BRITISH RAIL PROPERTY BOARD

# BRIDGE ASSESSMENT TO BD21/97

## B6259 – GREAT MUSGRAVE RAILWAY BRIDGE NO 25

CONSULTANCY & DESIGN

| CUMBRIA COUNTY COUNCIL - CONSTRUCTION SERVICES<br>BD 21/97 LOAD ASSESSMENT REPORT<br>FOR: B6259 GREAT MUSGRAVE RAILWAY BRIDGE | PAGE No. 1 OF 38 PAGES<br>REV No. 0<br>DATE: Nov. 98 |
|---|---|

## REPORT COVER SHEET AND INDEX



**CLIENT:** BRITISH RAIL PROPERTY BOARD

**SCHEME No.:** As Quality Plan

**ASSESSMENT LIST APPENDIX No.:** 24 **DATED:** 27/08/96

**FOR QUALITY PLAN REF:** BG/96/97
(Note: Work is covered by Scheme Specific Instruction)

**REPORT TITLE:** AS HEADER

| STATUS | DATE | AUTHOR | APPROVED |
|---|---|---|---|
| ISSUED FOR USE | Nov. 98 | [redacted] (Assessor) | [redacted] (Team Leader) |

CATEGORY B

**SIGNED:** ..... [redacted] ..... **Date:** 13 Nov. 98.
(Assessor)

**APPROVED:** ..... [redacted] ..... **Date:** 14 Nov. 98.
(Team Leader)

**DATE SUBMITTED TO CLIENT:** 19 Nov. 98.

**DISTRIBUTION LIST:**
ONE COPY PRODUCED FOR CCC STRUCTURES CLIENT AND BRPB.
ONE COPY RETAINED IN CCC RECORD SYSTEM

RECORD COPY RETAINED BY E+E.

The assessment was carried out in accordance with the standards stated in the Design Basis Statement/Approval in Principle Form TA1 countersigned by the Client on ....10 Nov 97.....(delete if non-applicable).

1. The results of the assessment are as follows:

Great Musgrave No 25 Railway Bridge has been assessed in accordance with BA16/97 and BD21/97 using the modified MEXE method.

The arch barrel has been found to be unsatisfactory for Full Construction and Use loading. A 17 Tonne weight restriction should be applied to the structure.

The allowable axle loads are: Max single axle load = 11.5T per axle
Max double axle load = 7.5T per axle
Max triple axle load = 6.5T per axle

The foundations, abutments, wingwalls, spandrels and parapets have been assessed qualitatively (visual inspection) in accordance with clause 8 of BD21/97 and are considered adequate to carry the present imposed loading.

The parapets do not comply with the requirements of BD52/93 in terms of impact resistance.

2. Recommendations to increase the assessed capacity are as follows:

Repoint arch barrel

# ASSESSMENT TO BD 21/97
# INSPECTION AND SURVEY INFORMATION

## Explanatory Notes on Completion of Inspection Report Form

Severity:

1 - No significant defect.

2 - Minor defects of a non-urgent nature.

3 - Defects which should be included for attention within the next annual maintenance programme.

4 - Severe defects where urgent Client action is recommended for the protection of persons and property.

Extent:

A - No significant defect.

B - Slight, not more than 5% of length or area affected.

C - Moderate, 5% - 20% affected.

D - Extensive, more than 20% affected.

Boxes for all applicable elements are to be completed, i.e. Extent A Severity 1 represents a 'nil' report.

Boxes for non-applicable elements are to be dashed to indicate consideration.

A typical form is shown overleaf.

The comments section is to be used to list remedial works and estimated costs. The rear of the form or an extra sheet may be used for continuations.

C.C.C. BRIDGE INSPECTION REPORT — DEPARTMENT OF HIGHWAYS AND ENGINEERING

ROAD NO B6259 BRIDGE NO 25 BRIDGE NAME GREAT MUSGRAVE

TYPE OF BRIDGE MASONRY ARCH SPANS 1 N° 8·45 m (SKEW)

DATE OF INSPECTION 4/9/96 INSPECTED BY [redacted]

| ITEM NO | ITEM DESCRIPTION | EXTENT | SEVERITY | COMMENTS/DESCRIPTION OF CONDITION |
|---|---|---|---|---|
| 1 | FOUNDATIONS | A | 1 | NOT INSPECTED BUT NO SIGNS OF MOVEMENT |
| 2 | INVERT OR APRONS | A | 1 | |
| 3 | FENDERS | | | |
| 4 | PIERS/COLUMNS | | | |
| 5 | ABUTMENTS | A | 1 | |
| 6 | WING WALLS | B | 2 | REPOINT OPEN/CRACKED JOINTS MONITOR CRACHING TO S·E WINGWALL |
| 7 | RETAINING WALLS OR REVETMENTS | | | |
| 8 | APPROACH EMBANKMENTS | | | |
| 9 | BEARINGS | | | |
| 10 | MAIN BEAMS | | | |
| 11 | TRANSVERSE BEAMS | | | |
| 12 | DIAPHRAGMS OR BRACING | | | |
| 13 | CONCRETE SLAB | | | |
| 14 | METAL DECK PLATES | | | |
| 15 | JACK ARCHES | | | |
| 16 | ARCH RING/~~ARMCO~~ | B | 2 | REPAIR LOCAL SPALLED ELEMENTS, REPOINT OPEN JOINTS |
| 17 | SPANDRELS | D | 3 | REPOINT OPEN/CRACKED JOINTS; MONITOR NORTH SPANDRELS FOR FURTHER MOVEMENT |
| 18 | TIE RODS | | | |
| 19 | DRAINAGE SYSTEM | | | |
| 20 | WATERPROOFING | | | |
| 21 | SURFACING | A | 1 | |
| 22 | SERVICE DUCTS | | | |
| 23 | EXPANSION JOINTS | | | |
| 24 | PARAPETS | D | 2 | REPOINT OPEN JOINTS TO NORTH PARAPET REBED DISPLACED MASONRY TO N·E END |
| 25 | ACCESS GANTRIES OR WALKWAYS | | | |
| 26 | MACHINERY | | | |

REMEDIAL WORK RECOMMENDED AT PREVIOUS INSPECTION SATISFACTORILY COMPLETED YES/NO

COMMENTS IF ANSWER IS NO.....

## INSPECTION AND SURVEY INFORMATION

ACTION

### GENERAL

Great Musgrave Railway No 25 consists of a 8.45m single skew span sandstone masonry arch structure carrying the B6259 over a disused railway line, 0.5km west of the village of Great Musgrave.

The structure can be located at Ordnance Survey Reference NY 765 136.

Inspection of the structure was carried out on 4 September 1996 using a 7.5m aluminium extension ladder for access.

The weather was warm, dry and sunny on the day of the inspection.

### FOUNDATIONS (Item No. 1)

Inspection of the bridge did not reveal any undue signs of movement/settlement which would indicate any inadequacies in the foundations. It can therefore be assumed that the foundations are sound and that they are adequate to support the present imposed loading.

### INVERT/TRACK BED (Item No. 2)

The original railway line and ballast has been recovered and the land returned to agricultural use.

### ABUTMENTS (Item No. 5)

Both east and west abutments were constructed from large rectangular, course, rockfaced sandstone masonry blocks following a good uniform alignment (Photo No 5 & 6). The mortar joints to the abutments were generally intact and filled with reasonable quality. Inspection of the abutments did not reveal any defects which would reduce their ability to carry the current imposed loading.

A longstanding vertical crack 0.3mm wide was present through the full depth of the NW springing bedstone, visible on the north face.

Monitor

### ARCH BARREL (Item No. 16)

Barrel constructed from coursed, dressed sandstone masonry (Fb = 0.95) with 6mm - 10mm wide mortar joints (Fw = 0.9). The faces of 4No barrel stones had spalled away to a depth of 30mm on the second and third courses above the west springing, 2No 500mm from the north edge and 2No 500mm from the south edge (Photo No 9). The face of 1 No number block has spalled away to a depth of 75mm over a 300 x 450mm area (Photo No 8), 2 No courses west of the crown 1.5m from the south edge. The mortar to the joints to this spalled barrel stone was missing for the full arch barrel depth. At the time of inspection the arch barrel was dry, however leachate deposits were present for a distance of 2m in from each edge indicating that water has or still is penetrating through the arch barrel construction. Random open joints were evident to 10% of the barrel soffit in the crown area.

Monitor

Local repair

## INSPECTION AND SURVEY INFORMATION (CONT.)

ACTION

The length of open joints varied between 150 to 300mm to an average depth of 300mm.
(Fd = 0.8, Fmo = 0.9)

Repoint open joints

The voussiors to the north elevation were reasonably well pointed and followed a good alignment with no visible deterioration of the individual masonry elements.

The south voussiors also maintained a satisfactory profile, with no visible deterioration of the individual masonry elements. The voussior soffit joint was open for up to 60mm in the length at the bottom corner for 3No voussiors at the SW quarter point, the rest of the joints to the voussiors were reasonably well pointed.

Repoint open joints

**SPANDREL WALLS (Item No. 17)**

Spandrels constructed from coursed rockfaced sandstone masonry. The alignment of the south spandrel was satisfactory with no sign of any significant lateral displacement, bulging or movement. Random cracking was evident to a number of mortar joints over the south spandrel area. Cracking of the mortar pointing to the extrados joint has occurred for the full length of the joint with the mortar missing over the 8th and 9th voussoir above the SW springing (Photo No 10).

Repoint cracked/open joints

50% of the pointing to the north spandrel extrados joint was missing, where pointing was present cracking was evident together with evidence of 2-3mm spandrel displacement (possibly longstanding). 30% of the mortar joints to the north spandrel were cracked or the pointing was spalling away from the masonry. Apart from the lateral displacement the alignment of the spandrel wall was satisfactory with no significant bulging or deformation evident.

Repoint cracked/open joints
Monitor for further movement

Both stringcourses followed a satisfactory alignment with no significant deformation, the majority of the mortar pointing to the perp joints has been washed out leaving the joints open. Minor vegetation was evident along the stringcourse to the north elevation (Photo No 13).

Repoint open joints
remove vegetation

**WING WALLS (Item No. 6)**

Wing walls constructed from coursed, rockfaced sandstone masonry.

The SE wingwall followed a good alignment with no significant deformation rotation or movement. A small number of the mortar joints were cracked but overall the pointing to the wall was satisfactory. A longstanding predominately vertical crack 1-2mm wide ran the full height of the wall, in the mortar joints, 4m east of the east abutment (Photo No 14).

Monitor

The SW and NE wingwalls were reasonably well pointed with only the occasional cracked joint, both walls following a satisfactory alignment.

## INSPECTION AND SURVEY INFORMATION (CONT.)

ACTION

The mortar was cracked or missing to 10% of the joints to the NW wingwall. 2 No masonry blocks were badly weathered with the faces spalled away adjacent to the spandrel, 1No 6 course above ground level for the full course height, 450mm in length for a depth of 100mm and 1No 3 course above ground level for the full course height, 300mm in length for a depth of 75mm (Photo No 15).

Repoint cracked/open joints
Local masonry repair

**PARAPETS (Item No. 24)**

The parapets are constructed of coursed dressed sandstone masonry with flat top sandstone copings. Accidental damage has resulted in 2No masonry blocks being displaced by up to 100mm at the east end of the north parapet, 2 courses above road level (Photo No 17). The pointing to the north parapet is at the end of its life with the majority of the joints open or cracked (Photo No 18) 30% of the mortar joints to the north parapet requiring repointing (Photo No 19). Apart from the minor accidental damage on the north parapet both parapets followed a satisfactory alignment.

