

Ensuring Consistency in Field Reports for Large Ground Investigations

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Contents

- Introduction
- Choosing the Right People
- Initial Training and Project Briefing
- Project Engagement
- QA/QC of Field Logs and Logging
- Revision Process
- Documenting Variations and Methods
- Additional Observations
- Conclusion



Preface

- Not only looking for consistency but rather HIGH QUALITY consistency.
- Want to ultimately be able to use field data (in conjunction with laboratory test results) to assign geological units and geotechnical parameters.
- An early CONCEPTUAL geological model is required to assist the team engaging and contributing to the OBSERVATIONAL geological model through accurate and consistent field reports.



Choosing the Right People

- Field logging is more than understanding the standards, it is understanding the contribution of the logging to the outcomes of the project.
- High quality consistency can be achieved through:
 - Engagement of staff (interest in the project/work)
 - Use of full time non-contract personnel who are likely stay for the duration of the project
 - Generally using degree qualified staff.



Initial Training and Project Briefing

- Initial Training is provided to staff prior to mobilisation. For example this may include:
 - Conceptual geological model including regional geological units and potential geological issues.
 - Logging standards and material description procedures (e.g. AS 1726-1993 with Clark & Walker classification system for Carbonate Rocks).
 - Field and In-situ test methods, practices (for less common tests) and results interpretation.
 - Electronic soil logging (use of tablets), standard inputs and data management.
 - Expectations for HSE, survey (AHD, LAT, etc.), daily reporting, core and sample handling and labelling, core photography, etc.



Initial Training and Project Briefing

- Project briefing included:
 - Site location
 - Site areas and terminology
 - Aims of the investigation
 - Clients expectations
 - Regional geology background (shallow and deep)
 - Summary of previous work at the site
 - Conceptual geological model
 - Site geomorphology
 - Expected field practices



Project Engagement

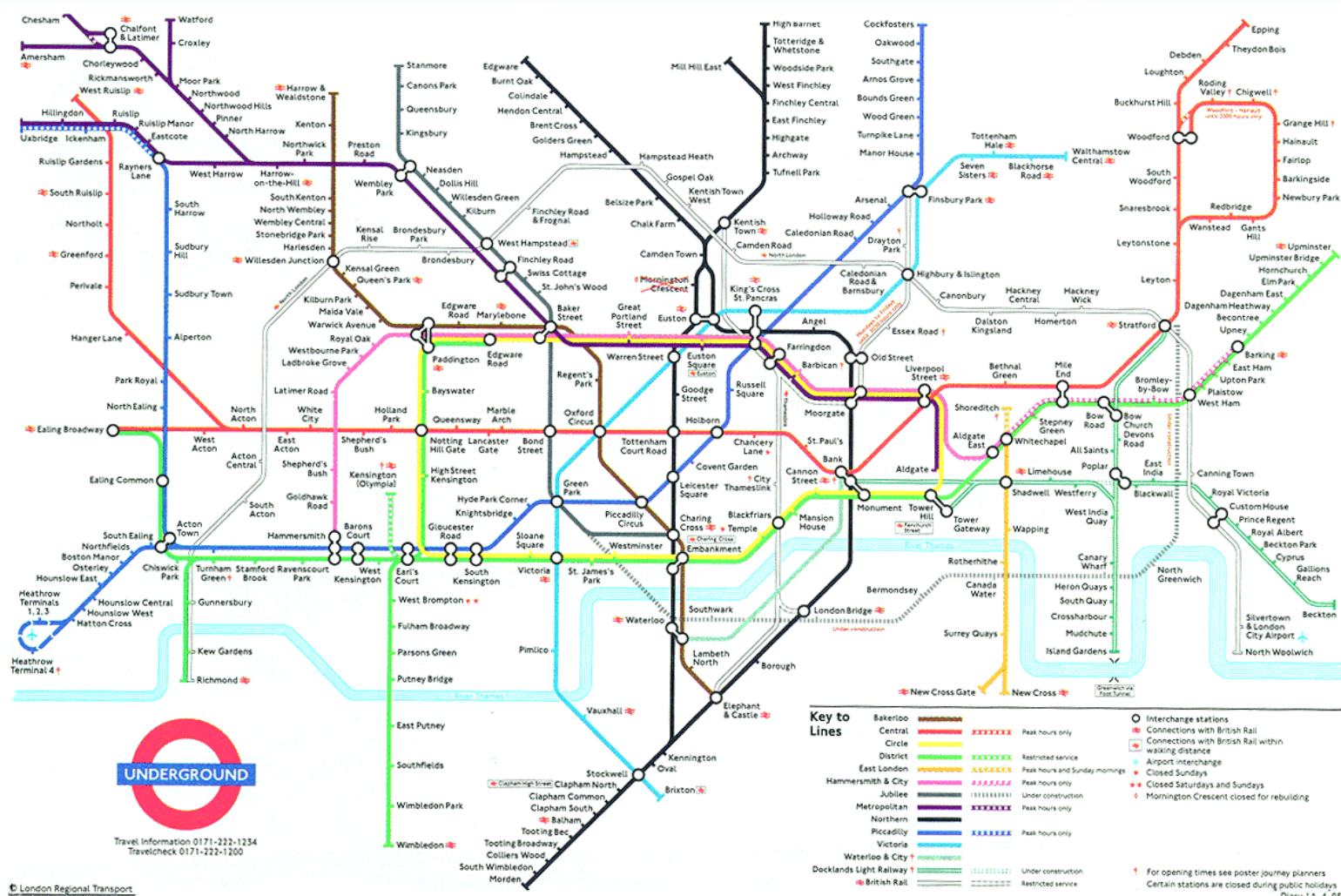
- Understand how field logging contributes to the project.
- Understanding of the conceptual geological model.
- Enables user to identify geological units.
- Knowing what to expect allows the field engineer/geologist to understand the importance of finding something different.
- The logging standard (e.g. AS 1726-1993) is a minimum baseline
 - Additional comments on the log - do not break consistency.



