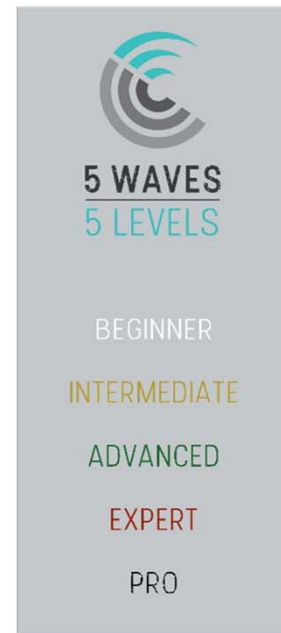
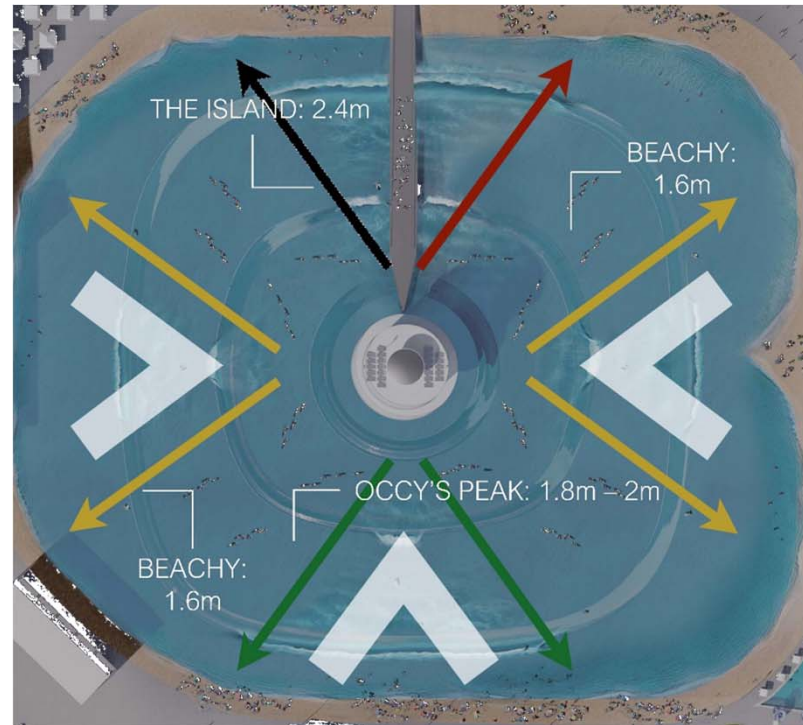




Everyone gets a break!

- The Surf Lakes 5 Waves Technology generates unique “concentric waves” which break around the perimeter of a man-made lake.
- Targeting range of users, but primarily the general public. Caters for all skill levels – 5 waves.
- Provides consistent waves, independent of weather, in controlled environment.
- ASPEC engaged to perform civil, structural mechanical engineering for “full scale prototype” for new wave park system in Yeppoon QLD.
- Engenuity Solutions providing Electrical, Instrumentation, mechanical and project engineering.



