Planning, Industry & Environment

Mr Roger Bailey
General Manager
Warrumbungle Shire Council
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Our ref: OUT20/3733

Dear Mr Bailey

Safe & Secure Water Program (SSWP) – Risk Prioritisation Advice

The $1 billion Safe and Secure Water Program has been established to address key risks to regional water safety and security in NSW, to provide safe, secure and sustainable water and wastewater services to regional NSW towns.

To ensure that the program funds the highest priority risks and issues, all eligible risks and issues are assessed against prioritisation criteria.

The NSW Government's multi-agency Prioritisation Review Panel (PRP) has now finalised the Prioritisation Review Framework which categorises major risks and issues in Water Quality, Water Security and Environmental categories as they relate to Town water and sewerage services across the State.

The PRP is comprised of representatives from DPIE, NSW Health, EPA, OLG, Treasury, DPC. The PRP is also responsible for overseeing and approving the prioritisation database which catalogues over one thousand known major risks and issues and validating the allocation of risk impact scores (1-5) to each. In addition, the PRP makes funding recommendations on risks to be prioritised under SSWP.

An explanation of the criteria used to assign a risk impact score in each category is attached for your information. The database will be regularly updated as new risks are assessed or for known risks where new information requires re-evaluation of the risk impact score.

New or re-assessed risks may be updated in the database based on; strategic planning assessments provided by Local Water Utilities – typically an Integrated Water Cycle Management Strategy - and other key data sources such as from NSW Health water quality assessments.

At this stage, only projects with the highest risk ranking (5) can be considered for funding under the current program. However please note that, as the program budget is not sufficient to co-fund resolution of all high impact risks (5), funding is to be prioritised based on community socio-economic disadvantage. Socio economic disadvantage has been assessed for all eligible entities comprising of; Cost of service (OMA), Remoteness (ARIA) and Socio-economic disadvantage (IRSD). A full explanation of how this rank is determined is also attached along with a thematic map of the State.

The PRP has now met and endorsed the initial database and scores. SSWP funding commitments will be progressively allocated to high impact risks (5) based on socio-economic rank until all available funds are committed.

A list of your Local Water Utility's identified risks and related risk scores is attached on the following page. Local Water Utilities will be advised separately if an eligible risk has been prioritised for funding to resolve.

For more information on the risk prioritisation please read the Questions and Answers available at the following link;

https://forms.gle/RGJLnytEAhzUz1dv5

This link also provides access to an online form via which Local Water Utilities may raise queries in relation to specific risks either listed in the attachments to this letter or other high risks which you believe should be listed.

DPIE is aware that some risks listed in the letter may have current projects underway to resolve the risk. These risks are expected to be updated once Local Water Utilities provide formal advice via the project completion report confirming that the objectives have been successfully delivered and the risk has been mitigated. Up until that time the risk will remain listed as active in DPIE's database.

DPIE expects to reissue this advice notice to all Councils at least annually and to affected Councils as material changes are made to the prioritisation database.

Yours sincerely

Michael Blackmore
Director Water Utilities

1 April 2020

Attachments;

- Specific Risks and related scores for your Council
- Generic Fact sheets on how risks are scored

Warrumbungle Shire Council
Your risks and issues have been recorded and assessed with the following risk impact scores:

Risk ID	**2266**
Risk Issue	Coolah
Factor	Water Quality
Risk Issue Type	Water Treatment
Risk Score	5
Reason	Drinking water management fails to effectively control chlorine resistant pathogens (e.g. Cryptosporidium). High risk from Cryptosporidium as assessed by NSW Health.

Risk ID	**2264**
Risk Issue	Binnaway
Factor	Water Quality
Risk Issue Type	Water Treatment
Risk Score	5
Reason	Drinking water management fails to effectively control chlorine resistant pathogens (e.g. Cryptosporidium). High risk from Cryptosporidium as assessed by NSW Health.

Risk ID	**1017**
Risk Issue	Coonabaraban
Factor	Water Security
Risk Issue Type	Water Supply Scheme
Risk Score	5
Reason	The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 1,000.

Risk ID	**2268**
Risk Issue	Dunedoo
Factor	Water Quality
Risk Issue Type	Water Treatment
Risk Score	5
Reason	Drinking water management fails to effectively control chlorine resistant pathogens (e.g. Cryptosporidium). High risk from Cryptosporidium as assessed by NSW Health.

Risk ID	**3072**
Risk Issue	Coonabarabran
Factor	Environment
Risk Issue Type	Sewage Treatment
Risk Score	5
Reason	There is a mismatch of STP technology and effluent management, and the wastewater quality efficiency index is ≥20%. This impacts a population of greater than 2,500.

Risk ID **2270**
Risk Issue Mendooran
Factor Water Quality
Risk Issue Type Water Treatment
Risk Score 5
Reason Drinking water management fails to effectively control chlorine resistant pathogens (e.g. Cryptosporidium). High risk from Cryptosporidium as assessed by NSW Health.

Risk ID **1079**
Risk Issue Dunedoo
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 4
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 500 and less than or equal to 1,000.

Risk ID **1080**
Risk Issue Coolah
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 4
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 500 and less than or equal to 1,000.

Risk ID **1081**
Risk Issue Baradine
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 4
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 500 and less than or equal to 1,000.

