

City of Surrey

High Level Review of South of Fraser

Community Rail Proposal, Final Report



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1.0 Executive Summary

The consultant completed for the City of Surrey a high level analysis and review of the costs, benefits and some of the issues pertaining to the Fraser Valley Heritage Railway Society's (FVHRS) recent proposal presented to the Surrey City Council in June, 2006. Their proposal entailed re-introducing passenger rail service to the City of Surrey on the old interurban 19.0 kilometre line, between a Cloverdale Station (176th Street and Highway 10) and Scott Road Station (Scott Road Station with a covered walkway or spur rail line connection to the nearby Scott Road SkyTrain Station).

This review was conducted with respect to two service scenarios:

Phase One

Phase One would have a weekend historic/tourism passenger service, using the original high level original interurban cars, provided first between the Cloverdale Station and Sullivan Station (64th Avenue and 152nd Street) in the summer of 2008. This service, operating on a single track, would be extended in the summer of 2009 through to Scott Road Station with six to seven stations in total. The connection from the Community Rail Station in North Surrey to the Scott Road SkyTrain Station would be by a 500 metre covered walkway. This service would be operated by the volunteers of the FVHRS and would operate only on weekends every 30 minutes (between Cloverdale and Sullivan Stations) in 2008, and every 90 minutes (between Cloverdale and Scott Road Stations) in 2009, between the hours of 9.00 a.m. and 5.00 p.m. The one way trip on the full length of the corridor between the Cloverdale Station and Scott Road Station would take about 36 minutes, and would include stops for a minute at each station, with trains operating at 25 mph/40 km per hr. The intention would be for these trains to be powered by a hydrogen-fuel cell engine and for this passenger rail service to be part of BC Hydrogen Highway, an integral part of the environmental objectives of the 2010 Winter Olympics.

Phase Two

Phase Two would involve introducing, in late 2009, a more extensive undertaking of operating a weekday, peak period and upgraded Community Rail passenger service between the Cloverdale Station and Scott Road Station, with the Scott Road Community Rail Station being linked to the Scott Road SkyTrain Station by a short rail spur line from the Community Rail line. The planning and designing for this service would be undertaken concurrently with Phase One above. This service would be built and operated in the cost-efficient model and strategy of the Community Rail service being re-invented in Great Britain and not in the standard being proposed for the planned \$1.1 billion dollar cost Evergreen LRT line for the Northeast Sector in Greater Vancouver.

This Surrey Community Rail service would be operated by a hired railway contractor such as the Southern Railway Company of BC (SRY), Canadian National Railway (CNR) or the Canadian Pacific Railway (CPR). The service would be operated every 20 minutes in weekday peak periods (5:30 am to 8:30 am and 3:30 pm to 6:30 pm-Note; Note: no weekend service initially), stopping 30 seconds at the 7 stations (includes 7th station which is optional station at 128th Street and 82nd Avenue) and use modern accessible LRT-like vehicles-the Parry People Mover- PPM 80 or PPM 100, made in Great Britain, and powered by hydrogen fuel cell engines. Alternatively, this service could use the modern, accessible and more expensive light rail transit vehicles used in the Ottawa LRT service-the Talent cars, only being powered by hydrogen fuel cell engines instead of diesel engines. A one-way trip time would be approximately 28 minutes, with trains operating at 30 mph/48 km per hour. This same trip today by transit takes between 50 to 55 minutes.

The Community Rail line would have limited sections of double tracking (including double tracking in the station areas for providing accessible service) and at key sidings, and a communications and signal

system installed to enable the trains to operate safely during peak periods on a single track. It is assumed that arrangements would be negotiated with the freight service operator-SRY on this line, in order to have time and physical separations allowed for the operation of this peak period Community Rail passenger service. Southern Railway Company currently operates two return freight trips daily on the interurban line between its New Westminster yards and Abbotsford. This project would be a demonstration project as part of the 2010 Olympics BC Hydrogen Highway project, which is operating between Surrey, UBC, the City of Vancouver and the Resort Village of Whistler.

With these tight timelines noted above for the implementation of a peak period Scott Road to Cloverdale service, an alternative would be to operate a more limited demonstration project for the 2010 Olympics with hydrogen fuel cell and modern LRT- like vehicles operating on a single track between the Newton and Cloverdale Stations via the Sullivan Station. The one way time for this trip, with 30 second stops at each station, would be about 16 minutes.

This City of Surrey Community Rail service would provide reliable and timely connections between the many businesses, residences and educational institutions in the vicinity and catchment areas of the stations. Appropriate approvals would be required from regional and provincial officials to operate this modern passenger rail service on a single track line, using an existing freight train line, and safety management systems and other requirements completed.

In undertaking this review, the following areas were examined:

- Some issues involved in obtaining and negotiating rights, and getting the appropriate government approvals to operate a passenger rail service along the interurban rail corridor.
- A brief review of the bus connections today between the proposed Community Rail stations.
- An explanation of the Community Rail Model and Strategy and how it works in Great Britain.
- Potential station locations on this interurban rail service and the land use, population and employment in the station catchment areas.
- The existing and future accessibility to the passenger rail service.
- Traffic and safety impacts of major at-grade road crossings of this interurban line, and how frequent road/passenger rail crossings are handled in Calgary with its LRT system.
- The potential vehicles on this interurban passenger service, both initially and in the future, and linkages to BC Hydrogen Highway project as part of the 2010 Winter Olympics.
- The range of potential capital and operating costs for operating a Tourism/Heritage Rail passenger rail service and a peak period Community Rail passenger rail service.
- Other general costs and benefits of this service.
- Conclusions of this work and recommendations for future directions.

1.1 Conclusions

- i. The Cloverdale to Scott Road rail corridor has a significant existing and forecast population and employment base in its catchment area. This corridor links key City of Surrey Town Centres- Cloverdale, Newton and viable and growing residential, educational and commercial/business community areas- Kennedy, Sullivan and others, which are not well linked today by timely, direct and reliable bus services.
- ii. There are no insurmountable safety or traffic issues with the introduction of passenger train service along the Cloverdale to Scott Road Community Rail corridor on the existing SRY line. Signing needs to be consistent along the corridor for motorists, and the frequent peak period passenger train operations, for example every 20 minutes will require coordination with nearby traffic signals. In

addition, it has been assumed in the costing of the service scenarios for this Community Rail project that at all of the 21 existing road/rail crossings, where there are no gates, bells and signage, improvements will be made to these crossings according to the Transport Canada guidelines, and the operation of the Community Rail service will include a signal and communications system along its full length to provide safe operations.

- iii. It is likely that the development of the Cloverdale to Scott Road Community Rail corridor for peak period rail service would draw potential ridership away from a possible King George Highway-104 Avenue Bus Rapid Transit investment. Therefore, it is important that EMME2 modelling be completed, at the earliest possible time, to determine the likely range of ridership and potential fare revenue estimates for the Community Rail project, and its impacts on other potential transit investments. This work will assist in preparing a detailed and comprehensive project plan and business case for the development and implementation of the Community Rail project in Surrey.
- iv. The development and implementation of a Community Rail passenger service in the Cloverdale to Scott Road corridor, using accessible and modern LRT-like vehicles, powered by hydrogen fuel cell engines, would be a valuable addition to the BC Hydrogen Highway. This service would provide a legacy project as part of the 2010 Olympic and Paralympics Winter Games and enable new community and private sector partnerships to be forged.
- v. The success of projects of this nature are dependent upon there being strong City of Surrey, regional (TransLink) and provincial/federal political financial support. As well, these need to be City of Surrey staff champions who will maintain a strong driving force and enthusiasm during the entire project including its planning, design, implementation and follow-up stages.
- vi. There may be a strong opportunity to draw provincial and federal funding for this project from its designation as part of BC Hydrogen Highway, and as well from BC Hydro's subsidiary-PowerTech located along the Community Rail corridor, and from other private sector partners (e.g. fuel cell makers and LRT vehicle manufactures) who are willing to demonstrate fuel cell engines in sustainable transportation modes for the 2010 Olympics.
- vii. Phase One (part one) involves operating the tourism/heritage train service in the summer months, on weekends, between Cloverdale and Sullivan Stations This service is projected to have a total capital high level cost estimate of approximately \$3.0 million and an operating cost of \$0.2 million. Part two of Phase One – operating the heritage/tourism service between Cloverdale and Scott Road Stations, is projected to have an additional high level capital cost estimate of \$6.0 million and an annual operating cost of \$0.3 million, for a total capital cost for Phase One of approximately \$9.0 million This service scenario was proposed by the FVRHS . Due to time limitations before the Olympics and the need to focus on the development and implementation of a viable demonstration for 2010 Olympics, it is not recommended that this service scenario-Phase One using the heritage rail cars (parts one and two) be developed at all.
- viii. Phase Two involves operating an accessible, modern Community Rail service every 20 minutes during peak weekday periods between the Cloverdale and Scott Road Stations, with a connection to the Scott Road SkyTrain Station on a single track with sidings, with some limited double track sections in the station areas in order to provide accessible service, and a signal and communications system for the corridor. The high order of magnitude cost estimate for this service is projected to have a total capital cost range of approximately \$80.0 million (i.e. using British Parry People Mover vehicles) to \$110.0 million (i.e. using Talent LRT vehicles) and an annual operating cost of approximately \$6.0 million. This is on top of the \$9.0 million capital cost sunk for Phase One, noted above bringing the total capital cost for Phase Two range to \$90.0 to \$120.0 million range. The capital costs include the following components: right-of-way and grade crossing improvements; passenger stations; adding vehicle storage and maintenance facilities and track access to the maintenance/storage facility at Sullivan Station; modifying some industrial sidings; double tracking the station areas to ensure physical separation of right and passenger services; providing adjacent

station parking and pedestrian access improvements; providing new LRT- like vehicles; installing fare revenue collection equipment; and implementing a train communication and signal system to ensure safety of the system. The costs do not include the following cost categories: property costs; utilities relocation; double tracking along the entire corridor and its associated costs; contingencies; engineering and design costs; project management costs during planning and construction; consulting, legal and public consultation fees; environmental impact studies; permits; interest on debt obligations; and payments that might be made to the Southern Railway Company as a business compensation cost.

- ix. This study assumes that the Surrey Community Rail service, which will not cross provincial boundaries, will be able to operate on a single track with the SRY freight operations, as there will be a temporal (time) and physical separation of the passenger rail and freight operations negotiated with the SRY, and that upgrades to the current communications and signalling systems will be put in place along the corridor to ensure there is no overlap of the services. Both LRT and freight operations operate in Baltimore and San Diego, where the LRT system operates during the day and freight services operate at night using a common single track corridor. Joint freight and passenger train service on shared trackage occurs as well in Europe (e.g. Karlsruhe, Germany) and in many areas throughout Japan.
- x. The Community Rail network will provide the following benefits and opportunities: provide reliable rail linkages between growing communities along the line well into the future as roadways in the City of Surrey become significantly more congested and these are few new road network options; attract a new market to transit among users who are adverse to using the bus but will use trains; provide potential development opportunities in the vicinity of the stations; and enable partnerships to be developed that can be used with the private sector to develop and fund a demonstration Community Rail project for the City of Surrey.
- xi. The timelines and staging for the project's peak period community and regional transit service are very tight, and therefore will require an early and dedicated commitment of funding and project management resources commitment for the City of Surrey, TransLink and provincial and federal representatives to realize the timelines laid out in this report.
- xii. With these tight timelines noted above for the implementation of a peak period Scott Road to Cloverdale Community Rail service, an alternative would be to operate a more limited demonstration project with hydrogen fuel cell and modern LRT- like vehicles operating on a single track between the 9.5 kilometre Newton Station to Cloverdale Station section via the Sullivan Station and be in operation for the 2010 Olympics.

2.0 Introduction

The consultant has been asked by the City of Surrey to complete a high level analysis and review of the cost, benefits and some of the issues pertaining to the Fraser Valley Heritage Railway Society's (FVHRS) recent proposal presented to the Surrey City Council to re-introduce passenger rail service to the City on the portion of the old interurban line, between Cloverdale (176th Street and Highway 10) and Scott Road (Scott Road near Scott Road SkyTrain Station) (See Figure1). Passenger rail service used to be offered on this line, in the 1910 to 1950 period, between Vancouver and Chilliwack.

The FVHRS South of Fraser Community Rail proposal consists of re-introducing passenger rail service in two phases:

Phase One

Phase One would have a weekend historic/tourism passenger service, using original high level original interurban cars, offered first between the Cloverdale Station and Sullivan Station (64th Avenue and 152nd Street) in 2008. In the summer of 2009 this service would be extended through to Scott Road Station with six stations in total. This service would be operated by the volunteers of the FVHRS during the weekends in the summer months and likely be run every 30 minutes (between Cloverdale and Sullivan Stations) in 2008, and every 90 minutes (between Cloverdale and Scott Road Stations) in 2009, in between the hours of 9:00 am and 5:00 pm on Saturdays and Sundays. The one way trip would take about 36 minutes including stops for a minute at each station, with trains operating at 25 mph/44 km per hr. The intention would be for these trains to be powered by a hydrogen-fuel cell engine and for this passenger rail service to be part of BC Hydrogen Highway, an integral part of the environmental objectives of the 2010 Winter Olympics. If the hydrogen fuel cell engines are not ready for the heritage/tourism train service, alternatively these trains could be powered by a diesel-electric generator located in the baggage car, as a back-up plan.

Phase Two

Phase Two would involve introducing, in late 2009, a more extensive undertaking of operating a peak period and significantly upgraded Community Rail passenger service between the Cloverdale Station and Scott Road Station, with the Scott Road Community Rail Station being linked to the Scott Road SkyTrain Station by either a 500-600 metre covered walkway or preferably a short rail spur line from the Community Rail line. The planning and designing for this service would need to be undertaken concurrently with Phase One above, due to the tight timelines for this work. This service would be operated by a hired railway contractor. The service would be operated frequently –every 20 minutes in weekday peak periods (5:30 am to 8:30 am and 3:30 pm to 6:30 pm Note: No service initially on weekends), stop at the 6 stations (another 7th station is optional) and use modern LRT accessible vehicles, powered by hydrogen fuel cell engines. A one-way trip time would be approximately 28 minutes, with trains operating at 30 mph/48 km per hr, and with 30 second stops at each station.

