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Our Ref: DJL: L.T2522.003

12 July 2024
Joe Fittell
Energy and Resource Assessments | Planning and Assessment
Department of Planning and Environment
joe.fittell@planning.nsw.gov.au

Attention: Joe Fittell

Dear Joe

RE: PEER REVIEW OF FLOOD RISK ASSESSMENT FOR HVO CONTINUATION PROJECT

Torrent Consulting was engaged by NSW Department of Planning and Environment (DPE to undertake a peer review of the of the of the Hunter River Flood Assessment for the Hunter Valley Operations Continuation Project (SSD 11826681 and SSD 11826621) (the Project).

The focus of the review is to assess the appropriateness of the developed models and design flood assessment, and general consistency with respect to industry best practice.

Scope of Review

The general scope of works for the review as defined by DPE is expected to cover the following elements (as a minimum).

1. Undertake a comprehensive review of the flood modelling and flood assessment completed for the Hunter Valley Operations Continuation Project EIS including:

    a. whether the assumptions used are reasonable, appropriate and suitably justified;

    b. the adequacy of the methodology, analysis and assessment presented in evaluating the flood impacts of the proposed development;

    c. the identification of any areas of deficiency and recommendations to improve or resolve these issues in the assessment;

    d. the significance of impacts, key environmental risks and issues for consideration during the assessment process;

    e. suitability of the proposed mitigation and/or management and/or protection measures; and

    f. any recommendations (if required) for additional information to inform the assessment of the project.

2. Consultation with relevant NSW Government personnel, the Applicant and its experts if required, to be co-ordinated through the Department.

To facilitate the review, the following relevant documents and files were provided:

- Hunter River Flood Assessment (Engeny, 2023)
- TUFLOW model files
- BCD - Advice on EIS
- Muswellbrook SC - Advice on EIS

- Singleton Council Advice on EIS

Model Review

The detailed review of the model configuration is documented in Appendix A. The following represent the most pertinent comments from the review:

- Model extent, resolution and topography – the model extent covers the Hunter River floodplain extending from Jerrys Plains to ~6km downstream of Singleton. The model extents appear adequate to simulate flood flow distributions in the potential area of influence of the proposed works, extending sufficiently upstream and downstream along the Hunter River and into backwater reaches of significant tributaries.

  The adopted TUFLOW model grid resolution of 8m is generally appropriate to resolve flow distribution in the channel and floodplain. The baseline model topography uses LiDAR data from various sources with underlying grid resolutions of 1 to 2m. Accordingly, the underlying topographical data resolution supports the adopted model grid resolution. Note that the review assumes the underlying LiDAR data sets are of appropriate accuracy in representing ground levels.

- Boundary conditions – design inflows to the TULFOW model have been derived from Flood Frequency Analysis (FFA) at relevant gauging stations including Hunter River at Liddell and Hunter River at Singleton.

  The methodology employed for the FFA is generally appropriate. However, it is recognised there is considerable uncertainty with some of the historical events in the annual series, particularly some high flow events that have a significant influence on the frequency distributions and peak flow estimates. The assumptions made in formulating the annual series and distribution fitting (e.g. stage-discharge relationships, outlier treatment) impacts on the design peak flood estimation for specified design flood magnitudes. This is evident in comparison of design flow estimates derived in other studies such as WBM Oceanics (2007), BMT (2016) and BMT (2021). Accordingly, there is variation in design flood estimates across the studies including the current assessment. Notwithstanding, the derived FFA in the current assessment is suitable for the investigation of the relative impacts of the proposed works.

  Further to above, the FFA confirms some inconsistency between estimated design flows at Liddell and Singleton for major design flood events. The inflow derivation for the assessment utilised a scaling method to derive the inflow distributions between Liddel (U/S model inflow), Singleton (D/S model boundary) and the intermediate tributary flows of Bowmans Creek, Glennies Creek and Wollombi Brook. Whilst the methodology can be justified, particularly in the context of the uncertainty around the FFA design flood estimates, the adopted inflows at the upstream model boundary may be considered on the low side. This is borne out of a greater weighting to tributary inflows providing the gap flow between Liddell and Singleton, rather than higher flows adopted at Liddell for the upstream model boundary.

