WorleyParsons

resources & energy

STATE WATER CORPORATION

Chaffey Dam Augmentation and Safety Upgrade

Environmental Impact Statement
State Significant Infrastructure

301015-02980 – 301015-02980-REP-0011

7 December 2012

Infrastructure & Environment
Level 12, 141 Walker Street,
North Sydney NSW 2060
Australia
Telephone: +61 2 8923-6866
Facsimile: +61 2 8923-6877
www.worleyparsons.com
ABN 61 001 279 812

This page has been left blank intentionally

SYNOPSIS

This Environmental Impact Statement (EIS) has been prepared by WorleyParsons Services Pty Ltd to document the environmental impact assessment for the Chaffey Dam Augmentation and Safety Upgrade, which is proposed to be carried out by State Water Corporation.

The EIS has been prepared in accordance with Part 5.1 of the *Environmental Planning and Assessment Act 1979*, Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and the Director-General's Environmental Assessment Requirements for this State Significant Infrastructure project.

PROJECT 301015-02980 - CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE								
REV	DESCRIPTION	ORIG	REVIEW	QUALITY MANAGEMENT REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Issued for internal review	N Cowlishaw	S Zivanovic	N/A	N/A	4-Sep-12	N/A	
B	Reissued for internal review	N Cowlishaw	S Zivanovic	R Power	N/A	7-Sep-12	N/A	N/A
C	Issued for client review	N Cowlishaw	S Zivanovic	R Power	C Thomas	7-Sep-12	N/A	N/A
D	Reissued for internal review	N Cowlishaw	S Zivanovic	R Power	N/A	12-Oct-12	N/A	N/A
E	Issued for agency review	N Cowlishaw	S Zivanovic	R Power	C Thomas	18-Oct-12	N/A	N/A
F	Issued for State Water review	N Cowlishaw	S Zivanovic	R Power	C Thomas	07-Nov-12	N/A	N/A
0	Issued for use	N Cowlishaw	S Zivanovic	R Power	C Thomas	09-Nov-12	J Khan	09-Nov-12
1	Reissued for use	N Cowlishaw	S Zivanovic	R Power	C Thomas	07-Dec-12	J Khan	07-Dec-12

This page has been left blank intentionally

CONTENTS

TABLES

FIGURES

APPENDICES

TERMS AND ACCRONYMS

Acronym / Term	Definition
ABS	Australian Bureau of Statistics
Account water	The balance in an access licence water allocation account at a particular time.
ACT	Australian Capital Territory
AEP	Annual exceedance probability
AHD	Australian Height Datum
Alluvial	Applying to the environments, actions, and products of rivers or streams.
Alluvium	Clay or silt or gravel (sediment) carried by rivers or streams and deposited where the stream slows down.
ANCOLD	Australian National Committee on Large Dams
ANZECC	Australian and New Zealand Environment and Conservation Council
Aquifer	A water-saturated geologic unit that is capable of transmitting significant or usable quantities of groundwater under ordinary hydraulic gradients.
ARI	Average recurrence interval
Catchment	The area of land drained by a creek or river system, or a place set aside for collecting water which runs off the surface of the land. Catchments provide the source of water for the dams and reservoirs in which our drinking water is collected.
CEMP	Construction Environmental Management Plan
Climate Change	Any change in global temperatures and precipitation over time due to natural variability or to human activity.
CMA	Catchment Management Authority
CMSS	Catchment Management Support System
CPP	Certified Practicing Planner
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTMP	Construction Traffic Management Plan
DEC	Department of Environment and Conservation

Acronym / Term	Definition
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DGRs	Director-General's Environmental Assessment Requirements
DLWC	Department of Land and Water Conservation
DP	Deposited Plan
DPI	Department of Primary Industries
EIA	Environmental impact assessment
EIS	Environmental Impact Statement
EL	Exploration Licence
ELA	Exploration Licence Application
Endangered ecological community (EEC)	Ecological community listed in Schedule one of the *Threatened Species Conservation Act 1995* or Schedule 4 of the *Fisheries Management Act 1994*.
ENM	Environmental Noise Model
Environmental contingency allowance (ECA)	A volume of water held in storage from which releases are made for particular environmental purposes or in response to particular environmental circumstances.
Environmental releases	Natural flows or releases of water, intend to supply the environment's needs.
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Ephemeral River	Rivers are generally storm-event driven and flow occurs less than 20% of the time; these rivers have limited baseflow component with no groundwater discharge during the no flow period.
Epilimnion	Warm upper layer of water resulting from thermal stratification. Overlies the hypolimnion.
Erosion	The process by which material, such as rock or soil, is worn away or removed by wind or water.
Eutrophication	A process where a water body receive excess nutrients that stimulate excessive plant growth.
Fluvial	Material deposited by moving water.

Acronym / Term	Definition
Fluvial Deposits	All material, past and present, deposited by flowing water.
FRP	Filterable reactive phosphorus
FSL	Full supply level
GL	Gigalitres
Groundwater	All the water contained in the pores/voids within unconsolidated sediments or consolidated rocks (i.e. bedrock).
ha	Hectares
Hypolimnion	Cold lower layer of water resulting from thermal stratification. Underlies the epilimnion.
ICNG	NSW Interim Construction Noise Guideline
INP	NSW Industrial Noise Policy
Integrated Quantity/Quality Model (IQQM)	A numerical hydrologic computer model that simulates a river basin's behaviour on a daily time step, based on inflows to the system, configuration of the major infrastructure, routing and losses of flows through the system and irrigation extractions to meet crop water requirements. It also models the processes of available water determinations, uncontrolled flow, supplementary water announcements and irrigator planting decisions. This model is used to analyse and compare the outcomes of proposed water sharing options or assess potential growth-in-use over long-term climatic sequences (> 100 years).
IPART	Independent Pricing and Regulatory Tribunal
Irrigation	The controlled application of water to cropland, hay fields, and/or pasture to supplement that supplied by nature.
km	Kilometres
LGA	Local Government Area
Long-term average annual extraction limit (LTAAEL)	The target for total extractions (under all water access licences plus an estimate of basic landholder rights within an EMU) which is used to assess whether growth-in-use has occurred. The actual annual extractions (metered plus estimated) are averaged over a fixed period of time defined by the water sharing plan when comparing with the LTAAEL. If the fixed period of time is greater than one water year, then in any one water year, extractions can exceed the LTAAEL without triggering a growth-in-use response.
m	Metre

Acronym / Term	Definition
MDBC	Murray-Darling Basin Commission
MDBMC	Murray-Darling Basin Ministerial Council
MHL	Manly Hydraulics Laboratory
ML	Megalitres
NES	National environmental significance
NSW	New South Wales
Nutrients	Any substance that promotes growth with living organisms. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.
NWES	North West Ecological Services
OEH	Office of Environment and Heritage
PADs	Potential Archaeological Deposits
PAG	Peel Advisory Group
Peel Valley Water Sharing Plan	Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010
PM10	Particulate matter 10 micrometres or less in diameter
PM2.5	Particulate matter 2.5 micrometres or less in diameter
PMF	Probable maximum flood
PO4	Orthophosphate
POEO Act	*Protection of the Environment Operations Act 1997*
Pool and riffle sequence	Occurs where a stream's hydrological flow structure alternates from relatively shallow areas to deeper water. This sequence is present only in streams carrying gravel or coarser sediments. Riffles are formed in shallow areas by coarser materials such as gravel deposits over which water flows. Pools are deeper and calmer areas whose bed load (in general) is made up of finer material such as silt.
RBL	Rating Background Level
Regulated Water Source	The supply of water in regulated rivers is typically controlled by releases of water from dams rather than being dependent solely on rainfall and natural river flows.
Rehabilitation	To restore to former condition or status.
Reservoir	The body of water built up behind the dam wall.

Acronym / Term	Definition
Revegetation	The process of providing denuded land with a new cover of plants.
RMS	Roads and Maritime Services
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
SES	State Emergency Service
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SIS	Species Impact Statement
t	Tonne
TAPM	The Air Pollution Model
The Project	Chaffey Dam Augmentation and Safety Upgrade Project
Thermocline	Transition layer of water resulting from thermal stratification that separates the epilimnion and hypolimnion.
TSC Act	*Threatened Species Conservation Act 1995*
TSP	Total Suspended Particulate
Unregulated Water Source	The supply of water in unregulated rivers is typically not controlled by releases of water from dams but rather is dependent solely on rainfall and natural river flows.

STATEMENT OF VALIDITY

Environmental Impact Statement prepared by:

Name	Nicole Cowlishaw
Qualifications	Bachelor of Environmental Science (First Class Honours)
Address	Level 12, 141 Walker Street, North Sydney, NSW

Environmental Impact Statement reviewed by:

Name	Sofie Zivanovic
Qualifications	Bachelor of Science – Geography and Environmental Science
	Master of Applied Science (Coastal Management) – Coastal Engineering and Marine Science
Address	Level 12, 141 Walker Street, North Sydney, NSW

Environmental Impact Statement reviewed and approved by:

Name	Christopher Thomas
Qualifications	Bachelor of Engineering (Civil) (Honours)
	Master of Engineering Science (Water Resources)
Address	Level 12, 141 Walker Street, North Sydney, NSW

Quality Management review undertaken by:

Name	Robert Power
Qualifications	Certified Practicing Planner (CPP)
Address	Level 12, 141 Walker Street, North Sydney, NSW

Applicant Name	State Water Corporation
Applicant Address	PO Box 1604 Sydney NSW 2001
Project Site	The land within and surrounding Chaffey Dam as described throughout this Environmental Impact Statement
Proposed Development	Augmentation and Safety Upgrade of Chaffey Dam, road and bridge realignment and relocation of existing facilities as described throughout this Environmental Impact Statement

Certificate

I certify that I have prepared the content of the EIS and to the best of my knowledge:

- It is in accordance with Part 5.1 of the *Environmental Planning and Assessment Act 1979* and Schedule 2 of the Environmental Planning and Assessment Regulation 2000;
- It contains all available information that is relevant to the environmental assessment of the infrastructure to which the statement relates; and
- The information contained in the statement is neither false nor misleading.

Name: Nicole Cowlishaw

Signature:

Date: 7 December 2012

EXECUTIVE SUMMARY

WorleyParsons Services Pty Ltd (WorleyParsons) has been commissioned by State Water Corporation (State Water) to undertake an environmental impact assessment (EIA), including preparation of an Environmental Impact Statement (EIS), for the proposed Chaffey Dam Augmentation and Safety Upgrade Project (the Project).

The EIS describes the Project Site and its environs, the proposed development, an assessment of the potential impacts of the Project, and recommended mitigation measures to manage potential environmental impacts.

The EIS accompanies a State Significant Infrastructure Application, submitted to the Minister for Planning and Infrastructure pursuant to Part 5.1, Division 2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The State Significant Infrastructure Application seeks approval for the Chaffey Dam Augmentation and Safety Upgrade works, as described in Section 4 of the EIS.

On 29 August 2012, State Water referred the Project to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 28 September 2012, SEWPaC provided its determination that the Project comprised a controlled action. SEWPaC determined that the Project would be assessed for the purposes of the EPBC Act through accredited assessment under Part 5.1 of the EP&A Act. On 19 October 2012, Supplementary DGRs were issued for the Project in relation to assessment of impacts to threatened species and communities under the EPBC Act.

The EIS has been prepared in accordance with the Director-General's Environmental Assessment Requirements (DGRs) issued on 23 January 2012 and the Supplementary DGRs issued on 19 October 2012 pursuant to Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

Project Site

Chaffey Dam is located on the Peel River approximately 30 kilometres (km) south east of Tamworth, in northern New South Wales (NSW). The dam and its catchment are wholly located within the Tamworth Regional Local Government Area (LGA). The town of Woolomin is located approximately 6 km north of the dam wall, downstream on the Peel River. The town of Nundle is located approximately 13 km south of the dam wall.

Chaffey Dam is owned and operated by State Water and stores water that is used as the town water supply for Tamworth and for irrigation purposes. It currently has a storage capacity of 62 gigalitres (GL), a reservoir surface area of 542 hectares (ha) and a catchment area of 420 km^2.

Chaffey Dam is located within the Peel Valley, which has been highly modified since European settlement as a result of grazing, cropping and intensive agriculture, forestry, mining and rural development. The area surrounding Chaffey Dam is largely cleared and has historically been used for agricultural purposes and gold mining. Areas of sparse native vegetation remain, with pockets of more dense vegetation occurring on steeper grades, particularly at the northern extent of the dam.

The Project Site comprises the existing Chaffey Dam (the dam wall, spillways and reservoir) and additional Crown, leasehold and freehold land to be inundated and land for realignment of roads (including works areas).

Project Description

The Project comprises the augmentation and safety upgrade of the existing Chaffey Dam. The Project will result in an increase to the Full Supply Level (FSL) of 6.5 m and an increase in the permanent storage capacity from 62 GL to 100 GL.

Construction works to achieve the required outcomes will include raising the dam wall by 8.4 m, raising the morning glory spillway by 6.5 m and reconfiguration of the auxiliary spillway fuseplug.

Realignment of roads, limited to parts of Tamworth-Nundle Road, Rivers Road, Western Foreshore Road[1] and bridges, limited to Bowling Alley Point Bridge, Hydes Creek Bridge and a culvert crossing at Silver Gully, are required due to the increased FSL.

Relocation of some facilities at the Bowling Alley Point Recreation Area and the South Bowlo Fishing Club is also required due to the increased FSL. As part of the Project, the South Bowlo Fishing Club facilities will be relocated to higher ground, proximate to their existing locations.

State Water is also committed to the relocation of impacted facilities at the Bowling Alley Point Recreation Area and is currently liaising with the Department of Lands to define suitable land for the relocation of these facilities. This relocation will be the subject of additional approvals (as required) when plans are complete.

The Project will result in an increase in the 100 year average recurrence interval (ARI) flood level and the Probable Maximum Flood (PMF) level around the perimeter of the reservoir.

Need for the Project and Alternatives Considered

Based on the population at risk and the severity of damage and loss that would result from dam failure, Chaffey Dam is currently rated as an “extreme” hazard dam, and is considered to be inadequate for the safe passage of a PMF (Dams Safety Committee 2009). If Chaffey Dam were to fail due to an extreme flood event, it has been estimated that up to 150 lives would be lost and over $2.1 billion in damages to property and agriculture would accrue (GHD 2007a).

[1] Western Foreshore Road is also known as Westbank Road

Some upgrade works have been completed at Chaffey Dam over the past decade to provide interim flood safety measures. However, implementation of the Project is required for the dam to meet current Australian National Committee on Large Dams (ANCOLD) and Dams Safety Committee safety standards for high hazard dams.

Chaffey Dam is also the primary water storage reservoir serving the town water supply for Tamworth. Tamworth Regional Council has a high security entitlement of 16,400 megalitres (ML) per year from Chaffey Dam. Water from the reservoir is also used for irrigation and agricultural purposes.

GHD (2007a) carried out an assessment of long-term options for Chaffey Dam, taking into consideration the improved system reliability that could be achieved through the augmentation. The assessment concluded that augmentation of Chaffey Dam is required to meet the future needs of the region by securing the supply of water to Tamworth up to the existing entitlement (16,400 ML). The Project will not change the entitlement itself. Assuming high population growth, Tamworth will require use of its full entitlement by 2033 (GHD 2006). Augmentation to 100 GL was shown to provide a sufficient increase in security of supply for high security and irrigation requirements, as well as a contingency for possible adverse events, including those resulting from climate change.

Relationship with the Peel Valley Water Sharing Plan

The Project was considered during the planning process for the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010 (Peel Valley Water Sharing Plan) (NSW Government 2010). Although the proposed works to the morning glory offtake will preserve the existing downstream stage-discharge relationship (Black & Veatch 2012), from a water sharing perspective, implementation of the Project will result in several management changes, as required by the Peel Valley Water Sharing Plan. All management changes under an augmented dam, including planned environmental water, are either explicitly written into the Peel Valley Water Sharing Plan or provided for through amendment clauses.

The Peel Valley Water Sharing Plan demonstrates that an enlarged Chaffey Dam will not result in a growth in extractions (NSW Office of Water 2010a).

As the impacts of management changes required by the Peel Valley Water Sharing Plan following augmentation of Chaffey Dam have been assessed (including public consultation) and approved, these impacts are not considered further in the EIS. The use of water from Chaffey Dam will continue to be managed in accordance with the approved Peel Valley Water Sharing Plan following implementation of the Project.

Stakeholder Consultation

A range of consultation activities were undertaken with the community and stakeholders over a period of four months between May and August 2012.to These activities aimed to inform the community of the Project and to seek comment and input. Specific engagement was undertaken with the aim of

identifying stakeholders' issues and ensuring that these issues were appropriately assessed and responded to either directly or in the EIS.

The key consultation activities comprised a risk workshop, establishment of a Project website, a mail-out to all land owners within and adjoining the site, an informal consultation day barbecue at Chaffey Dam, a formal consultation night in Tamworth and several community consultation drop-in sessions, all of which were open to the general public. State Water has separately liaised with all land owners who will be impacted by the proposed new FSL and road realignments.

Questions and issues raised by stakeholders during consultation activities have been addressed in detail in the EIS. Key issues raised related to land use and socioeconomic impacts.

State Water will consider the feedback from public exhibition of this EIS and will respond to submissions in a Submissions Report. State Water is committed to continuing its stakeholder engagement program throughout the assessment and construction phases of the Project.

Potential Impacts and Proposed Mitigation

Environmental assessments were carried out for the key issues identified for the Project in the DGRs, Supplementary DGRs and through an Environmental Risk Analysis. The key issues comprised:

- Soil and water
- Biodiversity
- Aboriginal heritage
- Historic heritage
- Traffic and transport
- Noise and vibration
- Air quality
- Visual amenity
- Land use, property and socioeconomic
- Spoil and waste management
- Hazards and risk

It is considered that the Project is likely to result in significant socioeconomic benefits. With the exception of land use and property impacts, soil and water, biodiversity and Aboriginal heritage, all issues are considered to be readily managed through standard mitigation measures, as described in the EIS. In relation to historic heritage, one locally listed heritage item, the Iron Footbridge, will be impacted by the new FSL and is proposed to be relocated. Additionally, Chaffey Dam is proposed to be reinstated to State Water's Section 170 Heritage and Conservation Register. Minor impacts to this item will result, however the Project will reinforce and increase the social and cultural significance of Chaffey Dam, its continued operation, performance and its role in supply the Tamworth region.

The potential impacts and proposed mitigation for land use and property impacts, soil and water, biodiversity, Aboriginal heritage and the socioeconomic environment are discussed below.

Land Use and Property Impacts

Relocation of some facilities at the South Bowlo Fishing Club and the Bowling Alley Point Recreation Area is proposed due to the increased FSL. Facilities below the new FSL at the South Bowlo Fishing Club and the Bowling Alley Point Recreation Area will be relocated to higher ground, proximate to their existing respective locations.

In relation to impacts of the Project on property, where land is within the new FSL or is within the proposed road realignment boundary, State Water proposes to acquire the part of the land that is impacted. Where State Water expects land may be regularly affected in order to manage the storage and associated works, such that the ability of the landowner to engage in ordinary usage of the land is affected, State Water will seek to acquire easements or full title depending on the level of impact.

Soil and water

Inundation of upstream land and tributaries will result from implementation of the Project. This is expected to cause a reduction in the area of land used for agricultural purposes; submergence of soils; submergence of existing terrestrial vegetation; increase in the reservoir perimeter; increase in aquatic lake environment; and decrease in aquatic stream environment. Review and continued implementation of the Chaffey Dam Foreshore Management Plan (Report for Site Specific Action Plans Chaffey, GHD 2010) will minimise the impacts associated with inundation of upstream land and tributaries.

Sedimentation and erosion, as well as impacts from construction wastes, have the potential to occur during construction, but are readily managed through the implementation of appropriate mitigation measures, as described in the EIS.

Biodiversity

A Terrestrial and Aquatic Flora and Fauna Impact Assessment was carried out by nghenvironmental Pty Ltd (nghenvironmental), including desk top investigations, flora and fauna surveys and assessment of the potential for the Project to impact on species and communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) and EPBC Act.

A desktop investigation was carried out to review and assess existing available information relevant to the Project Site and to inform field surveys.

Terrestrial and aquatic flora and fauna surveys were conducted within and surrounding the areas to be impacted by the Project in autumn 2012 (Survey 1) and spring 2012 (Survey 2). The surveys were carried out in order to assess the potential ecological impacts of the Project. Consultation was undertaken with the NSW Office of Environment and Heritage (OEH), NSW Department of Primary Industries (DPI) Fisheries, Namoi Catchment Management Authority (CMA) and SEWPaC to seek their input on the survey methodology.

No threatened flora species were detected during Survey 1 or Survey 2. It is considered unlikely that the threatened species Small Snake Orchid (*Diuris pedunculata*), Dungowan Star-bush (*Asterolasia sp. "Dungowan Creek"*) or *Euphrasia arguta* occur within the Project Site.

