

AMEY - SOUTH EAST



PRINCIPAL INSPECTION REPORT

Structure name: CLYDES RAIL

Structure number: A702 20

Latest Inspection date: 06-August-2016

Prepared by AMEY - SOUTH EAST

	Name	Qualifications	Signature	Date
Inspected by	[REDACTED]	[REDACTED]	[REDACTED]	06-August-2016
Checked & Approved by	[REDACTED]	[REDACTED]	[REDACTED]	28-October-2016

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EXECUTIVE SUMMARY

The bridge is in generally fair condition. Defects have been recorded as part of the inspection. Localised concrete spalls exposing steel reinforcement on soffit beam at uplink entrance. Rust staining and concrete spalling on a soffit beam near the centre of the bridge. Localised spalling of concrete and steel exposure noted on the abutments and wing walls. Water staining and efflorescence present on all four wing walls and on the abutments. It should be noted that carriageway joint replacement works are ongoing and include resurfacing of the wearing course across the bridge.

1. STRUCTURE IDENTIFICATION AND LOCATION PLANS

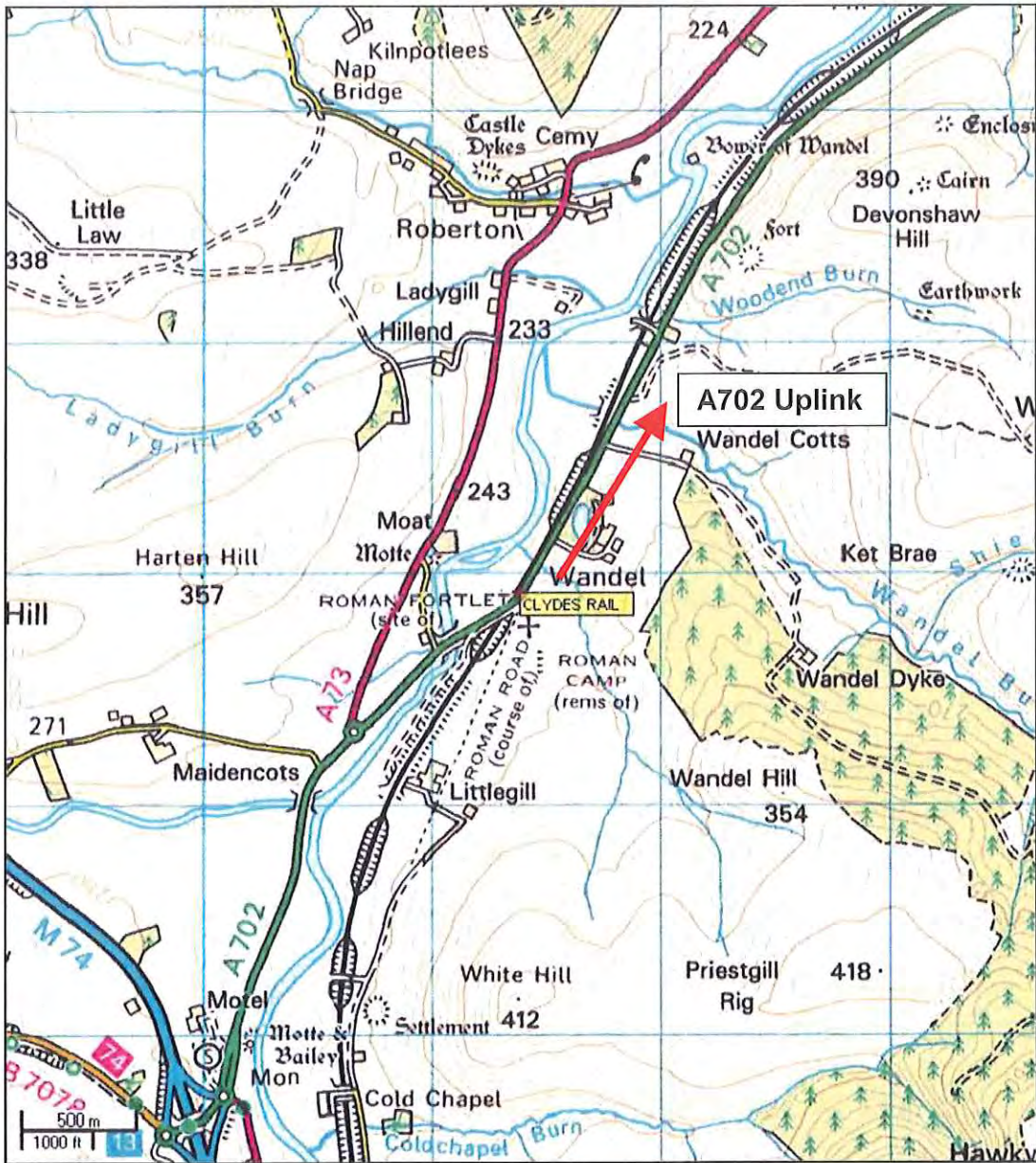
1.1 Structure Identification

Principal Inspection Report

Structure No.	:	A702 20
Structure	:	CLYDES RAIL
Grid Reference	:	294395,626902
Year of Construction	:	1972
Date of Inspection	:	Span No: 1 06/08/2016

This report is carried out in accordance with several documents, including: BD 63/07, the Inspection Manual for Highway Structures, and the Transport Scotland Inspection Manual.

1.2 Location Plan



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2. CHECKLISTS

2.1 Principal Inspection Report Checklist

Structure Reference No: A702 20

Structure Name: CLYDES RAIL

Principal Inspection Date: Span No: 1 06/08/2016

The above report has been checked for compliance with the following:-

[NOTE: To confirm compliance, double click box to insert tick]

