

Cardinia Planning Scheme Amendment C234 - Pakenham East Structure Plan

Conclave of Drainage Experts

Conclave Statement

Conclave Held: 9.00 - 11.00 am Thursday 24 May 2018
Location: Stormy Water Solutions, 1.26 202 Jells Road, Wheelers Hill 3150
Chairperson: Valerie Mag, Stormy Water Solutions (**SWS**)
Attendees: Valerie Mag, Stormy Water Solutions (SWS)
Warwick Bishop, Water Technology (**WT**)
Michael Prior, Melbourne Water Corporation (**MWC**)
Apologies: James Hodgens, Melbourne Water

1. Introduction

The conclave discussion focused on the three expert opinion reports (May 2018) produced by WT. The reports were for:

- Earlden Pty Ltd and Auscare Commercial Pty Ltd pertaining to PSP Property No. 28,
- Mr and Mrs Carney pertaining to PSP Properties No. 10, 11 and 14, and
- Lendlease Communities (Australia) Limited pertaining to PSP Properties No. 7, 8 and 9.

2. Discussion - PSP Property No. 28, Deep Creek between Ryan Road and Princes Highway

Discussion regarding the WT conclusions is summarised below. These discussions relate only to Deep Creek and its flood plain between Princes Highway and Ryan Road.

WT conclusion: The existing hydraulic analysis does not appear to have fully resolved the significant breakout of floodplain flow to the south of Canty Lane in the 1% AEP design flood.

Discussion: SWS agrees that a significant breakout from the flood plain to the south occurs. SWS explained that, historically, as much of this area was outside the floodway overlay, filling by individual lot owners may alter this breakaway. As such, since the early 1990's MWC has assumed 100% of the 1% AEP flow continues down Deep Creek. This assumption has formed the basis of drainage conditions on downstream landowners and the design development of the Deep Creek Retarding basin (downstream at the railway). However, to cover the possibility of breakaway, the freeway culverts (at WI-07) were also designed assuming a significant breakaway flow. The PSP was developed assuming the 1% AEP flow continues down Deep Creek (as MWC had planned for this) and extreme flow provisions could be accommodated by extreme overland flow path provisions (ie flow down road reserves) in the PSP area.

Recommendation ***The conclave recommend that the extreme flow overland flow path provisions should be clearly delineated on PSP Plans 3 and 9 between Deep Creek and WI-07.***

WT conclusion: Deep Creek downstream of the Princes Highway is a narrow, deep, steep-sided and relatively straight channel that, whilst not experiencing significant erosion or bank stability issues at present is likely to migrate laterally in the future, particularly as the pressures of urban development upstream begin to impact the flow regime experienced by the waterway.

Agreement: ***SWS and MWC agreed with the above conclusion***

WT conclusion: There is no clear hydraulic justification for the provision of additional waterway width on the east side of Deep Creek compared to the west side through the subject site.

Discussion: SWS explained original methodology pertaining to the 50 m easement on the western side of the creek, being no increase in flood levels if buildings occurred to this line, provided water could always spill out into the eastern flood plain. That is, the 50 m on the western side of the creek was appropriate when it was assume NO development would occur to the east of the creek.

WT stated that 100 metre corridor was an arbitrary corridor delineation, given flood plain augmentation works could occur on both the eastern and western sides of the creek in the future. This could reduce the eastern corridor requirements.

SWS and MWC agreed with this statement.

MWC noted that the preliminary Development Services Scheme (DSS) rates in this area are relatively high. As such, this would be a consideration in regard to the feasibility/applicability of augmentation works within the creek corridor.

Agreement: ***SWS, WT and MWC agree that, given future flood plain augmentation design, an appropriate corridor width between Ryan Road and Princes Highway may ultimately be between 50 m (minimum) to 100 metres.***

WT conclusion: The 1% AEP design flood flows can be accommodated through a modified floodway geometry in a corridor less than 100 m wide on the east side of Deep Creek.

Discussion: WT suggested that the PSP should allow flexibility to reduce the corridor width if future design and modelling work can delineate appropriate alternative flood plain works.

MWC pointed out that PSP Plan 9 includes a note indicating that "Stormwater quality treatment and drainage assets and waterway widths on this plan are subject to confirmation through detailed design to the satisfaction of Melbourne Water".

MWC preference is for a 100 m corridor to be shown on the PSP plans

Recommendation: *The PSP should show a 100 m corridor on the eastern side of Deep Creek, while indicating that this could be reduced (in the reach between Ryan Road and Princes Highway) through an appropriate design process and through agreement with Melbourne Water and Council. The eastern corridor width should (ultimately) be no less than 50 metres from the eastern top of bank of Deep Creek.*

WT conclusion: A 2D modelling approach is the most appropriate means of refining the existing and future flood behaviour along Deep Creek and the rest of the Pakenham East PSP area

Discussion: SWS indicated that a 1D model can be appropriate in this situation (where the flood plain and channel act as one system).

