

**IPMS** INTERNATIONAL  
PROPERTY  
MEASUREMENT  
STANDARDS

[www.ipmsc.org](http://www.ipmsc.org)

# International Property Measurement Standards: Industrial Buildings

International Property Measurement Standards Coalition

January 2018





[www.ipmsc.org](http://www.ipmsc.org)

# International Property Measurement Standards: Industrial Buildings

International Property Measurement Standards Coalition

January 2018

Published by the International Property Measurement Standards Coalition (IPMSC).

No responsibility for loss or damage caused to any person acting or refraining from action as a result of the material included in this publication can be accepted by the authors or IPMSC.

ISBN 978-1-78321-215-6

Copyright © 2018 International Property Measurement Standards Coalition (IPMSC). All rights reserved. Copies of this document may be made strictly on condition that they acknowledge IPMSC's copyright ownership, set out the IPMSC's web address in full, [www.ipmsc.org](http://www.ipmsc.org), and do not add to or change the name or the content of the document in any way.

This document should not be translated, in whole or in part, and disseminated in any media, whether by electronic, mechanical or other means now known or hereafter invented, including photocopying or recording, or in any information storage and retrieval system, without permission in writing from the IPMSC. Please address publication and copyright matters to [contact@ipmsc.org](mailto:contact@ipmsc.org)

# Contents

Welcome to IPMS: Industrial Buildings	1	
Introduction	2	
IPMS Standards Setting Committee	5	
Definitions	6	
<b>Part 1</b>	<b>Aim and Scope of the Standards</b>	<b>9</b>
1.1	Aim of the Standards .....	9
1.2	Use of the Standards .....	9
1.3	Accuracy .....	9
1.4	Floor Level Designation .....	9
<b>Part 2</b>	<b>Principles of Measurement</b>	<b>10</b>
2.1	General Principles of Measurement and Calculation .....	10
2.2	Best Measurement Practice .....	10
2.2.1	General .....	10
2.2.2	Unit of Measurement .....	10
2.2.3	Measurement Reporting .....	11
2.3	Limited Use Areas .....	11
2.4	Adjustment between IPMS and other standards .....	12
<b>Part 3</b>	<b>IPMS Standards</b>	<b>13</b>
3.1	IPMS 1 .....	13
3.1.1	Use .....	13
3.1.2	Definition .....	13
3.2	IPMS 2 – Industrial .....	15
3.2.1	Use .....	15
3.2.2	Definition .....	15
3.3	IPMS 3 – Industrial .....	17
3.3.1	Use .....	17
3.3.2	IPMS 3A – Industrial .....	17
3.3.3	IPMS 3B – Industrial .....	18
<b>Part 4</b>	<b>Technical</b>	<b>20</b>
4.1	Internal Dominant Face .....	20
4.2	Clear Height and Internal Height .....	22
4.3	Covered Area .....	22
4.4	Shared Walls (IPMS 1) .....	22
4.5	IPMS Industrial Component Areas .....	23
4.6	Sample Spreadsheet for Component Areas .....	27

## Contents *continued*

<b>Part 5</b>	<b>Floorplans and Sections</b>	<b>29</b>
5.1	IPMS 1 (External) .....	29
5.2	IPMS 2 – Industrial (Internal) .....	32
5.3	IPMS 3 – Industrial (Occupier) .....	35
5.3.1	IPMS 3A – Industrial .....	35
5.3.2	IPMS 3B – Industrial .....	38

## Table of diagrams

Diagram 1:	IPMS 1 – Total Floor Area of Level 0 and Level 1 .....	14, 29
Diagram 2:	IPMS 1 – Ground Floor (Level 0) .....	14, 30
Diagram 3:	IPMS 1 – Upper Floor (Level 1) .....	14, 31
Diagram 4:	IPMS 2 – Industrial – Total Floor Area of Level 0 and Level 1 .....	15, 32
Diagram 5:	IPMS 2 – Industrial – Ground Floor (Level 0) .....	16, 33
Diagram 6:	IPMS 2 – Industrial – Upper Floor (Level 1) .....	16, 34
Diagram 7:	IPMS 3A – Industrial – Ground Floor (Level 0) .....	18, 36
Diagram 8:	IPMS 3A – Industrial – Upper Floor (Level 1) .....	18, 37
Diagram 9:	IPMS 3B – Industrial – Ground Floor (Level 0) .....	19, 39
Diagram 10:	IPMS 3B – Industrial – Upper Floor (Level 1) .....	19, 40
Diagram 11:	Internal Dominant Face .....	21
Diagram 12:	IPMS – Cross Section .....	22
Diagram 13:	Extent of Covered Area .....	22
Diagram 14:	IPMS – Industrial – Ground Floor (Level 0) – Component Areas .....	25
Diagram 15:	IPMS – Industrial – Upper Floor (Level 1) – Component Areas .....	26

## Welcome to IPMS: Industrial Buildings

On behalf of the IPMS Coalition we present *IPMS: Industrial Buildings*. The Coalition comprises organisations from all over the world, who have come together to create one shared international standard for property measurement. We have recognised that there has been a lack of consistent measurement standards within many markets. Our profession and consumers deserve better.

This document follows feedback from previous consultations and discussions with many stakeholders over inconsistencies in industrial measurement within and across markets. It is a continuation of the work already carried out in relation to measurement of office and residential buildings and is part of a programme of work that includes preparing IPMS standards for other building classes: retail and mixed use.

The Coalition accepts that standard setting is a never-ending process of continuous improvement and will be listening closely to the market to make future developments to the standard as and when needed.

As a Coalition we are also continuing the important work of implementation through engaging with governments, occupiers, owners and other important stakeholders.

In preparing this document, the Coalition wishes to acknowledge the work on the floorplans undertaken by Professor Marc Grief of Mainz University of Applied Sciences.

On behalf of the Coalition, the Standards Setting Committee and the numerous participants in the consultation, we are proud to present *IPMS: Industrial Buildings*.

For further information on **IPMS** and to view the list of well over 200 companies and governments that have committed to using **IPMS** please visit the website [www.ipmsc.org](http://www.ipmsc.org)



**Kenneth M. Creighton**, Trustee for RICS, Chairman of the Board of Trustees IPMS Coalition



**Lisa M. Prats**, Trustee for BOMA International, Vice Chair of the Board of Trustees IPMS Coalition



**Jean-Yves Pirlot**, Trustee for CLGE, Secretary General of the Board of Trustees IPMS Coalition

## Introduction

The International Property Measurement Standards Coalition (IPMSC) was formed on 30 May 2013 after meeting at the World Bank in Washington DC. The **Coalition**, comprising (at the date of publication) the 87 organisations listed below, aims to bring about the harmonisation of national property measurement standards through the creation and adoption of agreed international standards for the measurement of **Buildings**.

This document for the measurement of **Industrial Buildings** is the third building class standard prepared by the **Coalition's** Standards Setting Committee (SSC). The **Coalition** members at the date of publication include:

- American Society of Farm Managers and Rural Appraisers (ASFMRA)*
- Appraisal Institute (AI)*
- Asia Pacific Real Estate Association (APREA)*
- Asian Association for Investors in Non-listed Real Estate Vehicles (ANREV)*
- Asociación de Consultoras Inmobiliarias (ACI)*
- Asociación de Promotores Constructores de España (APCE)*
- Asociación Española de Análisis de Valor (AEV)*
- Asociación Española Geómetras Expertos (AEGEX)*
- Asociación Profesional de Sociedades de Valoración (ATASA)*
- ASTM International*
- Australian Property Institute (API)*
- British Property Federation (BPF)*
- Building Owners and Managers Association of Canada (BOMA Canada)*
- Building Owners and Managers Association of China (BOMA China)*
- Building Owners and Managers Association Indonesia (BOMA Indonesia)*
- Building Owners and Managers Association International (BOMA International)*
- Bulgarian Chamber of Professional Valuers (KPO)*
- Bundesverband der Immobilien-Investment-Sachverständigen e.V. (BIIS)*
- China Institute of Real Estate Appraisers and Agents (CIREA)*
- Chongqing Real Estate Association (CREA)*
- Commonwealth Association of Surveying and Land Economy (CASLE)*
- Consiglio Nazionale Geometri e Geometri Laureati (CNGeGL)*
- CoreNet Global*
- Council of European Geodetic Surveyors (CLGE)*
- Council on Tall Buildings and Urban Habitat (CTBUH)*
- Counselors of Real Estate (CRE)*
- Cyprus Architects Association (CAA)*
- Cyprus Association of Civil Engineers (CYACE)*
- Cyprus Association of Quantity Surveyors and Construction Economists (SEEOKK)*
- Czech Banking Association (CBA)*
- European Association for Investors in Non-Listed Real Estate Vehicles (INREV)*
- European Association of Real Estate Professions (CEPI-CEI)*
- European Mortgage Federation (EMF)*
- Facility Management Institute Czech Republic*
- Facility Management Institute Slovakia (FMI)*
- Federation of Associations of Building Contractors Cyprus (OSEOK)*
- Gesellschaft für Immobilienwirtschaftliche Forschung e. V. (GIF)*
- Ghana Institution of Surveyors (GhIS)*
- GRESB*
- Hungarian Real Estate Developers Association (IFK)*
- HypZert GmbH*
- Ingenieur-Geometer Schweiz (IGS)*
- Institute of Estate Agents, Singapore (IEA)*
- Institute of Philippine Real Estate Appraisers (IPREA)*
- Institute of Real Estate Management (IREM)*
- Institution of Surveyors of Kenya (ISK)*
- International Association of Assessing Officers (IAAO)*
- International Consortium of Real Estate Associations (ICREA)*
- International Facility Management Association (IFMA)*
- International Facility Management Association Poland (IFMA Poland)*
- International Federation of Surveyors (FIG)*
- International Monetary Fund (IMF)*
- International Real Estate Federation (FIABCI)*
- International Right of Way Association (IRWA)*



## Introduction *continued*

*International Union of Property Owners (UIPI)*  
*International Union of Tenants (IUT)*  
*Italian Real Estate Industry Association (ASSOIMMOBILIARE)*  
*Japan Association of Real Estate Appraisers (JAREA)*  
*Japan Association of Real Estate Counselors (JAREC)*  
*Japan Building Owners and Managers Association (BOMA Japan)*  
*Middle East Council of Shopping Centres (MECSC)*  
*National Society of Professional Surveyors (NSPS)*  
*Nigerian Institution of Estate Surveyors and Valuers (NIESV)*  
*NP "Cadastral Engineers"*  
*Open Standards Consortium for Real Estate (OSCRE)*  
*Ordre des Géomètres-Experts (OGE)*  
*Polish Green Building Council (PLGBC)*  
*Property Council of Australia (PCA)*  
*Property Council New Zealand (PCNZ)*  
*Property Institute of New Zealand (PINZ)*  
*Pro Progressio*  
*Queensland Spatial & Surveying Association (QSSA)*  
*Real Estate Institute of Botswana (REIB)*  
*Real Estate Institute of Zimbabwe (REIZ)*  
*Real Estate Syndicate of Lebanon (REAL)*  
*Real Property Association of Canada (REALpac)*  
*Royal Institute of British Architects (RIBA)*  
*Royal Institution of Chartered Surveyors (RICS)*  
*Royal Society of Ulster Architects (RSUA)*  
*Secovi-SP (Secovi)*  
*Society of Chartered Surveyors Ireland (SCSI)*  
*Society of Industrial and Office Realtors (SIOR)*  
*South African Property Owners Association (SAPOA)*  
*Technical Chamber of Cyprus (ETEK)*  
*The Appraisal Foundation (TAF)*  
*Union Nationale des Economistes de la Construction (UNTEC)*  
*Zentraler Immobilien Ausschuss e.V. (ZIA)*

Research by the SSC has found that measurement practices vary substantially across local and global industrial markets. The SSC has focused only on issues directly related to

**Building** measurements and calculated areas within a **Building**. It is acknowledged that globally there are different **Floor Area** measurements adopted in construction, transactions and valuation. *IPMS: Industrial Buildings* will not only provide clarity for those purchasing or leasing industrial property, but will also enable comparison of differing measurement standards by interfacing to **IPMS**.

**IPMS**, as an international property measurement standard, has been created through a transparent, detailed and inclusive standard setting process by the **SSC**. It supports associated financial reporting and valuation standards such as the International Financial Reporting Standards (IFRS) and, in the USA, the Uniform Standards of Professional Appraisal Practice (USPAP). The International Valuation Standards Council (IVSC) supports **IPMS**, which should be read in conjunction with International Valuation Standards (IVS).

The **SSC** has spent considerable time researching established standards to ensure that existing intelligence has not been wasted. The **SSC** did not identify any existing industrial measurement standard that was suitable for adoption internationally. **IPMS** is not a hybrid of those standards but does introduce some concepts that may be new to some markets. These concepts have been further refined for the purpose of **IPMS**.

**IPMS** is a high-level and over-arching standard. Markets that do not have an existing established measurement standard are encouraged to adopt **IPMS**. The **SSC** expects **IPMS** to work initially in parallel with local standards and for a dual reporting basis and interface to be adopted where appropriate. In time the **SSC** expects **IPMS** to become the primary basis of measurement across all markets.

The **SSC** considered it unrealistic to create a single standard that would immediately apply to all classes of **Buildings** because each has distinctive characteristics that require individual analysis. However the principles, methodology and measurement practices developed for **IPMS** will be similar for all **Buildings**. **IPMS** needs to be consistent as another class of **Building**, mixed use, incorporates several **Building** classes.

