Proposed Closure of Redcliffs School

Independent Review of Transport-Related Submissions

CARRIAGEWAY
CONSULTING

traffic engineering | transport planning

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1. Introduction

1.1.   The closure of Redcliffs School was proposed by the Minister of Education in March 2015, and submissions were invited on the proposal. A submission has been made by the school's Board of Trustees, and this includes a number of transportation-related topics including road safety, likelihood of particular modes of travel, and transport efficiency issues. Several other submissions made by private individuals also raised transport matters.

1.2.   This report reviews each of the various components within the submissions to determine the underlying assumptions, whether these are robust or if alternative assumptions could be reasonably be made, whether the methodology followed in each case is rigorous, and hence whether the conclusion is valid or if different outcomes would arise under a different paradigm.

2.   Background

2.1.   Location

2.1.1.   Redcliffs School is located approximately 8.2km southeast of Christchurch central city. It lies on the western side of Main Road, a Minor Arterial Road under the Christchurch City District Plan which links the settlement of Sumner towards the southeast with the remainder of the urban form of the city. It has a defined school zone, as shown below.

2.1.2.   Also shown below are the locations of Mt Pleasant School and Sumner School, which are the locations to which students of Redcliffs School would transfer if the latter was to close. The van Asch Deaf Education Centre in Sumner is also shown, as this is the location from which Redcliffs School presently operates.

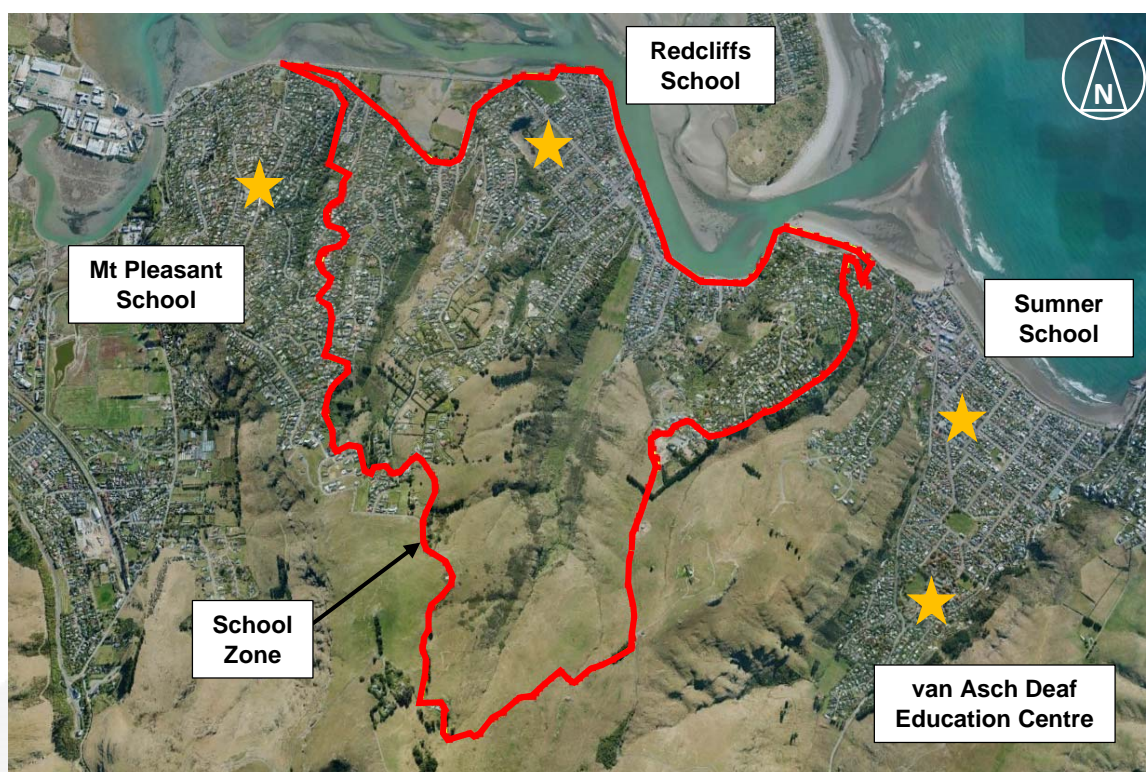**Figure 1: Redcliffs School Zone and School Locations**