The line would have some limited sections of double tracking in the station areas, sidings at key locations and a communications and signal system installed to enable the trains to operate on this frequency. It is assumed that arrangements would be negotiated with the freight service operator on this line (i.e. Southern Railway Company of BC) to have both physical and time separations from the peak period passenger service. This Community Rail passenger service would provide reliable and timely connections between the many businesses, residences and educational institutions in the vicinity and catchment areas of the stations.

In subsequent phases the Community Rail service could be extended to provide passenger service to the Langleys (both the City and Township), the City of Abbotsford (including the soon to be expanded airport) and the City of Chilliwack. Extension of the Community Rail to these communities to the east of Cloverdale Station will require, however, a resolution of the issues of the growing demand for the trackage to the east, between the Pratt and Livingston junctions on the CP/CN /SRY Page Subdivision through the Langleys, being used extensively today for the movement of long coal and other freight trains transporting goods from Vancouver ports to other parts of Canada and United States. The heavy movement of freight along this portion of the line, which is projected to continue to significantly increase, would prohibit a passenger service being operating on the same portion and likely calls for the freight line movements being re-located. Re-location of the existing mainline CN/CP/SRY rail freight line would not be an easy issue to resolve.

This high level review of the re-introduction of passenger rail service in the interurban rail corridor, termed the South of Fraser Community Rail Proposal, will examine the following factors and issues in the order shown below:

- Some issues involved in obtaining and negotiating rights, and getting the appropriate government approvals to operate a passenger rail service along the interurban rail corridor.
- A brief review of the bus connections today between the proposed Community Rail stations.
- An explanation of the Community Rail Model and Strategy and how it works in Great Britain.
- Potential station locations on this interurban rail service and the land use, population and employment in the station catchment areas.
- The existing and future accessibility to the passenger rail service.
- Traffic and safety impacts of major at-grade road crossings of this interurban line, and how frequent road/passenger rail crossings are handled in Calgary with its LRT system.
- The potential vehicles on this interurban passenger service, both initially and in the future, and linkages to BC Hydrogen Highway project as part of the 2010 Winter Olympics.
- The range of potential capital and operating costs for operating a Tourism/Heritage Rail passenger rail service and a Community Rail passenger rail service.
- Other general costs and benefits of this service.
- Conclusions of this work and recommendations for future directions.

To assist in undertaking this work, UMA has liaised and met and/or had discussions with appropriate officials and representatives of TransLink, the Southern Rail Company, the FVHRS and the City of Calgary. As well, several site visits were conducted along the length of the interurban rail corridor and at potential station sites to examine potential stations sites, their access and adjacent land use, and traffic and safety issues near rail crossings or roads. UMA was assisted by the Traffic Safety Institute of Canada (Mavis Johnson) in examining the safety issues along the rail corridor and by Mr. Don Henderson, a traffic engineering consultant, in examining the traffic issues near rail/road crossings. Pictures of the rail corridor and station sites and some rail/road crossings are included in Appendix C. A complete set of pictures of the railroad crossings are available.

3.0 Background

The FVHRS and other stakeholders in the City of Surrey, including representatives from the City of Surrey Council and staff, have been actively working to take steps in the last 6-7 years to restore passenger train service to the 11.4 miles (18.4 km) portion of the interurban rail corridor located in the City of Surrey between the New Westminster Rail Bridge at Brownsville and near the Cloverdale Town Centre at Highway 10 and 176th Street. A portion of the rail line corridor, between 90th and 98th Avenues west of Scott Road, is located within the Corporation of Delta. The FVHRS was incorporated as a not-for-profit society in 2001.

This single rail track line actually extends to the City of Chilliwack. The right-of-way generally varies from 50 to 100 feet wide between BC Hydro poles. However, in some areas along the corridor the BC Hydro poles are only 10 feet from the centre line of the track. The real estate under the tracks is owned by BC Hydro except for where the tracks transverse roads which existed prior to 1906. The City of Surrey has control of these rail/road crossings within city boundaries, as the rights of the rail line were set out in a contract between the Vancouver Power Company and the City of Surrey (in Appendix A). Tracks and other improvements are owned by the Southern Rail Company of BC except for the Page Subdivision rail east of Pratt Junction in the City which is jointly controlled by the CPR, CNR and the SRY.

This right-of-way is not sufficient in width in many parts of the corridor to provide tracks in each direction-double tracking of the line. In many areas double tracking would require the movement / relocation of the existing tracks as they are now located in the centre of the right-of-way, as well as the relocation of the

BC Hydro poles, the possible re-location of some of the sidings now serving adjacent industries/businesses, and the purchase of additional property.

A community rail service, linking the City of Vancouver and Chilliwack and all of the business and residential areas in between, actively operated on this line between 1910 and 1950. The population has significantly increased along the line corridor as it was 18,000 in 1910, 78,000 in 1951 and 850,000 today.

The FVHRS had a dedicated program, over the last 6-7 years, to educate the public about this valuable community transportation resource, and has undertaken other activities to assist in the restoration of this rail line for passenger service, including fund raising. A few years ago the FVHRS built a two-car barn on land leased from the City of Surrey in Sullivan at a location near 152nd Street and 64th Avenue. Also located here is a 600 foot oval Speeder rail track built in 2004/2005 and a replica Sullivan Station building which can be relocated to its original location to along the rail line. The FVHRS has a BCER vehicle which is currently being restored, and is attempting to acquire two vehicles—a BCER 1304 car and a 1700 series baggage car with a standard electric diesel generator to initially power this baggage car and one interurban vehicle. The FVHRS prepared a brief business plan for 2006/2007 which calls for the track and corridor to be upgraded from the Cloverdale Station to Scott Road Station in stages between 2006 and 2010 and to operate a two car tourism/heritage train service during summer weekends from Cloverdale to Scott Road Station by 2009/2010.

SRY now operates up to four freight trains daily (two in each direction) along this line which services business and industries in Surrey, Langley and Abbotsford. One train usually leaves from their New Westminster yard about 4:00 pm or 5:00 pm going eastward and returns westward to New Westminster between 10:00 pm and 12:00 am. Another train leaves the New Westminster yard between midnight and 1:00 am and returns to their New Westminster yard between 6:00 am and 7:00 am depending upon the level of coal/freight traffic moving on the main freight rail service line out of the region.

SRY has a Master Agreement with BC Hydro to operate freight train service on the line between its New Westminster yard and the businesses and industries that it serves in the City of Surrey, between the Cloverdale and Scott Road Station and further east in Langley and Abbotsford. There are sidings located along the Southern Rail line at which serves various industries and businesses, for example going into lumber yards, etc.

Today there are heritage/tourism trains operating in the following areas in North America: New Orleans, Memphis, Philadelphia, Portland, San Francisco, Tampa, Charlotte, Dallas, Galveston, Kenosha, Little Rock, San Jose, Seattle, San Pedro, Lowell, Tacoma, Tucson Vancouver, Astoria, Denver, Edmonton, El Reno, Fort Collins, Fort Smith, Issaquah, Nelson and Whitehorse.

4.0 Issues involved in operating a passenger rail service

To operate a passenger service within the interurban rail corridor located in the City of Surrey the track must be upgraded from the existing freight standard to Class One passenger standard to meet both the Railway Act and Southern Railway of BC standards. This would require the following:

- Improvements to the track and related costs for the levelling of track, surfacing and re-ballasting and replacement of defective ties to enable a passenger service to operate along this corridor with modern LRT-like vehicles.

- Double tracking within the station areas to provide separate tracks for the wider freight trains and narrower Community Rail trains and to ensure the Community Rail service is accessible for handicapped/disabled persons.
- The provision of a signalling and communication system along the corridor, and sidings at key locations to enable the operation of 20 minute peak period Community Rail service along a single track, with a physical and temporal separation of the SRY freight service.
- The provision of protection at all road/rail grade crossings with a combination of full gates, lights, bells and improved and improved and consistent signage depending upon the level of traffic and collision history at the crossing.
- The provision of fencing along key portions of the line for safety and protection with a higher frequency passenger service.
- Approval of the restrictions/conditions under which the Community Rail passenger service is going to be able to operate on a single line track corridor with the SRY freight service.
- Meeting all other provincial and federal passenger rail transport rules and regulations, and completing any requirement environmental impact assessments.

This work assumes that the Surrey Community Rail service will be able to operate on a single track with the SRC freight operations, as there will be a temporal (time) separation of the passenger rail and freight operations negotiated with the SRC, and that the current communications and signalling systems will be upgraded, where required, along the corridor to ensure there is no overlap of the services. Both LRT and freight operations operate in Baltimore and San Diego, where the LRT system operates during the day and freight services operate at night using a common single track corridor. Joint freight and passenger train service on shared trackage occurs as well in Europe (e.g. Karlsruhe, Germany) and in Japan.

In addition, accessible station platforms and shelters would need to be provided at the station locations and good access to the stations would need to be created with pedestrian, parking and cycling facilities and improved bus connections. In addition, the vehicles for the service will need to be provided. These items and their range of high level cost estimates are discussed in more detail in Section 15 of this report.

BC Hydro, with a letter dated March 29, 2006 to the FVHRS (see attached in Appendix A) has agreed in principle to the FVHRS operating a heritage/tourism passenger rail service between Cloverdale and Brownsville Station using the BC Hydro right-of-way as long as this change does not require an overhead catenary source of power and subject to meeting the following conditions and providing:

- Written consent of Southern Railway of BC and Terasen Gas with respect to their installations and interests;
- Consent from all regulatory and governing bodies;
- Detailed drawings of the location and design of platforms and any other installations associated with stations, such as parking on BC Hydro lands;
- A detailed plan for the operation of service included frequency, crowd and passenger control, staff and customer parking and waiting areas on BC Hydro lands;
- The right of access for BC Hydro is for its maintenance and construction activities in the rail corridor and even stoppage of service to complete these activities; and
- Indemnification and the release of BC Hydro from all costs and liabilities and carrying of adequate insurance which protects BC Hydro.

The Greater Vancouver Transportation Authority (TransLink), being the regional provider, planning and funding agency of transit service in the Greater Vancouver Regional District, has the right to operate passenger transit service with the Region, including in the City of Surrey and the Corporation of Delta.

Therefore, operation of a daily peak period Community Rail service during the whole year using modern vehicles (i.e. differentiated from a Tourism/Heritage service) between Cloverdale Station and Scott Road Station by a TransLink subsidiary (e.g. West Coast Express) or another provider would require TransLink's approval.

At this very early stage of the development of a passenger service in the interurban corridor in the City of Surrey, more negotiations and discussions are still required with BC Hydro, the Southern Rail Company, TransLink, the Corporation of Delta and the City of Surrey, and other community stakeholders in order to be able to work out all the details of phasing the re-introduction of passenger rail service in the corridor in the following potential stages:

- Operating a weekend-only, summer heritage/tourism passenger rail service, for example from Cloverdale Station to Sullivan Station in 2008;
- Operating a more extensive heritage/tourism passenger rail service the entire distance (11.4 miles/18.4 km) from Cloverdale Station, just east of 176th Street in Cloverdale to a Scott Road Community Rail Station, just east of Scott Road in the summer of 2009, with a covered walkway connection to the Scott Road SkyTrain Station; and
- Ultimately, in late 2009, operating a peak period (e.g. 5:30 am to 8:30 am and 3:30 pm to 6:30 pm) and high quality Community Rail service on weekdays between the Cloverdale Station and Scott Road SkyTrain Station using modern and accessible LRT-like vehicles. From a station located just east of Scott Road, customers could then walk along a covered 500-600 metre walkway which could be built along City-owned property and connect with the Scott Road SkyTrain Station or alternatively and preferably travel along a spur rail line which could be built to connect the two services along an existing road alignment in the City of Surrey (see Figure 2).

The timelines and staging for the project's progression from a heritage/tourism summer train service to a viable peak period community and regional transit service are very tight, and therefore will require an early and dedicated commitment of funding and project management resources commitment for the City of Surrey, TransLink and provincial and federal representatives to realize the timelines laid out in this report. With these tight timelines, an alternative to operating a full service with new modern vehicles in late 2009 from the Cloverdale to Scott Road Station, would be to operate a more limited demonstration project with hydrogen fuel cell and modern LRT-like vehicles operating between the 9.5 kilometre distance between the Newton and Cloverdale Stations via the Sullivan Station. This trip would take about 16 minutes.

Paved parking could potentially be provided adjacent to most of the stations (see Figures 3, 4, 5, 6, 7, 8 and 9):

- At the Cloverdale Station (176th Street and Highway 10);
- At the Sullivan Station (64th Avenue and 152nd Street);
- At the Newton Station (on Hall Road just west of King George Highway about 70th Avenue);
- At the Kennedy Station (on Nordel Way just east of Scott Road);
- At an optional Station at 82nd Avenue and 128th Street; and
- At the Punjabi Market Stations (just west of Scott Road between 94th and 95th Avenues).

As well, some shared parking arrangements may be able to be negotiated with other nearby land users at the Kennedy Station and nearby shopping centres. It is assumed that patrons of the Community Rail Scott Road Station would use the park-n-ride facilities at the Scott Road SkyTrain Station if there were good connections between the Community Rail and SkyTrain stations.

Good pedestrian access linkages should also be provided to each of the stations from adjacent land uses via sidewalks. In addition, cycling storage facilities, involving bike lockers and bike racks, should be provided at the stations. As well, modifications could be made to existing bus services to improve the connections to these stations both in terms of frequency of service and the directness of connections.

The Southern Rail Company of BC or another rail operator such as Canadian Pacific which operates the West Coast Express service could be contracted to operate the Community Rail passenger service. As of July 1, 2006, for example, Southern Railway of BC and the Island Corridor Foundation (ICF) reached an agreement to operate both freight and passenger service on the ICF owned line between Victoria and Courtenay on Vancouver Island. The ICF is a not-for profit organization incorporated in 2004 as partnership between local government and First Nations along the Island Railway corridor.

