



Archaeological Services & Consultancy Ltd

**HISTORIC BUILDING RECORDING:  
BRITISH TIMKEN WORKS  
MAIN ROAD, DUSTON  
NORTHAMPTON**

*on behalf of Bellway Homes*



By  
David Fell BA MA MIFA

June 2005

**ASC: 649/DBT/2r**

Letchworth House  
Chesney Wold, Bleak Hall,  
Milton Keynes MK6 1NE  
Tel: 01908 608989 Fax: 01908 605700  
Email: [office@archaeological-services.co.uk](mailto:office@archaeological-services.co.uk)  
Website: [www.archaeological-services.co.uk](http://www.archaeological-services.co.uk)



## Site Data

<i>ASC project code:</i>	DBT	<i>ASC Project No:</i>	649
<i>County:</i>	Northamptonshire		
<i>Village/Town:</i>	Duston		
<i>Civil Parish:</i>	Northampton unparished		
<i>NGR (to 8 figs):</i>	SP 725 640		
<i>Present use:</i>	Factory (disused)		
<i>Planning proposal:</i>	Demolition, followed by redevelopment for employment, residential and recreational use		
<i>Planning application ref/date:</i>	N/2004/200		
<i>Local Planning Authority:</i>	Northampton Borough Council		
<i>Date of fieldwork:</i>	February 2005		
<i>Client:</i>	Bellway Homes Oak House, Dencora Business Park Breckland, Linford Wood Milton Keynes MK14 6EY		
<i>Contact name:</i>	Kim Webster (Planning Manager)		
<i>Telephone</i>		<i>Fax:</i>	

## Internal Quality Check

<i>Primary Author:</i>	David Fell	<i>Date:</i>	29 <sup>th</sup> June 2005
<i>Edited/Checked By:</i>		<i>Date:</i>	
<i>Revisions:</i>		<i>Date:</i>	
<i>Edited/Checked By:</i>		<i>Date:</i>	

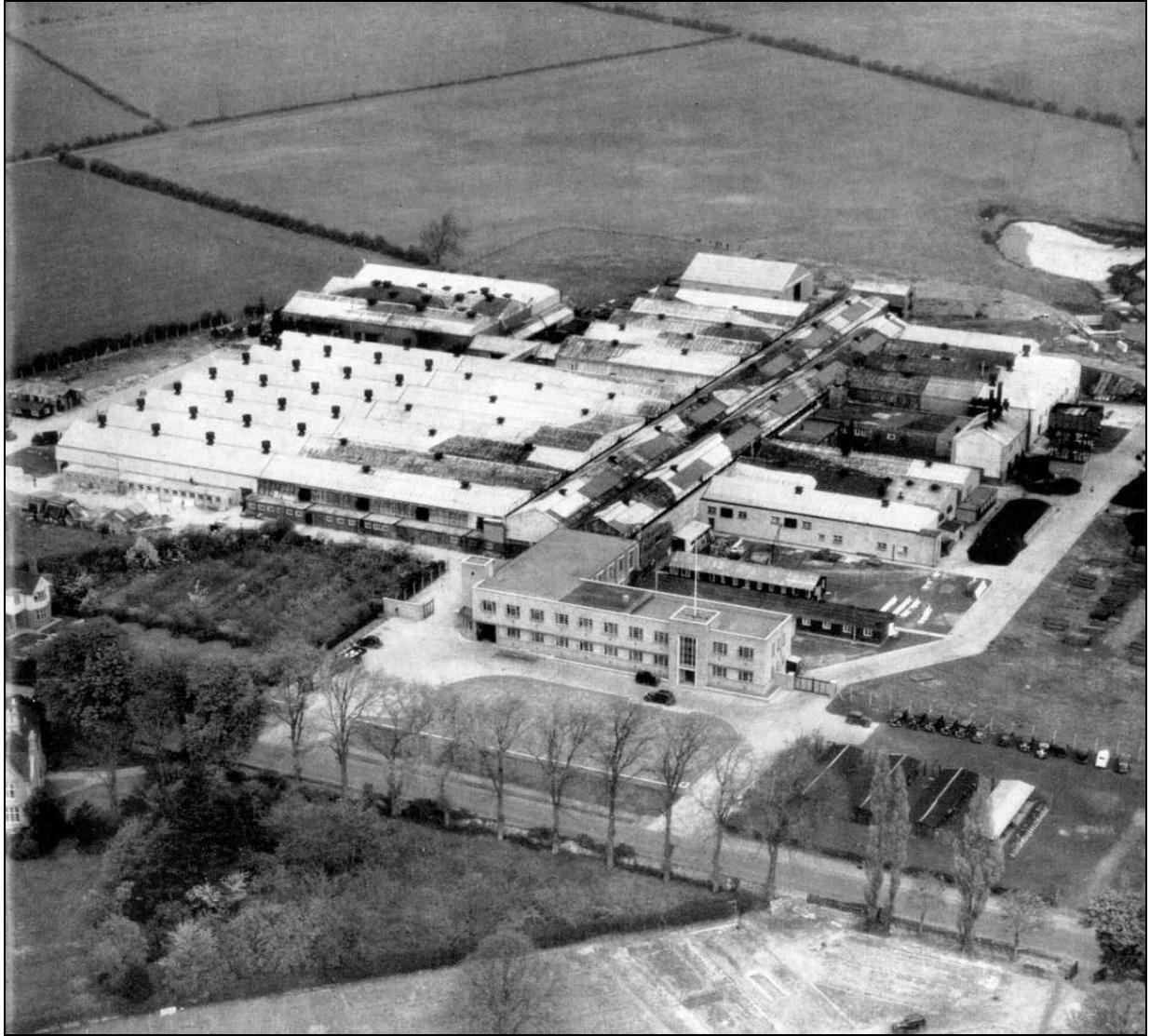
© Archaeological Services & Consultancy Ltd

No part of this document is to be copied in any way without prior written consent.

Every effort is made to provide detailed and accurate information. However, Archaeological Services & Consultancy Ltd cannot be held responsible for errors or inaccuracies within this report.

© Ordnance Survey maps reproduced with the sanction of the Controller of Her Majesty's Stationery Office.

ASC Licence No. AL 100015154



**Plate 1:** Aerial photograph of the site in 1948

## CONTENTS

<i>Forward</i> .....	9
1. Introduction .....	10
2. Aims & Methods .....	13
3. The Archaeological and Historical Background of the Site.....	14
4. History of the British Timken Works.....	19
5. Development and Description of the Buildings .....	27
6. The Manufacturing Process.....	91
7. The Timken Show .....	96
8. Miscellaneous.....	101
9. Acknowledgements .....	107
10. Archive .....	107
11. References .....	108

### Appendices:

1. Time Line .....	110
2. Timken Personalities .....	111

### Figures:

1. General location .....	8
2. Site location.....	12
3. Extract from the 25 inch Ordnance Survey Map <i>c.</i> 1886.....	16
4. A sketch map of Duston 1880-1919, showing limestone pits.....	17
5. Ordnance Survey Map <i>c.</i> 1950 .....	18
6. Extract from the 1969 Ordnance Survey .....	21
7. Site plan showing the function of the principal building .....	29
8. Plan of Building 2 showing the main phases of Development.....	36
9. The principal components of a Timken Tapered Roller Bearing.....	92
10. Schematic Representation of the Assembly Pattern in Building 2.....	95



**Plates:***Cover: Grinding Shop I in 1950*

1.	Aerial photograph of the site in 1948 .....	2
2.	Surviving section of narrow gauge railway line which served the ironstone quarry ...	18
3.	The Administration Block during construction in 1942 .....	28
4.	Opening of the Administration Block on 29 June 1942 .....	28
5.	Gun slit at the base of the Administration Block Tower .....	30
6.	Dining Room 2 and the Kitchen under construction (5 May 1942) .....	30
7.	View of No. 2 Dining Room (March 2005) .....	30
8.	VE Day decorations on the Administration Block (May 1945) .....	31
9.	View of the Product Engineering Drawing Office .....	31
10.	View of the 1954 Entrance and Reception Area .....	31
11.	View of the Boardroom. February 2005 .....	32
12.	South façade of the Admin Block after completion of the 1 <sup>st</sup> extension in 1954 .....	32
13.	South façade of the Admin Block after completion of the 2 <sup>nd</sup> extension in 1957 .....	32
14.	View of the Technical Department shortly after opening in 1957 .....	33
15.	View of the Sales Department shortly after opening in 1957 .....	33
16.	General view of the Administration Block from the east in Feb 2005 .....	33
17.	View of the Administration Block from the west February 2005 .....	34
18.	View of the Building 2 during the early part of construction 5 <sup>th</sup> Dec 1941 .....	39
19.	South façade of Building 2 & Admin Block during construction 20 Dec 1941 .....	39
20.	View of the northeast area during construction 3 <sup>rd</sup> November 1942 .....	39
21.	A similar view, three months later showing the rapid progress in construction during the war years. 15 <sup>th</sup> February 1943 .....	40
22.	View of the southwest area. 21 <sup>st</sup> April 1942. Grinding Shop .....	40
23.	View of the northwest area and Swarf House. 8 December 1942 .....	40
24.	Southeast area (Tool Shop), during construction. 24 <sup>th</sup> February 1942 .....	41
25.	Tool Shop construction 9 <sup>th</sup> June 1942 .....	41
26.	Tool Shop construction. Internal view. 26 May 1942 .....	41
27.	Hardening Shop and Press Shop during construction. 9 <sup>th</sup> June 1942 .....	42
28.	View of the Grinding Shop. 25 <sup>th</sup> March 1942 .....	42
29.	Auto Shop. 30 <sup>th</sup> June 1942. Temporary Gridley machinery in centre .....	42
30.	Night view of the Auto Shop c.1943 .....	43
31.	View of the Grinding Shop I in August 1943 .....	43
32.	View of the Roller Heading Shop in August 1943 .....	43
33.	View of the Assembly Shop in 1950 .....	44
34.	The south west corner of Building 2. February 2005 .....	44
35.	General view of the west side of Building 2. February 2005 .....	44
36.	Central area of north wall of Building 2 .....	45
37.	Northeast corner of Building 2, with suds house and loading bay .....	45

38.	East elevation of Building 2. February 2005 .....	45
39.	View east through the Matched Bearings Department .....	46
40.	View west through the Auto Shop. February 2005 .....	46
41.	View looking west through the Grinding Shop. February 2005.....	46
42.	View of the central corridor looking north. February 2005 .....	47
43.	Green & Black Store. Detail of service rooms on original west wall of Press Shop.....	47
44.	View of the Boiler House and Water Tower. 10 March 1942.....	47
45.	Ancillary buildings between the Auto Shop & Matched Bearings .....	49
46.	West end of the northeast area. Gas Producer House on left, water tower central and boiler house to left. 3 <sup>rd</sup> November 1942 .....	49
47.	View of the Swarf House and north end of Building 2. 8 <sup>th</sup> December 1942.....	49
48.	Preparations for the 1947 extensions. Cheltenham House in the background).....	51
49.	View of the southwest part of the site February 2005 .....	51
50.	View of the Grinding Shop with flat roofed extension to right. Feb. 2005.....	51
51.	Auto Shop Swarf House. February 2005 .....	52
52.	Auto Shop north bay view to Swarf House. February 2005.....	52
53.	North elevation of the Green and Black Stores. February 2005.....	52
54.	South elevation of the Hardening Shop. 15 <sup>th</sup> February 1943 .....	56
55.	South elevation of the Hardening Shop. February 2005 .....	56
56.	North elevation of the Hardening Shop under construction. 8 <sup>th</sup> Dec 1942 .....	56
57.	Construction of the Hardening Shop. Substation Excavations. 30 June 1942 .....	57
58.	Hardening Shop, showing the Rotary Hearth Furnaces. Aug 1943.....	57
59.	The 1949 extension to the Hardening Shop under construction.....	57
60.	West elevation of the Hardening Shop showing the 1950 extension .....	58
61.	West elevation of the Hardening Shop in its final form. February 2005.....	58
62.	Site of the Pit Furnaces showing Gantry and Crane. February 2005 .....	58
63.	Site of the Pit Furnaces showing Quenching Tanks & Ventilator. Feb 2005.....	59
64.	Sites of the Rotary Hearth Furnaces. February 2005.....	59
65.	Site of the Shot Blaster. February 2005.....	59
66.	Oil Tanks and Pumps.....	60
67.	Site of the Ipsem Furnaces. February 2005 .....	60
68.	Service Sales Department under construction in 1949 .....	61
69.	South elevation of the Service Sales Department. February 2005 .....	62
70.	Ground Floor of the Service Sales Department. February 2005 .....	62
71.	Packing and Loading Department (1949).....	62
72.	Main Office on the First Floor (1949).....	63
73.	Receiving and Wrapping Department on the Ground Floor (1949).....	63
74.	Roof of the Service Sales Division. February 2005 .....	63
75.	Former external north wall of the Service Sales Department. Feb 2005.....	65
76.	View of the south side of Building 3. February 2005.....	65
77.	View of the east elevation of Building 3. February 2005.....	65

78.	Chemical bath in Building 3. February 2005.....	66
79.	View of the site of the quenching tanks in Building 3. February 2005.....	66
80.	View of the rotary furnaces in Building 3. February 2005.....	66
81.	View of the cellar in Building 3. February 2005.....	67
82.	View of the south part of Building 3. February 2005.....	67
83.	View of the Suds House in Building 3. February 2005.....	67
84.	Building 4 under construction in March 1965.....	68
85.	East end of Building 4 showing the southern extension. February 2005.....	69
86.	Internal view of Building 4, looking east. February 2005.....	69
87.	Internal view of the 1st southern extension of Building 4, looking west. Feb 2005....	69
88.	View of the second southern extension of Building 4, looking east. Feb 2005.....	70
89.	Internal view of the Boiler House, Building 4. February 2005.....	70
90.	West side of the Suds House, Building 4. February 2005.....	70
91.	The 'Kanban Corridor' linking Buildings 4 & 5. View to north. Feb 2005.....	71
92.	View of the Building 3 and the Storage Building. February 2005.....	72
93.	Storage Building between Buildings 4 and 5. February 2005.....	72
94.	Buildings 5 and 6 under construction in 1960.....	73
95.	Buildings 5 and 6.....	74
96.	Aerial view of Building 5 in 1965.....	74
97.	East elevation of Building 5. February 2005.....	74
98.	View of the east bay (Heat Treatment Works) in Building 5. February 2005.....	75
99.	West bay of Building 5. February 2005.....	75
100.	View of the west end of Building 6. February 2005.....	75
101.	View of the east end of Building 6. February 2005.....	76
102.	Internal view of Building 6, looking west. February 2005.....	77
103.	Internal view of Building 6, looking east. February 2005.....	77
104.	Building 7. View of the south facing elevation. February 2005.....	77
105.	West facing elevation of Building 7. February 2005.....	79
106.	Building 7. North facing elevation showing extensions. February 2005.....	80
107.	View of the west room of Building 7. February 2005.....	80
108.	View of the 'Traub Shop' in Building 7. February 2005.....	81
109.	View of the east room in Building 7. February 2005.....	81
110.	Building 8 shortly after completion in 1949.....	82
111.	Building 8. View of the west elevation. February 2005.....	83
112.	Building 8 south and west elevations. February 2005.....	83
113.	Building 8 east end with later fire station. February 2005.....	83
114.	Building 8 internal view looking west. February 2005.....	84
115.	Building 8B internal view looking east. February 2005.....	84
116.	West elevation of Building 9. February 2005.....	84
117.	The Physical Laboratory shortly before demolition. 20th June 2005.....	86
118.	South room in Building 9. February 2005.....	86

119.	North room in Building 9. February 2005 .....	86
120.	External view of the Metallurgical Laboratory. February 2005 .....	87
121.	Internal view of the Metallurgical Laboratory. February 2005 .....	87
122.	Building 10 under construction in 1942 .....	88
123.	North East elevation of Building 10 February 2005.....	89
124.	Internal detail of Building 10. February 2005 .....	89
125.	View of the Catchment Pits. February 2005.....	89
126.	The tennis court. 20 <sup>th</sup> June 2005 .....	90
127.	Mary Finch and C R Newcombe planning the 1947 Timken Show .....	97
128.	Cover of the 1946 show programme .....	97
129.	Timken Show 1951. View of the jumping area .....	98
130.	Timken Show 1951. Livestock .....	98
131.	Timken Show 1957 .....	99
132.	Aerial view of the 1959 Timken Show .....	100
133.	The 1951 Children's Christmas party in the Guildhall, Northampton .....	101
134.	The British Timken XI and Northamptonshire XI. 26 <sup>th</sup> April 1964 .....	102
135.	British Timken and the Northamptonshire XI. 29 <sup>th</sup> April 1950 .....	102
136.	The Duke of Edinburgh laying the foundation stone of the sports pavilion.....	104
137.	The Duke of Edinburgh touring the Hardening Shop.....	104
138.	Princess Anne touring the works in 1973 .....	105
139.	Frankie Vaughan performing at Duston in 1962 .....	105
140.	John Pascoe and Michael Dewar at the 1950 Timken Show.....	111
141.	Sir John Pascoe (1893-1963) .....	113
142.	Sir John and Lady Pascoe at the Investiture on 12 <sup>th</sup> February 1957 .....	113
143.	C R D Tuckey at his desk in the Sales Department, 1951 .....	114
144.	C.R.D Tuckey featuring on a Players cigarette card .....	115
145.	I F Fisher, Duston Works Manager 1956-1966 .....	116
146.	Stephen F Bennett.....	117

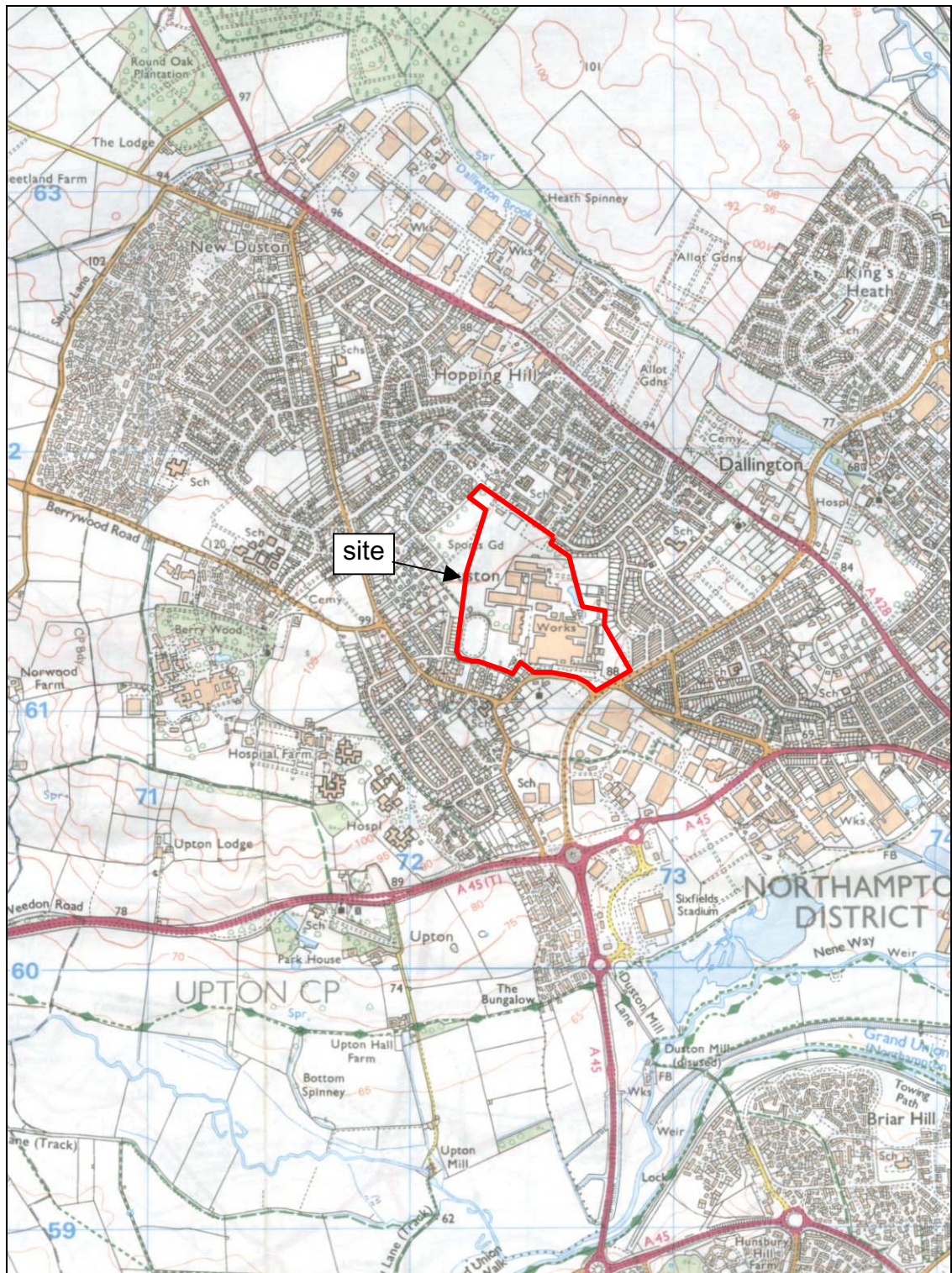


Figure 1: General location (scale 1:25,000)



## **Foreward**

*In February 2005 Archaeological Services and Consultancy Ltd carried out a survey of the former British Timken works at Duston, Northamptonshire. The work was undertaken in advance of redevelopment of the site and was required as a planning condition imposed by Northampton Borough Council.*

*The scope of the project was primarily defined in discussions with the Conservation Officer and the programme included historical research, an account of the site and compilation of a photographic record. Its primary purpose is to satisfy the condition attached to the planning permission and consequently it is not intended to serve as a definitive history of the Duston works.*

*As the work progressed, it became clear that there was considerable local interest in the project. Following agreement with the Conservation Officer and the client, the scope was widened, in order to allow consultation of a wider range of historical material and to seek accounts from former employees. Every effort has been made to consult as wide a range of sources as possible, but the original aims of the project did not allow for consultation of original company records, many of which may be held by The Timken Roller Bearing Company at Canton, Ohio.*

*The report gives a brief account of the archaeological and historical background of the site and then traces the development of the works from the original construction in 1942 to closure in 2003 (Sections 3 and 4). The principal buildings are then described and relevant cartographic and photographic material provided (Section 5). Section 6 provides an account of the manufacturing process. Later sections discuss the Timken Show, the various social and sporting activities that took place. The report concludes with brief biographies of some of the principal people associated with the works.*

# 1 Introduction

1.1 In 2005 *Archaeological Services and Consultancy Ltd* (ASC) carried out an historic building survey of the British Timken factory at Duston, Northampton (Figure 1). The project was commissioned by *Bellway Homes*, and was carried out according to a project design prepared by ASC (Zeeprat 2005), and a *brief* (Ballinger 2005) prepared on behalf of the local planning authority (LPA), *Northampton District Council*, by Ms Jenny Ballinger, *Senior Conservation Officer* of *Northamptonshire County Council*. The planning application reference is N/2004/200.

## 1.2 *Planning Background*

This building project has been required under the terms of *Planning Policy Guidance Note 15* (PPG15), in response to proposals for the demolition of buildings and redevelopment of the site. Under the terms of *Planning Policy Guidance Note 16* (PPG16), an archaeological evaluation will be required, which will be the subject of a separate report.

## 1.3 *Location*

The site is situated in Duston, in the borough of Northampton and is centred on Ordnance Survey National Grid Reference SP 725 614 (Figure 1). It comprises a triangular plot of land, fronting onto Main Road to the south and Cotswold Avenue to the north. The west side overlooks houses along Javelin Close and the east side is adjacent to former sports facilities to the rear of Mendip Road.