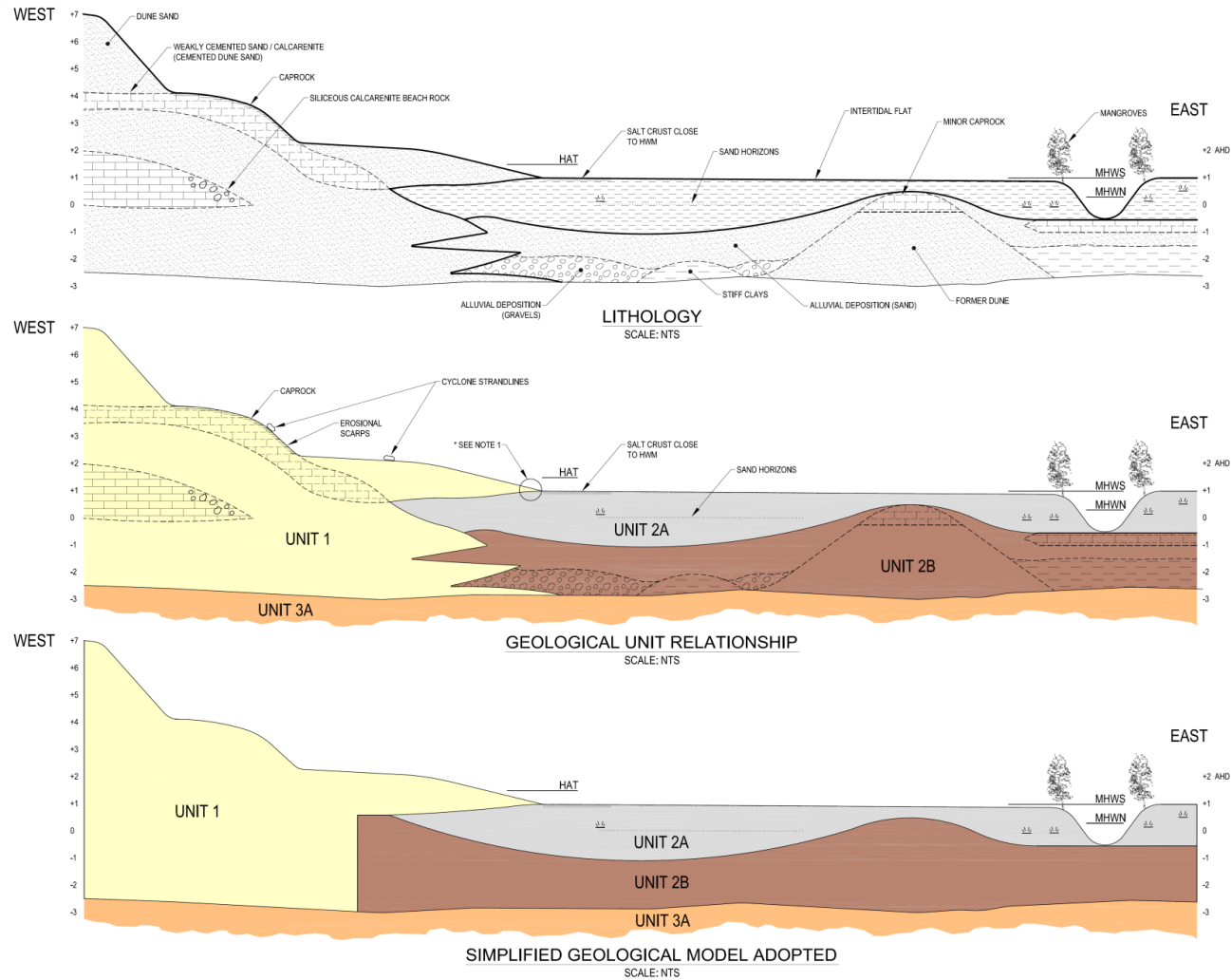
Why introduce a **CONCEPTUAL Geological Model** to the field team?

