

ESSEX COUNTY COUNCIL

ASSESSMENT REPORT

FINCHINGFIELD BRIDGE

BRIDGE No: 26



NOVEMBER 1994

M. COCKERSOLE, FICE, FIHT
COUNTY SURVEYOR
ESSEX COUNTY COUNCIL
HIGHWAYS DEPARTMENT
COUNTY HALL
CHELMSFORD
ESSEX, CM1 1QH

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ASSESSMENT CERTIFICATE

CERTIFICATE F1

Form of certificate to be used for assessment of structures in Category 0 which do not require approval in principle.

1. We certify that reasonable professional skill and care has been used in the preparation and checking of the assessment of Finchingfield Bridge No.26 with a view to securing that:-

- i. It has been assessed in accordance with the following standards :- see following page for list of standards.
- ii. It has been checked for compliance with the relevant standards in i.
- iii. The unique numbers of the drawings used for the assessment are:- None.

Signed :

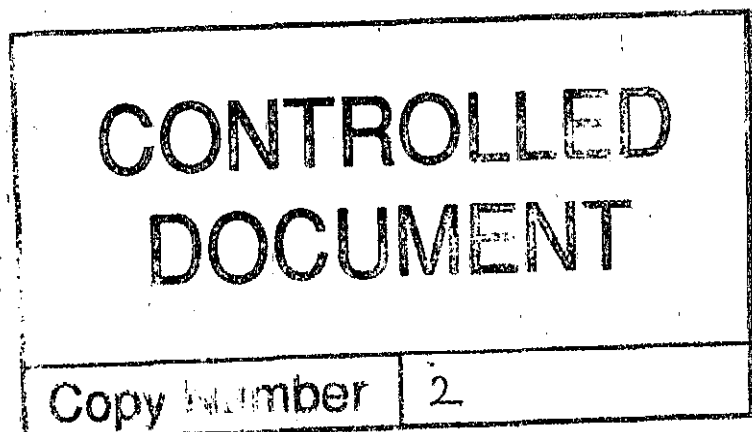
Name : T. SHEARING

Date : 18 January 1995

2. The certificate is accepted by Essex County Council, Essex Highways Consultancy, Bridges Group:-

Signed :

Name : A. Bagchi, M.Sc., C.Eng, MICE
Bridge Manager



List of standards :-

- BA 16/93 - The Assessment of Highway Bridges and Structures
- BD 21/93 - The Assessment of Highway Bridges and Structures

General Statement

Finchingfield Bridge No.26

The structure comprises a single span brick arch with an arched concrete extension.

The modified MEXE method was used for the initial assesement of both the brick arch barrel and the concrete extension. It was found that the arch barrel and extension have capacities of 7.5te and 40te respectively.

The brick parapets do not comply with BD 52/93.

Signed [redacted] ...
Terry Shearing (Project Engineer)

Date 18 January 1995

Assessment prepared by [redacted] ...
(S.K.Townsend)

Date 5.1.95

Assessment checked by [redacted] ...
(N.Richards)

Date 11.1.95

This document has been checked for its completeness (p.1-17incl.)
by [redacted] date 10/1/95

CONTENTS

Page No.

1.0 INTRODUCTION

1

1.1 ASSESSMENT BRIEF

1

1.2 BRIEF DESCRIPTION OF STRUCTURE

1

2.0 STRUCTURE ASSESSMENT

1

2.1 VISUAL INSPECTION

1

2.2 METHOD OF ANALYSIS

2

2.3 SUMMARY OF RESULTS

2

2.4 CONCLUSIONS

3

3.0 RECOMMENDATIONS

3

4.0 APPENDIX A Location Plan

5

General Arrangement

6

Bridge Card

7

APPENDIX B Calculations

9

APPENDIX C Notes on visual inspection

12

Photographs

14

1.0 Introduction

1.1 Assessment Brief

This report describes the assessment of Finchingfield Bridge No.26 and is part of Essex County Council's programme to assess all their traffic carrying bridges by 1999 (See Essex County Council's "Transport Policies and Programme" for further details).

1.2 Brief Description of Structure

The Bridge is situated in Finchingfield village and carries the B1057 over Finchingfield Brook. The superstructure consists of a single span brick arch with an arched concrete extension which is believed to have been constructed in 1912. The abutments are of brick construction but the foundation type is unknown.

The carriageway is 3.82m wide between brick parapets and there is a significant hump in the road levels over the structure. Brick wingwalls retain the carriageway for a considerable distance beyond the abutments.

The Bridge forms part of a very picturesque group around the village pond.

2.0 Structure Assessment

2.1 Visual Inspection

The inspection was carried out by C.Woodruff and S.Townsend during August 1993. The weather was warm and dry.

The brickwork forming the arch barrel is weathered but in a fair condition. The mortar joints are of random thickness and have been repointed periodically. There are a number of minor localised longitudinal cracks through the mortar.

The brick arch shape is generally good and a condition factor of 0.9 is considered appropriate.

The concrete extension is in good condition.

For further details regarding the visual inspection refer to Appendix C.

2.2 Method of Assessment

The superstructure has been assessed in accordance with the Department of Transport Design Manual for Roads and Bridges Volume 3 Section 4 Part 3 BA 16/93 and BD21/93.

The modified MEXE method was used for establishing the arch barrel capacity.

Due to the absence of construction details the modified MEXE method was also used to obtain an estimated capacity for the concrete extension. Assessment of this element was carried out assuming that it was constructed from concrete bricks with a ring thickness of 215mm.

The calculations are attached in Appendix B.

