SOUTH OF FRASER
transit plan

Technical Memorandum No. 4 APC (Automated Passanger Counter) Data Analysis

TRANSLINK

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Proposed Route & Rationale

The proposed route will provide Frequent Bus service between Langley Centre and Maple Ridge, via 200th St. and the future Golden Ears Bridge (expected completion in mid-2009), intersecting Walnut Grove. This route will serve commuters travelling between Langley, Walnut Grove and Maple Ridge. The full implementation of this route will not be possible until completion of the Golden Ears Bridge, however it is possible that the Langley to Walnut Grove portion of the route could be implemented in advance, if this is warranted by demand. The analysis provided here aims to estimate the expected demand if the Langley to Walnut Grove portion of the route were implemented prior to the implementation of the entire proposed route.

Figure 1. Proposed Route and 2031 South of Fraser Network.

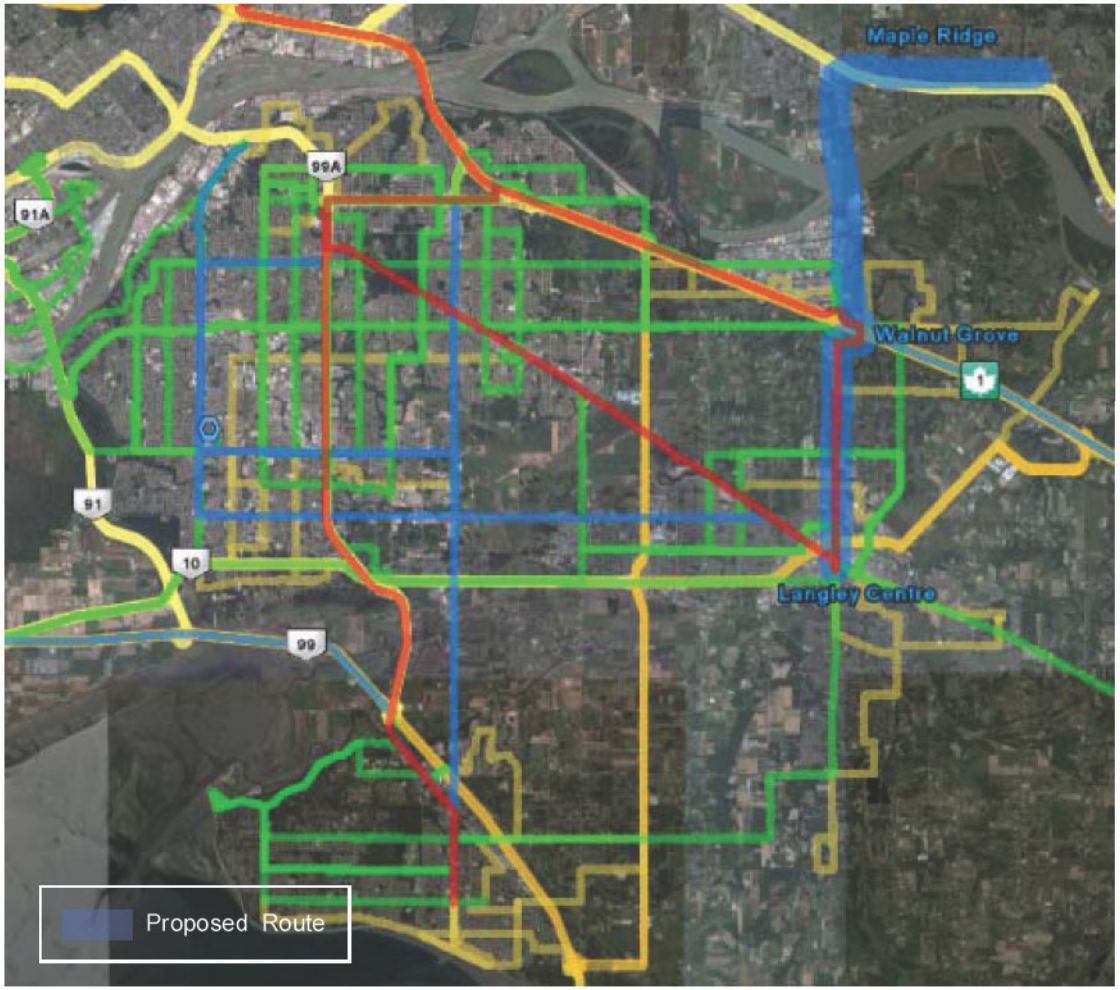
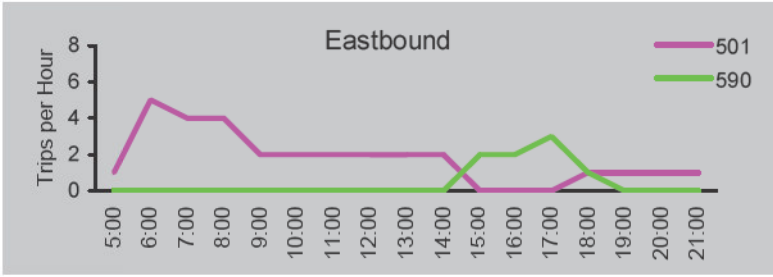


Figure 2. Proposed Route and Existing Routes and Frequencies

Route Frequencies:



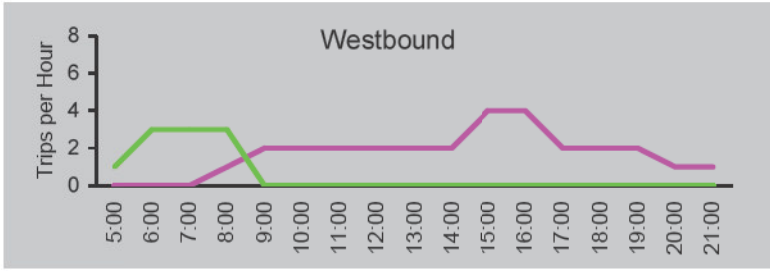


Figure 2 show the proposed route and existing routes and frequencies. The #501 and #590 currently serve 200 St. These routes have complementary schedules, and are in effect a single route. The combination of the #501/#590 operates at 15 to 30 minute frequency. Figure 2 shows the proposed route and the existing routes and frequencies.

APC Analysis and Results

The load profiles and stop activity for the #501/#590 are shown here. Figures 3 and 4 show the data for travel to Surrey Central in the AM Peak, and to Langley Centre in the PM Peak. Figures 5 and 6 show the data for travel to Langley Centre in the AM Peak, and to Surrey Central in the PM Peak.

Figure 3. Westbound AM Peak #590 Load Profile and Stop Activity (n = 19)

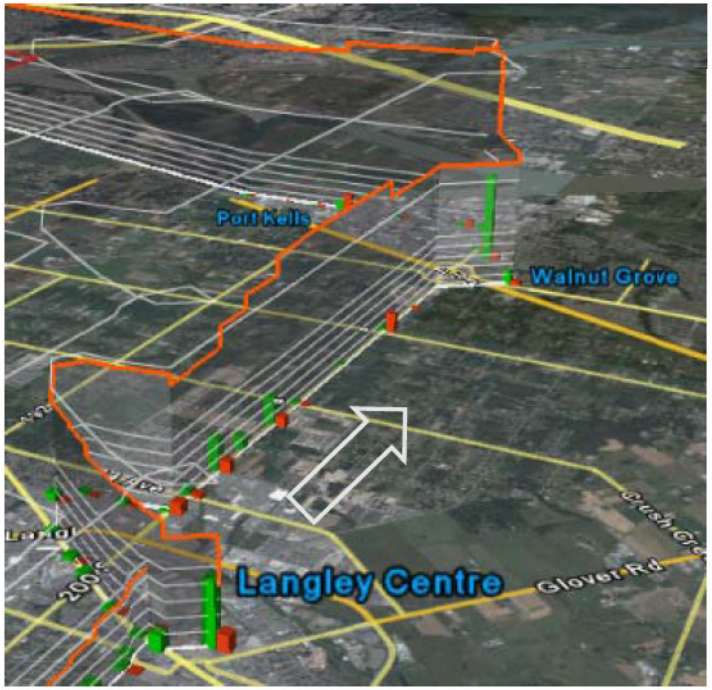


Figure 4. Eastbound PM Peak #590 Load Profile and Stop Activity (n = 24)

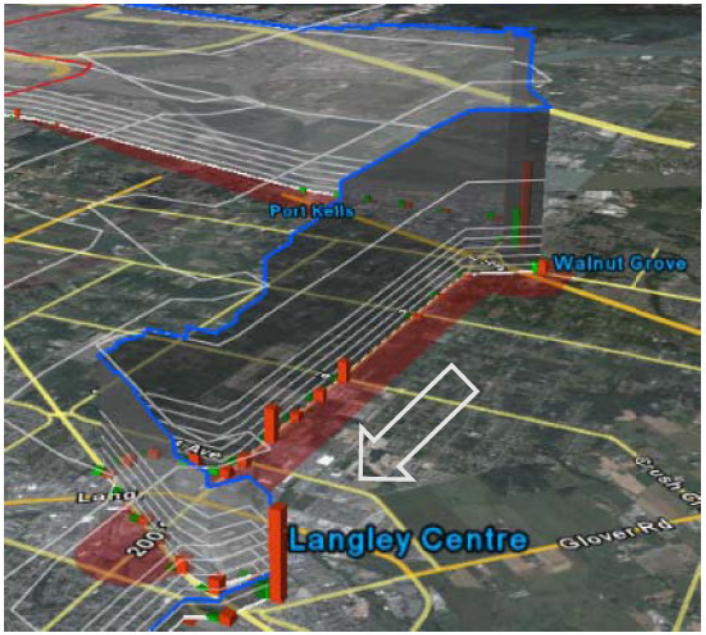
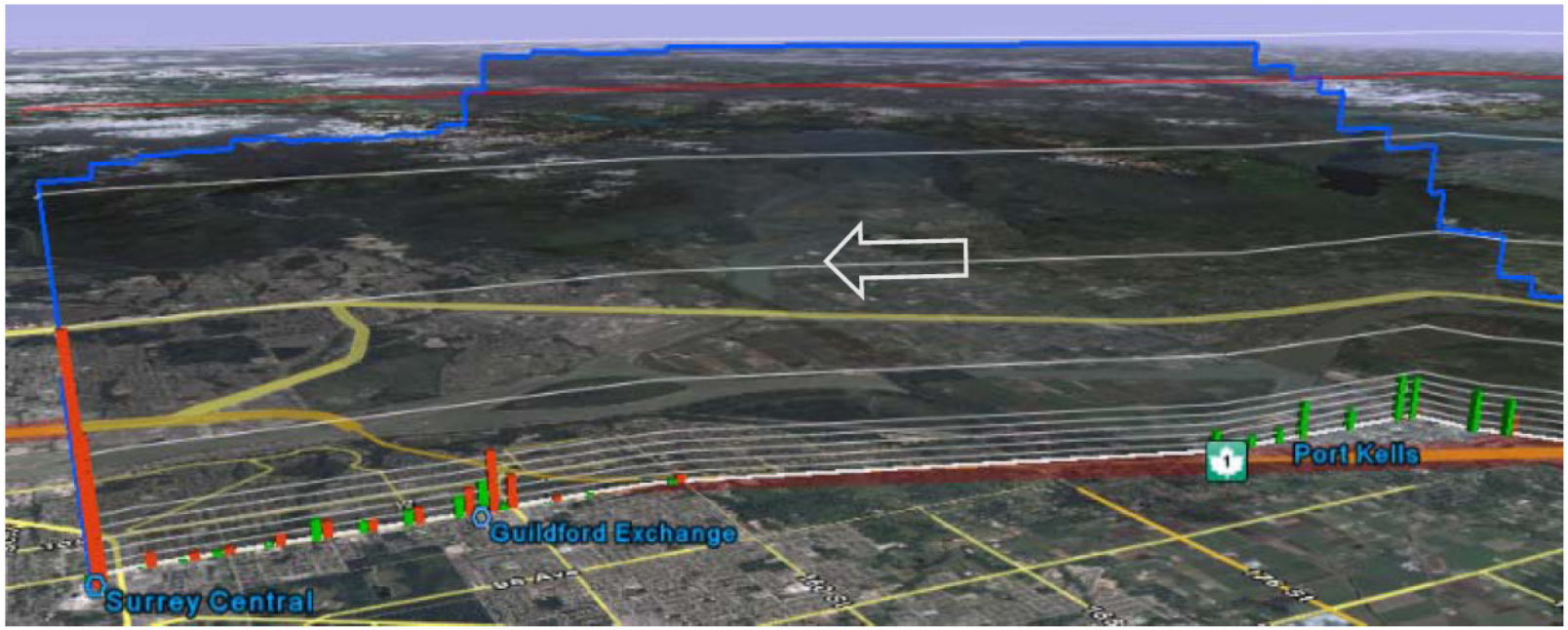
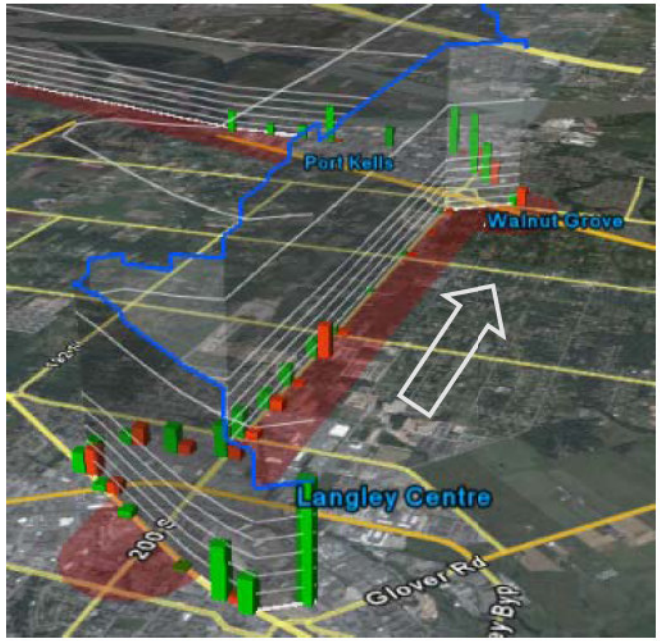


Figure 5. Eastbound AM Peak #501 Load Profile and Stop Activity (n = 54)

Figure 6. Westbound PM Peak #501 Load Profile and Stop Activity (n = 16).





