St Peter's Square,
Manchester,

Cenotaph Relocation – St. Peter's Square, Manchester
Design and Access Statement – Part 5

Prepared for the
Manchester City Council

STEPHEN LEVRANT
HERITAGE
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Prepared for
Manchester City Council

02 August 2012

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St. Peter's Square Redevelopment, Manchester

Non- Destructive Investigation of Cenotaph & St. Peter's Cross Construction

Final Report – 3557

Laing O'Rourke Construction Limited

PROJECT:	**St. Peter's Square Redevelopment Manchester**
TITLE:	**Non-Destructive Investigation of Cenotaph & St. Peter's Cross Construction**
CLIENT:	**Laing O'Rourke Construction Limited**
Final Report No:	**3557**
Compiled By:	**R Machin BSc**
Reviewed By:	**NO Fleming BSc**
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Non-Destructive Investigation of Cenotaph & St. Peter's Cross St. Peter's Square Redevelopment, Manchester

1.0 INTRODUCTION

1.1 Terms of Reference

Purpose:	Locate Embedded Fixings and determine Construction Detail of Cenotaph & St. Peter's Cross
Location:	St. Peter's Square, Manchester
Consultants:	GB Geotechnics Ltd (GBG)
Instructed by:	Laing O'Rourke Construction Limited
Survey Dates:	15th – 17th May 2012

This report is the final report of this investigation of the external masonry facing of the Cenotaph and St. Peter's Cross situated in St. Peter's Square, Manchester, GBG Ref. 3557; it supersedes any previous reports whether written or oral.

1.2 Background

Background information to this project has been supplied by Steven Levrant Heritage and is supplemented by further information and observations made and obtained on site by GBG.

The Cenotaph in St Peter's Square, Manchester is a First World War memorial, designed by Sir Edwin Lutyens and constructed in 1924. The structure is faced with Portland stone and is a Grade II listed structure.

To the rear of the Cenotaph is St. Peter's Cross, a gothic stone cross commemorating the Church of St Peter which was built on the site in 1789–94 and demolished in 1907. The cross marks the spot where the altar of the church would have stood and was unveiled in 1908.

On top of the Cenotaph is a figure of the Unknown Soldier draped in a greatcoat. Both monuments are decorated with carved figures and other decoration. The upper half of the St. Peter's Cross monument is columnar shaped with an intricately carved cross fixed to the top of the shaft.

The Cenotaph and St. Peter's Cross are sited in a memorial garden designed by L. C. Howitt.

Plans are being considered to move the two monuments to an alternative site within St Peter's Square in order for the adjacent Metrolink (tramway) station to be expanded.

To assist in this planning process, information is required on the construction detail of the monuments. The primary purpose of the survey being to identify the location of any metallic fixings within the Portland stone blocks. Due to the historic significance and value of these monuments, any information must be obtained without damaging the stonework.

GBG have therefore been instructed to carry out an investigation of the Cenotaph and St. Peter's Cross using non-destructive testing (ndt) survey techniques.

1.3 Purpose of Investigation

To assist in the planning for the relocation of the Cenotaph and St. Peter's Cross information is required on the construction arrangement of the two monuments. A non-destructive investigation was commissioned to provide information on each structure, including stone thickness, location of any metallic fixings and an overview of the condition of the structures.

2.0 THE SURVEY

2.1 General

On site survey works were conducted over three daytime survey sessions, by a 2 person survey team between 15th – 17th May 2012 working between c.08:30 and c.17:00 hours.

2.2 Areas Surveyed

Both the Cenotaph and St. Peter's Cross were investigated as described below.

Access was possible to survey the entire outer surface of the Cenotaph above the seating around its base, except for a small area of the North elevation c.2.5-4m above ground level, see Fig.1a.

Access to the Cross was possible to survey all outer faces to a height of c.2-2.5m above the top of the stepped plinth; above this level only the south face and parts of the south west & south east sides were accessible, accessed from a MEWP – see below.

2.3 Access and Health & Safety

Access permits/permissions were provided by Laing O'Rourke/Manchester City Council.

Access to the higher sections of the Cenotaph and St. Peter's Cross, above c.2.5m, was achieved via a MEWP (Mobile Elevated Working Platform) arranged by GBG and supplied by Universal Platforms. GBG provided a fully trained MEWP operator (Category 1b) as part of the survey team.

Working protection was supplied by Laing O'Rourke which included fencing/barriers to isolate the working areas from the public. A safe pedestrian route was established between the fencing/barriers and the footpath edges.

When not in use between survey sessions, the MEWP was stored in the Laing O'Rourke secure on-site compound.

The MEWP was driven between the site compound and the working area via a designated route along the roadway, crossing the Tramway, with a trained banksman provided by Laing O'Rourke whilst the MEWP was in transit.

2.4 Survey Techniques

The investigations used Metal Detection supplemented by Impulse Radar primarily to locate any metallic fixings within the outer stonework facing of the monuments also to determine the general sub-surface arrangement of the stonework itself. Technical information, providing background detail to the NDT equipment and methods used in this investigation, is available on request.

As the main investigative techniques used are non-destructive the findings given in this report are based on indirect measurements and the interpretation of electrical and electromagnetic signals. The findings represent the best professional opinions of the authors, based on their experience and the results of destructive methods of coring, drilling and exposure carried out elsewhere on similar materials. Such tests have substantiated most of the conclusions that have been drawn.

2.4.1 Metal Detection

Metal detection was the main investigative tool used over the accessible areas of the two monuments. The external faces were scanned using metal detection techniques to locate the position of any metallic fixings. The maximum depth to which metallic features could be located was c.100-120mm.

2.4.2 Impulse Radar

Further corroborative data was collected using impulse radar and whilst the primary purpose of the investigation was to locate metallic fixings, radar also provided

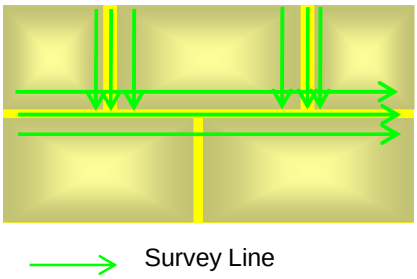
additional information on the construction arrangement including the thickness of the stonework and an overview of the condition.

Antennae operating at 1500MHz and 900MHz were used, set to penetrate to a maximum depth of c.400mm and 1000mm respectively.

The surveying and recording equipment was stationed on the ground with the transducers placed on the stone surface and drawn by hand, using the MEWP for access above a c.2.5m reach. All equipment was powered by 12V DC batteries.

Recovered signals were recorded both digitally and on a paper record, allowing both on site interpretation as well as a more detailed analysis of the data off site.

In order to assess the location of embedded metallic fixings, horizontal and vertical stone joints were scanned using metal detection. The majority of fixings (cramps, pins, ties etc.) are located along the joints between stones). Impulse Radar data was then collected from survey lines profiled directly over and below each horizontal joint, and directly over and to either side of the vertical joints.



Schematic Layout of Survey Lines

2.5 Calibration

A direct calibration of the depth measurements was made where the full thickness of stones could be measured in order to establish the depth of any resolved features of interest; a calculated velocity of 10.0cm/ns has been used for the Cenotaph stonework and 10.5cm/ns for the stonework of St. Peter's Cross. These velocities are consistent with a number of calibrations made at similar stone structures elsewhere, and are considered typical for the construction materials used at this site.

Thickness and depth estimates, where given, can be assumed to be good to better than ±8%, although no allowance for varying levels of moisture content has been made.

2.6 Relocation

A schematic site location plan, provided by Steven Levrant Heritage is shown in the key on Drawing Number 3557-1. Below this plan is a legend of the client referencing/relocation system which has been applied to each monument and includes particular features including stone courses and individual blocks. Elevation drawings provided by Steven Levrant Heritage which are annotated with these references have been used as base drawings for the presentation of the survey findings.

The drawings presented on Drawing Number 3557-1 have been reproduced at a scale of 1:50.

Note, a dimensional survey was not undertaken by GBG and the drawings produced were not verified. All general dimensions and conditions should therefore be checked on site prior to commencing any work.

Relocation of identified features was made to fixed features on the faces of the structures surveyed – mostly the corners of the structures, stone joints and carved figures.

3.0 FINDINGS

3.1 Presentation of Results

The main findings of the investigation are discussed below and the results are also presented on Drawing Number 3557-1. Figure 1 presents the findings from the Cenotaph and Figure 2 from St. Peter's Cross.

3.2 Overview - Radar

Radar signals returned from the subsurface contain a wide variety of information. Not all of this information is of engineering value, and much relates to the electrical properties of the material of which it is made.

The purpose of the analysis, therefore, is to identify the information contained in the signals, which relate directly to the engineering problem in hand.

Some consideration needs to be given to the nature and cause of the signals recorded however, and explanation as appropriate is given here. A full and exhaustive exposition of the theory of operation is, however, inappropriate.

Once the various components have been identified in the radar signals, the analysis is essentially comparative. Comparisons can be made firstly within the data collected from similar targets over the total survey, and a basic response of the subsurface identified. Secondly, comparison is made with the results from similar structures at other sites that we have surveyed. Any unusual responses are identified as anomalies.

3.3 General Structural Arrangement

Both the Cenotaph and St. Peter's Cross are constructed with an outer facing of Portland stone. The Cenotaph has a masonry core/hearting over almost its full height, capped on top with a carved stone of the Unknown Soldier. St. Peter's Cross

has a masonry core/hearting to a height of c.4m above ground level. Above this level, the Cross is constructed with stone blocks through the full thickness.

Many fixings have been identified within the stonework of both monuments. Except for a metallic feature at the top of the Cross, all the fixings, or features giving a similar response, were identified using radar. No metallic responses were recorded with the metal detector within its detection range (except for a feature at the top of the Cross), indicating the identified fixings are most probably non-ferrous.

3.4 Cenotaph

3.4.1 Construction Arrangement

The Cenotaph is rectangular shaped in plan. The outer faces are constructed of horizontally coursed cut stone blocks. The carved figures and other decoration appear to be all cut from the same coursed blocks.



Keyed in Stonework

The external masonry is keyed into an internal roughly coursed core/hearting most probably constructed of brickwork. The stones on each adjoining side (North/East, East/South etc.) are also keyed into each other.

Each course on the narrow sides (North & South elevations) is constructed of a single stone block across the full width; mostly with alternate courses of stone c.500-550mm and 750-850mm thick. Each course on the East and West elevations is constructed with a single stone block between the end stones of the North and

South elevations. The blocks at the centre of the East and West elevations are typically 200-300mm thick, some blocks are >300mm thick as shown at Figures 1b and 1d. The section presented at Figure 1e shows the keying-in detail of the stonework on the East and West faces.

3.4.2 Metallic Fixings

Many near surface targets have been located within the stonework identified only by radar, but within the detection range of the metal detector, although no metallic responses were recorded using a metal detector. The targets detected were located at the top of stones and also within adjoining stones, extending across stone joints.

The radar response from these targets is consistent with either a void or a fixing (pin or wedge). Logically, any of these targets which extend into two adjacent stones is most probably a fixing which will be non-ferrous or possibly made of slate. These fixings, shown in blue at Figure 1, were mostly located across vertical stone joints, although some were identified across horizontal joints.

The targets shown in cyan at Figure 1 were located at the top of stones, mostly centrally placed. The location of these targets suggests they could be either fixings, probably tying the stones to the central core/hearting (see Figures 1e and 1f); or alternatively these features may be Lewis Holes cut into the stones prior to construction for lifting purposes. Any fixings would again, most probably be non-ferrous or possibly made of slate.

