

# DISASTER RESILIENCE SCORECARD FOR CITIES

MAY 2017

PRELIMINARY LEVEL ASSESSMENT



# Disaster Resilience Scorecard for Cities

## Preliminary level assessment

To support reporting and implementation of the Sendai Framework for Disaster Risk Reduction: 2015-2030  
Based on the Ten Essentials for Making Cities Resilient

United Nations Office for Disaster Risk Reduction (UNDRR)

Developed with the support of USAID, European Commission, IBM and AECOM

This Scorecard provides a set of assessments that will allow local governments to monitor and review progress and challenges in the implementation of the Sendai Framework for Disaster Risk Reduction: 2015-2030, and assess their disaster resilience. It is structured around UNDRR’s Ten Essentials for Making Cities Resilient.

### What do we mean by resilience? The scope of the Disaster Resilience Scorecard for Cities

Resilience as defined by the Sendai Framework is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its Essential basic structures and functions through risk management.

Increasingly in the context of cities it is framed around the ability to withstand and bounce back from both acute shocks (natural and manmade) such as floods, earthquakes, hurricanes, wild-fires, chemical spills, power outages, as well as chronic stresses occurring over longer time scales, such as groundwater depletion or deforestation, or socio-economic issues such as homelessness and unemployment.

Disaster resilience, and indeed this Scorecard, covers the ability of a city to understand the disaster risks it may face, to mitigate those risks, and to respond to disasters that may occur so that immediate and longer term loss of life or damage to livelihoods, property, infrastructure, economic activity and the environment is minimized. However, this also requires practitioners to

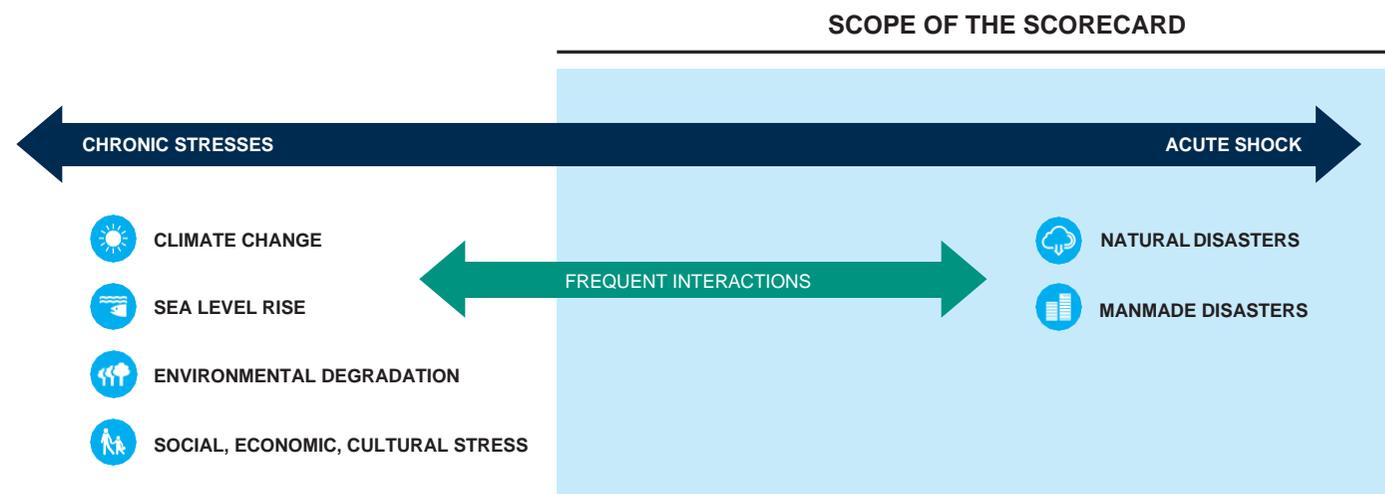


Figure 1: The scope of the Disaster Resilience Scorecard for Cities

consider the chronic stresses can affect the likelihood or severity of an acute shock event, as well as undermine a city’s capacity to respond and adapt. For example, deforestation may increase the potential for flash flooding, or deprived (and likely uninsured) communities may not be able to rebuild their homes and businesses after a major earthquake. Figure 1 depicts the scope of the Scorecard in relation to the range of shocks and stresses that a city may face.

The Scorecard is structured around the “Ten Essentials for Making Cities Resilient”, first developed as part of the Hyogo Framework for Action in 2005, and then updated to support implementation of the Sendai Framework for Disaster Risk Reduction: 2015-2030.

As shown in Figure 2, the Ten Essentials for Making Cities Resilient offer a broad coverage of the many issues cities need to address to become more disaster resilient:

- Essentials 1-3 cover governance and financial capacity;
- Essentials 4-8 cover the many dimensions of planning and disaster preparation;
- Essentials 9-10 cover the disaster response itself and post-event recovery.

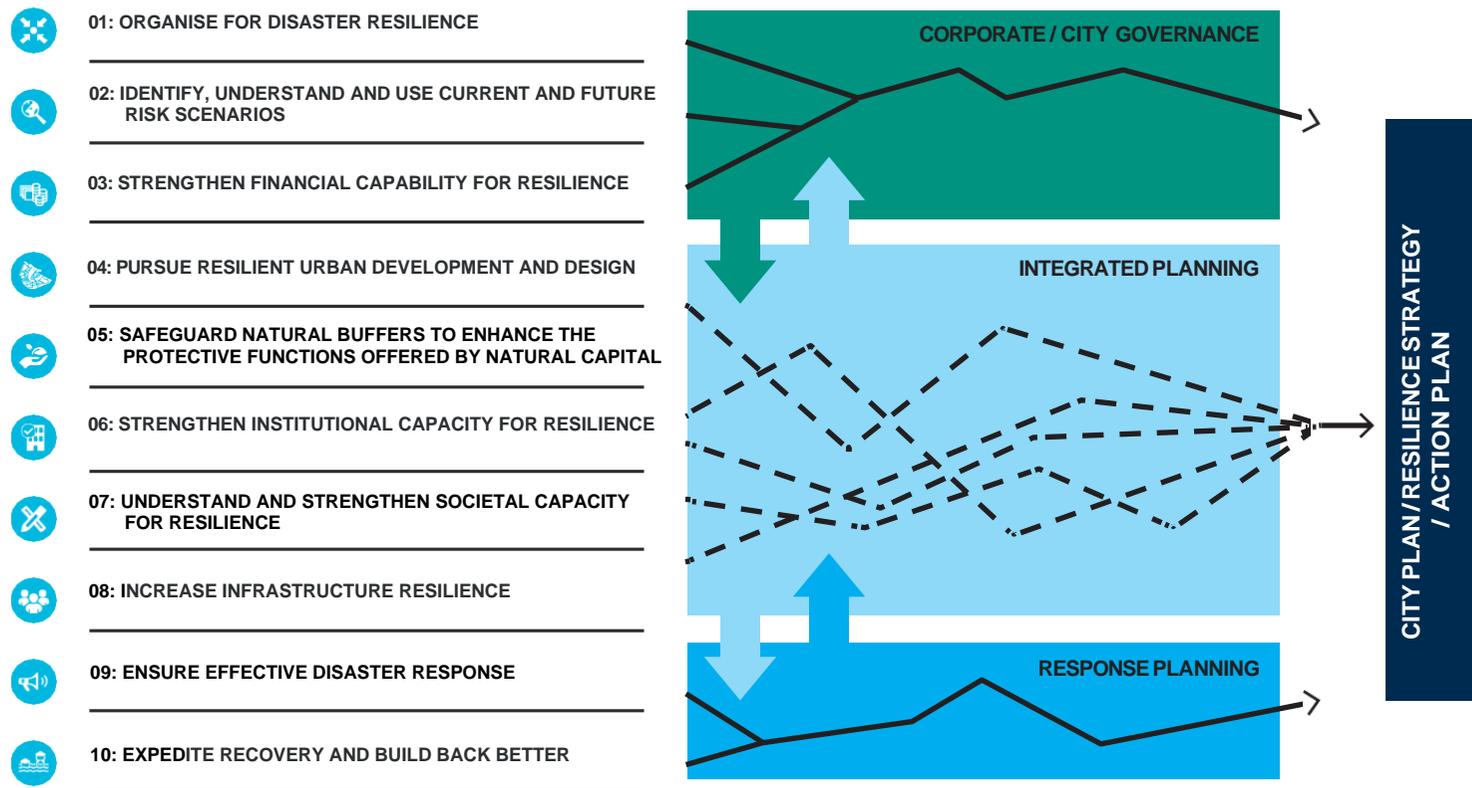


Figure 2: The Ten Essentials for Making Cities Resilient

## Primary Purpose of the *Disaster Resilience Scorecard for Cities*

- To assist countries and local governments in monitoring and reviewing progress and challenges in the implementation of the Sendai Framework.
- To enable the development of a local disaster risk reduction strategy (resilience action plans).

