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land and construction
surveyors



ICMS explained

A User Guide for the International Cost
Management Standard 3 (ICMS 3)

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1 Introduction



1.1 Cost Reporting Standards

Accurate and consistent cost reporting/planning is an essential tool for professional construction cost consultants in giving advice to their clients. In Ireland since its publication in 1970 cost professionals have relied on the National Standard Building Elements (last published 1993) and based on the international SFB cost reporting system, as their mainstay for cost reporting building construction costs. In respect to Civil Engineering works since 2007 the OGP have produced standard cost reports/planning for three types of civil engineering projects, namely roads, water services and marine works. The OGP have also adopted the National Standard Building Elements for reporting building costs.

SCSI as a founding member of the International Construction Measurement Standards Coalition and the International Property Measurement Standards Coalition is committed to adopting these recognised international cost reporting and property measurement standards as part of our commitment to providing a consistent and comprehensive cost reporting system which covers the whole range of all construction projects (building and civil) to a detailed level of costs groups for all projects incorporating standard reporting for Life Cycle costs consistent with recognised ISO standards.

SCSI advises that its professional members are conversant with ICMS3 as the best international practice for cost reporting construction projects to their clients both nationally and internationally and its use has the support of the EU. Whilst it is not in SCSI's remit to suggest that construction project clients abandon their own existing or national cost reporting standards it should be noted that in respect to building costs ICMS3 cost groups are almost identical with the current National Standard Building Elements. ICMS3 also offers much more such to addressing key project information to be provided, costs levels for up to 14 or more differing construction project types and the first standard for life cycle cost reporting. Further it offers for the first time a consistent measurement rule for measuring gross and internal buildings areas for both construction costs and property valuations.

This guide should be read in conjunction with the SCSI's user guide for International Property Measurement Standards and the SCSI mapping guide between ICMS3 and the National Standard Building Elements.

1.1 Purpose

The first edition of the *International Construction Measurement Standards: Global Consistency in Presenting Construction Costs* (ICMS 1) was published in July 2017. The second edition:

Global Consistency in Presenting Construction and Other Life Cycle Costs (ICMS 2), published in September 2019, extended the scope to include life cycle costs and a wider coverage of project types. The third edition, *International Cost Management Standard: Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions* (ICMS 3), was published in November 2021 and recognises the criticality of reducing greenhouse gas emissions if a disaster caused by global climate change is to be averted, and extends the scope to include carbon emissions, and a wider range of project types. Since the inception of ICMS 1, the driving principle has been that consistency in presenting the performance of construction projects globally will bring significant benefits to construction management.

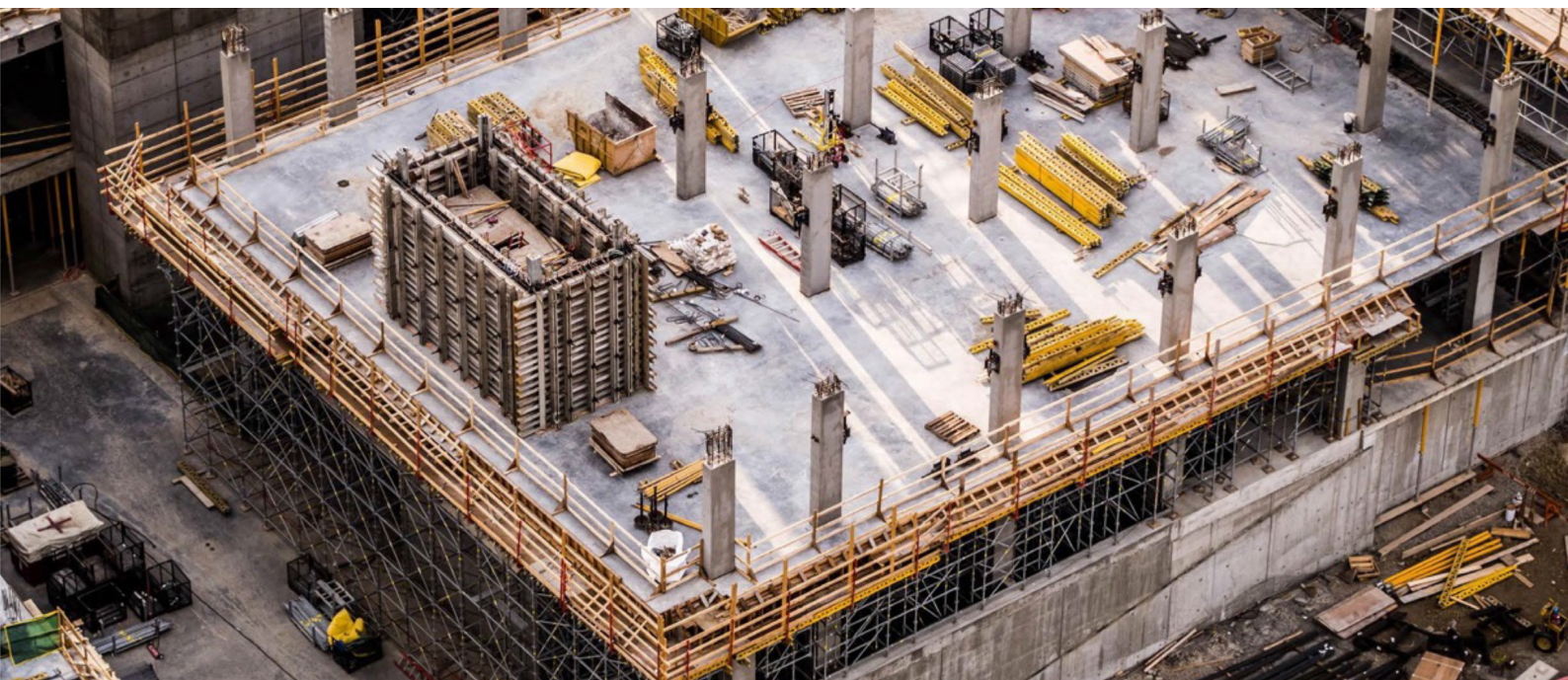
Unless otherwise stated, all further references to ICMS in this user guide refer to the third edition (ICMS 3).

ICMS explained provides a brief guide to the background, structure, content and potential use of ICMS. It explains the various sections and provides guidance on using the appendices, as well as explaining the classification system. Appendix 1a and 1b of this user guide contains worked examples of both cost and carbon assessment calculations.

1.2 Intended audience

This user guide is intended to assist SCSI/RICS members and other professionals globally in making use of ICMS as part of a client instruction or other relevant work. This work can be performed on behalf of or by investors, funders, clients, consultants and contractors across all aspects of construction.

For further assistance or support, please refer to Appendix 5 or visit the SCSI and RICS website.



2 | Design principles and philosophy



2.1 Objectives

ICMS is a principles-based international standard that sets out how to classify, define, measure, record, analyse, present and compare construction project life cycle costs and carbon emissions in a structured and logical format. Although life cycle costs include only construction, renewal, operation, maintenance and end of life costs, ICMS also makes provision for including acquisition costs, which may significantly impact a project's budget.

Although life cycle costs and carbon emissions are crucial, some ICMS users may be interested only in construction costs. ICMS is therefore designed to accommodate users who have an interest only in construction costs as well as those who deal with life cycle costs and carbon emissions. ICMS is the first step in creating a seamless, global, hierarchical classification of construction and other life cycle costs and carbon emissions: from high-level global cost and carbon emissions benchmarking to a granular, local measurement perspective.

The International Standards are a suite of documents covering the measurement and measurement reporting of land and property in various ways. Until such time as each International Standard is wholly incorporated into the SCSi's policy documents it is recommended that in instances where geospatial measurements are required and or used that full consideration is given to Appendix 4.

Assumptions around geospatial accuracy and or consistency must not be made – accuracies and scale must be stated, together with the date on which the measurement took place. For example, master planning drawings may be done at a scale (e.g. 1:2500 or Band I) that is inconsistent and incompatible with detailed design (e.g. 1:100 or Band E), yet neither are wrong they are both suitable for different purposes. The land or property may need to be remeasured at the appropriate scale if required for more a more detailed design and or measurement for costings.

2.2 Why is it important?

As investment in property, construction and infrastructure becomes increasingly global, there is a real need for international consistency in the interpretation of something as fundamental as the classification of construction and other life cycle costs and carbon emissions.

Historically, these processes have followed local and regional practices, which has made global comparison challenging, leading to confusion, uncertainty and lack of confidence from key stakeholders.

The worldwide goal to avoid the worst impacts of climate change by achieving net zero carbon provides an added impetus to the development of a standardised approach to reporting carbon emissions. The potential tensions between life cycle costs and carbon emissions demand an understanding of their relationship, further reinforcing the need for a common, consistent and integrated reporting framework.

2.3 Addressing both buildings and civil engineering

ICMS deals with the classification of construction and other life cycle costs and carbon emissions across buildings and civil engineering (infrastructure) projects.

'Buildings' are defined in ICMS as 'a construction with a cover and enclosure to house people, equipment or goods' and include all functional types, such as residential, offices, retail and industrial.

The definition of which functional type of building applies is then set out in the relevant description of the Project.

Civil engineering and/or infrastructure projects are presented as separate project classifications, each defined by their principal purpose. The project classifications identified in ICMS 1 included:

- Roads and runways
- railways
- bridges
- tunnels
- waste water treatment works
- water treatment works
- pipelines
- wells and boreholes
- power-generating plants
- chemical plants and
- refineries.

In ICMS 2, two further project classifications were added:

- dams and reservoirs and
- mines and quarries.

ICMS 3 extends the scope by including five further classifications:

- offshore structures
- near shore works
- ports
- waterway works and
- land formation and reclamation.

For each Project classification, the functional type is defined by the value of the attribute 'functional type' (for example: for bridges: road | railway | pipeline | conveyor | canal | pedestrian | other stated, where 'I' denotes acceptable alternatives).

The reason for the separate classification of civil engineering projects and buildings in ICMS is because the characteristics and purpose of each are different enough from each other to warrant separate sections. On the other hand, any differences in the functional types for each project can be captured in the project attributes section.

One of the strengths of ICMS is that it treats buildings and each separate class of civil engineering project in the same structured way.

2.4 Projects and sub-projects

A 'project' is considered as a standalone segment of building or civil engineering construction work for which a cost report is to be presented. When a project is too large or complex to be described by a single set of project attributes and values, it must be subdivided for cost and/or carbon emission reporting into sub-projects, each of which can be described by a single set of project attributes and values. A programme or portfolio can be thought of as a 'wrapper' for a series of 'sub-projects', where each sub-project is distinct and comprises part of the overall development. For example, a multi-lane highway might be a project that is split into separate sub-projects for carriageways, a sub-project for a tunnel and a sub-project for each of the bridges comprising part of the highway.