A record from 2003 of Queensland Bluegrass (*Dichanthium sericium*), which is listed as vulnerable under both the TSC Act and the EPBC Act, occurs adjacent (to the east) of the Project Site. Although this species was not identified during the field surveys, similar habitat to that of the previous record occurs in the Project Site and as such, it is considered that the species may occur within the Project Site. Using the precautionary principle, it is assumed that a population of Queensland Bluegrass may exist within the Project Site and could be significantly impacted by the Project. Surveys will be carried out by Namoi CMA and State Water during the summer (when the species reproduces and is most detectable) of December 2012 and January 2013 to confirm the presence or absence of this species in the Project Site. If the surveys find this species to be absent from the Project Site, the impact is unlikely to be significant.

Box-gum woodland and derived grassland vegetation communities within the Project Site are considered to comprise the White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community (EEC) listed under the TSC Act. Better quality remnants of the Box-gum woodland in good condition are also considered to meet the definition of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community (CEEC) listed under the EPBC Act. The Project will not significantly impact the TSC Act or EPBC Act listed communities. Nonetheless, appropriate mitigation measures and offsets will be implemented to ensure a net positive 'maintain or improve' outcome is achieved.

The Border Thick-tailed Gecko (*Uvidicolus sphyrurus*), which is listed as vulnerable under both the TSC Act and EPBC Act, will be impacted by construction activities on the dam wall. These activities will result in the temporary unavailability of habitat created by the dam wall. Given the species' occurrence in surrounding areas and the likelihood that it will recolonise the dam wall post construction, the impact of the Project on this species is unlikely to be significant. Nevertheless, a Border Thick-tailed Gecko Management Plan will be developed and implemented to minimise impacts and ongoing threats to this species within the Project Site.

The Project will result in the inundation of approximately 0.27 ha of known and potential Booroolong Frog (*Litoria booroolongensis*) habitat on the Peel River. This species is listed as endangered under both the TSC Act and the EPBC Act. A further 0.53 ha of potential Booroolong Frog habitat was mapped within a 1.7 km stretch of the Peel River, immediately upstream of the impacted area. Existing information suggests there is at least a further 8.5 km of suitable habitat for the species upstream of the mapped area (Anna Cronin Namoi CMA *pers.comm.*).

The area to be impacted includes an area previously recorded by NWES (2009b) as supporting a large population of the Booroolong Frog. Consequently, inundation to the new full supply level (FSL) may result in the loss of individuals of this species. Inundation will be gradual and occur over a period of time (a minimum of between eight and 21 weeks, although more likely taking several years) that

may allow upstream migration of the frogs. In order to manage Project impacts to the species, it is proposed to develop and implement a Booroolong Frog Management Plan, including provision for post-construction monitoring for a minimum of two years to monitor the success of the Management Plan. This will be dependent on the rate of inundation and consultation with the relevant parties (e.g. Namoi CMA), relocation of juvenile frogs upstream and threat mitigation in upstream areas of potential and known habitat.

Given the number of individuals that may be impacted by inundation to the new FSL, the Terrestrial and Aquatic Flora and Fauna Impact Assessment concluded that the Project is likely to have a significant impact on the local Booroolong Frog population immediately upstream of Chaffey Dam. However, the Terrestrial and Aquatic Flora and Fauna Impact Assessment concluded that this impact will be localised and the impact to the species across its range is unlikely to be significant. This conclusion will be reviewed following completion of additional surveys in summer 2012 / 2013.

In order to satisfy the provisions of the EP&A Act and the EPBC Act, offsets will be implemented for the Project. Based on preliminary scenarios developed using the EPBC Offset Assessment Guide, sufficient suitable area is available in the immediate vicinity of the Project area for use as offset sites for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC, Queensland Bluegrass and the Booroolong Frog.

State Water will undertake additional biodiversity surveys during summer 2012 / 2013 to further inform the biodiversity assessment for the Project in relation to Queensland Bluegrass and the Booroolong Frog. These summer surveys will form the basis for preparing final offset calculations in accordance with State and Commonwealth legislation and relevant offset policies.

The results of the summer surveys will be provided in either a Supplementary Report to be submitted to the Department of Planning in January / February 2013, a submissions report or a Preferred Infrastructure Report (PIR) prepared for the Project.

Aboriginal heritage

Consultation with Aboriginal stakeholders was carried out for the Project in accordance with the then Department of Environment, Climate Change and Water (now OEH) *Aboriginal cultural heritage consultation requirements for proponents 2010* (the 2010 Consultation Guidelines; DECCW 2010). The 2010 Consultation Guidelines supersede the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (the 2005 Draft Consultation Guidelines; DEC 2005b) and provide a more stringent process, which meets and exceeds the requirements under the 2005 Draft Consultation Guidelines. As such, the requirements under the 2005 Draft Consultation Guidelines have been satisfied.

Registered Aboriginal stakeholders attended a site visit on 28 September 2012. Copies of the Draft Aboriginal Cultural Heritage Assessment were also provided to registered Aboriginal stakeholders for comment. No comments were received.

Aboriginal heritage investigations carried out by Navin Officer Heritage Consultants for the Project recorded a total of 41 Aboriginal heritage items (comprising sites and Potential Archaeological Deposits, PADs) within and surrounding the Project Site. Of these items, 22 will be impacted via inundation only, three will be impacted by road construction activities and six will be impacted by inundation and road construction activities. Ten of the items will not be impacted directly or indirectly by the Project. The majority of the sites recorded within and surrounding the Project Site are of low to moderate archaeological significance at a local level.

In order to minimise impacts to Aboriginal heritage sites, avoidance of sites will be carried out wherever possible during construction activities, in particular road realignment works. Areas of PAD expected to be directly impacted will be investigated prior to commencement of the relevant construction activities in order to determine their significance and arrange for salvage where warranted.

Where impacts cannot be avoided to Aboriginal heritage sites, registered Aboriginal stakeholders have requested that salvage of artefacts for relocation be carried out in consultation with Aboriginal stakeholders.

Conclusion

The Project has been identified by the Minister for Planning and Infrastructure as a State Significant Infrastructure project. It is necessary to improve town water security for the city of Tamworth and surrounds and to improve the reliability of water supply for irrigation and agricultural purposes. The other key driver for the Project is the need for Chaffey Dam to be upgraded to meet modern dam safety standards. The Project has wide support from the community, irrigators and Tamworth Regional Council. Local, State and Commonwealth Governments have committed to fund the Project.

Construction of the Project will create employment opportunities for the area, both locally and regionally. Employment opportunities for up to 50 personnel will be created during the construction period through direct employment on the Project. Additional employment opportunities will also result from the provision of services for construction.

Operation of the Project will also provide positive socioeconomic impacts through increased water security for Tamworth residents and Peel Valley irrigators. Increased water security is expected to benefit the agriculture industry in the area, which together with the forestry and fisheries industries, employs the largest proportion of persons located outside Tamworth City, comprising 16.5% of total employed population (ABS 2006). The agricultural industry contributes significantly to the economy of the Tamworth region, with the gross value of production estimated at over $75 million (NSW Office of Water 2010a).

The Project will also provide socioeconomic benefits by reducing the risk of dam failure. If the dam were to fail due to an extreme flood event, it has been estimated that up to 150 lives would be lost and over $2.1 billion damage to property and agriculture would accrue GHD 2007a).

Although some detrimental socioeconomic impacts are expected to result by way of impact to existing land uses and property, where possible, the Project proposes to accommodate relocation of land uses and is anticipated to result in an overall socioeconomic benefit, both locally and regionally.

The EIS has assessed the key issues outlined in the DGRs and additional issues identified through the environmental risk analysis. Where impacts have been identified these are proposed to be mitigated in accordance with relevant State and Commonwealth environmental management requirements. All identified impacts, except those to soil and water, biodiversity and Aboriginal heritage are considered to be readily managed through standard mitigation measures, as described in the EIS.

The Project will have minor impacts on items of Aboriginal heritage and soil and water. Specific mitigation measures and management plans are proposed for these items.

In relation to potential significant adverse impacts of the project, the Project is likely to have a significant impact on the local population of the Booroolong Frog and, if present, Queensland Bluegrass. An Offsets Strategy has been prepared and an Offset Proposal to address the requirements of State and Commonwealth legislation will be implemented to compensate for biodiversity impacts. No other significant adverse impacts are anticipated.

Having regard to the proposed mitigation measures, management plans and offset strategy it is considered that the Project will not give rise to any significant adverse socio, economic or environmental impacts and is in the public interest.

The Project satisfies the relevant Objects of the EP&A Act with regard to the

- The proper management and development of natural resources;
- The promotion and co-ordination of the orderly and economic use and development of land;
- The protection of the environment including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities and their habitat; and
- Ecologically sustainable development.

It is considered that the Project will have a significant socioeconomic benefit, both locally and regionally, through increased water security and dam safety.

1 INTRODUCTION

WorleyParsons Services Pty Ltd (WorleyParsons) has been commissioned by State Water Corporation (State Water) to undertake an environmental impact assessment (EIA), including preparation of an Environmental Impact Statement (EIS), for the proposed Chaffey Dam Augmentation and Safety Upgrade Project (the Project).

The EIS describes the Project site and its environs, the proposed development, an assessment of the potential impacts of the proposal, and recommended mitigation measures to manage potential environmental impacts.

The EIS accompanies a State Significant Infrastructure Application, submitted to the Minister for Planning and Infrastructure pursuant to Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The State Significant Infrastructure Application seeks approval for the Chaffey Dam Augmentation and Safety Upgrade works, as described in Section 4 of the EIS.

On 29 August 2012, State Water referred the Project to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 28 September 2012, SEWPaC provided its determination that the Project comprised a controlled action. SEWPaC determined that the Project would be assessed for the purposes of the EPBC Act through accredited assessment under Part 5.1 of the EP&A Act. The EIS has been prepared in accordance with the Director-General's Environmental Assessment Requirements (DGRs) issued on 23 January 2012 pursuant to Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

As the Project has been determined as a controlled action pursuant to the EPBC Act, Supplementary DGRs were issued on 19 October 2012 in relation to assessment of impacts to threatened species and communities under the EPBC Act.

The information relied upon in the preparation of this EIS has been sourced wherever possible from recent literature, published by specialists and government agencies. Peer reviewed literature has been utilised where available. The EIS and supporting specialist studies have been prepared by qualified and experienced personnel.

1.1 Proposed Project

The Project includes the following components:

- Augmentation of Chaffey Dam from its existing storage capacity of 62 GL at full supply level (FSL) to 100 GL at FSL, through raising of the dam wall by 8.4 m and raising of the morning glory spillway by 6.5 m;
- Reconfiguration of the existing auxiliary spillway to enable staged release of flood flows;
- Realignment of roads and bridges, limited to parts of Tamworth-Nundle Road, Rivers Road, Western Foreshore Road[2] and Bowling Alley Point Bridge; and,
- Relocation of impacted facilities at the Bowling Alley Point Recreation Area and the South Bowlo Fishing Club.

The location of the Project is shown in Figure 1-1.

[2] Western Foreshore Road is also known as Westbank Road

320000

325000

6530000

6530000

6525000

6525000

N

INSET 1 - 1:10,000

N

0 250 500

Metres

INSET 2 - 1:12,500

N

INSET 3 - 1:20,000

N

0 250 500

Metres

0 250 500

Metres

LEGEND

- ROAD REALIGNMENT
- ROAD REALIGNMENT BATTERS
- WORKS AREA
- EXISTING FULL SUPPLY LEVEL
- NEW FULL SUPPLY LEVEL
- NEW 1 IN 100 YEAR FLOOD LEVEL
- NEW PROBABLE MAX FLOOD LEVEL

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

AERIAL IMAGERY BY GEOSPECTRUM (TAKEN 29.08.2011). ALTERNATE IMAGERY BY ESRI

320000

325000

WorleyParsons

resources & energy

State water

N

0 0.25 0.5 1 1.5 2

Kilometres @ A3

Datum : GDA94
Map Grid of Australia
Zone 56

LOCATION PLAN

TAMWORTH

NUNDLE

PORT MACQUARIE

NEWCASTLE

N

CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE

PROJECT LAYOUT

DATE : 28 Aug 2012
SCALE : 1:30,000
CUSTOMER : STATE WATER
AUTHOR : RW
REF : 301015-02980-GIS-SKT-003.mxd
REV : A1

Produced By: ryan.wright@worleyparsons.com - Geomatics

Location: \301015-02980 CHAFFEY DAM\03Project\Workspace_SKT\301015-02980-GIS-SKT-003

1.2 Project Objectives

The Project aims to improve town water security for Tamworth, improve the reliability of water supply for irrigation and agricultural purposes and to meet modern dam safety standards.

The key project objectives are:

- Safety upgrade - to enable the dam to comply with the Australian National Committee on Large Dams (ANCOLD) and Dams Safety Committee safety standards for high hazard dams;
- Augmentation - to provide greater reliability of supply for the Tamworth Regional Local Government Area (LGA) including Tamworth City town water supply and Peel Valley irrigation supply;
- Minimise adverse environmental impacts - to ensure potential adverse environmental impacts are minimised as far as practicable, including consideration of environmental improvements where possible; and
- Economic benefits - to provide economic benefits to the local community and businesses through employment and supply of goods and services during construction.

1.3 Project Team

To assist in the preparation of the EIS, an expert team was formed comprising the following specialist environmental consultancy firms:

Better Transport Futures	Traffic and Transport
Navin Officer Heritage Consultants	Aboriginal Heritage
nghenvironmental	Biodiversity
SLR Consulting	Air Quality, Noise and Vibration
WorleyParsons	Statutory Planning, Stakeholder Consultation, Environmental Risk Analysis, Soil and Water, European Heritage, Visual Amenity, Land Use, Socioeconomic, Spoil and Waste, Hazards and Risks

1.4 Project Proponent

The Proponent for the Project is State Water Corporation (State Water), of postal address PO Box 1604 Sydney NSW 2001.

State Water's environmental record is as follows:

- On 7 November 2007, State Water was issued with a Clean Up Notice (EPA ref#1077949) under Section 91 of the NSW *Protection of the Environment Operations Act 1997* (POEO Act)
- On 24 March 2008, Clean Up Notice EPA ref#1077949 was varied (EPA ref#1084003) under Section 110 of the POEO Act; and
- No other proceedings against State Water are known to the Proponent.

A copy of State Water's Environmental Policy is provided at Appendix 15. Details of State Water's environmental management and planning framework are described in the State Water Environmental Management Plan 2011 – 2016, as provided at Appendix 15.

2 SITE ANALYSIS

Chaffey Dam is located on the Peel River approximately 30 kilometres (km) south east of Tamworth, in northern New South Wales (NSW). The dam and its catchment are wholly located within the Tamworth Regional LGA (refer Figure 1-1). The town of Woolomin is located approximately 6 km north of the dam wall and downstream of the dam on the Peel River. The town of Nundle is located approximately 13 km south of the dam wall.

The dam was constructed between 1976 and 1979 and comprises a 54 metre (m) high earth and rockfill embankment with a crest length of approximately 430 m. A morning glory spillway at the dam allows excess water to pass through the dam and to be discharged downstream to the Peel River. Construction of a 35 m wide auxiliary spillway with fuseplug was completed in February 2011. This spillway is located on the left abutment of the dam and allows extreme flood flows to pass around the dam.

Chaffey Dam is owned and operated by State Water and stores water that is used as the town water supply for Tamworth and for irrigation purposes. It currently has a storage capacity of 62 gigalitres (GL), a reservoir surface area of 542 hectares (ha) and a catchment area of 420 km^2. Each year the reservoir supplies approximately 9 GL of potable town water to Tamworth and approximately 6.6 GL of irrigation water to downstream landholders (Molino Stewart 2011).

In operating Chaffey Dam, State Water releases water to meet water orders, basic landholder rights plus system losses, taking into account tributary inflows. A significant amount of water is lost annually to the Peel Alluvium, as well as minor losses associated with evaporation.

2.1 Legal Description of Land

The Project Site includes land within and surrounding the existing Chaffey Dam. The Lot, Section (where relevant) and Deposited Plans (DPs) which comprise the Project Site are described Table 2-1.

Table 2-1: Description of Project Site by Lot and Deposited Plan (DP)

Lot	DP	Lot	DP	Lot	DP	Lot	DP
7001	96451	3	719760	115	755324	3 (Section 13)	758020
7002	96452	4	719760	129	755324	4 (Section 7)	758020
7011	96454	5	719760	139	755324	4 (Section 8)	758020
7022	96455	6	719760	149	755324	4 (Section 12)	758020
4	111770	7	719760	155	755324	4 (Section 13)	758020
5	111770	308	723511	156	755324	5 (Section 7)	758020
6	111770	307	724509	158	755324	5 (Section 8)	758020
7	111770	1	744739	159	755324	5 (Section 12)	758020
8	111770	3	755324	160	755324	6 (Section 7)	758020
10	111770	4	755324	192	755324	6 (Section 8)	758020
11	111770	5	755324	219	755324	6 (Section 12)	758020
1	126791	6	755324	225	755324	7 (Section 7)	758020
1	161950	7	755324	226	755324	7 (Section 8)	758020
1	241578	12	755324	227	755324	7 (Section 12)	758020
2	241578	13	755324	228	755324	8 (Section 7)	758020
3	241578	14	755324	229	755324	8 (Section 8)	758020
4	241578	15	755324	230	755324	8 (Section 12)	758020
1	252679	16	755324	231	755324	9 (Section 7)	758020
2	252679	17	755324	232	755324	9 (Section 8)	758020
3	252679	19	755324	236	755324	10 (Section 7)	758020
9	260040	30	755324	237	755324	10 (Section 8)	758020
1	260741	32	755324	238	755324	10 (Section 12)	758020
1	261290	33	755324	239	755324	1640	1177614
2	261290	34	755324	240	755324	1	775371
3	261290	35	755324	241	755324	2	775371
4	261290	36	755324	249	755324	3	775371
7	261290	38	755324	257	755324	1	914747
8	261290	39	755324	261	755324	2	914747
1	585684	40	755324	264	755324	3	914747
2	585684	41	755324	276	755324	1	955377
1	589247	43	755324	284	755324	2	955377

Lot	DP	Lot	DP	Lot	DP	Lot	DP
2	589247	45	755324	285	755324	3	955377
1	598184	50	755324	287	755324	7023	1066124
2	598184	51	755324	288	755324	7024	1066124
3	598184	52	755324	291	755324	7025	1066125
3	611964	53	755324	293	755324	11	1092777
4	611964	54	755324	294	755324	7302	1125133
1	615111	56	755324	295	755324	10	1125418
2	615111	68	755324	1	758020	5	1139917
1	631895	69	755324	1 (Section 7)	758020	6	1139917
2	631895	70	755324	1 (Section 8)	758020	7	1139917
301	705106	74	755324	1 (Section 12)	758020	87	1157868
302	705106	89	755324	1 (Section 13)	758020	1	1172562
303	705107	93	755324	2 (Section 7)	758020	2	1172562
304	705107	94	755324	2 (Section 8)	758020	1	1174369
305	705108	103	755324	2 (Section 12)	758020	14	1176183
306	705108	104	755324	2 (Section 13)	758020	1638	1177607
2	709662	105	755324	3 (Section 7)	758020		
1	719760	106	755324	3(Section 8)	758020		
2	719760	112	755324	3(Section 12)	758020		

2.2 Climate

Monthly mean maximum and minimum temperatures, as recorded at the closest Bureau of Meteorology (BoM) meteorological monitoring station to the Project Site (Tamworth Airport: Station 55325), are provided in Figure 2-1. Average maximum temperatures in the region exceed 30°C during summer, while in the winter months, the average maximum temperature falls to about 22°C. Average minimum temperatures range from 17°C in summer to 2°C in winter.

Rainfall records from Tamworth Airport between 1993 and 2012 show the average annual rainfall is 393 mm (Figure 2-2). Higher monthly rainfall rates occur between November and February.

Monthly average 9:00am and 3:00pm relative humidity data recorded at Tamworth Airport (1992 – 2012) are provided in Figure 2-3. The humidity levels are higher in the morning compared to the afternoon. Levels are highest in June and July (around 80% at 9:00am and 50% at 3:00pm) and lowest in December and January (around 55% at 9:00am and 35% at 3:00pm).

