civil & structural engineers

PRP Leicester
Park House 21-22 Warren Park Way
Enderby Leicester LE19 4SA

Telephone: 0116 275 1710

leicester@prp.uk.com
www.prp.uk.com

Structural Survey Report

for

Burley Appliances Ltd, 4 Lands End Way, Oakham LE15 6RB

for:

Burley Appliances Ltd, 2 Lands End Way, Oakham, Rutland LE15 6RB

Date	Issued	Revision
04 February 2022	Issued	A
03 March 2022	Issued	B
06 April 2022	Issued	C

Reference: 82339-01

Prepared by: [redacted]

Ian Baggott
BSc CEng MIStructE
Principal Engineer

1. INTRODUCTION

1.1. The survey was carried out on the instruction of Will Seymour of Marrons Planning acting on behalf of their client, Burley Appliances Ltd.

1.2 The purpose of the survey was to inspect the buildings to determine their suitability for conversion to residential use from a structural perspective.

1.3 The survey was carried out on Tuesday 11 January 2022.

1.4 The weather during the survey was cold, damp and overcast.

1.5 The conditions stated in the appendix to this report were applied to this survey and the report is to be and construed accordingly.

1.6 The references to the left and right are given as being viewed from the front, main entrances of each of the properties.

1.7 The layout and extent of the buildings surveyed are as shown on the attached plans in appendix I.

2. THE PROPERTY

2.1 Building 1 –Large Industrial Unit

2.1.1 The property was a multi span portal framed building formed using precast concrete frames. In the main it was single storey but there was a separate area covered with a heat retaining structure within the footprint of the original building. The portal frame was formed of 3 bays.

2.1.2 In addition, there were single storey loadbearing masonry office and amenity buildings standing adjacent to the main building.

2.1.3 To the rear of the main building there was a steel framed canopy structure, which was independent of the concrete building. This provided protection from the elements over the loading bays (photograph 1)

2.1.4 The concrete frames supported cold formed steel zed purlins, which in turn supported the roof sheeting. The roof sheeting comprised an outer Big Six profile asbestos cement sheet, spacer bars with insulation between and an inner liner panel. Each portal bay had rooflights in each roof slope formed with profiled polycarbonate semi translucent sheets.

2.1.5 The front gable was formed with brick masonry full height to eaves level, whereas the walls to the sides and rear were brick masonry to part height with sheeting over. The sheeting rails to the sides and rear were of concrete spanning between the portal frames (photograph 2).

2.1.6 The ground floor slab was of ground bearing concrete construction.

2.2 Building 2 –Office Building

2.2.1 The office building was a two storey concrete framed building in two distinct wings with a central core/stair area. The concrete frames were precast with concrete columns positioned within the external wall constructions and expressed externally. A single row of internal concrete columns extended from ground to first floor, midway between the external walls (photograph 3).

2.2.2 The first floor was formed with 1200mm wide precast concrete beams that spanned between the external walls and the row of internal columns.

2.2.3 The roof was formed with precast concrete beams, supporting cold formed steel zed purlins and built-up profiled roof sheets. The roof was duo pitched with a single ridge line running parallel to the external walls and at mid span of the roof.

2.2.4 The roof sheeting comprised Bix Six profiled asbestos/cement outer sheets, spacer bars with insulation between and a profiled asbestos/cement inner panel. A lay in grid suspended ceiling system was also hung from the purlins.

2.2.5 External walls were formed using precast concrete panels, with a profiled textured surface finish to the outer face. The inner leaf was of blockwork. The soffit of the precast concrete panels over the first floor windows was profiled to form a double arch opening (photograph 4).

2.2.6 The ground floor slab was of concrete construction and ground bearing.

2.2.7 It was noted that the windows were single glazed and metal framed.

2.2.8 A profile metal gutter sat above the external wall construction with outlets within the building envelope.

2.2.9 The stairs were of precast concrete construction.

2.3 Building 3 –Office Building

2.3.1 This office building was a single storey precast concrete framed building with a double pitched roof and a single ridge running the length of the building midway between the external walls.

2.3.2 Precast concrete roof beams supported cold rolled zed purlins which in turn supported a built up roofing system. The roof sheets comprised an outer Big Six profile asbestos cement sheet, spacer bars with insulation between and a profiled liner panel. A lay in grid suspended ceiling system was also hung from the purlins.