On the other hand, a building designed and built for multi-use purposes, such as a tower block built for mixed-use development that contains residential, commercial office space, retail and hotel accommodation, would be considered a single project. The definition and modelling of projects and sub-projects remains flexible in ICMS and may vary from situation to situation. For a better demarcation of projects and sub-projects, users can refer to the classification for allocation into projects, programmes and portfolios.



3

Structure, framework, hierarchical levels, attributes and values



3.1 Structure

The second edition of ICMS is divided into four parts.

- **Part 1: Context** – provides an introduction including an updated Figure 1 illustrating the hierarchical framework adopted in ICMS. It sets out the aims of ICMS, the boundaries of its scope, particularly what should be excluded and included, especially in the context of the difference between life cycle and whole life costs whose principles are provided equally to costs and carbon emissions. It emphasises that ICMS is a reporting system: it does not purport to describe how costs or carbon emissions should be calculated, since methods of calculation vary from country to country, although reference is made to other publications where this information may be obtained. Part 1 also provides a list of potential applications of ICMS.
- **Part 2: ICMS Framework** – shows how a single framework is used for reporting both life cycle costs and life cycle carbon emissions. It illustrates the relationship between life cycle and whole life costs and carbon emissions, ICMS is consistent with ISO 15686-5:2017 buildings and constructed assets – Service life planning – Part 5: Life-cycle costing. Whole life costs and carbon emissions comprise non-construction costs and carbon emissions, such as income and externalities, for example, carbon sequestration. Life cycle costs and carbon emissions comprise only construction, renewal, operation, maintenance and end-of-life costs and carbon emissions. ICMS considers only life cycle costs and carbon emissions; all other costs and carbon emissions are considered to lie outside the project boundary. The framework for carbon emissions in ICMS differs from that adopted in EN 15978 and PAS 2080 because of the need to retain a common framework for cost and carbon emissions reporting. However, Appendix H-1 illustrates how the ICMS framework can be mapped to EN 15978: 2011 and PAS 2080:2016.

- **Part 3: Project Attributes and Values** – describe the major features of a project or sub-project that might impact its cost and/or carbon emissions. Their purpose is to ensure that, as far as possible, like is compared with like.
- **Part 4: Definitions** – provided in section 4.1 of ICMS. Definitions of life cycle costs are consistent with ISO 15686-5. A set of diagrams is provided in section 4.2 illustrating the suggested delineation between substructure and structure for buildings and a selection of civil engineering works, enabling the relevant cost and/or carbon emissions allocation to be made between substructure and structure.

The general concept and philosophy of ICMS 3 remains the same as ICMS 2 but some significant changes have been made to accommodate the inclusion of carbon emissions. The principal changes between ICMS 2 and ICMS 3 are shown in Table 1 of this document.

Table 1: Key differences between ICMS 2 and ICMS 3

ICMS (1st edition)	ICMS (2nd edition)
	Updated Figure 1 provides complete overview of ICMS reporting framework.
Covers only life cycle costs.	Covers life cycle costs and carbon emissions.
Covers 13 types of civil engineering projects.	Updated Figure 3 demonstrates that the hierarchies for reporting costs and carbon emissions are identical.
'Cost categories', 'cost groups' and 'cost sub- groups' were used throughout.	Covers 18 types of civil engineering projects: 'offshore structures', 'near shore works', 'ports', 'waterway works' and 'land formation and reclamation' have been added.
	'Cost categories', 'cost groups' and 'cost sub- groups' have been replaced by 'categories', 'groups' and 'sub-groups'.
	New Figure 7 describes and defines the 'railway corridor'.
	Appendices have been modified to reflect the inclusion of carbon emissions. New Appendix H provides templates for reporting carbon emissions.

In addition, ICMS 3 contains a new section in Part 2 (section 2.5), Carbon Emission Considerations requiring greenhouse gas emissions to be measured in terms of carbon dioxide (CO₂) equivalent and providing an overview of carbon assessment and management standards and guidance. ICMS does not mandate how carbon emissions are to be calculated, since in this relatively new and fast-moving area, a universally-accepted standard method has yet to emerge. Rather, the user is required to report the method of calculation adopted.

Project attributes and values have been generally amended to take account of the inclusion of carbon emissions.

3.2 Cost and carbon framework and hierarchical levels

Figure 1 in section 1.1 of ICMS provides an overview of the ICMS framework with various cost and carbon emissions classification levels, the component parts of which are explained in this guide. Figures 2, 3 and 4 in section 2.1 of ICMS set out reporting framework while Figure 5 sets out the hierarchical structure of ICMS. Section 2.2 of ICMS also provides a brief set of notes that describe the four levels of the framework:

- level 1: project or sub-project
- level 2: categories
- level 3: groups and
- level 4: sub-groups.

The categories defined in Table 2 of ICMS cover the complete life cycle of a project and are the same for costs and carbon emissions. They are:

- acquisition costs | carbon emissions (AC | AE)
- construction costs | carbon emissions (CC | CE)
- renewal costs | carbon emissions (RC | RE)
- operation costs | carbon emissions (OC | OE)
- maintenance costs | carbon emissions (MC | ME)
- end of life costs | carbon emissions (EC | EE).

Table 2 of ICMS also provides a detailed description of the scope or 'coverage' intended to be classified within the relevant level 3 groups under each of the six categories at level 2. The 'coverage' is common to both buildings and civil engineering projects and is mandatory and standardised for all projects, irrespective of type or function. They should not be changed, deleted or added to. They are the same for costs and carbon emissions except that there are no groups in carbon emissions for:

- 'Taxes and levies' in any category
- 'Work and utilities off site' and 'Consultancies and supervision' in the construction, renewals and maintenance categories
- 'Disposal inspection' in the end of life category

since the carbon emissions in these groups are considered negligible.

For convenience, a reminder of the colour coding is provided at the top of each page: turquoise for acquisition groups, light blue for construction groups, and light grey for renewal, maintenance, operation and end of life groups. Each of the groups within Table 2 of ICMS has a suggested primary cost code number. Further suggested codes are provided for level 3 (groups) in Appendix I, and codes at level 4 are suggested in Appendices A to E. None of the codes are mandatory. They should be used only when considered desirable, but may facilitate data processing.

Each category may be used separately or in conjunction with other categories. Thus, life cycle costs and/or carbon emissions are the sum of all six categories, while initial capital costs and/or carbon emissions are the sum of acquisition and construction costs and/or carbon emissions. The capital cost and/or carbon emissions budget may be the capital plus renewal costs and/or carbon emissions.

The cost or carbon emissions adviser is required to ensure that all the costs and carbon emissions to be classified are included somewhere in this framework at level 3.

No delineation diagrams are given between groups (for example, between structure and non- structural works) and accordingly the cost adviser is to use appropriate judgement for such decisions, based on the scope and description contained within Table 2 of ICMS.

Level 4 sub-groups are intended to capture further sub-divisions of cost and/or carbon emissions within each of the level 3 cost groups, thereby providing an even more granular level of detail. Examples of what might be included in level 4 sub-groups are provided in Appendices A to E of ICMS. More detail is provided in section 3.2.4 and Appendix 2 of this guide. The level 4 cost sub-groups are discretionary and can be formulated to suit local custom and practice.

Further information about the hierarchical levels is provided in the following sections.

3.2.1 Level 1: project or sub-project

This category relates to either buildings or projects classified as civil engineering or Infrastructure individually, although the treatment of both types is the same.

In the case of buildings, the description of the functional type of the building under consideration is given in the project attributes for the 'Works' in part 3 of ICMS. A selection of sample building functional types is given in Table 5: Buildings in part 3 of ICMS.

A selection of sample building functional types is given in Table 5: Buildings in part 3 of ICMS. There is also the opportunity to add any other functional types that are not specifically listed.

In the case of civil engineering or infrastructure projects, the 13 types included in ICMS 2 have been extended to 19 types in ICMS 3. These are listed in Table 1 of ICMS, and include both the most common infrastructure type projects that typically exist and those where there appears to be a market demand. The ICMS coalition may add further project types in future editions. For each classification, a selection of sample functional types is provided in Tables 5 to 23 of ICMS (such as tunnels for road, rail, or pipeline). Again, ICMS provides the opportunity to add any other functional type not specifically listed.

Appropriate skill and judgement are needed by the adviser if the building being classified (e.g. a shopping centre, railway station or airport terminal) contains within the development an element of surface access roads and car parking. In principle, it is suggested that unless they are of significant scope, the cost of roads and car parking is included within the building classification (within the 'external works' group) rather than being classified as separate projects. However, the decision about whether an element within a 'building' should be considered a separate sub-project may depend on whether the client is concerned only with construction or with whole life costs and/or carbon emissions.

Further consideration should be given by the adviser as to whether, for example, a small ancillary structure within a larger project should merely be considered as part of the whole, or whether it should be placed into – and reported as – a separate sub-project. Again, the decision will be influenced by whether construction or life cycle costs and/or carbon emissions are to be considered. Given that ICMS is intended to be a high-level framework model, it is impossible to provide meaningful guidance on the multitude of variants that will exist. Similarly, if the civil engineering project of one classification contains a minor amount of work in other classifications (e.g. minor lineside buildings and access roads to a railway), these may be included within the external work group rather than being classified as separate projects.

3.2.2 Level 2: categories

The six level 2 categories provide a suitable framework for reporting costs and carbon emissions in each phase of a project's life. They are:

- acquisition costs | carbon emissions
- construction costs | carbon emissions
- renewal costs | carbon emissions
- operation costs | carbon emissions
- maintenance costs | carbon emissions and
- end of life costs | carbon emissions

This is conveniently represented by the acronym ACROME. The sum of the last five of these six sub-groups is the life cycle cost or carbon emissions. Thus:

Life cycle costs | carbon emissions are the cost | carbon emissions of a Constructed Asset or its parts throughout its life cycle from construction through use, operation, maintenance and renewal until the end of life or a shorter Period of Analysis, while fulfilling the performance requirements.

The level 2 categories and level 3 groups are listed in Table 3 in Appendix 2 of this document. The categories can be described as follows.

Acquisition costs | carbon emissions are defined in ICMS as:

'All payments | carbon emissions associated with the acquisition, lease or purchase of the land, property or existing Constructed Asset, and all other expenses | carbon emissions excluding physical construction.' Costs include administrative, financial, legal and marketing expenses from inception to commissioning the project. The current open-market valuation of the site as an asset should not be included in this cost group – this is not relevant to this classification framework.

