

Former Bauer Millett Site

Albion Street
Manchester

Heritage Statement: Part 1 – Significance Appraisal

Prepared by:



Stephen Levrant Heritage Architecture Ltd

Canada House, 3 Chepstow Street, Manchester, M1 5FW
www.heritagearchitecture.co.uk

Prepared for:

Ask Central Ltd

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Former Bauer Millett Site, Manchester - Heritage Statement: Part 1 Significance Appraisal.

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Heritage Architecture Ltd is Registered in England 3053944 • VAT GB656883581. Registered office: 5 Technology Park, Colindeep Lane, Colindale, NW9 6BX

Correspondence to be addressed to: 62 British Grove, London, W4 2NL; or: Suite 1.06 Canada House, Chepstow Street, Manchester M1 5FW.

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1. INTRODUCTION

1.1 Purpose

- i) Heritage Architecture have been commissioned by Ask Central Ltd to provide a Heritage Appraisal of the former Bauer Millett Site, Albion Street, Manchester (henceforth referred to as 'the subject site').
- ii) The aim of the following report is to provide a baseline significance assessment of the subject site and its environs (Figure 1a below).



Figure 1A: Site Plan showing the redline boundary of the Site. **Source:** Ask Central Ltd.

- iii) The extant site comprises the former railway viaduct which passes over Great Bridgewater Street in Manchester City centre, originally connecting the train line to the former Central Station (now Manchester Central Convention Centre), along with a large area of brick arches forming an undercroft to the south of the viaduct. The viaduct structure and undercroft are listed at grade-II. Manchester Central Station, immediately north of the site, is listed at grade-II* (see Figure 2 below).
- iv) **Section 7 of the Planning (Listed Buildings and Conservation Area) Act 1990** states that “any works for the demolition of a listed building or for its alteration or extension in any manner which would affect its character as a building of special architectural or historic interest” requires authorisation in the form of Listed Building Consent. The National Planning Policy Framework (NPPF) sets out the framework for both plan-making and decision-taking to

ensure that heritage assets are conserved, and where appropriate enhanced, in a manner that is consistent with their significance and thereby achieving sustainable development.

- v) In particular, the statement is presented to accord with the national policy requirement of **NPPF paragraph 189**, to describe the significance of the heritage assets affected, and the consequent potential impact of the current proposals. The emphasis, as required by the NPPF, is to provide a **proportionate** amount of information in order to allow the proposals to be assessed by the local authority (Manchester City Council) and their heritage impact understood.

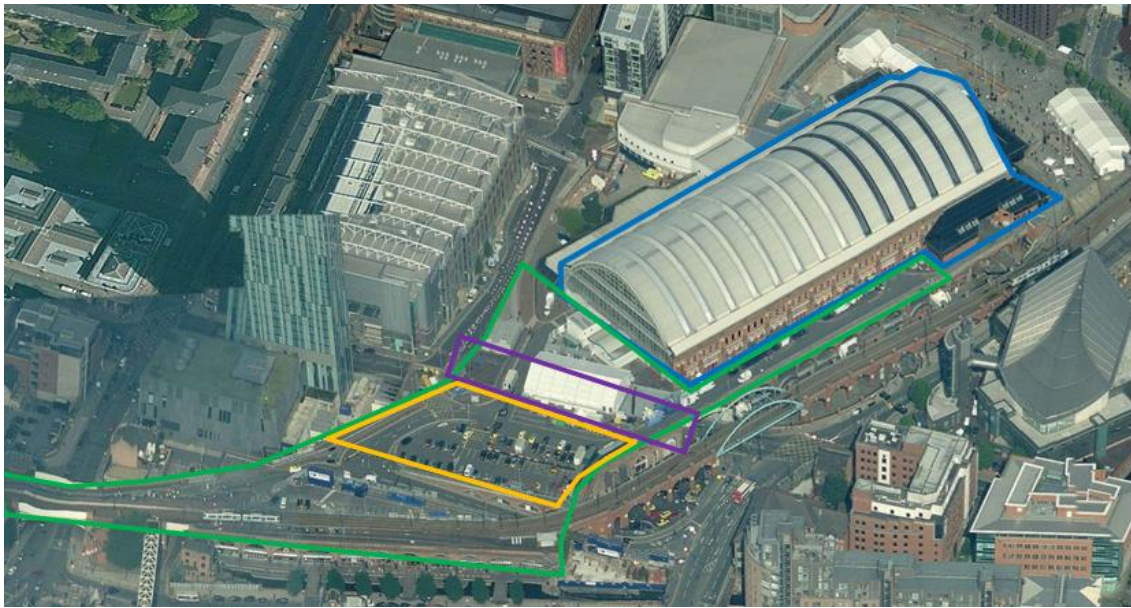


Figure 1B: Aerial view of the Site highlighting the location of the different components: green highlights the Grade II listed Castlefield Viaduct; the yellow area marks the location of the brick arch undercroft and the purple area marks the location of the Great Bridgewater Street Bridge. The grade-II* listed Manchester Central is highlighted by the blue outline.

1.2 Proposals

- i) Stephen Levrant : Heritage Architecture (SLHA) prepared a previous Heritage Appraisal for the Subject Site (commissioned by Ask) in February 2017 and a Heritage Statement in March 2017.
- ii) The Heritage Appraisal provided a baseline significance appraisal of the subject site, including extensive analysis of surrounding Conservation Areas, character areas and the architectural and historic interest of listed buildings within and around the proposed site area.
- iii) The subsequent Heritage Statement (March 2017) provided a robust Heritage Impact Assessment of the proposed development upon the city's historic environment, principally, upon the setting of the grade-II* listed Former Central Station and upon the original fabric of the grade-II listed Castlefield Viaduct.
- iv) Ask secured Planning permission and Listed Building Consent in 2017 for a 43-storey residential tower and 15-storey office building at land at the former Bauer Millett site in Manchester City Centre (Ref. 115871/FO/2017 and 115872/FO/2017). Ask & Salboy are now progressing plans to make minor amendments to the scheme. The focus of the following report, therefore, will be to reappraise the significance of the Subject Site and surrounding area to inform the emerging 2020 development proposals.
- v) In line with recommended Historic England guidance, a staged approach is required when assessing heritage significance (**Advice Note 12, October 2019**). The objective being to understand the heritage values of the heritage asset (in line with Para 189, NPPF 2019). This forms the first phase of the staged approach.
- vi) The following report, (**Part 1: Heritage Significance Appraisal**), is the baseline document which will inform '**Part 2: The Heritage Impact Assessment (HIA)**'. This will be issued as a separate document once the final development proposals have been issued. The principal focus of the HIA is to avoid any potential negative impact and seek opportunities to better reveal or enhance the significance of the designated heritage asset in question.

1.3 General Methodology – Focus on proportionality

- i) The below Heritage Appraisal is framed by the requirements of the **Planning (Listed Buildings and Conservation Areas) Act 1990**. This statutory document requires that the Local Planning Authority must treat the desirability of preserving the fabric and settings of designated heritage assets (including the character and appearance of conservation areas) as issues which are afforded great weight (rather than simply as material considerations).
- ii) Therefore, if it is considered that a Proposed Development would result in a negative impact on a designated heritage asset, the Local Planning Authority (LPA) must give that identified harm considerable importance and weight, in proportion to its actual impact, when determining planning consents.
- iii) The Local Planning Authority's assessment of potential harm to the setting of a listed building, or to the character and appearance of a Conservation Area, must be an evidence-based planning judgment. This is because the weight which the authority applies to demonstrable

harm must be proportionate to the magnitude of the impact. Thus, 'less-than-substantial' harm should not be afforded the same weight as that defined as being 'substantial'. The NPPF also stresses that evidence must be proportionate to the impact of the Proposed Development, this requirement informs the Heritage Appraisal.

- iv) Therefore, the analysis of heritage significance and impact in this document accords with the required NPPF approach, as it presents sufficient evidence to inform the design development and eventually enable the Council, "to reach an informed decision". The conclusions are thus based on the, "need to be proportionate to the significance of the heritage assets [potentially] affected, and the impact on the significance of those heritage assets".
- v) The following Heritage Appraisal intends to provide the evidence to enable an appropriate and proportionate consideration of the potential impact of the proposed redevelopment of the subject site on the identified designated heritage assets.
- vi) It is of course important to distinguish designated heritage assets, as these are subject to specific legislative and policy requirements at both national and local level. Thus, the relative status of the particular site will be evaluated against its particular national or adopted local policy definition. A designated heritage asset is defined as a:
 - vii) *"World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or a Conservation Area designated under the relevant legislation"*.
- viii) Significance is assigned relative to the defined value and sensitivity of the heritage asset, in accordance with best conservation practice. The development effects on built heritage can be direct (such as loss or damage to heritage features) or indirect (including the effect on the setting of a listed building). This heritage appraisal will thus be used to measure the potential indirect impacts of proposals on the historic environment.
- ix) Consideration has also been given to the historical development of the area and key views of the designated heritage assets within the locality. The purpose is to define the contribution of the built form to the appreciation and understanding of the special interest of the area.

1.4 Research Methodology

- i) This Heritage Appraisal is the result of an extensive process which synthesises literature and documentary research, analysis and processing of information, building surveying, and professional judgment. The documentary research was based upon primary and secondary sources, including maps, drawings and reports, and the Historic England Archives.
- ii) A visual survey of the Site was conducted in February 2017 and again in January 2020, in order to map out and identify the setting of the heritage assets which have the potential to be affected by the proposals.

1.5 Authorship

- i) This report has been prepared by Stephen Levrant Heritage Architecture Ltd., a multidisciplinary practice specialising exclusively in the historic cultural environment.

2. THE SITE AND STATUTORY DESIGNATIONS

2.1 Location

- i) The subject site is located from the northern side of Great Bridgewater Street, close to its junction with Albion Street to the east, in Manchester city centre. The subject site is bounded to the north by the former Manchester grade-II* Central Railway Station (now Manchester Central Convention Centre), a redundant open car sales forecourt and Albion Street to the east, the rear service courtyard to the Beetham Tower (Hilton Hotel) to the west, and the grade-II Listed Castlefield Viaduct and Trafford Street to the south (see **Figure 1C**, below).
- ii) The subject site is multi-layered above street level, on top of the Castlefield Viaduct, arches and Great Bridgewater Bridge is a service yard for the Manchester Central Convention Centre and high-level vehicle access west along the Castlefield Viaduct. There is also pedestrian access to the Deansgate-Castlefield Metrolink tram stop. The arches below, at street level, are currently in partial use as a car park and include a recently vacated car sales room.



Figure 1C: Site plan showing the location of the Subject Site in red (indicative).

2.2 Statutory Designations

Conservation Areas

- i) The Subject Site is not located within a Conservation Area.
- ii) It is however, considered that the proposed redevelopment of the subject site could impact the character and appearance of surrounding Conservation Areas to the north and west (see Figure 2 below):
 - *St Peter's Square Conservation Area*
 - *Albert Square Conservation Area*
 - *Deansgate/Peter Street Conservation Area*
 - *St John Street Conservation Area*
 - *Castlefield Conservation Area*

Listed Buildings

- iii) The subject site consists of part of the Castlefield Viaduct which is listed at grade-II. The brick arches underneath and the Great Bridgwater Street bridge are integral parts of the viaduct and are included under the listing.
- iv) Figure 2 illustrates the location of the listed buildings surrounding the Site (see Appendix I for full list of the listed buildings identified on the plan).

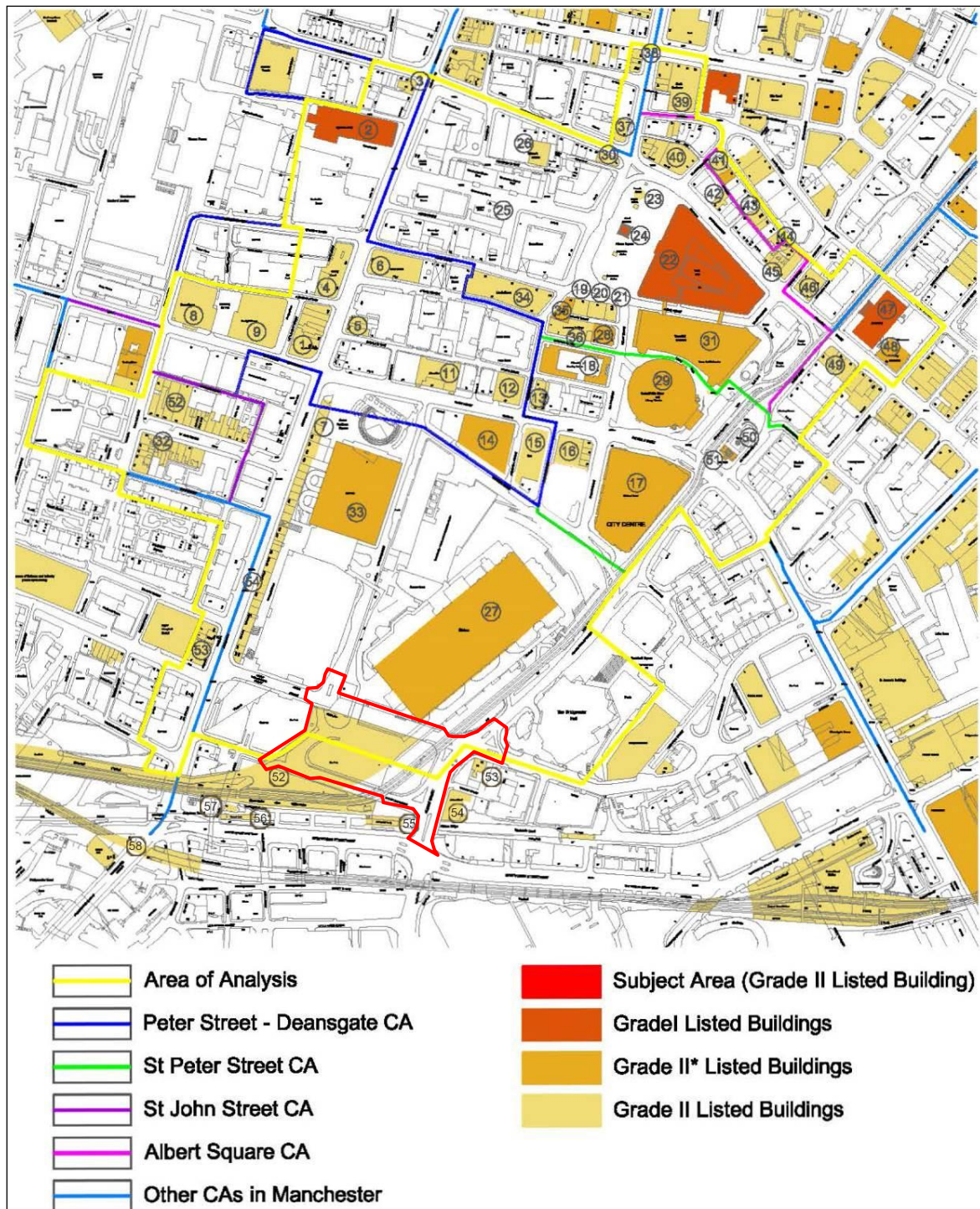


Figure 2: SLHA Heritage Asset Map.

3. POLICY CONTEXT

3.1 The Planning (Listed Building and Conservation Areas) Act 1990

- i) The subject site contains a listed building and is adjacent to a number of designated heritage assets situated in Manchester City Centre. **Section 66** of the Act requires the Local Planning Authority to “*have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses,*” when considering whether to grant planning permission.
- ii) Due to the proximity of the Site to the identified Conservation Areas, **Section 72** of the Act is also of relevance as it requires the Local Planning Authority to pay special attention to the ‘*desirability of preserving or enhancing the character and appearance*’ of the designated area. Consequently, it is important to consider the subject site as a contributor to the townscape character of the surrounding Conservation Area’s and the impact of the proposed works on this aspect of the wider historic environment.

3.2 National Planning Policy Framework (NPPF) (2019) and Planning Policy Guidance (PPG) 2014

- i) The policies in the NPPF constitute the Government’s view of what sustainable development means in practice. The definition requires development to give due weight to the appropriate conservation of heritage assets in order to be defined as sustainable development (**Paragraph 7**). This is because one of the key dimensions of sustainability is protecting and enhancing the historic environment (Paragraph 8, point c). It is thus necessary to demonstrate that the proposals for demolition are demonstrably sustainable.
- ii) In accordance with the legislation, the NPPF’s core principles, which underpins decision-taking, requires that Planning decisions should contribute to conserving designated heritage assets in a manner proportionate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations (**Paragraph 184**).
- iii) **Paragraph 189** of the NPPF states that applicants are required to “describe the significance of any heritage assets affected, including any contribution made by their setting.” Section 3 of the Planning Policy Guidance: Conserving and Enhancing the Historic Environment (**Paragraph: 009 ID: 18a-009-20140306**) furthers this requirement by stressing that “Heritage Assets may be affected by direct physical change or by change in their setting. 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 understanding the potential impact and acceptability of development proposals”.
- iv) The NPPF stresses that ‘great weight’ should be given to the objective of conserving designated heritage assets (**Paragraph 193**), emphasising the need to avoid harming their significance. Consequently, any identified harm impacting on a Conservation Area or the setting of the identified heritage assets will require both ‘clear and convincing justification’ and mitigation.

- v) **Paragraph 194 (NPPF)** stresses that “any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should *require clear and convincing justification*”. Substantial harm to or loss of assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade-I and grade-II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.
- vi) It will be clear that development within a heritage asset will have some impact on its fabric, and that it could be either *adverse, negligible or beneficial*. The fundamental design objective, therefore, is to ensure that the balance of the impact on the heritage asset minimises any negative impact on its significance.

3.3 Manchester City Council Core Strategy, 2012

- i) Manchester's Core Strategy was adopted on the 11th July 2012 and is the key document in the Manchester Local Plan. The relevant, local heritage planning policy maintains the same focus as the NPPF. Manchester City Council's (MCC) heritage policies focus on the fundamental importance of “*preserving or, where possible, enhancing the historic environment*”. The following policies from Manchester's Core Strategy are of importance to the heritage asset considered within this statement.
- ii) **Policy CC9** notes that the Council “*will support high density and mixed-use development in the City Centre, but developers must recognise the specific design challenges that must be overcome to ensure complementarity of function and form.*”
- iii) This key regeneration objective is tempered by the need to ensure that, “*historic sites and areas of particular heritage value should be both safeguarded for the future and, where possible, enhanced for their own heritage merits and as part of wider heritage regeneration proposals*” (**paragraph 12.21, Policy EN3**). This evidently also requires development proposals to be sensitive to the inherent values of the heritage asset and clarity of evidence, in order to justify the potential impact.

3.4 Historic England's Good Practice Advice Notes

- i) In 2015 Historic England released three Good Practice Advice notes supporting the implementation of national policy and the related guidance in the PPG. The advice notes do not constitute a statement of Government policy itself, nor do they seek to prescribe a single methodology or particular data sources. **Good Practice Advice Note 2 (Managing Significance in Decision-Taking in the Historic Environment)**, **Good Practice Advice Note 3 (The Setting of Heritage Assets – as amended December 2017)** and **Good Practice Advice Note 12 (Statements of Heritage Significance: Analysing Significance in Heritage Assets)** were all utilised as part of this assessment in order to gain a full understanding of the relevant issues, alongside the NPPF and PPG.
- ii) In particular, the present report takes account of the advice contained within the revised version of **Advice Note 3** on understanding what constitutes the setting of a listed building, conservation

area or other heritage asset, and the selection of assets the settings of which may be considered to be affected by development in a particular location, as well as the approach to the selection of indicative key views of a proposed development in context with existing heritage assets.

iii) **Advice Note 12, (October 2019)** which provides guidance on assessing the significance of heritage assets, states that, *'an understanding of significance must stem from the interest(s) of the heritage asset, whether archaeological, architectural, artistic or historic, or a combination of these'*. The guidance makes it clear that this understanding:

- must describe significance following appropriate analysis, no matter what the level of significance or the scope of the proposal;
- should be sufficient, though no more, for an understanding of the impact of the proposal on the significance, both positive and negative; and
- sufficient for the LPA to come to a judgment about the level of impact on that significance and therefore on the merits of the proposal.

iv) The following Heritage Appraisal aims to define the significance of the subject site, which will allow for a comprehensive Heritage Impact Assessment. A detailed analysis of the historical development of a heritage asset and its environs is a crucial preliminary phase to understanding its relative significance. The following section will therefore outline the historical development of the subject site in detail.

4. HISTORICAL DEVELOPMENT

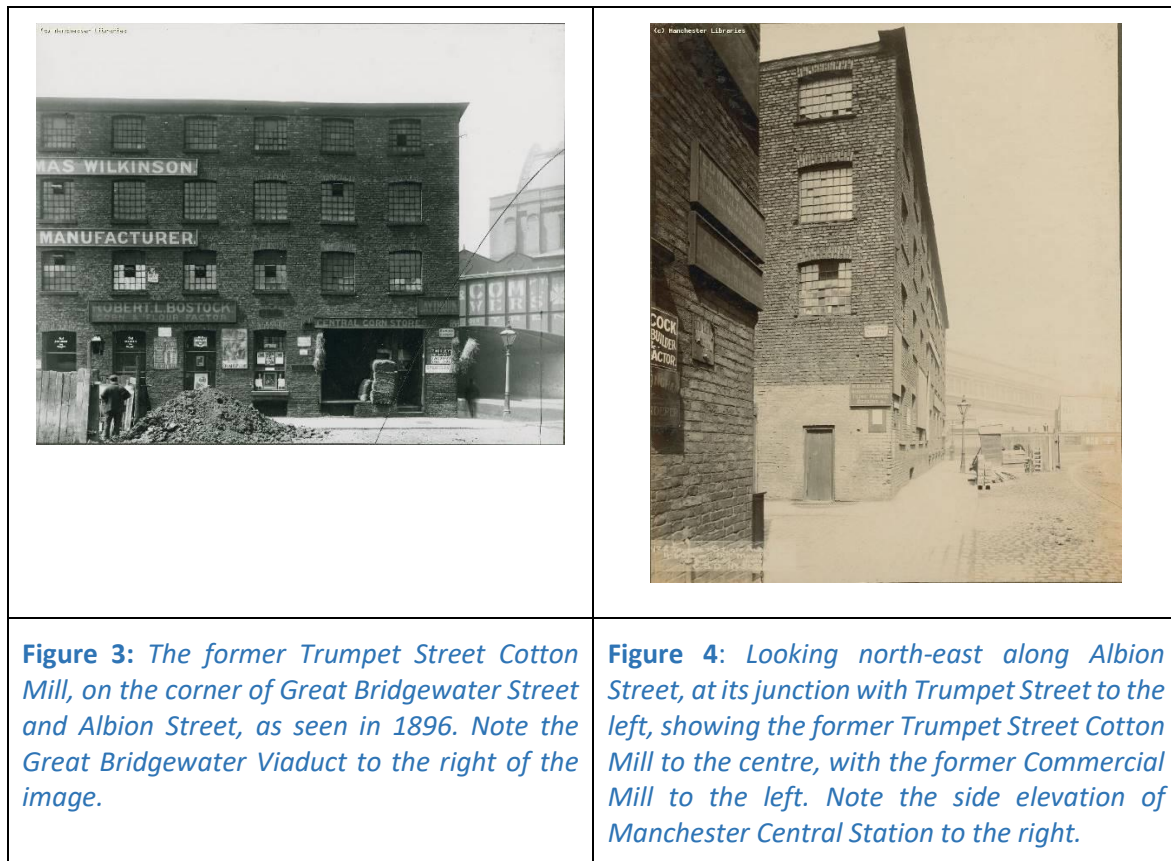
4.1 Introduction

- i) In order to understand the heritage significance of the subject site and provide comments regarding opportunities and constraints, it is first necessary to understand the way this part of the city historically developed.
- ii) This section of the report analyses and interprets historic maps and primary and secondary information in order to:
 - Provide a sound evidence base highlighting the main periods of development;
 - Inform assessment of the survival and significance of the buildings, open spaces and landscape features; and
 - Describe character areas and assess their relative historic and architectural importance.

4.2 Brief Historical Background and Development of the area

- i) During the 16th and 17th Centuries, the land to the south of Deansgate comprised a large ancient wood known as Aldport Park, which belonged to the Lords of Manchester and was documented as early as 1322.
- ii) The park and wood, which was a mile in circumference, was given in 1430–6 by Sir Reginald West, Lord La Warre, to John Huntington, warden of the collegiate church (Manchester Cathedral), and later sold to the Mosley family in 1599. Within the park was the mansion known as Aldport Lodge; whilst its exact location is not known, it is thought to have been built close to the junction of Deansgate and St John Street today.
- iii) Aldport Lodge played an important role during the Jacobite rebellion in the Siege of Manchester in 1642. The timber-framed mansion was the scene of cannon fire along southwards along Deansgate towards, what was then a small hamlet known as Alport Town, and was subsequently burned to the ground during the process.
- iv) The small hamlet of Alport Town contained timber-framed buildings dating to the 15th to the 17th Century, but largely built upon the same footprints of earlier buildings. As Manchester grew, Alport Town was incorporated into the burgeoning town to the north and east.
- v) During the 1830s the cutting of the Salford and Manchester Junction Canal had proceeded, cutting a canal tunnel from the River Irwell to the west, under Charles Street, Camp Street, Alport Street and beneath Alport Town, terminating at a double canal lock and large open reservoir at the junction of the eastern end of Alport Town and Watson Street, which is now the site of the former Manchester Central Station.

- vi) The early street pattern in the immediate area grew up around the ancient hamlet of Alport Town, containing many narrow courtyards, slum dwellings and alleyways. By the early to mid-Victorian period, the area was already infamous for having large number of slum dwellings and for being an area of ill repute. In 1880 a large area of slum dwellings to the east of Watson Street was taken over by the Great Cheshire Lines Committee for the construction of Manchester Central Station, this resulted in a large number of lodgers and vagrants being displaced, and thus further over-populating the already dangerously packed neighbouring slum area of Alport.



- vii) The construction of the new Manchester Central Railway Station in 1876-9 for the Midland Railway Company saw a large swathe of slum dwellings and small industrial buildings being cleared for the new station building and infrastructure, including the cast iron viaduct which was constructed over Great Bridgewater Street (the Site), and the large expanse of brick, vaulted undercroft arches to the south, which linked at high level the already extant Castlefield viaduct, to the new Central Station.
- viii) By the late 1890s, the need for a large new, city centre goods station saw the construction of the Great Northern Warehouse and Deansgate Goods Station complex being constructed along the eastern side of Deansgate. This new multi-purpose and large-scale station saw further cast-iron viaducts being erected over the western end of Great Bridgewater Street. These were removed as part of the construction of the Beetham Tower (Hilton Hotel), and the conversion of the Great Northern Warehouse into a leisure complex, both in the late 1990s.



Figure 5: The Wesleyan Methodist Chapel, built in 1801, which was originally located to the centre of Great Bridgewater Street, as seen in c1890. This was demolished in the late 1890s to make room for the Great Northern Warehouse viaducts, and is now the site of the Beetham Tower.



Figure 6: A painting of the Wesleyan Methodist Chapel on Great Bridgewater Street, as seen looking south-west in 1898, note the completed construction of the railway viaduct to the right which was completed in 1897 leading into the Great Northern Warehouse.



Figure 7: The construction of the viaduct to the western end of Great Bridgewater Street, and Deansgate during construction in mid-1897. Note the roof and two roof cowls of the 1801 Wesleyan Methodist Chapel on Great Bridgewater Street.



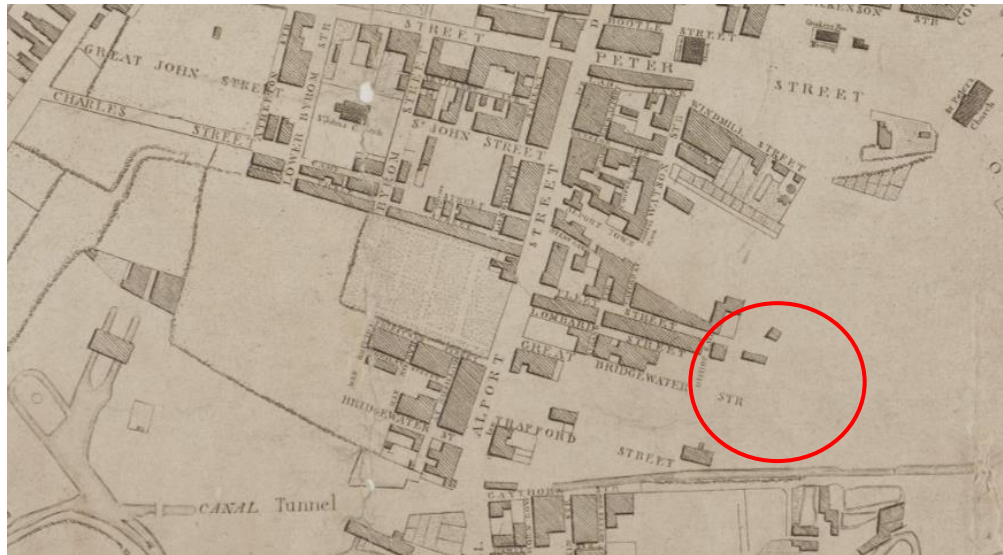
Figure 8: The completed viaduct leading into the Great Northern Warehouse, as seen on the 31st August 1900. Note the cast-iron viaduct (the Site) to the eastern end of Great Bridgewater Street seen in the far distance.

4.3 Map Regression

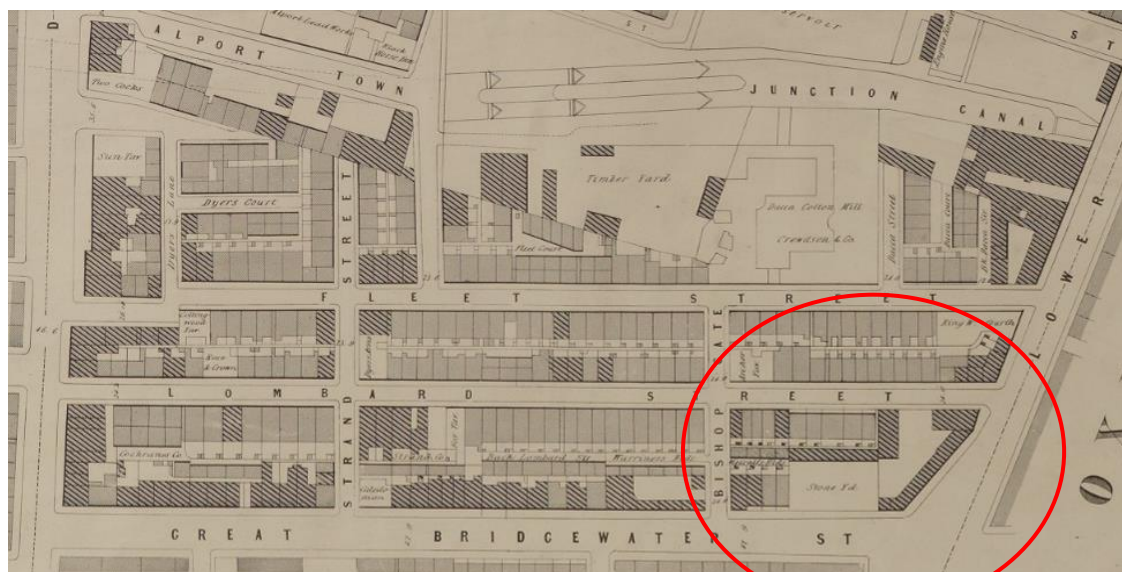
Table 1: Historic Map Regression (site area indicated by red circle)



1750 – This plan from the middle of the 18th Century, shows the town of Manchester primarily located to the north of the Site. The small hamlet of Alport Town can be seen to the south, close to the Site. This area was the site of a large ancient wood and parkland, which was undeveloped during this period.



