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2 June 2025

Independent Planning Commission
Suite 15.02
Level 15, 135 King Street
Sydney, NSW 2000

Dear Commissioners,

GEORGES COVE MARINA SITE – PP-2024-658

On behalf of the proponent Mirvac Homes (NSW) Pty Ltd and the Landowner, we thank the Panel for its consideration of our proposal. As you are aware, we have been working on this proposal since 2017, and we continue to seek a gateway approval to allow the proposal to progress to an amendment of the *Liverpool Local Environmental Plan 2008.*

We emphasise to the panel that the proposal is seeking to permit residential use on a proposed platform which directly adjoins our existing low density residential development which is flood-free at Georges Cove.

This proposal:

- Has always been strongly and continuously supported by the community.
- Is unanimously supported by the Liverpool City Council (LCC) local councillor who represents the ward that the site sits within, the LCC Mayor, and the NSW State Member for Holsworthy.
- Has been designed such that it far exceeds standard planning flood level building guidelines (i.e. 500mm above the 1:100 flood level) such that our residents will be able to drive out during a 1:500 year flood level.
- Is designed so that our residents can walk out in a 1:17,500-year flood event.
- Is designed so that all residences are built well above the PMF event which theoretically occurs every 1:1,600,000 years and is the maximum conceivable flood event that could occur.
- Should not be assessed in the same manner as houses built in low-lying, high velocity flood prone areas, this proposal instead needs to be considered for what it is, a structurally sound building on a platform above a low velocity flood storage area.

Our Proposal does not negatively impact surrounding residents and greatly enhances the local amenity, hence why it has been widely supported. We once again, welcome the commissioners to contact us and/or our experts if you would like to seek any further clarifications regarding the proposal.

Yours sincerely

[redacted]
Daniel Seraglio
Development Director

Contact
S. Leung

Our Ref
P2410708JC01V03

Pages
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30 May 2025

Mirvac
Attn: Elyse Debrincat
(by email)

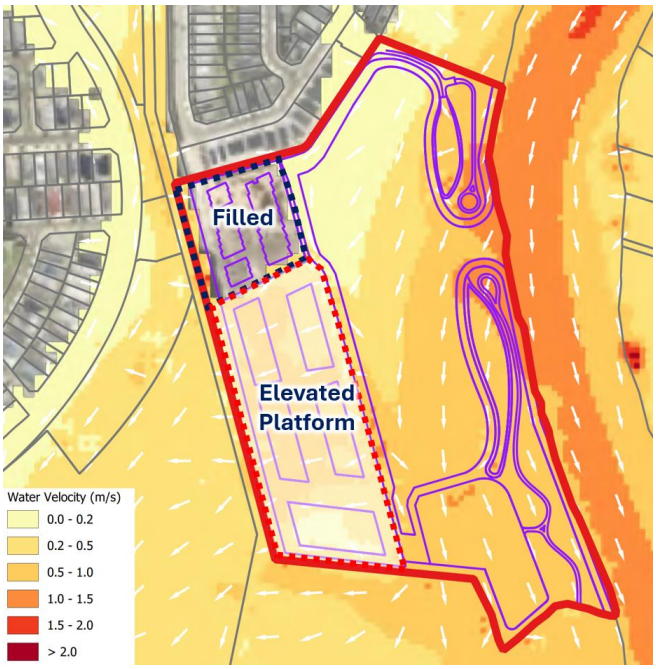
Dear Elyse,

RE: GEORGES COVE MARINA PLANNING PROPOSAL – RESPONSE TO AGENCY COMMENTS FROM 15 APRIL 2025 MEETING

We have reviewed the agency flood risk comments regarding the Georges Cove Marina Planning Proposal (**PP**) recorded in the minutes of the 15 April 2025 meeting with DPHI, NSW SES, and DCCEEW and the further advice contained in correspondence from DPHI dated 21 May 2025. Table 1 below sets out our responses to key issues.

Table 1: Response to agency comments.

