PSP Property 38 (being Lot 4 LP 138528)  
Troups Road South, Mount Cottrell

Report for Beacon Planning re drainage and PSP1082

Date: 8 September 2016

V1159_001
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1. INTRODUCTION

This report has been commissioned by Beacon Planning (on behalf of the landowner). This report relates to drainage and the proposed PSP for PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.

Details of the report author and reviewer are provided below.

1.1 Author Details

1.1.1 Name and Address

Andrew Prout
Suite 15, 333 Canterbury Road
Canterbury, Victoria, 3126

1.1.2 Qualifications

Andrew Glen Prout has the following qualifications and professional memberships:

Education

Bachelor of Engineering (Civil), Swinburne Institute of Technology, 1984
Postgraduate Diploma in Management Studies, Melbourne University, 1992

Registrations/Affiliations

Member, Institution of Engineers, Australia
Member, College of Civil Engineers, I.E. Aust.

1.1.3 Experience and Expertise of the Author / Reviewer

Andrew is a Senior Principal Engineer in the Melbourne branch of Engeny Water Management (Engeny). Andrew has gained more than 30 years' professional experience both in the consulting engineering field and with government and semi-government authorities. Andrew is a leader in the surface water management field, having updated Melbourne Water's Drainage Design Guide and having lectured at university level. Andrew's has extensive experience in the design and construction of retarding basins, wetlands, and drainage works. Andrew is also highly experienced in flood mapping, hydrology, hydraulics, water sensitive design and waterways. Andrew is familiar with the changes in drainage design standards in Victoria over the years and the standards, policies and other issues related to urban drainage.
Andrew is highly experienced with Melbourne Water Development Services Schemes (DSS), which are also known as drainage schemes. Andrew has been involved in designing drainage schemes and technical reviews of schemes since the 1980s and has recently signed off on the reviews for over a dozen schemes for Melbourne Water (MW). Andrew is therefore very familiar with Melbourne Water’s “Principles for Provision of Waterway and Drainage Services for Urban Growth”.

Andrew has undertaken expert witness work for a number of clients, including Melbourne Water, Southern Rural Water, Goulburn Murray Water, Councils and landowners.

Andrew has prepared this report.

This report has been reviewed in accordance with Engeny’s Quality Assurance system.

A CV with more details regarding Andrew’s experience is included in Appendix A.

1.2 Subject Site

The subject site is located in Mount Cottrell in the City of Melton. Plans showing the subject site are provided in Appendix B (plans also show planning zones and overlays). It should be noted that there are no flooding related overlays that apply to the property. On the plans in Appendix B the subject site is on the east side of Troups Road South and has the property number label 248 on the property.
2. PREVIOUS REPORT

Engeny prepared a report dated 26 May 2016 regarding the subject site. The May 2016 report considered alternative options for the drainage layout proposed by the Melbourne Water DSS and the exhibited PSP and concluded that:

1. The Mount Atkinson PSP proposes a wetland / retarding basin (WI-09) on the subject site.
2. I have reviewed the Mount Atkinson PSP and proposed Melbourne Water Dry Creek Upper Development Services Scheme in relation to WI-09 and the subject site.
3. The wetland / retarding basin WI-09 is required and its location is a good, logical design that treats stormwater as required by the VPPs, avoids conflict with the proposed conservation zone to the south and minimises the cost of drainage infrastructure that will need to cross the proposed Outer Metropolitan Ring Road (OMRR).
4. It should be noted that Melbourne Water will acquire the land for WI-09 as part of the implementation of the Dry Creek Upper DSS and the aim in determining the amount paid for the acquisition is to ensure that the owner is appropriately compensated for the land.
5. I have identified two alternatives to locating WI-09 on the subject site that are described in Section 3.4.2 of this report and shown in Appendices C and D. The two alternatives have both advantages and disadvantages to the layout proposed in the PSP and further consultation and work would be required to determine if the alternatives could / should be implemented.
6. A third alternative that I have considered is to move WI-09 onto the proposed conservation area south of the subject site. From a drainage pattern perspective this option is entirely feasible and would free up land on the subject site for residential development.

Note: In my May 2016 report the subject site was referred to as 248 Troups Road South. In this report I have changed and underlined the italicised text above to instead refer to the “subject site”. Elsewhere in this September report the subject site is referred to as PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.
3. REFERENCE DOCUMENTS

Documents were provided to Engeny by Beacon Planning in May 2016. These documents were:

- a planning property report, including zones and overlays

In addition to referring to the documents supplied we also sought additional information and/or were supplied with extra information including the following documents:

- Melbourne Water plan of part of the draft Dry Creek Upper Development Services Scheme (DSS) that includes the subject site

In August / September 2016 I have received and/or reviewed the following additional documents:

- aerial images from Google Maps and NearMaps
- letter from Melbourne Water responding to my May 2016 report, as provided in Appendix E
- plan information from www.land.vic.gov.au
- letter of advice from Chad Browning, Ecology and Heritage Partners, 27 May 2016
- beacon Town Planning report dated 30 May 2016, project number 16-021
- MPA letter dated 14 July 2016 (ref COR/16/7398) to Beacon Town Planning.
4. **UPDATED ASSESSMENT**

In August 2016 I was asked to provide an updated assessment of options for the layout of the Development Services Scheme and PSP in relation to PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.

