remove all materials and equipment from the site and make good. Clean site and any facilities used during the construction process.

Note: The existing WTP decommissioning process is unconfirmed at present.

4.3.1 Construction Equipment

The proposed construction method would depend on a number of factors including the final detailed design and the contractor's method, equipment and program. However, the following equipment is likely to be used for the WTP construction:

- Backhoe/excavator
- Trucks carrying construction materials
- Air compressor, concrete vibrator, concrete mixer
- Dewatering pump
- Ancillary pumps and holding tanks
- Light vehicles to transport construction workers.

4.4 Construction Environmental Management

Construction of the Proposal would be undertaken in accordance with a Construction Environmental Management Plan (CEMP) that would be prepared by the construction contractor/s and approved by Central Darling Shire Council prior to commencement. The CEMP would incorporate all of the mitigation measures identified in this REF as well as any conditions of the determination and any other licence/approval conditions. The CEMP would also incorporate an emergency response plan in case of a pollution incident, a complaints

handling procedure and a 24 hour telephone contact number. The complete list of the mitigation measures recommended in this REF is provided in Section 6.

5 Environmental Assessment

This section provides a profile of the environmental elements that could potentially be affected by the Proposal. This section also identifies and characterises the likely potential impacts associated with the construction and operation of the Proposal. Where considered necessary, mitigation measures are identified.

5.1 Assessment Methodology

The key objectives of this assessment are to:

- Identify those facets of the environment likely to be affected by the Proposal during both construction and operation
- Identify the sensitivity of the site
- Identify and characterise the associated impacts
- Identify and evaluate feasible mitigation measures for the identified impacts

Section 3 of the *Guidelines for preparing a Review of Environmental Factors* (OEH, 2016) has been used to assist in the identification of issues for assessment in this REF.

Environmental issues of potential relevance to the Proposal include:

- Land use
- Soil and water
- Heritage (Aboriginal and historic)
- Biodiversity
- Noise and vibration
- Air quality
- Traffic and access
- Waste management
- Hazards and risks
- Bushfire
- Visual amenity

5.2 Land Use

5.2.1 Existing Environment

Land-use histories and the majority of associated disturbances evident around the site is the result of development for the current WTP, pastoral and residential development and agricultural practices, predominantly grazing of livestock.

The existing WTP is located to the south-east of the town of Ivanhoe. The WTP is generally surrounded by rural open space.

The site for the new WTP (within Lot 1 DP 755649) is within the existing WTP property, which is currently owned by CDSC. The existing WTP building and reservoirs are located within the northern part of the site, north of the existing storage dam. There is a gravel access road leading from the Cobb Highway to the main brick building and reservoirs. There are currently two sedimentation lagoons which occupy the majority of the north-western corner of the WTP site. The lagoon embankments are obscured by bulrush and reeds with some scattered shrubs/small trees present between and surrounding the embankments of the sludge lagoons.

Several residential lots are located to the north east of the site on the other side of the Cobb Highway; the closest residence is located approximately 100m from the WTP property boundary. The Ivanhoe Railway Station and Ivanhoe Correctional Centre are located approximately 500m and 550m to the south east of the WTP property boundary, respectively; with a small area of residential development located near the correctional centre.

The WTP site is not subject to active Native Title Claim or Aboriginal Lands Claim, it is freehold land owned by CDSC.

Temperature and Rainfall

Bureau of Meteorology data from Ivanhoe (located at Ivanhoe Aerodrome AWS) indicates that the mean maximum temperature in Ivanhoe occurs in January (36.0°C), whilst the mean minimum temperature is recorded in July (5.0 °C). Mean annual rainfall is 232.7 mm.

5.2.2 Construction Impacts

The proposed new WTP building, access road and carpark would be located in the area to the east of the existing WTP and at the location of the existing ponds at the site.

At present the land is developed and the area where the new WTP structures are proposed is bare, with some areas of patchy grass cover and a line of shrubs/ small trees along the northern boundary fence line; .some of which would require clearing. The vegetation clearing for the proposed WTP site comprises low quality grassland, reeds (within the existing ponds) or bare earth (see Section 5.7).

5.2.3 Operational Impacts

The operation of the new WTP s would not significantly affect current land use practices of surrounding land as an existing WTP is currently operating at the site.

5.2.4 Mitigation Measures

- Best management construction impacts are to be documented in a project specific CEMP.
- No construction activities (e.g. tree clearing, stockpiling etc.) would be undertaken on private property surrounding the WTP site without prior approval. Appropriate security, supervision and access controls would be put in place and properly monitored to ensure no access by unauthorised personnel, either to the work area or via the work area to adjoining areas not under the ownership of CDSC.
- Central Darling Shire Council could provide a 24-hour telephone number so that any issues relating to the operation of the new infrastructure can be clarified and complaints dealt with by those able to respond.

- Restoration of the areas disturbed during construction would be undertaken so that these areas are returned to their pre-construction condition.

5.3 Soils

5.3.1 Existing Environment

The Ivanhoe 1:250,000 Geological Series Sheet SI/55-1 (First Edition, 1968) indicates that the WTP site is located within Quaternary deposits comprising flat to gently undulating plains of red and brown clayey sandy loam and lateritic soils.

Field investigation of the WTP site carried out by Public Works Advisory (2017) for the geotechnical investigation indicates that generally, the subsurface soil profile comprises an interbedded sequence of dominantly silty clayey sand and silty clay with fine sand/ sandy silty clay to maximum investigation depth of 4.8 m.

5.3.2 Construction Impacts

The construction of the Proposal would result in ground disturbance due to excavation works required for the foundations for the new plant building and tanks.

Borehole drilling investigation at the WTP site to determine the ground conditions indicate that the site subsurface spoil profile, comprises an interbedded sequence of dominantly silty clayey sand and silty clay with fine sand/ sandy silty clay. Bedrock was not encountered to the extent of geotechnical investigation drilling depth of approximately 5m.

There is potential for erosion and movements of excavated materials off-site, particularly during earthworks for the foundations of the new plant and sedimentation lagoon refurbishment and upgrade. Therefore, erosion and sediment controls would be required during construction works and stabilisation works undertaken following the completion of the construction phase at the WTP site.

It should be noted that although a number of mitigation measures to protect water quality have been listed in this REF, further site specific plans and construction details would be included in the CEMP for the works when further detail regarding the construction methodology is known.

5.3.3 Operational Impacts

The WTP works area would be inspected post construction to ensure all areas of disturbance are appropriately stabilised and erosion and sediment loss is not occurring. Provided the site is stabilised no impacts to soils are expected post construction.

5.3.4 Mitigation Measures

- A detailed Erosion and Sediment Control Plan (ESCP) would be prepared as part of the CEMP. The ESCP would describe the site specific measures to be implemented for all works areas, in accordance with the guidelines outlined in the 2004 Landcom publication *Managing Urban Stormwater: Soils and Construction*, 4th edition (“The Blue Book”) and *Volume 2a Installation of Services*. The ESCP would need to be site specific and would need to address the following issues to prevent erosion, sediment loss and water quality impacts:

- Minimisation of disturbance to soil and water adjacent to, and within, all watercourses in the works area.
- Identification of site specific sediment and erosion control measures wherever erosion is likely to occur.
- Identification of any environmentally sensitive areas on or near construction sites to ensure runoff is diverted away from sensitive areas.
- Requirements for vegetation clearing to be kept to a minimum.
- Retention of all surface runoff on-site
- Where possible, diversion stormwater around the construction site.
- Location and management of stockpiles, such as locating stockpiles away from any the drainage line near the works areas.
- All erosion and sediment controls would be regularly inspected, especially when rain is expected and directly after any rain events.

- All areas where ground disturbance has occurred would be stabilised following completion of works to ensure there is no erosion hazard and restored to their pre-construction condition. This would involve, where required, reshaping the ground surface, covering it with topsoil excavated from the site and re-establishing an appropriate vegetation cover.
- Any excess spoil would either be spread across the ground in nearby areas in such a manner as to avoid creating an erosion hazard, or removed off site for disposal in accordance with relevant Council and EPA requirements.

5.4 Water Quality

5.4.1 Existing Environment

There are no waterways present within close proximity to the WTP project site. The closest hydrological feature to the WTP site is an unnamed highly ephemeral drainage line located approximately 250 m to the north-west.

5.4.2 Construction Impacts

The main potential for water quality impacts to occur during construction would be associated with sedimentation and erosion during excavation works at the WTP site. Given the generally flat topography of the area, it is assessed that sediment and erosion controls would be effective in minimising any offsite impacts associated with WTP construction works.

The boreholes drilled as part of the geotechnical investigation (to maximum depth of 4.9m) did not encounter any groundwater at the WTP site within the depth of investigation, and it is unlikely that groundwater would be encountered at the WTP site.

After heavy rainfall events, standing water may impede the movement of light vehicles and plant.

5.4.3 Operational Impacts

The Proposal would not take water beyond Council's existing entitlement. Any water taken above this entitlement would require Council's Water Access Licence to be modified (refer to Section 2.3.6).

The operation of the Ivanhoe WTP would not result in any discharges of backwash water to the environment. Backwash wastewater (supernatant) from the filters would be returned to the sedimentation lagoons for treatment. The two sedimentation lagoons to be upgraded would be earthen clay lined and impermeable.

The new plant would include appropriate stormwater handling system (to be designed by the successful contractor as per Council's requirements). Stormwater from the roofs and run-off from paved areas would be diverted to the stormwater system.

No impact to local water quality is expected due to the operation of the new WTP.

5.4.4 Mitigation Measures

- Adequate procedures would be detailed in the CEMP, including notification requirements to the EPA, for incidents that cause material harm to the environment.
- A site specific spill management plan would be prepared and include the following requirements:
    - Emergency spill kits are to be kept at the site (vehicle kits).
    - Refuelling of machinery to be undertaken in a dedicated area within the construction compound appropriately protected as outlined in the spill management plan.
    - It is recommended that bio-friendly hydraulic fluids are used in plant and machinery. The decision is ultimately the machine operators, but at minimum a risk assessment needs to be undertaken on why the fluid cannot be used.
    - All plant and equipment shall be inspected daily for leakage of fuel, oil or hydraulic fluids. Machinery found to be leaking shall be immediately repaired or replaced.
    - Vehicle wash downs and/or cement truck washouts would be undertaken within a designated bunded area of an impervious surface or undertaken offsite.
- Mitigation measures to manage groundwater (should it be encountered during construction) would be incorporated into the CEMP which is to address the following issues in relation to groundwater:
    - Dewatering techniques during excavation/drilling;
    - Measures to ensure groundwater quality is not impacted during construction;
    - Techniques to settle, treat or filter groundwater encountered during excavation works i.e. diverting groundwater through baffle tanks or filter membranes; and
    - Appropriate treatment and monitoring regimes in the event that groundwater flows come to the surface, including disposal of groundwater in such a way as to prevent adverse impacts (such as erosion and water pollution).

- The CEMP would incorporate a pollution incident response management plan that defines appropriate procedures for notification of pollution incidents to the required authorities in accordance with s. 147 to 153 of the POEO Act, and requires response actions to be implemented in order to address any risks such as incidents posed to the environment, property or surrounding communities.

5.5 Aboriginal Heritage

5.5.1 Existing Environment

A desktop search was conducted on the following databases targeting the Ivanhoe WTP site to identify any potential previously recorded aboriginal heritage sites or objects within the area. The results of this search are summarised in Table 5-1 below and presented in Appendix D.

Table 5-1 Aboriginal Heritage Desktop - Database Search Results

Name of Database Searched	Date of Search	Type of Search	Comment
Heritage NSW Aboriginal Heritage Information Management System (AHIMS);	20.10.21	WTP site- Lot 1 DP815263	No registered AHIMS sites within the proposal study areas (or within 200 metres of the Proposal site).
National Native Title Claims /Determinations Search	20.10.21	NSW	No Native Title Claims or determinations cover the Proposal site.
Commonwealth Heritage Listings	20.10.21	NSW	No Aboriginal places listed on either the National or Commonwealth heritage lists are located within the Proposal site
Local Environment Plan	20.10.21	Central Darling LEP 2012	No Aboriginal places noted occur near the Proposal site.

5.5.2 Construction Impacts

No Aboriginal sites have been recorded in the vicinity of the WTP site. Construction works are not anticipated to impact significantly on any item or place having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010) has been used in assessing the likelihood of encountering items of Aboriginal cultural heritage during the construction works. It is considered that there is little to no potential for Aboriginal objects to remain within the WTP site and that further archaeological investigations and/or an Aboriginal Heritage Impact Permit are not required and that the Proposal can proceed with caution.

Overall, it is considered reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed WTP works, for the following reasons:

- No Aboriginal objects or places have been recorded within at least 200 m of the WTP site, in accordance with a search of the AHIMS database;
- No landscape features such as rock shelters, sand dunes, waterways, waterholes or wetlands are present at the site or within 200 m of the WTP site that are likely to indicate presence of Aboriginal objects; and
- The area of works would occur within previously disturbed areas of WTP site, including areas that have been subject to extensive above and below ground disturbance for existing infrastructure and current WTP operations.

However, in the event that any potential Aboriginal cultural heritage items are found during the proposed construction works, the works should cease and the safeguards listed below would be applied.

5.5.3 Operation Impacts

No impact to Aboriginal objects or places is expected due to the operation of the new WTP.

5.5.4 Mitigation Measures

- It would be a requirement that all workers/contractors on the site be informed of their obligations under the *National Parks and Wildlife Act* 1974 and *NSW Heritage Act* 1977, namely that it is illegal to disturb, damage or destroy a relic without the prior consent of Heritage NSW.
- If human skeletal remains are found the proponent must stop work immediately, secure the area to prevent unauthorized access and contact the NSW Police and Heritage NSW.
- If Aboriginal objects are found while undertaking the activity the proponent must stop work and notify Heritage NSW; an AHIP may need to be sought.
- Should any Aboriginal Objects be encountered during works associated with this Proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal Object the archaeologist would provide further recommendations. These may include notifying the Heritage NSW and the Local Aboriginal Land Council.
- In the event that known or suspected Aboriginal skeletal remains are encountered during the activity, the following procedure would be followed:
    a) all work in the immediate vicinity would cease;
    b) the find would be immediately reported to the work supervisor who would immediately advise the Environment Manager or other nominated senior staff member;
    c) the Environment Manager or other nominated senior staff member would promptly notify the police and the state coroner (as required for all human remains discoveries);

d) the Environment Manager or other nominated senior staff member would contact the Heritage NSW for advice on identification of the skeletal material as Aboriginal and management of the material; and

e) if the skeletal material is of Aboriginal ancestral remains, the Local Aboriginal Land Council would be contacted and consultative arrangements would be made to discuss ongoing care of the remains.

5.6 Historic Heritage

5.6.1 Existing Environment

The WTP site and surrounds has been historically used for residential and gazing related activities for the past 190 years. However, no physical evidence or registered historical heritage items relating the sites to local historical heritage is present today.

A search of the State Heritage Inventory and Heritage Council of NSW administered heritage databases, and the Central Darling LEP returned no records for historical heritage sites within the designated WTP site search area. The search results are provided below in Table 5-2 and in Appendix D.

Table 5-2 Historic Heritage Desktop Database Search Results

Name of Database Searched	Date of Search	Type of Search	Comment
Heritage NSW State Heritage Inventory Listings	20.10.21	Ivanhoe - area the vicinity of the WTP site	No places listed on the heritage lists are located within the Proposal site. The closest recorded heritage item compound is the Ivanhoe Railway Precinct located approximately 500 m southeast of the WTP property boundary which is listed on the s.170 NSW State agency heritage register under the *Heritage Act 1977*
National and Commonwealth Heritage Listings	20.10.21	Ivanhoe - area the vicinity of the WTP site	No places listed on either the National or Commonwealth heritage lists are located within the Proposal site.
Local Environment Plan (LEP)	20.10.21	Central Darling LEP 2012	No known heritage places noted occur near the Proposal site.

5.6.2 Construction Impacts

There were no historic heritage constraints identified by the assessment. Therefore, no impact to historical heritage items is expected due to the construction of the new WTP site.

5.6.3 Operation Impacts

No impact to historical heritage items is expected due to the operation of the new WTP site.

5.6.4 Mitigation Measures

- In the event that historical relics or sites are identified also work must stop and be protected until a qualified archaeologist inspects the site and provides management advice in consultation with Heritage NSW.

5.7 Biodiversity

5.7.1 Existing Environment

The area in the locality of the Ivanhoe WTP site has a long history of disturbance ranging from grazing, historical land clearing and habitation.

The area within the existing boundary fence of the site has been subject to past vegetation clearance and filling for the construction of the existing WTP. This area therefore has no remnant trees and groundcover consists of predominately bare earth with sparse ground cover including grass, weed species with some shrubs and planted trees. Immature trees and shrubs are also present along the northern boundary fence line. The two sedimentation lagoons onsite are overgrown with bulrush and long grass, with some shrubs/small trees present near the embankments surrounding and in between the lagoons.

Given the generally limited scope of works and area of disturbance at the WTP site, a targeted survey of threatened flora and fauna species listed as likely to be present was not undertaken.

One threatened fauna species (Corben's Long-eared Bat) has been previously recorded within 10 km of the Proposal site on the BIONET Atlas of NSW Wildlife database.

A search of the Bionet Atlas of NSW Wildlife species sightings mapping (accessed in October 2021 via NSW SEED Map) did not identify any threatened flora or fauna species as listed under the *Biodiversity Conservation Act 2016* or the *Environment Protection and Biodiversity Act* 1999 within or in the vicinity of the WTP work site. A copy of the BIONET Atlas search results is provided in Appendix D.

5.7.2 Construction Impacts

The proposed works would be contained within the previously cleared areas of the existing WTP site.

The construction of the new WTP would require the removal of a small number of planted reeds, shrubs, regrowth semi-mature trees and sparse grass ground cover, mainly in the area surrounding the sedimentation lagoons.

No threatened fauna or flora species have been recorded on the Bionet Atlas database mapping at the WTP site.

Increased traffic and noise associated with the construction works may temporarily disturb fauna inhabiting adjacent bush-land or lake areas in the vicinity of the WTP site. Whilst construction noise may temporarily displace local fauna, there is a large area of suitable bushland habitat surrounding the site to offer refuge. Any fauna which moves out of the area due to the works would be able to relocate back to the site at the completion of the construction period.

During construction works at the WTP site, suitable practices would be implemented to ensure weeds are not transported to the site by construction workers and equipment.

On the basis of the previous disturbance of vegetation at the WTP site and characteristics of the works, no significant impact is likely to any threatened flora or fauna species.

Overall, due to the extremely limited impacts to vegetation proposed as part of the WTP construction works, it is not considered that minor trimming or removal of vegetation would result in a significant impact to threatened flora or fauna. Therefore, an SIS under the BC Act or a referral to the Commonwealth Department of Agriculture, Water and the Environment under the EPBC Act is not required.

5.7.3 Operation Impacts

The operation of the Ivanhoe WTP is not expected to result in any impact to flora and fauna. There would be improved water quality for the town due to the new WTP and improved intake infrastructure.

5.7.4 Mitigation Measures

- The construction area is to be clearly delineated.
- Temporary construction sites and storage areas will remain in a tidy state and free of debris. Following completion and departure from the construction site areas, as required, disturbed surfaces will be stabilised.
- The contractor(s) will, as required, undertake appropriate vehicle and equipment hygiene to prevent the spread of weeds within and/or between sites.
- The area of disturbance and vegetation removal is to be kept to the minimum required to undertake the works.
- Temporary fencing and signage should be utilised to demarcate the area of works.
- Vehicles and machinery would utilise existing tracks and cleared areas where possible to access the site during construction.

- The works are to be undertaken in accordance with AS *4970-2009 Protection of trees on development sites* (Australian Standards 2009).
- Weed management measures are to be included in the CEMP to reduce the chance of spreading existing weeds or introducing new ones; weed management measures should be implemented prior to works commencing and should address:
    - Removal of weeds in the constructible footprint during construction including spraying and physical removal.
    - Suitable methods of disposal for weeds removed physically removed.
    - Vehicle wash-down procedures to minimise the likelihood of spreading weeds.

5.8 Noise and Vibration

5.8.1 Existing Environment

The area around the WTP is a rural environment. Several residential lots are located to the north east of the site on the other side of the Cobb Highway, with the closest residence located approximately 100m from the WTP property boundary. The Ivanhoe Railway Station and Ivanhoe Correctional Centre are located approximately 500m and 550m to the south east of the WTP property boundary, respectively and a small area of residential development is located near the correctional centre.

Noise monitoring was not undertaken as part of the REF, however given the rural nature of the area the background noise level is predicted to be around 35 – 40 dB(A).

5.8.2 Construction Impacts

The potential noise impacts associated with the construction and operation of the new WTP is low due to the distances to any affected sensitive receivers.

The typical A-weighted sound power levels for equipment which may be required to undertake the construction works are listed in Table 5-3 below (it is noted that this list is not definitive and these levels are taken from the *Australian Standard AS2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites*).

Table 5-3 Construction Equipment Sound Power Level

Equipment	Typical Sound Power Levels (dB)	Sound Pressure Level at 100m distance (dB(A))
Excavator/Backhoe	104	56
Concrete pump truck	108	60
Compressor	101	53
Truck (>20 tonne)	107	59
Light vehicles	106	58
Hand held tools	102	54
Machine mounted drill	116	68

Under the Interim Construction Noise Guideline (DECCW, 2009) construction noise criteria for projects where the construction duration is greater than three weeks is the rating background noise plus 10dB(A). As the daytime background noise level at the sites has been estimated to be 35 – 40 dB(A), the noise level objective would be 45 – 50 dB(A) at the nearest residence. Given the proximity to the nearest residents located to the north-east and south-east of the WTP, it is not expected that the construction works would meet the construction noise level criteria for the entire construction period. However, the noise levels at the closest residents are not likely to exceed the highly affected noise level (75 dB(A)) above which there may be strong community reaction (DECCW, 2009).

Noise and vibration levels would vary depending on the nature of the activities being undertaken. The use of several items of construction equipment simultaneously is only expected to occur intermittently, if at all. In addition, construction hours would be restricted to the normal daytime construction hours as specified by EPA and the nature of the works would be temporary.

Control measures to minimise noise impacts would be implemented during construction as part of the contractor's Construction Environmental Management Plan (CEMP), which would be required to be submitted for approval prior to commencement of works. This should include consideration of Tables 4 - 10 of the Interim Construction Noise Guideline, which present a summary of options for work practices with lower noise impact. The CEMP for the works would address site specific issues, including noise reduction practices, so as to minimise impacts to adjoining properties.

5.8.3 Operational Impacts

The proposed works would generate some operational noise from the WTP site, however as the Proposal involves the replacement of the existing WTP infrastructure the noise impacts associated with the new WTP would be similar to those existing and would not be a new noise source in the region.

The *NSW Noise Policy for Industry* (NPfI) (EPA, 2017) contains the relevant noise criteria for operational noise. The EPA is currently reviewing the NPfI to clarify assessment processes and modernise the document without significantly altering the main principles, processes or the recommended noise management levels for suburban and rural environments.

The NPfI recommends a noise management level of 5 dB(A) above the background level with an acceptable noise limit of:

- 50 dB(A) for rural environments during the day (7am to 6pm);
- 45 dB(A) for rural environments during the evening (6pm to 10pm); and
- 40 dB(A) for rural environments during the night (10pm to 7am).

During detailed design, the Contractor would be required to verify operational noise emissions to demonstrate that selected plant and equipment complies with NPfI requirements at the nearest sensitive receptors. During operation, vibration from the operation of the WTP would not be discernible at the boundary of the site.

Given the distances to the nearest sensitive receivers, the potential operational noise impacts would be very low.

