

# Results from Element Matching

**Project name:** Bod nidarosdomen

**Construction site located at:** 63.4269, 10.3969

## Summary of results

Total score	Substitutions	Savings
4963.99 kg CO2 equivalents	50.0%	13.38%

The 'Maximum Bipartite Matching Plural Multiple' algorithm yields the best results, substituting 5/10 demand elements (50.0%). Using GWP as the optimization metric, a total score of 4963.99 kg CO2 equivalents is achieved. For comparison, a score of 5730.54 kg CO2 equivalents would have been obtained by employing exclusively new materials. This results in a total saving of 13.38%. Note that transportation is not accounted for. Open the CSV file with the file path './Results/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	pdf_supply.csv	10
Demand	pdf_demand.csv	10

## Performance of algorithms

Name	Score	Substitutions	Time
Maximum Bipartite Matching Plural Multiple	4963.99	25.0%	0.006

The design tool is runned with 1 algorithms, namely: and Maximum Bipartite Matching Plural Multiple. The Maximum Bipartite Matching Plural Multiple yields the lowest score, as shown in the table. The substitutions by this algorithm are completed in 0.006 seconds.