## The benefits of using the *Disaster Resilience Scorecard for Cities*

Early users of the Scorecard have reported a number of benefits. The Scorecard can support cities to:

- Establish a baseline measurement of their current level of disaster resilience;
- Increase awareness and understanding of resilience challenges;
- Enable dialogue and consensus between key city stakeholders who may otherwise not collaborate regularly;
- Enable discussion of priorities for investment and action, based on a shared understanding of the current situation;
- Ultimately lead to actions and implementable projects that will deliver increased resilience for the city over time.

## Who should use the *Disaster Resilience Scorecard for Cities*?

A city is a system of systems, with each of those systems (e.g. communications, water, sanitation, energy, healthcare, welfare, law and order, education, businesses, social and neighbourhood systems)

potentially having separate owners and stakeholders. Resilience needs consideration within and across each of these systems and therefore can only be achieved through effective collaboration.

A range of actors – whether government, private business, community groups, academic institutions, other organizations or individuals – have roles to play in maintaining and improving city resilience. Ideally, local government authorities - which often have the best convening power- should take the lead in conducting the assessments of the Scorecard. A multi-stakeholder dialogue and approach between key city stakeholders will be necessary to complete the Scorecard, and is Essential in the push towards more resilient cities.

## How does the *Disaster Resilience Scorecard for Cities* deal with risk?

While the Scorecard can be used as a standalone tool, it does require you to consider your city's hazards and risks. Specifically, the Scorecard prompts you to identify "most probable" and "most severe" risk scenarios for each of your identified city hazards, or for a potential multi-hazard event. Some cities will have clear critical hazards, but for others it may be less obvious, and the major risk may lie in a combination of otherwise sub-critical events. In considering risk, you may find the Quick Risk Estimation tool (QRE) developed by UNDRR and Deloitte helpful. It is a simple spread sheet tool aimed at improving risk awareness and is designed to be used alongside this Scorecard. The QRE tool can be downloaded from <https://mcr2030.undrr.org/quick-risk-estimation-tool>

## How does the scoring in the *Disaster Resilience Scorecard for Cities* work?

Local Governments that have used the Scorecard so far have found that it can be useful at a range of levels, as follows:

- As a high-level survey, often via a 1 or 2 day workshop – this can be supported by questionnaires that participants fill out in advance. Sometimes an average or consensus score is applied at the level of each of the "Ten Essentials", rather than for each individual criteria / assessment;
- As a limited exercise focusing on some individual Essentials, to create an in-depth review of some specific aspects of resilience, e.g. community-level preparedness;
- As a detailed review of the city's entire resilience position, likely to take one to several months to complete.
- In light of user feedback, the Scorecard now offers the potential for scoring at two levels:
  - **Level 1:** Preliminary level, responding to key Sendai Framework targets and indicators, and with some critical sub-questions. This approach is suggested for use in a 1 to 2 day city multi-stakeholder workshop. In total there are 47 questions / indicators, each with a 0 – 3 score;
  - **Level 2:** Detailed assessment. This approach is a multi-stakeholder exercise that may take 1 – 4 months and can be a basis for a detailed city resilience action plan. The detailed assessment includes 117 indicator criteria, each with a score of 0 – 5. Note that the criterion in the detailed assessment may serve as helpful discussion prompts for a preliminary level workshop.

For the preliminary assessment, questions all need to be scored – the scoring is intentionally simple and crude. Treat the questions as prompts. Think, what could be done better? These points, if recorded, may be further developed into actions or projects in your city resilience strategy / action plan. In completing the preliminary assessment, the conversation is often as important as the score.

For the detailed assessment it is possible to opt out of completing some assessment criteria if they are not relevant to your city (for example, there is an assessment related to ports, when your city may not have one). Your final percentage score excludes any assessment criteria that you have deemed not to be relevant.

There is some intentional overlap between the preliminary and the detailed assessment. Local Governments completing the detailed assessment should find it easier if they have already completed the preliminary assessment. The detailed assessment is designed to build on the preliminary assessment, but prompt deeper thought, review and consultation.

This document (Part 1) contains the assessment criteria for the preliminary level assessment. The detailed assessment can be downloaded from:

<https://mcr2030.undrr.org/disaster-resilience-scorecard-cities>

The Scorecard is designed to be used flexibly, in a way, which best suits the needs of the city. Given this, local governments are free to apply their own weighting to scoring, across the “Ten Essentials” and decide on their own “evidence” to support the assessment. UNDRR has provided some suggestions regarding the types of evidence that would generally satisfy the scoring requirements. Cities may have other or similar evidence that provides assurance that the scoring criteria have been achieved.

As you use this Scorecard, keep in mind that:

- While the Scorecard aims to be systematic, individual scores may unavoidably be subjective – use your judgment to decide which scores apply most closely to your level of disaster resilience. Recording your justification for each evaluation score will enable validation, as well as future revisions and tracking of progress;
- Disaster risk reduction and building resilience needs to be a collaborative effort. Some aspects of disaster resilience may not be under the control of local governments (for example, the city’s electricity supply or phone system may be operated by a separate agency or private utility, or there may be a provincial or neighbouring government that also needs to be involved). The Scorecard should be completed in consultation with these other organizations. The consultation process will also help to engage and build understanding, ownership and alignment with these other organizations;
- Consulting your citizen groups as you complete the Scorecard will improve the validity of your results;
- Being as accurate and realistic as possible will help identify areas of vulnerability, enabling their prioritisation for attention and funding;
- The Scorecard may not address all the disaster resilience issues facing your city. If in doubt, take advice from an expert in risk management or another relevant discipline.

## Adopting a growth mind-set!

The Scorecard provides an aspirational definition of disaster resilience – it is very unlikely that any city will score maximum points, and most will not score more than 50%. The intention of the Scorecard is to guide cities towards improved disaster risk reduction, and to challenge complacency.

The scores are not normative and therefore not comparable across different cities. The Scorecard was not designed to facilitate competition between cities, but to identify and promote sharing of knowledge. Local governments using the Scorecard, may wish to encourage participants to adopt a “growth mind-set” – this means accepting that they will identify weaknesses in their city’s resilience, but that this will also inspire development of actions that, when acted on, can enhance and improve city resilience.

## Alignment with other global frameworks

This Scorecard is based on the Ten Essentials of Making Cities Resilient, which were first developed as part of the Hyogo Framework in 2005, and revised and updated as part of the Sendai Framework agreed in 2015. The Sendai Framework contains a number of key indicators developed to support reporting at a Global and National Level. Appendix D (Part 2) includes some illustrations to show – at a conceptual level - the relationships between the Sendai targets and the broader Sustainable Development Goals (SDGs), and the key climate goals agreed through the Paris Agreement (COP 21).

## Supporting tools

A supporting MS Excel spread sheet tool, which facilitates scoring at the two levels referred to above accompanies this version of the Disaster Resilience Scorecard for Cities. This tool also allows simple recording of comments or suggested actions that may arise through workshop discussion and which could begin to form the basis of a simple city resilience action plan. The supporting MS Excel tool can be downloaded from the <https://mcr2030.undrr.org/disaster-resilience-scorecard-cities>

An online tool will be soon made available for local governments as part of the Sendai Framework monitoring, to help collect and analyse data. This platform will be developed primarily for use by local governments and their partners. Local government leaders are best placed, to use the findings of the Scorecard and inform policy and planning decisions, and to track city progress over time.

## Glossary

A glossary of terminology is included at the end of the Detailed Scorecard (Part 2).

## Acknowledgements

- IBM and AECOM, who are members of UNDRR's Private Sector Advisory Group (PSAG) co-created the City Disaster Resilience Scorecard that was released in 2014, and collaborated again to produce version 2 of the Scorecard released in April 2015, post Sendai.
- A number of cities have supported official piloting of the Scorecard; feedback from these cities has informed this version. Our thanks go to the resilience champions in the following cities: Greater Manchester and Stoke on Trent, UK; Amadora and Lisbon, Portugal; Jonkoping and Arvika, Sweden; Bugaba, Panama; Kisumu, Kenya; Aqaba, Jordan; Yogyakarta, Indonesia; Makati, Philippines and Islamabad, Pakistan. Numerous other cities have completed Scorecard assessments and developed action plans. This feedback has also been considered as part of this Scorecard update.
- The Center for Climate and Energy Solutions (C2ES), with IBM and AECOM, has executed a series of workshops with US cities (Anchorage, AK; Providence, RI; Miami Beach, FL; Kansas City, MO; Phoenix, AZ). Learning from these workshops has informed the update of the Scorecard.
- UNDRR brought together a large working group to develop indicators that have formed substantial part of this Scorecard. Thanks to the entire working group comprising: Arghya Sinha Roy, ADB; Katy Vines, C40 Cities; Sarah Hendel-Blackford, Ecofys; Ben Smith, AECOM; Mark Harvey, Resurgence; Esteban Leon, UN Habitat; Stefan Kohler, UNOPS; Hugh Macleman, OECD; Cassidy Johnston, UCL; Mostafa Mohaghegh, IFRC; Ebru Gencer, CUDRR; Jair Torres and Margherita Fanchiotti, UNESCO; Margaret Arnold, World Bank; and Christopher G. Burton, Global Earthquake Model.

