

340 Borough Road Footbridge Principal Inspection North Tyneside Council

22 February 2011





Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Final			
Date	20 Jan 2012			
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File reference	10330058/PI340			

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Executive Summary

The steel lattice arch footbridge is in fair condition.

Instances of paint failure and associated corrosion were noted throughout the superstructure. Moderate to heavy corrosion has occurred at the connection of the superstructure to the north and south abutment. Calcites were noted to the concrete deck soffit indicating water penetration through the deck.

Vegetation growth and algal staining is evident to the masonry abutment shelves. The masonry piers have dry staining, pointing loss, graffiti and general weathering throughout their surfaces.

The steel mesh parapets are showing signs of paint failure in general. Moderate corrosion has also occurred to the top of the parapet posts.

The footway surfacing is in generally good condition but has a number of minor cracks in the top layer. Cracks were also noted on the paved approaches to the footbridge.

It is recommended that the following works are undertaken to maintain the integrity of the footbridge:-

Substructure

- De-vegetation of the abutments and cleaning of algal staining is required over both abutments.
- Masonry repair works (e.g. re-pointing etc. as required) should be undertaken to the abutments and piers.

Superstructure

It is recommended that a special inspection is undertaken to verify the existing paint condition of the superstructure, as per BD 87/05. Following the inspection, appropriate actions should be adopted in accordance with the guidance.

Footway Surfacing

The footway surfacing should be renewed to prevent water ingress to the deck slab.

1 Detailed Inspection Report

1.1 TITLE SHEET

1.1.1 Structure Name: Borough Road Footbridge

1.1.2 Structure Number: 340

1.1.3 Grid Reference: 435568 567948

1.1.4 Date of Construction: Not Known

1.2 DESCRIPTION OF STRUCTURE

GENERAL DESCRIPTION

1.2.1 Borough Road Footbridge is a 3 span steel lattice arch structure with reinforced concrete deck slab. It is supported over masonry piers and abutments. The central span of the footbridge is 17m with two end spans of 11m each. The clear width of footway is 2m. The parapets are of steel construction with mesh in-fill between the posts. The footbridge provides access for pedestrains between Waldon Street and Tennyson Terrace over the Borough Road in North Tyneside.

ANCILLARIES

1.2.2 None present

FOUNDATIONS

1.2.3 The foundations were not visible for inspection. However, they are believed to be spread footings for the piers and abutments.

DRAINAGE SYSTEM AND WATERPROOFING

1.2.4 It is believed that the surfacing to the top of bridge deck is acting as waterproofing to the bridge deck.

1.3 DESCRIPTION OF INSPECTION

PREVIOUS INSPECTIONS

1.3.1 Not known

PREVIOUS TEST DATA

1.3.2 None available

INSPECTING ENGINEER(S)

1.3.3 D.Garvie and K.Hancock

DATE(S) OF INSPECTIONS

1.3.4 22 February 2011

WEATHER CONDITIONS

1.3.5 Dark, wet and misty

DESCRIPTION OF HOW INSPECTION WAS UNDERTAKEN

1.3.6 All inspection works were carried out in accordance with the Risk Assessment and Method Statement. Traffic management was in place and MEWP was used for the inspection.

1.4 RESULTS OF INSPECTION

GENERAL

The footbridge is considered to be in generally fair condition.

FOUNDATIONS

1.4.1 The foundations are buried and were not visible for inspection. However, there were no apparent signs of foundation movement or settlement.

SUBSTRUCTURE

1.4.2 North Abutment

- Algal staining was noted to the surface of the abutment (photograph 2).
- Growth of vegetation to the abutment shelves, between the masonry blocks was noted (photograph 1).
- Mortar loss and open joints were noted to the block masonry to the west of the abutment (photograph 2).

1.4.3 South Abutment

- The south abutment was found to be subject to algal staining for most of the visible surface area with rust stains on the bearing stones (photograph 3).
- Growth of vegetation to the abutment shelves, between the masonry blocks was noted (photograph 3).
- Displaced blocks and open joints were noted to the block masonry to the east of abutment (photograph 4).

1.4.4 North and South Pier

- Both of the piers were noted to have pointing loss (upto 25% of surface area) due to weathering (photographs 5, 6).
- Dry staining and soot deposits were observed on both of the pier surfaces (photographs 7 & 10).
- The bearing pad of the north pier is showing signs of scaling (photograph 9).
- Algal staining and vegetation growth was noted to the top of the pier surfaces (photograph 8).