Depths to these features shown in blue and cyan at Figure 1 are shown in millimetres.

3.4.3 Stone Condition

Few visible defects were noted on the exterior surface of the Cenotaph, however some minor cracks and repairs were visible and these were recorded during an on-

site survey carried out by Steven Levrant Heritage immediately following GBG site investigations.

Evidence has however been found within the collected data of some defects (differentiation) within stones, which does not necessarily manifest as visual distress on the surface. The response from within these stones, highlighted in orange, is consistent with microcracking. This was only identified within 5no. stones.

3.4.4 Stone Seating

The stone seating which is situated around three sides of the Cenotaph at its base was also investigated.

The approximate thicknesses (depth) of these stones are shown in the plan presented at Figure 1g. The seating stones are supported by further stones of unknown thickness.

Some visible damage to the steps was noted - cracking and spalling at the outer faces, although generally the stones appear to be in good condition. An area of differentiation was however recorded in the radar signal within the stone at the Southeast corner, indicative of some distress – probably microcracking. An anomaly was also detected within the stone at the Southwest corner, shown in red; this feature was consistent with an inclusion, possibly a fixing located towards the bottom of the block.

3.5 St. Peter's Cross

3.5.1 Construction Arrangement

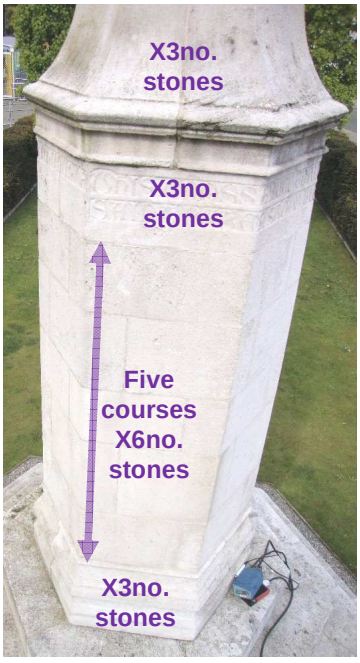
St. Peter's Cross is constructed with a plinth at the base, faced with stone steps, supporting a columnar structure. The stone steps and lower section of the Cross are hexagonal shaped in plan. Above this, the monument is more slender and rounded with carved figures. The top is decorated with an elaborately carved cross.



North/Northwest sides of St. Peter's Cross

Stone steps are c.350-400mm thick (horizontal measurement), set around an internal roughly coursed masonry core/hearting, probably brickwork.

The hexagonal section above the plinth, which extends to c.4mm above ground level, is constructed with outer faces of horizontally coursed cut stone blocks. The bottom course is constructed of 3no. facing stones between c. 360-400mm thick and the five courses above this with 6no. stones all c.190mm thick – vertical joints alternately on the right and left side of each face. These stones surround the masonry core/hearting – see Section C-C, Figure 2g.



Coursing on Hexagonal section of St. Peter's Cross

Above this, the following two courses are each constructed with 3no.adjoining stones forming the full thickness of the structure. Each course above this is formed of a single carved stone with no internal core/hearting.

3.5.2 Metallic Fixings

Figure 2a presents the South Elevation, which was the face accessible to survey over its full height and shows the positions of any fixings identified.

The carved cross figure at the top of the monument is fixed to the stone below with a metallic (ferrous) fixing. The data collected indicates that this fixing consists of a metallic base, probably a plate, embedded in the top section of the stone below the cross figure. A metallic rod extends vertically above the base plate into the centre of the cross stem – see annotated image P1d.

No metallic fixings were detected within the courses formed of a single stone block or the two courses formed of 3no. stones at the top of the hexagonal section.

Near surface targets were however identified in the top of the stone blocks of the courses which form the hexagonal section of the monument around a central core/hearting. The schematic (plan) section presented at Figure 2g illustrates the position of these targets. The location of these features, at stone joints, indicates they are most probably fixings - ties/cramps securing adjoining stones to each other. These fixings, shown in blue at Figure 2, are most probably non-ferrous – not located with a metal detector.

Depths to these features shown in blue at Figure 2 are shown in millimetres.

No metallic fixings were detected within the stone steps.

3.5.3 Stone Condition

Few visible defects were noted on the external surface of the stone blocks of St. Peter's Cross. Again, any visible defects were recorded during the on-site survey carried out by Steven Levrant Heritage.

The radar data collected in the areas accessible to survey, found no evidence of any internal defects (differentiation) within the stonework facing.

4.0 SUMMARY

This investigation has identified the general construction detail of both the Cenotaph and St. Peter's Cross within St. Peter's Square, Manchester.

The ***Cenotaph*** is constructed with a Portland stone facing around a masonry core/hearting over almost its full height. The outer faces are constructed of horizontally coursed cut stone blocks keyed into the hearting.

Near surface targets have been located within the stonework: features located at the top of individual stones and within adjoining stones extending across stone joints are most probably fixings - pins or wedges. Targets located at the top of the stones may be either fixings or Lewis Holes. Fixings would most probably be non-ferrous or may possibly be made of slate.

St. Peter's Cross is constructed with a Portland stone facing around a masonry core/hearting, with the bottom c.1.5m high section forming a stepped plinth.

The core/hearting extends to a height of c.4m above ground level. Above this, the monument is constructed of stone blocks forming the full thickness of a columnar structure.

The top of the monument is adorned with a carved cross figure which is fixed to the stone below with a metallic fixing consisting of a plate and rod.

Near surface targets were identified in the top of the stone blocks which surround the central core/hearting. These targets are consistent with fixings, probably ties/cramps securing adjoining stones to each other. These fixings are most probably non-ferrous, having not been detected with a metal detector.

Appendices

A Drawing

The results of this investigation are presented on Drawing Number 3557-1 as elevations, sections, plans and selected photographs.

The drawing has been provided in colour at A1 size as an AutoCad .dwg file and .pdf file.

Note: The base elevations used in the presentation of the results have been provided to GBG.

All dimensions are to be checked on site prior to preparing any drawings or commencing any works.

NON DESTRUCTIVE INVESTIGATION OF CONSTRUCTION OF CENOTAPH & St. PETER'S CROSS
St. PETER'S SQUARE, REDEVELOPMENT, MANCHESTER

FIG.1: CENOTAPH SCALE 1:50

FIG.1a: NORTH ELEVATION

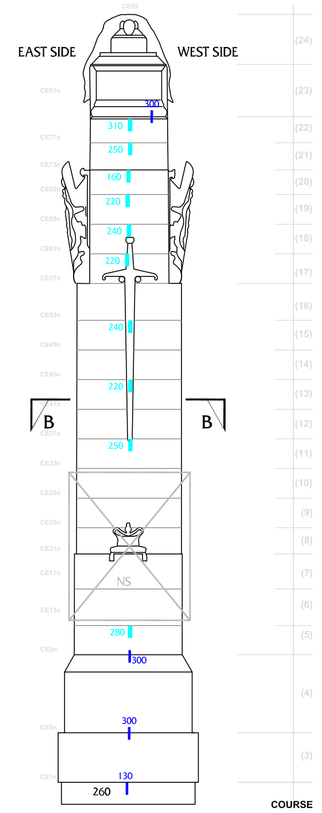


FIG.1b: EAST ELEVATION

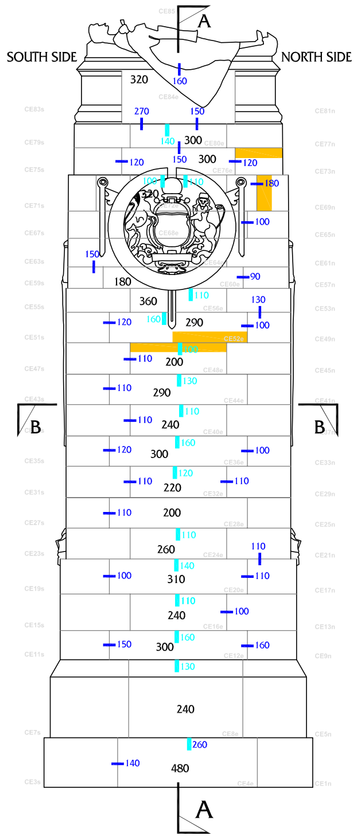


FIG.1c: SOUTH ELEVATION

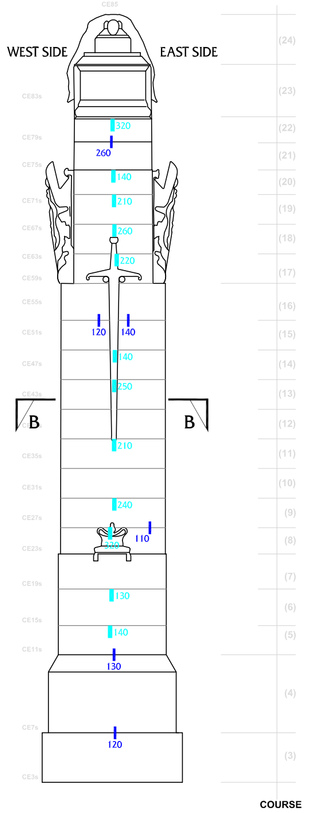


FIG.1d: WEST ELEVATION

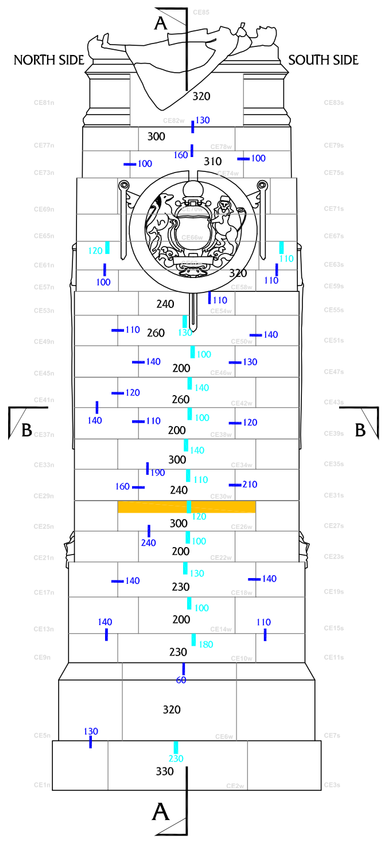


FIG.1e: SCHEMATIC SECTION A-A - GENERAL CONSTRUCTION ARRANGEMENT

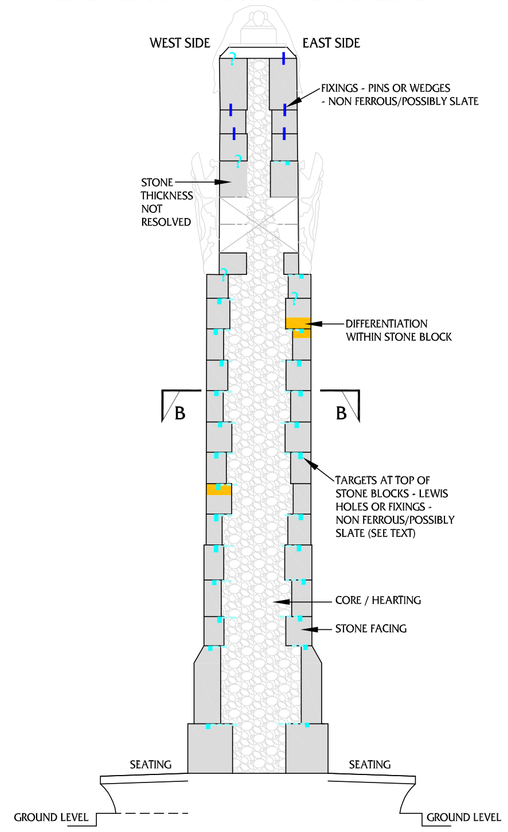
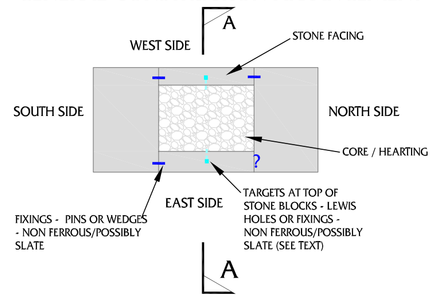


