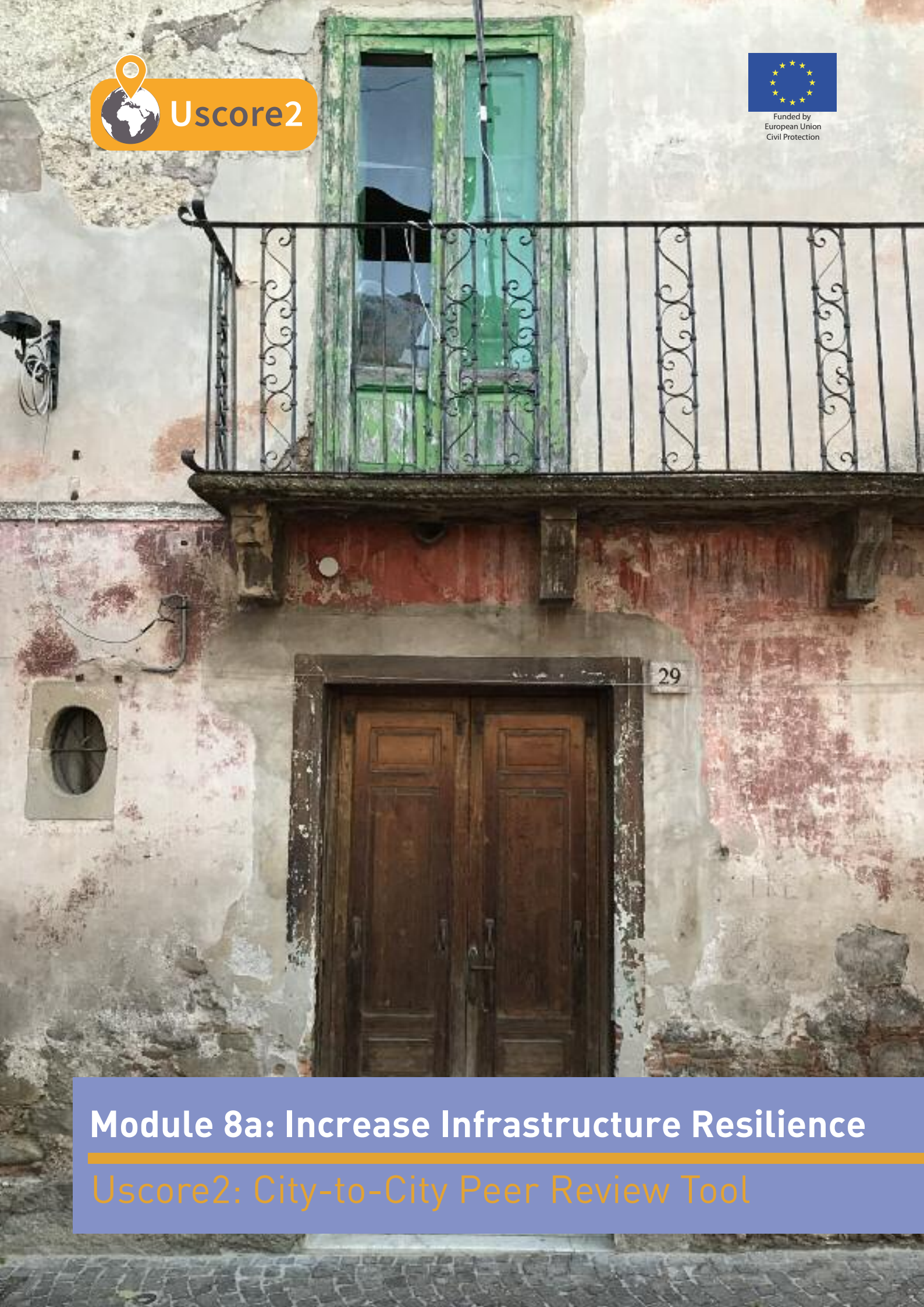

Module 8a: Increase Infrastructure Resilience

Uscore2: City-to-City Peer Review Tool

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INTRODUCTION

Uscore2 is a peer-to-peer review process for cities. Designed with funding from the European Commission, it enables cities to share and learn from good practice in Disaster Risk Reduction (DRR) in other cities across the world. Uscore2 focuses on the use of city-level peer reviews as a tool with which the activities of one city in the area of disaster risk management and civil protection are examined on an equal basis by fellow peers who are experts from other cities. This approach facilitates improvements in DRR through the exchange of best practice and mutual learning, whilst also maintaining impartiality and transparency. This peer review programme integrates an evidence based methodology for impact evaluation, enabling participants to demonstrate the value generated by the investment in the peer review.