SUPERSTRUCTURE

1.4.5 Steel Lattice Arch

- The steel members were found to have paint loss and associated corrosion in general. Minor steel flaking has occurred at a few places, also due to failure of the paint coating (photographs 12 18).
- Corrosion is more severe at the connection of the superstructure to the abutment and piers. Steel flaking was also observed at these locations (photographs 19, 20).

Graffiti was noted on the steel members near to the abutments (photograph 17).

1.4.6 Deck Slab

- Accumulation of calcites was noted at a few locations to the deck soffit (photograph 21).
- Algal staining and minor honeycombing was observed on the edges of the deck slab (photograph 22).

COMPONENTS

1.4.7 Parapets

- Moderate corrosion was noted to the connection of vertical and horizontal posts at the top (photograph 24).
- General paint failure and associated minor corrosion was observed to the parapet members at a few locations (photograph 25).
- Minor pointing loss has occurred on the masonry approach parapets (photograph 28).

1.4.8 Footway Surfacing

- Cracks were noted to the top layer of the footway surfacing (photograph 27). The concrete surfacing over the approaches is also showing the signs of cracking (photograph 28).
- Vegetation growth was observed to the edges of the footway for the whole length of the footbridge (photograph 26).

1.4.9 Waterproofing

The bridge deck soffit was generally found to be dry apart from instances of accumulation of calcites at a few locations. This is most probably due cracks on the footway surfacing that are allowing water penetration through the deck (photograph 21).

1.4.10 Joints

No joints were visible for inspection. However it is assumed that buried joints over the abutments are leaking allowing water ingress on to the abutments.

1.4.11 Bearings

The abutment bearing plates under the longitudinal members are believed to be corroded as is indicated by rust stains to the abutments (typical photograph 29).

1.4.12 Drainage

The drainage over the footbridge appears to be in good working order as there is no ponding over the footway surfacing.

CONCLUSIONS

The bridge has a number of defects, but these are not currently affecting the integrity of the structure. However, it is recommended that these defects be repaired to avoid any worsening of the defects in the future.

1.4.13 Substructure

- De-vegetation of the abutments and cleaning of algal staining is required over both abutments.
- Masonry repair works (e.g. re-pointing etc. as required) should be undertaken to the abutments and piers.

1.4.14 Superstructure

It is recommended that a special inspection is undertaken to verify the existing paint condition of the superstructure, as per BD 87/05. Following the inspection, appropriate actions should be adopted in accordance with the guidance.

1.4.15 Footway Surfacing

The footway surfacing should be renewed to prevent water penetration through the deck.

Appendix A - Photographs



Photo 1: View showing north abutment bearing shelf



Photo 2: Mortar loss, open joints and algal staining at north abutment



Photo 3: Algal staining and vegetation growth to the south abutment bearing shelf



Photo 4: Displaced block and open joints over the south abutment

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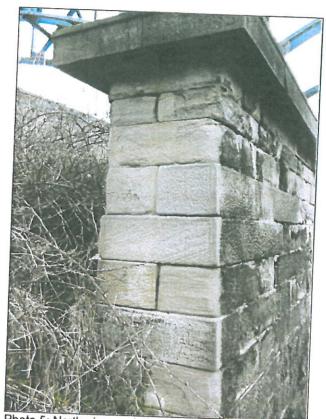


Photo 5: North pier – pointing loss at the top of pier (east face)

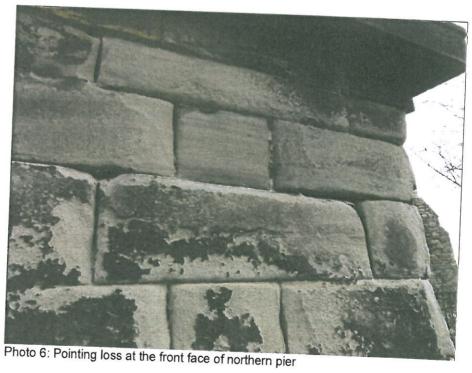




Photo 7: Staining over the pier surface



Photo 8: Algal staining and vegetation growth at the top of north pier



Photo 9: Scaling at the bearing plinth over the northern pier



Photo 10: View of south pier- condition similar to north pier



Photo 11: Graffiti at the pier elements



Photo 12: View showing paint failure and associated corrosion on the superstructure

