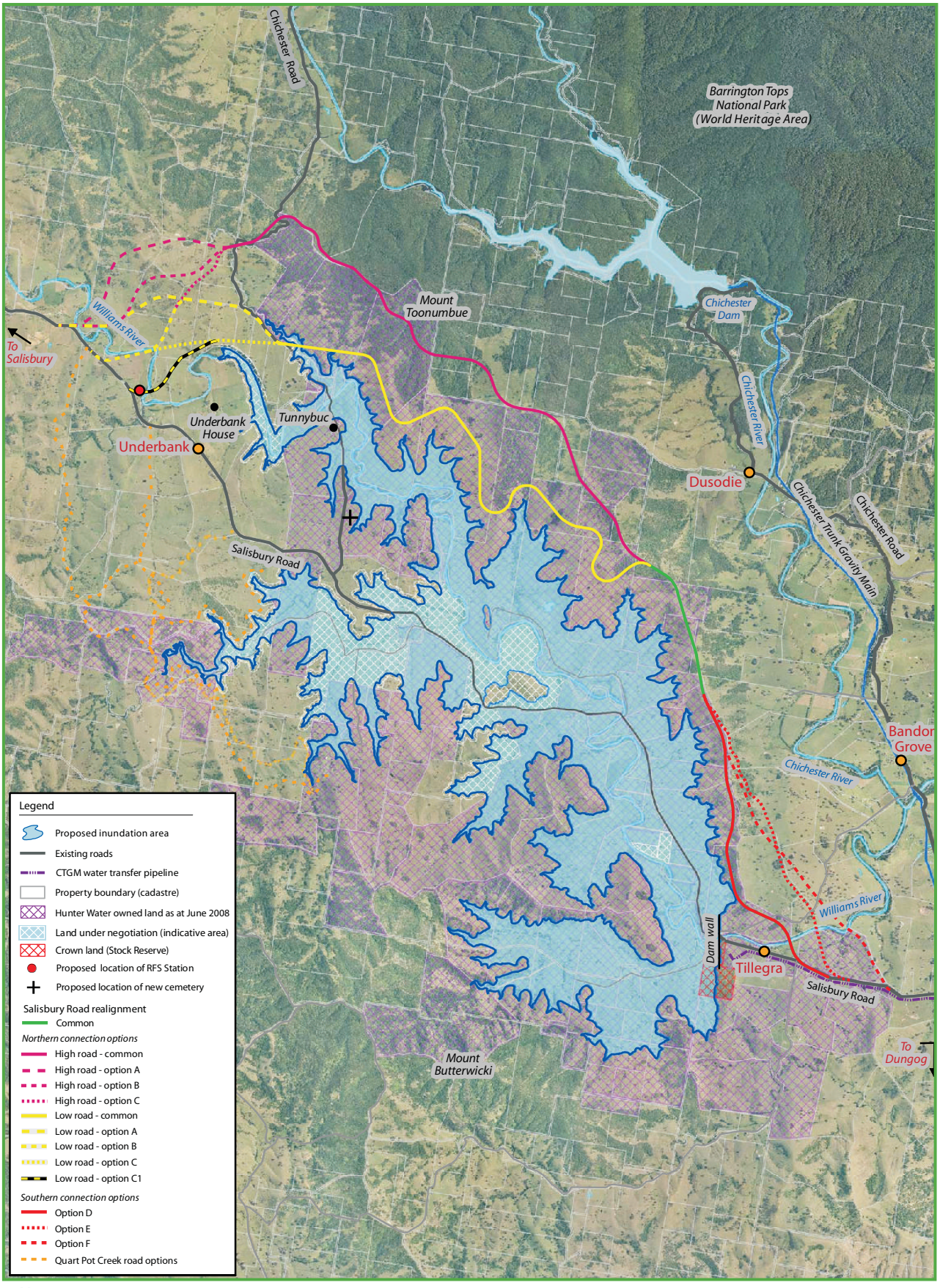

FIGURE 6.4 SALISBURY ROAD RELOCATION OPTIONS

- Low Road Option C was most preferred by people who use Salisbury Road most frequently
- the Low Road options were favoured as they were seen to have the least impact on property, agricultural farmland and the environment
- road safety and impacts on residential property and agricultural farmland were the principal concerns to respondents.

This was followed up by a stakeholder/community workshop held in Dungog on 2 August 2007 and attended by TDCRG representatives and agency stakeholders. The workshop activities comprised:

- a review of the proposed road options
- discussion and evaluation of relevant comparative route evaluation criteria
- discussion on the various options.