2.1.3.   Much of the urbanised area of the school zone lies within the Moncks Bay census area unit, shown below and consequently data collected by the most recent census can be helpful in determining certain of the characteristics of those that may have children attending Redcliffs School.
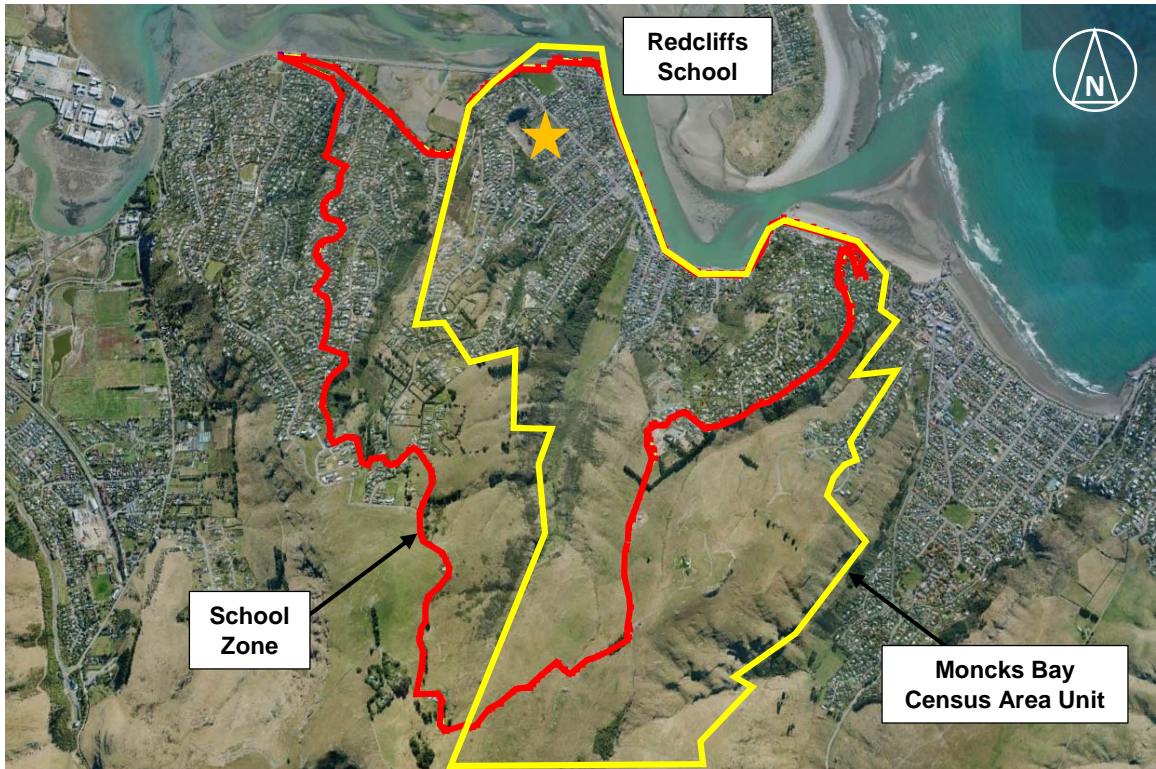
Figure 2: Redcliffs School Zone and Moncks Bay Census Area Unit

3. Travel Distance to the Schools

3.1. Submission

3.1.1. The submission sets out the travel distances for the Mt Pleasant, Redcliffs and Sumner schools, and highlights that the temporary relocation of Redcliffs School has resulted in an additional 1.7km travel distance each day for students (Table 1 of the submission). It is noted that the distance from Redcliffs School to the Mt Pleasant site is approximately 2.4km, and to Sumner school approximately 3.3km.

3.1.2. The submission then goes on to calculate the costs associated with the additional travel, concluding that the increase in travel distance equates to an additional annual travel cost of approximately $47,000, or $650,000 over a 40-year appraisal period.

3.2. Review

3.2.1. Table 1 of the submission is not explicit as to whether the distances cited are the one-way journey length (that is, from home to school) or the two-way length (from home to school and back again). Consequently the source data has been obtained and this shows that the distances are one-way only, that is, from home to school. The 2010 data is based upon Redcliffs School being at the Redcliffs site, with the 2014 data reflecting the relocation of the school to the van Asch site in Sumner. The values are 'crow-fly' distances, and are derived from the actual home locations of students.

3.2.2. Nevertheless, a number of journey distances appear spurious. For example, in the 2014 data set, there was one student that apparently travelled more than 27km from their home to the school, which in practice would mean that the student's home address was in Rolleston, Kaiapoi or another outlying settlement. While this cannot be precluded, it would seem to be an unusual circumstance at best. There are a considerable number of other journey distances that are not possible to achieve from locations within the school zone, and therefore these must represent home addresses for out-of-zone students.

3.2.3. The inclusion of addresses within the data set that are located considerably outside the school zone presents a number of issues. From a practical perspective, the nature of school zones is such that potential students living outside the zone are given lower priority than those within the zone, and they are therefore not assured of a place. On a year-on-year basis, this means that the number of students living outside the zone can fluctuate significantly, which precludes a realistic comparison of the annual data.