The issues raised in my correspondence and discussions with Jennie Jones of Beacon Planning for the updated assessment is:

- From a drainage perspective could wetland / retarding basin WI-09 proposed on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell, be located to the south onto the proposed conservation area?

- How would the relocation of WI-09 onto the property to the south impact on the design of the proposed DSS and the cost of providing drainage services for the area?

4.1 **Review of Information**

I have reviewed all of the supplied information listed in Section 3 of this report. Following my review of this information I have assessed the issues that I have been asked to address.

4.2 **Proposed PSP**

I have reviewed the proposed PSP in relation to proposed drainage and water sensitive urban design elements in the vicinity of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell. I have considered other constraints in the PSP that may impact on the drainage and water sensitive design elements of the PSP.

The PSP on page 60, proposes a wetland / retarding basin on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell, with an outlet pipe to Dry Creek. This proposed wetland / retarding basin is referred to in the PSP as WI–09. The proposed land area for WI-09 in the PSP is 4.41 hectares (Table 8 on page 62 of the PSP).

4.3 **Proposed Melbourne Water DSS**

Melbourne Water has considered the development proposed in the Mount Atkinson PSP and has prepared preliminary Development Services Schemes (DSS) to provide main, drainage, waterways, flood retardation and water sensitive design features for the PSP area.

PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell is located within Melbourne Water’s Dry Creek Upper DSS. Stephen Miller of Melbourne Water provided me with a copy of the part of the Dry Creek Upper DSS by email on Monday 23 May 2016. A copy of the plan provided by Melbourne Water is shown in Figure 4.1 below.
The Melbourne Water DSS layout appears to be consistent with the exhibited PSP in terms of the layout for wetlands / retarding basins on and in the vicinity of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.

The Melbourne Water DSS locates the proposed basin WI-09 on the subject site and east of the proposed OMRR. If the OMRR was not proposed in this location then WI-09 would be unlikely to be in its proposed location. I expect that WI-09 would be located closer to Dry Creek in a westerly and/or southerly direction without the OMRR.

Figure 4-1  Melbourne Water Dry Creek Upper DSS (May 2016)

4.4 Site Visit

A site visit was undertaken to the subject site on Monday 5 September 2016. Attendees for the site visit were:

- Andrew Prout, Engeny
- Jennie Jones, Beacon Town Planning
- Brett Lane, Brett Lane and Associates
Brett MacDonald, Brett Lane and Associates

David Hodge.

We visited the subject site and viewed the area from adjacent roads.

We had not been in contact with the owners of the proposed conservation area to the south of the subject site and therefore did not enter the proposed conservation area. Selected photographs from the site visit are provided below.

Figure 4-2 Subject site, looking east from Troups Road South
Figure 4-3  Looking west from Troups Road South

Figure 4-4  Dry Creek through subject site, looking north
Figure 4-5  Subject site left of fence, proposed conservation area right of fence, looking east

Figure 4-6  Subject site, proposed WI-09 site, looking NE towards Mt Atkinson
4.5 Consideration of Melbourne Water response to previous report

Melbourne Water provided a written response to my previous report dated 26 May 2016. A copy of Melbourne Water’s response is provided in Appendix E of this report.

I generally agree with the points raised by Melbourne Water and make the following points in relation to my previous report and Melbourne Water’s response:

- My previous report was intended to show that there may be alternatives to locating WI-09 on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell and did not provide any information on whether or not the two alternatives proposed were more cost effective than the proposed Melbourne Water DSS. The intention wasn’t to undertake a detailed assessment, but rather to just identify possible alternatives.

- I understand that Melbourne Water also has not investigated whether or not the two alternatives are likely to be more cost effective than their DSS.

- In my opinion the two alternatives proposed in my May 2016 report may not be more cost effective than the Melbourne Water DSS.

- The two alternatives proposed in my May 2016 report would have required works to be undertaken that would impact on other properties.
Given Melbourne Water’s response and further consideration my advice to the Panel is that the two alternatives in my May 2016 report may not be preferable to the Melbourne Water DSS layout, but that they do demonstrate that there are alternatives available.

A third option was mentioned in my May 2016 report which would involve relocating WI-09 onto the proposed conservation area to the south of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell. The remainder of this report further considers the drainage and cost implications of this alternative.

4.6 Responses to Issues

I have responded to the following issues raised by Beacon Town Planning for this report.

 From a drainage perspective, could the wetland / retarding basin WI-09 proposed on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell be located to the south onto the proposed conservation area?

 How would the relocation of WI-09 onto the property to the south impact on the design of the proposed DSS and the cost of providing drainage services for the area?

In each of the following sub-sections the question from the issues raised are provided in italics and the response below in normal font.