2.3.3 The ground floor was of concrete construction and ground bearing.

2.3.4 The external walls were formed of precast concrete panels, with a profiled textured surface finish to the outer face. The inner leaf was of blockwork. Above the windows the precast panels were profiled to form a double arch opening.

3. OBSERVATIONS AND DISCUSSION

3.1 Building 1 - Large Industrial Unit

3.1.1 The insulation (glass fibre quilt) contained within the roof build up was inadequate to meet current standards. It was anticipated the joint filler strips between the roof sheets had deteriorated and were no longer functioning.

3.1.2 There were several locations where the roof was leaking, particularly along gutter lines and around the internal outlet points. The outlets were all close to the column positions resulting in the column and roof beam connection points being very wet at these locations. The connection here between the column and rafter is often formed using dowels, which are grouted into pockets during erection. There were no apparent defects at present but it was anticipated that due to the water ingress, there would be some degradation of the dowels (photograph 5). Further investigation of these joints is warranted, in several locations, given the age of the building and the water ingress.

3.1.3 There were no apparent diagonal bracing members in the vertical plane nor any bracing members in the roof plane. Given that the roof beam/column connections did not appear to be moment resisting, it was anticipated that lateral wind loads were resisted by the columns acting as cantilevers from the foundations. The foundations would also need to have been designed to resist these moments.

3.1.4 The rooflights were of polycarbonate which deteriorates over time under UV light. Under these conditions the material would become brittle and the loadbearing capacity would deteriorate (photograph 6).

3.1.5 The concrete ground floor slab had deteriorated in places probably due to traffic by hard wheeled forklift trucks or pallet handlers. Repairs to these areas will require areas of slab to be broken out and replaced. Considerable areas of slab would also need to be broken out to introduce drainage runs if the unit were to be divided into separate dwellings (photograph 7). The slab construction was unlikely to include any insulation and any proposed drainage works would compromise any damp proof membrane that exists. Given this and the slabs construction, it was likely that the slab would need to be removed.

3.1.6 The heat retaining structure was independent of the main building frame and may be removed without compromising the stability of the rest of the structure (photograph 8).

3.1.7 If the current building were to be sub divided into separate dwellings, it would be difficult to introduce natural light into these without the provision of an internal courtyard area. The building form did not easily lend itself to creating an internal courtyard without the introduction of additional foundations, columns and trimming members to support the cut ends of the existing main rafters.

3.1.8 Given the historic water ingress there may be extensive concrete repairs required to the existing concrete frame members, particularly focused on joint locations.

3.1.9 The external wall constructions did not appear to meet the current standards for thermal insulation requirements and therefore significant works would be required to thermally upgrade the walls.

3.2 Building 2 –Office Building

3.2.1 The insulation contained within the roof build up was inadequate to meet current thermal requirements. It was anticipated that the jointing strips in the joints between the roof sheets have deteriorated and were no longer functioning.

3.2.2 The gutters were leaking in several places resulting in ingress into the buildings. This was due to the position of the gutter being within the external wall line. It appeared this had been an ongoing problem as there were indications that repairs had been attempted previously (photograph 9).

3.2.3 There did not appear to be any issues relating to the principal concrete beams, columns and floors forming the concrete frame.

3.2.4 Instances were noted where the precast panels in the external walls were cracked in areas. It is anticipated these defects related to the fixings between the panels and the concrete frame. Intrusive investigation was warranted in a number of locations to determine the condition and nature of the panel fixings together with any remedial measures required (photograph 10).

3.2.5 No diagonal bracing members were noted in either the vertical plane or within the plane of the roof. As such it was considered that lateral stability was afforded by the foundation resisting overturning moment and the columns acting as cantilevers.

3.2.6 It was unlikely that the external wall constructions would meet current thermal requirements and additional insulation would need to be provided.

3.2.7 Given the present use of the building, it was considered the concrete frame, floors and foundations would have adequate capacity to sustain the loads arising from domestic use.

3.3 Building 3 –Office Building

3.3.1 This office building was a similar form of construction to Building 2. The same roof build up was employed with an outer sheet of Bix Six profiled asbestos/cement sheets, spacer bars with insulation between and a profiled liner panel (photograph 11).

3.3.2 The insulation noted within the roof construction appeared inadequate in meeting current thermal insulation standards.

3.3.3 The precast beams above the windows had an arched profile soffit. This same profile was visible internally. It was anticipated that the external wall construction would not meet current standards with regards to thermal insulation (photograph 12).