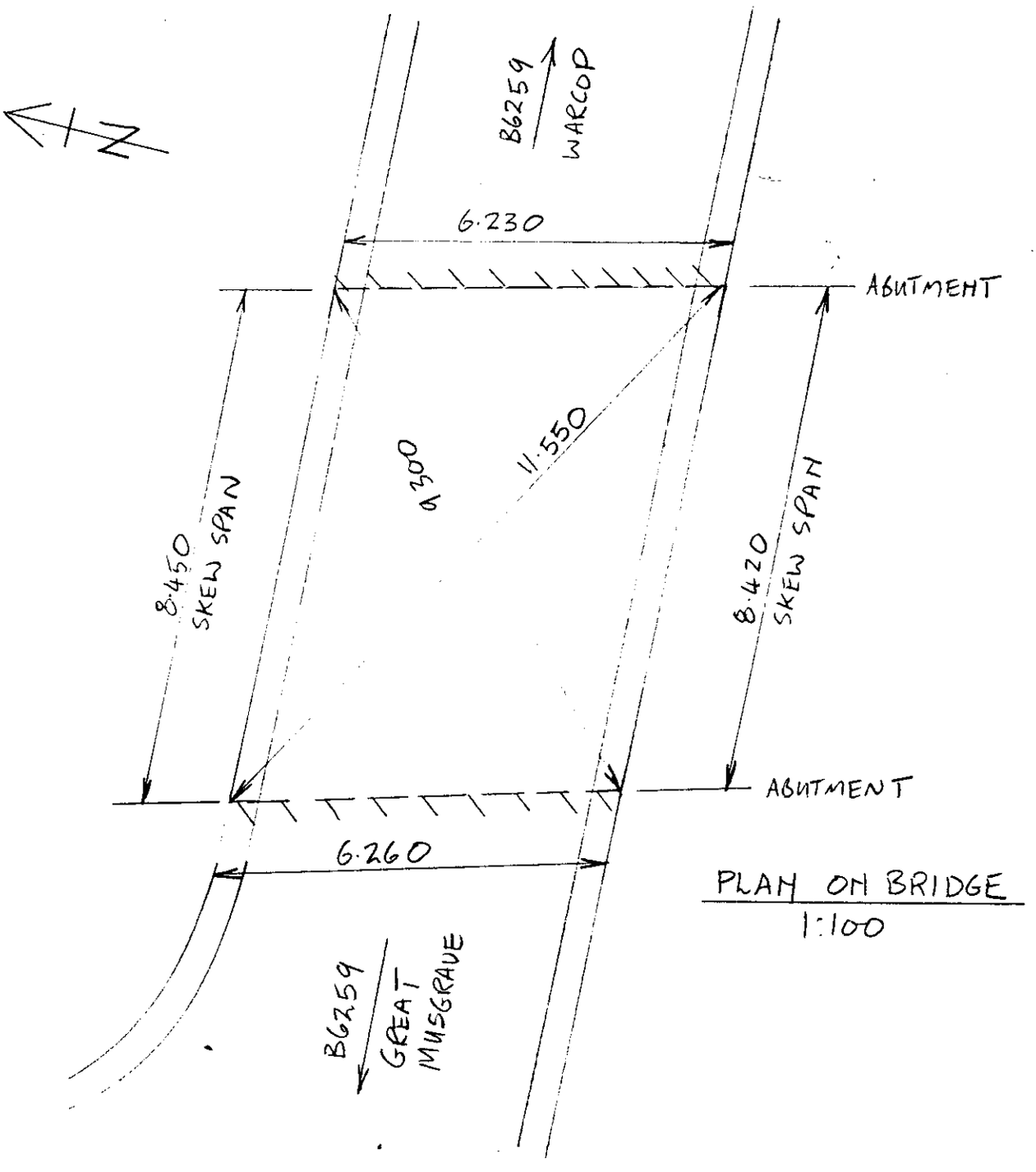
Reset masonry blocks
Repoint open/cracked joints

**CARRIAGEWAY (Item No. 21)**

The bitmac surfacing over the structure was found to be in a satisfactory condition, however very minor rutting was evident to the surfacing.

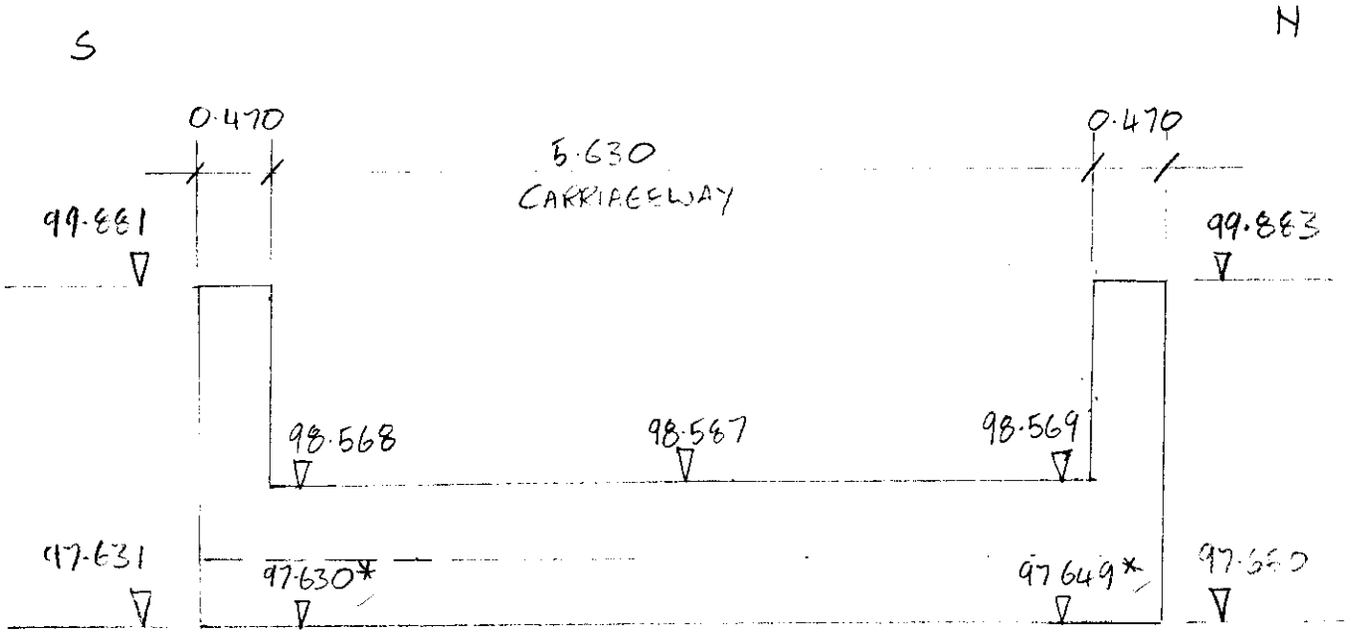
Inspection of the surfacing did not reveal any significant settlements/rutting therefore the unknown barrel fill is assumed to be well compacted ( Ff = 0.7).

## INSPECTION AND SURVEY INFORMATION




PLAN ON BRIDGE
1:100

## INSPECTION AND SURVEY INFORMATION




* INTERPOLATED LEVEL

SKEW CROSS SECTION AT CROWN
1:50

## INSPECTION AND SURVEY INFORMATION

(NOT TO SCALE)

SOUTH ELEVATION

$r_c$ = 97.631 − 95.331 = 2.300 m

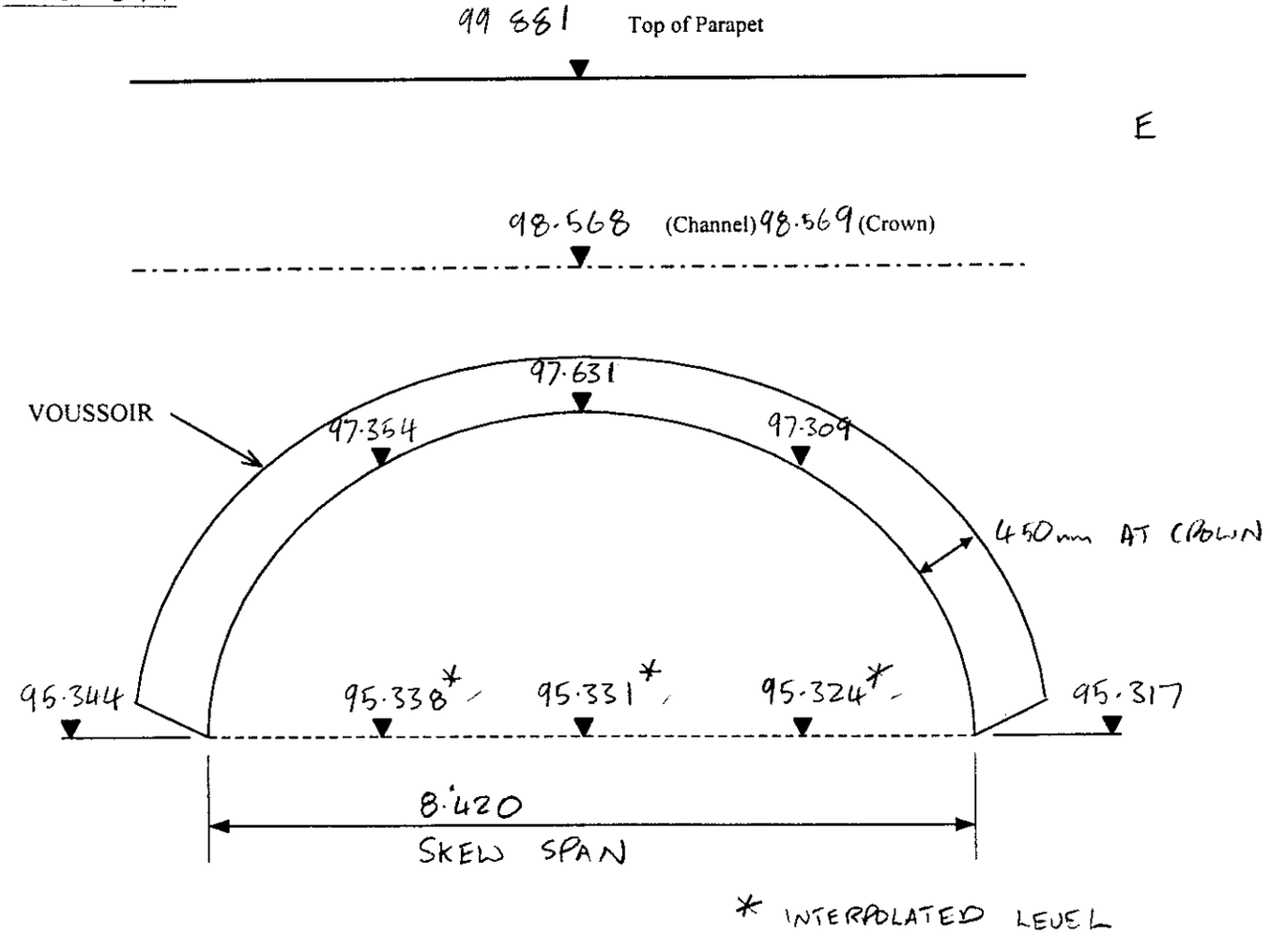
$r_q$ = { (97.354 − 95.338) + (97.309 − 95.324) } ½ = 2.001 m

$d$ = ⅔ × 0.450 = 0.300 m

$h$ = (98.568 − 97.630*) − 0.300

= 0.638 m

* DENOTES INTERPOLATED LEVEL



## INSPECTION AND SURVEY INFORMATION

(NOT TO SCALE)

