

# WAVE STUDY ST. JULIAN'S BAY, MALTA

## POOL DEVELOPMENT FOR SAN GILJAN AQUATIC SPORTS CLUB

San Giljan Aquatic sports club is planning to develop a land reclamation for a pool and deck area in Saint Julian's Bay, which is located at the east side of Malta. The Maltese authority Transport Malta requested a mathematical wave disturbance study for the whole Saint Julian's Bay (including Spinola and Balluta) comparing the present situation with different alternatives of the land reclamation to determine the effects on the wave climate in Saint Julian's Bay. In an interactive process the design of the land reclamation is optimised to fulfil the criteria of evaluation.

The basis for the wave penetration study is the wave climate just outside Saint Julian's Bay. This 'offshore' wave climate is established with a SWAN numerical wave model of the Mediterranean Sea. In this model a 20-year time series of hindcast wind fields (CFRS) is used to determine the 'offshore' wave climate.

Then the 20-year time series of the wave climate outside Saint Julian's Bay is transferred into the bay using the numerical wave model HARES. For this purpose, a 3D transfer matrix has been set up for many conditions of wave heights, wave periods and wave directions (for various output locations). These HARES calculations include both direction and frequency spreading. The calculations are performed for the present situation and several alternatives of the proposed land reclamation.

With the 3D-matrices the wave time series outside Saint Julian's Bay are transferred by interpolation or extrapolation to various output locations inside the bay area. The results are used to establish the local wave climate and to analyse the

influence of the proposed land reclamation alternatives on the wave conditions inside the bay.

Transport Malta required that the wave conditions in the bay shall not worsen due to the construction of the land reclamation. The shoreline of this reclamation will consist of vertical quay walls to accommodate mooring yachts. The main instruments to optimise the layout are the orientation of the quay wall and its reflective properties.

In the final design the quay wall is equipped with wave chambers to dissipate wave energy to reduce the reflection coefficient. This results in a more tranquil wave climate in front of the quay wall. The effectiveness of several wave chamber layouts is modelled with the numerical wave model SWASH.

At Balluta bay the proposed land reclamation has a small positive effect on the beach stability, for the rest of Saint Julian's Bay the effect of the reclamation on the wave climate is negligible.

### CLIENT

San Giljan Aquatic Sports Club

### LOCATION

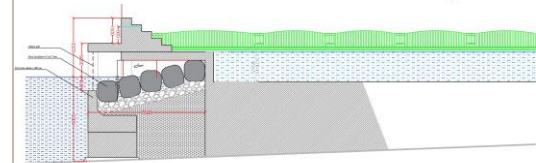
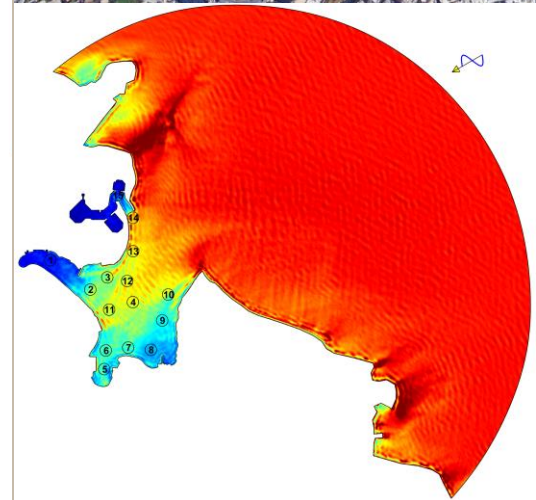
St. Julian's Bay, Malta

### DATE

2020 - 2021

### SERVICES

Wave study to assess impact of proposed land reclamation on local wave climate



# SVASEK

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