



RIBBLE VALLEY
BOROUGH COUNCIL

FOR THE
ATTENTION OF

19 SEP 2011

For office use only

Application No

320110757P

Date received

Fee paid £

Receipt No:

Council Offices, Church Walk, Clitheroe, Lancashire. BB7 2RA Tel: 01200 425111 www.ribblevalley.gov.uk

Application for listed building consent for alterations,
extension or demolition of a listed building.
Planning (Listed Buildings and Conservation Areas) Act 1990

Publication of applications on planning authority websites.

Please note that the information provided on this application form and in supporting documents may be published on the Authority's website.

If you require any further clarification, please contact the Authority's planning department

1. Applicant Name, Address and Contact Details

Title:		First name:		Surname:	
Company name:	Network Rail Infrastructure Ltd				
Street address:	Kings Place			Country Code:	
	90 York Way			National Number:	
				Extension Number:	
Town/City:	London			Telephone number:	
County:				Mobile number:	
Country:				Fax number:	
Postcode:	N1 9AG			Email address:	

Are you an agent acting on behalf of the applicant? ☒ Yes ☐ No

2. Agent Name, Address and Contact Details

Title:	Mrs	First Name:	Sue	Surname:	Wood
Company name:	Network Rail				
Street address:	Network Rail Infrastructure Ltd			Country Code:	
	Square One			National Number:	
	4 Travis Street			Extension Number:	
Town/City:	Manchester			Telephone number:	0161 8803599
County:				Mobile number:	
Country:	United Kingdom			Fax number:	
Postcode:	M1 2NY			Email address:	sue.wood@networkrail.co.uk

3. Description of Proposed Works

Please describe the proposals to alter, extend or demolish the listed building(s):

Installation of bored piled foundation underpinning to piers 33 & 34 and concrete structural lining to arch 34

Has the work already started
without planning permission?

☐ Yes ☒ No

4. Site Address Details

Full postal address of the site (including full postcode where available)

Description:

House: Suffix:
House name:
Street address:

Town/City:
County:
Postcode:

Arch 34 & Piers 33 & 34

Description of location or a grid reference
(must be completed if postcode is not known):

Easting:
Northing:

5. Related Proposals

Are there any current applications, previous proposals or demolitions for the site?

☐ Yes ☒ No

6. Pre-application Advice

Has assistance or prior advice been sought from the local authority about this application?

☒ Yes ☐ No

If Yes, please complete the following information about the advice you were given (this will help the authority to deal with this application more efficiently):

Officer name:

Title: First name: Surname:

Reference:

Date (DD/MM/YYYY): (Must be pre-application submission)

Details of the pre-application advice received:

7. Neighbour and Community Consultation

Have you consulted your neighbours or the local community about the proposal?

☐ Yes ☒ No

8. Authority Employee/Member

With respect to the Authority, I am:

- (a) a member of staff
- (b) an elected member
- (c) related to a member of staff
- (d) related to an elected member

Do any of these statements apply to you?

☐ Yes ☒ No

9. Materials

Please provide a description of existing and proposed materials and finishes to be used in the build (demolition excluded):

Others - add description

Other

Description of *existing* materials and finishes:

Description of *proposed* materials and finishes:

Are you supplying additional information on submitted drawings or plans?

☐ Yes ☐ No

If Yes, please state plan(s)/drawing(s) references:

10. Demolition

Does the proposal include total or partial demolition of a listed building?

☐ Yes ☒ No

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11. Listed building alterations

Do the proposed works include alterations to a listed building?

☒ Yes ☐ No

If Yes, will there be works to the interior of the building?

☐ Yes ☒ No

Will there be works to the exterior of the building?

☒ Yes ☐ No

Will there be works to any structure or object fixed to the property (or buildings within its curtilage) internally or externally?

☒ Yes ☐ No

Will there be stripping out of any internal wall, ceiling or floor finishes (e.g. plaster, floorboards)?

☐ Yes ☒ No

If the answer to any of these questions is Yes, please provide plans, drawings and photographs sufficient to identify the location, extent and character of the items to be removed, and the proposal for their replacement, including any new means of structural support, and state references for the plan(s)/drawing(s)

State references for these plan(s)/drawing(s):

JY287 002
JY287 API 002
JY287 003

12. Listed Building Grading

If known, what is the grading of the listed building (as stated in the list of Buildings of Special Architectural or Historical Interest)?

☐ Don't know ☐ Grade I ☐ Grade II* ☒ Grade II

Is it an ecclesiastical building?

☐ Don't know ☐ Yes ☒ No

13. Immunity from Listing

Has a Certificate of Immunity from listing been sought in respect of this building?

☐ Yes ☒ No

14. Site Visit

Can the site be seen from a public road, public footpath, bridleway or other public land?

☒ Yes ☐ No

If the planning authority needs to make an appointment to carry out a site visit, whom should they contact? (Please select only one)

☒ The agent ☐ The applicant ☐ Other person

15. Certificates (Certificate A)

Certificate Of Ownership - Certificate A

Certificate under Regulation 6 of the Planning (Listed Buildings and Conservation Areas) Regulations 1990

I certify/The applicant certifies that on the day 21 days before the date of this application nobody except myself/the applicant was the owner (owner is a person with a freehold interest or leasehold interest with at least 7 years left to run) of any part of the land or building to which the application relates.

Title: Mrs First name: Sue Surname: Wood

Person role: Agent

Declaration date: 16/09/2011

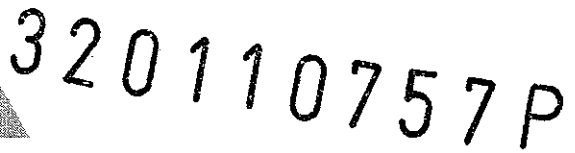
☒ Declaration made

16. Declaration

I/we hereby apply for planning permission/consent as described in this form and the accompanying plans/drawings and additional information.



Date: 16/09/2011



16th August 2011



1.3 Extensometers

1.3.1 EXT01 – South East Corner of Pier 34 (Up Side)

Rate of change movement has remains steady. Readings have increased by 0.25mm over the last 2-3 weeks at 3m, 6m and 10m which are now around - 2.75mm, - 3.25mm and 4.75mm suggesting continued movement of the ground.

1.3.2 EXT02 – West End of Pier 34 (Down Side)

As with extensometer EXT01 readings at 3m, 6m and 10m are continuing increasing at a steady rate. Readings have increased by 0.25mm over the last 2-3 weeks, now at 3.5mm, 3.65mm and 4.0mm respectively.

1.4 3D Monitoring – (Topographical)

1.4.1 Up side (East elevation)

There has been little change in the readings taken around 12/07/2011 has occurred Transverse movement/lean has steadied along in the up side of the viaduct from spans 33, 34 and 35. The arch barrel readings remain around 4 to 8mm.

1.4.2 Down side (West elevation)

Settlement readings of the viaduct on the down (west) side have generally remained the same since 12/07/2011.

2 Discussion/Commentary

Since the marked increase in readings taken around 12/07/2011 there has been little further activity, particularly to the west elevation. Also readings from rotation sensor have remained the same over the last 2-3 weeks. The slowing in settlement / rotation activity of the structure is encouraging, however the true rate of dilapidation of the piles beneath remains largely unknown and so the occurrence of further settlement of pier 34 cannot be ruled out.

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J1212 Whalley Viaduct (DJH/41) Span/Pier 34

Interim Review of Structural Monitoring Readings Provided by Datum Monitoring

24th March 2011

1 Introduction

1.1 General

Whalley Viaduct (DJH/41) is a Grade 2 listed 49 span brick arch structure located approximately 0.5km west of Whalley village in Lancashire. It carries the Daisyfield Junction (Blackburn) to Hellifield twin track railway line (DJH) over the River Calder from chainage 17 miles 638 yards to 17 miles 1298 yards.

Significant defects to span 34, including flattening to the west ring face of the arch barrel were noted following completion of recent 2010/2011 maintenance works to the viaduct.

The purpose of this review is to find out how the structure is behaving in the vicinity of span 34 and establish the underlying causes of any movement detrimental to the integrity of the structure. The contents of this review are for discussion purposes only and to assist in identifying potential strengthening works required to maintain the viaduct's longevity.

This review is based on information downloaded from the website of Datum Monitoring Service Ltd on 24th March 2011. Baseline readings for equipment attached to the viaduct and extensometers were taken by Datum Monitoring service Ltd on 10th February 2011 and 10th March 2011 respectively.

2 Structural Monitoring Readings

2.1 Crack Sensors

2.1.1 C1 East Elevation – Down Main Side

Lateral, vertical and longitudinal sensors each show very little relative movement across the longitudinal cracking to the head/parapet wall. Readings are less than 0.25mm in each direction.

2.1.2 C2 West Elevation – Up Main Side

The sensors on this side of the structure show more but not significantly more activity. Lateral and longitudinal movement seems to fluctuate slightly with temperature as expected, with low readings in the order of 0.5mm, 0.25mm respectively. The vertical sensor indicates an increase in the separation of the crack of approximately 1.25mm, the exact cause other than temperature is not clear at this stage of monitoring.

2.1.3 C3 Barrel, North Quarter Point – Up Main Side

The movement record across the transverse cracking at this location is virtually negligible at approximately 0.1mm. Readings appear to fluctuate with temperature.

2.1.4 C4 Barrel, North Quarter Point – Down Main Side

Very little movement has been experienced at the sensor with a reading of approximately 0.5mm. Readings indicate movement with temperature which is a reasonable given the magnitude of measurements recorded.

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2.2 Rotation Sensors

2.2.1 R1 Barrel, Above Transverse Crack – Down Main Side

When viewed for the east elevation R1 sensor readings suggest clockwise rotation of the barrel section above the transverse crack in the order of 7mm since the baseline reading on 10/03/2011.

2.2.2 R2 Barrel, Below Transverse Crack – Down Main Side

Readings indicate a small anti-clockwise rotation of approximately 1mm. Again readings fluctuate slightly with temperature.

2.2.3 R3 Barrel Above Transverse Crack – Up Main Side

The rotational movement indicated sensor R3 are similar to sensor R1 showing a clockwise rotation (viewed from east) in the order of 7.5mm since the baseline reading taken on 10/03/2011. Readings do trend with temperature but the relative rotation is not recovering, but increasing.

2.2.4 R4 Barrel, Below Transverse Crack – Up Main Side

As with sensor R2 on the down main side a small anti-clockwise rotation of approximately 0.5mm has been recorded.

2.3 Extensometers

2.3.1 EXT01 – West End of Pier 34

Vertical ground settlement readings are very low with values of around 0.5mm and 1.25mm for depths below ground level of 3-6m and 10m respectively.

2.3.2 EXT02 – South East Corner of Pier 34

Readings of ground settlement values to the south east corner are less than those recorded at EXT01 in the order of 0.1m to 0.25mm.



3 Discussion

Readings from crack sensors C1 to C4 are fairly inconclusive showing movement that what would normally be expected due to thermal expansion and contraction of the connected parts of the viaduct structure. The gap when measured at right angles to the edges of the crack do not appear to be affected by any marked settlement in movement of the superstructure or sub-structure.

Rotation sensors above the line of transverse cracking at the northern quarter point of span 34 are showing significant rotation of the upper barrel section towards the north (clockwise). In comparison, there is only a small anti-clockwise rotation lower barrel section to pier 34. This suggests the barrel is being twisted, but it is unclear as to what the exact cause of this is at present, as both extensometers installed indicate very little vertical movement of the ground within the zone of influence of the pier's foundation.

4 Conclusion

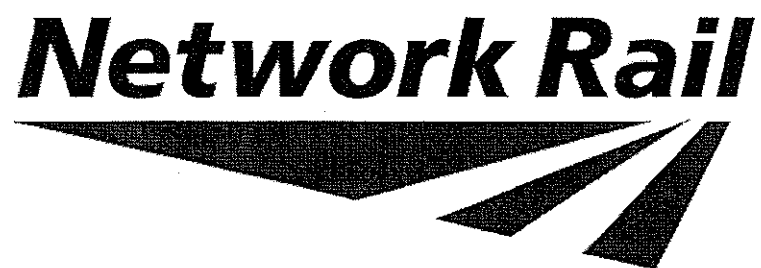
The arch barrel to span 34 is being subjected to rotation and some torsion about the transverse cracking. However, readings from sensor equipment below this level suggest the pier itself is not moving/settling at a level above what would normally be acceptable for changes in temperature of the structure and of the ground.

The cause of the obvious barrel rotation could be a result of other effects experienced by parts of the viaduct to the north or south i.e. pier 33 or king pier 35. Further monitoring time of the structure is required to establish further what the likely cause of the span 34 barrel deformation is. Consideration ought to be given to installing extensometers at the adjacent piers in order to gain a wider understanding of how the viaduct is behaving around span 34.