In order to resolve confusion with terms that have established definitions the **SSC** avoided using existing **Floor Area** descriptions such as Gross External Area (GEA), Gross Internal Area (GIA) and Net Internal Area (NIA). These terms are commonly, but inconsistently, used in markets across the world.

The **SSC** consulted widely to understand the measurement conventions used in different international markets against the background of the impact on consumers of non-transparent and varying local market practices. Our research found there was a need to measure the external area of a

## Introduction *continued*

**Building**, for planning purposes or the summary costing of development proposals. The **SSC** decided to refer to this as **IPMS 1** and apply it to all classes of **Buildings**.

**IPMS 2 – Industrial** was developed to measure the internal area of a **Building** and, with the use of **Component Areas**, will assist the **Property Industry** in making efficient use of space and in benchmarking data.

It was also important to measure areas in exclusive occupation for transactions and other purposes. The **SSC** identified two different measurement bases, **IPMS 3A – Industrial** and **IPMS 3B – Industrial**, that were required to meet global market needs for measuring areas in exclusive occupation.



## IPMS Standards Setting Committee

In July 2013 the **IPMSC** selected real estate experts from around the world to form the Standards Setting Committee (**SSC**) and develop global standards for property measurement.

The **SSC** brings together experts including academics, real estate fund and asset managers, **Valuers**, and specialists in development and construction. The **SSC** acts independently from the **Coalition** and its respective members.

The **SSC** members and co-authors of this standard for **Industrial Buildings** are:

Max Crofts FRICS (UK)	Chairman
Allen Crawford FRICS, FAPI (Australia)	Vice Chairman
Alexander Aronsohn FRICS (UK)	Executive Secretary to the Committee
Claudio Bernardes (Brazil)	
Anthony Gebhardt MRICS, RQS (South Africa)	
Kent Gibson BOMA Fellow (USA)	
Prof. Dipl. Ing. Marc Grief (Germany)	
Prof. Sr Dr. Ting Kien Hwa FRICS, FRISM, MPEPS, MMIPPM (Malaysia)	
Alex PW Leung MHKIS, MRICS, MCIREA (China)	
Andrei Lukahsev MRICS, CCIM, SIOR (Russia)	
Luke Mackintosh MRICS, AAPI, F Fin (Australia)	
Howard Morley ANZIV, SNZPI, FREINZ, AAMINZ (New Zealand)	
Frederic Mortier MSc (Belgium)	
Sara Stephens MAI, CRE (USA)	
Peter L. Stevenson CEO, BOMA, MRICS (USA)	
Nicholas Stolatis CPM, RPA, LEED AP (USA)	
V. Suresh FRICS (India)	
Koji Tanaka FRICS, ACI Arb, RIBA, JIA (Japan)	
Dr. Piyush Tiwari MRICS (India)	

## Definitions

### Ancillary Area

An area in exclusive use, which is either detached from the main area being measured or is being used for supplementary purposes.

### Balcony

An external platform at an upper floor level with a balustrade to the open sides projecting from or recessed from an **External Wall** and including in this definition generally accessible rooftop terraces, external galleries and loggia.

### Balustrade

A protective barrier formed by a solid wall, railings or other feature.

### Building

An independent attached or detached **Structure** forming all or part of a **Property**.

### Catwalk

An internal or external walkway above the surrounding area that provides higher level access.

### Clear Height

The height within a **Building** or section of a **Building** measured from the floor to the lowest point of the structural element above, ignoring the existence of any brackets, struts or fixtures and fittings.

### Coalition

The Trustees of **IPMS**, comprising not-for-profit organisations, each with a public interest mandate.

### Common Facilities

Those parts of a **Building** that would, in multiple occupation, provide shared facilities that typically do not change over time and may include, for example, circulation areas, stairs, escalators, lifts/elevators and motor rooms, toilets, cleaners' cupboards, plant rooms, fire refuge areas, maintenance rooms and unallocated parking spaces.

### Component

One of the main elements into which the **Floor Area** of a **Building** can be divided.

### Component Area

The total **Floor Area** attributed to one of the **Components**.

### Covered Area

The extent of the area of a **Building** covered by one or more roof(s) and the perimeter of which is sometimes referred to as the drip line, being the outermost permanent structural extension, exclusive of ornamental overhangs.

### External Wall

The enclosing element of a **Building**, including windows and walls, that separates the exterior area from the interior area.

### Finished Surface

The wall surface directly above the horizontal wall-floor junction, ignoring skirting boards, cable trunking, heating and cooling units, and pipework.

### Floor Area

The area of a normally horizontal, permanent, load-bearing structure for each level of a **Building**.

### IDF (Internal Dominant Face) Wall Section

The extent of each section of an **External Wall** where the inside finished surface area of each part of a window, wall or other external construction features varies from the inside finished surface area of the adjoining window, wall or external construction feature, ignoring the existence of any columns.

### Industrial Building

A **Building** mainly used for industrial purposes such as manufacturing and warehousing, whether or not part of the **Building** is used for other purposes.

### Internal Dominant Face (IDF)

The inside surface area comprising more than 50% of the first 2.75 metres measured vertically from the floor, or to the ceiling if lower, for each **IDF Wall Section**. If such does not occur, then the **Finished Surface** is deemed to be the **IDF**.

### Internal Height

The height within a **Building** or section of a **Building** measured from the floor to the lowest point of a ceiling, ignoring the existence of any brackets, struts or fixtures and fittings.

### IPMS

International Property Measurement Standards.

### IPMSC

The International Property Measurement Standards Coalition.

### IPMS 1

The total of the areas of each floor level of a **Building** measured to the outer perimeter of **External Walls**, **Sheltered Areas** and **Balconies**.

### IPMS 2

The total of the areas of each floor level of a **Building** measured to the **Internal Dominant Face** of all **External Walls** and **Balconies** on each level.

### IPMS 3

The **Floor Area** available on an exclusive basis to an occupier.

### Loading Bay(s)

Area(s) designed for vehicle access next to or adjacent to a **Loading Dock**.

### Loading Dock(s)

Elevated platform(s) at an opening of a **Building** designed for receiving or dispatching goods or equipment.

### Mezzanine

An intermediate or partial floor, other than a **Catwalk**, that is usually fully or partially open on one or more sides.

### Patio

A paved or floored terrace, adjacent to a **Building**, that may or may not be covered by an independent framework.

### Property

Any real estate asset in the built environment.

## Property Industry

Comprises **Users**, **Service Providers** and **Third Parties**.

## Service Provider

Any entity providing real estate advice to a **User** or **Third Party** including, but not limited to, **Valuers**, surveyors, facility managers, property managers, asset managers, agents and brokers, **Space Measurement Professionals**, cost consultants, interior designers and architects.

## Sheltered Area

Any part of the **Covered Area** that is not fully enclosed, but excluding insignificant areas under the eaves.

## Space Measurement Professional

A **Service Provider** qualified by experience or training to measure **Buildings** in accordance with **IPMS**.

## SSC

The Standards Setting Committee appointed by the **IPMSC** to develop global standards for property measurement.

## Standard Facilities

See **Common Facilities**.

## Structure

A construction that provides shelter or serves an ancillary function, but is not necessarily fully enclosed.

## Temporary Structure

A physical element within a **Building** installed on an interim or permanent basis, the removal of which would not damage the physical integrity of the **Building**.

## Third Party

Any entity other than a **User** or **Service Provider** with an interest in property measurement including, but not limited to, governments, banks, other property financing bodies, data analysts and researchers.

## User

An owner-occupier, developer, investor, purchaser, vendor, landlord or tenant.

## Valuer

A **Service Provider** with an appropriate professional qualification in valuation or appraisal.

## Veranda

An open or partly enclosed area on the outside of a **Building** at ground level (Level 0), and covered by a roof that is an integral part of the **Building**.

## Part 1 Aim and Scope of the Standards

### 1.1 Aim of the Standards

The aim of **IPMS** is to provide transparency in the measurement of **Buildings**. **IPMS** supports the requirements of **Service Providers, Third Parties** and **Users of Property** for consistency in measurement reporting. Until now the stated area of floor space in identical **Buildings** has varied considerably between countries, and sometimes within the same country, owing to differing measurement conventions.

The measurements can be used for asset management, benchmarking, construction, facility management, marketing, property financing, research, transaction, valuation and other purposes.

### 1.2 Use of the Standards

**IPMS** defines what is to be measured in a **Building** and the measurement parameters. **IPMS** does not dictate how measurements are to be obtained or used.

The appropriate **IPMS** standard (such as office, residential, industrial, retail) to be used should be chosen according to the current or proposed designed function of the **Building** or part of a **Building** being measured.

**IPMS** can be used for any purpose agreed between **Users, Service Providers** and **Third Parties**.

**IPMS** provides a common language that can interface with existing local measurement standards.

### 1.3 Accuracy

**Service Providers** must adopt appropriate measuring and computing processes so as to satisfy the requirements of **Users**. These requirements can range from a broad approximation for some purposes to a precise calculation for contractual or other reasons.

### 1.4 Floor Level Designation

The **SSC** found there is no market consistency in the reference to a particular level.

For all property classes **IPMS** has adopted Level 0 as the primary ground level. Upper and lower levels are referred to sequentially as the number of levels above or below Level 0. For example, Levels 1, 2 or 3, etc. are above Level 0 and Levels -1, -2 or -3, etc. are below Level 0.

## Part 2 Principles of Measurement

### 2.1 General Principles of Measurement and Calculation

**IPMS** is a factual measurement and must not include inflated or exaggerated **Floor Areas**. The **SSC** has adopted the following fundamental principles of measurement and calculation, which apply to all **Buildings**:

1. The item must be capable of being measured.
2. The measurement must be objectively verifiable.
3. All measurements with the exception of height are to be taken horizontally.
4. The measurements and calculations must be clearly documented and the following stated:
  - The **IPMS** standard used, for example, **IPMS 1, IPMS 2 – Industrial, IPMS 3A – Industrial or IPMS 3B – Industrial**
  - The method of measurement and the tools used (see Section 2.2.1)
  - The unit of measurement
  - The date of the measurement
  - Whether the measurement is verified on site.
5. **Buildings** are to be measured individually and reported on a floor-by-floor basis as existing or proposed at the time of measurement.
6. The principles of **IPMS** should be extrapolated using a common-sense approach.

### 2.2 Best Measurement Practice

#### 2.2.1 General

The **SSC** recommends that all **IPMS** measurement is supported by computer-generated drawings, if available, but where other drawings are used as a basis for measurement annotated dimensions on drawings should be used in preference to a reliance on scaling alone.

The **Service Provider** must report how the **Floor Area** has been established, for example, by computer-generated drawings, other drawings or by laser or tape measurement.

#### 2.2.2 Unit of Measurement

Measurements and calculations should be in the unit commonly adopted in the relevant country.

**Users** and **Third Parties** may require measurements to be converted, in which case the conversion factor must be stated.



### 2.2.3 Measurement Reporting

Any **Component Area** under **IPMS 1** or **IPMS 2** reported to a **User** or **Third Party** should, where practical and where appropriate, be cross-referenced to an appropriately coloured drawing and **Component Area** spreadsheet.

When reporting measurements and **Floor Areas** for proposed developments, **Service Providers** must take special care to ensure that measurements are cross-referenced as accurately as is reasonably possible to plans at the date of reporting.

## 2.3 Limited Use Areas

**Service Providers** need to be aware that in certain markets there may be areas in **Buildings** that are incapable of legal or effective occupation due to local or national legislation. Such areas and their limitations are to be identified, measured and stated separately within **IPMS** reported areas. If areas are subject to a restriction, this should be stated in the reporting document and in any **Component Area** spreadsheet.

**Users** and **Third Parties** need to be aware that the inclusion of measured areas in **IPMS** does not necessarily mean that the areas are available for legal occupation or use.

The reason why a particular area is regarded as a Limited Use Area must be stated.

The following examples are not exhaustive:

### Example 1 – Area difference from Internal Dominant Face

There may be a need to show the difference, if any, in **Floor Area** between measurements taken to the **Internal Dominant Face** and measurements taken to the wall-floor junction.

### Example 2 – Areas with height restriction

In various markets, areas defined as having limited or restricted height are identified separately. This height can vary between jurisdictions and in some instances the restricted height may be due to construction features.

### Example 3 – Areas with limited natural light

In some jurisdictions, areas with limited natural light in a **Building** are required to be identified separately.

### Example 4 – Above and below ground

A **Building** is generally composed of floors above ground and floors below ground. For measuring purposes, this distinction may be important in determining the conditions under which the premises may be used in compliance with local or national legislation, rules on fitness for habitation, or taxation.

## 2.4 Adjustment between IPMS and other standards

Where dual reporting is adopted, reconciliation between IPMS and the standard referred to must be appropriately explained. The SSC recommends that **Coalition** members provide interface guidance in their local implementation procedures for their respective membership.

## Part 3 IPMS Standards

The IPMS standards (and their principal uses) are:

- IPMS 1 (External)
- IPMS 2 – Industrial (Internal)
- IPMS 3A – Industrial (External: Exclusive Occupation)
- IPMS 3B – Industrial (Internal: Exclusive Occupation).

### 3.1 IPMS 1

#### 3.1.1 Use

IPMS 1 is used for measuring the area of a **Building** including **External Walls**.

The primary intent of IPMS 1 is that it is used for planning purposes or the summary costing of development proposals.

