



Photo 9b - Clear view towards development from Old Cooma Road South. Views are panoramic near Googong Dam Road but interrupted by roadside planting further South.



Photo 10 - View towards development from Old Cooma Road North. Travelling by car reveals brief and intermittent views through dense vegetation.



Photo 13 - Googong Dam Road near Old Cooma Road. NH1A is between trees at end of road.



Photo 11 - From top of cutting opposite Talpa towards WRP. This view is not available from the road.



Photo 12 - Googong Dam Road West of Cooke, pipelines for the WCP will run underground at the side of the road. The entrance to "Bunyip" is clearly shown to right of photo.



Photo 101 - View from Old Cooma Road and Googong Dam Road Junction



Photo 102 - View from 100m south of Old Cooma Rd and Googong Dam Rd junction



Photo 103 - View from Old Cooma Rd and Googong Dam Rd Junction

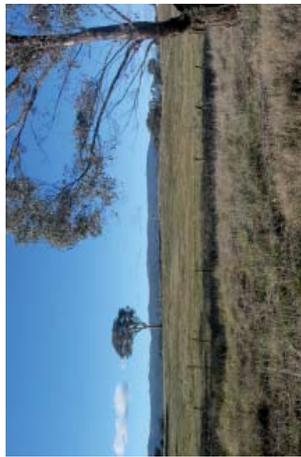


Photo 104 - View from 350m south of Googong Dam Rd junction opposite Hill 765



Photo 105 - View from 400m south of Old Cooma Rd and Googong Dam Rd junction



Photo 106 - View from 600m south of Old Cooma Rd and Googong Dam Rd junction



Photo 107 - View from 280m east of Old Cooma Rd and Googong Dam Rd junction



Photo 108 - View from 400m east of Old Cooma Rd and Googong Dam Rd junction



Photo 109 - View from 450m south of Old Cooma Rd and Googong Dam Rd junction



3. PROPOSED DEVELOPMENT

CIC Australia is proposing to develop a new, essentially self-contained, residential community at Googong, which will be located south of Queanbeyan in NSW. The proposed new town of Googong will have approximately 5,500 dwellings and be home to an estimated 16,000 people; the development will be established in stages over a 20–25 year period.

The development will include a variety of residential lot sizes, schools, parklands, a town centre and other social infrastructure.

The WCP will recycle, treat and supply water to Googong new township. The full WCP will be rolled out in stages as required by the developing neighbourhoods over a period of years. The majority of the WCP works to be undertaken that are addressed in this VIA comprise:

Permanent Works

- A Water Recycling Plant (WRP) on the northeastern boundary of NH1A, comprising a series of low rise buildings and an associated eight metre high vent stack.
- A series of five water reservoirs located on the crest and saddle of Hill 800, with associated minor operational plant, chemical shed and an access road linking the site of the reservoirs with Old Cooma Road on the west side of the hill (refer to Figures 1.2 and 3.1a).
- In-ground pumping stations with one 150mm diameter 12m high ventilation stack each and minor above ground construction. These are surrounded by boundary fence.
- Underground pipework that links the tanks with the WRP along Old Cooma Road and Googong Dam Road as well as to the existing Water Treatment Plant that stands on a ridge to the northeast of NH1A and Googong Dam Road.

Temporary Works (Interim Reservoirs)

- An array of four reservoirs and associated infrastructure located on Hill 765 to the east of the Old Cooma Road and just south of the junction with the Googong Dam Road (see Figure 3.1b).

Details of the full extent of infrastructure proposed for the WCP are provided in documents prepared by MWH Australia P/L.

