

CITY OF SEATTLE
2021-2026 ALL-HAZARDS MITIGATION PLAN



DRAFT 2/1/2021

V. 1.1

Prepared by:

City of Seattle

Office of Emergency Management

Vision, Mission, Guiding Principles

In an effort to align planning documents across all phases of emergency management, the City of Seattle Office of Emergency Management has collaboratively developed a vision, mission, and guiding principles that will provide a conceptual framework for all of the plans that support the City's emergency program, including the 2021 update of the City of Seattle All-Hazards Mitigation Plan.

Vision

Disaster ready...prepared people, resilient community

Mission

We partner with the community to prevent, prepare for, respond to, mitigate the impacts of, and recover from disasters.

Guiding Principles

Comprehensive: We consider and take into account all hazards, all phases, all stakeholders, and all impacts relevant to disasters.

Progressive: We anticipate future disasters and take preventive and preparatory measures to build disaster-resistant and disaster-resilient communities.

Risk-Driven: We use sound risk management principles (hazard identification, risk analysis, and impact analysis) in assigning priorities and resources.

Integrated: We ensure unity of effort among all levels of government and all elements of the community.

Collaborative: We create and sustain broad and sincere relationships among individuals and organizations to encourage trust, advocate a team atmosphere, build consensus, and facilitate communication.

Flexible: We use creative and innovative approaches in solving disaster challenges.

Professional: We value a science and knowledge-based approach based on education, training, experience, ethical practice, public stewardship, and continuous improvement.

City Council Resolution

To be added following approval

FEMA Letter of Approval

To be added following approval

Plan Adoption and Approval

44 CFR §201.6(c)(5) requires that the City of Seattle All-Hazards Mitigation Plan be formally adopted by the Seattle City Council. Council formally adopted the 2021 update of the Seattle All-Hazards Mitigation Plan on [to be filled in following plan approval]. The plan adoption resolution follows.

This plan was approved by the Federal Emergency Management Agency on [to be filled in following plan approval]. The official approval letter follows.

Acknowledgements

The City of Seattle All-Hazards Mitigation Plan is an ongoing effort of the Seattle Office of Emergency Management to ensure the City’s comprehensive approach to preparing for, mitigating the impacts of, responding to, and recovering from a disaster. Preparation of this document, and its continued improvement, requires participation and support from many individuals, agencies, organizations, and businesses. City departments, other agencies, and employees deserve recognition for their efforts to develop this plan.

Additionally, the City would like to acknowledge the efforts of the members of the Seattle Hazard Mitigation Work Group for investment of time and expertise in updating this plan.

Copies of this plan are available online at www.seattle.gov/emergency/publications or by request through the Seattle Office of Emergency Management Recovery and Mitigation Coordinator.

Record of Plan Update and Approval

The City of Seattle All-Hazards Mitigation Plan is required to be updated once every five years and submitted to the City for adoption and the Federal Emergency Management Agency for approval. The City may update the plan on a more frequent basis as needed.

Date of Update	Date of City Adoption	Date of FEMA Approval
July 2009	September 14, 2009	October 14, 2009
May 2015	December 17, 2015	February 11, 2016
To be filled in following plan approval	To be filled in following plan approval	To be filled in following plan approval

TABLE OF CONTENTS

TABLE OF CONTENTS	iv
APPENDICES	v
Tables	vi
Figures	vi
Acronyms and Abbreviations	vii
1 Introduction	1
1.1 Authority.....	1
1.2 What is Hazard Mitigation?	1
1.3 Purpose and Scope	3
1.4 City of Seattle Hazard Mitigation Program.....	3
1.5 Plan Organization	5
1.6 What’s New in the 2021 Update?	6
2 Planning Process	7
2.1 Planning Area.....	8
2.2 Data Collection and Incorporation of Existing Plans	8
2.3 Mitigation Work Group	11
2.4 Inclusive Outreach and Public Engagement	13
2.5 Plan Development and Review.....	16
3 Community Profile	19
4 Hazard Identification and Vulnerability Analysis	21
4.1 General	21
4.2 Climate Change.....	22
4.3 Geophysical Hazards.....	23
4.4 Biological Hazards.....	24
4.5 Intentional Hazards	24
4.6 Transportation and Infrastructure Hazards.....	26
4.7 Weather	27
4.8 SHIVA Scoring Methodology.....	29
4.9 Risk-Driven Planning.....	29
5 Capability Assessment	32
5.1 General	32
5.2 FEMA Funded Hazard Mitigation Projects.....	34
5.3 Citywide Organization Capabilities.....	35



5.4 Department-Specific Capabilities 40

5.5 Continuity of Operations Planning 63

5.6 Coordination with Community Partners 63

5.7 National Flood Insurance Program Participation 64

6 Mitigation Strategy..... 64

6.1 General 64

6.2 Mitigation Goals 65

6.3 Mitigation Actions 67

6.4 Evaluating and Prioritizing Mitigation Actions 77

6.5 2021-2026 Mitigation Implementation Plan 78

7 Program Implementation 86

7.1 Plan Adoption 86

7.2 Keeping the Plan Current 86

7.3 Continued Public Involvement 87

APPENDICES

Appendix A Seattle Hazard Identification and Vulnerability Analysis

Appendix B Plan Process Materials

Appendix C Stakeholder Engagement

Appendix D Mitigation Action Worksheets

TABLES

Table 1 - Plan Review and Integration Actions	11
Table 2 - Mitigation Work Group Members	11
Table 3 - Mitigation Work Group Meeting Schedule	12
Table 4 - Stakeholder and Public Outreach Activities	15
Table 5 - Seattle HMP Update Timeline	16
Table 6 - Hazard Ranking.....	31
Table 7 - FEMA Funded Hazard Mitigation Projects 1999-2020	34
Table 8 - Community Partners by Sector	63
Table 9 - Status of 2015 Mitigation Actions.....	68
Table 10 - Mitigation Actions by Hazard	76
Table 11 - STAPLEE Criteria	77
Table 12 - Mitigation Effectiveness Criteria.....	78
Table 13 - 2021-2026 Mitigation Implementation Plan (by Department).....	80

FIGURES

Figure 1 - National Preparedness Goal Mission Areas and Supporting Plans.....	2
Figure 2 - City of Seattle Mitigation Program Organization.....	4
Figure 3 - FEMA Recommended Local Mitigation Planning Tasks	8
Figure 4 - Seattle HMP Planning	18
Figure 5 - Mitigation Strategy Process	65

ACRONYMS AND ABBREVIATIONS

City of Seattle Departments

ARTS	Office of Arts and Culture
CBO	City Budget Office
DON	Department of Neighborhoods
FAS	Seattle Department of Finance and Administrative Services
HSD	Human Services Department
ITD	Seattle Information Technology Department
OED	Office of Economic Development
OEM	Seattle Office of Emergency Management
OH	Office of Housing
OPCD	Office of Planning and Community Development
OSE	Office of Sustainability and Environment
SC	Seattle Center
SCL	Seattle City Light
SDCI	Seattle Department of Construction and Inspections
SDOT	Seattle Department of Transportation
SFD	Seattle Fire Department
SPD	Seattle Police Department
SPL	Seattle Public Libraries
SPR	Seattle Parks and Recreation
SPU	Seattle Public Utilities

Other

ADA	Americans with Disabilities Act
BIPOC	Black, Indigenous and people of color
BPA	Bonneville Power Administration
BRIC	Building Resilient Infrastructure and Communities FEMA Grant Program
CIP	Capital Improvement Program
CFR	Code of Federal Regulations
City	City of Seattle
COOP	Continuity of Operations



DMC	Disaster Management Committee
DMA	Disaster Mitigation Act of 2000
DFIRM	Digital Flood Insurance Rate Map
EEB	Emergency Executive Board
EMAP	Emergency Management Accreditation Program
FEMA	Federal Emergency Management Agency
HMGP	Hazard Mitigation Grant Program
IOPE	Inclusive Outreach and Public Engagement Plan
MWG	Mitigation Work Group
NFIP	National Flood Insurance Program
PDMC	Pre-Disaster Mitigation Competitive Grant Program
PoS	Port of Seattle
Seattle HMP	City of Seattle All-Hazards Mitigation Plan
SHA	Seattle Housing Authority
SHIVA	Seattle Hazard Identification and Vulnerability Analysis
SNAP	Seattle Neighborhoods Actively Prepare
SPS	Seattle Public Schools
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988
SWG	Strategic Work Group

1 INTRODUCTION

Chapter 1 describes the authorities and principles that provide the basis for the City of Seattle's (City's) mitigation program as well as provides a description of that organization and how the plan is organized to support it.

The City of Seattle All-Hazards Mitigation Plan (Seattle HMP) is the guiding document for the City's hazard mitigation program. The plan's goal is to identify the hazards of which the City is at risk and identify a comprehensive strategy for minimizing potential losses and maximizing opportunity to increase the community's resiliency. This introductory chapter presents the authorities on which the City's mitigation program is based, the plan's purpose and scope, and plan organization.

1.1 Authority

The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act), as amended by the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, and its implementing Code of Federal Regulations (CFR) provisions, 44 CFR § 201, provide the legal authority for local hazard mitigation planning. The DMA 2000 requires state, local, and tribal governments to develop a hazard mitigation plan that identifies the jurisdiction's natural hazards, risks, vulnerabilities, and mitigation strategies. The planning process requirements mandated by the Federal Emergency Management Agency (FEMA) (outlined in 44 CFR §201.6) include the following activities:

- Document the planning process.
- Provide stakeholders with an opportunity to participate.
- Conduct and document public involvement.
- Incorporate existing plans and reports.
- Discuss continued public participation and plan maintenance.
- Provide a method for monitoring, evaluating, and updating the hazard mitigation plan.

Once complete, the hazard mitigation plan must be submitted to FEMA for approval. FEMA's approval of a hazard mitigation plan is a prerequisite for federal Hazard Mitigation Assistance grant program eligibility (outlined in 42 CFR §5165(a)).

The Seattle HMP was prepared in accordance with the requirements of the Stafford Act, as amended by the DMA 2000, and the implementing 44 CFR § 201 provisions. The City will integrate appropriate Americans with Disabilities Act (ADA) standards into mitigation projects and actions implemented as a part of the planning process. For example, alterations to existing facilities, such as seismic retrofits, will comply with all applicable federal accessibility requirements.

1.2 What is Hazard Mitigation?

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property posed by hazards (44 CFR §201.2). Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs (2013 Washington State Enhanced Hazard Mitigation Plan).

Additionally, hazard mitigation planning is one of the five mission areas presented in the National Preparedness Goal: Mitigation, Prevention, Protection, Response, and Recovery. The Seattle HMP is an integral piece of the larger emergency management picture and is intrinsically linked to other existing plans and emergency management activities.

Figure 1 illustrates these five emergency management mission areas and provides highlights of the plans that exist at the local, state, and federal level to support them.

Figure 1 - National Preparedness Goal Mission Areas and Supporting Plans



Mitigation planning is important because it not only encourages communities to become more flexible and adapt to change more easily, but it also:

- Guides mitigation activities in a coordinated and economic manner.
- Integrates mitigation into existing community plans/programs.
- Considers future growth and development trends.
- Makes a community more disaster resilient.
- Ensures eligibility for grant funding.

1.3 Purpose and Scope

1.3.1 Purpose

The Seattle HMP assesses the potential impact of the natural and human-caused hazards to the City of Seattle's (City's) communities and provides mitigation goals and strategies to reduce impacts. The Seattle HMP prioritizes the City's mitigation strategies and includes a comprehensive implementation plan. The overall purpose of the Seattle HMP is to strategically guide actions and investments in such a way as to reduce the impacts of natural and human-caused hazards on human life and property. The efforts that have contributed to the development of the Seattle HMP will lead to a safer, stronger, more survivable, and resilient city. The 2021 Seattle HMP is the required five-year update to the City of Seattle HMP prepared in 2015 and approved by FEMA in 2016. Keeping the Seattle HMP current is a good emergency management practice for the people of Seattle and allows the City to maintain its eligibility for state and federal mitigation funds that support the City's mitigation activities, such as:

- Seismic risk assessments.
- Facility seismic retrofit projects.
- Building redundant and resilient infrastructure.
- Planning for sea level rise and other impacts of climate change.
- Public education efforts surrounding risks of unreinforced masonry buildings.

The City has also focused on improving interdepartmental coordination in this update to ensure that the plan meets the needs of all City departments.

1.3.2 Scope

The Seattle HMP update covers the jurisdiction of the City and its departments, with the intent of benefitting all residents, businesses, and government and nongovernmental partners. It covers all areas within the City limits, as well as City department services and assets outside the City, such as municipal watersheds, water transmission pipelines, and dams.

Priority elements during this update process included:

- Creating dialogue around protecting the people of Seattle and building the City's resilience in the face of both smaller and catastrophic disaster risks.
- Developing an updated all-hazards mitigation plan that reflects the public and stakeholder input received.
- Ensuring that the process is conducted in accordance with FEMA's Local Multi-Hazard Planning Guidance (requirements identified in Title 44 CFR Part 201.6 and Emergency Management Accreditation Program (EMAP) Standard ANSI/EMAP EMS 5-2019).

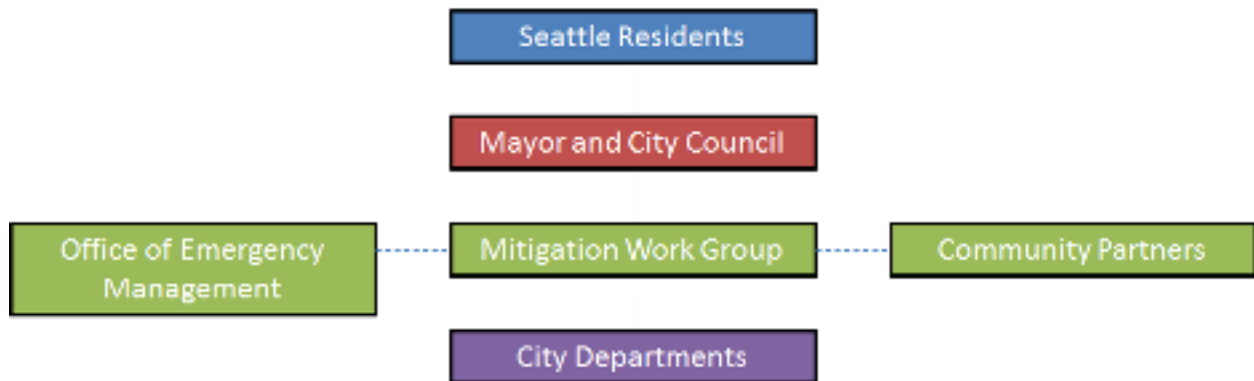
1.4 City of Seattle Hazard Mitigation Program

The Seattle HMP is just one aspect of the City's comprehensive approach to hazard mitigation, which includes Seattle residents, elected leadership, City departments, and community partners.

1.4.1 Organization

Figure 2 illustrates how the City organizes to ensure an engaged and collaborative approach to mitigation planning and program implementation. This organization is informally referred to in this plan as the City’s mitigation program.

Figure 2 - City of Seattle Mitigation Program Organization



1.4.2 Roles and Responsibilities

Seattle Residents

Prepared and educated residents are a critical aspect of the City’s resiliency, and the City actively encourages its residents to actively participate in efforts to minimize vulnerability to hazards by engaging in the following activities:

- Participate in the City’s hazard mitigation program by engaging in the City’s preparedness programs. More information can be found at <http://www.seattle.gov/emergency-management>.

Engage in personal and family preparedness and mitigation activities at home and at work.

Mayor and City Council

Seattle’s elected leadership plays a key role in the City’s mitigation program. As the City’s elected representatives, they are responsible for making balanced policy decisions that enhance the City’s resiliency. The Mayor and City Council perform the following activities in support of the City’s mitigation program:

- Provide policy direction for the City’s hazard mitigation program.
- Adopt the hazard mitigation plan.

Mitigation Work Group

The Mitigation Work Group (MWG) includes members from various City departments and key stakeholders and convenes regularly to monitor, evaluate, and implement the City’s mitigation program. While one of the MWG’s main purposes is to serve as the primary mechanism for City participation in updating the Seattle HMP, the City intends its role to continue throughout the planning cycle and serve as a driver for the program’s success. Key roles of the MWG include:

- Support ongoing implementation of the City’s hazard mitigation program.

- Provide input and technical support for update and maintenance of the Seattle HMP.

See Chapter 2 for a discussion of the role of the MWG in the 2021 update of the Seattle HMP.

Seattle Office of Emergency Management

The Seattle Office of Emergency Management (OEM) serves as the coordinating agency for the City's mitigation program. Under the direction of the OEM Director, the office facilitates mitigation activities, including updates to the Seattle HMP, and provides technical assistance to other City departments. The Director has delegated these coordination and facilitation tasks to the Recovery and Mitigation Coordinator. Key roles of OEM include:

- Facilitate the City's hazard mitigation program.
- Provide technical support to City departments regarding integration of hazard mitigation into department activities.
- Keep the Mayor and City Council apprised of the status of the City's hazard mitigation program.
- Serve as Applicant Agent on behalf of the City to apply for and manage grant awards under FEMA's Hazard Mitigation Assistance programs.

Seattle Departments

The success of the City's mitigation program is dependent on mitigation being a shared endeavor across all organizational elements of the City. City departments are strongly encouraged to incorporate hazard mitigation into their plans and programs and be active participants in the City's efforts to enhance resiliency. Key roles of City departments include:

- Implement actions identified in the Seattle HMP.
- Incorporate hazard mitigation into other departmental planning efforts.
- Assign a representative to serve as a liaison to the MWG.

Community Partners

The City is committed to a collaborative mitigation program that strives to integrate with other community efforts to mitigate the impacts of hazards. While the scope of the Seattle HMP primarily includes City departments, the City will continue to look for opportunities to partner with private industry, nonprofit organizations, and community- and faith-based organizations in its mitigation program. Key roles of community partners include:

- Incorporate hazard mitigation into organizational and business activities.
- To the greatest extent possible, coordinate hazard mitigation activities with those of the City and other community partners.

See Chapter 2 for a discussion of how community partners were engaged in the 2021 update of the Seattle HMP.

1.5 Plan Organization

The 2021 update of the Seattle HMP is organized into the following sections:

- **Chapter 1 – Introduction.** Identifies the authorities on which the plan is based, describes the plan’s purpose and scope, describes how the plan is organized, and identified changes to the plan since 2015.
- **Chapter 2 – Planning Process.** Describes the process used to update the plan, including data sources and plan integration activities, outreach and engagement strategies, MWG activities, and plan development milestones.
- **Chapter 3 – Community Profile.** Provides a summary community profile for the City of Seattle including geographic, demographic, and economic characteristics that make the City unique. A full community profile is provided in the Seattle Hazard Identification and Risk Assessment document in Appendix A.
- **Chapter 4 – Hazard Identification and Vulnerability Analysis.** Contains a summary of the hazards that could potentially impact the City, including a hazard ranking table. Full hazard profiles and vulnerability assessment information is provided in the Seattle Hazard Identification and Risk Assessment document in Appendix A.
- **Chapter 5 – Capability Assessment.** Identifies the existing mitigation capabilities of City departments and highlights mitigation accomplishments over the last planning cycle.
- **Chapter 6 – Mitigation Strategy.** Provides updated goals and objectives for the City’s mitigation program and identifies a comprehensive set of prioritized mitigation actions that would contribute to the City’s resiliency.
- **Chapter 7 – Program Implementation.** Describes the City’s plan for monitoring, evaluating, and updating the Seattle HMP over the next five-year period.

1.6 What’s New in the 2021 Update?

The 2021 update of the Seattle HMP includes the following major revisions to the 2015 plan:

- As part of the City’s ongoing enhancement of its emergency program, the Seattle HMP has been aligned with the current planning standards identified in the Emergency Management Accreditation Program (EMAP).
- The complete text of the updated Seattle Hazard Identification and Vulnerability Analysis (SHIVA) is included in Appendix A. No new hazards were identified, but the ranking of hazards changed, and more discussion of climate change was included.
- To increase public participation for the plan update, the City conducted a community survey that resulted in over 152 responses from across the City. The results of that survey are included in Appendix C.
- The methodology by which mitigation actions are identified and prioritized has been modified. A revised Mitigation Action Worksheet and instructions are provided in Appendix D.

Additionally, to aid in plan review and to ensure that all FEMA planning requirements are met, text box callouts have been inserted into the plan that identify the planning element, based on FEMA’s Local Mitigation Plan Review Tool, that is addressed in that particular section of the plan. The plan also strives to make robust use of internal call outs to ensure that plan users can easily find related information. For example, in Chapter 2, which addresses the planning process, the following text box appears:



FEMA

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for [the City of Seattle]? (Requirement §201.6(c)(1))

The City is also in the process of seeking to renew accreditation through the Emergency Management Accreditation Program (EMAP). EMAP includes a series of standards related to hazard mitigation and those standards are addressed throughout the plan.

2 PLANNING PROCESS

Chapter 2 provides a narrative description of the planning process the City conducted to ensure that the City’s mitigation strategy was informed by input from key City departments, community partners, and the public. The process was based on principles of strategies for inclusive engagement and integration with existing planning efforts.



FEMA

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for [the City of Seattle]? (Requirement §201.6(c)(1))

A local hazard mitigation plan’s organization is driven by the needs of the local community. While the regional FEMA offices provide review and approval of hazard mitigation plans in order for local governments to apply for mitigation project funding, there is no required format for the plan’s organization. The following guiding principles are recommended for the development of a local hazard mitigation plan:

- Focus on the mitigation strategy.
- Process is as important as the plan itself.
- Develop the plan in the way that best serves the community’s purpose and people.

FEMA recommends nine tasks for developing or updating local hazard mitigation plans. Figure 3 illustrates the nine recommended tasks. Tasks 1 through 3 involve the people and process involved in the all-hazards mitigation plan development or update; Tasks 4 through 8 focus on the analytical and decision steps that need to be taken; and Task 9 includes suggestions for plan implementation.

Figure 3 - FEMA Recommended Local Mitigation Planning Tasks




Source: FEMA Local Mitigation Planning Handbook, March 2013

2.1 Planning Area

The planning area refers to the geographic area covered by the plan (FEMA Local Mitigation Planning Handbook 2013). In the case of the Seattle HMP, the planning area includes all areas within the City limits, as well as City department services and assets outside the City, such as the municipal watersheds and dams.

See Figure 4 for a map of the planning area (not including assets outside the City).

2.2 Data Collection and Incorporation of Existing Plans

 FEMA	A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))
--	---

Data collection efforts for the Seattle HMP focused on documents pertaining to the planning area and examples of best practices in hazard mitigation planning. The primary source documents for the plan update were the 2015 Seattle HMP and the 2019 update of the Seattle Hazard Identification and Vulnerability Analysis (SHIVA). Additionally, related emergency management plans, current county and state hazard mitigation plans, and City plans with relevant hazard mitigation topics, such as stormwater management, were reviewed as part of the data collection efforts. Examples of hazard mitigation planning best practices were also reviewed for their applicability to the Seattle HMP.

2.2.1 City of Seattle All-Hazards Mitigation Plan 2015-2021

The primary source document for this update of the Seattle HMP mitigation strategy was the 2015 version of the plan. As part of the 2021 Seattle HMP update, the following actions were taken to ensure that the update reflected progress in the City’s mitigation efforts and any changes in priorities:

- Review and refinement of 2015 plan goals and objectives by the MWG.
- Update of City department mitigation capabilities.
- Update of status for all mitigation actions identified in the 2015 plan.

2.2.2 Seattle Hazard Identification and Vulnerability Analysis (SHIVA)

The SHIVA identifies Seattle’s hazards and examines their consequences to facilitate smart decisions about how best to prepare for them. The SHIVA document is the foundation for all of the City’s disaster planning and preparedness activities. The 2021 update of the Seattle HMP incorporates the most recent

version of the SHIVA. The 2019 SHIVA updates the version published in 2014. It meets FEMA and EMAP requirements, both of which publish standards to guide this work and provide quality and consistency across jurisdictions. It also meets the State of Washington's legal requirement that local governments identify and evaluate their hazards, as specified in Washington Administrative Code 118-30-070.

