

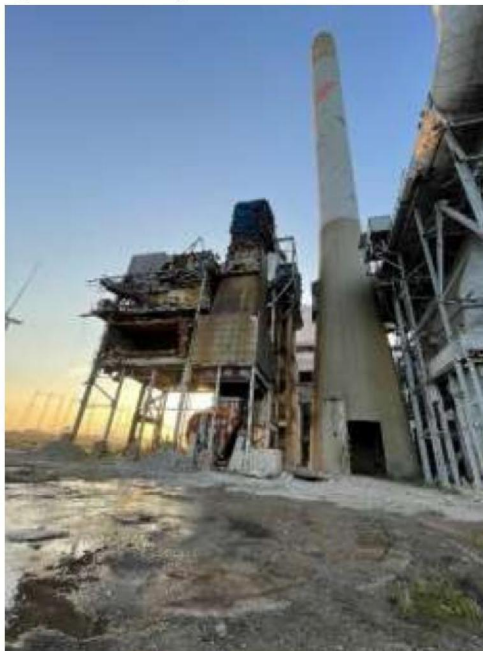
Design for Explosive Demolition

Site: Gelderland Power Station

Document No: C2002/MM/D003

Title: Design for the Demolition of the 150m Chimney
using Controlled Explosives.

Date: 8th October 2021



Document authorisation:

Designer	<div>5.1.2e</div> <div>5.1.2e</div>	Signature	<div>08/10/21</div> <div>Date</div>
Checker	<div>5.1.2e</div> <div>5.1.2e</div>	Signature	<div>08/10/21</div> <div>Date</div>

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1.0 CHANGE LOG

Rev	Date	By	Comment
-	21/10/2020	5.1.2e	Initial Issue

2.0 OBJECTIVE / PURPOSE OF CALCULATIONS

The purpose of the following calculations is to determine stability of the 150m Chimney following the proposed alterations to facilitate its demolition with the aid of Controlled Explosives.

3.0 EXECUTIVE SUMMARY

The calculations confirm that the proposed alterations to the 150m chimney do not adversely affect its stability and the attendant design drawings must be used to prepare the structure for demolition.

4.0 BASE DATA USED

1. ??? : PGEM Centrale Gelderland Ketelhuis 13 Doorsnede - Aanzicht.
2. G13.ZG99/AR 001: Schoorsteen G13.NR.30 Overzicht.
3. G13.ZG21/AS 001: Schoorsteen Wapening Foundiering.
4. G13.ZG26/AS 001: Schoorsteen Wapening Blad 1.
5. G13.ZG26/AS 002: Schoorsteen Wapening Blad 2.

5.0 DESIGN CODES / STANDARDS USED

1. NEN3851: 1973 – Technical Principles for the Design and Calculation of Building Structures. TGB 1972 – STEEL.
2. [REDACTED] 5.1.2f
3. [REDACTED]

6.0 REFERENCES

1. [REDACTED] 5.1.2f
2. V.B. 1974.

7.0 ASSUMPTION LOG

ASSUMPTION LOG			
Ref	Date	By	Assumption
A1	08/10/21	5.1.2e	The concrete density = 24kN/m ³ .

8.0 DESIGN INFORMATION

Building Age	The Chimney was built in the late 1970's.		
General Loading Conditions	Weight – to be calculated.		
	Services – N/A.		
	Wind loading conditions – basic wind speed 24.5m/s.		
Material data	The concrete 28-day design strength is B22.5.		
	Windshield @ Ground Level.		
	1. 124φ16- B1 2. 128φ16 – BU		
	Windshield @ Level +68.00.		
	3. 113φ16 - Bl. 4. 119φ16 – BU.		
Static coefficient of friction	N/A		

Waarden van de sterkte van grindbeton (in N/mm²)
(zie ook VB art. A-204.5)