1800 – By the beginning of the 18th Century, Alport town (seen in the middle of the map) can now be seen to be connected to the growing town of Manchester to the north. This map shows Great Bridgewater Street being laid out for the first time, but only reaching half of its current distance. The area is still predominantly open grass land, with some new streets being laid out but not fully developed.

Table 1: Historic Map Regression (site area indicated by red circle)

1850 – By the middle of the 19th Century, Manchester had become fully developed, with some of Alport Town's original buildings having been replaced with new, brick-built examples. The original pre 1750 'slanted' street pattern of Alport Town can still be seen clearly in comparison to the later early-18th Century grid pattern. This street plan shows the eastern entrance of the Salford and Manchester Junction Canal, which was opened in 1839, and still runs under the former Manchester Central Station. This eastern entrance and open stretch of canal was covered by the construction of Manchester Central Railway Station in the 1870s. Note the high density of slum dwellings and back-to-backs covering the area.



1871 – By 1871 the area can still be seen to be fully developed and shows the area before the construction of Manchester Central Station 5 years later.

Table 1: Historic Map Regression (site area indicated by red circle)

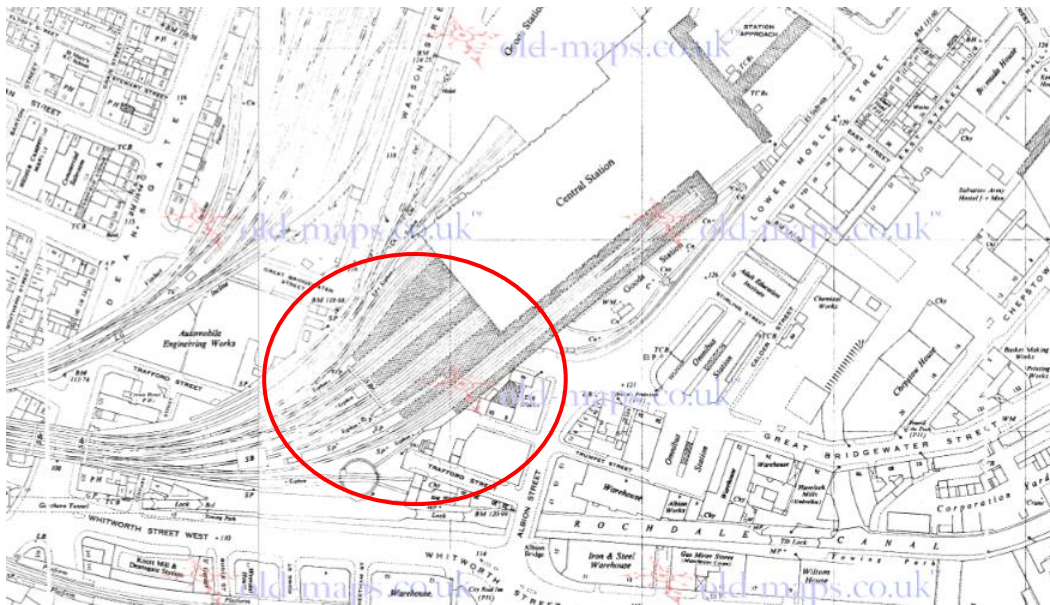
1878 – The 1878 map uses an older map to show the new Central Station as built but shows the railway viaducts as narrow lines further west along Great Bridgewater Street than was actually built. It also wrongly shows the existence of former dwellings upon the Site, which by this time had all been demolished to make way for the brick undercroft and viaduct structure.



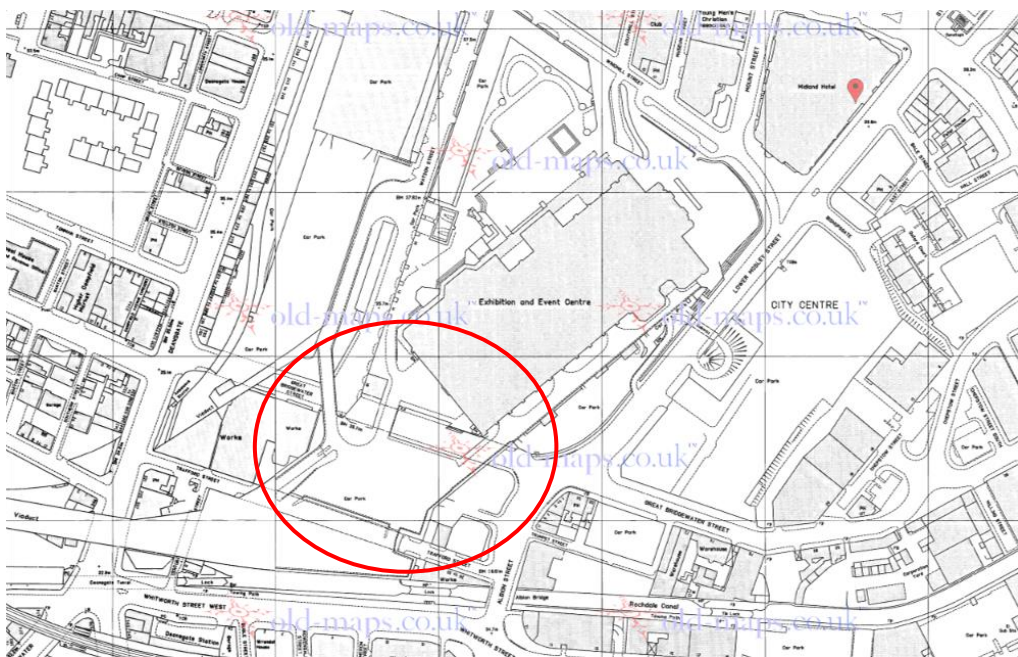
1891 – By the beginning of the 1890s, the Site can be seen to be entirely altered to accommodate the new railway viaducts. This plan clearly shows the retention of Trumpet Street to the south of Great Bridgewater Street, now having the new viaduct structure constructed over the street. The retention of older buildings such as the 18th Century Commercial Mill and Trumpet Street Mill can also be seen.

Table 1: Historic Map Regression (site area indicated by red circle)

1908 - This OS map depicts the area following the opening of the new Great Northern Warehouse and Goods Station to the top left of the map, The 1908 map also illustrates the extension of the eastern end of the Great Bridgewater Viaduct to accommodate a further railway line leading to the eastern side of the Central Station.



1951 – By the middle of the 20th Century, Central Station was still in full operation, but closed to railway traffic within a decade. The Great Northern Warehouse and Goods Station to the left of the station was still in operation as a goods station, later closing during the 1960s. The Site is unaltered, and still contains the track beds to the upper level of the viaducts and arches below. The former cotton mills fronting Albion Street have now been demolished.

Table 1: Historic Map Regression (site area indicated by red circle)

1986-9: By the late 1980s the area had altered substantially, with the conversion of Central Station into the new GMEX Convention Centre. This saw the demolition of original entrance buildings and the removal of original track beds to allow for access to the rear of the train shed. The Site remained unaltered, with all buildings fronting Albion Street being cleared. This area would later become the site of the new Metrolink tram network, with the erection of a new tram line running parallel to the eastern elevation of GMEX.

4.4 Historical Background and Development of the subject site

- i) As can be seen from the historic map regression above, the uses of the subject site and immediate surrounding area have substantially changed over the last 140 years, from a heavily populated area of slum dwellings and industry, to a major central transport hub connecting several railway lines, stations and interchanges, to a modern day convention centre and tram interchange.

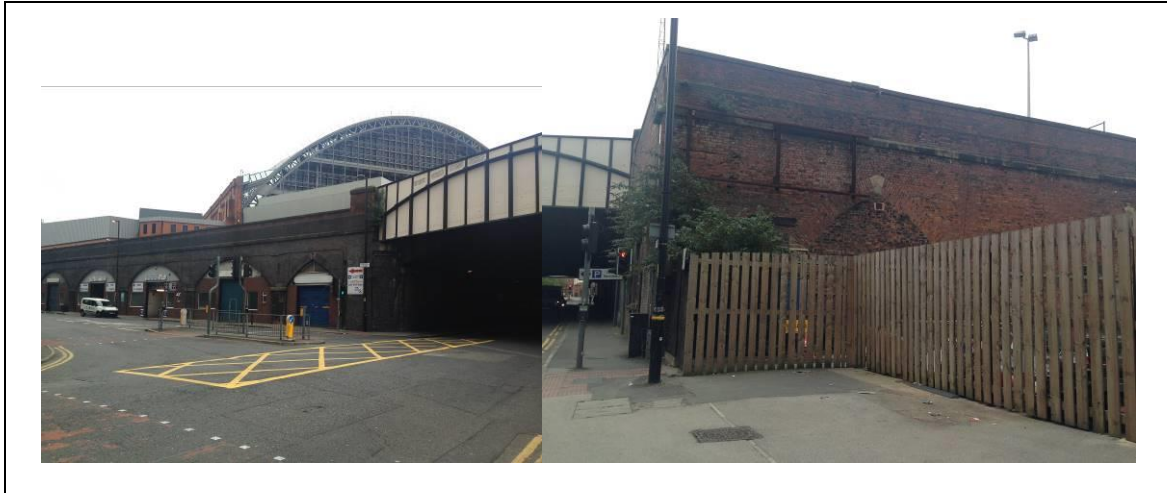


Figure 9: A composition image looking north-east towards the rear of Manchester Central, showing Watson Street to the left, and the western end of the Great Bridgewater Viaduct to the right. Note the rear (west) of the undercroft to the right.

- ii) Before the construction of the mid-19th Century railway network, the Site contained several streets and courts. Primarily these were Trumpet Street, Trafford Street, Opening Street, Rostocks Court and Thompsons Court.
- iii) Manchester Central Railway Station was constructed between 1876 and 1879. The south of the new station was cleared to make way for the new high-level track beds, which would branch off from the existing Castlefield Viaduct. This resulted in a large area of brick undercroft/arches linking the two, with a cast-iron bridge/viaduct structure carrying the tracks over Great Bridgewater Street.
- iv) The 1876-9 viaduct structure consists of a continual row of substantial curved, cast-iron girders supporting the former track beds above. The north and south walls are constructed of glazed white brick to reflect what little light was able to enter the long length of the viaduct. Along both walls were arches, also in glazed brick, which contained a doorway leading into the adjoining red-brick undercroft, and each firmly secured by cast-iron gates. The entire length of the viaduct was lit by gas lights, which were positioned at regular intervals along the north and south walls.

- v) The undercroft is constructed of red-brick and were interconnected to one another, allowing for storage of goods and stabling. The arched structure contains limestone pad stones and is barrel vaulted.
- vi) Regarding the development of Central Station Dr Ron Fitzgerald notes the compromising factors that led to its siting, and surrounding infrastructure (See Appendix V for full report):

The acquisition of suitable land was even more problematic than it had been in Liverpool. Clearly, a Central Station needed to justify its name but the options were constrained by the existing configuration of the Manchester South Junction and Altrincham Railway which passed through the densest concentration of urban property in Manchester. The location for the proposed station was finally settled upon as a block to the north of the M. S. J. & A. R. viaduct extending from Great Bridgewater Street on the south to Peter Street on the north. The eastern boundary was Lower Mosley Street and the western boundary, Watson Street. Peter Street was a major feature of the city centre and the addition of by the railway of an impressive frontage and a hotel would confer prestige on both the railway and city itself.

In the main, the property acquired by the Committee was densely covered not only by working class housing but also by the Manchester and Salford Junction Canal with its feeder reservoir and pumping station lay across the centre of the site, running east to west. There were also a couple of cotton mills and a pair of stone yards. These presented little problem as the current owners could be compensated at a reasonable cost but the Peter Street area posed greater problems. The frontage was occupied by several prestigious civic buildings, the Free Trade Hall, a chapel, The Theatre Royal, The Museum of Natural History, two schools and a concert hall. Despite taking out a second Act specifically to cover property acquisition the railway company was eventually forced to retreat from Peter Street following the failure of negotiations with the owners of Free Trade Hall. With the newly proposed frontage located in Windmill Street, demolition of the more amenable properties was under way by the summer of 1874. The canal had to be retained and this was to be incorporated into the undercroft of the station.

Most of the bridgework for the two tracks from Cornbrook, although imposing, was of a relatively mundane civil engineering character, with red brick viaduct arches, but the crossing of the Bridgewater basin involved a considerable lattice girder construction. This type of structure had emerged in the 1840s and was used for the two bridges on the Liverpool and Bury Railway in 1845 over River Croal at Burndon and at Darcy Lever over the

River Tonge. John Hawkshaw, at that time engineer to the Lancashire and Yorkshire Railway, made use of the form for the Paddock Viaduct in Huddersfield, and a second long span was erected by him over the Leeds Liverpool Canal for the Lancashire and Yorkshire Railway. The lattice girder gained favour where very long spans were required as its constructional weight was far less than the extravagantly built box girder bridges of Conway and Menai. Possibly the most advanced version of lattice construction was that built to carry that railway's new Liverpool to Manchester line over the Mersey at Runcorn in 1869 by William Baker, engineer to the London North Western Railway. This may well have been the formative influence on the design of the Bridgewater lattice girder which largely copies it in its iron elements and uses the same battlemented piers.

Beyond the Bridgewater basin the crossing of Deansgate was the most prominent piece of bridgework. Deansgate was main approach to Manchester from the south and was a major contributor to the civic character of the city. Correspondingly the C.L.C. bridge had not only to conform to the Local Authority's requirements; it also needed some architectural presence. The pattern had been set by a tradition of cast-iron arch railway bridges over Manchester's main streets. The first examples had been provided by the line connecting line between the Liverpool and Manchester Railway and Hunt's Bank, later Manchester Victoria on the Manchester and Leeds Railway. This was at the northern end of Deansgate and was continuous with an adjacent cast-iron bridge over the Irwell. These first generation railway cast-iron arches owed a continuing debt to the Telford/Rennie precedents with the solid I-section, segmental, bolted arch rings and open lozenge spandrel panels. The Manchester South Junction and Altrincham followed these early lines with similar bridges over the canal at Castlefield and over Deansgate.



Figure 10: Looking east beneath the viaduct, showing the original glazed brick walls and cast iron roof structure along the northern side of the street.



Figure 11: Looking east beneath the viaduct, showing the original glazed brick walls and cast-iron roof structure along the southern side of the street. Note the c1990s arched openings into the former car sales room.



Figure 12: An example of an original doorway into the arched undercrofts from Great Bridgewater Street.



Figure 13: A view looking into the brick vaulted undercroft, now used as car parking.



Figure 14: A view looking west across the junction of Albion Street (left) and Lower Mosley Street (right), looking into the western end of Great Bridgewater Street in 1900. This view shows the original extent of the 1870s viaduct and bridge structure before the addition of an extra line between 1900 and 1909. The bridge can be seen to pass over Great Bridgewater Street into the rear of the former Central Station to the right. Note the early Trumpet Street Cotton Mill to the left of the view, which is now the site of the 1990's train line/viaduct, and the surface car park.



Figure 15: 1909 – A closer view of the eastern end of the bridge/viaduct seen from Great Bridgewater Viaduct as seen in 1909 following the addition of a further railway line, which can be seen running horizontally across the image on extended brick piers.



Figure 16: 1909 – A view of the western end of the viaduct at its junction with Watson Street to the left. Note the rear elevation of the former Manchester Central Station to the left of the view.



Figure 17: The north side of Great Bridgewater Street, beneath the 1870s viaduct as seen in 1905, showing the original cast-iron roof structure and white glazed brick walls, which remain largely unaltered.



Figure 18: *The south side of Great Bridgewater Street, beneath the 1870s viaduct as seen in 1905, showing the original cast-iron roof structure and white glazed brick walls, which remain largely unaltered.*

5. SIGNIFICANCE ASSESSMENT

5.1 Introduction

- i) Due to the complexities of the subject site, this section of the report needs to consider the significance of the heritage assets within the proposed site area as well as those in the surrounding area which have the potential to be impacted by redevelopment proposals.
- ii) The following significance appraisal is structured to provide an objective description of the heritage assets in and around the extant subject site.
- iii) The assessment of significance accords with the requirements of the NPPF and uses Historic England's methodology outlined in its 2019 document, *"Statements of Heritage Significance"*. Historic England's *"Conservation Principles. Policies and Guidance"* 2008 has also been acknowledged as part of the following assessment.
- iv) Consequently, the significance of a designated heritage asset is determined by an analysis of the relevant aspects of the following:

Archaeological interest

There will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.

Architectural and artistic interest

These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, like sculpture.

Historic Interest

An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.

- v) The key criteria for listing are special historic or architectural interest. Consequently, in order to determine the significance of a certain component of a heritage asset the sum of its architectural, historic, artistic or archaeological value needs to be disaggregated and determined.

- vi) The analysis of the significance allows for an assessment of the current integrity and authenticity of the identified heritage assets. This has been used to inform and justify their capacity for change. The focus is on providing necessary and proportional amount of information, in order to justify the proposed alterations, based on the perceived level of heritage significance.
- vii) The assessment of the significance is based on both desktop research and on-site visual surveys.

Table 2. Definition of significance terms used in this Heritage Statement.
High heritage significance relates to those parts or elements of the structure deemed to be of particularly special interest. These components are <i>fundamental</i> to the understanding of the Sites design concept and play a major role in reflecting their archaeological, architectural, artistic or historic interest. The loss of such elements (through demolition removals or alterations) could potentially cause a major adverse impact on the special interest of the building.
Considerable heritage significance relates to those components of the structure deemed to be of special interest. They are <i>important</i> to the understanding of Sites design concept and play a considerable role in reflecting their archaeological, architectural, artistic or historic interest. The loss of such elements (through demolition removals and/or alterations) could potentially cause a moderate adverse impact on the special interest of the buildings.
Moderate heritage significance relates to those components of the Site deemed to be of some interest. They will make a modest contribution to the understanding of subject site's design concept and play a minor role in reflecting their archaeological, architectural, artistic or historic interest. The loss of such elements (through demolition removals and/or alterations) could potentially cause a moderate or low adverse impact on the special interest of the buildings.
Low heritage significance relates to those components of the Site deemed to be of more modest interest. They make a relatively negligible contribution to the understanding of the architectural design concept and retain a slight role in revealing the building's historic or aesthetic values. The loss of such elements (through demolition, removal or alteration) may cause a minor adverse, negligible adverse or neutral impact on the special interest of the building.
No significance /Detrimental features and elements that do not contain any special interest. These can <i>detract from the significance</i> of the building and maybe evidence of poor craftsmanship or ad-hoc refurbishments. The loss of such elements (through demolition removal or alteration) could potentially have a neutral or beneficial impact on the special interest of the building.
Unknown heritage significance. features or components which where the relative importance or interest requires determination by further investigation.

5.2 Characterisation Appraisal

The Character and Interrelationship of Spaces within the Area of Analysis

- i) The plan form and street grid around the subject site remains in various states of completeness and dates to the late 18th century when the Site and the adjacent plots were largely defined.
- ii) The urban grain reached its present configuration by the 1880s when the Central Station (now Manchester Central) was built and the last remaining residential premises were replaced by commercial and civic buildings, which resulted in a larger urban grain.
- iii) The area surrounding the subject site is distinguished by the interrelationship of large landmark buildings around the open spaces of St Peter's Square, Albert Square, Barbirolli Square and the piazza to Manchester Central to the north and a more open urban grain dominated by road, rail and tram infrastructure to the south.
- iv) The area is dominated by massive structures associated with former railway buildings and contemporary development. The Great Northern Warehouse, the International Convention Centre and the Central Station, now Manchester Central, were redeveloped in the late 1990's for a mix of leisure and retail uses, a conference hall and a new public space. Manchester Central's massive 70m single span arched roof provides a dominant horizontal form to this part of the city. Countering this horizontality, the Beetham Tower (completed in 2006) provides a striking vertical emphasis and backdrop to the area providing a key landmark to the skyline. To the east is the Bridgewater Concert Hall, a fine contemporary architectural composition providing a concert hall with a new public space adjacent.
- v) Whilst strategically located, the area is regarded as peripheral to the established historic city core because of its unfortunate relationship with the streetscapes to Windmill Street, Deansgate, Whitworth Street West, Lower Mosley Street and Albion Street which turn their back to it. As a result, there is a juxtapose between open public spaces such as the area in front of the Central Station and Barbirolli Square which lack the necessary definition to be acknowledged as formal squares and heavily enclosed spaces such as the area of Great Bridgewater Street that runs underneath the Site. Moreover, the severance formed by the Metrolink along Lower Mosley Street enhances the frail equilibrium of the spaces.
- vi) More recent developments which have transformed the city's skyline include the Owen Street development at Deansgate Square; the 'AXIS' building at the corner of Whitworth Street West and Albion Street and further committed schemes such as the at 10-12 Whitworth Street. These have gradually changed the character and interrelationship of this area at street level, and in turn have drastically changed views out to the wider cityscape.

Contribution Made to the Character of the Area by Greenery and Green Space

- i) The area surrounding the Site is characterised by a densely built urban environment and thus little space is left for trees and green areas. In this context, green spaces acquire even greater importance as points of relief within the dense urban grain, favouring architectural

perspectives, allowing for longer views and vistas and helping to enrich the setting by contrast to the solid built forms.

The Architectural and Historic Qualities of the Buildings & Prevalent / Traditional Building Materials

- i) Along the principal streets within the study area, historic buildings are adjoined by larger, generally taller, contemporary developments which have become an important characteristic of this part of the City. In the northern section of the study area however, and in the immediacies of the subject site, the historic and aesthetic values of the heritage assets are expressive and remain dominant against the contrasting massing and materiality of recent development, such as the Beetham Tower and the Axis Tower.
- ii) The fabric of earlier constructions varies within a wide range of high-quality materials such as stone, red brick, terracotta and faience. The fenestration in vertical, recessed sash windows is also predominant. These are set back from the external face of the building, enhancing the design of the facades with characteristic shadows.
- iii) The contemporary buildings are built in a range of modern materials that do not bear a strong relationship with the local or indigenous materiality. Roofs are generally clad in slates, usually blue-grey and occasionally green. The articulation of cornices and balustrades atop some buildings often produces local skylines of special interest.
- iv) The heights, form and scale of the historic buildings vary considerably throughout the study area from the modestly scaled 2 storeys; seen at the Britons Protection Public House, Great Bridgwater Street, which is almost domestic in scale, to the huge scale of the former train station of Manchester Central.
- v) The majority of the historic buildings within the study area are of 4-6 storeys over basement or with an attic, which was the most popular arrangement for the warehouse buildings. The tallest historic buildings are between 8 and 10 storeys; the 8 storeys plus attic of the Town Hall extension is clearly expressed in the building's architecture.
- vi) The style of the buildings is also varied; from the Baroque style (the former YMCA, Peter Street) to the industrial (Manchester Central). Variations of the classical style (Central Library, St Peter's Square) and eclectic style (Midland Hotel, Peter Street) are also present.
- vii) Albert Square is dominated by the Town Hall's Neo-Gothic architecture. The Victorian buildings to the south end of Albert Square are also Neo-Gothic in style, with relatively small footages and narrow frontages. The 1980s office blocks in front of the Town Hall were designed to create an enclosed open space and complete the Square's frontage. There is much variety in the building materials in Albert Square, such as stone, brick, terracotta and slate. Generally, buildings to the eastern side of the Square are built of yellow stone whilst those on

the west side, opposite the Town Hall, are finished in red brick. This helps to emphasise the civic importance of the Town Hall.

- viii) St Peter's Square is characterised by the large independent buildings that surround it; historic buildings such as the Midland Hotel, Central Library, Town Hall Extension and Town Hall are sat alongside large mid-late 20th century commercial buildings such as St Peter's House (1950s). Development of the Square continues today with the construction of No.1 St Peter's Square which replaces Elizabeth House to provide the south-western frontage to St Peter's Square.
- ix) The subject site itself is characterised by the vestiges of the former railway infrastructure and station building. The multi-level environment has led to a series of modern alterations; the tram line that carries trams from the former raised train deck, down the east side of the Manchester Central building and on to street level; the access road from Trafford Street up to the service yard on the south side of the Manchester Central building.
- x) As has already been discussed, tall buildings of 15 to over 40 storeys also now contribute to the character of the City.

Form, Setting and Character of the Public Realm

- i) As noted above, the character and interrelationship of space within the area surrounding the subject site differs between the north and south sides of the site. To the north, St Peter's Square and Albert Square form a continuum of open civic spaces which generate some of the most important and vital urban spaces in the city.
- ii) The pedestrian and public realms, which include Albert Square and St Peter's Square, form an important and unique network within the City's core. The key public spaces adjoining Albert Square and St Peter's Square are Lincoln Square, Manchester Central Piazza, Barbirolli Square and the Great Northern Square. These linked spaces are vitally important to the functionality and character of the city centre. They define the history of the city, offer core spaces in townscape terms and command a wide zone of visual influence, both in and out of the spaces.
- iii) The visual and physical links between Barbirolli Square, Manchester central piazza and Great Northern Square are weak and could be greatly enhanced.
- iv) In contrast to the area north of Manchester Central, the form, setting and character of public realm to the south side of Manchester Central is generally very poor; pedestrian footpaths are narrow and large road junctions, such as Great Bridgewater Street/ Lower Mosley Street and Whitworth Street/ Albion Street are hard to navigate. The area of Great Bridgewater Street that runs underneath the subject site is poorly lit and uninviting. Other streets such as Watson Street, which have a higher quality of public realm, are undermined by the lack of connectivity and activity.

- v) Within the subject site, the area around the elevated Deansgate/ Castlefield tram stop presents a very poor, illegible area of public realm. Whilst the redevelopment of the tram stop itself has introduced a high quality area of public realm, this has been focused to the south side of the tram stop and enhancing the connections down to street level onto Whitworth Street West. The area to the north of the tram stop, between it and the south side of Manchester Central, is dominated by access roads and a busy service yard.

Skyline, Views and Vistas

- i) The existing skyline of the city centre is characterised by a very rich variety of built forms, of principally 19th and 20th century buildings within the core of the city and taller buildings at the periphery. The skyline's profile accommodates a myriad of forms that rise above the general level including spires, turrets, towers and the more recent taller buildings that punctuate the cityscape.
- ii) The Area of Analysis is characterized by two different skylines:
 - 1- the 19th and 20th century buildings of Deansgate/Peter St, St Peter Street and Albert Square Conservation Areas which present continuous, enclosed views; and
 - 2- the more open irregular skyline of individual, large footprint buildings, such as Manchester Central, the Great Northern Warehouse, Great Bridgewater Hall, Beetham Tower; this skyline presents one of contrasts – the solid, robust forms of Manchester Central, the Great Northern Warehouse, the Midland Hotel and the Great Bridgewater Hall are seen in local, short-range views within the immediacies of the site. This contrasts to the dominant linear form of the Beetham Tower which commands a great presence to the city's wider skyline.
- iii) The skyline of the area of analysis is also continually evolving. In recent years' medium-height buildings have been constructed and tall buildings have made their way through the urban texture (such as the Axis tower and the cluster of towers at Deansgate Square). Whilst being significant landmarks, they act as a backdrop to significant views and vistas maintaining the ability to appreciate the historical texture of the urban landscape.
- iv) Figures 19 and 20, and accompanying Tables 3 and 4, below, set out a series of key views of the subject site within this context.

The Extent of Intrusion or Damage (Negative Factors) and the Existence of Any Neutral Areas

- i) Windmill Street and Watson Street have undergone extensive re-development and changes, largely due to the conversion of the buildings and sites related to the former Central Station and site of the former Goods Station. New developments tend to be much higher than the surrounding buildings providing new focus to the skyline, but the lack of cohesion at street

level has resulted in poor connections between areas of public realm and a lack of activity and vitality.

- ii) The area of Great Bridgwater Street, beneath the bridge of the subject site, is currently a highly negative space due to the lack of active street frontages and the low levels of light that characterise the space; it does not encourage permeability or movement.
- iii) In general, it is the lack of connectivity within the immediacies of the subject site, poor pedestrian environments and lack of active street frontages to Bridgwater Street, Watson Street, Lower Mosley Street and Albion Street that create negative factors within the study area.

Problems, Pressures and Capacity for Change

- i) There is the potential for enhancing the character and appearance of the area by reinstating the linear 'street wall' character to sites that are currently set back from the back of pavement line, have no active use and or are gap sites. The east side of the subject site, onto Albion Street, Bridgwater Street and Watson Street have a clear capacity for change.
- ii) The area around the subject site is part of a larger area (Deansgate/Peter Street/Lower Mosley Street/Whitworth Street West) which offers important opportunities to bring new activities into the city centre and to improve the urban space around Manchester Central. Bridgwater Street, Albion Street, Watson Street and the area of public realm to the north between the Deansgate/ Castlefield tram stop and the south side of Manchester Central could therefore represent a key element for the appearance of the whole area, and contribute to the amelioration of Lower Mosley Street and the approach to the city centre from the south-west.
- iii) As noted above, the area that surrounds Manchester Central could benefit from a strengthening of definition, identity and a reinforced sense of place. The opportunity for change is given by the City's strategy of converting the site to a main transport node, with the ongoing Metrolink Second City Crossing development. Government Guidance indicates that areas close to major transport nodes are the best locations for high density development. As highlighted during the European Transport Conference (2008) tall buildings create external economic benefits, in the form of agglomeration impacts, when placed by key transport nodes.
- iv) Following the review of the character of the surrounding conservation areas, townscape and urban form, this outline appraisal of the short-and-mid-range key views is intended to enable meaningful discussion with key stakeholders and the project team in understanding potential issues in terms of visual impact on the historic environment.

