NORTH VANCOUVER
DISTRICT

the city of north vancouver

North Vancouver Bicycle Master Plan 2012

October 2012

City of North Vancouver
141 West 14th Street
North Vancouver, British Columbia
Tel: 604.983.7333
Fax: 604.985.9417
Email: cycling@cnv.org
www.cnv.org

District of North Vancouver
355 West Queens Road
North Vancouver, British Columbia
Tel: 604.990.2311
Email: eng@dnv.org
www.dnv.org

This plan was endorsed by both the City of North Vancouver Council and the District of North Vancouver Council on November 5, 2012.

The following changes were made to the Bicycle Master Plan network and endorsed by the City of North Vancouver Council on July 25th 2016:

- Addition of East 3rd Street between Queensbury Avenue and St. Andrew's Avenue;
- Deletion of East 2nd Street between St. David's Avenue and Moody Avenue;
- Addition of a new route representing the future Spirit Trail alignment to the south of East 1st Street;
- Addition of the Queensbury Greenway between 3rd Street and the Spirit Trail.

Table of Contents

ANALYSIS & RECOMMENDATIONS

1. **introduction** 4
2. **what is the bicyle master plan** 6
   - Goals & Objectives
   - Principles
3. **bike route design** 11
   - Types of Routes
   - Types of Bike Facilities
   - Design Guidelines
   - Navigation
4. **end of trip facilities** 17
   - Bike Parking
5. **bicycle master plan public survey** 18
   - Bicycle Master Plan Survey
6. **north vancouver bicycle route network** 20
7. **evaluation and prioritisation** 23
8. **ongoing programs** 25
   - Bicycle Monitoring
   - Cycling Promotion & Education
   - Navigation

MAPS

2012 bicycle master plan (map d) 21
map a: new problem areas identified 42
map b: priority projects identified 43
map c: proposed route changes 44

APPENDICES

appendix 1 – scope of the 2012 bicycle master plan 30
appendix 2 – consultation process 33
appendix 3 – results of online survey with cyclists 35
appendix 4 – mapping process 41
appendix 5 – technical evaluation process 61
appendix 6 – monitoring program 63

1.0 Introduction

New Bicycle Master Plan

Between 2010 and 2012, the City and District of North Vancouver undertook a joint update to the North Vancouver Bicycle Master Plan to create this new stand-alone document. The incentive for updating the Plan stemmed from the need for bicycle planning to reflect evolving transportation priorities and direction in the two municipalities.

In updating the Bicycle Master Plan, it was important to recognize the types of facilities that are generally appropriate for North Vancouver, and how local cyclists feel about the variety of facilities.

Documentation of the process that led to the 2012 Plan is provided in **Appendix 1**. This document replaces the 2006 Bicycle Master Plan that was endorsed by City and District of North Vancouver Councils on 27th March 2006 and 20th March 2006, respectively.

The first documented Bicycle Master Plan for the City and District of North Vancouver was prepared by staff in 1994, and updated in 1996. The 2006 update to the Plan was completed by Urban Systems Limited, and involved a substantial level of effort to create the foundation for a new bicycle network for North Vancouver. The 2012 update to the Bicycle Master Plan builds upon the work accomplished in 2006, with the intention of updating key components of the Plan to reflect current needs. Thus, where appropriate, some elements of the 2006 Plan remain relevant, as indicated through references. Typically Bicycle Master Plans require updating periodically to account for changing conditions. As such, bike network improvements should be re-evaluated and re-prioritized every two years, and the entire Bicycle Master Plan should be updated within ten years to ensure that other aspects of the plan remain current.

A public consultation process contributed significantly to the development of the 2012 Bicycle Master Plan by providing valuable insight into local cycling issues. During the course of two workshops, two open houses and an online survey, staff sought to gain a better understanding of current problem areas and priorities for future project planning. A detailed description of the public consultation process and feedback outcome is detailed in **Appendix 2**.

The 2006 Bicycle Master Plan included a detailed evaluation and prioritisation of proposed bicycle routes in North Vancouver. The 2012 update shows the proposed network and the routes identified as priorities by the public. The City and District will produce separate plans to guide implementation timelines and priorities. This is further discussed in section 5.

What is the Bicycle Master Plan?

The following description of the Bicycle Master Plan was drafted in 2006 and still is supported in 2012:

> "The key component of the Bicycle Master Plan is a network of bicycle routes. The route network incorporates a combination of on-street routes and pathways connecting all major destinations and all neighbourhoods within the District and City of North Vancouver, as well as connections to West Vancouver and across Burrard Inlet, and connections to regional transit services."

The Bicycle Master Plan frames the City and District's vision of the future bike network, once all route segments and bike projects are ultimately built to the appropriate design standard. This Plan will help staff to schedule and design bicycle infrastructure over the next decade and beyond by highlighting the priority areas identified through consultation with the public.

Goals and Objectives

The purpose of the 2012 Bicycle Master Plan is to guide implementation of projects and programs that will contribute to the North Vancouver bicycle network from 2012 onward. It is envisaged that focussing on the priorities outlined in this Plan will lead towards completion of the bike network within the next decade and beyond.

The goals and objectives of the Bicycle Master Plan were created to align with the City and District's respective future visions for cycling beyond 2012:

GOAL #1: Establish a Bicycle Network that Strengthens Community Connections and Improves Safety

By:

- *Establishing a bicycle network that will provide safe routes;*
- *Providing a logical network that accommodates both local and regional bicycle trips; and,*
- *Developing facilities that serve cyclists of various ages and comfort levels.*

GOAL #2: Promote Cycling as a Key Part of a Sustainable Transportation System

By:

- *Encourage and support more people to regularly use cycling as a means of travelling within the North Shore and beyond;*
- *Encouraging healthy lifestyles; and,*
- *Providing more options for people to get around, thereby reducing car travel and its associated environmental impacts.*

Several objectives that support the goals of the Plan were also drafted, and they include:

- Identifying problem areas in North Vancouver where cyclists feel that substantial safety issues and other obstacles exist;

- Incorporating route changes into the Bicycle Master Plan map to establish a complete network for current and future cyclists;

- Making all municipal streets more appealing to cyclists – not only those routes marked on the network map – in addition to accommodating pedestrians and vehicles;

- Identifying the top priority locations where cyclists want municipal resources allocated for future project implementation; and,

- Gaining a better understanding of the profile of North Vancouver cyclists, to enhance the design of future bike facilities.

Principles

A set of guiding principles for the 2012 Bicycle Master Plan was established. The principles are based on those in the 2006 plan with modification to align with the current best practices and policies are, listed below and, will be supported for 2012 and beyond.

P1) ***The bicycle network should accommodate all cyclists*****.** This means cyclists of all skill levels, riding for all purposes. This includes children and adults, novice and experienced cyclists. It includes cyclists commuting to work and school, cyclists riding to the store or a medical appointment, for example, and recreational cyclists, including mountain bikers riding to trails.

P2) ***The bicycle network should incorporate different types of bicycle facilities.*** Skill levels, physical capabilities, trip purposes and needs vary widely among cyclists, and consequently different cyclists require or are attracted to different types of bicycle facilities. An experienced commuter cyclist may be comfortable riding along a high-volume multi-lane arterial road, and may prefer to ride along such a road in order to minimize travel times. On the other hand, a less experienced cyclist new to cycling may not feel comfortable riding along major roads, and may prefer neighbourhood trails and local streets. To accommodate all types of cyclists, a range of different types of bicycle facilities are needed.

P3) ***Cyclists should be accommodated on roadways wherever possible.*** This means that unless it is extremely difficult to do so, space should be provided for cyclists on all arterial and collector roads. This approach recognizes that cyclists fare best when they are treated as vehicles and integrated with other vehicle

traffic. Studies of crashes and safety issues indicate that cyclists are generally safer riding on roadways than on pathways. The reason for this is that cyclists share pathways with pedestrians and many other types of users, which can increase the potential for conflicts and crashes. In addition to safety considerations, travel times for cyclists are typically minimized when cyclists travel on roadways.

P4) ***Off-street pathways should complement — not replace — on-street bicycle facilities.*** Because the potential for conflicts and crashes is higher on a pathway, and because pathways do not serve all destinations to which cyclists wish to travel, many cyclists will end up riding on the roadway, either by choice or by necessity. Constructing pathways as an alternative to on-street bicycle facilities means that in many cases there would be no space for cyclists and motorists to safely share the roadway, and as a result, the safety of cyclists would be compromised. Instead, pathways should be provided in addition to on-street bicycle facilities, thereby ensuring that facilities are provided for all cyclists.

P5) ***Pathways should form a continuous network,*** using local streets where appropriate to bridge gaps in the pathway network. Many cyclists who are attracted to pathways are cyclists who would not be comfortable riding on arterial or collector roads. Recognizing this, these cyclists should be able to ride to destinations throughout North Vancouver on a combination of pathways and local streets, without the need to travel along arterial and collector roads. Although local streets may be used to complete gaps in the pathway network, desirably a continuous pathway connection is provided.

P6) ***Crossing treatments are essential.*** Crossings where bicycle routes along local streets and pathways intersect arterial and collector roadways are where the majority of crashes — and the most severe crashes — occur. To maximize safety for cyclists, and to avoid creating barriers to cycling within the bicycle network, a range of crossing treatments should be used at arterial and collector road crossings.

P7) ***The bicycle network should serve all important destinations.*** Just as the road network provides access to commercial, office, institutional, cultural and recreational destinations throughout the community, so should the bicycle network. Desirably, each important destination is served by an on-street bicycle route and a pathway connection.

P8) ***The "quality" of the cycling experience is important.*** The "quality" of the cycling experience is determined by perceptions of safety, traffic volumes, noise, air quality and aesthetics. Although providing a direct route and avoiding steep

grades are important, some cyclists will prefer a longer route or one with steeper grades if it is perceived as significantly safer, has lower traffic volumes, and provides a more enjoyable cycling experience.

P9) Trails and pathways should accommodate all forms of non-motorized transportation where possible. Pathways should be planned and designed to accommodate various forms of non-motorized transportation. This means, for example, that pathway grades should not be so steep as to prevent use of the pathway by persons in wheelchairs. Similarly, in areas where trails can function as bike routes, the surface should be upgraded accordingly to accommodate other forms of non-motorized transportation and wheelchairs.

P10) Facilities should be developed to an acceptable standard. No one would consider constructing a road to be used by motor vehicles with lane widths narrower than the minimum standard, with a grade steeper than the maximum permitted, for example. The road would not be safe. For the same reason, bicycle facilities should not be constructed to less than the minimum standard — they would not be safe, either. Constructing bicycle facilities to acceptable standards maximizes safety for cyclists, increases the attraction of the bicycle facilities to potential cyclists, minimizes maintenance costs and helps to avoid expensive liability claims.

P11) Parks needs and users must be considered. Parks trails should be intergrated into the bicycle network where possible and ensuring that the safety and comfort of pedestrians and park users are not compromised. It is important to protect and consider the integrity of sensitive ecosystems where facilities for cyclists are located through parks.

3.0 Bike Route Design

Types of Routes

North Vancouver's bicycle network is defined by a set of on-street and off-street bicycle facilities.

- **On-street bike route** – this type requires cyclists to integrate with vehicular traffic on the road network, and ranges from residential streets with minimal vehicle traffic, to busier arterial roads. On-street route design options– as illustrated in the following section – are selected based on design constraints such as road hierarchy, traffic volume and geometric elements.

- **Off-street bike route** – this type generally involves hard-surfaced, multi-use paths that are shared with pedestrians and are separated from the road network as much as possible. Hard-surface treatments may (depending on sensitivity of the riparian or ecological system) include asphalt, fine rock dust or boardwalk.

