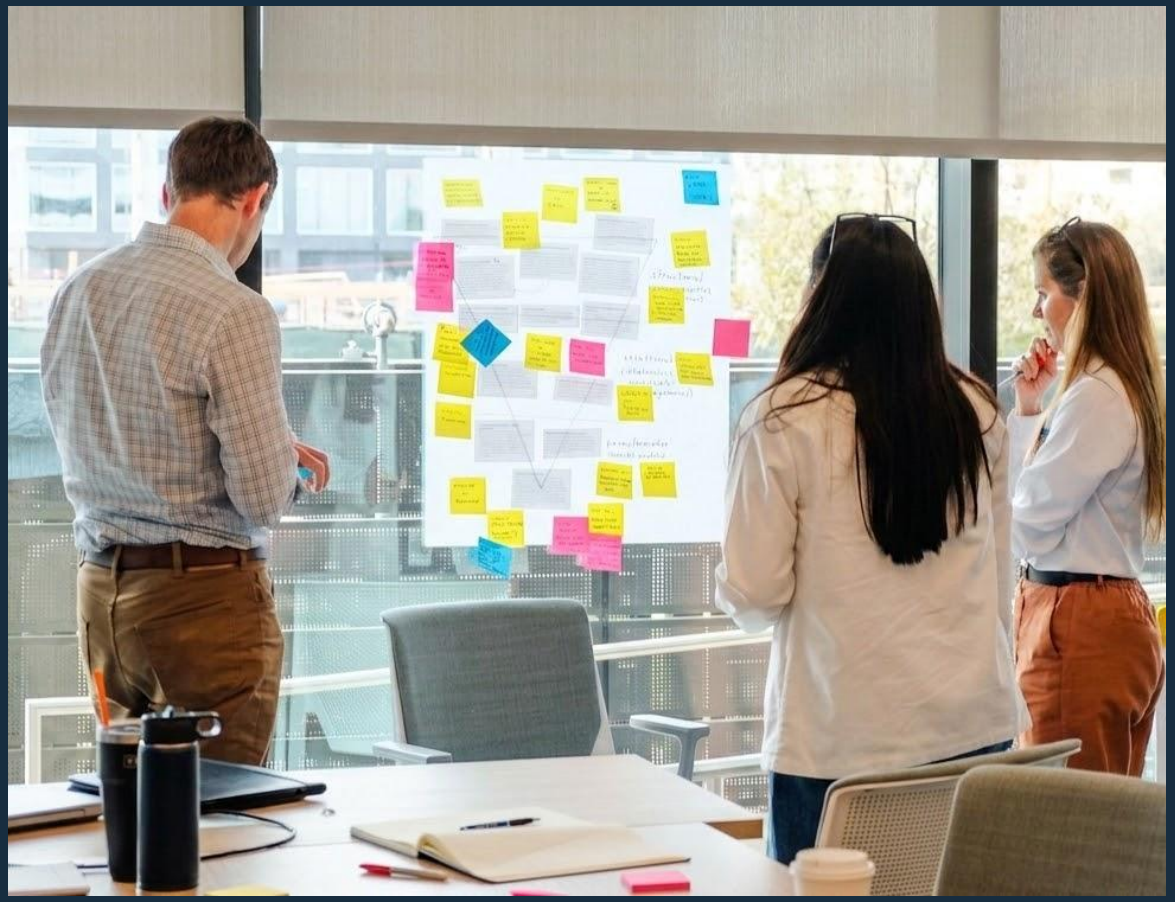
ADAPTING OPERATIONS TO A CHANGING CLIMATE

A guidebook for bridging the gap between data and decision making



Centre for Public Impact
Founded by BCG

TABLE OF CONTENTS

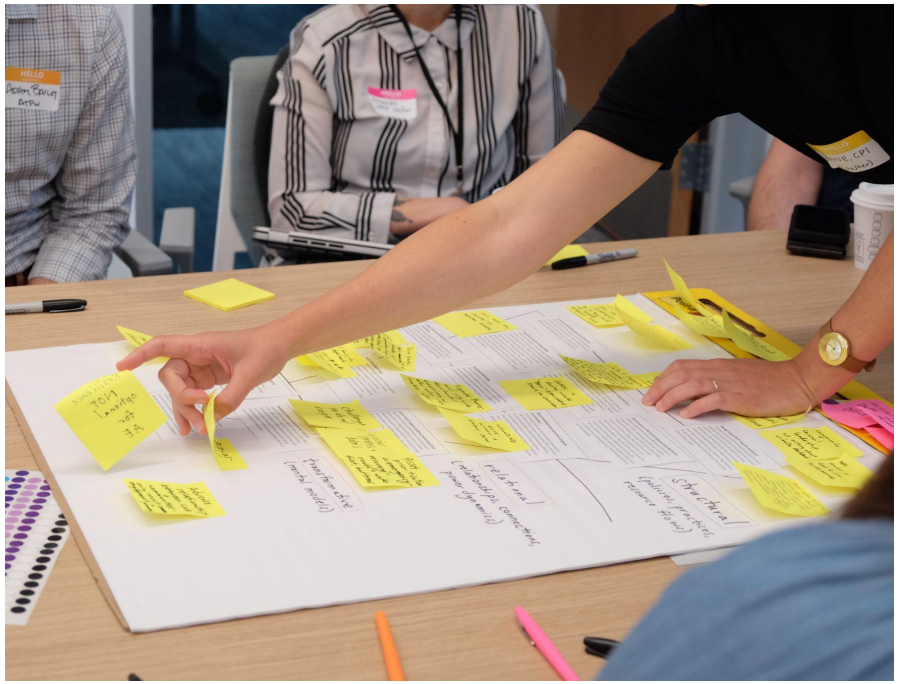
EXECUTIVE SUMMARY

As cities face more frequent and severe extreme weather events, their operations must evolve to keep pace with changing conditions. While individual departments are well equipped to manage day-to-day responsibilities, stronger cross-departmental coordination is essential to address systemic, multi-hazard risks efficiently.

This guidebook outlines a process for city departments to assess and adapt operations – from asset management to service delivery to general process improvement – for greater climate resilience.

The guidebook contains four modules:

1. **Identify your operational risks** focuses on understanding your operation as a whole, identifying impact from climate risks, and setting a time frame for planning.
2. **Understand the cost of not building resilience** translates risks into cost estimates to make a business case for investing in resilience actions.
3. **Design a future-ready strategy** examines future scenarios for developing a strategy that mitigates high-priority risks.
4. **Plan when and how to implement your strategy** lays the groundwork for putting your strategy into practice.



This guidebook will help you and your colleagues to achieve the following:

- Surface risks and ripple effects from climate projections
- Think through and plan for uncertainty
- Connect to colleagues and break down silos
- Consider new and diverse perspectives

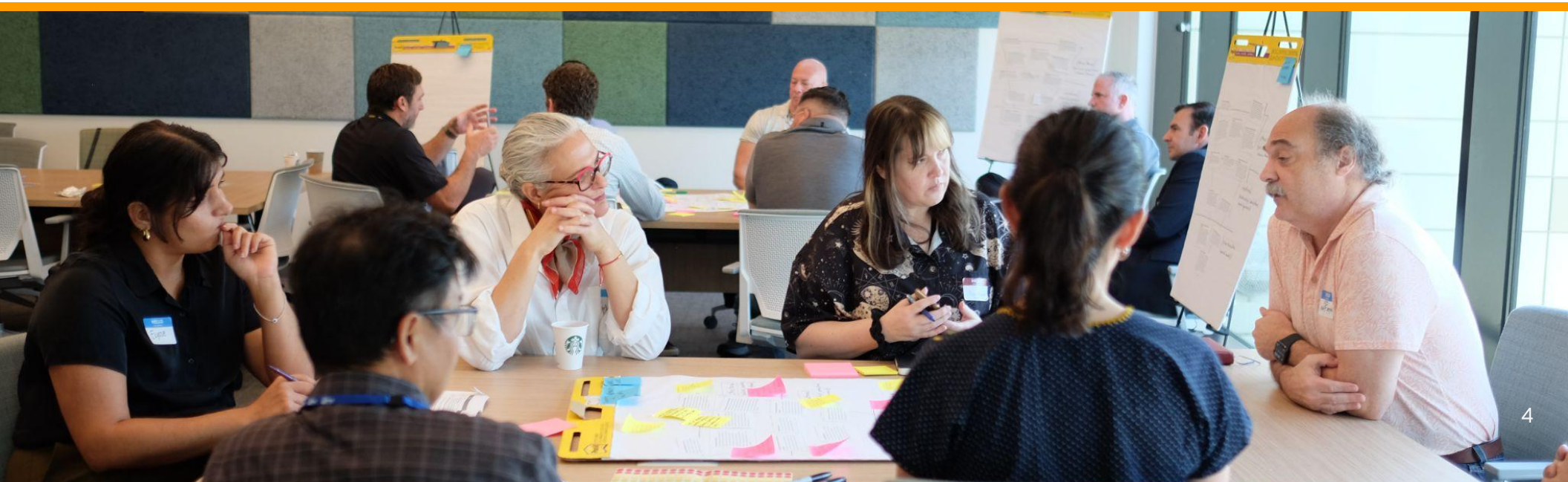
By the end of this guidebook, you will have a reasoned, implementation-ready climate-resilient strategy for your operation. This approach will help you better protect your staff, safeguard assets, maximize the impact of city resources, and reduce the budgetary strain of emergency response and recovery.

