

# Capital Works Management Framework

## *How to use the* Cost and Carbon Templates

CC 1-9

# Using the Cost and Carbon Templates (CC 1-9)

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## Introduction

This guide is intended to help you fill out the Cost and Carbon Templates (CC 1-9). Documents CC1-9 are Excel workbooks. There are nine workbooks covering nine different project types:

1. Buildings
2. Roads and Runways
3. Bridges
4. Tunnels
5. Railways
6. Ports
7. Nearshore Works
8. Offshore Structures
9. Waterway Works.

They can be used throughout project planning, execution and analysis, although not all of the workbooks will be relevant at every stage.

The Cost and Carbon Templates are based on the International Cost Management Standard (ICMS3). ICMS aims to provide global consistency in classifying, defining, measuring, recording, analysing, presenting and comparing costs and carbon emissions of construction projects and constructed assets. ICMS is a high-level classification system.

Below are the four main hierarchical levels of the ICMS standard:



Figure 1: Main hierarchical levels of the ICMS standard.

You can enter information related to any or all of the four ICMS levels into the Cost and Carbon Templates. Figure 2 shows the data recorded at each of the four levels:

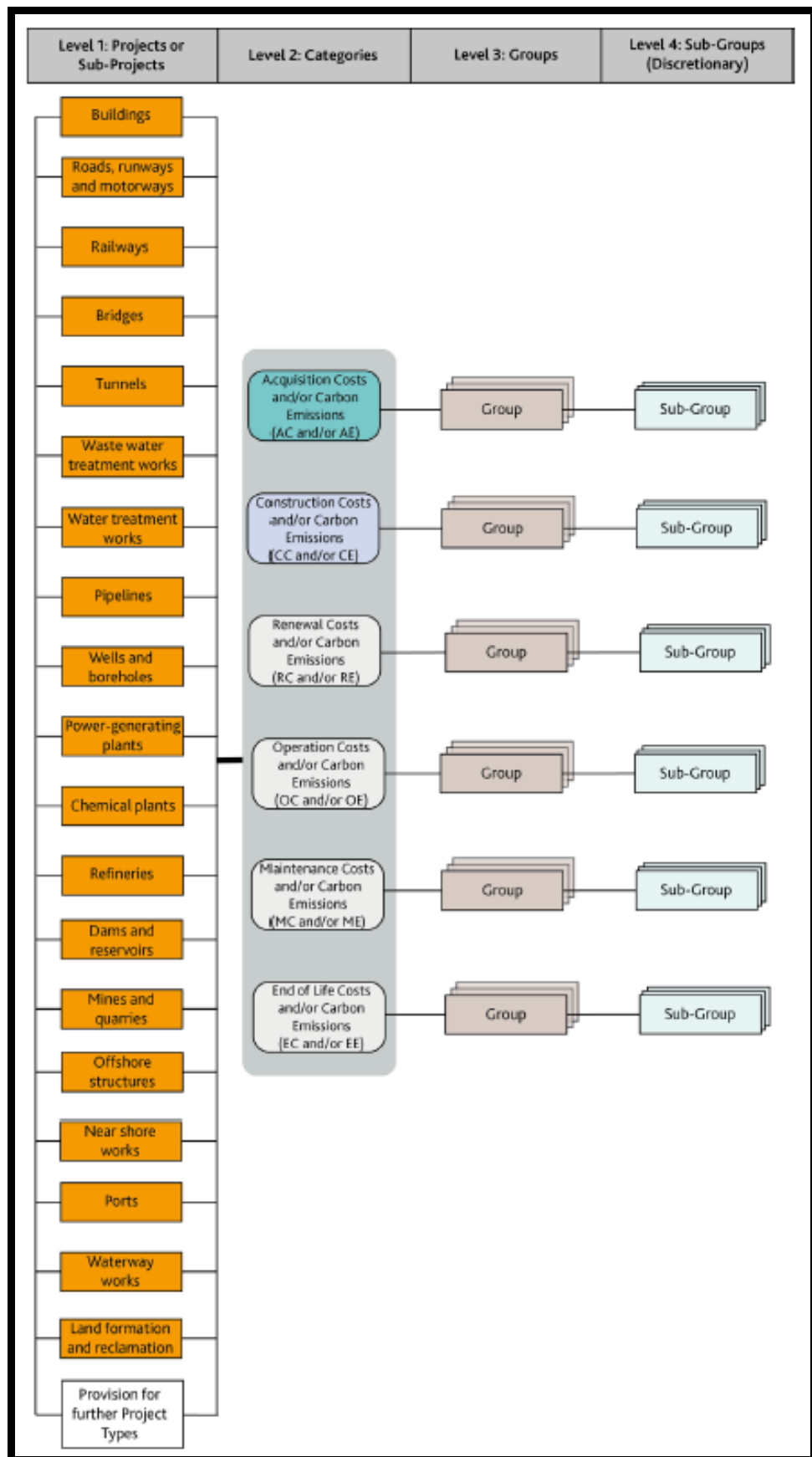


Figure 2: ICMS Framework including Level 1 Projects and Sub-Projects. The framework is identical for Costs (C) and Carbon Emissions (E).

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### **Outline Cost Plan**

When developing an **Outline Cost Plan**, you may not need to enter information at Level 4 detail. You may only want to collect and record information for the **project attributes** and the **construction cost groups** at ICMS Level 3.

You enter the cost group information on the category heading lines in tab 'G-4 Breakdown' of the Cost and Carbon Template worksheets.

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### **Detailed Cost Plan**

When developing a **Detailed Cost Plan**, you may want to break down those figures in more detail.

You enter the cost subgroup information in the 'G-4 Breakdown' tab, this time using the detail lines for each category. The subtotals and totals are calculated automatically and carried forward to the 'G-4 Summary', 'G-3 Breakdown' and 'G-3 Summary' tabs.

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### **Tender Cost Analysis**

