



**Historic Building Recording of Gasholder No.6
at the former Neepsend Gasworks
Neepsend Lane, Sheffield
October 2015 – March 2016**

Report No. 16/54

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Project title	Historic Building Recording of Gasholder No.6 at the former Neepsend Gasworks, Neepsend Lane, Sheffield, October 2015-March 2016	
Short description	<p>MOLA carried out a programme of historic building recording of Gasholder No.6 at the former Neepsend Gasworks, Neepsend Lane, Sheffield. The recording was carried out in two phases; Phase 1 being a pre-demolition survey of the site, and Phase 2, which was carried out during the dismantling of the gasholder, incorporating areas and elements not visible or accessible during Phase 1.</p> <p>Gasholder 6 was a spiral-guided gasholder built in the early 1950s and comprised a static base-tank and four lift-tanks. The tank was purged of gas prior to the start of the works and was fully dismantled by the end of overall recording.</p>	
Project type	Historic Building Survey	
Previous work	Unknown	
Future work	Unknown	
Monument type and period	Mid-19th century spiral-guided gasholder	
PROJECT LOCATION		
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Site address	Neepsend Lane, Neepsend, Sheffield	
NGR	SK 34391 88945	
Area	2900 sqm	
PROJECT CREATORS		
Organisation	MOLA Northampton	
Project brief originator	Montagu Evans on behalf of National Grid	
Project Design originator	MOLA Northampton	
Director/Supervisor	Amir Bassir	
Project Manager	Amir Bassir	
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Contents

1	INTRODUCTION	1
2	OBJECTIVES AND METHODOLOGY	3
3	HISTORICAL BACKGROUND	4
	3.1 Local history and development of the Neepsend area	4
	3.2 The Sheffield Gas Company	4
	3.3 Development of the Neepsend Works	7
	3.4 Archival and documentary evidence	14
4	HISTORIC BUILDING RECORDING	15
	4.1 The recording area	15
	4.2 Gasholder 6	17
5	DISCUSSION	19
	BIBLIOGRAPHY	

Figures

Front Cover: Gasholder No.6, looking south

Fig 1: Site location

Fig 2: The recording area (Image © Google Earth)

Fig 3: Plan of 1890, showing the proposed new works, with three possible gasholder locations (EMSHD_E_E_28)

Fig 4: Bomb damage to No.4 Holder, with No.5 holder in background (Hird 1944)

Fig 5: Bomb damaged gasholder (Hird 1944)

Fig 6: Plan of the Neepsend Gasworks, 1947 (EMSHD_E_E_25)

Fig 7: Concrete base of Gasholder 6 during construction (xg03093)

Fig 8: Gasholder 6, looking north (xg00901)

Fig 9: Aerial view of the site, c1980s-1990s, looking east (AA1095)

Fig 10: The site entrance from Parkwood Lane, looking west

Fig 11: Gas pipes leaving the National Grid compound, looking south

Fig 12: The National Grid compound, looking south

Fig 13: Buildings on the National Grid compound, looking south-east

Fig 14: The site of the former gasholder 5, looking north-east

Fig 15: Plan of gasholder 6, showing photograph locations

Fig 16: The gasholder, looking south-west

Fig 17: The gasholder, looking south-east

Fig 18: The gasholder, looking north-east

Fig 19: Detail of the base-tank fabrication

Fig 20: Detail of base-tank column, also showing lagged anti-freeze pipes

Fig 21: Detail of the column brackets

Fig 22: The gasholder, looking south-west, showing inlet / outlet pipes

Fig 23: The inlet / outlet pipes, looking south

Fig 24: The pipe pit / dry well

Fig 25: Donkin flow valves

Fig 26: Outlet pipe adjacent to gasholder, looking south-east

Fig 27: The base-tank stair, looking south

Fig 28: The base of the stair

Fig 29: The mid-height stair landing

Fig 30: Detail of signage on the stair

Fig 31: The gasholder crown, looking east

Fig 32: The base-tank walkway and handrails, looking west

Fig 33: The lift-tank stairs, looking south

- Fig 34: Detail of lift-tank stair
- Fig 35: The arrangement of the roller carriages
- Fig 36: Detail of a base-tank roller carriage
- Fig 37: Detail of a lift-tank roller carriage
- Fig 38: Anti-freeze pipe supports
- Fig 39: Anti-freeze pipe supports, looking south-west
- Fig 40: Detail of the anti-freeze pipes and valves leading to the supports
- Fig 41: Detail of electrical fittings
- Fig 42: Monitoring equipment
- Fig 43: Operational equipment
- Fig 44: Detail of control unit
- Fig 45: Dismantling of the gasholder
- Fig 46: The interior of the gasholder
- Fig 47: The gasholder crown-frame
- Fig 48: Detail of bottom crown-frame pipe plate
- Fig 49: The underside of the top-curb, showing brackets and truss supports
- Fig 50: The inner face of the lift-tanks
- Fig 51: Roller carriage and supporting brackets
- Fig 52: The inner face of the base-tank
- Fig 53: Detail of the base-tank columns' upper brackets
- Fig 54: The inner inlet / outlet pipes
- Fig 55: The inlet / outlet pipes and pipe pit
- Fig 56: The pipe pit
- Fig 57: Dismantling of the base tank
- Fig 58: The gasholder base, looking north-west
- Fig 59: Schematic section of the gasholder (dimensions approximate)
- Fig 60: Detail of the outer roller carriage and supports (dimensions approximate)

Historic building recording of Gasholder No.6 at the former Neepsend Gasworks Neepsend Lane, Sheffield October 2015 – March 2016

Abstract

MOLA carried out a programme of historic building recording of Gasholder No.6 at the former Neepsend Gasworks, Neepsend Lane, Sheffield. The recording was carried out in two phases; Phase 1 being a pre-demolition survey of the site, and Phase 2, which was carried out during the dismantling of the gasholder, incorporating areas and elements not visible or accessible during Phase 1.

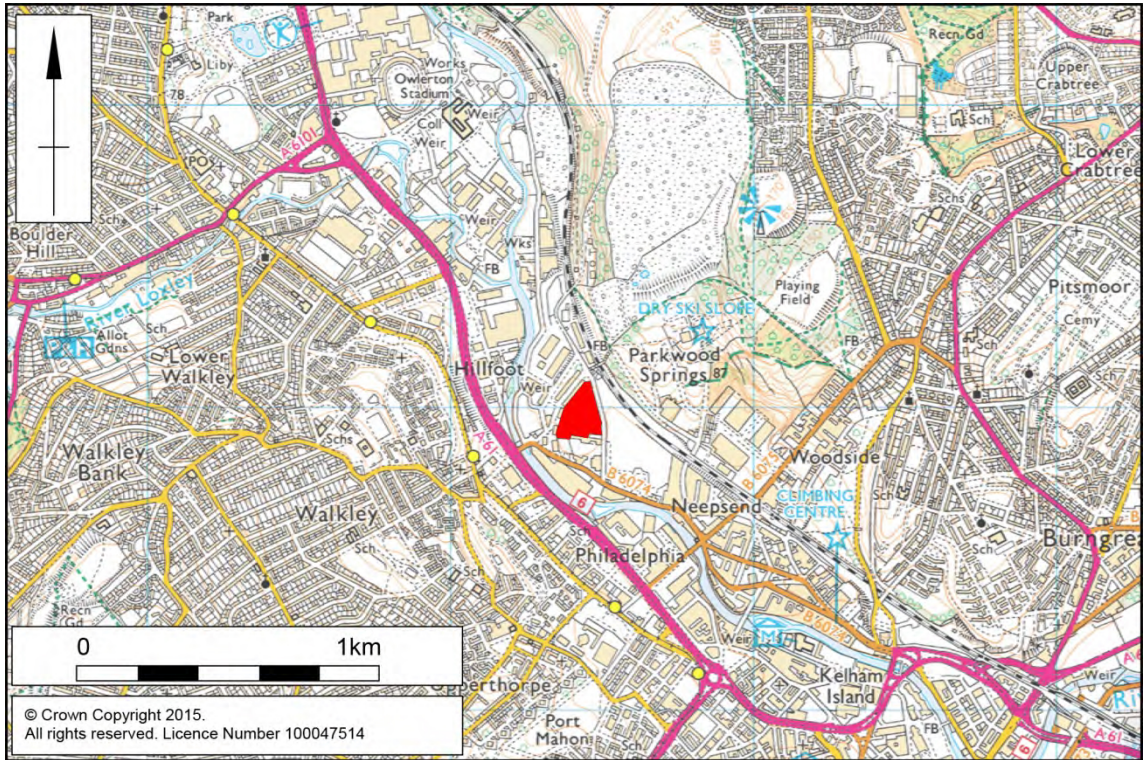
Gasholder 6 was a spiral-guided gasholder built in the early 1950s and comprised a static base-tank and four lift-tanks. The tank was purged of gas prior to the start of the works and was fully dismantled by the end of overall recording.