NORTH ELEVATION

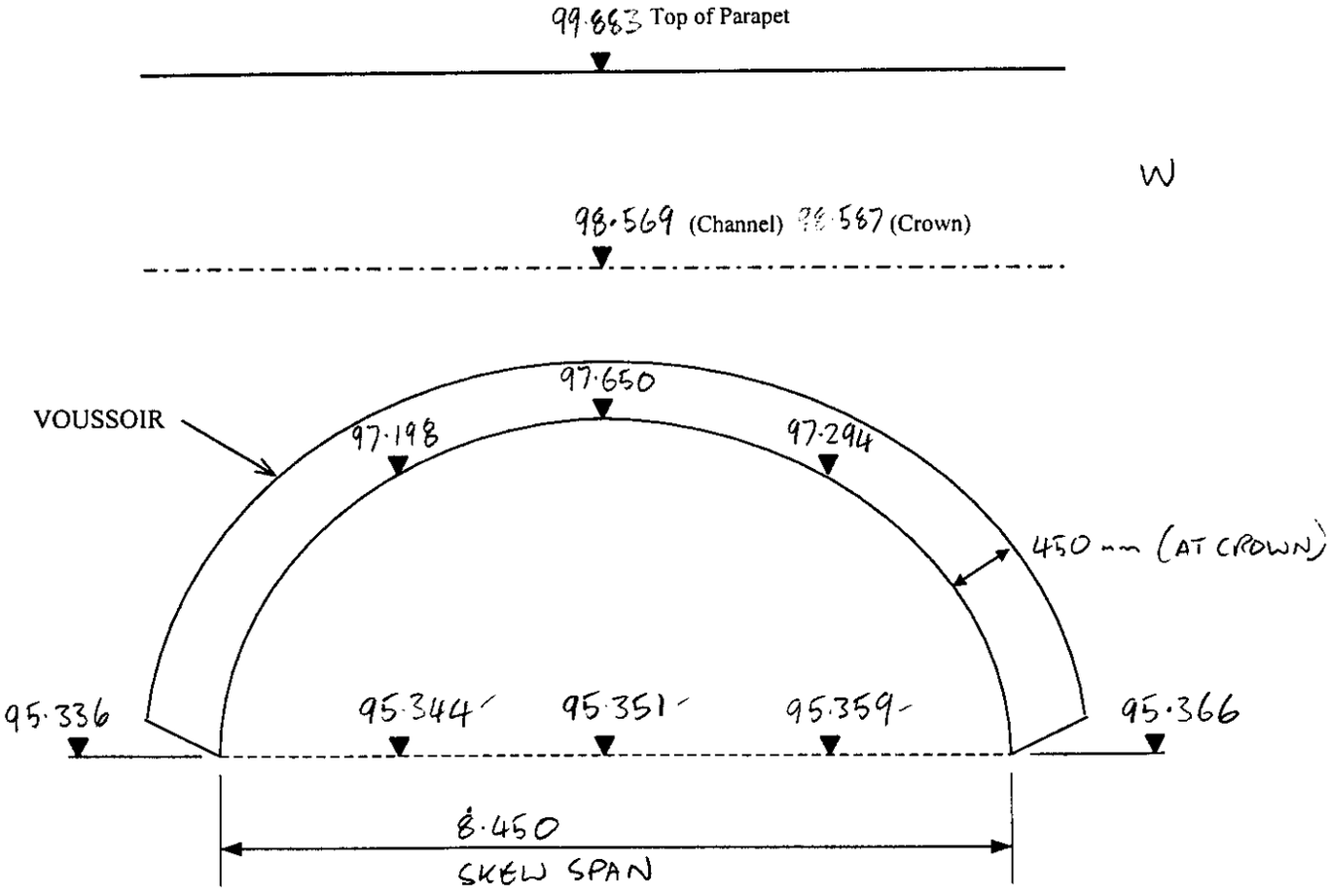
$r_c$ = 97·650 − 95·351 = 2·299 m

$r_q$ = { (97·198 − 95·344) + (97·294 − 95·359) } ½ = 1·895 m

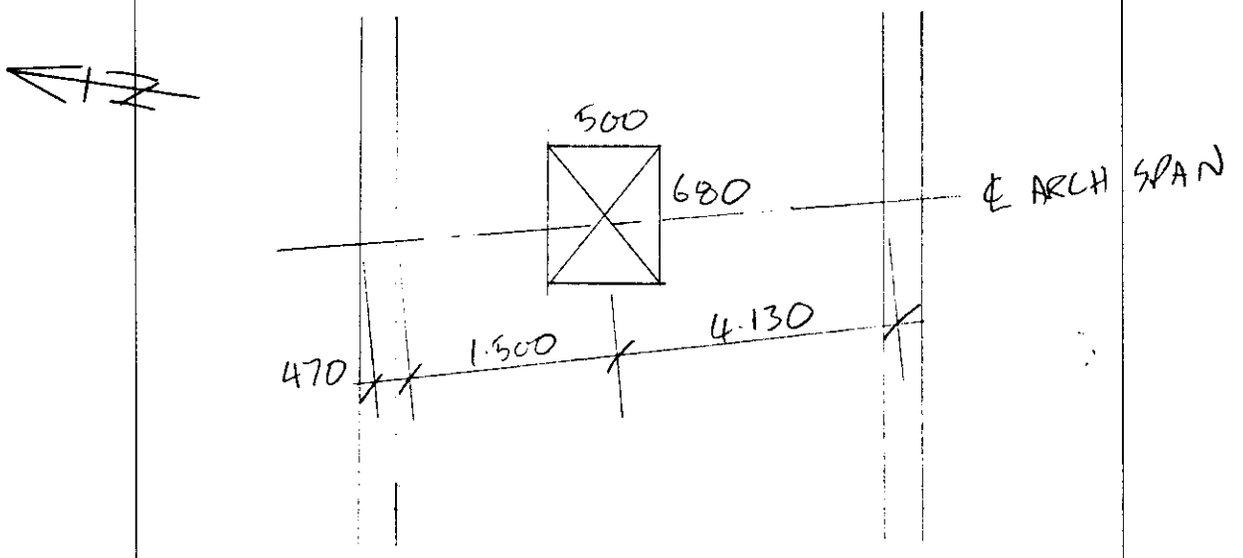
$d$ = ⅔ × 0·450 = 0·300 m

$h$ = (98·569* − 97·649*) − 0·3 = 0·620 m

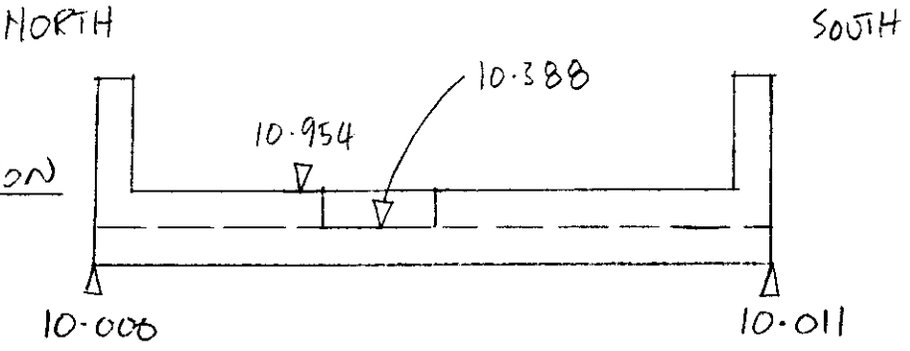
* DENOTES INTERPOLATED LEVEL



TRIAL HOLE 16/12/97



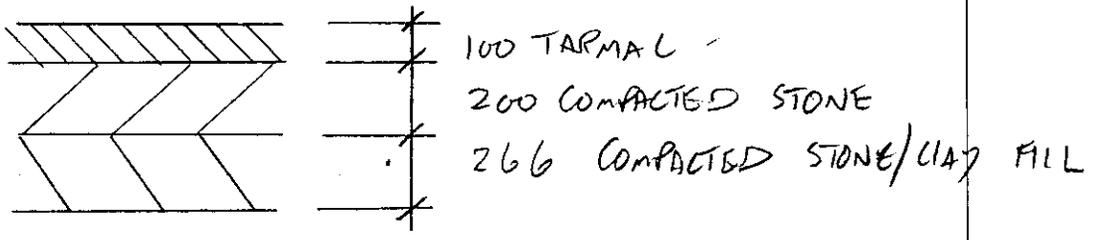

PLAN




SKEW CROSS-SECTION

$$\therefore \text{ARCH RING} = 10.388 - \left[10.000 + \left(\frac{1.97}{6.57} \times 0.011\right)\right]$$

$$= 0.385\ \text{m}$$




SECTION THROUGH TRIAL HOLE

# ASSESSMENT TO BD 21/97
# CALCULATIONS

**BD 21/97 LOAD ASSESSMENT**
**DESIGN BASIS STATEMENT AND CALCULATIONS**
**FIRST SHEET**

Sheet No: 21 of 38 sheets
Rev No: 0

**FOR: B6259 GREAT MUSGRAVE RAILWAY BRIDGE**

| Date Prepared: | Prepared by: |
|---|---|
| oct 98 | [redacted] |
| Date Checked: | Checked by: |
| Nov 1998 | [redacted] |

1. **NAME OF ASSESSOR** [redacted]
2. **NAME OF CHECKER**
3. **CHECK CATEGORY** C1/I
   (MS-04/03)

4. **PURPOSE OF CALCULATIONS**
   BD 21/97 ASSESSMENT FOR:- a) C & U VEHICULAR LOADING
   b) PROPOSED EC 40T LOADING

   ASSESSMENT OF TYPE HB LOADING CAPACITY FOR A SINGLE VEHICLE ON THE BRIDGE ONLY (WITH THE EXCEPTION OF MASONRY ARCH BRIDGES AND ALL U ROAD BRIDGES)

5. **STANDARDS, CODES OF PRACTICE AND REFERENCE DOCUMENTS USED FOR ASSESSMENT** *(Erase as appropriate)*
   SEE APPENDIX DBSC1 OVERLEAF
   SEE APPROVAL IN PRINCIPLE FORM TA1

6. **SOURCES OF INPUT DATA**
   SITE SURVEY AND INSPECTION DATA
   ~~RECORD DRAWINGS~~

7. **DESCRIPTION OF METHODS OF ANALYSIS AND DETAILS OF COMPUTER PROGRAMS USED**

   CASIO CALCULATOR - PROGRAM 'MEXE v1.5'

8. **REVIEW AND VERIFICATION OF ASSESSMENT BY TEAM LEADER**
   The assessment output meets above requirements

   Signed ..... [redacted] ..... Date 14 Nov. 98

   Name ..... [redacted] .....

   Comments ..... Satisfactory. .....

   .....

*(Note: Erase references not applicable)*

## A. MANDATORY DOCUMENTS

| | | Dated |
|---|---|---|
| ~~BD 16/82~~ | ~~Design of Composite Bridges - Use of BS 5400 Pt 5:1979~~ | ~~Nov 1982~~ |
| | ~~Amendment No. 1~~ | ~~Dec 1987~~ |
| ~~BD 24/92~~ | ~~The Design of Concrete Bridges - Use of BS 5400 : Pt 4: 1990~~ | ~~Nov 1992~~ |
| ~~BD 37/88~~ | ~~Loads for Highway Bridges~~ | ~~Aug 1989~~ |
| ~~BD 2/89~~ | ~~Technical Approval of Highway Structures on Motorways and Other Trunk Roads. Part 1 - General Procedures~~ | ~~Oct 1989~~ |
| ~~BS 5400~~ | ~~Steel, Concrete and Composite Bridges~~ | |
| | ~~Part 3: 1982 - CP for Design of Steel Bridges (see BD 13/90)~~ | ~~1982~~ |
| | ~~Part 4: 1990 - CP for Design of Concrete Bridges (see BD 24/92)~~ | ~~1990~~ |
| | ~~Part 5: 1979 - CP for Design of Composite Bridges (see BD16/82)~~ | ~~1979~~ |
| ~~BD 13/90~~ | ~~The Design of Steel Bridges - Use of BS 5400: Part 3: 1982~~ | ~~Feb 1991~~ |
| ~~BD 34/90~~ | ~~Technical Requirements for the Assessment and Strengthening Programme for Highway Structures - Stage 1 - Older, Short Span Bridges and Retaining Structures~~ | ~~Sept 1990~~ |
| ~~BD 44/95~~ | ~~The Assessment of Concrete Highway Bridges and Structures~~ | ~~Jan 1995~~ |
| ~~BD 52/93~~ | ~~The Design of Highway Bridge Parapets~~ | ~~April 1993~~ |
| ~~BD 48/93~~ | ~~The Assessment and Strengthening of Highway Bridge Supports~~ | ~~June 1993~~ |
| BD 21/97 | The Assessment of Highways Bridges and Structures | Feb 1997 |
| | Amendment No. 1 | Aug 1997 |
| BD 63/94 | The Inspection of Highway Structures | Oct 1994 |
| ~~BD 31/87~~ | ~~Buried Concrete Box Type Structures~~ | ~~Jan 1988~~ |

## B. ADVICE NOTES AND OTHER REFERENCE DOCUMENTS

*(Note: Add references as appropriate)*

| | | |
|---|---|---|
| ~~BA 39/93~~ | ~~Assessment of Reinforced Concrete Half Joints~~ | ~~April 1993~~ |
| ~~BA 32/89~~ | ~~Technical Approval of Highway structures on Motorways and other Trunk Roads. Part 1 - General Procedures~~ | ~~Oct 1989~~ |
| BA 16/97 | The Assessment of Highway Bridges and Structures | May 1997 |
| | Amendment No. 1 | Nov 1997 |
| ~~BA 55/94~~ | ~~The Assessment of Bridge Substructures and Foundations, Retaining Walls and Buried Structures~~ | ~~1994~~ |
| | ~~Amendment No. 1~~ | ~~Nov 1997~~ |
| ~~NNMD 34/61/8~~ | ~~Assessment of Buried Concrete Box Structures - HA Letter~~ | ~~29 May 1997~~ |
| BA 63/94 | The Inspection of Highway Structures | Oct 1994 |
| ~~BA 44/96~~ | ~~The Use of BD 44/95 - The Assessment of Concrete Highway Bridges and Structures~~ | ~~Nov 1996~~ |
| ~~BS 8110~~ | ~~Structural Use of Concrete~~ | |
| | ~~Part 1: Code of Practice for Design and Construction~~ | ~~March 1997~~ |
| Bridge Inspection Guide (HMSO ISBN 0 11 550638 1) | | 1984 |

