

**Walking School Bus Networks:
Evaluation of Trial in Christchurch**

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Abstract

A Walking School Bus (WSB) is an alternative method for children to travel to and from school. Adult volunteers walk along a set route to school, collecting children from designated stops along the way. Our earlier research investigating alternative methods for children travelling to school found a high level of interest in the WSB concept. Because of this interest, we designed a trial for WSB networks. Internationally, there had not been any attempts to test how far the WSB concept could be used to address the trend of increasing numbers of children being driven to school with all of the problems (congestion, pollution, safety, etc) that go with this trend. The trial involved 4 schools in Christchurch, New Zealand.

We conducted surveys of the parent communities involved in each school before and after launching the trial. Our evaluation shows that the networks have been a clear success. Ten weeks after launch, 13 WSBs involving 112 children were operating at 3 schools. That is, our simple approach using a then unproven concept resulted in nearly 10% of the children at the trial schools regularly using WSBs. Over 60% of these children had previously been driven to and from school. Furthermore, WSBs led to less parental time being spent taking children to and from school, reductions in car use (and petrol consumption), and increased activity levels in both children and adults. Parents and children alike were enthusiastic about the WSB, saying they enjoyed the friendships, sense of community, exercise and knowing that the children were getting safely to and from school.

All these WSBs proved to be self-sustaining even after the disruption and changes occurring over a 2-month summer break.

As a result of the Walking School Bus network trial, we developed a booklet, *The Walking School Bus – A Guide for Parents and Teachers*, outlining a clear and simple process for establishing one WSB or a whole network. This booklet is now being distributed nationwide by government organisations and has already been used to establish new WSB networks in Christchurch and other New Zealand cities.

Table of Contents

1. The First Phase: Exploration	1
2. The Second Phase: WSB Networks Trial	3
2.1 Schools Agreeing to be Part of a WSB Trial	3
2.2 Structure of the Initial Survey	4
2.2.1 Distribution and Collection of the Survey	4
2.2.2 Response Rate	5
2.3 Establishing the WSB Networks	5
2.3.1 Introduction	5
2.3.2 Creating WSB Routes, Schedules and Driver Rosters	5
2.3.3 Launching the WSB Network	7
2.3.4 The Resulting WSB “Networks”	7
2.4 Characteristics of the Survey Population	8
2.4.1 Usual Mode of Travel to and from School	8
2.5 Characteristics of Potential WSB Users and Volunteer Drivers	10
2.5.1 Indicated WSB Usage	10
2.5.2 Volunteer Drivers	10
2.5.3 Potential Impact of WSB on Car Usage	10
2.6 WSB Non-Users	10
2.6.1 Reasons for Not Wanting to Join a WSB	11
2.7 Bicycles	12
3. The Third Phase: Evaluating the Trial	13
3.1 Structure of the Evaluation	13
3.2 Contact People Survey	13
3.2.1 Size of WSBs	14
3.2.2 Changes in WSB operation	14
3.2.3 The impact of weather on WSB operation	14
3.3 Survey of WSB Users	14
3.3.1 Travel to and from School	15
3.3.2 WSB Drivers	16
3.3.3 Impact of the WSBs at the Trial Schools	16
3.3.4 Illustrative Benefits if WSBs Extended Christchurch-wide	18
3.3.5 Attitudes Towards the WSB	19
3.3.6 Future Use of the WSB	20
3.4 Survey of Families Not Using WSB Network (Despite Earlier Interest)	20
3.4.1 Reasons for Not Using the WSB	20
3.5 Medium-Term Impact	21
4. Guidelines for Walking School Buses	22
5. Conclusions	23
6. References	24

1. The First Phase: Exploration

A significant and growing component of road network congestion before 9 a.m. is caused by parents / caregivers driving their children to school. Anecdotal New Zealand-based evidence suggests that as much as 20% of the early morning traffic stream is a result of this, and survey results in the state of Victoria, Australia provide more concrete evidence that “at 8.50 in the morning in term time, cars chauffeuring children to schools make up in the order of 20% of all cars on urban roads” (Morris *et al* 2001). Traffic congestion contributes to environmental degradation, increased vehicle operating costs including fuel consumption, increased driver stress and time spent travelling, and so on. The 1997/98 New Zealand Household Travel Survey (LTSA 2000) confirms that 53% of the trips from home to school by primary school students are as car passengers. For the same trips by high school students, the figure is approximately 43%. The survey showed that around *twice as many* trips of this type were being made in 1997/98 as in the 1989/90 survey.

The increasing number of children being driven to school has captured the interest of policy- and decision-makers, among others, who would like to understand the reasons for this behaviour and how to mitigate it. To this end, in May 1999, Pinnacle Research, in collaboration with BRC Marketing and Social Research, conducted a survey of 128 parents / caregivers who regularly drive their children to school but are not on their way to work. 65 of the surveys were carried out in Auckland; the remaining 63 in Wellington.¹

The main purpose of the survey was to gauge parent / caregiver response to their child/ren using alternative methods to the car for travelling to and from school. We asked each respondent to consider their possible use of buses / trains; a “walking school bus” (also known as “people bus”), taxi / shuttle service, and carpooling. We described a walking school bus (WSB) as having an adult walking along a set route to school, collecting children from designated stops along the way. After school, they walk back the same route. The service is free and a co-ordinator helps to organise volunteers. Parents are not required to volunteer to “drive” the WSB. We also set a limit of 10 children per adult.

The WSB attracted considerable interest: 33 of 69 families (48%) living within 2 km of the school said they would use a WSB at least three days per week. This prompted us to conclude that the WSB had the potential to make a significant impact on how children travel to and from school in New Zealand.

The remainder of this report describes our trial of WSB networks that took place at 4 Christchurch schools in 2000. There were two distinct stages to this work:

- Setting up (surveying the school communities, analysing responses, mapping potential routes, holding meetings) and launching the networks at the three schools
- Evaluating user and non-user responses to the WSB concept and developing guidelines for setting up WSB networks anywhere in New Zealand.