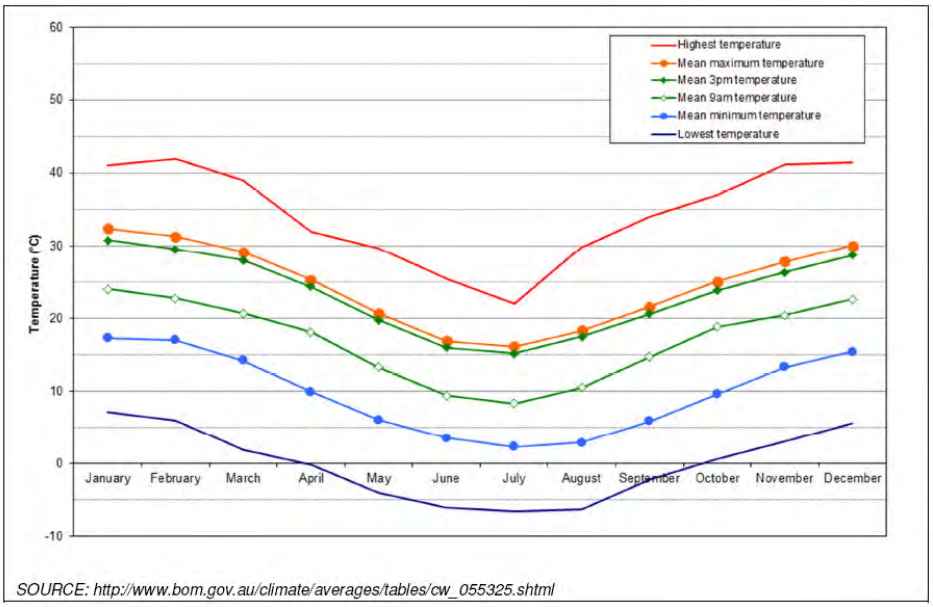


Figure 2-1: Monthly mean maximum and minimum temperatures recorded at Tamworth Airport Bureau of Meteorology Station 55325 (1992 - 2012)

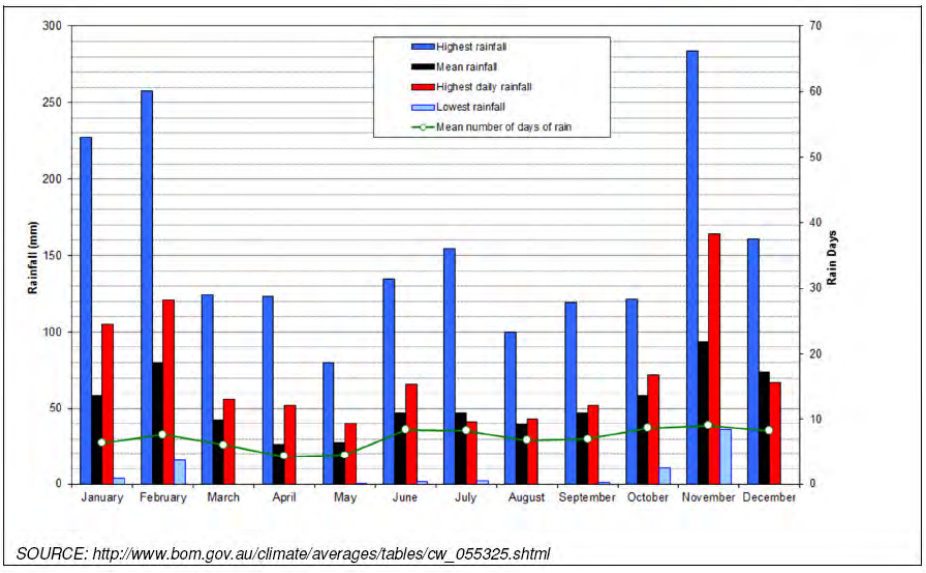


Figure 2-2: Monthly mean maximum and minimum rainfall recorded at Tamworth Airport Bureau of Meteorology Station 55325 (1993 - 2012)

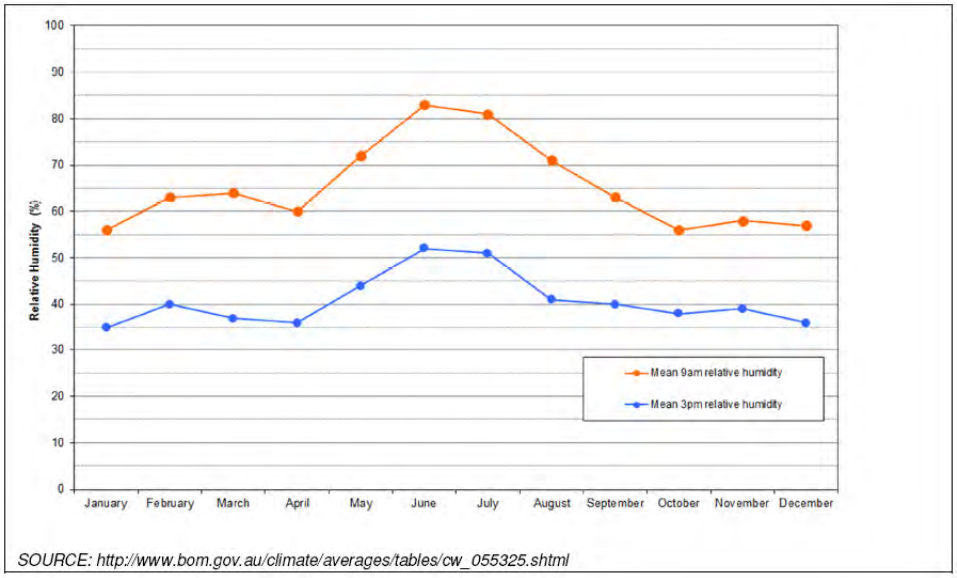


Figure 2-3: Monthly mean 9:00am and 3:00pm relative humidity levels recorded at Tamworth Airport Bureau of Meteorology Station 55325 (1992 –2012)

Meteorological modelling was carried out for the Project Site using The Air Pollution Model (TAPM) meteorological model (Appendix 13). Winds predicted by the TAPM model for the Project Site are predominantly light to moderate (between 1.5 m/s and 8 m/s) and from the east. Infrequent winds vary in direction. Calm wind conditions (wind speed less than 0.5 m/s) were predicted to occur just over 3.2% of the time throughout 2011. The annual average wind speed was 2.6 m/s.

Winds stronger than 5.4 m/s (the threshold for dust pick-up) were predicted to occur just over 5% of the time (518 hours/year). These stronger winds are generally associated with easterly winds during spring and summer.

The terrain within and surrounding the Project Site is relatively complex and the distances between the three main construction areas (Chaffey Dam, Bowling Alley Point and Western Foreshore Road) are significant. There is therefore potential for the predominant wind directions at each construction area to be affected by localised channelling effects due to nearby hills and valleys. Wind patterns predicted by the modelling at Bowling Alley Point show a much wider spread in wind directions than at the dam wall, with a predominance of westerly winds during the winter months. Windroses for these locations are provided in Appendix 13.

2.3 Surrounding Development

Chaffey Dam is located within the Peel Valley, which has been highly modified since European settlement as a result of grazing, cropping and intensive agriculture, forestry, mining and urban development.

The area surrounding Chaffey Dam is largely cleared and has historically been used for agricultural purposes. Areas of sparse native vegetation remain, with pockets of more dense vegetation occurring on steeper grades, particularly at the northern extent of the dam.

Existing development surrounding Chaffey Dam is generally comprised of agricultural activities, including grazing and dairy farming. Some rural residential properties are located around the perimeter of the existing reservoir. State Water administration and maintenance facilities and the State Water Storage Custodian's residence are also located adjacent to Chaffey Dam.

The locality of Bowling Alley Point is at the southern extent of the reservoir. Woolomin is located approximately 6 km north of the dam wall, while Nundle is located approximately 13 km south of the dam wall.

The Nundle and South Bowlo Tamworth Fishing Clubs lie on the foreshore of the reservoir. The Bowling Alley Point Recreation Area lies on the eastern foreshore of the reservoir.

At present, no other major infrastructure developments are known to be proposed or approved in the vicinity of Chaffey Dam.

3 PROJECT DEVELOPMENT HISTORY

Chaffey Dam was constructed between 1976 and 1979. The Chaffey Dam morning glory spillway was originally designed to handle a Probable Maximum Flood (PMF) determined in accordance with current practice at the time. Advancements in the understanding of meteorology and in hydrologic analysis have shown that the spillway capacities of many existing dams, including Chaffey Dam, are inadequate for the safe passage of a PMF (Public Works Department of NSW 1990).

The PMF is the largest flood that could conceivably occur at a particular location and effectively reflects the extent of the floodplain (NSW Government 2005). At Chaffey Dam, the PMF is approximately equivalent to a 1 in 1,000,000 AEP event (Molino Stewart 2011).

Based on the population at risk and the severity of damage and loss that would result from dam failure, Chaffey Dam is currently rated as an “extreme” hazard dam, having inadequate capacity to safely pass a PMF (Dams Safety Committee 2009).

State Water has completed some works at Chaffey Dam over the past decade to provide interim flood safety measures. However, implementation of the Project is required for Chaffey Dam to meet current Australian National Committee on Large Dams (ANCOLD) and Dams Safety Committee safety standards for high hazard dams.

To address the requirements of the Dams Safety Committee and ANCOLD standards, State Water proposes to carry out a safety upgrade to improve the flood capacity of Chaffey Dam and reduce the risk of dam failure in an extreme flood event. This will enable the dam to safely pass the PMF and concurrently increase the dam’s storage capacity to provide greater water security for potable, irrigation and agricultural supplies.

State Water began the Chaffey Dam Upgrade Program in 2003. The aim of the Program was to meet current safety standards for extreme floods and potentially, to meet other desired outcomes such as improved water supply reliability.

In 2004 an initial upgrade was undertaken by State Water to raise the dam crest to address the Dams Safety Committee’s requirements. The upgrade comprised the installation of a concrete parapet wall to the top of the dam wall, effectively increasing the height of the dam by 1.8 m.

In July 2005, State Water commenced interim works to increase the protection of the dam and downstream communities from large floods and investigated long term options to protect against extreme flooding. In 2005 and 2007, Hunter Water Australia and GHD (respectively) assessed future demand and water supply in the Tamworth Regional LGA and the Peel River Valley. The studies determined that augmentation of Chaffey Dam to 100 GL (from its current 62 GL) would meet the future demand and supply needs of Tamworth and Peel River Valley irrigators, as well as improve water supply reliability (Molino Stewart 2011).

In 2007, the Federal and NSW Governments announced a commitment to fund the augmentation of Chaffey Dam. GHD subsequently prepared a report that identified long term options for upgrades to Chaffey Dam (GHD 2007), followed by a report presenting the findings of ecological investigations undertaken for Stage 1 of the environmental assessment (GHD 2008a).

A Preliminary Environmental Assessment Summary Report (GHD 2008b) was prepared for three upgrade options. These options included:

- Option 1: Dam safety upgrade to achieve partial compliance (auxiliary spillway works).
- Option 2: Dam safety upgrade to achieve full compliance (auxiliary spillway works plus dam wall raising, with no impact on full supply level).
- Option 3: Dam safety upgrade to achieve full compliance plus augmentation (auxiliary spillway works, dam wall raising plus other works to increase supply storage capacity).

The results of an economic analysis indicated that Option 3 was the best performing full safety upgrade and augmentation option (Molino Stewart 2011).

In 2009, State Water was advised that the funding from the Federal and NSW Governments that was originally announced in 2007, was no longer available. In response, State Water decided to construct Option 1 in order to immediately improve the safety of the dam. Note that the auxiliary spillway works associated with Option 1 (the auxiliary spillway works) form part of the works recommended under Option 3. The auxiliary spillway works were completed in February 2011.

In 2011, funding was made available from the Federal and NSW Governments for the complete Chaffey Dam Safety Upgrade and Augmentation. As a result, State Water is currently pursuing the completion of Option 3 (the Project), which will achieve full compliance to the dam safety requirements plus augmentation of the reservoir capacity.

Given the extensive history of the Project, numerous studies potentially relevant to the EIA for the Project have been undertaken, as shown in Table 3-1. These studies have been relied upon to inform the EIS.

Table 3-1: Previous specialist studies prepared for Chaffey Dam

Date	Author	Title
1990	Pearson, S.A.	Proposed Enlargement – Chaffey Dam Historical Survey.
1990 (Aug)	Austeco	Chaffey Dam Enlargement Proposal: Impact on Terrestrial Fauna. Report prepared for Department of Water Resources, August 1990
1990 (Sep)	Public Works Department of NSW	Chaffey Dam Enlargement, Concept Design Report
2005 (Jun)	Manly Hydraulics Laboratory (MHL)	Chaffey Dam Upgrade, Environmental Investigations, Final Draft Report (Part A and Part B)
2007	GHD	Chaffey Dam upgrade, further assessment of long-term options. Contract No 3571, State Water Corporation
2007 (Sep)	GHD	Chaffey Dam Stage 1 Preliminary Environmental Assessment Downstream Impacts
2008 (Jan)	Navin Officer Heritage Consultants	Chaffey Dam Upgrade - Stage 1 Preliminary Archaeological and Heritage Assessment
2008 (Jun)	GHD	Report for Chaffey Dam Upgrade Water Quality Assessment
2008 (Jun)	GHD	Chaffey Dam Upgrade Ecological Assessment
2008 (Jun)	GHD	Chaffey Dam Upgrade Preliminary environmental assessment (stage 1) summary report
2008 (Sep)	GHD	Report for Chaffey Dam Masterplan
2009 (Feb)	North West Ecological Services (NWES)	Fauna and Flora Impact Assessment for the Proposed Chaffey Dam Safety Upgrade Options 1 & 2 Options 1 & 2, Addendum Report
2009	NWES	Review of the conservation status of the Booroolong Frog (*Litoria booroolongensis*) within the Namoi River Catchment. Report prepared for the Namoi Catchment Management Authority
2010 (Jan)	Molino Stewart	Chaffey Dam Safety Upgrade – Auxiliary Spillway, Review of Environmental Factors
2010 (Jun)	GHD	Report for Site Specific Action Plans Chaffey.
2011 (Nov)	Molino Stewart	Chaffey Dam Augmentation Preliminary Environmental Assessment

4 PROJECT DESCRIPTION

The Project comprises the augmentation and safety upgrade of the existing Chaffey Dam (Figure 1-1). The Project will result in an increase in the Full Supply Level (FSL) of 6.5 m and an increase in the permanent storage capacity from 62 GL to 100 GL. The FSL will increase from its current level of 518.6 m above Australian Height Datum (AHD) to 525.1 m AHD.

Construction works to achieve the required outcomes will include raising the dam wall by 8.4 m, raising the morning glory spillway by 6.5 m and reconfiguration of the auxiliary spillway fuseplug. Realignment of roads, limited to parts of Tamworth-Nundle Road, Rivers Road, Western Foreshore Road and bridges, limited to Bowling Alley Point Bridge, Hydes Creek Bridge and a culvert crossing at Silver Gully, are required due to the increased FSL.

Relocation of some facilities at the South Bowlo Fishing Club and the Bowling Alley Point Recreation Area is also required due to the increased FSL. Facilities below the new FSL at the South Bowlo Fishing Club and the Bowling Alley Point Recreation Area will be relocated to higher ground, proximate to their existing respective locations.

The Project will also result in an increase to the 100 year average recurrence interval (ARI) flood level around the perimeter of the reservoir. The 100 year ARI will increase by 6.3 m from its current level of 521.6 m AHD to 527.9 m AHD.

A combination of the Project and contemporary methodologies for PMF determination will result in the peak level of the PMF being higher than previously estimated. The PMF is the largest flood that could conceivably occur at a particular location and effectively reflects the extent of the floodplain (NSW Government 2005). The PMF will increase by 1.7 m from 539.8 m AHD to 541.5 m AHD.

Given that implementation of the Project will enable Chaffey Dam to meet the required safety standards, the existing flood warning system for Woolomin is no longer required and will be decommissioned.

Conventional land construction methods are anticipated to be used, except for works to the morning glory spillway, which will need to be undertaken by water.

Long term operation of the Project is intended and no significant decommissioning activities are proposed, excluding the decommissioning of the flood warning system (as above) and decommissioning of mechanical and electrical equipment that has reached the end of its operational life.

No part of the Project has yet been carried out.

4.1 Construction Facilities and Equipment

Construction of the Project comprises four key elements:

- Raising the dam wall;
- Raising the morning glory spillway;
- Reconfiguration of the auxiliary spillway fuseplug; and
- Realignment of roads and bridges.

Access to the site for construction will primarily be via Tamworth-Nundle Road, with heavy vehicles likely to access the site from the south and light vehicles from the north (refer Section 8.6). Site offices and ablution facilitates are expected to be required on site, along with equipment laydown areas. The construction methodology, facilities and equipment for each of these elements is described in Table 4-1.

Table 4-1: Project construction methodology, facilities and anticipated equipment

Methodology	Volume	Anticipated Equipment	Facilities
Raising the Dam Wall			
Remove and stockpile parapet wall for reuse. Some wall units will require excavation for removal.	380 pre-cast concrete units	20 tonne (t) rough terrain crane 10 t flatbed truck 5 t backhoe	Works Area located downstream of dam wall with direct access from Tamworth-Nundle Road (refer Figure 4-2)
Excavate and stockpile deposited material at toe of dam wall for reuse at toe of new embankment.	160,000 m^3	80 t excavator 45 t articulated dump trucks (12 loads per hour) D10 dozer	
Excavation of dam crest to expose existing crest embankment zones.	30,000 m^3	30 t excavator 30 t dump trucks (12 loads per hour) Water cart Cat 140H grader	
Haul and place rock from existing stockpile and clay from borrow areas for dam wall raising.	200,000 m^3	80 t excavators 50 t dump trucks (assume 9 loads per hour) 20 t vibrating roller 25 t compactor Water cart Cat 140H grader Cat D10N dozer	

Methodology	Volume	Anticipated Equipment	Facilities
Construction of road pavement and reinstalling the parapet wall.	3,740 m^2 380 pre-cast concrete units	30 t articulated dump trucks 16 t vibrating roller Water Cart Truck (8 m^3 body) (assume 94 loads at one hour per round trip) Cat 140H grader	
Raising the Morning Glory Spillway			
Decommission and remove all mechanical and electrical equipment from bridge deck.	N/A	5 t crane 5 t flatbed truck	Works Area located downstream of dam wall with direct access from Tamworth-Nundle Road (refer Figure 4-2)
Remove and store access bridge for reinstallation after dam wall and spillway raising.	N/A	180 t crane barge 180 t mobile crane 30 x 15 m barge 25 t rough terrain crane 25 t semi-trailer Truck 18 m work boat	
Raise morning glory spillway and piers.	2,500 m^3 (concrete)	180 t crane barge 180 t mobile crane 30 x 15 m barge 80 m^3/hour concrete pump	
Reinstall access bridge and gantry crane to bridge deck.	N/A	180 t crane barge 180 t mobile crane 30 x 15 m barge	
Install new mechanical and electrical equipment to bridge deck.	N/A	5 t crane 5 t flatbed truck	
Reconfiguration of Auxiliary Spillway Fuseplug			
Construction of dividing wall between the two bays.	70 m^3	Rock drill 5 t concrete truck 50 t mobile crane	Works Area located downstream of dam wall with direct access from Tamworth-Nundle Road (refer Figure 4-2)

Methodology	Volume	Anticipated Equipment	Facilities
Raise fuseplug embankment.	2,000 m^3	30 t articulated truck 30 t excavator D8 dozer Cat 140H grader 5 t smooth roller 5 t pad foot roller 20,000 litre (L) water cart	
Realignment of Roads and Bridges			
Construction of new, and raising of existing, road on Western Foreshore Road.	10,000 m^3 from cut in current alignment	20 t articulated dump truck 50 t excavator D10N dozer Cat 140H grader 20,000 L water cart 15 t smooth roller 15 t pad foot roller	Works Area located adjacent to realigned roads, which will be as per design plan (refer Figure 4-4 and Figure 4-5)
Construction of a two-span single lane bridge on Hydes Creek with a total length of 58 m	Drilling required for foundations	50 t rough terrain mobile crane 25 m^3/hour concrete pump 20 t piling rig on crawler tracks 10 t auger drill rig truck mounted 10 t flatbed truck 20 t semi-trailer	
Construction of approaches and new section of road on Tamworth-Nundle Road and Rivers Road.	10,000 m^3 from cut in current alignment	20 t articulated dump truck 50 t excavator D10N dozer Cat 140H grader 20,000 L water cart 15 t smooth roller 15 t pad foot roller	
Construction of six-span, two lane Bowling Alley Point Bridge with total length of 174 m	Drilling required for foundations	50 t rough terrain mobile crane 25 m^3/hour concrete pump 20 t piling rig on crawler tracks 10 t auger drill rig truck mounted 10 t flatbed truck 20 t semi-trailer	

4.2 Dam Wall

The crest of the existing dam wall will be raised by 8.4 m from 535.3 m Australian Height Datum (AHD) to 542.1 m AHD. This will be achieved by placement of rockfill on the downstream side of the embankment (Figure 4-1). The additional rockfill will be placed on the existing embankment face to steepen the slope and thus widen the crest. Existing rock sourced from the previous construction of the auxiliary spillway and stockpiled on site, will be utilised as rockfill for the embankment.

Existing fill at the downstream toe of the embankment will be excavated and stockpiled to allow the placement of rockfill on a sound soil and rock foundation. The stockpiled fill material will then be returned to the new embankment toe.

The existing 1.8 m high concrete parapet wall will be removed to enable the raising of the dam wall. This wall will be reinstated along the raised embankment crest to provide a 0.6 m freeboard should the reservoir reaches its maximum level during the PMF.

