NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

BOARD of ETHICAL REVIEW

CASE REVIEW

Sustainable Development and Resilient Infrastructure

Case No. 24-5

NSPE.ORG

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Facts

Engineer K, a licensed professional engineer, is hired by the City to design a new flood control system to protect a rapidly growing urban area that has experienced increasingly severe flooding. The City has policies in place to develop new infrastructure projects with resiliency due to climate change in mind. The project's goal is to create a resilient infrastructure that balances immediate protection needs with long-term sustainability.

During the initial design phase, Engineer K identifies two potential approaches, both of which could be successfully designed and implemented:

Traditional Approach: Build a concrete floodwall system to provide immediate protection at a relatively low cost. While effective in the short term, the floodwall system has a high carbon footprint, is prone to deterioration, and may require significant repairs or upgrades within 15 years. Further, the system does not provide for expandability should future flooding risk expand or increase and would require complete demolition and rebuilding if the capacity proved insufficient in the future.

Sustainable Approach: Develop a green infrastructure system incorporating wetland restoration and other biodynamic controls. This approach would mitigate flooding while enhancing local biodiversity and reducing carbon emissions. Further, the natural aspects of this approach could readily be expanded if additional capacity is necessary should future flooding risk expand or increase. However, the initial cost is significantly higher than the traditional approach and the system requires several years to fully mature before offering optimal protection.

As part of the project development process, the City directed Engineer K to hold stakeholder meetings to gather feedback on the project. During stakeholder meetings, some commentors expressed a preference for the Traditional Approach due to its lower upfront cost and faster implementation timeline. However, other community and environmental organizations advocated for the Sustainable Approach, citing its long-term environmental and social benefits. Engineer K personally believes the Sustainable Approach aligns better with both City policies and the engineer's professional obligation to promote sustainability and resilience, but recognizes competing priorities of cost, urgency, and long-term impact.

While working on the report and gathering necessary information, Engineer K discovers that the Traditional Approach could disproportionately impact a nearby underserved community by diverting floodwaters to their neighborhood under low-probability but high-volume conditions — particularly if the design capacity of the Traditional Approach is breached. Engineer K presents all available information about both the Traditional Approach and the Sustainable Approach, including the risks and benefits of each approach to the City's leadership during a City Council meeting.

The City's leadership decides not to address the identified floodwater issue with the Traditional Approach, ultimately concluding that any action to mitigate the impact on this community would delay the project further and reinforcing the low probability of such conditions occurring. The City approves the Traditional Approach and Engineer K proceeds to work on its implementation.

Questions

1. Engineer K personally believes the Sustainable Approach is better. Should Engineer K have only presented information about the Sustainable Approach?
2. Does Engineer K have any ethical obligations after the City approves the Traditional Approach?

Code of Ethics References:

I.1 Hold paramount the safety, health and welfare of the public.

I.4 Engineers shall act for each employer as a faithful agent or trustee.

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, or testimony, which should bear the date indicating when it was current.

II.5.b Engineers shall not offer, give, solicit or receive, either directly or indirectly, any contribution to influence the award of a contract by a public authority, or which may reasonably be construed by the public as having the effect or intent of influencing the awarding of a contract

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

III.1.f Engineers shall treat all persons with dignity, respect, fairness, and without discrimination.

III.2.a Engineers are encouraged to participate in civic affairs' career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.

III.2.d Engineers are encouraged to adhere to the principles of sustainable development.

BER CASE REFERENCES:

BER Case 65-9; BER Case 73-9; BER Case 15-12; BER Case 21-7; BER Case 22-10

Discussion

The Board of Ethical Review (BER) begin this discussion by reviewing the Fundamental Canons of the NSPE Code of Ethics (Code). Engineer K is hired by the City with a specific task in mind—design a new flood control system to protect a rapidly growing urban area; the goal of the completed system will be to protect the public health, safety, and welfare. Engineer K, as a professional engineer, has an obligation to the City to act as a faithful agent or trustee. We will explore the distinction between an agent and trustee with a somewhat simplified description:

· If the City hires Engineer K and tells them what to do, then Engineer K is acting as the City's agent—Engineer K should do what the city instructs them to do.

· If the City hires Engineer K and gives them discretion in how to complete a task, Engineer K is acting as a trustee — the City trusts that Engineer K will do the job as if they were doing it themselves.

