

Design Guidelines

Process documentation

Chapter 1 — Standardisation and the economics of the module

How to design with the Sustainer system so that it stays what makes it worth having: one module, repeated. This document goes a layer deeper than the interactive guidelines — it explains the reasoning behind each rule, shows the figures the rules rest on, and walks through the decisions a design team makes in order.

Builds on	Sustainer Design Guidelines v03, 12-05-2026 and the interactive chapters at sustainer.app/design-guidelines
Module version	V6.1 — the latest state of the system development
Audience	Sustainer staff and the architects, engineers and developers designing a Sustainer project
Status	Chapter 1 of a growing document — chapters are added one at a time
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How to read this

Prices and sizes come from Sustainer's own cost model (the .HOME V6 price-per-m² matrix) and from the guideline sheets, not from a project quotation. They are indicative for design decisions and early feasibility; a project price is always a quotation.

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Coming chapters, following the chapters of the website:

2. The module and its build-up (website ch. 01)
3. The apartment plan: circulation, configurations and the mix (ch. 03)
4. Stacking modules: column alignment, height and the core (ch. 04)
5. Building volume and the plinth (ch. 05)
6. Walls, facades, balconies and roofs (ch. 06–09)
7. Installations: the tech cluster and the penetrations (ch. 10)
8. The design process: rounds, who delivers what, and when

1. Standardisation and the economics of the module

The Sustainer system is a factory, not a kit of parts. It produces one thing very well: a timber apartment module of a fixed construction, in a size that the factory, the truck and the structure are all tuned to. The more a design repeats that module, the more of the system's advantage it keeps. This chapter explains why that is, which size is the economic optimum, and how to read the price of every other size.

1.1 Why a modular system works best standardised

A conventional building is designed once and built once. A modular building is designed once and then built many times over, module after module, in a factory. That is where the cost and quality advantage comes from — and it only exists when the modules are the same. Each place in the process where a module is repeated is a place where variation costs money:

- Engineering. A standard module is engineered, calculated and certified once: its columns, its floor and ceiling cassettes, its facade build-up, its fire and acoustic performance. A module of another size is a new structural calculation, a new column check and often a new set of details.
- Production. The factory runs on CNC files, jigs and a fixed sequence of stations. The same module means the same files, the same jigs and the same rhythm; an odd module interrupts the line, needs its own files and its own checks.
- Material. Beams, plates and columns are bought and cut for the standard spans. Longer spans need deeper beams, bigger columns or a stronger material (Baubuche instead of LVL) — every one of those is a step in price, not a slope.
- Transport. A module is moved on a 13.6 m trailer. Two 6.4 m modules fit on one truck; a 7 m module travels alone. Width decides the transport class: over 3.2 m, and again over 3.5 m, the day rate for the truck steps up.
- Stacking. Modules stand on each other's columns. The same module means the columns of every layer line up by definition; mixed sizes make column alignment a design problem to solve on every floor.
- Site. Standard modules use standard steel connections to each other, to cores, corridors and galleries. Fewer unique situations means fewer unique details, fewer mistakes and a faster assembly.

None of this forbids variation. It means variation has a price, and the price is paid in every one of the steps above at once. The design question is therefore never “which module size do I want here?” but “what does this plan need that the standard module does not give, and is that worth what it costs?”

1.2 The standard module

The economic optimum is a module of 6.4 × 3.3 m — 6.4 m long, 3.3 m wide, 3.21 m high from the underside of the floor to the top of the ceiling cassette. Every number in the interactive guidelines is read against this size, and the sizer opens on it.

Length × width	6.4 × 3.3 m — 21.1 m ² of module per layer
Height	3.21 m: 301 mm floor cassette, 2,615 mm clear, 298 mm ceiling cassette

Structure	Four LVL corner columns of 145 × 145 mm standing in the facade cavity; LVL floor and ceiling cassettes spanning between them
Floor	Cement board, LVL plate and olivine ballast under LVL joists 45 × 186 mm at 414 mm, closed with a plate
Ceiling	Spano board under LVL beams 63 × 255 mm at 661 mm, closed with a 25 mm Spano deck the module above stands on
Facade	267 mm framed wall: Fermacell board each side, LVL studs at 610 mm, insulation in every bay
Limits of the system	Width up to 4.5 m, length up to 6.8 m as standard; the two maxima cannot be combined. Longer modules (~7.5 × ~2.6 m) are under investigation.

Design freedom lives in the plan, not in the module: how many modules, in which arrangement, where the cores, corridors and galleries go, which facade finish, which apartment mix. A design that keeps the module standard and spends its creativity there gets the whole advantage of the system.

