### **Cultural Heritage Impact Assessment:**

Survey and Assessment of Kiln 5, Kiln 6 and the Associated Infrastructure at the PPC Slurry Plant, near Mahikeng, Mahikeng Local Municipality, Ngaka Modiri Molema District Municipality, North West Province



For

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#### **Executive Summary**

This report contains a comprehensive heritage impact assessment investigation in accordance with the provisions of Sections 38(1) and 38(3) of the *National Heritage Resources Act* (Act No. 25 of 1999) (NHRA) and focuses on the survey results from a Phase 2 cultural heritage survey as requested by Savannah Environmental.

PPC Slurry plans to decommission and demolish Kiln 5 and 6 and the associated infrastructure at the cement plant which is situated on various portions of the farms Rietvlei 102 JO and Benadeplaats 93 JO. The plant is located adjacent to the R49 approximately 22 km east of Mahikeng in the Mahikeng Local Municipality, Ngaka Modiri Molema District Municipality, North West Province. The Phase 2 Cultural Heritage Impact Assessment (HIA) was requested by Savannah Environmental on behalf of the client to evaluate the age and significance of the sections of the plant earmarked for demolition.

Although several cultural heritage surveys have been completed at PPC Slurry during the last 10 years (Coetzee 2008, 2014; Coetzee & Reeks 2010, 2012) none focussed specifically on the chronological development of the cement plant itself. Several aerial photographs, historical maps and the institutional memory of PPC management were used to place Kilns 5 and 6 within the chronological sequence of the plant.

Although PPC Slurry produced its first cement in 1916, it seems that management decided to convert operations from the wet process to the dry mix system in 1958. This resulted in the construction of Kiln 5 and later Kiln 6 during the late 1950s.

Site No	Site Type	Field Rating of Significance	Direct Impacts	Significance of Impact before Mitigation	Significance of Impact after Mitigation	Proposed Mitigation
Kiln 5	Horizontal dry kilns	Generally Protected C: Low Significance	Destruction	30 (Low)	30 (Low)	<ul> <li>None</li> <li>Site sufficiently recorded</li> <li>Destruction permit from SAHRA or PHRA-NW</li> </ul>
Kiln 6	Horizontal dry kilns	Not older than 60 years	Destruction	-	-	<ul><li>None</li><li>Site sufficiently recorded</li></ul>

Based on the Phase 2 research and results, the following is recommended:

- The exact date of completion of Kiln 5 is not clear but aerial photographs confirm that the kiln was near completion in 1958 and probably operational in 1959;
- As a result, Kiln 5 is on the cusp of being older than 60 years and therefore protected by the NHRA (Act No. 25 of 1999);
- The exact date of completion of Kiln 6 is not clear but aerial photographs confirm that the kiln was completed (and possibly already in operation) in 1961;
- As a result, Kiln 6 is therefore not older than 60 years and therefore do not fall under the NHRA (Act No. 25 of 1999);
- Both Kilns and their associated infrastructure have been sufficiently mapped, described and photographed and no further industrial archaeological or historical research is recommended;
- It has been confirmed that the kiln design and layout are very common in South Africa and that similar kilns are still in operation at some plants, as a result a low rating of significance is awarded; and

• An application for a Destruction Permit for Kilns 5 and 6 and the associated infrastructure may be applied for from SAHRA or PRHA-NW.

#### **Definitions and abbreviations**

Midden:	Refuse that accumulates in a concentrated heap.
Stone Age:	An archaeological term used to define a period of stone tool use and manufacture
Iron Age:	An archaeological term used to define a period associated with domesticated
	livestock and grains, metal working and ceramic manufacture
LIA:	Late Iron Age sites are usually demarcated by stone-walled enclosures
NHRA:	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA:	South African Heritage Resources Agency
SAHRIS:	South African Heritage Resources Information System
PHRA-G:	Provincial Heritage Resources Authority - Gauteng
GDARD:	Gauteng Department of Agriculture and Rural Development
HIA:	Heritage Impact Assessment
DMR:	Department of Mineral Resources
DENC:	Department of Environment and Nature Conservation: Northern Cape
I&APs:	Interested and Affected Parties

I, Francois Coetzee, hereby confirm my independence as a cultural heritage specialist and declare that I do not have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of the listed environmental processes, other than fair remuneration for work performed on this project.

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## **Contents**

Introduction and Terms of Reference	7
2. Objectives	7
B. Description of Physical Environment of Study Area	7
4. Proposed Project Description	11
5. Legal Framework	15
5. Study Approach/Methodology	17
6.1 Review of existing information/data	17
6.2 Site visits	24
6.3 Social interaction and current inhabitants	24
6.4 Public Consultation and Stakeholder Engagement	24
A Public Participation process will be conducted within the following few weeks	24
6.5 Assumptions, restrictions, gaps and limitations	24
7. The Cultural Heritage Sites	26
7.1 Heritage sites	26
<i>Locations and Evaluation of Sites</i>	26
<i>P. Recommendations and Conclusions</i>	27
10. References	28
Addendum 1: Description of the Recorded Sites	30
Addendum 2: Surveyor General Farm Diagram	37