## Questions?

Contact our staff and partners in the region nearest you.

<https://mcr2030.undrr.org/who-we-are/contact-mcr2030>

**The next pages of this document contain an outline of each of the Ten Essentials for Making Cities Resilient, together with the associated Disaster Resilience Scorecard for Cities assessment criteria.**

**This document (part 1) contains the assessment criteria for the preliminary level assessment.**

ESSENTIAL

01

Organize for Resilience





## Essential 01: Organize for Resilience

### Put in place an organizational structure and identify the necessary processes to understand and act on reducing disaster risks.

Recognizing that the exact format / structure will vary within and between countries, this will include but is not limited to:

- Establishing a single point of coordination in the city, accepted by all stakeholders.
- Exercising strong leadership and commitment at the highest elected level within the city authority, such as the Mayor.
- Ensuring that all departments understand the importance of disaster risk reduction for achieving objectives of their policies and programs; and that they have a framework within which to collaborate as required.
- Ensuring that all city government discussions routinely capture resilience implications; that the resilience implications of policies and standards in use are also assessed; and that action is taken upon these as needed.
- Engaging and building alliances with all relevant stakeholder groups including government at all levels (e.g. national, state, city, county, parish or other subdivision, neighbouring cities or countries as applicable), civil society and community organizations and the private sector.
- Engaging and learning from other city networks and initiatives (e.g. city to city learning programmes, climate change, resilience initiatives etc.)
- Establish necessary strategies, acts, laws, codes or integrate resilience qualities into existing policies aimed at preventing the creation of risk and reduction of existing risk.
- Creating policies to gather and manage data for sharing amongst all stakeholders and citizens.
- Putting in place reporting mechanisms for all citizens that capture key information about resilience and promote transparency, accountability and improved data capture over time (e.g. consider use of UNDRR tools e.g. this Scorecard) and enable information sharing with other organizations and with the public.

**Data you will need to answer this section of the Scorecard will include:** organization charts; lists of organizations by area, subject and other criteria; as applicable, memoranda of understanding (MOUs) and other role descriptions for each organization concerned; names of key individuals involved; meeting minutes and actions from the organizations concerned; a list of information and data available to reach stakeholder.

*Note: Data sharing can be important in helping to organise for resilience; assessment criteria covering data sharing are included under Essential 6.*

## Preliminary assessment

Ref	Subject / Issue	Question / Assessment Area	Indicative measurement scale	Comments
P 1.1	<b>Plan making</b>	<p>Does the city master plan (or relevant strategy/plan) include and implement disaster risk reduction approaches in line with the Sendai Framework?</p> <p>By 'plan' we typically mean some form of city wide plan, cross cutting strategy or vision. This could be a spatial plan, an infrastructure plan or an environmental or sustainability plan, providing it complies with the criteria from Sendai Framework paragraph 27 (b).</p> <p>Alternatively, if a city has a stand-alone disaster risk reduction plan / policy / strategy in place in line with the national strategies this can also demonstrate compliance.</p> <p>For compliance the plan should have coverage across all of the ten essentials.</p>	<p>3 – Fully integrated DDR plan, full Sendai Framework compliance and coverage across all of the Ten Essentials.</p> <p>2 – Stand-alone DDR plan complying with Sendai Framework and addressing all of the Ten Essentials.</p> <p>1 – Plans offering partial compliance with Sendai Framework and covering some of the Ten Essentials.</p> <p>0 – No plans / compliance.</p>	<p>To comply with the Sendai Framework paragraph 27 (b), a relevant local strategy should include:</p> <ul style="list-style-type: none"> <li>• time frames and targets</li> <li>• indicators</li> <li>• objectives and measures aiming at preventing the creation of risk</li> <li>• objectives and measures aiming at the reduction of existing risk</li> <li>• objectives and measures aiming at the strengthening of economic, social, health and environmental resilience</li> </ul> <p>It should also cover each of the Ten Essentials for Making Cities Resilient.</p>
P 1.2	<b>Organization, coordination and participation</b>	<p>Is there a multi-agency/sectoral mechanism with appropriate authority and resources to address disaster risk reduction?</p>	<p>3 – All lead agency teams are well established, properly resourced and with proper authority to act across all DRR stages.</p> <p>2 – All lead agency teams are well established, properly resourced and with authority to act, but there is inconsistency in resourcing across the key DRR stages.</p> <p>1 – City teams have authority and convening power but do not have proper inter-agency support and / or are under resourced.</p> <p>0 – Lead agencies lack proper authority and are under resourced.</p>	<p>Think about this for pre-event, event response and post disaster response. Is there a clear all-agency DRR organizational chart? Does each agency or entity have a clear and documented role and has it agreed to this role? Are funding allocations clearly established for co-ordination functions?</p>
P 1.3	<b>Integration</b>	<p>Is resilience properly integrated with other key city functions / portfolios? (e.g., planning, sustainability, investment case approval, finance and compliance, community engagement, emergency management, code compliance, infrastructure management, communications etc.)</p>	<p>3 – Explicit or semi-explicit decision point for resilience in decision-making process(es), applied to all policy and budget proposals in all relevant functional areas.</p> <p>2 – No formal process, but disaster resilience benefits are generally understood to be "helpful" to a proposal, in most functional areas.</p> <p>1 – Applied ad hoc or occasionally.</p> <p>0 – Not applied.</p>	<p>Is disaster resilience considered routinely as part of "day-to-day" decision making and budgeting, as opposed to being a separate issue disconnected with day-to-day government activity?</p>

*Notes*

ESSENTIAL

# 02

**Identify, Understand and use  
Current and Future Risk Scenarios**





## Essential 02: Identify, Understand and Use Current and Future Risk Scenarios

**Local Governments should identify and understand their risk scenarios, and use this knowledge to inform decision making.**

Risk scenarios should identify hazards, exposures and vulnerabilities in at least the “most probable” and “most severe” (“worst-case”) scenarios, paying particular attention to the following:

- How hazards might change over time, given the impact of factors such as urbanization and climate change.
- How multiple hazards might combine, and how repeated small scale disaster events (if there is a relevant risk of these) might accumulate in their impact over time.
- Geographic areas exposed and territorial impact.
- Population segments, communities and housing exposed.
- Economic assets and activities exposed.
- Critical infrastructure assets exposed, the consequent risk of cascading failures from one asset system to another (for example where loss of power prevents water being pumped or weakens the hospital system).
- Timescales over which impacts occur and responses are required.
- Creation and publication of exposure maps detailing the above.

Scenarios should be:

- Used to aid current and future investment decisions.
- Based on participatory processes that seek input from the full range of stakeholders (including ethnic and social groupings).
- Regularly updated.
- Widely communicated and used for decision-making purposes, and for updating of response and recovery plans.

Note that actions to address the hazards in each scenario are covered in other sections of the Scorecard.

**Data you will need to complete this section of the Scorecard will include:** documentation of hazards, exposures and vulnerabilities; identification of critical assets and dependencies between these.

## Preliminary assessment

Ref	Subject / Issue	Question / Assessment Area	Indicative measurement scale	Comments
P 2.1	<b>Hazard assessment</b>	Does the city have knowledge of the key hazards that the city faces, and their likelihood of occurrence?	<p>3 – City understands main hazards. Hazards data is updated at agreed intervals.</p> <p>2 – City understands main hazards, but there are no agreed plans for updating this information.</p> <p>1 – Data exists on most of the main hazards. 0</p> <p>0 – Hazards are not well understood.</p>	<p>Note: Use of the UNDRR Quick Risk Estimator Tool (QRE) can support assessment against these criteria.</p> <p>For each hazard there needs to be identified, as a minimum, the “most probable” and “most severe” consequences?</p>
P 2.2	<b>Shared understanding of infrastructure risk</b>	Is there a shared understanding of risks between the city and various utility providers and other regional and national agencies that have a role in managing infrastructure such as power, water, roads and trains, of the points of stress on the system and city scale risks?	<p>3 – There is a shared understanding of risks between the city and various utility providers – the points of stress and interdependencies within the system / risks at the city scale are acknowledged?</p> <p>2 – There is some sharing of risk information between the city and various utility providers and some consensus on points of stress.</p> <p>1 – Individual system risks are known but there is no forum to share these or to understand cascading impacts.</p> <p>0 – There is significant gaps in understanding risks, even at the level of individual systems (e.g. power, water, transport).</p>	<p>Is there a multi-agency / forum that assess issues of infrastructure and operational resilience? Does the city hold a comprehensive inventory / map of all critical infrastructure? Is the city sufficiently investing in maintenance and upgrade of critical infrastructure?</p> <p>This criterion should consider all public and private utilities, but could also extend to, for example, trucking companies, fuel suppliers, port operators, cargo airlines, unions etc.</p> <p>Infrastructure is covered in detail in Essential 8.</p>
P 2.3	<b>Knowledge of exposure and vulnerability</b>	Are there agreed scenarios setting out city-wide exposure and vulnerability from each hazard, or groups of hazards (see above)?	<p>3 – A comprehensive suite of disaster scenarios is available, with relevant background information and supporting notes. This is updated at agreed intervals.</p> <p>2 – A comprehensive suite of disaster scenarios is available, no background information or supporting notes exist to support use of these scenarios.</p> <p>1 – Some disaster scenario information is available.</p> <p>0 – No disaster scenario information is available.</p>	<p>Scenarios are narratives of the total impact of a hazard across the city</p> <p>Note: Use of the UNDRR Quick Risk Estimator Tool (QRE) can support assessment against these criteria.</p>