Costs include administrative, financial, legal and marketing expenses from inception to commissioning the project. The current open-market valuation of the site as an asset should not be included in this cost group – this is not relevant to this classification framework.

Acquisition carbon emissions are reported only if they are significant and are therefore colour coded differently in the figure.

Advisers may not be aware of the site acquisition cost and/or carbon emissions incurred by the client, or the site may have been within the ownership of the client for some time, so appropriate notes should be added to the project attributes section to make clear the status of the site acquisition.

Construction costs | carbon emissions are the total price payable for and carbon emissions associated with all permanent and temporary works normally included in construction contracts including goods or materials supplied by the client for the constructor to install. There may be separate sets of construction costs and carbon emissions that make up the total if more than one constructor is retained, depending on the procurement model chosen. Construction costs are expenditures arising as a direct result of construction including those associated with labour, materials, plant, equipment, site and head office overheads and profits as well as taxes and levies. Carbon emissions are those associated with similar activities, but exclude taxes and levies, and consultancies and supervision, which are considered negligible. Carbon emissions also exclude those associated with work and utilities off site which are considered to lie outside the project boundaries.

Renewal costs | carbon emissions are the costs incurred or carbon emitted in renewing major components of a project or sub-project during its life (such as boilers and air- conditioning units) that the client wishes to include in the capital budget. They exclude the costs and/or carbon emissions associated with renewing minor components such as light bulbs or bearings in pumps. The groups for renewable costs and carbon emissions are the same as for the construction category.

Operation costs | carbon emissions are costs incurred or carbon emitted in running and managing a constructed asset, including administrative support services, insurances, energy and environmental/ regulatory inspection costs. Operational costs include operator's site overheads and taxes and levies, though these are excluded from operational carbon emissions because they are considered to be negligible.

Maintenance costs | carbon emissions are the total costs and carbon emissions associated with labour, material and other resources used to ensure that a constructed asset remains in a state in which it can fulfil its required functions. They include corrective and preventative maintenance, such as cleaning, services, repainting, repairing or replacing parts that are not classed as renewal and that the client wishes to be included in the maintenance budget.

The coverage of construction, renewals and maintenance costs and carbon emissions expressed in the level 3 groups is identical.

End of life costs | carbon emissions are the net costs or fees (after deducting the salvage value and other income due to disposal) and/or carbon emissions associated with disposal of an asset at the end of its service life, including those resulting from:

- disposal inspection (for costs only, not carbon emissions)
- decommissioning and decontamination
- demolition and reclamation
- reinstatement
- asset transfer obligations
- recycling (for costs only, not carbon emissions, since credits for recycling are considered to lie outwith the project boundaries)

- recovery
- disposal of components and materials and
- transport and regulatory costs.

Costs include all constructors' site overheads, risk allowances and taxes and levies, though carbon emissions associated with inspection, and taxes and levies are considered negligible and should not be reported.

Occupancy costs and carbon emissions such as reception, library, portage, etc. arise exclusively because of the occupation of a constructed asset. They are specifically excluded from the operation category, since they are part of non-construction activities, which form part of whole life, rather than life cycle costs and carbon emissions. However, they may be included in the cost report if required by the client. There is the potential for overlap between operation and occupancy costs and carbon emissions, for example, in the security of an unoccupied building (operation) or security in an occupied building (occupancy) and some clients may require occupancy costs and/or carbon emissions to be included in operation costs and/or carbon emissions.

If the client's interest is confined to capital costs and/or carbon emissions, then the sum of the first two cost categories apply: acquisition and construction. If the client's interests embrace life cycle costs and/or carbon emissions, then the sum of all six categories apply. The adviser must ensure that in each case, all costs and/or carbon emissions are included in one of the relevant categories. In other words, the total cost and/or carbon emissions associated with each category or group is the sum of its components at the level below, plus any cost and/or carbon emissions allocated at that level and are not to be further broken down.

3.2.3 Level 3: groups

At level 3, each of the six categories is broken down into groups to provide greater granularity for capturing cost and carbon.

Acquisition category is divided into two groups. These cover all the costs associated with purchasing or hiring the site or existing asset (if known or released by the client) and all expenses incurred by the client on non-direct construction activities undertaken by lawyers, marketing people, sponsors, etc. If the site acquisition costs are not known, then the adviser should make this clear within the various notes included with the cost classification plan or report. It is suggested that for consistency in data systems, this information should have a well-defined location.

Carbon emissions associated with acquisition are generally considered to be negligible and should not be reported unless they are significant.

Construction, renewal and maintenance costs are classified identically into 13 separate level 3 groups reflecting the fact that items requiring renewal and maintenance are likely to be those that are included in level 4 construction sub-groups, and therefore wrapped up into level 3 groups. It is also recognised that costs and carbon emissions associated with maintenance activities in particular may not be available at level 4 or even level 3.

For example, it may be possible to predict maintenance costs only as a percentage of construction costs.

Direct construction costs are captured in seven groups:

- demolition, site preparation and formation
- substructure
- structure
- architectural works non-structural works
- services and equipment
- surface and underground drainage
- external and ancillary works.

These are supplemented by three groups for:

- site overheads/preliminaries
- risk allowances (contingency) where the client chooses to retain the risk allowance outside the parameters of the construction project and
- taxes/levies.

A further three groups capture:

- work and utilities off-site
- post completion loose furniture, fittings and equipment and
- construction-related consultancies and supervision.

These last three were included in associated capital costs in ICMS 1. Design fees incurred and paid for by the constructor should be included elsewhere within the construction costs, with a suitable note added to the attributes section.

It is acknowledged that the use of only seven directly related construction cost groups for the classification of all the construction cost will be fewer than many historic construction cost classification systems or databases have in place. However, it should be remembered that further and more detailed cost classifications can be given at level 4 within the various cost sub-groups.

Level 3 carbon emissions groups are identical to those used for reporting construction, renewal and maintenance costs except that carbon emissions associated with taxes and levies, and consultancies and supervision are considered negligible and need not be reported. In addition, carbon emissions associated with works and utilities off-site are considered to lie outside the project boundaries and equally need not be reported.

In the case of taxes/levies and where local mandatory tax is applicable as an addition to the cost of the construction works, but which by custom and practice have been excluded from any cost classification system, the adviser should ensure that it is clear that such mandatory tax is included within the cost classification and the total cost of the project. This is the case even though the tax status of the client and the local tax rules may mean that the tax incurred is recovered by the client at a later date. In addition, it should be made clear in the attributes section if the client does not have to pay such tax.

The inclusion of the cost and carbon emissions associated with loose furniture, fittings and equipment is intended to capture the cost and or carbon emissions associated with those items that are added to the completed project after completion of the construction works. However, the adviser should take into consideration the fact that these items may be installed prior to the completion of construction works.

Careful consideration needs to be given to items of that are linked to the project but are not properly to be considered as construction works (e.g. the new rolling stock for a railway or the process plant for a production facility). The adviser must make the overall status of these items clear within any project cost report.

There are eight level 3 groups for operations. The first five are:

- cleaning
- utilities
- waste management
- security and
- information and communications technology.

These capture all the activities and services required to operate a constructed asset. The last three included are:

- operators site overheads
- risk allowance and
- taxes and levies

though carbon emissions associated with operators site overheads and taxes and levies are generally considered to be negligible and need not be reported.

End of life costs and carbon emissions are divided into seven identical groups. The first four reflect all the potential activities involved in exiting the project or sub-project:

- disposal inspection
- decommissioning and decontamination
- demolition, reclamation and salvage and
- reinstatement.

Costs should be net of any income arising from the sale of the constructed assets or its component parts. The last three groups are:

- the usual constructor's site overheads
- risk allowances and
- taxes and levies.

Carbon emissions associated with inspection and taxes and levies are considered negligible and need not be reported.

3.2.4 Level 4: sub-groups

ICMS includes a set of suggested sub-group codes and descriptions, which it is recommended are followed wherever possible.

If costs or carbon emissions associated with a project are not listed within the suggested, exemplar sub-groups provided at level 4, then the adviser should add a suitable item and code (if desired) in a logical manner, taking account of the remainder of the coding within that group. The exemplar sub-groups are contained within five appendices in ICMS, as follows:

- Appendix A – Acquisition Sub-Groups: common to all types of project where the functional type is defined in the project attributes elsewhere.
- Appendix B – Construction | Renewal | Maintenance Sub-Groups: Buildings: where the functional type is defined in the project attributes elsewhere.
- Appendix C – Construction | Renewal | Maintenance Sub-Groups: Civil Engineering Works: the classification appears in the form of a table or matrix, where the relevant level 4 sub-group item is 'dotted' to indicate that it is relevant to that particular type of civil engineering works.
- Appendix D – Operation Sub-Groups: common to both buildings and civil engineering works.
- Appendix E – End of Life Sub-Groups: common to all types of project where the functional type is defined in the project attributes elsewhere.

3.3 Project attributes and values

Part 3 of ICMS presents a suggested model for the standard presentation of the key information about the project so that advisers (and others) can make judgements and comparisons between different projects in respect of time, size, quality, location, market conditions and any other relevant information that might have an impact on the costs or carbon emissions associated with a project and that would assist other advisers.

Following brief introductory notes, there are two separate sets of attributes and values. The first set, contained in Table 4 of ICMS, are common to all projects, while the second set, contained in Tables 5 to 23 of ICMS, are specific to buildings and each of the 18 civil engineering works types.

The common attributes and values provide general information about the project (which could be considered as non-technical) in areas such as:

- real-time date and project stage status
- currency and exchange rate
- programme information and
- site conditions and procurement model adopted

together with information relevant to life cycle costs, such as:

- discount rate and
- expected life span

and carbon emissions such as

- boundary of carbon reporting
- name of assessment process used
- main source(s) of carbon emission factors and
- energy sources.

Sample project values are given, and advisers should use appropriate skill and judgement to select the 'best-fit' value or add to and adapt that which is offered to suit the circumstances of the project and local custom and practice. At the same time, they should also seek to retain the suggested structure and form as best as possible.

The specific attributes and values are split into each of the 19 separate project types – 1 for buildings generally and 18 for each of the civil engineering works types – and these could be considered the technical information.

The attributes provide the context of the design, construction, use and end of life of the project and are designed to capture all the characteristics of the project that could have a significant impact on its costs or carbon emissions, including the key quantities.

With respect to quantities under the 'buildings' section, note that the gross external floor area (IPMS 1 External) and gross internal floor area (IPMS 2 Internal) are cross-referenced with the *International Property Measurement Standards* (IPMS) definitions (see Appendix J of ICMS). Advisers should be aware of the provisions of IPMS to report against this attribute (or be aware that any quantities provided to them by others have also been prepared in that format).

