STRATEGIES FOR INCREASING SAFETY AND ACCESSIBILITY ON POINT GREY ROAD

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UBC SCARP Plan 580
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1. INTRODUCTION

Point Grey Road (PGR) is a narrow, 2.3 kilometre-long street that wraps along the water on the northwest edge of Vancouver's Kitsilano neighbourhood. Classified as a secondary arterial by the City of Vancouver (Vancouver, 1997), PGR serves not only as a link between the area's residents and downtown Vancouver, but also as a commute and recreational route. A potential destination for PGR users is the University of British Columbia (UBC), located on the western tip of the Vancouver peninsula. Students and employees travelling by bike to UBC from downtown Vancouver, northern Kitsilano or the northern portion of East Vancouver, would logically take this road in order to substantially reduce their travel distances. Furthermore, on either end of PGR are some of Vancouver's most popular beaches and recreational areas, including Jericho and Spanish Bank beaches immediately to the west, and Kitsilano Beach to the east. To access these public amenities, Vancouver residents and visitors to the city travel by car, bike and foot along PGR.

1.1 Objectives and benefits

The objective of this study is to addresses the safety and accessibility issues facing the various transportation modes along this narrow stretch of roadway. For the purpose of this report, our definition of safety includes both real evidence of crashes and road users' perception of safety problems on the road. Similarly, we define accessibility as the physical and perceived ease of using the road as well as reaching the recreational destinations along it. As a result of Vancouver's transportation plan, which establishes pedestrians, bicycling, transit, and goods movement as transportation priorities, we prioritize the needs of cyclists and pedestrians over motorists in our definition of accessibility (Vancouver, 1997). Peter Ladner, former Vancouver city councilor notes: "The city has long had a policy of improving public access to the waterfront along this stretch, recognizing it as the most inaccessible ocean waterfront left in the city" (email correspondence, 2011). Ultimately, the objective of this study will be to evaluate the overall purpose of the PGR corridor and ways it can better achieve its recreational potential and ways to resolve traffic safety in the corridor.

Reducing motorized traffic on PGR could help reduce emissions of greenhouse gases and other pollutants. However, it is not clear if such a reduction of vehicles along PGR would simply shift the traffic to another roadway or neighbourhood. Increased physical activity, however, presents another potential benefit stemming from changing the design of PGR. If the road becomes a more attractive place for active commuting or active recreation, health benefits for local residents, UBC commuters, and recreational walkers and cyclists could be realized. The final potential benefit of redesigning PGR is reduced traffic collisions. The current small sidewalks, narrow road design and lack of defined space for cyclists creates conditions that appear unsafe. Changing the design could help address actual safety issues while at the same time addressing perceived safety issues that may stop people from walking or cycling on the street. The environment, health and safety are pressing issues globally that require small-scale, as well as large-scale solutions. PGR offers the opportunity to implement a small-scale solution that also increases equitable access to the recreation spaces in the neighbourhood.

1.2 Layout of the report

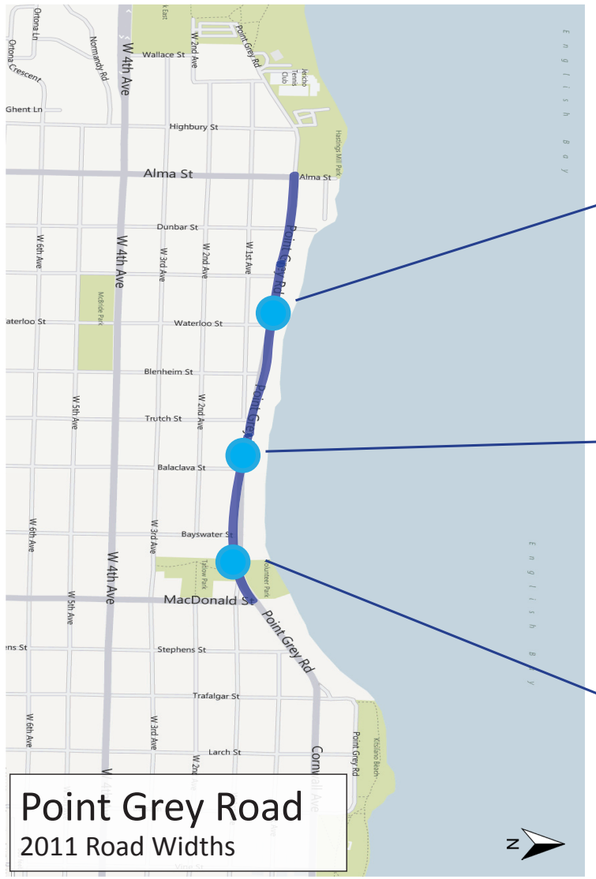
This first section of this report describes current conditions on Point Grey Road in order to clarify the unique and complex constraints defining this stretch of road. Also in this introductory section, we present the problems with the road from the perspectives of three user groups: local residents, bike commuters, and recreational cyclists and pedestrians. In the section that follows, we discuss the gaps in the data, and how we've obtained quantitative and qualitative data to inform us about the nature of the problem. In the fourth section, we outline two immediate measures, as well as three medium to long term scenarios of changes. Finally, we conclude by selecting our preferred scenario and explaining our rationale and our recommendations for further research on this topic.

1.3 CURRENT DESIGN AND PROBLEMS

At its eastern end, PGR starts as a residential road at Balsam Street, looping north of the Cornwall Avenue arterial for 300 metres, before returning to the path of Cornwall Avenue at Trafalgar Street and, in effect, taking over the position and arterial function of Cornwall Avenue. Between Trafalgar Street and Alma Street, PGR is a waterfront arterial, offering a direct link between the Burrard Bridge and Jericho Park along the spectacular and park-filled coastline. Although on the east, PGR connects to the busy and relatively high speed Cornwall Avenue, its western end connects to a parking lot. Perhaps this dramatic reduction in its intensity helps explain why there is no public transit service on PGR. Bus #22 travels from downtown on Cornwall Avenue and then the first couple of blocks of PGR, after which it heads south on MacDonald.

Although the City of Vancouver classifies PGR as a secondary arterial (Vancouver, 1997), there are three major ways that PGR differs from most arterial roads:

1. It is narrow, although its width varies throughout its length. From Trafalgar to just east of MacDonald Street, PGR is 11.65 metres wide, with a painted median strip and parking along most of the south side of the street. There is no parking on the northern, coastline side of the street. Just west of MacDonald Street, PGR widens to 13.25 metres, which allows for one lane of travel in each direction and parking on both sides of the street. The width changes again at Waterloo Street, where the roadway narrows dramatically to 7.6 metres. This width continues west to Alma Street, allowing for one lane of travel on the south and north sides, and one lane of



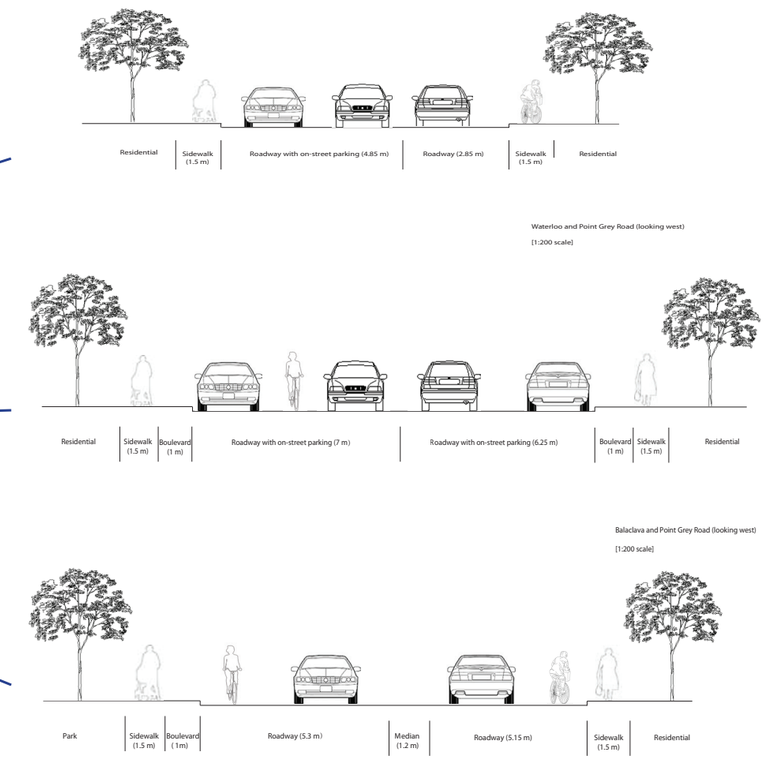


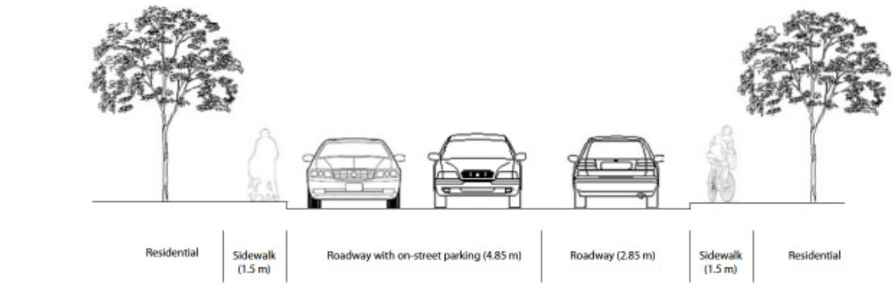
Figure 1: Point Grey Road map and street sections showing changing road widths