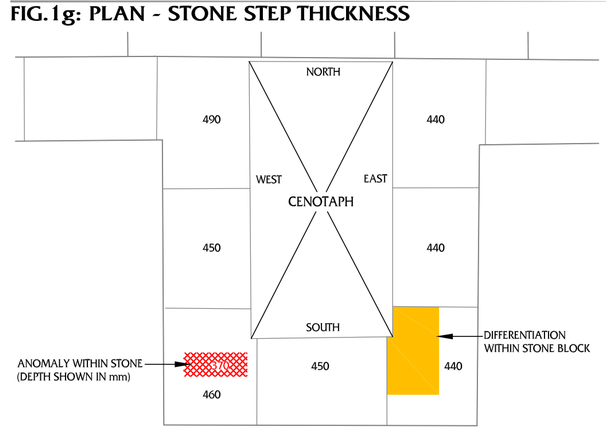
FIG.1f: SCHEMATIC SECTION B-B - GENERAL CONSTRUCTION ARRANGEMENT





P1a: CENOTAPH - EAST FACE

FIG.1g: PLAN - STONE STEP THICKNESS





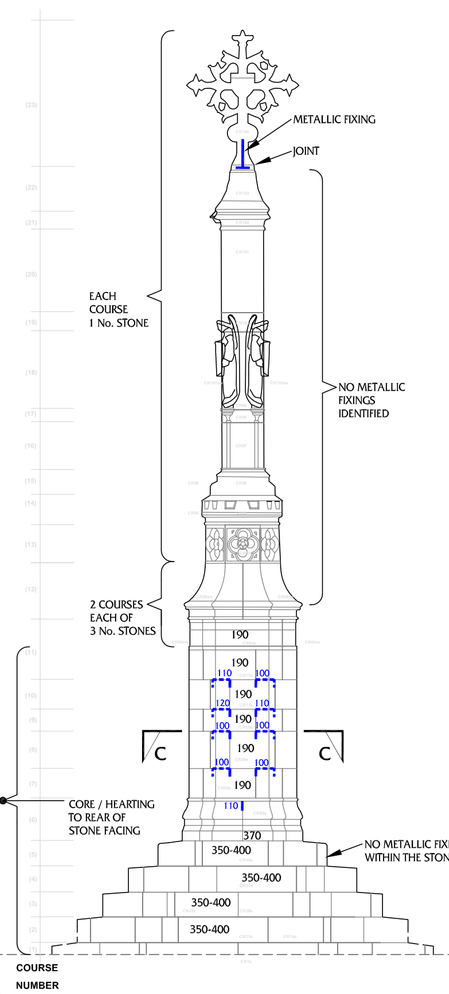
P1b: CENOTAPH - SOUTH FACE



P1c: CENOTAPH - NORTH FACE

FIG.2: St PETER'S CROSS SCALE 1:50

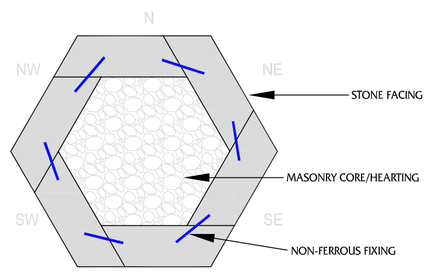
FIG.2a: SOUTH ELEVATION





P1d: St. PETER'S CROSS, SOUTH FACE - SHOWING EMBEDDED METALLIC FIXING AT TOP OF CROSS

FIG.2g: SCHEMATIC SECTION C-C- GENERAL CONSTRUCTION ARRANGEMENT SCALE 1:20





P1e: St. PETER'S CROSS - NORTH & NORTHWEST FACE



P1f: St. PETER'S CROSS - BASE/PLINTH - NORTH & NORTHEAST FACE

FIG.2b: SOUTHWEST ELEVATION

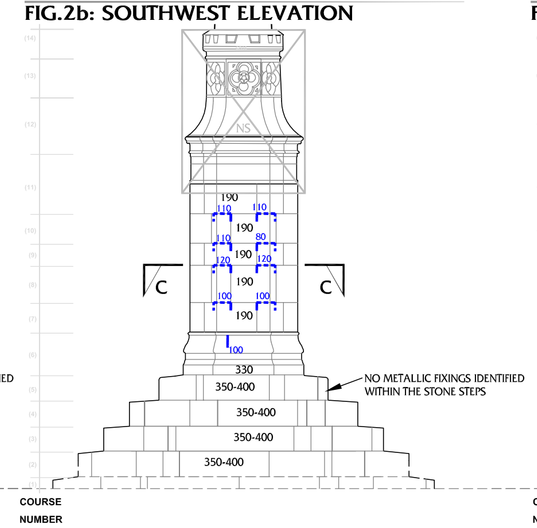


FIG.2c: NORTHWEST ELEVATION

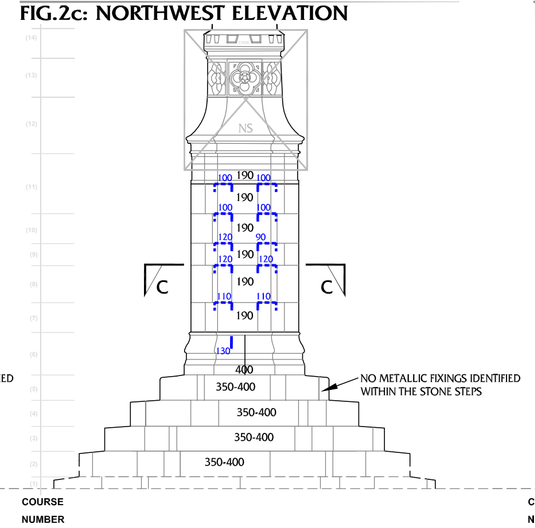


FIG.2d: NORTH ELEVATION

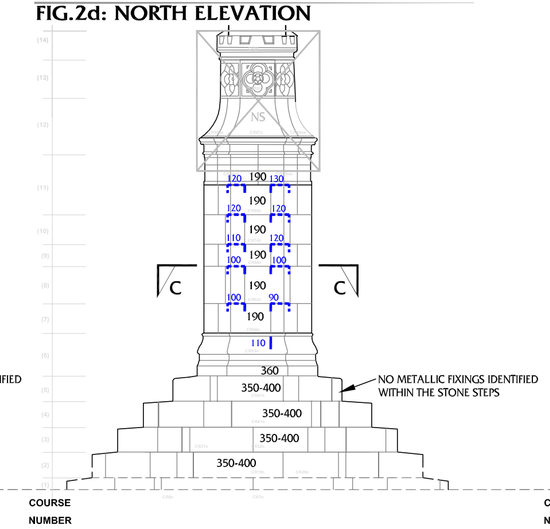


FIG.2e: NORTHEAST ELEVATION

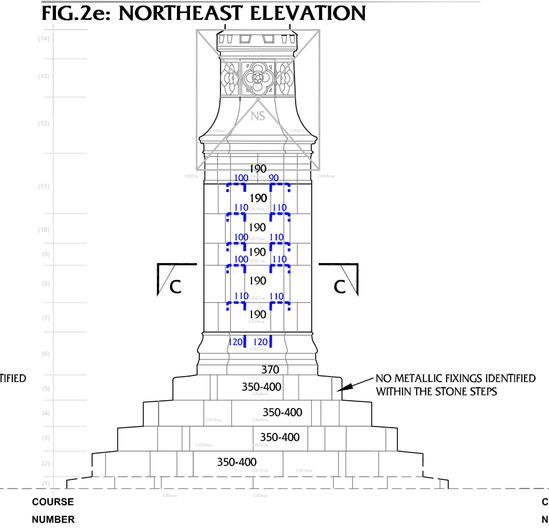
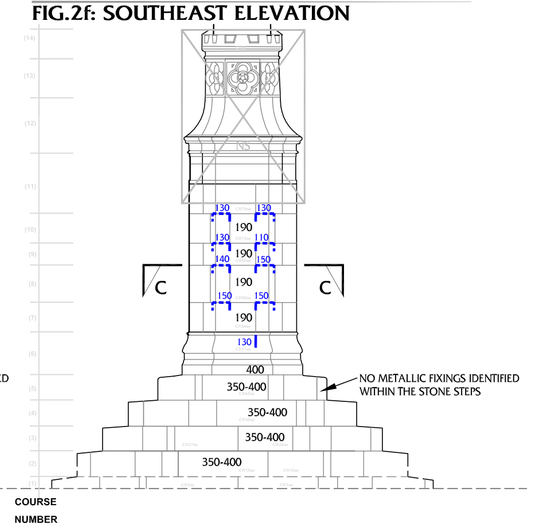
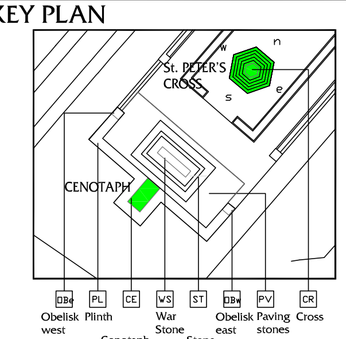


FIG.2f: SOUTHEAST ELEVATION



KEY PLAN



General Notes

These drawings are based on measured survey provided by others. GBG can not be held responsible for any inaccuracies that may exist.

Legend - Client reference system

u	upper	XX ## x (#)
l	lower	course number
n	north	
s	south	orientation
e	east	id number
w	west	element
(1)	course number	

SYMBOLS USED

SURVEY DETAILS

- STONE FACING BLOCK
- 300 — STONE FACING BLOCK (THICKNESS SHOWN IN mm)
- DIFFERENTIATION WITHIN STONE BLOCK
- CORE / HEARTING
- 190 240 — FIXINGS - PINS OR WEDGES - NON FERROUS/POSSIBLY SLATE (DEPTH IN mm FROM OUTER SURFACE)

FRONT VIEW
250 — TARGETS AT TOP OF STONE BLOCKS - LEWIS HOLES OR FIXINGS - NON FERROUS/POSSIBLY SLATE (SEE TEXT) (DEPTH IN mm FROM OUTER SURFACE)

SIDE VIEW

NS — AREA NOT ACCESSIBLE TO SURVEY



PROJECT DETAILS

GBG REPORT No. 3557 ACCOMPANIES THIS DRAWING. A TOTAL OF ONE DRAWING IS INCLUDED WITH THIS REPORT, Dwg. No. 3557-1.

STRUCTURE INVESTIGATED	1. CENOTAPH 2. St. PETER'S CROSS
LOCATION	St. PETER'S SQUARE, MANCHESTER
PURPOSE OF INVESTIGATION	TO DETERMINE CONSTRUCTION DETAIL PRIOR TO DISMANTLING AND RELOCATING

THIS DRAWING HAS BEEN PREPARED USING EXISTING DRAWINGS AND/OR PRINTS OF DRAWINGS AS SUPPLIED BY THE CLIENT AND SUPPLEMENTED BY MEASUREMENTS TAKEN ON SITE. ALL DIMENSIONS THEREFORE ARE TO BE CHECKED ON SITE PRIOR TO PREPARING DRAWINGS OR COMMENCING ANY WORK.