The dominant travel pattern for the #501/#590 is for eastbound travel from Surrey Central to Port Kells in the AM Peak and return travel to Surrey Central in the PM Peak (shown in Figures 5 and 6). The proposed route will not serve this demand; other services will provide service to Port Kells.

The demand between Langley Centre and Walnut Grove is moderate. There is moderate stop activity within Walnut Grove and Langley, and along 200th St, south of 72nd Ave. Travel along 200th St is bidirectional. With the expected intensification of land use east of 200th St between Langley Centre and Walnut Grove, and the future implementation of the Highway 1 Rapid Transit, the demand along this corridor can be expected to increase.

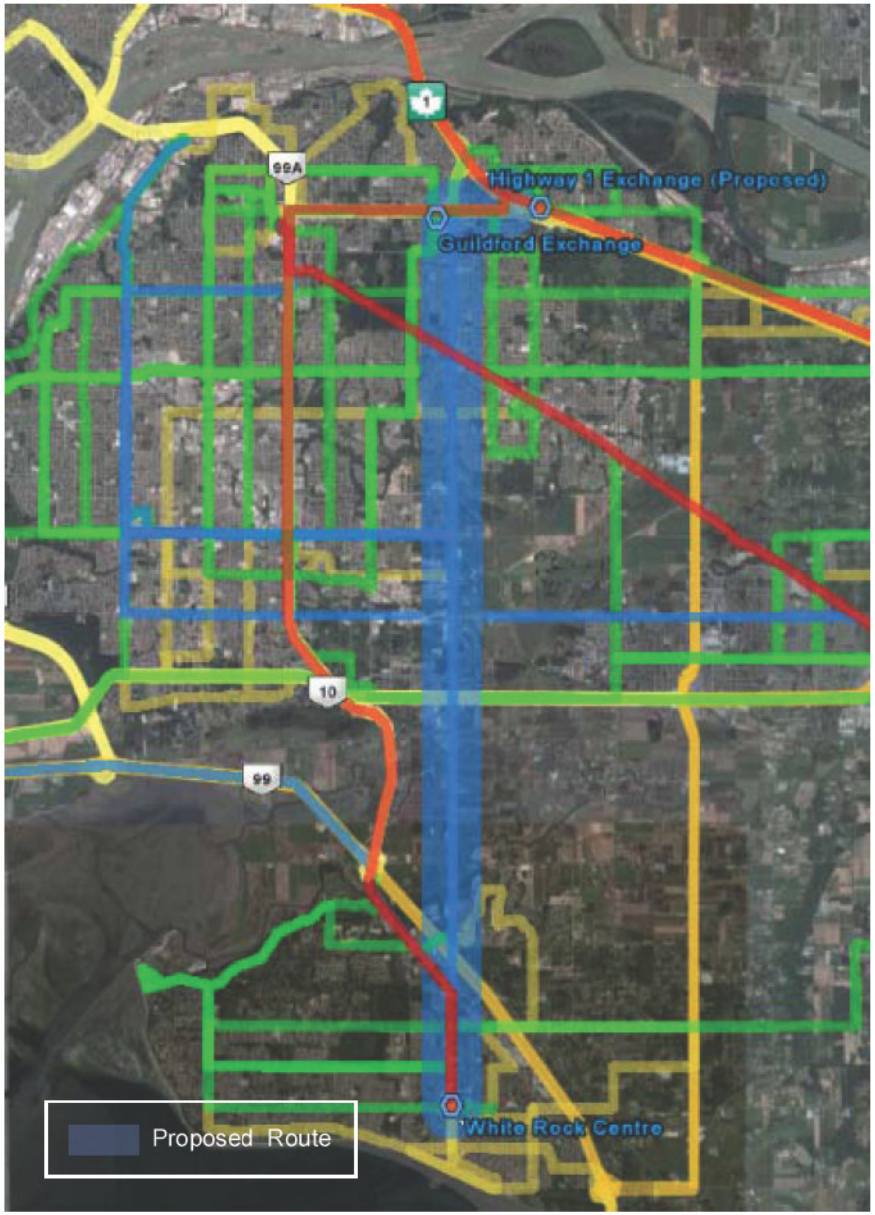
The future 200th St / Highway 1 Rapid Transit service will provide fast and convenient service between Walnut Grove and Langley, however the distributed stop activity along 200th St south of 72nd Ave indicates the need for underlying local service, which the proposed route will provide. Depending on the timing of the Highway 1 Rapid Transit service, and the rate of development east of 200th St, the implementation of the Langley Centre to Walnut Grove portion of the proposed route may be warranted.

Conclusion

The routes that currently serve the alignment of the proposed Frequent Bus service show moderate demand. Increased development east of 200th St, between Langley Centre and Walnut Grove, and the future implementation of the Highway 1 Rapid Transit can be expected to generate increased demand along the 200th St corridor. Depending on the timing these future developments, the implementation of the Langley Centre to Walnut Grove portion of the proposed route may be warranted.

Proposed Route & Rationale

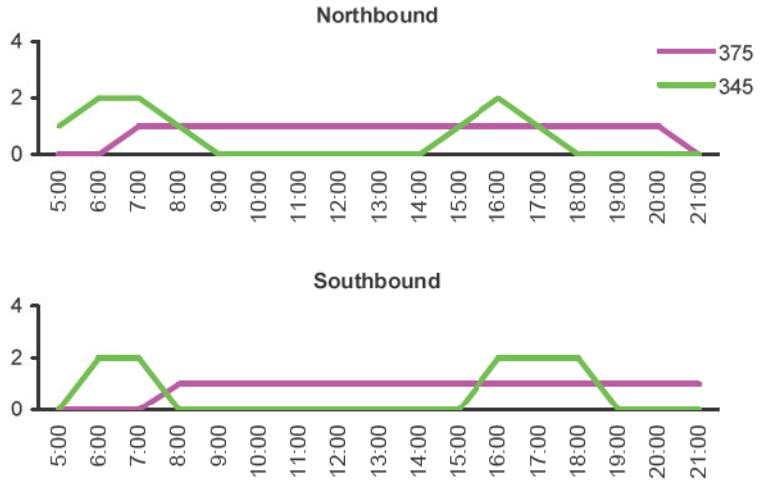
Figure 1. Proposed Route and 2031 Network.



The proposed route would provide convenient service between White Rock Centre and the proposed exchange at Highway 1 and 104th Ave, via 152nd St and 104 Ave. This would connect White Rock Centre with destinations along 152nd Ave, and with proposed Rapid Transit services at Fraser Highway, 104 Ave, and Highway 1.

Figure 2. Proposed and Existing Routes

Figure 2 shows the proposed and existing routes. 152nd Ave is currently served by the #345 and the #375. The #345 terminates at Surrey Central and runs during the peaks only at 30 minute frequency, and the #375 terminates at Guildford Exchange and runs at 1 hour frequency. The alignment of the proposed route is identical to that of the #375, with the exception that its southern terminus is at White Rock Centre, rather than at 8th Ave and King George Highway, and its northern terminus would be at the proposed Hwy 1 exchange, rather than at Guildford Exchange.



APC Analysis and Results

Note that all data for the #345 and #375 shown in this document was collected between January 8th and April 5th, 2007.

Figure 3. Southbound #375 Load Profiles

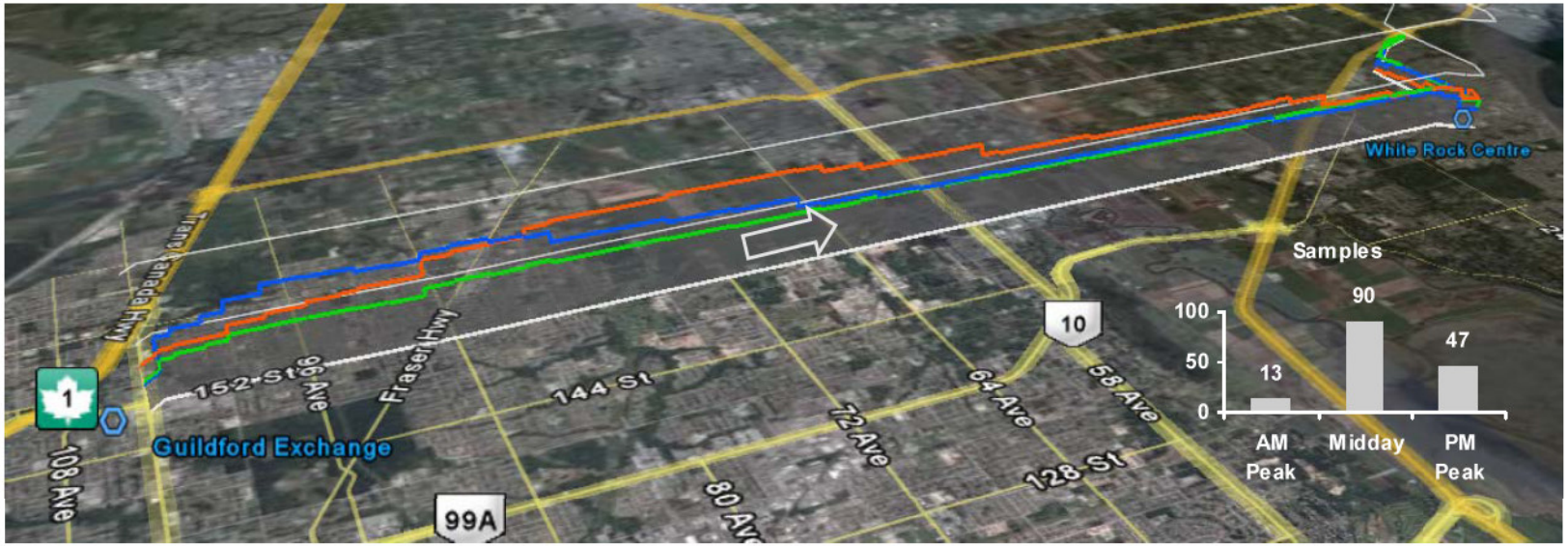


Figure 4. Northbound #375 Load Profiles

Figure 5. Southbound #375 AM Peak Stop Activity (n = 13)

