

# Better freight vehicles in NZ

## Impacts of VDAM Rule on road and infrastructure

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# VDAM Rule 2010

- Enabled greater use of the capability of the network
- Allowed more productive vehicles by increasing length
- Improved safety by double-bunking of logs and reducing the total number of trucks on the network for the same freight task
- Allowed higher mass

# HPMV Route investment 2012-15

- The High Productivity Freight Network has opened up 4900 km of most productive corridors to 58T vehicles.
- This is 5% of total road network carrying 50% of New Zealand's road freight kilometres



# But...

There are limits

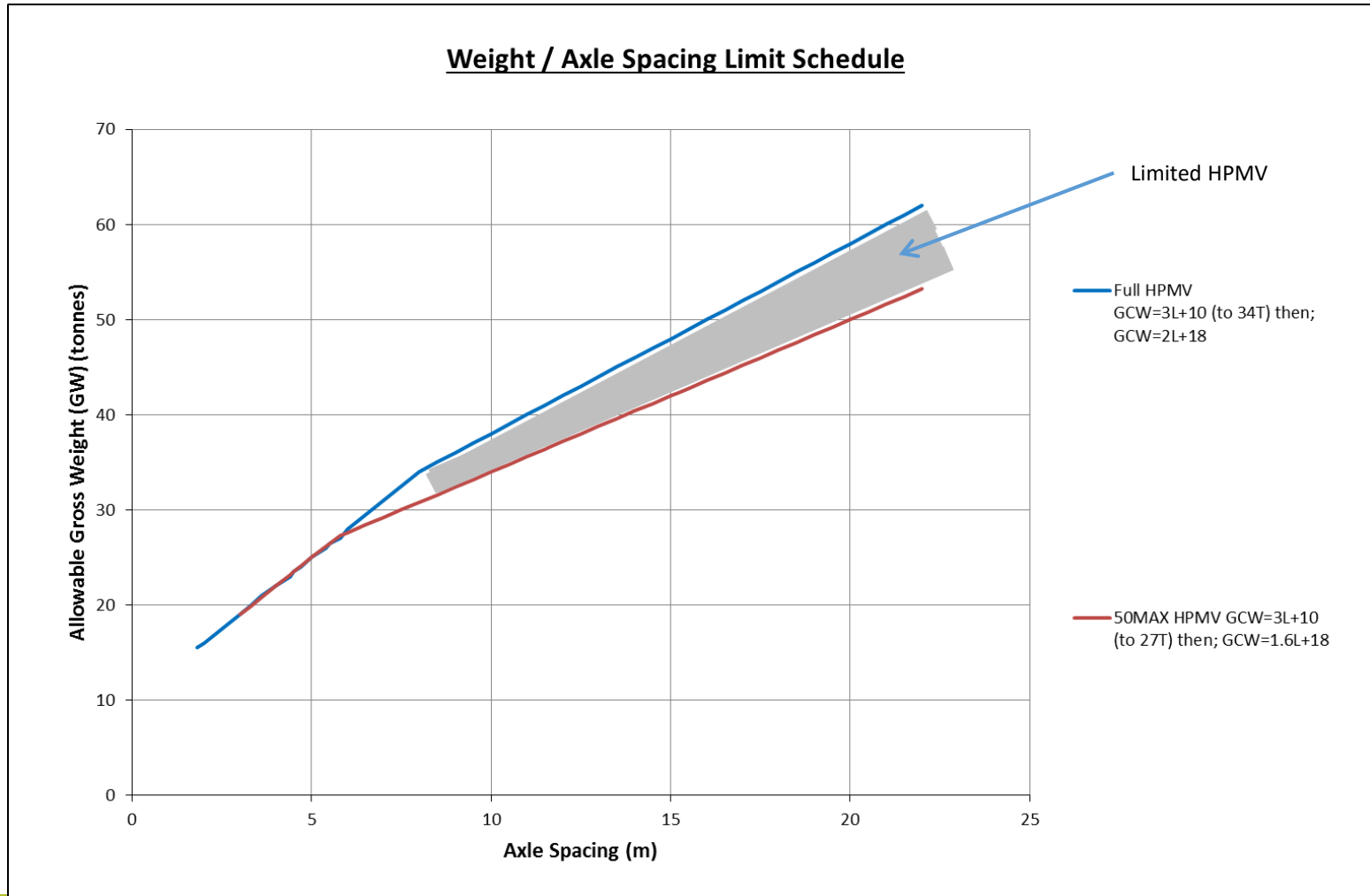


# Bridge Limits

Design Loading	Construction Date	Acceptable Span Range		
		Lower Bound HPMV (with Class 1 AWF)	Ltd. HPMV (with Class 1 AWF)	Full HPMV (with Class 1 or HPMV AWF)
HN-HO-72	1972-	All spans	All spans	All spans
H20-S16-T16	1961-1971	All spans	0 – 50m	0 – 45m
H20-S16-44	1944-1960	0 – 30m	0 – 25m	0 – 20m
H20-S16-41	1943	All spans	0 – 25m	0 – 20m
Traction Engine	1933-1942	0 – 25m*	0 – 17m*	-

\* Provided bridge is unposted and is assessed as being able to safely support Class 1 vehicles.

# Bridge Limits





# Pavement Limits

- New Zealand soils are much softer than those of large continents
- Rigid pavements are not generally viable due to ongoing settlement
- Hence axle loads are limited



# Sustainable Consumption of the Network

- New Zealand leads the world in paygo road funding
- RUC reflects an average damage exponent of 4
- Many minor roads have a damage exponent of 7-10





# Geometry Limits

- Austroads PBS Level 1 limit is 20m for truck and trailer or B train
- NZ has chosen to go to 23m for productivity
- This is creating some issues on a road network that has largely evolved rather than being fully designed