Values required to be quoted within the project attributes (part 3 of ICMS) should be defined and given to an appropriate level of detail, to give a general indication of the scale and size of the project.

It is suggested that the currency used for reporting should be the local currency relating to the payments made for the project. It is therefore important that the project attributes capture both the real-time details (when the project was undertaken) as well as the exchange rate applicable at the base point in time for the relevant report so that meaningful currency conversion can be made for comparison purposes. This is of particular importance where the project has a long construction period and various packages may be procured at different times.

However, certain clients may require all costs to be reported in their own local corporate 'trading' currency and appropriate dual reporting of costs may be necessary. Consideration should be given to the possibility that projects are reported on a common currency basis (i.e. US\$) converted at a suitable interbank rate. It is important for the purposes of both life cycle costing and life cycle carbon emissions that all assumptions are clearly and comprehensively stated. In this respect, the discount rate used to derive net present values, the assumed life of the asset, the base date, the sources of carbon emissions factors and energy are key attributes to which values should be assigned. See section 5 of this user guide for more information.

4 | Life cycle cost considerations



Figure 2 in ICMS demonstrates the difference between whole life and life cycle costs. In addition to life cycle costs, whole life costs include income streams and non-construction costs such as finance, business income from sales and disposals, occupancy costs and externalities. Externalities are defined in part 4 of ICMS as:

‘Quantifiable cost or benefit that occurs when the actions of organisations and individuals have an effect on people other than themselves, e.g. non-construction costs, income and wider social and business costs (ISO 15686-5). In the context of carbon emissions, these are benefits or loads beyond the system boundary including reuse, recovery and recycling potential.’

Section 2.4 of ICMS provides guidance about how life cycle costing should be carried out. It emphasises the importance of agreeing the scope of the life cycle costing (especially what is included and excluded) with the client before costing starts.

The scope should also define the level at which life cycle costs will be calculated and reported. There may be some problems in accessing renewal, operation and maintenance data at level 4 or even level 3. ICMS recognises this challenge by allowing the reporting of life cycle costs at a higher level (e.g. level 2 or level 1), than the level at which, for example, construction costs are reported (which may be at level 4).

Section 2.4 of ICMS also provides guidance on the expected asset life. This may be the design life, service life, economic life, anticipated physical life or any other period agreed with the client from the outset.

Guidance is also provided on how life cycle calculations should be carried out. For options appraisals, it recommends the use of net present value and indicates how this should be calculated. In Figure 6 of ICMS, a new term, the ‘base date’ is introduced. It is defined as the date at which the individual construction costs in ICMS cost reports apply exclusive of price level adjustments after that date, and is the date from which any agreed changes in conditions or prices are calculated. However, there can be a separate allowance for price level adjustments under the risk allowances group. A different date (the common date) applies to life cycle costs. This is the date to which all future cash flows are discounted or compounded and it occurs after completion.

Life cycle costing is not a straightforward process, and cost advisers should be sufficiently familiar with the underlying practice and theory before embarking on a life cycle costing exercise. In particular, judgement is required in the choice of discount rate, asset life, renewal dates, the level of detail at which the costs should be expressed, and how the asset will be operated and maintained.

5 | Carbon emissions considerations



ICMS establishes a framework for carbon emissions reporting that mirrors the approach established for cost reporting. This is shown in Figure 3 of ICMS. Life cycle carbon emissions are thus reported as opposed to whole life carbon emissions and this is explained further in section 2.5 of ICMS. The kinds of carbon emissions that are considered outside the life cycle defined in ICMS (i.e. the externalities) include:

- savings arising from energy generation or recycling
- carbon sequestration (e.g. from tree planting associated with the project)
- carbon emissions benefits and loads beyond the project's system boundary, for example, those associated with products designed for future reuse in line with circular economy thinking.

The above emissions sources (and reduction opportunities) and potentially various others are a valid and useful part of whole life carbon assessment and management but are not required for ICMS reporting and, for clarity and comparability, should be written up separately rather than being netted off in the ICMS life cycle carbon emissions figures.

Greenhouse gas/carbon assessment, management and reporting (also known by other terms such as carbon footprinting) is an established activity for countries, organisations and programmes/projects. It is developing and evolving rapidly for the construction sector in the context of global commitments to rapid emissions reductions to avoid the worse effects of human-induced climate change (i.e. beyond an average warming of 1.5 degrees Celsius).

Section 2.5 of ICMS introduces the principal metric and some of the most relevant standards and guidance for carbon assessment and management.

Carbon assessment and management is a large and complex area with an array of different approaches, models/tools and relevant national datasets (i.e. for emissions factors). It is recommended that cost management and project management professionals use the guidance, methods and data provided by the Irish Green Building Council (IGBC) as a standardized method in an Irish context for the preparation of Life Cycle Assessments to utilise carbon emissions data and report it alongside costs. This includes national generic data on common materials, EPD data and LCA tools.

To help facilitate this, ICMS provides a bridging framework so that results based on whole life carbon assessment stages that will be familiar to carbon and environmental professionals can be translated into the ACROME framework in ICMS. Appendix H of ICMS explains how to translate carbon emissions data from one framework to the other.

6 Other ICMS appendices

The appendixes are prefaced by general notes that clarify and define coverage and allocation in Appendixes A to E where applicable.

The other appendixes in ICMS are described below.

Appendix F – Process Flow Charts: a selection of process flow charts to assist cost advisers (and others) in formulating a structured approach to producing a cost classification model or report for a project and to ensure that all cost aspects of the project are adequately captured.

Appendix G – Cost Reporting Templates: a set of suggested templates for construction, capital and life cycle costs for building and civil engineering projects and sub-projects, for the grand total, and for comparing between two different design schemes (noting that this only contains the financial material, and the text and notes in respect of the project attributes and project values needs to be added). They can be used for:

- the cost classification of a project in its own right
- the cost classification between two different project design schemes (for option appraisal purposes, but only in respect of the capital cost and not developed tools such as cost benefit analysis) and
- the cost classification for a project with a selection of sub-projects.

While these reporting templates are paper-based models as published in the first edition of ICMS, it is expected that digital models or templates will be prepared by software vendors or independent organisations.

Appendix H – Carbon Emissions Reporting Template: tables H-1 and H-2 provide a template for capturing carbon emissions in each level 2 category and level 3 group respectively throughout the life of a project. There is provision for inserting the names of the standards and tools used and the sources of emissions factors. Table H-2 allows the insertion of quantities associated with each group. This is particularly useful when comparing the carbon emissions from two projects in which different sources of emissions factors have been used. In such cases, it is recommended that the data is amended to ensure that in making the comparison, the same emissions factors are used for each project.

Figure H-1 shows how ICMS reporting maps to the stages associated with whole life carbon assessment in EN 15978: 2011 and ISO 14064 Standard (the International standard for quantifying and reporting greenhouse gas emissions).

Appendix I – ICMS Coding Structure: a detailed but discretionary cost coding system is provided for all items, and it is suggested that this is followed whenever possible, although it is likely that future products published by RICS, SCSi and others will represent these in a formal structure. There is also a set of general notes that are applicable to appendixes A and B, which are intended to clarify and define coverage and allocation where applicable.

Appendix J – Interface with International Property Measurement Standards (IPMS): for reporting purposes, cost advisers are required to state the relevant areas of the project by reference to the relevant definition within IPMS: All Buildings and this appendix sets out applicable notes. Please note: This appendix reflects the changes in *IPMS: All Building Asset Classes* (Published 15 January 2023). Please refer to the International Property Measurement Standards Coalition (IPMSC) website for the Principles of IPMS Selection. Measurement Practice and Reporting.

Appendix K – Revision Notes for ICMS, third edition

Appendix L – Bibliography

7 Uses



Applications of ICMS include, but are not limited to, those discussed in the following sections. Notwithstanding the specific uses noted in this section, ICMS can be used for cost and carbon emissions reporting and analysis at any stage of a project life cycle, including inception, design, procurement, construction and post-asset use.

7.1 Early conversations

Advisers who are intending to use ICMS will likely have an early conversation with the end user of the report or other piece of work to explain the benefits of reporting costs and carbon emissions in this manner.

7.2 Benchmarking and reporting

As the requirement for life cycle optimisation of costs and carbon emissions increases, advisers will provide cost and carbon emissions information and recommendations to their clients at various stages throughout the life cycle of each project. ICMS will be an essential tool in this process. For example, in a recent application, ICMS is being used as the basis for a life cycle cost breakdown structure at the heart of a collaborative benchmarking initiative between a number of UK road and rail infrastructure bodies under the banner of the TIES Living Lab.

In addition, informed clients need robust data and reporting for benchmarking to assess the viability of their projects. They may also need to consider various options to ensure that the design solution chosen offers best whole life value for money. Increasingly, this is becoming a requirement of government procurement in some countries.

Firstly, when providing benchmarking, order-of-cost and carbon emissions estimates of the likely construction or life cycle cost and carbon emissions of a project, the adviser will use appropriate skill and judgement to provide and use costs and carbon emissions based on measurements such as an approximate area or key functional parameters, e.g. length or capacity against the relevant project type. These base figures will be drawn from historic data held either by the adviser or accessible from published sources. If the historic data and classification have been prepared using ICMS, the base figure will have a common

source basis. In carbon assessment and management this approach is sometimes referred to as a top-down carbon assessment.

This high-level cost and carbon emissions estimating by the adviser will still need to be adjusted in the usual way for external environmental factors such as geography and real time, and to take account of the size and scale of the project. It will also need to consider differences in maintenance, operation and end of life regimes, which in turn would affect the frequency and magnitude of any required renewals.

Secondly, when providing the client with more detailed estimates, procurement evaluation and post-contract and post-commissioning reporting, there will be a clearer means to compare different models and run what-if scenarios for any change in circumstances.

Scenarios and options appraisals can be used in a purposeful way to improve designs by specifying lower carbon/cost materials and products wherever possible. This is particularly important in life cycle cost and carbon emissions estimating, which should be repeated at regular intervals as more is learned about the behaviour of the asset and the way it is operated and maintained.

Thirdly, at the end of the project, there will be a need to capture the actual cost and carbon emissions of the scheme, which serves to provide the basis of the final report to the client, and for the individual project costs and carbon emissions to be added to a database for reference and future use.

Equally, throughout the life of the project life cycle, costs and carbon emissions should be captured in a database, both to track the performance of the asset throughout its life and to respond suitably to any changes, and also to improve the accuracy of forecasting with which life cycle costs and carbon emissions can be predicted for future projects.