The following major changes were made as part of the 2019 SHIVA update:

- Added chapter on Cyber-attack / Disruption. The emphasis is on immediate dangers to the public.
- Combined Terrorism and Active Shooter Incidents into one Attacks chapter.
- Renamed Infrastructure Failures to Infrastructure and *Structural* Failures.
- Added new scenarios for Disease, Social Unrest, Infrastructure and Structural Failures, Cyber-attack/Disruption and Windstorms.
- Updated map of social vulnerability using model developed by the University of South Carolina.
- Incorporated research published between 2014 and 2018.
- Reassessed hazards.

OEM is constantly collecting information from partners to update the SHIVA. It is updated as needed but a major review occurs at least every four years.

See Appendix A for the full text of the SHIVA.

2.2.3 Citywide Emergency Management Program Multi-Year Strategic Plan 2019-2021

This strategic plan is intended to meet the vision of the citywide emergency management effort through a multi-year strategy, in coordination with key emergency management stakeholders, to include a vision, mission, guiding principles, goals, objectives, outcomes, ongoing activities and projects and accomplishment tracking. One of the three strategic priorities is focused on mitigation.

Strategic Priority #3: Support/Facilitate a more resilient community through innovative mitigation and recovery efforts

Many of the ongoing activities and projects identified to achieve this Strategic Priority #3 relevant to the Seattle HMP include:

- Annually provide briefing on the ability of the City to detect and act on Cyber-threats and hazards.
- Incorporate critical infrastructure planning into city-wide Capital Improvement Plan process to mitigate risk identified in SHIVA/THIRA.
- Continue teaching 'Home Retrofit Program' supported by plan sets managed and maintained by the Department of Construction & Inspection. OEM routinely delivers workshops for residents who are interested in retrofitting their homes for an earthquake.
- Provide training to the Disaster Management Committee on the hazards identified in this SHIVA.
- Conduct annual updates and scheduled major revisions to the Seattle HMP (current version).
- Provide annual training to key personnel in each department on FEMA Public Assistance policies, protocols, and administrative systems.
- Identify procedures and additional planning issues to enhance the Seattle Recovery Framework.

- Maintain and improve a hazard mitigation program that recognizes priorities, activities, and processes to lessen impacts on the Seattle community.
- Identify, apply for, and leverage funding and grants for prioritized mitigation projects.

Action items identified as supporting these objectives are incorporated into this mitigation plan by reference and include, but are not limited to the following:

- Create a strategic integration of the assets management system, Capital Improvement Program, and Seattle HMP.
- Encourage the Emergency Executive Board to adopt mitigation policies.
- Integrate citywide initiatives that enhance resiliency, such as mitigation planning, the race and social justice initiative, Climate Action Plan, and Comprehensive Plan.
- Strengthen awareness of and focus on health systems/disease prevention in the mitigation program.
- Provide training to the Disaster Management Committee on the hazards identified in the SHIVA.
- Create a business outreach plan to build awareness of hazards and the cost-benefit of preparedness.
- Encourage the chambers of commerce and other business advocates to sponsor business efforts to prepare for and mitigate the impacts of hazards.

2.2.4 Washington State Enhanced Hazard Mitigation Plan

Hazard mitigation policy guidance for the State of Washington is provided in the 2018 Washington State Enhanced Hazard Mitigation Plan. This plan was approved by FEMA on October 1, 2018, and identifies hazard mitigation goals, objectives, actions, and initiatives for the Washington State government. Implementation of the policy guidance provided in the plan will reduce damage and injury caused by natural hazards. The plan meets the requirements for an Enhanced State Plan under Interim Final Rule 44 CFR parts 201.4 and 201.5, published in the Federal Register by FEMA on February 28, 2002. By meeting the requirements of the regulations, the State of Washington as well as qualified local jurisdictions and nonprofit organizations that provide like-government services are eligible to obtain federal Hazard Mitigation Assistance grants. The State of Washington can seek higher funding for the Hazard Mitigation Grant Program following a Presidential Disaster Declaration due to the enhanced portion of the plan (20 percent of federal disaster expenditures versus 15 percent with a standard plan) (Washington Military Department Emergency Management Division 2018).

The Seattle HMP was prepared in accordance with goals and objectives identified in the 2018 Washington State Enhanced Hazard Mitigation Plan.

2.2.5 Integration with Other Plans and Programs

The City has a long-standing history of hazard mitigation planning at a range of scales, including the neighborhood, city, and regional contexts. Therefore, hazard mitigation policies, plans, and programs have successfully been incorporated into various community plans and emergency management activities. Table 1 summarizes key programs and plans that support existing mitigation actions and the actions that were taken to ensure that they were appropriately aligned, integrated, or referenced in this plan update.

Table 1 - Plan Review and Integration Actions

Plan/Study	Plan Alignment/Integration Action
2015 Seattle All-Hazards Mitigation Plan	Superseded by this 2021 Seattle HMP update.
2019 Seattle Hazard Identification and Vulnerability Analysis (SHIVA)	Serves as the basis for the hazards identified in this plan. The full text is included in Appendix A.
Seattle Disaster Readiness and Response Plan	Reviewed to ensure consistency.
Seattle Disaster Recovery Framework	Reviewed to ensure consistency.
Seattle’s Comprehensive Plan	Reviewed to ensure consistency. Further alignment efforts will be a focus of the 2024 major update
Seattle Climate Action Plan	Reviewed to ensure consistency.
King County Regional Hazard Mitigation Plan	Reviewed to ensure consistency.
Washington State Enhanced Hazard Mitigation Plan	Reviewed to ensure consistency.

2.3 Mitigation Work Group

The MWG was convened at the start of the Seattle HMP update project to facilitate City department and agency input to the Seattle HMP update. The MWG aided in the update of capabilities, review of mitigation goals and objectives, identification of mitigation strategies, refinement of mitigation review criteria, and prioritization and implementation of mitigation strategies. This planning process focused on improving interdepartmental coordination to ensure that the resulting document met the needs of all City departments.

2.3.1 MWG Members

The MWG consists of members from various City departments and key stakeholders such as the Seattle Public Schools, Seattle Housing Authority and Port of Seattle. MWG members serve as project liaisons to community groups and interests they represent. Working together, the MWG has established the following mission statement to guide its activities:

“It is the mission of the Mitigation Work Group to develop a comprehensive disaster mitigation program that 1) increases community resilience; 2) builds upon existing mitigation programs; 3) increases knowledge of all hazards to which the City is at risk; and 4) implements interim and long-term mitigation actions that maximize loss reduction.”

The members of the MWG who participated in the plan update and their associated organizations and departments are listed in Table 2.

Table 2 - Mitigation Work Group Members

Name	Organization	Department
Flossie Pennington	City of Seattle	Office of Arts and Culture
Dan Foley	City of Seattle	Office of Housing
Patrice Carroll, David Goldberg	City of Seattle	Office of Planning and Community Development
Kara Main Hester, Jennifer Devore	City of Seattle	Seattle Budget Office

Name	Organization	Department
Jae Lee	City of Seattle	Seattle Center
Jana Elliot, Brittany Barnwell	City of Seattle	Seattle City Light
Micah Chappell	City of Seattle	Seattle Department of Construction and Inspections, Planning and Development
Elenka Jarolimek, Julie Matsumoto	City of Seattle	Seattle Department of Finance and Administrative Services
Sarah Sodt	City of Seattle	Seattle Department of Neighborhoods
Lawrence Eichhorn, Mary Wylie	City of Seattle	Seattle Department of Technology
Pattie Quirk	City of Seattle	Seattle Department of Transportation
Andy Collins	City of Seattle	Seattle Fire Department
Jill Watson	City of Seattle	Seattle Human Services Department
Amanda Allen, Jessica Sidhu	City of Seattle	Seattle Office of Economic Development
Lucia Schmit, Erika Lund, TJ McDonald, Laurel Nelson	City of Seattle	Seattle Office of Emergency Management
Edie Gillis, Lylianna Allala	City of Seattle	Seattle Office of Sustainability and Environment
Jon Jainga, Cynthia McCoy	City of Seattle	Seattle Parks and Recreation
Carrie Chitty, Lt. Daniel Nelson	City of Seattle	Seattle Police Department
Dennis Reddinger	City of Seattle	Seattle Public Library
Michael Godfried	City of Seattle	Seattle Public Utilities
Addison Houston	King County	Public Health Seattle King County
Kati Davich	Port of Seattle	N/A
Jared Cumber	Seattle Housing Authority	N/A
Benjamin Coulter	Seattle Public Schools	N/A

2.3.2 MWG Meetings

Seattle HMP issues were discussed, and key deliverables were reviewed at the MWG’s formal meetings. The MWG convened for a series of five meetings over the course of the project (see Table 3) where representatives from key City departments and other stakeholders had the opportunity to be briefed on project status, to assist in the plan update, and collaboratively work on plan content.

Table 3 - Mitigation Work Group Meeting Schedule

MWG Meeting	Date	Objectives
Mitigation Work Group Meeting No. 1 (in person)	January 27, 2020	Review plan process and MWG roles and responsibilities Present updated SHIVA Review status of 2015 Seattle HMP actions Review 2015 Seattle HMP actions Discuss Seattle HMP Capabilities
Planning process paused for Covid-19 response		


MWG Meeting	Date	Objectives
Mitigation Work Group Meeting No. 2 (online)	September 14, 2020	Present revised process, outreach Review Teams online platform Review and discuss outstanding Tasks
Mitigation Work Group Meeting No. 3 (online)	September 28, 2020	Confirm mitigation goals and objectives Present revised Mitigation Action Worksheet Develop department-specific mitigation actions
Mitigation Work Group Targeted Work Sessions (online)	November 2020	Meet with key departments to refine mitigation actions
Mitigation Work Group Meeting No. 4 (online)	November 4, 2020	Review outstanding tasks Updates and questions from MWG members
Mitigation Work Group Meeting No. 5 (online)	December 14, 2020	Review program implementation and monitoring
Mitigation Work Group Meeting No. 6 (online)	January 25, 2021	Review comments Finalize strategy

2.3.3 Planning Platform

Seattle HMP update process and draft documents were made available to the MWG through MS Teams, a web-based collaboration platform that allowed MWG members to work together virtually. The Teams platform included a project calendar, group email, SharePoint site, recordings of MWG meetings, chat, project team information, important links, and file management functionalities.

See Appendix B for documentation of all MWG activities.

2.4 Inclusive Outreach and Public Engagement

 FEMA	<p>A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))</p> <p>A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))</p>
---	--

A critical component of the Seattle HMP update effort is a robust stakeholder engagement process that provides “an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval” (44 CFR §201.6).

2.4.1 Inclusive Outreach and Public Engagement Plan

To facilitate meeting this requirement, OEM developed an Inclusive Outreach and Public Engagement (IOPE) Plan and a designated a public comment period for the Draft Seattle HMP (see Table 4). The IOPE Plan, titled the Outreach and Engagement Plan (November 2020), provides a detailed approach to how

the project team would engage the public and key stakeholders in the Seattle HMP update process. Because of the COVID-19 Pandemic, outreach and public engagement was conducted online and was more narrowly focused than the previous update. The Plan is designed to meeting the following objectives:

- Raise awareness of hazard mitigation, the update process and when opportunities to provide input will occur.
- Provide the opportunity to all who live, work and play in Seattle to participate in the update process.
- Ensure a process that is open and transparent, culturally sensitive, accessible, and ensures that input is considered.
- Gather input in ways that are safe for staff and the public during the COVID-19 Pandemic.
- Ask for input where the public feedback can authentically influence the plan.

See Appendix C for the full Inclusive Outreach and Public Engagement Plan and materials.

2.4.2 Engagement Strategies

In September 2020, the planning process was restarted. The following strategies were used to raise awareness about the Seattle HMP update and gather feedback on the Draft Seattle HMP:

Make Information Available on OEM Public Website

OEM established space on their public website to share information about the HMP. The website included the following:

- Project description
- Downloadable one-page summary about the Seattle HMP update
- Dedicated email address (HazardMitigationPlanUpdate@seattle.gov)
- Narrated presentation about the Draft Seattle HMP
- Draft Seattle HMP and instructions on how to submit comments
- Link to a Public Survey about priorities for future City/ community hazard mitigation partnerships

Online Stakeholder Meetings

In addition to the MWG, other stakeholders had an opportunity to provide input during development of the plan. The information about the Draft Seattle HMP will be presented during online meetings of following key stakeholder groups to solicit input and feedback:

- Seattle Disaster Management Committee
- Strategic Work Group
- Emergency Executive Board
- Community Safety Ambassadors

Traditional and Social Media

The broader public will be invited to learn about the project, opportunity to comment on the Draft Seattle HMP and respond to community partnership polling question. The following media will be used to communicate with the broader public:

- OEM general email list
- OEM Newsletter
- Posts on OEM social media
- Press release to various media outlets

Community Survey

A community survey was conducted as part of the outreach for the Draft Seattle HMP. The survey was designed to solicit input from Seattle residents on their perceived concern regarding various hazards, importance of different risk reduction strategies, and which community services were most important to protect through mitigation.

In total, 152 people responded to the community survey. Key findings included:

- Highest level of concern about earthquake and disease outbreak hazards.
- Most important risk reduction strategies were regulation and structural projects.
- Top four community services that should be protected through mitigation were: health/ mental health, homelessness service/emergency shelter, food assistance/ food banks, and affordable housing/ housing assistance.

Table 4 - Stakeholder and Public Outreach Activities

Activity	Timing	Description
Project paused due to COVID-19 Pandemic (March – August 2020)		
OEM Website update	September 2020	Website is updated with HMP description and timeline.
OEM Newsletter	September 2020 and January 2021	HMP information included in the September newsletter distributed to 6000+ people.
Community Survey	November 2020	OEM shares survey about community priorities on website, social media, newsletter.
Stakeholder Meetings (SWG, DMC)	November/ December 2020	Briefings at scheduled meetings to raise awareness and get input on HMP
Public Comment Period (2 weeks)	January 2021	Post HMP on OEM website Solicit public comments on the Draft HMP.

Outreach for Draft Plan	January 2021	OEM email notices, newsletter, press releases, stories to solicit comment on Draft HMP
DMC Review and Approval	February 2021	Final HMP is submitted to DMC
EEB Review and Approval	April 2021	Final HMP is submitted to EEB

2.5 Plan Development and Review

The Seattle HMP development process was conducted according to the process outlined above and described in detail in FEMA’s Local Mitigation Planning Handbook. Update of the City’s mitigation strategy was treated as the plan’s primary purpose and the plan serves as the written record of the comprehensive planning process. In addition, the Seattle HMP reflects the City’s current needs and hazard concerns. The development of the Seattle HMP update occurred over a 14-month period from January 2020 to February 2021. The plan development was conducted through a series of seven steps as detailed in Table 5. Many of the steps occurred concurrently. Table 5 also illustrates the corresponding FEMA local mitigation planning task for each Seattle HMP development milestone. The requisite State Hazard Mitigation Officer and FEMA review periods occurred during the Draft and Final Seattle HMP steps.

Table 5 - Seattle HMP Update Timeline

Seattle HMP Update Development Milestone	Corresponding FEMA Recommended Local Mitigation Planning Task¹	Timeline
1. Data Collection and Document Review	Task 1 – Determine the Planning Area and Resources	January 2020
2. Mitigation Working Group Coordination	Task 2 – Build the Planning Team	January 2020 – January 2021
3. Stakeholder Engagement and Outreach	Task 3 – Create an Outreach Strategy	October 2020 – January 2021
4. Hazard Mitigation Strategy Update	Task 4 – Review Community Capabilities Task 6 – Develop a Mitigation Strategy	September 2020 – December 2020
5. Draft Hazard Mitigation Plan	Written documentation of the planning process (all tasks)	January 2021
6. Final Hazard Mitigation Plan	Written documentation of the planning process (all tasks)	February 2021
7. Plan Adoption	Task 8 – Review and Adopt the Plan	March -July 2021

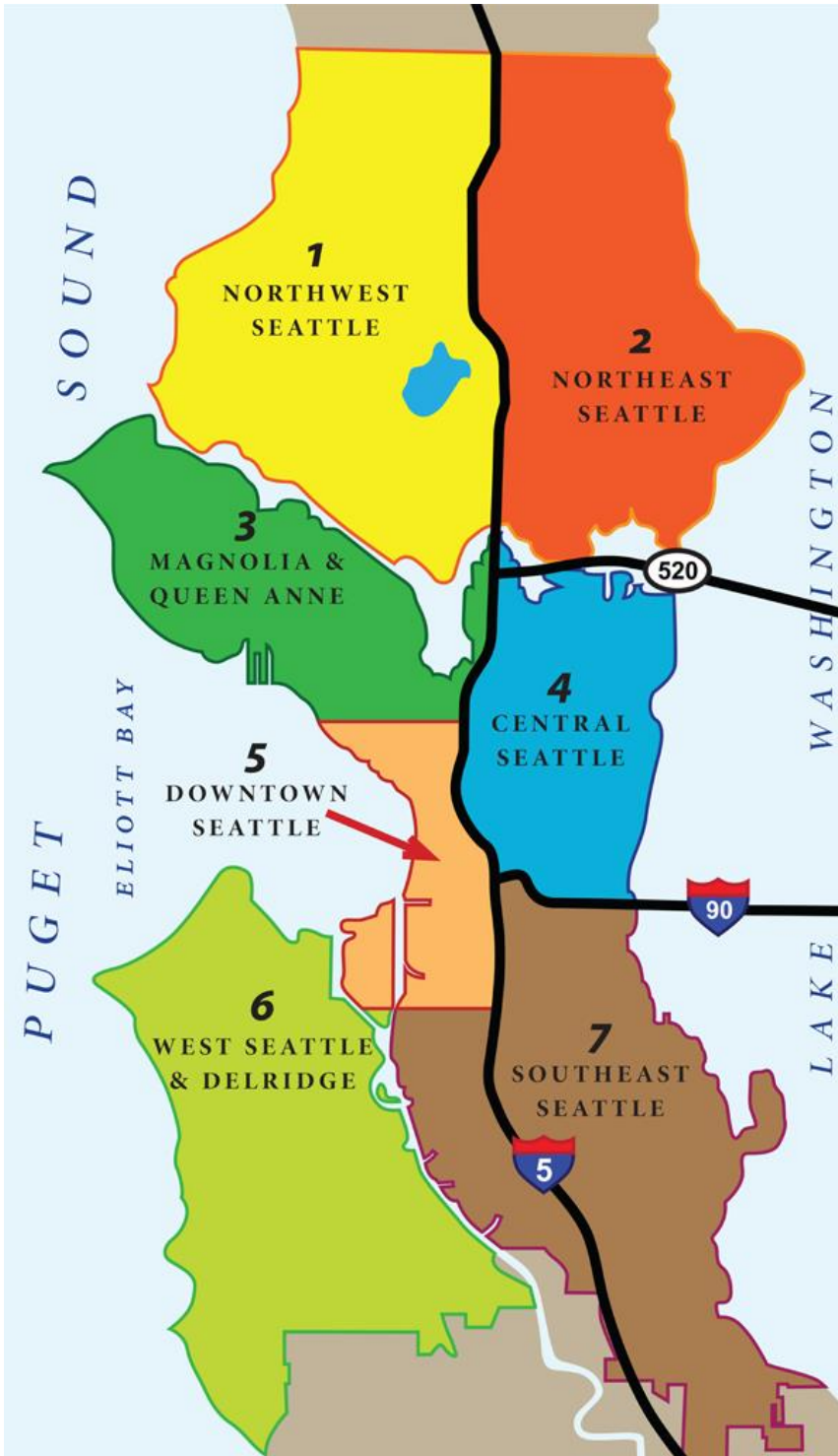
Notes:

Task 5 – Conduct a Risk Assessment was completed through the separate SHIVA process.

Task 7- Keep the Plan Current and Task 9 – Create a Safe and Resilient Community are part of the plan implementation process.



Figure 4 - Seattle HMP Planning



3 COMMUNITY PROFILE

Chapter 3 provides a summary of the community profile provided in full in the Seattle Hazard Identification and Vulnerability Analysis (SHIVA). The City's mitigation strategy is designed to be reflective of the unique characteristics of the community as an economic and cultural hub in the region.

Seattle is an 84-square-mile isthmus sitting between Puget Sound to the west and Lake Washington to the east. Elliott Bay, an extension of Puget Sound, is located in the middle of the City, giving Seattle an hourglass shape. Downtown is located in this narrow section, which results in many major transportation routes and services competing for land where there is the least space.

Seattle is a hilly city. Many roadways, especially in the downtown, Capitol Hill, Beacon Hill, Queen Anne, West Seattle, and Magnolia neighborhoods have steep inclines that can become hazardous and/or impassable in slippery driving conditions. There are 193 miles of waterfront, 53 of which are tidal. The Seattle Department of Transportation (SDOT) owns, inspects, maintains, and/or operates nearly 280 bridges spanning either natural or artificial barriers, 58 of which are designated vital lifeline structures. Two floating bridges, the Evergreen Point or Albert D. Rossellini (SR-520) and Lacey V. Murrow (I-90) bridges, are the most direct vehicular corridors linking Seattle to the neighboring eastside cities of Bellevue, Kirkland, and Mercer Island. The combination of hilly terrain, barriers, like waterbodies and elevated roadways, and the convergence of transportation pathways in constricted areas makes Seattle vulnerable to hazards like earthquakes that can damage the transportation system in key spots. The importance of these water and slope barriers on emergency response cannot be overstated. The arrangement of hills and water has dictated where transportation routes and large facilities can be located. The resulting patterns create a relationship between the natural and built environments that are fundamental to Seattle's hazard vulnerability.

With over 747,300 residents as of 2019, Seattle is the largest municipality in the Pacific Northwest. In normal times large numbers of people work in or visit Seattle.

Seattle also is home to the main campuses of three major universities: University of Washington, Seattle Pacific University, and Seattle University. In addition, Seattle Colleges, a multi-college district, serves Seattle and its surrounding communities at three comprehensive college campuses and five specialty training centers and has a combined enrollment of 45,000, operates three campuses located in West Seattle, Capitol Hill, and Northgate. The total combined student population for all of these universities and colleges is approximately 102,000.

Seattle is a center for cultural, governmental, and economic activity. It is both a city of neighborhoods with vibrant individual identities and one of the most trade dependent cities in the United States. One in three jobs relies on international trade.

The Seattle-King County area attracts more than 21.3 million overnight visitors each year (as of 2018). Major venues for conferences, conventions, and special events include the Washington State Convention and Conference Center, a wide variety of local hotels, the Bell Harbor International Conference Center, CenturyLink Field Events Center, and the Seattle Center (site of the 1962 World's Fair).

The city is also home for several professional sport teams including: the Mariners at Safeco Field (seats 54,000) and the Seahawks and Sounders at CenturyLink Field (seats 67,000). The renovated Climate

Pledge Arena on the Seattle Center Campus will open in 2021 will be the home arena of the NHL Seattle Kraken (seats 18.000).

King County has a total of 24 hospitals and three stand-alone emergency departments, including 14 in the City of Seattle. Of the 24 hospitals, there is a pediatric hospital, three psychiatric hospitals, and a Veteran’s Administration hospital. King County has nine designated trauma hospitals, including one Level I adult and pediatric regional trauma center in the City of Seattle (Harborview Medical Center).

The number of cruise ships that use the Port of Seattle has grown in recent years. Eight major cruise lines used the Seattle facilities in 2012 and in 2019 there were 213 sailings with 1,208,590 passengers.

See Chapter 3 of the SHIVA including a more detailed community profile.

4 HAZARD IDENTIFICATION AND VULNERABILITY ANALYSIS

4.1 General

Seattle is a vibrant city, yet it faces hazards that threaten the very tissue of our community. Seattle can reduce hazard impacts and this document is where we start. The Seattle Hazard Identification and Vulnerability Analysis (SHIVA) identifies Seattle’s hazards and examines their consequences so we can make smart decisions about how best to prepare for them.

This document is the foundation for the City’s disaster planning and preparedness activities. The City hopes the rest of the Seattle community will use it in the same manner. The Seattle Hazard Identification and Vulnerability Analysis (SHIVA) is a community document. OEM is constantly collecting information from partners to update it. It is updated as needed but, a major review occurs at least every four years.