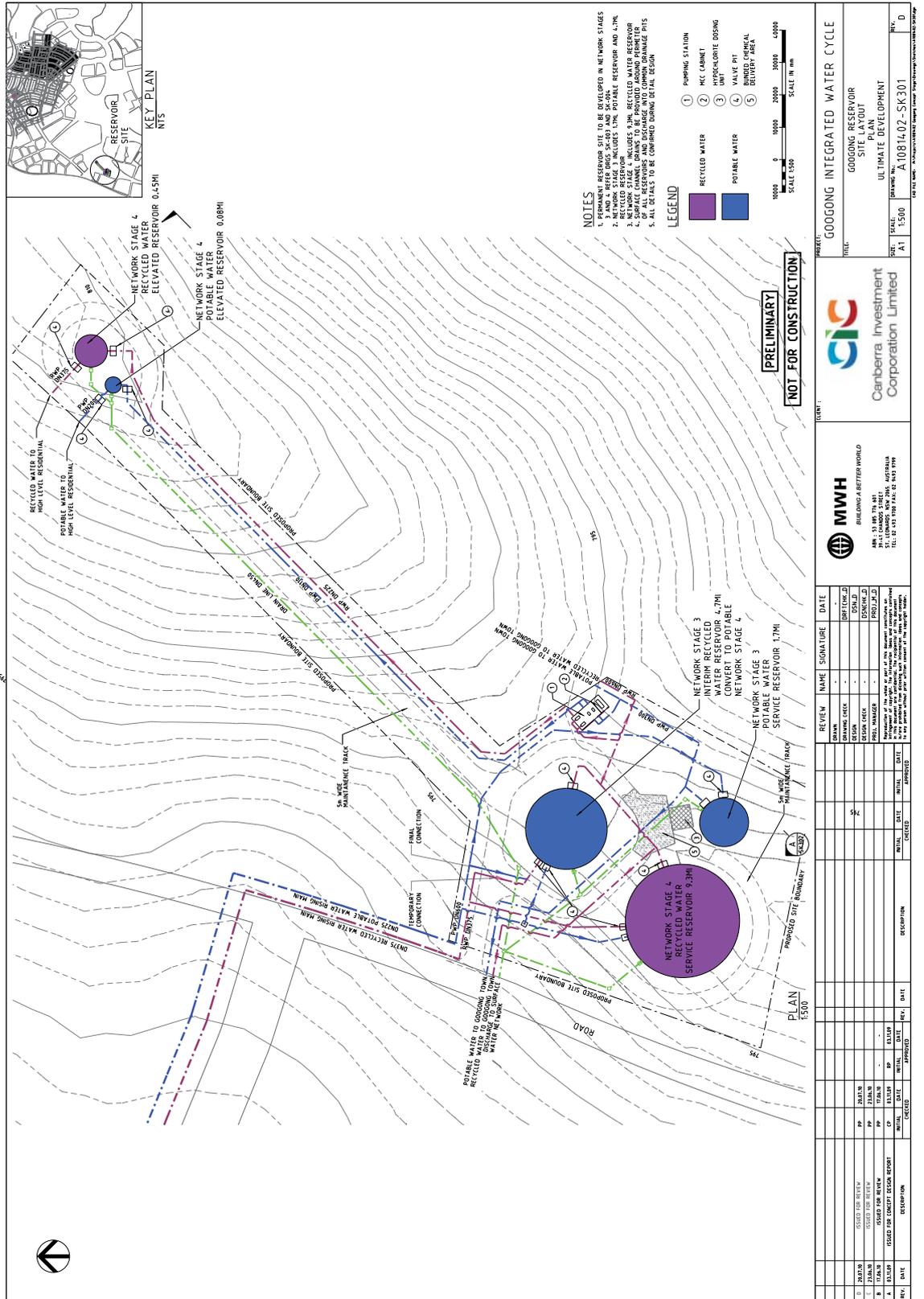


Fig 3.1a

Googong • visual impact assessment
WATER RESERVOIR SITES (PERMANENT)

NS 1113

12.08.10

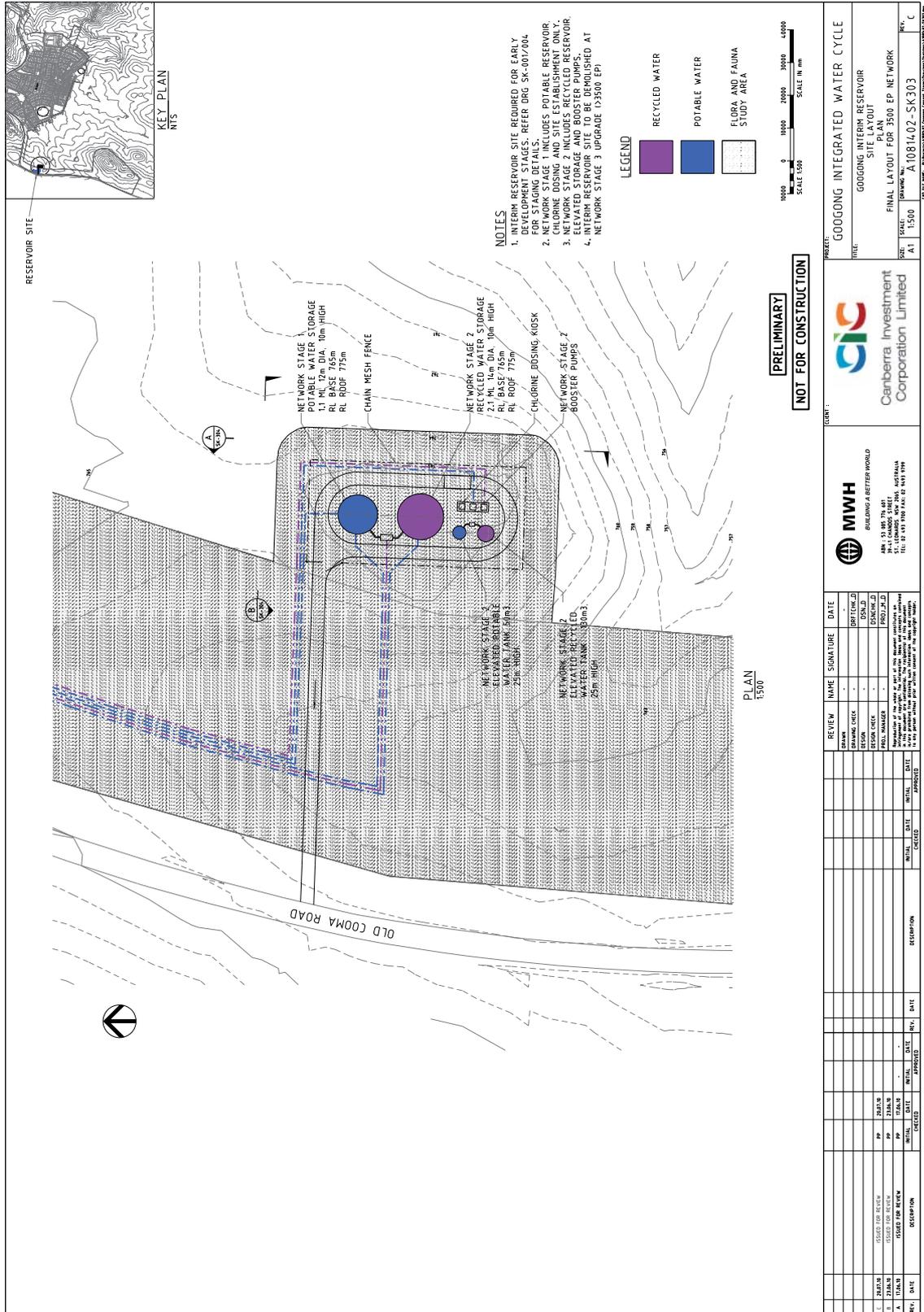


Fig 3.1b

Googong • visual impact assessment
WATER RESERVOIR SITES (TEMPORARY)