## C. LIST ANY DEPARTURES FROM STANDARDS

| Scheme | Scheme Ref. | Date Prepared | Prepared by |
|---|---|---|---|
| BRITISH RAIL PROPERTY BOARD | | SEPT 96 | [redacted] |
| **Element / Item** | **Joblog No.** | **Date Checked** | **Checked by** |
| GREAT MUSGRAVE RLY No 25 | 2177 | NOV 98 | [redacted] |

| Code Ref. | CALCULATIONS / WORK | Output / Remarks |
|---|---|---|

MASONRY ARCH TO BA 16/93 & BO 21/93

NORTH ELEVATION - SOUTH ELEVATION FACTORS SIMILAR EXCEPT WERE NOTED *

BARREL FACTOR ($F_b$)

LARGE COURSED SANDSTONE BLOCKS IN SATISFACTORY CONDITION — $F_b = 0.95$ ✓

FILL FACTOR ($F_f$)

UNKNOWN WELL COMPACTED FILL — $F_f = 0.70$ ✓

JOINT WIDTH FACTOR ($F_w$)

JOINT WIDTHS GENERALLY 6-12 mm — $F_w = 0.90$ ✓

MORTAR FACTOR ($F_{mo}$)

LOOSE OR FRIABLE MORTAR — $F_{mo} = 0.90$ ✓

DEPTH FACTOR ($F_d$)

JOINTS WITH UPTO ½ UNFILLED — $F_d = 0.80$ ✓

CONDITION FACTOR ($F_c$) 0.90

WATER PENETRATION / LEACHATE −0.05

EDGE LOADING −0.1

$F_c$ 0.75 — $F_c = 0.75$

**CUMBRIA COUNTY COUNCIL - CONSULTANCY & DESIGN**
**ARCH ASSESSMENT DESIGN SHEET - MODIFIED MEXE METHOD FOR BRPB**

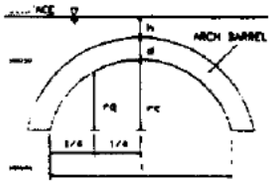


Bridge No: 25 | Bridge Name: GREAT MUSGRAVE RAILWAY

LOAD ASSESSMENT OF ARCHES IN ACCORDANCE WITH "THE ASSESSMENT OF HIGHWAY BRIDGES AND STRUCTURES"
DEPARTMENTAL STANDARD BD 21/97
AND ADVICE NOTE BA 16/97
(REFERENCES ARE TO BA 16/97 UNLESS NOTED OTHERWISE)

DATE PREPARED: APRIL 98 | PREPARED BY: [redacted]
DATE CHECKED: NOV. 98 | CHECKED BY: [redacted]

## STRUCTURAL DIMENSIONS




| | | NORTH | SOUTH | |
|---|---|---|---|---|
| SPAN (square/skew) | L= | 8.450 | 8.420 | (m) |
| RISE OF ARCH BARREL AT CROWN | rc= | 2.294 | 2.300 | (m) |
| RISE OF ARCH BARREL AT 1/4 POINT | rq= | 1.895 | 2.001 | (m) |
| EFFECTIVE THICKNESS OF ARCH BARREL | d= | 0.385* | 0.385* | (m) |
| EFFECTIVE DEPTH OF FILL AT CROWN | h= | 0.385** | 0.385** | (m) |
| | d + h= | 0.770 | 0.770 | (m) |

## PROVISIONAL ASSESSMENT (Cl 3.10)

PAL = 740 (d + h)²/L^1.3 but ≯ 70T

| | NORTH | SOUTH | | NORTH | SOUTH | (T) |
|---|---|---|---|---|---|---|
| SPAN (L) = | 8.450 | 8.420 | | | | |
| TOTAL CROWN THICKNESS (d + h) = | 0.770 | 0.770 | PAL = | 27.37 | 27.50 | |
| PAL = | 27.37 | 27.50 | (70T max) | | | |

## SPAN /RISE FACTOR (Fsr) (Cl 3.11)

(Fig 3.3) l / rc = 3.68 / 3.66 | Fsr= | 1.0 | 1.0 |

## PROFILE FACTOR (Fp) (Cl 3.12)

Fp = 2.3 [(rc - rq)/rc]^0.6

rq / rc = 0.824 / 0.67 | Fp= | 0.81 | 0.676 |

## MATERIAL FACTOR (Fm) (Cl 3.13)

BARREL FACTOR (Fb) (TABLE 3/1) Fb = 0.95
FILL FACTOR (Ff) (TABLE 3/2) Ff = 0.7
MATERIAL FACTOR (Fm) = ( Fb x d ) + ( Ff x h ) / d + h

0.975 | Fm = | 0.825 | 0.825 |

## JOINT FACTOR (Fj) (Cl 3.16)

WIDTH FACTOR (Fw) (TABLE 3/3) Fw = 0.9
MORTAR FACTOR (Fm) (TABLE 3/4) Fmo = 0.9
DEPTH FACTOR (Fd) (TABLE 3/5) Fd = 0.9
JOINT FACTOR (Fj) = Fw x Fmo x Fd Fj = 0.648

0.648 | 0.648 |

## CONDITION FACTOR ($Fc_H$) (Cl 3.17 To 3.23 Inclusive)

0.85 | Fc = | 0.75 | 0.75 |

## MULTI SPAN FACTOR

Single Span or Massive Piers Msf = 1.0
End span normally ~~Msf = 0.9~~
interMediate span normally ~~Msf = 0.8~~

1.0 | 1.0 |

## MODIFIED AXLE LOAD (MAL) (Cl 3.24)

MAL = Msf x Fsr x Fp x Fm x Fj x $Fc_H$ x PAL | MAL = | 8.89 | 7.46 |

## CENTRIFUGAL EFFECT (Fa) (Cl 3.29)

Is Centrifugal Effect considered applicable? ~~YES~~/NO
Radius (r) = _____ | Fa = | NA | NA |

## ALLOWABLE AXLE LOAD (AAL) (Cl 3.25)

Is Axle Lift-Off applicable?

| | YES (Fig 3/5b) | NO (Fig 3/5a) | | NORTH | SOUTH | (T) |
|---|---|---|---|---|---|---|
| AXLE FACTORS (Af) SINGLE AXLE = | | | | 1.34 | 1.33 | |
| 2 AXLE BOGIE = | | | AAL = | 13.50 | 11.50 | |
| 3 AXLE BOGIE = | | | AAL = | 9.0 | 7.50 | |
| | | | AAL = | 8.0 | 6.50 | |

GROSS VEHICLE WEIGHT RESTRICTION (Table 3/6) | 25T GVW | 17T GVW | (T)



* 'd' OBTAINED FROM TRIAL HOLE
** 'h' LIMITED TO 'd'

STRENGTHENING OPTIONS

OPTION 1

REPOINT OPEN JOINTS

$\therefore f_m = 1.0$, $f_d = 1.0$

M.A.L = 10.335 TONNES

$\therefore$ SINGLE AXLE = 16 TONNES
DOUBLE AXLE = 10.5 TONNES
TRIPLE AXLE = 9.5 TONNES

$\therefore$ SATISFACTORY FOR FULL 40 TONNE ASSESSMENT LOADING

scoring matrix

# Historical Railways Estate

| | | |
|---|---|---|
| Structure Reference | EDE/25 | |
| **Public Risk** | | |
| Severity | No significant risk | 0 |
| Likelihood | Low | 1 |
| Based On | | |
| Listed? | Yes ○ No ◉ | 0 |
| Maintenance Reqd? | Desirable (> 3 years) | 1 |
| Based On | Minor masonry repairs & pointing | |
| Future Plans | No plans or proposals | 0 |
| **Public Access** | Subtotal | 1 |
| Vandalism | Unlikely problem site | 1 |
| Flytipping | No evidence | 1 |
| Right of Way | No sign of use | 1 |
| Fencing | Good | 1 |
| **Action/Notes** | Total | 1 |

No action required.

V 1.009 5/11/2009

Signature

**Historical Railways Estate**

# Detailed Examination Report

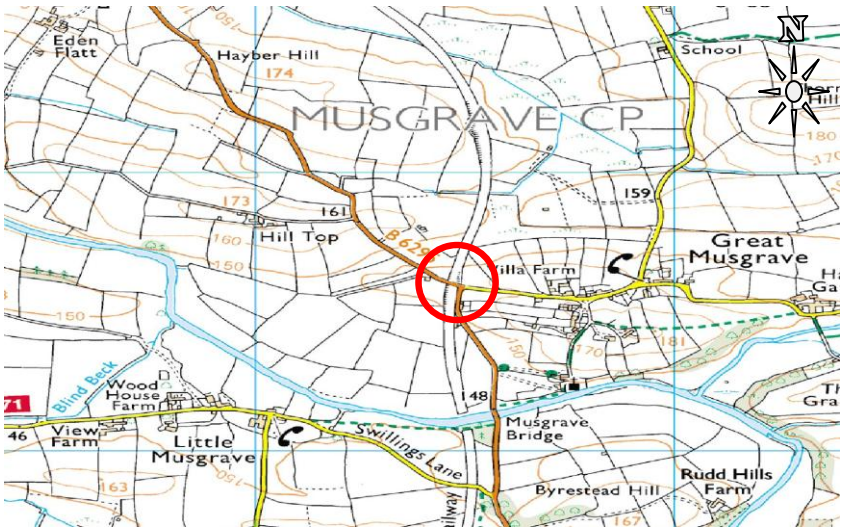
| Line: | Type of Structure: | |
|---|---|---|
| **EDEN VALLEY JCT KIRKBY STEPHEN {WARCOP}** | **OVERBRIDGE** | ELR: **EDE** |
| No. of Spans | Carrying: **PUBLIC ROAD** | Structure No: **OB 25** |
| **1** | Over: **DISMANTLED RAILWAY** | Mileage: **0m 0000ch** |
| | Name: **GREAT MUSGRAVE** | Exam. Date: **29/08/2017** |

**Sheet 1 of 83**

**Structure Ref: 3878**

| Name of Part: | G - Good F - Fair P - Poor |
|---|---|
| Rail Deck Floor | - |
| Cross Girders | - |
| Parapet Main Girders C.I. | - |
| Brick Jack Arches | - |
| Rivets and Bolts | - |
| Arch Rings | **F** |
| Spandrels | **F** |
| Abutments | **F** |
| Piers | - |
| Wing Walls | **F** |
| Parapets & Pilasters | **F** |
| Columns and Cylinders | - |
| Buttresses | - |
| Springer Course | **F** |
| String Course | **F** |
| Pointing | **F** |
| Waterproofing | **N/E** |
| Drainage | **F** |
| Rubble & Rubbish | - |
| Fencing/walling | **F** |
| Painting | - |
| Road Condition | **F** |
| Vegetation | **P** |
| Foundations | **N/E** |
| Bridge Numbers | **G** |

**Ordnance Survey Extract**




**Ordnance Survey Reference: NY: 765 136**

**General Comments:**

**STRUCTURE IN FAIR CONDITION**
**{Attention to the waterproofing}**

**Weather conditions during the detailed examination - Sunny intervals.**

Examined by:

| **Tick as appropriate:** | |
|---|---|
| Operational Rail Line | |
| Canal & River Trust | |
| Traffic Management | |
| Road Closure | |
| Height Restriction Plates | |
| Weight Restriction Plates | |
| Inaccessible Parts | ✓ |
| Existing Datals / Avongards on Structure | |
| Plumbing Points | |
| Parapet Risk Assessment | ✓ |
| Underwater Examination carried out during DE | |
| Vegetation removed during DE <10% | ✓ |
| Non - Dedication plates | |
| | |
| | |
| | |
| | |
| | |

**Historical Railways Estate**
**Detailed Examination Report**
**(Continuation Sheet)**

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Line: **EDEN VALLEY JCT - KIRKBY STEPHEN {WARCOP}** **Sheet 2 of 83**

Recommendations (By the Examining Engineer)

Investigate the adequacy of waterproof membrane and drainage system due to water ingress/wetness, drumminess and algae deposit to soffit. -P1.
Remove vegetation and trees in close proximity to the structure. £2K - P1.
General repairs to stonework, including eroded loss of face to the structure and parapets. £3K -P2.

| **Examination Elements of:** | |
|---|---|
| **EDE/25 - 0m 00ch** | |
| **Examination Date** | |
| **29/08/2017** | |
| **Examination Type** | |
| **DETAILED** | |
| **Sundries** | |
| Date Tabs Fitted (**T**/No) | |
| Fitting & setting combination locks (**C**/No) | |
| Non-Dedication Plates Fitted (**N**/No) | |
| **Access** | |
| Normal– on foot or with Ladders (**L**) | **L** |
| MEWP (**H**) | |
| Abseiling (**A**) | |
| **Underwater Examination** | |
| Probing by Examiner (**E**) | |
| By Dive Team (**D**) | |
| **Assessments** | |
| Masonry Parapets (**P**) | **P** |
| Inspection for Assessment (**I**) | **I** |
| Extended MEXE Method (**M**) | |
| **Misc.** | |
| Bat Expert (**B**) | |
| CCTV (**V**) | |

Signed:

Mentored by:

| Line: | Structure Identifier: **EDE/25** |
|---|---|
| **EDEN VALLEY JCT KIRKBY STEPHEN {WARCOP}** | **OB: 25 - Stone arch, spandrels, abutments, wing walls & parapets & pilasters. NY: 765 136.** |

Remarks (Refer to parts by name) 

**Risk Assessment** - The examination was carried out in accordance with the risk assessments in Appendix L of the Generic Method Statement for the Examination of Structures.