CONTEXT

Over six months, the City of Austin (COA) and the Centre for Public Impact (CPI) partnered to create a baseline, scalable process to help departments operationalize responses to climate risk.We hope this brief overview of our partnership and its outputs enables public, private, and social institutions to reduce service disruptions, increase efficiency, and save costs in the face of a changing climate.

The process was based on an analysis of the barriers to improving the resilience of city operations, which involved 15 small-group interviews, an 85+ source literature review, and a 27–person research validation workshop with stakeholders from nine city departments. The project team developed a four-stage process for adapting operations to be more resilient to projected extreme weather events. 72 people across six departments each tested this process on an operational challenge. Through the testing phase, departments gained critical insights into their operations, and developed robust strategies for operationalizing resilience. Some of these strategies will directly inform existing plans and operations.

A tested guidebook is just the first of many steps toward system-wide climate resilience. Through our partnership, we drafted an ecosystem approach to building resilience, complete with short term and long term actions that enable lasting change.



FOUNDATIONS FOR BUILDING RESILIENT OPERATIONS

1. **Exploring an organization's barriers to resilience:** Map cross-departmental barriers using frameworks (e.g., Water of Systems Change, Integral/AQAL) to visualize challenges and foster shared understanding for future advocacy.

2. **Leveraging data and technology to better monitor risks and estimate costs:** Centralize performance, risk, and budget data to fill gaps, enabling more proactive cost-effective, and data-informed investment decisions.

3. **Building leadership buy-in:** It is critical that practitioners make the case to leaders on the value of resilience, documenting and communicating regularly about improvements to service delivery and cost effectiveness that emerge from resilience-building measures.

4. **Aligning incentives and performance with resilience by setting a government-wide resilience goal:** Strengthen mandates for resilience by co-creating clear, organization-wide resilience goals with staff and community members to ensure targets are realistic, motivating, and actionable.

5. **Placing community and frontline experience at the core of change:** Build formal feedback loops with those most exposed to risk, frontline staff and community members, to ground operational decisions in reality.

6. **Crowding in external capital:** Ease budget pressures by working across departments to share funding, building outside partnerships, and using funds for multiple purposes to deliver greater public benefits and improve resilience.

ACKNOWLEDGMENTS

This work was stewarded by Austin Budget and Organizational Excellence (ABOE) and Austin Climate Action and Resilience (ACAR), with contributions from: Austin Energy (AE), Austin Parks & Recreation (AP&R), Austin Resource Recovery (ARR), Austin Transportation & Public Works (ATPW), Austin Water (AW), and Austin Watershed Protection (AWP).

The Centre for Public Impact is grateful for the financial support of the Central Texas Climate Action Fund, and intellectual collaborations with Open Government Partnership, University of Texas at Austin, the OECD, The Urban Systems Lab, and the Institute for the Future that enriched this process.

APPRECIATING OPERATORS

"Success" is underrated. We expect the quiet systems and workers that support our daily lives to continue operating 24/7 with no interruptions or service issues.

It is important that we acknowledge the often-rendered invisible **labor and excellence of operators,** whose ability to deliver demanding, high quality, and truly essential services to the community we are privileged to experience as the norm.

Throughout this guidebook, we ask that you prioritize how resilience-building efforts do not just improve resiliency against future climate uncertainties, but ensure that the people who operate services and facilities **continuously receive greater support, guidance and resources to manage and implement operations with dignity.**

GETTING STARTED - HOW TO USE THIS GUIDEBOOK

Upfront framing
We suggest you go through the modules in the order listed above, while also skipping any activities that are not useful to you. We want you to use this as a series of suggested prompts or starting points that you tailor to your needs!

This process for building resilience stems from systems, design, and futures thinking – which may be new methodologies for you and your team. Practicing these skills and perspectives may feel new, challenging, or uncomfortable at times. If you are new to these approaches, we have more information on what they are, their value, and tools from these frameworks for you to draw upon in the Appendix.

How long will it take to use this guide?
While this answer will differ dramatically from one project to the next, teams who piloted the first version of this guidebook did it over the course of 7 weeks, alongside their normal day-to-day responsibilities. Time estimates are included on the first page of each module, but in total we anticipate a minimum of 15 hours per team across 4 modules.

Can we have an example?
Throughout the guidebook, we reference an example operation – mobilizing crews during emergencies. You can find italicized "Example" responses between prompts and workspaces for most exercises, as illustrators of the level of detail or type of ideas for you to consider in your responses. You are encouraged to adapt the workspaces and questions to your context and needs.

This guidebook is…	*This guidebook is not…*
• **An accessible guide** for how to go from open questions about risks to a more resilient strategy. • **A way to build a business case** for why and how you can make your operations more resilient. • **A baseline way of working** that can be employed by departments and operational functions Citywide (more on this below).	• **A detailed assessment** of your operational vulnerabilities. • **A detailed map** of your operation and how it relates to other department or Citywide functions. • **A guidebook to design specifications** (e.g., safety codes, protocols, etc.) for your operation.

GETTING STARTED - SELECTING A FOCUS AREA

What operation or project should I select for this guidebook?

You will select a specific operation for which to apply the process in the guidebook.

Operations: "Operations" can encompass a wide range of active processes. This guidebook is meant to support discrete, low to medium-complexity operations that involve:

- Planning and coordination (e.g., forecasting, internal learning and connection, incentives alignment, etc.)
- Service delivery (e.g., management of workforce, route, equipment, etc.)
- Infrastructure (e.g. managing upgrades, maintenance, repairs, etc.)

On complexity level: We do not recommend that you rely solely on this process to adapt sophisticated assets or massive operations.

Use the checklist below to assess whether your operation is well suited for this guidebook. The more boxes you can check, the more likely it is a good fit.

Problem focus and ownership:

- ❏ Does your operation mostly sit within your current sphere of influence?
- ❏ Does it involve decision(s) on planning; coordination; service delivery; or infrastructure?

Information access: Do you have data or can you obtain data on …

- ❏ Your operational resources, performance, costs, and/or any operation-specific future projections?
- ❏ Climate projections and data that impact your operation?

Leadership commitment:

- ❏ Is changing your operation in the face of climate risk an explicit priority of your executive leadership?
- ❏ Do you have leadership buy-in around adapting your current operations?

Resourcing:

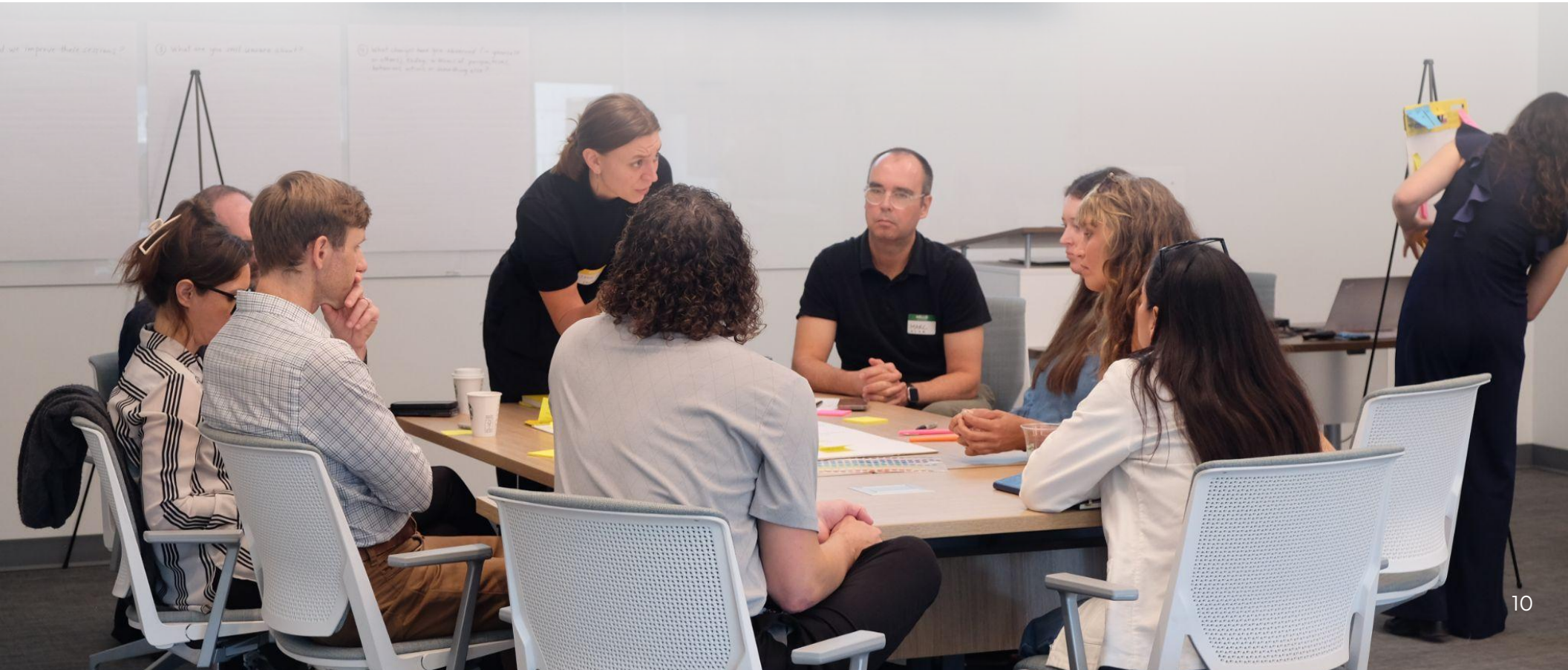
- ❏ Do you have / can you reasonably secure budget, time, and/or subject matter expertise to implement improvements to your operational strategy?
- ❏ Do you have other staff who can take part in these activities or weigh in with their experiences and expertise at key points?

Important: Through this guidebook, you may realize that there's an even more pressing challenge to address beyond your initial scope. *That is okay!* If it's necessary, we suggest using the activities in this guidebook to strategize around that newly-surfaced need.

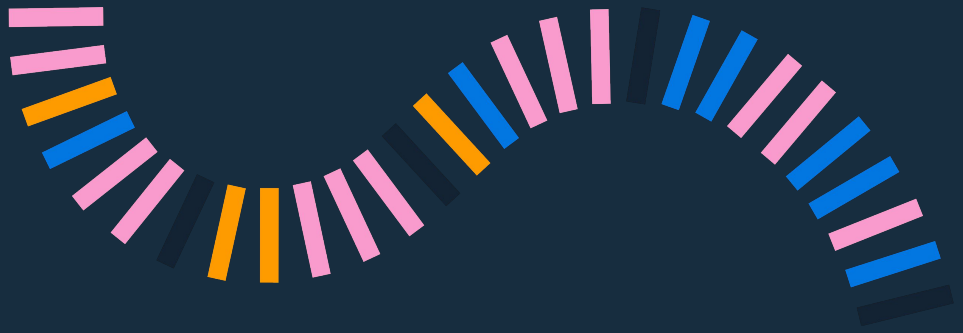
GETTING STARTED - BUILDING A TEAM

We recommend you build a team of 3–7 people to work through this guidebook on your selected operation. Think through who might be the best people for your team, based on experience, expertise, decision-making power, capacity, and relationships. We suggest:

- Appointing one person who can oversee guidebook completion (Project Lead)
- Appointing team roles to delineate roles and responsibilities: Project Manager; Lead Facilitator; Stakeholder engagement manager. *You may wish to engage an external facilitator for module activities.*
- Sharing project context with participants. This can include the prioritized operation; the goals, activities and mindsets from this guidebook; and the participant's role. You can use the template outreach email and Systems / Futures Thinking 101 sections to set that context.



MODULE 1
IDENTIFY YOUR OPERATIONAL RISK



MODULE 1

IDENTIFY YOUR OPERATIONAL RISKS

Objective: The goal of this module is to identify how your operation intersects with other City departments or divisions and to outline the climate risks it faces. This surfaces how your operation might respond to extreme climate events.

Key outputs: Identified operational risks and a planning time horizon for when you expect your operations to experience critical stresses or failures.

What you need:

- City climate projections and scenarios
- Data (quantitative and/or qualitative) about your operation's performance

Steps:

1. **Group discussion: Outline your operational context and climate risks** (120 mins).
    a. Consider what impacts and is impacted by your operations in terms of key departmental processes, functions, and climate risks.
    b. Then, dive into the City's climate projections (you may ask team members to review in advance) and discuss what kinds of future climate conditions could cause your current operational approach to experience stress or failure.
    c. Finally, select a time frame for which you will develop your strategy or strategies - essentially, when you might expect key climate risks to occur.
2. **Group activity: Simulate your operation** (60 mins). Pressure test what you've discussed by simulating how your operation would respond to a hypothetical future climate event under current protocol.
3. **Data deep dive: Your operation's performance** (60 mins). Use performance data and information to define how you know when your operation is working well or failing.
4. **Interviews: Learn through conversation** (30 min/interview). Improve your assessment of climate risks by speaking to people outside of your team with relevant expertise, knowledge, and/or experiences.

Note: Time estimates will vary depending on the complexity of the operation.

MODULE 1, STEP 1 | OUTLINE YOUR OPERATIONAL CONTEXT

Purpose of this step
Build a shared understanding of how your operation functions today and how climate risks affect it now and in the future.

You should leave this step with…

- A map or list of people and situations that influence or are impacted by your operation
- A clear list of current and future climate risks
- A defined time horizon for strategy development

🌍 Context & Risk Check: Before moving on to the next step, confirm…

- ❑ Operational context is mapped, including influencing departments, processes, and communities as well as those impacted by outcomes
- ❑ Current and future climate risks are identified with clear operational impacts, cascading consequences, and interactions between hazards
- ❑ Relevant climate projections and planning resources are reviewed to determine when stress or failure conditions may occur
- ❑ A time frame is selected that aligns with projected risks and planning priorities

MODULE 1, STEP 1 | OUTLINE YOUR OPERATIONAL CONTEXT (1/2)

Your operational context: Which communities and City departments, functions, and processes…

(1) … influence your operation's delivery? How? *Example: Communication division, monitoring tech, emergency staffing policies*

(2) … are impacted by your operation's outcomes? How? *Example: Parks & Rec employees and equipment, Council investments, residents*

Current climate risks: Consider, how do extreme weather events impact your operation? Start with the following climate vulnerabilities, and add any additional hazards in 'Other.' *Example: All of these risks increase the necessary capacity and frequency of emergency staff needs. Extreme heat and cold have frequent and costly health implications for staff.*

Extreme heat?

Extreme cold?

Flooding?

Drought?

Wildfire?

What new risks or damages might surface in the aftermath of an extreme weather event (i.e. 1st- and 2nd-order consequences)? How might one risk type exacerbate another? *Example: Insufficient emergency staff worsens response, increasing employee strain, burnout, and retention issues, which degrades department preparedness.*

MODULE 1, STEP 1 | OUTLINE YOUR OPERATIONAL CONTEXT (2/2)

Future climate risks: At this point, your team should have developed a view of how your operation sits within the City's other operations, and how extreme weather events *currently* impact your operation. Climate projections and scenarios help us understand how extreme weather like heat, flooding, drought, wildfire, and cold/ice will become more severe and frequent *in the future*.

First: Review your City's climate projections if you haven't already. Below, collate any other climate projections your department currently refers to for planning, making decisions, or other processes.
Note: You may prefer to make this pre-work or assign team members to review and collate asynchronously.

Next: Based on these climate projections, assess how and when your operation might experience climate-related stress or failure.

(1) What climate conditions can cause operational stress or failure? How? *Example: flash floods, endangering employees during commute + operations*

(2) When might your City experience those conditions? *Example: projected rain when moisture of peat soils <40% (hydrophobic ranges)*

Lastly: Later in this guidebook, you will develop a strategy or strategies to build operational resilience. Based on your responses above, where you identified when key climate risks to your operation might occur, **select the time horizon for which you will be developing your strategy**. This helps focus the remaining guidebook activities on the time frame most relevant to plan for, given your operation.
Example: 2026–2031

A note on interpreting climate projections: Climate projections show a range of future conditions (e.g., expected May temperatures five years from now will range X - Y degrees). To reduce failure likelihood, you might set your time horizon to the first year a projected range includes temperatures that would severely strain or shock your current operation or strategy (e.g., 118°F).

MODULE 1, STEP 2 | 'SIMULATE' YOUR OPERATION

Purpose of this step
Stress-test current protocols by simulating how your operation would respond to a plausible high-impact climate event and identifying gaps in preparedness, coordination, and continuity.

