THE PENRITH LAKES SCHEME

Mine Rehabilitation Works and Management for the Next Phase of the Penrith Lakes Scheme
Overview of Presentation

- Summary of the Penrith Lakes Scheme
- Key Elements of Scheme Water Management
  - Stormwater Management
  - Flooding Response
- Water Infrastructure
- Lake Establishment
- Catchment modelling
- Water Quality Model
- Applications / Direction
Regional Context
History of Penrith Lakes Site

1790s
Aboriginal occupation

1880
Quarrying first commenced
- Quarrying for Warragamba Dam started in 1940

1960
State Government sold holdings to Blue Metal Industries.
- 1970 - Castlereagh Steering committee formed in 1970
- Penrith Lakes Development Corporation formed in 1980

1984
RES published based on a 4 Lake Scheme
- 1987 Deed of Agreement Signed
- 2014 - Quarrying completed
- 2016 - Final dedication of the Scheme

2014
Final Water Management Plan lodged
Past and Future

The Past

1985

The Future

Artists impression of the completed Lakes Scheme.

Total Scheme covers 1,935 ha.

1200 Ha of completed landforms

770 Ha holding 38 Gigalitres of water
Dedicated Lakes and Parks

Sydney International Regatta Centre (SIRC)

- 196 ha successfully completed and dedicated to Government as the first stage of the Lakes Scheme.
- SIRC is one of the best rowing and sprint kayak courses in the world & won international acclaim during the Sydney 2000 Olympic Games.
- Now a popular sporting, corporate and social venue and receives an average of 40,000 visitors a month.

Penrith Whitewater Stadium

- The Stadium was the competition venue for the canoe/kayak slalom events during the Sydney 2000 Olympic Games.
Scheme Water Management
Stormwater Management
Gravity Flow System
Scheme Flooding Response
Water Infrastructure
Water Infrastructure
Infrastructure Details

2012 Scheme Water Management Plan includes:

• Reduced river inundation from a 5 year ARI event to a 10 year ARI, with no recreational lakes impacted until a 25 year ARI.
• Reduced risk of noxious species, sediment and water quality contamination.
• Riverbank flood cells protecting cultural and heritage values.
• Networks of flowpaths across the Scheme allowing for flood waters to uniformly increase and protect against extreme scouring flows.
• Flood outlet pipes that allow for reticulation with the riverbank under normal operating conditions.
• Reduced recurrent maintenance costs.
Water Quality Management
### Biodiversity Master Plan

#### Landscape Class | Guideline
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Woodland Vegetation | >30% of site
‘Core’ Conservation Vegetation | >10% of site, 30-50 hectare size
Riparian Corridors | >100 metres wide
All Vegetation Communities | 20-25 hectares in size and <2 kilometres apart
Intensive Land Use | <30% of site
Lake Establishment

Lakes and foreshores planted with native aquatic and terrestrial plants

Rock and woody ‘snags’ are placed prior to lake filling for fish and invertebrate habitat

As lake ecology develops Australian Bass are stocked as a top-order predator
Ecological Monitoring

The Integrated Monitoring Program has reported on:

- **Landscape Function Analysis** - constructed lands and static environments show comparable soil performance.
- **Effective noxious weed management** - including the control and eradication of Salvinia and Water Hyacinth from water bodies and detention basins.
- **Reintroduction of Species** – 9 native frog species, 165 bird 23 mammals and 15 reptile species are recorded as reintroduced species
- **61 families of macroinvertebrates** – routinely monitored showing developing communities routinely monitored across the scheme.
- **35 hectares of native grass farms** have been established producing 7 species.
Compliance monitoring for NHMRC Guidelines for Recreational Water (2008) in collaboration with the Public Health Unit.

Physical and biological profiling data currently being incorporated into a scheme-wide water quality model.
Water Quality Performance

- 79% Total Phosphorus and 47% Total Nitrogen reduction at the Final Basin
- 91% Total Phosphorus and 73% Total Nitrogen removal at the SIRC Lakes
- 95% Primary Contact in the SIRC Lakes
**Water Quality Model**

- Water quality model works
- Nepean River Pump and Pipeline delivering 86ML/Day
- 52ha Southern Wetland System
Nutrient Analysis

- Varied catchment land-use conditions and localised storm events have challenged traditional modelling approaches
- Preliminary observations of lake modelling suggests both P and N nutrient limitation for cyanobacterial growth
- Catchment inflows with wetland treatment systems provide substantial nutrient removal capabilities

Feb 2012 Rainfall event – Terry Hills BoM Radar Image
Applications of the WQM

• Assess the impacts of evolving land use in the surrounding the catchments
• Impacts of changes to river water quality and climate change
• Model the likely performance of the Scheme and set stormwater targets
• Assess the impacts of installing water quality infrastructure
Where to From Here?

• Urban development potential for the Scheme
• Nominate standards for lake performance and ecology requirements
• Applications of WSUD within and around the Scheme
• Vital management tool for local authorities to ensure the longevity of the Scheme
• Quarry Shareholders leave a highly valuable asset for to the community
Thank you