MODERNISATION OF THE TARC SYPHON

Assessment against Socio-Economic Criteria as part of the Resilient Rivers Water Infrastructure Program

MARCH 2025

Contents

Section 1: Project overview

1.1. Background

The Trangie Nevertire Irrigation Scheme (TNIS) covers an area of approximately 102,000 ha, servicing 33 individual farms. The Trangie Agricultural Research Centre (TARC) syphon links the TNIS pump station to its members further downstream. It is the only mechanism by which water can be delivered to Trangie Nevertire Co-operative Limited (TNCL) members.

In partnership with the Australian Government, a major investment of $115 million was made in the TNIS as part of the 2011 Private Irrigation Infrastructure Operators Program (PIIOP)[1] . Modernisation of the TNIS included significant upgrades of the irrigation delivery network, channel lining, a piped stock and domestic scheme, automation and rationalisation. The TARC syphon, installed in 1968, was not upgraded as part of this project and only minor repairs have been made to the up-and-downstream headwalls.

Over the past several years, with the improvements afforded by the TNCL modernisation project, metering and observations made by TNIS staff and management have identified the TARC syphon as a significant source of water leakage and loss. It has been identified that movement within the pipes is leading to leaking joints and circumference cracking where the angled pipes are located. This is creating foundational movement, which is likely to cause increases in leakage rates and may eventually lead to the failure of the structure.

Furthermore, safety concerns have been raised around current unauthorised human and stock access to up and downstream pits and potential WHS issues associated with the manual nature of maintenance that is required as a result of system blockages.

In addition, it has been identified that a small area of the existing channel liner immediately upstream of the TARC syphon requires replacement to ensure compatibility with the upgraded syphon and the additional infrastructure that will be installed as part of the project.

In order to remain financially, environmentally and socially sustainable, it has become apparent that there is a need to improve the operational efficiency and responsiveness of the TARC syphon. Modernisation of the TARC syphon will significantly reduce current water losses, improve the reliability and efficiency of water supply, bring economic activity to the area, provide socio-economic benefits to the regional community, and importantly, provide the security of water supply which will act as an important stimulant for investment.

1.2. Project Summary

The TNCL proposes to implement a $5,190,000 project to modernise the TARC syphon, an integral item of infrastructure within the TNIS, to improve water security for its members, create long-term water savings and return water to the environment.

[1] Refer TNCL Modernisation Project – Trangie Nevertire Irrigation Scheme for information on the success of this project

The project involves:

- replacement of two 1,800mm reinforced concrete pipes totalling 370 meters in length and two pit covers
- upgrade of 40,000 sqm of channel liner
- installation of an automated debris rake screen

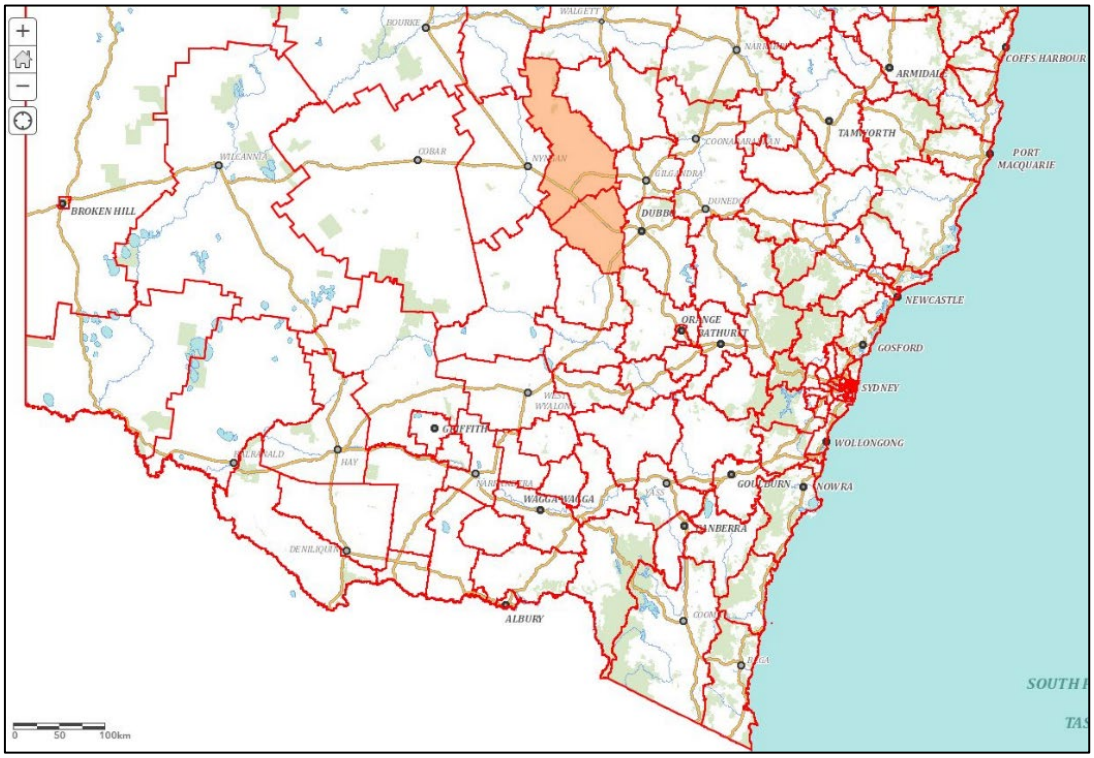
The project will result in approximately 800ML of annual water savings, of which 50% (400ML) of General Security (Macquarie River) Water savings will be transferred to the Commonwealth Environmental Water Holder (CEWH). These identified water savings will be consistent, long-term savings, which will be realised (on average) annually.

