Application to the Littlehampton Harbour Board for permission under S43 of The Littlehampton Harbour and Arun Drainage Outfall Act 1927 to undertake works on the West Side of the Littlehampton Harbour at the Arun Timber Docks (ATD) South Dock.

To: Littlehampton Harbour Board, Harbour Office, Pier Road, Littlehampton, West Sussex BN17 5LR

Applicant: River Arun Investments Ltd. Company registration number 81181.

7, Longfields, La Route Du Petit Clos, St.Helier, Jersey JE2 3FX

Date of Application: 26 November 2019

This application is identical to the application approved by the LHB on 19 march 2018

Project Title

Arun Timber Docks; removal of decaying existing wooden piles and installation of new steel piles and pontoons.

Project description

Improve the existing moorings at this site by removing and replacing piles and pontoons

The existing wooden piles will be removed and new steel piles installed.

Pontoons will be attached to the new steel piles and join up with the existing run, existing bridge access will be maintained, as will access to the inside run of new pontoons.

Activities of works

Site

Arun Timber Docks, South Dock

Site location

The site of works is located on the western side of the River Arun, opposite River Road Littlehampton

See MMO licence schedule 1 for coordinates

Activity 1.1 Removal of existing rotten wooden piles

Methodology

The wooden piles will be sawn off and removed from the site to the nearby works yard.

Programme of Works

Removal work can only take place at low tide.

Activity 1.2 Installation of new steel piles and pontoons

Activity type, Construction of new works

Description

Installation of 3 number vertical steel cylindrical piles of the dimensions 18 metres long by 415 millimetres diameter. New pontoons will be attached to the existing north run of pontoons and piles.

Methodology

The contractor carrying out the piling will be Walcon and River Arun Investments Ltd and will use their own manpower, plant and equipment in a supporting role.

Vessels will include the Jenny B, the company's work boat and the piling rig Walcon Wizard

The JNCC Statutory nature conservation agency protocol including soft start techniques for piling will be used as a guide to best practice in respect of all piling activity.

Programme of works and LOCAL CONSENT EXPIRY

The LHB Local Consent is sought for the works to be undertaken from 01 March 2020 to be completed on or before 27 September 2022

Subject to its availability prior to 22 September 2022 the piling rig will attend the harbour and drive in the steel piles. Once the piles are installed the pontoons will be attached and the water and electricity will be connected up.

Supporting Documents

1. **Marine Management Organisation Marine Licence**
   1.1. Licence number L/2017/00367/1 issued in respect of these proposed works to River Arun Investments Ltd. The Licence start date 28th September 2017, end date 27 September 2022

2. **Littlehampton Harbour Board Permit**
   2.1. Reference: Littlehampton/05/17/1

3. **MMO Licence schedule 1, Site coordinates**

4. **Site maps giving measurements and precise location of piles and pontoons**
   4.1. Site plan 1
   4.2. Site plan 2
   4.3. Site plan 3
   4.4. Site plan 4
   4.5. Site plan 5
5. River Arun Survey Chart depths
6. Wooden Pile Survey Report by Dr P Tosswell
7. Explanatory email from 25 May 2016 11:48 setting out critical points that formed the applicants original submission to the LHB for Permit reference: Littlehampton05/13-3
8. HOP Schedule of Condition of Piles and revetment

Robert M Boyce

For River Arun Investments Limited
Rope House
Rope Walk
Littlehampton
West Sussex
BN17 5DH

Email robert.boyce@me.com or robertboyce@msn.com

Tel:- 01903 713996 / 722063

Fax:- 01903 725911

Mob:- 07766 680086

From: **Brendan Rowe** brendan@seawideservices.co.uk
Subject: RE: North Dock Pile removal
Date: 27 November 2019 at 10:48
To: R M Boyce robert.boyce@me.com
Cc: office@seawideservices.co.uk

BR

Good Morning Robert

I have had a good look at your site and documentation you have sent me in view of removing the timber piles and supports above the mud bed level.

Our method would be supporting the timbers from our vessels crane and chain saw as close to the mud bed as practicable. Please see attached one of your drawings which I have indicated with a highlighted line the approximate position of the cuts.

We would then transport using our vessel to a site arranged and paid for by yourself and unload. It might be possible to arrange the use of the quay side North East of the foot bridge where we discharged the Harbours timber.

The cost of the above works

£15,000.00 plus any harbour and alongside berthing dues. Inclusive of bunkers this figure includes chain saws, disk cutters, oxy. propane cutting equipment, labour & accommodation.

The cost of disposal of the timber and any other materials to be paid be you.

Mob Falmouth to Littlehampton £1000.00 plus bunkers

Demob Littlehampton to Falmouth £1000.00 plus bunkers

Cost of bunkers on the last two passages between Falmouth and Littlehampton has been approximately 1600 Litres, today's price £0.65 per litre

Terms
Mob and Demob to be paid in full including VAT on departure Falmouth
£10,000.00 plus VAT to be paid on arrival Littlehampton

Remaining £5,000.00 plus VAT to be paid on completion of above works.

All above is subject to V.A.T. and you obtaining a Marine Licence.

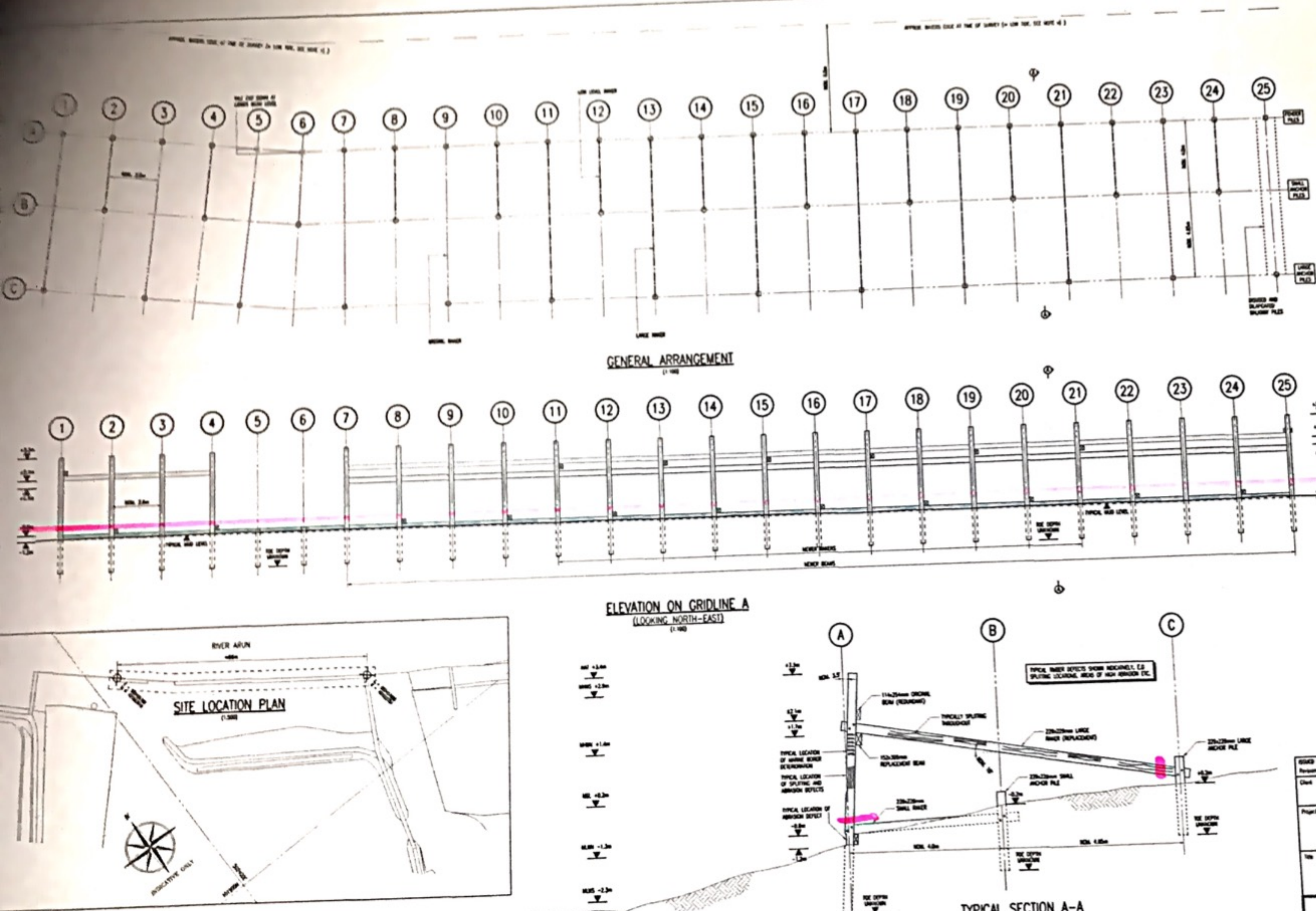
We estimate one week to complete

Quote valid until 29th February 2020

Please contact me to discuss further the above or any other works.

Best Regards
Brendan Rowe
+44(0) 7770 262649
brendan@seawideservices.co.uk

From: R M Boyce [mailto:robert.boyce@me.com]



NOTES.

1 GENERAL

(i) This drawing is not to be scaled, work to figured dimensions only, confirmed on site.

(ii) This drawing is to be read in conjunction with all relevant architectural drawings, detailed specifications where applicable and all associated drawings in this series.

(iii) Any discrepancy on this drawing is to be reported immediately to the partnership for clarification.

(iv) Pile spacings are variable, shown nominally for clarity.

(v) Walkover Condition Survey carried out at low tide in calm water, low wind, fine and dry conditions. All Levels are relative to water level at 9:15am on 02/08/15 and have been approximately referred back to Ordnance Datum.

(vi) The purpose of the Walkover Survey was to gain a general appreciation of the site condition, and not to survey specific details. HOP can not be liable for not identifying particular aspects of the structure.

(vii) All site dimensions are to an accuracy of ±100mm.

(viii) Water levels based on average values of Littlehampton (Entrance) and Littlehampton (UMA Wharf).

Client: OSBORNE OF ARUN GROUP (MANAGEMENT) LTD.

Project: ARUN TIMBER DOCK, LITTLEHAMPTON

Title: SOUTH DOCK GENERAL ARRANGEMENT, ELEVATION AND SECTION

HOP
HEMSLEY ORRELL PARTNERSHIP
CONSULTING CIVIL & STRUCTURAL ENGINEERS

Project No.	Sub No.	Drg. No.	Rev. No.
14683	02	01	–

Marine Management Organisation Marine Licence

1 Introduction

This is a licence granted by the Marine Management Organisation on behalf of the Secretary of State to authorise the licence holder to carry on activities for which a licence is required under Part 4 of the Marine and Coastal Access Act 2009.