3.2.4. Moreover, those students living outside the zone specifically seek to attend Redcliffs School and it could be argued that they therefore are aware that their journey will be longer compared to attending another school. As such, the process of putting themselves forward necessarily means that they will typically be less sensitive to changes in the journey distance compared to those that live within the zone, and will not be expecting to walk or cycle to the school.

3.2.5. Consequently, to ensure that the data sets can be fairly compared, the information has been cleaned to remove those students living outside the zone. The maximum distance between the Redcliffs site and the urban edge of the school zone is 1.9km, and thus for the 2010 data, distances of more than this have been removed. The maximum distance between the van Asch site and the urban edge of the Redcliffs school zone is 4.3km, and thus for the 2014 data, distances of more than this have been removed.

3.2.6. This results in a corrected 2010 average distance to school of 0.8km, and for 2014 the average distance becomes 2.5km. Thus the additional travel distance associated with the relocation of the site is confirmed to be 1.7km.

3.2.7. The calculation within the submission then sets out that there will be a cost associated with the extra travel time that will be necessary if students were to attend another school. In order to calculate this, a number of variables have been defined.

3.2.8. The school roll is assumed to be 221 students, based on the 2014 roll. This is therefore a reasonable assumption.

3.2.9. The increase in journey distance is assumed to be 1.7km, which is derived from Table 1 of the submission for the 2014 travel distance for Redcliffs students compared to the 2010 distance. This has been reviewed against the source data as described above, and is robust.

3.2.10. A value for time of $9.80 per hour has been used, which assumes that children are driven to school. This value is extracted from the latest version of the NZTA Economic Evaluation Manual and has been updated to a 2014 base year.

3.2.11. An average travel speed of 30km/h is allowed for. The prevailing speed limit on the roads which will be used is 50km/h, but it is not possible to maintain this speed during all parts of the journey due to the need to slow to pass through intersections and the like.

3.2.12. Based upon these factors, the submission sets out that extra 1.7km will take an additional 3.4 minutes to travel, which equates to $0.55 per person. For 221 students, this equates to $245.44 per day. Anticipating that a school is open for 192 days of the year, then this results in a figure of $47,000 each year. This figure is numerically correct.

3.3.   Discussion

3.3.1. Although the calculation and inputs of the submission withstand scrutiny, the derived figure allows for the journey to school to drop-off the child, and the journey from school having picked up the child, but does not recognise that part of the journey that is made by the caregiver without the child. If this is allowed for, then the annual cost of additional travel set out above becomes $94,000.

3.3.2. However, the calculation anticipates that there will be only one child in each vehicle. This is usually not the case, since siblings typically attend the same school and caregivers may also transport unrelated children. Data from the NZ Household Travel Survey (NZTA Research Report 467 and accompanying spreadsheet) indicates that on average each car carries at least 1.5 children, and this would mean that the resultant annual cost of additional travel becomes $62,650.

3.3.3. The submission notes that the calculation is "*conservative"* because in practice, the additional distance required to travel to Sumner and Mt Pleasant Schools is greater than the 1.7km additional distance allowed for. However, it is evident from Figure 1 that Sumner School is closer to the Redcliffs School zone than the van Asch site, and consequently students currently travelling from within the school zone to Sumner School would travel on average 0.8km *less* than if travelling to the van Asch site.

3.3.4. Consequently, if all students of Redcliffs School were to relocate to Sumner School, the average journey distance to school would reduce from 2.5km to 1.7km. This remains higher than the 2010 data for Redcliffs School (an average travel distance of 0.8km), but the additional

journey length of 0.9km rather than 1.7km means that the resultant annual cost of travel becomes $49,750. This reduces further to an additional $33,200 if a higher car occupancy is allowed for.

3.3.5. The 2013 census data showed that of 86% of all households in the Moncks Bay area unit made a journey to work and of these, 87% were made by motor vehicle in the direction of Christchurch. The most likely outcome of students relocating to Mt Pleasant School is therefore that a commuting journey currently being made will divert to drop the child off at the school. Importantly though, if a journey is already being made into the city, then the only additional journey length is that diversion from the commute to Mt Pleasant School.

3.3.6. A number of submissions from individuals have raised an issue that the route used within previous assessments is incorrect as it makes use of Rangatira Terrace for travel to Mt Pleasant School. At the time of writing, the lower section of this road remains closed due to earthquake damage and therefore it would not be appropriate to rely upon it within any analyses. The most likely route for travel to Mt Pleasant School is therefore via Mt Pleasant Road, Billys Track, Major Hornbrook Road and St Andrews Hill Road. This diversion is 1.8km long compared to a journey made solely along Main Road between Mt Pleasant Road and St Andrews Hill Road.