North Surrey

White Rock & South Surrey

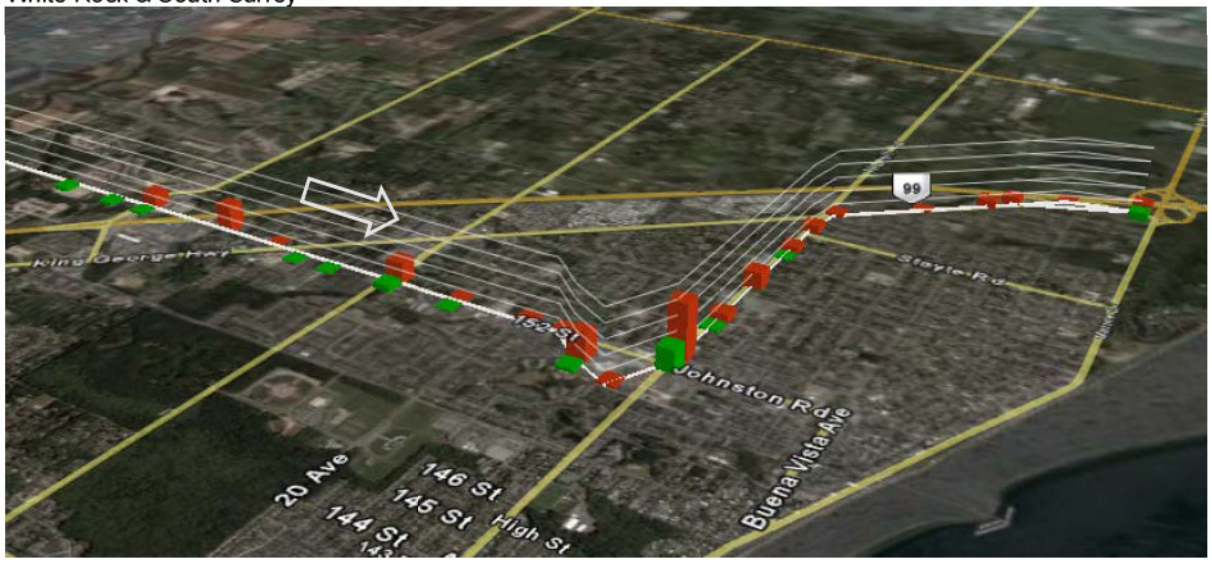
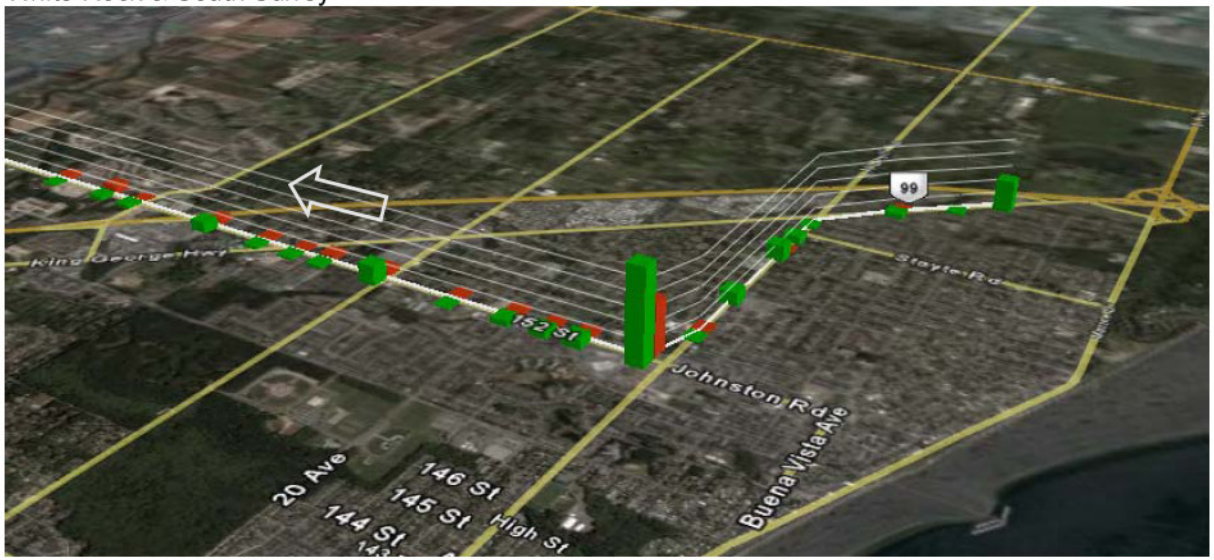


Figure 6. Northbound #375 PM Peak Stop Activity (n = 67)

White Rock & South Surrey



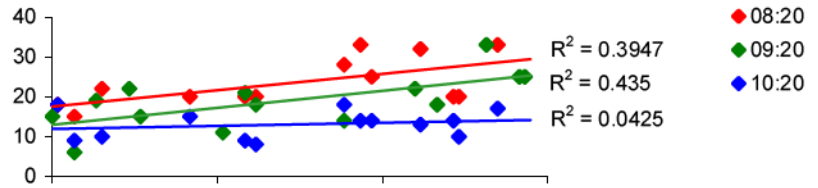
North Surrey

The load profile and stop activity data for the #375 show very low demand for this route. This can be expected, due to its very low frequency of service. It is also possible that since the #375 was implemented relatively recently (December 18, 2006), many potential riders have not yet incorporated this route into their regular travel patterns, and that ridership for this route is still developing. The graphs below show total boardings per trip, classified by departure time, from January 2007 to April, 2007, in order to determine if ridership is increasing.

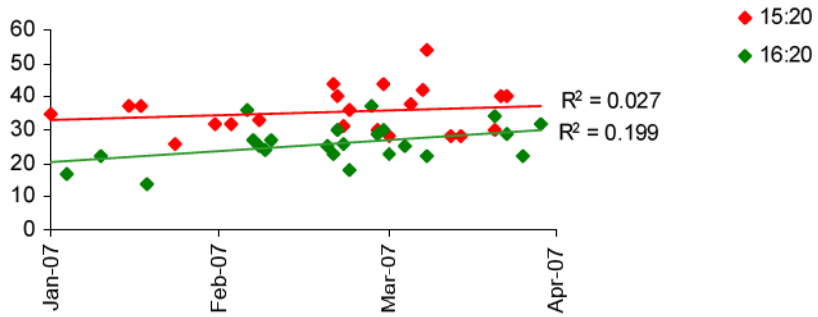
Figure 7. Total Boardings on #375, by Direction and Time Period, from January to April, 2007

Southbound

AM Peak

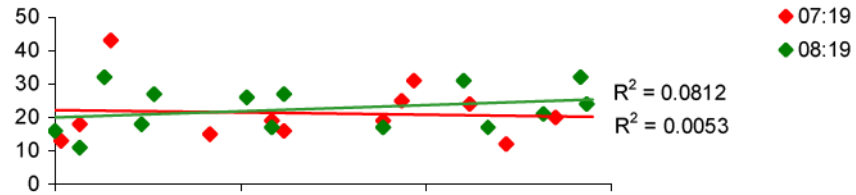


PM Peak

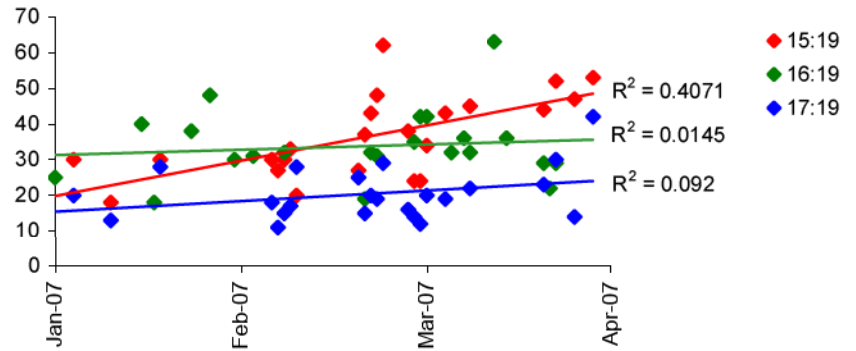


Northbound

AM Peak



PM Peak



The analysis of total boardings suggests that ridership on the #375 is not growing significantly; it is likely that this route has achieved its full potential ridership.

Figures 8 and 9 show the load profiles for the #345 for northbound and southbound trips, respectively.

Figure 8. Northbound #345 Load Profiles.

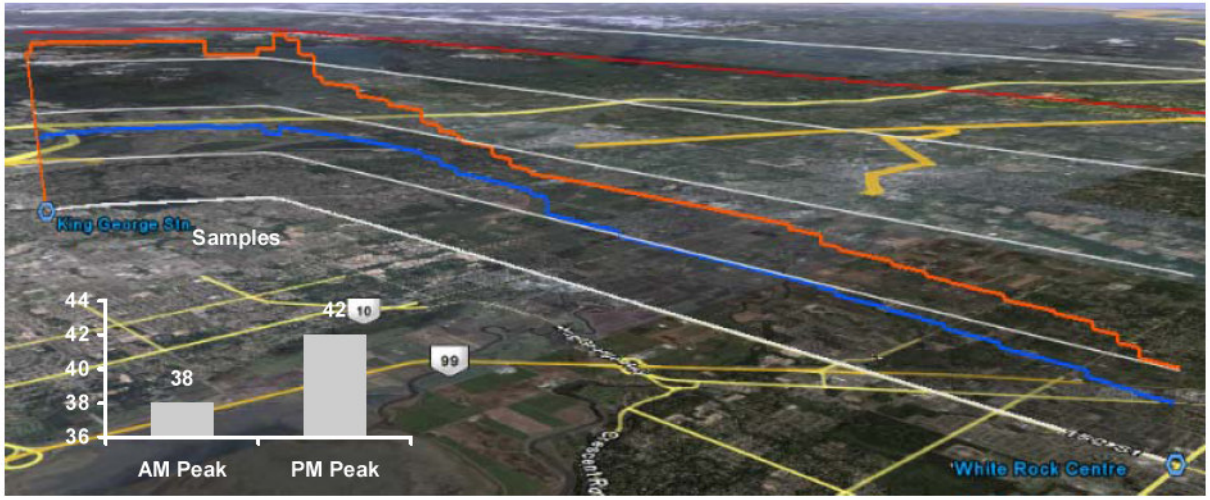
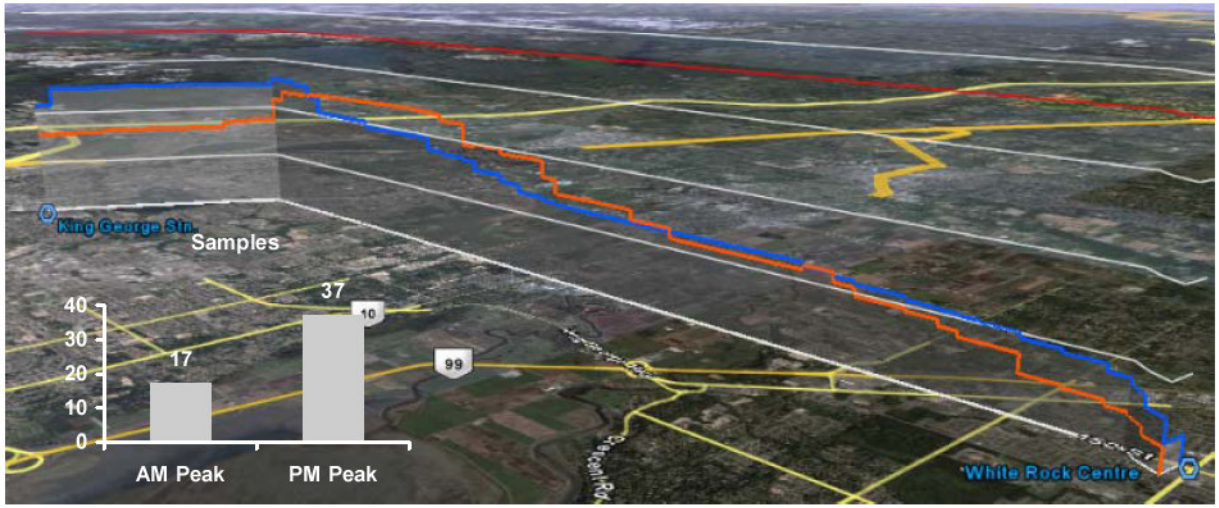


Figure 9. Southbound #345 Load Profiles.



The load profiles show that the dominant travel pattern is to Surrey Central in the AM Peak, and towards White Rock Centre in the PM Peak. Figures 10 and 11 show stop activity for these trips.

