

Western Davenport Implementation Actions 2024-2034



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Front page photo: Growing irrigated hay using a centre pivot

Acknowledgement of Country

The Department of Lands, Planning and Environment respectfully and proudly acknowledges the Northern Territory's Aboriginal people and their rich cultures. We pay respect to Elders past and present.

We acknowledge Alyawarr, Kaytetye, Warumungu and Warlpiri peoples as the Traditional Owners and custodians of the lands and waters of the Western Davenport Water Control District. We recognise the intrinsic connection of Traditional Owners to Country and value their ongoing contribution to managing the lands and waters.

We support the need for genuine and lasting partnerships with Traditional Owners to better understand cultural connections, and we will work to establish lasting partnerships to manage water together, now and into the future.



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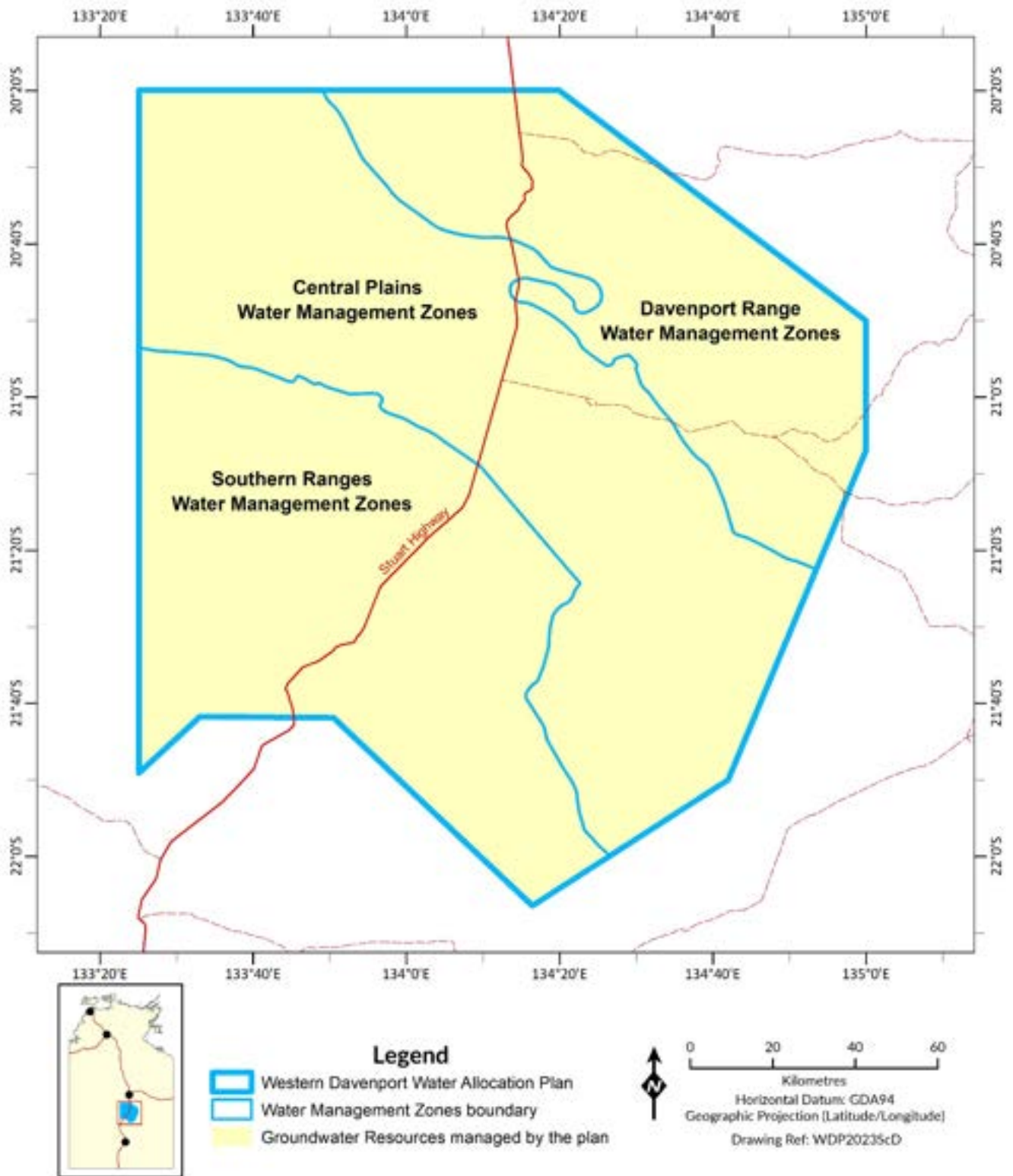
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Contents

1. Overview	5
2. Risk and adaptive management	6
2.1. Risk assessment.....	6
2.2. Risk management.....	6
2.3. Adaptive management	7
3. Water monitoring program	8
3.1. Monitoring by the department.....	8
3.2. Monitoring by licence holders	9
4. Implementation actions	10
4.1. Actions related to water requirements of key environmental values	11
4.2. Actions related to key Aboriginal and other cultural values associated with water.....	12
4.3. Actions related to water for rural stock and domestic purposes	14
4.4. Actions related to water security for public water supplies.....	14
4.5. Actions related to water for local Aboriginal economic development.....	15
4.6. Actions related to water for sustainable development in the region	16
5. Reporting	17
Schedule A: Dictionary	18
Schedule B: Acronyms	19
Schedule C: Western Davenport water control district	20
Schedule D: Western Davenport water management zones	21



..... 21

Schedule E: Western Davenport water monitoring network..... 22

Schedule F: Risk assessment methodology 27

Schedule G: Risk and adaptive management 29

Schedule H: Adaptive management framework..... 37

1. Overview

About the water allocation process

Water allocation is the process of determining how much water must stay in the environment to protect ecological functions and environmental requirements and how much is available for drinking and regional economic priorities. Water allocation in the Northern Territory is undertaken at a regional level within defined areas known as water control districts, which are declared by the Minister for Water Resources (Minister) by *Gazette* notice.

About the Western Davenport water control district

The Western Davenport water control district (the district), an area of about 24,500 km² located approximately 150 km south of Tennant Creek (Schedule C). The district was first identified for its potential as a commercial horticultural precinct in 2007 through a soil and land suitability assessment for irrigated agriculture. The assessment identified more than 43,830 hectares of land suitable for a range of irrigated agricultural cropping uses, and has been supplemented by investigative water studies, the declarations of the previous water allocation plans, and more recently through the studies undertaken as part of Mapping the Future program, which investigated land, biodiversity and water resources across the region.

About this document

This document is one of three core documents prepared as part of the water allocation process for the plan area. This document references other documents and guidelines that may relate to the plan area, but which do not form part of the core documents. The three core documents are:

Western Davenport Water Allocation Plan 2024–2034 (the plan). The plan is declared by the Minister under section 22B(1) of the *Water Act 1992* (the Act)¹. The plan describes the estimated sustainable yield for the water resources of the plan area in three water management zones (Schedule D). The estimated sustainable yield is the volume of water that can be taken sustainably from the water resources to which the plan applies. The plan allocates that water amongst declared beneficial uses and provides for the trading of water. The plan takes effect from the date in the *Gazette* by the Minister and will remain in force for a period of ten years.

