

APPENDIX

Full-size figures, 4 through 8, from “BIM to GIS: Multi-Criteria Queries for Material Tracking in Circular Built Environments” by Georgios Triantafyllidis, Karl-Christian Mahnert & Lizhen Huang.

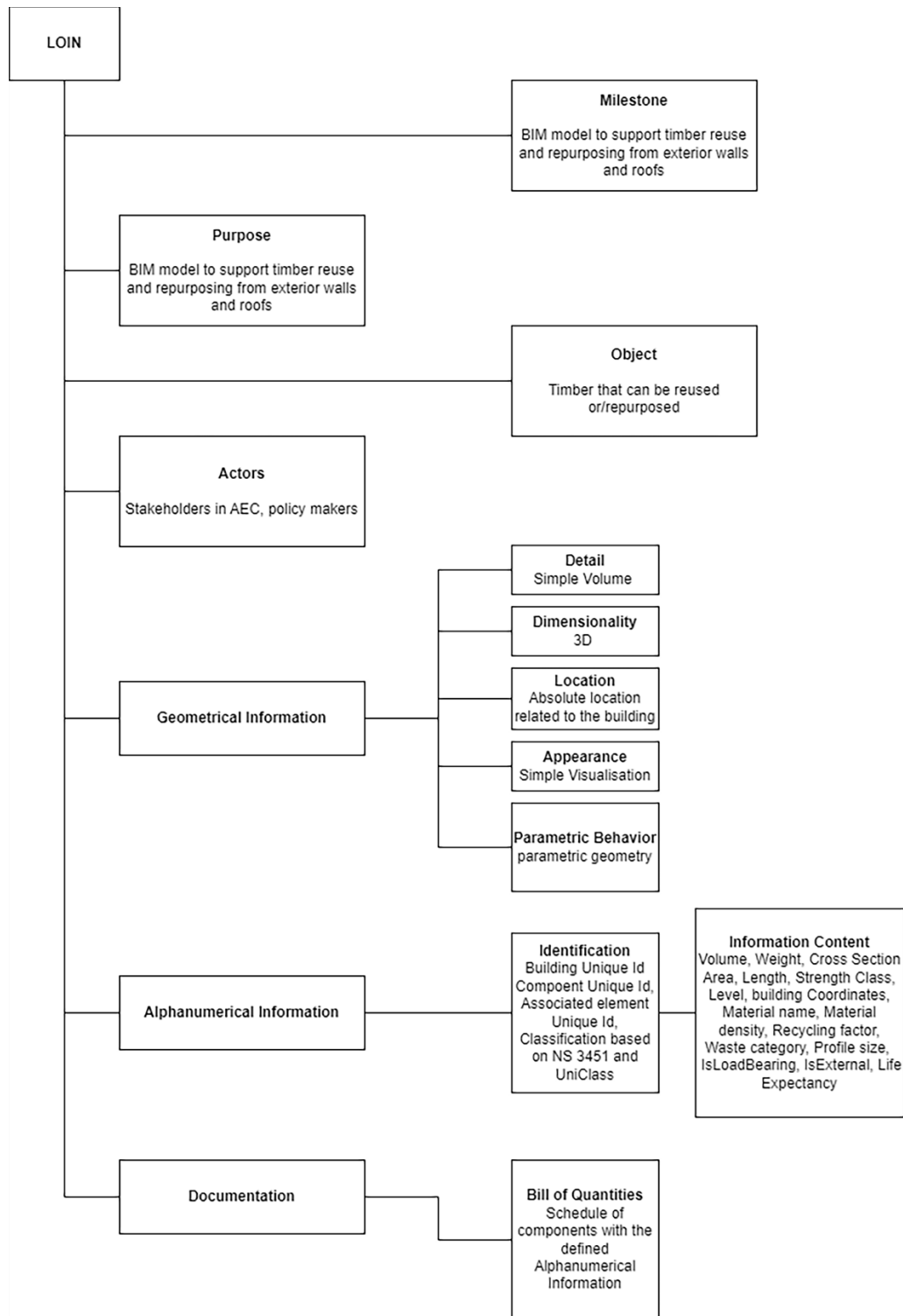


Figure 4. LOIN Framework Summary

Component Info IFC — Features Total: 525, Filtered: 525, Selected: 0

Expression	Uniclass Classification Description	Beams and joists
<input type="checkbox"/> Beams and joists	component IFC GUID	3f4NV7duqn3e9K50s796g9Yf
<input type="checkbox"/> Beams and joists	ClassificationNS3451	231
<input type="checkbox"/> Beams and joists	Material	Structural Timber
<input type="checkbox"/> Beams and joists	Weight (kg)	1,802992
<input type="checkbox"/> Beams and joists	MaterialDensity	450
<input type="checkbox"/> Beams and joists	hasRemainingLife	60
<input type="checkbox"/> Beams and joists	LifeExpectancy	60
<input type="checkbox"/> Beams and joists	WasteCategory	Wood
<input type="checkbox"/> Beams and joists	RecyclingFactor	0,12
<input type="checkbox"/> Beams and joists	Volume (m3)	0,040044
<input type="checkbox"/> Beams and joists	Length (m)	0,564
<input type="checkbox"/> Beams and joists	hasCrossSectionArea	71
<input type="checkbox"/> Beams and joists	Profile (mm)	48x148
<input type="checkbox"/> Beams and joists	Level	1
<input type="checkbox"/> Beams and joists	IsExternal	<input type="checkbox"/>
<input type="checkbox"/> Beams and joists	isLoadBearing	<input checked="" type="checkbox"/>
<input type="checkbox"/> Beams and joists	Uniclass Classification Number	Pr_20_85_08
<input type="checkbox"/> Beams and joists	Element IFC GUID	3gHdnelYn5rf68jm0h08p
<input type="checkbox"/> Beams and joists	Provenance	IFC
<input type="checkbox"/> Beams and joists	Strength Class	C24
<input type="checkbox"/> Beams and joists	Building ID	276567273
<input type="checkbox"/> Beams and joists	longitude	10,4045419
<input type="checkbox"/> Beams and joists	latitude	63,4259617
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_objectid	3447449
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_bygningsnr	10509688
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_lopernr	0
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_bygningstatuskode	TB
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_bygningstatus	Tatt i bruk
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_naringsgruppekode	X
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<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_vannforsyningskode	1
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_vannforsyning	Tilkn. off. vannverk
<input type="checkbox"/> Beams and joists	Cadaster Data on Detached Houses_avlonskode	1

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Figure 5. Component Data Linked to Cadaster Data based on the Building ID