## Figures

Figure 1: Regional map of the survey area (situated east of Mahikeng)
Figure 2: Regional context of the survey footprint located east of Mahikeng (indicated by the
red area)9
Figure 3: Local context of the survey footprint (1:250 000 Topographical Map 2524)9
Figure 4: The survey area as indicated on the 1:50 000 topographic map 2525DD (1998)10
Figure 5: Survey area within general context (Google Earth Pro 2018)10
Figure 6: Survey area within local context (Google Earth Pro 2001)11
Figure 7: Survey area within local context (Google Earth Pro 2018)11
Figure 8: The position of Kiln 5 and Kiln 6 and the associated structure earmarked for
demolition
Figure 9: The location of Kiln 5 and Kiln 6 and their associated infrastructure within the
plant layout
Figure 10: Recorded survey tracks for the project17
Figure 11: Jeppe's Map dating to 1899 indicates the location of the farm Rietvlei 102 JO18
Figure 12: War Office Map indicating the location of the survey area in 189918
Figure 13: The survey area as indicated on the 1:50 000 topographic map 2525DD (1968) 19
Figure 14: Aerial photograph of the PPC Plant in 1958 (showing only Kiln 5)19
Figure 15: Aerial photograph of the PPC Plant in 1963 (showing both Kiln 5 and 6)20
Figure 16: Aerial photograph of the PPC Plant in 1975 (showing only Kiln 5)20
Figure 17: Oblique aerial photograph of the PPC Plant probably during the last 1950s
(showing only Kiln 5)
Figure 18: Oblique aerial photograph of the PPC Plant probably during the last 1950s
(showing only Kiln 5)
Figure 19: Oblique aerial photograph of the PPC Plant probably during the last 1950s
(showing only Kiln 5)

HIA: Survey and Assessment of Kiln 5, Kiln 6 and the Associated Infrastructure at the PPC Slurry Plant, North West Province

Figure 20: Location of the kilns 5 and 6 and their associated infrastructure	26
Figure 21: General view of Kilns 5 and 6 and the associated infrastructure	36
Figure 22: Surveyor General's sketch of the farm Rietvlei 102 JO which was first surveyed	in
1904	37
Figure 23: Surveyor General's sketch of the farm Benadeplaats 93 JO which was first	
surveyed in 1924	38

## Tables

Table 1: Physical Environment	7
Table 2: Socio-economic environment	8
Table 3: Activities that trigger Section 38 of the NHRA	15
Table 4: Field rating system to determine site significance	16
Table 5: PCC Timeline	24
Table 6: Location and evaluation of site	26

#### 1. Introduction and Terms of Reference

A general cultural heritage survey (Phase 1) was conducted for PPC Slurry of the entire Mining Rights Area in 2008 (Coetzee 2008). This survey was followed by several additional studies focussing on PV solar energy (Coetzee 2014), historical lime kilns (Coetzee & Reeks 2010) and the historical steel-framed shed (Coetzee & Reeks 2012). Please note that none of these surveys focussed on the history and development of the cement processing plant itself.

PPC Slurry plans to decommission and demolish Kiln 5 and 6 and the associated infrastructure at the cement plant which is situated on various portions of the farms Rietvlei 102 JO and Benadeplaats 93 JO. The plant is located adjacent to the R49 approximately 22 km east of Mahikeng in the Mahikeng Local Municipality, Ngaka Modiri Molema District Municipality, North West Province. The Phase 2 Cultural Heritage Impact Assessment (HIA) was requested by Savannah Environmental on behalf of the client to evaluate the age and significance of the sections of the plant earmarked for demolition.

#### 2. Objectives

The specific objectives of this report is as follows:

- Conduct background and archival research on the relevant sections of the plant
- Mapping and documentation of all the associated features
- Apply for a destruction permit from SAHRA on behalf of the client

#### 3. Description of Physical Environment of Study Area

The PPC Slurry Plant is situated approximately 22 kilometres east of Mahikeng, North West Province.

Farm Name(s) and Portions	Rietvlei 102 JO
	• Portion 5
Size of Survey Area	270 m x 52 m
Magisterial District	Mahikeng Local Municipality
	Ngaka Modiri Molema District Municipality
1:50 000 Map Sheet	2525DD
1:250 0000 Map Sheet	2524
Central Coordinates of the	25.843633°E
Development	25.815584°S

 Table 1: Physical Environment

The northern parts of the survey area falls within the Savanna Biome, particularly the Central Dry Highveld Grassland Bioregion and more specifically the Carletonville Dolomite Grassland (Gh 15). This veld type occurs in North West (mainly) and Gauteng as well as marginally into the Free State Province. It occurs in Potchefstroom, Ventersdorp and Carletonville, extending westwards to the vicinity of Ottoshoop, but also occurring as far east as Centurion and Bapsfontein in Gauteng Province (Mucina & Rutherford 2006).

The proposed area of development is situated south of the Zeerust - Mafikeng Road (R49) located in the Mahikeng Local Municipality, Ngaka Modiri Molema District Municipality, North West Province. As a result of nearly 90 years of extensive and intensive surface mining activities and infrastructure development the survey area has been severely disturbed. Apart

from infrastructure development (roads, accommodation, pipelines, a canal, power lines, plant buildings and associated structures) and mining and prospecting activities, some areas were also used for agriculture and grazing pastures for livestock.