In all cases it is envisaged, at least initially, that ICMS reporting may run alongside other methods of reporting demanded by the client or the market. This should not be seen as incongruent, provided costs and carbon emissions can be easily mapped between the two methods of reporting using software solutions and professional interpretation.

7.3 Cost and carbon emissions classification and analysis

As well as providing a high-level cost and carbon emissions reporting tool, ICMS also has a classification function where individual categories, groups or sub-groups (if applicable) are set out, tabulated and totaled to arrive at the overall construction or life cycle costs and carbon emissions.

This will enable the adviser (at the stage of the project in which the business case is outlined) to critically challenge the cost or carbon emissions of any individual category or group if it seems to be significantly at variance with other current or historic data for that category or group.

In addition, this classification function will be used by the adviser to prepare tender enquiry documents so that tender returns – not only for construction costs and where appropriate, carbon emissions, but for renewal, operation, maintenance and end of life costs and carbon emissions too – can be interrogated, and informed evaluations made between bids on a common basis.

Critically, the standard classification will allow the collection of global construction and life cycle cost and carbon emissions data to better inform comparison between markets and prediction for future schemes.

7.4 Claims analysis and forensics

Advisers are also involved in the demonstration of proof of entitlement to recovery of costs incurred within a dispute or 'claims' environment. Using ICMS on the project will ensure that both the construction and the life cycle project costs are classified in a recognisable way, thereby providing greater confidence over the validity of the claim. Proving reasonable cost or providing the cost history of a project will also be easier with the adoption of ICMS.

7.5 Work breakdown structures

Work breakdown structures are common methods of classifying works in civil engineering. ICMS has been designed to work with these structures so that costs incurred at different times, at high level, can be classified in the same way. Examples are shown in Appendices 1a and 1b of this user guide.

7.6 Digital tools

ICMS is designed to be used, if applicable, with building information models (BIM) and digital twins. Project values and attributes are designed to be used with dropdown lists to ease data input and subsequent analysis. Note, however, that BIM may use other classification frameworks such as Uniclass or Unifomat II and there may be other classifications which would need to be mapped between them and ICMS, please refer to Appendix 3 for currently available mapping classifications.



8 | Limitations



8.1 Level of detail

ICMS is a construction and life cycle cost and carbon emissions classification and reporting tool and therefore does not require detailed measurement of construction quantities (as set out, for example, in guidance on measurement rules in the RICS New rules of measurement (NRM), the Civil Engineering Standard Method of Measurement (CESMM) or similar or the New Arm5 (Agreed rules of Measurement). However, in describing the significant features of a project, some quantities are required. These are intended to be an approximate quantity to provide an indication of the size and scale of the project, though they may be used to normalise the comparison of two projects of different sizes. Approximate quantities may also be taken from other sources such as a client brief or similar. The adviser should use appropriate skill and judgement to arrive at a suitable level of accuracy for such approximate quantities. However, note that more detailed quantities may be required in the estimation and reporting of carbon emissions to build up sufficient information to report across into the template shown in Appendix 1b (see also Appendix H of ICMS).

8.2 Currency and specification

No single currency is used as the basis of cost classification in ICMS, as this is intended to be expressed in the local currency of the location of the project and/or the currency that was used in the transaction. That stated currency will then be added as a project-specific value by the cost adviser, together with the base date of the costs. This is so that subsequent users of the cost data can reference the exchange rate for that currency at the time of the project and make suitable adjustments for the fluctuation in the exchange rate since that date. See section 3.2 of this user guide for more information about the reporting of costs in a common currency. While there are limitations to the accuracy of exchange rate comparisons over time, note that the use of purchasing power parity measures, while more accurate, would be more labour-intensive.

The specification (or quality) of the project will also be given as part of the project values, but this should only be an approximate indication of the general level of specification in each project, rather than a detailed description of each cost group. This is so that subsequent users of the data can form a reasonable judgement of the adjustment in cost and carbon emissions required when producing estimates based on historic data and normalising it for the perceived difference in specification or quality.

8.3 Extent of coverage – civil engineering

As already noted, ICMS covers 18 common civil engineering (infrastructure) project types and it is considered that these project types cover much of the infrastructure output. Should the demand arise, further infrastructure project types may be added into subsequent editions of ICMS.

8.4 Availability of life cycle data

The estimation of lifecycle costs and carbon emissions is in its infancy in many countries. As a result, little historic data is available and is not collected in any consistent way.

Different clients, contractors, consultants, facility managers and advisors may collect data in different formats from different sources using different work breakdown structures and different scopes (i.e. what is included and what is excluded). It is hoped that ICMS will help to rectify this and lead to consistency, where robust data can be used and preferably shared to introduce more certainty into the prediction and control of construction and other life cycle costs and carbon emissions.



9

Differences from elemental cost planning



9.1 Classification principles

ICMS has been developed at level 4 as an elemental work breakdown structure principally because this is required for life cycle costing. This elemental breakdown is needed because the maintenance and renewal costs are generally allocated at the elements and systems level. However, the classification of construction and other life cycle costs as set out in ICMS differ from other historic elemental cost plan structures, layouts and formats, given that the traditional elemental titles and groups for cost classification do not necessarily apply globally. The ICMS Coalition aimed to create a reporting framework that can be understood by all parties, hence the use of classification groups with titles such as categories, groups and sub-groups.

SCSI has developed a document which illustrates the mapping of the Irish National Standard Building Elements (NSBE) and Design Cost Control Procedures to the International Cost Management Standard (ICMS), which is available to download from SCSI.ie

The OGP have developed cost reporting templates from the NSBE to the ICMS under the CWMF (Capital Works Management Framework) which are available for use on their website <https://www.gov.ie>

9.2 Substructure and structure delineation

Different parts of the world have historically applied different 'boundaries' to where the 'substructure' and 'structure' (also known as 'superstructure') starts and ends, and these differences are also evident in the boundary applied between structural designers (engineers) and cost and carbon management professionals.

It is important that a single common approach is taken, so that when project classifications are prepared, the same principle is applied in each case, based on the sample diagrams as presented in section 4.2 of ICMS. This also serves to align with how 3D models of the building or structure are constructed.

9.3 Loadbearing and non-loadbearing delineation

Again, historic custom and practice in different parts of the world have led to different approaches being adopted to the definition of loadbearing and non-loadbearing structures and the resultant allocation of costs and carbon emissions between the two elements or sections. ICMS seeks to define what a 'structure' should include, and it is worth noting that the inclusion of non-load bearing components, which are an integral part of the composite load-bearing work, should be included in the 'structure' cost and carbon emissions allocation. This reflects the characteristics of some off-site manufactured modules.

Given that there is going to be an element of uncertainty over the actual contribution that non-load bearing components make to the integrity of the load-bearing component, advisers will be required to use appropriate skill and judgement over the allocation. A good example of this might relate to external walls, with the need to define in the project attributes the proportion of the façade that is glazed. However, this level of detail may not be known to any degree of confidence at the early stages of a project.

Cost and carbon management professionals may need to seek advice from structural designers (if appointed as part of the design team) to establish which construction elements are loadbearing or non-loadbearing, given that this is not always clear from the design information.

9.4 Alignment to design disciplines

The classification grouping set out in the ICMS framework seeks to align the various groups with the design discipline (and therefore individual members of the design team) that will stand behind the defined work, such that in section 2.2 of ICMS there are seven 'work-based' groups, namely:

- demolition
- substructure
- structure
- architectural and non-structural works
- services and equipment
- drainage (above and below ground) and
- external and ancillary works.

It is acknowledged that these seven groupings do not necessarily align with the 'packaging up' and the procurement of construction work in any market, but rather that the groups better align with the design discipline that undertakes the work in question.

Appendix

1

Appendix 1a: ICMS cost example

The worked example in Table 2 shows how ICMS cost categories and sub-cost groups are typically used. It provides transparency on the capital costs and the other life cycle or facility management costs in a format that enables easy comparison for analysis and benchmarking by cost categories and by sub-cost groups. This supports identification of the option that provides the best value for money, in terms of the total life cycle cost, as well as setting the forecast budgets for running the facilities over the defined life cycle period, in this case 30 years.

Table 2: Worked cost breakdown of two project life cycle options for an air-conditioned office

ICMS breakdown		Alternative 1	Alternative 2	Cost variance
Cost categories/ sub-cost groups	Cost code	Base date Q1 2020, new build base case option, IPMS 2 Internal = 12,000m ²	Base date Q1 2020, acquire/fit-out alternative option, IPMS 2 Internal = 11,800m ²	
Acquisition costs	AC	Land not included	€18.5m (excluding finance)	–€18.5m
Construction costs (cost plan no. 1)	CC (as cost plan)	€25.5m	€5. 5m	€20m
Renewal costs over the 30-year life cycle	RC; aggregated (no discounting)	€6.3m	€6.5m	–€0.2m
Operation costs		Forecast (30 years):	Forecast (30 years):	Forecast (30 years):
Cleaning	4.01	€8.5m	€8.3m	€0.2m
Utilities	4.02	€14.6m	€14.3m	€0.3m
Waste management	4.03	€1.3m	€1.2m	€0.1m
Security	4.04	€1.2m	€1.2m	€0
Comms/IT	4.05	€3.5m	€3.2m	€0.3m
Overhead & profit	4.06	included	included	included
Risk allowance	4.07	€1m	€1m	€0
Taxes	4.08	Out of scope	Out of scope	N/A

Table 2: Worked cost breakdown of two project life cycle options for an air-conditioned office

ICMS breakdown		Alternative 1	Alternative 2	Cost variance
Cost categories/ sub-cost groups	Cost code	Base date Q1 2020, new build base case option, IPMS 2 Internal = 12,000m ²	Base date Q1 2020, acquire/fit-out alternative option, IPMS 2 Internal = 11,800m ²	
End of life costs	EC	Out of scope	Out of scope	N/A
Other facilities management costs (option, if in scope)	Facilities management (optional)	Out of scope	Out of scope	N/A
Sustainability (BREEAM / LEED rating)	Included in CC			N/A N/A
Rental income	Not in scope			N/A
Service charges	Not in scope			N/A
User-defined (other costs)	Not in scope			N/A
Total life cycle cost	LCC	€69.2m	€66.9m	€2.3m

Source: Based on Faithful+Gould, anonymised office project life-cycle cost plan.

Notes: EC includes disposal inspections, reinstatement, decommissioning, salvage and taxes.