¹ This survey forms part of a larger project entitled “Identifying Factors to Reduce People’s Transport Use”, funded by the Foundation for Research Science and Technology through the Public Good Science Fund.

Section 2 addresses the setting up process, while section 3 discusses the evaluation and guidelines. Some documentation of our research is contained in the appendices outlined in Table 1-1 below.

Table 1-1 Description of Supporting Material found in Appendices

Appendix	Topic
A	Covering letter and initial survey of school community to assess interest in WSB concept
B	Meeting Handouts to assist scheduling of WSBs
C	Article in Christchurch Press
D	Questionnaires for contact people, users and non-users in evaluation of WSB networks
E	Walking School Bus Guidelines

2. The Second Phase: WSB Networks Trial

In presenting the results of our preliminary investigation to end-users in Auckland, Wellington and Christchurch in late March 2000, we indicated our desire to follow up it up with the establishment of a trial of walking school bus *networks* in an urban centre. Prior to this there had been three WSBs established in Christchurch, generally involving 3-5 families each and one much larger WSB at Gladstone Primary in Auckland. We argued that only by attempting to “network” an entire school community with WSBs could we understand the full potential of the WSB as both a safe alternative method for children’s travel to and from school and also as a means of reducing congestion (and all its inherent impacts) on the road network.

2.1 Schools Agreeing to be Part of a WSB Trial

The Safe Routes to School Coordinator (Paul Cottam) for Christchurch City Council expressed a willingness to assist in developing a trial of WSB networks in Christchurch. Christchurch City Council (CCC) is particularly interested in developing guidelines for schools to use in establishing their own WSB networks. In May 2000, the SRTS coordinator approached four schools to participate in such a trial and all four of them agreed to take part. The schools are a reasonable cross-section of schools both by socio-economic status (as indicated by a “decile rating” where 1 is the lowest socio-economic stratum and 10 the highest) and by size of school. The 4 schools are shown in Table 2-1 below.

Table 2-1 Schools in the WSB Trial

School	Decile Rating	School Roll (as at Feb 2000)
Beckenham	6	430
Gilberthorpe	2	135
Paparoa Street	10	485
Wairekei	6	184
Total		1234

We set a September 1st launch date for any WSB routes / networks we could establish at these schools, to fit in with the first day of spring celebrations planned by Christchurch City Council.

2.2 Structure of the Initial Survey

Our first task was to design a simple self-completion survey to be distributed to the parents of all children attending the 4 schools. The survey had to meet multiple needs:

- **research** (to quantify the potential of the WSB concept to reduce car use and provide a safe alternative for children to travel to / from school)
- **organisation** (to provide us with information about the children who would be using the WSB and the adult volunteers who would be driving it), and
- **guidelines** (to be a potential model for the WSB guidelines CCC wanted to have developed).

The resultant survey is divided into four sections:

- Section 1 gathers information about the child/ren living in each household, their address and usual means of travel to and from school. Further information about the purpose and length of the home-to-school trip is collected when this trip involves children being driven to school.
- Section 2 focuses on the potential interest in having a child/ren use a WSB. If a family is not interested in being part of a WSB, we asked why they would *not* use it. Otherwise, information was collected on the days and times a child/ren could be expected to use the WSB as well as the reasons for any indicated days of non-use. We also collected information about car use on the days that a child/ren used the WSB.
- Section 3 sought adult volunteers to act as drivers of the WSBs and asked what days and times would suit them to “drive the bus.”
- Section 4 collected some further background information on the activity levels of the child/ren and whether or not parents were willing to consider bicycle riding as a safe alternative for their child/ren to travel to school. The latter question set was developed to provide information for future work on safe travel of children to school.

A full copy of the questionnaire can be found in Appendix A.

2.2.1 Distribution and Collection of the Survey

The survey was distributed with a covering letter (included as part of Appendix A) signed by the Safe Routes to School Coordinator on each school’s regular “newsletter day”. This maximised the likelihood that each family would receive at least one questionnaire to complete as parents expect a newsletter to come home from school that day. Completed questionnaires were returned to the school. A reminder notice was inserted in the school newsletter to try maximising the response rate.

2.2.2 Response Rate

The number of questionnaires returned varied widely between the 4 schools. We had a total of 252 surveys returned, incorporating 367 children, representing a response rate of 30%. This response rate is not as high as desirable, but those returning the surveys, not surprisingly, tended to have a favourable response to WSBs, (see Table 2-2 below). Thus, this simple approach succeeded in getting an overall response rate of 30%, and a positive response rate concerning 231 of 1234 children (19%). Better initial responses may be achieved in future given that the WSB network concept is now proven rather than a novelty, and by using a shorter questionnaire (no longer needing the questions to estimate impact).

Table 2-2 Response to Initial Survey

School	No. of surveys returned	No. of children represented (% of school population)	Those wanting to use the WSB	Those not wanting to use WSB
Beckenham	57	86 (20%)	46	40
Gilberthorpe	24	34 (25%)	24	10
Paparoa	131	188 (39%)	126	62
Wairakei	40	59 (32%)	35	24
Total:	252	367 (30%)	231	136

2.3 Establishing the WSB Networks

2.3.1 Introduction

The analysis of the data collected in the survey had two distinctive stages, given the time constraints we were operating under. The initial focus was to determine whether or not there was potential to establish WSB networks at any or all of the schools surveyed. Secondly, we analysed the data for the benchmarking and research purposes.

2.3.2 Creating WSB Routes, Schedules and Driver Rosters

The survey asked if the respondent was willing for their child/ren to participate in a WSB as well as if they or another adult in the household would volunteer to “drive” the WSB. If a positive response was given to either of these queries, further questions sought information as to when and in what conditions would their child/ren use the WSB and when and how often an adult would be willing to be a driver.

Sixty-three percent of the respondents wanted their children to participate in the WSB. Nearly one-half (49%) of the parents who said their children would use the WSB also volunteered to help drive the WSB. Those adults who live >2 km from their child/ren’s school were perhaps less likely to volunteer to be drivers of a WSB (significance level = .11, two-tailed). If, at the time of the survey, they drove more than one child to school / kindergarten or were on their way to work, they were clearly less likely to volunteer to be a WSB driver.