1.1 Licence number

The licence number for this licence is L/2017/00367/1

1.2 Licence holder

The licence holder is the person or organisation set out below:

Name / company name	River Arun Investments Ltd
Company registration number (if applicable)	81181
Address	7 Longfields, La Route Du Petit Clos, St Helier, Jersey, JE2 3FX
Contact within company	Robert Boyce
Position within company (if applicable). State if company officer or director	Managing Agent

1.3 Licence date

Version	1
Licence start date	28 September 2017
Licence end date	27 September 2022
Date of original issue	05 October 2017

1.4 Licence validity

This version of this licence is valid from the licence start date to the licence end date.

This version of this licence supersedes any earlier version of this licence. Any activity commenced under a previous version of this licence and which is also a licensed activity authorised by section 4 of this version of this licence may continue in accordance with the licence conditions in section 5 of this version of this licence.

Validity unknown

Mr Ben Lander
+44 (0)208 026 5106
benjamin.lander@marinemanagement.org.uk

2 General

2.1 Interpretation

In this licence, terms are as defined in section 115 of the Marine and Coastal Access Act and the Interpretation Act 1978 unless otherwise stated.

- "licensed activity" means any activity set out in section 4 of this licence.
- "licence holder" means the person(s) or organisation(s) named in section 1 above to whom this licence is granted.
- "MMO" means the Marine Management Organisation.
- "mean high water springs" means the average of high water heights occurring at the time of spring tides.
- "sea bed" or "seabed" means the ground under the sea.
- "the 2009 Act" means the Marine and Coastal Access Act 2009.
- All times shall be taken to be the time on any given day.
- All geographical co-ordinates contained within this licence are in WGS84 format (latitude and longitude degrees and minutes to three decimal places) unless stated otherwise.

2.2 Contacts

Except where otherwise indicated, the main point of contact with the MMO and the address for email and postal returns and correspondence shall be:

Marine Management Organisation
Lancaster House
Hampshire Court
Newcastle upon Tyne
NE4 7YH
Tel:0300 123 1032
Fax:0191 376 2681
Email:marine.consents@marinemanagement.org.uk

Any references to any local MMO officer shall be the relevant officer in the area(s) located at:

Marine Management Organisation
Fish Market
Rock-A-Nore Road
Hastings
East Sussex
TN34 3DW

Tel: 01424 424109
Fax: 01424 444642
Email: hastings@marinemanagement.org.uk

3 Project overview

3.1 Project title

Arun Timber Docks; Removal of decaying existing wooden piles and installation of new steel piles and pontoons

3.2 Project description

This licence allows the making safe of the existing moorings on this site by removing and replacing piles and pontoons.

The existing wooden piles will be removed and new steel mooring piles installed.

Pontoons will be attached to the new steel piles and join up with existing ones, existing bridge access will be maintained.

4 Licensed activities

This section sets out the licensed activities. The licensed activities are authorised to be carried on only in accordance with the activity details below and with the licence conditions as set out in section 5 of this licence.

Please note that where licensed quantities are displayed with reference to their constituent materials, the relative quantities given for the constituent materials are indicative only.

Site 1 - Arun Timber Docks moorings	
Site location	The site of works is located on the southern side of the River Arun, opposite River Road in Littlehampton.
Activity 1.1 - Removal of existing rotten wooden piles	
Activity type	Other works
Activity location	Please see the coordinates schedule.
Description	The removal of old rotten wooden piles.
Methodology	The wooden piles will be sawn off and removed from the site to the nearby works yard.
Programme of works	Removal work can only take place at low tide.
Activity 1.2 - Installation of new steel piles and potoons	
Activity type	Construction of new works
Activity location	Please see the coordinates schedule.
Description	Installation of 4 number vertical steel cylindrical piles of the dimensions 18 meters long by 340 millimetres diameter. Installation of 4 steel mooring piles of dimensions 18 meters long by 415 millimetres diameter. 2 Existing pontoons and 3 new pontoons will be attached to the existing north run on pontoons and the new piles.
Methodology	The contractor carrying out the piling will be Walcon and River Arun Investments Ltd and will use their own manpower, plant and equipment in a supporting role. Vessels will include the Jenny B, the company's work boat, and the piling rig Walcon Wizard. The JNCC Statutory nature conservation agency protocol including soft start techniques for piling will be used as a guide to best practice in respect of all piling activity.
Programme of works	Subject to its availability during the next 18 months the piling rig will attend the harbour and drive in the 45 piles.

	Once the piles are installed the pontoons will be attached and the water and electricity will be connected up.

5 Licence conditions

5.1 General conditions

5.1.1 Notification of commencement

The licence holder must notify the MMO prior to the commencement of the first instance of any licensed activity. This notice must be received by the MMO no less than five working days before the commencement of that licensed activity.

5.1.2 Licence conditions binding other parties

Where provisions under section 71(5) of the 2009 Act apply, all conditions attached to this licence apply to any person who for the time being owns, occupies or enjoys any use of the licensed activities for which this licence has been granted.

5.1.3 Agents / contractors / sub-contractors

The licence holder must notify the MMO in writing of any agents, contractors or sub-contractors that will carry on any licensed activity listed in section 4 of this licence on behalf of the licence holder. Such notification must be received by the MMO no less than 24 hours before the commencement of the licensed activity.

The licence holder must ensure that a copy of this licence and any subsequent revisions or amendments has been provided to, read and understood by any agents, contractors or sub-contractors that will carry on any licensed activity listed in section 4 of this licence on behalf of the licence holder.

5.1.4 Vessels

The licence holder must notify the MMO in writing of any vessel being used to carry on any licensed activity listed in section 4 of this licence on behalf of the licence holder. Such notification must be received by the MMO no less than 24 hours before the commencement of the licensed activity. Notification must include the master's name, vessel type, vessel IMO number and vessel owner or operating company.

The licence holder must ensure that a copy of this licence and any subsequent revisions or amendments has been read and understood by the masters of any vessel being used to carry on any licensed activity listed in section 4 of this licence, and that a copy of this licence is held on board any such vessel.

5.1.5 Changes to this licence

Should the licence holder become aware that any of the information on which the granting of this licence was based has changed or is likely to change, they must notify the MMO at the earliest opportunity. Failure to do so may render this licence invalid and may lead to enforcement action.

5.1.6 Licence quantities

Where a licensed activity comprises dredging or the disposal of dredged material, the total quantity of material authorised to be dredged or disposed of in any given time period shall be as set out for that licensed activity in section 4 of this licence.

For each time period, the actual quantity dredged or disposed of shall be calculated by adding the quantity of material dredged or disposed of during that time period under this version of this licence to that dredged or disposed of under any previous version of this licence that was valid during that time period.

5.2 Project specific conditions

This section sets out project specific conditions relating to the licensed activities as set out in section 4 of this licence.

During works	
5.2.1	The intertidal area must be returned to its original profile. To verify this, a baseline photographic survey must be undertaken prior to the commencement of the licensed activities. A further repeat photographic survey must be undertaken no later than 10 working days after the licensed activities have been completed. Both surveys must be submitted to the MMO within 10 working days of the survey data being collected. Reason: *To ensure the seabed is returned to a similar state after the licensed activities to promote recovery.*
5.2.2	There must be no storage of construction materials or equipment on the foreshore. All materials and equipment must be stored clear of watercourses. Reason: *To minimise impacts on the environment.*
5.2.3	Bunding and/or storage facilities must be installed to contain and prevent the release of fuel, oils, and chemicals associated with plant, refuelling and construction equipment, into the marine environment. Secondary containment must be used with a capacity of no less than 110% of the container's storage capacity. Reason: *To minimise the risk of marine pollution incidents.*
5.2.4	Any oil, fuel or chemical spill within the marine environment must be reported to the MMO Marine Pollution Response Team within 12 hours [or in line with the approved marine pollution contingency plan if one is available]. Within office hours: 0300 200 2024.

	Outside office hours: 07770 977 825. At all times if other numbers are unavailable: 0345 051 8486. dispersants@marinemanagement.org.uk Reason: *To ensure that any spills are appropriately recorded and managed to minimise the risk to sensitive receptors and the marine environment.*
5.2.5	Where piles cannot be completely removed, they must be removed to at least 1 meter below seabed level. This must be undertaken prior to installation of new steel piles. Reason: *To minimise the risk to navigational safety/other users of the sea/sea bed/the dynamic marine environment.*

6 Compliance and enforcement

This licence and its terms and conditions are issued under the Marine and Coastal Access Act 2009.

Any breach of the licence terms and conditions may lead to enforcement action being taken. This can include variation, revocation or suspension of the licence, the issuing of an enforcement notice, or criminal proceedings, which may carry a maximum penalty of an unlimited fine and / or a term of imprisonment of up to two years.

Your attention is drawn to Part 4 of the Marine and Coastal Access Act 2009, in particular sections 65, 85 and 89 which set out offences, and also to sections 86, 87 and 109 which concern defences. The MMO's Compliance and Enforcement Strategy can be found on our website (https://www.gov.uk/government/publications/compliance-and-enforcement-strategy).

LITTLEHAMPTON HARBOUR AND ARUN DRAINAGE OUTFALL ACT 1927 S43

LITTLEHAMPTON HARBOUR BOARD

Harbour Office
Pier Road
Littlehampton
West Sussex BN17 5LR
Telephone: 01903 721215
Facsimile: 01903 739472

DECISION NOTICE

Application Reference: Littlehampton/05/13-3

To Addressee:
Osborne of Arun Group
The Rope House
Rope Walk
Littlehampton
West Sussex
BN17 5DH

Site Address:
Additional piles adjacent to Arun Timber Docks on West Bank of River Arun
Contact: Mr R Boyce

Description and Development

Removal of 3 steel piles from Littlehampton Yacht Club (LYC).

Driving of up to 10 steel cylindrical piles (3 from LYC, up to 7 additional), to be inserted into the river bed alongside the existing pontoon run of the North Timber Dock and the proposed new pontoon run alongside the South Timber Dock.

Modification of pontoon moorings adjacent to Arun Timber Docks to allow mooring of vessels inside and outside of pontoons.

Piling and pontoon arrangements as per plans submitted to LHB via email 25th May 2016 (pdf documents "Margin of safety 1" and "Margin of safety 2" and attached to this consent.

In pursuance of their powers under this Act and related Orders and Regulations the Littlehampton Harbour Board give conditional consent for these operations to be carried out in accordance with the application and plans submitted subject to compliance with the conditions specified below.

This consent replaces consent issued 29th January 2016 (Littlehampton/05/13-2) which itself is rescinded.