The workshop participants indicated a slight preference for Low Road Option C over Low Road Options A and B, giving consideration to the community survey results which demonstrated a general preference for the Low Road options. It was resolved that further consideration should be given to some minor adjustments around the dairy flat area where the Low Road options connected back to Salisbury Road to minimise landowner impacts.

Subsequently, this general route was taken forward for detailed investigation, this being conducted by Opus on behalf of HWC. Refinement of the alignment involved extensive use of the route optimisation program *Quantm*. This software package is particularly suited to projects where route options are of reasonably continuous length, cross variable terrain, and where a good digital terrain model (DTM) is available. In addition to significant benefits associated with speed of optimising alignment options, it also calculates the relative construction costs for each option allowing a rapid focus on the more cost effective options achievable.

A value management (VM) workshop was held in Newcastle on 18 January 2008 which brought together representatives from HWC, Dungog Shire Council, Opus, Connell Wagner and Douglas Partners Geotechnical. The group examined the major issues relating to development of the new alternative route for the section of Salisbury Road which would be inundated following the construction of Tillegra Dam. Key issues included maintaining access to the township of Salisbury while maximising the aesthetic attraction of the road as a tourist route and maintaining its role as an access to the various rural properties in the area.

The VM workshop participants agreed on a set of design parameters for the road as follows:

Speed:

- posted speed to be ultimately determined by Council including advisory signs
- design speed (operating) to be 70–80 km/h, in some circumstances this may be need to be reduced to minimise the cut and filling impact on the route.

Design vehicles:

- prime mover and semi-trailer/19 metre B–double.

Cross section:

- two lanes of 3.5 metres width each
- shoulders of 0.5 metres (minimum)
- overall eight metres seal

- curve widening as necessary
- typical single crown road with three per cent crossfalls
- shoulder allowance of 0.5 metre minimum for cutting acceptable
- clear zones an objective to be considered
- use of guardrail fence as necessary.

The potential alignments within the preferred corridor for the road were refined further while issues relating to construction and operation of the road were identified for consideration during the design process.

A second VM workshop was held in Newcastle on 13–14 May 2008 with the same attendees as the first workshop. At the outset, it was agreed that the road corridor was a given and that the workshop would involve participant stakeholders reviewing the concept design parameters and other available information with a view to developing better value outcomes for the Project. Participants developed 42 ideas that were considered worthy of either immediate adoption or further analysis.

A second aim of the workshop was to identify and consider risks that could arise during the design, construction and operational phases of the Project. The Workcover tool CHAIR (Construction Hazard Assessment Implication Review) was used to identify OH&S risks and to suggest ways of eliminating or mitigating these risks during the design process. Participants identified 44 risks that were assessed to calculate a risk factor. Opportunities to design out the risks were then identified and investigated. Recommendations made by participants at this workshop to 'design out risks' also provided opportunities for better value outcomes, which would contribute to getting the Project 'right first time'.

6.5.3 Preferred alignment

The preferred alignment for the new section of Salisbury Road is shown in Figure 6.1. The full concept design for Salisbury Road is contained in Annexure B to this report. With regard to the alignment options considered and shown in Figure 6.4, these comprise (moving south to north):

- Option E
- common section
- Low road – common
- Low road – option C
- Low road – option C1

From an environmental point of view, the preferred alignment avoids, as far as practicable, vegetated areas on the ridgeline to the east of the storage and minimises potential conflicts with development and use of the proposed habitat corridor (refer Section 6.6.5).

A separate temporary diversion road would be constructed around the dam construction site which has significant construction programming benefits.

The new section of Salisbury Road would be a public road as defined under the *Roads Act 1993*. The relevant roads authority for the works after completion would be Dungog Shire Council.

6.5.4 Waterway crossings

The relocation of Salisbury Road would require provision of three waterway crossings, two across the Williams River and the third across Moolee Creek at the northern end of the storage. Design

standards for all bridges exceed the minimum standard of catering for a 1 in 50 year flood. All bridges would be designed for a bridge deck level above the 1 in 100 year flood and to structurally withstand a 1 in 2,000 year flood. The locations of all the Salisbury Road bridge crossings are shown in Figure 6.1 with the principal features of each described as follows.

Lower Williams River

This crossing would comprise a 38 metre long, two span structure. The structure would include a reinforced concrete blade pier requiring a spread footing below current surface level supporting a reinforced concrete headstock. The bridge deck would consist of pre-cast, prestressed concrete planks with a reinforced concrete topping slab. The bridge would be 10.1 metres in width, this comprising two 1.55 metre shoulders and two 3.5 metre lanes.