  The Plan's "off-road" routes do not include many of the numerous rough surface trails that are part of the City and District's trail network. While many rough surface trails provide excellent community connections for cyclists, the Bicycle Master Plan is focused on a system of bike routes that can be used by all levels of cyclists safely at all times of the day. Thus, with a few exceptions, North Vancouver's trail system has generally not been incorporated into the bike network because of concerns regarding consistency and reliability of facility quality for cyclists.

Types of Bike Facilities

For both on- and off-street bike routes, there are a variety of design options feasible in North Vancouver. These bike facility designs are consistent with current practice per the Transportation Association of Canada, and are also aligned with bike facilities currently being implemented in both North Vancouver and other Metro Vancouver municipalities. Typical costs for bike facilities vary from the hundreds of dollars for signs and markings to over $1m for new bridges and multi-use paths. Descriptions of all relevant bike facility designs are provided below, with photos provided alongside for reference.

FIGURE 1: Major street with bike lanes

Currently bike lanes are provided on several busy corridors including Esplanade, Low Level Rd/Cotton Rd, Capilano Rd and W. 1st St.

FIGURE 2: Major street with wide curb lanes and "sharrow" markings (with room for bikes to ride side-by-side with vehicles)

Examples in North Vancouver include Marine Dr. and Lynn Valley Rd.

FIGURES 3a & 3b: Single file travel on major or minor streets with "sharrow" markings to indicate to road users the safest position for cyclists:

FIG 3a) With green underlay (for visibility):

Example outside City Hall (West 13th Street)

FIG 3b) Without green

Example Mackay Road South of Marine

FIGURE 4: Cycle path next to major street (separated by a physical barrier)

Example Lillooet Rd

FIGURE 5: Paved off-street multi-use pathway

Examples in North Vancouver include the Spirit Trail, Green Necklace and Seymour River Greenway.

FIGURE 6: Hard surface off-street multi-use trails

Located throughout the North Shore; however, most pathways are not included in the Bicycle Master Plan mapping.

Design Guidelines

The design of bicycle infrastructure requires technical guidance in order to achieve consistency throughout North Vancouver. Design guidance is necessary to select appropriate facilities (through the analysis of geometry, traffic data and other constraints) and, from a broader perspective, to guide all aspects of bicycle infrastructure (including signage, bicycle parking, signal improvements for cyclists and off-street path design).

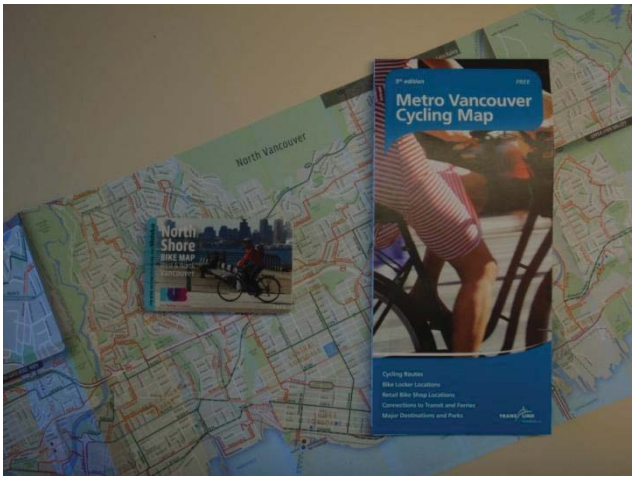
The North Vancouver Bicycle Master Plan supports the use of technical design guidelines prescribed by the Transportation Association of Canada (TAC) along with emerging best practices in bicycle facility design. This approach allows for local bike facility designs that reflect current standards as they evolve, while achieving bike route consistency with other Metro Vancouver municipalities. This approach also allows us the flexibility to consider innovative design options for site and context specific problems.

Navigation

Navigation is important for cyclists of all levels. A bicycle user map helps plan the trip prior to departure, and wayfinding helps the cycling while on route.

Bicycle User Map

A bicycle user map is an important tool to enable cyclists to plan their routes. The City and District should continue to work with TransLink to update the Regional cycling map. A local map catering specifically to the conditions found on the North Shore is also a valuable tool, which can show local routes in more detail.



Wayfinding

A comprehensive Wayfinding strategy is important for a cyclist once on route. Wayfinding is particularly important for new cyclists, who may not know the best routes to take to arrive at their destination. New cyclists will often not be aware of which roads have bicycle facilities, and may become uncomfortable and reluctant to cycle again if they use an inappropriate route. Wayfinding also helps more regular cyclists to discover other places they can access that are out of their normal routes.

For wayfinding to be successful it needs to be consistent along routes and across municipal boundaries. Signs and markings should have predictable content and locations in order to present clear guidance to cyclists for the whole length of their trip. Signs could provide information such as distances, level of difficulty and key destinations.

Bike Parking

Concern over theft and the lack of bicycle parking has been shown to be a significant deterrent to bicycle trips.

Bicycle parking can be split into categories:

Short term - Parking for a few minutes or hours while shopping, running errands or enjoying recreational facilities. For short term parking ease of access and the ability to lock a bike safely are important. Short term bicycle parking should be located within easy access to the bicycle network and in a place with a high level of natural surveillance. The location should include sufficient space so parked bicycles do not become obstructions.

Long term – Parking for a longer period of time for example at places of work, transit exchanges and at home. For long term parking security and shelter from the elements are more important; access need not be as direct, but should be easily navigated by all levels of users.

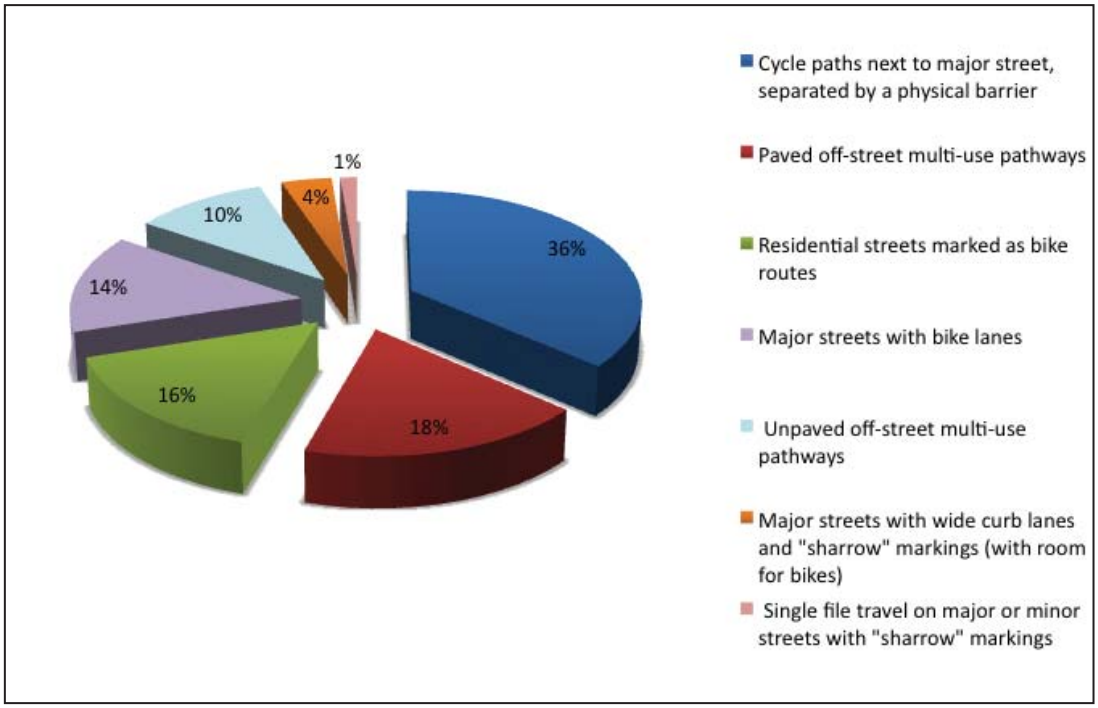
While bike parking for existing developments is out of the purview of the City and Districts of North Vancouver, bike parking in new developments can be controlled by provisions in the zoning bylaw.

5.0 Bicycle Master Plan Public Survey

Bicycle Master Plan Survey

As part of the Bicycle Master Plan process, cyclists were surveyed to gain a better understanding of local facility preference. The overall results of the survey question are shown in **Figure 7**.

FIGURE 7 SURVEY RESPONSE: BICYCLE FACILITY PREFERENCE



In general, cyclists were found to favour bike facilities that provide physical separation from vehicular traffic. The facility preferred by 36% of survey respondents is “cycle path next to major street, separated by a physical barrier.” Cyclists’ second preference was “paved off-street multi-use pathway” (18%), followed by “residential streets marked as bike routes” (16%), and major street bike lanes (14%). These survey responses indicate

that cyclists are least comfortable when sharing the road with vehicles through the use of "sharrow" markings or using unpaved paths.

The survey also found that different types of cyclists prefer different facilities. Most notably it was found that:

- providing separated bicycle facilities on major routes and marked routes along residential streets would benefit all users;
- providing bike lanes on major streets would benefit regular users and those who cycle often; and
- providing paved multi-use paths would encourage occasional users initially, but are less likely to be preferred as cyclists begin commuting more often.

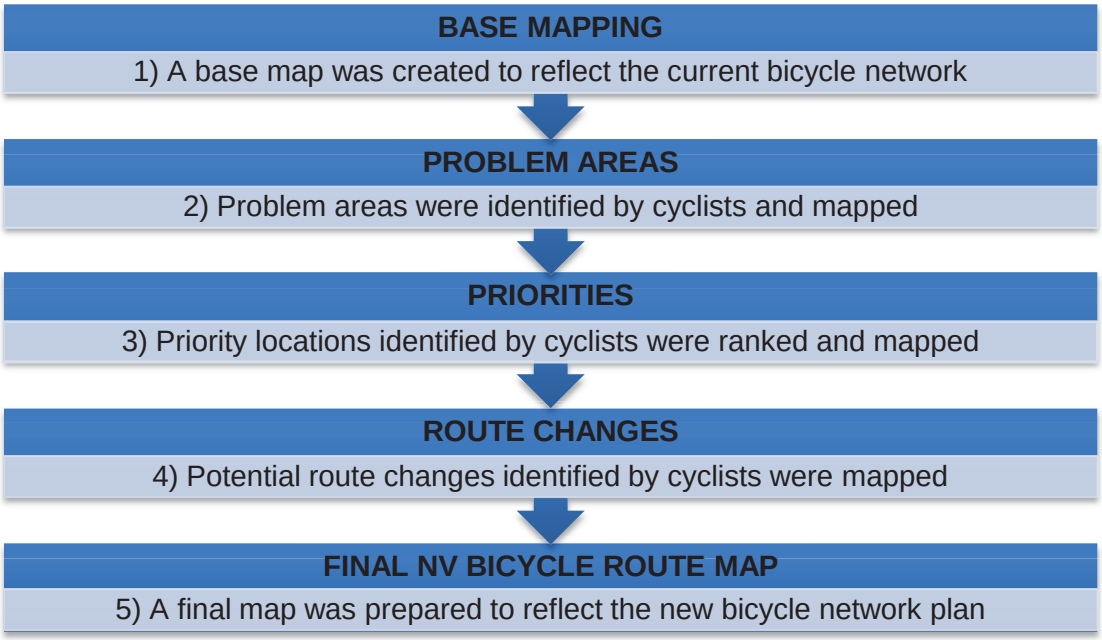
The survey revealed the following general trends related to cycling behaviour:

- Cycling is generally less favoured as a method of transportation for utilitarian trips, even for cyclists who are regular commuters; and
- Most survey respondents indicated they cycle for recreational reasons at least occasionally, and 75% have used their bikes for bicycle commuting.

