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# ARCHAEOLOGICAL RECORDING OF GASHOLDERS AT RIBBLETON LANE, PRESTON TECHNICAL APPENDIX MAY 2020

TEP

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Document Title	Archaeological Recording of Gasholders at Ribbleton Lane, Preston, Technical Appendix
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Approved	Jason Clarke

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# OASIS Report Form

## The Environment Partnership (TEP)

<b>Job Number:</b>	<b>8065.002</b>
<b>Project Name:</b>	Ribbleton Lane Gasworks, Ribbleton Lane, Preston
<b>OASIS Number:</b>	Theenvir1-414502

<b>PROJECT DETAILS:</b>		
Short description	<p>The Environment Partnership (TEP) carried out archaeological observation during the demolition of Gasholders 1 and 2 at the former Ribbleton Lane Gasworks, Preston, Lancashire. Gasholder 1 was a spiral-guided gasholder built in 1955, replacing a column-guided gasholder of 1869 and utilising the below-ground tank of the earlier holder. The gasholder was typical of this type and period with trussed crown frame, riveted crown sheets and top curb and welded lift sheets, and square cup and grips. The replacement of a column-guided gasholder with a spirally-guided one was a very common development on gasworks and allowed the site's storage capacity to be considerably increased within the existing site boundaries.</p> <p>Gasholder 2 was a giant single-order, single-tier column-guided gasholder built in 1855 by Thomas Piggot &amp; Co. of Birmingham and indicates the form of gasholder replaced in 1955. The gasholder remained essentially unaltered at the time of survey and the two lifts had a riveted construction with round cup and grips. The crown was trussed rather than utilising a static frame and when at rest was supported on a central concrete column. The first lift utilised a less common form of vertical stiffener. Neither of the two gasholders' tanks included a dumping.</p>	
Project type	Historic Building Recording	
Previous work	None	
Current lane use	Vacant	
Future work	Unknown	
Monument type and period	Post medieval and Modern Gasholders	
Significant finds	None	
<b>PROJECT LOCATION:</b>		
County	Lancashire	
Site address	Ribbleton Lane Gasholder Station, Ribbleton Lane, Preston	
Easting Northing	SD 55150 29980	
Area (sq ,/ha)	-	
Height aOD	45m aOD	
<b>PROJECT CREATORS:</b>		
Organisation	The Environment Partnership Ltd (TEP)	
Project brief originator	National Grid	
Project design originator	The Environment Partnership Ltd (TEP)	
Director/Supervisor	Amir Bassir	
Project manager	Jason Clarke	
Sponsor or funding body	National Grid	
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Start date	January 2020	
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## Abstract

*The Environment Partnership (TEP) carried out archaeological observation during the demolition of Gasholders 1 and 2 at the former Ribbleton Lane Gasworks, Preston, Lancashire. Gasholder 1 was a spiral-guided gasholder built in 1955, replacing a column-guided gasholder of 1869 and utilising the below-ground tank of the earlier holder. The gasholder was typical of this type and period with trussed crown frame, riveted crown sheets and top curb and welded lift sheets, and square cup and grips. The replacement of a column-guided gasholder with a spirally-guided one was a very common development on gasworks and allowed the site's storage capacity to be considerably increased within the existing site boundaries.*

*Gasholder 2 was a giant single-order, single-tier column-guided gasholder built in 1855 by Thomas Piggot & Co. of Birmingham and indicates the form of gasholder replaced in 1955. The gasholder remained essentially unaltered at the time of survey and the two lifts had a riveted construction with round cup and grips. The crown was trussed rather than utilising a static frame and when at rest was supported on a central concrete column. The first lift utilised a less common form of vertical stiffener. Neither of the two gasholders' tanks included a dumpling.*

## 1.0 Introduction

- 1.1 The Environment Partnership (TEP) was instructed by Atkins Ltd, acting on behalf of National Grid to undertake archaeological observation during the dismantling of two gasholders at the former Ribbleton Lane Gasworks, Preston, Lancashire (SD 5515 2998). This report describes the internal structure of the two gasholders and serves as a technical appendix to an initial historic building report undertaken on behalf of Atkins Ltd by Museum of London Archaeology (Bassir 2018) and should be read in conjunction with that document.