0 METRES 2

AT A SCALE OF 1:50 - ORIGINAL DWG SIZE A1 (594mm x 841mm)

REF.	REVISION	DATE

ALL ORIGINAL DRAWINGS ARE PRODUCED IN COLOUR

Project: St. PETER'S SQUARE, REDEVELOPMENT, MANCHESTER

Client: LAING O' ROURKE CONSTRUCTION LIMITED

Title: NON DESTRUCTIVE INVESTIGATION OF CONSTRUCTION OF CENOTAPH & St. PETER'S CROSS

Drawn	Date	Scale	Dwg. No.
AF	MAY 2012	1:50	3557-1
CAD	PM	APP	

GBG INNOVATION IN STRUCTURAL INVESTIGATION

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File 3557

7.1.5 Appendix 5: Public Monument and Sculpture Association Record

CENOTAPH

Region ID	MR
Work ID	212
Manual Reference	MR/MCR07
Type	War Memorial, World War I
Title	CENOTAPH
Architect	Lutyens, Sir Edwin
Date of design	1922-24
Year of unveiling	1924
Unveiling details	12 July 1924
Road	St. Peter's Square
Precise Location	Memorial garden opposite Central Library
A to Z Ref	p.162 F8
OS Ref	SJ835975
Postcode	
Work is	Extant
Listing Status	II
Duty of Care	Manchester City Council
Commissioned by	Manchester War Memorial Committee

Notes

War memorial; the central feature is a pylon surmounted by a moulded and carved bier upon which is the prone figure of a fighting man covered by his greatcoat. On each of the flank sides is carved the City of Manchester coat of arms encircled by large laurel wreaths, bound and supported by ribbons. On each of the ends are swords in enriched sheaths and the Imperial Crown in bold relief. Flanking the pylon are two obelisks, on which the dates of the Great War are carved. To the front is the Great War Stone, a replica of the stone of remembrance erected in the military cemeteries in France. It rests on a surround of three steps.

It was not until 1922 that plans to provide a city war memorial for Manchester moved forward. The Manchester branch of the British Legion initiated the project. Ernest Simon, the serving Lord Mayor, established a war memorial committee with representatives from different military associations, the business community and the council. A subscription was opened and quickly raised some £10,000, the maximum sum it had been agreed to spend on a monument. In a city where unemployment was increasing, prospective subscribers were informed that work associated with the memorial would benefit local firms. Controversy, however, soon engulfed the memorial scheme. Identifying 'the best available site' for the memorial proved problematic. Initially, the war memorial committee considered three possible sites: Albert Square, Piccadilly and St Peter's Square. The favoured site was Albert Square, the city's principal civic space, where it was proposed to remove all of the existing statuary, including the Albert Memorial, so that the new memorial would stand alone, a powerful expression of the community's loss. The committee moved quickly, approaching the King, who indicated that he had no objection to the removal of his German grandfather's memorial from the square. The Albert Square site was also strongly favoured by the British Legion. But, perhaps anticipating opposition to this location, the committee also considered St Peter's Square as an alternative site; the Lord Mayor stating that they had also obtained the consent of the Bishop of Manchester and the trustees of St Peter's for the removal of the cross. The articles and letters which appeared in the local newspapers following the announcement of Albert Square as the unanimous recommendation of the war memorial committee suggested that many Mancunians did not share the committee's view, especially when it would involve the removal of all the statues. The Manchester Art Federation, which included the Manchester Society of Architects and Manchester School of Art, led the protests. Opposition also came from the Royal Manchester Institution which argued that the proposed removal of the statues represented a breaking of the 'sacred trust' with those who had provided them. The Manchester sculptor, John Cassidy, also doubted whether Albert Square was the best available site. When the city council came to debate the issue, the arguments against moving the statues had been well rehearsed and it was the Piccadilly site that emerged - by a vote of 71 to 30 - as the favoured location. The proposal that only the Albert Memorial would be removed to make way for the war memorial was also defeated. Placing the memorial in Piccadilly - in the open space created by the demolition of the Infirmary - found particular support from members of the Art Gallery Committee who envisaged the memorial standing in front of' the art gallery that the city council intended to build there. But uncertainties still surrounded the plans for Piccadilly, and, in May 1923, the war memorial committee anxious to see the memorial scheme move forward, agreed to site it in St Peter's Square. It was understood that in order to make the necessary space for the war memorial that Temple Moore's memorial cross would be removed from the square. But the suitability of the St Peter's Square site, selected, as one correspondent to the Manchester Guardian put it, 'more or less casually by a number of laymen, acting in a spirit of compromise', continued to be questioned. One of the concerns rmaintained that although St Peter's Square was a central location it was very close to the city's theatre and cinema district. The selection of the design of the memorial also proved contentious. The importance of organising an open competition for such an important memorial had been emphasised by the Manchester Art Federation and the Royal Society of British Sculptors during the discussions over the site. The war memorial committee appeared to agree, appointing the Manchester architect, Percy Worthington, as the assessor. However, controversy erupted when it was announced that the committee was unwilling to leave the decision entirely to Worthington, reserving the right to overturn his selection. The announcement of this decision prompted an understandable reaction from architects and their professional association. The decision was debated in the local press, correspondents expressing their surprise and bewilderment over the committee's apparent arbitrary and arrogant stance. The Manchester Guardian turned to Charles Reilly, Professor of Architecture at Liverpool University, to explain the principles at issue to its readers. Paul Waterhouse, the son of Alfred Waterhouse, who had recently served as President of the Royal Institute of British Architects, regretted the deadlock whilst suggesting that he knew much more about the committee's internal conflict but would not betray confidences. The Lord Mayor, Wiiliam Cundiff, was equally diplomatic, referring to 'certain insuperable difficulties' within the committee whilst confirming that it was to go ahead and select its own designer. A sub- committee was appointed and instructed to approach an architect 'who can be trusted to prepare a suitable design.' That architect was Sir Edwin Lutyens. Lutyen's design was a cenotaph, and as with the majority of those he produced for other provincial towns (including Rochdale), the essential elements of the London cenotaph could be recognised. It was a simple, well proportioned nondenominational shrine in Portland stone, with a central pylon surmounted by the Unknown Soldier. The elegance and restraint of the lettering was a noteworthy feature of the design. It represented 'the triumphant end of the war as well as the sadness and sorrow it entailed.' But not all those who studied the proposed design felt that it was an entirely appropriate monument. Some reacted to its modernity, others even doubted the validity of any formal memorial. One correspondent writing to The Builder argued for a simple open space. 'Surely the creation of some fine square or some much- needed street widening would be a more fitting memorial of the recent war than any monolith, which, after all, can never convey the magnitude of the debt the city owes to its brave dead. The dedication of the Old Infirmary site to be a permanent open square would be an admirable thing, and in the future it will be of greater value as an open space than it can ever be if built upon.' But

after these extraordinary debates and arguments the project finally went ahead. By the early summer of 1924 Manchester's cenotaph was nearing completion. The intention to provide work for local men appears not to have been realised as Lutyens used the London-based Nine Elms Stone Masonry Works to erect the memorial. In all, it cost £6,490, the residual funds being used to provide beds in local hospitals for the families of servicemen. The unveiling ceremony in July 1924 was an occasion of dignified remembrance. No part of the ceremony was more significant than the unveiling itself which was carried out by the Earl of Derby and Mrs Bingle - 'a citizen of the working-class district of Ancoats ' - whose three sons had died in the war. The memorial was dedicated by Rev J. G. McCormick, the Dean of Manchester. Manchester's cenotaph was generally welcomed. Henry Cadness, a Manchester artist, acknowledged its simple beauty and dignity, providing 'an environment of consolation which will be ever sacred for all.' But it could not have gone unnoticed in the packed square that some people's view of the ceremony was obscured by the presence of Temple Moore's cross. Negotiations to remove it recommenced after the ceremony but the trustees were reluctant to do so. The issue was a delicate one and after some further discussion Lutyens effectively closed the matter by stating that because of the 'susceptibilities of the donors ' he did not object to the cross remaining. But however appropriate Lutyens' cenotaph was, there still remained an uneasiness about the suitability of the site, an uneasiness evident in 1925 when renewed discussions about the city art gallery were broadened to include the question of moving the cenotaph to Piccadilly. But no action was taken and the cenotaph was to remain in St Peter's Square.

Memorial to fallen of World Wars

circa	
raw year	1924
Condition	Fair
At risk	Not at risk
Inscriptions	The north-east side of the memorial bears the inscription: TO THE HONOURED MEMORY OF THOSE WHO GAVE THEIR LIVES FOR THEIR COUNTRY On the south west side the inscription is: O LORD GOD OF OUR FATHERS KEEP FOR EVER IN THE IMAGINATION OF THE THOUGHTS OF THE HEART OF THY PEOPLE The Great War Stone stands in front of the podium . It s 12 feet long.... It is a replica of the stone of remembrance erected on the cemeteries and battlegrounds in France. On it are inscribed the words: THEIR NAME LIVETH FOR EVERMORE
Signatures	none visible

Elements

Element Details

Part of work	Material	Dimensions
Cenotaph	Portland Stone	975cm high
Podium	Portland Stone	426cm long x 365cm wide
Obelisks	Portland stone	701cm high
Great War Stone	Stone	365cm long

Assessment of Condition

Surface Character

Detail	Comment
Bird guano	Extensive to upper parts
Biological growth	Algae on cenotaph
Corrosion, Deterioration	Weathering of cenotaph

Structural Condition

Structural Condition	Comment
None	

Vandalism

Vandalism	Comment
Graffiti	Paint on front

N.B.- DATE OF PMSA RECORD IS UNKNOWN

MEMORIAL CROSS

Portland stone memorial cross rising from a stepped base. The column is decorated with three angels holding shields on which are carved the keys of St. Peter. This cross marks the site of St. Peter's church which stood at this location from 1794 to 1907. Designed by Wyatt, St Peter's was built to meet the demand for church accommodation at a time when Manchester's population was increasing rapidly. Even so, when it was consecrated it still looked out across open land, including what was to become known as St Peter's Fields. The church was supported by a large congregation for many years but by the middle of the nineteenth century attendances fell as middle-class families took up residence in the suburbs. The church was eventually closed and demolished in 1907. Discussions about what should be done with the site led to the decision that in a city short of

open spaces, it was not to be built upon. The trustees, however, had reserved the right to erect a memorial to mark the site of their church. They commissioned Temple Moore to provide a memorial cross. Moore, who had studied under George Gilbert, was recognised as one of the foremost church architects. His response to the commission was a Gothic cross, which if not as grand as the one he designed for Sledmere, North Yorkshire, was nonetheless impressive. The idea of a Gothic cross, however, did not meet with the approval of all those who took an interest in the scheme. Two main criticisms emerged. Firstly, objections were raised over the style of the cross. A correspondent to the local press, signing himself 'An Architect who has travelled', argued that a Renaissance cross would have been a more appropriate choice for the site. Secondly, criticism was directed at the decision to place the cross on the site of the altar rather than closer to the junction of the roads in the square, where its presence would be much more obvious. Calls were made to erect a 'rough model' of the intended memorial. The church did not respond to these criticisms; Temple Moore's cross was installed on the site of the church's altar. The cross was unveiled in September 1908. Cross marks the site of St. Peter's Church which demolished in the winter of 1906-7.