Appendix

1

Appendix 1b: ICMS carbon emissions example

Names of carbon assessment standard(s) adopted for the project	Greater London Authority, Whole Life-Cycle Carbon Assessments guidance Pre-consultation draft (2020); RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment (2017); EN 15978:2011, Sustainability of Construction Works.
Names of carbon assessment tool(s) adopted for the project	One Click LCA
Source(s) of conversion factors (emission factors)	One Click LCA; Environmental Product Declarations; SAP 10

Table 3: Carbon breakdown by category for a proposed development (i.e. using Table H–1 of ICMS 3)

Code	Category	Buildings	
		Emissions (tCO ₂ e)	tCO ₂ e/Qty
	Project Quantity Quantity's Units of Measurement		
	Total		
1.	Acquisition Carbon Emissions (AE) (where significant)	Not significant	Not significant
2.	Construction Carbon Emissions (CE)	15,678	0.538
3.	Renewal Carbon Emissions (RE)	7,180	0.246
4.	Operation Carbon Emissions (OE)	8,005	0.275
5.	Maintenance Carbon Emissions (ME)	9,100	0.312
6.	End of Life Carbon Emissions (EE)	759	0.026
7.	Benefits and loads beyond the system boundary	-2,106	-0.072

Source: Adapted from a Whole Life Carbon Assessment Report for a proposed development of residential and commercial buildings (published in 2020 to support a UK planning application).

Appendix 2

Appendix 2: ICMS codes for buildings and civil engineering projects

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
1.	Acquisition costs (AC)		
1.01.	Acquisition costs (AC)	Site acquisition	
1.01.010			Costs and premium required to procure site
1.01.020			Compensation to existing occupiers
1.01.030			Demolition, removal and modification of existing properties by way of payment to existing owners instead of carrying out physical work
1.01.040			Contributions for the preservation of heritage, culture and environment
1.01.050			Related fees to agents, lawyers, and the like
1.01.060			Related taxes and statutory charges
1.02.	Acquisition costs (AC)	Administrative, finance, legal and marketing expenses	
1.02.010			Client's general office overheads
1.02.020			Client's project-specific administrative expenses
1.02.030			Interest and finance costs
1.02.040			Legal expenses
1.02.050			Accounting expenses
1.02.060			Sales, leasing, marketing, advertising and promotional expenses
1.02.070			Taxes and statutory charges related to sales and lease
1.02.080			License and permit charges for operation and use

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
2.	Construction costs		
2.01.	Construction costs	Demolition, site preparation and formation	
2.01.010			Site survey and ground investigation
2.01.020			Environmental treatment
2.01.030			Sampling of hazardous or useful materials or conditions
2.01.040			Temporary fencing
2.01.050			Demolition of existing buildings and support to adjacent structures
2.01.060			Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)
2.01.070			Tree transplant
2.01.080			Site formation and slope treatment
2.01.090			Temporary surface drainage and dewatering
2.01.100			Temporary protection, diversion and relocation of public utilities
2.01.110			Erosion control
2.02.	Construction costs	Substructure	
2.02.010			Foundation piling and underpinning
2.02.020			Foundations up to top of lowest floor slabs
2.02.030			Basement sides and bottom
2.03.	Construction costs	Structure	
2.03.010			Structural removal and alterations
2.03.020			Basement suspended floors (up to top of ground floor slabs)
2.03.030			Frames and slabs (above top of ground floor slabs)
2.03.040			Tanks, pools, sundries
2.03.050			Composite or prefabricated work

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
2.04.	Construction costs	Architectural works Non-structural works	
2.04.010			Non-structural removal and alterations
2.04.020			External elevations
2.04.030			Roof finishes, skylights and landscaping (including waterproofing and insulation)
2.04.040			Internal divisions
2.04.050			Fittings and sundries
2.04.060			Finishes under cover
2.04.070			Builder's work in connection with services
2.04.080			Composite or prefabricated work
2.05.	Construction costs	Services and equipment	
2.05.010			Heating, ventilating and air- conditioning systems/air conditioners
2.05.020			Electrical services
2.05.030			Fitting out lighting fittings
2.05.040			Extra low voltage services
2.05.050			Water supply and drainage above ground or inside basement
2.05.060			Supply of sanitary fittings and fixtures (installation included in 'Water supply and above ground drainage' unless not separable from costs of 'Fittings and sundries')
2.05.070			Disposal systems
2.05.080			Fire services
2.05.090			Gas services
2.05.100			Movement systems
2.05.110			Gondolas

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
2.05.120			Turntables
2.05.130			Generators
2.05.140			Energy-saving features
2.05.150			Water and waste water treatment equipment
2.05.160			Fountains, pools and filtration plant
2.05.170			Powered building signage
2.05.175			Audio/visual entertainment system
2.05.180			Kitchen equipment
2.05.190			Cold room equipment
2.05.200			Laboratory equipment
2.05.210			Medical equipment
2.05.220			Hotel equipment
2.05.230			Car park or entrances access control
2.05.240			Domestic appliances
2.05.250			Other specialist services
2.05.260			Builder's profit and attendance on services
2.06.	Construction costs	Surface and underground drainage	
2.06.010			Surface water drainage
2.06.020			Storm water drainage
2.06.030			Foul and waste water drainage
2.06.040			Drainage disconnections and connections
2.06.050			CCTV inspection of existing or new drains
2.06.060			Buried process pipe
2.07.	Construction costs	External and ancillary works	
2.07.010			Permanent retaining structures
2.07.020			Site enclosures and divisions

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
2.07.030			Ancillary structures
2.07.040			Roads and paving
2.07.050			Landscaping (hard and soft)
2.07.060			Fittings and equipment
2.07.070			External services
2.08.	Construction costs	Preliminaries Constructors' site overheads general requirements	
2.08.010			Construction management including site management staff and support labour
2.08.020			Temporary access roads and storage areas, traffic management and diversion (at the Constructors' discretion)
2.08.030			Temporary site fencing and securities
2.08.040			Commonly shared construction plant
2.08.050			Commonly shared scaffolding
2.08.060			Other temporary facilities and services
2.08.070			Technology and communications: telephone, broadband, hardware, software
2.08.080			Constructor's submissions, reports and as-built documentation
2.08.090			Quality monitoring, recording and inspections
2.08.100			Safety, health and environmental management
2.08.110			Insurances, bonds, guarantees and warranties
2.08.120			Constructor's statutory fees and charges
2.08.130			Testing and commissioning

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
2.09.	Construction costs	Risk allowances	
2.09.010			Design development allowance
2.09.020			Construction contingencies
2.09.030			Price level adjustments
2.09.040			Exchange rate fluctuation adjustments
2.10.	Construction costs	Taxes and levies	
2.10.010			Paid by the Constructor
2.10.020			Paid by the Client in relation to the construction contract payments
2.11.	Construction costs	Work and utilities off-site	
2.11.010			Connections to, diversion of and capacity enhancement of public utility mains or sources off-site up to mains connections on-site
2.11.020			Public access roads and footpaths
2.12.	Construction costs	Post-completion loose furniture, fittings and equipment	
2.12.010			Production, process, operating and loose furniture, furnishing and equipment not normally provided before completion of construction
2.13.	Construction costs	Construction Renewal Maintenance-related consultancies and supervision	
2.13.010			Consultants' fees and reimbursable
2.13.020			Charges and levies payable to statutory bodies or their appointed agencies (in connection with planning, design, tender and contract approvals, supervision and acceptance inspections)

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
2.13.030			Site supervision charges (including their accommodation and travels)
2.13.040			Payments to testing authorities or laboratories
3.	Renewal cost		
3.01.	Renewal cost	Demolition, site preparation and formation	
3.01.010			Site survey and ground investigation
3.01.020			Environmental treatment
3.01.030			Sampling of hazardous or useful materials or conditions
3.01.040			Temporary fencing
3.01.050			Demolition of existing buildings and support to adjacent structures
3.01.060			Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)
3.01.070			Tree transplant
3.01.080			Site formation and slope treatment
3.01.090			Temporary surface drainage and dewatering
3.01.100			Temporary protection, diversion and relocation of public utilities
3.01.110			Erosion control
3.02.	Renewal cost	Substructure	
3.02.010			Foundation piling and underpinning
3.02.020			Foundations up to top of lowest floor slabs
3.02.030			Basement sides and bottom
3.03.	Renewal cost	Structure	
3.03.010			Structural removal and alterations
3.03.020			Basement suspended floors (up to top of ground floor slabs)
3.03.030			Frames and slabs (above top of ground floor slabs)

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
3.03.040			Tanks, pools, sundries
3.03.050			Composite or prefabricated work
3.04.	Renewal cost	Architectural works Non-structural works	
3.04.010			Non-structural removal and alterations
3.04.020			External elevations
3.04.030			Roof finishes, skylights and landscaping (including waterproofing and insulation)
3.04.040			Internal divisions
3.04.050			Fittings and sundries
3.04.060			Finishes under cover
3.04.070			Builder's work in connection with services
3.04.080			Composite or prefabricated work
3.05.	Renewal cost	Services and equipment	
3.05.010			Heating, ventilating and air- conditioning systems/air conditioners
3.05.020			Electrical services
3.05.030			Fitting out lighting fittings
3.05.040			Extra low voltage services
3.05.050			Water supply and drainage above ground or inside basement
3.05.060			Supply of sanitary fittings and fixtures (installation included in 'Water supply and above ground drainage' unless not separable from costs of 'Fittings and sundries')
3.05.070			Disposal systems
3.05.080			Fire services
3.05.090			Gas services
3.05.100			Movement systems
3.05.110			Gondolas
3.05.120			Turntables
3.05.130			Generators
3.05.140			Energy-saving features

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
3.05.150			Water and waste water treatment equipment
3.05.160			Fountains, pools and filtration plant
3.05.170			Powered building signage
3.05.175			Audio/visual entertainment system
3.05.180			Kitchen equipment
3.05.190			Cold room equipment
3.05.200			Laboratory equipment
3.05.210			Medical equipment
3.05.220			Hotel equipment
3.05.230			Car park or entrances access control
3.05.240			Domestic appliances
3.05.250			Other specialist services
3.05.260			Builder's profit and attendance on services
3.06.	Renewal cost	Surface and underground drainage	
3.06.010			Surface water drainage
3.06.020			Storm water drainage
3.06.030			Foul and waste water drainage
3.06.040			Drainage disconnections and connections
3.06.050			CCTV inspection of existing or new drains
3.06.060			Buried process pipe
3.07.	Renewal cost	External and ancillary works	
3.07.010			Permanent retaining structures
3.07.020			Site enclosures and divisions
3.07.030			Ancillary structures
3.07.040			Roads and paving
3.07.050			Landscaping (hard and soft)
3.07.060			Fittings and equipment
3.07.070			External services