2.3 Summary of Results

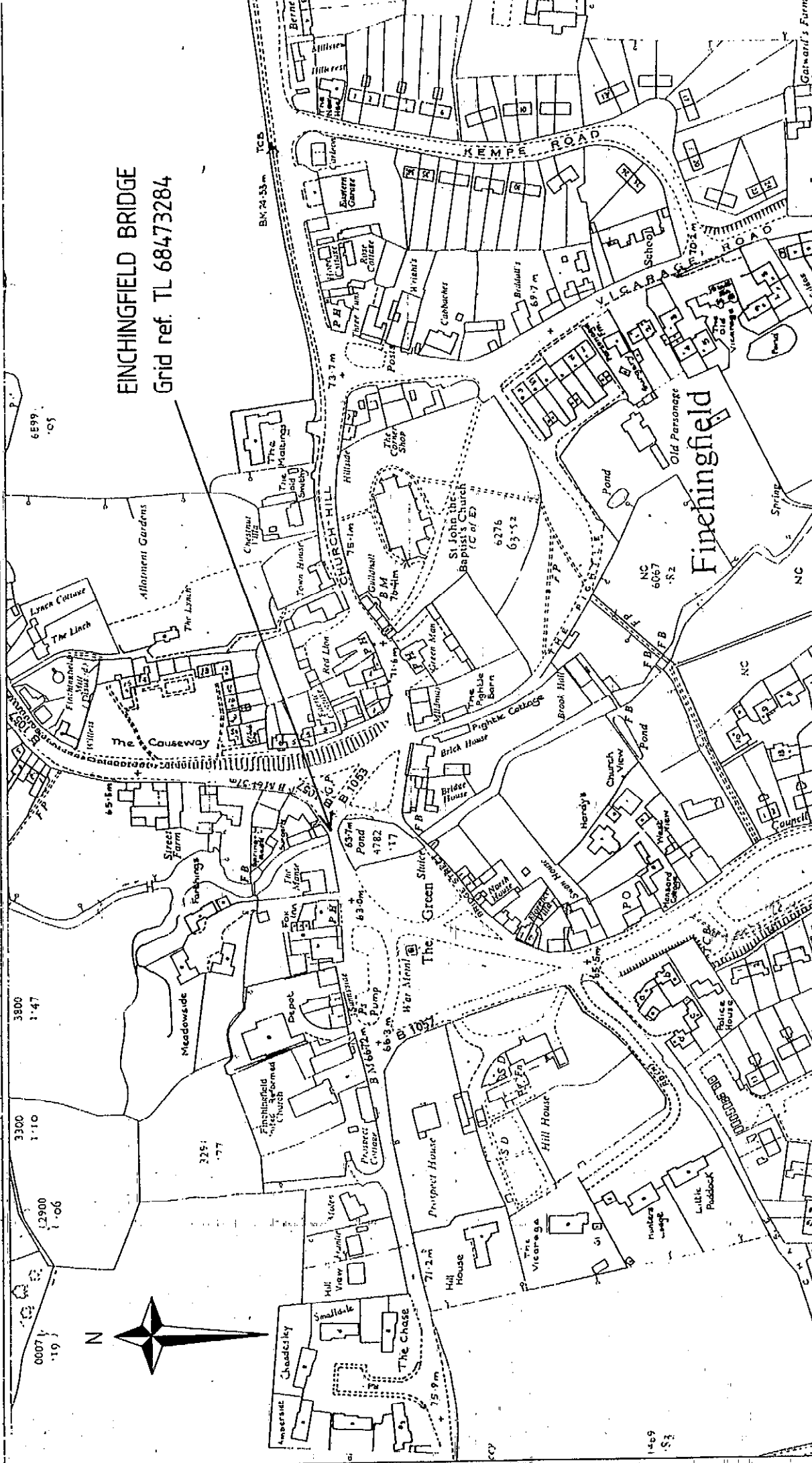
Element	Modified Axle Load	Gross Vehicle Weight
Brick Arch	6.0te	7.5te

