SUSTAINABLE DEVELOPMENT

Link between United Nations Sustainable Development Goals and CSA W200-18 Design of Bioretention Systems – Industry Perspective

Enabling Sustainable Development through Standards

6 CLEAN WATER AND SANITATION

United Nations Sustainable Development Goals Addressed:

SDG 6 – Clean Water and Sanitation

December 2021

Authors

Ruben Burga, **Ph.D., MBA, P.Eng.,** University of Guelph

Tristyn Wylie, **B. Comm.,** University of Guelph

Laura Fallowfield, **B. Comm.,** University of Guelph

Project Advisory Panel

Ana-Maria Tomlinson, **Ph.D.,** CSA Group (Project Leader)

Michael Leering, **P.Eng.,** CSA Group

Scott Lindsay, CSA Group

Financial Support

Funded by the Government of Canada's Sustainable Development Goals (SDG) Funding Program.

Canada

Summary

The United Nations Sustainable Development Goals (UN SDGs) have an agenda to achieve 17 goals with targets and indicators by 2030. CSA Group publishes standards to "hold the future to a higher standard" by being a leader in the research, development, education, and advocacy of national standards. CSA Group has developed the CSA W200-18 *Design of Bioretention Systems* standard to provide baseline requirements and recommendations for the design of bioretention systems used in the management of urban stormwater runoff. This study discusses the link between the CSA W200-18 standard and SDG 6 – Clean Water and Sanitation. Participants from two organizations were interviewed to inform this study.

1 Introduction

Stormwater management is becoming increasingly important in Canada. While guidelines vary across provinces, stormwater management and bioretention systems have been a new focus within the last 15 years. Bioretention systems are used to treat stormwater runoff using soil and vegetation to remove contaminants and sedimentation. The CSA W200-18 scope includes bioretention systems with and without an underdrain, biofilters, bioretention planters, and bump-outs. The CSA W200-18 standard was developed to help achieve the following main objectives:

- Minimize risk associated with inconsistent approaches.
- Level the playing field and clarify expectations.
- Shorten the learning curve for those who are not familiar with these practices.
- Set up winning conditions for successful projects.

Through a robust mapping process, connections between the use of CSA W200-18 and the following UN SDGs were identified:

SDG 6 – ensure availability and sustainable management of water and sanitation for all.

SDG 9 – build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

SDG 13 – take urgent action to combat climate change and its impacts.

Depending on the specific application scenario, the standard could also support:

SDG 14 – conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

SDG 15 – protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

This study focuses on one of the SDGs that is most strongly supported by the standard: SDG 6.

More specifically, CSA Group has developed two (aligned) standards for bioretention systems: CSA W200-18 *Design of Bioretention Systems* and CSA W201-18 *Construction of Bioretention Systems*. The design standard describes the scope of the work and what this encompasses in order to assist with selecting the design function and configuration, sizing of the system, and specifying plant material to be used with the bioretention systems. On the other hand, the construction standard provides direction on how to construct a bioretention system and who needs to be involved. For both design and construction, these accredited standards provide a way to measure compliance, include requirements and recommendations, and are concise and structured to help users easily locate specific content. These standards were published in both English and French.

2 Results and Impact

Standard users who were interviewed for this study are actively looking for projects to be sustainability oriented. Rather than following the current normative trend, users of CSA W200-18 are paving a path to a new trend in sustainability by following new national standards and the most recent best practice included therein. This is done by developing leading-edge projects with a focus on stormwater management or taking an approach that is environmentally performance based. Interviewed participants stated that their organizations are pushing for sustainability in project development, stakeholder awareness, and industry norms. On a day-to-day basis, approaches are aligned with sustainability and communicated with stakeholders, both internally and externally.

One interview participant mentioned that the CSA W200-18 standard is promoted through their organization's entire structure. This industry expert shares that when working with a new engineer, the first questions revolve around gaining an understanding of the engineer's knowledge of stormwater and bioretention issues as described in the standard. This awareness is important as the organization tries to adapt every project to be in accordance with the standard. The organization promotes awareness of the standard within the company. The company ensures that the primary design guidance should come from

the CSA W200-18 standard itself. Therefore, this study outlines the normative and institutionalized enforcement of the standard in the hydraulic and landscape architect environment.

Although sustainability was identified as a central theme by the interview participants, neither of their organizations have publicly aligned with the SDGs.

2.1 SDG 6 – Clean Water and Sanitation

Based on discussions surrounding the usage of the CSA W200-18 standard with interviewed participants, it was validated and confirmed that the impact of the standard clearly aligns with SDG 6. By utilizing this standard in the design processes of stormwater and bioretention systems, runoff from paved areas can be effectively treated by natural properties such as soil or vegetation that removes contaminants and, in turn, reduces water pollution. Stormwater runoff can pose a serious risk to water quality if allowed to discharge directly into surface waters as it can carry various pollutants, including oils, sediment, chemicals, pesticides, fertilizers, heavy metals, to name a few. These pollutants can be harmful to aquatic life and vegetation and can impair sources of drinking water. More specifically, the application of CSA W200-18 therefore directly supports SDG 6, target 6.3: *"By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally".*

3 Conclusions and Next Steps

The voluntary implementation of standard CSA W200-18 supports SDG 6. This standard has been adopted by industry because it addresses the environmental need for action and improvements to water systems and because it incorporates improved sustainability. Interviews with industry experts validated the purpose for this standard's usage links well with key aspects of SDG 6.

In order to understand the parameters surrounding the uptake of the CSA W200-18 standard, it is important to first note that a discrepancy exists in the extent sof implementation of this standard across Canada. Implementation of this standard can be hindered for several reasons. Some of the key issues include a lack of clarity on how to adapt a national standard to site-specific conditions or how to integrate its use into existing processes (e.g., bylaws, policies). This discrepancy could also be due to organizational adoption of the standard based on differences in severity of storms or other factors. For example, the Province of Quebec, at a cultural level, is focused on sustainability. The province has implemented ecological sustainability and responsibility at a municipal level. As a result, bioretention guidelines in accordance with the standard are integrated into design considerations for one landscape architect firm that works in Quebec. A landscape architect professional expressed enthusiasm for the development of this standard as it harmonizes the design of stormwater and bioretention systems.

In order to capitalize on the sustainability-based opportunities associated with using CSA W200-18, one industry expert recommended that enhanced awareness and training about the standard should be made available to support standard implementation across all provinces. This, in turn, would improve water quality throughout the country and satisfy the intent of SDG 6.