### **Objectives and Methodology**

- 1.2 The objectives of this survey were to provide a record of the internal structure, fabric and form of the gasholders during demolition works. The recording methodology was outlined in an agreed Written Scheme of Investigation (TEP 2019).
- 1.3 The Level of recording corresponds, as far as possible, with Level 2 Historic Environment guidelines as defined in *Understanding Historic Buildings: A guide to Good Practice* (HE 2016) and the document *Redundant Gasworks and Gasholders: Guidelines for the Evaluation and Recording* (HE 2019), however due to safety issues relating to active demolition works, access to the structures was limited and recording was undertaken from the edges of the gasholder tanks.
- 1.4 Due to work restrictions in place due to Covid-19 it was not possible for TEP staff to visit the site during the demolition of Gasholder 2 and this report includes images provided by the demolitions contractor, KDC Ltd.
- 1.5 A site visit was undertaken on 5th February 2020. The interior of the gasholders were photographically recorded to include general views of the tank and details of the crown frame and sheeting, top curb, inlet and outlet pipes, and the construction of the lifts.
- 1.6 The main LHER record is PRN19999, the event number for the 2018 recording is PRN42302/ELA3060; the event number for the 2020 recording is PRN42395/ELA3093.

## 2.0 Gasholder 1

- 2.1 Gasholder 1 was a four-lift spiral-guided gasholder with a below-ground tank, constructed in 1955 by Ashmore, Benson and Pease. The gasholder replaced an earlier column-guided gasholder which was built in 1869 by Thomas Piggot & Son of Birmingham, who also constructed Gasholder 2 in 1885. Aerial views of the site held at the Britain from Above archive show that the former Gasholder 1 was a giant single-order gasholder closely resembling Gasholder 2 (EAW034000 *not reproduced*). The tank had a diameter of 46.3m and was sunk to a depth of 9.1m, with a total storage capacity of 54,476 cubic meters (cu. m.)
- 2.2 At the time of recording the majority of the crown sheeting, crown frame and lifts had been removed. A small section of the inner lift on the north east side of the tank remained in place with a section of crown sheeting and supporting frame still attached. The crown sheeting comprised concentric rings of steel sheets, riveted at the edges and with hydraulic lids to the inlet / outlet pipes.
- 2.3 The crown frame arrangement was typical for a spirally-guided gasholder of the mid-20th century, comprising 30 primary and secondary radial trusses springing from a central pipe to meet vertical stiffeners on the inside face of the inner lift. The upper chords were comprised of Tees joined by angles to the underlying flat bar lower chords. The trusses were joined to each other with flat bar purlins which support the crown sheets. Tapered gusset plates were used to join the trusses to the vertical stiffeners and flat bar braces spanned from the gusset plates to the bottom of the central pipe.
- 2.4 The lifts were each formed of eight courses of welded steel sheets supported by vertical stiffeners (C-section rolled steel joists). Manholes were noted near the base of the lifts; these allowed passage into the gasholder when the lifts were aligned.
- 2.5 The tank was observed to be faced with red brick in English bond with regularly spaced masonry blocks corresponding with the position of vertical roller guides for the former early column-guided gasholder. Other examples tanks of this period were noted as having small relieving arches at the base of the tank but due to the level of water within the annulus this could not be confirmed here.
- 2.6 The former column pads were utilised to carry the later roller carriages; the intervening roller carriages were set onto concrete pads at the tank kerb and secured to the tank by long anchor bolts for which straps were fixed to the face of the tank.
- 2.7 The gasholder lacked a prominent dumpling and was effectively flat with slight declines around the edges to form the annulus. No rest blocks were visible.