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Photo 13: Paint failure and associated corrosion at the connection - typical



Photo 14: Another view of paint failure and associated corrosion on superstructure



Photo 15: Paint failure and associated corrosion at splice connection



Photo 16: Paint failure and associated corrosion on the bracing members



Photo 17: Graffiti on superstructure members



Photo 18: Steel flaking at the steel member



Photo 19: Corrosion to steel members over the abutment connection - typical



Photo 20: Corrosion and steel flaking at the pier connection - typical

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Photo 21: Accumulation of leaching salts on the deck soffit - typical



Photo 22: Algal staining and honey combing over the deck edges



Photo 23: General view of the parapet



Photo 24: Paint failure and steel flaking at top of parapet – typical for few locations



Photo 25: General paint failure and associated corrosion to parapet members



Photo 26: View of footbridge surfacing showing vegetation at the edges of footway

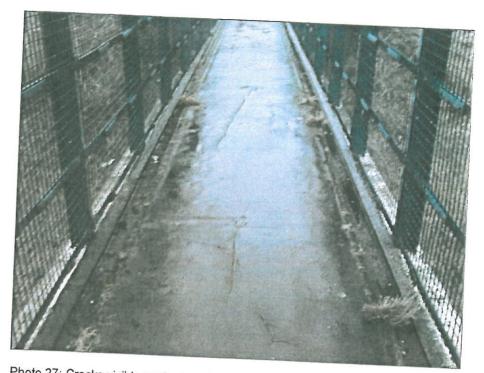


Photo 27: Cracks visible on the top of surfacing

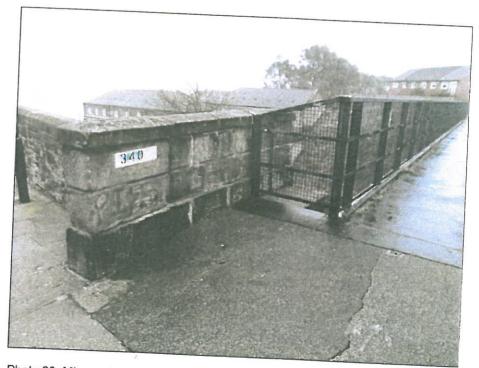
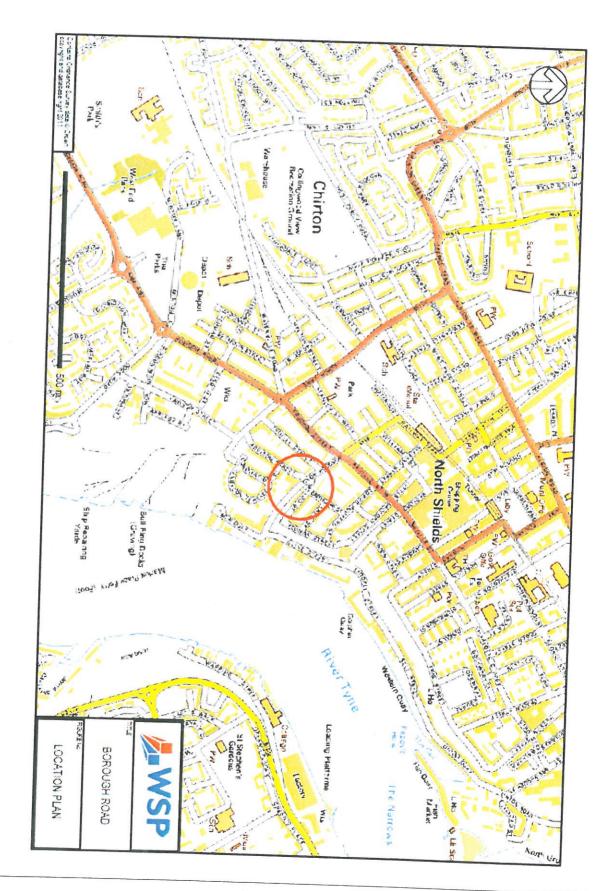