Issue	MA Response
What is the suitability of the site location?	The site location is suitable, being located adjacent to a recently constructed residential development and within an approved marina which is connected to the Georges River. Both developments evacuate to Brickmakers Drive (refer to Figure 1) and then the M5 via the newly constructed bridge on Promontory Way. The PP is an extension to the south of existing adjoining residential development with equal or higher ground levels, and is a 5-10 minute walk to flood free land or drive to the M5  *Figure 1: Site location and connection with adjoining development.*

How do flood levels compare to nearby development?	In terms of flood levels: • The existing residential development (Georges Cove) of more than 200 residences is flood free to about RL 7 m, or approximately the 10,000 year ARI flood. • Car parks A and B of the approved Marina are at RL 1.65 m (flooded around every 2 years) and RL 4.65 m (flooded around every 20 years). • By comparison, the PP seeks to have all carparking and commercial / shop areas at RL 7.6 m, or approximately the 17,500 year ARI flood, with all residential unit floor levels above probable maximum flood (**PMF**) of RL 11.78 m, which is the largest conceivable flood, ensuring that no residence will ever be impacted by floodwater. This means that residents would not need to pack any valuables or memorabilia in the worst conceivable flood as is the case for the Georges Cove residential development. It is clear from the above that the PP would deliver carparking and residential development that is significantly superior and more flood resilient compared to existing and recently approved development, going well beyond accepted flood risk design standards.
How will the urban footprint be built?	In respect of the PP urban footprint and access road, this will be partly on fill and partly on a connected elevated platform on piers above the flood corridor which will allow low velocity water to flow from the marina to the south west during extreme flood events (see mapping extract below for 5,000 year extreme flood). The PP site is located some 170 m from the River to the east where higher velocities occur.  *Figure 2: 0.02% AEP flow velocities.* The urban superstructure and associated buildings will be structurally designed to resist flood forces up to the PMF. Buildings and structures that are elevated on piers above a hazardous water body are not uncommon in Sydney.
What is the site's exposure to the flood hazard?	The site's exposure to flood water will be equivalent to or less than the recently approved and constructed adjoining existing residential development to the north, and will be substantially less exposed than the approved site Marina which includes 637 carparking spaces in three external carparks (A, B and C), 577 of which are inundated by flood water on average every 2 years at RL 1.65 m (car parks A and B). By comparison, the PP seeks to have all carparking and commercial / shop areas at RL 7.6 m, or approximately the 17,500 year ARI flood, with all residential unit floor levels above PMF of RL 11.78 m. Flood modelling indicates that commercial areas would only experience H5 hazard or above (depth > 2 m) on average every 60,000 years or less frequently, this far exceeding accepted practice to protect commercial areas to the 100 year ARI flood. Residential levels would not be exposed.

What is the site's suitability for development?	The site is highly suitable for residential use, and there is no basis for claiming unsuitability in terms of flood risk, for the following reasons: • **Residences are above PMF**: All residences will be above the PMF level, and therefore protected from all flood event possibilities, and will be less exposed to flood water than the existing recently constructed residential development to the north. • **Protected commercial areas and car parking**: All commercial areas and carparking will be protected from flooding up to the 17,500 year ARI flood, well above the 1% AEP +0.5 m flood standard, and above the level of protection provided in the recently constructed residential development to the north. • **Body corporate implements a FERP**: The site will be centrally managed by a body corporate that will operate in perpetuity a flood emergency response plan (FERP) to ensure flood risk management measures will be available to, maintained and operational for all residential lots and commercial owners. Such measures will include flood monitoring and alarms, owner and tenant education, flood warning system, and co-ordination with the NSW SES of any future site evacuation. Such measures are not required, and have not been implemented, for the existing residential development to the north or any other residential development on the floodplain, but can be offered at this site as additional risk management measures due to the centralised management of the site. • **No off-site flood impacts**: Detailed modelling for a full range of events including the 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2%, 0.05%, 0.02% AEP and PMF flood events has been completed using the most recent 2020 BMT flood model, which demonstrated that off-site flood impacts to flood levels, peak flow velocities or changes to flood hazard categories, or impacts to the local environment are not likely and could be readily mitigated through standard engineering design and practice. • **Safe evacuation available**: Detailed evacuation modelling using the Life Safety Model (LSM),1 indicated that the site can be fully evacuated during a worst case critical PMF event without impacting other floodplain evacuees. Indeed, the modelling demonstrated that the repurposing of the Marina to include the PP with a future body corporate, would enable site evacuation to be scheduled earlier during a flood event, this reducing road congestion during an evacuation and lowering the number of potential vehicles otherwise trapped on the floodplain by 19. • **Structural design**: The urban superstructure and associated buildings will be structurally designed to resist flood forces up to the PMF. Flood forces will not be significant and can be readily accommodated.
Safe Building Construction	Many structures are commonly built in or over hazardous water bodies or areas subject to extreme flooding (bridges, wharfs, ocean oil rigs *etc*). Finger Wharf at Woolloomooloo on the Harbour (shown in Figure 3) is a very real and successful example of residential development located over H6 hazard conditions, regularly experiencing hazards arising from deep water, extreme tidal or flood flows, and wave action. 