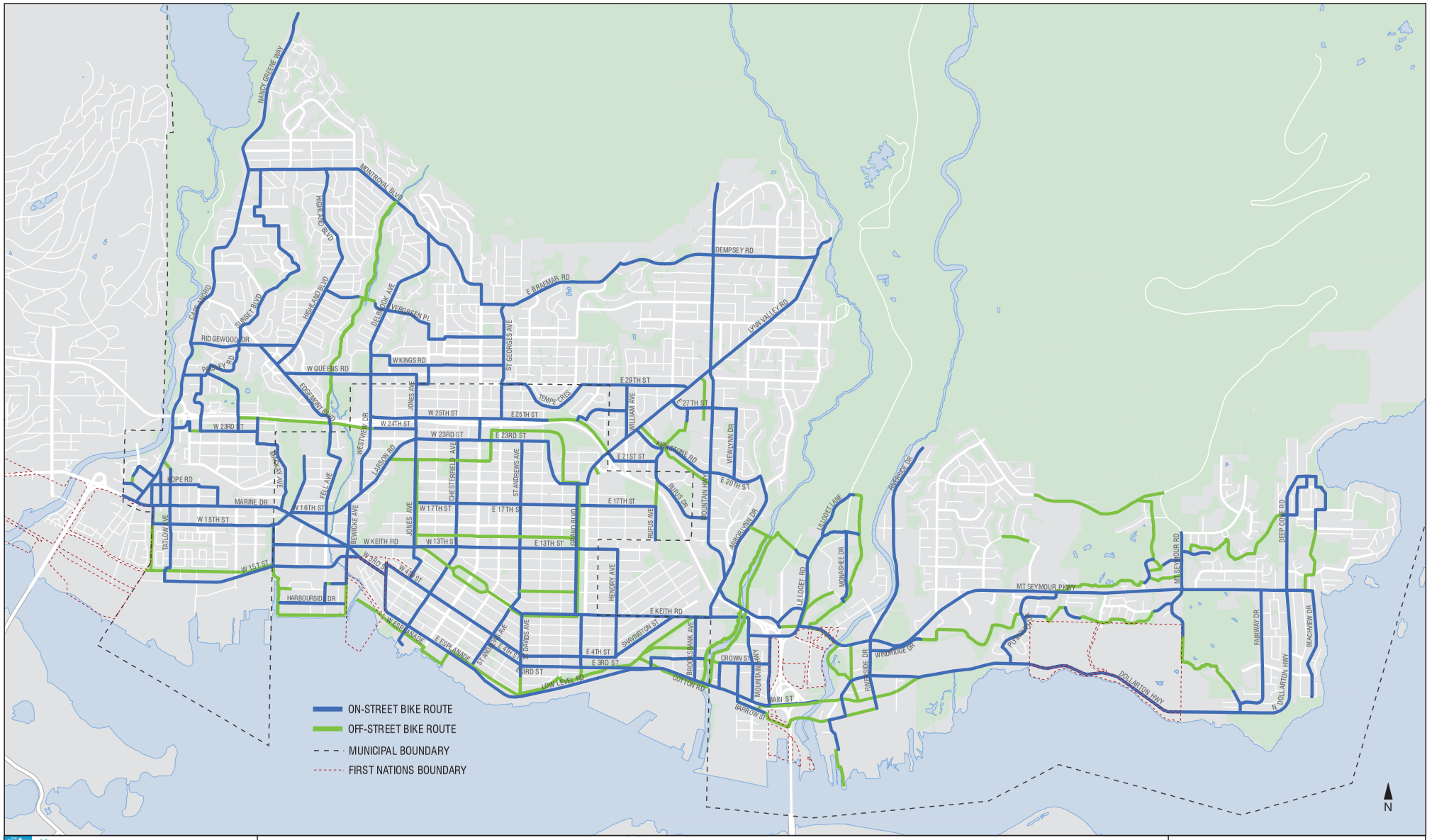
The facility preferences and trends described above will be further investigated in order to help inform staff when making future design decisions for bike routes. **Appendix 3** provides additional results from the survey.

North Vancouver Bicycle Route Network

At the core of the Bicycle Master Plan is a new network map that defines all on- and off-road bike routes. The process of updating the bicycle network map is described below, with more detailed information, including the mapping, provided in **Appendix 4**.



The resulting 2012 Bicycle Master Plan Map is provided on the next page.



GIS DEPARTMENT
GEOGRAPHIC INFORMATION SYSTEMS
604.990.2311 www.geoweb.dnv.org gis@dnv.org

NORTH VANCOUVER DISTRICT

BICYCLE MASTER PLAN NETWORK - 2016

0 0.5 1 Kilometers

Published: August 22, 2016

N:\4-Projects\Departmental\Transportation\TejaniS\11x17_BikeMasterPlanNetwork2016.mxd

This page left intentionally blank

Evaluation & Prioritization

Between 2006 and 2012, City and District staff found that many of the top priority projects identified within the Bicycle Master Plan were technically or financially challenging to implement. Further, the complexity of the 2006 evaluation methodology made it labour-intensive to revisit the analysis for frequent updating, especially given the subjectivity of the evaluation criteria.

The evaluation approach for 2012 and beyond enables City and District staff to technically evaluate priority projects in synch with Capital Planning processes. The evaluation process will occur periodically and will involve regular updates to ensure that current conditions are being reflected in a periodic updating of bike project priorities.

The evaluation process consists of two phases:

1) IDENTIFY PRIORITIES – this phase involved identifying priority locations for bike improvements through the public consultation process. This was completed in 2011, with the results illustrated in Map B (see Appendix 4). This phase provided staff with a stakeholder-ranked list of priority projects.

2) TECHNICAL EVALUATION – a detailed technical evaluation process will be conducted individually by City and District staff for their respective municipalities. The top priority locations (as ranked in Phase 1) will be separated by municipality. In the case of multi-jurisdiction priority projects, they will be subject to a technical review conducted jointly by City and District staff.

   Possible criteria to be applied in this Technical Evaluation process are described in **Appendix 5**. These criteria, along with the associated weighting for the evaluation, will be refined and finalized as a next step by each municipality.

It is envisioned that this two-phase process will facilitate future Capital planning for bike projects. City and District staff will have the ability to more thoroughly evaluate the technical merits of priority bike projects on a regular basis as needed, ensuring that evolving design constraints are matched by appropriate bicycle facilities.

Bicycle Monitoring

It is important for the municipalities to support ongoing monitoring programs to measure the progress of cycling in North Vancouver. An in-depth description of the purpose and benefits of bicycle monitoring was included in the 2006 Bicycle Master Plan. All aspects of this discussion are still supported for 2012 (as provided in **Appendix 6** for reference.)

A regular data collection program will measure annual changes in bicycle volume in the network as a whole and on particular routes. It is important to monitor data on both existing and proposed routes during both peak and off-peak seasons so that comparisons can be made in the future. Coordinating bicycle and vehicular traffic counts will allow the measurements to be places in the context of the overall transportation system.

While monitoring absolute change in the number of cyclists on a typical day provides a snapshot of cycling conditions, there are several other potential measures of success that could add value to the City and District's monitoring programs. The availability of data from larger collection programs (such as regional trip data collected by TransLink and StatsCan's census data) has improved in recent years, and can provide valuable information at regular intervals for monitoring cycling trends in North Vancouver.

Provided that resources (both local and regional) are consistently available to collect, assemble and analyse the necessary data, the City and the District will be monitoring:

- Non-Auto Mode Share - the City and District will monitor their cycling mode shares through corridor surveys and the use of regional trip data. The City and District have also set a target for non-auto mode share: **by 2030, 35% of all trips will be accomplished by biking, walking or transit.** (This is aligned with TransLink/Metro Vancouver mode share targets).

- Cycling Mode Share for Short Trips – **by year 2040, the City and District aim to achieve a 15% bike mode share for all trips less than 8km.** (This is aligned with goals from the 2011 TransLink Regional Cycling Strategy).

- The percentage of bike network completed (expressed as the linear distance of built bike facilities relative to the distance planned for the whole network; no specific target set at this time).

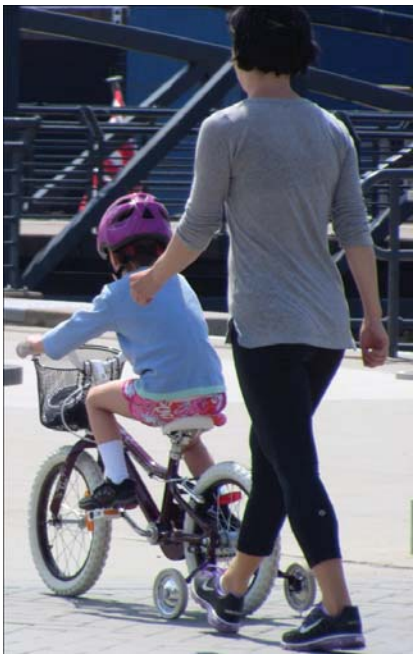
- The number of municipality-wide annual accidents involving cyclists (absolute numbers to be monitored annually by the individual municipalities).

As a secondary component of the bicycle monitoring program, "cyclist satisfaction" surveys will be conducted periodically. By establishing an online survey at regular intervals (for example, every two years), staff will be able to gain a broad overview of cyclist feedback and insight at regular intervals and plan accordingly.

Cycling Promotion and Education

Implementing bicycle infrastructure projects alone is not enough to create new cyclists: it is essential for education and awareness campaigns to accompany growth of the bicycle network. For the greatest impact, cycling education must not only reach young or novice cyclists, but also vehicular drivers, in order to optimize safety and interaction between transportation modes.

Supporting cycling education programs for school-age children, and linking with other sustainable transportation programs (such as Safe Routes to School), has the best potential to reach a broad audience for potential daily cyclists.



Ultimately, in order for the amount of every day cycling to increase in North Vancouver, potential new or infrequent cyclists must be encouraged to make more trips by bike. Cycling promotion needs to present this mode choice as an option that is possible for most residents to some degree.

The online survey of cyclists (discussed in Appendix 3) provides useful information about cycling behaviour that could help to support future cycling promotion programs for target audiences. Staff will be utilizing this information when considering the design of new bike routes and facilities in order to attract and accommodate new and existing cyclists.

LIST OF APPENDICES

APPENDIX 1 – Scope of the 2012 Bicycle Master Plan

APPENDIX 2 – Consultation Process

APPENDIX 3 – Results of Online Survey with Cyclists

APPENDIX 4 – Mapping Process

APPENDIX 5 – Technical Evaluation Process

APPENDIX 6 – Monitoring Program

APPENDIX 1 – SCOPE OF THE 2012 BICYCLE MASTER PLAN

This appendix describes the scope of the 2012 Plan, and how the new Plan differs from the 2006 version.

North Vancouver's Bicycle Master Plan requires periodic updating in order for it to guide and remain relevant to other planning and policy documents – such as the municipalities' respective Official Community and Transportation Plans. The 2006 report recommended that bike network improvements be re-evaluated and re-prioritized at least every two years to account for changing conditions. It also suggested that the entire 2006 Bicycle Master Plan be updated within ten years to ensure that other aspects of the plan remain current.

With five years having passed since the last Plan was adopted, the scope of the 2012 update was therefore limited to:

- **Re-defining the goals and objectives of the Plan.**
- **Updating the bicycle network map to complete missing links and to incorporate other current and future initiatives, such as the North Shore Spirit Trail;**
- **Conducting a survey of North Vancouver cyclists to gain a better understanding of preferred bike facilities;**
- **Identifying current project priorities to facilitate future capital planning; and**
- **Identifying key indicators to measure as part of ongoing bicycle monitoring.**

Some components of the 2006 Plan were excluded from the scope of the 2012 update. These include:

- Technical Evaluation - In 2006, the Bicycle Master Plan included an evaluation of all potential bike projects. The evaluation was undertaken by applying a matrix of both subjective and objective criteria to prioritize potential projects. The score for each project was used to separate projects into “low” and “high” priority categories.