- Why introduce a model that is not factually accurate? (...and if it is, then why the investigation?)
- Why would a model be useful to a group of engineers producing factual logs?
- Shouldn't they just log what they see or measure – so why confuse them with a model?

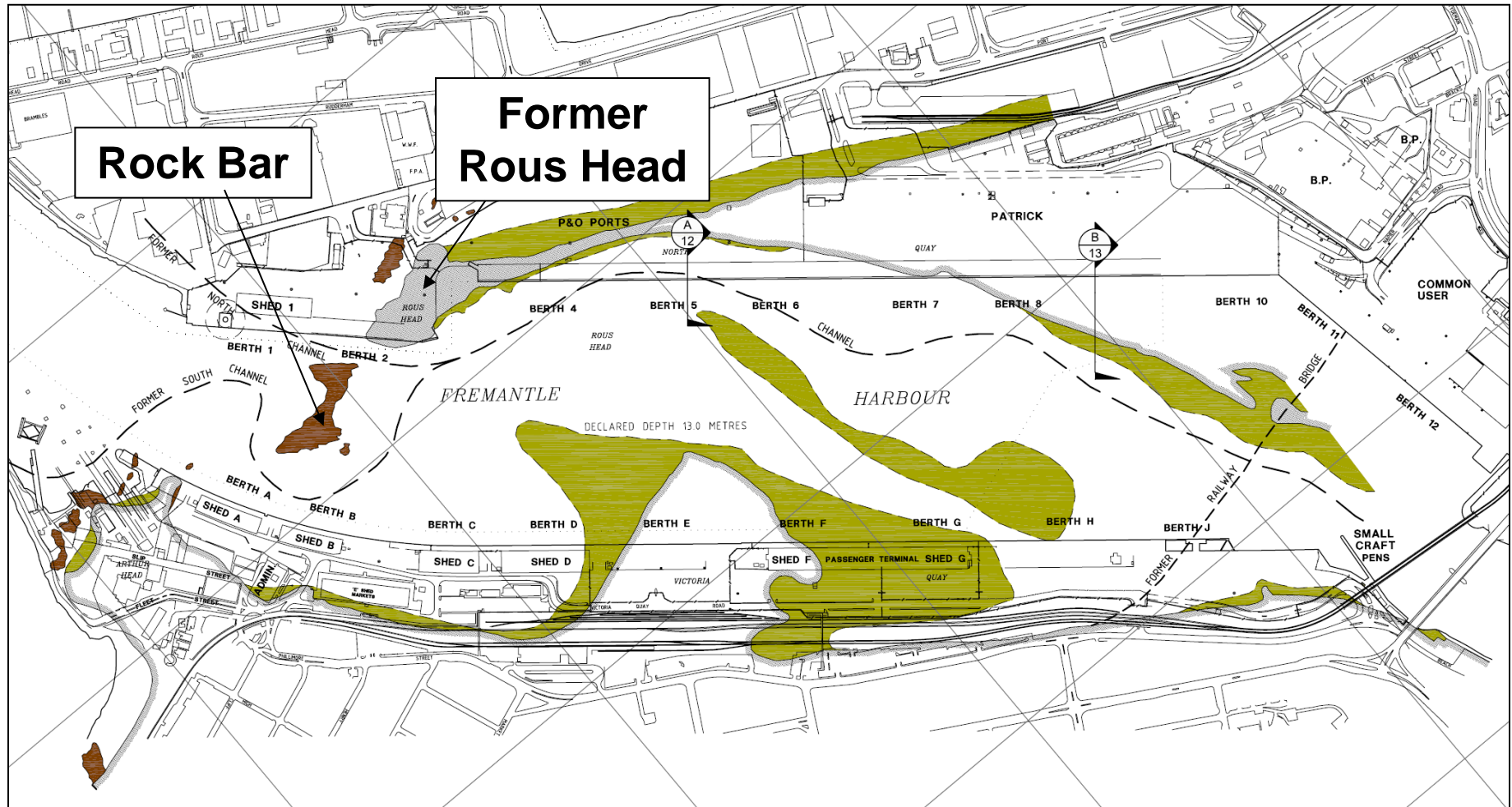
Example - Very Useful (But Not Factually Correct)