Druksterkte

beton- kwaliteit	karakteristieke kubus- druksterkte na 28 dagen verharding	karakteristieke beton- druksterkte	rekenwaarde voor de betondruksterkte	
			– buiging – buiging met druk, indien: $N_d \leq 0,1A_b \cdot f_{tk}$ – buiging met trek – excentrische oplegdruk	– buiging met druk, indien: $N_d > 0,1A_b \cdot f_{tk}$ – centrische oplegdruk
	f_{ck}	$f_{tk} = 0,8f_{ck}$	$f_b = f_{tk}$	$f_b = 0,75f_{tk}$
B 12,5	12,5	10	10	7,5
B 17,5	17,5	14	14	10,5
B 22,5	22,5	18	18	13,5
B 30	30,0	24	24	18,0
B 37,5	37,5	30	30	22,5
B 45	45,0	36	36	27,0
B 52,5	52,5	42	42	31,5
B 60	60,0	48	48	36,0

Extract from V.B. 1974.



Photo 1: Chimney Ground Floor Opening, facing East. NOTE - Live Cables.

9.0 CONDITION

The Chimney Windshield and Flues

B&M have satisfied themselves of the condition of the chimney windshield and flues under consideration and the assessment is going to be undertaken on the basis that the concrete and reinforcement have not suffered any deterioration.

A visual assessment of the structures was conducted on 08/09/2021.

10.0 STRUCTURAL SUMMARY

Windshield.

Height = 150m.

Outside diameter at ground level = 16.24m.

Outside diameter at level +64.11 upwards = 9.3m.

Windshield thickness = 450mm from ground level up to level +64.11 The thickness is 250mm from level +64.11 upwards.

Flues.

Number – 1no.

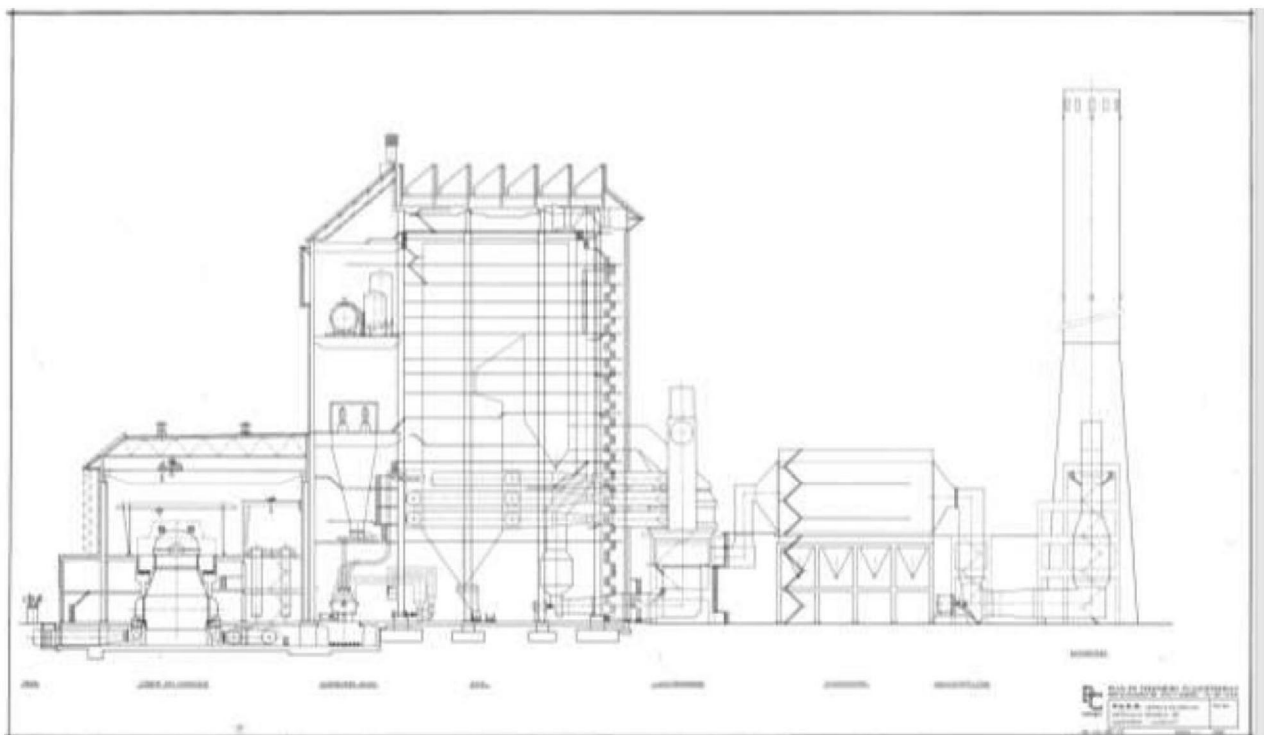
Flue wall thickness – 200mm. (40mm Foamglas + 10mm corrugated cardboard, + 70mm refractory masonry inside and 80mm refractory masonry outside.