Agreement: *WT, SWS and MWC agreed the 1D Hec Ras modelling has been applied appropriately up to this point in the planning process and produced reasonable results.*

3. Discussion - PSP Properties No. 10, 11 and 14, Deep Creek between the Princes Highway and the Powerline Easement

Discussion regarding the WT conclusions is summarised below. These discussions relate only Deep Creek and its eastern flood plain between Princes Highway and the powerline easement, and the design of WI-05.

WT conclusion: The present waterway corridor appears to be excessive and that there is a reasonable opportunity to reduce the corridor to something between 50 m and 100 m through a refined design and confirmation of a reduced design flow.

Discussion: SWS summarised the design process in this area, particularly the many constraints being:

- The natural form of the flood plain in this area, especially in relation to areas closer to the creek being higher than areas located away from the creek,
- Ecological areas of significance,
- The natural form of the valley requiring draining of the land to the north through a “low” point in the flood plain
- The consideration that locating the swale on the eastern edge of the 100 m corridor aligns it with a relatively low point in the “valley” thus maximising the depth of any future development outfall and minimising fill levels on adjacent development,
- The gas main constraints, particularly regarding the cost of providing additional crossings (in addition to the one gas crossing proposed),

- The outfall and wetland design considerations of WI-05

WT acknowledged that the drainage design was very complex and challenging in this area but that 100 metre corridor was an arbitrary corridor delineation, given alternative flood plain augmentation works could possibly occur reducing the corridor width requirement.

SWS advised, that based on the functional design process, a 100-metre delineation upstream of Princes Highway (in the opinion of SWS) was a minimum requirement.

MWC stated that PSP Plan 9 includes a note indicating that "Stormwater quality treatment and drainage assets and waterway widths on this plan are subject to confirmation through detailed design to the satisfaction of Melbourne Water".

MWC preference is for a 100 m corridor to be shown on the PSP plans

Recommendation: *The PSP should show a 100 m corridor on the eastern side of Deep Creek, while indicating that this may be able to be reduced marginally (in the reach between Princes Highway and the powerline easement) through an appropriate design process and through agreement with Melbourne Water and Council.*

WT conclusion: The Hec Ras model approach used to predict floodplain behaviour in Deep Creek north of the Princes Highway is not the best suited tool to resolve the 2D hydraulics of the floodplain (including flow splits, velocities and levels).

Discussion: WT agreed the 1D Hec Ras modelling has been applied appropriately up to this point in the planning process and produced reasonable results.

Agreement: *Due to the nature of this reach and the associated flood plain, SWS agrees a 2D hydraulic model would produce more realistic results in the design going forward.*

WT conclusion: Application of a detailed 2D hydrodynamic model will enhance the ability to optimise the design and ensure the floodplain hydraulics are accurately resolved.

Discussion: WT agreed the 1D Hec Ras modelling has been applied appropriately up to this point in the planning process and produced reasonable results.

Agreement: *As above, SWS agrees a 2D hydraulic model would produce more realistic results in the design going forward.*

WT conclusion: There may be an opportunity to provide floodplain storage in the powerline easement, hence reducing the storage requirement at WI-05. This would be dependent on the results of further analysis.

Discussion: Given the many constraints and design process to date WT agreed the potential to reduce the size of WI-05 via incorporating an additional retarding basin the powerline easement would be limited.

SWS pointed out that the functional design process did identify land within the PSP definition of WI-05 which is not required for drainage purposes. As such, there is scope to reduce the size of the site associated to this asset in the future.

Recommendation: *The note on Plan 9 should allow for reduction in reserve areas if all Melbourne Water and Council requirements are met during the design process.*

WT conclusion: The present location of the wetland is the most logical location for that asset

Agreement: *MWC, WT and SWS in agreement*

4. Discussion - PSP Properties No. 7, 8 and 9, Hancocks Gully between Princes Highway and the Powerline Easement

Discussion regarding the WT conclusions is summarised below. These discussions relate only Hancocks Gully through the PSP area (ie the discussions extended to the application of the strategy south of Princes Highway).

WT conclusion: The current balance between WI-02 and WI-04 could potentially be adjusted to provide more treatment at the downstream asset.

Discussion: SWS summarised the design process in this area, particularly the many constraints being:

- The methodology of treating all developed areas before outfall to Hancocks Gully or a constructed wetland system,
- The reasoning behind not being able to apportion “swale” treatment to the remodelled Hancocks gully as it is defined as a waterway due to its significant upstream catchment,
- Ecological areas of significance,
- The constrained nature of the WI-02 site,
- The gas main constricting in the WI-02 site, and
- The outfall constraints regarding the WI-04 site limiting the flood retardation role.

SWS stated the issues with designing on line wetlands in Hancocks Gully, particularly that wetland systems would require a wider corridor width.