## 1.4 *Description* (Figure 2)

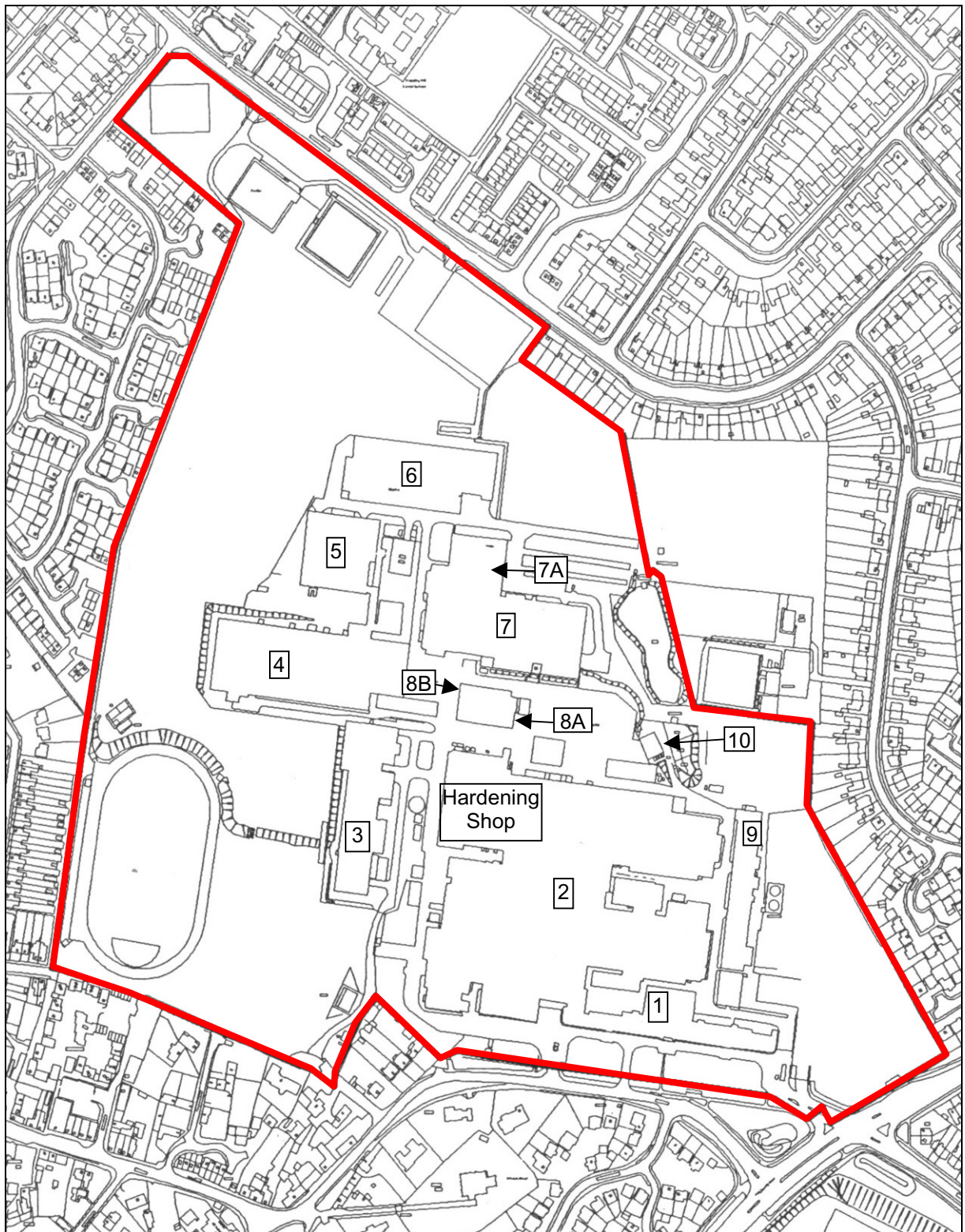
The site comprised an approximately triangular shaped area of land *c.*28 hectares in extent. At the time of the survey, all parts of the site were in disused condition. The central part was occupied by the factory buildings, which comprised a central complex of buildings with further production buildings and ancillary structures to the north and west. A number of sports facilities occupied the northern part of the site, with playing fields to the south. An athletics track was situated at the southwest corner and a tarmac parking area occupied the east and south sides, adjacent to Main Road. Access to the site is from the south, from Main Road.

## 1.5 *Geology & Topography*

1.5.1 The natural topography and soils of the site have been extensively modified by the development of the factory and laying out of the playing fields. The natural soils on the site have not been mapped, but elsewhere in Duston they comprise the *Banbury Association*, namely well drained fine and coarse loamy soils (Soils Survey 1983, 544). It is unlikely that the natural soil profile survives beneath the factory buildings on the east side of the site, but may partially survive on the west side, which was extensively terraced when the sports ground was laid out and associated facilities were developed. The underlying geology comprises Great Oolite Limestone to the north, Northampton Sand and Ironstone in the south and Estuarine Clay and Limestone in the centre.

- 1.5.2 The site is situated on land that rises to the north. The south part of the site is flat and lies at an elevation of 91m OD. The buildings on the north side of the complex have been terraced and are situated at an elevation of *c.*94m.





**Figure 2:** Site location with building numbers shown (*not to scale*)

## 2 Aims & Methods

### 2.1 *Aims and Methods*

As described in the *brief* (Section 2), the aims of the building recording were:

- to provide a written, drawn and photographic record of the site prior to demolition
- to provide a description of the manufacturing processes through a study of documentary sources, physical surviving evidence and oral accounts
- to provide an account of the manufacturing processes employed at the site
- to provide a detailed analysis of representative areas of the manufacturing process, to include the Auto Shop, marking, grinding, hardening and assembly and packaging areas

### 2.2 *Standards*

The survey conforms to the project design, to the relevant sections of the Institute of Archaeologists' *Code of Conduct* (IFA 2000) and *Standard & Guidance Notes* (IFA 2001), to the Royal Commission on the Historical Monuments of England's *Recording Historic Buildings: a Descriptive Specification*, 3<sup>rd</sup> Edition (RCHME 1996), and to the relevant sections of ASC's own *Operations Manual*.

### 2.3 *Methodology*

In line with the requirements of the Brief the survey follows the standards, conventions and specifications defined by English Heritage (RCHME 1996). A detailed specification appears in the project design. The main points of the survey were as follows:

#### 2.3.1 *Written Account:*

The emphasis of the report was on the manufacturing processes which took place on the site and an historical account, rather than the architectural features, except where the latter are relevant. The written account is analytical, combining information from the desk-based study and the results of physical examination of the site

#### 2.3.2 *Drawn Record:*

The drawn record is based as far as possible on existing plans of the works buildings, checked and amended for accuracy, and in order to ensure they meet current RCHME standards. These are supplemented as required by additional drawings, prepared to the same standard. All drawings resulting from the survey are available in digital format.

#### 2.3.3 *Photographic Record:*

The photographic record provides an overview of the surviving buildings on the site, and detailed coverage of surviving evidence relating to the manufacturing process at British Timken.

### 3 The Archaeological and Historical Background of the Site

SMR = Northamptonshire Sites and Monuments Record

- 3.1 This section summarises the archaeological and historical background to the works. Duston has been the subject of a number of archaeological and historical studies (eg Golby 1991; Young 2002; and the reader is referred to these volumes for a fuller account.

Duston is an area of considerable archaeological and historical importance and the area may have been inhabited since the early prehistoric periods as a number of Palaeolithic (SMR 4934) and Mesolithic tools have been found in the area.

- 3.2 The area was occupied during the Roman period and a small town may have developed south of the factory, in the centre of the present village. Little is known in detail of the settlement but a traces of the road were recorded during the excavation of a sewer trench in the centre of the village (SMR 2395). It is conjectured that the road ran in a northwesterly direction close to the south side of the works, but further evidence is required in order to confirm this. Roman artefacts including coins, tiles and a fibula have also been found in the area (SMR 7066 & 7214).
- 3.3 The village of Duston may have originated during the Saxon period, but no archaeological remains or artefacts have been recorded of this period in the village. It was in existence by the year 1086 and is included in the Domesday survey, where it is recorded as *Dustone*. The land was held by *William Peverel* and a mill, thirteen villagers, three small holders and three freemen are recorded (Morris 1979).
- 3.4 The Timken works was situated north of the medieval village of Duston. The village was centred on the church of St Luke, which is situated to the south of the site. The earliest elements of the church date from the 12<sup>th</sup> century (Pevsner & Cherry 1973, 358).
- 3.5 Duston was enclosed in 1777 (Foster & Garratt 1993). The field boundaries, which survived until the development of the factory in the mid 20<sup>th</sup> century (Figure 3) were probably laid at that time.
- 3.6 In the mid 19<sup>th</sup> century a deposit of ironstone was discovered at Duston. It was originally identified as extending over an area of c.200 acres and was 20 feet thick. Limestone quarries were opened at several locations to the north and west of the village (Figure 4). A substantial working northwest of Brants Lane, was served by a narrow gauge railway line (Figure 4). A short length of this track survived on the north side of Building 10 until 2005 (Plate 2). The pit was later reused as a balancing pond (below section 5.13). Clay was also worked from an area northwest of the site, which provided the raw material for *Watkin Brick Works* (Figure 4).

- 3.7 The limestone extraction was a short-lived industry and the 1901 edition Ordnance Survey map shows that the workings were disused. The land was acquired by *Yarde's Seed Merchants* and became a nursery and market garden (R G Sargeant- *pers com.*). The northern part of the site was an arable field.
  
- 3.8 The land was purchased by the War Office in 1941 and developed as the British Timken works. In addition to the former market garden, part of the garden of Cheltenham House, which was situated on Main Road was also acquired (S Garratt *pers com.*).

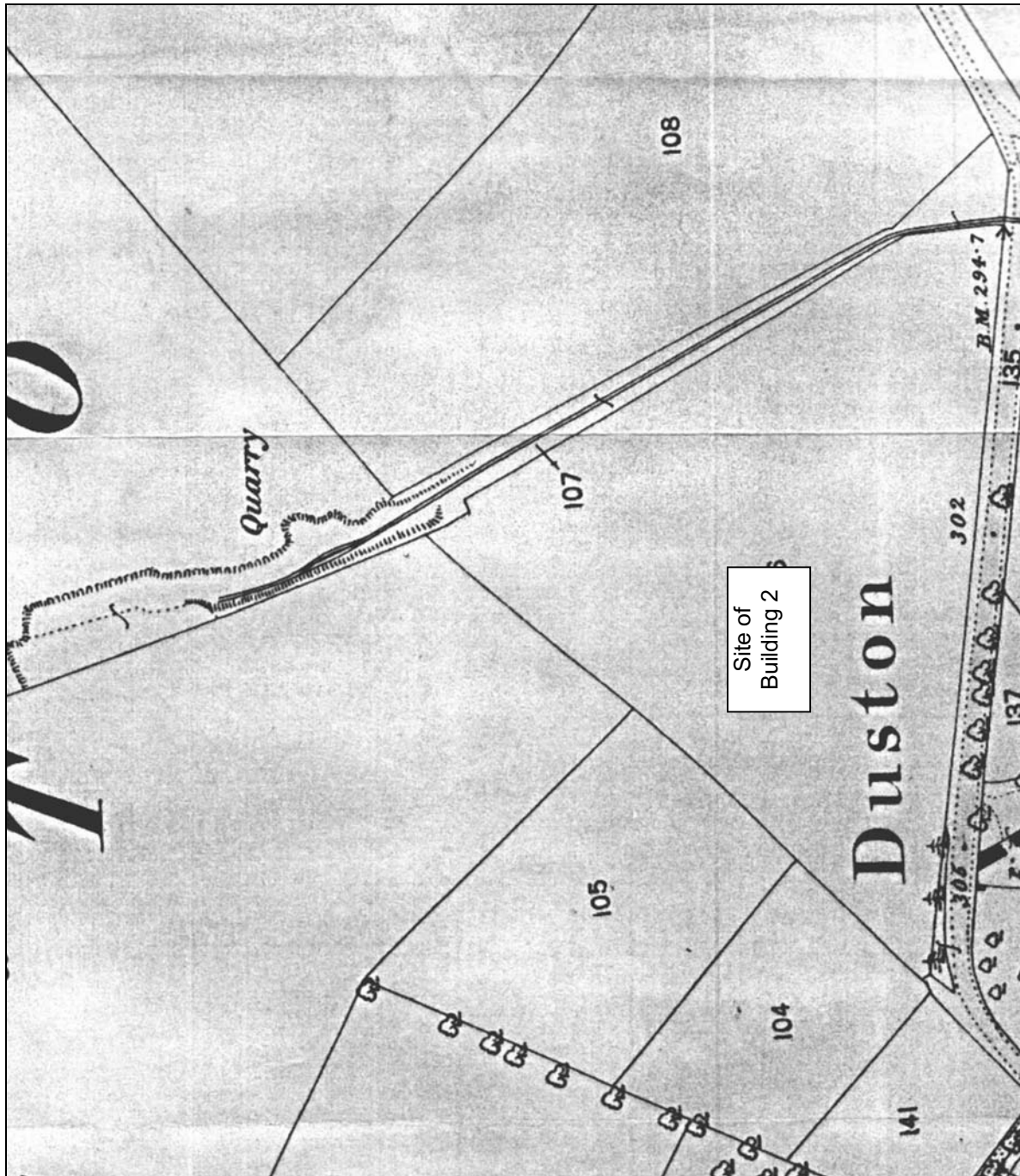


Figure 3: Extract from the 25 inch Ordnance Survey Map c.1886



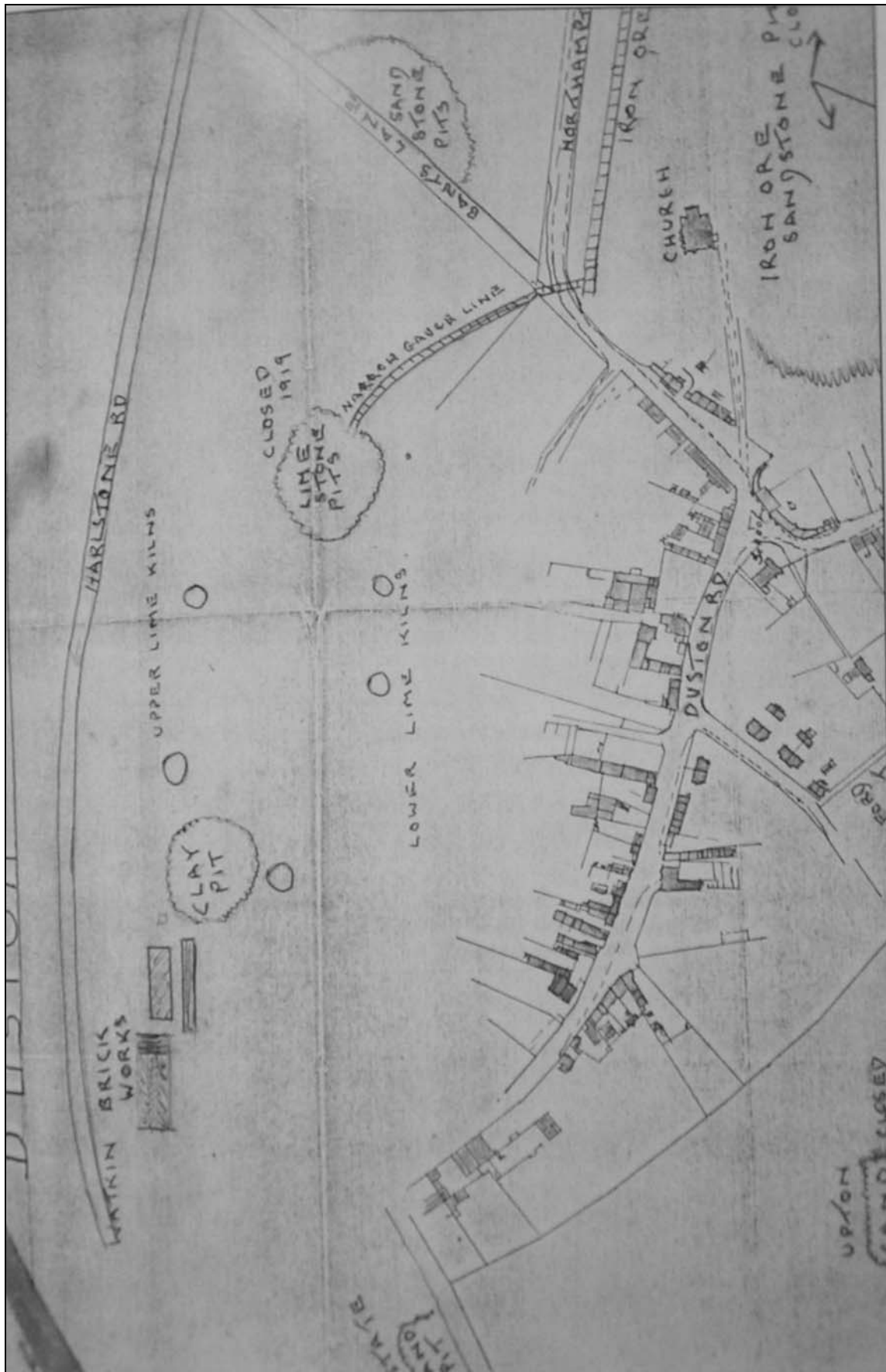
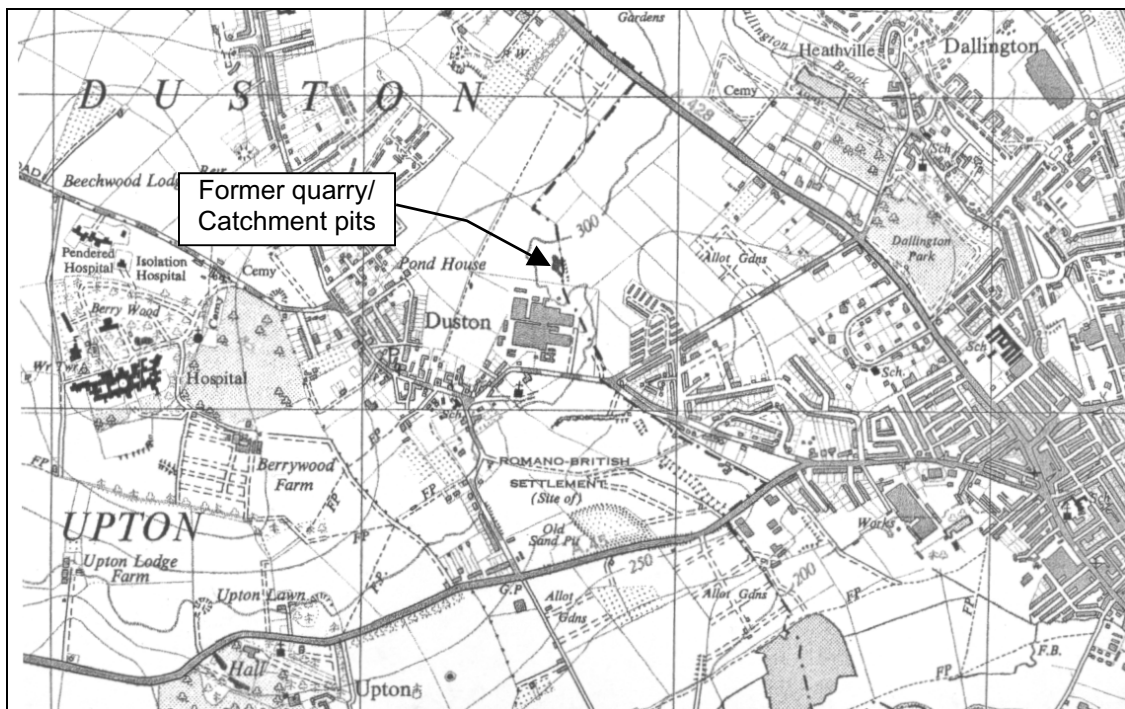


Figure 4: Sketch map of Duston 1880-1919, showing limestone pits (unpublished map, Northamptonshire CRO)



**Plate 2:** Surviving section of narrow gauge railway line which served the ironstone quarry. 20<sup>th</sup> June 2005



**Figure 5:** Ordnance Survey Map c.1950 (scale 1:25,000)

## 4 History of the British Timken Works

### 4.1 *The Origin of British Timken Ltd*

- 4.1.1 In 1909 the *Timken Roller Bearing Company* granted a licence to *Electric and Ordnance Accessories Ltd* of Aston in Birmingham (a subsidiary of *Vickers Ltd*) to produce tapered roller bearings in the United Kingdom. Production took place in a factory at Cheston Road, in Birmingham. Production commenced in 1910 and initially ten different sized bearings were produced. The products were a success and the range had increased to fifty different sizes by the following year.
- 4.1.2 The Vickers company was reorganised in 1917 and roller bearing production became the responsibility of another Vickers subsidiary *Wolseley Motors Ltd* at Common Lane, Birmingham. *British Timken Ltd* was formed on 4<sup>th</sup> June 1920 as a subsidiary of Wolseley Motors.
- 4.1.3 The Vickers Group underwent further reorganisation in 1927 and on 16th May of that year the *British Timken* subsidiary was sold to the American *Timken Roller Bearings Co.* Michael Dewar (below, Appendix 2), formerly Vice-Chairman of Wolseley became the chairman of the new company which, at that time had two hundred employees and produced five thousand bearings a week. Sir John Pascoe (below, Appendix 2) was appointed Managing Director in 1940.
- 4.1.4 The product range expanded during the 1920s and, for example, the first tapered roller bearings for the railway industry were manufactured in 1928. Capacity increased during the 1930s when the first heavy rolling mill bearings were produced and products for the aviation industry were also introduced.

### 4.2 *British Timken during the Second World War*

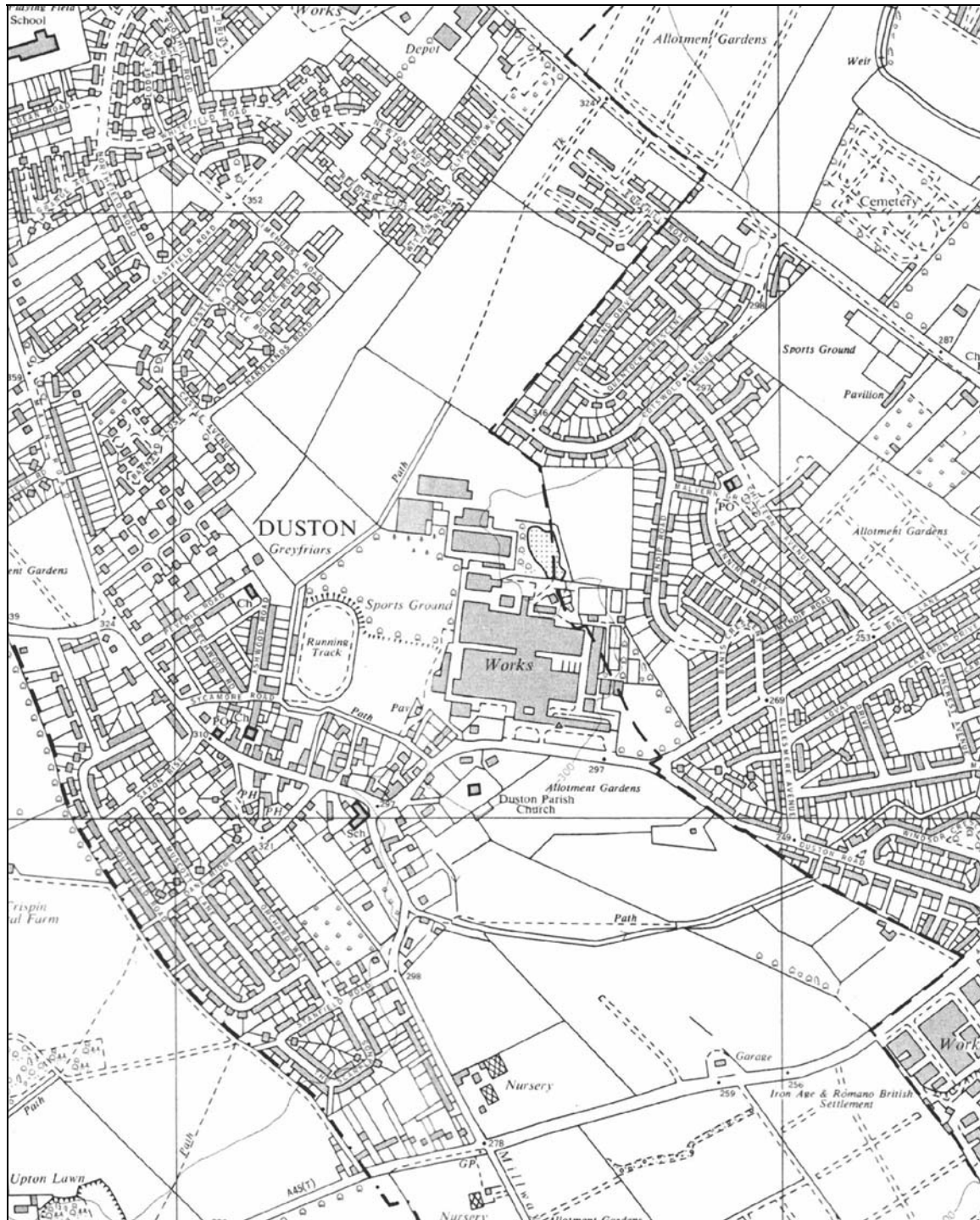
- 4.2.1 The outbreak of war in 1939 had a significant impact on the company. Timken immediately assumed strategic importance as it became the principal supplier of bearings for the British military authorities. The factory at Aston was particularly vulnerable to German air raids as it was situated close to a canal and was an easy target for German bombers. At least nine direct hits were made on the factory, including one on the heat-treatment department (Pruitt 1998, 152).

#### 4.2.2 *The Fischer Bearings Company Ltd*

Until the outbreak of the war, a number of German engineering companies had subsidiaries or works in Britain. One such company was the ball bearing manufacturer *Fischer Bearings Co. Ltd*, which was a subsidiary of the German company *FAG*. German owned companies were confiscated at the start of the war. At the request of the British Government British Timken assumed responsibility for Fischer and production of Fischer ball and straight roller bearings continued from its works at Wolverhampton. Fischer officially became a subsidiary of British Timken at the end of the war and remained part of the Timken group until 1959 (Pruitt 1998, 152-4).