**Access Route to the Structure** - B6259, to Warcop, park at N/W, walk back 50.00m, descend embankment at N/W parapet end.

**Site Issues and Impediments to carrying out repairs, DE's or other works** - Public access route to the top, fenced off to the underneath to both elevations, area under the structure ballasted with drainage pipes, evidence of previous vehicular impact damage to the parapet stonework, consider tree removal, livestock within the vicinity of the structure, animal burrows within the proximity of the structure, traffic management would be required for any roadside parapet work.

**Date of Last Examination** - 09/03/2017.

**Detailed Examination carried out within 12 months of Last Visual Examination AND within 6 years of Last Detailed Examination?** - Yes.

**Reason for Late Examination** - N/A.

**Underwater Examination carried out During Examination** - N/A.

**Changes to the Use of the Structure and/or the Surrounding Area since Last Examination** - N/A.

**Evidence of Repair/Maintenance/Investigation Work that appears to have been carried out since Last Examination** - Area under the structure has had ballast & drainage pipes provided also now fenced off with timber posts & rails & animal mesh.

**Use of Solum/Track Bed** - Fenced off to the underneath to both elevations, area under the structure ballasted with drainage pipes.

**Condition of Approach Fencing/Walling and Risk to the Public** - Overall condition of the approach road walling/fencing is fair, sections in disrepair. *{Uncertain of demarcation}*

**Existence and Condition of Weight Restriction Signs including Advanced Signs** - N/A.

**Existence and Condition of Height Restriction Signs including Advanced Signs** - N/A.

**Structure I.D Provided** - Yes.

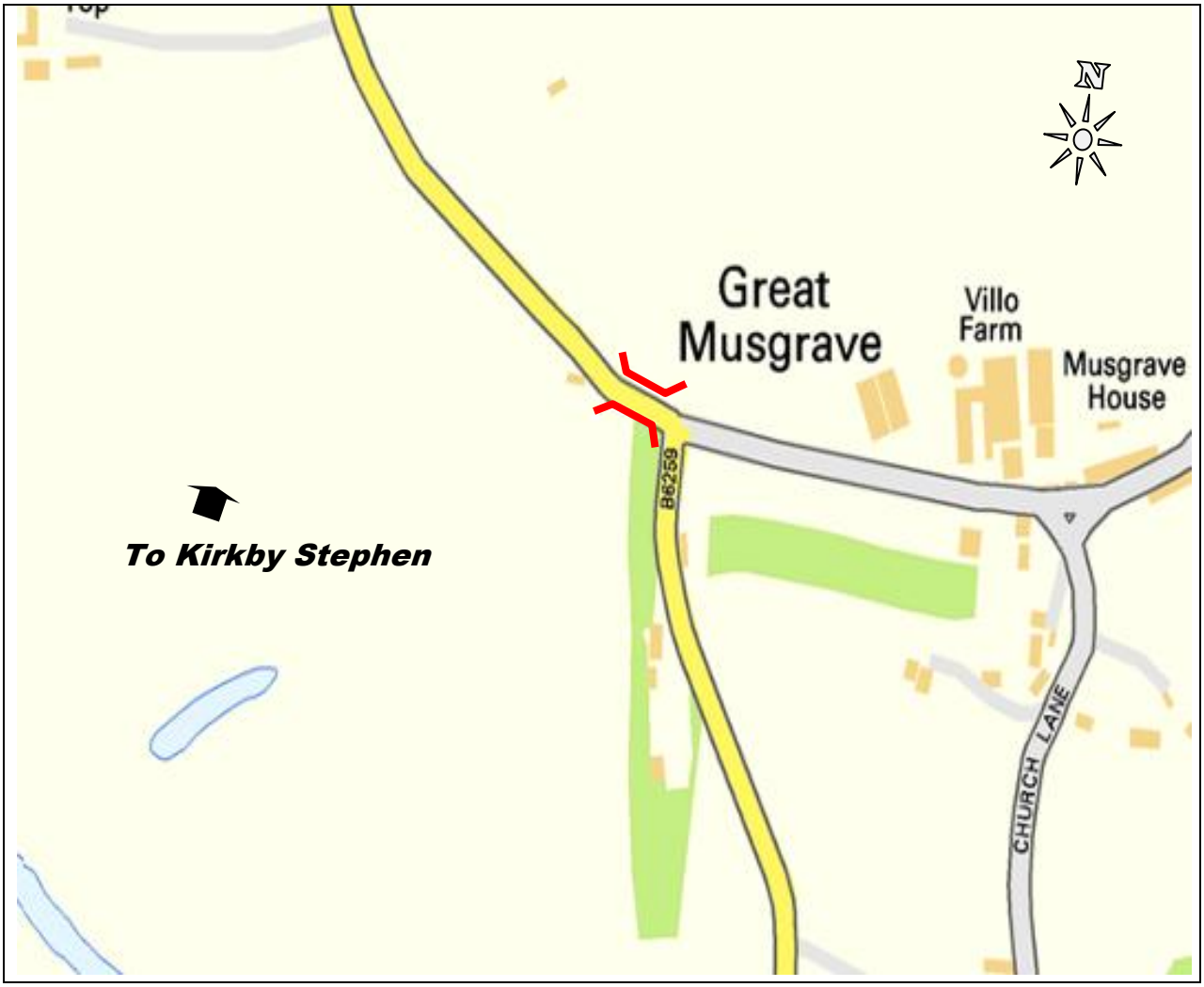
**New Mortar Tabs, Avongards, Plumbing Points, Pins, etc. Fitted during this Examination** - None installed.

**New Padlock(s) Fitted to Access Gates/Doors during this Examination** - None installed.

| Line: | Structure Identifier: **EDE/25** |
|---|---|
| **EDEN VALLEY JCT KIRKBY STEPHEN {WARCOP}** | **OB: 25 - Stone arch, spandrels, abutments, wing walls & parapets & pilasters. NY: 765 136.** |

Remarks (Refer to parts by name) 

- **Orientation of Structure -** Highlighted in red.




**-ALL MEASUREMENTS & SIZES TAKEN ARE APPROXIMATE-**

| Line: | Structure Identifier: **EDE/25** |
|---|---|
| **EDEN VALLEY JCT KIRKBY STEPHEN {WARCOP}** | **OB: 25 - Stone arch, spandrels, abutments, wing walls & parapets & pilasters. NY: 765 136.** |

Remarks (Refer to parts by name)



## AERIAL VIEW

## ARCH RINGS

### *Soffit*

- Slight deflection in stonework sagging up to 4mm at worst in places to the crown region.
- Moderate friable erosion with loss of face to the stonework up to 40mm deep at worst to the N/W haunch, 700mm in from the north face, 950mm up from the west springer course, 1.00m x 350mm area.
- Moderate friable erosion with loss of face to the stonework up to 35mm deep at worst to the S/W haunch, 800mm in from the south face, 350mm up from the west springer course, 1.60m x 350mm area.
- Slight to moderate friable erosion with loss of face to the stonework up to 15mm deep at worst to the N/E haunch, 860mm in from the north face, 350mm up from the east springer course, 1.00m x 350mm area.
- Loss of face to the stonework to the N/E crown region, 1.50m in from the north face, 200mm x 45mm x 40mm area.
- Stonework repairs have been carried out since the last detailed examination to the west crown region 2.50m in from the south face, 400mm x 350mm area.
- 3No: Former S&T fixing voids to the stonework to the N/E haunch 300mm in from north face, 1No: Former S&T fixing void to the stonework to the N/E haunch 560mm in from north face, 3No: Former S&T fixing voids to the stonework to the S/E haunch 280mm in from south face.
- Moderate friable erosion with some drumminess to the remaining stonework with loss of face up to 15mm at worst in various places.
- Degraded mortar joints up to 15mm wide x 40mm {Av 25mm} deep at worst in widespread places, 5.00m² area.
- Previous render repairs have been carried out in the past to the mid section of the west haunch.
- Pointing repairs have been carried out since the last detailed examination in isolated places.
- Evidence of water ingress to the stonework below the verge areas.
- Discolouration, water staining with calcite & leachate deposits to the stonework in widespread places.

**ARCH RINGS** ***{Cont}***

***Soffit*** ***{Cont}***

- Some smoke discolouration to the stonework to the former blast area. P5 to P20.

***Ring Face*** ***{33No: Facing stones to each elevation}***

- Pointing repairs have been carried out since the last detailed examination in various places.
- Previous pointing repairs have been carried out in the past in various locations.
- Slight to moderate erosion to the stonework in places with some loss of face to the bottom arris in various locations.
- Fissure type fractured stonework up to 1mm at worst in very isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Some smoke discolouration to the stonework to the former blast areas. P21 to P35.

**SPANDRELS**

***North Spandrel***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- 1No: Separation fracture extends over the extrados of the arch has been pointed since the last detailed examination.
- Bulging/oversailing to the stonework up to 15mm at worst in places causing fractured mortar joints up to 2mm in very isolated locations.
- Slight erosion to the stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 1mm at worst in very isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Some smoke discolouration to the stonework to the former blast area. P36 to P42.

**SPANDRELS** ***{Cont}***

***South Spandrel***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- 1No: Separation fracture extends over the extrados of the arch has been pointed since the last detailed examination.
- Bulging/oversailing to the stonework up to 8mm at worst in places causing fractured mortar joints up to 2mm in very isolated locations.
- Slight erosion to the stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to H/L at worst in very isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Some smoke discolouration to the stonework to the former blast area. P43 to P49.

**ABUTMENTS** ***{6.30m Long x 1.33m High with 600mm returns}***

***East Abutment***

- Previous pointing repairs have been carried out in the past in various places.
- Pointing repairs have been carried out since the last detailed examination in isolated places.
- Moderate friable erosion with loss of face to the stonework up to 25mm deep at worst, 400mm in from the N/E quoin, 700mm up from G/L, 550mm x 300mm area.
- Slight erosion to the remaining stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 2mm at worst in very isolated places.
- Discolouration, water staining with calcite deposits to the stonework in various places.
- No weep holes are visible. P50 to P57.

**ABUTMENTS** ***{Cont}***

***West Abutment***

- Previous pointing repairs have been carried out in the past in various places.
- Pointing repairs have been carried out since the last detailed examination in isolated places.
- Slight to moderate friable erosion to the stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 2mm at worst in isolated places.
- Discolouration, water staining with calcite deposits to the stonework in various places.
- No weep holes are visible. P58 to P64.

**WING WALLS** ***{Partially concealed by spoil}***

***N/W Wing wall*** ***{4.80m Long x 3.35m High}***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- Repairs to the stonework have been carried out since the last detailed examination at the return quoin 400mm up from G/L, 330mm x 200mm area.
- Repairs to the stonework have been carried out since the last detailed examination at the return quoin 1.30m up from G/L, 420mm x 270mm area.
- Bulging/oversailing to the stonework, up to 6mm at worst causing fractured mortar joints up to 2mm in isolated places.
- Slight friable erosion to the remaining stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 2mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations. P65 to P69.

**WING WALLS** ***{Cont}***

***N/E Wing wall {6.70m Long x 3.70m High}***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- Repairs to the stonework have been carried out since the last detailed examination, 3.20m from return quoin, 600mm up from G/L, 800mm x 300mm area.
- Bulging/oversailing to the stonework, up to 6mm at worst causing fractured mortar joints up to 2mm in isolated places.
- Slight friable erosion to the remaining stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 2mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations. P70 to P74.

***S/W Wing wall {3.00m Long x 2.90m High}***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- Repairs to the stonework have been carried out since the last detailed examination at the return quoin 550mm up from G/L, 300mm x 300mm area.
- Slight friable erosion to the remaining stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 2mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Mature tree growth within the proximity in front of the wing wall. P75 to P79.

**WING WALLS** ***{Cont}***

***S/E Wing wall*** ***{Cont}***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- Slight to moderate friable erosion to the stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 2mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Tree & vegetation growth in front of the wing wall cut back & killed off since the last detailed examination. P80 to P83.