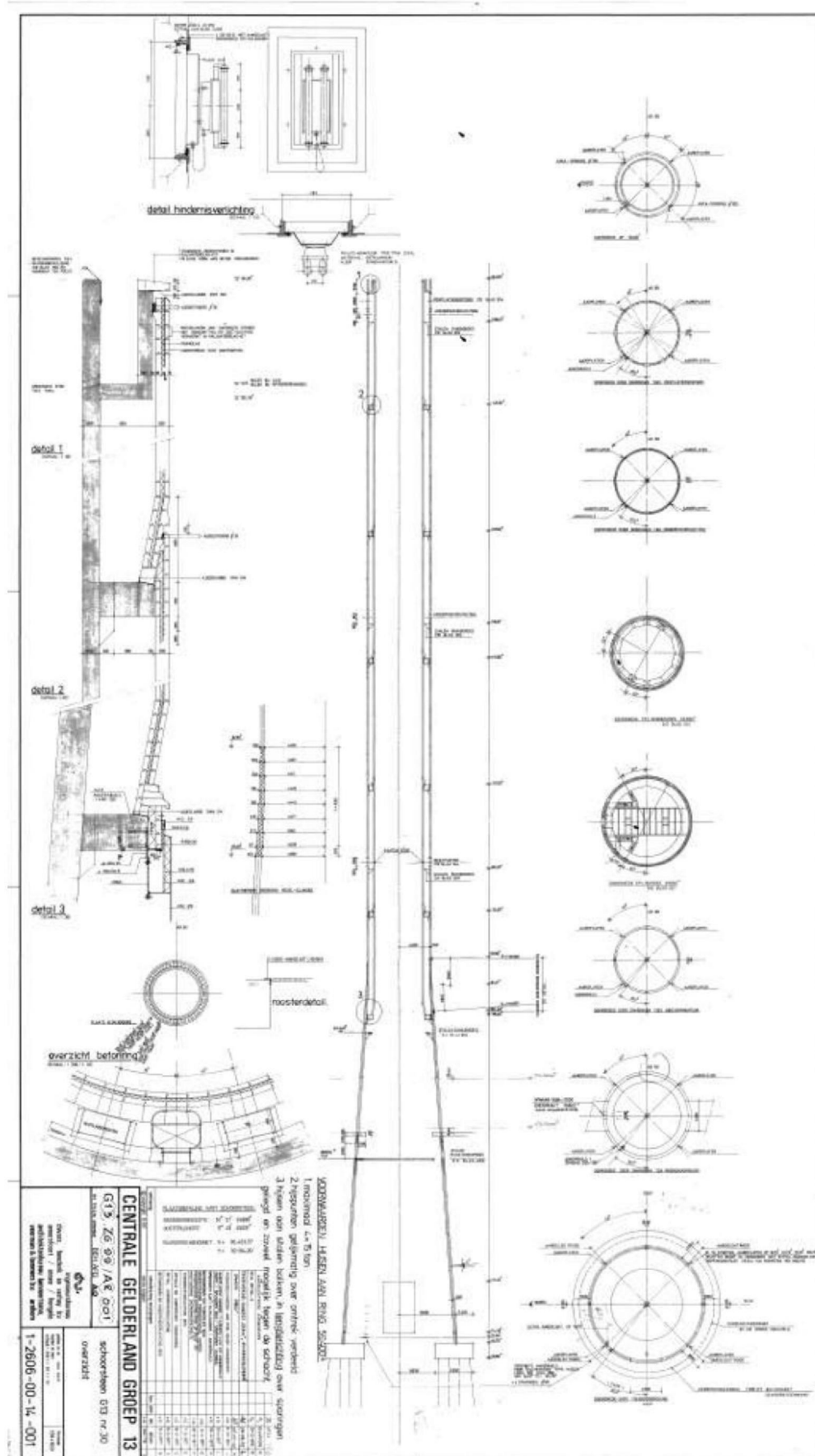
Height – 104.60m.

