



BURO HAPPOLD
COPPERHOUSE SLUICE GATE

DOCUMENT REVISION RECORD

Document Number: **C0395/006/DOC**

Number of Pages: **31**

Document Title: **REPORT ON THE MECHANICAL SURVEY OF
THE COPPERHOUSE SLUICE VERTICAL
LIFT GATE**

Saved as: **K:\Contracts Working\351-400\C0395B Copper House
Sluice\Documents\C0395B_006_DOC Rev A1.doc**

REV	DATE	AUTHOR	CHECKED	APPROVED
A	30.09.2006	C Appleton	R Digby	K Grubb

**Refer to the Revision Sheet at the rear of this document for details of
modifications.**



CONTENTS

1. INTRODUCTION	3
2. SURVEY FINDINGS	4
2.1 Review of documentation.....	4
3. SURVEY OF THE GATE STRUCTURE, CIVIL INTERFACES AND LIFTING GEAR.....	5
3.1 Gate Structure.....	5
3.2 Civil Work Interfaces	13
3.3 Gate Sealing System	18
3.4 Lateral Gate Guiding System.....	19
3.5 Gate Lifting Gear.....	20
3.6 Electrical Equipment	23
4. ISSUES AND CONSTRAINTS	25
5. RECOMMENDATIONS.....	27
5.1 Gate Structure.....	27
5.2 Civil Works Interfaces	27
5.3 Gate Sealing System	28
5.4 Lateral Gate Guiding System.....	28
5.5 Gate Lifting Gear.....	28
5.6 Electrical Equipment	29
6. CONCLUSIONS	29



1. INTRODUCTION

At the request of Buro Happold (BH) (the consultants retained directly by the Hayle Harbour site developer, ING), Kenneth Grubb Associates Ltd (KGAL) has undertaken a mechanical survey of the Vertical Lift Gate sited at Copperhouse Sluice on Copperhouse Pool and operated by the Environment Agency Operations Delivery Staff.

The survey was of a non-intrusive nature and undertaken during tidal conditions. There is some residual risk that problems relating to the gate were not uncovered.

Members of the Environment Agency (EA) staff were on hand to assist the surveyors with information regarding the history of the installation and the site in general. They were also able to provide information with regard to the operation and maintenance of the gates. In addition, Dave Turner of the EA was contacted and provided useful background information.

The purpose of the survey was to determine the condition and serviceability of the existing gate and drive mechanisms, take measurements of the installation, establish the need for any refurbishment work and ensure that no other problems exist. Also, to consider the possibility of the gate being capable of being used in a sluicing/scouring capacity.

As the gate is owned and operated by the Environment Agency, no attention was given to operational, management or Health and Safety issues, though problems in this regard are obvious on the site.

The survey was undertaken between 4th and 6th September 2006.

Personnel involved:	Chris Rose	(BH)	Part - time
	Ken Grubb	(KGAL)	
	Chris Appleton	(KGAL)	

The purpose of the vertical gate is, primarily, to act as a flood defence mechanism to prevent flooding of the area from tidal water.

The secondary purpose of the gate is to regulate the saltwater inundation within the Copperhouse Pool.

Note that historically the gate was used as a means of scouring sand from the harbour channels. Since that time the gate design has been changed by the EA. There may be some advantage to the potential Hayle harbour development if this functionality could be restored.

The gate was originally manufactured and installed in 1981 as the direct replacement for a pair of mitre gates. It was originally designed to work as a roller gate. The roller axles are still fitted to the ends of the gate.

However, at some time following original installation, the rollers were removed and the gate was modified to run on non-metallic wearing strips mounted on the opposing inner faces of the existing civil guide section.

Mr. Dave Turner of the Environment Agency stated that the reason that the gate was converted to a sliding gate was the high cost of maintenance attributed to the roller bearings which had continually seized.

The gate is generally maintained in a position with the lowest edge of the gate approximately 600mm above the civil sill.

No special problems associated with the operation of the equipment had been reported to KGAL prior to the inspection.

Discussions with the EA site staff indicated that the very nature of the gate operation (i.e. either tidal flood defence or undershot gate to relieve upstream flooding) had meant that the gate was very rarely operated.