Risk ID **2263**
Risk Issue Baradine
Factor Water Quality
Risk Issue Type Water Treatment
Risk Score 4
Reason Drinking water management fails to effectively control chlorine sensitive pathogens. Upgrade, repair or replacement of existing treatment barrier are needed for effective primary disinfection. Improved process monitoring and control are required to effectively manage barriers to pathogen contamination.

Risk ID **2267**
Risk Issue Coonabarabran
Factor Water Quality
Risk Issue Type Water Treatment
Risk Score 4
Reason Drinking water management fails to effectively control chlorine sensitive pathogens. Upgrade, repair or replacement of existing treatment barrier are needed for effective primary disinfection. Improved process monitoring and control are required to effectively manage barriers to pathogen contamination.

Risk ID **2269**
Risk Issue Kenebri
Factor Water Quality
Risk Issue Type Water Treatment
Risk Score 4
Reason Drinking water management fails to effectively control chlorine sensitive pathogens. Upgrade, repair or replacement of existing treatment barrier are needed for effective primary disinfection. Improved process monitoring and control are required to effectively manage barriers to pathogen contamination.

Risk ID **2265**
Risk Issue Bugaldie
Factor Water Quality
Risk Issue Type Water Treatment
Risk Score 4
Reason Drinking water management fails to effectively control chlorine sensitive pathogens. Upgrade, repair or replacement of existing treatment barrier are needed for effective primary disinfection. Improved process monitoring and control are required to effectively manage barriers to pathogen contamination.

Risk ID **1284**
Risk Issue Bendemeer
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 3
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 200 and less than or equal to 500.

Risk ID **3185**
Risk Issue Coolah
Factor Environment
Risk Issue Type Sewage Treatment
Risk Score 3
Reason Relevant infrastructure has a condition rating of 4 and/or was built between 1951 and 1970. This impacts a population of greater than 500 and less than or equal to 1,000.

Risk ID **1160**
Risk Issue Binnaway
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 3
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 200 and less than or equal to 500.

Risk ID **1161**
Risk Issue Mendooran
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 3
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of greater than 200 and less than or equal to 500.

Risk ID **3230**
Risk Issue Dunedoo
Factor Environment
Risk Issue Type Sewage Treatment
Risk Score 2
Reason Relevant infrastructure has a condition rating of 4 and/or was built between 1951 and 1970. This impacts a population of greater than 100 and less than or equal to 500.

Risk ID **3244**
Risk Issue Baradine
Factor Environment
Risk Issue Type Sewage Treatment
Risk Score 2
Reason Relevant infrastructure has a condition rating of 2 and/or was built between 1991 and 2010. This impacts a population of greater than 500 and less than or equal to 1,000.

Risk ID **3434**
Risk Issue Binnaway
Factor Environment
Risk Issue Type UnServiced
Risk Score 2
Reason The on-site wastewater management facilities have been classified as 'primary health and high environmental impact'. This means the on-site wastewater facilities have been assessed to have a direct impact the drinking water supply source and/or with widespread direct primary contact impact and/or high level impact to waterway uses and values. This impacts a population of greater than 100 and less than or equal to 500.

Risk ID **3437**
Risk Issue Mendooran
Factor Environment
Risk Issue Type UnServiced
Risk Score 2
Reason The on-site wastewater management facilities have been classified as 'secondary health and medium environmental impact'. This means the on-site wastewater facilities have a localised and direct primary contact impact and/or a medium level impact to waterway uses and values. This impacts a population of greater than 100 and less than or equal to 500.

Risk ID **3438**
Risk Issue Leadville
Factor Environment
Risk Issue Type UnServiced
Risk Score 1
Reason The on-site wastewater management facilities are classified as high risk, however, there is no evidence of any impact to public health and/or waterway uses and values. This impacts a population of less than or equal to 100.

Risk ID **3436**
Risk Issue Kenebri
Factor Environment
Risk Issue Type UnServiced
Risk Score 1
Reason The on-site wastewater management facilities are classified as high risk, however, there is no evidence of any impact to public health and/or waterway uses and values. This impacts a population of less than or equal to 100.

Risk ID **1276**
Risk Issue Kenebri
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 1
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of less than or equal to 100.

Risk ID **1282**
Risk Issue Bugaldie
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 1
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of less than or equal to 100.

Risk ID **3435**
Risk Issue Bugaldie
Factor Environment
Risk Issue Type UnServiced
Risk Score 1
Reason The on-site wastewater management facilities are classified as high risk, however, there is no evidence of any impact to public health and/or waterway uses and values. This impacts a population of greater than 100 and less than or equal to 500.

Risk ID **3439**
Risk Issue Merrygoen
Factor Environment
Risk Issue Type UnServiced
Risk Score 1
Reason The on-site wastewater management facilities are classified as high risk, however, there is no evidence of any impact to public health and/or waterway uses and values. This impacts a population of greater than 100 and less than or equal to 500.

Risk ID **1281**
Risk Issue Merrygoen
Factor Water Security
Risk Issue Type Water Supply Scheme
Risk Score 1
Reason The water security deficiency index is equal to or greater than 11%, indicating that the consumptive need is much greater than the headwork capacity on a secure yield basis. These systems are expected to have significantly more frequent and severe levels of restrictions during dry periods than the planned moderate restriction levels and with significantly higher risk and duration of water access failure in dry periods. This impacts a population of less than or equal to 100.