The SHIVA is intended to serve as the risk assessment portion of the Seattle HMP and provides the foundation for the rest of the mitigation planning process, which focuses on identifying and prioritizing actions to reduce hazard risk. The SHIVA is intended to guide the mitigation strategy outlined in this plan and is hoped to provide insight for other City planning efforts including future updates of the Comprehensive Plan.

The SHIVA, as the City’s risk assessment, is intended to accomplish the following:

- Describe hazards. Includes a description of natural and human-caused hazards that may impact the City. Each hazard includes information on the following:
 - **Location.** What areas of the City are most likely to be impacted?
 - **Extent.** What is the expected magnitude of the hazard?
 - **Previous occurrences.** What is the history of the hazard?
 - **Probability of future events.** What is the likelihood of the hazard occurring in the future?

Additionally, the SHIVA summarizes the City’s vulnerability to identified hazards including potential impacts and losses that may result.

The 2019 update of the SHIVA replaces the version published in 2014. It meets the requirements of the Federal Emergency Management Agency (FEMA) and the Emergency Management Accreditation Program (EMAP), both of which publish standards to guide this work and provide quality and consistency across jurisdictions. It also meets the State of Washington’s legal requirement that local governments identify and evaluate their hazards, as specified in WAC 118-30-070.

See Appendix A for the full text of the SHIVA.

2020 An Unprecedented Year

The 2019 SHIVA does not reflect the major incidents Seattle experienced in 2020 pandemic, wildfire smoke, civil unrest, and the West Seattle Bridge closure. The timing of this update has not allowed us to adequately reflect and integrate those events in this HMP. As the disasters, response and recovery from these events are assessed and better understood, changes to the SHIVA and the Seattle HMP may be desired or needed.

4.2 Climate Change

The climate has been changing over the past few decades and is projected to change into the future at an increasing rate. Climate change is caused by the build-up of greenhouse gases (GHG) in the atmosphere. According to 2014 data from the Seattle Office of Sustainability and Environment, 66% of the city's GHG emissions comes from road transportation, 32% comes from commercial and residential buildings, and 3% from waste management. Seattle has set a goal to reduce carbon emission by 58% by 2030 and to become carbon neutral by 2050 (with 2008 emissions as the baseline year), in hopes to reduce the future effect of local climate change. Further, the Seattle City Council passed a resolution in 2017 stating the city's commitment to uphold the Paris Agreement, meaning Seattle will take steps to ensure that future warming is limited to 1.5°C. Despite these local efforts to reduce GHG emissions, climate change is caused by global GHG emissions that continue to rise. Further, the Seattle City Council passed a resolution in 2017 stating the city's commitment to uphold the Paris Agreement, meaning Seattle will take steps to ensure that future warming is limited to 1.5°C. Despite these local efforts to reduce GHG emissions, climate change is caused by global GHG emissions that continue to rise.

Climate change presents Seattle with many challenges: flooding, summer heat and drought, rising sea levels, heightened wildfire risk, and declining snowpack. Seattle will also experience indirect impacts. These could include higher commodity prices, increased migration and increased economic and political instability across the globe. The primary effects for the Puget Sound region include:

- **Temperature.** The Puget Sound region is projected to warm between 4.2°F and 5.5°F on average by the 2050s.
- **Sea Level Rise.** The projected range of sea level rise for Seattle is as low as 4 inches, and as high as 56 inches by 2100 (dependent on land movement). Rising sea levels lead to an increased risk of coastal flooding and landslides.
- **Snowpack.** Seattle's water system and power system are dependent on Cascade Mountain snowpack and glacial melt. Mountain snowpack is projected to decline 42-55% by 2070 creating water management challenges. The impact of the decline in snowpack on the city's water supply system has been somewhat mitigated by a dramatic decline in per-capita water usage despite a rise in Seattle's population.
- **Streamflow.** Due to the decreased snowpack and early spring melting, streams that rely on snowmelt are projected to experience peak streamflow earlier in the year, and for some rivers, dry years are becoming drier. Seattle's watersheds will become more reliant on rain than on snowpack. Winter streamflow is projected to increase by about 28% to 34% by 2080, while summer streamflow is projected to decrease by 24% to 31% by 2080.
- **Precipitation.** Heavy rainfall events are expected to become more severe for Washington State. The number of days with more than one inch of rain is estimated to increase 6% to 20% by the 2050s. While projections of seasonal precipitation are mixed, most models point towards drier summers. Drier summers, with more severe precipitation events in other seasons leading to an increased risk of urban flooding and landslides, and more costly stormwater management.
- **Air Quality.** Increasing air temperatures, longer periods of heat, and drier summers have the potential to increase ground-level ozone and fine particulate matter accumulation. Summer deaths attributed to ozone are projected to increase to 132 per year by 2050.

4.3 Geophysical Hazards

These hazards originate in the movement of earth. They destroy the built environment over large areas and can cause huge casualties. While they are impossible to prevent there is a lot Seattle can do as a community to decrease their consequences.

4.3.1 Earthquakes

Earthquakes are Seattle's most significant hazard. No other hazard has the combination of likelihood and potential destructiveness. Seattle is at risk for earthquakes from three sources: 1) deep earthquakes like those that damaged the City in 1949, 1965 and 2001; 2) shallow earthquakes along the Seattle Fault; and 3) megathrust earthquakes that could reach magnitude 9.0 but would originate outside Seattle. The Seattle Fault is Seattle's most dangerous source. The Seattle Fault last ruptured in 900AD causing a 7.2 magnitude earthquake, massive landslides, and a tsunami. The major consequences are building collapse, lateral spread (where the ground permanently shifts under buildings), landslides, fires, liquefaction (where the ground turns liquid under buildings) and potentially a tsunami. Casualties could exceed 1,000 people and economic damage could easily run into billions of dollars. Seattle has been preparing for earthquakes for many years by enhancing building standards, retrofitting Infrastructure and facilities, and educating the public.

4.3.2 Landslides

Landslides are a common Seattle hazard especially when ground water is saturated in the winter. Landslides can always be deadly but more commonly they destroy buildings, block roads, and sever lifelines. The greatest risk is when a storm or earthquake triggers a swarm of landslides throughout the city within several days. The biggest swarm was in 1997 when 300 landslides happened in less than four weeks. A Seattle Fault earthquake could cause massive landslides. The last one in 900 AD caused whole forested hillsides to slide into Lake Washington. The City of Seattle addresses its landslide hazard by mapping its landslide prone areas and through its building codes. The U.S. Geological Survey (USGS) has created a gauge to show when Seattle has a heightened risk of landslides.

4.3.3 Tsunamis and Seiches

Tsunamis are a rare but potentially catastrophic hazard in Seattle. They are most often caused by earthquakes and landslides. Tsunamis that originate in the Pacific Ocean do not pose a major threat to Seattle because Puget Sound's shape and complex shoreline will break them up before they reach Seattle. The most dangerous tsunamis are generated locally. A Seattle Fault earthquake presents the greatest potential for a tsunami in Seattle. A large landslide could also trigger a tsunami. A landslide triggered a tsunami in the Tacoma Narrows in 1949. A seiche is a standing (vertical) wave produced by the sloshing of an enclosed water body like a lake, bay, reservoir, or river. The cause can be either earthquake shaking or storms. They are rare occurrences in this area. An 1891 earthquake produced an eight-foot seiche on Lake Washington and the 1964 Alaskan quake generated seiche that damaged property on Lake Union. In 2002 another seiche occurred in Lake Union due to an earthquake in Alaska. Seattle uses tsunami risk as a criterion in siting critical facilities, but it has not pursued additional tsunami or seiche preparedness measures because a tsunami 1) will strike the shoreline within seconds or minutes of being created, 2) will probably occur immediately after a massive earthquake and 3) happen rarely.

4.3.4 Volcanic Hazards

Volcanic material from Mt. Rainier washing down through the Duwamish River and ashfall are the most significant volcanic threats to Seattle. During an eruption, Mt. Rainier's glaciers could melt, mix with volcanic debris and flow down the valleys surrounding it. These flows are called lahars. Based on geologic evidence a lahar from Mt. Rainier would bury low-lying areas west of the mountain but would stop short of Seattle. In the days that follow, rain and erosion could wash the sediment down the Duwamish creating a major navigation and environmental hazard.

Severe ashfall is unlikely in Seattle. Our area's prevailing winds blow from west to east and will probably move ash away from Seattle, but it is possible that rare easterly winds could occur during an eruption producing an ashfall in Seattle. Seattle will need to support more heavily impacted neighbors, cope with transportation closures and help displaced people after an eruption or lahar. Seattle has not undertaken specific volcanic mitigation measures.

4.4 Biological Hazards

Biological hazards occur from natural matter in our world such as bacteria, viruses, insects, or animals. The only biological hazard identified for Seattle is disease/pandemic influenza (including bioterrorism).

4.4.1 Disease/Pandemic Influenza (including bioterrorism)

Seattle like all other cities is facing increased exposure to new diseases. The rapid increases in personal mobility, the proximity of people to livestock and global urbanization have created conditions in which it is possible for new diseases, especially influenza, to emerge and spread around the world in days. Global outbreaks are called pandemics. When a new disease emerges, human beings have no immunity against it. This condition increases the chance individuals will get sick when they come into contact with the disease and increase the severity of their symptoms if they do. The potential consequences of disease outbreaks include:

- Patients overwhelming local hospital and health care providers.
- Inability to request mutual aid assistance if impacts involve multiple communities.
- Contaminated water supplies.
- Threats to critical infrastructure if essential operators are absent in high numbers.
- Widespread mental health impacts.
- Closure of community services, schools and larger public events.

Public Health – Seattle & King County has developed plans to attempt to slow the spread of disease by closing public gathering places, increasing the space between people ('social distancing') and opening additional care facilities. Bioterrorism is the use of a biological agent as a weapon to cause fear, illness, or death. Seattle has not experienced a bioterrorist attack but being a densely populated urban hub makes it an attractive target.

4.5 Intentional Hazards

These are hazards that some person or group seeks to cause. Often the perpetrators want to disrupt the flow of normal community life, sometimes they want to cause property damage, and other times they

want to hurt people. The adversarial nature of these hazards makes them especially unpredictable and therefore dangerous. Law enforcement is primary in the response to these hazards.

4.5.1 Social Unrest

Social unrest includes riots, civil disorders, strikes, and mass civil disobedience. Seattle is the central stage for political and social activity in the Puget Sound region and the hub of its social activities. This condition makes social unrest likely to occur in Seattle. Most recent incidents were caused by anarchist groups. The largest centered on the 1999 World Trade Organization (WTO) meeting. Most of Seattle's incidents have targeted property but assaults and one death has occurred. Most incidents can be handled by the Seattle Police Department, but large ones like the WTO protests require outside assistance and can shut down large areas of the City. Most incidents occur in the downtown area and on Capitol Hill.

4.5.2 Attacks

Attacks can be perpetrated by many different actors with different motivations, but all use violent and destructive tactics to cause harm to people and/or property. Some actors include terrorists (domestic and international), violent extremists, and targeted violent offenders. Examples of tactics are mass shootings, bombings, arson, murder, kidnapping, hijacking, or skyjacking. Not all attacks are politically motivated, some are based on personal grievances. Most attacks happen in public gathering places or institutions, of which Seattle has many. The threat of attacks has grown with the interconnectedness of the internet and social media.

The Puget Sound region has active far-right and eco-terrorist groups, and has experienced activity related to international terrorist groups. Seattle has a heightened eco-terrorism risk. In 2001 the Earth Liberation Front (ELF) firebombed the University of Washington's Center for Urban Horticulture. The number of mass shootings in the U.S. has increased over the past decade. Seattle has experienced three mass shootings in recent history, and an active shooter situation at Seattle Pacific University. In today's security conscious, post-9/11 environment, the main threat appears to be attacks using small-scale tactics such as shootings or vehicle ramming.

Attacks are almost impossible to predict. In the aftermath of 9/11, national security focus shifted to terrorism involving chemical, biological, nuclear, radiological and explosive and cyber means. Locally, Seattle Public Schools are undertaking heightened security measures. The City has been the recipient of several federal grants to bolster local security.

4.5.3 Cyber-attack and Disruption

To function as a modern city, Seattle is highly dependent on digital systems and the internet. Disruptions to cyber infrastructure can include internet outages, release or deletion of sensitive data and information, compromised infrastructure or services, or physical destruction. Digital systems can face intentional attacks from small scale hackers to sophisticated nation-state actors. Cyber disruption can also occur from human errors or from another hazard (e.g. earthquake). Seattle's utility infrastructure uses Supervisory Control and Data Acquisition (SCADA) Systems to run and maintain basic functions. SCADA systems are generally outdated and vulnerable to hacking, especially if they are connected to the internet.

The likelihood of attack and disruption is increasing as more products and services connect to the internet. The City of Seattle experiences minor hacking attempts daily but has never experienced a major cyber-attack. However, limited information technology resources make a large attack a possibility and large-scale ransomware attacks have recently halted city functions in other areas of the U.S.

4.6 Transportation and Infrastructure Hazards

This section comprises failures in the built environment. Their causes are mostly accidental but can be deliberate when used as a means for terrorism. Engineering advances have dramatically improved safety, but Seattle still has many older transportation and infrastructure systems that were not built to modern safety standards. These systems require extra maintenance.

4.6.1 Transportation Incidents

Seattle is a hub for land, sea, and air transportation giving it an inherent exposure to accidents. One of the city's deadliest disasters was a plane crash that occurred in 1943, killing 32, including people on the ground. The South of Downtown (SODO) area is the most vulnerable because it is a hub for all major transportation modes, but our bridges and tunnels also have heightened risk. Transportation accidents are usually limited in size but can cause high fatalities, fires, hazardous materials incidents, power outages, transportation network disruptions, and infrastructure failures.

4.6.2 Fires

Multi-block and high-rise fires are now rare in the U.S. due to better fire code enforcement, but having a large concentration of high-rise buildings, hotels, entertainment venues and industry makes Seattle vulnerable. In the 1970's several single-room occupancy hotels burned with high fatalities. Seattle also has a large port making marine fires a danger and an underground electrical distribution network that can cause extended outages when fires occur in it. Fires are especially dangerous when they are ignited by other hazards like earthquakes and civil disorders because many fires can ignite in a short period while responders are already occupied.

4.6.3 Hazardous Material Incidents (including Wildfire Smoke)

Seattle is a regional industrial center and major transportation hub raising its exposure to hazardous materials incidents that release toxic chemical, combustible, nuclear, or biological agents into the environment. Seattle has not had any truly disastrous hazardous materials incidents but has had several close calls with fuel tanker explosions and a fire at a UW biology lab. There has been an increase in the transport of highly flammable crude oil through Seattle in recent years. Most incidents happen at fixed sites, but those that occur during transport are often more dangerous because they occur in uncontrolled, public spaces.

Smoke from wildfires has become a recurring seasonal air quality hazard in the western United States and British Columbia. In the Puget Sound region in 2018, wildfire smoke led to 24 days of poor air quality, including nine days that were considered either unhealthy for sensitive groups or unhealthy for everyone. In 2020, wildfire smoke led to a record-breaking number of days of poor air quality, including many days that were considered unhealthy for everyone. This smoke created additional risk for people with COVID-19 and worsened symptoms.

4.6.4 Structural Collapse and/or Failure

Structural collapse or failure includes buildings, dams, and other critical infrastructure such as bridges, and water, sewer, or power lifelines. There are no dams in Seattle, but the City owns a dam south of the city. If this dam failed, the biggest consequence would be flooding in the Duwamish Valley. Seattle is especially vulnerable to bridge collapse due to central role they play in connecting Seattle's transportation network to other areas. Western Washington has had four high profile bridge collapses since 1940. The Seattle Department of Transportation has an active bridge inspection and retrofit program. Regular inspections of the West Seattle High-Rise Bridge indicated accelerated growth of new and existing structural cracks resulting in its closure to all vehicle traffic on March 23, 2020. The City chose repair/strengthening over replacement, pushing for bridge reopening in 2022.

4.6.5 Power Outages

Power outages are a type of infrastructure failure but are treated as a separate hazard due to the complexity of their consequences. The 2003 Northeast Blackout highlighted the fragility of the U.S. power system. Seattle experienced a week-long power outage from a winter storm in December 2006. Since the wide-spread 2006 outage, Seattle City Light (SCL) has acquired a new power management system that allows it to isolate outages and respond faster. It has also improved fire suppression in its underground electrical system. In the 1980's and 1990's several fires in the underground system caused extended outages in major parts of downtown. About half of Seattle's power is purchased from the Bonneville Power Administration (BPA), making the city vulnerable to disruptions in other areas of the Northwest. While much of BPA's infrastructure is aging, they have been a leader in seismic upgrades to their critical infrastructure. Climate change is projected to decrease hydropower generation in the summer by mid-century.

4.7 Weather

Severe weather events are frequent hazards in Seattle. Except for flooding, they have citywide impacts that vary from minor to debilitating. Their consequences mount the longer they go on. Forecasters are getting better at predicting these events and their severity. The extra time reduces vulnerability by allowing the public and institutions more time to prepare.

4.7.1 Excessive Heat

Excessive heat events (EHE) can be an extremely deadly hazard. More than 700 people died during the 1995 Chicago heat wave. Because Seattle has a generally mild climate, most people are not acclimatized when EHEs do occur. The temperature itself is just one factor driving the consequences of EHEs. The other important factors are the season, difference between the pre-event and event temperatures, the event duration, nighttime cooling, wind and humidity. Meteorologists can accurately forecast the development of an EHE and the severity of its associated conditions with several days of lead time. The National Weather Service (NWS) has developed a Heat Health Watch/Warning System that tailors excessive heat guidance to specific regions in the country. EHEs are projected to become more intense in the future due to climate change. The most vulnerable people in EHEs are the elderly, infants, the homeless, the poor, and people who are socially isolated.

4.7.2 Flooding

Seattle is susceptible to four flood types: coastal flooding (including king tides), riverine, urban, and dam failure. Atmospheric rivers are storms that occur when the Jet Stream brings moist air from the tropics into the Northwest. They can cause extended periods of heavy rain that can cause riverine and urban flooding. Recent weather patterns have produced very high intensity rain cells, sometimes over narrow geographic storm-tracks.¹ These storms release larger amounts of rain, in short periods of time, which the drainage systems cannot always handle adequately.

- Coastal flooding happens during storms and especially high tides (called ‘king tides’). When the two coincide, the consequences are more severe. Sea level rise will make coastal flooding worse.
- Riverine flooding happens mostly along Seattle’s creeks. The South Park neighborhood is in a 500-year floodplain. Most of Seattle’s floodplains are very narrow.
- Urban flooding occurs when heavy rain overwhelms the drainage system. Seattle’s drainage systems were designed and originally built for longer duration and lower intensity rainstorms. The City has developed mitigation measures like detention ponds to decrease the consequences of urban flooding. The City of Seattle owns dams outside the city limits. Dam failure is mostly a hazard outside the city. The greatest risk is the Howard Hanson Dam. It discharges into the Green River and the Duwamish. Studies suggest that the likelihood of flooding on the Duwamish due to a dam failure is low.

4.7.3 Snow and Ice

Seattle’s winter weather is generally mild. When Seattle does receive snow, accumulations can be large. The consequences are especially severe if the snow lingers for more than several days or triggers secondary hazards like power outages. Seattle has heightened vulnerability to snow and ice storms because of its hilly topography and lack of dedicated snow removal equipment (Seattle has to repurpose general use equipment to plow snow). The City prioritizes major roads and is not able to plow residential streets. Extended snow can lead to severe transportation challenges. Excessive cold exacerbates risks to human health and safety when electric heating sources are inoperable. In 2008 several people died in King County due to carbon monoxide poisoning when they used charcoal grills indoors to heat their homes. Snow load has caused roof collapses in Seattle and rapidly melting snow has caused urban flooding and landslides.

4.7.4 Water Shortages

Seattle can experience water shortages during the summers that follow winters with low snowpack, because nearly all of Seattle’s water comes from watersheds in the Cascades that accumulate their supply from melting snow. Snowpack is projected to decline in future years due to climate change. The main shortage impacts are reduced stream flows for salmon, usage restrictions, and economic hardship for businesses that require large amounts of water. In 2006, Seattle Public Utilities (SPU) updated and adopted a plan to respond to and mitigate water supply problems. Water shortages also have consequences for power. Seattle City Light (SCL) faces challenges during water shortages because most power in the Northwest is generated by hydroelectric dams. During water shortages not as much water is available to turn generators to make electricity. To meet demand SCL must buy more expensive power from outside the region. Besides climate, water shortages can be caused by main breaks. These

shortages due to infrastructure failures are usually localized and short but could be longer if they are the caused by another hazard like an earthquake.

4.7.5 Windstorms

Windstorms with wind speeds equaling those of category one hurricanes can strike Seattle. Sustained winds of 85 miles per hour were recorded in the Seattle area in 1993 and 2006. Seattle’s most damaging storm was the 1962’s Columbus Day Storm. Windstorms cause power outages, structural damage, transportation blockages, and coastal flooding. Fall and winter is the most common time for windstorms, but the occasional out of season storms can be the most dangerous. Falling trees account for most damage. Windstorms often accompany other weather hazards producing complex emergencies that can include landslides, urban flooding, snow and extreme cold. Windstorms can damage structures with speeds as low as 32 mph. Seattle’s new building code requires new structures to withstand 85 mph gusts. The City of Seattle has programs for vegetation management that serve to mitigate damage to electrical systems during windstorms. This tree trimming program intensified after the 2006 storm that caused lengthy power outages.

4.8 SHIVA Scoring Methodology

Each hazard has been evaluated using its Most Likely and Maximum Credible scenarios. Both scenarios are evaluated using twelve parameters developed from EMAP and FEMA standards. Ten of these twelve parameters are “base parameters” that directly affect the community, e.g., health effects. Each of these ten base parameters was assigned a score from one through five. The ten base parameters were averaged for a “Base Score” for each of the two scenarios.

The remaining two parameters, “Frequency” and “Cascading Effects,” function as multipliers. These two parameters were also assigned a score of one through five. The two scores were added to get a “Combined Multiplier.”

The “Base Score” was then multiplied by the “Combined Multiplier” to get a Scenario Ranking. Finally, the Scenario Rankings for the two scenarios were summed and added to the “Future Emphasis” parameter to get a Combined Ranking. The equation is written below.

Scenario Ranking = Average (Base Parameters) * Sum (Multipliers)

Combined Ranking = (Scenario Ranking – Most Likely) + (Scenario Ranking – Maximum Credible) + Future Emphasis

Draft scores were assigned by Office of Emergency Management staff with suggestions from the Office of Emergency Management Strategic Working Group.

4.9 Risk-Driven Planning


OEM uses hazard identification, risk analysis, and impact analysis as the basis for all plan development, including the Seattle HMP. The mitigation strategy presented in Chapter 6 of this plan is based on the principles of maximizing loss reduction and the data presented in the SHIVA provides the City with the data necessary to identify goals, objectives, and actions that will be most effective. Some concepts in the SHIVA that were key considerations in developing the 2021 update of the Seattle HMP include:

- Earthquakes are Seattle’s top hazard. No other hazard has the combination of likelihood and potential destructiveness.
- Seattle is a hub for land, sea and air transportation giving it an inherent exposure to accidents.
- Seattle is vulnerable to bridge collapse due to central role they play in Seattle’s transportation network. Failure of multiple bridges could result in “islandization” of the community.
- Snow and ice storms rank second. Individually they are less damaging than a powerful earthquake, but they are much more frequent.
- Infrastructure failure is the third biggest risk due to infrastructure’s dependence on networked computers systems that are exposed to attack. The chance of successful, large scale attack is small, but its consequences would be severe.
- A combination of resource concentration, geography and lack of reserve capacity in our transportation system will make access to critical resources a challenge in a disaster.
- Our most vulnerable people live toward the outskirts of the city and along the Rainier Valley.
- Climate change will broadly affect most of the hazards Seattle experiences

See Appendix A for the full text of the SHIVA including a more detailed risk assessment.