Photo 28: Minor pointing loss over the approach parapets

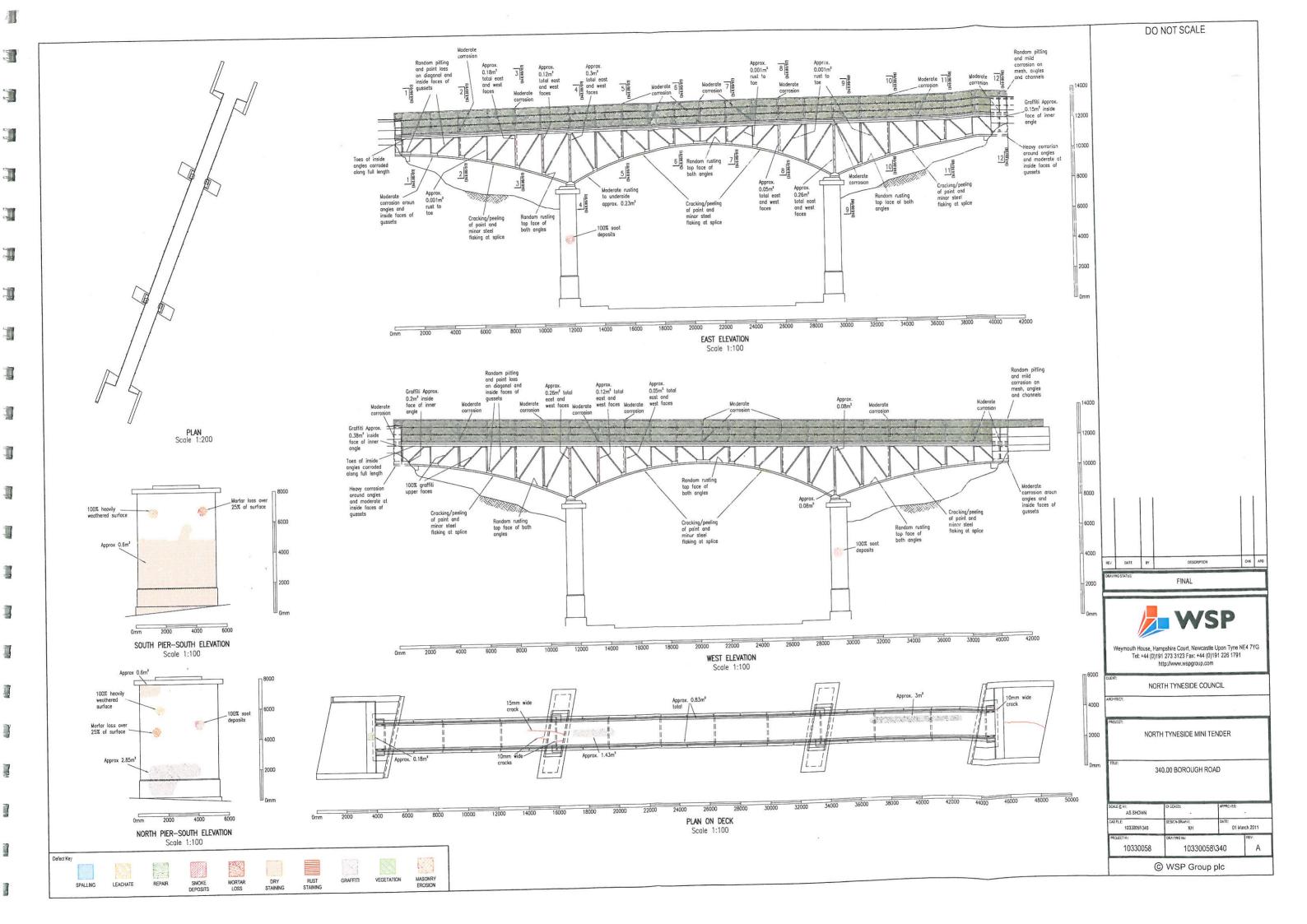


Photo 29: Corroded bearing plate under the longitudinal steel members

Appendix B - Location Plan



Appendix C - General Arrangement



Appendix D - Bridge Inspection Pro Forma

Bridge Inspection Pro Forma Version: July 2004 ☐ Superficial General Principal ☐ Special Form 1 of 3 for this bridge 22/02/2011 Inspector: Date: Next Inspection Type/Date: D Garvie GI/Feb 2013 Bridge Name: Borugh Road Footbridge Bridge Ref/No: 340 Road Ref/No: Primary deck form 435568 Map Ref: O.S.E O.S.N 567948 02 Primary deck material 2.0 of 3 (N to S) Span Width (m): Span Length (m): 11.00 Span E Secondary deck form Photographs? YES X NO All above ground elements inspected: YES 🔀 NO \square 34 Table 3 Secondary deck material Number of construction forms in bridge/span*: 1 ⊠ 2 □ 3 □ more □ (*delete as appropriate) A **Element Description** S Ex Def W P Set No Cost Comments/Remarks 2 B 1.2 Minor to moderate corrosion to steel members 2 £1,000 Primary deck element (Table 2) 1 2 Secondary Transverse beams В 1.2 R 2 Cost included in element 1 2 Deck Elements deck 2.2 1 A N 1 0 Element from Table 3 3 element/s Half joints 5 Tie beam/rod 5.1 0 Parapet beam or cantilever Deck bracing 6.1 1 N 1 0 Foundations 8 2 В M R 2 £1,000 Load-bearing Substructure Abutments (incl. arch springing) Spandrel wall/head wall 2 В 3.2 £1,000 R 2 Pier/column