5.8.4 Mitigation Measures

Construction

- Consult with residential premises in the immediate vicinity of the proposed works to determine any community concerns. Provide advice as to where concerns can be directed. If the consultation community concerns that are not readily resolved by agreement, Council staff are to be contacted who will endeavour to assist in resolving any outstanding issues of concern.
- Works would be undertaken during normal work hours i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays; and no work would be undertaken on Sundays, Public Holidays or outside these work hours without notification to affected community and EPA. Notification would provide the following details:
    - The locations and types of surrounding receivers likely to be affected;
    - The nature of the proposed works;
    - The noise characteristics of any powered equipment likely to be used;
    - Measures to be taken to reduce noise emissions; and
    - Any other information EPA may request.
    - All reasonable practical steps shall be undertaken to reduce noise and vibration from the site.

Operation

- Operational noise emissions would be verified to demonstrate selected plant and equipment complies with NPfI requirements at the nearest sensitive receptor. This would be achieved through post-compliance monitoring to validate the noise emissions and to identify the need for additional mitigation measures.

5.9 Air Quality

5.9.1 Existing Environment

Due to the rural setting regional air quality is generally good. Air quality in the vicinity of Ivanhoe is expected to be good and typical of small to medium sized country town. Some human related activities could cause air pollution in the region. However, while such industry, commercial and domestic air emissions can be a source of pollution it is unlikely that these sources are significantly impacting on air quality levels around Ivanhoe.

5.9.2 Construction Impacts

The new WTP would be constructed within the boundaries of the existing WTP site. The main impact to air quality during construction is expected to arise from the generation of airborne localised dust associated with earthworks for ground levelling and for the sedimentation lagoon refurbishment and upgrade works. However, this is not anticipated to cause notable adverse environmental impacts unless the weather is particularly windy. Dust suppression methods, including the use of water carts, would be applied on windy days to prevent dust being transported off site.

The potential air quality impacts likely to be caused by the construction works include:

- Vehicle emissions from vehicles transporting materials to site;
- Dust directly generated from excavation works;
- Dust generated from vehicles and plant operating on disturbed ground; and
- Dust generated from the temporary stockpiling of soil and during backfilling works.

No significant greenhouse gas emissions are anticipated during the works. Vehicle movements would emit greenhouse gases, but their short-term duration is unlikely to have a significant impact on the level of greenhouse gas emissions.

Given the isolated nature of the site, any air quality impacts are unlikely to impact on sensitive receivers.

5.9.3 Operational Impacts

There would be no long term reductions in air quality associated with the operation of the WTP.

The sedimentation lagoons area has the potential to create dust emissions. Bureau of Meteorology wind rose data obtained for Ivanhoe (BOM, 2021) shows that 9 am prevailing wind is either from the south or north whilst 3 pm prevailing winds are from the south and south-west so any dust impacts would generally affect areas to the south or north in the morning and north and north-east of the WTP site in the afternoon. The existing sedimentation lagoons are not in close proximity potentially affected receivers in these areas. Furthermore, vegetation would re-establish in the lagoons and therefore the incidence of dust generated from the lagoons is likely to be low.

During operation of the upgraded WTP, energy consumed onsite is likely to slightly increase due to the provision of power and general services supply to the buildings and water treatment infrastructure.

5.9.4 Mitigation Measures

- Construction vehicles and equipment would be suitably serviced within the six-month period prior to commencement of construction activities and all necessary maintenance undertaken during the construction period to meet EPA air quality requirements.
- The excessive use of vehicles and powered construction equipment is to be avoided.
- All construction machinery would be turned off when not in use to minimise emissions.
- Construction contractors would monitor dust generation potential.
- Dust suppression methods including the use of water carts would be applied where required (i.e. on windy days when earthworks and vehicle movements are generating dust).
- Any stockpiled spoil/fill would be protected to minimise dust generation to avoid sediment moving offsite.
- Vehicles transporting any spoil would be covered.
- Exposed surfaces to be progressively revegetated/regrassed as soon as practicable.

5.10 Traffic and Access

5.10.1 Existing Environment

The new WTP site is accessible from the Cobb Highway, via the access road to the to the existing WTP site.

5.10.2 Construction Impacts

Construction of the WTP would result in an increase in traffic in the local area. There would be minimal impacts to road users along the Cobb Highway and Abbotsford-Lake Morrison Road as large vehicles delivering materials to the works sites would only occur sporadically and would not cause major impediment to other road users. The construction of the Proposal would result in a very small volume of excess spoil which is likely to be worked around the site. This would significantly reduce the volume of construction traffic on the local road network.

A short section of new access road would need to be constructed that would require only minor grass cover vegetation clearing within the existing WTP site. The proposed access road would be within the existing WTP site owned by Council.

5.10.3 Operational Impacts

The Ivanhoe WTP would require the delivery of chemicals and other materials for the operation of the plant. Chemical deliveries would be expected to occur on average once per month. All deliveries would be via the access road within the site, via the Cobb Highway.

Chemical deliveries would be undertaken in accordance with all SafeWork NSW guidelines for the transport of dangerous goods (see Section 5.12 below).

The access road would be suitable for all-weather access, and is not anticipated to result in the generation of significant dust impacts from vehicles accessing the site.

The operation of the new WTP is not anticipated to result in any increase in traffic volumes.

5.10.4 Mitigation Measures

- The contractor would prepare a Traffic Management Plan as part of the CEMP prior to commencement of works. The Traffic Management Plan would include measures to minimise traffic impacts, ensure public safety and would be prepared in accordance with:
    - Transport for NSW's *Traffic Control at Work Sites Manual, Issued September 2020, and*
    - *Australian Standard 1742.3 - 2019 Manual of uniform traffic control devices Traffic control for works on roads*
- Prior to the commencement of works, existing access tracks that would be used by heavy vehicles would be assessed for adequacy and upgraded where necessary. Appropriate drainage would be provided for any unsealed tracks utilised during the works to ensure that vehicle movements do not cause erosion and sedimentation into any nearby drainage lines.
- Any disturbance to surrounding landowners as a result of vehicle movements and noise would be minimised. The contractor would avoid any inconvenience to

residences/landowners, and all access gates would be in their original condition following completion of the works.

- Any temporary access tracks required for the works would be located so as to minimise disturbance to the existing environment. Following completion of the works the temporary tracks would be removed, topsoil provided and re-grassed. Existing tracks would be restored to their condition prior to works.
- All traffic would comply with all applicable traffic laws and regulations including speed limits. All construction vehicles would comply with the speed limits set for the roads accessing the site.

5.11 Waste Management

5.11.1 Existing Environment

Wastewater and sewage generated from the shower, toilet and washbasin would be directed to Council's sewer reticulation or a septic tank.

5.11.2 Construction Impacts

The construction of the Proposal would result in waste in the form of excess spoil, cleared vegetation and general building wastes such as packaging, offcuts, excess materials and workers wastes such as drinks containers, food scraps etc. Portable toilets would be provided for workers at the construction sites.

To ensure that environmental harm does not occur as a result of uncontrolled or inappropriate collection, transport and disposal the relevant provisions of the following Acts would be implemented:

- *Waste Avoidance and Resource Recovery Act 2001*
- *Protection of the Environment Operations Act 1997*
- *Protection of the Environment Operations (Waste)Regulation 2014*

The waste management and contamination control procedures and/or measures listed below would be implemented for the proposed works.

5.11.3 Operational Impacts

The operation of the new WTP would result in backwash water and dried sludge. Backwash water would be returned to the headworks for treatment and would not be discharged to the environment.

Sludge would be dried in one of the two sedimentation lagoons at the WTP. Once dried, the sludge would be removed off site for disposal. Dried sludge would be managed by CDSC and is likely to be transported off site to landfill.

The WTP would be operated to avoid chemical spills and the generation of chemical waste. All chemical storage and dosing systems would be maintained in a bunded area. The entire chlorination system would be operated under vacuum conditions from the duty drum up to the injector to minimise the potential for chlorine leakage (see Section 5.12 below for further discussion).

Any chemical waste resulting from the operation of the WTP would be contained in the bund. There would be no separate chemical waste holding tank connected to any chemical bund. No chemical waste would be discharged into the stormwater system or drainage lines, such waste such as from the CIP neutralisation tank or chlorination dosing would need to be pumped out from the storage tank or chemical bund and taken offsite for appropriate treatment.

5.11.4 Mitigation Measures

Construction

- The contractor undertaking the works would detail waste management procedures in a Waste Management Plan to be incorporated into the CEMP. The contractor is to assume responsibility for the appropriate disposal of any waste generated. Adequate procedures should be established and detailed in the CEMP, including notification requirements to EPA, for incidents that cause material harm to the environment. The WMP would also follow the resource management hierarchy principles embodied in the W*aste Avoidance and Resource Recovery Act* 2001. Namely, to:
    - avoid unnecessary resource consumption;
    - recover resources (including reuse, reprocessing, recycling and energy recovery); and
    - dispose (as a last resort).
- No batched concrete mixing plants would be established in the works areas. Any required concrete would be mixed off-site and transported to the construction areas.
- Following completion of the works, excess concrete would be removed off-site for recycling.
- All waste removed from the site would be classified and disposed of appropriately, and all non-recyclable waste would be disposed of at an appropriate licensed waste disposal facility.
- If any contaminated material is encountered during earthworks, work shall cease, the site secured and a safe work method statement(s) and appropriate practices shall be implemented. Any contaminated material would be classified first and then stored, transported and disposed of in accordance with EPA requirements at an EPA licensed waste facility.
- Cleared vegetation (devoid of weeds) would be mulched and re-used on site as part of site stabilisation and revegetation. Excess mulch would be removed off site and disposed of in accordance with EPA requirements.
- If practicable, surplus excavated materials/fill would be reused onsite as part of rehabilitation and restoration works. Any surplus spoil disposed of in this manner would be seeded to minimise the likelihood of it being transported offsite through wind or water action

Operation

- Minor spills of chemicals and any minor chemical waste from the wet lab area would be directed to Council's sewer reticulation or a small chemical waste tank.

- No chemical waste would be discharged into the stormwater system.

5.12 Hazards and Risks

5.12.1 Operational Impacts

A number of chemicals that can be classified as Dangerous Goods under the ADG Code would continue to be stored on site and include:

- Liquefied Chlorine gas - Class 2.3
- Caustic Soda (sodium hydroxide) - Class 8 (to be confirmed as part of final design)

Class 2.3 substances are classified as toxic gases. These are defined as substances that are known to be so toxic or corrosive to humans as to pose a hazard to health.

Class 8 substances are classified as corrosive substances. These are defined as substances which, by chemical action, would cause severe damage when in contact with living tissue, or, in the case of leakage, would materially damage, or even destroy, other goods or the means of transport.

Dangerous good storage notification to SafeWork NSW would be undertaken for the above chemicals.

The quantities of chemicals that would be stored are all below the relevant thresholds that would trigger additional requirements under *State Environmental Planning Policy 33 – Hazardous and Offensive Development.*

The risk of chemical spills is considered to be low. All chemicals used in the treatment process would be stored on site within bunded areas. Bunds would be sized to contain 10% in addition to the chemical volumes stored (ie a minimum of 110% of chemicals stored within them).

Public safety hazards are unlikely beyond the boundary of the WTP site. Chemicals stored and used at the WTP are required to be stored in accordance with Australian Standards and SafeWork NSW guidelines, adequately sealed within infrastructure and appropriately bunded. Chemicals may be required to be disposed of during operation of the WTP.

Requirements for the storage, handling and disposal of chemicals during operation would be undertaken in accordance with the relevant Safety Data Sheets and included in the WTPs Operational Environmental Management Plan.

For the protection of the public, the entire WTP site including the sedimentation lagoons and reservoir would be fenced. The man proof fencing would also consist of one double leaf gate at the entrance.

The existing WTP would remain operational until the new plant is commissioned. Therefore, there would be no interruption of the water supply to the community.

5.12.2 Mitigation Measures

Construction

- Any chemicals and fuels are to be stored in a bunded area at least 50 metres from any waterway or drainage line.

- Any hazardous materials stored on site would be stored in the compounds and within impervious and bunded enclosures capable of storing 120% of the volume of material stored there.
- Workers would be trained in the spill management plan and the use of the spill kits.

Operation

- SafeWork NSW would be notified regarding the storage of dangerous goods at the site.
- The transport and handling of all chemicals used in the operation of the Ivanhoe WTP would be undertaken in accordance with all relevant SafeWork NSW guidelines including the following:
  - *Code Of Practice: Managing Risks Of Hazardous Chemicals In The Workplace* (SafeWork NSW, August 2019).
  - *Code Of Practice: Labelling Of Workplace Hazardous Chemicals (*SafeWork NSW, August 2019).
- Liquid chemical storage and filling areas would be located in bunded areas designed to accommodate 110% of the total capacity delivered and are to include appropriately designed drainage and safety equipment.
- Storage tanks would be regularly inspected and maintained to ensure their integrity. Plant personnel would be trained for proper and safe operation of these facilities.
- Specific requirements for the management of chemicals associated with the WTP would be detailed in an Operational Environmental Management Plan.
- Safety Data Sheets for chemicals used in the treatment process are to be available on site at all times.
- All hazardous substances are to be listed in a register together with the relevant Safety Data Sheets. Employees are to have access to this register.
- Fuel and lubricants for machinery maintenance are to be stored and managed appropriately.
- Appropriate signage is to be maintained where chemicals are stored.
- The Operational Environmental Management Plan would be periodically reviewed to assess the efficacy of all management procedures. Identified shortcomings would be remedied to ensure these continue to be effective.

5.13 Bushfire

5.13.1 Existing Environment

The perimeter of the WTP site is identified as bushfire prone land (vegetation buffer and vegetation category 3) on the Bushfire Prone Land Map, certified by the NSW Rural Fire Services (refer to Figure 5-1 below).

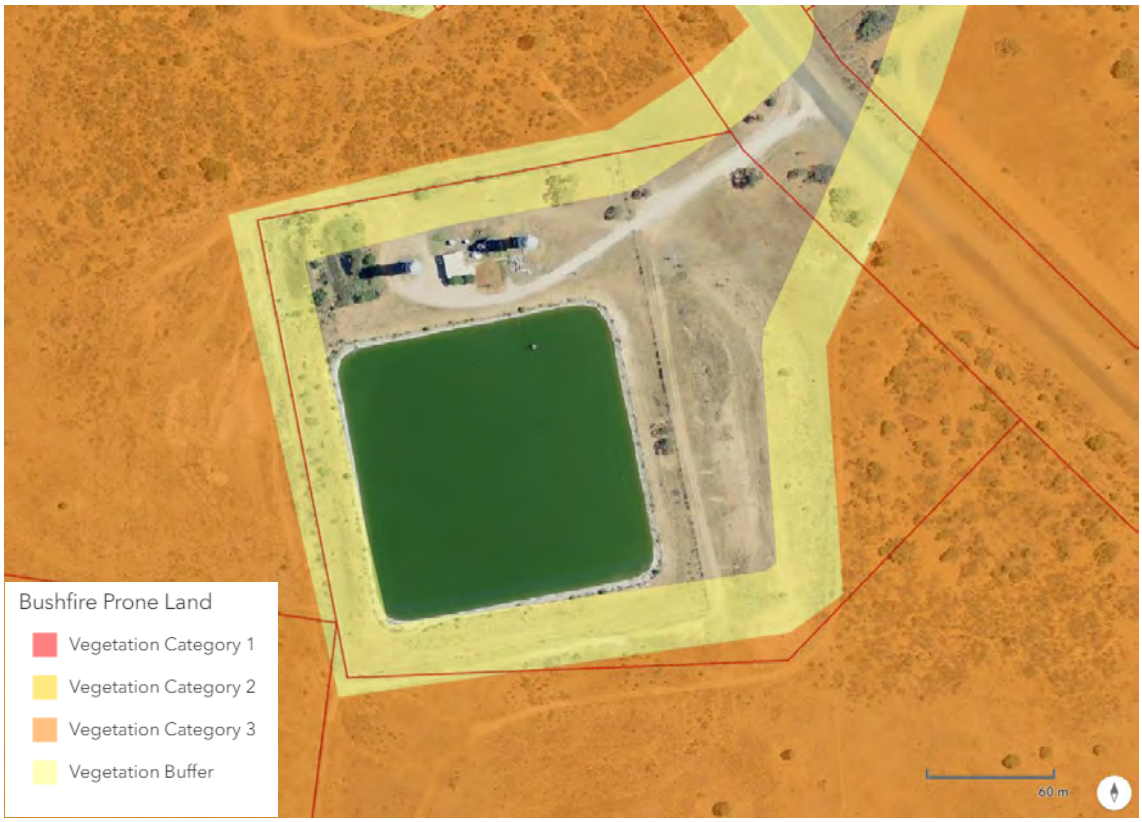


Figure 5-1 Bushfire Prone Land Map Extract

Source Bushfire Prone Land Map layer, NSW Planning Portal, accessed October 2021

5.13.2 Construction Impacts

Design of the aboveground infrastructure at the WTP site, including the chemical storage within the plant building, should take into consideration the potential bushfire risk at the site, in accordance with the relevant principles of the RFS publication *Planning for Bushfire Protection 2019*. However, it is noted that the site is cleared of vegetation which would reduce the ongoing risk of bushfire at the site.

Although the construction activities are not anticipated to pose a significant bushfire risk, mitigation measures listed below would be implemented to ensure that the works do not start a bushfire in grassland and surrounding vegetated areas.

5.13.3 Operational Impacts

During operation of the WTP, the new water treatment infrastructure is not anticipated to significantly increase the bushfire risk at the WTP site and the chemicals used as part of the water treatment process, including chlorine, would be stored within an enclosed, secure structure in a cleared area. As such, bushfire risk associated with chemical storage at the site is anticipated to be minor.

5.13.4 Mitigation Measures

- Design of the above ground infrastructure at the reservoir sites should take into consideration the potential bushfire risk at the site, in accordance with the relevant principles of the RFS publication *Planning for Bushfire Protection 2019*.

- Construction staff to be made aware of the location of the proposed works in bushfire prone land and the potential for bushfire risk.
- During high risk bush fire danger rating days, no construction activities would be undertaken that pose a risk of starting a bushfire (e.g. welding).

5.14 Visual Amenity

The new WTP would be located adjacent to the existing WTP within the same site, which is located in a rural setting on the outskirts of the Ivanhoe township. The site is visible to the members of the public from the Cobb Highway on the eastern boundary of the site.

The WTP site is characterised by the existing WTP shed, storage tanks and associated infrastructure, two sedimentation lagoons and a large reservoir, with trees and shrubs scattered along the site boundary. The adjoining land to the WTP infrastructure is vacant.

5.14.1 Construction Impacts

The main visual impacts during the construction period would be from equipment and vehicles used during construction works, stockpiling and site compound at the WTP site. Visual impacts resulting from construction would be short term and would be negligible due to the limited visibility of the site to surrounding residents and the general public.

5.14.2 Operational Impacts

The new WTP would result in the decommissioning of the existing WTP building and the construction of new infrastructure onsite. The new WTP building would be a single storey structure constructed from Colorbond which will be contained within the existing WTP site in the same lot parcel. New fencing would be the same height and of similar material to existing site security fencing. These new features would be consistent with the existing water treatment use of the site and are predicted to have a minimal additional impact on the visible aesthetics of the area.

5.14.3 Mitigation Measures

Construction

- The clearing of vegetation would be kept to the minimum required for the works.
- Construction compounds and areas for the parking of vehicles and storing of equipment would be located in cleared areas wherever possible.

6 Environmental Management

6.1 Construction Environmental Management Plan

Preparation of a Construction Management Plan (CEMP) is mandatory for all projects undertaken by or on behalf of government agencies or where funding is being provided by the government.

The CEMP would be developed to ensure that appropriate environmental management practices are followed during a project's construction and/or operation. Central Darling Shire Council would review the CEMP for this Proposal, which should include the following elements, as described in the *Guideline for the Preparation of Environmental Management Plans* (DIPNR, 2004):

Table 6-1 Construction Environmental Management Plan Structure

Background	Introduction to the document Description of the proposal and project details The context for the CEMP in regard to the overall project The CEMP objectives The contractor's environmental policy
Environmental Management	Environmental management structure of the organisation and specific team responsibilities with respect to the CEMP and its implementation Approval and licensing requirements relevant to the project Reporting requirements Environmental training Emergency contacts and response
Implementation	A project specific risk assessment A detailed list of environmental management safeguards and controls CEMP sub plans for specific environmental controls A detailed schedule assigning responsibility to each environmental management activity and control
Monitor and Review	Environmental monitoring Environmental auditing Corrective action CEMP review and document control procedures

The CEMP would include a risk assessment which ensures that the safeguards identified in this REF, as well as any others that are considered relevant, are effectively translated into actual construction techniques and environmental management activities, controls, and monitoring/verification to prevent or minimise environmental impacts. The CEMP should also

identify the requirements for compliance with relevant legislation and any other regulatory requirements to ensure environmental safeguards described throughout this REF are implemented. The environmental management objectives and supporting actions presented in this section are intended to assist in this process.

The following details the environmental objectives during construction and the proposed mitigation to be included in the CEMP. This list is not definitive, and additional measures detailed as part of the determination of the project and conditions of any other approvals must also be included. Operational safeguards are also included.

6.2 Environmental Management Measures

Implementation of the mitigation measures outlined below would be undertaken during several phases of the project. These phases comprise:

- Detailed design – refinement of the design details
- Pre-construction – prior to the contractor arriving on site to carry out the works
- Construction – during construction phase
- Operation – post construction

6.2.1 Land Use

Objective

- Minimise impacts to surrounding land users during construction and operation

Actions

Action/Phase	Responsibility
Pre-construction	
Best management construction impacts are to be documented in a project specific CEMP.	Contractor
Construction	
No construction activities (e.g. tree clearing, stockpiling etc.) would be undertaken on private property surrounding the WTP site without prior approval. Appropriate security, supervision and access controls would be put in place and properly monitored to ensure no access by unauthorised personnel, either to the work area or via the work area to adjoining areas not under the ownership of CDSC.	CDSC
Central Darling Shire Council could provide a 24-hour telephone number so that any issues relating to the operation of the new infrastructure can be clarified and complaints dealt with by those able to respond.	Contractor
Restoration of the areas disturbed during construction would be undertaken so that these areas are returned to their pre-construction condition.	Contractor

6.2.2 Soils

Objective

- To effectively manage sediment and erosion control during the construction stage of the project.

Actions

Action/Phase	Responsibility
Pre-construction	
A detailed Erosion and Sediment Control Plan (ESCP) would be prepared as part of the CEMP. The ESCP would describe the site specific measures to be implemented for all works areas, in accordance with the guidelines outlined in the 2004 Landcom publication *Managing Urban Stormwater: Soils and Construction*, 4th edition ("The Blue Book") and *Volume 2a Installation of Services*. The ESCP would need to be site specific and would need to address the following issues to prevent erosion, sediment loss and water quality impacts: • Minimisation of disturbance to soil and water adjacent to, and within, all watercourses in the works area. • Identification of site specific sediment and erosion control measures wherever erosion is likely to occur. • Identification of any environmentally sensitive areas on or near construction sites to ensure runoff is diverted away from sensitive areas. • Requirements for vegetation clearing to be kept to a minimum. • Retention of all surface runoff on-site • Where possible, diversion stormwater around the construction site. • Location and management of stockpiles, such as locating stockpiles away from any the drainage line near the works areas. • All erosion and sediment controls would be regularly inspected, especially when rain is expected and directly after any rain events.	Contractor
Construction	
All areas where ground disturbance has occurred would be stabilised following completion of works to ensure there is no erosion hazard and restored to their pre-construction condition. This would involve, where required, reshaping the ground surface, covering it with topsoil excavated from the site and re-establishing an appropriate vegetation cover.	Contractor
Any excess spoil would either be spread across the ground in nearby areas in such a manner as to avoid creating an erosion hazard,or removed off site for disposal in accordance with relevant Council and EPA requirements.	Contractor

6.2.3 Water Quality

Objective

- Prevention/minimisation of impacts to the waterways during the construction works.

