DESIGN AND ACCESS STATEMENT IN SUPPORT OF PROPOSED CORE HOLES AND BRICK MORTAR TESTING TO MANCHESTER SOUTH JUNCTION AND ALTRINCHAM RAILWAY VIADUCT

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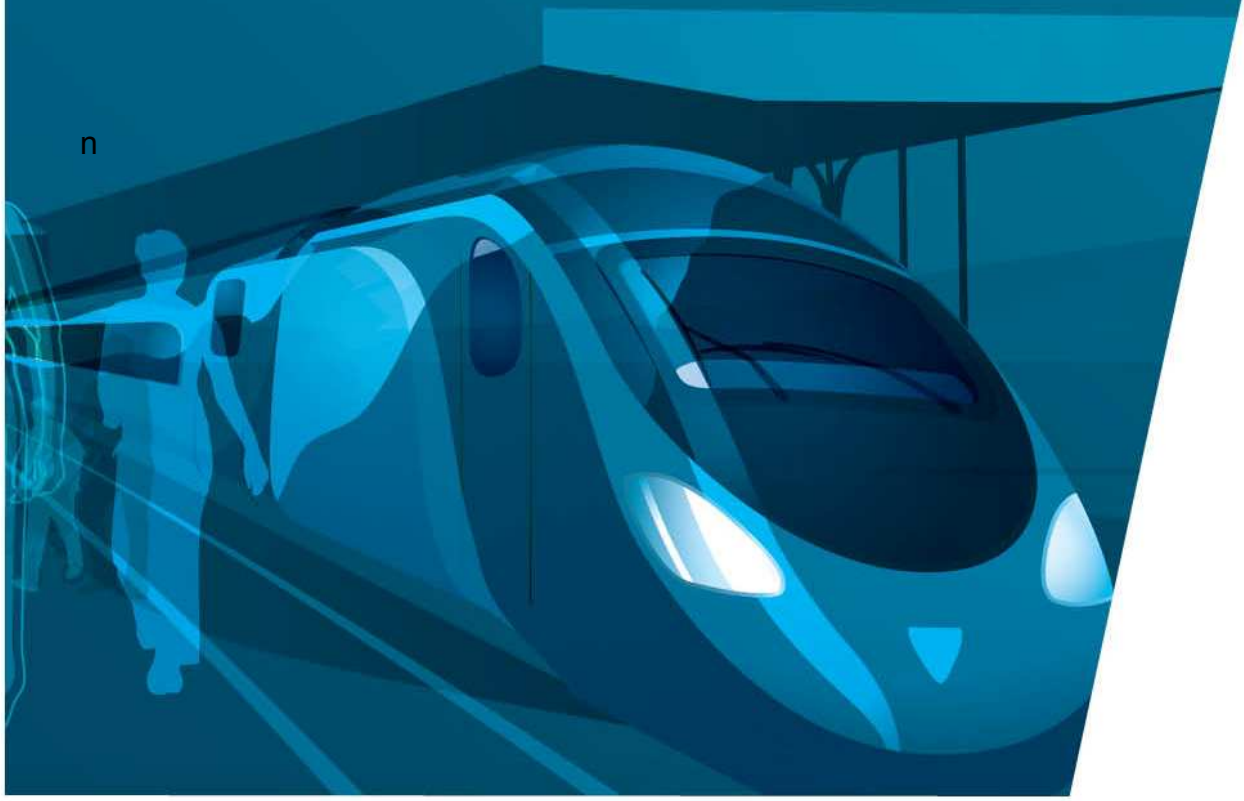

Introduction

This document is intended to outline the programme of works proposed to be undertaken to a section of the Manchester South Junction and Altrincham Railway Viaduct within the Castlefield area. This involves undertaking coring and surveying works at a number of locations within the viaduct structure. This is required to inform the ongoing detailed design and construction methodology for the Ordsall Chord. The Ordsall Chord is a new two track railway, which would run on a combination of new and existing bridges and viaducts to provide a rail connection between the existing Middlewood L&MR Viaduct and the Castlefield MSJ&AR Viaduct.

