NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

BOARD *of* ETHICAL REVIEW



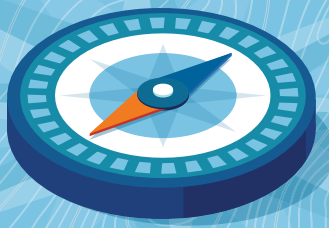
CASE REVIEW:

Public Health, Safety, and Welfare–Climate Change Induced Conditions

CASE NO. 21-02
APPROVED FEBRUARY 7, 2022

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BOARD *of* ETHICAL REVIEW

PUBLIC HEALTH, SAFETY, AND WELFARE – CLIMATE CHANGE INDUCED CONDITIONS

CASE NO. 21-02 **APPROVED 6/28/22**

FACTS:

Engineer A is a consulting engineer representing Client B, a developer who is proposing to develop a health care facility that requires a significant upgrade to the property's access road that crosses a tidal saltmarsh. Engineer A's scope includes design and local permitting of the roadway, including an upgrade of the tidal crossing from a small culvert to a small bridge, increasing its hydraulic capacity. Local development regulations require designing for a 25-year fresh-water storm, and assume that future weather conditions will be consistent with updated historical data. The local development regulations and national design codes and standards have not yet been updated to reflect changing conditions and weather patterns, including effects of sea level rise and changes in precipitation intensities and recurrence intervals effected by on-going climate change. It is Engineer A's judgment, based on hydraulic evaluation procedures presented at a recent transportation agency conference, that the proposed project may result in some upstream homes becoming uninhabitable a decade or more earlier than would otherwise be the case. Engineer A proposes a complex and costly hydrologic and hydraulic analysis by a specialized subconsultant to predict the extent to which sea level rise and the increased hydraulic capacity of the tidal crossing will result in flood damage to a neighborhood of twenty upstream homes during future high tides and storm surges, anticipating this to be a difficult question to answer in the project's public hearings. Client B directs Engineer A to proceed without the costly analysis unless and until such an analysis is requested by the applicable regulatory authorities.

QUESTIONS:

1. Does Engineer A have an ethical obligation to address or evaluate the impacts of a project on public health, safety, and welfare with respect to climate change induced conditions that have not yet occurred?

2. In this set of circumstances, what are Engineer A's reasonable courses of action with respect to engineering ethics?

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NSPE CODE OF ETHICS REFERENCES:

Section I.1. Engineers, in the fulfillment of their professional duties, shall hold paramount the safety, health and welfare of the public.

Section I.4. Engineers, in the fulfillment of their professional duties, shall act for each employer or client as faithful agents or trustees.

Section II.1.a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.

Section II.2.a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.

Section II.3.a. Engineers shall be objective and truthful in professional reports, statements or testimony. They shall include all relevant and pertinent information in such reports, statements of testimony, which should bear the date indicating when it was current.

Section II.3.b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.

Section III.1.b. Engineers shall advise their clients or employers when they believe a project will not be successful.

Section III.2.d. Engineers are encouraged to adhere to the principles of sustainable development[1] in order to protect the environment for future generations.

1"Sustainable development" is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.

NSPE BER CASE REFERENCES:

07.6, 18.9

DISCUSSION:

Professional engineers have a primary ethical obligation to hold paramount the protection of public health, safety, and welfare. That obligation is not bounded by what is required by law, or by regulations, but rather is stated broadly. That obligation leads to not uncommon "gray areas" in practice requiring judgment as to what issues potentially impacting public health, safety, and welfare merit more detailed evaluation and what issues do not. Such judgments increasingly necessitate engineers to have sufficient understanding of related areas of engineering practice and science to determine when more specialized evaluation is needed to assure protection of public health, safety, and welfare. Considering the effects of climate change in engineering planning and design adds substantial complexity to engineering decision-making as engineers consider "going beyond" existing requirements to provide long-term protection of public health, safety, and welfare.

For more than a century, engineers have assumed that future climate and weather conditions will be consistent with historical climate and weather data. In recent decades, as climate and weather data are updated, the historical dataset changes as climate and weather patterns continue to change. This necessitates that climate and weather patterns be addressed not as fixed by historical patterns but rather recognized as a "moving target."

In BER Case 07.6, Engineer A was a principal in an environmental engineering firm and had been requested by a developer client to prepare an analysis of a piece

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of property adjacent to a wetlands area for potential development as a residential condominium. During the firm's analysis, one of the engineering firm's biologists reported to Engineer A that, in his opinion, the condominium project could threaten a bird species that inhabited the adjacent protected wetlands area. The bird species was not an "endangered species," but it was considered a "threatened species" by federal and state environmental regulators. The BER determined that it was unethical for Engineer A to not include the information about the threat to the bird species in a written report that would be submitted to a public authority that was considering the developer's proposal. Engineer A should have included the information in the written report and advised the client of its inclusion. The BER noted that engineers have an obligation to be objective and truthful in professional reports, statements, or testimony and include all relevant and pertinent information in such reports, and that it would be reasonable to assume that the public authority approving the development would be interested in this information.

In BER Case 18-9, Engineer A worked for a developer to perform hydrodynamic modeling and coastal risk assessment regarding a proposed residential development. Based on newly identified historic weather data, Engineer A advocated that the project be designed for the then-projected 100-year storm surge elevation due to public safety risks even at lower projections. The Owner refused to agree that such protection was required or appropriate. The BER concluded that Engineer A should continue to attempt to convince the owner of the potential for damage to future residents and the public, and, failing agreement on Engineer A's proposed design standard, Engineer A should withdraw from the project.

Turning to the current case, Engineer A does have an ethical obligation to address the impacts of the project on public health, safety, and welfare regardless of whether or not that is required by applicable law. The BER believes that Engineer A has an obligation to consider climate and weather changes in the future with respect to potential impacts on public health, safety, and welfare, where such impacts are reasonably likely and significant.

Engineer A need not necessarily be a modelling expert. However, Engineer A needs to have sufficient understanding of hydrology, hydraulics, and coastal modeling to form a reasonable judgment that there is sufficient potential for flooding of other properties to merit a detailed, complex evaluation of future conditions. Based on the facts in this case, it is clear that Engineer A has such an understanding of the broad project issues.

The outcome of this case might have been different had Engineer A been comfortable with predicting that significant public health, safety, and welfare impacts were unlikely, in which case Engineer A might have ethically been able to proceed while noting both in writing and in public statements that more detailed analysis would be required to confirm that judgment.

However, with the facts as presented, Engineer A should engage Client B in discussions about the need for the detailed evaluation and disclosure of the potential impacts on the public and alternatives for the project to mitigate those impacts, and the potential risk to Client B of not evaluating the potential impacts. If Client B remains unconvinced, Engineer A should propose to Client B that engineer a provides the potential concern that may necessitate more detailed evaluation in an engineering report for consideration by regulatory agencies and the public. Failing agreement by Client B to t either of these courses of action the BER believes that Engineer A should withdraw from the project.

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CONCLUSIONS:

1. Engineer A has an obligation to consider potential impacts on public health, safety, and welfare, regardless of whether that is required by applicable law, including changing weather patterns and climate.

2. If Engineer A is reasonably certain that the project will result in adverse impacts to public health, safety, and welfare, and if the Client B denies the requisite evaluation, Engineer A should include the concern regarding potential adverse public health, safety, and welfare impacts in an engineering report for consideration by regulatory agencies and the public.

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