



Hydro Tasmania
Consulting

**Presentation to the
Executive Exchange Visit
delegation**

9 May 2008

LEADERS IN CONSULTABILITY

Hydro Tasmania Consulting

- Our Vision
 - To be the leading sustainable water and energy consultant in our chosen markets
- Our Mission
 - To be the leading consultant in sustainable water and energy solutions in our chosen markets in Tasmania, the eastern seaboard of Australia, India and the Pacific Basin delivering from hubs in Hobart, Melbourne and New Delhi

Hydro Tasmania Consulting

- Facts about HTC
 - ▶ 320 staff and growing
 - ▶ International consultant for more than 10 years
 - ▶ Undertaken projects in over 20 countries
 - ▶ Our clients include Governments, electricity and water utilities, developers, World Bank, ADB, AusAid, UN

Hydro Tasmania Consulting

- Capability areas
 - ▶ Power Engineering
 - ▶ Environment, Surveys and GIS
 - ▶ Dams
 - ▶ Hydropower
 - ▶ Catchments
 - ▶ Renewable Energy

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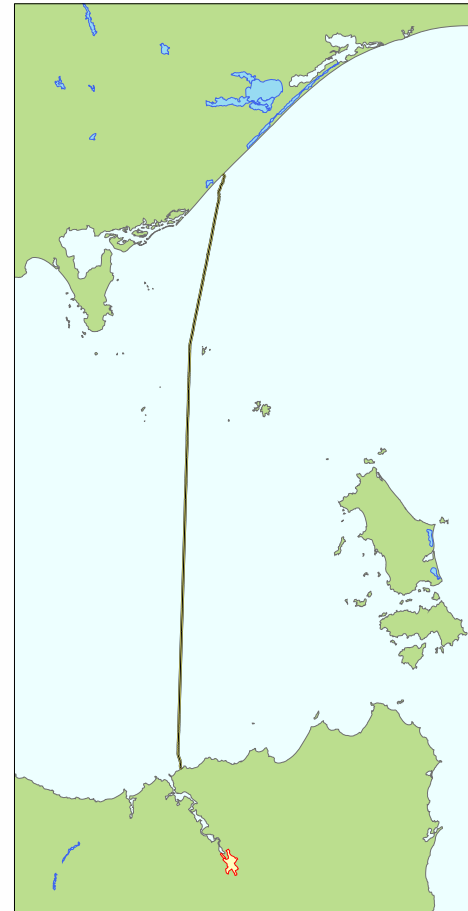
- Experience drawn upon
 - Terrestrial
 - Basslink HVDC Cable
 - Sri Lanka Rural Electrification and Network Expansion Project
 - Southern Cambodia Transmission Link Project
 - Tasmanian Natural Gas Project
 - Burnie-Smithton Transmission Line
 - Wonthaggi Desalination Plant power supply

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- Experience drawn upon
 - Marine
 - Basslink HVDC Cable
 - Tasmanian Natural Gas Project
 - Telstra BS-1 and BS-2 optic-fibre cables
 - Bass Strait Islands power options
 - Oil & gas pipeline projects in Australia and South East Asia

Basslink

- Marine component
 - ▶ World's longest marine HVDC cable (292 km)
 - ▶ Constructed in three separate laying/burial campaigns
 - ▶ Dual direction capacity of 500MW & short term overload rating of 630MW



Basslink

- Onshore works
 - Network design
 - Design and construction of new overhead and underground lines in Victoria and Tasmania
 - Design and construction of substations in Victoria and Tasmania
 - Network reinforcement in Tasmania

Basslink

- Our involvement
 - ▶ Power system planning / integration studies
 - ▶ Effects on existing Tasmania network
 - ▶ Development and delivery of NEM entry projects from concept to implementation
 - Metering
 - System Protection Schemes
 - ▶ Environmental studies
 - ▶ Client engineering for the link

Issues for consideration

- Network design and integration
- Technology selection
- Low risk, cost-effective deployment
- Environment and social impacts

Network design and integration

- Network issues
 - Basslink's relative size
 - Basslink is the largest connected source or sink of power in the Tasmanian power system
 - Point of connection
 - Basslink is connected to the largest load centre in the Tasmanian power system

Network design and integration

- Basslink's relative size
 - Frequency control
 - Regulation
 - Contingency
 - Opportunity to buy and sell services across the link
 - Basslink frequency controller
 - Contingency Management
 - Frequency Control System Protection Scheme

Network design and integration

- Point of connection
 - Transmission Capacity
 - Firm / Non-Firm
 - Network Control System Protection Scheme
 - Local Voltage Control
 - Network capacity to adapt to large changes in transmission flows