Approval of the use of the interurban line for formal peak period commuter service, operating from the Cloverdale to Scott Road Stations would require, according to federal regulations, the preparation of a Safety Management System (SMS) to ensure the safety of employees, contractors, the public and the environment. Municipal and regional staff would need to work with Transport Canada, Human Resources Development Canada, and the Southern Rail Company of BC for this input and to review the SMS.

5.0 Improvements to transit service in City of Surrey and perspective on community rail proposal

As of November, 2006 TransLink is working with the City of Surrey and other municipalities located in the South of the Fraser-Langley City and Township, Corporation of Delta and the City of White Rock in undertaking the review of transit service which is currently operating in these municipalities as part of preparing an Area Transit Plan (ATP). The objective of the ATP is to develop a vision for transit service in this area over the next 5-25 years, and then to develop a detailed plan for how this service should be improved in the next five years to realize part of that vision. As well, the ATP wants to determine how the longer term aspects of the plan could be brought on-stream and integrated with earlier improvements that are implemented. The objective is to have an ATP developed by the fall of 2007 which can then be implemented in stages through TransLink's Annual, Three Year and Strategic Transportation Plans.

In UMA's discussions with TransLink staff concerning the South of Fraser Area Transit Plan and transit service within the City of Surrey, it was indicated by TransLink staff that there is a need to make significant improvements in the transit service from its situation today. It is recognized that there is a need to improve linkages along the key travel desire corridors, in terms of frequency of service and type of service-bus rapid transit or perhaps even rail on specific corridors (e.g. LRT rail along King George Highway from King George SkyTrain Station to Newton Town Centre), and service coverage (i.e. to areas not with transit service today). This substantial improvement in service is required to get the service to a level which can begin to appeal to choice travellers that transit is a real option and to respond to the significant growth expected to occur in the City of Surrey in the next 25 years.

There is a current commitment in TransLink's Ten Year Outlook to build by 2013 a high quality bus rapid transit system between Guildford Town Centre, Surrey City Centre SkyTrain Station, Newton Town Center and White Rock/South Surrey Town Centre. However, at the current time TransLink does not have the funding to build its current proposed Evergreen LRT Line in the Northeast Sector (i.e. a shortfall of over \$500 million going forward for the capital funding of this line). As well, TransLink has indicated publicly that it requires a significant amount of additional funding annually (i.e. over \$200 million plus) to

meet its Strategic Transportation Plan annual operating funding needs, which would likely include the capital debt and operating funding required for the above-noted bus rapid transit system in the City of Surrey.

With these other transit service needs in the City of Surrey and other requirements in the region, and its capital, operating and funding constraints, TransLink may not be in a position to financially support the development, implementation and operation of a heritage/tourism or Community Rail type passenger train service as envisioned in the Community Rail proposal from Cloverdale to Scott Road Station. This would mean that the City of Surrey, perhaps in combination with funding from other partners, such as the federal government and provincial government and perhaps private partners involved with the fuel cell engine initiative, may have to bear a major portion of the capital and operating costs for the Community Rail project. Alternatively, the Community Rail project for the 2010 Olympics could be scaled back to be built and operate along existing single track between Newton Station and Cloverdale Station via a Sullivan Station.

TransLink has also indicated that despite the Community Rail corridor being a valuable longer term transportation asset for the City of Surrey and the Greater Vancouver Region, they feel that the corridor's southwest to northwest orientation and the destinations/communities the rail corridor links, do not correspond to the major travel corridors or areas that City of Surrey residents want improved. Their evidence quoted for this statement are early results from market research survey and focus groups conducted as part of the ATP visioning process, which are not yet available for distribution, and the existing dominate travel patterns within the City of Surrey today. Furthermore TransLink feels that funds placed in an investment in the Cloverdale to Scott Road passenger rail corridor service would divert likely funding from other higher priority transit investments in the City of Surrey such as the King George Highway/104th Ave Bus Rapid Transit service. It must be noted that the existing transit travel patterns today are heavily influenced by the level of bus service provided in a north-south direction versus east-west.

TransLink has expressed a similar policy position to the City of Vancouver in the City of Vancouver's interest in developing and operating a city streetcar network. TransLink has indicated to the City of Vancouver that they feel a streetcar network would divert ridership and funding away from other more important service improvements areas in the City of Vancouver, and TransLink has indicated to the city that if they wanted to operate this streetcar network that they would have to fund both its capital and operating costs.

6.0 City of Surrey's vision for transit service and relationship of community rail proposal to vision

The City of Surrey's vision for transit service, as expressed in its March 13, 2006 letter to TransLink (see Appendix A), calls for the new South of Fraser Area Transit Plan to create a significantly higher level of transit service that may be strictly warranted by future projected population and employment growth and densification in the city. This is being asked for in order to dramatically increase the transit modal share in the city and to make the service really attractive for "choice" travellers. This means that significant improvements in transit service would have to be made in advance of and concurrently with the employment and population growth and increased densification occurring. The area south of the Fraser served by the interurban rail corridor is expected to accommodate 40% of the region's growth in the next

twenty years. The key transit improvements required in the City's vision for transit improvements in the City of Surrey include:

- Provide an extensive Bus Rapid Transit Network. This network would include the introduction of very high quality and frequency bus rapid transit network in the City of Surrey including services along Scott Road, between 72nd and 104th Avenue, along 104th Avenue between Scott Road and Guildford Town Centre, along the King George Highway between South Surrey Town Centre, Newton Town Centre and Surrey City Centre and along the Fraser Highway between Langley Centre, 200th Street and the Surrey City Centre. Some of this network might initially be built as a rail line-Light Rail Transit System, similar to that currently being planned for the Northeast Sector of Greater Vancouver- the Evergreen Line, which does not have the projected employment and population growth of the level likely to occur along many of these corridors in the City of Surrey. (See Figure 11).
- Provide a significant improvement in the directness, frequency and reliability of transit service connections between the City of Surrey Town Centres-Newton, Cloverdale, South Surrey, Surrey City Centre and Guildford.
- Provide a much more frequent and reliable transit service grid on all major north-south and east-west arterial roadways within all areas of the City of Surrey during all periods of the day so many more services are operating ten minutes or better in the peak periods, 15-20 minutes in the midday and early evenings and on weekends, and never more that 20-30 minutes in the later evening periods. Use transit vehicles which are much more comfortable, accessible and have a greater availability of seats.

The availability of a dedicated and underutilized interurban rail corridor in the City of Surrey, which links to key and growing communities and destinations within the city and as well to the regional transportation network at the Scott Road SkyTrain Station and ultimately Langley, Abbotsford and Chilliwack, is a valuable transportation asset for the City and the Greater Vancouver Region. As well, the fact that this rail corridor is in relatively good condition and can be upgraded from operating freight service today to operating a future passenger rail service at a modest cost, compared to other proposed rail investments in the region (i.e. Evergreen LRT Line-\$1.1 billion capital cost), further increases the value of this corridor to both the city and regional transportation networks. Other cities around the world have endeavoured to protect such rail corridors and develop and use them for viable transportation options as they grow and road congestion increases.

The Community Rail network will provide the other following benefits and opportunities:

- Provide reliable rail linkages between growing communities along the line well into the future as roadways in the City of Surrey become significantly more congested and these are few new road network options;
- Attract a new market to transit among users who are adverse to using the bus but will use trains, if it is for the majority of their trip;
- Provide potential development opportunities in the vicinity of the stations-transit oriented development can be attracted to rail stations, but not BRT stations due to the lack of permanence of the BRT stations;
- Enable partnerships to be developed that can be used with the private sector to develop and fund a demonstration Community Rail project for the City of Surrey;
- Increase the use of a very underutilized portion of rail track age in the region, as SRY only operates two return daily trips in the City of Surrey.

The implementation of a bus rapid transit corridor between South Surrey/White Rock, Newton Town Centre, Surrey City Centre and Guildford Town Centre, proposed for full operation by TransLink in 2013, combined with other transit service improvements implemented as a result of the South of Fraser Area

Transit Plan, may limit in the short term the ridership potential of the Community Rail Proposal. However, the capital and operating funds have not yet been committed by TransLink for the proposed \$120 million capital cost (i.e. 1998 estimate) King George Highway (KGH)-104 Avenue Bus Rapid Transit (BRT) service, or for the full required funding for the Northeast Sector's proposed Evergreen LRT Line. Therefore, there is no guarantee that the KGH-104 Ave BRT service will be in place by 2013. As well, it is very likely considering the rapid cost escalation of other transit projects lately that the KGH-104 Avenue BRT line capital cost will be well above the \$120 million estimate by 2013.

It is forecast that the population and employment will increase significantly in the City of Surrey in the next 25-30 years, along with densification, as Surrey is one of the dominate areas in the region still available for future development in the region. With these conditions, the traffic congestion, travel times and reliability of moving within Surrey, both north to south and east to west for arterial roadways, both for buses and automobiles, will considerable worsen. The development and implementation of the Community Rail corridor service will provide the following:

- A viable option for enabling reliable and timely connections to be made within the City of Surrey and linking its established communities, as well as providing excellent linkages to the regional transportation network;
- A likely less costly transportation option, when compared to light rail transit system options, for other Surrey corridors; where there is not existing trackage and right of way; and
- Not be reliant as BRT or light rail transit options on reducing road capacity in order to maintain any reasonable speed, travel times and reliability.

The other variables that must be considered when making the trade offs and comparisons between rail and BRT or bus improvements in the City of Surrey are the following:

- Transit market research has found that rail projects are much more successful at capturing the "choice rider", who has an auto available for trips, in terms of encouraging more transit trips;
- The operating costs per passenger are generally lower for rail than bus, and bus operating costs per passenger have been increasing rapidly in recent years with the rising costs of energy and operator costs; and
- Rail travel times and reliability are generally better than bus, even Bus Rapid Transit projects, which can incorporate a lot of transit priority measures.

As shown in Table 1, which describes the current transit linkages between the propped Community Rail stations, many of the transit connections between these stations can be described as indirect and inconvenient. Many connections require customers to take at least one bus transfer and endure the wait associated with these transfers often with lower frequency bus service to travel between the proposed stations on the community rail line.

As well through the findings of the South of the Fraser Area Transit plan work, it has been observed that many of the current bus services today operating in the City of Surrey in the peak, midday and evening periods have unattractive service, especially in terms of the frequency of service. Only 11 of the 32 bus services serving the City of Surrey have frequencies which are 15 minutes or better in peak periods. As well, many of bus services in the City of Surrey are only operating in the midday and evening periods with 30 to 60 minute frequencies.

7.0 Community rail model and strategy

The FVHRS wants to pursue the development of passenger service on the existing interurban line in the City of Surrey using a Community Rail Model and Strategy which is new to North America. This model and strategy is currently being actively pursued in Great Britain in many communities where there are under-utilized freight and passenger rail lines in good condition which connect through urban areas. In these corridors, there is a desire to better use these existing rail lines in a more efficient and effective manner, including the provision of passenger service using a construction and cost delivery method which is more cost-efficient for providing passenger train service than modern LRT systems such as the existing SkyTrain and proposed Evergreen LRT lines.

Development and implementation of Community Rail systems in Great Britain also entailed large community consultation and private sector partnerships. This Community Rail Model and Strategy in Great Britain involves non-profit and community groups working together in close partnership arrangements with the railway companies who own or operate current services on these lines, local municipalities, other community groups and stakeholders and businesses to increase the value of the existing railway lines to the communities they serve and to put these lines on a more sustainable footing for the future using the following means:

Increasing community involvement

Allowing the community to improve the railway through locally funded investment and voluntary effort. This can help with economic regeneration of an area.

Reducing costs and improving efficiency

Ensuring that all work on the upgrading of these railways is done efficiently and to an appropriate standard, avoiding over specification.

Increasing use of railway

Developing and implementing cost-effective means to use the railway for the increased movement of passengers, as part of the community and broader regional transportation networks, through partnership arrangements to upgrade the railway stations and infrastructure, improved marketing, adjusting fares (both up and down), better revenue protection and introducing cost effective service enhancements.

Developing opportunities for achieving significant environmental benefits

Developing and implementing means to use alternative and environmentally friendly fuels and other means to contribute to reducing green house gas emissions.

This same cost-efficient Community Rail Model and Strategy used in Great Britain is being employed as the recommended model for the staged development and implementation of the passenger rail service on the interurban line between Cloverdale and Scott Road Station. This model could ultimately be used to provide an attractive passenger service which will link the communities to the east in the Fraser Village including the Langley City and Township, the Cities of Abbotsford and Chilliwack, and other key regional destinations such as the Abbotsford Airport and Trinity Western University. The passenger rail service through those areas to the east will, however, likely require a regional solution to the use of this trackage for extensive and growing long freight and container train traffic from the Greater Vancouver ports.