Excavation of the top part of the existing embankment will be undertaken for extension of the core and filter zones in the dam raising process. If required, the upper section of the raised dam wall will comprise a vertical wall constructed from reinforced earth blocks extending above the existing dam crest elevation.

An area with minimal vegetation at the northern end of the existing auxiliary spillway will be trimmed to allow floodwaters to be directed downstream to the Peel River via the spillway.

Two borrow areas downstream of the dam wall will be utilised to source clay for use in the dam wall raising as core material (Figure 4-2).

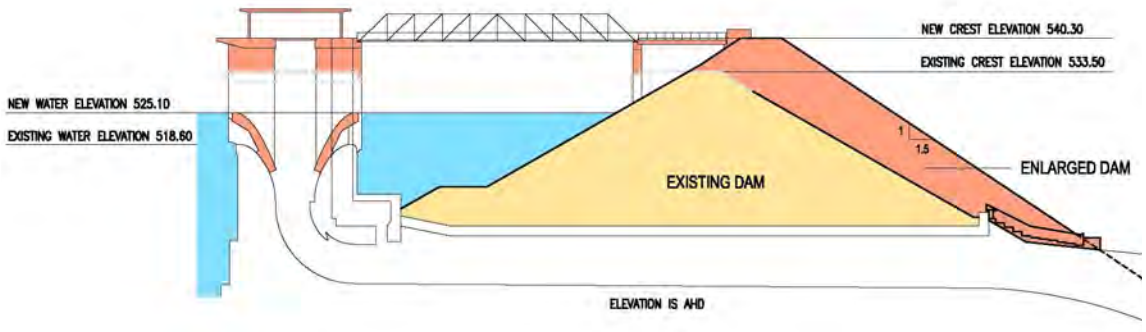
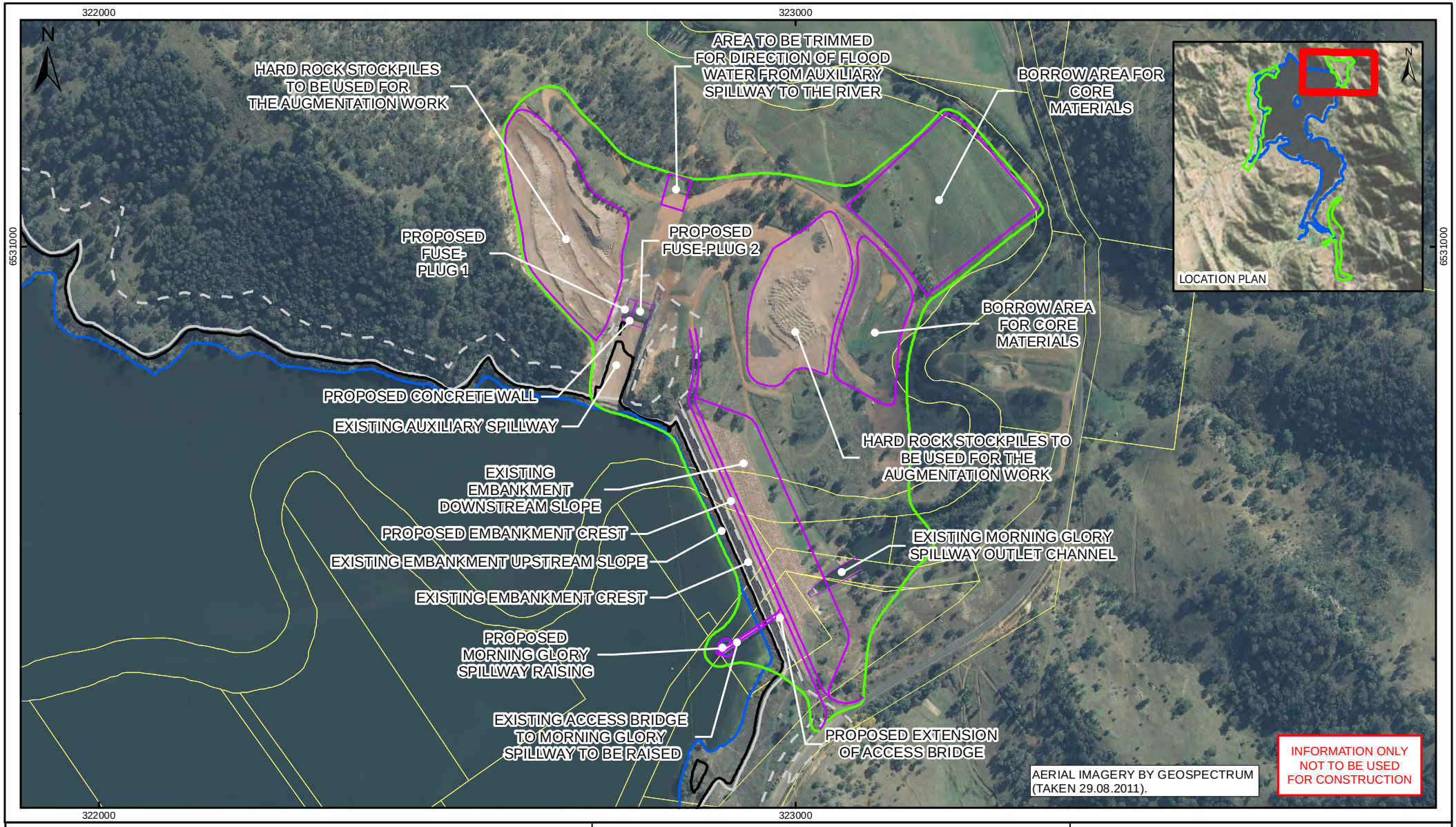


Figure 4-1: Proposed raising of the dam wall



WorleyParsons
resources & energy

State water

0 0.1 0.2 0.4
Kilometres @ A4

Datum : GDA94
Map Grid of Australia
Zone 56

LEGEND

- DAM WALL SITE LAYOUT AREAS
- WORKS AREA
- EXISTING FULL SUPPLY LEVEL
- NEW FULL SUPPLY LEVEL
- NEW 1 IN 100 YEAR FLOOD LEVEL
- NEW PROBABLE MAX FLOOD LEVEL
- CADASTRE (05.07.2012)

CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE

DAM WALL CONSTRUCTION AREA

DATE : 28 Aug 2012
SCALE : 1:7,500
CUSTOMER : STATE WATER
AUTHOR : RW
REF : 301015-02980-GIS-SKT-006.mxd
REV : A1

Produced By: ryan.wright@worleyparsons.com - Geomatics

Location: ..\301015-02980 CHAFFEY DAM\03Project\Workspace_SKT\301015-02980-GIS-SKT-006

4.3 Morning Glory Spillway

The Chaffey Dam morning glory spillway will be raised by 6.5 m. This will involve removal of the existing morning glory offtake, extension of the support piers and replacement with a new morning glory offtake at the raised level to align with the new FSL. The appearance and function of the new morning glory offtake will be the same as the existing, although at the raised level, with minor design modifications to preserve the existing downstream stage-discharge relationship (Black & Veatch 2012). The existing trash rack structure will also be extended to cater for the increase in storage level.

No changes are proposed to the existing morning glory spillway outlet channel, downstream of the dam wall.

It is expected that the entire existing passenger lift assembly (used to access the morning glory spillway tower for inspection and maintenance purposes) within the morning glory spillway tower will be replaced as it is 35 years old. Mechanical and electrical items generally have a design life of 20 to 25 years, although this can be extended with good maintenance (Black & Veatch 2012). Since Chaffey Dam is a relatively remote location, it is considered that transporting equipment to and from the site will form the bulk of the capital cost. Therefore, complete replacement is considered to be a better long term solution than extension and overhaul of the existing lift assembly.

The existing 56.4 m long single span steel truss bridge providing access to the morning glory spillway structure will be raised vertically by approximately 6.8 m, along with the dam offtake and embankment infrastructure. To achieve this, an additional span will be installed to the east of the existing span. This new span will carry one lane of vehicular traffic approximately 12 to 18 m from the dam embankment to the eastern end of the raised truss span. The new span will match the clear width, railing geometry, vertical profile and general colour of the existing span.

At the eastern abutment of the extended access bridge, the precast parapet wall panels will be replaced by a flood gate to allow access to the bridge. The flood gate will be about 3.5 m wide (Figure 4-3).

The raising of the morning glory spillway will not result in any change to the downstream release regime for Chaffey Dam.

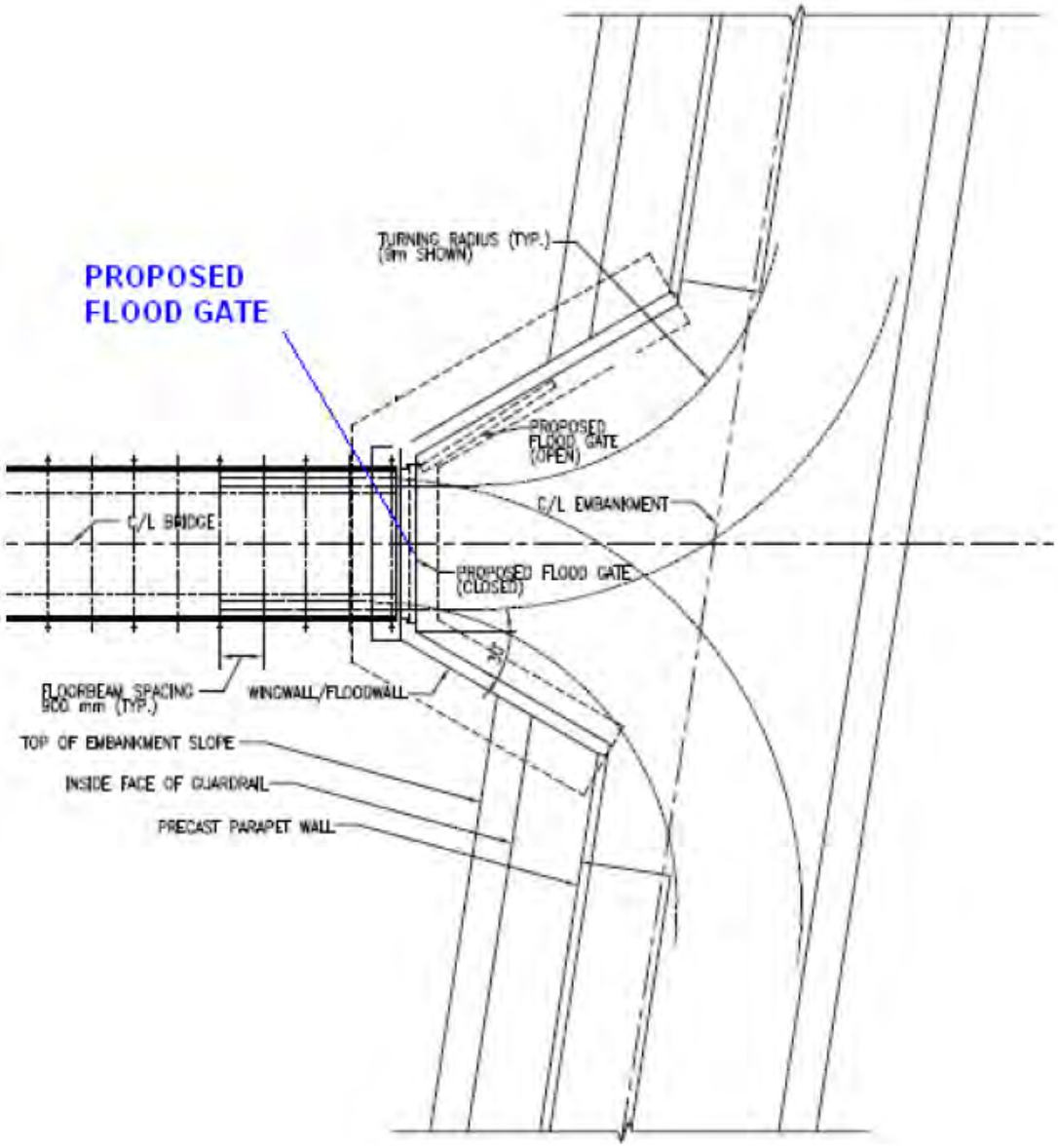


Figure 4-3: Plan view of the Extension Bridge and the East Abutment showing the proposed location for the Flood Gate (Black & Veatch 2012)

4.4 Auxiliary Spillway

The existing auxiliary spillway fuseplug will be modified to a two-bay design to enable a staged trigger of the fuseplug, at the 1 in 10,000 and 1 in 20,000 annual exceedence probability (AEP) events.

In order to establish the two-bay design, a new T-shaped concrete partition wall will be constructed within the existing auxiliary spillway, with a new fuseplug to be established either side of the wall. This will enable the fuseplugs to be triggered at staggered elevations and to initiate lateral failure, thus providing a controlled failure and a gradual increase in outflow discharge rather than a sudden flood wave.

The length of the partition wall will be extended in the downstream direction to avoid turbulent flow from triggering of the first fuseplug, which could cause erosion to the downstream slope of the second fuseplug. The current fuseplug sill level of 525.9 m AHD will be retained.

The modified auxiliary spillway will comprise the following:

- 10 m wide fuseplug with trigger level of 533.78 m AHD;
- 23.5 m wide fuseplug with trigger level of 534.49 m AHD; and,
- Peak water level in the PMF of 541.50 m AHD.

The same materials to be used for raising the core of the embankment dam will be used for constructing the core of the fuseplug. These materials will be sourced from two borrow areas downstream of the dam wall (Figure 4-2). Grouting along the foundation of the proposed fuseplug embankments might not be required due to the good quality of the insitu rock that forms the foundation (namely chert and in particular jasper), although dental concrete may need to be applied to the rock surface before placing the embankment fill materials.

4.5 Roads and Bridges

The Project will result in the inundation of some existing roads and bridges. Consequently, realignment of roads and construction of bridges is required along sections of Tamworth-Nundle Road, Rivers Road and Western Foreshore Road. In summary, the following works are proposed:

- Realignment of the intersection of Tamworth-Nundle Road and Rivers Road;
- Realignment of sections of Tamworth-Nundle Road and Rivers Road;
- Construction of a new Bowling Alley Point Bridge;
- Realignment of Western Foreshore Road from Hydes Creek to Silver Gully;
- Modification to Hydes Creek Bridge; and
- Modification to the existing culvert crossing at Silver Gully.

The intersection of Tamworth-Nundle Road and Rivers Road will be modified to direct traffic flow around a sweeping bend across the new Bowling Alley Point Bridge (Figure 4-4). Traffic entering Tamworth-Nundle Road from Rivers Road will be required to give way.

The alignment of Rivers Road will be modified from the intersection with Tamworth-Nundle Road, approximately 1,130 m to the south. This modification will primarily involve a shift of up to approximately 10 m to the east.

The alignment of Tamworth-Nundle Road will be modified from the eastern side of the Bowling Alley Point Bridge to around 50 m north of the bridge. This modification will primarily involve a shift of the north-south section of road up to approximately 10 m to the east.

The location of the Bowling Alley Point Bridge will be altered, with the eastern end of the new bridge located around 10 m from its existing location. The western end of the bridge will remain in the same location. The new bridge will be approximately 174 m in length, with six spans and two lanes. The deck level of the bridge will be at approximately 529.3 m AHD to provide adequate clearance above the predicted peak level of the 100 year ARI flood level.

Approximately 3.2 km of the Western Foreshore Road will be realigned from Hydes Creek in the south to Silver Gully in the north (Figure 4-5). The realignment will comprise a shift of the existing road up to around 20 m west. Construction of a new two span, single lane, 60 m long bridge at Hydes Creek will also be undertaken.

Design inputs for road realignment and bridge construction were determined in consultation with Black & Veatch, State Water, Tamworth Regional Council and Opus International Consultants, utilising the following design inputs:

- FSL: 525.1 m AHD;
- Finished surface levels for roads: 527.1 m AHD (2 m above FSL);
- Bridge deck levels: 529.3 m AHD;
- PMF: 541.5 m AHD;
- Tamworth-Nundle Road formation and alignment in accordance with NSW Roads and Maritime Services (RMS) requirements for Regional Roads; and
- Rivers Road and Western Foreshore Road formation and alignment in accordance with Tamworth Regional Council rural road requirements.

All roads have been designed for two lanes (one in each direction), with a speed limit of 80 km/h. Tamworth-Nundle Road and Rivers Road will be bitumen sealed, while the Western Foreshore Road will remain unsealed.

Fish passage under the proposed bridges will be generally consistent with the existing bridges and crossings.

Relocation of existing infrastructure will be required to achieve the required road and bridge realignments, including:

- 24 power poles along Tamworth-Nundle Road and Rivers Road;
- Essential Energy and Telstra infrastructure above the 1 in 100 AEP flood level; and,
- 1.2 km of Telstra infrastructure.

322000 323000

6527000 6526000 6525000

N

LEGEND

- ROAD REALIGNMENT
- ROAD REALIGNMENT BATTERS
- WORKS AREA
- PROPOSED BRIDGE
- EXISTING FULL SUPPLY LEVEL
- NEW FULL SUPPLY LEVEL
- NEW 1 IN 100 YEAR FLOOD LEVEL
- NEW PROBABLE MAX FLOOD LEVEL
- CADASTRE (05.07.2012)

AERIAL IMAGERY BY GEOSPECTRUM (TAKEN 29.08.2011).

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

WorleyParsons
resources & energy

State water

N

0 0.25 0.5

Kilometres @ A3

Datum : GDA94
Map Grid of Australia Zone 56

LOCATION PLAN

CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE

TAMWORTH-NUNDLE ROAD AND RIVERS ROAD REALIGNMENT

DATE : 28 Aug 2012
SCALE : 1:7,500
CUSTOMER : STATE WATER
AUTHOR : RW
REF : 301015-02980-GIS-SKT-005.mxd
REV : A1

Produced By: ryan.wright@worleyparsons.com - Geomatics

Location: ..\301015-02980 CHAFFEY DAM\03Project\Workspace_SKT\301015-02980-GIS-SKT-005

319500

321000

6531000

6529500

6528000

N

LEGEND

- ROAD REALIGNMENT
- ROAD REALIGNMENT BATTERS
- WORKS AREA
- EXISTING FULL SUPPLY LEVEL
- NEW FULL SUPPLY LEVEL
- NEW 1 IN 100 YEAR FLOOD LEVEL
- NEW PROBABLE MAX FLOOD LEVEL
- CADASTRE (05.07.2012)

AERIAL IMAGERY BY GEOSPECTRUM (TAKEN 29.08.2011).

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

WorleyParsons

resources & energy

State water

N

0 0.25 0.5

Kilometres @ A3

Datum : GDA94
Map Grid of Australia Zone 56

LOCATION PLAN

CHAFFEY DAM AUGMENTATION AND SAFETY UPGRADE

WESTERN FORESHORE ROAD REALIGNMENT

DATE : 28 Aug 2012
SCALE : 1:10,000
CUSTOMER : STATE WATER
AUTHOR : RW
REF : 301015-02980-GIS-SKT-004.mxd
REV : A1

Produced By: ryan.wright@worleyparsons.com - Geomatics

Location: ..\301015-02980 CHAFFEY DAM\03Project\Workspace_SKT\301015-02980-GIS-SKT-004

4.6 South Bowlo Fishing Club

Part of the existing South Bowlo Fishing Club, located on the northern foreshore of Chaffey Dam, will be inundated by the new FSL. Existing facilities expected to be impacted comprise the access track to the site, a shed used as a clubhouse, shelters, a boat ramp, caravan park and toilet facilities.

As part of the Project, State Water proposes to remove the impacted facilities and establish new facilities to enable continued operation of the South Bowlo Fishing Club following implementation of the Project.

A new lease boundary will be established to compensate for the reduction in available land associated with the increased FSL. The new boundary will be fenced, likely with a post a wire fence and a locked gate provided.

As part of the existing access road will be inundated, a new access track will be established. The new access track will be unsealed and may require clearing of approximately five trees. An alternate access track currently exists that will not be impacted by the Project, however this track is considered too steep to be safely used as the primary access to the site.

Demolition and removal of existing facilities below the new FSL will be carried out. These facilities comprise a shed used as a clubhouse, shelters, a water tank and toilet facilities. The caravan park will be moved to higher ground prior to inundation to the new FSL. An existing boat ramp is expected to remain in situ for use until the reservoir fills to the new FSL.

New facilities to be constructed above the new FSL comprise a boat ramp, clubhouse, an amenities building, a new water tank, five small shelters and car parking areas. Clearing of some vegetation may be required to establish these new facilities, however all facilities have been located to minimise impacts on vegetation where possible. Construction of other ancillary infrastructure and works, including earthworks and lighting will also proposed. The existing and proposed facilities at the South Bowlo Fishing Club are shown on Figure 4-6.

A discussed further in Section 5, approved State Significant Infrastructure projects also do not require a range of additional authorisations that would ordinarily be needed before the project could proceed.

