

## Beneficial Use for Sustainable Waterborne Transport Infrastructure Projects

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### Summary

A range of societal and environmental trends have impacted natural sediment processes worldwide. Innovative and sustainable approaches to dredge material management, to support healthy natural ecosystems and human development are required. PIANC WG 214 has been established to develop guidance on how to evaluate Beneficial Use opportunities with the goal of furthering the practice globally, to overcome barriers to beneficial use, how best to plan for and apply Beneficial Use principals, and to advance circularity and sustainability goals by managing dredge sediment as a resource.

*Keywords: Beneficial Sediment use, Dredging, Working with Nature, Sustainability*

### Introduction

Sediment is a natural resource with a large and long ecological cycle. Human activities often prevent the natural journey of sediment, interrupting or accelerating the sediment cycle. Beneficial sediment use (BU) presents an opportunity to re-establish natural sedimentary processes, contributing to sediment equilibrium in the natural environment. BU is not only key to natural aquatic ecosystems, but it also provides social and economic benefits, contributing to sustainability.

This report describes how dredged sediment can be used to deliver environmental, societal and economic benefits through the BU of dredged sediment. It considers the key issues associated with BU projects and identifies valuable international practices. Increased beneficial use, in harmony with nature, will foster greater circularity and improved environmental and socio-economic sustainability. Achieving these ambitions will, however, necessitate changes to established perspectives and ways of working. It requires greater strategic and collaborative planning to ensure that BU opportunities can be identified and delivered in the future.

### Main body

This PIANC guidance report recognises that BU approaches must be tailored to site-specific conditions and to regional environmental, economic, legislative, and cultural frameworks. We build upon the work of previous studies and guidance documents to provide a framework that can be used for site-specific decision making. This report seeks to achieve this goal by highlighting important factors that should be considered when assessing BU opportunities, leveraging the global need for more sustainable solutions.

Opportunity lies in the possibility to connect supply and demand by integrating circular economy principles into sustainable sediment management decisions. Circular economy principles focus on the useful application of both waste and natural resources streams.

Sediment BU alternatives often are perceived to be more expensive than conventional sediment management solutions. To overcome cost barriers, it is necessary to explore BU costs and opportunities for shared costs, distributing cost burdens among the stakeholders, who enjoy the broader range of benefits. It is also necessary to expand the business model for BU beyond traditional cost-benefit analyses, to include ecosystem services (PIANC WG 195; 2021), long-term life cycle considerations, and to focus on added value.

Sediment management involves multiple stakeholders with different objectives and different levels of active participation, from project partners to affected communities. Acceptance of BU alternatives can be influenced by specific stakeholder private or commercial interests and perceptions.

A Sustainable Sediment Management Assessment, such as that used in the Queensland ports in Australia, can be an effective tool in obtaining key stakeholder input into the assessment of dredged material placement options, including BU, focussing on multi-criteria analysis of placement options. Using this framework, stakeholders can regularly review opportunities for BU through a combination of stakeholder engagement and research, to ensure that BU is an essential component of current and future decision making.

Comprehensive reviews of BU technologies are available in PIANC 1992 and 2009, along with many international examples of BU reported in peer review literature, including recent publications by the Central Dredging Association (CEDA) (CEDA 2019a). Hence, this report focuses less on technologies and more on overcoming economic, governance and environmental challenges with a specific focus on sustainability.

### **Conclusion**

While BU is not new, it has not reached its full potential. Current societal challenges and increased interest in sustainable development generate an enhanced awareness of sediment management needs and opportunities to achieve BU. A comprehensive BU evaluation should address the consequences of no-action (not adopting BU) when comparing sediment management alternatives. The focus of this report is on advancing opportunities for BU. However, we also recognize that sometimes not adopting BU could be the more sustainable outcome when such a decision is reached after a comprehensive assessment of all sediment management alternatives and the ecosystem service benefits arising from each alternative.

### **References**

[1] PIANC ([www.pianc.org](http://www.pianc.org)) is the World Association for Waterborne Transport Infrastructure. Established in 1885, PIANC's mission is to provide expert guidance, recommendations, and technical advice on the design, development, and maintenance of ports, waterways, marinas and coastal areas.