1.3. About the applicant

The TNIS was floated as a concept in 1958. In 1965 a group of landholders formed an organisation to seek an allocation of water rights from the newly built Burrendong Dam, on the Macquarie River in Central West NSW. The TNCL was founded in 1968 as a separate legal entity which was charged with the responsibility of building the extensive 240km open channel network and infrastructure, while the TNIS operated the irrigation scheme. Each TNIS Member (of which there are approximately 33) has a share in the TNCL.

Currently, the TNCL delivers irrigation water via 140 km of channels across the serviced area (rationalised down from 240km as a component of the TNIS PIIOP project). The TNIS extracts water from the Macquarie River upstream of the Gin Gin Weir and delivers up to 700 ML/day through over 40 regulating structures throughout the scheme. The total irrigable area within TNCL is approximately 21,500 ha, but in any one year, up to approximately 7,000 ha is irrigated (depending upon General Security Water Allocations – which can vary between 0 and 110%). TNIS holds a number of Water Access Licences (WALs), with General Security (Macquarie Valley) Water Entitlements held across these WALs.

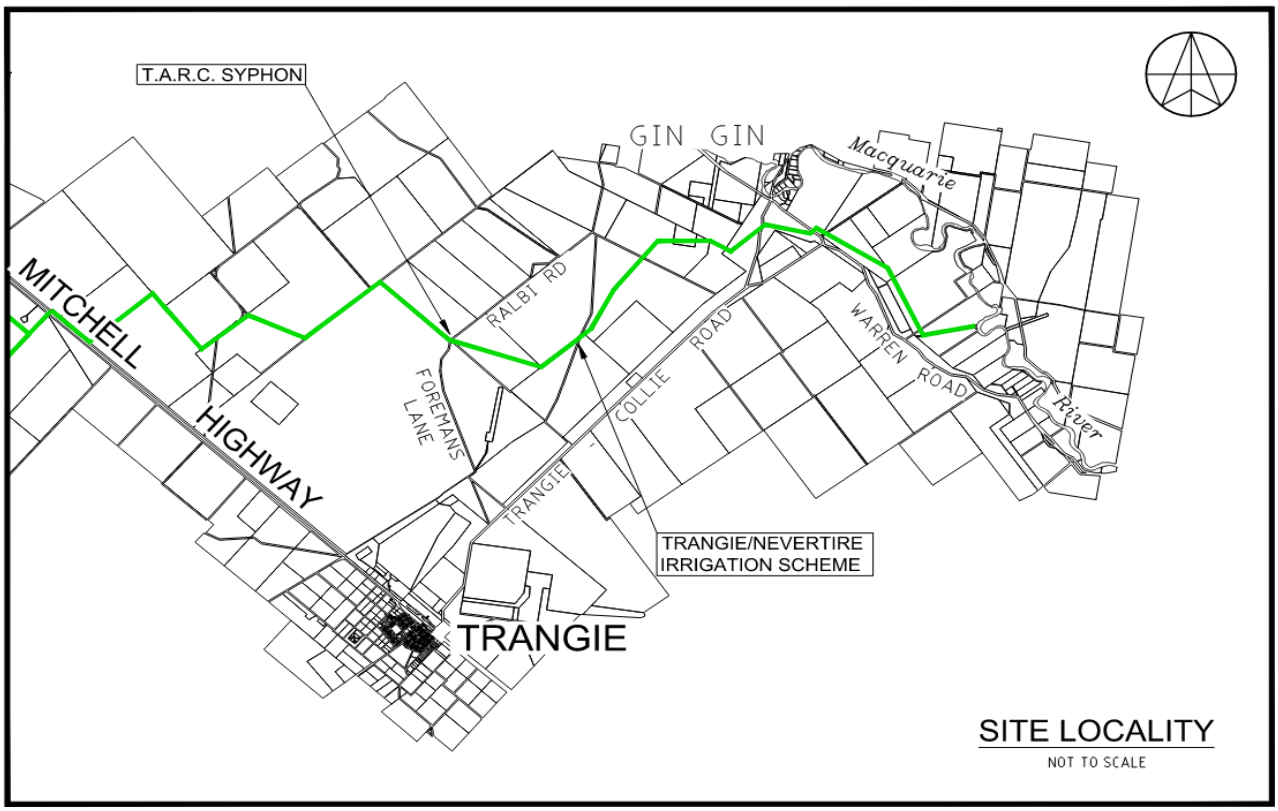
Figure 1 Location of the TNIS within NSW