Western Davenport Background Report 2024–2034 (the report) provides details on the information and processes that informed the plan, including available data and research on the surface and groundwater water resources of the plan area. It also describes the key environmental values of the plan area and their dependency on water resources, and the social and developmental context of the region, including existing water use and projections of future water demand. The report collates the information and knowledge regarding the plan area at the time of its preparation.

Western Davenport Implementation Actions 2024–2034 (this document, the implementation actions) details how the requirements in section 34 of the Act with respect to the water resources of the plan area are fulfilled. It defines a continuous program for the assessment of water resources in the plan area, including the investigation, collection and analysis of data concerning the occurrence, volume, flow, characteristics, quality and use of water resources. That program is described within the document as a series of implementation actions which includes a body of research, monitoring and analytical work.

The Controller of Water Resources must consider any water allocation plan applying to the area in question when making a decision referred to in s 90(1) of the Act. The Western Davenport 2024-2034 background report and implementation actions and other factors may be taken into account, where relevant to the decision.

¹ <https://legislation.nt.gov.au/en/Legislation/WATER-ACT-1992>

2. Risk and adaptive management

Overview

The combination of risk management with adaptive management ensures that water resources are managed in a sustainable and resilient manner over the long term, and that risks are effectively managed to maintain the health and productivity of natural ecosystems and human communities. Both approaches recognise that there is inherent uncertainty and complexity in natural systems, and that ongoing monitoring and adjustment is needed to effectively manage risks and maintain water resource resilience.

Risk management typically involves identifying and assessing potential risks to the water resource, such as water availability, or changes in hydrological patterns due to climate change. Actions are then developed and implemented to reduce the likelihood or impacts of these risks. Adaptive management is a complementary approach that recognises that there is often uncertainty and complexity around the effectiveness of actions taken, and that continuous learning and adjustment are needed. Adaptive management involves the ongoing monitoring and assessment of the effectiveness of actions, and the development of new actions as needed based on new information and changing conditions.

The objectives of water sharing in the plan are used to guide the development, implementation, monitoring and adjustment of actions to ensure these remain effective over time and meet community expectations.

2.1. Risk assessment

The risk assessment process ensures that water resources are allocated in a sustainable and resilient manner. It helps to identify potential risks to the water resource, which enables the development of actions to mitigate them, ensuring that water resources are available for future generations. The risk assessment process involves the identification of hazards, risk analysis and the identification of appropriate actions to mitigate and control the risks.

The primary risks to groundwater resources are associated with changes in groundwater recharge and water availability; reduced discharges to surface water sites, rivers and springs; reduced water quality and the impacts of greater climate variability. Groundwater levels are influenced by the amount of rainfall and recharge, the amount of water that is used and from where the water is extracted. Water quality is influenced by the inherent characteristics of the resource, how the land is used and from where water is extracted. Water users also bear the risk of any reductions to water availability resulting from seasonal or long term changes in climate.

The risks identified through the water planning process and development of the water allocation plan reflect the current knowledge and understanding of the water resource, which will improve over time and enable more focused management actions to be developed.

The risk assessment methodology is shown in Schedule F, which provides a description of the qualitative measures of likelihood, consequence and risk rating categories that were used to determine the risk.

2.2. Risk management

The detailed assessment and management of the key risks to the water resource are shown in Schedule G. This outlines the actions that are currently being implemented to assess the residual risk, as well as further actions that will be implemented to reach the target risk.

This process involves defining the key events and hazards that may impact the water resource:

- a) groundwater levels decline more than acceptable levels
- b) water quality declines to unacceptable levels
- c) water is not used.

The objectives of water sharing in section 3.2 of the plan are used to guide the assessment of risks in terms of the causes and impacts. The risk assessment methodology is applied to each objective to define the current residual risk with the existing controls in place to manage the resource. To lower the risk level, additional actions are applied which further reduce the likelihood or consequence of the hazard occurring once the actions are completed.

2.3. Adaptive management

Combining risk management with adaptive management enables a proactive approach to managing risks, while also being flexible and responsive to changing conditions.

Adaptive management provides an iterative process that monitors resource response to water use and actions, and uses this information to improve future actions to meet the objectives of water sharing in the plan.

Schedule H shows the steps and relationships in the adaptive management framework for the management of the resource. This means that the actions will be implemented and monitored over time to ensure their effectiveness. The outcomes of monitoring may result in refining the actions, implementing new ones or discontinuing those that are not effective.

The water monitoring program is critical to adaptive management and an overview of this program is provided in section 3 of this document.

3. Water monitoring program

Overview

Consistent with section 34 of the Act, a continuous program for the assessment of water resources of the Territory is required, including the investigation, collection, collation and analysis of data concerning the occurrence, volume, flow, characteristics, quality, flood potential and use of water resources.

This section describes the water resource monitoring program undertaken by the department to inform management of the water resources in the district. The monitoring is informed by the risk assessment process and underpins adaptive management to maintain the health and productivity of natural ecosystems and human communities. This monitoring is complemented by monitoring undertaken by licence holders.

3.1. Monitoring by the department

The department delivers a continuous monitoring program to manage the water resources in the plan area. This monitoring network includes both discrete and time series data from a series of groundwater monitoring bores, as well as surface water gauging sites that measure water flows in the wet and dry season.

The monitoring program is reviewed annually and includes:

- water level monitoring at 47 groundwater sites
- water quality monitoring at 12 groundwater sites, included in the 47
- water flow monitoring at 5 surface water sites.

Data collected under the monitoring program is available on the department's Water Data Portal.

The Western Davenport water monitoring network is shown in Schedule E and is centred on the Central Plains water management zone where most of the water is planned to be extracted during the life of the plan.

The purpose of the monitoring program is to:

- ensure spatial coverage consistent with significant water extraction areas
- monitor groundwater level trends and recharge, which will be used for model calibration and assessment
- ensure good temporal coverage through biannual site visits and the use of loggers
- monitor each of the different formations making up the water resource
- monitor regional water quality.

Priorities for the future expansion of the monitoring network include:

- a shallow, less than 30 metres deep, bore drilling program to improve understanding of the impact of water use on:
 - groundwater dependent ecosystems
 - recharge mechanisms.
- a deep, more than 30 metres deep, bore drilling program that will validate the stratigraphic units, improve resource conceptualisation, and inform the next iteration of the groundwater model in time for the planned five year review.

3.2. Monitoring by licence holders

The department monitoring program is supported and complemented by the water monitoring conducted and reported by licence holders to the department as a condition of their water licences.

4. Implementation actions

Overview

This section outlines the actions being implemented as part of the adaptive management cycle, with continuous monitoring, evaluation and adjustment to ensure they remain effective over time.

These implementation actions address the key risks to the water resource and are described in terms of their contribution to the objectives of water sharing in the plan. As water is used in the district, more specific triggers may be defined to measure and evaluate the actions.

The implementation actions, measured through key performance indicators (KPI), are shown in Tables 1 to 6 with a dictionary in Schedule A and acronyms defined in Schedule B.