Contributor details

Contributor	Role
Moore, Temple	Architect

Element details

Part of work	Material	Dimensions
Cross	Portland Stone	1000cm high approx
Pedestal	stone	210cm wide

PMSA recording information

Reference	Region
MR/MCR16	MR

Condition

General condition	Fair
Surface condition	• Corrosion, Deterioration
Structural condition	• None
Vandalism	• None

Location

Road	None
Precise location	Central garden/traffic island, next to Cenotaph
A-Z ref	p. 162 F8
OS ref	SJ835975

History

Date of design	1907-08
Year of unveiling	1908
Unveiling details	29 September 1908
Commissioned by	Trustees of St. Peter's Church
Duty of care	Manchester City Council

7.1.6 Appendix 6: St. Peter's Square, Manchester, Conservation Management Plan for the Stonework by Adriel Consultancy (2009)



Adriel Consultancy

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ST PETER'S SQUARE MANCHESTER

CONSERVATION MANAGEMENT PLAN FOR THE STONEWORK

PREPARED FOR:
MANCHESTER CITY ART GALLERIES
(Amanda Wallace,
Head of Asset Management and Development)

NOVEMBER, 2009

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(Plowman Craven)



(Plowman Craven)

1.0 THE COMMISSION OF A CONSERVATION STRATEGY FOR THE ST PETER'S SQUARE PRECINCT





The St. Peter's Square precinct is comprised of:

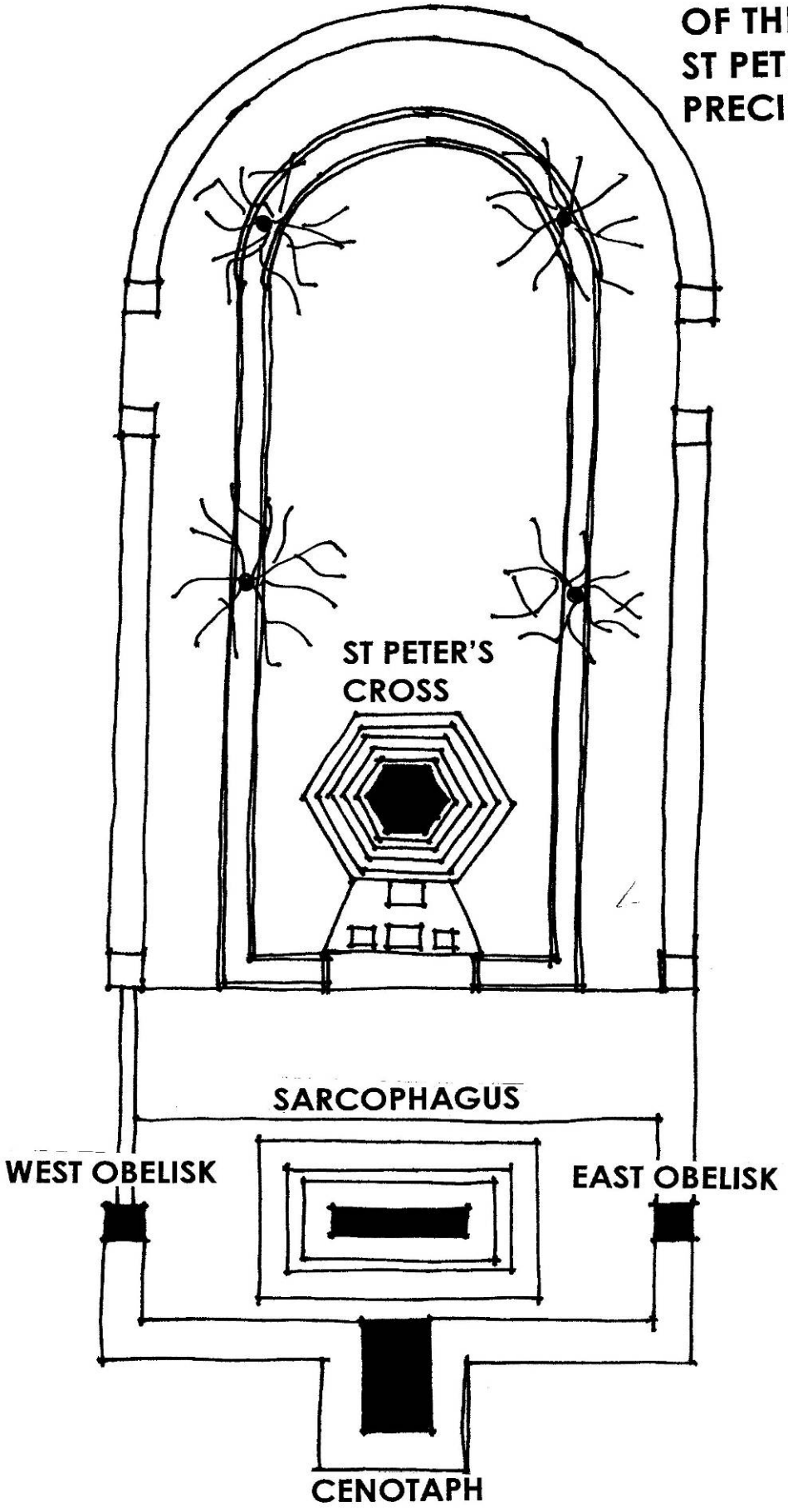
- St. Peter's Cross and associated memorials,
- The Cenotaph and its Sarcophagus,
- Two Obelisks,

surrounded by modern paving, seating and garden.

The extent of the area which is the subject of this study is shown on the plan on the following page.

The purpose of this document is to provide a strategy for the conservation of the historic elements and the maintenance of their surrounds. The work has been commissioned by Manchester City Art Gallery which now has responsibility for the historic items.

SKETCH PLAN OF THE ST PETER'S SQUARE PRECINCT



2.0 HISTORY

2.1 ST PETER'S CROSS



St. Peter's Square was created in 1907 when St. Peter's Church was demolished. The cross, designed by L.C. Howitt, was erected to commemorate the church.

Listed Grade II, the Cross has a "base of 4 hexagonal steps, an hexagonal pedestal with a swept top embellished with quatrefoils and brattishing*, shaft of slender clustered columns with an angel displaying a shield halfway up each side, surmounted by a large Gothic cross."
(Ref: Grade II Listed Building description SJ8839NE, 698-1/31/409, 03/09/74).
(*Brattishing: decorative cresting found at the top of a screen).

The cross and its steps are made of Portland limestone. The stone to the cross is of finer quality than that to the steps.

2.2 ASSOCIATED MEMORIALS



Adjacent to St. Peter's Cross are other memorials to:

- "Our Fallen Comrades" – by the British Legion, Manchester (Korean War)
  Bronze wreathed plaque on Portland stone base.

- "Our Italian Comrades 1915-1918".
  Marble slab on Portland base.

- "To the honour and memory of Mancunians who have given their lives in other conflicts since 1945."
  Slate slab on Portland base.

- "Korean War 1950-1953, Not one of them is forgotten before God."
  Slate slab on Portland base

2.3 THE CENOTAPH



(?????)



(WWW.FLICKR.COM)

The Cenotaph was designed by the well known architect Sir Edwyn Lutyens, the designer of the Cenotaph in Whitehall (London).

The Imperial War Graves Commission, now the Commonwealth War Graves Commission, was established in 1917. To provide the designs for the many cemeteries and memorials, three eminent architects of the day, one of which was Sir Edwyn Lutyens, were chosen as its principal architects and to oversee the work of a number of assistant architects.

The Manchester Cenotaph was completed in time for the Allied Victory Parade in 1919. Built of Portland stone it is topped by a sculpture of the Unknown Soldier draped in his greatcoat.

The Cenotaph is Listed Grade II* and described as follows:

> "The cenotaph is rectangular, with 3 unequal slightly battered stages, the topmost with an elaborate wreath in each side, a sword pendent from the front, and surmounted by a recumbent casualty on a catafalque. Between the obelisks to the rear, a stone sarcophagus."
> (Ref: Grade II Listed Building description SJ8839NE, 698-1/31/409, 03/09/74).

The obelisks and Cenotaph were linked by Portland stone seating. The Sarcophagus was surrounded by York stone steps and paving.

2.4 THE SARCOPHAGUS



Carved from a single piece of Portland, the Sarcophagus is also to the design of Sir Edwin Lutyens. Due to its design several areas of the stonework are unable to shed water and algal growth develops on these at a fast rate.



2.5 OBELISKS TO THE CENOTAPH



WESTERN OBELISK



EASTERN OBELISK

Contemporary with the Cenotaph and dated MCMXIX (1919), the obelisks to the Eastern and Western sides of the Cenotaph are constructed of a yellow shaded Portland limestone.

2.6 PAVING & SEATING

The seating between the obelisks and Cenotaph and the paving/steps to the Sarcophagus are part of Lutyens original design.

The paving (also York stone) and seating (also Portland stone) to the perimeter of the horseshoe garden date from 2008.

3.0 CONSERVATION PRINCIPLES FOR WAR MEMORIALS

3.1 KEY PRINCIPLES

There are several informative pieces of guidance on the principles and practices of looking after war memorials in the correct manner. Key statements from these follow, setting acknowledged standards for the approach to these historically important items.

- *"The primary purpose of a war memorial repair project should be to restrain the process of decay without damaging the character of the memorial, altering the features which give it historic or architectural interest, or unnecessarily disturbing or destroying historic fabric.* Key to this thorough understanding of conditions and the causes of these coupled with use of correct materials and techniques.

  (Russell, Joy "Conserving War Memorials", Context 107: November 2008, p.32).

- "Many of the problems currently facing war memorials can be avoided by careful and regular maintenance programme."

  (English Heritage/War Memorials Trust, "Advice on Maintenance on War Memorials").

- "Listing gives a memorial statutory protection against unauthorised demolition, alteration or extension. It is an integral part of the planning system for managing changes to our historic environment."

  (English Heritage/War Memorials Trust, "Advice on Maintenance on War Memorials," p.2).

- *"Proposed works should be in line with the best conservation practice and should aim to employ the least interventionist procedure. The aim of any conservation project should be to arrest decay by addressing the cases of damage and preserving the memorial in good condition. Works should aim to conserve what is there and repair any damage. Replacement of original material should be kept to a minimum and should only be carried out when absolutely necessary."*

  (War Memorials Trust, 2009 "Preparing a Method Statement", p.1. www.warmemorials.org).

3.2 THE FORMAT OF A CONSERVATION MANAGEMENT PLAN - THE ENGLISH HERITAGE/WAR MEMORIALS TRUST PROFORMA

The purpose of a Conservation Management Plan is to help preserve a war memorial and identify, at an early stage, repair needs.

The following process is recommended in the English Heritage/War Memorials Trust booklet:

This process involves:

1) RECORD

Preparation of an accurate record of its appearance and a description of its condition.

Identification of key factors affecting the war memorial:

1) *Responsibility over the site.*
2) *Responsibility over individual monuments within the site.*
3) *Statutory protections and their implications.*
4) *History.*
5) *Important dates e.g. Remembrance Day, when the local community will want access to the memorial.*

2) MONITOR

The war memorial should be inspected regularly, at least once a year.