- | | | |
|-----|--|-------------------------------------|
| 1. | Date of site visit entered into SMS | <input checked="" type="checkbox"/> |
| 2. | Report dated and signed | <input checked="" type="checkbox"/> |
| 3. | Colour photograph inserted on front page | <input checked="" type="checkbox"/> |
| 4. | Appendices GA1/PH*/DI*/FT1/WR*/DR*/HM* included
1 = Mandatory
* = Delete as required - refer to Scottish Ministers Requirements | <input checked="" type="checkbox"/> |
| 5. | All fields in Full Text Inventory verified as correct? | <input checked="" type="checkbox"/> |
| 6. | Updating of Joblist checked and verified? | <input checked="" type="checkbox"/> |
| 7. | Uplink/Downlink shown on GA | <input checked="" type="checkbox"/> |
| 8. | Photographs located on GA by arrows and reference | <input checked="" type="checkbox"/> |
| 9. | Measured headroom shown on GA
(Mandatory for all overbridges and for underbridges over roads) | <input checked="" type="checkbox"/> |
| 10. | Photographs of all defects with a Priority Ranking >2 included | <input checked="" type="checkbox"/> |
| 11. | Works estimates included if an Prioritisation Ranking >2.
Where applicable, rates from the Schedule of Rates and Prices given in the
Term Contract have been used in preparing the estimate. | <input checked="" type="checkbox"/> |
| 12. | Structural Review & Assessment undertaken | <input checked="" type="checkbox"/> |

3. DESCRIPTION OF STRUCTURE

3.1 General description

Structure Name: CLYDES RAIL

Number of Spans: 1

Structure Type: BRIDGE

Route: A702

Confined Space Working No

Obstacle(s) Crossed: Span 1: OPERATIONAL RAILWAY LINE

Ordnance Survey Grid Reference: 294395,626902

3.2 Deck description

Span Number: 1

Span Description: PRECAST PRETEN, INV 'T' BEAMS, IN SITU CONC INFILL, (COMPOSITE)