Initial Concept - Scale Model Results



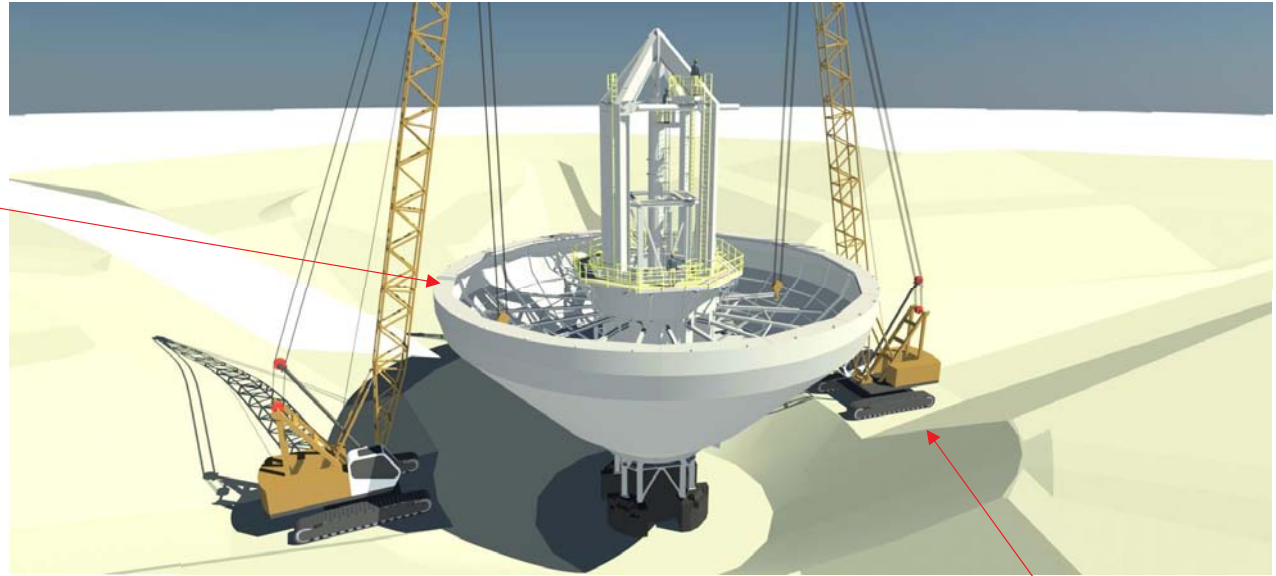
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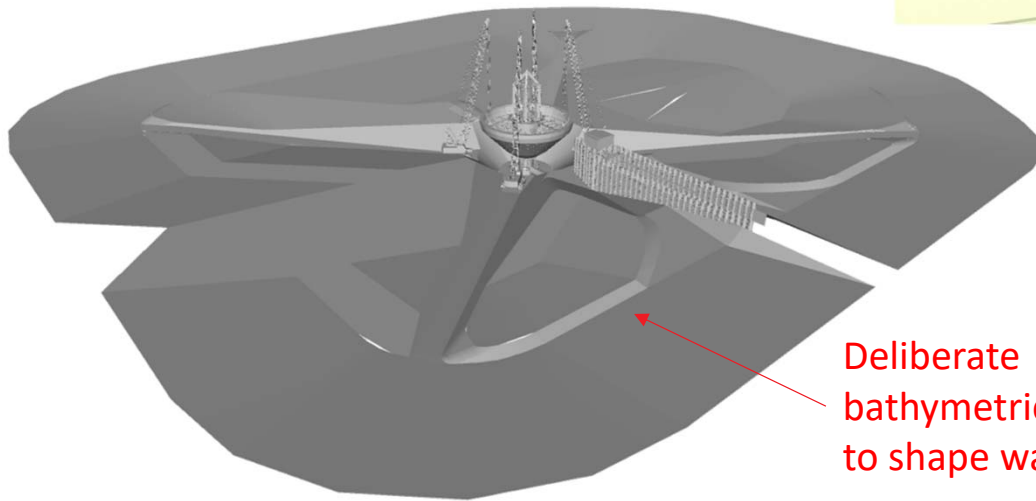
https://youtu.be/vk8X_GUYIgM

Full Scale Design

Concentric Wave
Device (CWD)
generates waves



Design for
construction /
crane access



Deliberate
bathymetric profile
to shape waves



Electrical, instrumentation & piping



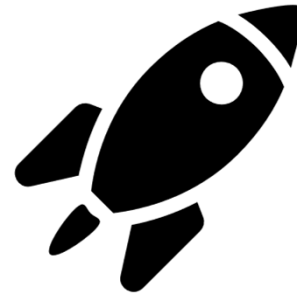
Civil, structural and mechanical

Key Figures



2.4m Wave

Wave face greater than any competing technologies



8 MN Thrust

CWD motivating force greater than SpaceX Falcon 9 Rocket thrust, pulsed every 6 seconds



2400 Rides/Hr

Multiple breaks and multi-wave sets means an order of magnitude more opportunity for rides than any other surf park.