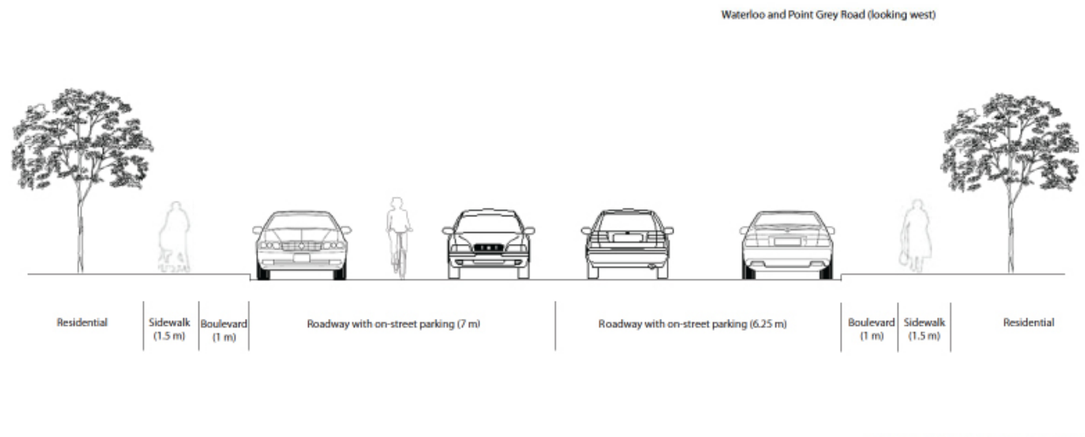
parking on the south side. Throughout the length of the street, the sidewalks are 1.5 metres wide. There are no bike lanes or other bicycle-specific infrastructure on PGR.

2. PGR is Vancouver's only road classed as an arterial with a 30 kph speed limit. The low speed limit is perhaps a function of the road's narrowness, as well as concerns raised by neighbouring residents.

3. As well as being an access road for a number of recreational destinations, including Jericho Beach, Jericho Tennis Club and the Royal Vancouver Yacht Club, PGR is itself a recreational destination. There are five parks along the northern waterfront side of PGR and one park along the southern side. With the exception of Tatlow Park on the southern side, these parks are the sizes of some of the lots on PGR. It appears many of these parks resulted from the City of Vancouver's attempt to purchase properties along the entire northern side of PGR in order to turn the entire section into a park. According to City records, this process lasted from 1969 until the policy was overturned by the courts in 1981 (Vancouver (City of) v. Simpson., Vancouver 1977).

PGR connects some of the most spectacular waterfront public spaces in Vancouver. The eastern end of PGR starts at Kits Beach and ends at Jericho Park, which contains Jericho Beach, Locarno Beach and Spanish Bank Beach. PGR is the only major road that provides direct access to the parking lot for Jericho Park. In addition, PGR is known as a popular destination for long distance runners and cyclists because it presents a suitable extension of the seawall. The 1.5 metre wide sidewalks, narrow roadway and the complete lack of bike infrastructure suggest that conflicts are likely on PGR, and that different types of road users are likely to experience and identify the problems differently.





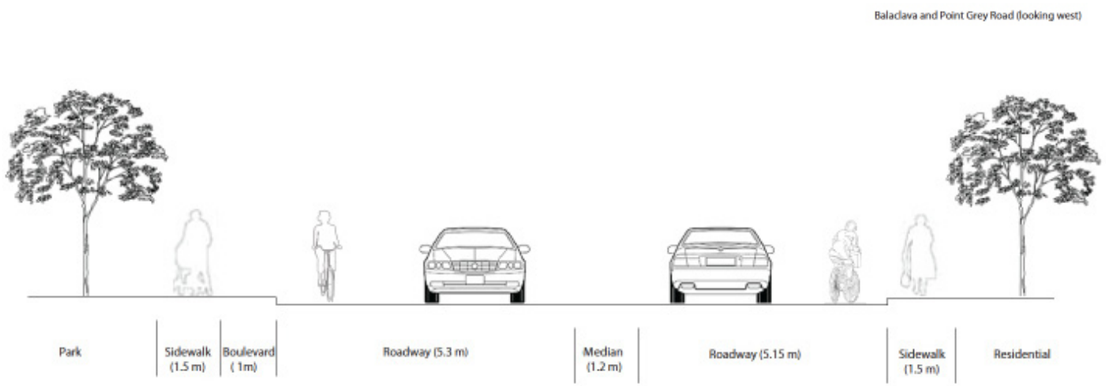


Figure 2: Point Grey Road map street sections (enlarged view from previous page)

Figure 3: Point Grey Road near Alma Street

1.4 NEIGHBOURHOOD CONTEXT

In this section, we identify PGR's stakeholders and outline specific considerations with regards to each group.

1.4.1 Local residents

PGR is entirely residential, with 163 properties between MacDonald Street and Alma Street (Van Map, 2011). The vast majority of lots contain single-family dwellings, with the housing stock ranging from modestly-sized heritage houses to more recently-constructed high-end residences. The corridor includes four of the ten homes with the highest assessed real estate values in Vancouver (Great Estates, 2010). Residences on the north side of the street contain driveway access off PGR, while approximately 20 per cent of the residences on the southern side offer driveway access off the street (note: the majority of these south side residences offer lane-way access south of PGR).

Based on available data and general observations, we have made several inferences about the residents living alongside PGR. Lot values for residences along PGR range between $8 and $20 million (Great Estates, 2010). We assume these residents are likely to own one or more vehicles (Dargay, 2001) and to be more physically active (Pan et al., 2009) than the average. In outlining potential solutions to the conflicts on PGR, it's important to consider the manner in which residents access their place of employment, and whether changes to the roadway that support active transportation will benefit them. As well, residents will likely be concerned about vehicle access to their residences, on-street parking and the ease of reversing from their driveways.

1.4.2 Commuting cyclists

For the purpose of this report, we've divided potential commuting cyclists using PGR into: a) local residents who work downtown and, b) UBC students and staff who live downtown or in parts of East Vancouver. In addition to having more than 40,000 students (UBC, 2011), UBC is the largest employer in Vancouver, with approximately 10,000 to 15,000 employees (Western Libraries, 2007). We assume a good fraction of the daily commute trips generated by UBC's students and staff use some portion of PGR. The roadway provides a reasonable connection linking Burrard Bridge, downtown and East Vancouver to UBC. Similarly, local PGR residents would logically access PGR in order to access Vancouver's downtown, for example.

PGR, however, is not the official bike route for the area. The official Seaside bike route follows the seawall until Trafalgar Street, where it runs south and then runs along West 3rd Avenue. However, this route contains a significantly steeper hill – compared to PGR – and does not have signalized crossings at either MacDonald or Alma (VACC, 2004). Questions that remain about the role of PGR as a commuting route include:

- How many commuters access UBC via PGR, and how many area residents use it to commute downtown?
- Is the design of PGR itself a disincentive for this group, or is the busy and high-traffic Cornwall Road to the east of PGR, as well as unpaved path through Jericho Park to the west greater disincentives?

• Cyclists vary greatly in their levels of confidence and preferred facilities (Cycling in Cities, 2010). Of course, commuter cyclists also face similar issues as recreational cyclists using the road. How can improvements on PGR address the needs and encourage active transportation options among inexperienced, slow-moving cyclists, as well as address the wishes of confident, intermediate-level cyclists?

1.4.3 Recreational pedestrians and cyclists

As previously discussed, PGR is both a destination for recreation and a connector between recreational sites. The interests and concerns of its recreational users are perhaps the most complex, because recreational users needs vary from the needs of other recreational users, as well as those of commuters and local residents. People using PGR to access the beaches may travel by car, and therefore, their primary concern may be their ease of driving along the corridor. As mentioned in the section about commuters above, cyclists of varying levels of skill and experience may have different wishes for the design and level of traffic calming on the street. Pedestrians also fall into two groups: walkers and joggers. Both groups will likely support the provision of sidewalks, but their overall numbers and whether large groups of pedestrians frequently travel together will give a picture of how wide the sidewalks ought to be to accommodate their level of use.

2. RESEARCH METHODS

We use both quantitative and qualitative methods to determine Point Grey Road (PGR) users, current safety issues, and current accessibility concerns. This information later informs our proposed scenarios. In this section, we briefly discuss the methods we use to address major components of the project before moving on to revealing our findings in the following section.

2. 1 Who uses Point Grey Road?

To answer the question of who uses Point Grey Road and how, we relied primarily on neighbourhood-level census data and qualitative research. To understand the travel patterns of local residents, we have looked at commuting mode share information for the census area that PGR falls within. We have also used qualitative data gathered from e-mail correspondence from local residents outlining their interest in, and concerns about, the road. In order to collect this data, we first contacted local resident and Vancouver politician, Peter Ladner, who we had heard was interested in this issue (Vancouver Courier, 2010). He forwarded our e-mail to a number of his contacts in the area, who in turn contacted us.