4.6.1 Could WI-09 be relocated to the south?

The issue raised was:

*From a drainage perspective could wetland / retarding basin WI-09 proposed on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell, be located to the south onto the proposed conservation area?*

My response to this issue is:

Yes, WI-09 could be relocated onto the proposed conservation area to the south from a drainage (and waterways) point of view.

I have prepared an alternative layout for the DSS showing the changes required to move WI-09 to the south. This revised drainage layout plan is provided in **Figure 4.8** below. The changes consist of moving the wetland / retarding basin WI-09 south from the subject site to the property to the south and provision of a constructed waterway through the subject site. My opinion is that this revised layout would comply with Melbourne Water’s “*Principles for Provision of Waterway and Drainage Services for Urban Growth*”. It would also have the additional benefit of providing a drainage outlet for the proposed conservation area that would otherwise have to drain through an extra culvert under the OMRR or into the proposed industrial area to the south.
4.6.2 Cost implications of moving WI-09 to the south?

The issue raised was:

*How would the relocation of WI-09 onto the property to the south impact on the design of the proposed DSS and the cost of providing drainage services for the area?*

My response to this question is:

Moving WI-09 to the south would have the following changes to reduce the cost to the DSS:

- Deletion of land acquisition of 4.41 hectares of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.

Moving WI-09 to the south would have the following changes to increase the cost to the DSS:

- Addition of acquisition of approximately 0.81 ha of land acquisition for a constructed waterway along the proposed boundary of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell adjacent to the proposed Outer Metropolitan Ring Road (OMRR). I have reviewed the proposed waterway corridor width in the PSP to the north of the subject site and have calculated that the PSP...
proposes a 15.5 m wide waterway corridor in this location (based on information regarding areas on pages 61 and 62 of the PSP, and measurement of the length of the proposed constructed waterway WI-08). From our knowledge of Melbourne Water's Guidelines for Waterway corridors we have allowed for a 30 metre wide overall waterway corridor should this be extended through PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.

- Addition of construction cost for a constructed waterway along the proposed boundary of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell and the OMRR.

In relation to the land acquisition I have been advised that the value of land within the vicinity that will be developable for residential purposes is within the range of $500,000 to $700,000 per hectare. I have used this range for comparison purposes (note that we are not valuers and this amount is approximate). Therefore the savings to the DSS by removing the need to acquire 4.41 hectares of land from the cost of the scheme would save $2,205M to $3,087M.

Cost estimates for works have been prepared using the Melbourne Water DSS spreadsheet template, that include cost rates used by MW to develop schemes including MW allowances for survey, design, scheme administration and contingencies. We have used the Melbourne Water DSS spreadsheet and estimated the cost of construction of the waterway (including design and contingencies) to be $300,000.

In relation to the proposed constructed waterway along the proposed boundary of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell and the OMRR, I would expect that the land acquisition would be funded by the Melbourne Water DSS. Under Melbourne Water’s “Principles for Provision of Waterway and Drainage Services for Urban Growth” the scheme has to acquire land that is otherwise developable. I have reviewed the existing waterways in the area on my site visit and by reference to plans from land.vic.gov.au. As shown on the first plan in Appendix B of this report there is no existing waterway in this area other than Dry Creek, the land is otherwise developable and therefore there would be no need for the owner to set aside this proposed constructed waterway land without compensation. Therefore creation of a constructed waterway would require the MW DSS to acquire the land for the waterway through the subject site. The MW DSS would need to acquire 0.81 hectares for the constructed waterway at a cost of $405,000 to $567,000.

The overall change to the cost the DSS would therefore be a saving of $1,320,000 to $2,220,000 depending on land value.

In addition the contribution rate per hectare for the MW DSS would be further reduced due to receipt of contributions from an additional 3.60 hectares of development on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.

These changes would reduce the contribution payable by all developments within the proposed Melbourne Water Dry Creek Upper Development Services Scheme.
5. **CONCLUSION**

In relation to the contents of this report I conclude that:

1. The Mount Atkinson PSP proposes a wetland / retarding basin (WI-09) on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.
2. I have reviewed the Mount Atkinson PSP and proposed Melbourne Water Dry Creek Upper Development Services Scheme in relation to WI-09 and PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell.
3. The wetland / retarding basin WI-09 is required and its location is a good, logical design that treats stormwater as required by the VPPs, avoids conflict with the proposed conservation zone to the south and minimises the cost of drainage infrastructure that will need to cross the proposed Outer Metropolitan Ring Road (OMRR).
4. It should be noted that Melbourne Water will acquire the land for WI-09 as part of the implementation of the Dry Creek Upper DSS and the aim stated in Melbourne Water’s “Principles for Provision of Waterway and Drainage Services for Urban Growth” for determining the amount paid for the acquisition is to ensure that the owner is appropriately compensated for the land.
5. I have considered the option to move WI-09 onto the proposed conservation area south of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell. From a drainage pattern perspective this option is entirely feasible and would free up land on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell for residential development.
6. I have considered the changes that would be required to the Melbourne Water DSS to relocate WI-09 onto the proposed conservation area south of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell and prepared a revised DSS layout.
7. I have considered the changes to the costs of the DSS if WI-09 were relocated onto the proposed conservation area south of PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell and conclude that there would be a cost saving of $1,320,000 to $2,220,000 depending on land value, as well as receipt of contributions from an additional 3.60 hectares of development on PSP Property 38 (being Lot 4 LP 138528), Mount Cottrell. These changes would reduce the contribution payable by all developments within the proposed Melbourne Water Dry Creek Upper Development Services Scheme.
6. **STATEMENT**

I have made all the inquiries that I believe are desirable and appropriate at this time and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

I have read the Planning Panel's Victoria “Guide to Expert Evidence” and agree to be bound by it.

