



**New Zealand
Maritime Pilots'
Association**

www.nzmpa.org

PORT & HARBOUR Marine Safety Code

N E W Z E A L A N D



Port Companies (pilotage providers)

Regional Councils (harbourmaster/local regulator)

Maritime New Zealand (national regulator)

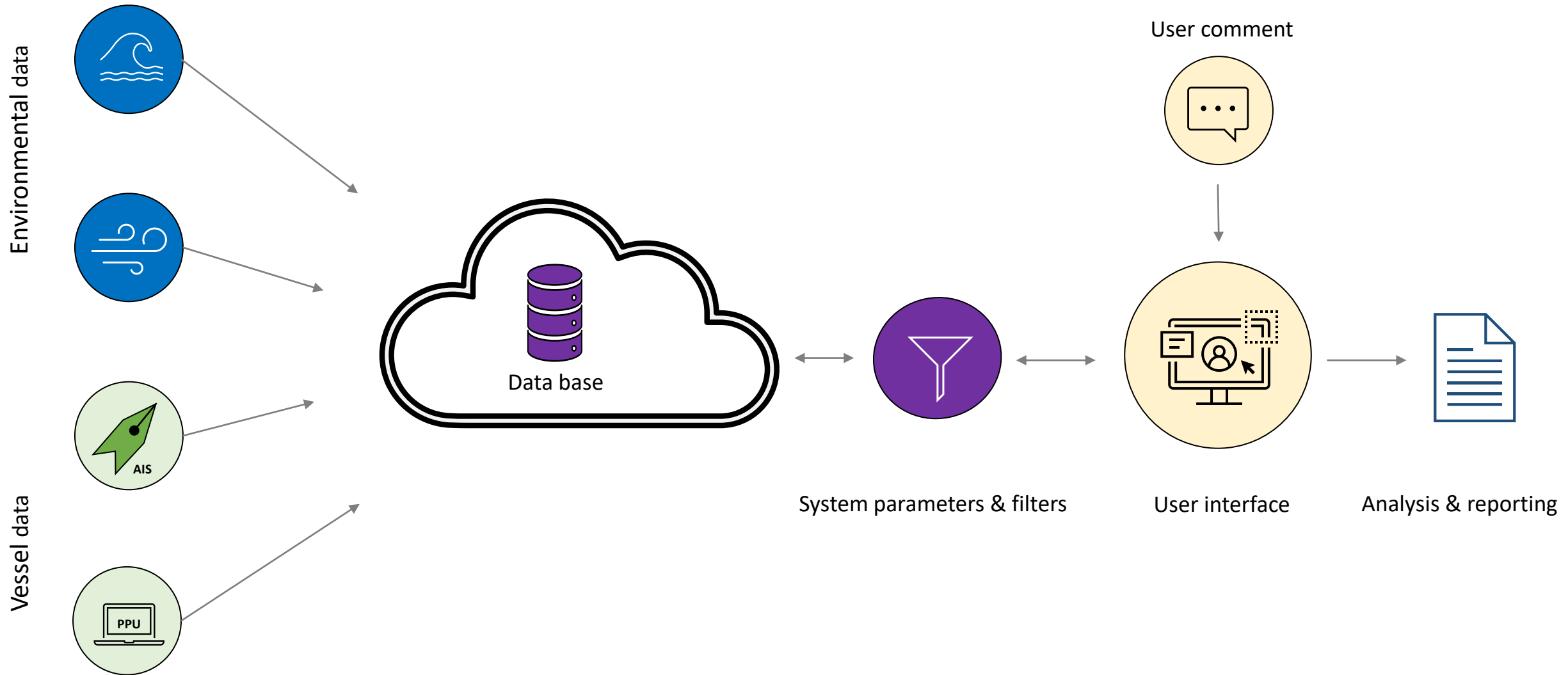
Routine Voyage Data Analysis

Carrot or stick?



Image courtesy of Marine Digital

Voyage data analysis from pilotage operations



Driver for routine voyage data analysis

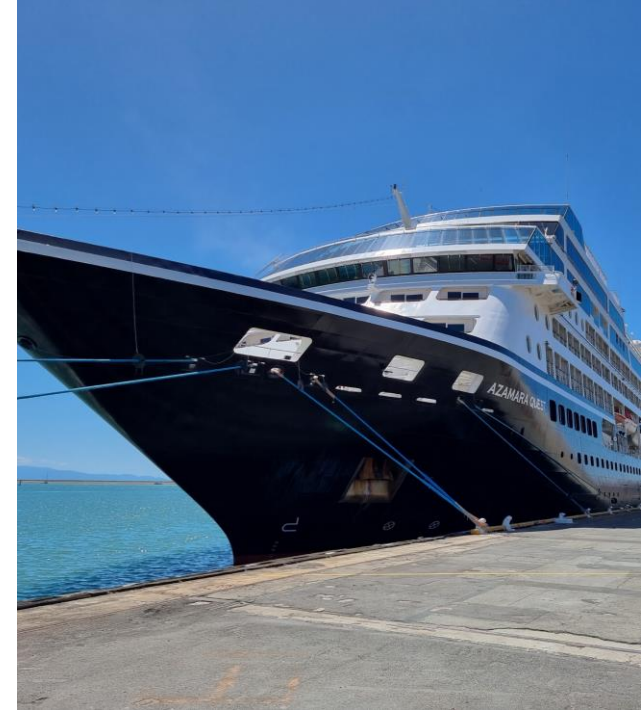
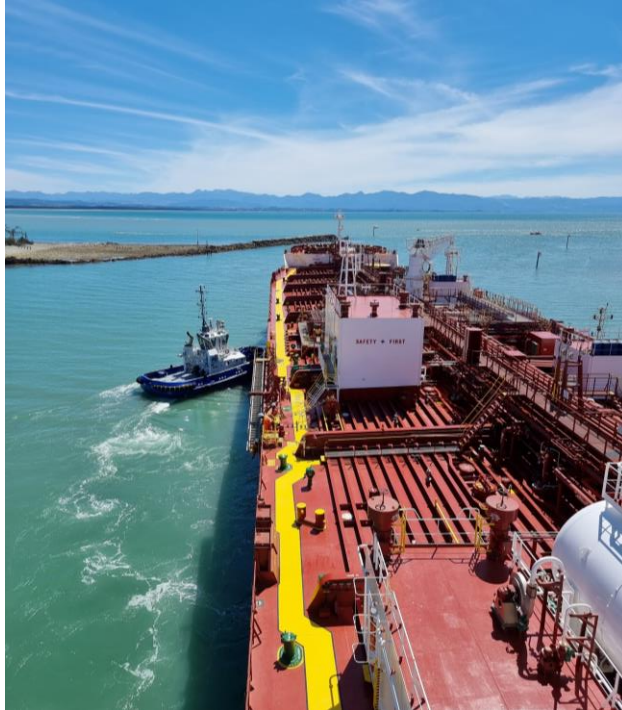
Channel optimization