Specific Conditions

1. Arrangement of piles, pontoons and vessels berthed adjacent to North Timber Dock to conform to the following parameters:

Maximum distance off current wooden piling for new steel piles (centre) to be 6.5m;

Maximum pontoon width 2.5m;

Maximum total distance (pile and pontoon) from current wooden staging 8.9m;

Piles to be enclosed in pontoons;

Single berthing only throughout;

Maximum vessel width 3.7m;

Maximum vessel width on southerly 11m section of pontoon 2.7m.

Any deviation from this configuration to be removed at Osborne of Arun Group's expense.

Reason: To ensure encroachment into main channel is limited and safety of navigation is maintained.

2. Arrangement of piles, pontoons and vessels berthed adjacent to South Timber Dock (aka North Yacht Berth) to conform to the following parameters:

Maximum distance off current wooden piling for new pontoons at northern end of pontoon run to be 6.2m;

Maximum distance off current wooden piling for new pontoons at southern end of pontoon run to be 4.5m;

Maximum pontoon width 2.0m;

Maximum total distance (pile and pontoon) from current wooden staging 8.2m at northern end of run and 6.5m at southern;

Single berthing only throughout;

Maximum vessel width 3.5m;

Any deviation from this configuration to be removed at Osborne of Arun Group's expense.

Reason: To ensure encroachment into main channel is limited and safety of navigation is maintained.

3. Existing wooden structures on foreshore adjacent to piling works taking place to be removed or cut down to bed level on completion of piling works.

Reason: To remove dilapidated structures and debris from the area which may present a danger to navigation.

4. The Harbour Master's office is to be notified at least 10 days prior to the commencement of works.

Reason: To allow the Harbour Master to issue a Local Notice to Mariners to ensure other vessels in the vicinity are aware of the works and can safely plan and conduct their passage.

For information on the Harbour visit our Web Site at: www.littlehampton.org.uk
E-Mail: harbour@littlehampton.org.uk

LITTLEHAMPTON HARBOUR AND ARUN DRAINAGE OUTFALL ACT 1927 S43

General Conditions

1. This consent in no way affects, removes, or alters the responsibility of the applicant, licensee, or contractor to ensure that his works are constructed in such a way so as not to affect, or obstruct, or cause siltation, or cause any other let or hindrance to any channel, berth, quay, mooring, or other works in the vicinity. Littlehampton Harbour Board as Harbour Authority will not accept any liability in such matters.

2. All or any other necessary statutory consents to be obtained including those of the Marine Management Organisation (under the Marine and Coastal Access Act 2009), Environment Agency (in respect of dredging or piling).

3. Permission of landowners or controllers must be sought where land is not in the direct ownership or control of the applicant. Planning Permission should be sought if required.

This consent was issued by the Littlehampton Harbour Board. A full discussion of the consent can be found at the officer report made to the Littlehampton Harbour Board at it's meeting of 11th July 2016 which is at the enclosure.

Date of Decision: 11th July 2016

Date Decision Issued: 18th July 2016

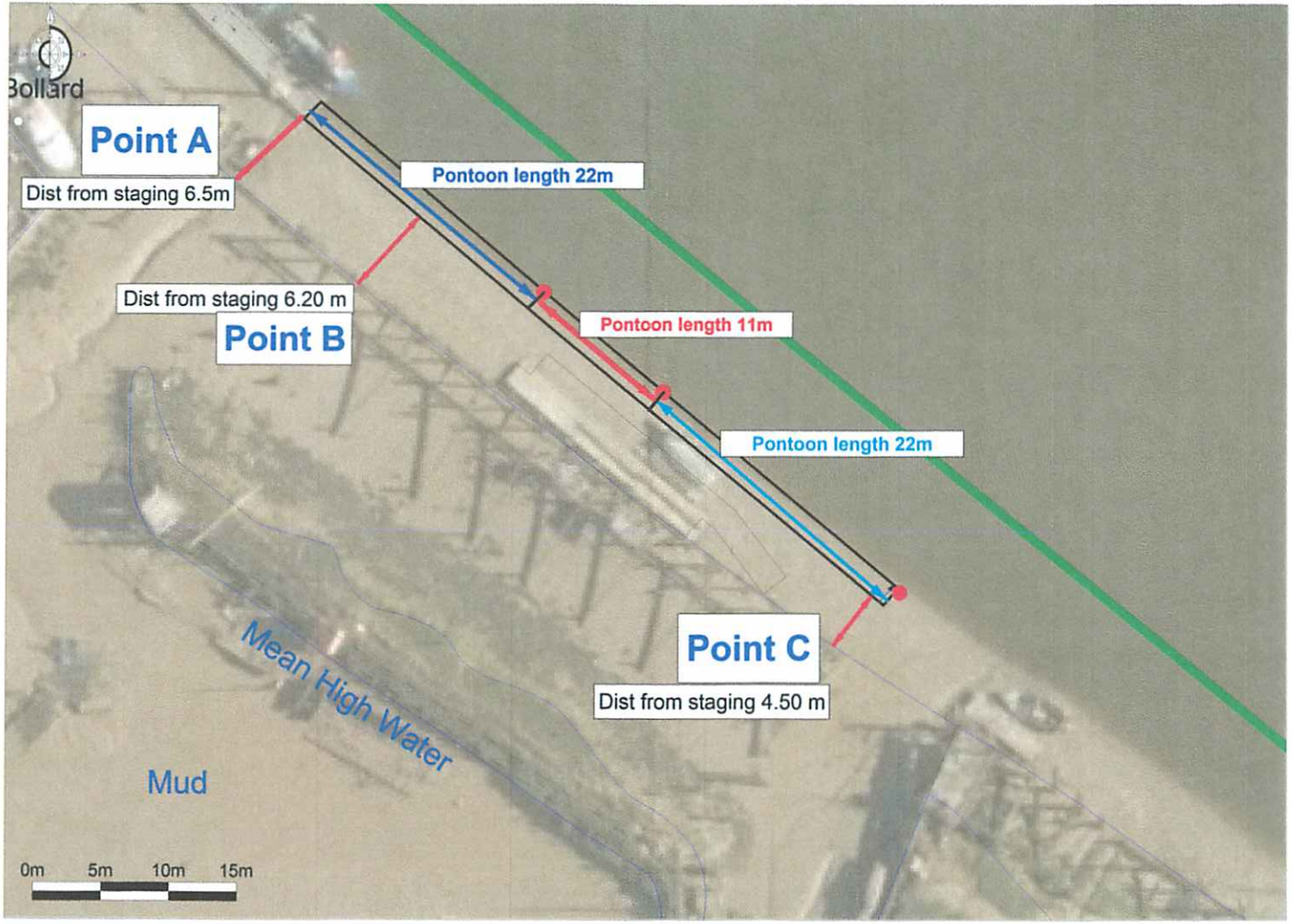
Licence Expires: 18th July 2017
Or on expiry of Marine Licence associated with this project (L/2012/00450/5).

Billy Johnson
Harbour Master, Littlehampton
For and on behalf of Littlehampton Harbour Board

1. Licence schedule 1

Arun Timber Docks moorings

50°48.5098'N 00°32.9149'W
50°48.4570'N 00°32.8343'W
50°48.4734'N 00°32.8229'W
50°48.5198'N 00°32.9050'W
50°48.5098'N 00°32.9149'W