Andrew Prout

BE Civil, PDMS, MIE Aust.
7. QUALIFICATIONS

a. In preparing this document, including all relevant calculation and modelling, Engeny Water Management (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.

b. Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.

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g. This report does not provide legal advice.
APPENDIX A

Andrew Prout’s CV
Andrew Prout
Senior Principal Water Resources Engineer
BE(Civil), PDMS, MIEAust

SUMMARY

Andrew established Engeny Water Management in Victoria and has gained more than 30 years professional experience both in the consulting engineering field and with government and semi-government authorities. Andrew is a leader in the surface water management field, having prepared Melbourne Water’s current Drainage Design Guide and having lectured at university level. He has undertaken a number of drainage and flood studies as well as water conservation studies and projects to minimise the overall environmental footprints of projects. This included being project Director for the Werribee Plains Urban Water Conservation Study for the Australian Conservation Foundation.

Andrew has undertaken projects for a wide range of clients, including Councils, Melbourne Water, Catchment Management Authorities, Water Authorities, VicRoads, VicTrack and many public companies and land owners. He has also done work related to water issues for numerous major projects including Principal Surface Water designer or Peer Reviewer for Eastlink, Peninsula Link, Monash Upgrade, City Link as well as work on Federation Square, various windfarms, landfills, quarries and mines. His work has taken projects through all stages from studies to designs and construction.

Andrew has done a significant amount of work for local Councils over the last 20 years. This has included strategic drainage studies, preparation of drainage design guides, expert witness services, preparation of Development Contribution Plans and flood mapping. This work has covered most of the municipalities in Greater Melbourne, as well as a number of rural Victorian Councils, including Ballarat, Geelong, Corangamite, Warrnambool, Moyne, Moira, Bass Coast, Surf Coast and South Gippsland and some Councils in New South Wales and Queensland. He has spoken at conferences and made a number of professional presentations and been active in debates in the industry on topics such as water conservation, climate change impacts on water systems, urban flooding and catchment management. Andrew has provided professional advice to a wide variety of clients in a range of forums, including VCAT, Panel Hearings and court proceedings. His work in this area and in regional Victoria is summarised on the following pages.

KEY AREAS OF EXPERTISE

- Flood mapping and Flood Mitigation
- Flood hazards and impacts on developments
- Coastal flooding and climate change impacts
- Wetlands and waterways
- Stormwater harvesting and water reuse
- Stormwater management and Water Sensitive Urban Design
- Drainage and stormwater treatment master planning and drainage schemes
- Surface water management for quarries and landfills
- EES and EIS work in relation to surface water, erosion and catchments
**EXPERIENCE**

**Ballarat West PSP and DCP: City of Ballarat:** Andrew and the team at Engeny were part of a large team that produced the Ballarat West Precinct Structure Plan and Development Contributions Plan for 1000 hectares in Ballarat. The work included catchment modelling for flooding and water quality and development of a master plan for development of the area. Andrew also prepared cost estimates for the works and produced an Expert Witness report for the Panel hearing for the Development Contributions Plan.

**Marchington Avenue, Mornington, Flooding Related Expert Witness Report, Melbourne Water:** In 2012 Andrew and his colleague Maria Verrocchi prepared a report related to a proposed residential development adjacent to Tanti Creek in Mornington. The report clearly described the flood hazards related to one of the proposed dwellings in terms of the Land Subject to Inundation and Floodway Overlays. Andrew presented the report at VCAT and Melbourne Water obtained a successful outcome.

**Kerang / Dingwall Flooding Expert Witness project – Goulburn Murray Water:** In 2013 Andrew undertook a detailed assessment of complex flooding patterns that occurred in 2011. The flooding was related to the catchments of the Loddon River and Wandella Creek and the interaction of the flood with the large floodplains and various infrastructure including roads, bridges, embankments, irrigation channels and syphons. Andrew also oversaw complex 2D flood modelling of the actual flood behaviour undertaken by his colleague Scott Dunn.

**Toora Coastal Flood Risk Report, South Gippsland Shire.** Andrew undertook a site review and prepared an Expert report for the South Gippsland Shire for a VCAT hearing in relation to six proposed dwellings in the Grip Road area in Toora. The report covered issues including local drainage and flooding, coastal flooding, sea level rise, climate change, wastewater disposal and related issues. Andrew gave evidence at VCAT which contributed to a successful outcome for the Shire and a report that has been referenced in various hearings and publications since the hearing.