NS 1113
 12.08.10



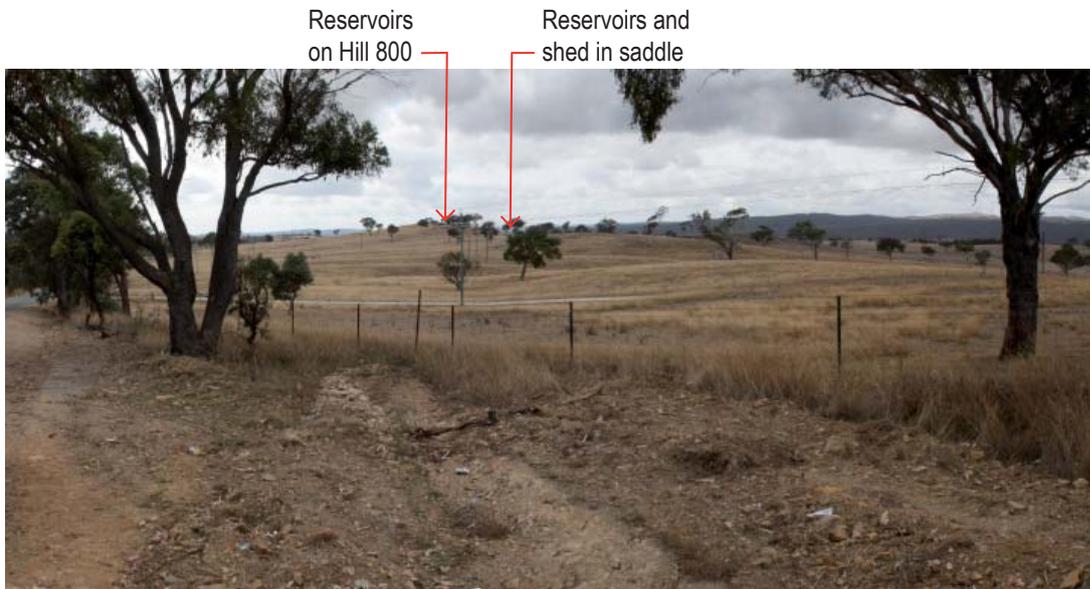
VIEW A - (refer Figure 1.2) Above photo shows the first significant view of Hill 800 on travelling south along Old Cooma Road and just south of Googong Dam Road. The proposed reservoirs on Hill 800 will be clearly visible but the reservoirs located on the lower saddle will be less visible until travelling further south (see Figure 3.3). For before and after images incorporating the reservoirs see Figure 3.4.



VIEW B - (refer Figure 1.2) Above photo shows the view from the intersection of Old Cooma Road and Fernleigh Drive. Clear views exist from either direction east from Fernleigh Drive or north along Old Cooma Road. The reservoir locations are indicated here and as shown in Figure 3.4. For before and after images incorporating the reservoirs see Figure 3.5.



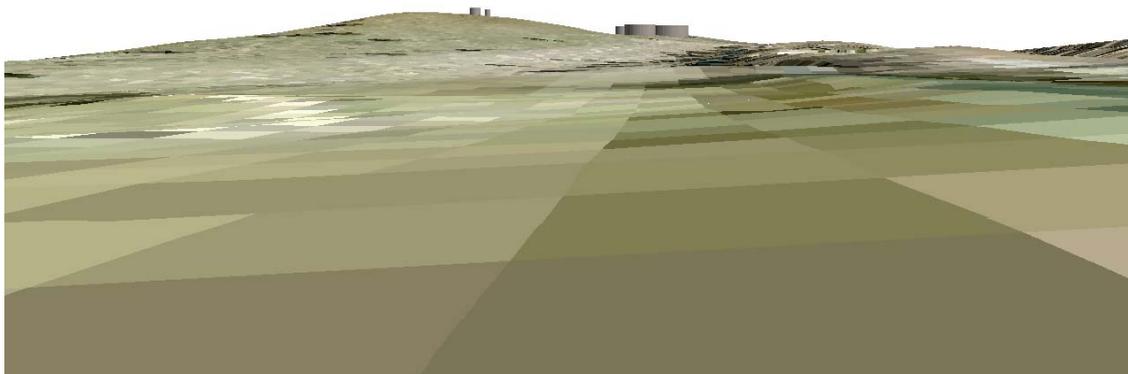
VIEW C - (refer Figure 1.2) Above photo indicates the position of the proposed reservoirs as viewed from adjacent to a residence just south of Hill 800 on the other side of Old Cooma Road (Receptor HE4). The property has very little vegetation to the east of the property, allowing clear views of Hill 800 from the house and gardens.



VIEW D - (refer Figure 1.2) Above photo shows a roadside view from Old Cooma Road south of the intersection with Fernleigh Drive. Topography and roadside planting prevent clear views of Hill 800 until this point if travelling from the south.



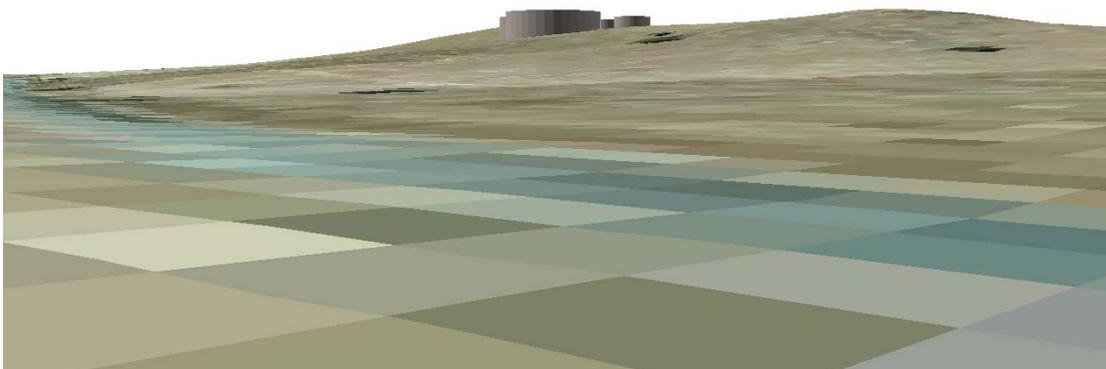
VIEW A - Existing landscape of Hill 800 viewed from northwest (Receptor RE3).



VIEW A PROPOSED - Indicative 3D model of reservoirs in location. The chemical shed is obscured by the reservoirs.



VIEW B - Existing landscape of Hill 800 viewed from southwest (Receptor RE3A).



VIEW B PROPOSED - Indicative 3D model of reservoirs in location. The chemical shed is obscured by the reservoirs.



VIEW 103 - Existing view to Hill 765, site of interim reservoirs.



VIEW 103 PROPOSED - Indicative view of interim reservoirs on Hill.



VIEW 104 - Existing view to Hill 765, site of interim reservoirs.



VIEW 104 PROPOSED - Indicative view of interim reservoirs on Hill.



VIEW 109 - Existing view to Hill 765, site of interim reservoirs.



VIEW 109 PROPOSED - Indicative view of interim reservoirs on Hill.

4. VISUAL IMPACT ASSESSMENT

In Table 01 the level of visual impact of the various elements of the proposed development on the principal visual receptors is summarised. These assessments are based on a range of evaluation criteria that are either:

- Quantitative (objective and measurable changes to the view and scene) or,
- Qualitative (subjective perceptions of the positive or adverse impacts of those changes based on the expected perceptions and experience of the different viewers/receptors).