Short-range views

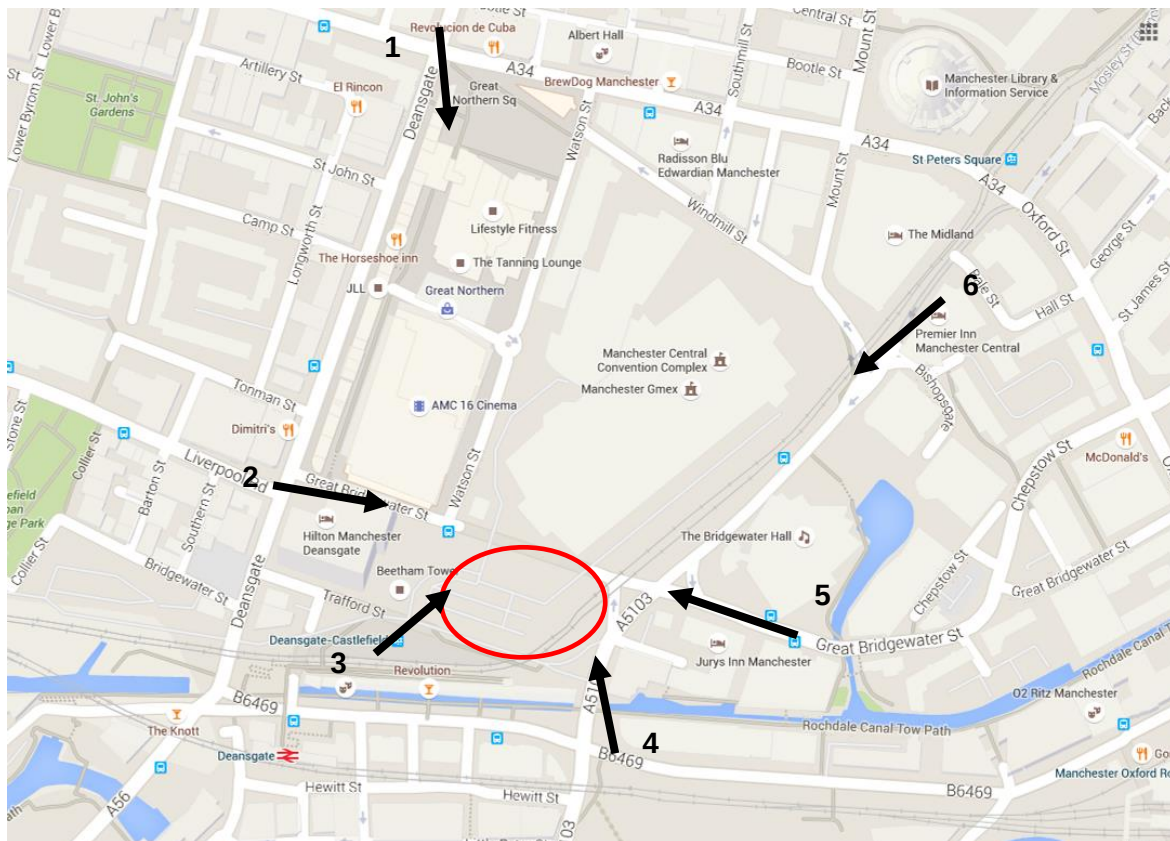


Figure 19: Location of short-range views of the site – area of subject site highlighted by red circle

Table 3: Key short-range views

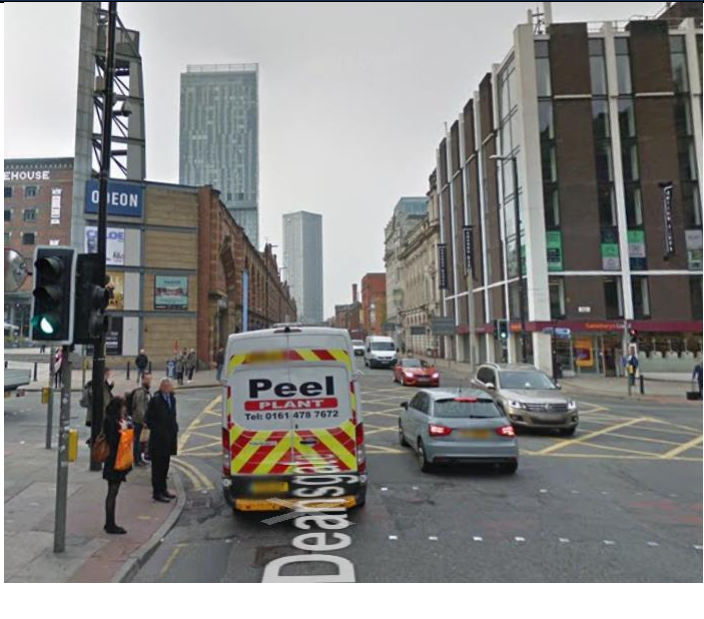
1		Junction of Peter Street, Deansgate and Quay Street looking south towards the subject site. Focal point of the Deansgate/ Peter Street Conservation Area and its high townscape value alongside view of Grade II* Northern Warehouse. Sensitivities: historic street pattern, scale and skyline; setting of listed buildings; and, character
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Table 3: Key short-range views

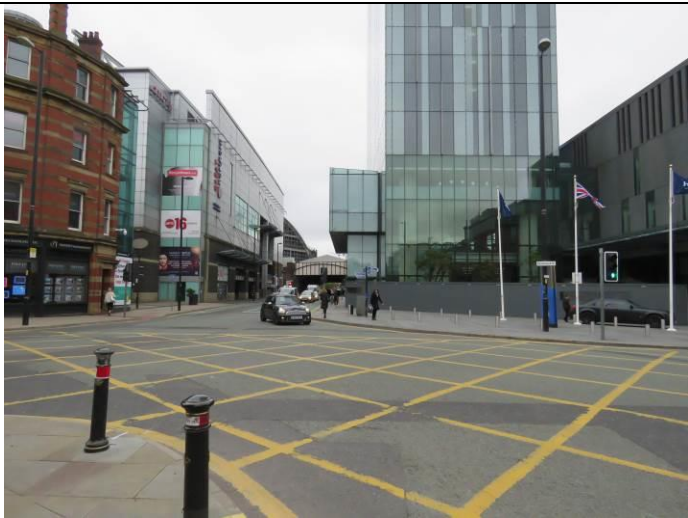
		and appearance of Conservation Area.
2		Junction of Great Bridgwater Street, Deansgate and Liverpool Road looking east towards the subject site. Key view of Great Bridgwater Street Bridge and Grade II* Manchester Central. Sensitivities: setting of listed buildings.
3		Deangate-Castlefield tram stop looking north-east towards the subject site. Key view of Grade II* Manchester Central from Grade II listed Castlefield Viaduct. Sensitivities: scale and skyline; setting of listed buildings

Table 3: Key short-range views

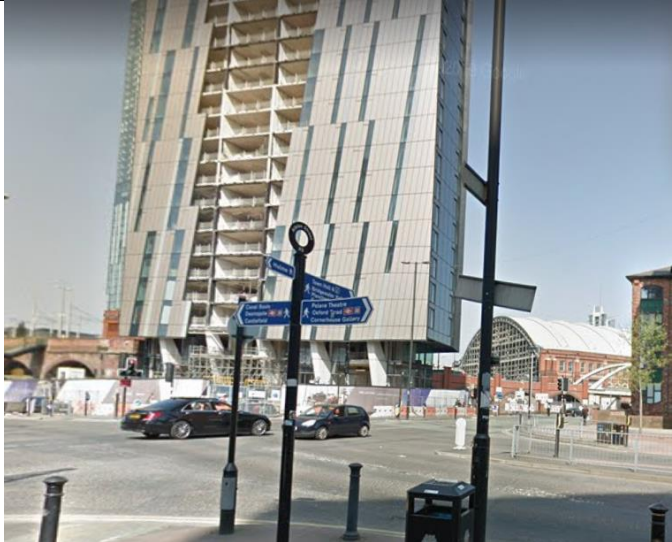
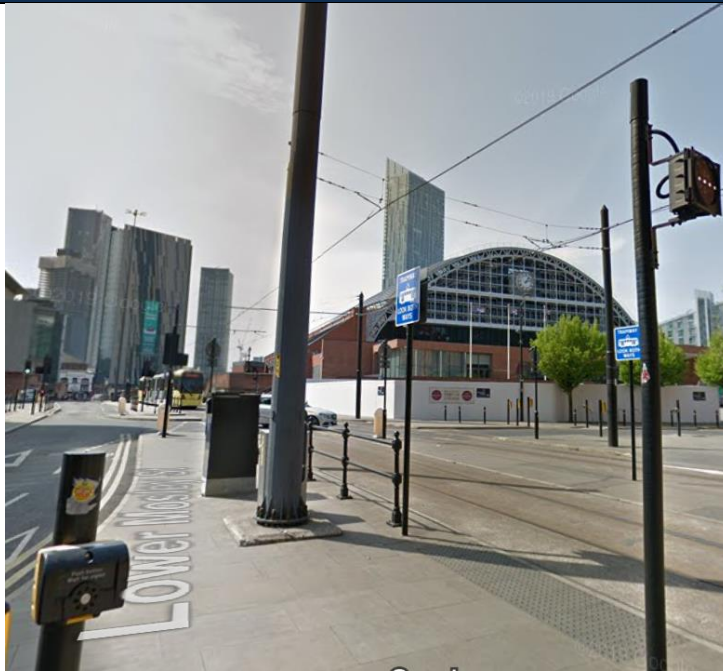
4		Junction of Albion Street and Whitworth Street looking north. The Axis development (now complete) forms the central focus of the view. Grade II* Manchester Central building and adjacent Grade II listed buildings Sensitivities: historic skyline and setting of listed buildings.
5		Great Bridgewater Street east looking west towards the subject site. Key view of Great Bridgewater Street Bridge and Grade II* Manchester Central. Sensitivities: historic street pattern, scale and skyline; setting of listed buildings

Table 3: Key short-range views

6



Lower Mosley Street at junction with Bishopsgate looking south-west towards the subject site.

Key view of the Grade II* Manchester Central.

Sensitivities: historic street pattern, scale and skyline; setting of listed buildings

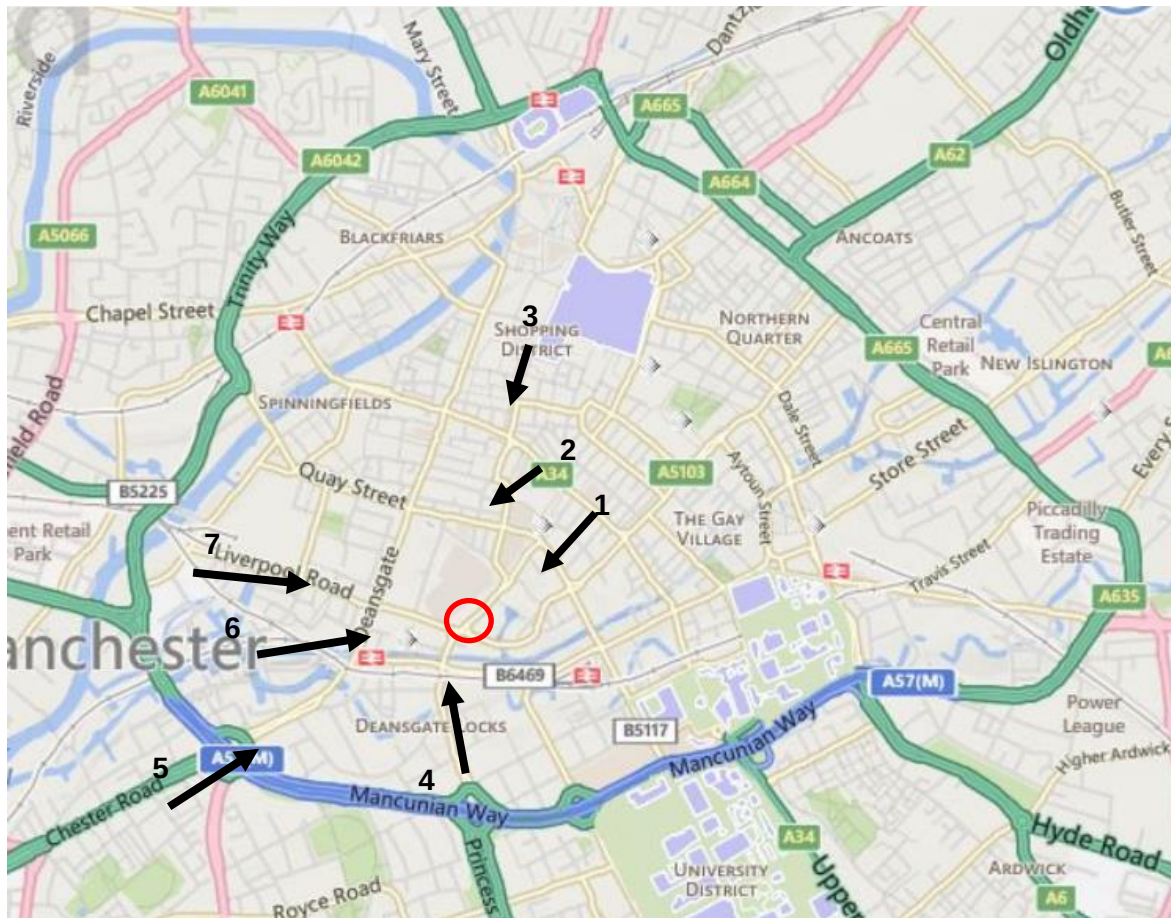
Mid-range views

Figure 20: Location of mid-range views of the site

Table 4: mid-range views

View	Baseline Image	Description
1		Mosley Street looking south towards the subject site. Grade I City Art Gallery and Grade II* Midland Hotel. Sensitivities: Key view looking into St Peter's Square and conservation area; historic skyline; setting issues.
2		North side of Albert Square looking south-west towards the subject site. Grade I Listed Town Hall and Grade I Listed Albert Memorial. Within the Albert Square Conservation Area. Sensitivities: historic skyline and impact on setting of listed buildings of international significance and character and appearance of conservation area.

Table 4: mid-range views

View	Baseline Image	Description
3		St Ann's Square looking south towards the subject site. Grade I listed Church and Grade II listed buildings. Within St Ann's Square conservation area. Sensitivities: historic skyline and impact on setting of listed buildings and character and appearance of conservation area.
4		Medlock Street looking north. Grade II* Manchester Central Sensitivities: Key kinetic views into the city centre; historic skyline and impact on setting of listed buildings.
5		Chester Road looking north east. Grade II* St George's Church and city sky scape Sensitivities: historic skyline and impact on setting of listed buildings.

Table 4: mid-range views

View	Baseline Image	Description
6		Castlefield Basin looking east. Various Grade II listed structures including canal locks, viaducts and associated buildings. Within the Castlefield Conservation Area. Sensitivities: historic skyline and impact on setting of listed buildings and character and appearance of conservation area.
7		West end of Liverpool Road looking east. Grade I listed former Liverpool Road Station buildings and adjacent Grade II listed buildings forming a streetscape of high value. Within the Castlefield Conservation Area Sensitivities: historic skyline and impact on setting of listed buildings and character and appearance of conservation area.

5.3 Listed buildings

- i) Statutory listing of buildings means that a building is of special architectural or historic interest and is therefore of heritage significance. Grading of listed buildings reflects their architectural and historic interest; Grade I buildings are of exceptional interest; Grade II* buildings are particularly important buildings of more than special interest; and Grade II buildings are of special interest.
- ii) This section presents a detailed discussion regarding the listed buildings within the subject site (Section 5.3.1). Considerations regarding the elevated nature of the proposed development site and the surrounding urban form have informed the identification of the listed buildings surrounding the subject site that could be affected by proposed redevelopment of the subject site. A summary of the contribution of the buildings' setting to its significance is provided in Table 2, Section 5.3.2. Appendix II provides further detailed information regarding the significance (including setting) of the key highly listed (Grade I and Grade II*) listed buildings surrounding the site.

Castlefield viaduct undercroft, Great Bridgwater Street Bridge and Manchester Central Station

- i) This section will discuss each listed component of the subject site in turn, providing a detailed assessment of its significance.



Figure 21: Aerial view of the subject site looking south-west. Manchester Central dominates the view in foreground; the Castlefield Viaduct can be seen running along the left side of the photo; the Manchester South Junction and Altrincham Railway Viaduct can be seen dissecting the Castlefield Viaduct in the top left corner. The location of the Great Bridgwater Street is seen to the bottom left of Manchester Central where the arched bridge structure is visible – this is the Metrolink tram line. The brick arched undercroft is located under the area of hard paving to the left of Manchester Central.

Manchester Central - Grade II*

- i) Although the Manchester Central building is outside of the subject site, due to being immediately adjacent, consideration to the significance of the building and its setting is crucial to informing development proposals.
- ii) Manchester Central Station was built in 1875-80 by Charles Sacre for the Cheshire Lines Committee and became Manchester's fourth and final passenger railway terminus. The huge cast iron train shed was never finished; the original intention was to construct a large railway hotel adjoining the train shed to the north but the frontage was left with temporary wooden structures forming a waiting room, station master's office and booking hall; the Midland Hotel, which was subsequently built to serve the railway station, was built on the other side of Windmill Street over twenty years later.
- iii) The former station is positioned upon a vast brick undercroft, with a single segmental-vaulted shed of 15 bays and a 210-foot span. The station closed in 1967 and was used as a car park until it was converted into the Greater Manchester Exhibition & Events Centre (G-MEX) in 1982-86. It is now called Manchester Central and has been extended to the west side for its use as an international conference centre.
- iv) The former Central Station building represents the end of a highly significant period in Manchester's history when it was the leading industrial city in Britain and newly-created railway companies recognised the need for a foothold in it. From the 1840s intense and protracted competition for access and site facilities lead to five lines radiating from four termini in Manchester; Manchester Central being the last. The construction of these new railway termini led to huge physical consequences for the Victorian City as well as being a significant contributor to the depopulation of the inner city. The remaining ring of railway lines, viaducts and station buildings (operational and non-operational) have become a key characteristic of the urban geography of the city.
- v) Due to the typology, scale and form of the building, it is clearly understood as a former railway station. The building is experienced at different levels around the site; most prominently from the Piazza at street level to the north. As discussed above, despite never being fully realised, the north side of the building is the principal façade and of greatest importance in terms of being able to understand and appreciate the setting of the building; views from Mosley Street/Windmill Street are the key viewing places to appreciate the architectural form and historic relationship to the Midland Hotel. The inactivity experienced along Windmill Street and the presence of the Metrolink tram line along Lower Mosley Street, combined with the changes of level of these streets, affects the ability to understand and appreciate the monumental form of the building in these areas. Appreciation and understanding of the significance of the setting of the building from the south side are yielded from longer distance views from Chester Road and Medlock Street. The experience of the building from the Metrolink tram stop is compromised by the poor pedestrian environment and visual clutter associated with the

building's service yard; the erosion of the former track beds and platform canopies to the south side has eroded the significance of the setting to this side of the building.

- vi) The architectural interest of the building is best represented from within the building itself where the sheer scale of the structure can be understood and appreciated fully (see Figures 22 & 22A). The special historic interest of the building is yielded by its group value alongside the Castlefield viaduct and remaining lines and viaducts. As has been described, the existing setting of the building is largely limited to the streets within the immediacies of the site and that the altered nature/ poor quality environment of these adversely affects the ability to understand and appreciated the heritage values of the building (see Figures 23-24).

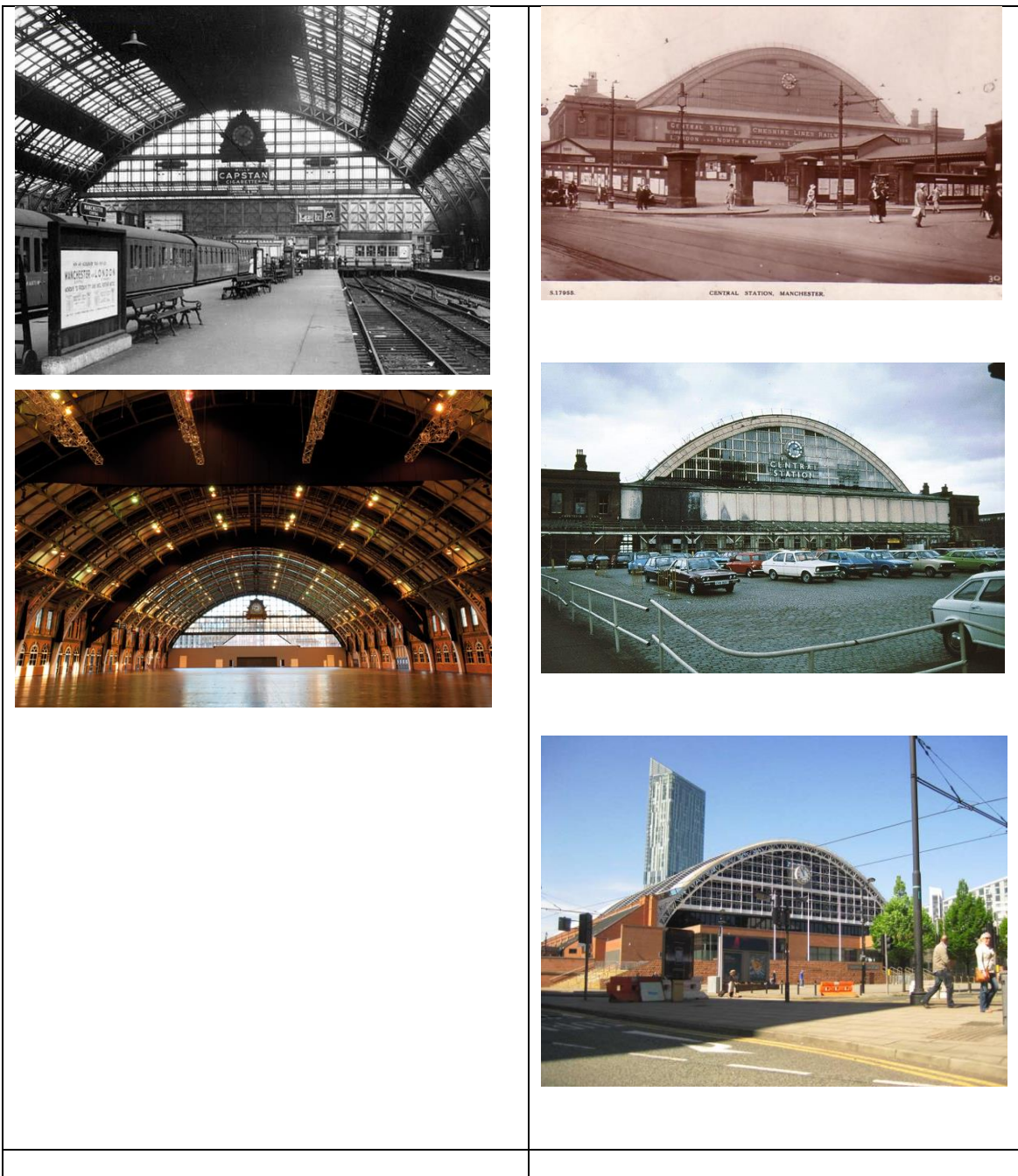


Figure 22 & 22A: These photos illustrate how the impressive form of the Manchester Central building remains largely as it was built (top) and that it can still be understood and appreciated today (bottom)



Figure 23, 23A & 23B: These photos illustrate the changing uses and settings of the Manchester Central building from the principal north side. Top image, as a railway station, middle image as a car park and bottom image as a convention centre.

Figure 24, 24A & 24B: These images illustrate the substantial alterations that have occurred to the south side of the Manchester Central building following the changes of use from train

<i>station, car park to service yard. Although the form of the building remains dominant, the changes to the glazing of the arch have affected its aesthetic value.</i>	
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Castlefield Viaduct including brick undercroft and Great Bridgwater Street - Grade II

- i) The Castlefield Viaduct structure is listed from its start at Manchester Central to Dawson Street, where it crosses the Mancunian Way/ A57.
- ii) The Castlefield Viaduct was built in c.1877 to carry twin railway tracks from ground level at Cornbrook Junction (to the south west of the city centre) into the area of the new Central Station. As can be seen from the south side of the structure, along Whitworth Street West, it consists of arches of wire-cut red brick and in the areas where track needed to be carried over roads, canals and dock basins.
- iii) Following the opening of Central Station in 1880, and the increase in train traffic into the station, the Viaduct was widened to five tracks in c.1893. The widening was accomplished by constructing a virtually identical brick viaduct adjacent to the original and knocking down the dividing parapet. The presence of blue bricks to the north side of the structure is testament to this phase of works. It appears that the bridge over Deansgate was replaced when the widening works took place although elsewhere along the viaduct, where space permitted, the additional tracks were carried on twin parallel bridge structures.
- iv) In 1969, following the Beeching cuts, Central Station closed and the train lines, including the one over Castlefield Viaduct, became abandoned. The track beds were removed and the area to the south side of the former Central Station became used as a car park. In 1986 when the former station building was converted into an exhibition centre a high level walkway was constructed from Deansgate Mainline Train Station across Whitworth Street West to provide access to the building, across the viaduct and former track beds of the railway lines that had once served the station building.
- v) During this time discussions regarding a light-rail transport system for Manchester were being progressed to improve access across Manchester and into the city. The first phase of the regional light-rail network was the Bury-to-Altrincham route which utilised the former railway lines into the city centre and then provided street level tracks across the city centre. In 1989 refurbishment works began on the Castlefield Viaduct to connect the Metrolink line from St Peter's Square to Cornbrook whilst providing a station at the former Central Station.
- vi) Refurbishment of the Castlefield Viaduct, to accommodate new tracks for the Metrolink service, included introducing waterproofing systems, installing a new concrete deck and providing vehicular access up to deck-level via Trafford Street. The new tram line that connects the deck

level to street level runs alongside the Castlefield Viaduct on the east side. Alterations to the brick undercroft and the creation of a car show room and yard were undertaken at this time.

- vii) Following the opening of the Metrolink stop, in the late 1990s conversion of the Viaduct's arches into a number of bars, known as 'Deansgate Locks,' regenerated the area further by providing use and activity to the area. However, not including the alterations and conversion of the eastern-most brick undercroft arches for a car showroom, the area of Great Bridgwater Street beneath the bridge has remained unutilised.
- viii) It will be clear that the Castlefield Viaduct is experienced from a wide variety of places along its length, and consequently its setting is vast. The architectural interest of the viaduct is best revealed from within Castlefield itself, where the mass and form of the structure, as it stretches over and above the canals and roads, dominates the area. Along Whitworth Street West the viaduct articulates the north side of the street and provides a strong sense of enclosure. Moving into Albion Street/ Great Bridgwater Street and Lower Mosley Street, where the subject site is located, the legibility of the viaduct is fragmented due to the alterations that have taken place to the structure, the poor quality pedestrian environment and dominance of road infrastructure.
- ix) Figures 25-28 illustrate the varied forms and elements of the Castlefield Viaduct. The structure is most fully appreciated and understood within the Castlefield Basin area (Figures 22 and 23). Figure 27 illustrates the view of the viaduct at the point it crosses Great Bridgwater Street demonstrating how the restrictions of the site have created a poor pedestrian environment. Figure 28 illustrates the brick undercroft within the subject site.



Figure 25: *Castlefield Viaduct as it appears within Castlefield; the structure splits in two at this point. This is where the*



Figure 26: *Castlefield Viaduct as it appears in Castlefield; the structure dominates the character of the area.*



Figure 27: View of Castlefield Viaduct at its crossing with Great Bridgewater Street



Figure 28: View of the brick undercroft of Castlefield viaduct

Discussion regarding the group value of the listed buildings within the Site

- i) Although the integrity of the Castelfield Viaduct structure is understood and appreciated within areas of Castlefield, within the subject site the intrusion of the Metrolink tram line to the east and alterations at deck level have eroded the legibility of the structure in this area. However, despite issues with permeability, connectivity and pedestrian environment, the group value of the brick undercroft, Great Bridgewater Street bridge and Manchester Central can still be understood and appreciated. Following the redevelopment of the Deansgate/ Castlefield tram stop there is the anticipation of further development that will enhance these neglected areas and improve the overall coherency of the space.
- ii) Regarding the development of the subject site Dr Ron Fitzgerald provides the following commentary regarding the compromising factors that led to its siting, and surrounding infrastructure (See Appendix V for full report):

The conditioning factor [that led to the choice of a cast-iron arched girder bridge over Great Bridgewater Street] was the slender envelope of construction that resulted from the pre-existing railway topography, the natural ground levels of the proposed station site and the Local Authority's prescriptive rights in terms of the preservation of Great Bridgewater Street. Collectively these factors implied a structure with a very restricted constructional depth. In selecting a shallow segmental arch [the designer] chose a structural form that had a history extending back to the early nineteenth-century, both in general terms and in the specific pattern used here; the arched girder. No innovation was called for in using this type of structure and the analytical tools necessary to ensure the adequacy of the final design were part of the commonplace of engineering technology by this time. The use of

wrought-iron deck plates was a more recent development, dating from the eighteen-sixties but again no originality is to be found in this instance.

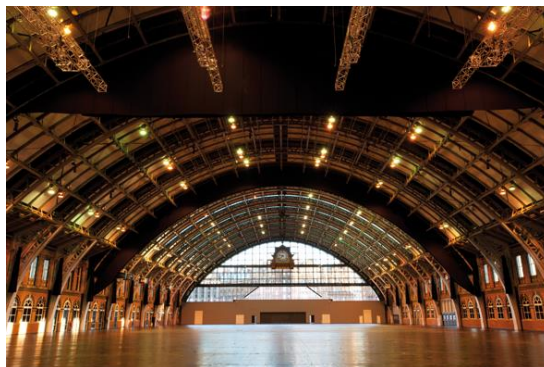
As far as the broader contextual issues are concerned the bridge is an integral component of the station's history. As such, along with the viaduct and the Deansgate crossing, it is an expression of the complex, competitive, free-enterprise framework that resulted in the railway geography of Manchester and which played a fundamental role in shaping the City as it is today.

- iii) Table 5 (below) disaggregates the significance of the Castlefield Viaduct and setting of Manchester Central.

Table 5: Significance Appraisal

Architectural Interest

The architectural form and expression of the viaduct and Manchester Central is of **high significance** due to the townscape qualities of the structure which is a dominant feature of Deansgate and Whitworth Street West. The large number of arches and span of the structure alongside the additional components, such as the Deansgate bridge, enhance the composition. The high significance is also due to the group value of the structures. The architectural interest of the viaduct structure is best represented within the Castlefield Basin area and along Whitworth Street West whilst the architectural interest of Manchester Central is best represented internally where the spatial qualities of the building are understood and appreciated most fully.