Mahikeng normally receives about 442 mm of rain per year, with most rainfall occurring mainly during mid-summer. The region receives the lowest rainfall (0 mm) in June and the highest (89 mm) in January. The monthly distribution of average daily maximum temperatures indicates that the average midday temperatures for the region range from 19°C in June to 31.8°C in January. The region is the coldest during July when the mercury drops to 0°C on average during the night (SAExplorer 2018).

Current Zoning	Mining
Economic activities	Farming
	Manufacturing
	Mining
Prior activities	Livestock farming and agriculture
Evaluation of Impact	An evaluation of the impact of the development on heritage resources
	relative to the sustainable social and economic benefits NHRA (Act No.
	25 of 1999, Section 38(3d)): Positive

 Table 2: Socio-economic environment



Figure 1: Regional map of the survey area (situated east of Mahikeng)



Figure 2: Regional context of the survey footprint located east of Mahikeng (indicated by the red area)



Figure 3: Local context of the survey footprint (1:250 000 Topographical Map 2524)



Figure 4: The survey area as indicated on the 1:50 000 topographic map 2525DD (1998)



Figure 5: Survey area within general context (Google Earth Pro 2018)



Figure 6: Survey area within local context (Google Earth Pro 2001)



Figure 7: Survey area within local context (Google Earth Pro 2018)

#### 4. Proposed Project Description

PPC Slurry plans to decommission and demolish Kiln 5 and Kiln 6 and the associated infrastructure at the plant. These are both horizontal (tubular) dry kilns that rotate during operation. Although the plant has been in operational since 1916, it has been confirmed by management that Kiln 5 was probably operational in 1959 and Kiln 6 in 1961. These dates broadly fall within the period during which the plant converted to a more efficient and cost effective dry-mix system from 1958.

The following structures associated with Kiln 5 will be demolished:

- Kiln Shell
- Refractory including kiln, cooler tubes and smoke chamber
- Drive Housing
- Cooler Tubes

- Dust bin
- Drive housing floor slab
- Walkway
- Lubrication Store Concrete
- Lubrication Store Brickwork
- Feed End Substation Concrete
- Feed End Substation Brickwork
- Kiln 5 Pier 1-6
  - Concrete piers
  - o Access platforms, Stairs and Railings
  - Riding Ring at Pier 1
  - Riding Ring at Pier 2
  - Riding Ring at Pier 3
  - Riding Ring at Pier 4
  - Riding Ring at Pier 5
  - Riding Ring at Pier 6
- Stack STA1
  - o Concrete
  - o Refractory
  - o Stairway and platforms
  - Duct from Stack STA1 to Lurgi Filter EF9 including supports

The following structures associated with Kiln 6 will be demolished:

- Kiln Shell
- Refractory including kiln, cooler tubes and smoke chamber
- Drive Housing
- Cooler Tubes
- Dust bin
- Drive housing floor slab
- Walkway
- Feed End Substation Concrete
- Feed End Substation Brickwork
- Kiln 6 Pier 1-7
  - Concrete piers
  - o Access platforms, Stairs and Railings
  - o Riding Ring at Pier 1
  - o Riding Ring at Pier 2
  - $\circ~$  Riding Ring at Pier 3 This Drive Station concrete works to remain intact No demolition required
  - o Riding Ring at Pier 4
  - Riding Ring at Pier 5
  - o Riding Ring at Pier 6
- Smoke Chamber
  - Smoke chamber housing
  - Smoke chamber platework
  - Smoke box chamber concrete structure
- Buell Filter CL3
  - o Buell Filter Cyclone Housing
  - $\circ \quad \text{ID Fan F14 housing} \quad$

- Dust collector and outlet ducting
- Ducting For Lurgi Filter EF9 To Stack STA3
  - Support Trestle & Ducting
- Raw Meal Silos RM1 & RM2 & Nearby Structures
  - Silo concrete roof, walls, underbin slab, extraction tunnel etc.
  - Feed structure to raw mix silos (including Hoppers)
- Raw Meal Blending Bins 1 to 12 & Support Structures
  - o Blending Bin housing structure
  - o Blending bins
  - Elevators Housing
- Airslide and Support to RM3 & RM4
  - Airslide and support structure
- Coal Mill NO1 & NO2
  - This structures concrete works to remain intact no civil work demolition required



Figure 8: The position of Kiln 5 and Kiln 6 and the associated structure earmarked for demolition



Figure 9: The location of Kiln 5 and Kiln 6 and their associated infrastructure within the plant layout

## 5. Legal Framework

- Section 38 of the NHRA (Act No. 25 of 1999) stipulates that the following activities trigger a heritage survey:

Development criteria in terms of Section 38(1a-e) of the NHRA (Act No. 25 of 1999)		
Construction of road, wall, powerline, pipeline, canal or other linear form of		
development or barrier exceeding 300m in length	(Total)	
Construction of bridge or similar structure exceeding 50m in length	No	
Development exceeding 5000 m <sup>2</sup> in extent	No	
Development involving three or more existing erven or subdivisions		
Development involving three or more erven or divisions that have been consolidated		
within past five years		
Rezoning of site exceeding 10 000 m <sup>2</sup>	No	
Any other development category, public open space, squares, parks, recreation grounds		