3.3.7. If all students of Redcliffs School relocated to Mt Pleasant School, the average journey distance to school would marginally increase from 1.7km to 1.8km, resulting in an annual cost for additional travel of $99,500. This reduces to $66,350 when allowing for car occupancy.

3.3.8. The submission also notes that the calculated figures do not take into account the "*congestion, health and environmental impacts*" of increased vehicles on the road at peak times. However, as set out above, travel to Mt Pleasant School is most likely to take place as part of a journey that is already being made anyway, and thus there will be little increase in the number of vehicles.

3.3.9. Although travel to Sumner School will result in additional journeys being made (compared to a return to the Redcliffs School site), it is of note that Main Road exhibits a strong tidal flow with the majority of movements in the morning peak hour being made in the direction of the main urban form of Christchurch. Travel from Redcliffs to Sumner is in the opposite direction to this, meaning that any contribution to congestion will be minimal.

3.4. Summary

3.4.1. The numerical calculation of the cost of extra travel time is correct, but it omits half of the journey meaning that the estimated additional travel time cost (calculated according to the submission) of $47,000 should be $94,000.

3.4.2. However, the calculation does not include a number of salient factors. This includes the likelihood that each car will have more than one child, that journeys made from the Redcliffs school zone to Sumner School will be 0.8km shorter than if made to the van Asch site as well as being made in the non-peak direction, and that journeys to Mt Pleasant School are likely to be made as part of an existing commuter journey that diverts to the school.

3.4.3. Taking these matters into account, the additional travel time costs arising from the closure of Redcliffs School will lie between $36,900 and $66,350 per annum. Costs towards the lower end of the range will occur if a greater proportion of students transfer to Sumner School, whereas the higher costs will arise if a higher proportion of students transfer to Mt Pleasant School.

4.   Change in Active Modes of Travel

4.1.   Submission

4.1.1.   The submission sets out that it will not be practical for pupils to walk or cycle to Mt Pleasant or Sumner from Redcliffs. The lack of walking and cycling means that there will be health and environmental costs of approximately $2.8M over a 40-year appraisal period, if it is assumed that 50% of students cycled to the Redcliffs School site and 50% of students walked.

4.2.   Review

4.2.1.   The government's strategy for encouraging walking and cycling 'Getting There – On Foot, By Cycle' sets out that the bulk (74%) of cycling journeys are 3km or less in length and that older cyclists are most likely to travel longer distances. The strategy also notes that 71% of all walking trips are under 1km in length. The relocation of students to Mt Pleasant or Sumner Schools means that for the most part, distances from student home locations to the school will lie outside these distances and therefore a significant reduction in walking and cycling could be expected to occur as the submission describes.

4.2.2.   However it would be extremely surprising if 50% of students cycled to the Redcliffs School site and 50% of students walked pre-quake. In the first instance, younger primary school students generally do not cycle unless there is off-road provision due to their lack of ability to negotiate the often-complex interactions with motor vehicles. The Redcliffs School website itself notes that "*it is recommended that children under the age of ten do not cycle to school, as their road and traffic sense is not adequately developed*". Similarly, many children will live at distances from the school where walking is not a viable mode of transport.

4.2.3.   The values for the benefits/costs for walking and cycling are noted to be $3.08 per pedestrian kilometre and $1.60 per cyclist kilometre. These values are extracted from the latest version of the NZTA Economic Evaluation Manual and are robust. However unlike the calculation of travel time costs, the submission does not set out the approach for evaluating the costs associated with the change in travel mode. This means that aspects such as the distances that have been assumed cannot be critically reviewed, and so any reassessment of the calculations can only be carried out via factoring the data.

4.3.   Discussion

4.3.1.   The submission allows for 50% of children to walk and 50% to cycle. Data from the NZ Household Travel Survey (NZTA Research Report 467 and accompanying spreadsheet) indicates that for a *typical* primary school around 3% of students would be expected to cycle and 27% would be expected to walk. In the case of a school roll of 221 students, this equates to 5 students cycling and 59 students walking.

4.3.2.   By way of a check on this, an average of 49% of students across the whole of Christchurch live within 1km of their primary school, and those schools have a model share for walking of 27%. The 2010 data set for the distance between student homes and the school has been reviewed, allowing for the school to be sited within Redcliffs. This shows that 58% of all students lived within 1km of the school and could therefore walk if they chose to do so. This is slightly higher than the average for the whole city, and therefore suggests that there is potentially slightly more walking likely to take place at Redcliffs School (at the Redcliffs site). Consequently, walking journeys may comprise 33% of school trips.