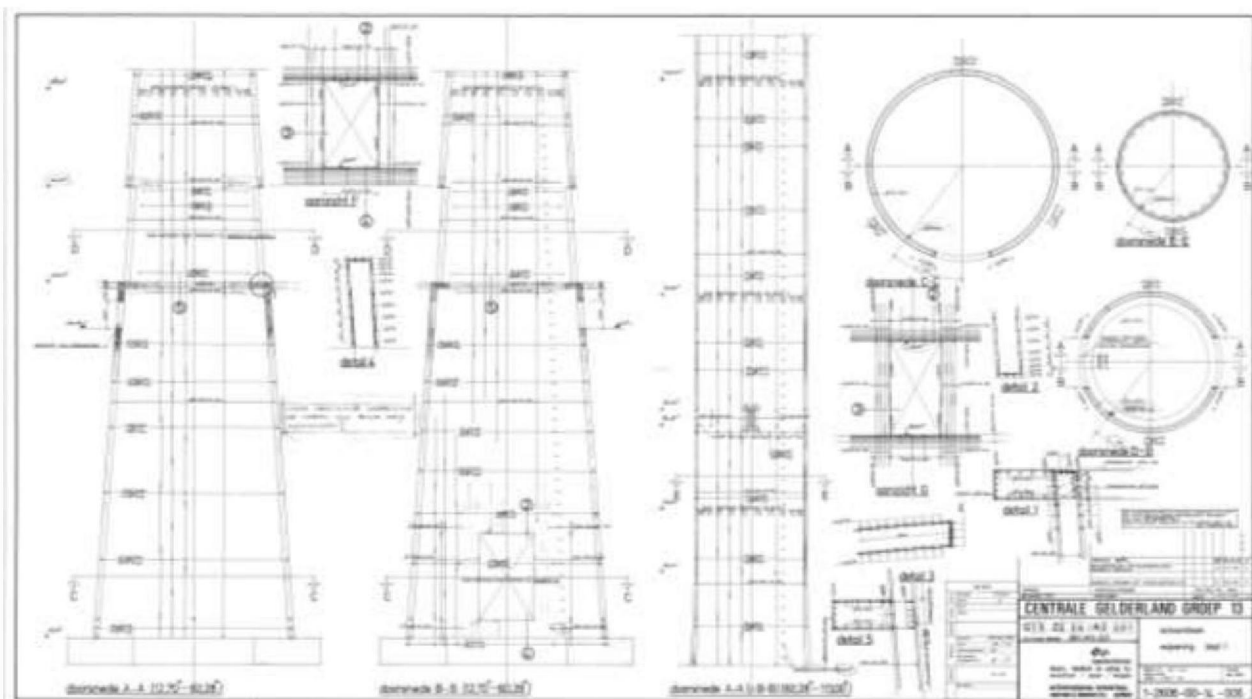
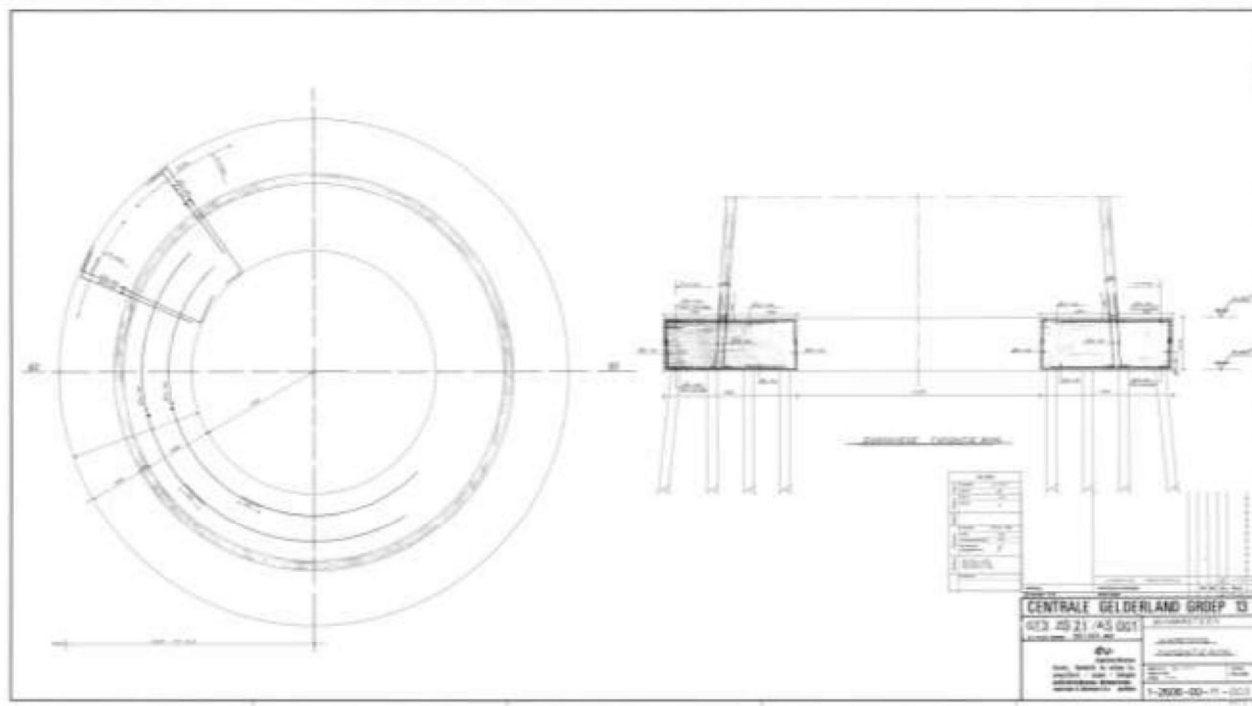
Internal Diameter – 6800mm.