IPMS 1 is a whole of **Building** measurement.

#### 3.1.2 Definition

**IPMS 1:** The total of the areas of each floor level of a **Building** measured to the outer perimeter of **External Walls, Sheltered Areas** and **Balconies**.

The definition for IPMS 1 is the same for all classes of **Building**.

In many markets, but not universally, this is known as Gross External Area.

#### Measurement practice:

Areas for IPMS 1 are to be taken from drawings or on site.

If required, IPMS 1 can be reported on a **Component-by-Component** basis for each floor of a **Building**. The aggregate of the **Component Areas** must equal IPMS 1.

If there are no available plans for a basement, the area must include an estimation of the exterior wall thickness.

In respect of **Sheltered Areas**, IPMS 1 is to be measured to the **Covered Area**. In respect of roller shutters and other openings the principal external perimeter line of the **Building** across such openings should be followed to measure IPMS 1.

**Balconies** and **Mezzanines** are to be measured to the outside edge of the floor construction.

#### Inclusions:

IPMS 1 includes all areas and walls, columns, and enclosed walkways or passages between separate **Buildings**, available for direct or indirect use. Enclosed void areas such as atria are only included at their lowest floor level.

#### Measurements included but to be stated separately:

**Balconies, Sheltered Areas, Verandas** and **Mezzanines** are included but the measurement of each must be stated separately.

### Measurements excluded but to be stated separately:

Measurement for IPMS 1 does not include:

- **Temporary Structures**
- Open light wells or the upper level voids of an atrium
- Open external stairways that are not an integral part of the **Building**, for example, an open framework fire escape
- Any **Structure** beyond the **Covered Area**.

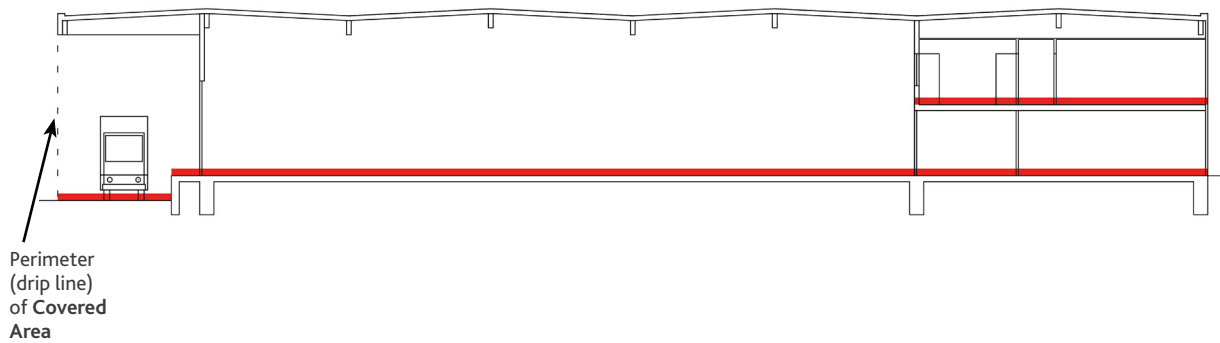


Diagram 1: IPMS 1 – Total Floor Area of Level 0 and Level 1

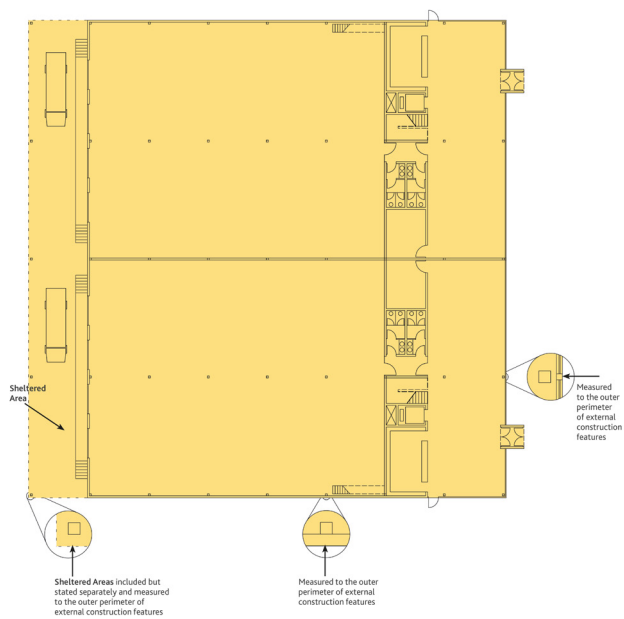


Diagram 2: IPMS 1 – Ground Floor (Level 0)

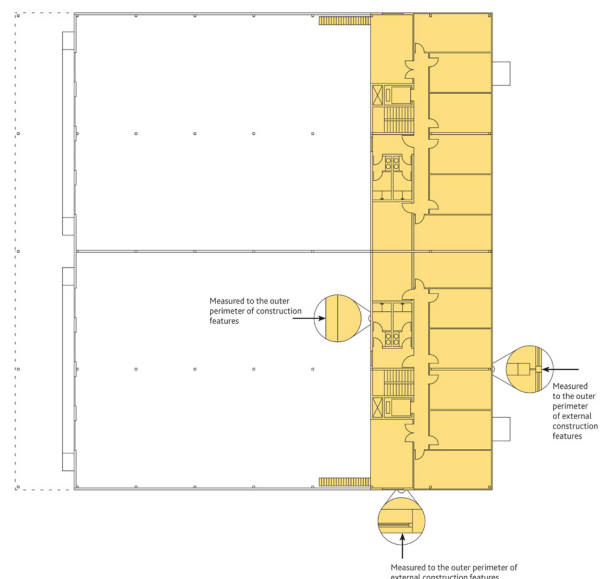


Diagram 3: IPMS 1 – Upper Floor (Level 1)

For larger versions of the above diagrams see Part 5 (pages 30–31).

## 3.2 IPMS 2 – Industrial

### 3.2.1 Use

**IPMS 2 – Industrial** is a whole **Building** measurement that is used for measuring the interior boundary area of a **Building**. The primary intended use is for providing data on the use of space and for benchmarking.

**IPMS 2 – Industrial** enables **Users, Third Parties** and **Service Providers** to make direct floor space comparisons between data derived from different market practices.

### 3.2.2 Definition

**IPMS 2 – Industrial**: The total of the areas of each floor level of a **Building** measured to the **Internal Dominant Face** of all **External Walls** and **Balconies** on each level.

In many markets, but not universally, this is similar to Gross Internal Area.

#### Measurement practice:

All areas in an **Industrial Building**, including for example offices, are to be measured in accordance with **IPMS 2 – Industrial**.

**Balconies** and **Mezzanines** are to be measured to the inner face of the balustrade, but not beyond the outside edge of the floor construction.

If required **IPMS 2 – Industrial** may be reported on a **Component-by-Component** basis for each floor of a **Building**.

#### Inclusions:

**IPMS 2 – Industrial** includes all internal areas, including internal walls and columns. Enclosed void areas such as atria are only included at their lowest floor level.

#### Measurements included but to be stated separately:

**Balconies**, internal **Loading Bays**, **Mezzanines** and enclosed walkways or passages between separate **Buildings**, available for direct or indirect use, are included but the measurement of each must be stated separately.

#### Measurements excluded but to be stated separately:

Areas outside the **External Wall** such as **Sheltered Areas** and external **Loading Bays** do not have to be measured, but if they are measured then these areas should be measured and stated individually and separately.

**Sheltered Areas** are to be measured to the **Finished Surface** of any walls and otherwise to the outer perimeter of the **Covered Area**.

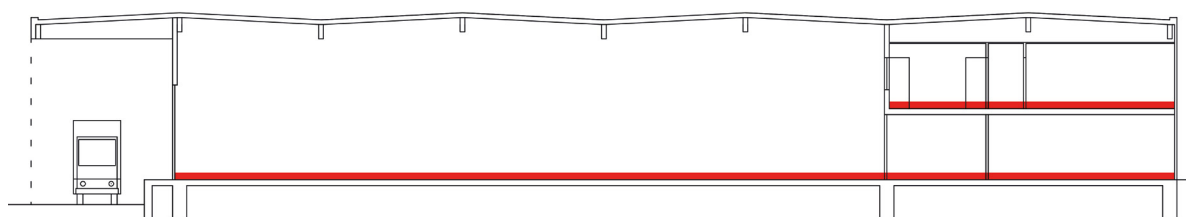


Diagram 4: IPMS 2 – Industrial – Total Floor Area of Level 0 and Level 1

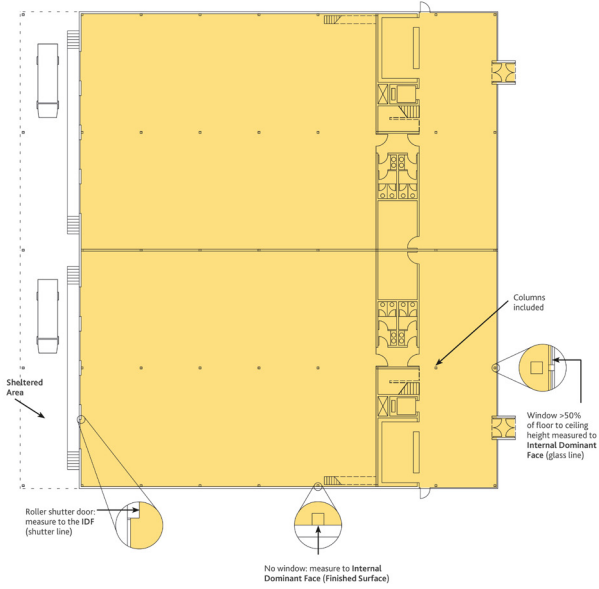


Diagram 5: IPMS 2 – Industrial – Ground Floor (Level 0)

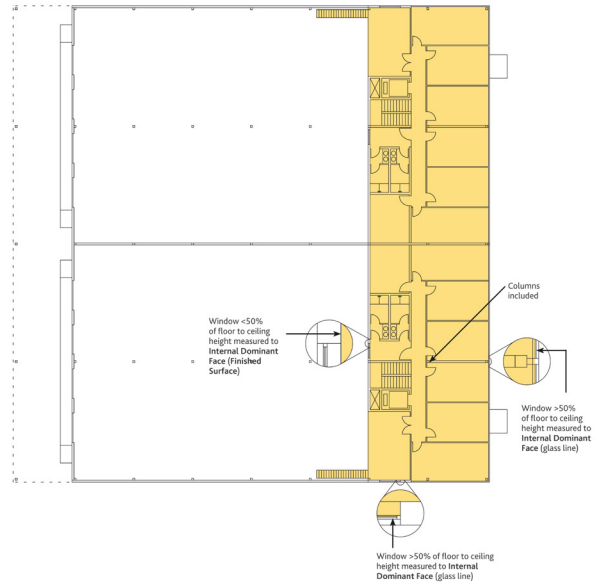


Diagram 6: IPMS 2 – Industrial – Upper Floor (Level 1)

For larger versions of the above diagrams see Part 5 (pages 33–34).



## 3.3 IPMS 3 – Industrial

### 3.3.1 Use

**IPMS 3A – Industrial** and **IPMS 3B – Industrial** are used for measuring the occupation of **Floor Areas** in exclusive use. They are not directly related to **IPMS 1** or **IPMS 2 – Industrial**.

The **SSC** has researched international property markets and identified different measurement bases that need to be accommodated. Some markets require only one of these measurement bases for transactional purposes, that being the primary intended use for **IPMS 3**. Other markets may either use **IPMS 3A – Industrial** or **IPMS 3B – Industrial** for sale purposes and the other for leasing purposes.

**Service Providers** must not simply state that a measurement is in accordance with **IPMS 3 – Industrial**. The reference must state whether the measurement is **IPMS 3A – Industrial** or **IPMS 3B – Industrial**.

Each unit in a multi-occupied **Building** must be measured separately, but if consistent the **Building** may be reported as an aggregate of **IPMS 3A – Industrial** or **IPMS 3B – Industrial**.

### 3.3.2 IPMS 3A – Industrial

#### Definition:

**IPMS 3A – Industrial**: The **Floor Area** available on an exclusive basis to an occupier measured from the outside face of the **External Walls** and any **Balconies** and also including any **Sheltered Areas**.

#### Measurement practice:

**IPMS 3A – Industrial** is measured to the outside face of **External Wall(s)** of the area in exclusive occupation.

In the case of attached or partially attached **Buildings** measurement is taken to the centre-line of shared walls between occupants.

In the absence of one or more **External Wall(s)**, **IPMS 3A – Industrial** (only at ground levels) is measured to the **Covered Area** excluding ornamental overhangs and eaves beyond **External Walls**.

Walls shared with **Common Facilities** are to be measured to the **Finished Surface**.

In respect of roller shutters and other openings, the principal external perimeter line of the **Building** across such openings should be followed to measure **IPMS 3A – Industrial**.

**Balconies** and **Mezzanines** are to be measured to the outside edge of the floor construction.

If required, office, storage, production and other such areas may be measured and stated separately.

#### Measurements included but to be stated separately:

**Ancillary Areas**, **Mezzanines** and **Catwalks** are included in **IPMS 3A – Industrial**, but are to be measured and stated separately.

The **Floor Area** occupied by stairs is only to be included at the lowest level. A vertical penetration, whose floor opening and surrounding walls, if any, is less than 0.1m<sup>2</sup> (1 ft<sup>2</sup>) is not separately identified and is included in the **Floor Area** measurement of **IPMS 3A – Industrial**.