Historic Interest

The historic interest of the viaduct and Manchester Central building is of **considerable significance** due to its association with the development of the railways and the effects this had on the urban geography of the city. Although the original relationship with the former Central Station has been altered the ability to appreciate and understand the structure's historical associations is still possible.

**Group Value**

The group value of the viaduct is of **high significance**. The viaduct is an integral part of the multi-layered environment of viaducts that run across Castlefield reflecting the former rail network in the area. Regarding the subject site, the adjacent listed structures associated with Manchester Central are also of high group value.

**Heritage Interest**

Despite the standardisation of railway structures by the 1870s, the scale of the viaduct and group value, alongside the other active and redundant lines, yield **considerable** architectural and historical interest. The viaduct illustrates the expansion of the railways in Manchester and the impact this had on technological innovation as well as economic and social spheres.

The dominance of the grouping of the structures and associated impact on the townscape in this area, especially in relation to Manchester Central, is also of **considerable** aesthetic interest.

Although altered, the viaduct yields sufficient aesthetic values to allow for the historical values to be appreciate and understood. The presence of the current Metrolink stop allows for continual activity and use of the structure, furthering appreciation and understanding of its heritage interest.	
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Contribution of Setting to Significance: Surrounding Listed Buildings

- iv) Table 6 presents a proportionate analysis of the significance of the setting of the identified heritage assets surrounding the subject site, utilising the characterisation appraisal and analysis of the conservation areas (Sections 5.2 and 5.4)

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
22	Manchester Town Hall, Albert Square	I	Town Hall designed by leading Gothic architect of the Victorian era; Alfred Waterhouse dating to 1868-77. Sandstone ashlar facing over brick carcass. Positioned on a Triangular island site, with 3 main ranges enclosing a triangular courtyard. Three storeys and attics. Building of major importance, and probably Waterhouse's finest work. Contains mural paintings by Ford Madox Brown.	Manchester Town Hall is one of the most important historical, and architectural buildings in Manchester, being understood and appreciated as a historic structure with strong aesthetic, communal and historic values. The building is regarded as architect Alfred Waterhouse's finest work. The town hall forms a highly important civic group with the adjoining Town Hall Extension and Central Library, which are experienced from Albert Square and St Peters Square. The building dominates the skyline from many parts of Manchester, with its tall central clock tower which is historically thought to signify the centre of the city.
11	Albert Memorial, Albert Square	I	Large stone memorial to Prince Albert dating to 1862-5, by Thomas Worthington, with central statue in white marble of	The Albert Memorial stands proudly in the centre of Albert Square and forms a tall, striking feature within its immediate environs including Albert Square, Princess Street,

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			Prince Albert by Matthew Noble. It was the first major Albert Memorial to be completed; and perhaps a prototype for the Albert Memorial in Kensington, by Sir George Gilbert Scott. Structure in the form of a large Gothic ciborium or canopy, to a design derived from the C13 church of Santa Maria della Spina in Italy.	Brazenose Street and Lloyd Street. The monument is highly significant in its setting with the Grade I Listed Town Hall, which result in creating a highly significant public civic square. The significance of the Town Hall is fully appreciated when viewed alongside the adjoining Town Hall Extension and Central Library, and when viewed from Albert Square, St Peters Square and from the main city centre streets surrounding the building.
31	Town Hall Extension, Lloyd Street	II*	Large extension to Manchester Town Hall 1938, by Vincent Harris. Steel frame with cladding of sandstone ashlar and steeply-pitched lead roof. Large irregular plan with long concave south side which creates a sweeping walkway between this building and Harris's Central Library. Eclectic style with Gothic accent. Eight storeys and attic, the 7th and 8th storeys set back behind a parapet.	The Town Hall Extension is a large, looming structure designed to fit harmoniously with the extant Town Hall and Central Library. The building is bold and confident in its setting, and heightens the sense of a civic group of buildings. Its irregular shape results from the close relationship it has with the adjoining Town Hall And Central Library and the requirement for it to fit in seamlessly with them. Important views and vistas can be seen along Lloyd Street, and through its colonnade in St Peters Square. Library Walk, which forms the passageway between the Extension and the Library, is a highly important public space. The significance of the Town Hall Extension is fully appreciated when viewed alongside the adjoining Central Library and Town Hall, and where viewed from Peter Street, St Peters Square and Mount Street.
29	Central Public Library, St Peters Square	II*	Public library dating to 1930-4, by Vincent Harris, who also designed the neighbouring Manchester Town Hall Extension in	Manchester Central Library forms one of the finest and most recognisable structures in Manchester. Its unusual cylindrical form, in a classical style is unique.

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			1938. Large classical style civic building in Portland stone. Four storeys with basement and attic. Notable for its circular form and set-back Tuscan colonnaded screen to 2nd and 3rd floors. Main entrance has a central 5-bay portico of giant Corinthian	The building forms a commanding and bold statement with views and vistas across the expanse of St Peters Square, Peter Street and Cross Street. The library forms a highly important civic group with the adjoining Manchester Town Hall and Town Hall Extension. The significance of the library is fully appreciated when viewed alongside the adjoining Town Hall Extension and Town Hall, and where viewed from Peter Street and St Peters Square.
33	Deansgate Goods Station (Great Northern), Watson Street	II*	Large former goods station and warehouse, now car park and entertainment venue. A unique survival of a 3-way railway goods exchange station, serving the railway, canal and road networks of the Manchester region, it was considered in its day to be one of the most advanced railway goods exchanges in the country. Constructed in 1885-96, and 1899, for the Great Northern Railway Company. Steel-framed construction, cladding of red brick with blue brick banding. Five storeys, frieze with lettering in white glazed brick: "GREAT NORTHERN RAILWAY COMPANY'S GOODS WAREHOUSE" (on all 4 sides); and brick bracketed cornice with blocking course. The	The former Deansgate Goods Station forms an enormous island site, bounded by Peter Street to the north, Watson Street to the east, Great Bridgewater Street to the south and Deansgate to the west. The industrial looking Great Northern Warehouse to the centre of the site rises proudly above the surrounding screen wall terrace of associated shops along Deansgate. This building is fully appreciated and understood from the western end of Peter Street, where the site opens up into a landscaped public square.

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			interior is of brick jack arch, fire-proof construction. Forms groups with Nos 235-92 Deansgate.	
17	Midland Hotel, Peter Street	II*	Late Victorian railway hotel. Dating to 1898-1903, by Charles Trubshaw, constructed for the Midland Railway Company and neighbouring Manchester Central Station (listed above). Steel frame, with cladding of brown polished granite, red brick and much buff and brown glazed terracotta. Very large tapeziform plan on island site. In an elaborate eclectic Edwardian Baroque style. Five diminishing storeys with cellars and attics. Roof has many turrets, and is surmounted by elaborate attic gables; with heavy cornice and balustraded parapet over ground floor. The ground floor, of polished granite, has a recessed central entrance under 2 massive semi-circular arches with raised lettering "MIDLAND HOTEL"; Very prominent building representative of the cosmopolitan wealth and taste of late C19 Manchester, and an early	The Midland Hotel forms a highly significant free-style Edwardian railway hotel, and one which is heightened by its association with the adjoining former Central Station. The building forms a giant island site, with all four of its elevations being highly decorated with glazed terracotta and faience. The Midland is viewed from many prominent positions including the wide and open St Peters Square to the north-east, Peter Street to the north and Central Plaza to the south-west. The varied and whimsical roofline with its many turrets, gables and pinnacles, can be appreciated from its immediate environs.

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			example of a steel-framed building.	
58	Manchester South Junction and Altrincham Railway Viaduct	II	Railway viaduct for the Manchester South Junction & Altrincham Railway Company, 1846-9, constructed by David Bellhouse Junior. Red brick with some small sections of blue brick, sandstone dressings and cast-iron bridges	This structure spans a great length and is a constant feature in the area and forms the background to many local streetscapes. The viaduct is mainly bound by Whitworth Street West in this area where it is understood and appreciated as a historic structure with communal and historic values. The significance of its setting is varied as it is in many parts built up against and hidden from view from other areas.
52	Castlefield railway viaduct from G-Mex to Dawson Street	II	Railway viaduct, dating to c1880. Cast iron and wrought iron, red brick. Runs south-west from former Central Station, then westwards, dividing into two over Castlefield where it forms cast iron drum piers rising to square castellated towers supporting metal lattice parapet. Castellated brick piers with stone dressings and Gothic style skew bridges.	The Castlefield Viaduct forms a significant part of Manchester's railway history, passing through the highly significant area of Castlefield and using many differing materials and Gothic bridges. The setting of the viaduct is fully appreciated from the Castlefield Basin area, and where passing across Deansgate.
58	Deansgate Station, Deansgate and Whitworth Street West	II	Railway station dating to 1896. Built of red brick with blue brick banding and stone and terracotta dressings, slate roof. On a very angular site with the entrance at the sharply curved corner. Two stories in a Baronial style. Paired entrances on the corner with terracotta surround, pointed arch	This station forms the late Victorian replacement to the original 1840's station, and holds the curved corner of Whitworth Street West and Deansgate, and forms an interesting group with the adjoining Manchester South Junction and Altrincham Railway Viaduct which runs through the rear of the building over Deansgate. This coupled with the long linear form of the neighbouring Castlefield railway viaduct to the

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			doorways with mock portcullises, gabled heads on colonettes, paired between the doors. Blue brick base with stone banding, band at first floor cill level, machicolated band at eaves level, parapet stepped up and down as mock battlements. Shield with date 1896 and stone scroll carved with the original name KNOTT MILL STATION.	north creates kinetic views along Deansgate and Whitworth Street West. The significance of the setting of the station building focusses on the linear form of the surrounding railway viaducts.
57	Rochdale canal lock keepers cottage at lock number 91, next to Gaythorn Tunnel	II	Former lock keeper's cottage, now bar dating to c1805, Red brick in Flemish bond, with sandstone dressings. Three storeys and 3 windows, the first storey being a full-height basement and the 2nd effectively the "ground floor" at street level. Forms group with Lock No 21.	This small, and isolated example of a domestic lock keepers cottage forms an interesting pre-industrial structure associated with the opening years of the Rochdale Canal system, before the industrial of the city. Its small domestic form and materials are at juxtaposition with the later road and rail networks running parallel to it. The significance of this building focusses on its relationship with the adjoining canal and railway viaducts running east-west.
53	The Britons Protection Public House, 50, Great Bridgewater Street	II	Small symmetrical public house dating to the early-19th Century, c1805, internally remodelled in c1930. Red brick, the front painted at ground floor and roughcast and whitened above. Long bar at front parallel to street with corridor and further rooms behind. Interior retains much of	The Briton's Protection public house is a rare surviving part of the pre-industrial nature of Manchester City centre before the industrial revolution saw smaller 18 th and 19 th Century domestic buildings being replaced by large and sprawling mills and warehouses. The building is a small domestic public house, which represents the pre 1815 small grain of the area. Due to the size of the building, it is only fully appreciated from Lower Mosley Street and the

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			remodelling dating to c1930.	junction with Great Bridgewater Street.
54	13-17, Albion Street	II	Warehouse, now offices. c.1860-70; altered. Red brick with sandstone dressings, slate roof. Shallow U-plan. Venetian Gothic style. Four storeys and basement, a 9-bay facade, the left corner canted back, with pilasters and sill-bands to the upper floors, and brick corbelled frieze; segmental-headed doorway in corner, and pointed-segmental arcaded windows at ground floor of left return wall, linked by impost bands, but altered showroom windows in front wall; 3-light windows to the upper floors, those at 1st and 2nd floors with cusped tracery and those at 2nd floor segmental-headed, and those at 3rd floor with pointed-arched lights. Hipped roof. Rear and interior altered.	Numbers 13-17 Albion Street is a bold former warehouse building. The building has strong fenestration detailing to its north and west elevations. The buildings' setting and original warehouse function is understood by the kinetic views along Albion Street and Whitworth Street West, which are enhanced and understood at the Rochdale Canal level from which the building was originally used for loading/unloading.
55	Lock 90, east of Albion Bridge	II	Canal lock. 1804-5, for Rochdale Canal Company; restored. Coursed squared sandstone, wooden gates. Chamber of 14-foot width with pairs of gates at both ends, ladder in centre of north side. Seventh in series of 9 locks on	Due to the public realm on the north side of Whitworth Street West and the associated footbridges and decking to access the bars within the arches of the viaduct, the setting of the locks has been substantially altered. Lock 90 and 91 are listed for their group value; the ability to understand and appreciate the structures together, alongside the

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			extension linking former Rochdale Canal basin at Dale Street with Bridgewater Canal basin at Castlefield, all in working order. Forms part of group with Lock No.91 and Lock Keeper's Cottage to west (q.v.), and Albion Street Bridge to east (q.v.).	former Lock Keeper's Cottage, which is intrinsic to their special interest. Consequently, the significance of the setting of these two lock structures is best experienced from the tow path, below street level. Views from the street level decking down to the canal and lock structures is not a historic view, although it affords the ability to gain further appreciation and understanding of the structures and their relationship with the canal.
56	Lock 91, west of Gaythorn Tunnel	II	Canal lock. 1804-5, for Rochdale Canal Company; restored. Coursed squared sandstone, wooden gates. Chamber of 14-foot width with pairs of gates at both ends, ladder in centre of north side, towpath "island" on south side with curved stone staircase at lower end. Eighth in series of 9 locks on extension linking former Rochdale Canal basin at Dale Street with Bridgewater Canal basin at Castlefield, all in working order. Forms group with Lock Keeper's Cottage on north side	Due to the public realm on the north side of Whitworth Street West and the associated footbridges and decking to access the bars within the arches of the viaduct, the setting of the locks has been substantially altered. Lock 90 and 91 are listed for their group value; the ability to understand and appreciate the structures together, alongside the former Lock Keeper's Cottage, which is intrinsic to their special interest. Consequently, the significance of the setting of these two lock structures is best experienced from the tow path, below street level. Views from the street level decking down to the canal and lock structures is not a historic view, although it affords the ability to gain further appreciation and understanding of the structures and their relationship with the canal.
15	Theatre Royal	II	Theatre now night club, 1845 by Irwin and Chester, altered 1875 by Edward Salomons. Exterior restored and interior remodelled in 1989. Two storeys and attic; monumental façade	The setting of the Theatre Royal is largely confined to its island site. The building can be experienced from Peter Street, Southmill Street, Museum Street and Windmill Street. The wider setting of the building is understood from mid-range views looking east or west along Peter

TABLE 6: Contribution of setting to significance – Designated heritage assets surrounding the Subject Site

No. on Fig 2	Listed Building Name	Grade	Summary of significance	Contribution of Setting to Significance
			of 3 unequal bays, symmetrical with plinth, modillioned cornice, attic treated as a parapet and gabled centre. The centre which breaks forward is treated as a giant recessed portico with fluted Corinthian columns distyle in antis. This is Manchester's oldest surviving theatre.	Street where the building can be read alongside the YMCA, Midland Hotel and Free Trade Hall as individual buildings of high townscape quality. Read alongside the YMCA and Midland Hotel buildings, the multi period townscape to this part of the city centre can be understood and appreciated.
16	YMCA (St George's House)	II	Former YMCA club 1911 by Woodhouse, Corbett and Dean rebuilt except for the façade 1991-3. Façade of brown and buff terracotta. Free Baroque style with Art Nouveau accent. 5 storeys and attic, 5 bays, heavily banded dark brown terracotta to ground floor channelled 1 st floor string course, festoons to 3 rd and 4 th floors, massive bracketed cornice to 4 th floor. The first important building in Manchester to be built in reinforced concrete internal arrangement modelled on New York YMCA.	As the YMCA building forms part of an island site, its significance aspect of its setting is towards Peter Street; this is where the principal façade of the building is and where it can be understood within the surrounding multi-period townscape. The building is bound by Museum Street and Mount Street which allow the scale and form of the building to be understood and appreciated. The YMCA building forms an important group of large individual buildings along Peter Street which defines the character of the wider townscape.

5.4 Conservation Areas

- i) Conservation areas are designated areas that are deemed to have special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.¹ In considering redevelopment options for the subject site, consideration will have to be given to the character and appearance of the surrounding conservation areas and how the site currently contributes to the setting of those conservation areas.
- ii) The following provides a summary of the conservation areas surrounding the subject site and appraises the character of these areas and overall significance. Further detailed analysis is provided in Appendix III.

St Peter's Square Conservation Area

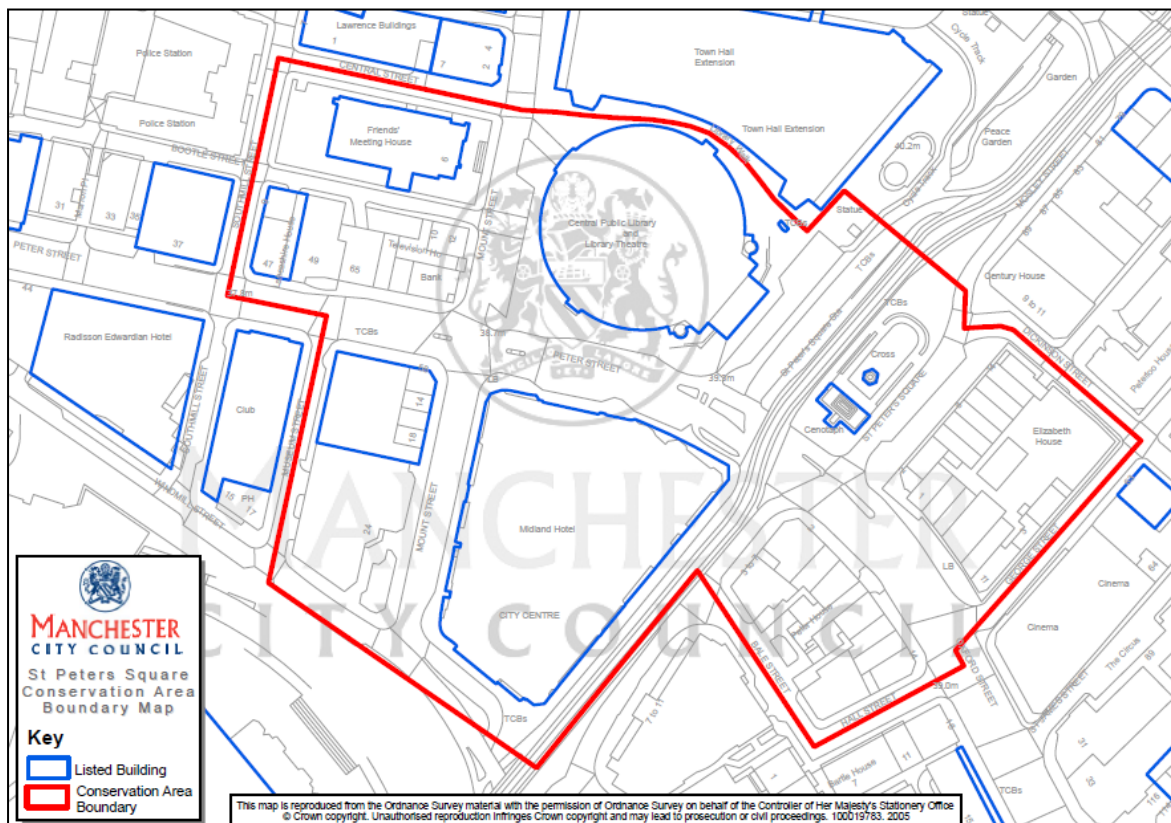


Figure 29: plan of St Peter's Square Conservation Area and associated Listed Buildings

- iii) St Peter's Square conservation area is an area which contains a mixture of commercial, cultural and civic buildings. The name derives from St. Peter's Church, which stood in the centre of St Peter's Square from 1788 to 1907.

¹ Section 69 (1) Planning (Listed Building and Conservation Area) Act 1990

- iv) Until St Peter's Church was built in 1788, the area consisted of fields on the outskirts of the relatively small Georgian town of Manchester. The church served a population which had settled in the vicinity.
- v) The area achieved notoriety on 16 August 1819, when at St Peter's Field, around Windmill Street and Peter Street, Henry Hunt addressed a meeting of 60,000 people to demand radical reform of the House of Commons. The size of the crowd so alarmed the City Magistrates that troops were called in to disperse it. Eleven people were reported killed and 140 injured in the resulting chaos. The incident is now remembered as the 'Peterloo Massacre.'
- vi) Towards the end of the 19th century, the area assumed a more commercial character and the resident population declined to a point where St Peter's Church had no congregation and was finally demolished in 1907.
- vii) The Central Station in Manchester opened in 1880 and became the terminus for the Midland Railway's route from St. Pancras in London. The railway commissioned their architect Charles Trubshaw to design the adjacent Midland Hotel 18 years later, which was built on the site of the Gentlemen's Concert Hall and two streets which divided the site north-south called Concert Buildings and Concert Place. The Midland Hotel contained a covered link corridor which passed over Windmill Street at the Hotel's southern entrance and to the station.
- viii) The new Central Library was designed by Vincent Harris and completed in 1934. This required the clearing of several streets, the foreshortening of Bootle Street to its eastern end and the removal of Cooper Street which ran north-south through the site. In 1938 Vincent Harris had designed the large new extension to the Town Hall, which was subsequently constructed in another area of cleared streets and buildings to the south elevation of the Town Hall, and linked at first floor level to the Town Hall by two decorative bridges.
- ix) The process of constructing both Central Library and the Town Hall Extension cleared the entire eastern side of Mount Street and dramatically changed the historic small urban grain of the area into a predominantly large urban grain. Vincent Harris's Town Hall Extension cleverly formed the visual link between the Gothic Town Hall and the Classical Central Library and created a new public realm for civic focus.
- x) The late 20th-Century saw no exceptional developments until the restoration of the former Central Station for use as the G-MEX Convention Centre in 1986 (now known again as Manchester Central). This large-scale redevelopment of the southern end of the Conservation Area became the catalyst for further successful adjacent developments.
- xi) Along with the Metrolink tram system, which opened in 1992, other large cultural developments were constructed to the south of the area, such as the Bridgewater Hall in (1990-1996), the International Convention Centre, adjacent to Manchester Central, and the conversion of the former Great Northern Goods Depot, for leisure use (both opening in 2000). These large public venues invited further interaction with the formation of new public realms to the north front of Manchester Central, forming Manchester Central Piazza, the construction of the Bridgewater

Hall on Lower Mosley Street, allowing the creation of Barbirolli Square and the restoration of the former Manchester and Salford Junction Canal and Bridgewater Canal basin, and the creation of the Great Northern Square to the north of the Great Northern Warehouse and Cinema complex.

- xii) The area contains some of Manchester's finest early 20th Century buildings. The Friends Meeting House, the Free Trade Hall and former Theatre Royal all survive from the early formation of the area as a cultural and learned hub and retain their classical designs.
- xiii) The main characteristic of St Peter's Square conservation area is primarily one of civic grandeur, but it also contains some commercial property. The area contains a highly diverse mix of building styles, periods, heights and materials which create interesting aesthetic juxtapositions such as the large industrial Manchester Central building alongside the highly decorated Edwardian Baroque Midland Hotel. Later 20th Century developments have restored and reused former commercial and industrial buildings which complement the existing historic fabric of the area and enhance its public use and enjoyment.

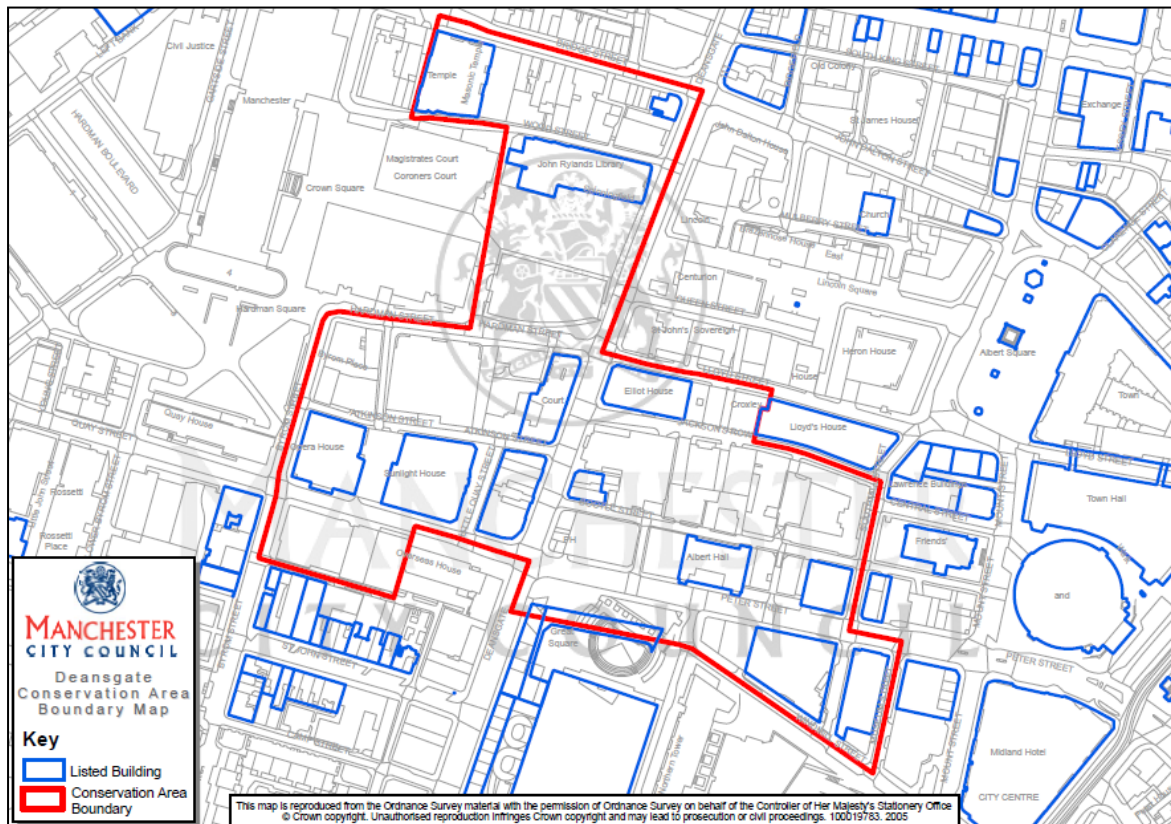
Peter Street/ Deansgate Conservation Area

Figure 30: plan of Peter Street/ Deansgate Conservation Area and associated Listed Buildings

- i) The focus of the Deansgate/Peter Street Conservation Area is on the high architectural interest of the commercial development of these two principal streets during the Victorian period.
- ii) Deansgate is one of Manchester's most historic streets, and one which is celebrated as a Roman road, used during the Roman occupation of Manchester. The street was formed to link two river crossings; the River Medlock to the south and the River Irwell to the north.
- iii) Until the early 19th Century the lower, southern end of Deansgate was known as Alport Lane. This street originally linked the ancient hamlet of Alport with the more recent township of Manchester to the north. The area of Alport Town which was an area of timber-framed cottages and shops was situated on the area now covered by the subject site. It wasn't until the later 18th Century and early-19th Century that the stretch of Deansgate between Peter Street and Great Bridgewater Street was fully developed, linking the old town with the new.
- iv) The center of the Conservation Area is the busy intersection of Peter Street, Quay Street and Deansgate. These streets make up a large portion of Manchester City Centre's commercial

district which was capitalized during the late-Victorian and Edwardian periods with the construction of many large, tall, highly decorative office buildings. Some smaller Victorian and Edwardian buildings along Deansgate occupy older building plots.

- v) Many buildings of architectural interest are located within the Conservation Area, with a large portion of these consisting of late Victorian and Edwardian buildings. Bridge Street, in particular, is a well preserved example of a Victorian and Edwardian shopping street primarily of small grain late 19th century red-brick buildings. The completeness of the street wall with individual buildings of architectural quality, especially along Deansgate is a prominent feature. Deansgate is a good example of a multi-phase streetscape, with individual, elaborately decorated buildings sitting harmoniously side by side.
- vi) The character of the Deansgate area is historically one of commercial development. Today this character continues with redevelopment and expansion to adjoining areas such as Spinningfields.
- vii) Deansgate forms the intersection of the pedestrian spaces and urban realms in, and immediately outside of the Conservation Area. Spinningfields to the western side of Deansgate contains several small pockets of open space, grassed areas and tree-lined avenues. Across Deansgate, Brazennose Street directly east of Spinningfields, opens onto the pedestrianized Lincoln Square and further east into Albert Square.
- viii) Great Northern Square is entered from the Deansgate /Peter Street junction and comprises of a large sunken, grassed amphitheatre. The configuration of Great Northern Square should encourage pedestrian movement across to Watson Street and along the tree-lined Windmill Street to reach Central Piazza and Barbirolli Square beyond. However, there is a lack of interconnection between these spaces, with no real focus or activity provided within Great Northern Square and Central Piazza. This is exacerbated by the lack of activity within the Great Northern Warehouse.
- ix) Since the redevelopment of the Great Northern Warehouse site in the late 1990s the context of the subject site has changed and it now forms an integral part of the character and appearance of the Deansgate/ Peter Street Conservation Area. There is the potential to enhance this part of the Conservation area by increasing the streetscape to Peter Street, enhancing permeability through the site and developing alternative uses within the site.
- x) The erosion of the former railway infrastructure to the south of the Great Northern Warehouse alongside developments such as the Great Northern Tower have had a negative impact on the ability to understand and appreciate the sites former uses and the ability to read them as a coherent group.