These criteria apply to both the permanent and temporary infrastructure of the WCP.

4.1 QUANTITATIVE ASSESSMENT

The quantitative evaluation criteria for each visual receptor include:

- Distance of viewer from the heart of the site or proposal.
- Quantum of view occupied by the development or proposal.
- Duration of the view, i.e. from a fixed position or while passing.
- Magnitude of change, i.e. how significantly different the proposal will be from the nature and form of the existing landscape.

These evaluation criteria are separately assessed on a five point scale of High, High/Medium, Medium, Medium/Low and Low. The rationale for these individual scores is provided in the key to the matrix (see Table 02).

From the aggregated scoring of each of the above criteria a total assessment of quantitative visual impacts is determined under the heading 'Quantitative Total Rating' and scored on the same basis.

4.2 QUALITATIVE ASSESSMENT

Given that consultation with all of the existing and future visual receptors is not viable or practical, an assessment of the perceptual visual impacts is based on a professional evaluation of the likely Receptor Sensitivity (i.e. is the receptor viewing the development as part of their domestic or working life or is the view periodic/occasional i.e. from a road while passing the site). This experiential context affects how the quantitative impacts (addressed above) are perceived by the receptors, with respect to their perception of the quality of the altered view.

It should be stressed that this assessment is solely a professional one and given the personal nature of each viewers experience, is provided for guidance in this assessment.

4.3 SUMMARY OF IMPACTS

For each receptor a total rating of qualitative and quantitative impacts is summarised and briefly described in Table 01.

In Section 5.0 a written summary of the net visual impacts is detailed. This summary then informs the evaluation of potential mitigation measures and recommendations in Sections 6.0 and 7.0.

RECEPTOR IDENTIFICATION			QUANTITATIVE ASSESSMENT						QUALITATIVE ASSESSMENT		SUMMARY	
RECEPTOR NO	RECEPTOR DESCRIPTION	PHOTO LOCATION	DISTANCE	QUANTUM OF VIEW	DURATION	MAGNITUDE OF CHANGE	QUANTITATIVE TOTAL RATING	RECEPTOR SENSITIVITY	OVERALL RATING	COMMENTS		
HE1	"Bunyip" property	Photo 1a	M	L	H	M	M	H	M/H	Limited view to Hills 800 and 765 and reservoirs from house but clear view from other parts of property. The stack in the southern pumping station will be obscured by the development.		
HE2	Talpa residence	Photo 2	H	L	H	L	M/L	H	M/L	Hilltop and pumping stations blocked by topography and vegetation. Only top of WRP stack would be visible.		
HE3	Coffen residence Group	Photo 3	M/L	L	H	L	M/L	H	M/L	Distant views of Hill 800 partly blocked by trees.		
HE4	Residence corner Old Cooma Road and Fernleigh Drive	Photo 4	M	H	H	H/M	H	H	H	Clear view to hills and reservoirs from close proximity to the west of Hill 800. The chemical shed is obscured by the reservoirs.		
HE4A	Group of residences north of HE4	View 3, Figure 3.3	M	L	H	M/L	M	H	M/H	Some oblique views but vegetation on properties obscure views of Hill 800.		
HE5	Hansom Residence	Photo 5	M/L	L	L	L	L	H	M/L	View of reservoirs is blocked by a hill to the south of Hill 800.		
HE6	Gorman residence		M/H	L	L	L	L	H	M/L	Possible view of top of WRP stack.		
HP1	Cooke Property: to Hill 800	Photo 6	M/H	L	L	L	L	M/H	M/L	Hill 800 is not visible from the property nor is WRP and the northern pumping station. Top of northern pumping station stack will be visible from upper parts of property.		

KEY HE - HOUSE EXISTING - View from window, door verandah etc. HP - HOUSE GROUNDS - View from property, garden outdoor area.

RE - ROAD EXISTING - View from road

TABLE 01 : VISUAL RECEPTOR IMPACT ANALYSIS - WATER CYCLE PROJECT

RECEPTOR IDENTIFICATION			QUANTITATIVE ASSESSMENT						QUALITATIVE ASSESSMENT		SUMMARY	
RECEPTOR NO	RECEPTOR DESCRIPTION	PHOTO LOCATION	DISTANCE	QUANTUM OF VIEW	DURATION	MAGNITUDE OF CHANGE	QUANTITATIVE TOTAL RATING	RECEPTOR SENSITIVITY	OVERALL RATING	COMMENTS		
RE1	Googong Dam Road near Cooke property to Hill 800 to pump station	Photo 7	L	L	L	L	M/L	M/L	M/L	Oblique views from the road to Hill 800. These will be further reduced with the construction of the NH1A.		
RE2	Googong Dam Road west of Talpa residence	Photo 8	L	L	L	L	L	M	L	Oblique views to Hill 800 partially obscured by small embankment.		
RE3 (fig. 3.4)	Old Cooma Road South	Photo 9a	M	M/H	M	M/H	M/H	M/H	M/H	Views to Hill 800 driving south broken occasionally by trees.		
RE3A (fig. 3.5)	Old Cooma Road/ Fernleigh Drive Junction	View 2, Figure 3.2	M/H	M/H	M/L	M/H	M/H	M	M/H	Open view to Hill 800 for short duration. See RE8 for views to Hill 765.		
RE4	Old Cooma Road North	Photo 10	L	L	L	L	L	M	L	Distant view to WRP stack obscured by trees.		
RE5	Googong Dam Road west of Cooke Property	Photo 12	L	L	M/L	M/L	M/L	M	M/L	Oblique views across development potentially to WRP stack. Filtered view of Hill 765.		
RE6	Googong Dam Road near Old Cooma Road	Photo 13	M-L	L	L	L	L	M	L	Hill 800 not visible from this receptor and roadside bank obscures Hill 765.		