The following table shows the socio economic disadvantage score and overall rank compared to the other 92 eligible entities.

SE_Score	***EntityRank***
56.1	11/93

Water Quality Assessment Criteria

Overview

The *Australian Drinking Water Guidelines* (ADWG) describes a preventive risk management approach to managing drinking water quality. This approach moves away from relying on water quality testing to determine water safety, instead looking at risks to unsafe water and how these risks are controlled and monitored. This approach is embodied in the 12 elements of the Framework for Management of Drinking Water Quality.

Water quality risks have been prioritised by applying this Framework, addressing a wide range of risks and mitigation measures for individual drinking water supply systems.

Objective

The water quality component of the prioritisation framework assesses the risks to health posed by public drinking water supplies. The assessment focuses on the presence of risks in the source water, the barriers present in the drinking water supply system to manage these risks, and the management of the integrity of the distribution system. Pathogen contamination is the greatest risk to water supplies. Drinking water systems must maintain robust multiple barriers appropriate to the level of potential contamination in source water.

The assessment and ranking of water quality risks reflects the degree of control applied to contamination risks from specific water quality hazards: *Cryptosporidium,* other pathogens, cyanobacteria, chemical and radiological contamination, and aesthetic challenges. The score is based on an assessment of the potential hazards in the source water and the barriers currently in place to prevent the public being exposed to these hazards. The water quality risk score for a supply system is the highest score for any of the five water quality hazard categories.

The initial priority scores for water quality are based on *Cryptosporidium* risks and other pathogen risks. NSW Health has carried out a state-wide modelling assessment of *Cryptosporidium* risks to identify supply systems that may need a higher standard of operation or new infrastructure to deal with this chlorine resistant pathogen. The model considered potential *Cryptosporidium* sources in the catchment(s) and any existing controls, such as reservoir detention and water treatment. The model uses information provided by water utilities to determine the *Cryptosporidium* risk and associated water quality risk score. NSW Health has separately communicated the preliminary findings of this risk assessment with local water utilities. Councils have been invited to confirm the information in this assessment. Any updates to these assessments will be communicated to DPIE to update Safe and Secure risk impact scores where necessary.

Risks from other pathogens have largely been identified through work by contractors engaged by NSW Health to support water utilities in their implementation of drinking water management systems. NSW Health has provided support projects since 2014. NSW Health notes that risks identified in earlier years may now have been addressed. Contractor reports are provided to the local water utility at the end of each project. Types of risks include:

- Catchment risks
- Treatment barriers not adequate to manage risks in source water
- Potential for contamination of water in distribution systems
- Operational monitoring equipment not adequate to determine if barriers are effective
- Operational challenges/risks, particularly for key treatment barriers

These risks may be managed with infrastructure and/or non-infrastructure solutions.

The cyanobacteria, inorganic chemical and radiological risk categories exist to allow priorities to be set for supply systems as these risks are identified. Aesthetic risks have not been used to determine priorities at this time.

Impact or population is not factored into the risk score. This approach is consistent with the ADWG, which does not accommodate a lower level of service in terms of drinking water quality risk for smaller populations compared to larger populations.

No water quality risk assessment has been undertaken if the existing town water supply system has been declared to be non-potable (i.e. not for drinking) system. The risks can be assessed and a priority applied where a Council and the community wish to convert a non-potable system into a potable system or provide potable reticulated water to an un-serviced community.

The following table shows the water quality risk categories with the criteria for the risk scores from zero (lowest) to five (highest).

SCORE	RISK OUTCOME	RISK EXAMPLES
5	Drinking water management fails to effectively control chlorine sensitive pathogens.	New or additional treatment barrier needed for effective pathogen control.
	Drinking water management fails to effectively control chlorine resistant pathogens (e.g. *Cryptosporidium*)	High risk from *Cryptosporidium* as assessed by NSW Health.
	Drinking water management fails to control health related chemical and radiological parameters.	Health related chemical and/or radiological characteristics consistently measured in drinking water above ADWG value, with no effective barrier available.
	Drinking water management fails to control risks from cyanobacteria	Evidence of raw water source experiencing potentially toxic cyanobacteria blooms, with no effective barrier available.
4	Drinking water management fails to effectively control chlorine sensitive pathogens	Upgrade, repair or replacement of existing treatment barrier needed for effective primary disinfection. Improved process monitoring and control required to effectively manage barriers to pathogen contamination
	Drinking water management fails to effectively control chlorine resistant pathogens (e.g. *Cryptosporidium*)	Medium high risk from *Cryptosporidium* as assessed by NSW Health.
	Drinking water management fails to control health related chemical and radiological parameters	Health related chemical and/or radiological characteristics measured in drinking water above ADWG value due to ineffective operation of a treatment barrier.
	Drinking water management fails to control risks from cyanobacteria	Evidence of raw water conditions known to encourage cyanobacteria blooms, with no effective barrier available.
3	Drinking water management fails to effectively control chlorine sensitive pathogens	Poor operation and maintenance of reticulation infrastructure which fails to control risk from chlorine sensitive pathogens Critical control points and procedures not documented appropriately
	Drinking water management fails to effectively control chlorine resistant pathogens (e.g. *Cryptosporidium*)	Medium risk from *Cryptosporidium* as assessed by NSW Health.
	Drinking water management fails to control health related chemical and radiological parameters	Improvement required for treatment barrier to ensure known chemical and/or radiological characteristics are managed effectively. No evidence of exceeding ADWG in drinking water.
	Drinking water management fails to control risks from cyanobacteria	Improvement required to existing barrier to manage potentially toxic cyanobacteria blooms.
2	Water quality management effectively manages water quality risks	
1	No assessed scores of 1 – All water supplies have some level of risk	
0	No information available to make an assessment	