8.0 Potential evolution of passenger rail service in the interurban corridor in the City of Surrey

The passenger train service in the interurban rail corridor in the City of Surrey could evolve from no service today to a peak period, modern and fully accessible service between a Cloverdale Station and Scott Road (with connections to the Scott Road SkyTrain Station) with appropriate financial, planning and legal support from the City of Surrey, the Corporation of Delta, Southern Rail, Terasan Gas, TransLink, BC Hydro, the provincial and federal governments and other private sector partners, in the following key stages:

8.1 Passenger Service Phase One - first part

- Acquire and/or prepare the original interurban vehicles BCER1225 and BCER 1304 and 1700 Baggage Car for the service;
- Obtain a designation of the interurban corridor as part of BC Hydrogen Highway;
- Develop the hydrogen fuel cell engine for powering the train service and integrate it into the historic vehicles;
- Have ready a back up diesel-electric generator as a power source for the train;
- Upgrade the rail corridor from Cloverdale Station to the Sullivan Station section in terms of the rail, ballast, resurfacing and road /rail crossings safety equipment and signage for passenger service;
- Make any required adjustments to the required traffic signals for operation of the service;
- Make the necessary upgrades to the rail storage and maintenance facility;
- Prepare a station platform building for the Cloverdale Station and relocate the Sullivan station near the rail line;
- Get written consent of Southern Railway of BC and Terasan Gas with respect to their installations and interests;
- Get consent from all provincial and federal regulatory and governing bodies;
- Start planning and design work for the peak period Community Rail service;
- Prepare detailed drawings of the location and design of platforms and any other installations associated with stations, such as parking ,on BC Hydro lands;
- Develop and implement plans for providing parking, improved pedestrian connections and cycling facilities at the Cloverdale and Sullivan stations;
- Enter into discussions with TransLink as part of the South of Fraser Plan to develop and implement improved bus connections to the Community Rail stations;
- Provide the right of access for BC Hydro for its maintenance and construction activities in the rail corridor and even stoppage of service to complete these activities;
- Start the procurement process for the accessible and modern vehicles for the peak period Community Rail service;
- For the vehicles required for the peak period Community Rail service;
- Conduct a risk assessment of the corridor;
- Obtain liability insurance;

- Indemnify and the release BC Hydro from all costs and liabilities and carry adequate insurance which protects BC Hydro.

Service Operation - Provide a summer weekend historic/tourism passenger service, using original high level interurban cars-BCER 1225 and the baggage car, between the Cloverdale Station and Sullivan Station (64th Avenue and 152nd Street) section of the corridor. This service would be operated by the volunteers of the FVHRS during the 2008 summer months and would operate every 30 minutes (between Cloverdale and Sullivan stations) between the hours of 9:00 am and 5:00 pm. The one-way trip (3.9 miles/6.2 kilometres) would take about 12 minutes, with 60 - 90 second stops at the three stations. The intention would be for these trains to be powered by hydrogen-fuel cell engine and for this to be part of BC Hydrogen Highway, an integral part of the 2010 Winter Olympics. If the hydrogen fuel cell engines area not ready, the trains could be powered by a diesel – electric generator located in a baggage car as a back-up.

8.2 Passenger Service Phase One - second part (Note: Many of these activities would occur concurrently during Stage One)

- Upgrade the rail corridor from Sullivan Station to the Scott Road Station in terms of the rail, ballast, surfacing and road /rail crossings safety equipment and signage for passenger service;
- Make any required adjustments to traffic signals for operation of the service;
- Make the necessary upgrades to the rail storage and maintenance facility;
- Prepare a station platform building for the Newton, Kennedy, Punjabi Market and Scott Road Stations;
- Get written consent of Southern Railway of BC and Terasen Gas with respect to their installations and interests;
- Get consent from all provincial and federal regulatory and governing bodies;
- Prepare detailed drawings of the location and design of platforms and any other installations associated with stations, such as parking on BC Hydro lands;
- Develop and implement plans for providing on site or shared parking and improved pedestrian and cycling facilities at all of the stations;
- Complete detailed planning and design work for Community Rail service;
- Complete and get approval of required environmental assessments;
- Continue with the procurement process for the accessible and modern vehicles for the peak period Community Rail service;
- Provide the right of access for BC Hydro for its maintenance and construction activities in the rail corridor and even stoppage of service to complete these activities;
- Double track key portions of the line or the whole line to permit increased train frequency in Phase 2 and procure a communications and signal system for the Stage 2 train service;
- Obtain liability insurance;
- Conduct a risk assessment of the entire corridor;
- Indemnify and the release BC Hydro from all costs and liabilities and carry adequate insurance which protects BC Hydro;
- Complete the preparation of a safety management system to ensure the safety of employees, contractors, the public and the environment. Municipal and regional staff would need to work with Transport Canada, Human Resources development Canada, and the Southern Rail Company of BC for this input and to review the SMS.

Service Operation - Provide a summer weekend historic/tourism passenger service, using original high level interurban cars, between the Cloverdale Station and Scott Road Station. This service would be operated by the volunteers of the FVHRS during the 2009 summer months and would operate every 90 minutes between the hours of 9:00 am and 5:00 pm. The one way trip would take about 36 minutes including stops for a minute at each station, with trains operating at 25 mph/44 km per hr. The intention would be for these trains to be powered by hydrogen-fuel cell engine and for this to be part of BC Hydrogen Highway, an integral part of the 2010 Winter Olympics. If the hydrogen fuel cell engines area not ready, the trains could be powered by a diesel – electric generator located in a baggage car as a back-up.

For the implementation of a viable Community rail demonstration service for 2010 Olympics, powered by hydrogen fuel cell, it is not recommended that this service scenario-Phase One using the heritage rail cars (parts one and two) be developed. Alternatively, it is recommended that efforts should be focussed on the planning and implementing a peak period service using LRT-like vehicles with powered by hydrogen fuel cell engines, in the complete corridor from Scott Road Station to the Cloverdale Station, or for a portion of this corridor.

8.3 Passenger Service - Phase Two

Service Operation - Secondly, Phase Two would involve introducing, in late 2009, a much more extensive undertaking of operating a weekday peak period upgraded Community Rail passenger service between the Cloverdale Station and Scott Road Station, with the Scott Road Community Rail Station being linked to the Scott Road SkyTrain Station by a 500 - 600 metre covered walkway or preferably a short rail spur line from the Community Rail line. This service would use modern and accessible LRT- like vehicles approved to operate on a freight line. The planning and designing for this service would be undertaken concurrently with Phase One above. This service would be operated by a hired railway contractor such as CPR, CN or SRY.

The service would be operated very frequently – every 20 minutes in weekday peak periods (5:30 am to 8:30 am and 3:30 pm to 6:30 pm) and stop 30 seconds at each of the 6 stations (another 7th station is optional), and use modern accessible vehicles, powered by hydrogen fuel cell engines. A one-way trip time would be approximately 28 minutes, with trains operating at 30 mph/48 km per hr. The line would be only double tracked in station areas with sidings provided at key areas along the entire corridor, and a communications and signal system must be installed to enable the trains to operate on this frequency, and to avoid any conflicts with nightly freight traffic which has a temporal and physical separation from the passenger service. This Community Rail service would provide reliable and timely connections between the many businesses, residences and educational institutions in the vicinity and catchment areas of the stations.

Ultimately this Community Rail service could be provided post 2010 during midday periods and on weekends with additional track and other improvements in the interurban rail corridor. Furthermore, this Community Rail service could be extended in subsequent phases to Langley, Abbotsford and Chilliwack and link the growing population and employment bases in these communities and provide service to many businesses, residences and educational institutions, with a regional resolution to finding another corridor for the movement of freight in the Page Subdivision east of between Cloverdale in the City of Surrey and 232 Street in Langley Township.

8.4 Overall Comment:

The timelines and staging for the project's progression from a heritage/tourism summer train service to a viable peak period community and regional transit service is extremely tight, and therefore will require an

early commitment of funding and project management resources commitment for the City of Surrey, TransLink and provincial and federal representatives to realize the timelines laid out in this report.

9.0 Potential rail stations and land use and employment and population in catchment areas

9.1 Proposed Rail Stations

The best proposed locations for the Community Rail stations, in terms of the level of existing and projected population and employment in their vicinity and catchment areas, prominent land uses, and their historical significance to the community are the following locations:

- Cloverdale Station (Highway 10 and 176th Street);
- Sullivan Station (152nd Street and 64th Avenue);
- Newton Station on Hall Road at 70th Avenue just west of the King George Highway;
- Optional Station at 128th Street and 82nd Avenue;
- Kennedy Heights Station, on Nordel Way just east of Scott Road
- Punjabi Market Station – between 94th and 95th Avenue, north of 92nd Avenue and just west of Scott Road; and
- Scott Road Station (near Scott Road SkyTrain Station) with a covered walkway or spur line access along the east side of Scott Road into the Scott Road SkyTrain Station.

The more specific locations recommended for the stations and potential parking areas are shown in Figures 3 through Figure 9. As more detailed planning and design work is completed on the corridor and the Community Rail project and the train service operations, the exact station locations, parking areas and other required facilities may be refined, and as well other stations could be added. It should be remembered that there needs to a balance struck between the number of stations on the line providing additional community rail access points, and the speed and reliability of the service able to be provided on the line.

9.1.1 Existing and Future Population in Station Immediate Vicinity and Catchment Areas

The range of recent (2003) and forecast (i.e. 2011 and 2021) population and employment within 300-500 metre radius of the stations is show in Table 2 and Table 3, and range from a total of 1400 population and 3500 employment in 2003, to a population of 5000 and employment of 4500 in 2010, and a population of 6400 and employment of 5500 in 2021.

The total population and employment within the broader community catchment areas of the proposed stations for Community Rail are shown in Tables 4 with a total population in the Community Rail catchment area communities of 244,000 and in Table 5 with a total employment in the Community Rail Catchment communities of 51,000.

The existing and future land use in the station areas and existing transit access are described below. The Cloverdale and Newton Stations are in the vicinity of neighbouring town centres and major educational

institutions- Kwantlen College campuses in each of these station areas. As well, the other station areas have growing residential and business areas.

The section below outlines the proposed Community Rail stations and potential land use and other changes in the station vicinity which make them good locations.

9.1.2 Cloverdale Station - 176 Street and Highway 10

The proposed Cloverdale Station is in very close proximity to the new Kwantlen Technical College, the downtown Cloverdale area, growing residential areas in Cloverdale, the new Surrey Museum and the Cloverdale Fair Grounds. Students at the Kwantlen Technical College may, however, if like students for example at the Burnaby BCIT campuses, come from significant distances and attend courses for concentrated periods of time 3-4 weeks, and may be more inclined to drive to school and rather than use transit.

The City of Surrey's Master Plan for the Cloverdale Fairgrounds includes building a streetcar line along 176A Street which would provide a direct connection from the Cloverdale Community Rail Station from the fairgrounds and 60th Avenue south (See Figure 3). An overhead pedestrian connection is also proposed across the Highway 10 at 176 A Street in order to provide a linkage from the streetcar system to the Cloverdale Community Rail Station.

The existing #320 bus route could be adjusted to provide improved connections to a proposed rail station here. As well, a Community Shuttle route could be provided as an outcome of the South of Fraser Area Transit Plan to provide local transit service within the growing Cloverdale Town Centre area, and provide greatly improved bus connections to the station.

If a larger site could be found close to this community rail station and a peak period community and commuter rail service connection was made between the Cloverdale Station and Scott Road Community Rail/Scott Road SkyTrain station, this station could serve a much larger commuter market for people who would drive in from Langley and, and use the SkyTrain network to get to their destination (e.g. work, school, etc.).

9.1.3 Sullivan Station - 152 Street and 64 Avenue

The proposed Sullivan Station is in close proximity to nearby market and shopping areas, the YMCA, and the new residential and commercial development in the surrounding area. This station is serviced by the #340 route which connects the Sullivan Station, to the Newton Town Centre and Scottsdale Mall, and the #345 route which connects to the Surrey City Centre and White Rock/South Surrey Town Centre. All of the routes should be significantly improved as part of the work of the South of Fraser Area Transit Plan, in terms of frequency, directness and reliability.

9.1.4 Newton Station - on Hall Road west of King George Highway and south of 72 Avenue

The proposed Newton Station is fairly close to the heart of the Newton Town Centre and in close proximity to the Kwantlen campus to the west off 72nd Avenue and the Newton Kwantlen campus, shopping areas, restaurants, the Newton recreational complex and the Newton transit exchange which has bus routes which provide connections to Surrey City Centre, White Rock/South Surrey Town Centre, Cloverdale, and Scottsdale Mall. With the future potential redevelopment of the Newton recreational area and transit exchange, and the land to the south of this area, the demand for use of this station could potentially increase significantly.

9.1.5 Kennedy Station - on Nordel Way east of Scott Road

The proposed Kennedy Station is located near the Kennedy Heights Shopping Mall and the nearby commercial development along Nordel Way and Scott Road. The nearest bus access to this station is from the #314, #319 and #329 which operates along Scott Road and adjacent corridors and makes connections into the Scottsdale Mall, and the Scott Road, King George and Surrey Central SkyTrain Stations. There is no existing bus access along 88 Avenue or Nordel Way and TransLink has no plans to introduce this service in the next two years.

9.1.6 Optional Station - 128 Street and 82 Avenue

A potential station could be located at 82nd Avenue and 128th Street, just northeast of the BC Hydro site which is convenient for refuelling the trains, being powered by hydrogen fuel cells. The station is also near the ethnic retail outlets and some of Surrey's largest banquet halls in the York Centre. The #323 bus service links this station to the Newton Station and Town Centre and to the Surrey City Centre SkyTrain Station.

9.1.7 Punjabi Market Station - between 94 Avenue and 95 Avenue west of Scott Road

A potential station could be located behind the Punjabi market on Scott Road, between 94th and 95th Avenues. There is a business access road /lane running east along the rail line off which both the station and parking could be located. There are single family residential areas to the west of the rail line and their closest access is 92nd Avenue or 96th Avenue.

9.1.8 Scott Road Station - east of Scott Road and just south of Scott Road SkyTrain Station

A potential station could be located along the rail line just east of Scott Road and south of the Scott Road SkyTrain station and its large park-n-ride lot. Access between the community rail could be provided by a covered walkway built on City of Surrey owned land along the east side of Scott Road north of the community rail or by a spur rail which could be built between the community rail line and the Scott Road SkyTrain Station park-n-ride lot along an existing road right-of-way. The north end of Surrey in this portion along Scott Road could potentially change dramatically in the next 5-10 years in terms of adjacent development which would use the station.

10.0 Ridership potential of community rail

It was beyond the scope of this report to prepare a ridership and revenue forecast for the Heritage/Tourism or peak period Community Rail service scenarios. However, it is highly recommended that EMME2 and micro-simulation modeling should be completed for these rail service scenarios in combination with future employment and population forecasts and potential scenarios for various combinations of bus, bus rapid transit and rail improvements in the South of Fraser area and outside the region to the Fraser Valley (include Abbotsford and Chilliwack). This work is required to be completed soon in order to determine the following:

- Identify the likely range of ridership for the Community Rail project and potential fare revenue projections;
- Measure the impacts of the Community Rail project on other potential transit investments in terms of their ridership and revenue projections; and

- Assist in the preparation of a detailed project plan and business case for the Community Rail project.