Actions

Action/Phase	Responsibility
Pre-construction and Construction	
Adequate procedures would be detailed in the CEMP, including notification requirements to the EPA, for incidents that cause material harm to the environment.	Contractor
The CEMP would incorporate a pollution incident response management plan that defines appropriate procedures for notification of pollution incidents to the required authorities in accordance with s. 147 to 153 of the POEO Act, and requires response actions to be implemented in order to address any risks such as incidents posed to the environment, property or surrounding communities.	Contractor
A site specific spill management plan would be prepared and include the following requirements: • Emergency spill kits are to be kept at the site (vehicle kits). • Refuelling of machinery to be undertaken in a dedicated area within the construction compound appropriately protected as outlined in the spill management plan. • It is recommended that bio-friendly hydraulic fluids are used in plant and machinery. The decision is ultimately the machine operators, but at minimum a risk assessment needs to be undertaken on why the fluid cannot be used. • All plant and equipment shall be inspected daily for leakage of fuel, oil or hydraulic fluids. Machinery found to be leaking shall be immediately repaired or replaced. • Vehicle wash downs and/or cement truck washouts would be undertaken within a designated bunded area of an impervious surface or undertaken offsite.	Contractor
Mitigation measures to manage groundwater (should it be encountered during construction) would be incorporated into the CEMP which is to address the following issues in relation to groundwater: • Dewatering techniques during excavation/drilling; • Measures to ensure groundwater quality is not impacted during construction; • Techniques to settle, treat or filter groundwater encountered during excavation works i.e. diverting groundwater through baffle tanks or	Contractor

Action/Phase	Responsibility
Pre-construction and Construction	
filter membranes; and • Appropriate treatment and monitoring regimes in the event that groundwater flows come to the surface, including disposal of groundwater in such a way as to prevent adverse impacts (such as erosion and water pollution).	

6.2.4 Aboriginal Cultural Heritage

Objective

- Minimise potential impacts to items and places of Aboriginal cultural heritage due to the works

Actions

Action/Phase	Responsibility
Construction	
It would be a requirement that all workers/contractors on the site be informed of their obligations under the National Parks and Wildlife Act 1974 and *NSW Heritage Act 1977*, namely that it is illegal to disturb, damage or destroy a relic without the prior consent of Heritage NSW.	Contractor
If human skeletal remains are found the proponent must stop work immediately, secure the area to prevent unauthorized access and contact the NSW Police and Heritage NSW.	Contractor
If Aboriginal objects are found while undertaking the activity the proponent must stop work and notify the Heritage NSW; an AHIP may need to be sought.	Contractor
Should any Aboriginal Objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal Object the archaeologist would provide further recommendations. These may include notifying the Heritage NSW and the Local Aboriginal Land Council.	Contractor
In the event that known or suspected Aboriginal skeletal remains are encountered during the activity, the following procedure would be followed: (a) all work in the immediate vicinity would cease; (b) the find would be immediately reported to the work supervisor who would immediately advise the Environment Manager or other nominated senior staff member; (c) the Environment Manager or other nominated senior staff member	Contractor

Action/Phase	Responsibility
Construction	
would promptly notify the police and the state coroner (as required for all human remains discoveries); (d) the Environment Manager or other nominated senior staff member would contact Heritage NSW for advice on identification of the skeletal material as Aboriginal and management of the material; and (e) if the skeletal material is of Aboriginal ancestral remains, the Local Aboriginal Land Council would be contacted and consultative arrangements would be made to discuss ongoing care of the remains.	

6.2.5 Historic Heritage

Objective

- Minimise potential impacts to items and places of historic heritage due to the works

Actions

Action/Phase	Responsibility
Construction	
In the event that historical relics or sites are identified also work must stop and be protected until a qualified archaeologist inspects the site and provides management advice in consultation with the Heritage NSW.	Contractor

6.2.6 Biodiversity

Objective

- Avoidance/minimisation of impacts to flora and fauna
- Minimise clearing of vegetation
- Avoid weed invasion
- Prevention/minimisation of impacts to surrounding waterbodies

Actions

Action/Phase	Responsibility
Construction	
The construction area is to be clearly delineated.	Contractor
Temporary construction sites and storage areas will remain in a tidy state and free of debris. Following completion and departure from the	Contractor

Action/Phase	Responsibility
Construction	
construction site areas, as required, disturbed surfaces will be stabilised.	
The contractor(s) will, as required, undertake appropriate vehicle and equipment hygiene to prevent the spread of weeds within and/or between sites.	Contractor
The area of disturbance and vegetation removal is to be kept to the minimum required to undertake the works.	Contractor
Temporary fencing and signage should be utilised to demarcate the area of works.	Contractor
Vehicles and machinery would utilise existing tracks and cleared areas where possible to access the site during construction.	Contractor
The works are to be undertaken in accordance with AS *4970-2009 Protection of trees on development sites* (Australian Standards 2009).	Contractor
Weed management measures are to be included in the CEMP to reduce the chance of spreading existing weeds or introducing new ones; weed management measures should be implemented prior to works commencing and should address: • Removal of weeds in the constructible footprint during construction including spraying and physical removal. • Suitable methods of disposal for weeds removed physically removed. • Vehicle wash-down procedures to minimise the likelihood of spreading weeds	Contractor

6.2.7 Noise and Vibration

Objective

- Compliance with relevant recommendations specified in the Interim Construction Noise Guideline (DECC, 2009).
- Avoidance/minimisation of noise impacts on nearby sensitive noise receivers.

Actions

Action/Phase	Responsibility
Pre-construction and Construction	
Consult with residential premises in the immediate vicinity of the proposed works to determine any community concerns. Provide advice as to where concerns can be directed. If the consultation community concerns that are not readily resolved by agreement, Council staff are to be contacted who	CDSC / Contractor

Action/Phase	Responsibility
Pre-construction and Construction	
will endeavour to assist in resolving any outstanding issues of concern.	
Construction	
Works would be undertaken during normal work hours i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays; and no work would be undertaken on Sundays, Public Holidays or outside these work hours without notification to affected community and EPA. Notification would provide the following details: • The locations and types of surrounding receivers likely to be affected; • The nature of the proposed works; • The noise characteristics of any powered equipment likely to be used; • Measures to be taken to reduce noise emissions; and • Any other information EPA may request. • All reasonable practical steps shall be undertaken to reduce noise and vibration from the site.	Contractor
Operation	
Operational noise emissions would be verified to demonstrate selected plant and equipment complies with NPfI requirements at the nearest sensitive receptor. This would be achieved through post-compliance monitoring to validate the noise emissions and to identify the need for additional mitigation measures.	CDSC

6.2.8 Air Quality

Objective

- Avoidance/minimisation of off-site dust nuisance to neighbouring residences and the community.
- Minimisation of air quality impacts resulting from machinery and vehicle emissions.

Actions

Action/Phase	Responsibility
Construction	
Construction vehicles and equipment would be suitably serviced within the six-month period prior to commencement of construction activities and all	Contractor

Action/Phase	Responsibility
necessary maintenance undertaken during the construction period to meet EPA air quality requirements.	
The excessive use of vehicles and powered construction equipment is to be avoided.	Contractor
All construction machinery would be turned off when not in use to minimise emissions.	Contractor
Construction contractors would monitor dust generation potential.	Contractor
Dust suppression methods including the use of water carts would be applied where required (i.e. on windy days when earthworks and vehicle movements are generating dust).	Contractor
Any stockpiled spoil/fill would be protected to minimise dust generation to avoid sediment moving offsite.	Contractor
Vehicles transporting any spoil would be covered.	Contractor
Exposed surfaces to be progressively revegetated/regrassed as soon as practicable.	Contractor

6.2.9 Traffic and Access

Objective

- Ensure that construction vehicles do not cause excessive inconvenience to road and pedestrian users.
- Ensure the safety of road users and construction personnel for the duration of the works.
- Minimise the pollution impacts resulting from the use of vehicles during construction.

Actions

Action/Phase	Responsibility
Pre-Construction	
The contractor would prepare a Traffic Management Plan as part of the CEMP prior to commencement of works. The Traffic Management Plan would include measures to minimise traffic impacts, ensure public safety and would be prepared in accordance with: • *Transport for NSW's Traffic Control at Work Sites Manual, Issued September 2020, and* • *Australian Standard 1742.3 - 2019 Manual of uniform traffic control devices Traffic control for works on roads*	Contractor
Prior to the commencement of works, existing access tracks that would be used by heavy vehicles would be assessed for adequacy and upgraded where necessary. Appropriate drainage would be provided for any unsealed tracks utilised during the works to ensure that vehicle movements do not	Contractor

Action/Phase	Responsibility
cause erosion and sedimentation into any nearby drainage lines.	
Construction	
Any disturbance to surrounding landowners as a result of vehicle movements and noise would be minimised. The contractor would avoid any inconvenience to residences/landowners, and all access gates would be in their original condition following completion of the works.	Contractor
Any temporary access tracks required for the works would be located so as to minimise disturbance to the existing environment. Following completion of the works the temporary tracks would be removed, topsoil provided and re-grassed. Existing tracks would be restored to their condition prior to works.	Contractor
All traffic would comply with all applicable traffic laws and regulations including speed limits. All construction vehicles would comply with the speed limits set for the roads accessing the site.	Contractor

6.2.10 Waste Management

Objective

- Compliance the provisions of the Protection of the Environment Operations (Waste) Regulation 2014.
- Maximise reuse/recycling of waste material and minimise waste disposed of to landfill.

Actions

Action/Phase	Responsibility
Construction	
The contractor undertaking the works would detail waste management procedures in a Waste Management Plan to be incorporated into the CEMP. The contractor is to assume responsibility for the appropriate disposal of any waste generated. Adequate procedures should be established and detailed in the CEMP, including notification requirements to EPA, for incidents that cause material harm to the environment. The WMP would also follow the resource management hierarchy principles embodied in the W*aste Avoidance and Resource Recovery Act* 2001. Namely, to: • avoid unnecessary resource consumption; • recover resources (including reuse, reprocessing, recycling and energy recovery); and • dispose (as a last resort).	Contractor
No batched concrete mixing plants would be established in the works areas. Any required concrete would be mixed off-site and transported to the construction areas.	Contractor

Action/Phase	Responsibility
Construction	
Following completion of the works, excess concrete would be removed off-site for recycling.	Contractor
All waste removed from the site would be classified and disposed of appropriately, and all non-recyclable waste would be disposed of at an appropriate licensed waste disposal facility.	Contractor
If any contaminated material is encountered during earthworks, work shall cease, the site secured and a safe work method statement(s) and appropriate practices shall be implemented. Any contaminated material would be classified first and then stored, transported and disposed of in accordance with EPA requirements at an EPA licensed waste facility.	Contractor
Cleared vegetation (devoid of weeds) would be mulched and re-used on site as part of site stabilisation and revegetation. Excess mulch would be removed off site and disposed of in accordance with EPA requirements.	Contractor
If practicable, surplus excavated materials/fill would be reused onsite as part of rehabilitation and restoration works. Any surplus spoil disposed of in this manner would be seeded to minimise the likelihood of it being transported offsite through wind or water action	Contractor
Operation	
Minor spills of chemicals and any minor chemical waste from the wet lab area would be directed to Council's sewer reticulation or a small chemical waste tank.	CDSC
No chemical waste would be discharged into the stormwater system.	CDSC

6.2.11 Utilities and Infrastructure

Objective

- Prevention/minimisation of impacts to utilities and services infrastructure during the construction works.

Actions

Action/Phase	Responsibility
Pre-construction	
Utilities and services which may be impacted by the proposal would be accurately located prior to commencement of works.	Contractor
Pre-construction and Construction	
Utility and service providers would be consulted prior to the commencement of and during construction works in the event that impacts on any utilities and services by the proposal are likely.	Contractor

6.2.12 Hazards and Risks

Objective

- Prevention/minimisation of hazards and risks during the construction and operation of the WTP.

Actions

Action/Phase	Responsibility
Construction	
Any chemicals and fuels are to be stored in a bunded area at least 50 metres from any waterway or drainage line.	Contractor
Any hazardous materials stored on site would be stored in the compounds and within impervious and bunded enclosures capable of storing 120% of the volume of material stored there.	Contractor
Workers would be trained in the spill management plan and the use of the spill kits.	Contractor
Operation	
SafeWork NSW would be notified regarding the storage of dangerous goods at the site.	CDSC
The transport and handling of all chemicals used in the operation of the Ivanhoe WTP would be undertaken in accordance with all relevant SafeWork NSW guidelines including the following: • *Code Of Practice: Managing Risks Of Hazardous Chemicals In The Workplace (SafeWork NSW, August 2019).* • *Code Of Practice: Labelling Of Workplace Hazardous Chemicals (SafeWork NSW, August 2019).*	CDSC
Liquid chemical storage and filling areas would be located in bunded areas designed to accommodate 110% of the total capacity delivered and are to include appropriately designed drainage and safety equipment.	CDSC
Storage tanks would be regularly inspected and maintained to ensure their integrity. Plant personnel would be trained for proper and safe operation of these facilities.	CDSC
Specific requirements for the management of chemicals associated with the WTP would be detailed in an Operational Environmental Management Plan.	CDSC
Safety Data Sheets for chemicals used in the treatment process are to be available on site at all times.	CDSC
All hazardous substances are to be listed in a register together with the relevant Safety Data Sheets. Employees are to have access to this register.	CDSC
Fuel and lubricants for machinery maintenance are to be stored and managed appropriately.	CDSC

Action/Phase	Responsibility
Construction	
Appropriate signage is to be maintained where chemicals are stored.	CDSC
The Operational Environmental Management Plan would be periodically reviewed to assess the efficacy of all management procedures. Identified shortcomings would be remedied to ensure these continue to be effective.	CDSC

6.2.13 Bushfire

Objective

- Minimisation of bushfire risk during the construction of the WTP.

Actions

Action/Phase	Responsibility
Pre-Construction	
Design of the above ground infrastructure at the reservoir sites should take into consideration the potential bushfire risk at the site, in accordance with the relevant principles of the RFS publication *Planning for Bushfire Protection 2019*.	CDSC
Construction	
Construction staff to be made aware of the location of the proposed works in bushfire prone land and the potential for bushfire risk.	Contractor
During high risk bush fire danger rating days, no construction activities would be undertaken that pose a risk of starting a bushfire (e.g. welding).	Contractor

6.2.14 Visual Amenity

Objective

- Protect the visual amenity of the locality for neighbouring land users and the local community.

Action

Action/Phase	Responsibility
Construction	
The clearing of vegetation would be kept to the minimum required for the works.	Contractor
Construction compounds and areas for the parking of vehicles and storing of equipment would be located in cleared areas wherever possible.	Contractor

7 Conclusions

The Proposal to construct a new WTP at the existing Ivanhoe WTP site would potentially cause short term construction impacts such as increased dust levels and minor noise and traffic impacts however these impacts are considered to be minor and temporary.

The main adverse environmental impacts potentially associated with the Proposal would involve vegetation clearance of shrubs and grass cover required for the construction of the new Ivanhoe WTP. However, if the mitigation measures outlined in this REF document are implemented, the impacts of the vegetation clearance and other environmental risks can be mitigated such that they would not be significant.

The Proposal would benefit the community in the Ivanhoe region, by improving the quality of the drinking water and addressing safety and health concerns associated with the operation of the existing WTP.

On the basis of the information presented in this Review of Environmental Factors, and taking into consideration Clause 228 of the EP&A Act Regulation, Section 5.5 of the EP&A Act it is concluded that by adopting the recommended safeguards, it is unlikely that there would be significant environmental impacts associated with the proposed Ivanhoe WTP works and therefore an Environmental Impact Statement is not required.

8 References

Bureau of Meteorology (2021) *Ivanhoe Aerodrome AWS Climate statistics* < http://www.bom.gov.au/climate/averages/tables/cw_049000.shtmlhttp://www.bom.gov.au/climate/averages/tables/cw_049000.shtml>

Department of Environment, Climate Change and Water,2010*, Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*

Environment Protection Authority, (2017), *Noise Policy for Industry*

National Transport Commission (2017) *Australian Dangerous Good Code*

NHMRC (2011) *Australian Drinking Water Guidel*ines

NSW Public Works (2016) *Ivanhoe, White Cliffs and Wilcannia Water Supply Upgrades – Scoping Study (Report No: WSR16047)*

NSW SEED Map Portal, <https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU>

Public Works Advisory (2017) *Concept Design Report for three New Water Treatment Plants at Ivanhoe, White Cliffs, and Wilcannia in the Central Darling Shire, NSW - Draft. (Report Number: WSR – 17036)*

Public Works Advisory (2017) *Ivanhoe Water Supply Scheme Water Treatment Plant and Weir Interim Report on Geotechnical Investigation (Report Number: 17-GT31A)*

Appendix A – Consideration of Clause 228

Clause 228 of the EP&A Regulation 2000 indicates, for purposes of Part 5 of the Act, the factors that must be taken into account when consideration is being given to the likely impact of an activity on the environment.

A determining authority is only required to consider the following matters where an EIS has been prepared for a Part 5 activity under the EP&A Act. However, the following information is provided to assist determining authorities in making determinations consistent with those made for an activity requiring preparation of an EIS.

The various factors and findings following environmental assessment are presented below.

***(a) any environmental impact on a* community,**

The works would involve removal of vegetation and would create some temporary noise and dust impacts during the construction phase.

(b) any transformation of a locality,

No transformation of a locality would result from the proposal as the new WTP would have a visual appearance consistent with the existing landscape due to the proximity to the existing WTP and otherwise sparsely populated region.

Any changes in visual amenity and ground disturbances would be of a temporary nature only and therefore no transformation of any locality would occur.

(c) any environmental impact on the ecosystems of the locality,

No significant impact on ecosystems is expected as the vegetation clearing required is in an area of already disturbed vegetation and would not significantly affect the ecosystems of the locality.

(d) any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality,

None identified.

(e) any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations,

None identified.

(f) any impact on the habitat of protected animals (within the meaning of the Biodiversity Conservation Act 2016),

None identified.

(g) any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air,

None identified.

(h) any long-term effects on the environment,

None identified. Provided the mitigation measures outlined in this REF document are implemented there would be no long term negative effects on the environment.

(i) any degradation of the quality of the environment,

Temporary ground disturbance would occur during the works due to the required excavations for the WTP. Soils at the disturbed locations would be protected by the adoption of mitigation measures identified in this REF and proposed in a CEMP.

(j) any risk to the safety of the environment,

None identified.

(k) any reduction in the range of beneficial uses of the environment,

None identified.

(l) any pollution of the environment,

No pollution of the environment would occur provided appropriate safeguards are adopted.

(m) any environmental problems associated with the disposal of waste,

None identified

(n) any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply,

All the materials to be used for the proposed works are in common use and are not in short supply.

(o) any cumulative environmental effect with other existing or likely future activities,

At some point in the future the existing WTP would be decommissioned, but that work is not part of this project scope and would be addressed in a separate REF.

(p) any impact on coastal processes and coastal hazards, including those under projected climate change conditions.

Not relevant to this Proposal.

Appendix B – Consultation Responses

Department of Primary Industries
Water

Contact Alice Buckley
Phone 02 6841 7469
Fax 02 6884 0104
Email alice.buckley@dpi.nsw.gov.au

Our ref 85ERM2017/0528

Public Works Advisory
Level 13 McKell Building,
2-24 Rawson Place
SYDNEY NSW 2000

By email: kristen.parmeter@finance.nsw.gov.au

27 June 2017

Dear Sir/Madam

Ivanhoe Water Treatment Plant and White Cliffs Water Supply Pipeline – Review of Environmental Factors – DPI Water Requirements

The DPI Water has reviewed the information provided in relation to the Ivanhoe Water Treatment Plant and White Cliffs Water Supply Pipeline and provides the following requirements to be addressed in the Review of Environmental Factors:

- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project. Also address if any licenses may be required under the *Water Act 1912* (WA 1912) and *Water Management Act 2000.*
- Assessment of any approval requirements under the *Water Management Act 2000,* in particular a water supply work approval for pipelines crossing a 3rd order stream or higher.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage during and post construction) from each surface and groundwater source as defined by the relevant water sharing plan.
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.
- An impact assessment of construction and operation of the pipeline within 40m of the banks of watercourses. Design and construction of works within waterfront land are recommended to be consistent with DPI Water *"Guidelines for Controlled Activities on Waterfront Land"*. These guidelines can be accessed at the DPI Water website (http://www.water.nsw.gov.au/water-licensing/approvals/controlled-activity). Particular attention should be given to the construction, maintenance and rehabilitation of temporary and permanent watercourse crossings.

- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.Third party impact for including additional catchment area in White Cliffs
- Ivanhoe Water Treatment Plants annual and peak daily production rate should be outlined
- The strategies for managing cleanliness, waste disposal and distribution within the reticulated system
- Outline safe storage and management of chemicals
- Outline waste water management systems
- Detail drought management strategies in line with the Drought Management Plan
- Detail Ivanhoe Water Treatment Plants proposed management of algae and contamination
- Outline compliance or non-compliance with the Australian Drinking Water Guidelines (2011) reference should be made to the Drinking Water Management Plan.
- Outline strategies for onsite management of storm water and sanitary waste
- Provide energy sources, including the reliability, availability and if alternatives will be required
- Consideration of relevant policies and guidelines.
- A statement of where each requirement is addressed in the REF (i.e. in the form of a table).

DPI Water will be able to provide more specific requirements when the pipeline alignment and design is finalised.

Should you have any further queries in relation to this submission please do not hesitate to contact Water Regulation Officer Alice Buckley on (02) 6841 7469.

Yours sincerely

Alice Buckley
Water Regulation Officer
Regional Water Regulatory Operations
Department of Primary Industries Water

Ivanhoe, Wilcannia and Whitecliffs, Water Treatment Plants, REF Consultation letter

Dear Kristen,

On behalf of Local Land Services, Western Region I thank you for the offer to provide advice on the Ivanhoe, Wilcannia and Whitecliffs, Water Treatment Plants.

Local Land Services, Western Region (LLS) is supportive of the WTP projects. The positive impacts to the local communities are consistent with LLS own goals in this area.

Our review of the documents provided does not reveal any issues of concern for LLS, in particular the change in alignment of the new potable water supply pipeline, to be installed along an existing unsealed roadway along the same alignment as the existing non-potable water supply pipeline effectively limits any possibility of disturbance to items of cultural significance. An assessment indicates that Pest species and soil erosion are not regarded as an issue

LLS notes that the developments are effectively within the existing footprints of current facilities.

LLS does wish to flag with you that while LLS are the appropriate land management agency for Stock Watering Points (SWP) within the Region, having the care and management of these vested in LLS, that the Department of Primary Industries-Lands are the appropriate legislative body for Crown Lands in the Western Division including Travelling Stock Routes (TSR).
In this instance no TSRs or SWPs are affected by these proposals.
DPI-Lands should be consulted regarding the Whitecliffs water pipeline as it involves Crown lands.
The NSW Office of Environment and Heritage (OEH) has the legislative responsibility for protection of Aboriginal Cultural Heritage and I suggest at least a referral to OEH, Aboriginal Heritage Information Management system (AHIMS) should be undertaken.
Whitecliffs is currently under review as an Aboriginal land claim, DPI-Lands can give advice on how this may affect the Whitecliffs proposal.

To conclude: Local Land Services, Western Region is supportive of the projects proceeding.

Yours Sincerely

David Lawrence
Local Community Manager, Broken Hill.
Local Land Services, Western Region.
32 Sulphide St. PO Box 692 | Broken Hill, NSW, 2880
david.lawrence@lls.nsw.gov.au
Web: www.western.lls.nsw.gov.au

Dated 07/11/16

Office of Environment & Heritage

Our Ref. DOC16/544616-1
Your Ref.

Ms Kirsten Parmeter
Public Works Advisor
Level 13 McKell Building, 2-24 Rawson Place
SYDNEY NSW 2000

Dear Kirsten

Ivanhoe, Wilcannia and White Cliffs Water Treatment Plants – REF request

Thank you for your letter dated 13 October 2016 seeking advice from the Office of Environment and Heritage (OEH) regarding our requirements for the preparation of a Review of Environmental Factors (REF) for the Ivanhoe, Wilcannia and White Cliffs Water Treatment Plants (WTP).