APPENDIX A

Location Plan

General Arrangement

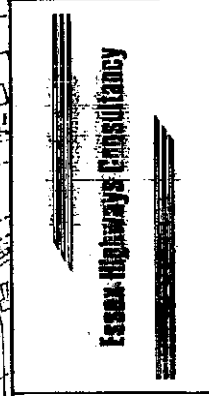
Bridge Card



EINCHINGFIELD BRIDGE
 Grid ref. TL 68473284

DRWG. NO. 26/A01
CAD NO.
SCALES 1:2500
DATE 06/93
CHECKED

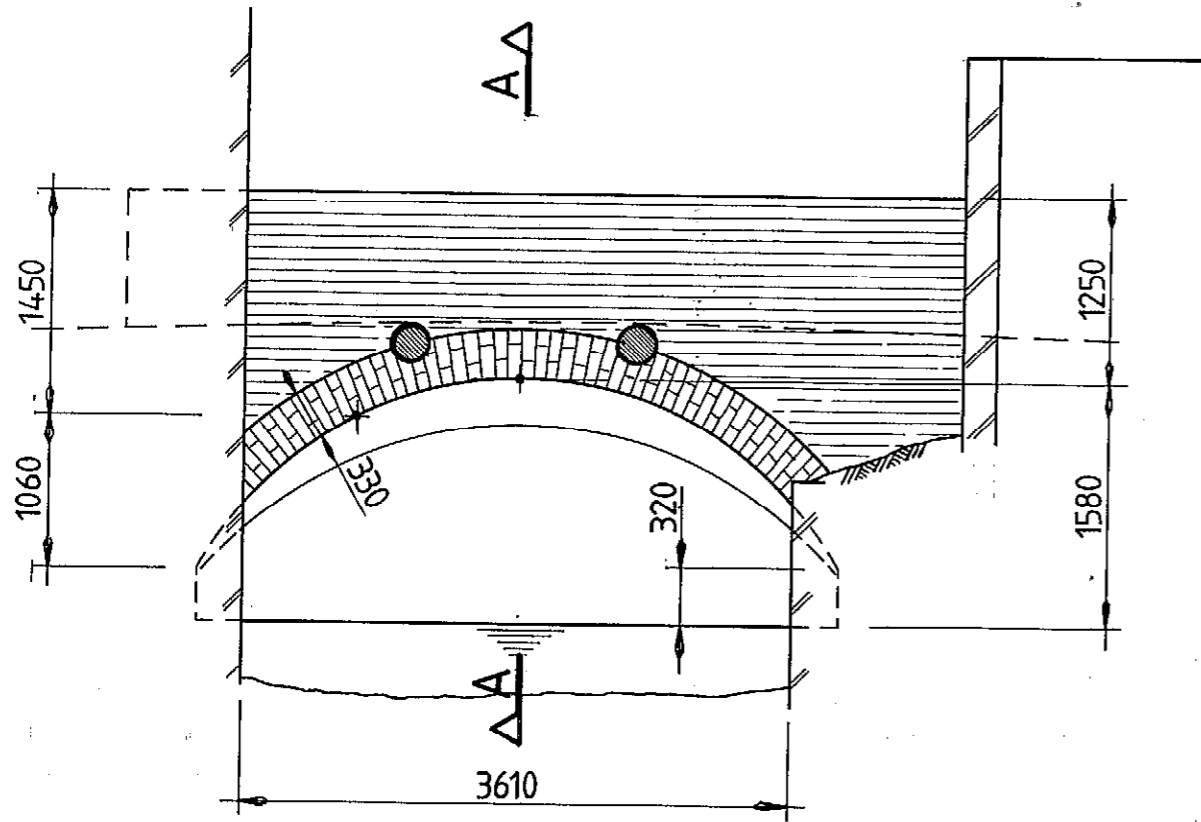
LOCATION PLAN



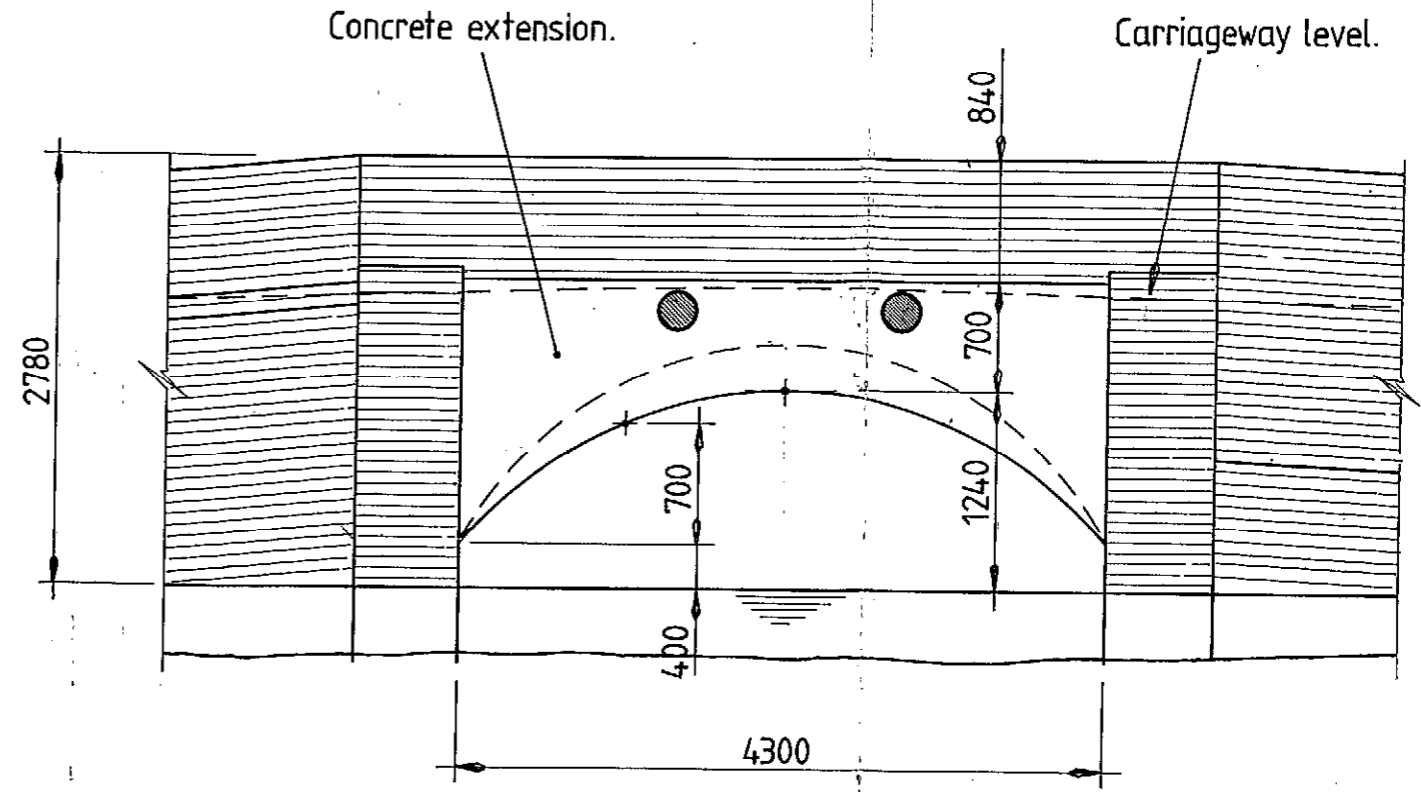
Martin Cockssole FICE FIHT
 County Surveyor
 County Hall
 Chelmsford CM1 1QH
 Tel: Chelmsford 492211