After completing the initial data-entry, we obtained large-scale “waterworks” maps from Christchurch City Council of the area surrounding each school. These maps showed each section and section / house number along with street names. We manually located the children and adult volunteers on the map in order to show where there was sufficient interest to establish a WSB and what route a WSB might follow.

Once the maps were completed, we sorted the database into a series of WSB route groups with each child, their age, address, and their anticipated usage of the WSB as well as the adult volunteers’ names, addresses, phone numbers, and possible “driving” times. The route group material, along with the maps, was the focal point of the meetings held with interested parents at each school in mid-August. The Safe Routes to School Coordinator organised these meetings with the assistance of a liaison person at each school. Notices about the meetings were inserted in the weekly school newsletter and personalised reminders were sent to those parents who had indicated an interest in the WSB.

The purpose of the meetings at each school was four-fold:

1. to further elaborate on the WSB concept and allow parents to ask questions / air any concerns about it
2. to let parents know what the response to the survey had been for their school and where the potential WSB routes were
3. to allow parents to sort out how the WSB would run in their area: its probable routing, days and time of operation, pick up / drop off points, driver roster. By having the parents do this themselves, we hoped to create a sense of “ownership” of the WSB in their area as well as use local knowledge to minimise problems.
4. to nominate a “contact person” for each WSB established. The contact person is someone people could speak to if they wanted information or wanted to join the WSB.

The attendance at these meetings was quite good and they attracted some additional parents who had not responded to the initial survey. Another positive outcome of the meetings was that further volunteer drivers were recruited.

After some introductory comments and discussion, we broke the meeting down to “potential route” groups so that the group could organise the schedule of the WSB and the driver roster. We gave each group, in addition to the map and database information for their route, two pages to guide them in their tasks (see Appendix B). This helped them to develop the scheduled days and time the bus would operate, its stops, the driver roster and some basic rules for the WSB (e.g. parents to ring the driver if their child is not using the WSB on their usual day and time). Generally, most groups completed this task within the meeting time, although some had to complete it later, particularly if not all the volunteer drivers for a given route were attending the meeting.

The meetings lasted between 1 and 1½ hours, depending on the number of parents attending and on how easily the scheduling and driver roster was resolved for a proposed WSB.

2.3.3 Launching the WSB Network

1 September 2000 was chosen as the official launch day for the WSB networks at the Christchurch schools. Not all of the individual bus routes began on this day (a Friday) because they were not “usually” scheduled to operate on Fridays.

Christchurch City Council provided sashes for all the children and the drivers to help identify them as participants in the WSB network. This serves multiple purposes, the two key ones being increasing the visibility of the children and adults to passing cars (and thereby contributing to safety improvements) and creating a higher profile of the WSBs in the surrounding community. In addition to the sashes, Christchurch City Council gave the children drink bottles, Council “fridge magnets” and some activity sheets to complete.

The Council also organised a high-profile Member of Parliament (Green Party co-leader Rod Donald) to walk with a WSB on its inaugural trip. A press release was sent to local newspapers and resulted in an article in the Christchurch Press a few days later (see Appendix C).

2.3.4 The Resulting WSB “Networks”

Following the preliminary mapping of potential WSB routes and the meetings to organise the roster and schedule of the WSBs, we found we had 16 buses arranged for 3 schools. To communicate the routes, schedule, names, ages and addresses of children, driver roster and contact details to families potentially involved on each WSB, we devised a simple 2-page handout to be sent to each family. The handout also incorporated some basic “Walking School Bus Rules.”

Soon after the official launch date of the WSBs, one of these routes was split into two and a new route started up at Beckenham School. To balance this, however, we found that 5 buses did not actually begin operation². Thus, by November 2000, there were a total of 13 routes (1 of which was operating independently before our trial began):

Table 2-3 WSB Network as at November 2000

School	No. of WSBs	Potential no. of children using WSBs (July survey)	Actual no. of children using WSBs (November survey)
Paparoa Street	9	94	73
Gilberthorpe	1	11	21
Beckenham	3	29	18
Total:	13	134	112

Note: November figures from survey of “contact people” described in section 3.2.

Most of the WSBs operate 5 mornings per week and over one-half of them operate 4-5 afternoons per week as well. The remainder operate 1-2 days per week, both in the morning and the afternoon.

² Subsequent to the evaluation surveys being sent out, one of these five routes began operating in the 2001 school year at Beckenham School. The WSB operates 5 morning and afternoons per week and involves 6 children from 4 families.

As can be seen from Table 2-3, the 13 WSB routes established and operating by November 2000, potentially accommodated 134 of the 231 children (57%) whose parents expressed an interest in participating in a WSB. The principal reasons for all of the potential users not actually joining a WSB were:

- Not enough children / families from a given area who had filled in the survey
- Children and volunteer drivers too geographically dispersed within an area
- Not enough volunteer drivers to make WSB operational.

In one or two cases, we had a volunteer driver who only had their children to drive in a particular area. Anecdotally, at the meetings with parents to set up the WSB networks, we heard that there were often many other families in any given area that apparently did not wish to be part of the WSB scheme. Three of the potential routes seemed to have sufficient children and volunteers for the WSB to become a reality, but when it came to scheduling the WSB, parents were unwilling to commit to driving and / or using the bus so that the WSB route did not eventuate.

No WSBs were established at Wairakei School, due in large part, to a lack of volunteer drivers. There were two areas around the school where sufficient numbers of families (children) registered interest in the WSB, but in both cases the few parents who volunteered to drive the bus had limited availability to drive the bus and were geographically far apart. Hence it was difficult to organise a consistent route. In addition, there was very little response from particular areas less than 1 km from the school that were known to have lots of Wairakei School children living in them.

2.4 Characteristics of the Survey Population

The following sections describe the characteristics of those who returned completed surveys to the school.

