BLACK FOREST ROAD STORMWATER HARVESTING SCHEME

Presenters:
Emma Hendy – Wallbridge & Gilbert Consulting Engineers
Guilliano Andy – City West Water
PROJECT OBJECTIVES & BACKGROUND

Strategic Need

- Water catchment in the East and demand in the West.
- Infrastructure and environmental benefits from local sources.
- Stormwater harvesting to optimise recycled water servicing strategy

Black Forest Road Stormwater Harvesting Scheme
BACKGROUND

Project background and objectives:

Development within RW network zone

Large Constructed Lake: High Storage Potential

Black Forest Road within high ASR viability region
DESIGN STAGES

Review of Site & Previous Investigations

Concept Options Assessment

Preliminary Consultation with Stakeholders

Option Selection

Functional Design

Stakeholder Consultation
SITE LOCATION

- Lollypop Creek Catchment
- Western Growth Corridor
- Increasing urban development
- Increasing demand for water supply
- Changing catchment
OPPORTUNITIES

• Potential to utilise new land development.
• Integrated with flood management and water quality objectives.
• Close the loop harvesting increased runoff for reuse.
• Provide alternate water source for growing urban demand.
• ASR for increased water security.
## DESIGN CONSIDERATIONS

<table>
<thead>
<tr>
<th>Lollypop Creek</th>
<th>Target the increase in the urban runoff</th>
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<tbody>
<tr>
<td>Water Bodies</td>
<td>Water quality, visual impact, storage available, evaporation, maintenance</td>
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<tr>
<td>Aquifer Storage &amp; Recovery (ASR)</td>
<td>Understanding the ASR conditions, Bore field size</td>
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<tr>
<td>Treatment Options</td>
<td>Footprint, end-use, demand</td>
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</table>

**Multiple Objectives**
- Aesthetic
- Flood Control
- Demand
- Water Quality
WATER STORAGES

Recreational Lake

•Large open water body.
•Key amenity and feature of the Town Centre development.
•0.3m maximum drawdown - aesthetics
•Public use could affect turbidity for treatment
•High evaporation loss

Water Storage Basin

•Open water storage (with potential to consider a treatment wetland).
•Not major public amenity but still needs to be visually appealing.
•Larger draw-down potential due to function of the basin
•Increased storage potential open water (not wetland).

Reference: Lend Lease 2015
AQUIFER STORAGE & RECOVERY (ASR)

• Multiple bores in the region currently in testing and operation.
• Desktop Assessment Only
• Assessment determined potential in the Werribee Formation based on a review of regional bores.
• Conservative injection and extraction yield and recovery efficiencies for the design assessment.
• Bore field sized to target demand.
• Recommend onsite investigation prior to detail and staged construction.

Reference: Southern Rural Water
PRELIMINARY STAKEHOLDER ENGAGEMENT

Wyndham City Council
Land Availability
Shared Assets
Community Benefit

Developer
Early Engagement
Mutual Benefit
Design Integration

Melbourne Water
Water Quality
Flood controls
Base-flow

Southern Rural Water
Aquifer Conditions
Permits & Approvals
OPTIONS ASSESSMENT

• Scenario Analysis & Water Balance Assessment
• Water Bodies – Storage Capacity, Evaporation Losses, Extraction
• Treatment Options- Wetland vs Media Filtration
• Extraction Rates
• Demand Projections and Targets
• Aquifer Storage & Recovery (ASR) – Number of bores, increased water security
• Shortlisted options for review
OPTIONS SELECTION

- CWW objective to maximise the yield potential (up to 3.3GL/a).
- Selected option to achieve the highest potential yield.
- Media filtration selected for increased rate of treatment and storage available.
- ASR was included to extend the yield potential.
DESIGN OVERVIEW

- Treatment Plant
- Recreational Lake
- Lollypop Creek
- Harpley Estate Land Development
- Local Catchment
- Water Storage
- ASR Bore Field
- Connection to Recycled Water Network
- Harpley Estate Land Development
- Lollypop Creek
- Recreational Lake
- Water Storage
BENEFITS – DESIGN

- Dual extraction points to allow isolation of water bodies while maintaining system operation.
- Increased extraction rate by diversion to storage in ASR, minimising evaporation losses and maintaining storage volume for catchment inflow.

Utilising media filtration allows increased treatment potential without impacting land takes and visual amenity value of the lake maintained.

- Increased resilience against climate change/drought by additional long-term storage in ASR.
BENEFITS - OUTCOMES

• Alternate Water Supply for City West Water to support increasing demand.

• Regional alternate water source to maintain liveable communities.

• Environmental benefit from extracting, treating and returning the increased urban runoff to the local environment.

• ASR water can be recirculated to maintain water levels in the water bodies as required.

• Reduce degradation downstream catchment.

• An opportunity to showcase water management, water quality and the water cycle, for educational purpose.

Reference: Quest Mawson Lakes.
Recognition of the multiple benefits to all:

- **Water Security**
- **Liveability**
- **Amenity**
- **Public Health**
- **Education**

**Next Steps:**

- Design coordination
- Land and asset ownership
- Integration of facilities
- Public safety
- Approvals & Permits
BUSINESS CASE AND NEXT STEPS

Key Business Case Questions

• Ownership of the lakes
• Lake Design
• Land acquisition process
• Distribution of costs and benefits
• Fall back options
### POTENTIAL LAKE GOVERNANCE PRINCIPLES

Governance principles based on inheritance of risks and benefits

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<tr>
<th>Scenario</th>
<th>Beneficiaries</th>
<th>Lake Governance</th>
<th>Key Risks</th>
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<td>MW</td>
<td>CWW</td>
<td>Council</td>
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<td><strong>BAU – No Lakes</strong></td>
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<td>SW quality</td>
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<td>Flooding</td>
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<td>Integrated – Lakes + SWH</td>
<td>Improved SW quality</td>
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<td>Flooding</td>
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**City West Water**

Black Forest Road Stormwater Harvesting Scheme
## NEXT STEPS

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<th>Key Tasks</th>
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<th>Dec 16</th>
<th>Jun 17</th>
<th>Dec 17</th>
<th>Jun 18</th>
<th>Dec 18</th>
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<tr>
<td>Formalise Collaboration</td>
<td>e.g. MoUs (MW, Council, LL, VicRoads). Land acquisition</td>
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<td>Stage 1 – diversion works/ TP retaining wall</td>
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<td>Business Cases</td>
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<td>Lake design</td>
<td>Base flow assessment</td>
<td>Master plan review</td>
<td>Detailed design</td>
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<td>Lake Construction</td>
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<td>Construction Lake 1 and 2 with SWH diversion works</td>
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<td>Cost Benefit assessment</td>
<td>Potential cost apportionment</td>
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<td>Design Integration</td>
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<td>Hydraulic modelling</td>
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<td>ASR Investigation</td>
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<td>Start Prelim Investigation</td>
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- **Stage 2 (treatment plant) & Stage 3 (ASR): post 2025**
- Completion of Lake 2
- Detailed ASR investigation
SUMMARY, CLOSE & QUESTIONS

Black Forest Road Stormwater Harvesting Scheme

• Presents and opportunity to integrate multiple benefits.
• Cost effective fit-for-purpose supply for region.
• Trial Aquifer Storage & Recovery for stormwater harvesting in Melbourne’s Western Growth Corridor and improved water security.
• Educate the public on water while providing increased amenity and liveable environment.
Acknowledgements

• Melbourne Water
• Lend Lease
• Wyndham City Council
• Southern Rural Water