Page 5

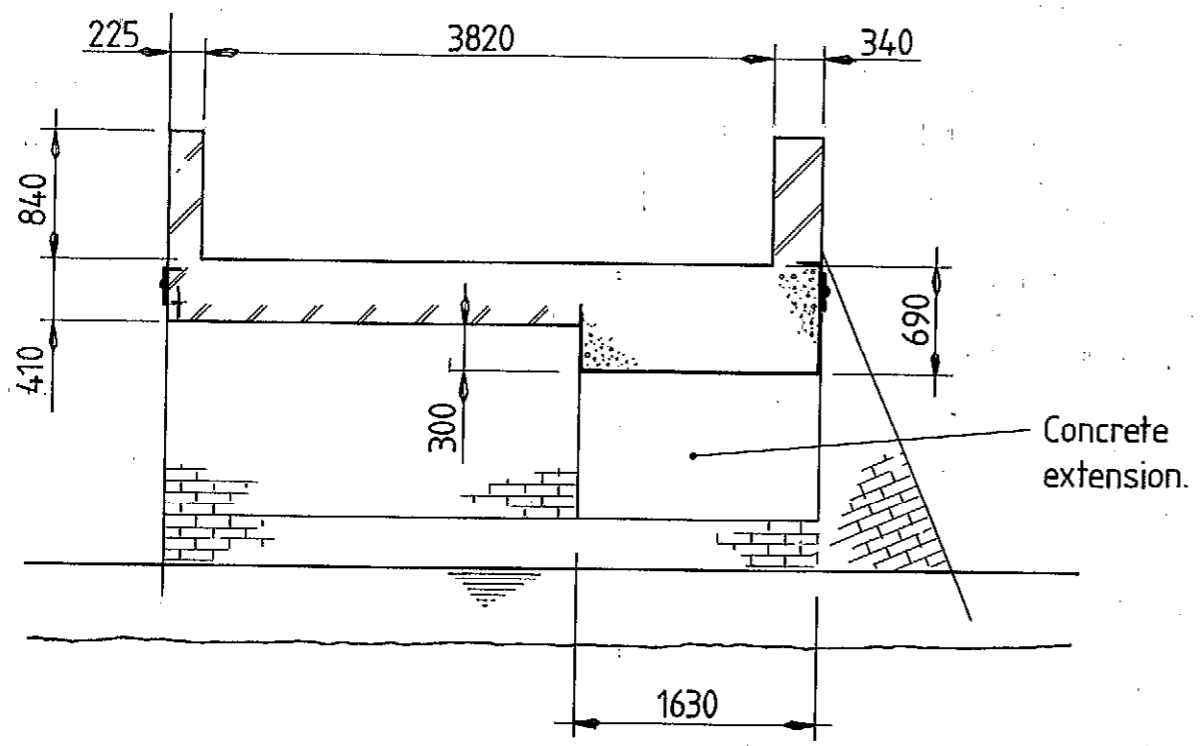
Essex County Council



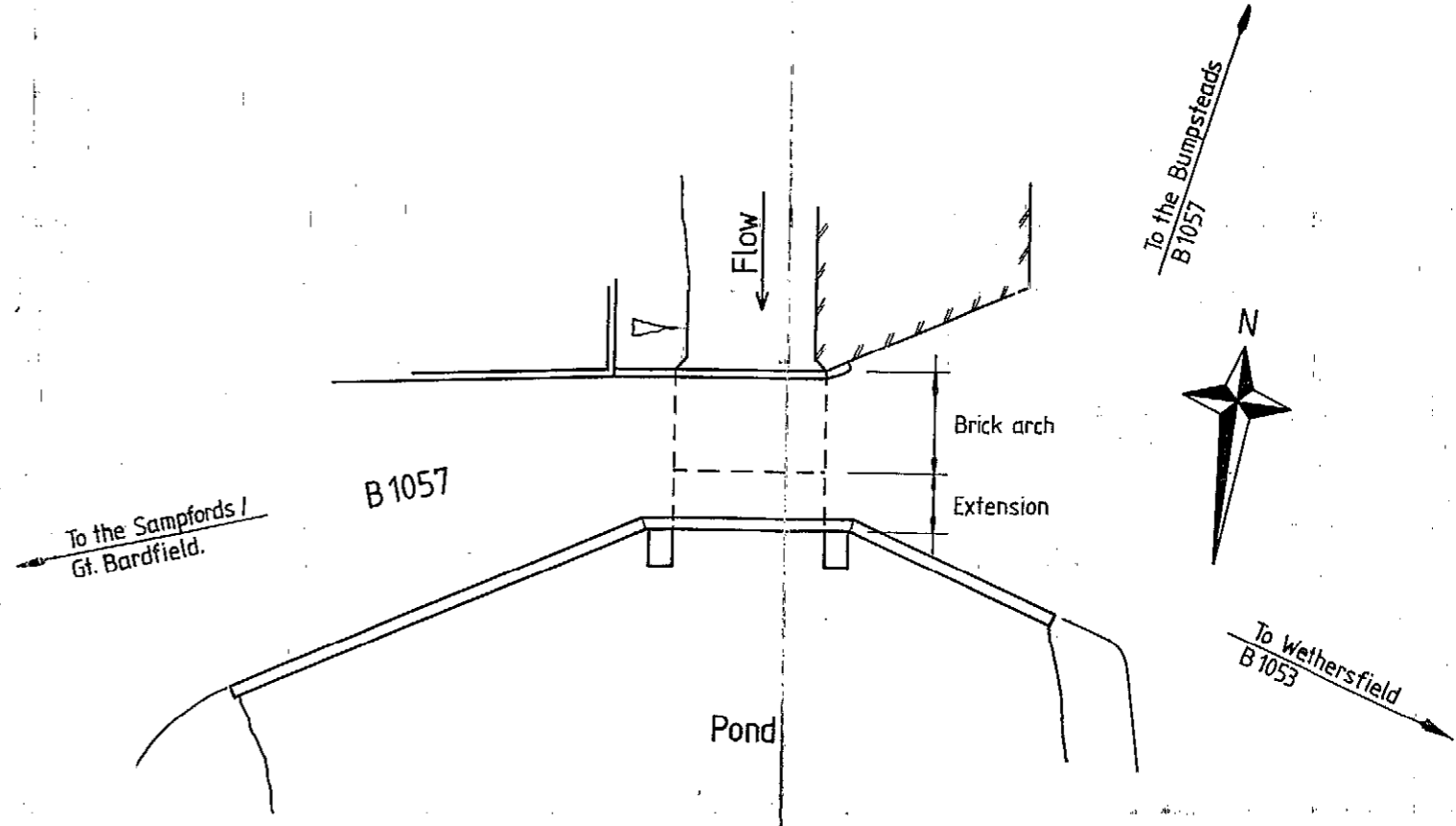
Upstream Elevation



Downstream Elevation



Section A-A



Plan (Scale 1:200)

SCALES		CONSTRUCTION AUDIT						
1:50 U.N.O.		SURVEYED	LEVELLED	DESIGNED	DRAWN	TRACED	CHECKED	DESCRIPTION OF DRAWING
INITIALS	DATE				SKT			FINCHINGFIELD BRIDGE (No. 26)
					10/94			
CAD FILE	REVISION	REVISION		CHECKED				
		SUFFIX	BY	DATE	BY			

FINCHINGFIELD COUNTY COUNCIL OF ESSEX - COUNTY SURVEYOR'S DEPARTMENT.

BRIDGE No. 26

BRIDGE REGISTER.

Y BRIDGE: CB DISTRICT No.: 12

Waterway: TRIBUTARY OF R. PANI
 Rly. Exec. No. _____
 Water Level _____
 Flood Level _____

Road Gt. Dunmow - Haverhill
 Road No. B.1067/3
 Local Authority BRAINTREE R.D.C. Parish Finchingfield

Sheet No. 15.14.
 2500
 Map Reference 148/685028

DETAILS:
 Material Brick
 Structure Brick arch with concrete widening
Brick parapets
 Authority Responsible C.C. of E

SERVICES:
 Bus Route _____
 G.P.O. _____
 Electricity _____
 Gas _____
 Water _____
 Sewers _____
 Survey _____
 Improvement Line _____
 Future Proposals _____

H.Q. INSPECTIONS:
 Date _____
 Condition _____

Authority Responsible C.C. of E
 of Spans One
 Dimensions 14'-1" x 9'
 Height —
 Construction 3.0m Approx. Construction Depth 0.4m. App.