City of Vancouver Community Planner, Catherine Sinasac, has been a third source information about the context of the neighbourhood. In addition, she has helped clarify some of our concerns about the relevant community plan for the area. PGR does not fall within the recently completed West Point Grey Community Vision, even though many people would identify it as being part of that neighbourhood. Instead, PGR is dealt with under the Kitsilano Neighborhood Plan, which was last completed in 1977. More recently, though still almost 20 years ago, the Kitsilano Traffic, Cycling and Parking Plan was completed in 1992, incorporating residents' opinions regarding issues related to transportation in and through their neighbourhood. Each of these documents has been used to inform our research of the local community context.

Our methods for researching how commuting cyclists use the road included examining census data, information provided by UBC's Trek (transportation planning) Office and the Vancouver Area Cycling Coalition, traffic (classifier) count data provided by the City of Vancouver, as well as data gathered through our own traffic counts. The census data and information from UBC's Trek Office gave us a general picture of commuting patterns both to and from the area that might use PGR. We added depth to our understanding of PGR as a commuter route through an analysis of traffic count data from the City of Vancouver, as well as data that we've collected ourselves. The PGR traffic count data available from the City of Vancouver was limited, with one peak-time manual count available for PGR and MacDonald Street, and one more peak-time manual count available for PGR and Alma Street. We also obtained automatic 24-hour traffic counts from 2005 and 2006 from the City of Vancouver. While they didn't tell the whole story, these sources helped highlight user demographics along the road.

Because the official City of Vancouver traffic count data was deemed incomplete, we collected our own manual traffic count data. Members of the research team counted the volume and direction of traffic along PGR during morning and afternoon weekday and weekend peak-times. We also included a weekend off-peak period in order to help us begin to understand the relationship between commuting and recreational uses of the road. We counted

motor vehicles, cyclists on the road, cyclists on the sidewalk, walkers and joggers – travelling in both east and west directions, respectively. These observations gave us a fuller picture of the use of the road, as well as the relationship between commuting and recreational road use. Of course, our own observations are relatively limited in scope and reflect the particularities of when they were each recorded (e.g. all manual counts were recorded during spring break). As well, we couldn't ensure all of our own traffic counts were conducted on days with comparable weather, due to time restraints.

To better understand the recreational use of the road, we drew on the traffic counts described above, as well as qualitative data gathered from the Vancouver Area Cycling Coalition (VACC), Wedgewood Cycling Team, and the Running Room running store and community run organizer. We contacted the Vancouver Area Group Leader of the VACC, Lisa Slakov, with a survey containing five open-ended questions, which she posted to the VACC members' listserve. We received responses from 26 VACC members expressing their concerns with the design of the road and their suggestions for future improvements. Through this community, we also received a link to a website a member put together in 2004 as a report to council suggesting specific changes to the design of PGR in order to address the same problems that we are dealing with in this report (Becker 2004).

In addition to looking at general recreational use of PGR, we also examined PGR as a site of endurance-based recreation, such as long distance cycling and running. The Wedgewood Cycling Team is comprised of serious, competitive road cyclists. There are many cyclists of this type that use PGR, and we included this community's perspective to enrich our report. We received five e-mail responses to our online posting of five open-ended questions on their internal club mailing list. As well, we also received brief feedback from the area manager of the Running Room, a popular running store on Alma Street near PGR that organizes community runs in the area.

Figure 4: Point Grey Road at Waterloo Street

Table 1. Summary of major stakeholders and groups consulted for this study

• Vancouver Area Cycling Coalition (VACC)	• Wedgewood Cycling Team	• The Running Room
• UBC Trek Office	• City of Vancouver Engineering Department	• Catherine Sinasac, Community Planner, City of Vancouver
• Peter Ladner, Former Councillor, City of Vancouver	• Brent Toderian, Director of Planning, City of Vancouver	• Local City of Vancouver Police Detachment

2.2 Defining the safety problem

Determining the extent and severity of the safety problem on PGR was both the most straightforward and most difficult question to answer. One of the best methods for answering this question was by analyzing collision data collected by ICBC. Through a somewhat painstaking process, we obtained and analyzed collision data collected by ICBC. We also drew inferences about widely held perceptions of safety problems in the local area by examining issues raised in the Kitsilano Traffic, Cycling and Parking Plan (1992), and from the feedback we received from VACC members and local residents.

2.3 Defining the accessibility problem

Developing methods for defining the problem with accessibility on PGR proved to be one of the most complicated parts of our project. Measuring this parameter proved difficult. Ultimately, we drew on a combination of our own observations of the site and the surrounding area, the website outlining the problems with the road put together by VACC members in 2004, and our own personal communication with PGR local resident, Peter Ladner. Our definition of the accessibility problems on PGR came entirely from qualitative data.

Figures 5 and 6: Example of cycling conditions on Point Grey Road

3. FINDINGS

Census data was analyzed to assess travel-to-work behavior for residents in the census tract that contains Point Grey Road (PGR). To ascertain current mode shares along this roadway, manual traffic counts were taken by the research team from Point Grey Road Park at Blenheim Street and PGR in March 2011. These were compared with traffic counts retrieved from the city that were taken in January of 2006 and 2008 to assess validity and temporal changes in travel behavior. These quantitative data sets were supplemented with anecdotal data obtained from local residents along PGR in order to draw a clear understanding of the road and its users.

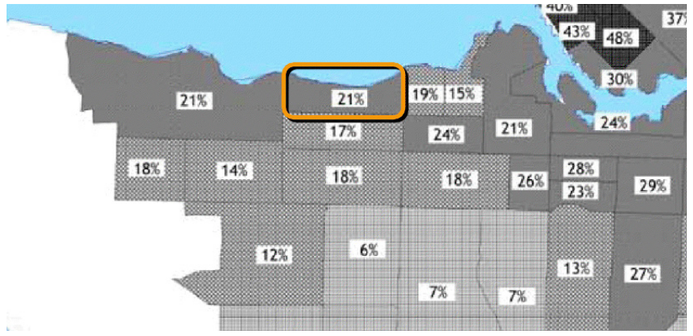
The accessibility and safety concerns that have stemmed from competing uses were identified by site assessments and e-mail correspondence with local residents and community groups that access the road (in particular, the Vancouver Area Cycling Coalition and Wedgewood Cycling Team). The identified concerns were corroborated with ICBC crash statistics for the stretch of PGR between MacDonald Street and Alma Street in order to gain a more accurate picture of the extent of the safety issue. This section outlines the results of our data analysis, indicating road usage for local residents, commuter and recreational cyclists, as well as recreational pedestrians.

3.1 Who uses Point Grey Road?

3.1.1 Local residents

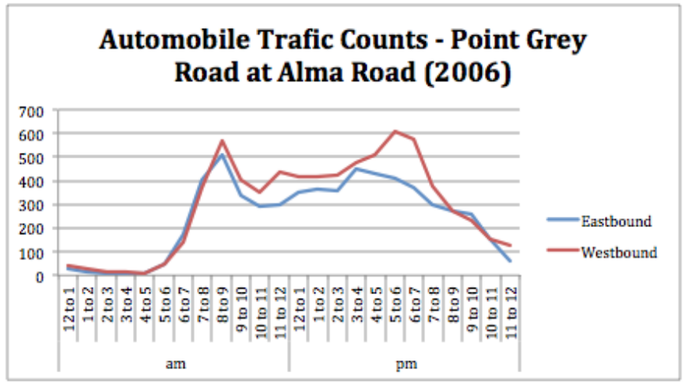
There are 163 properties along the stretch of PGR between MacDonald Street and Alma Street. Census data was analyzed in order to ascertain travel behavior data for individuals living on or near PGR. In this census tract, 9.6 per cent of the population journey to work by bicycle, and 21 per cent of the population journey to work by either bicycle or by walking (Statistics Canada, 2006) (See Figure 7). Both of these numbers are considerably higher than Vancouver's bicycle mode share (1.7%) and combined (bicycle and walk) mode share (15.9%) (Statistics Canada, 2006).

Figure 7: Journey to work by walk or bicycle (combined), 2006 census data. (Image source: City of Vancouver, RTS 7905)



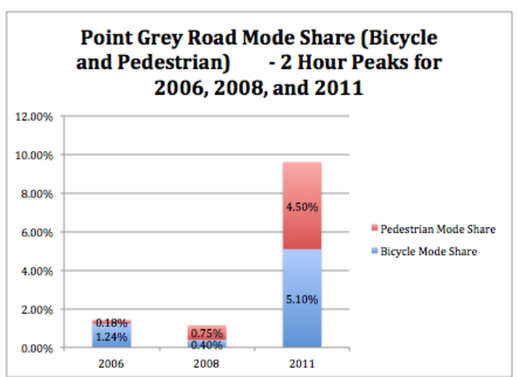
However, like most areas of Vancouver, the automobile remains the dominant mode share. In order to obtain a more accurate picture of the patterns of automobile traffic that is experienced along PGR, traffic count data were analyzed. Twenty-four hour automobile traffic counts taken in 2006 along PGR show distinct peaks at 8:30 a.m. and 5:30 p.m., respectively (See Figure 8), suggesting a commuter route. Westbound traffic counts totaled nearly 1,000 more than eastbound traffic counts in this data set (7,006 vehicles westbound versus 5,905 eastbound). This suggests that this route is predominantly used as a commuter route for those heading westbound, and it is assumed that many of these commuters are traveling to the University of British Columbia (UBC). The researchers feel this is a reasonable assumption considering that UBC is the third largest employer in the Lower Mainland and the largest single site employer in the province (UBC Fact Sheet, 2011).