- Hydraulic Roughness – the development of the TUFLOW model requires the assignment of different hydraulic roughness zones. These zones are typically delineated from aerial photography and cadastral data identifying different land-uses for modelling the variation in flow resistance. The spatial distribution of land-use type and adopted hydraulic roughness coefficient (Manning's' 'n' value) is considered fit for purpose.

- Development representation – the existing conditions (base) model was modified to represent the post-development design (operations) condition. Changes to the TUFLOW model incorporated various bulk earthworks design surfaces representing modifications to working/void areas, levees, ancillary works (roads and bridges).

  Figure 1 presents the difference in model topography from existing to design conditions. The DEM modifications appear to appropriately represent the scale and nature of the proposed works. However, it is noted that the adopted model grid resolution of 8m may not explicitly define the contiguous crest levels of narrow linear features such as levees and road embankment where they are read into the model directly via a DEM surface (1 or 2m resolution) and have not been reinforced by other 2d_zhape layers.

- Design Flood Results – the design flood results have been independently reproduced with the TUFLOW model files provided for the review. The design flood mapping and impact assessment of post-development conditions is consistent with the reported outcomes and analysis.

Response to SEARS

A peer review of the flood impact assessment for the proposed development has been undertaken including detailed technical review of developed models.

The developed models are considered fit for purpose in the model construction and adopted parameters. The model development and design flood assessment methodology is considered consistent with industry standard practice. The application of the models, assessment of flood impacts, and proposed design demonstrate that flood risk has been appropriately considered in accordance with the SEARS (refer to Appendix B).

Conclusions and Recommendations

The flood impact assessment and supporting modelling is found to generally be fit for purpose and suitable for assessment of the proposal on design flood conditions. The following represent the key limitations of the assessment undertaken, and recommendation for further consideration:

- The methodology employed for design inflow derivation potentially underestimates peak design flows at the upstream model boundary. This may provide for a lower peak flood condition in the upstream reach of the Hunter River between Liddell and the Glennies Creek confluence. The potential for higher design flows for a given flood magnitude may warrant consideration of potential impact on design flood immunity for proposed infrastructure. However, it is not expected that inflow refinement would change the overall findings of the impact assessment, being a relative condition. The potential variation in design flow may be considered by undertaking further sensitivity testing or reviewing change in flood condition with higher order events already established.
- A number of the topographical modifications for the proposed works are defined by direct import of design DEMs of 1 and 2m grid resolution. The underlying TUFLOW model resolution of 8m may not provide for adequate representation of the design in the modelled topography. It is recommended these be reviewed to consider impacts on design flood behaviour and potential localised impacts. It is noted any refinement in this regard is not expected to fundamentally change the flood assessment, but confirm local conditions.

Notwithstanding these limitations, the modelling, impact assessment and design are considered to appropriately consider and address flood risk for the proposed development in accordance within industry practice and requirements of the SEARS.