Moolee Creek

This crossing would comprise a 54 metre long, three span structure. The structure would include two reinforced concrete circular piers piled below current surface level supporting a reinforced concrete headstock. The bridge deck would consist of pre-cast, prestressed concrete planks with a reinforced concrete topping slab. The bridge would be 10 metres wide comprising two 1.5 metre shoulders and two 3.5 metre lanes.

Upper Williams River

This would be the largest of the three crossings comprising a 60 metre long, four span structure. The structure would include three piers piled below current surface level, each 1.2 metres in diameter supporting reinforced concrete headstocks. The bridge deck would consist of pre-cast, prestressed concrete planks with a reinforced concrete topping slab. The bridge would be 10 metres wide, consisting of two 1.5 metres shoulders and two 3.5 metre lanes.

6.5.5 Consideration of sustainability

Design development, while essentially focussed on engineering issues, has also considered environmental aspects including opportunities to contribute to achieving sustainability outcomes. These are summarised in Table 6.4.

TABLE 6.4 ROAD DESIGN SUSTAINABILITY ASPECTS

DESIGN ASPECT	SUSTAINABILITY ASPECT
Minimising length of road	Reduces demand on resources such as construction materials and fuel for construction plant Contributes to reducing GHG emissions
Minimising volume of earthworks	Minimises generation of surplus excavated material Reduces demand on resources such as construction materials and fuel for construction plant Contributes to reducing GHG emissions
Refinement of alignment	Shortest optimum route supports reducing demand on vehicle fuel consumption during operation Minimises impacts on biodiversity
Avoidance of heavily vegetated areas where practicable	Minimises impacts on biodiversity
Incorporation of underpasses into bridge design	While primarily to address human and stock access, also of benefit to fauna movements and therefore minimises impacts on biodiversity

6.6 Quart Pot Creek area access

The existing access to properties in the Quart Pot Creek area is via Quart Pot Creek Road which runs off the section of Salisbury Road within the inundation area. Consequently, an alternative access would be required.

Four possible routes were identified, all running off the existing section of Salisbury Road above the inundation area (refer Figure 6.4). All routes traverse cleared agricultural land currently in private ownership. No significant ecological issues were identified in relation to any of the potential routes.

The preferred route is shown in Figure 6.1. This was selected in consultation with affected property owners. The route avoids, as far as practicable, adverse impacts on existing landholders. The road would be of a similar standard to other local roads. It would be sealed for approximately the first half of the distance from Salisbury Road. This portion of the road would be a public road vested in the care and control of Dungog Shire Council. The remaining portion would be a gravel road which would be privately maintained. A road reserve would be created for the road's entire length providing for development of the gravel portion of the road into a publicly accessible road in the future should the need arise.

Reconstruction of Quart Pot Creek Road would involve the installation of a bridge to span Quart Pot Creek. The bridge would have a width of 5 metres including barriers, to provide for a single lane of traffic. It would have a length of 17 metres with two unequal spans. Span design allows the pier to be appropriately located so as not to affect the primary channel conveying flows in the creek.

Access to all private properties serviced by the existing Quart Pot Creek Road would be provided to a level equal to or better than the existing access arrangements. This would include the provision of fences, gates and letter boxes where necessary. The distance travelled to and from individual properties to other locations may be marginally increased as a result of the Project.

6.7 Other works

6.7.1 Relocation of affected utilities

The Project would impact on existing telecommunications and electrical supply infrastructure, approximately 20 kilometres of which is located within the inundation area. The routes of the existing services are shown in Figure 6.5 together with the proposed relocation routes.

With respect to telecommunications infrastructure, works would include:

- temporary diversion of a copper service line around the dam wall site
- relocation of copper service lines that would be impacted by the road and fringes of the dam inundation area (these would be deepened and put in a conduit or diverted as appropriate)
- construction of a new copper line to the Quart Pot Creek area to replace the existing line
- relaying sections of the existing optic fibre cable that may be affected by the reservoir in conduits between the Bandon Grove and Underbank exchanges.