4.1. Actions related to water requirements of key environmental values

Table 1. Actions and measures that contribute to: balancing the retention and preservation of key environmental values dependent on water with the overall benefits provided by the water resources

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.1a There is an improved understanding of the characteristics and environmental values of the groundwater and surface water resources	4.1.1 Completing deep bore drilling program and integrating into monitoring program to expand understanding of the resource beyond existing development area (funded by NWGA)	Additional bores registered and monitored	DLPE WRD	2025-2026
	4.1.2 Improving knowledge of aquifer interconnectivity and hydrogeological processes through hydro-stratigraphy investigation (funded by NWGA) and identification of trigger levels to maintain ecological processes	Project completed, report published	DLPE WRD	2024-2027
	4.1.3 Determining the specific groundwater requirements of key plants in the region through monitoring daily water utilisation and water quality	Updated GDE guideline	DLPE WRD, FFD	2028-2029
	4.1.4 Refining limits to change criteria based on actual water requirements of GDEs, monitoring of GDE health as water use increases across the area	Publish updated limits to change guideline	DLPE WRD, FFD	2028-2029
	4.1.5 Defining regional scale map of key environmental values associated with water including surface water springs	Mapping completed	DLPE WRD, FFD, stakeholders	2034
3.2.1b The condition of GDEs is monitored as far as practicable and appropriately accounted for in water planning and licensing	4.1.6 Releasing GDE health and monitoring guideline for use by both the department and licence holders to enable GDE condition to be assessed	GDE guideline released	DLPE WRD, FFD	2025-2026
	4.1.7 Completing on site verification of high value areas of the probability mapping to define the likely extent of GDEs	Key GDE map published	DLPE WRD, FFD	2025-2028

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
	4.1.8 Assessing and establishing a monitoring baseline of GDE condition on properties with significant water extraction licences	Regulatory compliance	DLPE WRD, licence holders	Ongoing
	4.1.9 Comprehensive review and reporting of health and condition of key GDEs where significant water extraction occurs against the acceptable limits to change, if any	Review available at end of plan	DLPE WRD	2033
3.2.1c Key environmental values are appropriately accounted for in water planning and licensing	4.1.10 Producing communication products that explain how environmental values are managed	Materials produced and appropriately communicated	DLPE WRD	2026-2027 ongoing

4.2. Actions related to key Aboriginal and other cultural values associated with water

Table 2. Actions and measures that contribute to: water licence decisions consider Aboriginal and other cultural values dependant on water

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.2a There is an improved understanding of Aboriginal cultural values and other cultural values associated with the water resource	4.2.1 Collaboration with Traditional Owners and appropriate Aboriginal representatives to establish and maintain a water advisory committee to share knowledge of resources and ways Aboriginal people can be involved in water management	Aboriginal reference group or appropriate mechanism established	DLPE WRD, AAPA, CLC, Aboriginal representatives	2025 ongoing
	4.2.2 Collaboration with Traditional Owners and appropriate Aboriginal representatives to agree suitable regional understanding of cultural values and how information is disseminated, if appropriate	Used in decision making	DLPE WRD, CLC	2026-2027
	4.2.3 Collaboration with Traditional Owners and appropriate Aboriginal representatives to identify baseline conditions of key cultural sites	Baseline assessment completed	DLPE WRD, CLC	2027-2028

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
	4.2.4 Collaboration with Traditional Owners and appropriate Aboriginal representatives to quantify water requirements of key cultural sites and establish ongoing monitoring	Sites identified and water defined	DLPE WRD, CLC, AAPA	2028-2029
	4.2.5 Collaboration with Traditional Owners and appropriate Aboriginal representatives to manage and protect key cultural sites	Management of cultural sites	DLPE WRD, CLC	2029-2030
3.2.2b Key Aboriginal cultural sites that rely on water are monitored and potential impacts are appropriately accounted for in water planning and licensing	4.2.6 Collaboration with Traditional Owners and appropriate Aboriginal representatives to document key Aboriginal cultural sites where significant water extraction is occurring (property scale)	Regulatory compliance	DLPE WRD, licence holders	Ongoing
	4.2.7 Collaboration with Traditional Owners and appropriate Aboriginal representatives to monitor and assess the condition of key Aboriginal cultural sites and delivery of monitoring programs, if appropriate	Monitoring delivered locally	DLPE WRD, licence holders	Ongoing
3.2.2c Other cultural values that rely on water are monitored and potential impacts are appropriately accounted for in water planning and licensing	4.2.8 Collaboration with other stakeholders in the identification, and monitoring of other cultural sites and values	Sites identified and protected	DLPE WRD	2024-2034
	4.2.9 Collaboration with Traditional Owners and appropriate Aboriginal representatives to produce appropriate communication products explaining how Aboriginal cultural sites are identified and monitored in water management	Materials produced and appropriately communicated	DLPE WRD	Ongoing

4.3. Actions related to water for rural stock and domestic purposes

Table 3. Actions and measures that contribute to: predicting and protecting water for rural stock and domestic purposes

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.3a The amount of water needed to support stock and domestic use is met	4.3.1 Reviewing and improving the methodology used for estimating domestic water needs and use	Improved methodology applied	DLPE WRD	2026-2027
3.2.3b The quality of water sourced for stock and domestic purposes is maintained	4.3.2 Implement water quality monitoring program across the district, including licence conditions requiring monitoring and reporting	Regulatory compliance	DLPE WRD, licence holders	Ongoing
3.2.3c Community members and relevant stakeholders understand water management	4.3.3 Using appropriate communication materials and methods to increase understanding by community members and stakeholders' of water supply and water management arrangements, service delivery and the application of regulations and policies	Materials developed and appropriately communicated	DLPE WRD, OWS, DCF, PWC	2025 ongoing

4.4. Actions related to water security for public water supplies

Table 4. Actions and measures that contribute to: outcomes for public water supplies

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.4a The amount of water needed to support public water supply continues to be met	4.4.1 Reviewing long-term planning for population and community growth for public water supplies	Allocation sufficient for public water supply needs	PWC	2033-2034
3.2.4b The quality of water sourced for public water supplies is maintained	4.4.2 Regular water quality monitoring of water extracted for public water supplies and reporting to WRD	Source water quality data to WRD	DLPE WRD, PWC	Annually

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.4c Community members and relevant stakeholders understand water management	4.4.3 Using appropriate communication materials and methods to increase understanding by community members and stakeholders' of water supply and water management arrangements, service delivery and the application of regulations and policies	Materials developed and appropriately communicated	DLPE WRD, OWS, DCF, PWC	2025 ongoing

4.5. Actions related to water for local Aboriginal economic development

Table 5. Actions and measures that contribute to: setting aside water to support local Aboriginal economic development

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.5a Local Aboriginal people have access to water through the Aboriginal water reserve to support economic development	4.5.1 Using appropriate communication materials and methods to support the use of water from the Aboriginal water reserve in partnership with appropriate Aboriginal representatives	Materials developed and appropriately communicated	DLPE WRD, OWS, NLC, CLC	2025-2026
3.2.5b Arrangements to access the Aboriginal water reserve are documented and communicated	4.5.2 Assisting eligible Aboriginal water rights holders to access the Aboriginal water reserve for their own enterprise, or in partnership with others	Aboriginal water reserve licence applications lodged	CLC, DCMC, DAF	Ongoing
3.2.5c Aboriginal people are receiving benefits from Aboriginal water reserve	4.5.3 Licensing water usage from the Aboriginal water reserve. Defining local benefits (qualitative and quantitative)	Aboriginal water reserve water licences are used	CLC, DCMC	Ongoing