Albert Square Conservation Area

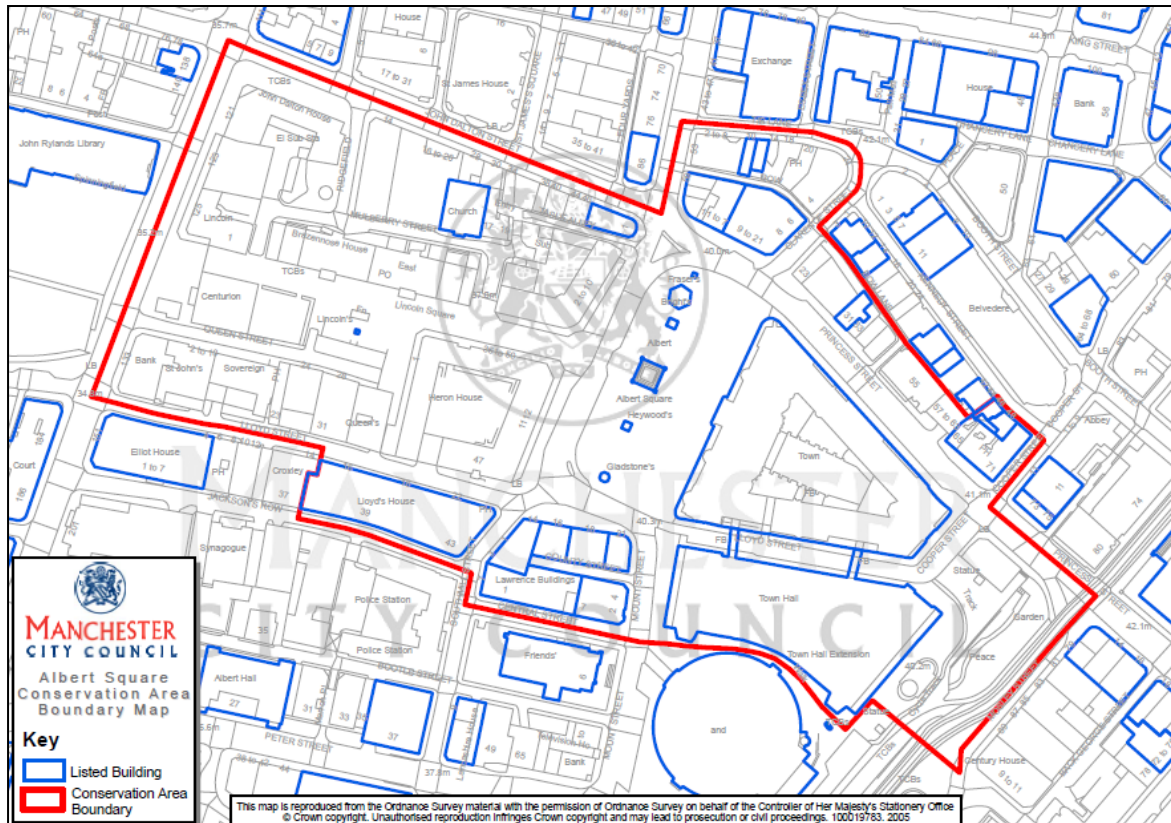


Figure 31: plan of Albert Square Conservation Area and associated Listed Buildings

- i) The area now comprising Albert Square, was offered by the Corporation in 1863 in order to create a public space providing a memorial to the recently deceased husband of Queen Victoria, Prince Albert. The space was subsequently cleared of buildings in 1864 to make way for the new square. The Albert Memorial was erected under public subscription and opened in 1869.
- ii) The New Manchester Town hall was a Gothic masterpiece, a style befitting the mid-Victorian period in which it was conceived; Waterhouse's design perfectly fitting the awkward triangular site. The building dominated the skyline when opened in September 1877. Albert Square was pedestrianized in 1987 when the eastern roadway of the 'island site' was closed to traffic and paved in granite setts.
- iii) Albert Square still retains the majority of its late Victorian, Gothic buildings fronting onto the Square. The western range of former shops and offices were demolished in c1980 and replaced with two brick-built office buildings named Heron House (1982) and Commercial Union House (1983). Brazennose Street and Lincoln Square to the west, were conceived during the same period and were originally planned as a processional route leading from the law courts in Spinningfields, through Lincoln Square, directly to Albert Square.

- iv) The area to the east of Albert Square contains the largest density of buildings of high architectural and historical quality in the city. The majority of these buildings are of a high-Gothic style and include Manchester Town Hall, Town Hall Extension, Lloyd's House, and Lawrence Buildings along with 7 listed statues. Albert Square is the focus of civic events and creates the focal point of the area, with Manchester Town Hall dominating this space, creating exciting views of its clock tower, tall gables and turrets from surrounding streets. The prominence of Manchester Town Hall's clock tower within the urban landscape, can be fully appreciated looking east along Brazennose Street, where the full height and scale of the tower can be appreciated from the long, pedestrianized and tree-lined avenue.
- v) Building heights vary, with the majority being of 4 storeys plus attics around Albert Square and Princess Street. Manchester Town Hall represents the dominant tall structure with other recent tall developments, outside the Conservation Area boundary, being viewed from Albert Square, such as the Beetham Tower, Deansgate, Great Northern Tower, Watson Street and The Lexicon (formally Television House), Mount Street.
- vi) The large open, public realm of Albert Square links surrounding streets, such as Princess Street, Cross Street and Mount Street, with prominent Victorian and Edwardian buildings fronting these main thoroughfares. The character of Albert Square is predominantly Victorian and Gothic in style, emulating the Town Hall, albeit on a lesser scale. The western aspect of the square, and leading further westwards to Deansgate, comprises of largely early dark brick 1980s office buildings, with small shop units behind areas of brick colonnades. This space, including Lincoln Square to its centre, is void of any historical context except for two small later 19th century buildings which were incorporated into the design. This late-20th Century pedestrianized space, along with the mid-Victorian Albert Square adjoining it to the east, creates a strong and enjoyable pedestrian-friendly link from Deansgate to the Town Hall, in an area which is largely fully built up to back of pavement.
- vii) The large open public space of St Peter's Square is interconnected with Albert Square via Lloyd Street located between Manchester Town Hall and Town Hall Extension.
- viii) Albert Square is the civic heart of the city and the main characteristic of the conservation area is its civic grandeur. The Town Hall and Town Hall Extension are the most dominant buildings in the area, and any proposals should respect these landmark buildings.

St John's Conservation Area



Figure 32: plan of St John's Conservation Area and associated Listed Buildings

- i) The St John Street Conservation Area has been designated due to the high architectural interest of the buildings on St John Street which is the only surviving Georgian terraced street in central Manchester.
- ii) The St John's Character Area contains, at its heart, a small but almost complete example of a Georgian terraced street; the only remaining in Manchester. St John Street's Georgian terraces do not form a unified scheme as plots were sold off piecemeal. The eastern end of the street contained a large timber and stone yard which was not built upon until the mid-20th Century.
- iii) This rare, early residential scheme is juxtaposed against subsequent large-scale developments which surround it, such as the subject site and commercial development to Quay Street. The architectural quality and detailing of the buildings illustrate the middle-class status of their early inhabitants. The original scheme was terminated by a large Gothic church, and this dominant presence found its way into subsequent architectural detailing upon nearby houses. The level of survival of the historic scheme and overall layout and composition of the whole contributes largely to the character of the area.
- iv) Whilst developments outside of the Conservation Area, such as that of the subject site, do not directly contribute to its character and appearance, the setting of the conservation area, in terms of its intimate scale, form and massing, should be considered.

Castlefield Conservation Area

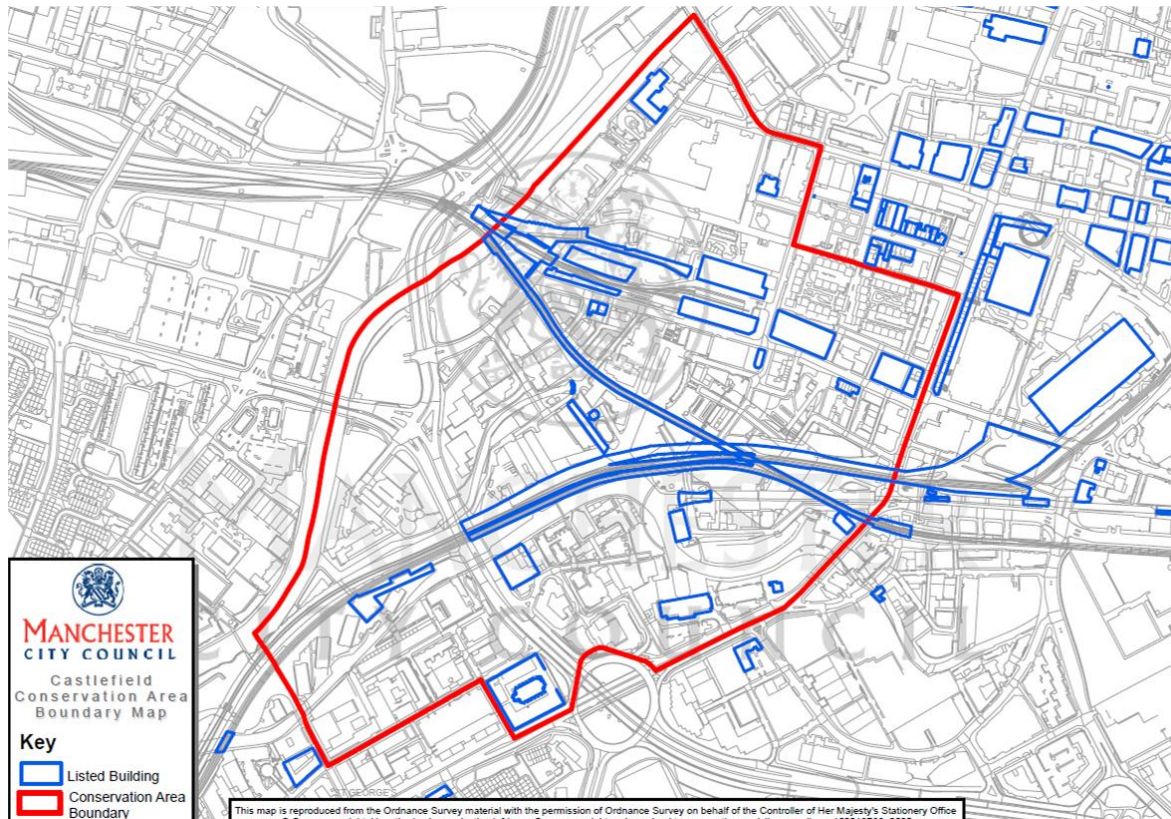


Figure 33: *plan of Castlefield Conservation Area and associated Listed Buildings*

- i) Castlefield Conservation Area is the largest conservation area in Manchester.
- ii) The focus of the Conservation Area is the Castlefield Basin/ Potato Wharf and Liverpool Road areas, as these areas contain a large number of listed buildings which best represent the development of the railways and industry in this part of the city.
- iii) The numerous viaducts and bridges constructed as part of the development of the railways dominates the character of this area, creating a unique multi-level environment which straddled both warehouses and canals. These structures resulted from the growing rail network in and out of Manchester during the second half of the 19th Century. Different rail companies constructed their own lines into the city resulting in new lines passing through Castlefield having to be operated at high level to prevent them from obstructing road and canal traffic below.
- iv) In recent years the area has been redeveloped for residential, commercial and recreational use which has restored something of the former historic urban grain to the area making it an open and vibrant area.

- v) Although the former railway tracks and viaducts to the subject site have been removed, there is still a clear relationship between the character and appearance of the conservation area and that of the subject site. Consequently, the subject site is a significant element within the setting of the conservation area.

5.5 Summary

- i) This Section has presented a significant amount of information in order to provide a baseline in which to assess the significance of the identified heritage assets and their settings.
- ii) The characterisation appraisal, which includes appraisal of the designated conservation areas surrounding the subject site, has demonstrated that the context of the subject site is complex; whilst the urban form to the area north of Manchester Central is characterised by the civic core of the city, with high quality public realm and active enclosed streetscapes; the area to the south of Manchester Central, in which the subject site lies, presents underutilised spaces, inactivity and a poor pedestrian environment.
- iii) Appraisal of the listed structures within the subject site, and those surrounding it, has demonstrated that whilst the legibility of the former railway infrastructure is better represented elsewhere, the vestiges that remain within the subject site have high group value which allows for an understanding and appreciation of them; albeit that this is currently undermined by the lack of activity and poor pedestrian environment in the area.
- iv) The next section of the report seeks to define the significance of the subject site by providing a statement of significance.

6. STATEMENT OF SIGNIFICANCE

6.1 Introduction

- i) Within the subject site, the Great Bridgewater Street Bridge and brick undercroft are statutorily listed.
- ii) The southern part of the subject site, which forms the brick undercroft, was formally connected to the Grade II Listed Castlefield Viaduct to the south of the site, and is now disconnected following the insertion of an access ramp from Albion Street to the high level car park above the undercroft (Trafford Street).
- iii) The subject site is also adjacent to the Grade II* listed Manchester Central and other highly graded listed buildings within the civic core to the north.
- iv) The subject site is not located within a Conservation Area but is located close to the boundaries of the Castlefield Conservation Area, St Peter's Square Conservation Area, Albert Square Conservation Area, Peter Street/ Deansgate Conservation Area, and St Johns Conservation Area.

6.2 Statement of Significance

- i) The special architectural and historic interest of the Castlefield Viaduct has been recognised by its Grade II listed status.
- ii) The intrinsic architectural merit and group value of the viaduct within the multi-layered environment of the railway lines is fundamental to the significance of the structure as a whole. Within the subject site, the historical, evidential, aesthetic and communal values that the structure yields are related to the townscape value of the structure and its association with the development of the railways in Manchester. The brick arched undercroft and Great Bridgewater Bridge are intrinsic to the structure's special interest.
- iii) Castlefield Viaduct is also of special interest due to its group value alongside the Grade II* Manchester Central building. It is recognised that the current poor pedestrian environment to the upper deck area and street level have a detrimental impact on the setting of the listed structures, however, despite this the structures are still understood and appreciated as a coherent group. In light of recent enhancements to the Deansgate/ Castelfield tram stop there is the anticipation of further development that could enhance the setting of the structures and better reveal their heritage values.
- iv) Regarding the setting of the Castlefield Viaduct and Manchester Central, this was never formally considered and has always been compromised due to the being 'shoe-horned' into an established urban form. Whilst views of the structures are largely incidental, it is considered that the heritage values of these two structures are best represented in views from within Castelfield Basin and looking south from Lower Mosley Street respectively.

- v) Regarding the capacity for change to the listed elements of the Castelfield Viaduct, within the subject site, due to the historical patterns of use and un-use, the bridge, brick undercroft and upper deck have been altered over time; this has affected the special interest of these elements. Consequently, there is clearly further scope for alteration and change.
- vi) In regards to the capacity for change within the setting of the Grade II* Manchester Central, it will be clear that the dominant, horizontal form of the building is robust enough to withstand further development within its setting and will always be understood and appreciated as a former railway station.

7 SUMMARY AND CONCLUSION

- The subject site is formed of part of the Grade II Listed Castlefield Viaduct; the brick arch undercroft and Great Bridgewater Street bridge are integral to the character of the special interest of the listed structure.
- Castlefield Viaduct is also listed for its group value, being an integral component to the development of the Grade II* listed Manchester Central.
- The setting and character of the listed buildings within the subject site is varied; within the immediacies of the subject site the inactivity, poor pedestrian environment and lack of permeability, connectivity and wayfinding have had a detrimental effect on its character and setting.
- Dr Ron Fitzgerald's discursive commentary on the Great Bridgewater Street bridge demonstrates that this structure was typical of its time and has been altered, however, he notes that the bridge is still integral to the group value of the Castlefield Viaduct and Manchester Central.
- The brick arched undercroft is typologically common for its date, but its pointed arch structure and brick work is of high quality. Other than minor alterations in regards to the use as a car park and car sales room, the structure is largely intact.
- The upper deck of the viaduct, and the setting of the rear (south side) of Manchester Central have been substantially altered with the removal of the original track beds and creation of a service yard.
- The 1990s Metrolink bridge and viaduct structures, to the east of the subject site, have cluttered the space, providing visual intrusion to the ability to appreciate and understand the listed arches and viaduct.
- Whilst there are pedestrian links between the Manchester Central complex and the Deansgate-Castlefield tram stop, there is a lack of permeability across the site as a whole, which has been exacerbated by poor way-finding signage and poor pedestrian routes.
- There is clearly a capacity for change within the subject site that could enhance the character and setting and better reveal the heritage values of the identified heritage assets.
- Development should focus on the maximum retention of historic fabric of the Castlefield Viaduct and protection of views of Manchester Central from the north.

8 APPENDICES

8.1 Appendix I – Listed buildings within Figure 1

1. Royal London House, Deansgate (west side) Nos.188 to 202, Grade II
2. Rylands Library, Deansgate (west side), Grade I
3. Sawyers Arms Public House, Deansgate (west side) No.138, Grade II
4. Deansgate (west side) Nos.184 and 186, Grade II
5. Deansgate (east side), Nos.205 to 209. Onward Buildings, Grade II.
6. Elliot House DeansGate (east side), Grade II
7. Former entrance to Deansgate Goods Station Deansgate (east side), Nos.223 to 233, Grade II
8. Opera House Theatre, Quay Street (north side), Grade II
9. Sunlight House, Quay Street (north side), Grade II.
10. Masonic Temple, Bridge Street. Grade II.
11. Albert Memorial Hall, Peter Street (north side), No.27. Grade II.
12. Harvester House, Peter Street (north side), No.37. Grade II.
13. Lancashire House, Peter Street (north side), No.47 (Includes No.9 Southmill Street), Grade II.
14. Free Trade Hall, Peter Street (south side), Grade II*.
15. Former Theatre Royal (now listed as Royale Club) Peter Street (south side), Grade II.
16. Peter Street (south side), No.56 to 58. Former Young Men's Christian Association. [Includes: Nos.14 to 18 Mount Street] Grade II.
17. Peter Street (south side), Midland Hotel. Grade II*.
18. Mount Street, Friends' Meeting House. Grade II.
19. ALBERT CHAMBERS, 16-18 ALBERT SQUARE (south side). Grade II
20. Albert Square, No.16. Grade II. 3.10.74 – Albert Square CA Nos.17 and 18. Carlton House. Grade II
21. ALBERT SQUARE 698- 1/27/4 (South side) 03/10/74 Nos.20 AND 21 St Andrew's Chambers. Grade II.
22. Albert Square, Town Hall Grade I
23. Albert Square, Fraser's statue, Bright's statue, Heywood's statue, Gladstone's statue Fountain (Jubilee) Grade II
24. Albert Square, Albert Memorial. Grade I.
25. Brazenose Street Abraham Lincoln statue (formerly in Platt Fields park). Grade II.
26. Mulberry Street Roman Catholic Church of St. Mary (The Hidden Gem). Grade II.
27. Windmill Street G-MEX. (Formerly listed as former Central Station.) Grade II*.
28. Central Street, No.7, Grade II*
29. Central Public Library St Peter's Square (west side). Grade II*
30. Albert Square, No.1. Abbey National. Grade II
31. Manchester Town Hall Extension. Grade II*
32. 11 – 17 St John Street (South Side). Grade II
33. Deansgate Goods Station And Attached Carriage Ramp. Grade I*
34. Lloyds House. Grade II
35. Lancashire House, 47 Peter Street (North Side). Grade II

- 36. 1-5 Central Street (North Side). Grade II
- 37. N/A
- 38. Eagle House, King Street (South Side) Cross Street Nos.62 To 68 (Even).
Grade II
- 39. Prudential Assurance Office. Grade II
- 40. Northern Assurance Building, 9-21 Princess Street (North East. Grade II
- 41. 10 Kennedy Street (South West Side). Grade II
- 41. Manchester Law Library, 14 Kennedy Street (South West Side) Grade II*
- 42. 31 Princess Street (North East Side). Grade II
- 43. 32 And 34 Kennedy Street (South West Side). Grade II
- 43. 36 Kennedy Street (South West Side). Grade II
- 44. Vine Inn, 42 And 44 Kennedy Street (South West Side). Grade II
- 44. Vine Inn, 46 Kennedy Street (South West Side). Grade II
- 45. 65-71 Princess Street (North East Side). Grade II
- 46. 73 And 75, Princess Street Grade II
- 47. City Art Gallery, Mosley Street (East Side). Grade I
- 48. The Athenaeum, 81 Princess Street (North East Side). Grade II*
- 49. Harvest House, 14 And 16 Mosley Street (West Side). Grade II
- 50. Memorial Cross, St Peter's Square (South West Side). Grade II
- 51. War Memorial, St Peter's Square (South West Side). Grade II*
- 52. Castlefield Viaduct, GMex to Dawson Street, Grade II
- 53. Britons Protection, 50 Great Bridgwater Street, Grade I
- 54. 13-17 Albion Street, Grade II
- 55. Lock 90 east of Albion Bridge, Grade II
- 56. Lock 91 west of Gaythorn Tunnel, Grade II
- 57. Rochdale Canal Lock Keepers Cottage at Lock 91, Grade II
- 58. Manchester South Junction & Altrincham Railway Viaduct, Grade II

8.2 Appendix II – Listed building descriptions (within the subject site)

Name: G MEX

List entry Number: 1270514

G MEX, WINDMILL STREET

The building may lie within the boundary of more than one authority.

County:

District: Manchester

District Type: Metropolitan Authority

Parish:

National Park: Not applicable to this List entry.

Grade: II*

Date first listed: 18-Dec-1963

Date of most recent amendment: 06-Jun-1994

UID: 458616

This list entry does not comprise part of an Asset Grouping. Asset Groupings are not part of the official record but are added later for information.

SJ8397NE WINDMILL STREET 698-1/31/443 (South West side) 18/12/63 G-Mex (Formerly Listed as: WINDMILL STREET (South West side) Former Central Station)

GV II*

Railway station, now exhibition hall and car park. 1876-9, by Sir John Fowler, for Midland Railway Company; altered. Iron and glass on brick undercroft, with brick side walls. Rectangular plan. Single segmental-vaulted vessel of 15 bays with 210-foot span, built on extensive undercrofts; pilastered 2-storey south side with 3 windows on each floor of each bay, those at ground floor round-headed and those above square-headed; segmental arched roof with ridged bands of glazing. C20 glazed canopy to entrance at north end. Vaulted undercroft with intersecting tunnel vaults. Intended entrance block at north end never built.

Listing NGR: SJ8373797786

Name: CASTLEFIELD RAILWAY VIADUCT FROM G-MEX TO DAWSON STREET

List entry Number: 1292315

CASTLEFIELD RAILWAY VIADUCT FROM G-MEX TO DAWSON STREET, DEANSGATE

Grade: II

Date first listed: 14-Feb-1988

Date of most recent amendment: 06-Jun-1994

SJ8297NW DEANSGATE 698-1/18/115 Castlefield Railway Viaduct from 04/02/88 G-Mex to Dawson Street (Formerly Listed as: DEANSGATE Castlefield Railway Viaduct from Central Station, dividing into 2, rejoining an)

GV II

Railway viaduct. c.1880. Cast iron and wrought iron (?); red brick to east of Duke Street. Runs south-west from former Central Station, then westwards, dividing into two over Castlefield and rejoining west of River Medlock. Cast iron drum piers rising to square castellated towers supporting metal lattice parapet. Castellated brick piers with stone dressings to Gothic style skew bridges over River Medlock and roadways. To east of Duke Street viaduct is of brick with segmental arches and castellated brick piers. At western end a blue brick bridge over Dawson Street.

Listing NGR: SJ8287397542

8.3 Appendix III – detailed appraisal of significance of high graded (GI and GII*) listed buildings surrounding the subject site.

8.3.1 Manchester Town Hall - Grade I

Manchester Town Hall was built between 1867 and 1877 by Alfred Waterhouse. Its towering spires, pinnacles and roofscape dominate the skyline and characterises the civic centre of Manchester.

The Town Hall was built upon the roughly-triangular, former Town's Yard. The dimensions of the site presented Waterhouse with an interesting challenge suited to his use of the asymmetrical Gothic style. Waterhouse used Gothic-style geometrical tracery with foliated capitals to create an eclectic and very highly decorated arrangement upon the building's 4 elevations. The significance of Waterhouse's design was not in his eclecticism of sources, but the skill of their assimilation into a unified design. The Town Hall is a significant and solid piece of architecture.

The principle western elevation faces onto Albert Square and this is the frontispiece for the whole architectural arrangement. The west elevation is at first glance almost symmetrical, but contains subtle differences of decoration and window arrangements throughout. It is a long and undulating façade with very deeply set fenestration within rounded-Gothic arches.

Roughly centre to the western elevation is the enormous clock tower which dominates this façade, Albert Square and the roofscape. The rest of the building's roofscape is given prominence with differing sized projecting and recessed dormer gables, each with steeply pitched roofs surmounted with decorative ironwork.

The north elevation is experienced as part of the multi-phased enclosed streetscape of Princess Street which affords long range views from the east. The south elevation of the building is experienced within the more intimate surroundings of Lloyd Street where it is joined to the Town Hall Extension by two link bridges at first floor level. It is here that the building is understood as being part of a significant grouping of buildings and their civic function is appreciated. The importance of the setting of the Town Hall, and its civic value, is further understood and appreciated by the open spaces to Albert Square and St Peter's Square (currently in a state of flux). These two open areas of public realm form a unique setting to the Town Hall allowing it to be experienced in its totality and appreciated as the heart of the civic centre of the city.

8.3.2 Town Hall Extension - Grade II*

The Town Hall Extension was designed as a link between the Town Hall and the classically designed Central Library. The building was designed by Vincent Harris and constructed in 1934-8 in a curious and restrained modernist style, using an eclectic mix of Arts and Crafts, Gothic and Art Deco components. The building is built of Stancliffe sandstone ashlar from Darley Dale quarries in Derbyshire, and is of 8 stories plus attic, with the 7th and 8th stories behind a parapet. The roof is a steeply pitched lead covered roof with a series of mullioned dormer windows.

The fenestration is of bronze metal-framed top and side opening casements. To each corner of the unusually shaped building, are two projecting, cantered staircase bays with decorative tracery grilles, which rise from ground to attic floors. The west elevation received more detailed fenestration with dramatic expanses of deeply-set, stone-mullioned leaded lights surmounting a round arched colonnade.

The Town Hall Extension is a dramatic and unusually stark building which harmoniously links and sits between the Town Hall and the Central Library. The building is a highly significant component of the three dominant civic buildings set within St Peters Square and Albert Square.

The Town Hall Extension, alongside the Town Hall and Central Library, forms a set piece of civic grandeur. This civic group is experienced in its entirety from St Peters Square (albeit ongoing construction works to St Peter's Square limit this experience currently).

From the Peter Street junction, the view north along Mount Street wholly embraces the full impact of form and scale of the three civic structures. Manchester Town Hall with its tall Gothic tower, the Town Hall Extension with its solid gable end and Central Library with its classical cylindrical form, create a striking and unique view towards Albert Square.

8.3.3 Central Library - Grade II*

The Central Library was designed by Vincent Harris in 1930-34, predating the adjacent Town Hall Extension. The library is constructed using a steel frame and is encased by a circular Portland stone, ashlar exterior. The two lower storeys are rusticated with the upper two storeys set directly behind a continuous row of Doric columns. The centre of the building contains a large domed reading room which is hidden from street level. The entrance on St Peters Square comprises six giant Corinthian columns supporting a flat-roofed portico creating an impressive entrance to the building.

Central Library is of an unparalleled and unique design, of which its form and function continues to full capacity today. The building's imposing style and bulk is of a high architectural significance.

The use of Portland Stone creates an interesting contrast when compared to the neighbouring Town Hall Extension and Town Hall. The difference in materials between the three civic buildings allows each to be appreciated in their own right, without comparison to one another. Central Library was the second of the three civic buildings to be constructed in 1934, the completion of the Town Hall Extension in 1938 in the darker Stancliffe sandstone, effectively bridged the gap between the three buildings, linking them as one inextricable group. These buildings have a significant group value and their large footprints, mass and forms command views along Mount Street and St Peters Square creating a sense of solid geometry.

The circular form of the library can be appreciated from the Mount Street/Peter Street junction where the view opens out southwards, revealing the elaborate architectural form of the Midland Hotel. The style and height of Central Library also enhances the existing classical elements of the

Peter Street streetscape such as the Free Trade Hall and Theatre Royal. The circular form is matched by the concaved parallel southern elevation of the Town Hall Extension and Library Walk which forms a pedestrian link between the two buildings.

The bold design and massing, along with the historically confident use of bright Portland stone, is paralleled in the material choice and scale of the recent No. One St Peter's Square development, currently under construction directly opposite the library.

8.3.4 The Midland Hotel - Grade II*

The Midland Hotel was constructed in 1898-1903 by Charles Trubshaw and consumed the footprint of several plots and roads to form a new city block. The hotel was built for the Midland Railway to serve the newly built Central Railway Station, directly to the south of the hotel. The building is built of red stock brick and glazed brown terracotta and faience which is highly decorated in the Edwardian Baroque style.

The hotel commands a highly prominent corner position at the southern end of St Peters Square and is a good example of a high-Victorian purpose built railway hotel.

The building is of high architectural significance, and its heavily decorated whimsical towers, finials and Dutch gables provide one of few surviving examples of this style of architecture in Manchester.

The extremely expressive design, decoration and form of the Midland Hotel is key to its successful execution. The hotel's use of highly glazed components is in stark contrast to its neighbouring buildings and unparalleled in the area. The large footprint of the Midland Hotel forms an island site, with each elevation equally highly decorated. The large scale footprint of the building is characteristic of the majority of buildings along Peter Street, such as St Georges House, the Theatre Royal and the Free Trade Hall, and this continues into Oxford Street with such buildings as Peter House. The original use of the southern entrance was to link this to the railway station opposite via a covered walkway.

Views of the Midland Hotel from the Central Piazza, eastern end of Windmill Street and Barbirolli Square, encompass the entire southern and eastern aspects of the hotel, from where the building can be appreciated in its entirety. The crowded network of bicycle lanes, pavements, tram lines and roadways traversing the southern end of Lower Mosley Street, including the Midland Hotel's 'drive through' drop off point on Windmill Street, severely affect the appreciation and enjoyment of these open, tree-lined spaces, making it difficult for pedestrians to navigate between spaces and creating the sense of separation.

8.3.5 Free Trade Hall – Grade II*

The Free Trade Hall on Peter Street was designed as a public hall by Edward Walters in 1853–6. The building was built on the former open space known as St Peter's Fields on land given by

Richard Cobden. The fields became the site for the famous 'Peterloo Massacre' in 1819, and the building was built to commemorate the repeal of the Corn Laws of 1846. Two earlier halls had been constructed on the site previous to the existing building. A large temporary timber structure was built on the site in 1840, and this was subsequently rebuilt in brick in 1842. The hall was funded by public subscription and became a concert hall and home of the Hallé Orchestra in 1858.

During the Second World War, the hall was directly hit during the Manchester Blitz in December 1940. Its interior was rebuilt and opened once more in 1951 as a consort hall and the continued home of the Hallé Orchestra. The Free Trade Hall ceased to be a concert venue in 1996 when the building was sold to be developed into the Radisson Hotel, which saw the Orchestra move into their newly built permanent home, the Bridgewater Hall. The majority of the rear of the building was subsequently demolished and a new hotel block was constructed, leaving only the front stone elevation remaining, along with statuary fragments of the 1946-51 rebuilding by Leonard C. Howitt.

The Yorkshire sandstone Peter Street elevation was built in the palazzo style. The ground floor is of rusticated stone open arcading, with the first floor containing giant arcading supported on paired Roman Ionic columns. Each bay contains a triangular pedimented casement window and above, the building is surmounted by a heavy and bold bracketed cornice with a balustraded parapet.