5 CAPABILITY ASSESSMENT

Chapter 5 identifies the City’s existing mitigation capabilities. These are the plans and policies, programs, and projects that are currently in place to reduce the City’s vulnerability to hazards. It also includes key mitigation accomplishments that have been completed since the last plan update in 2015. As mitigation actions identified in the City’s mitigation strategy (Chapter 6) are completed, they become new mitigation capabilities.

 <p>FEMA</p>	<p>C1. Does the Plan document each [City department’s] existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))</p>
--	--

5.1 General

The City of Seattle has a long history of commitment to neighborhood, citywide, and regional hazard mitigation planning. Existing hazard mitigation authorities, policies, plans, programs, and resources have reduced impacts from hazards. Where possible, City departments will leverage existing programs to implement mitigation actions (see Chapter 6). Utilizing existing authorities, policies, plans, and programs will provide the best value to the City of Seattle and build on programs already supported by Seattle communities and policymakers.

This chapter identifies planning and regulatory, administrative and technical, financial, education, and outreach capabilities to mitigate hazards; describes recent mitigation accomplishments; and identifies the City’s participation in the National Flood Insurance Program (NFIP) in accordance with the Disaster Mitigation Act (see 44 CFR § 201.6(c)(3)). Seattle hazard mitigation capabilities include the following:

- **Plans and Regulations.** Plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Examples of plans and regulations include Seattle’s Comprehensive Plan, the City of Seattle Stormwater Management Plan, the Seattle Building Code, and the Seattle Environmentally Critical Areas Code.
- **Administrative and Technical.** Staff, their skills, and tools that can be used for mitigation planning. Examples of administrative and technical capabilities include Seattle Department of Planning and Development dedicated staff to building code enforcement and the OEM – SHIVA.
- **Financial.** Funding resources that can be utilized for hazard mitigation. Examples of financial capabilities include the Seattle Capital Improvement Program, the Fire Facilities and Emergency Response Levy, and federal funding programs such as the Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC).
- **Education and Outreach.** Education and outreach used to communicate hazard-related information and increase community preparedness and resiliency. Example of education and outreach include Home Retrofit Program.

CAPABILITY HIGHLIGHT

Unreinforced Masonry Building Retrofit Policy Development

Unreinforced masonry buildings (URMs), are old brick buildings typically built prior to 1945. Because these buildings were not built using modern building codes, they are much more likely to experience damage or collapse during an earthquake. Most URMs have brick walls and wood-frame floors and roofs. A tell-tale sign of URM construction is what's called header courses- lines of bricks turned on end. Seattle has an estimated 1,164 URMs throughout the city, and many can be found in historic neighborhoods such as Pioneer Square, the International District, Capitol Hill, Columbia City and Ballard.

Right now, there are no retroactive regulations in the City of Seattle requiring owners of URMs to upgrade their buildings through seismic retrofitting. However, property owners who decide on a major renovation, re-occupy a vacant URM, or change the use occupancy of a URM may be required to comply with seismic regulations in the current Seattle Building Code.

The City has been working for many years to develop a policy, program, and funding to seismically retrofit URMs. Prior to COVID-19, SDCI was working with the Mayor's Office and City Council to draft a joint resolution to begin the process to develop and implement a mandatory URM upgrade program. This work was planned to be undertaken in 2020 and would have taken into consideration the recommendations from the 2017 report prepared by the URM Policy Committee. However, these efforts have been placed on hold as the City focuses its resources on response to the COVID-19 pandemic.

The City will continue to consider the development of a URM policy and identify funding opportunities to implement retrofits. Key resources to support ongoing and future work on URM policy include:

- [Recommendations from the Unreinforced Masonry Policy Committee to the City of Seattle](#) (2017)
- [Updated Confirmed URM List](#) (SDCI, December 2020)
- [Funding URM Retrofits](#) (National Development Council, 2019)
- Update Draft Technical Standard to reflect anticipated changes in seismic retrofit codes on the national level (future work)

A new state program, C-PACER (Property Assessed Clean Energy and Resiliency), could provide low cost, long-term loans for commercial properties for qualified building improvements. The C-PACER program aims to address the significant needs for property owners to finance energy efficiency upgrades, renewable energy improvements, stormwater management, water conservation, and resiliency retrofits to address vulnerabilities to earthquakes and other natural disasters. Although the State cannot currently support this new program because of the fiscal shortfalls brought on by COVID-19, counties can take steps to establish a program.

5.2 FEMA Funded Hazard Mitigation Projects

Table 7 identifies FEMA-funded hazard mitigation projects conducted in the City of Seattle from 1999 to 2020.

Table 7 - FEMA Funded Hazard Mitigation Projects 1999-2020

Project	Funding Source	Award Date	Award Total	Lead Department	Status
Duwamish Head Stabilization Project	HMGP - DR 1159	Mar-1999	\$2,187,500	SPU [DWU]	Completed - Won engineering award!
North Queen Anne Dr. Bridge Seismic Retrofit	HMGP - DR 1361	Aug-2002	\$1,200,000	SDOT	Completed
Low Income Home Seismic Retrofit	HMGP - DR 1361	Jan-2003	\$1,000,000	SPD/OEM	Completed
Mitigation Plan Development	HMGP - DR 1361	Oct-2003	\$100,000	SPD/OEM	Completed
South Lake Union Armory Building Seismic Retrofit	PDMC 2005	Nov-2005	\$713,229	Parks	Completed
Gas Shut Off Valve Project	HMGP - DR 1671	Sep-2008	\$200,000	FFD	Completed
Queen Anne Community Center Seismic Retrofit	HMGP - DR 1671	Aug-2008	\$ 780,000	Parks	Completed
Post Alley Areaway Seismic Retrofit	HMGP - DR 1682	Oct-2010	\$589,055	SDOT	Completed
Urban Flood Hazard Identification Project	HMGP - DR 1817 & 1825 5% Funding	Nov-2010	\$208,500	SPU	Completed
Jefferson Community Center Seismic Retrofit	HMGP - DR 1817 and 1825	May-2011	\$1,371,198	Parks	Completed
Mitigation Plan Update and Seismic Assessment	PDMC 2011	Nov-2011	\$379,220	OEM & FFD	Completed
URM Public Education and Outreach	HMGP Dr 4056 5% Funding	Jul-2012	\$71,905	DPD	Completed
Columbia St. Areaway Seismic Retrofit	HMGP DR 4243	May 2017	\$1,737,885	SDOT	Completed
Bremer Apartments Seismic Retrofit	PDMC 2018	May 2020	\$5,016,312	OEM	Grant Awarded
8th Ave NW Bridge Seismic Retrofit	HMGP DR 4309	Oct 2020	\$2,691,045	SDOT	Grant Awarded
Funding Notes HMGP = Hazard Mitigation Grant Program. State/FEMA funding generated from Presidential Disaster Declarations. PDMC = Pre-Disaster Mitigation Competitive Grant Program. FEMA funding made available for national competition. BRIC = Building Resilient Infrastructure and Communities. FEMA funding made available for national competition.					

Source: City of Seattle Office of Emergency Management.

5.3 Citywide Organization Capabilities

5.3.1 Race and Social Justice Initiative

The Seattle Race and Social Justice Initiative (RSJI), launched in 2005, is a citywide effort to end institutionalized racism and race-based disparities in City government. RSJI builds on the work of the civil rights movement and the ongoing efforts of individuals and groups in Seattle to confront racism. The Initiative's long-term goal is to change the underlying system that creates race-based disparities in our community and to achieve racial equity. The City's RSJI internally focused work includes core team, change teams, employee training and RSJI Toolkit. Since 2014 RSJI has expanded to include more community partnerships and collaboration with BIPOC communities to guide City investments to achieve equity.

- **Core Team.** A Citywide team of about 30 people that works with key stakeholders on RSJ issues. Provide Citywide technical assistance and strategic planning support; Communicate/facilitate. Team members lead RSJI orientations and workshops for City staff.
- **Change Teams.** This group of employees in each department supports RSJI activities. They work together to extend RSJI's reach in departments, strengthen each departments capacity, offer expertise, work to address departmental issues, and build momentum to advance RSJI throughout the organization.

Training. City employees and volunteers who sit on City boards and commissions have access to trainings on various RSJI topics such as implicit bias, leading with race, how to apply the RSJI toolkit.

- **RSJI Toolkit.** This tool is designed to assist departments to analyze the racial equity impact of policies, programs, initiatives, and budget issues.

5.3.2 Citywide Plans and Regulations

The City has a foundation of long range, citywide policy and strategic plans that guide growth and City investments in infrastructure, services, and other assets. These plans require substantial interdepartmental collaboration and provide guidance for more detailed functional and operational plans. Some, adopted by ordinance, have statutory authority. Others, adopted by resolution, and are less binding and more aspirational. The following plans and regulations help the City achieve mitigation goals and actions.

Seattle 2035 Comprehensive Plan (OPCD, 2016)

Comprehensive Plan, a 20-year vision and roadmap for Seattle's future. The Comprehensive Plan guides City decisions about where to accommodate and plan for new jobs and residences, how to improve the transportation system, and where to make capital investments such as utilities, sidewalks, and libraries. It provides a framework to guide most of Seattle's big-picture decisions on how to manage growth to achieve environmental sustainability, racial equity, shared prosperity, and healthy and vibrant neighborhoods. As required by Washington's Growth Management Act, the plan must undergo a major review and update every 8 years. The next major update must be adopted by June 2024.

Move Seattle 10-Year Strategic Vision (SDOT 2015)

Move Seattle sets out a 10-year plan for a transportation system that meets present demands while looking ahead to future needs for a safe, affordable, connected system that works for people regardless of mode choice.

Parks and Open Space Plan (SPR 2017-2022)

This six-year plan documents and describes SPR's facilities and lands, looks at Seattle's changing demographics, and lays out a vision for the future. The 2017 Plan is required by the Washington State Recreation and Conservation Office (RCO) to maintain the City of Seattle's eligibility for state grants and funding programs that will help realize outdoor recreation capital projects and open space acquisition projects.

Climate Action Plan (OSE 2013)

This plan focuses on city actions that reduce greenhouse emissions and support vibrant neighborhoods, economic prosperity, and social equity. Actions are focused on areas of greatest need and impact: road transportation, building energy and waste. The plan also includes actions that will increase Seattle's resilience to the likely impacts of climate change.

Urban Forest Stewardship Plan (OSE 2013)

This plan set four goals for Seattle's urban forest: create an ethic of stewardship about the urban forest among City staff, community organizations, businesses, and residents; strive to replace and enhance specific urban forest functions and benefits when trees are lost, and achieve a net increase in the urban forest functions and related environmental, economic, and social benefits; Expand canopy cover to 30 percent by 2037; and increase health and longevity of the urban forest by removing invasive species and improving species and age diversity"

Consolidated Plan for Housing and Community Development (HSD 2018-2022)

This plan includes guidance for the allocation of an estimated \$17 million of federal grant and program revenue funds [approximately \$9.8 million in Community Development Block Grant (CDBG) funds, \$4.2 million in HOME program funds, \$796,000 in Emergency Shelter Grant Program (ESG) funds and \$2.3 million in Housing Opportunity for Persons with AIDS (HOPWA) funds] from the U.S. Department of Housing and Urban Development (HUD). The Plan outlines strategies to address the housing, homeless, community and economic needs of the City's low and moderate-income residents and neighborhoods over the next five years.

Land Use Code (SDCI, OPCD)

The Land Use Code regulates the use and development of land in Seattle. SDCI reviews permit applications to make sure they comply with this code. With input from residents, designers, developers, and other interested stakeholders, City planners draft amendments to update the code to better address Seattle's land use policies.

Building Code and Residential Code (SDCI)

The Seattle Building Code (SBC) provides minimum requirements for design and construction of new buildings. The Seattle Residential Code (SRC) provides minimum requirements for design and construction of single-family houses, duplexes, and townhouses with no more than three stories and with separate entrances. Seattle has adopted the 2015 International Building Code and 2015 Residential Code with amendments specific to our city.

Stormwater Code (SPU & SDCI)

The stormwater code contains regulations to protect people, property and the environment from damage related to stormwater runoff. Seattle's stormwater code also satisfies the City's obligation to comply with our Municipal Stormwater Discharge National Pollutant Discharge Elimination System (NPDES) Permit, issued by the Washington State Department of Ecology.

Shape Our Water (SPU 2023-2053)

This community-centered project will plan for the next 50 years of resilient drainage and wastewater systems. As Seattle faces powerful forces like climate change and rapid growth, future investments in water systems will transform the city. This effort will look beyond pipes and green infrastructure to see the broader role in people's lives, including safer neighborhoods, deeply rooted communities that resist displacement, thriving local businesses, and healthy and fun public spaces.

5.3.3 Voter Approved Property-Tax Levies

Many projects and programs are funded by special purpose voter-approved property tax levies. In Seattle, these funds have been an important source of funding for hazard mitigation. Seismic retrofits of transportation infrastructure, libraries, community centers are examples of mitigation projects included in these initiatives. Planning projects to be included in upcoming levies typically begins two to three years prior to the ballot date. The City also prepared a consolidated plan to document how it plans to spend federal funding provided through a number of programs.

Housing Levy (expires 2023)

Approved by Seattle voters in August 2016, the 7-year, \$290 million levy Seattle Housing Levy provides funding to provide, produce, and/or preserve affordable housing in Seattle and to assist low-income Seattle residents. The Levy funds five programs: Rental Production and Preservation, Operating and Maintenance, Homeownership, Acquisition and Preservation, Homelessness Prevention and Housing Stability Services. OH administers all 2016 Seattle Housing Levy programs except the Homelessness Prevention and Housing Stability Program, which is administered by the HSD.

Move Seattle Levy Fund (expires 2024)

Approved by Seattle voters in November 2015, the 9-year, \$930 million Levy to Move Seattle provides funding to improve safety for all travelers, maintain our streets and bridges, and invest in reliable, affordable travel options for a growing city. The levy provides roughly 30% of the City's transportation budget and replaces the 9-year, \$365 million Bridging the Gap levy approved by voters in 2006.

Families and Education Levy Fund (expires 2025)

Approved by Seattle voters in November 2018, the 7-year, \$619 million Families, Education, Preschool and Promise Levy will partner with families and communities to advance education equity, close opportunity gaps, and build a better economic future for Seattle students. A portion of levy funds is allocated to the Seattle Preschool Program Provider Facilities Fund to support capital projects that improve quality or help providers meet preschool facility licensing standards, expand space in existing SPP preschool facilities, start new facilities, either from the ground up or by substantially remodeling existing buildings to use as part of SPP.

Libraries for All Levy (expires 2026)

Approved by Seattle voters in August 2019, the 7-year, \$219.1 million Libraries for All Levy restores core Library services cut during the Great Recession, invests in critical systems' needs, and support the changing needs and interests of the communities we serve. Funding for earthquake retrofit of the historic Columbia, Green Lake and University branches were included.

Fire Facilities and Emergency Response Levy (expired)

In the aftermath of the 2001 Nisqually earthquake, in 2004 Seattle voters approved a 7-year, \$167 million Fire Facilities and Emergency Response Levy to provide funding to strengthen the City's ability to respond after a major disaster. Funds were used to renovate or replace all 32 neighborhood fire stations, build a new joint training facility for Seattle Fire and Seattle Public Utilities, construct a new fire alarm center and City emergency operations center, harden fire hydrants so firefighters can draw water directly out of eight City reservoirs, place emergency generators at community centers, and place emergency supply caches in four areas of the City.

Seattle Parks District Funding (no expiration)

Approved by Seattle voters in 2014, the metropolitan park district is authorized by Chapter 35.61 of the Revised Code of Washington. The Seattle Park District has the same boundaries as the City of Seattle and the Seattle City Council members serve as the Park District's Governing Board. Property taxes collected by the Seattle Park District will provide funding (\$55 million in 2019) for City parks and recreation including maintaining parklands and facilities, operating community centers and recreation programs, and developing new neighborhood parks on previously acquired sites. Seattle Parks and Recreation develops a 6-year Park District budget. However, planning for the next 6-year budget (2021-2026) has been delayed due to challenges in getting community input during COVID-19.

5.3.4 Community-led City Investments

For many years the City has directed City funds to support community-initiated capital projects and education programs. One of the earliest initiatives, the Neighborhood Matching Fund, was created in 1988 to provide matching dollars for neighborhood improvement, organizing, or projects developed and implemented by community members. The number of community grants and the funds allocated has grown. Communities are not only initiating capital projects implemented by City departments, but increasingly communities are leading the implementation of larger capital projects that involves land, buildings, and other physical structures. While programs are still evolving, there is an opportunity to share the City's mitigation goals and values to protect community-led investments and assets from hazards and future disasters.

Equitable Communities Initiative (\$30 million in FY 2021)

This fund, new in 2021, will focus on ensuring that BIPOC communities thrive. It will be guided by a community-led Equitable Communities Initiative Task Force who will receive the technical assistance of at least 18 City Departments. Potential areas for investment include building opportunity, inclusive economy, community wealth building, preserving cultural spaces, community wellness and climate justice. Task force recommendations could include expanding current programs, refocusing current City investments, creating new programs or investments or pilots, capacity building for community-based organizations, and identifying new and complementary opportunities for investment by philanthropy, regional, state or federal partners.

Strategic Investment (Anti-Displacement) Fund (\$30 million in FY 2021)

This fund, new in 2021, will support strategic investment in areas at high risk of displacement or in areas of low access to opportunity that present unique opportunities for transformational equitable development. This would include areas with significant planned public investment like light rail station areas and parks, where increased access to opportunities will likely also increase displacement pressure. This fund will focus on sites and projects with the potential to achieve multiple community benefit outcomes through mixed-use and mixed-income development that creates opportunities for housing, affordable commercial and cultural space, public open space, and childcare.

Participatory Budgeting (\$18 million in 2021)

This program, new in 2021, will engage communities in a participatory budgeting process. About \$17 million will fund successful project proposals for implementation of community safety strategies.

Equitable Development Initiative (\$5.6 million in 2021)

Equitable Development Initiative (EDI) invests in community-led efforts aimed at addressing issues of racial equity, social justice, economic mobility, and residential, cultural and commercial displacement. The Equitable Development Framework guides how the City prioritizes its work; shapes its budgets, policies, programs, and investments; and structures the implementation of targeted strategies and equitable development projects by using clear objectives for reducing disparities and achieving equitable outcomes for marginalized populations. OPCD coordinates this initiative.

Community Grants (\$5.0 million in 2021)

Community Grants support to local grassroots projects within neighborhoods and communities by providing funding to implement community-driven improvement or education projects such as community infrastructure, public space, and public health. The programs that support this work include Neighborhood Matching Fund, Duwamish River Opportunity Fund, Find It Fix, Healthy Food Fund. DON also administers grants for the 135 designated Community Emergency Hubs. DON manages these grants.

Environmental Justice Fund (\$500,000 in 2020)

The Environmental Justice Fund is a grant opportunity for community-led projects that improve environmental conditions, respond to the impacts of climate change, and get us closer to achieving environmental justice. Community members and Seattle City Council worked together to create the Environmental Justice Fund in 2017. Seattle's Environmental Justice Committee plays a critical role in overseeing the fund to ensure the experiences and priorities of BIPOC communities shape the work. OSE manages this fund.

5.4 Department-Specific Capabilities

Departments are listed alphabetically by acronym.

5.4.1 Office of Arts and Culture (ARTS)

The Office of Arts & Culture (ARTS) envisions a city driven by creativity that provides the opportunity for everyone to engage in diverse arts and cultural experiences. The office promotes Seattle as a cultural destination and invests in Seattle's arts and cultural sector to ensure the City provides a wide range of high-quality programs, exhibits and public art. ARTS includes eight programs: Cultural Partnerships, Communications and Outreach, Equity and Youth, Cultural Facilities Operations, Public Art, Artwork Conservation, Administrative Services, and Cultural Space. These programs are supported by two funding sources: Arts and Culture Fund (funded through the City's admission tax revenues) and the Municipal Arts Fund (supported by the 1% for Arts contributions from City capital projects).

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Public Art	Administrative and Technical Financial	Oversee the City's public art collection. Manage the Municipal Arts Fund for the commission, purchase, and installation of public art. Funding through 1% for Art ordinance that requires eligible City capital projects to contribute 1% of their budgets to the Municipal Arts Fund. Provides professional assessment, conservation, repair, and routine and major maintenance of permanently-sited works of art. As of 2020 the public art collection includes 400 permanently-sited and 3,200 portable works of art and periodic temporary art installations. All public art installations are subject to regulation by Seattle Municipal Code and ADA guidelines. Recent accomplishments include: <ul style="list-style-type: none"> ARTS created an Inspection List for integrated public portable artworks to prioritize damage assessments after a disaster. 	All Hazards
Cultural Facilities Operations	Administrative and Technical	Provide operational support for Langston Hughes Performing Arts Institute. Support the operation and programming of ARTS at King Street Station, including a public cultural space, office space for ARTS, and meeting spaces. Recent accomplishments include: <ul style="list-style-type: none"> ARTS worked with SDOT and FAS to completely renovate and retrofit 7,500 sf 3rd floor of King Street Station including stabilization support beams and an updated sprinkler system. Renovations completed in 2019. 	Earthquake Fire

5.4.2 City Budget Office (CBO)

The City Budget Office (CBO) is responsible for developing and monitoring the City's annual budget, carrying out budget-related functions, overseeing fiscal policy and financial planning activities, policy analysis, and preparing legislation for City Council review. CBO provides strategic analysis relating to the use of revenues, debt, long-term issues, and special events. The office also provides technical assistance, training, and support to City departments in

performing financial functions. The Innovation and Performance team is also in CBO, supporting and advancing initiatives by using data and design to solve problems.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Oversight of City Fiscal Policy and Financial Planning	Financial	Provide strategic analysis and oversight for financial functions within the city. Work closely with all city departments in their fiscal policy and financial planning. One primary example would be the monitoring and development of the budget for Seattle's Capital Improvement Program (CIP) which allocates funds to rehabilitate, restore, improve, and add to the City's capital facilities. Recent accomplishments include: <ul style="list-style-type: none"> Monitoring and development of the budget for Seattle's 2020-2025 Capital Improvement Program (CIP), which identifies City investments including projects that mitigate hazards. 	All Hazards

5.4.3 Department of Neighborhoods (DON)

The Seattle Department of Neighborhoods provides resources and opportunities for community members to build strong communities and improve their quality of life. With more than 180 neighborhoods in the city, the department plays a key role in helping neighbors develop a stronger sense of place, build closer ties, and engage with their communities and city government.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Historic Preservation Program	Regulatory	Designate and protect more than 350 historic structures, sites, objects, vessels, and eight historic districts. Recent accomplishments include: <ul style="list-style-type: none"> A number of historic buildings have undergone, or are in the process of undergoing, seismic renovation from damage sustained during the Nisqually earthquake. 	Earthquake
Historic Preservation Program	Education and Outreach	Provides technical assistance for historic preservation. Recent accomplishments include: <ul style="list-style-type: none"> Provided technical assistance to University of Washington for a comprehensive multi-building approach to URM upgrades; provided education resources/best practices/technical assistance in presentations given at URM related conferences and symposiums. 	Earthquake
Community Liaison Program	Education and Outreach	Manage Community Liaisons (CL). CLs are independent contractors who are expert community navigators who provide a number of outreach services in historically underrepresented communities: translations, proofreading, interpretation, facilitation (in native language), constituent support at City-hosted events, feedback and expertise on cultural concerns and barriers, reports of participant feedback and concerns, and community workshops. In 2018, Community Liaisons worked with 15 City departments on 48 outreach and engagement projects.	All Hazards

<p>Community Grants Program</p>	<p>Financial</p>	<p>Provide support to local grassroots projects within neighborhoods and communities by providing funding to implement community-driven improvement projects. The programs that support this work include Neighborhood Matching Fund, Duwamish River Opportunity Fund, Find It Fix It, Healthy Food Fund. Communities could propose mitigation projects through these programs. DON also administers grants for the 135 designated Community Emergency Hubs. Recent accomplishments include:</p> <ul style="list-style-type: none"> • In 2020, awarded \$33,360 grant to develop five additional emergency hubs, translate current Hub brochure and videos into multiple languages, and provide interpretation at 2021 outreach events. • In 2015, awarded \$15,000 to the South Park Area Redevelopment Committee and South Park Senior Citizens to develop more stable food sources for the Senior Center Meal Program. 	<p>All Hazards</p>
--	------------------	---	--------------------