Network design and integration

- Our capability
 - SPS design and Back-up design and implementation
 - System modelling including
 - Dynamic model development
 - System simulation in frequency and time domains
 - Market analysis and transmission utilisation analysis
 - Primary and secondary plant to integrate new connection

Technology selection

- Directionality
 - One-way, two-way (seasonal), two-way (daily)
- HVDC vs HVAC
- HVDC options
 - Conventional HVDC
 - HVDC Light and HVDC Plus now in market
 - Return cable vs earth return
- Mono-pole vs bi-pole

Low risk, cost-effective deployment

- Marine route
 - Risks faced in construction and operation
 - Impact to the cable leading to reduction in operational efficiency or failure during operation (third-party damage)
 - Faults during installation leading to catastrophic failure during construction (immediate effects)
 - Faults during installation leading to reduction in operational efficiency or failure during operation (delayed effects)

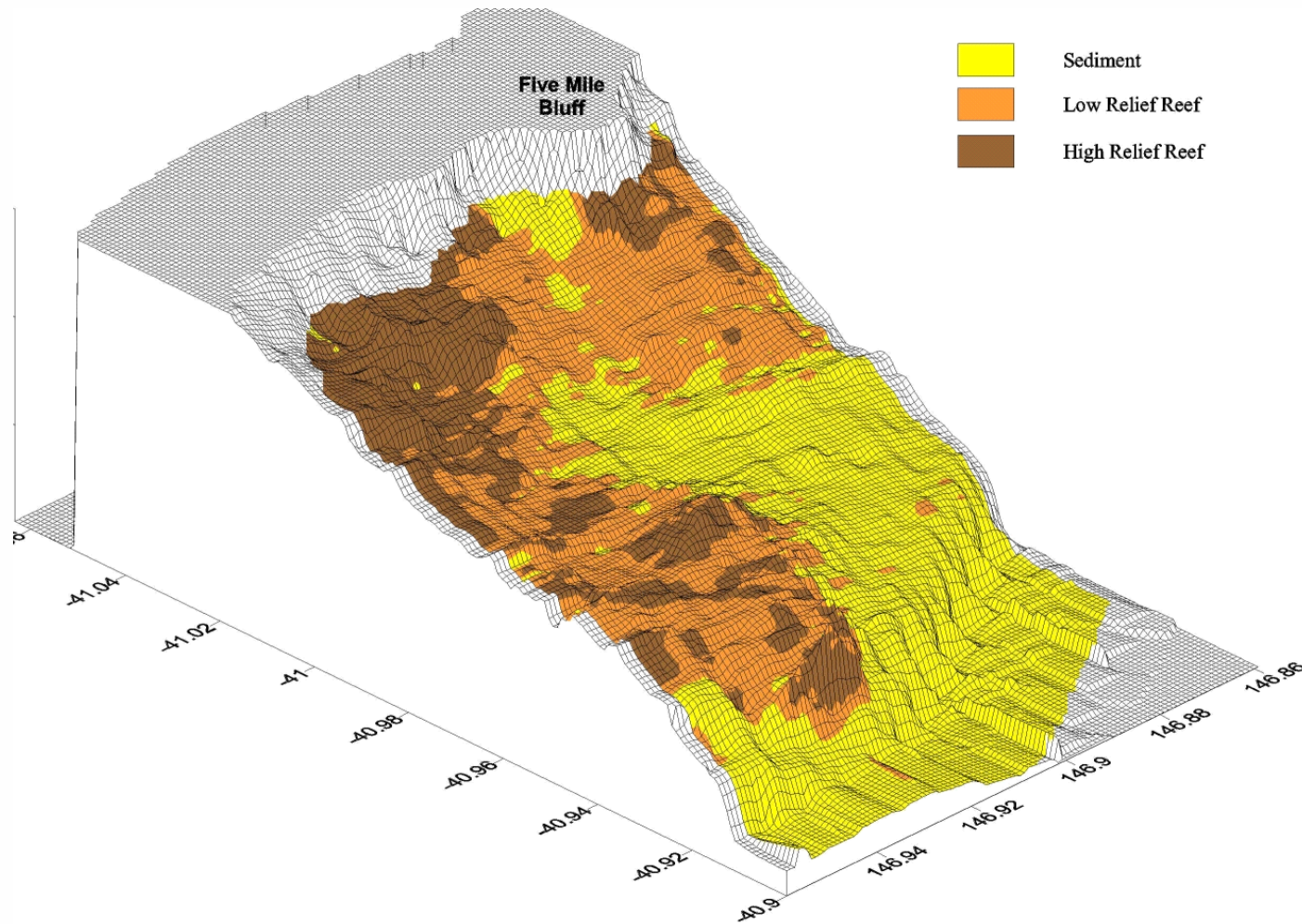
Low risk, cost-effective deployment

- Marine route
 - Cost drivers
 - Cable rating and flow requirements, including necessity for return cable
 - Geotechnical survey and analysis
 - Nature and extent of protective works required to protect against local third-party impacts
 - Number of vessels and specialist equipment mobilised