Span Width: 67.7m

Span Length 9.70m

Primary Deck Element = 04 Beam / Girder At Or Below Deck Surface

Primary Deck Element Material = D Pre - Tensioned Concrete

Secondary Deck Element = 20 No Secondary Deck Element - No Transverse Beams

Secondary Deck Element Material = P No Secondary Element

3.3 End Supports

Support Number 01E

Support Foundation Type = SPREAD FOOTING ON ROCK

Support Foundation Material = REINFORCED CONCRETE

Support Structural Form = FULL HEIGHT CANTILEVER ABUTMENT

Support Construction = PC H-BLOCKS, POST TENSIONED, WITH MASS CONC CORE

Support Number 02E

Support Foundation Type = SPREAD FOOTING ON ROCK

Support Foundation Material = REINFORCED CONCRETE

Support Structural Form = FULL HEIGHT CANTILEVER ABUTMENT

Support Construction = PC H-BLOCKS, POST TENSIONED, WITH MASS CONC CORE

3.4 Intermediate Supports

Not Applicable

4.MAINTENANCE HISTORY

4.1 Details of Maintenance Works undertaken since last principal inspection

From SMS

Span No:

Work Required:

Defect:

Comments:

Date of Order:

Cost:

Completed Date:

From TRBDB

Year Works Started:

Maintenance Work Category:

Works Description:

Approximate Cost:

Total Cost:

Contractor:

Designer:

5. DESCRIPTION OF INSPECTIONS

5.1 Previous Inspections

Principal Inspection:

01-August-2010
30-May-2004
23-August-1998
01-August-1994

General Inspection:

21-Feb-2014

Special Inspection details:

5.2 Name of Inspecting Engineer and Assistant

Inspecting Engineer: [REDACTED]

Assistant: [REDACTED]

5.3 Date of this inspection

06-August-2016

5.4 Weather conditions

Weather Conditions at time of inspection: Mild – Dry

Weather Conditions 2 days before inspection: Mild - showers

5.5 Description of how inspection was undertaken

Span: 1

Access Equipment Used: First = Scaffolding
Second = Not Applicable
Third = Not Applicable

Traffic Management Used: First = No Traffic Management Used
Second = Not Applicable
Third = Not Applicable

5.6 List of areas not inspected

<i>Span Number</i>	<i>Element</i>
1	Foundations

6. RESULTS OF INSPECTION

6.1 Summary

*Severity descriptions are in accordance with the Inspection Manual for Highway Structures. Full descriptions are available in Table G.8 and 1.1.3 of Vol.2 Part B.

Span No.	Element	Severity*	Extent	Maint. Priority Ranking (1-4)	Multi Defect
1	Primary Deck Element (Table G4)	3 Moderate	B Slight <5%	4	False
1	Primary Deck Element (Table G4)	2 Minor	C Moderate 5 20%	2	True
1	Primary Deck Element (Table G4)	2 Minor	B Slight <5%	2	True
1	Foundations	6 NOT APPLICABLE	F NOT APPLICABLE	?	False
1	Abutments (Incl. Arch Springing)	3 Moderate	C Moderate 5 20%	2	True
1	Abutments (Incl. Arch Springing)	2 Minor	C Moderate 5 20%	2	False
1	Abutments (Incl. Arch Springing)	1 As New / Insignificant	A No Significant Defect	2	True
1	Waterproofing	2 Minor	B Slight <5%	2	False
1	Movement/Expansion Joints	2 Minor	B Slight <5%	4	False
1	Painting: Parapets/Safety Fences	1 As New / Insignificant	A No Significant Defect	1	False
1	Handrail/Parapets/Safety Fences	1 As New / Insignificant	A No Significant Defect	1	False
1	Carriageway Surfacing	3 Moderate	D Extensive 20 50%	2	False
1	Wing Walls	2 Minor	D Extensive 20 50%	2	True
1	Wing Walls	2 Minor	C Moderate 5 20%	2	True
1	Wing Walls	2 Minor	B Slight <5%	2	False
1	Wing Walls	2 Minor	B Slight <5%	2	True
1	Wing Walls	1 As New / Insignificant	A No Significant Defect	2	True