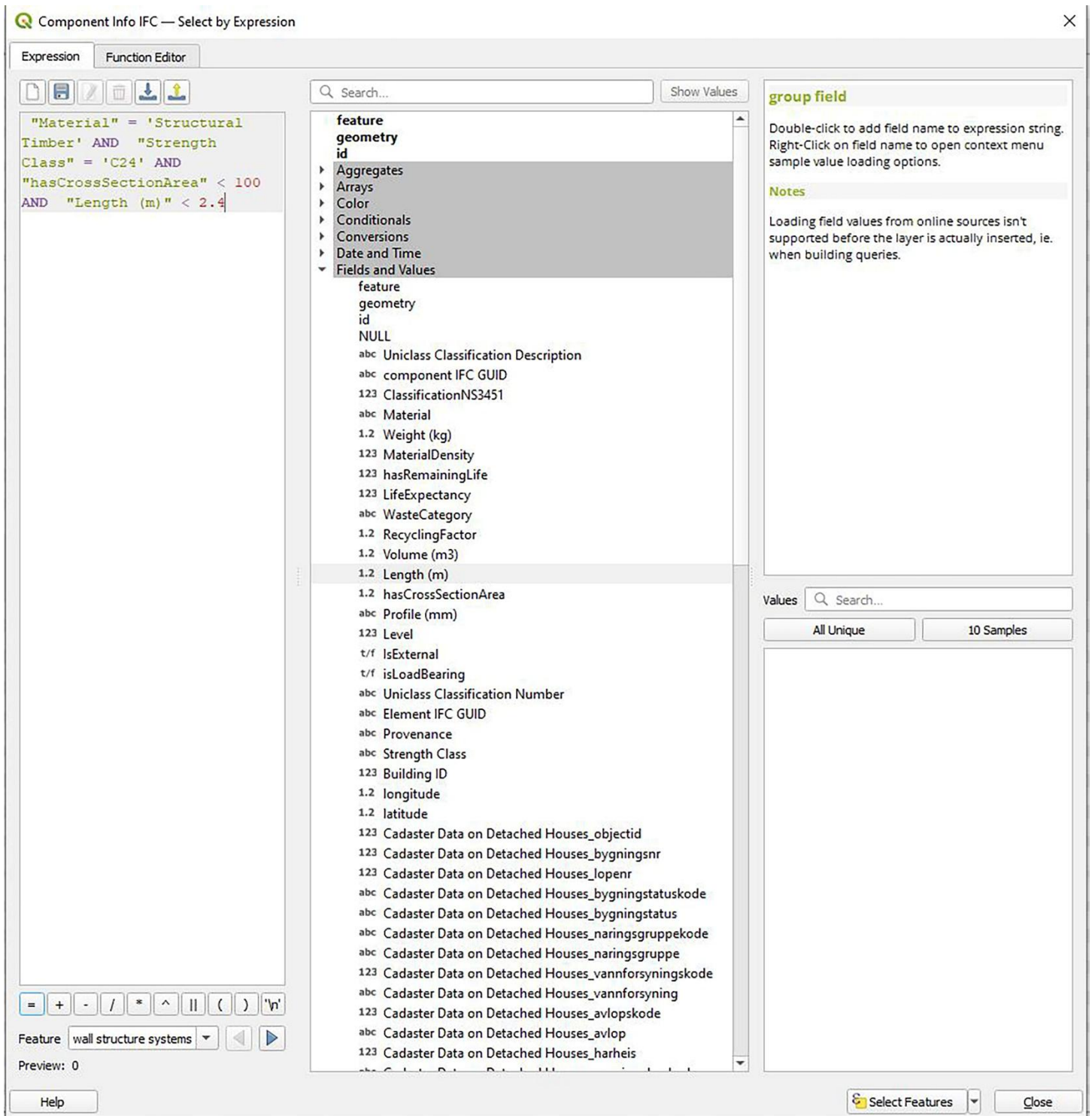


Figure 6. Example of one Multi-Criteria Query

Component Info IFC — Features Total: 525, Filtered: 155, Selected: 155

Expression

Beams and joists	Uniclass Classification Description	Beams and joists
Beams and joists	component IFC GUID	3HNV7duqn3e9K50s7\$6g9Y
Beams and joists	ClassificationNS3451	231
Beams and joists	Material	Structural Timber
Beams and joists	Weight (kg)	1,802992
Beams and joists	MaterialDensity	450
Beams and joists	hasRemainingLife	60
Beams and joists	LifeExpectancy	60
Beams and joists	WasteCategory	Wood
Beams and joists	RecyclingFactor	0,12
Beams and joists	Volume (m3)	0,040044
Beams and joists	Length (m)	0,564
Beams and joists	hasCrossSectionArea	71
Beams and joists	Profile (mm)	48x148
Beams and joists	Level	1
Beams and joists	IsExternal	<input type="checkbox"/>
Beams and joists	isLoadBearing	<input checked="" type="checkbox"/>
Beams and joists	Uniclass Classification Number	Pr_20_85_08
Beams and joists	Element IFC GUID	3gHdneYn5ifj68jm0h08p
Beams and joists	Provenance	IFC
Beams and joists	Strength Class	C24
Beams and joists	Building ID	276567273
Beams and joists	longitude	10,4045419
Beams and joists	latitude	63,4259617
Beams and joists	Cadaster Data on Detached Houses_objectid	3447449
Beams and joists	Cadaster Data on Detached Houses_byggningsnr	10509688
Beams and joists	Cadaster Data on Detached Houses_lopenr	0
Beams and joists	Cadaster Data on Detached Houses_byggningsstatuskode	TB
Beams and joists	Cadaster Data on Detached Houses_byggningsstatus	Tatt i bruk
Beams and joists	Cadaster Data on Detached Houses_naringsgruppekode	X
Beams and joists	Cadaster Data on Detached Houses_naringsgruppe	Bolig
Beams and joists	Cadaster Data on Detached Houses_vannforsyningskode	1
Beams and joists	Cadaster Data on Detached Houses_vannforsyning	Tilkn. off. vannverk
Beams and joists	Cadaster Data on Detached Houses_avlonskode	

