Evidence of Dr Graeme Lorimer

to the North East Link Inquiry and Advisory Committee
27th August 2019

This slide shows the structure of my presentation and my thoughts.
Slide 3

Overlooked or Understated Impacts

1. Loss of trees just outside project boundary;
2. Likely clearing for ancillary works (e.g. barracks, tennis centre);
3. Degradation or fragmentation of retained habitat;
4. Multiple-counting of retained Matted Flax-lilies

The left margin contains cross-references, with ‘S’ meaning ‘Section’ and brackets [ ] for paragraph numbers or dot-points.

1. Studley Park Gums are among the trees just outside the project boundary whose risk was not assessed.
2. Regarded by the consultants as not part of their job.

Slide 4

Outside the project area, the EES totalled the number of MFLs from four surveys, even when different surveys appear to have detected the same plant and even when the latest survey failed to find plants previously detected, but the same approach was not taken inside the project area.

Miller said in verbal evidence that additional MFLs are very likely to have escaped detection, so the estimate of 95+ plants and patches in the EES is probably too low.
Slide 5

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5. Extra gums (incl. SPGs) impacted by groundwater drawdown;
6. Vegetation-related overlays (ESO, VPO, SLO);
7. Risk levels and consequence levels

Slide 6

Risk EC02 / Conclave S14 dot point 4

The truncated part of the top table (for ‘final risk’) is the same as the part shown for ‘initial risk’.

43 ha of endangered EVCs occur in the project area, including over 10 ha in one zone in Simpson Barracks.
Categorising the greatest risks as ‘Planned’ discourages reconsideration of avoidance and minimisation. Faulty calculation re endangered EVCs, MFL and SPG further reduces impetus for reconsideration.
Slide 9

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7. Risk levels and consequence levels;
8. **Planted understorey**

8. Caffin said, ‘...there is very likely not much understorey vegetation’ (Day 8 recording at 5:39:38). That’s wrong.

Slide 10

Plants shorter than 3m are abundant in the ‘amenity plantings’.
So-called ‘amenity plantings’ are estimated to occupy 184 ha.
9. Ecosystem services, health, childhood development, resilient communities *etc.* are in the state biodiversity strategy, which is the ‘Flora and Fauna Guarantee Strategy’ for the purposes of section 17 of the *Flora and Fauna Guarantee Act 1988*.

10. I provide additional reasons in support of Smitt’s overall conclusion on his Slide 24 that ‘the model cannot be used to accurately predict impacts on sensitive environmental receptors’:

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5. Extra Studley Pk Gums impacted by groundwater drawdown;
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9. Beneficial uses of nature for humans, e.g. health, childhood devt;
10. Potential for worse impacts of groundwater changes

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**Depth to Groundwater**

- **NEL-BH137** is near Greenaway St, near Banksia cut & cover, area of max. build-up.
- Low uncertainty on range of predicted depth to groundwater level over long term.

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‘95-percentile’ contours do not mean that worse impacts have only a 1-in-20 chance of being worse. Numerical models can be affected by various types of inaccuracies, e.g. programming errors, simplified conceptions of physics or geology, mesh selection, number of layers and uncertain input parameters. The EES’s ‘95-percentile’ only represents uncertainty in input parameters and it substantially understates total inaccuracy – in this graphic, 1.3 m compared with 0.5 m.
‘Comparison of predicted standing water levels (SWLs) from the EES model to the April 2018 GME [Groundwater Monitoring Event] data often show a SWL difference of up to between 3 m to 5 m (seen by myself as significant) – The current model seems to be struggling to accurately model spatially on groundwater drawdowns through the geology’.

– *Interim Report of Craig Barker (doc. 77), p. 12*

Middlemis explained (at 3:41:15 of Day 8 recording) that the modelling has been tuned to best match the observations for the period of these hydrographs. Future performance and performance away from the bores used to tune the model are unlikely to be as good.