Example - Relationship Diagrams Developed at Conceptual Model Stage



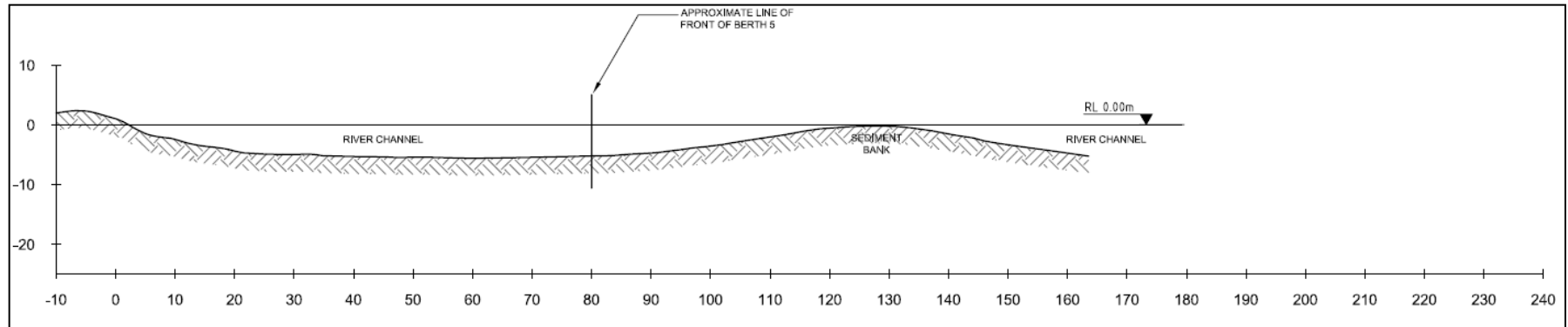
Example – Fremantle Inner Harbour



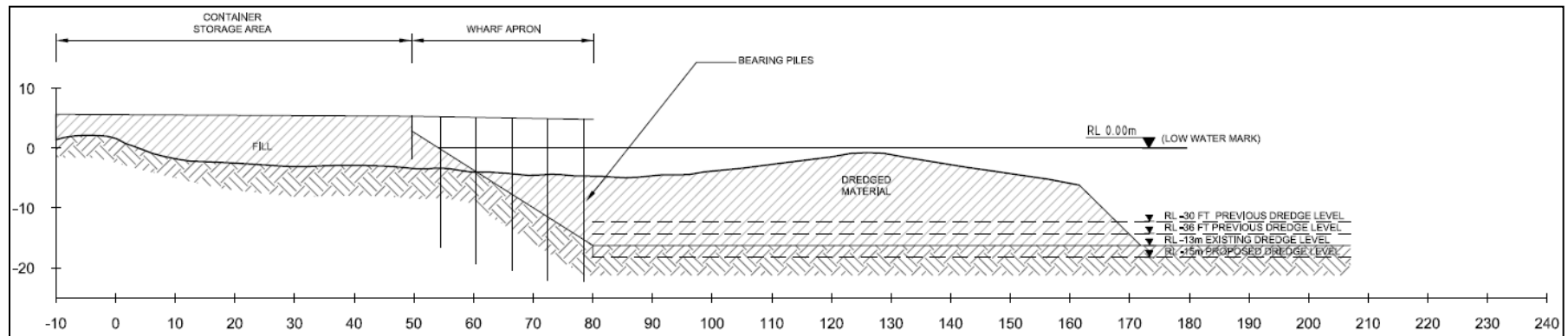


Example – Fremantle Inner Harbour

Pre - Harbour (indicative)