BOURKE
WALGETT
NARRABRI
COFFS HARBOUR
ARMIDALE
TAMWORTH
PORT MACQUARIE
WILCANNIA
COBAR
WYRALLAH
COONABARABRAN
GILGANDRA
DUNEDOO
BROKEN HILL
DUBBO
NEWCASTLE
ORANGE
BATHURST
GOSFORD
SYDNEY
WEST WYALONG
GRIFFITH
WOLLONGONG
HAY
GOULBURN
NOWRA
WAGGA WAGGA
CANBERRA
DENILIQUIN
ALBURY
0
50
100km

Commercial operations commenced in 1971 and the TNIS continues to service a number of industries. Primarily, irrigation water is used for the production of irrigated cotton. Water use and its application varies from year to year depending on seasonal conditions, water availability and commodity prices. Apart from cotton, irrigation water is used in the production of winter cereal and oilseeds, sorghum, as well as for pasture production for livestock.

In addition to private production, the TNIS provides irrigation water for the Trangie Agricultural Research Centre (TRAC), a 3,900 ha research facility operated by the NSW Department of Primary Industries and Regional Development. It is the largest government owned agricultural research facility servicing the Central West of NSW. The facility has over 300 ha of developed irrigation, and holds around 3,300ML of high security water entitlements. Water is supplied directly by TNIS through the TARC syphon to the facility. It is a major employer of highly skilled people in the region.

Figure 2 Schematic of the TNIS Scheme – showing location of the TARC syphon



Prior to the PIIOP project, surface irrigation was the dominant irrigation system. The scheme serviced over 66 members and over 90 properties. Irrigation in the TNIS during the 1990-2000s period declined significantly, due to a prolonged period of low irrigation allocations.

High scheme transmission losses at low allocations meant that a large percentage of pumped water was lost before reaching farms. An extended period of low water allocation created significant community and social impacts in local towns as well as substantial economic hardship to landholders and local businesses.

The completion of the irrigation infrastructure modernisation project undertaken by TNCL through the PIIOP has delivered approximately 32,000ML of water savings and returned around 29,600ML of water entitlements to the Commonwealth through the upgrade of 140km of earthen channels and rationalisation of a further 100km of channels.

The TARC syphon modernisation project will continue to build on these positive outcomes through providing additional water savings and efficiency, enhanced service levels and contributing to the regional economy.

1.4. Project outputs at a glance

2 × 1,8000mm reinforced concrete pipes (370m total) and 2 × pit covers

40,000m² HDPE channel liner

1 × automated trash screen and debris remover

1.5. Project Scope

The TARC Syphon Modernisation project includes the upgrade of existing infrastructure that is reaching its effective end of life and installation of new infrastructure that will assist in optimising water flow and address safety concerns. The following works are proposed to be undertaken to achieve these objectives:

- Replacement of the existing TARC syphon pipes, including the installation of two pit covers, one upstream and one downstream
- Upgrading of channel liner immediately upstream of the syphon, and
- Installation of an automated trash remover.

Each individual component will generate significant safety, operational and/or water savings benefits, and collectively are integral to implementation of the proposed overall modernisation project.
The project will result in:

- A reduction in water losses from an (annual) estimate of 842ML/year
- Water savings of 95% of the current estimate – or approximately 800ML/year
- 50% of the annual anticipated water savings (400ML of General Security [Macquarie Valley] Water) to be returned to the Commonwealth Environmental Water Holder
- A significant improvement in the operation of the TARC syphon – with commensurate risk reduction to the long-term integrity of the syphon, downstream landholders and the environment
- A significant improvement in WHS conditions for TNIS operational staff

The outputs and outcomes of this project should be considered as complementary to the existing modernisation TNCL has previously undertaken. It adds significant value to this investment and is the 'final piece in the puzzle' in terms of modernising the entire TNIS.