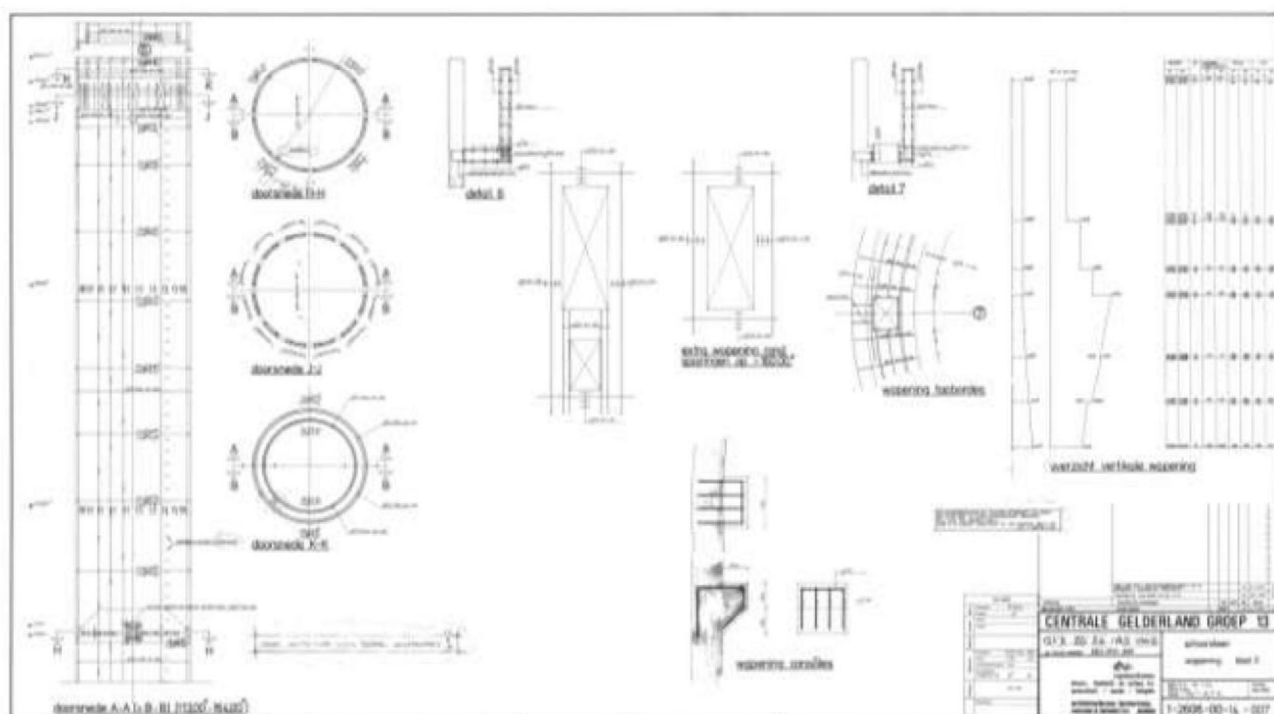
Floors.

