Attachment A

Upper South Creek Advanced Water Recycling Centre (SSI 8609189) Flood Impact Assessment (FIA)

Way Forward

Existing Flood Behaviour – The adopted Base Case for the FIA

Basic requirements:

1. The FIA Base Case should be compatible with the flood behaviour and constraints of the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian for Infrastructure NSW.

2. The FIA Base Case must be compatible with the flow volume, flood extent, level, depth, velocity, duration and hazard categorization of this study.

3. The FIA Base Case must adopt the Flood function (floodways and flood storage areas) as identified in the study.

I. Hydrology Base Case

The results of the XP-RAFTS Model AR&R 2016 as presented in Section 4.3 (Page 18-21) and detailed in Section 5 of the FIA show inconsistency with the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian. Therefore, this Model XP-RAFTS Model AR&R 2016 is not fit to support the EIS and should not be used for the FIA Base Case. This should not be presented in the report.

The flow results of the XP-RAFTS Model AR&R 1987 as presented in Section 4.3 Page 22 of the FIA, show acceptable differences to the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian.

This model should be validated to ensure that the flow hydrographs shape and peak for key events and locations match those within the INSW flood model prior to adopting it for the FIA Base Case.

Reporting on hydrology Base Case

- The FIA is to report on the XP-RAFTS AR&R 1987, the model set up, parameters, inputs and assumptions.
- The FIA is to report on the validation of the XP-RAFTS Model AR&R 1987.
- The FIA is to report on the model results and identify the flows for key events at key locations, within the area extended from the upstream hydraulic control (upstream of Elizabeth Drive) to the downstream hydraulic control (downstream of Warragamba pipeline).

II. Hydraulic Base Case

The flow hydrographs from the validated XP-RAFTS Model AR&R 1987 are to be used as inputs into the consultant's TUFLOW hydraulic model.

The hydraulic model extent should cover the extent from the upstream hydraulic control (upstream of Elizabeth Drive) to the downstream hydraulic control (downstream of Warragamba pipeline).

The TUFLOW hydraulic model must adopt the Flood function (floodways and flood storage areas) as identified in the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian.

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The TUFLOW hydraulic model must be validated to ensure that the levels and timing within the hydraulic model for key events and locations is compatible (match) with the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian prior to adopting it for the FIA Base Case.

Reporting on Hydraulic Base Case

- The FIA is to report on the TUFLOW AR&R 1987 model set up, parameters, inputs and assumptions.
- The FIA is to report and document the validation of the TUFLOW AR&R 1987 model
- The FIA is to report and document the validated TUFLOW AR&R 1987 model results and map existing flood behaviour and flood constraints on the site and its surrounding areas (within the model extent) for the full range of events, including 10% AEP, 1% AEP, 0.5% AEP, 0.2% AEP and PMF.

This will replace all the maps presented in the report for existing case in Section 6.2 of the FIA.

Climate Change

The flood behaviour for FIA adopted base case for 0.5% AEP and 0.2% AEP can be utilised as proxies for assessing sensitivity to an increase of 10% and 30% respectively in rainfall intensity of flood producing rainfall events due to climate change.

III. **Proposed development**

The FIA is to incorporate the proposed AWRC onto the adopted FIA Base Case models.
The AWRC should have the necessary detail to support the EIS and provide an understanding of the potential impacts of flooding on the project and the impacts of the project on flood behaviour.

The necessary details to support the EIS include:

- The USC AWRC components as shown in Figure 7-3 of USC AWRC EIS – Surface Water Impact Assessment
- The treated water pipelines various proposed infrastructure components and proposed locations and extent
- The Brine pipeline location, extent and proposed locations of pumping stations

IV. **Post Development Flood Behaviour and reporting**

The Consultant is to report on changes in Post Development flood behaviour, impacts of flooding on existing community and impact of flooding on the project and its future performance for the full range of events, including 10% AEP, 1% AEP, 0.5% AEP, 0.2%AEP and the PMF.

The consultant is to report on proposed management measures required to minimise the impacts of flooding to the project and to minimise risks on existing and future community.

Notes about Flood Frequency Analysis (FFA):

The following is not required if the above I to IV are undertaken. The following is an alternative to the above.

Attachment A

It is noticed that, the FIA includes maps limited to the 1% AEP that show the consultants used South Creek 1% AEP flow (538m3/s) identified by the Flood Frequency Analysis (FFA) at gauge (212320) upstream of Elizabeth Drive.

The consultant may prefer to utilise the FFA for South Creek for the hydrological assessment. However, FFA information is not available for Kemps Creek or Badgerys Creek, therefore, additional modelling would be required for the hydrology for Kemps Creek and Badgerys Creek catchments.

The FIA must validate the hydrological models for Kemps and Badgerys Creeks to ensure that the flow hydrographs shape and peak for key events and locations match those within the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian prior to adopting it for the FIA Base Case.

The flow hydrographs from the FFA for South Creek and the validated hydrologic models are to be used as inputs into the consultant's TUFLOW hydraulic model.

The TUFLOW hydraulic model must adopt the Flood function (floodways and flood storage areas) as identified in the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian.

The TUFLOW hydraulic model must be validated to ensure that the levels and timing within the hydraulic model for key events and locations is compatible (match) the Wianamatta (South) Creek Flood Study – Existing Conditions prepared by Advisian prior to adopting it for the FIA Base Case.

Reporting on Hydraulic Base Case

- The FIA is to report on the FFA TUFLOW model set up, parameters, inputs and assumptions.
- The FIA is to report and document the validation of the FFA TUFLOW model
- The FIA is to report and document the validated FFA TUFLOW model results and map existing flood behaviour and flood constraints on the site and its surrounding areas (within the model extent) for the full range of events, including 10% AEP, 1% AEP, 0.5% AEP, 0.2% AEP and PMF.

This will replace the maps presented in the report for existing case in Section 6.2.

The consultant is to undertake Items III and IV as outlined above.