The background information provided indicates that the Ivanhoe, Wilcannia and White Cliffs Water Treatment Plant Projects will include:

- a new WTP next to the existing WTP in Ivanhoe;
- a new WTP next to the existing WTP in Wilcannia; and
- a new WTP next to the existing WTP in White Cliffs, as well as a new reticulation pipeline system within the existing road easement between the three existing water supply dams and the new WTP.

OEH Role

OEH has responsibilities under the:

- *National Parks and Wildlife Act 1974* (NP&W Act) - namely the protection and care of Aboriginal objects and places, the protection and care of native flora and fauna and the protection and management of reserves;
- *Threatened Species Conservation Act 1995* (TSC Act) which aims to conserve threatened species of flora and fauna, populations and ecological communities to promote their recovery and manage processes that threaten them.
- *Native Vegetation Conservation Act 2003* – ensuring compliance with the requirements of this legislation.

OEH understands from the correspondence that the proposed activity is a Part 5 application pursuant to the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such OEH only has a statutory role in assessing such an activity if the determining authority determines that:

a) the activity is likely to significantly affect a threatened species, population, ecological community, or its habitat, as listed under the TSC Act; and/or

PO Box 2111 Dubbo NSW 2830
Level 1 48-52 Wingewarra Street Dubbo NSW
Tel: (02) 6883 5330 Fax: (02) 6884 8674
ABN 30 841 387 271
www.environment.nsw.gov.au

b) An Aboriginal Heritage Impact Permit is required.

The EP&A Act requires that the REF should fully describe the proposal, the existing environment and impacts of the proposal. It is the responsibility of the proponent and consent authority to adequately consider the requirements under the EP&A Act and the *Environmental Planning and Assessment Regulation 2000.*

OEH can provide advice on the REF where it deals with biodiversity and cultural heritage conservation issues. OEH may also comment on the legitimacy of the conclusions reached regarding the significance of impacts by the proposed development to these components of the environment.

This letter directs you primarily to our generic guidance material. However please note that it is up to the proponent (and later the consent/determining authority after appropriate consultation) to determine the detail and comprehensiveness of the surveys and level of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the level of investigation. It is important that all conclusions are supported by adequate data.

OEH Requirements

In summary, the OEH's key information requirements for the proposal include an adequate assessment of:

1. **Impacts to Aboriginal cultural heritage objects;** and
2. **Impacts on flora, fauna, threatened species, populations, communities and their habitats.**

This assessment should include consideration of direct and indirect impacts as a result of construction of the project. Assessment of any cumulative impacts of this and other developments in the area will be essential.

Flora, Fauna and Threatened Species

A copy of our generic Environmental Impact Assessment requirements for biodiversity are included in **Attachment 1**. Associated guidance documents are referenced in **Attachments 1** and **Attachment 2**. These guidelines address requirements under the *EP&A Act* and OEH's areas of responsibility relating to flora, fauna and threatened species, populations and ecological communities and their habitats.

OEH is committed to the protection, appropriate management, and where necessary, rehabilitation of native vegetation. For these reasons, OEH considers that careful planning should precede any development that involves further vegetation clearance or other significant impact within areas of remnant vegetation.

Cultural Heritage

The importance of protecting Aboriginal Cultural Heritage is reflected in the provisions under Part 6 of the NP&W Act, as amended. That Act clearly establishes that Aboriginal objects and places are protected and may not be harmed, disturbed or desecrated without appropriate authorisation. Importantly, approvals under Parts 4 and 5 of the EP&A Act do not absolve the proponent of their obligations under the NP&W Act.

Under the NP&W Act, it is the responsibility of each individual proposing to conduct ground disturbance works to ensure that they have conducted a due diligence assessment to avoid harming Aboriginal objects by the proposed activity. OEH has produced a generic due diligence process, which is not mandatory to follow, however any alternative process followed must be able to demonstrate their process was reasonable and practicable in attempts to avoid harm to Aboriginal objects.

Consultation must also be in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) as set by OEH if impact to cultural heritage is unavoidable.

Further advice regarding Aboriginal cultural heritage can be found on the OEH web-site at: http://www.environment.nsw.gov.au/licences/achregulation.htm. and within guidance documents listed in **Attachment 2**.

Should you require further information please contact David Geering Conservation Planning Officer on (02) 68835335.

Yours sincerely

STEVEN COX
Senior Team Leader Planning, North West Region
Regional Operations

Contact officer: DAVID GEERING
5335 5335

1 November 2016

ATTACHMENT A

EIA Requirements Review of Environmental Factors – Biodiversity

Introduction

These are introductory, generic specifications of the Office of Environment and Heritage (OEH) for an adequate assessment of the impacts of a development proposal on native flora and fauna (i.e. including protected and threatened species).

However, OEH recognises that the scale and complexity of the project will to some extent, dictate the level of information that is required to address the questions posed below. Consequently, flora and fauna assessments need to be tailored to suit the proposal. For example, a development which is proposed on land which has already been totally (or substantially) cleared should address the issues raised below but the amount of work required to address these issues may be substantially less than if the area comprised undisturbed bushland and, therefore, of more significant wildlife habitat value. A preliminary assessment, including a desktop investigation and a preliminary site inspection, may indicate the need for a detailed survey of the site.

It is up to the proponent (and later the consent and/or determining authorities) to determine the detail and comprehensiveness of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the detail of investigation. It is important that all conclusions are supported by adequate data and that these data are clearly presented in EIA documentation.

OEH will consider the following issues when reviewing an EIA document:

1. **Concerns** - What are OEH's concerns regarding the conservation of natural and cultural heritage in accordance with the relevant legislation? Is the proposal likely to affect natural and cultural heritage? How?
2. **Provision of Information** - Is adequate information provided for a valid assessment of the impacts?
3. **Validity of Conclusions** - Has the proponent arrived at valid conclusions as a result of the assessment of impacts?
4. **Recommended Conditions of Consent/Approval** (where appropriate) - Should Consent or Approval be granted, what conditions (if any) are required to ensure that the project is developed, and thereafter managed in accordance with natural and cultural heritage conservation and the provisions of legislation administered by OEH?

Thus the EIA document should fully describe the existing environment including flora and fauna, so that future impacts can be properly assessed and then reviewed (e.g. during the public participation phase).

1. Flora

Background

Although the proposed site may be disturbed by various landuses, any remnants of native vegetation are of significant natural heritage value, including riparian and wetland areas. The area of vegetation and habitat at the proposed site may provide an area of high biological diversity, high conservation value or may not be well represented or protected elsewhere. It may also act as a corridor or migratory route for wildlife, drought refuge habitat or have other important values.

OEH is committed to the protection, appropriate management, and where necessary, rehabilitation of native vegetation. For these reasons, OEH considers that careful planning should precede any development that involves further vegetation clearance or other significant impact within areas of remnant vegetation.

Negative impacts to native vegetation (e.g. clearing) should be avoided where possible. Where impacts cannot be avoided, mitigation measures must be implemented. Where residual impacts remain the EIA should detail how a "maintain or improve" outcome for biodiversity will be achieved via compensatory measures such as offsets - the provision of sites of similar type of vegetation to that

impacted that will be managed in perpetuity for conservation. BioBanking provides a voluntary mechanism through which this can be achieved.

The BioBanking Assessment Methodology allows quantification of impacts and assessment of the value of offset areas and associated management regimes for those areas. The BioBanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process. Information about BioBanking is located on OEH's website at http://www.environment.nsw.gov.au/biobanking/

Where an offset package will not be determined using the BioBanking Assessment Methodology then the package should:

a) Meet the OEH's *Principles for the use of biodiversity offsets in NSW*[1], which are available at: http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm ;
b) Identify the conservation mechanisms to be used to ensure the long term protection and management of the offset sites; and
c) Include an appropriate Management Plan (such as vegetation or habitat) that has been developed as a key amelioration measure to ensure any proposed compensatory offsets, retained habitat enhancement features within the development footprint and/or impact mitigation measures (including proposed rehabilitation and/or monitoring programs) are appropriately managed and funded.

Report Requirements

The EIA documentation should include a report on the flora that includes the following:

- detailed location map and identification of the area surveyed (including the location of photographs, transects, areas of significance etc),
- at least one of the following: a land satellite image, vegetation communities map, aerial photograph, or a remnant vegetation map,
- A map identifying the vegetation communities located in the study area and the areas of each vegetation community to be impacted.
- a complete plant list (including scientific names of those plants) of all tree, shrub, ground cover and aquatic species, categorised according to country of origin (i.e., native versus exotic),
- a detailed description of vegetation structure (in terms of a scientifically accepted classification system) and spatial distribution (i.e. plant densities and patterning) on the site, including a vegetation map,
- describe the condition and integrity of the vegetation including a description of any past disturbance,
- an account of the likely original vegetation communities (pre-, or at early settlement), and an assessment of the likely regional distribution of the original communities,
- an assessment of whether the plant communities are adequately represented in conservation reserves or otherwise protected,
- an account of the hydrology of the area and how this relates to the dynamics of the vegetation communities,
- a list of **known** and **likely** threatened species as listed under Schedules 1 & 2 (TSC Act) which might occur at the site. The OEH database needs to be accessed and the likelihood of occurrence of threatened flora species determined,
- an assessment of the impacts of the proposal on flora, on-site and off-site (e.g. siltation, water availability or drainage changes) and measures to mitigate these impacts,
- an assessment of the significance of the impact of the development at both the site and at the regional scale,
- a detailed rehabilitation/management plan including a list of the plant species to be used during rehabilitation (if required),
- detail methodologies used and a list of the reference literature cited, and

- any other issues that may be considered relevant.

The above guidance will provide some of the information necessary to conduct an Assessment of Significance required for threatened flora and fauna under Section 5A of the EP&A Act, should threatened species be likely or known to occur in the locality of the subject development proposal. Similarly, it will provide some of the information required if an application is found to be necessary under the *Native Vegetation Act (2003)*. However the above relates mostly to the specific environmental assessment processes under the EP&A Act and does not constitute an Assessment of Significance.

Similarly, the above guidance will provide some of the information required for BioBanking, but may not be sufficient for BioBanking offset calculations. Please refer to the BioBanking website or contact OEH for specific information relating to BioBanking assessment requirements. The BioBanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

2. Fauna

Background

The present high rate of biodiversity decline is associated with clearing and reduced condition of habitats. Native vegetation including wetland, riparian and remnant environments are very significant areas of fauna habitat. Therefore any development in such areas should fully consider the impact on fauna and its habitat.

Report Requirements

The EIA document should include a report on the fauna (including protected and threatened species), that includes the following:

- detailed location map and identification of the area surveyed (including the location of photographs, transects, areas of significance etc),
- at least one of the following: a land satellite image, vegetation communities map, aerial photograph, or a remnant vegetation map,
- a complete list of all **known** and **likely** terrestrial and aquatic species (e.g. birds, mammals, reptiles and amphibians including scientific names). It is suggested that invertebrates also be considered as they form part of the food chain for many fauna species,
- those species which are protected, threatened or listed under any international agreements, as well as introduced species,
- those species known or likely to breed in the area,
- any species which have specific habitat requirements found within the project area,
- those species or populations which may be near the limit of their geographic range or are a disjunct/isolated population,
- assessment of the importance or otherwise of the location as a corridor, migratory route or drought refuge, in relation to other remnant vegetation, riparian and wetland areas or habitat in the region,
- assessment of the impacts of the proposal on all fauna and its habitat, at both the site and at the regional scale,
- identification of any mitigation measures proposed to limit or ameliorate the impact of the proposal,
- detailed methodologies used and a list of the reference literature cited, and,
- any other issues that may be considered relevant.

Again, the above guidance will provide some of the information necessary to conduct an Assessment of Significance required for threatened flora and fauna under Section 5A of the EP&A Act, should threatened species be likely or known to occur in the locality of the subject development proposal. However the above relates mostly to the specific environmental assessment processes under the EP&A Act and does not constitute an Assessment of Significance.

Similarly, the above guidelines will provide some of the information required for the Threatened Species component of BioBanking, but may not be sufficient for BioBanking offset calculations.

Please refer to the BioBanking website or contact OEH for specific information relating to BioBanking assessment requirements

SEPP No. 44 - Koala Habitat Protection

The Local Government Area (LGA) may be listed in Schedule 1 of SEPP No. 44 - Koala Habitat Protection. If so, the requirements of the SEPP regarding Koala habitat protection should be considered by the proponents.

3. Threatened Species of Fauna and Flora

Background

The proponent will need to address the requirements of legislation that currently governs threatened species protection and impact assessment in NSW.

The TSC Act protects all threatened flora and fauna native to NSW (excluding fish and marine plants). The proponent will need to consider the provisions of this Act.

The TSC Act contains lists of threatened species, which are divided into a number of categories – those presumed extinct, endangered species, critically endangered species and vulnerable species. It also contains lists of endangered populations and endangered ecological communities. This Act also allows for the declaration of critical habitat, key threatening processes and the preparation of both Recovery Plans and Threat Abatement Plans. These listings and plans must be considered as part of the EIA process.

If an activity or development is proposed in a locality **likely** or **known** to be occupied by a threatened species, population, ecological community or critical habitat, any potential impact to that threatened species must be taken into account during the development assessment process. However under the EP&A Act, some types of development are not required to go through approval processes. Please note that a licence may still be required under the TSC Act if such a development/activity is likely to harm a threatened species, population or ecological community.

Proponents can voluntarily use BioBanking to minimise and offset their impacts on biodiversity. The scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

Assessment of Significance & Species Impact Statements

If during the flora or fauna assessment or survey, threatened species are **found** or are **likely** to occur in the area, the proponents must undertake an Assessment of Significance as outlined in section 5A of the EP&A Act to determine whether or not the development would be likely to have a significant impact upon threatened species.

The Assessment of Significance is a statutory mechanism which allows decision makers to assess whether a proposed development or activity is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats.

The Assessment of Significance is contained within section 5A of the EP&A Act and consists of seven factors which need to be addressed for informed decisions to be made regarding the effect of a proposed development or activity on threatened species, populations or ecological communities, or their habitats. A copy of OEH's *Threatened species assessment guidelines: The assessment of significance* can be obtained from the OEH website at: http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf

Following threatened species assessment via the Assessment of Significance, it may be necessary to prepare a Species Impact Statement (SIS). The proponent will need to prepare a SIS in the following circumstances:

- If (after having addressed Section 5A) the flora/fauna assessment concludes that there is likely to be a significant impact to threatened species, or
- The proposed development is likely to affect critical habitat declared under the TSC Act.

If a SIS is required, the proponent (not the consultant) must write to OEH for any formal requirements for the SIS that he might deem appropriate. The SIS must then be prepared in accordance with these

requirements and provided to the OEH. In some instances the Minister for the Environment will also need to be consulted for approval.

Methods to reduce the impact on the protected and threatened species should be considered fully, and are considered an integral requirement within any SIS document.

The OEH advises that conducting an Assessment of Significance or an SIS according to the provisions of the EP&A Act and the TSC Act is a complex task and should be undertaken by suitably qualified person(s).

Available Biodiversity Data

The following information sources are recommended:

Data Source	Web Address
Atlas of NSW Wildlife - A general search for flora and fauna records can be conducted. Please note that not all the information associated with the individual records is available on this website. You can apply to the Office of Environment and Heritage for more detailed information about individual sightings (terms and conditions apply). Contact the Wildlife Data Unit for more information on (02) 9995 5000.	http://www.bionet.nsw.gov.au/
OEH Threatened Species website - detailed information relating to threatened species, populations, ecological communities and their habitats can be obtained.	http://www.environment.nsw.gov.au/threatenedspecies
BioBanking Threatened Species Database	http://www.environment.nsw.gov.au/threatenedspecies
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
Other data sources (e.g. PlantNET, Online Zoological Collections of Australian Museums, previous or nearby surveys etc.) may also be used to compile the list.	http://www.ozcam.org.au/

ATTACHMENT B

Guidance Material

Title	Web Address
Commonwealth Environment Protection & Biodiversity Conservation Act 1999	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
National Parks and Wildlife Act 1974	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Threatened Species Conservation Act 1995	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N
Aboriginal Cultural Heritage	
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/consultation.htm
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/archinvestigations.htm
Due Diligence Code for the Protection of Aboriginal Objects in NSW (DECCW 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm
Biodiversity	
BioBanking Assessment Methodology (OEH, 2014)	http://www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf
BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECCW, 2008)	http://www.environment.nsw.gov.au/biobanking/calculator.htm
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009)	http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
OEH Threatened Species website	http://www.environment.nsw.gov.au/threatenedspecies/
Atlas of NSW Wildlife	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm
BioBanking Threatened Species Database	http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
PlantNET	http://plantnet.rbgsyd.nsw.gov.au/
Online Zoological Collections of Australian Museums	http://www.ozcam.org.au/
Threatened Species Assessment Guideline - The Assessment of Significance (DECCW, 2007)	http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
Principles for the use of biodiversity offsets in NSW	http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm

NSW EPA

Our reference: EF16/12213; DOC16/528980-01
Contact: Stephanie Todd 02 6969 0700

The Environmental Scientist
Public Works Advisory
Level 13 McKell Building
2-24 Rawson Place
SYDNEY NSW 2000

Dear Ms Parmeter

Re Proposed Ivanhoe, Wilcannia and White Cliffs Water Treatment Plants

I refer to your letter dated 13 October 2016 to the Environment Protection Authority (EPA) requesting our comments for the three Review of Environmental Factors (REF) to be prepared for the proposed replacement water treatment plants at Ivanhoe, Wilcannia and White Cliffs.

The EPA has responsibilities for the regulation of scheduled activities under the *Protection of the Environment Operations Act 1997* (the Act). We advise that based on the information provided the proposed works are not a scheduled activity under the Act and do not require an environment protection licence.

Based on the project description outlined in your letter we make the following comments on matters to be addressed in the REF's.

- Proposed measures to manage dust from all sources;
- Identification of potential noise impacts from the construction works and operation of the water treatment plants and where required, proposed noise mitigation measures;
- Details on the proposed management of backwash water from the plants once in operation; and
- Where works are proposed instream at the Willandra Creek and Wannara Creek offtake locations, identify any water quality impacts from the proposed works and identify mitigation measures, including sediment and erosion controls to ensure waters are protected.

We also suggest contacting the Department of Primary Industries to determine if any approvals are required for working within close proximity to waterways.

PO BOX 397 Griffith NSW 2680
Suite 7, 130-140 Banna Avenue Griffith NSW
Tel: (02) 6969 0700 Fax: (02) 6969 0710
ABN 43 692 285 758
www.epa.nsw.gov.au

Health
Far West
Local Health District

Kristen Parmeter
Public Works Advisory
Level 13 McKell Building, 2-24 Rawson Place
SYDNEY NSW 2000

Email: kristen.parmeter@finance.nsw.gov.au

Dear Kristen

IVANHOE, WILCANNIA AND WHITE CLIFFS WATER TREATMENT PLANTS - REVIEW OF ENVIRONMENTAL FACTORS – COMMENTS FROM FAR WEST LOCAL HEALTH DISTRICT

Thank you for the opportunity for the Far West Local Health District (FWLHD) to comment on the Review of Environmental Factors for new water treatment plants at Ivanhoe, Wilcannia and White Cliffs.

The FWLHD supports the construction of the new plants which will enable Central Darling Shire Council to provide safe and reliable drinking water to these communities and consistently meet the standards required by the Australian Drinking Water Guidelines.

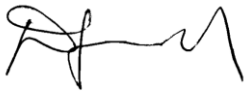
We would also like to request that Public Works Advisory considers the impact on White Cliffs existing wastewater systems and their capacity to cope with any increase in water usage as a result of a new water treatment plant and distribution network.

The existing systems are unlikely to have ever been approved by the local authority and are rudimentary in design with some systems only ever been designed for temporary use. Given that the new water treatment plant would be supplying potable water, there is a concern that any increase in water demand may in turn cause public health issues from failing wastewater systems.

Your consideration of this issue through your Review of Environmental Factors process is appreciated.

Please don't hesitate to contact me should you requite further information.

Yours sincerely



David Ferrall
Senior Environmental Health Officer

27 October 2016

Far West Local Health District
ABN 71030541064

Thomas Street, BROKEN HILL NSW 2880
PO Box 457, BROKEN HILL NSW 2880
Tel (08) 80801333 Fax (08) 80801682
Website www.gwahs.nsw.gov.au

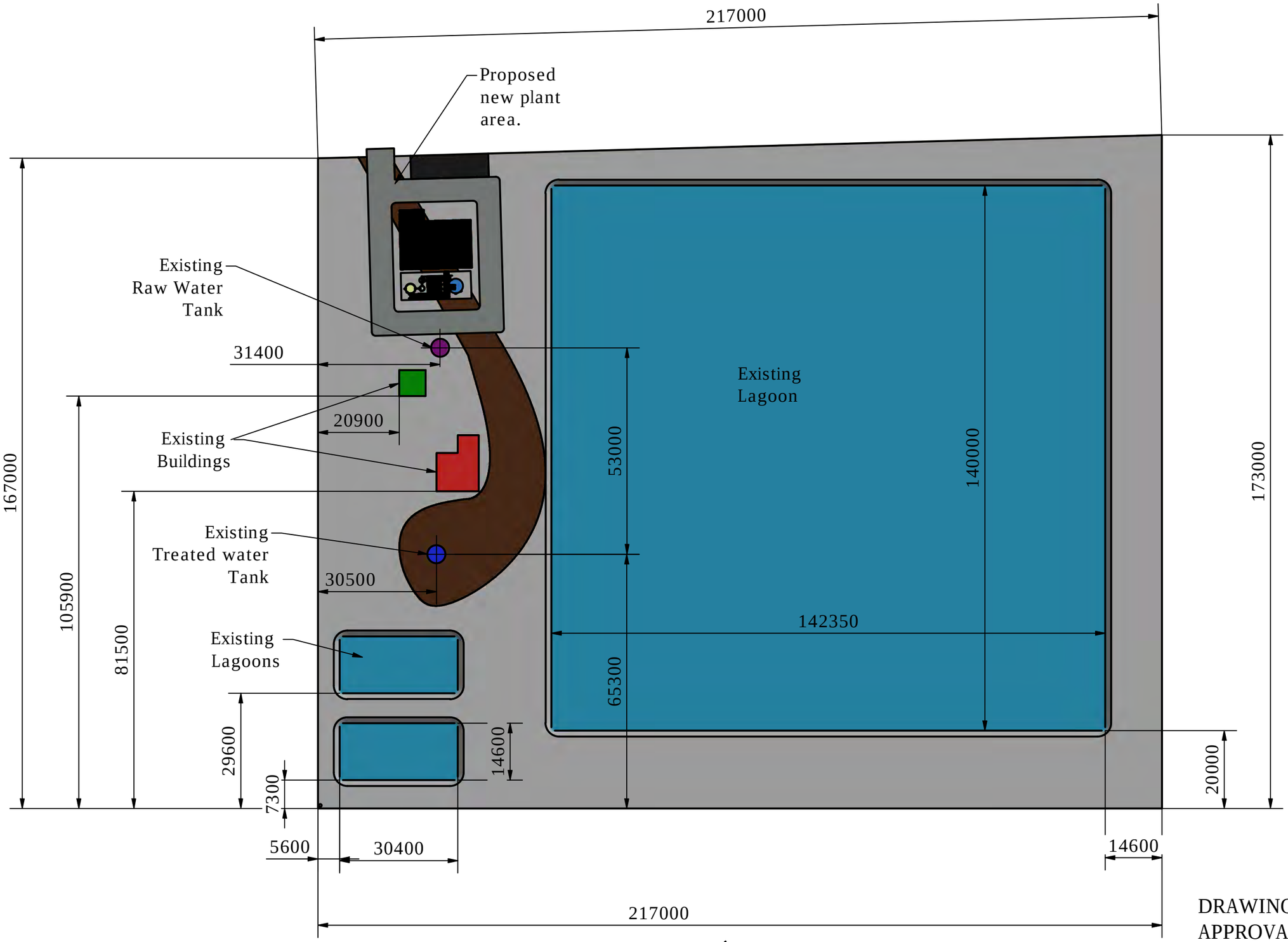
If you have any further enquiries about this matter please contact Stephanie Todd by telephoning 02 6969 0700.