The Free Trade Hall is a dominant and bold building within the Peter Street streetscape. The building is now only fully appreciated from Peter Street, its Southmill Street elevation only retains three original bays which are now lost amidst the recent hotel buildings, which make up the majority of this elevation. The modern hotel structure along Southmill Street elevation includes a break in the line of pavement, setting back the hotel entrance slightly from the original line of the building, and is staggered towards Windmill Street; this adds interest to the otherwise fully built-up and enclosed nature of this short street.

The rear of the hotel, facing Windmill Street, is entirely modern, and constructed in a lighter stone to that of the original structure, with deeply recessed vertical, paired bands of glazing. This elevation does not detract from the original building as it replaces the 1951 extension and cannot be seen in conjunction with Walters building. This juxtaposition allows for the historic nature of the façade to be clearly appreciated and understood. The new building sits comfortably with the original building by using similar materials and an uncomplicated contemporary design. The rear hotel bedroom block is a tall 15-storey building by Stephenson Bell Architects which faces the Central Piazza, and is complimented by the taller, but similarly designed Great Northern Tower opposite on Watson Street, however its ground floor use as a restaurant creates further non-active street frontages along Windmill Street.

8.4 Appendix IV – detailed appraisal of surrounding conservation areas

8.4.1 St Peter's Conservation Area

The Origin's and Development of the Conservation Area

At the turn of the 19th century the immediate area surrounding St Peters Square was still largely undeveloped farmland. The area contained only a small collection of small gardens, St Peters Church, the New Quakers Meeting House (precursor to the Friends Meeting House on Mount Street) and two other small buildings. Oxford Street, to the east, and Peter Street to the west had been laid out, but had not yet been developed as far as the junction with St Peters Square.

By 1819 only one small building had been built in the vicinity, located on the south-west corner of what is today the Midland Hotel site. The area also achieved notoriety on 16 August 1819, when at St Peter's Field, around Windmill Street and Peter Street, Henry Hunt addressed a meeting of 60,000 people to demand radical reform of the House of Commons. The size of the crowd so alarmed the City Magistrates that troops were called in to disperse it. Eleven people were reported killed and 140 injured in the resulting chaos. The incident is now remembered as the 'Peterloo Massacre'.

By the 1820s the southern side of Windmill Street had largely been developed. The eastern side of St Peter's Square, along with a few plots approximately where Central Library is positioned today, had begun to be developed piecemeal with Georgian townhouses. The classical Greek Friends Meeting House was built in 1828-30 by Richard Lane, replacing the earlier structure on the site which dated to before 1800. Lane also designed a gymnasium and riding school to the rear of the classically designed 'Gentlemen's Concert Hall' in 1831. The concert hall faced north onto St Peters Square on the site of what is now the north-east corner of the Midland Hotel site. By 1837, a classically styled natural history society/museum had been constructed in stone facing Peter Street occupying the northernmost end of the block.

The southern side of the area, which today forms the subject site, was undeveloped. By 1842 the southern end of the block containing the Gentlemen's Concert Hall, which today forms the footprint of the Midland Hotel, had been fully developed leaving the northern part of that block facing Peter Street empty. By this period, the majority of the surrounding plots had been fully developed. Between 1855 and 1857 the area forming the Subject site had been developed with a large square building, set back from Windmill Street but not completely occupying the full plot.

The Central Station in Manchester opened in 1880 and became the terminus for the Midland Railway's route from St. Pancras in London. The railway commissioned their architect Charles Trubshaw to design the adjacent Midland Hotel 18 years later, which was built on the site of the Gentlemen's Concert Hall and two streets which divided the site north-south called Concert Buildings and Concert Place. The Midland Hotel contained a covered link corridor which passed over Windmill Street at the Hotel's southern entrance and to the station.

By 1891 the former Museum of Natural History, which fronted Peter Street, had been converted into the Young Men's Christian Association (YMCA). By 1907 St Peters Church, with its dwindling congregation had become surplus to requirements and was demolished. The church was replaced by a commemorative stone cross signifying its former location and the open square was created. In 1924 the area to the south of the cross was utilised by Sir Edwin Lutyens First World War cenotaph. In 1949 the area surrounding the cross was redesigned to incorporate Portland stone edgings and seating in memory of the Second World War (currently being relocated and redeveloped).

By the early 1930's, Manchester was in need of a purpose-built city library, a site was chosen immediately to the west of St Peters Square, and fronting onto it. The new Central Library was designed by Vincent Harris and completed in 1934. This required the clearing of several streets, the foreshortening of Bootle Street to its eastern end and the removal of Cooper Street which ran north-south through the site. In 1938 Vincent Harris had designed the large new extension to the Town Hall, which was subsequently constructed in another area of cleared streets and buildings to the south elevation of the Town Hall, and linked at first floor level to the Town Hall by two decorative bridges.

The process of constructing both Central Library and the Town Hall Extension cleared the entire eastern side of Mount Street and dramatically changed the historic small urban grain of the area into a predominantly large urban grain. Vincent Harris's Town Hall Extension cleverly formed the visual link between the Gothic Town Hall and the Classical Central Library and created a new public realm for civic focus.

By the mid-20th Century the eastern range of low-rise Victorian, commercial premises and offices had been replaced by the modernist Elisabeth House in 1959, closely followed by Peter House to the south-east of the square and the curtain-wall construction of Television House on the junction of Mount Street and Peter Street in 1959. The late 20th-Century saw no exceptional developments until the restoration of the former Central Station for use as the G-MEX Convention Centre in 1986 (now known again as Manchester Central). This large-scale redevelopment of the southern end of the Conservation Area became the catalyst for further successful adjacent developments.

Along with the Metrolink tram system, which opened in 1992, other large cultural developments were constructed to the south of the area, such as the Bridgewater Hall in (1990-1996), the International Convention Centre, adjacent to Manchester Central, and the conversion of the former Great Northern Goods Depot, for leisure use (both opening in 2000). These large public venues invited further interaction with the formation of new public realms to the north front of Manchester Central, forming Manchester Central Piazza, the construction of the Bridgewater Hall on Lower Mosley Street, allowing the creation of Barbirolli Square and the restoration of the former Manchester and Salford Junction Canal and Bridgewater Canal basin, and the creation of the Great Northern Square to the north of the Great Northern Warehouse and Cinema complex.

Prevailing Former Uses within the Area

The initial former uses within the Conservation Area began in the late 18th Century with the religious and friendly institutions of St Peters Church and the Friends Meeting House which were surrounded by open fields with the nearest housing to the west towards Deansgate. Peter Street became increasingly developed with impressive, classically styled public buildings facing St Peters Square, St Peters Church and Peter Street, such as the Gentlemen's Concert Hall, The Free Trade Hall and the Museum of Natural History. The area became a cultural and musical hub. Housing had developed to the south of the Conservation Area by the 1840's and by the end of the 19th Century the immediate area had an amount of concert halls, theatres and clubs.

Three prevailing former uses changed when Manchester Central Railway Station was opened in 1880, occupying all former residential streets to the south of Windmill Street, followed by the construction of the sprawling Great Northern Goods Depot to the south-west and the neighbouring Central Goods Depot. These large-scale modern developments created a new transport quarter to the south.

By the 1930's further housing and commercial premises had been cleared to allow for the construction of the new Central Library and Town Hall Extension. These developments removed the last remnants of former residential buildings, creating an area of public buildings, institutions and commercial properties. These early-20th Century changes altered the dynamics of the area and shifted its predominant use from one of a cultural/ residential use, to one of an almost entirely civic and commercial focus.

The Architectural and Historic Qualities of the Buildings and the Contribution they make to the Conservation Area

The St Peters Square Conservation Area is today dominated by a series of large, early-20th Century civic and commercial buildings such as the Midland Hotel and Central Library, which occupy large footprints. This phase of construction dominates St Peters Square, creating a varied and exciting mix of buildings of various heights and materials, which are further complimented by the Town Hall (Grade I) immediately to the north and within the Albert Square Conservation Area.

The early-20th Century buildings were complimented by height and matching Portland stone with the addition of developments such as Peter House in 1958. Peter House's large scale, on the corner of Oxford Street and Lower Mosley Street, respects the densely-built urban form and materials of its neighbouring buildings and creates a sense of enclosure to the southern aspect of the Square, in a location where previously there were low-rise 19th century red-brick shops and warehouses.

The heights of buildings and their roofscapes vary considerably throughout the Conservation Area, from the modestly scaled 2 stories seen at the Friends Meeting House, Mount Street; which is the oldest building within the Conservation Area and the only remaining in a domestic scale; to the exaggerated, monolithic 4 stories plus attic construction of the Central Library along with the

adjacent 8 stories plus attic of the Town Hall Extension (part of the Albert Square Conservation Area) making up the western range of St Peters Square.

The eastern aspect of the Square is currently in the process of being developed into a 13-storey office building, which enhances the sense of enclosure of the eastern aspect of the square, adding to the dense urban grain and creating a landmark building to match the scale and confidence of its neighbouring predecessors.

Prevalent and Traditional Building Materials

Late-18th and early-19th Century buildings were predominantly of red-brick with stone dressings and slate roofs. Public and cultural institutional buildings at this time were constructed using limestone, with concealed roofs. The Midland Hotel (1898-1903) represents an unusual break from the traditional stone and brick materials of the area, into the new and advanced use of highly decorated, glazed brown faience, highly polished pink granite and red stock-brick. The hotel was built with two large internal courtyards constructed entirely of contrasting white glazed-brick.

The use of Portland stone started with Central Library and Century House during the 1930's. Portland stone, which is bright and off-white in colour, was ideally matched for 'modern' construction during Art Deco movement of that decade. By the end of the 1930's the large Town Hall Extension had been constructed using a slightly contrasting, muted-buff sandstone to create a middle-ground between the darker stone of the Town Hall and the much brighter stone of Central Library. The use of Portland stone carried on into the mid-20th Century with the construction of the 12-storey Peter House in 1958, and the intended use of Portland stone upon the exterior of Elisabeth House in 1959-60 (not realised due to lack of funds).

An entirely new form of curtain wall construction took place in the Conservation Area with the construction of the ten-storey ABC Television House in 1959-60 on the corner of Mount Street and Peter Street. The building has recently been re-clad with coloured blue glass panels and metal framing and is now known as The Lexicon. Later unsuccessful buildings towards the end of the 20th Century, primarily along Mosley Street, consisted largely of Georgian pastiches, which used red-brick and concrete detailing imitating stone.

Recent developments, to the south of Lower Mosley Street and along Windmill Street, has seen new materials used for the first time, such as red sandstone ashlar and rusticated sandstone, which can be seen in entrance to Manchester Central, the International Convention Centre constructed in 1999-2000, and the Bridgewater Hall in 1990-1996.

The Character and Relationship of Spaces within the Area

The most successful examples of the relationship between buildings and spaces within the area is around St Peters Square itself. The juxtaposition of differing scales, mass's and designs of buildings, create an exciting contrast from street-to-street, allowing short and long-range views

into and out of the Square. Recent developments such as One Peter Square and Manchester Central, have enhanced a sense of vitality around St Peters Square with such varied landmark buildings being an exciting contrast to other, less ambitious examples in a Conservation Area which has historically accommodated interesting and unique buildings. The large developments of Manchester Central, the Bridgewater Hall and the Great Northern Warehouse have facilitated several small areas of public realm around them, which creates a corridor from the restored canal basin beside the Bridgewater Hall on Lower Mosley Street, along Windmill Street, to the landscaped area of Great Northern Square, Peter Street.

The Contribution made by Green Spaces and other Natural Elements to the Conservation Area

The area has not historically contained areas of green space. Its first green area was the small garden surrounding the newly erected St Peters Church cross c1907. During the 1920's the centre of the Square was added to by the construction of Lutyens memorial garden surrounding his Great War cenotaph, which was enlarged in 1949. St Peters Square is currently in the process of being reconfigured and redesigned with an emphasis on areas of mature trees and shrubs, opening up the Square and creating a more useable, pedestrian-friendly environment. Other areas of a somewhat more limited green space can be found along Windmill Street, where a long avenue of mature trees are planted to the perimeter of Manchester Central Piazza, linking it with similar planting arrangements at Barbirolli Square and Great Northern Square.

Negative & Neutral Factors: The Extent of Loss, Intrusion or Damage to the Area

Negative factors to the area focus largely on the area of Windmill Street. A distinct lack of active street frontages is obvious here, with the backs of buildings facing Peter Street contributing to this. The derelict former Theatre Royal has a negative impact to the streetscape and further detracts from the lack of activity along the street. The large expanse of the Manchester Central piazza is largely underutilised and mainly used as a pedestrian thoroughfare. The adjacent Barbirolli Square is another underutilised open space which is only occasionally used for large university graduation events at the Bridgewater Hall. The two public spaces are noticeably severed from one-another by the Metrolink tram route and Lower Mosley Street which runs parallel to it.

Heritage Values

Archaeology

- The remaining railway and canal infrastructure which is still able to be easily understood and interpreted.

Historical

- The infamous 'Peterloo Massacre' in 1819, when 60,000 people demanding radical reform of the House of Commons so alarmed the City Magistrates that troops were called in to disperse it. Resulting in 11 people being reported killed and 140 injured.

- The meeting place of Charles Stewart Rolls and Frederick Henry Royce at the Midland Hotel which led to the formation of Rolls-Royce Limited in 1904.
- Historically, the conservation area was once the focus of many cultural/educational institutions and concert venues. These such venues which had all but disappeared by the early 20th Century, have in the last 20 years been re-established in the form of the Bridgewater Hall, Manchester Central and the International Convention Centre.
- St Peters Square has been a focus of learning and education since the formation of the Central Library in 1934, and this continues following its recently successful restoration.
- The St Peters Square Conservation Area along with the adjacent Albert Square Conservation Area contains a high concentration of Manchester's civic public buildings, which are of high historical value.

Aesthetic & Architectural

- The area contains some of Manchester's finest early 20th Century buildings.
- The Friends Meeting House, the Free Trade Hall and former Theatre Royal all survive from the early formation of the area as a cultural and learned hub and retain their classical designs.
- The area contains a highly diverse mix of building styles, periods, heights and materials which create interesting aesthetic juxtapositions such as the large industrial Manchester Central building alongside the highly decorated Edwardian Baroque Midland Hotel.
- Later 20th Century developments have restored and reused former commercial and industrial buildings which complement the existing historic fabric of the area and enhance its public use and enjoyment.
- St Peter's Square, although much altered in form, is a valuable amenity space and the alignment, form, scale and massing of the development around it has responded to the changes in this space over time.

8.4.2 Peter Street and Deansgate Conservation Area

The Origin's and Development of the Conservation Area

Deansgate is one of Manchester's most historic streets, and one which is celebrated as a Roman road, used during the Roman occupation of Manchester. The street was formed to link two river crossings; the River Medlock to the south and the River Irwell to the north.

Until the early 19th Century the lower, southern end of Deansgate was known as Alport Lane. This street originally linked the ancient hamlet of Alport with the more recent township of Manchester to the north. The area of Alport Town which was an area of timber-framed cottages and shops situated around a small enclave to the eastern side of Deansgate. It wasn't until the later 18th Century and early-19th Century that the stretch of Deansgate between Peter Street and Great Bridgewater Street was fully developed, linking the old town with the new.

Aldport Lodge was the manor house of the old town of Alport, and was situated approximately at the junction of St John Street and Deansgate. From Alport Lodge during the siege of Manchester in 1642 during the English Civil War, Royalist forces fired cannon along Aldport Lane (the lower half of Deansgate), against the Parliamentarians, who were strongly supported by the people of Manchester. The siege of Manchester brought about some of the earliest bloodshed in the Civil War. Alport Lodge was destroyed by fire during the fighting.

Areas of land on either side of Alport Lane were largely open fields with some gardens to the western side during the 17th Century. Quay Street was laid out to access the original quay on the River Irwell, and was extended eastwards in 1794 to link with Mosley Street.

During the 18th and 19th Centuries, the area surrounding Alport Town was a notorious area of slums, tenements and deprivation. Many small courtyards and alleyways contains dozens of squalid inhabited rooms. In the mid 1890's the site of Alport Town and its slums, were compulsory purchased for the construction of the Great Northern Goods Depot and Warehouse.

In c1838 the Free Trade Hall had been built as a temporary wooden structure on the site of the present Free Trade Hall (Now the Radisson Edwardian Hotel). In 1840 this timber structure had been replaced by a brick building, and again replaced by its present form in 1853-6 by Edward Walters. The Free Trade Hall was virtually destroyed by a direct hit during the Manchester Blitz of 1940. The Free Trade Hall was the original home of the internationally acclaimed Halle' Orchestra during the 1860's.

Hundreds of homes and businesses between Peter Street and Great Bridgewater Street had been demolished by 1897 to make way for the enormous goods depot which opened in 1898, and today forms the Grade II* Listed Great Northern Warehouse and leisure complex (developed in 2000). The buildings fronting Peter Street, associated with the Great Northern Warehouse, were demolished to create a new area of public realm known as the Great Northern Square, complete with sunken amphitheater and water features. The long continuous range of shops shielding the Great Northern Warehouse from Deansgate is considered to be the longest Victorian terrace in Great Britain and was completed in 1901.

By the 1890's the John Rylands Library (Grade I Listed) had been built at 144 Deansgate by Basil Champneys to house the book collection of John Rylands; Manchester's first multi-millionaire and owner of its largest cotton manufacturers.

The Edwardian period (1901-1910) saw a number of large buildings being constructed along Peter Street, Quay Street and Deansgate, including the Albert Hall (Grade II Listed) on Peter Street, which was designed in 1910 by W. J. Morley in an eclectic Edwardian Baroque/Gothic style using glazed buff terracotta for the Wesleyan Mission. The Opera House was erected on Quay Street in 1912 as 'the New Theatre', by Richardson & Gill with Farquarson and is Grade II Listed. The building is heavily detailed with banded, rusticated stucco in the classical style.

During the inter-War period, the monumental Masonic Hall on Bridge Street (Grade II Listed) had been constructed, designed by Thomas Worthington and Son built of Portland stone ashlar in 1929. The building formed the grand lodge for the Freemasons and was designed in the stripped

classical style with many areas of Art Deco decoration internally. In 1932, Sunlight House was constructed to the eastern side of the Opera House and was the tallest building in Manchester at the time.

During the mid-20th Century, many later Victorian and Edwardian buildings were demolished. The Manchester & Salford Hospital for Skin Diseases (1904-6) on Quay Street was demolished in 1999 and replaced by Direct Line House. The Victorian buildings on the corner of Quay Street and Deansgate were demolished in the late 1970's and replaced by the concrete and brown-brick Overseas House by Leach Rhodes Walker. This period of redevelopment reflects the predominance of commercial use within the area.

Prevailing Former Uses within the Area

The period before the 19th Century, the area surrounding Deansgate also contained many dwellings and small shops, interspersed by open fields and gardens. The area became fully developed by the early-19th Century was largely in residential use.

As with St Peters Square Conservation Area, this area also contains a number of places of religious focus and friendly society institutions such as the Jacksons Row Synagogue, the former Wesleyan Albert Hall and the Masonic Hall. During the 20th century the area along Deansgate became increasingly commercial with many of the city's largest department stores located there. Side streets contained smaller shops and office buildings and some residential properties.

Today the area is largely dominated by commercial use alongside pockets of leisure and residential use.

The Architectural and Historic Qualities of the Buildings and the Contribution they make to the Conservation Area

The focus of the Conservation Area is the busy intersection of Peter Street, Quay Street and Deansgate. These streets make up a large portion of Manchester City Centre's commercial district which was capitalized during the late-Victorian and Edwardian periods with the construction of many large, tall, highly decorative office buildings. Some smaller Victorian and Edwardian buildings along Deansgate occupy older building plots.

Many buildings of architectural interest are located within the Conservation Area, with a large portion of these consisting of late Victorian and Edwardian buildings. Bridge Street, in particular, is a well preserved example of a Victorian and Edwardian shopping street primarily of small grain late 19th century red-brick buildings. The completeness of the street wall with individual buildings of architectural quality, especially along Deansgate is a prominent feature. Deansgate is a good example of a multi-phase streetscape, with individually elaborate buildings sitting harmoniously side by side. The choice of building materials along Deansgate and its side streets is noticeably varied. Each building has differing roofscapes, architectural detailing and building materials illustrating the different former building uses and owners. Materials range from red-brick, red terracotta and red sandstone, to glazed buff terracotta, Portland stone and lime stone.

Developments during the late-20th Century have tended to use modern materials such as glass. Building heights vary from fourteen-storey office developments such as Sunlight House on Quay Street, to the three-storey shops on Bridge Street and the properties backing on to them in Wood Street.

The Character and Relationship of Spaces within the Area

The character of the Deansgate area is historically one of commercial development. Today this character continues with redevelopment and expansion to adjoining areas such as Spinningfields. Deansgate represents the centre for shopping in Manchester and this historical use has influenced the surrounding building types, which contain larger Victorian and early-20th Century departmental stores along with smaller businesses.

The long, straight and broad nature of Deansgate has resulted in subsequent roads being joined to it containing medium-rise and high-rise buildings upon large footprints, regularly occupying entire blocks. The principal streets comprise of largely enclosed complete street frontages. Developments from the mid-20th Century until present day sometimes have staggered building lines which break up the street frontage and add interest.

Deansgate forms the intersection of the pedestrian spaces and urban realms in, and immediately outside of the Conservation Area. Spinningfields to the western side of Deansgate contains several small pockets of open space, grassed areas and tree-lined avenues. Across Deansgate, Brazenose Street directly east of Spinningfields, opens onto the pedestrianized Lincoln Square and further east into Albert Square.

Great Northern Square is entered from the Deansgate, Peter Street junction and comprises of a large sunken, grassed amphitheatre with seating and water feature. The configuration of Great Northern Square encourages pedestrians over Watson Street and along the tree-lined Windmill Street to reach Central Piazza and Barbirolli Square beyond. There is a lack of interconnection between these spaces, with no real focus or activity provided within Great Northern Square and Central Piazza.

Prevalent and Traditional Building Materials

Historically the building materials used within the Conservation Area were of red-brick with stone dressings to window sills and quoins/door surrounds. Later buildings used buff limestone ashlar in either classical or Gothic styles. The John Rylands Library was constructed in red sandstone, an unusual material for the immediate area. Edwardian buildings used red-brick with terracotta dressings or entirely terracotta facades. Late-20th Century developments, primarily from the 1970's to the later-1980's, used a variety of new and modern materials which were non-existent in the area at that time, such as reflective expanses of plate-glass, brown-brick, concrete and steel.

The Contribution made by Green Spaces and other Natural Elements to the Conservation Area

Historically the area was open fields and gardens before the 18th Century. The surrounding streets were quickly developed by the start of the 19th Century and until recent developments had no areas of green space. The area has several small areas planted with mature trees which have been planted along pavements and to areas of late 20th Century developments where buildings were constructed set back from the original pavement. Other areas towards Spinningfields contain mature trees planted in large free-standing planters.

Negative & Neutral Factors: The Extent of Loss, Intrusion or Damage to the Area

One possible negative factor within the area is examples of unsuccessful and intrusive office-block developments dating from the 1970's which can jar against heritage assets and well-designed recent developments. Some later 20th Century developments removed the original building line back from the pavement leaving an undulating street wall and breaking the historic line of Victorian and Edwardian commercial buildings.

Heritage Values***Historical***

- Deansgate is the site of the 'Siege of Manchester' during the English Civil War in 1642, where cannons were fired south along Alport Lane.
- The Western side of Deansgate is strongly associated with the Roman occupation of Manchester, with the Roman remains of their fort located nearby in Castlefield.
- The southern end of Deansgate is the site of the early hamlet of Alport Town, which predates Manchester.
- The Free Trade Hall was the original home of the internationally acclaimed Halle' Orchestra during the 1860's, and whose home since 1996 has been the Bridgewater Hall.

Aesthetic & Architectural

- The area contains many of Manchester's late Victorian and Edwardian commercial architecture and purpose-built shops.
- The area contains a diverse mix of individual building styles, heights and materials mainly from the late-19th and early-20th Centuries, which create interesting aesthetic juxtapositions.
- The famous thoroughfare of Deansgate is a long and straight road of Roman origin, which became a major road and area of trading during the 19th Century and a draw for many leading companies and organisations to build their flagship stores.
- The removal of former Great Northern Warehouse structures fronting Peter Street allowed for the creation of Great Northern Square, opening out the corner of Deansgate and Peter Street and providing a new public realm.

8.4.3 Albert Square Conservation Area

The Origin's and Development of the Conservation Area

Albert Square and the site of Manchester Town Hall originally were open fields which sloped towards the River Tib, known as Hall Field. By the late 18th Century the immediate area had been laid out, and with a few exceptions, this layout of streets remains largely intact today. The area of the Town Hall was roughly triangular in shape and its earliest form included buildings with adjoining fields to the rear.

John Dalton Street, to the west, originally did not meet with Deansgate and instead its eastern end was called Tastle Street and led from Longworth's Folly into the cul-de-sac, Ridge Alley. Cross Street to the north had been laid out but was originally known as Red Cross Street at its southern end. By 1811 Lloyd Street had not been fully developed and it appears the triangular site now containing the Town Hall was still largely market gardens with small individual buildings on each garden plot.

By 1824 Longworth's Folly had been renamed Poole Street and the eastern end of Lloyd Street had been developed. By 1865 John Dalton Street had been laid out and joined with Deansgate to the west. By 1850 the triangular site containing market gardens had been taken over by the Corporation for use as the Towns Yard, containing a weighing machine and firefighting department. Any early Georgian buildings that originally occupied the streets surrounding the Towns Yard, were demolished leaving only a small pocket of early townhouses at the eastern end of Princess Street.

The decision to locate the new Manchester Town Hall in Albert Square, was taken in 1863. The former Town Hall was located at the junction of King Street and Cross Street, and by the 1860's the burgeoning city of Manchester was outgrowing the former, classical town hall building. The design for the new Town Hall was obtained by a two-stage architectural competition. In August 1867 the winner was chosen from the 137 entries, and the winning architect, Alfred Waterhouse was appointed on the 1st April 1868.

The area now comprising Albert Square, was offered by the Corporation in 1863 in order to create a public space providing a memorial to the recently deceased husband of Queen Victoria, Prince Albert. The space was subsequently cleared of buildings in 1864 to make way for the new square. The Albert Memorial was erected under public subscription and opened in 1869.

The New Manchester Town hall was a Gothic masterpiece, a style befitting the mid-Victorian period in which it was conceived; Waterhouse's design perfectly fitting the awkward triangular site. The building dominated the skyline when opened in September 1877. Albert Square was pedestrianized in 1987 when the eastern roadway of the 'island site' was closed to traffic and paved in granite setts.

Albert Square still retains the majority of its late Victorian, Gothic buildings fronting onto the Square. The western range of former shops and offices were demolished in c1980 and replaced

with two brick-built office buildings named Heron House (1982) and Commercial Union House (1983). Brazenose Street and Lincoln Square to the west, were conceived during the same period and were originally planned as a processional route leading from the law courts in Spinningfields, through Lincoln Square, directly to Albert Square.

Prevailing Former Uses within the Area

The foremost use of the area was originally one of residential use. By the mid-19th Century the principal roadways, such as Princess Street, had been developed with a high number of Georgian townhouses. However, by the middle of the century these had largely been converted and or replaced by warehousing for commercial and industrial uses. Once Albert Square had been laid out, closely followed by the completion of the Town Hall, the area gained new status which attracted commercial use and increased land values; this resulted in the decline in residential use within the area. Today the main use of the area is still commercial with a large office provision.

The Architectural and Historic Qualities of the Buildings and the Contribution they make to the Conservation Area

The area to the east of Albert Square contains the largest density of buildings of high architectural and historical quality in the city. The majority of these buildings are of a high-Gothic style and include Manchester Town Hall, Town Hall Extension, Lloyd's House, and Lawrence Buildings along with 7 listed statues. Albert Square is the focus of civic events and creates the focal point of the area, with Manchester Town Hall dominating this space, creating exciting views of its clock tower, tall gables and turrets from surrounding streets. The prominence of Manchester Town Hall's clock tower within the urban landscape, can be fully appreciated looking east along Brazenose Street, where the full height and scale of the tower can be appreciated from the long, pedestrianized and tree-lined avenue.

Building heights vary, with the majority being of 4 storeys plus attics around Albert Square and Princess Street. Manchester Town Hall represents the dominant tall structure with other recent tall developments, outside the Conservation Area boundary, being viewed from Albert Square, such as the Beetham Tower, Deansgate, Great Northern Tower, Watson Street and The Lexicon (formally Television House), Mount Street.

The Character and Relationship of Spaces within the Area

The large open, public realm of Albert Square links surrounding streets, such as Princess Street, Cross Street and Mount Street, with prominent Victorian and Edwardian buildings fronting these main thoroughfares. The character of Albert Square is predominantly Victorian and Gothic in style, emulating the Town Hall, albeit on a lesser scale. The western aspect of the square, and leading further westwards to Deansgate, comprises of largely early dark-brick 19th century office buildings, with small shop units behind areas of brick colonnades. This space, including Lincoln Square to its centre, is void of any historical context except for two small later 19th century buildings which were incorporated into the design. This late-20th Century pedestrianized space, along with the mid-Victorian Albert Square adjoining it to the east, creates a strong and enjoyable

pedestrian-friendly link from Deansgate to the Town Hall, in an area which is largely fully built up to back of pavement.

The large open public space of St Peter's Square is interconnected with Albert Square via Lloyd Street located between Manchester Town Hall and Town Hall Extension. A similar connection which is made between St Peter's Square and Mount Street is the curved Library Walk, located between Central Library and the Town Hall Extension; when approached from either end of Library Walk, the pedestrianized avenue affords no glimpses of either end, creating short range views and an element of surprise from both directions.

Prevalent and Traditional Building Materials

Early building materials in the area were predominantly red-brick with stone detailing such as window sills and door surrounds. Buildings were generally of 2 to 3 storeys with slate pitched roofs. The construction of Manchester Town Hall in a buff limestone saw a range of later Victorian buildings surround Albert Square in matching stone. Other Victorian and Edwardian buildings surrounding the Town Hall are constructed of red-brick with stone or terracotta dressings. Later buildings during the late-20th Century returned to the use of dark brickwork with imitation stone dressings.

The Contribution made by Green Spaces and other Natural Elements to the Conservation Area

Historically, the Conservation Area did not contain any green spaces. Albert Square was formed in the mid 1860's and did not contain any planting originally. The area of Lincoln Square and Brazenose Street contain the largest area of green space in the area which was formed during the construction of Heron House and Commercial Union House during the early 1980's. Lincoln Square provides a semi-hidden urban space concealed behind buildings on all sides.

