

## Appendix 3.2: Case study Decision

Originally a 'case study decision document' was created as part of the first year study to consider the case study scope and relationship to constructing knowledge in detail but this document is a reduced version to support Chapter 3. This document presents the result of that process, so that for future city case studies there is a starting point to evaluate which cities in which country.

To generate knowledge to consider the conceptual interplay of which characteristics of sustainability and resilience have manifested themselves in decision making of the urban environment. Best outcomes of sustainable buildings are made with the design principles managed from the early stages of projects (Sullivan, 2012; The U.S. Green Building Council, 2013; Bocchini *et al.*, 2014). However, as decisions get made what conflicts occur with the conceptual origins and what other influences come into play? The relevant decision making levels are policy, planning and design.

This research is looking at the 'concept' of sustainability and resilience and how it is interpreted into planning and design guidance (not the actual 'design' of buildings in response to the concepts). To explore the concept fully, the building typologies and profile (new buildings, existing and refurbishments) will be generalized. For example, wind loading affects all buildings and it has factors applied to it before it becomes a design load (the theory). Once it becomes a design load, the building design professionals manage it accordingly (design practice). Taking this approach allows the transferability of the approach to other contexts and is not limited to specific building typologies or profiles. This is not to say that the building profile is not relevant further on in the design process; however, once an early decision support framework has been developed it can become more bespoke to the local built environment and stakeholders, with further research beyond the scope of this PhD.

## 1. Narrative review questions for case study design

Table1 shows the questions that emerged from the literature trend analysis, and potential narrative review questions for a case study.

*Table 1: Trends 1-6 lines of enquiry for case study consideration*

Trend	Concepts	Case study
Theoretical landscape	No specific questions- fluid discussion	To position how concepts interplay in practice
Resilience Theory	<i>Can a retrospective comparison be made with Cutter's community resilience indicators?</i> <i>Can a retrospective comparison be made with Wisner's PAR model?</i>	<i>How are hazards and vulnerabilities managed at a local level? And how are they reflected in development policy?</i> <i>How is infrastructure maintained/ supported in risk scenarios?</i> <i>How do GBM support resilience?</i> <i>Life cycle management approach and phases of change- how do they complement each other?</i>
Resilience concept in practice	insurance costs should start investing in preparedness and mitigation measures- is this happening? how is practice of planning and design considering: <i>Sendai and SDG?</i> <i>Green Building Methods- specific to BREEAM and LEED as they inform international practice.</i> <i>Habitat III</i> Risk Prevention and Risk Planning- how much impact are risk and vulnerability assessment having and why? (how to change perception to cost to build back better (more sustainable and more resilient)	How do 39 frameworks (ODI 2016) improve resilience practice? Do these 39 frameworks develop on Sendai and SDG- do they include sustainable development practice? As per GAR 2015 recommendations. Sendai and SDG- a critical juncture in research and practice, how is it being managed?
Urban Theory		How does resilience support risk and vulnerability scenarios, and how can sustainable development create disaster resilient cities that can cope with incremental changes? However, the drive to measure resilience is still there, so what does it mean in practice? Is measurement effective and why is it needed (political?)
Sustainability practice	Why aren't sustainable buildings a part of everyday risk management? What are the barriers?	Which LEED credits provide opportunity for: risk management (day to day, event and prevention). Increased spatial scale to a systems, ecosystems, city wide scale approach? And in increasing the scale do they become more effective at risk management (point 1) How does city planning response to SDG 11, Sendai and sustainable buildings/systems?
City Frameworks	Measuring resilience and sustainability- how and why is it necessary? Is it beneficial?	How does city planning manage these frameworks (C40,100RC, MMCRC)?

## 2. Case study Decision

Exposure to hazards and threats are important to the overall model development process and the case study used must have evaluated them; but this research is not to be defined by a type of shock or stress, more the ability that the planning and design documentation responds to becoming a more resilient-sustainable city. It should be noted that both programs do not differentiate between types of hazards and threats, and this could be defined as a direct conflict between theory and practice. However, the goal here is to make a decision around whether the city has identified its 'shocks and stresses'.

The case study decision is primarily determined by quantity and quality of data available, then working factors of language, location and time zones needs to determine its viability. To reduce variations (to provide a realistic model), the same country should be used because it shares the same policy at national level before expanding the testing phase (post PhD). The model then becomes realistic as it is testing the local response (i.e. how it is used in practice built environment).

A decision framework has been created using Microsoft Excel based on the factors in chapter 3, section 3.4.1. To make a non-biased decision, a point scoring approach has been adopted: one point is to be awarded for responses to the primary parameters. Cities that have a minimum requirement of 4 points will be viable for pairing with another city in the same country. If there is no other city in the same country, or has less than 4 points, it will not be considered. In stage 2, the working factors will then be applied; the city needs a minimum of 3 'yes' responses to be a working option as a case study city.