AGREEMENTS:
 Ref. No. _____
 Between C.C. & _____
 Subject _____
 Date _____

Authority Responsible C.C. of E
 Surface Asphalt Gradient Humped
 Parapets None
 Parapets 12'-8"
 Construction Widening C/19/12
 Weak Bridge _____

ADDITIONAL INFORMATION:
"Narrow bridge" signs up
Diamond notices up (1
Car gets 1896 + 1903).
Blind corner north app
LENN AVENUE
Photographs available [

Restrictive Notices
~~Not Transposed~~

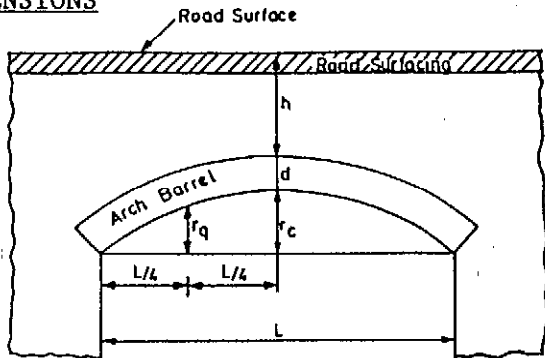
APPENDIX B

Calculations

ARCH ASSESSMENT TO MODIFIED MESE (BA 16/93)

STRUCTURE: NO. 26 NAME: FINCHINGFIELD BRIDGE
BRICK ARCH.

1. DIMENSIONS



L = 4.30 m
rc = 1.26
rq = 1.06
d = 0.33
h = 0.08
h+d = 0.41

2. PROVISIONAL ASSESSMENT LOADING (Fig 3/1)

PAL = 18 TONNE

3. SPAN RISE FACTOR

$$\frac{L}{rc} = \frac{4.30}{1.26} = 3.4 \quad (\text{Fig 3/3})$$

Fsr = 1.0

4. PROFILE FACTOR

$$\frac{rq}{rc} = \frac{1.06}{1.26} = 0.84 \quad (\text{Fig 3/4})$$

Fp = 0.78

5. MATERIAL FACTOR

(Table 3/1 & 3/2) $F_m = \frac{F_b d + F_h h}{d + h} = \frac{1.0 \times 0.33 + 0.9 \times 0.08}{0.41} = 0.98$

6. JOINT FACTOR

(Tables 3/3 & 3/4 & 3/5) $F_j = F_w F_d F_{m0} = 0.9 \times 0.9 \times 0.9 = 0.73$

7. CONDITION FACTOR

Para 3.17 to 3.23

Fc = 0.9

8. MODIFIED AXLE LOAD: PAL x Fsr x Fp x Fm x Fj x Fc = MAL =

$$18 \times 1.0 \times 0.78 \times 0.98 \times 0.73 \times 0.9$$

9.0 TONNE

9. AXLE LIFT-OFF: (Fig 3/5)

Factor Af = 0.66

Allowable Axle Load = 9.0 x 0.66 = 5.9 te

10. WEIGHT LIMIT ON ARCH (MAX GROSS VEHICLE WEIGHT) (Table 3/6)

7.5 TONNE

11. CONCLUSION:

The modified MESE method indicates that the brick barrel has a gross vehicle capacity of 7.5 te -
USING AN ALTERNATIVE ANALYSIS.

Assessed by: _____

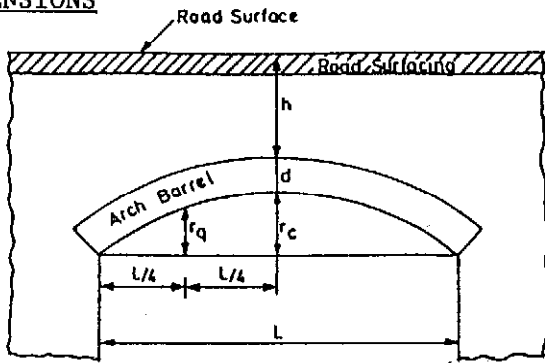
Date: 10/94

Signed: _____

ARCH ASSESSMENT TO MODIFIED MEXE (BA 16/93)

STRUCTURE: NO. 26 NAME: FINCHINGFIELD BRIDGE
CONCRETE EXTENSION. (ESTIMATE)

1. DIMENSIONS



- L = 4.30
- rc = 0.84
- rq = 0.70
- d = 0.215 (SAY)
- h = 0.475
- h+d = 0.69

2. PROVISIONAL ASSESSMENT LOADING (Fig 3/1)

PAL = 51 TONNE

3. SPAN RISE FACTOR

$$\frac{L}{rc} = \frac{4.30}{0.84} = 5.1 \quad (\text{Fig 3/3})$$

Fsr = 0.84

4. PROFILE FACTOR

$$\frac{rq}{rc} = \frac{0.70}{0.84} = 0.83 \quad (\text{Fig 3/4})$$

Fp = 0.80

5. MATERIAL FACTOR

(Table 3/1 & 3/2) $F_m = \frac{F_{bd} + F_h}{d + h} = \frac{1.2 \times 0.215 + 1.0 \times 0.475}{0.69} = 1.06$

CONC. BRICKS (SAY) ↓
CONC. FILL ↓

6. JOINT FACTOR

(Tables 3/3 & 3/4 & 3/5) $F_j = F_w F_d F_{m0} = 1.0 \times 1.0 \times 1.0 = 1.0$

7. CONDITION FACTOR

Para 3.17 to 3.23 $F_c = 1.0$

8. MODIFIED AXLE LOAD: PAL x Fsr x Fp x Fm x Fj x Fc = MAL = 36.3 TONNE
 51 x 0.84 x 0.80 x 1.06 x 1.0 x 1.0

9. AXLE LIFT-OFF: (Fig 3/5) Factor Af = 0.66
 36.3 x 0.66 = 24.0

10. WEIGHT LIMIT ON ARCH (MAX GROSS VEHICLE WEIGHT) (Table 3/6) > 40 TONNE

11. CONCLUSION: USING A MODIFIED MEXE METHOD OF ANALYSIS FOR THE EXTENSION INDICATES THAT IT IS CAPABLE OF 40 to A.L.L.

Assessed by: _____ Date: 10/94

Signed: _____

NOTE:- ESTIMATED

CAPACITY Page 10
Version 1.1

APPENDIX C

Notes on Visual Inspection

Appendix C

Notes on Visual Inspection

Carriageway and Parapets

The Bridge carries the B1053/1057 over Finchingfield Brook, with a considerable hump in the road levels over the structure (see photographs 1 and 2).