- 4.2.3 In 1941 the British government commenced the *dispersals programme*, whereby industrial installations of strategic or military importance were relocated to sites away from traditional industrial areas. In addition, more capacity was required, which could not be met by the existing factories at Aston and Coalville, so a site for a new factory was found on agricultural land at Duston near Northampton. A separate heat treatment shop was also provided at Bilston (Pruitt 1998, 152).
- 4.2.4 Construction work started at Duston in 1941 to a War Department conventional design. The work was financed by the *Board of Trade* and due to the urgency of the need for the product, rapid progress was made. The first roller was produced in March 1942, after a construction period of barely five and a half months (Timken Times, Jan 1960). Due to a shortage of parts during the war years many of the original tools were secondhand. The first roller grinding machines, for example, were provided by the Royal Mail. Many of the employees from the Aston factory transferred to the new plant. The first Works Superintendent, Freddie Fischer, was brought in from the Coalville works, where he had been Works Manager.
- 4.2.5 The new factory was a success and played a significant part in the war effort. Its location on a green field site gave it an advantage over the Aston and Coalville plants, as it had the potential for expansion. Accordingly, the company took the decision to develop production at Duston and the site at Coalville was closed in 1945.
- 4.3 *1945-1950*
- 4.3.1 The Board of Trade handed ownership of the factory to British Timken in 1945 and the company initiated a programme of investment at the site. The factory became well known for the Timken Show (below, Section 7). The first show took place in 1945 as a victory celebration, but a sports ground and permanent facilities for the show and sporting activities were developed from the later 1940s.
- 4.3.2 Development of the economy during the post-war period led to a rapid increase in the demand for roller bearings. British Timken had gained a reputation for high quality products both before and during the war and was thus well placed to meet this demand. During the late 1940s and 1950s much of the production was for the motor industry and Ford, Morris, Rolls Royce, Daimler, AEC and Leyland were important customers. Demand was sufficient to require continuous production and the factory went on to three eight hour shifts each day. Some of the staff opted to do permanent nights (P H Green, *pers comm.*).
- 4.3.3 The strong links between the British and American companies were demonstrated in 1947 when the parent company provided food parcels for employees of British Timken. The rationing introduced during World War II was still in place and at Christmas every employee of British Timken received a food parcel, funded by the American company (Timken Times Apr 1956, 2). This generosity was repeated in 1948.



**Figure 6:** Extract from the 1969 Ordnance Survey 1:10,000 scale map

#### 4.3.4 *The Timken Show*

The management at Duston directly encouraged sporting and social activities, and successful cricket, athletics and other sporting associations were formed by the employees. One of the most active societies during the 1940s was the Horticultural Society, which organised a number of events and competitions, including the internationally famous Timken Show (below, Section 7). A cricket pitch immediately west of the works opened in 1948 and a football pitch was provided the following year.

4.3.5 In order to meet the increasing demand a programme of expansion commenced, continuing into the 1950s. The first extension, which comprised additions to the main building was made in 1947 and 1948, and over the succeeding years the main building and hardening shop were extended on a number of occasions.

#### 4.4 *1950-1959*

4.4.1 Michael Dewar died in 1950 and was succeeded by John Pascoe. Pascoe continued the policy of expansion at Duston and, following additions to the Hardening Shop (below, section 5.4) and Main Works (section 5.3), by the early 1950s the factory had doubled in size. Expansion during the 1950s was not only limited to Duston. A new plant was established at Daventry in 1952 for the maintenance of machine tools.

#### 4.4.2 *The Athletics Track and the first Royal Visit*

In order to provide better facilities for the show and other events, improvements were made to the grounds. One of the most significant additions was the construction of the athletics track and pavilion. This took place in 1954 and the new facilities were opened by the Duke of Edinburgh on 15<sup>th</sup> December (below, section 8.2). A bowling green was constructed in the north east corner of the site in 1950 and the *British Timken Social and Athletic Club* formed a bowls section. The green was successful and in 1954 hosted the county match between Northamptonshire and Nottinghamshire. The Northamptonshire team included four Timken employees.

4.4.3 The 1950s were a period of expansion and prosperity for British Timken. During the decade British Timken's workforce grew from under 2,000 to c.4,700, as demand rose and Timken gained a reputation as one of Britain's pre-eminent industrial firms (Pruitt 1998, 226).

#### 4.4.4 *The Coronation*

Perhaps the major event at Duston in 1953 was the Coronation celebrations. The Administration Block was decorated with a large picture of the monarch and the Houses of Parliament and the staff were able to watch the events of the day on a television projection in the factory. In the evening the company sponsored a dance on the lawn and a fireworks display.

#### 4.4.5 *The New Building (Building 7)*

British Timken benefited from technical support from its American parent which was based at Canton, Ohio. In 1953 the *New Building* (Building 7; Continuous Line Works; Section 5.10) was developed where production took place following the *Bucyrus Concept*. Named after the Bucyrus plant in Ohio, this automated facility allowed for the production of up to five million bearings per year (Pruitt 1998, 231) and was the first fully automated continuous line works of this type in Europe (Ian Black, *pers com*).

#### 4.5 *Development of the Daventry Works*

4.5.1 In addition to improvements at Duston, Timken invested in other locations and in 1954 a seventy five acre site was acquired at Daventry. Duston specialised in the production of smaller bearings and Daventry was designed to supply larger products. Known as *Daventry No 5*, the largest bearings it produced had a diameter of 108 inches and it specialised in the supply of bearings for rolling mills. A second factory was opened at Daventry in 1959. Known as the *East Works*, it specialised in the automatic manufacture of bearings for the railway industry.

#### 4.6 *Closure of the Aston Works*

4.6.1 The new purpose built factories at Duston and Daventry provided the workshop and expansion capacity for the developing market for bearings during the 1950s. Accordingly, the pre-war factory at Aston became surplus to requirements. It was closed in 1958 and the site was subsequently redeveloped.

#### 4.7 *The American takeover of British Timken*

4.7.1 By the 1950s the American owners of Timken were considering the future of the British organisation. Although a subsidiary, British Timken under John Pascoe's management often followed an independent course. Investment at the Fischer ball bearing plants also made it a competitor to the American company and consolidation was called for. Accordingly, U.S. Timken embarked on a strategy of buying the outstanding British Timken stock. Pascoe and the other directors supported the strategy, but considered that the share price undervalued the company. Anxious to support his British investors Pascoe announced a 25% stock dividend and an increase in the regular cash dividend. This had the effect of rising the share price, which added substantially to the total cost to U.S. Timken. The eventual cost of the merger was \$31 million, of which the company had to borrow \$25 million to complete the deal.

4.7.2 Pascoe's actions caused a sense of betrayal at U.S. Timken. He was replaced as Managing Director by Stephen Bennett, but stayed on as Chairman. He was also elected a Director of U.S. Timken (Pruitt 1998, 241). British Timken Limited subsequently became known as 'British Timken, Division of The Timken Roller Bearing Company'.

#### 4.8 *Sale of Fischer Bearings Company*

4.8.1 The American owners clearly took the decision that the British division would concentrate on the production of roller bearings. The *Fischer Bearings* subsidiary was primarily a producer of ball bearings and did not fit with this strategy. Accordingly, Fischer was sold and was acquired by *Fafnir Bearing Co. Ltd (UK)*, which was itself a subsidiary of U.S. Timken and Fafnir of Connecticut.

#### 4.9 *Developments at Duston in the 1960s*

4.9.1 The late 1950s and 1960s were periods of considerable expansion at Duston. Even with the opening of the new plants at Daventry, much of the pressure to expand fell on Duston, which trebled in floor space between 1945 and 1959 (Pruitt 1998, 231).

4.9.2 By the 1950s the company had established a reputation for supplying high quality products for a range of customers. Quality control was of crucial importance in order to maintain consistent standards and raw materials testing took place in Building 8 (below, section 5.11). Additional facilities were provided in 1959 when the Physical and Metallurgical Laboratories were constructed (Section 5.13). Additional facilities for testing hardened products were also available in the Hardening Shop.

4.9.3 A self-contained building for the production of rollers was constructed in 1960 (Building 5, below, section 5.8) and a workshop for the increasingly well regarded apprenticeship scheme (Pruitt 1998, 226) was provided, when the open area between the east wall of the Hardening Shop and Building 2 was roofed over (below, section 5.3.6). In a later re-organisation, the apprentice workshop was relocated to the former Service Sales Department and the area became a store room for green and black products. A new Cage Shop (Building 6) was also constructed during this period (below, section 9) and an additional bay provided on the north side of the Auto Shop (below, section 5.3.5).

#### 4.10 *Sports Facilities at Duston*

4.10.1 The works at Duston were set in extensive grounds, which the company used to good effect for the annual *Timken Show* and also sporting activities. Improvements were made to the cricket pitch when a pavilion was opened in 1964 (Timken Times, May 1964). The opening ceremony was performed by Managing Director Stephen Bennett and was followed by a match between British Timken and Northamptonshire County XI (Plate 134).

4.10.2 Major improvements were made to the sports facilities in 1966, when the company obtained an additional area of land north of the works from Northamptonshire County Council. The original bowling green had been situated north of the suds house (Building 10) but in a deal between the county council and the company, Timken land on the east side of the works was released back to the county who, in return provided the additional land to the north of the playing field (Ian Black, *pers com*). A new bowling green, tennis

court, archery range and pavilion for the *Timken Sports and Social Club* were laid out in the new area (below, section 5.14.3).

#### 4.10.3 *The Pavilion*

Facilities for the annual show were also improved during the 1960s. A permanent building was provided for horse show officials and a pavilion was constructed. This was situated on the west side of the running track and provided seating and other facilities for spectators. It was extended in 1976.

### 4.11 *Duston in the 1970s and 1980s*

#### 4.11.1 *New Buildings*

A number of improvements were made to the works during the 1970s and 1980s. Notably, substantial investment was made in a new building on the west side of the works (Building 3; below, section 5.6). Known as the *Cold Form* or *203 Department*, it provided a self-contained facility for the cold formation of cups and cones and was provided with its own suds house. It was situated on the west side of Building 2 and encroached onto the lawns on the north side of the cricket pitch.

Additions were also made to the Administration Block and a two storey extension was added to the rear (Figure 2). This provided space for secretarial and office staff and also accommodation for the computer systems.

#### 4.11.2 *Swarf and Suds*

The facilities for the processing of swarf and suds were also modified during the early 1970s. Swarf had been processed in a building just to the north of Building 2, while suds were filtered off into a self-contained suds house (Building 10). Increased production and changes in metal recycling technology led to the requirement for a dedicated swarf house to serve the Auto Shop (below, section 5.3.5). Accordingly, the swarf house was demolished and a new building constructed on the north side of the Auto Shop.

#### 4.11.3 *The Second Royal Visit: H.R.H. Princess Anne*

Many of the former Timken employees recall the visit of H.R.H. Princess Anne (below, section 8.2; Plate 138). The royal visit took place in 1973, and the princess was accompanied by the Managing Director Mr Stephen Bennett before returning to Buckingham Palace by helicopter.

#### 4.11.4 *The Timken Show (Plates 12-131)*

The Timken Show, which had been formally encouraged by John Pascoe and Stephen Bennett had been immensely valuable in promoting the Timken organisation. It was a social event of both county and national importance and the horse and dog shows were particularly well regarded. During the 1950s and 60s the company had invested substantially in the event, but the enthusiasm was not shared by the American management during the 1970s. U.S. Timken was less willing to make the financial resources available and the last show took place in 1978. The following year, following a strike by electricians in the

run up to the show, the event was cancelled. A significant area of the showground was sold off for housing and the pavilion was subsequently demolished.

#### 4.11.5 *Retirement of Stephen Bennett*

Stephen Bennett had been Managing Director of British Timken since 1958, having joined the company eight years previously. He retired in 1976 and was succeeded by Ronald Knapp. Knapp had been the General Manager of the Fischer Bearings Company and had been associated with Timken since the 1950s. He took on a wider role than Bennett and was appointed Managing Director of Timken Europe. He thus had responsibility for the continental plants as well as the British plants at Duston and Daventry (Pruitt 1998, 415).

### 4.12 *The 1990s and Closure*

#### 4.12.1 *Daventry*

The two plants at Daventry had been in operation since the 1950s. In 1993 the main plant was closed and production switched to Duston and plants elsewhere. The distribution centre remained open.

#### 4.12.2 *Developments at Duston*

Daventry was contracting during the 1990s but investment continued to be made at the plant at Duston until the late 1990s. A facility for the repair of railroad bearings was opened in 1997 and the cage shop (Building 6) was converted into the *Advanced Package Bearings Plant* (Building 6).

#### 4.12.3 *Closure*

The closure of the Timken works at Duston was announced in 2001 and the factory closed in 2003. The bulk of the machinery was removed and transferred to Timken plants elsewhere and the site was sold on for redevelopment. The buildings were demolished between March and July 2005.

## 5 Development and Description of the Buildings

### 5.1 *Building 1: The Office Block* (Figure 2)

- 5.1.1 The office block was one of the earliest buildings to be completed on the site. Prior to its completion, administration took place in temporary wooden buildings. It comprised an 'L' shaped two storey red brick building. Work commenced in 1941 and it was formally opened on 29 June 1942 by Mrs W L Hubbard (Plate 4).
- 5.1.2 The main office range originally comprised an east to west aligned block. It was an eleven bay structure, with a principal entrance and stairway in the third bay from the east (Plate 3). The southern façade of the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> bays was originally painted in a dark colour, which may have been camouflage, in order to disguise the full extent of the building.
- 5.1.3 The east to west range housed the main managerial and administrative offices. The original managing directors office comprised the 7<sup>th</sup> and 8<sup>th</sup> bays on the ground floor. Further office accommodation was on the first floor which, in addition, housed dining facilities. The managing director and, at Pascoe's invitation, other senior members of staff used a dining room above the directors office (No. 1 Dining Room). Their meals were prepared in an adjacent kitchen and comprised a three course lunch with full service (Pruitt 1998, 228). The dining area for the office staff comprised the first and second bays on the west end of the block (No. 2 Dining Room).
- 5.1.4 The west end of the range comprised a separate tradesman's entrance and commissionaire's office. A squat tower was constructed at the west end, illuminated internally by an *oeil de beouf* window (Plate 3). A gun slit was present on the west facing elevation at first floor level and two further slits were present on the ground floor, defending the corridor and main site entrance (Plate 5).
- 5.1.5 The north range of the Administration Block comprised No. 2 Dining Room, which served both the office staff and blue collar workers. The dining room was segregated with the office staff dining area occupying the west two bays of the east to west range, while the blue collar staff ate in a larger area on the north side, served by a separate entrance (Plates 6 and 7). It was extended in 1948 (Timken Times, Jul 1948, 5).
- 5.1.6 By the late 1940s the Administration Block was no longer sufficient to accommodate the expanding work force and many members of staff were accommodated in temporary huts (Timken Times Jan 1950, 3). Plans for an extension to the Administration Block were drawn up and the work was completed in 1954. The extension comprised a two storey addition of twenty one bays to the east side of the block (Plate 12). A new principal entrance and reception area was constructed in the centre (Plate 10), with a flight of stairs leading to a new boardroom (Plate 11) and other offices on the first floor. A subsidiary entrance was situated at the new east end. The construction work took place to a tight schedule, as the work had to be completed in time for the



Duke of Edinburgh's visit to Duston, which took place on December 15<sup>th</sup> (below, section 8.2.1).

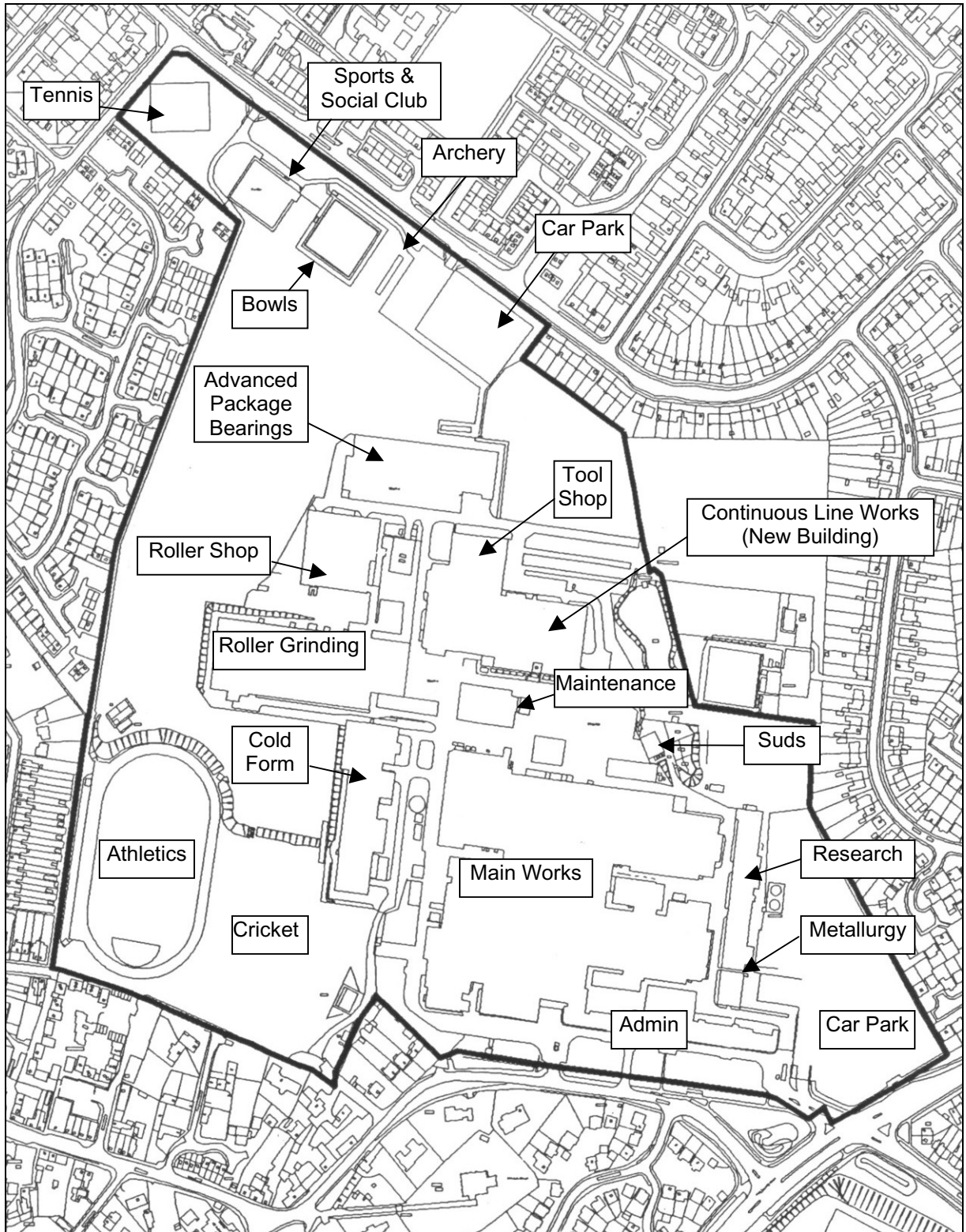
- 5.1.7 Further developments took place in 1957, when a second extension was added, and the block reached its final form. A further two storey, eight bay extension was added, housing a new Technical Department on the first floor (Plate 14) and the Sales Department on the ground floor (Plate 15). A rectangular tower, similar to that at the west end, completed the east end of the extension.



**Plate 3:** The Administration Block during construction in 1942



**Plate 4:** Opening of the Administration Block on 29 June 1942 by Mrs W L Hubbard.  
M.D. John Pascoe seated left & Works Manager Mr C R D Tuckey standing right



**Figure 7:** Site plan showing the function of the principal buildings (*not to scale*)  
See Figure 10 for detail of the Main Works



**Plate 5:** Gun slit at the base of the Administration Block Tower (Feb 2005)



**Plate 6:** Dining Room 2 and the Kitchen under construction (5 May 1942)



**Plate 7:** No. 2 Dining Room (February 2005)



**Plate 8:** VE Day decorations on the Administration Block (May 1945)



**Plate 9:** The Product Engineering Drawing Office shortly after opening in 1955



**Plate 10:** The 1954 Entrance and Reception Area



**Plate 11:** The Boardroom. February 2005



**Plate 12:** South façade of the Admin Block after completion of the 1<sup>st</sup> extension in 1954



**Plate 13:** South façade of the Admin Block after completion of the 2<sup>nd</sup> extension in 1957

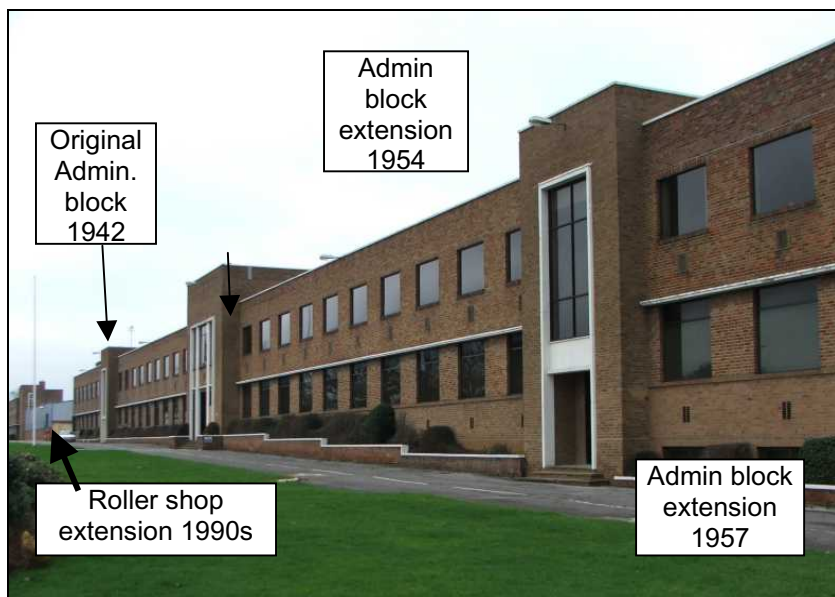




**Plate 14:** The Technical Department shortly after opening in 1957



**Plate 15:** The Sales Department shortly after opening in 1957



**Plate 16:** The Administration Block from the east in Feb 2005



**Plate 17:** The Administration Block from the west. February 2005

## 5.2 *Building 2 (Main Works)* Figures 2 and 8

Discussion of Building 2 will comprise an account of the main building, followed by consideration of various neighbouring buildings (Hardening Shop, Service Sales Dept., etc.). The latter were eventually incorporated into the main works. The building evolved considerably during the course of its life and the main elements of the complex will be treated individually.

### 5.2.1 *Main Works* (Figure 2)

The main works was designed and constructed by the War Department as part of the *dispersals scheme*, whereby manufacturing plants were relocated from their traditional urban centres, in order to avoid enemy action. The building was based on the War Department standard design for factories of this type and comprised four working areas linked by a central corridor. The administration block (section 5.1, above) and Hardening Shop (section 5.4, below) were situated to the south and west respectively.

5.2.2 The building was constructed of red brick around a steel frame, with cladding above. Its original dimensions were *c.*95m east to west and *c.*110m north to south. Work on the building commenced in late 1942 and rapid progress was made. Construction progressed rapidly and production commenced in mid 1942, “five and a half months after driving the cows off the field” (photograph annotation, Mr Martin, personal collection).

5.2.3 The original layout of the building is shown in Figure 8 and comprised the four principal working areas and a corridor with two separate bays. A separate swarf house lay to the north, connected by an access corridor (Plate 23).