3.3.4 There were no obvious indications of deterioration of the external precast concrete panels. As with Building 2, it would be advisable to conduct an intrusive investigation to determine how the precast wall panels were connected to the precast frames and to examine the condition of those connections. These investigations should be conduced in a number of locations to gain a sample representative of the whole.

3.3.5 As this was a single storey concrete framed structure, the loading regime supported by the frame would not change as a result of its change of use to a residential building.

3.3.6 The windows were all single glazed and were metal framed. It was likely that the windows would be replaced as part of the works to improve the thermal insulation properties of the external walls.

4. RECOMMENDATIONS

4.1 Building 1 –Large Industrial Unit

4.1.1 The roof covering will need to be replaced to address the issues with water ingress and inadequate thermal properties. The new roof covering may require additional or wholesale new purlins to support the additional loading.

4.1.2 The ground floor slab will likely require replacement due to its inherent damage, lack of insulation and the extensive works required to introduce new foundations and drainage runs.

4.1.3 The introduction of a courtyard will require new foundations, columns and steel trimming members. It may also require the introduction of shear walls or bracing.

4.1.4 Partitioning systems between individual units would need to be both fire resistant and acoustically designed. These will also need to extend from ground floor level to the underside of the roof structure. Additional structural members may be required to support the tops of these partitions and tie them back to the existing concrete framed structure.

4.1.5 An investigation of the foundations will be required to ascertain if their proportion supports the view that these were design to resist lateral loads and overturning moments.

4.1.6 Given that it appeared the ground floor slab, roof covering, potentially the purlins and parts of the principal structure would need to be demolished to enable the proposed works and that the external walls would require full thermal upgrades, it would not appear cost effective to retain this structure. Particularly given that the accommodation created will ultimately be compromised due to the constraints of the conversion.

4.2 Building 2 –Office Building

4.2.1 The roof coverings will need to be upgraded to address the issues with water ingress and inadequate thermal properties. Over cladding the existing system will be limited by the load capacity of the main concrete roof beams and the cold rolled purlins. This will need to be assessed by a qualified structural engineer.

4.2.2 External walls will need to be upgraded to improve their thermal characteristics and to meet current standards for renovated buildings. Intrusive investigations will need to be carried out to determine how the external walls were formed and the method of fixing the precast wall panels to the concrete frame. This will also enable the condition of the fixings to be checked and any remedial works to be determined.

4.2.3 Some localised concrete repairs to the external precast concrete wall panels will be required to prevent further deterioration of both the wall panel and to prevent water ingress. These defects may be indicative of a deterioration of the fixings between the concrete panels and the concrete frame. See 4.2.2 above.

4.2.4 The sub division of the offices into smaller residential units will require new partitions to be introduced. The weight of such partitions at first floor level should be assessed by a qualified engineers so that the loading capacity of the precast floor beams and concrete frame is not exceeded. Lightweight partitions at ground floor level may be borne by the existing ground bearing slab. This may include certain types of lightweight block but this should be checked by a qualified engineer.

4.3 Building 3 –Office Building

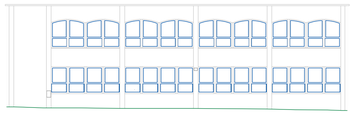
4.3.1 The roof coverings will need to be upgraded to address the issues with water ingress and inadequate thermal properties. Over cladding the existing system will be limited by the load capacity of the main concrete roof beams and the cold rolled purlins.

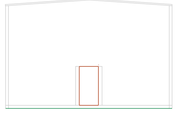
4.3.2 External walls will need to be upgraded to improve their thermal characteristics and to meet current standards for renovated buildings. Intrusive investigations will need to be carried out to determine how the external walls are formed and the method of fixing the precast wall panels to the concrete frame. This will also enable the condition of the fixings to be checked and any remedial works to be determined.

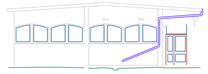
4.3.3 The sub division of this building will require new partitions to be introduced. Lightweight partitions may be borne by the ground bearing concrete slab. This may include certain types of walls constructed using lightweight concrete blocks but this should be checked by a qualified engineer.

