

# Results from Element Matching

**Project name:** Last\_test

**Construction site located at:** 63.6716, 10.7924

## Summary of results

Total score	Score without reuse	Savings	Substitutions
459.32 kg CO2 equivalents	2114.16 kg CO2 equivalents	78.27%	81.58%

The 'Maximum Bipartite Matching' algorithm yields the best results, substituting 31/38 demand elements (81.58%). Using 'GWP' as the optimization metric, a total score of 459.32 kg CO2 equivalents is achieved. For comparison, a score of 2114.16 kg CO2 equivalents would have been obtained by employing exclusively new materials. This results in a total saving of 78.27%. Note that impacts of transporting the materials to the construction site is not accounted for. Open the CSV-file "Last\_test\_substitutions.csv" to examine the substitutions.

## Constants used in calculations

Constant	Value	Unit
Density timber	491.0	kg/m <sup>3</sup>
Density steel	7850	kg/m <sup>3</sup>
GWP new timber	28.9	kg CO2 equivalents
GWP reused timber	2.25	kg CO2 equivalents
GWP new steel	800.0	kg CO2 equivalents
GWP reused steel	4.0	kg CO2 equivalents

## Information about datasets

Elements	Filename	Number of elements
Reused	SUPPLY_DATAFRAME_SVERRE.xlsx	109
Demand	DEMAND_DATAFRAME_SVERRE.xlsx	38

## Performance of algorithms

Name	Total score	Substitutions	Time
Maximum Bipartite Matching	459.32 kg CO2 equivalents	81.58%	0.02s
Greedy Algorithm Plural	459.32 kg CO2 equivalents	81.58%	0.072s

The design tool is runned with 2 algorithms, namely: Maximum Bipartite Matching, and Greedy Algorithm Plural. The Maximum Bipartite Matching yields the lowest score, as shown in the table. The substitutions by this algorithm are completed in 0.02 seconds.