5.2.4 *The Original Press and Auto Shops*

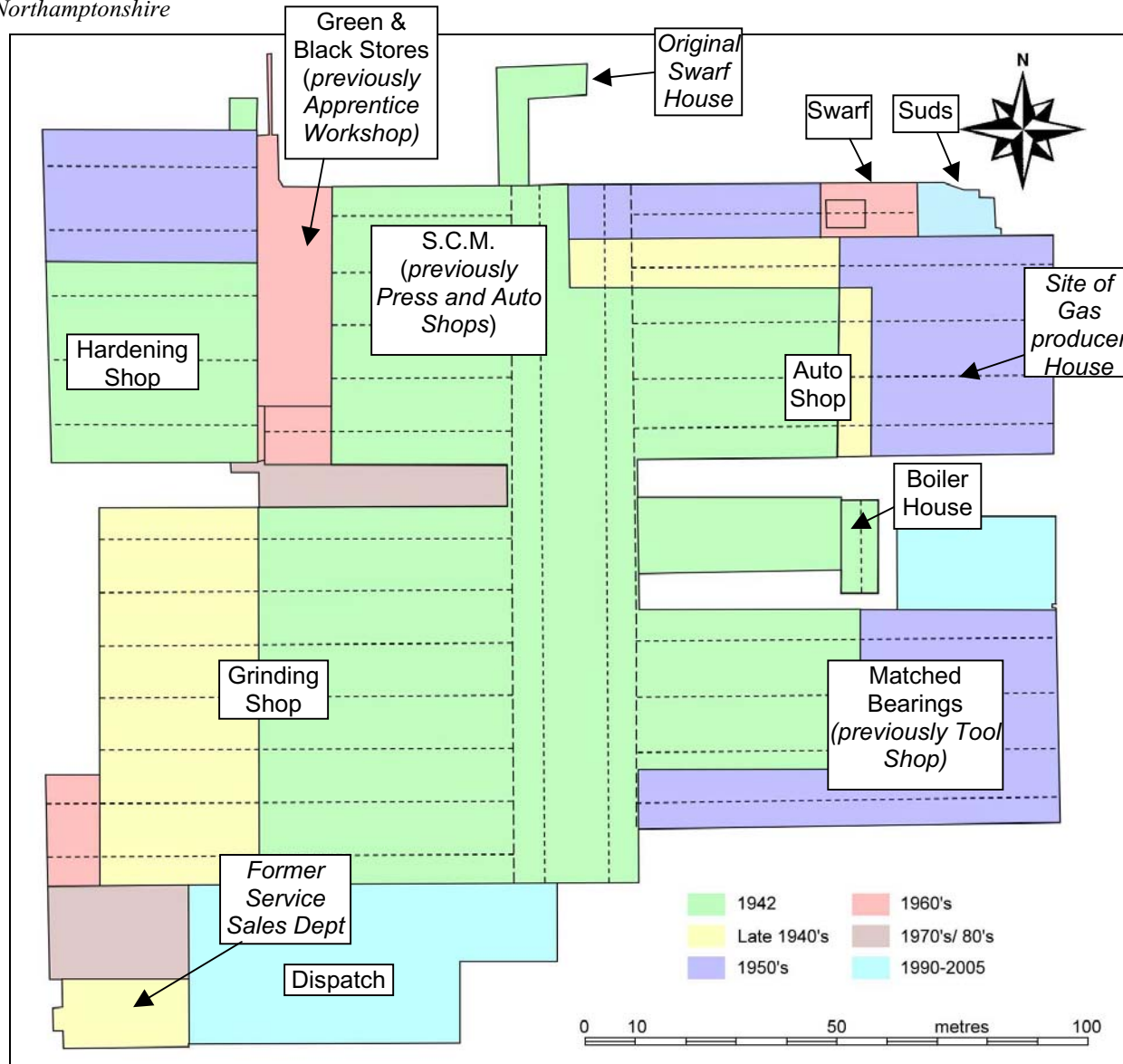
The cages were produced in the *Press Shop*, which comprised the northwest bays (Plates 23 and 27). Its original dimensions were 44m north to south and 28m east to west and was divided into five east-west aligned bays. The main access route was from the west crane bay and a separate corridor from the southwest corner provided access to the hardening shop. A line of service rooms, including toilets were situated on the west side, the doors and external windows of which remained visible in the later Green and Black Stores (Plate 43).

5.2.5 *The Auto Shop* (Plates 29-30)

During the late 1940s the Auto Shop accommodated ninety multi-spindle automatic machines, capable of producing cups and cones between of between one and five eights and nine inches in diameter. Most of the work was undertaken using *Acme Gridley machines*, laid out in two rows. Between each double row was a conveyor belt, which took the finished components to the Inspection Department.

Raw material was supplied in the form of coil for small size cages and as manageable strips for the larger sizes. The first operation was production of the cage blank, which was punched from the raw material in automatic presses. These were situated in the Auto Shop which occupied the east part of the area (Plates 29 and 30). The pockets were pierced in a separate operation in a machine known as the '*L Type*'. The initial pressing was now complete, but the edges were raw and square. They were then passed through a further press for '*winging*' where they were finished off to conform with the radii of the body angle of the rollers. The final operation was '*opening out*'. This gave the cage its tapered shape and was undertaken in a separate press. The cages were then shot blasted and, after inspection, passed through to the Assembly Shop (Woollen 1950d).





**Figure 8:** Plan of Building 2 showing the main phases of development (Labels refer to the final function of each area)

### 5.2.6 *The Grinding Shop* (Plates 22, 28 and 31)

The southwest part of the building comprised the *Grinding Shop*. It was separated from the press shop by an open rectangular area 8m wide. It comprised five east to west aligned bays and measured c.60m north to south and c.40m east to west. The principal access was from the west crane bay and additional service rooms were positioned along the south wall. The grinding shop was originally divided into two areas: Grinding I (cups and cones) and Grinding II (Roller Production).

### 5.2.7 *Grinding I* (Plate 31)

Cones were taken from the Black Stores and were face ground on double-headed *Blanchard Surface Grinders*. They then passed, via conveyor belts for bore, race and rib grinding. Between each stage they underwent quality control in the Inspection Department. The cups were initially treated in the same way as the cones, but after face grinding the next stage, referred to as *O/D grinding*, took place on *Cincinnati Centreless Machines*. Following inspection, they then moved on for bore grinding.

### 5.2.8 *Grinding II*

Grinding II was responsible for grinding the working surfaces of the rollers. The operation took place in *Cincinnati* or *Churchill Centreless Grinders*. The partially completed rollers were fed into the machines from hoppers. The ground rollers emerged from the grinders and then passed into a separate automatic degreasing, washing and drying machine. In 1950 roller production at Duston was 2,250,000 per week (Woollen 1950d).

### 5.2.9 *Heading Shop*

Rollers were produced in the *Heading Shop*. The raw material, in the form of high carbon chrome steel wire up to half an inch in diameter, was delivered from the Tool Store. The rollers were produced on cold heading machines known as *Waterburys* (large sizes), *Nationals* (intermediate) and *Manvilles* (smallest sizes). The machines were fully automatic and their output ranged between 70 to 120 rollers per minute. The partially completed rollers then passed through to the Barrelling Shop and eventually to the Hardening Shop.

### 5.2.10 *Assembly Shop* (Plate 33)

The Assembly Shop originally occupied the southwest bays of Building 2 and was the focal point on which all the production lines converged. The individual parts were brought in from the stores and washed with synthetic turpentine. The individual bearings were assembled by hand, the closing operation being performed on a press. Smaller bearings were closed in a pneumatic press, whereas a hydraulic press was used for larger bearings. Once assembly was completed the bearings were 'run in' and bathed in turpentine to remove any small particles of metal that may have rubbed off the cage during the assembly. The completed bearings were then inspected and underwent greasing. They were placed in metal baskets, passed through a pre-heater and then into a bath of molten grease. An even film of grease covered all parts of the bearing and

provided protection against corrosion during subsequent storage. The bearings were then packed in greaseproof paper and were ready for dispatch (Woollen 1950e).

#### 5.2.11 *Central Corridor*

The east and west areas were separated by a corridor running the entire length of the building. It comprised two bays, which were originally referred to as the *crane bays* and provided access between the four main working areas. The west bay was constructed first and was *c.*110m in length. It ran along the full length of the building and an entrance at the north end led to a corridor providing access to the Swarf House (below, section 5.2.21). The east bay was *c.*15m shorter than the west bay and their combined width was *c.*20m. The bays were both equipped with gantry cranes.

5.2.12 Two separate shops were constructed on the east side of the crane bays. They were smaller than the west areas and were originally separated by an open area *c.*25m wide, which accommodated a boiler house and water tower (below, sections 5.2.16 and 5.2.20).

#### 5.2.13 *The Tool Room* (Plates 24-26)

The southeast block was originally the *tool room*. It was the last of the four principal areas to be built and construction took place during mid 1942. Its dimensions were *c.*33m east to west and *c.*35m north to south and it comprised four east to west aligned bays. A central internal wall between the second and third bays divided the area into two separate rooms.



**Plate 18:** Building 2 during the early part of construction. 5<sup>th</sup> December 1941



**Plate 19:** The south façade of Building 2 and the Admin. Block during construction 20 Dec 1941



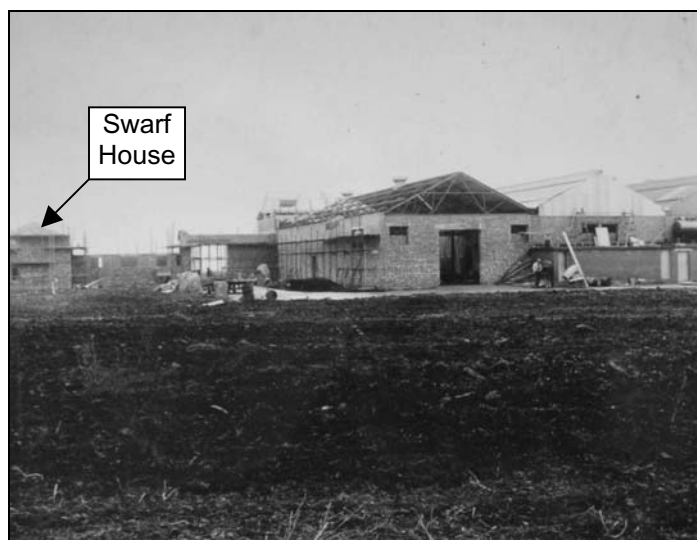
**Plate 20:** The northeast area during construction 3<sup>rd</sup> November 1942



**Plate 21:** A similar view, taken three months later showing the rapid progress in construction during the war years. 15<sup>th</sup> February 1943



**Plate 22:** The southwest area. 21<sup>st</sup> April 1942. Grinding Shop



**Plate 23:** The northwest area and Swarf House. 8 December 1942



**Plate 24:** Southeast area (Tool Shop), during construction. 24<sup>th</sup> February 1942



**Plate 25:** Tool Shop construction 9<sup>th</sup> June 1942



**Plate 26:** Tool Shop construction. Internal view. 26 May 1942



**Plate 27:** Hardening Shop and Press Shop during construction. 9<sup>th</sup> June 1942



**Plate 28:** View of the Grinding Shop. 25<sup>th</sup> March 1942



**Plate 29:** The Automatic Shop. 30<sup>th</sup> June 1942.  
Temporary belt driven Gridley machinery visible in centre



**Plate 30:** Night view of the Auto Shop c.1943



**Plate 31:** View of the Grinding Shop I in August 1943



**Plate 32:** The Roller Heading Shop, August 1943





**Plate 33:** The Assembly Shop in 1950



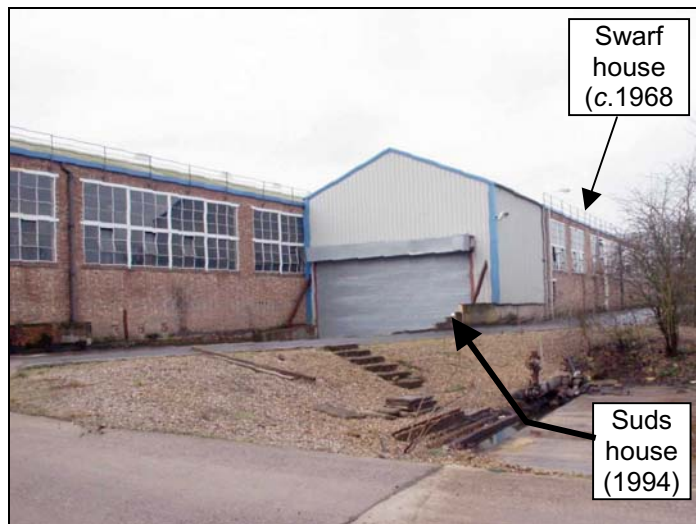
**Plate 34:** The south west corner of Building 2. February 2005



**Plate 35:** General view of the west side of Building 2. February 2005



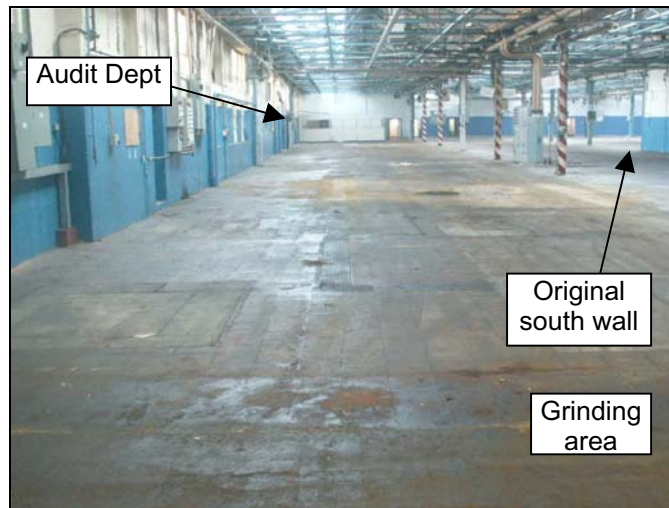
**Plate 36:** Central area of north wall of Building 2



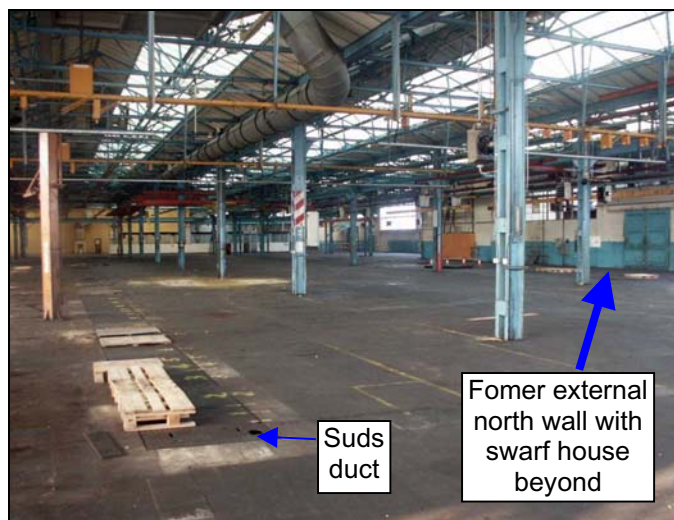
**Plate 37:** Northeast corner of Building 2, with suds house and loading bay



**Plate 38:** East elevation of Building 2. February 2005



**Plate 39:** View east through the Matched Bearings Department Feb 2005



**Plate 40:** View west through the Auto Shop. February 2005



**Plate 41:** View west through the Grinding Shop. February 2005





**Plate 42:** The central corridor looking north. February 2005



**Plate 43:** The Green and Black Store, showing detail of the service rooms along the original west wall of the Press Shop



**Plate 44:** The Boiler House and Water Tower. 10 March 1942

### 5.2.15 *Auxiliary Structures*

The main works (Building 2) was served by a number of auxiliary structures. The number and locations varied as the works developed and details are shown on Figure 8.

### 5.2.16 *The Boiler House*

The boiler house was situated in the open area between the northeast and southeast areas of Building 2 (Figure 8). In its original form it was a free standing building (Plate 44) but as Building 2 expanded, it became subsumed within later additions to the southeast area (Plate 45).

5.2.17 The boiler house was constructed early in 1942. It was a rectangular single bay building with a ridged roof, c.15m north to south and measuring c.7m east to west. It was built in red brick with upper external cladding. Two entrances were located in the east wall and three chimneys rose from the central ridge of the roof.

### 5.2.18 *The Gas Producer House* (Plate 46)

Both gas and coal were consumed at the site. Coal was stored on the east side of the boiler house (Plate 46) and gas was produced in a building east of Building 2 (Figure 8; Plate 46).

5.2.19 The gas producer house was a rectangular building aligned east to west and was constructed of red brick with a metal ridged roof. The building had a relatively short life as it was demolished c.1950, when the north part of Building 2 was extended over the site.

### 5.2.20 *The Water Tower*

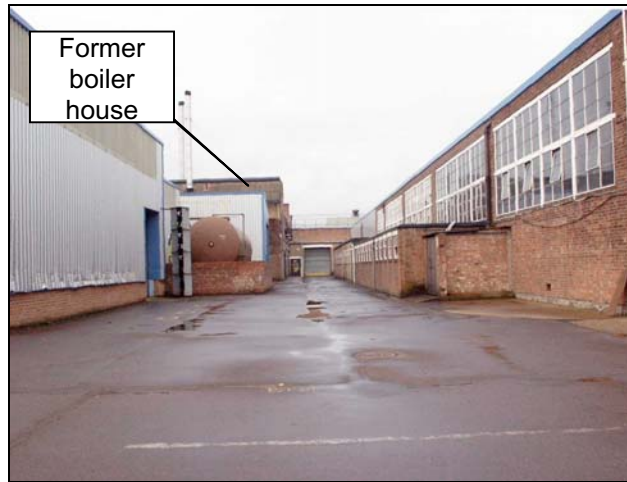
A water tower was situated close to the east side of the boiler house (Plates 44 and 46). It was constructed in March 1942 and survived until c.1970, when it was demolished to make way for an extension to the tool shop.

### 5.2.21 *The Swarf House*

Swarf and suds were originally processed in separate buildings on the north side of the main works. The original Suds House is discussed in section 5.13.

5.2.22 Swarf was originally processed in a building north of Building 2 (Figure 8: Plates 23 and 47). It was constructed in late 1942 and was located to the north of the west crane bay. The two were linked by a single storey brick built corridor, which extended c.5m north from the crane bay. Swarf was transported along the corridor on a conveyor belt and upon reaching the swarf house was reduced to small chips. The chips were then loaded into a machine known as the 'whizzer', where oil was separated by centrifugal force (Woollen 1950a).

5.2.23 The building comprised a rectangular red brick built structure and measured c.16m east to west and c.6m north to south (Plate 47). It had two storeys and access from the main works was via the corridor on the south side of the building. It remained in existence until c.1970.



**Plate 45:** Ancilliary buildings between the Auto Shop and Matched Bearings



**Plate 46:** View towards west end of the northeast area. Gas Producer House on left, water tower central and boiler house to left. 3<sup>rd</sup> November 1942



**Plate 47:** The Swarf House and north end of Building 2. 8<sup>th</sup> December 1942

### 5.3 *Post-War Expansion of Building 2 (Figure 8)*

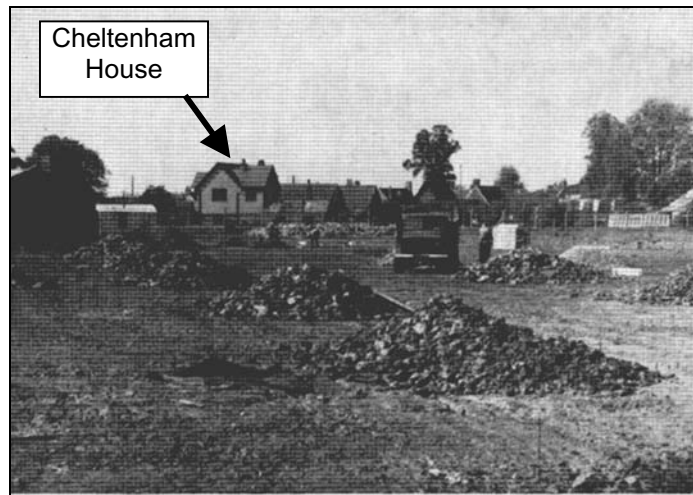
- 5.3.1 The nature and extent of the market for bearings evolved during the later 1940s as output switched to civilian production. Once legal ownership of the factory had been transferred to Timken by the *Board of Trade*, a programme of investment was embarked upon, which resulted in a near doubling of the size of Building 2, during the late 1940s and 1950s.
- 5.3.2 The first major addition took place in 1947, when the company architect C E M Fillmore designed extensions to the grinding, press and barrel shops. The southwest area (grinding shop) was almost doubled in size, when all seven bays were extended *c.*25m to the west. The ancillary rooms along the south side of the original south bay were extended along the new area (Plate 1). The northeast range was also extended, as an additional north bay was added and the original three bays were extended *c.*10m east. Work was also undertaken in the northwest area (Press Shop).
- 5.3.3 Major extensions were made to the east bays in 1950. The Gas Producer House (section 5.2.18) was removed and all four bays were extended *c.*30m to the west. An additional bay was constructed *c.*1960. This extended only half way along the line of the Auto Shop, but resulted in a continuous building line on the north side of Building 2, from the Press Shop. The Tool Shop was also extended to the east and additional bay was added to the south, reducing the size of the open area behind the Administration Block.

#### 5.3.4 *Grinding Shop Extensions*

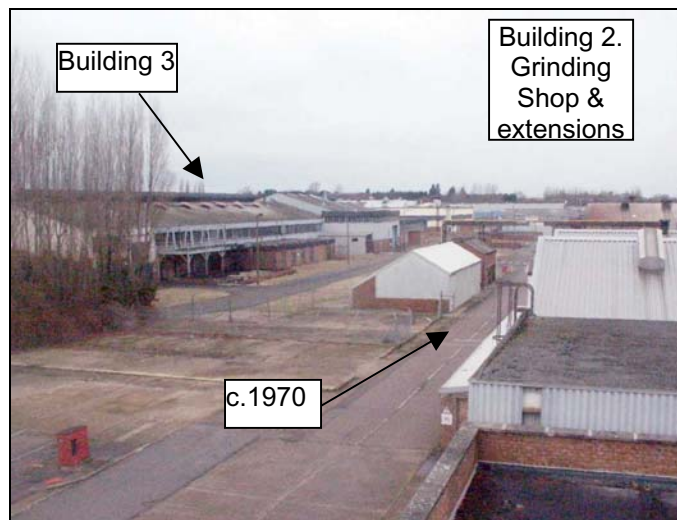
Growth in demand during the 1950s and 1960s led to the need for additional capacity and a number of developments took place during this period, notably at the south end of the Grinding Shop. Several additions were made during this period, including a double bay extension at the southwest corner, providing an additional 128 sq m of floor space. In *c.*1970 the small external area between the southern bay and the former Sales Service Department (below Section 5.5) was incorporated into the building and provided with a flat roof (Plates 34 and 49). The Swarf House (sections 5.2.21- 5.2.23) and adjoining corridor were demolished during the same period.

Until the mid 1960s the Grinding Shop was separated from the Hardening Shop by a strip of open land *c.*10m wide. It ran along the entire south side of the Hardening Shop and extended as far east as the central corridor of Building 2 (Figure 8). Additional capacity was subsequently provided in the grinding shop by roofing over the east part of this area, adjacent to the Apprentice Workshop, leaving only the south wall of the Hardening Shop exposed as an external wall.





**Plate 48:** Preparatory works for the 1947 extensions Cheltenham House (Publicity Dept). is visible in the background



**Plate 49:** The southwest part of the site. February 2005



**Plate 50:** The Grinding Shop with flat roofed extension to right. Feb. 2005



**Plate 51:** Auto Shop Swarf House. Former external windows of the Auto Shop north bay visible to right. Former east wall, partially demolished in 1994 visible in centre. Feb 2005



**Plate 52:** Auto Shop north bay, view towards original east elevation, which latterly formed the west wall of the swarf house. February 2005



**Plate 53:** North elevation of the Green and Black Stores. February 2005

### 5.3.5 *Auto Shop Swarf and Suds House (Figure 8)*

A significant development during the late 1960s was the construction of a separate swarf house for the Auto Shop (Plates 37, 51 and 52). It was added to the east end of the north bay, was constructed of brick with dimensions of *c.*16m east to west and *c.* 10m north to south. Suds continued to be drained off into the original swarf house (Building 10, Section 5.13). A separate suds house was constructed in 1994 to serve the Auto Shop (Plate 37).

### 5.3.6 *Apprentice Workshop/Green and Black Stores (Plates 43 and 53)*

The original Hardening Shop (below, Section 5.4), was a square building, entirely separate from Building 2. An open area, *c.* 55m north to south and *c.* 13m east to west separated the two buildings. This gap was filled in *c.*1960 when the Apprentice Workshop was constructed.

The workshop was a single bay building, extending from the north side of Building 2 to the south end of the Hardening Shop. External access was via a main entrance on the north elevation (Plate 53) and internal doorways were located at the north, south and west sides. The former external west wall of the Press Shop formed the east wall and the original external features of the Press Shop wall were retained in the new room (Plate 43).

Later, the apprentice workshop was relocated in the former Service Sales Department (below, Section 5.5.4). The original building then served as a storage area for parts entering the hardening shop (Green and Black Stores).

### 5.3.7 *Dispatch Department*

Towards the end of the life of the works the south side of the Grinding Shop was extended, in order to provide additional accommodation for the Dispatch Department. The new department extended from the east side of the former Service Sales Building to the Commissionaires Office on the west side of the Administration Block. It measured *c.*70m east to west and *c.*33m north to south and was constructed of red brick with cladding above and a flat roof (Plate 16). An entrance for vehicles was situated adjacent to the Commissionaires Office.