Table 2: Decision results

Country-City	How many 'Y's? (min of 4)	Pairing city with a min of 4 'Y's?	Language (English spoken)	Known contacts	Time zone GMT +/- 6 hours	Working Case study option?	Viable City pairing?	Green Building Regulations	National plan (sustainable or resilience)	City Sustainability Strategy	Local Green Building Code (beyond BEAM)	City Resilience strategy? Only 'Y'
Canada-Montreal	5	Y	Y	N	Y	Y	Y	N	Y	Y	N	N
New Zealand-Wellington	5	Y	Y	N	N	Y	Y	N	Y	Y	N	Y
GB/UK-Bristol	6	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
New Zealand-Auckland	6	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N
GB/UK-London	7	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
USA-Washington DC	7	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Canada-Toronto	8	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N
South Africa-Cape Town	8	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N
South Africa-Durban	8	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N
USA-Boston	8	Y	Y	N	Y	Y	Y	P	Y	Y	Y	Y
USA-Chicago	8	Y	Y	N	Y	Y	Y	P	Y	Y	Y	N
Australia-Sydney	9	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N
USA-New Orleans	9	Y	Y	N	Y	Y	Y	P	Y	N	Y	Y
Australia-Melbourne	10	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
USA-New York City	11	Y	Y	N	Y	Y	Y	P	Y	Y	Y	Y

3. City profiling

In the following table 3 lists the cities in their regions. The cities that have a high response to the city decision factors (section 3.4.1) are presented in green (higher number) with the lower responses heading towards red.

Table 3: 175 Cities ordered according to city decision framework.

Africa		Central East Asia		East, Southeast Asia and Oceania		Europe	
Liberia-Paynesville	1	China-Deyang	1	Myanmar-Mandalay	1	Georgia-Tbilisi	1
Egypt-Cairo	2	China-Haiyan	1	Thailand-Patong	1	Portugal-Lisbon	1
Egypt-Luxor	2	China-Huangshi	1	Vietnam-Can Tho	2	Serbia-Belgrade	1
Rwanda-Kigali	2	China-Yiwu	1	Australia-Cairns	3	France-Sommieres	2
South Africa-Tshwane	3	China-Dalian	2	Australia-Canberra	3	Italy-Provincia Di Potenza	2
Ghana-Accra	4	China-Guangzhou	2	Japan-Kyoto	3	Austria-Lienz	3
Kenya-Nairobi	4	China-Nanjing	2	Malaysia-Kuala Lumpar	3	Denmark-Vejle	3
Nigeria-Lagos	4	China-Shanghai	2	Malaysia-Putrajaya	3	France-Monaco	3
Senegal-Dakar	5	China-Beijing	3	Philippines-Albay Province	3	Germany-Bonn	3
South Africa-Johannesburg	5	China-Chengdu	3	Philippines-Makati	3	Greece-Thessaloniki	3
Tanzania-Dar es Salaam	5	China-Wuhan	3	Philippines-San Francisco Province	3	Italy-Viggiano	3
Ethiopia-Addis Ababa	7	China-Hong Kong	4	Vietnam-Ho Chi Minh City	3	N. Ireland/UK-Belfast	3
South Africa-Cape Town	8	China-Qingdao	4	Indonesia-Semarang	4	Netherlands-The Hague	3
South Africa-Durban	8	China-Shenzhen	4	Japan-Toyama	4	Sweden-Gothenburg	3
				Malaysia-Melaka	4	Sweden-Jonkoping	3
				Vietnam-Da Nang	4	Sweden-Karlstad	3
				Vietnam-Hanoi	4	Sweden-Kristianstad	3
				New Zealand-Christchurch	5	Sweden-Malmo	3
				New Zealand-Wellington	5	Denmark-Copenhagen	4
				Philippines-Quezon City	5	Norway-Oslo	4
				S. Korea-Changwon	5	Russia-Moscow	4
				S. Korea-Seoul	5	Switzerland-Basel	4
				Indonesia-Jakarta	6	GB-Manchester	5
				Japan-Tokyo	6	Turkey-Istanbul	5
				Japan-Yokohama	6	GB/UK-Bristol	6
				New Zealand-Auckland	6	Germany-Berlin	6
				Thailand-Bangkok	7	Germany-Heidelberg	6
				Singapore-Singapore	8	Italy-Milan	6
				Australia-Sydney	9	Netherlands-Amsterdam	6
				Australia-Melbourne	10	Poland-Warsaw	6
						Scotland/UK-Glasgow	6
						Spain-Madrid	6
						Sweden-Stockholm	6
						GB/UK-London	7
						Italy-Rome	7
						Italy-Venice	7
						France-Paris	8
						Greece-Athens	8