### Measurements excluded but to be stated separately:

Measurement for IPMS 3A – Industrial does not include:

- **Temporary Structures**
- Open light wells or the upper level voids of an atrium
- Open external stairways that are not an integral part of the **Building**, for example, an open framework fire escape
- Any **Structure** beyond the **Covered Area**.

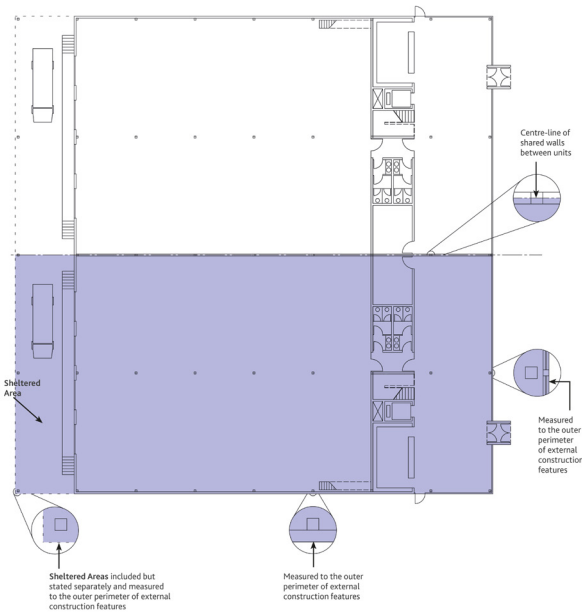


Diagram 7: IPMS 3A – Industrial – Ground Floor (Level 0)

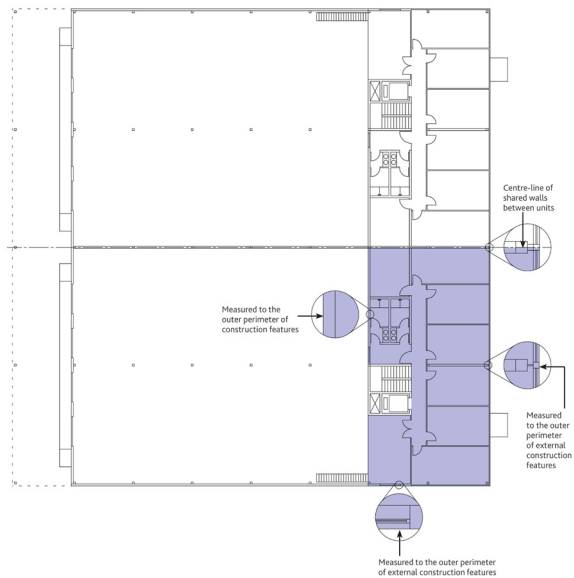


Diagram 8: IPMS 3A – Industrial – Upper Floor (Level 1)

For larger versions of the above diagrams see Part 5 (pages 36–37).

### 3.3.3 IPMS 3B – Industrial

#### Definition:

**IPMS 3B – Industrial:** The Floor Area available on an exclusive basis to an occupier measured to the **Internal Dominant Face of External Walls** and **Balconies**, and otherwise to the **Covered Area**.

#### Measurement practice:

All areas in an **Industrial Building**, including for example offices, are to be measured in accordance with **IPMS 3B – Industrial**.

**Balconies** and **Mezzanines** are to be measured to the inner face of the balustrade, but not beyond the outside edge of the floor construction.

Walls shared with **Common Facilities** or adjoining occupiers are to be measured to the **Finished Surface**.

The **Floor Area** occupied by stairs is only to be included at the lowest level. A vertical penetration, whose floor opening and surrounding walls, if any, is less than 0.1m<sup>2</sup> (1 ft<sup>2</sup>) is not separately identified and is included in the **Floor Area** measurement of **IPMS 3B – Industrial**.

If required, office, storage, production and other such areas may be identified, and measured and stated separately.

### Inclusions:

**IPMS 3B – Industrial** includes all exclusive use areas within the **External Walls**, including internal walls, columns and enclosed walkways or passages between separate **Buildings**, available for direct or indirect use. Enclosed void areas such as atria are only included at their lowest floor level.

### Measurements included but stated separately:

**Balconies**, internal **Loading Bays** and **Mezzanines**.

### Measurements excluded but stated separately:

Measurement for **IPMS 3B – Industrial** does not include:

- **Temporary Structures**
- Any areas outside the **External Wall**.

Areas outside the **External Wall**, such as some **Ancillary Areas**, **Sheltered Areas** and external **Loading Bays**, may be measured and stated separately.

**Sheltered Areas** are to be measured to the outside perimeter of the **Covered Area** and such measurements are to be stated individually and separately.

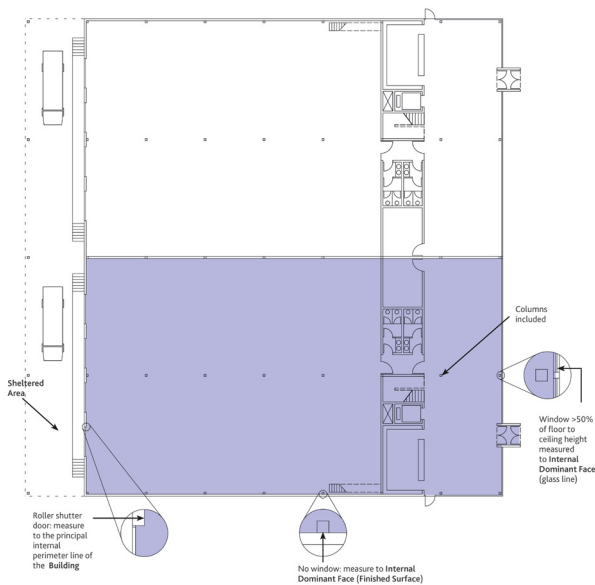


Diagram 9: IPMS 3B – Industrial – Ground Floor (Level 0)

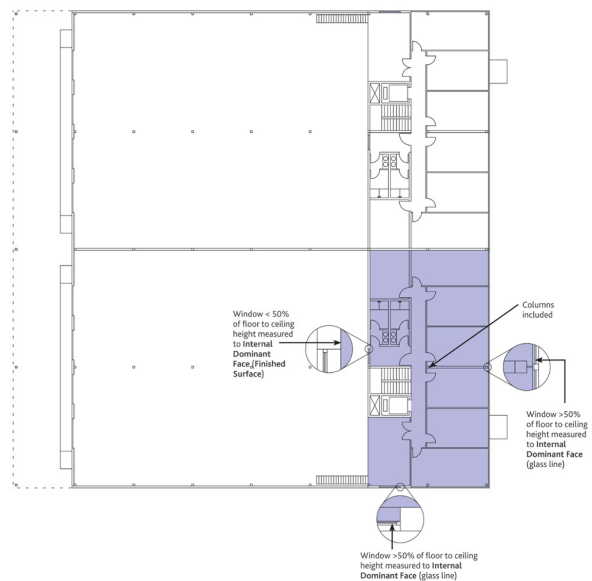


Diagram 10: IPMS 3B – Industrial – Upper Floor (Level 1)

For larger versions of the above diagrams see Part 5 (pages 39–40).

## Part 4 Technical

### 4.1 Internal Dominant Face

The **Internal Dominant Face (IDF)** is the inside surface area comprising more than 50% of the first 2.75 metres measured vertically from the floor, or to the ceiling if lower for each **IDF Wall Section**. If such does not occur, then the **Finished Surface** is deemed to be the **IDF**.

An **IDF Wall Section** is the extent of each section of an **External Wall**, where the inside finished surface area of each part of a window, wall or external construction feature varies from the inside finished surface area of the adjoining window, wall or external construction feature, ignoring the existence of any columns.

If the **Internal Dominant Face** is not vertical, the measurement is to the **Finished Surface**.

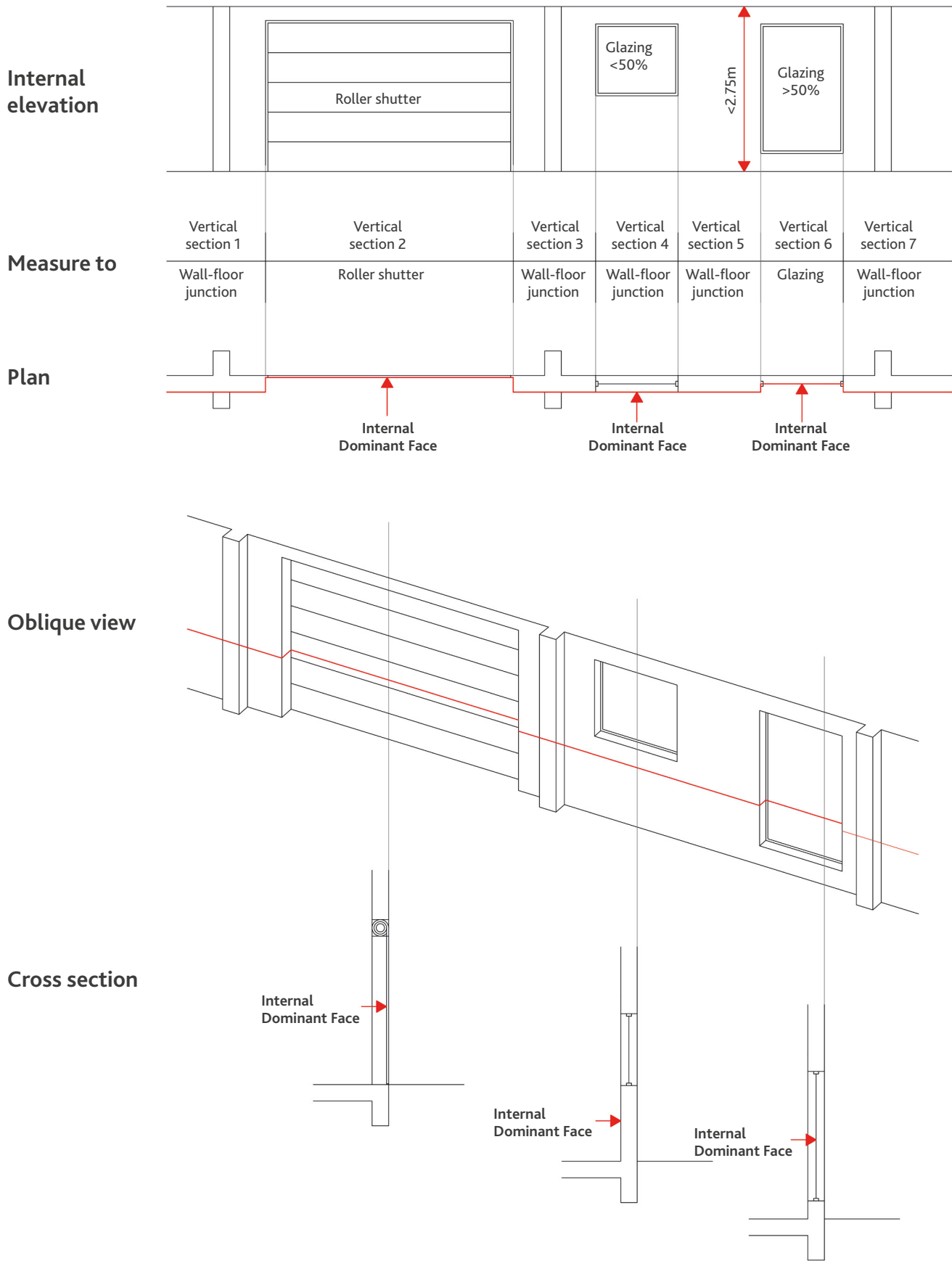


Diagram 11: Internal Dominant Face

## 4.2 Clear Height and Internal Height

**Clear Height** is the height within a **Building** or section of a **Building** measured from the floor to the lowest point of the structural element above, ignoring the existence of any brackets, struts or fixtures and fittings.

**Internal Height** is the height within a **Building** or section of a **Building** measured from the floor to the lowest point of a ceiling, ignoring the existence of any brackets, struts or fixtures and fittings.

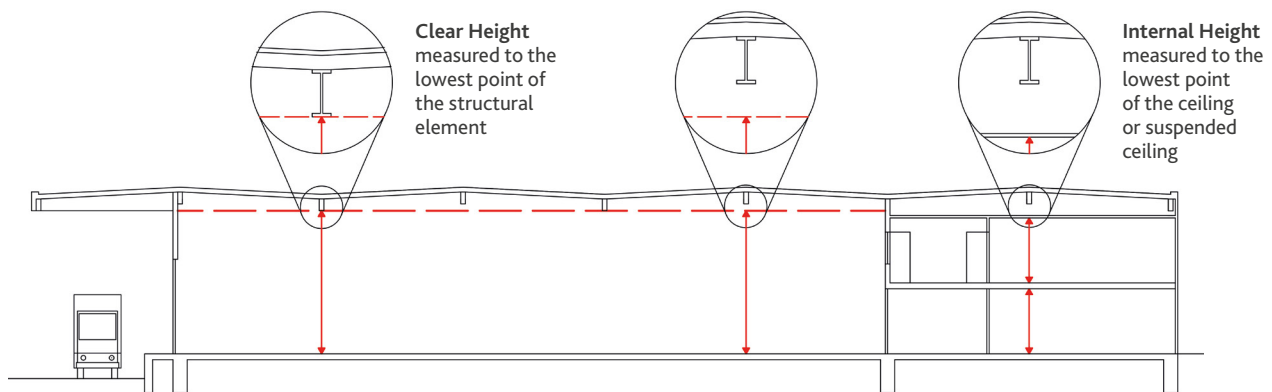


Diagram 12: IPMS – Clear Height and Internal Height

## 4.3 Covered Area

The extent of the area of a **Building** covered by one or more roof(s) and the perimeter of which is sometimes referred to as the drip line, being the outermost permanent structural extension, exclusive of ornamental overhangs.