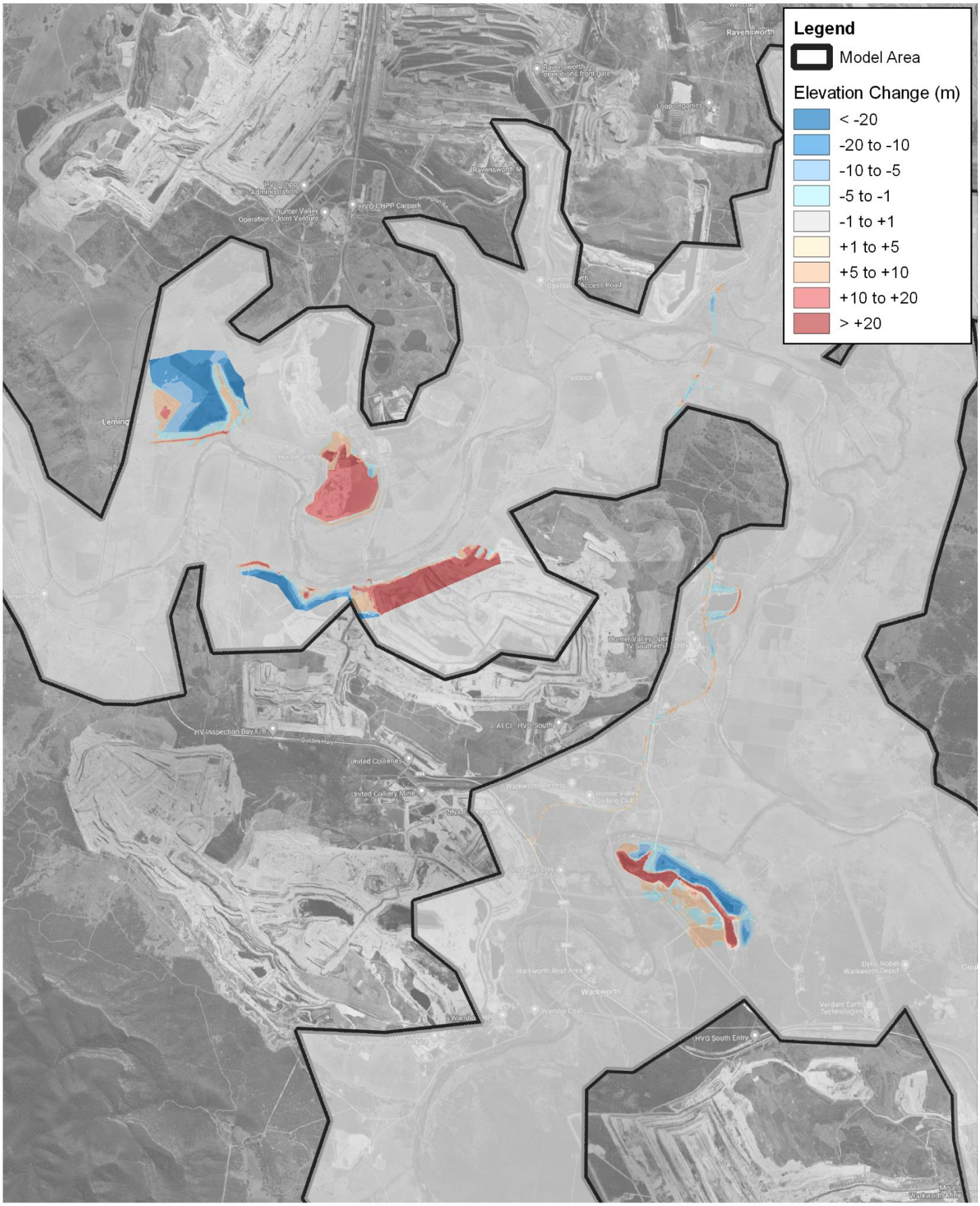
We trust that this review meets your requirements. For further information or clarification please contact the undersigned. The CV of the reviewer is attached at Appendix C.

Yours faithfully

Torrent Consulting

Darren Lyons
Principal Water Resources Engineer

CPEng MIEAust



Title:

Change in Model Topography

0 2 4 km

approx. scale

Figure: 1

Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

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Filepath: Z:\Projects\T2522_HVO_Flood_Review\GIS\T2522_002_Topography.qgz

APPENDIX A – Detailed Model Review

Table A1 – Model Audit of TUFLOW Run File HVO_~e1~_~e2~_~s1~_113.tcf

Item	Configuration	Comment	Action
Software	TUFLOW Version	• TUFLOW_2020-01-AB-iSP-w64- build indicated in model copy handover, suitable for assessment	Nil
Control Files	File Structure	• Standard folder structure used. • Processed results files (maximum ascii grids) used in mapping provided. • No raw TUFLOW results provided. Simulation of models in review process reproduced results consistent with mapping.	Nil
Simulation Commands	Solution Scheme	• HPC solution scheme utilising GPU hardware.	Nil
	Timestep	• 2D Model timestep = 0.4 seconds (sets initial timestep value) • HPC uses adaptive time stepping • No 1D Timestep (noting no 1D domain)	Nil
Model Extent	2D Domain	• Model grid size 8m - suitable for broad Hunter River floodplain environment, typical channel width >40m) • No SGS mode – would provide better conveyance representation and utilise available DEM resolution, but no major benefit at scale of modelling • Active 2D domain set by 2d_code_HVO_105_R.shp – model extent covers Hunter River floodplain from Jerrys Plains to downstream of Singleton, including reaches on tributaries capturing backwater influence (e.g. Farrells Creek, Bayswater Creek, Bowmans Creek, Glennies Creek, Wollombi Brook, Rixs Creek) • Domain sufficiently covers proposed works extent and potential impact area, extends sufficiently downstream to consider impacts.	Nil
	1D Domain	• No 1D elements	Nil