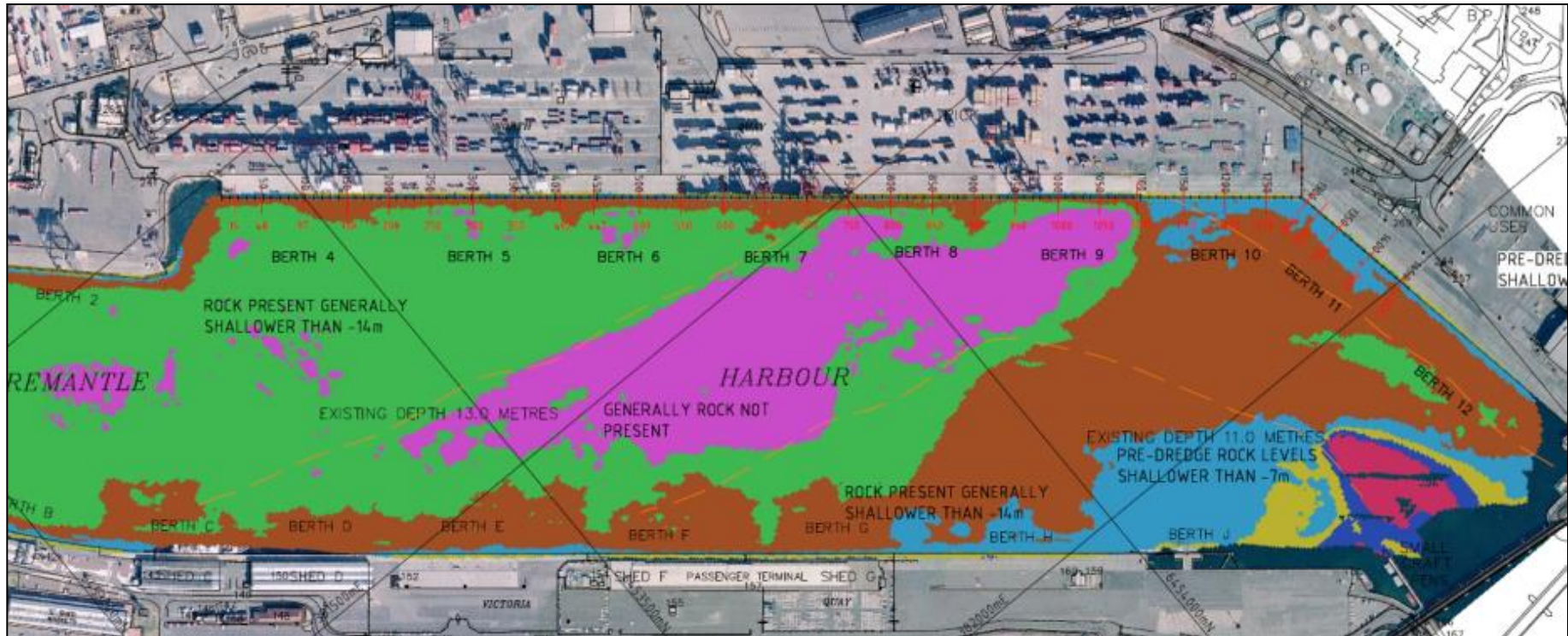
Post - Harbour





Example – Fremantle Inner Harbour