Pro-Forma Design	12.5m radius curve		19m radius curve (25km/h)		35m radius curve (35km/h)		50m radius curve (45km/h)	
	Trailer Radius	Required Width	Trailer Radius	Required Width	Trailer Radius	Required Width	Trailer Radius	Required Width
20m truck and trailer	6.33	6.17	14.42	4.58	31.58	3.42	46.99	3.01
18m tridem semi-trailer	5.39	7.11	13.84	5.16	31.31	3.69	46.82	3.18
19m quad semi-trailer	4.96	7.54	13.43	5.57	31.06	3.94	46.65	3.35
23m truck and trailer	4.96	7.54	13.45	5.55	31.11	3.89	46.70	3.30







# First run - ascent from Wairarapa side



Left side



Forward



Right front wheel



# Fit to the Network

- Clause 2.1(1) of the VDAM Rule states:

*“A vehicle and its load must comply with dimension requirements in this rule and must be manoeuvrable, fit safely on a road and interact safely with other road users”*

- This is similar to other legislation that requires vehicles to stay in their own lane unless it is safe to cross the centreline

# Available Options

- Education
- Enforce the current law
- Modify PBS
- Limit certain vehicles to specific routes
- Erect warning signs



# Performance Based Standards Review

**ORACLE**  
BMW ORACLE Racing

**BMW ORACLE Racing, USA** Challenger for the 33rd America's Cup

**SIZE MATTERS**

- 20** stories high
- 150,000** man-hours to build the yacht
- 90x90** feet, bigger than a baseball infield

**On the Wing Sail**  
The main wing sail and flap are trimmed separately; this precise control is the right main advantage over a conventional sail.

The carbon fiber and Kevlar frame is covered with shrinkable anaerobic film

All flow around the wing sail, creating higher pressure on one side than the other and giving the yacht forward thrust. In the same way, an aircraft is pushed by its wings.

The rig can power the hull as well as trim to take the speed of the prevailing wind.