5.4.4 Finance and Administrative Services (FAS)

The Seattle Department of Finance and Administrative Services (FAS) has the most diverse set of responsibilities of any City department. FAS combines the functions from the former Fleets and Facilities Department and the former Department of Executive Administration with the revenue forecasting, debt management, and tax policy functions that were previously performed by the former Department of Finance. It also houses the Customer Service Bureau, Neighborhood Service Centers, and manages the Find It, Fix It app. As a result, the department provides a variety of services to City departments and the public, including citywide operational responsibilities for accounting, payroll, licensing, revenue collection and processing, animal services, weights and measures, treasury activities, purchasing, construction and consultant contracting, risk management, the City's financial management and personnel data systems, and management of City real estate, buildings, and vehicles, as well as construction and renovation of fire stations as part of the Fire Facilities and Emergency Response Levy. FAS-managed facilities and IT infrastructure. Schedule 1 facilities are comprised of existing and future office buildings located in downtown Seattle, including but not limited to City Hall, the Seattle Municipal Tower and the Justice Center Schedule 2 facilities are comprised of existing and future structures, shops and yards located throughout Seattle, including but not limited to City vehicle maintenance facilities at Haller Lake and Charles Street, FAS shops located at Airport Way S., fire stations, police precincts including the animal shelter, and other FAS managed facilities used for City Services.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
<p>Capital Improvement Program (CIP)</p>	<p>Financial</p>	<p>Develops capital projects for FAS-managed facilities and IT infrastructure, and coordinates with CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments. Recent accomplishments include:</p> <ul style="list-style-type: none"> • The renovation and seismic retrofit of Fire Station 5 was completed in 2018. 	<p>All Hazards</p>
<p>Seismic Program</p>	<p>Administrative and Technical</p>	<p>Perform seismic assessment to identify seismic risk at FAS facilities. Recent accomplishments include:</p> <ul style="list-style-type: none"> • A seismic assessment of the North Precinct was performed in 2019. 	<p>Earthquake</p>

Facilities and Emergency Response Program (Fire Facilities and Emergency Response Levy)	Financial	<p>Manage the voter-approved Fire Facilities and Emergency Response Levy. The levy provided \$167 million to enable the Seattle Fire Department to be more resilient in dealing with crisis situations, especially those that could damage critical department assets and disrupt emergency operations. Recent accomplishments include:</p> <ul style="list-style-type: none"> • The construction of Fire Station 22 was completed in 2017. • The construction of Fire Station 32 was completed in 2017. 	All Hazards
Mail Safety Protocol	Administrative and Technical	<p>Implement bomb detection procedures to screen incoming package for potential threats. Employees are trained in procedures to safely handle suspicious packages in coordination with SPD. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Trained mailroom staff to be aware of what to look for in a suspicious mail or package. • Conducted training for City Departments by the USPS Postal Inspectors and Seattle Police Bomb Squad on what they should be looking for and what to do if they find something suspicious. Training was completed in October 2018. 	Attacks
Safe and Healthy Buildings for City Workforce	Administrative and Technical	<p>Manage 120 City facilities to be safe and healthy buildings for the City workforce. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Implemented safety protocols in response to the COVID-19 pandemic. To improve indoor air quality HVAC filters were upgraded to MERV-13 in 2020. 	Disease Outbreak

5.4.5 Human Services Department (HSD)

The Seattle Human Services Department (HSD) is one of the largest contributors to Seattle’s safety net. HSD operates programs, provides services and is responsible for investing more than \$120 million in contracts to more than 170 community-based human service providers that support the city’s most vulnerable each year. Through the lens of racial equity, HSD supports programs, initiatives and policies that prepare youth for success, support affordability and livability, address homelessness, promote public health and promote healthy aging.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Aging Disability Services	Planning, Administrative, Education and Outreach	<p>Prepare clients and home care agencies in Seattle and King County to be ready in case of a disaster. Recent accomplishments include:</p> <ul style="list-style-type: none"> • As the Area Agency on Aging (AAA) for Seattle and King County, developed the Area Plan 2020-2023, which includes an Emergency Response Plan. • Developed COVID-19 care guidance on various topic areas and provided to home care agencies, case managers and case managed clients. Planning unit worked closely with King County housing providers on resident signage, 	All Hazards

		<p>education and face covering use. Collaborated with Public Health to address availability of influenza vaccinations for underinsured and uninsured for 2019-2020 season.</p> <ul style="list-style-type: none"> • Developed Respiratory Health during Wildfire Smoke Exposure Self-Management Plan. • Coordinate disaster response plans with home care agency directors. • Maintain list of high-risk clients that is used to prepare for and respond to disasters to include weather, wildfire smoke, and changes to roads (e.g., closure of Viaduct). • Provide emergency preparedness information to clients and help clients with personal emergency plans. Distributed Red Cross emergency kits to clients and staff. 	
--	--	---	--

5.4.6 Seattle Information Technology Department (ITD)

The Seattle Information Technology Department (ITD) manages the City's information technology infrastructure and performs strategic information technology planning. ITD coordinates strategic technology direction for the City by developing common standards, architectures, and business solutions to deliver City services more efficiently and effectively; builds and operates the City's corporate communications and computing assets, which include the City's telephone, radio, and email systems, networks, and servers; and oversees development of the Democracy Portal, a project to improve the City's government access television station and its accompanying web site by providing new programming, live Web streaming of City Council meetings, live "webcasting" and interactive services that allow residents to access government information and contact decision makers.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Puget Sound Regional Interoperability Committee	Technical	Plan interoperable infrastructure initiatives across King, Pierce, and Snohomish counties. Tri-County Regional Interoperability, which links the radios from King County, Snohomish County, Tacoma, and the Port of Seattle with conventional radio in Pierce County, Washington State Patrol, and the Federal Integrated Wireless Network.	All Hazards
Regional Communications Board	Administrative	Govern the King County public safety radio network. The Seattle Information Technology Department operates a portion of the radio network system, including nine radio sites and 6,000 800-megahertz public safety radios that link every police and fire agency in the County, as well as Seattle Public Utilities.	All Hazards
Capital Improvement Program (CIP)	Financial	Propose capital projects and coordinate with FAS and CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments. Recent accomplishments include: <ul style="list-style-type: none"> • Replacement of two old radio towers in Northeast and West Seattle. • Establishment of two separate data centers with 50 miles of separation. • Cloud infrastructure and data back up in place. 	Earthquake

King County Emergency Management Advisory Committee	Administrative	Participate in the ICC EMAC Critical Infrastructure Workgroup. Recent accomplishments include: <ul style="list-style-type: none"> Series of Cybersecurity “Emerald Downs” exercises and workshops to advance the understanding of county and local government responsibilities. Securing funding through State Homeland Security Grants. 	Cyber-attack and Disruption
2020 ITD Digital Security & Risk Register	Administrative	Perform an annual assessment of 73 CIS/NIST framework risk controls. Recent accomplishments include: <ul style="list-style-type: none"> ITD Digital Risk Register Report Projects: Fire Eye, Zen GRC 	Cyber-attack and Disruption

5.4.7 Public Health – Seattle & King County (PHSKC)

Public Health – Seattle & King County (PHSKC) provides public health services for the City, including services for children and youth, persons with chronic disease, and communicable diseases; immunization services; environmental health services; public health emergency preparedness; emergency medical services; violence and injury prevention services; a medical examiner; nutrition support services; and tobacco prevention programs.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Health Code and other codes	Regulatory	Has legal authority over Code of the King County Board of Health. Updated 2018, and King County Code Title 12: Public Peace, Safety, and Morals. Recent accomplishments include: <ul style="list-style-type: none"> Board of Health Code was updated in 2018. 	All Hazards
Emergency Program	Planning, Administrative, Regulatory	Maintain Emergency Support Functions (ESF) 8 of Comprehensive Emergency Management Plan (CEMP) Basic Plan: Health, Medical, and Mortuary Services and has a designated emergency manager and section to handle emergency management. Implements a training and exercise program to support the general public’s health and safety by training Public Health staff on their role in an emergency and disaster. Maintains a well-developed risk communication plan. Recent accomplishments include: <ul style="list-style-type: none"> ESF-8 Basic Plan updated 2018. ESF-8: Environmental Health Emergency Response Annex updated 2018. ESF-8: Medical Countermeasures Annex updated 2018. Isolation and Quarantine Plan updated 2017 Mass Fatality Management Plan updated 2018 Equity Response Annex updated 2019 Environmental Health Services Division 24HR Emergency Notification Reporting Line established Nov. 2019. 	All Hazards

Services for Vulnerable Populations	Administrative/ Technical	Provide equitable health services, through Healthcare for the Homeless program, to vulnerable populations through engagement with homeless service providers. In addition, Environmental Health Services Division's Community Toxics, Science, and Policy Section provides homeless service providers with guidance and resources to ensure implementation of proper sanitation and hygiene measures within shelters and unsanctioned encampments. Recent accomplishments include: <ul style="list-style-type: none"> • 2017-2020 Hep-A vaccination strategy, coordinating with homeless service providers to hold Hep-A vaccination clinics for individuals living as homeless. • Sanitation & Hygiene Guidance for Homeless Service Providers; issued Oct. 2019 	Disease Outbreak
Climate Change & Health	Planning	Adopted PHSKC Blueprint for Addressing Climate Change in 2018. This outlines core PHSKC functions, strategies, and actions to develop internal expertise, analyze gaps and opportunities for prioritizing work, and build on current programs and projects to address climate change impacts on health and equity.	Climate Change, All Hazards

5.4.8 Office of Economic Development (OED)

The Office of Economic Development (OED) seeks to foster an inclusive economy that grows family-wage jobs and increases wealth among underserved communities. OED invests in four primary program areas all targeting underserved populations: supporting entrepreneurs; building healthy and vibrant neighborhood business districts; developing the talent of youth and adults; and partnering with key industry sectors. The core services OED provides capitalize on Seattle's economic strengths, particularly in the industry areas of manufacturing and maritime, technology, startups, restaurants, health care, life sciences and global health, clean technology, and the creative economy.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Neighborhood Business Districts	Financial, Education and, Outreach	Support small businesses and neighborhood business districts through direct funding and technical support. Work through business district organizations and business improvement associations (BIAs) to distribute information and provide assistance. Recent accomplishments include: <ul style="list-style-type: none"> • In response to COVID-19, the OED expanded the Small Business Stabilization Fund to provide relief for small businesses financially impacted by the virus. To date, the department has provided \$10,000 grants to over 706 	Disease Outbreak Fire HazMat Incident

		<p>businesses from high risk of displacement/highly disadvantaged areas and anticipates investing an additional \$5 mill to stabilize small businesses in the city of Seattle.</p> <ul style="list-style-type: none"> • In 2020 OED established the language access resource line to support small business owners with resources and information in over 8 different languages. • OED has also hosted webinars directed at small businesses and business outreach organizations to provide information about resources, organize outreach and direct technical assistance to small businesses in need. • OED has distributed information via social media, e-newsletters, ethnic media, and via partners' electronic communication channels. • In response to incidents such as fires and explosions within business districts (Ballard & Chinatown-ID fires and Greenwood gas explosion) OED staff have provided direct technical assistance to businesses to make insurance claims and apply for FEMA and SBA resources. 	
Special Events	Regulations	Support special events through advocacy and permit coordination to encourage and maximize positive business, economic, and cultural activity while ensuring public safety.	All Hazards

5.4.9 Office of Emergency Management (OEM)

The Seattle Office of Emergency Management (OEM) is responsible coordinating the City's resources and responsibilities in dealing with all aspects of emergencies. Its basic mission is devoted to citywide disaster preparedness, response, recovery, and mitigation. It places a strong emphasis on individual and community preparedness and provides a key liaison function between the city and its state and federal emergency management counterparts.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Hazard Vulnerability and Risk Technical Expertise	Technical	<p>Provide information and expertise about hazard vulnerability and risk. Update the Seattle Hazard Identification and Vulnerability Assessment (SHIVA) every four years. The SHIVA identifies Seattle's hazards and examines their consequences providing a foundation for the City's disaster planning and preparedness activities. Provide technical assistance on hazards and vulnerability to support emergency management planning, projects and other implementation. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Updated the SHIVA in 2019. • Created and updates Hazard Explorer, an online GIS resource providing accessible mapped data of various hazards. • Participated in pilot of One Concern, a disaster simulation tool. • Participated in beta-test for Shake Alert Earthquake Early Warning system to deliver early warning of impending hazardous ground shaking to key public safety officials. • Ongoing. Participated in standing working groups focused on specific hazards such as Tsunami Working Group. 	All Hazards

Hazard Mitigation Grant Funding and Program Coordination	Planning and Administrative	Manage applications and administration of State/FEMA Mitigation grants on behalf of the City. Recent accomplishments include: <ul style="list-style-type: none"> Between 2016 and 2020, the City was awarded approximately \$9.4 million in grant funding for mitigation projects. 	All Hazards
Emergency Management Stakeholder Coordination	Planning and Administrative	Convene internal and external stakeholders to support the City's emergency management functions, including mitigation. City stakeholders include Mitigation Work Group, Strategic Work Group, Tsunami Working Group and the Executive Emergency Board. External stakeholder groups include the Disaster Management Committee, and Community Safety Ambassadors. Recent accomplishments include: <ul style="list-style-type: none"> Participate in the interdepartmental Climate Justice Working Group created in 2020. 	All Hazards
Comprehensive Emergency Plans	Planning	Maintain a suite of plans that guide the city in its mitigation of, response to, and recovery from a disaster. These include Seattle All-Hazards Mitigation Plan, Seattle Comprehensive Emergency Management Plan and Seattle Disaster Recovery Framework. Recent accomplishments include: <ul style="list-style-type: none"> Adopted the Seattle Disaster Recovery Framework in July 2015. Adopted an updated Seattle Comprehensive Emergency Management Plan and Emergency Operations Plan in December 2017. 	All Hazards

5.4.10 Office of Housing (OH)

The mission of the Seattle Office of Housing (OH) is to support the preservation and production of affordable housing through long-term loans to mission-based multifamily developers in Seattle. The Office of Housing also provides home repair and weatherization programs for lower-income residents. A guiding principle of OH is to create a more equitable and affordable community through affordable housing investments.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Capital Financing and Resources	Regulatory Financial	Serve in the capacity as a lender and compliance monitor for the production of affordable rental housing in the City. Works in close partnership with a network of mission-based non-profits and provides resources and investment for housing initiatives. Resources could potentially provide funding for seismic reinforcement in affordable housing projects. Recent accomplishments include: <ul style="list-style-type: none"> In 2020, received FEMA Pre-Disaster Mitigation Grant funding on behalf of Community Roots Housing for The Bremer Project, a seismic retrofit of an identified URM building of affordable housing. First time this was done and OH is exploring other opportunities to replicate this model. In 2016, voters approved a six-year \$290 million Affordable Housing Levy to create or preserve affordable housing for seniors, low- and moderate-wage workers, and formerly homeless individuals and families. Also, will provides 	Earthquakes

		<p>assistance to more than 900 first-time low-income home buyers and emergency rental assistance to more than 6,500 households.</p> <ul style="list-style-type: none"> In 2018 the City enacted Mandatory Affordable Housing that requires new commercial and multifamily residential development contributes to affordable housing expanding OH's financial resources. 	
HomeWise Weatherization Program	Technical	<p>Provide weatherization services to income eligible households to install improvements such as insulation, duct and air sealing, ductless heat pumps, new hot water tanks, furnace repair or replacement, new kitchen and bathroom fans, and new energy efficient refrigerators. Recent accomplishments include:</p> <ul style="list-style-type: none"> In 2019, the OH Weatherization Program expended \$4.74 million in grant funds and completed the upgrades in 97 single-family homes which benefited low-income renters and homeowners. Also provided weatherization services to nine (9) affordable apartment buildings that contained 469 units. 	Climate Change

5.4.11 Office of Planning and Community Development (OPCD)

The Office of Planning and Community Development (OPCD) supports thriving communities through an integrated and equitable approach to planning and community investment. OPCD works across City departments to assess community needs, prioritize resources, and develop a vision for how Seattle grows to ensure that we are coordinating and implementing our plans with a cohesive vision. We are working toward a city that is inclusive, affordable, vibrant, interconnected, and innovative. We partner with neighborhoods, businesses, agencies and others to bring about positive change and coordinate investments for Seattle communities.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Seattle Comprehensive Plan	Plans and Regulations	<p>Maintain the Comprehensive Plan, a 20-year vision that guides City big-picture decisions on how to grow while preserving and improving our quality of life. Recent accomplishments include:</p> <ul style="list-style-type: none"> Adopted Seattle 2035 in 2016, an update of the plan to guide how Seattle will grow by 70,000 households and 115,000 jobs over the next 20 years. 	All Hazards
Community Planning	Plans and Regulations	<p>Lead community planning processes in multiple neighborhoods each year. The City engages organizations and individuals to come together to shape the future of their neighborhood by setting long range goals and policies, designing strategies, and coordinating city investments.</p> <ul style="list-style-type: none"> In 2018 OPCD adopted a community prioritization process that includes “environmental burdens” and “public safety concerns” as two factors to determine where community planning resources will be focused. 	All Hazards

5.4.12 Office of Sustainability and Environment (OSE)

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Seattle Climate Action Plan	Planning and Administrative	Implement the Seattle Climate Action Plan (2013) and Climate Action Strategy (2018) to reduce Seattle's greenhouse gas emissions, including goal assessment, action planning, community outreach, and performance measurement. The Seattle Climate Action Plan (CAP) provides a coordinated strategy of short- and long-term City actions to reduce GHG emissions while also supporting other community goals, including building vibrant neighborhoods, fostering economic prosperity, and enhancing social equity. The CAP focuses on road transportation, building energy, and waste as well as actions that will increase our community's resilience to the likely impacts of climate change.	All Hazards
Food Access Action Plan	Planning and Administrative, Financial	Provide direct benefits that increase purchasing power of residents experiencing food insecurity to afford healthy food through Fresh Bucks and Emergency Grocery Vouchers. Implement Seattle's Food Action Plan, a five-year plan, adopted in 2013 containing 40 actions to increase access to get more healthy food to more Seattle residents, expand opportunities to grow food in the city, strengthen our regional food economy, and reduce food related waste.	All Hazards
Duwamish Valley Program and Action Plan	Planning and Administrative	Co-lead (with OPCD) a multi-department effort to mitigate the combined impacts of environmental inequities, climate change, and systemic racism in South Park and Georgetown. Implement the Duwamish Valley Action Plan that includes 87 City and community-led actions in seven priority areas: Healthy Environment, Parks & Open Spaces, Community Capacity, Economic Opportunity & Jobs, Mobility & Transportation, Affordable Housing, and Public Safety. Plan promotes collaboration and guides the City's work and investments in the Duwamish Valley. interdependence. The program also supports community-led projects funded by the Duwamish Valley Opportunity Fund (DVOF). Recent accomplishments include: <ul style="list-style-type: none"> • Since 2015 the DVOF has granted \$1.1 million to 37 community projects including several to mitigate hazards related to flooding, excessive heat events and hazardous materials. • Between 2016 and 2018, the City invested over \$2M in investments to respond to community priorities. • Release the Duwamish Valley Action Plan in 2018. 	All Hazards

5.4.13 Seattle Center (SC)

Seattle Center (SC) is a valued civic asset with community roots that reach back in time to native tribes and pioneers. Today, the 74-acre campus is the region's top visitor destination. Over 14,000 events presented on the campus each year, attracting millions of Seattle residents, arts patrons, out-of-town guests, and global travelers. The Seattle Center grounds and venues support an extraordinary level of arts, cultural, sports, educational and tourism activities. The City looks forward to celebrating the opening of Climate Pledge Arena in 2021 as a world-class venue for sports and entertainment. The

Arena, housed in the landmarked Century 21 Coliseum building that dates to the 1962 World’s Fair, represents nearly \$1 billion in private investment, and its operation will support the continued vibrancy and sustainability of Seattle Center for decades to come.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Capital Improvement Program (CIP)	Financial	<p>Develops capital projects and coordinates with CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Seismic retrofit and deferred major maintenance of the Mercer Garage • Relining of existing Seattle Center owned sewer main lines • Roof replacements at Cornish Playhouse and the Seattle Children’s Theatre • Monorail deferred major maintenance including update of electrical rooms and seismic evaluation of the Seattle Center station • Preservation and redevelopment of the historic Century 21 Coliseum roof, superstructure and façade to reopen as Climate Pledge Arena in 2021 	All Hazards

5.4.14 Seattle City Light (SCL)

Seattle City Light (SCL) was created in 1902 to provide affordable, reliable, and environmentally sound electric power to the City of Seattle and neighboring suburbs. Owned by the community it serves, Seattle City Light is a nationally recognized leader in energy efficiency, renewable resource development, and environmental stewardship. Seattle City Light provides electric power to more than 360,000 residential, business, and industrial customers. Its service area of 131.3 square miles includes the City of Seattle, areas north of Seattle, including the city of Shoreline and parts of Lake Forest Park, and areas south of Seattle, including the cities of Burien, Tukwila, and SeaTac. To serve these customers, City Light owns, maintains, and operates a multi-billion-dollar physical plant that includes: a power generation system consisting of seven hydroelectric plants on the Pend Oreille, Skagit, Cedar, and Tolt rivers; 656 miles of high-voltage transmission lines linking these plants to Seattle; a distribution system with 15 major substations and more than 2,500 miles of overhead and underground cable; a state-of-the-art System Operations Center coordinating the City’s electric system; and billing and metering technology tracking approximately 461,000 accounts.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Mitigation Policy	Planning and Administrative	<p>Conduct structural mitigation, security, and non-structural mitigation projects as facility upgrades are made. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Created the Disaster Recovery and Business Continuity Planning (Information Technology Division) • Installed a fail-over redundancy system with backup at an off-site location for data systems. 	All Hazards

Dam Safety Program	Planning and Administrative	<p>Oversee the Dam Safety Program involving the coordination, monitoring, and oversight of activities for six major dams to reduce the risk and impacts from dam failure due to natural and man-made hazards. Recent accomplishments include:</p> <ul style="list-style-type: none"> ▪ Vulnerability and threat assessments for the Skagit and Boundary Hydroelectric Projects and the Cedar Falls/Tolt dams. ▪ Skagit Spillway Gate seismic strengthening at Ross and Diablo dams. ▪ Hillside and slope stabilization at Boundary, Diablo, and Ross dams. ▪ Equipment installation and monitoring to detect dam movement, measure high flows, and dam failure at Cedar Falls and Boundary dams. ▪ Annual dam safety inspections by the Federal Energy Regulatory Commission (FERC). ▪ Procedures for dam inspections following events ▪ Emergency Action Plans for facilities. ▪ Annual update/tests of emergency procedures. 	All Hazards
Capital Improvement Program (CIP)	Financial	<p>Develop capital projects and coordinate with CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments. CIP projects repair, upgrade, and expand SCL's physical plant, and implement a variety of safety improvements, mitigation activities, and licensing requirements. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Completed a joint assessment project for the Cedar Falls/Tolt Dams. 	All Hazards
Hazard tree mitigation (vegetation management) near SCL Right-of-Way	Administrative and Technical	<p>Identify and abate hazard from trees that are likely to fail and cause power outages in all the identified areas. SCL maintains over 300,000 trees adjacent to 1700 miles of distribution power lines throughout Seattle, Burien, Lake Forest Park, Normandy Park, Renton, SeaTac, Shoreline, Tukwila, and unincorporated King County. Also, SCL manages vegetation along 657 miles of transmission power lines passing through five counties across Washington State. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Identified all areas that need vegetation management. 	Fires, Landslides, Power Outages, Snow and Ice Storms, and Windstorms
Remove/sample PCB transformers	Administrative and Technical	<p>Ensure full compliance with laws and regulations for all transformers. The PCB master plan was completed in 2014 and software to track the PCB concentration of all transformers was implemented in 2015. SCL is replacing transformers that need critical attention and establishing procedures for transformer inspections. SCL will complete the project by 2021.</p>	Earthquakes, Snow and Ice Storms, and Windstorms
Charging Stations	Administrative and Technical	<p>Make available a charging station to deploy throughout the greater Seattle area.</p> <ul style="list-style-type: none"> • Locate two mobile trailers. • Purchase equipment for the mobile units. • Complete the study on most vulnerable areas in Seattle. • Deployment of mobile unit procedures. 	Climate Change