1.6. Project Delivery

A preliminary Project Management Plan (PMP) has been developed to guide the delivery of the TARC syphon modernisation project. Key components of the plan that will ensure successful project delivery are outlined below.

1.6.1 Resourcing

A well-defined project management governance structure will be established, with clear lines of command and feedback mechanisms to ensure probity, direction and communication are maintained. This will include a Program Steering Committee and Project Control Group that will be comprised of project staff, State Government representatives and Australian Government representatives.

A designated project manager will be engaged to oversee a team of design and construction consultants, suppliers and manufacturers to deliver detailed designs and technical specifications for the TARC Syphon Modernisation project including hydraulic, civil and geotechnical engineers. This project manager will be appointed by the TNCL Management Committee.

External contractors and suppliers will be engaged via a transparent procurement/engagement process to provide the majority of the necessary works – including material supply and construction. This will ensure probity is maintained at all times through project implementation, and also ensure skilled, suitably qualified and competent suppliers and service providers are engaged to implement the project.

In addition to these external contractors, key members of the TNIS Management Team will be recruited to assist with project implementation due to their extensive knowledge of the TNIS supply and delivery network, and previous experience with modernisation. These staff members will likely fill various roles including site supervision and WHS compliance, and project administration, providing governance and financial administration support for the project.

It is anticipated that during the construction phase of the project a head contractor will lead a team of sub-contractors. Based on current data, it is envisaged that approximately 5-10 individual

consultancy/contractor businesses will be engaged to deliver the project, employing up to 25 individuals at various stages of the project.

1.6.2 Planning

In February 2023, TNCL was awarded $132,000 to undertake a detailed Feasibility Study, to best understand the range of options to modernise the TARC syphon, likely water savings that could be generated and potential capital cost associated with the project. The Feasibility Study included preliminary investigations including detailed site survey, review of current water losses, condition assessment of existing infrastructure, analysis of remediation and replacement options, review of planning pathway, draft tender development and community consultation. The feasibility project findings have informed the proposed TARC Syphon Modernisation project and formed the basis of the preliminary PMP. Upon appointment, the Project Manager will refine the existing PMP to reflect the conditions and variables at that time.

1.6.3 Community Consultation

The proposal to implement modernisation of the TARC Syphon was supported by its members and the community, evidenced through initial feedback and responses to newsletters and company meetings and the outcomes of the Feasibility Study. As a result, a number of letters of support were received.

For the implementation of the TARC syphon modernisation project the Project Manager will be responsible for engaging with relevant parties including members, government agencies and the community. An appropriately targeted and directed consultation plan will be developed including both broad scale community consultation and targeted consultation with directly affected parties.

1.6.4 Designs

Preliminary investigations, in the form of a site survey and geotechnical investigations, were undertaken and construction drawings developed as a component of the Feasibility Study to inform potential options for the modernisation of the TARC syphon. The preferred TARC syphon modernisation option has a limited scope that is based on the replacement and/or upgrade of existing infrastructure using prefabricated materials and minor earthworks.

Further detailed design works will be undertaken as a component of the works program based off the outcomes of these activities.

1.6.5 Licensing and Approvals

The proposed modernisation of the TARC Syphon will involve the removal of the old syphon, and construction of new syphon and associated infrastructure. This will be conducted within the existing alignment of the syphon and supply channel network.

A desktop assessment of anticipated approvals was undertaken as a component of the Feasibility Study. Requirements for development and works approvals lie with Narromine Shire Council Approvals under the *Water Management Act 2000* and Crown Land licences will be verified as part of the full project. Given the nature of the proposed works, and the fact the works will be conducted in an area that was previously disturbed (via the original construction of the syphon), it is anticipated that any requirements for approvals are likely to be minimal.

It should be noted that TNIS holds a Crown Land Licence over Crown lands where TNIS infrastructure (primarily irrigation channels and pipelines) is located. TNIS will work closely with Crown Lands regarding any required amendments to this existing licence as this will be critical to the approval process for the timely implementation of the TARC syphon modernisation project.

TNCL have undertaken a significant amount of consultation with Narromine Shire Council to-date and will continue to build on this relationship throughout the planning and implementation phases of the TARC Syphon Modernisation project.

Given the extensive background work that has occurred in identifying the required licences and approvals, the consultation with agencies and authorities that has occurred to date as part of the Feasibility Study, and the good relationships TNCL/TNIS and its consultants have developed with these agencies and authorities, there is a high degree of confidence the regulatory component of the project can be managed effectively and in a timely manner.

