**One Click LCA® – Result reporting template for BREEAM UK New Construction Mat 01 life cycle assessment for client reporting**

Life cycle assessment results for achieving credits for BREEAM UK New Construction 2011 and 2014 Mat 01 life cycle assessment exemplary credit.



**Insert your own picture here**

**Project name**

Address:

Author:

Date:

*[Text marked with blue color and brackets contains guidance. Remove from the final report.]*

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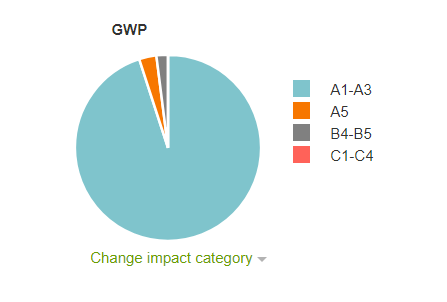
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# Life cycle impact assessment result summary

The life cycle assessment was calculated using One Click LCA which is officially approved for the BREEAM UK Mat 01 credit by BRE. The results are summarized in following table and graph. The results represent the total life cycle impact during 60 year service life according to BS EN 15978:2011 for the proposed design.

Assessment results for proposed deign for global warming potential are presented in table and graph below.

|  |  |  |
| --- | --- | --- |
|  | Global warming potential | kgCO2 eq |
| A1-A3 | Construction Materials |  |
| A5 | Construction site wastage |  |
| B4-B5 | Use stage: Replace and refurbish |  |
| C1-C4 | End of life: Re-use, recycling or disposal |  |



*[Insert here your summary graph of results comparing the proposed building to baseline building. (copy from project main page).]*

# The life cycle assessment scope and service life

One Click LCA tool was used to model the building.

Assessment covered Global warming potential impact category.

In the assessment following life cycle stages according to BS EN 15978:2011 were included:

* A1-A3 Construction Materials1)
* A5 Construction site wastage2)
* B4-B5 Use stage: Replace and refurbish
* C3-C4 End of life: Re-use, recycling or disposal

*1)Site excavation fuel use is calculated as part of A1-A3*

2)*A5 only covers construction waste, not full EN 15804 scope*

Following life-cycle modules are not assessed (MNA): A4, B1, B2, B3, B6 and B7.

# Description of the datasets

The One Click LCA database for European /International markets was used in the assessment. The tool supports CML methodology and Global Warming Potential category required for the credit.

