Under	the Resource Management Act 1991
In the matter of	hearings of submissions and further submissions on the Proposed Wellington City District Plan
By	**Wellington's Character Charitable Trust Inc** Submitter

STATEMENT OF EVIDENCE OF DONALD WIGNALL

7 FEBRUARY 2023

Counsel Acting
D W Ballinger
Stout Street Chambers

(04) 915 9278
duncan.ballinger@stoutstreet.co.nz
PO Box 117, Wellington

INTRODUCTION

1. My full name is Donald Richard Wignall.

Qualifications and Experience

2. I am a consultant with experience in multi-modal transport planning, project development and assessment at national, regional and local scales. I have served as an advisor to government ministries, national agencies, regional organisations, transport operators, territorial authorities, public bodies and commercial developers in New Zealand.

3. I have a Master of Science in Transportation and Traffic Planning from the University of Birmingham, and a Master of Civic Design from the University of Liverpool.

4. I worked as a transport planner in the United Kingdom from 1976 until 2003, for engineering consultancies and urban councils. Since 2003 I have worked as a transport consultant for Transport Futures Ltd in New Zealand.

5. My recent experience in transport planning and assessment includes:

    (a) Advising Greater Wellington Regional Council on the Wellington Rail Programme Business Case (2021/2022);

    (b) Authorship of '*The Development of Rail Path Modelling, Corridor Capacity Assessment*', Australasian Transport Research Forum, (2022);

    (c) Advising KiwiRail on the Wellington Rail Signalling Business Case (2020/21);

    (d) Economics Peer Review of the Lower North Island Longer-Distance (Rail) Rolling Stock Business Case (2019);

    (e) Assessment for Waka Kotahi (New Zealand Transport Agency) of success factors for international Mass Transit (2018/2019); and

    (f) Advising Waka Kotahi on the public transport evaluation section of the Monetised Benefits and Costs Manual (2019/2020).

6. I attach a copy of my CV to this statement of evidence.

Scope of Evidence

7. I have been engaged by Wellington's Character Charitable Trust.

8. Wellington's Character Charitable Trust and others have lodged submissions supporting the position in the notified proposed district plan that the Johnsonville line stops are not rapid transit stops. I understand that other submitters have been lodged that oppose that position and seek for the Johnsonville line stops to be identified as rapid transit stops.

9. My evidence addresses the issue of whether the Johnsonville railway line is a rapid transit service and whether the Johnsonville rail stations are "rapid transit stops" for the purposes of the National Policy Statement on Urban Development.

Code of Conduct

10. I have read the Code of Conduct for expert witnesses in the Environment Court Practice Note 2023 and I have complied with it when preparing this evidence. My evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

EXECUTIVE SUMMARY

11. Whilst most of the Wellington region's electrified rail network can legitimately be described as rapid transit, this does not extend to the Johnsonville Line because of limitations in frequency, travel time, reliability and capacity.

12. The Johnsonville Line is not competitive with alternative modes and does not meet contemporary professional standards expected of rapid transit.

13. There is no realistic prospect of improvements on the Johnsonville Line occurring in the future to meet the definition of rapid transit in NPS-UD and to thereby service the residential intensification aims of NPS-UD.

14. Therefore, in my professional opinion the Johnsonville Line is therefore not a rapid transit service and there are no planned improvements that will make it a rapid transit service.

MATERIAL REVIEWED

15. In preparing this statement of evidence I have reviewed the following materials:

(a) Wellington City Council's section 32 evaluation report – part 1 – context to section 32 evaluation and evaluation of proposed Strategic Objectives.

(b) Wellington City Council Proposed District Plan – Section 42A report for Hearing Stream 1.

(c) Review of the designation of the Johnsonville Railway Line as a Rapid Transit System by Lawrence Collingbourne, Tony Randle and Julie Ward (dated 18 May 2022).

(d) Wellington Regional Land Transport Plan 2021.

(e) One Network Framework and Classification Guidance (version 1 dated November 2022)

(f) National Policy Statement on Urban Development (2020).

(g) Ministry for the Environment "Understanding and implementing intensification provisions for the National Policy Statement on Urban Development" (2020).

(h) Wellington Rail Programme Business Case, Wellington's Strategic Rail Plan, July 2022

(i) North Wellington Public Transport Study, Technical Evaluation Report, 2006

(j) 'Auckland Transit Baseline', Auckland Council, Auckland Transport, Waka Kotahi, 2021

(k) 'Let's Get Wellington Moving – Rapid transit network options' Prepared for Greater Wellington Regional Council, April 2018.

MY APPROACH

16. The National Policy Statement, Urban Development (NPS-UD) 2020, defines a rapid transit stop as "a place where people can enter or exit a rapid transit service, whether existing or planned".

17. A rapid transit service, in turn, is defined as "any existing or planned frequent, quick, reliable and high-capacity public transport service that operates on a permanent route (road or rail) that is largely separated from other traffic".

18. Both these definitions use the expression "existing or planned". Planned is defined "in relation to forms or features of transport" to mean "planned in a regional land transport plan prepared and approved under the Land Transport Management Act 2003".

19. The NPS UD does not give further definition around what constitutes a rapid transit stop or rapid transit service.

20. There are no other documents applicable in New Zealand that provide a definition of a rapid transit stop or service for the purposes of the NPS-UD.

21. For example the One Network Framework includes a similar definition of the PT1 class of public transport, as follows.

Class	Public Transport Service Level descriptor	Strategic Significance (Role in Public Transport Network)	Indicative vehicle volume (Bi-directional)	Indicative People Movement (Bi-directional)	Description
PT1	Dedicated	Strategically significant corridors where **rapid transit** services are operated, providing a quick, frequent, reliable, and high-capacity service that operates on a permanent route (road, rail or sea lane) that is dedicated to public transport or largely separated from other traffic.	≥ 4 services per hour	≥1000 per day	Dedicated or largely separated public transport corridors provide for the fast and efficient movement of people by rapid transit. They only service public transport (except rail lines that can also provide a goods movement function under the freight mode).