Section 2: Socio-Economic Criteria

2.1 Preparing for the future

Implementing the TARC Syphon Modernisation project will support agricultural production, regional economies, and the environment by forming a fully integrated water supply network. A modernised TARC syphon will complement the major investment already completed within the TNIS, and ensure the benefits provided by this investment can be fully realised. The improved water delivery efficiency and increased delivery performance that this project will deliver will enable TNCL to meet industry demands and enable regional agribusinesses to maximise their potential for sustainable production.

A direct result of increased water use efficiency for irrigators is productivity gains and a 'cleaner and greener' operation as growers are able to better target water use to the requirements of the plants, and to respond to climatic conditions. It has been shown that previous automation projects, including the TNIS irrigation infrastructure modernisation project itself, lead to improved quantity and quality of crop yield per unit of input, and improved flexibility of farm systems enabling greater frequency and reliability of production. This in turn supports regional and national goals, such as the Commonwealth goal for agriculture to be a $100 billion industry by 2030.

2.2 Investing in current and future viability

Located in the Narromine Shire Local Government Area, the TNIS serves a critical function in local production that benefits the local, regional and state economy. Cotton production is a major user of water delivered through the TNIS. Typically, around 40,000 bales of cotton are produced from the area representing approximately 13% of the total cotton production in the Macquarie Valley and as such, is a major component of the Australian industry. Apart from cotton, there is a range of agricultural commodities that benefit from the TNIS including winter cereal and oilseeds.

The TNIS also services the Trangie Agricultural Research Station. The research station employs a large number of professional staff, with additional casuals and visiting researchers working at the facility. The provision of an effective and efficient irrigation scheme allows the research centre to undertake agricultural

studies that will assist in the provision of a more sustainable and economically viable agricultural industry into the future.

This modernisation project aligns with the Narromine Shire Council's *Community Strategic Plan* (2023). In particular, it aligns with its reference to 'Industry Change' where it outlines:

'*Agriculture will continue to dominate the economy over the next ten years. The two irrigation Schemes in our Shire are in the process of modernisation, which will create greater water efficiencies and enable irrigators to grow broadacre crops in both summer and winter. Irrigation bores on many farms allow more permanent plantings of more intensive, higher value irrigated crops (vegetable and fruit). A sign of further development in this area is the planting of small areas of citrus for juice production and cooler climate grape and cherry varieties. These new developments have the potential to increase the economic value of production and employment opportunities in the Shire.'* (p. 15).

2.3 Benefits to community, region or state

Throughout the implementation of the TARC syphon modernisation project it is anticipated that TNCL would engage and retain the services of locally and regionally based goods and service providers wherever practical, and where these will provide the best value for money. TNCL recognises and values the ongoing benefits of local investment, where the direct procurement of goods and services leads to ongoing benefits within the community and local businesses.

In addition to the local and regional direct and indirect stimulus this would provide, the benefits to the local and broader community of implementing the TARC syphon modernisation project includes:

- Improved water use efficiency
- Improved water delivery volumes and reliability
- Improved responsiveness to water demand
- Return of 'recovered' water for environmental purposes
- Enhanced agricultural production – both in total and in reliability
- Impetus for greater production diversity and value-adding
- Reductions in WH&S related issues for network operators
- Reductions in waterlogging and water table accessions as a result of minimising leakage
- Reduced likely of 'catastrophic failure' of the infrastructure, and the consequences to downstream users, the immediate environment and the economic security of the TNCL community
- Improved prosperity and confidence to invest (and attract such investment) locally

2.4 Community support and engagement

As detailed in section 1.6.3, community consultation has, and continues to be, a core component of the TARC syphon modernisation project. An extensive amount of consultation was completed with a range of stakeholders, including TNCL members, industry and government agencies throughout the development of the Feasibility Study. This ranged from provision of information, information requests, email correspondence, face-to-face discussions, on-site meetings and provision of written materials, such as briefing notes and project background. In addition to the consultation with members as outlined in section 1.6.3 TNCL undertook consultation with relevant government agencies including Narromine Shire Council, NSW Department of Climate Change, Energy, the Environment and Water and WaterNSW. Further consultation to be undertaken prior to project implementation.

Letters of support have been provided by a number of industry members, TNCL members, community members and government agencies to demonstrate the strong level of community and industry support for this project to proceed.

2.5 Positive Economic Outcomes

As a valuable contributor to agribusiness within the local, regional, state and national economies, any improvements to the TNIS will aide in ongoing sustainable agricultural production feeding into both the local and international markets. Anticipated benefits that will be derived from the implementation of the TARC syphon modernisation project will include:

- economic benefits of water recovery when volumes are to be used on-farm to support additional irrigated production (increase in production)
- producer surplus benefits from increased efficiency of existing and future on-farm activities (measured in additional gross margins returned per hectare for irrigation)
- avoided conveyance losses
- avoided environmental impacts
- the economic stimulus provided to the local economy
- short-term employment opportunities (anticipated up to 25 short term employment opportunities during the construction process)
- long-term job security for existing TNIS employees
- benefits from the value of saved water transferred to the CEWH that can be used to support environmental outcomes.