			Netherlands-Rotterdam	8
			Spain-Barcelona	8

Central and North America, and the Caribbean		Latin America		South and West Asia (MENA)		Viable country-city combinations	
Puerto Rico-San Juan	1	Bolivia-La Paz	1	Israel-Tel Aviv	1	Argentina-Santa Fe	5
The Dominican Republic-Santiago De Los Caballeros	1	El Salvador-Santa Tecla	2	India-Bhubaneswar	2	Argentina-Buenos Aires	8
Canada-Calgary	3	Uruguay-Montevideo	2	Jordan-Aqaba	2	Australia-Sydney	9
Canada-Victoria (Vancouver Island)	3	Brazil-Campinas	3	Pakistan-Karachi	2	Australia-Melbourne	10
Panama-Panama City	3	Chile-Santiago	3	India-Pune	3	Brazil-Sao Paulo	8
USA-Louisville	3	Mexico-Guadalajara	3	Lebanon-Byblos	3	Brazil-Rio De Janeiro	9
USA-Minneapolis	3	Mexico-Juarez	3	Palestine-Ramallah	3	Canada-Montreal	5
USA-Nashville	3	Brazil-Porto Alegre	4	UAE-Dubai	3	Canada-Toronto	8
USA-Atlanta	4	Columbia-Cali	4	India-Bengaluru	4	Canada-Vancouver	9
USA-Dallas	4	Mexico-Colima	4	India-Chennai	4	Columbia-Bogota	6
USA-EI Paso	4	Venezuela-Caracas	4	India-Kolkata	4	Columbia-Medellin	6
USA-Miami (greater Miami and the beaches)	4	Argentina-Santa Fe	5	India-Surat	4	GB-Manchester	5
USA-Tulsa	4	Mexico-Mexico City	5	Bangladesh-Dhaka	5	GB/UK-Bristol	6
USA (Hawaii)-Honolulu	4	Brazil-Curitiba	6	India-Delhi NCT	5	GB/UK-London	7
Canada-Montreal	5	Brazil-Salvador	6	India-Jaipur	5	Germany-Berlin	6
USA-Berkeley	5	Columbia-Bogota	6	India-Mumbai	5	Germany-Heidelberg	6
USA-Boulder	5	Columbia-Medellin	6	Jordan-Amman	6	India-Delhi NCT	5
USA-Norfolk	5	Mexico-Ciudad de Mexico	6	Iran-Mashhad		India-Jaipur	5
USA-Oakland	5	Peru-Lima	6			India-Mumbai	5
USA-Pittsburgh	6	Ecuador-Quito	7			Indonesia-Semarang	4
USA-Austin	6	Argentina-Buenos Aires	8			Indonesia-Jakarta	6
USA-Philadelphia	6	Brazil-Sao Paulo	8			Italy-Milan	6
USA-Portland	7	Brazil-Rio De Janeiro	9			Italy-Rome	7
USA-Houston	7					Italy-Venice	7
USA-Seattle	7					Japan-Tokyo	6
USA-Washington DC	8					Japan-Yokohama	6
Canada-Toronto	8					Mexico-Mexico City	5
USA-Boston	8					Mexico-Ciudad de Mexico	6
USA-Chicago	8					Netherlands-Amsterdam	6
USA-Los Angeles	9					Netherlands-Rotterdam	8
Canada-Vancouver	9					New Zealand-Christchurch	5
USA-New Orleans	10					New Zealand-Wellington	5
USA-San Francisco	11					New Zealand-Auckland	6
USA-New York City						S. Korea-Changwon	5
						S. Korea-Seoul	5
						Scotland/UK-Glasgow	6
						South Africa-Johannesburg	5
						South Africa-Cape Town	8
						South Africa-Durban	8
						Spain-Madrid	6
						Spain-Barcelona	8

			USA-Berkeley	5
			USA-Boulder	5
			USA-Austin	6
			USA-Houston	7
			USA-Seattle	7
			USA-Washington DC	7
			USA-Boston	8
			USA-Chicago	8
			USA-Los Angeles	8
			USA-New Orleans	9
			USA-San Francisco	10
			USA-New York City	11
			USA-Atlanta	4
			USA-Dallas	4
			USA-El Paso	4
			USA-St Louis	4
			USA-Tulsa	4
			USA-Miami (greater Miami and the beaches)	4
			USA-Norfolk	5
			USA-Oakland	5
			USA-Pittsburgh	5
			USA-Philadelphia	6
			USA-Portland	6
			USA (Hawaii)-Honolulu	4
			Vietnam-Da Nang	4
			Vietnam-Hanoi	4