Consent has previously been granted for a scheme of core holes and brick mortar testing to the viaduct, through application 104159/LO/2013/C1 which was granted LBC on 18 December 2013. The current scheme seeks to expand the scale of investigation/exploratory work at the viaduct, over and above that proposed in the previously consent.

The scope of investigation works also extends to the adjacent Stephenson Bridge and 'Zig Zag' viaduct and separate applications for LBC have recently been submitted in respect of these works.

The 'proposals' section below explains the works in further detail, setting out the rationale and justification for the scheme. This will also include analysis of the proposals' heritage implications to satisfy the requirements of the National Planning Policy Framework.

Planning Policy

Relevant National and Local planning policy is outlined below:

National Planning Policy Framework

The NPPF was published in March 2012 and established the Government's vision for planning to help achieve sustainable development. Central to this is that economic, social and environmental gains should be sought through the planning system. The NPPF's approach to Heritage is fundamentally unchanged from that of PPS5, in that there is still a focus on the identification of 'heritage assets', outlining their 'significance' and considering any impact upon that significance as a consequence of any proposed works.

NPPF paragraph 128 establishes the information requirements for an application for consent affecting a heritage asset. Local Planning Authorities (LPAs) should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance.

Paragraph 129 details the policy principles that should guide LPAs in determining applications in relation to heritage assets. It states that in considering the impact of a proposal on any heritage asset, Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.

When determining applications, LPAs should take account of (paragraph 131):

- the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
- the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality;
- the desirability of new development making a positive contribution to local character and distinctiveness.

Paragraph 132 states that when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation.

Manchester Core Strategy

When developing the proposals, regarding was had to the policies within the Manchester Core Strategy, including the following:

Policy EN 3 - Heritage
Throughout the City, the Council will encourage development that complements and takes advantage of the distinct historic and heritage features of its districts and neighbourhoods, including those of the City Centre

Policy EC 1 - Employment and Economic Growth in Manchester (supporting text)
Ensuring access to job opportunities via sustainable transport such as walking and cycling, and public transport, such as bus routes, Metrolink and heavy rail is vital to improving the quality of life of residents through job opportunities, raising residents' wages and thereby increasing wealth

Policy T 1 -Sustainable Transport
To deliver a sustainable, high quality, integrated transport system the Council will support proposals that: - Contribute to improvements to the extent and reliability of the public transport network

Policy EN 1 -Design Principles and Strategic Character Areas
Developers will be expected to consider the City's heritage and continue the rich pattern of activity in the core area

Significance of Heritage Asset

The requirement for applicants proposing to undertake works to heritage assets to describe the significance of the heritage asset affected is set out in the NPPF. Guidance to assist with assessing the asset's significance is provided in the PPS5 Practice Guide. Notwithstanding the fact that PPS5 was deleted following the publication of the NPPF, the associated Practice Guide remains a valid and Government endorsed document. Paragraph 54 of this document states *'being able to properly assess the nature, extent and importance of the significance of a heritage asset and the contribution of its setting is very important to an applicant in order to conceive of and design a successful development and to the local planning authority in order to make decisions in line with the objectives of the PPS and the development plan'*. When evaluating the existing significance of an asset, the Guide recommends assessing the nature of significance, extent of fabric and level of importance. These are all considered below.

Nature of Significance

It is apparent that the viaduct possesses significance due to its historical and aesthetic value and also as a consequence of its grouping with, and relationship with, other heritage assets in proximity to it.

- *Historic Value*

The English Heritage document *'Designation Listing Selection Guide: Transport Buildings'* (2011) is of particular importance when assessing the historic value associated with railway infrastructure. This sets out four 'ages' of railway construction which, in descending importance, is as below:

- The pioneering first phase, 1825–41;
- The heroic age, 1841–50;
- The third phase 1850s–1870s, the consolidation of the network; and
- The fourth period, up to 1914, the completion of the network.