Cross-head/capping beam 12.1 2 В R 3 £1,000 13 Bearings 2 В 5.1 R £500 2 Bearing plinth/shelf 8.1 N 0 A 1 1 15 Superstructure drainage **Durability Elements** 16 Substructure drainage В 14.2 2 R 2 Repair cost in element 25 17 Waterproofing 2 В 10.12 R £2,000 2 Leakage over the abutment Movement/expansion joints 18 4 C 4.1 R 3 £10,000 Finishes: deck elements 19 20 Finishes: substructure elements 4 В 4.1 R 3 £1,000 Finishes: parapets/safety fences 21 Access/walkways/gantries 22 2 В 1.2 R 3 £1,000 23 Handrail/parapets/safety fences Carriageway surfacing 24 2 B 9.4 3 £3,000 Footway/verge/footbridge surfacing 26 Invert/river bed Other Bridge Elements 27 Aprons Fenders/cutwaters/collision prot. River training works 30 Revetment/batter paving Wing walls Retaining walls 32 Embankments 33 34 Machinery В 3.2 R £500 2 Approach rails/barriers/walls 36 Signs 37 Lighting 38 Services 39 40 41 42

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Ref. No ,2, 19 1, 14 3 1, 23	Clean Maso Repai	ing of n nry repa r to bea r to par	ust/corm airs to a aring pla apets ar	Suggers osion of butmer stes	f the ste	d Rem	NO/	RK F Work		3 2 3 2	Estimated Cost £19,000 £1,500 £1,000 £2,000	Action/Work	
Name: Ref. No ,2, 19 1, 14 3 1, 23 5	Clean Maso Repai	ing of n nry repa r to bea r to par	ust/corm airs to a aring pla apets ar	Suggers osion of butmer stes	f the ste	d Rem	NO/	RK F Work		3 2 3 2	Estimated Cost £19,000 £1,500 £1,000 £2,000	Action/Work	