When carrying out a **Tender Cost Analysis**, you can also use the 'G-4 Breakdown' worksheet. If you wish, you can also use the individual subgroup categories to present a more detailed breakdown.

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### **Analysis of Outturn Costs**

When the project is complete, and you are carrying out an **Analysis of Outturn Costs**, you can use the 'G-4 Breakdown' worksheet, with the individual category subgroups if it is useful to do so.

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## Using the Cost and Carbon Templates (CC 1-9), Continued

### How to Fill in the Workbook

This section will describe how to fill in the Cost and Carbon Templates (CC1-9). Data only needs to be entered in two tabs, the 'Attributes' tab and the 'G-4 Summary' tab. The remaining tabs will be automatically populated based on the data entered.

The screenshots shown below are from the CC1 (Buildings) template document but the explanations also apply to the workbooks for other project types.

### Step 1: Fill in Attributes Tab

Open the Cost and Carbon Template Excel file. Go to the 'Attributes' tab (see Figure 3).

COMMON PROJECT ATTRIBUTES	
<b>REPORT</b>	
Project title	<please insert text>
Status of cost and/or carbon emissions report	<please select from dropdown>
Date of cost and/or carbon emissions report	<please insert text>
Revision number of cost and/or carbon emissions report	<please insert text>
Brief description of the Project	<please insert text>
• client's name	<please insert text>
• main Project type (principal Sub-Project)	<please insert text>
• brief scope	<please insert text>
Location and country	<please insert country>
	<please insert address of building site(s)>
Project type	Buildings

Figure 3: Common Project Attributes.

The first section to be filled out is the Common Project Attributes. These are the same for all project types. The majority of the cells on this tab are locked and cannot be edited. Only the cells coloured green can be filled in.

Dark green indicates that you must select an option from a dropdown, and light green indicates that you should type in text (overwrite text that says, for example, '<please insert text>').

Further down the page in the same tab are the Unique Project Attributes (see Figure 4). These differ depending on the project type. For example, the attribute ‘bathymetry (seabed survey)’ may be relevant for an Offshore Structures project but not a Buildings project.

Figure 4: Building Unique Attributes.

Near the end of the ‘Attributes’ page there is a section for entering the project quantities (see Figure 5).