4.3.3. Allowing for 50% of the 221 students to walk and 50% to cycle equates to a cost of $514.80 per kilometre travelled. However from the data above, 3% of students would be expected to cycle and 33% would walk and this equates to a cost of $232.84 per kilometre.

4.3.4. A cost of $2.8M is described in the submission, and this equates to $202,500 per annum (found by applying the factor used to convert annual travel time costs to a 40-year period). Applying the more realistic proportions for walking and cycling, a figure of $91,600 per annum (and $1.27M over 40 years) would be more appropriate, recognising that even when it is possible to travel on foot or by cycle, a significant number of students do not do so.

4.4. Summary

4.4.1. Due to a lack of detail, it is not possible to review a number of the parameters used in the calculation of the costs arising from students not being able to travel on foot or by cycle. However the analysis is based upon significantly more students travelling by these modes of transport than is likely to be the case. Taking this into account, the costs are likely to be around 55% lower than has been set out in the submission.

5. Impacts on Other Users of the Transport System

5.1. Submission

5.1.1. The submission sets out that as a result of vehicles transporting students to either Mt Pleasant or Sumner Schools there will be adverse effects on other road users. Existing congestion at the school sites will be intensified as vehicles converge on these sites, with potential effects on accident risk.

5.2. Review

5.2.1. The submission acknowledges that the data for this is anecdotal, and does not attempt to quantify the effects that are described.

5.3. Discussion

5.3.1. Although anecdotal, it is reasonable to anticipate that existing deficiencies (if any) at Mt Pleasant and Sumner Schools would be exacerbated through additional travel taking place. This will include increased congestion due to increased vehicle numbers. However this effect is not specific to the closure of Redcliffs School and it would also arise if for example, new subdivisions were constructed within the respective school zones.

5.3.2. The current roll at Sumner School is 453, with Mt Pleasant School having a roll of 314. Crudely, assuming that half of Redcliffs School students transferred to each of these, there would be a 24% increase in student numbers at Sumner School, and a 35% increase at Mt Pleasant School. Due to the likelihood that these students would travel by car, it could reasonably be expected that these percentages are the minimum increases that would be seen in traffic movements at the school gate due to school-related travel.

5.3.3. Increases of this magnitude arise at other types of developments relatively frequently, and do not necessarily translate into significant adverse effects. However, they invariably trigger the need to review the existing transport infrastructure provided and fully assess the likely effects of the increase on efficiency and road safety. In the event that Redcliffs School was to close, it would be prudent to undertake a detailed review of the existing operation of the transport networks adjacent to Sumner and Mt Pleasant Schools, in advance of any increases in student movements due to higher rolls.

5.4. Summary

5.4.1. Although the information is anecdotal, it is appropriate and prudent to review the levels of transportation infrastructure at Mt Pleasant and Sumner Schools prior to any transfer of students from Redcliffs School, to ensure that no adverse safety or efficiency effects will arise as a result of the increase in vehicle numbers.

6. Road Safety

6.1. Submission

6.1.1. The submission presents outputs from the NZTA Crash Analysis System for the location of recorded traffic accidents within the Mt Pleasant, Redcliffs and Sumner areas, and then filters them to identify those accidents which occurred between 7am to 7pm, Monday to Friday (representing accidents taking place during daylight hours on school days).

6.1.2. It is highlighted that the Mt Pleasant School site and Sumner School site had 40 reported crashes each, with only 25 reported crashes at the Redcliffs School site, and that as a result, the former are on "*higher risk roads*". The increase in traffic on these roads that would arise due to the closure of Redcliffs School, coupled with the extra travel distances, is noted as increasing the number of accidents around the schools, with a consequential social, health and economic impact.

6.2. Review

6.2.1. It is certainly the case that there is a relationship between travel distance and potential to be involved in an accident. The data presented in the submission shows a cluster of accidents along Main Road, which is as would be expected due to this being the road that carries the greatest number of vehicles, with relatively few accidents recorded elsewhere (with locations that are dispersed over the wider area).

6.2.2. The filtering of the accidents is a little puzzling, as it gives rise to a 12-hour period during weekdays. However school travel typically only occurs in the hour prior to the school opening and the hour after it closing. Filtering in a manner that includes additional hours, including the busy evening peak hour, will undoubtedly show accidents at times the schools will not generate traffic. Put another way, the potential of school-related traffic to create additional road safety risk at 7pm is negligible, because at this time, school traffic volumes are non-existent.