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Heritage Statement

**Installation of underpinning and arch alterations:
Whalley Viaduct, Whalley, Lancashire.**

Introduction

This statement gives an outline of the principles adopted by the proposal in context to the heritage status of the application site.

Whalley Viaduct is a Grade II listed structure, receiving its designation in March 1986.

The application seeks listed building consent for the installation of a structural arch support and piled foundations. A separate planning application is not required in this instance as the proposed works would fall under Part 17 of the Town and Country Planning (General Permitted Development) Order 1995) and would therefore be considered as permitted development.

Site Context

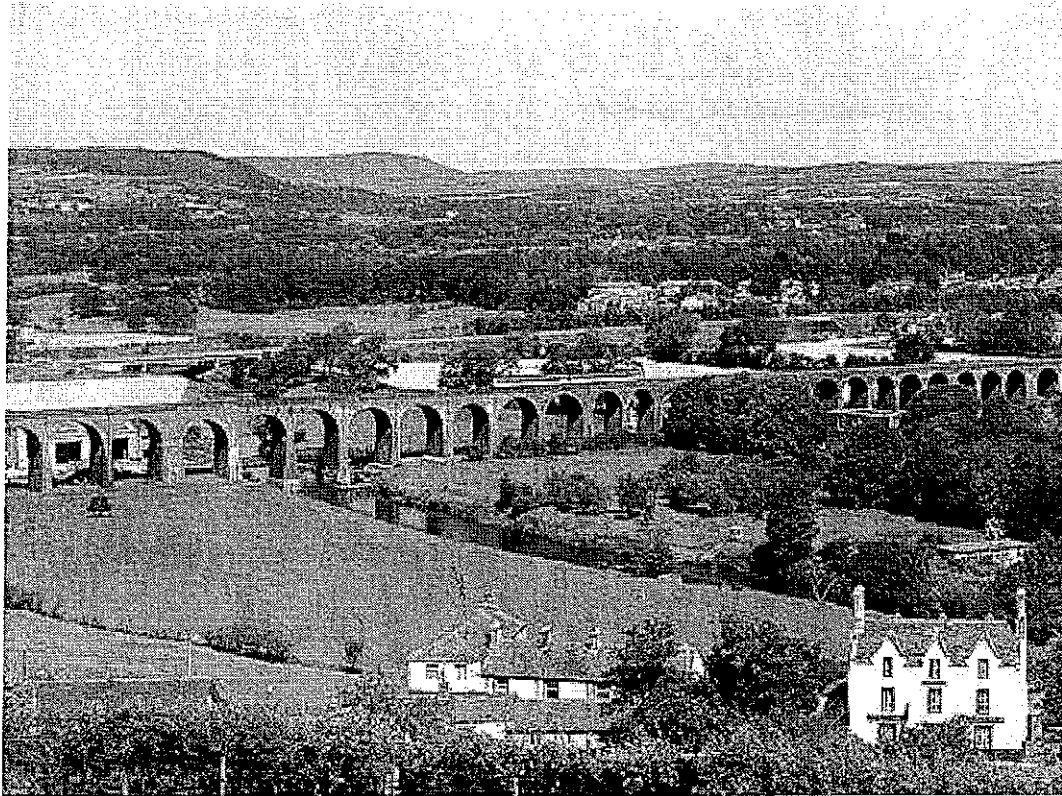
The viaduct falls to the west of the village of Whalley within Lancashire, approximately 0.5km from the village. The structure lies astride the development limits for the settlement and falls adjacent to the conservation area and an area of essential open space as designated within the Ribble Valley Local Plan. The conservation area boundary is under examination and will potential include the northern section of the viaduct (from Broad Lane to the station) within the designated conservation area.



Aerial view

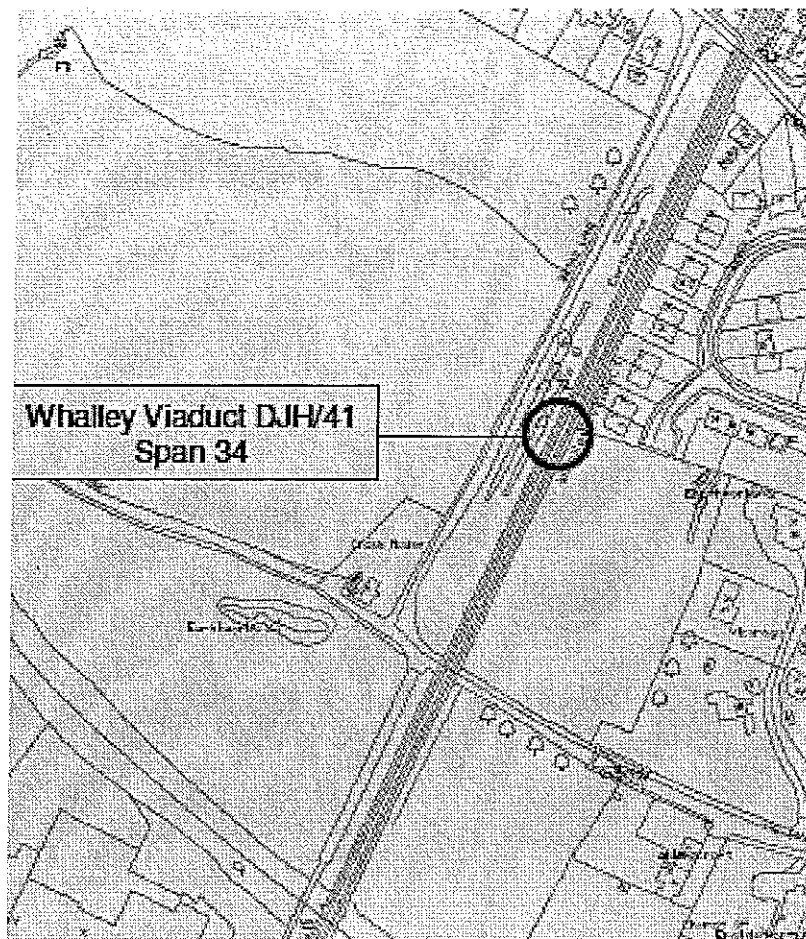
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The viaduct spans across the valley of the River Calder, carrying the Daisyfield Junction (Blackburn) to Hellfield railway line. The structure runs partly alongside Broad Lane, and consists of 48 arches, measuring approximately 620m in length. The viaduct is notably a dominate feature within the landscape and is considered to be the longest and largest viaduct in Lancashire.



The viaduct has previously undergone previous strengthening and maintenance works over the years, including arch strengthening and underpinning works to piers. The structure is considered to be the largest and most prominent engineering feature on the Ribble Valley Line.

The application site is located to the northern end of the viaduct, towards Whalley station. The application site lies between Broad Lane, which runs parallel with a section of the viaduct and a school playing field. The proposed works will involve arch 34 and the adjacent piers (33 & 34).

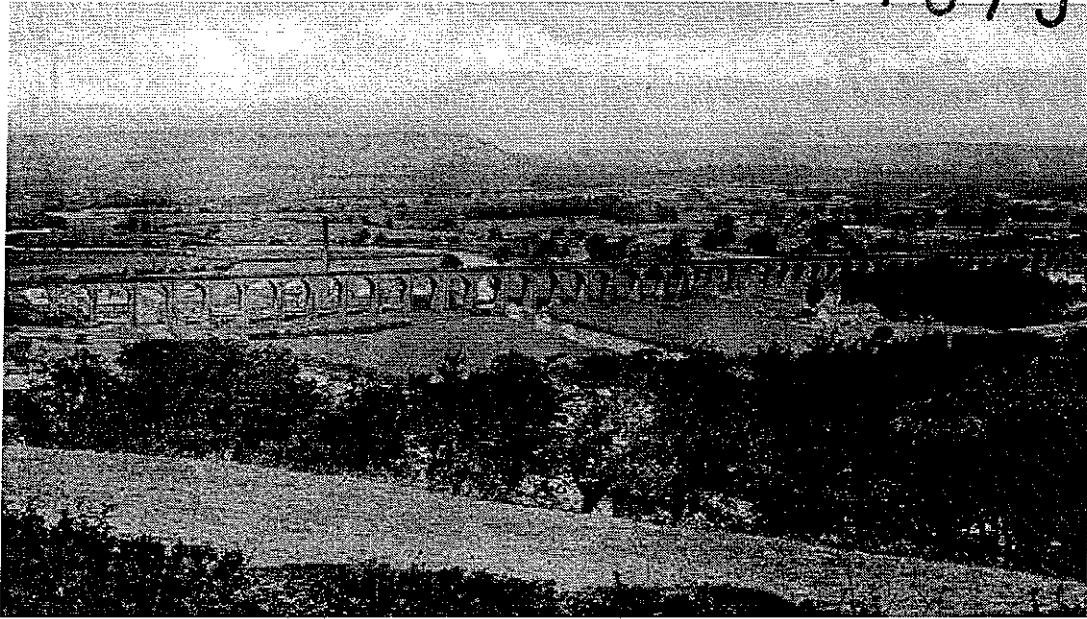


Historic Context

The structure, known locally as "Whalley Arches", was designated a Grade II listed structure in 1986. Over 7 million bricks and 12,338 cubic metres of stone were used in construction, with 3,000m of timber used for the arch centring, temporary platforms and the permanent foundation piles.

The structure was built between 1846 and 1850 for the Blackburn & Bolton Railway Company, in order to increase opportunities on the line. The company were struggling to keep their line open and to make it financially viable, as a result they decided that if the line was extended to the Ribble Valley this would open up the area to the industrial centres of Lancashire, creating opportunities for additional services and much needed traffic. Work began at once to take the line as far as Clitheroe. The line and Railway Company therefore became known as Bolton, Blackburn, Clitheroe and West Yorkshire Railway.

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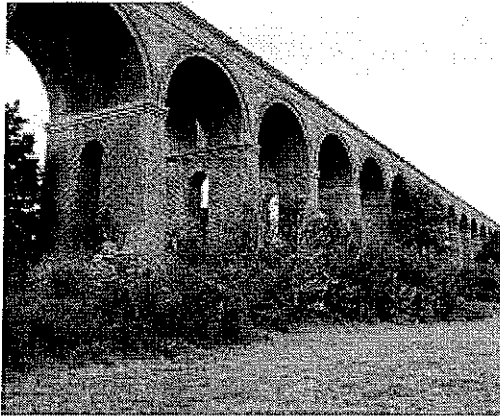


The viaduct was engineered by Terrance Wolfe Flanagan, and J Withers and provides an interesting feature within the landscape. The structure conveys some unusual characteristics in that the structure was unusually constructed of brick and that 2 arches have been filled in with a brick screen decorated with a large gothic arch, which astride the The Sands, which leads to Whalley Abbey via Broad Lane. Flanagan used Gothic elements here to try to harmonise the structure with the ruins of the nearby Abbey. It is considered that these unusual features of the structure contribute to the historical importance of the viaduct.

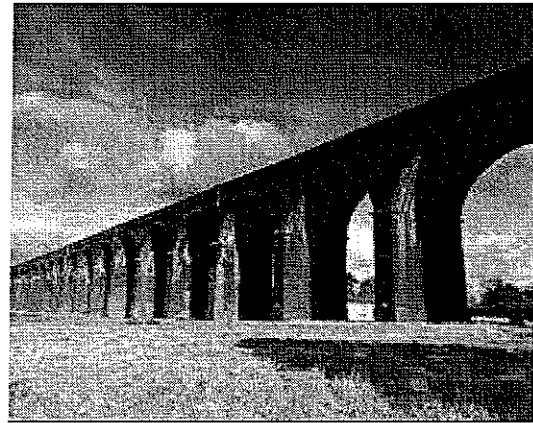


Whalley Viaduct 'gothic arches'

Although the viaduct demonstrates some architectural elements and holds significance for Lancashire it is not the only example of a brick built viaduct from the Victoria era of this scale. Stockport viaduct was constructed between 1839 – 1840 measuring 546m; Harringworth viaduct measures 1166m, constructed 1876-1879 and Chappel viaduct reaching 325m in length was constructed 1846-1848 (Examples below).



Chappel viaduct



Harringworth viaduct



Stockport viaduct

Justification for the proposed works

Defects within the structure have been evident throughout the history of the viaduct, with the first recorded strengthening works taking place in 1884. Assessments are undertaken of every structure within Network Rail's ownership to ensure the safe operation of the railway. During programmed maintenance works in 2010, significant defects to Span 34 were recorded, including the flattening to the west ring face of the arch barrel and a full width transverse crack.