**Maribyrnong River Flood Hazard Report, Melbourne Water:** In 2009 Andrew was engaged by Melbourne Water to provide a comprehensive report on flood hazards in the Maribyrnong Township in response to a development application. Andrew prepared a detailed report that covered historic flooding since 1870, flood warning systems and flood hazards and also provided expert witness services at a VCAT hearing. The work undertaken by Andrew was influential in a successful outcome for Melbourne Water.

**Victorian Flood Review, Melbourne Water:** Andrew was engaged by Melbourne Water to prepare a report that documented the roles of Melbourne Water and the Bureau of Meteorology in flood prediction and forecasting. The work involved liaison with Melbourne Water, Bureau of Meteorology, VicSES and production of a report in response to a recommendation from the Victorian Flood Review prepared by Neil Comrie.

**Banyule Flood Mapping and Special Building Overlays, City of Banyule:** Andrew and his colleague Paul Clemson have provided the City of Banyule with detailed advice regarding flood mapping of the flow paths associated with all of Councils drainage system. In addition to the flood mapping done by Paul and the team, detailed written advice in 2014 regarding how to determine process flood mapping results and options for using the results to control building and planning
processes.

**Lockerbie Property Kalkallo, Surface Water Master Plan, Stockland.** Andrew has been working with Stockland and National Pacific on a significant master planning project for the future urban development of over 1100 hectares in the Kalkallo area. The work involved consultation with the landowners, the Growth Area Authority, Melbourne Water, Council and other consultants. The master planning focussed on the drainage, wetlands and retarding basin components of a Structure Plan for the overall development as well as a creek corridor master plan for Merri Creek.

**Modella Poultry Farm surface water report, landowner:** In 2012 Andrew and his colleague Maria Verrocchi prepared a report related to surface water issues for a proposed poultry farm in Modella in the Koo Wee Rup district. Andrew presented the report at VCAT.

**Powling Street Wetland, Port Fairy, community group:** In 2013/14 Andrew represented a local community group in relation to a proposed residential subdivision adjacent to a sensitive wetland. Andrew provided advice, undertook a site visit and prepared a report regarding local flooding, coastal inundation and water quality issues. Andrew represented the community group at a VCAT hearing and the hearing resulted in a reduction in the subdivision that had been proposed.

**Botanic Ridge Estate, City of Casey:** In 2013/14 Andrew represented the City of Casey in relation to the Botanic Ridge Estate in Cranbourne. Andrew assessed the effectiveness of construction control measures, stormwater harvesting, stormwater treatment and flood control works for the Estate and impacts on the downstream property. Andrew produced a detailed report that considered reports from other parties and made recommendations to resolve the issues.

**Sunshine North Industrial Estate Drainage review, Brimbank City Council:** In 2013/14 Andrew undertook a review of the constructed drainage systems in this estate. A number of the drainage pipes were found to be damaged prior to handover to Council. Andrew reviewed CCTV footage, drainage design plans, contracts and specifications and provided an Expert Report to Council on the issues and how to manage them.

**Bungower Road Kennels, Moorooduc for landowner:** In 2013/14 Andrew prepared a report related to the suitability of the site for a proposed kennel development in relation to the land capability for wastewater disposal as well as stormwater harvesting and drainage requirements. Andrew prepared a report and made a presentation at VCAT that assisted the applicant to obtain a permit.

**Maribyrnong River LSIO rezoning, Keilor, Melbourne Water:** In 2012 Andrew undertook an independent review of a proposed Land Subject to Inundation Overlay for Melbourne Water along the Maribyrnong River in Keilor and Calder Park. Andrew’s report assisted Melbourne Water to effectively negotiate all issues with an adjacent landowner.

**O’Gradys Ridge Road Dam Break Expert Report, Southern Rural Water:** In 2013 Andrew investigated the circumstances related to the failure of a large licensed farm dam. Andrew visited the site, assessed the role of Southern Rural Water, documented the downstream consequences of the dam failure and
completed a risk assessment and a report.

**Werribee Flood Expert Report, Southern Rural Water:** In 2012/13 Andrew studied flooding patterns in the Werribee East area associated with a severe storm in February 2011. Andrew oversaw work by his colleague Glenn Ottrey that included detailed hydrologic and 2D hydraulic modelling of the flooding behaviour for a range of scenarios. Andrew and Glenn’s work was able to demonstrate how recent works had effected flooding in some locations and not in others. Andrew produced reports that assisted all parties to reach agreement where recent works had worsened flooding patterns and to defend claims where there has been no change in flooding.

**Keysborough Expert Witness Report, landowner:** In 2011/12 Andrew investigated the drainage issues associated with an industrial development in Keysborough South. This work included review of recent developments, Melbourne Water Drainage Scheme, temporary retarding and stormwater treatment works and the downstream system. Andrew produced a comprehensive report and appeared at hearings at VCAT.

**Sheyna Drive Subdivision, Numurkah, Shire of Moira:** In 2013 Andrew prepared a report regarding a proposed residential subdivision on flood prone land in Numurkah. Andrew reviewed the flooding of the site in 2012 and flood mapping of the area, as well as drainage patterns, the effect of irrigation infrastructure and the potential risks and issues associated with the proposed subdivision. Andrew obtained information from the Goulburn Broken CMA and Council. Andrew presented his report at VCAT and his evidence assisted Council in having the subdivision refused.