Figure 8: Traffic count data taken at Alma and Point Grey Road on May 15th and 16th, 2006. (Data retrieved from Van Map)



In order to better assess mode share for travelers along PGR, the research team conducted manual traffic counts for PGR for weekday and weekend peak periods (7:30-8:30 a.m., and 4:30-5:30 p.m.). These data were then compared with City of Vancouver traffic count data from 2006 and 2008 in order to gain an understanding of how travel behaviors along this route have changed over time. We found that bicycle and pedestrian mode-share generally increased along PGR between 2006 and 2011. Pedestrian mode share was at 0.18% in 2006, 0.75% in 2008, and 4.5% in 2011. Bicycling mode share increased similarly, with a 1.24% mode share in 2006, 0.40 % in 2008, and 5.10% in 2011 (See Figure 9). The dip in bicycle mode share in 2008 is difficult to explain.

Figure 9: Point Grey Road bicycle and pedestrian mode shares from 2006, 2008, and 2011. (Data retrieved from Van Maps and collected by research team)



Through our research, we also identified both current corridor users, and gathered qualitative data on who isn't using the corridor but would like to.

3.1.2 Recreational Users

Pedestrians and recreational cyclists often use PGR as a route to either Jericho (east of PGR) or Kitsilano Beach (west of PGR). Our data supports this notion, with the highest combined pedestrian/cyclist mode share occurring during weekend a.m. and p.m. peaks (17.24%, and 14.65%, respectively). This is considerably higher than weekday combined pedestrian/cyclist mode shares during a.m. and p.m. peaks, which were 4.11% and 15.48%, respectively (See Figure 9), suggesting that PGR is in fact used more heavily by recreational users than commuters.

- Steve Mattina, area manager for the Running Room, says that their running clubs try not to use this stretch of PGR, as they generally find it to be unsafe (e-mail correspondence).
- Recreational cyclists use PGR in varying capacities. "I use Point Grey Road to get between Jericho and Kitsilano beaches all year round," notes a recreational user*.
- Several members of Vancouver's Wedgewood cycling team reported using the corridor exclusively on the weekend.
- Still, many other recreational cyclists would like to use PGR, but do not. An experienced cyclist who lives in the neighborhood states that she: "would be using [this corridor] constantly with my children... as it's the only flat route around... except it's way too dangerous for them." *

"I would not take my wife or children on this route"
– Recreational cyclist*

Thus, the perceived danger of the roadway is significantly limiting its use for recreational purposes.

3.1.3 Commuter Cyclists

Point Grey Road is a commuter route for cyclists heading eastbound out of Kitsilano and West Point Grey, as well as for those heading westbound to UBC campus. While there is currently a bike route on 3rd Avenue, it is not heavily used and is viewed as being inadequate in facility and even dangerous due to the lack of linkages across major streets such as MacDonald Street and Alma Street. As a local resident put it: "If [cyclists are] coming from the North Shore or the downtown peninsula, [PGR] is a short route to UBC, with by far the fewest cross streets, which is why cyclists ride on it in spite of a so-called bike route on 3rd, a narrow/dangerous 3-block section on Pt. Grey Rd. and a stop-and-go bike route along 8th." *

A bike commuter further explains the issues with the 3rd Ave bike route: "It is not a good alternative [to PGR] since it is hilly and has lots of intersections and parked cars; also, it is not direct and requires an unsignalized crossing of Alma."*

* Data collected via an email survey administered by the research team.

Of the 14 e-mail survey respondents who do use this route to bike commute, many still voice concerns: "If I was not a confident rider, I would have difficulty on this street."* Six bike-commuting respondents avoid this route, despite noting its convenience and directness. "While this would be my preferred route for commuting – as it is the most direct – I rarely use it during peak periods," says one bike commuter*. Another seasoned bike commuter and "experienced rider in city traffic" notes: "[he] simply will not ride on that road."

Someone who formerly bike commuted along this corridor remarked: "currently it is usable by only the fearless cyclists; it is totally unusable by most cyclists." He continues:" Right now I think that Point Grey road is to be avoided."*

"If I was not a confident rider, I would have difficulty on this street"
– Bike commuter*

While anecdotal and traffic count data support the notion that PGR is used as a commuter route to UBC, there has in fact been a decrease in commuter bicycle trips to the UBC campus, from about 2,700 trips in 1997 (roughly 3% of all trips) to 1,700 trips in 2009 (roughly 1% of all trips) (See Figure 10). However, this is likely due to a number of factors, most notably the implementation of the U-Pass and the associated rise in transit trips (18% to 47%) in the same time period (2009 Transportation Status Report, UBC).

Despite the reduction in commuter bicycle trips to campus, traffic counts on PGR suggest that it is a major commuter cycling route, with the highest cycle mode shares (4.5%) occurring at weekday a.m. and p.m. peak periods (See Figure 11). This fact, in conjunction with UBC's transit system overload, suggests that with proper alterations, PGR could become more of a prominent cycle commuter road than it is currently. This is supported by the previously discussed comparison of traffic counts from 2006, 2008, and 2011 (See Figure 9), which showed that bicycle and pedestrian mode-share has increased along Point Grey Road in the past five years.

Figure 10: A comparison of weekday mode shares to UBC from 1997 and 2009 (retrieved from UBC Transportation Report 2009).

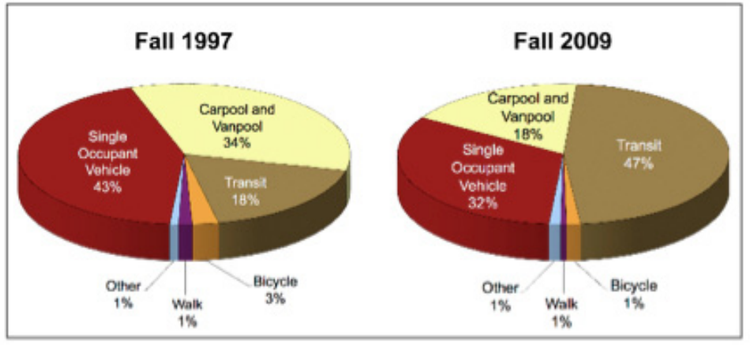
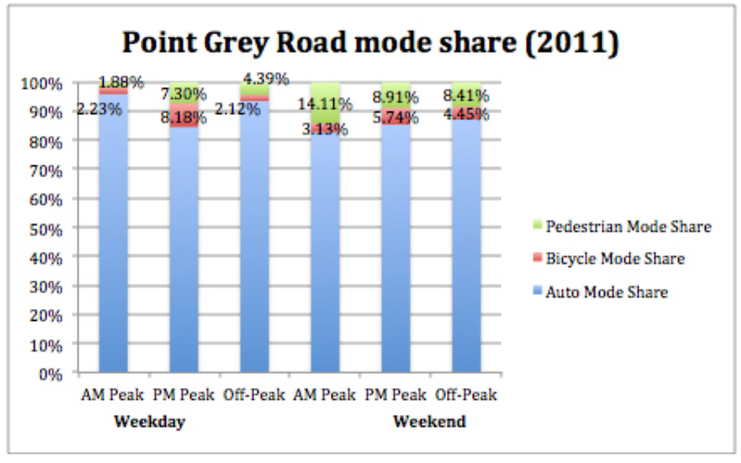


Figure 11 : Manual peak hour traffic counts taken at Point Grey Road Park at Blenheim and Point Grey Road on March 19th and 23rd, 2011.



* Data collected via an email survey administered by the research team.

3.2 What is the Safety Problem?

Despite being an attractive route for pedestrians, cyclists, and cars, PGR is not designed in such a way to safely facilitate the movement of all three of these travel modes and is instead an uncomfortable and unsafe corridor for travel.

The stretch of PGR between MacDonald Street and Alma Street varies substantially in width as one travels through the corridor, and this can lead to conflict between users of the road. At MacDonald Street, PGR is 11.65 meters wide, at Blenheim Street it widens to 13.25 meters, and then at Waterloo Street it narrows severely to 7.6 meters (see Figure 2). This variance in width causes unsafe conditions for users of the road, as there is simply not enough space to accommodate the various modes in some places, and the transitions between different road widths is abrupt.