Notwithstanding the above, development approval for the relocation of the South Bowlo Fishing Club and associated facilities is sought as part of this State Significant Infrastructure application. The proposed development is defined in the Tamworth LEP 2010 as:

- 'Boat launching ramp';
- 'Caravan park';
- 'Demolition';
- 'Earthworks'; and
- 'Recreation facility (outdoor).

N

LOCATION DIAGRAM

EXISTING TRACK
NEW ACCESS ROAD
NEW
EXISTING
NEW ENTRY GATE
ACCESS ROAD
NEW
EXISTING TRACK
CURRENT ENTRY GATE
EXISTING TRACK
NEW
LEASE BOUNDARY
PROPOSED NEW SHELTERS
PROPOSED NEW CLUBHOUSE
PROPOSED NEW AMENITIES
PROPOSED NEW WATER TANK SITE (EXISTING FLAT AREA)
PROPOSED NEW SHELTERS
ACCESS ROAD
TO BE FENCED
EXISTING WATER TANK
LEASE BOUNDARY TO BE FENCED
PROPOSED GATE
EXISTING AMENITIES
EXISTING SHELTERS
EXISTING TRACK
NEW
EXISTING FENCE LINE BOUNDARY
EXISTING BOAT RAMP
PROPOSED NEW BOAT RAMP

LEGEND:

- CADASTRE
- CONTOURS
- FARM DAM
- FENCE
- EXISTING TRACK
- NEW ACCESS ROAD
- NEW PARKING AREAS
- EXISTING FULL SUPPLY LEVEL
- NEW FULL SUPPLY LEVEL
- 1 IN 100 YEAR FLOOD LEVEL
- NEW PROBABLE MAXIMUM FLOOD LEVEL

0 20 40 60 80 100 200 METRES
SCALE 1:2000 @A1

0 20 40 60 80 100 200 400 METRES
SCALE 1:4000 @A3

ZONE	REF.	REVISION	BY	CKD	DATE

Sturo water

CHAFFEY DAM
AUGMENTATION AND SAFETY UPGRADE
SOUTH BOWLO FISHING CLUB

SURVEY SERVICES
LEVEL 10
55 CLARENCE STREET
SYDNEY 2000

SURVEYED: N/A	FIELD BOOK: N/A	DATE: AUGUST 2011	DRAWING FILE: D12_0292_CHAFFEY_DAM_FISHING_CLUB.DWG	A1
DATUM: A.H.D.	RL ORIGIN: PILLAR 2 (E323027.38 N6530344.31 TOP OF PILLAR=542.35)		COORD. SYSTEM: MGA 56	
DRAWN: J.M.S	DATE: 30/10/2012	EXAMINED: T.L	SCALE: 1:2000	PLAN NO: D12/0292 SHT. 1 OF 1

4.6.1 Boat Ramp Design and Implementation

Prior to detailed design and construction of the proposed boat ramp, a hydrographic survey will be prepared in order to determine the available (or future) depth of water and in particular to determine whether any excavation prior to inundation will be necessary in order to accommodate the proposed structure. The hydrographic survey should be undertaken in accordance with the NSW Maritime Authority's Guidance Note GN 01 – Provision of Hydrographic and Geotechnical Data.

Geotechnical investigations may also be required to determine the properties and constituents of the ground surface and underlying rock strata.

Any existing structures need to be considered during the planning and design of proposed new structures. In particular, site investigations should consider the following aspects:

- Whether any part of an existing structure is suitable to be incorporated into the new structure; and
- Where any part of an existing structure will become redundant, demolition of same.

The then NSW Maritime, now RMS prepared the 'Engineering Standards and Guidelines for Maritime Structures' (2005) which sets out the minimum engineering standards for maritime structures proposed to be constructed on the NSW Maritime Authority's land.

'Boat Launching Ramps – Guidelines' (NSW Public Works Department 1985) also provides advice on the design and construction of trailer-boat launching facilities. Guidance is given on planning, geometry, materials and design of boat ramps.

The detailed design of the proposed boat ramp at the South Bowlo Fishing Club will be prepared in accordance with the above mentioned guidelines and relevant Australian Standards. Materials should generally comply with the durability requirements specified in Standard Australia's - DR 02536 - Guidelines for Design of Maritime Structures and appropriate Australian Standards.

The boat ramp will be designed for a minimum uniformly distributed live load of 10.0 kPa or a minimum concentrated live load of 45.0 kN.

Design life should be based on consideration of capital and maintenance expenditure. The designer or contractor, in consultation with State Water, should determine an appropriate maintenance regime consistent with the adopted design and materials that will achieve the design life. Guidance on design life is given in Standard Australia's - DR 02536 - Guidelines for Design of Maritime Structures. It is recommended that a minimum design life of 25 years be adopted for maritime structures.

Structures which will be utilised by the public shall be designed to provide access for disabled persons in accordance with AS1428 and the Commonwealth Government's - Disability Standards for Accessible Public Transport Guidelines 2001.

Post construction, maintenance will need to be carried out in order to ensure that the intended design life of the boat ramp is achieved. Essential features of a maintenance program include the following:

- Regular inspections;
- Timely repairs; and
- Keeping records of inspections carried out and maintenance performed.

4.6.2 Club House, Amenities and Shelters Design

The proposed new club house will be constructed on the northern side of the new access road. The club house will be single storey open plan layout, built on a concrete slab and will have a floor space of approximately 800 m^2. The roof will either be tiled or colourbond.

A separate single storey amenities building of approximately 300 m^2 in size will be constructed to the east of the club house.

Five new single storey shelters will be constructed. The shelters will be constructed of either metal or wood and will be open on all sides with either a tiled or colourbond roof.

Car parking is proposed in various locations along the new access track. A new water tank is also proposed.

4.7 Bowling Alley Point Recreation Area

Some facilities at the Bowling Alley Point Recreation Area will be impacted by the increased FSL. Existing facilities in the Recreation Area include a boat ramp, picnic tables and chairs, barbecues, toilet facilities and unpowered grassed camping areas.

State Water is committed to relocating impacted facilities through demolishing and removing such facilities and establishing new, equivalent facilities above the new FSL but proximate to their existing respective locations. State Water is currently liaising with the Bowling Alley Point Trust and the Crown Land Division of the Department of Primary Industries (DPI) to finalise the requirements for this work and the location of the new facilities.

Additional assessment may be required for the relocation of facilities in accordance with relevant legislative requirements.

4.8 Relationship with Peel Valley Water Sharing Plan

The Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010 (Peel Valley Water Sharing Plan) (NSW Government 2010) was developed by the NSW Office of Water following extensive environmental, social and economic assessment. The Peel Valley Water Sharing Plan commenced in July 2010 following approval by the NSW Minister for Primary Industries in accordance with the *Water Management Act 2000*.

The main objective of the Peel Valley Water Sharing Plan is to provide for sustainable and integrated management of water sources for the benefit of both present and future generations, to promote healthy and enhanced water dependant ecosystems and to provide for equitable water sharing among users of these water sources.

The Peel Valley Water Sharing Plan covers all water extraction within the Peel Valley, comprising the following water sources:

- Peel Regulated River Water Source;
- Peel Unregulated River Water Sources, comprised of:
  - Chaffey Water Source.
  - Goonoo Goonoo Creek Water Source.
  - Upper Peel River Tributaries Water Source.
  - Lower Peel River Tributaries Water Source.
  - Cockburn River Water Source.
- Peel Alluvium Water Source; and
- Peel Fractured Rock Water Source.

The *'Chaffey Water Source'* is listed as being part of the Peel Unregulated Water Sources under the Peel Valley Water Sharing Plan. The Chaffey Water Source is divided into two management zones, namely the Peel River Management Zone and the Chaffey Tributaries Management Zone.

The Peel Valley Water Sharing Plan specifies the water sharing provisions for Chaffey Dam, including environmental water rules, allocation of water to satisfy basic landholder rights, water extraction under access licences and bulk access regimes. The plan is consistent with and contributes to the Namoi Catchment Action Plan.

The Peel Valley Water Sharing Plan is linked to the Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003 (Namoi Water Sharing Plan) (NSW Government 2003) through rules that are targeted toward managing projected growth in the town water supply demand for Tamworth and rules aimed at managing the trading of water access entitlements and account water[3]. The provisions of the Peel Valley Water Sharing Plan are required to be consistent with those in the Namoi Water Sharing Plan. Both plans are subject to and consistent with the MDBMC Cap Agreement. The objective of the MDBMC Cap Agreement, made between NSW, Victoria, South Australia and the Australian Capital Territory (ACT), is to manage the extraction from surface waters within the Murray-Darling Basin to '*the volume that would have occurred under 1993/4 levels of development and management*' (NSW Office of Water 2010b).

[3] account water is the balance in an access licence water allocation account at a particular time.

The Peel Valley Water Sharing Plan demonstrates 'no growth' beyond that limited by the current MDBMC Cap Agreement, providing detailed rules to ensure that extractions remain within the long-term average annual extraction limit (LTAAEL). The LTAAEL is a fixed value determined from historical levels of water use, implemented to protect water for the environment and the supply to existing users.

The Project was considered during the planning process for the Peel Valley Water Sharing Plan and all management changes under an augmented dam, including planned environmental water, are either explicitly written into the Peel Valley Water Sharing Plan or provided for through amendment clauses. The Peel Valley Water Sharing Plan demonstrates that an enlarged Chaffey Dam will not result in a growth in extractions (NSW Office of Water 2010a).

4.8.1 Environmental Releases

Clause 31 of the Peel Valley Water Sharing Plan provides provisions in relation to environmental release rules from Chaffey Dam and requires that a minimum daily release of 3 ML be made, both prior to and following augmentation of the reservoir to 100 GL.

Under the Peel Valley Water Sharing Plan the provision of environmental releases above the minimum daily release will change following augmentation. The current environmental release provisions require a total of 1,600 ML to be released over seven days. Following augmentation of Chaffey Dam, Clause 31(2) requires the implementation of an environmental contingency allowance (ECA) of 5,000 ML, which may be released over any period of time at the discretion of the NSW Environmental Water Manager. The current environmental release provisions also stipulate a peak flow of 500 ML/day on day 2 of the seven day release period, however after augmentation the magnitude and timing of releases is not prescribed.

At present, environmental releases are only provided once a minimum storage volume is reached, only in certain months of the year and only if flood flows of a given magnitude have not occurred. None of these conditions apply after augmentation. The background document to the Peel Valley Water Sharing Plan (NSW Office of Water 2010a) states that although the magnitude, timing and duration of environmental releases after augmentation is not prescribed, the ECA is likely to be used as a stimulus flow over seven days with a peak on day 2 of 1,200 ML/day.

The change in management of environmental releases from pre to post augmentation offers more environmental water and greater flexibility in its release, ensuring environmental outcomes are maximised.

4.8.2 Entitlement and Use

Water entitlement in the Peel Valley is divided between regulated and unregulated surface water, as well as alluvial and fractured rock groundwater. Entitlement to and usage of these water sources, as at the time of preparation of the background document to the Peel Valley Water Sharing Plan (NSW Office of Water 2010a), is shown in Table 4-2. No metering records are available for unregulated use.

Table 4-2: Water entitlement and usage in the Peel Valley (NSW Office of Water 2010a)

Water Source	Entitlement (ML/year)	Average Use (ML/year)	Number of Licences
Unregulated water sources			
Chaffey	400	N/A	14
Goonoo Goonoo Creek	1,062	N/A	24
Upper Peel River Tributaries	9,267	N/A	72
Lower Peel River Tributaries	2,541	N/A	69
Cockburn River	4,438	N/A	87
Total	**17,708**	**N/A**	**266**
Peel Regulated River			
General Security	30,335	7,014	168
High Security	17,373	5,189	30
Total	**47,708**	**12,103**	**198**

The majority of the high security entitlement from the Peel Regulated River is allocated to Tamworth Regional Council for town water supply for Tamworth (16,400 ML/year). Chaffey Dam is the primary infrastructure to service the town water supply for Tamworth, although Tamworth Regional Council also holds a water licence for the extraction of water from Dungowan Dam. This licence allows Tamworth Regional Council to extract up to 5,600 ML/year from Dungowan Dam. A maximum supply limit of 20 ML/day is in place for town water supply for Tamworth taken from Dungowan Dam.

Additionally, Tamworth Regional Council reconditioned a series of wells, known as the 'drift wells', as an alternate water supply for drought periods. These 'drift wells' currently have a combined licensed volume of 10 ML/year. Council is currently investigating the use of the drift wells for supplementing water supply under normal conditions.

Tamworth Regional Council operates the town water supply for Tamworth in accordance with its Drought Management Plan, which includes specified triggers for restrictions based on the capacity of Chaffey and Dungowan Dams, as shown in Table 4-3.

Table 4-3: Tamworth Regional Council Drought Management Action Plan triggers (NSW Office of Water 2010a)

Drought Response Level (when Dungowan Dam at or below 40% capacity)	Trigger Point for Tightening Restrictions (as Chaffey Dam falls)	Trigger Point for Easing Restrictions (as Chaffey Dam rises)
Permanent Water Conservation	N/A	60%
1 - Low	50%	45%
2 - Moderate	40%	37.5%
3 - High	35%	32.5%
4 - Very High	30%	32.5%
5 - Emergency	25%	32.5%

Town water supplies for Moonbi / Kootingal and Attunga are sourced from the Peel Alluvium, whilst town water supplies for Nundle are sourced from the Peel Fractured Rock water source.

All of the water sources in the Peel Valley have been embargoed under the *Water Act 1912*, meaning that applications for new licences will not be accepted (NSW Office of Water 2010a). In consideration of the previous embargo orders on water sources in the Peel Valley, the Peel Valley Water Sharing Plan does not provide for additional applications for licences outside those provided for under the Water Management (General) Regulation 2004.

Permanent trade of water entitlements from the Peel Regulated River Water Source to the Lower Namoi Regulated River Water Source is permitted (NSW Office of Water 2010a). The Peel Valley Water Sharing Plan defines separate rules for trading of water from Chaffey Dam both pre and post augmentation (NSW Office of Water 2010a).

Clause 85 of the Peel Valley Water Sharing Plan provides for amendments to share component dealings (i.e. change of water source) following the augmentation of Chaffey Dam to 100 GL. Under the rules of the Peel Valley Water Sharing Plan, the volume of total trades permitted from the Peel Regulated River Water Source to the Lower Namoi Regulated River Water Source entitlement will increase from 7,500 ML to 15,000 ML.

4.8.3 Development of the Peel Valley Water Sharing Plan

The water sharing rules in the Peel Valley Water Sharing Plan were designed to have minimal socioeconomic impact, while improving environmental outcomes for the Peel Valley. A number of groups comprising numerous government and non-government stakeholders, contributed to development of the Peel Valley Water Sharing Plan. Detailed environmental and socioeconomic assessments were carried out during development of the Plan and a range of mitigating strategies

were incorporated. The Peel Valley Water Sharing Plan was placed on public exhibition prior to its approval.

The State Interagency Panel, Peel Interagency Regional Panel and State Groundwater Panel were formed to assist in the development of the Plan and included representatives from the then Department of Environment, Climate Change and Water (DECCW), including the NSW Office of Water, Industry and Investment NSW and Catchment Management Authorities. These Panels were given access to staff from the agencies to provide technical and scientific information. Local knowledge and expertise were also utilised to develop the Peel Valley Water Sharing Plan.

Additionally, the Minister for Water established the Peel Advisory Group (PAG) to directly advise on issues relevant to a water sharing plan for the Peel Valley. The Peel Advisory Group comprised a range of local stakeholders, including:

- Peel Valley Water Users;
- Cockburn Valley Water Users;
- Namoi Water;
- Tamworth Regional Council;
- A local Indigenous representative;
- A local environmental representative;
- Tamworth Chamber of Commerce;
- A local residents' representative;
- The Federal Member for New England;
- Namoi Catchment Management Authority (CMA);
- The NSW Office of Water; and
- A representative from the Minister's Office.

Assessments undertaken for development of the Peel Valley Water Sharing Plan included hydrologic modelling, socioeconomic investigations and analysis of ecological impacts. Key environmental assets identified in the unregulated water sources are protected in the Plan by the dealings and access rules. Water sources with high in-stream values were allocated indicative access rules designed to protect in-stream values and dealings rules (trade) to encourage extraction to shift from areas of high environmental impact to areas of lower impact.

Hydrologic modelling was carried out for the Peel Valley Water Sharing Plan using the Integrated Quantity and Quality Model (IQQM), which is the preferred hydrologic model for water resource management in NSW. The IQQM was utilised to simulate river flows, reservoir storage, water extraction, losses and operation, irrigation demands and water sharing plan rules. A full description of

IQQM, including details about model structure, algorithms and assumptions is provided in the IQQM Reference Manual (DLWC 1995).

An economic assessment relating to the draft Peel Valley Water Sharing Plan was carried out to analyse the changes to the alluvial groundwater access rules for Cockburn River and Goonoo Goonoo Creek (Flavel and Bari 2009).

An assessment of the flow needs of particular ecological functions and processes was carried out using hydrologic modelling. The outcomes of this modelling were used to determine the best ecological outcomes for the provision of environmental water releases. The assessment considered the constraints and limitations imposed by the physical nature of the river, the available climatic sequence and the presence of Chaffey Dam. The Ecological Features Report for the Peel Regulated Water Source (Foster and Lewis 2009) considered the relevant river flow objectives, changes to the flow regime and the ability to meet the water requirements for specified in-stream and wetland features. These factors were all considered when selecting and developing environmental flow rules for consideration in the Peel Valley Water Sharing Plan.

The methodology adopted for the identification and scheduling of high-priority groundwater dependent ecosystems in the development of the Peel Valley Water Sharing Plan was consistent with the NSW State Groundwater-Dependent Ecosystem Policy (DLWC 2002). The desktop assessment that was carried out enables protection of groundwater dependent ecosystems of known high conservation value.

A desktop analysis and ground reconnaissance assessment of Aboriginal cultural heritage values was carried out in the upper riparian zones of the Chaffey and Upper Peel River Tributaries water sources during development of the Peel Valley Water Sharing Plan. The assessment concluded that no deleterious effects on Aboriginal cultural heritage values would result from implementation of the Peel Valley Water Sharing Plan within the upper extent of the water sources examined (Albertson 2009 in NSW Office of Water 2010a). Consultation with the Aboriginal community was also carried out. No formal submissions were received from Indigenous individuals or groups during the public exhibition of the Peel Valley Water Sharing Plan.

4.8.4 Relationship to the EIS

From a water sharing perspective, implementation of the Project will result in several management changes, as required by the Peel Valley Water Sharing Plan. All management changes under an augmented dam, including planned environmental water releases, are written into the Peel Valley Water Sharing Plan. The primary change will be in the provision of a larger volume of planned environmental water.

The Plan demonstrates ‘no growth’ beyond that limited by the current MDBMC Cap Agreement and provides detailed rules to ensure that extractions remain within the LTAAEL. The requirement to demonstrate that an enlarged Chaffey Dam would not result in any growth in water extractions, necessitated that management under an augmented dam had to be considered during the planning process for the Peel Valley Water Sharing Plan.

As the impacts of management changes required by the Peel Valley Water Sharing Plan following augmentation of Chaffey Dam have been assessed (including public consultation) and approved, these impacts are not considered further in the EIS. The use of water from Chaffey Dam will continue to be managed in accordance with the approved Peel Valley Water Sharing Plan following implementation of the Project.

4.9 Relationship with Namoi Regulated Water Sharing Plan

The Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003 (the Namoi Regulated Water Sharing Plan) commenced in 2004. The Namoi River is located northwest of Chaffey Dam and extends about 350 km between the Great Dividing Range and the Barwon River. Split Rock Dam on the Manilla River and Keepit Dam on the Namoi River are the two main water storages on the Namoi River. The Peel River joins the Namoi River upstream of Keepit Dam, about half way between Manilla and Gunnedah.

Operationally, the management of Chaffey Dam is independent of storages on the Upper and Lower Namoi Regulated River Water Sources. Consequently, the NSW Government has chosen to manage the Peel and Namoi regulated rivers under different plans, despite their collective assessment and reporting relationship under the MDBMC Cap Agreement (NSW Office of Water 2010a).

As discussed in Section 4.3, the proposed works to the morning glory offtake will preserve the existing downstream stage-discharge relationship (Black & Veatch 2012). From a water sharing perspective, as discussed in Section 4.8, implementation of the Project will result in implementation of the management changes set out in the Peel Valley Water Sharing Plan.

As discussed in Section 4.8.4, given the impacts of management changes required by the Peel Valley Water Sharing Plan following augmentation of Chaffey Dam have been assessed and approved, these impacts are not considered further in the EIS.

4.10 Relationship with Namoi Catchment Action Plan

On 24 July 2012, the Minister for Primary Industries, the Honourable Katrina Hodgkinson, announced that the Namoi Catchment Action Plan 2010-2020 (Namoi CMA 2011) had been approved by Cabinet. The Namoi Catchment Action Plan 2010-2020 is a strategic plan for management of natural resources in the Namoi Catchment Management Area through to 2020.

