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Supplemental data

Appendix A:

Teams & companies involved in the competition

- Designteam AIM (Helsingborg) och Onix Sweden AB (Helsingborg) med rådgivare/underkonsulter Noema Culture & Place Mapping (London), Atkins (Malmö) och Farawaysoclose/Apokalyps Labotek (Malmö)
- Bjarke Ingels Group (Köpenhamn), Spacescape (Stockholm), Testbedstudio (Stockholm), Topotek 1& Man Made Land (Berlin) och Resource Vision (Stockholm)
- BSK Arkitekter AB (Stockholm), MVRDV (Rotterdam) och Grontmij i Sverige AB (Stockholm)
- COBE Aps (Köpenhamn) med rådgivare Kragh & Berglund (Köpenhamn och Stockholm), Moe& Brødsgård (Rødovre), Yngve Andrén Konsult AB (Stockholm) och Boris Broman Jensen (Århus)
- Ecosistema Urbana (Madrid), arkitekt Kristine Jensens tegnestue (Århus), 700N arkitektur AS (Tromsø), Ljusarkitektur (Stockholm) och Atkins (Stockholm)
- KCAP Architect&Planners (Rotterdam) och CaseStudio (Göteborg)
- NorconsultByplan (Sandvika), Norconsult landskapsarkitekt (Sandvika), Fantastic Norway (Oslo) och 0047 International AS (Oslo)
- Tham och Videgård Arkitekter (Stockholm), Territorial Agency (London) och a_zero environmental architects (London)
- Tovatt Architects & Planners (Stockholm), Atelier Dreiseitl (Ueberlingen), Urban Think Tank Architects LLC (Zurich) och Wenanders (Stockholm).
- White arkitekter AB (Stockholm), Ghilardi + Hellsten (Oslo), Spacescape (Stockholm), Vectura Consulting AB (Solna) och Evidens BLW AB (Stockholm)

Appendix B:

Questions posed

Please select the one answer that best applies.

1 In which country do you primarily

work?

- Denmark ☐
- Ireland ☐
- Norway ☐
- Switzerland ☐
- Spain ☐
- Sweden ☐
- The Netherlands ☐
- United Kingdom ☐
- Other (please specify) ☐ _____

2 Are you male or female?

- Male ☐
- Female ☐

3 When were you born?

A list of years (1930-1990)

4 What is your main profession?

- Architect ☐
- Designer ☐
- Engineer ☐
- Landscape architect ☐
- Politician ☐
- Urban planner ☐
- Other (please specify) ☐ _____

5 What formal education do you have?

- High school graduate or less ☐
- University 1 year ☐
- University 2 years ☐
- University 3 years ☐
- University 4 years ☐
- University 5 years or more ☐
- PhD ☐

6 What role did you have in the Kiruna project?

- Competitor ☐
- Jury member ☐
- Jury advisor ☐

If the answer to question 6 is competitor, then please answer questions 7, 8 and 9:

7 As a competitor, what was your main responsibility?

- Administration ☐
- Design ☐
- Business executive or CEO ☐
- Leading the group ☐
- Production of drawings/blue prints ☐
- Production of illustrations ☐
- Production of text ☐
- Other (please specify) _____ ☐

8 How many employees work at your company?

- 1-4 employees ☐
- 5-9 employees ☐
- 10-29 employees ☐
- 30-49 employees ☐
- 50-100 employees ☐
- 101-200 employees ☐
- 201 or more employees ☐

Note: Questions 9 - 13 in the original survey are purposely omitted here. Those questions probed factors relating to the drivers for environmental design, pro-environmental behaviour, environmental building and planning, and ecological world views. As this paper does not explore this territory, these questions are omitted from this appendix.

14 Kiruna wants to become a sustainable model city. How important do you think the following environmental impacts are in the Kiruna city centre project?

Possible responses: extremely important - very important - moderately important - slightly important - not at all important

- Emissions from electricity and heat production
- Emissions from transport
- Emissions from infrastructure energy use
- Emissions from buildings energy use
- Use of non-developed land
- Destruction of existing flora and fauna
- Destruction of existing ecosystem services
- Polluted storm water run-off
- Cold and windy microclimate
- Lack of daylight
- Construction activity pollution
- Waste from construction work
- Depletion of potable water resources
- Impact from wastewater
- Environmental impact from materials
- Use of toxic substances
- Waste from inhabitants

15 What do you know about handling the following environmental aspects?

Possible responses: Don't know about it - Know about it - Know about it & have worked with it myself

- a) Minimising emissions from electricity and heat production
- b) Minimising emissions from transportation
- c) Energy efficient infrastructure
- d) Energy efficient buildings
- e) Protection of non-developed land
- f) Protection of existing flora and fauna
- g) Protection of existing ecosystem services
- h) Reduction of storm water run-off
- i) Reduction of cold and windy microclimate
- j) Good daylight conditions
- k) Reduction of construction activity pollution
- l) Reduction of waste from demolition and construction waste
- m) Decreasing use of domestic water
- n) Improving wastewater treatment
- o) Decreasing environmental impact from materials
- p) Minimising use of toxic substances
- q) Reuse and recycling of materials
- r) Treatment of waste from inhabitants