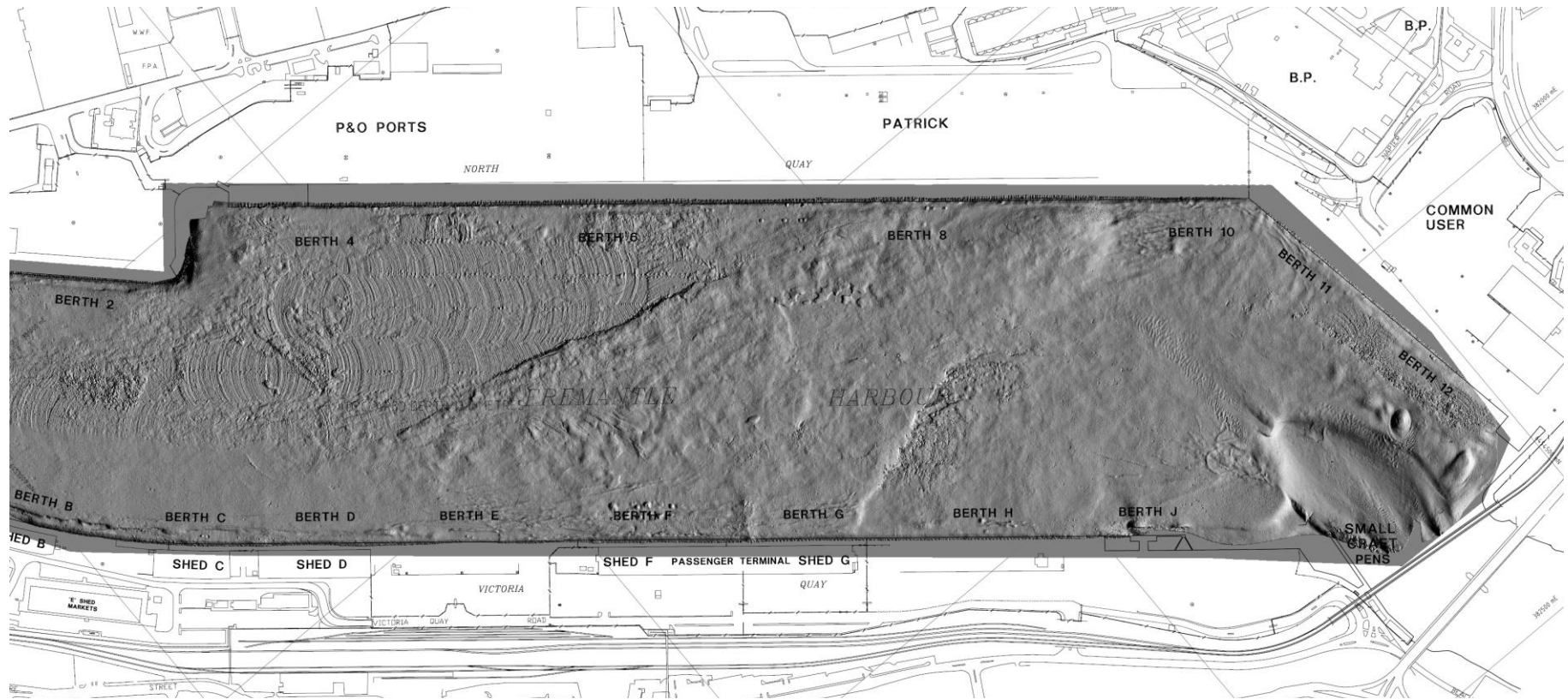
Hydrographic Survey – Evidence of Paleochannel in Soundings