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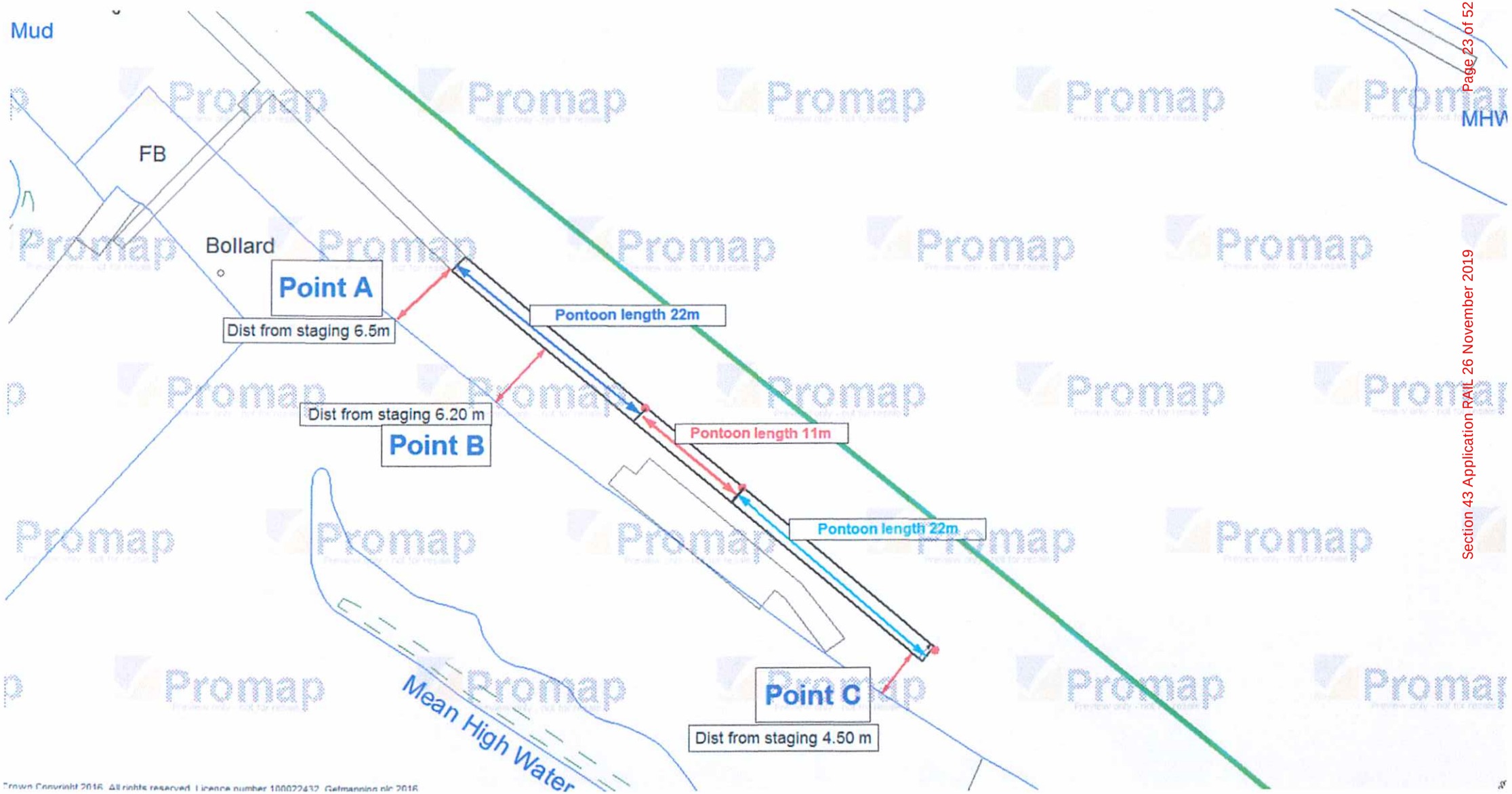
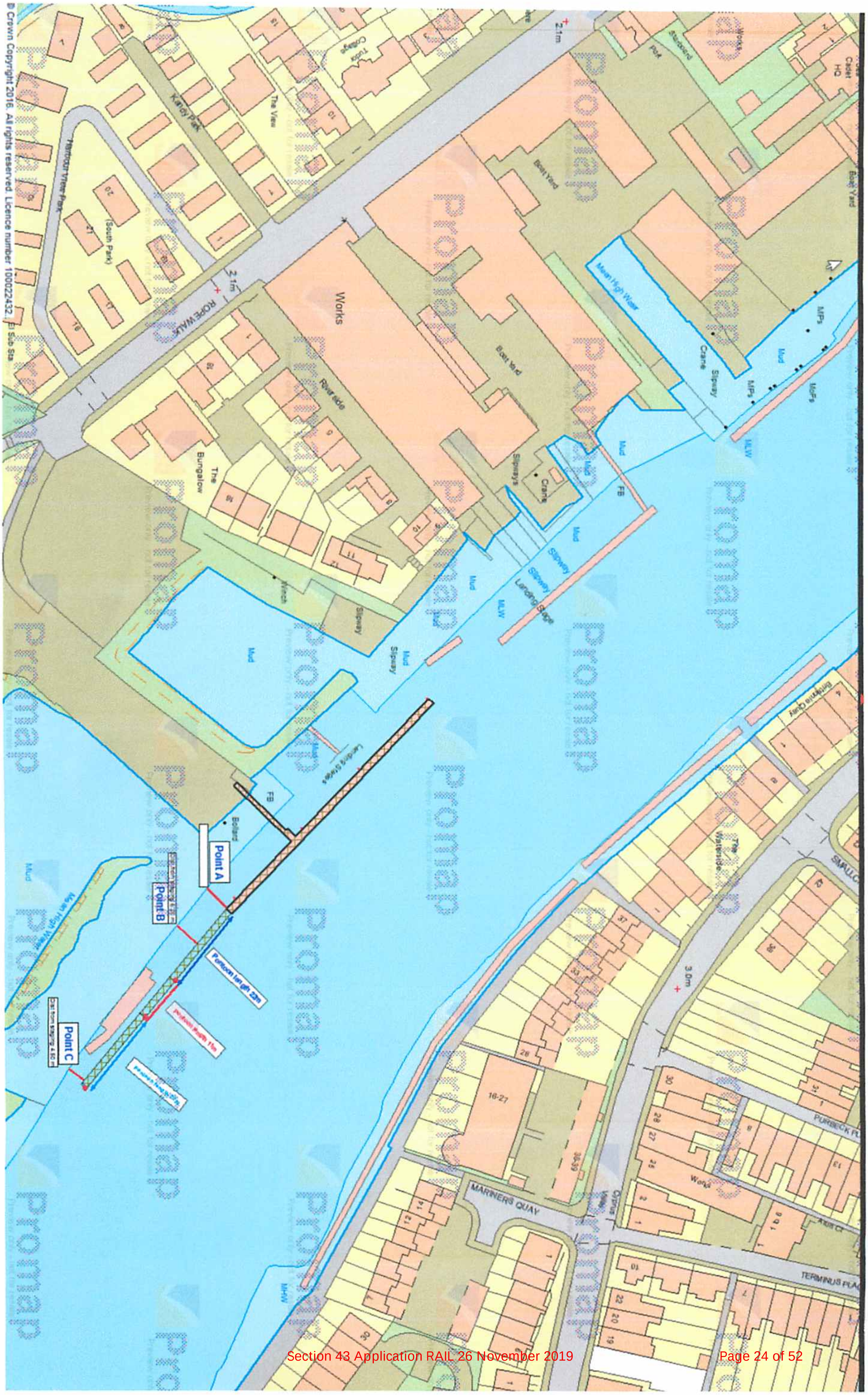
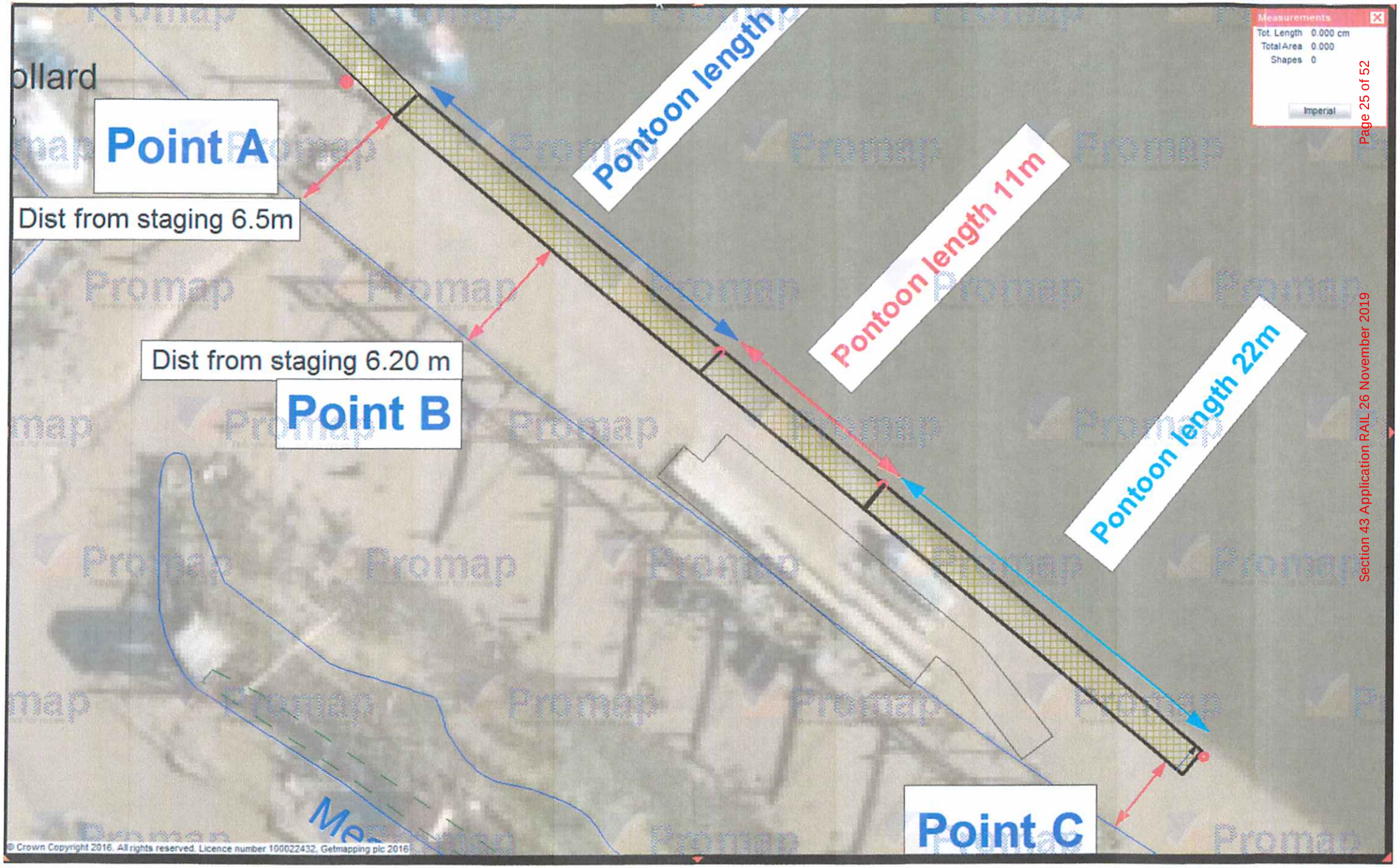
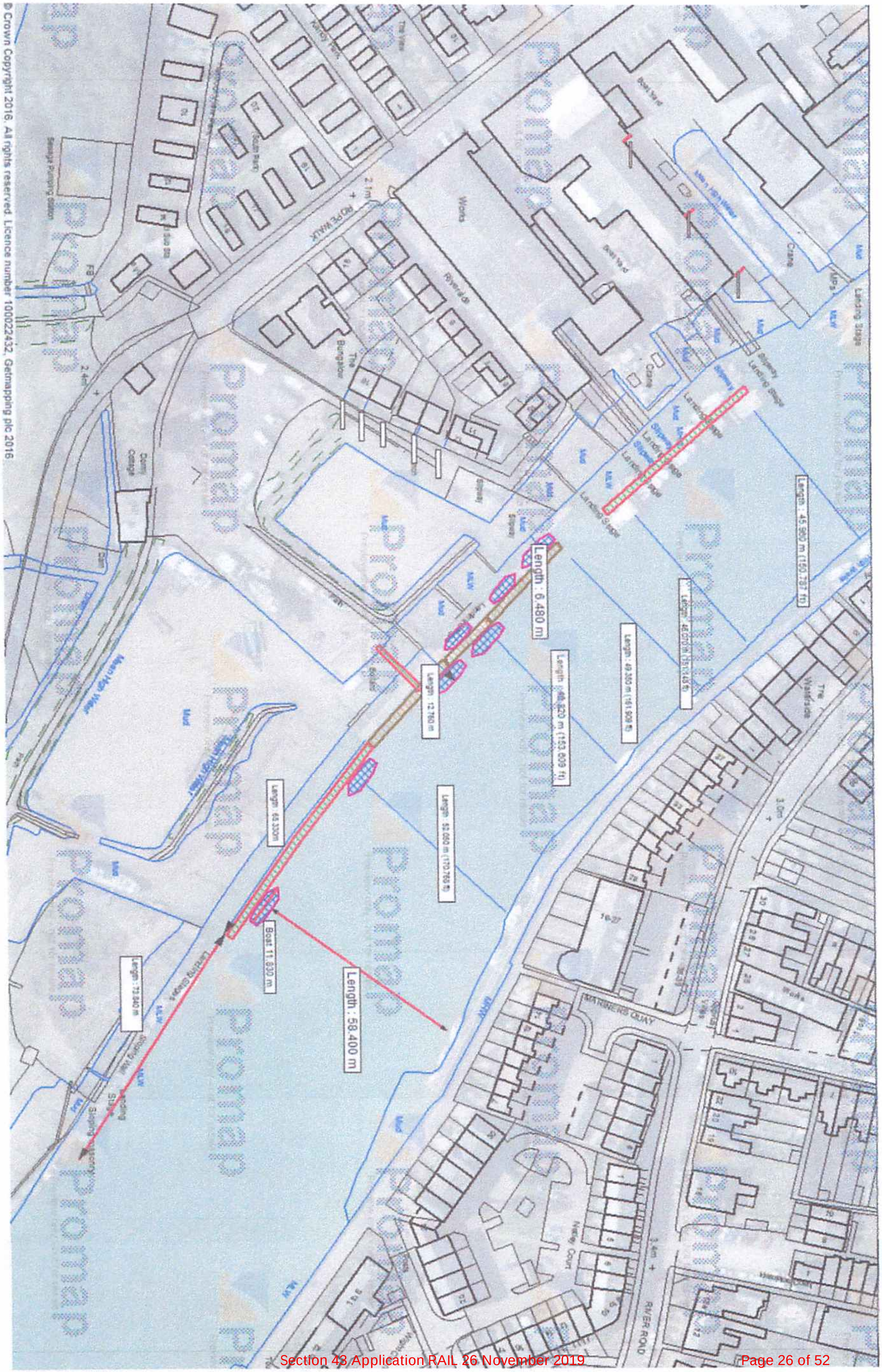
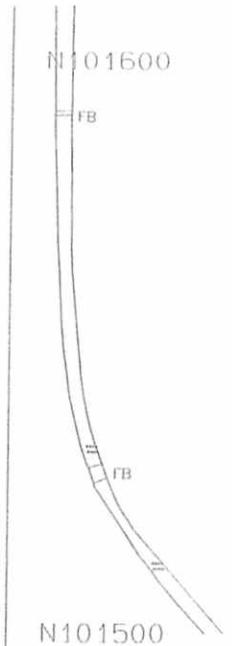