Figure 12: Point Grey Road at Trutch Street

3.2.1 Crash data

Over a five-year period (2005-2009), there were 143 crashes along the stretch of PGR between MacDonald Street and Alma Street (ICBC, 2011). Thirty-two of these crashes resulted in an injury or fatality, and the remaining 111 resulted in property damage only, meaning material damages to vehicles with no injuries or fatalities (ICBC, 2011). During the same time period, one pedestrian and one cyclist were involved in crashes along the corridor. It is important to note that not all crashes are reported to the police, and as a result, there are fewer crashes reported to the police when compared to ICBC data. As well, under-reporting is often more prevalent in cyclist-automobile crashes than automobile-automobile crashes (Langley et al., 2003). The number one contributing factor to these crashes along PGR was alcohol, which was a reported factor in seven of the crashes. This was followed by road condition, which was a reported factor in six of the crashes, and speed, which was a reported factor in four of the crashes (ICBC, 2011).

3.2.2 Excessive speed concerns

While the speed limit for PGR was reduced from 50 km/hour to 30 km/hour in 1992, speeding remains a problem along this corridor (Kitsilano Traffic, Cycling and Parking Plan, 1992). The researchers observed vehicular speeds that were perceived to be in excess of the current 30-kph speed limit, and these perceptions were validated through correspondence with a member of the Vancouver Police Department. Sergeant Brian Green commented that while vehicular speeding does occur, there is minimal speeding enforcement on the corridor because enforcement is instead prioritized for areas with greater crashes and/or complaints.

3.2.3 Anecdotal evidence of safety concerns

Every single respondent to the VACC e-mail survey noted safety concerns on PGR, whether as a cyclist, runner, or vehicle driver. There was complete overlap between the issues noted by recreational and commuter cyclists, so they are presented here in aggregate. These concerns are largely based on the physical design and maintenance of the road, as well as the actions of those with whom the road is shared. Out of the 26 responses to this question, 17 people indicated that the narrowness of the road is a problem. Vehicle speed was the next most commonly cited issue, with 15 mentions. Interestingly, the "attitude/ aggressiveness / impatience" of vehicle drivers was noted by 12 respondents. The opening of doors on parked cars was cited nine times. The high volume of vehicular traffic was mentioned in six responses. The existence of blind driveways and cars backing into the road received five mentions. Four respondents pointed to the seams and unevenness of the road surface. Nonetheless, one respondent, a bike commuter, claimed that PGR is actually safer than some of the alternative routes, as there are fewer intersections.

"If I ride close to the curb cars will pass me quickly without necessarily giving me much space on my left hand side. If I ride further out from the curb to discourage them from passing me closely I feel much pressure to go quickly and/ or get out of the way. Sometimes this pressure is my own

sense of the traffic behind me, sometimes it comes in the form of revving or light honks from the cars behind me." - Recreational cyclist who tends to avoid PGR*

"This is only one of a number of streets in the last year where I have had motorists brush by me at high speed as oncoming traffic is going by. That is to say, they couldn't be bothered to slow down and wait for the oncoming car to go by before blowing by me. A car driver with this attitude is bound to bring down a cyclist sooner or later. This is worth mentioning because I have been riding seriously in Vancouver, as a commuter, since 1970, and the recent deterioration is significant." - long-time commuter cyclist*

Vancouver Police Sergeant and cyclist, Brian Green, refers to riding the stretch of PGR between Waterloo and Alma as "running the gauntlet".

Our single response by a runner indicated that sidewalk and road characteristics, coupled with the multi-use nature of the right-of-way make for a dangerous running environment. The sidewalk is described as being quite narrow, with frequent, sharp ups and downs to accommodate driveways. In narrow parts of the corridor, vehicular movement is just inches away, which allows little room for error if a runner was to trip on the uneven sidewalk. There is also danger of cars backing out of driveways with obstructed sight-lines; extensive hedging and landscaping can obscure both drivers' and runners' views of each other. An additional issue observed during our traffic counts is the potential conflict between runners/pedestrians and cyclists using the sidewalk in lieu of exposing themselves to the dangers of the roadway. "That stretch has always been a concern, but the run is beautiful along there, so its sad that it can't be fixed to [better] accommodate pedestrian traffic," said Steve Mattina, Running Room Manager.

While those using non-motorized modes of transport raised many more concerns, vehicle drivers also have safety concerns along PGR. These centre on the road's physical layout as well as the shared character of the space. The road's narrowness was consistently mentioned: "It's a very tight squeeze for both bikes and auto in many places," notes one respondent*. The combination of vehicles and cyclists makes for what one motorcyclist referred to as "an unsafe mix". He further explains that "during the week there is inadequate room for vehicles and cyclists commuting, and on the weekends you have weekend drivers and weekend cyclists mixing," inferring that the varied purpose of travel (commuting, recreation) and the concomitant skill and concentration levels involved may exacerbate the situation*.

Motorists also expressed concerns over the potential for vehicle-vehicle crashes along the route. A cyclist who also uses the route as a driver states: "motorists often have to suddenly slow down until they can safely pass a cyclist and pull out into the oncoming lane...with traffic coming quickly from the other direction"*. This rapid change of vehicle speed and the necessity of swerving into an oncoming lane present concerns of rear-ending, as well as head-on crashes. Further, as was observed during our traffic counts, cars backing out from north-side driveways with obstructed sight-lines from landscaping and a line of parked cars (in some cases), present a potential for side-impact vehicle-vehicle crashes.

3.3 Accessibility

Most of the residences along the stretch of PGR between MacDonald Street and Alma Street have driveways, and this is an important consideration when developing design recommendation that would limit access to local residents. Of the 163 houses along this stretch of road (78 on south side and 85 on north side), 85 of them have driveways (17 on south side, 68 on north side). In other words, more than a fifth (21.8%) of the residences on the south side of PGR have driveways, and four-fifths (80%) of the residences on the north side include driveways. While the south side proportion of driveways is much lower than the north side, it is important to note that the majority of the houses on the south side have laneway access.

The issue of access takes on different meanings for each group of PGR users. For local residents, access refers to the ability to arrive at and leave one's residence with ease. For commuter cyclists, access is the ability to reach one's school or workplace, and return home again with reasonable speed and directness. For recreational users, both cyclists and pedestrians, access refers to the ability to use PGR, itself, as a recreational corridor, as well as to reach the many recreational destinations along the route and at either end of it.

* Data collected via an email survey administered by the research team.

3.3.1 Local residents

Local residents' easy access to and from their homes is currently impeded by the extent of vehicular traffic on PGR. A resident who has lived on PGR for 35 years adds: "[he's] witnessed the ever increasing volume and speed of car traffic." In the Kitsilano Traffic, Cycling and Parking Plan (1992), it is mentioned that: "the narrow 27' pavement width west of Waterloo St. was noted to be a problem for private driveways on the north side of the street (vehicles backing into traffic lane). It was noted widening could be done through a local improvement if desired by the residents." However, the Engineering Department noted that, as of the date of the report: "property owners have not supported widening the narrow section of Point Grey Road" (ibid). Personal observations confirm the difficulty faced by some residents when trying to back out of their driveways and onto the busy thoroughfare.

3.3.2 Commuter cyclists

Commuter cyclists' easy access to their workplace or to UBC is complicated by this stretch of PGR. "The route directness and absence of uncontrolled intersections make [PGR] convenient," writes one survey respondent*. Though as previously noted, safety concerns force some cyclists to go out of their way, and over a sizable hill, in order to avoid riding this stretch.

3.3.3 Recreational users

Recreational users desire comfortable access to the right-of-way, as well as to the popular and highly used destinations on and around it. "In the summer, it gets a bit busy with lots of bikes going between the beaches and cars also going to the beaches," states a cyclist who frequents this route recreationally*. It is also important to contextualize this route within the greater network of recreational infrastructure in the city. As one cyclist points out: "it seems silly to have a wonderful bike route from Lions Gate Bridge to Burrard Bridge, and then have the whole thing stop suddenly; it is such a short section of road that needs to be [improved to make the cycling infrastructure] go all the way out to UBC and around the back on SW Marine"*. The aforementioned safety concerns directly affect recreational users' ability to access PGR as a recreational route. While there's no concrete evidence to support this, the desire to avoid PGR may limit people's use of the park and beach amenities along PGR.

4. PROPOSED SOLUTIONS

In light of the findings of our research into the safety and accessibility issues along the Point Grey Road (PGR) corridor, we have identified a number of design solutions. We feel these recommendations could do much in the way of addressing the concerns of local residents, commuters, and recreational users that use this stretch of road. The following section outlines these proposed solutions. It is important to note that with the exception of our immediate term solutions, all of our proposed solutions would require PGR to be reclassified from a secondary arterial to a neighbourhood collector road (Vancouver, 1997).

The first part of this section identifies some recommendations for immediate safety improvement on PGR. These recommendations are inexpensive and relatively easy to implement, and are modifications that we feel should be implemented in the short-term. Following the section on immediate improvements, we outline three comprehensive medium- to long-term scenarios for improving safety, recreation and access for cycling and pedestrian users on PGR. These scenarios are: 1) The creation of traffic barriers along PGR at MacDonald Street and Alma Street to restrict through-traffic on the corridor, 2) The conversion of PGR to a one-way street, with a segregated cycle facility on the south side, and 3) The removal of street parking and implementation of a segregated cycle facility.

* Data collected via an email survey administered by the research team.

