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Your Ref:
Contact: Con Vink

21 February 2017

Capital Bluestone Pty Limited
PO Box R1898
Royal Exchange NSW 1225

Attention: Emily McLaughlin

Dear Emily,

Woolooware Bay Town Centre Stage 3 Residential Development Application
Response to Authority Queries

We refer to correspondence received from various authorities requesting additional information in relation to the Development Application lodged for the Residential Stage 3 precinct at Woolooware Bay Town Centre. We respond in this letter to questions that have civil engineering implications.

The questions raised refer to civil engineering drawings prepared by at&l consultants. We have reviewed those drawings and our responses below expand on the drawings and recommend some additional measures.

Sutherland Shire Council requested the following:

Q1: A batter would be preferable over shoring. Can this be achieved? Alternatively, the shoring will need to be located outside of the drainage easement, with detailed plans required to be submitted clearly showing this.

A1: Excavating a batter would expose the existing electrical cables and require replacement of the cables and the electrical kiosk, which are Ausgrid assets. It would also expose contaminated fill so the excavation would have to go deeper to provide for a new capping layer over the top of the fill, to achieve the required batter levels. This would introduce a high risk of contamination of the stormwater channel and downstream fisheries habitat. Finally, the batter would be more difficult to maintain as it would have an extended slope subject to tidal movement, with deposition of litter and other contaminants from the upstream catchment which would be difficult to remove (as witnessed in the existing stormwater channel).

Council asks for the shoring to be located outside the drainage easement. It is currently located outside the easement at the southern end, and only extends into the easement on the northern end to match in with the top of the existing batter. Shifting the shoring outside the easement and thereby widening the channel excavation would improve flood conveyance only slightly, and increase the risk of exposing contaminated fill.

Q2: Provide information on the elevation level of the excavated bench adjacent to the drainage channel, including where this level lies in relation to the highest tide and mean high water levels.

A2: We have added levels to each of the cross-sections on drawings SKC24 and SKC29 at the lowest point of excavation. We have also indicated Mean High Water (RL 0.52m AHD) and Highest Recorded Tide (RL 1.47m AHD) on the cross-sections.

Q3: Provide clarification on structural integrity of the sheet pile wall, whether any anchoring will be required or not and whether this will involve excavation landward of the sheet pile wall.

A3: Our concept design shows anchorage to a deadman anchor as an option only. Our drawings show that anchors can be installed while maintaining clearances from electrical services. Anchors would not be drilled below the electrical substation. The question of whether anchors would be required in other areas can only be answered by

the pile designers. Drilling of the anchors (if required) is preferred to trenching, to minimise possible impacts on existing services and/or contaminated materials, but not having to install the anchors is preferable to both anchorage installation methods.

Q4: Provide information on how the excavated bench will be treated to mitigate potential flow on erosion and sedimentation impacts to the adjacent channel and Aquatic Reserve. This needs to include information on how the excavated bench will be stabilised in the short and long term, and how these works will be sequenced with the construction of any approved landscaping works along the channel.

A4: During construction, we would propose to minimise siltation of the wetlands by:

- Installing a sediment control filter consisting of a geotextile linear "balloon" approximately 600mm in height filled with granular material on the perimeter of the area of the works. The filter would be lowered into position by a long-reach excavator from dry land, then the granular material added and the filter wrapped over and stitched together to form the balloon. The sediment control filter would not be affected by tidal movement. The position where it will be located is above low tide but below mean high tide.
- Installing the sheet pile wall
- Excavating in front of the wall using a long-reach excavator sitting behind and above the sheet pile wall
- Stabilising the exposed surface with a fibrous matting (in the short term) through which seedlings would be planted
- Removing the sediment control filter using the excavator, after completion of the stabilisation work.

The existing stormwater channel has been effectively stabilised by mangrove roots over the full width of the channel. This has been so effective that siltation is occurring with water backing up the culverts crossing Captain Cook Drive, even at low tide. Consequently, we would expect the risk of bed scour to be low (as distinct from scour of the banks, where mangroves have not become established). The most effective way to provide long-term protection against bed scour would be planting of more seedlings, which would establish themselves permanently. The type, size, spacing and methodology for planting of seedlings would be as recommended by the ecologist.