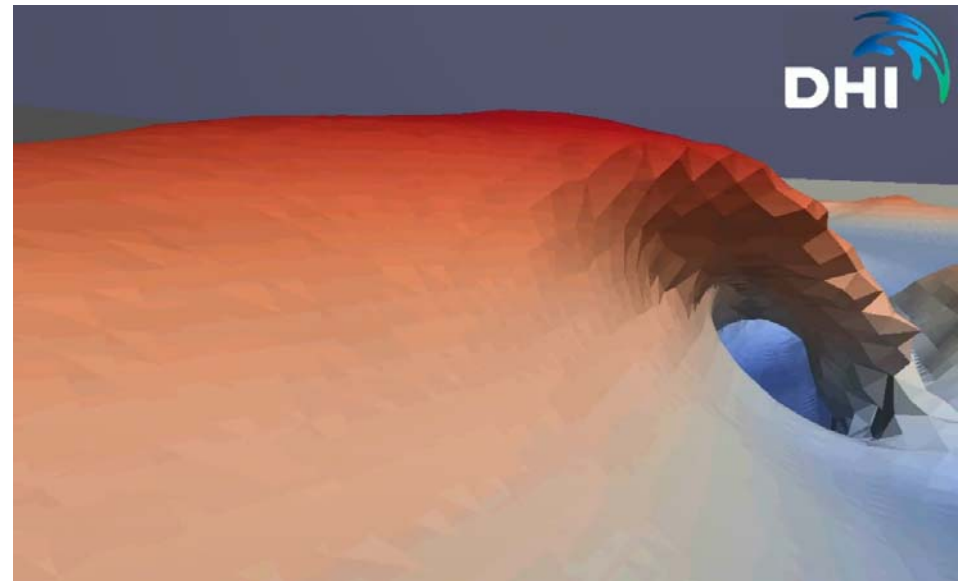
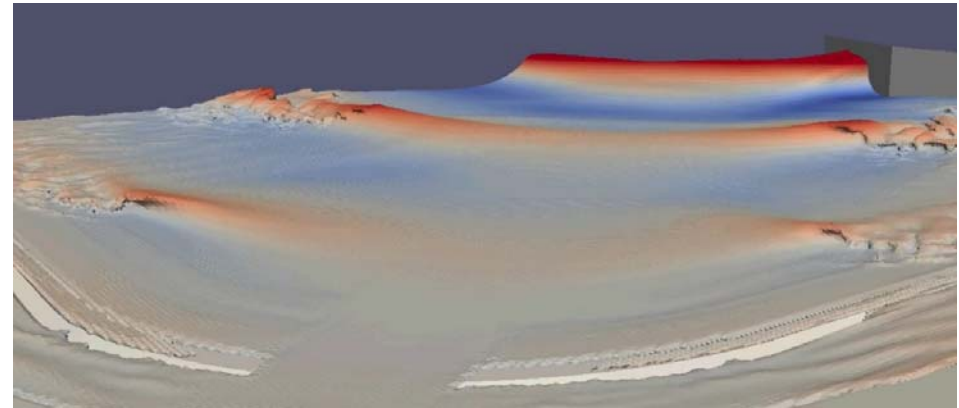


>200 People

More than 200 people were directly involved in the design, construction, marketing & commissioning of the Surf Lakes technology.

