ACEC

# ACEC COMMENTARY ON CLIMATE CHANGE AND THE ENGINEER'S STANDARD OF CARE

VERSION 1.0 | MAY 19, 2025

## Guideline Usage

The Commentary below has been drafted by the Water & Environment Committee with contributions by the Risk Management Committee. Neither this Commentary nor anything else set forth herein constitute requirements, mandates, or an establishment of any facet of a design professional's standard of care.

# OVERVIEW

### WHAT IS THE STANDARD OF CARE?

**The standard of care is a reasonableness test. It asks whether the engineer acted with the care and skill ordinarily exercised by members of the engineering profession under similar circumstances, at the same time and place.**

The changing climate and the increasing occurrence of weather events once considered extreme present many challenges for engineers. Primary among these is the reality of designing projects in the face of changing climate conditions which may bear directly on the function and endurance of built systems.

This Commentary focuses on the professional standard of care for engineers in the face of an expanded range of climatic conditions and associated extreme weather events. Because codes governing the practice of engineering are typically based on historic data and weather assumptions, the adequacy of their guidance for the conditions that may prevail during a project's design lifetime cannot be assumed to the extent it could previously. What the standard of care may or should require in such circumstances is the subject of this Commentary.

In the infrastructure space, concerns over resilience directly overlap the concepts of reliability, a traditional and fundamental design consideration in the electric, water, transportation and communications sectors, and public safety, a fundamental engineering duty in projects of all kinds, including levees, dams, roads, bridges, pipelines, etc. What has changed for the engineer is the backdrop of climate conditions against which these design objectives are to be achieved.

This is not a completely new problem. Engineering has adapted to new climate conditions throughout history: as engineering reached new geographies, new climates had to be learned. What is different now is the dynamic nature and velocity of the change—not just from a familiar climate condition to a different one, but to a new set of conditions that are not only unknown but also are unlikely to present a fixed new equilibrium in the short term.[1]

---

*[1] Some scientists call this condition "nonstationarity." See, e.g., Jim Rossi and J.B. Ruhl, Adapting Private Law for Climate Change Adaptation, 76 Vanderbilt Law Review 827, 844 (2023) (summarizing scientific consensus). The contemporary challenge of designing for cyber and other evolving security conditions presents an analogous example of fluid and ever-changing design conditions.*

# 1 | OBJECTIVES

ACEC has three primary objectives in offering this Commentary.

## STABILITY OF LIABILITY REGIME.

Objective number one is to promote increased certainty and stability with respect to the legal standard applied to engineers practicing under unprecedented or "no-analog"[2] conditions. Legal standards should remain reasonable and not discourage engineers from innovating or taking on the challenging projects precisely where their talents are most needed. Important considerations include the limited and still-developing modelling capabilities that may be available to project future climate conditions at a specific location,[3] and the fact that engineers are not climate scientists trained to interpret such data. The application of the standard of care should also recognize that the engineer does not control a client's project scope, schedule or budget, including decisions about whether to engage a consulting climate expert to inform the design basis of a project, or include in the client's budget the cost of introducing design elements that may exceed the requirements of applicable codes. Nor is the engineer responsible for defining the client's risk tolerance.

Questions about the engineer's performance should be limited to whether the engineer exercised due care within their scope of authority and services. Extreme weather events should not become grounds for shifting liability for broader climate-related costs onto engineers or their professional liability insurance policies. The engineer's sole responsibility is to exercise due care with respect to project decisions within the engineer's sphere of control.

The standard of care, rooted in locality- and temporally-based "generally accepted practices," is inherently flexible and able to adapt to dynamic design conditions, including changing climate conditions, and any changes in how engineers practice. While generally accepted engineering practices are likely to change, the well-established legal standard of care doctrine governing those practices should not.

## GUIDANCE FOR INDUSTRY PARTICIPANTS.

Another objective of this Commentary is to promote dialogue about and increased understanding of the challenge presented by climate change and the application of the standard of care. It is hoped that this Commentary can provide guidance and a framework for discussion for those who will come to grapple with the issues laid out in this document—engineers and related practitioners, private sector and governmental clients, engineering boards and regulators, insurers, and other participants in contract negotiation and dispute resolution processes, such as contract drafters, procurement specialists, counsel and claims professionals, experts, and the ultimate finders of fact and appliers of law—mediators, arbitrators, and courts.