Negative & Neutral Factors: The Extent of Loss, Intrusion or Damage to the Area

Brazenose Street and Lincoln Square are spaces within the Conservation Area where there is a high level of loss of historic fabric. The loss of historic buildings during the 1970's and 1980's eroded the significance of the western aspect of Albert Square.

Heritage Values

Historical

- Strong direct link to Victorian architect Alfred Waterhouse. Manchester Town Hall is considered to be Waterhouse's finest work.
- Albert Square and the Town Hall and reflect and embody the confidence and power of Manchester's strength in the international cotton trading industry during the 19th Century.
- Historically Albert Square is considered to be the centre-point of Manchester.
- Strong connections to past political movements and politicians/statesmen.

Aesthetic & Architectural

- Peoples understanding of the past civic use of the area is easily interpretable.
- High aesthetic values resulting from the high quality designs, craftsmanship and past uses of Manchester Town Hall and Albert Square.
- A vibrant mix of mainly commercial buildings dating from the Victorian, Edwardian and later 20th Century.
- The Conservation Area focuses around Manchester Town Hall and Albert Square, a landmark building of immense proportion and presence.
- A wealth of mid to late Victorian commercial buildings are a dominant feature of the streetscape, skyline and views/vistas throughout the Conservation Area.
- High level of craftsmanship in stone carving, joinery, design and execution.
- Dramatic and exciting roofscapes and skyline featuring towers, pinnacles, turrets and tall chimneys.
- Differing heights and masses of different building eras.

8.5 Appendix V – Report by Dr Ron Fitzgerald: Great Bridgewater Street Bridge – contextual analysis

1. Introduction

The following specialist report was requested by Ms. Kirsten McKnight, Senior Associate, Stephen Levrant Heritage Architecture Ltd., to supplement their own commentary on the future of the Cheshire Lines Committee's Central Station Approach Bridge over Great Bridgewater Street.

This report sets out the history of the Great Bridgewater Street bridge within its historic context, both nationally and locally. Its focus is to establish the wider background in the history of technology against which the bridge was built and the historical geography of Manchester's railway in the immediate environs of the bridge which gave it its immediate form. To this end the following sections, headed as follows have been presented:

2. The First Cast-iron Arch Bridges

A brief resume of the development of the cast-iron arch.

3. The Onset of the Mathematical Rationalisation of Arch Design

Summary of the evolution of the theory of the arched bridge from 1773 to the 1840s.

4. The Cast-iron Arch Railway Bridge.

The first cast-iron arch railway bridges.

5. The Maturity of Structural Theory.

Further discussion of the continued development of the structural theory of the nonvoussoir arch.

6. The Manchester Sheffield and Lincolnshire Railway

A historical geography of the railway companies. The inter-relationships that eventuated in the Manchester Central Station and the approach line bridge over Great Bridgewater Street.

7. The Cheshire Lines Committee.

The circumstances that led to the formation of the Cheshire Lines Committee

8. Manchester Central Station and its Approaches.

A discussion of the bridge itself and the circumstances that conditioned its design.

It is intended that the above content should provide sufficient historical information to inform any decision concerning the future of the bridge. The report does not enter into questions of architectural history nor does it attempt to make judgments in the area of aesthetic value.

This report has been prepared by Dr. R. Fitzgerald. Phd. U.M.I.S.T who has forty years' experience in the history of technology and responsible for several significant publications including the R.C.H.M. (E), Liverpool Road Station, Manchester.

2. The First Cast-iron Arch Bridges

By the time that the first inter-city railways were built in the eighteen-thirties the technology of the cast-iron arch bridge was structurally mature. Although the pioneering role of the Iron Bridge at Coalbrookdale is beyond dispute, as model for development it had little to offer. It was a small group of engineers, Thomas Telford, John Rennie, James Walker and the iron founders, the Walker Brothers, Hazledine and Aydon and Elwell who, by the end of the third decade established the characteristic features of the nineteenth century iron arch bridge. Of these Telford was the most significant.

Telford had been building iron bridges since 1796 but his early bridges were aberrant in terms of later developments. It was the Bonar Bridge of 1812 that had lasting influence. Following the loss of the Meikle Ferry with considerable loss of life, as engineer to the Commissioners for Roads and Bridges in the Highlands of Scotland, Telford was asked to design a bridge that would remove the need for a ferryboat. Circumstances led him to adopt a single, 150-foot span, segmental, arch composed of cast-iron ribs. Earlier cast-iron bridges of this form had attempted to follow the constructional features of stone bridge, effectively using stone block-sized cast-iron voussoirs but Telford realised that the resulting large number of joints was conducive to buckling failure. At Bonar he resolved the problem by building the arch ring up from a small number of large panel segments bolted together through face joints. His initial intention was to employ only five segments but the difficulties that would have arisen in transporting and erecting the sections persuaded him to increase the number to seven. By using open frame panels with web diagonals separating the top and bottom flanges, the weight of each section was reduced from three tons to two and half tons.

Bonar also showed the first full expression of several other distinctive attributes of the classic Telford iron bridge. Open lattice spandrels built up from intersecting diagonal columns replaced the spandrel circles used by Coalbrookdale and its immediate successors. The cruciform section lattice bars dovetailed into the arch ring extrados and into the underside of the deck longitudinals. At the intersection of the diagonals of each lozenge there was a square notch to receive a cast iron tie. The deck was built up of flanged cast iron plates. Lateral instability was guarded against by diaphragm plates which extended across the whole width of the arch soffit and which were sandwiched between the flanges of the rib sections. In addition a continuous grated cast iron plate soffit was fastened to the extrados of the arch. The rise to span ratio of the arch rings at Bonar was 1:7.5 and the total weight of the ironwork was 180 tons.

Some part in these detail design improvements was probably owed to William Hazledine with whom Telford had formed a close alliance following their collaboration on Pontcysyllte aqueduct. Hazledine's Plas Kynaston foundry had cast the parts for Pontcysyllte and it was to undertake the manufacture of the ribs for Bonar. It is generally felt that Hazledine and his works foreman Suttle played a large part in the practical development of the constructional elements of the Telford bridges.

Bonar was not only Telford's most accomplished iron bridge to that date, it was also probably the first cast iron arch bridge to be considered unequivocally successful. At the same time and, to an almost identical pattern, Telford was building the Craigellachie Bridge over the Spey. The rise, span and weight hardly differed from Bonar although the members were of different sizes. Here the spandrel diagonals were made up of a single diagonal into which were mortised the other two half diagonals. In 1815, as part of the Holyhead road, Waterloo Bridge at Bettws-y-Coed was built. Although the outer spandrels were heavily decorated with national emblems and the ribs carried a patriotic inscription the structural system was essentially the same as Bonar.

These three structures established the characteristic pattern of the Telford bridge, the majority of which were built after 1820, beginning with his first English cast iron bridge, the Metal Bridge over the Esk in Cumberland. This had three spans, two of 105 feet and one of 150 feet. It was demolished in 1915. Others followed at Tewkesbury over the Severn, the Mythe Bridge of 1823-6, a single span of 170 feet, the only instance of a bridge that exceeded his normal upper limit of 150 feet span and a bridge at Galton over the Birmingham canal 1829, 150 feet. In these latter two the axis of the lozenges was vertical whereas earlier examples had retained the inclined angles of Bonar which offended Telford's aesthetic sensibilities. There was a further 150 foot arch at Holt Fleet, Ombersley built in 1827 which survives today heavily strengthened with steel and concrete. Between Bonar and these later bridges the rise to span ratio of Telford's bridges gradually rose to 1:10, subsequently regarded as the limit for stability.

The most ambitious of Telford's iron arch bridge projects never progressed beyond the design stage, his single 600-foot span to replace the old London Bridge in 1800 and the 500 foot span for the Menai Straits a decade later. When the first iron arch crossing of the Thames was completed, Telford was not involved. In 1816 the Dodd brothers, Ralph and George promoted three new bridges, later to become Waterloo, Vauxhall and Southwark bridges. John Rennie, who vied with Telford for the title of Britain's leading civil engineer, was appointed engineer to all three projects. In the event only Waterloo and Southwark proceeded under his Rennie's auspices. Vauxhall had passed to James Walker in 1813. With his assistant William English, Walker decided to use nine arches of 78-foot span on masonry piers. For the first time the rib section took the form of a solid I-section, 18 inches deep with 5" flanges top and bottom and uniform web and flange thickness of 1". The ribs were to be cast in three lengths, each not much longer than Telford's segments but cast integrally with the spandrels. The weight was 3 tons for the middle third segment and 7.75 tons for the lower thirds.

The Butterley Company was chosen as contractor for the supply of the ironwork and also carried out the erection. The first segments, springing from the piers were cantilevered out by the use of temporary straps tying each to its adjacent segment on the other side of the pier. The midspan

segment was then lowered into place without the use of any centring. Poorly organised identification and dispatch of the components from the works caused endless confusion and delay. Eventually Butterley attempted to abandon the erection side of the contract looking to claim £31,930. 00. 00. for the castings only. The bridge was finally completed in 1816.

Rennie's opportunity to bridge the Thames in iron came with the third of the bridges which Dodd had promoted, the Southwark Bridge. By this time Rennie had recruited Teirney Clark from Coalbrookdale and Clark's expertise in iron was a valued supplement to his own. The new bridge was to be downstream from Blackfriars and if London Bridge was rebuilt there was the prospect of navigable traffic passing underneath it. The site chosen was also the narrowest and deepest stretch of the river, 30 to 36 feet deep at high water. To deal with the situation Rennie designed long arches, two of 210 feet and one of 240 feet rising 19 and 24 feet respectively. He offered two alternative designs, one using ribs with crossed diagonal open panels like Bonar and the other with solid rib panels. In the former the spandrel panels had vertical columns and were attached separately to the rib whereas the latter had lozenge spandrel panels cast integrally with the rib. The second design was selected. The first design had only 7 segments per rib but the second with its solid rib section and cast in spandrels involved a substantial increase in weight and to make handling practical thirteen rib elements, each twenty feet long, were to be used.

The three arches were all segments of the same radius, the centre one of 240 feet span with rise of 24 feet and the side arches 210 feet span with a rise of 18 feet 10 inch. There were eight ribs in each arch. The cross section of the ribs incorporated the theoretically correct increase in depth towards the springing. Rennie senior had previously attempted to adopt an arch ring of increasing depth at Boston but the foundry had resisted. At Southwark Rennie was not to be compromised and the ribs increased from six feet in depth at the crown to eight feet at the spring line with a web thickness of 2½", slightly thickened at the top and the bottom edges and with flanges on the ends of each casting. Despite Walker's recommendation that the unit weight be kept below five tons the segments in the form finally settled upon weighed between six and eight tons. The middle arch span was the largest cast-iron span ever built in Britain and in the course of the casting the ribs the capacity of the Walker Brothers foundry was almost overwhelmed. Four furnaces had to be tapped simultaneously for a single plate weighing 19 tons.

Cross frames fixed between the flanged joints of the ribs provided lateral stability. The joints were made by dovetailed sockets and cast-iron wedges and bolts were used only to assist in the erection. Diagonal braces in continuous lines from springing to crown were recommended by Aydon to Rennie for the earlier Boston Bridge but the local authorities would not pay the extra cost and it remained unbraced. Rennie adopted Aydon's plan at Southwark.

The bridge was opened in 1816 by the Prince Regent and was known at first as the Regent Bridge. It had cost £666,000. 00. 00. against Rennie's estimate £287,000. 00. 00. The Walkers agreed to take part payment for their work in shares in the enterprise but it proved to be a financial disaster and the losses which the firm incurred played a substantial part in its bankruptcy and closure of the ironmaking aspect of their business.

3. The Onset of the Mathematical Rationalisation of Arch Design

At Southwark, probably for the first time, the arch form was mathematically rationalised. The calculations were carried out by Rennie's eldest son, George, who had received his technological education at Edinburgh University. The Scottish universities, Glasgow and Edinburgh, were far in advance of English academic institutions in the study of engineering physics and John Rennie senior had been closely associated with John Robison who held the chair in natural philosophy at Edinburgh where he made a major contribution to arch bridge theory. In 1794 the already accomplished Thomas Young moved from London to Edinburgh to join Robison. Young was multilingual and was formidably proficient in mathematics and natural philosophy by the time he was twenty. These talents gave him access to the French and Continental literature where theoretical analysis across the whole range of the mathematical sciences had made dramatic progress in the second half of the eighteenth century.

Young was amongst the earliest of British natural philosophers to discard Newton's archaic and unmanageable fluxions in favour of the continental calculus of Leibniz, the Bernoullis and Euler. This mathematical radicalism was profoundly important for arch bridge theory as the fundamental contribution to arch analysis had been made in 1773 when Charles Auguste Coulomb published his *Essai sur une application des regles de Maximis & Minimis a quelques Problemes de Statique relatifs a L'Architecture*. As its title implies, Coulomb's work applied the calculus of maxima and minima to the problem of arch stability, defining the line of thrust, the hinge mechanism of arch failure and the limits of frictional cohesion operating between voussoir faces.

Although no definitive study is yet available to confirm the fact, it has been suggested by various writers that Young had absorbed Coulomb's findings by 1800. Strongly indicative is the fact that he was the first modern physicist to resurrect the concept of the catenary in British arch theory and by 1804 he was certainly considering friction as an element in voussoir arch design. This led him to a point where he was prepared to say that the line of thrust may be contained within an angle whose tangent is not greater than the coefficient of friction, effectively a re-statement of Coulomb's key proposition.

George Rennie was the more academically capable of John Rennie's two sons and his father dispatched him to Edinburgh in order to further his education where he formed bonds of close friendship and scientific collaboration with Young. This alliance continued after Rennie returned to London in 1812 where he assumed increasing responsibility for the family engineering works at Blackfriars, his physical disabilities precluding a more active outdoor career. At Young's instigation he carried out considerable research into the strength of materials and together they equilibrated and worked out the profile and dimensions of Southwark Bridge. Their joint calculations, later published by Young, showed that the thrust line in the arch ring would not deviate more than 2" from the centreline of any part of the ribs when the structure was carrying its own weight and the loading imposed by the roadway. These loads would cause a uniform stress of two tons per square inch in the cross section of the arch ribs.

The bridges of Telford and Rennie became the pattern upon which the majority of subsequent cast-iron bridges were modelled. Design improvements were matters of detail, better foundry techniques and the use of machine tools to replace hand fitting but this ossification of design

tended to act as a disincentive as far as the development of the theory of arch bridges was concerned. British engineers were inclined to dismiss the need for more advanced mathematical analysis and Coulomb's work received only limited exposure until Henry Moseley's *Mechanical Principles of Engineering and Architecture* was published in 1834. Moseley was a product of the mathematical revolution that was centered upon King's College, Cambridge and which finally brought continental mathematics and physics to Britain. He made extensive use of calculus in the resolution of structural problems and in the introduction to his book he acknowledges Coulomb as the inspiration for his ideas on the limiting angle of friction as a general topic. Notably, on the same page, he states in footnote that Coulomb's work on arches was unknown to him at the time that he was formulating his own theory of arch stability. Moseley's *Mechanical Principles* began the process of underpinning British civil engineering practice with disciplined mathematical theory but because his approach demanded a fairly high pre-existing competence in mathematics it was only of use to a limited number of engineers.

4. The Cast-iron Arch Railway Bridge

The railway inherited the cast iron arch bridge and by far the vast majority of such bridges were built for railway service. Apart from a questionable use of iron for a bridge on the Surrey Iron Way and the plateway bridge/aqueduct at Pont-y-Cafnau which must be counted a truss, George Leather's colliery railway bridge over the Aire at Astley was probably the first railway application of the iron arch bridge. Built in 1827, Leather's Astley Bridge was a tied arch and owed some debt in its detailing to a series of previous bridges built by Aydon and Elwell's Shelf Ironworks. John Rennie senior had used Shelf Ironworks for bridge works and other iron structures at the London Docks; Leather was resident engineer under Rennie on the Aire and Calder Navigation.

The Liverpool and Manchester Railway used cast iron for the Water Street Bridge in Manchester but this was a level beam bridge and elsewhere the arch bridges were built of masonry or brick. The first iron arch bridge on an inter-city railway was almost certainly James Walker's single span Shippen Farm accommodation bridge sited beyond Garforth over the Leeds and Selby Railway of 1834. By this time Walker had evolved a fairly standard design of cast iron bridge, which he had used at Clapton Bridge in 1820, a 70 foot span and for three similar spans over the River Severn at Haw. The 53' 6" foot span Leeds and Selby Railway bridge is virtually indistinguishable from its predecessors with I-section ribs and spandrels consisting of vertical cruciform section columns. The bridge was constructed by Butler's Stanningley Ironworks, a firm that was subsequently to become one of the country's leading iron bridge builders and structural engineers.

An identical bridge was built six years later over the York and Midland Railway, a line with which Walker had no connection, the chief engineer being George Stephenson and the resident Fredrick Swanwick. The bridge parts were manufactured by W. & C. (Crosland) of the Union Foundry Bradford. In spite of the lack of any obvious connection between the two bridges the common identity is immediately apparent.

The first cast iron arch bridges designed to carry the dynamic loading of a steam locomotive and its train came with the London and Birmingham Railway. The L. & B. line made use of a variety of

castiron spans including level beams, arched girders and tied arches. The best known example of what was by now a conventional cast-iron arch was the bridge over the Grand Union Canal at Blisworth near Northampton. This was a relatively short span of 50 feet, with the modest rise span ratio of 6.25 but it was skewed crossing. Six I-section ribs with a constant depth of 2' 2" and a web thickness of 2" carried cast iron lozenge spandrels with longitudinal deck beams cast integrally. At the base intersection of the diagonals a cast plate was bolted to the rib.

Blisworth did not represent any major advance in the technology of the cast-iron arch bridge; it was simply a more substantial version of Telford's concept improved by more substantial cross bracing between the ribs. Executive responsibility for the design rested with the resident section engineers although Robert Stephenson as chief engineer was ultimately accorded the credit. Notwithstanding this, the resident engineers were generally the decisive influence on the form that the bridges took in their section. Some residents were accomplished bridge designers before they were associated with Stephenson. George Watson Buck, the resident engineer on the Camden to Tring section, had extensive previous experience of cast iron as engineer to the Eastern Branch of the Montgomeryshire Canal. "Iron Mad Buck" had joined the London Birmingham staff in December 1833. Charles Fox, who joined the London and Birmingham four years after Buck, was the section engineer between Camden and Euston is known to have been responsible for the tied arch at Camden and other cast-iron arches. He also designed the roof spans for Euston station and its propylaeum.

The Blisworth Bridge was opened to commercial traffic on the 17th September 1838 by which time the Midland Counties Railway was under construction. The M.C.R. linked the London and Birmingham at Rugby with Derby and by a branch, with Nottingham. Charles Blacker Vignoles was the engineer and again his policy towards solving bridging problems was one of delegation either to his resident staff or competent outside firms. In the case of the Trent crossing at Sawley, the Butterley Company assumed complete responsibility for the design, manufacture and erection of the three-span iron bridge. The bridge was considerably larger than anything that the Stephensons had attempted up to that time. Each span was 100 feet long with a rise of 10' 00" in three segments. The I-section ribs had a depth of 2' 6" at the crown increasing to 3' 00" at the springing. The spandrel panels had vertical cruciform section columns which were cast integrally with the ribs and were also integral with the longitudinal deck beam. These must have been largest bridge castings attempted up to that period.

Stone piers were carried up from a timber grillage built in a coffer dam and rose only to the spring line of the arches. The arch rings were set against stone springbacks but a cast-iron frame rose above the spring course of masonry to deck level so that the cast iron of the spandrels was continuous between the landside abutments. Cruciform struts diagonally intersecting to make up Xpanels braced the spandrels at every column interval and the ribs were braced at the flanged joints by a framed panel and at midspan between the joints by a cruciform section strut. Lead packings were only used between the faces of the cast iron springing plates and the stone skewbacks; the fit between the ribs, the bracing panels and struts was metal to metal. This was made possible by the use of a planing machine at Butterley which may well constitute the first application of such a machine to bridge building. Crown Point Bridge over the River Aire in Leeds,

built by Leather in 1839 and cast by Parkside Ironworks, had chipped fitted faces and used leather between all significant joints.

Seven years after the completion of the Sawley Bridge the Royal Commission on the use of Iron in Railway Structures stated that:

"The general opinion of engineers appears to be that the cast iron arch is the best form for an iron bridge when it can be selected without regard to expense or the height above the river or road which is to be crossed."

The context within which this comment was made was the crisis that followed the collapse of the Chester and Holyhead Railway's bridge over the River Dee in 1847. This was a cast-iron level beam bridge trussed with wrought iron bars. Excessive stresses in the truss rods and overloading of the deck caused it to fail under a train with six deaths and many serious injuries. Robert Stephenson was chief engineer to the line, and he accepted responsibility although George Parker Bidder, the resident, had designed the bridge. A major reaction against cast-iron ensued and whilst this was mainly directed at level beam bridges the material was generally held to be suspect thereafter. In consequence attention turned to wrought iron which was not subject to brittle fracture. Wrought iron was manufactured by rolling plate and angle sections which then required to be fabricated into usable girder forms by riveting. In consequence it was considerably more expensive than cast iron but it was more flexible in application and capable of attaining longer spans with heavier loads.

The collaboration of Robert Stephenson, William Fairbairn and Eaton Hodgkinson resulted in the first major long span wrought-iron bridges at Conway and Menai. These bridges took the form of largesection hollow tubes through which the trains passed but largely through the work of William Fairbairn, the fabricated wrought-iron I-section girder subsequently emerged. Girders of this type rapidly supplanted cast-iron for level beam bridges and further development introduced the lattice girder bridge. Compared to the arch form both offered a much improved constructional envelope and correspondingly the arch bridge became an increasingly specialised response to particular conditions and where an arch was used wrought-iron replaced cast-iron as the material of choice. The last major arch bridge to be built entirely of cast iron was probably Bazalgette's Battersea Bridge over the Thames, started in 1886 and opened on the 21st. of May 1890. The contractors were John Mowlem and Sons.

5. The Maturity of Structural Theory

The majority of the first generation of iron arches on the Stephenson's railways owed only a limited debt to fundamental analytical technique. It is clear that the coterie of engineers employed on these lines drew heavily upon Telford's practice which had been widely presented in published form by this time. However, a number of bridges demanded a more rigorous approach and amongst the first of the railway engineers to have a thorough competence in mathematical rationalization was William Henry Barlow, son of Peter Barlow, master of mathematics at the Woolwich Academy. Woolwich, although a military foundation, had a tradition of interest in arch theory. William Henry Barlow doubtless obtained his academic education from his father and

subsequently trained at Woolwich Dockyard and the London Docks after which he was employed by Maudsley, Sons and Field. Following a period of working abroad for Maudsley's he returned to England and took up the post of assistant engineer under Locke on the Manchester and Birmingham Railway. Shortly after he was appointed resident engineer to the Midland Counties Railway under Vignoles, where he was responsible for rationalizing the three arch span bridge at Sawley. Barlow was subsequently associated with Stephenson on the North Midland Railway and when this became a constituent of the Midland Railway, he became Chief Civil Engineer. He is best known today as the engineer responsible for the design of the St. Pancras Station train shed roof.

In 1845 Barlow had displayed his mastery of arch theory when he submitted a paper to the Institution of Civil Engineers as a contender for the first premium prize in 1845. The topic set by the Institution was intended to direct interest into areas where research was felt to be deficient:

On the theory of arches, abutments and piers; comparing the hypotheses of different writers; with practical examples of the application of theory.

Barlow presented a masterly survey of research to date including a discussion of both Coulomb and Moseley's work. He then demonstrated the operation of the line of thrust by means of several models in the course of which the catenary was proved and a semi-arch shown with minimum thickness to contain the line of thrust. The magnitude and direction of the line of thrust at the springing and the pier was graphically determined. Barlow acknowledged the value of Coulomb and Moseley's approach in identifying the hinge mechanism mode of failure which occurred as the line of thrust passed outside the limits of the arch ring but he was forced to concede:

.....the deductions have not received that attention from engineers which their importance deserves; chiefly from the absence of any decided practical exhibition of their correctness and utility, and also from the investigations being surrounded by too much mathematical difficulty to admit of ready application.

Barlow's response was to replace the algebraic content of the theory by a graphical construction. The discussion that followed the paper was overwhelmingly favorable. Stephenson commented:

.....the paper would remove many difficulties hitherto felt in examining the subject by the process laid down by Prof. Moseley whose formula although highly scientific and no doubt very beautiful were much too abstruse for the use of the practical man.

Brunel however made a characteristically perceptive point in drawing attention to the elasticity of the material of construction. Up to this stage the theory had been exclusively concerned with the geometry of the arch and no real consideration had been given to the properties of the material of construction. Brunel whose education had imbued him with the French analytical tradition clearly saw Barlow had failed to provide positive rules for finding the hinge points. In the audience was George Snell who had also looked at Moseley's work. Within a few months Snell had submitted his own paper to the Institution. It was both more extensive and more comprehensive than Barlow's and began by stating three modes of arch failure, slipping, turning on edge and crushing of the material. He defined the angle of friction and also made the point that a load concentrated at the edge of the block would cause localised shattering of the heel or toe. He then proceeded to explain

the line of resistance and restates the condition for stability as that in which the line does not pass outside the arch ring. The governing critical state was that at which the line finally touched the extrados and the intrados before passing outside it. The resolution of the problem thus depended upon locating this critical point. Referring to Moseley he says that his mathematics were difficult and for the algebraic approach Snell substituted a graphical technique using force triangles. He then considered the formation of the hinge when the line passed outside the arch observing that frictional resistance had hitherto been greatly underestimated and was thus less consequential. For this reason, the rest of the paper focused upon failure that entailed the formation of a four part hinged mechanism and the location of the hinges at the final instant before rupture took place.

Over the twenty years that followed the reading of Snell's paper the literature of civil engineering began to develop. The Proceedings of the ICE assumed pre-eminent status but more general journals such as the *Engineer* (1856) and *Engineering* (1866) began to offer a high-quality forum to the profession. In 1858 the first edition of W.J.M. Rankine's authoritative *Applied Mechanics* appeared, the first general university level textbook to meet wide acceptance. Rankine along with James Clerk Maxwell in his reciprocal diagrams for the resolution of forces in structures provided the concepts for the maturity of arch theory.

The final phase began with William Bell who had rationalized the continuous girder to the in Brunel's Saltash Bridge. In his 1867 I.C.E. paper *On the Stresses of Rigid Arches, Continuous Beams, and Curved Structures* he was principally concerned with the problem of the growing use of wrought iron which made elastic bending concepts more relevant. Wilfrid Airy and Jules Gaudard had both recently published on the subject and it was Airy who coined the term elastic arch. Gaudard had developed a theory which not only concerned itself with the arch but was capable of incorporating the part that a rigidly attached spandrel played in the overall performance of the structure.

Bell's method of analysis was a purely elastic one which involved the calculation of bending moments throughout the arch ring, by which it was possible to determine the stress at any given section. Interestingly, Rankine, in the discussion that followed indicated that the method had already been in use for ten years although he added no further details. It is however worth remarking that William Humber's work on Bridges, published in 1864 develops an elastic approach to arch theory.

The paper by Bell marked the end of one generation of structural analysis and the start of a new one. The theory of elasticity which had largely evolved around the needs of the level beam and lattice girder bridge was also to prove better suited to the treatment of the non-voussoir arch with rigid connections joining its elements. The theory of the arch based upon elastic bending was the most competent tool for dealing with the new structural materials that emerged towards the end of the nineteenth century, steel and concrete.

6. The Manchester Sheffield and Lincolnshire Railway

The British railway system was entirely the product of private capital. The first inter-city railways, the Liverpool and Manchester and the London to Birmingham provided dividends of between 6% and 10% to shareholders, a return un-matched by most industrial investments and two to three times better than government securities. This led to a bonanza as successive major cities of the United Kingdom offered the opportunity for railway promotion. Inevitably, as the most obvious candidates were eliminated the returns declined. Whilst the Liverpool and Manchester, the London and Birmingham and the Great Western and other spinal lines remained consistently good investments throughout the nineteenth century, the later entrants into the capital market became progressively more marginal performers as they sought to duplicate access into towns and cities, eroding the initial monopolies. Of the latter the Manchester Sheffield and Lincolnshire acquired early notoriety, its signature M.S. & L. R. becoming alliterated to Money Sunk and Lost. When it finally gained access to London its title was changed to The Great Central Railway but with no dividend improvement the wags translated G.C.R. into Gone Completely.

In 1838, when the first sod was cut for the Sheffield, Ashton-under-Lyme and Manchester Railway, precursor of the Manchester, Sheffield and Lincolnshire Railway, Manchester already had established railway connections to the north, south, east and west. The earliest of these was the seminal Liverpool and Manchester railway which was followed by the Manchester and Leeds. By 1844 these two lines had a cross town connection which enabled passengers to travel continuously from Liverpool to Leeds. Manchester was also in the process of acquiring a direct connection with London through the Manchester and Birmingham Railway which met the London and Birmingham at the latter city. The Manchester and Birmingham diverged from the earlier Grand Junction Railway at Crewe and approached Manchester after passing through Stockport on George Watson Buck's magnificent brick viaduct. Because the Manchester and Birmingham already held parliamentary sanction to enter Manchester, the passage of the enabling bill for the Manchester, Ashton-under-Lyme and Manchester was conditional upon it making use of the same terminal facilities as the Manchester and Birmingham in Store Street, Manchester, later known as London Road and now, Manchester Piccadilly.

The M. & B.R. Store Street terminus was opened to traffic on the 10th May 1842 but it was not until the 2nd June 1843 that the M. A. & S. R. took possession of its own facilities there. The Sheffield line joined the Manchester and Birmingham at Ardwick and both railways followed the same course for the final part of the Manchester journey. At this point the M. A. & S. R. was confined to operating from the western end of its Woodhead tunnel which was to penetrate the Pennines in order to reach Sheffield. It was not until the 22nd December 1845, that the first trains were able to run between the Lancashire and Yorkshire cities using the tunnel.

The M. A. & S. R.'s capitalization was never sufficient to extend it sufficiently into areas of potential traffic and periodically it considered amalgamating with its wealthier neighbours. The leading contenders were the London and North Western Railway, formed by an amalgamation of the Manchester and Birmingham, the London and Birmingham and the Grand Junction in 1845, and George Hudson's Midland Railway which was centred upon Derby. These unconsummated

dalliances recurred throughout the history of the M. A. & S. R. and its successor the Manchester, Sheffield and Lincolnshire Railway.