Cities undertaking a peer review of infrastructure resilience will generally be undertaking this as part of a wider review as outlined in the Uscore2 Step-by-Step Guide to City-to-City Peer Reviews for Disaster Risk Reduction. The Step-by-Step Guide provides an essential overview of the peer review process, the Impact Evaluation Methodology (IEM) used to measure the impact of the peer review and the 11 Modules for conducting city-to-city peer reviews for DRR.

It is strongly recommended that cities interested in inviting another city to peer review their DRR activity work through the Step-by-Step Guide as a precursor to undertaking Module 8a. This Module Guide gives information relevant to those steps in the peer review process which are specific to Module 8a.

During the development of Uscore2, the peer review process has been piloted by three cities: Amadora (Portugal), Salford (UK) and Viggiano (Italy). The pilot cities spoke positively of their experiences:

> "Peer reviews are interactive and about mutual learning, exchange of best practice and policy dialogue, a support tool for prevention and preparation under the EU civil protection mechanism and promote an integrated approach to disaster risk management, linking risk prevention, preparation, response and recovery actions."

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BACKGROUND

This Module addresses the protection and support of critical infrastructure services, systems and supplies which enable a city to run in times of normality, crises and recovery (UNISDR, n.d). One of the seven targets of the Sendai Framework for Disaster Risk Reduction 2015 – 2030 is to substantially reduce disaster damage to critical infrastructure and disruption of basic services such as health and educational facilities through developing their resilience by 2030 (Sendai Framework, 2015).

Critical infrastructure includes facilities that are required for the operation of the city and, where different, those that are required specifically for emergency response. As such, special attention must be paid to preserving their function and risk reduction efforts must focus on ensuring they can continue providing services when most needed (UNISDR, 2017). Critical infrastructure required for city operation may include, but is not limited to: transport (roads, rail, airports and other ports), vehicle and heating fuel suppliers, telecommunication systems, utilities systems, hospitals and healthcare facilities, educational institutes and school facilities, food supply chain, police and fire services, etc. (UNISDR, n.d).

Critical infrastructure services also carry out essential functions during and after a disaster, where they are likely to provide recovery and relief (UNISDR, n.d).

Resilience of critical infrastructure can be supported through upgrading infrastructure protection (Johnson and Blackburn, 2014), advancing technical capacity (Manyena 2016), and developing performance goals for infrastructure design and recovery (Briceño 2010). In turn, this supports continued access to, and functionality of, critical services within cities throughout potentially varied periods of stability.

To effectively assess the resilience of critical infrastructure it is important to identify the ways in which these physical and technical systems interact with the political, social and economic systems of the city (Briceño, 2010). To do this, critical infrastructure resilience should involve perspectives from multiple stakeholders who are able to provide insights into the vulnerabilities and exposure of all these systems (Birkmann et al., 2013; Kamh et al., 2016).

To effectively assess the resilience of critical infrastructure it is important to identify the ways in which these physical and technical systems interact with the political, social and economic systems of the city (Briceño, 2010). To do this, critical infrastructure resilience should involve perspectives from multiple stakeholders who are able to provide insights into the vulnerabilities and exposure of all these systems (Birkmann et al., 2013; Kamh et al., 2016).

The starting point for a city increase their infrastructure resilience is to understand:

- Which infrastructure is critical to the functioning of the city
- The condition and vulnerability of the infrastructure and whether it lies in areas at risk from hazards
- The design codes and maintenance standards that ensure resilience is considered throughout an asset's lifecycle
- The stakeholders that own and operate the infrastructure, together with the availability of data for use in disaster risk mitigation, prevention, response and recovery (UNISDR, 2017).

This understanding can be supported through:

- Ensuring any changes in risks in the environment within which assets operate or in the use of the infrastructure itself are understood and addressed over time
- Developing good asset management processes with regular inspection, up-to-date data on asset condition, routine maintenance and rapid repair mechanisms for critical assets
- Developing and implementing strong disaster response plans with regular training on disaster response to ensure all organisations that own and manage critical infrastructure have high levels of readiness and preparedness
- Balancing access to, and sharing of, data between system owners to encourage an understanding of inter-dependencies whilst being mindful of commercial and security concerns
- Planned investment together with holding contingency budgets and enabling retrofitting where necessary
- Assessing whether the infrastructure has redundancy and / or surge capacity which can accommodate sudden increases in use during emergencies.