Figure 10. Northbound AM Peak #345 Stop Activity

Figure 10. Northbound AM Peak #345 Stop Activity

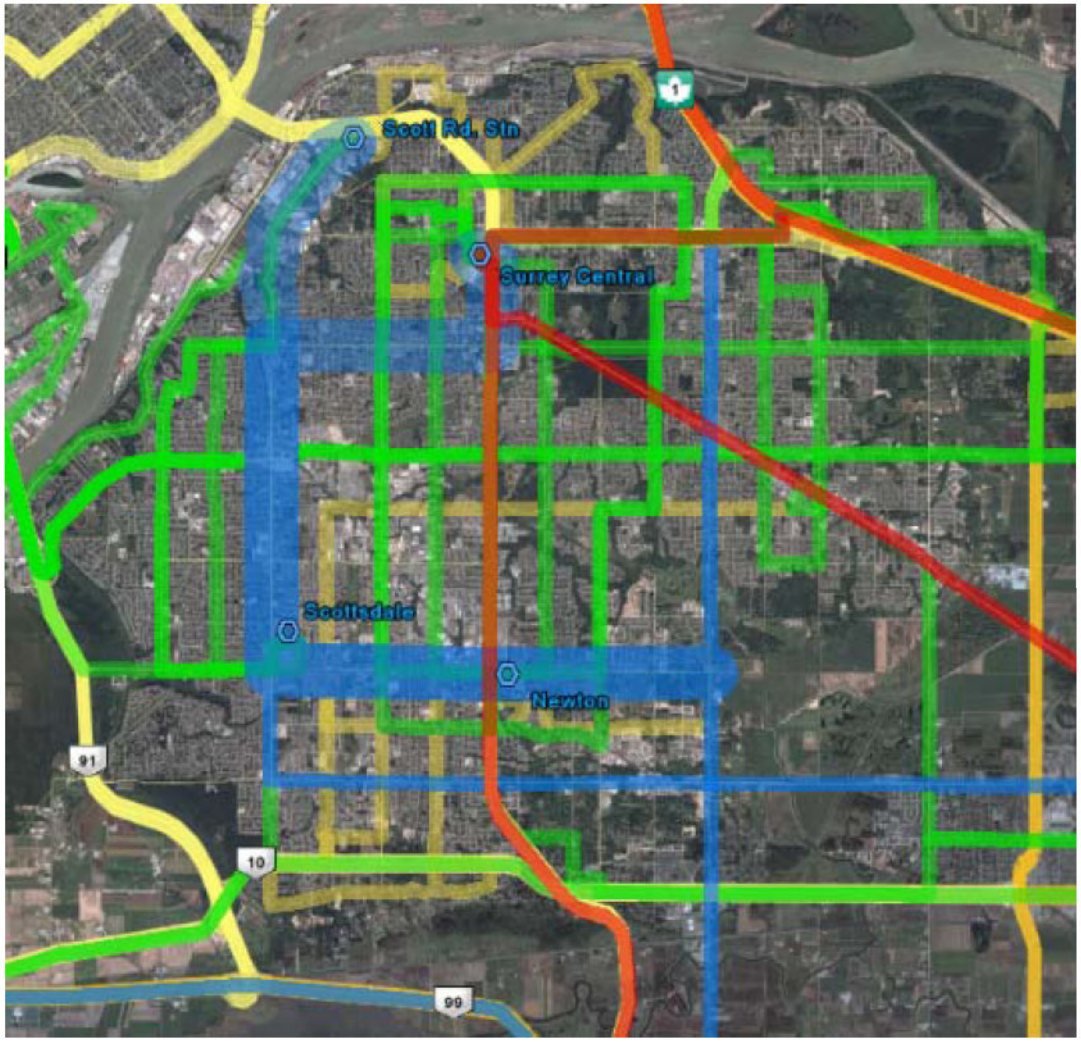
The stop activity data shows very little passenger turnover on the #345: most passengers in the AM Peak are not alighting until King George Station, and most passengers in the PM Peak board at King George Station. The load profiles are therefore reliable indicators of demand on this route. It is significant that approximately half of the northbound AM peak demand for the #345 is generated by passengers boarding north of King George Highway. It is this demand that will be served by the proposed route. Passengers south of King George Highway, travelling to King George Station would likely opt to use the proposed King George Highway / 104th Ave Rapid Transit service.

Conclusion

Demand on the #345 is moderate to high, though only half of that demand is likely to be served by the proposed Frequent Bus service. Demand on the #375 is low, however this route runs at very low frequency so its current ridership is not an ideal indicator of potential demand. The frequency of the proposed route should be increased gradually over time in order to gauge actual demand.

Proposed Route & Rationale

Figure 1. Proposed Route and 2031 Network.

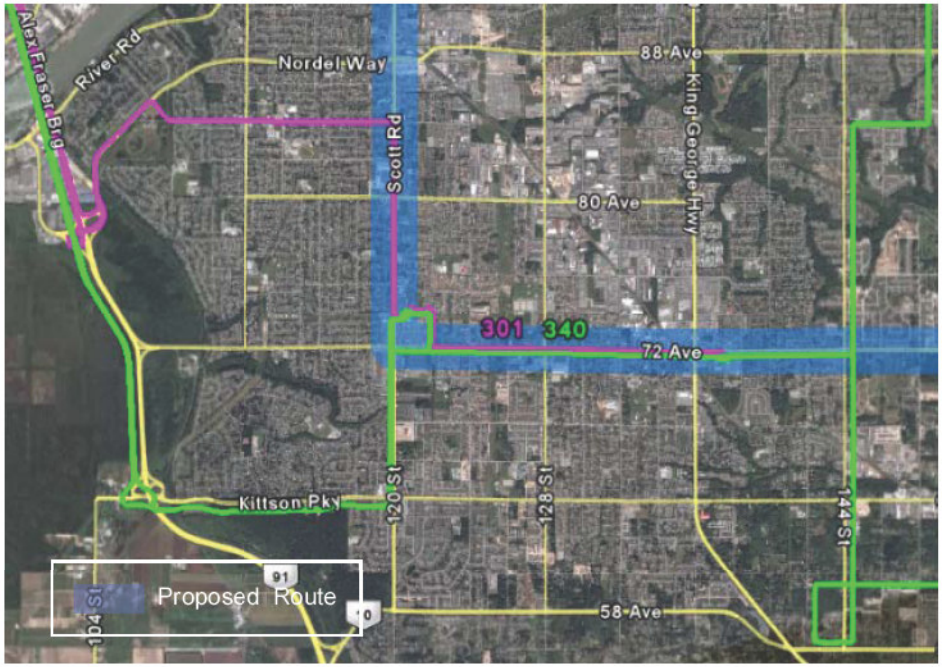


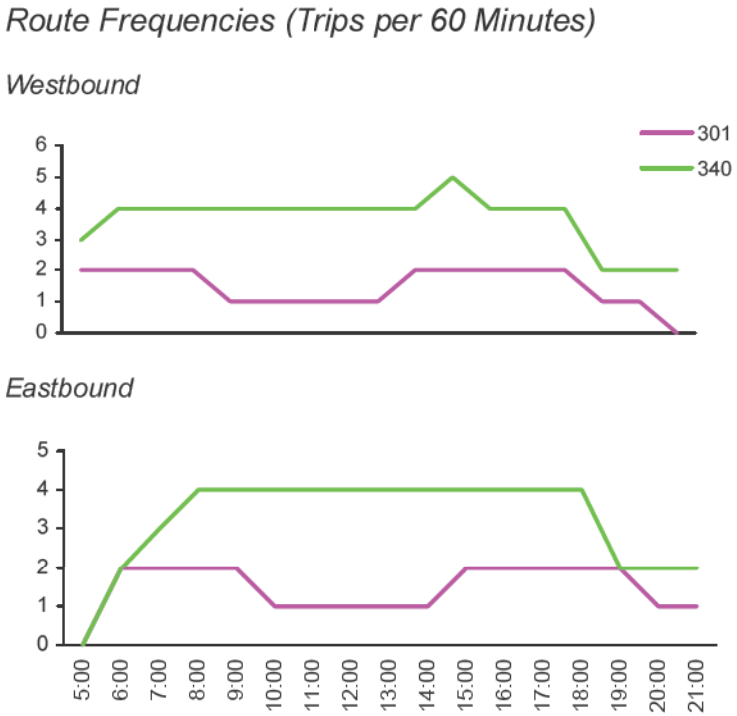
The proposed route will provide Frequent Bus service along 72nd Ave, between 152nd St. and Scott Rd, and along Scott Rd. to either Scott Rd Station or to Surrey Central (via 96 Ave and King George Hwy). This route will serve important destinations along 72nd Ave, including Newton Exchange, Kwantlen University College, Scottsdale exchange, and a proposed transit exchange at 152nd St with connections to the proposed 152nd St Frequent Bus route. The Scott Rd. portion of the proposed route will connect to many other existing and proposed routes, and connect to the SkyTrain either at Scott Rd. Station or Surrey Central. There are also many neighborhood destinations along both Scott Rd and 72nd Ave.

Both 72nd Ave and Scott Rd. currently have Frequent Transit service. This proposal is to combine these existing services into a single continuous route.

Figure 2 shows the routes currently serving 72nd St. The #340 provides 15 minute service throughout most of the day while the #301 provides 30 to 60 minute service.

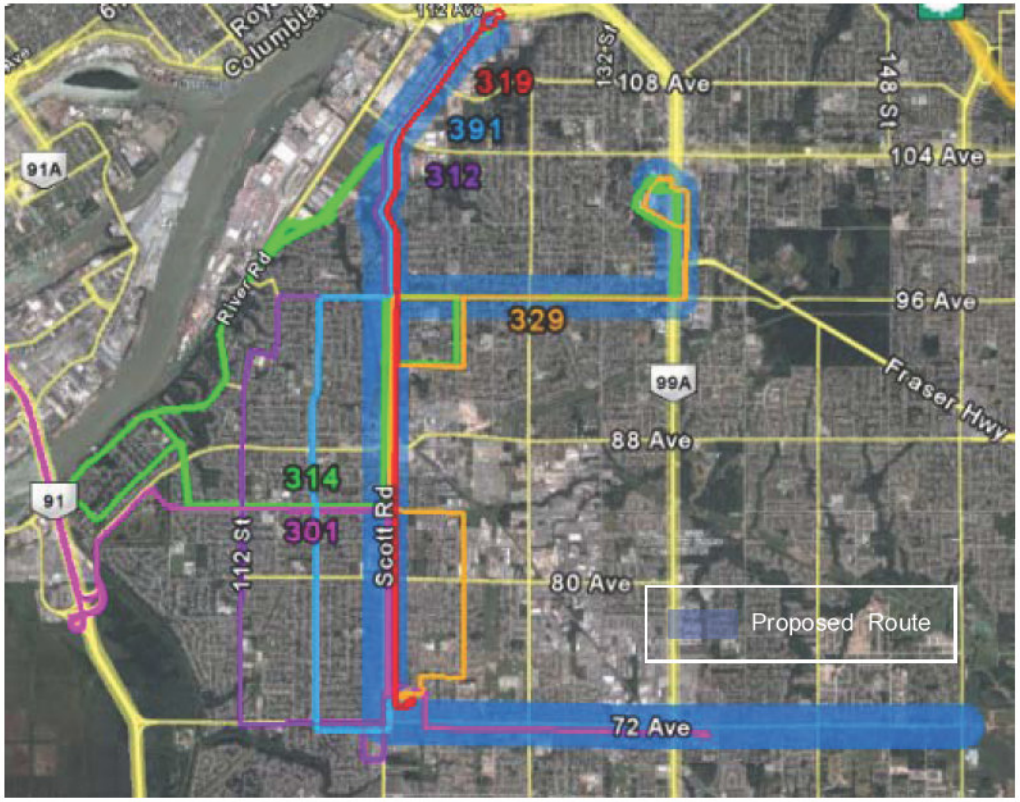
Figure 2. Routes and Frequencies of Current 72nd Ave Services.

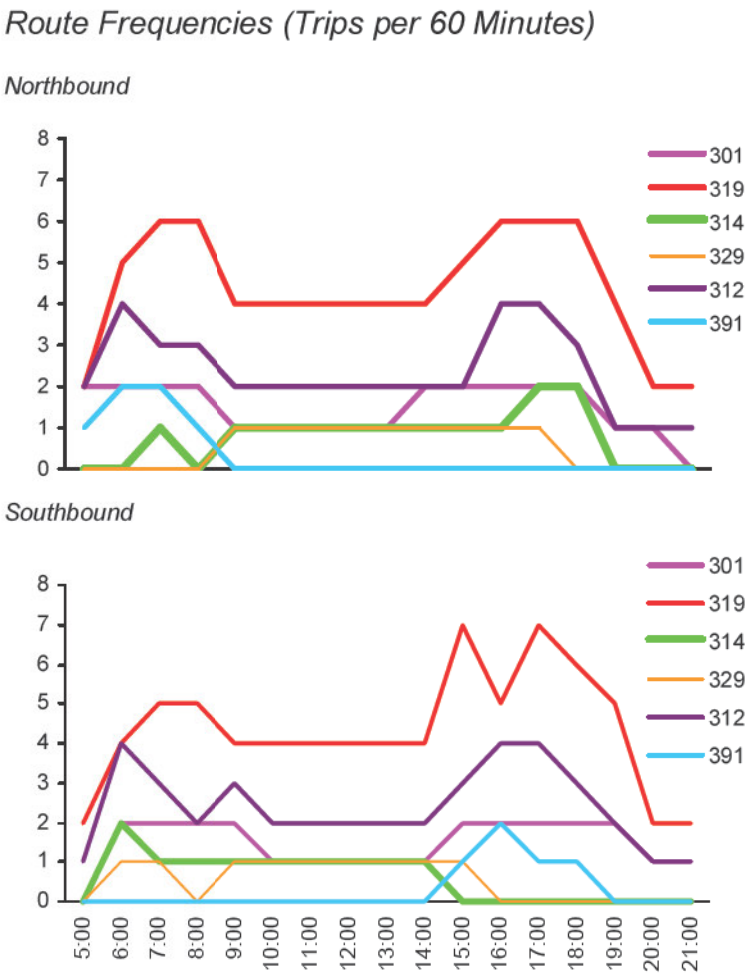




Routes currently serving Scott Rd. include the #301, #312, #314, #319, #329 and #391 (Figure 2). The #319 provides 10 to 15 minute service along the entire corridor. Other routes augment service along portions of Scott Rd. Of note are the #312 and #391 which provide 15 to 30 minute service to and from Scott Rd. Station during the peaks, and the #301 which provides 30 to 60 minute service between 72 Ave and 84 Ave.