Rates of rise and fall are poorly predicted, with serious implications for drying phases of wetlands and hence rare wetland plants, particularly Short Water-starwort.
This table is only for trees with trunk diameters over 80 cm. Smaller trees were excluded from consideration. The EES provides no citations or empirical evidence to support Table 40.

Mr Middlemis’s statement (at p. 8) expresses biological opinions. His opinion appears to be outside his area of expertise and I disagree.

Before leaving this slide, note that 2 m drawdown has High or Very high impact on large trees whenever they access groundwater.

Slide 18

3.7 m drawdown by 2075 without NEL or 4.3 m with, in ‘dry climate scenario’. Compare that with abovementioned Table 40.
Tech Note 35 ignores climate change.

This scenario is worst-case for climate. It shows the potential for GDEs to come under extreme stress from climate change and for NEL to significantly reduce the time GDEs have to adapt.

Mr Middlemis said (at 3:55:40 of the Day 8 recording) that groundwater monitoring should continue until the water table equilibrates, but this diagram shows that it might never equilibrate.

### Slide 19

**Overlooked or Understated Impacts**

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6. Vegetation-related overlays (ESO, VPO, SLO);
7. Risk levels and consequence levels;
8. Planted understorey;
9. Beneficial uses of nature for humans, e.g. shade, health;
10. Potential for worse impacts of groundwater changes;
11. Interaction with climate change.

11. Groundwater drawdown is not the only thing that may interact with climate change – see 128:S13[3].

### Slide 20

**Chain of Logic re Biodiversity-related Impacts**

- many understatements about impacts
- shortfalls in offsets and other mitigation
- Seriously reconsider ‘avoid and minimise’ options
- Adjust offsets, mitigation & EPRs
Slide 21

Inadequate Mitigation, Part 1

For the impacts acknowledged in the EES & Technical Notes:

1. Matted Flax-lily (MFL) plan does not fully compensate the loss;
2. Studley Park Gum (SPG) plan: as above; cannot be relied upon;
3. NV offsets ignore 95+ MFLs, 49 SPGs, 10+ ha of critical habitat and 43 ha of endangered EVCs;
4. NV offsets will probably contain little if any endangered EVCs;
5. NV offsets for Bolin Bolin & Simpson Barracks existing offset;
6. NV offsets are only for ‘no net loss’;
7. The Tree Canopy Replacement Plan has a time lag.

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1&2. Two shortcomings: a) decline of species in planted situations; (b) value judgement. The decision to regard the salvage and planting plans as providing adequate compensation for MFL & SPG relies upon a value judgement that is inconsistent with threatened species policies, law & regulation from international to municipal jurisdictions; e.g. FFG Act.

3. Neither MFL nor SPG are modelled by DELWP to occur at the barracks and so no offsets are required, hence little impetus for avoidance and minimisation. Endangered EVCs are ignored by the offset computer program.

6. ‘Net gain’ is referenced in state biodiversity strategy, Yarra River Protection Act & Manningham ESOs.

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Slide 22

Inadequate Mitigation, Part 2

... plus, for the conclave-agreed impacts omitted from the EES:

8. Offsets for trees just outside the project boundary;
9. Offsets etc. for consequential clearing (incl. MFLs & SPGs);
10. Offsets for edge effects, reduced patch size and fragmentation;
11. Offsets for indirect loss of extra SPGs and River Red Gums;
12. Tree Canopy Replacement Plan lacks understorey, has lag;
13. No mitigation for impacts on children, health, resilience...

These measures exclude offsets under the EPBC Act.
The options considered in EES Chapter 6 and pp. 132-133 of TRQ appear superficial and biased. For the northern tunnel, the focus of Ch. 6 is on the perceived advantages of the reference design and disadvantages of the alternatives, not *vice versa*.

I see a need for an objective method of exploring options and weighing up competing beneficial uses, comparable to the risk assessment.