5.4.15 Seattle Department of Construction and Inspections (SDCI)

The Seattle Department of Construction and Inspections (SDCI) develops, administers, and enforces standards for land use, design, construction, and housing within the Seattle city limits. SDCI is also responsible for long-range planning, including Seattle's Comprehensive Plan and related projects- transportation improvements, neighborhood business revitalization, and downtown and waterfront planning.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Seattle Unreinforced Masonry Retrofit Policy (in development)	Regulatory	<p>This policy is under development to mitigate the risks associated with Unreinforced Masonry (URM) structures in the City. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Finalized list of confirmed URM buildings. • Supported National Development Council (NDC) efforts to develop financing report for URM retrofit. • Provided support for Alliance for Safety, Affordability, and Preservation (ASAP!) for development of permitting processes. • Worked with OEM to continue URM Retrofit policy development. 	Earthquakes
Emergency Response and Recovery Roles	Administrative	<p>Provide rapid assessment of damaged buildings following earthquakes. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Trained appropriate staff to conduct ATC-20 building safety assessments. • Trained appropriate staff on required NIMS Incident Command System courses. • Trained appropriate staff on EOC procedures and WebEOC. 	Earthquake
Environmentally Critical Areas (ECA) Code	Regulatory	<p>Administer the ECA Code which governs areas of Seattle that provide critical environmental functions. For example, wetlands can protect water quality and provide fish and wildlife habitat. The ECA code also addresses areas that represent particular challenges for development due to geologic or other natural conditions. The goal of the ECA regulations, (Seattle Municipal Code [SMC] Chapter 25.09) is to effectively protect these areas and to protect public safety, while allowing reasonable development. Specific hazard-related areas identified include:</p> <ul style="list-style-type: none"> • Geologic hazard areas including landslide-prone areas, liquefaction-prone areas, peat-settlement-prone areas, seismic hazard areas, and volcanic hazard areas. • Flood-prone areas. 	Earthquakes Flood Landslides Volcanic Hazards
Floodplain Management	Regulatory	<p>Administer the City's National Flood Insurance Program (NFIP). Recent accomplishments include:</p> <ul style="list-style-type: none"> • Established and maintained eligibility in the Regular Phase of the NFIP since 1977. • Maintains a National Flood Insurance rate map for properties identified as flood prone. These Digital Flood Insurance Rate Maps (DFIRMs) have been updated and will go into effect August 19, 2020. Interim regulations were adopted in Aug 2020 and permanent regulation will be adopted in Feb 2021. • Public outreach through a Community Assistance Visit will occur prior to adopting the updated mapping. 	Flood

		<ul style="list-style-type: none"> Seattle Municipal Code Chapter 25.06, as amended by Council Bill Number 114503 (2003), is the floodplain management chapter; it was reviewed and found to be fully compliant with the NFIP and State floodplain management regulations. The Municipal Code Chapter 25.06 was amended by Ordinance 125781 (Council Bill 119420) to update the referenced vertical datum. 	
Codes, Regulations, Rules, and Memos	Regulatory	<p>Develops, adopts, and enforces codes, ordinances, and policies that regulate construction activities of new and existing buildings. The selected codes, regulations, rules, and memos mitigate damage caused by natural disasters. Key mitigation rules, memos, codes, and policies for which the department is responsible including Directors Rules, Client Assistance Memos, Seattle Construction Codes, Seattle Municipal Code, and other policy provisions. Recent accomplishments include:</p> <ul style="list-style-type: none"> Updates to the building code to reflect changes tsunami standards in the International Building Code. 	All Hazards
Landslide Awareness Program	Education and Outreach	<p>Conduct public outreach with the intent of providing expert advice for property owners to manage landslide-prone areas.</p> <ul style="list-style-type: none"> Conducted public meetings. Updated ECA Steep Slope Area Mapping Units. Updated ECA known landslide area mapping GIS information. 	Landslide

5.4.16 Seattle Department of Transportation (SDOT)

SDOT’s mission is to deliver a transportation system that provides safe and affordable access to places and opportunities. SDOT develops, maintains, and operates a transportation system that promotes the mobility of people and goods, and enhances the quality of life, environment, and economy of Seattle. Services are coordinated and delivered through 10 divisions that respond to changes in the function and use of the transportation system and the evolving needs of the businesses and people of the City of Seattle.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Levy to Move Seattle	Financial	Fund bridge seismic retrofit program through this voter-approved transportation levy.	Earthquake
Move Seattle: 10-Year Strategic Vision for Seattle	Planning	This plan identifies actions to accomplish policies in the Comprehensive Plan and the Puget Sound Regional Council’s Transportation 2040 plan, as well as integrate the City’s 4 modal plans .	All Hazards
Transportation Asset and Performance	Planning and Administrative	This program focuses on getting the best results of performance for the prevention, improvement, and operation of infrastructure assets given the resources available.	Infrastructure and Structural Failure

Management Program			
Landslide Mitigation Program	Planning, Administrative and Technical	<p>Conduct studies and direct CIP funds towards high priority arterial streets vulnerable to landslides. Track ongoing clean-up and maintenance costs associated with slide area and develop draft standards for tailoring streets and drainage in residential areas. Recent right-of-way landslide repair projects include:</p> <ul style="list-style-type: none"> • 4 - Soldier Pile Walls at various sites along 9700 block to 10300 block of Rainier Ave S • 4 – Gravity walls at various sites along 9700 block to 10300 block of Rainier Ave S • Soldier Pile wall at 10400 block 47 Ave SW • Soldier Pile wall at 9400 block California Ave SW 	Landslides
Areaways Program	Administrative and Technical	<p>Identify and implement mitigation projects for areaways - usable space, generally in the street right-of-way, constructed under sidewalks, and between the building foundation and the street wall. Recent accomplishments include:</p> <ul style="list-style-type: none"> • Monitoring Program – An extensive monitoring system has been installed in the most critical areaways in the Pioneer Square District • Inspection – Condition inspection was performed on areaways in the International District. This inspection provides an important benchmark for determining deterioration. • Reconstruction – elimination of areaway hazard Columbia St. 	Infrastructure and Structural Failure
Capital Improvement Program (CIP)	Financial	<p>Recent accomplishments include:</p> <ul style="list-style-type: none"> • NE 45th St Viaduct (East Approach) • Fairview Ave Bridge (East and West) • Landslide Mitigation Projects. • Areaway Projects 	Earthquakes

5.4.17 Seattle Fire Department (SFD)

The Seattle Fire Department (SFD) has 33 fire stations located throughout the City. SFD deploys engine companies, ladder companies, and aid and medic units to mitigate loss of life and property resulting from fires, medical emergencies, and other disasters. SFD also has units for hazardous materials responses, marine responses, and high-angle and confined-space rescues. In addition, SFD provides leadership and members to several disaster response teams: FEMA Washington Task Force 1 Urban Search and Rescue, USCG Area Maritime Security Committee, and regional wildland firefighting through the Washington State Fire Mobilization Plan. SFD's fire prevention efforts include: fire code enforcement; inspections and plan reviews of fire and life safety systems in buildings; public-education programs; regulation of hazardous materials storage and processes; and regulation of public assemblies. FAS manages the construction, maintenance, and mitigation of all SFD facilities.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Fire Prevention Division	Regulatory	<p>The Fire Prevention Division (FPD) administers the SFD fire prevention program to provide a reasonable level of life safety and property protection from the hazards of fires, explosions, and dangerous conditions, including releases of hazardous materials for Seattle’s residents, workers, and visitors. Recent accomplishments include:</p> <ul style="list-style-type: none"> From 2016-2020 approximately 3,300 facilities that store, dispense, use, or handle hazardous materials were inspected annually by the SFD Operations Division; the FMO processed approximately 300 new hazardous materials operational permit applications annually during the same period. Additionally, the FMO received and issued approximately 2,200 temporary permits related to hazardous activities annually primarily related to hot work (i.e., cutting, welding, and roofing operations). Provided oversight to testing and repairs for over 27,500 fire protection systems in the City of Seattle. More than 4,000 deficient systems were reported and repaired annually. Conducted over 1,600 compliance inspections annually to resolve complex or difficult fire code violations. Inspected over 430 high-rise buildings annually in Seattle to ensure fire and life safety in these uniquely risky structures. 	Fires HazMat Incidents
Local Emergency Planning Committee (LEPC)	Planning	<p>This inter-jurisdictional public/private mitigation partnership is managed by the SFD and addresses hazardous materials issues. The Seattle LEPC actively participates with regional and state partners in the Washington State Emergency Response Commission (SERC). The goal of the SERC is to plan for and mitigate the effects of a release or spill of hazardous materials. Recent accomplishments include:</p> <ul style="list-style-type: none"> In 2020 the Seattle LEPC received and distributed approximately 700 U.S. Department of Transportation Hazardous Materials Emergency Response Guidebooks to response agencies in the City of Seattle. These books provide responders with recommendations for initial identification and isolation actions when responding to hazardous materials incidents. 	HazMat Incidents
Capital Improvement Program (CIP)	Financial	Proposes capital projects and coordinates with FAS and CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments.	All Hazards

5.4.18 Seattle Police Department (SPD)

The Seattle Police Department’s (SPD) primary mission is to prevent crime; enforce the law; and support quality public safety by delivering respectful, professional, and dependable police services. SPD is specifically charged with the enforcement of Title 11 (City of Seattle Traffic Code), Title 12 (City of Seattle Criminal Code), Revised Code of Washington Title 9A (Criminal Code), and statutes in Washington Code 9 (specified sections dealing with Criminal Law). Consistent with its mission, SPD has lead agency responsibility for all criminal investigations, to include civil disorder, bomb threats, and terrorism incidents as codified in Article VI of the Seattle City Charter. SPD operates within a framework that divides the city into five geographical areas called "precincts." These precincts define east, west, north, south, and southwest patrol areas, with a police station in each.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Incident Management Team	Technical/Operational	Participates in the regional multi-discipline Type 3 Incident Management Team. Maintains a cadre of personnel to effectively manage major incidents or disasters and conducts regular training and exercises.	All Hazards
Washington State Fusion Center	Administrative	Stage representatives with the Washington State Fusion Center to ensure interagency communication and collaboration in preparedness, prevention, and response efforts as they relate to Critical Infrastructure and Key Resources. The Fusion Center supports public safety and homeland security missions.	Attacks
Capital Improvement Program (CIP)	Financial	Proposes capital projects and coordinates with FAS and CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments.	All Hazards

5.4.19 Seattle Public Libraries (SPL)

The Seattle Public Library, founded in 1891, includes the world-renowned Central Library, 26 neighborhood libraries, a robust "virtual library" available 24/7 through the Library's popular website, a Mobile Services division, as well as leased storage and shops space. The Central Library provides library services for downtown residents and workers, is a hub for planning and developing systemwide programs and services, critical computer and Wi-Fi access for people without internet service, community meeting rooms and an auditorium for cultural and educational programs. The 26 neighborhood libraries provide services and programs close to where people live, go to school and work, and serve as neighborhood anchors for lifelong learning, civic engagement, and economic vitality. In 2019, The Seattle Public Library (SPL) hosted nearly five million in-person visitors and circulated 12.6 million items. More than 12,000 attended the Library's adult learning programs, 34,000 attended STEM-focused Summer of Learning activities and over 1,200 attended homework help sessions. The 2008 Library Levy, known as "Libraries for All", increased the amount of physical space by 80%. The next 2012 Library Levy provided funding to maintain the five new and 22 updated libraries. The 2019 Library Levy focuses on asset preservation and includes seismic retrofits at three century-old Carnegie-era branches.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Library Levy	Financial	The 2019- 2026 voter-approved Library Levy funds capital projects, services and programs at all 27 libraries. <ul style="list-style-type: none"> Included funding for seismic retrofits for three Carnegie-era branches (Green Lake, University and Columbia) 	Earthquakes
Capital Improvement Program (CIP)	Financial	Develops capital projects for library facilities and coordinates with CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments. Recent accomplishments include:	Earthquakes

		<ul style="list-style-type: none"> Recent CIP was informed by an SDCI URM building survey that identified seven unreinforced masonry (URM) libraries. Three libraries were identified as high vulnerability (Green Lake, University and Columbia) and four libraries were medium vulnerability. 	
Library Programs	Education and Outreach	Host a variety of educational displays and programs which in past have programs related to disaster preparedness, earthquakes, and other mitigation-related topics.	All Hazards

5.4.20 Seattle Parks and Recreation (SPR)

Seattle’s Department of Parks and Recreation (SPR) works with all City residents to be good stewards of the environment and to provide safe, welcoming opportunities to play, learn, contemplate, and build community. Seattle Parks and Recreation manages 400 parks and open areas in its approximately 6,200-acre park system. This includes 224 parks, 185 athletic fields, 112 neighborhood play areas, nine swimming beaches, 18 fishing piers, four golf courses, and 22 miles of boulevards. Other Department of Parks and Recreation facilities include 151 outdoor tennis courts, 24 community centers, eight indoor and two outdoor swimming pools, 27 wading pools, a nationally recognized Rose Garden, and the Seattle Aquarium. The Woodland Park Zoological Society operates the zoo with financial support from the City.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
Asset Management Plan (AMP)	Planning	Maintain and update AMP actions to keep the SPR assets in safe and operable condition and to maintain a Tier 1 sheltering system. Recent accomplishments include: <ul style="list-style-type: none"> Installation of Emergency Generators at Tier 1 Emergency Shelters at Garfield Community Center and Southwest Teen Life Center and Pool Helene Madison Pool seismic upgrade Hiawatha Community Center seismic upgrade Magnolia Community Center seismic upgrades Magnuson Building 11 seismic retrofit Cal Anderson Fountain discharge retrofit Freeway Park Fountains (3) retrofit Emma Schmitz Memorial Park seawall 	All Hazards
Urban Forest Management	Maintenance	Maintain healthy forest canopy, provides slope stability in environmentally critical areas and reducing carbon in air.	Windstorms, Snow and Ice, Power Outages, Heat Events, Landslides

Capital Improvement Program (CIP)	Financial	Develops capital projects and coordinates with CBO to prepare the CIP, a six-year financial planning tool that identifies future capital investments and potential strategies for funding those investments. SPR uses the AMP which measures each potential capital project by criteria including safety, asset preservation, race and social justice, legal obligation, and improvements in efficiency to set priorities for capital projects.	All Hazards
--	-----------	---	-------------

5.4.21 Seattle Public Utilities (SPU)

Seattle Public Utilities (SPU) is comprised of four major utilities: water, drainage, wastewater, and solid waste. The water utility provides a reliable water supply to more than 1.5 million customers in King County; the drainage utility manages stormwater; the wastewater utility collects and disposes of sewage and storm water; and the solid waste utility collects and disposes of recycling, yard waste, and residential and commercial garbage. SPU’s mission is to provide vital services to the community that are equitable, environmentally responsible, and resilient. Resilience is a system’s ability to incur fewer negative impacts and recover more quickly from stresses and shocks, while adapting to new conditions and opportunities. As a community-centered utility, SPU seeks to proactively address community needs and risks to improve resilience.

Existing Mitigation Capability	Capability Type	Description	Hazard Mitigated
General Response Planning, and Response Capabilities	Planning, Administrative and Technical	<p>SPU assesses and mitigates hazard risks to minimize disruptions to water supply, drainage, wastewater, and solid waste services. Accomplishments include:</p> <ul style="list-style-type: none"> • Updated SPU’s Continuity of Operations Plan (2018, 2021). • Completed SPU’s Emergency Management Logistics Plan (2020). • Completed the first Comprehensive Emergency Management Plan (2018). • Completed the Water Utility’s Emergency Response Plan (2020) and Risk and Resilience Assessment (2020) per America’s Water Infrastructure Act. • Updating Damage Assessment Plan and Training Program (2-year cycle). • Completed the Ship Canal Water Quality Incident Management Plan (2020). • Completing the Solid Waste Management Plan Amendment (2021) that incorporates resilience to hazards. • Updated the Solid Waste Debris Management Plan including contracts (2018). • SPU’s Wet Weather Readiness and Response Program responds to in-city flooding. • SPU’s Spill Response Team responds to spills impacting drainage and wastewater, and water systems. • SPU’s Watershed Wildland Fire Team responds to wildfire in the municipal watersheds. • SPU’s Operation Response Center (24-hour dispatch) with expanded remote working capabilities and with backup at the North Operations Center. 	All Hazards
Emergency Preparedness	Education and Outreach	<p>SPU supports employees, the public, customers, and partners in being prepared. Accomplishments include:</p> <ul style="list-style-type: none"> • Employee preparedness programs, including annual field crew trainings and a Continuity of Operations Plan exercise (2020). 	All Hazards

		<ul style="list-style-type: none"> • Manages an alert and warning system for SPU, AlertSeattle. SPU is community notification capable. • SPU has developed tools and resources to assist employees and community members. Distributed “SPU for 2” Preparing for the Big One booklet, guides and other materials during preparedness campaigns to encourage staff and their communities to prepare for disasters or emergencies. • Continuing partnerships with local community leaders and businesses for Partners in Preparedness annual event and the Annual Night Out Ambassador Program. 	
<p>Stormwater and Wastewater Planning and Programs</p>	<p>Planning and Regulatory</p>	<p>SPU manages wastewater, storm water, and water quality programs and capital projects. These programs are in part required under the National Pollution Discharge Elimination System and a Consent Decree with the Department of Justice, US Environmental Protection Agency (EPA), and the Washington State Department of Ecology. Accomplishments include:</p> <ul style="list-style-type: none"> • Completing a Wastewater System Seismic Assessment (2021). • Analyzed risk and likelihood of failure for many types of wastewater and drainage assets and have begun capital planning, to address vulnerabilities. • Revised storm water code (2021) and Directors Rule to protect against flooding, pollution, landslides, and erosion. • Performed Structural Storm Water control projects that include flood mitigation through the use of Green Stormwater Infrastructure. • Completion of the Wastewater System Analysis (2019), which in part analyzed sewer system flooding and sewer backups. • Completion of the Drainage System Analysis (2020), which in part analyzed property and road surface flooding. • Implementing the Plan to Protect Seattle’s Waterways (2015), which reduces combined sewer overflows that occur during storm events. 	<p>Storms, Flood, Earthquake, Landslides</p>
<p>Water System Seismic Mitigation Program</p>	<p>Administrative, Technical and Financial</p>	<p>Seattle Public Utilities (SPU) completed its first water system seismic vulnerability assessment in 1990. This comprehensive assessment evaluated essentially all of SPU’s water system storage reservoirs and tanks, pump stations, transmission pipelines, and support buildings and facilities. The 1990 seismic vulnerability assessment was the impetus for a seismic upgrade program that led to approximately \$100 million of seismic upgrades and facility replacements.</p> <p>Since the 1990 study was completed, there have been several significant developments that affected SPU’s seismic mitigation program:</p> <ul style="list-style-type: none"> • Major earthquakes in Northridge, Kobe, Christchurch and Tohoku that show water systems remain highly vulnerable to large earthquakes. • The realization that the many Western Washington crustal fault zones, including the Seattle Fault Zone that runs directly below Seattle, are active. • The Uniform/International Building Code has significantly evolved since 1990. • Earthquake-resistant ductile iron pipe that has performed exceptionally well in Japan is now available in the United States. <p>In 2018, SPU completed a new water system seismic vulnerability assessment that incorporated the developments listed above. The most significant finding of the 2018 study is that SPU’s transmission and distribution pipeline systems would be expected to sustain significant damage during a catastrophic earthquake. Restoring even minimal service to all of SPU’s customers may take months. Additionally, several facilities that were previously believed to be seismically robust were identified as seismically vulnerable to the stronger ground motions that are now believed possible.</p>	<p>Earthquake, Landslide</p>

		<p>The water system seismic mitigation program direction was updated to reflect the 2018 seismic study findings. In addition to instituting new seismic pipeline standards for all water mains, several critical transmission pipeline locations and critical facilities were identified for seismic upgrade. Earthquake emergency preparedness and response measures are also being augmented.</p> <ul style="list-style-type: none"> • Completed seismic upgrades to four terminal reservoirs. • Completed water system seismic vulnerability assessment and updated seismic mitigation plan. • Developed and instituted seismic design standards for water mains. • Installed earthquake resistant ductile iron pipe in areas subject to pipe damaging permanent ground displacements. • Wrote earthquake hazard-specific response plan for the water system. • Began developing post-earthquake isolation and control plan to mitigate pipeline damage effects. • Identified pipeline emergency repair material deficiencies and developed plan to obtain these materials. • Initiated Trenton, Magnolia, Riverton and Eastside Tank seismic upgrade projects. • Installed drains in ongoing landslide area to reduce ongoing sliding and reduce potential sudden slides in a seismic event. • Initiated more comprehensive/detailed study of SPU water system transmission pipelines. 	
Dam Safety Program	Planning and Administrative	<p>SPU monitors 14 dams to ensure safe operation of reservoirs and storm water detention systems. Accomplishments include:</p> <ul style="list-style-type: none"> • Development of Emergency Action Plans for SPU Dams. Updated Annually, Rewritten every 5 years. • Tabletop and Functional Exercises with Emergency Action Plans for SPU Dams. • Completion of SF Tolt Dam Surveillance and Monitoring Report to FERC (annually). • Physical Modeling of Tolt Dam Valve 15 for extreme hydraulic conditions. • 2019 SF Tolt Emergency Action Plan Full-Scale Exercise. • 2018 SF Tolt Inundation Study (identify flooding risks). • 2017 SF Tolt Ring Gate Rehabilitation. • 2017 SF Tolt Part 12D Follow-up Investigations including Tolt Spillway Condition Assessment and Hydraulic Modeling. • Critical Infrastructure Protection: security enhancements at SPU facilities. 	Flood, Dam Failure
Climate Change Adaptation Program	Planning and Administrative	<p>SPU is committed to understanding and preparing for the impacts that climate change will have on our communities, infrastructure, and essential services, and to reducing the utility's contribution to climate change by: 1) Assessing potential impacts to the water supply, drainage, wastewater, and solid waste systems; tidally influenced infrastructure; and integrating this information into the decision-making process; 2) Collaborating with water utilities, academia, philanthropy, City departments and other regional public agencies, community-based organizations, and the science community locally and nationally to enhance Seattle's capacity to prepare; 3) Centering frontline communities in the planning and preparedness process.</p> <p>Assessments of potential climate change impacts by SPU include:</p>	Drought, Flood, Wildfire, Excessive Heat Events

		<ul style="list-style-type: none"> ● Repeated scientific study of hydrology and water supply, as well as water demand. ● Study of extreme precipitation events and their effects on urban drainage. ● Mapping of exposure to sea-level rise. ● Mapping of urban heat islands and exposure to heat stress. ● Evaluation wildfire risk in the municipal watersheds and implementation of climate-adaptive forest management. <p>Measures to reduce vulnerability could include:</p> <ul style="list-style-type: none"> ● New infrastructure projects and modifications to existing infrastructure and facilities. ● Changing the way infrastructure is operated to reflect changing conditions. ● Reducing greenhouse gas emissions through fleet electrification and facility improvements. ● Embedding climate information into asset management decision-making tools. ● Developing early-warning systems for urban flooding. ● Amending or implementing new regulations, codes, and policies. ● Supporting capacity building in frontline communities. 	
<p>Facility Capital Improvements</p>	<p>Financial</p>	<p>SPU CIPs allocate funds to rehabilitate, improve, and add to SPU's capital facilities for water, drainage and wastewater, and solid waste utilities. SPU CIP Facilities Projects related to hazard mitigation include:</p> <ul style="list-style-type: none"> ● New Watershed Headquarters Building (2018) that serves as an incident management center for wildfire and other incidents. ● New North Transfer Station (2016) is built to current seismic standards with emergency backup generator. ● New Morse Lake Pump Plant (2015) to provide access to water when the lake level is low due to drought. 	<p>Earthquake, Wildfire, Drought</p>

5.5 Continuity of Operations Planning

One notable city-wide planning capability is the requirement that all City departments maintain Continuity of Operations (COOP) plans. These plans play a key role in mitigating the impacts of hazards by ensuring that departments are planning to minimize the potential disruption to their essential functions that may result from a disaster. Key plan information includes:

- Identification of department essential functions.
- Identification of alternate facilities that can be used if the department’s normal facility is damaged or uninhabitable.
- Establishment of recovery time objectives for essential functions.
- Assignment of roles and responsibilities for continuity operations.