- Evidence based risk profiling
- Evidence based training and continuous improvement





PORT NELSON



2022-2023

- \$12M EBITDA
- \$70M Revenue
- 3.2M tonne cargo
- 850 shipping movements

PORT NELSON

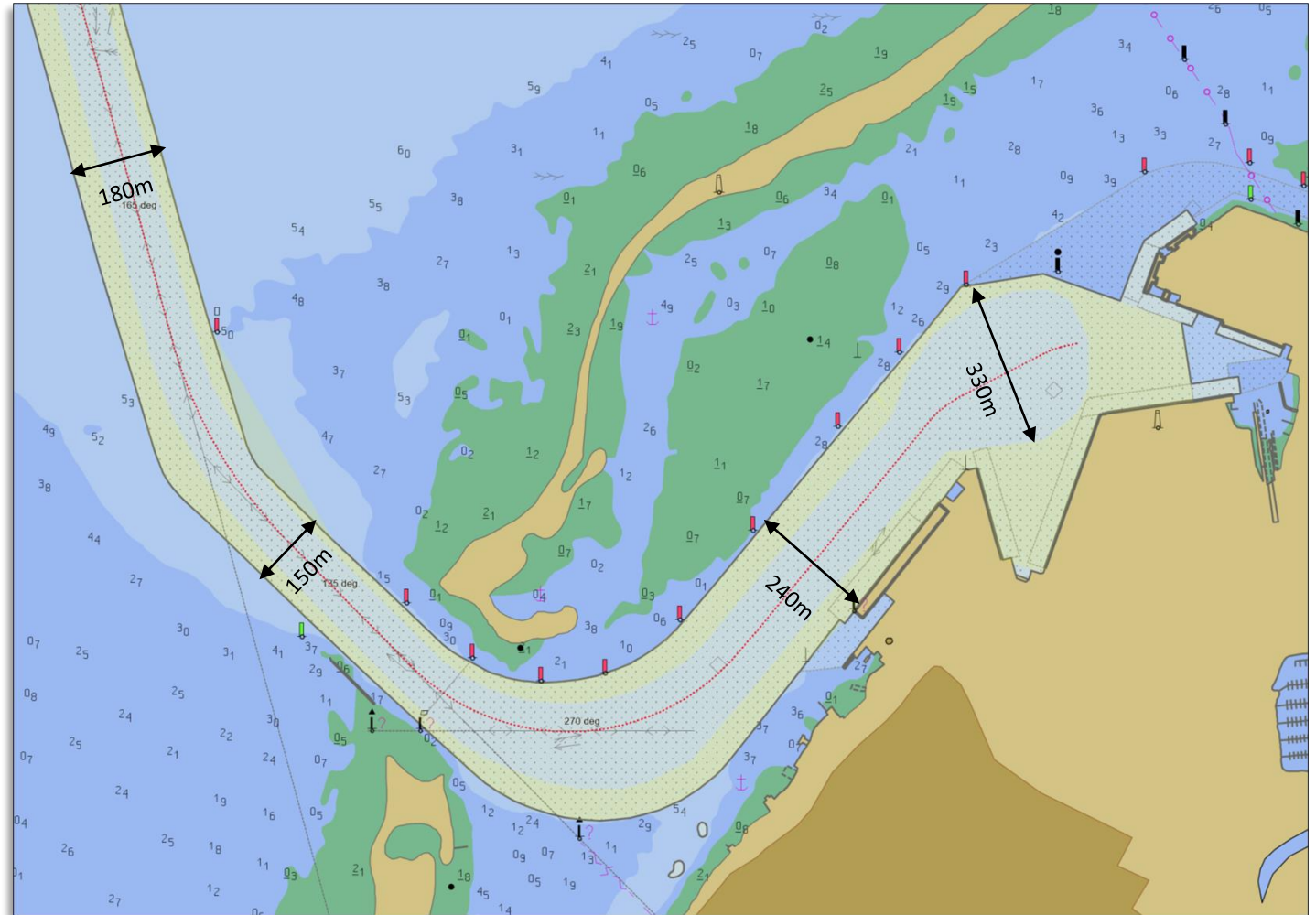


River estuary and tidal lagoon

Port entrance

River estuary and tidal lagoon


The Pilotage




Detailed passage planning

- Define normal operational parameters (navigational and environmental)
- Define safety margins
- Define no-go areas

The New Zealand Maritime Pilot's Association



A GOOD PRACTICE GUIDE
TO PILOTAGE PLANNING



A GUIDE TO THE PROCESS OF PRODUCING FIT FOR PURPOSE
PASSAGE PLANS FOR PILOTAGE OPERATIONS

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11 Page

Feature: Mental models in confined waters

Mental models in confined waters

Sharing planned intervals for timely challenge and response

Antonio Di Lieto – Hans Hederström – Peter Låstrup – Ravi Nijjer

Accidents in confined waters are often the result of intentions and actions not being challenged in due time, despite all formal bridge resource management tools being applied. So, what is missing? How can we ensure that the level of information exchanged on the bridge is detailed enough to enable unambiguous and timely challenge and response?

In order to meet these challenges, a new concept is required for navigation and manoeuvring in confined waters. By defining critical navigational elements (ie cross-track distance, speed, rate of turn, drift angle etc.) in terms of an interval of values – rather than single values – we can remove any ambiguity about when it is appropriate to challenge whenever it is causing the vessel.

This concept addresses many concerns raised by safety investigators around the world. In its accident report M12W0377, investigating a vessel striking a coal terminal, the Transportation Safety Board of Canada maintained that ‘the absence of a detailed, mutually agreed-upon passage plan deprives bridge team members of the means to effectively monitor a vessel’s progress, compromising the principles of bridge resource management.’

Critical navigational elements should be identified and specified by:

- An interval of planned values that represent normal operations. If everything goes according to plan, none of these values will be exceeded.
- Negotiable values that cannot be exceeded (ie non-negotiable waters, breakwaters, speeds beyond or below which it is impossible to control the vessel). If the range value is exceeded then the ship is either aground or has had an allision or collision.
- The reserve: the difference between planned values/limits and margin vulnerabilities. This represents the safety margin available for a specific critical element. The reserve can be used intentionally in order to adapt to unplanned situations, such as traffic or changes in environmental conditions. It may also be used unintentionally due to costing errors.