**Tyers Street, Portland, Drainage Expert Witness Report, multiple parties:** Andrew was engaged by a number of briefing parties to investigate urban flooding in Portland in Victoria and to recommend flood alleviation works to mitigate the flood risk for commercial properties in Portland. This 2010 report recommended a highly efficient, cost effective solution to the existing flooding problem, which was adopted by all parties.

**Melbourne Water Drainage Scheme Reviews, Melbourne Water.** Andrew has been project director for a number of drainage scheme reviews for Melbourne Water, including hydrologic modelling, stormwater quality modelling and development and costing for drainage infrastructure for proposed urban areas.

**City of Knox, City wide drainage strategy:** Andrew was Project Director for this municipality wide study into all aspects of the Council drainage system. The study assessed flooding risks, drain capacities and opportunities for Water Sensitive Design. Outputs included overland flow maps, capital works program and recommended planning scheme amendments and funding scheme.

**City of Maribyrnong and City of Moreland Drainage Strategies:** Responsible for management of these projects which involved preparation of a comprehensive strategy to enable Council to identify drainage problems and prioritise a capital works program to resolve all problems, including flooding and water quality related works. Information was supplied in MapInfo format including maps, reports, calculations and photographs.

**Stormwater Drainage Strategies for Councils:** Andrew developed methodologies and undertook comprehensive municipality wide strategies for a
number of councils in greater Melbourne. The strategies included risk based drainage flooding mapping and works programs as well as water sensitive design programs of works, funding advice, design guides and planning advice. Andrew has done studies of this type for many Councils including Darebin, Glen Eira, Manningham, Monash, Whitehorse and Stonnington.

**Monash Flood Management Plan, Melbourne Water.** Andrew was responsible for overseeing this project. The work included workshops, identifying flooding hot spots and developing a detailed action plan for Council, Melbourne Water and VicSES. Andrew brought his decades of experience in the area and working relationships to the project and contributed to a comprehensive plan for managing flood risks in the City of Monash.

**Geelong Racecourse stormwater harvesting, Racing Victoria:** Andrew developed this project with Racing Victoria and was Project Director for the completed study that identified a low cost and viable source of water for the racecourse by harvesting stormwater. Andrew then followed up with the detailed design and implementation of the works that provide over 70ML/annum of water to irrigate the racecourse. Major regional racecourses are important employers and are required for a viable training and racing industry. The Geelong project led to similar studies that Andrew undertook at Ballarat and Bendigo Racecourses.

**Water Sensitive Road Drainage Scheme, Bandiana Link Road, VicRoads:** Andrew has undertaken work for VicRoads in Wodonga to develop a water sensitive road design system for the Bandiana Link Road and to prepare a cost apportionment scheme to obtain contributions from all benefiting landowners. The results of the study have been used in negotiations with benefitting landowners to offset the value of the works built by VicRoads against the land acquisition compensation.

**Surface Water assessment, Crowlands Windfarm:** Andrew undertook a detailed surface water assessment of the proposed Crowlands windfarm in the Pyrenees in north western Victoria. His work included a site assessment, input to the windfarm design, assessment of erosion risks, concept design of waterway crossings (including the Wimmera River) and erosion control works and a detailed report.

**Merri River and Russell Creek flood studies, Warrnambool, Glenelg Hopkins CMA and Shire of Warrnambool:** Andrew was project manager for this flood study and undertook hydrologic modelling and hydraulic modelling, as well as producing the flood study report and recommendations.

**Moyne River Flood Study, Port Fairy, Glenelg Hopkins CMA and Shire of Moyne:** Andrew was project manager for this flood study and undertook hydrologic modelling and hydraulic modelling, as well as producing the flood study report and recommendations.

**Shire of Moira Drainage Strategy:** Andrew was project manager for a comprehensive drainage strategy for Council that included consideration of drainage patterns and urban pollutant loads and management for towns including Numurkah, Nathalia, Cobram, Katamatite, Katunga and Waaia.

**Blackburn Creek rehabilitation, Melbourne Water:** Andrew was Project Director for the design and superintendent for the construction of two stages of
waterway rehabilitation works on Blackburn Creek

**Surface Water study for Nowingi waste facility EES, Office of Major Projects:** Andrew was project manager for the surface water study for the proposed long term waste facility at Nowingi. Andrew prepared the EES specialist report and an Expert witness statement and gave evidence to the Panel hearing. The study covered issues including flooding risk, water balance and risk of surface water discharges from the site.

**Baddaginnie Flood Study, Office of Major Projects:** Andrew was Project Manager for this flood study in central Victoria. The project involved hydrology and hydraulic modelling for four creeks north of Violet Town and south of Baddaginnie. Andrew also undertook significant public consultation, including presentations at public meetings and briefing of Ministerial advisers and his work was central to Government decisions that the site was not appropriate for use for a long term waste facility due to flooding risks.