The carriageway is gouged and there are significant areas where the surfacing has 'broken-up' (*). There is a crack, adjacent to the single storey building, in the upstream parapet (see photograph 3).

The internal (south-east) corner of the downstream parapet has been gouged by vehicular traffic (see photograph 4).

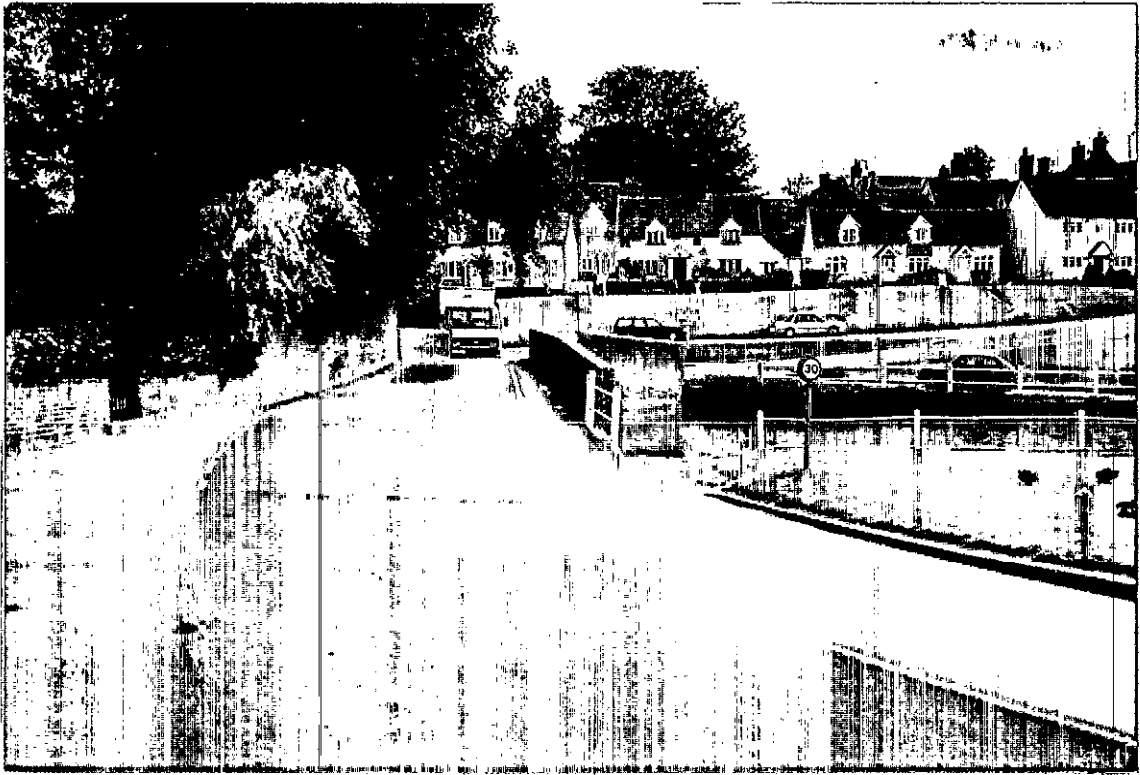
The downstream parapet and wingwall have been rebuilt in recent years. The Bridge is part of a very picturesque group around the village pond (see photograph 5).

Structure

The brick arch shape is generally good and both the voussoir and barrel joints have been repaired and repointed on a number of occasions. There are some longitudinal cracks through the barrel joints and there are white deposits on some of the bricks, presumably efflorescence (see photographs 6 and 7).

The downstream concrete extension is in good condition and is heavily buttressed at the abutments (see photograph 8).

(*) Subsequent to the visual inspection the carriageway, across the Bridge, has been resurfaced.



Photograph 1. Carriageway looking east.



Photograph 2. Carriageway looking west.



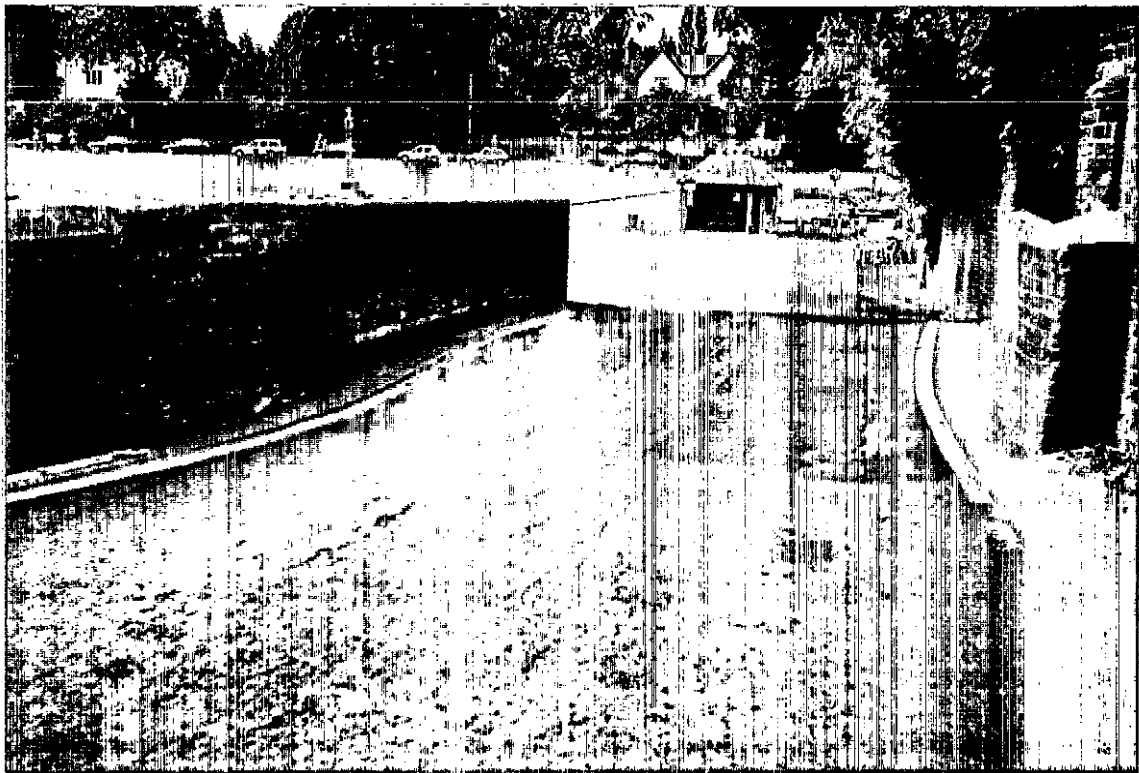
Photograph 1. Carriageway looking east.