# Analysis material scope

The material scope is according to the Guidance note 08. The LCA analysis included following building elements:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Category |  | Sub category |  | | Sub category | Included | Comment |
| 1 | Substructure | 1 | Substructure | 1 | | Standard foundations | Yes |  |
|  |  |  |  | 2 | | Specialist foundation systems | Yes |  |
|  |  |  |  | 3 | | Lowest floor construction | Yes |  |
|  |  |  |  | 4 | | Basement excavation (fuel use) | Yes | Can be aggrecated |
|  |  |  |  | 5 | | Basement retaining walls (2.5.2) | Yes |  |
| 2 | Superstructure | 1 | Frame (excl. floors) | 1 | | Steel frames | Yes |  |
|  |  |  |  | 2 | | Space decks | Yes |  |
|  |  |  |  | 3 | | Concrete casings to steel frames | Yes | Aggregated to x? |
|  |  |  |  | 4 | | Concrete fames | Yes |  |
|  |  |  |  | 5 | | Timber frames | Yes |  |
|  |  |  |  | 6 | | Other frame systems | Yes |  |
|  |  | 2 | Upper Floors | 1 | | Floors | Yes |  |
|  |  |  |  | 2 | | Balconies | ? | Optional |
|  |  |  |  | 3 | | Drainage to balconies | ? |  |
|  |  | 3 | Roofs | 1 | | Roof structure | Yes | Aggregated to x? |
|  |  |  |  | 2 | | Roof covering | Yes | Aggregated to x? |
|  |  |  |  | 3 | | Specialist roof systems | Yes | Aggregated to x? |
|  |  |  |  | 4 | | Roof drainage | ? | Optional |
|  |  |  |  | 5 | | Rooflights, skylights and openings | Yes |  |
|  |  |  |  | 6 | | Roof features | ? | Optional |
|  |  | 4 | Stairs and ramps | 1 | | Stair / Ramp structures | Yes |  |
|  |  |  |  | 2 | | Stair / Ramp finishes | ? | Optional |
|  |  |  |  | 3 | | Stair / Ramp balustrades, handrails | ? | Optional |
|  |  |  |  | 4 | | Ladders / Chutes / Slides | ? | Optional |
|  |  | 5 | External walls | 1 | | External enclosing walls above ground floor level | Yes |  |
|  |  |  |  | 2 | | External enclosing walls below ground level | Yes |  |
|  |  |  |  | 3 | | Solar / Rain screening | Yes | Aggregated to x? |
|  |  |  |  | 4 | | External soffits | Yes |  |
|  |  |  |  | 5 | | Subsidiary walls, balustrades, handrails, railings and proprietary balconies | ? | Optional |
|  |  |  |  | 6 | | Façade access / cleaning systems | ? | Optional |
|  |  | 6 | Windows, ext. doors | 1 | | External Windows | Yes |  |
|  |  |  |  | 2 | | External doors | Yes |  |
|  |  | 7 | Internal Walls | 1 | | Walls and partitions | Yes |  |
|  |  |  |  | 2 | | Balustrades and handrails | ? | Optional |
|  |  |  |  | 3 | | Moveable room dividers | ? | Optional |
|  |  |  |  | 4 | | Cubicles | ? | Optional |
|  |  | 8 | Internal Doors | 1 | | Internal Doors | Yes |  |
| 3 | Internal Finishes | 1 | Wall Finishes | 1 | | Finishes to walls | Yes | Aggregated to x? |
|  |  | 2 | Floor Finishes | 1 | | Finishes to floors | Yes |  |
|  |  |  |  | 2 | | Raised access floors | Yes |  |
|  |  | 3 | Ceiling Finishes | 1 | | Finishes to ceilings | Yes |  |
|  |  |  |  | 2 | | False ceilings | Yes |  |
|  |  |  |  | 3 | | Demountable suspended ceilings | Yes |  |
| 4 | Fittings, Furnishing and Equipment | | |  | |  | ? | Optional |
| 5 | Services (note: category may be used for operational/in-use fuel and energy use) | | | | | | ? | Optional |
| 8 | External works | 2 | Roads, Paths, Pavings | 1 | | Roads, paths and pavings | Yes |  |
|  |  |  |  | 2 | | Special surfacings and pavings | Yes |  |
|  |  | 3 | Soft Landscaping, Planting and Irrigation Systems | | | | ? | Optional |
|  |  | 4 | Fencing, Railings, Walls | | Fencing and railings | | Yes |  |
|  |  |  |  |  | | Walls and screens | Yes |  |
|  |  |  |  |  | | Retaining walls | Yes |  |
|  |  |  |  |  | | Barriers and guardrails | ? | Optional |
|  |  | 5 | External fixtures |  | |  | ? | Optional |
|  |  | 6 | External drainage |  | |  | ? | Optional |
|  |  | 7 | External services |  | |  | ? | Optional |
| A5 | Construction Installations (may be based on a rate per m2 NIA) | | | | | | Yes |  |

All of the material quantities are given with +/- 5 % of the actual quantities. Minor fixings such as screws and nails have been excluded. The service life of each material has been checked and estimated to be the most likely in-use scenario.

The end-of-life impacts of each material have been included automatically by the database settings by mapping each individual material to the most likely end-of-life scenario: re-use, recycling or disposal. Scenarios do not include any end-of-life benefits.

# Explanation how LCA tool was used and how it helped to steer the design process

*[Write here how you used the LCA tool. You can also use the example text given below. You’ll need to specify following information.]*

