Recycled Water MUSIC Model (Insertion at upstream basin) – Revised Bioretention – Case 6

The developed model was modified to incorporate the insertion of the discharge of recycled water from the WRP supplied by MWH (Revision C, dated 27 Jan 10) at the upstream end of Googong Creek, into Detention Basin 4. Details of the basin are discussed in Section 6.4 of the *Googong Creek Stormwater Strategy* prepared by Brown Consulting (2010). The layout of the *MUSIC* model is presented in Figure 4.

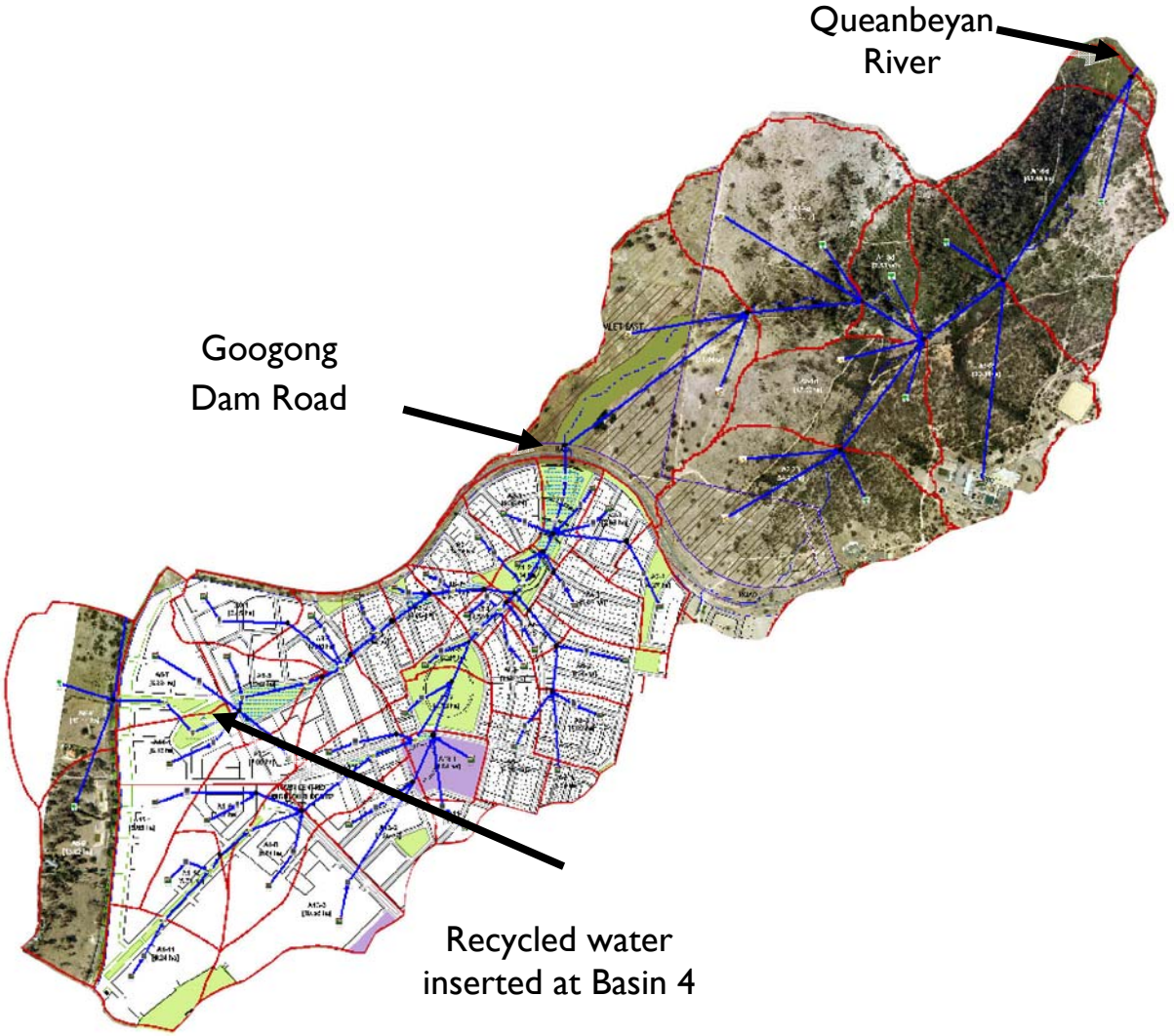

Figure 4 Developed Catchment *MUSIC* Model (WSUD Recycled at Basin 4 – Revised Bioretention)

The results of the *MUSIC* modelling for Googong Creek catchment with excess recycled water discharged into the system at Basin 4 are reported in Table 4 at the downstream end of the development Googong Dam Road, and at the confluence with the Queanbeyan River.