  Between 2006 and 2012, City and District staff found that many of the top priority projects identified within the Bicycle Master Plan were technically or financially challenging to implement. Further, the complexity of the 2006 evaluation methodology made it labour-intensive to revisit the analysis for frequent updating, especially given the subjectivity of the evaluation criteria. Thus, a more adaptable evaluation approach is proposed for 2012 and beyond, which will enable City and District staff to technically evaluate priority projects in synch with their respective Capital planning processes.

- Implementation – The 2006 Plan recommended an implementation strategy for bike projects based on project costs, predicted municipal funding levels and cost-sharing opportunities. The project costs were “order-of-magnitude” estimates. During the period between 2006 and 2012, staff found that the implementation strategy did not always paint a realistic portrayal of the financial implications of a bike project. This was primarily due to the fact that the cost estimates and funding information became dated rapidly, in addition to the inability of the planning-level document to identify technical constraints and design issues.

  For the 2011 update the implementation strategy, including financial implications, was removed. The capital costs for top priority bike projects, along with municipal funding levels and cost-sharing opportunities are more appropriately analyzed on a rolling annual basis, in the context of the City and District’s respective Capital Plans processes to optimize accuracy

- Design Guidelines – The 2006 Bicycle Master Plan included a set of guidelines for use in designing bike facilities in North Vancouver. At that time, the local guidelines were created to be consistent with and refer to nationally accepted guidelines per Transportation Association of Canada (TAC).

  Since 2006, bicycle facility design has evolved, and there is an increasing need for consistency amongst Metro Vancouver municipalities. This means adhering to the most widely accepted and current design standards prescribed by the Transportation Association of Canada. The local design guidelines therefore were

excluded from the 2012 update to avoid redundancy and the risk of this information becoming out-of-date.

- Mapping – The mapping style adopted in the 2006 Bicycle Master Plan was not found to be user-friendly and created confusion in recent years. The 2011 Plan therefore involved developing a new map legend and set of maps.

APPENDIX 2 – CONSULTATION PROCESS

This appendix outlines the public consultation process followed for the 2012 Bicycle Master Plan update.

- A workshop with Joint Bicycle Advisory Committee (JBAC) members was held on December 2, 2010. The purpose of this meeting was to solicit feedback on priorities for updating the 2011 Bicycle Master Plan. A staff presentation provided the committee with background information and described how JBAC's feedback would inform the Plan's update. JBAC members suggested ways of improving components of the Plan to better satisfy the needs of current North Vancouver cyclists.

- On March 2, 2011 a second workshop was held with the City's Bicycle Advisory Committee members, former District JBAC representatives and other observers. There was a total of ten attendees. The purpose of this meeting was to identify specific problem areas and project priority locations through the use of mapping. Following a staff presentation, two breakout groups marked up maps by sketching problems, solutions and new route ideas. These maps contributed to the creation of the 2011 Bicycle Master Plan map. Seven comment sheets were also received at the workshop; these sheets reinforced the feedback received through the mapping exercise

- A public open house was held on March 9, 2011 to describe the purpose of the project to stakeholders. Attendees were encouraged to identify specific problem areas and project priority locations through the use of mapping. Forty-five people signed in at this open house (with City and District residents equally represented), and 27 comment sheets were received.

- Between March 2 and April 30th 2011 the City's website hosted an online cycling survey. The goal of the survey was to find out more about current cycling trends, preferences and project priorities in North Vancouver. The survey resulted in 139 responses, with City/District residents equally represented.

- On June 23, 2011 a second public open house was held. This event provided stakeholders with an opportunity to view the progress of the project, including new bicycle network mapping. Twenty-three people signed-in at the open house and 21 comment sheets were received. Eighty-six percent of respondents indicated full support for the new bicycle master plan mapping, while one person

(5%) did not support the plan. The remaining responses were either blank or indicated support for some parts of the plan but not all.

- Presentation and discussion with the CNV Cyclist Advisors (City members of the former Joint Bicycle Advisory Committee) on 23rd November 2011.

- Comments on the draft plan received by DNV Transportation Consultation Committee (formally known as the Transportation Planning Advisory Committee) and Bicycle Consultation Email Group in Fall 2011.

- Presentation and discussion with the CNV Advisory Planning Commission (APC) on 9th June 2011 and 7th December 2011.

- Presentation and discussion with the CNV Parks and Environment Advisory Commission (PEAC) on 2nd June 2011 and 1st December 2011.

- Presentation and discussion with the CNV Integrated Transportation Committee (ITC) 7th March 2012 and 4th April 2012.

APPENDIX 3 – RESULTS OF ONLINE SURVEY WITH CYCLISTS

This appendix summarizes the feedback received from cyclists as part of the 2012 Bicycle Master Plan Update online survey.

Through the 2011 public consultation process staff collected a variety of information from North Vancouver cyclists. While details related to specific problem areas and projects are covered in the mapping, the online survey results are summarized in the following figures.

The online survey conducted in April and May 2011 resulted in 139 responses (which was noted to be a high response rate compared to other recent surveys hosted on the City's website, but generally a low response rate compared to comprehensive transportation plan surveys). The survey questions and responses are described below. It must be noted that the survey participants were generally cyclists – and therefore the survey results are skewed towards profiling cyclists rather than transportation system users as a whole.

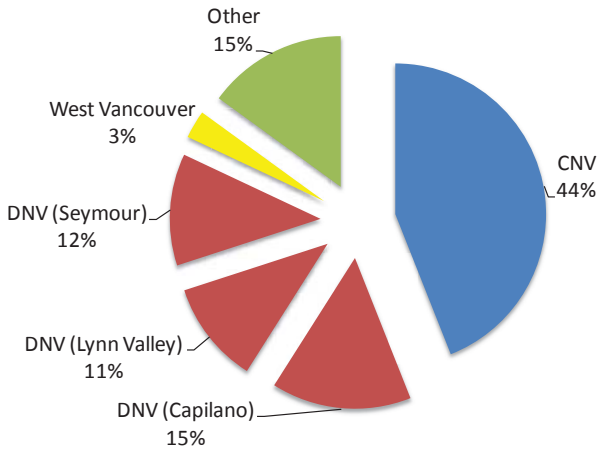
The survey found that:

- Cycling is generally less favoured as a method of transportation for utilitarian trips, even for cyclists who are regular commuters; and

- Most survey respondents indicated they cycle for recreational reasons at least occasionally, and 75% have used their bikes for bicycle commuting.

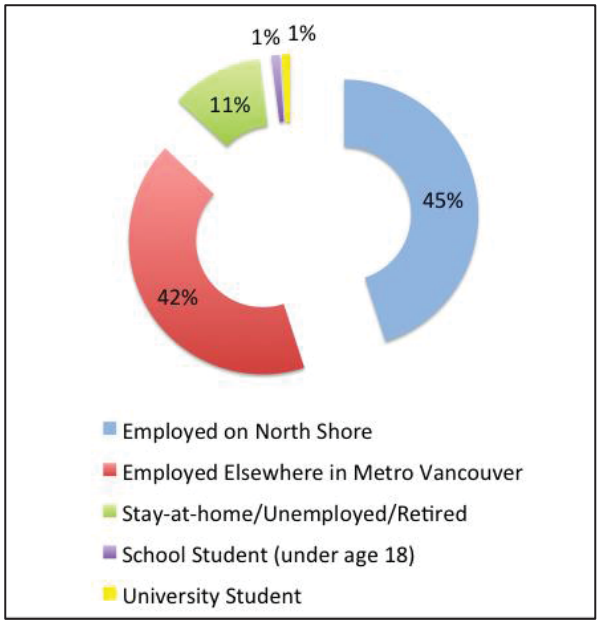
Staff plan to use these survey results to better design future projects and cycling promotion programs for the appropriate users. Specifically, the results indicate the need to work further to determine what network changes are necessary to promote more cycling trips for utilitarian purposes.

FIGURE i: HOME MUNICIPALITY



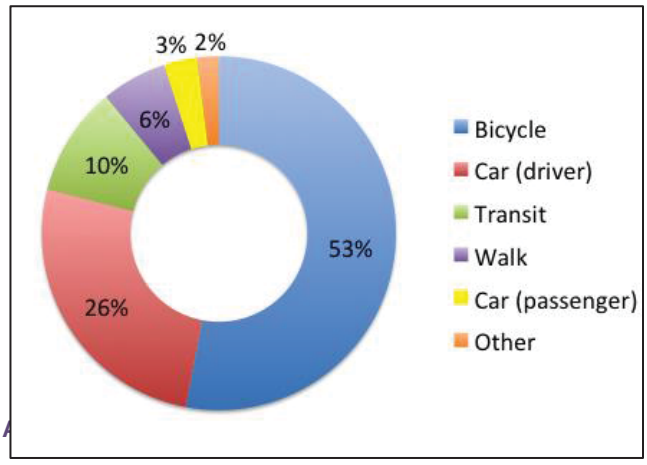
District respondents represented 38% of the total, slightly less than the City share of 44%.

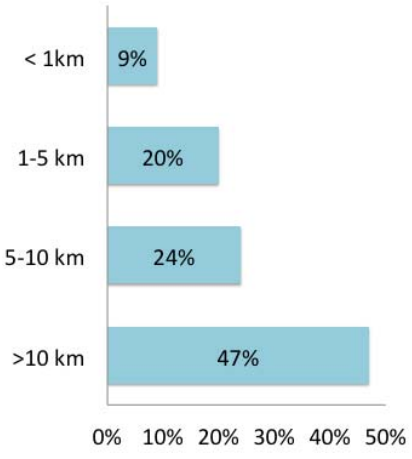
FIGURE ii: TYPICAL WEEKDAY ACTIVITY



Around half of survey respondents indicated that they remain on the North Shore on a typical day.

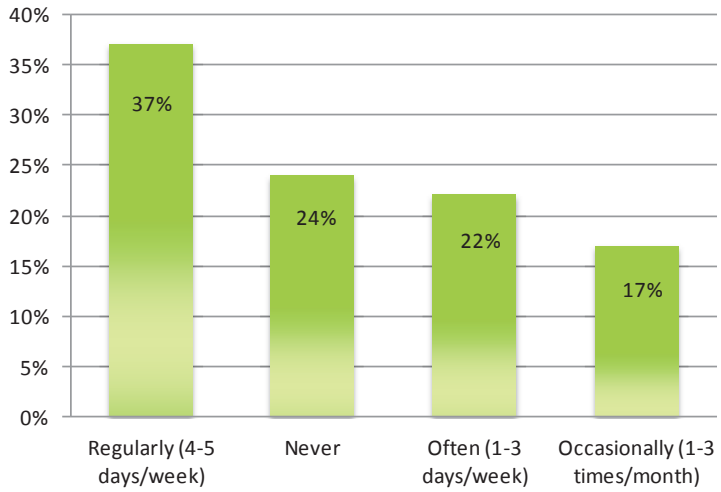
FIGURE iii: TRAVEL MODE AND COMMUTE LENGTH FOR WORK/SCHOOL TRIPS





For those respondents who travel to school or work, the majority complete their trip using a bike. Nearly half of respondents indicated that their commute length exceeds 10 kilometres.

FIGURE iv: FREQUENCY OF CYCLING FOR WORK/SCHOOL TRIPS



More than a third of survey respondents cycle to work or school regularly throughout the year, while a quarter of respondents do not cycle at all to work or school.