---

[2] *J. Rossi and J.B. Ruhl, supra, at 838.*

[3] *See Ariane Laxo, Brenda Hoppe, Heidi Roop, Patrick Cipriano, "Climate Forward? How architects and engineers are(n't) using climate projection to inform design," University of Minnesota Climate Adaptation Partnership and HGA (2023) (hereafter "Climate Forward?"), at 2 (sources of climate projection data "are often not well-suited for immediate A&E applications and their results are often difficult to interpret") and 10 ("There is a strong need for the development and promotion of industry standards, mandates (including building codes), guidance and training for using climate projections in A&E applications.").*

**Identifying emerging practices with respect to climate-related design challenges.** Practices potentially appropriate for adoption by engineers are considered in Section 5 below. As discussed below, the appropriateness of adopting these and/or other additional practice elements will be determined by factors including, but not limited to, geographic location and unique physical vulnerabilities of a project, criticality of the facility, the potential for third-party harm, and the design life or duration of the structure or system being designed. Another important limiting factor is the willingness of the engineer's client to implement resilient design solutions proposed by the engineer.

# 2 | DESIGN CODES AND THE STANDARD OF CARE

**Codes are generally based on historic weather data, while the standard of care is flexible and adapts to engineering practice.**

There are several key distinctions between code requirements and the standard of care, but both are considered in determining whether an engineer satisfies their professional responsibilities.

## DESIGN CODES

No discussion about the standard of care is complete without consideration of design codes and their applicability. Such codes are regulations or laws that typically establish minimum requirements for specific elements of the built environment. This includes, for example but without limitation, building codes, bridge codes, etc. Codes are specific, addressing the design and construction of elements such as structures; mechanical, electrical, and plumbing (MEP); stormwater facilities; fire protection; Americans with Disabilities Act (ADA) compliance; and many others. Although many state and local jurisdictions adopt model codes that attempt to offer some consistency across jurisdictions, most jurisdictions modify them, sometimes substantially, to meet the needs of their localities. Some jurisdictions may even create their own.

Codes have limitations, particularly as they are applied to a changing physical environment. For example, codes typically rely on historical data on elements such as precipitation, wind, and temperature ranges to create these requirements, causing them to be inherently backwards looking. Consequently, they may not be equipped to address conditions that vary from historical ranges. Because state and local jurisdictions do not coordinate amongst each other when writing, formally adopting, or updating their code systems, codes are updated inconsistently across jurisdictions potentially creating a "lag" in code updates from one jurisdiction to another. Furthermore, even regular updates to model codes are typically not made annually and are often completed on a three-year cycle (e.g., International Building Code) given the complexity of updating processes.

### THE STANDARD OF CARE

The standard of care is the legal standard by which the performance of engineers and other professionals are judged. Any claim against an engineer for negligence requires proof of four things: (1) there must be a professional duty owed by the engineer to the party bringing the claim; (2) the engineer must have breached that duty; (3) that breach must be the legal cause of harm to the party bringing the claim; and (4) the party bringing the claim must have incurred damages. The standard of care is the standard which determines whether an engineer satisfied or breached their professional duty.

Unlike rigid and specific requirements of codes, the standard of care is inherently flexible and dynamic. It requires an engineer to exercise the care and skill ordinarily used by members of the same engineering discipline practicing under similar circumstances at the same time and in the same locality. In other words, an engineer should act in accordance with generally accepted practices existing at the time and place where the services are performed. This standard is well suited to the issue of climate change because it takes into account both the time and place of the performance of the services. What constitutes "generally accepted practices" is not static; engineering practices adapt over time to changing factors, conditions and technology.

Foreseeability of harm is a key area of inquiry in determining whether an engineer may have breached their professional duty. As extreme weather events become more frequent and severe, questions of whether such events were reasonably foreseeable will become increasingly important in determining whether an engineer has met the duty owed under the standard of care. However, foreseeability must be evaluated in light of the reasonable engineer's knowledge, and not that of a climate scientist.

## 3 | ANALYSIS: WHAT IS REQUIRED?

**While awareness of climate-related design risks is growing, and codes remain largely based on historical data rather than forward-looking climate projections, there is still no consensus on how engineers should take into account such projections in design—leaving firms to rely on their professional judgment.**

Guidance about how engineers can satisfy the standard of care as climate change impacts weather conditions is emerging, but a clear path to compliance is not yet extant.