Due to the broad range of infrastructure in a city, much of which may connect regionally or nationally, it is vital that the peer review process encourages cross-sector discussions to address maintenance of services, response to disasters and reduction of risk (UNISDR, 2017). These should actively seek to facilitate knowledge exchange and best practice in critical infrastructure resilience across the various physical, technical, political, social and economic systems of the city to ensure a holistic and integrated approach.

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Further Information

For further information on peer reviews visit: www.Uscore2.eu. Also refer to ISO 22392 when published. Currently it is in draft and will contain further information about peer reviews.

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HOW CAN INCREASED INFRASTRUCTURE RESILIENCE BE ASSESSED AND IMPROVED?

The description of Essential 8: Increase Infrastructure Resilience taken from the UNISDR's Making Cities Resilient website and given below, describes the activities a city should be demonstrating to improve resilience in this area. A city's capacity for resilience is the responsibility of a number of organisations, though it is usual for local government to take the lead and enable effective collaboration.

Essential Eight: Increase Infrastructure Resilience

Assessment of the capacity and adequacy of critical infrastructure

- Consider possible damage to parallel infrastructure. For example, impact on evacuation capacity if one of two roads out of a city is blocked;
- Take into account linkages between different systems. For example, impact when a hospital loses its power or water supply.

Strengthen / retrofit the vulnerable infrastructure

- Start systematic triaged processes for prioritisation of retrofit or replacement of unsafe infrastructure;
- Liaise with, and build connections between infrastructure agencies (including those that may be in the private sector) to ensure resilience is considered appropriately in project prioritisation, planning, design, implementation and maintenance cycles;
- Carry out procurement processes that to include resilience criteria agreed upon by the city and stakeholders and is consistent throughout.

Establish alliances with environmental managers and the private sector

- Build capacity with partners to carry out risk and vulnerability assessments, environmental assessments and scientific monitoring, expanding governance capacities for ecosystem-based disaster risk management through multi-sector, multidisciplinary platforms, involving local stakeholders in decision making;
- Build partnerships with the private sector to leverage technical and financial resources and ensure that private investments follow environmental and risk reduction norms.

Recognise the relevance of priority services and operations during and after a disaster

- For emergency management infrastructure, assess "surge" capacity – ability to deal with suddenly increased loadings from law and order issues, casualties, evacuees, and so on;
- Protect or support the protection of cultural and collecting institutions, and other sites of historical, cultural heritage and religious interest.

HOW CAN THIS BE MEASURED?

The following table lists the high level indicators for Essential 8 taken from the Disaster Resilience Scorecard Preliminary Level Assessment. Indicators 8.1 to 8.6 and indicators 8.8 and 8.9 make up Module 8a. These are used in this Module as indicators against which to gather evidence and make recommendations.

Indicator 8.7 is covered under a separate Module 8b which explores public health and DRR.

Ref	Subject / Issue	Question / Assessment Area
P 8.1	Critical infrastructure overview	Is critical infrastructure resilience a city priority, does the city own and implement a critical infrastructure plan or strategy?
P 8.2	Protective infrastructure	Is existing protective infrastructure well-designed and well-built based on risk information?
P 8.3	Water - potable and sanitation	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 8.4	Energy	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 8.5	Transport	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 8.6	Communications	Would a significant loss of service be expected for a significant proportion of the city in the 'worst case' scenario event?
P 8.7	Health care	Would there be sufficient acute healthcare capabilities to deal with expected major injuries in 'worst case' scenario? ***This area is covered in Module 8b Health.**

Ref	Subject / Issue	Question / Assessment Area
P 8.8	Education facilities	% of education structures at risk of damage from "most probable" and "most severe" scenarios.
P 8.9	First responder assets	Will there be sufficient first responder equipment, with military or civilian back up as required?

The full Detailed Assessment from the Disaster Resilience Scorecard for Cities is available through the following link:
http://www.unisdr.org/campaign/resilientcities/home/toolkitblkitem/?id=4.

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METHODOLOGY
PHASE 2, STEP 7: INFORMATION TO SEND TO REVIEW TEAM PRIOR TO THE REVIEW TEAM VISIT

Please refer to the Step-by-Step Guide for advice on both conducting and hosting peer reviews. This section sets out information that is specific to this Module, which begins in Phase 2.

As set out in the Step-by-Step Guide if Modules 1 (Organise for Disaster Resilience) and 2 (Identify, Understand and Use Current and Future Risk Scenarios) are not undertaken at the same time as Module 8a, then an overview of both the Host City's disaster risk governance and DRR risk assessment should be included in the pre-visit information sent to the Review Team.