Water Security Assessment Criteria

Overview

Water security is important to ensure long term continuous access to reliable drinking water supply and water for sanitation. Uninterrupted long term access to water enables communities to grow and thrive by ensuring good public health, economic development opportunities, social amenity and liveability, and the revenue for utilities to meet fixed costs.

Fresh water is a finite resource and is highly influenced by climate and weather patterns; therefore, all water supply systems are planned and sized to accommodate moderate levels of restrictions. The town water supply systems in regional NSW are also planned and sized considering the historical and future consumptive needs and climate in consultation with the community. Australia with its highly variable wet and dry weather patterns depends heavily on the size of the surface and ground water storages and access to these storages for its water security.

Objective

The primary purpose of the water security component of the prioritisation framework is to assess the long term access risk a regional town water supply system faces for a reliable water source. This access risk has been assessed after taking into account the frequency and duration of water restrictions and the availability of water in the systems to meet the demands under moderate restrictions. Whilst it is recognised that the social and health impact of water restrictions are significant, the consequence of 'running out of water' is almost catastrophic requiring water carting or immediate access to alternate drinking water sources or evacuation. Thus, to avoid 'running out of water', long-term planning for water security is always future focused and considers the practicality of implementing tactical emergency measures such as higher levels of restrictions and water carting.

In consideration of these tactical measures, the inherent water security access risk is combined with the population serviced by the water supply system, to account for the practicality of implementing emergency measures such as water carting, to arrive at an overall water security risk impact score. Water carting is generally not considered practical for populations beyond 1,000.

The water security access risk profile of a town water supply system in regional NSW is dependent on the type of the water source and the size of storage. There are four main fresh water source types used for drinking in town water supply systems across regional NSW namely unregulated rivers, regulated rivers, groundwater and roof water harvested in rain water tanks (i.e. communities with no reticulated water supply system).

Water Security Deficiency Index (WSDI)

The water security deficiency index (WSDI) is the ratio of the water security access risk and demand. The water security access risk is the shortfall in a system's headwork capacity (referred to as secure yield) and the forecasted annual unrestricted drinking water demand placed by the community on the system's headworks. Secure yield is the highest annual drinking water demand that can be supplied from a water supply headworks system whilst meeting the "5/10/10" design rule and is determined using a system specific hydrologic water balance computer model that incorporates historical and future metrological information.

The WSDI is based on the 5/10/10 design rule for water supply headwork infrastructure, which states:

- Duration of drought restrictions should not exceed 5% of the time
- Frequency of restrictions should not exceed 10% of years

- Severity of restrictions should not exceed 10%. That is, the system should be able to meet 90% of unrestricted water demand during the worst recorded drought at the level where restrictions are imposed.

Communities that harvests roof water in rain water tanks *(*i.e. communities with no reticulated water supply system) generally have a WSDI of 100% as they can be expected to regularly run completely out of water during periods of below average rainfall. This problem cannot be economically addressed with larger household storages since the roof catchment size is the primary determinant of refill volumes. However, it is acknowledged that for small communities it is more cost effective to cart water during these times, while for communities in excess of 1,000 people, water cartage in the event of failure of supply is less feasible. Thus, for a small community when the WSDI score and the population score is multiplied the overall water security risk impact score will be lower compared to a larger community with the same WSDI score.

Town water supply systems that use *unregulated river as* their supply source, the WSDI is calculated using the methodology described in the *NSW Guidelines of Assuring Future Urban Water Security – Assessment and Adaption Guidelines for NSW Local Water Utilities,* which apply the 5/10/10 rule to calculate the secure yield. For town systems that do not currently have reliable assessment of secure yield, the guideline methodology was extrapolated to these systems to estimate the WSDI.
Town water supply systems serviced by *regulated river systems* typically have the most secure entitlements owing to the large storage compared to the towns needs and would almost always receive 100% of their allocation as set out in the water sharing plan. However, during an extended dry period or drought, the water allocations to these town water supply systems could be significantly reduced as happened during the Millennium Drought. Drought reliability assessments to determine the water security access shortfalls to towns are being completed by the Department for the regulated river systems using Water Sharing Plan rules, water allocation principles and past experiences. The findings of these studies together with the location of these town systems in relation to the main regulating storage have been used to calculate the WSDI to be consistent with the 5/10/10 rule. The town water systems that source water from *groundwater systems* have inherently varying water security risk depending on the type of aquifer and regional hydrogeology. In the absence of system specific hydrogeological assessments, water security risk has been assessed based on past aquifer performances and general aquifer characteristics. Water sourced from the Great Artesian Basin is considered highly secure with a WSDI of 5%. Town systems that are dependent on fractured rock type aquifers are considered less secure with a WSDI of 20%. Town water system bores drawing on alluvial sources have security double the associated surface water system.

