

LYONS CMC
COAL MINING & GEOTECHNICAL
CONSULTANCY

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Date: 6th December 2021
Your ref: (S70 1NQ).
My Ref: CMRA 00277

FOR THE ATTENTION OF

Dear Sir,

**COAL MINING RISK ASSESSMENT (CMRA) - FOR PROPOSED STOARGE BUILDING AT
LAND AT POND STREET, BARNSELEY S70 1NQ**

434446 / 405692

Introduction

Planning permission is being sought for a single storey detached store at the above named site, the location of which can be seen on the attached plan No. 00277/A in Appendix 1. The site is centred around national grid reference E: 434446 / N: 405692. A Coal Mining Risk Assessment is required for the proposals, in order to competently address the mining legacy for the site and determine what impact this may have had upon the land. The assessment is intended to be included as a supporting document to a future planning application to Barnsley MBC ref: 2021/1306.

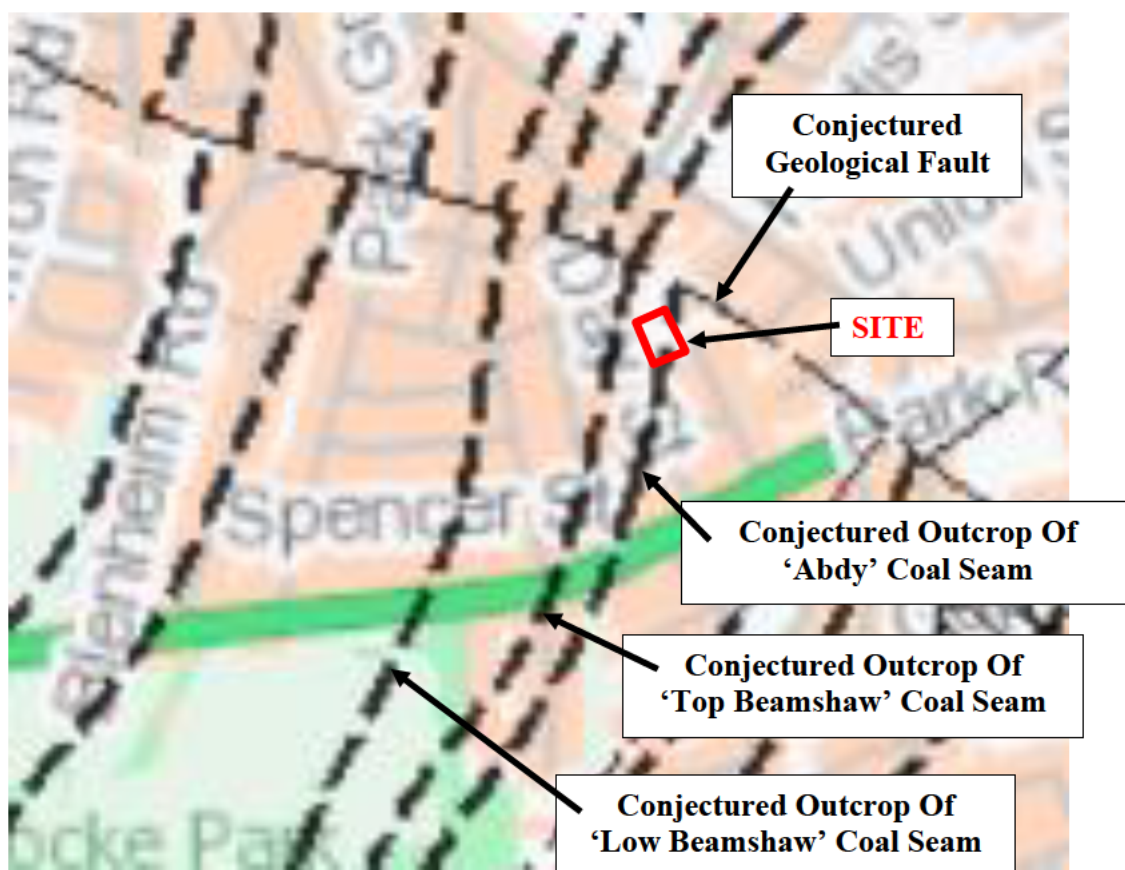
Scope of the Coal Mining Risk Assessment