Figure 3. Routes and Frequencies of Current Scott Rd. Services.





Both 72nd Ave and Scott Rd. are high-volume and busy corridors: the loads on many of these routes are high despite their high frequency of service, and stop activity is consistently high along both corridors. However, the current system is circuitous and complex. The #340 has several different route alignments, and many trips only travel a portion of the entire route. The #319 provides a direct, continuous service on Scott Rd, while the rest of the Scott Rd. services only travel a portion of the corridor, and many overlaps exist between routes. This complexity detracts new riders, as the route alignments and route naming are non-intuitive. The proposed reconfiguration of services, with a single frequent service along both 72nd Ave and Scott Rd, is intended to simplify the network.

APC Analysis and Results

Figures 4 and 5 show load profiles and stop activity for the #319 on Scott Rd, and Figures 6, 7, 8, and 9 show loads for the #340 on 72nd Ave, for trips originating from Cloverdale and from Guildford Exchange.

Figure 4. Northbound #319 Load Profiles with AM Peak Stop Activity

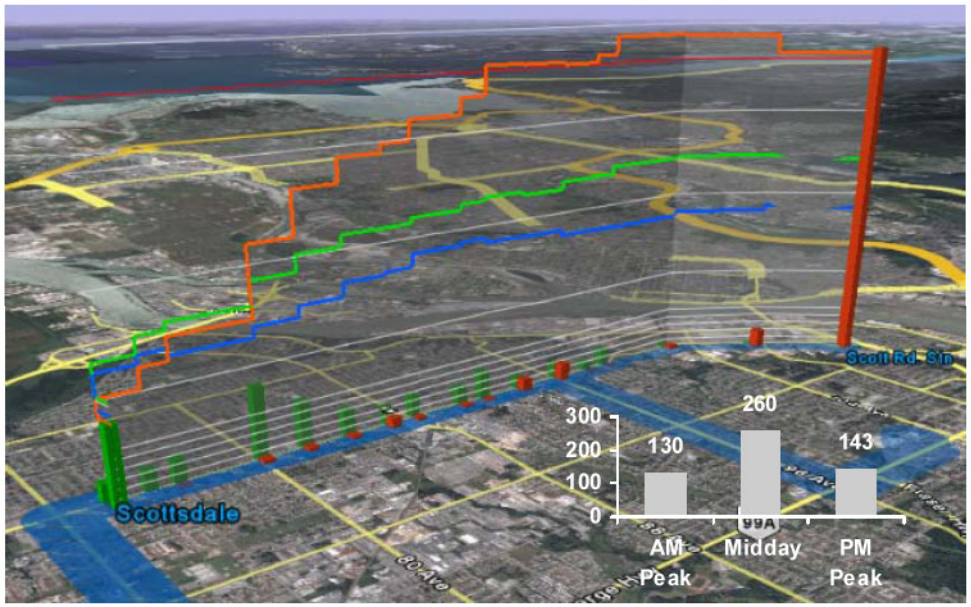


Figure 5. Southbound #319 Load Profiles with PM Peak Stop Activity

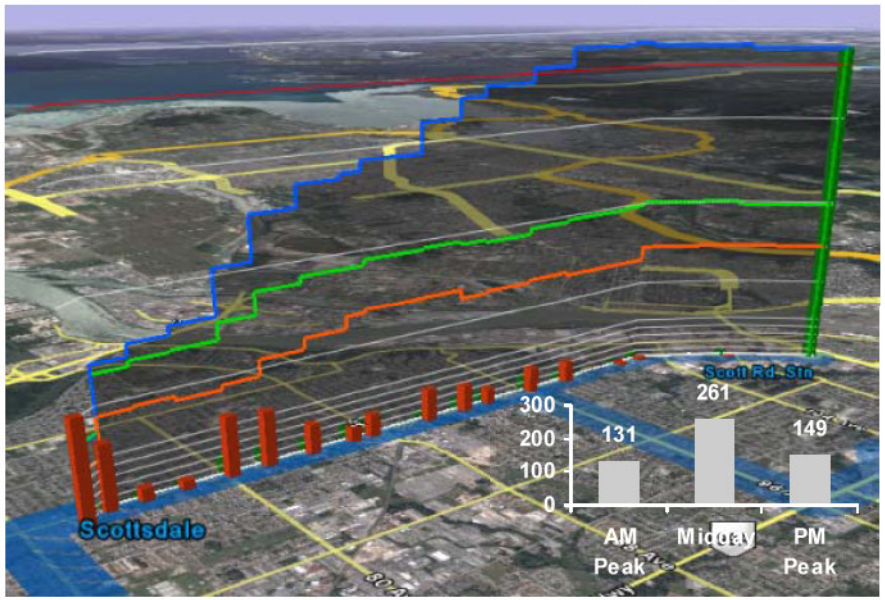


Figure 6. Westbound #340 Load Profiles (from Cloverdale)

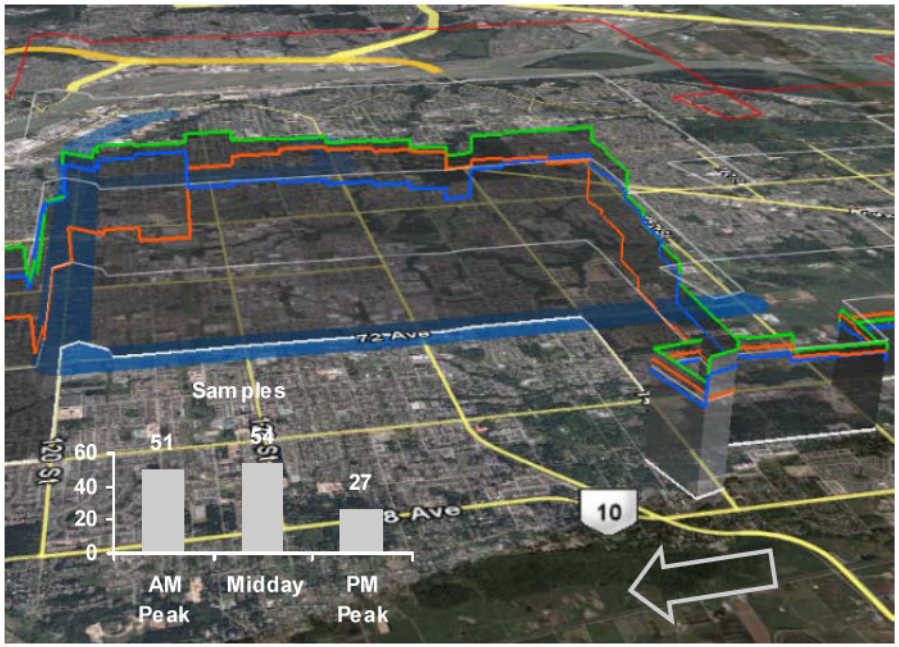


Figure 7. Westbound #340 Load Profiles (from Guildford Exchange)

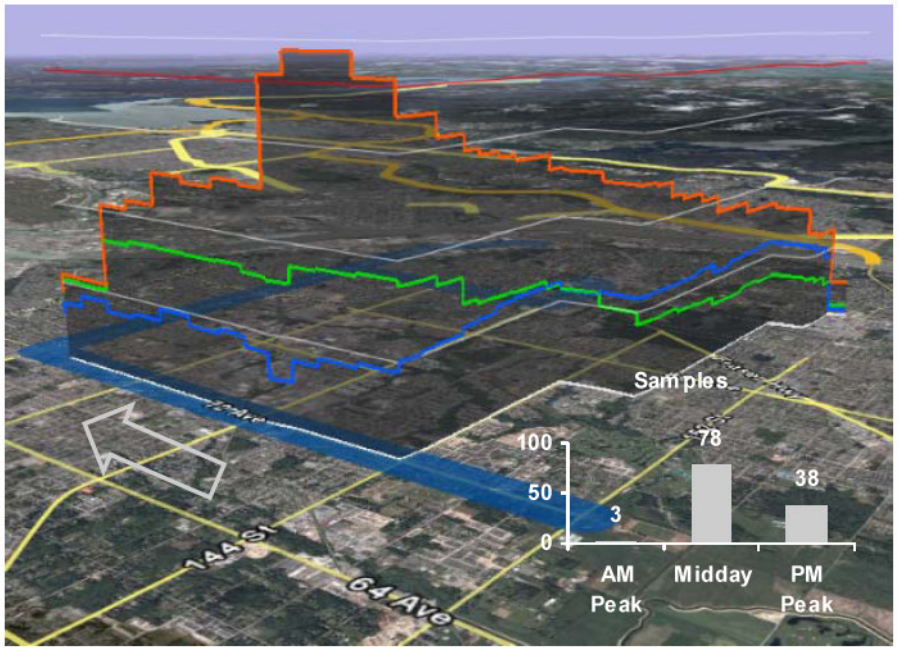
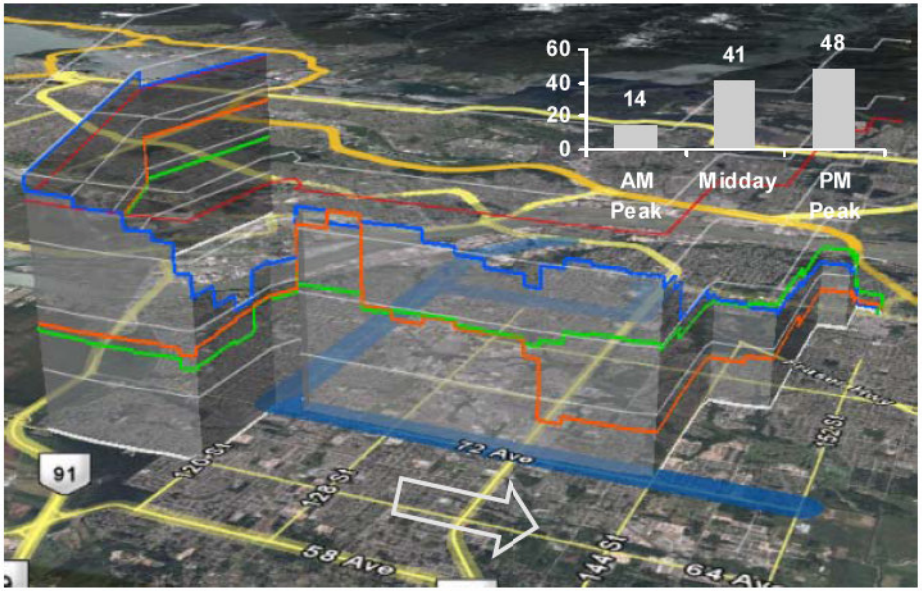


Figure 8. Eastbound #340 Load Profiles (to Cloverdale)

Figure 9. Eastbound #340 Load Profiles (to Guildford Exchange)



The #319 load profiles show that loads exceed seated capacity north of 90th Ave during northbound AM Peak trips and southbound PM Peak trips. This is due to Scott Rd. Station being the dominant trip generator and attractor for this route. During northbound AM Peak trips, loads gradually increase as passengers board, and relatively few people alight before Scott Rd. Station. During southbound PM Peak trips, buses fill beyond capacity at Scott Rd station and loads gradually decrease along Scott Rd as passengers alight. The standing loads north of 90th Ave suggest that increased service is required for this portion of the route. This could be achieved by increased route frequency or by establishing short-turn patterns to augment frequency on certain portions of the route.

The #340 load profiles show that loads are typically below seated capacity along 72nd Ave, except during AM Peak westbound trips from Guildford (Figure 7), however the sample size for this load profile is very low. The load profile for the *reciprocal trip*, the PM Peak eastbound to Guildford, has a large sample size and does not show standing loads. Regardless, service along this portion of the corridor will increase with the introduction of the proposed Frequent Bus service, which will alleviate any standing loads on 72nd Ave. In general, loads on this section of 72nd Ave are moderate.

It is important to note that the lower load profiles on 72nd Ave than on Scott Rd. are not necessarily indicative of lower demand. It is possible that the same number of boardings are occurring, but the average trip length is shorter, so loads do not accumulate as severely as on Scott. Rd. Indeed, the stop activity data shown in the next section shows that numerous major destinations exist along 72nd, which probably result in shorter average trips, higher rates of passenger turnover, and therefore lower average loads.

Figures 10 and 11 show stop activity for the #319 midday northbound and southbound trips.