2.4.1 Usual Mode of Travel to and from School

The modal split shown in Table 2-4 is similar to that found by the Land Transport Safety Authority in cities nationwide³ and by Christchurch City Council in its survey of 29 schools for Walk a Child to School Day.⁴ Many (44%) of the parents / caregivers were dropping children off at school on their way to work. A similar number (37%) of the parents were making a trip specifically to drop children to school and/or kindergarten. They then returned home. The remainder drop children off to school while on their way to somewhere else. Dropping children off at school while on the way to work often requires a diversion from the route that otherwise would be taken – 39% of parents indicated that dropping children off to school required an extra 5 to 10 minutes of driving each day. For 57% of the parents, however, very little (less than 5 minutes) or no extra driving was involved in driving children to school.

³ www.ltsa.govt.nz/research/travel_survey/research/school_children.html, accessed 21 November 2000.

⁴ In 1999, Christchurch City Council sponsored a "Walk a Child to School Day" (WCSD). In order to monitor the impact of the day, the Council asked schools to survey their students on one day in the week prior to WCSD to find out how they had travelled to school on that day. Middle decile schools (4-7) were found to have lower walking rates and higher car passenger rates than either low (1-3) or high (8-10) decile schools.

Table 2-4 Usual mode of travel to and from school (by school)

Usual mode of travel to / from school	School				
	Paparoa	Gilberthorpe	Wairakei	Beckenham	Total
Walking (with an adult, sibling or by themselves)	45%	50%	41%	24%	40%
Bicycle	2%	0	7%	12%	5%
Driven by a parent	48%	50%	48%	59%	51%
Other (incl car pool, bus)	6%	0	4%	4%	5%

The time factor (either in terms of the extra time required for driving or the school being *en route* to work) seems to have little influence on whether or not a family was interested in participating in a WSB. Table 2-5 shows that the most common reason for driving a child/ren to school were because a parent was going to work (regardless of how much little or extra time might be taken due to stopping off at school). Those who felt it was too far for the children to walk generally lived over 2 km from the school, although a small proportion lived less than 2 km from the school.

Table 2-5 Main Reasons for Driving Children to School – Parents were asked to give the main reason their child/ren is driven to school. Some parents gave two or three reasons.

Main Reasons	No. of responses
Going to work / study	41
Too far to walk	38
Organisation / timing / running late	31
Weather	24
Convenience	19
Roads too busy / too dangerous	16
Safety	15
Too young to walk without an adult	14
Sibling needs to go to school / day care	12
Total no. of parents responding	n=159

2.5 Characteristics of Potential WSB Users and Volunteer Drivers

2.5.1 Indicated WSB Usage

The potential usage of WSBs by each child varied widely. Some families signalled that their child/ren would use the WSB to and from school every day while others indicated that their usage would vary according to before and after school activities, parents' work schedules and so on.

Most parents indicated that their child/ren's use of the WSB would not be affected by cold / frosty weather (71%) or windy days (74%). Families were more concerned about their child/ren's use of the WSB when it was raining – 57% said they would not use the WSB and 22% said they didn't know what their children would do.

2.5.2 Volunteer Drivers

Approximately one-half (48%) of the families who wanted to participate in the WSB trial offered one or more adult volunteer drivers to the scheme. Those who normally drove their children to school on the way to work were less likely to volunteer as drivers than those who had some flexibility in their driving habits.

The majority of volunteers (74%) offered to drive the WSB twice per week or less. The remainder offered to drive the bus 3 to 5 times per week. The indicated low level of involvement from parents is one of the reasons that several WSBs never began operation in September 2000.

2.5.3 Potential Impact of WSB on Car Usage

Seventy percent (70%) of the families who indicated that they were interested in using a WSB usually drove their children to school. Given that 50% of the school children in Christchurch are driven to school (CCC 1999), this is a positive indication that the WSB trial could be successful in providing a safe alternative to the car for travel to and from school and reduce congestion problems near schools.

However, such optimism must be tempered by other realities – 44% of the parents who usually drive their child/ren stated that they would still drive their car before 9 a.m. even on the days their child/ren were using the WSB. Primarily, these parents were on their way to work or their place of study (83%) and in other cases were dropping off children to other schools / kindergarten / crèche (17%). A small number were doing both.

Overall, 159 families originally stated that they wanted to participate in the WSB scheme. Of these, 48 families (30%) indicated that they would not use their car before 9 a.m. on weekdays as a result of their child/ren's use of the WSB. While small, it is a suggestion of the potential of WSBs to impact on the traffic surrounding local schools.

2.6 WSB Non-Users

Clearly it was of greater interest to the families who wanted to become part of the WSB scheme to complete the survey and return it to the school. Nonetheless, we had 93 surveys (37% of the total) returned from families who did not want to use a WSB.

2.6.1 Reasons for Not Wanting to Join a WSB

Respondents were invited to give up to 3 reasons that their family would not be using a WSB. The most commonly cited reason was “prefer to take children myself/ourselves” (40%) and the next most common reason was “we live too close to the school” (29%) and “too much traffic / traffic moves too fast” (27%). This was followed by “it’s too far for children to walk” (25%) and “taking the car out then anyway” (22%). Of those who stated that they live too close to the school, the majority (73%) are less than 0.5 km away from the school. Those who stated that they lived too far away from the school generally live over 2 km away, although there is a notable proportion (23%) that lives between 1 and 2 km away from the school.

The ranking of reasons for not wanting to participate in a WSB varied across the four schools as indicated in Table 2-6 below. For example, at Paparoa Street School, the most common reason cited was that we live too close to the school, a factor that was ranked 3rd at Wairakei and at least 6th at Beckenham School. Similarly, at Wairakei, “we live too far away to walk” was the most commonly cited reason for not wanting to participate in the WSB, a factor that had rankings of 3rd or lower at the other schools.

Table 2-6 Relative Ranking of Reasons for Not Participating in a WSB (by School). Gilberthorpe School has been omitted from this table because there were too few responses (n=7).