4.6. Actions related to water for sustainable development in the region

Table 6. Actions and measures that contribute to: providing access to water to support sustainable development for the benefit of the region

Outcomes of water sharing	Actions	KPI	Responsibility	Timeframe
3.2.6a Water is available to support sustainable economic development in the region	4.6.1 Completing model recalibration using actual data from current and future water users and reviewing future climate change projections (funded by NWGA)	Model recalibration completed	DLPE WRD	
	4.6.2 Staging significant extraction against development plans which is regulated to ensure water extraction is occurring as planned	Regulatory compliance	DLPE WRD, licence holders	Ongoing
	4.6.3 Recovering unused water and return to the consumptive pool for further development	Regulatory compliance	DLPE WRD	Ongoing
	4.6.4 Undertaking regulatory site visits to water licence holders to ensure they are meeting licence conditions	20 per cent licence holders per year	DLPE WRD, licence holders	Ongoing
3.2.6b Industry is confident to invest in the region	4.6.5 Regional investments and employment are underpinned by reliable water resource planning and management	\$ investment and local jobs	NTG	2029-2030
3.2.6c Water is used for productive purposes and in a water-efficient manner	4.6.6 Using soil and land suitability maps and reports to identify development potential through Mapping the Future or similar	Development report completed	DLPE WRD	2024-2025
	4.6.7 Testing baseline soil and water salinity and identifying key sites for ongoing monitoring to appropriately manage salinity risks	Site specific salinity data	DLPE WRD	2025-2026
	4.6.8 Refining and maintaining salinity risk mapping based on results of sampling and monitoring	Salinity map refined	DLPE WRD	2027
	4.6.9 Appropriate crop management practices and remedial measures adopted to avoid deterioration of the resource	Water use	DLPE WRD, licence holders	Ongoing

5. Reporting

Overview

This section outlines how the management of water resources in the plan area will be reported. Regular public reporting by the department will ensure a level of community understanding of the management of the resource.

The department maintains a public record of all water extraction licences on its Water Licensing Portal².

The department maintains a public record of water monitoring results on its Water Data Portal³.

The department will produce a report annually for the district which summarises:

- an overview of the water resources
- key monitoring results
- regulatory performance
- progress on implementation actions.

² <https://depws.nt.gov.au/water/permits-and-licences/water-licensing-portal>

³ <https://water.nt.gov.au/Data>

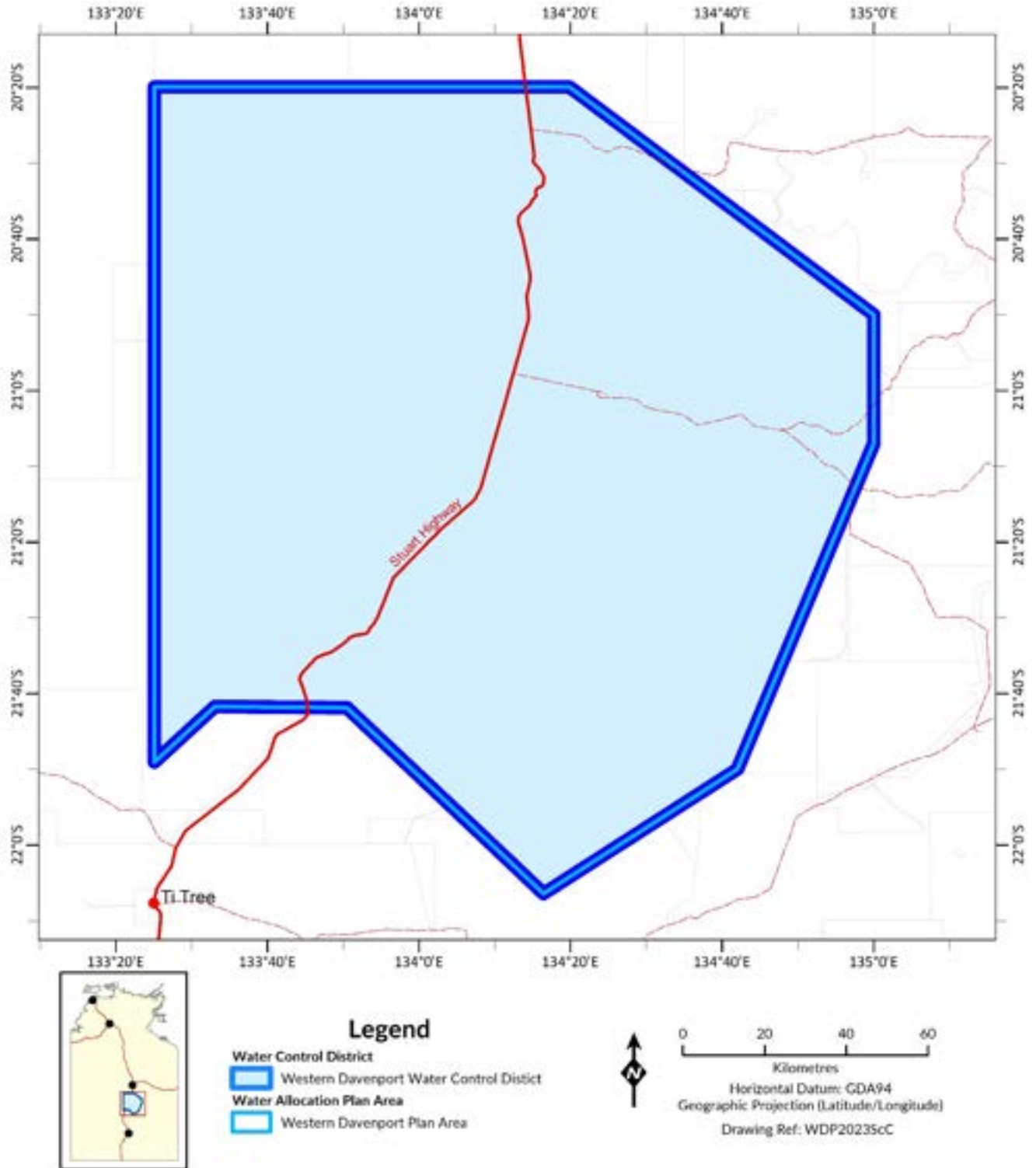
Schedule A: Dictionary

Term	Definition or reference
Aboriginal water reserve	see <i>Water Act 1992</i> , section 4(1)
Act	the <i>Water Act 1992</i>
beneficial uses	the beneficial uses for the Western Davenport water control district declared by Gazette notice dated 3 December 2021. A copy of the declaration is included in Schedule E of the plan
Controller	the Controller of Water Resources appointed under the <i>Water Act 1992</i> , section 18
consumptive pool	the amount of water that can be made available for beneficial uses in a given water system and where a water plan has rules, in accordance with those rules
department	the department with responsibility for administering the <i>Water Act 1992</i> , according to the Northern Territory of Australia Administration Arrangements Order
eligible land	see <i>Water Act 1992</i> , section 4B
estimated sustainable yield	the amount of water that can be allocated from the water resource to support declared beneficial uses that is sustainable, section 3.1 and 3.4 of the plan refers
groundwater	see <i>Water Act 1992</i> , section 4(1)
groundwater dependent ecosystem	an ecosystems that requires access to groundwater to meet all or some of their water requirements
licence holder	the person granted a licence to take water under section 45 or section 60 of the <i>Water Act 1992</i>
water control district	the Western Davenport water control district, declared by Gazette notice dated 15 July 2009 under section 22 of the Act. A copy of the declaration is included in Schedule E of the plan
water management zone	those areas of land within the plan area separated for management purposes as depicted in Schedule D of this document