FIGURE v: TYPICAL TRAVEL MODE FOR UTILITARIAN TRIPS

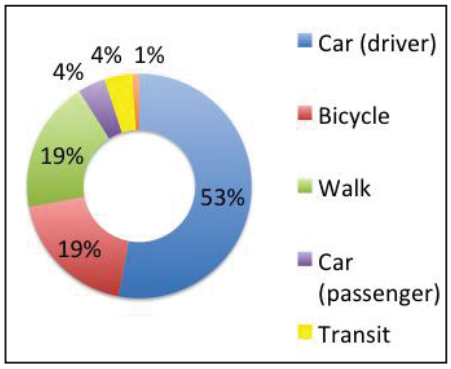
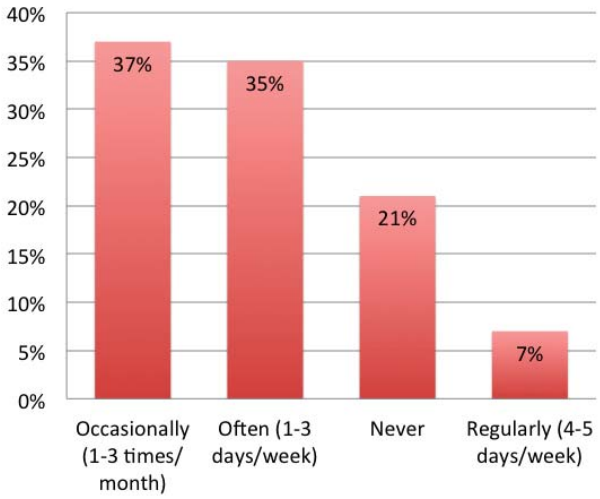


FIGURE vi: FREQUENCY OF CYCLING FOR UTILITARIAN TRIPS



Survey respondents indicated that more than half of their utilitarian trips are completed with a car, with bikes used only one fifth of the time. For those respondents who use bikes for utilitarian trips, 42% do so on a weekly basis.

FIGURE vii: TYPICAL TRAVEL MODE FOR RECREATION TRIPS

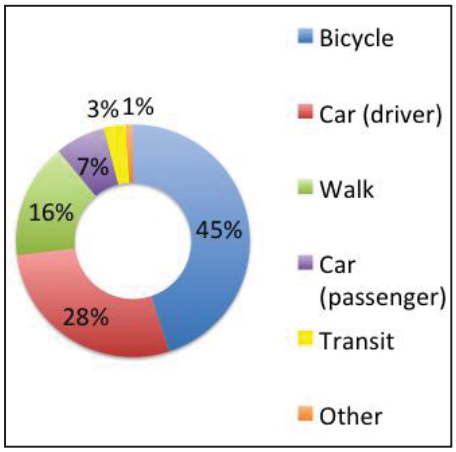
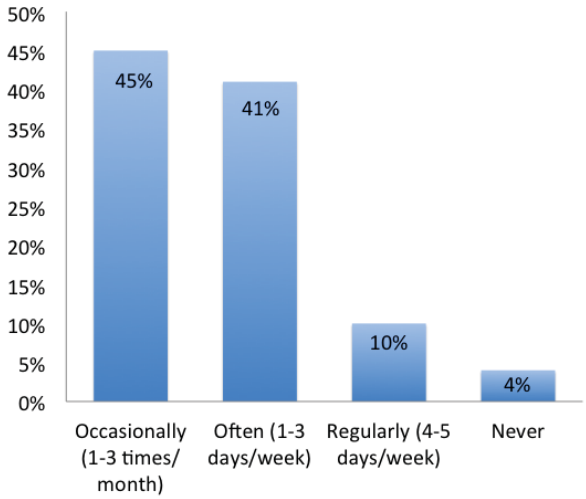


FIGURE viii: FREQUENCY OF CYCLING FOR RECREATION TRIPS



Just under half of survey respondents use their bikes for trips related to recreation. Those who make recreational bike trips generally do so 2 times a month or more.

Online Survey: General Feedback

In addition to the online survey responses and location-specific feedback reflected in the mapping, a variety of general comments were received from stakeholders. This feedback was categorized and is summarized in Table A.

TABLE A SUMMARY OF GENERAL COMMENTS FROM CYCLISTS

CATEGORY	COMMENTS RECEIVED
General Planning	- Seamless multimodal integration is important - Municipalities need to work together to build bike network. - More east-west routes with bridges at creek crossings. - Add zigzags to north-south routes to create more gentle grades. - Make routes radiate from key destinations. - Routes must offer value to cyclists. - More bike storage lockers. - At busy intersections, separate bikes from cars. - More bike routes through parks. - Improve access to recreation facilities.
Facilities	- Place bike racks strategically and safely, with innovative designs. - Remove parking to install bike lanes. - Make sidewalks wider for bikes, to facilitate utilitarian trips. - Way-finding signage to advise cyclists of routes, hills, distance. - Make bike facilities for all ages and abilities. - Bike lanes are the preferred facility. - Improve maintenance of bike lanes. - Some cyclists like traffic circles-but not all cyclists.
Projects	- Complete a Low Route across the North Shore, in addition to Spirit Trail. - Expand Seymour River Greenway eastwards. - Improve routes to Deep Cove. - Improve connections to Edgemont Village. - Improve connections from Capilano to Westview on North Side of Highway. - Create a user map to help cyclists navigate the North Shore. - Improve illumination. - Install more bike pushbuttons.
Enforcement/ Policy/ Promotion	- Introduce tax incentives for commuter cycling. - Increase cost of parking to encourage cycling. - Reduce speed limits. - Increase idling, speed and parking enforcement. - Make SeaBus a 1 zone fare. - Provide cycling education for cyclists and motorists. - Advertising campaign to promote cycling and active transportation, especially at schools. - Promote electric bikes. - Consider "car free days." - Implement bike shuttle program for steep hills such as Lonsdale.

APPENDIX 4 – MAPPING PROCESS

This appendix outlines the process followed to create new Bicycle Master Plan mapping.

1) The 2006 Bicycle Master Plan maps were used as a basis for discussion. In 2011 a new map base was created to display both the 2006 network, in addition to projects planned and implemented between 2006 and 2012. Most rough surface trails were not incorporated into the mapping for the reasons described in previous sections.

2) Stakeholders and staff used the Base Map to mark problem areas, project priorities and route change suggestions.

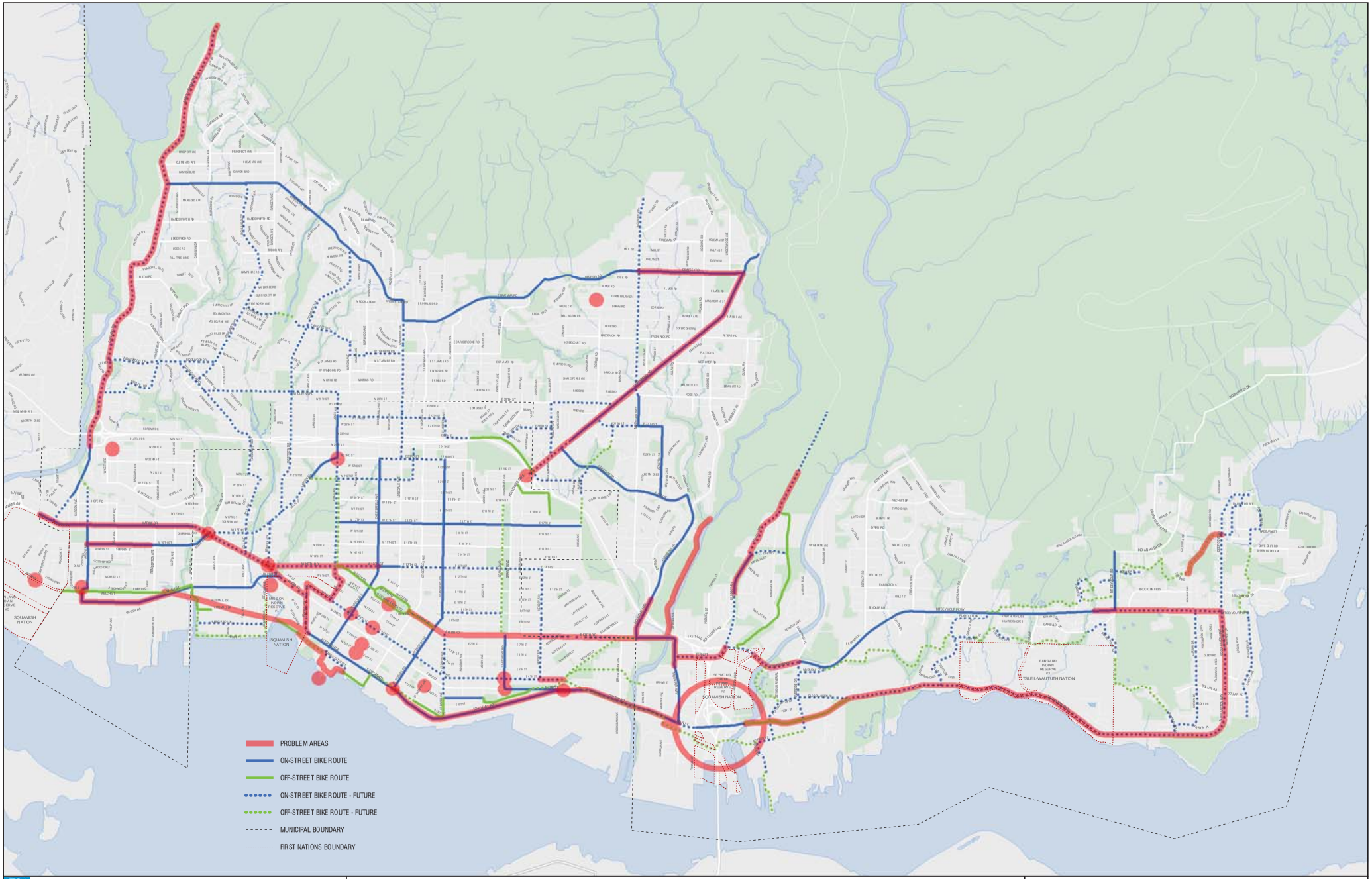
    - A list of all **problem areas** identified by stakeholders was compiled and is illustrated on "Map A – Problem Areas." The accompanying text list of locations is provided in TABLE 1.

    - All **priority project locations** identified by stakeholders were compiled in a list, with locations ranked by the number of times they were identified. Priority project locations are illustrated on "Map B – Project Priorities." This map provides an illustration of where cyclists wish to have cycling funds allocated towards implementing projects. The accompanying list of projects, sorted in descending number of "mentions" is provided in TABLE 2.

    - Stakeholders identified several **possible route changes**, including removals and additions. These suggestions are illustrated on "Map C – Suggested Route Changes," with the accompanying list provided in TABLE 3.

    - The suggested route changes were reviewed by staff and incorporated into the new Bicycle Master Plan Map where required.