11.0 Accessibility improvements for rail stations

To significantly improve the accessibility of the proposed Community Rail stations the following facilities should be provided (see also Table 6):

11.1 Automobile Parking

It is recommended that small parking lots (60 paved parking spots) be constructed adjacent to the Cloverdale, Sullivan, Newton, Kennedy and Punjabi Market stations and the optional station near 128th Street and 82nd Avenue. Shared parking arrangements may as well be able to be arranged with nearby shopping areas near the Kennedy Station. The Scott Road Station can be linked to the Scott Road SkyTrain station initially by a covered walkway, which can be upgraded to a spur rail line linking the two services, using city owned land along the east side of Scott Road.

11.2 Improved Bus Connections

Through the development and implementation of South of Fraser Area Transit Plan, modifications to existing and future bus service can be made in the City of Surrey to make the following improvements to bus service interconnecting with the stations:

- Provide increased bus service frequency, especially in peak periods - 10 to 15 minutes, but also in midday and evening periods - 20 minutes;
- Make the connections more direct to key destinations (i.e., no transfers) such as to the town centre downtown areas (i.e. Cloverdale downtown area and new Kwantlen Technical College from Cloverdale Station);
- Introduce a region-wide Transit Smart Card to make using transit easier; and
- Introduce new types of service connections to the stations. For example, introduce Community Shuttles in the Newton, Cloverdale and Punjabi Market station areas which will provide good transit connections from the station to the surrounding communities.

11.3 Cycling Facilities

Storage bike racks and lockers should be provided at each of the train stations.

11.4 Double Tracks

To enable the wider freight and narrower passenger service vehicles to operate in the stations and for the passenger rail service to provide service for those that are physically challenged, double trackage would be provided in the stations areas-one track for the freight trains and one track for the passenger service.

12.0 Traffic assessment at stations and at key railroad crossings

12.1 Traffic Assessment Overview

Traffic assessment for the South of Fraser Community Rail will require a range of issues to be reviewed as project decisions move from a conceptual level to detailed design and operation. In this report traffic considerations will include the impacts on existing traffic control signal locations and the corridors that are controlled by the affected signals. The rail line under consideration is used by Southern Rail of BC for freight movement up to four times per day mostly on weekdays. Roadways impacted are under the authority of either the City of Surrey or the Ministry of Transportation (MoT). In addition to roadway corridor issues that impact traffic signal operation there may be local issues immediately adjacent to station locations such as pedestrian access and parking requirements to be reviewed.

In general, two vehicles, peak period passenger trains, operating every 20 minutes, will disrupt individual traffic signals cycles for 30-40 seconds, which is considerable less than long freight trains which use the today. See Page 32 for a fuller discussion of the impact of road/rail crossings, for example, in the City of Calgary which operates several LRT lines in busy arterial road-rights-of-way.

12.2 Corridors Impacted by Community Rail

12.2.1 Ministry of Highways

- Highway 10 is affected at several streets in the Cloverdale area including the following:
 - 176th Street -- signal
 - 168th Street -- signal
 - 164th Street/Old McLellan Road – rail crossing

Except for the 164th Street/Old McLellan Road location the train impact is relatively minor since Highway 10 will maintain a green signal phase when trains cross the intersecting roads and only impacted left and right turns from the highway will be delayed during pre-emption. At the 164th Street/Old McLellan Road, Highway 10 will be stopped for the train pre-empt but this time will be less than the existing time required for the freight movements.

12.2.2 City of Surrey

- 152nd Street is affected at 64th Avenue. At this location 152nd Street carries about 20,000 vehicles on a daily basis and will be impacted when the pre-emption of the signal at 64th Avenue occurs. This impact will be less than the interruption caused by the passage of the freight trains.
- 64th Avenue is affected at 152nd Avenue and 148th Avenue due to train pre-emption at both signal locations. The daily traffic volume is approximately 26,000 vehicles. It is expected that the impact on 64th Avenue will be less than the existing time required for the freight movements and within a few cycles of the signal normal timing sequences will be in place.
- King George Highway, with a daily traffic volume of 34,000, is affected near 72nd Avenue signal although the rail crossing is about 150 meters south of the signal. The impact is expected to be relatively minor.

- 72nd Avenue, with a daily traffic volume of 30,000, is affected near the King George Highway signal although the rail crossing is about 150 meters west of the signal. The impact is expected to be relatively minor.
- 132nd Street and 76th Avenue, each with a daily volume of about 14,000, are both affected at the same time due to a complex geometric situation caused by the rail line passes through the centre of the intersection. In this case roads, 132nd and 76th are impacted simultaneously and both must be stopped for the passage of a train. Fortunately both streets have somewhat lower volumes than many of the impacted streets.
- 80th Avenue, with a daily volume of 18,000, is affected east of the signal at 128th. The impact is expected to be relatively minor.
- 128th Street, with a daily volume of 24,000, is affected at the 82nd Avenue signalized “T” intersection. The impact due to the train crossing is expected to be relatively minor due to limited volume on 82nd.
- 88th Avenue/Nordel Way, with a daily traffic volume of 27,000, is affected east of the Scott Road near the Mall Access signal. It is expected that the interruptions on 88th Avenue will be less than the existing time required for the freight movements and, after train passage, within a few cycles of the signal normal timing sequences will be in place.
- Scott Road, with a daily traffic volume of 34,000, is affected near 92nd and 99th Avenues, away from major traffic signals; therefore little impact is expected at this location.
- 96th Avenue, with a daily traffic volume of 12,000 and no traffic signal control, is affected west of Scott Road. The impact at this location is expected to be minor.
- 104th Avenue, with a daily traffic volume of 7,000, is affected away from major arterials: therefore little impact is expected at this location.
- Old Yale Road, with a daily traffic volume of 5,000, is affected away from major arterials: therefore little impact is expected at this location.

The impacts of a number of road/rail crossings along passenger trains services can be seen from the City of Calgary where at grade level crossings in the Northeast and Northwest lines, the LRT trains are allowed to pre-empt the normal operation of traffic signals in order to allow the uninterrupted movement of trains between stations.

12.3 Design Considerations at Traffic Signal Locations

As the project progresses the following factors will require review during the design process.

- The exact length of time the Community Rail will take to cross individual roadway crossings compared with the existing freight services;
- The strategy for pre-emption of traffic signal to permit train crossings could be a factor in station location and operation, for example nearside stations could use in-train pre-emption devices;
- Pre-emption operation should be responsive to both the Ministry of Transportation’s and the City of Surrey’s signal operation and coordination techniques; and
- Train speed and the prevailing road/rail guidelines would be applied to pre-emption bell and gate-down timing.

12.4 Details of Road Crossings

The Community Rail line has the following 21 road crossings between a Cloverdale Station at 176th and Highway 10 and Scott Road Station near the Scott Road SkyTrain Station. The crossings which now have full gates, bells and lights and are noted. Some of the crossings which have controls may require further upgrading in line with the Transport Canada Grade Crossing regulations under the Canada Safety

Act (see Appendix A). Crossings which have no controls, noted below, would require some or all the following facilities- full gates, bells and lights to be provided to enable passenger services to be provided on the interurban rail line.

- 176th Street-Cloverdale Station would likely be located just east of 176th Street-full gates are now installed;
- Crossing Highway 10 at 168th Street-full gates are now installed;
- Highway 10 near 164th Street, also intersecting with Old McLellan Road-full gates, lights and bells will be installed as part of the Border Infrastructure Program and upgrading of Highway 10;
- 156th Street-now has no control gates and would require rail crossing facilities;
- 152nd Street-existing full gates and controls just south of Highway 10-Sullivan Station would be located just east of 152nd Street;
- 64th Avenue and 148th Street-just east of traffic signals at 148th Street-full control gates, bells and whistles exist;
- 144th Street - just north of Hyland Road-no control gates today and would require rail crossing facilities;
- 68th Avenue and 138th Street-not near traffic signals and today there are no gates-needs gates;
- King George Highway at about 70th Avenue just south of 72nd Avenue intersection with traffic signals-full control gates exist-may need upgrading;
- 72nd Avenue just west of King George Highway near fire hall-Newton Station would likely be located on Hall Road just to the southeast of 72nd Avenue and west of the King George Highway-gates will require upgrading;
- 76th Avenue and 132nd Street intersection which has traffic signals-needs full control gates;
- 82nd Avenue at 128th Street intersection with traffic signals-has full control gates and may need upgrading;
- Nordel Way just east of Scott Road and Mall Access traffic signals-has full control gates-possible Kennedy Station just north of 88th Avenue;
- 88th Avenue between Scott Road and 120A Street/Holt Street-Track crosses 88th Avenue between Scott Rd and 120A Street/Holt. There are currently lights and barriers. Warning signs Westbound only;
- Scott Road - just at about 90th Avenue and south of 92nd Street Avenue traffic signals-needs full control gates;
- 92nd Avenue-just west of Scott Road-needs full control gates;
- 96th Avenue just west of Scott Road-needs full control gates;
- Scott Road and 99 intersection with traffic signals-full control gates are there;
- 104th Avenue mid-block between Scott Road and 128th Street at about 124A Street-no traffic signals-needs full gate controls;
- Old Yale Road mid-block between 125A and 125B Streets - no traffic signals and needs full gate controls; and
- 120th Street (Scott Road) just south of the turn off for the Scott Road SkyTrain Station and not near traffic signal-end of passenger service.

12.5 Handling of Road/Passenger Rail Crossings in Other Cities-Calgary

To see the potential impact of road/passenger rail crossings officials from the City of Calgary were contacted, where they have had two LRT lines –the Northeast and Northwest LRT lines, operating since the mid-1980s with many road /rail crossings on very busy arterial roadways.

In the Northeast Sector of Calgary, for example, there are 10 at grade crossings along 36th Street, a north-south street in Calgary with average weekday volumes of 25,000 to 50,000 vehicles. Grade level road and pedestrian crossings are protected by LRT gates, bells, flashing lights, pedestrian crosswalk heads and gates which are consistent with the Canadian Transport safety measures. The average gate warning time for individual traffic intersections is 22 seconds, with an additional 10-15 seconds for the gates to ascend and the warning lights and bells to turn off. Traffic signals at intersections can be interrupted for up to 60 seconds.

The 36th Street LRT corridor is designed so that pre-empted traffic movements (e.g. north and south left turns) are reserviced if the preset time has not been met once the trains clears the intersection. No permissive left turns are permitted in the traffic intersections. There have been some auto collisions and fatalities at intersections in the history of the LRT lines operating in the Northeast and Northwest corridors in Calgary.

In Calgary, however, the LRT trains are operating every 5 minutes in peak period and every 10-15 minutes in off-peak periods, much more frequently than envisioned for the initial operation of the Surrey Community Rail line.

13.0 Potential safety impacts of community rail proposal

The Canadian Traffic Safety Institute provides the following observations on the proposed community rail project.

This report reflects site visits to all road/rail crossings and more detailed observations at the proposed station locations on June 23 and 26, 2006. The focus of these observations was on the potential safety impacts of the new line, specifically with respect to vulnerable road users, i.e. pedestrians, cyclists and the visually and physically challenged. Pictures are available for all the road/rail crossings.

An important consideration will also be the existing collision situation at the road/rail crossings since the project should not make a bad situation worse. Collision and crash summary data from ICBC from January, 2001 to December, 2005 was reviewed for all the rail/road intersections. Critical intersections where collision and crash levels were high were examined in more detail to determine if the presence of the rail line had any connection to the collisions.

The road/rail crossings and potential station sites visited and observations were as follows:

Station - Scott Road near the Scott Road SkyTrain Station

Good sidewalk to full traffic signal close to the Scott Road SkyTrain Station. Lighting good. Road surface flat, which would be good for pedestrians and motorized scooters and wheelchairs.

Old Yale Rd between 125A and 125B Streets

Track crosses Old Yale Road, a 2-lane narrow (rural type) road between 125A and 125B streets. The crossing currently has lights but no barriers. There are no advanced warning signs for the crossing, in either direction. Visibility of the crossing when traveling in both directions along Old Yale Road is poor, primarily due to overgrown trees. Vehicles traveling on Old Yale Road were traveling quickly, not necessarily speeding, but driving too fast for the driving environment. (May require additional signing or better visibility for crossing.)

104th Avenue between Scott Rd and 128th Street (near 124A Street)

Track crosses 104th Avenue, a 2-lane narrow (rural type) road close to 124A Street. The crossing currently has lights but no barriers. Visibility of the crossing when traveling in both directions along 104th Avenue is poor, primarily due to overgrown trees. There is an advanced warning sign Northbound, but none Southbound. This is quite a steep hill and westbound traffic traveling downhill seemed to be driving too fast for the driving environment. (May require additional signing and/or speed reduction measures.)

Scott Road at 99th Avenue

This is a full crossing with traffic signals, lights and barriers. The rail line crosses diagonally across Scott Rd. There are advanced warning signs in both directions.

96th Avenue just west of Scott Road

Track crosses 96th Avenue just west of Scott Rd (in Delta). There are lights but no barriers. There are advanced warning signs Westbound only. This is quite a busy 2-lane street next to Royal Heights subdivision.

Station – Behind Punjabi Bazaar between 94th and 95th Avenues

Behind the Punjabi Bazaar the track is located across a lane. Nighttime visibility and safety related issues might be a concern. May require additional lighting. Flat surface. Good for vulnerable road users.

92nd Avenue just west of Scott Road

Track crosses 92nd Avenue just west of Scott Road (in Delta). The crossing is immediately after turning right southbound from Scott Rd. There are lights but no barriers. There are warning signs Eastbound only. This is a residential area. There could be a potential queuing problem over the tracks when traveling northbound on 92nd Avenue.