Point A
Dist from staging 6.5m
Pontoon length
Pontoon length 11m
Pontoon length 22m
Dist from staging 6.20 m
Point B
Point C
Measurements
Tot. Length 0.000 cm
Total Area 0.000
Shapes 0
Imperial
© Crown Copyright 2016. All rights reserved. Licence number 100022432, Getmapping plc 2016





shoreham port

Nautilus House, Albion Street, Southwick, Brighton. BN42 4ED
Telephone: +44 (0) 1273 598100 – Fax: +44 (0) 1273 592492
email: jseaman@shoreham-port.co.uk – www.shoreham-port.co.uk

TITLE:

Entrance to Old Quay

CLIENT:

Littlehampton Harbour Board

Project No:	Scale:	Survey Date:	Surveyed By:
LI0209	1:1250	26-06-09	JS & JC

Tidal data supplied by client

GEODESY

Transverse Mercatot Projection

OSGB 1936 (Airy) Spereid

Central Meridian: 2.00 W

False Easting: 400000 W

False Northing: -100000 N

Scale Factor: 0.999601272

NOTES

Coordinates in OSGB, British Grid

Depths below chart datum

Tidal data recorded from a tide board.

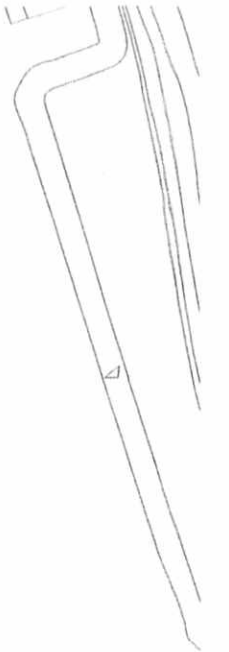
Line spacing - 5 metres

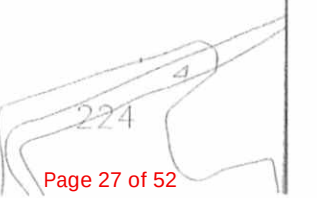
Every recorded sounding is plotted

Positioning system: Trimble DGPS

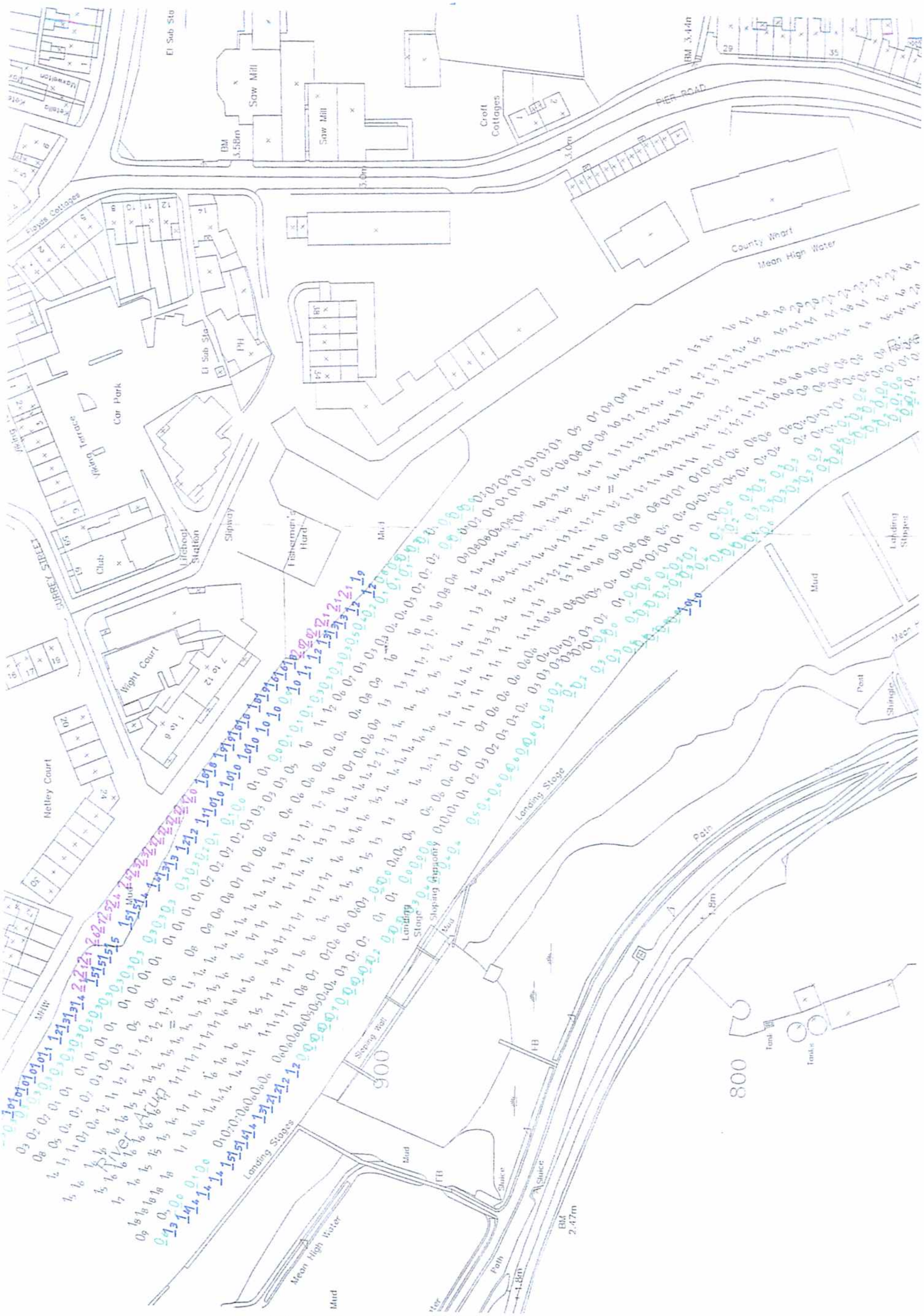
DGPS: station IALA Id - 307.5mHz

Data is true and accurate at time of survey only






Mud
Sand
Post
Shingle
Dinghy Pen
Landing Stages
Gridiron
Slipway
Boat House
Depot
Hall
Works
Tank
Bstns Gardens
The Riverside Cafe
Nelson Hotel (PH)
CLIFTON ROAD
Pond
Valve
Amusement Par
COAST
Amusen Park
Sand


El Sub Sta
Saw Mill
Saw Mill
BM 3.58m
Croft Cottages
BM 3.44m
PIER ROAD
County Wharf
Mean High Water
Floyds Cottages
Car Park
Viking Terrace
El Sub Sta
PH
Slipway
Lifeboat Station
Club
SURREY STREET
Fisherman's Hard
Mud
Wight Court
Netley Court
River Arun
Landing Stage
Sloping Masonry
Sloping Wall
Landing Stages
Path
Post
Shingle
Landing Stages
Mud
FB
Sluice
BM 2.47m
Mean High Water
Mud
Tank
Tanks
900
800

Osborne of Arun Group Mgt Ltd

Arun Timber Docks

Timber Revetment

Compiled by Dr P Tosswell

Document 10427 ATDv2 September 2015

1. Background

Arun Timber Docks are situated on the west bank of the River Arun, Littlehampton.

In the mid-19th century Littlehampton was receiving large quantities of timber from overseas. Due to constant silting of the river reducing depths revetments (effectively 'training walls') were installed to enable dredging of the main channel whilst retaining the river banks.

Early images (c1890) show a revetment in front of the Timber Docks and the river bank immediately behind it. This evidences the intention to maintain the land at that location.

The image below shows the docks today with the remnants of the revetment. Note the erosion leading to the gap between the piles and the dry land.

In its original installation the revetment would have consisted of vertical piles driven at a slight angle towards the bank for better stability. Horizontal members would have been attached to these to prevent bank collapse and aid safer berthing.

The image below is from 1920 and the partial remnants of the revetment (where vessels are berthed) are visible. The timber docks are visible as is the loss of mud bank behind the revetment line. This suggests that at that time (when the commercial use of the west bank was diminishing) the bank was already being eroded.

The image below is from 1927 and shows the remnants of the revetment more clearly. Note the man-made structure forming the timber docks and the original bank line retained (by a structure) just downstream. This would suggest that erosion of the original bank had occurred prior to this date.

The image below is from 1932 and shows the partial revetment but note the remaining continuous line of defence just above the water level. This is likely to be part of the much earlier structure (or a repair/replacement thereof) intended to maintain the edge of the riverbank with some berthing. This is not visible in the 1927 image as the tide was higher.

The image below is from 1947 and the piles with raking supports are now continuous in front of the timber docks. Berthing of vessels along the length of the timber docks is now re-established. The Littlehampton Harbour Board report of December 1936 makes reference to the repairs of this section being undertaken. Specific mention is made of the necessity to undertake these works to prevent flooding and make the river bank safe.

As time moved on the necessity to maintain (by the Harbour Authority) such structures diminished with the loss of much of the commercial shipping particularly to the west bank. (Aggregate berths remain operational on the east bank but the timber revetments have long since been replaced by steel sheet piling).