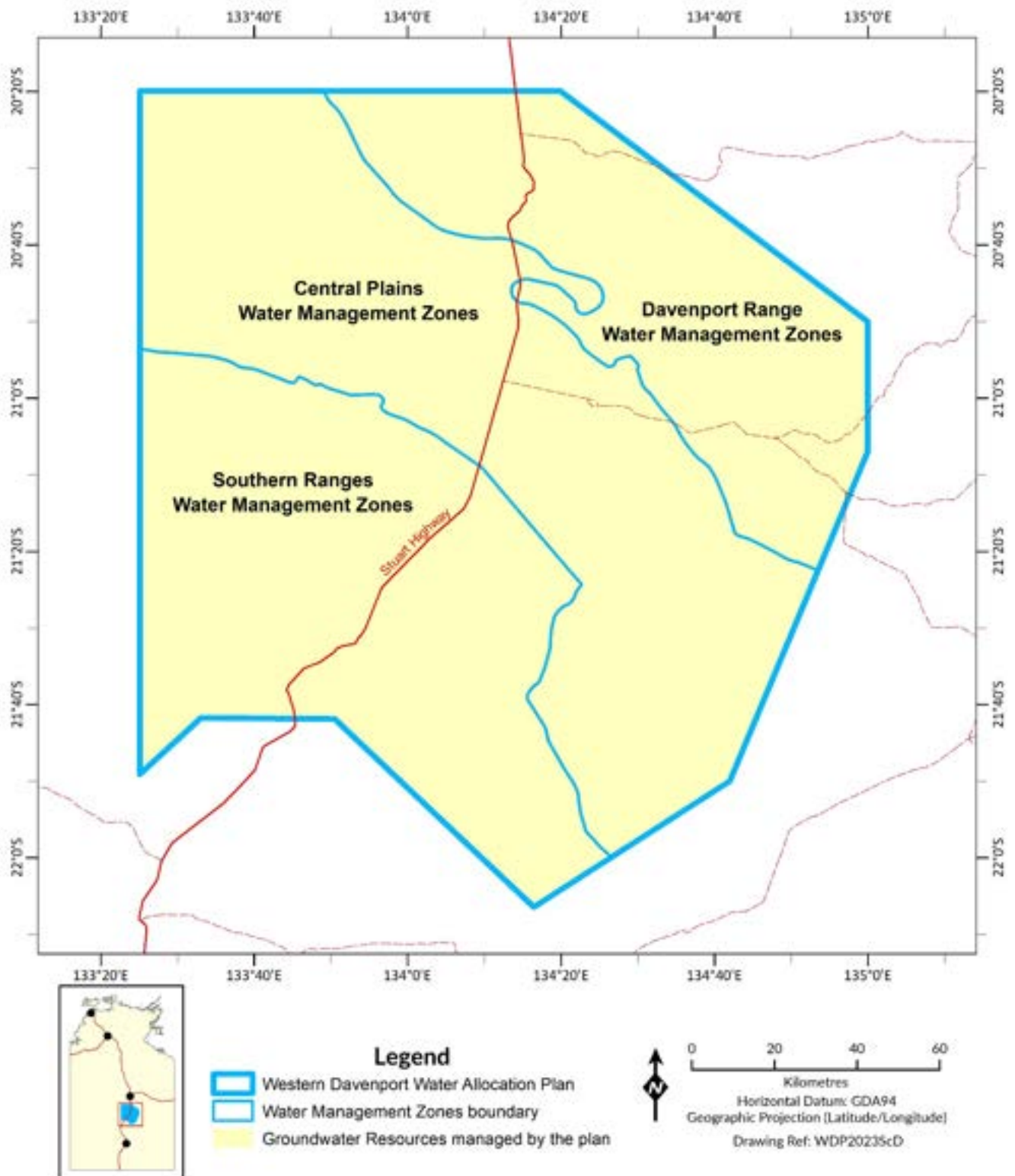
Schedule B: Acronyms

Acronyms	Full form
AAPA	Aboriginal Areas Protection Authority
AWR	Aboriginal water reserve
CLC	Central Land Council
district	Western Davenport water control district
CM&C	Department of the Chief Minister and Cabinet
DAF	Department of Agriculture and Fisheries
DLPE	Department of Lands, Planning and Environment
DCF	Department of Children and Families
FFD	Flora and Fauna Division, DLPE
GDE	groundwater dependent ecosystem
km	kilometre
KPI	key performance indicator
Minister	Minister for Water Resources
NTG	Northern Territory Government
NWGA	National Water Grid Authority
OWS	Office of Water Security, DLPE
plan	Western Davenport Water Allocation Plan 2024-2034
PWC	Power and Water Corporation
WAC	water advisory committee
WRD	Water Resources Division, DLPE