Low risk, cost-effective deployment

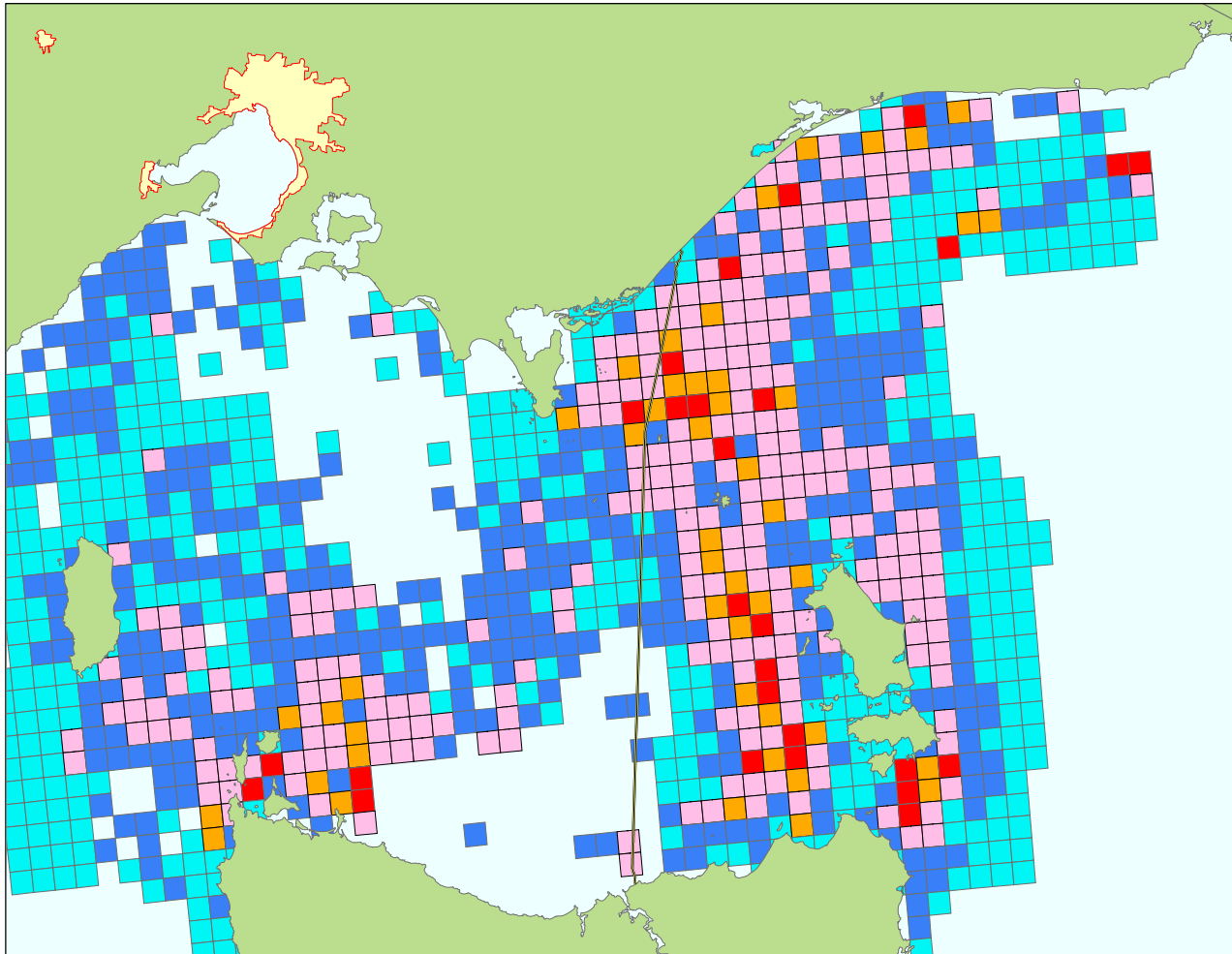
- Marine route
 - Basslink experience
 - Low-cost seabed survey used to target more expensive geotechnical survey
 - Geotechnical survey to drive burial method
 - Spend on burial to be focussed into areas with the greatest risk
 - Management of day-to-day operations needed to ensure no liabilities passed back to owner