**Slide 24**

**Simpson Barracks**

Mounting evidence of environmental impacts:

- Number of known SPGs increased significantly when surveyed;
- Acceptance that SPGs do not breed true, upsetting plans for planting;
- Acceptance that MFL offsets are likely to be required under EPBC Act;
- Acceptance that the Army probably needs to clear more vegetation, MFLs & SPGs;
- Acceptance that the retained woodland would suffer degradation;
- Evidence that the sub-½-metre accuracy of groundwater drawdown needed for GDE assessments is beyond the model’s capability.

Reconsider the option of a Simpson Barracks no-go zone, weighing up the competing interests in a transparent and objective manner.
These two designs differ from the one Mr Miller described to me, in which the trunk is 6 m from the nearest road.

Are alternatives really unviable? For example, how essential is a dry road in a 200-year flood? Does Bridge St need to exist, and in that location?

Examples like these appear to put significant vegetation at risk of needless destruction. FF2 should not be relied upon as a default to protect vegetation. The project boundary should be drawn to balance significant vegetation against how greatly the engineers need the vegetation to be removed.
Whether or not there is any redesign of the reference project, offsets, other mitigation and EPRs need refinement.

Slide 28

Changes to Mitigation: Non-EPR

1. Before approval, determine and secure new NV offsets;
2. Devise specific measures for Caltex tree, children, health, ...
3. Satisfy the unmet expectations of overlays, e.g.
   - Manningham ESO2, ESO3 require a land management plan & consideration of locally or regionally threatened flora and fauna;
   - Banyule VPO1 Decision guideline: ‘Whether the application includes a landscape plan or agreement to replace areas of vegetation on the land’;
   - SLOs of Banyule, Boroondara and Manningham require a landscaping plan & consideration of ‘The effect of the removal of vegetation on the natural landscape character, habitat protection, wildlife movement and long term viability of remnant and revegetated areas’.

2. Follow the MoU between Ministers for Health & Environment.
3. Most (but not all) overlay requirements can be met by EPRs proposed below.
**EPR AR3: Tree Canopy Replacement Plan**

**Implement a Tree Canopy Replacement Plan**

Develop and implement a Tree Canopy Replacement Plan to replace the canopy of native vegetation and amenity plantings removed as a result of the project and achieve a net-10% gain in tree canopy cover (relative to 2020) by 2045 (the 'net gain target'). The plan must:

- Show the location, size and species of replacement trees, in consultation with relevant land managers and having regard to their policy objectives.

- Respond to the eleven points listed in Schedule XX [derived from Ms Caffin’s Section 11, with plantings for childhood development and visual amenity added]. Specify requirements to support the long-term viability of all replacement plantings including appropriate soil requirements, establishment works and ongoing maintenance.

- Adopt and maintain at least a 2:1 replacement of amenity plantings from project completion to 2045.

The replacement planting should commence as soon as possible and in stages, once tree removal extent is confirmed and suitable replacement sites have been determined in consultation with relevant councils and authorities.

A post-construction assessment is to be undertaken to confirm extent of tree removal and that the Tree Canopy Replacement Plan will achieve the net gain target set out above.

At five-yearly intervals thereafter until 2045, progress toward the net gain target is to be monitored and corrective measures taken as required to ensure the target is met.

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**New EPR: Understorey Replacement Plan**

**Implement an Understorey Replacement Plan** [first cut]

Develop and implement an Understorey Replacement Plan to plant, establish and maintain the same extent of understorey (planted or in natural vegetation) as removed for the project within 5[?] years from project completion. Understorey includes all plants below 3 m tall except lawn. In consultation with relevant land managers and having regard to their policy objectives, the plan must be integrated with the Tree Canopy Replacement Plan and:

- Be prepared by [date];

- Include a Landscape Design showing the areas to be planted and, within each area, state the species and planting density within each life-form category or height class (0–0.5 m, 0.5–1 m, 1–3 m);