No floors – only a 1000mm wide mezzanine at level +42.60.









11.0 DESIGN PHILOSOPHY

1. Demolition phasing.

The chimney may be removed in conjunction with the Electro Filters in one blowdown event.

2. Demolition Strategy.


The chimney will be prepared as shown on the drawings. The windshield triangular cut-out will be made at ground level at the eastern end of the mouth.

Structural Checks.



The global stability and stresses of the windshield will be checked at different stages of preparation leading to the demolition of the chimney.




5.1.2f


 <p>BROWN & MASON Anson House, Schooner Court, Crossways Business Park, Dartford, Kent, DA26QQ Tel : 01322 277731 Fax : 01322 284152</p>	Project: Gelderland Power Station				Job Ref.: C1801	
	Part of Structure: 150m Chimney.				Sheet No./rev.:	
	Calc. by: 5.1.2e	Date: 08/10/21	App'd by: 5.1.2e	Date: 08/10/21		
Ref.	Calculations					Output


12.0 CALCULATIONS

BS6399:2	WIND LOAD ASSESSMENT.	
		
Figure 6	Chimney height = 150m	
		

 <p>BROWN & MASON Anson House, Schooner Court, Crossways Business Park, Dartford, Kent, DA26QQ Tel : 01322 277731 Fax : 01322 284152</p>	Project: Gelderland Power Station				Job Ref.: C1801	
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	Calc. by: 5.1.2e	Date: 08/10/21	App'd by: 5.1.2e	Date: 08/10/21		
Ref.	Calculations				Output	

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 BROWN & MASON Anson House, Schooner Court, Crossways Business Park, Dartford, Kent, DA26QQ Tel : 01322 277731 Fax : 01322 284152		Project: Gelderland Power Station				Job Ref.: C1801	
		Part of Structure: 150m Chimney.				Sheet No./rev.:	
		Calc. by: 5.1.2e	Date: 08/10/21	App'd by: 5.1.2e	Date: 08/10/21		
Ref.	Calculations					Output	

		
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13.0 DESIGN CONCLUSION SUMMARY

Having concluded our design calculations we can confirm that the 150m Chimney remains stable in its temporary state following the proposed alterations to aid its felling with the aid of controlled explosives.