Reasons	Paparoa	Wairakei	Beckenham	All
We live too close to the school	1	4	--*	2
It’s too far for children to walk	3	1	5	3
Prefer to take my child myself	2	3	2	1
Taking the car out then anyway	--	2	5	4
Weather (cold, etc)	5	4	--	--
Too much traffic / Traffic moves too fast	4	--	1	2
No safe places to cross the road	--	--	3	5
Not convinced that other parents will take the same care as me	--	4	4	5
Total no. of parents responding	n=42	n=17	n=27	n=86

* -- Indicates a ranking below 5th.

Traffic and safety seem to be the primary concern at Beckenham School, where the main reason for not wishing to use a WSB was “too much traffic / traffic moves too fast”, followed by “prefer to take child myself/ourselves” and “no safe places to cross the road”. An examination of the most recent vehicle count data (for both directions) reveals that the main roads passing by Beckenham School and Wairakei School carry traffic volumes five to six times greater than those roads passing outside the other two schools in the trial (see Table 2-7 below). This may explain why so few parents from Wairakei School, particularly on the far side of Wairakei Road, were interested in joining a WSB network.

Table 2-7 Vehicle Traffic Counts at Trial Schools⁵

Main Road (School)	Average Weekday Traffic Count
Rutland Road (Paparoa Street School)	211
Tennyson Street (Beckenham School)	1030
Wairakei Road (Wairakei School)	1381
Gilberthorpe Street (Gilberthorpe School)	255

2.7 Bicycles

We asked parents about the use of bicycles as a potentially safe alternative method for their child/ren travelling to and from school.

Over 90% of those responding to this question (n=226) stated that their child/ren had access to bicycles. One-third (33%) of these would allow some or all of their children to ride their bicycles to school.

Police youth education officers and the Land Transport Safety Authority have conveyed the message to parents that children should be at least 10 before they can safely ride their bikes on the road to school. To this end, at least one of the schools involved in the trial has a rule that no children under the age of 10 are permitted to ride their bicycles, unaccompanied by an adult, to school. As might be expected, given the age range of a primary school, nearly 80% of the children involved in the survey are under the age of 10, and thus are unable to ride bicycles to school unless accompanied by an adult.

Parents were asked to give their reasons for not letting their children ride bicycles to school. Most (>90%) said it was because their child/ren was too young. Many of these people indicated that, even if their child/ren was older, they would not let them ride to school because the roads were too busy, dangerous to cross and/or the traffic moved too quickly. In total, approximately 65% said the roads were too busy or dangerous to allow their children to cycle to school. In a small number of cases, the families lived either too close or too far for cycling to be a viable option for their child/ren's travel to school.

⁵ The traffic count data are not directly comparable in so far as they are taken over 3 different years but they are the most recent data available: Tennyson Street (Beckenham School) and Wairakei Road (Wairakei School) – February 2001; Rutland Street (Paparoa Street School) – July 1999; and Gilberthorpe Road (Gilberthorpe School) – August 2000. In each case, traffic in both directions was counted for a one-week period.

3. The Third Phase: Evaluating the Trial

A significant component of our trial of WSB networks is the evaluation of how well they worked. This evaluation is coupled with an assessment of their potential impact as an alternative method for children to travel school and as a means of reducing congestion. As a result, we conducted a formal evaluation survey 10 weeks after the implementation of the WSB networks, three weeks before the end of the 2000 school year. We also undertook, with the co-operation of the Safe Routes to School Co-ordinator, a more informal appraisal of the networks early in the 2001 school year to find out how many WSB routes were continuing to operate after the summer break.

3.1 Structure of the Evaluation

In order to develop a full understanding of the impact of the WSB networks, we thought it was important to contact both current WSB users and non-users. Thus, our evaluation encompassed four distinct stages:

1. A survey of contact people for each WSB route
2. A survey of current WSB-using families
3. A survey of non-using families (who showed initial interest)
4. An afternoon focus group of contact people.

Each of these stages is discussed separately below. Copies of the three questionnaires developed for the evaluation are found in Appendix D.

3.2 Contact People Survey

Our initial step in evaluating the WSB network trials was to get in touch with the nominated contact people for each WSB route. This preliminary survey had multiple purposes:

- to confirm the days and time the WSB was operating as well as the “usual” number of children and drivers per trip
- to discover if there had been any changes to the route, timing or stops since it was implemented and the reason for the changes
- to find out if any scheduled WSB trips had been cancelled and the reasons why
- to learn which children were / were not using the WSB.

We also invited any suggestions for potential improvements to the WSB service in their neighbourhood. Finally, we asked if the contact person was willing to attend a group discussion with other contact people to share experiences and to improve guidelines for WSB operation.

By keeping the survey quite simple, we maximised the co-operation of contact people.

3.2.1 Size of WSBs

The smallest WSB has only 3 families involved, who generally carpool rather than walk. The largest WSB, at Gilberthorpe School, has 18-21 children on it each morning with 4 adults accompanying the children to school. The number of children using the other WSBs varies from 4 to 10 or 11, depending on the day and time (morning or afternoon).

Many of the WSBs have only 1 adult accompanying up to 8 children, although 3 WSBs have 2 adults accompanying them each day with 6-8 children using the bus. The 3 WSBs that have 9-11 children using them have 2 drivers.

Total numbers of users at each school are given in section 2.3.4 above.

3.2.2 Changes in WSB operation

Several WSBs experienced “fine tuning” types of changes to their operation, such as leaving 5 minutes later in the morning (the bus was arriving too early to school), or adjusting the driver’s roster (due to changes in drivers’ employment or availability). In one instance, this resulted in changing the days that the WSB operated. One WSB group ceased its Friday afternoon “run” as not enough children used it. Only one WSB adjusted its actual routing during this time and this was, in part, due to the fact that the original route was divided into two WSB routes. Another WSB transformed itself into an on-going carpooling arrangement between the 3 families who actually used the bus. And finally, two WSBs began operating every day rather than the two or three they had originally planned because, as one contact person put it, the WSB “has been so successful.” Clearly, good forward planning is helpful in reducing the number of problems encountered in the initial operation of a WSB. But also note that the changes show that WSBs are simple and flexible enough for parents to adapt them over time to fit their changing needs and circumstances without external help.