Model Topography	Base DEM	• Built from multiple sources with following hierarchy (in order of use where coverage overlaps):
		  ○ LiDAR 2020 1m.dem (1m grid resolution)
		  ○ sry egl lidar 161123.txt (2m grid resolution)
		  ○ Cessnock201110_Wollombi.txt (1m grid resolution)
		  ○ Camberwell201705-Glennies.txt (1m grid resolution)
		  ○ Cessnock201110_Additional_Singleton.txt (1m grid resolution)
		  ○ Cessnock201110-LID1-AHD_Spliced.txt (1m grid resolution)
		• General consistency found at boundaries, no significant edge effects
			Nil

	Base DEM Modifications	• 210413 1m Flood Data Levee Raise 2021 Surface_trim.asc (1m grid resolution) - Cheshunt Haul Road description in report)  • 20201207 WSP Des NV Levee 1 DEM 1m.dem (1m grid resolution) - West portion of North Void TSF Levee  	Nil
	BASE Z shape modifications	• 2d_zsh_HVO_101_P.shp | 2d_zsh_HVO_101_L.shp – localised lowering and widening of Bowmans Creek near Hunter River confluence	Nil

- 2d_zsh_ExLevee_103_P.shp | 2d_zsh_ExLevee_101_L.shp – reinforcement of existing levee crest (multiple levees including works area and Singleton township)

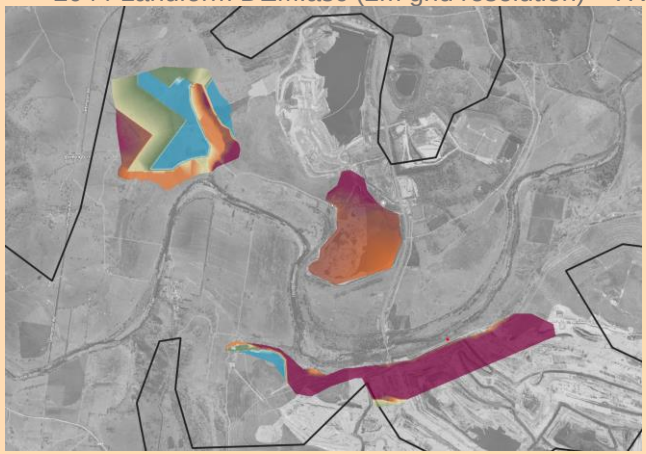
- 2d_zsh_South_Lemington_Levee_107_P.shp | 2d_zsh_South_Lemington_Levee_107_L.shp – reinforcement of existing levee crest

			
Hydraulic Structures	Base model (2d representation)	• 2d_lfcsh_HVO_112_R.shp – layered flow constriction representing haul road bridge crossing of Wollombi Brook • No survey review, broad parametrisation looks appropriate	Nil
Hydraulic Roughness	Materials Layers	• Materials layer defined by 2d_mat_HVO_001_R.shp and 2d_mat_HVO_Channel_101_R.shp • Default material set to “Grazing/Grassland”. Digitised polygons generally reflective of land use as defined in materials file (tmf) • Same roughness distribution adopted for existing and design condition.	Nil
	Manning’s’ ‘n’ values	• Values applied as per input file HVO_105.tmf • Adopted values within appropriate ranges for land use types. • It is noted the “Riverbank” and “Cleared Riverbank” land use types digitised separately have adopted the same Manning’s’ ‘n’ value. Not expected to have significant influence on broader floodplain levels and flow distribution.	Nil
Boundary Conditions	Inflow Boundaries	• Upstream inflow defined as QT (hydrograph) inflow boundary (2d_bc_HVO_102_L.shp) for mainstream Hunter River • Tributary inflows applied to 2D domain via source area (2d_sa_HVO_101_R.shp) hydrographs for Bowmans Creek, Glennie Creek and Wollombi Brook. • Inflow hydrographs correctly reference via boundary condition database (bc_dbase_HVO_106.csv) • Derivation of hydrographs discussed in main body of report.	Refer to report body
	Downstream Boundary	• Model outflow boundary D/S of Singleton represented by TUFLOW HQ boundary (2d_bc_HVO_102_L.shp) • Adopted boundary slope of 0.0005 - this appears to be consistent with modelled profiles though region in other studies.	Nil