Maps A, B and **C** are provided on subsequent pages, followed by **Tables 1, 2** and **3**



GIS DEPARTMENT
GEOGRAPHIC INFORMATION SYSTEMS
604.990.2311 www.geoweb.dnv.org gis@dnv.org

NORTH VANCOUVER DISTRICT

MAP A: NEW PROBLEM AREAS IDENTIFIED

(INTERSECTIONS AND CORRIDORS)

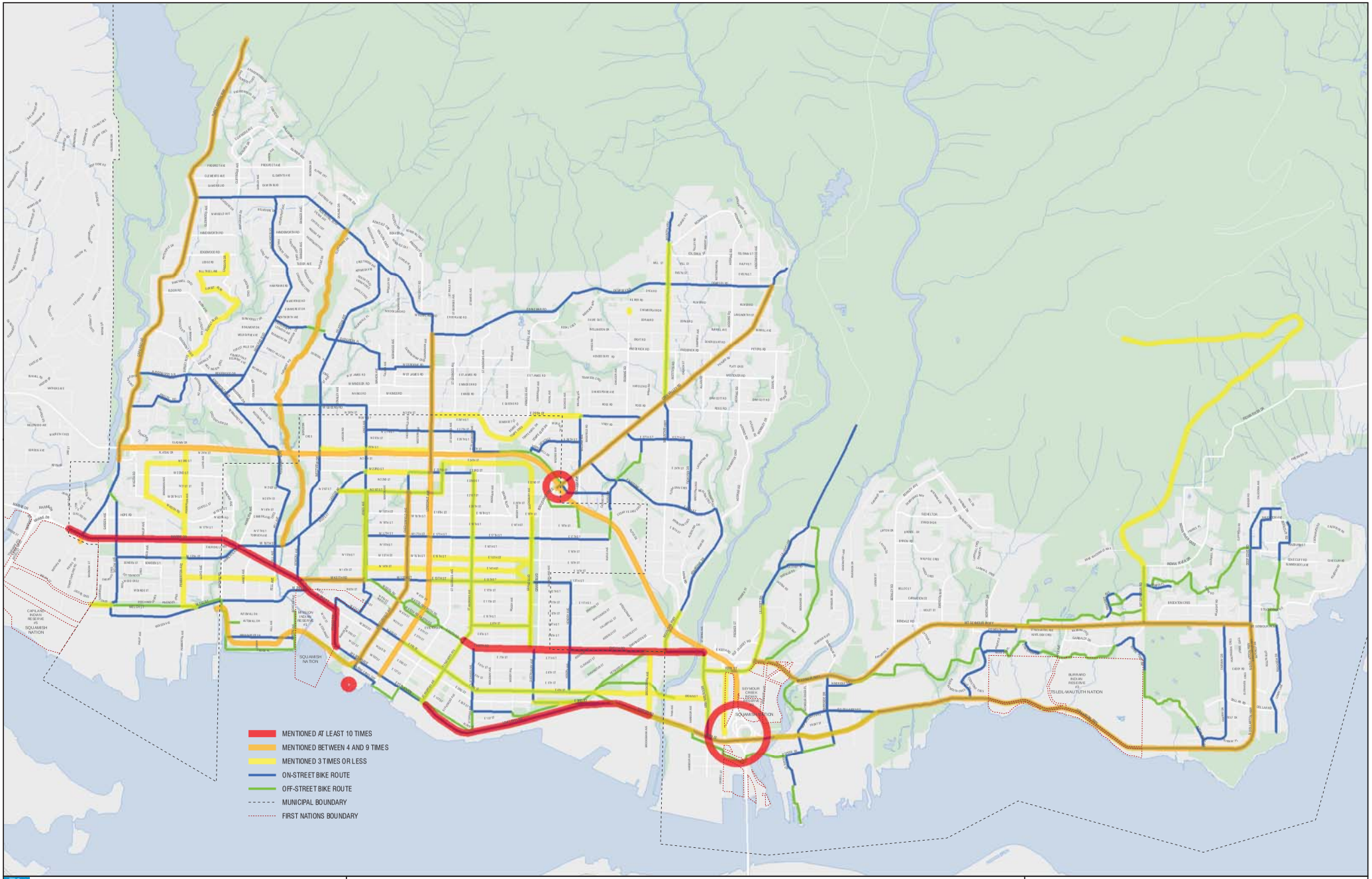
0 500 1,000 2,000
Meters

N

Published: November 2, 2011

Scale: **1:17,500**

N:\4-Projects\Departmental\Transportation\Kim\ABikeMasterPlan\A1_MapA_NewProblemAreas.mxd



GIS DEPARTMENT
GEOGRAPHIC INFORMATION SYSTEMS
604.990.2311 www.geoweb.dnv.org gis@dnv.org

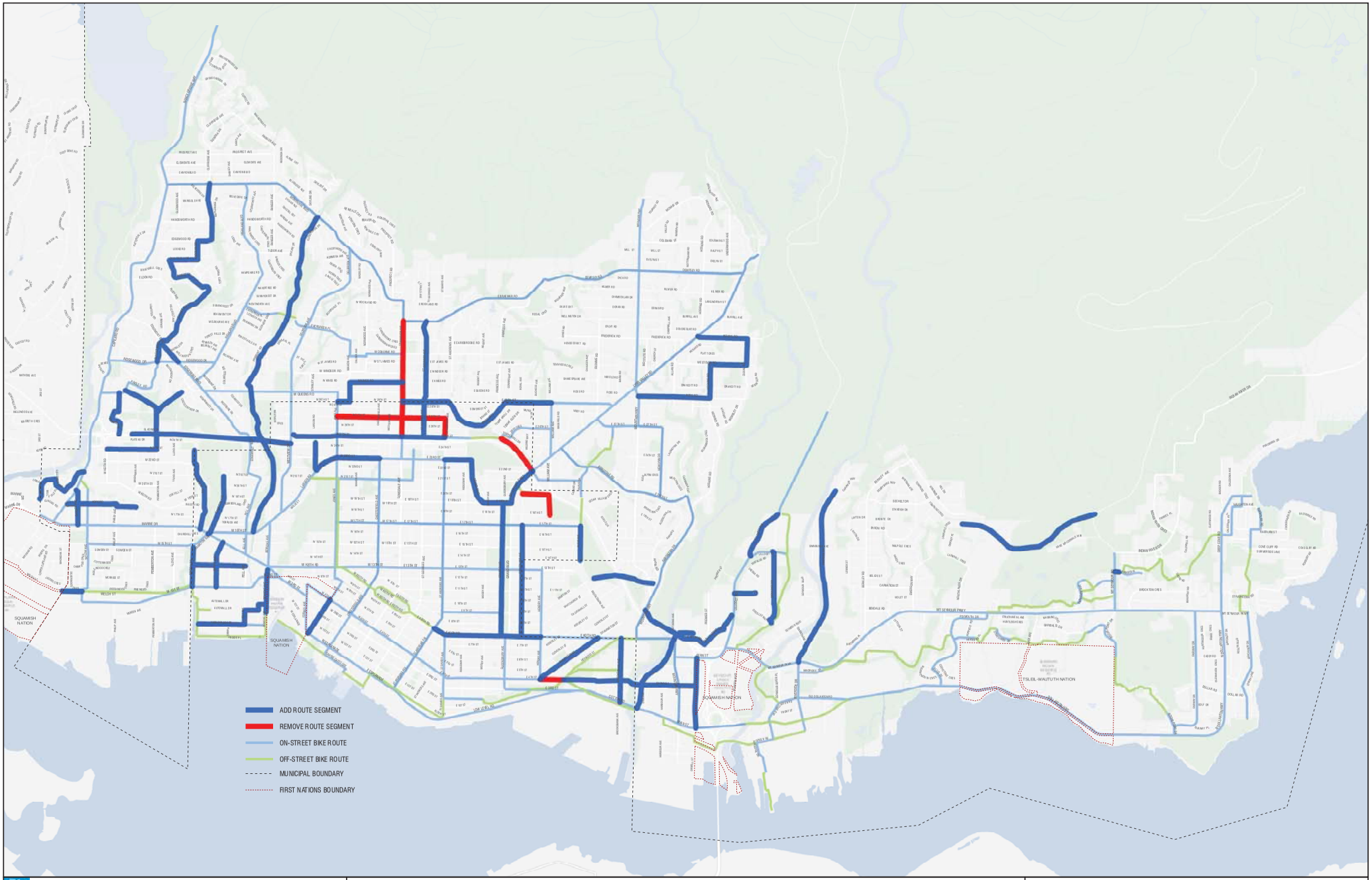
MAP B: PRIORITY PROJECTS IDENTIFIED

0 500 1,000 2,000
Meters

N

Published: November 2, 2011
Scale: 1:17,500

N:\4-Projects\Departmental\Transportation\Kim\ABikeMasterPlan\A1_MapB_LocationsForImprovement.mxd



GIS DEPARTMENT
GEOGRAPHIC INFORMATION SYSTEMS
604.990.2311 www.geoweb.dnv.org gis@dnv.org

NORTH VANCOUVER DISTRICT

MAP C: PROPOSED ROUTE CHANGES TO THE BICYCLE MASTER PLAN

0 500 1,000 2,000
Meters

N

Published: October 12, 2012

Scale: 1:17,500

N:\4-Projects\Departmental\Transportation\Kim A\BikeMasterPlan\A1_MapC_ProposedRouteChanges.mxd

This page left intentionally blank

Table 1 contains the list of problem areas identified by cyclists (through the public consultation process) that are illustrated on **Map A**.

TABLE 1: LIST OF PROBLEM AREAS FOR MAPPING			
PROBLEM AREA	Intersection, Corridor, Segment, Trail	JURISDICTION	DETAILS OF PROBLEM
West 15th St (from Tatlow Ave to Pemberton Ave)	S	DNV	Bikes and vehicles don't mix well; too much traffic.
West 3rd St (from Forbes Ave to West Keith Rd)	S	CNV	Difficult for cyclists
East 4th St/Queensbury Ave	I	CNV	East-west difficult for cyclists
East 3rd St/Queensbury Ave	I	CNV	Difficult for cyclists
Lonsdale Ave at 4th St	I	CNV	Crossing Lonsdale is a problem for bikes
East 4th St (Hendry Ave to Heywood Ave)	S	CNV	Too steep for bikes uphill
Capilano Rd(from Highway 1 to Grouse Mtn)	S	DNV	Needs separation from vehicular traffic
Cotton Rd (at East 3rd St/Low Level Rd intersection)	I	CNV	Difficult for cyclists to make EB and WB maneuvers due to signal timing plan.
Dollarton Hwy Corridor	C	DNV	Needs separation from vehicular traffic
Dollarton Hwy (from Ellis Rd eastward)	S	DNV	WB hill, just east of Ellis: slow bikes and fast cars, and pinch points
Dollarton Hwy/Main St	I	DNV	Bikes must cross WB exit lane; dangerous
Esplanade/St. Andrew's Ave	I	CNV	Cars park in the bike lane
Fern St (Mt Seymour Pkwy to Mountain Hwy)	S	DNV	Dangerous

TABLE 1: LIST OF PROBLEM AREAS FOR MAPPING			
PROBLEM AREA	Intersection, Corridor, Segment, Trail	JURISDICTION	DETAILS OF PROBLEM
Forbes Ave (from West 3rd St to Esplanade)	S	CNV	Not enough space for cyclists
Fromme Rd (north end, at trail heads)	I	DNV	Logistical problems for mountain biking
Iron Worker's Bridge - north end	I	MoT	General difficult, dangerous area for cyclists
Hamber Place (just west of Deep Cove)	I	DNV	Steep hill
Barrow St (from Harbour Ave to Railway St)	S	DNV	Getting to Iron Worker's bridge EB from Barrow
East Keith Rd (St. Georges Ave to Lynnmouth Ave)	S	CNV	A gap in the network for bikes
Marine Dr (from Mackay Rd to Fell Ave)	S	CNV	Not enough space for cyclists
Marine Dr/Capilano Rd	I	DNV	Eastbound left-turn difficult for cyclists
West Keith Rd (Marine Dr to Chesterfield Ave)	S	CNV	A gap in the network for bikes
East Keith Rd Bridge (over Lynn Creek)	S	DNV	Dangerous for bikes; too narrow; not enough space
Larson Ave/West 23rd St /Jones Ave	I	CNV	Eastbound left-turn difficult for cyclists
Lillooet Rd (from Cap College Northwards)	S	DNV	Few signs uphill, and downhill markings are too close to parked cars
Marine Dr (Lions Gate Bridge eastwards to Garden Ave)	S	MoT, DNV	Difficult for bikes to get to NB Capilano from Lions Gate.
Lonsdale Ave/Keith Rd	I	CNV	Difficult to cross Lonsdale

TABLE 1: LIST OF PROBLEM AREAS FOR MAPPING			
PROBLEM AREA	Intersection, Corridor, Segment, Trail	JURISDICTION	DETAILS OF PROBLEM
Lonsdale Ave at 1st St	I	CNV	Difficult to cross Lonsdale
Lonsdale Ave at 2nd St	I	CNV	Difficult to cross Lonsdale
Low Level Road (from Esplanade to East 3rd St)	S	CNV	Flooding and debris cause problems for bikes
Low Route (from Welch St to Esplanade)	C	DNV/CNV	There is a missing link the Low Route in order to avoid Marine Drive- need a connection. Poorly maintained road.
Lynn Creek Pathway (from Highway 1 northwards)	T	DNV	Paved path is in poor condition (cracks and ruts)
Lynn Valley Rd (Highway 1 to Dempsey)	C	DNV	Not enough space for cyclists
Lynn Valley Rd /Highway 1	I	DNV/CNV	Not enough space for cyclists
Seylynn (trail from under Highway 1 to East Keith Rd)	T	DNV	Needs a better link
Marine Drive Corridor	C	DNV/CNV	Generally busy and feels unsafe
Marine Dr/West Keith Rd/Bewicke Ave	I	CNV	Difficult intersection
Marine Dr/Hamilton Ave	I	CNV	Pinchpoint EB in front of Steed
Jones/Keith intersection down to 3rd/Forbes	S	CNV	Lots of conflict with cars, needs better signage and design
Mt Seymour Pkwy (from Riverside Dr to Seymour Blvd)	S	DNV	Problem area, and not enough space on bridge for bikes. Needs bike lanes.