COOP plans are a vital part of the basic foundation that supports the City’s response to and recovery from disasters. Without them, work following a major event is made much more difficult and chaotic. With them our efforts in restoring services and bringing a sense of normalcy to the City will happen quicker and minimize the long-term impacts that disasters have on communities.


5.6 Coordination with Community Partners

The City of Seattle is not alone in its efforts to create a more resilient community through hazard mitigation and will actively pursue strategies to ensure effective coordination and integration with the private sector, both for-profit and not-for-profit, including the County’s critical infrastructure, key resources, other business and industry components, and not-for-profit organizations (sometimes called nongovernmental organizations (NGOs), including those serving special needs populations, engaged in mitigation activities. These efforts are ongoing, and the City has proactively identified enhanced coordination with community partners as a mitigation action in this update of the plan (OEM1).

Table 8 - Community Partners by Sector

<p>Education</p> <p>Seattle Public Schools Seattle Colleges University of Washington Seattle University Seattle Pacific University</p>	<p>Business and Industry</p> <p>Greater Seattle Business Association Seattle Chambers of Commerce Port of Seattle Local Businesses</p>
<p>Finance</p> <p>Area Financial Institutions</p>	<p>Healthcare</p> <p>Area Hospitals and Healthcare Facilities</p>
<p>Private Utilities</p> <p>Puget Sound Energy Seattle Steam Telecommunications Providers</p>	<p>Transportation</p> <p>Burlington Northern Santa Fe Railroad King County Metro Seattle-Tacoma International Airport Sound Transit Washington State Ferries</p>

5.7 National Flood Insurance Program Participation

 FEMA	C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3))
---	--

The Seattle Department of Construction and Inspections manages the City’s NFIP. The City has established and maintained eligibility in the Regular Phase of the NFIP since 1977. Seattle Municipal Code Chapter 25.06 is the floodplain management chapter.

On February 19, 2020, FEMA published a Flood Hazard Determination adopting a new Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) for all jurisdictions in King County, including Seattle. FEMA requires that all jurisdictions within King County adopt the new FIRM and FIS within six months which was August 19, 2020. Additionally, local FEMA officials reviewed Seattle’s floodplain regulations and this review directed the minimum amendments to the Floodplain Development Regulations (SMC 25.06) to meet 44 CFR Section 60.3 (d and e) for the August 19, 2020 deadline.

In addition to adopting the new FIRM and FIS, the City of Seattle is required to have floodplain regulations that apply to the new maps that did not apply to the existing 1995 FIRM and FIS. These requirements come from the NFIP regulations in Title 44 of the Code of Federal Regulations (CFR). Specifically, 44CFR section 60.3e contains regulations for coastal high hazard flood zones, which were not identified on the 1995 maps. These coastal flood zones are designated as VE zones on the new FIRM.

Seattle Municipal Code Chapter 25.06 was amended by Council Bill Number 119832 (2020) to adopt new interim Floodplain Development Regulations and floodplain maps, and these took effect on August 23, 2020. These interim regulations will be effective for approximately six months while the City works on permanent regulations.

The most recent Community Assistance Visit by the Washington State Department of Ecology was conducted on August 6, 2008, and the City was certified as a participant in good standing in the NFIP. A new Community Assistance Visit has not yet been scheduled.

Within the Seattle city limits, there are currently twelve properties identified as Repetitive Loss and one property identified as Severe Repetitive Loss according to NFIP criteria.

6 MITIGATION STRATEGY

6.1 General

Chapter 6 describes the City of Seattle’s mitigation strategy which is the primary focus of the City’s mitigation planning efforts. This strategy represents the blueprint for the approach chosen by the City to reduce or prevent losses flowing from hazards identified in the SHIVA.

The strategy is made up of three main required components: mitigation goals and objectives, mitigation actions, and a mitigation action plan for implementation (see Figure 5). These components provide the framework to identify, prioritize, and implement actions to reduce risk from hazards.

Figure 5 - Mitigation Strategy Process



6.1.1 Maximizing Loss Reduction


While this mitigation strategy is meant to be comprehensive in nature and address all hazards identified in the SHIVA, the City also recognizes that there are some hazards that pose greater risk to the community in terms of potential losses both in terms of impact to life and to property and the environment. In the City of Seattle’s case, the hazard identified as having the potential for the greatest impact to life and property is earthquake. This focus on reducing the City’s vulnerability to seismic events is due to following drivers:

- Earthquakes are Seattle’s top hazard with the highest combination of likelihood and potential destructiveness.
- Seattle’s built environment, which includes vulnerable infrastructure and building types such as unreinforced masonry buildings, creates an increased risk.

The City continues to reduce vulnerability to seismic risk through the Seismic Retrofit Facilities Improvement Program. This program, managed by the Department of Finance and Administrative Services, provides the City with an opportunity to address facilities at risk and support decision making regarding seismic retrofit projects. The mitigation strategy outlined in this chapter will inform how to increase the City’s resiliency and reduce the risk of downtime to critical City services post-earthquake.

In addition to a focus on areas of greatest loss, the planning process includes tracking of repetitive loss. Although Seattle does not have a large exposure to repetitive losses due to river flooding, as many communities do (see Section 5.7 on National Flood Insurance Program), as part of the annual review process the City will revisit and address any recurring loss trends that emerge across all hazards.

6.2 Mitigation Goals

 FEMA	C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))
---	---

Mitigation goals are intended to represent what the City seeks to achieve through mitigation plan implementation. The goals are general guidelines and provide a framework for identification of more detailed objectives and actions. The MWG reviewed the goals and objectives from the 2015 plan update and confirmed these goals and objectives for the 2021 update.

GOAL 1: Protect life and safety and promote community resiliency.

- Objective 1.1. Conduct hazard specific public outreach to vulnerable areas.
- Objective 1.2. Reduce the possibility of damages and losses resulting from disease/pandemic hazards.
- Objective 1.3. Promote community resiliency through a comprehensive approach to preparing for the impacts of a changing climate.
- Objective 1.4. Increase the resiliency of the City's food system.
- Objective 1.5. Enhance the City's response capacity.

GOAL 2: Safeguard critical infrastructure and ensure continuity of service.

- Objective 2.1. Ensure system redundancies and backup power are available to support key City functions.
- Objective 2.2. Ensure protection of the City's information technology infrastructure.

GOAL 3: Protect public and private property.

- Objective 3.1. Reduce the possibility of damages and losses to City facilities and infrastructure from earthquakes and other geo-physical hazards.
- Objective 3.2. Reduce the possibility of earthquake-related damages and casualties due to Unreinforced Masonry Buildings.
- Objective 3.3. Reduce the possibility of damages and losses resulting from weather hazards.
- Objective 3.4. Reduce the possibility of damages and losses resulting from transportation and infrastructure hazards.
- Objective 3.5. Reduce the possibility of damages and losses resulting from intentional acts of destruction.
- Objective 3.6. Ensure that City building codes reflect the latest standards in seismic safety.

GOAL 4: Protect the natural environment and cultural and historic resources.

- Objective 4.1. Determine the earthquake vulnerability of historic landmarked properties.
- Objective 4.2. Reduce the use of or minimize the impacts of the use of potentially hazardous substances in City operations.


GOAL 5: Ensure a resilient economy.

- Objective 5.1. Collaborate with local business to promote hazard mitigation.

GOAL 6: Promote a collaborative and integrated mitigation program.

- Objective 6.1. Incorporate hazard mitigation into other City plans and programs.
- Objective 6.2. Engage external partners in the City's mitigation planning process.

6.3 Mitigation Actions

 FEMA	<p>C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for the [City of Seattle] being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))</p>
---	--

A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementation of mitigation actions helps achieve the City’s mitigation goals and reduce vulnerability to threats and hazard identified in the plan. Mitigation plan regulations require the City to identify and analyze a comprehensive range of specific mitigation actions and projects to reduce the impacts identified in the City’s risk assessment.

See Appendix A for the full text of the SHIVA.

6.3.1 Review of 2015 Hazard Mitigation Actions

As part of the mitigation strategy update, all mitigation actions identified in the 2015 plan were evaluated to determine what the status of the action was and whether any ongoing or incomplete actions should be included as actions in the 2021 plan update.

See Table 9 for an overview of the status of all actions from the 2015 plan update.

Table 9 - Status of 2015 Mitigation Actions

Actions are listed alphabetically by department acronym.

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
DON-1	Conduct survey of landmarks/historic district resources that have had seismic upgrades/life safety upgrades.	Assessments and Studies	Complete	Part of the work conducted in DPD-1.
DPD-1	Prepare comprehensive list of unreinforced masonry buildings.	Assessments and Studies	Complete	Current department is SDCl.
DPD-2	Update Seattle structural codes to current standards	Plans and Regulations	Ongoing	Current department is SDCl. New seismic standards will be adopted in 1Q 2021. Updates to the structural codes happen regularly. Unclear at this point what structural code changes will be required for future updates.
DPD-3	Identify City-owned unreinforced masonry buildings.	Assessments and Studies	Complete	Current department is SDCl. Information will be used to prioritize retrofits of City-owned URM buildings.
FAS-1	Develop analytical tools to support the asset planning program.	Plans and Regulations	Complete	Completed seismic risk assessment demonstration project completed along with 2015 Seattle HMP update. The project developed a practical screening methodology that can be utilized city-wide to evaluate seismic risks, prioritize mitigation actions and reduce seismic risk over time. Carried forward in the 2021 Seattle HMP as a capability.
FAS-2	Seismic upgrade of Charles Street – Fleets Vehicle Maintenance.	Infrastructure/Capital Project	Incomplete	High priority but on hold pending funding. Dropped and replaced with FAS 1 - Initiate feasibility studies to determine seismic upgrade of critical facilities. This is an ongoing action to conduct assessments and studies to address the earthquake hazard.
FAS-3	Continue the Emergency Generator Program.	Infrastructure/Capital Project,	Ongoing	Use excess capacity on the Seattle Animal Shelter emergency generator to support other critical operational functions. This a non-structural project to address power outages related to Winter Storm, Earthquakes, etc. High priority but on hold pending funding. Electrical components will be evaluated to ensure proper sizing for capacity requirements. This determines costs for potential upgrades.

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
FAS-4	Investigate and perform feasibility studies of new technologies for hazard mitigation.	Assessments and Studies	Ongoing	Dropped and replaced with FAS 2 - Install ShakeAlert technology into express elevator in SMT. This is non-structural project to be completed in next 1-3 years to address earthquake hazards. This project is ongoing through Q2, 2021. Anticipated costs to be \$15,000 and funded through operations budget. Project co-sponsored by OEM to connect city facilities to the USGS supported earthquake early warning system.
FAS-5	Seismic upgrade of South Precinct.	Infrastructure/Capital Project	Incomplete	Dropped and replaced with FAS 1 - Initiate feasibility studies to determine seismic upgrade of critical facilities. High priority but on hold pending funding.
FAS-6	Complete ASCE 31-03 Tier 2 seismic studies on (10) critical FAS facilities.	Assessments and Studies	Complete	Conducted detailed study of Charles Street Vehicle Maintenance Garage and South Precinct. Using the ASCE 31-03 methodology, CD was able to conduct more in-depth review of facilities for structural deficiencies and provided prescriptive retrofit recommendations for future capital projects. Carried forward in 2021 Seattle HMP as a Capability.
FAS-7	Conduct a workshop to share methodology and lessons learned from the seismic risk assessment demonstration project with other departments and building owners	Education and Awareness	Complete	Seismic Prioritization Workshop brought together approx. 70 stakeholders throughout the city to share and exchange mitigation projects, challenges, and successes. Participants included facility planners, asset managers, emergency managers for entities with a portfolio of multiple buildings. Carried forward in 2021 Seattle HMP as a Capability.
HSD-1	Increase the quantity and quality of food available through the emergency food system for people at risk for food insecurity. Through the 3-year investment period work with selected agencies to increase coordination, efficiency, and resiliency of the food system.	Plans and Regulations	Complete	Increased access to healthy foods via HSD and OSE contracts and partnerships, and other City departments. Examples include funding for food banks, congregate meal programs, bulk buy food ordering to purchase discounted food for distribution to food banks and meal programs, investments in farm-to-table programs, new BIPOC grassroots projects.
ITD-1	Upgrade essential network routers, firewalls, and switches for City of Seattle information technology systems.	Infrastructure/Capital Project	Incomplete	Dropped due to ongoing standard IT upgrades and no definable project
ITD-2	Add upgrades to SONET as necessary to improve capacity of existing fiber optic network.	Infrastructure/Capital Project	Incomplete	Dropped due to ongoing standard IT upgrade and no definable project
ITD-3	Upgrade telecommunications systems: Implement Unified Communications System	Infrastructure/Capital Project	Complete	Implemented new City of Seattle digital telecommunications technology

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
ITD-4	Creation of citywide next generation data center site and a secondary alternate data center site for the City of Seattle.	Infrastructure/Capital Project	Complete	Stood up new data centers, West and East.
ITD-5	Implement controls on City owned desktop systems that enforce policy and prohibit installation of non-approved applications.	Infrastructure/Capital Project	Complete	Prevents employees from loading and using unauthorized software
ITD-6	Implement technology for the detection of command and control computer traffic for compromised desktop systems.	Infrastructure/Capital Project	Complete	Provides network & system monitoring, security and risk oversight for cybersecurity
ITD-7	Implement technology to routinely inventory installed, non-Microsoft applications to determine to the extent to which upgrade or patching is required. Transition the information to operations for patch/upgrade of the systems.	Infrastructure/Capital Project	Complete	Provides IT work management system to manage applications, network, systems, and devices
OEM-1	Identify opportunities for integration of community partners into the City's mitigation planning program	Education and Awareness	Ongoing	OEM worked with Community Roots, an affordable housing developer/provider, to secure FEMA funds to complete a seismic retrofit of one building in their portfolio.
OEM-2	Tailor public education messaging to emphasize earthquake preparedness and mitigation in programs delivered in liquefaction-prone areas of the city and on the OEM website.	Education and Awareness	Ongoing	Between 2015 and 2020, OEM conducted approximately 140 public education programs at locations with identified liquefaction prone areas. All of these programs included information on earthquake risk and preparedness. Ongoing but not emphasis on liquefaction areas. Hazard explorer.
OEM-3	Strengthen awareness of and focus on health systems/disease prevention in the mitigation program.	Education and Awareness	Ongoing	Public health impacts associated with fire smoke and pandemic have become more urgent based on recent events. Learnings from these incidents will shape future education and awareness efforts.
OEM-4	Encourage the chambers of commerce and other business advocates to sponsor business efforts to prepare for and mitigate the impacts of hazards. (Ref: City-wide Emergency Management Multi-Year Strategic Plan 2015 – 2017 Action Item 6.c.2.)	Education and Awareness	Complete	OEM led 277 business preparedness programs between 2015 and 2020. In 2018 OEM developed a "Preparing Your Workplace" guide with input from small businesses and promoted to chambers and business improvement areas in the city.
OSE-1	Develop Climate Preparedness Strategy	Plans and Regulations	Ongoing	Scope, policies and plans in development. Office is not resourced to work on preparedness and under-resourced for mitigation.

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
P&R-1	Assessment and seismic retrofit of the North Shops (Densmore)	Infrastructure/Capital Project	Complete	A roof project on the facility included seismic Work. North Shops building now meets current seismic code.
P&R-2	Conduct an assessment of remaining Parks Community Centers and pools for seismic retrofit and other renovations needed for service as secondary emergency shelters.	Assessments and Studies	Complete	Study of pools completed. Bids put out on seven pool buildings. Seismic retrofits completed on two pools, and studies completed on five other pools. Seismic upgrades to Madison, structural work done at Queen Anne, damaged and rotting beams identified in assessments. Seismic retrofits will be made to roofs of pools when it is time for replacement. Community Centers: Loyal Heights, South Park, Magnolia, Hiawatha, Ballard, Ravenna Eckstein conducted seismic evaluations for these locations. Project in design and planned to begin construction at Magnolia and Hiawatha CC. Queen Anne and Madison pools are now safer and less life safety risk. More in line with current seismic code. Magnolia and Hiawatha CC will now meet current seismic code.
P&R-3	Identify illicit/improper drainage systems by private residents, impacting steep slope areas (in conjunction with SDOT and SPU).	Plans and Regulations Education and Awareness	Ongoing	More work needed. No active projects and no illicit connections fixed. SPR and SPU coordinating on project in Deadhorse Canyon to potentially address drainage impacting steep slopes. Coordination ongoing between departments. Carried forward to 2021 Seattle HMP.
SC-1	Design and install a dedicated power supply and emergency generator and transfer switch in the Seattle Central Armory	Non-Structural Mitigation Measures	Incomplete	No activity on this project since fail to receive a grant. Carried forward to 2021 Seattle HMP.
SC-2	Conduct an electrical assessment/study to determine the best options for installing generators for in key facilities.	Assessments and Studies	Ongoing	need emergency generator for CUP and replace existing generator for Playhouse, which is obsolete, and no replacement parts are available. Completed campus wide preliminary electrical assessment.
SC-3	Reroof and make minor electrical, plumbing and storage improvements to the Seattle Center Pavilion to allow it to be used for sheltering purposes in inclement weather and other hazard conditions.	Infrastructure/Capital Preparedness and Response	Incomplete	Project dropped. Building demolished as part of new Arena.
SCL-1	SCL Systems Operations Center seismic retrofit design	Infrastructure/Capital Project	Complete	2018: Current estimate is \$5 million. 2019 - fully designed and put out to bid. Construction in 2020.
SCL-2	Seismic review of vaults and substations to update 1993 study	Assessments and Studies	Incomplete	Determine if this study still needed. Retrofit design work at individual substations is ongoing.

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
SCL-3	Substation seismic upgrade	Infrastructure/Capital Project	Incomplete	In year 4 of a 15-year process to re-do base isolation. Carried forward in 2021 Seattle HMP as an Action.
SCL-4	Hazard tree mitigation (vegetation management) near SCL Right-of-Way	Non-Structural Mitigation Measures	Ongoing	Required regular maintenance work. Carried forward in 2021 Seattle HMP as a Capability.
SCL-5	Provide seismically designed storage racks for critical parts and supplies	Non-Structural Mitigation Measures	Incomplete	No recorded progress to date.
SCL-6	Secure tall furniture at SCL facilities	Non-Structural Mitigation Measures	Incomplete	No recorded progress to date.
SCL-7	Map cell towers and identify feeders	Assessments and Studies	Incomplete	Currently no capacity to do this project.
SCL-8	Remove/sample PCB transformers	Natural Systems Protection	Ongoing	2019 - part of normal business practice; consider moving to capability section
SCL-9	Preposition supplies needed for restoration efforts at secure locations	Preparedness and Response	Ongoing	2019 - part of normal business practice; consider moving to capability section
SCL-10	Install impact recorders at substations	Non-Structural Mitigation Measures	Incomplete	Need for action to be determined.
SCL-11	Conduct study of downstream consequences from dams to update and improve inundation maps	Assessments and Studies	Complete	Dam Safety Program produced new dam failure inundation models for federally licensed dams; notification and evacuation application tested in 2019. Provides more detailed illustration of risk and timing of inundation for public notification and evacuation planning.
SCL-12	Retrofit electrical transmission towers in Snohomish County against landslide damage.	Infrastructure/Capital Project	Incomplete	2018: Project designed, and application submitted for FEMA funding. 2019: Project pending funding. Currently an alternate for HMGP funding.

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
SDOT-1	Bridge Seismic Retrofit Phase III	Infrastructure/Capital Project	Ongoing	Seismic retrofits for 16 bridges were included Move Seattle Levy. 2 bridge - Construction completed for Cowen Park Bridge, Howe St. Bridge 2 bridges - Design completed & waiting for approval to AD and go to construction: SW Andover Pedestrian Bridge, 8th Ave. NW/NW 133rd St. Bridge 13 bridges - Seismic recommendations reports completed & design and construction deferred due to insufficient funding: Fremont Bridge, Ballard Bridge, Delridge Way Pedestrian Bridge, 15th Ave. NE/NE 105th St. Bridge, 1st Ave. S. Viaduct/Argo Bridge, 4th Ave. S. Viaduct/Argo Bridge, 4th Ave. S. Bridge (Main to Seattle Blvd), McGraw St. Bridge, W., Admiral Way N. Bridge, Admiral Way S. Bridge, N. 41st Pedestrian Bridge, 15th Ave. NW/Leary Way Bridge
SDOT-2	Conduct a Transportation Operations Center implementation assessment to combine the Traffic Management Center (TMC), dispatch, construction coordination, customer inquiry and call center, and emergency operations functions into a 24/7 work center.	Assessments and Studies	Complete	Assessment is complete in 2016. Department readiness and response communications have been streamlined and improved. Response times improved. Incidents in the right of way cleared more efficiently. Carried forward in 2021 Seattle HMP as a Capability.
SDOT-3	Traffic Management Center (TMC) expansion to 24/7 operations (TMC expansion construction, FTE).	Infrastructure/Capital Preparedness and Response	Complete	SDOT's TOC continues to be a critical tool in managing and responding to the City's transportation network. Other agencies such as WSDOT and KC Metro rely on the TOC for regional coordination efforts. Carried forward in 2021 Seattle HMP as a Capability.
SDOT-4	Conduct a security threat assessment of the Seattle rail corridor to identify risk associated with new volume of oil train movement.	Assessments and Studies	Incomplete	While the risk still exists, SDOT does not own the assets and is a support agency. With the layers of regulations related to the rail system, and no authority, SDOT's efforts would be applied to other projects.
SDOT-5	Implement Seattle rail corridor access control measures (fencing, security cameras, improved right of way management).	Non-Structural Mitigation Measures	Incomplete	While the risk still exists, SDOT does not own the assets and is a support agency. With the layers of regulations related to the rail system, and no authority, SDOT's efforts would be applied to other projects.
SDOT-6	Conduct a Seattle earthquake damage spot arterial repair planning/exercise.	Preparedness and Response	Incomplete	The need to test post-earthquake arterial spot repairs still exists. Carried over to 2021 Seattle HMP as an Action.
SDOT-7	Separation of rail and arterial right-of-way for S. Lander Street Grade.	Infrastructure/Capital Project	Complete	Improved reliability of a key east/west arterial in the SODO area. Eliminated the potential for pedestrian/vehicle and train collisions.

Action No.	2015 Mitigation Action	Type of Action	Status	Comments
SPU-1	Develop a plan to protect the drinking water system from earthquakes.	Plans and Regulations	Complete	The completed seismic study provides a good understanding of how the drinking water system will be impacted by a catastrophic earthquake. Based on these findings, SPU has developed a short- and long-term plan, for the next 50 years, that provides a steady path for making significant investments to improve seismic resilience.
SPU-2	Improve Thornton Creek Confluence to reduce upstream flooding and downstream flows.	Infrastructure/Capital Project Natural Systems Protection	Complete	The project removed an undersized culvert, restored the creek channel and provided increased flood storage by removing four homes and 2 acres of fill, which allowed for reconnection of 2.5 acres of floodplain habitat.
SPU-3	Accelerate flooding and sewer backup prevention projects in the Broadview and South Park neighborhoods.	Infrastructure/Capital Project	Incomplete	The South Park Flood Control Pump Station when complete will facilitate drainage to the Duwamish when the tide is high, reducing flooding. The pump station project is in construction and is scheduled to be complete by end of 2021. The South Park Conveyance Project partners with SDOT to improve streets with pavement and provide drainage infrastructure to convey flows safely to the pump station; this project will complete design in 2021 and will be in construction for two years, completing in 2023. The 12 th Ave NW Basin Drainage Improvement project builds drainage infrastructure to address priority flooding areas in the Broadview area. Design completes in 2021 and construction will continue through 2022. Carried forward in this 2021-26 HMP as an action item.
SPU-4	Create a comprehensive emergency plan for maintaining and restoring essential services in emergencies.	Plans and Regulations	Complete	The CEMP was prepared by SPU Emergency Management to provide planning and program guidance for implementing emergency management programs and plans. The CEMP assists SPU to maintain the capability to provide critical services during an emergency or large-scale disaster.
SPU-5	Prepare for water supply and utility system threats that may occur from climate change.	Plans and Regulations Natural Systems Protection	Ongoing	A climate change analysis for the City of Seattle water supply was completed for the 2019 Water System Plan. Progress and next steps are detailed in the plan.