Currently, mobile phone reception is limited or not available from the Tillegra locality, north along Salisbury Road. The proposed route for the relocation of Salisbury Road would however, be subject to mobile coverage as a signal can currently be received from the ridgeline on which the majority of the road would be located. While additional coverage across the storage would be desirable, HWC does not propose to establish a mobile phone tower as part of the Project. The matter of improved mobile

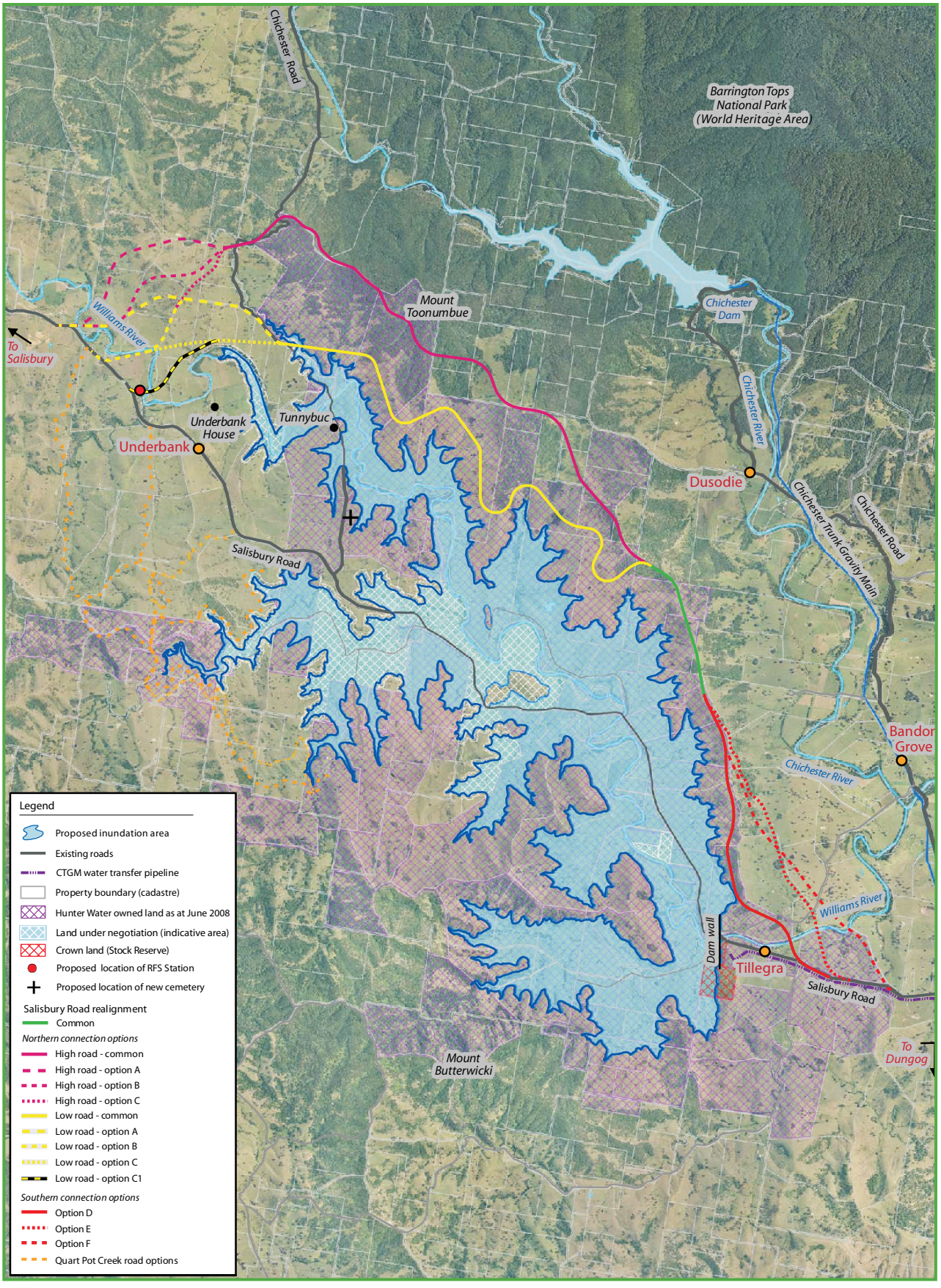

FIGURE 6.5 UTILITIES RELOCATION

coverage for the area would be raised with Commonwealth Department of Broadband, Communications and the Digital Economy, the Australian Communications Authority and Telstra.

As far as practicable, the relocated electrical supply would be sited within the corridor of the new section of Salisbury Road. Similarly, the new supply to the Quart Pot Creek area would generally follow the route of the new access. The temporary diversion of the main line around the dam wall site would be required to maintain service until such time as the new lines are installed and brought into service.

6.7.2 Relocation of Bendolba RFS fire station

The RFS has a station located along Salisbury Road (between the Tillegra and Munni bridges) which lies within the proposed inundation area. The station would need to be relocated as part of the Project.

Following consultation with the RFS and consideration of a number of possible locations, a preferred location for the new station was identified. The site is near where the northern part of the relocated section of Salisbury Road would connect back to the existing Salisbury Road (refer Figure 6.1). This would allow for quick and efficient access up and down the valley. The proposed location is on a section of existing road reserve that would be abandoned as a result of the new road construction.