Management Action: Span 1 : 2 - Maintenance Works should proceed next Fin Year

Maintenance Priority Ranking [1-4]

- 1 - INSIGNIFICANT Nothing to worry about. Leave for further examination at next PI. Not likely to deteriorate significantly within 6 years.
- 2 - MINOR Nothing to worry about, but likely to deteriorate significantly within 6 years.
- 3 - UNACCEPTABLE Should not be left for 6 years until next PI. Rapid deterioration and escalation of repair cost inevitable if left unrepaired. Could become severe to affect integrity of structure.
- 4 - SEVERE: ACTION CURRENTLY AFFECTING THE INTEGRITY OF THE STRUCTURE. Essential to repair at an early date. NEEDED Could become hazardous if left. Cost of repair/damage to structure escalating rapidly.

Management Actions [1-8]

- 1. No maintenance works required; no defective main elements with maintenance prioritisation ranking >2. General Inspections to monitor.
- 2. Maintenance works should proceed next financial year; defective main elements having maintenance prioritisation ranking >2. General Inspections to monitor if repairs delayed. (Estimate required)
- 3. Special Investigation required next financial year to determine the nature and extent of works required. (Estimate required)
- 4. Await programmed strengthening or other upgrading and carry out any structural maintenance concurrently with these works.
- 5. Where an improvement scheme with detrunking is imminent (estimated to start within 6 years) - postpone all works until opening of the new trunk road to minimise traffic disruption. General inspections to monitor.
- 6. Postpone maintenance works so that they can be phased with other future works to be carried out on the route. Transport Scotland Bridges Section consulted. General Inspections to monitor until works commence. (Estimate required)
- 7. Demolition as part of trunk road scheme planned - structure can safely be neglected. General Inspections to monitor until demolition takes place.
- 8. Beyond economical repair - Replace. (Estimate required)

6.2 Detailed Defect Descriptions

Span Number: 1

Element: Primary Deck Element (Table G4) (1)

Defect Type: 2 5 3 Major localised spalls possibly exposing shear links and/or main bars with general corrosion

Multiple Defect?: False

Severity: 3 Moderate

Extent: B Slight <5%

Location: Not entered

Maintenance Priority Ranking: 4

Work Required: Concrete - Repairs

Estimated Cost: ██████████

Comments: Severe spalling at Beam 1, the uplink end, exposing 4No shear links and 1No. main reinforcement bar, which are corroding. This defect was previously reported but no action has been taken. It is recommended to repair this defect. See defect photograph D1 and D2

Span Number: 1

Element: Primary Deck Element (Table G4) (1)

Defect Type: 2 5 2 Minor localised spalls possibly exposing shear links

Multiple Defect?: True

Severity: 2 Minor

Extent: B Slight <5%

Location: Not entered

Maintenance Priority Ranking: 2

Work Required: N No Action Monitor Only

Estimated Cost: ██████████

Comments: Localised spalling of soffit beam concrete, accompanied with significant rust staining. Located near Support 1 (downlink), 32 beams in from LHS. No reinforcement exposed. Spalling concrete approx 10mm deep. Area approx. 400mm x 100mm. See defect photograph D3.

Span Number: 1

Element: Primary Deck Element (Table G4) (1)

Defect Type: 99 ? .2 WDM Generic Defect Severity 2

Multiple Defect?: True

Severity: 2 Minor

Extent: C Moderate 5 - 20%

Location: Not entered

Maintenance Priority Ranking: 2

Work Required: N No Action Monitor Only

Estimated Cost: ■

Comments: Dried staining and leaching on the abutment wall both at end support 1 and support 2 just under the carriageway joint area. This is due to historic water leakage through previously defective joints (defect photograph D4). Current water staining out with the area covered by the carriageway joints (defect photograph D5).