For this concept to work effectively, critical navigational elements must be agreed and shared in due time before navigating in confined waters. The analysis of real world data from ship’s sensors and high fidelity simulations are essential tools to define the critical elements of a challenging manoeuvre in such a level of detail.

It is important to keep the number of critical elements as low as possible. Applying the concept of the interval of values to all possible navigational elements in confined waters may defeat the overall aim of the concept itself, which is to prevent accidents caused by intentions and/or actions not being challenged in due time.

Case studies – using the reserve intentionally


In Figure 1, the ‘critical element’ is the ship’s position, which is specified by the planned corridor and entering the reserve as a result of an alteration of course to starboard. The reserve here is being used intentionally – and quite correctly. Indeed, the reserve can and should be used as soon as the person costing believes it is reasonable to do so, for example to avoid impeding the passage of a ship contained by its draught.

The person costing should make the bridge team aware of their intention to use the reserve by using the **thinking aloud** technique. This technique is based on verbalising – before the action is initiated – the intended action, the reason behind it and the expected outcome. In this way the critical elements are made available for either confirmation or challenge by other team members.

With reference to Ship A, an example of thinking aloud could be: Plan: ‘I intend to alter course to starboard’.

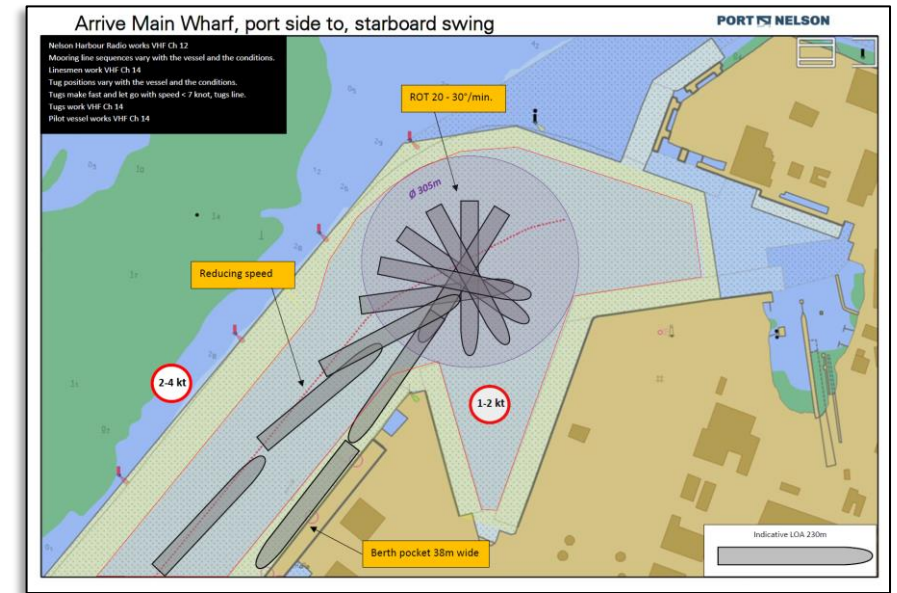
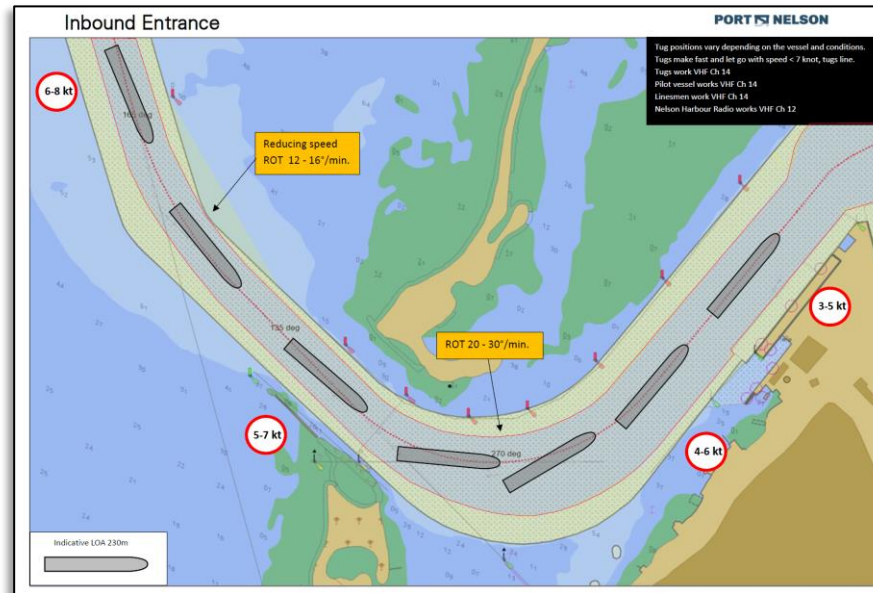
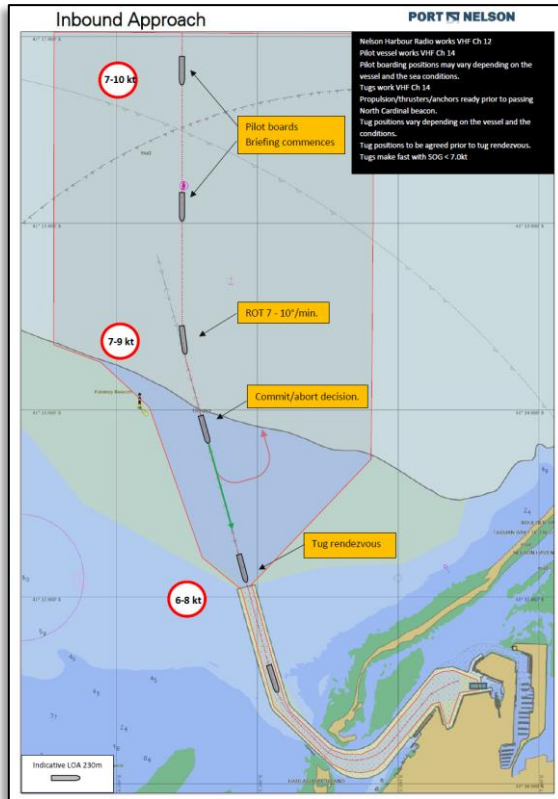
Reason: ‘To avoid impeding the passage of Ship B, which is constrained by its draught’.

Outcome: ‘I will navigate inside the planned corridor with a cross-track distance not more than 200m right of the track’.