Methodology for Water Security Risk Ranking

The water security risk impact score is a combination of the inherent water security risk score and the impacted population, combined in accordance with the Australian Standards, AS 4360/AS ISO 31000.

The inherent water security risk score is based on the WSDI, the higher the deficiency index, the higher the risk score. Since the WSDI takes into consideration the frequency and duration of access failures and the possible consequential public health, social, environmental and economic impacts, an analysis was undertaken to determine risk thresholds so an inherent risk score of between 1 to 5 could be assigned to each water supply system. Analysis suggests that the failure frequency (i.e. running out of water) is almost exponential with increasing deficiency index and the duration of failure significantly increased when the WSDI is equal to or greater than 11%. Based on these observations the WSDI were assigned the risk scores as follows:

Risk Score	WSDI	Risk Narrative
5	Equal to or greater than 11%	Generally, includes systems with no storages or small storage compared to consumptive needs and most communities that depend on harvesting roof water in rainwater tanks.
4	Equal to or greater than 6 & less than 11%	
3	Equal to or greater than 1% & less than 6%	
1	Less than 1%	Systems where the secure yield is at least equal to the future unrestricted annual consumptive needs circa 2040
0		No data available

The population risk score was established by grouping the serviced population into five groups with the higher population cut-off of 1,000 reflecting the impracticality of implementing short term emergency response measures given drought affects a larger geographical area and hence could stretch the available regional resources (e.g. carters, $$, operational personnel, etc.) and the distance to a reliable alternative source.

The risk impact scores, which is the combination of the water security risk score and the impacted population, is categorised into 5 priority risk ranks following the Australian Standards, AS 4360/AS ISO 31000. The table below shows how the risk impact score is derived based on these two factors.

		Inherent risk score				
		5	4	3	1	
Population	>1000	5	5	4	2	Risk impact score
	>500-1000	5	4	3	1	
	>200-500	4	3	2	1	
	>100-200	3	2	2	1	
	<=100	2	1	1	1	

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Environment Assessment Criteria

Overview

Sewage needs to be 'safely managed' to prevent public health impacts and impacts to receiving waterway uses and values. The NSW EPA as the regulator of Council owned and operated sewerage systems uses a risk based outcome focused regulatory approach.

Objective

The environment component of the prioritisation framework assesses both the risk to public health and the risk to receiving waterway uses and values from sewage management. The assessment focuses on the existing treatment technology and/or management barriers present to manage both these risks. The consequence of discharging untreated or partly treated sewage is high potentially causing death or severe illness in the impacted communities or significant to waterway uses and values, and may require improvement to existing management practices or pump-out for treatment at a different plant or implementation of new/additional barriers such as modern technology.

In regional NSW, the sewage (wastewater) is generally either managed on-site at the premises or collected and transferred off-site to a sewage treatment plant. Sewage handing and treatment facilities (collectively referred to as sewerage systems) are generally owned and operated by the local Council under the Local Government Act (LGA) and these systems are regulated by NSW EPA with or without an environmental pollution licence issued under the POEA Act. Licenses are generally not required for smaller sewerage systems if they can be operated without causing environmental pollution and where industry guidance can be followed to avoid pollution. On-site systems are regulated by the local Council under section 68 of the LGA.
For the purposes of this risk prioritisation framework, sewerage systems in regional NSW are grouped into three types:

1. ***Sewered Communities with Unlicensed Systems*** – These systems are generally small with a processing capacity of less than 2,500 equivalent persons or 750 kilolitres per day. Effluent management is generally by evaporation, reuse and/or discharge.
2. **Sewered Communities with Licensed *Systems* -** These systems typically service populations in excess of 2,500 equivalent persons and include a discharge and/or reuse (e.g. irrigation, recycling).
3. **Unsewered Communities and Towns** – These are generally small communities with populations less than 500 equivalent persons but there are few communities with population exceeding 1,000. Sewage management is achieved through on-site treatment and soil adsorption systems.

Two risk assessment methodologies have been developed, one covering the type 1 and 2 systems and the other covering the type 3 systems. In both methodologies, the risk to public health and the risk to waterway uses and values exist equally. However, in order to ensure consistency in prioritisation between this environmental risk framework and the other (water security and water quality) risk frameworks, impact to public health is considered a priority.

In consideration of the different regulatory regimes and the practicality of the tactical measures available to deal with emergencies, the inherent environmental risk score is combined with the population of the community to arrive at an overall environmental risk impact score.

Methodology for assessing environmental risk in type 1 and 2 systems

The risk assessment for sewered communities uses four risk criteria, including (1) regulatory action; (2) performance; (3) loading/capacity; and (4) condition/age.

The following table outlines the basis for assigning the inherent risk score for each risk criteria. Inherent risk scores of between 1 and 5 will be assigned, with a score of 5 representing the highest environmental risk and a score of 1 the lowest environmental risk. A score of 0 is given where there is no information/data.