Span Number: 1

Element: Foundations (8)

Defect Type: 0 ? .0 Item present but not inspected

Multiple Defect?: False

Severity: 6 NOT APPLICABLE

Extent: F NOT APPLICABLE

Location: Not entered

Maintenance Priority Ranking: 0

Work Required: ?

Estimated Cost: Not Completed

Comments: There were no signs that would indicate issues with the foundations

Span Number: 1

Element: Abutments (Incl. Arch Springing) (9)

Defect Type: 2 8 2 Early signs of delamination e.g. cracks with rust staining

Multiple Defect?: False

Severity: 2 Minor

Extent: C Moderate 5 - 20%

Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: N No Action Monitor Only
 Estimated Cost: ■■■
 Comments: Cracks and rust staining on the abutment walls at localised areas. Cracks are being investigated as part of a post tensioning risk review of the structure which includes the vertically tensioned precast reinforced blocks forming the abutment (see defect photograph D6/D7)

Span Number: 1

Element: Abutments (Incl. Arch Springing) (9)
 Defect Type: 99 ? .1 No Defect
 Multiple Defect?: True
 Severity: 1 As New / Insignificant
 Extent: A No Significant Defect
 Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: N No Action Monitor Only
 Estimated Cost: ■■■
 Comments: Elements assumed to be network rail assets bolted to the abutments. Handrail rusting, bolts missing, sections of handrail detached from the abutment (defect photograph D8). Bolts from assets that have been removed remain in the abutment (defect photograph D9).

Span Number: 1

Element: Abutments (Incl. Arch Springing) (9)
 Defect Type: 3 65 3 Major leaching and/or staining
 Multiple Defect?: True
 Severity: 3 Moderate
 Extent: C Moderate 5 - 20%
 Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: N No Action Monitor Only
 Estimated Cost: ■■■
 Comments: Localised areas of efflorescence, water stains and stalactites on the abutment walls (defect photographs D4/D5/D10).

Span Number: 1

Element: Waterproofing (17)

Defect Type: 14 55 2 Minor Seepage Through Deck/Arch Etc. (Slow Dripping)

Multiple Defect?: False

Severity: 2 Minor

Extent: B Slight <5%

Location: Not entered

Maintenance Priority Ranking: 2

Work Required: N No Action Monitor Only

Estimated Cost: ██████████

Comments: signs of historic minor water seepage through the inverted beams including leaching and Stalactites (defect photograph D11).

Span Number: 1

Element: Movement/Expansion Joints (18)

Defect Type: 10 47 2 Initiation of cracking or tearing of components

Multiple Defect?: False

Severity: 2 Minor

Extent: B Slight <5%

Location: Not entered

Maintenance Priority Ranking: 4

Work Required: Joints - Replace

Estimated Cost: ██████████

Comments: Historic water staining is evident on the abutments under the carriageway joints (defect photograph D4). It is noted that there are existing ongoing works to replace these joints in Dec 2016, resulting from a risk assessment review of the existing joints.

Span Number: 1

Element: Painting: Parapets/Safety Fences (21)

Defect Type: 4 17 1 Finishing Coat Sound, Slight Weathering

Multiple Defect?: False

Severity: 1 As New / Insignificant

Extent: A No Significant Defect



Location: Not entered
 Maintenance Priority Ranking: 1
 Work Required: N No Action Monitor Only
 Estimated Cost: ■
 Comments: New parapets in good condition, no sign of deterioration.

Span Number: 1

Element: Handrail/Parapets/Safety Fences (23)
 Defect Type: 99 ? .1 No Defect
 Multiple Defect?: False
 Severity: 1 As New / Insignificant
 Extent: A No Significant Defect
 Location: Not entered
 Maintenance Priority Ranking: 1
 Work Required: N No Action Monitor Only
 Estimated Cost: ■
 Comments: New parapets in good condition, no sign of deterioration.