4 | Seaways | June 2018

Detailed passage planning





Chart

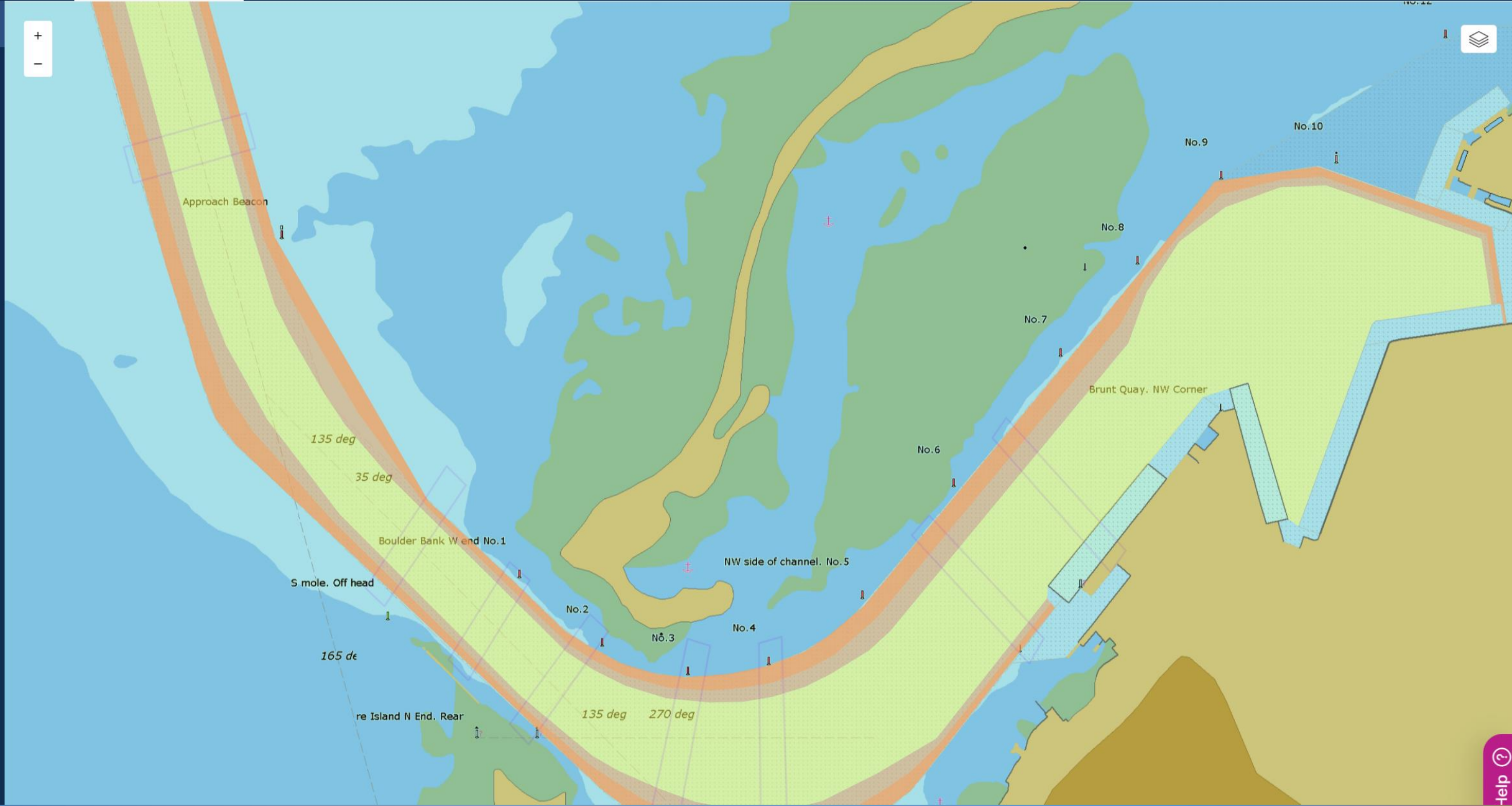
search and playback

Grid

tabular transit data

Matt Conyers

Port manager-Nelson

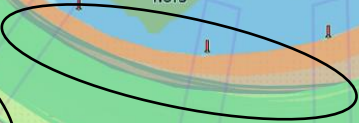
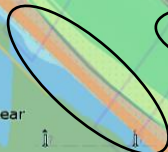
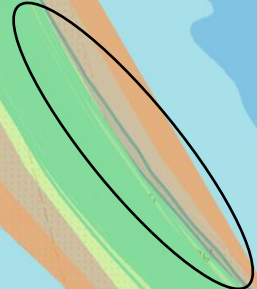