Yours sincerely

27/10/16

DARREN WALLETT
Head, Griffith Unit
Environment Protection Authority

Appendix C – WTP Layout Plans



DRAWINGS FOR PLANNING APPROVAL ONLY.

MEMBRANE SYSTEMS AUSTRALIA
membranesystems.com.au

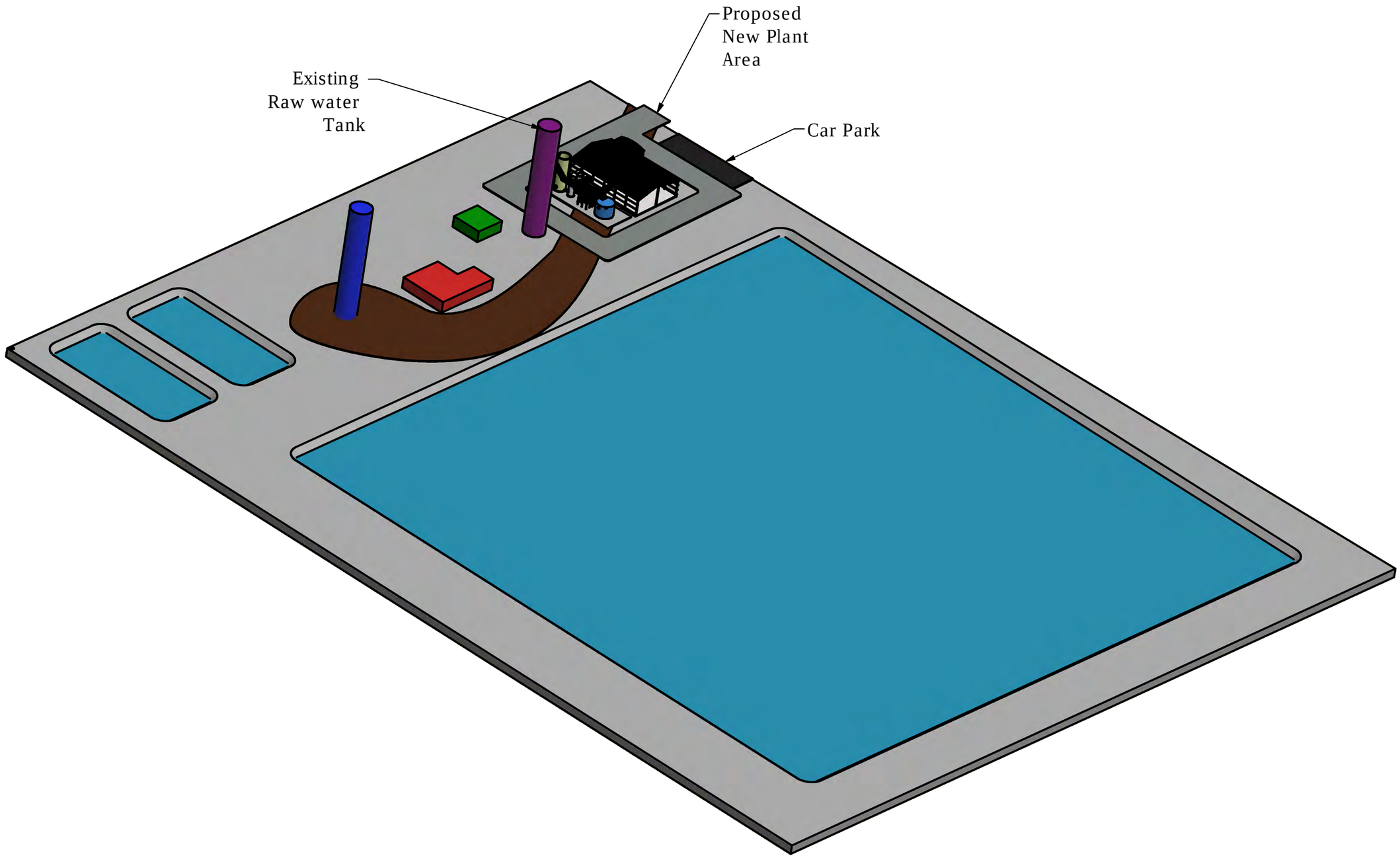
THIRD ANGLE PROJECTION
AS1100

Rev	REVISIONS
A	

Inventor File		DO NOT SCALE - IF IN DOUBT ASK	
UNSPECIFIED TOL s	DRAWING No.	Sheet 1	
DIMENSIONS SHOWN	TO BE		
00 ±	1.5		
00.0 ±	0.5		
00.00 ±	0.15		
JOB No.	2559_Ivanhoe	DATE	22/7/2021
DRAWN	MN	CHECKED	RL
SCALE		REVISION No	A
		SHEET SIZE	

CLIENT Central Darlings Shire

TITLE Ivanhoe Water Treatment Plant



DRAWINGS FOR PLANNING
APPROVAL ONLY.

MEMBRANE SYSTEMS AUSTRALIA
membranesystems.com.au

THIRD ANGLE PROJECTION
AS1100

Rev	
A	

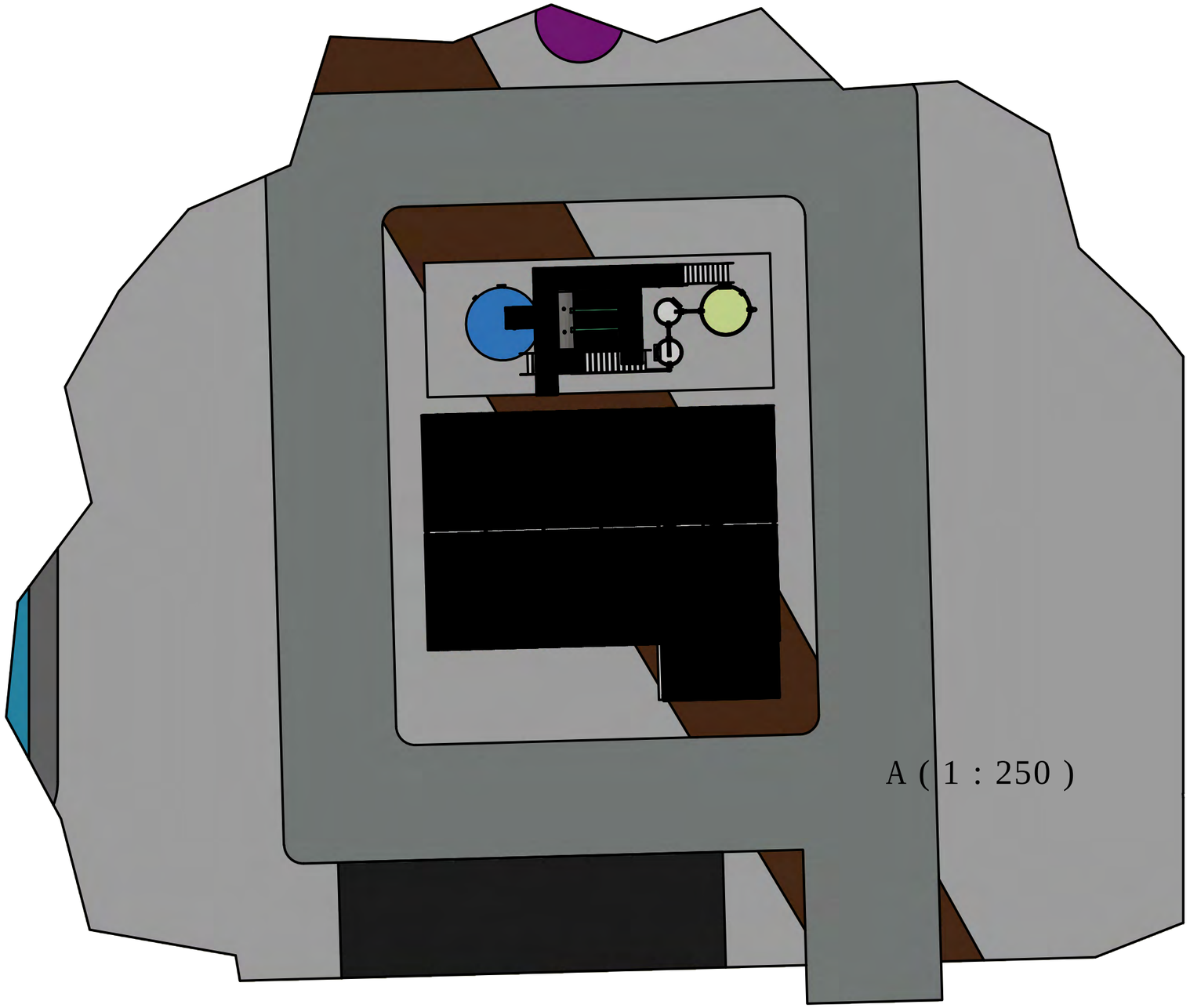
Inventor File

UNSPECIFIED TOL.s	
DIMENSIONS SHOWN	TO BE
00 ±	1.5
00.0 ±	0.5
00.00 ±	0.15

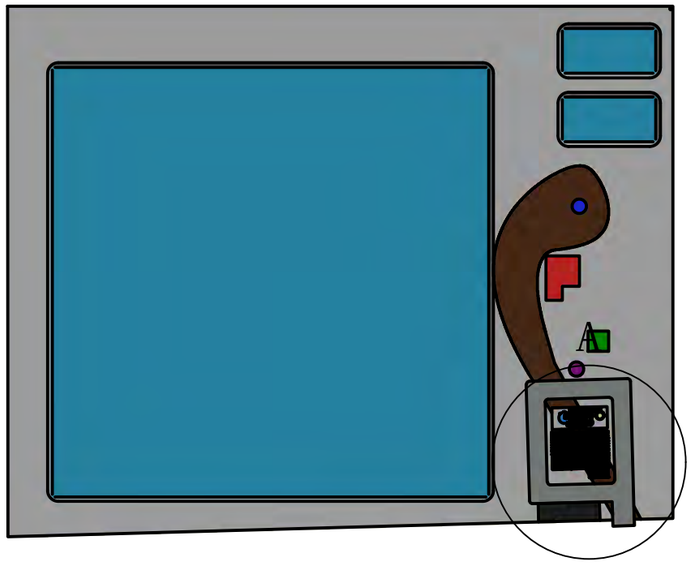
DRAWING No.
JOB No. 2559
DRAWN MN
SCALE

DO NOT SCALE - IF IN DOUBT ASK
Sheet 2
DATE 22/7/2021
CHECKED RL
REVISION No. A
SHEET SIZE

CLIENT Central Darlings Shire
TITLE Ivanhoe Water Treatment Plant



A (1 : 250)



DRAWINGS FOR PLANNING
APPROVAL ONLY.

MEMBRANE SYSTEMS AUSTRALIA
membranesystems.com.au

THIRD ANGLE PROJECTION
AS1100

Rev	
A	

Inventor File

UNSPECIFIED TOL s

DIMENSIONS SHOWN	TO BE
00 ±	1.5
00.0 ±	0.5
00.00 ±	0.15

DO NOT SCALE - IF IN DOUBT ASK

DRAWING No.	Sheet 3				
JOB No.	2559	DATE	8/9/2021		
DRAWN	MN	CHECKED	RL		
SCALE		REVISION No	A	SHEET SIZE	

CLIENT Central Darlings Shire

TITLE Ivanhoe Water Treatment Plant

DRAWINGS FOR PLANNING
APPROVAL ONLY.

MEMBRANE SYSTEMS AUSTRALIA
membranesystems.com.au

THIRD ANGLE PROJECTION
AS1100

Rev	
A	

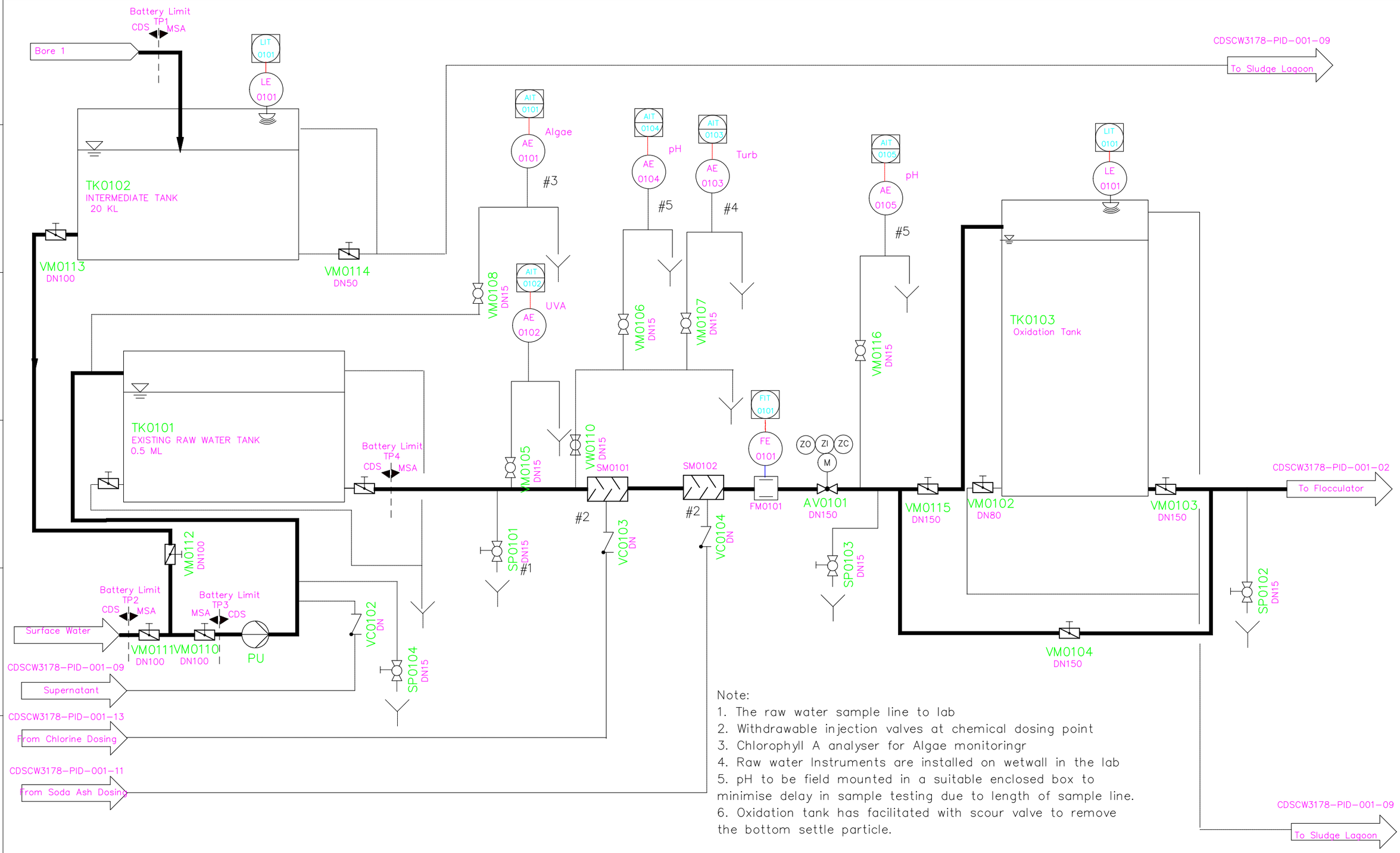
Inventor File
UNSPECIFIED TOL.s

DIMENSIONS SHOWN	TO BE
00 ±	1.5
00.0 ±	0.5
00.00 ±	0.15

DRAWING No.
DO NOT SCALE - IF IN DOUBT ASK
Sheet 4

JOB No.	2559	DATE	9/9/2021
DRAWN	MN	CHECKED	rl
SCALE		REVISION No.	A
		SHEET SIZE	

CLIENT Central Darlings Shire
TITLE Ivanhoe Water Treatment Plant



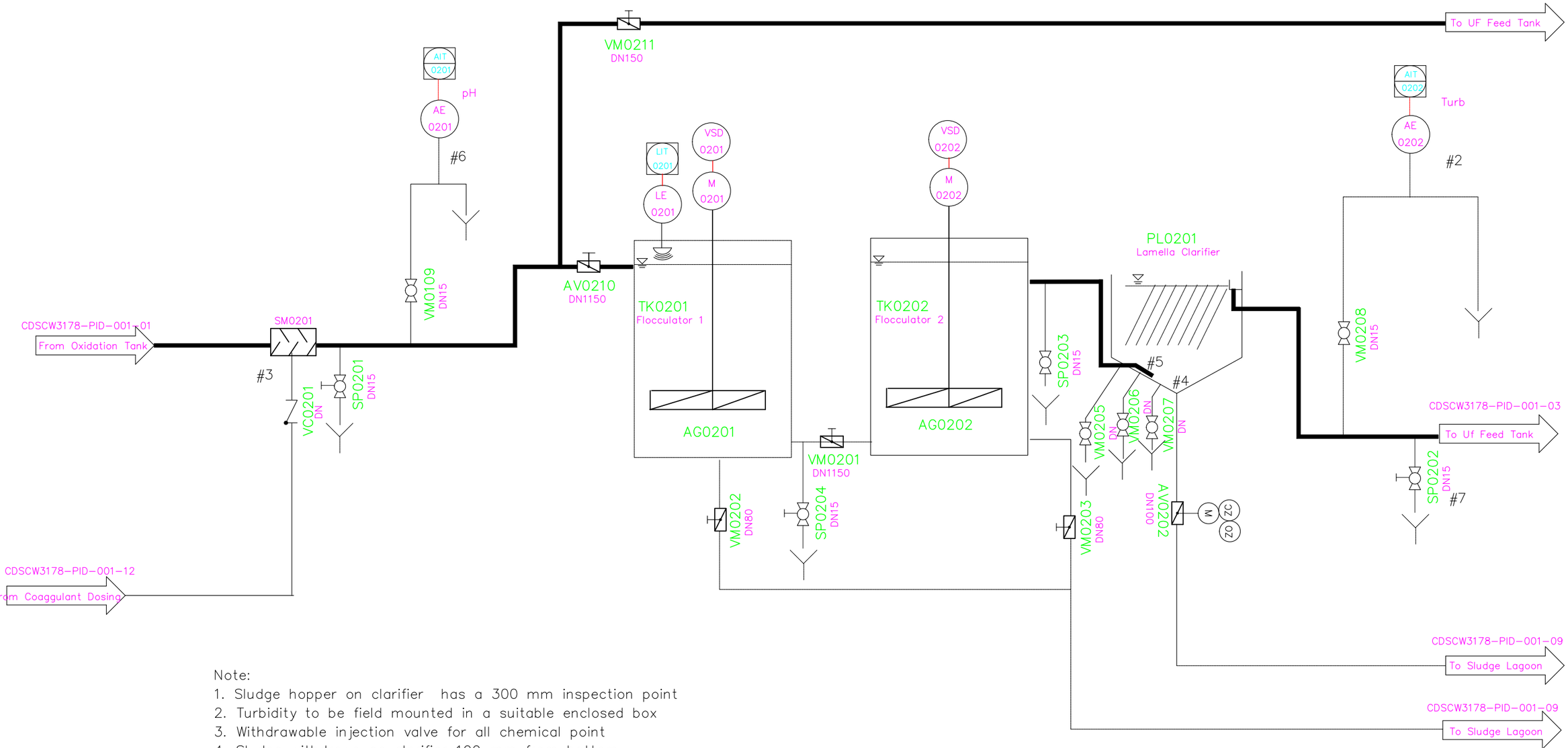
Note:
1. The raw water sample line to lab
2. Withdrawable injection valves at chemical dosing point
3. Chlorophyll A analyser for Algae monitoringr
4. Raw water Instruments are installed on wetwall in the lab
5. pH to be field mounted in a suitable enclosed box to minimise delay in sample testing due to length of sample line.
6. Oxidation tank has facilitated with scour valve to remove the bottom settle particle.

MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	19/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	25/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE:

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: FEED AND OXIDATION TANK
DRAWING No. DWG: IVCDSCW2559-PID-001-01
REV D
SHEET: 1 OF: 18
A3



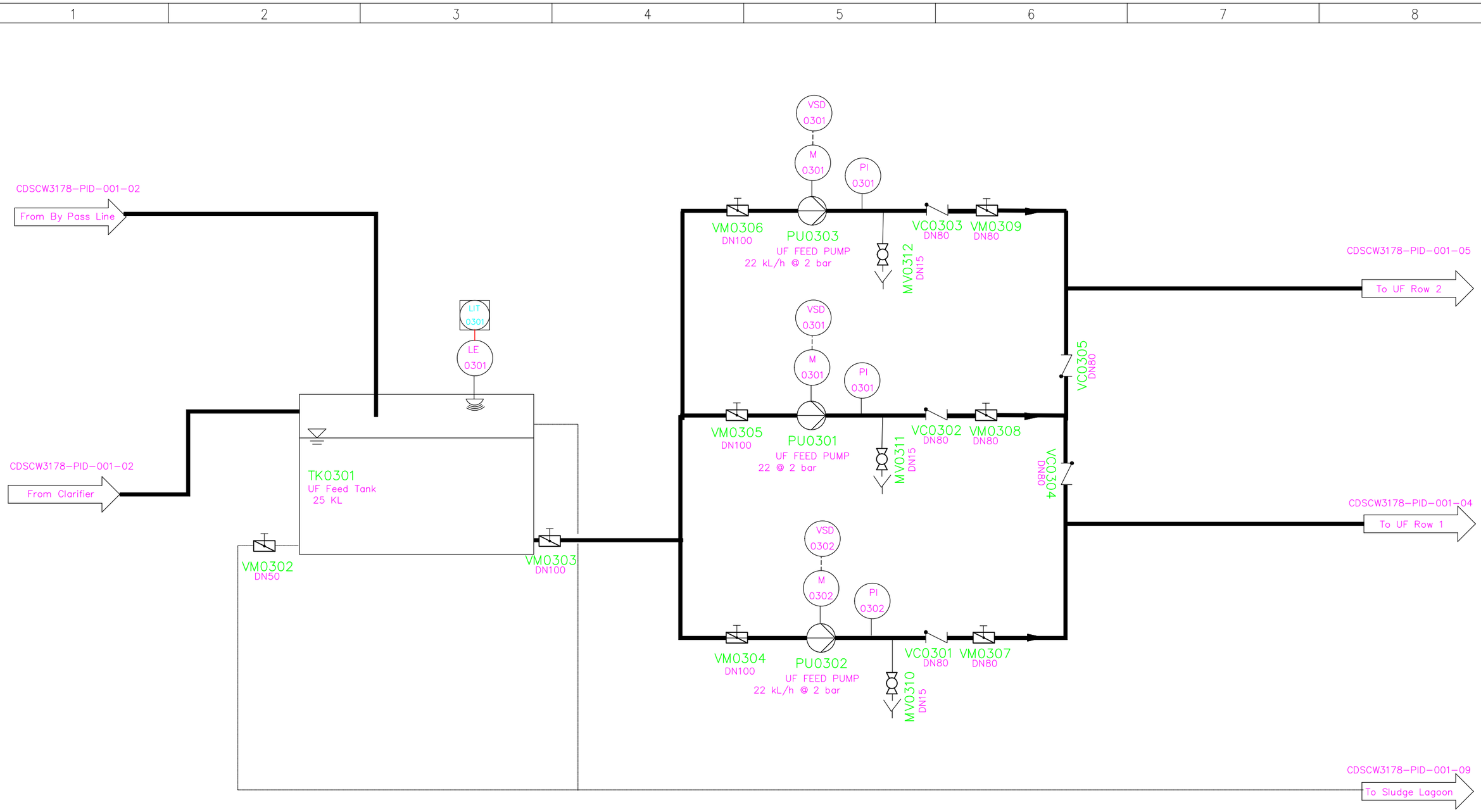
Note:
1. Sludge hopper on clarifier has a 300 mm inspection point
2. Turbidity to be field mounted in a suitable enclosed box
3. Withdrawable injection valve for all chemical point
4. Sludge withdrawa on clarifier 100 mm from bottom
5. Clarifier Inlet > 1 m from bottom of hopper
6. pH to be field mounted in a suitable enclosed box to minimise delay in sample testing due to length of sample line.
7. The raw water sample line to lab