1.3 The price of every other size

Sustainer's cost model prices the floor and ceiling of a module — the structural part that changes with size — for every length from 1.2 to 7.6 m and every width from 1.0 to 4.5 m. The result is the matrix on the next page: euros per m² of module, including margin, the price of the columns and the fixed surcharges (€2,300 per module plus €575 per m²). For each size it takes the cheapest variant that still passes the structural checks and the column connection.

Two prices, two scopes

The interactive sizer on the website shows about €540 per m² for the standard module: that figure is the modules and their transport, from the calculator's cost formula. The matrix here shows €1050 per m² for the same module: the floor and ceiling, including margin, the columns and the fixed surcharges. They measure different things and are not meant to agree; neither is a building price. Use the matrix to compare sizes, the sizer to see what the size does to the module.

How to read it:

- Rows are the module width: the span of the main beams. Columns are the module length: the span of the secondary beams.
- The optimum is 6.4 × 3.3 m, marked with a ring: at € 1050 per m² it is the lowest price this side of the red line that needs no special letter. The raw figures do keep falling a little towards bigger and wider modules (down to € 1,033 at 6.0 × 4.2 m) — but those sizes buy that with heavier material, bigger columns and transport steps, which is what the letters and the red line show.
- Anything around the optimum is economical: the green zone, roughly 5.0 to 6.6 m long and 2.9 to 3.9 m wide. Within it, choosing a slightly shorter, narrower or wider module to suit the plan costs little.
- Beyond the red line a module needs specific attention: Baubuche beams instead of LVL, columns larger than 145 mm, a transport class up. Not impossible — but not optimal, and each such module is engineered on its own.
- The letters in a cell say what the cheapest passing variant had to resort to: K = a column larger than 145 × 145 mm (its extra price is in the number); H = main beams in Baubuche (needed, or simply cheaper there); R = edge beams in Baubuche. The optimum itself carries an H: at that span Baubuche main beams were merely the cheaper choice, not a necessity — the red line, not a letter, marks where Baubuche becomes a must.

Price per m² of module floor + ceiling, by module size (.HOME V6)

EUR per m² incl. margin, columns and surcharges (€2,300 per module + €575 per m²) · rows: width = span of the main beams · columns: length = span of the secondary beams · per size the cheapest variant that passes the column connection · K = column > 145 × 145 mm (price included) · H = main beams in Baubuche (needed or cheaper) · R = edge beams in Baubuche