The following should be assessed:

Condition of the fabric

- *Structural condition*
- *Surface conditions*
- *Surface soiling*

Inscription and names:

- *Legibility*
- *Rate of erosion*
- *Are names/plaques missing or damaged?*

Access:

- *Access to the public*
- *Disabled access*
- *Repair of paving*
- *Cleaning of paving*
- *Weeding of paving*

Surroundings:

Maintenance of the site

- *Seating*
- *Planting*
- *Bins*

Security:

- *Vandalism of the war memorial including graffiti.*

3) MAINTAIN

Any maintenance works should be performed by a properly trained and appropriately monitored person. The materials and issues which are likely to be involved include:

- *Stone of various types*
- *Bronze*
- *Iron*
- *Joints*
- *Organic growths*

4) REPAIR

"Materials and techniques that could potentially cause damage...should not be employed."
"Altering the appearance and design of the memorials should also be avoided."
"Covering up inscriptions with new plaques removing inscriptions, redressing the surface should not be carried out."
(All quotations from English Heritage/War Memorials Trust booklet.)

3.2.1 THE ST PETER'S SQUARE APPROACH

The English Heritage/War Memorial Trust approach has been adapted for St Peter's Square and is used as the basis for this report.

3.3 THE VALUE OF LETTERING

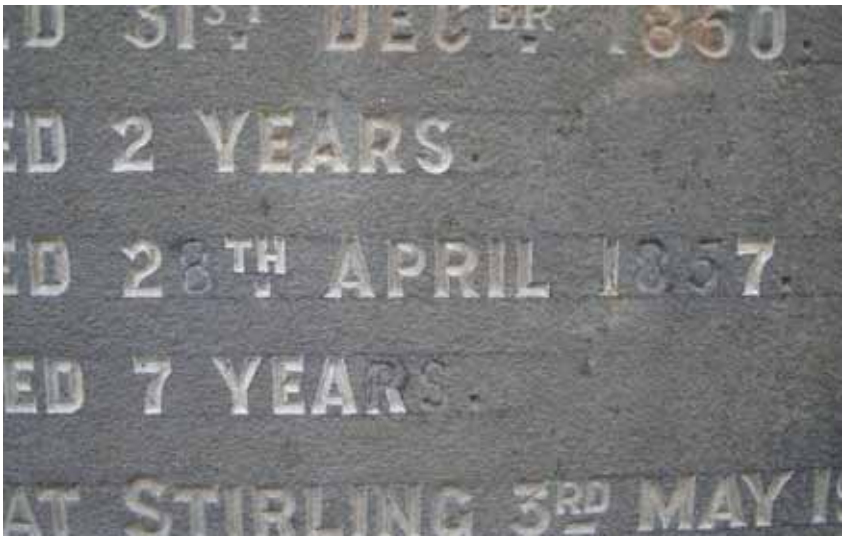
> *"War memorials are valued for a variety of reasons, not least as places of communal memory. Many also have aesthetic sculpture. Regardless of architectural or sculptural merit, however, the dedication and role of honour have an intrinsic historic value, which differentiates war memorials from other types of public monument."*
>
> (Russell, Joy "Conserving War Memorials", Context 107: November 2008, p.33).

The problem is often that the commemorative and symbolic values of a war memorial which are embodied predominantly in its lettering are eroded as surface weathering gradually reduces the lettering illegible.

Limited re-cutting of letters may be possible during the early stages of surface erosion but stone surfaces soon become too worn for this to be done in an acceptable manner. As loss of legibility is usually caused by erosion of the stone surface it is generally not possible to recarve letters without substantially altering their appearance (clarity, precision and font). Recarved letters are often large and thicker and don't sit well against letters which are not recarved.

The difficulty is how to ensure the commemorative value continues and the war memorials values are to be sustained.

The philosophical debate surrounding letter re-cutting on memorials can be intense. The following photographs illustrates that it is not always successful.



4.0 CURRENT CONDITIONS & APPEARANCES

4.1 THE CENOTAPH & SARCOPHAGUS

4.1.1 THE CENOTAPH SHAFT



The Cenotaph is constructed in large blocks of Portland stone. The stone is evenly textured although it has a proportion of shell throughout.

The Portland stone has weathered in a typical and predictable fashion where affected by rainwater runoff, its surfaces have dissolved areas which are most frequently wetted eroding the most.

Frequency of wetting has been dictated by degree of exposure, and the prevailing direction of the weather. The configuration of the surrounding streets and buildings has played a significant part in this. Directionality of the weathering has meant that despite the symmetry of the Cenotaph design, similar features on opposing sides have weathered differently. This is best demonstrated by the comparative condition/degree of weathering of the carved stone swords.



NORTHERN SWORD



SOUTHERN SWORD



Localised variations in the properties of individual stones coupled with localised exposure to weathering has meant that certain features have suffered deeper surface less than others. In its simplest form this affect can be seen at the top of the Plinth to the Cenotaph.

The following two photographs show the Cenotaph in November 2008, with 12 months algal growth/soiling on areas of chronic saturation.





Algae will grow on stone surfaces in locations where conditions of moisture, pH and light are suitable. Moisture levels on stonework are prime instigators of growth. These can be due to direct rainfall, high relative humidity, temperature and the slow drying of surfaces in shaded positions.

Normally the shaded sides of monuments are more often affected. In St Peter's Square conditions of shade are prolonged by all surrounding buildings, in particular St. Nicholas House to the East.

It is very difficult to prevent algal growth in locations such as Manchester where the rainfall is relatively high. If global warming causes this to increase, the rate and level of growth (and staining) will increase.

It needs to be accepted that algae will regrow for the simple reason that external stone surfaces will be wetted frequently and remain wet for extended periods. Consequently algae will grow, die, regrow. Surfaces will gradually resoil with the darkest, thickest soiling/build up being to the wettest areas.

The use of biocides will have limited use as these are water soluble. Their effectiveness is particularly short lived in areas of frequent wetting. They may nevertheless be important in reducing the growth of algal growth thereby reducing the need to steam clean the surfaces.



One of the flag holders has been replaced in ferrous metal which is rusting and will soon cause distress to the stone, over and above the staining which has developed beneath it.

The holder should be removed and replaced in bronze, to match the originals adjacent.

4.1.2 THE FALLEN SOLDIER





The carving of the Fallen Soldier at the top of the Cenotaph has been weathered the most which is to be expected. While virtually all original carved surfaces have been lost, it is still possible to appreciate each element. The ongoing poignancy of the carving is as yet unchallenged.

While there is nothing that can be done about the position of the carving and the degree of its exposure and subsequent weathering, improvements in the current situation can be made by:

i. Ensuring regular removal of salt-bearing pigeon guano where it has collected in recesses and where it is adherent to the stone.
ii. Ensuring the removal of build up of algae and other small lichens etc. which encourage moisture retention and produce acid secretion.
iii. Ensuring removal of these is undertaken as sensitively as possible.
iv. Application of a lime-based shelter coat which is compatible with the stone's properties and its response to moisture, but which will provide a sacrificial layer of protection, slowing down the rate of loss to the stone surface.





The stone surfaces should be monitored in detail so that the actual rate of surface loss can be quantified. The carving should also be recorded in detail to provide a benchmark for future evaluation and measurement.





The photographs on this page were taken in late October 2009, prior to Remembrance Day. Loose surface growths bind deposits of algae, lichen, pigeon guano and other particulate matter were removed by low pressure steam cleaning. Although large scale equipment was used, the pressure of the process was low. As steam was involved, the proportion of hot pressure water was low as well.

The 'before' and 'after' photographs above show the thickness of the build up of algal growth and pigeon guano within recesses and on exposed surfaces. The initial pass confirmed the biological growth to surfaces to be a combination of algae and small lichen growths. It also revealed some of the bird guano to be well attached. Both localised deposits required further softening, brushing and steam cleaning to achieve complete removal.





4.1.3 THE WREATHS











CARVED DETAILS:
THE WREATH TO THE EASTERN SIDE

The photographs show the varying stone conditions and remains of details to the Eastern high level wreath to the Cenotaph.

Areas of stone which have been most frequently washed by rain have had their surface dissolved and the quality of the original carving reduced. There are also several areas of friable and delicate stone to the carvings of the coat of arms.

Both wreaths need to be recorded and monitored.

Application of a breathable shelter coat to friable areas will reduce the impact of further weathering and surface loss, at least for a short period.

Removal of soiling and biological growths to these surfaces needs to be undertaken with a combination of steam cleaning processes with small scale steam cleaning being used on the carvings within each wreath, to ensure minimal impact to localised areas of friability.

4.1.4 THE CENOTAPH INSCRIPTIONS







NORTH INSCRIPTION:
O LORD GOD OF OUR
FATHERS KEEP THIS
FOR EVER IN THE
IMAGNATION OF THE
THOUGHTS OF THE
HEART OF THY PEOPLE

SOUTH INSCRIPTION:
TO THE
HONOURED MEMORY
OF THOSE WHO
GAVE THEIR LIVES
FOR THEIR COUNTRY

Both inscriptions are fully legible. There is some early evidence of blurring of arrisses to many letters due to loss of stone surface.
As is usual for Portland stone, the sulphated skin which has developed has split and spalled in some locations. It is not possible to alter or reverse this process so lettering will eventually be affected by these thin surface losses (<1mm).

Both panels of lettering should be recorded and then monitored to gauge the rate of surface loss.

The condition of the crowns and tasselled cushions above are similar to the carved wreaths. Recommendations for their recording, monitoring, cleaning and surface treatments are the same.

4.1.5 THE SARCOPHAGUS INSCRIPTION





The Sarcophagus is seen above just after its 2009 Remembrance Day steam clean. A light cover of algal growth had developed within 10 days.

All surfaces to the stone have experienced small amounts of surface loss.

Lettering to the top line of the inscription (THEIR NAME LIVETH) has lost noticeably more precision compared to that of the bottom line (FOR EVERMORE).



This photograph shows the difference in legibility between the upper and lower lines of lettering.

These surfaces should be recorded and then monitored on an annual basis so that the degree and rate of surface loss can be measured.

4.2 THE OBELISKS

4.2.1 BIOLOGICAL GROWTH

The photographs immediately below show the concentrated soiling at the top of the Eastern obelisk. The Western obelisk has similar irregular patches in these areas of saturation, also capped with pigeon guano.





BIOLOGICAL GROWTH TO THE TOP OF THE EASTERN OBELISK

4.2.2 LOCALISED WEATHERING & LOSS OF CARVED AND LETTERED DETAIL

This stone of both obelisks is softer and more porous than the Portland stone of the Cenotaph. The quality of the obelisk stone also varies noticeably from block to block meaning some are more heavily weathered than their immediate neighbours.

There is a pronounced difference between the weathering of sides of each obelisk.

The date plaques and carved garlands to the Southern face of each obelisk are in far worse condition compared to their counterparts on the North sides, even though there are of identical design and carved into the same stone. The accelerated weathering also involves the West sides of the same stones. These conditions are illustrated in the following series of photographs.

WESTERN OBELISK – CARVED DETAILS:



Northern and Eastern sides.



Southern and Western sides

The variable stone surface conditions reflect the effect of differential weathering caused by the direction of the weather including the speed and direction of wind within St Peter's Square.

The areas of surface loss have soft, friable surfaces from which stone granules can be easily dislodged.

EASTERN OBELISK CARVED DETAILS:



(Both Photos: Plowman Craven)



Southern & Eastern sides



Northern & Western sides

It is important these areas are monitored by digital photograph so that the rate of surface deterioration can be measured.

It should be expected that surface losses will continue with lettering and carving details becoming less legible. The application of a sacrificial lime coating could be used to reduce this rate but it would not eliminate it altogether as the stone would continue to respond to its environment. Increased wind speeds would increase the rate of decay.