MEMBRANE SYSTEMS AUSTRALIA
WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	19/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	25/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE:

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: FLOCCULATOR AND CLARIFIER
DRAWING No. DWG: IVCDSCW2559-PID-001-02
REV D
SHEET: 2
OF: 18
A3



MEMBRANE SYSTEMS AUSTRALIA

cwt WATER TREATMENT SPECIALISTS

CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	25/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE:

PROJECT: IVANHOE WATER TREATMENT PLANT

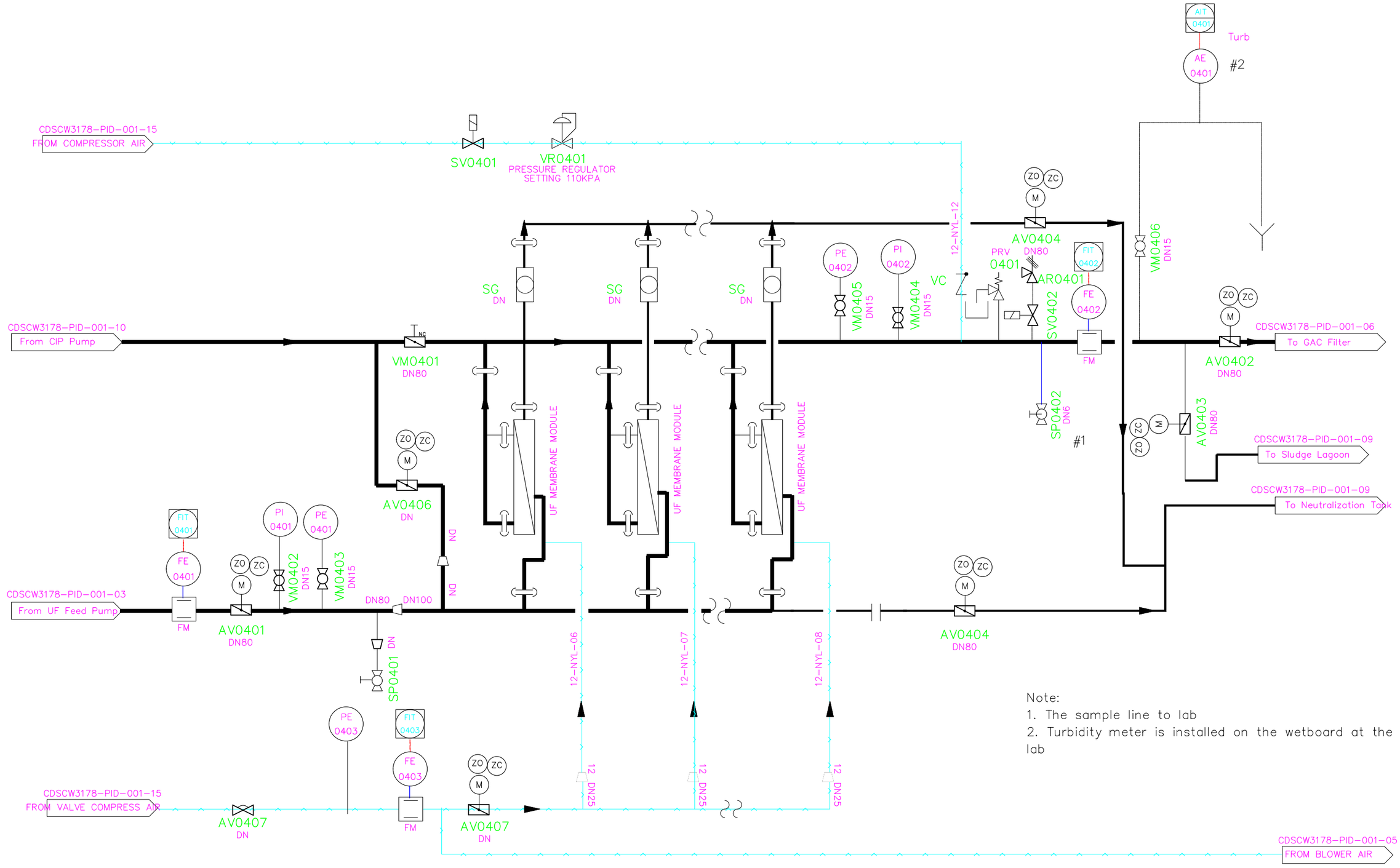
TITLE: UF FEED PUMP SYSTEM

DRAWING No. DWG: IVCDSCW2559-PID-001-03

REV D

SHEET: 3 OF: 18

A3



MEMBRANE SYSTEMS AUSTRALIA

cwt WATER TREATMENT SPECIALISTS

CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT

TITLE: UF PANT – TRAIN 1

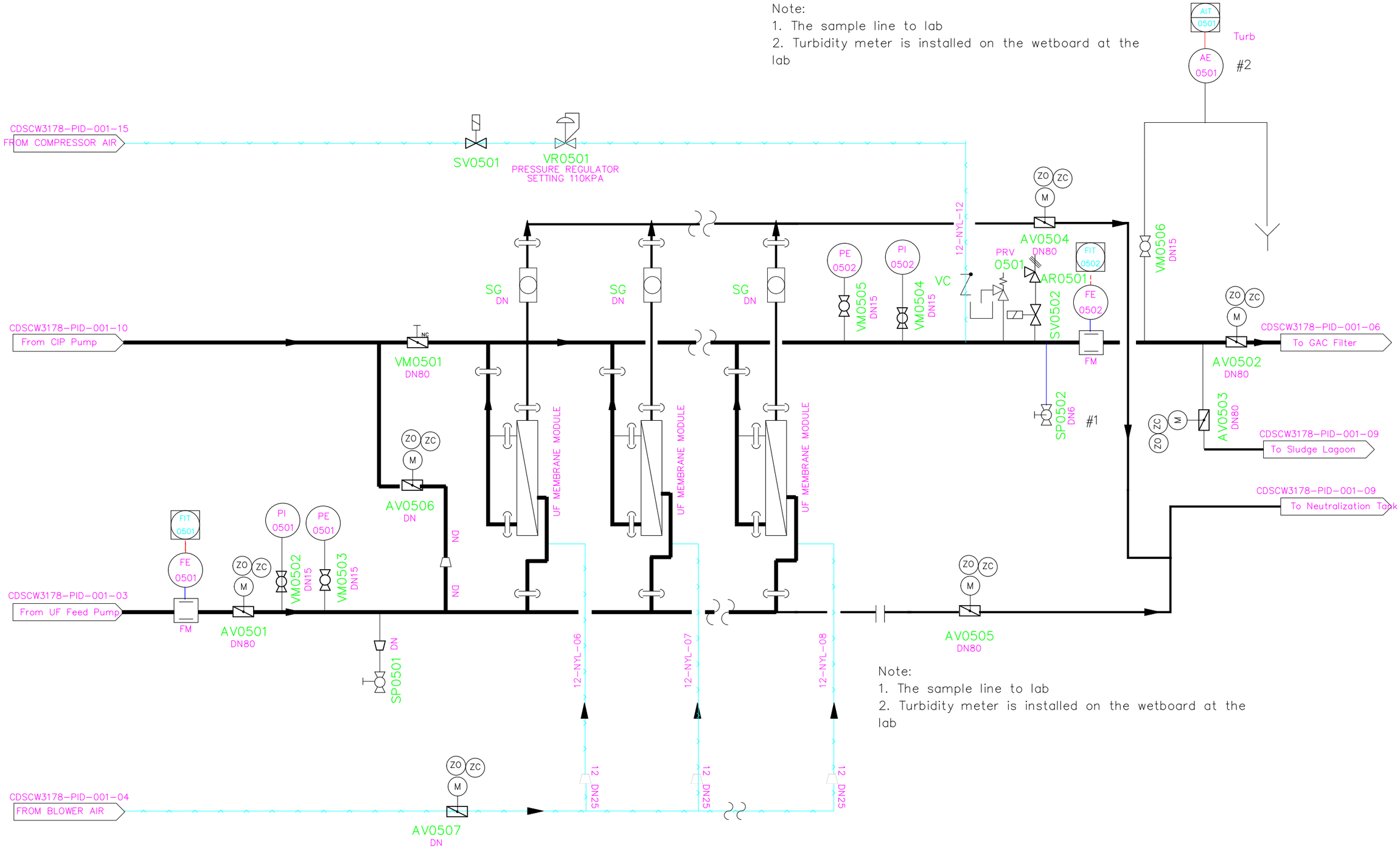
DRAWING No. DWG: IVCDSCW2559-PID-001-04

REV D

SHEET: 4 OF: 18

A3

Note:
1. The sample line to lab
2. Turbidity meter is installed on the wetboard at the lab



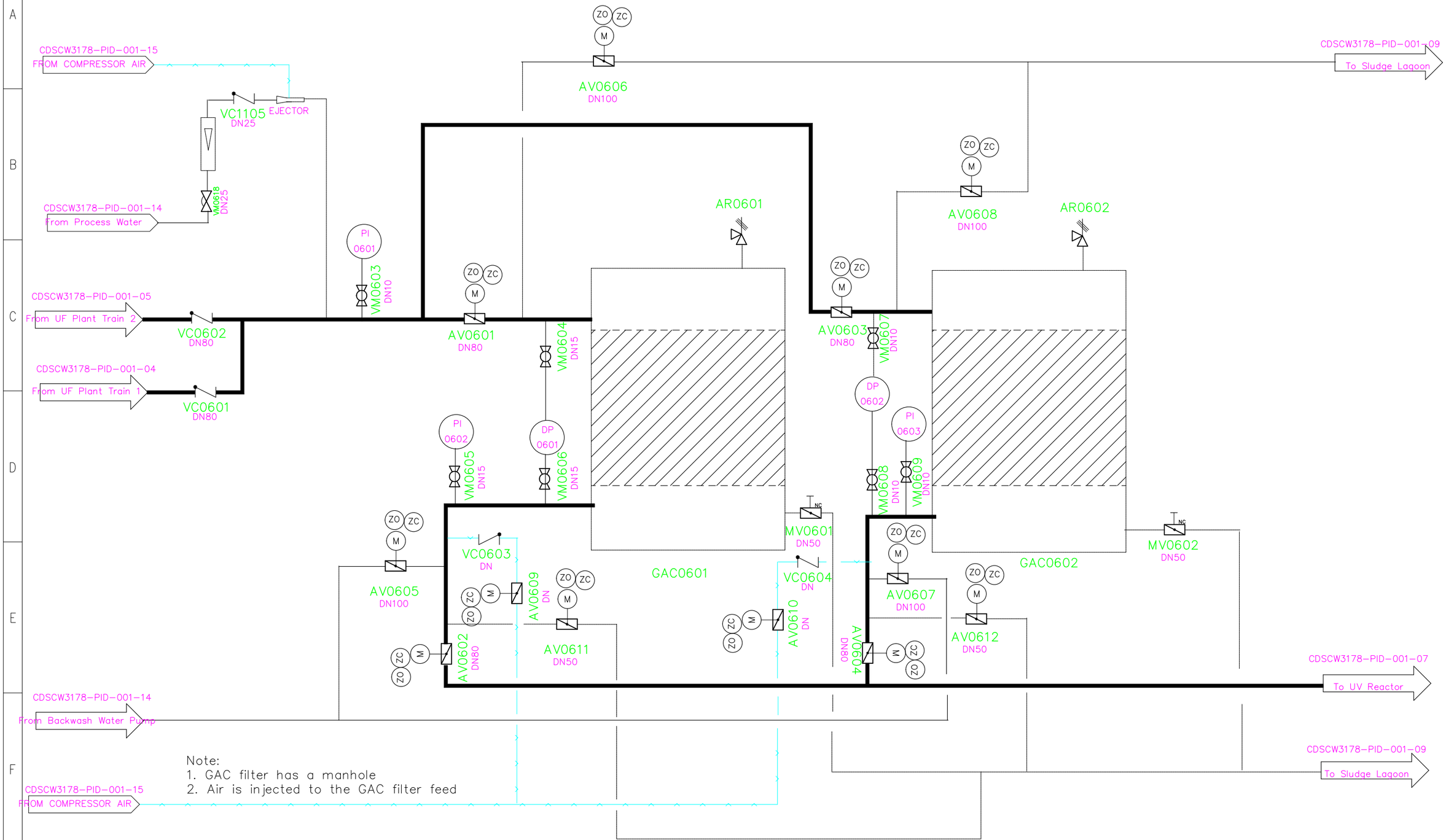
Note:
1. The sample line to lab
2. Turbidity meter is installed on the wetboard at the lab

MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: UF PANT – TRAIN 2
DRAWING No. DWG: IVCDSCW2559-PID-001-05
REV D
SHEET: 5 OF: 18
A3



ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RL
A	4/02/2021	FOR TENDER	BD	RL

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT

TITLE: GAC Filter

DRAWING No. DWG: IVCDSCW2559-PID-001-06

REV D

SHEET: 6 OF: 18

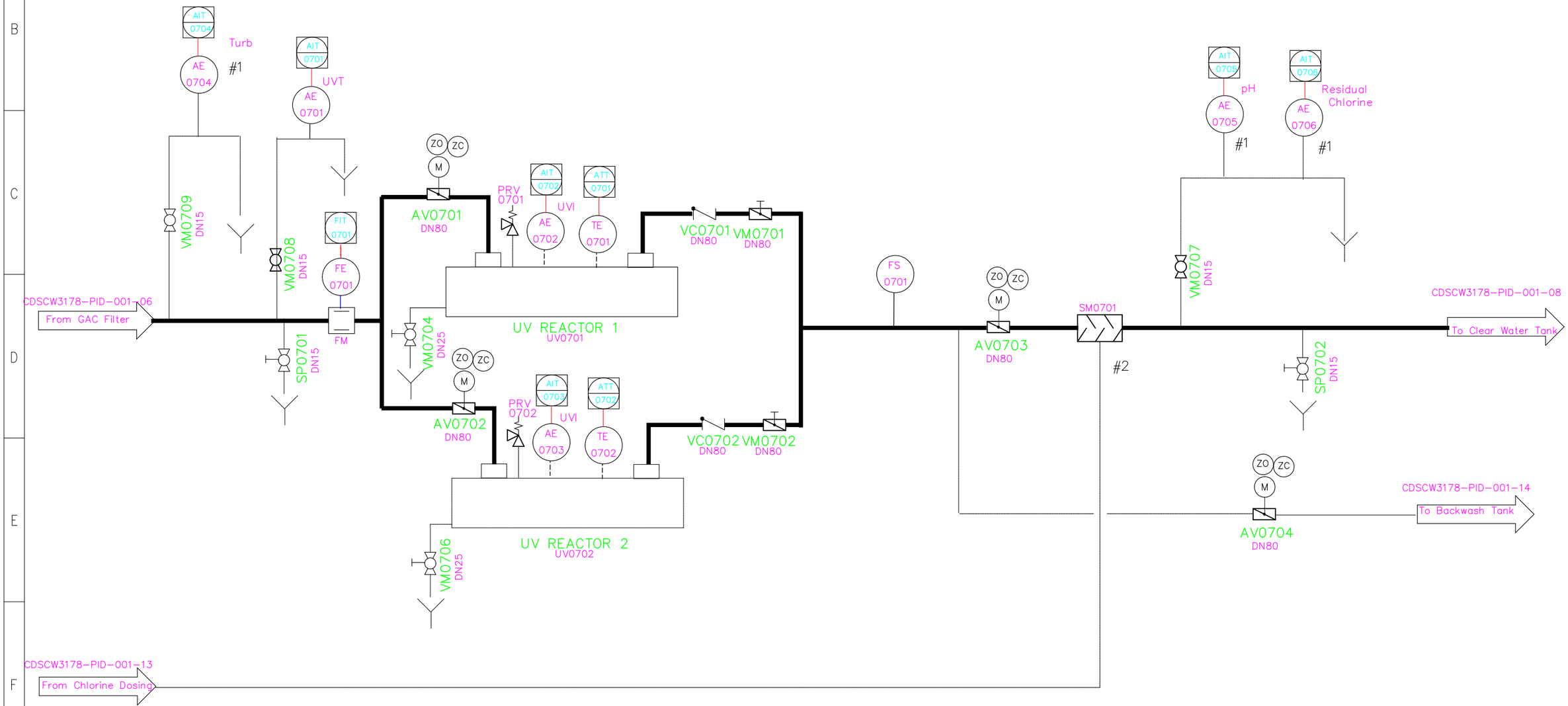
MEMBRANE SYSTEMS AUSTRALIA

WATER TREATMENT SPECIALISTS

CENTRAL DARLING SHIRE COUNCIL

A3

Note:
1. All the instrment installed on the wetboard at the lab
2. Withdrawable injection valve



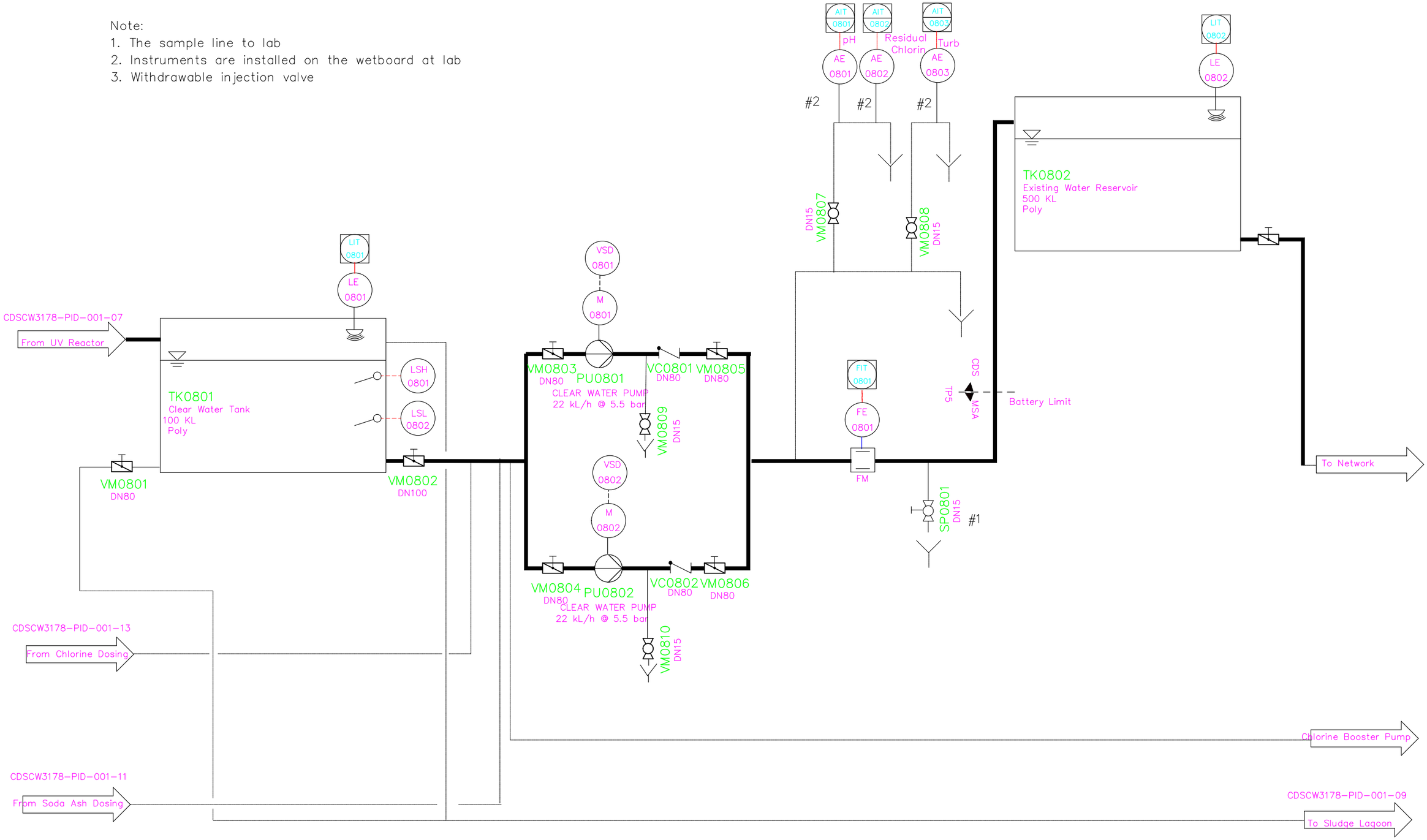
MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RL
A	4/02/2021	FOR TENDER	RS	RL

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: UV REACTOR
DRAWING No. DWG: IVCDSCW2559-PID-001-07
REV D
SHEET: 7 OF: 18
A3

Note:
1. The sample line to lab
2. Instruments are installed on the wetboard at lab
3. Withdrawable injection valve



MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	4/02/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: CLEAR WATER TANK
DRAWING No. DWG: IVCDSWC3178-PID-001-08
REV D
SHEET: 8 OF: 18
A3

Note:
1. Valve are in the accessible pit

CDSCW3178-PID-001-10
From CIP Tank
CDSCW3178-PID-001-04
From CEB Cleaning&F/F Train 1
CDSCW3178-PID-001-05
From CEB Cleaning&F/F Train 2
CDSCW3178-PID-001-03
From UF Feed Tank
CDSCW3178-PID-001-01
From Oxidation Tank
CDSCW3178-PID-001-02
From Floc Tank
CDSCW3178-PID-001-02
From Clarifier Sludge
CDSCW3178-PID-001-06
GAC Backwash
CDSCW3178-PID-001-06
From GAC drain
CDSCW3178-PID-001-08
From Treated water tank drain/overflow
CDSCW3178-PID-001-04&05
From UF divert to waste
CDSCW3178-PID-001-14
Process Water Tank
CDSCW3178-PID-001-01
From Intermediate tank
Drain/Overflow

LIT 0901
LE 0902
AIT 0901
pH
AE 0901
TK0901
CIP NEUTRALISATION
2500 L
PU0903 PU0904
VC0901 DN50
VM0901 DN50
VC0902 DN50
VM0902 DN50
VM0911 DN50
To Irrigation

VC0903 DN50
VM0903 DN50
VC0904 DN50
VM0904 DN50
FIT 0901
FE 0901
FM
VM0907 DN50
SP0901 DN15
CDSCW3178-PID-001-01
To Raw Water Inlet