## 3.0 Gasholder 2

- 3.1 Gasholder 2 was a giant single-order column-guided gasholder with two lifts and was constructed in 1885 by Thomas Piggot & Co. It was recorded during the previous survey that each of the 17 cast iron columns was c1m at the base and had a toroidal base set onto stone or concrete footing blocks measuring 1.4m in width.
- 3.2 As also observed in Gasholder 1, the base of the tank was essentially flat with no annulus and with a slight depression around the edge of the tank. At the centre of the gasholder was a square column of concrete blocks which served to support the crown frame when at rest. The rest blocks were comprised of simple rectangular blocks of stone or concrete.
- 3.3 The crown frame was comprised of primary and secondary rafters radiating from a central post to join stiffeners on the inside face of the first lift. The rafter upper chords comprised steel Tees joined to the circular bar lower chords with perpendicular angle struts and diagonal circular braces. The rafters were joined by regularly spaced lines of angle purlins. The crown top curb was provided additional support by closely spaced tapered gussets of which three were set between each rafter.
- 3.4 The lifts were formed of c12 courses of small riveted sheets. This form of sheeting is more typical of 19th century gasholders and in later gasholders, particularly spirally-guided examples, lift sheets became taller and much wider. On the inner or first lift an uncommon arrangement was utilised for the vertical stiffeners comprising a vertical bar attached to the lift, rising from the bottom of the lift to the rafter gusset plates. From this were projected outward a series of perpendicular arms joined together by a vertical tensioning bar. On the outer lift a more typical form of stiffener comprising shallow channels were used.
- 3.5 The tank was faced with red brick in English Garden Wall bond with the kerb formed of stone blocks. The column footing pads were set flush with the brickwork and the vertical guide channels were bolted to small masonry blocks set into the tank.
- 3.6 With the crown sheeting removed a clearer view of the substantial hydraulic lid connecting to the top of the inlet / outlet pipe was possible.



## 4.0 Buildings

- 4.1 Two buildings remained extant at the time of this survey; these had in the previous site investigation been identified as comprising the Governor House and Workshop but access to the interior was not possible at that time.
- 4.2 The Governor House was a brick building with gabled roof and with smaller extensions housing an electrical switch room. The building was fairly plain with no decoration and included a number of visible alterations to the fenestration. A number of gas mains and valves remained connected to the building. A sub-basement level allowed access to the underside of the iron grate floor, providing access to the lower part of the pipes. RSJs spanning between the walls allowed for moving of heavy equipment in the room and for suspending of pipes or equipment. The roof was comprised of wooden and steel trusses.
- 4.3 The workshop occupied a simple rectangular open plan and was open to the roof. The large windows included metal grills on the inside face and had concrete lintels and sills. The building had a concrete floor and the roof was supported on modern steel trusses. No fixtures or fittings remained within the building.

## 5.0 Conclusion

- 5.1 Recording during the demolition of the two gasholders has demonstrated the character and design of the two structures, showing them to be typical of the type of gasholder and the period of construction of each.
- 5.2 Gasholder 1 was built in 1955 to replace a late 19th century column-guided example and utilised the existing tank of that structure. This was a very common development on gasworks and allowed the site to considerably increase its storage capacity without having to expand the gasholder site since spirally guided gasholders could accommodate more lifts than their column guided counterparts and were cost-effective and easier to maintain. The gasholder crown was trussed using the commonly found system of radiating trusses of angles and tees joined to a central pipe and vertical stiffeners on the lift sides.
- 5.3 Gasholder 2 was constructed in 1885 as a column-guided gasholder with below ground tank and two lifts and remained essentially unaltered until the time of recording. Many mid to late 19th century gasholders incorporated a static frame to support the crown when at rest; this would generally take the form of upright wooden posts and rails rising from the tank base such as was recorded at Salford, Liverpool Street. This design gave way to trussed crowns in which the crown support was fixed to the crown, rising and falling with it. The crown frame of Gasholder 2 resembles the more typical lightweight form which came to be utilised throughout the 20th century; other contemporary gasholders of this period such as Gasholder 2 at Macclesfield Black Lane (1884) and Gasholder 7 at Fulham (1879) used a heavier arrangement of lattice girders forming the crown frame trusses. The gasholder utilised an less common form of vertical stiffener on the inner lift comprising projecting arms and vertical tensioning bar instead of the more frequently used RSJ or channel arrangement.
- 5.4 The tanks were faced in brick, which in Gasholder 1 was arranged in English bond and in Gasholder 2 in English garden wall bond, these varieties both being commonly found in gasholder tanks as it is considered a stronger form of brickwork. Neither gasholder included a dumpling and the tanks had flat bases; this was likely a response to the site ground conditions.