During the design phase, the City trusts Engineer K to develop a design. What should be included in the design is where the analysis of the Code is required. Certainly, the system should be functional; any non-functional design brings into play the obligation to advise a client or employer if a project will not be successful under Code section III.1.b. When reporting about their design, Engineer K shall be objective and truthful in their professional reports, statements, or testimony. Per Code section II.3.a, they "shall include all relevant and pertinent information in such reports . . . ." Under Code section III.1.f, professional engineers shall treat all persons with dignity, respect, fairness, and without discrimination, and under Code section III.2.d, they are encouraged to adhere to the principles of sustainable development.

The BER have referenced multiple Code citations, and there are others that could be added to the list. Generally, Engineer K should use all of their knowledge and ability to study the problem, develop solutions, and recommend to the City the option (or options) they believe are best. Engineer K has identified two options for the City to consider—the traditional approach and the sustainable approach. Each should be presented completely, and the advantages and disadvantages of each should be included.

The BER reviewed an analogous situation in BER Case 21-7, where an engineer was asked to prepare a report discussing replacement of a fossil-fueled electric generation facility with a system of solar panels. If a system of stand-alone solar panels is selected, the chance of power system unreliability may be increased. The discussion of this case noted the ethical objective of an informed policy and project decision making process; the engineer in BER Case 21-7 was obliged to include information about the potential for rolling blackouts if a reliable

generation alternative was not selected. The additional cost to make the solar panel system more reliable by supplementing it with battery storage should be included in the engineer's report.

BER Case 22-10 also dealt with sustainability and the tradeoffs between traditional systems (in this case lawn irrigation) and sustainable options. BER Case 22-10's discussion noted that Engineer Intern Wasser (an important player in BER Case 22-10) "could be in a unique position to meaningfully serve the client – and his company. By introducing and offering sustainable alternatives . . . , Wasser . . . can harmonize [Code sections] I.4 and III.2.d." Engineers should take the opportunity to educate clients. In closing the discussion of BER Case 22-10, the BER concluded:

As was noted, engineers shall act for each employer or client as faithful agents or trustees, but are encouraged to adhere to the principles of sustainable development. It is not enough to simply look at the situation and conclude an engineer's obligation to the client/ employer takes precedence over the sustainable development principles. This case helps to illustrate that endeavoring to integrate all code of ethics provisions when developing a solution is critical. Suggesting sustainable options for an irrigation system as a means to resolving the ethical tension presented in this case is a path the BER endorses. Furthermore, suggesting sustainable options will inform the client; refusing to perform the task, or quitting, will not.

The BER next turns to how Engineer K should address disproportionate impact. BER Case 15-12 discusses the tradeoffs involved with routing a highway. Certainly, highway routing concerns and disparate impact have been discussed at depth in the media, and there are several additional BER cases that discuss highway routing (BER Cases 65-9 and 73-9). The take aways from these cases are there is not necessarily one correct answer, and that engineers should be creative when looking at solutions. In BER Case 15-12, the engineer was encouraged to think beyond the binary of tearing down the farmhouse or finding another highway route — could the farmhouse be relocated?

This type of creative thinking is incumbent on Engineer K and their team when considering the impact of floodwaters on the underserved community. For example, analysis of whether some combination of the traditional approach (with a quick solution to the flooding problems) be used with sustainable provisions in the underserved community to mitigate the risk if a portion of the traditional system does not work.

Ultimately, Engineer K will present the design alternatives to the City decision makers so they can make a choice. Once the decision is made, Engineer K should act as a faithful agent and follow the decision made by City officials. These officials serve at the will of the people and are ultimately accountable to the people for their decisions. Engineer K should respect that accountability and not be motivated by self-interest in a sustainable solution if the City decides against it. In fact, an effort to influence the award of a contract by a public authority would be a violation of Code section II.5.b.

Conclusions:

1. Engineer K should present both approaches to the City if Engineer K believes both are viable solutions.
2. Because Engineer K has entered into a contract to design the new flood water control system, Engineer K has an ethical obligation to act as a faithful agent or trustee. Engineer K is ethically obligated to fulfill their contractual obligations to the City and continue to design the Traditional Approach as approved by the City.