<b>P 2.4</b>	<b>Cascading impacts</b>	Is there a collective understanding of potentially cascading failures between different city and infrastructure systems, under different scenarios?	<p>3 – Relatively complete / collective understanding of cascading impacts under numerous disaster scenarios.</p> <p>2 – Relatively complete / collective understanding of cascading impacts under some disaster scenarios.</p> <p>1 – Some understanding of cascading impacts under some disaster scenarios.</p> <p>0 – No clear understanding of cascading impacts.</p>	The “failure chains” between different elements of a city’s infrastructure (for example, where an energy system failure triggers loss of water treatment) can be a critical vulnerability – and one that may be hidden unless specifically identified, and thus come as an unwelcome shock when responding to a disaster.
<b>P 2.5</b>	<b>Presentation and update process for risk information</b>	Do clear hazard maps and data on risk exist? Are these regularly updated?	<p>3 – High quality hazard maps exist, for most hazards, and are regularly updated (at agreed intervals).</p> <p>2 – Hazard maps exist, for most hazards, update plans are not known.</p> <p>1 – Hazard maps exist for some hazards.</p> <p>0 – No hazard maps exist.</p>	Updates need as a minimum to be sufficiently frequent to keep up with changing urban extents, and changing views of risk. Many countries aim at updates every 5 years, and this is unlikely to be adequate.

ESSENTIAL

# 03

## Strengthen Financial Capacity for Resilience





## Essential 03: Strengthen Financial Capacity for Resilience

**Understand the economic impact of disasters and the need for investment in resilience. Identify and develop financial mechanisms that can support resilience activities.**

Key actions might include:

- Understanding and assessing the significant direct and indirect costs of disasters (informed by past experience, taking into account future risk), and the relative impact of investment in prevention rather than incurring more significant costs during recovery
- Assigning a ring-fenced capital budget for any major works found to be necessary to improve resilience
- Including risk management allocations in operating budget as required to maintain the required state of resilience over time
- Assessing disaster risk levels and implications from all planning, permitting and capital spending decisions, and adjusting those decisions as needed
- Creating incentives for homeowners, low-income families, communities, businesses and public sector to invest in reducing the risks they face (e.g. business continuity planning, redundancy, building upgrades)
- Applying (and if necessary generating) insurance coverage for lives, livelihoods, city and private assets
- Exploring as needed innovative financing mechanisms such as specialised bonds, specialised insurance, tax efficient finance, development impact bonds etc.

**Data you will need to complete this section of the Scorecard will include:** budget and capital plan documentation; documentation of any incentives or financing schemes (for example, loans for seismic upgrades) with a disaster resilience impact, together with take-up statistics for each area of the city; insurance coverage statistics.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 3.1	<b>Knowledge of approaches for attracting new investment to the city</b>	The city / lead agencies understand all sources of funding, and the “resilience dividends”, are well connected, understand all available routes to attract external funding and are actively pursuing funds for major resilience investments.	<p>3 – The city understands all routes to secure funding for DRR activities, is actively pursuing a range of these and has had some success.</p> <p>2 – The city is aware of numerous routes to secure funding for DRR activities and is actively pursuing a range of these.</p> <p>1 – There is some visibility of routes of funding, but picture is incomplete and little is done to pursue these funds.</p> <p>0 – There is little understanding / awareness of available sources of funding for DRR.</p>	<p>Examples include:</p> <ul style="list-style-type: none"> <li>• Leasing</li> <li>• Government grants</li> <li>• Social impact or resilience bonds;</li> <li>• Development banks and aid organizations</li> <li>• Foundations</li> <li>• Other government agencies with funds that may be relevant to some aspect of resilience</li> <li>• Crowd-funding</li> <li>• Development fees</li> <li>• Public-private partnerships</li> <li>• Taxes and surcharges.</li> </ul> <p>“Resilience dividends” – sometimes called co-benefits - arise in two ways:</p> <ul style="list-style-type: none"> <li>• “Inbound” dividends – where investments elsewhere in the city have additional resilience benefits.</li> <li>• “Outbound” dividends – where an investment in resilience also provides an additional benefit.</li> </ul>
P 3.2	<b>Financial plan and budget for resilience, including contingency funds</b>	Does the city have in place a specific 'ring fenced' (protected) budget, the necessary resources and contingency fund arrangements for local disaster risk reduction (mitigation, prevention, response and recovery)?	<p>3 –The city financial plan is comprehensive in relation to DRR, budgets are ring fenced and contingency plans are in place.</p> <p>2 – The city financial plan allows for DRR activities, budgets are ring fenced.</p> <p>1 – There are some plans in different agencies / organizations but they are not co-ordinated.</p> <p>0 – No clear plan.</p>	It is key to assess here both the presence and size of the budget, and the protection for these funds that stops them being diverted to other uses.

P 3.3	Insurance	What level of insurance cover exists in the city, across all sectors - business and community?	<p>3 – The uptake for insurance products across all sectors / services is high.</p> <p>2 – The level of insurance varies significantly by sector or by area. The city actively promotes insurance cover across all sectors.</p> <p>1 – The level of insurance varies significantly by sector or by area. The city is not actively promoting greater uptake of insurance products.</p> <p>0 – Little or no insurance cover exists in the city.</p>	<p>This assessment covers both the adequacy of coverage (will insurance pay out enough?) and the extent of coverage (are enough people and businesses insured?)</p> <p>Consider levels of insurance for:</p> <ul style="list-style-type: none"> <li>• domestic housing, contents and personal transport (e.g. car insurance)</li> <li>• commercial and public infrastructure.</li> </ul> <p>Personal health insurance is not included.</p>
P 3.4	Incentives	What incentives exist for different sectors and segments of business and society to support resilience building?	<p>3 – A range of incentives exist, across all sectors to increase resilience, and these meet known needs.</p> <p>2 – A range incentives exist, across all sectors to increase resilience, but there are known gaps / opportunities.</p> <p>1 – Some incentives exist, but it is patchy.</p> <p>0 – Few or no incentives exist.</p>	

ESSENTIAL

# 04

## Pursue Resilient Urban Development





## Essential 04: Pursue Resilient Urban Development

### The built environment needs to be assessed and made resilient as applicable.

Building on the scenarios and risk maps from Essential 2, this will include:

- Land zoning and management of urban growth to avoid exacerbating resilience issues – identification of suitable land for future development taking into consideration of how low-income groups can access suitable land
- Risk-aware planning, design and implementation of new buildings, neighbourhoods and infrastructure, using innovative or existing/traditional techniques as applicable
- Addressing needs of informal settlements including basic infrastructure deficits such as water, drainage and sanitation
- Development and implementation of appropriate building codes, and using these to assess existing structures for resiliency to potential hazards, incorporating appropriate retro-fitting of prevention measures
- Maximizing use of urban design solutions such as impermeable surfaces, green areas, shadowing, water retention areas, ventilation corridors etc) that can cope with risks and also reduce the dependency on technical infrastructure like sewage systems, dikes etc
- Engaging affected stakeholders in appropriate and proportional participatory decision-making processes when making urban development decisions
- Incorporating exemplary sustainable design principles into new development. Link to other existing standards where appropriate (BREEAM, LEED, Greenstar, etc)
- Updating building regulations and standards regularly (or periodically) to take account of changing data and evidence on risks.