1 INTRODUCTION

MOLA Northampton was commissioned by Montagu Evans, acting on behalf of National Grid, to undertake a programme of historic building recording of Gasholder No.6 at the former Neepsend Gasworks, Neepsend lane, Sheffield (NGR SK 34391 88945, Figs 1 and 2).

The survey is a voluntary exercise commissioned by National Grid as part of their commitment to the heritage of their broader estate. This report is in response to a Historic Building Recording brief by Montagu Evans (pers comm Montagu Evans 2015) and in accordance with current best archaeological practice as defined in the Chartered Institute for Archaeologists' *Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures* (CIfA 2014) and the Historic England procedural document *Management of Research Projects in the Historic Environment* (HE 2015).

The former Neepsend Gasworks is located in the Neepsend area of Sheffield, to the north of the 19th-century boundaries of the city, now north of the modern city centre. The gasworks is located close to the eastern bank of the River Don, separated from it by the the B607 Neepsend Lane, and the Toledo Steel Works. To the east of the site is the wide expanse of the former Sheffield Ski Village which was opened in the 1980s on the site of the former Parkwood Springs housing estate. To the north of ski village is the Parkwood Landfill Site. To the immediate north-west are a number of modern warehouse and commercial units. The former Neepsend Rail Station was located a short distance to the north of the former gasworks. This was demolished by the 1970s and served the former Great Central Railway which runs immediately adjacent to the eastern perimeter of the gasworks. To the south and south-east, the land use is predominantly industrial and commercial retail units and warehouses, with some modern residential estates further to the south-west. The former gasworks is bisected by Parkwood Road, from which the recording area is accessed.



Site location Fig 1



The recording area (Image © Google Earth) Fig 2

2 OBJECTIVES AND METHODOLOGY

The objectives of this survey as set out in the brief were to:

- Produce an illustrated, written document detailing the fabric, appearance and form of the gasholder and associated structures and pipework. Due to the safety constraints associated with gasholders, recording was limited to the exterior of the structures;
- Provide historical survey drawings (or sketches) for comparable investigation relating to building form and function, identification of fixtures and fittings where visible or accessible;
- Provide an account of historic fixtures, fittings and architectural features where visible or accessible;
- Provide a photographic record of the structures in context.

The level of recording was specified as basic Level 2 – a descriptive record (Historic England 2015). This is defined by consisting of

- A systematic account of the building's origins, development and use
- A drawn and photographic record to illustrate the gasholder's appearance and structure as well as measured drawings of specific elements of historic or architectural interest.

Recording was carried out in two phases. Phase I encompassed pre-demolition recording of the extant elements of the site whilst Phase II comprised recording of any areas not visible or safely accessible during Phase I. The demolitions contractor carried out the Phase II photography which included the interior of the tank and lifts.

Phase I recording was carried out in October 2015. The site was photographically recorded to include general views of the site and structures, placing them within their wider context, and detailed views of any structural, historic and architectural details that would be lost during demolition.

Photography was carried out using a Nikon D7200 DSLR equipped with Sigma 35-17mm and Nikon 18-70mm lenses. Black and white 35mm film photography was carried out using a Nikon F80 SLR equipped with a Sigma 10-20mm lens. The photographs are reproduced on archive quality photographic paper, submitted alongside this report. Additional photography was carried out using a Fujifilm Bridge camera.

The Neepsend Gasworks, referred to as Neepsend Works on some documentation, formerly encompassed a larger site than the immediate recording area, occupying land to the north of the recording area and on the eastern side of Parkwood Road. In this report, the term Gasworks will refer to the full workings of the Neepsend Works, rather than the recording area.

3 HISTORICAL BACKGROUND

3.1 Local history and development of the Neepsend area

The Neepsend Gasworks dates to between 1853 and 1890. The Ordnance Survey map of 1853 (not reproduced) shows that the gasworks site at this time comprised enclosed agricultural areas and gardens. The Neepsend Tannery was located a short distance to the east of the gardens and the Manchester Sheffield and Lincolnshire Railway crossed to the north of the site.

By 1890, the gasworks comprised four equal-sized column-guided gasholders arranged in two north-south rows separated by long, linear buildings. Two linear buildings were located to the north of the gasholders, parallel to the rail sidings, with six small tanks. The gasworks was bound to the west by Parkwood Road and to the east by the Hallamshire Steelworks which straddled the Barrowell Road. The Toledo Steel Works, Philadelphia Steel Works and the Rutland Steel Works had also been established to the north of the site between 1853 and 1890. To the north of the railway lines, the Parkwood Springs housing development had also been constructed by this time.

The site remained relatively unchanged by 1905. To the west of Parkwood Road, the Parkwood Road Works had been established. By 1923, a fifth, much larger gasholder had been constructed to the north-west of the main gasworks complex, at the intersection of Parkwood Road and Fairfield Road. A number of smaller structures and tanks had also been built to the south of the new gasholder, adjacent to Parkwood Road and the Parkwood Road Works. Construction of a new gasholder was underway by 1952, to the south-west of the fifth gasholder, adjacent to the Parkwood Road Works. The gasholder is depicted on the map with a dashed outline, indicating that it was not yet completed at the time of mapping. The new gasholder, which is still extant, brought the total of gasholders at this time to six. The gasholder continued to be depicted with a dashed outline on the Ordnance Survey maps of 1953-55 and 1956. To the north of the earlier gasholders, the easternmost linear building adjacent to the railway line had been replaced with two rows of fourteen tanks alongside a conveyor and travelling crane, and water purifying plant.

The gasworks was decommissioned in 1967 and the westernmost pair of the original gasholders had been dismantled by the early 1980s, followed shortly thereafter by the eastern pair and the north-western gasholder, leaving only the current gasholder.

3.2 The Sheffield Gas Company

Much of the following history of the Sheffield Gas Company is condensed from the Sheffield Gas Undertaking, 1818-1949 by D E Roberts, a highly detailed account of the history of the company and the economic and practical factors which affected both the company and the town of Sheffield, as well as the personalities who drove the industry at that time. Additional information was obtained from newspaper clippings of *Daily Independent* articles at the time of the inauguration, by the Duke of Kent, of Gasholder 1 at Wincobank Gasworks in 1938. To mark this event, a small booklet and a fold-out pamphlet were produced which provide a brief history of the company and its workings at this time.

Among the East Midlands towns in which gas companies were formed, Sheffield was second only to Nottingham in taking the necessary steps to establish a gas company, and then only by a matter of months. Following the lead of London, Exeter, Glasgow, Manchester and Nottingham, a group of notable townsmen...called a public meeting which was held at the Cutlers Hall on 6 March 1818. Here it was resolved to seek an Act of Parliament to form a company by adding gas lighting to an Improvement Bill which was pending in

the House of Commons. The Sheffield Gas-Light Company was in due course incorporated by an Act passed on 23 May 1818 (Roberts 1979).