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Show Selected Features

Figure 7. Results from the Query

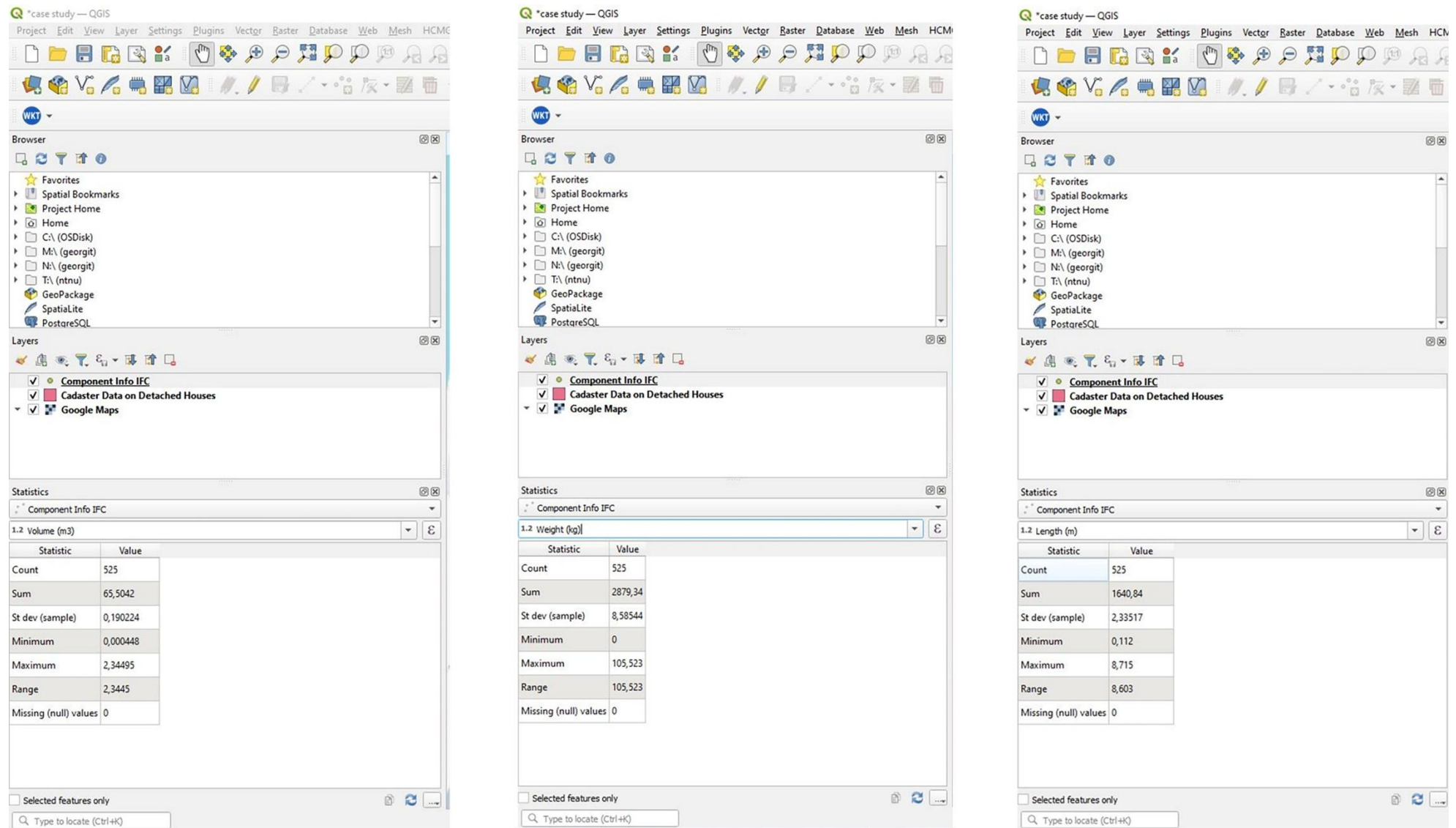


Figure 8. Summary of Values Contained in the GeoJSON