## Table 3: Activities that trigger Section 38 of the NHRA

- Field rating system as recommended by SAHRA:

Field Rating	Grade	Significance	Recommended Mitigation
National Significance	Grade I	High significance	Conservation by SAHRA, national site nomination, mention any relevant international ranking. No alteration whatsoever without permit from SAHRA.
Provincial Significance	Grade II	High significance	Conservation by provincial heritage authority, provincial site nomination. No alteration whatsoever without permit from provincial heritage authority.
Local Significance	Grade III-A	High significance	Conservation by local authority, no alteration whatsoever without permit from provincial heritage authority. Mitigation as part of development process not advised.
Local Significance	Grade III-B	High significance	Conservation by local authority, no external alteration without permit from provincial heritage authority. Could be mitigated and (part) retained as heritage register site.
Generally Protected A	Grade IV-A	High/medium significance	Conservation by local authority. Site should be mitigated before destruction. Destruction permit required from provincial heritage authority.

Generally Protected B	Grade IV-B	Medium significance	Conservation by local authority. Site should be recorded before destruction. Destruction permit required from provincial heritage authority.
Generally Protected C	Grade IV-C	Low significance	Conservation by local authority. Site has been sufficiently recorded in the Phase 1 HIA. It requires no further recording before destruction. Destruction permit required from provincial heritage authority.

Table 4: Field rating system to determine site significance

- Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and they are valuable, finite, non-renewable and irreplaceable.
- All archaeological remains, features, structures and artefacts older than 100 years and historic structures older than 60 years are protected by the relevant legislation, in this case the National Heritage Resources Act (NHRA) (Act No. 25 of 1999, Section 34 & 35). The Act makes an archaeological impact assessment as part of an EIA and EMPr mandatory (see Section 38). No archaeological artefact, assemblage or settlement (site) may be moved or destroyed without the necessary approval from the South African Heritage Resources Agency (SAHRA). Full cognisance is taken of this Act in making recommendations in this report.
- Cognisance will also be taken of the Mineral and Petroleum Resources Development Act (Act No 28 of 2002) and the National Environmental Management Act (Act No 107 of 1998) when making any recommendations.
- Human remains older than 60 years are protected by the NHRA, with reference to Section 36. Human remains that are less than 60 years old are protected by the Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003 as well as local Ordinances and regulations.
- With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise.
- The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3, and the Australian ICOMOS (International Council on Monuments and Sites) Charter (also known as the Burra Charter) are used when determining the cultural significance or other special value of archaeological or historical sites.
- A copy of this report will be submitted on SAHRIS as stipulated by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), Section 38 (especially subsection 4) and the relevant Provincial Heritage Resources Authority (PHRA).
- Note that the final decision for the approval of permits, or the removal or destruction of sites, structures and artefacts identified in this report, rests with the SAHRA (or relevant PHRA).

#### 6. Study Approach/Methodology

Geographical information (KML shapefiles) of the survey area was supplied by Savannah Environmental. The most up-to-date Google Earth images and topographic maps were used to indicate the survey area. Topographic maps were sources from the Surveyor General. Please note that all maps are orientated with north facing upwards (unless stated otherwise). Older historical maps were also consulted. PPC Slurry Management was asked to supply any information and photographs on the history and sequence of the plant.

The strategy during this survey was to survey the complete footprint that forms part of the application.



Figure 10: Recorded survey tracks for the project (tracklog=yellow lines; red lines=outline of kiln structure site).

#### 6.1 Review of existing information/data

Additional information on the cultural heritage of the area was sourced from the following records:

- National Mapping Project by SAHRA (which lists heritage impact assessment reports submitted for South Africa);
- Environmental Potential Atlas (ENPAT);
- Online SAHRIS database;
- National Automated Archival Information Retrieval System (NAAIRS);
- Maps and information documents supplied by the client; and
- Historical aerial photographs and maps



Figure 11: Jeppe's Map dating to 1899 indicates the location of the farm Rietvlei 102 JO



Figure 12: War Office Map indicating the location of the survey area in 1899



Figure 13: The survey area as indicated on the 1:50 000 topographic map 2525DD (1968)



Figure 14: Aerial photograph of the PPC Plant in 1958 (showing only Kiln 5)



Figure 15: Aerial photograph of the PPC Plant in 1963 (showing both Kiln 5 and 6)



Figure 16: Aerial photograph of the PPC Plant in 1975 (showing only Kiln 5)



Figure 17: Oblique aerial photograph of the PPC Plant probably during the last 1950s (showing only Kiln 5)



Figure 18: Oblique aerial photograph of the PPC Plant probably during the last 1950s (showing only Kiln 5)



Figure 19: Oblique aerial photograph of the PPC Plant probably during the last 1950s (showing only Kiln 5)

1888	Edouard Lippert gets permission from Paul Kruger, President of the Transvaal Republic, to build the first local cement factory outside of Pretoria.
1892	Edouard Lippert registers De Eerste Cement Fabrieken Beperkt.
1902	De Eerste Cement Fabrieken Beperkt changes its name to The First Portland Cement