The purpose of this Coal Mining Risk Assessment Report is to:

- Present a desk-based review of all available information on the coal mining issues which are relevant to the application site;
- Use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues;
- Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any further works that may be necessary; and
- Demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

Surface Geology (inc. any superficial deposits)

Records indicate the site to be located on sandstones, shales and mudstones of the Middle Coal Measure series from the Carboniferous formation. No superficial deposits are indicated in the vicinity of the site itself. A summary of the surface geology is illustrated on the image below which is an extract from the BGS Onshore Interactive Viewer:



Fault Planes or Fissures

A geological fault is conjectured to pass the site some 30m away to the north-east of the site as shown above. Although no fissuring of bedrock is known in the vicinity, the likelihood of natural fissures within any sandstone bedrock, that could have been opened out by the past deep coal mining in the area, should not be precluded.

Coal Seam Outcrops

As outlined on the extract image above from the BGS Onshore Interactive Viewer, the ‘Abdy’ coal seam (also known as the ‘Winter’ coal seam), of around 1m thickness, is conjectured to outcrop through the site itself. As such, this seam or part of it may be experienced beneath the surface soils and/or any made ground. The ‘Top Beamshaw’ coal seam is conjectured to outcrop some 20m away to the west as indicated, which is known locally to be of around 1.2m thickness – but this includes a dirt band of around 0.3m. Dipping gently eastwards, the Top Beamshaw seam would be anticipated as being beneath the site at a very shallow depth. The ‘Low Beamshaw’ coal seam is conjectured to outcrop some 130m away to the west as indicated. This coal is known to be of around 0.6m thickness, some 9m or so beneath the Top Beamshaw coal seam.

Made Ground

No made ground is indicated in the vicinity of the site. There will be a slight potential for discovering an element of made/infilled ground associated with historic ‘digging out’ of shallow coal.

Opencast Coal Workings.

No opencast coal operations are known within 500m of the site. *Note: the historic ‘digging out’ comment above however.*

Underground Coal Workings - Deep

Deep coal mining (over 50m deep) has taken place beneath the site in various coal seams, all settlement from which will be long complete. As no coalfields now exist, the site should remain stable from the deep coal mining perspective for the foreseeable future.