**Data you will need to complete this section of the Scorecard will include:** land use, population, income levels and economic activity by segment of the city; and also relevant building codes and their application on a property-by-property basis.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 4.1	<b>Land use zoning</b>	Is the city appropriately zoned considering, for example, the impact from key risk scenarios on economic activity, agricultural production, and population centers?	<p>3 – The city is zoned according to land use, and this connects well with hazards and risk mapping (see Essential 2). The zoning is updated at agreed intervals.</p> <p>2 – The city is zoned according to land use, and this connects loosely with hazards and risk mapping (see Essential 2). Plans for updating this zoning are not well understood.</p> <p>1 – The zoning is not thorough / complete and is not reviewed regularly against hazards / risks.</p> <p>0 – No known / clear zoning.</p>	<p>Displacement for 3 months or longer as a consequence of housing being destroyed or rendered uninhabitable, or the area in which it is located being rendered uninhabitable.</p> <p>This assessment also needs to cover informal and unplanned settlements.</p> <p>Effectiveness of zoning should ideally be independently validated (see also Essential 2).</p>
P 4.2	<b>New urban development</b>	Are approaches promoted through the design and development of new urban development to promote resilience?	<p>3 – Clear policy exists at city level. Guidance has been prepared for a range of practitioners (e.g. Architects, landscape architects, engineers etc).</p> <p>2 – Policy exist but supporting guidance is inadequate.</p> <p>1 – Resilience approaches are promoted, but not in a consistent manner, and not underpinned by city policy.</p> <p>0 – Little / no promotion of resilience in new urban development.</p>	Is there policy promoting physical measures in new development that can enhance resilience to one or multiple hazards. For example, appropriate locations for new development, water sensitive urban design, proper integration of disaster refuge areas, proper access and egress routes (street widths) etc.) .
P 4.3	<b>Building codes and standards</b>	Do building codes or standards exist, and do they address specific known hazards and risks for the city? Are these standards regularly updated?	<p>3 – Local codes and standards exist; these address all known city hazards and are regularly updated.</p> <p>2 – Local codes and standards exist; these address main city hazards and are regularly updated.</p> <p>1 – Some codes exist covering some hazards. No clear plan for updating the codes.</p> <p>0 – No real use / existence of relevant building codes and standards.</p>	<p>This can be taken to mean mandatory codes (regulations) or voluntary standards (e.g. BREEAM, LEED, Greenstar, REDi) where these are promoted by the city through policy or incentives. It is important to be clear that the codes in use actually improve resilience to the identified hazards.</p> <p>Standards will include those for the supply of basic infrastructure services to informal settlements, without which the ability of those settlements to recover from disasters will be severely compromised.</p>
P 4.4	<b>Application of zoning, building codes and standards</b>	Are zoning rules, building codes and standards widely applied, properly enforced and verified?	<p>3 – Zones and building codes are 100% applied and enforced / verified.</p> <p>2 – Zones and building codes are applied and enforced / verified in greater than 50% of cases.</p> <p>1 – Application of existing zones and building codes is partial and / or inconsistent.</p> <p>0 – There is no real focus on enforcing zones and building codes.</p>	<p>Zone verification requires proof that in any given zone, only appropriate activity is occurring.</p> <p>Code verification generally refers to a third party check by someone external to the design and construction team.</p> <p>Cities with informal settlements are unlikely to score highly on this assessment, unless the occupants of those settlements have been engaged and helped in making themselves more resilient.</p>

*Notes*

ESSENTIAL

05

**Safeguard Natural Buffers to  
Enhance the Protective Functions  
Offered by Natural Ecosystems**





## Essential 05: Safeguard Natural Buffers to Enhance the Protective Functions Offered by Natural Ecosystems

**Safeguard natural buffers to enhance the protective functions offered by natural ecosystems. Identify, protect and monitor critical ecosystems services that confer a disaster resilience benefit.**

Relevant ecosystem services may include, but are not limited to: water retention or water infiltration; afforestation; urban vegetation; floodplains; sand dunes; mangrove and other coastal vegetation, and pollination. Many ecosystem services that are relevant to the city's resilience may be provided well outside its geographical area.

This Essential includes:

- Recognising value and benefits from ecosystem services for disaster risk prevention, protecting and /or enhancing them as part of risk reduction strategies for cities.
- Considering also natural buffers in the rural hinterland of the city, watershed and wider region, and cooperation with municipalities there to establish a regional approach of land use planning to protect the buffers.

- Anticipating changes from climate trends and urbanization, and planning to enable ecosystem services to withstand these, enhanced as required by green and blue infrastructure.

Ecosystem services that benefit a city may be located many miles away (for example, where upstream forests may manage floodwater run-off to the benefit of cities on downstream floodplains). Ecosystem services may not be recognized or even suspected, and you may require external expertise to identify them. Ecosystem services that offer a generalized, planetary benefit (for example, polar icecaps) are excluded.

**Data you will need to complete this section of the Scorecard will include:** land use and zoning documentation, plus data on the extent and health of relevant ecosystems as measured by applicable indicators.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 5.1	<b>Awareness and understanding of ecosystem services / functions</b>	Beyond just an awareness of the natural assets, does the city understand the functions (or services) that this natural capital provides for the city?	<p>3 – The city and key stakeholders are familiar with the term ecosystem services and understand and economic value all of the functions provided by key local natural assets.</p> <p>2 – The city and key stakeholders understand the majority of the functions provided by key local natural assets. These are not economically valued.</p> <p>1 – There is an incomplete, awareness and understanding of the functions delivered by the cities natural capital.</p> <p>0 – Very little / no awareness of this topic area in the city.</p>	<b>Ecosystem functions</b> include: water attenuation, food growing, fuel, carbon sequestration, air filtration, heat attenuation, pollination, aesthetic value etc.
P 5.2	<b>Integration of green and blue infrastructure into city policy and projects</b>	Is green and blue infrastructure being promoted on major urban development and infrastructure projects through policy?	<p>3 – Green and blue infrastructure is being promoted on major urban development and infrastructure projects through policy and supporting guidance material in the city.</p> <p>2 – Green and blue infrastructure is being promoted through policy, but there is little supporting guidance for practitioners.</p> <p>1 – Some green and blue infrastructure is being promoted, but this is not universal and it is not supported by policy.</p> <p>0 – There is little / no active push to promote green infrastructure in new urban development or infrastructure projects.</p>	<p><b>Green Infrastructure</b> includes: greening streets, squares and roadsides; greening roofs and facades, developing urban agriculture; creating urban green corridors; replace impermeable surfaces; natural water filtration; daylighting urban rivers and restoring embankments, etc.</p> <p><b>Blue Infrastructure</b> includes: river corridors, wetlands and other waterways.</p>
P 5.3	<b>Transboundary environmental issues</b>	Is the city aware of ecosystem services being provided to the city from natural capital beyond its administrative borders? Are agreements in place with neighbouring administrations to support the protection and management of these assets?	<p>3 – The city is aware of the importance of natural capital beyond its administrative borders and has plans in place with neighbouring administrations to support the protection and management of these assets.</p> <p>2 – There city is aware of the functions provided by natural capital beyond the city administrative borders; there have been some early discussions with neighbouring administrations.</p> <p>1 – The city has some awareness of the functions provided by natural capital beyond the city administrative borders, but has taken no action.</p> <p>0 – Little to no awareness</p>	

*Notes*

ESSENTIAL

06

**Strengthen Institutional  
Capacity for Resilience**





## Essential 06: Strengthen Institutional Capacity for Resilience

**It is important to ensure that all institutions relevant to a city's resilience have the capabilities they need to discharge their roles.**

“Institutions” include, as applicable, central, state and local government organizations; private sector organizations providing public services; (depending on locale, this may include phone, water, energy, healthcare, road operations, waste collection companies and others as well as those volunteering capacity or equipment in the event of a disaster); industrial facility owners and operators; building owners (individual or corporate); NGOs; professional, employers’ and labour organizations, and cultural and civil society organizations (see Essential 7).

Capacity should be developed across the five key DRR areas of understanding, prevention, mitigation, response and recovery planning. Factors affecting capacity will include:

- Skills, including but not limited to: hazard/risk assessment, risk-sensitive planning (spatial and socio-economic), integrating disaster and climate risk considerations in project evaluation/design (including engineering design, co-ordination, communication, data and technology management, and disaster management, response, recovery, assessment of structures post disaster; business and services continuity planning).
- Training, based ideally on case studies of how DRR can be implemented and what business continuity requires (Note that the training referred to here is about the subject of disaster resilience. Formal emergency response practice drills, which obviously are a form of training, are covered under Essential 9).
- Creating and implementing information and data frameworks for resilience and disaster risk reduction that build consistency in data capture and storage and enable data access, use and re-use by multiple stakeholder groups for regular development processes.

Shared understanding of roles and responsibilities, and a framework of shared and open information on resilience in the city are also important to capacity – these are covered in Essential 1.