4.1 RECOMMENDATIONS FOR IMMEDIATE SAFETY IMPROVEMENTS ON POINT GREY ROAD

This report introduces three key scenarios for improving safety, recreation and access for cycling and pedestrian users on PGR. In addition to these recommendations, we propose two inexpensive and easily installed devices that can be implemented immediately. They will reduce traveling speed of vehicles, and increase visible awareness between modes utilizing this secondary arterial. They are:

1. Installing radar speed-reader signs at:
   - Balaclava Street and Point Grey Road
   - Waterloo Street and Point Grey Road
2. Creating a driveway mirror program for residents with driveways abutting Point Grey Rd.

4.1.1 Radar Speed-Reader Signs

During our data collection on Point Grey Road, each member of our team observed average vehicle speeds that were well above the posted speed limit (30 km/h). A vehicle can currently travel unimpeded by traffic signals or stop signs for seven blocks between MacDonald Street and Alma Street, allowing drivers ample space and time to accelerate to unsafe speeds. Observational experience tells us that this appears to be common practice. This poses a substantial safety concern to pedestrians, cyclists and other compliant drivers who share the road. Reducing speed to improve safety between travel modes should be an immediate concern regardless of the proposed scenario, since radar speed-readers can be easily integrated into any of our proposed improvements.

Radar speed-reader signs are used in urban areas to increase traffic calming and speed limit compliance on roads where speeding and safety issues are a concern. Often they will be utilized to communicate safety concerns in areas where traffic maintenance staff are working on or adjacent to the street. The signs use radar technology to determine a vehicle's traveling speed, and instantly relay that information through a large LED readout screen that is visible to the driver from an approaching distance of at least 200 meters.

Figure 13: Example radar speed-reader sign
(Image credit: www.trafficlogix.com)

Brewer et al. (2006) conducted research on a Texas arterial and found that utilizing radar speed signs that are "reactive" to the speed of oncoming vehicles have "considerable potential" to change speeding behaviours of drivers and help with compliance and safety. Brewer also points to a study conducted by Pesti and McCoy (in Brewer et al., 2006), who found three direct results of implementing signs:

- They reduced the average speed of vehicles
- They narrowed the deviation of speeds that vehicles traveled on the road
- They increased compliance

Woo et al. (2007) also conducted speed testing with radar speed signs. This research involved pre-trial testing with hidden cameras to obtain regular driving speeds. Speeds were then tested with a radar sign, without a radar sign, and again with a radar sign. This process showed that speeds before the test were highest, and speeds during the second "off" phase were also lower. Speed levels during the radar signage test periods showed an average reduction of 4.5 kph in a 50 kph zone.

Wang's (in Brewer et al. 2006) findings are congruent with the above, and add that speed deviation and compliance continued to show lower speeds than pre-trial levels even after the sign was removed. They point to the likelihood that drivers think they are being "watched" by the sign, and/or that there may be traffic authorities nearby. While the continued behaviour might be situational to the context of Wang's study, we believe that the 'reactive' nature of these signs might alter long-term driving behaviour if drivers are presented with feedback on their actions.

This device clearly moves one step further than the speedometer in the driver's vehicle – instead of providing private readings, it provides publicly visible and recorded feedback. Once this information has been relayed back to the driver, this almost always results in an immediate deceleration in traveling speed (Brewer et al. 2006).

Highly visible sign design usually comes in two options: A trailer-mounted sign that sits on a sidewalk, boulevard, or on the road shoulder (Figure 14), or a stand-alone sign that can be mounted on an existing utility pole, or a small signage pole (Image 15).

Figures 14 (left): example road shoulder LED speed readout sign

Some units require an electric hook-up, while other models can run on a dedicated solar panel that mounts above the unit. The signs are also able to capture and record data on traffic volume, time of day, and speed readings, which can help to better understand hotspots of speeding on PGR. In terms of functionality, Traffixlogix.com outlines that most signs can be programmed to offer the following readout options:

1. Sign reads “Your Speed” for compliant speeds
2. Sign reads “Slow Down” for excessive speeds
3. Sign reads “Speed Limit” for static signage during low volume.
4. Sign strobes with a speed readout for high speeds

on the north side of the road and 17 on the south side, between MacDonald Street and Alma Street. Many of the driveways have tall landscaping or property walls that obstruct sound and visibility of road activity. For drivers exiting their driveways from either side of the road, there exists a safety hazard due to the inability to fully observe any oncoming traffic (pedestrian,

4.1.2 Driveway Mirroring

PGR currently acts both as a passageway for people who travel from MacDonald Street to Alma Street, and continue on to their destination, as well as a residential access for those who live directly adjacent to the road. As mentioned previously, there are 76 driveways on the north side of the road and 17 on the south side, between MacDonald Street and Alma Street. Many of the driveways have tall landscaping or property walls that obstruct sound and visibility of road activity. For drivers exiting their driveways from either side of the road, there exists a safety hazard due to the inability to fully observe any oncoming traffic (pedestrian, cycle, automobile).

With the installation of a driveway mirror on the west side of the driveway entrance in each location, the driver is able to extend their immediate observable environment to those areas that were previously out-of-sight. In the first image, the driver is now able to see oncoming travelers that might be on the sidewalk or road, allowing for better judgment when exiting the driveway. In the second image, the driver could remain further back in the driveway while waiting for an open road, allowing the westbound traveling vehicle to remain in its lane (it has deviated to the middle to mitigate the possibility of a collision). In this case, the mirror improves the safety for modes traveling in both directions, as the westbound driver is utilizing the entire road to compensate for perceived danger, but is creating more risk for eastbound travelers.

A driveway-mirroring program that provides homeowners with an easily installed device would greatly reduce the risk of collision posed in either of these scenarios. The modes most affected by the current visibility problems are cyclists and pedestrians who currently travel closest to the driveway openings, creating a higher risk of injury.

Figures 16 and 17 show one such driveway on the north side of PGR. Drivers here are unable to see westbound traffic on the road or sidewalk while exiting their properties. The orange shapes outline the area excluded from the drivers view, and show that the driver is unable to see an oncoming vehicle at a very close distance.

4.2 MEDIUM TO LONG TERM RECOMMENDATIONS: 3 SCENARIOS

In light of the safety and accessibility issues discussed in the previous section, we propose three medium to long-term scenarios that would help to address the concerns for the local residents, commuters, and recreational users that travel along the PGR corridor.

4.2.1 SCENARIO 1: Remove street parking and create a separated space for cyclists

This relatively straight-forward scenario includes the removal of street parking from both the north and south sides of PGR. The corridor would then include a marked (barricade-free) unidirectional bike route with painted road markings on either side of PGR. Ornamental pavings in narrow sections of PGR will help to denote the presence of the bike lanes. As well, shared-lane markings, or sharrows, will be painted on the narrow section, and traffic calming bumps will be installed in the centre "vehicle" lanes to slow vehicular traffic throughout.

Residents currently using PGR for street parking will find alternative street parking on the intersecting streets along PGR.

Stakeholder Support for Scenario

Survey respondents consistently supported the creation of bicycle-specific facilities, with 19 of the 23 respondents suggesting this alternative. For more than 20 years, Kitsilano-based cyclists have advocated for parking removal along PGR, according to the Kitsilano Cycling Survey (1990). Additionally, five of our survey respondents specified their desire for speed humps (with bicycle-friendly design) and three stated the need for improved signage that would indicate to drivers the need to share the road.

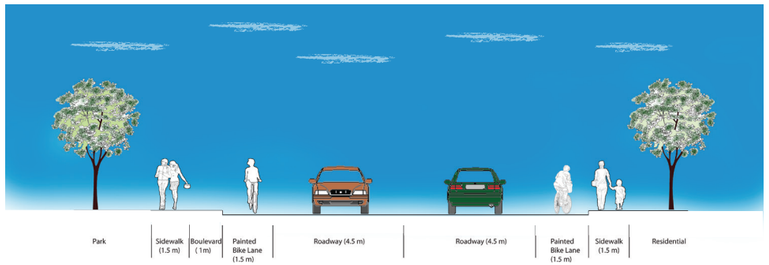


Figure 18 (left): Street section highlighting proposed changes

Figure 19 (right): Example of sharrows on a narrow street (Image credit Joshua Putnam, Flickr)

Case study

There have been several examples of non-segregated bike lanes in Vancouver. Non-segregated cycling routes – complete with road markings – have increasingly been commonplace on city roads, such as Dunbar Street. Because of the uniquely narrow nature of PGR, the removal of street parking is essential. To that end, several cities, such as Vancouver, Washington (Fourth Plain Boulevard), have removed either a travel lane or a parking lane in favour of cycling routes. This process is closely connected to a phenomenon known as "road diet". Winters and Teschke (2010) showed that routes with traffic calming, bike lanes, paved surfaces, and no on-street parking were preferred by cyclists, resulting in increases in likelihood of choosing the route from 12% to 37%.