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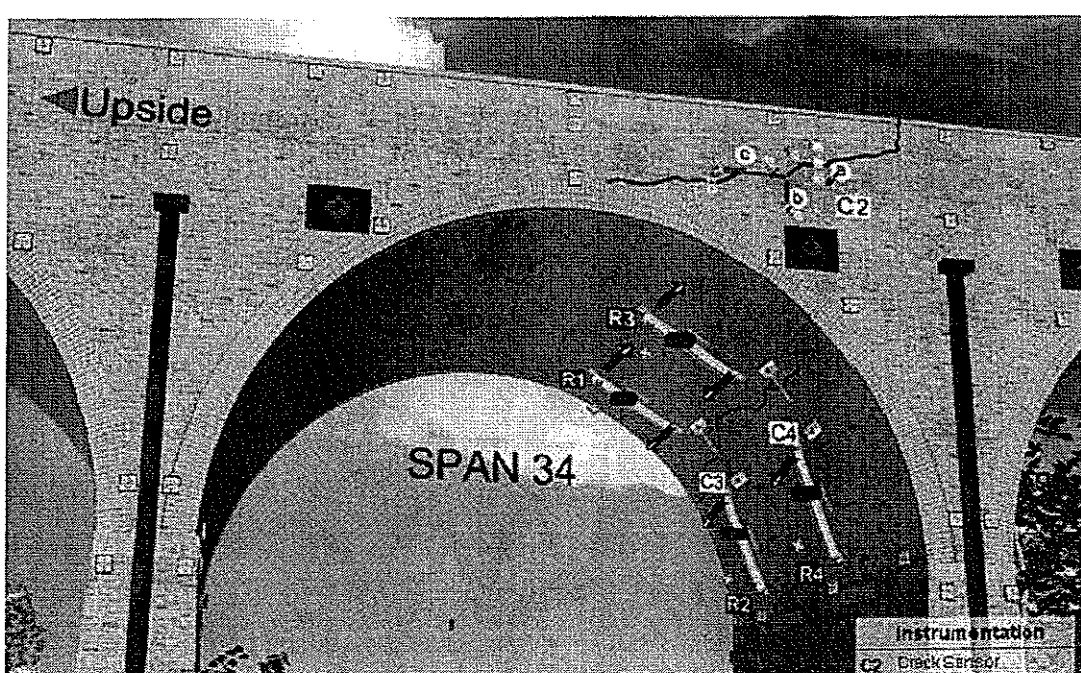
The bridge pier 34 has settled and that in turn has resulted in the cracks in span 34. The cracks widen when it rains hard and the settlement deepens and when it gets hot and the bridge expands. As a result, monitoring has been undertaken in order to ascertain a full understanding of the problem to provide a suitable solution. The level of monitoring on this arch is intensive, with alarms set to indicate any trigger movements. The monitoring system allows a level of control such that any movement, no matter how small, will be picked up and reported within minutes by the automated monitoring system.

The following processes have been used:

- Structural monitoring (installed and recorded by Datam Monitoring Ltd)
- Intrusive structural and geotechnical site investigation
- Interpretation of geotechnical site investigation
- Structural modelling using structural analysis computer software (LimitState: RING 3.0)

The monitoring equipment was attached to the arch barrel and the piers as well as within the ground. The results from the monitoring equipment have been recorded electronically, with Datam Monitoring Ltd providing fortnightly reports on the findings, and current condition of the arch and pier (examples of reports have been provided with this submission).

Over the last 6 months, up to 25mm (approx) of arch rotation has occurred. From the image (produced by Datum Monitoring) below it is evident that points R3 and R4 demonstrate a difference in moving, which if unrestricted would result in the arch folding over the pier.



Ground investigations revealed that the site is overlain by alluvium superficial (mainly sand and gravel) and glacial till superficial. Geological information indicates that these superficial strata overlie mudstone of the Bowland Shale Formation, indicating a layer of soft material underneath the site. Therefore, any strengthening works to the structure would need to be founded at Least 3.0mbgl or below the soft incompetent material. The investigations suggested that the high water table could be contributing to the dilapidation of the pier's timber foundations.

In order to maintain the functionality of the structure, it is acknowledged that strengthening works are required to arch 34 and the adjacent piers 33 and 34. Without these works the stability of the structure would be questionable and the need to stop rail services over this structure could be considered in the future if the trend continues to increase.

Proposed options

The analysis from the survey information supports the conclusion that the settlement of Pier 34 has caused the transverse crack/hinge in the arch barrel of Span 34. Readings recorded from the rotation sensors in the monitoring exercise indicated a longitudinal rotation of the arch barrel around the transverse crack trending with changes in ambient temperature and hence thermal expansion and contraction of the structure. When the temperature drops, so does the rotation, but full recovery is not apparent. This suggests that the capacity of the arch barrel may be compromised if only the works to rectify settlement of Pier 34 is addressed. It is considered that strengthening works to the arch barrel is undertaken in addition to the underpinning works.

A number of options were considered in order to strengthen the structure in this location. The options examined and considered for the underpinning included:

1. Bored piles and concrete encased steel pier support beams – involves the installation of concrete piles around the perimeter of the existing pier, with support beams across the span of the pier base.
2. Reinforced concrete raft foundation – involves the exaction of the layer of soft material from around and beneath the brickwork pier in stages and backfilling with concrete.
3. Jet Grouting – involves injecting grout under a high pressure into the strata beneath the existing pier foundation.

4. Raking piles – involves installing steel ground anchor piles drilled through the pier at specified angles into the ground.

During the assessment of the 4 options, a number of factors were considered, including the impact upon the structure and its listed status, the methodology of construction and the longevity of the solution. Option 2 was considered unsafe to implement and would compromise the overall support integrity of the temporary condition of the structure during the construction leading to the instability of the pier. In addition, this method would rely upon no further settlement and/or movement in the ground. Options 3 and 4 would have a similar issue, by making the existing pier support ineffective during construction and therefore resulting in the viaduct becoming unstable. In addition, with options 2, 3 and 4, risk of transitory instability can only be mitigated by introducing considerable temporary support to arches 33 and 34 in the form of a heavy structural tower propping system. Due to the size and geometry of such a support framework, it would result in the required positions to the base of pier 34 becoming inaccessible for construction traffic and processes required for the underpinning works, and therefore are not considered viable. Option 1 was considered the preferred option.

In order to strengthen the arch barrel the appropriate method is considered to insert a concrete ring to the intrados of the existing arch barrel. Previous maintenance works has included stitching and tie bars, this method was considered but this method was not considered practical on its own to resolve the problem.

An alternative option examined would be to install RAMARCH as a temporary or permanent solution. RAMARCH is a galvanised steel mesh with mesh spacing, which is pressed in a number of ways to produce a curved structure. A final spine wire can be fixed to the inner face to stiffen the arch mesh. Although RAMARCH can be used on the railway, this is generally for brick tunnels where a temporary support is required where bricks are held in place allowing the arch to continue to function and can still be inspected through it in the short term. It is a safe method for contractors to undertake work involving stitching and grouting through the mesh.

However, RAMARCH is not considered suitable for use under railway bridges/arches as it is not suitable to carry live loads. At Whalley viaduct, the cracks in the arch are starting to form a hinge mechanism, in this circumstance any further deterioration will result in the arch becoming structural inadequate. RAMARCH is not suitable in areas requiring severe structural support

The existing arch is rotating about a hinge created by the settlement of Pier 34. Where masonry ties and reinforcements are used to hold the concrete lining in place, the dead load of the lining may be carried by the original arch which could lead to failure. Also the condition of the existing barrel would be difficult to check in the future following the addition of a new concrete ring. As a result the proposed design of the lining should be as a fully structural arch, where the existing becomes redundant.

As a result of the concrete arch, there will be an additional dead load on the piers (33 & 34). Preliminary calculations show that the works would result in an 8.7% increase over the existing dead load. This therefore justifies the strengthening works to pier 33.

Proposal

In order to strengthen this location on Whalley viaduct Network Rail intend to undertake works to Arch 34 and Piers 33 and 34. The proposal includes the installation of a bored piled foundation, which will underpin the existing timber foundations at the base of the brickwork piers (33 & 34) and the installation of a concrete lining (under ring) to the arch barrel to arch 34.

The proposed underpinning works involves the installation of bored concrete piles around the perimeter of the existing pier extending into the mudstone strata below, to a depth of approximately 15m in order to provide solid bedding. The piles will be 600mm in diameter and positioned at 1.2m intervals over an area of approximately 47.38 sq m around the brickwork pier. The load of the pier will then be transferred onto the piles via a series of hot rolled steel beams inserted through the brickwork (in the direction of the span) close to the existing ground level at the base of the pier and cased in concrete to form a support (plan ref: JY287/AIP/002).

The proposed concrete arch will be 450mm thick and will span the full width of the arch. In order to blend in with the existing brickwork, it is intended to face to elevation sections of the proposed arch in brick to match the viaduct. A stonework springer feature and corbelled brickwork detail are proposed to provide a support for the proposed lining and connection to the existing viaduct (plan ref: JY287/AIP/002).

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Assessment against relevant planning policy

The relevant planning policy document for the area includes the adopted Ribble Valley Local Plan. Policies ENV16 and ENV19 provides guidance relating to the preservation, conservation and enhancement of the designated Conservation Area and the protection of nationally designated Listed Buildings. The guidance contained with the Whalley Conservation Area appraisal should also be taken into consideration.

These policies should be read in conjunction with the relevant National Planning Policy Statements, PPS1 'Delivering sustainable development' and PPS5 'Planning for the historic environment'.

Network Rail understands the importance of approaching works within heritage areas with care, to ensure that the proposal would not detract from the character of the Conservation Area

The guidance set out in PPS5: HE7.4 states that when determining applications effecting heritage assets Local Planning Authorities should take into account the desirability of sustaining and enhancing the significance of heritage assets, and of utilising their positive role in place shaping; and the positive contribution that conservation of heritage assets and the historic environment can make to the establishment and maintenance of sustainable communities and economic vitality.

Policy HE7.2 states that in considering the impact of a proposal on any heritage asset, Local Planning Authorities should take into account the particular nature of the significance of the heritage asset and the value that it holds for this and future generations. This understanding should be used by the Local Planning Authority to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposals.

Policy HE10 1 states that when considering applications for development that affect the setting of a heritage asset, the local planning authorities should treat favourably applications that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset.

The above policies place significance on both preserving and enhancing heritage assets and ensuring that future work will not be detrimental to the significance of the listed building or the character of Conservation Area.

The significance of the viaduct falls within a number of elements; the scale and prominence within the landscape promotes the grandeur of the structure, whilst the use of brick conveys its interest within an area constructed predominately of limestone and sandstone. The unusual gothic arches are probably its most interesting element as the only architectural detailing upon this simple (appearance) structure. These gothic arches connect the viaduct to the nearby Whalley Abbey, with gothic influences also echoed within the settlement itself. In addition, importance could be added to the contribution the viaduct had in respect of the industrial growth and import/exportation of goods in Ribble Valley, as this was the primary reason for its original construction.

Network Rail have considered a number of options to ensure that the structural stability and continued use of the viaduct is retained, whilst respecting its interest as a heritage asset. The proposed works involve the installation of bored piled foundations (underpinning) and the installation of a concrete lining to the arch barrel. It is considered that the proposal aims to respect the historical importance of the structure whilst maintaining the future use.

The application site lies towards the northern end of the viaduct, and would not interrupt the important views into and out of the conservation area, as highlighted within the Conservation Area Appraisal map (Revised). Although the viaduct provides a prominent feature within the landscape, this section has obscured views due to surrounding development and vegetation which partly 'break up' its dominance (particularly from the west). The location of the works are also viewed independently from the gothic infill arches which astride The Sands, and will therefore not directly impact upon this architectural feature and the intended connection with the ruins of the Abbey.

The proposed work to the arch will have some visual impact upon the listed viaduct. In order to mitigate this impact, Network Rail have proposed to 'face' the western and eastern elevation of the lining addition with bricks to match the existing material, with additional detailing to the springer stone and corbelled brickwork. Alternative options were considered but did not provide the same structural support as the proposal. It is considered that the proposed structural arch will aim to preserve the character of the structure and ensure its continued use as a railway viaduct.

The proposed underpinning will not result in a visual alteration to the structure, all works and 'development' will take place under ground and will provide the necessary stability pier 33 and pier 34 require. Although the proposal requires rods to be drilled through the base of the piers, this will be undertaken underground and will not visually harm the listed structure. This method of underpinning aims to minimise the impact upon the structure and its setting, ensuring the preservation of the heritage asset and will retain the original timber piled foundations intact, which a method demonstrate Victorian engineering.