**PARAPETS & PILASTERS**

***North roadside elevation***
*{Measurements & defects taken from the west pilaster end}*

- **2.80m - 7.60m -** Vehicle impact scrape marks to the stonework up to 6mm deep at worst in places.
- **23.30m -** Moderate friable erosion with loss of face to the stonework up to 65mm at worst, above exposed plinth, 400mm x 360mm area.
- **24.15m - 26.40m -** Vehicle impact damage with displacement to the stonework out of alignment northwards up to 70mm at worst to the 2nd course below the coping stones with loss of face up to 100mm at worst.
- N/E pilaster capstone displaced southwards up to 25mm at worst.
- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in various places.
- Slight to moderate laminated erosion to the stonework in places with some loss of face in various locations.
- Fractured mortar joints open up to 1mm at worst in isolated places.

**PARAPETS & PILASTERS** ***{Cont}***

***North roadside elevation*** ***{Cont}***

- Fissure type fractured stonework up to 2mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations. P84 to P92.

***North outer elevation***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in widespread places.
- Slight laminated erosion to the stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 1mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Some smoke discolouration to the stonework to the former blast area. P93 to P97.

***South roadside elevation***
*{Measurements & defects taken from the west pilaster end}*

- **2.85m - 5.24m -** Possible vehicle impact damage to the coping stones, oversailing southwards up to 12mm at worst.
- **21.30m - 23.20m -** Vehicle impact scrape marks up to 15mm at worst to the coping stones.
- **22.90 - 26.70m -** Possible vehicle impact damage with displacement to the stonework out of alignment southwards up to 20mm at worst with evidence of previous pointing repairs to the area.
- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in places.
- Fractured mortar joints open up to 2mm at worst in places.

**PARAPETS & PILASTERS** ***{Cont}***

***South roadside elevation*** ***{Cont}***

- Slight laminated erosion to the stonework in places with some loss of face in various locations.
- Slight to moderate erosion to the exposed plinth stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 1mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen & moss growth in various locations. P98 to P108.

***South outer elevation***

- Previous pointing repairs have been carried out in the past in various locations.
- Pointing repairs have been carried out since the last detailed examination in widespread places.
- Slight laminated erosion to the stonework in places with some loss of face in various locations.
- Fissure type fractured stonework up to 1mm at worst in isolated places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Some smoke discolouration to the stonework to the former blast area. P109 to P115.

**SPRINGER COURSE** ***{320mm}***

- 1No: Vertical fracture extends full height, open up to 2mm at worst to the N/E return section.
- Moderate laminated erosion with loss of face to the top of the stonework, 1.20m in from the N/E quoin, 800mm x 80mm x 80mm area.
- Moderate erosion with loss of face to the underside of the stonework to the N/W quoin, 1.10m x 80mm x 50mm area.
- Slight erosion to the remaining stonework in places with some loss of face in various locations.
- Discolouration, water staining with calcite deposits to the stonework in widespread places. P116 to P124.

**STRING COURSE** ***{210mm}***

- Slight laminated erosion to the stonework in places with some loss of face in various locations.
- Pointing repairs have been carried out to the perpend joints since the last detailed examination in various places.
- Discolouration, water staining to the stonework in various places also some lichen growth in various locations.
- Light vegetation growth to the top of the string course in very isolated places.
- Some smoke discolouration to the stonework to the former blast areas. P125 to P126.

**POINTING**

- {See elemental parts}

**WATERPROOFING**

- N/E: Evidence of failure due to the condition of the arch ring soffit.

**DRAINAGE**

- No weep holes are visible, area under the structure has had ballast & 2No: 320mmø plastic drainage pipes provided. P127.

**FENCING/WALLING**

- Overall condition of the approach road walling/fencing is fair, sections in disrepair, some pointing repairs have been carried out to the S/E approach road walling since the last detailed examination. *{Uncertain of demarcation}*
- Overall condition of the fencing underneath the structure is good *{Timber posts & rails & animal mesh provided to both elevations at straight span since the last detailed examination}* P128 to P133.

**ROAD CONDITION**

- Road surface slightly worn in places across the structure. P134.

## VEGETATION

- {See elemental parts}

## FOUNDATIONS

- N/E: No visible signs of failure.

## BRIDGE NUMBERS

- Structure I.D. provided in 2No: Locations. P135 to P136.

**Photo No.1: General view: {North}**

**Photo No.2: General view: {South}**

**Photo No.3: View: Across Structure. {East}**

**Photo No.4: View: Across Structure. {West}**


**Photo No.5: Arch ring soffit: View.**


**Photo No.6: Arch ring soffit: View.**

**Photo No.7: Arch ring soffit: Erosion with loss of face to stonework at N/W haunch area.**

**Photo No.8: Arch ring soffit: Erosion with loss of face to stonework at S/W haunch area.**

**Photo No.9: Arch ring soffit: Erosion with loss of face to stonework at N/E haunch area.**

**Photo No.10: Arch ring soffit: Loss of stonework to the N/E crown region.**

**Photo No.11: Arch ring soffit: Stonework repairs to the S/W crown region.**

**Photo No.12: Arch ring soffit: Former S&T fixing voids.**

**Photo No.13: Arch ring soffit: Former S&T fixing voids.**

**Photo No.14: Arch ring soffit: Typical example of the condition.**

**Photo No.15: Arch ring soffit: Typical example of the condition.**

**Photo No.16: Arch ring soffit: Typical example of the condition.**

**Photo No.17: Arch ring soffit: Typical example of the condition.**

**Photo No.18: Arch ring soffit: Typical example of the condition.**

**Photo No.19: Arch ring soffit: Typical example of the condition.**


**Photo No.20: Arch ring soffit: Profile.**


**Photo No.21: North arch ring face: View.**

**Photo No.22: North arch ring face: Typical example of the condition.**

**Photo No.23: North arch ring face: Typical example of the condition.**

**Photo No.24: North arch ring face: Typical example of the condition.**

**Photo No.25: North arch ring face: Typical example of the condition.**

**Photo No.26: North arch ring face: Typical example of the condition.**

**Photo No.27: North arch ring face: Typical example of the condition.**

**Photo No.28: North arch ring face: Typical example of the condition.**


**Photo No.29: South arch ring face: View.**

**Photo No.30: South arch ring face: Typical example of the condition.**

**Photo No.31: South arch ring face: Typical example of the condition.**

**Photo No.32: South arch ring face: Typical example of the condition.**

**Photo No.33: South arch ring face: Typical example of the condition.**

**Photo No.34: South arch ring face: Typical example of the condition.**


**Photo No.35: South arch ring face: Typical example of the condition.**

**Photo No.36: North spandrel: N/E view.**

**Photo No.37: North spandrel: N/W view.**

**Photo No.38: North spandrel: Separation fracture above the extrados has been pointed.**

**Photo No.39: North spandrel: Typical example of the condition.**

**Photo No.40: North spandrel: Typical example of the condition.**

**Photo No.41: North spandrel: Typical example of the condition.**

**Photo No.42: North spandrel: Typical example of the condition.**

**Photo No.43: South spandrel: S/E view.**

**Photo No.44: South spandrel: S/W view.**

**Photo No.45: South spandrel: Separation fracture above the extrados has been pointed.**

**Photo No.46: South spandrel: Typical example of the condition.**

**Photo No.47: South spandrel: Typical example of the condition.**

**Photo No.48: South spandrel: Typical example of the condition.**

**Photo No.49: South spandrel: Typical example of the condition.**


**Photo No.50: East abutment: View.**


**Photo No.51: East abutment: View.**

**Photo No.52: East abutment: Erosion with loss of face to stonework.**

**Photo No.53: East abutment: Typical example of the condition.**

**Photo No.54: East abutment: Typical example of the condition.**

**Photo No.55: East abutment: Typical example of the condition.**

**Photo No.56: East abutment: Typical example of the condition to the N/E return section.**

**Photo No.57: East abutment: Typical example of the condition to the S/E return section.**


**Photo No.58: West abutment: View.**


**Photo No.59: West abutment: View.**

**Photo No.60: West abutment: Typical example of the condition.**

**Photo No.61: West abutment: Typical example of the condition.**

**Photo No.62: West abutment: Typical example of the condition.**

**Photo No.63: West abutment: Typical example of the condition at the N/W return section.**

**Photo No.64: West abutment: Typical example of the condition at the S/W return section.**

**Photo No.65: N/W wing wall: view.**

**Photo No.66: N/W wing wall: Stonework repairs at return quoin, 400mm from G/L.**

**Photo No.67: N/W wing wall: Stonework repairs at return quoin, 1.30m from G/L.**

**Photo No.68: N/W wing wall: Typical example of the condition.**

**Photo No.69: N/W wing wall: Typical example of the condition.**

**Photo No.70: N/E wing wall: View.**

**Photo No.71: N/E wing wall: Stonework repairs at 3.20m from return quoin, 600mm from G/L.**

**Photo No.72: N/E wing wall: Bulging/oversailing to the stonework.**

**Photo No.73: N/E wing wall: Typical example of the condition.**

**Photo No.74: N/E wing wall: Typical example of the condition.**

**Photo No.75: S/W wing wall: View.**

**Photo No.76: S/W wing wall: Stonework repairs at return quoin, 550mm from G/L.**

**Photo No.77: S/W wing wall: Typical example of the condition.**

**Photo No.78: S/W wing wall: Typical example of the condition.**

**Photo No.79: S/W wing wall: Mature tree growth.**

**Photo No.80: S/E wing wall: View.**

**Photo No.81: S/E wing wall: Typical example of the condition.**

**Photo No.82: S/E wing wall: Typical example of the condition.**

**Photo No.83: S/E wing wall: Typical example of the condition.**

**Photo No.84: North roadside parapet: View.**

**Photo No.85: North roadside parapet: View.**

**Photo No.86: North roadside parapet: Vehicle impact scrape marks.**

**Photo No.87: North roadside parapet: Loss of stone face at road level at 23.30m.**

**Photo No.88: North roadside parapet: Vehicle impact damage at the N/E end.**

**Photo No.89: North roadside parapet: N/E pilaster capstone displaced.**

**Photo No.90: North roadside parapet: Typical example of the condition.**

**Photo No.91: North roadside parapet: Typical example of the condition.**

**Photo No.92: North roadside parapet: Typical example of the condition of the coping stones.**

**Photo No.93: North outer parapet: View.**

**Photo No.94: North outer parapet: Typical example of the condition.**

**Photo No.95: North outer parapet: Typical example of the condition.**

**Photo No.96: North outer parapet: Typical example of the condition.**

**Photo No.97: North outer parapet: Typical example of the condition.**

**Photo No.98: South roadside parapet: View.**

**Photo No.99: South roadside parapet: View.**

**Photo No.100: South roadside parapet: Oversailing to the coping stones at 2.85m to 5.24m.**

**Photo No.101: South roadside parapet: Vehicle impact scrape marks to the coping stones.**

**Photo No.102: South roadside parapet: Possible vehicle impact damage to the S/E end.**

**Photo No.103: South roadside parapet: Typical example of the condition.**

**Photo No.104: South roadside parapet: Typical example of the condition.**

**Photo No.105: South roadside parapet: Typical example of the condition.**

**Photo No.106: South roadside parapet: Typical example of the condition.**

**Photo No.107: South roadside parapet: Typical example of the condition.**

**Photo No.108: South roadside parapet: Typical example of the condition of the coping stones.**

**Photo No.109: South outer parapet: View.**

**Photo No.110: South outer parapet: Typical example of the condition.**

**Photo No.111: South outer parapet: Typical example of the condition.**

**Photo No.112: South outer parapet: Typical example of the condition.**

**Photo No.113: South outer parapet: Typical example of the condition.**

**Photo No.114: South outer parapet: Typical example of the condition.**

**Photo No.115: South outer parapet: Typical example of the condition.**

**Photo No.116: East springer course: View.**

**Photo No.117: East springer course: Fracture at N/E return section.**


**Photo No.118: East springer course: Erosion with loss of face to the stonework, 1.20m from the N/E quoin.**

**Photo No.119: East springer course: Typical example of the condition.**

**Photo No.120: East springer course: Typical example of the condition.**

**Photo No.121: West springer course: View.**

**Photo No.122: West springer course: Moderate erosion with loss of face to the stonework at the N/W quoin.**


**Photo No.123: West springer course: Typical example of the condition.**

**Photo No.124: West springer course: Typical example of the condition.**

**Photo No.125: String course: Typical example of the condition.**

**Photo No.126: String course: Typical example of the condition.**

**Photo No.127: Area under the structure: Typical example.**

**Photo No.128: Approach road walling: Typical example of the condition at N/E end.**

**Photo No.129: Approach road walling: Typical example of the condition at S/E end.**

**Photo No.130: Approach road walling: Typical example of the condition at N/W end.**

**Photo No.131: Approach road walling: Typical example of the condition at S/W end.**


**Photo No.132: Fencing under the structure: Typical example.**


**Photo No.133: Fencing under the structure: Typical example.**

**Photo No.134: Road surface: Typical example of the condition.**


**Photo No.135: Structure I.D.**


**Photo No.136: Structure I.D.**

scoring matrix

# Historical Railways Estate

| | | |
|---|---|---|
| Structure Reference | EDE/25 | |
| **Public Risk** | | |
| Severity | No significant risk | 0 |
| Likelihood | Low | 1 |
| Based On | | |
| Listed? | Yes ○ No ○ | 0 |
| Maintenance Reqd? | Desirable (> 3 years) | 1 |
| Based On | Minor masonry repairs & pointing | |
| Future Plans | No plans or proposals | 0 |
| **Public Access** | Subtotal | 1 |
| Vandalism | Unlikely problem site | 1 |
| Flytipping | No evidence | 1 |
| Right of Way | No sign of use | 1 |
| Fencing | Good | 1 |
| **Action/Notes** | Total | 1 |

No action required.