The attendant drawings to be strictly adhered to during the alterations process.

14.0 Appendix

1. Designers Risk Assessment
2. Design Drawings – C2002/D003/DWG000 - 005.

Appendix 1

Designers Risk Assessment

Hazard/Risk Assessment

Hazard	Hazard Sub Category	Persons at Risk	Initial Risk Rating			Control Measures	Residual Risk Rating		
			S	L	RR		S	L	RR
Undermining the existing structure during the formation of the triangular breakout.	a. Plant	B&M	3	3	9	The formation of the triangular breakout should be undertaken carefully as an alteration without undermining the integrity of the adjacent concrete.	3	1	3
	b. Personnel	Contractors	3	3	9		3	1	3
		Others	3	3	9		3	1	3
Damage to third party structures on collapse.	a. The De Klok Fulfilment and Warehousing.	B&M	3	3	9	a. The fall direction will be away from the neighbouring property. 5.1.2f 5.1.2e Debris is not expected to fly beyond 100m. The Explosives Engineer will provide suitable protection. A vibration assessment and monitoring should be undertaken. c. The cables and Aircraft Warning Lights to be kept operational until agreed otherwise with the LVNL, Air Traffic Control the Netherlands.	3	1	3
	b. The Noordkanaalhaven and Maas-Waalkanaal water bodies.	Contractors	3	3	9		3	1	3
	c. Live Cables for Aircraft Warning Lights	Others	3	3	9		3	1	3
Cutting rebar during drilling.		B&M	3	3	9	Avoid cutting rebar during drilling.	3	1	3
		Contractors	3	3	9		3	1	3
		Others	3	3	9		3	1	3
No floor, lift or stepped access to reach level +69.00 drilling.		B&M	3	2	6	Provide suitable crane and facilities to aid the drilling and charging operations.	3	1	3
		Contractors	3	2	6		3	1	3
		Others	3	2	6		3	1	3
Gust wind speed exceeding 40m/s.		B&M	3	3	9	All operations to be stopped and the premises vacated immediately should the limit be exceeded as a safety precaution against potential flown objects..	3	1	3
		Contractors	3	3	9		3	1	3
		Others	3	3	9		3	1	3

Severity

Likelihood

1 – Minor accident (First Aid)	2 – Major accident (RIDDOR)	3 – Fatality	1 - Low	2 – Medium	3 – High
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Risk Rating & Control & Monitoring Protocols

1-2: Work may proceed in accordance with Brown and Masons policy and procedures	3-4: Work may proceed providing stringent control measures have been implemented (e.g. permit to work, monitoring, etc.)	6-9: The work cannot commence until alternative method of work or additional control measures implemented
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Appendix 2