TABLE 1: LIST OF PROBLEM AREAS FOR MAPPING			
PROBLEM AREA	Intersection, Corridor, Segment, Trail	JURISDICTION	DETAILS OF PROBLEM
Mountain Hwy (from Hunter St to Fern St)	S	DNV	Not enough space for cyclists
Mountain Hwy (from East Keith Rd to Arborlynn Dr)	S	DNV/MoT	Not enough space for cyclists
SeaBus terminal	I	CNV	Lack of directional signage and conflict with trains
Spirit Trail (from Waterfront to Harbourside)	S	CNV	Needs the missing link
St. Patrick's Ave/East 2nd St	I	CNV	Conflicts between cars and bikes
Welch St/Capilano Rd	I	DNV	Busy
Welch St/Tatlow Rd	I	DNV	Right of way confusion
Northerly bike route in DNV from Dempsey to Mountain Highway	C	DNV	Entire corridor is a problem
Mount Seymour Parkway (from Parkgate Mall entrance eastwards to Deep Cove)	S	DNV	No bike infrastructure exists
Rail crossing at Bewicke Avenue	I	CNV	Needs rubber track guards
West 4th Street at Chesterfield Avenue	I	CNV	Westbound sight distance is not good

Table 2 contains the list of top locations identified by cyclists that are illustrated on **Map B** – and are separated by jurisdiction. Rows are color-coded to match the lines on **Map B**.

TABLE 2: LIST OF PROJECTS IDENTIFIED BY CYCLISTS		
LOCATION	JURISDICTION	# OF COMMENTS RECEIVED
LOCATIONS IN SHARED CNV/DNV JURISDICTION:		
Lynn Valley Rd/Highway 1	Joint CNV/DNV	14
Marine Drive Corridor (from West 3rd St/Forbes Ave to Lions Gate Bridge)	Joint CNV/DNV	13
East Keith Rd (from Mountain Hwy to St. Andrews Ave)	Joint CNV/DNV	12
Low Route (across North Shore)	Joint CNV/DNV/Other	10
Spirit Trail (across North Shore)	Joint CNV/DNV	9
Lonsdale Ave (from Esplanade to Braemar Rd)	Joint CNV/DNV	7
Mosquito Creek (from West 16th St to Montroyal Blvd)	Joint CNV/DNV	3
New Lynn Creek Ped/Bike Bridge (from Crown St to West 4th St, through Park and Tilford)	Joint CNV/DNV	2
New Lynn Creek Ped/Bike Bridge (from Crown St to West 4th St, through Park and Tilford)	Joint CNV/DNV	1
West 3rd St (from Pemberton Ave to Fell Ave)	Joint CNV/DNV	1
CNV JURISDICTION:		
Cotton Rd/Low Level Rd Corridor	CNV	11
West Keith Rd (from Marine Dr to 13th St)	CNV	7

TABLE 2: LIST OF PROJECTS IDENTIFIED BY CYCLISTS		
LOCATION	JURISDICTION	# OF COMMENTS RECEIVED
Spirit Trail (from Esplanade to Harbourside)	CNV	7
Forbes Ave (from Esplanade to West 3rd St)	CNV	5
SeaBus Terminal	CNV/TransLink	3
Chesterfield Ave (from Carrie Cates to West 21st St)	CNV	3
East 4th St (from Lonsdale Ave to Gladstone Ave)	CNV	2
West 25th/East 25th St (from Westview Dr to Tempe Glen)	CNV	2
East 29th St: 29th (Lonsdale to Tempe), Tempe (from 29th to 29th), 29th (Tempe to William)	CNV	2
East 3rd St (from Low Level Rd to Queensbury)	CNV	2
East 13th St (from West Grand Blvd to Lonsdale Ave)	CNV	2
Brooksbank Ave (from East Keith Rd to Cotton Rd)	CNV	1
East 15th St(from West Grand Blvd to Lonsdale Ave)	CNV	1
East 3rd St/Queensbury Ave	CNV	1
East 4th St (from Heywood Ave to Hendry Ave)	CNV	1
Green Necklace	CNV	1
Lonsdale Ave/1st St	CNV	1
Lonsdale Ave/2nd St	CNV	1

TABLE 2: LIST OF PROJECTS IDENTIFIED BY CYCLISTS		
LOCATION	JURISDICTION	# OF COMMENTS RECEIVED
Lonsdale Ave/4th St	CNV	1
Lonsdale Ave/Keith Rd	CNV	1
St. Andrew's Avenue (Esplanade to East 23rd St)	CNV	1
Grand Blvd (East Keith Rd to Lynn Valley Rd)	CNV	1
East 25th St (Westview to Lonsdale)	CNV	1
West 23rd Street (Jones Avenue to Lonsdale Avenue)	CNV	1
DNV JURISDICTION:		
Main St (from Dollarton Hwy to Brooksbank)	DNV	8
Mt Seymour Pkwy/Fern St (from Riverside to Mountain Hwy)	DNV	7
Lynn Valley Rd(Highway 1 to Dempsey Rd)	DNV	7
Mountain Highway (from Main St to East Keith Rd)	DNV	5
Capilano Rd (from Hwy 1 to Grouse Mountain)	DNV	4
Welch St (from Tatlow to Lions Gate Bridge)	DNV	3
Dollarton Hwy (from Main Street to Deep Cove)	DNV	3
Mt Seymour Pkwy Corridor	DNV	4
East Keith Rd Bridge/Lynn Creek	DNV	3
Mountain Highway (from East Keith Rd to Arborlynn)	DNV	2

TABLE 2: LIST OF PROJECTS IDENTIFIED BY CYCLISTS		
LOCATION	JURISDICTION	# OF COMMENTS RECEIVED
Garden Ave/Welch St	DNV	2
Lillooet Rd (from Mt Seymour Pkwy to Purcell Way)	DNV	2
Mountain Highway (from Lynn Valley to McNair)	DNV	2
Edgemont Village (from Edgemont Blvd to Sunset Blvd)	DNV	1
Mt Seymour Pkwy/Fern St (from Riverside to Mountain Hwy)	DNV	1
Fromme Rd (north end)	DNV	1
Marine Drive/Garden Ave (Eastbound left-turn)	DNV	1
Lloyd Ave(from West 23rd to West Keith)	DNV	1
Mackay Ave (from West 15th St to Marine Dr)	DNV	1
Orwell St (from Main St to Fern St)	DNV	1
Pemberton Ave (from West 1st St to Marine Dr)	DNV	1
Mount Seymour Rd (Mt. Seymour Pkwy to mountain top)	DNV	1
OTHER JURISDICTIONS:		
Iron Worker's Bridge - North End	MoT	12
Lions Gate Bridge - North End	MoT	7
Capilano Rd (from Marine Dr to Welch St)	Other	3
Highway 1 (from Iron Worker's Bridge to Taylor Way)	MoT	3

Table 3 contains the list of route changes suggested by cyclists that are illustrated on **Map C**.

TABLE 3: LIST OF POSSIBLE ROUTE CHANGES IDENTIFIED BY CYCLISTS			
REMOVE OR ADD ROUTE?	DETAILS OF PROPOSED ROUTE CHANGE	STAFF COMMENT ON WHETHER TO INCORPORATE ROUTE CHANGE IN BMP	JURISDICTION
Remove	Eliminate East 4th St east of Hendry	No-need to connect to Hendry for Spirit Trail connection; and upcoming 2011 signage and marking project extends to Hendry.	CNV
Add	Add Shavington (Hendry to Keith)	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road segment: Keith from St. Andrews to Hendry	Yes - add to the Bicycle Master Plan	CNV
Remove	Eliminate trail that goes through bushes from Tempe Glen to Lynn Valley	No-need to keep this link as it is currently used, and provides the only off-road connection to Lynn Valley in this area.	CNV
Remove	Eliminate 27th Street route (from Jones to St. Andrew's) , plus St. Andrew's (25th to 27th)	Yes - 25th Street has better potential as a bike route, and 29th is being added as well.	CNV
Add	Add Sutherland from Keith to 17th	No. Hendry will have ped signal in future, which will improve safety for bikes and peds crossing Keith. Also, Sutherland has a crest that reduces sight distance for Eastbound left-turn cyclists.	CNV
Add	New on-road segment: 23rd between Jones and Chesterfield	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road segment: 23rd between St. Andrew's & Ridgeway	Yes - add to the Bicycle Master Plan	CNV

TABLE 3: LIST OF POSSIBLE ROUTE CHANGES IDENTIFIED BY CYCLISTS			
REMOVE OR ADD ROUTE?	DETAILS OF PROPOSED ROUTE CHANGE	STAFF COMMENT ON WHETHER TO INCORPORATE ROUTE CHANGE IN BMP	JURISDICTION
Add	New on-road segment: 19th between Moody and West Grand Blvd)	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road segment: Larson between Jones and 21st	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road route: 29th (from Lonsdale to Tempe)	Yes - add to the Bicycle Master Plan	CNV/DNV
Add	New on-road route: Tempe Crescent (from 29th to 29th)	Yes - add to the Bicycle Master Plan	CNV/DNV
Add	New on-road route: 29th (from Tempe to William)	Yes - add to the Bicycle Master Plan	CNV/DNV
Add	Off-road route: along south side of Highway 1 from Capilano to Westview	Yes-MoT jurisdiction but could be future project	MoT
Add	Add this "EXISTING on-road" route: Mackay from 1st to 15th	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road route: Purcell Way (east of Lillooet Rd to University)	No – new path constructed in 2011	DNV
Add	New bike ped overpass: from Seylynn Park over Highway 1	No-MoT jurisdiction	DNV/MoT
Add	New on-road route: Bewicke (Marine to Copping), off-road (Copping to Fell), Fell (south of Automall), Harbourside (west of Fell).	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road route: Lloyd Ave (from Hwy 1 to 23rd)	Yes – add to the Bicycle Master Plan	DNV
Add	New on-road route: 23rd (from Pemberton to Philip)	Yes – add to the Bicycle Master Plan	DNV