**Dickson and Lyneham Wetlands, ACT Government:** Andrew was Project Director for the design, approvals and then construction of two major wetlands in the northern suburbs of Canberra in 2009 and 2010. The wetlands will play a vital role in stormwater treatment and harvesting approximately 400 ML/annum of stormwater for use in open space irrigation. Andrew has overseen the preparation of the Final Sketch Plans, flood study, water treatment and water harvesting modelling and has developed a number of the technical solutions for this project. Andrew has also had a leading role in the agency and public consultation for the projects and the approval process.

**Surface Water Study for Environmental Effects Statement for Mount Shamrock Quarry Extension:** Andrew completed the surface water EES report and made an Expert Witness statement and presentation to the panel assessing the EES. Andrew's work related to the site water balance, surface water quality, interaction of surface water and groundwater, discharge licensing and flooding risks.

**Ruffey Creek rehabilitation, Melbourne Water:** Andrew was Project Director for the design and superintendent for the construction of works on Ruffey Creek in Doncaster in 2007/08. The creek was deeply incised and in poor condition. The works included rock work, batter works, planting and an off stream wetland.

**Dollar Wind Farm Expert Witness Report and Presentation, Southern Hydro:** Andrew was peer reviewer for the civil design study for the Dollar Wind Farm in South Gippsland for Southern Hydro. His report related to surface water management and erosion control for the proposed development of the wind turbine project. Andrew made a presentation and was cross examined at the panel hearing in Foster in 2005.

**Spindrift Avenue waterway impact report, landowner:** In 2010 Andrew prepared an expert witness report and assisted a landowner in mediation in relation to development and works on a property in Spindrift Avenue, Flinders.

**Lower Stony Creek VCAT report, Melbourne Water:** Andrew represented Melbourne Water in relation to filling and realignment of Lower Stony Creek in Tottenham. Andrew's role included briefing of Melbourne Water's barrister on technical issues, preparation of reports and maps and appearances at VCAT hearings.
Lower Stony Creek Flood Impact Study, Melbourne Water. Andrew was project manager for a flood study that analysed the flooding impact of recent fill and creek alignment works on Stony Creek in Tottenham.

Lower Stony Creek Waterway Design, Melbourne Water. To mitigate the effects of recent filling and realignment of the creek a design was prepared to reduce the flooding impact, stabilise the creek, improve the creek environment and to allow for access across the creek.

Yarra River Flood Risk report, City of Boroondara: Andrew investigated the flooding risks associated with a property in Coppin Grove, Hawthorn. The property is adjacent to the Yarra River and the owner had made an application to Council for a Planning Permit for dwellings on the high part of the site. Andrew prepared a flood risk report in accordance with the Planning and Environment Act to assist Council in deciding on the limit of residential development, the location of a path and the extent of Council’s Public Acquisition Overlay.

Flood Risk Report, Jacksons Creek: In 2002 Andrew prepared a flood risk report in relation to a proposed supermarket adjacent to Jacksons Creek in Gisborne. The report was prepared for the owner of a nearby supermarket as part of their submission to VCAT.

Drainage Design Guide, Melbourne Water: Andrew was personally responsible for reviewing the previous design guides and rewriting them to produce the current Melbourne Water Drainage Design Guide. This guide is the industry standard for drainage throughout the greater Melbourne area.

Development Contributions Plan, City of Monash: Andrew prepared the City of Monash’s Development Contribution Plan (DCP) for drainage works and worked with Council manager’s to obtain approval from the Department of Infrastructure (now DPCD) to the DCP. The DCP meets all of the requirements of the Planning and Environment Act and could provide Council with substantial funds every year towards the cost of drainage improvement works.

Porter Street Retarding Basin, Manningham City Council: Andrew analysed the drainage in the catchment in relation to a proposed subdivision on land in Porter Street, Templestowe. Part of the site was low lying and flood prone. Andrew made a presentation to VCAT that resulted in a retarding basin being set aside as part of the subdivision.

Wensleydale Coal Mine, Winchelsea, Victoria: The project involved risk assessment and design of stabilisation works for this disused mine in south-west Victoria. Severe erosion of the creek through the site occurred following a flood in 1995. Andrew developed a site management plan and detailed design of major stabilisation works.

Waterway Condition Assessment, Melbourne Water: Manager of waterway condition assessment studies for the Bunyip River, Tarago River, King Parrot Creek and Woori Yallock Creek catchments.

Dromana Flood Study: Andrew was project director for this project for the Mornington Peninsula Shire in Victoria. The flood mapping was done with the 2D flood model TUFLOW. Scenarios modelled included a range of storms as well as potential climate change scenarios considering sea level rise and increases in rainfall intensity. Andrew provided a report and policy advice on the implications of the study results.
Gunbower Forest Watering, Goulburn Broken CMA and Goulburn Murray Water: Andrew undertook technical and peer reviews for the design of the water diversion scheme to provide additional environmental water for the Gunbower Forest.

Racecourse Lake / Murray Valley Highway irrigation channel technical review, Goulburn Murray Water: Andrew oversaw hydraulic analysis and recommendations to improve channel capacity without impacting on flooding patterns for this irrigation system between Kerang and Swan Hill.

