SUSTAINABLE DEVELOPMENT

Link between United Nations Sustainable Development Goals and CSA S503:20 Community Drainage System Planning, Design, and Maintenance in Northern Communities – Government Perspective

Enabling Sustainable Development through Standards



6 CLEAN WATER AND SANITATION

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

United Nations Sustainable Development Goals Addressed:

SDG 6 – Clean Water and Sanitation,
SDG 9 – Industry, Innovation and Infrastructure

December 2021

Authors

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

Nicole Bena, B. Comm., University of Guelph

Tristyn Wylie, 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

Disclaimer

This work has been produced by the University of Guelph and is owned by Canadian Standards Association. It is designed to provide general information in regards to the subject matter covered. The views expressed in this publication are those of the authors and interviewees. The University of Guelph and Canadian Standards Association are not responsible for any loss or damage which might occur as a result of your reliance or use of the content in this publication.

The opinions and interpretations in this publication are those of the author and do not necessarily reflect those of the Government of Canada.



Summary

CSA Group is a leader in standards research, development, education, and advocacy with the goal of enhancing the lives of Canadians through the advancement of standards in the public and private sectors. CSA Group has developed the Northern Infrastructure Standardization Initiative (NISI) standard CSA S503:20 *Community Drainage System Planning, Design, and Maintenance in Northern Communities* to assist in both water and infrastructure development and operation and maintenance of drainage systems in Northern communities. Due to the geographic location, limited resources, and lack of funding in Northern communities, this standard directly concerns community developers, consulting firms, engineers, and community stakeholders. In light of the 2030 SDGs Agenda developed by the United Nations, the objective of this study is to assess the link between CSA S503:20 and the SDGs and their targets. The United Nations Sustainable Development Goals (UN SDGs) that relate to this standard are SDG 6 – Clean Water and Sanitation and SDG 9 – Industry, Innovation and Infrastructure. An interview with a government stakeholder using this standard was conducted to obtain an institutional perspective on the issue and to form the basis of this study.

1 Introduction

The CSA S503:20 standard specifies the minimum planning, design, and maintenance requirements for community drainage systems in Canada's Northern communities. The standard aims to increase the capacity of communities and individuals to prepare and implement effective community drainage plans. These plans address both existing and anticipated drainage management challenges arising from deficiencies in past practices, as well as the need to adapt to future changes in the climate.

Through a robust mapping process, connections to the following UN SDGs have been 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 11 – make cities and human settlements inclusive, safe, resilient, and sustainable.



SDG 12 – ensure sustainable consumption and production patterns.



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

This study focuses on two of the SDGs that are most strongly supported by the standard: SDG 6 and SDG 9.



2 Results and Impact

The study was informed by an interview with a government stakeholder and information gathered from the Government of Nunavut in Northern Canada. The people of Nunavut share a strong belief in climate change mitigation strategies as evidenced by the many resources and action plans highlighted on their government's website. This strong belief is evident in their community planning actions as well; the Government of Nunavut requires all engineering firms hired for their drainage projects to comply with the CSA S503:20 standard. Following the interview with the representative from the Government of Nunavut, public documents were shared regarding their community-specific *Master Drainage Plan and Geotechnical Investigations.* These extensive documents rely on state-of-the-art mapping technology in order to implement the most sustainable course of action for drainage systems in Nunavut communities. These documents demonstrate one way the Government of Nunavut is addressing sustainability in its community action plans.

The interview discussion indicated that the participant had some knowledge of the SDGs, including a broad understanding that the goals address a variety of aspects of sustainability. The interviewee agreed that there are direct links between the sustainability goals and the standard itself.



2.1 SDG 6 – Clean Water and Sanitation

As part of SDG 6, the indicator 6.b.1 focuses on: *"Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management".* The interview participant identified CSA S503:20 as a flexible document as opposed to a prescriptive step-by-step set of requirements. The layout of the standard allows for discussion surrounding sustainability and allows for improvements to the standard over time. As such, the implementation and use of the CSA S503:20 is linked with target 6.b.1 of SDG 6.