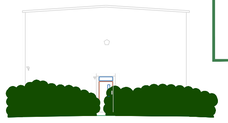
APPENDIX I

LAYOUT PLANS









N

Site Notes:

MEASURED BUILDING SURVEY KEY:-

Rev:	Date:	Description:	Surveyed:	Quality Ref:

FOSSE SURVEYING

Fosse Surveying Limited
The Old Vicarage, Market St, Castle Donington, DE74 2JB
Tel: 0116 2325165
Mobile: 07940 147244
Email: mail@fossesurveying.co.uk -Website: www.fossesurveying.co.uk

Client: Marrons Planning

Project: Burley Appliances Ltd
Lands End Way
Oakham, LE15 6RB

Title: Office Elevations

Surveyed: CB/BI Date: 11/11/2021

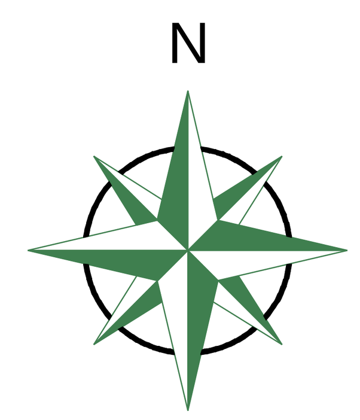
Quality Ref: 1637 Scale: 1:200@A1

Level Datum: OS GNSS Grid: OS GNSS

Job No. 1637 Rev.

Comments:
The survey has been orientated to the Ordnance Survey (OS) National Grid (OSGB36) via a GPS and the OS active network.
The level datum GPS derived at ....
No Scale factor has been applied to the survey therefore the coordinates shown are arbitrary and not true OS which has a scale factor applied.

All critical dimensions to be verified on site before design - construction takes place. All dimensions shown are in meters.



Site Notes:

MEASURED BUILDING SURVEY KEY:–

0.00	ROOM HEIGHT
←	ROOF SLOPE (DOWN)
sh	SILL HEIGHT
hh	HEAD HEIGHT
fh	FLOOR TO HEAD
dh	DOOR HEIGHT
u/s	UNDERSIDE
t/s	TOPSIDE
s/c	SUSPENDED CEILING
rl	ROOFLIGHT
fp	FIREPLACE
sd	SLIDING DOOR
fb	FLOORBOARDS
cup'd	CUPBOARD
elec	ELECTRICS
	RADIATOR
htr	HEATER
hwt	HOT WATER TANK

SANITARY WARE

DOORS

WINDOW

BUILDING LINE

WALL

BEAM

RAFTER

Rev:	Date:	Description:	Surveyed:	Quality Ref:

FOSSE SURVEYING

Fosse Surveying Limited
The Old Vicarage, Market St, Castle Donington, DE74 2JB
Tel: 0116 2325169
Mobile: 07940 147244
Email: mail@fossesurveying.co.uk -Website: www.fossesurveying.co.uk