#### 5.4 *The Hardening Shop* (Figure 8; Plates 54-67)

- 5.4.1 The Hardening Shop was originally a free standing building and was constructed in late 1942. It was an original element of the factory complex and provided accommodation for furnaces and other equipment used in the hardening processes. Due to the hazardous nature of the processes taking place within it, it was originally constructed as a separate building, on the west side of Building 2.
- 5.4.2 The building originally comprised a rectangular brick built two bay structure with entrances on the north and south sides (Plate 56). It had its own power supply and a substation was installed beneath the floor in the southern part of the building (Plate 57). Due to increasing demand, the capacity of the building soon proved insufficient and an additional bay was added in 1949 (Plate 59). A further bay was added in 1950 (Plate 60) and the building reached its full extent when an extension was added to the north during the mid 1950s (Plate 61). The northeast corner of the building was partitioned off in *c.* 1985 when, in an attempt at further automation of the hardening process, two *Ipsen Furnaces* were installed (Plate 67).
- 5.4.3 Following completion of the 1949 extension the Hardening Shop covered an area of 3,100 square metres. It contained twenty five separate furnaces comprising thirteen 110KW *Carburising Furnaces*, seven 120KW *Rotary Hearth Furnaces* (Plate 58), two *Rotary Gas Carburisers* and three *Electric Refining Furnaces* (Woollen 1950b). All the electrical equipment, oil tanks, pipelines and pumps were originally in cellars and passages, where there was less risk of accidental damage. Access to the cellars was via a flight of stairs close to the south wall, where a stand-by compressor and substation were situated. The substation transformed the 11,000 volt supply down to 440 volts and had to meet a demand in excess of 1300 KWH. Cooling oil was originally pumped to roof height and gravity fed through a filter, to an oil cooler. Subsequently, underfloor pipes were installed and an oil pump was installed in a single storey extension on the west side of the building (Plate 66).
- 5.4.4 The hardening processes developed considerably as new technologies became available, but the first operation in the Hardening Shop was “potting up”. The untreated (green) components arrived from the Auto Shop (later the Stores) and were packed into microchrome pots with a carburising compound. The pots were then placed into the furnaces for heating. Smaller components were treated in the *Rotary Gas Furnaces*, where the packing could be simplified and which, as the components did not take as long to heat up, required a shorter heating cycle. *Rotary Hearth Furnaces* were later used for hardening smaller products. They were situated in the central part of the building and their position is indicated by the pits in the floor, visible in Plate 64.
- 5.4.5 Later in the life of the building, much of the heating was carried out in *pit furnaces* (Plate 63). These were situated in the south east part of the building, where a row of furnaces was located in a rectangular brick lined pit. The filled microchrome pots were lifted into the furnaces by a gantry crane and, after completion of the process, were transferred by the crane into quenching pots.

The hot product was then placed into adjacent oil filled quenching tanks for cooling (Plate 63). The oil for these tanks was fed through underground pipes from a pump room on the west side of the Hardening Shop. Drenching the hot product produced a considerable amount of steam, which escaped through ventilators situated above the quenching tanks (Plate 63). The ventilators contained filters which required regular renewal. Failure to do so resulted in the filters catching fire on a number of occasions and dealing with burning ventilators was a regular job for the *Timken Fire Service* (Ian Black *pers com.*). Quenching of the hot product from the *Rotary Hearth Furnaces* took place in separate *Quench Jigs*.

- 5.4.6 Once the parts had been quenched they were transferred to a *Degreasing Tank* for the removal of the quenching oil and subsequently to *Tempering Furnaces*. The latter were situated at the southwest corner of the building and the process released the stresses that had built up within the product.
- 5.4.7 The final process undertaken within the Hardening Shop was *Shot Blasting*. This took place on the west side of the building (Plate 65) where the product was blasted with an abrasive, in order to remove any remaining carburising compound.
- 5.4.8 A more recent addition at the northeast end of the Hardening Shop was the automated treatment works (Plate 67). This development took place towards the end of the life of the factory, and was a process designed to combine the individual elements of the heating process into a single automated operation. Components were placed on a conveyor belt and passed through two *Ipsem Furnaces*, where the individual processes took place. The full potential of this scheme was never fully exploited at Duston and the majority of the factory output continued to be treated using the traditional method.
- 5.4.9 The Hardening Shop also housed the Laboratory which latterly was situated in a partitioned area adjacent to the *Pit* and *Rotary Hearth Furnaces*. The laboratory had responsibility for quality control of the hardening processes and also examination of the raw tubes, bars and coils. Originally the laboratory housed the Photographic Section, but this was latterly accommodated in a house on the south side of Main Road, Duston.





**Plate 54:** South elevation of the Hardening Shop. 15<sup>th</sup> February 1943



**Plate 55:** South elevation of the Hardening Shop. February 2005

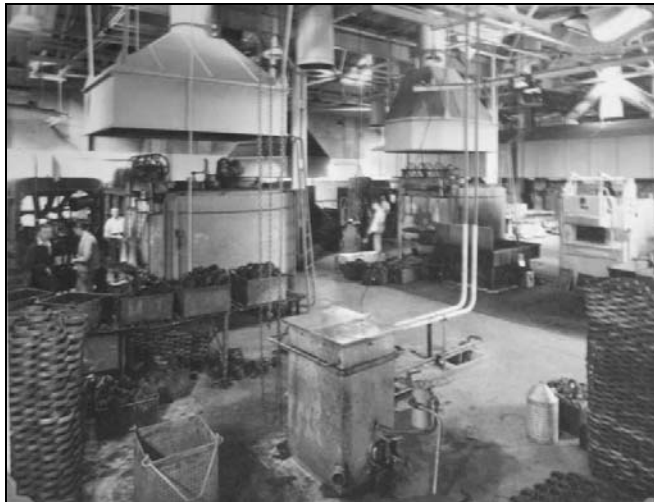


**Plate 56:** The original north elevation of the Hardening Shop under construction. 8<sup>th</sup> December 1942

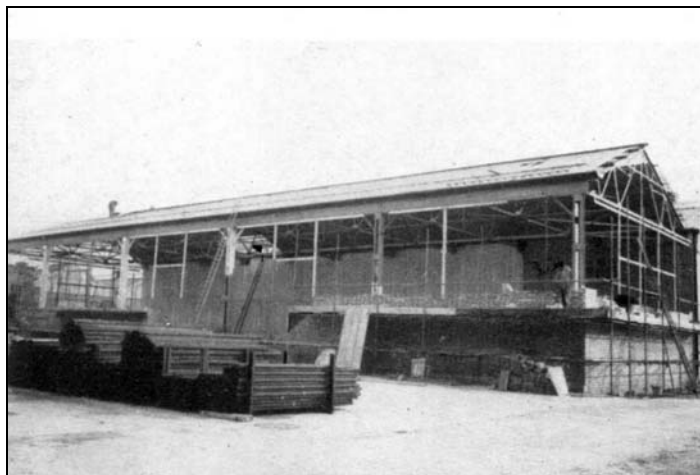




**Plate 57:** Constructing the Hardening Shop.  
The excavations for the Substation. 30 June 1942



**Plate 58:** Internal view of the Hardening Shop, showing  
the Rotary Hearth Furnaces. Aug 1943



**Plate 59:** The 1949 extension to the Hardening Shop under construction



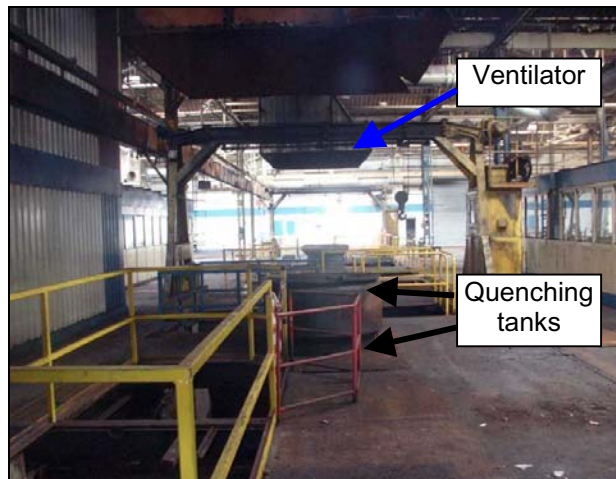
**Plate 60:** West elevation of the Hardening Shop following completion of the 1950 extension



**Plate 61:** West elevation of the Hardening Shop in its final form. February 2005



**Plate 62:** Site of the Pit Furnaces showing Gantry and Crane. February 2005



**Plate 63:** Site of the Pit Furnaces showing Quenching Tanks and Ventilator. February 2005



**Plate 64:** Sites of the Rotary Hearth Furnaces. February 2005



**Plate 65:** Site of the Shot Blaster. February 2005





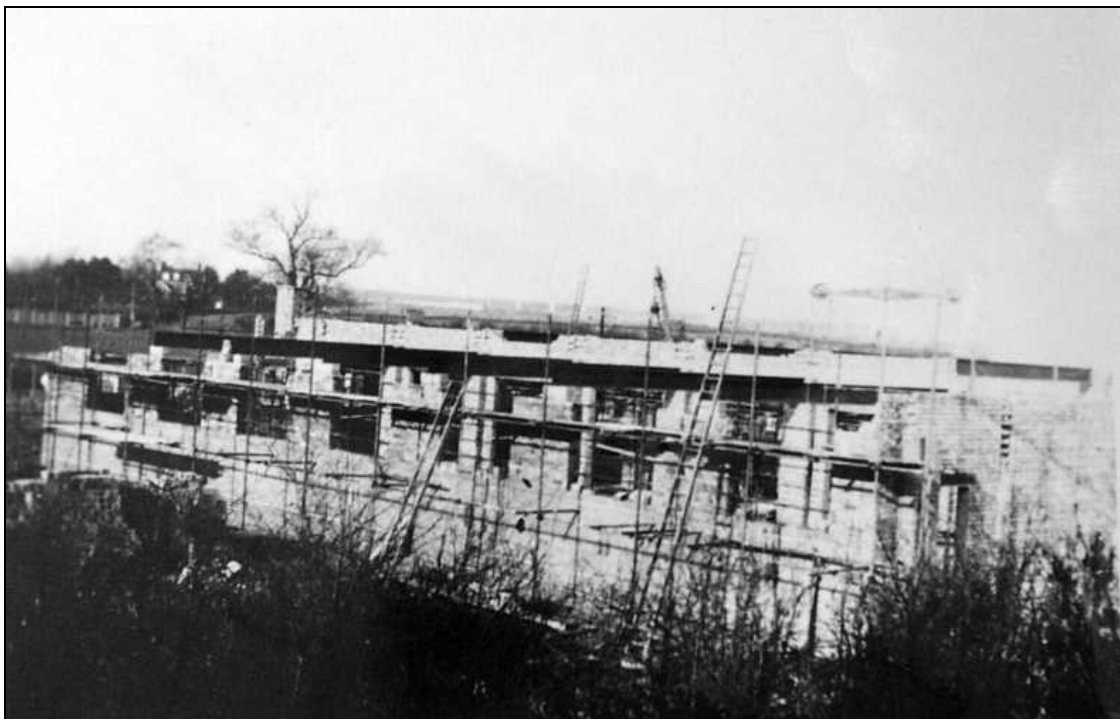
**Plate 66:** Oil Tanks and Pumps. February 2005



**Plate 67:** Site of the Ipsen Furnaces. February 2005

## 5.5 *Service Sales Department*

- 5.5.1 The Sales Division handled sales of bearings for installation into new vehicles or machinery. In 1944 the *Service Sales Division* was established, which handled sales of replacement bearings. A new purpose built building was constructed for this department in 1949, when the division was led by Arthur Bradford (Glassey 1951).
- 5.5.2 The building was situated close to the southwest corner of the main works. It was a red brick seven bay building over two storeys with a flat roof (Plate 69). A tower, similar to that on the west side of the Administration Block was located on the east side and allowed access to the roof (Plate 74). Due to expansion of the main works, the building became subsumed during the 1970s. The north wall of the building effectively became a dividing wall within the main works and a former window is visible in Plate 75.
- 5.5.3 Internally, the ground floor comprised a central area flanked by isles to north and south (Plate 70). The first floor, which occupied only the southern third of the building was carried on concrete columns, corresponding to the bays. A roof light was positioned over the central lower floor space. When first completed the first floor housed the Sales Office, and the ground floor accommodated the Boxing, Stores and Packing Departments (Plates 71-73).
- 5.5.4 In later years this building housed the Apprentice Training Workshop and machine repairs (Ian Black *pers com.*)



**Plate 68:** Service Sales Department under construction in 1949



**Plate 69:** South elevation of the Service Sales Department. February 2005



**Plate 70:** Ground Floor of the Service Sales Department. February 2005



**Plate 71:** Packing and Loading Department (1949)





**Plate 72:** Main Office on the First Floor (1949)



**Plate 73:** Receiving and Wrapping Department on the Ground Floor (1949)



**Plate 74:** Roof of the Service Sales Division. February 2005

5.6 *Building 3: Cold Form or 203 Dept and Heat Treatment (Plates 76-83)*

- 5.6.1 The early 1970s was a period of expansion at the factory and additional capacity was required for the production of cups and cones. Accordingly Building 3 was constructed on the west side of Building 2 for this purpose. It encroached onto the cricket pitch and measured *c.*125m north to south and *c.*25m east to west. It was a steel framed rectangular building of red brick partially faced with cladding (Plates 76 & 77).
- 5.6.2 Metal ingots entered the cold treatment works, which comprised the north half of the building. They were initially treated in a chemical bath (Plate 78) before passing into a separate area where they were formed into individual components in two presses, which were partially set into the ground, in the centre of the building (Plate 76).
- 5.6.3 Building 3 was provided with its own Suds House (Plate 83). Ducts carried the suds and swarf from the presses to the Suds House, which was situated on the east side of the building. The swarf was then separated and deposited into baskets which were hauled by an overhead gantry before being removed by lorry through an entrance on the east side (visible in Plate 83).
- 5.6.4 When the products had been formed, they were transferred to the south half of the building for hardening (Plate 82). This area was separated from the cold treatment works by a dividing wall and a variety of furnaces were used. Four pit furnaces were situated in a cellar in the north part of this area (Plates 80 and 81)) and additional rotary furnaces were situated at floor level. A further linear furnace was situated at the south end of the building. Products were transferred to the latter on a conveyor.
- 5.6.5 Following completion of the hardening, the products were shot blasted. The shot blasting machines were fixed to the walls of the building and no traces were visible at the time of the survey. On completion of the shot blasting the products were transferred to Building 2 for grinding.



**Plate 75:** Former external elevation of north wall of the Service Sales Department. Feb 2005



**Plate 76:** The south side of Building 3. February 2005



**Plate 77:** The east elevation of Building 3. February 2005





**Plate 78:** Chemical bath in Building 3. February 2005



**Plate 79:** The site of the presses in Building 3. February 2005



**Plate 80:** The rotary furnaces in Building 3. February 2005



**Plate 81:** The cellar in Building 3. February 2005



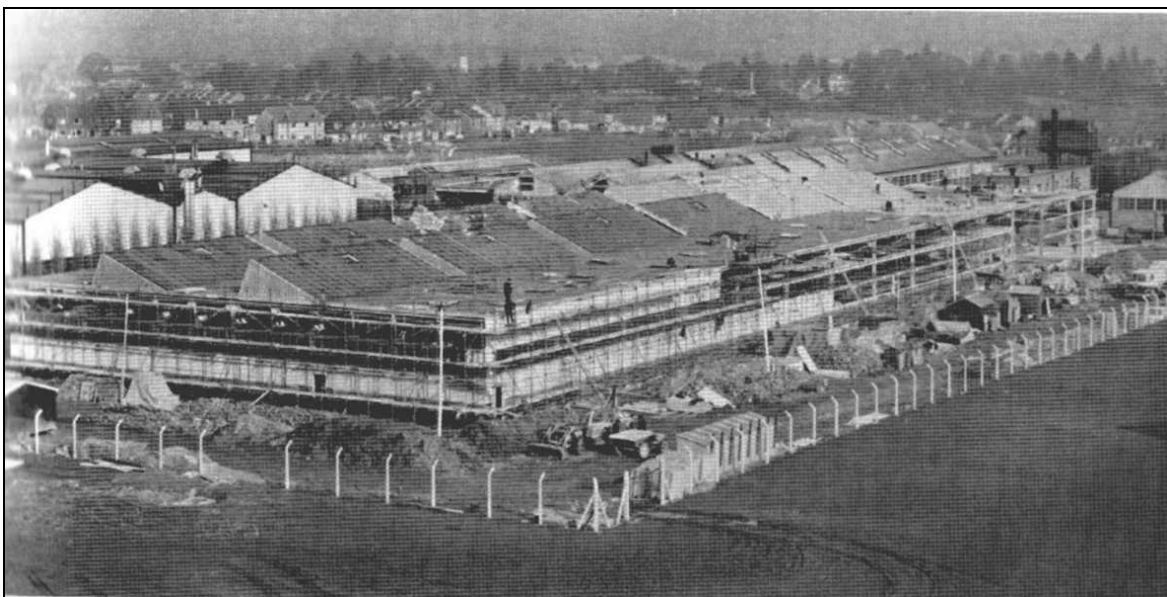
**Plate 82:** The south part of Building 3. February 2005



**Plate 83:** The Suds House in Building 3. February 2005

## 5.7 Building 4: Roller Grinding (Plate 84-90)

- 5.7.1 Building 4 was constructed in 1964 in order to provide additional capacity for grinding and finishing of rollers. It was situated north of Building 3 and west of Building 8. It comprised two bays and was constructed of red brick with metal cladding. Its long axis was aligned east to west and was c.143m long and, in its original form, was c.38m wide. Entrances were located on the south and east sides (Plates 84 and 85).
- 5.7.2 Site preparation commenced in September 1964 and the building was nearing completion by March 1965 (Plate 84). The majority of the building accommodated grinding machines. Ducts for the suds and swarf led beneath a partition wall in the east side of the building to a separate suds house, which occupied the northeast corner of the building (Plate 90). The suds house had its own entrance, on the east side of the building, which provided entry for lorries. A separate boiler house was also provided (Plate 89).
- 5.7.3 A number of extensions were made to the building from the 1970s, when additions were made to the south of the building in order to provide increased storage capacity (Plates 85, 87 & 88). The first phase of the addition comprised an extension to the west end of the south side of the building (Plate 87). This was extended to the east after 1971. The extensions were constructed of red brick with cladding of similar appearance to the original part of the building. Entrances were situated in the east and south walls and a gantry crane was provided (Plate 87).
- 5.7.4 In its final phase Building 4 accommodated thirty two separate lines. Parts were supplied for grinding according to the *Kanban Principle*. This was a Japanese technique whereby parts were supplied in batches, in order to meet only the immediate requirements. This avoided the need to store large quantities of parts in the roller grinding shop.



**Plate 84:** Building 4 under construction in March 1965





**Plate 85:** East end of Building 4 showing the southern extension. February 2005



**Plate 86:** Internal view of Building 4, looking east. February 2005



**Plate 87:** Internal view of the first southern extension of Building 4, looking west. Former external windows visible on wall on right. February 2005



**Plate 88:** The second southern extension of Building 4, looking east  
Blocked in windows and cladding of the former south wall visible on the left. Feb 2005



**Plate 89:** Internal view of the Boiler House, Building 4. February 2005



**Plate 90:** West side of the Suds House, Building 4. February 2005

## 5.8 *The Kanban Corridor*

5.8.1 The rollers produced in Building 4 were hardened in a separate building to the north (Building 5, below Section 5). The two buildings were linked by the 'Kanban Corridor', which ran from the northeast of Building 4 to the southeast corner of Building 5 (Plates 91 and 92). An external door was also situated at the north end of the corridor. It was constructed of red brick, had a flat roof and was lit by a continuous line of windows below the roof line.

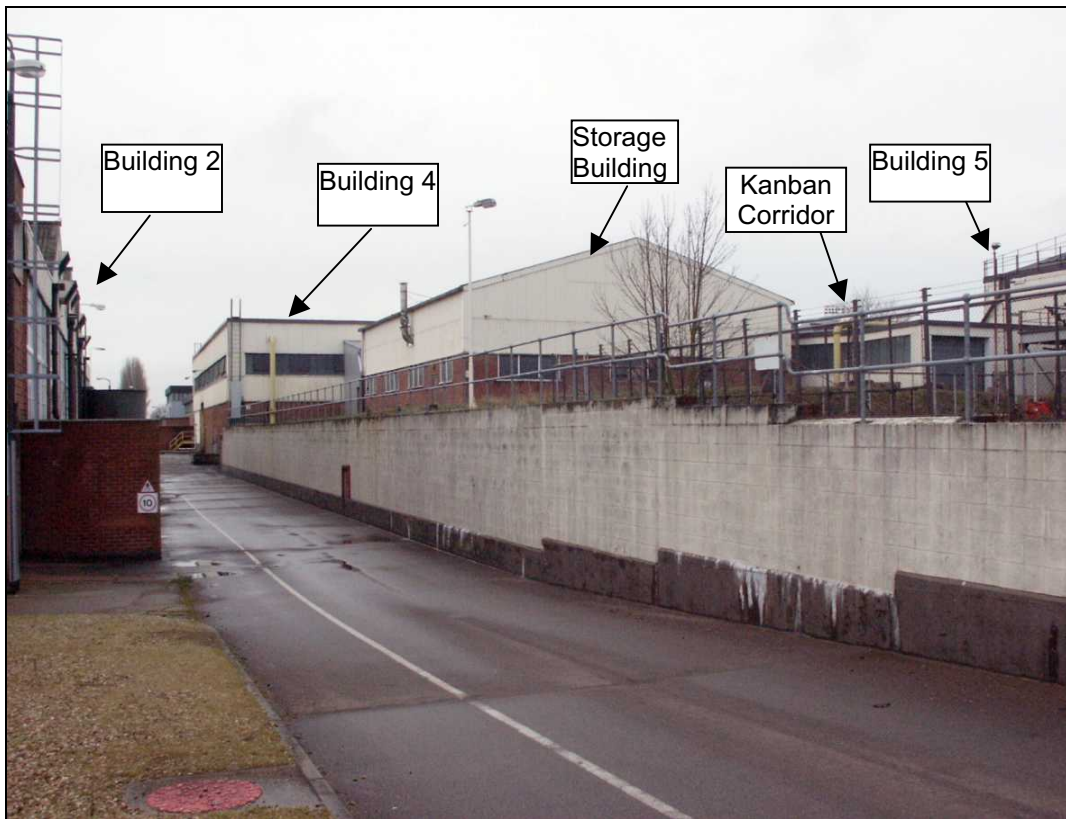


**Plate 91:** The 'Kanban Corridor' linking Buildings 4 and 5  
View looking north. February 2005

### 5.7.4 *The Storage Building*

A separate building was subsequently constructed on the east side of the corridor (Plate 93). It comprised a single bay with a sloping roof measuring *c.*17m by *c.*21m. It was of similar construction to Building 4 and a large gantry crane was situated in the centre. This building served as a storage building/holding area.





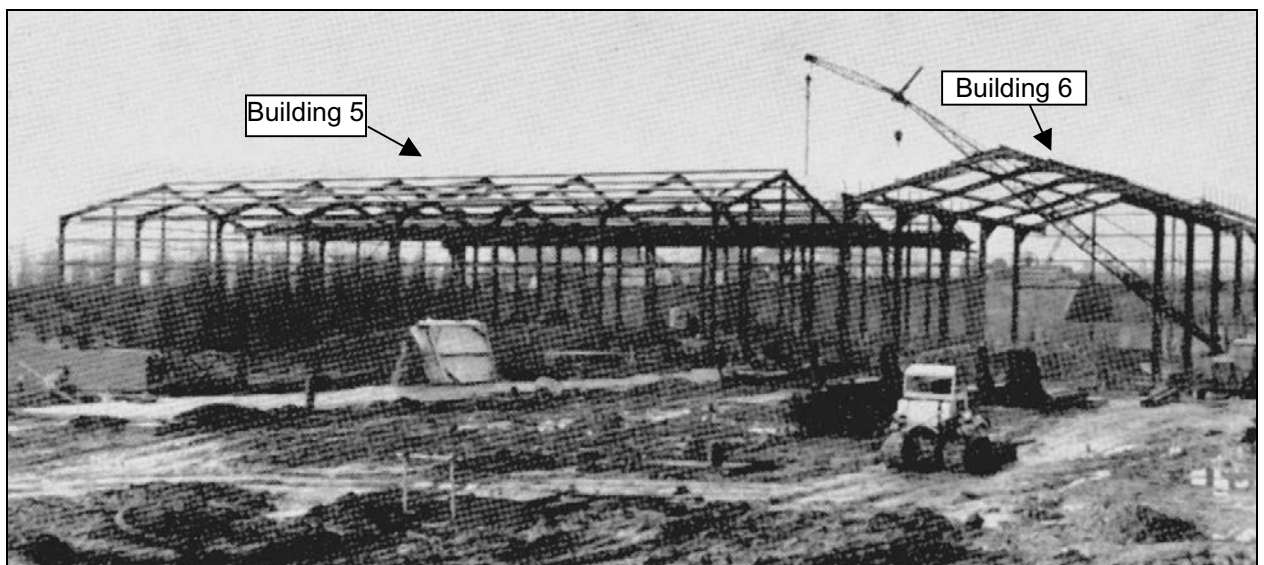
**Plate 92:** Building 3 and the Storage Building. February 2005



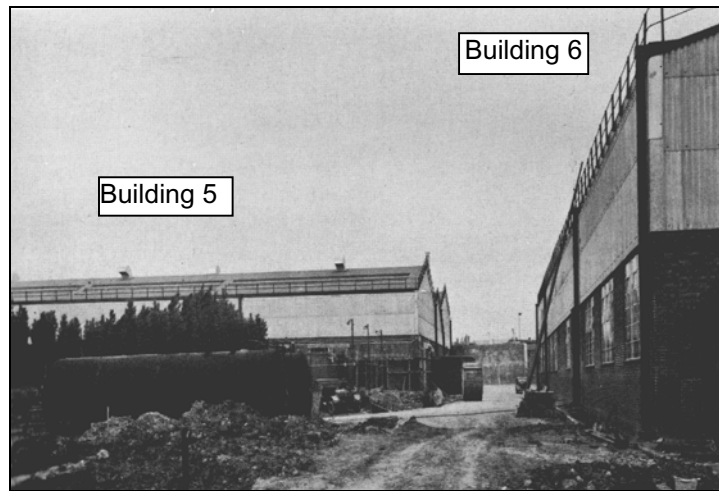
**Plate 93:** Storage Building between Buildings 4 and 5. February 2005

## 5.8 *Building 5: Roller Heating Shop* (Plates 95-99)

- 5.8.1 A major expansion took place at the site in 1960, when the Roller Heat Treatment Works (Building 5) and a new Cage Shop (Building 6) were constructed (Fig. 2). They were situated towards the north side of the site in an area of slightly rising ground. Consequently, terraces had to be cut in order to accommodate the new buildings, which involved the removal of 40,000 tons of earth (Timken Times Feb 1960, I).
- 5.8.2 Building 5 was situated north of Building 4 and south of Building 6 and was almost square measuring 55m by 53m. It comprised three bays and was constructed of red bricks on a steel frame with cladding above. Two entrances were located on the north wall, with an additional entrance, providing access from the Kanban Corridor, near the southeast corner
- 5.8.3 Internally, the building was divided into two separate bays by a north to south wall (Plates 98 and 99). Rollers were formed in the west bay, which was entered by its own door on the north side of the building. The green products were then loaded into baskets and transferred into the east bay, which accommodated the Roller Heat Treatment Works. Rollers were transported in two overhead gantries (visible on Plate 98) and placed into the furnaces, set into the floor. Two quenching tanks were situated north of the furnaces. Once the processes had been completed, the rollers were transported through the Kanban Corridor to Building 4 for grinding (section 5.7).