No.12



Channel excursion



Beacon

No.9

No.10

No.8

No.7

No.6

End No.1

NW side of channel. No.5

S mole. Off head

No.2

No.3

No.4

165 de

re Island N End. Rear



Chart

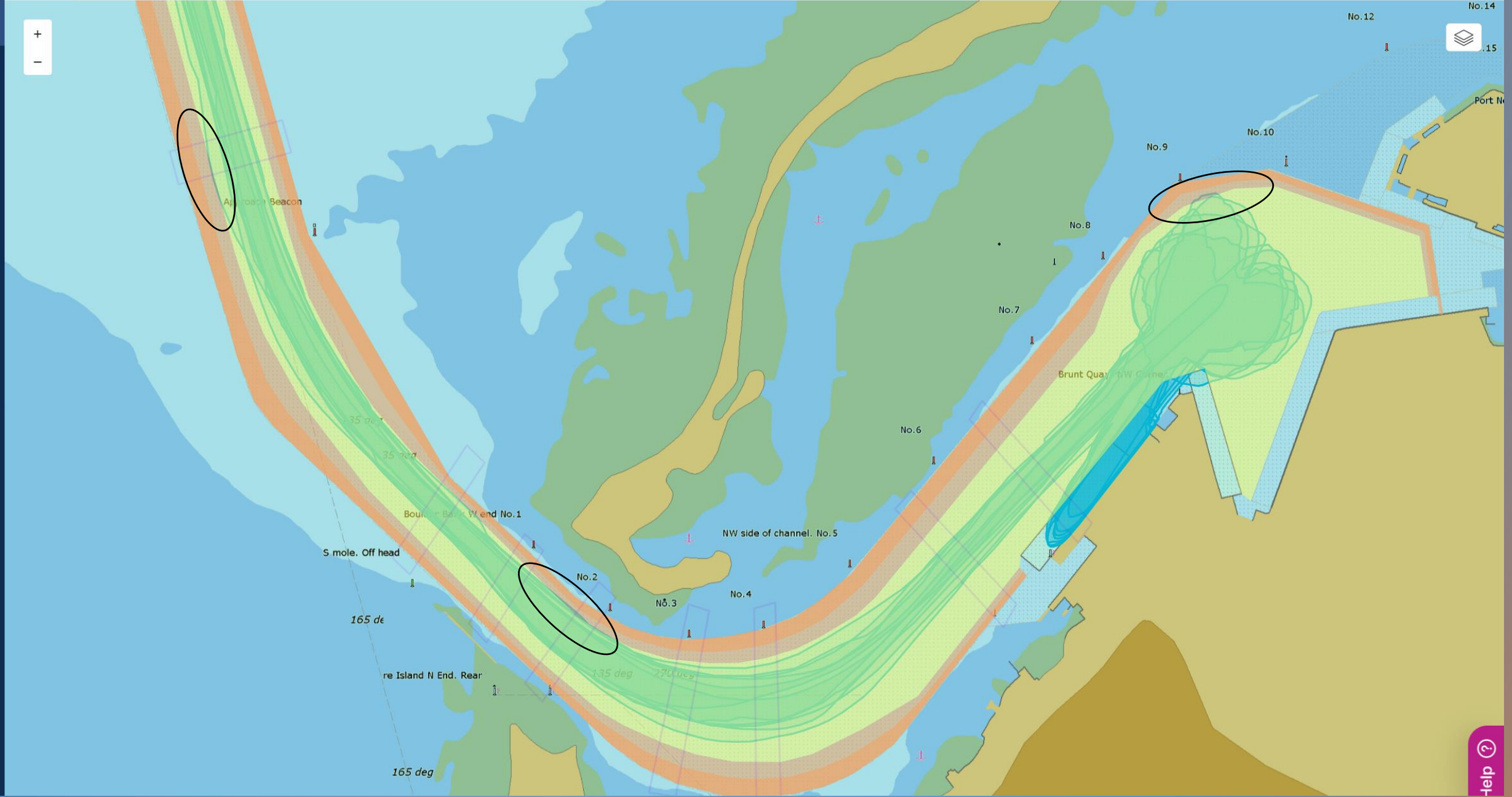
search and playback

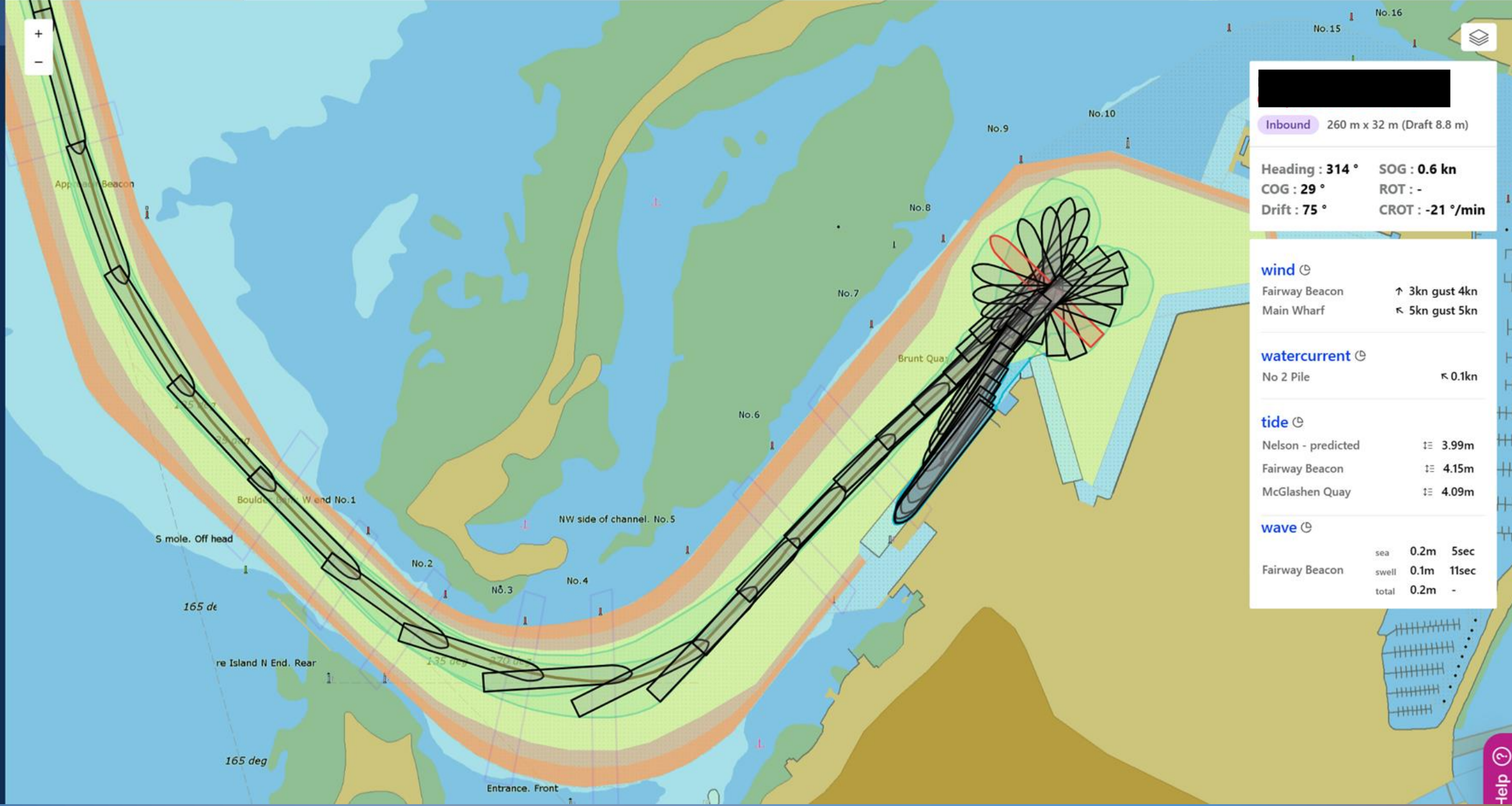
Grid

tabular transit data

Matt Conyers

Port manager-Nelson





Inbound 260 m x 32 m (Draft 8.8 m)