width	length (m) ↓																											
	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.4	6.6
1.0	3023	2719	2493	2315	2172	2058	1960	1880	1809	1748	1696	1661 _K	1620 _K	1584 _K	1550 _K	1522 _K	1496 _K	1473 _K	1451 _K	1436 _K	1417	1403	1386	1379	1392	1393	1396	1395
1.1	2830	2552	2347	2184	2054	1949	1861	1787	1723	1667	1619	1587 _K	1550 _K	1516 _K	1486 _K	1461 _K	1436 _K	1416 _K	1396 _K	1382	1364	1351	1336	1330	1342	1342	1345	1344
1.2	2669	2413	2224	2075	1955	1859	1777	1710	1650	1599	1555	1526 _K	1491 _K	1459 _K	1432 _K	1408 _K	1386 _K	1367 _K	1349 _K	1333	1312	1300	1293	1284	1270	1265	1261	1270
1.3	2557	2319	2145	2006	1894	1806	1730	1668	1613	1565	1525	1497 _K	1465 _K	1435 _K	1403	1389 _K	1369 _K	1353 _K	1330	1316	1306	1295	1288	1279	1272	1266	1262	1274
1.4	2439	2217	2054	1925	1821	1739	1668	1610	1559	1514	1477	1451 _K	1422 _K	1393 _K	1363	1350 _K	1331 _K	1317 _K	1296	1282	1273	1262	1256	1247	1240	1235	1231	1243
1.5	2336	2128	1976	1855	1758	1681	1614	1560	1512	1470	1435	1411 _K	1383 _K	1357 _K	1329	1316 _K	1299 _K	1285 _K	1265	1253	1244	1234	1228	1220	1213	1208	1205	1215
1.6	2246	2051	1907	1793	1702	1630	1567	1516	1471	1431	1399	1376 _K	1350 _K	1325 _K	1299	1287 _K	1271 _K	1258 _K	1239	1227	1218	1209	1204	1196	1190	1185	1182	1191
1.7	2167	1982	1847	1739	1653	1585	1526	1478	1435	1398	1366	1345 _K	1320 _K	1297 _K	1272	1261 _K	1246 _K	1233 _K	1216	1204	1196	1187	1182	1176	1169	1164	1161	1170
1.8	2096	1921	1793	1691	1609	1545	1489	1443	1403	1367	1338	1318 _K	1294 _K	1272 _K	1249	1238 _K	1223 _K	1212 _K	1195	1184	1176	1167	1163	1157	1151	1146	1143	1152
1.9	2050	1883	1762	1664	1586	1525	1472	1429	1390	1356	1328	1309 _K	1287 _K	1266 _K	1243	1234 _K	1215 _K	1210 _K	1194	1184	1179	1171	1166	1160	1155	1153	1150	1160
2.0	1992	1833	1718	1625	1551	1492	1441	1400	1363	1331	1305	1286 _K	1265 _K	1245 _K	1224	1215 _K	1196 _K	1192 _K	1177	1167	1162	1155	1150	1144	1139	1137	1134	1144
2.1	1940	1788	1678	1589	1518	1462	1413	1374	1339	1308	1283	1265 _K	1245 _K	1226 _K	1206	1197 _K	1179 _K	1175 _K	1161	1151	1146	1139	1135	1129	1125	1122	1120	1129
2.2	1892	1747	1641	1556	1488	1435	1388	1351	1317	1288	1263	1246 _K	1227 _K	1209 _K	1189	1181 _K	1164 _K	1160 _K	1146	1137	1133	1126	1122	1116	1112	1109	1107	1116
2.3	1849	1710	1608	1527	1462	1410	1366	1330	1297	1269	1246	1229 _K	1211 _K	1193 _K	1174	1167 _K	1150 _K	1146 _K	1133	1125	1120	1113	1110	1104	1100	1097	1095	1103
2.4	1809	1676	1578	1500	1437	1387	1344	1310	1279	1252	1229	1214 _K	1196 _K	1179 _K	1161	1153 _K	1138 _K	1134 _K	1121	1113	1108	1101	1098	1093	1089	1086	1084	1092
2.5	1785	1656	1563	1487	1426	1379	1337	1304	1274	1248	1226	1211 _K	1194 _K	1178 _K	1160	1149 _K	1138 _K	1136 _K	1124	1115	1111	1107	1103	1098	1095	1094	1092	1101
2.6	1751	1627	1536	1463	1405	1359	1319	1287	1258	1233	1212	1197 _K	1181 _K	1165 _K	1148	1137 _K	1127 _K	1125 _K	1113	1105	1101	1097	1093	1088	1085	1084	1083	1092
2.7	1720	1599	1512	1441	1385	1341	1302	1271	1243	1218	1199	1184 _K	1169 _K	1153 _K	1137	1127 _K	1116 _K	1114 _K	1103	1095	1091	1087	1084	1079	1077	1075	1073	1082
2.8	1690	1574	1489	1421	1366	1324	1286	1256	1229	1205	1186	1172 _K	1157 _K	1142 _K	1127	1117 _K	1106 _K	1105 _K	1094	1086	1082	1079	1076	1071	1070	1068	1066	1074
2.9	1663	1550	1468	1402	1349	1308	1272	1243	1216	1193	1175	1161 _K	1147 _K	1132 _K	1117	1107 _K	1097 _K	1096 _K	1085	1079	1075	1071	1069	1064	1062	1061	1059	1067
3.0	1637	1528	1449	1384	1333	1293	1258	1230	1204	1182	1164	1151 _K	1137 _K	1123 _K	1108	1099 _K	1089 _K	1089 _K	1078	1071	1069	1064	1061	1058	1055	1053	1054	1063
3.1	1624	1517	1440	1378	1328	1289	1255	1228	1203	1181	1164	1151 _K	1137 _K	1124 _K	1109	1100 _K	1092 _K	1092 _K	1083	1076	1072	1071	1068	1063	1064	1064	1062	1071
3.2	1601	1498	1423	1362	1314	1276	1243	1216	1192	1171	1154	1142 _K	1128 _K	1115 _K	1102	1094 _K	1085 _K	1087 _K	1075	1069	1066	1064	1064	1059	1058	1057	1056	1065
3.3	1580	1479	1406	1347	1300	1263	1231	1205	1182	1161	1145	1133 _K	1120 _K	1108 _K	1095	1086 _K	1079 _K	1079 _K	1069	1063	1060	1060	1058	1054	1052	1051	1050	1060
3.4	1560	1462	1391	1333	1287	1252	1220	1195	1172	1152	1136	1125 _K	1113 _K	1101 _K	1089	1080 _K	1072 _K	1074 _K	1063	1060	1057	1055	1052	1048	1047	1046	1046	1056
3.5	1541	1445	1376	1320	1275	1241	1210	1186	1163	1144	1128	1118 _K	1106 _K	1095 _K	1082	1075 _K	1067 _K	1069 _K	1060	1055	1052	1049	1047	1043	1042	1044	1043	1050
3.6	1523	1430	1362	1308	1264	1230	1200	1176	1155	1136	1122	1111 _K	1100 _K	1088 _K	1077	1069 _K	1064 _K	1067 _K	1055	1049	1047	1044	1042	1039	1040	1040	1038	1046
3.7	1514	1423	1358	1304	1261	1229	1199	1176	1155	1138	1123	1114 _K	1102 _K	1093 _K	1079	1075 _K	1071 _K	1060 _K	1054	1051	1047	1044	1042	1039	1047	1047	1046	1054
3.8	1498	1409	1345	1293	1251	1219	1190	1168	1149	1131	1118	1107 _K	1099 _K	1087 _K	1077	1070 _K	1062 _K	1065 _K	1055	1050	1047	1044	1042	1039	1047	1043	1043	1051
3.9	1483	1396	1333	1282	1241	1210	1182	1162	1142	1126	1111	1102 _K	1092 _K	1085 _K	1072	1066 _K	1061 _K	1051 _K	1045	1043	1045	1044	1042	1039	1040	1040	1038	1047
4.0	1468	1383	1322	1272	1232	1201	1176	1155	1137	1119	1107	1098 _K	1092 _K	1082 _K	1068	1062 _K	1054 _K	1057 _K	1048	1042	1042	1042	1040	1038	1038	1037	1036	1046
4.1	1454	1371	1311	1262	1223	1196	1169	1150	1132	1115	1105	1097 _K	1087 _K	1078 _K	1065	1058 _K	1054 _K	1044 _K	1044	1041	1042	1040	1039	1036	1036	1034	1035	1045
4.2	1441	1360	1301	1253	1218	1188	1164	1145	1126	1114	1101	1094 _K	1085 _K	1075 _K	1061	1055 _K	1048 _K	1051 _K	1043 _K	1042 _K	1040 _K	1039 _K	1036 _K	1034 _K	1033 _K	1034 _K	1035 _K	1045 _K
4.3	1435	1356	1298	1254	1217	1190	1166	1151	1133	1117	1105	1097 _K	1089 _K	1079 _K	1065	1059 _K	1054 _K	1053 _K	1051 _K	1047 _K	1045 _K	1045 _K	1043 _K	1040 _K	1040 _K	1043 _K	1044 _K	1053 _K
4.4	1423	1345	1292	1246	1212	1186	1166	1147	1129	1114	1101	1095 _K	1086 _K	1075 _K	1063 _K	1057 _K	1051 _K	1053 _K	1050 _K	1045 _K	1043 _K	1043 _K	1040 _K	1038 _K	1040 _K	1043 _K	1041 _K	1051 _K
4.5	1412	1335	1283	1241	1207	1185	1161	1142	1125	1110	1098	1092 _K	1082 _K	1073 _K	1061	1055 _K	1051 _K	1052 _K	1048 _K	1043 _K	1040 _K	1040 _K	1038 _K	1037 _K	1041 _K	1042 _K	1041 _K	1048 _K