The newly incorporated gas company had its offices in Haymarket Lane and situated its gasworks at Shude Hill, near Sheaf Bridge, a location chosen for its close proximity to the River Sheaf and canal wharves which greatly facilitated the transportation of the raw materials and equipment needed for the works. The company encountered numerous problems from the outset, many caused by the lack of experienced gas engineers and the rudimentary state of the gas industry at this time. *Bad workmanship in stonework, serious delays in the delivery of ashlar stone, imperfect castic , etc., proved frustrating. It is also evident that the second gasholder was defective and had to be replaced in 1820 (Roberts 1979).*

The Sheffield New Gas company, previously known as the Consumers' Gas Company, was formed under the Sheffield Gas Act of 1835 as a rival to the Sheffield Gas-Light Company. The emergence of this rival company was in part a response to a perceived insufficient expansion in the gas supply and high gas prices.

By 1835 Sheffield had expanded considerably in every direction. The population had risen from about 60,000 in 1818 to around 105,000... Sheffield Gas-Light Company was selling insufficient gas of poor quality at a high price...by 1835 Sheffield required nearly double the quantity of gas used in 1828 to provide an equal amount of light (Roberts 1979).

The Sheffield New Gas Company was supported by a number of industrialists and manufacturers and the proposed new gas company was entered as a Bill into Parliament in 1835. The Bill was opposed by the Sheffield Gas-Light Company. During a House of Commons committee meeting it was highlighted that,

the [Sheffield Gas-Light Company] was failing to remove completely the ammoniacal liquor and sulphuretted hydrogen from the gas before distribution... the Company had never... inspected any work done by pipefitters, and a great deal of shoddy work was being undertaken (Roberts 1979).

The Sheffield New Gas Company gained the support of Parliament...Under the Sheffield Gas Act of 1835, the New Company was authorised to raise £80,000 in capital with which to establish works at Effingham Street to supply gas in competition with the Old Gas Company (Roberts 1979).

Shortly thereafter the Sheffield Gas Act of 1844 the Sheffield New Gas Company and the Sheffield Gas-Light Company were amalgamated as the Sheffield United Gas-Light Company.

The merger led to improved profits for the proprietors and a reduced price of gas for consumers...Considerable saving resulted from having only one management, the removal and replacement of old and decayed pipes, the connection of services to one set of new mains, and the collection of accounts on a quarterly basis (Roberts 1979).

The Shude Hill works were improved and added to and additional land was purchased on which to erect a new gasholder to meet the increased demand. This gasholder was operational by 1850.

A rival to the Sheffield United Gas-Light company emerged in 1850 when the Highways Board and Town Council, along with certain members of the public formed

the Gas Consumers' Company. The company obtained a Board of Trade licence to operate and a new gas works was opened in August 1932 at Neepsend. *The cornerstone to the new gas works at Neepsend was laid by the Mayor on 30 August 1852* (Roberts 1979). Due to a lack of Parliamentary sanction, the Gas Consumers' Company acted somewhat illegally and were opposed by the United Company who took it upon themselves to act outside of the law and place obstructions in the way of the Consumer's Company's workmen, such as filling in pipe trenches during the night which had been dug by the Consumer Company's labour force during the day.

Prosecutions and fines for illegally digging up streets to lay pipes eventually forced the Gas Consumer' Company to seek legal protection and placed a Bill before Parliament, a move naturally opposed by the United Company. The Parliamentary Committee sitting on the 1854 Bill recommended a deed for amalgamation be drawn up. This amalgamation became law under the Sheffield Gas Act of 1855.

One of the first actions of the newly established Board was to authorise re-arrangement of the mains based on the extension of the Effingham Street site, including the erection of two large gasholders, and the running down of the Neepsend station. The disused gasholder at Neepsend was sold to the contractor of the Effingham Street development (Roberts 1979).

The onset of war in 1914 presented a considerable challenge to the Sheffield United Gas Company and indeed gas companies throughout Britain. Among the problems faced by the company were a reduction in the quality of gas caused by the extraction of toluol and benzol (chemicals required for high explosives), an increase in demand from the steel industry and a shortage of labour.

In the face of inflationary rises in wages and the price of coal and other raw materials, gas companies suffered losses in the markets for residuals. The main markets were overseas, the German chemical industry being a major buyer

In terms of revenues from gas and coke sales, however the Sheffield Gas Undertaking was in a more favourable position than most other gas companies...The Sheffield steel industry was at the heart of the munitions drive, so that the Sheffield Gas undertaking, which provided a growing quantity of fuel power necessary for the output of armaments, became a crucially important cog in the war machine. (Roberts 1979).

Friction between the steel industry and the gas company over the provision of good quality gas at high pressure was compounded by labour shortage. The men offered to the company by the Supply Department of the Ministry of Munitions were unsuitable for the heavy labour required and of the 600 men initially seconded to the gas company only 61 remained by 1917. The Company had begun employing women to meet the labour shortage but these were unable to carry out the heavy work required. Strike threats and complaints from the munitions producers led to an intervention by Winston Churchill, then Minister of Munitions, as a result of which, the company director, Wilson Mappin, resigned from his post.

In 1919 Ralph Halket succeeded the Managing Director Hanbury Thomas as General Manager, then as General Manager and Secretary from 1925 to 1940, then as Director and General Manager until 1945. From 1917, a long term decision was made to *change over from being primarily a gas maker to being predominantly a collector and re-distributor of gas* (Roberts 1979). This goal required the *collection, purification and re-distribution of coke oven gas, and... the gradual merger of small gas undertakings within an extended area.*

By 1929 the contribution of coke oven produced gas to the total supply had been increased to 68 per cent, so about a third only of the gas supplied to customers was manufactured town gas (Roberts 1979).

As stated by Ralph Halket:

Prior to 1931, the greater part of the gas produced in the manufacture of coke was literally blown into the air – sheer waste. Nowadays that Gas is purchased, purified and distributed by the Sheffield Gas Company to the benefit of all consumers, industrial and domestic within an area of 314 square miles... More than that, valuable residuals and by-products are extracted from the Gas and put to profitable use (G11_SHE_5514).

As part of its plan to merge smaller gas undertakings, the company acquired the Woodhouse and Dronfield undertakings in 1924, followed by works at Holyand, Elescar, Baslow, Matlock, Bakewell, Eckington and Killamarsh between 1932 and 1940.

The area of supply which had in 1920 been 167 square miles...had by 1938 been enlarged to 314 square miles. In view of the expansion the name of the undertaking was altered to the Sheffield and District Gas Company...Thus, when war broke out in 1939, the Sheffield Grid System was almost complete and served a large region (Roberts 1979).

It was because of the tremendous growth in the operations of the Sheffield Gas Undertaking ...that the significant part played by the Gas Company in the Second World War was probably greater than that in the Great War...the production of crankshafts for Spitfires and Hurricanes was carried out by one of the leading Sheffield firms, and output of the forges depended upon gas (Roberts 1979).

The Gas Company's works were fortunate to escape the brunt of the damage from air raids during the Blitz. This was in part due to the Company's control system which had been developed during the inter-war period and consisted of a fully equipped underground control room from which the Company could control the Grid System throughout the area of its authority. Direct lines allowed the various gasworks to be rapidly notified of any impending attacks. On 12 December 1940, the Neepsend and Grimesthorpe works were hit by bombs.

No direct hits were reported at Wincobank, but a high explosive bomb completely destroyed the central laboratory at Grimesthorpe and wrecked No.2 holder, the 1.5 million cu.ft. of gas burning out in a matter of seconds in a gigantic mountain of fire (Roberts 1979).

Ralph Halkett resigned as director and was succeeded by his son Ralph Halkett Junior who was appointed General manager and Chief Engineer. The Gas Company passed into public ownership in 1949, following the Gas Act of 1948 which nationalised the UK gas industry.

3.3 Development of the Neepsend Works

The Neepsend Works, constructed in 1852-53 was the first gasworks of the newly formed Gas Consumers' Company. The amalgamation of the Gas Consumers' Company and United Gas-Light Company following the Sheffield Gas Act of 1855, led to an assessment of the plant at the Neepsend Works.