Heading : 314 ° **SOG : 0.6 kn**
COG : 29 ° **ROT : -**
Drift : 75 ° **CROT : -21 °/min**

wind ☺

Fairway Beacon ↑ 3kn gust 4kn
Main Wharf ↖ 5kn gust 5kn

watercurrent ☺

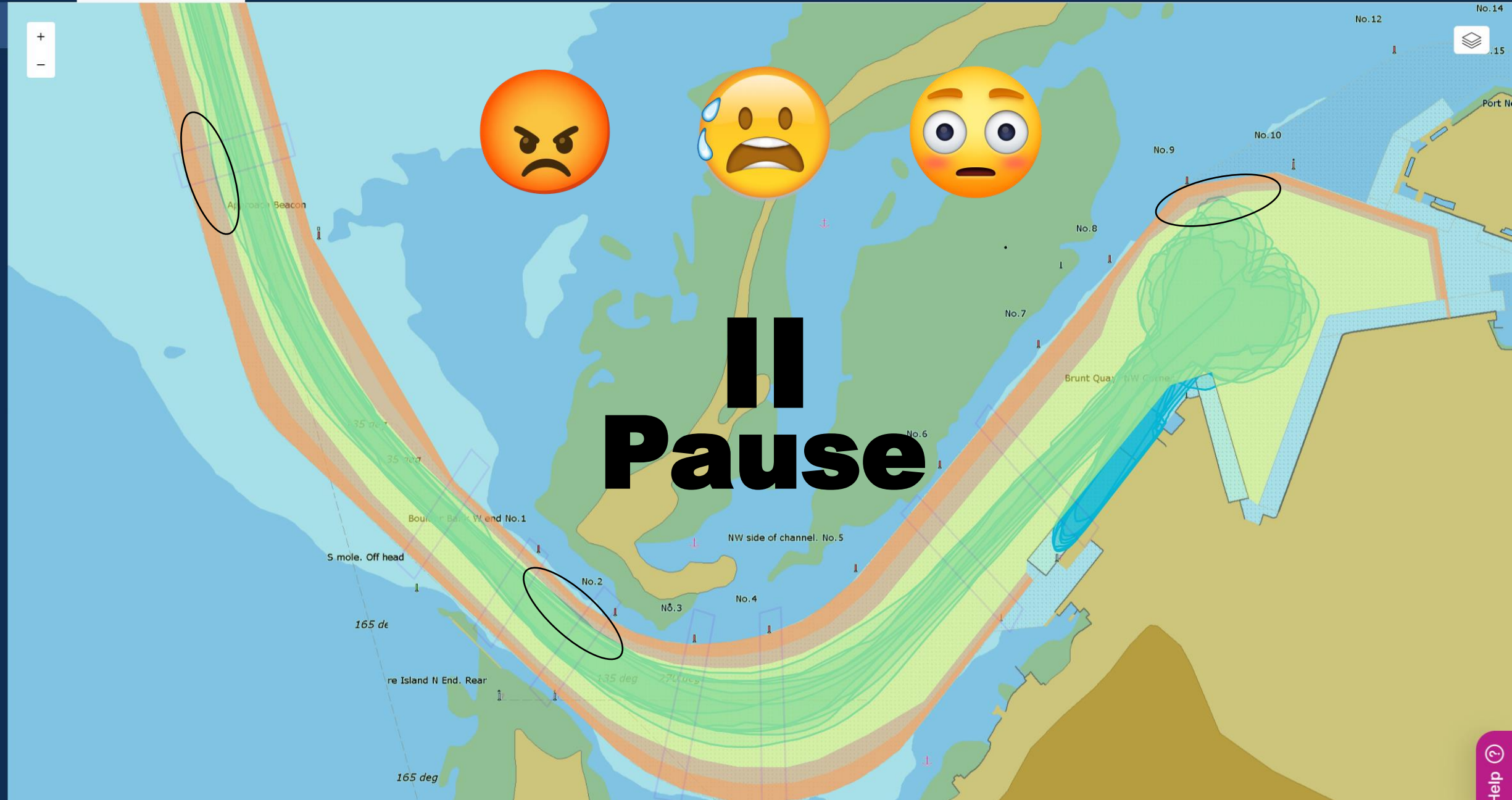
No 2 Pile ↖ 0.1kn

tide ☺

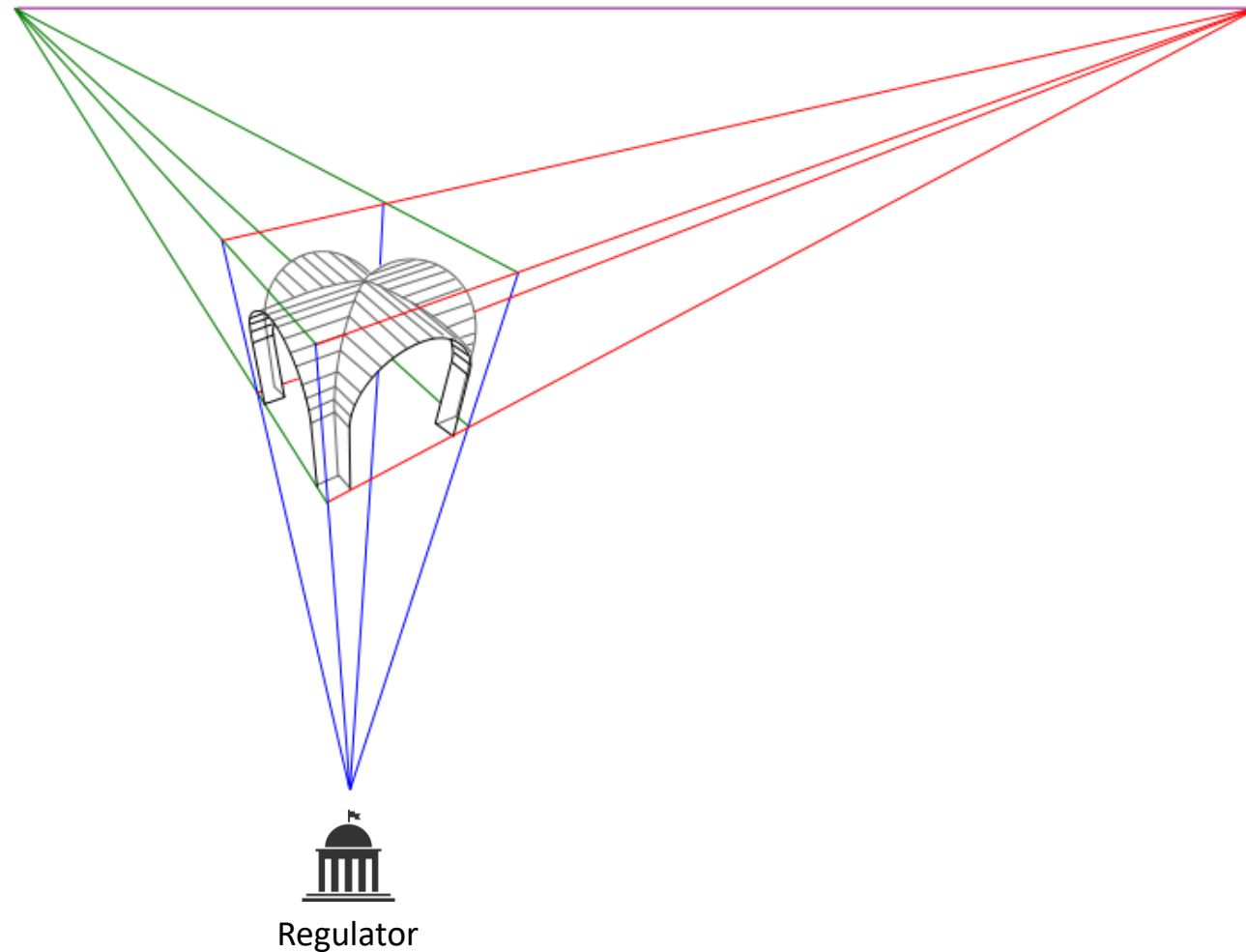
Nelson - predicted ⚡ 3.99m
Fairway Beacon ⚡ 4.15m
McGlashen Quay ⚡ 4.09m