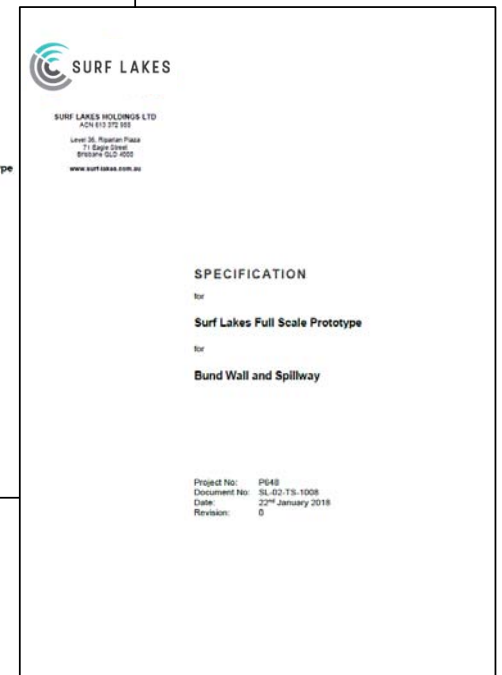
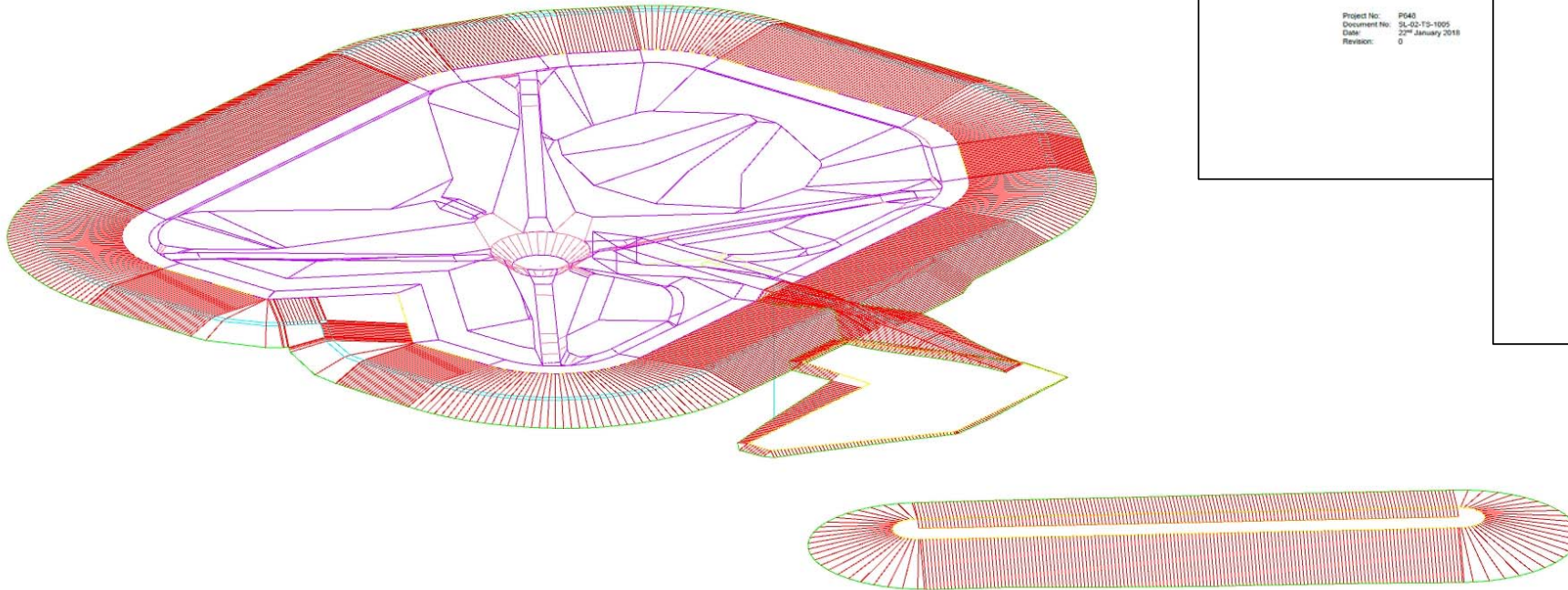
Bathymetry Design & CFD

- ASPEC design / modelling of lake bathymetry and civils
- Advanced Computational Fluid Dynamics (CFD) by DHI
- Close match between actual and simulated waves