From the start it was clear that the Sheffield United directors regarded the [amalgamation] as merely the acquisition of an additional plant with more shareholders to contend with...The Board's attitude was that they had taken over a lame duck, especially with respect to the newly erected gasholder at Neepsend which could reputedly service a town twice the size of Sheffield (Roberts 1979).

It was claimed that the gasholder had been continuously supported by a water pump since its construction and, against the advice of engineers of the former Consumer's Company, the gasholder was tested under its own weight and subsequently collapsed.

In 1864 the Company began works to alter and extend the Neepsend works with the addition of a new retort house and gasholder. Rising demand for gas, particularly for use in gas cooking, necessitated further expansion of the Company's facilities and a scheme of expansion began in 1870 on newly purchased land at the Neepsend site.

A plan of 1890 (EMSHD_E_E_27) shows the *plan of land to be used*, indicating the plot of land to the north-west of the site, between the railway sidings and Farfield Road. An accompanying plan shows the layout of *proposed new works* (EMSHD_E_E_28, Fig 3). This plan shows the three possible positions of a new gasholder (Gasholder No. 5). The northernmost, being the site that was eventually chosen, and just the south of this were two potential locations. The three gasholders are labelled *3 lift gasholder, capacity 3 million cubic feet, outer lift 184 feet dia, middle 182 dia, inner 150 dia, each lift 40 feet deep*. It is unclear if all three proposed gasholders were planned to be constructed at that time or if a large enough space was acquired to allow for a staggered building scheme as storage needs dictated. A governor or booster house is depicted adjacent to the gasholders, with a network of pipes connecting to each proposed gasholder.

By 1890 the Neepsend Gas Works comprised four gasholders, arranged in north-south aligned off-set pairs. Three were four-lift holders and the north-western holder was three-lift. All were frame-guided. The pairs of gasholders were separated from each other by a central area buildings aligned north-south which included purifiers, oxide sheds, exhauster and boiler house and a possible retort house. To the south of the western pair of gasholders were purifiers and scrubbers. The western boundary of the site was occupied by a long narrow stretch of hoppers on a north-south alignment. To the south of the eastern gasholders, close to the site entrance from Neepsend Lane were a motor garage, weigh house, office and laboratory. At the northern extent of the site, adjacent to the rail sidings were retorts and oxide purifiers.

Further expansions were announced in 1903, plans being drawn up for a 7.8 million cu. ft. gasholder at Neepsend...The new holder tank constructed by Messers. John Aird & Sons was completed by March 1905 and the new gasholder put into operation the following winter (Roberts 1979).

An October 1911 article in the *Journal of Gas Lighting, Water Supply* (written by John Morrison, Engineer of the Neepsend Gas Works at that time, states that the site had three retort houses with a total of 93 beds, producing a total of nearly 10 million cubic feet of gas per day. The article described how the retort benches and roof of No.3 house were worn out and the machinery slow in action. It was therefore decided that the house be demolished and reconstructed, and equipped with horizontal rather than vertical retorts. The retorts of No.1 house were cleared out and the space utilized for the storage of coke from No.2 house.

It is noted in the *Gas Journal* of 1925 (GJ_1925_V169_P737) that the Neepsend Works was at that time *one of the biggest in the country, with a daily output capacity of over 14,000,000 cu. ft and storage for 13,930,000 cu. ft.*

Following the outbreak of war in 1939, the Sheffield Gas Company undertook a number of precautions to mitigate against the air raids of the Blitz. An underground control room was set up which was equipped with telephones with direct lines to the local Civil Defence Headquarters and the Police Headquarters, as well as direct lines to each coking plant supplying the crude gas grid, and each of the Company's gasworks. A *Gun Room* provided warning of imminent danger, via messages transmitted from Observer Corps sites. *The senior officials of the Company in turn took charge of this vitally important dual purpose Control Room each night* (Hird 1944).

An air raid took place on the evening of 12 December 1940. The raid began with the dropping of incendiaries, the resultant fires from which would act as markers for subsequent aircraft, followed by high explosive bombs. As assessment of the damage to the Neepsend Gas Works revealed large scale damage to the gasholders and surrounding buildings (Figs 4 & 5). Gasholders 1-4 were listed as *completely destroyed* and the newer gasholder, No.5, located to the west was *damaged and out of action*.

Of the five gas holders, No, 1, 2, 3 and 4 (total capacity 6,000,000 cu. Ft) were completely wrecked and No. 5 (capacity 8,000,000 cu. Ft) had a rent in the crown and a split 40 ft. in length in the side sheeting of the inner lift (Hird 1944).

Two of the governors were completely destroyed and the remaining governors were severely damaged and in need to rebuilding. A power house and two gas compressors were completely destroyed by a parachute mine.

Reconstruction efforts and repair work began in short order, with priority given to the industrial districts, and supply was restored to several of the Grimesthorpe and Effingham supply districts within December. Neepsend, however, suffered the most damage of the Sheffield sites.

Some indication of the magnitude of the task may be obtained from the fact that the dismantling of the tangled wreckage averaged nearly nine months for each holders...Four firms of contractors were engaged on this work, and certain changes were made in the capacity of the holders at Neepsend during the reconstruction. No. 4 Holder...which was in use as a relief holder, was reconstructed temporarily as a single-lift holder of 400,000 cu. ft. capacity. Holders Nos. 1, 2 and 3 were each rebuilt with an additional lift, thereby increasing the amount of storage available (Hird 1944).

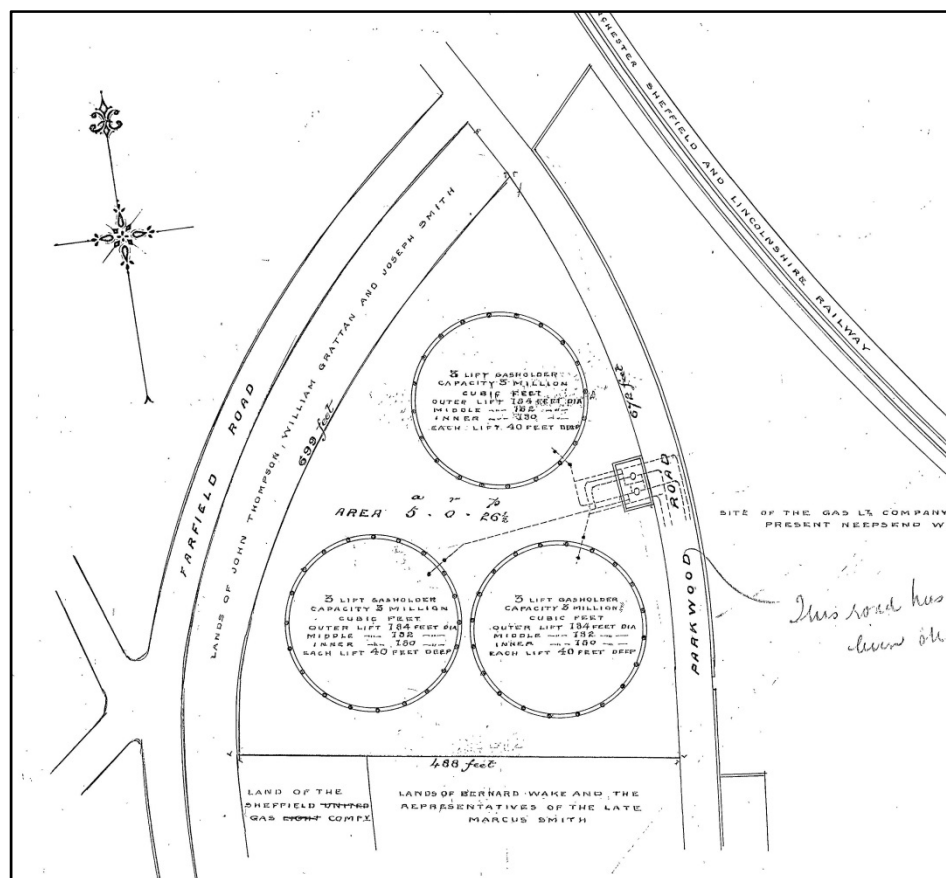
Construction of Gasholder No.6 appears to have been underway by 1952, where it is depicted in a dashed outline on the Ordnance Survey map of this date. A historic photograph held at the National Grid Archive (xg03093, Fig 7) shows the gasholder base under construction but the photograph is undated.