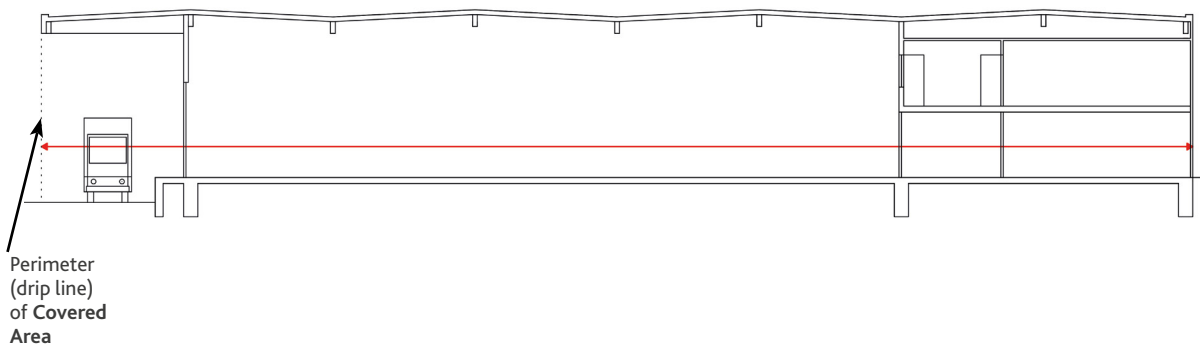


Diagram 13: Extent of Covered Area

## 4.4 Shared Walls (IPMS 1)


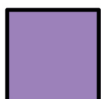





Where a **Building** extends over more than one individually owned **Property** each separated by a shared wall, as in adjoining industrial units, then **IPMS 1** is to be measured to the centre-line of the shared wall unless the boundary of the titled area differs, in which case the titled area takes precedence.



## 4.5 IPMS Industrial Component Areas

Below are recommended industrial **Component Areas** that should be used when areas need to be separately allocated for cost or other purposes under IPMS 1 and IPMS 2 – **Industrial**. These may be further subdivided if required.

### Industrial Component Areas

	(indigo)	<b>Component Area A1</b>	<b>Vertical Circulation Penetrations</b> Examples of vertical circulation penetrations include stairs and lifts/elevators.
	(violet)	<b>Component Area A2</b>	<b>Vertical Technical Penetrations</b> A technical penetration such as a pipe, duct or shaft, whose floor opening and surrounding walls, if any, is more than 0.1m <sup>2</sup> (1 ft <sup>2</sup> ): otherwise, the opening is not separately identified and remains in the <b>Component Area</b> where it is found.
	(maroon)	<b>Component Area B1</b>	<b>External Wall</b> The enclosing element of a <b>Building</b> , including windows and walls, that separates the exterior area from the interior area.
	(red)	<b>Component Area B2</b>	<b>Internal Structural Elements</b> This comprises all internal structural walls and columns.
	(pink)	<b>Component Area B3</b>	<b>Internal Non-Structural Elements</b> This comprises all internal, full-height, permanent walls other than those included in <b>Component Areas B1 and B2</b> .
	(light green)	<b>Component Area C</b>	<b>Technical Services</b> Examples of technical and building services include mechanical/electrical plant rooms, lift/elevator motor rooms and maintenance rooms.
	(light brown)	<b>Component Area D</b>	<b>Hygiene Areas</b> Examples of hygiene areas include toilet facilities, cleaners' cupboards, bath/shower rooms and changing rooms.
	(yellow)	<b>Component Area E</b>	<b>Circulation Areas</b> This comprises all circulation areas within the building, measured horizontally.
	(dark green)	<b>Component Area F</b>	<b>Amenities</b> Examples of amenities include internal facilities such as cafeterias, day-care facilities, sport, leisure and fitness areas, and prayer rooms. They are normally but not necessarily <b>Common Facilities</b> .
	(light blue)	<b>Component Area G</b>	<b>Workspace</b> Examples of workspace include warehouse, production, office, showroom, <b>Mezzanine</b> and enclosed <b>Loading Docks</b> .
	(yellow hatched)	<b>Component Area H</b>	<b>Other Areas</b> Examples of other areas include auxiliary areas, unenclosed <b>Loading Docks</b> , internal parking and storage rooms.

If a particular space may be assigned to more than one **Component Area**, then it is to be assigned to the **Component Area** that best reflects its primary design function within the larger space.

**Component Areas**, as a whole or in part, may be classified as private (being reserved exclusively for one occupier) or shared (being available for the use of several occupiers).

Areas within **Component Area H** not available for direct industrial-related use may be described as auxiliary. They are to be measured but may also be stated in an alternative way. For example, car parking may also be reported by the number of spaces.

#### Limited use areas

Limited use areas as defined in Section 2.3 are included within **IPMS** reported areas but must be identified, measured and stated separately.

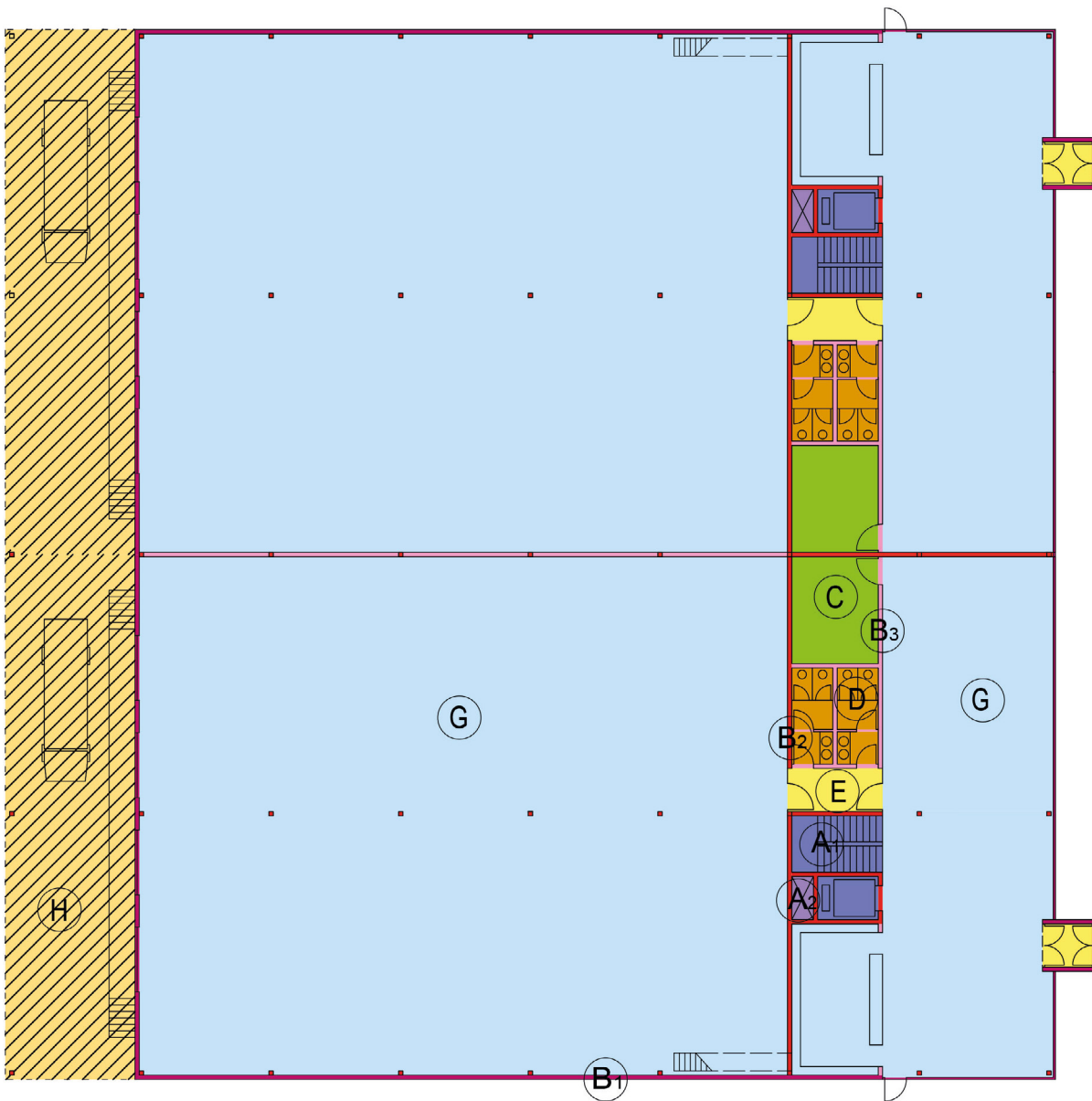


Diagram 14: IPMS – Industrial – Ground Floor (Level 0) – Component Areas

- Component Area A1 – Vertical Circulation Penetrations
- Component Area A2 – Vertical Technical Penetrations
- Component Area B1 – External Wall
- Component Area B2 – Internal Structural Elements
- Component Area B3 – Internal Non-Structural Elements
- Component Area C – Technical Services
- Component Area D – Hygiene Areas
- Component Area E – Circulation Areas
- Component Area F – Amenities
- Component Area G – Workspace
- Component Area H – Other Areas

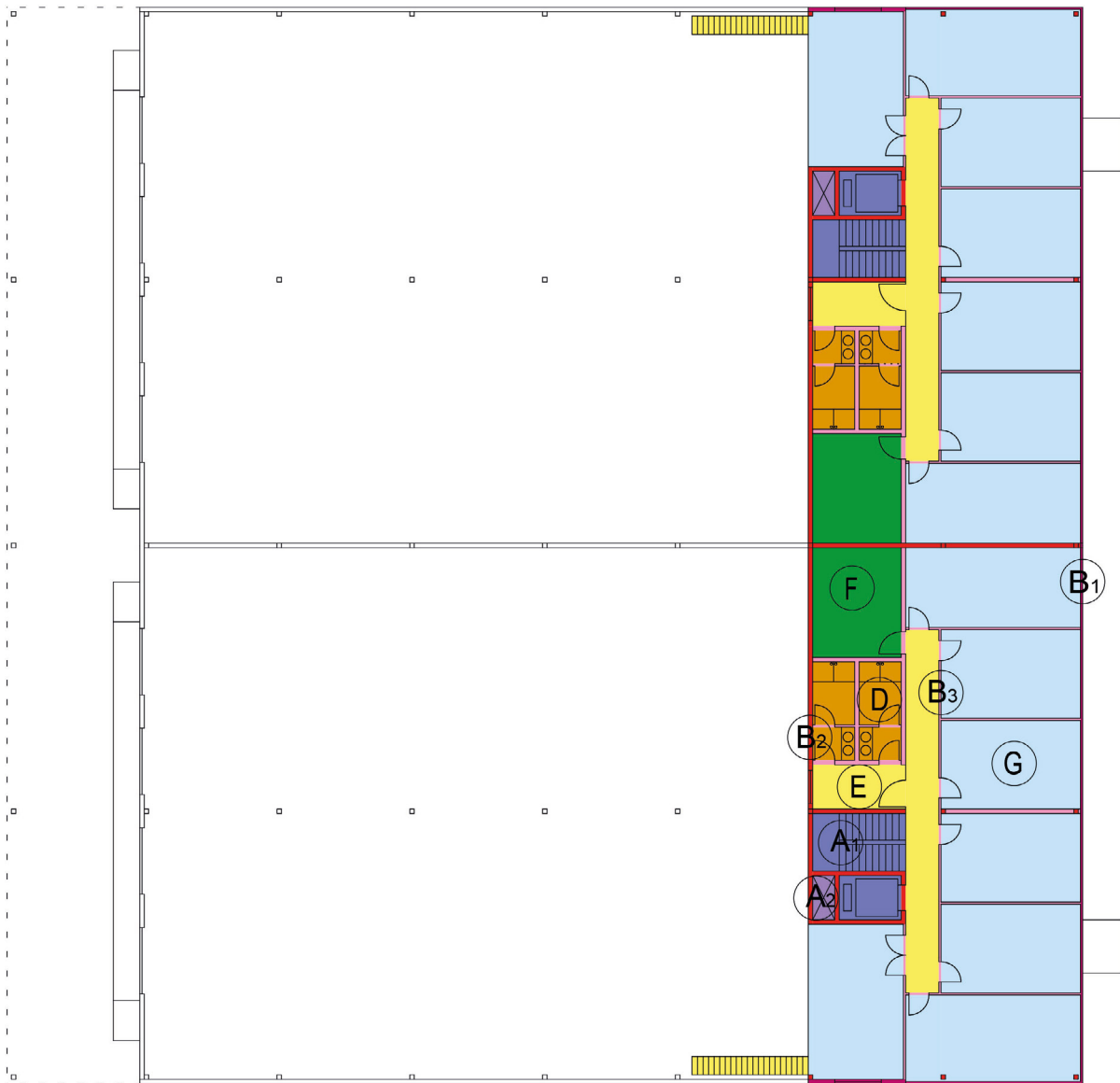


Diagram 15: IPMS – Industrial – Upper Floor (Level 1) – Component Areas

- Component Area A1 – Vertical Circulation Penetrations
- Component Area A2 – Vertical Technical Penetrations
- Component Area B1 – External Wall
- Component Area B2 – Internal Structural Elements
- Component Area B3 – Internal Non-Structural Elements
- Component Area C – Technical Services
- Component Area D – Hygiene Areas
- Component Area E – Circulation Areas
- Component Area F – Amenities
- Component Area G – Workspace
- Component Area H – Other Areas