Scott Road between 92nd Avenue and 90th Avenue

Track crosses Scott Road between 92nd Avenue and 90th Avenue diagonally across the 4-lane arterial. There are lights but no barrier at this time. (May require barriers)

There are warning signs Northbound – none Southbound. Location looks busy, might be a good idea to review collision data and conduct more investigation.

88th Avenue between Scott Road and 120A Street/Holt Street

Track crosses 88th Avenue between Scott Road and 120A Street/Holt. There are currently lights and barriers. Warning signs Westbound only. Visibility here is poor.

Nordel Way/Mall entrance

Track crosses Nordel Way near Mall Entrance. Currently there are lights and barriers.

Warning signs in both directions. Depending on traffic volume, time of day, etc. there could be a queuing problem for Mall entrance.

Station – Kennedy

May need to provide pedestrian footway to Mall to avoid pedestrians crossing close to the track.

Optional Station - 128th Street and 82nd Avenue

Track crosses 128th Street at 82nd Avenue. There are currently full traffic signals and barriers at this location. Warning signs in both directions. Traveling Southbound there is no left turn into 82nd Avenue that would eliminate additional problems at that location.

This is an extremely busy location for pedestrians to negotiate. Might lead to difficulties for wheelchairs and motorized scooters.

80th Avenue east of 128th Street

Track crosses 80th Avenue east of 128th Street. There are currently lights and no barriers. There are warning signs in both directions. There is a potential for queuing westbound across the existing rail crossing. There is also an additional rail crossing just past this one (may be disused).

76th Avenue and 132nd Street

Extremely busy road – heavy traffic. Currently has full traffic signals and advanced warning signs. Might be a good idea to review collision data and conduct more investigation if the collision history warrants it.

72nd Avenue and Hall Road

This location is just off King George Highway (W) past the junction with 72nd Avenue and Hall Road. Currently have lights but no barriers. Advanced warning signs in both directions.

Station – Newton

Probably will require full signal to access Newton Crossing Shopping Mall located across King George Highway from the station. May require railings in centre median on KGH to prevent pedestrians crossing other than at the signal.

68th Avenue and 138th Street

Track crosses 68th Avenue at 138th Street, a 4-lane road and has lights but no barrier.

It does have advanced warning signs in both directions. No left turn Westbound over the crossing. Depending on the traffic volume could be queuing problem Eastbound at 137A Street.

144th Street and Hyland Road

Track crosses 144th Street at Hyland Road. Exit from Hyland Road (left) might present problems. Currently lights but no barriers. No advanced warning signs. Constant traffic flow during my site visit.

148th Street just north of 64th Avenue

Track crosses 148th Street just north of 64th Avenue. This 2-lane road currently has lights and barriers. Has advanced warning signs. There is the potential for a queuing problem through the traffic signal at 64th and 148th.

64th Avenue east 148th Street

Track crosses 64th Avenue one block east of 148th Avenue. This location outside the Firehall has lights and barriers. Advanced warning signs in both directions. There is a signal pre-empt for vehicles exiting the Firehall. This might cause queuing problems across the track Eastbound.

64th Avenue at 152nd Street

The crossing at 64th Avenue and 152nd Street is actually a few metres south of 64th. It has a full traffic signal with barriers.

Station – Sullivan

Pedestrian access should be provided.

156th Street

This is a rural 2-lane road. The track is indicated by a crossbuck sign with STOP-sign control on each side. There are advanced STOP and RRcrossing signs in both directions. The crossing is not very visible due to the trees around the crossing. In 15 minutes of observation not one car STOPPED before crossing the track. (The crossing will need to be more visible.)

Highway 10 and 164th Street

(This also intersects with Old McLellan Road.) Plans to upgrade to a full RR crossing with barriers on upgrade of Highway 10.

Highway 10 and 168th Street

Track crosses Highway 10 at 168th Street. Controlled by full barrier on 168th Street.

Between 168th and 176th on Highway 10 there is also an entrance to a small business complex, just west of 176th. Consideration may need to be given to this location as exiting traffic waiting to turn left particularly on Highway 10 could be stopped on the track.

Highway 10 and 176th Street

Full traffic signal at this location.

13.1 Examination of ICBC Collision and Crash Data

Collision and crash summary data from ICBC from January, 2001 to December, 2005 was reviewed for all the rail/road intersections. Critical intersections where collision and crash levels were high were examined in more detail to see if the presence of the rail line had any connection to the collisions.

The following four intersections were identified where there were a high number of injury collisions and property damage only (PDO). At all of the locations the majority of collisions were either rear-end or involved head-on turning movements. Very few of the collisions were related to the rail/road crossing.

Highway 10/176th Street-Surrey

115 Injury Collisions and 222 Property Damage only - 3 were related to the rail/road crossing.

80th Avenue East/128th Street-Surrey

125 Injury Collisions and 135 Property Damage only - 6 were related to the rail/road crossing.

92nd Avenue West of Scott Road and Scott Road-92nd Avenue –Delta

126 Injury Collisions and 162 Property Damage only - 1 was related to the rail/road crossing.

64th Avenue/152nd Street-Surrey

139 Injury Collisions and 178 Property Damage only - 3 were related to the rail/road crossing.

13.2 Conclusions

- When we consider collision prevention, the first priority is to “Minimize the exposure to being involved in a collision” – so moving to other safer modes is a benefit.
- There is a need for consistency for Advanced Warning Signs for the crossings.
- We need to ensure good visibility at all the crossings.

14.0 Potential vehicles for community rail service and linkage to BC Hydrogen Highway Project

The Phase Two component of the City of Surrey Community Rail project would entail operating a train service between the Cloverdale and Scott Road Stations, with a spur line linkage to the Scott Road SkyTrain Station from the Scott Road Community Rail Station along a available road right-of-way or alternatively a covered walkway along the east side of Scott Road on city owned land (see Figure 2). In order to be attractive, this service would have to operate every 20 minutes during peak periods, and be able to operate on a single track with some double-tracked portions in stations to provide service for physically challenged persons. The corridor would be fully equipped with a full communication and signalling system to enable service to operate on this frequency on a single track. There would have to be a physical and time separation negotiated with Southern Railway Company for the operation of their freight trains on this line.

The intention of this service would be to use modern, comfortable, accessible and preferably service proven light rail transit vehicles, made by a well known manufacturer. These vehicles could be powered by hydrogen fuel cell technology currently being developed by a number of prominent companies, such as Nedstack of the Netherlands and Nuvera of United States which uses an Italian developed fuel cell. As well a company such as Vancouver’s Azure Dynamics could be used to assist in this project as the firm’s business lies in the development and commercialization of control systems for hybrid electric and electric vehicle power trains. The Azure Control Systems (“ACS”) technology is a real-time management system that adapts the operation of the hybrid electric vehicle to any driving mode. It employs software comprising sophisticated mathematical algorithms and real-time on-board data analysis to continuously manage the complex relationships between the engine, electric motor and battery.

For example, the train service might deploy the Parry People Mover vehicles made in Great Britain, which use a rotating flywheel as a store of kinetic energy that is used to power the vehicle, combined with an engine fuelled with propane or hydrogen fuel cells. In Great Britain these vehicles are powered with propane, and are operated on Community Rail lines.

Parry People Movers produce the following vehicles that may be viable for the Surrey Community Rail Proposal and include the following:

- The PPM 80 which has seating for up to 40 passengers (depending on customer specification) and 40 standing passengers for a total of 80 passengers or the PPM 100 which has seating for 40 passengers and can accommodate 100 passengers in total including standees. Modifications can be made to the vehicle size, boarding height, power source, appearance and interior layout. The North American price for the PPM 100 vehicle would be approximately \$3.0 million powered by a hydrogen fuel cell engine.

An important issue with the use of the Parry People Mover vehicle from Great Britain is that the proponents of the Community Rail project would have to obtain the required government approvals and pertinent conditions/restrictions to be able to use this vehicle for passenger service on the single track Community Rail line, with SRY freight use. The Parry vehicle has been given the required regulatory approvals in Great Britain to be used for passenger service on Community Rail lines in Great Britain which are also used for freight service.

Other potential vehicles include LRT vehicles such as the Bombardier Talent, which is used in the Ottawa O-Train corridor, which is 8 kilometre north–south LRT line with 5 stations which connects two bus rapid transit facilities in Ottawa. This service is operated by CPR and freight trains operate in the corridor as well. This project cost \$21 million in capital costs, and that includes purchasing the trains, installing the braking system, and constructing new station and a maintenance facility. Annual operating costs are \$4.0 million with about a 25% fare cost recovery, and daily ridership ranges from 5,000 to 6500.

With the Community Rail project this Bombardier Talent vehicle would be powered by a hydrogen fuel cell engine instead of the diesel multiple units used in Ottawa. However, this vehicle which seats 135 and can have 150 standing, with a total capacity of 285 passengers, cost about \$6.0 million each on small order which is the case with the Community Rail project. However, for the Surrey Community Rail corridor, the size and cost of this vehicle may not be suitable. (See Appendix B.)

The Tokyo-based East Japan Railways Co. will soon start test runs of its New Energy Train, claimed to be the world's first fuel cell-powered train, in July, 2006 with the aim of operating it on regular tracks by the middle of next year. The initial train will consist of a single car powered by electric batteries and capable of traveling at up to 100 kph (62 mph). A diesel-run generator will provide most of the electricity, with two 65-kilowatt hydrogen fuel cells chipping in about a third. (See Appendix B.)

Assuming a round trip time between the Cloverdale and Scott Road Community Rail Stations, with modern vehicles and 7 stations of approximately 56 minutes and a peak period frequency of 20 minutes, 10 vehicles would be required for four 2 vehicle trains and 2 spare vehicles.

The Surrey Community Rail project has the potential to become a legacy and sustainable transportation project as part of the 2010 Olympic and Paralympics Winter Games, both in terms of the important community linkages it is creating and its use of hydrogen fuel engines for its power source. The entire Community Rail project should be developed as part of BC's Hydrogen Highway - a sustainable and legacy project as part of the 2010 Olympic and Paralympics Winter Games. The BC Hydrogen Highway project is described below.

The City of Surrey Council had approved the project as one of its legacy projects for the 2010 Winter Olympics.

14.1 The BC Hydrogen Highway

An integral part of the 2010 Olympic Games is the BC Hydrogen Highway. The Hydrogen Highway, launched in 2002, is an integral part of British Columbia's Fuel Cell Strategy - a strategy aimed at making the province one of the leading lights in the hydrogen economy by 2020.

The BC Hydrogen Project is a coordinated, large-scale demonstration and deployment program intended to accelerate the commercialization of hydrogen and fuel-cell technologies. The project will demonstrate a wide variety of transportation, stationary, portable and micropower applications that can utilize the hydrogen fuelling infrastructure. It will also demonstrate the operational, economic, environmental and social feasibility of a hydrogen fuelling infrastructure that utilizes different hydrogen production and delivery pathways.

The objective of this demonstration and deployment project is to form a consortium of organizations to design, build, operate, test and evaluate a hydrogen fuelling infrastructure or "BC Hydrogen Highway" along a corridor linking the Vancouver International Airport, PowerTech Labs in Surrey, the National Research Council's (NRC) Institute for Fuel Cell Innovation, the Finnings Lands/Athletics Village, Sacré-Davey in North Vancouver, the Whistler Village and the University of Victoria/BC Transit. The Powertech Labs, which has a 10,000-psi (700-bar) hydrogen dispenser, is located along the Community Rail project, just south of the proposed Kennedy Station located just north of Nordel Way and east of Scott Road.

15.0 Benefits of community rail project

The Community Rail Model and Strategy employed with the FVRHS, the City of Surrey, the Corporation of Delta, TransLink, the provincial government, Southern Railway, BC Hydro, other stakeholders and the general public could be used to develop and implement the inter-urban rail facility in the City of Surrey, between Cloverdale and Scott Road Station. This could be used to provide an opportunity to achieve the following objectives:

- Provide a valuable, environmentally friendly and green legacy for the 2010 Olympics Games in the Greater Vancouver region through the deployment of passenger rail vehicles powered by hydrogen fuel cells.
- Provide a very cost-effective, reliable and timely commuter transit service which connects key and growing City of Surrey destinations at the proposed stations, and provides an important and cost effective linkage to the regional transportation network at the Scott Road Station. This corridor will not be impacted by the growing traffic congestion which will impact other City of Surrey streets and serve to increase the travel times and unreliability of automobile and bus traffic.
- Upgrade the condition of the rail, ballast and track along the full corridor between Cloverdale and Scott Road Stations. As well, the safety of the entire rail corridor will be significantly enhanced through the introduction of fencing along portions of the corridor, the installation of rail safety gates and signage at all the rail/road crossings where required, and the introduction of a communications and signalling system along the corridor. These improvements will serve to enhance the corridor for the movement of goods by Southern Rail as it is today a very under-utilized transportation corridor asset in the community and only two (4 one-way trips) freight trains daily use this line.
- Improve the integration between all transit modes in the City of Surrey-SkyTrain, inter-urban rail, bus rapid transit services, conventional bus routes and Community Shuttles.
- Generate regional tourism economic activity.
- Provide large educational benefit for sustainable transportation.
- Reduce congestion and improve air quality and road safety in the City of Surrey.
- Contribute to the economic vitality of the communities and businesses in the vicinity of the rail stations.

16.0 Range of potential capital and operating costs of heritage/tourism and community rail train services

Table 7 provides a high level estimate of the capital and operating costs for Phase One-a Heritage/Tourism service being operated during summer months by the FVHRS and for a full Community Rail peak period service using modern vehicles and contracted out to Southern Rail or CP etc. These costs are high level estimates and are based upon estimates and data from rail companies, and other data from municipalities (e.g. sidewalks etc.). These estimates would have to be further developed in much more detail and accuracy for the planning and design of such services and in preparing a detailed business plan for the next phase of this project.