By 1963 the Neepsend Gasworks was at its largest extent, comprising six gasholders and a full range of associated plant and infrastructure.

The exploitation of North Sea gas from 1967 led to a decline and abandonment of town gas and the closure of many gasworks, though the gasholders were retained on these sites to allow for storage distribution of natural gas. A contract for *New*

Gasmaking Plant, dated September 1967 (BGC/CNC/T/P/2/9) describes the processing of natural gas conversion at Neepsend as follows: “Cyclic catalytic reforming of straight-run light petroleum distillate by the Micro-Simplex Process with cyclic hot shift CO conversion to 5% or less in the final gas. Napthalene washing is included and the gas is desulphurised in existing tower purifiers.” The contractor was Woodall-Duckham Construction Co. Ltd and the capital cost of the new plant is given as £900,000.

The expansion of the national grid pipelines, and innovations to gas pipe technology which allows the storage of gas within the grid have latterly rendered Britain’s remaining gasholders obsolete. Gasholder No.5 at Neepsend was dismantled between 1999 and 2002 and dismantling of Gasholder No.5 began at the end of 2015. The dismantling of the gasholders and the site as a whole will provide new development opportunities in this area.



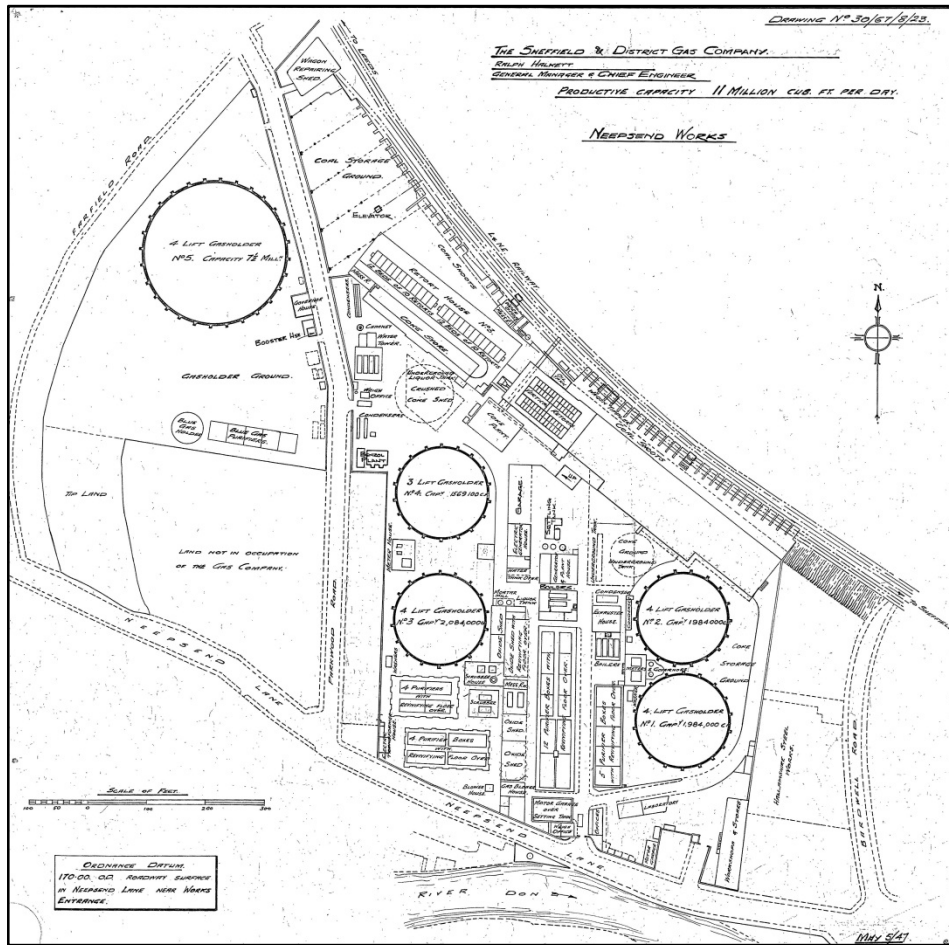
Plan of 1890, showing the proposed new works, with three possible gasholder locations (EMSHD_E_E_28) Fig 3



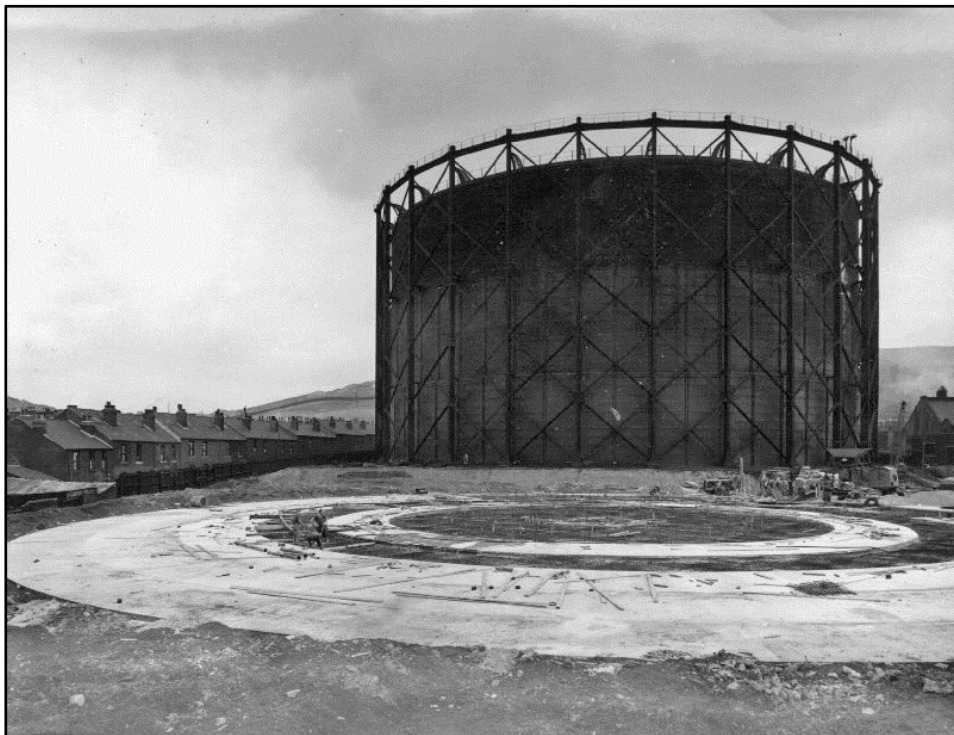
Bomb damage to No.4 Holder, with No.5 holder in background (Hird 1944) Fig 4



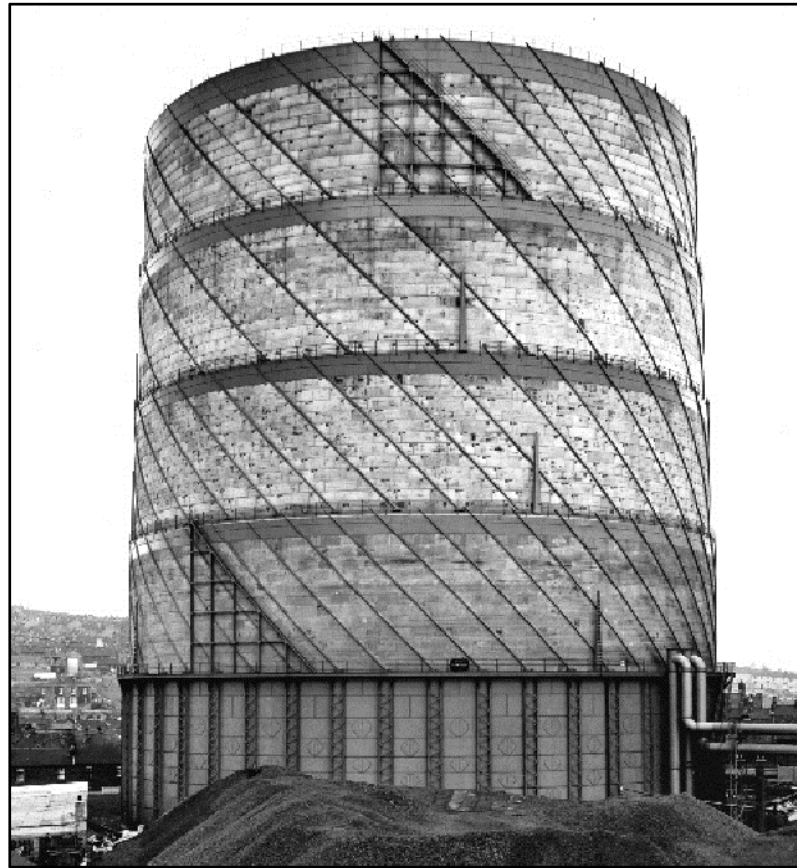
Bomb damaged gasholder (Hird 1944) Fig 5