Personal comment/s, (voluntary) _____

16 Did you personally work with the following environmental aspects in the Kiruna city centre project?

Possible responses: Yes - No

- a) Minimising emissions from electricity and heat production
- b) Minimising emissions from transportation
- c) Energy efficient infrastructure
- d) Energy efficient buildings
- e) Protection of non-developed land
- f) Protection of existing flora and fauna
- g) Protection of existing ecosystem services
- h) Reduction of storm water run-off
- i) Reduction of cold and windy microclimate
- j) Good daylight conditions
- k) Reduction of construction activity pollution
- l) Reduction waste from demolition and of construction waste
- m) Decreasing use of domestic water
- n) Improving wastewater treatment
- o) Decreasing environmental impact from materials
- p) Minimising use of toxic substances
- q) Reuse and recycling of materials
- r) Treatment of waste from inhabitants

17 What do you know about the following environmental assessment tools and management systems?

Possible responses: Don't know about it - know about it - know about it and have used it

LEED
BREEAM
CASBEE
DGNB

Minergie
Miljöbyggnad
Living Building Challenge
Green Star

HQE
One Planet
Code for Sustainable Homes
Green Building

ISO 14001
LCA
Sima Pro
SP-Tool
Gabi

Other/s, please specify _____

18 Did you personally use any environmental assessment tool or management system in the Kiruna competition?

Possible responses: Yes - No

If the answer on question 18 was yes, please answer question 19.

19 Which environmental assessment tools or management system did you use in the Kiruna competition?

- ☐ LEED
- ☐ BREEAM
- ☐ CASBEE
- ☐ DGNB

- ☐ Minergie
- ☐ Miljöbyggnad
- ☐ Living Building Challenge
- ☐ Green Star

- ☐ HQE
- ☐ One Planet
- ☐ Code for Sustainable Homes
- ☐ Green Building

- ☐ ISO 14001
- ☐ LCA
- ☐ Sima Pro
- ☐ SP-Tool
- ☐ Gabi

- ☐ Other/s, please specify _____

20 To what extent do you think the competition programme addressed the environmental issues listed below?

Possible responses: Very little - Rather little - Medium - Rather much - Very much - Don't know

- a) Emissions from electricity and heat production
- b) Emissions from transport
- c) Emissions from infrastructure energy use
- d) Emissions from buildings energy use
- e) Use of non-developed land
- f) Destruction of existing flora and fauna
- g) Destruction of existing ecosystem services
- h) Polluted storm water run-off
- i) Cold and windy microclimate
- j) Lack of daylight
- k) Construction activity pollution
- l) Waste from demolition and construction work
- m) Depletion of potable water resources
- n) Impact from wastewater
- o) Environmental impact from materials
- p) Toxic substances
- q) Waste from inhabitants

Personal comment/s, (voluntary) _____

21 Do you think the following aspects could have made your competition proposal even better from an environmental point of view?

Possible responses: Yes - Maybe - No

- Higher environmental goals in the competition programme
- More measurable environmental requirements in the competition programme
- A more environmentally friendly attitude at your company
- A more environmentally friendly attitude among competition team members
- If you personally had better knowledge about environmental problems
- If you personally had better knowledge about environmental design strategies and solutions
- If your team members had better knowledge about environmental problems

- If your team members had better knowledge about environmental design strategies/solutions
- If there were fewer conflicting competition goals/criteria/targets
- If you had had more time
- If you had had a larger budget for the competition proposal
- If the budget for the whole project had been larger
- If you had been able to analyse and evaluate different design proposals from an environmental point of view
- If you had had relevant working equipment, simulation programmes and software to calculate environmental impacts
- If your team had involved more experts
- If environmental legislation were stronger
- If there were more subsidies for environmental solutions
- If it were more trendy to work with environmental issues
- Other, please specify _____

Note: For participants that were jury and jury advisors (not competitors) the question 21 was changed into question 21. The changes are shown embolded and underlined.

21x Do you think the following aspects could have made the competition proposals even better from an environmental point of view?

Possible responses: Yes - Maybe - No

- Higher environmental goals in the competition programme
- More measurable environmental requirements in the competition programme
- A more environmentally friendly attitude at your company
- A more environmentally friendly attitude among competition team members
- If you personally had better knowledge about environmental problems
- If you personally had better knowledge about environmental design strategies and solutions
- If **the competitors had** had better knowledge about environmental problems
- If **the competitors had** had better knowledge about environmental design strategies/solutions
- If there were fewer conflicting competition goals/criteria/targets
- If **the competitors had** had more time
- If **the competitors had** had a larger budget for the competition proposal
- If the budget for the whole project had been larger
- If you had been able to analyse and evaluate different design proposals from an environmental point of view
- If you had had relevant working equipment, simulation programmes and software to calculate environmental impacts
- If **the competitors** had involved more experts
- If environmental legislation were stronger
- If there were more subsidies for environmental solutions
- If it were more trendy to work with environmental issues
- Other, please specify _____

22 How would you rank your competition proposal from an environmental point of view?

Possible responses: very poor - poor - average - good - excellent

Personal comment/s, (voluntary) _____

22x. How would you rank all the competition proposals from an environmental point of view?
(question to jury, and reference group)

Appendix C:

Flow diagram