2.2 SDG 9 – Industry, Innovation and Infrastructure

In discussing sustainability, the interview participant emphasized the concept of extending the lifespan of materials used in the production of drainage systems, and using a life-cycle analysis point of view. This concept is useful when considering the use of culverts (pipe-like channels that allow the runoff water from snowmelt and rain to flow into storm ponds, wetlands, lakes, rivers, and so on to control the buildup of water on public streets). The participant discussed ways to increase a culvert's lifespan by experimenting with different materials. The consideration of material lifespan is especially important as there is a limited seasonal time frame available for the transport of resources to Northern communities in Canada, therefore the durability and sustainability of culverts are critical. Such challenges that are unique to Northern Canada have led to enhanced sustainability awareness regarding resource material selection and fuel emissions through transportation. SDG 9 is therefore supported by CSA S503:20. More specifically, the application of CSA S503:20 can be related to target 9.4, which states, *"By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities".*

Implementation of CSA S503:20 has also allowed for discussion and awareness of other standards and sustainability-related topics. For example, CSA S503:20 is closely aligned with drilling standards implemented by geotechnical engineers. The discussion of borehole drilling and understanding of soil properties beneath homes is very important when it comes to distinguishing between optimal locations for construction in order to avoid areas where deep permafrost is present. An understanding of how the standards complement each other is leading to increased discussion and awareness of sustainability for present and future drilling project plans.

2.3 Standards Life Cycle

The first edition of CSA S503 was published in 2015. To address the continuously changing dynamic nature of materials and processes, a new edition of the standard was published in 2020. The CSA S503:20 standard is a flexible document, therefore a five-year review routinely conducted by CSA Group is essential to help ensure all voices are heard and that the need for future updates to the standard are identified accordingly.



3 Conclusions and Next Steps

The interviewed participant emphasized the need for Northern communities to be considered and accepted as vulnerable communities due to their nature of being built on a variety of unstable surfaces, having to comply with different drilling specifications, and having different needs than other communities. The structure of the CSA S503:20 standard provides Nunavut with a framework that assists with more than supporting environmental sustainability. The concern of large turnover in human resources is a very prominent issue in Northern communities, mainly due to the challenging weather conditions and isolated location. As a result, it is very difficult to attract senior-level engineers to lead large-scale projects such as master drainage systems in Northern communities. In this respect, the framework of the standard simplifies the process that must be followed. This structure allows employees with a less senior engineering background to go into the field and work with the standard to provide instructions to others on what needs to be done, ultimately helping address the human resources challenge.

Vulnerable communities such as those in Nunavut do not have the same access to funds, resources, advocacy, and human capital to promote the same level of sustainability as more concentrated and less isolated regions within Canada do. This translates into difficulties with standard implementation let alone advocacy for SDGs and sustainability. Many SDG targets include statements such as *"with all countries taking action in accordance with their respective capabilities".* Comments such as these identify and recognize the varying capabilities dependent on a country-to-country basis; however, capabilities within country borders must be addressed as well. Despite the obstacles and difficulties experienced in Northern communities, sustainability can be a difficult aspect to fund, promote, and implement given the scale of the national agenda. Nonetheless, the people of Nunavut have been able to create specific policies and rules that are beneficial for their specific communities. This is evident in their use of CSA S503:20, which Nunavut communities have been referencing in their work for over two years. Our interview participant summarized the importance of sustainability as the ability to preserve communities for future generations to enjoy, "in our particular government division … we want our communities to be sustainable. We want them to still be there in a hundred years". For vulnerable communities in Canada's North that experience the effects of climate change drastically, preserving those communities for future generations is not a guaranteed result. For communities and organizations in Nunavut, the effects of climate change and the need for sustainable action is witnessed firsthand in their own communities.

© 2021 Canadian Standards Association. All Rights Reserved.
12/2021