The Namoi Catchment Action Plan 2010-2020 documents the Namoi CMA's vision for the Namoi Catchment as "*Vibrant communities and landscapes for the future*". The plan also provides targets across four key themes, namely biodiversity, land, water and people. These targets do not have any legislative implications, but are intended to guide investment and debate about management of natural resources in the Namoi Catchment.

The targets set out in the Namoi Catchment Action Plan 2010-2020 are as follows:

- Biodiversity Targets;

  1. By 2020 there is an increase in native vegetation extent and vegetation does not decrease to less than 70% in less cleared sub-catchments and 30% in over cleared sub-catchments and no further Regional Vegetation Community decreases to less than 30% extent as identified by 2010 baseline.

  2. By 2020 maintain sustainable populations of a range of native fauna species by ensuring that no further Regional Vegetation Community decreases to less than 30% extent as identified by 2010 baseline.

  3. By 2020 contribute to the recovery of priority viable threatened species, populations and communities.

  4. By 2020 no new invasive species are established in the Catchment and the spread of key emerging invasive plants and animals is limited.

- Land Target:

  1. By 2020 there is an improvement in soil health as measured by an increase in ground cover at the paddock, sub-catchment and catchment scales.

- Water Targets:

  1. By 2020 there is an improvement in the condition of those riverine ecosystems that have not crossed defined geomorphic thresholds as at the 2010 baseline

  2. By 2020 there is an improvement in the ability of groundwater systems to support groundwater dependent ecosystems and designated beneficial uses

  3. By 2020 there is an improvement in the condition of regionally important wetlands and the extent of those wetlands is maintained.

- People Targets:

  1. Natural resource management decisions contribute to social wellbeing.

  2. There is an increase in the adaptive capacity of the Catchment Community.

It is considered that the Project aligns with the CMA's vision of "*Vibrant communities and landscapes for the future*" by increasing water security for the community, both now and into the future. The Project also contributes to several of the targets defined in the Namoi Catchment Action Plan 2010-2020, primarily those relating to water and people.

The Project will enable implementation of increased environmental releases, as set out in the Peel Valley Water Sharing Plan (also refer Section 4.8). The Project will also result in increased security of surface water supply, rather than the potential for increased reliance on groundwater sources.

4.11 Need and Justification for the Project

The Chaffey Dam morning glory spillway was originally designed to handle a PMF determined in accordance with current practice at the time. Advancements in the understanding of meteorology and in hydrologic analysis techniques have shown that the spillway capacities of many existing dams, including Chaffey Dam, are inadequate to safely pass a PMF (Public Works Department of NSW 1990).

The PMF is the largest flood that could conceivably occur at a particular location and effectively reflects the extent of the floodplain (NSW Government 2005). At Chaffey Dam, the PMF is approximately equivalent to a 1 in 1,000,000 AEP event (Molino Stewart 2011).

Based on the population at risk and the severity of damage and loss that would result from dam failure, Chaffey Dam is currently rated as an “extreme” hazard dam, having inadequate capacity to safely pass a PMF (Dams Safety Committee 2009).

If Chaffey Dam were to fail due to an extreme flood event, it has been estimated that up to 150 lives would be lost and over $2.1 billion damage to property and agriculture would accrue (GHD 2007a). Consequences for townships immediately downstream of the dam, such as Woolomin, would be expected to be catastrophic.

As outlined in Section 3, State Water has completed some works at Chaffey Dam over the past decade to provide interim flood safety measures. However, implementation of the Project is required for the dam to meet current ANCOLD and Dams Safety Committee safety standards for high hazard dams.

To address the requirements of the Dams Safety Committee and ANCOLD standards, State Water proposes to carry out a safety upgrade to improve the flood capacity of Chaffey Dam and reduce the risk of dam failure in an extreme flood event. This will enable the dam to safely pass the PMF and concurrently increase the dam’s storage capacity to provide greater water security for potable, irrigation and agricultural supplies.

Chaffey Dam is the primary infrastructure to service the town water supply for Tamworth. Tamworth Regional Council has a high security entitlement of 16,400 ML/year from Chaffey Dam. Water from the reservoir is also used for irrigation and agricultural purposes.

GHD (2007a) carried out an assessment of long-term options for Chaffey Dam, taking into consideration the improved system reliability that could be achieved through the augmentation.

The assessment included:

- An analysis and interpretation of available historical data on climate, population and water demand in Tamworth, including projected future demand levels and demand management initiatives, current and future irrigation demands and past assessment by Hunter Water Australia on potential supply augmentation options;
- The potential impacts of climate change;
- The results and analysis of IQQM modelling for the Peel River, with an emphasis on model accuracy verification. Reliability of water supply for different users within the Peel Valley for a range of Tamworth water demand and sensitivity scenarios was also a key focus;
- The Murray-Darling Basin Commission (MDBC) Cap and Peel Water Sharing Plan; and
- The results for the inferred reliability of supply.

The assessment also examined the augmentation in relation to high security water supply requirements and irrigation water supply requirements. The assessment showed that the percentage of time Tamworth was subject to water restrictions decreased by around 6% when Chaffey Dam was augmented from 62 GL to 100 GL (GHD 2007a). Additionally, the probably of an 80% allocation for general security users when Tamworth reached its full water supply entitlement of 16,400 ML increased from 0% at the current dam capacity, to 85% at the augmented capacity (100 GL).

GHD (2007a) concluded that an augmentation of Chaffey Dam is required to meet the future needs of the region by securing the supply of water to Tamworth up to the existing entitlement (16,400 ML). The Project will not change the entitlement itself.

With increasing competition between water users for access to water, the Project is required in order to secure the future of Tamworth's town water supply, while providing protection to the current reliability of the Peel irrigation industry.

Consideration of the Project against the objects of the EP&A Act 1979 is set out in Table 4-4.

Table 4-4: Consideration of the Project against the objects of the EP&A Act

Object of the EP&A Act	Comment
(a) to encourage:	
(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,	Implementation of the Project will increase water security for Tamworth town water supply and irrigators in the Peel Valley. Operation of the Project will also improve flood safety.
(ii) the promotion and co-ordination of the orderly and economic use and development of land,	The Project comprises the expansion of an existing use of land to increase dam safety and water security

Object of the EP&A Act	Comment
	for the region.
(iii) the protection, provision and co-ordination of communication and utility services,	Consultation has been carried out with utility and service providers (Telstra and Essential Energy) to ensure impacts to services from the Project are minimised, including the design of road realignments. Implementation of the Project will necessitate the relocation of some services (power lines and Telstra cables), which will be carried out by the relevant providers. Installation of additional services is not required.
(iv) the provision of land for public purposes, (v) the provision and co-ordination of community services and facilities, and	Impacts to land currently utilised by the public will be mitigated through the relocation of impacted facilities at the South Bowlo Fishing Club and Bowling Alley Point Recreation Area.
(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	Some impacts to flora and fauna are expected to result from the Project.
(vii) ecologically sustainable development, and	Consideration of the principles of ecologically sustainable development in regard to the Project is shown in Table 8-28.
(viii) the provision and maintenance of affordable housing, and	This object is not relevant to the Project.
(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	The Project has been developed by State Water in consultation with Tamworth Regional Council. Consultation with various State Government agencies has been undertaken throughout development of the Project. Further investigations will be undertaken jointly by State Water and Namoi Catchment Management Authority. The Federal and NSW Governments will contribute to funding implementation of the Project.
(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.	Public consultation has been undertaken throughout development and environmental impact assessment of the Project, including formal and informal community consultation events and opportunities for comment.

4.12 Evaluation of Alternatives

Hunter Water Australia (HWA) (2005) undertook an evaluation of a number of options for providing a more reliable water supply to Tamworth. GHD (2006) subsequently provided an overview of the options considered. The supply side options considered and a comparison of costs, as reassessed by GHD (2006) are provided below and in Table 4-5. No other options were identified as possible supply augmentations.

- Augment Chaffey Dam: potential incremental capital costs of augmentations (over and above the costs for dam safety upgrade) were considered to be $10.8 million to increase the capacity of Chaffey Dam to 80 GL, $15.1 million to increase capacity to 100 GL and $19.9 million to increase the capacity to 120 GL;
- Dungowan Dam: options considered included an upgrade of the storage capacity, replacement of the Dungowan to Tamworth pipeline or use of Dungowan Creek and Peel River to transfer water from Dungowan Dam to Tamworth. Replacement of the pipeline was found to be the only practicable option, with a capital cost in the order of $28 to $37 million;
- Enlarge Peel extraction: the options considered were enlargement with and without additional raw water storage, a new intake downstream of the Cockburn River junction and storage at the pump station;
- Stormwater harvesting: this option was considered to be an unreliable and not cost effective mechanism for improving the reliability of supply;
- Purchase additional licences for low security allocation: this option was not considered viable;
- New storages: both on stream and off stream storage options were considered;
- Regional transfer systems: water transfer options from Keepit Dam, Split Rock Dam and Barnard River Diversion were considered; and
- Groundwater extraction.

Table 4-5: Comparison of Supply Augmentation Options (GHD 2006)

Option	Capital Cost
Chaffey Dam augmentation (80 GL)	$10.2 M
Chaffey Dam augmentation (100 GL)	$14.5 M
Chaffey Dam augmentation (120 GL)	$19.3 M
Chaffey Dam pipeline	$43.0 M
Augment Dungowan pipeline	$41.7 M
Upgrade intake pumping station	$1.58 M
Local storage near water treatment plant	$2.24 M

Option	Capital Cost
Local storage near intake pumping station	$3.53 M
New 25 GL on-stream storage	$97.4 M
Transfer from Keepit Dam	$52.7 M

The augmentation of Chaffey Dam was shown to be the most cost effective supply option to augment water supplies within the Peel Valley. HWA (2005) also showed that augmentation of Chaffey Dam delivered the greatest improvement in water yields, which was confirmed by GHD (2006).

The costs of the dam safety upgrade component of the works were considered to be generally consistent across all options considered. The incremental capital costs of augmentations (over and above the costs for the dam safety upgrade) were estimated by GHD (2006) to be $10.8 million to increase the capacity of Chaffey Dam to 80 GL; $15.1 million to increase the capacity to 100 GL; and $19.9 million to increase the capacity of to 120 GL.

During the development and feasibility stages of the Project, numerous options were considered by State Water. GHD (2007a) carried out a further assessment of options for the augmentation of Chaffey Dam, including consideration of augmentation to 80 GL, 100 GL and to 120 GL. Consideration was also given to the need for the Project. The assessment concluded that an augmentation of Chaffey Dam is required to meet the future needs of the region.

4.12.1 Do Nothing

State Water has recently completed several works at Chaffey Dam, including construction of an auxiliary spillway. These works have been targeted toward providing interim flood safety measures. However, implementation of the Project is required in order to bring Chaffey Dam up to modern standards.

If the dam did fail due to an extreme flood event, there would be disastrous consequences in terms of loss of life, property and environmental damage, as well as the loss of a vital water supply. It has been estimated that up to 150 lives would be lost and over $2.1 billion damage to property and agriculture would accrue in the event of the dam failing. There would also be major adverse environmental impacts (GHD 2007a).

GHD (2007a) also found that an augmentation of Chaffey Dam is required to meet the future water supply needs of the region, as described in Section 4.6.

The short-term advantage of the “Do Nothing” option is that no environmental impacts would result from construction activities and inundation associated with the Project. However as stated above, the medium-term and long-term disadvantages of potential catastrophic dam failure and unsatisfactory water security outweigh such short-term advantages.

For these reasons and to ensure State Water implements its responsibilities from both due diligence and legal perspectives, the 'do nothing' option and associated risk of catastrophic dam failure and unsatisfactory water security is considered to be unacceptable.

4.12.2 Lesser Augmentation

Consideration was given to the augmentation of Chaffey Dam to 80 GL. GHD (2007a) concluded that, based on the IQQM modelling and assuming no effluent offset, augmentation to 80 GL is required to meet the needs of high security water users. Augmentation to 80 GL would also maintain at least a 70% probability of 80% allocations on 1 July each year.

Augmentation of Chaffey Dam to 80 GL would provide a short-term advantage over the Project due to its lesser impact on vegetation communities and fauna habitats immediately adjacent to the permitter of the reservoir, given the increase in inundation would be less than for augmentation to 100 GL.

Although implementation of a lesser augmentation would result in a saving of around 30% of the Project capital costs (Table 4-5), GHD (2007a) found that augmentation of Chaffey Dam to 80 GL provided no contingency for possible adverse events, including those associated with climate change. Such an augmentation would be inadequate to meet the medium-term and long-term needs of both high security and general security water users if adverse events were to unfold.

4.12.3 Greater Augmentation

Consideration was also given to effectively doubling the existing storage capacity of Chaffey Dam, by augmentation to 120 GL. Although benefits were determined from an increase in storage capacity to 120 GL, the benefits were found to be incrementally smaller beyond augmentation to 80 GL (GHD 2007a). As discussed in Section 4.12.2, while augmentation to 80 GL satisfied projected water user needs, it provided no contingency for possible adverse events. However, it was considered that augmentation to 100 GL satisfied such contingency requirements and therefore the higher cost (approximately 30% higher than augmentation to 100 GL) and impact of augmentation to 120 GL was not justified.

Additionally, augmentation of Chaffey Dam to 120 GL would have an increased impact on vegetation communities and fauna habitats immediately adjacent to the permitter of the reservoir, as the increase in inundation would be greater than for augmentation to 100 GL. This option is considered to have no significant short, medium or long-term advantages over the Project.

4.12.4 The Project

In addition to upgrading Chaffey Dam to pass extreme flood events, a need to increase the security of Tamworth's water supply was identified. The proposed augmentation of Chaffey Dam will provide increased water security. Of the potential short term headworks augmentation strategies and new source development options, an increase in the storage capacity of Chaffey Dam to 100 GL was recommended (Public Works Department of NSW 1990). This option was considered to be cost

effective, require only minimal land acquisition and likely to have only minimal environmental impacts (Public Works Department of NSW 1990).

GHD (2007a) found that augmentation of Chaffey Dam to 100 GL would be needed to meet the needs of Tamworth high security users as well as maintaining irrigation allocations at above 70% probability of 80% allocation on 1 July each year. Further, this augmentation option also allowed for Tamworth demand growth beyond 16.8 GL per annum and a 10% reduction in inflows as a result of climate change.

It is considered that the Project is in the public interest.

No other alternatives to the Project are considered to be feasible.

4.13 Project Program

The program for construction and operation of the Project will be dependent on the selected contractor and dam safety requirements, however with optimal conditions the preliminary program is expected to comprise the following:

- Weeks 1 to 12 Construction documentation, approvals and establishment (approximately 20 personnel on site).
- Weeks 13 to 60 Raising of dam wall, realignment of roads and bridges and reconfiguration of auxiliary spillway (approximately 50 personnel on site).
- Weeks 61 to 90 Raising of morning glory spillway (approximately 40 personnel on site).
- Weeks 90 to 104 Commissioning and site disestablishment (approximately 20 personnel on site).

In carrying out the realignment of roads and bridges, the contractor is expected to utilise personnel and equipment for specific works in a sequential manner. That is, rather than completing all work at Bowling Alley Point, then moving to works at Western Foreshore Road, specific works (for example concrete works) will be completed in one location (Bowling Alley Point), then move to the next location (Western Foreshore Road).

The program specifically for realignment of roads and bridges is expected to comprise the following:

- Weeks 13 to 40 Bowling Alley Point Bridge.
- Weeks 13 to 40 Tamworth-Nundle Road and Rivers Road.
- Weeks 20 to 40 Hydes Creek Bridge.
- Weeks 20 to 45 Western Foreshore Road.

5 PLANNING AND LEGAL CONTEXT

The Commonwealth EPBC Act and the NSW EP&A Act are the primary pieces of planning legislation relevant to the Chaffey Dam Augmentation and Safety Upgrade Project. Numerous other pieces of legislation are also potentially relevant to the Project, as discussed in Sections 5.1 and 5.2.

5.1 Commonwealth Legislation

The Commonwealth legislation relevant to the Project is discussed in Section 5.1.1. A summary of approvals required under Commonwealth legislation is also provided in Section 5.2.15.

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legal framework for the protection and management of nationally and internationally important flora, fauna, ecological communities and heritage places. Under the provisions of the EPBC Act, an action that will have, or is likely to have, a significant impact on a matter of national environmental significance requires approval from the Minister for Sustainability, Environment, Water, Population and Communities.

Matters of national environmental significance under the EPBC Act include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park; and
- Nuclear actions.

Preliminary environmental assessments, including a literature review and field investigations (nghenvironmental 2012), identified the potential for the Project to impact on matters of national environmental significance under the EPBC Act. These matters of NES include:

- Booroolong Frog (*Litoria booroolongensis*);
- Border Thick-tailed Gecko (*Uvidicolus sphyrurus*); and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community (CEEC).

A meeting was held with the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) on 5 July 2012 to inform SEWPaC of the Project and to seek input on the requirement for the Project to be referred under the EPBC Act.

On 29 August 2012, a *Referral of Proposed Action Form* was submitted by State Water to SEWPaC. On 28 September 2012, SEWPaC provided its determination for the Project, concluding that the Project is a controlled action and as such, requires assessment and a decision of approval under the EPBC Act before it can proceed. SEWPaC determined that the Project was to be assessed by accredited assessment under Part 5.1 of the EP&A Act.

On 19 October 2012, the Director-General modified the DGRs of 23 January 2012 for the purposes of taking into account matters of national environmental significance (supplementary assessment requirements issued).

5.2 NSW Legislation

The NSW legislation relevant to the Project is discussed in Sections 5.2.1 to 5.2.13. A summary of approvals required under NSW legislation is provided in Section 5.2.15. A summary of approvals *not* required for the Project is provided in Section 5.4.

5.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. Part 4, Division 4.1 of the EP&A Act deals with State Significant Development, while State Significant Infrastructure is assessed under the provisions of Part 5.1 of the EP&A Act.

Part 5.1, Section 115U(2) of the EP&A Act states that a *'State environmental planning policy may declare any development, or any class or description of development, to be State Significant Infrastructure'*.

5.2.2 State Environmental Planning Policy (State and Regional Development) 2011

Clause 14(1) of the *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP) provides that, pursuant to section 115U(2) of the EP&A Act, development is State Significant Infrastructure if:

> *(a) the development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act, and*
>
> *(b) the development is specified in Schedule 3.*

Schedule 3 of the State and Regional Development SEPP addresses 'State significant infrastructure – general'.

Clause 4 'Water storage or water treatment facilities' provides:

1) *'development for the purpose of water storage… carried out by or on behalf of a public authority that has a capital investment value of more than $30 million'*

The Infrastructure SEPP includes provisions for certain developments that are permitted without consent. Division 24 addresses 'Water supply systems'.

Clause 125 provides:

1) *Development for the purpose of water storage facilities, including development for any of the following purposes, may be carried out by or on behalf of a public authority without consent on land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone SP1 Special Activities, Zone SP2 Infrastructure or an equivalent land use zone:*

   a) *catchment management works,*

   b) *public recreational facilities associated with a water storage facility.*

Under the provisions of Clause 125(5) development for the purpose of a water supply system includes 'dams', 'access ways', 'construction works' and 'environmental management works'.

The Project will be carried out by State Water, a public authority, on land zoned '*RU1 Primary Production*' under the *Tamworth Regional Local Environmental Plan 2010*. As such, the Project falls within the definition of *'development for the purpose of water storage facilities'* in the Infrastructure SEPP and is permissible without consent under the provisions of Clause 125.

The Project satisfies the requirements of Part 5.1 of the EP&A Act and has been classified by the Minister for Planning and Infrastructure as State Significant Infrastructure. Section 115Y of the EP&A Act prescribes the environmental assessment requirements for approval of State Significant Infrastructure, including the requirement for DGRs to be issued and preparation of an EIS.

Accordingly, State Water has sought and received DGRs, which must be addressed in the EIS for the Project (Appendix 1). In accordance with the requirements of Clause 115Y(3) of the EP&A Act, the Director-General has consulted with the relevant public authorities and has had regard to the need for the requirements to assess any key issues raised by those public authorities. Agencies' requirements were provided separately to the DGRs.

The EIS is required to be prepared and exhibited in accordance with Part 10 of the Environmental Planning and Assessment Regulation 2000. Clause 193(1) of the Environmental Planning and Assessment Regulation 2000 provides:

> *The consent of the owner of the land on which State significant infrastructure is to be carried out is required for an infrastructure application or modification request unless the application or request relates to any of the following:*
>
> > *(a) State significant infrastructure proposed to be carried out by a proponent that is a public authority…*

Given that the Project will be carried out by State Water, a public authority, the consent of the owner of land on which the Project is to be carried out is not required.