USA has more than 250 sensors feeding performance and wind speed information to a central database, collecting more than 25,000 data points per second

Rear flap element of wing; new flaps linked together can be twisted and individually adjusted to provide optimum performance

Main rigging hold flaps and wing sail together

The control system for main wing sail uses a small engine to power the hydraulics

The mast rests on a ball to allow for movement, and is held up by conventional stays strong enough to take loads of up to 100 tons

Two bearing positions—one to port, one to starboard—one high upon a horizontal crossbeam allowing the helmsman clear vision of sails and sea on both sides

**America**  
Winner of the first America's Cup in 1851  
Displacement: 124 tons  
Length: 33.5m (110ft 5in)

**USA 17**  
Challenger for the 33rd America's Cup 2007  
Displacement: 24 tons  
Length: 23m (75ft)

**USA**  
Challenger for the 33rd America's Cup

**WING SAIL**

Height	220ft (68m compared to 112ft / 34m length of a Boeing 747 wing and 140ft / 43.3m length of an Airbus A380 wing)
Chord	10 to 30ft / 3 to 10m
Width	2 to 6ft / 0.6 to 2.3m
Surface area	7,000sq ft / 650sq m (in profile)
Weight	7,700lbs / 3,500kg (approx)

**HULL**

Boat Type	Trimaran of carbon composite construction
Where Built	Core Builders, Anacortes, WA, USA
Overall Length	100ft / 30m
Waterline Length	90ft / 27m
Beam	90ft / 27m

Dropper Board  
Rudder

**"USA", an exceptional Ship** [Source: BMW Oracle Racing]



# Performance Based Standards

- What is PBS
- Present use of PBS
- Trials – the discovery of problems
- TERNZ review
- PBS and the future VDAM Rule
- How do we transition?

