



Addendum To:

**Dangar Island Berthing Facility
Options**

Final Report February 2013

EVALUATION AND COMMENTS ON

ADDITIONAL DIMC MOORING FACILITY OPTION

1. Introduction

At a meeting with Hornsby Shire Council on 22 April 2013 DIMC presented an additional option and requested it be submitted to SMEC for evaluation. Details of their submission are attached. Council agreed to this and forwarded the details to SMEC. The results of this evaluation are presented below.

2. Updating of Existing Options

As well as evaluating the additional option, updating of details presented in the Final Report have been undertaken. Layouts have been updated for consistent spacing of vessels between Options 1, 2B 4 and 5 including updating the cost estimate. In updating the costs it was found that the number of piles for Options 4 and 5 had been miscounted which has resulted in the costs for these options increasing. In addition the cost estimates for Options 1 and 2B have increased due to the adjustment of spacing for consistency with Options 4 and 5.

3. Additional DIMC Option

The Option put forward by DIMC has been renamed called Option 6 and has been set out and costed as requested. The spacing of vessels used on this Option is 2.4m with the stabilising fingers removed although this could not be adapted in practice. It has to be emphasised that while this option was costed as per the DIMC layout that it is essential that the fingers between each pair of berths are provided to ensure stability for the pontoons subject to flooding current loads. These fingers are not the same as the light duty fingers at Brooklyn. Thus this layout that would have to be constructed is a set out in Option 6A.

4. Comments on DIMC Submission Points

In making these comments SMEC needs to emphasis that the environment this facility is being constructed in is very severe and environmental loads need to be fully allowed for to ensure an adequate level of service is provided.

In reference to the DIMC points set out in their submission Option, SMEC make the following comments, referencing the DIMC points:

Point 1

- The mooring pontoons at Brooklyn are not compatible with the environmental loads at the Dangar Island site.
- The berth widths for Option 4 and 5 are $((2 \times 3\text{m}) - 0.9\text{m}) / 2 = 2.55\text{m}$

- We have adjusted Options 1 and 2B for consistency.
- The fingers between each pair of berths are required to provide additional stability for the pontoons which are subject to flooding current loads. The fingers are not the same as the light duty fingers at Brooklyn.
- The pontoons experience suction on the leading edge which drag the pontoon leading edge down. If the current is high enough this can drag the edge under and failure of the pontoons can result.

Point 2

- (i) Option 6 extends an additional 6m into the main river channel than the preferred Option 2B. The westerly aspect is also increased by 12m resulting in increased loading on the structure. Changes to details such as increasing the west face projection of the facility by 12m may not sound like much but in reality this is about a 38% (12/32) increase in loading from the adverse westerly loading. Option 6 as set out shows 34 vessels. In order for compatibility with Options 1, 2B, 4 and 5 the nominated length would only make provision for 28 vessels which would significantly increase the cost per berth. In order to achieve 34 berths the facility would extend at least another 9m into the channel with a corresponding increase in westerly exposure.
- (ii) SMEC agrees that the projection of the facility Option 6 is significantly less in the westerly direction by approximately 21m than Option 2B.
- (iii) SMEC agrees that Option 6 projects across less property. The predominant concerns are flooding current and debris loading from the west followed by wave loading from the west and north west. The advantage of a smaller western face of the facility from a structural durability consideration cannot be understated.
- (iv) SMEC agrees that point of access score improves for Option 6.
- (v) No comment required on technical issues.
- (vi) SMEC notes that the Council preferred option was to avoid relocation of the Fire boat if possible.
- (vii) Fire boat access from pontoon was not a criteria specified by Council. SMEC agrees that this may be easier however security may be an overriding factor. This option is also available for Option 2B at additional cost to Council therefore not differentiated.
- (viii) Number of berths is less if consistent set out required for stabilising fingers is used or unacceptable extension to north to achieve required number of berths. (refer to point (i) above)
- (ix) SMEC agrees that not having visitor berths on the northern face is a significant advantage but not differentiated from Option 1 or 2B.
- (x) There is some potential for collision with the gangway when attempting to use existing access steps.

- (xi) Partial removal of existing wharf is not a structural requirement. This possibility was noted to increase ease of access to offload ramp for barges as it was noted that this access was tight for some vessels. Cost saving for this item is not a differentiation for Option 2B as jetty could be retained for this option also.
- (xii) We disagree with the cost analysis. The cost comparison for Council compared to Option 0 is straight forward however when comparing cost for the private berthing component it is useful to use cost per berth rather than total cost. The cost for Option 6 is approximately \$16,000 per berth however if a like for like set out it used then there would only be 28 private berths with some additional cost for stabilising fingers resulting in a total cost per berth approaching \$20,000 which is more than the cost of approximately \$18,600 for Option 2B.

5. Summary of Cost Revisions

The following modifications have been made to the tables on the original report:

Table 4.1

	Option 0	Option 1		Option 2B		Option 4	Option 5	Option 6
Cost	\$289,973	\$377,484		\$334,738		\$414,171	\$469,820	\$465,138
Contingency	\$28,997	\$37,748		\$33,474		\$41,417	\$46,982	\$46,514
Total	\$318,971	\$415,232		\$368,212		\$455,588	\$516,802	\$511,651
	0.0%	30.2%		15.4%		42.8%	62.0%	60.4%

Table 4.2

	Option 0	Option 1		Option 2B		Option 4	Option 5	Option 6
Private Cost		\$511,488		\$675,435		\$566,486	\$627,533	\$496,773
Contingency		\$51,149		\$67,543		\$56,649	\$62,753	\$49,677
Total		\$562,636		\$742,978		\$623,135	\$690,286	\$546,450
No of Berths		36		40		38	37	34
Per Berth		\$15,629		\$18,574		\$16,398	\$18,656	\$16,072

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Table 4.3

	Option 0	Option 1		Option 2B		Option 4	Option 5	Option 6
Council Cost	\$318,971	\$415,232		\$368,212		\$455,588	\$516,802	\$511,651
Private Cost	\$0	\$562,636		\$742,978		\$623,135	\$690,286	\$546,450
Total	\$318,971	\$977,868		\$1,111,190		\$1,078,723	\$1,207,088	\$1,058,101

Table 4.4 – Weighted Evaluation Scores

Option	Factor Scores and Factor Weighting										Score	Rank	
	Optimal Structural Performance	Environmental Load Effectiveness	Pontoon Cost/ Option 0 Cost	Construction Difficulty	Maintenance Costs	Separation of Operational Areas	Need for Dredging	Need to Relocate RFS	Disability Access	Future Private Berth Expansion			
Weighting Factor	0.15	0.15	0.15	0.05	0.05	0.1	0.15	0.05	0.1	0.05			
1	5	5	5	3	3	5	5	1	3	1	1	4.2	2
2A	5	5	3	1	5	5	1	5	5	3	3	3.8	3
2B	5	5	3	3	3	5	5	5	3	5	5	4.3	1
3	5	5	5	1	5	5	1	1	5	1	1	3.8	4
4	3	1	1	3	1	1	5	1	1	3	3	2.1	7
5	3	1	1	3	1	1	5	1	1	3	3	2.1	6
6	3	1	1	3	1	5	5	1	1	1	1	2.4	5

6. Conclusion

The evaluation of this Option placed it overall in a similar position to the other perpendicular to the shore Options.

Finally SMEC would like to reiterate the arduous nature of the environmental load conditions at the Dangar Island site. The detailed design of the pontoons will be the responsibility of the pontoon manufacturer. SMEC note that some commercial pontoons systems will not be suitable for this site and some pontoon manufacturers may decline to offer due to the high current loads and wave climate.