Risk Score	Criteria 1 - regulatory action	Criteria 2 - performance	Criteria 3 - load/capacity	Criteria 4 - condition/age
5	● PRP - Effluent quality driven; or ● PRP - Asset design/condition/effluent quality driven	● Mismatch of STP technology and effluent management[1] and wastewater quality deficiency index >= 20%;	● Population > Capacity by > 10% and with high imminent growth prospect; or ● Dry weather overflows	● Pre 1950 built facility or facility with condition rating of 5
4	● PRP – reuse driven; or ● PRP – overflows and by-pass driven (I/I); or ● PRP – Mass and volume limits driven; or ● PRP – Biosolids driven	● Opportunistic reuse with possible public contact but not to appropriate standards (AGWR + EPA); or ● Mismatch of STP technology and effluent management and/or wastewater quality deficiency index < 20%	● Population > Capacity by < 10% and with high medium-term growth prospect; or ● Wet weather overflows with high downstream user risk; or ● Daily flow volume exceeds licence limits with high impact to receiving environment	● 1951 – 1970 built facility or facility with condition rating of 4
3	● PRP – Odour /noise issues	● Appropriate plant for effluent management (i.e., discharge and/or maximised reuse) BUT wastewater quality deficiency index >= 20%; or ● Dry/wet load by-passes/overflow in excess of state median	● Pop = Capacity and with low medium-term growth prospect; or ● Wet weather overflows with medium downstream user risk; or ● Daily flow volume exceeds licence limits with medium impact to receiving environment	● 1971 – 1990 built facility or facility with condition rating of 3
2	● PRP – Administrative; or ● PRP – Trade waste policy/implementation	● Appropriate plant for effluent management BUT wastewater quality deficiency index < 20%; or ● Opportunistic reuse with NO public contact but not to appropriate standards (AGWR + EPA)	● Capacity > Population by > 10% and with low medium-term growth prospect; or ● Wet weather overflows with low impact to receiving environment; or ● Daily flow volume exceeds licence limits with low downstream user risk	● 1991 -2010 built facility or facility with condition rating of 2
1		● wastewater quality deficiency index of 0%; or ● No known issues with reuse	● No known capacity Issue; or ● No known volume limit exceedance	● Post 2011 built facility or facility with condition rating of 1
0	● Insufficient Information	● Insufficient Information	● Insufficient Information	● Insufficient Information

The inherent environmental risk is taken as the highest score from any of the above 4 criteria. As described below, this inherent environmental risk score is then multiplied with the population score to obtain an environmental risk impact score.

Methodology for assessing environmental risk in type 3 systems

The table below outlines the basis for assigning the risk score for un-sewered towns and villages.

RISK OUTCOMES	SCORE based on Risk
Primary health and High environmental Impacts: Wastewater from on-site wastewater management facilities has direct impact on drinking water supply source and/or with widespread direct primary contact impact to resident population and/or high impact on waterway uses and values	5
Secondary health and medium environmental Impacts: Wastewater from on-site wastewater management facilities has localised direct primary contact impact to resident population and/or medium impact on waterway uses and values	4
Tertiary health and low environmental Impact: Wastewater from on-site wastewater management facilities may potentially contribute to public health impacts and/or with low impacts on waterway uses and values	3
High risk on-site wastewater management facilities but has **no evidence** of public health impacts and/or impacts on waterway uses and values	2
Medium risk on-site wastewater management facilities but has **no evidence** of public health and/or impacts on waterway uses and values	1

The above environmental risk score is then multiplied with the population score to obtain an environmental risk impact score.

Methodology for Environmental Risk Priority Ranking

Combination of the inherent environmental risk score (likelihood of a hazard) and population (severity of impact) provides an environmental risk impact score. These impact scores are categorised into 5 priority risk ranks in accordance with the Australian Standards, AS 4360/AS ISO 31000.

The population risk score was established by grouping the serviced population into five groups with the higher population cut-off reflecting the POEA Act threshold of 2,500 population equivalent.

The risk impact score, which is the combination of the environmental risk score and the population, is categorised into 5 priority risk ranks following the Australian Standards, AS 4360/AS ISO 31000. The table below shows how the risk impact scores will be ranked between 1 and 5.

		Inherent risk score					
		5	4	3	2	1	
Population	>2500	5	5	4	3	2	Risk impact score
	>1000-2500	4	4	3	2	1	
	>500-1000	4	3	2	2	1	
	>100-500	3	2	2	1	1	
	<=100	2	1	1	1	1	

Socio-Economic Factors Assessment Criteria

Socio-economic capacity does not influence the risk impact score but is used to consider hardship and affordability issues faced by ***the community*** (not the proponent) impacted by the identified risk or issue. The socio-economic factor criterion ensures that prioritisation takes into account the particular challenges faced by socially disadvantaged and/or remote communities.
Importantly this criteria should help prioritise co-funding for a "risk or issue" which may have been previously identified but remained unmitigated for several years due to a lack of capacity to pay for the mitigating works to achieve the desired level of service.

Socio –Economic Capacity Criterion

Index of Relative Socio-economic Disadvantage (IRSED)

Use of SEFIA as a prime indicator for socio-economic state of a community that compares relative socio-economic characteristics in terms of people's access to material and social resources and their ability to participate in society, is well recognised. However, out of the four SEFIA indexes (IRSAD, IRSD, IEO, IER), the Index of Relative Socio-economic Disadvantage (IRSD is commonly used to rank the relative disadvantage of the areas and will provide an objective measure to assess the funding need of the communities). The indexes include variables like:

- Percentage of low-income households
- Unemployment rate
- Percentage of low-skilled occupations and people without qualifications
- Percentage of households without a car
- Percentage of people living overcrowded dwellings
- Percentage of people with a disability
- Other socio-economic variables that relate to persons or families.