KEY LOCAL RECEPTORS FOR INTERIM RESERVOIRS (TEMPORARY) HILL 765

RECEPTOR IDENTIFICATION			QUANTITATIVE ASSESSMENT						QUALITATIVE ASSESSMENT		SUMMARY	
RECEPTOR NO	RECEPTOR DESCRIPTION	PHOTO LOCATION	DISTANCE	QUANTUM OF VIEW	DURATION	MAGNITUDE OF CHANGE	QUANTITATIVE TOTAL RATING	RECEPTOR SENSITIVITY	OVERALL RATING	COMMENTS		
RE7	Old Cooma Road and Googong Dam Road Junction	Photo 103	M/H	M	M/L	M/H	M/L	M/H	M/H	Interim reservoirs increasingly visible travelling South from here.		
RE8	South of Googong Dam Road junction, opposite Hill 765	Photo 104	H	M/H	M	H	L	M/H	H	Interim reservoirs highly visible at 90 degree to the road.		
RE9	Old Cooma Road, South of Hill 765	Photo 109	M/H	M	M/L	M/H	L	M/H	M/H	Interim reservoirs clearly visible driving from the South.		
HE7	904 Old Cooma Road Residence		M/H	L	L	M/L	M/H	H	M/L	While the reservoirs are quite close to Hill 765, existing vegetation on the property obscures views from the house.		
HP2	Grounds of private residence 904 Old Cooma Road		M/H	M	L	M/H	M	H	M	Closest point on property is less than 150 metres but vegetation on property filters views.		

KEY HE - HOUSE EXISTING - View from window, door verandah etc. HP - HOUSE GROUNDS - View from property, garden outdoor area. RE - ROAD EXISTING - View from road

TABLE 01 (CONTINUED) : VISUAL RECEPTOR IMPACT ANALYSIS -WATER CYCLE PROJECT

TABLE 02 - KEY TO MATRIX TABLES AND SCORING

RECEPTOR IDENTIFICATION		
Receptor No.		Receptor number describes the type and reference number of the viewer. The Googong site falls into three categories: Private. HE Existing residential. HP Existing garden or property. Public. RE Existing Road.
Receptor Description		The address, location or property name of the visual receptor.
Photo Location		The photo reference of the view from this visual receptor, where applicable.
QUANTITATIVE ASSESSMENT		
Distance		The effect the development has on the view is related to the distance between the development and the receptor. The distances are categorised as: H Within 100 metres- high impact. H/M 100 to 500 metres - high to moderate impact. M 500 metres to 1000 metres - moderate impact. M/ L 1000 metres to 2000 metres - moderate to low impact. L Further than 2000 metres - low impact.
Quantum of view		The Quantum of view relates to the openness of the view and the angle of the view to the principal vistas. A development located in the direct line of sight has a higher impact than if it were located obliquely at the edge of the view. Whether the view of the development is filtered by vegetation etc. also affects the impact, as does the nature of the view (panoramic, restricted etc.). A small element within a panoramic view has less impact than the same element within a restricted or narrow view. The effects can be categorised as: H A direct view of the development or its presence in a narrow or framed view, where the development occupies a large proportion of the view cone. M/H A direct view of the development within a panoramic view where development occupies a large proportion of the view cone. M A direct view of the development or its presence in a restricted view where development occupies a moderate proportion of the view cone. M/L A direct view of the development within a panoramic view where development occupies a moderate proportion of the view cone. L An oblique or highly filtered view of the development.
Duration		The period during which the view is experienced. H Fixed position (i.e. view from living areas of residence) or in view for several minutes while driving. M Experience for a shorter period (i.e. from within a residential property or while passing in a car). L Experienced very briefly in passing (i.e. for a matter of several seconds at most from a vehicle).

Magnitude of change		Magnitude of change is a quantitative assessment of the change in nature or character of the view. If the development will complement the existing elements within the view (i.e. buildings of a similar scale, location and appearance), the magnitude of change is low. If the development radically changes the nature or composition of the view (i.e. a view of open space is replaced by a view of large buildings) the magnitude of change is high. The magnitude of change can be categorised as:
	H	More than 50 percent of elements of the view (e.g. built form, open space, streetscape) and composition of the view will change
	M/H	Less than 50 percent of the view and composition of the view will change
	M	More than 50 percent of elements of the view are unchanged but composition or arrangement of the view changes.
	M/L	Less than 50 percent of elements of the view are unchanged but composition or arrangement of the view changes.
L	Elements and composition of the view remain largely unaltered.	
Quantitative Total Rating		A summary rating that combines all of the quantitative ratings. This is rated high, moderate to high, moderate, moderate to low or low, where low implies limited visible change based on the above criteria and high implies significant visible change.
QUALITATIVE ASSESSMENT		
Receptor sensitivity		Each receptor type has an inherent sensitivity based on its relative level of presence or interest in the landscape. Rating is from highest to lowest.
	H	Existing Residential - view from dwelling experienced regularly over extended periods of time, residents develop a strong familiarity and association with the view. Viewers may have a personal investment in the property and consequently the view has the highest sensitivity
	M/H	Existing Garden / Property - as with the dwelling, view is experienced over long periods, and there is a familiarity with the view. There is also greater likelihood that the viewers attention will not be focused continually in the same direction, therefore it has high sensitivity.
M	Existing Roads - the view experienced is often temporary, views are sometimes oblique and obstacles such as topography and trees fragment the view thus reducing its impact, sensitivity may be increased where the landscape travelled through is of high scenic quality and/or the road is a major tourist drive, giving it moderate sensitivity.	
SUMMARY		
Qualitative Impacts overall		The nature of the visual impact may be beneficial or adverse , based on a transparent professional judgement of the combined totals of qualitative and quantitative ratings:
	H	Highly adverse.
	M/H	Moderately to Highly adverse.
	M	Moderately adverse.
	M/L	Slightly adverse.
L	Neutral or Beneficial.	
Comments		Written summary of the key visual impacts both quantitative and qualitative.

5. SUMMARY OF VISUAL IMPACTS

PERMANENT IMPACTS POST CONSTRUCTION

From the foregoing assessment of both the qualitative and quantitative visual impacts of the WCP when completed, the summary of overall impacts from most to least potential significance are:

High Impacts

- Views of the proposed reservoirs on Hill 800 from the residences immediately to the west of Old Cooma Road (Receptor HE4).
- Views of the interim reservoirs from Old Cooma Road south of the Googong Dam Road (Receptor RE8).