You should leave this step with…

- A documented walkthrough of how your operation would respond under current protocols to a hypothetical climate scenario
- A prioritized list of operational weaknesses, capacity constraints, and coordination gaps revealed by the exercise
- Identified ripple effects that may require revisiting earlier risk assessments or dependencies

🔍 Simulation Check: Before moving on, confirm…

- ❏ Operational weaknesses are documented with concrete examples (staffing, communication, logistics, skills gaps)
- ❏ Potential cascading impacts across departments, partners, or community stakeholders are captured
- ❏ Any newly identified risks or vulnerabilities are flagged in Module 1, Step 1

MODULE 1, STEP 2 | 'SIMULATE' YOUR OPERATION (1/1)

In the previous section, your team outlined how and when your operation might experience climate-related stress or failure. Now, work with your team to 'simulate' how your operation would currently perform in response to a specific high-risk event. After this exercise, you can revisit the previous step if you've identified new weaknesses, risks, or ripple effects.

Select a hypothetical future, high-risk climate condition:
Example: Major flood (7in of rain) happens over a holiday weekend, followed by 110°F heat wave.

What would happen under current protocol?
Example: Some staff are already on call for flood, but need more; EMS deputy director puts out call for more staff 5 days before event, about half of needed surge support volunteers. Pulling staff from across departments based on informal connections + emergency dispatches. Send warning messages to the community at bus stations and through community organizations, etc.

Based on current protocol, where are there operational weaknesses?
Example: Do not have a formal way of mandating surge support, getting the right people into the right positions on a moment's notice. Lack of backup skills across the department so that those already on call know how to respond to the current situation.

MODULE 1, STEP 3 | YOUR OPERATION'S PERFORMANCE

Purpose of this step

Establish how your team measures operational performance by defining indicators that signal normal functioning, emerging stress, or failure - and identifying critical data gaps that limit situational awareness.

You should leave this step with…

- A defined set of performance indicators that demonstrate operations are functioning as intended
- Clear thresholds or warning signs that indicate operational stress or failure during climate-related events
- A prioritized list of missing data, metrics, or insights and an explanation of why these gaps persist

📊 Performance Check: Before moving on, confirm…

- ❑ Indicators for "working as expected" are measurable, time-bound, and tied to operational goals
- ❑ Stress and failure signals are documented with concrete thresholds or observable patterns
- ❑ Missing data gaps are explicitly identified along with barriers (capacity, tools, process, ownership), and potentially a plan to fill these gaps or collect new data

MODULE 1, STEP 3 | YOUR OPERATION'S PERFORMANCE (1/1)

Your team has developed an understanding of climate risks to your operation and how and when your operation might experience climate-related stress or failure. In this section, your team will discuss how you measure and track your operation's performance. Based on your operation's performance data and information, **how do you know that your operations are…**

… working as expected? Include examples or measures of how you would know this. *Example: Have 100% projected needs covered 3 days before an anticipated major event*

… under stress or failing? Include examples or measures of how you would know this. *Example: Consistently falling short of projected staffing needs for emergency events; failure to deliver services in after-action reports*

What key data or insights do you need to monitor your operational performance, but are currently missing? Why are you missing these? *Example: Staff surveys on burnout, role clarity, etc. following major events*

MODULE 1, STEP 4 | LEARN THROUGH CONVERSATION

Purpose of this step
Establish how your team measures operational performance by defining indicators that signal normal functioning, emerging stress, or failure - and identifying critical data gaps that limit situational awareness.

You should leave this step with…

- A defined set of performance indicators that demonstrate operations are functioning as intended
- Clear thresholds or warning signs that indicate operational stress or failure during climate-related events
- A prioritized list of missing data, metrics, or insights and an explanation of why these gaps persist

🤝 Engagement Check: Before moving on, confirm…

- ❑ You have held ~4–8 conversations with stakeholders outside of your team
- ❑ Notes from conversations are documented and accessible to the broader team (with consent as needed)
- ❑ Insights from stakeholder engagement are synthesized and incorporated into Module 1, as needed
- ❑ Follow-up communication (thank-you messages and next steps) has been sent

MODULE 1, STEP 4 | LEARN THROUGH CONVERSATION (1/4)

So far, your team has outlined your operational context, identified climate risks and how they might impact your operation (as well as simulated an example based on a hypothetical climate condition), and determined how you track and measure your operation's performance. As a final step, you will coordinate brief conversations with colleagues to improve your assessment of climate risks, by bringing in perspectives beyond your team.

Before you reach out to anyone, **identify who or which groups…**

… manage this operation? *Example: EMS deputy director*	
… deploy this operation? *Example: Workforce operators*	
… resource this operation? *Example: Human resources department*	
… receive feedback from the community about this operation? *Example: Parks & Rec liaisons*	
… are most impacted by the success or failure of this operation? *Example: Frontline operators, community members*	

MODULE 1, STEP 4 | LEARN THROUGH CONVERSATION (2/4)

Identify who to reach out to: Next, determine as a team who to reach out to. Think about: Who will provide a complementary or different perspective? Whose perspective is missing (e.g., frontline workers, leaders, planners, engineers)? Who holds knowledge, expertise, roles, or experiences not present on the team? Aim to reach out to 4–8 people.

	Name	Email	Who's reaching out?	Status/Notes
1				
2				
3				
4				
5				
6				
7				
8				

Prepare questions: For each conversation, prepare the questions you'd like to ask. You can amend the outline below for each conversation.

Sample Interview Outline

[5 min] Welcome and context-setting

- Thank your interviewee for their time
- Remind them of this project's aims
- Confirm if/how the interviewee's responses will be kept anonymous, private, or confidential

[5 min] Share what you've learned in Module 1

- Share your current understanding of risks and operational vulnerabilities
- Ask: How do these align with your experiences?

[15 min] Surface other risks

- Ask: What's missing from this understanding? How do you experience these risks? How do they impact you? How do they impact others? *If the conversation has been largely technical, prompt around impacts to people and COA staff.*
- Ask: Why do these risks persist?

[5 min] Close and thank you

- Make space for anything else the interviewee would like to share
- Thank them for their time, and share where you're going next in the process. Ask if/how they would like to be involved

Reach out: Then, reach out to the designated contacts. You can amend the email template below. It is advised that you send key questions or interview topics in advance.

Sample Outreach Email

Subject: Setting up a conversation on climate risks to [...]
CC: *[If appropriate, cc the interviewee's supervisor]*

Hi [Name],

Hope you are well. [Insert any greeting based on your relationship with the interviewee.]

I am reaching out to set up a 20–30 minute conversation between [insert dates] to hear your perspective on the risks that our [insert specific operation] may face due to a changing climate.

For context, I am working with a team in [Department] through a guided process to figure out how we might adapt [insert specific operation] to future risks based on climate projections. The first step in this process is to deepen our understanding of the potential climate risks to our operation. This is why we'd like to speak with you!

In our conversation, I'm hoping to speak with you about:

- [Insert specific interview questions or high-level topics]

Please let me know if you are interested and able to participate.

Best,
[Name]

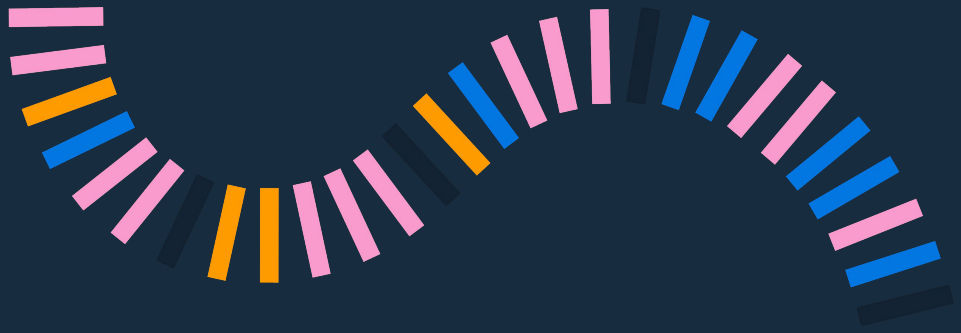
MODULE 1, STEP 4 | LEARN THROUGH CONVERSATION (4/4)

Hold the conversation: As applicable and as you have permission, link or centralize notes from your conversation(s) below, so your team members who weren't in the interview can see what was discussed.

	Name	Conversation Notes
1		
2		
3		
4		
5		
6		
7		
8		

After the conversation(s): After your conversation, send a thank you note to your interviewee, reiterate next steps for this process, and offer for them to share any additional thoughts. Once you have this new layer of information, make additional notes or amendments to the content your team worked through in Module 1. Make sure to spend time in any team meetings during this period to share what you're learning through these conversations.