Client Marrons Planning

Project Burley Appliances Ltd
Lands End Way
Oakham, LE15 6RB

Title Office Ground and First Floor Plan

Surveyed: CB/CT Date: 11/11/2021

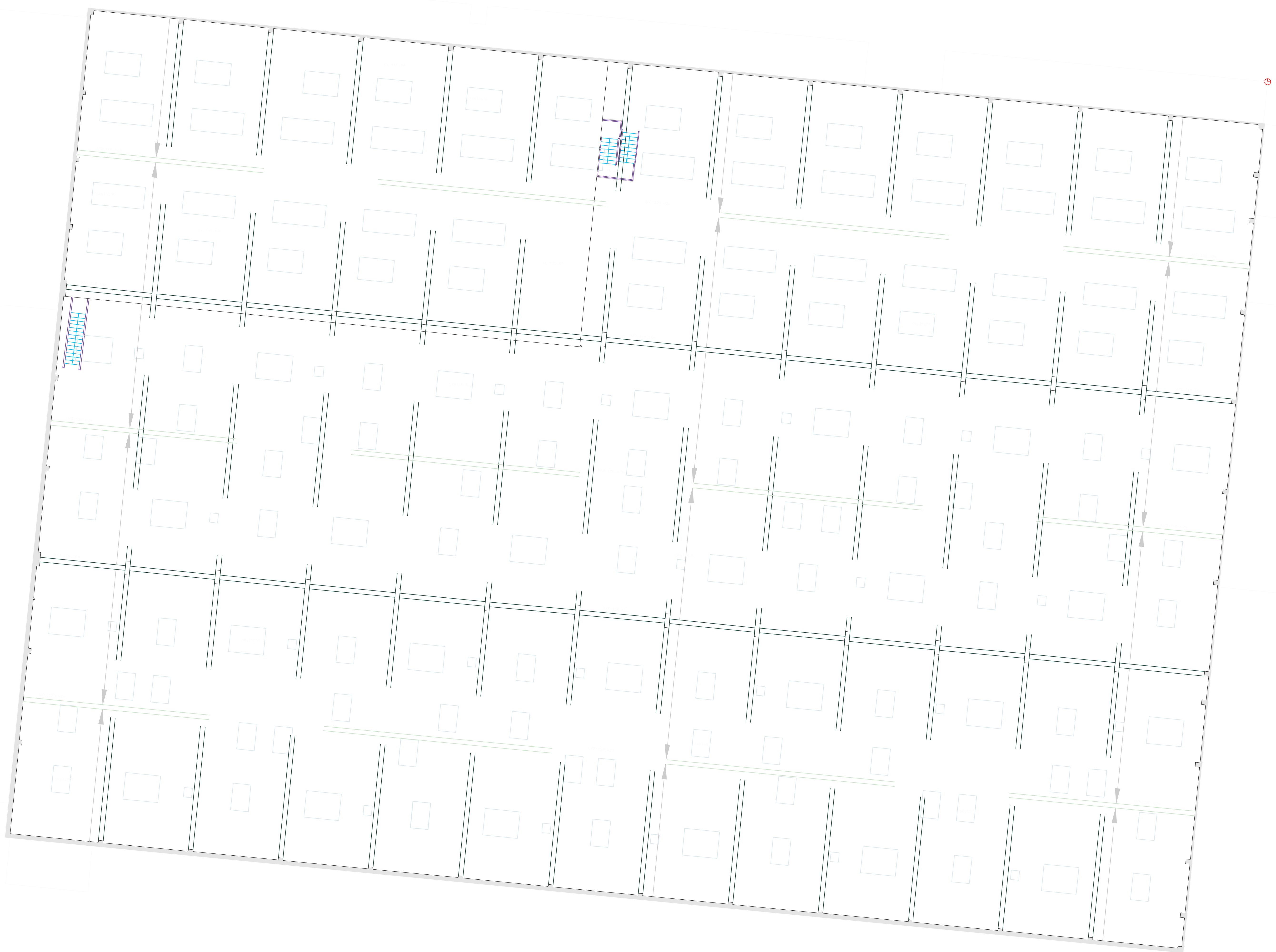
Quality Ref: 1637 Scale: 1:200@A1

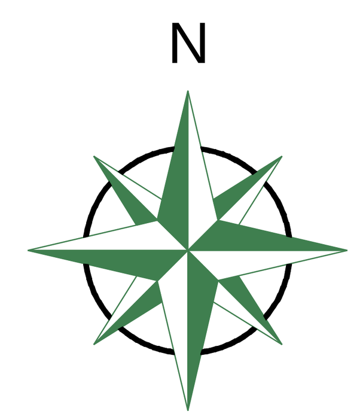
Level Datum: OS GNSS Grid: OS GNSS

Job No. 1637 Rev.

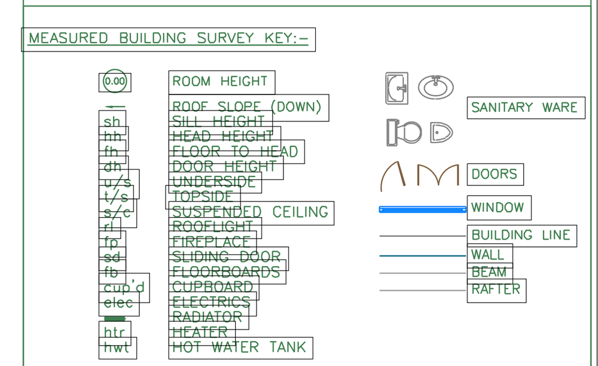
Comments:
The survey has been orientated to the Ordnance Survey (OS) National Grid (OSGB36) via a GPS and the OS active network.
The level datum GPS derived at ....
No Scale factor has been applied to the survey therefore the coordinates shown are arbitrary and not true OS which has a scale factor applied.

All critical dimensions to be verified on site before design - construction takes place. All dimensions shown are in meters.
No liability will be taken for this drawing if passed onto a third party without written permission of Fosse Surveying.