2. SURVEY FINDINGS

2.1 Review of documentation

There were no drawings of the installation made available to the surveyors.

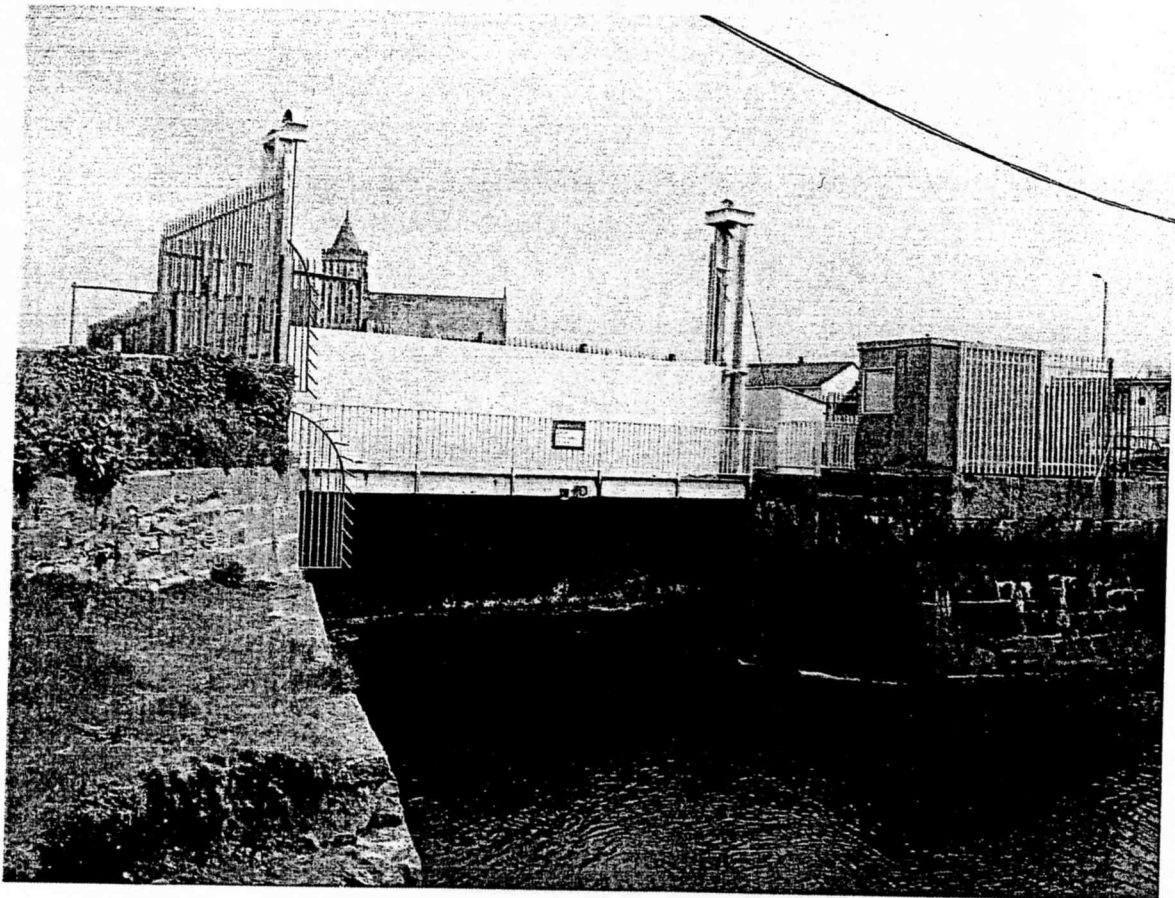
It is understood that drawings are available from the EA.

3. SURVEY OF THE GATE STRUCTURE, CIVIL INTERFACES AND LIFTING GEAR

3.1 Gate Structure

The survey focused initially on the gate structure.

NB: For the purpose of this survey, downstream will be defined as the water in the foreground as shown in Photograph 1 below (i.e. that level open to the sea) and upstream will be defined as water on the other side of the gate as shown in Photograph 1 below (i.e. the impounded Copperhouse Pool).



Photograph 1 General view of the gate; lifting frame superstructure, access footbridge, plant room and control cubicle of the vertical lift gate at Copperhouse Sluice