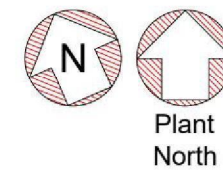
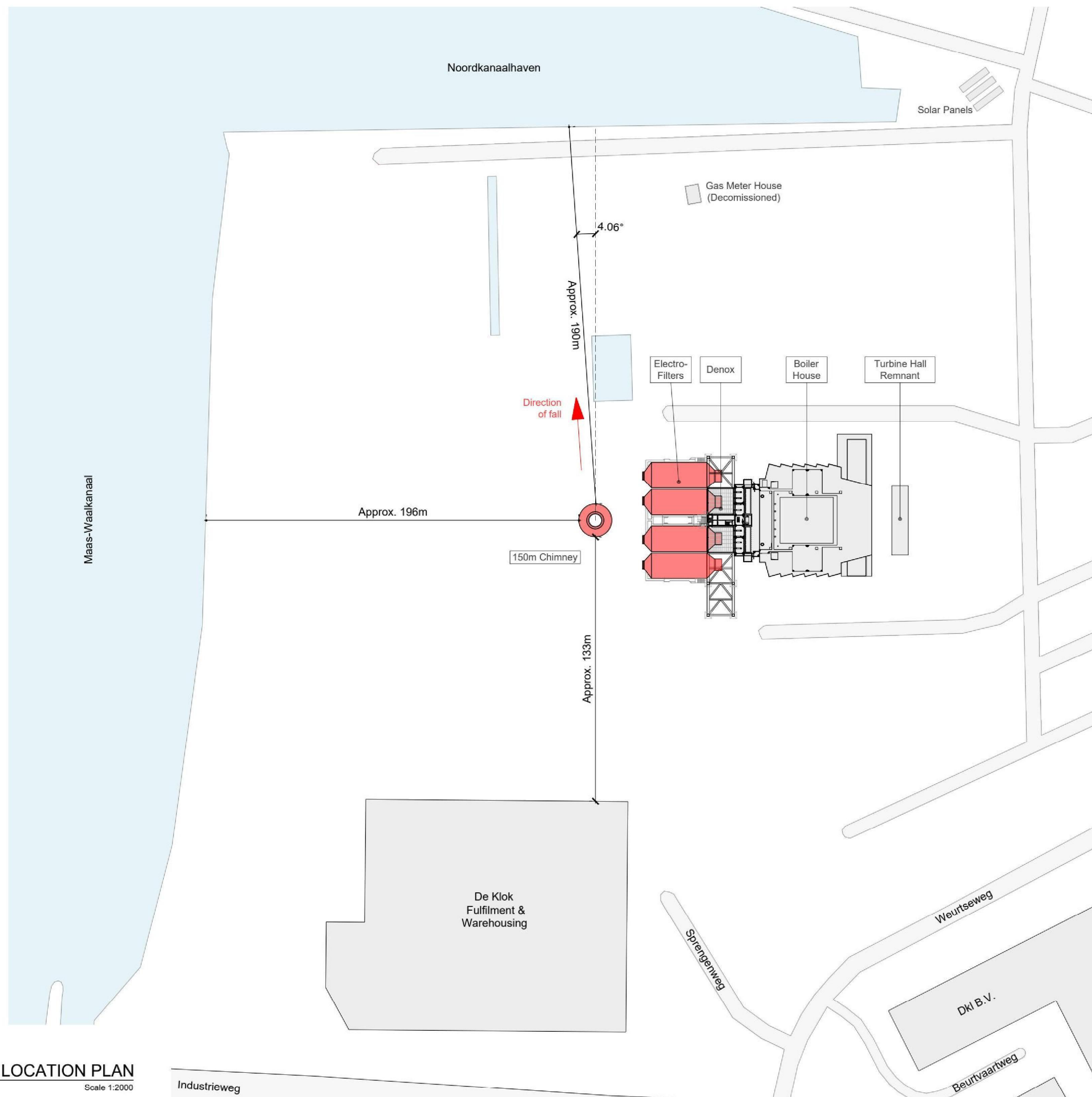
Design Drawings – C2002/D003/DWG000 - 005.

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5.1.2f

1 SITE LOCATION PLAN

Scale 1:2000



Notes

Key

Drawing References

C2002 / D003 / DWG000	Plan Layouts and Drilling Details
C2002 / D003 / DWG001	Site Location Plan
C2002 / D003 / DWG002	Plan Layouts
C2002 / D003 / DWG003	Elevations
C2002 / D003 / DWG004	Developed Elevation
C2002 / D003 / DWG005	Isometric Views

All drawings to be printed in color

Rev	Date	Description	By
 BROWN & MASON Anson House, Schooner Court, Crossways Business Park, Dartford, Kent, DA2 6QQ Tel : +44 (0)1322 277731 Fax : +44 (0)1322 284152			

Site	Central Gelderland Power Plant Hollandiaweg 11, 6541 BL Nijmegen
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Title	150m Single Flue Chimney Explosive Demolition Preparation Site Location Plan
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Scale at A3	Date	Drawn	Designed
1:2000	06-10-2021	5.1.2e	5.1.2e
Project Number	Design Number	Drawing Number	Revision
C2002	D003	DWG001	

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5.1.2f