The Host City should aim to send the pre-visit evidence to the Review Team three months ahead of the Review Team's visit. It is recommended that the pre-visit evidence is limited to 3 – 5 items for each Module.

Suggestions for the type of pre-visit evidence that could be shared between cities

A selection of evidence should be sent to the Review Team before their visit to the Host City. This could include the type of information listed below or any other information that the two cities agree would be of benefit.

It is **highly recommended** that the Host City prepare a **summary** of how the city promotes increased infrastructure resilience including:

- An overview of the main types of critical infrastructure in the Host City, the services they provide and who owns / operates the different infrastructure
- The key stakeholders in the Host City involved in assessing and strengthening infrastructure resilience
- The measures that the Host City has in place to prepare for, respond to and recover from infrastructure damage caused by a disaster.

In addition, **no more than 4 other items** should be selected from the suggestions below to demonstrate the Host City's baseline capacity.

P 8.1: Critical infrastructure overview

- A summary of how the Host City promotes infrastructure resilience outlining the risks to critical infrastructure
- A structure chart or process diagram that shows who has the responsibility for planning and approving new infrastructure development in the Host City including extensions to existing systems
- A description of roles and responsibilities for assessing how disaster risks may affect the Host City's critical infrastructure, including updating and reviewing these risk assessments, together with the approach taken to reducing the vulnerability and exposure of infrastructure identified as being at risk
- A map illustrating the interdependencies between different types of infrastructure and an assessment of any potential cascading consequences or failure chains in a disaster
- A plan or other document that provides an example of how institutions in the Host City are planning to work together to maintain or restore the essential services provided by critical infrastructure if it is damaged during a disaster
- An example of any formal reports, perhaps drafted for the local government or Mayor, on critical infrastructure resilience
- A report from, or description of, an example of a city-to-city knowledge exchange that has resulted in a strengthening of the resilience of the Host City's critical infrastructure

- A report assessing learning from any exercises held in the Host City to rehearse critical infrastructure response and recovery plans, together with any action plan to implement the learning identified from the exercise
- A case study of a retrospective or post-disaster assessment to assess critical infrastructure vulnerabilities and how this has then informed mitigation activity or has been built into future planning and response / recovery activities
- The outcomes of local completion of the UNISDR's Disaster Resilience Scorecard for Cities, Essential 8.

P 8.2: Protective Infrastructure

- A map or description indicating the location of key protective infrastructure and the risk(s) it is reducing, for example, flood defences protecting areas of residential and industrial activity
- An example of the Host City's building codes or standards that new infrastructure is expected to meet in order to be resilient to disaster risks
- Details of any schemes using nature based solutions to reduce disaster risks.

Due to similarities the following areas are grouped together:

P 8.3: Water – Potable and Sanitation
P 8.4: Energy
P 8.6: Communications
P 8.8: Education Facilities

- The outcomes of any modelling that the Host City has undertaken to understand the impacts on water, sanitation and energy supplies, communications and / or educational facilities of the loss of these infrastructure types in both the most probable and the most severe disaster scenarios
- The Host City's emergency management plan for dealing with loss of water, sanitation and energy supplies, communications and / or educational facilities
- Public information advising the population how to act if water, sanitation and energy supplies, communications and / or educational facilities are interrupted
- A Memorandum of Understanding (MoU) between the Host City government and a private sector organisation for supplies or services in an emergency where water, sanitation and energy supplies, communications and / or educational facilities have been interrupted
- A plan or outline description of the arrangements for restoring water, sanitation and energy supplies, communications and / or educational facilities in the post-disaster recovery phase
- An example of an occasion where the Host City, following a disaster, has reconstructed more resilient water, sanitation and energy supplies, communications and / or educational facilities.

P 8.5: Transport

- A map indicating areas at risk of a disaster in the Host City and the likely impacts for the transport infrastructure for both the most probable and worst-case scenarios
- An inspection and maintenance schedule for key transport infrastructure including tunnels and bridges
- An evacuation plan for the Host City indicating how transport flows out of the city will be maintained in the evacuation and how relief supplies will enter the city post-disaster

- A response plan or similar document outlining how the Host City's transport infrastructure will be maintained in the case of a major disaster
- An example of how the Host City has used learning identified in disaster scenarios elsewhere in the world to strengthen its own plans to provide effective means of transport in an emergency.