LSH 0901
TK0902
LAGOON INLET PIT
750 L
VM0903 DN150
VM0903 DN150

LIT 0901
LE 0901
VM0905 DN100
VC0905 DN100
VC0906 DN100
VM0906 DN100
PU0901 PU0902
#1
#1
SLUDGE LAGOON 1
SLUDGE LAGOON 2

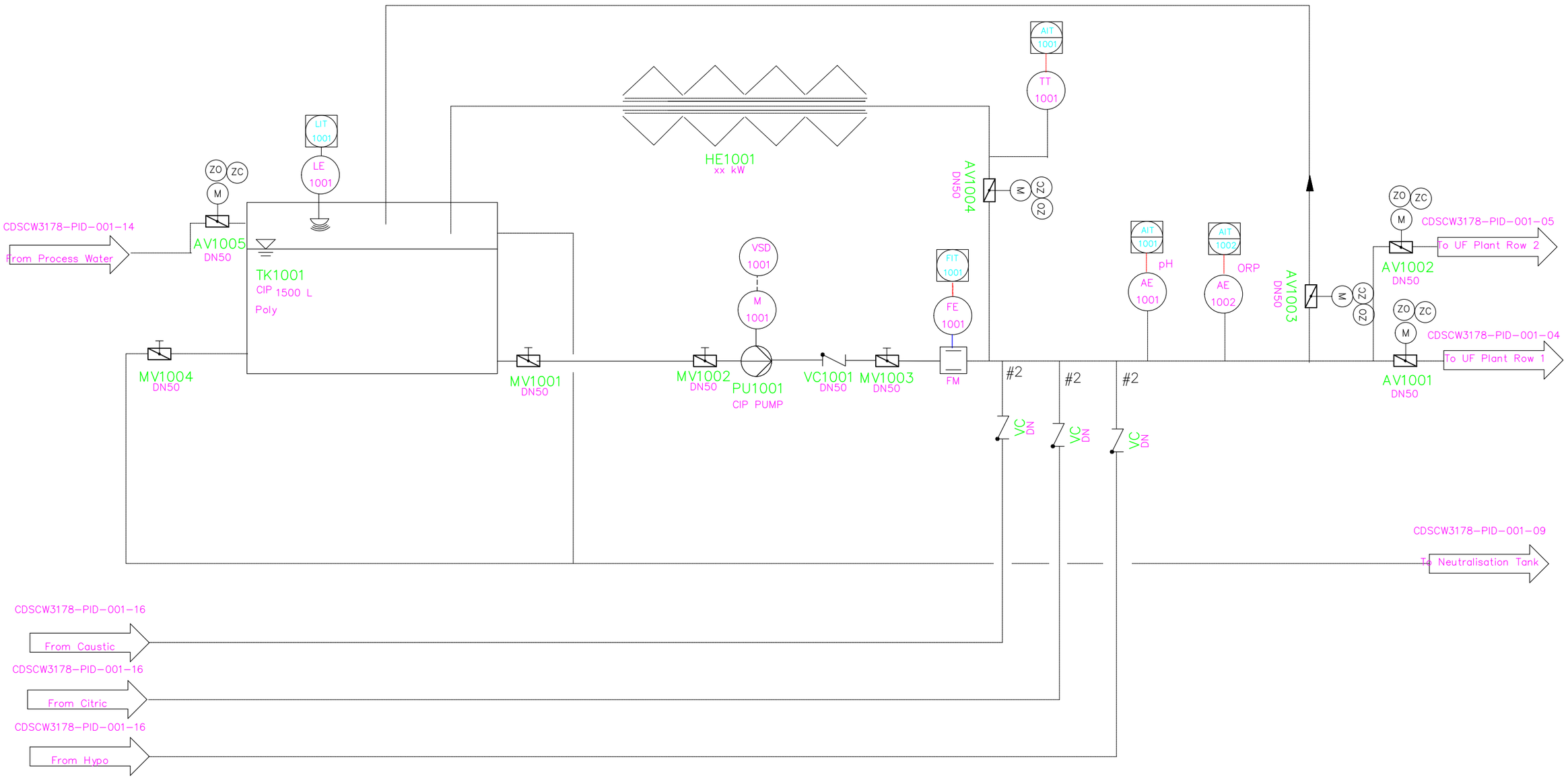
MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	RL	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: SLUDGE LAGOON
DRAWING No. DWG: IVCDSCW2559-PID-001-09
REV D
SHEET: 9 OF: 18
A3

Note:
1. pH prob always wet
2. Dosing point with withdrawal injection valve



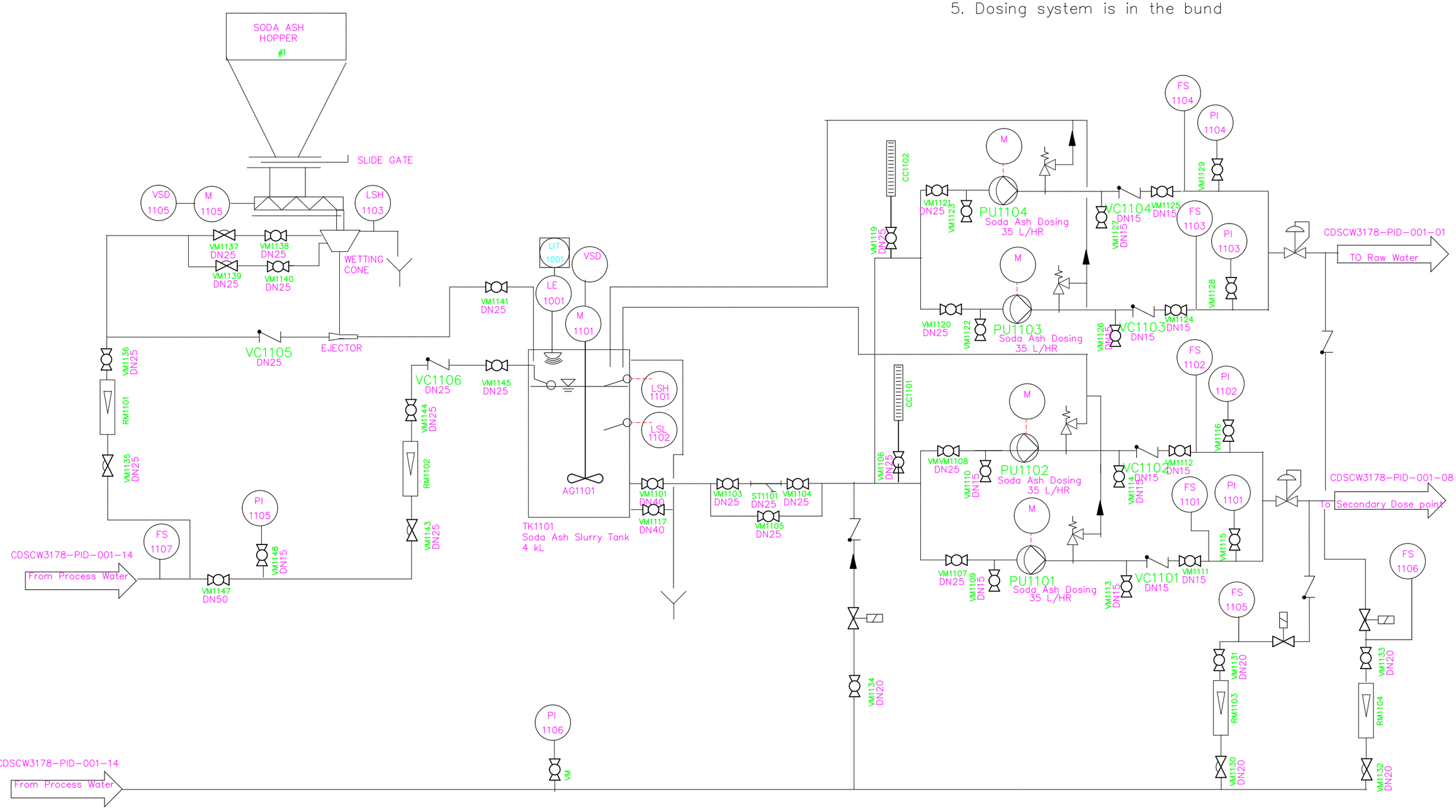
ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: CIP SYSTEM
DRAWING No. DWG: IVCDSCW2559-PID-001-10
REV D
SHEET: 10 OF: 18
A3

Note:
1. Soda Ash is fed manually to hopper
2. Hopper construction material is PE
3. All the overflow and drain to sludge lagoon
4. Calibration cylinder hight is higher than the slurry tank
5. Dosing system is in the bund



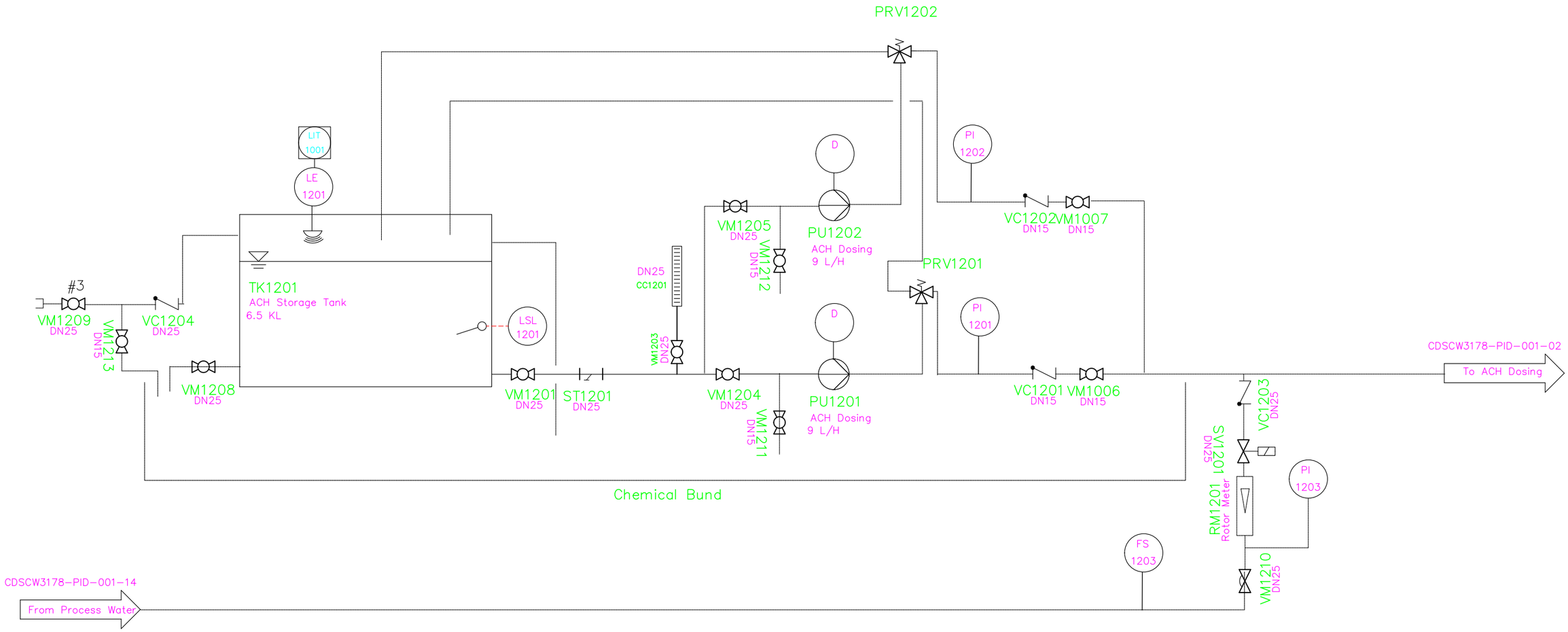
ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 26/03/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: SODA ASH DOSING SYSTEM
DRAWING No. DWG: IVCDSCW2559-PID-001-11
REV D
SHEET: 11
OF: 18
A3

Note:
1. Dosing point with withdrawal injection quill
2. Grundfos DDA pump has inbuilt flow and pressure switch and flow signal is availbale to SCADA
3. Isolation valve with possition switch

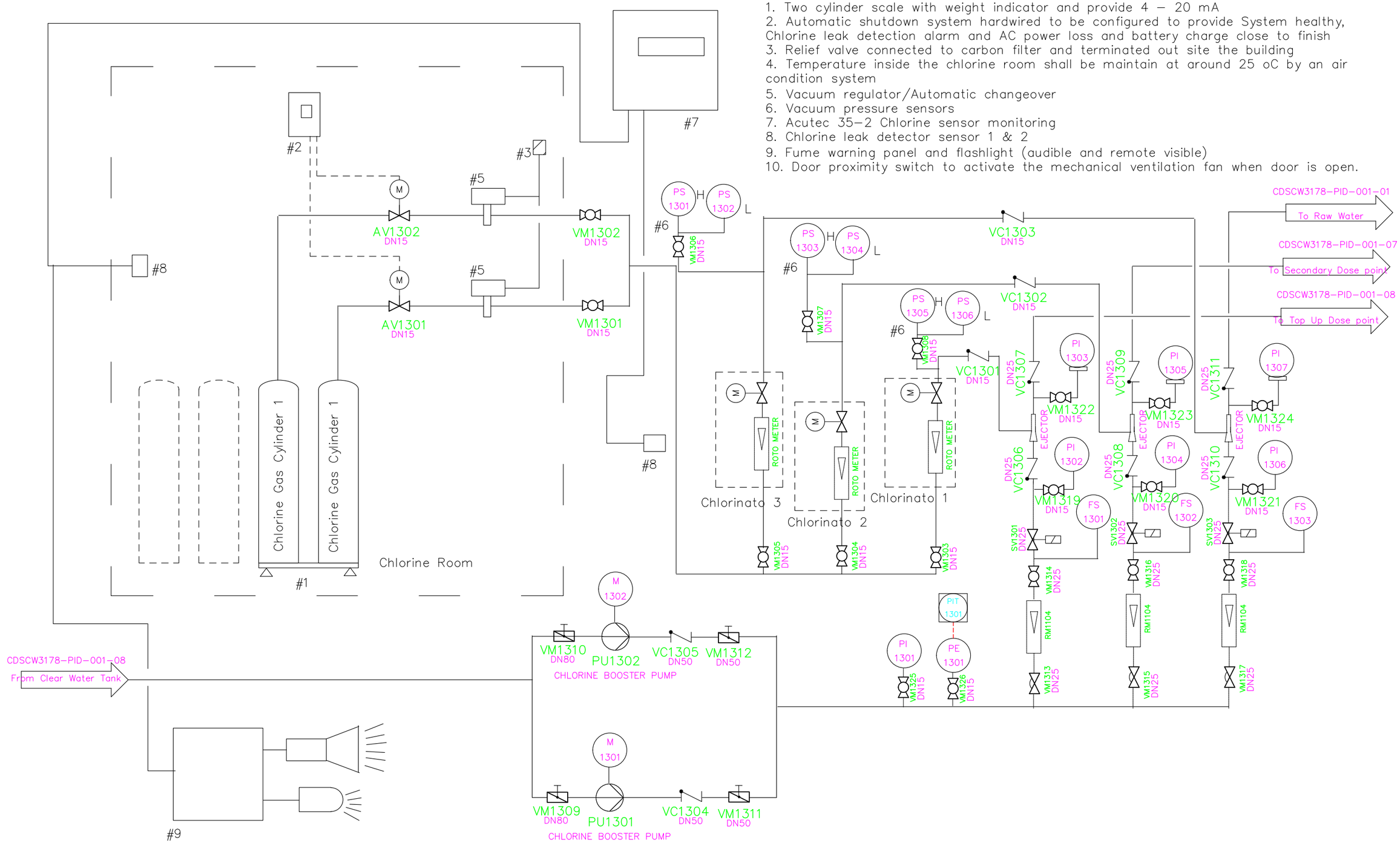


ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: ACH DOSING
DRAWING No. DWG: IVCDSCW2559-PID-001-12
REV D
SHEET: 12
OF: 18

Note:
1. Two cylinder scale with weight indicator and provide 4 – 20 mA
2. Automatic shutdown system hardwired to be configured to provide System healthy, Chlorine leak detection alarm and AC power loss and battery charge close to finish
3. Relief valve connected to carbon filter and terminated out site the building
4. Temperature inside the chlorine room shall be maintain at around 25 oC by an air condition system
5. Vacuum regulator/Automatic changeover
6. Vacuum pressure sensors
7. Acutec 35–2 Chlorine sensor monitoring
8. Chlorine leak detector sensor 1 & 2
9. Fume warning panel and flashlight (audible and remote visible)
10. Door proximity switch to activate the mechanical ventilation fan when door is open.

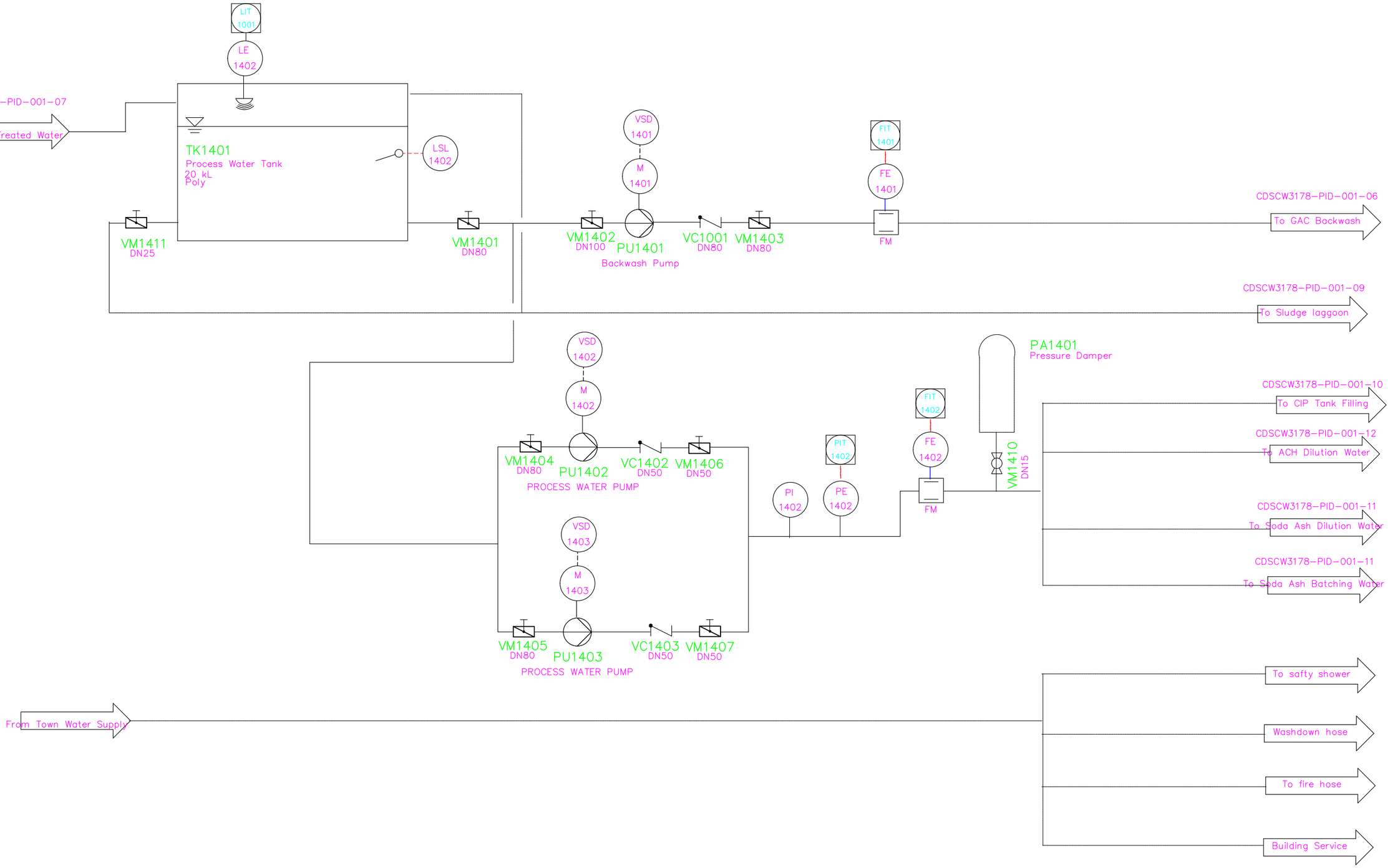


MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: CHLORINE DOSING SYSTEM
DRAWING No. DWG: IVCDSCW2559–PID–001–13
REV D
SHEET: 13 OF: 18
A3



MEMBRANE SYSTEMS AUSTRALIA

CWT WATER TREATMENT SPECIALISTS

CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT

TITLE: BACKWASH AND PROCESS WATER

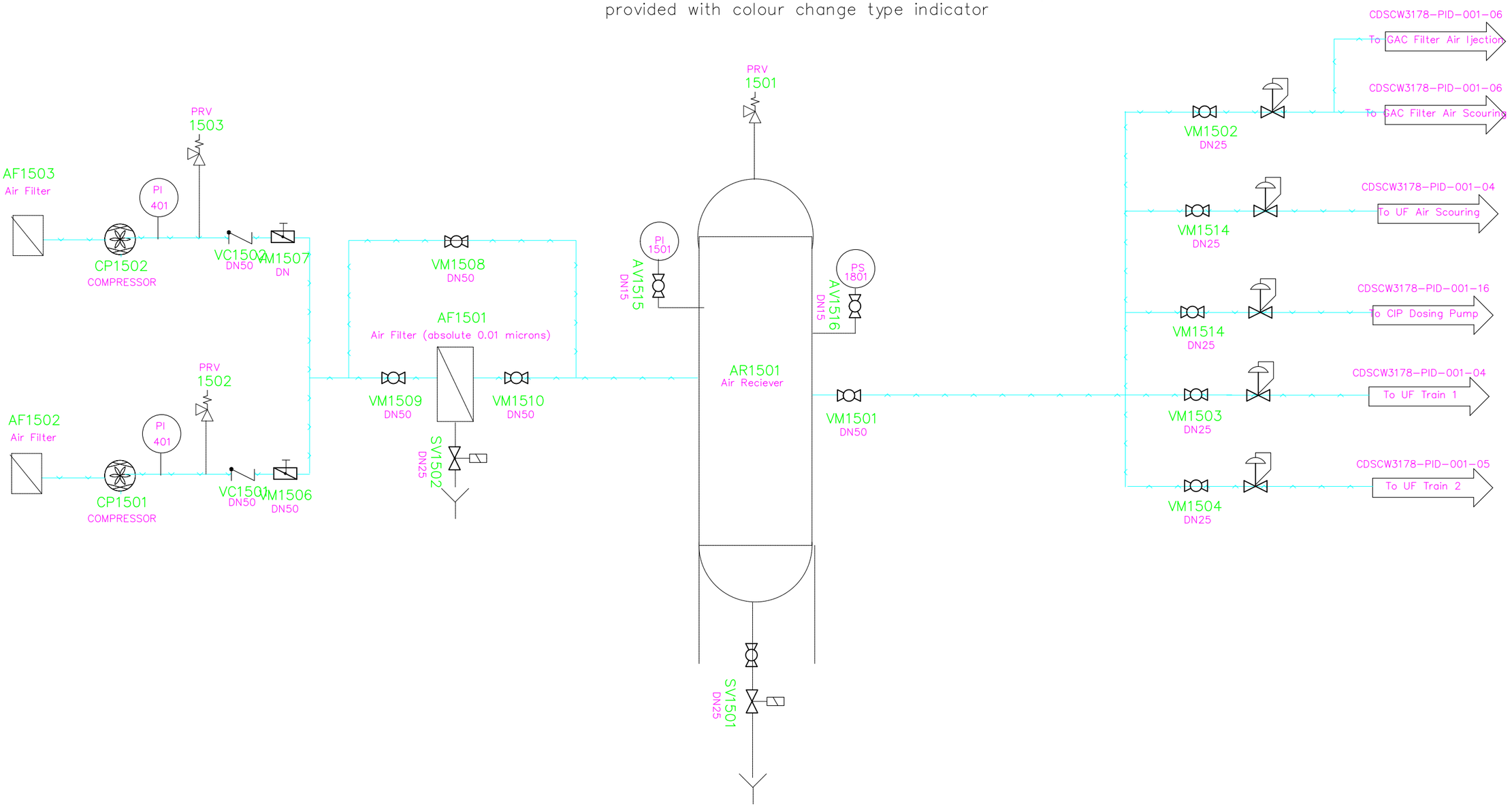
DRAWING No. DWG: IVCDSCW2559-PID-001-14

REV D

SHEET: 14 OF: 18

A3

Note:
1. Air compressor mounted on vibration isolator
2. Compressor discharge site filter pressure drop < 5 kPa and provided with colour change type indicator