3.2.3 The impact of weather on WSB operation

About one-half of the WSBs appear to operate in any weather, including when it’s raining. Others have decided that the WSB will not go in the rain, in which case it can be everyone for themselves or children may be car pooled in 1-2 cars. It is harder to gauge what happens in the afternoon, as children can dry out at home if they get a little wet on the way. The proximity of the school to the children’s homes may also influence the decision to operate. A couple of WSB contact people noted that WSBs with preschoolers do not go in the rain. Clearly, what happens in bad weather has to be sorted out within the user group for each WSB.

3.3 Survey of WSB Users

Through the Contact People survey, we were given the names of most of the 112 children (approximately 70 families) using WSBs at the three schools involved in the trial. Self-completion surveys were distributed to these children with their regular weekly school newsletter. Postage-paid, addressed envelopes were provided to facilitate the return of the questionnaires.

The survey sought information from parents about their child/ren's use of the WSB, about how they travelled prior to the implementation of the WSB, and if they had missed using the WSB for any reason in the past 4 weeks. Parents were asked how they felt about being WSB drivers or, if not a driver, why they were not. One section of the survey assessed the impact of the WSB on their child/ren, themselves and their household's car use. We also asked what improvements, if any, parents would like to see for the WSBs in their neighbourhood or school.

We received replies from 47 families, involving 74 children using the WSBs. This is a clearly satisfactory response rate of 66%.

3.3.1 Travel to and from School

All of the families live less than 2 km from their local school, with 63% of them living less than 1 km from school. Prior to the implementation of the WSB in early September 2000, 62% of the families usually drove their child/ren to and from school, with a small proportion (11%) of these using a carpooling arrangement with another family. The remaining children usually walked to school with an adult (30% of families), or in some cases by themselves (2%) or with siblings or friends (2%).

Once the WSBs started operating, there was a change in these travel patterns, though clearly not all children use the WSBs everyday (see Table 3-1 below). Some WSBs do not run everyday pre-empting their greater use. However, it also reflects the fact that using the WSB everyday to and from school may not suit the families, particularly after school when other activities, such as both parents working, a child's music or other lesson, or the child/ren going to play at a friend's house, may mean it is more convenient to use a car. On average, each child involved was using the WSB for around five trips per week.

Table 3-1 Number of Children Using WSBs To and From School Each Day (n=74)

Day	To School	From School
Monday	51	30
Tuesday	43	25
Wednesday	49	22
Thursday	62	33
Friday	45	23

Most children (84%) had missed using the WSB at least once in the previous four weeks. Poor weather (rain), and a child's illness were the main reasons for missing the WSB, along with family holidays. One-off before or after school activities also affected WSB use.

Three families had participated on a WSB since September 2000 but were no longer using the WSB due to a variety of reasons, including that the parent was taking a car out then anyway, the child/ren preferred to walk on their own or it took too long (on the WSB) to walk to school.

Ninety percent (90%) of the families still using the WSB said they would continue to do so following the summer holidays (in the 2001 school year). The families who said they would not had children who were older and/or moving on to a different school. In one instance, a family was selling house and shifting elsewhere.

3.3.2 WSB Drivers

Most of the families responding (86%) to the survey also provided at least one adult driver for their child/ren's WSB. This figure can be considered alongside the fact that adults from approximately one-half of the families initially wanting to become involved in the WSB networks had volunteered to become drivers. The two figures suggest that those families who initially commit to having child/ren use, and parents drive, the WSB are more likely to become and remain actively involved in their neighbourhood WSB. Alternatively, parents actively involved as drivers may have been more likely to complete the second survey.

Those families who did not provide a volunteer WSB driver had one of two reasons for not doing so: either the parent(s) worked and were not available for "driving" or they had toddlers/preschoolers which made driving the WSB a difficult prospect. Note, however, that others drive WSBs while pushing prams.

3.3.2.1 What Drivers Like about Driving a WSB

We asked WSB drivers what they liked and disliked about being WSB driver. About one-half of the respondents identified two or more things they liked about being a WSB driver. The most common responses (in order) were:

- Meeting other parents and children in the neighbourhood, getting to know them and having regular interactions with them (20 responses)
- Getting exercise – several respondents commented on the fact that being part of the WSB prompted them to walk more as a form of transport and exercise. One parent wrote that the WSB "got me started walking. Now I walk more regularly and have lost weight because of it. It's a great way to start the day." (16 responses)
- Being with the children in the morning – chatting and having a "relaxing, pleasant time together." (9 responses)
- Being part of the WSB network – "taking my turn" and knowing that they are helping to get the children safely to school. (8 responses)

3.3.2.2 What Drivers Don't Like

Over one-quarter (27%) of the WSB drivers responding to the question "what do you dislike about being a WSB driver?" wrote "nothing." For the remaining drivers, there were a variety of comments such as waiting for children to turn up for the WSB (particularly after school) and waiting for slow walkers, making decisions in bad weather about whether the WSB will go, and being ready on time or even early compared with when they took their children on their own. None of these reasons stand out as being more important than any other.

3.3.3 Impact of the WSBs at the Trial Schools

We asked parents questions about the impact of using the WSB network on their child/ren's physical activity levels, the parents' time, and the use of the family car.

3.3.3.1 Impact on Child/ren's Physical Activity Levels

In its 1998/99 Sports and Physical Activity Survey, the Hillary Commission (2000) found that 31% of young people (aged 5 to 18 years) were "inactive" – doing less than 2.5 hours of sport or physical activity per week. Overseas studies have found that children who have daily physical education or other physical activity perform better academically than those who are not active. In addition, for up to 2 hours after the physical activity, the children have better concentration and problem-solving capability, improved creativity, enhanced memory and learning capabilities, and improved mood state (Hillary Commission 1998). The report also notes "leisure-time physical activity also helps to strengthen family bonds and build stronger communities through increasing social networks and developing community identity" (p.10).

Together with the National Health Committee, the Hillary Commission (1998) has begun a "Push Play" campaign recommending a minimum of 30 minutes of physical activity of moderate intensity (for example, brisk walking) on most, if not all, days of the week. This activity can be taken in small "snacks" of 10 minutes each. Clearly the WSBs have the potential to contribute to improved physical activity levels in both the children and parents who use them.