Given the construction date of circa 1846-9, it is apparent the viaduct stems from the 'heroic phase' of railway construction. The viaduct displays historic significance as a consequence of the role it played in the development of Castlefield and, more broadly, Manchester as a transportation hub. The Castlefield area has had a significant history as a crucially important element of Manchester's transport infrastructure. The railway lines carried over Castlefield by the various viaducts represented the next stage in the development of

Manchester s transport infrastructure. Following the introduction of the railways to Manchester, the explosive rise in numbers of passengers and freight carried by the railways of the railways soon made the canals redundant and obsolete. Here the railway allowed goods to be transported at much greater efficiencies than ever before. This introduction of a new technology (railways) replacing old (canals) was symptomatic of the association the railways have with the increased mechanisation stemming from the industrial revolution and the rise of Manchester as an economic powerhouse throughout the nineteenth century. The viaduct is Listed at Grade I1, see Appendix 1 for the associated List Description.

- *Townscape and Aesthetic Value*

As detailed further is the List Description associated with the bridge, the bridge presents visual interest stemming from its impressive 1 3/4 mile length, incorporating a series of well-detailed bridges; some with highly decorative Gothic-style ironwork.

Proposals and Assessment of Impact upon Heritage Significance

The scope of the works proposed relates to coring in 82 locations. In addition to these works, 14 trial pits will also be dug (3 machine dug and 11 hand dug). The location of the proposed core holes, bore holes and trial pits is shown in drawing NHE_127523-2405-OCD-00-DDR-C-001007, which is submitted with this pplication.

Core holes to Piers and Spandrel Walls

In total, the proposal will see coring at 82 locations with cores going through the pier or spandrel walls at each location. All core holes will measure 75mm in diameter. The lengths of the cores in the spandrel walls and transversely in the piers will vary from 2m to 3m. The longitudinal cores in the piers will be the full width of the pier. The cores are required to ascertain the thickness, makeup, and strength of the masonry and mortar. Where there are 5 vertical cores specified in the spandrel wall, it may be possible to reduce these to a minimum of 2 cores depending on the result of trial pits from track level to expose the backing level on top of the viaduct.

A series of cores to the piers will be undertaken with a separate LBC application which has already been approved (Application number: 104159/LO/2013/C1). Number of the additional cores to the piers specified in this document will be reviewed and could possibly reduce based on the results of these cores in already approved application. Brickwork samples from the cores may also be retained for material testing purposes to determine the brick strength and mortar strength. The openings proposed will be filled with a proprietary non-shrink cementitious grout and the facing brick will be fully reinstated using lime mortar to match the existing.

Structural Integrity

The core holes through the structure will measure 75mm in diameter. The diameter has been minimised to ensure that the effect on the integrity of the structure is minimal either during the survey work or once the survey work is completed. A competent engineer will be employed to carry out the survey work and it is not anticipated that structural support will be required from underneath while the work is being carried out.

Trial pits

Trial pits will be excavated at 14 locations either by machine or by hand. Dynamic Probes will be undertaken in the hand dug trial pits to prove lateral extent of the foundation and step details if present. Inclined masonry core through existing pier foundation will also be undertaken at an angle of 2:1 to prove the depth and thickness of foundation. All trial pits are to be backfilled and reinstated.

It is considered that there is a sound and reasoned justification for the proposals in that the survey work is required in order to acquire a comprehensive understanding of the structure, composition and strength and the viaduct structures. This information will be essential for the design team working on the proposals for the Northern Hub, in that it will ensure that the most preferable design is able to be carried out. There will be significant economic, environmental and social benefits associated with the Northern Hub programme, which

will allow up to 700 more trains to run each day and provide space for 44 million more passengers a year. More specifically, the intrusive core hole surveys are required to inform the ongoing detailed design and construction methodology for the Ordsall Chord. The Ordsall Chord is a new two track railway, which would run on a combination of new and existing bridges and viaducts to provide a rail connection between the existing Middlewood L&MR Viaduct and the Castlefield MSJ&AR Viaduct

Prior to submitting this application, non-intrusive alternative survey methods were explored. This was in accordance with advice set out within English Heritage Guidance Investigative Work on Historic Buildings which states that intrusive surveys *should only be dug if there is a clearly defined reason for doing so and if important information is likely to be gained as a result, for example about bearing strata or foundations*.
The following alternatives have been considered for this site:

- A review of all historical drawings of rail structures held within the Network Rail archive. Whilst the structures within this application site are no longer owned by Network Rail, a thorough review of the archives was undertaken which identified drawings for the structures in this application. This included the original design drawings for the Stephenson's Bridge Approach Arches and Zig-Zag Viaduct. However, there is limited archived structural information available for the existing structures.
- A visual inspection of the structures was carried out. The survey did not provide adequate information on the internal form and make-up of the structure.
- The use of Ground Penetrating Radar from the top of the viaduct structures was also reviewed. A review of this type of survey and equipment concluded that this approach would not provide the necessary definitive information required for these structures and would still need to be supplemented by information gathered through intrusive survey. This is supported by advice published by the Highways Agency.

All possible avenues of non-intrusive investigations have been assessed before resorting to the proposed intrusive survey work. Intrusive survey work is deemed necessary to ascertain definitive structural information and it is considered that non-intrusive works would be inappropriate and inconclusive if used.

In order to mitigate the impact of the investigation:

- The number of intrusive surveys proposed has been limited as far as is practical.
- All of the works will be carried out under the supervision of an engineering geologist.
- Photos of all openings will be taken during the surveys and the findings will be made available to Manchester City Council for information, should this be required.
- In order to minimise the visual impact on the existing structures, the first brick is to be removed prior to undertaking the cores and then replaced following coring. The brick is to be reinstated with lime based mortar, to match the existing.

As can be seen from the above, the physical impact to the viaduct structure will be limited to the absolute minimum, using sensible methodologies to ensure that there is no loss of externally-visible historic fabric. The removal and subsequent re-use of the existing bricks that are to be remove, in conjunction with the use of an appropriate lime-based mortar for pointing, will ensure that there is no adverse impact on the structure's architectural or aesthetic interest. With no significant permanent physical change proposed as part of this application.

The works are relatively minor in scope and the very nature of the sympathetic investigations proposed will not adversely impact upon the structure's historic significance: its original form and purpose will remain unaffected, as will the relationship with nearby historic structures.

Conclusion

In summary, it is considered that the works proposed are respectful to the special character and appearance of both the viaduct and other heritage assets within its environs. The proposal will not result in any unacceptable impact upon the significance of the heritage asset. There are numerous public benefits associated with the Northern Hub/Ordsall Chord programme and the proposals will assist with the successful implementation of this in a sensitive and appropriate manner.

In light of the above, the proposals are considered to be in accordance with the NPPF and the Manchester Core Strategy. Consequently, it is requested that Listed Building Consent should be granted for the proposed development.

APPENDIX 1: LIST DESCRIPTION

List entry Description

Summary of Building

Railway viaduct for the Manchester South Junction & Altrincham Railway Company, 1846-9, constructed by David Bellhouse Jnr. Red brick with some small sections of blue brick, sandstone dressings and cast-iron bridges.

Reasons for Designation

The Manchester South Junction & Altrincham Viaduct is designated at Grade II for the following principal reasons:

* Design interest: it is an impressive 1 3/4 mile long urban viaduct incorporating a series of well-detailed bridges; some with highly decorative Gothic-style ironwork;

* Date: it is an early example of a railway viaduct dating from the second phase of railway development - the period from 1841-50 often referred to as 'railway mania' - in which commercial speculation and competition for routes led to the rapid construction of lines and expansion of the railway network;

* Historic interest: the viaduct forms an important and integral component of the Manchester South Junction & Altrincham Railway, which was one of the country's earliest suburban railways, and Manchester's first; helping to bring this form of transport to the hinterlands;

* Group value: the viaduct has strong group value with neighbouring railway structures (both contemporary and later), including two other railway bridges crossing the River Irwell (the 1830 Grade I listed stone bridge and the 1869 Grade II listed girder bridge) and their associated viaducts, the Grade II listed Castlefield Viaduct (c1880), the Grade II listed stations of Manchester Oxford Road (1958-60) and Deansgate (1896), and the Grade II listed former goods offices (c1850-60) and train shed (c1881) at Manchester Piccadilly Station.