MODULE 2
UNDERSTAND THE COST OF NOT BUILDING RESILIENCE



MODULE 2

UNDERSTAND THE COST OF NOT BUILDING RESILIENCE

Objective: By framing current operational vulnerabilities and weaknesses as future costs, you'll be able to make a compelling case for investing in the operational resilience actions that you identify (in Module 3).

Key outputs: A simple and high-level estimate of the costs of *not* making an operational change or continuing with a 'business-as-usual' approach.

What you need:

- Data related to the various costs of your operation
- Identified climate risks and your selected time frame from Module 1

Steps:

1. **Data deep dive and brainstorm: Calculate costs of 'business-as-usual' (BAU)** (90 mins). Conduct a brainstorming exercise and simple calculation for the 'cost of business-as-usual,' based on the climate risks projected for your selected time frame.

Note: Time estimates will vary depending on the complexity of the operation.

MODULE 2, STEP 1 | CALCULATE THE COSTS OF 'BAU'

Purpose of this step
Develop high-level estimates of the potential costs associated with continuing business-as-usual (BAU).

You should leave this step with…

- A brainstormed inventory of potential losses and costs
- A prioritized shortlist (1–4) of the most significant cost types linked to previously identified risks
- Documentation of available data sources, assumptions, and identified data gaps
- Cost estimates that illustrate the consequences of operational failure or degradation under future climate conditions

💰 Costing Check: Before moving on, confirm…

- ❑ Key assumptions, multipliers, and uncertainties are clearly documented for your estimates
- ❑ Data gaps that limit cost estimation are identified and noted for future analyses
- ❑ The resulting estimates provide a clear narrative illustrating why resilience investments may be justified

MODULE 2, STEP 1 | CALCULATE THE COSTS OF 'BAU' (1/2)

First: Brainstorm what types of losses or costs you might anticipate if you continue business-as-usual, whether to maintain your operation or because of its failure in the face of a changing climate. Consider the risks you identified in Module 1.
Example: Costs of service delays for typical waste collection schedules as a result of major event

Losses *E.g., staff injury/illness, productivity loss, property damage, yield loss, water loss, repair costs, legal damages*	
Economic costs *E.g., maintenance costs, insurance costs, investments, property values, tourism reductions*	
Social and environmental costs *E.g., biodiversity loss, community losses, recreation limits, soil degradation*	

Next: Discuss as a team and select the 1–4 most significant costs and/or cost types. **What data do you have on these costs?** Where possible, use current and historical data or estimates, preferably specific to your area.

- *Example 1: For extreme heat, find scientific papers showing worker productivity loss at various temperatures to estimate lost productivity costs.*
- *Example 2: For injury / illness, examine records of work-related injuries/ illnesses tied to extreme weather. Estimate average sick days or treatment costs, and multiply by projections of future incident frequency or intensity.*

Note down any data sources below. Also note: What data do you need to find or get access to? Where are there data gaps?

Losses	Economic costs	Social and environmental costs

This approach is inspired by the World Resources Institute's Triple Dividend of Resilience framework.

MODULE 2, STEP 1 | CALCULATE THE COSTS OF 'BAU' (2/2)

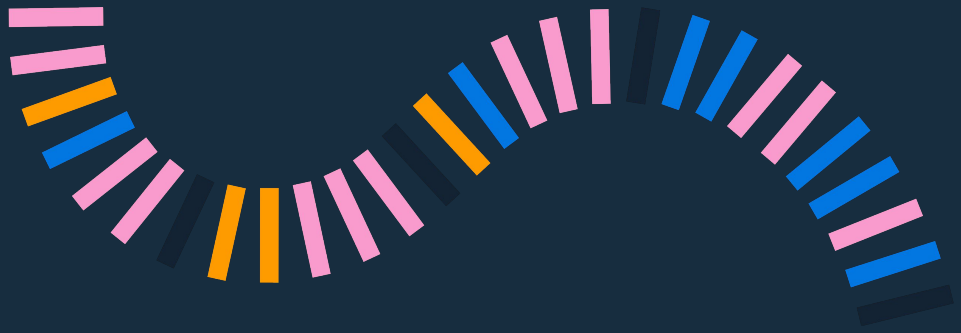
Last: Develop high-level cost estimates that demonstrate the potential consequences of not building resilience into your operations.

Directions for estimating costs:

- **Option 1: If you have limited data**, make the simplest estimate of cost you can based on the information you have.
    - For example, if you anticipate more traffic control and closures due to flooding - estimate the cost per day of additional traffic control and closures and multiply by the number of days/year you would need to call upon these resources, to get a rough estimate.
- **Option 2: If you have the requisite data** for the losses and costs you've selected, estimate the total cost of continuing to operate in business-as-usual by multiplying these three figures (below) together. You should do this for each cost type:
    - Cost per unit and event: For each cost type, how much cost is incurred per unit (e.g. person, facility, equipment, etc.), for a given event (e.g. a wildfire, a storm, a month, a year)? Choose units and events that make the most sense for your operation.
    - Number of units: How many units are affected?
    - Risk of stress or failure: How much more likely are you to experience critical stress/failure in the timeframe you selected in Module 1? *For example, a 50% increase in probability during a 5–year time frame means you should multiply costs by 1.5.*

Use the space below to jot down your assumptions and calculations or write out a few sentences describing the cost estimate.
*Example: **$800K** in avg public equipment damage per major event **x 7** major 'critically understaffed' events 2026 **x 1.15** (15%) increase in likelihood of events in 2027 compared to 2026 **= $6.44M** projected cost of damage to public equipment in 2027 season, BAU*

MODULE 3
DESIGN A FUTURE-READY STRATEGY



MODULE 3

DESIGN A FUTURE-READY STRATEGY

Objective: Explore how climate change and other future scenarios might impact your operations, and develop a strategy to make your operation more adaptable and resilient to these scenarios.

Key output:
A new strategy for your current operation that responds proactively to future risks.

What you need:

- Policies, protocols, codes, budget, plans, and resources that inform current (or future) operations

Steps:

1. **Creative thinking: Brainstorm a range of scenarios** (60 mins): Identify forces or future trends that could impact your operation, describe what these risks would look like in practice, and prioritize the risks that are most important for your operation to manage.
2. **Creative thinking, part 2: Develop ideas that mitigate risk** (60 mins): As a group, come up with ways that your operation could adapt in response to your highest priority risks. Refine and prioritize your ideas based on existing protocols, criteria, and departmental goals.
3. **Discussion-based planning: Translating ideas into a strategy** (30 mins): Based on your ideas, develop a strategy that builds in contingencies in the face of future uncertainty.
4. **Synthesis: Summarize your strategic plan** (30 mins): Summarize your recommended strategy and note what you need to implement this strategy.

Note: Time estimates will vary depending on the complexity of the operation.

MODULE 3, STEP 1 | BRAINSTORM A RANGE OF SCENARIOS

Purpose of this step
Identify external forces shaping your operation's future using a PESTEL lens, develop plausible scenarios describing how these forces could impact operations, and prioritize the most significant risks for planning.

You should leave this step with…

- A comprehensive list of political, economic, social, technological, environmental, legal, and other forces influencing your operation
- A set of future scenarios linking drivers of change to potential operational impacts within your selected time horizon
- A prioritized shortlist of high-impact, high-likelihood risks requiring focused attention, including rationale for why they have been prioritized

🧭 Foresight Check: Before moving on, confirm…

- ❏ PESTEL forces capture both near-term trends and longer-term structural shifts affecting the operation
- ❏ Scenarios are created that combine multiple drivers of change and describe concrete operational consequences
- ❏ Priority risks are selected based on scenarios identified, with agreement across the team

MODULE 3, STEP 1 | BRAINSTORM A RANGE OF SCENARIOS (1/3)

Warm-up activity: To better understand how change can happen, it's helpful to identify the forces that may affect your current and/or future operations. Using the PESTEL model below, consider: How do different forces shape the current and future state of your operation? Use the space below to jot down as many forces, trends, or drivers of change as you can think of per category.

Macro-forces	Detailed forces
Political *Example: State of Texas increases controls of Austin*	
Economic *Example: Tariffs increase costs*	
Social *Example: More municipal aid*	
Technological *Example: Autonomous vehicles more common*	
Environmental *Example: Worse flooding of roads*	
Legal *Example: More legal precedent to sue cities for climate damages*	
Other	

MODULE 3, STEP 1 | BRAINSTORM A RANGE OF SCENARIOS (2/3)

Now that you have identified some forces impacting the future, imagine how these might specifically affect your operation during the time horizon you chose in Module 1. We'll call these descriptions of how future forces impact your operations **scenarios**. Use the table below (examples in row 1) to build out scenarios.