Plan of the Neepsend Gasworks, 1947 (EMSHD_E_E_25) Fig 6



Concrete base of Gasholder 6 during construction (xg03093) Fig 7



Gasholder 6, looking north (xg00901) Fig 8



Aerial view of the site, c1980s-1990s, looking east (AA1095) Fig 9

3.4 Archival and Documentary evidence

As part of background research for this report, searches were made of the Sheffield City Council online historic photograph archive, the Britain from Above online archive, the Sheffield Local Studies and Archive and the National Grid Archive. While the material collected was relevant to the early development of the gasworks and the history of the Sheffield Gas Company, fairly minimal documentation relating to the gasholder itself was found.

Reference	Description	Date
EMSHD_E_E_28	Plan of proposed new works	1890
EMSHD_E_E_25	Plan of the Neepsend Works	May 1947
G11_SHE_5514	Commemorative pamphlet from inauguration of the Wincobank Works	June 1938
EMSHD_E_E_27	Plan of land proposed to be used	1890
GJ_1925_V169_P737	Gas Journal	March 1925
Xg03093	Gasholder 6 under construction	Undated
BGC/CNC/T/P/2/9	Contract for new gasmaking plant	Sept 1967
Xg00901	View of gasholder 6	Undated
AA1095	Aerial view of gasholders 5 and 6	Undated

Archive documents referenced in this report. Held at the National Grid Archive

4 HISTORIC BUILDING RECORDING

4.1 The recording area

The recording area comprises the western portion of the former Neepsend Gasworks. The site is accessed from the east via Parkwood Road, which bisects the former gasworks (Fig 2). The site has a gated entrance with stone piers flanking a modern steel double gate (Fig 10). A coursed stone wall spans the eastern site boundary alongside the road. To the east of the gasholder is an active National Grid compound containing modern brick structures as well as live and defunct pipes (Fig 13). Live gas pipes leave the site from the east, elevated above the road by stanchions or gantries (Figs 11 & 12). To the north of the site an earth embankment separates gasholder 6 from the now overgrown site of the former gasholder 5 (Fig 14).



The site entrance from Parkwood Lane, looking west Fig 10



Gas pipes leaving the National Grid compound, looking south Fig 11



The National Grid compound, looking south Fig 12



Buildings on the National Grid compound, looking south-east Fig 13



The site of the former gasholder 5, looking north-east Fig 14

4.2 Gasholder 6 (Figs 16-60)

This is a spiral-guided gasholder comprising an above-ground steel base tank and four lift-tanks. It has a diameter of c60m, with a footprint of c2900 sq. m, and rises to a total height of around 65m. The gasholder has a circular reinforced concrete base, flush with external ground level, which is covered by welded steel sheets, staggered as in brick stretcher bond and cut to match the curve of the tank. The base runs flush to the static tank where lengths of riveted right-angle beams provide a strong joint between them. Additional steel girders radiate around the outer edge of the base and provide support for the bottom of the lift-tanks when they are at rest. At the north-eastern side of the gasholder is a rectangular below-ground pipe-pit or dry-well of reinforced concrete, which allows inlet and outlet pipes to pass under the tanks.

The base tank is fabricated of mild-steel sheets, overlapping at the top and bottom, arranged in ten courses. The sheets are riveted together and octagonal steel plates secured to the outer and inner face of the tank strengthen the vertical joints between them. The strengthening plates are roughly diamond-shaped, measuring 1.5m x 1.1m, and have lines of circular rivets at the edges, a double row down the centre, with additional rivets in the remaining space. The upper two courses are staggered relative to the courses below them and lack strengthening plates at the vertical seams. Forty-eight full height columns, each 1.1m in width, encircle the base tank, rising from concrete pads to the underside of the walkway where they support both the walkway and the outer ring of roller carriages. The columns are formed of pairs of outward facing, mild-steel C-beams which are bolted to the tank, with flat steel bars forming a triangular lattice between them. At the top of the columns, triangular brackets project outward to the edge of the walkway. The column brackets are bolted through the tank to vertical brackets on the inner face. The internal brackets comprise angled beams over flat plates, which project outward at the top, and to which the roller carriages are bolted. The inner edge of the steel walkway at the top of the base tank meanders in and out to meet the inner edge of the roller carriages.

The lift tanks are formed of staggered mild-steel sheets, with smaller dimensions than those of the base tank. The sheets are welded, with rivets showing on the external face. Each lift tank comprises approximately fourteen courses of sheets, with square profile, steel cups and grips at the top and bottom. Vertical stiffeners or stays span the full height of the inner face of each tank. These are formed of lengths of C-profile steel beams and are bolted to the dip skirting plate at the bottom of the tank and the cup skirting at the top, with additional bolts where the stiffeners cross the diagonal guide rails.

The crown is formed of concentric rings of overlapping steel sheets with double rows of rivets at the edges. The sheets overlap each other from top to bottom and from right to left. The rings are slightly staggered so that vertical lines are not formed across the span roof. At the apex of the crown is a venting point to allow the dispersal of gas to atmosphere and a number of circular manholes within square hatches are arranged around the outer edge of the crown. The sheets of the outer curb are thicker than elsewhere and are reinforced by steel brackets which span between the underlying crown trusses and the vertical stiffeners of the tank. The crown-frame comprises a central, circular profile steel pipe from which radiate a number of steel trusses formed of flat and angled steel bars, which attach to the brackets of the outer curb. The trusses are bolted to a circular plate at the top of the central post. A similar circular plate is connected to the bottom of the post, with steel straps radiating out to join the brackets at the top-curb. When the lift-tanks are at rest, the central post comes to rest upon a steel box-frame pillar or stanchion that rises from the centre of the gasholder's base.

The roller carriages are of a fairly standard design for spiral gasholders of this period. The mechanism is atop a steel base plate through which the carriage is bolted to supporting brackets below the walkway. The roller carriages comprise pairs of side by side steel rollers which grip the guide rails, with the roller axles contained within separate cylindrical housing. A lateral rib runs across the roller carriage between the rollers. The whole unit is secured by hexagonal nuts and steel bolts.

The steps from ground level to the base tank walkway are located at the north-east corner of the gasholder. The stair structure is held away from the tank and is arranged in two tiers with a mid-height landing supported by a free-standing square stanchion of steel beams which rises from a concrete pad. The frame of the stair is formed of C-profile beams, and the treads each comprise four flat bars spanning between plates which are bolted to the frame. A mesh gate at the landing can be locked to prevent unauthorised access to the top of the gasholder. High visibility, yellow-painted steel safety rails line the full extent of the stairs and also encircle the edge of the base tank as well each of the lift tanks.