Schedule C: Western Davenport water control district



Schedule D: Western Davenport water management zones



Schedule E: Western Davenport water monitoring network

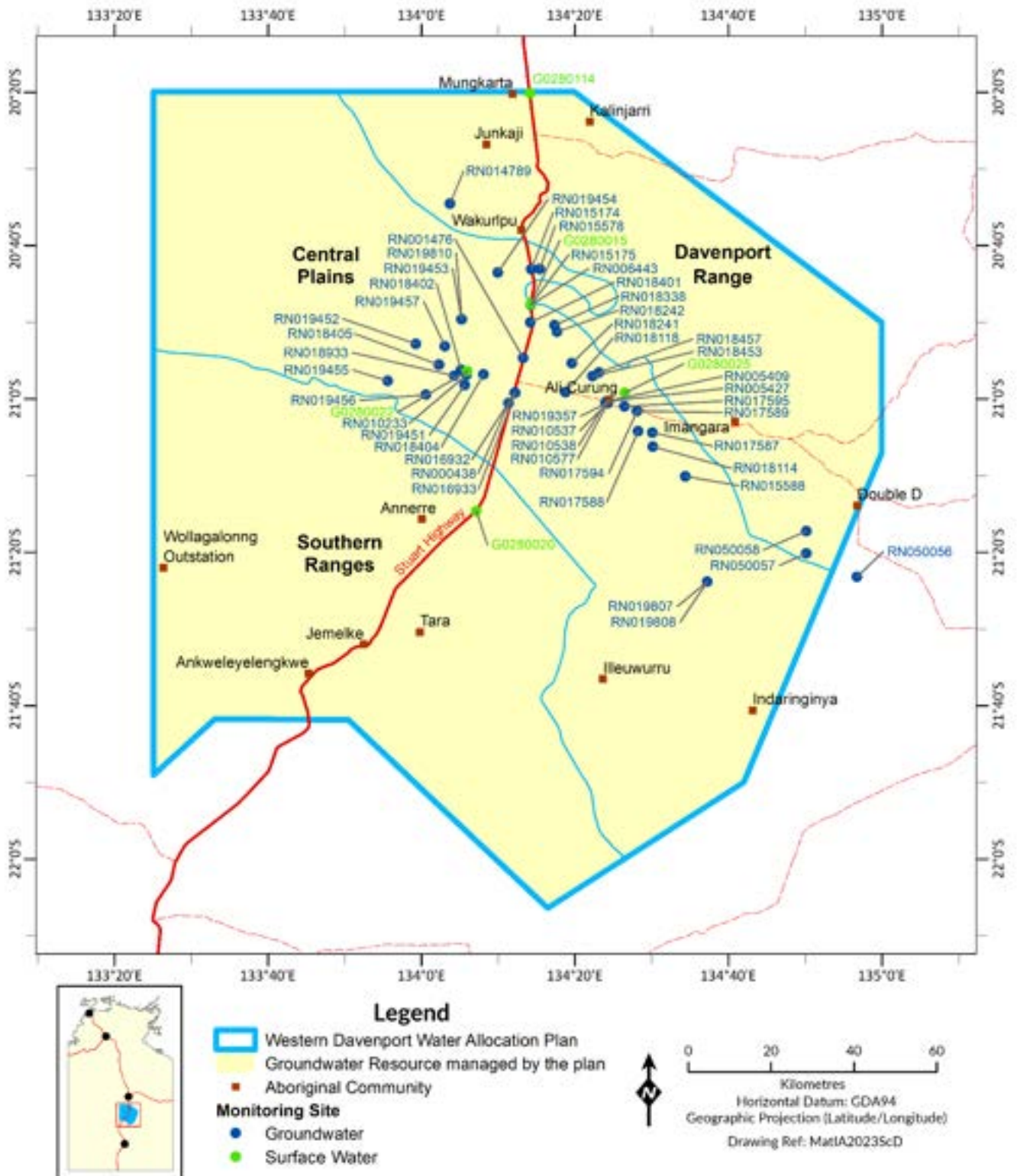


Table 7. Western Davenport groundwater monitoring network

Water management zone	Aquifer monitored	Site	Latitude	Longitude	Started monitoring groundwater level (year)	Purpose	Groundwater level logger	Water quality
Central Plains	Cenozoic	RN000438	-21.00733567	134.19016656	2008	Model	-	-
	Cenozoic	RN001476	-20.90931871	134.22203074	2005	Model	-	-
	Cenozoic	RN005409	-21.00338435	134.40380669	1967	Model	-	-
	Cenozoic	RN005427* *	-21.00359676	134.40771228	1966	Model	-	-
	Cenozoic	RN006443	-20.79413160	134.23857239	1969	Model	-	-
	Cenozoic	RN010233	-20.94602838	134.09906160	2009	Model	-	-
	Cenozoic	RN010537 ^	-21.00771833	134.40555031	2007	WQ baseline	Yes	Yes
	Cenozoic	RN010538	-21.00755774	134.40098048	2007	Model	-	-
	Cenozoic	RN010577 ^	-21.00736603	134.40557095	1977	Model/WQ baseline	Yes	Yes
	Cenozoic	RN016932	-20.9851547	134.20353330	2007	Model	-	-
	Cenozoic	RN016933	-20.98515369	134.20525534	2007	Model	-	-
	Cenozoic	RN017594	-21.02469935	134.46954443	2001	Model	-	-
	Cenozoic	RN018404	-20.94499082	134.13601846	2008	Model	-	-
	Cenozoic	RN019357* *	-21.00540191	134.40716634	2016	Regional/WQ baseline	Yes	Yes
	Cenozoic & Arrintheta	RN018457	-20.94072725	134.38667586	2009	Recharge investigations	-	-
Arrintheta	RN017588	-21.0686906	134.47195874	2001	Recharge investigations	-	-	

Water management zone	Aquifer monitored	Site	Latitude	Longitude	Started monitoring groundwater level (year)	Purpose	Groundwater level logger	Water quality
	Arrinthrunga	RN017589	-21.02510464	134.46912920	2001	Model calibration	-	-
	Arrinthrunga	RN017595	-21.01477266	134.44226112	2001	Recharge investigations/WQ baseline	Yes	Yes
	Arrinthrunga	RN018241	-20.92064552	134.32766481	2007	Model calibration /WQ baseline	-	Yes
	Arrinthrunga	RN018242	-20.85220976	134.29553860	2007	Model calibration	-	-
	Arrinthrunga	RN018338	-20.83799526	134.29066469	2007	Model calibration /WQ baseline	Yes	Yes
	Arrinthrunga	RN018401	-20.83187752	134.2378542	2008	Model calibration	-	-
	Arrinthrunga	RN018453	-20.94901562	134.37259946	2009	Recharge investigations	-	-
	Arrinthrunga	RN019453	-20.82539152	134.08824914	2019	Regional	-	-
	Arrinthrunga	RN019810	-20.82541056	134.08843162	2022	Regional	-	-
	Chabalowe	RN015174	-20.71640712	134.23991221	2005	Model calibration	-	-
	Chabalowe	RN015175	-20.79401423	134.23859219	2007	Recharge investigations	-	-
	Chabalowe	RN015578	-20.71594416	134.25805507	2005	Model calibration	-	-
	Chabalowe	RN015588	-21.16688488	134.57443731	2001	Model calibration /WQ baseline	Yes	Yes
	Chabalowe	RN017587	-21.07160322	134.50297384	2001	Model calibration	-	-
	Chabalowe	RN018114	-21.10209016	134.50364269	2006	Model calibration /WQ baseline	Yes	Yes
	Chabalowe	RN018118	-20.98383691	134.31387541	2006	Model calibration /WQ baseline	Yes	Yes
	Chabalowe	RN019808	-21.39602105	134.62190874	2021	Model calibration	-	-

Water management zone	Aquifer monitored	Site	Latitude	Longitude	Started monitoring groundwater level (year)	Purpose	Groundwater level logger	Water quality
Davenport Ranges	Chabalowe	RN050058	-21.28589758	134.67655244	2021	Model calibration	Yes	-
	Lake Surprise	RN018402	-20.93509707	134.08731748	2008	Model calibration /WQ baseline	Yes	Yes
	Lake Surprise	RN018405	-20.92417217	134.03923575	2008	Recharge investigations/WQ baseline	Yes	Yes
	Lake Surprise	RN018933	-20.94777381	134.07241021	2021	Recharge investigations	-	-
	Lake Surprise	RN019451	-20.96843166	134.09507021	2019	Regional	Yes	-
	Lake Surprise	RN019452	-20.87889872	133.98903583	2019	Regional	Yes	-
	Lake Surprise	RN019455	-20.95903344	133.92798109	2019	Regional	Yes	-
	Lake Surprise	RN019456	-20.98928335	134.01049800	2019	Regional	Yes	-
	Lake Surprise	RN019457	-20.88414596	134.05178632	2019	Regional	Yes	-
	Lake Surprise	RN019807	-21.39578592	134.62181287	2021	Model calibration	-	-
	Sandstone	RN019454	-20.723687	134.16712813	2019	Regional	Yes	-
	Cenozoic	RN014789	-20.57418083	134.0629057	2005	Regional/WQ baseline	-	Yes
	Chabalowe	RN050057	-21.33409773	134.83723278	2020	Model calibration	-	-
Outside plan area	Chabalowe	RN050056	-21.38499127	134.94682291	2021	Model calibration	-	-

** RN019357 may replace RN005429 due to bore damage. Groundwater level to be monitored in RN005427 when water level above blockage.