The evidence from our survey suggests that WSBs may be making a difference. One in three (31%) of the families reported that their child/ren's overall level of activity was higher because of using the WSB. This perception also suggests that the results in Table 3-2 showing the higher activity ratings occurring after the introduction of WSBs are not purely due to warmer weather later in the year. We also asked respondents to rate their oldest child's activity level in November 2000 and prior to the start up of the WSBs in September 2000. The categorisations we used for this were adapted from an evaluation of the WSB at Pirehill First School in the UK by the Centre for Alternative and Sustainable Transport at Staffordshire University (Bickerstaff & Shaw, 2000). We had 3 categories:

- **Sedentary** – gets very little exercise. For example: walks or runs less than 1 km per day; spends most of his/her free time sitting, watching TV, using the computer or reading.
- **Moderately active** – gets some exercise. For example: walks or runs 1-2½ km per day; when not in school he/she spends more of his her time in active play than he/she does reading or watching TV.
- **Active** – is involved with programmed exercise 2 or 3 times per week. For example: soccer, basketball, athletics or walks / runs 2½ km or more per day.

This comparison of physical activity levels before and after the implementation of the WSBs reveals that there has been a distinct shift in the level of activity by 10 of the 42 children (see Table 3-2 below).

Table 3-2 Comparison of Level of Activity Before and After WSB Network⁶ (n=42)

Before WSB (Sept. 2000)	With WSB (Nov. 2000)		
	Sedentary	Moderate	Active
Sedentary	-	6	
Moderate	1	19	4
Active	-	-	11

3.3.3.2 Impact of the WSB on Parents' Time

We asked parents if they were spending more, less, or about the same amount of time getting their child/ren to and from school since using the WSB. Thirty percent (30%) said they were spending about the same amount of time while a further 14% said they were spending more time (typically 10-30 minutes) per week getting their child/ren to and from school.

The remainder (56%, n=24) said they were spending less time taking child/ren to and from school since using the WSB. Many of these (38%) estimated their time saving as 10-30 minutes per week, while 25% estimated the time saving to an 30-50 minutes per week. A further 29% said they saved at least 1-2 hours per week.

Overall, parents saved 24 minutes per week on average (this is a net result, taking into account those losing as well as those saving time).

3.3.3.3 Impact of the WSB on Car Use and Operating Costs

Seventy-nine percent (79%) of the families responding to the survey and using WSBs drove their children to school at least once a week prior to the implementation of the WSB – in fact, for these families the “usual” mode of travel for their children to get to school was by car. Since September 2000, 62% of the families found that they were using their car *less* before 9 a.m. because of the WSB, and 17% said their car use was the same. On average, these families were each saving around 20 minutes of driving per week. This represents 14 hours per year per family (based on a 40 week school year).

We have estimated a saving in petrol, per family⁷, per 40-week school year of approximately 120 litres and, hence, \$132.

3.3.4 Illustrative Benefits if WSBs Extended Christchurch-wide

The four schools approached for the WSB trial have around 1200 children enrolled compared with around 25,000 children aged 5 to 10 in Christchurch (1996 Census). Simple extrapolation from our evaluation to the greater numbers in the whole of Christchurch suggest that the impacts of roughly the following size could be achieved by extending the approach city-wide:

- 1300 families and 2100 children using WSBs
- 11,000 child/ trips per week using WSB

⁶ To avoid multiple ratings from one parent, rated only the oldest child in each household using WSB

⁷ Based on an average driving speed of 50 km / hour and fuel use of 8 litres per 100 km. Fuel price based on average of premium and unleaded 91 petrol prices in February 2001 – approximately \$1.10 per litre. This estimate assumes that most trips are cold-started and short-distance (less than 7 kilometres) but does not take into account any savings in wear and tear of running a vehicle on very short trips.

- 3100 car arrivals at school per week saved
- 640 children with higher level of physical activity noticeable by parent
- 230 fewer "sedentary" children
- 500 hours saved per week by parents
- 150,000 litres of petrol per year saved (as most trips are short, cold started)
- Approximately 3.4 tonnes less of carbon dioxide emitted
- \$165,000 per year saved on petrol.

Greater impact could well be achieved at other schools in future. Firstly, at the time of our trial, the concept was unproven. Now we can point to lasting local success (and with networks of WSBs, not just isolated groups of parents doing this). Secondly, our initial approach was heavily dependent on an initial self-completion survey. Others may be able to promote the now proven concept more forcefully from the start. Also, preliminary forms to complete can be shorter than ours because they only need gather information required to organize WSBs, not the extra information needed for evaluation and research. Thirdly, the practical experience from this trial has resulted in guidelines useful for setting up WSB networks more smoothly in future.

3.3.5 Attitudes Towards the WSB

We asked parents and children what they liked and disliked about the WSB. As the questions were open-ended, respondents were free to state more than one like or dislike and many did so.

By far and away (35 responses), children like the WSB because it allows them to socialise and meet with their friends and others. A few children (2-3 responses for each item) commented that they liked wearing the safety "gear" as part of the WSB, enjoyed the exercise, liked arriving at school on time or early and having a play, and that they valued their independence of going to school without their parent.

There are very few "dislikes" expressed by the children. Of note were the comments that sometimes children felt "too tired" to walk (9 responses), didn't like the pressure of having to be ready at a certain time (6 responses) or didn't like other adults (besides their parents) driving the bus.

One-half of the parents particularly liked the fact that they have more time for themselves and make fewer trips to and from school due to the WSB network. They also liked knowing that their children were travelling to school in a safe, supervised fashion and that they were meeting up with their friends and neighbours. Parents enjoyed the convenience of the WSBs, knowing that their child/ren was getting exercise and was on time for school. A few parents commented on the fact that they were saving petrol and using the car less since the WSB started.

Many parents wrote that there was "nothing" they disliked about the WSB. Like the children, the dislikes were varied with only 2-3 respondents making the same observation. Concern was expressed about the safety of road crossings, having to be organised to make the bus on time, and coping with the change to routine when the WSB was cancelled due to poor weather. Two parents complained that the WSB did not operate often enough.