Agreement: *WT agreed a stormwater treatment role cannot be attributed to Hancock Gully if it is retained as a waterway.*

WT agrees that the strategy methodology and design for the Hancocks Gully catchment are appropriate.

SWS and MWC agree that alternative designs may be formulated in the future to optimise wetland and retarding basin site areas.

Recommendation: *The note on Plan 9 should allow for reduction in reserve areas if all Melbourne Water and Council requirements are met during the design process. This must be proven on a catchment scale to the outfall of Hancocks Gully at the Freeway (ie to the WI-04 outfall)*

WT conclusion: The size of WI-02 could potentially be reduced through expansion of WI-04 or utilisation of a new asset in the powerline easement at the northern end of Hancocks Gully.

Discussion: SWS summarised the methodology of designing a wetland in WI-02 to not only provide water treatment and flood storage, but to enable a “high” piped outfall to allow crossing of the gas assets upstream of Princes Highway.

Agreement: *SWS agreed that additional flood storage could occur in the powerline easement, but this would be required to be agreed to by Melbourne water and council given all other constraints (including ecological).*

Recommendation: *The note on Plan 9 should allow for reduction in reserve areas if all Melbourne Water and Council requirements are met during the design process. This must be proven on a catchment scale to the outfall of Hancocks Gully at the Freeway (ie to the WI-04 outfall)*

WT conclusion: The present arrangement of wetlands suggests there is “over treatment” according to the standard benchmarks for water quality performance.

Discussion: SWS quoted from 2014 Melbourne Water advice that, given EPA and Melbourne Water interpretation of the F8 schedule, as a minimum 85% TSS, 50% TP and 50% TN should apply to the PEPSP (ie targets higher than BEPM). SWS pointed out that flood storage also played a role in the sizing of the wetland/retarding basin assets, so reducing the stormwater treatment role may not necessarily reduce the site areas requirements.

Agreement: *WT acknowledged this agreement but indicated the requirement may be open to challenge.*

WT conclusion: Some marginal reduction in waterway width may be possible during detailed design if adequate performance and design standards can be demonstrated.

Agreement: *SWS and MWC agree that the PSP plans can be changed to reflect a 55 metres (minimum) reserve width required for drainage purposes over Hancocks Gully.*

5. Summary of Conclave

Agreements:

- SWS, WT and MWC agree that, given future flood plain augmentation design, an appropriate corridor width between Ryan Road and Princes Highway may ultimately be between 50 m (minimum) to 100 metres.
- WT, SWS and MWC agreed the 1D Hec Ras modelling has been applied appropriately up to this point in the planning process and produced reasonable results.
- Due to the nature of the Deep Creek flood plain north of Princes Highway, SWS agrees a 2D hydraulic model would produce more realistic results in the design going forward.
- SWS agrees a 2D hydraulic model would produce more realistic results in the design for the drainage system in the Dore Road DSS upstream of Princes Highway going forward.
- WT agreed a stormwater treatment role cannot be attributed to Hancock Gully if it is retained as a waterway.
- WT agrees that the strategy methodology and design for the Hancock Gully catchment are appropriate.
- SWS and MWC agree that alternative designs may be formulated in the future to optimise wetland and retarding basin site areas.
- SWS agreed that additional flood storage could occur in the powerline easement, but this would be required to be agreed to by Melbourne water and council given all other constraints (including ecological).

Recommendations

- The extreme flow overland flow path provisions in the Ryan Road DSS should be clearly delineated on PSP Plans 3 and 9 between Deep Creek and WI-07.
- The PSP should show a 100 m corridor on the eastern side of Deep Creek, while indicating that this could be reduced (in the reach between Ryan Road and Princes Highway) through an appropriate design process and through agreement with Melbourne Water and council. The eastern corridor width should (ultimately) be no less than 50 metres from the eastern top of bank of Deep Creek.
- The PSP should show a 100 m corridor on the eastern side of Deep Creek, while indicating that this may be able to be reduced marginally (in the reach between Princes Highway and the powerline easement) through an appropriate design process and through agreement with Melbourne Water and Council.
- The “green” note on Plan 9 should allow for reduction in reserve areas if all Melbourne Water and Council requirements are met during the design process. This must be proven on a catchment scale to the relevant outfall point for from the PEPSP area.
- PSP plans can be changed to reflect a 55 metres (minimum) reserve width required for drainage purposes over Hancock Gully (ie WI-01 and WI-03)

6. Signatures

Valerie Mag, Stormy Water Solutions

A handwritten signature in black ink, appearing to be 'V. Mag', written on a light-colored background.

Warwick Bishop, Water Technology

A handwritten signature in blue ink, appearing to be 'W. Bishop', written on a light-colored background.

Michael Prior, Melbourne Water Corporation

A handwritten signature in black ink, appearing to be 'M. Prior', written on a light-colored background.