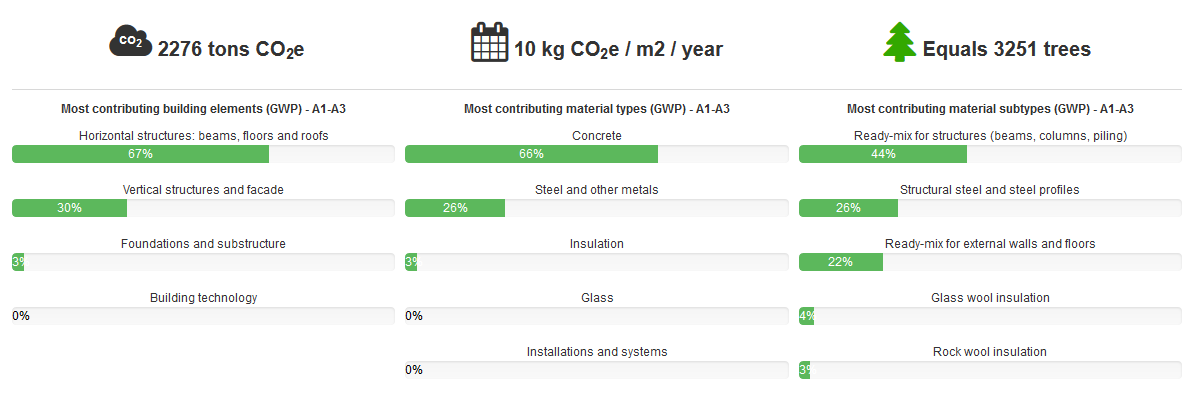
Design stages when LCA was done:

*[example:]* The analysis was conducted between Riba stages 3 and 4.

Explanation on how analysis was conducted**:**

*[example:]* The analysis was first conducted using the architectural model. The building material data was imported to One Click LCA and mapped with suitable environmental profiles. As all of the required data was not available in the model some of the data such as excavation fuel use and finishing materials were added to the calculation in the web interface.

After completing the first calculation we analyzed the results and noticed that most of the carbon impacts were generated in the material manufacturing stage A1-A3. In our design, the concrete materials used for foundations and concrete slabs as well as structural steel columns caused most of the material impacts (*see picture*).



*[Replace with picture of your own results]*

Studied design options

*[NOTE: studying design options is not required but we recommend it as it is an easy way to show how you have used LCA to steer the design process]*

To steer the design process following design options were studied:

|  |  |  |
| --- | --- | --- |
| Design option | Emission change on building level | Conclusions |
| Choosing concrete from another manufacturer with different kind of cement | + 10 % | We found out that our concrete manufacturer was able to deliver concrete in which 15 % of the cement had been replaced with recycled fly ash. This option had approximately 10 % less impacts on building level than concrete without the recycled content so it was found out that chosen solution was good. |
| Choosing different kind of rebar steel | From + 5 % | Comparison between manufacturers showed that the steel we had chosen had a high recycled content and thus less emissions than compared steel option. |
| Replacing some of the external wall and roof insulation with renewable option | - 2 % | Changing to cellulose based insulation in suitable wall parts instead of Rock wool resulted with few small emission reduction. However, change would have required thicker walls which was not possible to change in this design stage. |
| Replacing some of the brick wall with reclaimed bricks | - 1 % | Reclaimed bricks had significantly lower impacts than average bricks but on whole building level the impact was minor. Changing to the bricks was studied but was not possible due to availability and cost. |

The detailed comparison results for scenarios are shown below.

*[Add here your result tables from One Click LCA.]*

*[Guidance: Add here the comparison result tables from proposed design that shows the percentage differences.]*

Conclucions on how LCA helped to steer the design process:

LCA enabled design team to learn about their choices, to make some better choices and to ensure the current planned emission friendly choices were specified to further process steps. A10 % impact reduction was achieved by choosing concrete option with recycled fly ash replacing cement. Additionally the planned steel manufacturer was proven to be carbon efficient choice and thus using this manufacturer was specified for the following process steps. On the other hand, all of the more sustainable options found were not possible to execute because of the project schedule and availability of products. Starting LCA calculations earlier in the design process in next projects could in increase the available options.

# Description of One Click LCA calculation tool

The calculations were performed with One Click LCA calculation tool. The software has been verified to be IMPACT equivalent by BRE. The approval letter can be found here.

One Click LCA has also been third party verified by ITB for compliancy with the following LCA standards: EN 15978, ISO 21931–1 and ISO 21929, and data requirements of ISO 14040 and EN 15804. You can find the official letters of compliancy here: https://www.oneclicklca.com/wp-content/uploads/2016/11/360optimi-verification-ITB-Certificate-scanned-1.pdf.

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