Project Quantities	
Site area - Qty (within legal boundary of building site, excluding temporary working areas outside the site)	7000
Site area - Unit	m <sup>2</sup>
Covered area on plan - Qty	5100
Covered area on plan - Unit	m <sup>2</sup>
Gross external floor area as IPMS 1 (EXTERNAL) - Qty	5000
Gross external floor area as IPMS 1 (EXTERNAL) - Unit	m <sup>2</sup>
Gross internal floor area as IPMS 2 (INTERNAL) - Qty	4900
Gross internal floor area as IPMS 2 (INTERNAL) - Unit	m <sup>2</sup>

Figure 5: Building Project Quantities.

In ICMS, ‘project quantities’ are not the same thing as units of measurement. The ICMS3 standard defines project quantities as:

*The physical quantities (numbers, lengths, areas, volumes and weights), functional quantities (capacities, inputs, outputs) and degree of repetition required to be captured in the Project Attributes and Values so the costs or carbon emissions of different projects or design schemes can be converted to a unit cost or carbon emission per the desired Project Quantity for evaluation and comparison.<sup>1</sup>*

Different project quantities may have the same unit of measurement. For example, for a Buildings project, both the ‘IPMS 1 (gross external floor area)’

<sup>1</sup> [International Cost Management Standard \(ICMS3\)](#), p.68.

and 'Site area' quantities are expressed in m<sup>2</sup>, but the quantities being expressed are not the same.

Different quantities are available for different project types. For example, the Ports template provides an option for entering a 'Volume of breakwaters' quantity, but this will not be applicable for a Buildings project.

Now enter at least one project quantity in the fields provided. If you do not enter at least one quantity, the full functionality of the templates will not be available to you – you will not be able to view cost and carbon per metre squared (or per other unit) in the summary tabs.

After entering the project quantities and units as shown above, go to the final dropdown on the Attributes page: 'Unit of choice' (see Figure 6).

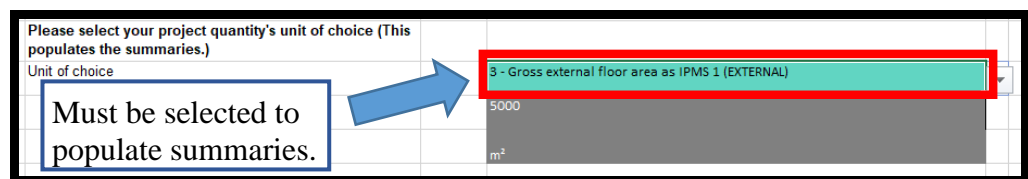


Figure 6: Building Unique Attributes: project quantity unit of choice.

This dropdown allows you to select which quantity you wish to see your costs and carbon displayed in (for example, you can choose to see your costs displayed per m<sup>2</sup> of 'Site area', or per m<sup>2</sup> of 'Gross internal floor area').

From the dropdown, select the quantity type that you wish to see in the summary tabs. You can select a different quantity type and unit from the dropdown at any time, if you wish to see your costs displayed per a different quantity.

Please note that the units for some project quantities are composite and therefore not suitable for dividing into cost and carbon. For example, in the 'Ports' template the 'Quay length + height' quantity is expressed as a combination of two metre measurements ('m + m'). It is therefore better to select another quantity type as the 'Unit of choice' for display in the summary tabs (although the composite quantity can still be recorded in the 'Attributes' tab).

### Step 2: Fill in 'G-4 Breakdown' tab

After you have completed the Attributes tab, open the 'G-4 Breakdown tab'. You will see that some of the attributes information you have already entered has automatically populated the headers on this tab, for example the project title, type and quantity. You can now enter cost and carbon data for the project in the fields provided.

The majority of the cells in this tab are locked, and only the cells for entering cost and carbon data are unlocked (see Figure 7). You only need to enter information in the '€' and 'Emissions' columns highlighted below, all of the other columns will be automatically populated based on these two columns.