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
3.08.	Renewal cost	Preliminaries Constructors' site overheads general requirements	
3.08.010			Construction management including site management staff and support labour
3.08.020			Temporary access roads and storage areas, traffic management and diversion (at the Constructors' discretion)
3.08.030			Temporary site fencing and securities
3.08.040			Commonly shared construction plant
3.08.050			Commonly shared scaffolding
3.08.060			Other temporary facilities and services
3.08.070			Technology and communications: telephone, broadband, hardware, software
3.08.080			Constructor's submissions, reports and as-built documentation
3.08.090			Quality monitoring, recording and inspections
3.08.100			Safety, health and environmental management
3.08.110			Insurances, bonds, guarantees and warranties
3.08.120			Constructor's statutory fees and charges
3.08.130			Testing and commissioning
3.09.	Renewal cost	Risk allowances	
3.09.010			Design development allowance
3.09.020			Construction contingencies
3.09.030			Price level adjustments
3.09.040			Exchange rate fluctuation adjustments

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
3.10.	Renewal cost	Taxes and levies	
3.10.010			Paid by the Constructor
3.10.020			Paid by the Client in relation to the construction contract payments
3.11.	Renewal cost	Work and utilities off-site	
3.11.010			Connections to, diversion of and capacity enhancement of public utility mains or sources off-site up to mains connections on-site
3.11.020			Public access roads and footpaths
3.12.	Renewal cost	Post-completion loose furniture, fittings and equipment	
3.12.010			Production, process, operating and loose furniture, furnishing and equipment not normally provided before completion of construction
3.13.	Renewal cost	Construction Renewal Maintenance-related consultancies and supervision	
3.13.010			Consultants' fees and reimbursable
3.13.020			Charges and levies payable to statutory bodies or their appointed agencies (in connection with planning, design, tender and contract approvals, supervision and acceptance inspections)
3.13.030			Site supervision charges (including their accommodation and travels)
3.13.040			Payments to testing authorities or laboratories

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
4.	Operation cost		
4.01.	Operation cost	Cleaning	
4.01.010			External cleaning (routine and periodic)
4.01.020			Internal cleaning (routine and periodic)
4.01.030			Specialist cleaning (define type)
4.02.	Operation cost	Utilities	
4.02.010			Fuel (state type: gas/electricity/oil and other fuel sources)
4.02.020			Water, drainage and sewerage
4.03.	Operation cost	Waste management	
4.03.010			Waste collection and disposal
4.03.020			Recycling and salvage
4.04.	Operation cost	Security	
4.04.010			Physical security
4.04.020			Remote monitoring
4.05.	Operation cost	Information and communications technology	
4.05.010			Communication systems
4.05.020			Specialist technology / sensors
4.06.	Operation cost	Operators' site overheads general requirements	
4.06.010			Administration
4.06.020			Property insurance
4.07.	Operation cost	Risk Allowances	
4.07.010			Operation related (user definable)
4.07.020			Contractual obligations

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
4.08.	Operation cost	Taxes and levies	
4.08.010			Taxes
4.08.020			Levies
5.	Maintenance cost		
5.01.	Maintenance cost	Demolition, site preparation and formation	
5.01.010			Site survey and ground investigation
5.01.020			Environmental treatment
5.01.030			Sampling of hazardous or useful materials or conditions
5.01.040			Temporary fencing
5.01.050			Demolition of existing buildings and support to adjacent structures
5.01.060			Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)
5.01.070			Tree transplant
5.01.080			Site formation and slope treatment
5.01.090			Temporary surface drainage and dewatering
5.01.100			Temporary protection, diversion and relocation of public utilities
5.01.110			Erosion control
5.02.	Maintenance cost	Substructure	
5.02.010			Foundation piling and underpinning
5.02.020			Foundations up to top of lowest floor slabs
5.02.030			Basement sides and bottom
5.03.	Maintenance cost	Structure	
5.03.010		Structure	Structural removal and alterations

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
5.03.020		Structure	Basement suspended floors (up to top of ground floor slabs)
5.03.030		Structure	Frames and slabs (above top of ground floor slabs)
5.03.040		Structure	Tanks, pools, sundries
5.03.050		Structure	Composite or prefabricated work
5.04.	Maintenance cost	Architectural works Non-structural works	
5.04.010			Non-structural removal and alterations
5.04.020			External elevations
5.04.030			Roof finishes, skylights and landscaping (including waterproofing and insulation)
5.04.040			Internal divisions
5.04.050			Fittings and sundries
5.04.060			Finishes under cover
5.04.070			Builder's work in connection with services
5.04.080			Composite or prefabricated work
5.05.	Maintenance cost	Services and equipment	
5.05.010			Heating, ventilating and air- conditioning systems/air conditioners
5.05.020			Electrical services
5.05.030			Fitting out lighting fittings
5.05.040			Extra low voltage services
5.05.050			Water supply and drainage above ground or inside basement
5.05.060			Supply of sanitary fittings and fixtures (installation included in 'Water supply and above ground drainage' unless not separable from costs of 'Fittings and sundries')
5.05.070			Disposal systems

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
5.05.080			Fire services
5.05.090			Gas services
5.05.100			Movement systems
5.05.110			Gondolas
5.05.120			Turntables
5.05.130			Generators
5.05.140			Energy-saving features
5.05.150			Water and waste water treatment equipment
5.05.160			Fountains, pools and filtration plant
5.05.170			Powered building signage
5.05.175			Audio/visual entertainment system
5.05.180			Kitchen equipment
5.05.190			Cold room equipment
5.05.200			Laboratory equipment
5.05.210			Medical equipment
5.05.220			Hotel equipment
5.05.230			Car park or entrances access control
5.05.240			Domestic appliances
5.05.250			Other specialist services
5.05.260			Builder's profit and attendance on services
5.06.	Maintenance cost	Surface and underground drainage	
5.06.010			Surface water drainage
5.06.020			Storm water drainage
5.06.030			Foul and waste water drainage
5.06.040			Drainage disconnections and connections
5.06.050			CCTV inspection of existing or new drains
5.06.060			Buried process pipe

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
5.07.	Maintenance cost	External and ancillary works	
5.07.010			Permanent retaining structures
5.07.020			Site enclosures and divisions
5.07.030			Ancillary structures
5.07.040			Roads and paving
5.07.050			Landscaping (hard and soft)
5.07.060			Fittings and equipment
5.07.070			External services
5.08.	Maintenance cost	Preliminaries I Constructors' site overheads I general requirements	
5.08.010			Construction management including site management staff and support labour
5.08.020			Temporary access roads and storage areas, traffic management and diversion (at the Constructors' discretion)
5.08.030			Temporary site fencing and securities
5.08.040			Commonly shared construction plant
5.08.050			Commonly shared scaffolding
5.08.060			Other temporary facilities and services
5.08.070			Technology and communications: telephone, broadband, hardware, software
5.08.080			Constructor's submissions, reports and as-built documentation
5.08.090			Quality monitoring, recording and inspections
5.08.100			Safety, health and environmental management
5.08.110			Insurances, bonds, guarantees and warranties
5.08.120			Constructor's statutory fees and charges
5.08.130			Testing and commissioning

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
5.09.	Maintenance cost	Risk allowances	
5.09.010			Design development allowance
5.09.020			Construction contingencies
5.09.030			Price level adjustments
5.09.040			Exchange rate fluctuation adjustments
5.10.	Maintenance cost	Taxes and levies	
5.10.010			Paid by the Constructor
5.10.020			Paid by the Client in relation to the construction contract payments
5.11.	Maintenance cost	Work and utilities off-site	
5.11.010		Work and utilities off-site	Connections to, diversion of and capacity enhancement of public utility mains or sources off-site up to mains connections on-site
5.11.020		Work and utilities off-site	Public access roads and footpaths
5.12.	Maintenance cost	Post-completion loose furniture, fittings and equipment	
5.12.010			Production, process, operating and loose furniture, furnishing and equipment not normally provided before completion of construction
5.13.	Maintenance cost	Construction Renewal Maintenance-related consultancies and supervision	
5.13.010			Consultants' fees and reimbursable
5.13.020			Charges and levies payable to statutory bodies or their appointed agencies (in connection with planning, design, tender and contract approvals, supervision and acceptance inspections)
5.13.030			Site supervision charges (including their accommodation and travels)
5.13.040			Payments to testing authorities or laboratories

ICMS code	Cost category (level 2)	Cost group (level 3)	Cost sub-group (level 4)
6.	End of life costs		
6.01.	End of life costs	Disposal inspection	
6.01.010			Dilapidations report
6.01.020			Contractual handback obligations
6.02.	End of life costs	Decommissioning and decontamination	
6.02.010			Shutdowns and decommissioning
6.02.020			Decontamination
6.03.	End of life costs	Demolition, reclamation and salvage	
6.03.010			Demolition
6.03.020			Reclamation
6.03.030			Salvage
6.04.	End of life costs	Reinstatement	
6.04.010			Agreed reinstatement works
6.04.020			Contractual obligations
6.05.	End of life costs	Constructors' site overheads general requirements	
6.05.010			Administration
6.05.020			Overheads (project specific)
6.06.	End of life costs	Risk Allowances	
6.06.010			End of life specific (user definable)
6.06.020			Abnormal risks (user definable)
6.07.	End of life costs	Taxes and levies	
6.07.010			Taxes
6.07.020			Levies
6.07.030			Credit for grants

Appendix 3

Appendix 3: ICMS and other construction information and cost classification systems

ICMS was designed with compatibility with other established or emerging standards in mind. It has aimed to strike a balance between compatibility and the need for flexibility to accommodate detailed construction information and the different classification systems that exist across the world.

The cost sub-groups are generally compatible with the elements in ISO 12006-2:2015: Building construction – Organization of information about construction works – Part 2: Framework for classification and can be adapted to be compatible with most other construction information and cost classification systems. Users of ICMS may adopt a cost sub-group classification based on trades, work breakdown structure or work results according to their local practice.