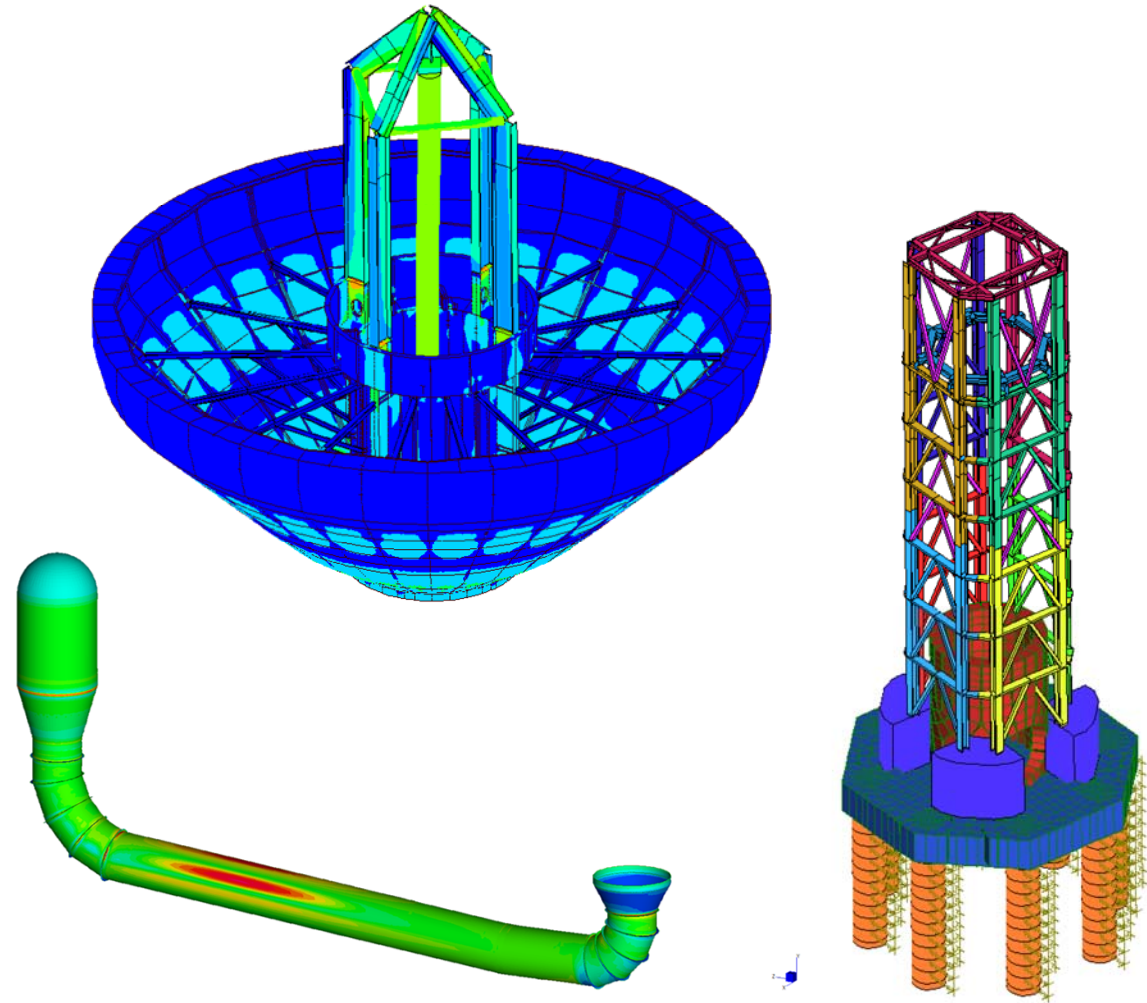
Civil Design

- Civil engineering and modelling (12D)
- Geotechnical design
- Specification of pavements, lake liner, crane pads, earthworks

