False Bay Literature Review

# Surrounding Waters – Regional influences

# Physical Characteristics of False Bay

False Bay is a square-shaped embayment on the southwest coast of South Africa. The central coordinates of the bay, as presented by Flemming (2024), are and (Figure 1). The maximum meridional extension of the bay is ~35 km from northern shore to the latitude crossing Cape Hangklip to the south , while the zonal counterpart is ~39 km between Fish Hoek and Gordon’s Bay (Flemming, 2024). The embayed area is approximately (Flemming, 2024).The average depth is ~41 m and the deepest point near the entrance is ~90 m (TALJAARD 2000). The bay is open to the sea at its southern extent, which is defined by Cape Point and Cape Hangklip to the west and east respectively. The northern extent is defined by long sweeping beaches separated nearly halfway by the eroding cliffs found from Kapteinsklip to Swartklip. The boulders and cliffs of the predominantly rocky eastern and western shores are interspersed with small sandy beaches. Mountain Group Sandstone and Malmesbury Group Shale (Flemming, 2024).

## Bathymetry and Surrounding Topography

The bay has been split into four geographical zones which categorize sectors of the bay with similar bathymetric features (Atkins, 1970). The northern sector is categorized by a gentle slope (~1:400) with a fragmented rocky bottom to the west and a predominantly sandy bottom to the east (Mallory, 1970). The west zone is characterized by several large rocky features listed here from north to south: Roman Rock, Seal Island & York Shoal, East Shoal, Whittle Rock and Rocky Bank (Mallory, 1970). These features are a mix of granite and sandstone and form part of the Cape Granite and Table Mountain Group of geological formations (Flemming, 2024). The eastern side is characterized by long N-S running ridges, some of which are ~17 km long and ~300 m wide (Mallory, 1970). These ridges are comprised of shale and form part of the Malmesbury Group (Flemming, 2024). Two distinct terraces, one between 30 and 45 m, the other between 50 and 55 m, exist in the bay and are indicative of Pleistocene (2.6 Ma to 11 700 ka) sea-level stillstands (Flemming, 2024).

Given this pre-historic context, the bay itself can be seen as the southernmost extension of the Cape Flats, a sandy valley which links the Cape Peninsula on the west to the mainland on the east. The eastern side of the bay is bordered by mountainous inland terrain with relatively high ranges of between 1100 and 1400 m (Bonnardot et al., 2005). (3D figure?)

## Wind Climate

Complexity

Prevailing Regimes

Spatially Varying Wind

## Wave Climate

Generation

Modification

## Circulation

Wind driven currents

Wave driven currents

Tidal currents

Subtidal currents

## Density Structure

Hydrodynamic modelling of False Bay indicates that Rocky Bank segregates warmer western water from colder eastern waters (Coleman, 2019). Bottom waters east of Rocky Bank are consistently (under well-mixed and stratified conditions) approximately 1-2 colder than to its west (Coleman, 2019). Coleman’s (2019) model showed (given stratified conditions) that the north-westerly winds, usually associated with warmer months, cause cold offshore water to be advected into the centre of the bay.

# Historical Measurements and Observational Studies

# Hydrodynamic Modelling of False Bay