V 1.009 5/11/2009

Signature

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

## General view of structure: North Elevation

## Examiner comments

**NEW DEFECTS**

New impact damage is noted at the east quoin of the south parapet since the previous detailed and visual examinations.

**LONG-STANDING DEFECTS**

Unless noted, all accessible long-standing defects show no evidence of change since the previous detailed examination dated 29/08/17 and the visual examination dated 31/07/18.

Any changes within the structure have been highlighted with Red text.

See page 2 for details.

A **Visual Examination** of this structure has been carried out and any deterioration in condition or development of defects or other factors, which might place at risk the public at large, is recorded in the Examiner's Comments section of this document.

**Examiner:** [redacted]

**Signed:** [redacted]

**Date:** **11/02/2020**

## Access Hazards:

Moderately steep embankment down to the structure may result in potential slip, trip and fall hazards. The examiner was approached by the local landowner (his residential property is located to the southwest of the structure) who gave verbal permission allowing access at time of future examinations without the need to contact him. Kirkby Stephen West Junction with DNT has been denoted as the low mileage end (South).

## Recommendations:

Rebuild SE parapet quoin within six months- P1 £2.5k.

Rpoint very deep open joints to soffit - P1 £5k.

**Signed by Examining Engineer:**

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

## *Examiner Comments on Structure condition*

**SERVICES**

There is no evidence in the HE (HRE) 2020 Health and Safety File, previous examination reports nor as noted on site to confirm the presence of any statutory services affecting the structure.

**SOFFIT**

Long-standing downward alignment defects were noted along the transverse joint lines of individual stones within the soffit at crown and the east upper haunch. The downward alignment along the stonework was noted up to approx 15mm where accessible. Alignment defects within the soffit were noted up to 4mm at time of the detailed examination **(photos 11 to 13)**.

A number of joints within the soffit showed mortar loss up to 170mm where accessible. The mortar loss was noted up to a max of 40mm at time of the previous detailed examination **(photos 14 & 15)**.

**PARAPETS & PILASTERS**

***South***:- internal road face: impact damage was noted from the east quoin over a max length of 2.4m inclusive of the copings. Inward displacement was noted along the 2nd quoin stone from G/L over a length of 1.36m up to 12mm with the copings found displaced up to a max of 22mm. Due to the density of the stone and copings the affected area remains secure under hammer **(photos 16 to 18)**. Some loose fragments of sheared stone/spalling within the affected stone and copings were removed at the time of the examination **(photos 19 & 20)**. Local knowledge advised the examiner that the parapet was struck in Spring 2019 by a local farmer. Lifting/pushing mortar is noted to external face of the parapet opposite the impact damage **(photo 21)**. "Possible" impact damage at this area was noted at time of the previous detailed examination report (photo 102 within the DE).

**HANDRAILS & FENCING**

***Northwest***:- small section of stone walling extends off the end of the parapet. Stone loss is noted adjacent to the parapet over a height of 450mm x a width of 390mm **(photos 22 & 23)**.

***Northeast***:- stone boundary wall extends from the end of the parapet.

***Southwest***:- small section of stone walling extends off the end of the parapet. The stonework is loose to hammer **(photo 24)**.

***Southeast***:- stone boundary wall extends from the end of the parapet.

**VEGETATION**

The structure is typically free from vegetation ingress with odd areas of moss growth.

**TRACK/ROAD CONDITION**

The redundant track bed is found waterlogged to both the north and south of the structure **(photo 25)**.

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** | 25 | **Mileage:** | **Examination date:** 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | | **OS ref:** NY 765 136 |
| **Name:** | Great Musgrave | | | | **Type:** Over bridge |

***Photographs of structure***

Photograph 1: south elevation

Photograph 2: general view of the soffit

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** | 25 | **Mileage:** | **Examination date:** 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | | **OS ref:** NY 765 136 |
| **Name:** | Great Musgrave | | | | **Type:** Over bridge |

***Photographs of structure***

Photograph 3: general view of the west abutment

Photograph 4: general view of the east abutment

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 5: general view of the northwest wingwall

Photograph 6: general view of the northeast wingwall

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 7: general view of the southwest wingwall

Photograph 8: general view of the southeast wingwall

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** | 25 | **Mileage:** | **Examination date:** 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | | **OS ref:** NY 765 136 |
| **Name:** | Great Musgrave | | | | **Type:** Over bridge |

***Photographs of structure***

Photograph 9: general view over the structure from the west looking east

Photograph 10: general view over the structure from the east looking west

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 11: example of long-standing downward alignment defects noted within the soffit

Photograph 12: example of long-standing downward alignment defects noted within the soffit
The downward alignment defects were noted up to approx 15mm

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 13: The downward alignment defects were noted up to approx 15mm Denoted to 4mm at time of the detailed examination

Photograph 14: example of open joints located within the soffit

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 15: the mortar loss was noted up to 170mm where accessible

Photograph 16: impact damage noted at the east quoin of the south parapet

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 17: displacement of the quoin stone was noted up to 12mm

Photograph 18: displacement of the copings was noted up to 22mm

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** | 25 | **Mileage:** | **Examination date:** 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | | **OS ref:** NY 765 136 |
| **Name:** | Great Musgrave | | | | **Type:** Over bridge |

***Photographs of structure***

Photograph 19: spalled/sheared stone noted due to impact damage

Photograph 20: the spalled/sheared stone fragments were removed at time of the examination

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|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 21: general condition of the external face of the south parapet opposite the impact damage noted within the internal face

Photograph 22: stone loss noted to stone wall extending off the west quoin of the north parapet

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|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** 25 | **Mileage:** | **Examination date:** | 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | **OS ref:** | NY 765 136 |
| **Name:** | Great Musgrave | | | **Type:** | Over bridge |

***Photographs of structure***

Photograph 23: stone loss within the wall extending off the west quoin of the north parapet

Photograph 24: loose stonework noted within the wall extending off the west quoin of the south parapet

| | | | | | |
|---|---|---|---|---|---|
| **ELR:** | EDE | **Structure No:** | 25 | **Mileage:** | **Examination date:** 08/02/20 |
| **Route:** | Eden Valley Jn - Kirkby Stephen (Warcop Branch) | | | | **OS ref:** NY 765 136 |
| **Name:** | Great Musgrave | | | | **Type:** Over bridge |

***Photographs of structure***

Photograph 25: example of waterlogged ground located to both the north and south ends of the structure

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

## General View of Structure: North Elevation

## Preliminaries

**Risk Assessment** – the examination was carried out in accordance with the risk assessments in Appendix V of the Generic Method Statement for the Examination of Structures - ES080-BBR-JA-RGS-MS16034.

**Access Route to Structure** – Via public road.

**Site Issues and Impediments to carrying out repairs, DE's or other works** – Narrow road on a bend / junction. No footpaths or verges.

**Date of Last Examination** – 08/02/2020.

**Structure Examined within specified period?** – Yes.

**Reason for time frame non-compliance** – N/A.

A **Visual Examination** of this structure has been carried out and any deterioration in condition or development of defects or other factors, which might place at risk the public at large, is recorded in the Examiner's Comments section of this document.

Examined by: [redacted]

## General Comments by the Examiner:

- The bridge appears to be in fair condition.
- General masonry repairs required to the arch soffit.
- Bridge bash damage requires attention.
- Approach walls require repairing.

Recommendations (by the Examining Engineer):

Take down & rebuild the bridge bash damaged SE wingwall parapet £3k - P1.

Repair two drystone approach walls £5k - P1.

General masonry repairs to the arch soffit including repoint DOJ's and stitch & grout displaced blocks as necessary £50k - P1.

Fit Highways Act 1980 "not a dedicated way" signs to each elevation £500 - P1.

Signed: [redacted]

STE2/STE6 Examining Engineer: [redacted]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

**Severe Defects –** Displaced blocks and DOJ's in the arch soffit stonework.

**New Defects –** None.

**Changes to Existing Defects since Last Examination –** None.

**Changes to the Use of the Structure and/or the Surrounding Area since Last Examination –** None.

**Evidence of Repair / Maintenance / Investigation Work that appears to have been carried out since Last Examination –** None.

**Orientation of Structure –** Railway is referenced as running north to south for report purposes.

**Use of Solum/Track Bed –** Trespass.

**Condition of Approach Fencing and Risk to the Public** – Two walls are falling into disrepair.

**Existence and Condition of Weight Restriction Signs including Advanced Signs –** None.

**Existence and Condition of Height Restriction Signs including Advanced Signs –** N/A.

**New Mortar Tabs, Avongards, Plumbing Points, Pins, etc. Fitted during this Examination –** None.

**New Padlock(s) Fitted to Access Gates / Doors during this Examination –** N/A.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

## *Photographs of Structure*

Photograph 1: South elevation.

Photograph 2: View looking west.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

***Photographs of Structure***

Photograph 3: View looking east.

Photograph 4: Arch soffit.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

## *Photographs of Structure*

Photograph 5: SW Approach Wall, serviceable.

Photograph 6: NW Approach Wall, missing stones.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

***Photographs of Structure***


Photograph 7: NE Approach Wall, drystone wall, falling into disrepair.

Photograph 8: SE Approach Wall, serviceable.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

***Photographs of Structure***

Photograph 9: Arch soffit, displaced blocks & DOJ's.

Photograph 10: SE wingwall parapet (roadside view), 2019/20 bridge bash damage.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ELR: | **EDE** | Structure No.: | **25** | Mileage: | **4m 10ch** | Examination Date: | **22/01/2021** |
| Route: | **Eden Valley Branch** | | | | | OS Ref.: | **NY765136** |
| Name: | **Great Musgrave** | | | | | Type: | **OB** |

***Photographs of Structure***

Photograph 11: SE wingwall parapet (roadside view), 2019/20 bridge bash damage.

Photograph 12: SE wingwall parapet (trackside view), 2019/20 bridge bash damage.

**From:** [redacted] [mailto[redacted]@highwaysengland.co.uk]
**Sent:** 24 June 2021 18:23
**To:** [redacted]
**Cc:** [redacted]
**Subject:** RE: EDE/25 - Great Musgrave. Enforcement case 21/5064.

Dear [redacted]

Thank you for your email of 23 June 2021 which relates to the advice Eden District Council (EDC) has sought in relation to the original confirmation provided by the EDC's Planning Services Team on 24 April 2020 that the works at EDE/25-Great Musgrave constitute permitted works to maintain the highway.

In response to your recent email, we draw the following to your attention. In 1993 by virtue of the Public Bodies (Abolition of BRB (Residuary) Limited) Order 2013, the Historical Railways Estate (HRE) was transferred back to the Secretary of State. Under the provisions of Part 5 of Annex C of the Highways England Framework Agreement 2015. Highways England, a government owned company (not forming part of the Crown), were instructed to safely manage the assets within the HRE. The ownership of HRE remains with the Secretary of State.

In this context Highways England is essentially acting as agent for the Secretary of State and therefore the Crown. Under the provisions of S117 of the Transport Act 1968 the Secretary of State is under a duty to maintain the bridges within the HRE and Highways England is their agent in relation to the maintenance of this asset.

We note EDC asserts that the works do not constitute permitted development under Schedule 2, Part 19 Class Q; on the basis insufficient evidence has been provided of the asserted emergency. We would note that the permitted development right not only allows works to be undertaken to deal with an emergency but to also prevent an emergency. It is our view that the latter situation applies here. The emergency we were seeking to "prevent" falls squarely in the definition within Class Q.

"Emergency" is defined in class Q as an event or situation which threatens serious damage to human welfare which is clarified as only where it involves, causes or may cause (amongst other criteria) -

(a) loss of human life;

(b) human illness or injury;

(d) damage to property;

(g) disruption of facilities for transport.