Lake Mokoan alternative water supply, Goulburn Murray Water: Andrew undertook technical reviews of proposed channel and pipe works to provide irrigation water to customers following the decommissioning of Lake Mokoan near Benalla.

Hattah Lakes environmental watering, Mallee CMA: Andrew developed concepts for water diversions for Hattah Lakes including channel works and regulating structures to provide environmental watering that would closely replicate flow patterns prior to regulation of flows in the Murray River catchment.

Surface Water Study for Learmonth Saleyards and abattoir for the City of Ballarat. This work included a flood study, drainage study and design of surface water quality management systems. Andrew’s work included an expert report and appearance at a Panel Hearing.

PROFESSIONAL HISTORY

2010 - present
Senior Principal Engineer, Engeny Water Management, Melbourne

2003 - 2010
Principal Water Surface Engineer, URS Australia Pty Ltd

2002 - 2003
Business Development Manager, Waterways & Water Resources, GHD Pty Ltd

2001 - 2002
Manager of Water Resources, Egis Consulting Australia Southern Region

1997 - 2001
Principal Engineer, Hyder Consulting

1994 - 1996
Senior Project Manager, Sinclair Knight Merz

1992 - 1994
Consulting Engineer, AGP Consulting

Part-time Lecturer, Swinburne University

1990 - 1992
Works Program Engineer, Dandenong Valley and Western Port Authority

1986 - 1989
Planning and Investigation Engineer, Dandenong Valley Authority

1984 - 1986
Planning Engineer, Port of Melbourne Authority

1982 - 1984
Dandenong Valley Authority

EDUCATION

1992
Postgraduate Diploma in Management Studies, Melbourne University

1984
Bachelor of Engineering (Civil), Swinburne Institute of Technology

REGISTRATIONS / AFFILIATION

Member, Institution of Engineers, Australia
APPENDIX B

Locality Plan, zones plan and overlays plan
APPENDIX C

Alternative DSS layout 1
Appendix C

Possible Alternative Scheme layout 1

In relation to proposed WI-09 on 248 Troups Road South

SEE ENGEnY REPORT
MAY 2016

DELETE WETLAND AND PIPE

ADD MAIN DRAIN (PIPE OR CHANNEL?)

CONVERT PIPE TO CHANNEL (CONSTRUCTED WATERWAY)

EXPAND WETLAND WITHIN ELECTRICITY TRANSMISSION EASEMENT
APPENDIX D

Alternative DSS layout 2
Appendix D

Possible Alternative Scheme layout 2

In relation to proposed WI-09 on 248 Troups Road South

SEE ENGINEER REPORT
MAY 2016

DELETE WETLAND AND PIPE

ADD MAIN DRAIN (PIPE OR CHANNEL?)

ALTERNATIVE WETLAND IN GWZ
APPENDIX E

Melbourne Water response to Engeny May 2016 report
11 August 2016

Jennie Jones  
Beacon Town Planning  
Level 1, 61-63 Commercial Road  
SOUTH YARRA VIC 3141

Dear Ms Jones,

Re: 248-316 Troups Rd, Mt Cottrell

Melbourne Water has considered your submission dated: 30 May 2016. The issue relevant to Melbourne Water is the request to relocate the drainage basin asset WI-09 (Section 4.4). Two alternative locations were suggested for the drainage basin. Each alternative has been considered and an assessment of each alternative is outlined below.

Alternative 1 is to relocate the basin to the powerline easement in PSP Property 51. There are several disadvantages to this location. It would require diverting flows away from natural flow paths, compared to the DSS which directs flows to the nearby waterway. It would require construction of a waterway through the downstream conservation area, which would be an additional impact to that area. Melbourne Water also requires stormwater to be treated before it is discharged to waterways, both constructed and natural. Therefore, a stormwater quality treatment system would still be needed within the property to achieve compliance with this requirement. Finally, it may be difficult to construct larger treatment assets in the electricity easement with the need to avoid powerline towers.

Alternative 2 is to relocate the asset to part of PSP Property 46 that is outside of the urban growth boundary. Disadvantages discussed above also apply to this alternative. The alternative would divert flows away from the natural flow paths, require construction of a waterway through the downstream conservation area and also require stormwater to be treated prior to the constructed waterway. In addition, large flows would need to be conveyed under the Outer Metropolitan Ring Road which would likely increase the DSS rate above current calculations. Finally, it is difficult to justify locating assets that service urban growth on land that is not within the urban growth boundary.

Melbourne Water does not support alternative 1 or 2 proposed; as it considers the current location of the retarding basin / wetland (RB/WL) is the most appropriate based on the factors outlined above. The current location and size shown in the PSP is consistent with the Retarding Basin/Wetland in Melbourne Water’s Dry Creek Upper Development Services Scheme (DSS).

If you would like to discuss this response further, please call me on 9679 6657 or Michael.prior@melbournewater.com.au
Yours sincerely

MICHAEL PRIOR
DEVELOPMENT SERVICES