**Data you will need to complete this assessment include:** training curricula; training records for those trained, courses run; school and university curricula; survey and market research data on effectiveness.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 6.1	<b>Skills and experience</b>	Does the city have clear access to all the skills and experience it believes it would need to respond to reduce risks and respond to identified disaster scenarios?	<p>3 – The city itself has quick access to all the required skills / experience and resources it would need to respond to identified disaster scenarios.</p> <p>2 – The city has quick access to most of the skills / experience and resources required to respond to identified disaster scenarios; other required skills can be obtained from nearby cities/counties/regions.</p> <p>1 – The city can access most of the skills / experience and resources it needs to respond to identified disaster scenarios, but there are some gaps.</p> <p>0 – There are significant gaps in the skills / experience and resources that the city can quickly access to respond to identified scenarios.</p>	<p>The city should consider skills and experience relating to pre-event planning, and during and post-event response.</p> <p>Skills may come from within the city itself, or from external organizations based in the city (for example, utilities), or on a paid basis from consultancies and so on.</p>
P 6.2	<b>Public education and awareness</b>	Does a co-ordinated public relations and education campaign exist, with structured messaging and channels to ensure hazard, risk and disaster information (that can be understood and used) is properly disseminated to the public?	<p>3 – Fully co-ordinated campaigns and programmes (PR and education) exist to ensure proper dissemination of hazard, risk and disaster information. Key messages reach over 75% of the city population.</p> <p>3 – Campaigns and programmes (PR and education) exist to ensure proper dissemination of hazard, risk and disaster information. Key messages reach over 50% of the city population.</p> <p>2 – Some useful programmes / channels exist for disseminating hazard, risk and disaster information, but there is significant room for improvement to reach a greater proportion of the public. 25% of the city population is reached.</p> <p>0 – Systems for disseminating critical information on disaster risk are wholly inadequate.</p>	<p>Here we are assessing the city's ability to communicate with the public. There will be numerous other communications channels managed by other stakeholders.</p>

<b>P 6.3</b>	<b>Data sharing</b>	Extent to which data on the city's resilience context is shared with other organizations involved with the city's resilience.	<p>3 – The city has a portal (or other method) for bringing together/ synthesising numerous city data sets, useful to build a picture of city resilience.</p> <p>2 – The city has done a good job at synthesising and sharing some data layers to enhance resilience in a particular sector or area.</p> <p>1 – Some but not all of the cities data layers are shared / accessible but the data is raw and requires interpretation.</p> <p>0 – Little or no useful city data is available / shared.</p>	<p>(See also Essential 1).</p> <p>The types of city data that are useful in understanding a city's resilience context include, e.g. population, demographics, vulnerabilities, infrastructure risks, flooding, disaster event records.</p> <p>Best practice may include a full stakeholder / public communications strategy and data portal and / or licencing of risk information to key city stakeholders.</p> <p>The key question is whether there is "one version of the truth" shared as applicable between all stakeholders – in other words, do all stakeholders have consistent and compatible information and assumptions?</p>
<b>P 6.4</b>	<b>Training delivery</b>	Are there training courses covering risk and resilience issues offered to all sectors of the city including government, business, NGOs and community?	<p>3 – There are training courses covering risk, resilience and disaster response offered across all sectors of the city including government, business, NGO's and community?</p> <p>2 – The city has a track record of delivering resilience training to some sectors, but other sectors lack training and engagement.</p> <p>1 – Some training modules are available. Coverage and content needs to be significantly improved.</p> <p>0 – Little or no relevant training exists that is tailored for the city.</p>	Note that emergency response drills are covered under Essential 9. Training delivery in Essential 6 relates to professional training.
<b>P 6.5</b>	<b>Languages</b>	Are training materials available in the majority of languages in common use in the city?	<p>3 – All training materials are available in all of the languages in common use in the city.</p> <p>2 – All training materials are available in most of the languages common in use in the city.</p> <p>1 – All training materials are available in some of the languages common in use in the city.</p> <p>0 – No translations have been made.</p>	Cities with high numbers of different languages may need to settle for a selection of languages that reaches everyone as a first or second language.
<b>P 6.6</b>	<b>Learning from others</b>	Is the city proactively seeking to exchange knowledge and learn from other cities facing similar challenges?	<p>3 –The city proactively seeks to exchange knowledge and learn from other cities facing similar challenges and is active in a range of networks to facilitate this.</p> <p>2 – The city understands the importance of knowledge share and has membership to a range of city networks. The networks are not leveraged for maximum benefit.</p> <p>1 – Some knowledge share happens between cities, but it tends to be ad-hoc.</p> <p>0 – Any knowledge share that does take place relies on individuals.</p>	This might be via a direct exchange with peer cities, or through industry groups, national resilience and emergency management forums, city groups such as C40, ICLEI and others, or NGOs such as the UN.

ESSENTIAL

07

**Understand and Strengthen  
Societal Capacity for Resilience**





## Essential 07: Understand and Strengthen Societal Capacity for Resilience

**Ensure understanding and strengthening of societal capacity for resilience. Cultivate an environment for social connectedness which promotes a culture of mutual help through recognition of the role of cultural heritage and education in disaster risk reduction.**

Social connectedness and a culture of mutual help have a major impact on the actual outcomes of disasters of any given magnitude. These can be encouraged by measures that include:

- Establishing and maintaining neighbourhood emergency response groups and training
- Engaging and co-opting civil society organizations – youth groups, clubs, religious groups, advocacy groups (e.g. for the disabled)
- Encouraging diversity to support decision making and outreach (e.g. gender, racial and ethnic, socioeconomic, geographic, academic, professional, political, sexual orientation and life experience.)
- Offering education, training and support to community groups
- Providing community groups with clear data on risk scenarios, the current level of response capabilities and thus the situation they may need to deal with.
- Undertaking formal or informal censuses of those who may be vulnerable and less able to help themselves, in each neighbourhood, and understanding from them what their needs are
- Using government engagements with the public such as welfare or social services visits and offices, police, libraries and museums to build awareness and understanding
- Engaging with employers as a communications channel with their workforces for disaster awareness, business continuity planning and training
- Engage local media in capacity building (TV, print, social media, etc.)
- Mobile (phone / tablet) and web-based systems of engagement (for example, crowdsourcing or disseminating data on preparedness)
- Translation of all materials into all languages used in the city
- Ensuring that the education curriculum within schools, higher education, universities and the workplace includes disaster awareness activities and training is a key element of social resilience – this is covered in Essential 6.

**Data you will need to complete this assessment include:** list of “grassroots” organizations and information on their size, roles and how they operate; details of how the city works with disadvantaged groups – for example, those in areas of high poverty; transient or nomadic communities; slum/favela residents; the elderly; physically or mentally sick or disabled; children; non-native language speakers.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 7.1	<b>Community or “grassroots” organizations, networks and training</b>	Are grassroots or community organizations participating in pre-event planning and post-event response for each neighbourhood in the city?	<p>3 – Community organizations that cover a significant proportion of the city’s population are actively participating in pre-event planning and post-event response right across the city.</p> <p>2 – There is involvement in diverse grassroots organizations, either in some locations, or in some aspect of the planning or response, but it is not comprehensive.</p> <p>1 – There is awareness amongst key grassroots organizations of the importance of DRR, they support with awareness raising but not with active participation around response or planning.</p> <p>0 – There is very little involvement from grassroots organizations in the city.</p>	The types of grassroots organizations actively supporting disaster risk reduction activities will vary by region and by city. It could include youth groups, YMCA, sports clubs etc. It will depend on which groups have the best traction and capacity in each location.
P 7.2	<b>Social networks “Leave no one behind”</b>	Are there regular training programmes provided to the most vulnerable and at need populations in the city?	<p>3 – Once every six-months training programmes are conducted. 2 – Once a year training programmes are conducted.</p> <p>1 – No training programmes. But mapping of socially vulnerable population is available.</p> <p>0 – There is no mapping of socially vulnerable population.</p>	Social vulnerability is the result of pre-disaster social factors that create a lack of capacity or capability to prepare for, respond to, and recover from emergencies. Social vulnerability includes people who are more likely to suffer disproportionately because of their existing social circumstances such as those associated with age, gender, race, medical illness, disability, literacy and social isolation.
P 7.3	<b>Private sector / employers</b>	What proportion of businesses have a documented business continuity plan that has been reviewed within the last 18 months?	<p>3 – 60 – 100% businesses.</p> <p>2 – 40 – 60% businesses.</p> <p>1 – 20 – 40% businesses.</p> <p>0 – Under 20%.</p>	Businesses over 10 people / employees.
P 7.4	<b>Citizen engagement techniques</b>	How effective is the city at citizen engagement and communications in relation to DRR?	<p>3 – Engagement through multiple media channels (e.g. social, radio, email, newspaper, mobile device). Mobile used for inbound data flow, crowd management etc. Result is multiple contacts per citizen per year.</p> <p>2 – Multiple media channels. No inbound data collection from mobiles. Majority of citizens reached several times per year.</p> <p>1 – Some channels, semi-regular updates. 0 – Poor or no citizen engagement on DRR.</p>	

*Notes*

ESSENTIAL

08

Increase Infrastructure Resilience





## Essential 08: Increase Infrastructure Resilience

### Assess the capacity and adequacy of, as well as linkages between, critical infrastructure systems and upgrade these as necessary according to risks identified in Essential 2.

This Essential addresses how critical infrastructure systems will cope with disasters the city might experience) and developing contingencies to manage risks caused by these outcomes. This should be addressed through measures including, but not limited to:

- Assessment of capacity and adequacy in the light of the scenarios in Essential 2. Consider possible damage to parallel infrastructure (for example, impact on evacuation capacity if one of two roads out of a city is blocked), as well as linkages between different systems (for example, impact if a hospital loses its power or water supply).
- Liaising with, and building connections between infrastructure agencies (including those that may be in the private sector) to ensure resilience is considered appropriately in project prioritization, planning, design, implementation and maintenance cycles.
- Tendering and procurement processes that to include resilience criteria agreed upon by the city and stakeholders and is consistent throughout.
- For emergency management infrastructure, assessment of “surge” capacity, which refers to the ability to deal with suddenly increased loadings from law and order issues, casualties, evacuees, and so on.