P 8.9: First Responder Assets

- An assessment that the Host City has undertaken to model the first responder assets that will be required in the most probable and worst case disaster scenarios
- The outcomes of any comparative global indices that the Host City has undertaken to assess its provision of first responder assets e.g. WCCD, DRS, CRI
- A copy of the programme together with a list of the stakeholders that participated in a recent training and exercising event for critical infrastructure resilience
- A report assessing learning from any multi-agency exercises held in the Host City to rehearse critical infrastructure recovery plans, together with any multi-agency action plans to implement the learning identified.

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PHASE 2, STEP 8: ARRANGEMENTS FOR THE PEER REVIEW VISIT

As described in the Step-by-Step Guide, in the 3-6 months before the peer review visit, the Host City and Review Team are recommended to agree an agenda for the visit. This will include a range of activities to enable the Review Team to understand how the Host City is strengthening and improving its preparations to strengthen the resilience of its critical infrastructure. The types of activities could include some or all of those listed below, or any other relevant actions.

It is anticipated that the review of this Module will take approximately 3 days given the breadth of infrastructure types covered. If preferred, the Host City and Review Team could agree to focus on a small selection of indicators and infrastructure types.

For all interviews, the Host City should ensure translators are available if they are required.

At the start of the Review Team's assessment of Module 8a, the Host City is **highly recommended** to make a **presentation** to the Review Team which sets out its approach to strengthening infrastructure resilience.

This could include information about:

- The Host City's key infrastructure assets and how they are owned and managed, including the key stakeholders involved in delivering resilient infrastructure
- The governance arrangements in the Host City for critical infrastructure resilience including information on an infrastructure plan or strategy
- How Host City infrastructure providers are coordinated and work together to deliver essential services in a disaster, especially for the most probable and most severe disaster scenarios, including preparing and planning for emergencies, together with responding to and recovering from them.

Who should the Review Team interview?

When considering who is important for the Review Team to interview and / or receive a presentation from, it is **highly recommended** that **the Mayor** and / or other key local political leaders who give leadership in strengthening infrastructure resilience are included and available. The Host City and Review Team should consider any other Modules being assessed during the peer review, albeit infrastructure resilience may form the basis of an entire peer review, and combine relevant questions with each senior politician or officer into one appointment.

The Host City and Review Team may also wish to consider who would be most appropriate in light of their initial exchange of pre-visit information and also given the most probable and most severe disaster scenarios for the city.

Suggestions include:

- Infrastructure owners and providers of essential services to keep the Host City functioning effectively, who can offer information about infrastructure resilience
- Infrastructure owners and providers who can describe how essential services will be maintained in a disaster
- Senior managers of institutions that deliver critical infrastructure services whether part of the city government or the private sector
- Municipal officials who have responsibilities for infrastructure strategy, development and planning in the Host City who can describe how resilience is taken into account in infrastructure decisions
- Municipal officials responsible for the implementation, verification and enforcement of building codes and standards for infrastructure resilience, including any used to retrofit infrastructure to strengthen its resilience

- Municipal officials responsible for evacuation planning, including those who make arrangements for the care of displaced people
- Academics, researchers and technical experts who assess the Host City's disaster risks, model the impact of disaster risks on infrastructure and assess inter-dependencies and cascading consequences in infrastructure failure
- Environmental managers who can discuss the relationship between protective ecosystems, urban disaster risk and the built environment in the Host City
- Senior managers and practitioners from first responder organisations who can describe the assets available in an emergency and how the adequacy of supply is determined, including how additional assets can be sourced in a disaster where a surge in capacity is required
- Community representatives, faith leaders and municipal officials who can describe how the resilience of the Host City's cultural, religious, heritage and historic infrastructure is strengthened in case of disaster
- Representatives from the insurance industry to discuss the risks to the Host City's infrastructure, insurance coverage, the protection afforded to the Host City's infrastructure in a disaster and how the industry might support efforts to build back better after a disaster
- Representatives from the institutions providing funding for new infrastructure projects who can discuss the role of resilience in financing decisions
- Practitioners who have been involved in a city-to-city knowledge exchange to explore how this has helped the Host City to strengthen its infrastructure resilience.

How can the Host City multi-agency capacity be demonstrated?

In addition to interviews and presentations, suggestions for activities within the programme for the visit include but are not limited to the list below. In the pilot of this Module, site visits proved an effective means of demonstrating infrastructure resilience to the Review Team.