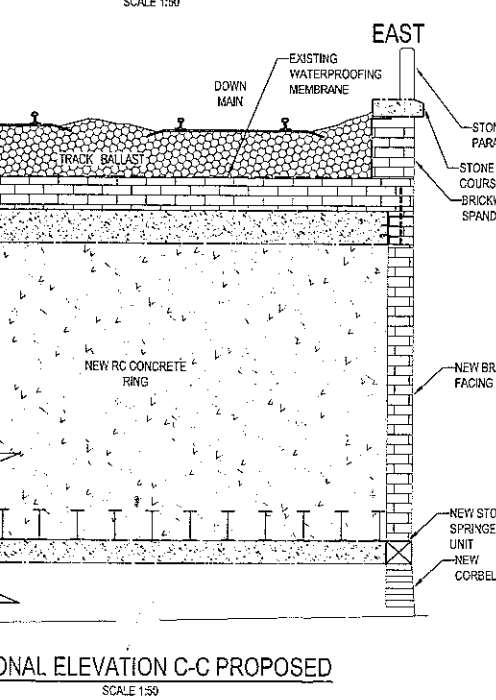
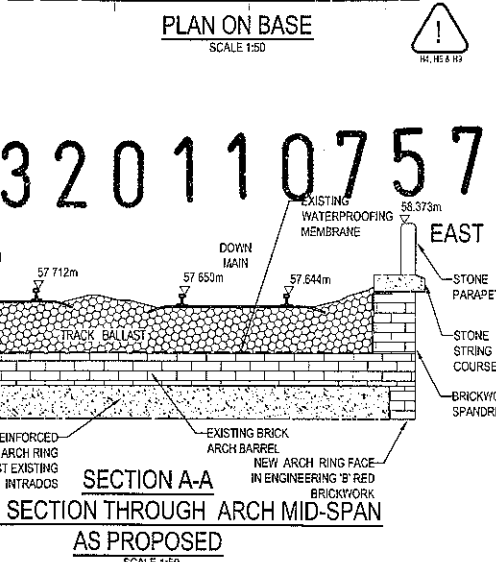
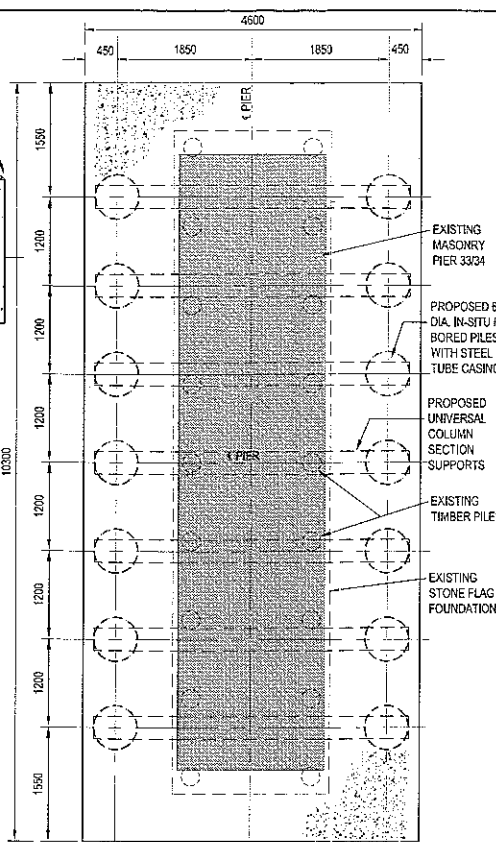
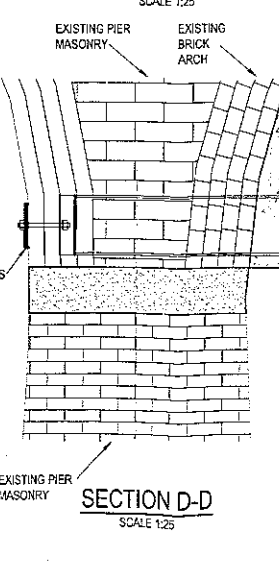
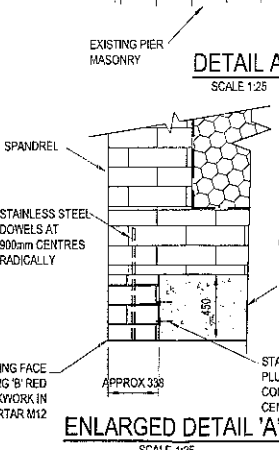
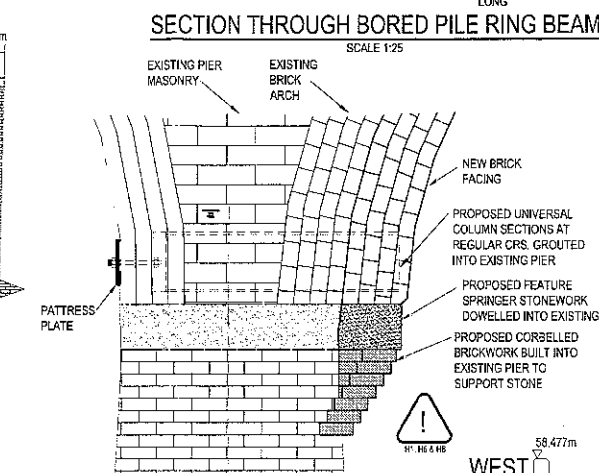
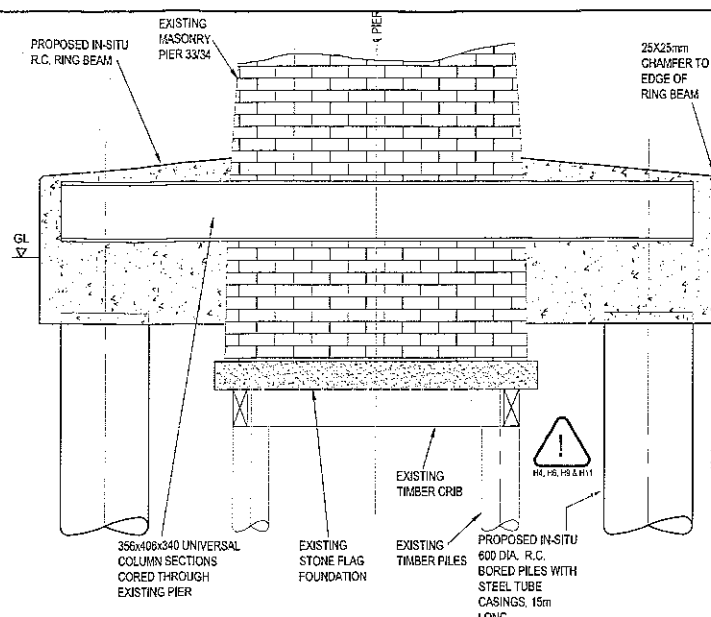
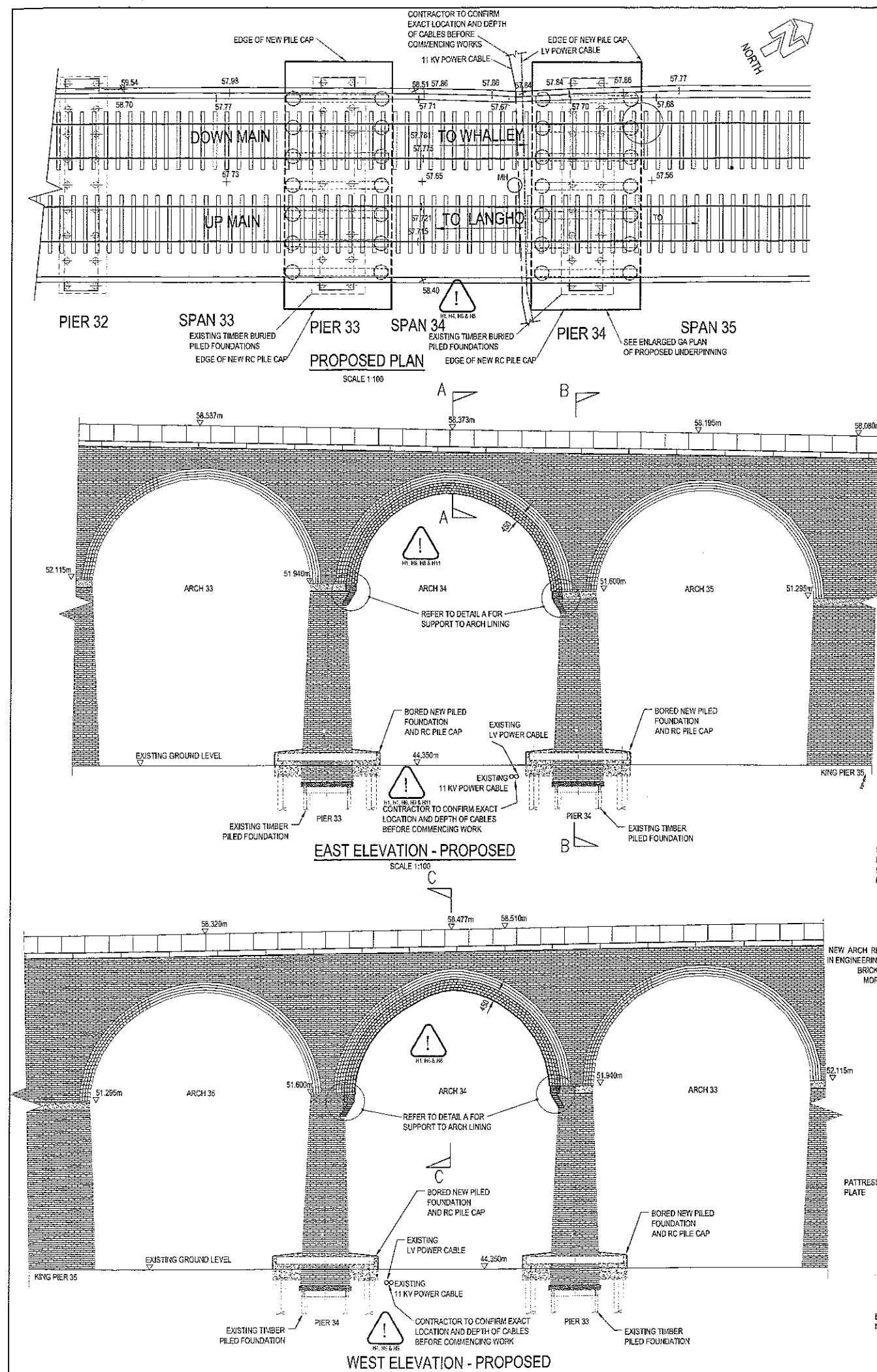
It is considered that the proposed works to Whalley viaduct will help to preserve the structure, which is referred to as a notable feature of Whalley's character within the Whalley Conservation Area Appraisal and ensure its continued use as a part of railway infrastructure. The proposal will not result in significant visual harm to the structure and will not influence the gothic arches, which are considered to contribute to the special interest of the viaduct.

Conclusion

The proposal considers national and local planning legislation to provide a suitable justification for the alterations/ repairs to Whalley viaduct. The proposed works will provide increased stability to piers 33/34 and arch 34, which will enable the continued safe running of the railway.

Taking into account the above policy guidance and the assessment of the proposed work above it is considered that the works would not significantly detract from the historic character or significance of the Listed Building.

It is therefore considered that this application should represent an acceptable proposal in terms of design, access and impact on the heritage assets.