Site Notes:



Rev:	Date:	Description:	Surveyed:	Quality Ref:

FOSSE SURVEYING

Fosse Surveying Limited
The Old Vicarage, Market St, Castle Donington, DE74 2JB
Tel: 0116 2325169
Mobile: 07940 147244
Email: mail@fossesurveying.co.uk -Website: www.fossesurveying.co.uk

Client: Marrons Planning

Project: Burley Appliances Ltd
Lands End Way
Oakham, LE15 6RB

Title: Warehouse First Floor Plan

Surveyed: CT — Date: 11/11/2021

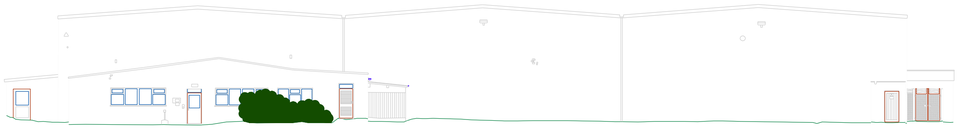
Quality Ref: 1637 — Scale: 1:200@A1

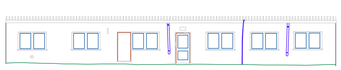
Level Datum: OS GNSS — Grid: OS GNSS

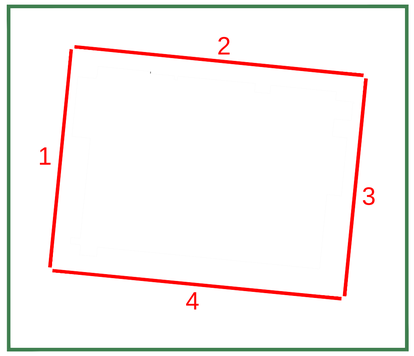
Job No. 1637 — Rev.

Comments:
The survey has been orientated to the Ordnance Survey (OS) National Grid (OSGB36) via a GPS and the OS active network. The level datum GPS derived at ....
No Scale factor has been applied to the survey therefore the coordinates shown are arbitrary and not true OS which has a scale factor applied.

All critical dimensions to be verified on site before design - construction takes place. All dimensions shown are in meters.
No liability will be taken for this drawing if passed onto a third party without written permission of Fosse Surveying.







Site Notes:

MEASURED BUILDING SURVEY KEY:-

Rev:	Date:	Description:	Surveyed:	Quality Ref:

FOSSE SURVEYING

Fosse Surveying Limited
The Old Vicarage, Market St, Castle Donington, DE74 2JB
Tel: 0116 2325169
Mobile: 07940 147244
Email: mail@fossesurveying.co.uk -Website: www.fossesurveying.co.uk