- Respond to the points listed in Schedule YY [parallel to Ms Caffin’s Section 11];

- Commence the planting as soon as practicable and complete it within 2[?] years of project completion; and

- Every two years for a period of xx years, monitor the survival of plants in each life-form category or height-class within each area in the Landscape Design and undertake replacement planting as necessary to ensure the density meets specifications.
Slide 31

EPR FF2: Minimise and offset

1. Increase offset requirements above the regulatory minimum (e.g. ×1.5) to account for matters such as:
   • Absence of offsets for endangered EVCs, MFLs and SPGs;
   • Absence of offsets for health, childhood development, resilience etc.;
   • ‘Net gain’ compared with ‘no net loss’; and
   • Habitat degradation and fragmentation;

2. Set a minimum proportion of ‘general units’ to be achieved in endangered Ecological Vegetation Classes.

*(requires change to Section 4.8 of the draft incorporated document)*

Slide 32

Revise EPR FF6 (Part 1)

*from document 152*

Implement a groundwater dependent ecosystem monitoring and mitigation plan

Prepare and implement a Groundwater Dependent Ecosystem Monitoring and Mitigation Plan. The Groundwater Dependent Ecosystem Monitoring and Mitigation Plan must be informed by the groundwater modelling and groundwater monitoring required by EPR GW1 and EPR GW2, and must include (but not be limited to):

- Identification of Groundwater Dependent Ecosystems (GDEs) predicted to be impacted
- Details of the monitoring procedures and program for each relevant GDE including monitoring periods appropriate to each GDE
- Specific procedures to monitor groundwater levels at GDE’s predicted to be impacted Bolin Bolin Billabong and Barvaie Billabong including monitoring must be monitored as close as possible to the GDE billabongs (considering ecological and access constraints). The water levels and quality at these billabongs must also be monitored; and for aquatic GDEs monitoring the surface water levels and quality is appropriate
- Identification of relevant monitoring and management programs by Melbourne Water or other authorities and how these are referenced in the Groundwater Dependent Ecosystem Monitoring and Mitigation Plan
- Measures to mitigate monitored changes should be included in the Groundwater Dependent Ecosystem Monitoring and Mitigation plan to address in water levels and quality that could impact the billabongs or other GDEs, which take into account the natural seasonal variability

intervals and duration?  
Duration ≥10 years
Revise EPR FF6 (Part 2)

Except where prevented by access restrictions, monitoring must include the cycle of wetting and drying of wetlands that may support indigenous plants reliant on periods of slowly-drying mud, including River Swamp Wallaby-grass and Short Water-starwort. Where reproduction is failing due to too rapid drying, corrective measures are to be implemented.

Where the survival of Groundwater Dependent Large Trees not requiring removal is predicted to be affected by groundwater drawdown during construction or operation based on groundwater modelling outputs, include measures should be included in the plan to maintain the health of large trees and any supplementary watering.

In relation to any trees unlikely to survive during operation as a consequence of groundwater drawdown, processes for offsets must be obtained in accordance with EPR FF2. Mitigation measures or offsets are to be determined to the satisfaction of DELWP.

The process for review of the Plan, including how the groundwater modelling and monitoring under EPR GW1 and EPR GW2 will be considered and the GDE monitoring program and periods subsequently reviewed.

Other EPRs

1. EPR AR2: Extend monitoring of mature trees to ≥3 years;
2. EPRs FF8 & 9: Remove ‘to the extent practicable’;
3. EPR FF10 (DELWP letter S5.1): As per conclave Section 15, i.e.:
   • Ten-year timeframe for Studley Park Gum mitigation measures;
   • Enhance an existing, natural SPG stand, not just plant seedlings;
   • SPG mitigation must involve clear, practical, measurable commitments;
4. EPR GW2: Increase duration of GDE ecological monitoring to 10 years, as per conclave statement S15, second dot-point.

– the end –