The new RFS station would be a category 2C station with a floor plan area of approximately 15 metres by 20 metres. Car parking would be provided and there would be sufficient area for an on-site sewage management system. A generalised layout arrangement is shown in Figure 6.2 of Working Paper N *Draft Integrated Land Use Plan*. The exact placement of the station on the site may need to be refined during detailed design to ensure that drainage in and around the site could be managed appropriately.

As noted, the preferred site has been selected in consultation with the RFS. If, however, during the public exhibition period sensible alternate site suggestions are made, an alternate site location could be considered provided that any environmental impacts are likely to be equally minor and the suggested site is subsequently supported by the RFS.

6.7.3 Relocation of Quart Pot/Munni Cemetery

Quart Pot/Munni Cemetery is located beside Salisbury Road between Munni and Underbank. It occupies an area of approximately 0.85 hectares of sloping land. There are approximately 80 known burials in 55 graves in the cemetery. The oldest burial dates from 1923 while the most recent was in January 2008. There are about 10 reservations for future burials.

At FSL, the cemetery would be submerged by approximately 10 metres of water. Given the planned operational strategy to maintain storage levels between 90-100 per cent of FSL outside of drought periods (refer Section 6.8), the area occupied by the cemetery would be underwater for prolonged periods, possibly years at a time.

Through the TDCRG cemetery subcommittee consultation process (including a wider survey of affected families), a number of alternatives sites were considered with a preferred site identified to the north of the storage beside Upper Chichester Road (refer Figure 6.1). This site would be of sufficient area to cater for the relocation of the burials from the existing cemetery and for reasonable future expansion.

Soils in the upper reaches of the Williams River catchment where the new cemetery would be located are relatively shallow (less than one metre) and the site would need to be built up with imported fill to provide sufficient depth for burials to meet public health regulations. The imported fill would be

obtained from borrow areas on the nearby river flats located below the storage FSL. These areas from have been specifically identified to ensure that the correct type of soil for the cemetery is obtained.

The process for the relocation of the cemetery is described in detail in Working Paper H *Proposed Quart Pot/Munni Cemetery Relocation Plan* and is also discussed in Working Paper N in relation to land use management around the storage. Additional discussion relating to the social issues surrounding the relocation of the cemetery is provided in Chapter 12.

6.7.4 Conservation of Munni House

Munni House is a single storey red brick homestead located at 800 Salisbury Road, approximately 20 kilometres north-west of Dungog and within the planned inundation area of the dam. The original fabric of the house dates from the mid 18th century. The property also includes two timber slab outbuildings which also were identified as having heritage value integral to the property. The heritage values of the house and its outbuildings are discussed in detail in Chapter 13 and Working Paper L *Contemporary Heritage*.

In view of their significant local heritage value, the feasibility of relocating Munni House and one or both of its outbuildings either in their entirety or partially was investigated. The contemporary heritage investigation identified the following possible conservation options:

- Option1: Leave as is
- Option 2: Retain masonry only (ie Munni House)
- Option 3: Removal
- Option 4: Relocation.

The fourth option included two sub-options: 4a–dismantle and reassemble, or 4b–removing the buildings in their entirety.

Option 4a was identified as being the most practicable, however, given the manner of construction of Munni House (both the original fabric and subsequent additions), it was found that it would incur a substantial cost (in excess of $2 million) to remove both Munni House and the two outbuildings in their entirety. In view of this, HWC's preference is to relocate as much as possible of the original fabric of Munni House reflecting the key aspects of its heritage values together with one of the timber slab outbuildings.

It is proposed to relocate the buildings to a site below the dam wall with Munni House being used as an interpretive or visitors centre. A conceptual layout is shown in Figure 7.1 of Working Paper N.

6.7.5 Carbon offset initiatives

Construction and operation of the Project would have an associated quantum of GHG (greenhouse gas) emissions. It is HWC's intention that these would be offset over the life of the Project through the provision of a range of offsets across its entire water supply system, effectively making Tillegra Dam carbon neutral.

Estimation of GHG emissions is described in detail in Chapter 4 of Working Paper F *Sustainable Resource Use* and summarised in Chapter 19. A suite of potential offset measures have been identified. The cornerstone is sequestration though vegetation, a large part of which would occur through the revegetation of land around the margin of the storage acquired by HWC for this purpose.

Revegetation of land would establish significant green corridors. A major corridor would be established on the eastern side of the storage. A secondary corridor would be established around the southern part of the storage. The general extent of these corridors is shown in Figure 11.4.