Figure 10. Northbound #319 Midday Stop Activity (n = 256)

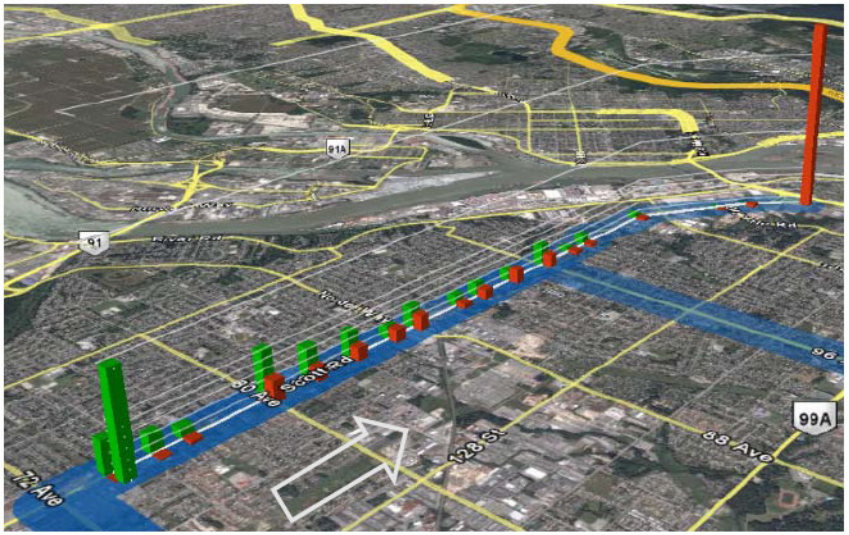
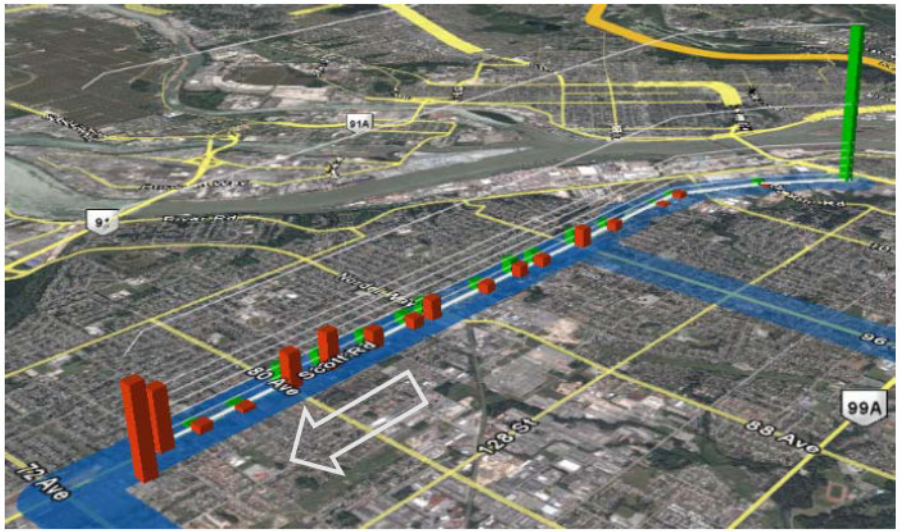


Figure 11. Southbound #319 Midday Stop Activity (n = 261)



Figures 12, 13, 14 and 15 show stop activity for the #340 midday westbound and eastbound trips, for both the Guildford and Cloverdale routes.

Figure 12. Westbound #340 Midday Stop Activity (from Cloverdale, n = 54)

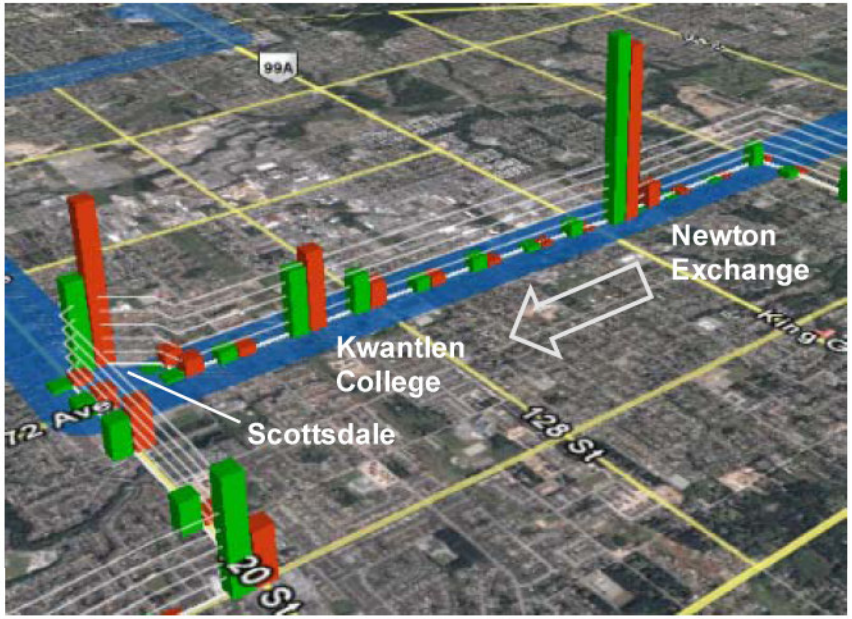


Figure 13. Westbound #340 Midday Stop Activity (from Guildford, n = 78)

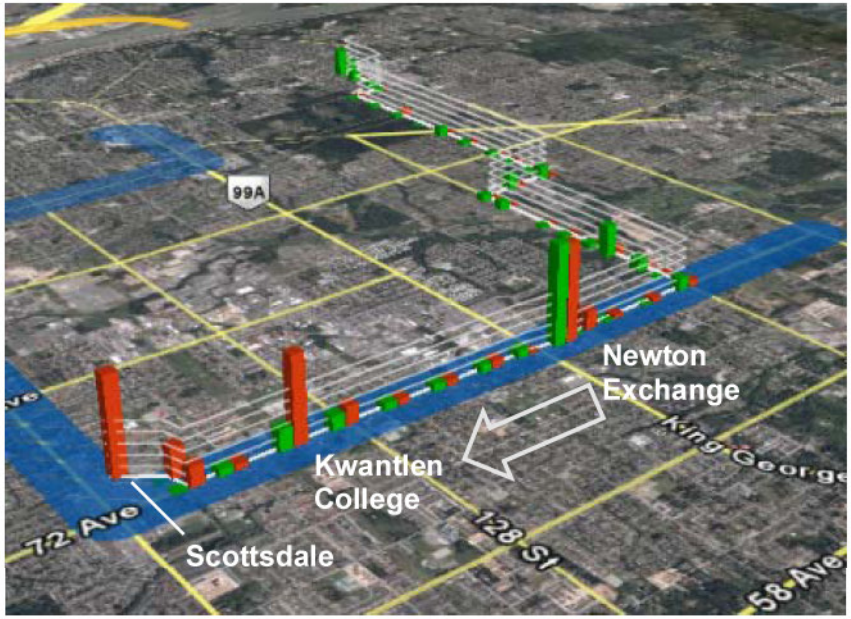


Figure 14. Eastbound #340 Midday Stop Activity (to Cloverdale, n = 56)

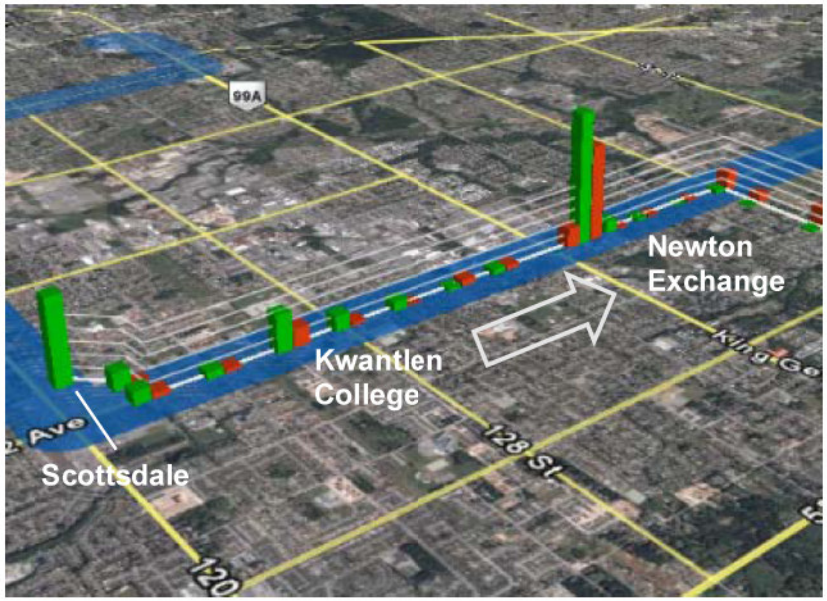
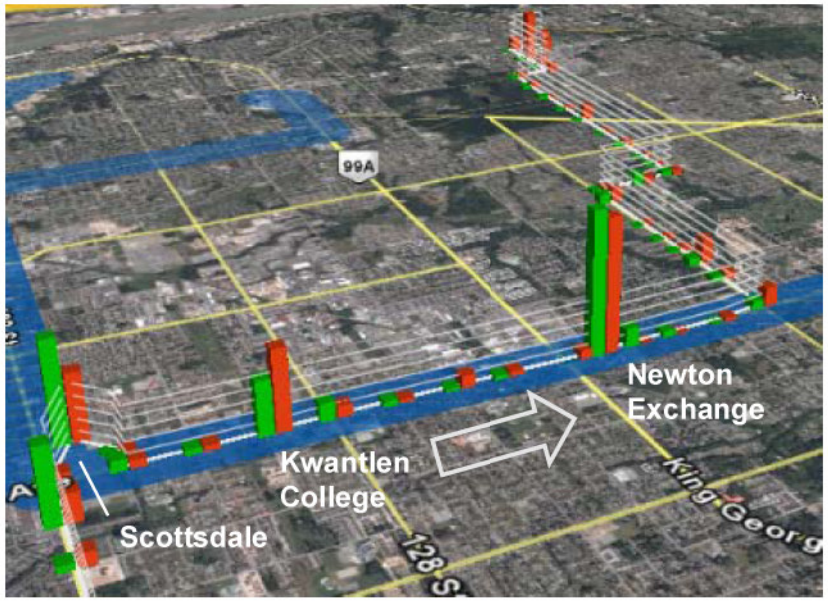


Figure 15. Eastbound #340 Midday Stop Activity (to Guildford, n = 41)



The stop activity data shows high rates of both boardings and alightings, in both directions, during the midday. On Scott Rd. stop activity is concentrated at Scottsdale and Scott Rd. Station, with high rates of activity at many stops in between. On 72nd Ave, Scottsdale, Kwantlen College, and Newton Exchange are major generators of stop activity, and moderate activity occurs at stops between.

Decision – Northern Terminus: Scott Rd Station or Surrey Central?

This route is proposed to terminate at either Surrey Central or Scott Rd. Station. The current relative demand for each of these destinations was not well known at the time of the original network proposal. The following analysis uses demand data from existing routes to estimate the relative demand for the two terminus options.

The APC data for the #319 shows that the dominant travel demand on Scott Rd. is for morning travel to Scott Rd. Station, and evening travel from Scott Rd. Station. The question considered here is whether or not latent commuter demand exists along Scott Rd for travel to and from Surrey Central.

On 116 St, the #391 (peak only service) provides direct service to Scott Rd Station, and the #316 provides direct service to Surrey Central. Both routes run at 30 minute frequency during the peak periods. The relative demand for these routes along the corridor of overlap can be used to estimate the relative demand for the alternative terminus options. Figures 16 and 17 compare stop activity and load profiles for these two routes along 116 St in the AM Peak and PM Peak.