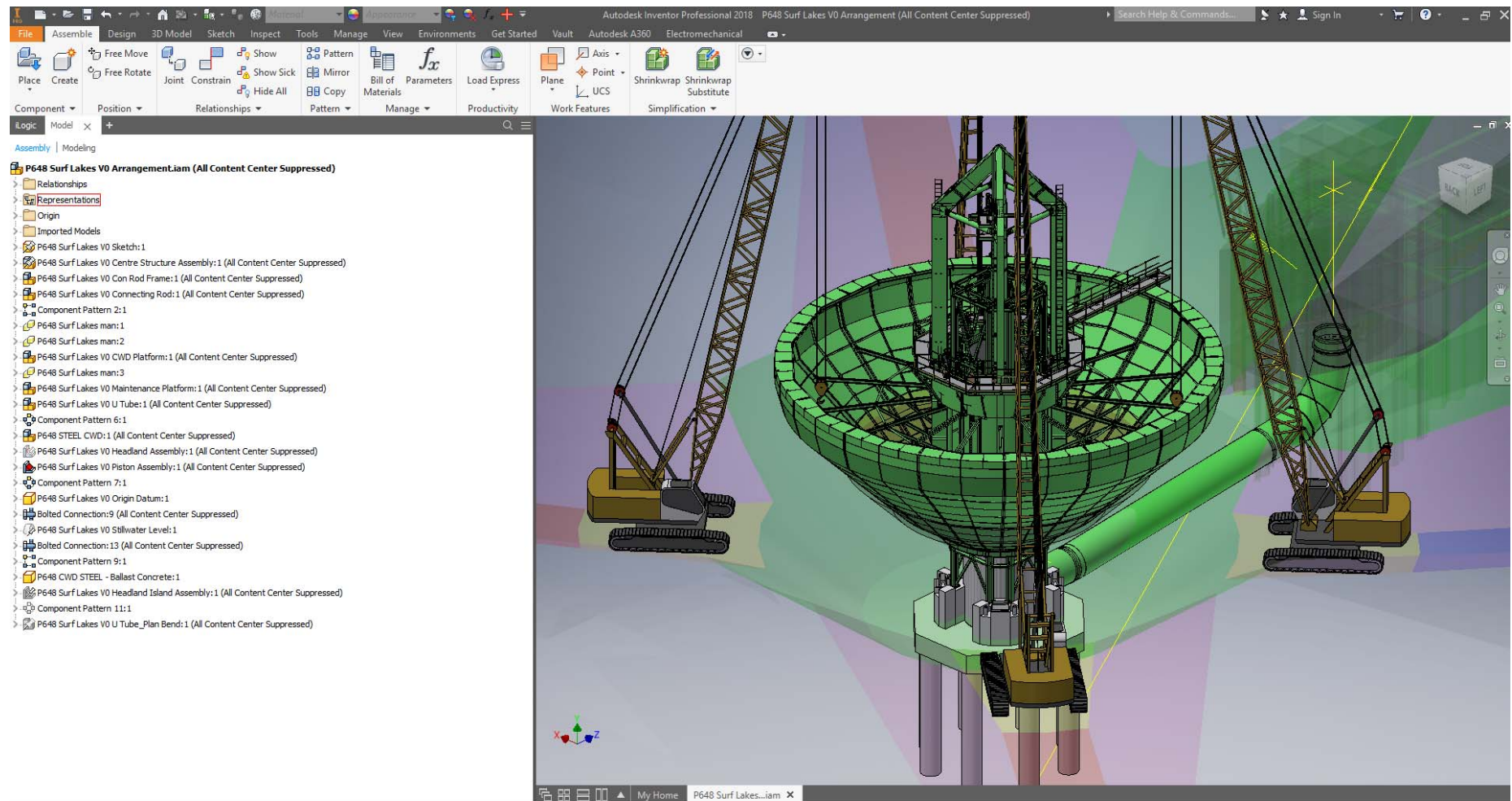


Structural / Mechanical Engineering

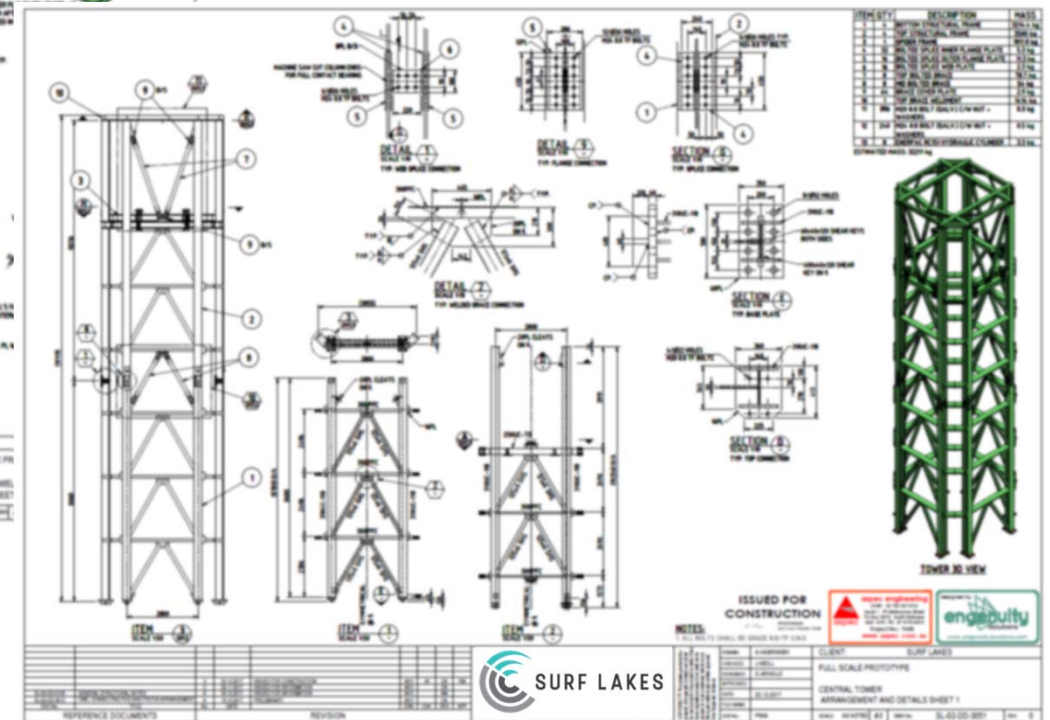
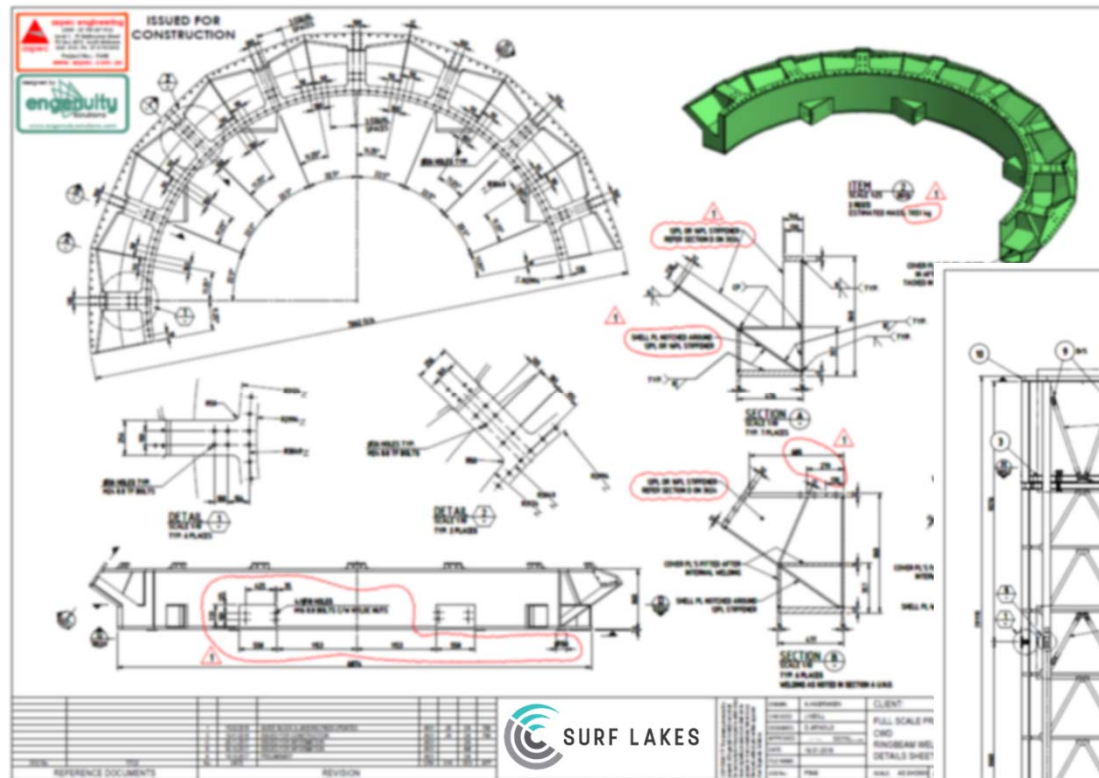
- ASPEC completed structural and mechanical engineering for the majority of major structures / equipment on site.
- The extreme loads and fatigue cycles experienced by the wave generation equipment required the use of advanced non-linear static and dynamic Finite Element Analysis (FEA) techniques.
- ASPEC leveraged past experience from heavy industrial / materials handling machine engineering to execute the design.