# Persistent & Deliberate Overloading

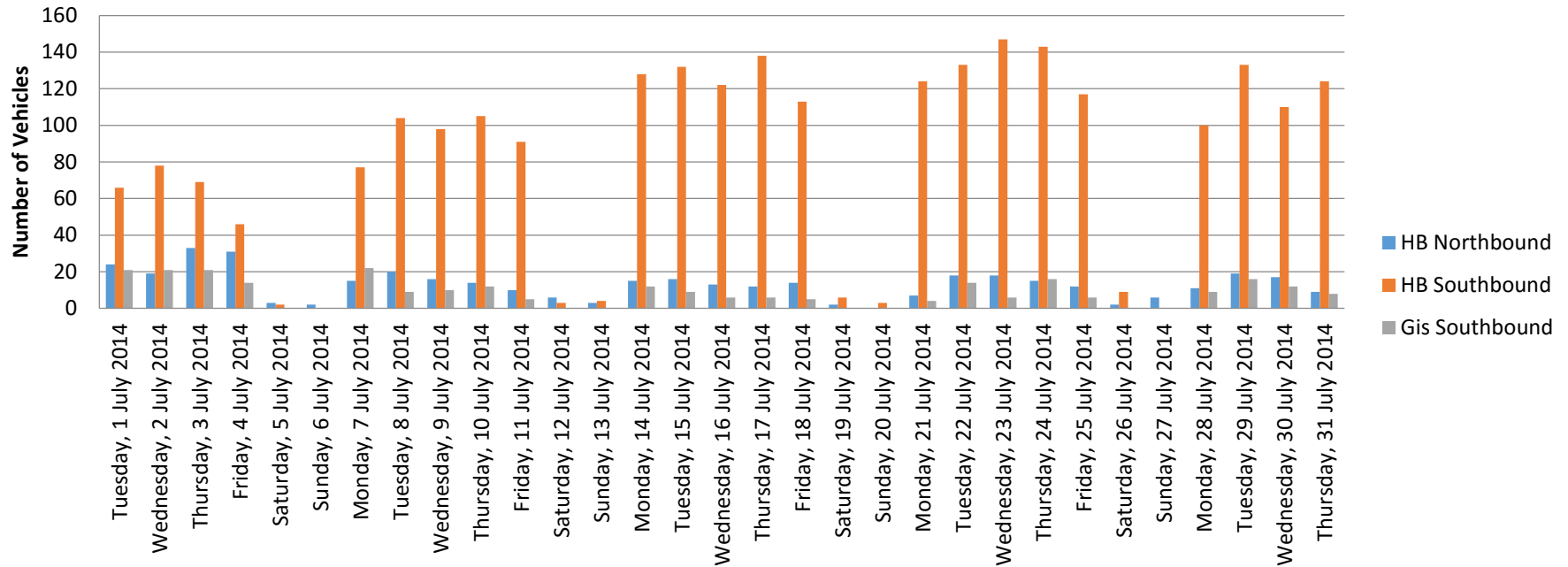




# Weight by the day

Out of 200 vehicles

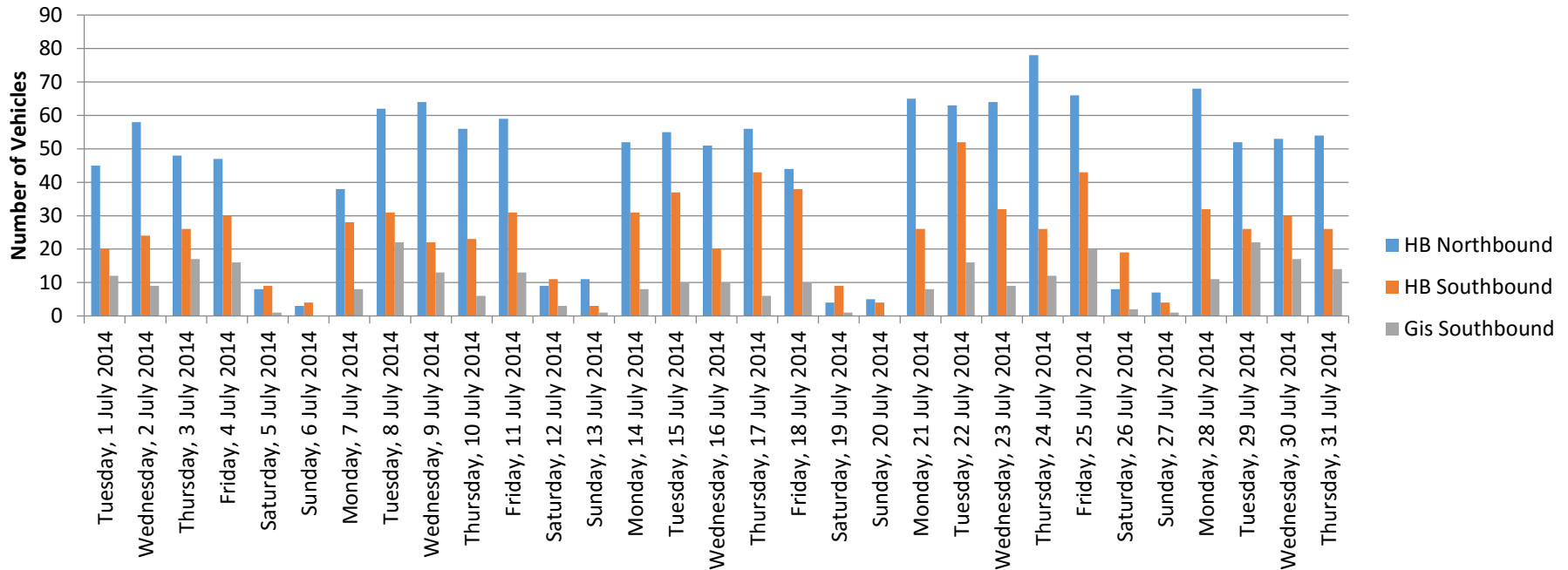
## WiMPR Overweight - 2014



# Speed by the day

Out of 200 vehicles

## WiMPR Overspeed - 2014



# VDAM Permitting manual

- Consolidation of policy and procedures for HPMV, OW, OD, 50MAX and 23-25m, plus new content
- 'Joined up thinking' across common permitting areas, update policy, deliver consistency, remove redundancy

## Vehicle dimension and mass permitting manual

Vol 1 - Applying for and operating under an overweight, overdimension or HPMV permit