Photograph 2. Carriageway looking west.



Photograph 3. Downstream parapet/carriageway.



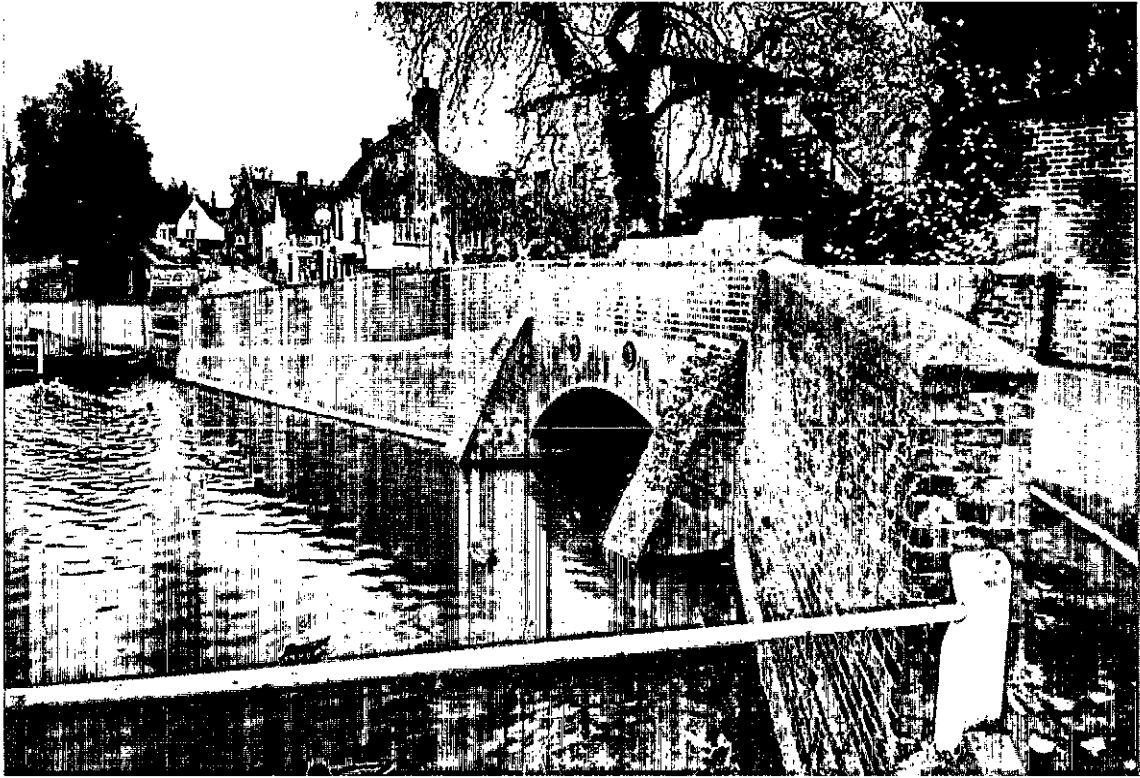
Photograph 4. Upstream parapet.



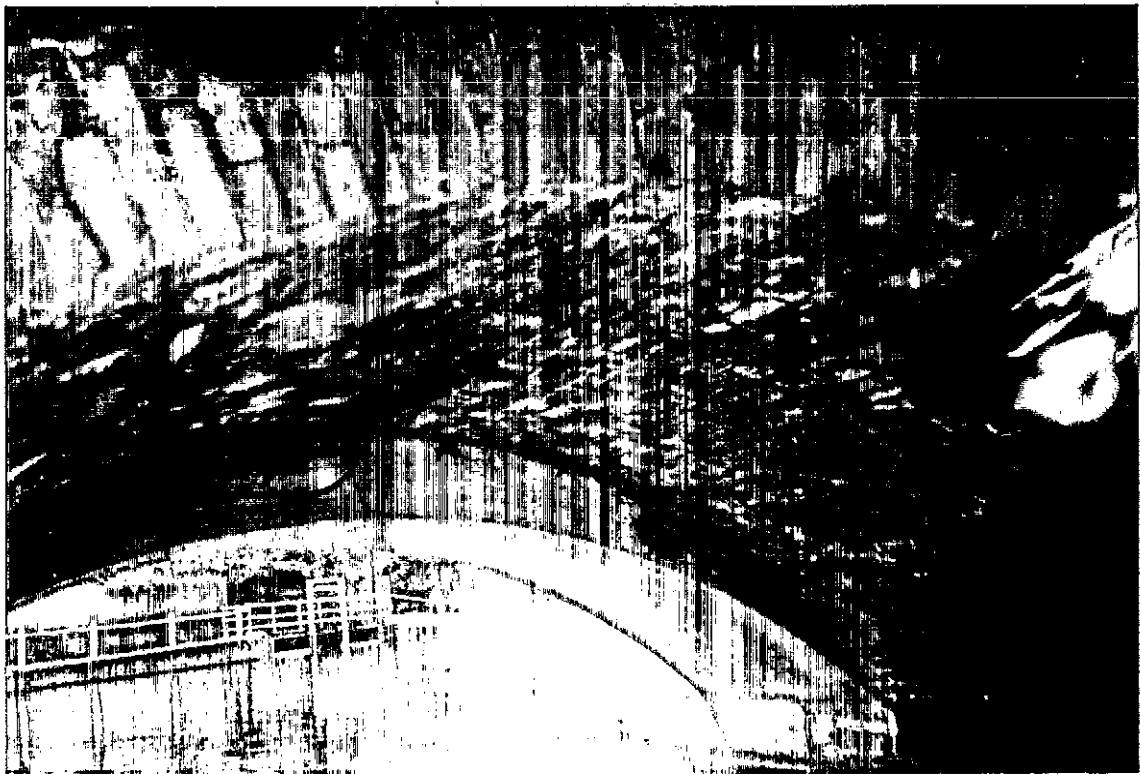
Photograph 3. Downstream parapet/carriageway.