Accordingly, IRSD has been used as an indicator for ranking this prioritisation criterion as it reflects relative capacity of communities to pay for services.

Accessibility and Remoteness Index of Australia (ARIA+)

(ARIA+) is purely a geographic measure of remoteness. Remoteness areas divide Australia into 5 classes of remoteness on the basis of a measure of relative access to services. The classifications are: Major Cities of Australia; Inner Regional Australia; Outer Regional Australia; Remote Australia (RA); and Very Remote Australia (VRA).

Degree of difficulties in providing services and the cost of services may increase with the increase in remoteness from the main service centres. Therefore, ARIA+ has been used as an indicator for ranking this prioritisation criterion to further emphasise the special need for remote communities. However, IRSD covers the main socio-economic factors associated with remoteness areas except the relatively higher costs of providing services in a remote community that may make services more unaffordable, therefore a lower weighting is on this indicator considered appropriate. There are other indicators that better reflects the comparative cost of water services (discussed below).

Operation, Maintenance and Administration (OMA) Cost per Property

Water supply and Sewerage OMA cost per property represents the relative cost of providing services averaged over a 3 year period. OMA cost reflects things like, economies of scale and density, topography, discreteness of water services schemes, complexity of treatment process, cost of materials and labours, resourcing costs due to remoteness.

Prioritisation Matrix

Criteria	Indexes	Score	Weight (%)
IRSD (Lower index means more disadvantage)	Nominal LWU scale indexes developed based on ABS LGA or Suburb indexes.	Scored 20-100 continuously with the most disadvantaged LWU scoring 100 and the least disadvantaged scoring 20	40
ARIA+ (Higher index means more remote)	Major cities (1) Inner Regional (2) Outer Regional (3) Remote (4) Very remote (5)	Scored 20-100 continuously with most remote scoring 100 and the least remote scoring 20	20
OMA cost per property	Each LWU: Water OMA and Sewerage OMA, 3 years average	Score 20-100 continuously with highest OMA scoring 100 and the lowest OMA scoring 20	40