Drivers of change *Can include combinations of factors from above, Example: worse flooding of roads + more AVs*	**Potential Future Scenario** *Describe a risky situation your operation could face. Example: All emergency vehicles autonomous, staff operate these remotely.*	**Likelihood** *Projected, probable, plausible, possible, preposterous*	**Consequence** *What risks might the operation face in this scenario? Example: AV tech issues are harder to manage remotely.*

MODULE 3, STEP 1 | BRAINSTORM A RANGE OF SCENARIOS (3/3)

Now consider: What assumptions are you making about future trends and risks? Once you have written your assumptions below, consider scenarios that could play out if your assumptions were false and add them to the table on the previous page.
Example: There will be a fleet of publicly owned, specialized autonomous vehicles

Take a look at the scenarios from earlier in the exercise. Referring to the likelihood and consequence columns, as well as your team's insight into current operations, prioritize: **What are the highest priority risks for your team to manage? Why?**
Example: Worse flooding of roadways that AVs are unable to handle, reducing mobility of staff

MODULE 3, STEP 2 | DEVELOP IDEAS THAT MITIGATE RISKS

Purpose of this step

Brainstorm ideas for how your operation could adapt in response to your highest priority risks, refining and prioritizing your ideas based on existing protocols, criteria, and departmental goals.

You should leave this step with…

- A list of possible ideas for how your operation could be resilient to the high-priority risks identified in the last step
- A smaller set of prioritized ideas to move forward with, based on key criteria

🧠 Brainstorm Check: Before moving on, confirm…

- ❏ Ideas have been brainstormed by the team for how to adapt your operation to key risks
- ❏ A shortlist of ideas have been prioritized, based on agreed-upon criteria and departmental priorities

MODULE 3, STEP 2 | DEVELOP IDEAS THAT MITIGATE RISKS (1/3)

Working quickly and creatively, brainstorm a list of ways your operation could be adapted to better respond to your identified risks.
How might your operation work if it were resilient to your high-priority risks from above?

Struggling to get started? Here are some high-level mechanisms to consider:

- **Relational**: What sorts of partnerships, community/staff engagement, or people-centered practices could help you build resilience?
- **Informational**: What data, technology, or communication mechanisms could help mitigate risks?
- **Economic**: What sorts of economic or financial instruments or plans could cover weak points in the operation?
- **Political**: What leadership mandates or top-down commitments could enable the change you need for a more resilient operation?
- **Infrastructural:** What equipment or asset procurement, protocol, maintenance, or management would reduce potential damages?

You can also write out 'How Might We' questions to spur the brainstorming process. More guidance on what these are and how to use them can be found in the Appendix.

	Ideas (and how they respond to future risks)
	Example: "Operator suites" - municipally-owned accommodations for operators and their families to stay in that minimize commutes when on-call for major events.
1	
2	
3	
4	
5	
6	
7	
8	

MODULE 3, STEP 2 | DEVELOP IDEAS THAT MITIGATE RISKS (2/3)

Now, you may have many ideas to consider! It's good to think about how well these would perform in the context of existing departmental and City criteria, ordinances, constraints, or organizational priorities.

Use the space below to list critical criteria or priorities. Note which of these are "critical" vs. "flexible" to aid your assessments. You may have specific criteria (e.g., building codes or engineering specifications, noise ordinances, procurement standards) and departmental or organizational priorities (e.g., affordability, alignment with KPIs).
Example: Maximum work-hour policies

Consider: **How do your different ideas perform against the criteria you listed above?** Note any ways that you might change your ideas or priorities based on this exercise.
Example: accommodation should not put additional strain on work hours; see if others can absorb transition hours / moving time as work hours.

Check: **What are the first, second, and third-order effects of different ideas?** How do they hold up against multiple types of climate risk? How might you further risk-proof your ideas?

MODULE 3, STEP 2 | DEVELOP IDEAS THAT MITIGATE RISKS (3/3)

Last step: Prioritize your ideas! Are certain ideas high priority and others low priority? Are certain ideas not worth recommending as part of a new strategic approach?

Note the ideas you would want to embed into your strategy below.

MODULE 3, STEP 3 | TRANSLATING IDEAS INTO STRATEGY

Purpose of this step
Translate resilience ideas into a strategy, by defining the resources, sequencing, coordination, and contingencies required to operationalize your ideas.

You should leave this step with…

- A sketched out strategy for implementing your ideas
- Identification of required resources, approvals, and coordination mechanisms (e.g., standards development, staffing alignment, funding strategies)
- Initial contingencies or parallel options that increase flexibility in the face of uncertainty

🛠️ Implementation Check: Before moving on, confirm…

- ❑ Implementation steps are specific, feasible, and aligned with departmental authority and capacity
- ❑ The strategy reflects how multiple resilience actions may operate in tandem to strengthen overall outcomes

MODULE 3, STEP 3 | TRANSLATING IDEAS INTO STRATEGY (1/1)

Now it's time to flesh out your ideas. **What would it take to implement your ideas for building resilience?** Some general examples (please be specific about your department's resources for this!) include: aligning on standards, getting executive buy-in, defining clear roles, conducting a research audit, coordinating across staff, applying for grants or writing RFPs to help resource needs, etc.

As you plan the specific steps you'd take to carry out your ideas, consider:

- How might your different ideas work in tandem with each other?
- How might different ideas be sequenced to best build off of one another or respond to future unknowns? *For example, would you try to implement an idea around developing standards and policies before standing up a peer learning mentorship program? What would make the most sense for your operation?*
- What if your assumptions about the future completely change? How might you pivot? You may wish to note when there is more than one option for how you proceed, as a way of building contingencies in the face of uncertainty!

Use the space below to plan how you would implement your idea(s):
Example: First start with mandatory on call rotation + inclusion of expectations into hiring process, job description, and onboarding while developing reward systems for anyone who does or has to take more time on call; create a multi-skill matrix audit + training program within department to ensure coverage while working with other departments to to build out skill sharing and peer training programs for key responsibilities.

MODULE 3, STEP 4 | SUMMARIZE YOUR STRATEGY

Purpose of this step
Summarize your strategy for an outside audience.

You should leave this step with…

- A clearly articulated set of operational risks the strategy aims to address and how these risks will be mitigated, managed, or responded to
- A consideration of the strategy's contingencies and overall feasibility

🧩 Strategy Check: Before moving on, confirm…

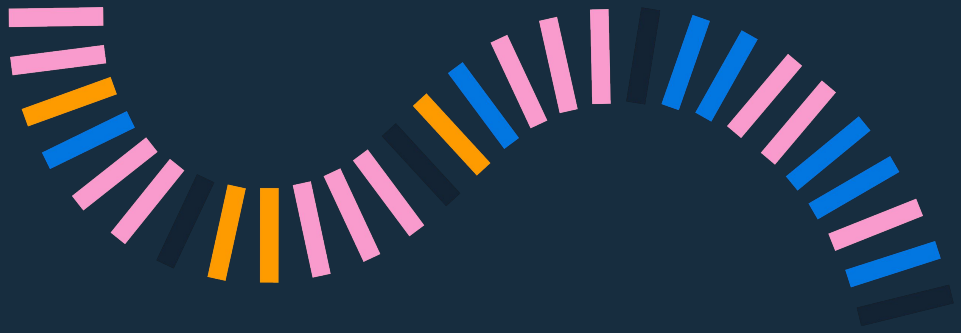
- The strategy addresses multiple risks through complementary actions rather than a single solution
- The strategy is coherent and easy to understand for people who have not been involved in this process

MODULE 3, STEP 4 | SUMMARIZE YOUR STRATEGY (1/1)

Now it's time to translate your ideas into a comprehensive strategy that you can communicate with others, using the prompts below! Your strategy should contain several components (ideas) rather than just one "silver bullet" solution.

What operational risks do you need to address?	
How do you plan to mitigate or respond to those risks?	
Preparing for uncertainty: What change in condition would cause you to pivot from this plan? What contingencies are you devising in response?	
How feasible is this plan given existing constraints and priorities? What would be necessary to make it feasible?	

MODULE 4
PLAN WHEN AND HOW TO IMPLEMENT YOUR STRATEGY



MODULE 4

PLAN WHEN AND HOW TO IMPLEMENT YOUR STRATEGY

Objective: Define how the new operational strategy will be sustained and adapted over time to improve the likelihood that the strategy will be implemented successfully, deliver services, and avoid foreseeable risks.

Key outputs:

- An implementation plan (including preparations to launch and adaptively manage your strategy).
- Communication narratives about your operation (to share with key stakeholders).