Figure 1: One Network Framework Detailed Design, November 2022, Table 5, page 45

22. The definition of the PT1 service level in the One Network Framework includes the same criteria (for rapid transit) as contained in the NPS-UD, namely: ''...quick, frequent, reliable and high-capacity...''.

23. The indicative people movement metric for PT1 indicates a minimum expected two-way patronage of 1,000 passengers per day. I consider that indicative two-way patronage figure to be very low for a public transport service — for example, it would be met by a single bus service per hour. So

this aspect of the PT1 class is not appropriate for defining a rapid transit service.

24. The One Network Framework is a very general document intended to facilitate conversations between professionals and therefore requires interpretation for application to particular services or corridors. For example, it would be possible to classify the Johnsonville Line as either PT1, PT3 or PT4 if one refers to one particular criterion in isolation. In movement corridor terms, the Johnsonville line is either M3 "moderate" or M4 "minor".

25. The One Network Framework needs to be interpreted in light of classification guidance from Waka Kotahi. As it happens, this classification guidance says the Johnsonville Line is PT4, rather than PT1, because it has less than four services per hour on the corridor. By contrast the classification guidance identifies the Hutt and Kāpiti lines as PT1 Dedicated and notes that they generally average around four trains per hour across the day.[1]

26. The section 42A officers report relies on an early draft discussion document version of the One Network Framework as stating that "all metro rail corridors" are PT1 Dedicated. [2] That discussion document has since been replaced, and the current version does not say that all metro rail corridors are PT1 Dedicated.

27. Another possible source of guidance is the Ministry for the Environment's document entitled "Understanding and implementing intensification provisions for the National Policy Statement on Urban Development". This states that commuter rail stops in Wellington and Auckland are examples of existing rapid transit stops. However, this guidance is not binding and does not include any qualitative assessment of the Johnsonville rail line (or indeed any other transport service).

28. In my opinion, the majority of the electrified Wellington rail network would meet the NPS-UD criteria for rapid transit. This is because of the current operational frequency, speed, reliability and capacity of the network and planned improvements to further enhance these characteristics. However, I have concluded, based on my assessment set out below, that the

[1] Waka Kotahi "One Network Framework: Classification Guidance" (November 2022) at page 20.

[2] Wellington City Council s Hearing Stream 1 – s42A Report at [156].

Johnsonville Line is an outlier which does not meet the required criteria for a rapid transit service.

29. The NPS-UD itself does not say that all public transport services (bus, rail, etc) are rapid transit services. In my view this reflects the obvious fact that not all public transport services in New Zealand are equal, and that only some have the necessary qualities to be considered "rapid transit services".

30. My approach to assessing whether or not the Johnsonville line is a rapid transit service involves an assessment of its qualities as a transport service, applying the criteria contained in NPS-UD. Given there is no clear and unequivocal definition of what is meant by quick, frequent, reliable and high-capacity, then professional judgement is needed. In my view, the best way of considering this issue is to examine the characteristics of the Johnsonville Line in the context of contemporary professional practice to determine whether or not it represents a rapid transit service.

31. I assess the qualities of the Johnsonville line service at the present day as the baseline. I then consider whether there are any improvements in the qualities of the service that are planned in the Regional Land Transport Plan (RLTP). This approach is intended to reflect the definition of "planned" in the NPS-UD.

32. For completeness, I also comment briefly on whether there are other improvements to the qualities of the Johnsonville line that could feasibly be made despite not being planned in the approved RLTP.

ASSESSMENT OF THE QUALITIES OF THE JOHNSONVILLE LINE

33. The Johnsonville Line is a historic route, of predominantly single track. It passes through seven tunnels, over 6 bridges and through steep terrain with a sub-standard alignment. It is limited by low operational speeds, infrequent passing places. Station capacity is restricted, with 4 of the 8 stations located on curves and 6 stations being single platform only.

34. In my professional opinion, the Johnsonville rail line cannot credibly be classified as a rapid transit service for NPS-UD purposes, because of severe limitations in its frequency, travel time, reliability and capacity. I now consider these criteria further.

35. **Is the Johnsonville Line frequent?**[3]

(a) The Johnsonville line currently operates half hourly for most of the day, evening and weekends with services every 15 minutes only operating during weekday morning and evening peak periods.

(b) Operating every 15 minutes during the weekday peak periods (only) cannot in my view, be described as frequent in rapid transit terms, given also that the Johnsonville line is only able to accommodate 4 car trains.

(c) Two recent examples of contemporary rapid transit frequency expectations are:

(i) In Wellington professional advice for the Let's Get Wellington Moving programme includes: ''The following characteristics are assumed for rapid transit, …. high frequency (at least 10-minutes all-day, every day)..''[4]

(ii) In Auckland professional advice includes: ''The current definition in the RPTP (for rapid transit) is at least every 15 minutes, between 7am and 7pm, 7 days a week…. A true 'turn up and go' frequency would be a minimum of every 10 minutes.''[5]

(d) These pieces of professional advice are in my view a good representation of current thinking on rapid transit expectations. The Johnsonville Line does not meet the frequency expectations in these guidance materials.

(e) There are no plans to increase Johnsonville Line train frequency from current levels in the RLTP. To increase frequency would require major capital improvements, such as double tracking, additional passing loops, platforms and rolling stock, but such

[3] My comments here respond to the points in Wellington City Council s Hearing Stream 1 – s42A Report at [175] and [178]–[179].

[4] '*Let's Get Wellington Moving - Rapid transit network options*' Prepared for Greater Wellington Regional Council, April 2018 at p10.

[5] '*Auckland Transit Baseline*', Auckland Council, Auckland Transport, Waka Kotahi, 2021 at p9.

options have not been adopted in the investment programme to 2051. For this reason, the existing Johnsonville Line frequency should be assumed to be the same as the planned frequency.