Table G-4: (Breakdown) Template for Total Capital Cost (Acquisition Cost and Construction Cost) for a Building Project  
 # Give subtotals and totals in the heading rows

Code	Description	€	/ qty	€ % by Category	€ % of total	Emissions (tCO <sub>2</sub> e)	tCO <sub>2</sub> e/Qty	% tCO <sub>2</sub> e by Category	% tCO <sub>2</sub> e of total
	Project Quantity		5,000 m <sup>2</sup>						
	<b>Total Capital Costs (AC+CC)</b>	0.00		0.00		0.00		0.00	100.00%
1	<b>Acquisition Costs (AC)</b>	0.00		0.00	100%	0.00		0.00	100.00%
2	<b>Construction Costs (CC)</b>	0.00		0.00	100%	0.00		0.00	100.00%
1	<b>Acquisition Costs (AC)</b>	0.00		0.00	100.00%	0.00		0.00	100.00%
1.01	Site acquisition	0.00		0.00		0.00		0.00	
1.01.010	Costs and premium required to procure site	0.00		0.00		0.00		0.00	
1.01.020	Compensation to existing occupiers	0.00		0.00		0.00		0.00	
1.01.030	Demolition, removal and modification of existing properties by way of payment to existing owners instead of carrying out physical work	0.00		0.00		0.00		0.00	
1.01.040	Contributions for the preservation of heritage, culture and environment	0.00		0.00		0.00		0.00	
1.01.050	Related fees to agents, lawyers, and the like	0.00		0.00		0.00		0.00	
1.01.060	Related taxes and statutory charges	0.00		0.00		0.00		0.00	
	Site acquisition cost summary	0.00		0.00		0.00		0.00	

Enter data in these columns only

Figure 7: 'G-4 Breakdown' tab (Buildings).

It is not always necessary to enter acquisition costs, this depends on the requirements for the project.

You have the option of entering data only at the higher cost group level, and leaving the lower-level cost subgroups blank. This also depends on the project stage and requirements.

If filling in the lower-level subgroup data, it is not possible to also fill in the cell for the higher-level cost group category (see Figure 8). Instead the total will automatically be calculated for you.

9		<b>Total Capital Costs (AC+CC)</b>	0.00	0.00
10	1	<b>Acquisition Costs (AC)</b>	0.00	0.00
11	2	<b>Construction Costs (CC)</b>	0.00	0.00
12				
13	1	<b>Acquisition Costs (AC)</b>	0.00	0.00
14	1.01	Site acquisition		0.00
15	1.01.010	Costs and premium required to procure site		0.00
16	1.01.020	Compensation to existing occupiers		0.00
17	1.01.030	Demolition, removal and modification of existing properties by way of payment to existing owners instead of carrying out physical work		0.00
18	1.01.040	Contributions for the preservation of heritage, culture and environment		8.00
19	1.01.050	Related fees to agents, lawyers, and the like		0.00
20	1.01.060	Related taxes and statutory charges		0.00
21				
22		Site acquisition cost summary		0.00

Enter EITHER a single cost for the category in this cell OR a breakdown of costs for the category in 15-20 below.

Figure 8: 'G-4 Breakdown' tab (Buildings): cost categories.

Once you have filled in all of your cost and carbon data, the remaining columns in the 'G-4 Breakdown' tab will be calculated automatically. Cost and carbon data will be expressed as

- cost per project quantity (for example, per m<sup>2</sup>)
- carbon per project quantity
- costs as a percentage of costs for each category (as a percentage of acquisition costs and construction costs)
- carbon as a percentage of carbon for each category
- costs expressed as a percentage of total project costs
- carbon expressed as a percentage of total project carbon.

You have now filled out all required data and can proceed to view the remaining tabs in the workbook. Tab 'G-4 Summary' provides a higher-level summary of the information contained in 'G-4 Breakdown' (see Figure 9, where 'G-4 Summary' has been populated for the purposes of illustration).