2. Recent Use

In recent years the primary purpose of the revetment (to assist in maintaining the navigation channel and prevent flooding) has reduced due to its condition. The image on the next page shows the current condition of the structure.

However, despite its condition the lower section of the structure will have some impact in retaining the bank. This is more likely to be due to the attenuation of the tidal velocities locally rather than physically holding the mud.

The structure has been used for berthing small vessels (it being unsuitable for large vessels) for many years by customers of Osborne of Arun Group Mgt Ltd. Vessels moor to the structure on both sides at suitable tide times.

3. Summary

There can be no doubt that the revetment was originally installed in order to maintain the river banks (to assist vessel unloading) and allow maintenance (dredging) of the river to facilitate commercial shipping.

Historic lack of maintenance has led to erosion of the original restrained line. The structure has significantly less impact on the river than intended and now serves use as mud bank retention and limited berthing.

From: **R M Boyce** robert.boyce@me.com
Subject: Email 1
Date: 25 May 2016 at 11:48
To: **Sue Simpson** sue@littlehampton.org.uk
Cc: **Nigel Draffan** nigel@angpk.co.uk, **Fiona Boyce** fionaboyce@gmail.com
Bcc: **Robert Boyce** robert.boyce@me.com, **Frances Boyce** franboyce@gmail.com, **Ian Buckland** ibuckland05@aol.com

Dear Sue

there are a number of screen shots here.

The notable points are

1. The green line represents the safety margin as prescribed by the other vessels on the moorings to the north and south.

2. The arial photos show the latest OS mapping and therefore the existing North Dock pontoons and bridge.

3. Attached to the southern point of the north pontoon I have drawn the revised proposed pontoon.

4. The distances from the existing line of wooden staging is 6.2 at the red arrow and 4.5 at the southern most tip.

5. The Piles are on the outside in red. They are there so that if we need to move the pontoons out to allow access for larger boats to pass then we can move them.

6. We have "feathered the pontoon in by 2 metres at the southern most end as Billy asked us to do.

7. I can prove that the LHB have consistently used the mooring envelope at least 9 metres if not more from the old wooden staging.

8. I have lost 2 if not 3 moorings as a result of moving the pontoons.

9. Please note that all other pontoons in the river follow the line of the river bank and staging - they are never feathered in towards the staging.

10. I do not know when this photo was taken or at which state of the tide - but the boats all sit in the mud and I would think that if a large 70m ship to get this close to these moorings then it would probably run aground before colliding with the moored vessels.

I have more images in the next email.

I am available today to come over to the Office if you think we could settle this today!

PDF

Margin of safety 2.pdf

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ARUN TIMBER DOCKS, LITTLEHAMPTON

SOUTH DOCK – CONDITION SURVEY

SEPTEMBER 2015

Ref: 14683/2

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CONTENTS

APPENDICES

Client : Robert Boyce
Osbourne of Arun Group Management
Rope House
Rope Walk
Littlehampton
West Sussex
BN17 5DH

Prepared by	Checked by	Approved by
Will McGrath	Tristan Banks	Nigel Hosker

1.0 INTRODUCTION

Hemsley Orrell Partnership (HOP) have been commissioned to undertake a condition survey of the disused Arun Timber Docks, Littlehampton (for site location plan refer to drawing 14683/02/01 in Appendix II).

The timber staging is suspected to have some structural deterioration and safety problems, in addition to posing hazards to navigation in the harbour should further deterioration occur. HOP were subsequently commissioned to assess the existing condition and comment on matters related to overall stability and safety. Signage at either end of the structure prohibits mooring which may indicate an unsafe structure.

A brief visual appraisal of the disused timber staging area (constructed circa.1890) on the west bank of Littlehampton Harbour, adjacent to Rope Walk and Dormy Cottage was undertaken on 02/09/2015. Observations were carried out on foot at low spring tide, and by boat before high spring tide. Inspections were undertaken by two HOP maritime engineers.

The condition appraisal did not include any intrusive work and is based on visual observations only. Access to the site was made by wading at low tide through alluvial deposits with an appropriate safe system of work in place. Parts of the structure are covered in alluvium deposits and are inaccessible. These have therefore not been inspected. The results of this appraisal do not therefore constitute as the results of a full structural survey.

Typical vessel movements in the area comprise the following:

- Small fishing vessels (<30m LOA) and other small commercial craft served by the Osbourne moorings to the north of the structure.
- Small leisure craft served by Littlehampton Marina to the north, and moorings for the Arun Yacht Club and Littlehampton Yacht Club to the south of the structure.
- Larger commercial aggregate vessels (up to 70m LOA) berthing at the Tarmac aggregate quay to the north of the structure.

2.0 SURVEY METHODOLOGY

Work is broken down into the following main operations, though the scope of each operation was dictated by how fieldwork progressed on site with all relevant risks addressed appropriately:

a) In water survey work by a HOP Engineer: these works included a visual inspection of piles, props and any other structural elements with photographic records of significant damage;
b) A walk-over visual inspection of the timber structure from the river bank level with photographic records of significant damage;
c) Level readings using an optical level and 50m tape to determine the general arrangement and approximate dimensions of the structure;
d) Measurement of approximate pile verticality using a 600mm long spirit level and tape and measurement of timber section sizes.

3.0 OBSERVATIONS

3.1 Summary of Structural Form

The staging comprises of raked timber piles and horizontal timber beams. Two lengths/types of timber raked props are provided in alternate bays which act as props to the upper and lower parts of the structure respectively. The staging has an overall length of approximately 66m as observed at low tide. Signage prohibits mooring against the structure indicating that it is disused in the current state.

A floating pontoon is located at water level in the centre of the structure. This is currently used as storage for steel sections however the use for this pontoon appears unclear and infrequent. Timber outer piles are a marine grade timber likely Greenheart timber, Douglas fir or similar. These piles provide raked support for a disused scaffolding platform with remnants of fishing equipment. They also act as rubbing fenders for the small pontoon. The piles are propped with raked props which rest on horizontal timber beams.

Timber piles in the outer row are inclined slightly from vertical, generally raked away from the river channel. The verticality of 6no. piles was measured as a representative sample. An average angle of 3.5 degrees to the vertical was measured. A total of 25no. piles were counted and labelled 1-25 from the northern end, with measured angles ranging from -0.5 degrees to 4.75 degrees. Negative incline towards the river channel only occurs in 2-3 piles around pile P12.

Timber sections in their current form are variable in nature due to varying levels of abrasion and deterioration. Piles were nominally measured to be a maximum of approximately 9”x9” square, thought to be the original section size. In some case however, significant abrasion has occurred so that roughly circular sections remain with a diameter of approximately 200-250mm.

2no. vertical timber piles (5 and 6) appear to have been cut and removed at bed level as observed at low tide. These piles have evidently been considered redundant in the past and their removal provides an access channel to the intertidal basin behind the structure.

Raked props are generally fixed near to the top of every other pile. In some cases props are missing where excessive deterioration has occurred. These are typically also 9”x9” square timber sections at typically 10 to 20 degrees to the horizontal. There appears to be two different timber grades used. Some older timber rakers (likely better quality) exist at the extreme ends of the structure. Across the central portion of the structure there appears to be newer rakers (likely a lesser quality of timber).

The replacement of original rakers over the central portion of the structure in the past may have caused some piles to become more vertical or to even have negative rake. It is thought that all of the piles were originally installed with a nominal rake towards the bank, with some nominal deviations due to construction tolerances.

The raked props rest on a horizontal timber beam near to the top of the piles and are connected with through-bolts. Older rakers rest on a horizontal beam at high level (typically 4.5”x10”) which is assumed to be the original timber. Newer rakers have been installed in tandem with a replacement horizontal beam (typically 6”x12”) at a lower level. In general the older beam at high level is in very poor condition and is considered no longer structural.

At bed level, a horizontal timber beam (4.5”x10”) spans between piles. Low level props support the base of the piles in every other bay.

Refer to drawing 14683/02/01 in Appendix II for indicative levels, dimensions and details.

3.2 Structural Condition

All accessible parts of the timber structure were visually assessed in order to determine their structural condition. Timber decay and marine borers have resulted in a physical deterioration of timber is evident throughout the structure which is typical for timber waterside structures of this age.

Physical deterioration (Figure 1) was observed. Deterioration mechanisms observed here could be a combination of the following:

- Timber decay and marine borer activity;
- Corrosion and fretting of connections;
- Splitting and general wear;
- Abrasion due to moving debris or items attached to the structure such as mooring lines;
- Damage from vessel impact in the river; and
- Softening due to water penetration and increased moisture content.

Biological deterioration (Figure 2) was also observed. Deterioration mechanisms here could consist of wood-destroying organisms that infest the timber above and below the waterline. In this case Marine Borers commonly pose issues for waterside timber structures.

In British temperate waters two types of marine borers are common; the gribble (Liminoria) and the shipworm (Teredo). Shipworm burrow into timber materials, generally below mid tide level and can penetrate to depths over 500mm. Extensive attack from gribble weakens the surface of timber until it is eroded away. Few timbers are entirely immune to marine attack but the marine grade timber thought to be used for the original staging structure is typically highly resistant.

Figure 1 - Typical evidence of Physical Deterioration.

Figure 2 - Typical evidence of marine borer activiy.

3.2.1 Piles

Piles were numbered 1 to 25, working in a downriver direction. A summary of the visual condition of the piles is given in Table A.I.1 in Appendix I.

In general, piles are observed to be in reasonable condition at bed level. The exceptions to this are:

- Pile P7 which has timber debris around the base of the pile which is mobile when lifted. This is thought to be causing accelerated abrasion around the base of the pile, with an almost circular section remaining of approximately 150-200mm in diameter as seen in Figure 3.
- Piles P5 and P6 which are cut at bed level (Figure 4).

Figure 3 - Significant abrasion identified on P7.

Figure 4 - Piles P5 and P6 cut at bed level for vessel access.

In the intertidal zone, there are varying levels of physical and biological deterioration observed. Physical deterioration is considered moderate and fairly uniform along the length of the intertidal zone where an expected ‘rounding’ of sharp edges and general section loss are evident on all piles. The surface of the timber is considered soft in the intertidal zone and may be depressed by hand.

Biological deterioration is evident on all piles ranging from ‘moderate’ to ‘significant’. There is marine growth along the full wetted length as seen in photographs, however it is typical that deterioration as a result of marine borers occurs at higher concentrations just below connections with horizontal beams. In some cases, effects of marine borers are not visible due to more recent deterioration. The effects however can be identified where the accelerated abrasion has occurred in the weaker timber at the surface, where biological deterioration has occurred. In this case part of the pile section has typically broken away as a result (Figure 2).