Steps:

1. **Group discussion: Determine strategic thresholds** (30 mins): Clarify the conditions or risk levels that prompt action for your strategy noted in Module 3.
2. **Group or asynchronous design: Prepare to implement your strategy** (120 mins):
    - Prepare for the launch of your strategy.
    - Build an adaptive management system for once your strategy is implemented - including what success would look like and key indicators of success and failure. Determine who is responsible for monitoring the implementation of this strategy and when.
    - Close with a brief action plan of immediate next steps.
3. **Group or asynchronous design: Communicate your strategy** (60 mins): Develop the core message of your recommended strategy and how to communicate it with different audiences going forward.

Note: Time estimates will vary depending on the complexity of the operation.

MODULE 4, STEP 1 | DETERMINE STRATEGIC THRESHOLDS

Purpose of this step
Define strategic thresholds that activate elements of your resilience strategy, clarify decision authority, and strengthen operational design by linking triggers directly to responses or actions.

You should leave this step with…

- A completed threshold table linking risks to indicators, triggers, and corresponding strategic responses
- Documented authority and activation rules (automatic vs. confirmed) for each threshold
- Identified gaps in procedures, ownership, or data revealed through the threshold-setting process

⚠️ Threshold Check: Before moving on, confirm…

- ❏ Thresholds are explicitly linked to priority risks and strategy components rather than defined in isolation
- ❏ Strategic responses specify what changes operationally when thresholds are crossed
- ❏ Decision authority and activation rules are clearly assigned and understood
- ❏ Any gaps in ownership, procedures, or data surfaced during this process are documented for follow-up
- ❏ Thresholds are designed to be revisited periodically as part of adaptive management

MODULE 4, STEP 1 | DETERMINE STRATEGIC THRESHOLDS (1/2)

Determining strategic thresholds often exposes gaps in operational design. If activation triggers for your strategy are unclear, it may signal unclear ownership or decision-making, incomplete procedures, or missing and unreliable data.

This step is not only about setting triggers, it's also about strengthening the operating model itself. Well-defined thresholds reduce duplication, prevent cascading failure, and enable accountable action. Due to evolving conditions, they should be revisited regularly as part of adaptive management.

Linking thresholds to strategy
Strategic thresholds should correspond directly to the strategy and operating model you selected in Module 3. What triggers the start of a new activity, a major next step in a process, or the execution of time-sensitive responses? For each threshold, ask:

- What specifically changes when a threshold is crossed? Which elements of the strategy are activated?
- Who has the authority to initiate the shift?
- Does activation require confirmation or is it automatic?

If the answer to "what changes?" is unclear, the strategy may need refinement.

For example, if your strategy involves minimum viable staffing during extreme weather events, the Trigger Point must define when that staffing model replaces standard operations.

Thresholds are not separate from the strategy. They are what make it real and actionable.

MODULE 4, STEP 1 | DETERMINE STRATEGIC THRESHOLDS (2/2)

Use the table below to define the conditions that would activate your strategy. Consider the risks identified in Module 1, Step 1, and the process you used to identify your time horizon.

For each risk identified in Module 1, work left to right across the row. Each column asks a different question:

- **High Priority Risk:** What condition or event are you planning for?
- **Risk Indicators:** What does it look like when this starts to happen?
- **Emerging Signals:** What early or weak signs will you watch for?
- **Standby Conditions:** What tells you to start preparing?
- **Trigger Point:** What is the defined threshold that activates your response strategy?
- **Strategic Response:** Link each strategic response to the relevant strategy from Module 3.

High priority risk	Risk Indicators	Emerging Signals	Standby Conditions	Trigger Point	Strategic Response
Example: Poor staffing of major anticipated event	*Example: Not all staff participate in on-call responsibilities*	*Example: Staff unclear about on-call needs / available resources*	*Example: About 1 month ahead of early forecasts for extreme weather season (e.g., early Spring)*	*Example: Major event; only 50% on call staff confirmed for event*	*Example: Have on call teams game plan ahead of events; complete teams by filling skill gaps*

MODULE 4, STEP 2 | PREPARE TO IMPLEMENT YOUR STRATEGY

Purpose of this step
Prepare to launch and implement your strategy by documenting key actions for launch and establishing an adaptive management framework for strategy implementation.

You should leave this step with…

- A 3–6 month implementation roadmap for each action, including leads, sequencing, milestones, and delivery roles
- An adaptive measurement framework linking outcomes, indicators, measures, and monitoring frequency, and owners
- A prioritized list of near-term launch actions (3–5 tasks within 30–60 days)

🌱 **Momentum Check:** Before moving on, confirm…

- ❑ Every task has a named owner
- ❑ At least one task begins within the next 30 days
- ❑ All deadlines align with your strategic thresholds
- ❑ Funding assumptions are realistic

MODULE 4, STEP 2 | PREPARE TO IMPLEMENT YOUR STRATEGY (1/3)

First: How can you set yourself up for success when implementing change? Let's prepare the launch of your strategy. For each action type, list the concrete steps you need to take to operationalize this strategy in the next 3–6 months.

How detailed should your responses be? Be specific enough that someone outside your team could execute the first steps without additional clarification. *For example, instead of: improve coordination, increase awareness, secure funding… write: schedule D.D. alignment meeting, revise staff protocol for heat events, submit FY25 budget amendment request*

Action type	**Focus** *The specific area being addressed*	**Lead(s)** *Named individual, not just dept.*	**First step** *What is the first step? When does it begin?*	**Next step(s)** *What follows once the first is done*	**Final step** *The last step to realizing your idea*	**Achieved by…** *Date for reaching this milestone*
Who delivers the new approach? *E.g., operation managers, staffing & training*						
Whose buy-in can enable this? *E.g., internal staff + leadership, external stakeholders*						
Which funding streams can resource this? *E.g., current budget, future budget, grants, public-private partnerships*						

Inspired by Delivery Associate's deliverology framework, as well as the Ready to Fund Resilience technical paper.

MODULE 4, STEP 2 | PREPARE TO IMPLEMENT YOUR STRATEGY (2/3)

What must be in place before your operation can launch? Drawing on ownership roles and actions above, identify the preconditions that must be met before you can go live. This is different from your action plan, these are gate-opening requirements, not the steps themselves. *Examples: staffing plan approved, budget reallocated, training completed, communication protocol finalized*

Define performance measures for your strategy, once it is implemented. Climate conditions, operational contexts, and community needs change over time. A strategy that works today may need adjustment next season or next year. An adaptive management system ensures that change is not reactive or ad hoc but is built into how your operation runs. Without clear ownership and defined measures, adaptation tends to fall through the gaps: signals go unnoticed, decisions stall, and strategies become outdated without anyone realizing it. **This step turns your strategy from a plan into a living process.**

First: Define how you will measure performance of your strategy against your priorities using your outcomes, indicators, measures, and monitoring frequency.

Outcomes: What does success look like for this action? Be specific about what will change and for whom. *Example: Adequate prep for major events*	
Indicators: What signs show you are on track, exceeding expectations or need to adapt? *Example: Low burnout among responders*	
Measures: What data points or metrics will you track to support each indicator? *Example: Fatigue down 30% since '25*	
Monitoring Frequency: How often will you check indicators and who is responsible for collecting the data? *Example: Post-event after-action survey, head of workforce management*	

MODULE 4, STEP 2 | PREPARE TO IMPLEMENT YOUR STRATEGY (3/3)

Second: Define who owns each stage of the process. Assign clear responsibility for monitoring, interpreting signals, making decisions, implementing changes, communicating updates, and reviewing the strategy.

Note: Roles and measures should be reviewed regularly (e.g., annually) or after any significant operational change. You may also find that your performance measures and role assignments cause you to revisit your responses above in this Module.

Define who owns each stage of the process

Who coordinates adaptive management for the operation? *Example: Deputy Director Ellie Sanchez*	
How **long should it take** to turn feedback into real changes? *Example: 3 weeks between reflection and proposal of a new solution to leadership*	

Who is responsible at each stage?

Monitor: Who tracks signals and indicators over time? *Example: Head of emergency workforce*	
Interpret: Who has the authority to determine where a signal warrants actions? *Example: Head of emergency workforce*	
Decide: Who can approve changes to operations, models or investments? *Example: Assistant director Kai Adams*	
Communicate: Who communicates changes to internal staff, leadership and external stakeholders? *Example: Assistant director Kai Adams*	
Review and Update: Who is responsible for updating the documentation and strategy itself? *Example: Emergency workforce manager*	

MODULE 4, STEP 3 | COMMUNICATE YOUR NEW STRATEGY

Purpose of this step
Develop messaging that communicates the rationale, approach, and value of your strategy while tailoring communication to key audiences.