(f) In contrast, competing bus services from Johnsonville to Wellington Rail Station are frequent, operating in the peak on average every 5 minutes, or 12 buses per hour, compared to Johnsonville Line trains (4 per hour in the peak).

36. **Is the Johnsonville Line quick?**[6]

(a) The Johnsonville Line maximum operational speed is predominantly 50 km/h, compared to 80 km/h on the Hutt Road and 100 km/h on the urban motorway into Wellington. Actual travel speeds on the Johnsonville Line are low compared to other electrified rail lines in Wellington Region, for example the Kāpiti and Hutt Valley line trains reach speeds of 100 km/h.

(b) The scheduled rail service from Johnsonville to Wellington Station operates over a distance of 10.5 km with a scheduled time of 23 minutes in the peak direction, and 28 minutes for counter-peak services. Because of the 5 minute allowance for punctuality purposes, actual rail travel times are often longer than scheduled. Travel speeds are low for scheduled train services, at 27km/h for 23 min timings and 22 km/h for 28 min timings.

(c) By bus the distance to Wellington Rail Station via Hutt Road, is 8.8 km and the scheduled bus travel times from Johnsonville vary between 15 and 30 minutes. However, for the vast majority of the day, travel times are far quicker by bus than by train with a typical bus time of 15 minutes at an average speed of 35 km/h.

(d) By road the distance from Johnsonville Station to Wellington Rail Station is 8.7 km (via SH1). Car travel times are on average in

[6] My comments here respond to the Wellington City Council Hearing Stream 1 – s42A Report at [180]–[183].

the peak expected to take 12 minutes, representing a speed of 44 km/h. I have set out these speeds in the following comparative table of rail, bus and car:

Table 1 Johnsonville Station to Wellington Rail Station Travel Comparison

Metric	**Rail**	**Bus**	**Car**
Distances	10.5 km	8.8 km	8.7 km
Typical Travel Times	23 min and 28 min	15 min	12 min
Speeds	22 to 27 km/h	35 km/h	44 km/h

(e) For travel from outer stations, such as Johnsonville, train services are simply not competitive, and access to Wellington CBD and to a range of other destinations is much quicker and more attractive by bus (or car) rather than by rail.

(f) There are no plans to increase speeds on the Johnsonville line in the RLTP.

37. **Is the Johnsonville Line reliable?**[7]

(a) The Johnsonville Line experiences reliability and delay issues in adverse weather due to low wheel adhesion (or 'slippery tracks') which are common during the autumn and winter months. Due to the steep topography, the Johnsonville line is prone to slip-related issues. As KiwiRail have stated: ''Slippery track conditions are the most common reason for disruptions on the Johnsonville Line, particularly during the winter months. The grade of 1 in 36 on the steepest part of the line makes the Johnsonville Line one of the steepest commuter lines in Australasia. When dew or overnight frost settles on the tracks, this causes adhesion issues for the trains, which means that services often struggle to keep up to the current timetable. The fact that the Johnsonville Line is predominantly single line track

[7] My comments here respond to the Wellington City Council Hearing Stream 1 – s42A Report at [179] and [184]–[185].

compounds delays to services, meaning that any small delay has a knock on effect, especially during the peak travel periods…. There are other factors that contribute to disruptions on the Johnsonville Line, such as operational reasons, points and signal faults, land slips and mechanical faults just to name a few.''[8]

(b) The presence of a 5 minute timing allowance on such a short journey for punctuality purposes, encourages poor timekeeping and late running.

(c) These issues are unique to the Johnsonville line, and negatively impact on its reliability.

(d) There are no plans in the RLTP to address these reliability issues, and major capital investment would be needed to address them.

38. **Is the Johnsonville Line high capacity?[9]**

(a) The current maximum seated capacity is 1,176 people per hour in the peak direction. This is based on a four-car electric multiple unit train operating every 15 minutes. This also represents the maximum capacity the line can accommodate either now or in the future.

(b) In my opinion, this cannot be described as high capacity in rapid transit terms. The ONF PT1 definition of ≤1000 people per day (bidirectional) is inappropriate for NPS-UD definition purposes as it is overinclusive and could, for example, be satisfied by the operation of a single bus an hour, clearly an unsuitable minimum threshold for rapid transit definition purposes.

(c) An indication of contemporary professional advice on what constitutes 'high capacity' in rapid transit terms was provided in

[8] KiwiRail, Customer Communications review for the Johnsonville Line, July 2015

[9] My comments here respond to the Wellington City Council Hearing Stream 1 – s42A Report at [176] and Appendix C.

Auckland: ''Compared to the capacity of a single lane of traffic (800-2,000 vehicles per hour), rapid transit offers the potential to move vastly more people.'' [10] Clearly, such an approach would not classify Johnsonville Line as being high capacity.

(d) Bus services from Johnsonville to Wellington currently offer an equivalent seated capacity to that offered by the Johnsonville Line. This is the only example of buses being operated by Greater Wellington Regional Council in direct competition with an entire rail service, in recognition of the severe limitations of the Johnsonville Line. Bus services from Johnsonville operate on a high frequency and recent investments in capacity and quality have been on the major Johnsonville bus hub, rather than on the nearby rail station.

(e) No improvements to increase rail capacity through major capital improvements on the Johnsonville Line are planned in the RLTP or the Wellington Rail Programme Business Case. Any substantial improvements to the Johnsonville Line would be very high in cost terms and would almost certainly be categorised as 'low' in terms of Waka Kotahi cost-benefit funding criteria.

39. I now make some overall comments on whether the Johnsonville rail line meets the NPS-UD rapid transit criteria.

40. First, there are key limitations to the frequency, capacity, travel time and reliability of this service. These limitations are interrelated. For example, increasing train frequency would substantially decrease the reliability of the Johnsonville Line unless there were major planned infrastructural improvements to the line. Capacity limitations severely restrict the ability for the Johnsonville Line to support urban intensification in the surrounding catchment area.