4.3 ST. PETER'S CROSS

St. Peter's Cross, dating from 1907, is also constructed of Portland. Hexagonal in plan it is a pleasant combination of moulded and carved stonework as follows:

4.3.1 CROSS AND THE ANGELS



The stonework of the cross has been repaired in the past. These repairs need to be reinspected at close range on a regular basis.

The moulded capital at the base of the cross has weathered and lost detail to upper moulding to the extent that this is no longer fully functional as a weathering. It should be indent repaired as part of the next repair programme. It is also a ledge preferred by pigeons.

The stone to the trefoil column has weathered most obviously to the side facing the weather but is not in need of intervention.

The three angels are also in a range of degrees of weathering with the one facing south having lost most detail.

ANGELS



(Plowman Crave n)

North facing



(Plowman Craven)

South East facing



(Plowman Craven)

South West facing

PHOTOGRAPHIC RECORDING OF THE THREE ANGELS BY PLOWMAN CRAVEN

4.3.2 QUATREFOIL PANELS AND THE LETTERING



The stonework to these features reflects both the high quality of the stone and the varying degrees of weathering. This has resulted in the carved and lettered surfaces to the North and East being in sound and near-original condition. The surfaces to the South and West are sound but weathered. Carved surfaces are still legible. The lettered surfaces are bordering on illegibility as the depth of carving wasn't very deep to start off with.

Considering the stone has experienced 103 years of weathering, these conditions are all normal.

Recording of the surfaces by digital scanning will provide the baseline for the measurement of further loses. The following photographs show the range in conditions to the quatrefoils and brattishing:





COMPARISON OF CONDITIONS OF LESS WEATHERED STONE (NORTH FACE) & MORE WEATHERED STONE (SOUTH FACE)

Both photos: Plowman Craven

4.3.3 STEPS TO THE CROSS







The Portland stone selected for the steps of St Peter's Cross was of poorer quality to that of the shaft and all its carvings. It is more coarsely grained, has a larger pore structure and a larger proportion of shell inclusions. After a century of weathering this has led to roughly textured surfaces which readily retain moisture and dust. Consequently they are perpetually covered in moss, lichen and algal growths. Efforts have been made in the past to skim render the surfaces, to remove the surface pitting. Predictably, this layer has failed. About 2% still remains attached. As this is less suitable to the retention of moisture, the level of colonisation by biological growth is less and this provides the noticeably patchy appearance to the steps.

Due to the severity of the biological growth problem to the steps and the fact that nothing satisfactory can be done to prevent it (even if the steps were replaced and smooth their surfaces would be wetted just as much), a series of masonry biocides have been tested to see if any of these can prevent regrowth and for how long this can be maintained. See Section 6.2.

5.0 PAVING & SEATING





THE ORIGINAL SEATING



NEW SEATING

5.1 PORTLAND STONE SEATING

The Portland stone seating to the base of the Cenotaph and between the Cenotaph and both obelisks is of monolithic units which are jointed vertically. The horizontal skyfacing surfaces have weathered and the resultant pits retain water, providing fertile conditions for algal spores. The stone joints are in sound condition in 2009 but these should be checked every 3 years.

The Portland stone seating to the horseshoe shaped end of the square dates from a scheme implemented in 2008. All the stone units are in sound condition although some joints have started to deteriorate. They should be checked and repaired on the same cycle as those to the older seating.

5.2 YORK STONE PAVING

The sandstone paving and steps to the Sarcophagus area was originally pointed. Due to their age, some of its slabs are undergoing surface delamination. At the moment this can be rectified by careful localised redressing by stone masons. The paving to the horseshoe path, was originally dry-jointed.

In 2009 the steps and paving surrounding the Sarcophagus was steam cleaned, relaid (where necessary), joints were deep-packed with mortar and areas of detaching surface lamination were dressed back. All the work was undertaken by specialist stonework contractors.

6.0 IMPLEMENTING RECOMMENDED STUDIES

6.1 RECORDING OF SURFACES: 2009

In 2009, Manchester City Art Gallery commissioned the detailed recording of the surfaces of the Cenotaph, obelisks and St. Peter's Cross undertaken by Plowman and Craven these records were prepared in:

1) **High Resolution Rectified Photographs:**
   These provide elevational views of all surfaces, their current colours and textures. The level of resolution will permit close range comparison between the 2009 record and the photographs taken in the future.

2) **Laser Scanning** of lettering, sculpture, carvings and areas of detailed mouldings.
   The areas which were laser scanned include:

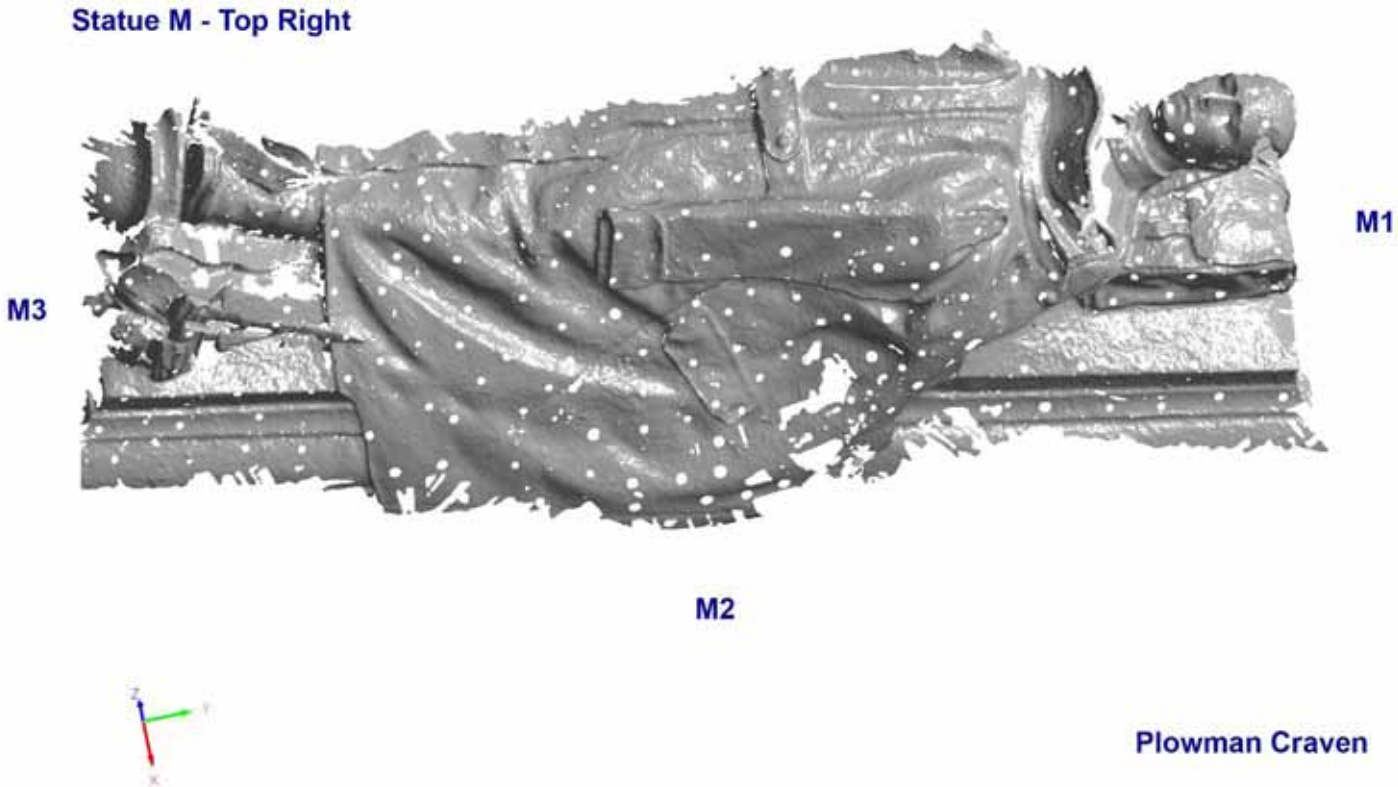
   - Cenotaph: Sculpture of the Fallen Soldier
     Two wreaths
     Two swords
     Two areas of lettering and surrounding crowns
   - Sarcophagus: lettering
   - Obelisks: whole stones including garlands and lettering
   - St. Peter's Cross: Cross (both sides)
     Angels (3 No.)
     Quatrefoil panels (6 No.)
     Lettered Panels (6 No.)

   The laser scanning provides a virtual record of the above surfaces. Each elevation of the individual structures was recorded to an accuracy of 2mm. Surface details were recorded to n accuracy of 0.1mm. Comparative scans in the future can be compared digitally and surface losses of up to 0.1mm detected, hence providing a measurement of the rate and location of stone surface loss.

Results of this work are held by Manchester City Art Gallery.



(Plowman Craven)



6.2 SMALL SCALE STEAM CLEANING TRIALS





A larger scale steam cleaner (Doff) has been in use on the Cenotaph, Sarcophagus, Obelisk and Cross surfaces in recent years to remove biological growths prior to Remembrance Day celebrations. This has performed well.

A smaller scale system (Derotor GV6) was tested for use on more friable surfaces which might be disturbed by the larger scale system.

The photographs show the Derotor in action on a smooth and a more textured surface. While it was slower, it was gentler on more friable surfaces.

The trials confirmed that while the Joss system could continue to be used on sound stone surfaces, the Derotor should be used on friable surfaces whenever the stone surfaces are cleaned as follows:

CENOTAPH:

CENOTAPH	**SURFACE CONDITIONS**	**SMALL OR LARGE SCALE STEAM**
Fallen Soldier	Weathered but sound	Larger scale
Shaft	Weathered but sound	Larger scale
South Sword	Weathered and delicate	Smaller
North Sword	Sound	Larger scale
East Wreath:		
Wreath:	Sound	Larger scale
Carvings inside wreath	Some delicate areas	Smaller scale
West wreath:		
Wreath:	Sound	Larger scale
Carvings inside wreath	Some delicate areas	Smaller scale
North crown & lettered panel	Carving partly friable Letters potentially delicate	Smaller scale
South crown & lettered panel	Carving partly friable Letters potentially delicate	Smaller scale
SARCOPHAGUS:		
Generally	Sound	Larger scale
Lettering	Sound but weathering	Smaller scale
OBELISKS:		
Generally	Sound	Larger scale
Stones containing lettering & carved garlands	Delicate & friable in parts	Smaller scale
SEATING:		
Generally	Sound	Larger scale Calibrate for joint materials
PAVING:		
Generally	Sound	Larger scale Calibrate for joint materials

6.3 BIOCIDE TRIALS



The following four biocides, suited for use on stonework and which have longer term effectiveness, were applied to the sky surfaces of steps to the Cross:

-Wykabor 10
-Boracol 10Rtt
-Antibak Residual
-Antil Mousses' Guard

Details of the biocides are shown on the following page.

The rectangular areas to each test zone were cleaned with the small scale steam cleaner.



This close range view of one of the steps to St Peter's Cross shows how the moss and algal growths are deeply embedded in the textured surface of the stone. The stone on the right hand side of the area shown had been cleaned with a small scale steam cleaner (also see rectangular patch below).
Despite this gentle and thorough surface cleaning process substantial amounts of moss and lichenous root growths remained embedded. Unless these are removed and/or killed they will regrow as soon as optimum conditions return. Invisible algal spores will do the same.