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Section 2

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	Sup	erficial 🗌 General 🛛] Pri	ncipa	ıl	□ s	pecia	al	Form 3 o	of 3 for this bridge	
Inspec	ctor:	D Garvie	Da	te:	22/02	/201	1	N	ext Inspection Type/Da	te: GI/Feb 2013	
Bridge	Nan	ne: Borugh Road Footbridge				Bridge	Ref/N	No:	340	Road Ref/No: F	
Map F	Ref:	O.S.E	43	5568		O.S.N	56	7948		Primary deck form Table 2)2
Span	3	of 3 (N to S) Span Width (r	n): :	2.0		Span	Length	n (m):	11.00	Table 2	E
	ove g	round elements inspected: YES) N	0 🗆		Photo	graphs	? YE	S 🛛 NO 🗌	6 Secondary deal form	34
-		construction forms in bridge/span*: 1		2 🔲	3 🔲	more		(*delet	e as appropriate)	Secondary deck material Table 4	A
Set	No	Element Description	S	Ex	Def	W	Р	Cos	Co	mments/Remarks	*
-	-	Primary deck element (Table 2)	2	В	1.2	R	2	£1,00		corrosion to steel members.	
97	2	Secondary Transverse beams	2	В	1.2	R	2		Cost included in ele	ment 1	
Deck Elements	3	deck element/s Element from Table 3	1	Α	2.2	N	1	0		£.	
E E	4	Half joints							7		
ᄍ	5	Tie beam/rod								•••	
) O	6	Parapet beam or cantilever	1	Α	5.1	N	1	0		NULL COLUMN TO A SECOND TO A S	117-1300-1-00-11
	7	Deck bracing									
	8	Foundations	1	Α	6.1	N	1	0	 		-
	9	Abutments (incl. arch springing)	2	В	M	R	2	£1,00	D		
Load-bearing Substructure	10	Spandrel wall/head wall							1		
Deal	11	Pier/column	2	В	3.2	R	2	£1,00	0	140	
ad-la	12	Cross-head/capping beam									
Su	13	Bearings	2	В	12.1	R	3	£1,000			
	14	Bearing plinth/shelf	2	В	5.1	R	2	£500			
-	15	Superstructure drainage	1	Α	8.1	N	1	0			-
nts	16	Substructure drainage				-			-	Anggos Air	
E I	17	Waterproofing	2	В	14.2	R	2		Repair cost in eleme	ent 25	
Durability Elements	18	Movement/expansion joints	2	В	10.12	R	2		Leakage over the al	butment. Cost in form 1	
C	19	Finishes: deck elements	4	С	4.1	R	3	£10,00		manufacture and the	
rab		Finishes: substructure elements	-			-					
20	21	Finishes: parapets/safety fences	4	В	4.1	R	3	£1,000	-		
-	_	Access/walkways/gantries									
h	_	Handrail/parapets/safety fences	2	В	1.2	R	3	£1,00	5		
Safety Element	24	Carriageway surfacing	-							mm	
S Ele	25	Footway/verge/footbridge surfacing	2	В	9.4	R	3	£3,00	0		
		Invert/river bed									
S	_	Aprons						-			
Jen	28	Fenders/cutwaters/collision prot.	-				-			¥	
le le		River training works									
Je E	-	Revetment/batter paving							-		
Į Š	31	Wing walls									
E B	_	Retaining walls									
Other Bridge Elements	33	Embankments									
١		Machinery									
	35	Approach rails/barriers/walls	2	В	3.2	R	2	£500			
Ancillary Elements	_	Signs									
icill me	37	Lighting									
E A	38	Services									
	39										
	40								7	×	
	41										
	42									No.	ž.
		S – severity, Ex – extent, I	Def –	defe	ct, W -	- wor	k req	uired,	P – work priority, C	Cost - Cost of work	

Element		The second second	-	The same of the same of	MINTERS OF THE	-	The state of the s		with the same of the last of t	FECTS			and the same of th
	t)efect	1	D	efect	2	0)efect	3		_		
No.	S	Ex	Def	S	Ex	Def	S	Ex	Def		C	omments	
9	2	В	3.2	2	В	3.7	2	В	5.1			in the second se	Mary Control of the C
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				Market Wood Add		INS	SPE	CTOP	R'S C	OMMENT	S	No.	
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	ints wer												
25 Cra	acks no	ted on t	he surfa	cing.									
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lame:	На				overall.	Sig	ned;	TT	Sw	IRED	vork required ta		1/1/12
	Ha			еу		Sig	ned:	TT.	REQU		Priority		Action/Work Ordered?
Ref. No		rpreet	Jagde	ey Sug	geste	Sig	ned: - WOI	RK F	REQU			Date: 1º	Action/Work
Ref. No	Clear	rpreet	Jagde ust/corr	ey Sugg	gester f the ste	Sig	ned: - WOI	RK F	REQU	JIRED	Priority	Date: 10 Estimated Cost	Action/Work
Ref. No 2, 19 , 11, 14	Clear Maso Repa	rpreet	Jagde ust/corr airs to a	Sug:	gester f the ste	Sig	ned: - WOI	RK F	REQU	JIRED	Priority 3	Date: 10 Estimated Cost £11,000	Action/Work
Ref. No ,2, 19 ,11, 14	Clear Maso Repa	rpreet ning of n	Jagde ust/corr airs to a	Sug:	gester f the ste	Sig	ned: - WOI	RK F	REQU	JIRED	Priority 3 2	Date: 10 Estimated Cost £11,000 £2,500	Action/Work
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