2.5.1 Management of future lifecycle costs

TNIS is experienced in the assessment of future replacement needs of its infrastructure, and in the ongoing operational and maintenance costs. The assets TNIS currently manage are assessed through detailed asset management plans and associated maintenance and inspection schedules.

TNIS currently budgets for asset replacement and ongoing operation and maintenance costs involved with the operation of its irrigation delivery network. In replacing the existing syphon, it is expected that short- and medium-term costs associated with the TNIS operation and maintenance will fall. Similar asset renewal charges to those applied currently would continue to be set aside by TNIS.

Currently, TNIS incurs costs associated with manual debris removal. These are included with the current fees and charges placed on network users. It is likely these costs would reduce in moving to an automated trash removal system. TNIS would set aside any additional gains for future asset replacement.

Overall, it is expected there would likely be no net change to the costs placed on network users for ongoing operational, maintenance and asset renewal that TNIS currently implements as a result of this project.

2.5.2 No impacts to the water market

Total (average annual) water savings of 800ML will be generated as a result of the TARC syphon modernisation project. These savings will be generated by reducing conveyance and seepage water losses. Upon completion, the project will see a significant decrease in the volume of water required to meet these conveyance losses and will allow a greater proportion of allocation water to be delivered to TNCL members. 50% (400ML) of these savings are proposed to be returned to the environment. These measures will ensure there are no negative impacts on current water availability and markets.

There will be no reduction in the amount of water available for consumptive use.

2.5.3 Supporting Regional Communities Economically

Irrigation in the Murray Darling Basin already makes a very considerable contribution, supporting 9,200 irrigated agriculture businesses producing $22 billion worth of food and fibre annually. The TNCL makes a relatively small but nevertheless meaningful contribution to this activity and has the potential to increase it through increased water efficiency and increased crop yields per ML of water applied. Greater confidence in the delivery of water as and when it is required to meet crop demands will underpin additional agricultural development which leads to increased economic activity and income in the region, better supporting regional communities.

Enhanced agricultural activity will also support downstream processing such as food manufacturing, product milling, animal feed production, etc. This is particularly important in the context of the Basin Plan where improved regional outcomes can mitigate some of the negative impacts of the Plan on irrigation reliant communities. The employment delivered through value adding, downstream processing and food and water related tourism are very important in building resilience through a diverse economic base. This diversity becomes even more evident in periods of drought.

Investments that result in increases in farm value added without altering intermediate inputs generate productivity improvements and result in net economic gains for the local economy. For example, as demonstrated by a 4% p.a. ($22M) increase to Murrumbidgee Irrigation Area GDP and 75 extra jobs annually as a result of the modernisation of its delivery network[2].

A large proportion of these gains have been achieved by improved quality and quantity of crop yield per unit input resulting from greater access to higher flowrates and precise irrigation methods. It has been shown that under average climate conditions (based on the 2000-01 to 2017-18 period), there has been a marginal decrease in the application rate and an increase in the yield for rice and cotton in the Southern Connected Basin[3].

Similar scaled improvements would be achievable from modernisation of the TARC syphon. In addition, it is highly likely that improvements may be more substantial, given that TNCL is well positioned to learn from any lessons that modernisation has bought to other irrigation areas (and indeed itself), and that this project complements and adds further value to an already highly modernised irrigation network.

Irrigation water supplied by TNIS is predominately used for the production of irrigated cotton. Water use and its application varies from year to year depending on seasonal conditions, water availability and commodity prices. Apart from cotton, irrigation water is used in the production of winter cereal and oilseeds, as well as for pasture production for livestock.

In addition to private production, the TNIS provides irrigation water for the Trangie Agricultural Research Centre – a 3,900 ha research facility operated by NSW Department of Primary Industries and Regional Development. It is the major publicly owned agricultural research facility for the central west of NSW. The facility has over 300 ha of developed irrigation. Water is supplied directly by TNIS through the TARC syphon to the facility. It is a major employer of highly skilled people in the region.

This project will support ongoing efforts of farmers to make every drop count and increase water productivity. The Project will leverage this investment to provide a further substantial increase to farm productivity by:

- Maintaining and improving customer service levels and system capacity through precise water control/delivery throughout the supply network;
- Improved river operations efficiency, internal irrigation network efficiency and on farm irrigation efficiency;
- Linking to on-farm efficiencies for higher overall irrigation efficiency from river to paddock;
- Providing accurate metering to ensure fair accounting of water extractions from the network;
- Increasing regional productivity through water use efficiency and supporting further agriculture development;
- Increase grower confidence through meeting customer demand.