In addition to offsetting carbon emissions, the strategic development of these corridors has been undertaken to provide substantial habitat for native plants and animals. This would assist to offset the loss of habitat within the proposed inundation area and that lost during the construction of the new section of Salisbury Road. These corridors would also provide connectivity from the Williams River north to the Barrington Tops area and west to the Mount Butterwicki area.

As noted in Section 6.3.6, the Project includes provision of a mini HEP plant which would allow generation of electricity associated with the release of environmental flows and the bulk transfer of water to Grahamstown Dam.

A number of initiatives have been identified which could be implemented during construction to reduce GHG emissions. These are also discussed in Working Paper F.

6.7.6 Ancillary works

Given its intended use as a potable water supply, maintaining a suitable level of water quality would be one of the primary management issues for the storage. Water quality would be influenced substantially by land uses in the catchment above the storage. For the most part, HWC would not have any direct control over land use in the catchment above the storage. This would largely be controlled through the Dungog LEP administered by Dungog Shire Council.

It should be noted however that the entirety of the Williams River catchment area falls under the *Hunter Water (Special Areas) Regulation 2003*. The Regulation currently specifies that it is an offence to pollute waters within a special area including the Williams River. The existing Regulation is currently viewed as adequate for managing water quality risks in the upper catchment. While the Regulation is reviewed every five years (as are all Regulations), HWC would not be making representations to change the Regulation in response to Tillegra Dam and management of land in the catchment above the dam wall.

To prevent pollution and maintain water quality in the storage, the Project includes establishment of a buffer zone around the perimeter of the storage. This would have a nominal width of 50 metres. Public access would be managed to ensure that the integrity of the buffer area is maintained for filtering surface runoff. Future management may include the provision of designated access areas to the dam for development purposes. In general however, vegetation would be encouraged to establish within this buffer zone and would be complemented by supplementary planting as required. Fencing may be required in some locations to prevent access by livestock. Once established, the vegetation would act as a filter for surface water draining to the storage.

Notwithstanding the Project's primary objective as a water supply, it is recognised that the presence of a substantial inland water body (approximately 2,100 hectares at FSL) also represents a potential significant regional asset for the local and wider community. In order to facilitate the coordinated and sustainable use of the storage for uses beyond just water supply, a draft integrated land use plan (ILUP) has been prepared as part of the Project and is provided as Working Paper N.

While emphasising the need to provide long term protection of water quality, the ILUP also identifies potential long term recreational and other economic opportunities. These opportunities would

provide a long term positive legacy to the local and wider community and represent significant mitigation measures and positive community offsets to the impacts as identified.

The ILUP is intended as a dynamic document and would evolve as the dam is constructed and the storage fills. Accordingly not all of the components/facilities identified in the ILUP are proposed as part of the Project for which HWC is seeking approval.

For clarification, the following ancillary works are included in the Project for approval under the Part 3A assessment process:

- replacement road access to the Quart Pot Creek area
- tree planting/restoration/revegetation and habitat replacement/restoration measures
- weed management
- walking tracks on HWC-owned land
- fish stocking (Australian bass)
- fencing
- bushfire risk management
- weather station and telemetry
- essential services
- dam security components (eg CCTV, fencing, etc)
- office building(s) and storage sheds
- two caretaker's cottages
- visitor/walking track lookouts and associated access
- a visitors/interpretative centre and associated parking, access and amenities
- interpretative signage
- designated boating, non-boating and swimming only areas including appropriate boundary markings (eg signage and buoys)
- picnic/barbecue areas/facilities and associated amenities/water tanks and playground(s)
- boat ramp and associated access infrastructure, including service road and trailer parking
- relocation of existing facilities including Munni House, RFS station, Quart Pot/Munni Cemetery and installation of memorials, heritage signage, parking and supporting facilities for access to relevant areas
- salvage and clearing of structures, improvements, trees, and assets (including items such as power poles and transformers) from within the storage area to allow the recovery of materials that could be economically recycled and that would also reduce or remove safety risks associated with providing public access to the storage.

Further details on these components are included in the environmental assessment and also in the ILUP.

The following are not included in the Project under the Part 3A assessment/approval process:

- kiosks/shops
- walking tracks/access not on HWC-owned land;
- privately operated camping grounds and associated facilities including access road(s)

- caravan parks and associated access roads and facilities
- commercial accommodation (eg eco lodges)
- other commercial activities
- recreational activities (eg boating, swimming and fishing).