Table 4 Developed Catchment (WSUD (Recycled Water Insertion at upstream basin)) Pollutant Export rates

Pollutant	*Pollutant Load at Googong Dam Road (kg/year)*	*Removal Rate (%)*	*Pollutant Load at Queanbeyan River (kg/year)*
TSS	11,100	93.6%	42,700
TP	82.6	65.1%	117
TN	1,090	82.9%	1,640
Gross Pollutants	0	100.0%	4,390
Annual Flow Volume (ML/year)	1,080	4.5%	1,230

The results in Table 4 indicate that the treatment system proposed in Figure 4, with the insertion of recycled water from the WRP at the upstream end of Googong Creek at Basin 4 would meet the removal targets at Googong Dam Road for nutrient removal.

The pollutant load at the confluence with the Queanbeyan River is lower than the existing catchment rate for total suspended solids and gross pollutants, but is higher for nutrients.

Recycled Water MUSIC Model with Rainwater Tanks (Insertion at upstream basin) – Case 7

The model developed for Case 6, incorporating the insertion of recycled water at the upstream end of Googong Creek was modified to incorporate rainwater tanks on each dwelling. Rainwater tank parameters are the same as those used in Case 5. The layout of the *MUSIC* model is presented in Figure 5.

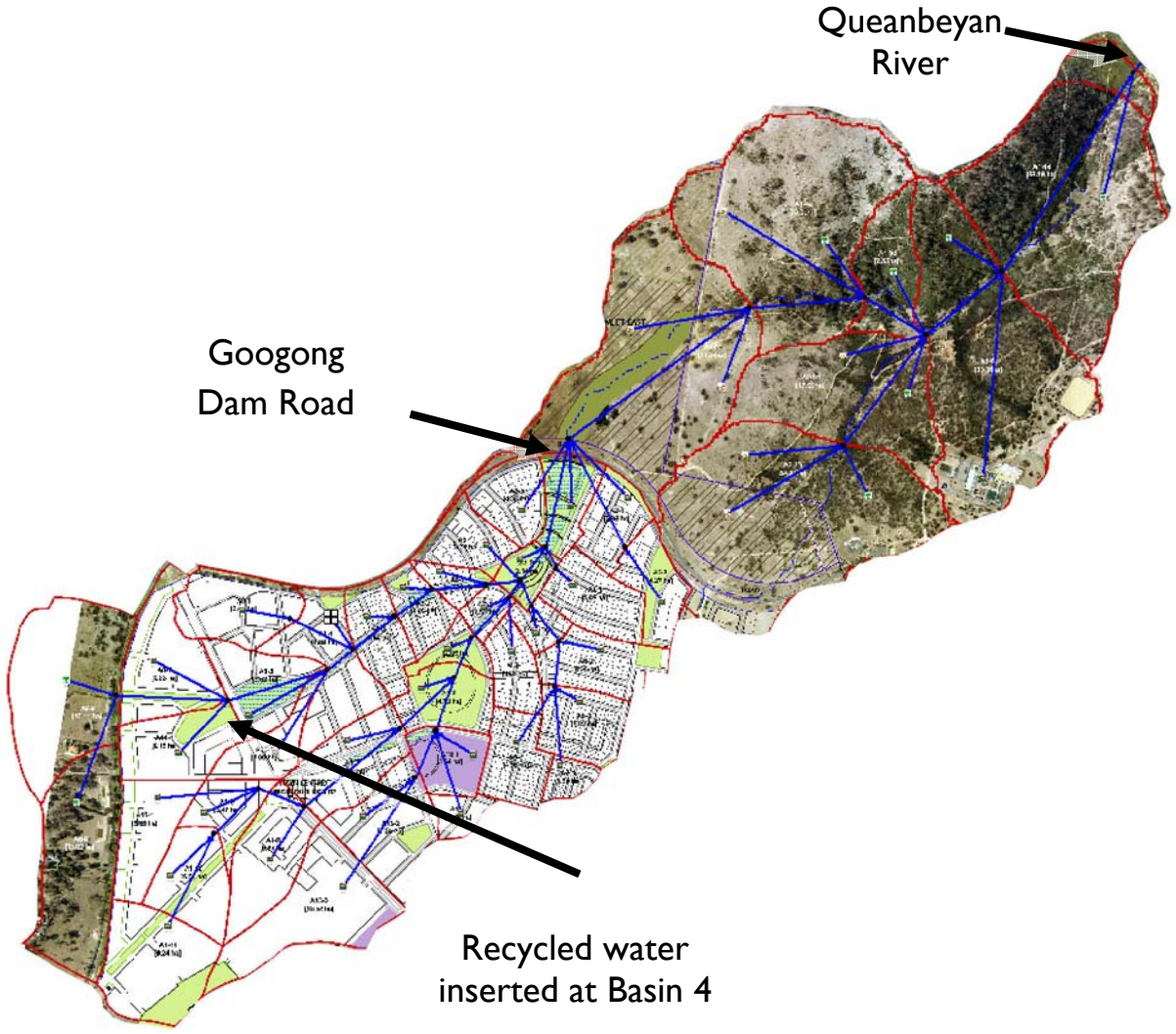

Figure 5 Developed Catchment *MUSIC* Model (WSUD Recycled at Basin 4 – Revised Bioretention with Rainwater Tanks)

The results of the *MUSIC* modelling for Googong Creek catchment with excess recycled water discharged into the system at Basin 4, incorporating the effect of rainwater tanks on each dwelling are reported in Table 5 at the downstream end of the development Googong Dam Road, and at the confluence with the Queanbeyan River.

Table 5 Developed Catchment (WSUD with Rainwater Tanks (Recycled Water Insertion at upstream basin)) Pollutant Export rates

Pollutant	*Pollutant Load at Googong Dam Road (kg/year)*	*Removal Rate (%)*	*Pollutant Load at Queanbeyan River (kg/year)*