PRODUCT NAME	MAIN INGREDIENT	SUPPLIER DETAILS
Wykabor R10 (formerly Microtech Biocide 25X)	Borate	Wykamol Group (Stanhope Chemicals Ltd) Knowsley Road Industrial Estate Haslingden Rossendale LANCASHIRE BB4 4RX Tel: 01706 831223 Fax: 01706 214998 Email: sales@lectros.com Website: www.wykamol.net
Boracol 10RH	Quaternary ammonium compound and Borate	Advanced Chemical Specialities Ltd of Borors Park Artillery Road SOMERSET BA22 8YH Tel: 01935 414012 Fax: 01935 414022 Email: info@acslimited.co.uk
Antibak Residual	Quaternary ammonium compound	Bio Technics Ltd Upper Mill Inverbervie ABERDEENSHIRE DD10 OSP Tel: 01561 361515 Fax: 01561 361011 Email: info@biotechnics.com
Anti Mousses' Guard	Quaternary ammonium compound	Guard Industries (UK) Ltd 7200 The Quorum Oxford Business Park North Garsington Road OXFORD OX4 2SZ Tel: 0870 734 5972 Fax: 0870 734 5973 Email: contactus@guardindustry.com

6.4 REMOVING METAL STAINS FROM PORTLAND STONE





Remembrance Day wreaths are made of steel wire. This rusts in an external environment, causing staining of the stone beneath. The longer the wreaths remain on the monuments, the deeper and more permanent the resultant stains. On white Portland stone the stains are particularly disfiguring.

The top photograph shows the removal of a clay poultice which contained the sequestering agent EDTA. It was successful in reducing the stain present but not in removing it completely.

In the lower photograph the Derotor steam cleaner was just as effective at reducing the intensity of a similar stain.
It is recommended that further iron stain removal is undertaken using the Derotor steam cleaner as soon as possible after the staining takes place



Photos by Plowman Craven



(i) Ideally wreaths should be made of materials which do not cause staining i.e. steel or copper wires.

(ii) Wreaths should not be placed on top of the Sarcophagus. Evidence suggests this occurs after Remembrance Day celebrations. Liaison between the Art Gallery and Remembrance Day organisers will be able to confirm this. Arrangements with Council cleansing staff could be made to have wreaths from the top of the Sarcophagus placed at paving level, with the others.

(iii) Wreaths should be lifted as soon as respectfully possible after Remembrance Day.

At the Cenotaph on Whitehall, London the artificial wreaths are removed no later than six weeks after Remembrance Day, by the term contractor for the maintenance of the London monuments.

6.5 GRAFFITI REMOVAL STRATEGY

6.5.1 GRAFFITI REMOVAL PRODUCTS

The visible location of the St Peter's Square monuments has probably been the greatest deterrent against graffiti attach.

Should an attack occur this should be dealt with as soon as possible using the specialised skills of Manchester City Art Gallery's Conservation Workshop or a specialist stonework cleaning firm which is approved to use the recommended products.

Until an attack takes place and the type/s of "graffiti" marker can be identified it is not possible to specify a detailed removal regime.

Abrasive or pressure water systems should not be used as these will impact the stone surfaces unnecessarily, possibly leaving permanent marks due to their erosive effect.

The following series of chemical graffiti and paint removers should be procured, initially in sample quantities so that small scale tests can be made to see which product or combination of products is effective. The technical advice of the manufacturer should be sought regarding sequence of application for each graffiti type and for all other recommendations to ensure correct application and removal.

The products are:

- AGS Graffi Clean 300
- AGS Graffi Green
- AGS Graffi Ghost

- ProSoCo Tavec 201
- ProSoCo Eeze Strip

They are available from:

Tensid UK plc
Aquila House
Wheatash Road
Addleston KT15 2ES
Tel: (01932) 564 133
Fax: (01932) 562 046
e-mail: info@tensid.com

They require a hot water low pressure washer for their removal.

Tensid can advise local specialist masonry contractors who are approved and experienced in their use.

6.5.2 ANTI GRAFFITI COATING

An anti graffiti coating should not be applied until there is a proven and unresolvable graffiti problem.

At that time, the coating should be permeable; reversible and not change the colour or texture of the stone. At the moment there is only one product which is suitable i.e. Tensid Graffi Coat 1. Further specialist advice should be sought at the time, should it arrive.

7.0 CONSERVATION MANAGEMENT STRATEGY

7.1 THE MONUMENTS & MEMORIALS

A Conservation Management Strategy has been prepared for the St Peter's Square historic precinct, based on the assessments and trials described so far in this report, to enable the stone items to be looked after in a manner which on the one hand, recognises their historic value and the condition of the stonework and on the other, ensures they receive a good level of maintenance which demonstrates they are being looked after.

The Strategy has been presented in the form of two tables which includes the following items:

1) Cleaning of the Monuments
    - For Remembrance Day
    - On a regular basis at other times

   Differentiation between small scale and medium scale steam cleaning systems depending on the condition of the stone surfaces.

2) Monitoring the surfaces of highly valuable or delicate surfaces to determine rates of natural surface erosion. This includes carvings and lettering.

3) The application of a surface biocide, to reduce the rate of regrowth of biological growth, particularly algae, and thereby reduce the need for surface cleaning.

4) Use of Memorial Wreaths which are not made of wires which cause stains on the stonework.

5) Remembrance Day wreaths

6) Removal/reduction of copper/iron stains.

7) Use of lime sacrificial coats to areas of particularly important stone which are subject to particularly heavy weather loading or to localised areas of friable stone to carvings.

8) Application of Microcrystalline Wax to bronzes to reduce corrosion rates and staining of stonework.

7.2 UNDERTAKING THE WORKS TO THE MONUMENTS & MEMORIALS

All the cleaning and maintenance works should be undertaken by the Queens Park Conservation Studios of Manchester City Art Gallery or others similarly qualified, experienced, and supervised by them.

7.3 PAVING & SEATING

The Portland stone seating and the York stone paving within the historic precinct can receive a more practical approach to their cleaning, repair and maintenance.

Both stone surfaces can be cleaned with the larger scale (Doff) cleaning system or another steam system used at appropriate parameters.

Joints to the Portland seating should be checked every 3 years and localised repointing undertaken to defective pointing.

Joints to the raised Sarcophagus should be inspected and repaired similarly.

The York stone paving to the horseshoe seated area is dry jointed. The paving slabs should be checked annually to ensure each is fully bedded, and rebedded if not.

7.4 UNDERTAKING WORKS TO THE PAVING & SEATING

It would be logical for these works to remain under the control and guidance of Manchester City Art Gallery.

The works themselves could be undertaken by a specialist masonry cleaning and repair contractor rather than the Queens Park Conservation Studios, once parameters had been agreed with them.

7.5 CONSERVATION MANAGEMENT STRATEGY

On the following pages the Conservation Management Strategy has been presented in table form.

TABLE 1: CLEANING & BIOCIDE TREATMENT

	MATERIALS	REMEMBRANCE DAY		EVERY 3 YEARS		BIOCIDE
		GV6 STEAM	LARGE SCALE STEAM	GV6 STEAM	LARGE SCALE STEAM	
CENOTAPH						
FALLEN SOLDIER	Portland		✓			✓
WREATH - EAST	"		✓			✓
CARVING INSIDE	"	✓				✓
WREATH - WEST	"		✓			✓
CARVING INSIDE	"	✓				✓
SWORD - NORTH	"	✓				✓
SWORD - SOUTH	"		✓			✓
LETTERING & CROWN -	"	✓				✓
LETTERING & CROWN -	"	✓				✓
ARCHITECTURAL	"		✓			✓
SARCOPHAGUS						
STONE	Portland		✓			
LETTERED PANEL	"	✓				
WREATHS	Corroding					
EAST OBELISK						
SHAFT & PLINTH	Portland				✓	Shaft ✓
GARLAND - NORTH	"			✓		
LETTERING - EAST	"			✓		
GARLAND - SOUTH	"			✓		
LETTERING - WEST	"			✓		
WEST OBELISK						
SHAFT & PLINTH	Portland				✓	Shaft ✓
GARLAND - NORTH	"			✓		
LETTERING - EAST	"			✓		
GARLAND - SOUTH	"			✓		
LETTERING - WEST	"			✓		
ST. PETER'S CROSS	Portland					
CROSS	"				✓	
ANGEL 1 & 2	"				✓	
ANGEL 3	"			✓		
LETTERED PANEL 1 - 4	"				✓	
LETTERED PANEL 5 - 6	"			✓		
QUATREFOIL PANELS 1	"				✓	
QUATREFOIL PANELS 5	"			✓		
ARCHITECTURAL	"				✓	
STEPS TO CROSS	Portland		✓			✓

	MATERIALS	REMEMBRANCE DAY		EVERY 3 YEARS		BIOCIDE
		GV6 STEAM	LARGE SCALE STEAM	GV6 STEAM	LARGE SCALE STEAM	
SMALL MEMORIALS	Bronze		✓			
	Marble, Portland		✓			
	Slate		✓			
SEATING - OLD	Portland		✓			
SEATING - NEW			✓			
PAVING TO SARCOPH.	York stone		✓			
PATHS	York stone		✓			

TABLE 2: RECORDING, REPAIR & MAINTENANCE

	MATERIALS	JOINTS	SURFACE RECORDING - ANNUALLY			SURFACE RECORDING		WAX	METAL STAINS	SHELTER COAT
			2010	2011	2012	2014	2015			
CENOTAPH										
FALLEN SOLDIER	Portland		✓	✓	✓	TBC				
WREATH - EAST	"		✓	✓	✓	"				
CARVING INSIDE	"		✓	✓	✓	"				
WREATH - WEST	"		✓	✓	✓	"				
CARVING INSIDE	"		✓	✓	✓	"				
SWORD - NORTH	"		✓	✓	✓	"				
SWORD - SOUTH	"		✓	✓	✓	"				
LETTERING & CROWN	"		✓	✓	✓	"				
LETTERING & CROWN - S	"		✓	✓	✓	"				
ARCHITECTURAL	"					✓				
SARCOPHAGUS										
STONE	Portland					✓				
LETTERED PANEL			✓	✓	✓	TBC				
WREATHS	Corroding							3yrs	Annual	
EAST OBELISK										
SHAFT & PLINTH						✓				
GARLAND - NORTH			✓	✓	✓					
LETTERING - EAST			✓	✓	✓					
GARLAND - SOUTH			✓	✓	✓					
LETTERING - WEST			✓	✓	✓					
WEST OBELISK										
SHAFT & PLINTH	Portland					✓				
GARLAND - NORTH			✓	✓	✓					
LETTERING - EAST			✓	✓	✓					
GARLAND - SOUTH			✓	✓	✓					
LETTERING - WEST			✓	✓	✓					
ST. PETER'S CROSS	Portland		✓	✓	✓					
CROSS	"		✓	✓	✓					
ANGEL 1 & 2	"		✓	✓	✓					
ANGEL 3	"		✓	✓	✓					
LETTERED PANEL 1 - 4	"		✓	✓	✓					
LETTERED PANEL 5 - 6	"		✓	✓	✓					
QUATREFOIL PANELS	"		✓	✓	✓					
QUATREFOIL PANELS	"		✓	✓	✓					
ARCHITECTURAL	"	✓								

STEPS TO CROSS	Portland	✓								
SMALL MEMORIALS	Bronze									
	Marble, Portland									Portland, annual
	Slate									
SEATING - OLD	Portland	3 yrs								
SEATING - NEW	Portland	3 yrs								
PAVING TO	York stone	3 yrs								
PATHS	York stone	3 yrs								

7.1.7 Appendix 7: Drawings and Images