^ RN010537 may replace RN010577 for water quality sampling pending an investigation into RN010577.

Table 8. Western Davenport surface water monitoring network

Water management zone	Water body	Site	Latitude	Longitude	Started monitoring	Purpose	Type
Central Plains	Taylor / Wycliffe creeks	G0280015	-20.79363038	134.23726842	2020	Recharge investigations	Flow, level
	Taylor Creek	G0280022	-20.93916611	134.09944859	2021	Recharge investigations	Flow
	Murray Creek	G0280025	-20.98660033	134.44148181	2021	Recharge investigations	Flow
Davenport Ranges	McLaren Creek	G0280114	-20.3353088	134.23613999	1984	Recharge investigations	Flow, level
Southern Ranges	Taylor Creek	G0280020	-21.24348601	134.11891949	2020	Recharge investigations	Flow, level

Schedule F: Risk assessment methodology

An assessment of the level of risk posed by the described risk can be a useful way to prioritise the way in which the water will be managed. The relative level of a certain risk can be determined by considering the likelihood of a threat occurring and the consequence associated with that threat on a scale of 1 to 5, and using a matrix below to determine the risk level:

Risk level

Risk level		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Rare	very low	very low	low	moderate	moderate
	Unlikely	very low	low	low	moderate	high
	Possible	low	low	moderate	high	high
	Likely	low	moderate	moderate	high	very high
	Almost certain	moderate	moderate	high	very high	very high

Likelihood

Category	Qualitative descriptor	Frequency	Probability of occurring in life of plan
1	Rare	Event occurs 1 in every 100 years	< 1%
2	Unlikely	Event occurs 1 in every 20–50 years	1 – 20%
3	Possible	Event occurs 1 in every 5–10 years	21 – 80%
4	Likely	Event occurs annually	81 – 95%
5	Almost certain	Event occurs many times per year	> 95%

Consequence

Category	Qualitative descriptor	Ecological/water quality impacts	Socio-economic impacts
1	Insignificant	No noticeable impact to ecosystem	Short period of low level water restrictions causing minor inconvenience to households, no material impact on irrigation allocations, minimal financial impact on industry and little to no loss of amenity.
2	Minor	Some impact on marginal ecosystems, for example, edges of riparian zones or small mixed dependency ecosystems	Extended period of low level water restrictions causing some inconvenience to households, reduction in irrigation allocations with minimal material impact, potential financial impact for some industries and minor loss of amenity. First signs of impact on public morale.

Category	Qualitative descriptor	Ecological/water quality impacts	Socio-economic impacts
3	Moderate	Water availability is so low, such that only the highest value environmental sites receive or retain water, putting vulnerable species at risk	Medium level of water restrictions directly impacting on households, reduction in irrigation allocations resulting in some loss of productivity, some industries severely impacted or forced to close tourism, prioritisation of watering for amenities, increased impact on morale.
4	Major	Water availability is at critically low levels and groundwater systems become depleted beyond recharge rate. Extensive damage to ecosystems occurs with potential irreparable damage in some areas	High level water restrictions directly limiting household water use, limited irrigation allocations resulting in low levels of productivity, some industries forced to close which may impact on national economy, severe loss of amenity and morale, some people leave.
5	Catastrophic	Irreparable damage to ecosystem; severe adverse impacts to environment	Water supply to major town becomes insufficient to ever again sustain community or nationally significant activity; no irrigation allocations, collapse of industry, total loss of amenity, dislocation of people, significant impact to the national economy.

Risk response

The risk level will indicate the type of response that may be required to mitigate or avoid the risk.

Risk level	Action	Timing
Very low – low	Continue routine approach to management – no specific actions required	Ongoing
Moderate – high	Manage by specific monitoring or response procedures	Within water plan period
Very high	Develop management or investigation plan, cease activities for which high risks may arise	Immediate