## 4.6 Sample Spreadsheet for Component Areas

Floor	-2	-1	0	1	2	3	4	Total
<b>Component Area A1 – Vertical Circulation Penetrations</b>								
Example – stairs, lift/elevator shafts and ducts	0	0	0	0	0	0	0	0
<b>Component Area A2 – Vertical Technical Penetrations</b>								
Example – pipes, ducts or shafts	0	0	0	0	0	0	0	0
<b>Component Area B1 – External Wall</b>								
Example – exterior wall of a building	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area B2 – Internal Structural Elements</b>								
Example – internal structural walls and columns	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area B3 – Internal Non-Structural Elements</b>								
Example – all internal, full-height, permanent walls other than those included in Component Areas B1 and B2	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area C – Technical Services</b>								
Example – mechanical/electrical plant rooms, lift/elevator motor rooms and maintenance rooms	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area D – Hygiene Areas</b>								
Example – toilet facilities, cleaners' cupboards, bath/shower rooms, laundry and changing rooms	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0

## 4.6 Sample Spreadsheet for Component Areas *continued*

Floor	-2	-1	0	1	2	3	4	Total
<b>Component Area E – Circulation Areas</b>								
Example – all horizontal circulation areas	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area F – Amenities</b>								
Example – cafeterias, day-care facilities, sports, leisure and fitness areas, and prayer rooms	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area G – Workspace</b>								
Example – factory, warehouse, office, laboratory, showroom and enclosed Loading Docks	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>Component Area H – Other Areas</b>								
Example – Balconies, covered galleries, Sheltered Areas, unenclosed Loading Docks, internal car parking and storage rooms **	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
IPMS total	0	0	0	0	0	0	0	0
<b>TOTAL IPMS 1</b>								
Aggregate non-limited use Component Areas	0	0	0	0	0	0	0	0
* Limited use areas	0	0	0	0	0	0	0	0
<b>Total IPMS 1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Additional areas outside IPMS 1</b>								
External vehicle parking								0
External Catwalks								0
Hardstand storage areas/external storage pads								0
External vehicle circulation								0
Other areas or Structures (examples include equipment yards, cooling equipment, refuse areas)								0

All subcomponents are to be stated separately.

\* Each limitation, if any, is to be stated separately.

\*\* The extent of each use within Component Area H is to be stated separately.

## Part 5 Floorplans and Sections

Measurement practice text and diagrams are replicated here for ease of use by practitioners.

### 5.1 IPMS 1 (External)

#### Measurement practice:

Areas for IPMS 1 are to be taken from drawings or on site.

If required, IPMS 1 can be reported on a **Component-by-Component** basis for each floor of the **Building**. The aggregate of the **Component Areas** must equal IPMS 1.

If there are no available plans for a basement, the area must include an estimation of the exterior wall thickness.

In respect of **Sheltered Areas**, IPMS 1 is to be measured to the **Covered Area**. In respect of roller shutters and other openings the principal external perimeter line of the **Building** across such openings should be followed to measure IPMS 1.

**Balconies** and **Mezzanines** are to be measured to the outside edge of the floor construction.

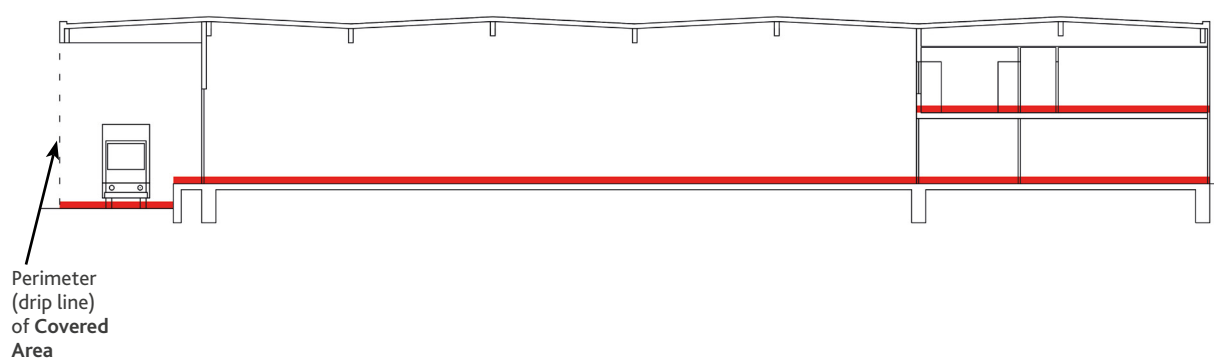


Diagram 1: IPMS 1 – Total Floor Area of Level 0 and Level 1

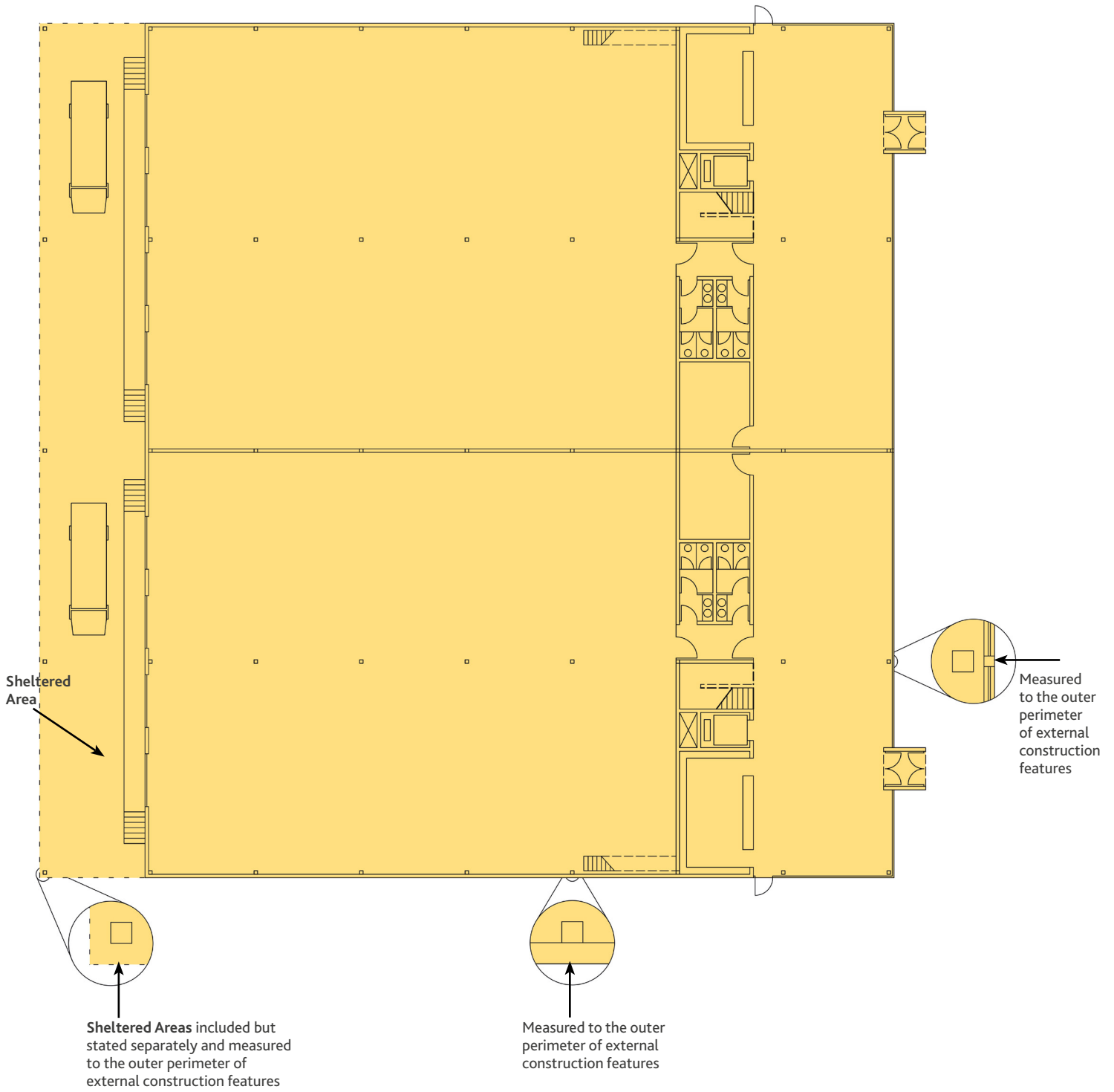


Diagram 2: IPMS 1 – Ground Floor (Level 0)



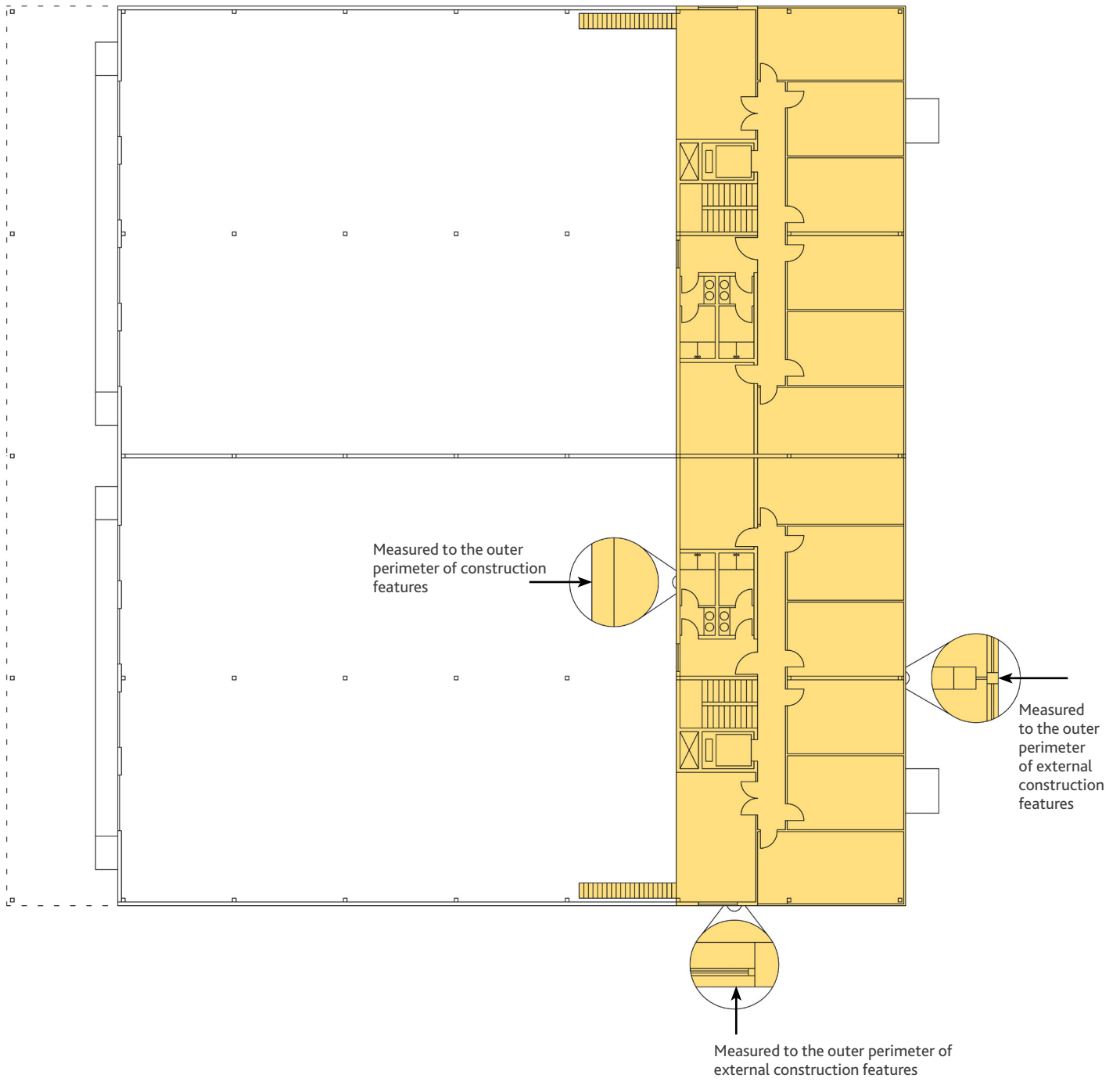


Diagram 3: IPMS 1 – Upper Floor (Level 1)

## 5.2 IPMS 2 – Industrial (Internal)

### Measurement practice:

All areas in an **Industrial Building**, including for example offices, are to be measured in accordance with **IPMS 2 – Industrial**.

**Balconies** and **Mezzanines** are to be measured to the inner face of the balustrade, but not beyond the outside edge of the floor construction.

If required **IPMS 2 – Industrial** may be reported on a **Component-by-Component** basis for each floor of a **Building**.