Span Number: 1

Element: Carriageway Surfacing (24)
 Defect Type: 9 32 3 Moderate Wear/Weathering
 Multiple Defect?: False
 Severity: 3 Moderate
 Extent: D Extensive 20 - 50%
 Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: Other - Surfacing
 Estimated Cost: ■■■■■
 Comments: Carriageway showing significant signs of wear however it is noted that resurfacing works are planned for October 2016

Span Number: 1

Element: Wing Walls (31)

Defect Type: 2 5 2 Minor localised spalls possibly exposing shear links

Multiple Defect?: False

Severity: 2 Minor

Extent: B Slight <5%

Location: Not entered

Maintenance Priority Ranking: 2

Work Required: Concrete - Repairs

Estimated Cost: ██████████

Comments: Localised concrete spalling around steel (defect photograph D13). Steel possibly from panel lifting points, not considered structural steel. Spalling and cracking at connection between North East wing wall and abutment at bridge soffit level (defect photograph D14). Large area of spalling located close to the centre panel of north east wing wall, area approx. 3m x 3m (defect photograph D15).

Span Number: 1

Element: Wing Walls (31)

Defect Type: 5 18 2 Minor Vegetation Causing No Structural Damage (Surface Mosses, Small Grass And Weeds)

Multiple Defect?: True

Severity: 2 Minor

Extent: C Moderate 5 - 20%

Location: Not entered

Maintenance Priority Ranking: 2

Work Required: N No Action Monitor Only

Estimated Cost: ██████████

Comments: Moss and grass on wing wall coping (defect photograph D16)

Span Number: 1

Element: Wing Walls (31)

Defect Type: 99 ? .1 No Defect

Multiple Defect?: True

Severity: 1 As New / Insignificant

Extent: A No Significant Defect



Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: Joints - Repair
 Estimated Cost: ██████████
 Comments: Polysulphide joint material missing and breaking out along wing wall/abutment joint (defect photograph D17). Rake out and reinstate joint sealant to repair.

Span Number: 1
 Element: Wing Walls (31)
 Defect Type: 99 ? .2 WDM Generic Defect Severity 2
 Multiple Defect?: True
 Severity: 2 Minor
 Extent: D Extensive 20 - 50%
 Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: N No Action Monitor Only
 Estimated Cost: ██████████
 Comments: Efflorescence development on the wing walls at localised areas (defect photograph D18).

Span Number: 1
 Element: Wing Walls (31)
 Defect Type: 3 64 2 Minor masonry spalling, shallow and/or small areas
 Multiple Defect?: True
 Severity: 2 Minor
 Extent: B Slight <5%
 Location: Not entered
 Maintenance Priority Ranking: 2
 Work Required: Masonry - Pointing
 Estimated Cost: ██████████
 Comments: Small areas of masonry between panels missing, water leaking through masonry joints in isolated areas (defect photograph D19). Repair with localised re-pointing works.

Is lane rental required? Y N

6.3 Concrete Impregnation

Surface not impregnated

6.4 Works Estimates

Cost estimate for a practical package of maintenance works (all defects in a structure to be considered) or alternatively cost estimate for a special investigation.

<u>Item</u>	<u>Cost (£)</u>
Scheme Preparation (to contract stage)	
Contract Administration (excluding tendering procedures, if applicable)	
Site Supervision	
Preliminaries	
List of Defective Main Elements and their Repair/Remedial Costs	
<i>Span Element Name</i>	<i>Work Required</i>
1 Primary Deck Element (Table G4)	Concrete - Repairs
1 Movement/Expansion Joints	Joints - Replace
1 Carriageway Surfacing	Other - Surfacing
1 Wing Walls	Joints - Repair
1 Wing Walls	Concrete - Repairs
1 Wing Walls	Masonry - Pointing
Contingencies	
Statutory Undertakers' Costs	
1 Rail possession and isolation required to carry out works	
Special Inspections and Testing Services	
VAT (if payable)	
Total	