Example – Fremantle Inner Harbour

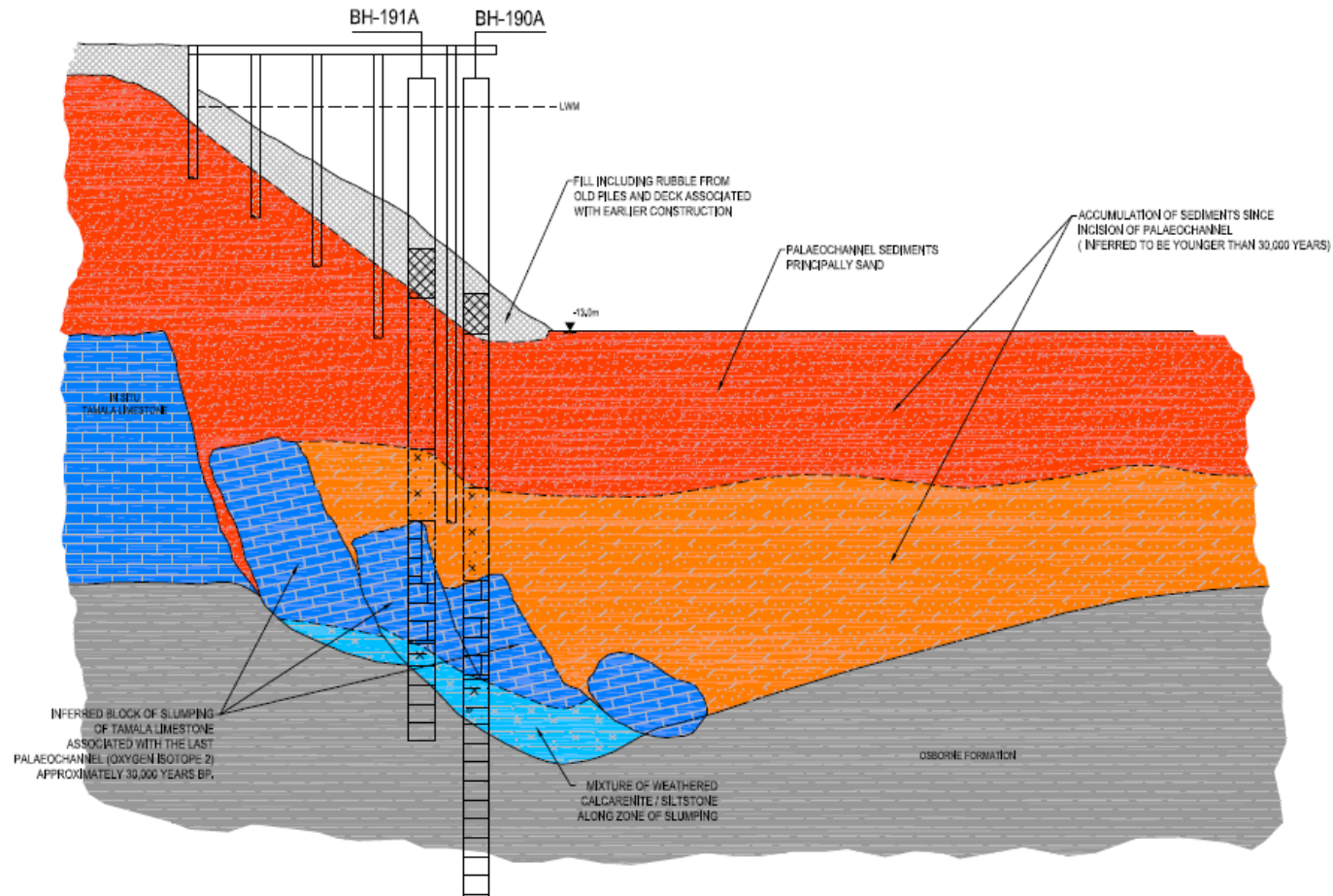
Side Scan Sonar - Paleochannel





Example – Fremantle Inner Harbour

Evidence of a Paleo-Slump in Paleochannel





QA/QC of Logs and Field Logging

- QA/QC of field logging by site based Technical Mentor.
- Technical Mentor role to focussed on logging process not checking of completed logs.
- Field Data Manager producing paper logs from data files, cross-referenced with core samples and provided feedback (with Technical Mentor) to enable field logger to modify and fine-tune logging within 24 hours.
- Field laboratory results provided within 48 hours to cross-reference with paper log prior to issue.



Revision Process

- Borehole reports revised multiple times:
 - Revision A: Raw log from data file.
 - Revision B: Edited log following review of core by senior field staff (Data Manager/Technical Mentor/Site Manager).
 - Revision C: Edited log with laboratory test results included for client comment (Draft log).
 - Revision D: Issued to client (Final log for report).



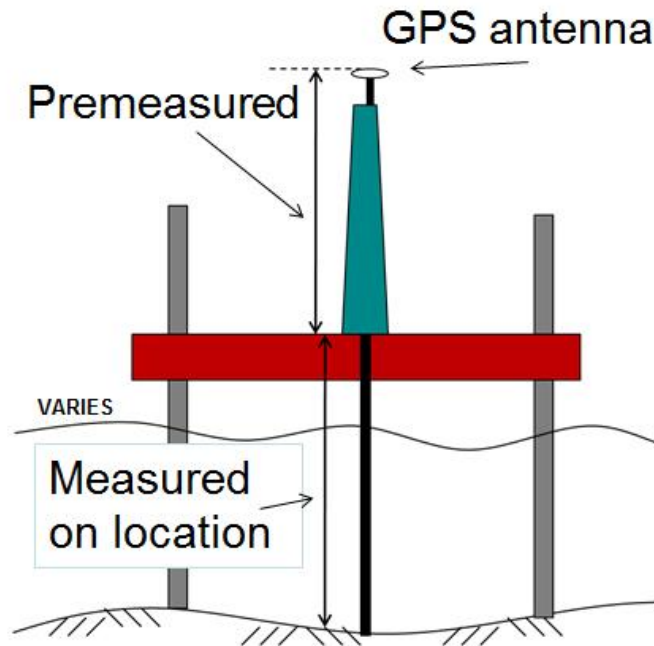
Documenting Variations and Methods

- Field testing during investigations:
 - Qualitative carbonate content testing
 - Pocket penetrometer and torvane testing.
- Soil comments and variations from procedures and standards:
 - SPT testing
 - Density/consistency descriptors
 - Borderline classifications – dual symbols
 - Carbonate Descriptors.
- Rock comments and variations from procedures and standards:
 - Carbonate classification
 - Weathering
 - Inferred strength and Point Load Test (PLT) results
 - Core loss and inferred conditions.



Additional Observations

- Nearshore survey.
- Time/tidal measurements.
- Observations of borehole location relative to surrounding area.
- Daily reporting.





Conclusion

- High quality consistency is achieved through:
 - Choosing the right people.
 - Assigning regional geological units to the conceptual geological model.
 - Refining and modifying the conceptual geological model to obtain a robust model both geologically and geotechnically.
 - Training staff and communicating expectations.
 - Successful engagement of staff in the project.
 - Understanding how the field results contribute to the project and the importance of variations to the expected sub-surface profile.
 - QA/QC of the logging process/procedures.