[1] Documented in the Molino Stewart 2022 *Georges River Evacuation Modelling report*, that being the most recent and up to date assessment of evacuation for the floodplain.

	Figure 3: Finger Wharf residential development. Flood modelling included in the Flood Risk Assessment (**FRA**) prepared by Martens in March 2025 demonstrates that flood forces will be very low on supporting piers due to low velocities (< 1 m/s in the 5,000 year ARI flood which is not dissimilar to peak tidal flows in the harbour). High riverine velocities are not experienced within the urban area even under the most extreme PMF conditions. There is no credible impediment to constructing safe buildings at this site.
Minister's s9.1 Requirements	Section 4.1 of the FRA provides a comprehensive assessment of the PP against the Section 9.1 Local Planning Directions 4.1 Flooding, indicating that all provisions are met. In summary: • The PP is consistent with the NSW flood prone land policy because there will be no off-site impacts under a full range of floods up to the PMF, and that future development will be readily protected from damages, with residences above the PMF, and is capable of safe occupation and evacuation in all events up to the PMF. • The PP is consistent with the 10 development principles of the NSW Floodplain Development Manual (now the Flood Risk Management Manual) on the grounds that there will be no off-site impacts under a full range of floods up to the PMF, and that future development will be readily protected from damages and is capable of safe occupation and evacuation in all events up to the PMF • The PP is consistent with the 2021 *Landuse Planning Guideline* because it has assessed potential risks to life and property for a full range of floods including the 1% AEP, 1% AEP + CC, 0.05% AEP, 0.02% AEP and PMF flood events using the latest BMT 2020 flood model and 2022 Molino Stewart LSM evacuation model. • The PP is based on and consistent with the most recent BMT 2020 flood model and 2022 Molino Stewart LSM evacuation model. • The PP does not seek to rezone land within the flood planning area from a Recreation zone to a Residential zone. The planning proposal seeks additional permitted uses within the existing RE2 Private Recreation zone. • The PP will seek an urban use located on structural piers above water (flood storage) within the marina, and will not be located in a floodway. • The PP does not propose any residential accommodation in high hazard areas because all residences will be above the PMF. • The PP does not propose an increase in the occupation of land below the flood planning level. All residences will be above the PMF. • The PP does not include any proposed sensitive land-use activities such as centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing. • Future development would require consent. • The PP will not result in increasing government spending on emergency services due to the flood resilience measures that would be incorporated into a future development of the site, and centralised management of the site by a body corporate, which would in perpetuity implement, fund and operate a FERP over the site, providing a single point of contact for the SES during a flood emergency and co-ordinating any flood emergency response. • The PP does not propose any hazardous industries or storages. All future commercial floor levels would be 1.6 m above the flood planning levels.
Evacuation Frequency	The site will not receive the same evacuation warnings as Sector R25 and will not be subject to frequent evacuation because: • Sector 25 (see Figure 4) is located at very low levels of around RL 2 m, requiring an emergency response or evacuation around every 1-5 years. • By contrast, the site egress driveway will be at RL 7.4 m (see following image) which means it is flood free up to the 17,500 year ARI flood level. • The evacuation route low point from the site to the M5 is around RL 5.80 m and occurs at the intersection of Promontory Way and Brickmakers Makers Drive (see following image). This is