The inlet / outlet pipes the north-eastern side of the gasholder are of standard dimensions for a gasholder of this period and utilise *Donkin* flow valves and fittings of types seen on numerous gasholders. The pipes have flanged joints with steel bolts and are raised from ground by steel footings fastened to concrete pads. Defunct cable tracking around the pipes formerly led to various electrical switches. The dry-well or pipe pit into which the pipes descend is rectangular in plan, aligned north-east to south-west. The pit is lined with reinforced concrete and be accessed by a steel ladder secured at the north-east corner of the pit. The pit is slightly deeper at the eastern end and has a central reinforced concrete wall which separates the inlet and outlet pipes and supports the base of the gasholder. Steel stanchions located to the north of the inlet / outlet pipes carry overhead pipes from the top of the base-tank to a tank or sump located nearby. Outlet / distribution pipes on a north-south alignment are located to the east of the gasholder, alongside the National Grid compound. These defunct pipes enter pipe pits at each end of the pipe line and are elevated from the ground by concrete pads. The lengths of pipe are connected by *Donkin* connectors and retain various fittings and switches.

5 DISCUSSION

Gasholder 6 was a good example of its type and was well maintained since it remained in use until very recently. The gasholder retained a full complement of standard operational, mechanical and electrical fittings. The main variation between spiral-guided gasholders is whether they are above or below ground tanks. Above-ground gasholders such as Gasholder 6 have minor variations which are most evident in the design of the roller carriages and external supporting brackets or columns. Although the gasholder components do not have manufacturer's stamps, it is likely that the primary source was Newton Chambers, one of the leading fabricators of gasholders, who had their ironworks at Thorncliffe, near Sheffield.

The earliest spiral-guided gasholder was built in Northwich, Cheshire in 1890 by Clayton, Son & Co Ltd of Leeds. This design gained popularity from the early 20th century and continued to be built into the 1950s, replacing column-guided gasholders as the preferred type, due to factors such as cost and capacity as well as ease of maintenance.

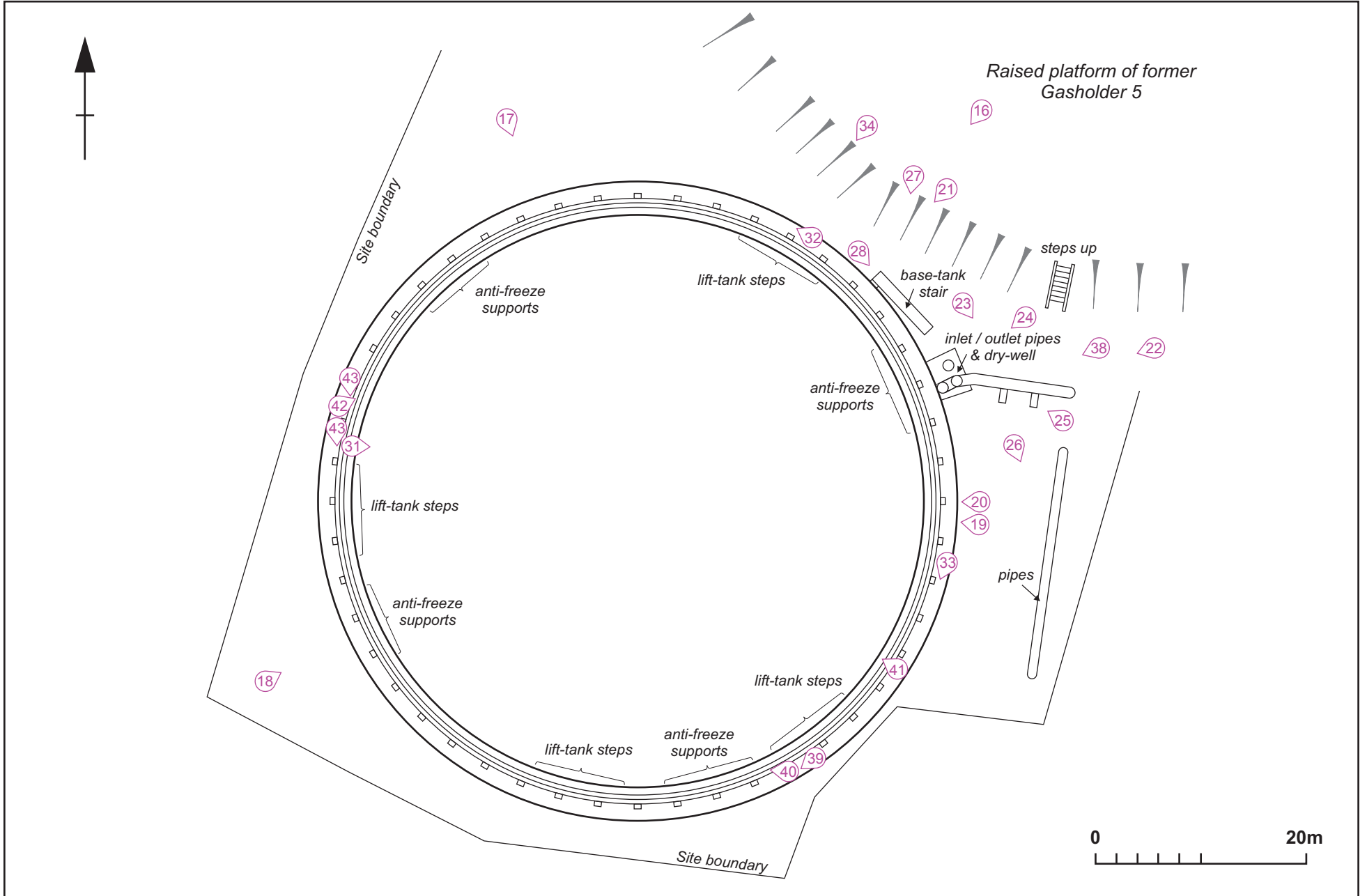
The two main formal surveys of gasholders and gasworks, *the London Gasholders Survey* and *Step 3 Report for Monuments Protection Programme* (Trueman 2002) have focussed primarily on earlier column-guided gasholders and the typology of their components, with little or no formalised classification of the later gasholders and the spiral-guided and waterless types. The Neepsend Gasworks is not included within the coverage of the 151 gas sites of the Step 3 Report.

The discovery and exploitation of North Sea natural gas rendered many of the UK's gasworks financially and practically unviable and led to the closure of such sites, though many of the gasholders such as at Neepsend were converted to store and distribute natural gas which was enriched on gasworks sites that were converted and outfitted with new plant for this purpose. The expansion of Britain's network of gas pipelines and the development of new gas pipe technology has rendered the remaining gasholders largely obsolete and a large-scale programme of dismantling has been initiated to allow for the redevelopment of these sites.

Scale 1:500

Plan of Gasholder 6, showing photograph locations

Fig 15





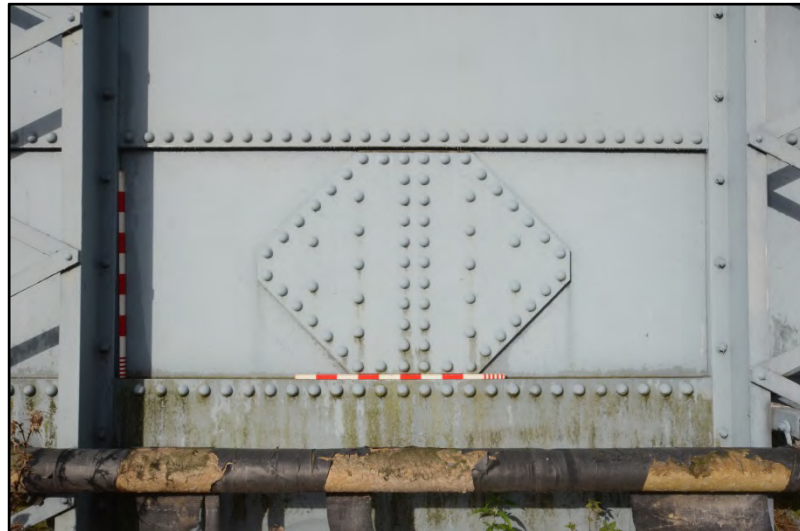
The gasholder, looking south-west Fig 16