wave ☺

	sea	0.2m	5sec
Fairway Beacon	swell	0.1m	11sec
	total	0.2m	-



Perspective



Pilots' fears of routine voyage data analysis



Mistrust of motives

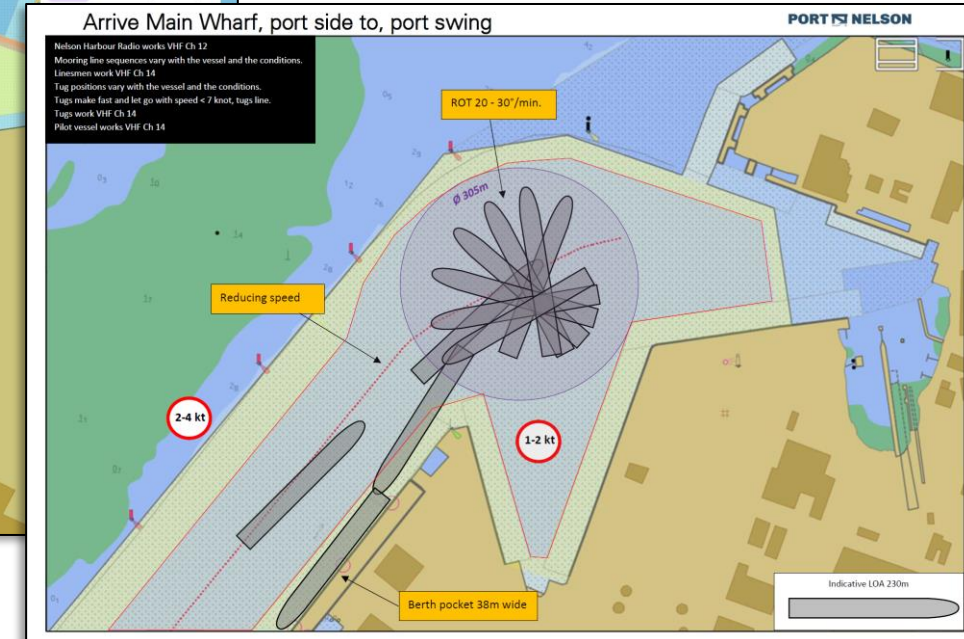
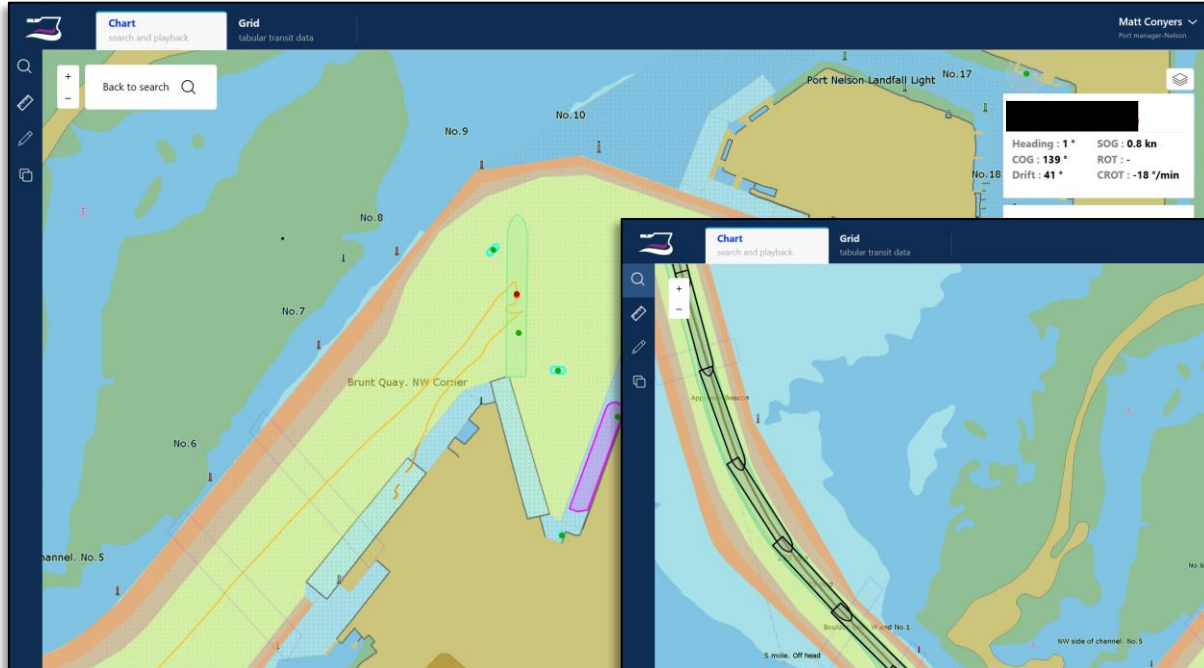
- Objectivity of analysis.
- Individual performance monitoring.
- Punishment or reprimand.