	Initial Water Levels	• Initialisation of IWL=-120m AHD (no initial storage) • Initial water level in HVO pit defined at 64.5m AHD via 2d_IWL_HVO_106_R.shp.	Nil
Model Scenarios	Design Events	• Historical calibration events identified as 1955 and 2007 with hydrographs included in event file (HVO_001.tef) and bc_dbase references • Note no calibration results provided – refer to main body of review • Design events identified as 10yr, 20yr, 50yr, 100yr, 200yr, 500yr, 10-00yr and PMF with hydrographs included in event file (HVO_001.tef) and bc_dbase references • Peak ascii grid results provided for design event scenarios and reproduced in review process	Nil
	Development Scenario	• "Base" scenario representing existing/pre-development conditions • "Op" scenario representing operations/post-development condition • Scenario references used in various control file commands as appropriate	Nil
Errors, checks and warnings	Output Files	• No issues with model stability, time-stepping	Nil

Table A2 – Model Audit of TUFLOW Run File HVO_~e1~_~e2~_~s1~_113.tcf

(NB: only changes from HVO_~e1~_~e2~_~s1~_113.tcf documented to compare pre- and post-development condition)

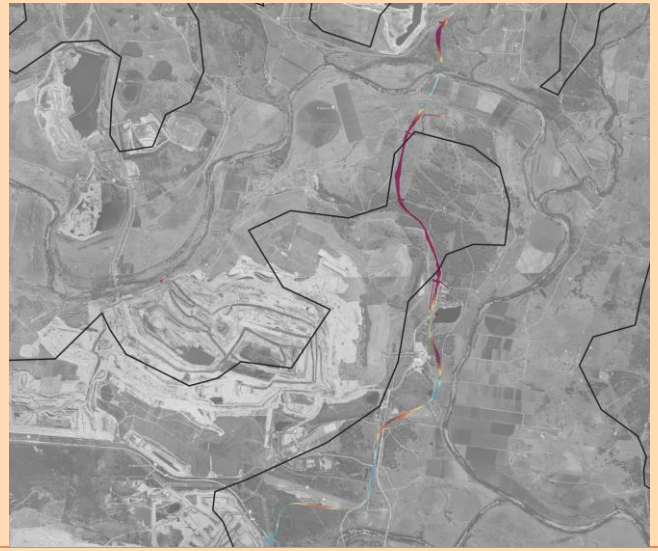
Item	Configuration	Comment	Action
Model Topography	Base DEM Modifications	• 2044 Landform DEM.asc (2m grid resolution) – HVO final landform description in report  • 201207 1m HVO CONTINUATION MITCHELL LEVEE.dem (1m grid resolution) – Mitchell levee design	Suggest confirm crest appropriately represented with respect to model grid size and DEM sampling, and potential impact on assessment

- WSP DES NV LEVEE 2 DEM 1m.dem (1m grid resolution) – Southern portion of North Void TSF Levee

- 20201207 WSP DES CH LEVEE DEM 1m.dem (1m grid resolution) – Cheshunt Levee

- 201207 1m HVO CONTINUATION RIVERVIEW LEVEE.dem (1m grid resolution) – Riverview Levee