Clause 193(4) of the Environmental Planning and Assessment Regulation 2000 requires that, where the land owner's consent is not required, notification be provided to the owner of the land on which State Significant Infrastructure is to be carried out, as follows:

> *If the consent of the owner of the land is not required for an infrastructure application or modification request under this clause, the proponent is required to give notice of the application or request:*
>
> *(a) by written notice to the owner of the land before, or no later than 14 days after, the application or request is made, or*
>
> *(b) by advertisement published in a newspaper circulating in the area in which the infrastructure is to be carried out:*
>
> > *(i) in the case of an infrastructure application—at least 14 days before the environmental impact statement that relates to the infrastructure is placed on public exhibition…*

The requirements of the Director-General and the Department of Planning and Infrastructure in assessing and making publically available the EIS are also prescribed in Part 10 of the Environmental Planning and Assessment Regulation 2000.

In accordance with Section 115(w) of the EP&A Act, the Minister for Planning and Infrastructure is the Determining Authority for the EIS.

5.2.3 State Water Corporation Act 2004

State Water was created under the provisions of the *State Water Corporation Act 2004*. State Water's powers and responsibilities are defined by this legislation and subsidiary instruments, principally State Water's Operating Licence. The Operating Licence is audited by the NSW Independent Pricing and Regulatory Tribunal (IPART) against key performance indicators, and is reported to the portfolio Minister.

State Water is responsible for managing the storage and release of water which are detailed in Water Sharing Plans and Water Supply Work Approvals, issued through the NSW Office of Water.

5.2.4 Dams Safety Act 1978

Section 7 of the *Dams Safety Act 1978* constituted the Dams Safety Committee to ensure the safety of dams in NSW. Section 14 of the *Dams Safety Act 1978* prescribes the functions of the Dams Safety Committee, as follows:

> *(a) to maintain a surveillance of prescribed dams, the environs under, over and surrounding prescribed dams and the waters or other materials impounded by prescribed dams to ensure the safety of prescribed dams,*

(b) to examine and investigate the location, design, construction, reconstruction, extension, modification, operation and maintenance of prescribed dams, the environs under, over and surrounding prescribed dams and the waters or other materials impounded by prescribed dams,

(c) to obtain information and keep records on matters relating to the safety of dams,

(d) to formulate measures to ensure the safety of dams,

(e) to make such reports or recommendations to the Minister or any other person in relation to the safety of prescribed dams as the Committee considers necessary or appropriate,

(f) to make reports and recommendations with respect to the prescription of dams for the purposes of this Act,

(g) to exercise such other functions as are conferred or imposed on the Committee by or under this or any other Act or the regulations, and

(h) to do such supplemental, incidental and consequential acts as may be necessary or expedient for the exercise of its functions.

The *Dams Safety Act 1978* empowers the Dams Safety Committee with various enabling functions to undertake these roles. This includes directing owners of dams to upgrade prescribed dams to meet current safety standards.

Chaffey Dam is listed under Schedule 1 of the *Dams Safety Act 1978* as a prescribed dam and is therefore subject to the provisions of the *Dams Safety Act 1978* and subsequently the Dams Safety Committee.

5.2.5 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) identifies threatened species, populations, endangered ecological communities (EECs), critical habitats and key threatening processes. In relation to development assessment, the provisions of the TSC Act have been integrated into the EP&A Act.

Section 5A of the EP&A Act requires that for the purposes of the Act, consideration of whether the proposal is likely to impact on threatened species, populations or ecological communities is required. It establishes seven factors on which this assessment must be based (the 'Seven Part Test'). Where a significant impact is considered likely, a Species Impact Statement (SIS) must be prepared and submitted with the EIS (refer Section 8.2).

Under Section 91 of the TSC Act, the Director-General may grant a licence authorising a person to take action which is most likely to result in harm to any animal that is of, or is part of, a threatened species, population or ecological community. A licence under Section 91 of the TSC Act is not required for the carrying out of an activity authorised under the EP&A Act.

5.2.6 Fisheries Management Act 1994

The objectives of the *Fisheries Management Act 1994* are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations.

Part 7 of the *Fisheries Management Act 1994* requires a permit for a number of activities, including those involving dredging and reclamation work and those involving harm to marine vegetation.

Section 199 of the *Fisheries Management Act 1994* sets out the circumstances in which a public authority (other than local authority) may carry out dredging or reclamation. Under the provisions of the *Fisheries Management Act 1994* (Section 198A), the following definitions are provided:

> ***dredging work*** *means:*
>
> *(a) any work that involves excavating water land, or*
>
> *(b) any work that involves the removal of material from water land that is prescribed by the regulations as being dredging work to which this Division applies.*
>
> ***reclamation work*** means any work that involves:
>
> *(a) using any material (such as sand, soil, silt, gravel, concrete, oyster shells, tyres, timber or rocks) to fill in or reclaim water land, or*
>
> *(b) depositing any such material on water land for the purpose of constructing anything over water land (such as a bridge), or*
>
> *(c) draining water from water land for the purpose of its reclamation.*
>
> ***water land*** *means land submerged by water:*
>
> *(a) whether permanently or intermittently, or*
>
> *(b) whether forming an artificial or natural body of water,*
>
> *and includes wetlands and any other land prescribed by the regulations as water land to which this Division applies.*

Section 199 of the *Fisheries Management Act 1994* requires that a public authority must, before it authorises or carries out dredging or reclamation work:

> *(a) give the Minister written notice of the proposed work, and*
>
> *(b) consider any matters concerning the proposed work that are raised by the Minister within 28 days after the giving of the notice (or such other period as is agreed between the Minister and the public authority).*

Raising of the dam wall for the Project is proposed to be achieved by placement of rockfill on the downstream faces of the embankment. The additional rockfill will be placed on the existing embankment face to steepen the slope and widen the crest. The rockfill to be utilised is consistent with that currently *insitu* on the upstream and downstream sides of the embankment and was sourced

from construction of the auxiliary spillway, adjacent to the dam wall. No placement of rockfill on 'water land' to raise the dam wall is anticipated.

If any work comprising dredging or reclamation work is proposed, State Water is required to notify the Minister for Fisheries in accordance with Section 199, and take into account any matters concerning the proposed work raised by the Minister, prior to carrying out the reclamation work component Project.

Under the provisions of Section 115ZG (1)(b) of the EP&A Act, *'a permit under section 201, 205 or 219 of the Fisheries Management Act 1994'* is not required for approved State Significant Infrastructure.

Under Section 218 of the *Fisheries Management Act 1994*, a public authority is required to consult with DPI Fisheries if it alters or modifies a dam, in regard to the passage of fish through or over the dam. Section 218(5) of the *Fisheries Management Act 1994* states:

> *'a public authority that proposes to construct, alter or modify a dam, weir or reservoir on a waterway (or to approve of any such construction, alteration or modification):*
>
> *(a) must notify the Minister of the proposal, and*
>
> *(b) must, if the Minister so requests, include as part of the works for the dam, weir or reservoir, or for its alteration or modification, a suitable fishway or fish by-pass.'*

It is noted in Molino Stewart (2011) that State Water previously consulted with DPI regarding the requirement to install a fishway at Chaffey Dam during the earlier safety upgrade works (Stage 1, refer Appendix 2).

In a letter to State Water dated 29 January 2007 DPI advised:

> *'NSW DPI does not recommend the capacity for a fishway be investigated and incorporated into the Chaffey Dam Safety Upgrade Project'.*

In a letter to the Department of Planning and Infrastructure dated 22 December 2011 in relation to the current Project, DPI Fisheries confirmed their previous correspondence with State Water that a high-level fishway will not be pursued at Chaffey Dam (Appendix 2).

5.2.7 Heritage Act 1977

Under Section 57 of the *Heritage Act 1977*, an approval must be obtained for works that have the potential to interfere with a heritage item or place listed on the State Heritage Register or the subject of an interim heritage order.

There are no heritage items listed on the State Heritage Register or subject to an interim heritage order that are either in, or in the vicinity of the Project Site.

Under the provisions of Section 115ZG (1)(c) of the EP&A Act, *'an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977'* is not required for approved State

Significant Infrastructure. Additionally, Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of approved State Significant Infrastructure.

5.2.8 Catchment Management Authorities Act 2003

The *Catchment Management Authorities Act 2003* establishes catchment management authorities throughout the State and specifies their functions. Chaffey Dam is located within the Namoi CMA catchment area (Figure 5-1).

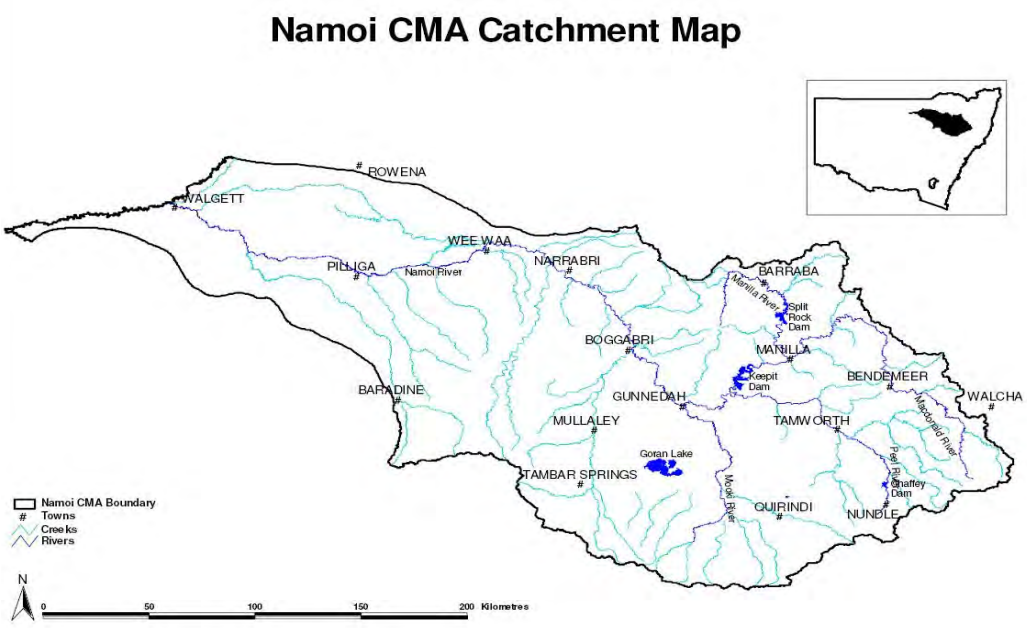


Figure 5-1: Namoi Catchment Management Authority catchment area (source: New South Wales Government Catchment Management Authorities Website, accessed 2 July 2012 at http://www.cma.nsw.gov.au/namoi-cma.html)

The Act also requires the preparation of draft catchment action plans for approval by the Minister. Catchment action plans are strategic, statutory plans under the *Catchment Management Authorities Act 2003* that provide a framework for natural resource management in a catchment. Catchment action plans include general principles for biodiversity, land and water management.

The 2010-2020 Namoi Catchment Action Plan has been submitted to the Minister for Primary Industries for review. In accordance with the *Natural Resources Commission Act 2003*, the Natural Resource Commission will review and make recommendations to the Minister for approval of the plan if it is consistent with the state-wide standard and targets adopted by the NSW Government.

5.2.9 Water Management Act 2000

The *Water Management Act 2000* governs sustainable and integrated management of water sources across the State. Areas of the state where water sharing plans have commenced are subject to the *Water Management Act 2000*.

Part 3 of the *Water Management Act 2000* prescribes the approvals required for certain water uses, water management works, controlled activities and aquifer interference. Under the provisions of Section 115ZG (1)(g) of the EP&A Act, *'a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000'* is not required for approved State Significant Infrastructure.

Construction of part of the Project may require the temporary lowering of the water level in Chaffey Dam. This aspect of construction is the subject of ongoing consultation between State Water and the NSW Office of Water in the context of the *Water Management Act 2000*.

The *Water Management Act 2000* enables the preparation of water sharing plans, which are legal documents under the Act. Water sharing plans are prepared by the NSW Office of Water and establish rules for sharing water between the environmental needs of the river or aquifer and water users and also between different types of water use such as town supply, rural domestic supply, stock watering, industry and irrigation. Under the *Water Management Act 2000*, water sharing plans must protect each water source and its dependant ecosystems, while also protecting basic landholder rights. State Water delivers water in accordance with approved water sharing plans.

Water sharing plans are developed through a process of technical assessment, classification and development of water sharing rules by interagency panels. Environmental, social and economic issues are considered in the planning process for water sharing plans.

Chaffey Dam is located within the Namoi water sharing area, which aligns with the Namoi CMA catchment area (Figure 5-1). Water sharing plans within the Namoi water sharing area are:

- Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008;
- Water Sharing Plan for the NSW Great Artesian Basin Shallow Groundwater Sources 2011;
- Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011;
- Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011;
- Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010;
- Water Sharing Plan for the Phillips Creek, Mooki River, Quirindi Creek and Warrah Creek Water Sources 2003;

- Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003; and
- Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003.

The Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010 covers all of the water extraction within the Peel Valley and is discussed in Section 4.8. The Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003 is discussed in Section 4.9.

At 3 September 2012, no water sharing plans were on exhibition.

5.2.10 Crown Lands Act 1989

All reserved Crown lands are subject to the general land management objectives and provisions of the *Crown Lands Act 1989*, including the reserve management provisions of Part 5. The land management provisions relating to the protection of public land in Division 5 of Part 7 of the *Crown Lands Act 1989* also apply. The objectives and principles of Crown land management are listed in Sections 10 and 11 respectively of the *Crown Lands Act 1989*. The principles of Crown land management are that:

- Environmental protection principles be observed in relation to the management and administration of Crown land;
- The natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible;
- Public use and enjoyment of appropriate Crown land be encouraged;
- Where appropriate, multiple use of Crown land be encouraged;
- Where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity; and
- Crown land be occupied, used, sold, leased, licenced or otherwise dealt with in the best interests of the State consistent with the above principles.

The lands within and surrounding Chaffey Dam are largely crown reserve under the *Crown Lands Act 1989* and managed by State Water, Tamworth Regional Council and the Bowling Alley Point Reserve Trust, a community trust.

Under the current provisions of Part 5 of the *Crown Lands Act 1989*, Crown land can be reserved or dedicated for a public purpose and managed by a reserve trust appointed by the Minister. The name of the reserve and the appointment of members of the Trust Board to manage its affairs is also the Minister's prerogative.

The Chaffey Dam Reserve (number R.96568) at Bowling Alley Point is listed under Schedule 1 of the Crown Lands (General Reserves) By-Law 2006. The reserve is managed by the Bowling Alley Point Reserve Trust for the purposes of public recreation.

A draft Masterplan was prepared for Chaffey Dam in accordance with Part 5 Division 6 Section 112 to 114 of the *Crown Lands Act 1989* (GHD 2008). The Masterplan covered land upstream of the existing dam wall and below the PMF. The main objective of the Masterplan was to:

- Satisfy the requirements of the *Crowns Land Act 1989;*
- Ensure that the natural and cultural values of Chaffey Dam are conserved and enhanced;
- Describe an appropriate land management and rehabilitation program for Chaffey Dam and surrounds;
- Allow for the continual use of Chaffey Dam for passive recreation, education and research; and
- Balance the issues of conservation, public access, recreation and business opportunities and landholders' interests in the future management of the Reserve.

This Masterplan is not included on the DPI (Catchment & Lands) website as an adopted plan of management.

5.2.11 Native Vegetation Act 2003

The *Native Vegetation Act 2003* regulates the clearing of native vegetation outside national parks, conservation areas, state forests and reserves and urban areas (as defined in Schedule 1 to the Act).

The *Native Vegetation Act 2003* applies to the land on which Chaffey Dam is located. Section 12 of that Act provides:

> *12 Clearing requiring approval*
>
> *(1) Native vegetation must not be cleared except in accordance with:*
>
> *(a) a development consent granted in accordance with this Act, or*
>
> *(b) a property vegetation plan.*

However, under the provisions of Part 5.1 Section 115ZG(e) of the EP&A Act, an authorisation referred to in Section 12 of the *Native Vegetation Act 2003* to clear native vegetation is not required for State Significant Infrastructure. The proposed development is State Significant Infrastructure under the provisions of Schedule 3 to the State and Regional Development SEPP. Therefore, an authorisation is **not** required.

'*Offsets*', as defined in Clause 3 of the Native Vegetation Regulation 2005 means:

> *any natural resource management action or work required by a* [property vegetation plan] *PVP for the purpose of ensuring that broadscale clearing proposed by the PVP improves or maintains environmental outcomes.*

As a property vegetation plan is not required for the Project, in accordance with Section 115ZG(e) of the EP&A Act, offsets under the *Native Vegetation Act 2003* are **not** required.

5.2.12 Protection of the Environment Operations Act 1997

The POEO Act is the primary piece of environmental protection legislation in NSW and is administered by the Office of Environment and Heritage (OEH). Major features of the legislation include protection of the environment policies relating to water quality, air quality, noise emissions, contaminated land and waste disposal impacts. The POEO Act also regulates activities that have potential to cause environmental harm.

Chapter 3 of the POEO Act states that an Environment Protection Licence is required for scheduled activities. Schedule 1 of the POEO Act lists '*scheduled activities*' for which an Environment Protection Licence is required under Sections 48 or 49 of the Act.

Clause 13 of Schedule 1 to the POEO Act prescribes '*concrete works*' that constitute a scheduled activity. '*Concrete works*' means:

> *(1) This clause applies to concrete works, meaning the production of concrete products, but does not include the production of pre-mixed concrete (concrete batching).*
>
> *(2) The activity to which this clause applies is declared to be a scheduled activity if it has a capacity to produce more than 30,000 tonnes per year of concrete products.*

Although a concrete batching plant may be utilised on site during construction, it has not been included in this assessment. The Contractor will be responsible for carrying out all required environmental assessment and obtaining all relevant approvals, including an Environment Protection Licence if required.

Clause 19 of Schedule 1 to the POEO Act specifies '*extractive activities*' that comprise scheduled activities and this require an Environment Protection Licence. '*Extractive activities*' means:

> *(1) This clause applies to the following activities:*
>
> *land-based extractive activity, meaning the extraction, processing or storage of extractive materials, either for sale or re-use, by means of excavation, blasting, tunnelling, quarrying or other such land-based methods.*
>
> *water-based extractive activity, meaning the extraction of extractive materials, either for sale or re-use, by means of dredging or other such water-based methods.*
>
> *(2) In this clause, extractive materials means clay, sand, soil, stone, gravel, rock, sandstone or similar substances that are not minerals within the meaning of the Mining Act 1992.*
>
> *(3) Each activity referred to in Column 1 of the Table to this clause is declared to be a scheduled activity if it meets the criteria set out in Column 2 of that Table.*

Table

Column 1	***Column 2***
Activity	***Criteria***
land-based extractive activity	*involves the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials*
water-based extractive activity	*involves the extraction of more than 30,000 cubic metres per year of extractive materials*

Pursuant to Clause 19 of the Schedule 1 to the POEO Act, '*Extractive materials*' means:

> *clay, sand, soil, stone, gravel, rock, sandstone or similar substances that are not minerals within the meaning of the Mining Act 1992*

Approximately 200,000 m^3 of existing hard rock stockpiled on site, sourced from previous construction of the auxiliary spillway, will be utilised as rockfill for the dam wall embankment. Storage of this material comprises a scheduled activity, pursuant to Clause 19 of Schedule 1 to the POEO Act and as such will require an Environment Protection Licence.

Approximately 160,000 m^3 of existing fill at the downstream toe of the dam wall embankment will be excavated and stockpiled to allow the placement of rockfill on a sound soil and rock foundation. Excavation and storage of this material comprises a scheduled activity, pursuant to Clause 19 of Schedule 1 to the POEO Act and as such will require an Environment Protection Licence.

Section 115ZH(1) of the EP&A Act provides that an authorisation for an Environment Protection Licence under Chapter 3 of the POEO Act (for any of the purposes referred to in Section 43 of that Act) cannot be refused if it is necessary for carrying out approved State Significant Infrastructure and is to be substantially consistent with the approval under Part 5.1 of the EP&A Act.

The Protection of the Environment Operations (Clean Air) Regulation 2010 replaced the Protection of the Environment Operations (Clean Air) Regulation 2002. The Regulation is the core legislative and regulatory instrument for air quality issues in NSW.

Part 5 (Air impurities from emitted activities and plant) of the Protection of the Environment Operations (Clean Air) Regulation 2010 refers to the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005a). These approved methods have been utilised for the assessment of impacts of air pollutants relevant to the Project.

5.2.13 Roads Act 1993

Section 7(4) of the *Roads Act 1993* provides that:

> *The council of a local government area is the roads authority for all public roads within the area, other than:*
>
> *(a) any freeway or Crown road, and*
>
> *(b) any public road for which some other public authority is declared by the regulations to be the roads authority.*

Section 138 of the *Roads Act 1993* requires the consent of the appropriate roads authority for the carrying out any of the following work:

> *(a) erect a structure or carry out a work in, on or over a public road, or*
>
> *(b) dig up or disturb the surface of a public road, or*
>
> *(c) remove or interfere with a structure, work or tree on a public road, or*
>
> *(d) pump water into a public road from any land adjoining the road, or*
>
> *(e) connect a road (whether public or private) to a classified road,*

Given the realignment of roads and bridges proposed as part of the Project, consent under Section 138 of the *Roads Act 1993* will be required to be granted by Tamworth Regional Council. As the Project comprises State Significant Infrastructure, then in accordance with the provisions of Section 115ZH(1)(f) of the EP&A Act, a consent under Section 138 of the *Roads Act 1993* cannot be refused.