	Factory Limited.
1908	The First Portland Cement Factory changes its name to the Pretoria Portland Cement Company Limited and declares its first dividend.
1910	PPC is listed on the JSE.
1916	PPC's new Slurry factory in the North West Province produces its first cement.
1921	PPC establishes the Cape Portland Cement Company and builds a factory at De Hoek.
1927	PPC floats the Eastern Province Cement Company and builds a cement factory on the outskirts of Port Elizabeth.
1937	PPC's Jupiter factory in Germiston produces its first cement.
1946	PPC purchases property that will eventually become the Riebeeck operation.
1949	PPC commissions its new factory in Orkney.
1956	PPC begins the planning and construction of the Riebeeck cement factory.
1958	PPC's Slurry operation converts from the wet process to the dry mix system.
1960	The Riebeeck cement factory is commissioned.
1977	PPC becomes a subsidiary of the Barlow Rand Group.
	The Cape Portland Cement Company becomes a full subsidiary of PPC.
	PPC acquires the Northern Lime Company and enters the lime market.
1984	PPC's Dwaalboom cement plant is completed, but mothballed due to the economic recession.
1992	PPC celebrates its centenary year.
1994	PPC signs an agreement with Botswana Development Corporation to construct a cement blending plant and depot in Gaborone.
1996	PPC commissions its Gaborone cement blending plant and depot.
	PPC launches its SureBuild general purpose cement to the Botswana market.
	PPC acquires the Laezonia quarry in Muldersdrift.
1997	PPC's materials handling facility at Saldanha Steel in the Western Cape comes online.
1998	The mothballed Dwaalboom plant is recommissioned.
1999	PPC acquires the Kgale quarry in Botswana.
2001	PPC acquires ownership of Portland Holdings Limited, Zimbabwe's top cement

	company.	
	PPC purchases the Mooiplaas dolomite quarry on the outskirts of Pretoria.	
2003	PPC is included in the FTSENSE Top 40 Companies index.	
2006	PPC becomes a constituent of the JSE Socially Responsible Investment Index.	
2007	PPC is unbundled from Barloworld.	
2008	PPC establishes its first broad-based black economic empowerment (B-BBEE) transaction.	
2009	PPC achieves Level 3 B-BBEE contributor rating.	
	PPC launches South Africa's first 3-D branded cement tankers.	
2010	PPC achieves Level 2 B-BBEE contributor rating, the highest in the cement industry.	
	PPC celebrates 100 years on the JSE.	
2011	PPC acquires three aggregate quarries from Quarries of Botswana for USD6.8- million.	
2012	PPC and IDC jointly acquire a 47% equity stake (USD21-million) in Ethiopia's Habesha Cement Share Company.	
	PPC announces its second-phase B-BBEE transaction, resulting in 26% black ownership of PPC South Africa.	
	PPC launches its Express Outlet Pilot Project to local entrepreneurs.	
	PPC's Nolwandle Mantashe is named Transformation Champion of the Year at the 2012 Van Ryn's Black Business Quarterly (BBQ) Awards.	
	Pretoria Portland Cement (PPC) Company Limited changes its name to PPC Ltd.	
2013	PPC signs MoU with DRC's Barnet Group to build USD230-million cement factory in DRC.	
	PPC Zimbabwe announces its plans to construct a new cement plant to service the Harare and central Mozambique markets.	
2014	PPC Barnet DRC signs engineering contract with China's Sinoma International Engineering Company for construction of DRC cement plant.	
	PPC launches SureBuild cement to Zimbabwean market.	
	PPC launches Cement and Concrete Cube (C3), a subject-specific information- sharing platform for cement and concrete.	
2015	PPC Zimbabwe breaks ground at its Msasa plant.	

	PPC launches PPC Imaginarium Awards.
2017	PPC Zimbabwe officially commissions new Harare mill.

#### Table 5: PCC Timeline

It seems that in 1892, South Africa's first cement plant was established on the outskirts of Pretoria by Edouard Lippert under the name De Eerste Cement Fabrieken Beperkt, to counter the exorbitant cost of importing cement from Europe. This same facility, today known as PPC's Hercules cement plant, is still in operation today, 125 years after it was first established.

Ten years after the establishment of the plant, in 1902, De Eerste Cement Fabrieken Beperkt changed its name to The First Portland Cement Factory Limited, and six years after that it changed again, this time to the name we all know today: Pretoria Portland Cement. In 1910, 18 years after its inception, PPC was listed on the Johannesburg Stock Exchange. In the 107 years since that listing, the company has grown to become South Africa's largest cement producer, surviving two world wars, several recessions, and the booms and busts of the cement market.

The Surveyor General's map of the farm Rietvlei 102 JO confirms that the farm was first surveyed in 1904 and the Title Deed was granted to F.F.J. Steyn in 1857. The farm Benadeplaats 93 JO farm was first surveyed in 1924 and the Title Deed was granted to G.G.C. Benade (also see Addendum 3).

#### 6.2 Site visits

The field survey was conducted on 30 October 2018.

#### 6.3 Social interaction and current inhabitants

The environmental officer and other senior personnel were consulted on the historical sequence of the cement plant.

#### 6.4 Public Consultation and Stakeholder Engagement

A Public Participation process will be conducted within the following few weeks.