- Site visits to critical infrastructure including: protective infrastructure; that for water, sanitation, energy, transport and communications
- Visiting at least one of the key emergency response agencies with a significant role in disaster response to understand and view the capabilities available for effective disaster response
- Visits to sites where the Host City has invested to improve critical infrastructure resilience reducing the exposure or vulnerability of critical infrastructure to disaster risk
- Visiting one of the Host City's critical infrastructure providers to observe how they prepare and plan for an emergency that may interrupt critical supplies
- Site visits to identified evacuation centres and areas identified for temporary housing and shelter
- A site visit to view infrastructure that has been retrofitted to strengthen its resilience
- Site visits to any location(s) in the Host City that have been reconstructed after a disaster with a view to build back better in case of subsequent disasters
- Site visits to understand how cultural, religious, heritage and historic infrastructure is improving its resilience to disasters.

Exercises and Training

Observing an example of a public or practitioner training event taking place in the Host City at the time of the visit, or observation of a table top or live exercise to rehearse the response to and recovery from a disaster that impacts critical infrastructure in the Host City, may be helpful. However, given the limited time available, if this is not feasible, the Host City may wish to include video or other evidence from these activities.

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PHASE 2, STEP 9: REVIEW TEAM: GATHERING EVIDENCE

The Review Team will gather evidence from the pre-review information submitted before the peer review visit, together with information from interviews and activities undertaken during the visit, to gain a view of the effectiveness of the existing capacity to strengthen infrastructure resilience. This will include:

- How effective the Host City is in building resilience considerations into new infrastructure development
- How the institutions have assessed the risks to the Host City's critical infrastructure and whether they have in place suitable, sufficient and scalable plans and procedures, capabilities, systems and arrangements to recover from predicted disaster scenarios
- How effective the strategies within the Host City are to engage all relevant agencies and organisations to support measures to strengthen infrastructure resilience
- Areas of strength and good practice.

The Review Team will structure their evidence gathering and interviews to enable the Host City to describe and demonstrate their approach against each of the indicators included in the Disaster Resilience Scorecard Preliminary Level Assessment. Overall, the Review Team should determine:

- Who leads / contributes / coordinates / assesses performance in this area? Is this effective? Is shared ownership of DRR evident?
- Who is missing / underperforming or underrepresented?
- What skills and experience are evidenced? Are there deficits?
- What activities currently support performance in this area? Are these activities effective?
- What, if any, additional activities would the Host City like to undertake in future? What are the barriers to extending activities?
- How are resources / information / training shared? Are there exclusions or barriers to access?
- How is the Host City accessing local / national / international sources of expertise to improve DRR in this area? Which networks is the Host City part of to support this activity?

Although the Review Team should design their own detailed questions in order to explore issues they consider relevant in the context of the Host City, the following questions are offered as suggestions that may be helpful in stakeholder interviews for Module 8a. They are example questions and it is wholly acceptable to tailor them or, equally, not to use them, according to the individual peer review. The Review Team could choose to select just the relevant questions as well as asking additional questions that have not been listed below.

Ref	Subject / Issue	Suggested Questions
P 8.1	Critical infrastructure overview	**Is critical infrastructure resilience a city priority, does the city own and implement a critical infrastructure plan or strategy?** • What are your responsibilities and accountabilities in relation to critical infrastructure resilience? • What powers and capacity do you have to act on these responsibilities? • How do you define the level of resilience required by the Host City's critical infrastructure and what criteria is this based upon? • How does the Host City understand the condition of its critical infrastructure and any limitations to its continued performance in disasters? • How do you research and assess the future trends, whether local, national or global, that may impact on future critical infrastructure resilience? • How are climate change projections factored into approaches to strengthen infrastructure resilience? • How does the Host City engage in DRR planning with neighbouring areas where infrastructure is cross-border or connected across geographies that extend beyond the city? • How does the Host City engage all critical infrastructure stakeholders, across different sectors, in DRR mitigation, preparedness and capacity-building for disaster response? • What (if any) hazardous industrial critical infrastructure does the Host City contain and how well are these industries engaged in DRR? How are the risks posed by industrial infrastructure managed? • How does the Host City promote the resilience of critical infrastructure when funding new developments? • What plans are in place to allow for surges in demand of services during / after disasters? • What financial mechanisms are there in the Host City / institution(s) to restore the function of their critical systems? What are the arrangements that are in place? • How do critical infrastructure providers and operators, and / or the Host City, gather the views of communities on how resilient they perceive the infrastructure to be?