5.2.14 State Environmental Planning Policy No 33—Hazardous and Offensive Development

State Environmental Planning Policy No 33—Hazardous and Offensive Development (SEPP 33) includes provisions in relation to potentially hazardous and offensive industries and hazardous and offensive industries. SEPP 33 applies to the State and includes the following relevant aims within Clause 2:

> *(d) "to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and*
>
> *(e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact…"*

No bulk storage of hydrocarbons or other hazardous materials on site is proposed during construction and the Project is not considered to be a potentially hazardous or offensive industry.

5.2.15 State Environmental Planning Policy No 44—Koala Habitat Protection

State Environmental Planning Policy No 44—Koala Habitat Protection (SEPP 44) aims to:

> *"…encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline…"*

SEPP 44 defines land that is potential and core Koala habitat and provides, in Schedule 2, a list of known Koala feed tree species.

SEPP 44 applies to land of a certain size in the LGAs listed in Schedule 1 of the SEPP that is land in relation to which a development application has been made. The Nundle LGA is identified under Schedule 1 of SEPP 44. However, most of the Nundle LGA was absorbed into Tamworth Regional LGA in 2004. The Tamworth Regional LGA is not listed within Schedule 1 of SEPP 44, although Koalas are known to occur in the Tamworth Regional LGA.

As this EIS is the subject of a SSI application, rather than a development application, SEPP 44 does not apply to the Project. However, in order to take a conservative, precautionary approach, the Project Site was assessed for its likelihood of supporting Koalas, as described in Section 8.2.

5.3 Summary of Required Approvals

A summary of the approvals required for the Project is provided in Table 5-1.

Table 5-1: Summary of approvals required for the Project

Legislation	Approval
Environment Protection and Biodiversity Conservation Act 1999	Controlled Action Approval
Environmental Planning and Assessment Act 1979	State Significant Infrastructure Approval
Protection of the Environment Operations Act 1997	Environment Protection Licence
Roads Act 1993	Section 138 Consent

5.4 Summary of Approvals Not Required

A summary of the approvals that have been considered but are **not** required for implementation of the Project is provided in Table 5-2.

Table 5-2: Summary of approvals not required for the Project

Legislation	Approval	Justification
Threatened Species Conservation Act 1995	Section 91 Licence	Not required for the carrying out of an activity by or in accordance with an approval under the EP&A Act.
Fisheries Management Act 1994	Permit under section 201, 205 or 219	Section 115ZG(1)(b) of the EP&A Act provides that such authorisations are not required for approved State Significant Infrastructure.
Fisheries Management Act 1994	Section 218 consultation with DPI Fisheries where a public authority alters or modifies a dam, in regard to the passage of fish through or over the dam	In letter to State Water dated 29 January 2007 DPI advised: 'NSW DPI does not recommend the capacity for a fishway be investigated and incorporated into the Chaffey Dam Safety Upgrade Project'. In letter to the Department of Planning and Infrastructure dated 22 December 2011 DPI Fisheries confirmed their previous correspondence with State Water that a high-level fishway will not be pursued at Chaffey Dam.
Heritage Act 1977	Approval under Part 4, or an excavation permit under section 139	Section 115ZG(1)(c) of the EP&A Act provides that such authorisations are not required for approved State Significant Infrastructure.
Native Vegetation Act 2003	Section 12 authorisation to clear native vegetation	Section 115ZG(1)(e) of the EP&A Act provides that such authorisations are not required for approved State Significant Infrastructure.

6 STAKEHOLDER CONSULTATION

A range of consultation activities were undertaken with the community and stakeholders to inform them of the Project and to seek their comment and input on the Project (Table 6-1). The key consultation activities comprised the following:

- 23 January 2012 - DGRs and Agencies' comments and requirements issued for the Project;
- 15 May 2012 - Project Risk Workshop held at Chaffey Dam with key Agencies and Stakeholders. A register of invitations sent out and attendees is provided at Appendix 5;
- 28 May 2012 - comment on Project biodiversity and Aboriginal heritage methodology from OEH and the Department of Planning and Infrastructure sought;
- 12 July 2012 - Project website established to inform the community and stakeholders of the Project and provide a means to comment on the Project. The Project website is www.worleyparsons.com/chaffeydam;
- 14 July 2012 - Community Consultation Day Barbecue held at Chaffey Dam. Advertisements were placed in the local newspaper (Northern Daily Leader) on Saturday 30 June 2012, Wednesday 4 July 2012 and Saturday 7 July 2012 prior to the Community Consultation Day Barbecue. Notices were provided at the Woolomin General Store and letters were posted to land owners within the Project Site as well as adjoining land owners to notify them of the Community Consultation Day Barbecue;
- 30 August 2012 - Community Consultation Night held in Tamworth. Advertisements were placed in the Northern Daily Leader on Wednesday 22 August 2012 and Saturday 25 August 2012, prior to the Community Consultation Night. Notices were provided at the Woolomin General Store and letters were posted to land owners within the Project Site as well as adjoining land owners to notify them of the Community Consultation Night. An email was sent to the key Agencies and Stakeholders invited to the Risk Workshop informing them of the Community Consultation Night and inviting them to attend;
- 30 August 2012 - Community Drop-in Session held in Tamworth City Plaza from 2:30pm-4:30pm. Advertisements were placed in the Northern Daily Leader on Wednesday 22 August 2012 and Saturday 25 August 2012, prior to the Community Drop-in Sessions. Notices were provided at the Woolomin General Store and letters were posted to adjoining landholders to notify them of the Community Drop-in Sessions;
- 31 August 2012 - Community Drop-in Session held in Woolomin from 9:00am-10:00am. Advertisements were placed in the Northern Daily Leader on Wednesday 22 August 2012 and Saturday 25 August 2012, prior to the Community Drop-in Sessions. Notices were provided at the Woolomin General Store and letters were posted to adjoining landholders to notify them of the Community Drop-in Sessions;

- 8 October 2012 - Meeting with the Department of Planning and Infrastructure to update the Department on the status of the EIA for the Project and to discuss the Minister for Sustainability, Environment, Water, Population and Communities' declaration of the Project as a controlled action, requiring assessment and approval under the Commonwealth EPBC Act;
- 19 October 2012 - Supplementary DGRs issued by Department of Planning and Infrastructure to incorporate SEWPaC's environmental assessment requirements for the Project;
- 19 October 2012 - A copy of the Preliminary Draft EIS (excluding assessment of biodiversity) was provided to key NSW Government Agencies for information and comment. Agencies consulted were: the Department of Planning and Infrastructure, Environment Protection Authority (EPA) and OEH (Environment NSW and the Heritage Council of NSW). Phone messages were also left with NSW Office of Water and DPI Fisheries offering to provide a copy of the Preliminary Draft EIS, however no response was received. EIS Comments were received from EPA and Heritage Council of NSW, while Department of Planning and Infrastructure declined to comment on the Preliminary Draft EIS. No comments were received from Environment NSW;
- Ongoing - Consultation with Namoi CMA and OEH regarding management of the Booroolong Frog; and
- Ongoing - Consultation with SEWPaC and Department of Planning and Infrastructure was undertaken throughout preparation of the EIS, through meetings, phone calls and emails.

Consultation with Aboriginal stakeholders undertaken for the Project is detailed in Section 8.4.

This page has been left blank intentionally

Table 6-1: Summary of consultation carried out for the Project

Stakeholder	Consultation
Department of Sustainability, Environment, Water, Population and Communities	A meeting was held with SEWPaC on 5 July 2012 to inform the Department of the Project and to seek input on the requirement for the Project to be referred under the EPBC Act. A *Referral of Proposed Action Form* was submitted by State Water to SEWPaC on 29 August 2012. The assessment provided in the Referral concludes that implementation of the Project is not likely to constitute a significant impact on any matter of NES. SEWPaC provided its determination for the Project on 28 September 2012, concluding that the Project is a controlled action and as such, requires assessment and a decision of approval under the EPBC Act before it can proceed. Supplementary DGRs were issued on 19 October 2012 by the Department of Planning and Infrastructure to incorporate SEWPaC's environmental assessment requirements for the Project. Consultation with SEWPaC was undertaken throughout preparation of the EIS, through meetings, phone calls and emails.
Department of Planning and Infrastructure	The Director-General of Planning and Infrastructure was consulted to obtain DGRs for the Project. The Director-General's Environmental Assessment Requirements were issued on 23 January 2012, a copy of which is provided at Appendix 1. The Department of Planning and Infrastructure identified the following key issues to be addressed in the environmental assessment for the Project: Soil and water; Biodiversity; Aboriginal heritage; Historic heritage; Traffic and transport; Noise and Vibration; Air Quality; Visual Amenity; Land Use, Property and Socioeconomic; Spoil and Waste Management; and Hazards and Risk. The Department of Planning and Infrastructure was further consulted via email in regard to the Aboriginal heritage methodology for the Project. Representatives from the Department of Planning and Infrastructure were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however no representatives were available to attend. Email notification of the Community Consultation Day was provided to the Department of Planning and Infrastructure on 10 July 2012.

Stakeholder	Consultation
	A meeting was held with the Department of Planning and Infrastructure on 8 October 2012 to update the Department on the status of the Environmental Impact Assessment for the Project and to discuss the Minister for Sustainability, Environment, Water, Population and Communities' declaration of the Project as a controlled action, requiring assessment and approval under the Commonwealth's EPBC Act. Supplementary DGRs were issued on 19 October 2012 by the Department of Planning and Infrastructure to incorporate SEWPaC's environmental assessment requirements for the Project. Consultation with the Department of Planning and Infrastructure was undertaken throughout preparation of the EIS, through meetings, phone calls and emails. A copy of the Preliminary Draft EIS was also provided to the Department of Planning and Infrastructure for information and comment,.
Department of Primary Industries	Representatives from the Department of Primary Industries Fisheries and NSW Office of Water attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to the Department of Primary Industries Fisheries, Forest and Agriculture and NSW Office of Water on 10 July 2012. A phone message was left with NSW Office of Water and DPI Fisheries offering to provide a copy of the Preliminary Draft EIS, however no response was received and consequently a copy of the document was not provided.
Office of Environment and Heritage	Representatives from OEH (including Environment NSW and the Heritage Council of NSW) were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however no representatives were available to attend. OEH was consulted in relation to the Project biodiversity and Aboriginal heritage methodology. A letter was sent to Environment NSW on 28 May 2012 to seek comment on the biodiversity methodology for the Project. A response letter was received on 7 June 2012, providing several points for consideration. A copy of this consultation is provided at Appendix 7. A letter was also sent to the Heritage Council of NSW to seek comment on the Aboriginal heritage methodology for the Project. A response email

Stakeholder	Consultation
	was received on 31 May 2012, although no additional considerations, above those included in the DGRs, were proposed. A copy of this consultation is provided at Appendix 7. Email notification of the Community Consultation Day was provided to OEH (including Environment NSW and the Heritage Council of NSW) on 10 July 2012. A copy of the Preliminary Draft EIS (excluding assessment of biodiversity) was provided to OEH (Environment NSW and the Heritage Council of NSW) for information and comment. Comments were received from Heritage Council of NSW, although no comments were received from Environment NSW. The Draft EIS was updated in response to these comments. Ongoing informal consultation has been and continues to be carried out with OEH regarding management of the Booroolong Frog.
Environment Protection Authority	A representative from the EPA attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to the EPA on 10 July 2012. A copy of the Preliminary Draft EIS (excluding assessment of biodiversity) was provided to the EPA for information and comment. The Draft EIS was updated in response to comments received from the EPA.
Roads and Maritime Services	Representatives from RMS were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however were unable or declined to attend. Email notification of the Community Consultation Day was provided to RMS on 10 July 2012.
NSW Dams Safety Committee	Representatives from the NSW Dams Safety Committee were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however were unable or declined to attend. Email notification of the Community Consultation Day was provided to the NSW Dams Safety Committee on 10 July 2012.

Stakeholder	Consultation
Namoi Catchment Management Authority	Representatives from the Namoi CMA attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to the Namoi CMA on 10 July 2012. Namoi CMA and frog specialist Phil Sparks were also consulted in relation to assessment of impacts on the Booroolong Frog. Ongoing informal consultation has been and continues to be carried out with Namoi CMA regarding management of the Booroolong Frog.
State Emergency Service	A representative from the State Emergency Service attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to the State Emergency Service on 10 July 2012.
Tamworth Regional Council	Representatives from Tamworth Regional Council attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to Tamworth Regional Council on 10 July 2012. Liaison between State Water and Tamworth Regional Council road engineers has been undertaken throughout design of the road and bridge realignments.
Tamworth Local Aboriginal Land Council	Representatives from the Tamworth Local Aboriginal Land Council were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however no representatives were available to attend. Email notification of the Community Consultation Day was provided to the Tamworth Local Aboriginal Land Council on 10 July 2012.
Nungaroo Local Aboriginal Council	Representatives from the Nungaroo Local Aboriginal Land Council were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however no representatives were available to attend.

Stakeholder	Consultation
	Email notification of the Community Consultation Day was provided to the Nungaroo Local Aboriginal Land Council on 10 July 2012.
Bowling Alley Point Recreation Trust	A representative from the Bowling Alley Point Recreation Trust attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to the Bowling Alley Point Recreation Trust on 10 July 2012.
Peel Water Users	Representatives from the Peel Water Users were invited to attend the Project Risk Workshop on 15 May 2012 to contribute to development of a risk matrix for the Project, however were unable or declined to attend. Email notification of the Community Consultation Day was provided to the Peel Water Users on 10 July 2012. Representatives from the Peel Water Users attended the Community Consultation Day held at Chaffey Dam on 14 July 2012.
Tamworth Historical Society	A representative from the Tamworth Historical Society attended the Project Risk Workshop on 15 May 2012 and contributed to development of a risk matrix for the Project. Email notification of the Community Consultation Day was provided to the Tamworth Historical Society on 10 July 2012. Representatives from the Tamworth Historical Society carried out a site inspection with Heritage Specialists from WorleyParsons on 15 August 2012. Consultation with Tamworth Historical Society was carried out in regard to the potential impacts of the Project on listed heritage items, as well as the potential relocation of the Iron Footbridge at the Bowling Alley Point Recreation Area.
Utilities and Service Providers	The only primary services to be impacted by the Project, specifically the increased FSL and road realignments, are power lines and Telstra cables. In carrying out detailed design for the proposed road and bridge realignments, Design Consultant Black & Veatch carried out consultation with Telstra and Essential Energy regarding relocation of services. Negotiations with Telstra and Essential Energy will continue to ensure detailed design incorporates the requirements of these services providers. Relocation of these services (power lines and Telstra cables) will be carried out by the relevant providers, separate to the Project.

Stakeholder	Consultation
The Local Community	Advertisements were placed in the local newspaper prior to the Community Consultation Day on 30 June, 4 July and 7 July 2012. Notices were also provided at the Woolomin General Store and letters were posted to adjoining landholders to notify them of the Community Consultation Day. Representatives from the local community attended the Community Consultation Day held at Chaffey Dam on 14 July 2012.
Landowners within the Project Site and Adjoining Landowners	More than 45 letters were posted to landowners within the Project Site and adjoining landowners to notify them of the Community Consultation Day. Some affected and adjoining landowners attended the Community Consultation Day held at Chaffey Dam on 14 July 2012. Landowners and adjoining landowners were also notified again by mail of the Community Consultation Night and Drop –In sessions.
Nundle Fishing Club	On 5 September 2012, Nundle Fishing Club were provided with Project plans, including Project layout and land tenure plans, by WorleyParsons and invited to comment on any potential impacts it considers the Project may on land occupied by Nundle Fishing Club.
South Bowlo Fishing Club	Representatives from South Bowlo Fishing Club attended the Community Consultation Day held at Chaffey Dam on 14 July 2012. State Water liaised directly with representatives from South Bowlo Fishing Club to prepare the plan for the South Bowlo Fishing Club relocation as shown in Figure 4-6.

Questions and issues raised by stakeholders during consultation activities have been addressed in the EIS. The questions raised and the sections of the EIS in which these questions have been addressed are shown in Table 6-2.

Table 6-2: Questions raised by stakeholders and relevant Section in the EIS

Ref	Questions Raised by Stakeholders	Section of EIS Where Addressed
1	How are impacts on private lands being addressed?	Sections 8.10 and 8.11
2	How are impacts on leased lands (Tamworth Fishing Club and Bowling Alley Point Recreation Area) being addressed?	Sections 8.10 and 8.11
3	What impacts do the new FSL and PMF have on development and use of land and will there be any additional restrictions on land?	Sections 8.10 and 8.11
4	What impact will this have on insurance and levels of cover?	Sections 8.10
5	The FSL is proposed to be raised. What happens if private property sustains damage due to flood waters?	Sections 8.10 and 8.11
6	Further resumption of dairy land coupled with the loss of water supply will lead to the loss of a Dairy Farm enterprise (established in 1930) and the redundancy of four employees.	Sections 8.11
7	Are the remains of the old community hall, tennis court and shop going to be documented?	Sections 8.10
8	The Arboretum is not a listed heritage item. What is happening to it?	Section 8.10
9	Cattle should not be allowed to graze freely around Chaffey Dam in the areas of the Peel River Catchment. They are eroding the banks of the Peel River, carry diseases and cause algal outbreaks in the lower water supply.	Section 8.1
10	Will a Traffic Management Plan be prepared for construction activities? An accident occurred on Western Foreshore Road during construction of the existing Bowling Alley Point Bridge	Section 8.6
11	The construction timeframe is approximately 2 years. Will construction personnel come from out of town or require accommodation in town?	Sections 8.10 and 8.11
12	Continued use of the land immediately adjoining Chaffey Dam for cattle grazing and wandering stock should be discouraged. They are eroding the banks of the Peel River, carry diseases and cause algal outbreaks in the lower water supply	Section 8.1

Ref	Questions Raised by Stakeholders	Section of EIS Where Addressed
13	Have the Aboriginal heritage investigations found any human remains?	Section 0
14	Below the 1 in 100 year flood line should be a buffer zone for the protection of the dam and should not permit cattle grazing;	Section 8.1
15	Good camping areas amongst tree areas will be inundated by the new FSL. The relocated facilities of the Bowling Alley Point Recreation Area are likely to be moved closer to the road (due to the proposed new FSL and land availability). Is there any possibility of planting tree barriers along the road to screen car lighting, noise and for safety of campers? The planting would also recreate a 'bush camping' feel;	Sections 8.10 and 8.11
16	Is a new access track going to be provided to and within the Bowling Alley Point Recreation Area?	Sections 8.10 and 8.11
17	Department of Primary Industries (Crown Lands) will look into the preparation of a formal recreation plan for the Bowling Alley Point Recreation Area and relocated facilities, including potential upgrade of the boat ramp. In 2009 the Minister for Ports and Waterways announced funding to support boating infrastructure projects across NSW. The Chaffey Dam Bowling Alley Point Recreation Reserve was one of the successful 'applicants'.	Sections 8.10 and 8.11
18	What are the potential impacts on the Booroolong Frog habitat and how will they be managed?	Section 8.2
19	What are the potential impacts on threatened species and how will they be managed?	Section 8.2
20	Is there potential for cold water pollution downstream?	Sections 4.3 and 8.2
21	Is the reservoir water level required to be lowered for construction of the Project?	Section 8.1.4
22	What is happening to the early warning system?	Section 4
23	Is an Environment Protection Licence required?	Section 5.2.12

7 IDENTIFICATION OF KEY ISSUES

The EIS addresses key issues in relation to the Project. These key issues were identified through two primary methods: adherence to the DGRs issued for the Project; and an environmental risk analysis. These methods are described in Section 7.1 and Section 7.2 respectively.

7.1 Director-General's Requirements

In accordance with Section 115Y of the EP&A Act, the Director-General of Planning and Infrastructure is required to prepare environmental assessment requirements in respect of any application for approval of State Significant Infrastructure.

The Director-General was consulted to obtain DGRs for the Project. The *Director-General's Environmental Assessment Requirements* were issued on 23 January 2012, a copy of which is provided at Appendix 1. The Department of Planning and Infrastructure identified the following key issues to be addressed in the environmental assessment for the Project:

- Soil and water;
- Biodiversity;
- Aboriginal heritage;
- Historic heritage;
- Traffic and transport;
- Noise and vibration;
- Air quality;
- Visual amenity;
- Land use, property and socioeconomic;
- Spoil and waste management; and
- Hazards and risk.

Table 7-1 details each of the DGRs and provides a reference to the Section of the EIS in which they are addressed.

As the Project has been determined as a controlled action pursuant to the EPBC Act, Supplementary DGRs were issued in relation to assessment of impacts to threatened species and communities under the EPBC Act.

Table 7-2 details each of the Supplementary DGRs and provides a reference to the Section of the EIS in which they are addressed.