#### 6.5 Assumptions, restrictions, gaps and limitations

No severe physical restrictions were encountered as the survey area was fairly accessible.

#### 6.6 Methodology for assessment of potential impacts

All impacts identified during the EIA stage of the study will be classified in terms of their significance. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The **physical exten**t, wherein it is indicated whether:
  - $\circ$  1 the impact will be limited to the site;

- $\circ$  2 the impact will be limited to the local area;
- $\circ$  3 the impact will be limited to the region;
- 4 the impact will be national; or
- $\circ$  5 the impact will be international.
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - $\circ$  1 of a very short duration (0–1 years);
  - 2 of a short duration (2-5 years);
  - 3 of a medium-term (5–15 years);
  - $\circ$  4 of a long term (> 15 years); or
  - 5 permanent.
- The **magnitude** of impact, quantified on a scale from 0-10, where a score is assigned:
  - $\circ$  0 small and will have no effect;
  - 2 minor and will not result in an impact;
  - 4 low and will cause a slight impact;
  - o 6 moderate and will result in processes continuing but in a modified way;
  - 8 high, (processes are altered to the extent that they temporarily cease); or
  - $\circ$  10 very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring and is estimated on a scale where:
  - 1 very improbable (probably will not happen);
  - 2 improbable (some possibility, but low likelihood);
  - 3 probable (distinct possibility);
  - 4 highly probable (most likely); or
  - o 5 definite (impact will occur regardless of any prevention measures);
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
  - The degree to which the impact can be reversed;
  - $\circ$  The degree to which the impact may cause irreplaceable loss of resources; and
  - The degree to which the impact can be mitigated.

The significance is determined by combining the criteria in the following formula:

- $S = (E+D+M) \times P$ ; where:
- S = Significance weighting
- E = Extent
- D = Duration
- M = Magnitude
- P = Probability

Points	Significance Weighting Discussion	
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60	Medium	Where the impact could influence the decision to
point	Wedfulli	develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

#### 7. The Cultural Heritage Sites

#### 7.1 Heritage sites

The main focus of the survey is the recording and assessment of Kiln 5 and 6 and their associated infrastructure. Although the exact date of completion of Kiln 5 is not clear, it seems that aerial photographs and management interviews confirm that the kiln was near completion in 1958 and probably operational in 1959. As a result, Kiln 5 is only just older than 60 years and therefore protected by the NHRA (Act No. 25 of 1999). The exact date of completion of Kiln 6 is also not clear but aerial photographs confirm that the kiln was completed in 1963, but possibly already in operation in 1961. As a result, Kiln 6 is not considered older than 60 years and therefore does not fall under the NHRA (Act No. 25 of 1999). The filters for both kilns were manufactured by FL Smidth & Co Ltd which was started in Denmark in 1882. They were also involved in the design of the rotary kiln since 1898 and have installed over 2000 of them worldwide.

It has also been confirmed that the design and layout of the kilns are very common in South Africa and that similar kilns are still in operation at some plants, as a result a low rating of significance is awarded.



Figure 20: Location of the kilns 5 and 6 and their associated infrastructure

#### 8. Locations and Evaluation of Sites

Site	Coordinates	Site Type	Field Rating of Significance	Impact	Proposed Mitigation
Kiln 5	25.843633°E 25.815584°S	Horizontal dry kilns	Generally Protected C: Low Significance	Destruction	<ul> <li>None</li> <li>Site sufficiently recorded</li> <li>Destruction permit from SAHRA or PHRA-NW</li> </ul>
Kiln 6	25.843633°E 25.815584°S	Horizontal dry kilns	Not older than 60 years	Destruction	<ul><li>None</li><li>Site sufficiently recorded</li></ul>

Table 6: Location and evaluation of site

#### 9. Recommendations and Conclusions

Based on the Phase 2 research and results, the following is recommended:

- The exact date of completion of Kiln 5 is not clear but aerial photographs confirm that the kiln was near completion in 1958 and probably operational in 1959;
- As a result, Kiln 5 is on the cusp of being older than 60 years and therefore protected by the NHRA (Act No. 25 of 1999);
- The exact date of completion of Kiln 6 is not clear but aerial photographs confirm that the kiln was completed (and possibly already in operation) in 1961;
- As a result, Kiln 6 is therefore not older than 60 years and therefore do not fall under the NHRA (Act No. 25 of 1999);
- Both Kilns and their associated infrastructure have been sufficiently mapped, described and photographed and no further industrial archaeological or historical research is recommended;
- It has been confirmed that the kiln design and layout are very common in South Africa and that similar kilns are still in operation at some plants, as a result a low rating of significance is awarded; and
- An application for a Destruction Permit for Kilns 5 and 6 and the associated infrastructure may be applied for from SAHRA or PRHA-NW.

Nature: Kiln 5 with associated infrastruc	ture		
	Without mitigation	With mitigation	
De-commissioning Phase			
Probability	Definite (5)	Definite (5)	
Duration	Permanent (5)	Permanent (5)	
Extent	Limited to the site (1)	Limited to the site (1)	
Magnitude	Small (0)	Small (0)	
Significance of Impact	<b>30</b> (Low)	<b>30</b> (Low)	
Status (positive or negative)	Neutral	Neutral	
Reversibility	Low	Low	
Irreplaceable loss of resources?	None	None	
Cumulative impacts and indirect impacts	Destruction		
Can impacts be mitigated?	Site sufficiently recorded.		
	Structures to be demolished/decommissioned and destruction		
	permit to be applied for accord	ingly.	
	No mitigation required.		