History

The Manchester South Junction & Altrincham Railway viaduct was constructed in 1846-9 by David Bellhouse junior for the Manchester South Junction & Altrincham Railway (MSJ&AR) Company; Bellhouse was also responsible for laying the track. Several of the cast-iron bridges situated along the viaduct were built by his son, the engineer and iron-founder, Edward Taylor Bellhouse, along with others by the line's Chief Engineer, William Baker, and William Cubitt.

The MSJ&AR line is one of the country's earliest suburban railways and was the first in Manchester. It was started as a joint venture between the Manchester & Birmingham Railway (later

the London & North Western Railway, LNWR) and the Sheffield, Ashton-under-Lyne & Manchester Railway (later the Manchester, Sheffield & Lincolnshire Railway, MS&LR) which operated London Road Station (known as Manchester Piccadilly Station since 1960). The aim was to create an extension of their lines, known as the South Junction line, that would be carried along the southern boundary of the city centre on a viaduct and then join the Liverpool and Manchester Railway at Ordsall Lane in Salford, providing access to the lucrative port and city of Liverpool. A branch line, leaving the South Junction line at Castlefield, would also follow the Bridgewater Canal to Altrincham. The Manchester South Junction & Altrincham Railway Act received Royal Assent on 21 July 1845.

300,000 cubic feet of stone (91,440 cubic metres), 50 million bricks and 3000 tons (3048 tonnes) of cast iron were used in the viaduct's construction. The MSJ&AR line opened on 20 July 1849, although sections of the viaduct were not opened until 1 August 1849. The line ran for 8 1/2 miles from London Road Station via Oxford Road and Deansgate Stations to Altrincham, with the viaduct forming a 1 ¾ mile (2 ¾ km) long stretch: the northern branch terminating at the north-west bank of the River Irwell, and the southern branch terminating at the east side of Dawson Street.

Details

LOCATION: The viaduct runs from Manchester Piccadilly Station via Oxford Road and Deansgate, following approximately the route of the River Medlock (crossing it at a number of points), and then branches into two at Castlefield, with the northern branch terminating on the north-west side of the River Irwell, and the southern branch terminating at the east side of Dawson Street.

ARCHITECTURE: The viaduct is approximately 1 ¾ mile (2 ¾ km) long and incorporates 224 brick arches that average a span and height of approximately 30ft, and a width of 28ft; many of the arches, particularly those near to Manchester Oxford Road Station and Deansgate Station, have been in-filled and converted into commercial premises. The tallest arches can be found in the section between Manchester Piccadilly and Oxford Road stations where the ground level is lower. A brick parapet has been altered and rebuilt in places and later repairs have been carried out to some of the arches.

The viaduct incorporates a series of predominantly arched, cast-iron bridges by Edward Taylor Bellhouse, William Baker and William Cubitt that cross various streets, the Rochdale Canal, and the Bridgewater Canal. The bridges have an average span of 70ft, although one of Baker's bridges, which spans the Rochdale Canal has a span of 105ft. A number of the bridges incorporate highly decorative Gothic-style ironwork and detailing and castellated towers (referencing the location of a Roman fort at Castlefield), whilst others, such as a bridge over Gloucester Street are more classically detailed. A bridge over Egerton Street by William Baker was replaced in steel in 1976. Some of the viaduct's brick arches and bridges are skewed. The Irwell Bridge at the north-west end of the viaduct is of brick with two segmental arches, each of approximately 65ft span, with a central

pier and cut-water. Rusticated stone voussoirs and pilaster strips exist to the central pier and abutments, and the parapet above the western arch incorporates cast-iron panelling.

Following electrification of the line in the C20 the viaduct now incorporates a series of C20 and early-C21 gantries along its course. Also along the viaduct's course are a number of attached or abutting buildings, most of which are later in date and are un-related to the viaduct's use; all are excluded from the listing, which relates solely to the viaduct. Manchester Piccadilly Station, Deansgate Station and Manchester Oxford Road Station (the two latter stations being constructed on top of and to the side of the viaduct) are all separately listed at Grade II.

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