Underground Coal Workings - Shallow

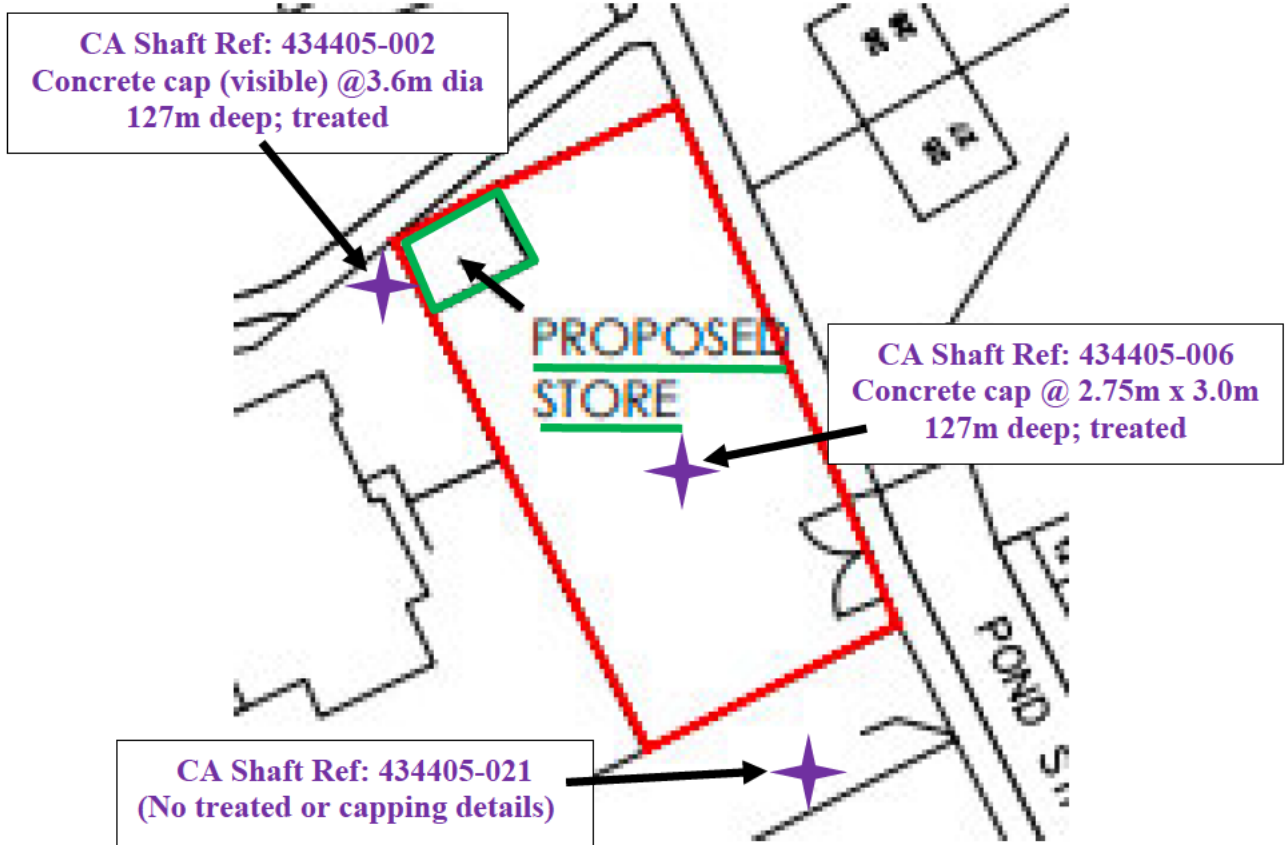
No specific records of any shallow underground workings of the anticipated shallow coal seams are known beneath the site itself. The Abdy (or ‘Winter’) seam is not expected to be at sufficient depth to give rise to any such risks, and although the Top Beamshaw seam may have more potential for causing a stability issue (should any old unrecorded mining voids be present) the likelihood would be considered low to moderate - given that little information is known of associated underground workings in this seam in this vicinity, but also considering the very close mine shaft. The same will apply to the Low Beamshaw seam which is again not very well known to have been worked via underground methods in this vicinity; indeed the seam may be too deep to have any stability affects in any case given the guidelines as set out in CIRIA C758D (i.e more than 10 times the seam thickness of natural strata above the coal/workings). No other coal seams below the Low Beamshaw seam are expected to give rise to shallow mining issues.

Mine Entries

According to Coal Authority details, three old mine shafts are located in the positions as indicated below, associated with the former 'Agnes Colliery' of the mid to late 1800's which worked the Barnsley coal seam at circa 125m deep. The southernmost shaft (ref: 434405-021) will not have any implications on the proposed development provided the building is located in the northern part of the site (i.e. over 20m away).

The shaft within the site itself (ref: 434405-006) is shown to be circa 19m away from the currently proposed building. Provided this clearance remains as such, it is unlikely this shaft will have any stability issues providing the depth to bedrock is not abnormally significant. No visible signs of the associated cap are noted – recorded by the Coal Authority as 2.75m x 3.0m.

The concrete cap of shaft ref: 435505-002 is clearly visible at the surface (as indication in the following photographs), situated within the hardstanding of the adjacent property. The boundary blockwork wall can be seen approximately 400mm away from the shaft cap. The applicant is considering the possibility of using this boundary wall as one of the sides of the proposed storage building. From the available Coal Authority details (including their response to BMBC Ms Willows of 4th November 2021) it is unclear as to any specific details as to the actual shaft diameter itself; it may be reasonable to assume however that the shaft side would be at a minimum of 300mm (1ft) inside from the edge of the cap; making for at least 700mm distance from the shaft side to the boundary wall.