- NOTES:**
1. ALL DIMENSIONS IN MILLIMETERS UNLESS STATED OTHERWISE.
 2. ALL LEVELS ARE IN METRES AND RELATE TO ORDNANCE DATUM UNLESS STATED OTHERWISE.
 3. ALL WORKS IN ACCORDANCE WITH NETWORK RAIL MODEL CLAUSES FOR SPECIFYING CIVIL ENGINEERING WORKS NR/L3/CIV/140.
 4. TOPOGRAPHICAL SURVEY INFORMATION WITHIN THIS DRAWING HAS BEEN PROVIDED BY DATUM MONITORING LTD.
 5. THIS DRAWING TO BE READ IN CONJUNCTION WITH JY287/AIP/001.
 6. CONCRETE: CONCRETE FOR FOUNDATION AND THE NEW ARCH TO BE STRENGTH CLASS C40/50 IN ACCORDANCE WITH BS5500-1:2005.
 7. MINIMUM COVER TO ALL REINFORCEMENT TO 50mm UNLESS NOTED OTHERWISE.
 8. CONCRETE FINISHES TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS AS FOLLOWS: BURIED FORMED CONCRETE - F2 UNFORMED TOP SURFACES - F2 FORMED CONCRETE - F3
 9. ALL BURIED CONCRETE SURFACES TO RECEIVE 2 COATS OF RUBBERISED BITUMINOUS EMULSION BY GECOL OR SIMILAR.
 10. BLINDING CONCRETE TO BE GRADE ST1
 11. ALL REINFORCEMENT SHALL BE GRADE ST1
 12. ALL STRUCTURAL STEELWORK SHALL BE STEEL GRADE S355 TO BS EN 10025:2004.
 13. ALL STRUCTURAL STEELWORK SHALL BE GALVANISED IN ACCORDANCE WITH BS EN ISO 1461:2009.
 14. ALL NEW MASONRY SHALL BE CLASS B RED ENGINEERING BRICKS TO BS EN 771 IN MORTAR CLASS M12 TO BS EN 1996-1-1:2005.
 15. PREPARATION OF SURFACES PRIOR TO CONCRETING: ALL LOOSE MATERIAL AND CONTAMINATION SUCH AS DISCOLOURATION, STAINING, PAINT, ENCRUSTATION AND VEGETATION ETC. SHALL BE CLEANED FROM THE FACES OF BRICKWORK INCLUDING JOINTS PRIOR TO CONCRETING.
 16. TEST PILE TO BE TESTED BY STATIC LOAD TESTING AND CORRELATED WITH DYNAMIC LOAD TESTING APPARATUS THEREBY ALLOWING DYNAMIC TESTING TO BE CARRIED OUT ON WORKING PILES.

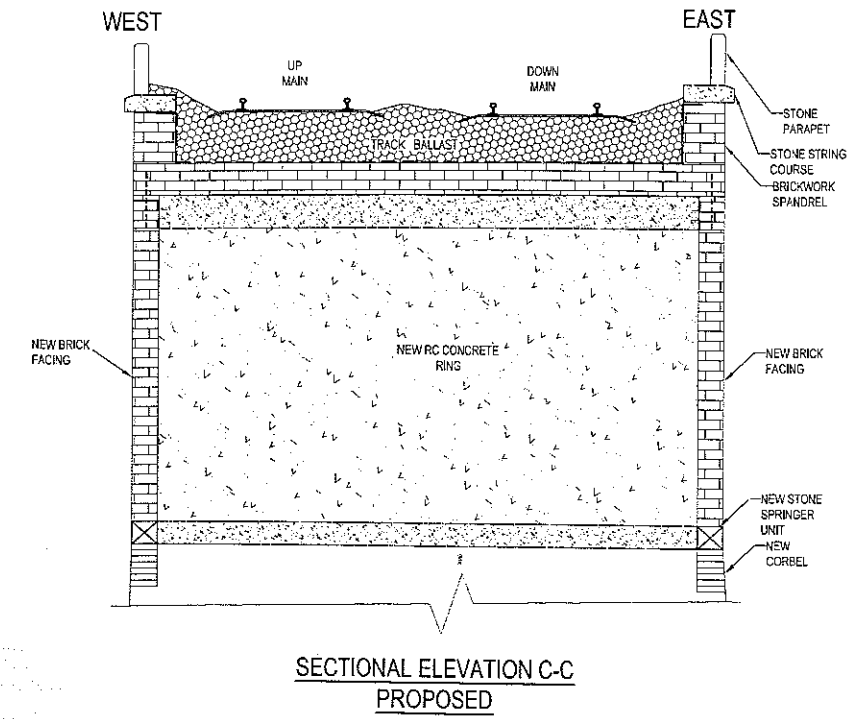
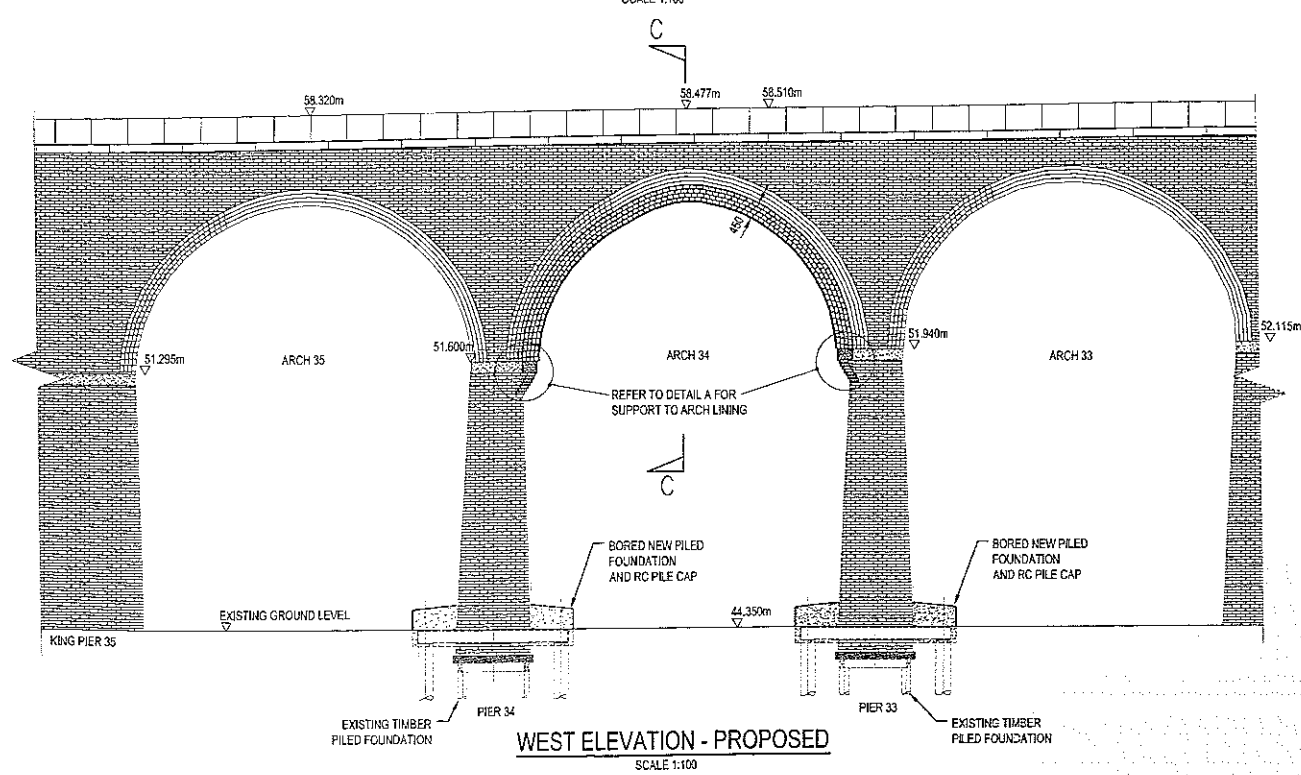
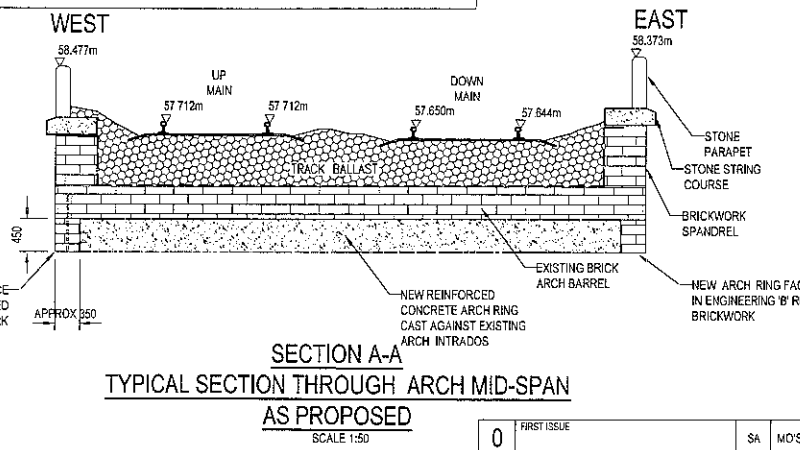
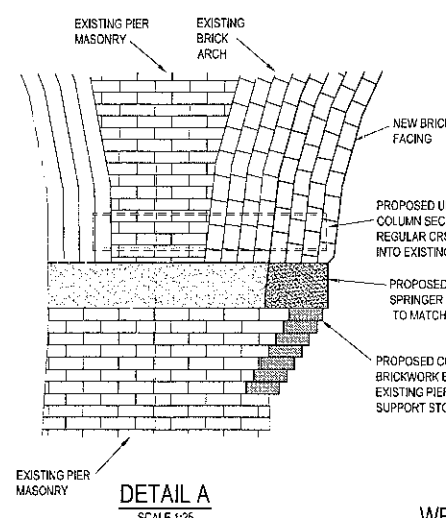
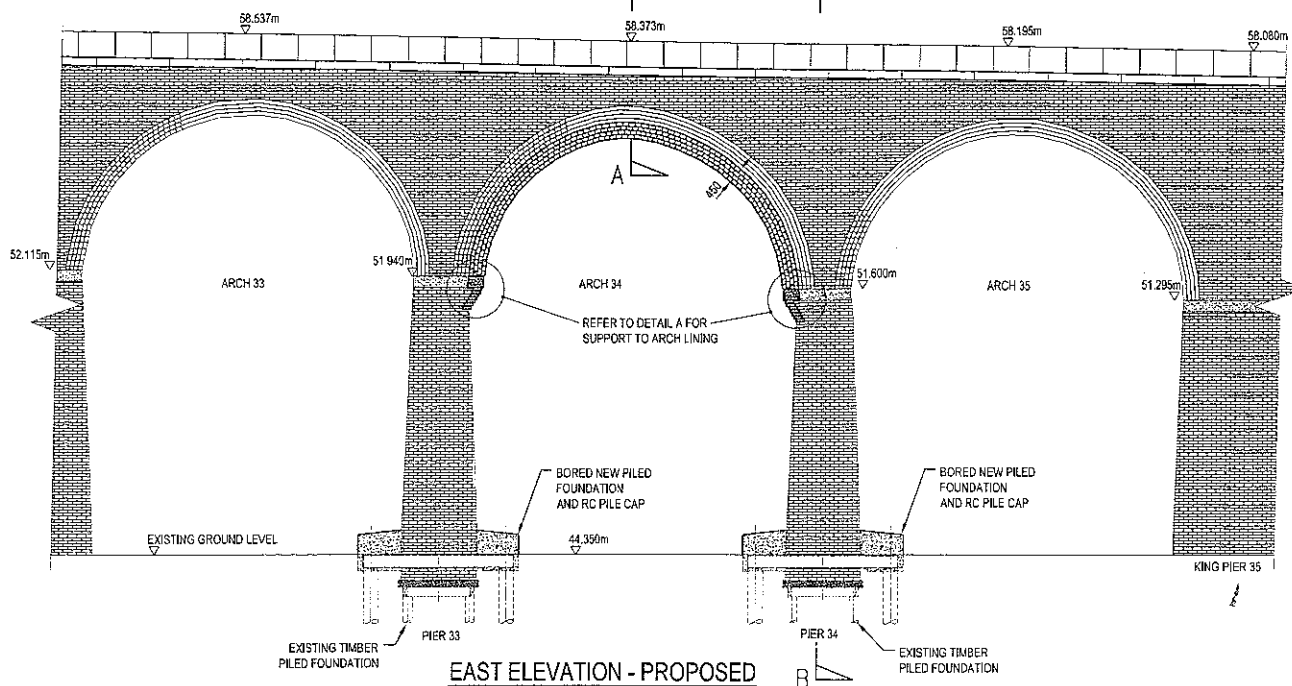
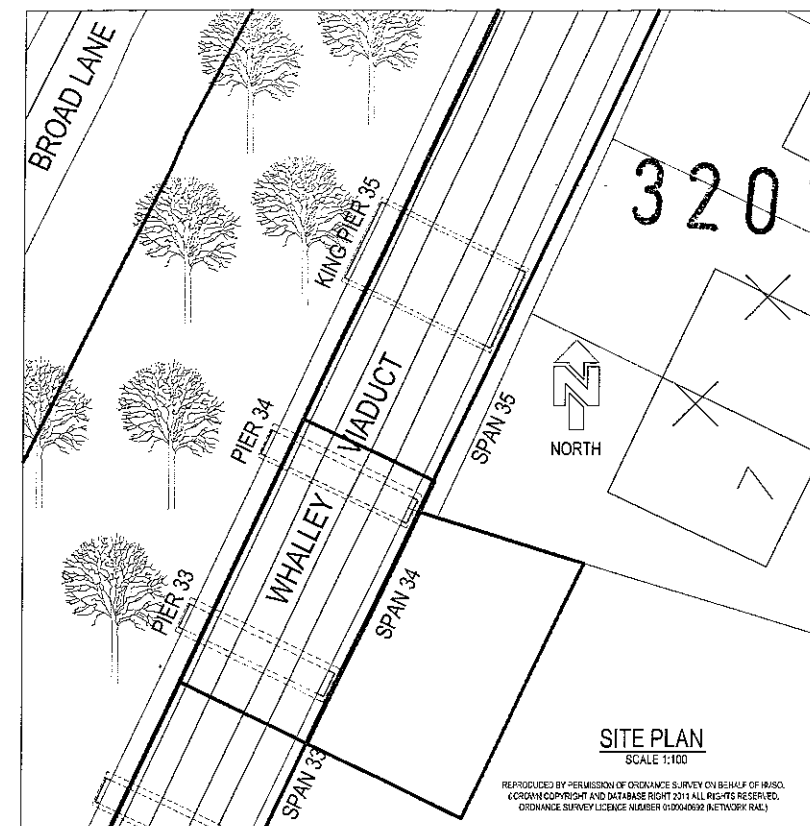
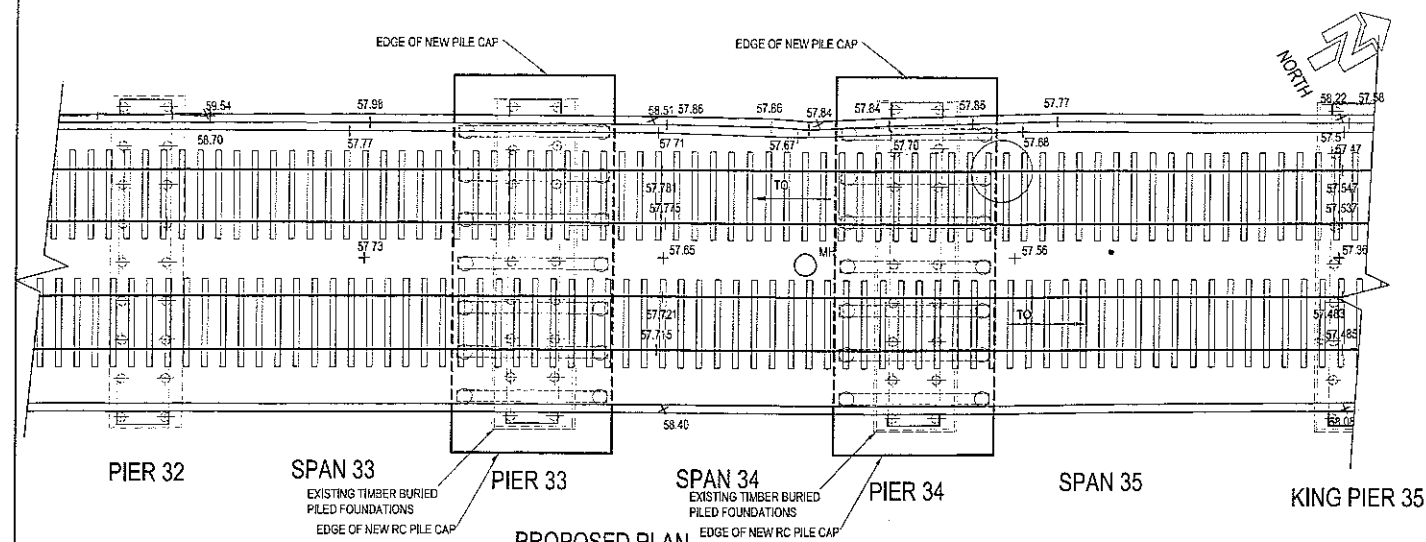
SIGNIFICANT DESIGNER'S IDENTIFIED HAZARDS	
H1	WORKING AT HEIGHTS
H2	11 KV POWER CABLE
H3	CONCRETE AND STEELWORKS MANUAL HANDLING
H4	DISMANTLING WORKS
H5	PILING
H6	PILING RIG
H7	STEELWORK