Moderate to High Impacts

- Views of the proposed reservoirs on Hill 800 from the Old Cooma Road immediately to the west of the hill driving south and north (Receptors RE3 and RE3A).
- View to Hill 800 from Bunyip (Receptor HE1) and residences north of Fernleigh Drive (Receptors HE4A).
- Dependent on exact alignment of the pipeworks along Old Cooma Road impacts could be moderate to high for receptors using the road south of Googong Dam junction (Receptor RE3). Alignment will affect removal or retention of existing trees.
- Views of the interim reservoirs on Old Cooma Road from immediately north and south of Hill 765 (Receptor RE7 and RE9).

Moderate Impacts

- Views of interim reservoirs from the grounds of 904 Old Cooma Road (Receptor HP2).

Moderate to Low Impacts

- View to WRP stack (potential, subject to exact final location of stack) from Talpa Residence (Receptor HE2).
- View to Hill 800 from Coffen Residence Group (HE3).
- View to Hill 800 from Hansom Residence Group (HE5)
- View to Hill 800 from Gorman Residence (HE6). Buildings will be removed when NH1A is built.
- View to northern pumping station from Googong Dam Road near Cooke property (Receptor RE1).
- View to WRP from Googong Dam Road (Receptor RE5).
- View to northern pumping station stack (potential, subject to exact final location of stack) from upper levels of Cooke Property (Receptor HP1).
- Views of Interim reservoirs from the residence of 904 Old Cooma Road (Receptor HE7).

Low Impacts

- All other listed Receptors (RE2, RE4, RE6).

The high visual impacts of the proposed reservoirs to be located on Hill 800 are illustrated in the photos and 3D models in Figures 3.4 and 3.5. These show the existing hill from two key views, whilst a 3D model of the same view illustrates how the reservoirs will appear. The equivalent photomontage before and after images of the interim reservoirs on Hill 765 are shown in Figure 3.6, 3.7 and 3.8.

IMPACTS SPECIFIC TO CONSTRUCTION PERIOD

Several elements may be visible during the construction period that will either be present for a limited period after the construction is complete or completely removed, these include:

- Cranes and other plant used for demolition and construction.
- Construction signage and fencing.
- Stockpiling and temporary erosion control measures.
- Major construction vehicles accessing and exiting the sites.
- Disturbance to ground for earthworks.
- Lighting of construction during dark hours and for security.
- Contractor's compounds.
- Pipework excavations.

None of these impacts are likely to be of a duration or magnitude to impact significantly on visual amenity of the locality beyond temporary disruption.

IMPACTS SPECIFIC TO OPERATIONS AND MAINTENANCE

Several elements may be visible in the day-to-day life and maintenance of the proposed WCP once completed, these include:

- Security or operational lighting for WRP.
- Lighting for the Hill 800 and Hill 765 reservoir sites if required.

These impacts can mostly be mitigated by lighting design and the appropriate location of planting.

6. MITIGATION MEASURES

The most effective mitigation measures for any form of potential visual impact are largely those that entail either avoidance, reduction or alleviation. Where these may not be fully effective within the site itself, off site mitigation measures to reduce visual impacts for key visual receptors or, in the case of unavoidable impacts where no mitigation measures are achievable, off site compensations may be considered.

In some cases there may be reason to accentuate rather than reduce the visual profile of a relevant development item that would otherwise be deemed of unacceptable visual impact. The principal forms of effective mitigation for the WCP and the relative merits of various options, where they exist, are discussed below.

6.1 AVOIDANCE

Given that the site is zoned appropriately for residential development of this nature, the site selection is appropriate here, and therefore no avoidance measures for the WCP by way of relocation are considered necessary or practical. Some options for refining the siting for parts of the WCP infrastructure are addressed below.

6.2 REDUCTION AND ALLEVIATION

Reduction refers to the lessening of visual impacts through detailed siting, levels and layout of the elements that cause the visual impacts. This reduces their visibility from the major viewpoints/ visual receptors.

Alleviation refers to associated works adjoining or surrounding the visual impact source. The focus here should be primarily on achieving sound design outcomes that compliment the adjoining landscape, rather than masking the item causing the visual impact. To that end, screening (such as through dense planting surrounding the item) should be adopted only as a last resort and handled with some care as it can frequently draw attention to, rather than obscure, the item causing the visual impact. The following are reduction and alleviation options for the respective elements of the WCP.

The Water Recycling Plant (WRP) Pipelines, Pumps and Water Treatment Plant

None of these elements of the WCP have significant visual impacts; however, the following are some minor works that would further reduce/alleviate such impacts as they have:

- WRP: specific siting of the 8 metre stack to minimise visibility from Googong Dam Road as far as engineering constraints will permit.
- Underground pipelines: selecting alignments of the route that minimise loss of or damage to existing roadside tree planting (especially along Old Cooma Road) where engineering constraints will permit. This already forms part of the construction strategy for the pipework.
- Pumping stations: these are sited in locations of relatively limited visual accessibility and mostly comprise of a fenced compound with a small above ground structure and a narrow 2.2 metre high kiosk, all of which could be mitigated by tree planting. The most significant item would be a narrow 12 metre ventilation stack in the centre of each compound. Their exact siting relative to future paths and landscape planting should be addressed as part of the detailed landscape design, to reduce such impacts as exist.
- Water Treatment Plant: this facility already exists and when the pipeline connections to the plant from the WCP are constructed the only mitigation required will be restoration of the pipeline excavation locations.

The Reservoirs on Hill 800

The most significant permanent visual impact of the WCP is the proposed array of reservoirs and associated plant and access routes on Hill 800 (refer Fig 3.1a). The location and scale of the reservoirs is directly driven by water supply provision to the estate and the need for elevation to achieve gravity feed to the estate’s water reticulation system.

Reduction and Alleviation options that may be explored here, (also including Celebration and Accentuation approaches addressed further below), are summarised in Table 03, in order of degree of intervention required to achieve each objective. In this context, Celebration sees the structures as objects of interest and worthy of drawing attention to. Accentuation also sees the structures as a positive visual feature but is based on acknowledgement rather than enhancement.