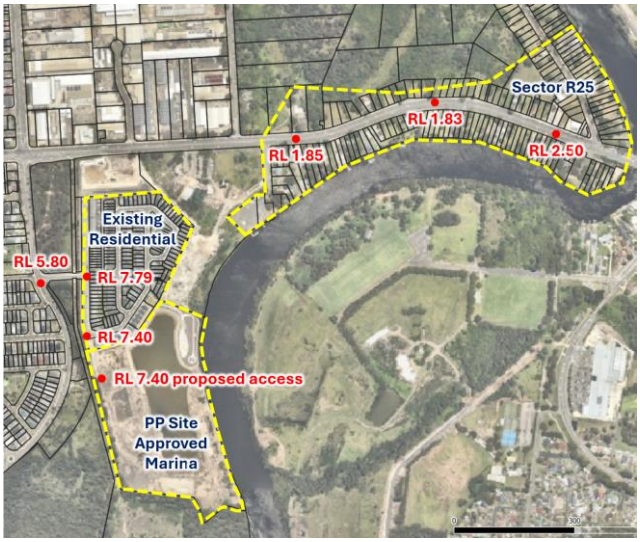
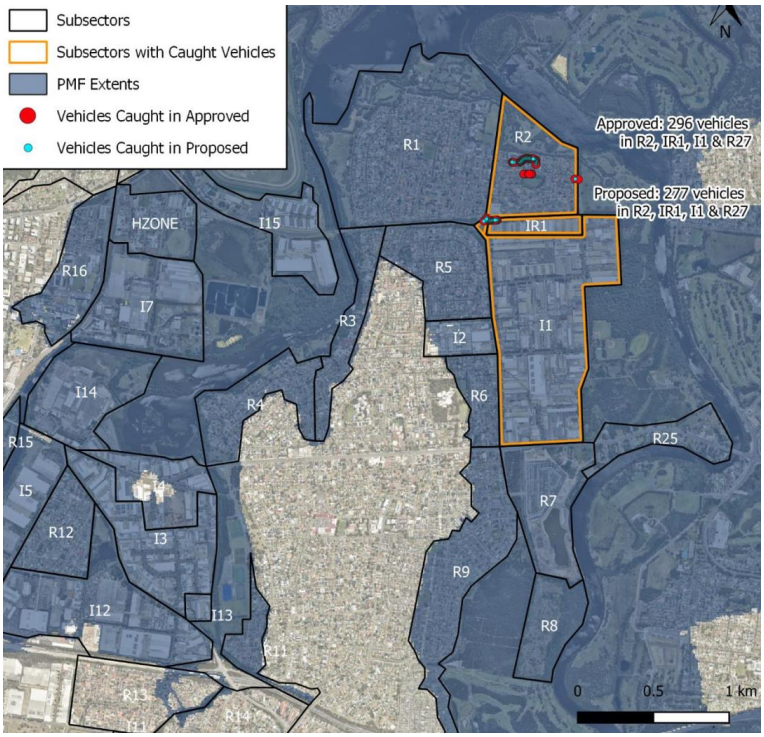
	approximately equivalent to the 300 year ARI flood and means that the site egress route would be cut by the 500 year ARI flood after gutters on Brickmakers Drive are full. • It is clear that given the site levels, the site would not require frequent evacuation, and that any evacuation would likely occur less frequently than every 500 years. • The PP site would have the same evacuation profile as the existing recently constructed residential development adjoining to the north.  *Figure 4: Local area ground levels.* It is important to recognise that the evacuation modelling completed at Section 3.4 of the FRA was for a critical duration PMF event, that being the worst case most extreme flood possible. The purpose of that modelling was to demonstrate that the site could be fully evacuated in an orderly manner, without impacting other evacuees on the floodplain, under the most extreme conditions possible.
Evacuation Route	The offsite evacuation route would initially be via Brickmakers Drive, but once this is impacted would be routed via Maddecks Avenue (see image below) which is accessible up to the 0.2% AEP (1 in 500 AEP) event, and in a worst case critical duration PMF event there is 18 hours available to evacuate after BoM warnings are received and before an evacuation route is cut. Evacuation once every 500 years on average is not frequent.

Figure 5: Evacuation routes.

Under non-evacuation conditions, there is no right turn to Maddecks Avenue for southbound traffic on Brickmakers Drive. However, during a flood emergency once Brickmakers Drive is closed by floodwater, Maddecks would clearly be used and would be readily accessible for all floodplain evacuees which would be travelling southbound and not northbound (see Figure 6). Under these conditions, SES or another emergency response agency would likely place temporary route direction signage so that all evacuees would be appropriately redirected.

Figure 6: Brickmakers Drive and Maddecks Avenue intersection.

Vehicles Trapped on Floodplain	Detailed evacuation modelling indicated that the site can be fully evacuated during a worst case critical PMF event without impacting other floodplain evacuees: • Evacuation modelling demonstrated that repurposing the approved Marina to include the PP with a future body corporate, would enable site evacuation to be scheduled earlier during a PMF flood event, thus reducing road congestion during an evacuation and lowering the number of potential vehicles otherwise trapped on the floodplain by 19. • Vehicles that are modelled to be trapped on the floodplain during a worst-case critical duration PMF event are located within Sectors R2, IR1, I1 and R27 (1 vehicle). These sectors are located kilometres to the north or west of the site, which is located in Sector R7 (see image below, extracted from Figure 10 in the FRA). These vehicles are impacted by floodwaters irrespective of the Planning Proposal.