Client: Marrons Planning

Project: Burley Appliances Ltd
Lands End Way
Oakham, LE15 6RB

Title: Office Elevations

Surveyed: CB Date: 11/11/2021

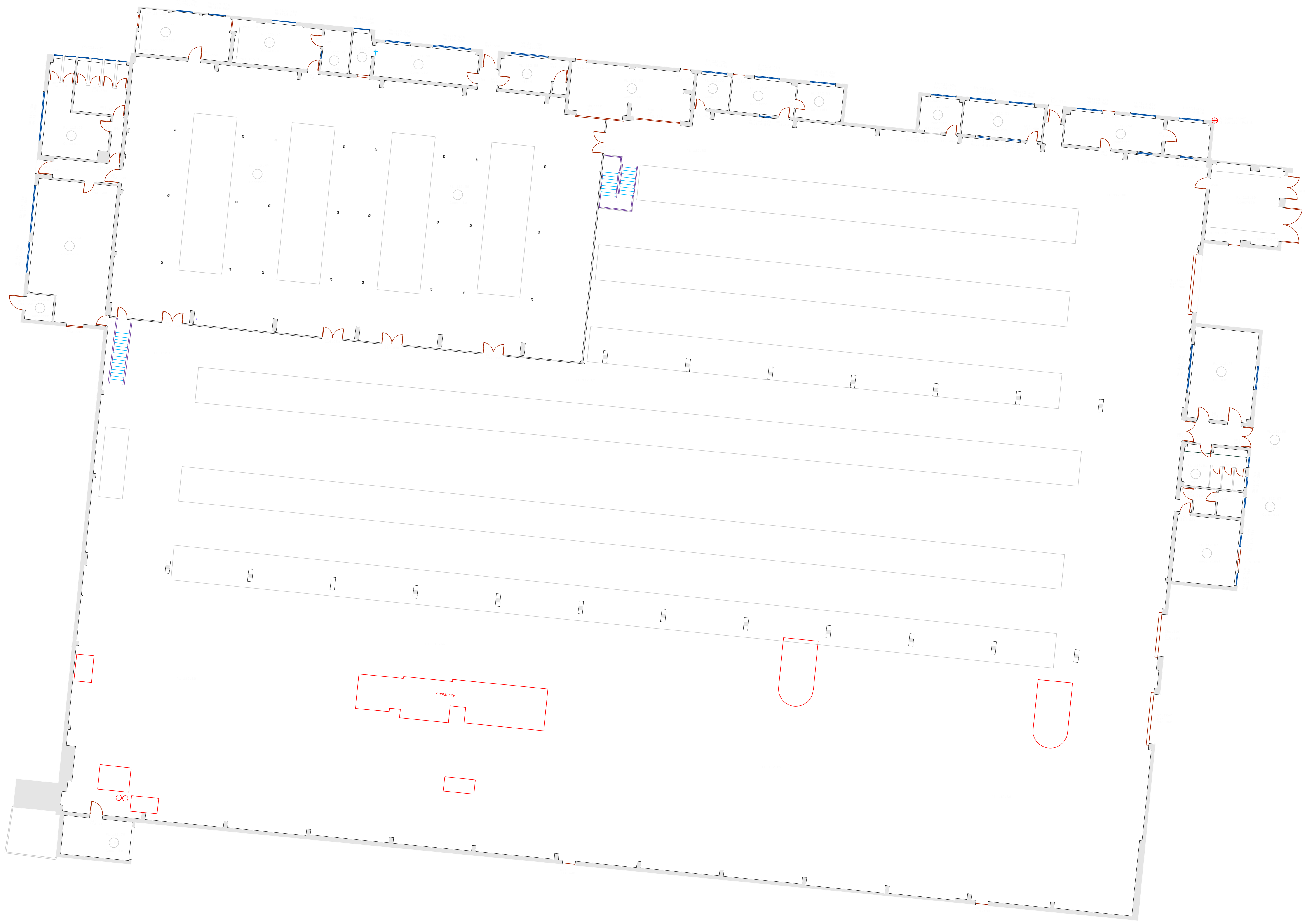
Quality Ref: 1637 Scale: 1:200@A1

Level Datum: OS GNSS Grid: OS GNSS

Job No. 1637 Rev.

Comments:
The survey has been orientated to the Ordnance Survey (OS) National Grid (OSGB36) via a GPS and the OS active network.
The level datum GPS derived at ...
No Scale factor has been applied to the survey therefore the coordinates shown are arbitrary and not true OS which has a scale factor applied.

All critical dimensions to be verified on site before design - construction takes place. All dimensions shown are in meters.



Site Notes:

MEASURED BUILDING SURVEY KEY:-

0.00	ROOM HEIGHT
←	ROOF SLOPE (DOWN)
sh	SILL HEIGHT
hh	HEAD HEIGHT
fh	FLOOR TO HEAD
dh	DOOR HEIGHT
u/s	UNDERSIDE
t/s	TOPSIDE
s/c	SUSPENDED CEILING
rl	ROOFLIGHT
fp	FIREPLACE
sd	SLIDING DOOR
fb	FLOORBOARDS
cup'd	CUPBOARD
elec	ELECTRICS
	RADIATOR
htr	HEATER
hwt	HOT WATER TANK

SANITARY WARE
DOORS
WINDOW
BUILDING LINE
WALL
BEAM
RAFTER

Rev:	Date:	Description:	Surveyed:	Quality Ref:

FOSSE SURVEYING

Fosse Surveying Limited
The Old Vicarage, Market St, Castle Donington, DE74 2JB
Tel: 0116 2325169
Mobile: 07940 147244
Email: mail@fossesurveying.co.uk -Website: www.fossesurveying.co.uk

Client Marrons Planning

Project Burley Appliances Ltd
Lands End Way
Oakham, LE15 6RB

Title Warehouse Ground Floor Plan

Surveyed: CT/BI Date: 11/11/2021

Quality Ref: 1637 Scale: 1:200@A1

Level Datum: OS GNSS Grid: OS GNSS

Job No. 1637 Rev.

Comments:
The survey has been orientated to the Ordnance Survey (OS) National Grid (OSGB36) via a GPS and the OS active network.
The level datum GPS derived at ....
No Scale factor has been applied to the survey therefore the coordinates shown are arbitrary and not true OS which has a scale factor applied.

