MARICO MARINE

TEES VALLEY COMBINED AUTHORITY

TEES SOUTH BANK NAVIGATION RISK ASSESSMENT - ADDENDUM

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MARINE AND RISK CONSULTANTS LTD

TEES VALLEY COMBINED AUTHORITY

TEES SOUTH BANK NAVIGATION RISK ASSESSMENT - ADDENDUM

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EXECUTIVE SUMMARY

During 2020, Tees Valley Combined Authority (TVCA) appointed Marine and Risk Consultants Ltd (Marico Marine) to undertake a Navigation Risk Assessment (NRA) to assess the impact of the construction and operation of the South Tees development project on the existing navigation risk profile of the River Tees.

The final draft of that NRA[1] was dated 10 November 2020 and delivered to TVCA.

Since the original NRA was submitted, permissions have been sought to undertake phase 1 of the project only, with some further changes to methodology and dredge volumes anticipated.

This addendum is required to consider Phase 1 only to reflect changes proposed by the Contactor to the initial proposals.

The purpose of this document is to confirm that the risk to navigation posed by Phase 1 of the project only and undertaken by Cutter Suction Dredger would remain acceptable.

The proposed changes to dredge methodologies and areas have been re-assessed, and it is concluded, based on the quantified assessments of navigational risk for both the original NRA, and a subsequent internal review of using a Cuter Suction Dredger only, that overall navigational risk during the construction phase of the Tees South Bank Project will decrease, almost entirely as a result of the significant reduction in vessel traffic due to the use of a cutter suction dredger and two large barges, instead of multiple smaller dredging vessels.

Furthermore, it is the opinion of the assessor that should it become necessary to adopt a hybrid dredging approach (for example, mainly CSD, but also some BHD / THSD excavations), navigational risk would remain acceptable, due to the fact that the level of risk was mainly driven by the number of vessel movements – and therefore the potential frequency of hazards being realised.

[1] Tees South Bank NRA, document number 20UK1650, 10 November 2020, Marine and Risk Consultants Limited.

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1 INTRODUCTION

During 2020, Tees Valley Combined Authority (TVCA) appointed Marine and Risk Consultants Ltd (Marico Marine) to undertake a Navigation Risk Assessment (NRA) to assess the impact of the construction and operation of the South Tees development project on the existing navigation risk profile of the River Tees.

The final draft of that NRA was dated 10 November 2020 and delivered to TVCA.

Subsequently, to support possible changes to the proposed construction methodology, Marico Marine was asked to undertake a revised assessment to review navigational risk, making the assumption that all dredging would be undertaken using a Cutter Suction Dredger CSD). While not a formal project document, this assessment was delivered as short addendum to the original NRA to review the impact of the proposed changes to plant in terms of quantified navigational risk.

The proposed development was fully described in the original NRA report, but briefly, it will include the demolition of the existing wharf and the construction of a 1,035m long quay on the South Bank of the River Tees and will be completed in two phases:

- Phase 1: Partial demolition of the existing berth and construction of a new 450m berth; and
- Phase 2: Demolition of remaining berth and construction of an additional berth length of approximately 585m.

The construction phase also requires dredging of the Tees Dock Turning Area, the Navigable Channel adjacent to the proposed berths and the proposed Berth Area - to enable the accommodation of vessels at the new facility

2 ADDENDUM TO ORIGINAL NRA

Since the original NRA was submitted, permissions have been sought to undertake phase 1 of the project only, with some further changes to methodology and dredge volumes anticipated

This addendum is required to consider Phase 1 only to reflect changes proposed by the Contactor to the initial proposals:

- A change of dredging plant form Trailing Suction Hopper Dredger (TSHD) and Back Hoe Dredger (BHD), to Cutter Suction Dredger (CSD) for the majority of the dredging works (all phases);
- A slight re-alignment of the dredge profile in the turning circle (and dredging by CSD as above).

- An increase in the dredge volumes due to a proposed variation to the marine licence which may re-classify material which was originally planned to be recovered onshore that is now planned for offshore disposal.

2.1 EFFECTS OF USING A CSD

The internal amended NRA considered the following changes to the original proposals:

- A change of dredging plant form TSHD and BHD, to CSD for the majority of the dredging works (all phases);
- A slight reduction in the area to be dredged in the Phase 2 plan area near the mudflat (North Bank upriver end of project) – the new dredge area is reduced to avoid disturbing the slag bunds that retain the mudflat; and
- A slight re-alignment of the dredge profile in the turning circle (and dredging by CSD as above).

Taken together, these proposed changes were considered to have the following impacts in terms of navigation following formal risk assessment, and consultation with the Harbour authority and pilots:

- A (slight) reduction in the volume of material for disposal;
- Reduced time for the dredging component of the project (efficiencies from using CSD);
- A reduction in the number of vessel movements to sea (larger capacity of barges used by CSD, compared to TSHDs);
- Larger vessels used (disposal barge), and barges requiring towage rather than being self-propelled;
- A reduction in the requirement for pilotage resource due to reduced movements; and
- The CSD will be less manoeuvrable than TSHDs on site, as anchored while dredging.

2.2 PHASE 1 UNDERTAKEN BY CUTTER SUCTION DREDGER

The purpose of this document is to confirm that the risk to navigation posed by Phase 1 of the project only and undertaken by Cutter Suction Dredger would remain acceptable.

The estimated duration, number of movements and dredge volumes for the original proposal (Phase 1 only) are given in **Table 1**.