Voyage data protocol

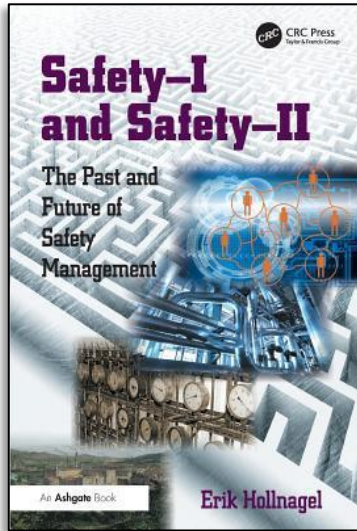
- Shared Objective
- Applications (perspectives)
- Implementation process
- Data sharing principles
- Safety parameters



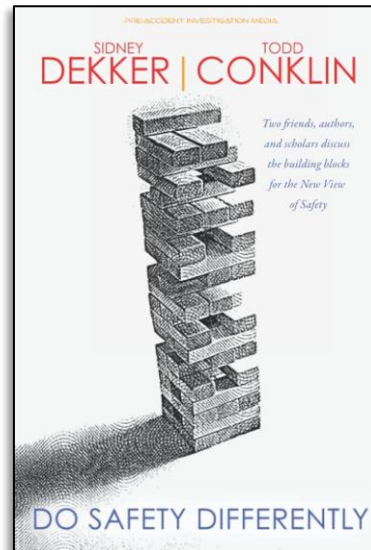
December 2022 – April 2024



Citations

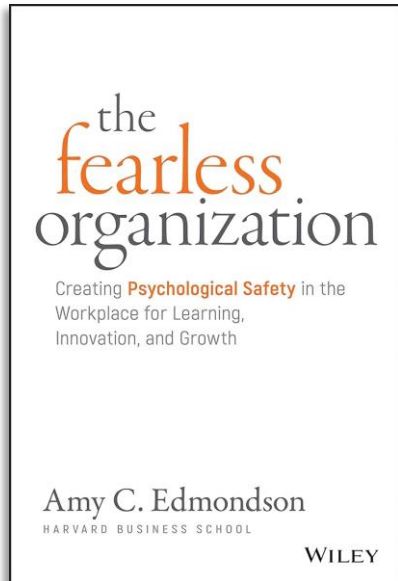


“...focus on why things routinely go right...” (2015)

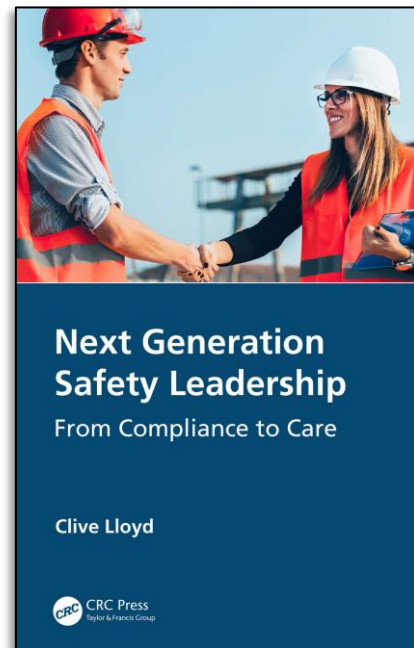


“...safety is creating the capacity to succeed...” (2020)

Citations

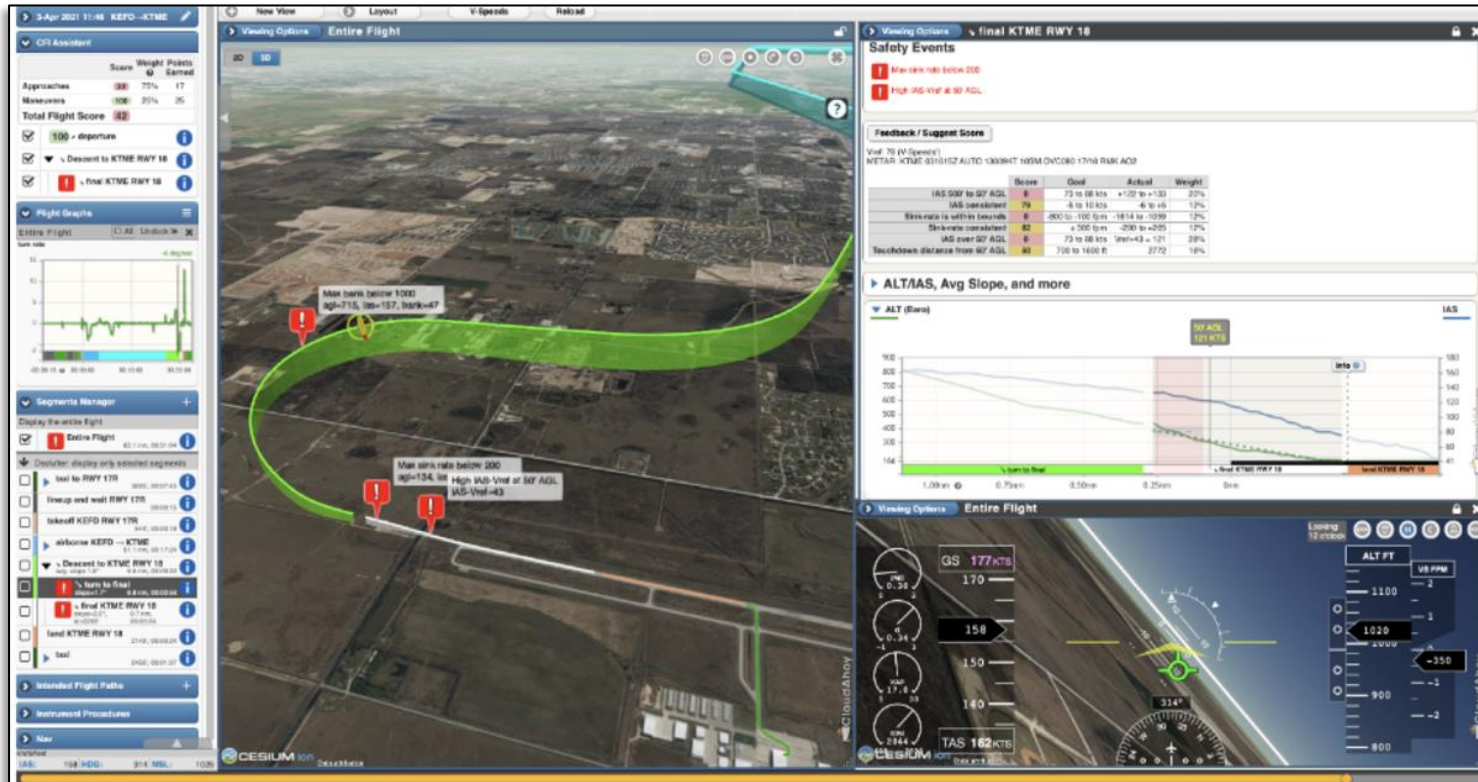


“...creating psychological safety in the workplace...” (2018)



“...a key factor in safety performance is trust...” (2020)

Citations



Flight Operations Quality Assurance

Routine Voyage Data Analysis

Carrot or stick?



Learnings

System Prerequisites

- Detailed passage planning
- A collaborative undertaking
- Practitioner led analysis

System Benefits

- Improved understanding of successful operations
- Improved understanding of risk profile

Leading to:

- Clear training goals
- Improved consistency of pilotage
- Improved processes

Leading to:

- Channel optimisation
- Improved organisational culture

Where to now?

- National / international policy?
- PPU compatibility?