Other design professional associations have issued commentary regarding their members' duties in connection with climate change and resiliency, but the scope, purpose, and conclusions of these statements vary widely, and tend to be general or aspirational in nature. For example:

- The American Society of Civil Engineers (ASCE) has issued Policy Statement 360 - Climate Change (adopted July 18, 2024), which asserts that "Engineering practices and standards associated with [infrastructure] systems must be revised and enhanced to address climate change and resiliency to ensure they continue to provide low risks of failures and to reduce vulnerability to failure in functionality, durability, and safety over their service lives."[4]

[4] https://www.asce.org/advocacy/policy-statements/ps360---climate-change.

- Engineers Canada has stated that "[e]ngineers, under their professional code of ethics, play a fundamental role in ensuring infrastructure design and operations are continuously adapted to the impacts of climate change to ensure public safety."[5]
- The Canadian Engineering Qualifications Board has published a detailed national guideline on the principles of climate adaptation and mitigation for engineers, which includes an express disclaimer that the guidelines "do not establish a legal standard of care or conduct."[6]
- The American Institute of Architects (AIA) 2024 Code of Ethics and Professional Conduct includes Ethical Standards (E.S.) 2.4 and 6.5, both of which suggest that architects have an ethical obligation to consider climate change in design solutions.[7]

The aforementioned commentaries are provided strictly for informational purposes only and their citation herein does not constitute endorsement or concurrence by ACEC.

At present ACEC is unaware of recent case law that is directly on point with respect to the engineer's standard of care as it relates to climate change, though past judicial decisions do provide a framework for understanding how courts determine reasonableness and foreseeability in determining whether the professional standard of care has been met. We anticipate that the evolution of a body of relevant published judicial decisions will take some time, due to the propensity for construction cases to settle prior to trial and also to the complex nature of such cases that makes swift resolution both difficult and uncommon.[8]

Accordingly, engineers will need to be guided by their own professional judgment in this evolving landscape where generally accepted practices have yet to be defined.

# 4 | EMERGING PRACTICES

**New engineering practices will continue to emerge with increased knowledge of changing climate conditions and the development of new design and technology options.**

To date, there is no set of climate-focused design practices that can reasonably be termed "standard" or "generally accepted" among engineers. As knowledge of the nature, extent, and range of reasonably foreseeable climate conditions evolves, we anticipate that design practices, processes, and technology will develop over time in response to this emerging information. The nature and extent of their deployment for any given project will depend on factors such as project location, anticipated service life, and criticality of function, along with the client's desire to explore, fund, and implement climate-related design investigations and solutions.

---

*[5] Engineers Canada, Climate Change and Engineering, https://engineerscanada.ca/public-policy/climate-change-and-engineering.*

*[6] Public guideline: Principles of climate adaption and mitigation for engineers, https://engineerscanada.ca/guidelines-and-papers/public-guideline-principles-of-climate-adaptation-and-mitigation-for-engineers.*

*[7] Rule E.S. 2.4 provides that "[m]embers should . . . make reasonable efforts to advise their clients and employers of their obligations to the environment, including . . . a built environment that . . . is resistant to climate change. . ." . Rule E.S. 6.5 provides that "[m]embers should incorporate adaptation strategies with clients to anticipate extreme weather events. . . ." https://www.aia.org/code-ethics-professional-conduct.*

*[8] Insurance claims related to severe weather events are increasingly evident, yet statistical certainty in attributing these events to climate change is not yet possible due to the long-term nature of climate change science (measured over decadal time frames). ACEC wishes to acknowledge the reviews and contributions of Victor Insurance to the discussion of insurance-related topics and more broadly.*

Various insurers, risk managers, and legal counsel for design professional firms have noted the following practices that have been employed by some engineers in response to evolving knowledge of climate risk. (It should be noted that there is no evidence to date that suggests that these have become commonplace in engineering practice.)