Table 1: Original Estimated Construction Vessel Movements and Dredge Volumes – Phase 1 Only

Dredging	No. of Weeks	Movements		Phase 1 Dredge
	Phase 1	Average/Week	Max/Week	Volume (m^3)
EGD/BHD: 2 Barges (Contaminated Material)	6	16	21	90,000
BHD: 2 Barges (Soft Material)	1	77	102	410,000
TSHD (Soft Material)	5	66	88	
BHD: Barge (Hard Material)	6	30	40	150,000
Totals	**18**			**650,000**

Revised dredge volumes under the most recently amended proposals are shown in **Table 2** and revised production parameters in **Table 3.**

Table 2: Revised Phase 1 Dredge Volumes (Source: Van Oord)

Item	Volume (m3)
1. Soft material (Total) *a. Berth Pocket* *b. Channel* c. *Turning Circle*	435,000 (Total) *175,000* *120,000* *140,000*
2. Hard material *a. Berth Pocket* *b. Channel* c. *Turning Circle*	640,000 (Total) *460,000* *105,000* *75,000*
3. Contaminated material to be discharged ashore	125,000
4. Siltation allowance – soft material	35,000
Total dredging volume	**1,235,000**

(**N.B.** The significant increase in volume is a worst-case scenario, including the additional material to be disposed of offshore, which is subject to MMO approval – **see section 2**)

Table 3: Revised Production Parameters for CSD (Source Van Oord)

Parameter	Soft soil	Hard soil
Weekly operational time	115 hr/week	115 hr/week
Dredge cycles per week	22	14
Barge capacity	10,107 m3	10,107 m3
Hopper load	2,000 situ m3	5,000 situ m3
Maximum weekly production (during bulk dredging)	240,000 situ m3/week	180,000 situ m3/week

From the above data, the following comparison with respect to the intensity of vessel movements can be made (**Table 4**):

Table 4: Vessel Movement Comparison

	Original Proposal	Amended proposal	Difference
Hard material movements per week	30	14	-16
Soft material movements per week	159	22	-137
Duration (weeks)	41*	21	-20
Total vessel movements	(Approx.) 1680	363	-1317

* In original proposal multiple vessels may have worked concurrently, so overall duration may have been less, but total movements would be unaffected.

2.3 IMPACTS OF REVISED METHODOLOGY ON SAFETY OF NAVIGATION

It is clear from **Table 4** above, that the revised proposals will result in a significant reduction in dredge vessel movements, albeit each movement will be of a much larger vessel.

In terms of this assessment, this means that the opportunity for navigational incidents to occur (related to the dredging vessels) is greatly reduced (the frequency with which hazards may be realised is reduced), both as a result of less vessel transits from the dredge areas to the disposal areas at sea, and also because fewer vessels will be used overall.

However, it is considered that the use of much larger disposal vessels (barges) may have the potential to result in more significant impacts if they were to be involved in an incident. Nevertheless, PD Teesport has considerable experience of managing towed vessel traffic of this size, all of which would be subject to pilotage. The significant reduction in vessel transits will greatly ease the pilotage resourcing issue previously identified, and two movements a day should be easily covered by current resources.

In terms of the dredge operation itself, the utilisation of CSD vessels means that during operations the dredger will be anchored using a combination of anchors / cables and a “spud” on the dredger. Therefore, the CSD is unable to manoeuvre to avoid other river traffic while operational, but conversely, the vessel’s location can be planned and promulgated in advance of other vessel movements. When other traffic passes, the anchor cables van be lowered to the seabed and dredging operations temporarily suspended.

However, should it be required to make full use of the turning circle for shipping during dredging operations, the CSD may have to be completely removed, which will require considerable advanced planning.

3 BASELINE NAVIGATION SCENARIO

The baseline navigation scenario remains unchanged from the original assessment.

4 HAZARD IDENTIFICATION

See original NRA for detail.

5 NAVIGATION RISK ASSESSMENT

This note does not constitute a full navigation risk assessment but has been informed by the original formal NRA undertaken for the whole project (Phases 1 and 2) and an additional internal assessment undertaken for the client, to quantify the navigational impact of using a Cutter Suction dredger only for the original phases / volumes.

6 POSSIBLE HYBRID CONSTRUCTION METHODOLOGY

While this note has been produced to consider the consequences to navigational risk of using a CSD only for the entirety of phase 1, it is the opinion of the assessor that should it become necessary to adopt a hybrid dredging approach (for example, mainly CSD, but also some BHD / THSD excavations), navigational risk would remain acceptable, due to the fact that the level of risk was mainly driven by the number of vessel movements – and therefore the potential frequency of hazards being realised.

The quantified level of risk could only be established following a new assessment of final traffic numbers, but this is not considered necessary, as by definition, any element of CSD production will result in a lower risk than that established in the original NRA, which was shown to be acceptable with suitable mitigations in place.

7 CONCLUSIONS AND RECOMMENDATIONS

The proposed changes to dredge methodologies and areas have been re-assessed, and it is concluded, based on the quantified assessments of navigational risk for both the original NRA, and subsequent internal review of using a CSD only, that overall navigational risk during the construction phase of the Tees South Bank Project will decrease, almost entirely as a result of the significant reduction in vessel traffic due to the use of a cutter suction dredger and two large barges, instead of multiple smaller dredging vessels.

The operation of the CSD, while requiring management to ensure no conflict with passing vessels, will be more predictable due to its more stationary operations, allowing existing traffic management procedures to remain effective.

A further advantage of the proposal is the reduced requirement for Pilotage, allowing much more effective use of pilotage as a risk reduction mitigation.

Overall, the risk reduction identified positively supports the amendments to the project methodology.