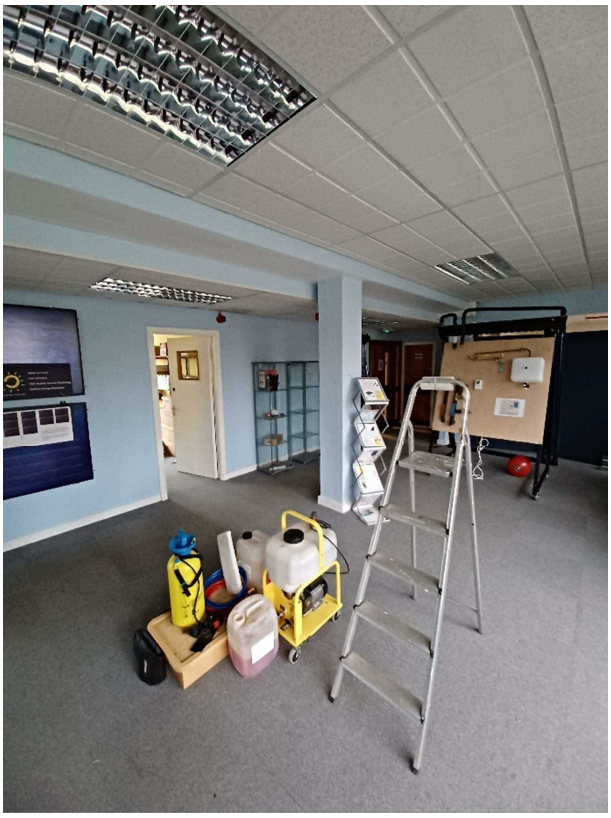
All critical dimensions to be verified on site before design - construction takes place. All dimensions shown are in meters.
No liability will be taken for this drawing if passed onto a third party without written permission of Fosse Surveying.

APPENDIX II

PHOTOGRAPHS

Photograph 1

Photograph 2



Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

APPENDIX III

GENERAL CONDITIONS

1. EXTERNAL

1.1 Unless indicated otherwise the exterior has been inspected from ground level only supplemented where possible by observations from windows.

1.2 Flat or sloping areas of roof (including chimney stacks and flashings) to which direct access was not available have been inspected as closely as possible from suitable vantage points.

1.3 Internal roof spaces have only been inspected to the extent that reasonable access was available.

1.4 Depending on weather conditions during the inspection, leaks existing in gutters and downpipes may not have been detected.

1.5 The foundations have not been opened up for examination.

1.6 The condition of cavities and cavity ties in double-leaf walls has not been inspected.

1.7 External joinery has been inspected from ground level only.

1.8 Detached garages and outbuildings have only been inspected where indicated.

2. INTERNAL

2.1 Furniture and wall hangings have not been moved. Fixtures, fittings and surface finishes have not been disturbed. Where necessary and possible, accessible corners of fitted floor coverings have been lifted sufficiently to identify the structural material of the floor beneath. Fixed floorboards have not been lifted.

2.2 Ceilings, walls and partitions have been inspected from floor level only.

2.3 The internal condition of flues has not been inspected.

2.4 Woodwork and other parts of the structure which were covered, unexposed or inaccessible have not been inspected and it has, therefore, been impossible to report that any such part of the property was free from defect.

3. SERVICES

3.1 A visual inspection of drainage has been made where it was possible to locate and raise the covers of inspection chambers.

3.2 No inspections or tests have been carried out on any services.

4. GENERAL

4.1 No enquiries have been made concerning building regulations, town and country planning, roads or any statutory mining or environmental matters.

4.2 No enquiries have been made of any central or local government departments or any statutory undertakers.

4.3 No attempt has been made other than by visual examination to establish:

A. The presence in mortar or concrete of high alumina cement, calcium chloride or other deleterious substance.

B. The presence in mortar or concrete of active alkali-aggregate reaction; sulphate attack or other agency promoting the deterioration of such materials.

C. The presence in timber components of chemicals which would promote the corrosion of embedded or adjacent metal components.

4.4 A detailed dimensional survey was not carried out. Except to the extent that openings in walls allowed thicknesses to be noted approximately any comments on wall thicknesses are based purely on assumptions.

4.5 This report was prepared on the instructions of the client(s) named in the introduction to this report and is exclusively for his/her/their benefit. This benefit is not transferable to any third party except with the express agreement of the original client and the written agreement of PRP UK Limited. Such agreements may require the payment of additional fees.

4.6 The copyright in this report and other related plans and documents prepared by PRP UK Limited is owned by them and no such report, plan or document may be reproduced, published or adapted without their written consent. Complete copies of this report may, however, be made and distributed by the client as an expedient in dealing with matters related to its commission.