Low risk, cost-effective deployment

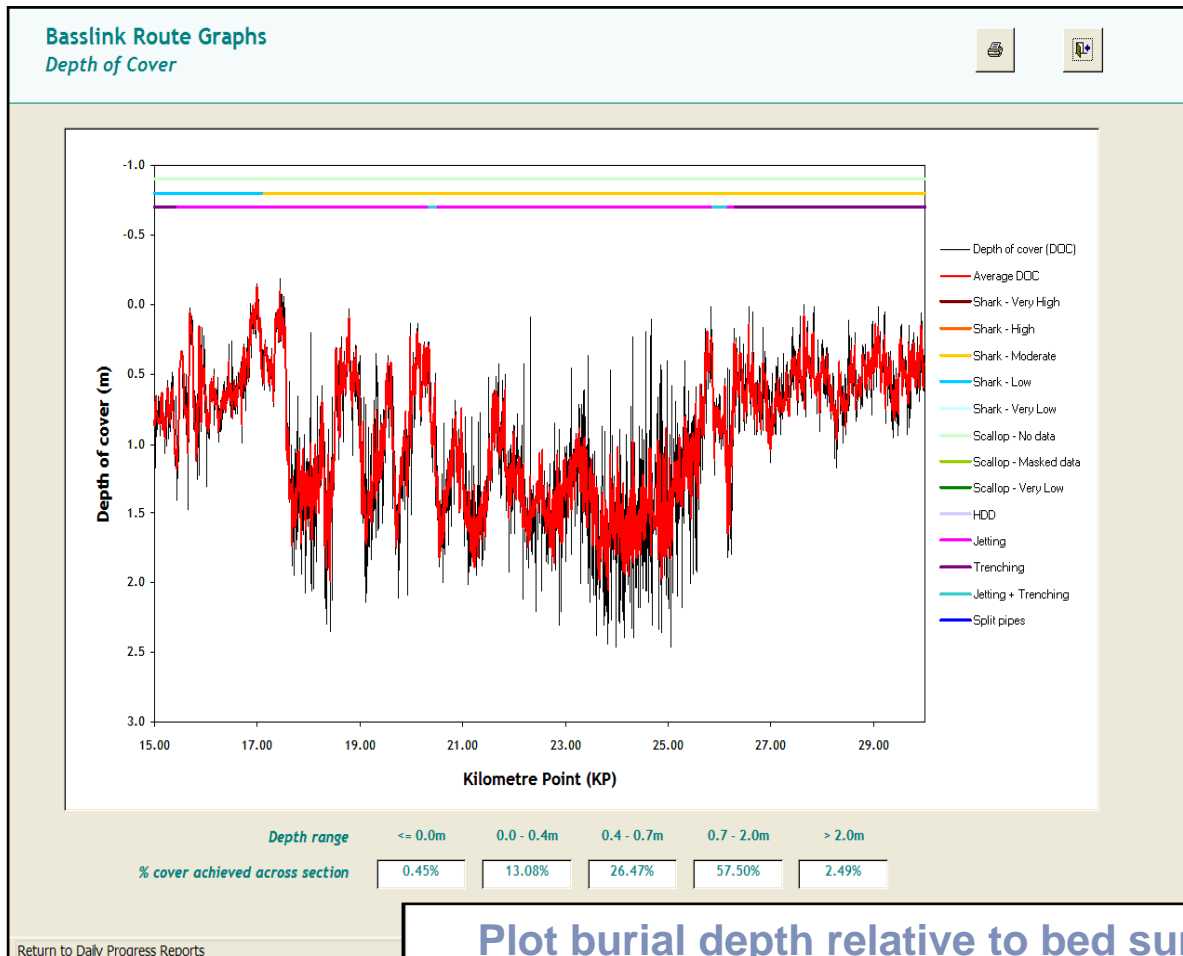


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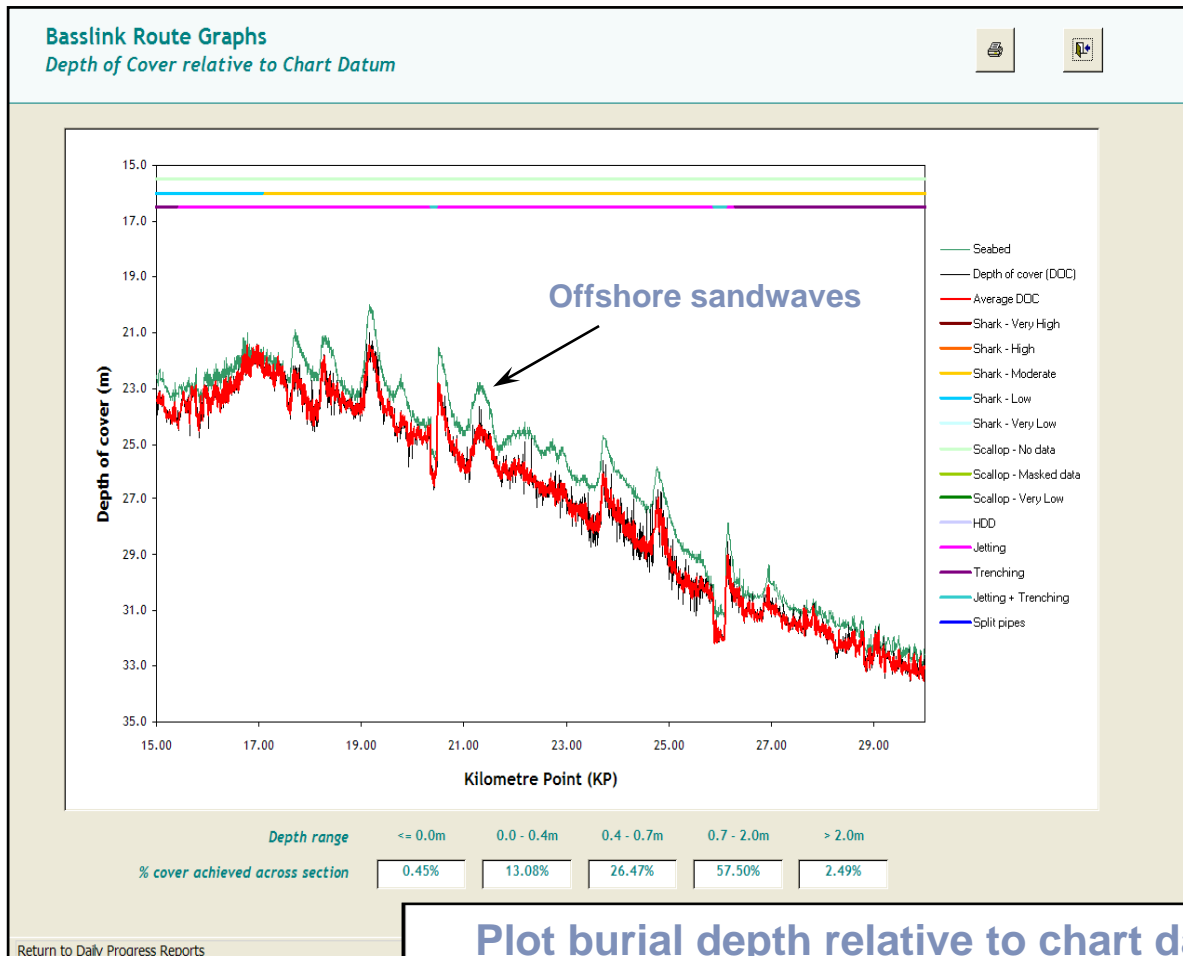
Low risk, cost-effective deployment



Low risk, cost-effective deployment



Low risk, cost-effective deployment



Plot burial depth relative to chart datum

Low risk, cost-effective deployment

- Terrestrial route
 - Corridor alignment chosen using GIS to balance engineering and other issues
 - Site inspection either on-ground or helicopter to refine route
 - Route alignment surveys
 - Community consultation
 - Relocation strategy
 - Security strategy

Environmental and social impacts

- Need to integrate multi-disciplinary environmental advice early in the project
 - Opportunities to highlight risks and avoid impacts
 - Ensures design is not just an engineering “solution” but addresses environmental, social, political and security concerns
 - Reduces costly redesign
 - Reduces objections

Environmental and social impacts

- Basslink experience
 - Scoping study assessed technical, social and environmental issues to shortlist route options
 - Terrestrial concerns dominated route selection
 - Marine concerns drove delivery and route options
 - GIS was a useful tool for both terrestrial and marine works
 - Adjunct issues important
 - Integration with engineering studies was vital

Summary

- HTC has:
 - A skilled multi-disciplinary team that can provide integrated planning to produce low risk, cost-effective, sensitive solutions
 - Technical experience and know-how in planning and implementing marine and terrestrial HVDC interconnectors
- We would be delighted to assist in the successful implementation of the Sri Lankan Submarine Interconnector

Summary

- QUESTIONS