Systematically triaged processes are also required for prioritization of retrofit or replacement of unsafe infrastructure. These are covered in Essential 2.

Critical infrastructure includes that required for the operation of the city and that required specifically for emergency response, where different. Infrastructure required for operation includes but is not limited to:

- Transport – roads, rail, airports and other ports
- Vehicle and heating fuel supplies
- Telecommunication systems
- Utilities systems (water, wastewater, electricity, gas, waste disposal)
- Health care centres, hospitals
- Schools and educational institutes
- Community centres, institutions
- Food supply chain
- Emergency response including ambulance, police and fire services
- Jails
- “Back office” administration – welfare payments, housing

- Computer systems and data supporting the above
- As resources allow, safety and survivability of cultural heritage sites and artefacts.

Infrastructure required for disaster response may include the above, and others such as:

- Emergency or incident command centres, and associated communications and monitoring/situation awareness systems – these may include cameras, sensors and crowdsourcing mechanisms such as reading of SMS and Twitter feeds
- Additional fire, police and ambulance vehicles
- National guard or other military services
- Earth and debris-removing equipment
- Pumps
- Generators
- Sports facilities, school buildings and so on that provide places of shelter
- Mortuaries
- Back-up computing facilities.

**Data you will need to complete this section of the Scorecard will include:** disaster resilience plans for each infrastructure system (each may be owned by one or more separate agencies), and data on execution of those plans; location of, and relationship between, critical assets, the populations they serve, and documentation linking their loss or damage to the scenarios in Essential 2. This data is likely to come from multiple organizations and completion of this section of the Scorecard will probably require engineering input.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 8.1	<b>Critical infrastructure overview</b>	Is critical infrastructure resilience a city priority, does the city own and implement a critical infrastructure plan or strategy?	<p>3 – The city owns and implements (in collaboration with other stakeholders) a critical infrastructure plan or strategy to protect its critical infrastructure, utilities and services. The strategy highlights risks / stresses and includes continuity plans for essential services.</p> <p>2 – There is a critical infrastructure forum or other means to establish a shared understanding of risks between the city and various utility providers upon the points of stress on the system / risks at the city scale?</p> <p>1 – Risks are understood for some but not all of the major infrastructure types.</p> <p>0 – There are no plans or forums. Critical infrastructure risks are not well understood in the city.</p>	
P 8.2	<b>Protective infrastructure</b>	Is existing protective infrastructure well-designed and well-built based on risk information?	<p>3 – In all cases protective infrastructure is in place and consistent with best practice for asset design and management, based on relevant risk information.</p> <p>2 – In most cases protective infrastructure is in place and consistent with best practice for asset design and management, based on relevant risk information.</p> <p>1 – In some cases protective infrastructure is in place but some strategic protective infrastructure is missing. Design and management may not be consistent with best practice.</p> <p>0 – Significant parts of the city are unprotected from known risks / hazards.</p>	<p>Examples of protective infrastructure:</p> <ul style="list-style-type: none"> <li>• Levees and flood barriers;</li> <li>• Flood basins;</li> <li>• Sea walls (where used);</li> <li>• Shelters, such as tornado/hurricane shelters;</li> <li>• Storm drains and storm water holding tanks;</li> <li>• Wetlands and mangroves (see Essential 5);</li> <li>• Shock absorption capabilities fitted to infrastructure to deal with earthquakes.</li> </ul>
P 8.3	<b>Water - Potable and Sanitation</b>	Would a significant loss of service for these two essential services be expected for a significant proportion of the city under the agreed disaster scenarios?	<p>3 – There would be no loss of service even from “most severe” scenario.</p> <p>2 – Some loss of service would be experienced from the “most severe” scenario.</p> <p>1 – Some loss of service would be experienced from the “most probable” scenario.</p> <p>0 – Significant loss of service would be experienced from the “most probable” scenario.</p>	

<b>P 8.4</b>	<b>Energy</b>	Would a significant loss of service be expected for a significant proportion of the city in the 'worst case' scenario event? In the event of failure would energy infrastructure corridors remain safe (i.e. free from risk of leaks, electrocution hazards etc.)?	<p>3 – There would be no loss of service even from “most severe” scenario.</p> <p>2 – Some loss of service would be experienced from the “most severe” scenario.</p> <p>1 – Some loss of service would be experienced from the “most probable” scenario.</p> <p>0 – Significant loss of service would be experienced from the “most probable” scenario.</p>	
<b>P 8.5</b>	<b>Transport</b>	Would a significant loss of service be expected for a significant proportion of the city in the 'worst case' scenario event? In the event of failure would transport infrastructure corridors remain safe (i.e. free from risk of flood, shocks etc) and passable?	<p>3 – There would be no loss of service even from “most severe” scenario.</p> <p>2 – Some loss of service would be experienced from the “most severe” scenario.</p> <p>1 – Some loss of service would be experienced from the “most probable” scenario.</p> <p>0 – Significant loss of service would be experienced from the “most probable” scenario.</p>	
<b>P 8.6</b>	<b>Communications</b>	Would a significant loss of service be expected for a significant proportion of the city in the 'worst case' scenario event?	<p>3 – There would be no loss of service even from “most severe” scenario.</p> <p>2 – Some loss of service would be experienced from the “most severe” scenario.</p> <p>1 – Some loss of service would be experienced from the “most probable” scenario.</p> <p>0 – Significant loss of service would be experienced from the “most probable” scenario.</p>	
<b>P 8.7</b>	<b>Health care</b>	Would there be sufficient acute healthcare capabilities to deal with expected major injuries in 'worst case' scenario?	<p>3 – &gt;90% of major injuries in “most severe” scenario, can be treated within 6 hours.</p> <p>2 – &gt;90% of major injuries in “most severe” scenario, can be treated within 24 hours.</p> <p>1 – &gt;90% of major injuries in “most severe” scenario, can be treated within 36 hours.</p> <p>0 – Longer than 36 hours, or no emergency healthcare capability.</p>	
<b>P 8.8</b>	<b>Education facilities</b>	% of education structures at risk of damage from “most probable” and “most severe” scenarios	<p>3 – No teaching facilities at risk in “most severe” scenario.</p> <p>2 – No teaching facilities at risk in “most probable” scenario.</p> <p>1 – 5-10% of teaching facilities at risk in “most probable” scenario.</p> <p>0 – &gt;15% of teaching facilities at risk in “most probable” scenario.</p>	

<p><b>P 8.9</b></p>	<p><b>First Responder assets</b></p>	<p>Will there be sufficient first responder equipment, with military or civilian back up as required?</p>	<p>3 – Equipment levels and assets have either been modelled or proven to be adequate in practice to deal with a “most severe” scenario.</p> <p>2 – Equipment levels and assets have either been modelled or proven to be adequate in practice to deal with a “most severe” scenario, although this relies on mutual aid arrangements. Mutual aid agreements are tested for likelihood of being affected by the same disaster.</p> <p>1 – Assets will meet basic needs under “most severe” scenario, but gaps are known to exist.</p> <p>0 – Significant gaps in ability to meet needs even under “most likely” scenario.</p>	<p>First responder staffing – see Essential 9.</p> <p>Critical law and order/responder assets include such items as:</p> <ul style="list-style-type: none"> <li>• Vehicles (fire-fighting, ambulances, police vehicles)</li> <li>• Helicopters and aircraft;</li> <li>• Emergency food and first aid stocks/supplies</li> <li>• Shelters</li> <li>• Back-up generators</li> <li>• (Communications systems – see above)</li> <li>• (Operations centres – see below)</li> <li>• (Key buildings – see below)</li> <li>• (Critical IT systems – see below).</li> <li>• Utility vehicles, as required to restore energy, communications, water and sanitation services;</li> <li>• Other critical equipment such as earthmovers, trucks, winches, chainsaws etc.</li> </ul> <p>Service may be provided either from the asset itself or via a designated alternative/back-up.</p>
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ESSENTIAL

09

**Ensure Effective  
Disaster Response**





## Essential 09: Ensure Effective Disaster Response

### Building on the scenarios in Essential 2, ensure effective disaster response, for example by:

- Creating and regularly updating contingency and preparedness plans, communicated to all stakeholders through the structure in Essential 1 (especially including other levels of government and adjacent cities, infrastructure operators, community groups). Contingency plans to include law and order, providing vulnerable populations with food, water, medical supplies, shelter, and staple goods (e.g. for housing repairs).
- Developing and installing detection and monitoring equipment and early warning systems and effective associated communication systems to all stakeholders and community groups.
- Ensuring interoperability of emergency response systems in adjacent cities or counties, between agencies and with neighbouring cities.
- Holding regular training drills/tests and exercises for all aspects of the wider emergency response “system” including community elements and volunteers.
- Integration of risk reduction and emergency response with engineers, contractors, et al to be able to effectively and efficiently engage in preparedness, response and recovery operations.
- Coordinating and managing response activities and relief agencies’ inputs.
- Ensuring in advance that a viable mechanism will exist for the rapid, rational and transparent disbursement of funds after a disaster (Essential 10).
- Assigning and ring-fencing adequate contingency funds for post event response and recovery (Essential 3).

