



Our Ref: 497/01

21 June 2022

Gerard Thompson, Director
Barker & Associates Ltd
PO Box 1986
Shortland Street
AUCKLAND 1140

Dear Sir

Re: Drive Holdings Mission Bay - Summary of Civil Engineering Advice

1. My full name is Peter David Dodd. I am a Chartered Professional Engineer. I am the Managing Director of Dodd Civil Consultants Ltd.
2. I have the following qualifications: CPEng, CMEngNZ, IntPE(NZ), BE, NZCE. I am a member of Engineering New Zealand. I have over 40 years' experience in land development (subdivision), commercial and Industrial site works including earthworks, drainage, pavements and servicing. This covers design, contract administration and supervision of construction. I currently manage a Civil Engineering Consultancy with 20 staff.
3. I have been asked to summarise the civil engineering matters regarding to the application by Drive Holdings Limited for resource consents relating to the construction of seven new multilevel buildings on 75-79, 81-87 & 89-97 Tamaki Drive, 6, 8-10, 12 and 14 Patteson Avenue, 26, 28, and 30 Marau Crescent, Mission Bay ("**the Site**") providing for retail, food and beverage, and residential activities and supporting car parking (located on the ground and two basements levels), loading bays, vehicle manoeuvring areas, landscaping and plant ("**the Project**"). My assessment addressed construction issues, servicing issues, and the appropriate engineering response to the increase in inundation risk that is expected to occur over time as a consequence of climate change and sea level rise.
4. The following comments are informed by the extensive work that I undertook from 2018 to 2022 in relation to a previous development proposed for the Site of generally similar overall scale to the Project ("**Previous Proposal**"). The Previous Proposal was declined consent in the Environment Court for reasons relating to its bulk and height but not its civil engineering elements. The Project adopts the basement and ground level treatments and mitigation measures as were proposed in the Previous Proposal and that were acceptable to Auckland Council in that context.
5. **Bulk Earthworks and Basement Construction** - The construction of the basement levels will involve the excavation and removal from the Site of approximately 35,000 m³ (solid measure) of cut material, to depths ranging from 5.5 to 6.5 m, and will involve approximately 6,500 m² of land disturbance activities across practically the whole Site. The bulk earthworks will be carried out in a single stage and my estimation is that it will require approximately 16 weeks to complete, if activities are carried out on 6 days per week. The excavations will be carried out using hydraulic excavators that will load out on to trucks for removal of material from the site to authorised fill sites.



6. The perimeter foundation piles will also be constructed in association with the bulk earthworks to provide support to the surrounding ground. The Site is essentially flat and is bordered by roads on three sides. It has no characteristics that complicate the excavation or construction works.
7. **Sediment Control** - The proposed works will involve 6,500 m² of ground disturbing activities associated with demolition, earthworks and foundation construction which will occur over an estimated 26 week period. It is proposed to implement a range of sediment control measures in accordance with Council's Guideline Document 2016/005 - Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region to protect the downstream receiving environment, being the Waitemata Harbour, against the potential adverse effects associated with the uncontrolled discharge of sediment.
8. **Street works** - The Project will involve relatively minor street works (e.g. reconfiguration of parking bays that will be subject to Council's and Auckland Transport's Engineering Plan Approval).
9. **Stormwater discharge** – The existing downstream public stormwater network has sufficient capacity to service its existing catchment and the Project. No quality treatment or additional stormwater management practices will be required. The proposed means of stormwater disposal is to extend a new 450 mm diameter pipeline under Tamaki Drive. These works will be subject to an Engineering Plan Approval Process by Auckland Council.
10. **Wastewater Disposal** – Our analysis has established that the immediate existing local public wastewater network servicing the Site has sufficient capacity to service the existing catchment and the Project. Watercare Services Limited, the wastewater utility network operator, considers that one remote section of the existing network may not have sufficient capacity and may need upgrading. Once there is clarity as to the capacity issue, any improvements will be resolved between Watercare and the developer as part of the Engineering Plan Approval process. There are also two sections of the existing public wastewater networks that currently pass through the Site that will need to be diverted to avoid the proposed basements. These works will be subject to Engineering Plan Approval.
11. **Water Supply** - The flow and pressure tests that have been carried out on the existing water supply network surrounding the Site have determined that the network has sufficient capacity to service the Project.
12. **Off-site effects of flooding** - I calculate that construction of the Project on the Site will increase the water level of the 1% Annual Exceedance Probability flood plain on the surrounding land by less than 3.4 millimetres. That is a negligible increase which in my opinion will be practically indiscernible and I do not consider that any additional adverse flooding effects will arise as a consequence of it.
13. **Inundation** –
 - a. The building is currently not subject to flooding but, over time, may become subject to flooding as a consequence of increasing rainfall events and sea level rise. A worst case level of flooding of RL 3.45m has been adopted (1% AEP inundation + 1m sea level rise) for the protective measures taken with the building.
The primary protection is by using construction materials that are water resistant with the intention that the building can be quickly and effectively put back into operation should flooding occur.
 - b. The possible quantum of flooding, assuming any inundation occurs, is expected to be minor and manageable. Flood events will be limited in duration and maximum levels will only last for a short period of time. By way of illustration, I have calculated that the approximate level of flooding expected in any basement level will be less than 500mm, based on conservative assumptions.
 - c. The potentially affected levels of the building are Level 1 (i.e.: the ground floor), Basement 1 and Basement 2. An "adaptive pathway" approach has been adopted which allows for

decisions to be made progressively over time while uncertainty may exist (such as the extent and timing of sea level rise).

- d. Tonkin & Taylor advise that inundation/flooding will not become problematic for some time and a review in 2050, or following an earlier flood event, is proposed to assess the appropriateness of the mitigation measures and to determine if additional mitigation is necessary. This follows the adaptive pathway approach.
 - e. The proposed 4.5m floor to floor height for Level 1 (ground) will enable changes to be made to the Level 1 retail and commercial activities (e.g.: through raising the floor level) should this be deemed necessary in the future to avoid potential flooding effects. There are other mitigation options available and the 2050 review will allow current information to be considered when assessing risks. Additional management techniques may also be developed by that stage.
 - f. Any flood or inundation event will come with a reasonable warning period (12 to 36 hours). A flood/inundation management plan is proposed to be provided in detail at building consent stage. This will allow for the minimisation of effects on the building and protect against loss of life.
14. My support for the Project assumes the imposition of appropriate conditions to ensure potential adverse effects are mitigated. Conditions regarding civil engineering matters and mitigation measures were agreed with Auckland Council through the application process relating to the Previous Proposal. I consider that those conditions will form an appropriate basis for a refined set of conditions for the Project.
15. From a civil engineering perspective, there are no reasons that would preclude redevelopment of the Site in accordance with the Project.

Yours faithfully,
Dodd Civil Consultants Ltd



Peter Dodd
MANAGING DIRECTOR

PD:LB