6.2.3. Reporting the number of accidents is also unusual in such a case, because it is the *risk* of being involved in an accident that is the most important factor. The number of accidents on any given section of road is in part due to the traffic volumes on that road. Thus one location which has (say) double the number of accidents of another location might in fact be equally safe if the traffic volumes at that site are also double. In this particular instance, it does not appear that any attempt has been made to relate accident numbers to traffic volumes.

6.2.4. It is also noted that the submission describes that the accident "*rates*" are "*almost twice as high around Sumner and Mr Pleasant Schools compared with the Redcliffs School site*". This is incorrect since no information is presented regarding rates.

6.2.5. It is also noted that an 11-year period was selected for an examination of the accident records, from 2004 to 2014 (inclusive). The NZTA Economic Evaluation Manual sets out that considering the accident records over a five-year period is appropriate (Page 5-278) unless traffic flows are less than 1,500 vehicles per day, whereupon a ten-year period can be used (and the results are then divided by two). It is not clear why an 11-year period was chosen in this case.

6.2.6. The 11-year period used not only includes the patterns of road safety period prior to the 2010/11 seismic events, but also the period during the earthquakes when many residences in the area were unoccupied, plus the subsequent years. It also spans the period when Redcliffs School was operating from its Redcliffs site, and also the time when it was operating from the

van Asch site. It is therefore potentially unsurprising that the number of accidents recorded in the vicinity of Redcliffs School is lower than at Mt Pleasant or Sumner Schools, since for four of the eleven years of analysis the school was not at the Redcliffs site. It is also possible that the accident record on the roads to Sumner School will be affected by vehicles travelling to/from Redcliffs School at the van Asch site.

6.3. *Discussion*

6.3.1. In view of the shortcomings in the analysis presented within the submission, the NZTA Crash Analysis System has been used to further refine the assessment. Part of the filtering carried out for the submission was to limit the accidents to "*roads likely to be used for trips to or from the schools*". No further details are provided as to which roads were considered or how they were selected and because of this, it is not possible to have certainty that the analysis below adopts an identical approach as the submission.

6.3.2. This analysis is also split into two parts, 2006 to 2010 as the five-year period prior to the earthquakes, and 2011 to 2014 as the subsequent period when travel patterns were disrupted, and Redcliffs School relocated to Sumner.

Area	Number of Reported Accidents							
	2006 to 2010				2011 to 2014			
	All	Wkday 7am-7pm	Wkday 8am-9am	Wkday 2:30pm-3:30pm	All	Wkday 7am-7pm	Wkday 8am-9am	Wkday 2:30pm-3:30pm
Mt Pleasant (as per submission Figure 1)	63	35	3	3	21	12	1	1
Redcliffs (as per submission Figure 2)	38	21	4	4	16	13	1	0
Sumner (as per submission Figure 3)	52	29	3	4	28	9	0	1

Table 1: Number of Reported Accidents at Different Times of Day

6.3.3. The analysis confirms the general pattern described in the submission that accident numbers are higher within the Mt Pleasant and Sumner areas than at Redcliffs. However, any differences are negligible when the records are examined for the times when school travel is likely to occur. Prior to the earthquakes, six accidents were recorded in Mt Pleasant compared to eight in Redcliffs and seven in Sumner. Post-quake (and noting that this is a four-year period rather than five years), only one or two accidents had been recorded at these times. These differences are attributable to normal statistical fluctuations rather than to any intrinsic road safety issues on the network.

