

# Controlling Coastal Sediment Transport in Basin Head, PEI

**Introduction**

Basin Head, PEI, is a popular tourist destination and is designated as a Provincial Park and Marine Protected Area. A previous fishing wharf, connecting the beach to a tidal lagoon is a common location where the public jumps from the above bridge into the channel inlet. Sediment build-up in this channel renders it unsafe for public use and requires dredging. The rate at which dredging is needed has increased significantly in the past decade.

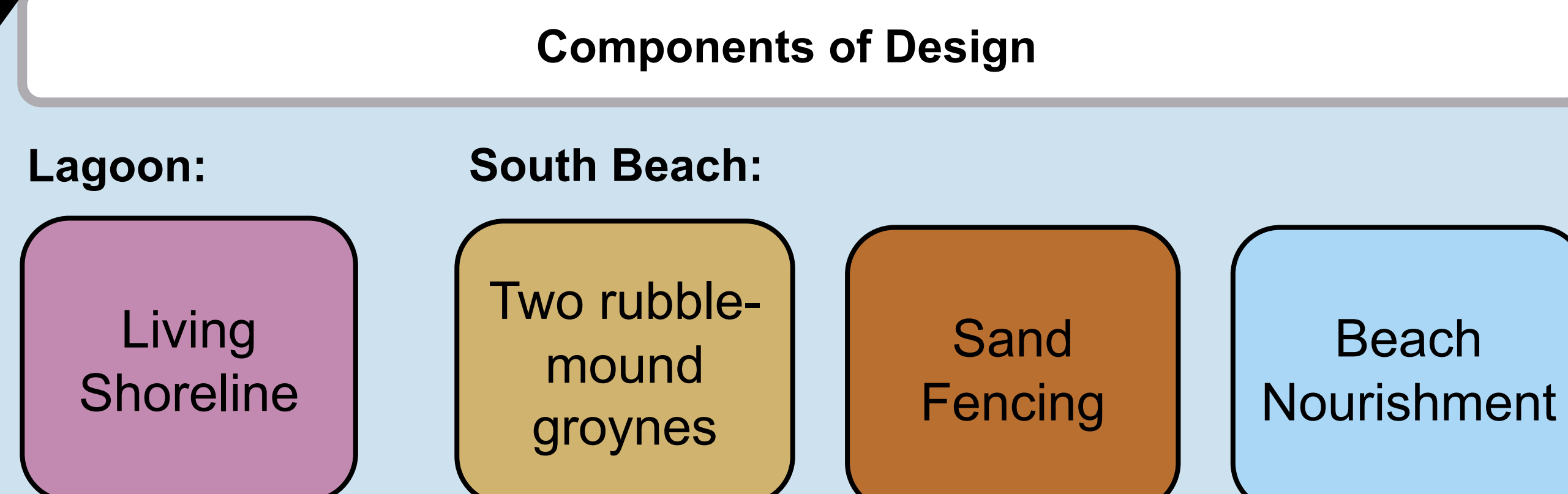
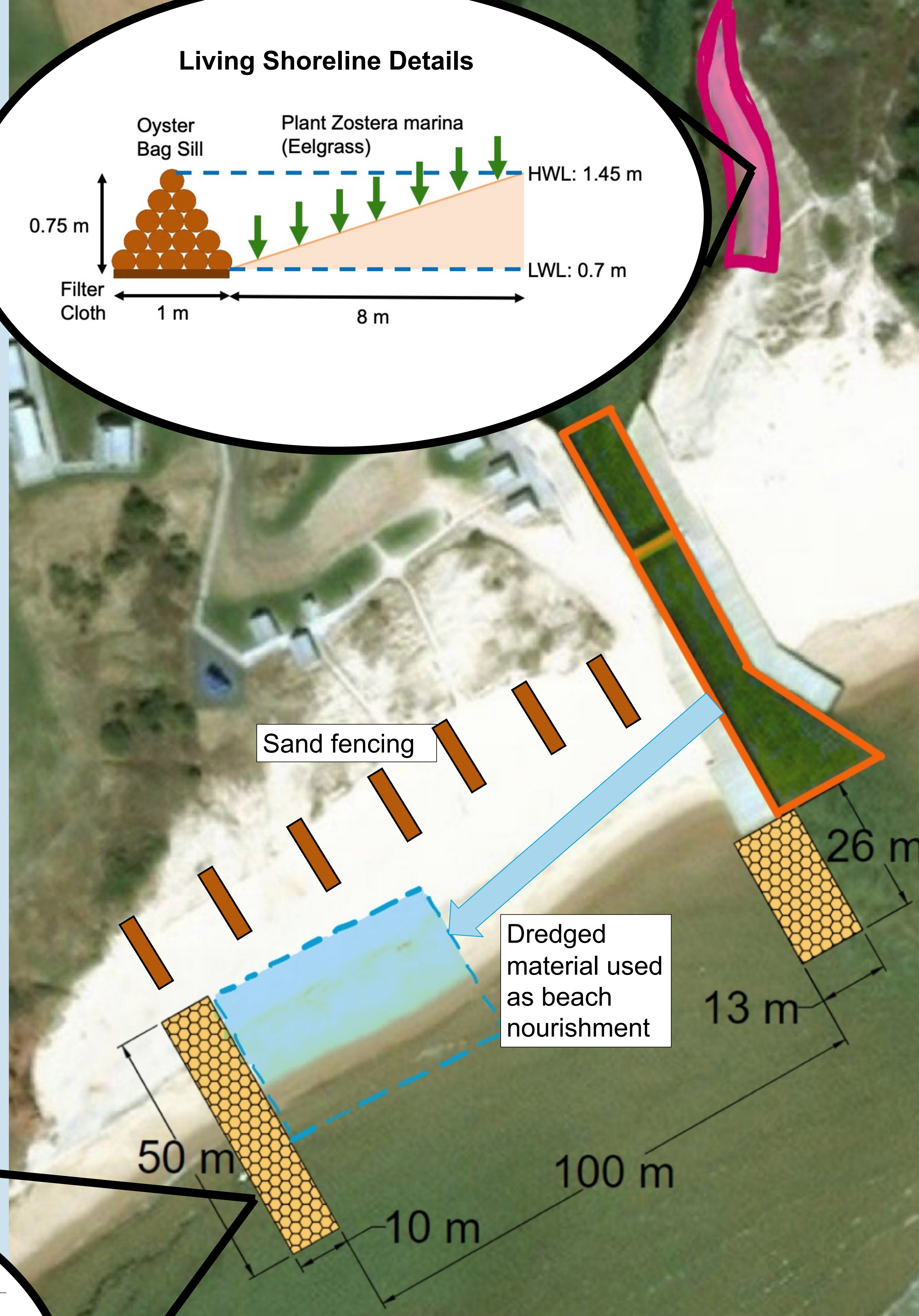
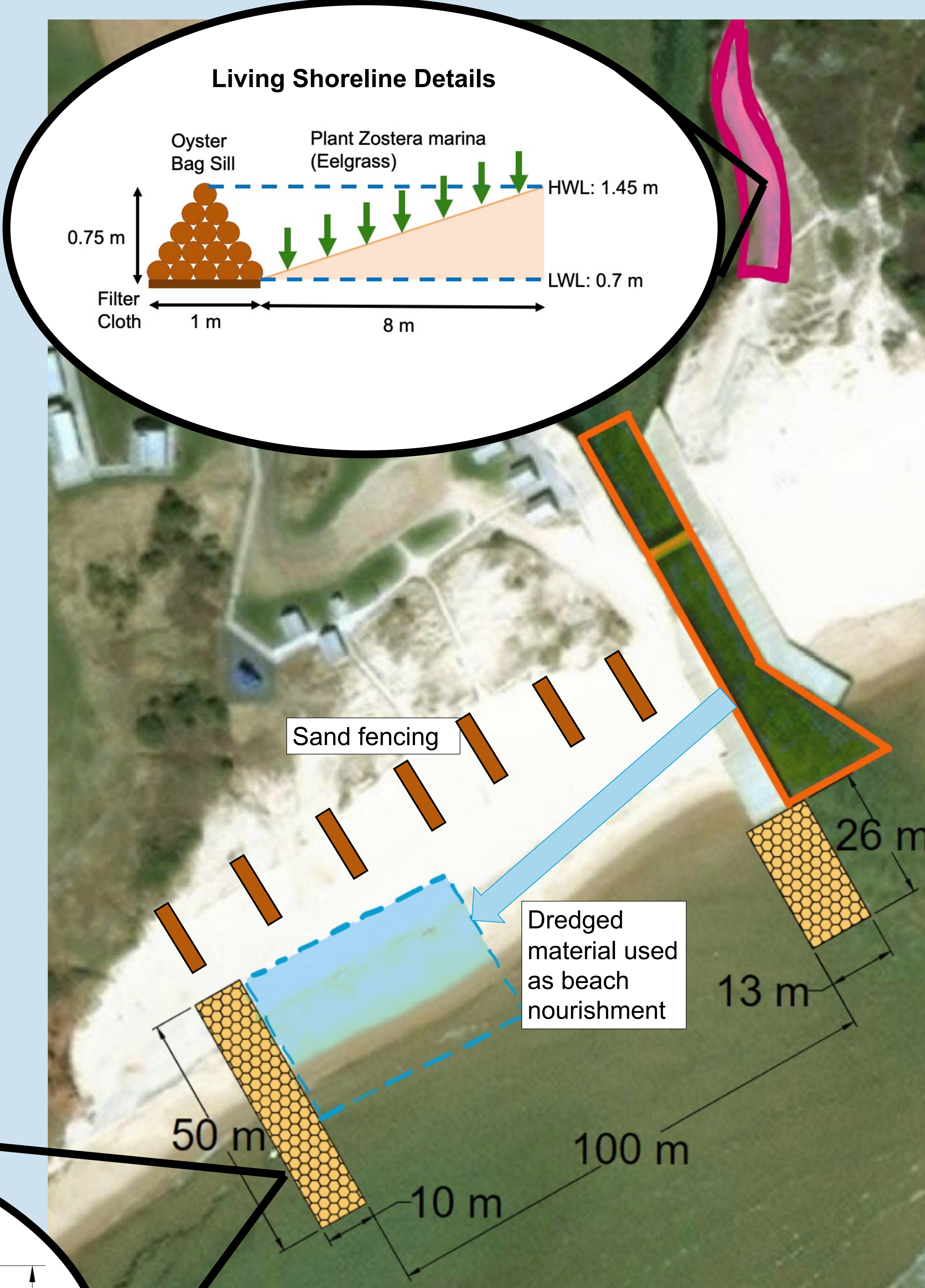
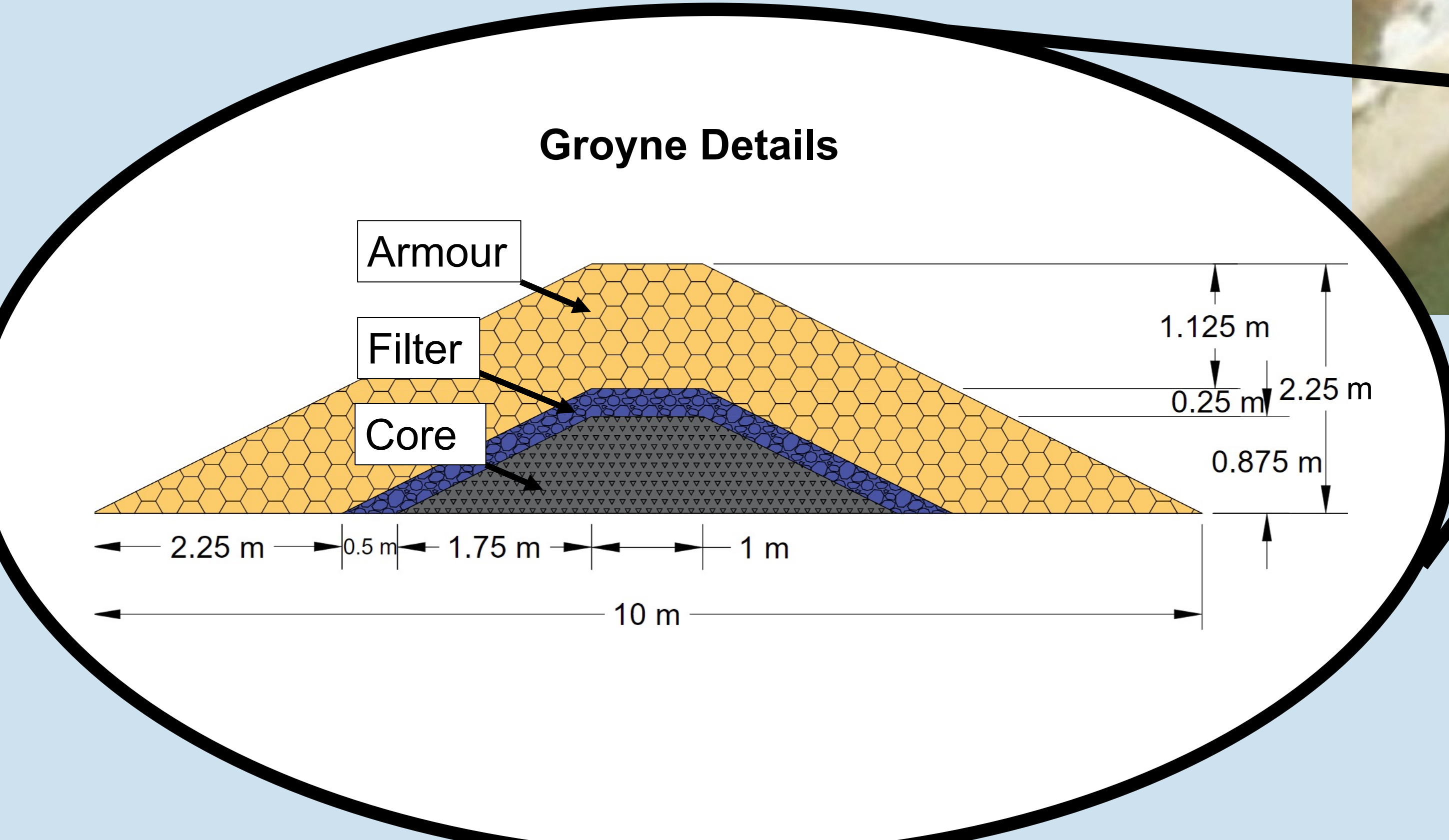
**Project Scope**