Splitting has been observed in numerous piles. The cause of splitting is not known however typically the splitting of waterside timber structures may be due to overloading in the past as a result of berthing and mooring loads from vessels using the staging. This is expected to be in combination with other deterioration mechanisms which have weakened the timber pile sections such as wetting and drying and freeze-thaw damage (see Figure 5). Splitting is a sign of significant weakening due to a combination of effects and is particularly concerning when biological deterioration is commonly increased around splits.

Figure 5 - Typical splitting of timber piles.

3.2.2 Raked Props

Rakers have commonly been identified as either missing or giving clear evidence to splitting and biological deterioration.

At either extreme ends (P1 and P25), the original props still exist. At piles P3, P7 and P9 the rakers have broken off with only debris remaining (Figure 6), which may pose a hazard to safe navigation in the intertidal basin.

Between P11 and P21, newer rakers of different quality timber are present, as previously mentioned, assumed to have been installed in combination with a more recent horizontal beam upon which they rest at the seaward end.

Newer rakers are typically split along the grain with marine borers causing further progressive deterioration possivbly suggesting a less appropriate timber specification for the use.

It is assumed that the previous strengthening of this mooring stage was carried out with the purpose of prolonging its serviceable life and to permit the safe berthing of larger fishing vessels where previous operations may have caused damage. It is unknown when strengthening works took place, however the evidence of splitting and decay indicate that the quality of timber used is lower than that of the original structure. As such, berthing and mooring has caused compressive damage and in some cases failure of the newer rakers as shown in Figure 7(a) and (b).

Figure 6 - Debris of original raked prop at high level on P9.

Figure 7(a) & (b) - Examples of split rakers.

3.2.3 Horizontal Beams

The high level (original) horizontal beam is considered structurally redundant. Its function is to support original rakers and brace the top of the piles. With only 2no. original rakers remaining and piles therefore self-supporting at the upstream and downstream ends, this structural element, which is in poor condition, is considered ineffective.

The larger and more recent beam supporting newer rakers is generally in good condition. There is some splitting from possible vessel impact during operation (Figure 8); however there appears to be minimal section loss.

At bed level a horizontal beam runs the full length of the structure as mentioned in section 3.1. This beam is observed to be in a serviceable condition with only slight abrasion and deterioration. It is assumed that this is a part of the original timber structure and partial encasement in bed material has preserved the timber. With movement of bed material over time however, it cannot be determined whether the hidden faces of this member shows signs of similar deterioration as this was not readily available for inspection.

Figure 8 - Splitting of horizontal beam between P16-P17.

3.2.4 Anchor Piles

Anchor Pile is a term given to the small piles located at the end of raked props to anchor the structure. There are 2no. rows of anchor piles in line with different lengths of prop in alternate bays (Figure 9(a)). The embedment depth of these piles is unknown. The condition of the buried timber could not be determined.

Above surface however, connections between anchor piles and rakers are visible. Connections show deterioration around through-bolts and bolt holes in the timber due to concentrations of marine growth, biological factors and abrasion from likely movement during operation of the mooring stage. The tops of anchor piles show significant deterioration, both physical and biological as shown in Figure 9(b).

Figure 9(a) & (b) Anchor piles and typical deterioration.

4.0 SUMMARY OF CONDITION

The condition of the timber mooring stage is fairly consistent along the length of the entire structure. In addition to the mechanisms listed in section 3.2, there are a number of missing elements assumed due to failure or removal. In the current condition it is therefore unlikely significant lateral load could be resisted by the structure.

Complete collapse of the structure is considered unlikely at present and further deterioration will continue. It is noted that there are numerous examples of protruding steelwork and timberwork from the structure which could cause damage to passing vessels and users. Therefore, the structure in its current condition is considered to be a medium risk to river users.

5.0 DISCUSSION

5.1 Practical and Safety Considerations

Removal of the timber staging will pose some practical issues and safety risks to river users and the environment which must be considered carefully.

If the structure were to be removed, all timber debris and elements would need to be removed and taken from site to prevent a hazard to navigation and to the marine environment.

Piles would need to be extracted or where this is not possible, cut down below bed level such that the hazard of submerged obstructions is omitted. Access will most likely be via floating plant due to adverse ground conditions for plant access.

5.2 Hydrological Considerations

The foreshore in the area of the timber docks has a fairly gradual increase in gradient down to the low water mark. The bottom wailing beam is intermittently exposed/embedded throughout and does not seem to offer significant retaining action.

If the timber structure was removed to just below bed level, the negative effects to the foreshore or adjacent bank would likely be negligible. It is anticipated that only minor re-grading of the bank may occur.

From visual observations carried out, the current size and spacing of piles is unlikely to provide significant retention to the fine alluvium deposits where currents of such magnitude exist in the river.

Furthermore, minor localised excavation works to the alluvial foreshore may need to be carried out to enable the removal the structure. Some minor re-grading of the bank may naturally occur however this could be minimised by sequential working and timing of the works.

MMO Regulations must be adhered to, however the works may fall under a maintenance exemption.

The timber structure is a primarily a mooring stage. The observed structural form indicates that its capacity as a river training structure is limited as there are no significant longitudinal members and the distance between pile centres is relatively large.

At this time HOP are not aware of any elements within the structure that serve the purpose of retaining alluvium deposits in the river bank (it is possible however, these could have been covered at the time of inspection). Retaining elements exist in the form of longitudinal boarding below the wailing level however this seems unlikely as the bank gradient is similar up and downstream of the structure.

It is not thought that the removal of the structure would cause any increases in the effects of scour and vessel wake on the adjacent foreshore and river bank.

5.3 Estimation of Current Capacity

Some initial calculations have been carried out to determine indicative resistances of timber piles in their current form. A typical current load for the location of the timber staging in the river channel has been applied to both the pontoon and the pile sections.

The reduced section sizes identified with a remaining pile section (approximately 200mm) are subjected to loads in two cases:

a) Lateral current load on piles only; and
b) Lateral current load on piles and pontoon adjacent.

Pile capacities have been calculated based on marine grade Greenheart timber piles with square sections reduced as necessary. The maximum lateral load that may be imposed near the top of the piles is likely to be less than 10kN.

Without the pontoon, current loads are marginally less than the lateral capacity of the piles however with further deterioration this may not be the case in the medium term.

It is estimated that with the pontoon moored to the staging as observed during the appraisal, the piles sections are slightly overstressed as a result of the increased drag load.

It is therefore recommended that the pontoon is removed and mooring remains prohibited.

6.0 REUSE CONSIDERATIONS

The previous use of the structure is assumed to be as a mooring stage and it is assumed that reuse will involve restoration to an acceptable working condition for the same purpose.

It was observed that at low tide levels, the bed level at the base of the mooring stage is above water level. At higher tides only vessels with a shallow draught may therefore be able to use the berth in a given tidal window. Dredging will not be required the enable reuse under this condition; however for large vessels to enable a deep water mooring, dredging will likely be required.

6.1 Reuse as a Mooring Stage (without dredging)

If the structure were to be reused in its current arrangement without dredging there would be minimal impact on the river hydraulics. This would however limit access for craft using the staging to a short tidal window avoiding grounding or drying out unless this is tolerable.

The structure will need to be assessed for any proposed mooring and berthing loads to ensure safe operation can be achieved. Strengthening works are likely to be required following such assessment, including the replacement of some piles and the majority of the raked props and beams.

Safe access from the structure to the shore is currently not possible due to a missing walkway and dilapidated walkway piles. Without appropriate access, the staging may only be used as a temporary mooring stage posing some additional safety hazards particularly in the event of an emergency. Access requirements for reuse must be considered in line with current safety regulations.

It is likely the existing structure is approaching the end of its serviceable life and would need rebuilding to meet current standards.

6.2 Reuse as a Mooring Stage (with dredging)

If the structure was proposed to be reused and include a dredged berth pocket to allow mooring without grounding; then much more careful consideration of the river hydraulics is required. Not only will this alter the current flow in the river, it will destabilise the bank behind the structure thus requiring structural modification to incorporate a retaining feature. Maintenance dredging will also likely be required.

Dredging the bed adjacent to the berth would mean an increase in effective length in all of the pile elements. This would mean increased bending stresses in the piles due to a combination of loads such as berthing, mooring loads. Such increases in bending would be difficult to justify given the condition and deterioration of the current structure. Significant replacement of structural elements and strengthening would likely be required.

7.0 RECOMMENDATIONS

The existing structure is approaching the end of its serviceable life. Quick calculations suggest that the loss of timber section to piles by decay and deterioration currently results in pile strength reduced to the order of 30% of original capacity in places, with possible overstressing as a result of the pontoon currently attached to the staging. Timber decay along with loose connections, ineffective bracing and loss of tying members is likely to significantly reduce mooring load resistance, particularly in the longitudinal direction where loads due to drag are dominant.

We recommend plans are put in hand to demolish the structure in the short to medium term (up to 2 years).

Careful demolition would comprise of the following:

- Cut down piles below bed level, subject to agreement with the Harbour Master;
- Dispose of all debris correctly to an appropriate location ensuring minimal impact to the marine environment;
- Carry out further investigation before extracting the piles and structure below bed level.
- Use of floating or remote demolition plant would seem to be required to enable the works.

Minor works should be carried out to ensure safe navigation in the harbour in the interim including:

- Remove all loose metal and timber work and disused fishing equipment;
- Replace lost or in effective members to allow service over the short term if required;
- Address Health and Safety issues that may be associated including any edge protection, access provision, signage/restrictions, life rings/emergency equipment, and any other minor works to ensure compliance with necessary regulations;
- Monitor closely for remaining residual life with continued piecemeal maintenance as required; and
- Bracing and replacement members might be required on a piecemeal basis to maintain stability.

If a replacement structure is required this would need to meet current standards such as the dock regulations and British and European standards.