#### 10. References

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#### **Addendum 1: Description of the Recorded Sites**

A system for grading the significance of heritage sites was established by the NHRA (Act No. 25 of 1999) and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

#### Kilns 5 and 6

A. GENERAL SITE D	ESCRIPTION				
Site type	Industrial archaeology (Historical)				
Site Period	Mid 20 <sup>th</sup> century				
Physical description	The site comprises two main horizo installed during the late 1950s. Kiln operational in 1959. Kiln 6 was p buildings and infrastructure were operational buildings, silos, filters, mo	ontal (rotary) dry 5 was probably co probably only co constructed durin otors and piping w	kilns (Kilns 5 an ommissioned in 19 mpleted in 1961. ng and after this vere constructed.	d 6) th 58 and Variou time.	at were became as other Various
Integrity of deposits	Most of the steel, corrugated iron and	cement are in a s	table, but worn cor	ndition.	Most of
or structures	the technology is redundant and will be replaced with newer kilns.				
Site extent	Approximately 270 m x 52 m				
B. SITE EVALUATIO	N				_ N.7
B1. HERITAGE VALU	JE			Yes	No
Historic Value	a manuality on mattern of South Africa's	history on massal	anial histom	1	v
It has importance to the o	community of patient of South Africa's	nistory or precol	onial history.		
importance in the history	of South Africa	a person, group c	or organisation of		Λ
It has significance relating	ing to the history of slavery in South Afr	ica.			x
Aesthetic Value	is to the motory of shavery in South The	icu.		I	
It has importance in	exhibiting particular aesthetic chara	cteristics valued	by a particular		X
community or cultural gr	coup.		v 1		
Scientific Value					
It has potential to yield natural and cultural herit	information that will contribute to a	n understanding o	of South Africa's		Х
It has importance in de	emonstrating a high degree of creati	ve or technical a	achievement at a		X
particular period.					
It has importance to th	e wider understanding of the tempor	ral change of cul	ltural landscapes,		X
Sector Volue	luman occupation.				
It has strong or spacial	association with a particular comm	unity or cultural	group for social		v
cultural or spiritual reaso	cultural or spiritual reasons (sense of place).			Λ	
Tourism Value					
It has significance through	gh its contribution towards the promot	ion of a local soci	iocultural identity		X
and can be developed as	tourist destination.				
Rarity Value					
It possesses unique, unc	ossesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural X			Х	
heritage.					
Representative Value		C ( 1	1 60 1		N
It is importance in der	nonstrating the principle characteristi	cs of a particula	r class of South		X
R2 RECIONAL CONT	rat places of objects.				
Other similar sites in the	regional landscape				X
C. SPHERE OF SIGNI	FICANCE	High	Medium	L	ow
International		8		-	X
National					X
Provincial					X
Local	X				

Specific community		Х
D. FIELD REGISTER RATING		
National/Grade 1 [should be registered, retained]		
Provincial/Grade 2 [should be registered, retained]		
Local/Grade 3A [should be registered, mitigation not advised]		
Local/Grade 3B [High significance; mitigation, partly retained]		
Generally Protected A [High/Medium significance, mitigation]		
Generally protected B [Medium significance, to be recorded]		
Generally Protected C [Low significance, no further action]		Х
E. GENERAL STATEMENT OF SITE SIGNIFICANCE		
Low		Х
Medium		
High		
F. RATING OF POTENTIAL IMPACT OF DEVELOPME	INT	
None		
Peripheral		
Destruction		Х
Uncertain		
C DECOMMENDED MUTICATION		

#### G. RECOMMENDED MITIGATION

- Kiln 5: Site sufficiently recorded; Destruction permit from SAHRA or PHRA-NW
- Kiln 6: None

#### H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

• National Heritage Resources Act (Act No. 25 of 1999, Section 34)

#### I. PHOTOGRAPHS







HIA: Survey and Assessment of Kiln 5, Kiln 6 and the Associated Infrastructure at the PPC Slurry Plant, North West Province





HIA: Survey and Assessment of Kiln 5, Kiln 6 and the Associated Infrastructure at the PPC Slurry Plant, North West Province







Figure 22: Surveyor General's sketch of the farm Rietvlei 102 JO which was first surveyed in 1904

HIA: Survey and Assessment of Kiln 5, Kiln 6 and the Associated Infrastructure at the PPC Slurry Plant, North West Province



Figure 23: Surveyor General's sketch of the farm Benadeplaats 93 JO which was first surveyed in 1924

# **SPECIALIST TERMS OF REFERENCE**

#### 1. PROJECT SPECIFIC INFORMATION

#### Proposed decommissioning of kilns 5 & 6 at PPC Slurry Plant

PPC Ltd is the proposing the decommissioning of Kilns 5 & 6 at the PPC Slurry Plant, North West Province.