We submit we were entitled to undertake these works under Schedule 2 Part 19 Class Q on behalf of the Secretary of State.

Reference has been made to the assessment carried out by the Cumbria County Council (CCC) in 1998. That assessment concluded that the bridge's capacity was 17 tonnes, not 40 tonnes which the road is subject to, and that the capacity could be increased by repointing. As a result CCC as the local highway authority should have carried out the recommended works or restricted the route to vehicles the bridge could carry in safety and without causing long term damage to the structure. The local highway authority however did not act on that information and the structure continued to be utilised and damaged by vehicles in excess of 17 tonnes**.**

We would have agreed with the opinion of EDC, as whether the condition constituted an impending emergency, if the only evidence of the structural state of the bridge was the 1998 CCC assessment report. However, as we outline below, there is additional information that is highly relevant.

In 2012 HRE's predecessors (BRB Residuary) repointed the arch. The last detailed examination of the bridge on 29 August 2017 (copy attached) noted that the joints between the masonry in the arch had again opened up (up to 40mm with an average of 25mm) and that the crown of the arch had dropped; at that time it was recorded as a drop of 4mm. These areas of concern were specifically checked as part of the examination of 8 February 2020 (copy attached). The downward movement of the arch had increased to 15mm and the joints between masonry opened up to 170mm in depth in the period (under 3 years) between the two examinations.

These figures may appear small but in the context of an arch barrel that was measured as 450mm thick (by CCC) a measured loss of 38% of the mortar in the joints compared with a loss of less than 10% in such a short period is significant. This combination of defects indicates a structure that is suffering from being continually overloaded.

Without intervention those defects would continue to develop and disruption to the network through the closure of the road over the bridge would be the "best case" scenario.

The structural analysis (carried out by CCC) concluded that the load bearing capacity of the bridge was not commensurate with the type of vehicles able to use the road. Our examination process and the recorded failure by 2017 of repairs carried out in 2012 confirmed that the bridge was being overloaded and that works were required to prevent the failure of the bridge and avert a collapse.

The last visual examination on 22 January 2021 confirmed the extent of the distress to the arch though no measurements were recorded on that occasion (copy attached). However, this reaffirmed that the mitigation works were required as a priority to "prevent" a collapse and thereby an emergency as defined within Class Q. Based solely on the visible defects to the bridge during the

examination our examiner considered the arch defects Priority 1 *(An item of work that should be completed within one year from the date of the Examination)* and indicated a significant cost for remedial works; that cost estimate makes no allowance for access, scaffolding, road closures etc. These remedial works, similar but more intensive because the damage is now significantly worse, would still only last a short period as the root cause remains unmitigated.

Safety is our principle concern and we have adopted mitigation which we consider is the most reliable and does not require an ongoing programme of interventions. Schedule 2 Part 19 Class Q is not prescriptive as to the nature of the mitigation works that can be undertaken merely that they should "prevent" an emergency. There is no requirement that any preventative work should take a prescribed form or be the absolute minimum required. Therefore, the works planned were the result of the professional judgement and significant experience of our engineers of managing the HRE.

As previously stated, repointing the arch provided only a short period of respite whilst the loads crossing the bridge remained unrestricted and would have to be repeated cyclically to maintain the arch's integrity. As the damage to the structure developed the load capacity of the bridge reduced in parallel; the acceleration of the damage evident by the difference in the figures recorded in the 2017 and 2020 examinations.

Infilling the arch to form an embankment is, in these circumstances, the most reliable form of mitigating the risk to road users, our employees and our contractors who would have to continue examining the bridge. It stabilises the structure in the long term and avoids the disruption of closing the road to carry out repairs to the structure beneath. Additionally infilling represents a better use of public funds compared with frequently having to repair the arch when the root cause, the traffic loading, remains unchecked.

It is our intention to submit an application to retain the works within 12 months from the date we commenced works as required by schedule 2 Part 19 Class Q of the Town and Country (General Permitted Development) Order 2015. We are aware that we have a right of appeal to the Secretary of State under S78 of the Town and Country Planning Act 1990 in the event the local authority fails to determine our application or it is refused.

Throughout this process we have acted in good faith and maintained a clear dialogue with EDC and the Planning Services Team since before the works commenced. The Planning Services Team confirmed on 24 April 2020 our understanding of the availability of permitted development rights for these works. We reserve the right to refer to this in the event any decision is made to pursue enforcement action against Highways England.

The works are now substantially complete. The infilling operation is complete and the resulting embankments are being trimmed, top soiled and seeded. Failure to finish these works would leave

the site in a mess resulting in unnecessary inconvenience for the farmer who has facilitated access to the bridge, leave an eyesore for the village and result in further negative public comment.

We trust the above provides sufficient clarification to assure the LPA that we have acted within the scope of the permitted development powers available to us**.**

Yours sincerely,

[redacted]

[redacted]

**Historical Railways Estate (on behalf of Department for Transport)**
Highways England | 37 Tanner Row | York | Y01 6WP
General Office: +44 (0) 1904 621924

Mobile: + 44 (0) 7857 601177

Web: http://www.highwaysengland.co.uk

If you would like to make a request under the Freedom of information Act, please contact info@highwaysengland.co.uk

Fridays – I am not in the office and do not have access to emails

**From:** [redacted]
**Sent:** 23 June 2021 09:21
**To:** [redacted] <[redacted]@highwaysengland.co.uk>
**Cc:** [redacted] ; [redacted]
[redacted]@eden.gov.uk>
**Subject:** EDE/25 - Great Musgrave. Enforcement case 21/5064.
**Importance:** High

Dear [redacted],

Further to my email below, the planning department has now received legal advice regarding the current works being undertaken at Great Musgrave and whether they would constitute permitted development under either Part 9 – Development relating to roads, Class B – development by the Secretary of State or a strategic highways company under the Highways Act 1980 or Part 19

Development by the Crown for national security purposes Class Q – development by the Crown relating to an emergency.

In terms of the works qualifying under Part 19, Class Q the Council do not accept the works being carried out fall within the definition of permitted development under Schedule 2, Part 19 Class Q, due to insufficient evidence of the asserted emergency. The most recent assessment provided stated that the bridge was fit for purpose, with repointing being suggested to increase the load capacity. No further evidence has been provided for the suggested emergency and therefore in the absence of this, it is the Council's opinion that the works do not constitute permitted development under this part of the legislation.

In respect of Schedule 2, Part 9, Class B the Council equally has not been provided with a sufficient evidence base in respect of the function(s) being carried out by Highways England to establish if the works being undertaken constitute permitted development under this part of the legislation. In order to consider this element further, it is requested that Highways England confirm exactly which function(s) of the Highways Act 1980 are being exercised.

The Council have considered that the function maybe under Part 5 of the Highways Act 1980, namely the improvement of a highway. If Highways England believe that an alternative function is being exercised then the Council would require this to be confirmed with relevant evidence, i.e. a structural report if the bridge is believe to be out of repair.

Due to the level of public and political interest in this alleged breach of planning control and taking into account the level of works which have already taken place on site, the Council wishes to resolve this investigation as soon as possible and therefore it would be appreciated if the requested information could be provided within 5 working days of the date of this email. This deadline is felt to be reasonable and achievable, however should you foresee any difficulties in achieving this then please do not hesitate to contact the Council to discuss and agree an alternative deadline.

As previously advised, due to the questionable lawfulness of the works being undertaken the Council once again strongly recommended that all works on site cease immediately until the planning position is formally confirmed. Any further works undertaken on site are done so at Highways England's own and risk and maybe subject to formal planning enforcement action should the works be deemed unlawful.

I trust you understand the Council's position and the request for additional information from Highways England to support the permitted development claim. Should you wish to discuss the request in greater detail then please do not hesitate to contact me again. Please note my working days are alternate Mondays and every Tuesday and Wednesday. In my absence the planning department can be contacted via [redacted] or via [redacted]. Please quote case reference 21/5064 in all communications with the Council.

I look forward to hearing from you and hopefully being able confirm the planning position as soon as possible.

Yours sincerely,

[redacted]

Planning Enforcement Officer

Planning Services Team

Tel: [redacted]

Eden District Council

Mansion House

Penrith

Cumbria

CA11 7YG

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**From:** [redacted]
**Sent:** 5:48
**To:** [redacted] @highwaysengland.co.uk>
**Subject:** FW: EDE/25 - Great Musgrave. Enforcement case 21/5064.

**Sent:** 16 June 2021 15:47
**To:** [redacted]
**Cc:** [redacted]
<N
**Subject:** RE: EDE/25 - Great Musgrave. Enforcement case 21/5064.

Dear [redacted],

Further to our telephone conversation on Monday 14th June and the emails below, I thought it pertinent to update you Eden District Council's (EDC) current thoughts regarding the works currently being undertaken on the Great Musgrave railway bridge.

As discussed, EDC are not wholly satisfied that the works qualify as permitted development under The Town and Country Planning (General Permitted Development) (England) (Amendment) Regulations 2020, Part 9 – Development relating to roads, Class B or Part 19 - Development by the Crown for national security purposes; and are therefore currently seeking legal opinion in this regard. We will of course update you with the EDC's findings in due course.

In the meantime, I would like to remind you that any works conducted under Part 19, Class Q are subject to the following conditions, in order for the works to be permitted:-

**Conditions**

Q.1 Development is permitted by Class Q subject to the following conditions—

(a)the developer must, as soon as practicable after commencing development, notify the local planning authority of that development; and

(b)on or before the expiry of the period of 12 months beginning with the date on which the development began—

(i)any use of that land for a purpose of Class Q ceases and any buildings, plant, machinery, structures and erections permitted by Class Q is removed; and

(ii)the land is restored to its condition before the development took place, or to such other state as may be agreed in writing between the local planning authority and the developer.

You will note that condition (b) (ii) requires the land to be reinstated as was before the works or to another state agreed by EDC, within 12 months of the works commencing. This was raised in our recent conversation and I am now seeking a written response as to HE's future intentions to secure compliance with this requirement of the relevant permitted development legislation? An early response would be greatly appreciated to aid the planning enforcement investigation.

I also must once again take this opportunity to stress to HE that as the lawfulness of the current works are being investigated, any further works undertaken on site are done so at your own risk and may in the future be subject to formal planning enforcement considerations. It is therefore strongly recommended that works on site cease immediately until the planning position can be confirmed.

I trust you understand the need for the planning department to investigate this matter and that you understand the action requested. Should you wish to discuss any element of the investigation in

greater detail then please do not hesitate to contact me again or in my absence, Mr. Nick Atkinson or [redacted]

I look forward to hearing from you in due course.

Yours sincerely,

[redacted]

Planning Enforcement Officer

Planning Services Team

Tel: [redacted]

Eden District Council

Mansion House

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**From:** [redacted]
**Sent:** 15 June 2021 06:53
**To:** [redacted]' <[redacted]@highwaysengland.co.uk>
**Subject:** RE: EDE/25 - Great Musgrave

Dear [redacted],

Thanks you for providing these images and also for your time on the phone yesterday.

It is hoped that Eden District Council can conclude the investigation into the lawfulness of the works being undertaken and update you with the findings as soon as possible.

Kind regards,

[redacted]

[redacted]

Planning Enforcement Officer

Planning Services Team

Tel: [redacted]

Eden District Council

Mansion House

Penrith

Cumbria

CA11 7YG

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**From:** [redacted] [mailto:[redacted]@highwaysengland.co.uk]
**Sent:** 14 June 2021 15:42
**To:** [redacted]
**Subject:** EDE/25 - Great Musgrave

Hello [redacted]

As discussed please find attached a couple of photos of finished infill projects to give you an idea of what it will look like. The attached JPEG is of EDE/75 near Kirkby Thore and was completed in March 2018.

The embankments are finished with 150mm depth of topsoil and then seeded; the same treatment as proposed for Great Musgrave.

The Word doc has two photos of a structure in Scotland which was infilled last year.

Kind regards,

[redacted]

[redacted]

**Historical Railways Estate (on behalf of Department for Transport)**
Highways England | 37 Tanner Row | York | Y01 6WP
General Office: +44 (0) 1904 621924

Mobile: + 44 (0) 7857 601177

Web: http://www.highwaysengland.co.uk

If you would like to make a request under the Freedom of information Act, please contact info@highwaysengland.co.uk

Fridays – I am not in the office and do not have access to emails

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**Eden District Council**



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***Highways England Company Limited | General enquiries: 0300 123 5000 |National Traffic Operations Centre, 3 Ridgeway, Quinton Business Park, Birmingham B32 1AF*** | https://www.gov.uk/government/organisations/highways-england | info@highwaysengland.co.uk

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