**Plate 94:** Buildings 5 and 6 under construction in 1960



**Plate 95:** Buildings 5 and 6



**Plate 96:** Aerial view of Building 5 in 1965



**Plate 97:** East elevation of Building 5. February 2005





**Plate 98:** The east bay (Heat Treatment Works) in Building 5. February 2005



**Plate 99:** West bay of Building 5. February 2005



**Plate 100:** The west end of Building 6. February 2005

## 5.9 *Building 6: Cage Advanced Package Bearings (formerly Cage Shop) Plates 100-103*

- 5.9.1 Building 6 was situated north of Building 5 and both buildings were constructed in 1960 (Timken Times Feb 1960, I). It was built in red brick around a steel frame with boarding above. In their original form the buildings were built in similar styles, but the appearance of Building 6 was radically altered by the later application of full height multi-tone blue cladding (Plates 100 and 101).
- 5.9.2 Building 6 was originally a two bay rectangular structure, aligned east to west. Its original dimensions were 96m east to west by 35m north to south. The south bay was 8.85m high to the eaves, while the north bay (later central) was 6.7m to the eaves.
- 5.9.3 The building was constructed as part of a wider scheme of expansion at the works and provided additional capacity for the manufacture of cages. Minor modifications were made during the 1970s, notably when a half width extension was added on the east side. This extension was subsequently removed, during a major expansion of the building, when a third full length bay was added on the north side of the building.
- 5.9.4 The expansion of Building 6 was associated with its conversion, in 1998, as a plant for the production of specialist bearings. It became known as the *Advanced Package Bearings Plant* and produced specialist bearings usually of larger sizes, notably for use in Volvo trucks.



**Plate 101:** View of the east end of Building 6. February 2005



**Plate 102:** Internal view of Building 6, looking west. February 2005



**Plate 103:** Internal view of Building 6, looking east. February 2005



**Plate 104:** Building 7. View of the south facing elevation. February 2005

## 5.10 Buildings 7 and 7a Continuous Line Works (New Building) Plates 104-109

- 5.10.1 Building 7 was situated north of Building 8 and east of Buildings 4 and 5 and originally comprised an east to west aligned building constructed in red brick. In its final form it was c.117m east to west by c. 52m north to south, with a substantial addition to the northwest (Figure 106). It was constructed in 1952 amidst considerable secrecy and provided facilities for continuous production of bearings at extremely high rates in as nearly an ideal environment for the employees as possible (Pruitt 1998, 210). The principle was known as the *Bucyrus Concept*, after the U.S. Timken factory at Bucyrus in the United States where the method was first developed. Known initially as the *New Building*, it was the first continuous line works of its type in Europe (I Black, *pers com*).
- 5.10.2 The building has a complex sequence of development, but originated during the 1950s as two separate buildings (Buildings 7 and 7a; Plate 106). A third building, which occupied the site of the later north extension was subsequently demolished. The original main building comprised three bays and was c. 95m east to west by c.32m north to south. It was constructed to accommodate further automated production capacity and expanded as demand grew during the 1960s and 1970s.
- 5.10.3 A separate building (7a) was constructed close to the north side of Building 7 by 1964 (Plate 106). It was aligned east to west with dimensions of c.5m by c.6m and was constructed of red brick with a flat roof. The west end had a raised roof with a skylight.
- 5.10.4 The buildings developed during the 1960s and the layout in 1969 is shown on Figure 6. Building 7a was extended to the north and, by 1984, additional flat roofed bays had been added on the north and south sides of Building 7 (Plate 106). The east end was also extended. Towards the end of the life of the factory a new one and a half bay red brick building was constructed on the north side of Building 7a which functioned as the Tool Shop.

### 5.10.5 *The Manufacturing Process*

Raw material, in the form of billets, entered the west side of the building, where the green parts were formed in the Auto Shop (below, Section 5.10.6). They then passed to the central room known as the 'Taub Shop' where the green parts were machined. Once the latter operation had been completed, the parts were then transferred back to the west room for hardening in the 'hot forge', which was situated on the south side of this room (Plate 105). Once hardening was completed, the black parts were then transferred to the east side of the building for final assembly and finishing.

### 5.10.6 *Building 7 Auto Shop* (Plate 107)

The west end of Building 7 comprised the Auto Shop. It was a rectangular room measuring c.31m north to south and c.20m east to west opening to a corridor to the south. Entrances were in the north and west walls and a gantry crane was present in the open corridor area, on the south side of the area. An



additional entrance and the 'hot forge' was latterly added at the southeast corner of the building, adjacent to this area (partially visible in Plate 105).

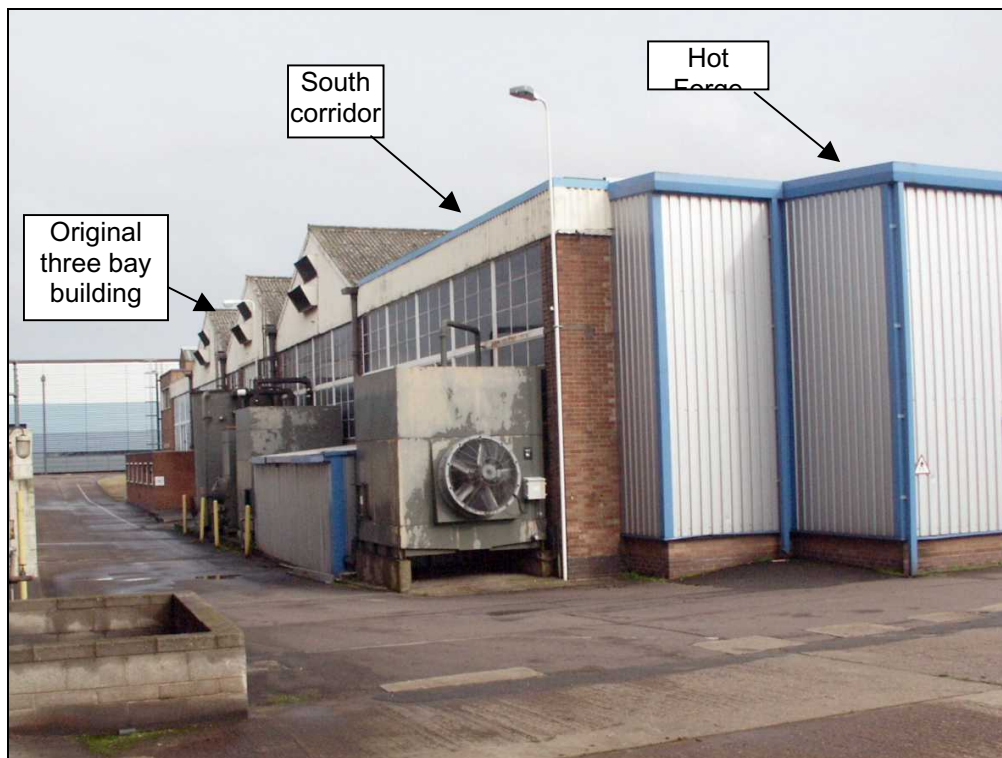
#### 5.10.6 *Building 7 central area* (Plate 108)

The east half of the building was partially separated from the central area by a partition wall. This extended across approximately two thirds of the width of the building and was constructed in brick with internal windows above.

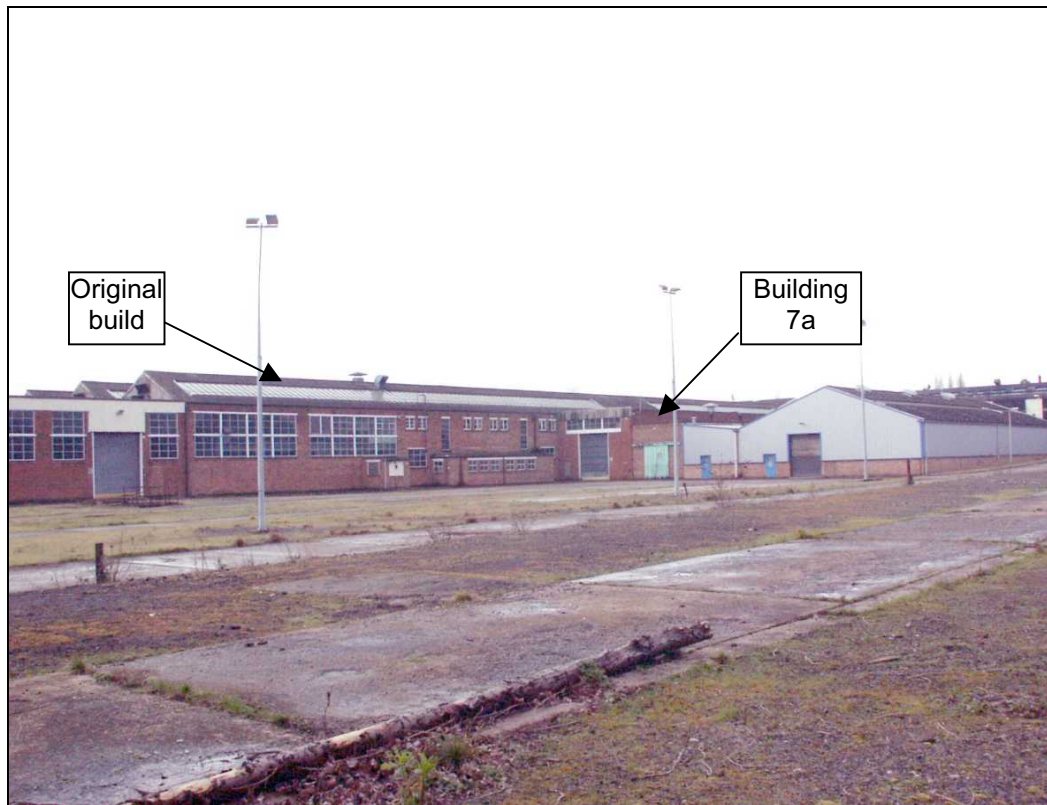
5.10.7 The central area was the green machining shop. It comprised a rectangular room measuring *c.*32m north to south and *c.* 11m east to west. Doors were present in the north and east walls. There was no south wall to this area. The wall line would have followed the line of the original south wall of the building had been removed in this area when a new flat roofed open to a corridor was constructed along the entire south side of Building 7. The latter linked the three principal areas of Building 7 and was a later addition to the building (section 4.7.4).

#### 5.10.5 *Building 7 east area* (Plate 109)

The east side of Building 7 comprised the main works (Plate 109). It accommodated a number of production lines and, following completion of the additional flat roofed bays was *c.*86m long and *c.*52m wide. It had its own administration area, in raised offices on the south side of the building.



**Plate 105:** West facing elevation of Building 7. The three bays of the original building visible in the centre. February 2005



**Plate 106:** Building 7. The north facing elevation with northern extensions to right. February 2005

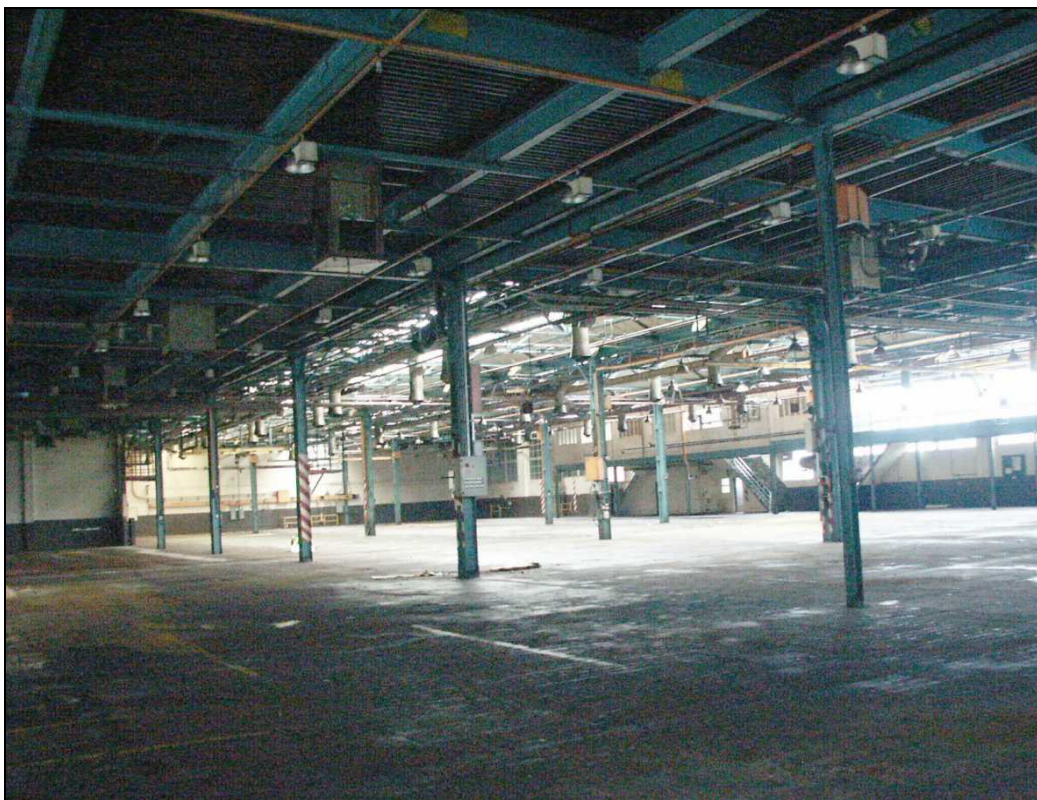


**Plate 107:** The Auto Shop in Building 7. February 2005





**Plate 108:** The 'Traub Shop' (green machining) in Building 7. February 2005



**Plate 109:** The east room in Building 7. February 2005

## 5.11 *Building 8: Maintenance*

Building 8 was situated north of Building 2 and south of Building 7 (Figure 2) and was constructed in two phases, referred to as Building 8A and Building 8B.

### 5.11.1 *Building 8A (Tube Store)*

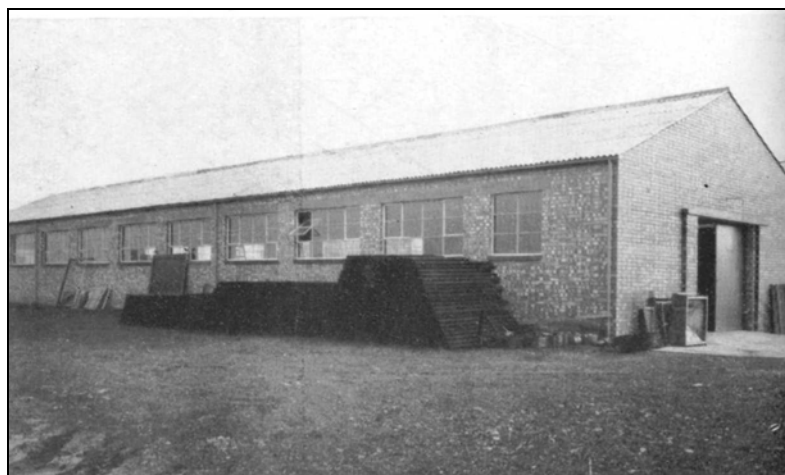
Building 8A was a single bay rectangular red brick building measuring *c.*43m east to west by *c.* 11m north to south (Plates 110 & 112). It had a tile roof and entrances centrally placed on the west elevation and offset to the south, on the east elevation. The north and south walls contained six and twelve light windows and the building was constructed in 1949 for the storage and inspection of steel tubes and other raw materials, prior to their delivery to Building 2 (Timken Times, Dec 1949, 4).

### 5.11.2 *Building 8B*

The building was extended during the mid 1950s, when an additional bay was added on the north side (8B; Plates 111, 114 and 115). This was marginally longer than the original bay (*c.*43m) and higher (*c.*7.9m). The east part of the original north wall of the south bay was partially removed, allowing access between the two areas.

## 5.12 *The Fire Station*

5.12.1 During the 1950s a red brick building was constructed adjacent to the east end of the northern bay (Plate 113). It had a flat roof with a central light well and measured *c.*7m by 11m. It latterly accommodated the site fire engine and a scaffold tower was situated to the north. The original fire station had been situated north of the Hardening Shop and the scaffold tower was transferred from the original location during the 1990s (I. Black, *pers com*).



**Plate 110:** The Tube Store shortly after completion in 1949



**Plate 111:** The west elevation of Building 8. February 2005



**Plate 112:** Building 8 south and west elevations. February 2005



**Plate 113:** Building 8 east end with later fire station. February 2005





**Plate 114:** Building 8 internal view looking west. February 2005



**Plate 115:** Building 8B internal view looking east  
Former north wall of Building 8A to right. February 2005



**Plate 116:** West elevation of Building 9. February 2005

### 5.13 *Building 9A and 9B: Research and Development & Metals Laboratory*

Building 9 was situated north of Building 1 and east of Building 2 (Figure 2). It comprised two separate red brick buildings, constructed *c.*1958 (Timken Times 1959 June, 2).

#### 5.13.1 *Building 9A: Physical Laboratory*

Building 9A was a single storey red brick building constructed in 1959. It was aligned north to south and measured *c.* 113m north to south and *c.*18m east to west. It comprised two main rooms and a number of minor internal subdivisions were present. A small pump/suds house was subsequently added near at the south end of the building. The main entrance for personnel was at the north end and two entrances, equipped with steel roller doors were located along the west elevation (Plate 116). Both rooms were provided with overhead gantries.

The primary function of the physical laboratory was testing the physical behaviour of metals used in the manufacture of bearings in the works. The building accommodated a large number of test rigs, the largest of which was the *axle deflection rig*, which tested automotive rear axles under high transmission loads. Fatigue testing was also an important element of the work.

#### 5.13.2 *Building 9B: Chemical and Metallurgical Laboratory*

The Chemical and Metallurgical Laboratory was situated immediately south of the Physical Laboratory. It was a three bay, two storey building, constructed of red brick. It had dimensions of *c.*25m by *c.*18m. Two main doors were situated on the west side of the building, and a third pedestrian entrance was on the south side (Plate 120).

The purpose of the Metallurgical Laboratory was the testing of the chemical behaviour of the raw materials (Plate 121). The ground floor comprised the metallurgical laboratory, where each consignment of raw materials was tested for magnetism, hardness, sulphur and acid etching. Microscopic examination of heat treated parts was also undertaken.

The first floor accommodated the Chemical Laboratory. This housed apparatus for chemical testing, including *Spekker Photoelectric Absorptiometers* and equipment for determining the level of carbon in the steel. Work on the development and testing of lubricants was also undertaken.





**Plate 117:** The Physical Laboratory shortly before demolition. 20th June 2005



**Plate 118:** South room in Building 9. February 2005



**Plate 119:** North room in Building 9. February 2005



**Plate 120:** External view of the Metallurgical Laboratory. February 2005



**Plate 121:** The internal layout of the Metallurgical Laboratory. Metallurgical Laboratory on the ground floor. Chemical Laboratory above. Feb 2005

### 5.13 *Building 10 (Suds House) and Catchment Pits*

5.12.1 Building 10 was situated to the north of Building 2 (Figure 2). It was the original Suds House and was a primary feature of the original factory, built in 1942 (Plate 122). It was constructed of red brick and originally measured c.12m northwest to southeast by c.13m northeast to southwest. It had a flat roof and a window on the northeast and southeast elevations. The building was subsequently extended to the northeast, when it attained a length of c.16m. A small pumping station/valve house was situated to the southeast.

5.12.2 The suds, swarf and overflow water left Building 2 through ducts and were fed through to the suds house and catchment pits (balancing ponds) respectively, which were all at a slightly lower level than the main works buildings. The balancing ponds were situated to the east and north of the suds house and were where runoff and waste water collected, prior to filtering. The first catchment pit was an irregular feature north of the main factory complex. It was on the same site as a former limestone quarry (above, section 3.6) and is shown on the 1950 Ordnance Survey map (Figure 5). A Settling Pond was constructed adjacent to the suds house by 1964 (Plate 125).



**Plate 122:** Building 10 under construction in 1942





**Plate 123:** North East elevation of Building 10 (later Extension visible to right). February 2005



**Plate 124:** Internal detail of Building 10. February 2005



**Plate 125:** The Catchment Pits. February 2005

5.14 *Sports and Social Facilities (Figure 2)*

- 5.14.1 The factory at Duston was set in extensive open grounds and a range of facilities for sport and other activities was provided. The Timken show ground was situated in the field on the west side of the buildings and is disused in Section 7.
- 5.14.2 Athletics, cricket and football took place on the factory fields on the west side of the works. The company also owned a smaller area of land on the northeast side of the suds house where, in 1949, a bowling green was laid out. Bowling was a popular pastime during the 1950s and 1960s and the bowling green was made available to the general public in 1966 when it was purchased by the local authority. In return, the local authority made an area of land beyond the north side of the available to the company, where a number of sports and social facilities were constructed (Figure 2).
- 5.14.3 The bowling green was immediately relocated to the new site and a pavilion for the Social and Athletic Club was constructed in 1968. A tennis court was constructed at the same time and the pavilion was extended in 1976. Facilities for archery were also provided.



**Plate 126:** The tennis court. 20<sup>th</sup> June 2005



## 6 The Manufacturing Process

6.1 This section provides an account of the manufacturing process at the site. The initial sections describe the background and manufacturing processes of the individual roller bearing components. The third section reconstructs the manufacturing process across the site.

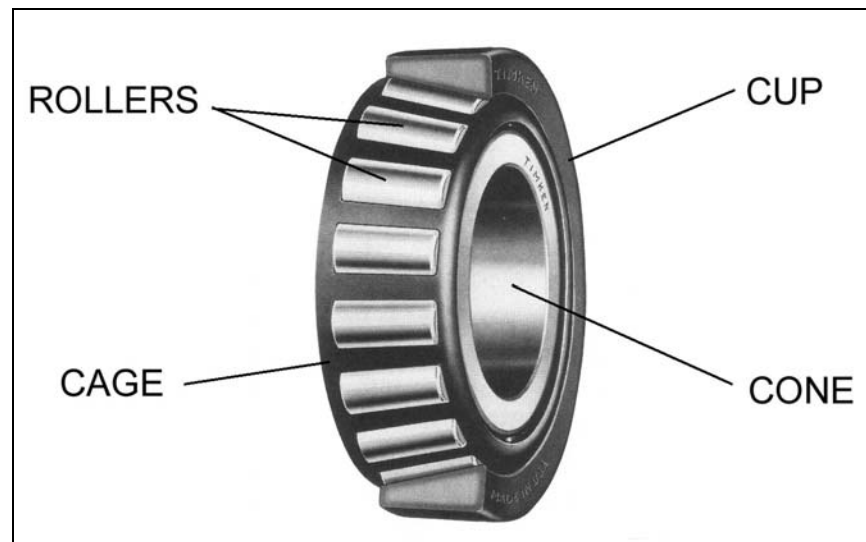
### 6.2 *Background*

6.2.1 There are essentially four types of rotary bearing used in machinery: plain, ball, plain roller and tapered roller bearings. Plain bearings require skilled fitting and constant maintenance, and are not suited to thrust or high speed running. Ball bearings are also not suited to thrust, but can run at higher speeds. Plain roller bearings have a greater bearing surface area, so they can cope with greater loads. Tapered roller bearings can carry greater loads at high speeds. Their taper allows them to cope with thrust, and permits adjustment for wear. The British Timken factory at Duston only ever manufactured tapered roller bearings.