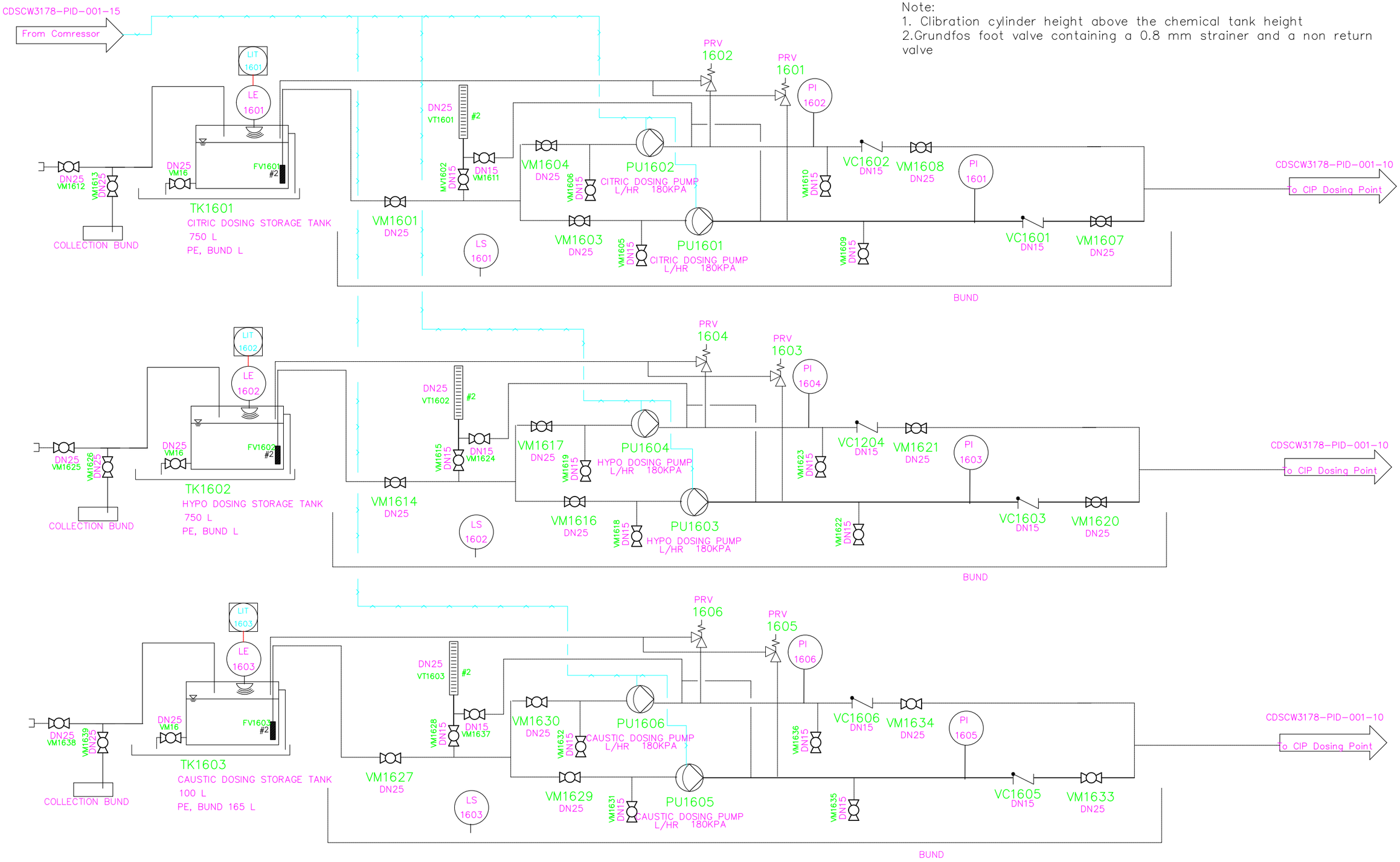


MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: COMPRESS AIR SYSTEM
DRAWING No. DWG: IVCDSCW2559-PID-001-15
REV D
SHEET: 15 OF: 18
A3



MEMBRANE SYSTEMS AUSTRALIA

cwt WATER TREATMENT SPECIALISTS

CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	28/03/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 4/02/2021

PROJECT: IVANHOE WATER TREATMENT PLANT

TITLE: CIP DOSING SYSTEM

DRAWING No. DWG: IVCDSCW2559-PID-001-16

REV D

SHEET: 16 OF: 18

A3

Pumps

Pump General
Pump Centrifugal
Pump Positive Displacement
Pump Screw
Pump Helical Rotor
Pump Diaphragm
Pump Pneumatic Double Diaphragm
Pump Reciprocating
Pump Gear
Pump Liquid Jet
Pump Peristaltic

Compressors

Compressor General
Compressor Reciprocating
Compressor Positive Displacement
Compressor Screw
Compressor Diaphragm
Compressor Rotary
Compressor Turbo
Compressor Liquid Ring
Compressor Roller Vane
Compressor Ejector

Blowers

Blower General
Blower Axial
Blower Radial

Drives

Drive General
Drive Electric Motor
Drive Combustion Engine
Drive Turbine
Drive Gear

Filters & Screens

Filter General
Filter Liquid
Filter Media
Filter Ion Exchange
Filter Activated Carbon
Separator Cyclone
Screen General
Strainer
Membrane Module

Agitators

Agitator General
Agitator Flat Blade
Agitator Anchor
Agitator Propeller
Agitator Turbine
Agitator Cross Beam
Agitator Disc
Agitator Gate Paddle
Agitator Impeller
Agitator Helical

Conveyors

Chain Conveyor
Belt Conveyor

Equipment & Fittings

Restriction Orifice
Venturi Nozzle
Sample Point
Strainer
Mixer General
Static Mixer
Reducer Concentric
Reducer Excentric
Vent
Barrel Union
Flange
Sight Glass
Aerator Membrane Diffuser
Aerator Venturi
Float Switch
Floating Skimmer
Barrier Diaphragm
Cam-Lock Fitting
Cap
UV Reactor
Pipe Heater

General Symbols

Flow Indicator
Off Page Connector
MSA Limit
Others
Line Break
Water Level
Flow
Pressure
Temperature
Line Info

Process Valves

Valve General
Valve Ball
Valve Gate
Valve Butterfly
Valve Globe
Valve Needle
3/2 Way Solenoid
Valve Diaphragm
Valve Angle
Valve 3-Way General
Valve 3-Way Ball
Valve Pressure Relief
Air Relief Valve
Pressure Regulator Valve

Flow Meters

Flow Meter Turbine
Flow Meter Magnetic
FIXXX
Flow Meter Variable Area

Actuators

Actuator Rotary Motor
Actuator Piston Double Acting
Actuator Piston Single Acting
Actuator Solenoid
Actuator Solenoid Manual Reset
Actuator Manual
Actuator Diaphragm
Actuator Diaphragm Pressure Balanced
Actuator Float

Check Valves

Valve Check General
Valve Check Lift
Valve Check Swing

Line Types

Main Process Line
Secondary Process Line
Compressed Air Line
Signal General
Signal Electrical
Signal Software
Hose

Tanks & Vessels

Tank Below Ground
Tank Above Ground Domed
Tank Above Ground Flat
Bin
Pit General
Pit With Lid
Pit with Grate
Pit with Grate & Silt Basket
Hopper
Gravity Clarifier
DAF Floatation Vessel
Plate Clarifier
Oil/ Water Separator Coalescing

MEMBRANE SYSTEMS AUSTRALIA

cwt WATER TREATMENT SPECIALISTS

CENTRAL DARLING SHIRE COUNCIL

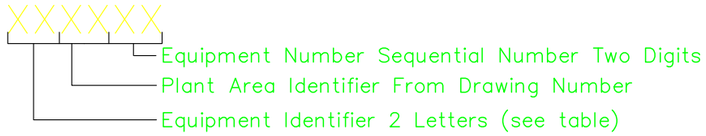
ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	4/02/2021	FOR TENDER	BD	RS

DRAWN: BD
APPROVED: RS
NTS
DATE: 01/05/2021

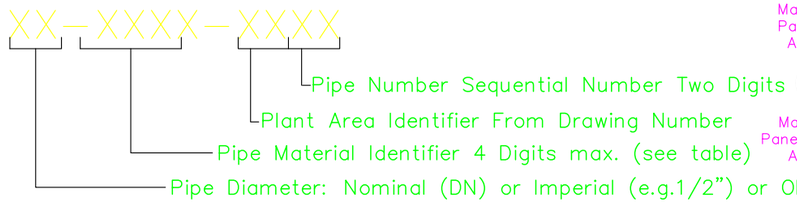
PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: Symbols
DRAWING No. DWG: IVCDSCW2559-PID-001-17
REV D
SHEET: 17 OF: 18

A3

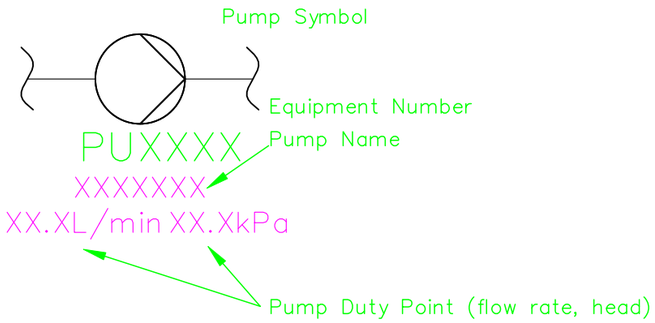
Equipment Numbering



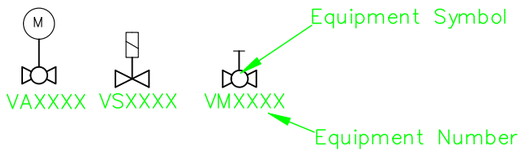
Line Numbering



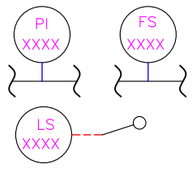
Identification Pumps



Identification Other In–line Equipment

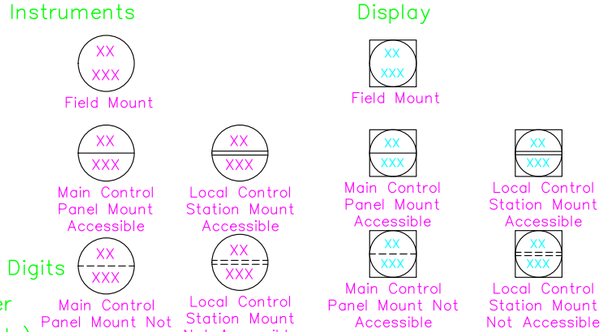


Identification Simple Instruments & Switches



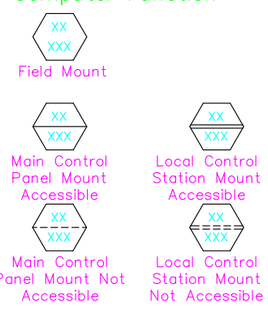
Instrument & Control Loop Identification

Instruments

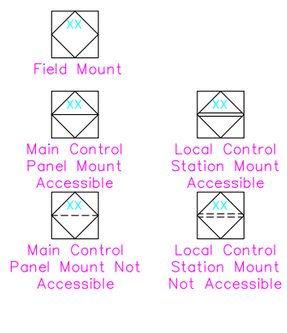


Display

Computer Function



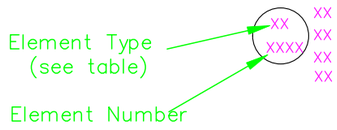
PLC



Input/ Output Type

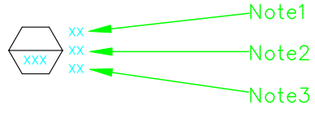
AI– Analog Input
AO– Analog Output
DI– Digital Input
DO– Digital Output

Identification of Element



Alarms

HH– HighHigh
H– High
L– Low
LL– LowLow



Type of Function

P– Proportional
PI– Proportional Integral
PID– Proportional Integral Derivative
SET–Setpoint

Sensor Identifiers

FI	Flow Indicator
FT	Flow Transmitter
FM	Flow Meter
FIT	Flow Transmitter with Display
PI	Pressure Indicator (Gauge)
PT	Pressure Transmitter
PIT	Pressure Transmitter with Display
AI	Analytical Indicator
AT	Analytical Transmitter
AIT	Analytical Transmitter with Display
LI	Level Indicator
LT	Level Transmitter
LIT	Level Transmitter with Display

Pipe Material Identifiers

UPDW	UPVC Drain Waste & Vent (DWV)
UP08	UPVC Pressure Pipe PN8
UP10	UPVC Pressure Pipe PN10
UP12	UPVC Pressure Pipe PN12
UP40	UPVC Pressure Pipe Schedule 40
UP80	UPVC Pressure Pipe Schedule 80
CPxx	CPVC Pipe Spec as Above
PE10	PE100 Pressure Pipe PN10
PE16	PE100 Pressure Pipe PN16
PE21	PE100 Pressure Pipe PN21
SS05	Stainless Steel Schedule 5
SS10	Stainless Steel Schedule 10
SS40	Stainless Steel Schedule 40
SS80	Stainless Steel Schedule 80
LDPE	Low Density Polyethylene Tubing
PTFE	Teflon Tubing
NYL	Nylon Tubing

Equipment Identifiers

AE	Aerator
AG	Agitator
BL	Blower
CB	Circuit Breaker
CO	Compressor
EL	General Electrical Equipment
EQ	General Equipment
ES	E–Stop
FS	Flow Switch
FT	Filter Genral
LM	Limit Switch
LS	Level Switch
LT	Light/ Lamp
MT	Motor
PI	Pressure Indicator (Gauge)
PS	Pressure Switch
PU	Pump
SM	Static Mixer
SN	Sensor
SP	Sample Point
SV	Vertical Saturator Pipe
TK	Tank
VA	Automatic Valve
VC	Check Valve
VD	Variable Frequency Drive
VM	Manual Valve
PRV	Pressure Relief Valve
VR	Pressure Regulating Valve
VS	Solenoid Valve
ZO	Limit Switch Open
ZC	Limit Switch Open
ZI	Possition Switch
PC	Plate Clarifier
AR	Air Reliefe Valve
ST	Strainer
RM	Rotor Meter
AF	Air Filter
ARS	Air Reciever
AD	Air Dryer
CC	Calibration Cylinder

Notes:
Note 1, 2 and 3 are used to display additional information about the particular instrument or control loop.
For example Note 2 on analytical instruments are typically used to display the type of analytical sensor (i.e. pH, ORP, turbidity etc.).
Note 1 and 3 are used to display limits.
For example on level switches they are used to display the levels which are processed in the PLC (i.e. high level H, high high level HH) and also alarm limits and tank volume percentages
On automatic valves for example Note 1 and 3 can be used to display open and close feedback (i.e. O, C,)

MEMBRANE SYSTEMS AUSTRALIA
cwt WATER TREATMENT SPECIALISTS
CENTRAL DARLING SHIRE COUNCIL

ISSUE	DATE	DESCRIPTION	DRN	APPD
D	27/08/2021	INCLUDED COMMENTS OF REVIEW C	BD	RS
C	05/08/2021	INCLUDED COMMENTS OF REVIEW B	BD	RS
B	26/07/2021	FOR 25% DESIGN REVIEW	BD	RS
A	4/02/2021	PRELIMINARY DESIGN	BD	RS

DRAWN: BD
APPROVED: RS
SCALE: NTS
DATE: 01/05/2021

PROJECT: IVANHOE WATER TREATMENT PLANT
TITLE: Identification
DRAWING No. DWG: IVCDSCW2559–PID–001–18
REV D
SHEET: 18 OF: 18
A3

Appendix D – Database Searches

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Ivanhoe WTP

Client Service ID : 632027

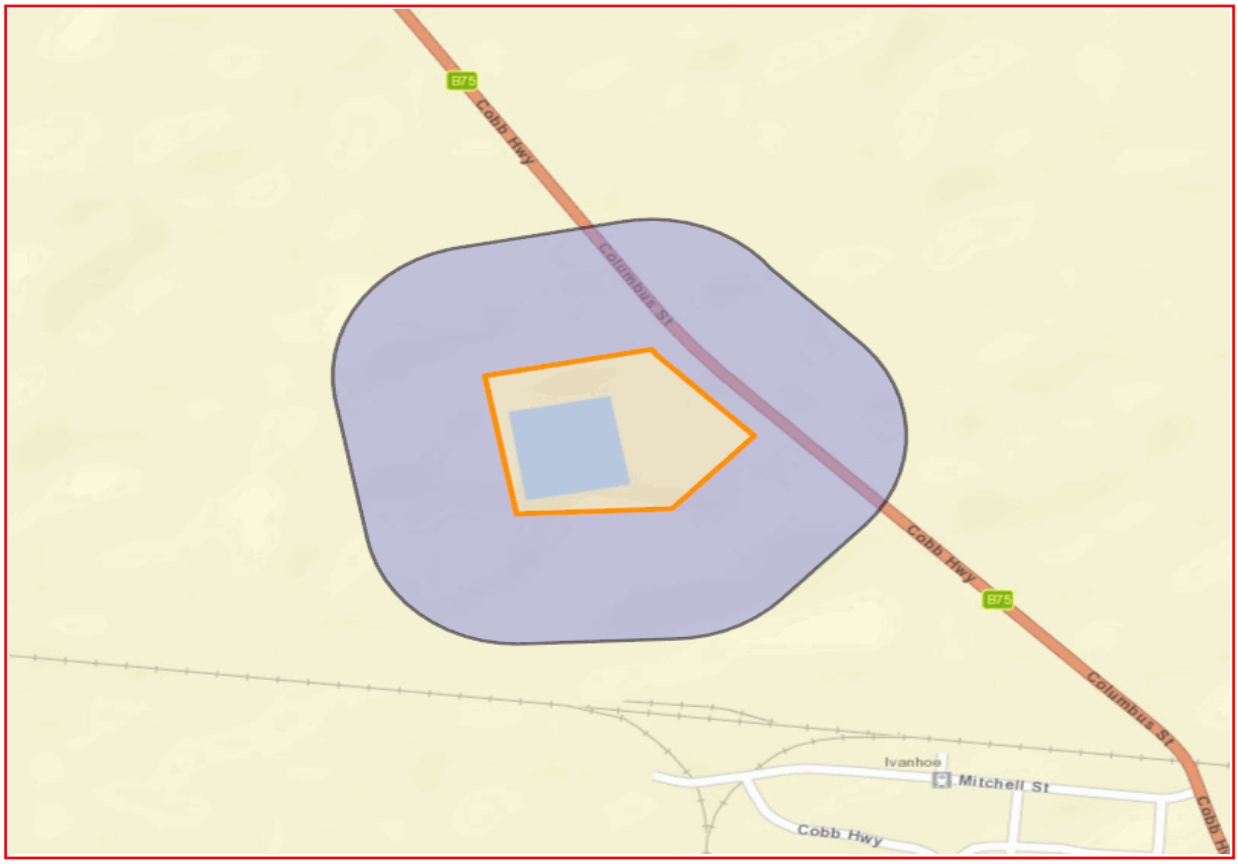
Public Works Advisory
66 Harrington Street
Sydney New South Wales 2000
Attention: Kristen Parmeter
Email: kristen.parmeter@finance.nsw.gov.au

Date: 20 October 2021

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 1, DP:DP815263, Section : - with a Buffer of 200 meters, conducted by Kristen Parmeter on 20 October 2021.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Heritage Search Result

Date: 20/10/2021

Item Name	Location	LGA	SHR Id	Item Type	Record Owner
Ivanhoe Railway Precinct	IVANHOE NSW 2878	Central Darling		Built	SGOV
Ivanhoe Railway Precinct	IVANHOE NSW 2878	Central Darling		Built	SGOV
Jacks Lookout and Surveyors Lake Rocks	IVANHOE NSW 2878	Central Darling		Complex / Group	HNSW

Search Results

10 results found.

Corinya Lake Area	Ivanhoe, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Indigenous Place	Cobar, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Indigenous Place	Cobar, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Indigenous Place	Cobar, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Indigenous Place	Ivanhoe, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Indigenous Place	Ivanhoe, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Indigenous Place	Ivanhoe, NSW, Australia	(Removed from Register or IL) Register of the National Estate (Non-statutory archive)
Kajuligah Nature Reserve	Ivanhoe, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Marma - Bulla Sites Complex	Cobar, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Willandra Lakes Region Mildura Ivanhoe Rd	Balranald, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)

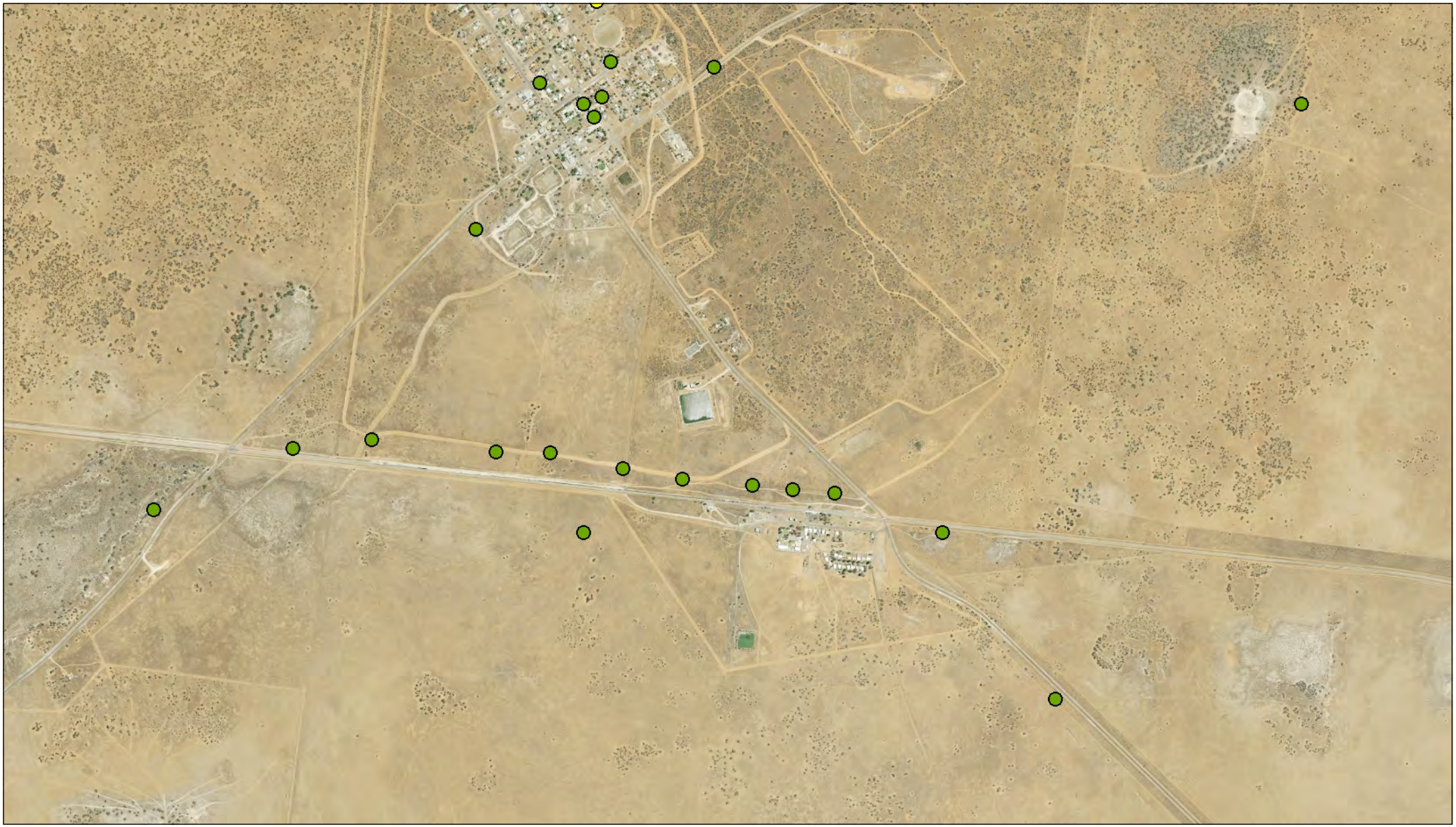
Report Produced: Wed Oct 20 16:15:35 2021

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report generated on 22/10/2021 5:01 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Mammalia	Vespertilionidae	T315	*Nyctophilus corbeni*		Corben's Long-eared Bat	V,P	V	1	

SEED | Sharing and Enabling Environmental Data

SEED Map - Ivanhoe WTP site Bionet Species Sightings



1.3 0 0.67 1.3 Kilometers

Scale 1: 26,731.15

WGS_1984_Web_Mercator_Auxiliary_Sphere

Generated from SEED web map. Created 4:48 PM 22/10/2021

Legend

BionetSpeciesSightings

- Critically Endangered
- Endangered
- Endangered Population
- Endangered Population, Vulnerable
- Vulnerable
- Presumed Extinct
- Not Listed as Threatened

4 Parramatta Square, 12 Darcy Street, Parramatta, NSW, 2150
www.publicworksadvisory.nsw.gov.au