



3. Flood Hazard and Risk Assessment

The complete findings of the flood hazard assessment for the Ocean Boulevard Pump Station are summarized in the technical memorandum, "Ocean Boulevard Pump Station Protection Plan - Flood Hazard and Risk Assessment" in Appendix A. The objective of the flood hazard assessment was to provide the estimated probability that the station will be flooded by seawater due to storms and tsunamis to the year 2065 (the end of its' expected service life) and the year 2100. Potential flooding from overland sources (e.g. rainfall and creeks) was not considered in the analysis.

The Ocean Boulevard is exposed to three different flooding hazards:

- "Blue water" flooding in which the station is below the still water level and is inundated;
- storm wave or "white water" flooding in which the station is periodically flooded by waves as they run-up the beach but in general the ground does not have standing water; and
- Tsunami wave flooding which, for planning purposes, should be expected to completely destroy the building and render the station inoperable.

The results of the flood hazard assessment are summarized as follows:

- It is estimated that there is a 37% probability that "blue water" flooding to the 2.45 m CGVD elevation could occur at least once before the service life of the pump station is reached (about 2065). At this flooding elevation, seawater can enter the wet well, potentially causing a sewage overflow, the ventilation and odour control kiosk can be damaged and access to the station will be difficult due to standing water and debris (logs, etc.). "Blue Water" flooding to the 2.80 m CGVD elevation, in which damage to electrical systems could occur, is not probable before the service life of the pump station is reached.
- Storm wave or "white water" flooding to the 2.45 m CGVD elevation is predicted to occur every two years on average by 2025 and will become more frequent thereafter. Storm wave flooding to the 2.80 m CGVD elevation is expected to occur on average every 8 years by the year 2025 reducing to a 2-year return period by 2065. This storm wave flooding could result in damage to the station if it is not mitigated through the construction of shore protection or the station is flood-proofed.
- It is estimated that there is a 9% chance that the pump station will be impacted by a CSZ tsunami before the service life of the pump station is reached. The estimated total flood level (2015) in the CSZ tsunami is 4.1 m CGVD including a recommended safety factor.

Potential methods to mitigate these flood hazards are discussed in the following sections.