1. **Where applicable to the project scope, the engineer can access widely accepted publicly available data descriptive of recent or projected climate conditions at the project location and consider whether those conditions may impact the integrity of the project.[9]**

2. **Based on this assessment, the engineer can inform their client of potential increased risk of adverse climate-based impacts on the project and advise that this risk may not have been factored into existing governing codes, standards, and guidelines. The engineer can also advise the client regarding next steps and whether it might be advisable for the client or a third-party consultant to perform a project-specific risk assessment to evaluate whether and the extent to which adaptive or resilient measures beyond code requirements, standards, and guidelines should be incorporated into the project criteria. These may include adding safety factors to account for uncertainties within the design life of the proposed improvements.**

3. **The engineer should document these discussions and the client's decisions and directions.**

It is ultimately the client's decision whether to adopt, and budget for, resilience measures that go beyond code requirements. The only potential exception is the instance where the engineer believes that the client's decision will endanger the public or the safety of the users of a project.[10] In those cases, the engineer should advise the client of the options that are available to define and mitigate reasonably foreseeable safety risks. If none of these efforts resolve a perceived increased risk to the health, safety, and welfare of the public, and no other mitigation strategies are available (e.g., the manner in which the owner operates or maintains the project may mitigate risks), the engineer should document their efforts to inform the client of the risks, and outline the limitations on the engineer's ability to assist the client based on licensure and professional practice obligations.

---

[9] *In the financial risk management world, project sponsors may utilize a variety of climate model data or model-derived data to obtain regionally specific climate projections, such as the World Bank Group's Climate Change Knowledge Portal, https://climateknowledgeportal.worldbank.org, or "locally constructed analogs," such as the data interface made available Lawrence Livermore National Laboratory, https://gdo-dcp.ucllnl.org/downscaled_cmip_projections/dcpInterface.html, or the National Climate Assessment Atlas, https://atlas.globalchange.gov/pages/data, to obtain more regionally specific climate projections. However, regionally "downscaled" data may not be consistently available in formats directly usable by software tools preferred by architects and engineers; collaboration has been called for between the A&E industry and the climate science community to build shared language and improve workflows. Laxo, et al., Climate Forward?, at 8-9.*

*Other publicly available data sources include State and local climate adaptation and/or mitigation plans; Intergovernmental Panel on Climate Change (IPCC) Regional Reports (https://www.ipcc.ch/report/ar6/wg1/chapter/chapter-12/); IPCC Regional Fact Sheets (https://www.ipcc.ch/report/ar6/wg2/about/factsheets/); Climate Mapping for Resilience and Adaptation (CMRA) (https://resilience.climate.gov); United States National Climate Assessment (https://nca2023.globalchange.gov); National Oceanic and Atmospheric Administration (NOAA) Climate Explorer (https://crt-climate-explorer.nemac.org); NOAA Sea Level Rise Viewer (https://coast.noaa.gov/digitalcoast/tools/slr.html); NOAA Heat Risk Map (https://www.wpc.ncep.noaa.gov/heatrisk); United States Department of Agriculture (USDA) Wildfire Risk to Communities (https://wildfirerisk.org); Federal Emergency Management Agency's (FEMA) National Risk Index (https://hazards.fema.gov/nri), among others. While these federal resources remain accessible online as of April 4, 2025, their continued availability is not guaranteed and may be affected by future federal actions, including budgetary cuts or changing priorities.*

[10] *Such situations are generally governed by applicable engineering codes of ethics and are addressed in ACEC's Professional and Ethical Conduct Guidelines (1980), II Rules of Practice, § 1(a) (consulting engineer's primary obligation is to protect the safety, health, property and welfare of the public).*

It bears emphasizing that it is not the role of the engineer to serve as a climate change expert, except where they have explicitly accepted project scope that calls for such expertise and qualifications in setting climate-related project design conditions.[11] It is not the role of the engineer, where identified climate-related risks exceed the design criteria associated with code compliance, to make risk decisions for the client, who is in the position to best address those risks for their stakeholders.

# CONCLUSION

**As climate risks grow, codes and other guidance may lag behind. Accordingly, engineers should rely on their reasonable professional judgment to implement, where applicable, climate-related practices that satisfy the standard of care.**

Both climate change and the design challenges it poses are a moving target. As of this writing, new generally accepted engineering practices for responding to these challenges have not become established or incorporated into the standard of care. However, new practices—such as client risk communications, use of location-specific climate modelling or projection tools, and engaging consulting climate scientists to inform design conditions—are emerging to varying degrees and some may become "generally accepted" over time. This Commentary should be updated periodically as analytic tools improve, experience increases and practices become more defined.

## LEGAL DISCLAIMER



---

*[11] In such cases, where the engineer's scope includes providing climate expert services, the engineer may discharge this scope using internal resources, if a firm has the relevant expertise, or by engaging a consultant or subcontractor. In this respect, engaging a climate scientist would be little different than engaging geotechnical engineers or other third parties offering specialties that a firm may not have in house.*