Figure 20: Example of a painted bike lane on a narrow residential street (Image credit erokore, Flickr)

Table 2: The potential safety effects of Scenario 1 on selected stakeholders

	PROS	CONS
Local Residents/ Drivers	Drivers will be comforted to know that cyclists will be riding on the far right-hand side of the street, in both the eastward and westward directions. There will be no need to swerve into oncoming traffic in order to overtake cyclists. Residents accessing and leaving their driveways along PGR will face fewer blind spots.	This scenario would most likely result in an increased number of cyclists along PGR and may confront cyclists overlapping onto the vehicular traffic lanes.
Cyclists	Increased space between the curb and fast-moving vehicles. Reduced amount of "dooring" from vehicles parked on the street.	Along the narrow section of PGR, cyclists will still face close proximity to traffic. As well, cyclists will still encounter the challenge of avoiding vehicles exiting driveways along the corridor.
Pedestrians	As our manual traffic counts showed, several cyclists were observed cycling on sidewalks. With more capacity and increased safety for bicycles on the road, pedestrians will not have to contend with cyclists on the sidewalks.	There are no foreseen cons for pedestrians with regard to safety with this scenario.

Table 3: The potential accessibility effects of Scenario 1 on selected stakeholders

	PROS	CONS
Local Residents/ Drivers	Accessibility for through-way traffic will be unchanged (or slightly improved with cyclists riding on the far-right of the lane).	While access to their residences is not hindered per say, the removal of street parking may mean that residents will have to park a vehicle on an intersecting street, south of PGR (particularly for a handful of south side residences that don't have driveways or laneway access). Drivers will also face traffic calming bumps along PGR, which may increase drive time through the corridor.
Cyclists	Cyclists would be afforded much more comfortable access to PGR and nearby recreational amenities. Its role as a commuter and recreational route would likely increase substantially.	Access from the PGR cycle facility onto the southbound street network or south side driveways may require traveling a minimal extra distance, to reach a break in the floating parking.
Pedestrians	There are no foreseen pros for pedestrians with regard to accessibility with this scenario.	There are no foreseen cons for pedestrians with regard to accessibility with this scenario.

Summary of solution and additional considerations/complications in the implementation

This simple strategy could very easily be constructed on a trial-basis, since it does require a great deal of additional infrastructure beyond additional signage and painted lanes and sharrows. While some residents may object to losing street parking along PGR, others may welcome the relative simplicity and effectiveness of increasing space for cyclists, and thereby potentially decreasing cyclist-motor vehicle collisions, along PGR. The small number of residents on the south side of PGR without driveways nor laneways would be most affected.

Commuting and recreational cyclists, on the other hand, would surely welcome a scenario that affords them more space throughout the length of the corridor and reduces risk of "dooring" incidences. Through the implementation of traffic calming bumps this scenario would also help decrease excessive speeding. Finally, it's important to note again that there no businesses are located along PGR, and this scenario would therefore not limit business access.

4.2.2 SCENARIO 2: Make Point Grey Road a one-way street, with a segregated cycle facility on the north side

This scenario involves converting the portion of Point Grey Road from Alma Street to MacDonald Street into a one-way road for vehicular traffic, with a segregated bi-directional cycle facility installed along the north side of the road. Westbound vehicular movement will continue unchanged, while eastbound traffic approaching from 4th Avenue will be directed (via signage) to continue east, in lieu of turning north on Alma Street. Due to the one-way conversion, residents may access their driveways by simply entering on to PGR just east of their homes and following the westward flow of traffic.

Northside parking will remain between MacDonald Street and Waterloo Street, in the form of floating parking, buffering the cycle facility immediately to its north. Large gaps will be left in the floating parking lane to allow for driveway access and ample sight lines. Southside parking will remain unchanged.

For the entirety of the corridor (between MacDonald Street and Alma Street) the bi-directional cycle facility will be buffered from the floating parking or vehicle lane by a permeable physical barrier, a low hump that will run parallel to the flow of motion. This hump will provide cyclists with a sufficient barrier from vehicle movement, while still allowing local residents to access their driveways with ease.

In addition to 'one-way' signage on the junctions of northbound feeder streets to PGR, additional signalization would be required at MacDonald Street and Alma Street. At the intersection of MacDonald Street, Cornwall Avenue and PGR, a bicycle-only signal (allowing any bicycle movement through the intersection) would facilitate cyclist transition into and out of the new infrastructure. At Alma Street and PGR, phased signalization with an advanced left turn signal, allowing both cars and bikes to turn south onto Alma Street, is recommended.

If vehicle speeds are found to increase following the conversion, stop signs may be placed to encourage more appropriate speeds. This signage would not apply to cyclists traveling in the segregated facility.

Stakeholder Support for Scenario

According to our findings, there is strong support for dedicated cycle facilities, as it was suggested as a design alternative by all of the 19 respondents to our e-mail survey. Ten respondents also recommended making the road one-way. Additionally, the Vancouver Area Cycling Coalition's 2004 position statement to City Council proposes the same design solution suggested herein (VACC, 2004).

Our data shows that cycle mode-share has increased in the last five years, and if this continues, it will be vital for safety reasons to provide some separation between car and bike traffic.

Figure 21: Example of a segregated two-way cycle facility in Montreal (Image credit the Cyclist Webhouse, H-JEH Becker)

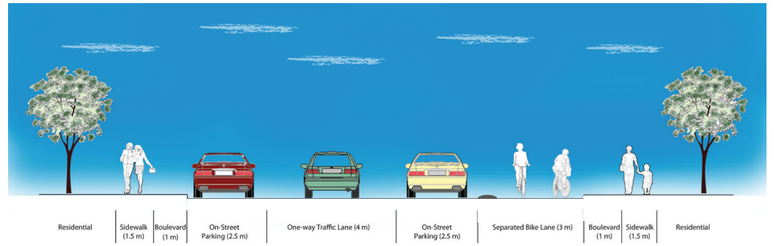


Figure 22: Street section highlighting proposed changes

Case study

The Hornby bike lanes in Vancouver and the curb-separated bike facilities of Toronto are prime examples of design recommendations made in this scenario. Due to improved cycling infrastructure and programming throughout Toronto, cycling mode share is on the rise. "In 2010, the city experienced a 35-40% growth in ridership over its 2008 bicycle ridership counts," reports McGill University Civil Engineering Professor Luis Miranda-Moreno in a recent study. While the Hornby bike lanes have received criticism over difficulties with right-turning vehicles, it is important to note the contextual differences between this example and the PGR context. PGR has no intersecting roads to the north; there are only 76 residences with driveways on the north side. This means that mandatory driveway mirroring and a targeted educational campaign, aimed at familiarizing local residents with the protocol for crossing the cycling facility, will alleviate the majority of potential collision risk.

Table 4: The potential safety effects of Scenario 2 on selected stakeholders

	PROS	CONS
Local Residents/Drivers	Reduced vehicular flow. No need to swerve into oncoming traffic in order to overtake cyclists.	North side residents backing out of driveways will have to cross the bi-direction cycle facility, and floating parking in some cases, before reaching the driving lane. Driveway mirroring and an educational campaign should minimize the potential risks of collision here.
Cyclists	Increased protection from fast-moving vehicles	Depending on the width of the physical barrier, eastbound cyclists may be in danger of getting 'doored' by parked vehicles. However, sight lines are optimal, as parked cars and eastbound cyclists are in counterflow.
Pedestrians	Walking on north sidewalk will be more comfortable in some places, as it abuts slower-moving bicycle traffic instead of fast-moving vehicular traffic.	There are no foreseen cons for pedestrians with regard to safety with this scenario.

Table 5: The potential accessibility effects of Scenario 2 on selected stakeholders

	PROS	CONS
Local residents	Minimal north side parking removal will be required to accommodate improved sight lines. Local drivers approaching PGR from the east will be able to access their homes as they do now.	Drivers approaching PGR from the west will be required to access their homes through the side street network, though the added time and distance of travel will be minimal.
Cyclists	Cyclists would be afforded much more comfortable access to PGR and nearby recreational amenities. Its role as a commuter and recreational route would likely increase substantially.	Access from the PGR cycle facility onto the southbound street network or south side driveways may require traveling a minimal extra distance, to reach a break in the floating parking.
Pedestrians	As mentioned above, mid-block crossing may be more comfortable, as there is only one lane of car traffic.	Street crossing would require passing through three lanes of traffic, though two would be bicycle traffic.

Summary of solution and additional considerations/complications in the implementation

In summary, this scenario includes a conversion to a westbound one-way vehicular lane, with a segregated two-way bicycle facility. It offers a safer alternative for both recreational and commuter cyclists by buffering them from most vehicle movement. As there will be a reduced vehicular flow, pedestrians will experience more comfortable movement throughout the corridor, including the ability to cross mid-block with added ease. Local residents will benefit from the new recreational amenity and the traffic calming of their street.