6.3.2 2021 Mitigation Actions

In order to achieve the mitigation goals identified above, the City has identified a comprehensive series of mitigation objectives and supporting actions that are focused on reducing vulnerability and maximizing loss reduction. The actions can typically be broken out into the following types of activities:

- **Plans and Regulations.** Regulatory actions or planning processes that result in reducing vulnerability to hazards.
- **Assessments and Studies.** Actions taken to better understand the potential impacts of identified hazards. An example would be seismic studies of City facilities.
- **Infrastructure/Capital Projects.** Actions taken to modify existing buildings or structures to protect them from a hazard.
- **Non-Structural Mitigation Measures.** Physical actions taken that don't include structural modifications. An example would be efforts to secure furniture or installation of backup generators.
- **Natural Systems Protection.** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems.
- **Education and Awareness.** Actions taken to inform and educate residents, elected officials, and property owners about hazards and potential ways to mitigate them.

All mitigation actions identified in the plan are addressed in the Mitigation Implementation Plan provided in Section 6.5. The actions include both interim- and long-term strategies for reducing vulnerability to hazard.

6.3.3 2021 Mitigation Actions by Hazard

The 47 mitigation actions identified in the 2021 update of the Seattle HMP are intended to address natural, technological and human-caused hazards. The HMP is comprehensive in addressing all of the hazards identified in the SHIVA, and the inclusion actions to address multiple hazards.

See Table 10 which identifies which hazards are addressed by each mitigation action.

6.4 Evaluating and Prioritizing Mitigation Actions

Once mitigation actions were identified, the MWG, and other key stakeholders went through the exercise of evaluating and prioritizing each action to determine which actions are most suitable for the City to implement. A Mitigation Action Worksheet was developed for each action that included the following information:

- Description of the action.
- Action status.
- Type of action.
- Mitigation goals supported by the action.
- Lead and supporting departments.
- Timeline for implementation and expected life of the action.
- Hazards addressed by the action.
- Anticipated cost and funding source.
- Race and Social Justice Focus Areas.
- Location description.
- Geographic area (citywide, district, neighborhood) that will benefit from this action.

See Appendix D for a sample worksheet, worksheet instructions, and completed worksheets for all actions identified in the plan.

6.4.1 STAPLEE Analysis

In addition to the information developed above, each action was self-evaluated using STAPLEE criteria as described in Table 11. Evaluators were asked to rate each STAPLEE criteria to come up with a total score that determined the relative suitability of each action.

Table 11 - STAPLEE Criteria

STAPLEE Criteria	Evaluation Rating
S: Is it Socially acceptable?	High Medium Low
T: Is it Technically feasible and potentially successful?	
A: Does the responsible agency/department have the Administrative capacity to execute this action?	
P: Is it Politically acceptable?	
L: Is there Legal authority to implement?	
E: Is it Economically beneficial?	
E: Will the project have either a neutral or positive impact on the natural Environment? (score a 3 if positive impact, 2 if neutral impact)	

6.4.2 Mitigation Effectiveness Analysis

In addition to the STAPLEE analysis, MWG members rated each action on criteria for effectiveness in achieving loss reductions or other City goals listed in Table 12.

Table 12 - Mitigation Effectiveness Criteria

Criteria	Evaluation Rating
Will the implemented action result in lives saved?	High Medium Low
Will the implemented action result in a reduction of disaster damage?	High Medium Low
Will the action provide multiple community benefits beyond mitigation?	High Medium Low
Will the action involve collaboration between City departments and/or the community?	High Medium Low
Will the action reduce hazard vulnerability for BIPOC communities?	High Medium Low

The STAPLEE and Mitigation Effectiveness ratings for each mitigation action identified in this plan will serve as one of the tools the City uses in prioritizing what mitigation actions it wishes to pursue during the next planning cycle. Of course, actions may also become a higher priority based on available funding, emerging hazards, or because they align with priorities identified in other planning efforts.

FEMA regulations do not require a formal cost-benefit analysis for hazard mitigation plans; however, a formal cost-benefit analysis of mitigation measures is required in order to be approved for Hazard Mitigation Grant Program funding. Therefore, a more formal cost-benefit analysis will be conducted as a component of any future mitigation grant applications.

6.5 2021-2026 Mitigation Implementation Plan

The mitigation implementation plan (Table 13) lays the groundwork for how the mitigation plan will be incorporated into existing planning mechanisms and how the mitigation actions will be prioritized, implemented, and administered by the City. The implementation plan includes both short-term strategies that focus on planning and assessment activities, and long-term strategies that will result in ongoing capability or structural projects to reduce vulnerability to hazards.

The “Loss Avoidance Rating” shown in Table 13 is derived from two mitigation effectiveness criteria:

- Will the implemented actions result in lives saved?
- Will the implemented action result in a reduction of disaster damage?

Each project was scored as follows:

- High + High = score of 6



- High + Medium = score of 5
- Medium + Medium = score of 4
- High + Low = score of 3
- Medium + Low = score of 2
- Low + Low = score of 1

See Appendix D for more details. It contains Mitigation Action Worksheet instructions and detailed Mitigation Action Worksheets for the 47 actions listed in Table 13.

Table 13 - 2021-2026 Mitigation Implementation Plan (by Department)

Lead Depart/ Action #	2021-2026 Mitigation Action	Action Status	Type of Action	Goals Supported	Supporting Departments	Timeline	Anticipated Cost	Funding Available	Loss Avoidance Rating
FAS1	Modify the Seattle Animal Shelter electrical system to accommodate excess power from emergency generator.	New	Non-Structural Measures	Life and Safety Property Protection	Seattle Animal Shelter and Capital Development	3-5 years	TBD	No	2
FAS2	Seismic Retrofit Facilities Improvement Program	Potential	Assessments and Studies	Life and Safety	N/A	5 years +	TBD	No	5
FAS3	Install ShakeAlert Technology into SMT Elevators.	New	Non-Structural Measures	Life and Safety Critical Infrastructure Protection Property Protection	Facility Operations	1-3 years	\$15,000	Yes	2
HSD1	Develop a strategic feeding plan to increase capacity for emergency feeding.	New	Plans and Regulations	Life and Safety	OSE, DON	1-3 years	TBD	Anticipated	2
ITD1	Create stand-alone Communication Site on Wheels to provide localized communications via radio, cellular, Wi-Fi and Point to Point Network.	New	Non-Structural Measures	Life and Safety	SCL, SDOT, SFD, SPD, SPU, FAS, SP&R, HSD, SDCI	1-3 years	\$ 600,000	No	6
OEM1	Expand partnerships for community-led mitigation projects.	New	Plans and Regulations	Life and Safety Property Protection Natural Resource Protection Resilient Economy	DON, OH	3-5 years	TBD	No	4
OEM2	Undertake an analysis to better integrate equity into hazard mitigation program.	New	Assessments and Studies	Integrated Planning		3-5 years	TBD	No	2
OEM3	Update Home Retrofit Education Program materials and guidance to reflect latest changes in design and permitting.	Existing	Education and Awareness	Life and Safety Property Protection	SDCI	3-5 years	TBD	No	5
OEM4	Ongoing support for URM Retrofits	Existing	Plans and Regulations	Life and Safety Property Protection		1-3 years	TBD	No	6

Lead Depart/ Action #	2021-2026 Mitigation Action	Action Status	Type of Action	Goals Supported	Supporting Departments	Timeline	Anticipated Cost	Funding Available	Loss Avoidance Rating
OPCD1	Provide policy guidance regarding resilience, climate adaptation, and hazard mitigation in the Comprehensive Plan Update.	New	Plans and Regulations	Life and Safety Integrated Planning Critical Infrastructure Protection Property Protection Resilient Economy Natural Resource Protection	All Depts	1-3 years	\$ 500,000	Anticipated	1
OSE1	Duwamish Valley Program Resilience and Adaptation Planning will study potential for creating a “resilience district” and the construction of protective multi-purpose sea-level rise infrastructure.	New	Assessments and Studies	Life and Safety Critical Infrastructure Protection Property Protection Resilient Economy Integrated Planning	OPCD, SPR, SPU, SDOT, OH, MO	< 1 year	\$600,000	Yes	3
SCL1	SCL Systems Operation Center Seismic Retrofit	Existing	Infrastructure/ Capital Projects	Life and Safety Critical Infrastructure Protection Property Protection Resilient Economy		1-3 years	\$ 2,700,000	Anticipated	4
SCL2	Seismic Review of Vaults & Substations, an update of a 1993 study.	Existing	Assessments and Studies	Life and Safety Critical Infrastructure Protection		1-3 years	\$ 200,000	Anticipated	4
SCL3	Seismic upgrade of 14 substations.	Existing	Infrastructure/ Capital Projects	Life and Safety Critical Infrastructure Protection		3-5 years	\$ 8,400,000	Yes	4
SCL4	Non-structural Mitigation at SCL Facilities to install seismically designed storage racks for critical parts and supplies, and secure furniture.	Existing	Non-Structural Measures	Life and Safety Critical Infrastructure Protection Property Protection		1-3 years	TBD	Yes	3
SCL5	Install Seismic Impact Recorders at Substations.	Existing	Non-Structural Measures	Life and Safety Critical Infrastructure Protection		1-3 years	TBD	No	3
SCL6	Map Cell Towers & Identify Feeders.	Existing	Assessments and Studies	Critical Infrastructure Protection		1-3 years	TBD	Yes	3
SDCI1	Ongoing Support for URM Retrofits to update URM inventories and proposed technical standard.	Existing	Plans and Regulations	Life and Safety Property Protection		3-5 years	TBD	Yes	6

Lead Depart/ Action #	2021-2026 Mitigation Action	Action Status	Type of Action	Goals Supported	Supporting Departments	Timeline	Anticipated Cost	Funding Available	Loss Avoidance Rating
SDOT1	Seismically retro fit a 66-year old timber and steel seawall that support the roadway and sidewalk of N. Northlake Way.	New	Infrastructure/Capitol Projects	Life and Safety Critical Infrastructure Protection Property Protection Natural Resource Protection	SDCI	1-3 years	\$ 20,000,000	Anticipated	3
SDOT2	Strengthen and seismically upgrade the West Seattle High Bridge.	New	Infrastructure/Capitol Projects	Life and Safety Critical Infrastructure Protection Property Protection Resilient Economy Integrated Planning	WSDOT, US Coast Guard, Port of Seattle, NW Seaport Alliance	1-3 years	\$ 47,000,000	Anticipated	6
SDOT3	Post-Earthquake Arterial Damage Spot Repair Planning and Exercise.	New	Education and Awareness	Life and Safety Critical Infrastructure Protection Resilient Economy Property Protection		< 1 year	\$80,000	No	4
SDOT4	Bridge Seismic Retrofit Program has identified 14 bridges for retrofits. 10 bridges are funded by Move Seattle Levy, and 4 bridges are in need of funding.	Existing	Infrastructure/Capital Projects	Life and Safety Critical Infrastructure Protection Resilient Economy		1-3 years	\$37,260,000	Yes	5
SDOT5	Vision Zero is a plan to reduce speed limits and add pedestrian signals to reduce ped/vehicle collisions which have increased during the pandemic.	Existing	Plans and Regulations	Life and Safety Critical Infrastructure Protection	SFD, KC, WSDOT	3-5 years	\$ 75,000,000	Yes	5
SPL1	Seismic Retrofit of three historic libraries-Green Lake, U-District and Columbia City.	New	Infrastructure/Capital Projects	Life and Safety Critical Infrastructure Protection Property Protection		3-5 years	\$13,800,000	Yes	6
SPR1	Improvements to community centers to ensure they can serve as Clean Air and Cooling Centers .	Existing	Infrastructure/Capital Projects		SCL, OEM, HSD	3-5 years	TBD	Anticipated	3
SPR2	Mitigate Impacts to Park Property and Assets Resulting from Flooding, High Tides and Sea Level Rise.	Existing	Assessments and Studies	Property Protection Natural Resource Protection	SPU	< 1 year	TBD	Yes	2

Lead Depart/ Action #	2021-2026 Mitigation Action	Action Status	Type of Action	Goals Supported	Supporting Departments	Timeline	Anticipated Cost	Funding Available	Loss Avoidance Rating
SPR3	Seismic Retrofits of SPR Programmed Buildings	Existing	Infrastructure/ Capital Projects	Life and Safety Property Protection Natural Resource Protection	Office of Emergency Management/ Facilities and Administrative Services	<1 year	\$10,000,000 - \$20,000,000	Anticipated	6
SPR4	Mitigation of Potential Damage to Environmentally Critical Areas from weather-related hazards.	Existing	Infrastructure/ Capital Projects	Critical Infrastructure Protection Property Protection Integrated Planning	Seattle Parks and Recreation Facilities.	3-5 years	\$ 5,000,000	No	5
SPR5	Steep Slope Restoration of Coastal and Inland Areas	Existing	Natural System Protection	Natural Resource Protection Life and Safety Property Protection	Finance and Performance Management/ Green Seattle Partnership	< 1 year	\$ 6,000,000	No	3
SPR6	Mitigate Impacts to Park Property and Assets Resulting from Water Shortage by maintaining and strategically updating the water shortage contingency plan and implementing water reuse.	New	Natural System Protection	Natural Resource Protection	SPU	< 1 year		Yes	2
SPU01	Evaluate Wastewater Pump Stations for flooding and sea-level rise as they are upgraded or replaced. Potentially impacted pump stations will be modified to improve reliability and increase capacity.	New	Assessments and Studies	Critical Infrastructure Protection		1-3 years	\$ 100,000	Yes	2
SPU02	Seismic Upgrade and Rehabilitation for Eastside Reservoir in Bellevue and Riverton Reservoir in SeaTac.	New	Infrastructure / Capital Projects	Life and Safety Critical Infrastructure Protection		3-5 years	\$ 24,000,000	Anticipated	5
SPU03	Augment Water Pump Station with Emergency Generators.	New	Infrastructure / Capitol Projects	Critical Infrastructure Protection		3-5 years	\$ 1,000,000	Anticipated	3
SPU04	Magnolia Elevated Tank and Trenton Standpipes Recoating and Seismic Upgrade.	New	Infrastructure / Capitol Projects	Life and Safety Critical Infrastructure Protection		3-5 years	\$ 23,000,000	Anticipated	3

Lead Depart/ Action #	2021-2026 Mitigation Action	Action Status	Type of Action	Goals Supported	Supporting Departments	Timeline	Anticipated Cost	Funding Available	Loss Avoidance Rating
SPU05	Complete the Shape Our Water Integrated Plan for drainage and wastewater systems that will assess impacts of flooding, sea-level rise, earthquakes, and identify investments to improve system and community resilience. Project implementation will follow plan completion.	New	Plans and Regulations	Integrated Planning Resilient Economy Natural Resource Protection Property Protection Life and Safety Critical Infrastructure Protection	SDOT, SPR, OPCD, DON, King County, community, and private sector stakeholders	1-3 years and beyond for implementation	TBD	Yes	5
SPU06	Install Piezometers / leachate extraction wells on east slope of Kent Highland Landfill to monitor the stability of the slope and mitigate slope failure risk.	New	Plans and Regulations	Life and Safety Critical Infrastructure Protection	WADOE, USEPA	1-3 years	\$ 200,000	Yes	5
SPU07	Implement flooding and sewer backup projects in Broadview, South Park and Beacon Hill neighborhoods.	Existing	Infrastructure/ Capital Projects	Property Protection	SDOT	Immediate	\$ 20,000,000	Yes	3
SPU08	Add system capacity and resilience to climate change impacts, and decrease polluted runoff, through funding community-identified green stormwater infrastructure projects.	New	Infrastructure/ Capital Projects	Property Protection Natural Resource Protection Integrated Planning		3-5 years	\$ 20,000,000	Yes	2
SPU09	Develop a Wildfire Strategic Plan to study potential wildfire impacts on water supply watersheds, identify, and implement mitigation strategies.	New	Plans and Regulations/ Capital Projects	Life and Safety Critical Infrastructure Protection Natural Resource Protection Resilient Economy Integrated Planning	USFS, Washington State University, University of Idaho, SCL	1 year for the plan and beyond for implementation	TBD	Yes for Plan, TBD for mitigation strategies	5
SPU10	Perform seismic assessment of Cascade Dam and design seismic upgrade.	New	Assessments and Studies	Life and Safety Critical Infrastructure Protection Property Protection Natural Resource Protection Resilient Economy		0-5 years and beyond	TBD	Anticipated	6
SPU11	Begin implementing short- and long-term Water System Seismic Upgrade Plan to improve water system seismic resilience.	Existing	Infrastructure/ Capital Projects	Life and Safety Critical Infrastructure Protection Property Protection Resilient Economy Integrated Planning		0-5 years and beyond	TBD	Anticipated	6


Lead Depart/ Action #	2021-2026 Mitigation Action	Action Status	Type of Action	Goals Supported	Supporting Departments	Timeline	Anticipated Cost	Funding Available	Loss Avoidance Rating
SPU12	Design of the Landsburg Flood Passage Project that will allow flood waters and large woody debris to pass around the dam to prevent dam failure.	New	Infrastructure/ Capital Projects	Life and Safety Critical Infrastructure Protection Property Protection Natural Resource Protection		1-5 years	TBD	Anticipated	6
SPU13	City acquired a 0.9 acre residential parcel to create the Lake City Floodplain Park to restore and reconnect floodplain in the North Branch of Thornton Creek. When complete it will contain floodplain and upland habitat and increase access to open space for the Lake City community.	New	Natural System Protection Infrastructure/ Capital Projects	Life and Safety Property Protection Natural Resource Protection Integrated Planning	SPR, Mid Sound Fisheries Enhancement Group	1-3 years	TBD	Anticipated	2
SPU14	Cedar Falls Power Service Upgrade that will improve quality, capacity, and redundancy of electrical service for the Cedar River Watershed. Phase I of a potential 2 phase project.	New	Natural System Protection	Critical Infrastructure Protection	SCL	1-3 years and beyond	\$12,000,000	Yes	5
SPU15	Comprehensive Peak Flow Program to replace undersized culverts in the drinking water watersheds to account for flood events and near-term climate change.	New	Infrastructure/ Capital Projects	Critical Infrastructure Protection Natural Resource Protection		1-5 years and beyond	\$2,000,000	Anticipated	2
SPU16	Study and design of a project to increase storage capacity for the Chester Morse Reservoir during drought conditions and provide new opportunities to lower the reservoir more quickly during flood conditions in the fall and winter.	New	Infrastructure/ Capital Projects	Critical Infrastructure Protection Property Protection Natural Resource Protection	SCL	1-5 years	TBD	Anticipated	4
SPU17	Design and repair/replace of the Tolt Dam Spillway used to release water from the Tolt Reservoir in flood and other emergency conditions.	New	Infrastructure/ Capital Projects	Critical Infrastructure Protection Property Protection Natural Resource Protection	SCL	1-5 years	\$9 –22,000,000	Yes	6

7 PROGRAM IMPLEMENTATION

Chapter 7 provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

The Seattle HMP is intended to be a “living” document that will help inform all interested parties about the City of Seattle’s natural hazard mitigation policies and projects. It will be reviewed and updated on a regular basis. The mitigation strategy will guide for City of Seattle departments in determining projects and priorities for FEMA assistance and other mitigation funding.


7.1 Plan Adoption

 FEMA	E1. Does the Plan include documentation that the plan has been formally adopted by the [Seattle City Council]? (Requirement §201.6(c)(5))
---	--

44 CFR §201.6(c)(5) requires that the Seattle HMP be formally adopted by the Seattle City Council. City Council formally adopted the 2015 update of the Seattle HMP on [INSERT DATE]. This plan was approved by FEMA on [INSERT DATE].

See the front matter of this plan for adoption and approval materials.

7.2 Keeping the Plan Current

 FEMA	A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))
---	--

7.2.1 Monitoring and Evaluating the Plan

OEM is responsible for coordinating annual review of the Seattle HMP and making appropriate revisions. On an annual basis, OEM will gather monitoring information and convene the MWG to review the plan to ensure that all information is current.

Prior to the MWG meeting, departments will track and report the following information on those mitigation actions for which they are the lead:

- Mitigation accomplishments for completed actions, including documentation of actual losses avoided and benefits achieved.
- Overall status of mitigation actions, including justification for any cancelled actions.
- Status of funding for mitigation actions, such as the CIP, levies, and other grant funding.

The MWG will meet to consider the following and determine if any interim changes to the Seattle HMP are needed:

- Emerging or increasing hazards (e.g., wildfire smoke), damage trends and repetitive losses.
- Identification of new mitigation needs and potential new mitigation opportunities and actions.
- Changes in membership to the MWG.
- After-Action Reports or lessons learned reports issued to inform what new initiatives or actions should be added, or how to integrate mitigation into any recovery efforts. A specific mitigation

question was added to the After Action Report survey to capture mitigation actions identified from real world events and exercises.

- Regional perspectives from external partners.
- Major updates of long-range policies and plans underway where mitigation principles or actions can be more fully integrated (e.g., comprehensive plan, climate action plan, capital improvement plan, major levy funding plans, zoning and building codes).
- Potential community partnerships and investments in community-led projects.
- Supporting OEM’s equity analysis of mitigation program and actions, as well as learning from relevant analyses from other equity initiatives such as OPCD Equitable Development Initiative, Risk of Displacement Indicators and OSE Environmental Justice Committee.


The results of the annual review will be compiled into an Annual Mitigation Status Report that will be made available to key stakeholders and the public.

7.2.2 Updating the Plan

Every five years, OEM and the MWG will conduct a revision of the plan based on a thorough evaluation and community engagement. The MWG will develop an updated set of proposed mitigation actions based on emerging needs and the ongoing monitoring and evaluation of the plan and its component actions. The resulting draft plan will be made available for public comment. After the public comments have been reviewed and adjudicated, the plan will be approved by the groups identified in External Plan Review and Approval Summary table in the City of Seattle Emergency Management Planning Policy.

Work on the next update of the Seattle HMP will begin in 2025 and will be adopted in 2026. OEM intends to use the process described in Section 2.0 of this document with some modifications. The future process may include more in-person meetings and public outreach that was not possible in 2020 because of the pandemic.

7.3 Continued Public Involvement

	<p>A5. Is there discussion of how the [City of Seattle] will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))</p>
---	--

Public involvement is a key component of the plan implementation and update process. The City will prepare and make available via the OEM website an Annual Mitigation Status Report providing an update on the implementation of the current Seattle HMP. OEM’s monthly newsletter offer additional opportunities to highlight progress of individual mitigation projects.

The DMC is a broad stakeholder group of senior City staff, emergency management professionals and engaged community volunteers that support the City’s Emergency Management Programs. This group is another way to raise awareness or get feedback on mitigation projects and issues on a continuous basis.

OEM has included a mitigation action to expand partnerships between the City and community-based organizations to plan, fund and implement mitigation projects. Implementation will involve targeted outreach to high priority community service organizations. In coming years, the City will make investments in more community-led projects. This could lead to increased level of community involvement in mitigation projects and programs.



RECORD OF CHANGES

Change Number	Section	Date of Change	Individual Making Change	Description of Change

APPROVALS AND ADOPTION RECORDS

Approval/Adoption Body	Date of Action	Notes