FOR MORE DETAILED INFORMATION ON THE HIGH IDENTIFIED HAZARDS, REFER TO DONALDSON ASSOCIATES LTD DESIGNER'S RISK ASSESSMENT FOR THIS PROJECT

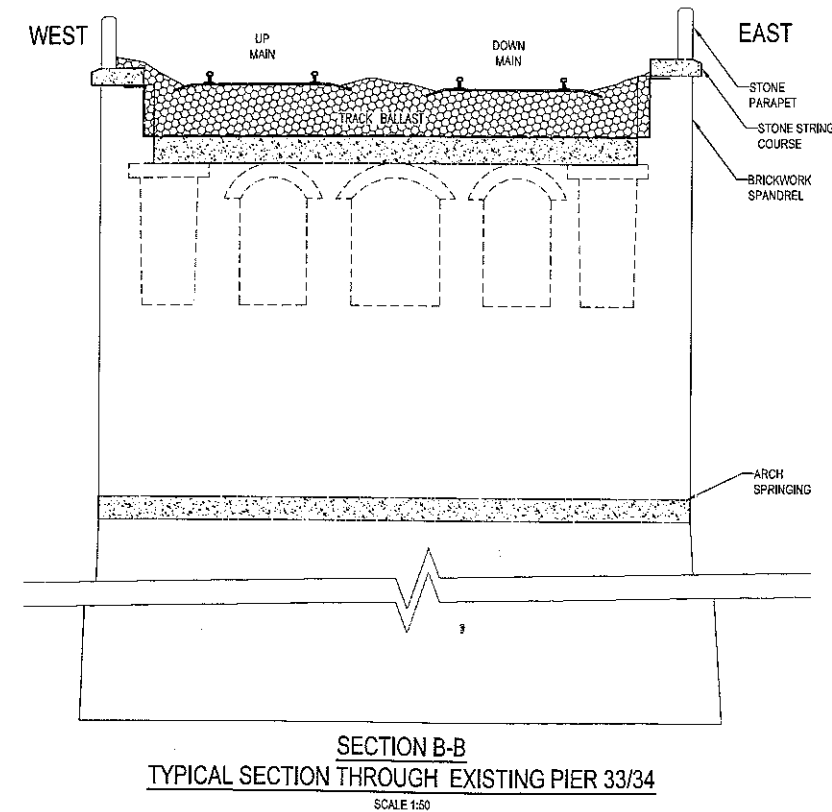
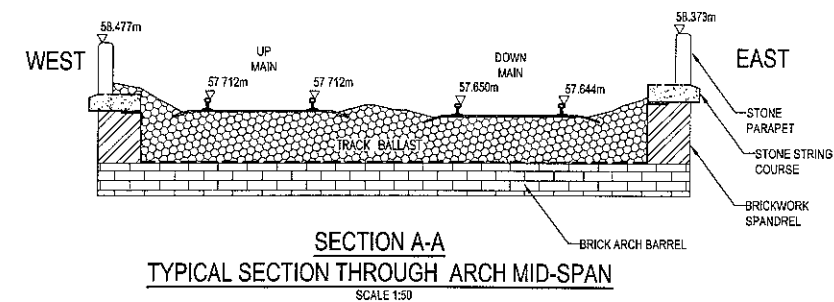
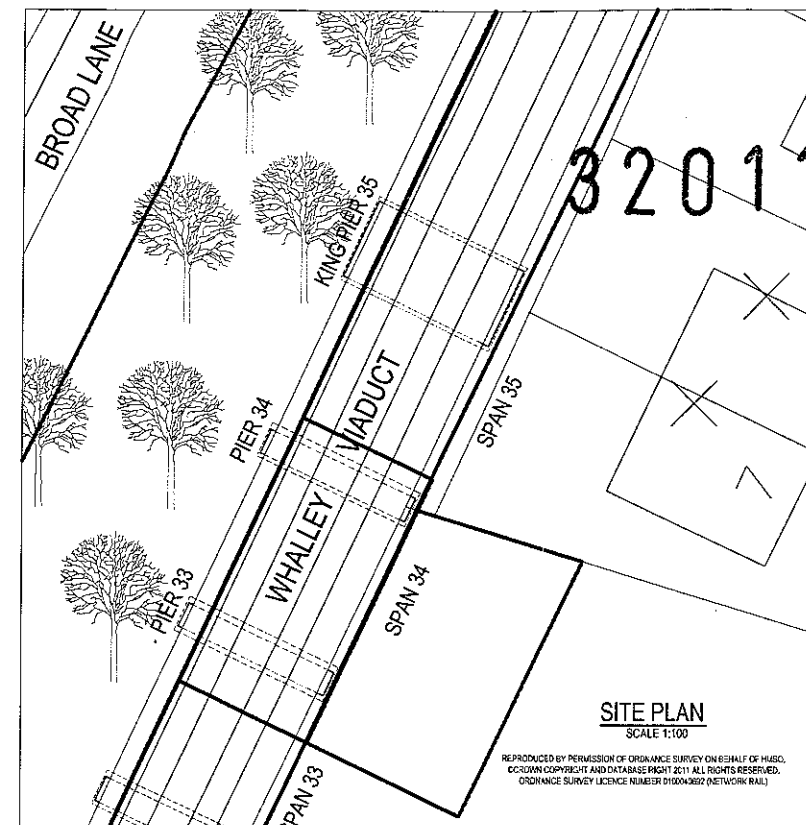
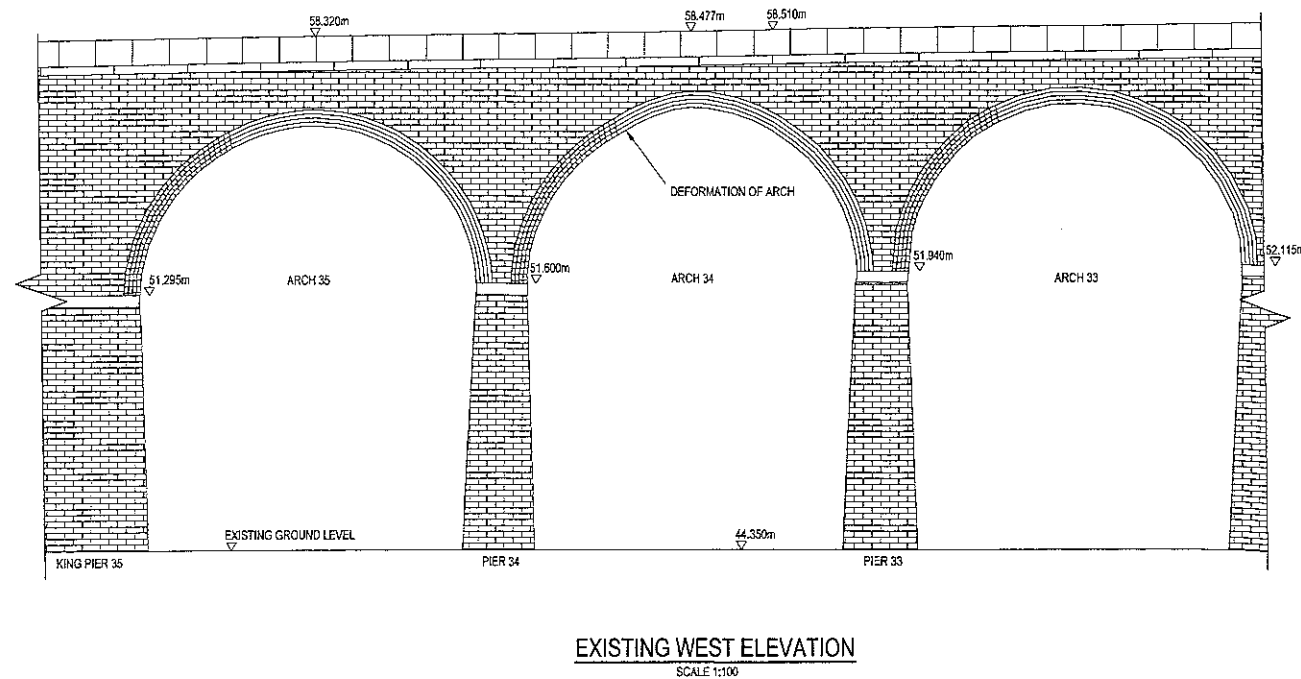
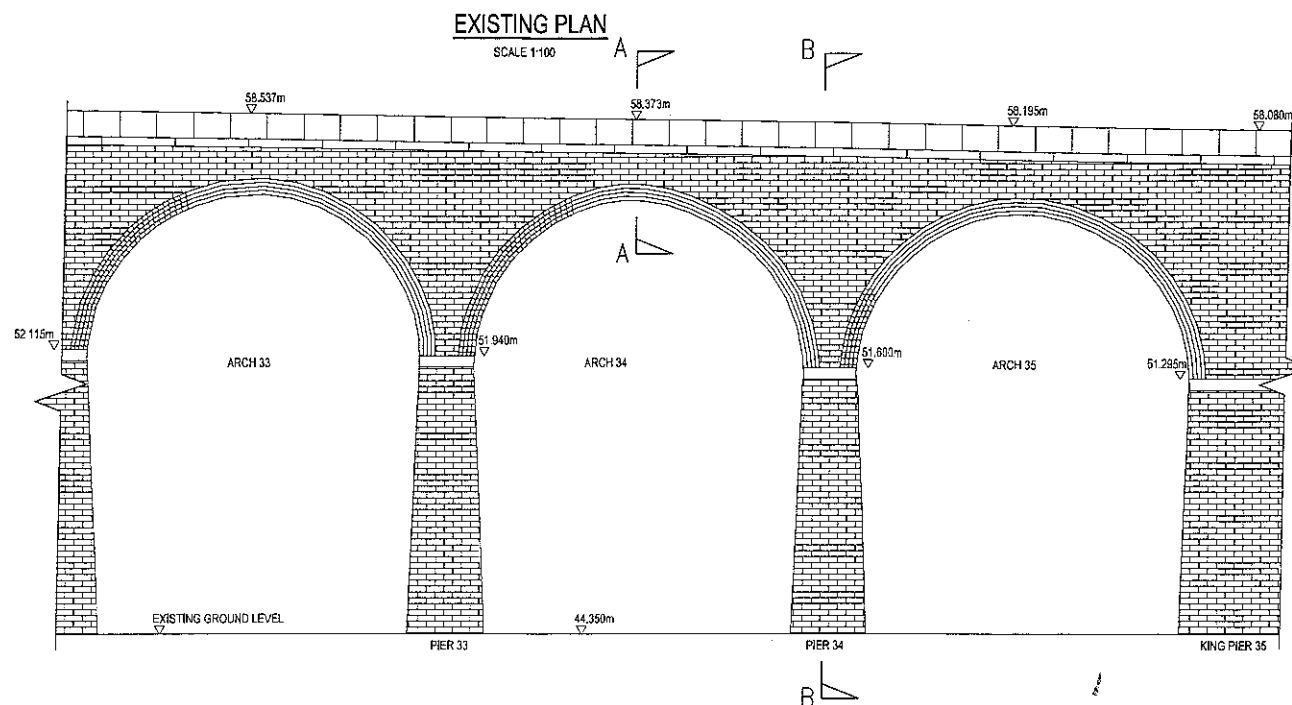
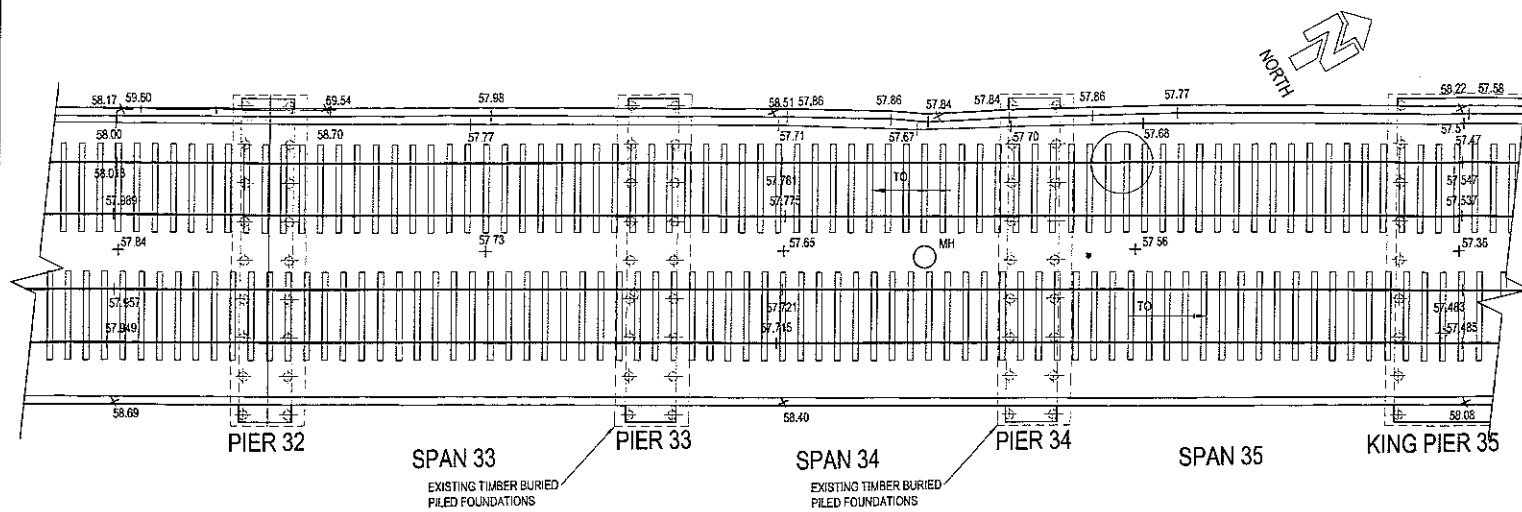
EVERYDAY LOW RISK HAZARDS AND THOSE HAZARDS WHICH SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING

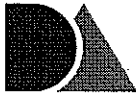
SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED DURING THE COURSE OF THE WORKS, THE CONTRACTOR SHALL NOTIFY ALL RELEVANT MEMBERS OF THE PROJECT TEAM

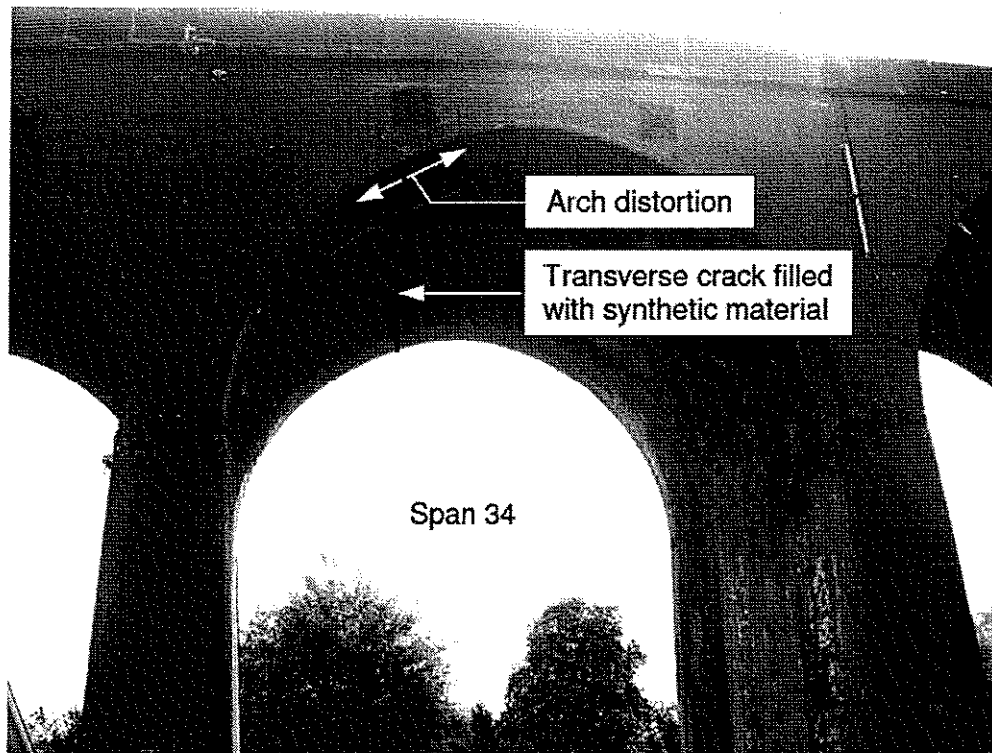
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Status:	FOR FORM A APPROVAL				
Client:	 Swindon House Unit 5, Station Business Park Higate Park Drive York, YO26 4GB Tel: 01904 790500 Fax: 01904 790105 E-Mail: york@donaldsonassociates.com Website: www.donaldsonassociates.com				
Project:	WHALLEY VIADUCT DJH/41 SPAN 34 STRENGTHENING				
Title:	PROPOSED GENERAL ARRANGEMENT & DETAILS				
Drawn by:	SA	Designed by:	MO'S	Checked:	PH
Date:	AUG 11	Original Sheet Size:	A1	Approved:	PH
Scales:	AS SHOWN				
Drawing No:	JY287/AIP/002				Revision
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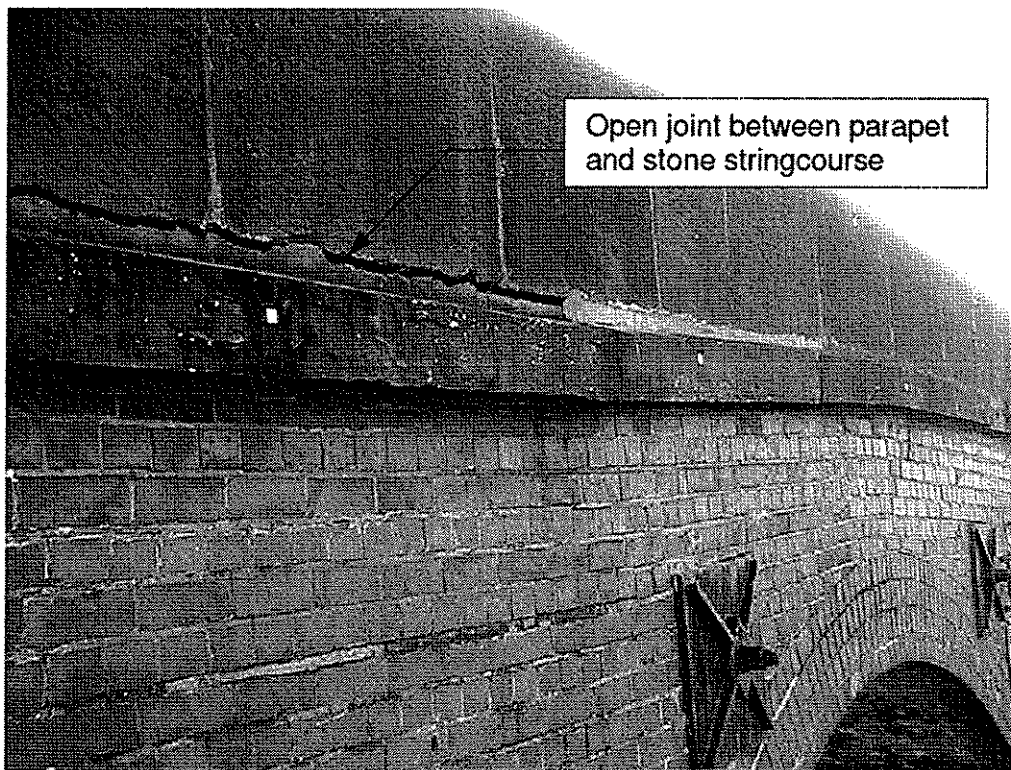
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 Swire House Unit 5, Station Business Park Holgate Park Drive York YO26 4GB Tel: 01304 795860 Fax: 01304 790108 E-Mail: york@donaldsonassociates.com Website: www.donaldsonassociates.com					
Client:					
 					