	 *Figure 7: Evacuation sectors with trapped vehicles (R27 west of I5 not shown).*
Is an Early Warning System Proposed?	An **early warning system is not proposed**. Rather, the evacuation capability assessment documented in Section 3.4 the FRA has demonstrated that with a minor adjustment to the evacuation sector scheduling for a critical duration PMF event, the PP site can be fully evacuated and deliver a benefit to the overall floodplain evacuation process by reducing the number of vehicles potentially trapped by 19. • The 2022 LSM evacuation model prepared by Molino Stewart represents an analysis of how floodplain evacuation sectors could be scheduled to minimise the number of vehicles potentially trapped by floodwater during a critical duration worst case PMF event. • The PP site would not need to be evacuated in events up to the 500 year ARI flood at which point the site would become isolated. • Future development at the PP site would be centrally managed by the body corporate, which would in perpetuity implement, fund and operate a FERP over the site, providing the opportunity for a single point of contact with the SES during a flood emergency. As such, site management will facilitate and improve the implementation any SES evacuation advice without increasing government spending on emergency services. • It is not credible that SES and site management would not communicate during an emerging flood emergency given that this would not demand any material SES resources, this benefiting the overall floodplain evacuation process.
What is the number of evacuating vehicles?	The evacuation model includes the best available population data: • The evacuation model is consistent with the 2022 Molino Stewart report. • The evacuation model represents a 2036 scenario with all adjacent development and infill developments under existing zoning and developments, including populations from the planning proposals which have been approved since the preparation of the 2022 Molino Stewart report. The exception was the gateway approved Moore Point site (Site F) which was excluded from the modelling as it will generate a very large number of vehicles, those numbers being uncertain at present, and will require significant road and transport infrastructure upgrades to proceed, all presently unknown. It is therefore not possible or reasonable to include Moore Point in the base or proposed modelling cases.

What is the impact of site evacuation on other evacuees?	The evacuation model shows that with a minor adjustment to the evacuation sector scheduling during a critical duration worst case PMF event, the PP site can be fully evacuated and deliver a benefit to the overall floodplain evacuation process by reducing the number of vehicles potentially trapped by 19: • The evacuation model shows that the number of vehicles potentially trapped in the floodplain during the critical duration worst case PMF significantly reduces from 273 to 111 with the M5 upgrade. • Vehicles that are modelled as potentially trapped on the floodplain during a worst case critical duration PMF event are located within Sectors R2, IR1, I1 and R27 (see Figure 7), which are kms to the north or west of the site (which is located in Sector R7) and are impacted by floodwater irrespective of the PP. • The evacuation modelling does not assume the proposed development is at 50% capacity. It assumes the residential component is at 100% capacity and conservatively assumes non-residential vehicle spaces are 50% occupied, given that most (if not all) of the commercial areas will be closed the day before the major flood event, considering 18 hours warning is available.
How frequently would the PP site be isolated?	The PP site becomes isolated from floodwater approximately every 500 years: • The intersection between Promontory Way and Brickmakers Drive was upgraded to a level of around 5.80 mAHD when Promontory Way was constructed in association with development of the adjacent residential land to the north of the PP site. Egress is therefore available up to the 0.2% AEP (1 in 500 year AEP) event, and in a PMF event there is 18 hours available to evacuate after BoM warnings are received and before the evacuation route is cut. • Intersection flooding has been accounted for in the detailed evacuation modelling, with sufficient time available to ensure safe evacuation of PP site prior to intersection inundation.
What is the proposed emergency response?	The primary emergency response strategy for the site is vehicular evacuation based on BoM flood warnings and SES evacuation orders to a nominated evacuation centre or alternative accommodation outside the floodplain (see p 38 of FRA): • The drive to the M5 via the evacuation routes is approximately 2.5km distance, or around 5-10 minutes by car under adverse driving conditions. • There is alternative rising flood egress pedestrian evacuation available via the newly constructed footbridge over Brickmakers Drive which is about 5 minutes walk from the site. • As a consequence of the future residences being located above the PMF, this will ensure that any site occupants who have not managed to evacuate the site prior to evacuation route cut off, can as a measure of last resort, take refuge above the PMF level, with access to food, water, backup power, medical supplies and connection to the internet. However, this is not part of the proposed evacuation strategy. • It is illogical and not credible to criticise the PP on the basis that residential units will be located above the PMF and safe from flood water • A detailed assessment of the PP against the 2025 Shelter in Place (SIP) Guidelines is provided in Section 4.2 of the FRA. Whilst the assessment is provided, the Guideline does not apply because the PP site is not affected by flash flooding, that being because flooding occurs significantly after the 6 hour period following a precipitation event (as defined in the Guideline).

If you require any further information, please do not hesitate to contact our offices.

For and on behalf of

Martens & Associates Pty Ltd

[redacted]

Dr Daniel Martens

LLB(Hons1), BSc(Hons1), MEngSc, PhD, FIEAust, CPEng, NER, RPEQ, APEC Eng, IntPE(Aus)

Director, Principal Engineer