Table G-4: (Summary) Template for Total Capital Cost (Acquisition Cost and Construction Cost) for a Building Project - Give subtotals and totals in the heading rows		Example Building Project							
Code	Description	€	/ qty	1 % by Category	1 % of total	Emissions (tCO <sub>2</sub> e)	tCO <sub>2</sub> e/Qty	tCO <sub>2</sub> e/ha	% tCO <sub>2</sub> e of total
	Project Quantity		5,000						
			3 - Gross external floor area as IPMS1						
	<b>Total Capital Costs (AC+CC)</b>	<b>1,430,000.00</b>	<b>286.00</b>	<b>100.00%</b>	<b>100%</b>	<b>1,700.00</b>	<b>0.34</b>		<b>100.00%</b>
1	<b>Acquisition Costs (AC)</b>	<b>530,000.00</b>	<b>106.00</b>	<b>100.00%</b>	<b>36%</b>	<b>600.00</b>	<b>0.12</b>	<b>100.00%</b>	<b>35.29%</b>
2	<b>Construction Costs (CC)</b>	<b>950,000.00</b>	<b>190.00</b>	<b>100.00%</b>	<b>64%</b>	<b>1,100.00</b>	<b>0.22</b>	<b>100.00%</b>	<b>64.71%</b>
1	<b>Acquisition Costs (AC)</b>	<b>530,000.00</b>	<b>106.00</b>	<b>100.00%</b>		<b>600.00</b>	<b>0.12</b>	<b>100.00%</b>	
1.01	Site acquisition	500,000.00	100.00	94.34%	33.78%	500.00	0.10	83.33%	29.41%
1.02	Administrative, financial, legal and marketing expenses	30,000.00	6.00	5.66%	2.03%	100.00	0.02	16.67%	5.88%
2	<b>Construction Costs (CC)</b>	<b>950,000.00</b>	<b>190.00</b>	<b>100.00%</b>		<b>1,100.00</b>	<b>0.22</b>	<b>100%</b>	<b>64.71%</b>
2.01	Demolition, site preparation and formation	100,000.00	20.00	10.53%	7%	100.00	0.02	9.09%	5.88%
2.02	Substructure	200,000.00	40.00	21.05%	14%	200.00	0.04	18.18%	11.76%
2.03	Structure	200,000.00	40.00	21.05%	14%	200.00	0.04	18.18%	11.76%
2.04	Architectural works   Non-structural works	100,000.00	20.00	10.53%	7%	100.00	0.02	9.09%	5.88%
2.05	Services and equipment	100,000.00	20.00	10.53%	7%	100.00	0.02	9.09%	5.88%
2.06	Surface and underground drainage	50,000.00	10.00	5.26%	3%	100.00	0.02	9.09%	5.88%
2.07	External and ancillary works	50,000.00	10.00	5.26%	3%	100.00	0.02	9.09%	5.88%
2.08	Preliminaries   Constructors' site overheads   general requirements	50,000.00	10.00	5.26%	3%	100.00	0.02	9.09%	5.88%
2.09	Risk Allowances	20,000.00	4.00	2.11%	1%	20.00	0.00	1.82%	1.18%
2.10	Taxes and Levies	20,000.00	4.00	2.11%	1%	20.00	0.00	1.82%	1.18%
2.11	Work and utilities off-site (including related risk allowances, taxes and levies)	20,000.00	4.00	2.11%	1%	20.00	0.00	1.82%	1.18%
2.12	Post-completion loose furniture, fittings and equipment (including related risk allowances, taxes and levies)	20,000.00	4.00	2.11%	1%	20.00	0.00	1.82%	1.18%
2.13	Construction-related consultants and supervision (including related risk allowances, taxes and levies)	20,000.00	4.00	2.11%	1%	20.00	0.00	1.82%	1.18%

Figure 9: 'G-4 Summary' tab (Buildings).

Tab 'G-3 Breakdown' contains the same information as 'G-4 Breakdown', but acquisition costs are excluded and only construction costs are reported (see Figure 10).

In the Buildings G-3 tabs, both IPMS1 (gross external) and IPMS2 (gross internal) floor area quantities are shown by default, so that the difference between the internal and external floor areas can be easily compared.