Project:					
WHALLEY VIADUCT DJH41 SPAN/PIER 34/33					
Title:					
PROPOSED STRENGTHENING SPAN/PIER 34/33					
Drawn by: SA		Designed by: MO'S		Checked: PH	
Date: AUG 11		Original Sheet Size: A1		Approved: PH	
Scales: AS SHOWN					
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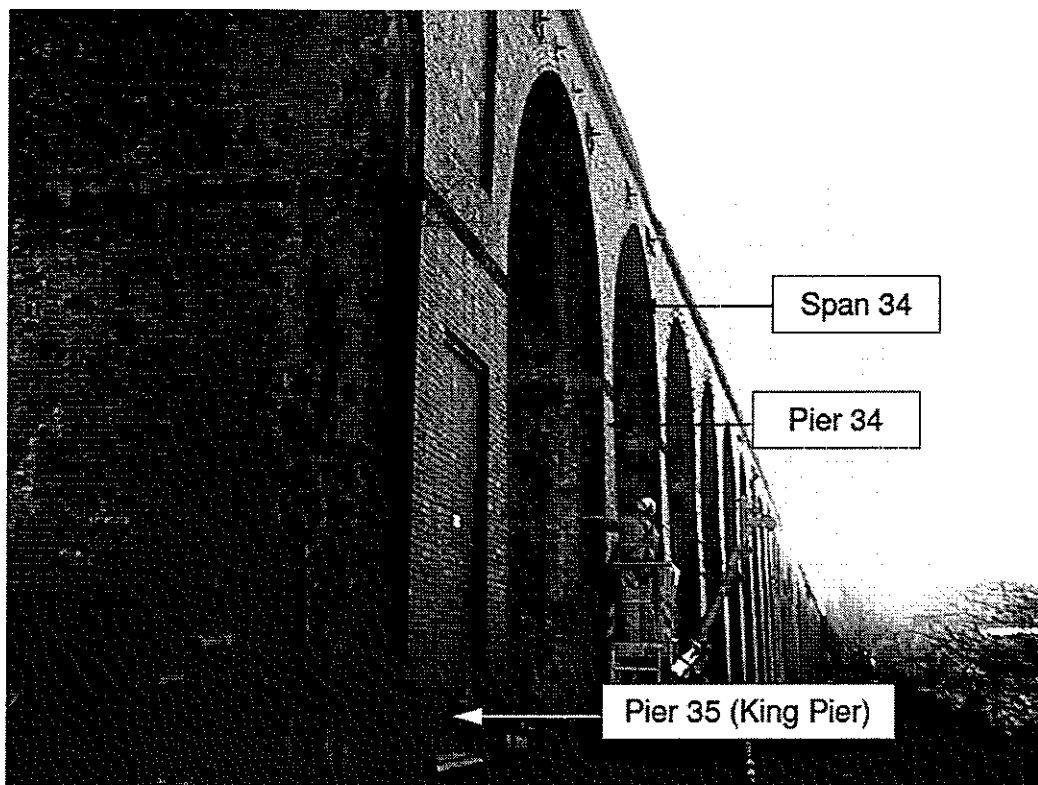
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 DONALDSON ASSOCIATES Swinson House Unit 5, Station Business Park Holgate Park Drive York, YO26 4GB Tel: 01904 786960 Fax: 01904 790106 E-Mail: york@donaldsonassociates.com Website: www.donaldsonassociates.com					
Client:  					
Project: WHALLEY VIADUCT DJH/41 SPAN/PIER 34/33					
Title: EXISTING DETAILS OF SPAN/PIER 34/33					
Drawn by: SA		Designed by: MO'S		Checked: PH	
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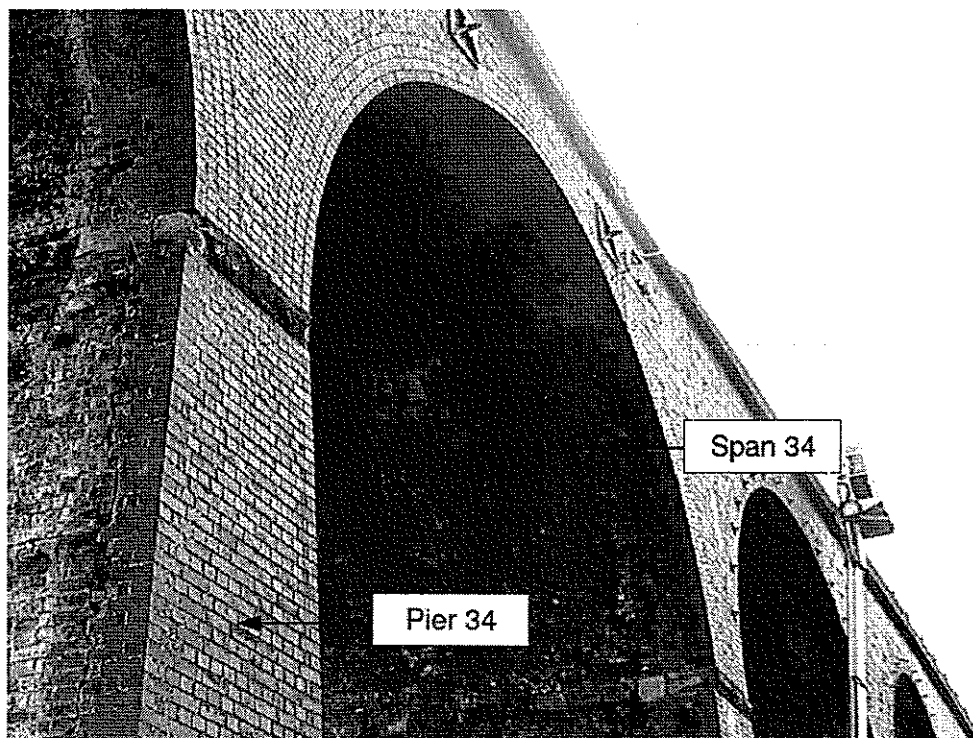
Photograph 3 – West elevation (Down Side), arch distortion and transverse cracking



Photograph 4 – West elevation, spandrel, stringcourse and parapet forced upward over arch barrel to span 34



Photograph 1 – West elevation, looking south

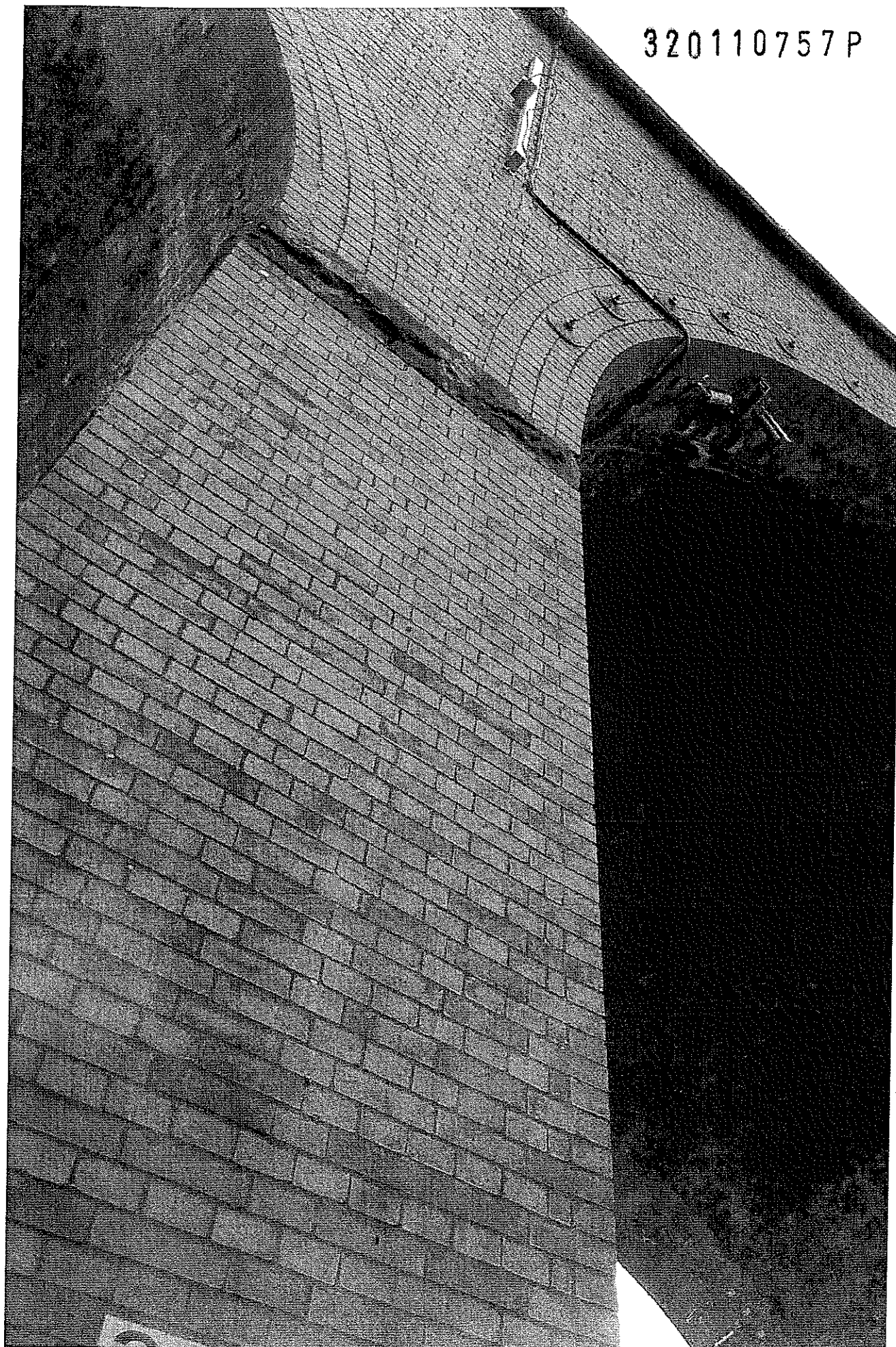


Photograph 2 – West elevation, Span 34

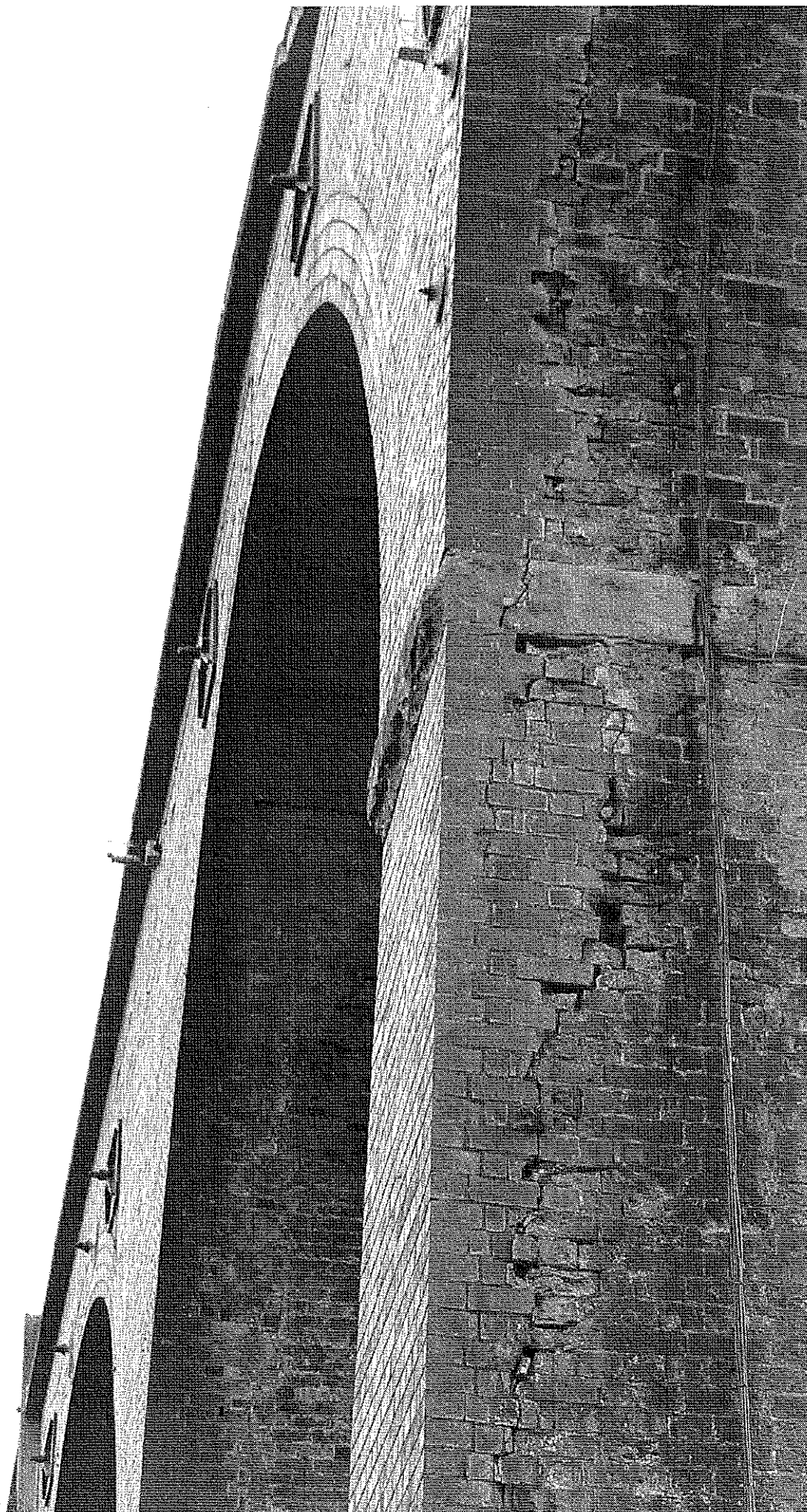
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