3.3.6 Future Use of the WSB

Most respondents (90%) said that their children would continue to use the WSB after the summer holidays (i.e. for the 2001 school year). The reasons for discontinuing their use of the WSB related to the age of the children, shifting house and shifting schools.

Some parent volunteer drivers (12%) stated that they would not continue to drive the WSB after the summer holidays because their children were old enough to walk themselves, were changing schools or shifting house. One parent found that the arrangements for picking her child up from the WSB don't suit and had decided to withdraw at the end of the 2000 school year.

3.4 Survey of Families Not Using WSB Network (Despite Earlier Interest)

Through the Contact People survey, we found 49 children (in 37 families) were not using WSBs that were operating from their neighbourhood to their school. Self-completion surveys, designed specifically for non-users, were distributed to these children's parents with their regular weekly school newsletter. Postage-paid, addressed envelopes were provided to facilitate the return of the questionnaires.

The aim of these questionnaires was to find out why these families, who had earlier expressed an interest in their children using a WSB, had decided against being involved. We also wanted to find out if the existence of the WSB had had any influence on how their children travelled to and from school.

Seventeen families responded to the survey distributed to non-users of the WSB network. Six of the families were from Beckenham School and the remainder were at Paparoa Street School.

3.4.1 Reasons for Not Using the WSB

Most (82%) of the families had never used the WSB. The remainder had tried it and discontinued their use for various reasons, such as their child/ren preferred to walk with their parent / caregiver rather than the WSB. For one family this preference arose, in part, due to a lack of communication about the timing and stops of the bus and because their child didn't feel part of the group when he didn't receive a sash to wear like the others. Another family has one child using the WSB and the other being driven to school.

The reasons that families had not ever started using the WSB varied widely. The most often commented on factors (4 responses each) were:

- Taking the car out then, anyway
- Child/ren preferred walking with a friend or parent to walking with the WSB
- Family circumstances – parents who felt that because they could not volunteer as drivers, they should not “free ride” by letting their child/ren use the WSB
- Lack of communication – parents commented that they were unaware or unsure that the WSB was operating in their neighbourhood.

The message that we received from the families that were not using the WSB is that *communication* about the WSBs is very important. Also, children appear to like being associated with the “bus” and want to feel as if they are like everyone else in the group – so it is important that *all* children on any given WSB receive any sashes or other “goodies” on offer.

3.5 Medium-Term Impact

Early in 2001, we collected evidence which showed that not only were all of the WSBs started in September 2000 still operating but that some of them continued to grow in numbers (Gilberthorpe School’s bus now has up to 23 children on it daily). A new bus has been added to the existing network at Beckenham School and Papanoa Street School is considering expanding its network.

In short, without further support from the outside, WSBs have proved to be self-sustaining even after the inevitable disruption and changes occurring over a summer break.

Furthermore, using the networking approach, Waimari School has conducted a survey of the school community and is to launch 7 WSBs at the beginning of the second term. In March 2001, Oakland School was in the process of surveying its community and is expecting to have a network of at least 5 WSBs in mid-2001.

4. Guidelines for Walking School Buses

Based on the results from the Christchurch trial, we developed guidelines for setting up WSB networks. Because of New Zealand-wide interest in the project, the booklet *The Walking School Bus – A Guide for Parents and Teachers* is available to anyone interested in establishing one or a whole network of WSBs. Two central government agencies (the Energy Efficiency and Conservation Authority and the Hillary Commission) are already distributing it nationwide.

The guidelines outline a clear and simple process for setting up WSB networks, or even just one WSB. They also provide helpful hints for successful WSBs and tips on how to keep a network going as well as contacts for help. The booklet contains all of the forms required in the process, including a letter introducing the WSB concept to parents, a survey form for the school community to gauge interest in WSBs, and route scheduling forms. We further simplified the forms that we used in the trial, taking into account the evaluation feedback.

A copy of the guidelines is found in Appendix E. The guidelines are also available on the Pinnacle Research website (www.pinnacle.research.co.nz).

5. Conclusions

Our earlier research investigating alternative methods for children travelling to school found a high level of interest in the Walking School Bus (WSB) concept. Nearly one-half of the families who lived within 2 kilometres of their school stated that they would use a WSB at least 3 days per week – all but one of these 33 families drove their children to school 4 or more days per week.

Because of this interest we designed a trial for WSB networks. Internationally, there had not been any attempts to test how far the WSB concept could be used to address the trend of increasing numbers of children being driven to school with all of the problems (congestion, pollution, safety, etc) that go with this trend. We surveyed the entire school community for the 4 Christchurch schools involved in the trial, mapped out a potential network of WSB routes, held meetings with interested families and volunteers so that they could “take ownership” of “their” bus route, and helped them to launch the network. Christchurch City Council provided Walking School Bus kits, including safety sashes and drink bottles for all children using the networks.

Our evaluation of the trial shows that the networks have been a clear success. Ten weeks after launch, 13 WSBs involving 112 children were operating at 3 schools. That is, our simple approach using a then unproven concept resulted in nearly 10% of the children at the trial schools regularly using WSBs. Over 60% of these children had previously been driven to and from school. Parents and children alike were enthusiastic about the WSB, saying they enjoyed the friendships, sense of community, exercise and knowing that the children were getting safely to and from school.

Even following the 2-month summer break, all of the bus routes started in September 2000 have survived and some have even grown. New routes have begun in early 2001 and two additional schools in Christchurch are in the process of being networked.

The widespread interest in WSB networks led us to produce a booklet *The Walking School Bus – A Guide for Parents and Teachers* that outlines a clear and simple process for establishing one WSB or a whole network. The practical success of our Christchurch trial suggests that WSB networks can be set up simply following this process with minimal outside support and deliver lasting benefits to the families taking part as well as relieving traffic problems. As shown by illustrative calculations for Christchurch in this report, benefits from successful extension of WSB networks to an entire city would be substantial.

6. References

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