TABLE 3: LIST OF POSSIBLE ROUTE CHANGES IDENTIFIED BY CYCLISTS			
REMOVE OR ADD ROUTE?	DETAILS OF PROPOSED ROUTE CHANGE	STAFF COMMENT ON WHETHER TO INCORPORATE ROUTE CHANGE IN BMP	JURISDICTION
Add	New off-road route: 23rd (from Philip to Keith)	Yes – add to the Bicycle Master Plan	DNV
Add	New on-road route: Barrow Street (from Harbour to east end), then off-road connection up to Main.	Yes – add to the Bicycle Master Plan	DNV/MoT
Add	New on-road route: Garden or Tatlow from Marine to Capilano	Yes - add to the Bicycle Master Plan	DNV
Add	New on-road route: West Grand Blvd (Keith Road to 19th), Boulevard (from 19th to Lynn Valley), 19th (West Grand to East Grand)	Yes - add to the Bicycle Master Plan	CNV
Add	New off-on road route: From Pemberton/Hwy 1 overpass, an off-road route through Murdo Fraser Park, connecting to Edgemont Village	No – grades are very challenging	DNV
Add	New off-road connection: Orwell to Fern	Yes - add to the Bicycle Master Plan	DNV/MoT
Add	New off-road route: a trail along Lynn Creek from Main St to Mtn Hwy on DNV side	Yes - add to the Bicycle Master Plan	DNV
Add	New on-road route: add King's Road (Lonsdale to Mahon)	Yes - add to the Bicycle Master Plan	DNV
Add	New on-road route: add Mahon (King's Road to 29th)	Yes - add to the Bicycle Master Plan	DNV
Add	New on-road route: add 29th (Mahon to Jones)	Yes - add to the Bicycle Master Plan	DNV
Add	New on-road route: Brooksbank Avenue (Cotton Rd to Keith Rd)	Yes - add to the Bicycle Master Plan	CNV

TABLE 3: LIST OF POSSIBLE ROUTE CHANGES IDENTIFIED BY CYCLISTS			
REMOVE OR ADD ROUTE?	DETAILS OF PROPOSED ROUTE CHANGE	STAFF COMMENT ON WHETHER TO INCORPORATE ROUTE CHANGE IN BMP	JURISDICTION
Add	New on-road route: Riverside Dr up to top (Mtn bike Trails entrance)	Yes – add to the Bicycle Master Plan	DNV
Add	New on/off-road route: Edgemont (Ridgewood to Sunset), Sunset Blvd (from Edgemont to Tall Tree Lane), Tall Tree Lane (from Sunset to Carolyn), Carolyn (from Tall Tree to Edgewood), and off-road from Handsworth School on an off-road path up to Montroyal Boulevard	Yes – add to the Bicycle Master Plan	DNV
Add	New off-road route: Trail between Brooksbank Elementary School (over/under Highway 1) to Arborlynn Dr	No-MoT jurisdiction	MoT
Add	New Off-road route: mark bike route through Mosquito Creek Park (16th to Mont Royal).	Yes – add to the Bicycle Master Plan	CNV/DNV
Add	New on-road route: Various local roads in Lynn Valley from (from Peters in north to William in south) to connect to Mountain Hwy	No – circuitous route	DNV
Add	New on-road route: 25th (Westview to St. Andrew's)	Yes - add to the Bicycle Master Plan	CNV
Add	New on-road route: West 3rd (Fell to Mackay)	No-1st Street already has bike lanes, and therefore no need for a parallel route so close.	CNV
Add	New off-road route: path from Iron Worker's Bridge to Lonsdale, using rail line	Rail line is not in CNV/DNV jurisdiction	various
Add	New on/off road route: Old Lillooet Rd from East Keith to Lillooet Rd, with a bit of off-road path at north end.	Yes – add to the Bicycle Master Plan	DNV

TABLE 3: LIST OF POSSIBLE ROUTE CHANGES IDENTIFIED BY CYCLISTS			
REMOVE OR ADD ROUTE?	DETAILS OF PROPOSED ROUTE CHANGE	STAFF COMMENT ON WHETHER TO INCORPORATE ROUTE CHANGE IN BMP	JURISDICTION
Add	Short trail from southbound Capilano Rd to Sandown Place, then down to Fullerton, Glenaire, Klahanie to Lions Gate Bridge.	No – already exists	DNV
Add	Spirit Trail	Yes – add to the Bicycle Master Plan	CNV/DNV
Remove	Trail North of Sutherland School	Yes – removed because it is not suitable for all cyclists.	CNV
Add	Rufus Avenue between 17th and 14th to provide a connection to Brooksbank Elementary and the bike park.	Yes – add to the Bicycle Master Plan	CNV
Add	Lillooet Lane	Yes – add to the Bicycle Master Plan	DNV
Add	Crown Street between Mountain Highway and Orwell Street	Yes – add to the Bicycle Master Plan	DNV
Add	Orwell Street between Oxford and Main	Yes – add to the Bicycle Master Plan	DNV
Add	Mackay Road between 22nd and 23rd	Yes – add to the Bicycle Master Plan	DNV
Add	Connection between Lynn Creek and Arborlynn Drive	Yes – add to the Bicycle Master Plan	DNV
Add	Keith Road between Lillooet Road and Mountain Highway	Yes – add to the Bicycle Master Plan	DNV

TABLE 3: LIST OF POSSIBLE ROUTE CHANGES IDENTIFIED BY CYCLISTS			
REMOVE OR ADD ROUTE?	DETAILS OF PROPOSED ROUTE CHANGE	STAFF COMMENT ON WHETHER TO INCORPORATE ROUTE CHANGE IN BMP	JURISDICTION
Add	Monashee Drive	Yes – add to the Bicycle Master Plan	DNV
Add	Garden Avenue between Marine Drive and Capilano Road.	Yes – add to the Bicycle Master Plan	DNV
Add	Terrace Avenue between Gladwin Drive and St. Anne Drive	Yes – add to the Bicycle Master Plan	DNV
Add	North south connection between Murdo Frazer Park and St. Anne Drive	Yes – add to the Bicycle Master Plan	DNV
Add	North south alternate route to Capilano Road	Yes- add to the Bicycle Master Plan	DNV

This page left intentionally blank

APPENDIX 5 – TECHNICAL EVALUATION PROCESS

This appendix outlines the proposed process for evaluating the technical aspects of priority bicycle network projects.

When the prior (2006) Bicycle Master Plan was drafted, all identified "network priorities" underwent a technical evaluation in order to categorize bike projects into "low" and "high" priorities.

In the context of the 2012 Bicycle Master Plan, the projects identified as "priorities" (Phase 1) will also undergo a technical evaluation (Phase 2). This 2nd phase of the evaluation process will be conducted by City and District staff separately, in conjunction with their respective Capital planning processes. Beyond 2012, the technical evaluations will be updated periodically as required, in order to reflect current conditions.

The City and District will apply both qualitative and qualitative criteria during Phase 2 of the evaluation process, using methodologies similar to that used for the 2006 Bicycle Master Plan. The criteria are not finalized at this time, but will likely include the following five categories.

- **Safety -** This is a measure of existing safety conditions and involves a subjective rating on scale of 1 to 5 to reflect a range from negligible to severe safety issues.

- **Guidelines** - This criterion measures how well a bicycle facility could be constructed to meet applicable design guidelines (including Transportation Association of Canada guidelines as well as supplementary guidelines).

- **Demand -** This criterion provides a measure of existing and latent demand. Subjective ratings are based on estimated increases in cyclists and resulting number of cyclists if route/connections were developed as proposed.

- **Appeal -** This criterion provides a measure of the potential appeal of a route to cyclists and the proportion of all cyclists to whom the route would appeal. This criterion considers aesthetics, grade and other factors affecting the quality of the cycling environment. A subjective rating on scale of 1 to 5 reflects a range from negligible to strong appeal.

- **Cost -** This criterion is based on an order-of-magnitude estimate of the cost of implementing route or connection. Ratings on a scale of 1 to 5 are assigned to projects based on comparative costs.

The technical evaluation of priority projects will be initiated once the criteria and weighting methodologies are established by City and District staff.

APPENDIX 6
MONITORING PROGRAM

This appendix provides additional information and background related to Bicycle Monitoring

The 2006 Plan[1] included a section dedicated to bicycle program monitoring. This section (as follows) is still supported in the 2012 Bicycle Master Plan (though the reference to the "Joint Bicycle Advisory Committee" should more appropriately be "Cycling or Transportation Advisory Committee."

In general:

- A monitoring program is essential to ensure that the Bicycle Master Plan is implemented as intended, and to determine whether the plan is achieving the goals of improving safety for cyclists and encouraging more cycling. A monitoring program will also enable municipal staff to justify continued expenditures and allocation of resources for bicycle facilities and programs. Monitoring also provides a means of identify changing conditions which would require changes to the Bicycle Master Plan.

- Monitoring should be undertaken on a periodic. The first year of monitoring will establish baseline conditions, against which information collected in subsequent years will be compared. After data have been collected and summarized in the first year, it will also be possible to establish targets to be achieved within a specific time period.

- Monitoring should be conducted by municipal staff, as part of on-going data collection and management activities. Other agencies and volunteers can be recruited through the Joint Bicycle Advisory Committee, the Vancouver Area Cycling Coalition and other cycling organizations to assist in monitoring, as a means of increasing the scope of the monitoring program, and minimizing costs.

[1] 2006 North Vancouver Bicycle Master Plan (Urban Systems Limited)

Measures of Success:

In order to clearly and reliably gauge the success of the Bicycle Master Plan, the monitoring program should collect data that can be used to calculate the following performance measures:

- **Mode share.** Data available from TransLink and Statistics Canada indicate bicycle mode shares — the proportion of trips made by bicycle. Currently, 1.2% of all trips in North Vancouver are made by bicycle. A trend increase in the bicycle mode share of all trips and of work trips will be a key indicator of the success of the Bicycle Master Plan.

- **Usage of routes.** Annual counts of bicycles at selected locations on the bicycle network —including on-street routes and pathways — will provide an indication from year-to-year of the increase in bicycle use. A trend increase in the numbers of cyclists will be a key indicator of the success of the Bicycle Master Plan.

- **Kilometres of routes.** The number of kilometres of bicycle routes — on-street and off-street — should be recorded each year. Over time, this will provide a measure of the expansion of the bicycle network.

- **Bicycle parking.** Similarly, the number of bike rack spaces and secure bicycle parking spaces should be recorded each year.

- **Cyclist satisfaction.** Periodic surveys of cyclists should be used to indicate satisfaction with bicycle facilities and various features of the bicycle network, and to identify major issues. Satisfaction should be rated on a scale of 1-to-5, where 1 indicates very unsatisfied, 2 indicates somewhat unsatisfied, 3 indicated neutral, 4 indicates somewhat satisfied and 5 indicates very satisfied. Continued increases in satisfaction ratings will be a key indicator of the success of the Bicycle Master Plan.

- **Bicycle crashes.** Although bicycle crashes are typically not reported, and even when reported are often poorly recorded, a year-to-year summary of numbers and locations of bicycle crashes is useful in identifying safety-related issues and trends.

As previously outlined[2], an annual data collection program should be designed by local municipalities to consider the following components.

1) **Bicycle Counts** should be undertaken on a cordon basis so that shifts in bicycle travel to a new or improved route do not skew usage calculations. For consistency, counts

[2] 2006 North Vancouver Bicycle Master Plan (Urban Systems Limited)

should be undertaken at the same locations each year, and at the same times of the year and the same times during the day. The optimum time to undertake counts is in late September/early October (avoiding the Thanksgiving holiday), as schools and post-secondary institutions are in session at this time, and the weather is generally good.

2) **Bicycle surveys** should be undertaken annually or bi-annually to determine cyclists' travel patterns, to identify key origins and destinations, to measure cyclists' satisfaction levels, to identify bicycle network needs and priorities, and to collect other data needed to calculate the performance measures described above. These surveys could be conducted on-line and/or via survey forms distributed along bicycle routes, through bicycle stores and through local employers.

3) **Local data** should be supplemented with travel data available from TransLink and Statistics Canada. TransLink conducts a regional trip diary survey every five years, which provides information regarding bicycle mode shares, origins and destinations, trip lengths and other travel characteristics. Statistics Canada conducts a census every five years, which provides information regarding bicycle mode shares for trips to work.

City of North Vancouver
141 West 14th Street
North Vancouver BC V7M 1H9

Tel: 604.983.7333
Fax: 604.985.9417
Email: cycling@cnv.org
www.cnv.org

www.cnv.org/cycling

District of North Vancouver
355 West Queens Road
North Vancouver, BC V7N 4N5

Tel: 604.990.2311
Email: eng@dnv.org
www.dnv.org

www.dnv.org/cycling