Table G-3: (Breakdown) Template for Construction Costs only for a Building Project - Show unit costs per two Project Quantities, IPMS 1 (EXTERNAL) and IPMS 2 (INTERNAL) floor areas.		Example Building Project							
Code	Description	€	/ m <sup>2</sup>	/ m <sup>2</sup>	%	Emissions (tCO <sub>2</sub> e)	tCO <sub>2</sub> e/Qty (IPMS1)	tCO <sub>2</sub> e/Qty (IPMS2)	% of tCO <sub>2</sub> e
	Project Quantity		5,000	4,900					
			IPMS1 (EXTERNAL) Floor Area (m <sup>2</sup> )	IPMS2 (INTERNAL) Floor Area (m <sup>2</sup> )					
2	<b>Construction Costs (CC)</b>	<b>950,000.00</b>	<b>190.00</b>	<b>193.88</b>	<b>100.00%</b>	<b>1,100.00</b>	<b>0.22</b>	<b>0.22</b>	<b>100.00%</b>
2.01	Demolition, site preparation and formation	100,000.00				100.00			0.00%
2.01.010	Site survey and investigation	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.020	Environmental treatment	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.030	Sampling for construction, geophysical, geological or similar purposes	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.040	Temporary fencing	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.050	Demolition of existing buildings and support to adjacent structures	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.060	Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.070	Tree transplant	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.080	Site formation and slope treatment	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.090	Temporary surface drainage and dewatering	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%
2.01.100	Temporary protection, diversion and relocation of public utilities	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%

Figure 10: 'G-3 Breakdown' tab (Buildings).

A summary of the 'G-3 Breakdown' is provided in the 'G-3 Summary' tab, in which only the 13 high-level construction cost groups are presented (see Figure 11).

Table G-3: (Summary) Template for Construction Costs only for a Building Project									
* Show unit costs per two Project Quantities, IPMS 1 (EXTERNAL) and IPMS 2 (INTERNAL) floor areas.									
Code	Description	Example Building Project							
		€	/ m <sup>2</sup>	/ m <sup>2</sup>	%	Emissions (tCO <sub>2</sub> e)	tCO <sub>2</sub> e/Qty (IPMS1)	tCO <sub>2</sub> e/Qty (IPMS2)	% of tCO <sub>2</sub> e
Project Quantity		5,000.00	4,900.00						
		IPMS1 (EXTERNAL) Floor Area (m <sup>2</sup> )	IPMS2 (INTERNAL) Floor Area (m <sup>2</sup> )						
2	Construction Costs (CC)	950,000.00	190.00	193.88	100.00%	1,100.00	0.22	0.22	100.00%
2.01	Demolition, site preparation and formation	100,000.00	20.00	20.41	10.53%	100.00	0.02	0.02	9.09%
2.02	Substructure	200,000.00	40.00	40.82	21.05%	200.00	0.04	0.04	18.18%
2.03	Structure	200,000.00	40.00	40.82	21.05%	200.00	0.04	0.04	18.18%
2.04	Architectural works   Non-structural works	100,000.00	20.00	20.41	10.53%	100.00	0.02	0.02	9.09%
2.05	Services and equipment	100,000.00	20.00	20.41	10.53%	100.00	0.02	0.02	9.09%
2.06	Surface and underground drainage	50,000.00	10.00	10.20	5.26%	100.00	0.02	0.02	9.09%
2.07	External and ancillary works	50,000.00	10.00	10.20	5.26%	100.00	0.02	0.02	9.09%
2.08	Preliminaries   Constructors' site overheads   general requirements	50,000.00	10.00	10.20	5.26%	100.00	0.02	0.02	9.09%
2.09	Risk Allowances	20,000.00	4.00	4.08	2.11%	20.00	0.00	0.00	1.82%
2.10	Taxes and Levies	20,000.00	4.00	4.08	2.11%	20.00	0.00	0.00	1.82%
2.11	Work and utilities off-site (including related risk allowances, taxes and levies)	20,000.00	4.00	4.08	2.11%	20.00	0.00	0.00	1.82%
2.12	Post-completion losses furniture, fittings and equipment (including related risk allowances, taxes and levies)	20,000.00	4.00	4.08	2.11%	20.00	0.00	0.00	1.82%
2.13	Construction-related consultants and supervision (including related risk allowances, taxes and levies)	20,000.00	4.00	4.08	2.11%	20.00	0.00	0.00	1.82%

Figure 11: 'G-3 Summary' tab (Buildings).

**Further Information**

For further information about cost planning and analysis, see *GN 2.2 Planning and Control of Capital Costs*.

For further information about the International Cost Management Standard, see the ICMS website at <https://icms-coalition.org/>.

The Society of Chartered Surveyors Ireland (SCSI) has provided a suite of guidance material for ICMS and IPMS. It is available on their website [here](#).