[2] *Murrumbidgee Irrigation Automation Finalisation. Assessment against Socio-Economic criteria as part of the Off-Farm Water Efficiency Program. Griffith, NSW, 2021*

[3] *Hughes, N, Gupta, M, Soh, W, Boult, C, Lawson, K, Lu, M, Westwood, T, The Agricultural Data Integration Project. ABARES research report, Canberra, 2020*

2.5.4 No negative third-party impacts

As the TARC syphon modernisation project for the most part involves only the replacement and upgrade of existing infrastructure and is being undertaken wholly within its existing footprint, it is anticipated that there will be no negative impacts to third parties.

2.6. Water savings shared between the environment and water users

Water use within the TNCL is highly variable year to year, and is the result of several factors, including:

- Seasonal conditions experienced locally
- Water availability (which includes factors relating to seasonal allocations, availability and cost)
- Enterprise mix at the farm level
- The ability to use water – a reflection of both District and farm level infrastructure.

Taking the above fluctuations into account, it is anticipated that the implementation of the TARC syphon modernisation project will provide an average of around 800ML of direct water savings per year.

These savings are attributable to a range of factors including:

- reductions in conveyance losses as a direct result of infrastructure modernisation
- direct remediation of leaking supply delivery pipelines
- improvements in measurement accuracy
- Improved water management, resulting in improved water delivery efficiency
- Reductions in direct water losses from operation of the syphon.

Of the savings directly attributable to the project, 50% (400ML) will be returned to the Commonwealth for the use of the environment. Any additional savings that may be generated by this project would be shared between the irrigation network and its members. The water savings are shared in alignment with the principle the region is in a “net” better position with regard to socio-economic outcomes as a result of completing this project.

Further, the improvements in water supply, reliability and flexibility at the District level should result in greater efficiency gains at the individual farm level. This will be driven by individual landholders who will be encouraged to undertake further irrigation efficiency investments at the farm level, as a result of the greater confidence and reliability of water supply, and the efficiency of the delivery system which will result from this project. These additional savings have not been considered as part of the assessment of this project but will nonetheless be substantial and add significantly to the cumulative benefits of the project.

2.7. Water saving assumptions

The identified water savings were determined based on physical measurements, laboratory geotechnical assessments and a commissioned pipe inspection report, completed as components of the Feasibility Study. Specifically, water losses have been determined as a result of an in-depth study conducted by Rubicon Water as part of the Feasibility Study.

2.8. Overall value for money

The costs for the TARC syphon modernisation project have been determined primarily on the findings of individual reports completed as part of the Feasibility Study. A rigorous approach was adopted to define the major capital costs with specific costings sourced from suitably qualified organisations.

As a preface to this, industry experts were engaged to determine options to solve the water loss issue at the syphon. Two clear options were identified:

a. Decommission the existing syphon and replace 'new for old', and

b. Remediate the existing syphon.

A series of tender documents, including detailed construction and remediation technical specifications, were prepared as part of the Feasibility Study and industry was approached to develop costed and verifiable solutions for each option.

Tenders were submitted to TNCL, and an independent subject matter expert was engaged to evaluate the various options submitted in terms of meeting the technical specifications, value for money (including immediate capital cost and ongoing effectiveness) and solving the water loss issue.

From this, a series of recommendations were presented to the TNCL Management Committee. As a result of this exhaustive process, it was recommended (and endorsed by the TNCL Committee) the best solution (in terms of minimising water loss and maximising value for money) was to decommission the existing syphon and replace with an entirely new structure.

2.9. Benefits to industry

The improved water delivery efficiency and increased delivery performance that the TARC Syphon Modernisation project will deliver will enable TNCL to meet industry demands and enable regional agribusinesses to maximise their potential for sustainable production. A direct result of increased water use efficiency for irrigators is productivity gains and a 'cleaner and greener' operation as producers are able to better match water use to the requirements of the plants, and to respond to climatic conditions. It has been shown that previous automation projects conducted under PIIOP have already led to improved quantity and quality of crop yield per unit of input and improved flexibility of farm systems enabling greater

frequency and reliability of crop yield[4]. This in turn supports regional and national goals, such as the Commonwealth goal for agriculture to be a $100 billion industry by 2030[5].

Better security of water supply for irrigated production and downstream processing also underpins greater domestic food security. As seen in 2020, low water allocations combined with strong consumer demand as a result of the pandemic, led to a perfect storm of low rice supplies and excess demand for a staple product. Many crops, such as rice, require water security in order for growers to invest in planting and this project will help to offer such security. This principle and approach would be no different for TNCL.