Photograph 4. Upstream parapet.



Photograph 5. Downstream parapet/wingwall.



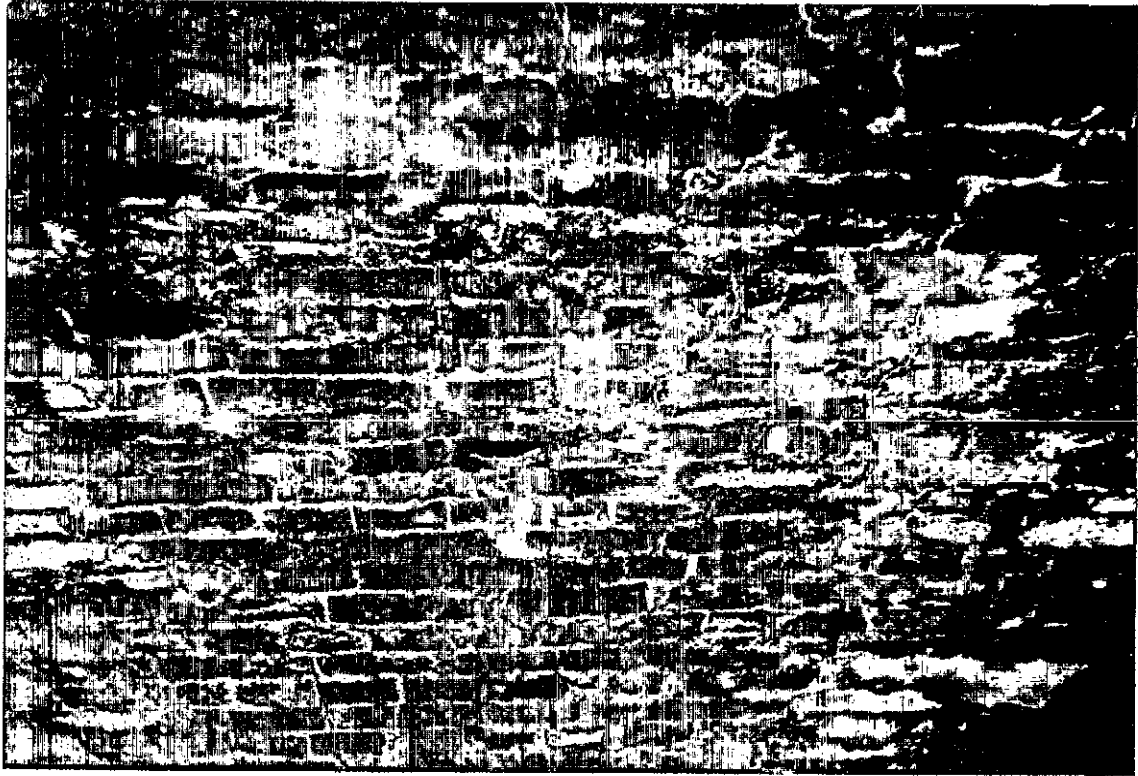
Photograph 6. Upstream brick arch.



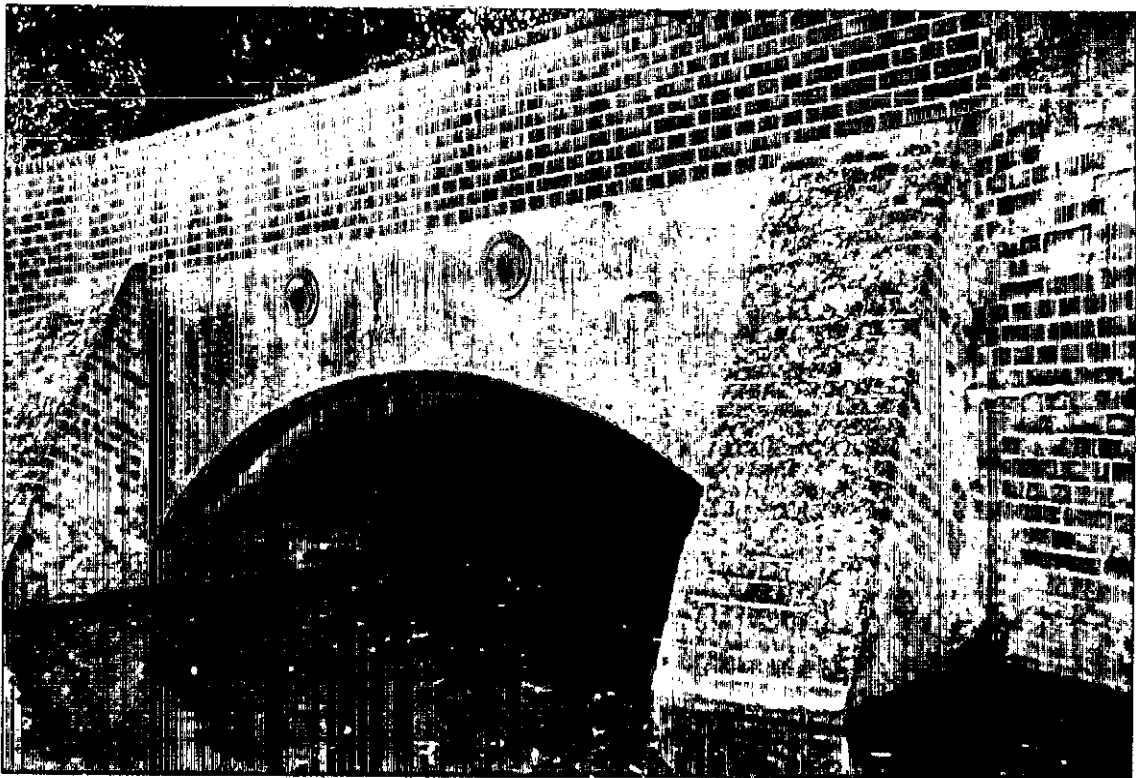
Photograph 5. Downstream parapet/wingwall.



Photograph 6. Upstream brick arch.



Photograph 7. Barrel brickwork.



Photograph 8. Downstream extension.



Photograph 7. Barrel brickwork.



Photograph 8. Downstream extension.