41. Secondly, the Johnsonville line is very limited in its attractiveness and convenience to potential users compared to alternative travel modes. The

[10] '*Auckland Transit Baseline*', Auckland Council, Auckland Transport, Waka Kotahi, 2021

low-speed and single-track nature of the route restricts the competitiveness of the Johnsonville Line. For travel from outer stations, such as Johnsonville and Khandallah, to Wellington, rail services are simply not competitive, and access to the Wellington CBD and to a range of other destinations is quicker and more attractive by bus and car. The Johnsonville rail service is only partly competitive for some peak directional travel from inner stations (such as Crofton Downs) to Wellington Rail Station where the commuter's starting point and end destination are very close to the rail stations.

42. Thirdly, there are no material improvements to the Johnsonville line that are planned either in the RLTP or in the Wellington Rail Programme Business Case. This means there is no prospect of increasing speed, capacity, reliability or frequency out to 2051. The inability to meet any of the NPS-UD rapid transit criteria and the lack of plans or potential for any improvement, clearly differentiates the Johnsonville Line from the rest of the electrified rail network.

43. The Council officers' section 42A report states that the capacity of the current Johnsonville line service may need to be increased in the 2035–2050 period by adding two cars per service in peak times or alternatively adding a passing bay at Simla Crescent to support the population growth along the line.[11] None of these improvements are planned in the RLTP or the Wellington Rail Programme Business Case, and it is speculative to assume they would either be feasible, effective or would be funded.

44. Finally, to put this issue in context, no one would use the current characteristics of the Johnsonville Line to derive a standard for a rapid transit system. This would be unthinkable given the obvious limitations of the line.

DONALD WIGNALL
7 FEBRUARY 2023

[11] Wellington City Council Hearing Stream 1 – s42A Report at [178].

Appendix A: Don Wignall CV

Don Wignall

PROFESSION: **Transport Consultant**

QUALIFICATIONS: **Master of Science;** Transportation and Traffic Planning; University of Birmingham (UK)

Master of Civic Design; Town Planning, University of Liverpool (UK)

Summary

Experience in transport planning, project development and assessment (NZ, Australia, UK, Europe and USA) national, regional and local scales, for government ministries, national agencies, transport operators, regional organisations, territorial authorities, and developers:

2003 – 2022: Transport Consultant, Transport Futures Limited (NZ) http://transportfutures.co.nz/

NZ Transport Agency / Waka Kotahi

- Peer Review of research project 'Climate Change: interventions to reduce land transport greenhouse gas *emissions'* (Waka Kotahi, 2022).
- Transmission Gully motorway road tolling modelling and feasibility analysis, using SATURN, including publication of results at ATRF see references (NZTA, 2020/21).
- Development of Public Transport evaluation section of the Monetised Benefits and Costs Manual, EEM refresh (NZTA, 2019/20)
- Peer review of Transmission Gully SH1 readiness project to forecast 'day one' impacts, including review of modelling assumptions, methodology and outputs for a large complex regional network, involving the use of strategic and localised detailed models (NZTA, 2019/20).
- Preliminary assessment of international mass transit (BRT and LRT) success factors, public transport research scoping project (NZTA, 2018/19).
- Post-implementation reviews: transport consultant for 24 transport projects throughout NZ, (capital value $2.4b including assessments of forecasting accuracy and measurement of performance against objectives. Specific projects; included: *Public Transport*: Auckland Northern Busway, Auckland Real Time Passenger Information, Auckland Integrated Fare Systems. *Road Projects*: SH1 Alpurt B2 Auckland Northern Motorway Toll Road, SH1 Victoria Tunnel (Auckland), SH20 Manukau Harbour Crossing and Motorway Extension, including publication of results at ATRF https://www.australasiantransportresearchforum.org.au/sites/default/files/ATRF2017_031.pdf (NZTA, 2012-16).
- Peer reviews for research projects, topics included: integrated land use and transport planning, bus policy model development, public transport parameter values, economic evaluation of public transport services, park and ride evaluation, operational network evaluation (NZTA, 2008-16).
- Development and application of elasticity based multi-modal **S**trategy **R**eview **M**odel and associated web based SRM Communications Model (NZTA, 2008-2014).
- Review of NZ public transport evaluation procedures, involving literature review, analysis, reporting and presentation of results https://www.nzta.govt.nz/assets/planning-and-investment/docs/northern-busway-review-report.pdf and https://www.nzta.govt.nz/assets/planning-and-investment/docs/northern-busway-review-annexes.pdf (NZTA, 2012).
- Research on option values and non-use values to quantify public transport economic benefits https://nzta.govt.nz/assets/resources/research/reports/471/docs/471.pdf now incorporated in ATAP Guidelines M1 (NZTA, 2011/12)
- Research on the implications of road investments, to provide evidence on the implications of major road investments in New Zealand on travel demand, operational performance, environmental effects, emissions, road safety, development patterns and economic effects. https://www.nzta.govt.nz/assets/resources/research/reports/507/docs/507.pdf (NZTA, 2011/12).
- Review of PT fares policy and objectives (NZTA, 2011).
- Assessment of Regional Land Transport Strategies, regional transport models and development of targets https://www.nzta.govt.nz/assets/resources/research/reports/385/docs/385.pdf (NZTA, 2008/9).

- Regional Land Transport Programme guidelines https://www.nzta.govt.nz/assets/resources/regional-land-transport-programmes/2009-2012/docs/rltp-guidelines-09-12-v1.pdf (NZTA, 2008).