The gasholder, looking south-east Fig 17



The gasholder, looking north-east Fig 18



Detail of the base-tank fabrication Fig 19



Detail of base-tank column, also showing lagged anti-freeze pipes Fig 20



Detail of the column brackets Fig 21



The gasholder, looking south-west, showing inlet / outlet pipes Fig 22



The inlet / outlet pipes, looking south Fig 23



The pipe pit / dry well Fig 24



Donkin flow valves Fig 25



Outlet pipe adjacent to gasholder, looking south-east Fig 26



The base-tank stair, looking south Fig 27



The base of the stair Fig 28



The mid-height stair landing Fig 29



Detail of signage on the stair Fig 30



The gasholder crown, looking east Fig 31



The base-tank walkway and handrails, looking west Fig 32



The lift-tank stairs, looking south Fig 33



Detail of lift-tank stair Fig 34



The arrangement of the roller carriages Fig 35



Detail of a base-tank roller carriage Fig 36



Detail of a lift-tank roller carriage Fig 37



Anti-freeze pipe supports Fig 38



Anti-freeze pipe supports, looking south-west Fig 39



Detail of the anti-freeze pipes and valves leading to the supports Fig 40



Detail of electrical fittings Fig 41



Monitoring equipment Fig 42



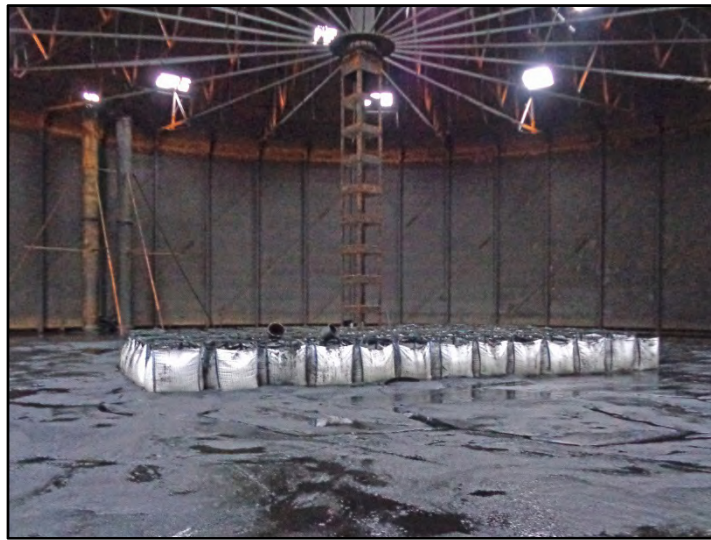
Operational equipment Fig 43



Detail of control unit Fig 44



Dismantling of the gasholder Fig 45



The interior of the gasholder Fig 46



The gasholder crown-frame Fig 47



Detail of bottom crown-frame pipe plate Fig 48



The underside of the top-curb, showing brackets and truss supports Fig 49



The inner face of the lift-tanks Fig 50



Roller carriage and supporting brackets Fig 51



The inner face of the base-tank Fig 52



Detail of the base-tank columns' upper brackets Fig 53



The inner inlet / outlet pipes Fig 54



The inlet / outlet pipes and pipe pit Fig 55



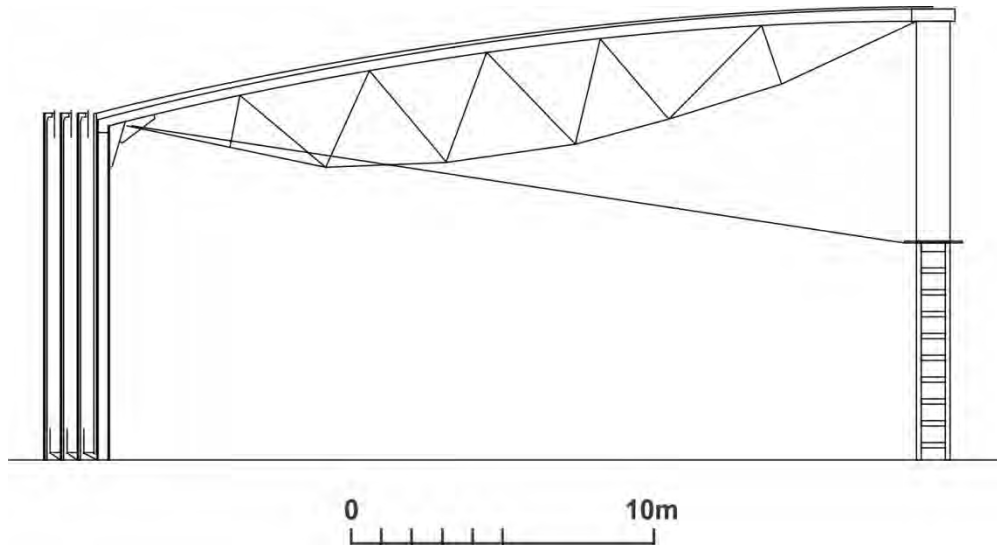
The pipe pit Fig 56



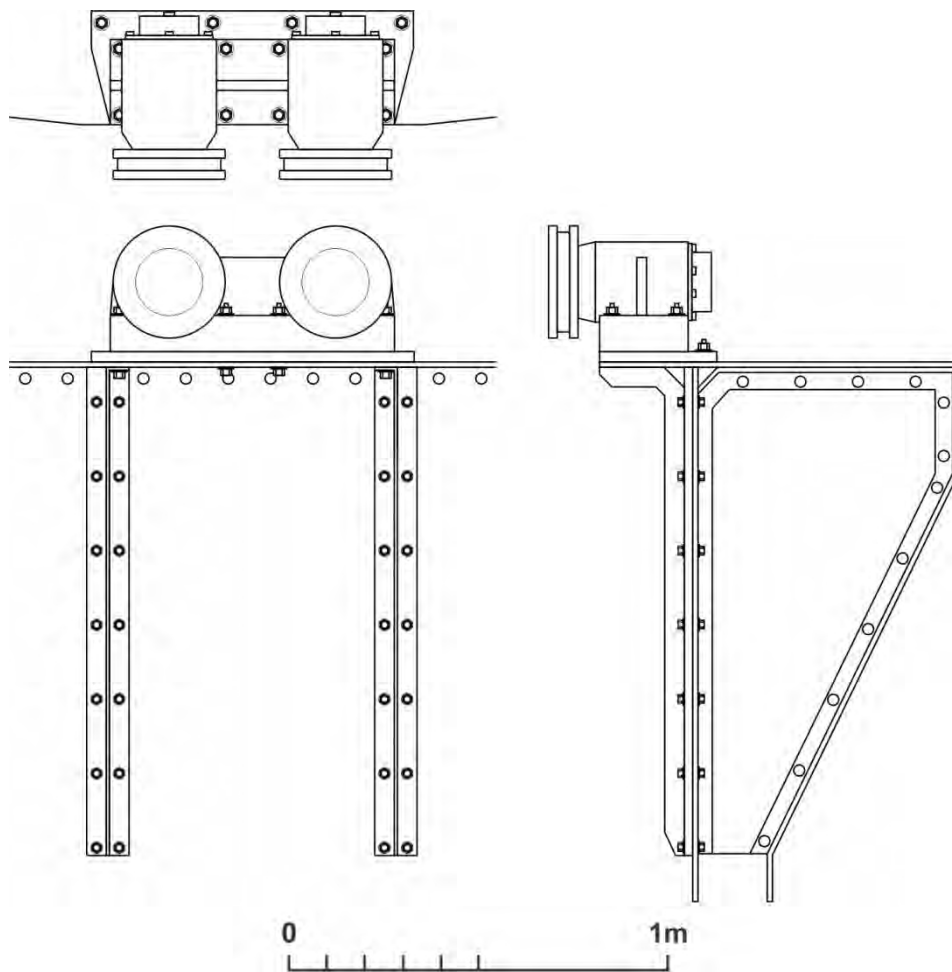
Dismantling of the base-tank Fig 57



The gasholder base, looking north-west Fig 58



Schematic section of the gasholder (dimensions approximate) Fig 59



Detail of outer roller carriage and supports (dimensions approximate) Fig 60

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