 6.4 × 3.3 m — the optimum (€ 1050 / m²)  economical: the zone around the optimum, this side of the red line  beyond the red line: Baubuche, bigger columns — specific attention

Colour runs from green (cheapest per m²) through yellow to red (dearest). Source: .HOME V6 price-per-m² matrix, Sustainer cost model. The red line is Sustainer's hand-drawn boundary.

Source: .HOME V6 floor + ceiling price-per-m² matrix (Sustainer cost model, settings tab). The red line is Sustainer's own boundary, drawn by hand on the matrix, and so is the green zone around the optimum; both are judgement, informed by the figures, not a formula.

1.4 Designing with the matrix

The matrix answers one question: what does it cost per m² to make the module itself a different size? Used well, it turns a vague “we’d like it a bit wider” into a number. Used badly, it suggests that bigger is cheaper, which the rest of the building contradicts. A few rules for reading it as a designer:

What the letters in a cell mean

Code	Meaning	What it means for the design
K	Column larger than 145 × 145 mm; its extra price is already in the number	The standard 145 mm LVL column does not carry this size. A bigger column eats into the facade cavity and has to line up with the module below — engineered per project.
H	Main beams in Baubuche instead of LVL — needed for the span, or simply cheaper there	On the optimum and around it an H is the cheaper choice, not a must. Beyond the red line it is a must: a harder, dearer beech material, ordered specially.
R	Edge beams in Baubuche	The beam all round the cassette needs the stronger material too — the far end of the table.
n/a	No variant passes the checks and the column connection (columns up to 400 mm)	Not a module the system makes.

