INTRODUCTION
Batavia Coast Marina (BCM) in Geraldton, Midwest WA is one of 50 Department of Transport (DoT) coastal facilities spanning Western Australia from Wyndham to Esperance. Since construction of BCM was completed in 1995, there have been significant operability issues in the form of excessive motion of moored vessels, mooring line breakages, and damage to pens at the facility. This was in part addressed by the addition of the Northern Breakwater in 2000 as seen in Figure 1.

BCM is subjective to persistent southwesterly swell energy from the Southern Indian Ocean as well as sea waves associated with sea breezes particularly during summer. Due to a relatively wide, shallow reef extending 5km offshore, significant infragravity (IG) wave energy is released into the nearshore environment. This IG energy adversely impacts operability at nearby Geraldton Harbour and therefore has been widely investigated including an IG wave mitigation symposium hosted by Mid West Ports in Geraldton in 2014. IG energy is prevalent along the coast of WA, and poses an issue for many DoT facilities.

OBJECTIVE
The objective of the study is to investigate the causes of BCM operability issues including Gravity and IG wave penetration, transmission through the breakwater, and basin resonance. This is accomplished by a comprehensive 3-year data collection program of strategically placed instrumentation including 3 Acoustic Wave and Current (AWAC) devices, 6 pressure sensors, an Aquadopp, Waverider, vessel motions, and structural inspections. Results from IG wave modelling are also assessed.

RESULTS/CONCLUSION
The investigation of BCM operability has leveraged a comprehensive data collection program to formulate a credible explanation of the causes of operability issues. This has included novel and complementary data analysis methodologies including comparisons of gravity and IG wave PSD, transverse and longitudinal PSD of currents, as well as correlations to analytical methods and vessel motions. Once the causes have been determined, the path toward operability improvement is elucidated. This investigation provides a template for future investigations.

REFERENCES