Accordingly, the assessment does not address the impacts of the components/facilities that are not proposed as part of the Project. These components would be subject to the ongoing development of the ILUP and would be assessed in accordance with the applicable statutory provisions of the time. The approval process for these components could vary (depending upon the operator/developer and the specifics of the activity) from a development application lodged with Dungog Shire Council to a new approval by the Minister for Planning. In all cases it is expected that the established planning approval process would apply. For development proposals of a significant nature, it is expected that this would include a mechanism for public participation and comment prior to any final planning consent being issued.

With regard to recreational activities (boating, swimming and fishing), these activities are currently permissible in NSW unless specifically banned by order made under a statutory instrument. When undertaken by any member of the public, these types of activities do not therefore require planning approval. Accordingly, these matters are not required to be put forward for approval under the Part 3A approval process. Such activities however, can have adverse environmental outcomes if not undertaken sensibly and represent a consequential impact from the dam. These matters are therefore briefly noted and assessed in Chapter 17.

6.7.7 Land acquisition and property boundary adjustments

Currently HWC owns or has agreement to purchase 94 per cent of land required for the Project. Of the remaining land required, the majority is Crown land, including the bed of the river, the travelling stock reserve and various road reserves. There are, however, five properties that are affected by the proposal which are still currently held in private ownership.

Should the Project be approved, HWC will aim to seek a negotiated settlement with the remaining private landowners as has occurred during the purchase of other properties in the area, over the last few years. This process of negotiation can continue separate to and post approval.

The negotiated process includes obtaining independent property valuations to ensure that a fair price is paid for the affected property, for all parties concerned through the negotiated process. All associated and necessary costs for both parties, including legal fees and stamp duty are paid for by HWC.

Compulsory land acquisition is provided for under the provisions of the *Hunter Water Act 1991*, however, the use of this power is one of last resort. HWC's preference is to work with these landholders to reach a mutually agreeable settlement on just terms.

The acquisition process for Crown land, as undertaken with the Department of Lands, will take on the format of the compulsory acquisition process which is the normal procedural process required to be adhered to by that Department. This will also include necessary referrals to NTSCORP to ensure that Commonwealth Native Title matters, if present, are properly accounted for within the process.

To facilitate the management of land around the storage, boundary adjustments would need to be made to existing allotments of land held under Torrens title through subdivision or consolidation. Approval under the Part 3A process is required to:

- establish new allotments where existing land parcels are intersected by the reservoir storage area and buffer area
- allow the consolidation of land within the designated reservoir area for administrative purposes
- establish public road reserves for both the relocated Salisbury Roads and the new Quart Pot Creek area access and consolidate residual land titles on either side of the newly created roads where appropriate
- create a public reserve to establish the new cemetery off Upper Chichester Road
- dedicate a parcel of land for use by the RFS.

The subdivision or consolidation of land as proposed relates to the orderly administration of land titles within the Project area so that land not required for the Project can be returned to agricultural use, retained for a utility installation or dedicated for the establishment of a community facility. It is not proposed to subdivide land through this process to enable the establishment of residential dwellings. The future use of surplus land sold to third parties by HWC would continue to be subject to the provisions of the Dungog LEP which contains various principles and rules governing appropriate land use.

6.8 Operation

The FSL is set at RL 152.3 mAHD providing a total storage volume of 450,566 megalitres. The effective dead storage level (ie the level immediately below the lowest extraction point in the multi-level offtake tower) is RL 99 mAHD giving a dead storage of approximately 2,700 megalitres. While specific operational details are yet to be finalised, and in any case would be subject to ongoing refinement to optimise the value of Tillegra Dam to the whole of HWC's water supply system, the general intention is to maintain storage levels between 90 per cent of FSL (approximately RL 148 mAHD) and FSL.

Environmental flows and bulk water transfers

Development of a strategy for the transfer of run-of-river flows to Grahamstown Dam has been undertaken with close consideration given to minimising impacts on the existing hydrological regime (but recognising the obvious effect the dam would have). Releases from the dam have also been designed to maintain water quality and fluvial geomorphologic aspects of the Williams River below the dam, as well as provide for existing aquatic flora and fauna assemblages. Specific details on each of these aspects are provided in Working Papers A *Water Quality and Hydrology*, B *Fluvial Geomorphology* and C *Aquatic Ecology*. A holistic consideration of the issues is documented in Working Paper D *Environmental Flows and River Management* and summarised in Chapter 10.