Shaft ref: 434405-002



Fugitive Gases

As far as we are aware, no evidence of coal mining related fugitive gas emissions are known within 250m of the site. However, there will be some risk for associated gases in relation to the nearby mine entries which will create a more credible pathway (through fill material, shaft sides, fissured/faulted sandstone, surface soils and/or any made ground etc).

Historical Records

The colliery complex of the former 'Agnes Colliery' can be seen on plans of the late 1800's, although no indications are shown of the mine entries. Some former buildings associated with the colliery appear to have been located on this site itself. A 'Velvet' works appears to have been situated just to the south during the early 1900's when the colliery is believed to have been abandoned.

Coal Mining Risk Assessment (based on the above).

Coal Seam / Coal Mining Issue	Risk Assessment (VeryHigh/High/Moderate/Low/VeryLow)
Underground coal mining (at shallow depths)	Low to Moderate
Mine entries (shafts and adits)	High
Geological faulting	Low to Moderate
Geological fissures	Low to Moderate
Fugitive gas emissions	Moderate to High
Surface mining (opencast workings)	Low
Aggressive ground	Moderate
Coal exposed / near foundation level	High

Defined Risk Assessment

(Where 'Underground Coal Mining' above = Very High to Moderate)

Extent of known underground mining in this/these shallow coal seam/s in the wider vicinity	(Extensive / Much / Occasional / None Known) Occasional
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Intrusive Site Investigation of Coal Seam / Mines of Coal (given nature of proposals).	(Required / Recommended / Unnecessary)** Required
Advised critical depth beneath foundation level to investigate considering geology and nature of the shallow coal/s*	20m

Key:

** The critical depth is calculated according to Ciria C758D guidance which details that for the land to be regarded as stable from any voided mineworkings, then a suitable section of competent rock cover above the workings should be proved that is equal or greater than ten times the 'in-tact' coal seam thickness. The advised critical depth to investigate in this report takes into account the available geological information, any nearby mining records and may include a contingency for the seam to be of a slightly greater thickness than anticipated. Due care and diligence should be employed on-site to ensure that sound information is gathered of the in-tact seam thickness, particularly if concluding that old workings are outside the critical depth of affecting stability for the proposed development.*

*** Where :*

Required	<i>Intrusive Site Investigation required of the shallow coal/s and/or mine entries to determine any necessary stabilisation works for the given development.</i>
Recommended	<i>Intrusive Site investigation recommended – given a lower level of risk in relation to the nature of proposed development some proposals may reduce the risk to an acceptable level via suitable design considerations.</i>
Unnecessary	<i>Intrusive Site Investigation deemed unnecessary – given geological/mining information.</i>

Coal Authority

Prior written permission from The Coal Authority is required for intrusive activities which will disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits). Further information on The Coal Authority's permissions process can be found at:

www.coal.gov.uk/services/permissions/index.cfm

Information sources:

- *British Geological Survey Map Sheet SE 30 NW 1980 Edition*
- *British Geological Survey – Geology Of Britain Viewer*
- *Coal Authority Interactive Viewer and Mine Abandonment Plans*
- *Historical Mapping – old-maps.co.uk*

CONCLUSIONS

- 1) The site can be regarded as stable from the **Deep Coal Mining** perspective, and as no coal fields now remain this position should continue for the foreseeable future.
- 2) Given the **Shallow Coal Mining** position, an intrusive mining investigation of between 3 to 5 boreholes would be recommended to maximum depths of 20m below rock head / formation levels. This would determine the nature of the shallow coal seam/s anticipated and the likelihood of any associated mining voids that could compromise stability for the proposed development. If encountered then appropriate treatment works should be considered along with suitably designed foundations. A guide to a recommended site investigation process is outlined in appendix 2; CIRIA C758D ‘Abandoned Mine Working Manual’ guidance should be followed. A permit from the Coal Authority should be secured to enable such an investigation. Water flush drilling methods would be required to mitigate from fugitive gas risks.
- 3) Current guidelines indicate that best practice regarding the mine shafts would be for buildings to be sited at least 45° back from where the shaft side intersects rock head (as detailed in CIRIA C758D). This is very likely to be achieved for mine shaft ref: 434405-006. However, as a degree of uncertainty exists for its precise location an element of trenching works would be recommended on the southern side of the proposed footprint to ensure that it is not present further northwards than expected; unless actual signs of this shaft can be determined which prove it to be well clear