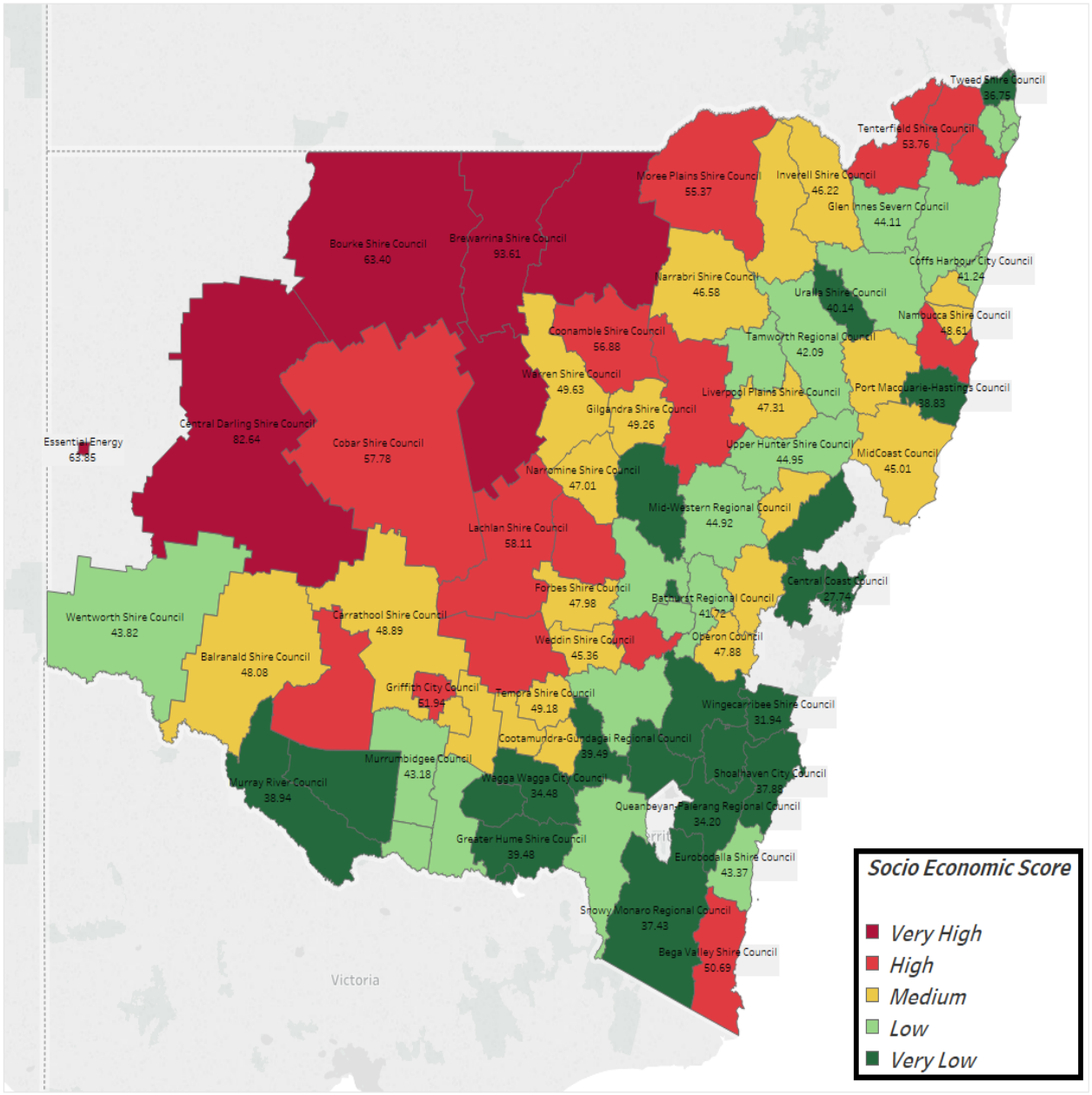
Prioritisation

The overall socio-economic score calculated on the basis above for each local water utility has been applied to prioritise the water supply and sewerage systems within their "risk impact" band only. This will ensure all priority risks ranked 5 are prioritised ahead of any risk ranked 4 and so on. Consequently, the first risk prioritised for funding will be a risk impact score 5 in the Council area with the lowest socio-economic (Central Darling Shire Council) followed by any other risks with impact score of 5 in that same Council area. Below those will be a risk impact score 5 in the next lowest socio-economic Council area (Bogan Shire Council) followed by any other risks with impact score of 5 in that Council area and so on. Note in the example above there are other Councils with a comparatively higher socio-economic score but no risks scored 5.

This means all major impact risks (scored 5) will be prioritised Council by Council in order of maximum socio-economic disadvantage with funding allocated accordingly from the top of the list.

A map and listing for socio-economic scores of all Councils across NSW follows on the next page.

Socio Economic Plot - Regional NSW



LGA Name	
Albury City Council	35.31
Armidale Regional Council	41.01
Ballina Shire Council	41.13
Balranald Shire Council	48.08
Bathurst Regional Council	41.72
Bega Valley Shire Council	50.69
Bellingen Shire Council	45.91
Berrigan Shire Council	41.53
Bland Shire Council	53.88
Blayney Shire Council	42.38
Bogan Shire Council	75.78
Bourke Shire Council	63.40
Brewarrina Shire Council	93.61
Byron Shire Council	42.50
Cabonne Council	41.69
Carrathool Shire Council	48.89
Central Coast Council	27.74
Central Darling Shire Council	82.64
Central Tablelands Water	42.09
Clarence Valley Council	43.09
Cobar Shire Council	57.78
Cobar Water Board	57.78
Coffs Harbour City Council	41.24
Coolamon Shire Council	46.78
Coonamble Shire Council	56.88
Cootamundra-Gundagai Regiona..	39.49
Cowra Shire Council	52.33
Dubbo Regional Council	40.81
Edward River Council	40.90
Essential Energy	63.85
Eurobodalla Shire Council	43.37
Federation Council	41.82
Fish River Water Supply	45.14
Forbes Shire Council	47.98
Gilgandra Shire Council	49.26
Glen Innes Severn Council	44.11
Goldenfields WCC (Combined)	50.83
Goulburn Mulwaree Council	37.65
Greater Hume Shire Council	39.48
Griffith City Council	51.94
Gunnedah Shire Council	41.53
Gwydir Shire Council	47.74
Hawkesbury City Council	32.01
Hay Shire Council	53.46
Hilltops Council	41.88
Inverell Shire Council	46.22
Junee Shire Council	49.30

LGA Name	
Kempsey Shire Council	51.29
Kyogle Council	51.03
Lachlan Shire Council	58.11
Leeton Shire Council	47.63
Lismore City Council	43.98
Lithgow City Council	47.87
Liverpool Plains Shire Council	47.31
Lockhart Shire Council	36.51
Mid-Western Regional Council	44.92
MidCoast Council	45.01
Moree Plains Shire Council	55.37
Murray River Council	38.94
Murrumbidgee Council	43.18
Muswellbrook Shire Council	47.26
Nambucca Shire Council	48.61
Narrabri Shire Council	46.58
Narrandera Shire Council	46.37
Narromine Shire Council	47.01
Oberon Council	47.88
Orange City Council	36.51
Parkes Shire Council	50.13
Port Macquarie-Hastings Council	38.83
Queanbeyan-Palerang Regional ..	34.20
Richmond Valley Council	52.77
Riverina Water County Council	36.94
Rous County Council	43.02
Shoalhaven City Council	37.88
Singleton Council	36.33
Snowy Monaro Regional Council	37.43
Snowy Valleys Council	43.73
Tamworth Regional Council	42.09
Temora Shire Council	49.18
Tenterfield Shire Council	53.76
Tweed Shire Council	36.75
Upper Hunter Shire Council	44.95
Upper Lachlan Shire Council	40.46
Uralla Shire Council	40.14
Wagga Wagga City Council	34.48
Walcha Council	46.64
Walgett Shire Council	65.31
Warren Shire Council	49.63
Warrumbungle Shire Council	56.12
Weddin Shire Council	45.36
Wentworth Shire Council	43.82
Wingecarribee Shire Council	31.94
Yass Valley Council	30.27