- LAKE JAMES 1m.dem (1m grid resolution) – Lake James

		 • 210414 1m HVO LEMINGTON ROAD DESIGN.dem (1m grid resolution) – Lemington Road 	
	BASE Z shape modifications	• 2d_zsh_South_Lemington_Levee_107_P.shp | 2d_zsh_South_Lemington_Levee_107_L.shp (reinforcement of existing levee crest). • Note not referenced in “Ops” model geometry (HVO_8m_113.tgc but covered by final landform DEM (2044 Landform DEM.asc)	Nil

			
Hydraulic Structures	Operations model (2d representation)	• 2d_lfcsh_HVO_DEV_113_R.shp | 2d_lfcsh_pts_HVO_Dev_113_P.shp – layered flow constriction representing proposed Lemington bridge crossing of Hunter River (north bridge section on main river alignment and south bridge section on southern flood runner) • No survey review, broad parametrisation looks appropriate	Nil
Boundary Conditions	Outflow Boundary	• Ingress to pit behind Mitchell Levee defined as represented by TUFLOW HQ boundary (2d_bc_HVO_ext_DEV_106_L.shp) with nominal slope 0.05 • Levee overflow extracted from model, assume for mapping purposes	Nil
	Initial Water Levels	• Initial water level in HVO pit defined at 70.0m AHD via 2d_IWL_HVO_Fin_106_R.shp.	Nil
Errors, checks and warnings	Output Files	• No issues with model stability, time-stepping	Nil

APPENDIX B – Response to SEARS

Hunter River Flood Assessment (Engeny, 2023)

Table 6-4: Summary of Response to Flooding SEARs

SEARs - Requirement 13	Response	Relevant Section
9. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including: • Flood prone land. • Flood planning area, the area below the flood planning level. • Hydraulic categorisation (floodways and flood storage areas).	All items mapped	Section 2.4
10. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year/ 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.	Flood model technical report	Appendix C
11. The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios: • Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	Flood impact mapping and detailed assessment including climate change assessment	Section 6.2 (including Section 6.2.6) and Appendix C
12. Modelling in the EIS must consider and document: • The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories. Relevant provisions of the NSW Floodplain Development Manual 2005.	Flood impact mapping and detailed assessment	Section 6.2 and Appendix C
13. The EIS must assess the impacts on the proposed development on flood behaviour, including:		
• Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.	Detailed mapping of flood impacts (level and velocity) and discussion focused on the 1% AEP used for flood planning	Section 6.2
• Consistency with Council floodplain risk management plans	Consistent with current plan	Section 6.2.4
• Compatibility with the flood hazard of the land	Compatible with flood hazard	Section 6.2.4

SEARs - Requirement 13	Response	Relevant Section
• Compatibility with the hydraulic functions of flood conveyance in floodways and storage in flood storage areas of the land.	Compatible with hydraulic functions	Section 6.2.4
• Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site	No impact on beneficial inundation as level changes are minimal for the range of flood events assessed. Refer ecology assessment for further detail.	Section 6.2
• Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	Assessment of channel stability indicates velocity changes are localised around the project infrastructure and that there remains a low likelihood of scour.	Section 6.4
• Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council.	An analysis of potential changes to emergency management, hazard and inundation times on primary transport routes has been undertaken.	Section 6.2.4
• Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council.	Impact assessment indicates minimal change in flood behaviour and therefor no further specific measures to manage risk to life are required. Improved immunity of the Lemington Road crossing will reduce risk exposure for road users.	Section 6.2.4
• Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES.	Impact assessment indicates minimal change in flood behaviour and therefor no changes are required to existing site emergency management, evacuation and access, and contingency measures. Improved immunity of the Lemington Road crossing will reduce risk exposure for road users.	Section 6.2.4
• Any impacts the development may have on the social and economic costs to the community as consequence of flooding.	Impact assessment indicates minimal change in flood behaviour and therefor no change in existing social and economic costs to the community. Social and economic impacts of the Project are discussed in more detail elsewhere in the EIS.	Section 6.2

APPENDIX C – Reviewer CV

Torrent CONSULTING

Darren Lyons

Position
Principal Water Resources Engineer

Experience
25+ years

Qualifications
Bachelor of Engineering Civil (BE Hons1), University of Technology, Sydney (1996)
Chartered Professional Engineer (CPEng), Member Institution of Engineers (MIEAust), Registered Professional Engineer of Queensland (RPEQ)