**Data you will need to complete this section of the Scorecard (potentially from multiple organizations and agencies) will include:** which warning systems exist and whom they will reach; emergency management plans and procedures that specifically consider the impact of the scenarios in section 3; documentation of first responder – staffing and equipment - capabilities; records of drills and practices; identification of systems where interoperability with other agencies is critical and of the standards adopted; and records of evaluations, learning points and improvements enacted.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 9.1	<b>Early warning</b>	Does the city have a plan or standard operating procedure to act on early warnings and forecasts? What proportion of the population is reachable by early warning system?	<p>3 – Estimated that over 90% of the population is reachable by early warning system.</p> <p>2 – Estimated that over 75% of the population is reachable by early warning system.</p> <p>1 – Estimated that more than half of the population is reachable by early warning system.</p> <p>0 – Less than half of the population is reachable by early warning system.</p>	At this time, meaningful early warning for earthquakes is not technologically possible.
P 9.2	<b>Event management plans</b>	Is there a disaster management / preparedness / emergency response plan outlining city mitigation, preparedness and response to local emergencies?	<p>3 – There is a disaster management / preparedness / emergency response plan outlining city mitigation, preparedness and response to local emergencies.</p> <p>2 – A comprehensive plan exists but it contains significant gaps in coverage for city mitigation, preparedness and response to local emergencies.</p> <p>1 – Some plans exist, but they are not comprehensive or joined up. 0 – No known plan.</p>	Does the plan provide the city strategy, organization and structure for disaster preparedness and response directions? Does it set out roles, responsibilities, resources, cooperation and coordination modalities among key city stakeholders?
P 9.3	<b>Staffing / responder needs</b>	Does the responsible disaster management authority have sufficient staffing capacity to support first responder duties in surge event scenario?	<p>3 – Surge capacity exists and is tested either via actual events or practice drills for disaster and risk scenarios in Essential 2 – coverage of all neighbourhoods will be possible within 4 hours.</p> <p>2 – Coverage of all neighbourhoods within 24-48 hours. 1 – Coverage of all neighbourhoods within 48-72 hours.</p> <p>0 – No surge capacity identified.</p>	Adequacy of equipment levels is covered in Essential 8.
P 9.4	<b>Equipment and relief supply needs</b>	Are equipment and supply needs, as well as the availability of equipment, clearly defined?	<p>3 – Needs defined, linked to disaster scenarios, and taking into account the role of volunteers.</p> <p>2 – Needs defined, linked to disaster scenarios.</p> <p>1 – Needs definition is essentially nominal or guesswork.</p> <p>0 – No needs defined (or no plan).</p>	

<b>P 9.5</b>	<b>Food, shelter, staple goods and fuel supply</b>	Would the city be able to continue to feed and shelter its population post-event?	<p>3 – In “most severe” scenario, supply of emergency food and basic relief items exceeds estimated need.</p> <p>2 – In “most severe” scenario, supply of emergency food and basic relief items is equal to estimated need.</p> <p>1 – In “most severe” scenario, supply of emergency food and basic relief items is less than estimated need by 2% or more.</p> <p>0 – In “most severe” scenario, supply of emergency food and basic relief items is less than estimated need by 5% or more / food gap exceeds 24 hours.</p>	
<b>P 9.6</b>	<b>Interoperability and inter-agency working</b>	Is there an emergency operations centre, with participation from all agencies, automating standard operating procedures specifically designed to deal with “most probable” and “most severe” scenarios?	<p>3 – Emergency operations centre exists with hardened / redundant communications, designed to deal with “most severe” scenario; all relevant agencies participate.</p> <p>2 – Emergency operations centre exists with hardened / redundant communications, designed to deal with “most severe” scenario; core agencies only participate.</p> <p>1 – Emergency operations centre designated but with vulnerable communications and/or one or more relevant agencies not participating.</p> <p>0 – No emergency operations centre.</p>	
<b>P 9.7</b>	<b>Drills</b>	Do practices and drills involve both the public and professionals?	<p>3 – Annual suite of drills validated by professionals to be realistic representation of “most severe” and “most probable” scenarios.</p> <p>2 – Annual drills validated by professionals, limited test scenarios. 1 – Ad hoc partial exercises – not all scenarios tested, not realistic. 0 – No exercises (or no plans – see above).</p>	Skills training is covered in Essential 6.

ESSENTIAL

10

**Expedite Recovery and  
Build Back Better**





## Essential 10: Expedite Recovery and Build Back Better

**Ensure sufficient pre-disaster plans according to risks identified, and that after any disaster, the needs of the affected are at the centre of recovery and reconstruction, with their support to design and implement rebuilding.**

Building Back Better is a key element of the Sendai Framework and Ten Essentials. After any disaster there will be a need to:

- Ensure that the needs of disaster survivors and affected communities are placed at the centre of recovery and reconstruction, with support for them and their community organizations to design and rebuilding shelter, assets and livelihoods at higher standards of resilience.
- Planners should ensure that the recovery programmes are consistent with the long-term priorities and development of the disaster-affected areas.

Recovery, rehabilitation and reconstruction can, to a considerable degree, be planned ahead of the disaster. This is critical to building back better and making nations, cities and communities more resilient to disasters than they were before the event. Pre-disaster plans for post-event recovery should cover the following and with necessary capacity building, where relevant:

- Providing shelter, food, water, communication, addressing psychological needs, etc.
- Limiting and planning for any use of schools as temporary shelters.
- Identifying the dead and notifying next of kin.
- Debris clearing and management.

- Taking over abandoned property.
- Management of local, national and international aid and funding, and coordination of efforts and prioritizing and managing resources for maximum efficiency, benefit and transparency.
- Integration of further disaster risk reduction in all investment decisions for recovery and reconstruction.
- Business continuity and economic reboot.
- Learning loops: undertake retrospective/post-disaster assessments to assess potential new vulnerabilities and build learning into future planning and response activities.

**Data you will need to answer this section of the Scorecard will include:** post-event plans, potentially from multiple organizations and agencies.

## Preliminary assessment

Ref	Subject / issue	Question / assessment area	Indicative measurement scale	Comments
P 10.1	Post event recovery planning – pre event	Is there a strategy or process in place for post-event recovery and reconstruction, including economic reboot, societal aspects etc.?	<p>3 – There is a strategy / process in place. It is robust and well-understood by relevant stakeholders.</p> <p>2 – There is a strategy / process in place. It is well-understood by relevant stakeholders but has known weaknesses.</p> <p>1 – Some plans / strategies exist but they are not comprehensive or joined up or understood by relevant stakeholders.</p> <p>0 – No known plans.</p>	<p>Comprehensive post event recovery plans will need to detail, for example,</p> <ul style="list-style-type: none"> <li>• Interim arrangements for damaged facilities;</li> <li>• Locations and sources of temporary housing;</li> <li>• Triage policies for inspection, repairs and debris removal;</li> <li>• Counselling and personal support arrangements;</li> <li>• Community support arrangements;</li> <li>• Economic reboot arrangements;</li> <li>• Improvements to city layout and operations as rebuilding takes place.</li> </ul> <p>Plans may be from several organizations, but these should be reviewed for consistency of assumptions and priorities.</p> <p>Post event organization structures – see Essential 1, Funding – see Essential 3.</p>
P 10.2	Lessons learnt / learning loops	Do post-event assessment processes incorporate failure analyses and the ability to capture lessons learned that then feed into design and delivery of rebuilding projects?	<p>3 – Clear processes are in place to capture lessons from failures post-event. There are clear and effective mechanisms / processes to feed these lessons into design and delivery of rebuilding projects.</p> <p>2 – Clear processes are in place to capture lessons from failures post event, mechanisms / processes to feed these lessons into design and delivery of rebuilding projects require improvement.</p> <p>1 – Some lessons are captured and disseminated but not in a thorough or systematic way.</p> <p>0 – Lesson learnt are unplanned / ad-hoc and rely on individuals.</p>	<p>This learning is critical in helping a city understand how it can 'build back better' and also in improving comprehension of risks. New risks and learning from real events can be re-incorporated into to city risk management framework, as outlined under Essential 2.</p>

*Notes*

# Appendices

All appendices for the Disaster Resilient Scorecard for Cities are included with Part 2.

Part 2 is available to download from: <https://mcr2030.undrr.org/disaster-resilience-scorecard-cities>

For more information, visit the MCR2030 website:

[mcr2030.undrr.org](http://mcr2030.undrr.org)