6.3.4. The locations of the accidents in the 2006 to 2014 period have been plotted below.
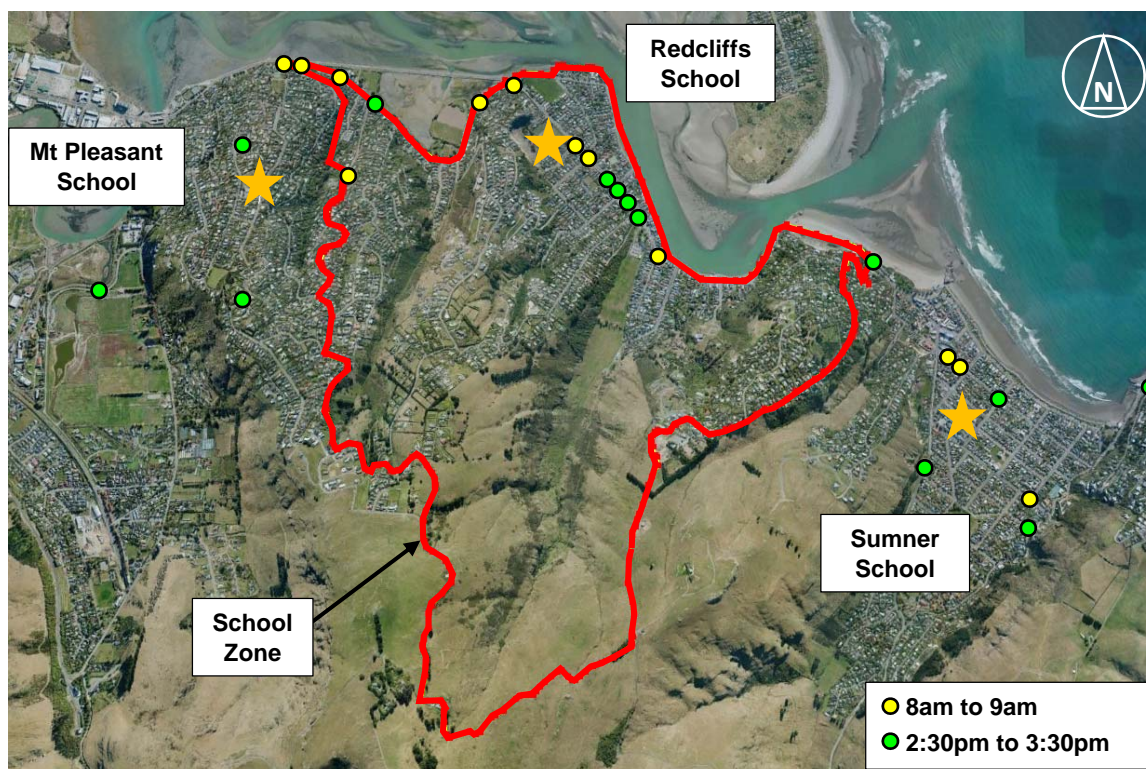
Figure 3: Redcliffs School Zone, School Locations and Accident Locations

6.3.5.   The locations of the accidents show that they have generally occurred some distance from Mt Pleasant School and are dispersed within Sumner, but there have been two in close proximity to Redcliffs School.

6.3.6.   A review has also been carried out of all accidents over this whole geographic area which involved children. In the period 8am to 9am on a weekday, between 2006 and 2014, just one accident involved a child. This occurred in 2006 and involved a ten-year-old cyclist who was struck by a car on Nayland Street (Sumner). There have been no crashes recorded involving children in the period 2:30pm to 3:30pm on weekdays between 2006 and 2014.

6.3.7.   Finally, a review was carried out of the roading network within 200m of each school site. Even adopting the less stringent criteria used in the submission (7am to 7pm on weekdays), there were only two accidents recorded within 200m of Mt Pleasant School between 2006 and 2014. Both of these occurred on Major Hornbrook Road. One occurred in 2006 when a driver lost control while travelling downhill and the records note that alcohol was a factor in this. A further accident occurred in 2013, when a motorcyclist travelling downhill lost control. A factor recorded for this accident is that the driver was new and showed inexperience. Neither of these occurred at times when school travel could be expected.

6.3.8.   Nine crashes were recorded in the same time period within 200m of Redcliffs School, all of which occurred on Main Road. Two of these involved u-turning vehicles that were struck by others, two involved drivers opening a car door directly in front of a cyclist, and two involved distracted drivers who struck parked cars. The remaining accidents were attributable to a variety of reasons. However one accident involving a u-turning vehicle and one involving a driver that turned into a side road and struck a cyclist occurred at times when school travel could be expected.

6.3.9.   Seven crashes were recorded within 200m of Sumner School. Three involved drivers that failed to give-way to other vehicles at intersections. One involved a driver who skidded and left

the road (and the record sets out that this was a new driver that showed inexperience) and one involved a driver who had a sudden illness and left the road. One accident involved a child cyclist (described in more detail above) and one occurred when a u-turning vehicle was struck by another vehicle. These latter two accidents occurred at times when school travel could be expected.

6.3.10. On this basis, there is no evidence to suggest that the roading network in the vicinity of any of the three schools has an inherent road safety issue. Taken over a longer timeframe, the data shows that Mt Pleasant School appears to have the best accident record of the three but assessing only the times when school travel is likely shows that there is no discernible difference between any of the three sites. There is therefore no reason to anticipate that a significant adverse road safety effect would arise from the additional movement of students to either Sumner or Mt Pleasant Schools.

6.3.11. One comment made within the submission is that the current configuration of the roading system does not accommodate safe crossing points for children and therefore results in additional road safety risks. From a practical perspective however, this risk is considerably mitigated because the distances involved mean that few students will walk or cycle, and thus the need for them to cross the road as a pedestrian or cyclist is greatly reduced.

6.3.12. As noted previously however, even on well-designed roads additional distance travelled results in an increased exposure to the risk of an accident and general equations that enable this risk to be calculated are set out in the NZTA Economic Evaluation Manual. The actual level of risk for vehicle occupants depends on the route that is selected and how many intersections through which they pass (as there is increased risk of conflict where turning traffic streams meet), and in this case there is also a change in risk factor because some students that previously walked will now travel by car.