OPTION	OBJECTIVE	APPROACH	MITIGATION IMPLICATIONS
1	Accept	No treatment Reservoirs located as required for operational purposes with no treatment to reservoirs or associated infrastructure.	Advantages: Least disruption to the existing hilltop appearance and least cost. Disadvantages: No reduction of the significant visual impact of the reservoirs.
2	Alleviate	Minor/Moderate treatment. Planting of native tree groups at various locations at and below the crest of the hill to reduce views; the reservoirs also painted in muted/recessive colours.	Advantages: Minimal disruption to the hilltop itself. Impacts of the reservoirs reduced from various views in a manner compatible with the existing landscape character. Relatively limited costs. Disadvantages: Achieving healthy tree growth may be technically challenging on shallow soil and exposed hilltop, potentially taking some years to achieve optimum effect. Some views not obscured as this is not a screening approach.
3	Celebrate	Moderate/Major Treatment Painting the reservoirs either in strong colour(s) or with artwork accompanied by bold planting.	Advantages: minimal disruption to the hilltop, reverses the concept of reducing visibility and is easily modified over time. Could be a popular community initiative. Disadvantages: Challenge to achieve artwork that is equally effective at close and long distance. May be more controversial within local community.
4	Accentuate	Major treatment Architectural treatments to reservoirs and associated plant as well as ground modelling, and associated planting.	Advantages: Minimal disruption to the hilltop reverses concept of reducing visibility. Strong design statement for the development. Disadvantages: Challenge to achieve design that is equally effective at close and long distance view. Potentially very expensive.
5	Reduce	Major Treatment Excavating more deeply into the hilltop to create a lower platform for reservoirs, to reduce their visibility from all views.	Advantages: Most significant reduction in visual impact with no other treatment required Disadvantages: Major disruption to the hill, significant excess in cut/fill balance requiring to be used for landform. Significantly most expensive option for level of reduction gained.

Table 03: Visual Impact Mitigation Options for The Reservoirs

An approach that combines elements of one or more treatments as listed in Table 03 can also be considered. Section 7 provides guidance on which of the options in the table are recommended for the reservoirs.

Interim Reservoirs (Temporary) on Hill 765

While these reservoirs are temporary in nature, they may still be in place for several years in the early phases of construction and completion of Neighbourhood 1A and 1B. Furthermore the design of the reservoirs may include two elevated tanks (to be confirmed). Consequently this assessment adopts the position of the most visual impact i.e. assessed as if permanent and with the raised tanks included. On this basis the impacts in the immediate vicinity on Old Cooma Road are moderate to high as Hill 765 lies within 100 metres of the road. The most effective mitigation would be to plant groups of trees on the road side and at points between the road and the tanks. This would reflect the random tree groups that exist in this landscape and limit direct views to the reservoirs.

6.3 OFF SITE MITIGATION

In some instances, on site mitigation measures may entail extensive works to achieve a lessening of visual impact that is more readily accomplished with less intervention on the landscape by mitigation measures closer to the key visual receptors.

In these instances, the party that proposes the development that is the source of that impact may seek to negotiate with the owner(s) of adjoining land or the properties affected by the visual impact to undertake mitigation works on that land, be that publicly or privately owned property.

The visual receptors most affected by the visual impacts of the permanent reservoirs on Hill 800 in the WCP are the residential properties along Cooma Road immediately west of Hill 800 (receptors HE4 and HE4a) as well as those travelling on Old Cooma Road (receptors RE3 and RE3a).

Some of the residences in this locality are surrounded by dense vegetation limiting views to Hill 800. However, the property immediately north of the Old Cooma Road junction with Fernleigh Drive presently has a direct and uninterrupted view of Hill 800, a view in which the proposed reservoirs will be dominant.

With respect to the impacts of the interim reservoirs the principal property affected would be the residence directly to the west of Hill 765 (904 Old Cooma Road, Receptor HE7 / HP2). Views from the residence appear highly restricted if available at all. So, any off site mitigation would relate to reducing visibility from within the grounds of the residence.

While on site mitigation measures described above may substantially reduce these impacts on these properties, it may also be worth pursuing consultation with these property owners to establish whether they consider that additional plantings on their site boundary would assist that mitigation from their perspective. This might reduce the extent of on site mitigation required.

Likewise the users of Old Cooma Road travelling north and south presently view Hill 800 and Hill 765 in places through filtered roadside trees and in other places as an open view direct to the hill tops.

Enhancement of the roadside planting in the locations of the more open views to the hill (e.g. opposite Fernleigh Drive and opposite Hill 765 junction travelling north) may reduce the visual impacts of the reservoirs whilst still maintaining filtered views to the hills. Again the roadside plantings, being closer to the viewing point may reduce the extent of required on site mitigation measures closer to the reservoirs themselves.

6.4 OFF SITE COMPENSATION

In instances where the visual impact of a particular development is highly significant and where opportunities for on site or off site mitigation measures are unavailable or impractical, it may be appropriate for the proponent to offer off site compensations, i.e. enhancing another local landscape as a development 'offset.'

The relatively moderate quantum of overall visual impact of the WCP and its various elements, as well as the reasonable options available to mitigate these impacts through on and/or off site works as outlined above, are such that this option is not required.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 GENERAL OVERVIEW AND CONCLUSIONS

The landscape of the locality in which the Googong new township is proposed is without doubt of significant visual interest and scenic appeal. Combining as it does various elevated vantage points from which to view an open farmland valley, deep vegetated gullies that feed the Queanbeyan River, local ridgelines and highpoints such as Hill 800 and the dramatic backdrop of the Eastern Mountain Ranges, Googong can be described as a landscape of high scenic quality.

Scale and Implications of Visual Impacts

That development of the WCP will significantly change the immediate landscape of a generally sparsely populated local visual catchment is evident. However, the broader visual impact of much of that change is greatly mitigated by a number of factors that include:

- The relatively small visual catchment of the WCP from publicly accessible landscapes; Googong Dam Road and Old Cooma Road are the only local public domain viewpoints in the immediate visual catchment.
- The limited number of existing residences within the immediate visual catchment that have close, unobstructed views to the WCP.
- The presence of significant existing industrial infrastructure and other non-residential built form visible from roads within the locality including a major quarry, a sewer treatment plant, Googong Dam infrastructure and the Googong Dam Visitor Centre.
- Many of the WCP elements (e.g. pump stations, underground pipes, WRP etc) are of limited visual impact or sited in locations of low visual accessibility or scenic sensitivity.

However, the specific features of the WCP that will generate the most significant visual impacts - namely the proposed permanent reservoirs on Hill 800 as the reservoirs on Hill 765 - require careful implementation of the appropriate mitigation to ensure that the immediate and scenically sensitive landscape in which the reservoirs lie is not compromised.