The capital costs include the following components: right-of-way and grade crossing improvements; passenger stations; adding vehicle storage and maintenance facilities and track access to the maintenance/storage facility at Sullivan Station; modifying some industrial sidings; double tracking the station areas to ensure physical separation of right and passenger services; providing adjacent station parking and pedestrian access improvements; providing new LRT- like vehicles; installing fare revenue collection equipment; and implementing a train communication and signal system to ensure safety of the system. The costs do not include the following cost categories: property costs; utilities relocation; double tracking along the entire corridor and its associated costs; contingencies; engineering and design costs; project management costs during planning and construction; consulting, legal and public consultation fees; environmental impact studies; permits; interest on debt obligations; and payments that might be made to the Southern Railway Company as a business compensation cost.

An example of the cost of a passenger train service from the GVRD which was developed and implemented in the last ten years is the West Coast Express peak period train service. This service, which commenced in 1995, operates 65 kilometres between the City of Mission and downtown Vancouver, with 8 stations and 37 cars, and peak period trains about every 30 minutes in the morning and afternoon peak periods. The upgrade of the freight line corridor for passenger service cost \$73.0 million (1995) and the total capital cost for the project was approximately \$110 million. The WCE's annual operating cost in 2006 is approximately \$16.0 million but this cost excludes rolling stock leasing costs, insurance and property taxes.

Phase One (part one) – operating the tourism/heritage train service in the summer months between Cloverdale and Sullivan Stations is projected to have a total capital cost of just over \$3.0 million and an operating cost of \$0.2 million. The part two of Phase One –operating the heritage/tourism service between Cloverdale and Scott Road Stations is projected to have an additional capital cost of \$5.5 million and an annual operating cost of \$ 0.3 million, for a total capital cost for Phase One of approximately of \$8.0 to \$9.0 million.

Phase Two – operating an accessible, modern transit service every 20 minutes during peak weekday periods between the Cloverdale and Scott Road Stations corridor. The high order of magnitude cost estimate for this service is projected to have a total capital cost range of approximately \$80.0 million (i.e. using British Parry People Mover vehicles) to \$110.0 million (i.e. using Talent LRT vehicles) and an annual operating cost of approximately \$6.0 million. This is on top of the \$9.0 million capital cost spent on Phase One, noted above bringing the total capital cost for Phase 2 range to \$90.0 to \$120.0 million range and an annual operating cost of approximately \$6.0 million.

Note: UMA has also conducted a high level examination of the costs and benefits of a Community Rail service in Langley City and Township, operating the service to 264 Street. The total estimated and high order capital cost for a Community Rail service from the Scott Road Station to the Langley Town Centre, using the interurban rail corridor in Surrey and a combination of the Pratt Subdivision and the old interurban corridor in the Langleys is \$170.0 million to \$200.0 million, with the range being dedicated by which vehicles are utilized-the PPM 100 or the Talent vehicles.

17.0 Conclusions and recommendations

The conclusions and recommendations in regard to this high levels analysis and review of the costs and benefits of the re-introducing passenger rail service to the City of Surrey on the portion of the old interurban line, between a Cloverdale Station (176th Street and Highway 10) and Scott Road Station (Scott Road near Scott Road SkyTrain Station), include:

17.1 Conclusions

The Cloverdale to Scott Road rail corridor has a significant existing and forecast population and employment base in its catchment area. This corridor links key City of Surrey Town Centres-Cloverdale, Newton and viable and growing residential, educational and commercial/business community areas-Kennedy, Sullivan and others, which are not well linked today by timely, direct and reliable bus services.

There are no insurmountable safety or traffic issues with the introduction of passenger train service along the Cloverdale to Scott Road Community Rail corridor on the existing SRY line. Signing needs to be consistent along the corridor for motorists, and the frequent peak period passenger train operations, for example every 20 minutes will require coordination with nearby traffic signals. In addition, it has been assumed in the costing of the service scenarios for this Community Rail project that at all of the 21 existing road/rail crossings, where there are no gates, bells and signage, improvements will be made to these crossings according to the Transport Canada guidelines, and the operation of the Community Rail service will include a signal and communications system along its full length to provide safe operations.

It is likely that the development of the Cloverdale to Scott Road Community Rail corridor for peak period rail service would draw potential ridership away from a possible King George Highway-104th Avenue Bus Rapid Transit investment. Therefore, it is important that EMME2 modelling be completed, at the earliest possible time, to determine the likely range of ridership and potential fare revenue estimates for the Community Rail project, and its impacts on other potential transit investments. This work will assist in preparing a detailed and comprehensive project plan and business case for the development and implementation of the Community Rail project in Surrey.

The development and implementation of a Community Rail passenger service in the Cloverdale to Scott Road corridor, using accessible and modern LRT-like vehicles, powered by hydrogen fuel cell engines, would be a valuable addition to the BC Hydrogen Highway. This service would provide a legacy project as part of the 2010 Olympic and Paralympics Winter Games and enable new community and private sector partnerships to be forged.

The success of projects of this nature are dependent upon there being strong City of Surrey, regional (TransLink) and provincial/federal political financial support. As well, these needs to be City of Surrey staff champions who will maintain a strong driving force and enthusiasm during the entire project including its planning, design, implementation and follow-up stages.

There may be a strong opportunity to draw provincial and federal funding for this project from its designation as part of BC Hydrogen Highway, and as well from BC Hydro's subsidiary PowerTech located

along the Community Rail corridor, and from other private sector partners (e.g. fuel cell makers and LRT vehicle manufactures) who are willing to demonstrate fuel cell engines in sustainable transportation modes for the 2010 Olympics.

Phase One (part one) involves operating the tourism/heritage train service in the summer months, on weekends, between Cloverdale and Sullivan Stations. This service is projected to have a total capital high level cost estimate of approximately \$3.0 million and an operating cost of \$0.2 million. Part two of Phase One –operating the heritage/tourism service between Cloverdale and Scott Road Stations, is projected to have an additional high level capital cost estimate of \$6.0 million and an annual operating cost of \$0.3 million, for a total capital cost for Phase One of approximately \$9.0 million. This service scenario was proposed by the FVRHS. Due to time limitations before the Olympics and the need to focus on the development and implementation of a viable demonstration for 2010 Olympics, it is not recommended that this service scenario-Phase One using the heritage rail cars (parts one and two) be developed at all.

Phase Two involves operating an accessible, modern Community Rail service every 20 minutes during peak weekday periods between the Cloverdale and Scott Road Stations, with a connection to the Scott Road SkyTrain Station on a single track with sidings, with some limited double track sections in the station areas in order to provide accessible service, and a signal and communications system for the corridor. The high order of magnitude cost estimate for this service is projected to have a total capital cost range of approximately \$80.0 million (i.e. using British Parry People Mover vehicles) to \$110.0 million (i.e. using Talent LRT vehicles) and an annual operating cost of approximately \$6.0 million. This is on top of the \$9.0 million capital cost sunk for Phase One, noted above bringing the total capital cost for Phase 2 to a \$90.0 to \$120.0 million range.

The capital costs include the following components: right-of-way and grade crossing improvements; passenger stations; adding vehicle storage and maintenance facilities and track access to the maintenance/storage facility at Sullivan Station; modifying some industrial sidings; double tracking the station areas to ensure physical separation of right and passenger services; providing adjacent station parking and pedestrian access improvements; providing new LRT-like vehicles; installing fare revenue collection equipment; and implementing a train communication and signal system to ensure safety of the system. The costs do not include the following cost categories: property costs; utilities relocation; double tracking along the entire corridor and its associated costs; contingencies; engineering and design costs; project management costs during planning and construction; consulting, legal and public consultation fees; environmental impact studies; permits; interest on debt obligations; and payments that might be made to the Southern Railway Company as a business compensation cost.

This study assumes that the Surrey Community Rail service, which will not cross provincial boundaries, will be able to operate on a single track with the SRY freight operations, as there will be a temporal (time) and physical separation of the passenger rail and freight operations negotiated with the SRY, and that upgrades to the current communications and signalling systems will be put in place along the corridor to ensure there is no overlap of the services. Both LRT and freight operations operate in Baltimore and San Diego, where the LRT system operates during the day and freight services operate at night using a common single track corridor. Joint freight and passenger train service on shared trackage occurs as well in Europe (e.g. Karlsruhe, Germany) and in many areas throughout Japan.

The Community Rail network will provide the following benefits and opportunities: provide reliable rail linkages between growing communities along the line well into the future as roadways in the City of Surrey become significantly more congested and these are few new road network options; attract a new market to transit among users who are adverse to using the bus but will use trains; provide potential development opportunities in the vicinity of the stations; and enable partnerships to be developed that can be used with the private sector to develop and fund a demonstration Community Rail project for the City of Surrey.

The timelines and staging for the project's peak period community and regional transit service are very tight, and therefore will require an early and dedicated commitment of funding and project management resources commitment for the City of Surrey, TransLink and provincial and federal representatives to realize the timelines laid out in this report.

With these tight timelines noted above for the implementation of a peak period Scott Road to Cloverdale Community Rail service, an alternative would be to operate a more limited demonstration project with hydrogen fuel cell and modern LRT- like vehicles operating on a single track between the 9.5 kilometre Newton Station to Cloverdale Station section via the Sullivan Station and be in operation for the 2010 Olympics.

17.2 Recommendations

The recommendations from this review of Community Rail in Surrey include the following:

- i) That the Community Rail corridor should be protected for future transportation options through the Official Plans of both the City of Surrey and the Corporation of Delta, and in TransLink's new Strategic Transportation Plan to be prepared in 2008.
- ii) That TransLink, the City of Surrey, the Corporation of Delta, the provincial government, BC Hydro, GVRD and other agencies should be encouraged to directly support, through financial, manpower and other in-kind contributions, any of the efforts of the Fraser Valley Heritage Railway Society to upgrade the entire Community Rail corridor. The main efforts of these parties should be focussed on preparing the detailed business case and the planning work to enable the implementation of a full scale weekday peak period Community and Regional rail service between the Scott Road SkyTrain Station and Cloverdale, and to obtain support from public and private sector partners. However, a lead agency other than the volunteer FVHRS, such as TransLink working the City of Surrey, with sufficient staff and funding resources, including financial contributions from provincial and federal contributions, needs to be the driving force for this effort.
- iii) That the City of Surrey, BC Hydro, TransLink, Terasen Gas and the Southern Railway Company, work with the FVHRS, and other community groups and stakeholders along the interurban line to put together a detailed business and financial plan and timetable by the end of February 2007. This plan would be expected to provide the details, process, stages and resources required for upgrading the entire Cloverdale to Scott Road Station corridor for a the introduction of peak period Community Rail service by late 2009 operated with a green and environmentally friendly propulsion system (i.e., hydrogen fuel cells) as a demonstration service as part of the BC Hydrogen Highway Project and using modern and accessible LRT type vehicles This would enable the provision of a reliable, timely and cost-effective transportation option for the City of Surrey and the Greater Vancouver Region.
- iv) That the City of Surrey, linking with TransLink and the FVHRS, should work with the Vancouver 2010 Olympic Committee, and the provincial and federal governments and Hydrogen Canada to have the Cloverdale to Scott Road rail corridor designated as part of the Hydrogen Highway and obtain funding for this component of the project.
- v) That the City of Surrey should immediately appoint a Project Manager who is a member of staff and/or a consultant to assist and work with TransLink, the Corporation of Delta, BC Hydro, FVHRS, GVRD, Southern Rail, Terasen Gas and other key stakeholders on a Community Rail Project Board to fund, plan design and implement Phase One and Phase

Two of the South of Fraser Community Rail project. That this report as well as additional work currently being completed by TransLink on the Community Rail line and complete transportation modelling on proposed transportation improvements south of the Fraser be completed and used as the initial basis for this more detailed planning and design work.

- vi) That the City of Surrey actively work with political and staff representatives of TransLink, Langley Township, Langley City, City of Abbotsford and the City of Chilliwack to get their support for the City of Surrey Community Rail initiative in order to organize the planning and fundraising required for its extension to their areas. This group also must attempt to work with TransLink, provincial and federal governments and railway company representatives to resolve the existing freight movement issue which focuses on the rail corridor east of Cloverdale, where the number of daily freight trains on this section of a Community Rail corridor severely hinders its eastern extension as a passenger service.