As regards the mine entry ref: 434405-002, with the circular concrete cap clearly visible some 400mm away to the west of the existing boundary blockwork wall, a trenching exercise would be recommended to determine the depth to bedrock and indeed if the wall itself is located on such. If this is the case and rock head is quite shallow, given the nature of development there may be a possibility (considering that it would be reasonable to assume that the adjacent shaft cap would also be sited on rock head at a similar horizon) that the boundary wall could be classed as being stable and not interfering with the integrity of the shaft/shaft cap. Consultations with the Coal Authority (as owners of the shaft) should take place to determine the feasibility of this subsequent to the investigations and indeed whether the wall can therefore be utilised as the side of the proposed building. If depth to bedrock is more significant then a stand-off to achieve the 45° rule would need to be considered – i.e. a separate wall built inside of the boundary wall.

- 4) Any coal exposed at the surface beneath surface soils/clays will require appropriate considerations for removal and blinding off to help prevent chemical attack on foundations and reduce the risk of spontaneous combustion risks.
- 5) Given the nearby mine shafts it would be recommended to include robust gas protection measures (such as a methane membrane and/or positive ventilation layers) within future foundation designs. All usual safety precautions should be employed regarding possible fugitive gases in any deep excavation work taking place.
- 6) A watching brief should be employed during future grounds works for any signs of unrecorded mine entries. A site scrape to natural ground is the most effective procedure to check for such features; circular areas of grey fill within bedrock would be an indication. If suspected the Coal Authority (as owners) should be notified immediately for appropriate deliberations.
- 7) A watching brief should be employed during future grounds works for any signs of made ground that may be associated with small scale 'digging' out of shallow coal, or indeed any opened out fissures of sandstone bedrock. Appropriate foundation design considerations may be required.

Note: should there be any uncertainty of actual conditions during future ground works Lyons CMC or indeed the Coal Authority themselves can be further consulted for on site assessment if necessary.

A suitably qualified and competent professional should be employed to use this report to determine the conditions on site, and ultimately advise on what action, if any, is necessary to safeguard the development. It should be noted that any future works to investigate any coal seam, mines of coal or associated mine entries will need the prior consent of the Coal Authority via their permitting procedure.

I trust that this satisfies your requirements, however please do not hesitate to contact myself at any time for further clarification or advice.