Determine the source of sediment accumulating in the channel run and complete a conceptual design to control sediment transport and reduce frequency of channel dredging.



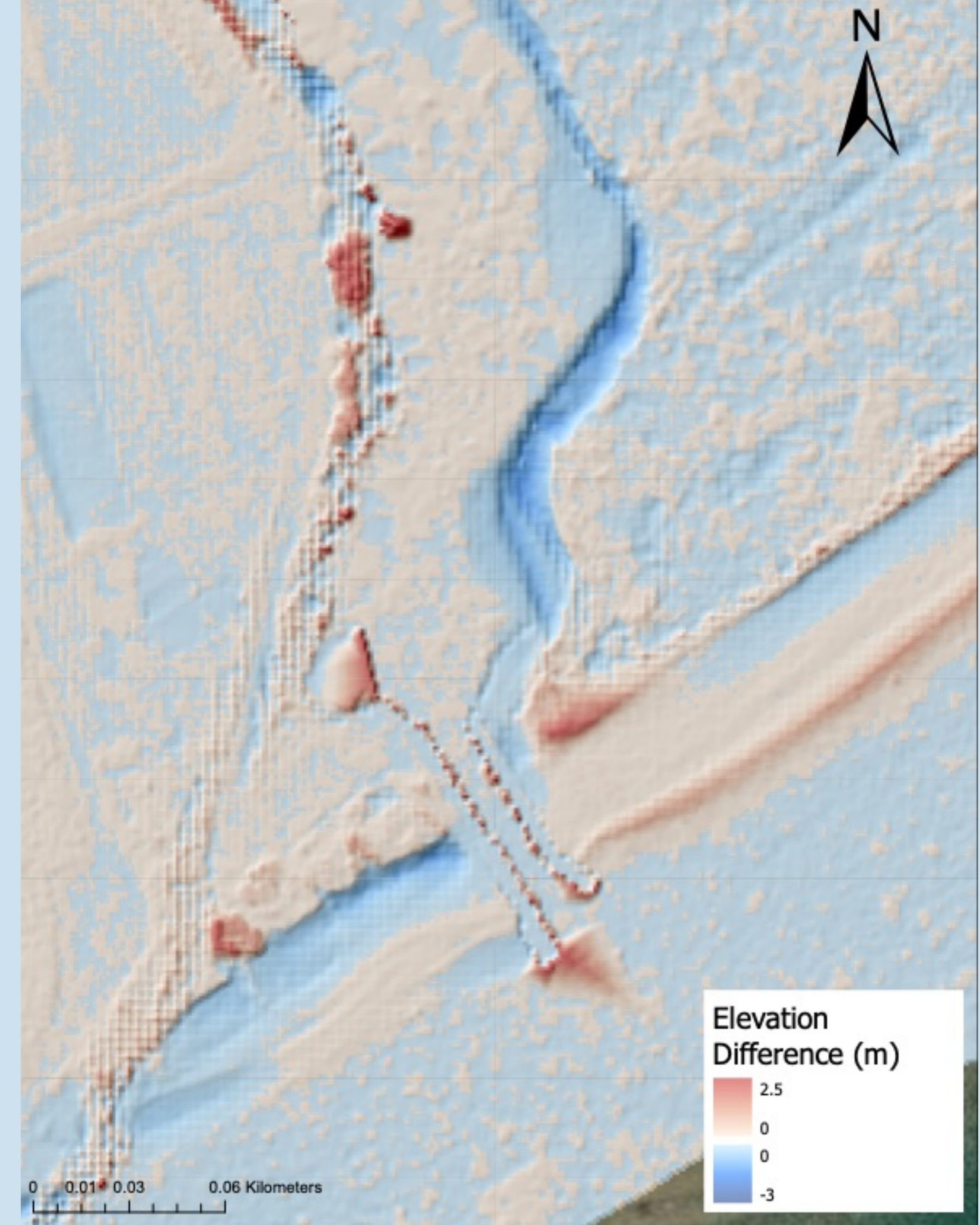
**Steps to find source of sediment:**

- Compare sediment samples at beach, channel and lagoon
- GIS analysis comparing 2008 and 2020 LiDAR data
- Empirical calculations



**Processes:**

- Longshore sediment transport
- Shear stress imposed by tidal current
- Tidal Asymmetry



Calculated elevation difference (blue = erosion) between 2008 and 2020 provincial LiDAR (provided by CBCL)

**Conclusions and Recommendations**

The sources of the accreting sediment were determined to be the south beach, transported by longshore currents, and the eroding right bank of the inner lagoon. Two groynes will impede longshore sediment flux, while a living shoreline design will stabilize the sediment of the inner lagoon in order to reduce the accumulation of sediment in the channel and associated dredging. Dredged material from the channel will act as beach nourishment between the groynes, and sand fencing is recommended to limit aeolian transport and build up dunes.

It is recommended that a living shoreline be implemented as a pilot project initially, given that there are limited guidelines and established best practices rooted in engineering principles relating to its design.

**Key References**

US Army Corps of Engineers. (1984). Shore protection manual. US Army Coastal Engineering Research Center.

Kamphuis, J. W. (2020). Introduction to coastal engineering and management (Vol. 48). World Scientific.

Bilkovic, et al. (2017). Living shorelines: the science and management of nature-based coastal protection. CRC Press.