Land Transport NZ

- Stocktake of national funding allocation process, involving case study analysis of 19 projects (LTNZ, 2008).
- Auckland Road Pricing Study representative (LTNZ, 2007/8).
- Peer reviewer for 'Regional Public Transport Plan Guidelines' (LTNZ, 2007/8).
- Pre-investment reviews of major investment packages, including: Ngauranga to Airport Corridor and Auckland Eastern Corridor, (Land Transport NZ, 2006-2008).
- Detailed involvement in regional land transport strategies (Auckland, Northland, Bay of Plenty, Horizons) and the development and selection of strategic options for: public transport, travel demand management and highway network improvements (Land Transport NZ, 2005-2008).
- Evaluation of Wellington RLTS development (LTNZ, 2007).
- National review of Land Transport Programmes to assess performance against LTMA requirements and authorship of document *''Towards better practice in land transport programmes''* (LTNZ, 2007).
- Joint designer and facilitator for workshops to develop working definitions of sustainability and application for funding assessment purposes (LTNZ, 2007).
- Assessment of major modelling proposals, including Auckland ATM2 and Christchurch CTM multi-modal four stage models, and strategic traffic models for the Waikato and Bay of Plenty Regions: North Shore and Rodney Districts involving associated reviews of modelling/forecasting techniques (LTNZ, 2005-7).
- Examination of potential for the application of strategic environmental assessment techniques to NZ (Land Transport NZ, 2005/6).

Transfund NZ

- Development of national guidelines for the preparation of Regional Land Transport Strategies within the new (Land Transport Management Act) national policy context (Transfund NZ, 2005).
- Detailed participation in the Auckland Regional Land Transport Strategy review process, involving detailed involvement on the ARLTS Technical Advisory Committee, covering topics such as, travel demand management, public transport, network planning, safety and funding (Transfund NZ, 2004/5).
- Identification of examples of good practice to develop potential 'packages' of measures to optimise investments (Transfund NZ, 2004/5).
- Design of assessment, prioritisation and decision-making methodology used for the development of the National Land Transport Programme (Transfund NZ, 2004).
- Leadership of assessment and technical review of the six major projects suspended from the 2003/4 national programme, applying the policy context developed for the new funding allocation process (Transfund NZ, 2003).
- Development of procedures and techniques to implement the new funding allocation policy development to (Transfund, 2003/4).
- Leadership of project to comprehensively revise the national funding allocation process (FAP) on a multi-modal basis, to comply with the Land Transport Management Act, involving the design of new six stage process: formulation, assessment, prioritisation, programming, approval and monitoring (Transfund NZ, 2003).

Ministry of Transport

- Consultant to New Zealand Transport Strategy Update Project, including the development of forecasting and scenario testing capabilities The New Zealand Transport Strategy 2008 (mcguinnessinstitute.org) (MoT, 2007/9).
- Representative on the Waikato Joint Officers Group (MoT, 2006).
- Review of major NZ transport models, application of regional and national models to test alternative policy initiatives (MoT, 2007/9)
- Review of NZ roading costs, involving case study analysis of 14 projects (Ministerial Advisory Group, 2006).
- Transport Sector Strategic Directions: Integrated Approach to Planning project, researching multi-modal and inter-modal transport integration and land use integration with transport. Literature review and associated analysis (Ministry of Transport, Ministry for the Environment, Transit NZ, 2006)

Greater Wellington Regional Council

- Wellington Rail Plan Programme Business Case, economic appraisal of long-term future scenarios ($6.7b to $12.2b) taking account of upper and lower demand growth ranges (including rail patronage and other modal forecasts) authorship of economics chapter and appendix (GWRC, 2021/22).
- Wellington Real Time Information renewal / improvement project, Single Stage Business Case, peer reviewer (GWRC, 2021).
- Inputs to business case for national integrated ticketing project (GWRC, 2018).
- Economics peer reviewer Single Stage Business Case for passenger rail rolling stock improvement options (GWRC, 2018).
- Economic evaluation of fast-track Single Stage Business Case for Bus Hubs development project (GWRC, 2018).

Toll NZ/ KiwiRail

- Wellington Rail ECTS Signalling Indicative Business Case, for improvement options ($160m TO $620m) economic appraisal, authorship of economics chapter and appendix (KiwiRail, 2020/21).
- Feasibility assessment and economic evaluation for a range of national and regional passenger rail service options: development of cost benefit analysis 'Handbook' for KiwiRail economic evaluation methodologies/procedures to extend the NZTA EEM, application of Handbook to assess the potential for the development of long-distance passenger rail services and preparation of a national 'Network Case' document. This included a re-assessment of former regional passenger rail services and a review of national / regional rail network development potential (Toll NZ / KiwiRail, 2006-11).
- Identifying the Economic Value of Rail Services: Issues in Transport Assessment and Evaluation: "Identifying the economic value of rail services: issues in transport a" by R. Boulter and D. Wignall (worldtransitresearch.info) Australasian Transport Research Forum (KiwiRail, 2009).
- Development of modelling techniques for public transport economic evaluation, including consumer surplus estimation and the effect of fare structures on demand and BCRs (Toll NZ / KiwiRail, 2007-2009).
- Identifying the value of long-distance rail services: Current issues in assessment and evaluation: VTPI, http://www.vtpi.org/rail_evaluation.pdf (Toll NZ / KiwiRail, 2008).
- Preparation of a range of research papers covering topics such as international passenger rail comparisons and alternative mode comparisons (KiwiRail, 2008-2009).

Auckland Authorities

- International review of rail patronage and other impacts for Auckland Central Rail Link Reference Case, investigation of 5 major comparative rail investments (Auckland Transport, 2013).
- Application of elasticity based multi-modal **S**trategy **R**eview **M**odel web based SRM Communications Model to test the effect of oil price changes on transport demand in Auckland (Auckland Regional Transport Authority, 2010).
- Review of innovative 'non-network improvement' policy options for the Auckland Regional Land Transport Strategy (Auckland Regional Council, 2008/9).
- Review of Auckland Regional Land Transport Strategy 2040 forecasts and targets for freight, public transport, other modes, safety and emissions (Auckland Regional Council, 2008).
- Peer reviewer for Sustainable Transport Plan (Auckland Regional Transport Authority, 2006).