Usually as a reaction to the failure of such negotiations the M.A. & S. R. periodically turned to bonding with smaller strategic proposed railways. The aborted proposal to marry the line to the Midland and the Manchester and Birmingham in 1845 resulted in a spate of activity which had two significant results for the M. A. & S. R. The first of these involved the extension of the railway from Sheffield into Lincolnshire and ultimately, the River Humber at Grimsby. It was the final fusion of the Sheffield and Lincolnshire Railway, Great Grimsby and Sheffield Junction Railway and the M. A. & S. R. that formed the consolidated Manchester, Sheffield and Lincolnshire Railway in 1846.

At the same time a proposal to form connections with the area to the south and west of Manchester was maturing. The key element in this development was a line with the dual intention of linking to the Liverpool and Manchester Railway at Ordsall Lane and at the same time throwing an arm off towards Altrincham which potentially gained access into Cheshire, potentially offering an independent route to Liverpool. This was clearly a sensitive issue in view of the uneasy alliance that existed between the M. A. & S. R. and the Manchester and Birmingham Railway to who it was beholden for its Manchester terminus. To avoid friction it was agreed that the Manchester South Junction & Altrincham should be a joint venture between the two existing railways. It was opened without ceremony on the 20th July 1849 and consisted of a 1¾ mile 'main line' between Store Street and the Ordsall Lane Junction with the Liverpool and Manchester Railway and a 7¾ 'branch' from Castlefield Junction to Altrincham. It was promoted as an independent company but the capital was subscribed jointly by the M. A. & S. R. and the M. & B. R. Because Lord Francis Egerton's canal interests were threatened by the new line he was allotted £50,000 in shares although these shares were to be acquired by the London and North Western Railway and the Manchester Sheffield and Lincolnshire Railway in July 1847. The joint administration of this line proved to be a fertile field for inter-company animosities which were only partially resolved by the appointment of an independent arbitrator.

The national railway scene was now one of great fluidity. George Hudson who had dominated early railway construction and held an empire which included many important inter-city connections was finally de-throned by George Leeman and retreated into bankruptcy. His empire fragmented and from it emerged a number of companies that were to be part of the essential framework of Britain's railways. Of these the North Eastern Railway and the Midland Railway were most prominent. Elsewhere the London and North Western seized several promising connections. Mark Huish emerged as the chairman of the L.N.W.R. and by his complete absence of moral integrity rapidly acquired formidable status. Huish's formation of the Euston Square Confederacy seduced the Midland, the Lancashire and Yorkshire Railway and the Manchester Sheffield and Lincolnshire into joining an illegal traffic pooling agreement. Much of the background to the blandishments of Euston Square Confederacy lay in Huish's opposition to the emergence of an alternative route from the north to London, the Great Northern Railway. In the Denisons, father and son, Huish was to meet his equal in battle and for the next few years the M. S. & L. R. was to transfer its loyalties between the two.

In January 1854 Edward William Watkin moved from the London and North Western to become General Manager of the Manchester Sheffield and Lincolnshire Railway. Watkin was as adroit as any of his opposite numbers on the larger systems and his ambition was to be the determining force in the direction that the M.S. & L.R. followed for the rest of the century. Watkins first strategic gesture was to gain control of the Warrington and Stockport Railway. This line in turn had an end-on connection with the St. Helens Canal and Railway which again fell into Watkin's hands. This gave the Manchester, Sheffield and Lincolnshire Railway running access to Garston on the threshold of Liverpool.

Watkins still retained his affinity to the L.N.W.R. and throughout 1854 there were negotiations aimed at uniting the Manchester, Sheffield and Lincolnshire Railway with the North Western. Again, these foundered but an important residual consequence was that the L.N.W.R. contracted to undertake the whole of Manchester, Sheffield and Lincolnshire Railway's passenger and parcels business at London Road including collection and delivery by van. For this transfer of responsibility, the M.S. & L.R. paid the L.N.W.R. £600 per annum.

This arrangement was particularly unfortunate in the light of ensuing events. The duplicity of Huish was exposed in 1857, when the Great Northern and another minor railway extending from Skipton to Lancaster, the 'Little North Western' challenged Huish's traffic pooling agreement and threatened by Chancery proceedings the Euston Square Confederacy collapsed. Relationships between the M. S. & L. R. and the L.N.W.R. subsequently underwent an acrimonious collapse and the Manchester, Sheffield and Lincolnshire moved into the now completed Great Northern Railway's camp. Parliamentary sanction for a fifty year traffic agreement was sought and obtained. This brought the M. S. & L. R. to Retford opening the way over G.N.R. metals to London.

The London and North Western still held control over the M.S. & L. R.'s principal Manchester terminus by virtue of the earlier agreement. When the M. S. & L.R. attempted to regain control the L.N.W.R. resisted. Direct competition with the M. S. & L. R. in terms of services was stepped up by the L.N.W.R. and the North Western's staff became obstructive at London Road. When on the 17th December the notice to terminate the working of the passenger business by the North Western expired two clerks were dispatched to take over the booking of the M. S. & L. R. passengers. One was refused admission and the other, who managed to get into the office through a window, was forcibly ejected by the North Western staff. The North Western staff harassed passengers alighting from M. S. & L. R. trains 'frightening one old lady out of her wits' and only the intervention of the M. S. and L. R.'s legal agencies terminated the North Western's intimidatory antics. Nevertheless the North Western continued to obstruct M. S. & L. R. trains. It was only when the Great Northern and Manchester, Sheffield and Lincolnshire Traffic Arrangements bill became law that the temperature of the conflict subsided.

The L.N.W.R. continued to be a party to the operation of the Manchester South Junction and Altrincham and its spleen was duly vented in this direction when Watkins provoked the situation by becoming instrumental in the promotion of the Stockport and Woodley Junction and the Cheshire Midland. This incursion into L.N.W.R. territory resulted in the serving of an injunction upon the M.S. & L. R. members of the joint board, which included Watkin. The larger company again failed and Watkin continued to penetrate the L.N.W.R.'s Cheshire fiefdom. In June 1862 the

L.N.W.R. was again outflanked when the Manchester, Sheffield and Lincolnshire and the Great Northern formed the Cheshire Lines Committee. This embraced the West Cheshire Railway, the Cheshire Midland, the Stockport, Timperley and Altrincham and the Stockport and Woodley Junction Railways to which the Garston and Liverpool Railway was later added. Each partner was to subscribe equally towards the capital of these lines and an Act was passed on 13th July 1863, the Great Northern (Cheshire Lines) Act which confirmed the arrangement.

7. The Cheshire Lines Committee

The Cheshire Lines Committee was the direct result of the 1863, the Great Northern (Cheshire Lines) Act. Despite being a formally constituted railway company, it was to be distinguished amongst British railways in that it owned no locomotives, declared no dividends and held no shareholders meetings. It was, in fact, an operational organization put together to administer the growing number of small but strategic Cheshire railways in which the M.S. & L.R. shared an interest with the Great Northern Railway. As noted above, the Garston and Liverpool as a later addition to the original four constituents. It was isolated from the other three lines and could only be accessed by way of the L.N.W.R. To circumvent the old foe Watkins proposed linking railways between Timperley Junction and Garston but to succeed in gaining parliamentary sanction he needed an ally and in consequence the Midland Railway became the third partner of the Cheshire Lines Committee. Each of the three companies contributed three of its directors who formed a committee of management but the Cheshire Lines Committee had fully independent status under the Cheshire Lines Act of 15th August 1867. It was hosed by locomotives provided by the Manchester, Sheffield and Lincolnshire Railway but the C.L.C. owned its own passenger and goods rolling stock.

This network of lines gave the C.L.C. its main asset. It offered an alternative route to the London and North Western's Liverpool and Manchester Railway but it also became the focus for a strengthening presence throughout Cheshire, reaching Chester itself by 1865. The Liverpool connection joined the Manchester system by way of a junction with the Manchester South Junction and Altrincham at Cornbrook, increasing the density of traffic on that line. Against an otherwise tedious litany of financial mediocrity, the Manchester South Junction and Altrincham represented the M.S. & L. R.'s golden goose. Between 1850 and 1863 its annual profit had risen from £9,600 to over £34,500 and passengers carried from 639,000 to 1¾ million. Merchandise traffic had enjoyed a comparable rise from 114,600 tons per year to 679,000 tons. Such was its scrupulous record in operating that its initials were again corrupted but to the much more favourable Many Short Journeys & Absolute Reliability.

This success was not without tribulations. The L.N.W.R. created recurrent difficulties for the Manchester and Sheffield line where the latter had to recourse to running powers over L.N.W.R tracks between Ardwick Junction and London Road and London Road and Ordsall Lane. This increased pressure brought about the first proposal for an independent terminal station but a bill of 1865 for a Manchester Central Station had to be abandoned. Striving for an alternative, Watkins prepared the case for the M. S. & L. R. having its own cross Manchester line connecting Cornbrook directly to Ancoats where a Midland Railway good depot was proposed. The threatened disruption

of Piccadilly and Oxford Streets brought the Manchester Corporation out in opposition but it was only a veto in the House of Lords veto that prevented the bill becoming law. Watkins efforts had a positive result in that the reconstruction of London Road Station by the L.N.W.R. in 1866 allocated a separate portion to the Manchester, Sheffield and Lincolnshire with two platforms for its exclusive use. The L.N.W.R. also widened the lines around Ardwick to increase capacity which eased the operating conditions.

The position at London Road remained endemically difficult and increasingly Oxford Road became the destination for Manchester traffic to which end, the through running platforms were augmented by a terminal station attached to the north side of the premises. The inadequacy of this arrangement became obvious following the completion of the Cheshire Lines Committee's new station at Liverpool. This had involved a major civil operation and included a 1,320 yard tunnel under the streets of Liverpool. In addition it had a low level connection with the Mersey Railway giving the M. S. & L. R. direct access to Birkenhead. As completed in 1874, the new Liverpool terminus had five passenger platforms and the two for milk, horses and carriages. All was covered by a single span, arched, roof rising to 65 feet with a three storey façade to Ranelagh Street.

8. Manchester Central Station and its Approaches

Despite the successful penetration of Liverpool and the relocation of the Cheshire Lines Committee's administrative headquarters to the new Ranelagh Street Central Station, Manchester remained the centre of gravity of both the M. S. & L. R. and the Cheshire Lines Committee. Pressure to improve the Manchester terminal facilities was inescapable and under the Cheshire Lines Act of 22nd June 1872 the bill for a proposed Manchester Central Station, abandoned eight years previously, was finally secured.

The acquisition of suitable land was even more problematic than it had been in Liverpool. Clearly, a Central Station needed to justify its name but the options were constrained by the existing configuration of the Manchester South Junction and Altrincham Railway which passed through the densest concentration of urban property in Manchester. The location for the proposed station was finally settled upon as a block to the north of the M. S. J. & A. R. viaduct extending from Great Bridgewater Street on the south to Peter Street on the north. The eastern boundary was Lower Mosley Street and the western boundary, Watson Street. Peter Street was a major feature of the city centre and the addition of by the railway of an impressive frontage and a hotel would confer prestige on both the railway and city itself.

In the main, the property acquired by the Committee was densely covered by working class housing but the Manchester and Salford Junction Canal with its feeder reservoir and pumping station lay across the centre of the site, running east to west. There were also a couple of cotton mills and a pair of stone yards. These presented little problem as the current owners could be compensated at a reasonable cost but the Peter Street area posed greater problems. The frontage was occupied by several prestigious civic buildings, the Free Trade Hall, a chapel, The Theatre Royal, The Museum of Natural History, two schools and a concert hall. Despite taking out a second Act specifically to cover property acquisition the railway company was eventually forced to retreat from Peter Street

following the failure of negotiations with the owners of Free Trade Hall. With the newly proposed frontage located in Windmill Street, demolition of the more amenable properties was under way by the summer of 1874. The canal had to be retained and this was to be incorporated into the undercroft of the station.

That the station's train deck should be elevated was inevitable. The station site sloped with the highest point to the north-east at the junction of Lower Moseley Street and Windmill Street. As the road carriage entry, this conditioned the platform level and hence the rail level. The other major factor was the existing rail connections. Whilst the Manchester South Junction and Altrincham Railway had been a primary influence upon the choice of station site the main function of the proposed new station was to service the Cheshire Lines Committee's Liverpool and Cheshire system which converged upon Cornbrook to the south west of the Castlefields Basin of Bridgewater Canal.

Beyond the convergence of the lines from Cheshire at the basin the lines ran on a brick viaduct with cast iron arch bridges over the canal and thence on an ever tightening radius until it joined the Ordsall Lane to London Road viaduct. As the proposed station site was on the other side of the M. S. J. & A. R. viaduct the new line would need to cross this heavily trafficked route and a crossing on the same level would inevitably lead to traffic chaos. In the event it was decided that a direct connection with the M. S. J. & A. R. should be eschewed and the new tracks should be carried over the existing lines at a higher elevation on a bridge. After swinging north-east from Cornbrook the proposed viaduct was planned to make a rapid curve townwards in the course of which, the track plan expanded into the station fan. Much of the fan developed on a series of bridges over Deansgate, Crown Street, Trafford Street and Great Bridgewater Street. These were all to remain undisturbed but the minor residential streets were to be extinguished entirely.

The C.L.C. line at Cornbrook was already at a high level but it was necessary to gain another 30 feet in order to clear the Ordsall Lane Branch of the M. S. J. & A. At 70 foot above surface level, this crossing point was to be the summit of the viaduct. In addition to the prevailing Windmill Street level, the rail level for the station was also subject to the Local Authority's right to specify both the minimum headroom above street level and the width to be adhered to in the preservation of the road and footways. The Local Authority's demands with regard to the Deansgate and the Great Bridgewater crossings were thus determinants of the datum level for the station itself. The combination of parameters was to result in the trainshed rail deck ending up 5 feet lower than the summit, advantageous to the railway company in that the approach gradients to the station were not significant.

For diplomatic reasons, the engineering management of the scheme was carried out under the joint superintendence of Charles Reboul Sacre, the M.S. & L.R. engineer, Richard Johnson the Great Northern Railway's Chief Civil Engineer and A. Johnson, civil engineer to the Midland Railway. Sacre although carrying responsibility for the Manchester, Sheffield and Lincolnshire Railway's civil engineering was only nominally a civil engineer and was mainly engaged in the locomotive and rolling stock side of the railway's activities. Richard Johnson had been appointed the Great Northern Railway's Chief Civil Engineer in 1861 and had risen from artisan ranks starting as a carpenter. The two Johnson's were competent civil engineers but it was, in any case, usual for the

railway companies to make use of specialist consulting engineers where works of great novelty or magnitude were involved. These might be Westminster based, where Robert Stephenson and Brunel had established a traditional focus for the profession or, increasingly, they might use the specialist bridge and structural engineering firms that emerged with the railway. These firms either had in-house design specialists or formed alliances with independent consulting engineers. Andrew Handyside of Derby was amongst the most eminent of these firms and Handyside made use of three of the most talented civil engineering theoreticians in Britain, Ewing Matheson, R. M. Ordish and Max Am Ende.

Handyside were to undertake the construction the..... grandly desolate..... trainshed roof for the Cheshire Lines Committee's Central Station, one of three related large span trainshed roofs built by the firm built in this period. Manchester Central, built at a contract price of £58,032. 13. 1., was not the largest and with a span of 210 feet rising 90 feet it, was 30 feet less than the father of the genre, St. Pancras. It was also slightly less accomplished than Glasgow St. Enoch's which was a completely equilibrated arch.

Most of the bridgework for the two tracks from Cornbrook, although imposing, was of a relatively mundane civil engineering character, red brick viaduct arches, but the crossing of the Bridgewater basin involved a considerable lattice girder construction. This type of structure had emerged in the eighteen-forties and was used for the two bridges on the Liverpool and Bury Railway in 1845 over River Croal at Burndon and at Darcy Lever over the River Tonge. John Hawkshaw, at that time engineer to the Lancashire and Yorkshire Railway, made use of the form for the Paddock Viaduct in Huddersfield, and a second long span was erected by him over the Leeds Liverpool Canal for the Lancashire and Yorkshire Railway. The lattice girder gained favour where very long spans were required as its constructional weight was far less than the extravagantly built box girder bridges of Conway and Menai. Possibly the most advanced version of lattice construction was that built to carry that railway's new Liverpool to Manchester line over the Mersey at Runcorn in 1869 by William Baker, engineer to the London North Western Railway. This may well have been the formative influence on the design of the Bridgewater lattice girder which largely copies it in its iron elements and uses the same battlemented piers.

Beyond the Bridgewater basin the crossing of Deansgate was the most prominent piece of bridgework. Deansgate was main approach to Manchester from the south and was a major contributor to the civic character of the city. Correspondingly the C.L.C. bridge had not only to conform to the Local Authority's requirements; it also needed some architectural presence. The pattern had been set by a tradition of cast-iron arch railway bridges over Manchester's main streets. The first examples had been provided by the line connecting line between the Liverpool and Manchester Railway and Hunt's Bank, later Manchester Victoria on the Manchester and Leeds Railway. This was at the northern end of Deansgate and was continuous with an adjacent cast-iron bridge over the Irwell. These first generation railway cast-iron arches owed a continuing debt to the Telford/Rennie precedents with the solid I-section, segmental, bolted arch rings and open lozenge spandrel panels. The Manchester South Junction and Altrincham followed these early lines with similar bridges over the canal at Castlefield and over Deansgate.

The Cheshire Lines Committee's Deansgate bridge was directly descended from these earlier Manchester railway bridges. As it stands today, it consists of six three-segment arch rings of about a 120 degree arc but with vertical spandrel columns of cruciform section, terminating in Gothic arches which carried the deck. The arches were braced by open lattice struts and the deck was built up of wrought iron plates resting on fabricated wrought iron needle beams.

Between Deansgate and Great Bridgewater Street the area cleared of industrial and domestic dwellings was largely crossed by a system of brick, groined arches similar in character to those previously built in Leeds when the joint Midland and North Eastern Railway station was extended in 1866. The Manchester brick structure was carried to the limits of Bridgewater Street itself.

At the street crossing the constructional envelope for the crossing was almost entirely predetermined. The track formation top level of the bridge was dictated by the approach from the south and the station fan track level on the opposite side of the street. Bridgewater Street was inviolate in its width with footpaths, 44 feet, and the minimum soffit level was imposed by the Local Authority. The construction depth consisting of the total height of the rails, the sleepers, the ballast and the structural components of the bridge was thus exceedingly slender.

Whilst evidence for the design process does not appear to survive it is possible to speculate on the reasoning that resulted in the structure that survives today. The width between abutments was not extreme and a girder bridge was doubtless the first consideration. As no intermediate support was possible this would posit a deep section to meet the span and loading conditions but Bridgewater Street was not Deansgate and the demand to satisfy aesthetic sensibilities was less. These factors supported a first option case for a level beam. By this time cast-iron level beam bridges were anathema for line carrying work and the more reliable wrought iron had supplanted it in new bridge construction.

Of the choices available the wrought-iron plate girder bridge was cheap and utilitarian. This form of construction owed its origins to the monumental Conway and Britannia bridges of 1849, hollow box girders of very deep and wide section, the trains passing tunnel-like through the tube. Conceived by William Fairbairn and Robert Stephenson these two bridges broke new ground in bridge construction and theory but they were unduly massive with a large margin of structural redundancy. Fairbairn improved the structural form by reducing the box sections to a pair of side girders retaining the twin-web box-section with a wrought iron deck spanning between. In this form it became a widely used type of wrought-iron girder bridge in railway construction and Fairbairn's Ancoats works produced the majority. Ultimately it was appreciated that the box section itself was excessive and the girder was reduced to a single, deep, I-section built up of riveted plate and T or L angles. The girders could be configured as a U-trough through which the trains ran or under slung below the deck creating an inverted U-section. This is the widely used variety of bridge in railway service today.

The second option was a refinement of the lattice girder with more highly rationalised diagonals, greatly reduced in number. The earliest form was the Warren truss, which was developed into the Pratt truss. The concept was evolved on the continent and the first application of the new truss pattern in the United Kingdom took place in Ireland followed by one the South Eastern Railway for the approach to their London Bridge Station. This latter failed due to injudicious loading whilst

under construction. The failure did not deter the more perceptive from seeing the Warren girder's potential, particularly after Charles Heard Wild built up a sophisticated mathematical analytical technique to rationalise the design. Wild carried out detailed analysis of the structural properties of the truss and although at first professing a preference for plate girders appears to have undergone conversion by 1851 to the extent that in collaboration with Clark, shares were acquired in Warren's patent. Wild was instrumental in persuading William Cubitt and his son Joseph who was consulting engineer to the Great Northern Railway, to use a Warren truss for a new crossing of the Trent at Newark Dyke, the free span of which was to be 97' 6". Although highly rationalised the inclusion of cast iron for the compression members gave it a weight of 2.43 tons per foot run of effective span it comparing unfavourably with the last of the Stephenson tubular bridges. The next generation replaced cast iron by wrought iron for all members which although slightly heavier in unit terms could be fabricated into more slender sections of equal strength. Wild was again the central figure in this development and his past association with Fox Henderson is strongly evident.

The principal objection to both the plate girder and the Warren truss was the very deep section required. Newark Dyke was 16' 00" deep. If a bridge similar to Newark Dyke was employed at Great Bridgewater Street, trusses would rise as side elements from track level creating a series of parallel U-troughs through which the rails could be laid. In this the situation would have been similar to the Cornbrook lattice viaduct. This was impractical as the side members would be highly obstructive in terms of track layout and platform extensions. The alternative was sling the truss below the deck but the constructional envelope meant that the prescribed headroom would have been virtually eliminated.

Almost certainly for these reasons the engineers fell back upon the cast-iron arch but instead of the deep segment and spandrel panel pattern used elsewhere in Manchester a mutation was used, the arched girder. In its first applications, the arched-girder consisted of a normal cast-iron arch ring of I-section but with an integrally cast spandrel panel. The top flange of the spandrel rose no higher than the maximum height of the extrados of the arch with which it was integrated. If the arc had a cord to versed sine ratio of less than 1:10 then the arch would act entirely in compression and cast iron of adequate thickness prevented the onset of buckling. Effectively it was an arch with girder properties.

The earliest use of the arched-girder is almost certainly owed to the London and Birmingham Railway. As it was used on the section running out of London through Camden it is likely to have been another major contribution by Charles Fox although George Watson Buck could also have had some involvement. Frederick Swanwick certainly used such girders on the North Midland Railway and outside the Stephenson camp Thomas Grainger used at least one and probably more on his Leeds and Thirsk Railway in 1847. The latter may have been designed by the resident engineer John Bourne but equally possibly the ironworks that originated the castings, Stanningley Ironworks near Leeds, may have carried out the detail design work. These earlier examples of arched girders might have spans of up to fifty five feet but beyond this it was necessary to build the arch up from segments bolted together. As long as the rise to span relationship was maintained the bolted faces were subject only to compressional stresses.

The Bridgewater Street bridge reflects these developments and has little by way of structural novelty. Two girders, bolted together on the centreline of the span by a bolting flange make up the 44 foot span which has a ratio of about 1:8 (not measured). The arcuated element is confined to a modestly embellished, bulbous bottom flange. Above this there is no visually defined arch ring in the sense of a web and top flange, these features being effectively subsumed into the integral spandrel panel which forms a web. This spandrel panel is solid from crown to about the one third points, where perforations are cast in to reduce the mass of the casting. These are mildly decorated with raised edges. Cast-in stiffening verticals divide the spandrel into panels and a similarly cast-in top flange runs for the full length of the arch. This is the member to which the deck is fastened. The deck itself is made up of flat plates which, given a date of 1877, undoubtedly wrought iron. The plates are connected by T-iron cover plates riveted in place. Lateral stiffness between the arches is maintained by the deck plates although a single row of cruciform section cast-iron struts provides a continuous brace in the lower third of the arch attached immediately above the bottom flange. In the nature of such a shallow rise arch the abutments are called upon to resolve the high horizontal thrusts at the spring line in addition to the vertical component. The forces are conducted through cast-iron springback plates into the mass of the masonry which is good quality red brick set in lime mortar. The abutments are part of the system of groined arches running underneath the station and back to Deansgate. White glazed-brick has been applied as a surface dressing beside the pavements up to impost level to improve lighting in what is a relatively long and potentially dingy tunnel.

Contemporary accounts of the building of the station and the bridge approaches do not clearly differentiate the credit for the various parts of the design and construction of the civil engineering. Handyside, builders of the train shed, were mainly builders of iron bridges and were quite capable of undertaking the undemanding task of building the Bridgewater Street crossing in addition to the trainshed but nowhere is it stated that it was included in their contract. The British Architect has an account of the works written in June 1877 as the opening of the first part of the station was impending. It states that the Manchester structural engineering firm of De Bergue was responsible for the greater part of the ironwork and bridges but their account is mainly directed at the Cornbrook lattice viaduct, very much De Bergue's forte. In the absence of further evidence it is probable the De Bergue also undertook the Bridgewater Street Bridge.

The station in its present form was not that which opened to traffic in July 1877. Even as late as June, The British Architect reported that the works connected with the viaduct were completed only up to the point where it is carried over the Ordsall Lane Branch of the M.S.J & A.R. and adds that the heaviest part of the work was still to be finished but was in a very forward state. The great trainshed took a further three years to complete and over this interim period a temporary timber-built station served the site. Four lines of track with two platforms were provided on the Moseley Street side of area later to be covered by Handyside's arch. These platforms extended over the viaduct. The platforms were covered by a temporary, overall, glazed timber roof which extended for a length of 480 feet from the Windmill Street end. Of the two platforms the arrival platform had a length of 660 feet and the departure platform 600 feet. The width of both was 20 feet. The great iron trainshed was opened officially by the C.L.C. on 1 July 1880 but the range of timber buildings that served as offices; booking offices and parcels office survived its completion. The

sumptuous hotel that was planned was never built and today this impromptu timber response to the need for a hasty opening provides the very subdued frontage to the trainshed.

On the western side of the site, adjacent to Watson Street, a large warehouse into which loaded wagons could be run was to be included in the development. An inclined ramp from Windmill Street gave access to the wagon floor for carriers and carters. The warehouse was not completed until 1898.

The extent to which this delayed completion of the iron (steel?) trainshed had an impact upon the approach bridges is difficult to assess but The British Architect writing in November 1874, eighteen months after work had started reported that:

.....the (Cheshire Lines) Committee are laying their plans with the view to accommodating not only the proposed traffic but also of providing for the augmentation which will follow upon the concentration of their business in one locality.

The statement might be taken to imply that the bridges were constructed to their full dimensions in 1877 when most of the station track layout was completed but this is slightly qualified by the same journal when it says that as far as the station itself was concerned:

..... it might be opened tomorrow if that could be done independently of the completion of the viaduct. At present the streets are being covered only sufficiently to meet the immediate necessity and some time must elapse before the works of the permanent station will be so far advanced as to lead to the bridging of the street to the full extent... ultimately its width will be such as to necessitate bridging over a considerable part of the two streets last mentioned.

There is no evidence within the present day fabric of either the Deansgate Bridge or the Bridgewater Street Bridge that the core construction was anything other than a single build. Almost certainly, the cast iron elements of the Bridgewater Street Bridge date from the 1870s. The bridge has however been extended. On both the north and south ends an extra bay has been added. These additions are distinctively different from the main construction and consist of matching profile arched girders but fabricated from either wrought iron or steel plate and angle sections. The changes are almost certainly associated with the developments that took place in of the last decade of the century.

The original twin track capacity was rapidly overtaken by the growth of the combined traffic of the Cheshire Lines Committee and Midland Railway. In 1888 designs were prepared by W.G. Scott, Chief Civil Engineer to the C.L.C. aimed at providing additional capacity from as far back as the Cornbrook junction. These were approved by the C.L.C. and the M.R. and parliamentary powers were obtained. In 1890, contracts were let for a new viaduct carrying three tracks from Cornbrook to the Central Station, $\frac{3}{4}$ mile and work began immediately. There were to be 56 viaduct arches, several girder bridges and an eight span, steel lattice viaduct of 370 yards extending from Egerton Street to Deansgate. This was supported on 15 cast iron cylinders 10' 6" diameter in the shaft and 13' 6" in the base. The longest was 60 ft high from the ground to rail with 20 ft below ground. The contractors for the masonry and brickwork were M. W. Walmsley and Coy of Manchester and Southport and the steel and ironwork had been undertaken by Heenan Froude of Newton Heath.

To mark the completion of the structure a ceremony took place on the viaduct at the point where it crosses the M. S. J. and A. R. The last rivet was closed by W. G. Scott C.E. and Mr. Heenan.

The viaduct had cost £250,000. Citing the kind of statistics that delighted the Victorian engineering soul, the Manchester Weekly Times marking the opening of the new line on 12th May 1893, gave the total of weight of iron and steel in the viaduct is upwards of 7,000 tons, 6 million rivets having been used 10% of which were closed by hydraulic power. Prior to the building of the widened lines 300 trains made use of the two tracks every 18 hours compared with 120 at the time of opening. It was anticipated that the three additional tracks would result in 500 trains using the station in 24 hours.

9. Conclusion

It has been concluded in the foregoing text, that the bridge carrying the approach lines to Manchester Central Station over Great Bridgewater Street was largely completed by 1877. This applies more strictly to the forty-four, cast-iron, segmental, arches that make up the main part of the structure. The wrought iron or steel plate girder extensions observable at either end of the structure were almost certainly additions made in 1893 as part of the widened lines programme.

The circumstances that led to the choice of a cast-iron arched girder bridge have been fully discussed in the text. The conditioning factor was the slender envelope of construction that resulted from the pre-existing railway topography, the natural ground levels of the proposed station site and the Local Authority's prescriptive rights in terms of the preservation of Great Bridgewater Street. Collectively these factors implied a structure with a very restricted constructional depth. The possible way in which the bridge designer approached this problem and the alternatives available to him as a solution have been considered. In selecting a shallow segmental arch he chose a structural form that had a history extending back to the early nineteenth-century both in general terms and in the specific pattern used here, the arched girder. No innovation was called for in using this type of structure and the analytical tools necessary to ensure the adequacy of the final design were part of the commonplace of engineering technology by this time. The use of wrought-iron deck plates was a more recent development, dating from the eighteen-sixties but again no originality is to be found in this instance.

Alterations to the structure in its working life have been marginal. Some work has been carried out in the masonry of the abutments in the area of the springback plates where the brick work has undergone deterioration but this has not had a material impact upon structure-at-large.

The bridge is a fin de siècle gesture in cast-iron. It is probable that had the main structure been built at the time that the extensions were added in 1893 cast-iron would not have been the material of construction and more probably the use of fabricated steel girder sections as used in the extensions would have been a more appropriate choice.

As far as the broader contextual issues are concerned the bridge is an integral component of the station's history. As such, along with the viaduct and the Deansgate crossing, it is an expression of the complex, competitive, free-enterprise framework that resulted in the railway geography of Manchester and which played a fundamental role in shaping the City as it is today.