To promote the adoption and implementation of ICMS, RICS has released ICMS cost templates in Microsoft Excel. ICMS Coalition is also developing maps that show suggested links between regional and local classification systems and ICMS cost groups. These Excel-based tables recommend how the detailed classification systems can be mapped to ICMS. The following maps are available on the ICMS Coalition and

RICS websites:

- Uniclass 2015
- NRM

A document mapping ICMS to the Irish National Standard Building Elements is available on SCSi.ie

The OGP (Office of Public Procurement) have mapped the National Standard Building Elements cost reporting templates to the ICMS for the CWMF (capital Works Management Framework)

The following maps will be made available on the ICMS Coalition and RICS websites after consultation with ICMS SSC and with the providers of these detailed classification systems:

- Method of Measurement for Highway Works (MMHW) by Highways England
- Network Rail's Rail Method of Measurement (RMM)
- Institution of Civil Engineers (ICE) Civil Engineering Standard Method of Measurement (CESMM)
- CSI MasterFormat
- CSI UniFormat
- CIQS Elemental Cost Classification
- Australian Cost Management Manual (ACMM)

These maps are provided to demonstrate the process required to connect detailed classification systems with ICMS. As each project is different, the actual mapping will require the intervention of a cost management professional who is familiar with international and local practices as well as the project under consideration. Therefore, these tables are provided as a guide for a skilled practitioner to use. Other maps are also being considered by the ICMS Coalition.

Figure H-1 in Appendix H of ICMS shows how the ICMS framework can be mapped to the stages associated with whole life carbon assessment in EN 15978: 2011 and PAS 2080:2016. Since this is a rapidly developing field of interest, professional advice is needed to ensure that any mapping takes account both of local practice and the latest editions of national and international standards.

Additionally, in order to support software writers and software providers, RICS publish a data standard (RDS) to allow ICMS 3 project attributes, costs, and emission information to be captured and exchanged in the machine-readable formats of XML and JSON. The RDS is available freely under the MIT License and RICS can provide technical support on the implementation of the RDS for ICMS 3. It is acknowledged that this data standard is most relevant to advanced IT users of ICMS3 data. Further information and support is available at datastandards@rics.org

Appendix

4

Appendix 4: Survey detail accuracy band table

Plan accuracy (X,Y)			Height accuracy (Z) ¹			Example survey types/uses ²	Approximate legacy plot scale output required to achieve accuracy band ³	Min size of feature shown true to scale (not symbolised)
Band	1 sigma	2 sigma	Band	Accuracy hard detail	Accuracy soft detail			
A	+/- 2mm	+/- 4mm	A	+/- 2mm	N/A	Monitoring, high accuracy engineering setting out and fabrication surveys	1:5	4mm
B	+/- 4mm	+/- 8mm	B	+/- 4mm	N/A	Monitoring, high accuracy engineering and measured building surveys and setting out	1:10	5mm
C	+/- 5mm	+/- 10mm	C	+/- 5mm	N/A	Engineering surveying and setting out, high accuracy measured building surveying, heritage recording	1:20	10mm
D	+/- 10mm	+/- 20mm	D	+/- 10mm	+/- 25mm	Engineering surveying and setting out, measured building surveys, high accuracy topographic surveys, determined boundaries, area registration	1:50	20mm
E	+/- 25mm	+/- 50mm	D	+/- 10mm	+/- 50mm	Measured building surveys, topographic surveys, low accuracy setting out, net area surveys, valuation surveys, area registration, utility verification (QL-A) PAS 128 (UK)	1:100	50mm
F	+/- 50mm	+/- 100mm	F	+/- 50 mm	+/- 100mm	Low accuracy measured building surveys, topographic surveys, high accuracy utility tracing, gross area surveys	1:200	100mm
G	+/- 100mm	+/- 200mm	G	+/- 50mm	+/- 100mm	Topographic surveys, low accuracy measured building surveys, utility tracing surveys, boundary mapping, high accuracy geotechnical, detection (QL-B1) PAS 128 (UK)	1:500	200mm
H	+/- 250mm	+/- 500mm	H	+/- 125mm	+/- 250mm	Low accuracy topographic surveys, national urban area mapping, geotechnical mapping, tree surveys	1:1000	500mm
I	+/- 500mm	+/- 1000mm	I	+/- 500mm	+/- 1000mm	Low accuracy topographic mapping, national non-urban mapping, general boundary mapping, asset mapping, utility survey – detection QL-B4 PAS 128 (UK)	1:2500	1000mm
J	+/- 1000mm	+/- 2000mm	J	+/- 1000mm	+/- 2000mm	Low accuracy route/corridor planning surveys, large area GIS asset mapping	1:5000	2000mm
XY	(Custom) ⁴		Z	(Custom)	(Custom)	Note: To create a customised band please select the band letter required and add as a prefix to XY or Z (i.e. +/-125mm plan = G-XY)		(Custom)

¹ See section 2.3.1 and multiply by 2 for 2 sigma values.² Example survey types/uses – The table includes examples for users of the types of survey and plot scale output that may be suitable for different accuracies. However, this is not an exhaustive list of examples nor fixed to each band.³ Legacy plot scale output – This has been included for the benefit of previous users of this document to understand the historical requirements for plot scale related accuracy to achieve this band.⁴ Add more customised rows if required.

Appendix 5

Appendix 5: Further information

RICS contact details

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Websites

- RICS
- ICMS Coalition

RICS publications

Please see the current edition of the following related RICS standards:

- Whole life carbon assessment for the built environment
- Cost prediction
- NRM: New rules of measurement

SCSI contact details

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Websites

- www.scsi.ie

SCSI publications

Please see the current edition of the following related SCSI publications:

- GUIDE TO MAPPING NSBE TO ICMS: Information Paper
(A Guide to Mapping National Standard Building Elements to 'International Cost Management Standard')
Whole life carbon assessment for the built environment
- OGP CO2 Costing Document (Civil Engineering Works)

Other Useful Resources

- ISO 14001 is an internationally agreed standard that sets out the requirements of an environmental management system. This standard regulates GHG emission and reduction accounting.
- ISO 14064 Standards provides governments, businesses, regions and other organisations with a complementary set of tools for programs to quantify, monitor, report and verify greenhouse gas emissions.

Appendix 6 - Introduction to IPMS: All Buildings

IPMS All Buildings supersedes all previously published IPMSC standards for individual asset classes by utilising the concepts and objectives contained in those specific versions of IPMS into one harmonised standard. *IPMS All Buildings* is applicable to all types of Buildings independent of their use or their occupation.

IPMS are sufficiently flexible to apply to different purposes such as:

• Analysis and Benchmarking	• Property Financing
• Construction Cost Rates and Ratios	• Property Management
• Conversion between Measurement Standards	• Research
• Cost Allocation	• Summary Costing
• Insurance	• Sustainability & Energy Efficiency
• Planning and Architecture	• Valuation/Transactions (incl: leasing and sales)
• Property Development	

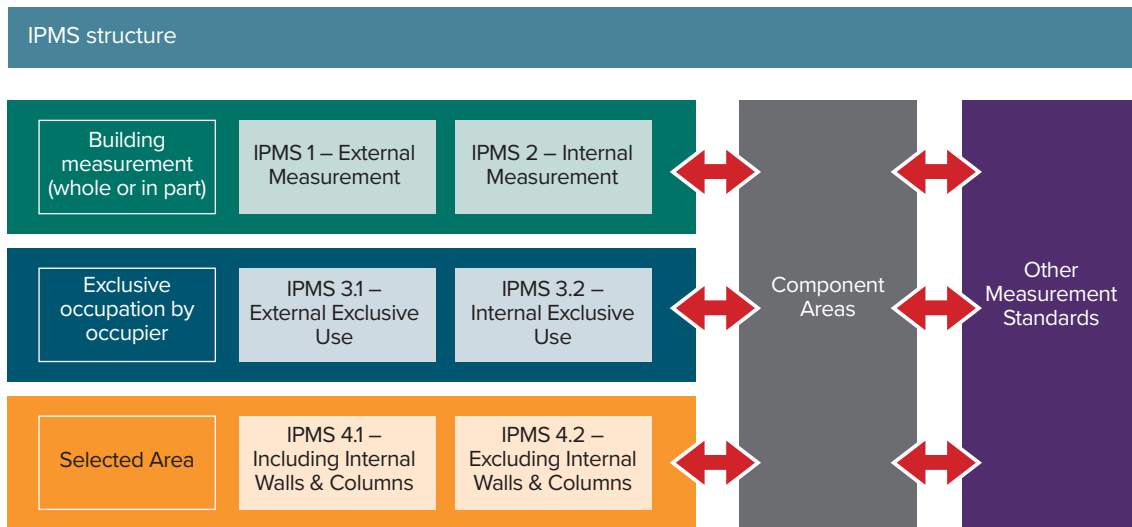
IPMS have the flexibility to measure only part of a building or to holistically measure all the areas in the building and allocate these areas into separate components. This flexibility provides a common language that can interface with pre-existing local measurement standards.

IPMS adopt unique nomenclature to avoid confusion with existing terms that are unfortunately used inconsistently in markets across the world. The IPMS structure and interface with other measurement standards is demonstrated by the flow chart shown below.

IPMS have been composed to enable the selection of the appropriate basis of measurement so that there may not be a need to review the whole document to apply the measurement but only to have regard to the specific standard to suit the market needs. IPMS are divided into three (3) fundamentally different groupings as shown below:

1. IPMS 1 and IPMS 2 are external and internal measurements respectively for the whole or part of a Building.
2. IPMS 3.1 and IPMS 3.2 are external and internal measurements respectively required for exclusive occupation.
3. IPMS 4.1 and IPMS 4.2 are internal measurements required for selected areas respectively including Internal Walls and Columns and excluding External Walls and Columns.

For ease of reference the Standards Setting Committee (SSC) has named the various standards using the IPMS prefix to make the nomenclature IPMS 1, IPMS 2, IPMS 3.1, IPMS 3.2, IPMS 4.1 and IPMS 4.2 more user friendly. The use of Component Areas is optional, but they facilitate the analysis of a Building and can also be used to convert between IPMS and other measurement standards.



Diagrams within IPMS do not reflect a particular asset class and the sole purpose of each diagram is to depict the principles of the IPMS concept.

Dating back to 1895, the Society of Chartered Surveyors www.scsi.ie Ireland is the independent professional body for Chartered Surveyors working and practicing in Ireland.

Working in partnership with RICS, the pre-eminent Chartered professional body for the construction, land and property sectors around the world, the Society and RICS act in the public interest: setting and maintaining the highest standards of competence and integrity among the profession; and providing impartial, authoritative advice on key issues for business, society and governments worldwide.

Advancing standards in construction, land and property, the Chartered Surveyor professional qualification is the world's leading qualification when it comes to professional standards. In a world where more and more people, governments, banks and commercial organisations demand greater certainty of professional standards and ethics, attaining the Chartered Surveyor qualification is the recognised mark of property professionalism.

Members of the profession are typically employed in the construction, land and property markets through private practice, in central and local government, in state agencies, in academic institutions, in business organisations and in non-governmental organisations.

Members' services are diverse and can include offering strategic advice on the economics, valuation, law, technology, finance and management in all aspects of the construction, land and property industry.

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