Geotechnical Assessment of Existing Stopbanks in New Zealand

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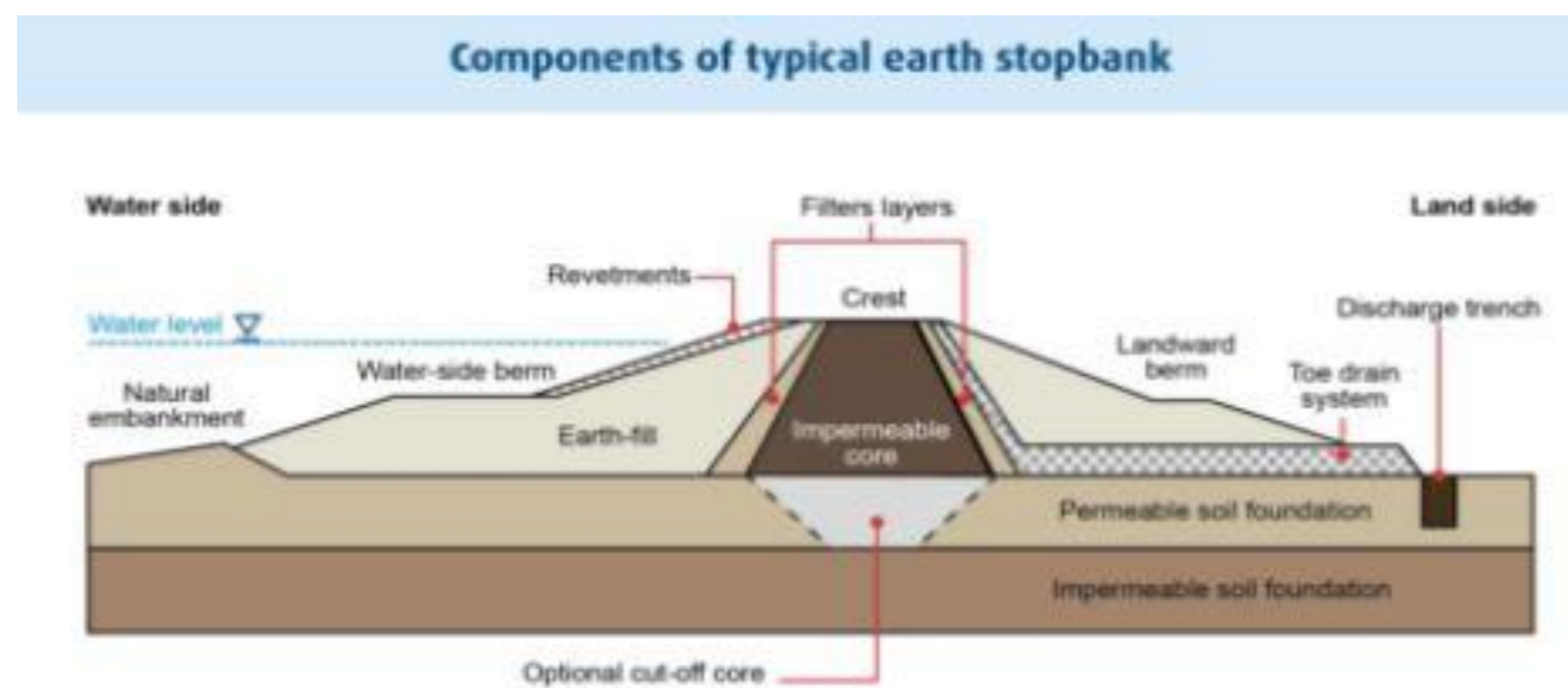Supervisor: Kaley Crawford-Flett

What are stopbanks and why are they important?

Stopbanks are an important part of New Zealand's prevention against floods as they help protect people, infrastructure and communities safe. They are human made elongated soil embankments that prevent the flooding of rivers. To this day, New Zealand currently has 5000 km in total length of stopbanks. [3]

Currently, New Zealand has no national guidelines or framework for stopbanks maintenance which calls for precautionary measures when approaching the design and capacity of these embankments.

Components of typical earth stopbank

What methods are used to assess existing stopbanks in New Zealand?

Methods in place to assess existing stopbanks include:

- **Desk studies** are undertaken to assess the geotechnical mapping, topographical data and historical geographical data.
- **Site investigations** take place to observe any noticeable features around the proposed area.
- **In-situ testing** such as cone penetration tests and standard penetration tests are carried out to assess the soil behaviour.

Why do we need to know about stopbank condition?

It is important that we know about the conditions of a stopbank as different regions in New Zealand have different environmental conditions. From analysing various stopbank assessments the following conditions seem to have the greatest impact on stopbanks conditions:

- Age
- Varying standards (no national standards)
- Hazards exposed to (e.g regions of high flood rates)
- Changing land use (e.g agricultural, farmland)
- Environmental conditions (e.g weather)
- Soil condition

The conditions mentioned above must be carefully accounted for so that proper regulations can be implemented into the new national standards.

References

[1] Te Ara, *'Stopbanks',* https://teara.govt.nz/en/photograph/4902/stopbanks

[2] BOPRC (2014), *'Stopbank Design and Construction Guidelines',* https://www.boprc.govt.nz/media/395649/stopbank-design-and-construction-guidelines.pdf

[3] Kaley Crawford-Flett, Daniel M Blake, Eduardo Pascoal, Matthew Wilson, Liam Wotherspoon, https://wiki.canterbury.ac.nz/download/attachments/50626873/Blake%20NZIS.pdf?version=1&modificationDate=1559599812947&api=v2

[4] Polder2C's/Stephan Rikker, https://www.dutchwatersector.com/news/levee-tests-show-importance-of-closed-grass-cover

What could we do to improve the assessment of existing stopbanks in New Zealand?

As New Zealand has no national guidelines surrounding the assessment of existing stopbanks, the major step forward would be to create some form of national guidelines. The following steps are ones we believe are important for the progression of stopbank management in New Zealand:

- Active participation from all regional councils/operators of stopbanks
- Direct research and testings for stopbanks for future construction
- Implementation of other national guidelines into new New Zealand stopbank guidelines.

Summary and Future work

We have found lacking information in the stopbank guidelines in New Zealand. Due to different regions having unique environmental traits, a stopbank framework that accounts for respective features such as topography and environmental conditions must be carefully considered.

The next steps for the development of this assessment are to look into additional national guidelines that could be implemented for risk management around the stopbanks in New Zealand. Along with this, discussions with regional councils should be made to promote a regulated national stopbank framework for New Zealand stopbanks.