6.2.2 The advantages of roller bearings were evidently recognised at an early stage, as by the late 19<sup>th</sup> century over thirty European and American patents on tapered roller bearings had been granted, the earliest dated 1802 (Pruitt 1998, 25). None of these proved commercially successful, as there were a number of design problems that remained unresolved. The rollers had a tendency to creep up the cone, causing the roller ends to rub against a constraining surface, creating friction and increasing wear. To counter this, restraining ribs were added to the cone, but these caused the rollers to skew with much the same effect. There were also technical difficulties in producing components, notably the rollers, to accurate and consistent dimensions.

6.2.3 In June 1898 two patents on tapered roller bearings were issued for designs by American engineers Henry Timken and Reginald Heinzelman. Their design employed thin cylindrical rollers between the tapered rollers to eliminate skewing, and was adjustable for wear. By 1899, when they went into commercial production, the intermediate rollers had been replaced by a cage which held the rollers in alignment, and prevented creep and skewing (*ibid*, 27).

6.2.4 A basic single row tapered roller bearing has four elements (Figure 9). At the centre of the bearing, normally a close push fit on the shaft that it supports or the axle it turns on, is the *cone* (A). This has a parallel inner face and a tapered outer face, with a thrust flange at its wider end. On the outer face run closely spaced tapered *rollers* (B). These are held in place by a pressed metal *cage* (C), which may be either separate, or retained on the cone by a smaller flange at the narrow end. The final element, the *cup* (D) is a ring with a tapered inner bearing surface that fits over the caged rollers. The cup is normally a tight press-fit in the machine body or in the hub that turns on the bearing.



**Figure 9:** The principal components of a Timken Tapered Roller Bearing

### 6.3 *Manufacturing the Bearings: Cup & Cone*

6.3.1 Two methods of manufacturing the cup and cone were employed at Duston. The first involved turning the cup and cone from solid round-section steel bar. Alternatively, the basic shapes were pressed cold from chemically treated steel billets. The tapered raceways, flanges and other elements were then turned on a lathe, and the manufacturer's name and part number are stamped on. This initial stage of manufacture was known as **Green Machining**. The machined cups and cones were then transferred to the **Green Store**, to await the hardening process.

6.3.2 Hardening the cups and cones involved bringing them to red heat, and then quenching them in an oil bath. The hardened cups and cones were then degreased. The resulting **Black** products then passed to tempering furnaces, where they were heated to release stress. The products were then shot blasted to remove accumulated scale and carbon deposits. The hardened cups and cones were then moved to the **Black Store**, to await the final stage of manufacture. This involved grinding the cup and cone to their final dimensions. The tapered bearing surfaces were ground first, then the outer diameter (cup) and inner diameter (cone).

### 6.4 *Manufacturing the Bearings: Rollers & Cage*

6.4.1 Rollers are produced from steel rod, and turned to the appropriate diameter. Like the cup and cone, they are hardened by heating to red heat, then quenching in oil. The bearing face of each roller then has to be ground to a taper, to a tolerance of 0.0005", and a bearing surface has to be ground on the end of the roller that runs against the thrust rib on the broad end of the cone. The cage is pressed from steel tube in a single operation.

### 6.5 *Manufacturing the Bearings: Assembly*

6.5.1 The components of the bearing are brought together in the assembly shop. The rollers are placed in the cage, which is then pressed onto the cone. The cup is

added, and the bearing is inspected. Finally, the complete bearing is packed in oiled brown paper and boxed for shipping.

## 6.6 *The Manufacturing process in Building 2 (Figure 8)*

6.6.1 Production of roller bearings at Duston was centred around Building 2. The following section provides an overview of the production process in this building. It is largely based on the accounts of two former employees of the company and as the pattern of production changed considerably over the life of the works, it refers to production in the period immediately before closure in 2003.

6.6.2 The manufacturing process followed a straightforward plan, where steel entered the works, passed through four main areas: Auto Shop, Grinding Shop, S.C.M. and Matched Bearings. The finished products emerged from the Dispatch Department on the south side of the works.

### 6.6.3 *Auto Shop*

The raw material, in the form of steel tube entered Building 2 into the Auto Shop. This occupied the five east to west bays on the northeast side of the building which had formerly accommodated the press shop. The tube was turned on spindle machines which produced the cups and cones.

### 6.6.4 *S.C.M*

From the Auto Shop, the unhardened, or green, components passed into the S.C.M. area. This area was the former press and assembly shop and occupied the five bays in the north central part of the building. Three main processes took place in this area. The cups and cones were fed into a chamfering machine where they were pressed into the required shape. They then travelled on a conveyor belt to a ten ton marking press, where identifying information (Timken name, part number, etc) was stamped onto the surface. They then returned to the conveyor belt and transferred to the west end of the area, where they were placed into metal baskets. A hoist was used to lift the filled baskets for onward movement into the Green and Black Stores.

### 6.6.5 *Green and Black Stores*

The Green and Black Store had been constructed as the apprentice workshop and was located on the east side of the Hardening Shop. The parts passed from S.C.M. through an entrance on the northeast side of the stores building and were temporarily stored in baskets on the east side of the building.

The green parts passed into the Heat Treatment Works, where they were hardened (above, Section 5.4) and then returned to the stores as *black* or hardened products.

#### 6.6.6 *The Grinding Shop*

The black parts passed from the stores into the Grinding Shop. This was the largest area in the building and occupied the seven bays in the southwest area. It accommodated the grinding machinery and also the assembly area.

*Cup Grinding:* The grinding process consisted of several separate operations, all of which took place in the Grinding Shop. The grinding machines were arranged in rows along the length of the area. The machines were supplied with suds through overhead pipes and the waste suds and swarf ran off in ducts to the swarf house. The grinding operations comprised face and OD (outside diameter) grinding. When the OD grinding was completed the cups were inspected and packed, before passing to the assembly area.

*Cone Grinding:* The grinding of cones took place in a similar way to that for cups. The operations took place individually and comprised raceway grinding; ball grinding and rib grinding. Once these had been completed the cones were then honed and passed on for inspection.

#### 6.6.7 *Matched Bearings*

The southeast part of Building 2, originally constructed as the tool room, provided accommodation for the production of *Matched Bearings* (i.e. opposing bearings on axles). This was a more specialised process and during the later period in the life of the factory, work was dominated by production of larger size bearings for the railway industry, which had previously taken place at Daventry. The French railway company SNCF was an important customer.

Components were produced in the east side of the area, transported to the Hardening Shop and then returned for grinding and assembly. A number of areas were subdivided from the main shop area and provided accommodation for more specialist tasks. For example, a room for quality control and measurement was provided on the south side and a room housing the Audit Department was situated at the east end. In addition, a large storage area was later added on the north side and a snack canteen on the south side of the area.

#### 6.6.8 *Dispatch*

Once the bearing had been completed and checked, it passed to the dispatch area. This was located on the south side of the grinding shop in an extension built specifically for the purpose.

The finished products were greased before being individually wrapped in greaseproof paper and then packed into cardboard boxes. Access for delivery vehicles was through doors on the east side of the area, adjacent to the security office.



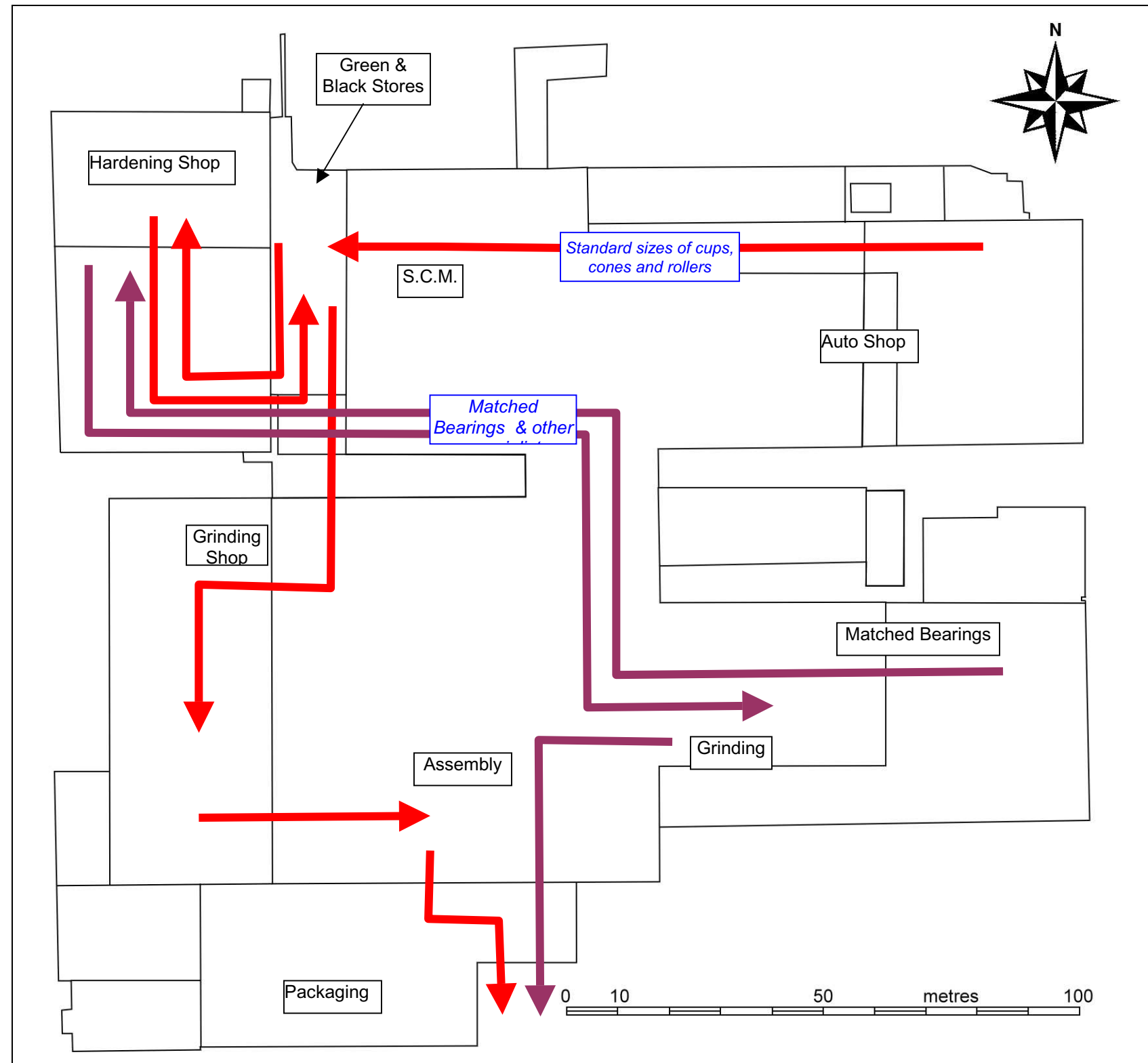


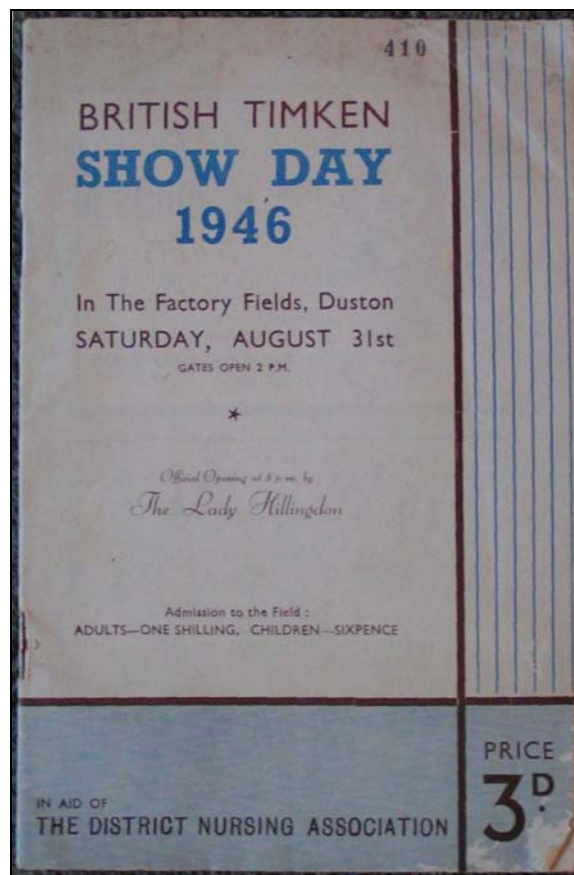
Figure 10: Schematic Representation of the Assembly Pattern in Building 2

## 7 The Timken Show

- 7.1 The Timken Show was one of the major social events in Northamptonshire and by the 1960s it attracted international attention. It originated in 1945, when the first show was planned as a peace celebration to mark the end of the Second World War. It took place on 8<sup>th</sup> September 1945 on seven acres of rough pasture land on the west side of the factory.
- 7.2 For the first few years the centre of attraction was the Horticultural Show, organised by the *Horticultural Society*. In the 1940s and 1950s organisation was in the hands of C R Newcombe (Horticultural Show Secretary), Duston's Director of Personnel Mary Finch and Lt-Col A T Roper-Caldbeck (Show Day Secretaries).
- 7.3 From the modest event in 1945 the show flourished and in 1946 included displays of Timken Bearings, Timken equipped agricultural machinery, a boxing match and an acrobatic exhibition (Pruitt 1998, 153). It became a two day event in 1949. Coaches transported staff from the Aston factory and between 1951 and 1967 attendances rose from 9,600 to 40,700. The original show in 1945 attracted 700 entries. This rose to 2,707 in 1955.
- 7.4 The forerunner of the later famous horse show was, in 1945, a one man act given by a member of the works police on a borrowed horse which he had trained in an adjacent field. It later attracted both local and nationally recognised entrants. Pat Smythe, Alan Oliver and Ted Williams were regular competitors during the 1950s. The first dog show made its debut with three spaniels and a bull terrier. It was subsequently run by the *Northampton and District Canine Society* and became a nationally recognised event. The Livestock Show, organised by the *Northamptonshire Federation of Young Farmers* was also popular (Timken Times Sept/Oct 1959, 38).
- 7.5 The show was televised in 1957, initially by the BBC and latterly by ITV, and it generally received a two hour slot on Saturday afternoons.
- 7.6 The Timken Show was essentially a product of the enthusiasm of the British management and staff. This enthusiasm was not fully shared by the American management in the 1970s and the last show took place in 1978. Plans were made for a show in 1979, but following a strike by electricians at the works, the show was cancelled. The stadium was subsequently demolished and part of the ground was sold for housing. Two of the streets on this housing estate are named *Javelin Close* and *Rosette Close* and act as a reminder of the show and the contribution that it made to life in Northamptonshire and beyond for much of the second half of the twentieth century.



**Plate 127:** Mary Finch and C R Newcombe planning the 1947 Timken Show



**Plate 128:** Cover of the 1946 show programme



**Plate 129:** Timken Show 1951. View of the jumping area. This area latterly occupied by Building 3. Building 8 and Hardening Shop in background



**Plate 130:** Timken Show 1951. Livestock



**Plate 131:** Timken Show 1957



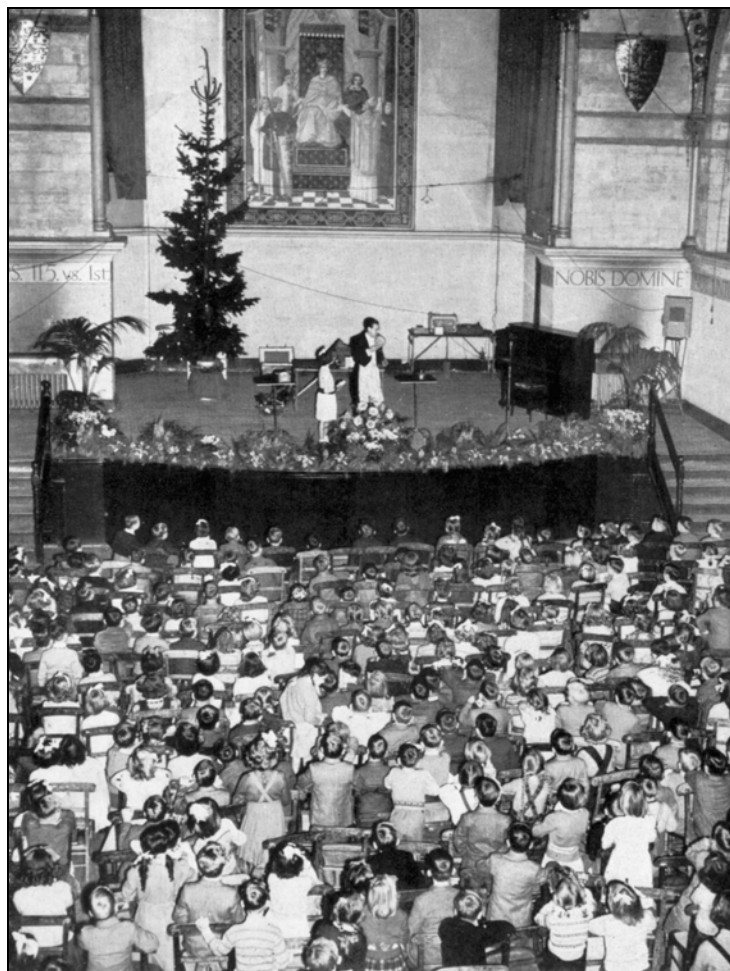


**Plate 132:** Aerial view of the 1959 Timken Show

## 8 Miscellaneous

### 8.1 Clubs and Societies

- 8.1.1 The management of British Timken had a policy of encouraging their employees to pursue their interests and sporting activities to the full. Sir John Pascoe was a keen sportsman himself and under its British managers the company invested substantially in social and sporting facilities for the staff.
- 8.1.2 The British Timken show was organised by the *Horticultural Society* (above, Section 7) and many of the sports and social activities were organised under the auspices of the *British Timken Social and Athletic Club*. Membership of the club was open to all company employees and it operated at both the Duston and Daventry plants. A pavilion on the north side of the site was provided for the club in 1968 and in later years the club received sponsorship from John Smith's and Fosters breweries.
- 8.1.3 Each sport and activity had a separate section. For example, in 1964 the Duston branch had eighteen separate sections, with interests ranging from amateur radio, sport of all kinds and winemaking. An annual Christmas party for employees' children was also organised (Plate 133).



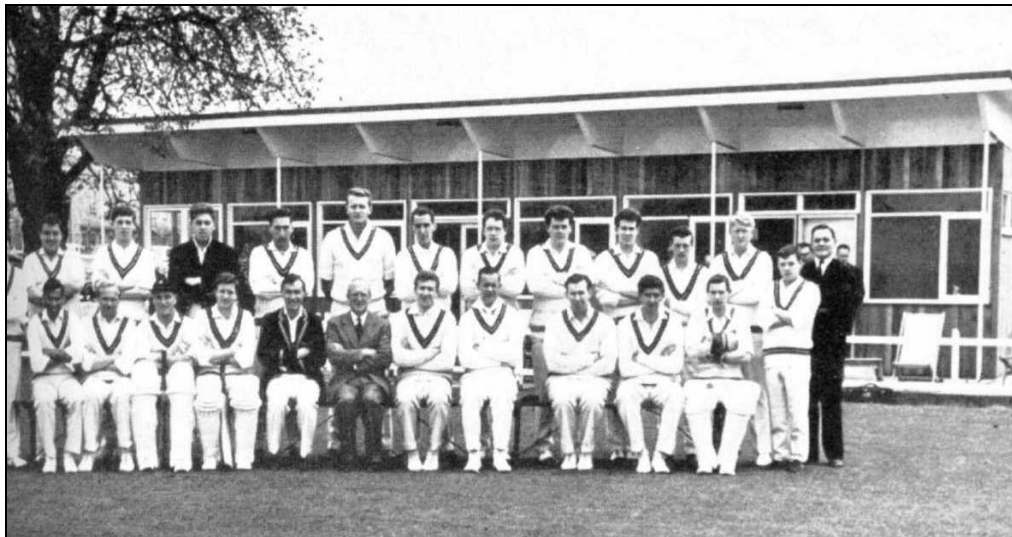
**Plate 133:** The 1951 Children's Christmas party in the Guildhall, Northampton

#### 8.1.4 Cricket

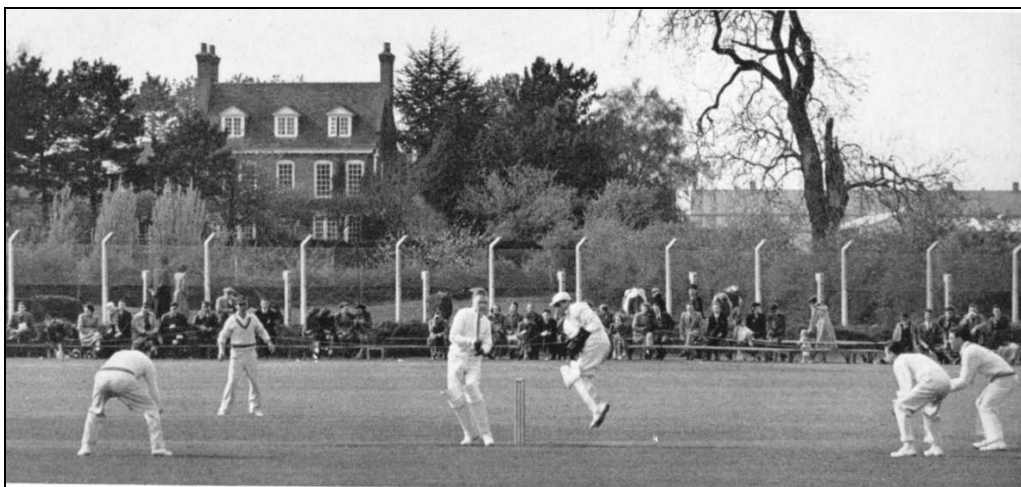
The cricket section of the social club was very well regarded and the Timken XI enjoyed considerable success. Cricket matches had taken place on the factory fields since 1942 and as well as the local county side, the team regularly took on teams such as Oxford University. The team was highly regarded and in 1950 one Timken employee, Frederick R Brown was selected as captain of the England team to tour Australia (Timken Times, June 1950).

Cricket was originally played on the east side of the fields, adjacent to Building 2 and a pavilion had been provided during the 1940s. This was replaced by a new structure on the same site which was opened by Stephen Bennett on 26<sup>th</sup> April 1964.

The company employed several former Northamptonshire County Cricket Club players, including George Tribe, Jock Livingston, Bert Nutter, Freddy Brown and Bob Clarke (P Green, *pers com*).



**Plate 134:** The Timken XI and Northamptonshire County XI before a match on the opening day of the cricket pavilion. 26<sup>th</sup> April 1964



**Plate 135 :** A cricket match between British Timken and the Northants XI. 29<sup>th</sup> April 1950

### 8.1.5 Athletics

The athletics section was also popular and a range of activities took place from the 1940s. Races took place on the south side of the fields, adjacent to the cricket pitch and the section became extremely successful.

The company provided a fully equipped running track and pavilion, which was opened by the Duke of Edinburgh in 1954 (below, section 8.2.1). The athletics section also made use of the former cricket pavilion, which been replaced in 1964 (above, Section 8.1.4). The structure was re-erected on the west side of the field and served as a changing room for athletes using the track.

A significant event took place on 26<sup>th</sup> August 1967 when a sub four minute mile was achieved by Alan Simpson. The race took place on the track in a time of 3 minutes and 58.1 seconds.

### 8.1.6 Other Sports

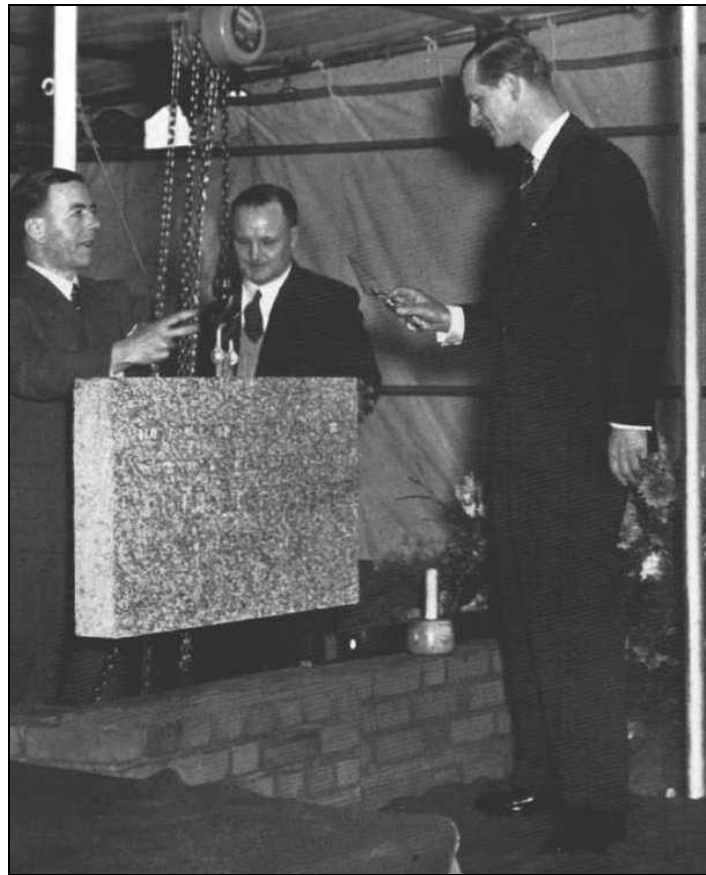
A variety of other sports were catered for. Bowls was popular and a bowling green was constructed on the east side of the factory in 1949 (above, Section 4.10.2). This was relocated to a site on the north of the playing fields during the 1970s. A tennis court and facilities for archery were provided in the same area.