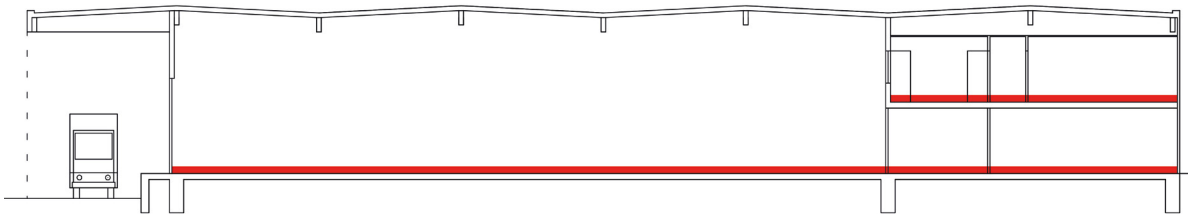


Diagram 4: IPMS 2 – Industrial – Total Floor Area of Level 0 and Level 1

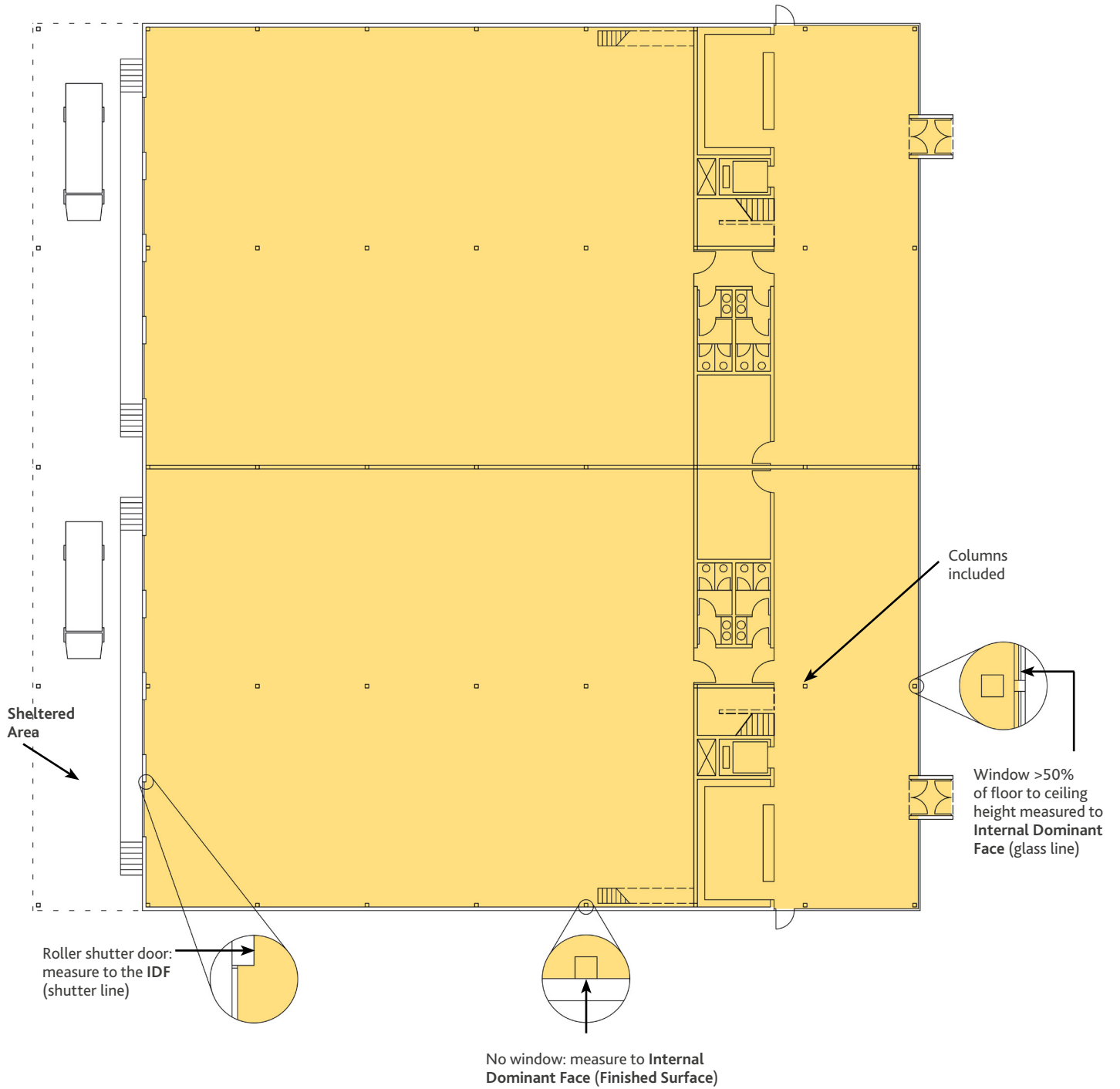


Diagram 5: IPMS 2 – Industrial – Ground Floor (Level 0)

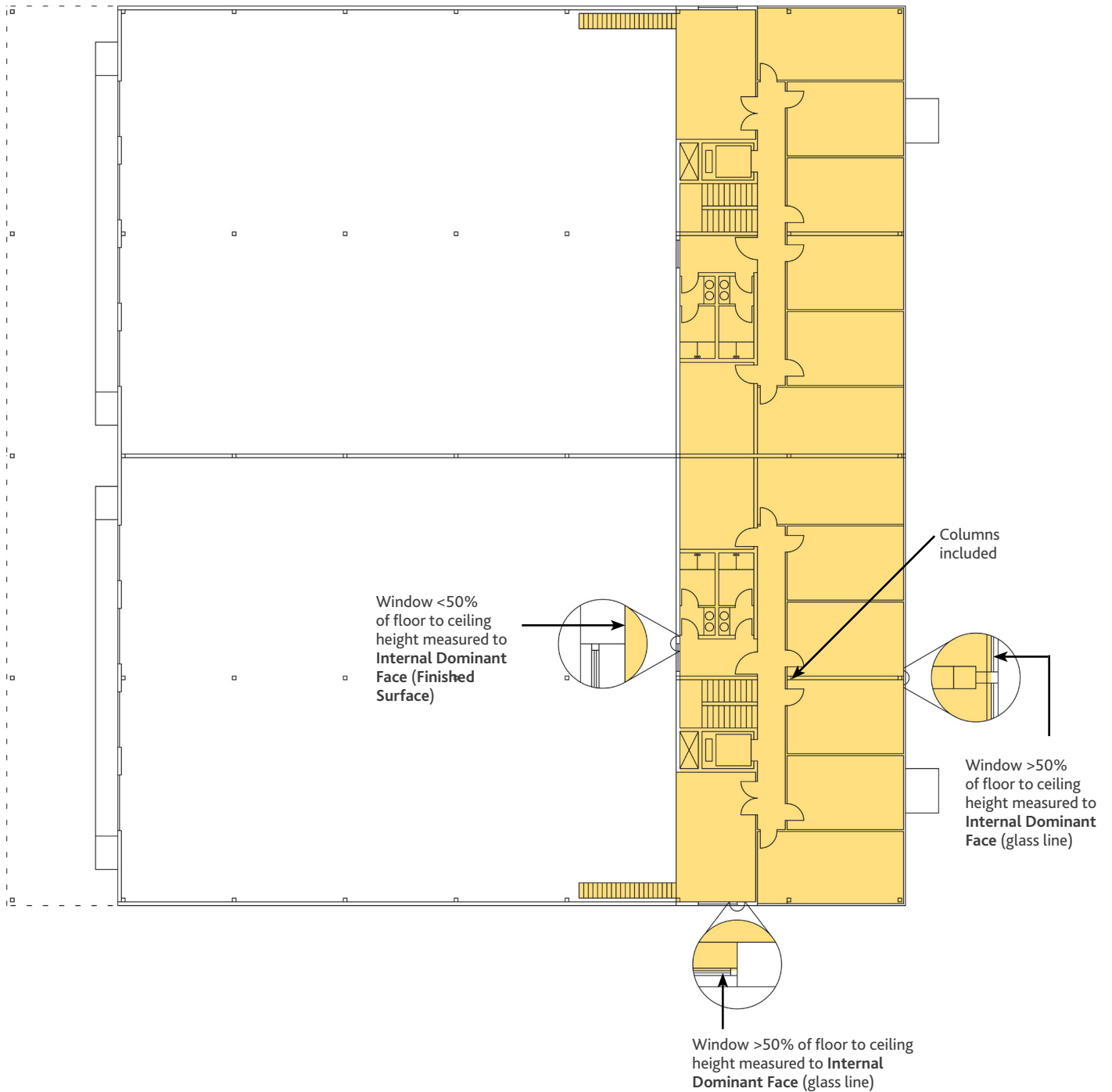


Diagram 6: IPMS 2 – Industrial – Upper Floor (Level 1)

## 5.3 IPMS 3 – Industrial (Occupier)

### 5.3.1 IPMS 3A – Industrial

#### Measurement practice:

**IPMS 3A – Industrial** is measured to the outside face of **External Wall(s)** of the area in exclusive occupation.

In the case of attached or partially attached **Buildings** measurement is taken to the centre-line of shared walls between occupants.

In the absence of one or more **External Wall(s)**, **IPMS 3A – Industrial** (only at ground levels) is measured to the **Covered Area** excluding ornamental overhangs and eaves beyond **External Walls**.

Walls shared with **Common Facilities** are to be measured to the **Finished Surface**.

In respect of roller shutters and other openings, the principal external perimeter line of the **Building** across such openings should be followed to measure **IPMS 3A – Industrial**.

**Balconies** and **Mezzanines** are to be measured to the outside edge of the floor construction.

If required, office, storage, production and other such areas may be measured and stated separately.

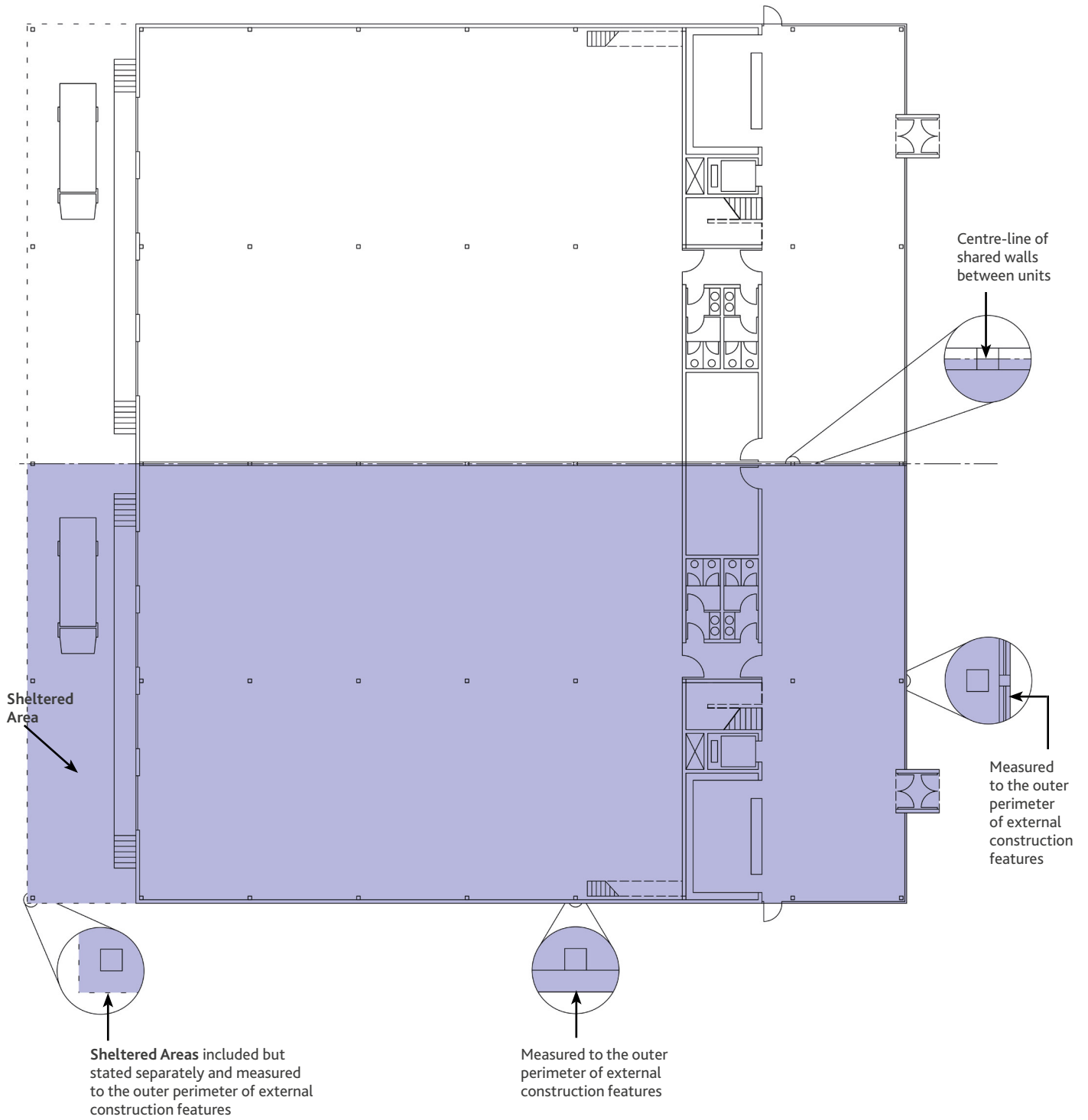


Diagram 7: IPMS 3A – Industrial – Ground Floor (Level 0)

