

## **Design and Analysis of A Storm Surge Protection System for Reagan National Airport**

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**Abstract:** Recent climate studies have discussed the threat Ronald Reagan Washington National Airport (DCA), which is at a relatively low elevation, faces with regards to future storm surge events. DCA is situated adjacent to the Potomac River, increasing its chances of becoming inundated due to future flooding. Issues such as flooded runways will lead to flight delays and cancellations if a protective design is not implemented. This paper will examine the airport under flood conditions with protective alternatives in place using a fluid dynamics model. Furthermore, this paper presents a stochastic simulation of aircraft throughput using a queuing model based on historical data. The three alternatives are; permanent sea walls, temporary flood barriers, and an improved drainage system. A utility analysis considering suitability and airport performance indicates that a temporary flood barrier is the most effective design in protecting the roughly 600 daily passenger flights through DCA from surge events.

*Keywords:* storm surge fluid dynamics, aircraft throughput queuing, seawall, flood barrier, drainage