Recent Employment
2023 to present
Torrent Consulting – Principal Water Resources Engineer

2021 to 2023
Umwelt Australia - National Water & Catchments Lead

2006 to 2020
BMT – NSW/Vic Business Unit Manager (2012 to 2020), NSW Flood Lead (2006-2016)

2001 to 2005
Mott MacDonald, Cambridge (UK) – Senior Water Resources Engineer

Career Overview
Darren is a Principal Water Resources Engineer with extensive consulting engineering experience in Australia and overseas. Darren has a specialised background in both the development and application of numerical models for hydraulic, water quality and sediment transport studies. This has provided for extensive experience in investigating natural resource processes across catchment, fluvial, estuarine and coastal environs.

Through the senior management role of multi-disciplinary teams, Darren has extensive experience in managing and directing a wide range of specialist water and environmental projects including coastal processes and coastal zone management, stormwater management and Water Sensitive Urban Design, climate change risk and adaptation, water conservation and planning studies. This has provided him a sound knowledge of a wide range of natural resource management issues and the skills required to investigate, interrogate and provide quality outcomes to address Client's needs in these areas.

Skillset

Hydrodynamic, water quality and sediment transport modelling and investigations

Hydrological catchment and receiving water processes

Flood studies and floodplain risk management

Impact assessments for infrastructure and land development

Design and performance of hydraulic structures

Flood emergency response management

Community engagement

Expert witness and peer review services

Project Experience

Flood Studies and Floodplain Risk Management Studies (FRMS)

- Ungarie Flood Study and FRMS (2017 and 2020)
- Lake Illawarra, Mt Warrigal, Oak Flats Flood Study (2020)
- Emu Plains Flood Study (2020)
- Waverley LGA Overland Flood Study (2019)
- Georges River Flood Study Review (2019)
- Mullet Creek/West Dapto Flood Study Update and Flood Planning Assessment (2017)
- Mid-Georges River Sub-Catchments FRMS (2017)
- Jewells Wetland Flood Study and FRMS (2013 and 2018)
- Fairfield CBD FRMS (2018)
- Williamtown-Salt FRMS (2017)
- Lower Wollombi Brook Flood Study (2016)
- Griffith Main Drain J and Mirrool Creek Flood Study and FRMS (2015)
- Botany Bay Foreshore Flood Study (2015)
- Lower Myall River and Myall Lakes Flood Study (2015)
- Alexandra Canal Catchment Flood Model Conversion (2015)
- Clarence Town Flood Study and FRMS (2011 and 2014)
- Darling Harbour Catchment Flood Study (2014)
- City of Sydney CBD Flood (2014)
- Wyong River Flood Study (2013)
- Narrabeen Lagoon Flood Study (2013)
- Manly Lagoon Flood Study (2013)
- Lake Conjola FRMS (2013)
- Burrill Lake FRMS (2013)
- Liverpool Overland Flow FRMS (2013)
- Lake Wyangan Flood Study and FRMS (2012 and 2013)
- Wollombi Brook Flood Study and FRMS (2012)
- Duck Creek Flood Study (2012)
- Coogee Bay Flood Study (2012)
- LT Creek Flood Study (2011)
- Tabourie Lake Flood Study (2010)
- Liverpool Overland Flow Flood Study Stage 2 and 3 (2008 and 2010)
- Bomaderry Creek Flood Study (2010)
- Moore Reserve Overland Flow Study (2009)
- Coffs Creek Flood Study Review (2008)
- Anzac Creek FRMS (2007)