The PPC Slurry Kilns 5 and 6 were constructed in the 1950's and have come to the end of their effective operating life. PPC Ltd has therefore decided to demolish these two Kiln Lines with most of their associated ancillary plant infrastructure including Raw Mill 1, 2 and 3. The appointed Demolition Contractor will strip, demolish, load and remove everything off site, except for selected mechanical and electrical equipment which PPC Ltd wishes to keep (mechanical and electrical items will be off-loaded at the selected PPC Slurry salvage yard/stores). The demolished concrete and brickwork rubble will be disposed at the municipal dump site all arranged and paid for by the Demolition Contractor.

The PPC Slurry Plant is located about 25 km from Mafikeng on the R49 provincial road between Mafikeng and Zeerust in the North West Province (Figure 1). The proposed decommissioning of kilns 5 and 6 will take place on the following property:

» Portion 5 of the Farm Rietvallei 102 – JO.

#### 2. REPORT FORMAT

The following terms of reference include:

- » Field survey and assessment of proposed structures to be decommissioned;
- » Phase 2 Heritage Impact Assessment report;
- » Permit application for the destruction permit of the structures to be decommissioned; and
- » Documentation, GPS tracklogs, photographic records and mapping of the structures to be decommissioned in the Phase 2 Heritage Impact Assessment Report.

The Specialist report must include:

- » an indication of the methodology used in determining the significance of potential environmental impacts
- » a description of all environmental issues that were identified during the environmental impact assessment process
- » an assessment of the significance of direct, indirect and cumulative impacts in terms of the following criteria:
  - \* the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
  - \* the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
  - the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0–5 years), medium-term (5–15 years), long-term (> 15 years, where the impact will cease after the operational life of the activity) or permanent

- the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood), probable (distinct possibility), highly probable (most likely), or definite (impact will occur regardless of any preventative measures)
- \* the severity/beneficial scale, indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit, with no real alternative to achieving this benefit), severe/beneficial (long-term impact that could be mitigated/long-term benefit), moderately severe/beneficial (medium- to long-term impact that could be mitigated/ mediumto long-term benefit), slight or have no effect
- \* the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high
- \* the status, which will be described as either positive, negative or neutral
- \* the degree to which the impact can be reversed
- \* the degree to which the impact may cause irreplaceable loss of resources
- \* the degree to which the impact can be mitigated
- » a description and comparative assessment of all alternatives identified during the environmental impact assessment process
- » recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr)
- » an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- » a description of any assumptions, uncertainties and gaps in knowledge
- » an environmental impact statement which contains:
  - \* a summary of the key findings of the environmental impact assessment;
  - \* an assessment of the positive and negative implications of the proposed activity.

In terms of Appendix 6 of 2014 EIA Regulations, as amended;

- » A specialist report prepared in terms of these Regulations must contain details of—
  - (i) the specialist who prepared the report; and
  - (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;
- » a declaration that the specialist is independent in a form as may be specified by the competent authority;
- » an indication of the scope of, and the purpose for which, the report was prepared;
- » the date and season of the site investigation and the relevance of the season to the outcome of the assessment;
- » a description of the methodology adopted in preparing the report or carrying out the specialised process;
- » the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;
- » an identification of any areas to be avoided, including buffers;
- » a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
- » a description of any assumptions made and any uncertainties or gaps in knowledge;
- » a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;

- » any mitigation measures for inclusion in the EMPr;
- » any conditions for inclusion in the environmental authorisation;
- » any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- » a reasoned opinion—
  - (i) as to whether the proposed activity or portions thereof should be authorised; and

(ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;

(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;

(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and

(q) any other information requested by the competent authority.

#### Assessment of Impacts

Direct, indirect and cumulative impacts of the issues identified must be assessed in terms of the following criteria:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The duration, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) assigned a score of 2;
  - \* medium-term (5–15 years) assigned a score of 3;
  - \* long term (> 15 years) assigned a score of 4; or
  - \* permanent assigned a score of 5;
- The magnitude, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the status, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.

- » the degree to which the impact may cause irreplaceable loss of resources.
- » the degree to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

S = (E + D + M)P

- S = Significance weighting E = Extent D = Duration
- M = Magnitude P = Probability

The **significance weightings** for each potential impact are as follows:

- > < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts must be summarised in the following table format. The rating values as per the above criteria must also be included.

Example of Impact	table summarising	lho significanco	of impacts (with	and without miti	a ation)
Example of impact	iuble sommunising i	me signincunce d	Ji illipacis (willi		gunonj

	Without mitigation	With mitigation
Extent	High (3)	Low (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	36 (Medium)	24 (Low)
Status (positive or	Negative	Negative
negative)		
Reversibility	Low	Low
Irreplaceable loss of	Yes	Yes
resources?		
Can impacts be mitigated?	Yes	
Mitigation:		
Mitigation Measures		
Cumulative impacts:		
Cumulative Impacts		

## Residual Impacts:

**Residual Impacts** 

Measures for inclusion in the Environmental Management Programme must be laid out as detailed below:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies

Project	List of project components affecting the objective
component/s	
Potential Impact	Brief description of potential environmental impact if objective is not met
Activity/risk source	Description of activities which could impact on achieving objective
Mitigation:	Description of the target; include quantitative measures and/or dates of
Target/Objective	completion

Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into
	consideration responsibility, frequency, methods and reporting