Examples, read straight off the matrix:

Module	€ / m ²	Letters	Where it sits
4.8 × 3.4 m	1063	—	this side of the red line
5.6 × 3.0 m	1061	—	green zone
6.2 × 3.3 m	1051	—	green zone
6.4 × 3.3 m	1050	—	the optimum
5.4 × 3.6 m	1044	H	green zone
5.8 × 3.4 m	1048	H	green zone
3.4 × 3.2 m	1142	K	this side of the red line
6.0 × 3.6 m	1040	K	green zone
6.4 × 3.4 m	1046	K	green zone
7.6 × 1.0 m	1546	R	this side of the red line
6.6 × 3.4 m	1056	H K	green zone
6.8 × 3.3 m	1084	H K	beyond the red line
7.0 × 3.4 m	1083	H K	beyond the red line
7.6 × 3.2 m	1166	R K	beyond the red line
7.6 × 3.0 m	1169	H R K	beyond the red line

- Start from 6.4 × 3.3 and let the plan argue you away from it, not the other way round. A row of standard modules with one odd module at the end is a standard building; a building of odd modules is a one-off.
- Vary by band, not by module. If a plan needs a wider module, make a whole row or a whole wing wider, so the columns still line up vertically and the factory still sees repetition.
- Stay in the green zone when you deviate: roughly 5.0 to 6.6 m long and 2.9 to 3.9 m wide. Inside it a change costs a percent or two per m²; every step beyond costs more than the one before.

- Treat the red line as a conversation, not a wall. A module beyond it is possible — the matrix prices sizes to 7.6 m — but it is engineered on its own, with Baubuche and bigger columns, so it is agreed with Sustainer early, not discovered at tender. Note that 6.8 m is the standard maximum length of the system: the matrix prices longer modules, the guidelines do not offer them, and anything longer is a Sustainer conversation before it is a size.
- Remember what the matrix does not price. Facade area grows with the perimeter, not the floor; a wider module needs a wider transport; taller buildings need bigger columns regardless of module size (chapter 04 of the guidelines, Stacking modules); and a plan with mixed sizes needs mixed connections.

What the width costs on the road

Width also sets the transport class. The sizer's cost formula carries the day rate of the truck per module width, spread over the modules that share one trailer — two 6.4 m modules on a 13.6 m bed, one module of anything over 6.8 m.

Module width up to	Transport day rate	What changes
2.6 m	€ 1,000	Normal transport
3.0 m	€ 1,167	Wide load
3.2 m	€ 1,300	Wide load
3.5 m	€ 1,333	The standard 6.4 × 3.3 m module travels in this class
4.0 m	€ 2,333	Escort and permits — the big step
4.25 m	€ 3,000	Exceptional transport; wider is special transport, not priced

Source: moduleCost.ts in the interactive guidelines (the "Size the module" cost formula), Sustainer transport rates.

Worked example: three ways to make 20 modules

A small building of 20 modules, priced for its floor and ceiling only with the matrix, so the figures below are a difference in structure, not a building price:

Module	m ² / module	€ / m ²	Codes	20 modules	vs the optimum
6.4 × 3.3 m	21.1	1050	—	€ 443,520	optimum
6.0 × 3.6 m	21.6	1040	K	€ 449,280	+€ 5,760 for +10 m ²
5.4 × 3.3 m	17.8	1060	—	€ 377,784	-€ 65,736 for -66 m ²
7.0 × 3.0 m	21.0	1097	K	€ 460,740	+€ 17,220 for -2 m ²

The numbers say what the matrix says: a 6.0 × 3.6 module prices a shade lower per m² and gives more floor — and it does so with a column over 145 mm and a transport class up, which the per-m² figure already contains but the plan has to live with on every floor. The shorter 5.4 × 3.3 keeps everything standard and costs about 1 % more per m². The 7.0 × 3.0 module travels one to a truck. Which is right depends on the plan; the point is that the choice is now a number, made early.

Checklist before a module size is fixed

- Is it 6.4 × 3.3? If not, which plan requirement forces the change, and does it apply to a whole band of modules?
- Where does the size sit in the matrix — green zone, between, or beyond the red line?
- Which codes does its cell carry? K or H means engineering on its own and a conversation with Sustainer.
- What is its transport class, and how many modules fit on one truck?
- Do the columns of every layer still land on the columns below (chapter 04 of the guidelines)?
- What does the change do to facade area, connections and the number of unique details?