Parametric Modelling in Inventor



Parametric Modelling -> Drawings



Civil Construction



Heavy Fabrication & QA Auditing





On-Site Assembly

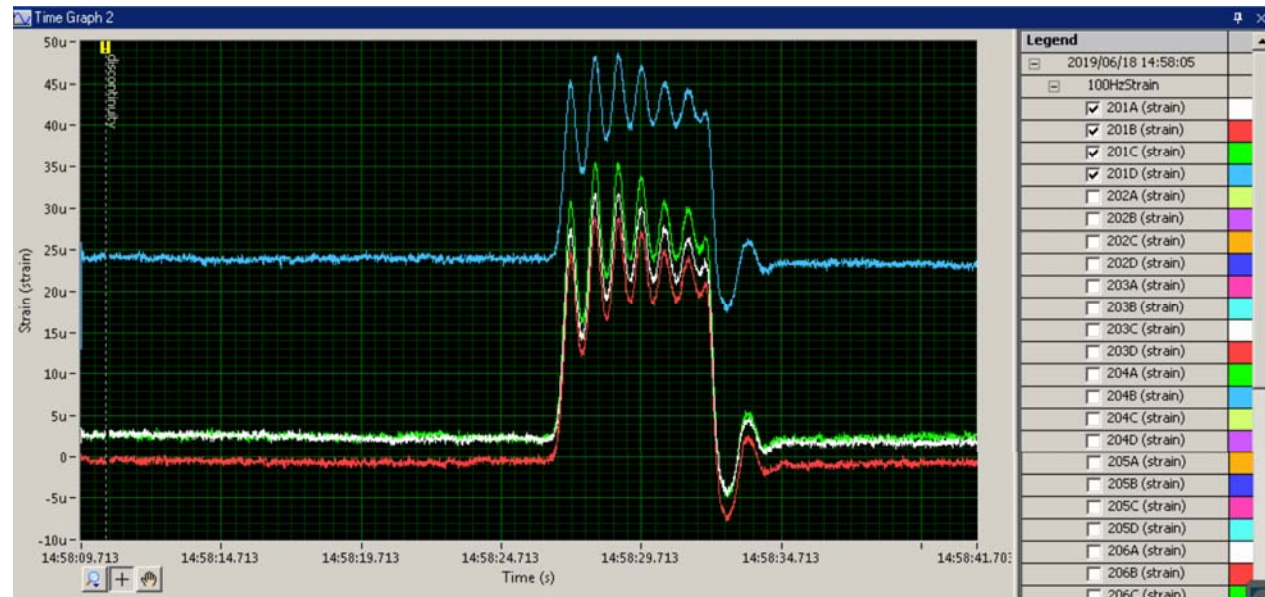
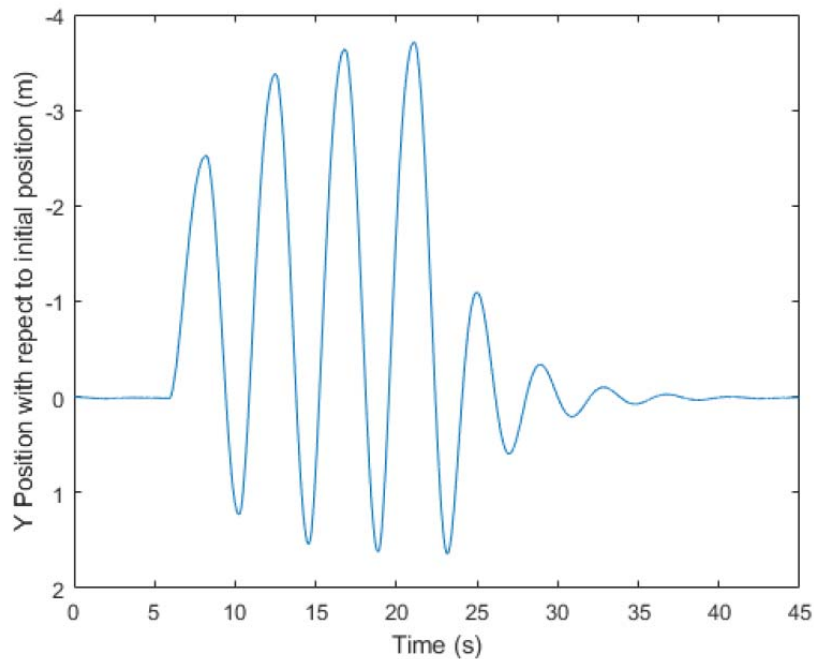


Lake Filled



Commissioning & System Dynamic Models

- ASPEC -> Matlab model of system dynamics
- Engenuity -> Instrumentation Design, Installation and Commissioning
- Real time field analysis of data.



Waves Produced!



Waves Produced!



<https://www.youtube.com/watch?v= l6r0cDqPN4>



Surfs Up



Surfs Up





Thank you.

aspec engineering