Yours Sincerely,

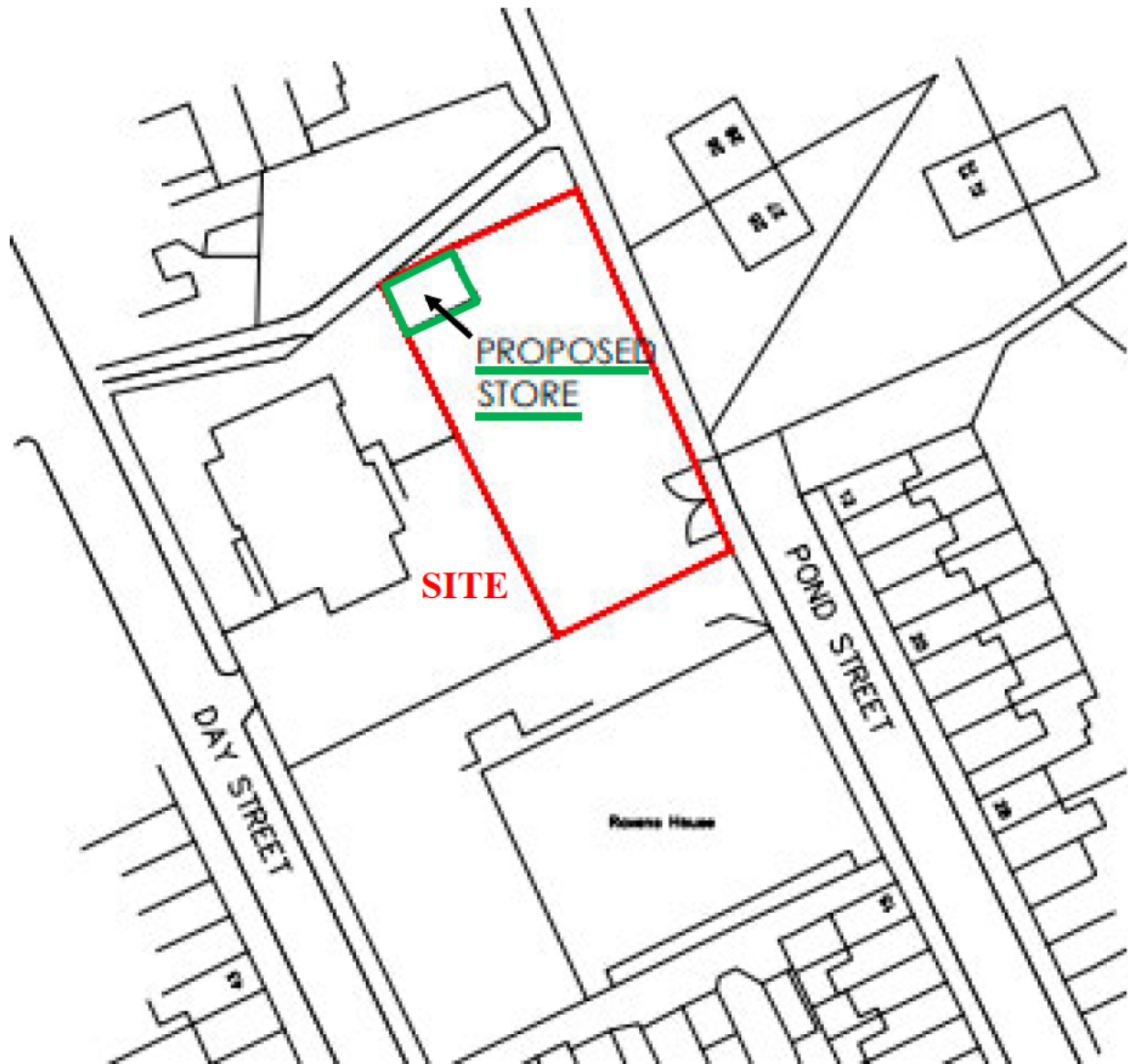


M. Lyons
Consultant Mining Engineer
BSc CSci MIMMM

Enc.

THIS COAL MINING RISK ASSESSMENT IS BASED ON AND LIMITED TO THE INFORMATION IN MY RECORD AT THE TIME THE ENQUIRY IS ANSWERED. It is based on my professional opinion in line with the guidelines set out in CIRIA C758D "Abandoned mine workings manual." The opinion may be overruled by Government Authorities decisions based on other information not in my record. If a site investigation is recommended then this risk assessment will be superseded by the factual findings of that investigation. All site investigation work should be carried out by a competent professional from which independent conclusions and recommendations for safe development should be provided. It should be noted that no operation should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. The investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases; these risks both under and adjacent the site should be fully considered in any proposals both for personnel and public safety. Copyright in this CMRA belongs to M.A.Lyons. All rights are reserved and unauthorised use is prohibited. Copyright is not transferred to external parties by possession of this report, however, those for whom the report is compiled have the right to use it. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the author does not owe them any Duty of Care or Skill.

Appendix 1 – Location Plan No. 00277/A
(Not To Scale)
Site centred at O.S. 434446 / 405692



Appendix 2

Borehole Site Investigation (SI) Process Guide (Shallow Underground Coal Workings)

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