## 6.0 Photographic Survey



*Figure 1 Gasholder 1, view of the crown frame, showing trusses spanning between the central pipe and gusset plates attached to vertical stiffeners*



*Figure 2 Gasholder 1, the crown during removal. Note hydraulic lid to pipe*



*Figure 3 Gasholder 1, the gasholder interior with crown frame removed*



*Figure 4 Gasholder 1, view of the brick tank with lifts removed*



*Figure 5 Gasholder 2, the crown frame during demolition*



*Figure 6 Gasholder 2, view of the central crown frame supporting column*



*Figure 7 Gasholder 2, view of the inner lift showing the top curb and vertical stiffeners*



*Figure 8 Gasholder 2, view of the brick tank following removal of the ifts*



*Figure 9 Interior of the Workshop*



Figure 10 Interior of the Governor House



Figure 11 Interior of the Governor House with floor removed



## References

Bassir, A, 2018, *Historic Building Recording of Gasholders at the Ribbleton Lane Gasholder Station, Preston, Lancashire, September 2018*, Museum of London Archaeology, Report 18/115

CIfA 2015 *Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings and Structures*, Chartered Institute for Archaeologists

HE 2015 *Management of Research Projects in the Historic Environment (MoRPHE)* Historic England

HE 2016 *Understanding Historic Building: A Guide to Good Recording Practice*, Historic England

HE 2019 *Gasworks and Redundant Gasholders: Guidelines for their Evaluation and Recording*, Historic England

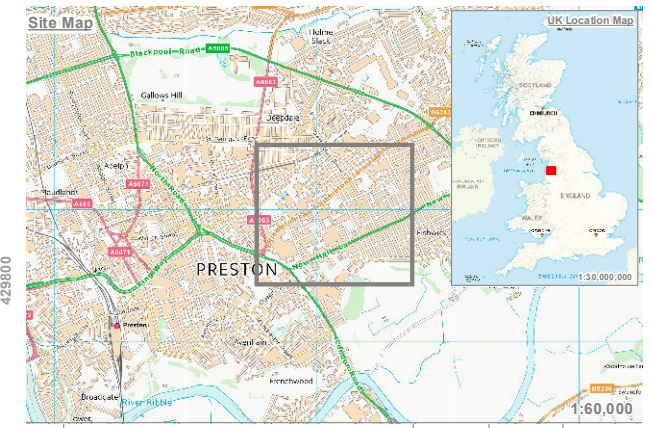
TEP 2019 *Written Scheme of Investigation for Historic Building Recording of Gasholders at Ribbleton Lane, Preston, Lancashire*, The Environment Partnership.



**KEY**

- Recording area
- Surveyed gasholders

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Rev	Description	Drawn	Approved	Date

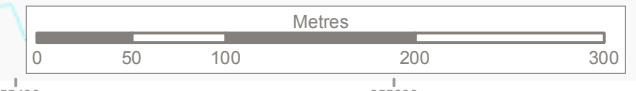
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Project  
**Ribbleton Lane, Preston**

Title  
**Site Location Showing the Surveyed Gasholders**

Drawing Number  
**G8065.001**

Drawn	Checked	Approved	Scale	Date
AB	SA	JC	1:4,000 @ A3	08/06/2020



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DSC04369



DSC04678



DSC04684



DSC04687



DSC04709 tweaked



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DSC04710



DSC04711



DSC04712



DSC04720



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IMG\_8166



IMG\_8168



IMG\_8169



IMG\_8170



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