Ref	Subject / Issue	Suggested Questions
P 8.1	Critical infrastructure overview	• How does DRR planning take into consideration the Host City's cultural heritage? • What are the gaps (if any) at the Host City level in data about critical infrastructure? How can this data be accessed during a disaster? • What maps does the Host City have which show critical infrastructure and / or risks? How have these been overlaid to assess potential critical infrastructure vulnerabilities? • What strategies does the Host City have for increasing and improving critical infrastructure resilience? • How often are the plans for disaster resilience / emergency plans within each infrastructure provider updated? • What strategies are in place to retrofit infrastructure within the Host City to protect it from disaster risks and how is this activity funded? • What plans do critical infrastructure operators, and the Host City, have in place to support vulnerable people if a disaster causes short-term or long-term loss of critical infrastructure and the services they provide?
P 8.2	Protective infrastructure	**Is existing protective infrastructure well-designed and well-built based on risk information?** • How does the Host City assess disaster risks and share information about how the risks might affect the city? • What approaches does the Host City take to investing in and building protective infrastructure? • How does the Host City ensure that protective infrastructure is fit for purpose and will meet the most severe disaster scenario predicted for the city? • What governance arrangements are in place to ensure any protective infrastructure is well-designed and well-built? • How does the Host City protect the most vulnerable and at-need communities from disaster risk? • What approaches does the Host City take to protecting its cultural, religious, heritage and historic infrastructure from disaster risk?

Ref	Subject / Issue	Suggested Questions
P 8.3 P 8.4 P 8.6	Water - potable and sanitation Energy Communication	**Would a significant loss of service for these essential services be expected for a significant proportion of the Host City under the agreed disaster scenarios?** • In the most probable and most severe disaster scenarios for the Host City, what proportion of critical infrastructure is lost? • What arrangements are in place to provide alternative and back-up essential services? • What arrangements exist to restore critical infrastructure in the event it is damaged? • How do infrastructure providers ensure that damage to their infrastructure doesn't pose additional risks e.g. electrocution from electrical infrastructure or transport infrastructure becoming impassable? • How does the Host City ensure that vulnerable and in-need communities are not disproportionately affected by the loss of infrastructure and essential services? • What are the wider inter-dependencies the Host City has considered (e.g. loss of power to a hospital that impacts the provision of healthcare in an emergency)? What arrangements are in place to manage this? • How are the interdependencies between different types of critical infrastructure assessed and how does the Host City and its stakeholders try to prevent cascading failures (or failure chains) as loss of one critical infrastructure type affects another and potentially another?
P 8.5	Transport	**Would a significant loss of service be expected for a significant proportion of the Host City in the 'worst case' scenario event? In the event of failure would critical transport infrastructure corridors remain safe (i.e. free from risk of flood shocks, etc.) and passable?** • What modelling has the Host City undertaken to assess the extent of the impact on its transport systems in the most probable and most severe disaster scenarios? • What arrangements are in place to ensure people can evacuate the Host City, or parts of it, if the transport network is damaged in a disaster?

Ref	Subject / Issue	Suggested Questions
P 8.5	Transport	• What arrangements are in place to ensure emergency services and relief supplies can access areas affected by a disaster if the transport network is damaged? • What does the Host City do to actively promote the principles of equality and non-discrimination in relation to the impact of failure of critical transport infrastructure? • How does the Host City identify and address single points of failure of its transport infrastructure? • How does the Host City promote resilience in its transport systems?
P 8.8	Education facilities	**% of education structures at risk of damage from "most probable" and "most severe" scenarios?** • How does the Host City model the impact of disaster risks on educational establishments? • What arrangements are in place to share disaster risk information with educational establishments? • How does the Host City ensure pupils can be evacuated or sheltered in a place of safety in a disaster? • What strategies does the Host City have in place to reduce and mitigate the impacts of disasters on its educational establishments? • How does the Host City reassure itself that educational establishments in the most vulnerable and in-need communities will not be disproportionately affected in a disaster? • What approach does the Host City take to understanding the impact of climate change on the disaster risk for educational establishments across the city?
P 8.9	First responder assets	**Will there be sufficient first responder equipment, with military or civilian back up as required?** • What approach does the Host City take to understanding, planning for and investing in adequate first responder equipment to deal with disaster risks, including the most probable and most severe disaster scenarios?

Ref	Subject / Issue	Suggested Questions
P 8.9	First Responder Assets	• How does the Host City plan for unexpected surges in demand in both slowly rising risk scenarios, sustained risk scenarios and sudden impact hazards? • What arrangements are in place for the Host City to draw on equipment and resources from elsewhere? o From neighbouring or national administrations? o From emergency responders elsewhere in the country? o From its own supply chains and the private sector? o From NGOs, the voluntary sector and community groups? o From the military? • How does the Host City exercise and validate that it has sufficient first responder equipment for responding to a range of disaster scenarios? • What approach does the Host City take to understanding the impact of future trends such as climate change on the first responder equipment that it needs to have in place? • How does the Host City seek to understand the needs of vulnerable and in-need communities and if there is particular equipment needed for vulnerable people? • How does the Host City plan for first responders to have the equipment needed in a timely manner for institutions at risk in disaster scenarios and where vulnerable people are cared for?