Modernisation of the existing TNIS irrigation supply network has already led to substantial improvements in agricultural production within the TNIS and has enhanced the areas ability to be a significant food and fibre producer within the broader Murray-Darling Basin. This project will further enhance these benefits, ensure the gains already achieved continue to be realised and pave the way for additional industry opportunities into the future.

The TNIS also services the Trangie Agricultural Research Station. The provision of an effective and efficient irrigation scheme allows the research centre to undertake agricultural studies that will assist in the provision of a more sustainable and economically viable agricultural industry into the future.

2.10. Environmental benefits

In addition to the return of 400ML of water entitlements for the environment, the project will deliver local environmental benefits including:

- reduced accessions to the water table through a reduction in leakage
- reduced waterlogging at the farm level – where investment in infrastructure will improve on-farm efficiency
- reduced likelihood of 'catastrophic failure' of the infrastructure, and the consequences to downstream users, the immediate environment and the economic security of the TNCL community, and
- potential to contribute to the circular economy through reuse or recycling of existing concrete pipes (pending the condition of pipes on removal).

2.11. Cultural impacts and benefits

The TARC Syphon Modernisation project is located within the Narromine Shire Local Government Area on Wiradjuri Country. The Trangie Local Aboriginal Land Council plays a critical role in maintaining and enhancing Aboriginal culture, identity and heritage within the local area including the management of traditional sites and cultural materials.

A heritage desktop analysis of both Aboriginal and European heritage values associated with the TARC syphon site and its immediate surrounds was undertaken as a component of the Feasibility Study**.** The

[4] Marsden Jacob Associates (2017). *Economic effects of the Commonwealth water recovery programs in the Murrumbidgee Irrigation Area* Marsden Jacob Associates. Melbourne, Vic.
[5] Delivering Ag2030 - April 2022, Australian Government Department of Agriculture, Water and the Environment, 2022

results of these online searches found that there were no registered native title claims, no Aboriginal objects or sites recorded and no European heritage items within the study area.

As part of any pre-planning and planning process for the project (if approved), the Trangie Local Aboriginal Land Council will be consulted and engaged with to explore opportunities for involvement with the project.

Where possible, TNCL commits to procure products and services in line with the Australian Government's Indigenous Procurement Policy.

2.12. Supporting the Murray Darling Basin Plan

This project aligns with the objectives of the Murray Darling Basin Plan by promoting water conservation, equitable water allocation, environmental protection, climate change adaptation, and regional development. It exemplifies the basin plan's integrated and balanced approach to managing water resources for the benefit of all stakeholders and the long-term sustainability of the basin's ecosystems and communities through:

- **Water Conservation**: The project focuses on optimising water use in rural communities and agricultural operations. By reducing water losses and improving water management practices, the project contributes to overall water conservation. The project will return 400ML of water to the environment. This aligns with the basin plan's objective of ensuring a sustainable water supply for all stakeholders, including the environment.
- **Enhanced Water Allocation:** The project will minimise system losses and thereby help to maximise the allocation of available water resources to consumptive users. Appropriate water allocation is a key component of the Basin Plan's goal to balance the needs of various users.
- **Improved Environmental Outcomes:** The Murray Darling Basin Plan places significant emphasis on restoring and maintaining the health of the basin's ecosystems and water-dependent environments. By optimising water use through efficiency measures, more water can be dedicated to environmental flows, helping to protect and rejuvenate wetlands, rivers, and habitats critical for native flora and fauna.
- **Climate Change Adaptation:** As climate change impacts water availability and exacerbates drought conditions in the basin, investing in water efficiency infrastructure becomes crucial for adapting to these challenges. By minimising operational water losses, this project will assist in maximising the total volume of water available to all water users, particularly during times of low water availability (which may be the consequence of drought and/or longer-term climate change). The project's implementation enhances resilience to climate variability, which is a fundamental aspect of the basin plan's long-term vision for sustainable water management.
- **Regional Economic Development:** A well-executed water efficiency project can lead to increased agricultural productivity, economic growth and diversification in rural communities. By supporting primary producers and other water users in maximising water use efficiency and availability, this project will lead to a more sustainable, resilient and vibrant regional community and economy. It is envisaged that wherever possible regionally based suppliers and/or service providers would be used to implement this project. In addition, by maximising water availability to local water users, it helps underpin local producers, provides them with the confidence to provide ongoing, long-term employment opportunities, and will also ensure TNIS is able to continue to operate its workforce.

The project supports the healthy working basin objectives of the Murray-Darling Basin Plan. The investment in water dependent regional communities also mitigates some of the impacts of reduced water availability resulting from the Basin Plan.