The final operating protocol and release strategy for the dam is as follows:

- implementation of a transparent environmental flow from the dam within existing low to moderate flow classes to preserve approximately 70 per cent of all smaller flows and freshes in the river that would otherwise normally occur;
- releasing run of river transfers within a specifically tailored event based transfer protocol of 4,300 ML, consisting of a peak discharge of 1,500 ML declining over a 10 day period
- inclusion of additional event-based discharges from the dam consisting of a peak discharge of 270 ML, tailing off over a four day period (these discharges would be released to ensure a minimum number of variable flows important for fish passage occur below the dam wall, should run of river releases or natural spills not occur)
- ensuring releases occur at the correct time of year to maintain the seasonality of flows within the river

- installation of a multi-level offtake tower to allow the physio-chemical properties of releases to be matched to dam inflows.

The release strategy for the dam has been generally designed to allow capture and storage of flood flows while maintaining the existing status quo of water availability in the river in lower, moderate 'A' and 'B' class flows, necessary for ongoing maintenance of the river's environment as well as other existing use rights.

The *Hunter Unregulated Water Sharing Plan*, which is currently in preparation by the DWE, has provisions at clauses 43(6) and 43(7)(a)(ii) to take into account the incorporation of environmental flow requirements from both dam and Seaham Weir by 2013. Following public exhibition and community comment, it is proposed to refer a final preferred flow regime to the DWE for incorporation into the Plan prior to operation of the dam.

CTGM transfers

As noted previously, the Project incorporates a connection to the CTGM to provide operational flexibility in the event of water quality issues at Chichester Dam, such as an algae bloom. Water would be chlorinated prior to transfer to inhibit growth of bacteria and other pathogens in the CTGM. Based on past experience, the expected frequency of these transfers is low.

Management of land surrounding the storage

As indicated in Section 6.7.6 management of HWC-owned land surrounding the storage would be undertaken within the framework of a structured management plan, ie the draft ILUP. Chapter 3 of the draft ILUP provides a detailed discussion in relation to this. This covers:

- management of the riparian buffer zone
- managing erosion risk, particularly around the storage shoreline
- fencing needs (construction and maintenance)
- disposal of wastewater (sewage and grey water)
- maintenance of access routes around the storage
- bushfire risk management
- public safety.

HWC intends to employ up to three full-time employees whose responsibilities would include maintenance and inspection of dam infrastructure, water quality testing, monitoring of erosion and general maintenance of HWC land. Two of these employees and their families would potentially be accommodated in two cottages which would be located to the south west of the spillway. A third dwelling would be provided as alternate accommodation for temporary caretaking. An existing house on Salisbury Road, currently owned by HWC would be allocated for this purpose.

6.9 Dam safety

The DSC (NSW Dams Safety Committee) is a NSW government statutory authority created under the *Dams Safety Act 1978* and charged with responsibility and authority to ensure that all prescribed dams in NSW are designed, constructed, operated and maintained in such a condition so as to not pose an unacceptable safety risk.

The DSC requires dams to be designed according to appropriate engineering standards for the present and the foreseeable future and it has the power to direct reviews if standards change

through the operating life of a dam. Engineering standards are published by ANCOLD (Australian National Committee on Large Dams) and its parent organisation ICOLD (International Commission on Large Dams).

Selection of the appropriate design standard is driven by an assessment of the consequences of failure of the dam with the highest standards applying to dams constructed upstream of population centres. Risks are assessed in accordance with AS/NZS 4360:2004 *Risk management* and additional requirements set by the DSC. These requirements are based on, but are stricter than, ANCOLD/ICOLD standards and are intended to reduce the risk to less than 1 chance in 10 million that a dam safety issue would occur., As risks this rare are almost impossible to assess, this means that the dam would be required to be designed to comply with exceptionally strict criteria such that all risk was effectively eliminated and no part of the design essential for public safety would fail.

While design requirements for the dam would exceed those adopted nationally and internationally, the dam is still required to have a dam safety emergency plan (DSEP). The DSEP is a formal plan identifying emergency conditions which could threaten the integrity of the dam. Additionally, it prescribes procedures to be followed by HWC to mitigate the conditions and provide timely warning to emergency management agencies. It would normally include inundation plans so that the emergency agencies would be able to formulate evacuation plans for potentially affected areas.

The DSC oversight process is rigorous. In general terms, HWC must demonstrate to the DSC that the dam (both during construction and when completed) would not pose an unacceptable risk to persons, infrastructure and the environment downstream. As noted, the acceptance criteria for risk–based engineering or operational decisions are generally based on the ANCOLD *Guidelines on Risk Assessment for Dams*.

As such, it is not necessary for the environmental assessment to consider potential inundation areas affected by dam failure. This is in much the same way in that it would not be a normal requirement to assess the impact of a catastrophic failure of other major infrastructure such as tall building in the CBD (eg Sydney Tower) or a railway or motorway tunnel collapsing, etc. However, information on potential inundation areas would be communicated to the community via the DSEP.