Sir John Pascoe actively encouraged many of the local sports teams and regularly offered out of season employment to local professional sportsmen. Several local sportsmen later obtained permanent employment at Timken. Sales Manager Raymond Tuckey was a former Wimbledon Doubles Champion (below, Appendix 2) and Managing Director E R Knapp was a former *Wasps* (Northampton Town Rugby Football Club) member. John Croy, a professional player for the *Cobblers* (Northampton Town Football Club) joined British Timken at the end of his professional football career in 1955 and became Treasurer of the Sports Office (P Croy *pers com*). Former Cobblers goalkeeper Peter Pickering was also an employee (P Green, *pers com*).

## 8.2 Royal Visits (Plates 136-138)

8.2.1 Two royal visits were made to the factory. The first was a visit by the Duke of Edinburgh in 1954. The sports pavilion and running track were built in 1954 (above section 4.4.2) and the Duke of Edinburgh was invited to open them. The visit took place on 15<sup>th</sup> December 1954 and the duke travelled to Northampton by train and drove from Northampton Station to Duston in the royal car. The royal visitor laid the foundation stone of the pavilion and toured the factory in the afternoon. Separate marquees for lunch and cocktails were provided, the latter also accommodating a display of bearings, the centrepiece of which was a huge bearing weighting three and a half tons, made for a rolling mill in Germany.

8.2.2 A second royal visit was made in 1973 when Princess Anne toured the factory (Plate 138). She travelled to and from Duston by helicopter, and was shown around the site, including the recently completed Cold Form Works (Building 3) by Managing Director Stephen Bennett.

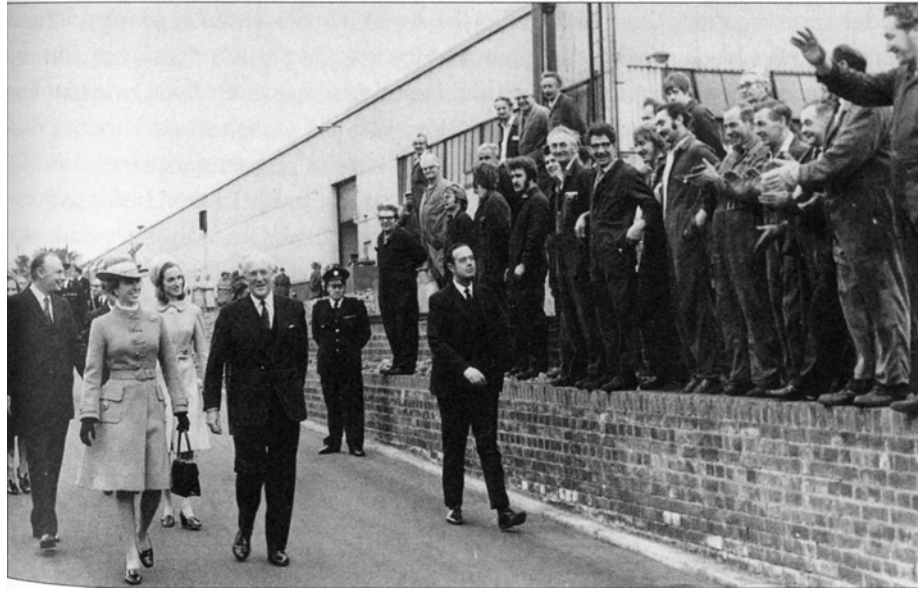


**Plate 136:** The Duke of Edinburgh laying the foundation stone of the sports pavilion



**Plate 137:** The Duke of Edinburgh touring the Hardening Shop (the Duke in centre, John Pascoe on left)





**Plate 138:** Princess Anne touring the works in 1973. Building 4 to rear (Managing Director Stephen Bennett to her left)



**Plate 139:** Frankie Vaughan performing at Duston in 1962

### 8.3 Social Activities

- 8.3.1 A number of parties, dances and other social activities also took place. The annual staff dance was well attended and events were regularly organised at Christmas, often by individual departments. In 1962 the *Apprentices Association* invited the singer Frankie Vaughan to perform at the works (Plate 139). The comedian Kenneth Horne and the guitarist and singer Elton Hayes also visited the works. Trips to see shows in London were also organised

regularly and included The Crazy Gang, Jimmy Edwards and Tony Hancock (P Green *pers com*).

- 8.3.2 The B.B.C. were regular visitors to the works and as well as providing coverage of the annual Timken Show (above, section 7) also broadcast “Workers Playtime” from the canteen (Peter Green *pers com*).

## 9 Acknowledgements

ASC Ltd is grateful to Ms Kim Webster for commissioning the survey on behalf of *Bellway Homes*. The *brief* for the work was prepared by Ms Jenny Ballinger, *Conservation Officer* of *Northamptonshire County Council*.

Thanks are due to Mr Ian Black, formerly Facilities Manager of British Timken, for providing access to the site and practical assistance. Much of the information contained in this report was provided by Mr Black and his colleague Mr Tony Mockett

Documentary research was undertaken at the *Northamptonshire County Record Office* and the *Northampton Local Studies Library* and the assistance of their staff is gratefully acknowledged.

The project attracted considerable local interest and ASC is grateful for the many former employees who took the trouble to contact us and offer help and assistance. Particular thanks are extended to Mr David Clarke the former *Recreation Manager* for loan of the *Timken Times* and Mr Maurice Palmer for loan of photographs by Ron Griffin. In addition, letters, e-mails and offers of help were received from the following: Mr Peter Green, Mrs Pamela Croy, Mrs Ann Martin, Mr Barry Ryan, Mr & Mrs A Schampier, Mr Brian Crutchley, Mrs Jean Stacey, Mr R G Sargeant, Mr R A Denham, Christine Mackay, Mrs Jeanie Jordan, Ben Roberts, Mrs Wendy Scarrott, Mr Andy Line, Mr Peter Freestone, Alan Webb, Mrs Meg Adams, R Woollen, Mr S Garratt and Mr Leonard Mutton.

The fieldwork was undertaken for ASC Ltd by David Fell BA MA MIFA, Calli Rouse BA and Nigel Wilson HND AIFA. Documentary research was undertaken by David Fell and Calli Rouse. This report was compiled by David Fell and edited by Bob Zeepvat BA MIFA.

## 10 Archive

10.1 The project archive will comprise:

1. Brief
2. Project Design
3. Report
4. List of photographs/slides
5. B/W prints
6. B/W negatives
7. CDROM with copies of all digital files.

10.2 The archive will be deposited with the *Northamptonshire County Record Office*.

## 11 References

### *Standards & Specifications*

Ballinger J 2005 *Building Recording brief. British Timken, Main Road, Duston.* Northamptonshire County Council

IFA 2000a Institute of Field Archaeologists' *Code of Conduct.*

IFA 2000b Institute of Field Archaeologists' *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology.*

IFA 2001 Institute of Field Archaeologists' *Standards & Guidance documents (Desk-Based Assessments, Investigation and Recording of Standing Buildings).*

RCHME 1996 *Recording Historic Buildings: a Descriptive Specification (3<sup>rd</sup> Edition).*

Zeepvat R J 2005 *British Timken Works, Main Road, Duston, Northampton.* Project Design for Building Recording

### *Books and Historical Sources:*

Foster D & Garratt S, 1993 *Duston Link-Up: A Brief history of Duston.* Duston parish Council

Glasse H K B, 1951 'Presenting Timken to Timken and the Rest of the World' *Timken Times and FBC Bulletin* **7.7**, 12-19.

Golby 1991 *Duston and St James. A Pictorial History*

Morris J (ed) 1979 *The Domesday Book. Northampton.* History from the Sources. Phillimore

Pevsner N & Cherry B, 1973 *The Buildings of England. Northamptonshire.* Penguin

Pruitt B H, 1998 *Timken. From Missouri to Mars- A Century of Leadership in Manufacturing.* Harvard Business School Press

Woollen R, 1950a 'Presenting Timken to Timken and the Rest of the World: The Auto Shop at Duston' *Timken Times and FBC Bulletin* **6.1**, 4-8

Woollen R, 1950b 'Presenting Timken to Timken and the Rest of the World: The Hardening Shop' *Timken Times and FBC Bulletin* **6.2**, 12-17

Woollen R, 1950c 'Presenting Timken to Timken and the Rest of the World: The Grinding I Shop' *Timken Times and FBC Bulletin* **6.3**, 6-11

Woollen R, 1950d 'Presenting Timken to Timken and the Rest of the World: Roller production at Duston' *Timken Times and FBC Bulletin* **6.7**, 14-20

Woollen R, 1950e 'Presenting Timken to Timken and the Rest of the World: The Press and Assembly Shops at Duston' *Timken Times and FBC Bulletin* **6.9/10**, 52-59

Young J 2002 *An Archaeological Desk-Based Assessment of land at British Timken, Duston, Northampton.* John Samuels Archaeological Consultants

*Maps*

Date	Description
1886	Ordnance Survey 1:2,500 XLIV.8 County Series
1901	Ordnance Survey 1:2,500 XLIV.8 County Series
1925	Ordnance Survey 1:2,500 XLIV.8 County Series
1950	Ordnance Survey 1: 10,560 XLIV.8 County Series
1958	Ordnance Survey 1: 10,000 SP 76 SW National Grid Series
1964	Ordnance Survey 1: 2,500 SP7264
1969	Ordnance Survey 1: 10,000 SP 76 SW
1984	Ordnance Survey 1: 10,000 SP 76 SW
2003	Ordnance Survey Landplan data. 1: 5000

***Pictorial Sources***

Photographs held by the *Northamptonshire County Record Office*  
Photographs in the personal collection of Mr Peter Martin  
The Timken Times (1946-1968)



## Appendix 1: Time Line

1941	Construction starts at Duston. Foundation stone laid Nov 10 1941 by Cllr & Mrs W L Hubbard
1942 March	Factory opens. Offices originally wooden huts
1942 June 9	Office block opened
1945 Aug	First Annual Show- to celebrate victory
1946	Establishment of the Service Sales Department
1947 June	Extension to grinding and assembly shops. Rebuilding of barrelling (?) and Press Shops (TT 1947, 7)
1948	New reception office opens
1948 June	Work progressing on the sports ground
1948 Sept	Barrelling Shop now completed
1948	Precision Bearing Dept opened
1948	Extension to Grinding Shop completed
1948	Extension to Assembly Shop completed
1949 Aug	Autoshop extended to twice its original size (TT Aug 1949)
1949 Aug	New Service Sales Division completed
1949	New bay added to hardening shop
1949	Laboratory added
1949	Completion of the Bowling Green
1949	Production reaches 140,000 a week
Late 49/early 50	Work commenced on 6 new bays to east of factory
1950	Yet another bay added to hardening shop
Early 1950s	Continuous line works. Built to keep up with demand from the car industry
1950	New bays to Press and Heading Shops (part of the 6)
1950	Extensions to Compressor House, Boiler House and Sub-Station
1952 Nov	New Surgery opened
1953 May	Extension to sports field started
1953	Opening of Building 7 "New Building"- Bucyrus
1954	Daventry Plant opens
1954	Admin Block Extension
1954 Dec	440 yard running track opened by Duke of Edinburgh
1955	Flood lights and Horse Show Secretary's office installed
1956	Extensions
1957	Completion of the final extension of the office block (TT 1957 March 2)
1959	Metallurgical lab completed
1959	Hardening Maintenance & Plant Dept in existence
Late 1950s	Aston Plant closed
1960	Major expansion: Cage Shop & Roller Heating Shops built (Buildings 5 and 6)
1963 Feb 5	Death of John Pascoe
1965	Building 4 Roller Grinding constructed
1966	Car park & bowling green constructed
1968-70	Main Works Suds building constructed
1968-70	Pavilion built (partially)
1970	Building 3 constructed abt 1970
1971	Visit of Princess Ann
1976	Pavilion extended
1978	Last Timken Show
1979	Timken Show cancelled due to electricians strike
1984-5	Extension to rear part of admin block
1997	Railway bearing repair facility opened
1998	Advanced Package Bearings Plant opened
2003	Plant Closure

## Appendix 2: Timken Personalities

### Michael Dewar 1886-1950 (*Chairman*)

Michael Bruce Urquhart Dewar OBE MA MIEE AM Inst CE AMIEE Vice-President FBI Chairman of British Timken Ltd

Michael Dewar was born on 5<sup>th</sup> August 1886 and was the eldest son of William Dewar of Rugby, Warwickshire. He was educated at Rugby and read Mechanical Sciences at Trinity College, Cambridge.

After graduation he served an apprenticeship with *Vickers Ltd*, at Sheffield and later he joined *T F Firth & Sons Ltd*, where he became director. During the 1914-18 War he served with the Royal Engineers. He was subsequently appointed director of National Projectile Factories, Assistant Controller of Shell Manufacturing and served on several inter allied committees.

In 1919 he joined the board of the *Leeds Forge Company Ltd*. He eventually became Managing Director and it was during his time at Leeds that he met John Pascoe, who was eventually to succeed him as Chairman of British Timken. Between 1922 and 1927 Dewar was also Managing Director of the *Metropolitan Carriage Wagon and Finance Company Ltd*. He was appointed Chairman of *British Timken* in 1928 and held this position until his death.

In July 1942 Dewar was appointed to head a delegation to the United States to purchase tanks. Within two weeks he had placed orders with six different American and Canadian firms for over 3000 tanks, many of which took part in the advance from El Alamein. He also played a key role in the design and production of the Sherman Tank.

Michael Dewar married Dorothy Firth, eldest daughter of Sir Algernon F Firth in 1910 and they had three sons and three daughters. The eldest son was killed in action in 1941. His wife died in 1943 and in 1945 he married Miss Josephine Judith Mullins. He lived at Little Horwood Manor in Buckinghamshire and died after a short illness on 21<sup>st</sup> December 1950.



**Plate 140:** John Pascoe and Michael Dewar at the 1950 Timken Show

**F J Pascoe 1893-1963** (*Managing Director and Chairman*)

Frederick John Pascoe MSc. Managing Director and Chairman of British Timken

John Pascoe was born at Redruth in Cornwall on 19 March 1893 and was the son of Frederick Richard Pascoe and Laura Augusta Tonkin. He was educated at Exeter School and during World War I served in the *Duke of Cornwall's Light Infantry* and with the *Indian Signal Service*, where he served on the northwest frontier of India and Mesopotamia. He returned to England after the war and read mechanical sciences (engineering) at St John's College, Cambridge. He was an apprentice at the *Leeds Forge Company* and it was while at Leeds that he met Michael Dewar, who was later to become chairman of British Timken.

After completion of his apprenticeship he was appointed secretary of the *Electric and Railway Finance Company* and, in 1930, he joined board of *British Timken Ltd* as Director of Finance. He remained at Timken for the rest of his working life, being appointed Managing Director in 1940. He played a major role in the development of British Timken during the 1940s and 1950s. He was a principal figure in the development of the factory at Duston but, following the absorption of British Timken into the parent company in 1958 (above, section 4.7) was replaced as Managing Director by Stephen Bennett. He was subsequently appointed Chairman of British Timken and a director of U.S. Timken. He held the latter position for four years, but resigned in 1962.

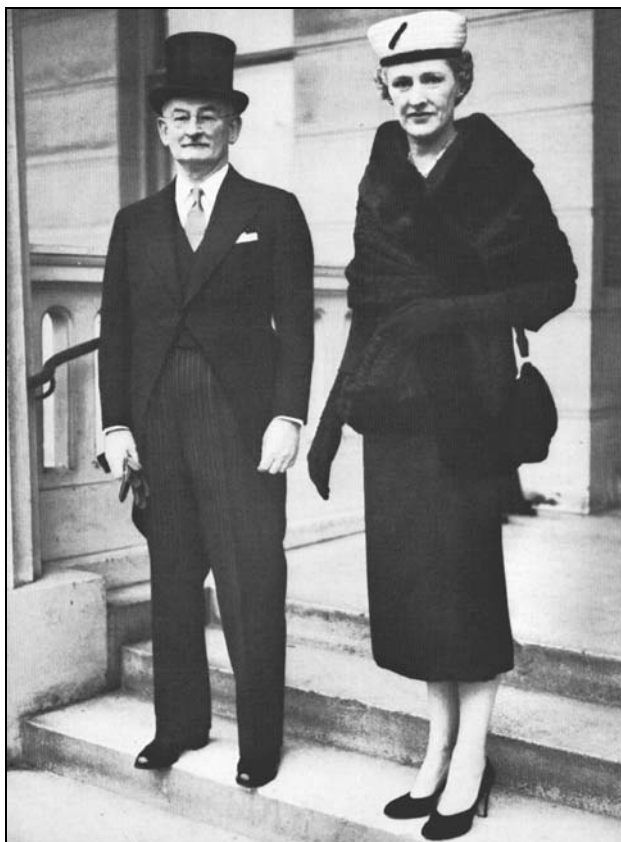
John Pascoe married Margaret Esson Scott on 7<sup>th</sup> January 1936 and they had two children, Belinda Jane in 1938 and Frederick Richard in 1940. He was knighted on 12<sup>th</sup> February 1957 and died after a short illness on 5<sup>th</sup> February 1963.

Pascoe was a member of the *Council of the Institute of Directors*. He was a sports enthusiast and supported many local sports clubs and events. He was manager of *Kettering United Football Club*, President of the *Northamptonshire Schools Cricket Association* and Vice-President of the *English Schools Cricket Association*. He was an authority on the works of William Shakespeare and also a keen fruit farmer and encouraged the annual Timken Show (above, Section 7). He is remembered as a firm but fair manager who took a great interest in the welfare of the staff. Every Friday morning he would tour the whole factory to ensure the staff were happy (P H Green, *pers com.*).

Sir John Pascoe is commemorated at Duston, and a residential street on former Timken land on the Hardlands Estate, is named *Sir John Pascoe Way*.



**Plate 141:** Sir John Pascoe (1893-1963)  
(Photograph by Ron Griffin)



**Plate 142:** Sir John and Lady Pascoe at the  
Investiture on 12<sup>th</sup> February 1957

**C R D “Raymond” Tuckey (*Works Manager*)**

Raymond Tuckey was born at Godalming, Surrey in 1910. He was educated at Charterhouse and Queen’s College, Cambridge where he read mechanical sciences. After graduation he joined the Royal Engineers, where he attained the rank of captain.

Tuckey was one of England’s leading tennis players during the 1930s. From 1931 to 1934 he was Army Singles Tennis Champion and between 1935-7 he represented Britain in the Davies Cup where he was described as “a harder hitter than any other Englishman”. He reached the peak of his tennis career in 1936, when, along with G P Hughes, he was mens Doubles Champion at Wimbledon. In 1937 he was author of “*Lawn Tennis for Men*” published by Blackie and Son.

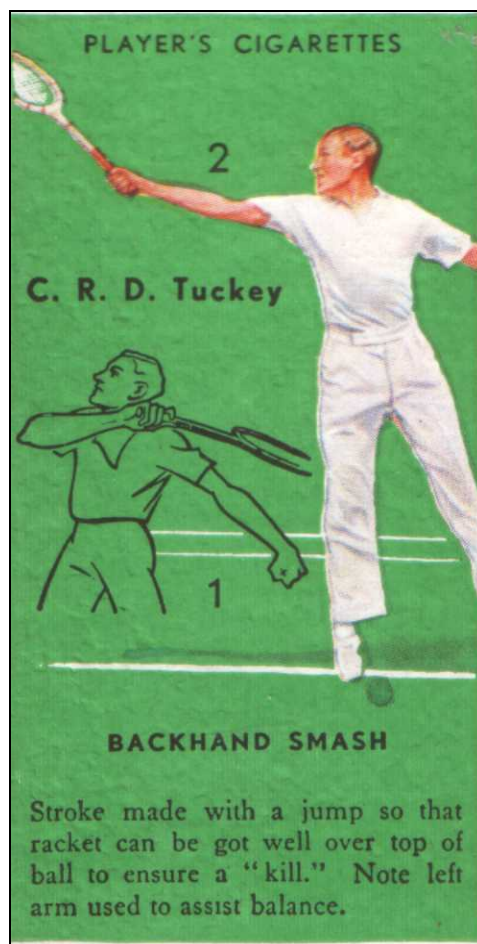
After his success in tennis, Tuckey joined British Timken in 1937 as sales engineer trainee at Aston. He trained in the shops, technical & sales departments and became a sales representative, specialising in automobile and aircraft bearings. In 1940 he was appointed head of the Planning Department at Aston and in December of the same year was promoted to the post of Assistant Works manager.

When the new plant at Duston opened in 1942 Tuckey was transferred from Aston and became the first Works Manager. In 1946 he was appointed General Sales Manager of British Timken and in 1967 was appointed to the Board of Directors.



**Plate 143:** C R D Tuckey at his desk in the Sales Department, 1951





**Plate 144:** C.R.D Tuckey featuring on a Players cigarette card

**Ivor Frederick 'Freddie' Fisher** (*Works Manager*)

Freddie Fisher was born in Birmingham in 1901 and commenced his engineering career as an apprentice with *Electric Ordnance and Accessories Co. Ltd.* He joined British Timken as a toolroom turner at Aston in 1922 and in 1938 he was appointed Night Superintendent at Aston. He occupied this position throughout the war and was responsible for the organisation of the Aston factory during the blitz.

The new plant opened at Coalville in 1941 and Fisher was the first Works Manager. He transferred to Duston in 1943 as Works Superintendent and became Works Manager in 1946. He held this post for twenty years and retired in 1966. Shortly before his retirement he married Miss Ellen Dexter. He was a keen gardener and fisherman and was awarded an MBE in 1953.



**Plate 145:** I F Fisher, Duston Works Manager 1956-1966

**Stephen F Bennett** (*Managing Director*)

Stephen Bennett was born in Birmingham in 1908 and was educated at Shrewsbury School and Clare College, Cambridge, where he read mathematics. He was appointed a Director of the Fischer Bearing Company in October 1949.

Bennett began his direct association with British Timken in 1950 when he became a Director and in January 1952 was appointed Assistant Managing Director. He succeeded Sir John Pascoe as Managing Director in 1958 and was appointed a Director of U.S. Timken in 1962.

Stephen Bennett was a married man with two children and his hobbies included golf and trout fishing. He retired in 1976 and a residential street bearing his name is situated on the Hardlands Road estate in Duston.



**Plate 146:** Stephen F Bennett

## Appendix 2: SMR Summary Sheet

SMR Record Number	Parish Duston	Site Name Former British Timken Works
Date of Fieldwork Feb-June 2005	Grid ref. SP 725 640	Fieldworker David Fell
Sponsor Bellway Homes	Activity Building Recording	
Landowner name/address: Bellway Homes Oak House Dencora Business park Breckland Linford Wood Milton Keynes, MK14 6EY		
Finds location N/a	Finds Destination N/a	
Records location ASC Ltd	Records Destination Northamptonshire County Record Office	
Finds Quantity N/a	Records Quantity N/A	
<p><b>Summary of Results</b></p> <p><i>In February 2005 Archaeological Services and Consultancy Ltd carried out a survey of the former British Timken works at Duston, Northamptonshire. The work was undertaken in advance of redevelopment of the site and was required as a planning condition imposed by Northampton Borough Council.</i></p> <p><i>The scope of the project was primarily defined in discussions with the Conservation Officer and the programme included historical research, an account of the site and compilation of a photographic record. It's primary purpose is to satisfy the condition attached to the planning permission and consequently it is not intended to serve as a definitive history of the Duston works.</i></p> <p><i>As the work progressed, it became clear that there was considerable local interest in the project. Following agreement with the Conservation Officer and the client, the scope was widened, in order to allow consultation of a wider range of historical material and to seek accounts from former employees. Every effort has been made to consult as wide a range of sources as possible, but the original aims of the project did not allow for consultation of original company records, many of which may be held by The Timken Roller Bearing Company at Canton, Ohio.</i></p> <p><i>The report gives a brief account of the archaeological and historical background of the site and then traces the development of the works from the original construction in 1942 to closure in 2003 (Sections 3 and 4). The principal buildings are then described and relevant cartographic and photographic material provided (Section 5). Section 6 provides an account of the manufacturing process. The later sections discuss the Timken Show, the various social and sporting activities that took place and concludes with brief biographies of some of the principal people associated with the works</i></p>		