Figure 16. Load Profile and Stop Activity for AM Peak Northbound #391 (n = 36)

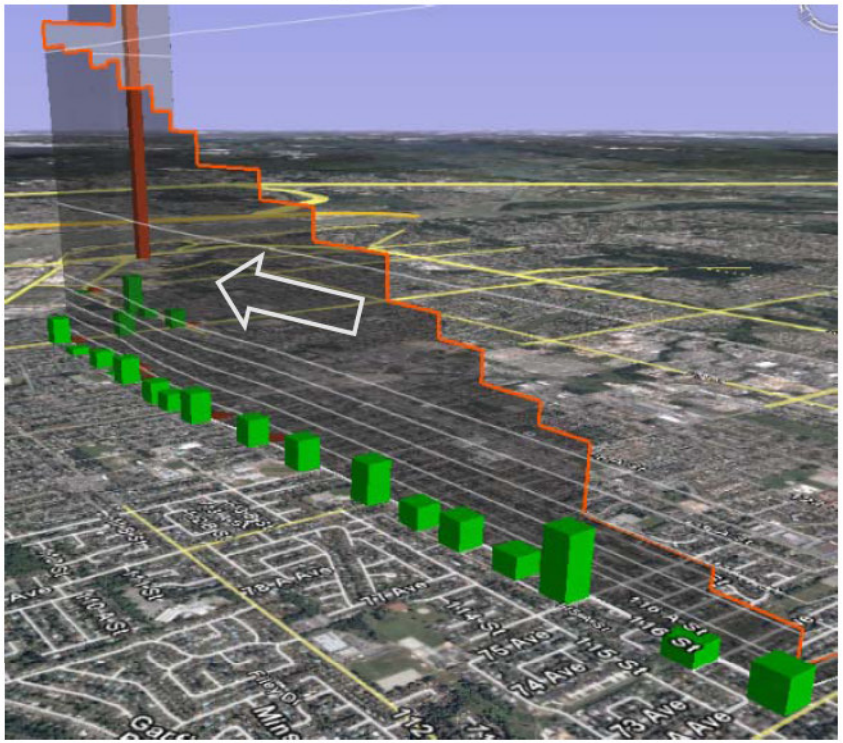
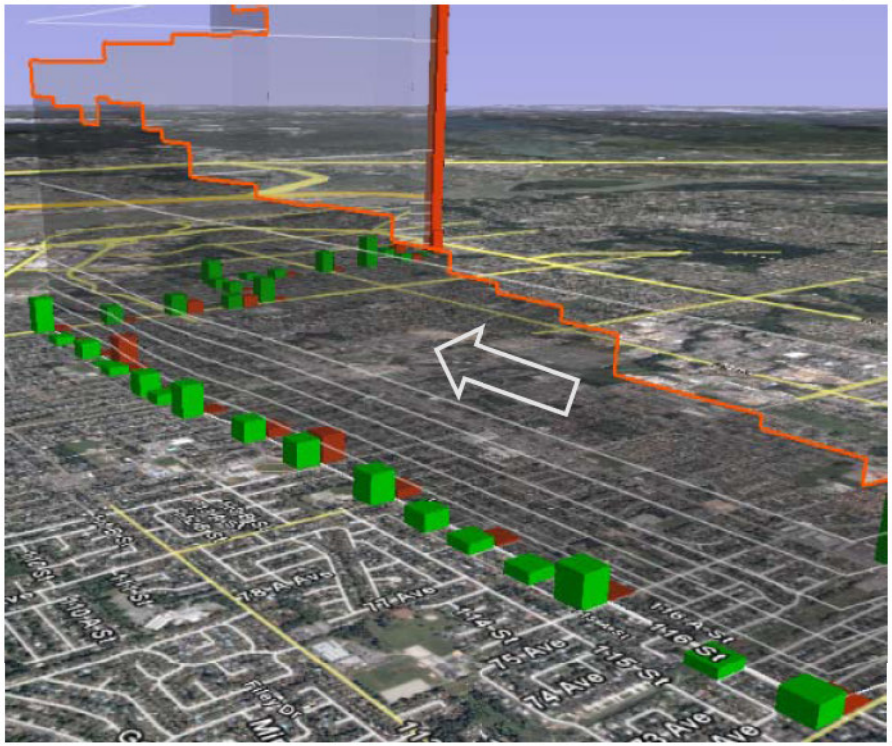


Figure 17. Load Profile and Stop Activity for AM Peak Northbound #316 (n = 63)



The load profile and stop activity data show that significantly greater demand exists for travel to Scott Rd Station than travel to Surrey Central. The average number of boardings per trip over the section of overlap along 116th St is approximately 21 passengers for the #391, and 14 passengers for the #316 (note that data for the *reciprocal trips* which is omitted here show consistent patterns). This shows that the preferred destination for passengers boarding along this corridor is Scott Rd Station, suggesting that the preferred terminus for the proposed route is Scott Rd Station. This finding also has implications for the alignments of the proposed Local Bus services on 112 St and 116 St, as discussed in their respective analysis documents.

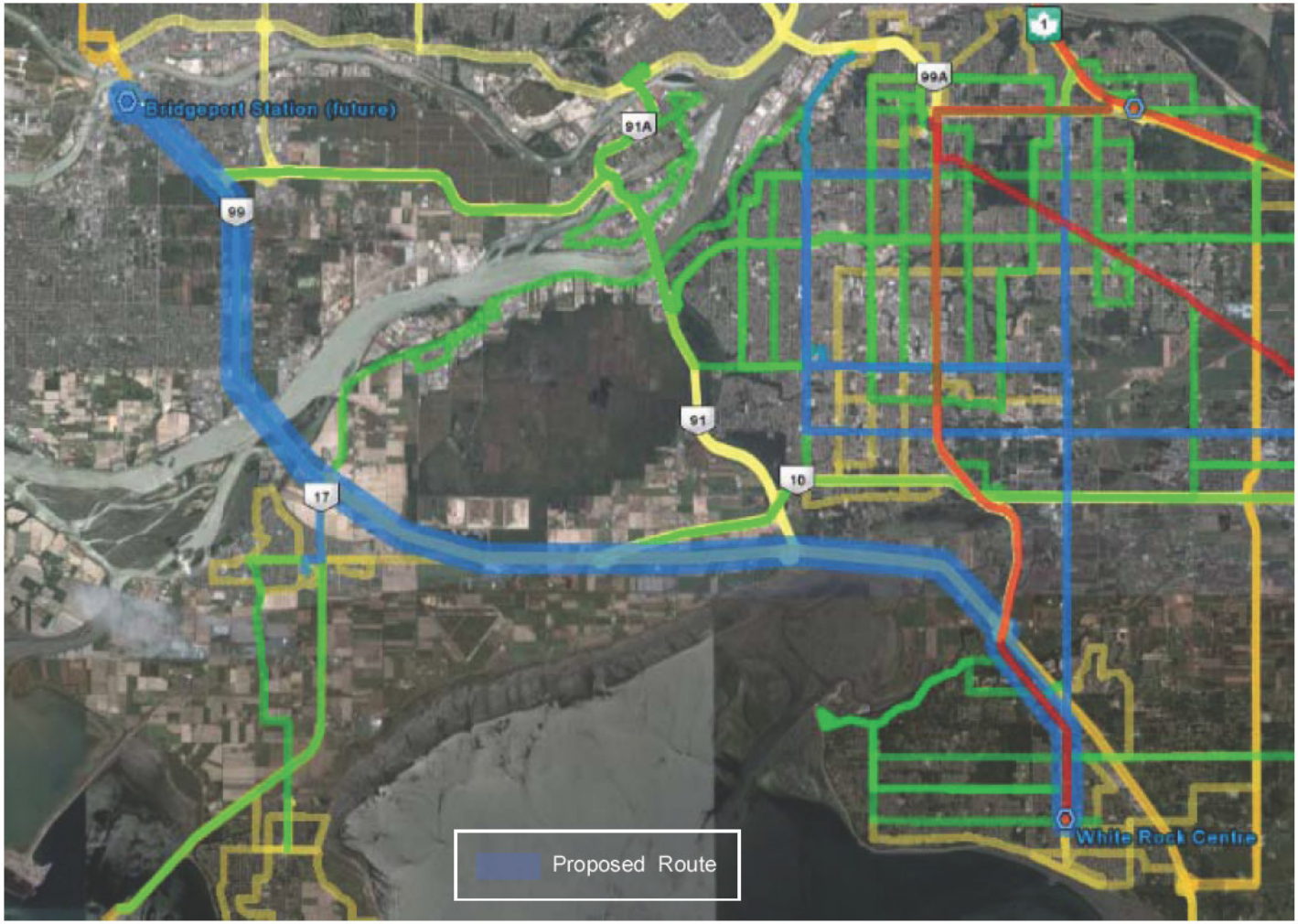
Conclusion

The stop activity and load profile data suggest that the corridors traversed by the proposed route have a high demand for transit service. High frequency service along these corridors should be maintained and loads should be monitored along the route to ensure passenger comfort. It can be expected that loads will be particularly high north of 90th Ave on Scott Rd. Measures to reduce crowding on this portion of the route, such as increased frequency or short-turn trips, should be considered.

A comparison of the relative demand for the #391 and #316, along 116 St suggests that there is a greater preference for travel to Scott Rd. Station than to Surrey Central. It is recommended that the proposed route therefore terminate at Scott Rd. Station.

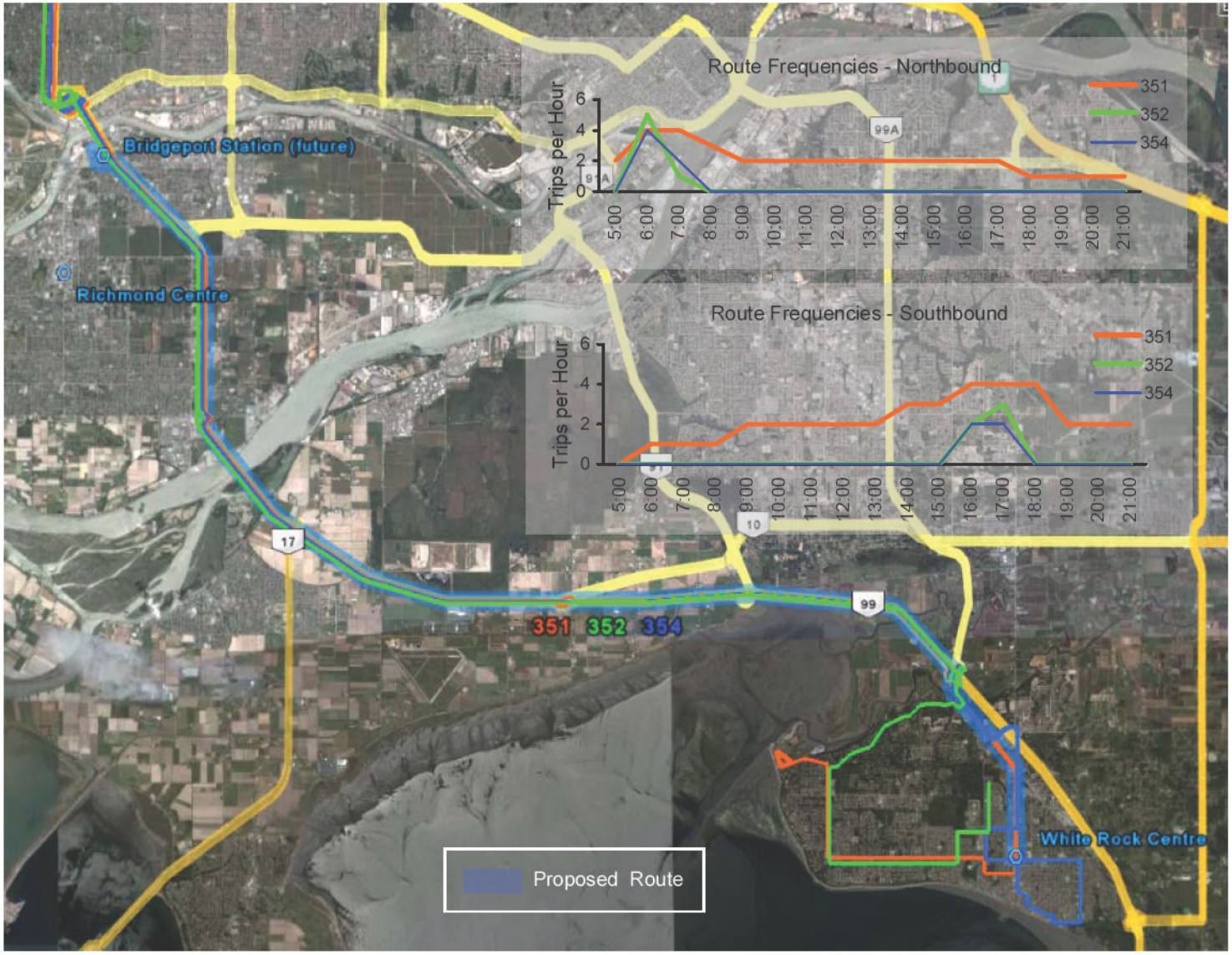
Proposed Route & Rationale

Figure 1. Proposed Route and 2031 Network



The intention of the proposed route is to simplify service between White Rock and Richmond, and to increase the frequency of this route. Figure 2 shows the proposed route and the existing routes that serve the same corridor.

Figure 2. Proposed Route and Existing Routes and Frequencies



Under the proposed network, the #351, #352 and #354 would be replaced by a single Frequent Bus service which would terminate at White Rock Centre. Midday and reverse-peak service would be increased from 30 minute frequency to 15 minute frequency. The APC data is examined here to estimate the expected demand for such an increase in service, and determine if this is an appropriate service level for this route.

Currently, many White Rock residents have direct service to Richmond and Vancouver via the #351, #352 and #354, however under the proposed network, many of these passengers would be forced to make an additional transfer. For passengers travelling to Richmond. reconfigured local and neighbourhood bus

services throughout White Rock would provide connections to the proposed Frequent Bus route at White Rock Centre. The APC data is examined here to estimate the extent of these additional transfers, and to determine if an alternate southern terminus would result in a more efficient system.

APC Analysis and Results

The APC dataset for this analysis was collected between January 8th and April 10th, 2007.