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PHASE 3, STEP 11: RECORDING INFORMATION AND DRAFTING INITIAL RECOMMENDATIONS

The Step-by-Step Guide describes how the Review Team can record information during the peer review visit and includes a generic form that can be used to capture information during individual presentations, interviews and other activities.

At the end of each day it is recommended that the Review Team assemble to consider all the information that it has heard during the day and summarise the evidence to understand:

- Areas of good practice and strengths on which the Host City can build
- Areas where further information may be needed before the peer review visit is finished
- Areas where possible recommendations for the future may be made.

This process will help to inform both the remainder of the visit and the drafting of the peer review outcome report.

The two tables below are offered as a way of recording the overall findings for Module 8a together with the initial recommendations arising from the activities experienced during the day.

SUMMARY OF INITIAL FINDINGS			
	Comments	Justification for assessment	Good practice identified
P 8.1 Critical infrastructure overview Is critical infrastructure resilience a Host City priority, does the Host City own and implement a critical infrastructure plan or strategy?			
P 8.2 Protective infrastructure Is existing critical infrastructure well-designed and well-built based on risk information?			
P 8.3 Water – potable and sanitation Would a significant loss of service for these two essential services be expected for a significant proportion of the Host City under the agreed disaster scenarios?			
P 8.4 Energy a) Would a significant loss of service be expected for a significant proportion of the Host City in the 'worst case' scenario event? b) In the event of failure would energy infrastructure corridors remain safe (i.e. free from risk of leaks, electrocution hazards, etc.)?			
P 8.5 Transport a) Would a significant loss of service be expected for a significant proportion of the Host City in the 'worst case' scenario event? b) In the event of failure would transport infrastructure corridors remain safe (i.e. free from risk of flood, shocks, etc.) and passable?			

SUMMARY OF INITIAL FINDINGS			
	Comments	Justification for assessment	Good practice identified
P 8.6 Communications Would a significant loss of service be expected for a significant proportion of the Host City in the 'worst case' scenario event?			
P 8.8 Education facilities % of education structures at risk of damage from "most probable" and "most severe" scenarios.			
P 8.9 First responder assets Will there be sufficient first responder equipment, with military or civilian back up as required?			
Other			

INITIAL RECOMMENDATIONS			
	Description of areas for potential development	Justification	Time horizon
E.g. Post-event assessment processes, failure analyses and lessons learned.	E.g. Multi-agency debriefs are held to identify strengths, areas that didn't work as well and recommendations.	E.g. Capturing this information and recommendations should aid future response and recovery.	E.g. Short, medium, long term implementation
P 8.1 Critical infrastructure overview Critical infrastructure resilience is a city priority. The city owns and implements a critical infrastructure plan or strategy.			
P 8.2 Protective infrastructure Existing protective infrastructure is well-designed and well-built based on risk information.			

INITIAL RECOMMENDATIONS			
	Description of areas for potential development	Justification	Time horizon
P 8.3 Water – potable and sanitation A significant loss of service for these two essential services would be expected for a significant proportion of the city under the agreed disaster scenarios.			
P 8.4 Energy a) A significant loss of service would be expected for a significant proportion of the city in the 'worst case' scenario event.			
b) In the event of failure energy infrastructure corridors remain safe (i.e. free from risk of leaks, electrocution hazards, etc.)			
P 8.5 Transport a) A significant loss of service would be expected for a significant proportion of the city in the 'worst case' scenario event.			

INITIAL RECOMMENDATIONS			
	Description of areas for potential development	Justification	Time horizon
P 8.5 Transport b) In the event of failure, transport infrastructure corridors would remain safe (i.e. free from risk of flood, shocks, etc.) and passable.			
P 8.6 Communications A significant loss of service would be expected for a significant proportion of the city in the 'worst case' scenario event.			
P 8.8 Education facilities % of education structures at risk of damage from "most probable" and "most severe" scenarios.			
P 8.9 First responder assets There is sufficient first responder equipment, with military or civilian back up as required.			

INITIAL RECOMMENDATIONS			
	Description of areas for potential development	Justification	Time horizon
Other Area / issue			

NOTES:

NOTES:

Further information is available from: www.Uscore2.eu

ISO22392 is being drafted and will contain further information about peer reviews

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