6.3.13. Due to the variety of factors involved, it is extremely difficult to robustly evaluate the change in level of risk associated with the closure of Redcliffs School. However, from the analyses set out previously, the relocation of students to Mt Pleasant School would give rise to an increased journey length of 7.2km per day per vehicle (taking account of both the journey to drop-off or pick-up the child and the return journey) and an additional distance of 3.6km per day per vehicle for travel to Sumner School. With the journey being made by 150 vehicles per day, for 192 days of the year, this equates to 103,700 additional kilometres per year for travel to Sumner, and an extra 207,350km for travel to Mt Pleasant.

6.3.14. Using the equations within the NZTA Economic Evaluation Manual, it is calculated that the additional travel will give rise to one additional injury accident every 32 years if all vehicles were to travel to Sumner School, or to one additional injury accident every 16 years if all vehicles were to travel to Mt Pleasant School.

6.4. Summary

6.4.1. The road safety assessment of additional travel in the submission encompasses a much wider timeframe that would be expected, since schools only generate travel at specific times of the day. If two one-hour periods are considered rather than a 12-hour period, there is little difference in the accident record at any of the three schools (Redcliffs, Mt Pleasant or Sumner).

6.4.2. Two accidents were recorded within 200m of both Redcliffs and Sumner Schools which occurred at times when school travel might occur. However, between 2006 and 2014, over the whole geographic area there has been only one accident recorded that involved a child at such times.

6.4.3. The additional risk associated with travel to Mt Pleasant or Sumner Schools rather than Redcliffs School is difficult to quantify, as it involves a number of factors such as the number of intersections through which each driver passes, and a change in risk factor due to a change in travel mode. However solely assessing the change in travel distance that would arise shows that if all students travelled to Sumner School then one additional injury accident can be expected every 32 years, or one additional injury accident can be expected every 16 years if all students travelled to Mt Pleasant School.

7. Summary

7.1. Travel Distance to the Schools

7.1.1. The numerical calculation of the cost of extra travel time set out in the submission is correct, but it omits half of the journey meaning that the estimated additional travel time cost of $47,000 (calculated according to the submission) should be $94,000.

7.1.2. However, the calculation does not include a number of salient factors. This includes the likelihood that each car will have more than one child, that journeys made from the Redcliffs school zone to Sumner School will be 0.8km shorter than if made to the van Asch site as well as being made in the non-peak direction, and that journeys to Mt Pleasant School are likely to be made as part of an existing commuter journey that diverts to the school.

7.1.3. Taking these matters into account, the additional travel time costs arising from the closure of Redcliffs School will lie between $36,900 and $66,350 per annum. Costs towards the lower end of the range will occur if a greater proportion of students transfer to Sumner School, and higher costs will arise if a higher proportion of students transfer to Mt Pleasant School.

7.2. Change in Active Modes of Travel

7.2.1. Due to a lack of detail, it is not possible to review a number of the parameters used in the calculation of the cost of not being able to travel on foot or by cycle. However the analysis is based upon significantly more students travelling by these modes of transport than is likely to be the case. Solely taking this into account, the costs are likely to be around 55% lower than has been set out in the submission.

7.3. Impacts on Other Users of the Transport System

7.3.1. Although the information is anecdotal, it is appropriate and prudent to review the levels of transportation infrastructure at Mt Pleasant and Sumner Schools prior to any transfer of students from Redcliffs School, to ensure that no adverse safety or efficiency effects will arise as a result of the increase in vehicle numbers.

7.4. Road Safety

7.4.1. The road safety assessment of additional travel encompasses a much wider timeframe that would be expected, since schools only generate travel at specific times of the day. If two one-hour periods are considered rather than a 12-hour period, there is little difference in the accident record at any of the three schools (Redcliffs, Mt Pleasant or Sumner).

7.4.2. Two accidents were recorded within 200m of both Redcliffs and Sumner Schools which occurred at times when school travel might occur. However, between 2006 and 2014, over the whole geographic area there has been only one accident recorded that involved a child at such times.

7.4.3. The additional risk associated with travel to Mt Pleasant or Sumner Schools rather than Redcliffs School is difficult to quantify, as it involves a number of factors such as the number of intersections through which each driver passes, and a change in risk factor due to a change in travel mode. However solely assessing the change in travel distance that would arise shows that if all students travelled to Sumner School then one additional injury accident can be

expected every 32 years, or one additional injury accident can be expected every 16 years if all students travelled to Mt Pleasant School.

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