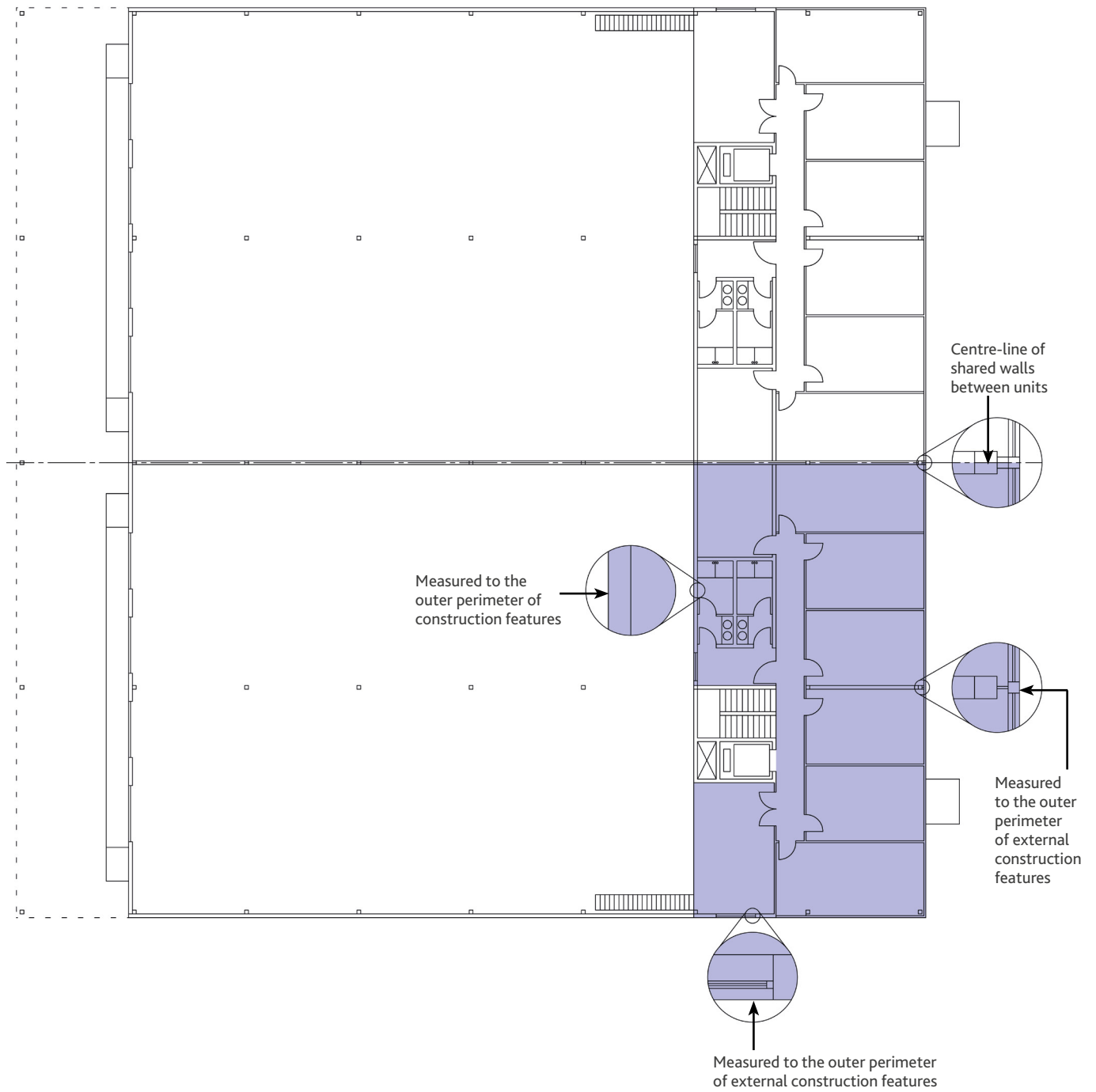


Diagram 8: IPMS 3A – Industrial – Upper Floor (Level 1)

### 5.3.2 IPMS 3B – Industrial

#### Measurement practice:

All areas in an **Industrial Building**, including for example offices, are to be measured in accordance with **IPMS 3B – Industrial**.

**Balconies** and **Mezzanines** are to be measured to the inner face of the balustrade, but not beyond the outside edge of the floor construction.

Walls shared with **Common Facilities** or adjoining occupiers are to be measured to the **Finished Surface**.

The **Floor Area** occupied by stairs is only to be included at the lowest level. A vertical penetration, whose floor opening and surrounding walls, if any, is less than 0.1m<sup>2</sup> (1 ft<sup>2</sup>) is not separately identified and is included in the **Floor Area** measurement of **IPMS 3B – Industrial**.

If required, office, storage, production and other such areas may be identified, and measured and stated separately.



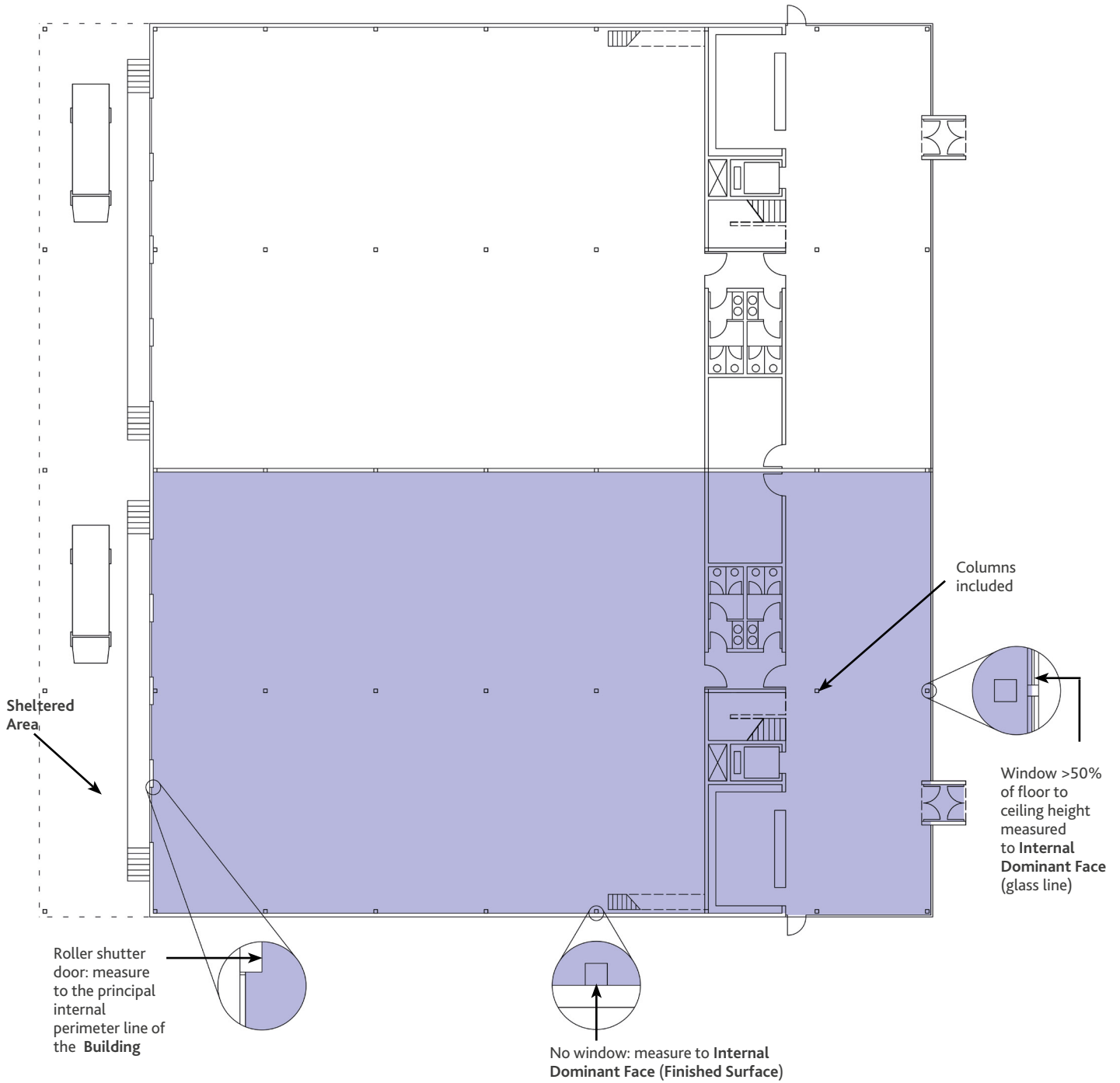


Diagram 9: IPMS 3B – Industrial – Ground Floor (Level 0)

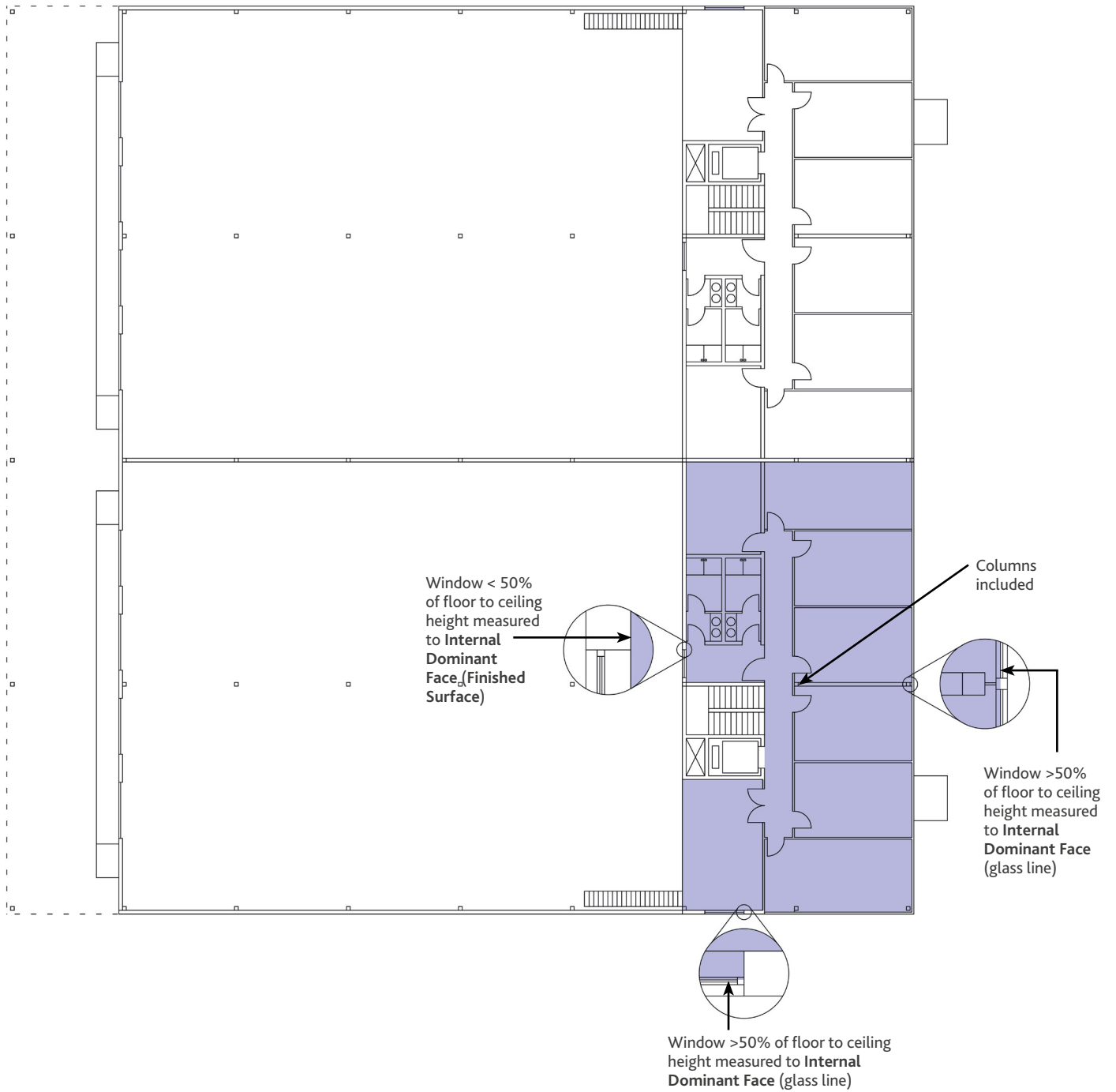


Diagram 10: IPMS 3B – Industrial – Upper Floor (Level 1)

Published by the International Property Measurement Standards Coalition (IPMSC).

No responsibility for loss or damage caused to any person acting or refraining from action as a result of the material included in this publication can be accepted by the authors or IPMSC.

ISBN 978-1-78321-215-6

Copyright © 2018 International Property Measurement Standards Coalition (IPMSC). All rights reserved. Copies of this document may be made strictly on condition that they acknowledge IPMSC's copyright ownership, set out the IPMSC's web address in full, [www.ipmsc.org](http://www.ipmsc.org), and do not add to or change the name or the content of the document in any way.

This document should not be translated, in whole or in part, and disseminated in any media, whether by electronic, mechanical or other means now known or hereafter invented, including photocopying or recording, or in any information storage and retrieval system, without permission in writing from the IPMSC. Please address publication and copyright matters to [contact@ipmsc.org](mailto:contact@ipmsc.org)