Flood/Water Resources Impact Assessments

- Kurri Kurri Lateral Gas Pipeline WRIA (2023)
- Jingi Jingi Solar Farm FIA (2023)
- Goulburn River Solar Farm WRIA (2023)
- Broken Hill Energy Storage WRIA (2023)
- Olympic Hwy Interswection Upgrades (2022)
- Moah Creek Wind and Solar Farm FIA (2022)
- Tallawang Solar Farm WRIA (2022)
- Warragamba Dam Raising Project EIS (2020)
- Hawthorn Rowing Club Floating Pontoon FIA (2020)
- Nelson Bay Road Upgrade Concept Options Flood Constraints (2020)
- Penway Place Penrith Flood Emergency Management Plan (2020)
- Light Horse Interchange Hub FIA (2019)
- Surry Hills Shopping Village Drainage and Flooding (2019)
- Old Cooma Road Upgrade FIA (2018)
- Lower Hunter Freight Corridor Surface Water Constraints (2017)
- Newcastle Rezoning of Surplus Rail Corridor Lands FIA (2016)
- Singleton Bypass Route Options Investigation (2014)
- Hexham Train Support Facility FIA (2013)
- Hexham Relief Roads Project FIA (2013)
- Northbank Enterprise Hub FIA (2013)
- Newline Road Levee Assessment FIA (2012)
- Country Regional Network Culvert Upgrade Investigations (2012)
- Burrill Bridge Upgrade Options FIA (2012)

Expert Witness and Peer Review

- Astoria Developments vs Coffs Harbour City Council NSW L&E Court – Statement of Evidence flooding matters (2022)
- HB&B Property vs Parramatta City Council NSW L&E Court – Expert Witness on Flooding Matters including Court Evidence (2021)
- McBride vs Great Lakes Council NSW L&E Court –Flooding Matters including Court Evidence (2020)
- Hernes Investment vs Insurance Australia Group - Statement of Evidence flooding matters (2020)
- Colac Otway Planning Scheme Amendment C90 VCAT Hearing Colac Shire Council (2020)
- Jenman & White vs Sydney Water Corporation Council NSW L&E Court –Flooding Matters (2019)
- Gardener vs Central Coast Council NSW L&E Court –Flooding Matters (2019)
- Scott v Singleton Council NSW L&E Court –Flooding Matters including Court Evidence (2017)
- Paper Trade Processing (Aust) vs Liverpool City Council - Flooding and Stormwater Matters (2017)
- Gili vs City of Greater Geelong VCAT –Flooding Matters including Court Evidence (2017)
- Kenneth William Allport v Lismore City Council NSW L&E Court –Drainage Matters (2017)
- Pridel Investments vs Coffs Harbour City Council NSW L&E Court – Expert Witness on Flooding Matters incl. Court Evidence (2016)
- Sunland Developments vs Pittwater Council NSW L&E Court – Flooding Matters including Court Evidence (2016)
- Sketch Design Studio vs Manly Council NSW L&E Court –Flooding Matters including Court Evidence (2015)
- Trinvass and Kelaron vs City of Sydney NSW L&E Court– Flooding Matters (2015)

Papers and Presentations

- Williams, D., Lyons, D. and Asquith, B. “Improving the Rigour of Catchment-wide Hydrodynamic Modelling of the Rainfall-runoff Process”. Hydrology and Water Resources Symposium, Sydney 2023
- Leister, J., Lyons, D., South, M., and Newby M. “Best Practice Planning for Residual Risk Behind Levees: The Launceston Experience”. Floodplain Management Australia National Conference, Canberra 2019
- Williams, D., Lyons, D., Eggleton, J. and Lyons, S. “Predicting the Next Major Flood on the Hunter River”. Floodplain Management Australia National Conference, Newcastle 2017
- Lyons, D. and Williams, D. “Entrance Modelling and the Influence on ICOLL Flood Behaviour” Presented at the 52nd NSW Floodplain Management Association Conference, Batemans Bay 2012
- Lyons, D.J. and Jennings, P. “Flooding in the Wollombi Valley – Learning from Experience”. Presented at the 51st NSW Floodplain Management Association Conference, Tamworth 2011
- Guganesharajah, K., Pavey, J.F., van Wonderen, J., Khasankhanova, G.M, Lyons, D.J. and Lloyd, B.J. |2007| Simulation of Processes Involved in Soil Salinization to Guide Soil Remediation. Journal of Irrigation and Drainage Engineering, ASCE, 133|2|, 131-139
- Guganesharajah, K., Lyons, D.J., Parsons, S.B., and Lloyd, B.J. |2006|. Influence of Uncertainties in the Estimation Procedure of Flood Water Level. Journal of Hydraulic Engineering, ASCE, 132|10|, 1052-1060