Waikato Regional Council

- Peer review of Business Case economic evaluation for passenger rail service proposal (Waikato Regional Council, 2018)
- Review of Hamilton-Auckland and upper North Island passenger rail service proposals, with emphasis on feasibility, demand forecasting and revenue potential (Waikato Regional Council, 2017/18)
- Review of Hamilton-Auckland passenger rail service proposals, reviewing earlier studies and considering different options for service type and stopping pattern, estimating resultant variations in patronage demand forecasting (Waikato Regional Council, 2017/18)
- Feasibility reassessment for potential re-introduction of a Hamilton-Auckland passenger rail service, including patronage forecasting, revenue estimation and economic evaluation (Waikato Regional Council, 2011)

Kāpiti Coast District Council

- Major new residential assessment using the KTM4 district-wide SATURN model, testing future network improvement options, alternative demand matrices and analysis of changes to traffic volumes, travel times and origin/destination patterns for 3,000 dwellings at Kāpiti Airport / Quarter (KCDC, 2021/22).

- Feasibility assessment of various network options using SATURN (Hadfield Road / The Drive / Trieste Way) for road programming and evaluation purposes (KCDC, 2020/21).
- SIDRA (network model) development for Paraparaumu Town Centre and Paraparaumu Airport networks, including approximately 40 intersections in total (KCDC, 2014-2021).
- Proposed District Plan Environment Court Appeals process witness (KCDC, 2018-2020).
- Assessment of proposed major retail/commercial town centre extension (Coastlands Square) including new links/intersections and large supermarket using SATURN and SIDRA (KCDC, 2019).
- Linked traffic signals optimisation review, Parts 1 and 2, including strategic (SATURN) and detailed (SIDRA) modelling of 8 sets of closely spaced traffic signals Kāpiti Road (including SH1 M2PP Expressway interchange). Review of Wellington Traffic Operations methodology for assessing, setting and monitoring. Design of field trials and travel time monitoring (using BLIP) and analysis, (KCDC, 2018/19).
- Kāpiti Coast Proposed District Plan Hearing, (Chapters, 2, 6 and 11) transport, traffic and modelling witness (KCDC, 2015-19).
- SATURN, VISSIM and PARAMICS model peer reviewer, (KCDC, 2013-2019)
- Review of Programme Business Case for East-West Transport Connectors, including re-analysis of findings and recommendations (KCDC, 2017).
- Analysis of proposed rail designation at Paekakariki, adjacent to the NIMT line, including vehicle access, operational, planning and amenity effects. Representation at Notice of Requirement: Adjustment of rail designation Hearing, and preparation of evidence, (KCDC, 2017).
- Kāpiti Coast Proposed Private Plan 84 (Airport) Hearing, transport, traffic and modelling witness (KCDC, 2016/17).
- Review of new rail station potential at Raumati, Peka Peka and Mackays Crossing, analysis of at-grade rail crossings, modelling and evaluation of proposed rail frequency changes on road traffic (KCDC, 2010-2016).
- Modelling review of the impact of the proposed 'Road of National Significance' through Kāpiti District, involving testing alternative networks and demand matrices for negotiation and preparation of evidence for Board of Inquiry purposes. Operation and interrogation of SATURN models for the M2PP, PP2O and TG Wellington RoNS sub-projects (KCDC, 2010-14).
- Scheme assessments: Kāpiti Road Relief Route ($12m), submission of material for regional programming (ranked as priority one for Wellington Region) and NZTA TIO application, including SATURN / SIDRA network modelling and economic evaluation (KCDC, 2014).
- Waikanae School Notice of Requirement, Council Commissioner Hearing, school location access assessment witness (KCDC, 2014).
- Paraparaumu Town Centre (PC72A), Environment Court Plan Change Appeal witness (2013).
- Peka Peka to Otaki Expressway (12 km State Highway 1 $300m grade separated off-line dual carriageway) Board of Inquiry witness (KCDC, 2013).
- Mackays to Peka Peka (State Highway 1) Expressway (18 km $700m grade separated dual carriageway), Board of Inquiry witness (KCDC, 2012/13).
- Scheme assessment report (SAR) for the Kāpiti Road, Milne and Te Roto intersections upgrade ($3m) including economic analysis and successful funding application (KCDC, 2012).
- Bunnings Warehouse, Independent Commissioner Hearing, traffic and modelling witness (KCDC, 2012).
- Transmission Gully motorway (27 km State Highway 1 replacement) Board of Inquiry witness (KCDC, 2011/12).
- Expressway transport consultant (KCDC, 2010).
- Assessing Potential Impacts of M2PP on Paraparaumu Town Centre (KCDC, 2009).

Upper Hutt District Council

- Development of integrated transport assessment guidelines for District Plan purposes, including liaison with Waka Kotahi (UHCC, 2021/22).
- Peer review of Maymorn residential proposal (Gabites Block) for 400 dwellings (UHCC, 2021).
- Plan Change 50 assessment of transport effects and provisions, including estimating the effects of increased working from home and the potential need for associated planning controls. Upper Hutt SATURN and SIDRA modelling for Plan Change 50 (UHCC, 2021).