You should leave this step with…

- A concise core message articulating the problem or opportunity, required decision, and urgency for change
- Audience-specific communication plans reflecting stakeholder interests, concerns, influence levels, messengers, delivery channels, topic literacy, and engagement opportunities

📣 Communication Check: Before moving on, confirm…

- ❑ The core message clearly explains why change is needed now and what decision is required
- ❑ 1–3 key audiences have tailored messaging based on their interests, concerns, and influence levels

MODULE 4, STEP 3 | COMMUNICATE YOUR NEW STRATEGY (1/2)

Define your core message: What is the core message of your new strategy (from Module 3)? Being able to communicate your approach to key stakeholders is critical to its implementation and sustainability. Why are you prompting this change?

Use the table below to define your message. See how your work in Module 4 thus far has changed or clarified any of your thinking as summarized in Module 3, Step 4.

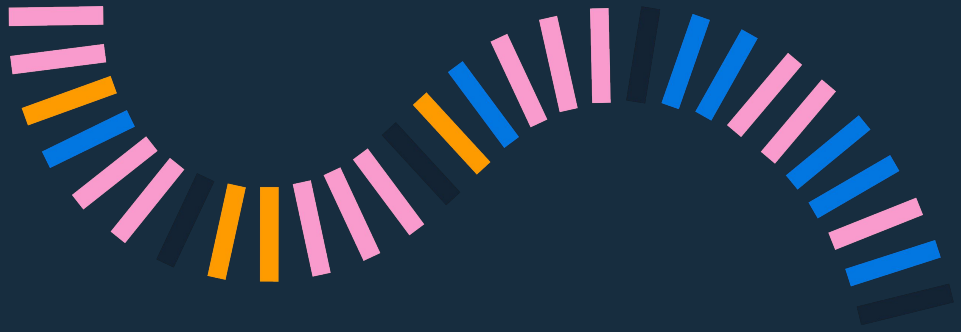
What is the **problem/opportunity?**	
What is the **decision we need to make** and why now?	
What is the **process** that we're following to enable change?	
Who **owns** and **informs** this process? How?	
What does **success** look like?	
What are the **costs of this strategy** and the **costs of inaction?** *(Revisit Module 2)*	
How will we **monitor risks**? Over what **timeline**? When can outsiders expect to hear from us?	

MODULE 4, STEP 3 | COMMUNICATE YOUR NEW STRATEGY (2/2)

Tailor the message to key audiences: Messages can change depending on your audience! Outline how you might communicate your core message to three different, high-priority audiences (e.g., dept staff, CMO, etc.):

Audience type	[ ]	[ ]	[ ]
Interests			
Concerns			
Influence level			
Messenger			
Delivery medium			
Topic **literacy**			
Engagement opportunities			

APPENDIX



GLOSSARY

- Adaptive management: A process that "uses feedback from the environment to continuously improve management strategies."
- Extreme weather: Unexpected, unusual, or severe atmospheric conditions that deviate significantly from historical averages for a specific time and place, like heat waves, floods, hurricanes, droughts, or storms. They can cause significant disruption or damage to society, ecosystems and infrastructure.
- Failure: An inability to deliver on core expectations or agreements. This can be a result of a breakdown in process, assets, technology, communication, and more. It can also be prompted by conditions that add stress to the system. Consider the Centre for Public Impact's and Amy Edmondson's work as guidance.
- First-, second-, and third-order effects: A first-order effect is the consequence of an action; immediate, direct impacts. Second-order effects are responses to the consequence of an action; longer-term or indirect impacts. Third-order effects are the responses to second order effects; long-term, indirect "ripple effect" that unfolds as a consequence of an action.
- Hazard: Something that threatens harm.
- Operation: Resources and processes that create products and services.
- Projection: A scientific simulation of one particular scenario, projections model or quantify the expected outcomes of forces on future conditions.
- Risk: The potential for loss of something of value.
- Scenario: A hypothetical description of the future, often based on assumptions about the impact of different factors.
- Stress: The reaction to challenging or sub-optimal conditions.

SYSTEMS THINKING AND DESIGN THINKING 101

How do we prepare for "surprise" ripple effects that originate far from our operation? By *taking time* to map the full picture of your operation and the **resources, relationships and risks** that can impact it, you can proactively develop partnerships, plans/policies, and investments to improve the security of your operation long-term.

Framework and Directions	Useful for…
5 Whys: When a statement is made, ask "Why?" and continue to probe with whys for as many responses as you can (try 5!).	Getting to a root cause of a situation (best in interviews or discussions).
Causal Loop Diagram: Start with one "cause and effect" loop around a certain process or condition. Gradually expand this map with more loops and influences. You can use "+" icons to indicate where a cause and effect relationship amplifies change, and a "-" icon to indicate where a cause and effect relationship prompts balance or equilibrium.	Exploring which system elements are positioned to amplify change versus maintain balance, aiding in identifying dynamic properties and potential leverage points.
Iceberg Model: Map all the information you have about your situation using the linked diagram. Consider where you need more information to understand your situation's events, patterns of behavior, structures, and mental models; then, draw connections between information at different levels.	Visualizing a situation's influential elements and their connections to identify which system elements most affect the current state.
"How Might We" Questions: Begin with an existing challenge or risk. Phrase it as an open-ended "How might we..." (HMW) question to inspire broad brainstorming. Be prepared to generate or rephrase multiple HMW questions as needed.	Generating new ideas; turning a problem into an opportunity for expansive, strategic thinking.
S.C.A.M.P.E.R. Ideation: Referencing an operation, ask questions (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse) to transform products, services, or processes.	Generating specific new ideas; especially for discrete solutions.
Stock and Flow Diagrams: Similar to a Causal Loop Diagram, but instead you explore the relationships between quantitative inputs and outputs into a system.	Exploring how a system of different quantifiable factors impact one another.
'What If' Analysis: This simple exercise identifies operational risks. Define the problem, identify critical factors (activities, conditions, or thresholds), and use "What if" questions to imagine impacts from pressures or alternative scenarios. Finally, consider the effect and brainstorm a response.	Brainstorming risks and identifying potential solutions.

FUTURES THINKING 101

We often look at the future and see 1–2 options for what's possible. But the possibilities of the future are endless! Rather than waiting to react to the 1–2 future pathways you foresee, look to **enhance your own agency** by envisioning myriad possibilities and preparing for the risks or opportunities.

Framework and Directions	Useful for…
Backcasting: Create a clear future vision of success, then outline the necessary milestones, decisions, and actions. The group determines leverage points and short-term priorities that align with the long-term vision.	Defining a desirable future outcome and working backward to identify the steps required to reach it.
Cone of Possibility: Draw or review a cone expanding outward from the present and place trends, uncertainties, and scenarios into the appropriate zones. Then discuss which futures the group wants to prepare for and how.	Broadening thinking beyond "most likely" outcomes and encouraging strategic flexibility.
Delphi Method: Have participants respond to questionnaires individually, review aggregated results, and refine their responses based on group feedback. Iterations continue until patterns, convergence, or clear disagreements emerge.	Gathering expert input anonymously over multiple rounds to generate forecasts that require consensus and expertise.
Futures Wheel: Place a central change in the middle of a page and draw outward branches to identify direct impacts, then extend further branches for indirect consequences. Review patterns, risks, and opportunities that emerge from the cascading effects.	Explore first-, second-, and third-order consequences of a change or event.
Horizon Scanning: For the chosen operation condition, gather weak signals, emerging trends, and disruptions in technology, society, environment, economics, and politics. Scan news, research, and fringe ideas; cluster findings into themes; and discuss potential growth in impact.	Proactively identifying early signals of change helps organizations recognize future risks and opportunities before they become mainstream.
Polak Game: As a group, individuals physically position themselves along two axes of choice: optimism vs. pessimism about the future, and agency vs. lack of agency to influence it. Discuss why each person chose their positions, and reflect on how mindset shapes strategy and action.	Surfacing hidden assumptions and emotional orientations toward change within teams.
War Gaming: Divide into stakeholder or competitor teams with goals and constraints. Test assumptions and adapt strategies in real time through structured rounds of action and response.	Simulating competitive or adversarial scenarios to test strategies under pressure.

CLIMATE DATA AND PERFORMANCE DATA EXAMPLES

Climate data and risk assessment resources

- Data sources like Google Earth Engine, IPCC Atlas, GIS for Climate
- Vulnerability assessment resources from the US Climate Resilience Toolkit, the World Bank, and US DOT
- Environmental Defense Fund climate vulnerability index - Census level vulnerability data across dozens of parameters

Performance data examples

- Your operation's safety ratings
- Your operation's compliance with codes
- An incident list that shows where operations have had issues in the past
- A supply / asset inventory - which and how many resources do you have available?
- History of service demand + projected growth models

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