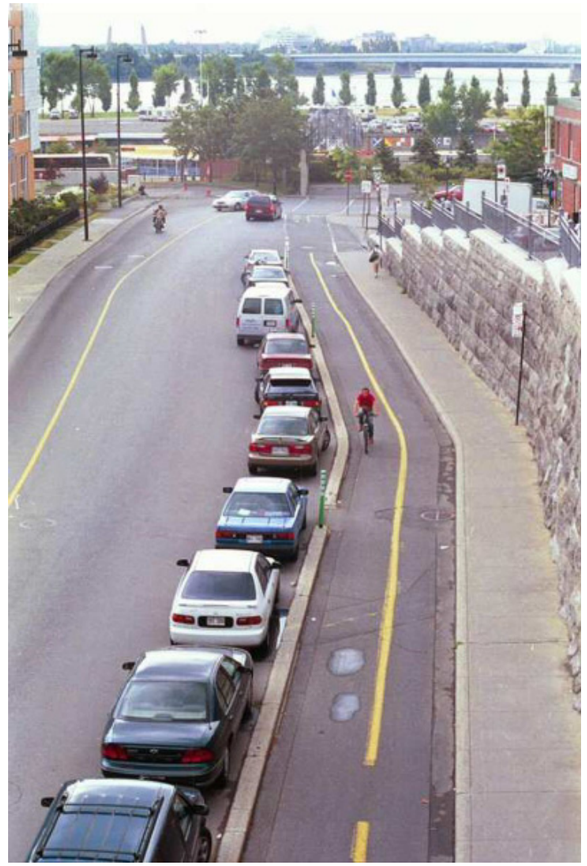


Figure 23: Example of a segregated two-way cycle facility in Montreal (Image credit the Cyclist Webhouse, H-JEH Becker)

4.2.3 SCENARIO 3: Traffic diverters at MacDonald and Alma Streets

This scenario aims to reduce through-traffic along PGR and to direct it south along MacDonald Street and Alma Street to 4th Avenue, which is an arterial that is capable of accommodating heavier traffic. The scenario involves the use of traffic diverters to restrict through-traffic along the corridor. We propose the construction of "barrier parks", small landscaped areas that span the width of the road obstructing vehicular traffic, while allowing the passage of cyclists and pedestrians. We use the term "parks" because the barrier is planted with trees and shrubs and are therefore not the standard concrete structures one associates with traffic diverters.

The design of the traffic diverter would be to have elevated concrete barriers that would turn both eastbound and westbound traffic south along MacDonald Street and Alma Street. While vehicular traffic would be diverted south, cyclists and pedestrians would be able to traverse the barrier park with ease.

Stakeholder Support for Scenario

While only two of our survey respondents explicitly suggested closing PGR to through traffic, this design alternative would address almost all of the safety concerns expressed by reducing automobile traffic and therefore reducing the chance of conflict between drivers and cyclists.

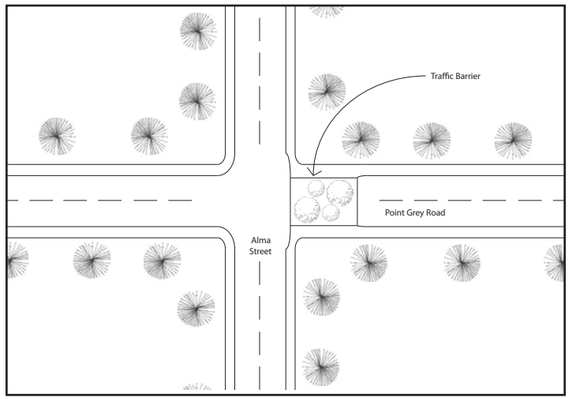


Figure 24 (above): Example of a lanscaped traffic diverter on Union Street in Vancouver's Strathcona neighbourhood

Case study

This type of traffic barrier is a common facility in many neighborhoods that are implementing traffic calming measures. In the Vancouver region alone, similar barriers have been implemented in the West End at Cardero Street and Comox Street, as well as at Haro Street and Bute Street, and in Strathcona at Hawkes Street and Union Street (pictured above and right).

Figure 25 (above): Aerial view highlighting proposed changes

Figure 26 (below): Example of paving treatment on landscaped traffic diverter on Union Street in Vancouver's Strathcona neighbourhood

Table 6: The potential safety effects of Scenario 3 on selected stakeholders

	PROS	CONS
Local Residents/Drivers	Local residents would benefit from having decreased levels traffic flow through their neighborhood, and this has many safety benefits including ease of exiting driveways, and safety in crossing the local street.	A decrease in emergency vehicle access, and for those residents living on 1st and 2nd Avenue West, a potential increase in through-way traffic.
Cyclists	Commuter and recreational cyclists alike would benefit greatly from a safety perspective due to the reduced through-traffic along PGR. While this scenario does not provide any dedicated space for cyclists, the reduced traffic flow along PGR would lead to less conflict between cyclists and cars.	A concern for cyclists would be that the barrier park may reduce visibility on the other end and so it would be imperative that they reduce speed while entering and exiting these barrier parks.
Pedestrians	Pedestrians would benefit similarly to cyclists from a safety perspective, in that reduced through-traffic along PGR would lead to less conflict between pedestrian and cars as there would be more freedom to cross the street without worrying about high-speed traffic. Joggers may feel more comfortable and safe accessing this route due to the reduction in traffic.	A concern for pedestrians would be that closing the street to through traffic may in fact induce more cyclists to ride along this route, and therefore the likelihood of pedestrian-cyclist conflict may increase.

Table 7: The potential accessibility effects of Scenario 3 on selected stakeholders

	PROS	CONS
Local residents	Because there will be fewer drivers on their street, local residents will have easier access to their driveways.	As access from MacDonald Street and Alma Street will be restricted, residents with vehicles along that stretch of PGR will have to take a less direct route to their residences.
Cyclists	By reducing the traffic along PGR and making this stretch more attractive to cyclists, this scenario will improve east-west access for cyclists. The barrier park treatment is permeable to cyclists and therefore does not slow cyclists down, much like other traffic diverter treatments. Lastly, by making this stretch of road more attractive to cyclists, it is a step in the direction of linking the sea wall route.	There are no foreseen cons for cyclists with regard to accessibility with this scenario.
Pedestrians	Similar to cyclists, this scenario makes PGR a more attractive route to walk or jog along, and could encourage recreational users to use it more to access either Jericho or Kitsilano Beach.	There are no foreseen cons for pedestrians with regard to accessibility with this scenario.

Summary of solution and additional considerations/complications in the implementation

In short, these improvements would discourage through-traffic and permit residents easy access to various parts of the neighborhood. The diversion of through-way traffic from PGR south has the potential to do much to reduce conflict between travel modes, particularly the conflicts between cyclists and cars. By reducing automobile-traffic along the corridor, this allows cyclists the freedom to travel without feeling the pressure of constant, high-speed traffic moving alongside. This scenario does not adversely affect the daily lives of the local residents and their ability to navigate their way home, as local traffic will continue to be allowed along the corridor (although they will have to detour along one of the side streets to access PGR). As well, while cars simply have to drive four blocks south to continue on their way, this scenario allows PGR to be more accessible for cyclists and pedestrians who are either commuting to UBC campus or are accessing Jericho and/or Kitsilano Beach. A further consideration of this scenario would be to implement pedestrian or cyclist-designated traffic lights at both MacDonald Street and Alma Street to allow for safer access to and from PGR.

5. CONCLUSION

Point Grey Road (PGR) doubles as a transportation corridor and a major regional recreational destination for Vancouver's residents and visitors. This 2.3 kilometre stretch of road, however, is denoted by its limited space to accommodate vehicle and bike movement in several locations. As the location of several accidents, PGR is seen among residents, and area cyclists and pedestrians, to be an unsafe corridor with limited access.

In assessing the overall means in which PGR can better achieve its recreational potential, we examined ways to resolve both traffic safety and accessibility issues in the corridor.

In general, both our research methods and findings were constrained by a lack of available data. Due to the short timeframe of the project, we were unable to collect as much data about local residents' and other road users' perceptions of PGR as we would have preferred. The short timeframe of the project also meant that we were unable to obtain all the data we would have liked from the Insurance Corporation of British Columbia (ICBC). We were successful in obtaining collision data for PGR itself, but did not have enough time to obtain information about collisions on other comparable roads to help us contextualize the information about PGR.

In addition to the short timeframe, we were constrained by the small and unusual scale of the study area. Data tends to be collected at city, neighbourhood or census tract areas. None of these match the area of study, which means that we have had to draw inferences from data from the areas that most closely align with PGR. We feel that, although imperfect, the data that we have been able to gather provides a full enough picture of the situation to draw conclusions and make preliminary recommendations. However, further study would undoubtedly benefit the issue.

As well, in assessing safety, accessibility and utility of the PGR corridor at present and in the future, it will be important to further consider the roadway and bike route extensions to and from PGR. For example, commuting and recreational cyclists coming from the Burrard Bridge bike route would normally access PGR via Cornwall Avenue. At present, Cornwall Avenue does not have dedicated bike lanes. Moreover, many of the current challenges confronting active transportation users on PGR are similar in scope along Cornwall Avenue.

This study presents several immediate recommendations to better serve the multi-modal users who commute on a daily basis or access PGR for recreational purposes. In addition, we present three intermediate to long-term scenarios (listed below), each with its pros and cons for each user group.

Scenario #1: Remove street parking and create a separated space for cyclists

Scenario #2: Make Point Grey Road a one-way street, with segregated cycle facility (on south side)

Scenario #3: Traffic diverters at MacDonald Street and Alma Street

We conclude that all of these scenarios are soundly constructed based on solid research and input from many stakeholders. Of course, with many urban design challenges, the ultimate decision often comes down to political will and which stakeholder holds the most influence at the end of the day. While outside the scope of this project, further research on the resulting impact of the proposed changes on areas surrounding PGR is highly recommended.

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