Porirua City Council

- Kenepuru Programme Business Case, multi-modal area-wide transport network improvements (capital value $36m) in response to Transmission Gully motorway opening and major new developments, economic appraisal and authorship of PBC economics chapter (PCC, 2020/21).
- Comprehensive Area Studies (City Centre, Kenepuru, Eastern Porirua) and Corridor Assessments (for Kenepuru Drive, Raiha-Prosser, Whitford Brown Avenue) multi-modal and development planning assessments, capacity assessments, conceptual design, economic appraisal and reporting (PCC, 2018-2021).
- Assessment of Transmission Gully (TG) motorway traffic impacts and associated responses; including traffic calming, parking and traffic management pedestrian and cycling improvements, provision for public transport and the feasibility of alternative intersection form, and feasibility assessments (PCC, 2018-2020).
- Assessment of 2,100 new private dwellings in Eastern Porirua using NWSM SATURN model for long-term (2041) network assessment and programming purposes (PCC/Kainga Ora, 2019).
- Modelling, feasibility assessment and economic appraisal of improvement options for complex intersections connected to SH1 along Whitford Brown Avenue and Titahi Bay Road (PCC, 2019).
- Assessment of 1,200 dwellings (Kenepuru Landing) for resource consent purposes (PCC, 2019)
- Kenepuru Area Study and report update: Multi-modal reviews of area transportation and access requirements, including residential and employment growth areas, linkages to CBD, health and leisure facilities, passenger rail, bus, walking, cycling and private vehicle access needs. (PCC, 2018/19).
- Kenepuru Area Study (KAS) including analysis of multi-modal access requirements for residential and employment growth areas, linkages to CBD, health and leisure facilities, provision of public transport services, assessment of walking, cycling, car and freight needs, assessment of linkages to CBD, health and leisure facilities, provision of public transport services, assessment of walking, cycling, car and freight needs (PCC, 2018).
- Gravity and economic modelling for waste disposal site studies in the Wellington Region and economic 'rooftops' modelling (Porirua City Council, Wellington City Council, 2014-16).

Masterton District Council

- Review of Business Case procedures, requirements, technical content and improvement options analysis for Wairarapa passenger rail improvement proposals (Masterton District Council, 2018).
- Masterton DC, Review of passenger rail service development options, associated feasibility, patronage forecasting and costings (Masterton District Council, 2016-18).
- Analysis of strategic policy, planning and programming context and preparation of submission material for regional public transport planning purposes (Masterton District Council, 2017).

Other Councils

- Otaki to Levin SATURN model review and advice (Horowhenua District Council, 2018).
- Capital Connection (Palmerston North-Wellington) passenger rail service study, Phases 1 and 2, economic feasibility evaluation for regional passenger rail service options (Horizons Regional Council, 2011/12).
- Sustainable Transport Funding Review, (Bay of Plenty Regional Council, 2013).
- Advisor and peer reviewer for regional '*Transport Futures Study*' (Bay of Plenty Regional Council, 2009/10).
- Assessment of new and reopening rail station potential in connection with transport impacts, new development requirements and District Plan proposals (Papakura District Council, 2008).
- SATURN model interrogation for Takanini Structure Plan review, TRANSYT/LINSIG analysis, urban form study in support of District Plan development, land transport programme investigations and funding applications (Papakura District Council, 2006-9).
- Review of rural travel demand management potential (Northland Regional Council, 2006).

Miscellaneous

- Housing development traffic assessments in Porirua, Kāpiti and Hutt City (Private Developers, 2021/22).
- Peer review of economic appraisal for bus network development (Nelson City Council, 2021).
- High Court expert witness evidence review and brief of evidence preparation / submission of transport effects in the context of private parking ownership in Wellington (Commerce Commission, 2019).

- Authorship of book chapter, *'Developing Bus Rapid Transit: The Value of BRT in Urban Spaces'*, Chapter 4, Edward Elgar, 2019).
- Peer review of multi-modal Sydney Public Transport Project Model (Highways Component) v4 (Transport for New South Wales, 2015).
- International review of transport investment appraisal procedures in New South Wales, Australia (Annex 6) and New Zealand (Annex 7) https://www.gov.uk/government/publications/international-comparisons-of-transport-appraisal-practice (Department for Transport, 2013).
- SIDRA advanced training courses (2013/14).
- Review of regional commuter bus potential for major strategic corridor (NZ Bus, 2008).

1996-2017: Partner, Transportation Planning Partnership (UK)

- Establishment of Manchester based specialist transport consultancy, working directly for major clients and jointly with larger consultancy practices.
- Assessments for corridor, route management and multi-modal studies throughout the UK. The work on route management strategies for the Highways Agency included the preparation of corridor specific policies on land use and development planning, to strike a balance between the strategic role of the route and regional economic development needs/aspirations.
- Review and design of 'integral' demand management proposals for South and West Yorkshire Multi-modal Study and detailed interaction with several multi-modal studies (including SWARMMS, JETS, HUMMS and SWYMMS) and their implications for regional highway network planning.
- Transportation team leader for major corridor transport assessments, including; M6 (Warrington to Scottish Border); M1 (Chesterfield to Leeds); A64 (A1 to Scarborough); A30/A31/A35 (Southampton to Exeter), A46 (Leicester to Lincoln), M60 Greater Manchester, A556 (M6–M56 Link). Issues reviewed during the work included inherited improvement proposals and the development of strategic safety, reliability, delay, level of service assessment techniques for the Highways Agency.
- Transportation team leader for the first route management strategy undertaken in the UK, the 200km Liverpool to Hull (M62). Including multi-modal considerations, traffic analysis using a purpose designed operational model, future traffic growth projections, strategic safety assessments and the testing of alternative strategies and options. Important elements of the project included the development of route performance indicators and extensive public consultation.
- Transportation team leader responsible studies for urban regeneration and economic development projects for local authorities.
- Public transport planning for; bus networks, guided bus systems, light rail, other rapid transit systems, heavy rail and people mover systems, including advice, research and representation for private and public-sector clients (e.g., research into light rail and road traffic interaction to model joint street running potential for GMPTE).
- Representation of clients and presentations at meetings, public consultation, planning appeals, Transport and Works Act inquiries, local plan inquiries. Design of consultation material, expert witness statements and evidence.
- Light rail system evaluations in Manchester (1996-2003) and Birmingham (1986-1988).
- UK Intermodal rail terminal development, feasibility and economic analysis (Liverpool, Manchester, Birmingham, 1988-96).