TSS	9,500	94.5%	41,100
TP	71.2	69.9%	105
TN	897	85.9%	1,640
Gross Pollutants	0	100.0%	4,390
Annual Flow Volume (ML/year)	908	18.4%	1,080

The results in Table 5 indicate that the treatment system proposed in Figure 5, with the insertion of recycled water from the WRP at the upstream end of Googong Creek at Basin 4, with the inclusion of rainwater tanks would meet the removal targets at Googong Dam Road for nutrient removal.

The pollutant load at the confluence with the Queanbeyan River is lower than the existing catchment rate for total suspended solids and gross pollutants, but is higher for nutrients.

CONCLUSION

The results of the *MUSIC* modelling outlined in this letter report indicate that the design meets the stormwater water quality objectives. The calculations indicate that the design presented on Trunk Stormwater Drainage Concept Plan for Neighbourhood 1 and Town Centre" X07008.02.SK01 Issue C (with the modification of Basin 1, increased from 3000m^2 to 3500m^2) achieves the pollutant removal targets in the Queanbeyan City Council Development *Design Specification D7 – Erosion Control and Stormwater Management* and Googong New Town Development Control Plan with the inclusion of recycled water from the Googong Water Recycling Plant.

If you have any queries or comments regarding the *MUSIC* modelling or the findings of this letter report, please contact either myself or Nigel Bosworth on 02 8808 5000.

Yours faithfully,
BROWN CONSULTING (NSW) PTY LTD

Robert Peterson
Director – Water and Environment

Attachments:
A UD1104 Rev H Concept Lot Layout
B Trunk Stormwater Drainage Concept Plan for Neighbourhood 1 and Town Centre" X07008.02.SK01 Issue C
C Roberts Day – Yield Analysis Table dated 24 June 09
D graph of discharge of recycled water from the WRP supplied from WATNET modelling undertaken by MWH dated 29 Oct 09