The NSW Department of Primary Industries (Fisheries) requested the following:

- A brief description of the construction methodology for the works adjacent to or within the channel.
- A final comprehensive Ecological Assessment is required to be submitted addressing the impacts of the proposed engineering works to the mangrove lined channel. This Assessment must include a detailed survey of vegetation i.e. mangroves and other vegetation communities. The report shall also address the potential impacts eg. environmental on the riparian zone for Woolooware Bay i.e. connectivity with proposed landscaped etc (MP10_0229 MOD 5).
- An assessment of potential environmental impacts from the works proposed to occur adjacent to/within the drainage channel. This needs to include potential direct and indirect impacts to aquatic habitats and marine vegetation within the drainage channel and within Towra Point Aquatic Reserve.

The response to Council's questions (above) have touched on the construction methodology for the sheet pile wall and the excavation in the channel, including stabilisation of the excavated surface in the channel.

Construction of the civil works, including bulk earthworks, roadworks, pavements, stormwater drainage and water quality controls, would be in accordance with normal construction practice, including the provision of erosion and sedimentation controls to Council and Fisheries standards. The additional requirements that are specific to this project are as follows:

- Siltation controls are to be installed in the stormwater channel before any work on or near the channel banks.
- Ausgrid's access to the substation and associated ducts is to be maintained at all times in accordance with the terms of their easements.
- All work in proximity to the existing power cables is to be carried out in accordance with Ausgrid requirements for protection of their cables.
- The sheet piling is to be installed by machinery situated on dry land, not in the channel.
- Excavation within the channel is to be carried out using machinery situated on dry land.
- Spoil that is to be removed from site is to be classified by an environmental engineer before disposal to landfill in accordance with the classification.
- Site runoff from site is to be pre-treated before discharge to the stormwater system discharging to the channel.

- All exposed surfaces are to be stabilised using short-term methods such as hydro-mulching and seeding until permanent landscaping including planting of bio-retention swales is installed.

Potential sources of pollution of the Aquatic Reserve are:

(a) The site construction works

(b) Erosion of the bench constructed below the proposed sheet pile wall

(c) Erosion of the landscaping constructed behind the sheet pile wall, and

(d) Pollution from the completed development itself.

(a) Potential pollution from the construction works will be controlled by the builder in accordance with Council and Fisheries requirements. This will include the control of sediment from earthworks, treatment of stormwater runoff prior to discharge, collection and disposal of rubbish from the construction site, and control of dust and air pollution.

Erosion and sedimentation from site earthworks will be controlled using measures outlined in the Landcom "Blue Book" as supplemented by Council standards, until all bare surfaces have been fully stabilised.

Treatment of stormwater runoff from the construction site will be carried out using filtration and dosage with flocculants to remove suspended fine sediments. All site runoff will be collected in basins or tanks and tested before being pumped to the drainage channel.

Rubbish from the construction works will be collected and removed from site in accordance with a Waste Management Plan to be prepared and controlled by the builder.

Dust control will be by such measures as the installation of wind breaks, spraying water over surfaces that could generate dust, and removal of surface dust from constructed works.

Air pollution from vehicles will be controlled by the use of catalytic converters and filters on plant and equipment exhausts in accordance with EPA regulations.

(b) The proposed methodology for siltation control during and after construction of the excavated bench was discussed in our response to Council's queries above.

(c) The areas that will have soft landscaping will be initially trimmed to profile by the builder and the surface stabilised by the use of sprayed mulch and grass seeding. Following completion of the main building works, the final mulching and planting of these areas will be carried out by the landscaping contractor. The landscaping contractor will be responsible for maintenance including watering until all vegetation has become established.

(d) In relation to the quality of stormwater discharged from the completed development, the current design proposed by at&l includes a bioretention swale for treatment of site runoff from Stage 3. The at&l drawings showed the stormwater discharge that overflows the bio-retention swale (in more extreme storm events) discharging to the stormwater channel with the provision of rock rip-rap to control scour. In our current concept, this pipe (or pipes) would pass through the proposed sheet pile wall, with the same scour protection at the outlet, on the excavated bench. Given that there would be open space accessible by the general public, we propose the addition of a CDS (Continuous Deflective Separation) gross pollutant trap just before the discharge to the stormwater channel, to collect any site litter. The actual size of the CDS unit and any additional treatment measures will be determined by modelling using the MUSIC software package, demonstrating that the proposed measures would remove pollutants in accordance with current Best Practice.

These elements have been shown on the attached drawings.

We trust that these responses fully address the questions raised by Council and DPI (Fisheries).

Yours faithfully
Calibre Consulting

Con Vink
Principal Engineer - Civil

ATTACHMENTS
1. SKC24 Protection of Ausgrid - Plan (Rev E)
2. SKC29 Protection of Ausgrid - Sections and Details (Rev D)