Table 1: Existing Bus Connections and Travel Times between Proposed Community Rail Stations

	Cloverdale Station-176 Street and Highway 10	Sullivan Station-152 Street and 64 Avenue	Newton Station-70 Avenue and King George Highway on Hall Road	Kennedy Station-on Nordel Way just east of Scott Road -Kennedy Heights Mall	Punjabi Market Station 94 and 95 Avenues-west of Scott Road	Scott Road Station -near Scott Road SkyTrain
Cloverdale Station-176 Street and Highway 10		-Use #340 bus every 30 minutes - 14 minute trip time plus wait time	-Use #340 bus every 30 minutes Total trip time -28 to 29 minute trip time plus wait time	-Walk west to Scott Road for 5 minutes to use #319 south on Scott Road to Scottsdale Exchange and then the #340 to Cloverdale. Total trip time-50 minutes plus wait and transfer times and walking times	-Walk short walk to Scott Road and uses #319, which operates every 10 minutes, south to Scottsdale Bus Exchange and then transfer to #340 bus Total trip time-55 minutes plus transfer and wait time at Scottsdale Exchange	-Use the #319, which operates every 10 minutes in peak periods, south to #340 bus at Scottsdale Bus Exchange- 20 minutes and then transfer to #340 bus, which operates every 15 minutes, Total trip--50-55 minutes
Sullivan Station-152 Street and 64 Avenue	#340 bus every 30 minutes -10 minute trip time plus wait time		- Use #340 bus which goes very 30 minutes to Newton Total trip time-12 minutes trip time plus wait time	-Walk west for 5 minutes to use #319 south on Scott Road to Scottsdale Exchange and then the #340 to Sullivan. Total Trip time -36 minutes plus wait and transfer times and walking times	-Walk short walk to Scott Road, take #319 south of Scottsdale Exchange and then take #340 to Sullivan Station- Total trip time-36 minutes plus transfers and wait times at Scottsdale Exchange	-Use the #319 bus, which operates every 10 minutes in peak periods, south to Scottsdale bus Exchange and then #340 bus, which operates every 15 minutes to Sullivan Station Total trip time--46 minutes plus long wait and transfers at Scottsdale

<p>Newton Station-70 Avenue and King George Highway on Hall Road</p>	<p>-Use #340 bus every 30 minutes Total trip time- 28 to 29 minute trip time, plus wait time, and not very direct trip</p>	<p>- Use #340 bus which goes very 30 minutes to Newton- Total trip time-14 minute trip time plus waiting time-</p>		<p>-Walk west for 5 minutes to Scott Road, take #319 south on Scott Road to Scottsdale Exchange and then the #340 to Newton. Total trip time- 24 minutes plus wait and transfer times and walking times</p>	<p>-Walk short walk to Scott Road and use #319 south to Scottsdale Exchange and then transfer to #340 to Newton- Total trip time 22 minutes plus transfers and wait times-</p>	<p>-Use the #319 bus south to Scottsdale Bus Exchange and then transfer to #340 bus, which operates every 15 minutes, Total trip time-32 minutes plus wait and transfer time at Scottsdale Exchange</p>
<p>Kennedy Station- Scott Road and Nordel Way -- near Kennedy Heights Mall</p>	<p>-Use #319 south on Scott Road to Scottsdale Exchange and then the #340 to Cloverdale. Total trip time-50 minutes plus wait and transfer times</p>	<p>-Use #340 to Scottsdale Exchange and then #319 north on Scott Road and Nordel Way and then short walk to the east Total Trip time -36 minutes plus wait and transfer times and walking times</p>	<p>-Use #340 bus west to Scottsdale Exchange on Scott Road and then use the #319 north to Nordel Way and walk east for 5 minutes Total trip time- 24 minutes plus wait and transfer times and walking times</p>	<p>- Walk short distance east to Scott Road and then take #319 south to Scott Road and Nordel Way, and then walk 5 minutes west to station on Nordel Way Total trip time-5-6 minutes plus walk times</p>	<p>- Walk short distance east to Scott Road and then take #319 south to Scott Road and Nordel Way, and then walk 5 minutes west to station on Nordel Way Total trip time-5-6 minutes plus walk times</p>	<p>Walk 5 minutes to west to Scott Road and then take # 319 north to Scott Road Station, which operates every 110 minutes in peak periods Total trip time, -15 minutes plus wait and transfer for buses</p>
<p>Punjabi Market Station 94 and 95 Avenues-west of Scott Road</p>	<p>-Use #340 bus to Scottsdale Bus Exchange and then transfer to #319 bus Total trip time-55 minutes plus transfer and wait time at Scottsdale Exchange</p>	<p>-Use #319 south to Scottsdale Exchange and then take #340 to Sullivan Total trip time-36 minutes plus transfers and wait times</p>	<p>-Use #340 west bus to Scottsdale Bus Exchange and then transfer to #319 bus- Total trip time- 22 minutes plus transfers and wait times</p>	<p>- Walk west to Scott Road and then take #319 north to 94 Ave. and walk west-7-8 minutes</p>		<p>-Use #319 bus along Scott Road to Scott Road station-10 minutes</p>

<p>Scott Road Station SkyTrain Station</p>	<p>-Use #340 bus to Scottsdale Bus Exchange 40 minutes and then transfer to #319 bus Total trip--60 minutes plus wait and transfer time at Scottsdale Exchange</p>	<p>-Use #340 to Scottsdale Exchange and then take #319 north Total trip time--46 minutes plus long wait and transfers at Scottsdale</p>	<p>-Use #340 bus to Scottsdale Bus Exchange and then transfer to #319 bus- Total trip time-32 minutes plus wait and transfer time at Scottsdale Exchange</p>	<p>-Walk 5 minutes to west to Scott Road and then take #319 north to Scott Road Station Total trip time -15 minutes plus wait and walking times</p>	<p>-Use #319 bus north to Scott Road Station -8-9 minutes plus wait time for bus</p>	
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Table 2: Employment within 300-500 Metre Radius of Community Rail Stations

Potential Stations	2003 Employment	2011 Employment	2021 Employment
Cloverdale Station –Highway 10 and 176 Street	666-1452	786-1737	938-2078
Sullivan Station—64 Avenue and 152 Street	45-123	104-284	162-444
Newton Station-70 Avenue and King George Highway on Hall Road	535-1460	651-1764	775-2089
Kennedy Station- on Nordel Way just east of Scott Road	72-209	86-250	106-331
Scott Road Station-Near Scott Road SkyTrain Station	102-297	133-400	178-542
TOTAL	1420-3541	1760-4435	2159-5484

Source-City of Surrey, 2006

Table 3: Population within 300 – 500 metres radius of Community Rail Stations

Potential Stations	2003 Population	2010 Population	2021 Population
Cloverdale Station – Highway 10 and 176 th Street	330-695	399-858	634-1325
Sullivan Station – 64 th Avenue and 152 nd Street	77-212	311-835	316-848
Newton Station - 70 th Avenue and King George Highway on Hall Road	648-1443	957-2201	1115-2602
Kennedy Station – Nordel Way just east of Scott Road	338-1012	331-992	368-1107
Scott Road Station – Near Scott Road SkyTrain Station	45-218	46-227	99-355
Total	1436-3578	2044-5113	2532-6217

Source-City of Surrey, 2006

Table 4: Residents in Community Rail Corridor Catchment Area Communities-2005

Area	Number of Residents
Whalley(west)	50,000
North Delta	52,000
Newton	104,000
Cloverdale	38,000
TOTAL - Surrey and Delta	244,000

Source: City of Surrey and Corporation of Delta

Table 5: Employees in Community Rail Corridor Catchment Area Communities-2005

Area	Number of Employees
Whalley(west)	14200
Newton	22800
Fleetwood	6800
Cloverdale	7100
TOTAL - Surrey and Delta	50900

Source: City of Surrey and Corporation of Delta

Table 6: Means of Accessing Proposed Stations on Community Rail

Proposed Station	Access Auto, Walking, Cycling and Transit
Cloverdale Station – just east of 176 Street and south of Highway 10	#340 and #320 Buses to Langley Town Centre, Newton Town Centre, Surrey City Centre, Sullivan Rail Station, and Scottsdale Exchange; could provide 60 angle parking spots; need improvements to walking access; Cloverdale Fairgrounds streetcar with access via 176 A street and overhead pedestrian walkway across Highway 10; provide cycling storage facilities and racks
Sullivan Station-just east of 152 Street and south of 64 Avenue	#345 bus to Guildford Town Centre and White Rock/South Surrey Town Centre, #340 to Newton Town Centre and Scottsdale Exchange; could provide 60 angle parking spots near the station; walking access
Newton Station-on Hall Road just west of King George Highway and south of 72 Avenue	Buses along King George Highway-#321 and #394 and close to Newton Bus Exchange which is on 72 Avenue just east of King George Highway, which serves the #301, #321,#323,#324,#325,#340,#393 and #C75 with connections to Surrey City Centre, Sullivan, Scottsdale Exchange, Cloverdale and Richmond City Centre; could provide angle parking near station platform; needs improvements to walking access ; provide cycling storage facilities and racks
Optional Station-128 Street and 82 Avenue just east of 128 Street	Buses along 128 Street -#393, #323 to Surrey City Centre and Newton Town Centre; can use bus to travel south to Kwantlen College, which is located on 72 Avenue just west of 128 Street; needs improvements for walking access ; provide cycling storage facilities and racks
Kennedy Station- (Nordel Way just west of Scott Road) near Kennedy Heights Mall	New bus route along 88 Avenue (i.e. not currently in TransLink’s plans) between Fleetwood and Annacis Island, could share parking with Kennedy Heights Mall; near Scott Road with access to #314, #319, and #329 buses which link to Surrey City Centre, King George and Scott Road SkyTrain Stations; provide cycling storage facilities and racks
Punjabi Market Station-between 94 and 95 Avenues just west of Scott Road	Buses long Scott Road-#314 #, 319 and #329 making connections with the Scott Road (#319) and King George SkyTrain stations(#314,#329) connections ; walk to nearby shop parking; provide cycling storage facilities and racks
Scott Road Station –just east of Scott Road near Scott Road SkyTrain Station	Could provide a 500-600 metre covered walkway link on City of Surrey land along Scott Road to the Scott Road SkyTrain Station, or alternatively a spur rail line connection to the SkyTrain station with 7000 parking spots; provide cycling storage facilities and racks

Table 7: High Level Operating and Capital Cost Estimates for Heritage/Tourism and Community Rail Service Scenarios

CAPITAL COSTS	Option 1- Stage 1- (Part One) Single Existing Track and Heritage /Tourism Trains operate weekend trains every 30 minutes between Cloverdale Station and Sullivan Station-8.00 a.m. to 5.00 p.m. during summer Stage 2-(Part Two) Heritage/Tourism Trains operate weekend trains every 90 minutes between Cloverdale and Scott Road Stations 8.00 a.m. to 5.00 p.m. during summer	Option 2 - Single Tracked Line, with double tracking in station areas, sidings and Communications/Signal System to Operate 20 Minute Weekday Peak Period Commuter Service –5.30 a.m. to 8.30 a.m. and 3.30 p.m. to 6.30 p.m. - Cloverdale Station to Scott Road Station with spur line or covered walkway connection to Scott Road SkyTrain Station
Stations	Stage 1(part one) -2 stations at \$75,000 each= \$150,000 Stage 1(part two)- 5 additional stations at \$75,000 Total=\$375,000	7 Station Further Upgrades at \$1,000,000 each = \$7,000,000
Parking Lots	Stage 1(part 1)-Parking at Sullivan, Cloverdale -60 spots at each station-\$3,000 per paved spot = \$360,000 Stage 1(part 2)-Add 60 parking spots at each of 5 other stations=\$900,000	Parking completed in Stage 1 at Sullivan, Cloverdale, Newton, 128 St./82 Ave., Kennedy, and Pubjabi Market Stations- -Arrange additional parking by negotiating shared parking with other properties near the stations
New Continuously Welded Track, Ties, Surfacing and Ballast, some movement of Hydro Facilities for Double Tracking in Station Areas, and Changes to Industrial Sidings		Assume \$1,500,000 per km (19km).* -Approximately \$28,500,000
Track Surfacing (includes lifting, lining and trimming), Some New Replacement Ties and Ballast Upgrade and Some Rail Replacement –Assume \$100,000 per km **	Stage1 (part one)-some of this work done through Border Infrastructure Program with Highway 10 -\$200,000 for Cloverdale to Sullivan Station section Stage 1 (part two)-for Sullivan Station to Scott Road-\$1,200,000	
Vehicles	Rehabilitation/acquisition costs for 2 BCER cars and baggage car with hydrogen fuel cell powered engine and diesel-electric generator as back –up generator-\$2,000,000 plus	Example : Use Parry PPM 100 vehicles(total standing capacity of 100)- \$3.0 million each delivered with hydrogen-fuel cell engines - Four 2 car trains and 2 spares -10 vehicles at \$3.0 million per vehicle \$30.0 million Note: In comparison Ottawa 's accessible Talent LRT vehicles, diesel powered, would be \$6.0 million each-\$60.0 million
Right-of- Way Fencing	Stage1-(part one)-none	\$20 a linear foot for 33% of line

	Stage 1-(part two)- none	\$400,000 times 2 sides-\$800,000
Signal and Communications System		\$5,000,000 for upgrading current communications and signal system
Maintenance Facilities-Additional	Add on/modifications to vehicle maintenance/storage vehicles facility at Sullivan Station- \$100,000	Add on to vehicle maintenance/storage vehicles at Sullivan Station -\$5,000,000
Complete Risk Assessment-one time cost	\$30,000	\$50,000
Railroad Crossings Warning Signals-new or upgrades	Stage 1(part one)- 156 Street signal upgrade and signage at other locations-\$300,000 Stage 1 (part two) 12 crossings and upgrades, and improved signage at others- \$275,000 each \$3,300,000	
Pedestrian Walkways to Stations and Cycling Facilities-\$50,000 per station at \$1,000 per metre for 50 metres of sidewalk at each station	Stage1-(part one) – 2 stations-\$100,000 Stage 1-(part two)- 5 stations \$250,000	Further upgrades-\$1,000,000
Fare Revenue Collection Equipment-\$150,000*** per unit and 1 per station and some spares		10 times \$150,000=\$1,500,000
Spur line connection between Scott Road Community Rail Station and Scott Road SkyTrain Station		\$2,500,000
TOTAL CAPITAL COSTS	Stage 1 and Stage 2 TOTAL= \$9,265,000	\$81.3 million with PPM vehicles and \$111.3 million with Talent vehicles
ANNUAL OPERATING/MAINTENANCE COSTS		
Annual Track and Signal Maintenance and Inspection	Stage 1 -\$60,000 Stage 2-\$225,000	\$350,000
Annual Payment-Southern Rail – cost for use of trackage	Stage 1 (part one)-volunteers Stage 1 (part two)-volunteers No cost	Included in per vehicle service hour costs
Marketing Costs	Stage 1 -\$10,000 Stage 2-\$10,000	\$100,000
Vehicle Maintenance Costs	Stage 1 -\$10,000 Stage 2-\$10,000	\$500,000
Training and Safety Costs	Stage 1 -\$10,000 Stage 2-\$10,000	\$100,000
Service Operating Costs –WCE uses \$468.00 per vehicle service hour	Stage 1 (part one)-volunteers Stage 1 (part two)-volunteers	12,000 vehicle service hours times ***\$50% *468.0 per hour =\$234.00 times 12,000 vehicle hours =\$2,808,000
Liability Insurance \$25-\$100 Million	\$100,000	\$2,000,000
TOTAL OPERATING COSTS	Stage 1 (part one)\$190,000 plus Stage 1(part two) \$-255,000 plus	\$5,858,000 plus

Note:

* and ** Estimates from several rail companies

*** Use 50% of 2006 West Coast Express rate due to smaller 2 vehicle trains and much shorter track- WCE trains are 6-7 cars and operate over 65 km track

**** Pedestrian walkways-\$1000 per metre in City Surrey with some ditch infill. Provided by City of Surrey Engineering Department