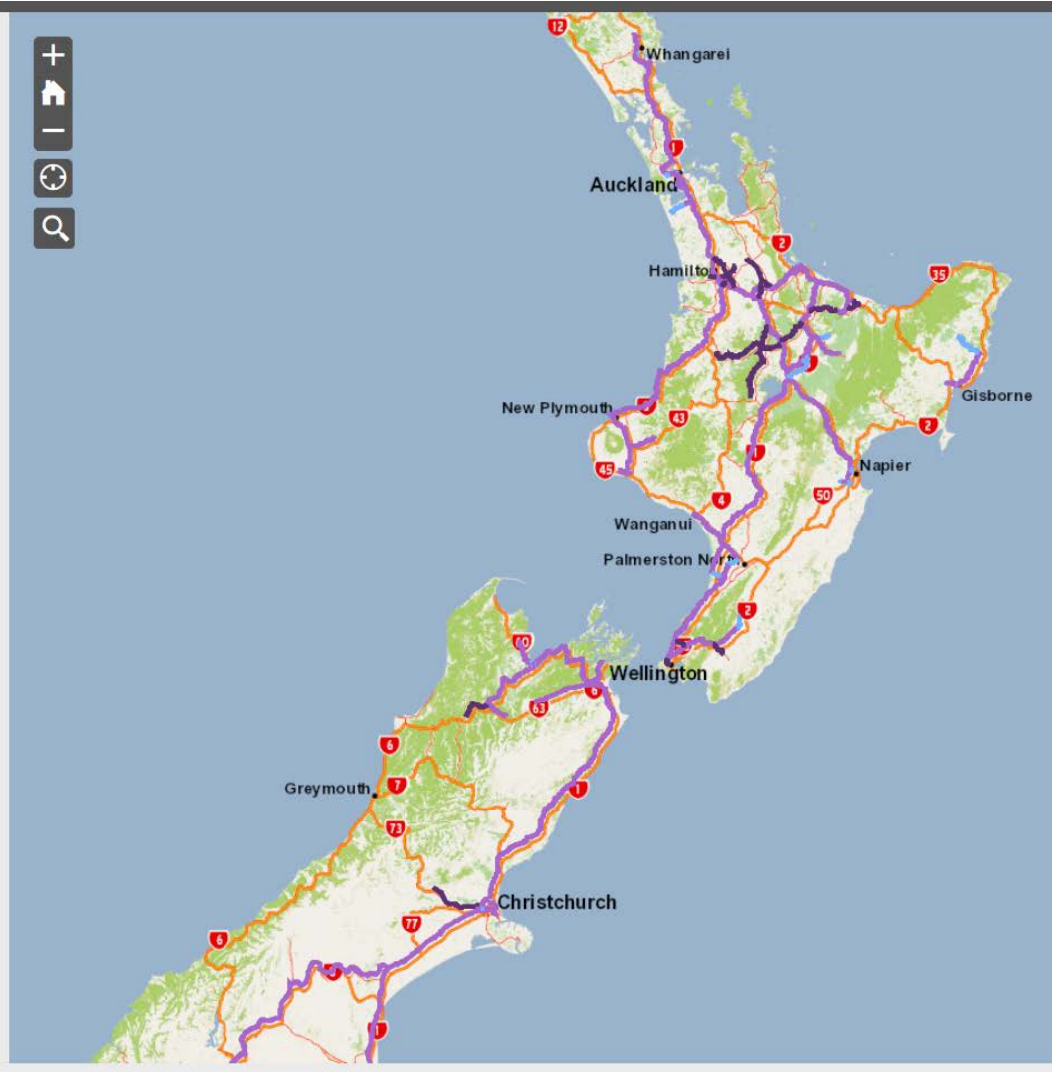
 **NZ TRANSPORT**  
AGENCY  
WAKA KOTAHĪ

New Zealand Government

# High Productivity Freight Network Online Map

High Productivity Freight Network - July 2015 - Total Open Routes 4979km

- SH Route Open for full HPMV following bridge strengthening works - 4133km
- SH Route Open for full HPMV - no strengthening work required - 571km
- Local Road Open for full HPMV - 275km
- SH Not Available



# High Productivity Freight Network - July 2015 - Total Open Routes 4979km

- SH Route Open for full HPMV following bridge strengthening works - 4121km
- Local Road Open for full HPMV - 287
- SH Route Open for full HPMV - no strengthening work required - 571km
- SH Not Available



Land Information New Zealand



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