8.0 APPENDIX I

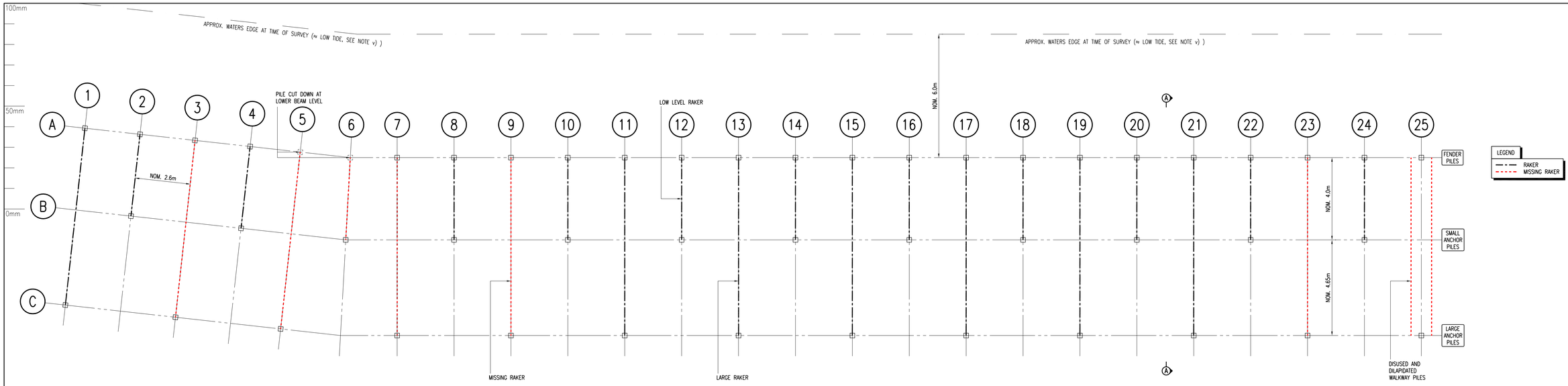
Table A.I.1 - Visual observations of piles and props with reference to Pile ID.

Pile ID	Pile Condition	Large Raked Prop	Other Comments
P1	Marine borer deterioration visible particularly towards top; Erosion/Abrasion in intertidal zone; Vertical cracking on seaward face; Soft wood, damp and depressible with fingers up to approx. 3mm.	Original prop fixed to high level beam. Significant longitudinal splitting.	Top Rail is in a poor condition.
P2	Timber rubbing strake to face of pile; Greater deterioration than P1 both physical and biological, moderate section loss.	-	
P3	Condition as P2.	-	
P4	Condition as P2 (no rubbing strake).	-	Undermining of lower timber beam due to drainage outflow or similar.
P5	Cut/snapped at bed level.	-	-
P6	Cut/snapped at bed level.	-	Bottom Rail is in poor condition with heavy marine growth and splitting.
P7	Splitting down centre of pile; Significant abrasion generally, but in places some girth has been retained. Mobile timber debris at pile base accelerating abrasion; Significant marine borer deterioration.	-	
P8	Splitting on seaward face, Marine borer deterioration prominent, Minimal abrasion observed.	-	Bottom rail appears in better condition.
P9	Marine borer damage evident.	Marine borers/ weathering have caused failure of the original raker with minimal section remaining, suspended on top rail.	-
P10	Marine borer deterioration prominent causing some section loss.	-	-
P11	Significant abrasion at base of pile	More recent raker appears lower quality timber. Generally solid, although timber is split longitudinally along the length.	New top rail under original is generally reasonable

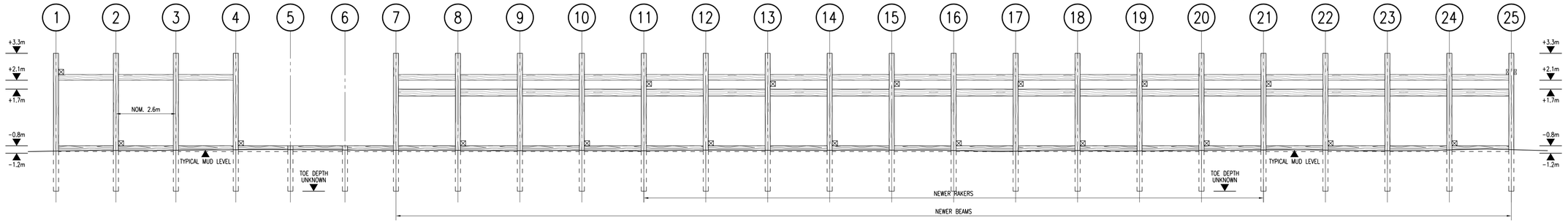
P12	Substantial splitting to pile Significant marine borer deterioration.	-	-
P13	Condition as P12.	Signiciant longitudinal splitting.	-
P14	Condition as P12.	-	-
P15	Significant abrasion and splitting throughout.	Significant longitudinal splitting.	Scaffold platform over begins.
P16	Rubber rubbing strake to face of pile,	-	Large split in new beam and significant marine borer deterioration.
P17	Nominal abrasion and marine borer deterioration.	Significant splitting, potentially due to impact.	
P18	Timber is generally very soft . Heavy abrasion to lower half of pile and considerable splitting throughout. Substantial evidence of marine borer deterioration.	-	Bull head rail standing vertically to scaffold platform is heavily corroded between 18-19.
P19	South face of pile split, North face of pile significantly damaged by marine borers.	Raker in fair condition with some splitting.	-
P20	Rubbing strake dilapidated by marine borers, with significant boring damage throughout pile.	-	-
P21	Some splitting.	Significant longitudinal splitting	-
P22	Severe abrasion to pile with reduction in section to almost circular with dia. 200-250mm.	-	-
P23	Nominal marine borer deterioration and abrasion damage.	Raker is missing.	-
P24	Pile is now almost circular due to marine borer deterioration and ersosion/abrasion.	-	-
P25	Marine borer deterioration and abrasion damage evident, Some splitting to pile.	Original raker of higher quality timber but with deterioration due to splitting and marine borers.	Pairs of detached vertical pile supports present, potentially for a historic walkway back to river bank.

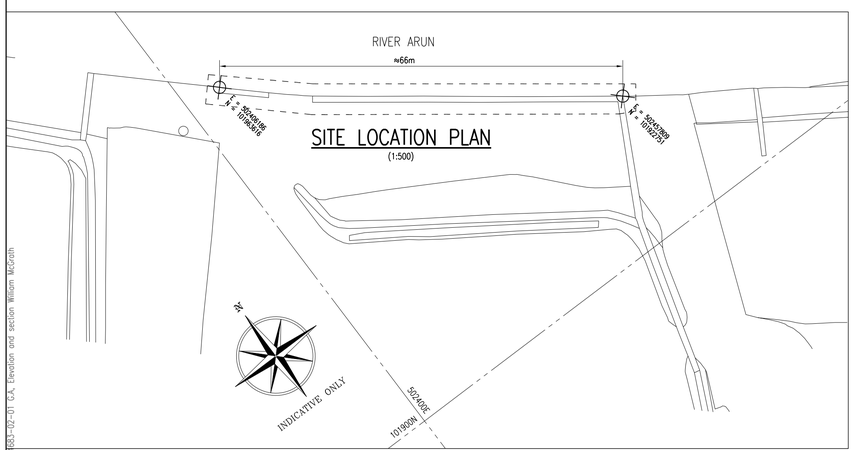
9.0 APPENDIX II

Drawing 14683/02/01 – South Dock General Arrangement, Elevation and Section.

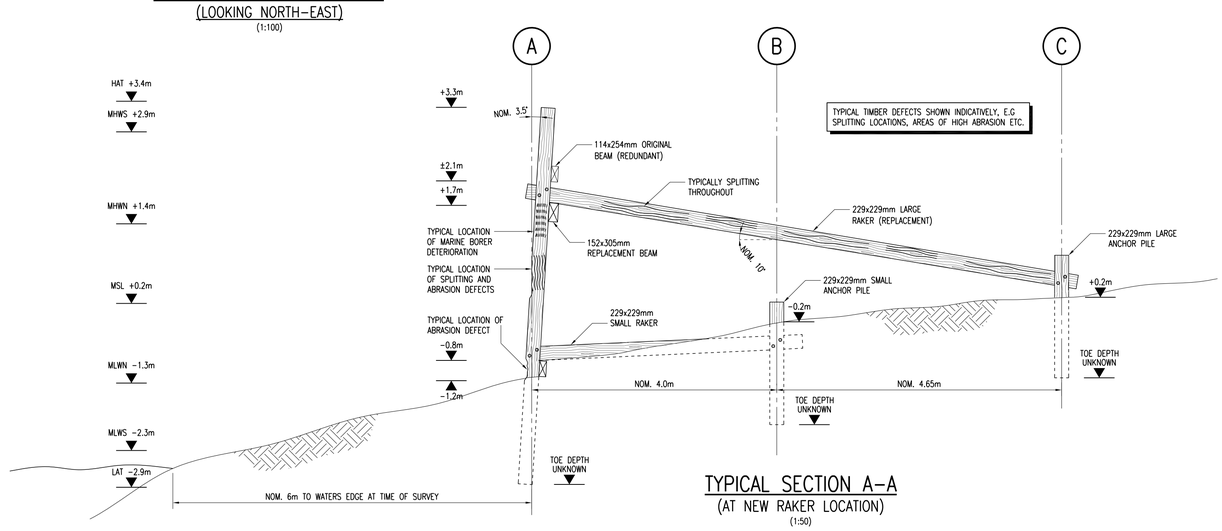


GENERAL ARRANGEMENT
(1:100)





ELEVATION ON GRIDLINE A
(LOOKING NORTH–EAST)
(1:100)



TYPICAL SECTION A–A
(AT NEW RAKER LOCATION)
(1:50)

NOTES.

1. GENERAL

(i) This drawing is not to be scaled, work to figured dimensions only, confirmed on site.

(ii) This drawing is to be read in conjunction with all relevant architectural drawings, detailed specifications where applicable and all associated drawings in this series.

(iii) Any discrepancy on this drawing is to be reported immediately to the partnership for clarification.

(iv) Pile spacings are variable, shown nominally for clarity.

(v) Walkover Condition Survey carried out at low tide in calm water, low wind, fine and dry conditions. All Levels are relative to water level at 9:15am on 02/09/15 and have been approximately referred back to Ordinance Datum.

(vi) The purpose of the Walkover Survey was to gain a general appreciation of the site condition, and not to survey specific details. HOP can not be liable for not identifying particular aspects of the structure.

(vii) All site dimensions are to an accuracy of ±100mm.

(viii) Water levels based on average values of Littlehampton (Entrance) and Littlehampton (UMA Wharf).

1:100
0 1m 2m 3m 4m 5m

1:50
0 0.5m 1m 1.5m 2m 2.5m

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PRELIMINARY DRAWING
DRAWING FOR INFORMATION ONLY.
NOT FOR CONSTRUCTION.

Revision	Date	By	Rev. No.
ISSUED FOR CONDITION REPORT	28.09.2015	W MCGRATH	–

Client: OSBORNE OF ARUN GROUP (MANAGEMENT) LTD.

Project: ARUN TIMBER DOCK, LITTLEHAMPTON

Title: SOUTH DOCK GENERAL ARRANGEMENT, ELEVATION AND SECTION

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Scales	Date	Drawn	Engineer	Checked	Approved	HOP Contact
AS SHOWN	14.09.15	L.R.S	W.P.M	T.J.B	N.H	T.BANKS

Project No.	Task No.	Dwg. No.	Rev. No.
14683	02	01	–

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