1988 – 1996: Technical Director, Allott Transportation (UK)

- Technical direction of company transportation work, establishing transport consultancy services in Manchester, Birmingham and London.
- Regional transportation research study, involving analytical and consultative work and encompassing road, rail, sea and air modes. Future infrastructure investment to assist economic development was proposed and approved by the client group based on the study findings.
- Regional economic growth study: review of linkages between transport investment and economic performance: Greater Manchester (AGMA).
- Technical Director responsible for traffic modelling and assessment work for several major highway schemes in the North West and Midlands.
- Three-year Highways Agency/Department of Transport NNMD regional traffic term commission, extending throughout the North of England (Midlands to Scottish Border) reviewing the traffic impact of major planning and development proposals on the trunk road and motorway network.

- Project Manager of four-year engineering term commission for Merseyside Development Corporation. Work included: transportation and modelling studies in support of an area development framework, involving multi-modal analysis of development, regeneration, economic investment and urban design proposals.
- Airport Access Study: review of Manchester Airport access proposals for the development of the Second Runway (on behalf of Trafford Metropolitan Borough Council)
- Freight Studies; including technical direction of: Trafford Park Intermodal Terminal study (road and rail) and Ferrybridge Power Station Study (involving consideration of road, rail, canal and pipeline modes for materials delivery)
- Ministry of Defence Studies, in the UK and Germany.

1986 – 1988: Transportation Policy Team Leader (PO4), City of Birmingham (UK)

Review of transport policy affecting Birmingham, directing transport expenditure to meet wider regeneration, economic development, environmental and urban design objectives.

1978 – 1986: Principal Officer (PO1), Merseyside County Council (UK)

Responsible for developing strategic aspects of regional transportation policies, central urban area regeneration centre plans, industrial improvement area transport planning and multi-modal studies.

1976 – 1978: Transport Planner, Brian Colquhoun & Partners Consulting Engineers (UK)

Area wide studies for public transport priority, selective vehicle detection, bus lane design and associated traffic management.

Organisation and supervision of public transport and traffic surveys, computer analysis, economic appraisal, environmental scheme assessment.

Other Appointments

Member of **Transport Users Consultative Committee for North-West England** (1982-94) for the Department of Trade, involving membership of tribunals, including major rail closure hearings for the Settle to Carlisle rail line.

National Transport Panel Member (1995 - 99), National Expert Advisor (1999 – 2005), **Royal Town Planning Institute**

Publications/Papers

- **The Development of Rail Path Modelling, Corridor Capacity Assessment,** Australasian Transport Research Forum, Adelaide, 28-30 September 2022, http://www.atrf.info
- **Assessing Toll Road Demand in New Zealand:** Australasian Transport Research Forum 2021 Proceedings 8-10 December, Brisbane, Australia Publication website: http://www.atrf.info
- **Developing Bus Rapid Transit:** The Value of BRT in Urban Spaces (book), Chapter 4, Elgar,2019
- **Economic Re-evaluation of New Zealand Transport Investments**, Australasian Transport Research Forum, November 2017 http://www.atrf.info https://www.australasiantransportresearchforum.org.au/sites/default/files/ATRF2017_031.pdf
- **Auckland Northern Busway Retrospective**: **Updated Review of Impacts**, Australasian Transport Research Forum 2017 Proceedings, November 2017 http://www.atrf.info
- **Implications of Road Investment**, NZTA Research Report 507, http://www.nzta.govt.nz/resources/research/reports/507/ November 2012
- **Northern Busway Review,** NZTA, http://www.nzta.govt.nz/planning/monitoring/audits/docs/northern-busway-review-report.pdf May 2012
- **The value of public transport – option values and non-use values**, NZTA Research Report 471, http://www.nzta.govt.nz/resources/research/reports/471/ January 2012
- **Regional transport targets for sustainable transportation in New Zealand**, NZTA Research Report 385, http://www.nzta.govt.nz/resources/research/reports/385/ November 2009
- **National Transport Model Development: Relating transport forecasts to economic performance***,* Australasian Transport Research Forum, http://www.atrf.info/papers/2009/2009_Furnish_Wignall.pdf September 2009
- **Identifying the Economic Value of Rail Services: Issues in Transport Assessment and Evaluation***:* Australasian Transport Research Forum, http://www.atrf.info/papers/2009/2009_Boulter_Wignall.pdf September 2009

- **Making the most of models: The use of modelling to support the development of more effective transport policies and strategies**, VTPI, http://www.vtpi.org/FerWig_Modelling.pdf July 2009
- **Big picture transport planning**: **When precision fails and approximation succeeds**: Operational Research Conference, Victoria University, November 2008 http://orsnz.org.nz/conf43/content/ORSNZ08_conference_proceedings.pdf
- **Strategic modelling choices**: **The role of policy modelling in New Zealand***:* IPENZ Model User Group Meeting, October 2008
- **Identifying the value of long distance rail services:** *Current issues in assessment and evaluation*: VTPI, http://www.vtpi.org/rail_evaluation.pdf May 2008
- **Role of land use planning in shaping our transport system**: Christchurch Conference (NZ); July 2007
- **Better practice in land transport programmes**; Planning Quarterly (NZ): March 2007
- **Potential for High Occupancy Vehicle Priority in the UK**; TRB Conference, Dallas (US): August 2000
- **The A565 Atlantic Avenue**; **A Regeneration Corridor**; Highways and Transportation (UK): February 1996
- **How Public Transport Can Influence Development Location**: Aston University Development Conference (UK): May 1995.
- **Sustainable and Attractive Industrial Development**: Estates Times Industrial Review (UK): February 1995.
- **B1 Public Transport Access Strategies**; Planning Report Journal (UK): October 1995.
- **Royal Town Planning Institute Prize,** Civic Design, University of Liverpool (1992)
- **Completing the Terminal Network for European Inter-Modal Traffic**: Freight Conference: September 1991.
- **Trafford Park Rail Terminals**; **Results of a Freight Development Study**: Municipal Engineer (UK); October 1990
- **Manchester Phoenix Regeneration Study:** Municipal Engineer (UK), June 1990