Design and Consultation Processes

While the recommendations that follow identify a suggested approach that best meets this objective, its realisation will also be dependent on design development inputs from various consultants such as Engineers and Landscape Architects as well as consultation with third parties such as Council and potentially the most affected visual receptors such as nearby property owners.

7.2 RECOMMENDATIONS

The specific recommendations for mitigation measures for each of the WCP elements are as follows:

The Water Recycling Plant (WRP)

In general the location of the proposed WRP and its associated stack on relatively steep land with a westerly facing aspect limits its visibility from within NH1A, from nearby existing residences or from Googong Dam Road. Its visual impact is therefore very limited and no significant mitigation measures beyond architectural designs for buildings that are lightweight in appearance would be needed; the placement of the eight metre vent stack should also be based on minimising its relatively limited visibility to the minimum possible.

Recommendation: resolve the details of these mitigation proposals through inclusion of these requirements in the brief for the design development process for this element.

Underground Pipework and Pumps

The alignment of the proposed underground pipework that will link the reservoirs on Hill 800 with NH1A and the existing Water Treatment Plant north of Googong Dam Road will not be visibly evident once construction is complete and the landscape over the covered pipework has established. However, the careful selection of the final alignment of the pipework route where it adjoins Old Cooma Road and Googong Dam Road should be based - where engineering constraints permit - on the maximum retention of existing roadside trees. The minor mitigation works for the pump stations should be addressed through optimal final siting and strategic tree planting that is integrated in the landscape design for the site.

Recommendation: Ensure engineering for final pipeline route alignment and construction specifications have integrated recommendations by Arborist/Landscape Architect for:

- Optimum existing tree retention.
- Tree replacement where losses are unavoidable through route alignment.
- Enhanced roadside planting that does not compromise access for pipe maintenance, repair or replacement.
- Appropriate protection of trees to be retained during pipe construction.

Ensure engineering for pump station locations and design have integrated recommendations by Landscape Architect of their optimum integration within the landscape design.

Water Treatment Plant

For the most part there will be no visible differences to the existing Water Treatment Plant when viewed from Googong Dam Road after the WCP pipelines are connected to the plant. For the WRP itself there are therefore no formal mitigation proposals required. However the linking pipework crosses an open ridge between Googong Dam Road and the Plant, requiring appropriate post-construction landscape rehabilitation.

Recommendation: Ensure landscape design for connecting pipework rehabilitates exposed and open ridgeline compatibly with pre-construction landscape condition and character.

Reservoirs on Hill 800

Table 03 outlines a range of options for mitigation measures for the reservoirs. In terms of the two most significant interventions, namely Option 4 Accentuation and Option 5 Reduction, the level of disruption required to the hilltop to achieve these outcomes and the significant costs involved for the level of mitigation achieved would not appear to provide a best value outcome.

While Option 3 celebrate of the reservoirs, provides for bold paint colours or specifically commissioned artwork on the structures could provide a striking feature in the landscape, this is most likely to be best appreciated at a closer viewing point.

Accordingly, this option might be best employed in concert with other mitigation options and may not require to be applied to the full extent of each structure (i.e. artwork is confined to an eye level height on the structures to be viewed at closer quarters, given that the hilltop is likely to be publicly accessible and a popular viewing point). This approach also has benefits in acting as a focus for a local community/new community initiative after the reservoirs are constructed.

Option 1 Acceptance would not appear to be an adequate response to the significant visual impacts of the reservoirs.

Of all of the approaches assessed in Table 03, Option 2 Alleviation through the use of informal groups of trees across and around the hilltop, in concert with careful siting of the associated plant and access road for the reservoirs would appear to be the most effective form of visual impact mitigation.

Assuming that the challenges of establishing those trees in the prevailing conditions of the hill can be overcome and accepting that a period of growth over several years will be required to achieve the optimum mitigation, this option would appear the most compatible with the existing landscape character, the most ecologically sustainable approach and also be cost effective in respect of long term and enduring impact mitigation.

Off site mitigation through selected roadside plantings and - subject to the owners' preferences - some selected planting on the residential properties of those most affected may extend the effectiveness of the mitigation and potentially reduce the extent of on site plantings required.

Recommendation: Adopt Option 2 Alleviation, to be delivered principally through informal groups of native tree plantings carefully sited on the slopes and crests of Hill 800 and its southern saddle to mitigate views from key visual receptors and viewing points. Undertake this process through detailed landscape design for the hill and surrounding landscape and from there establish the need/benefits of off site planting before commencing consultation with Council (i.e. for roadside tree plantings) and/or affected property owners for mitigation plantings on their properties.

With respect to design development of the reservoirs, their associated plant and access road and the wider landscape design for the hilltop and slopes, ensure an integrated design approach between Landscape Architects and Engineers that addresses at minimum:

- Most appropriate finished landform profile of the top of the hill that integrates the reservoirs.
- Detailed siting and design of any elements over and above the reservoirs (plant equipment, fencing, signage, lighting etc) to minimise visibility.
- Access road alignment to ensure a careful balance of limited visible road profile and minimised cutting/embankment visibility where following contours.
- Location and extent of tree groups to best mitigate impacts.
- Consideration of soil and microclimate factors and amelioration to ensure healthy and rapid tree growth.

Finally, when the design process for the above is in an evolved form determine whether Option 3 Celebrate will have a significant aesthetic impact and if so to what degree this may be applied to the structures to enhance their appearance when viewed at close quarters on the hilltop itself.

Interim Reservoirs on Hill 765

Although temporary in nature, the visibility of these interim reservoirs and the likelihood that they may be in place for some years before the permanent reservoirs are built on Hill 800 means that their impacts should be mitigated where possible.

It is therefore recommended that the following measures be put in place:

- all finishes on the reservoirs and associated infrastructure should be in muted non-reflective colours
- Groups of trees be planted at key positions along Old Cooma Road from south of the junction with Googong Dam Road to roughly half a kilometre south of Hill 765. These plantings should enhance those already existing on the roadside.
- Short term, pioneer native tree species be planted in small groups closer to the reservoirs to reduce their visual impact.
- Residents along Old Cooma Road south of Hill 765 and within the visual catchment of the reservoirs be consulted as to whether they would consider plantings on their properties would be necessary or preferred as a means of reducing visual impacts from their residences or properties.

8. REFERENCES

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