Schedule G: Risk and adaptive management

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
Groundwater levels decline more than acceptable levels	Lack of rainfall and recharge due to drought and impacts of climate variability	3.2.1 Regional loss of GDE health more than acceptable levels	3.1 monitoring program (this document) Plan for district: <ul style="list-style-type: none"> 4.4 GDE limits of acceptable change GDE mapping complete in key development area Groundwater model developed and used	Possible Model is available that uses: <ul style="list-style-type: none"> cautionary drawdown parameters in predictions calibrated with real data with good results in areas for development considers cumulative effect of extraction against mapped GDEs 	Moderate GDE are mapped regionally and considered in significant extraction through licence conditions that requires property verification and to meet thresholds to change Department monitoring continues across the region to enable early action if triggered	Moderate	4.1.1 drill and monitor additional bores 4.1.2 hydro-stratigraphy 4.1.3 extend GDE probability map 4.1.4 GDE water requirements 4.1.6 define environmental values 4.1.9 review report regional GDE health	Possible	Minor	Low
		3.2.2 Regional loss of key cultural sites due to reduced access to water	3.1 monitoring program (this document) Plan for district: <ul style="list-style-type: none"> 3.3 recognition cultural values Funding to establish ARG confirmed	Possible Cultural sites have not been defined yet to be accounted for in water management	Moderate Significant extraction have licence conditions for property mapping prior to extraction	Moderate	4.2.1 Aboriginal people involved in water management 4.2.2 culture considered in decisions 4.2.3 baseline condition cultural sites 4.2.4 define cultural site water requirements	Unlikely	Moderate	Low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
							4.2.7 other cultural aspects defined			
		3.2.4 Insufficient security of public water supplies	Prioritisation of public water supplies in allocation and licensing	Unlikely Public water supplies are highest priority in water used Demand is relatively low Majority of development not in close proximity to Ali Curing	Minor Regional aquifer with extensive volumes of good quality water available Department monitoring continues to enable early action if triggered	Low	4.4.1 long term planning of demand	Rare	Minor	Very low
		3.2.5 and 3.2.6 reducing amount of water available through licences and reducing development	3.1 monitoring program (this document) Regulatory compliance and enforcement of licence conditions	Unlikely Water allocations are based on stored water which currently exists Model is available that uses cautionary drawdown parameters in predictions, calibrated with real data with good results in areas for development	Minor Regional aquifer with extensive volumes of good quality water available Department monitoring continues to enable early action if triggered	Low	4.6.1 further model development	Rare	Minor	Very low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
	Excessive impact of water extraction	3.2.1 Local loss of GDE health more than acceptable levels	3.1 monitoring program (this document) Plan for district: <ul style="list-style-type: none"> 4.4 GDE limits of acceptable change GDE mapping complete in key development area Groundwater model developed and used	Possible Currently extraction is low Extraction is regularly reported and monitored to ensure impacts remain acceptable	Moderate Effects of extraction varies spatially and proximity to GDEs Significant extraction is: <ul style="list-style-type: none"> staged so not all the water is released at once cannot exceed thresholds and can be adjusted or stopped if triggered 	Moderate	4.1.5 refine limits to change 4.1.7 GDE monitoring and health guideline 4.1.8 baseline GDE	Possible	Minor	Low
		3.2.2 Local loss of key cultural sites due to reduced access to water	3.1 monitoring program (this document) Plan for area: <ul style="list-style-type: none"> 3.3 recognition cultural values Funding to improve Aboriginal involvement	Possible Cultural sites have not been defined yet to be accounted for in water management	Moderate Significant extraction will have licence conditions for property mapping prior to extraction	Moderate	4.2.1 Aboriginal people involved in water management 4.2.2 culture considered in decisions 4.2.3 baseline condition cultural sites 4.2.4 define cultural site water requirements 4.2.7 other cultural aspects defined	Unlikely	Moderate	Low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
		3.2.3 Reduced availability or access to water for rural stock and domestic purposes	Plan for district Refined methodology for stock use	Unlikely Very low demand compared to water availability	Minor Regional aquifer with extensive volumes of good quality water available Department monitoring continues to enable early action if triggered	Low	4.3.1 improve methodology for domestic use	Rare	Minor	Very low
		3.2.4 Insufficient security of public water supplies	Prioritisation of public water supplies in allocation and licensing	Unlikely Very low demand compared to water availability	Minor Regional aquifer with extensive volumes of good quality water available Department monitoring continues to enable early action if triggered	Low	4.4.1 long term planning of demand	Rare	Minor	Very low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
		3.2.5 and 3.2.6 reducing amount of water available through licences and reducing development	<p>ESY set in Plan</p> <p>3.1 monitoring program (this document)</p> <p>Groundwater model developed and used</p> <p>Factors the Controller considers when making a water licensing decision</p> <p>Regulatory compliance and enforcement of licence conditions</p>	<p>Unlikely</p> <p>Model is available that uses:</p> <ul style="list-style-type: none"> cautionary drawdown parameters in predictions calibrated with real data with good results in areas for development considers cumulative effect of extraction 	<p>Minor</p> <p>Regional aquifer with extensive volumes of good quality water available</p> <p>Department monitoring continues to enable early action if triggered</p>	Low	<p>4.6.1 further model development</p> <p>4.6.2 staging licence conditions for significant extraction</p> <p>4.6.3 recovering water not used</p>	Rare	Minor	Very low
Water quality declines to unacceptable levels	Water use increases groundwater salinity levels	3.2.1 Local loss of GDE health more than acceptable levels	<p>3.1 monitoring program (this document)</p> <p>Plan for district:</p> <ul style="list-style-type: none"> 4.4 GDE limits of acceptable change <p>GDE mapping complete in key development area</p> <p>Groundwater model developed and used</p>	<p>Unlikely</p> <p>Salinity naturally varies</p> <p>water movement is very slow</p>	<p>Moderate</p> <p>GDE are mapped regionally</p> <p>Department monitoring continues to enable early action if triggered</p>	Low	<p>4.1.3 extend GDE probability map</p> <p>4.1.4 GDE water requirements</p> <p>4.1.6 define environmental values</p> <p>4.1.9 review report regional GDE health</p> <p>4.6.6 land suitability maps</p> <p>4.6.7 soil salinity testing</p>	Rare	Moderate	low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
							4.6.8 refine salinity map 4.6.9 effective crop management			
		3.2.2 Local loss of key cultural sites due to reduced water quality	3.1 monitoring program (this document) Plan for area: • 3.3 recognition cultural values Funding to improve Aboriginal involvement	Unlikely Cultural sites have not been defined yet to be accounted for in water management	Major Significant extraction will have licence conditions for property mapping prior to extraction	Moderate	4.2.1 Aboriginal people involved in water management 4.2.2 culture considered in decisions 4.2.3 baseline condition cultural sites 4.2.4 define cultural site water requirements 4.2.7 other cultural aspects defined	Rare	Major	Moderate
		3.2.3 Reduced water quality available for rural stock and domestic	3.1 water quality monitoring program (this document)	Unlikely Very low demand compared to water availability	Moderate Generally high quality water suitable for drinking Department monitoring continues to enable early action if triggered	Low	4.3.2 water quality monitoring and licence conditions 4.6.6 land suitability maps 4.6.7 soil salinity testing 4.6.8 refine salinity map 4.6.9 effective crop management	Rare	Moderate	low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
		3.2.4 Insufficient quality for public water supplies	Water quality monitoring program (PWC)	Unlikely Very low demand compared to water availability	Moderate Generally high quality water treated for drinking that is regularly monitored	Low	4.4.2 water quality monitoring program 4.4.3 communication on service delivery arrangements 4.6.6 land suitability maps 4.6.7 soil salinity testing 4.6.8 refine salinity map 4.6.9 effective crop management	Unlikely	Minor	low
		3.2.5 and 3.2.6 land use and practises increases the rate	3.1 monitoring program (this document) Groundwater model developed and used Factors the Controller considers when making a water licensing decision Regulatory compliance and enforcement of licence conditions	Unlikely Salinity naturally varies Water movement is very slow	Minor Regional aquifer with extensive volumes of good quality water available Department monitoring continues to enable early action if triggered	Low	4.6.1 further model development 4.6.2 staging licence conditions for significant extraction 4.6.3 recovering water not used 4.6.6 land suitability maps 4.6.7 soil salinity testing 4.6.8 refine salinity map	Rare	Minor	Very low

Event scenario - risk			Existing controls	Current residual risk			Further controls	Target risk		
Hazard identification	Why can it happen	Impact on objectives	Management in place	Likelihood	Consequence	Risk level	Actions	Likelihood	Consequence	Risk level
							4.6.9 Effective crop management			
Water isn't used	Sustainable development isn't achieved	3.2.5 water isn't used to provide benefits to eligible land holders through AWR	Aboriginal water reserve supports Aboriginal economic development	Possible Extraction is currently very low with modest impact on economic development	Moderate Economic status of the region remains the same	Moderate	4.5.2 promote and support eligible land holders to benefit from access to water 4.5.1 Aboriginal water reserve	Unlikely	Minor	Low
		3.2.6 water isn't used to provide benefits to the region	4.6.2 applying unused water policy Regulatory compliance and enforcement of licence conditions	Possible Extraction is currently very low with modest impact on economic development	Moderate Economic status of the region remains the same	Moderate	4.1.10 communication on maintaining environmental values 4.2.9 communication on maintaining cultural values 4.3.3 communication water management 4.6.4 facilitating development 4.6.5 ensuring suitable	Unlikely	Minor	Low

Schedule H: Adaptive management framework