Figure 3. Northbound #351 Load Profiles

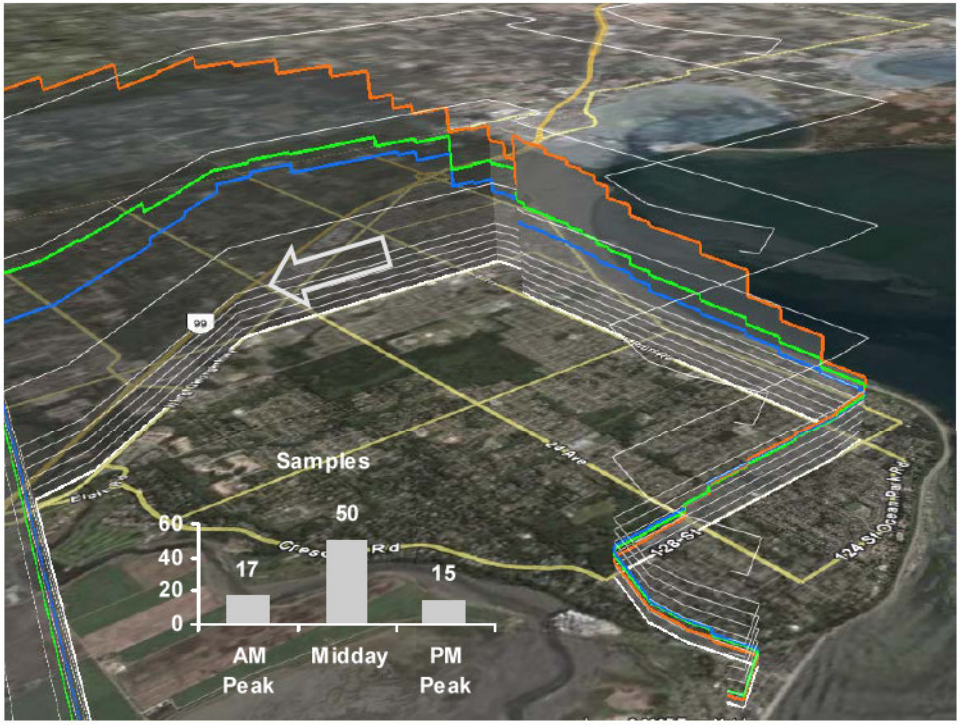


Figure 4. Southbound #351 Load Profiles

Figure 4. Northbound #351 AM Peak Stop Activity (n = 17)

Figure 5. Southbound #351 PM Peak Stop Activity (n = 15)

Figure 6. Northbound AM Peak #352 Load Profile and Stop Activity (n = 9)

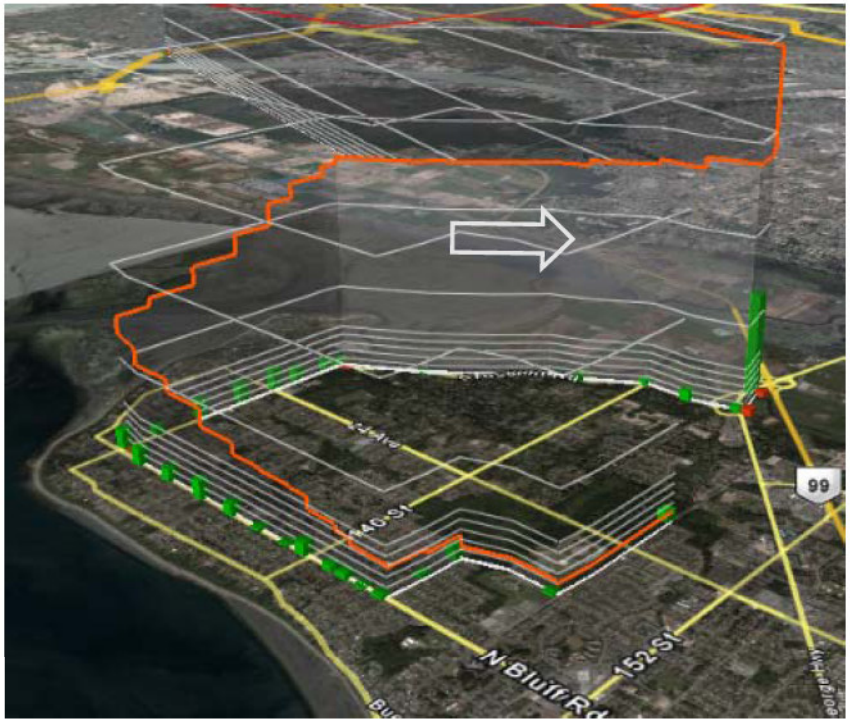


Figure 7. Northbound AM Peak #354 Load Profile and Stop Activity (n = 9)

(No data is available for either the southbound #352 or southbound #354)

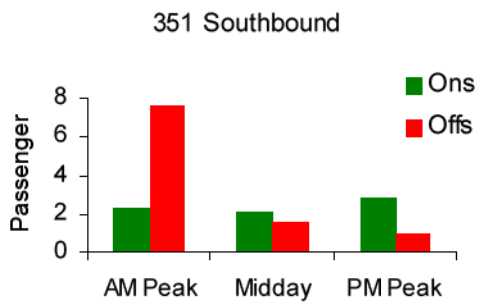
The load profile and stop activity data show high demand for travel to Vancouver in the AM Peak and return travel to White Rock in the PM Peak. Midday and reverse-peak demand is moderate, despite low service frequency during these time periods (30 minute). With increased frequencies, it can be expected that demand for the proposed route will be high throughout the entire day.

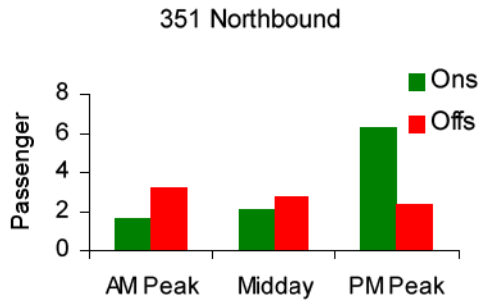
The stop activity data for the #351 show that this route is being used for local trips that begin and end in White Rock. This route is served by a highway coach vehicle, which only has a single door and is not well-suited to serving local trips. By splitting the existing #351 into the proposed Frequent Bus route and Local Bus routes, it will be possible to provide more appropriate vehicle types for these this local demand.

The proposed network will introduce an additional transfer for many White Rock residents currently travelling to Richmond and Vancouver via the #351, #352 and #354. Passengers without direct access to the proposed Frequent Bus route will have to make a connection to this service via a Local or Neighbourhood Bus. The APC data shows that this will affect many passengers along North Bluff Rd and 128th St, and passengers in southeast White Rock.

Stop activity at Steveston Highway for the #351 is significant throughout the day, and particularly high in the reverse-peak direction. This suggests that many customers are commuting from Vancouver to south Richmond, via the #351. Stop activity is less but still significant during the remainder of the day.

Figure 7. Stop Activity at Steveston Highway.





Conclusion

Frequent Bus service is appropriate for the level of demand evident in the APC data. High demand can be expected during peak periods in the peak direction , and moderate to high demand can be expected during midday and in the reverse peak directions.

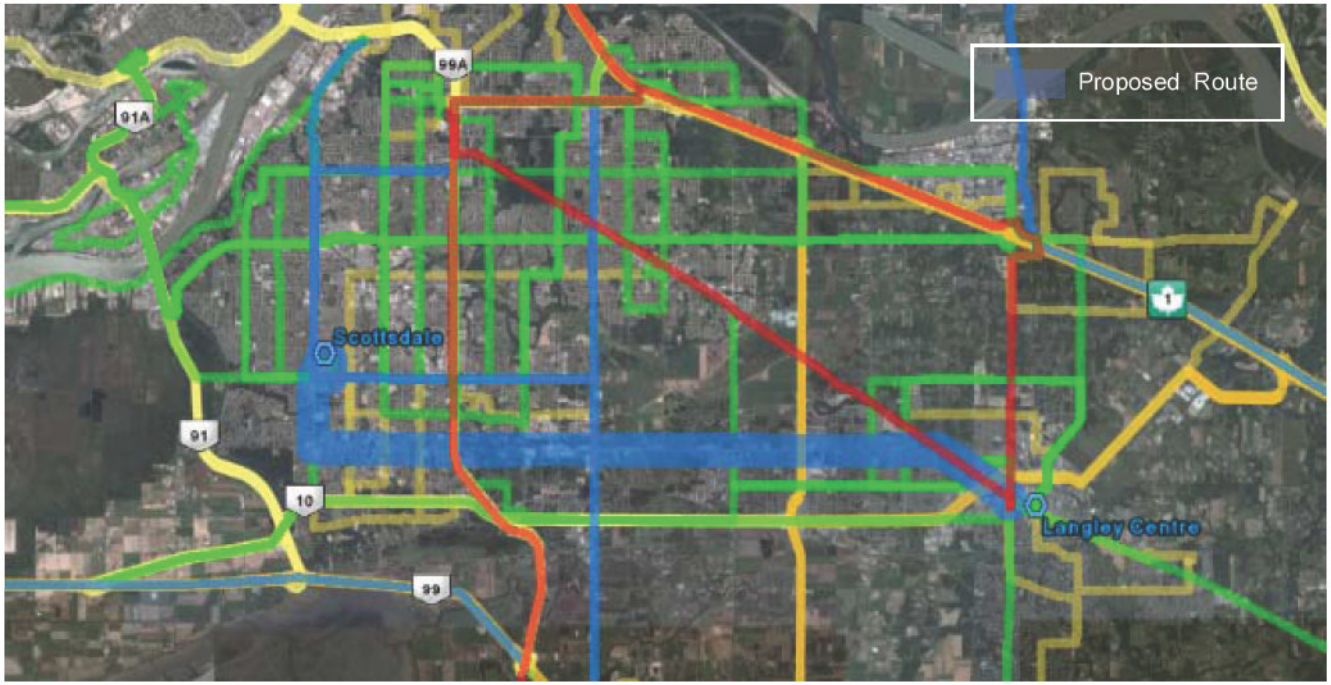
The proposed route should maintain service to the stop at Steveston Highway, as this stop shows high demand during the peak periods and moderate demand through the rest of the day.

By splitting the existing bus routes in White Rock into Local and Frequent Bus services, it will be possible to provide more appropriate vehicle types to serve local travel within White Rock.

Many current White Rock passengers who travel to Vancouver or Richmond via the #351, #352, or #354 will be forced to make an additional transfer at White Rock Centre. Ridership should be monitored as the proposed network changes are made, in order to gauge the impact of this additional transfer.

Proposed Route & Rationale

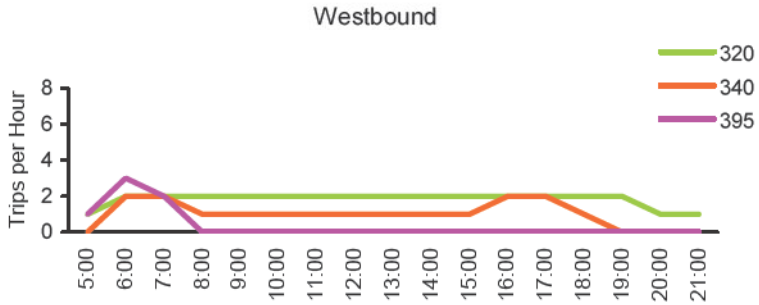
Figure 1. Proposed Route and 2031 Network.

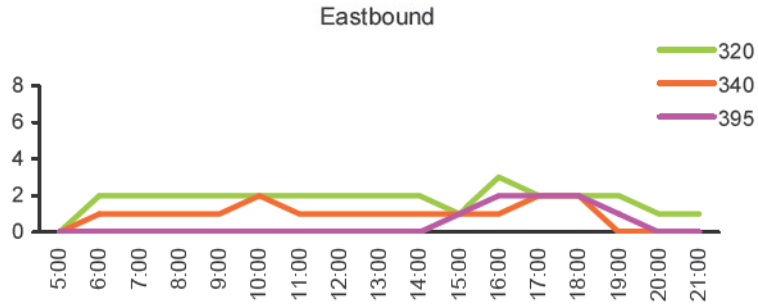


The proposed route will provide a direct connection between Langley and Scottsdale. There is currently no direct service between Langley and Scottsdale, however a combination of either the #395 (peak only service) or the #320, and the #340, provide this connection with a transfer at Cloverdale (see Figure 2). However, the resulting trip is circuitous, and the frequency of these routes is low. The #320 has two different paths east of Cloverdale, one via 56th Ave, and one via 60th Ave. Data for the #395 is unavailable.

Figure 2. Proposed Route and Existing Routes and Frequencies

Route Frequencies:





APC Analysis and Results

As there is currently no service along most of the corridor of the proposed route, expected demand can only be estimated based on the load profiles and stop activity of existing routes that travel along nearby, parallel corridors. Figures 3 and 4 show load profiles for the #340, with stop activity for the dominant time period of travel, and Figures 5 and 6 show load profiles for the #320, with the stop activity for the same time periods.

Figure 3. Eastbound #340 Load Profiles with AM Peak Stop Activity (PM Peak Load Profile Unavailable)

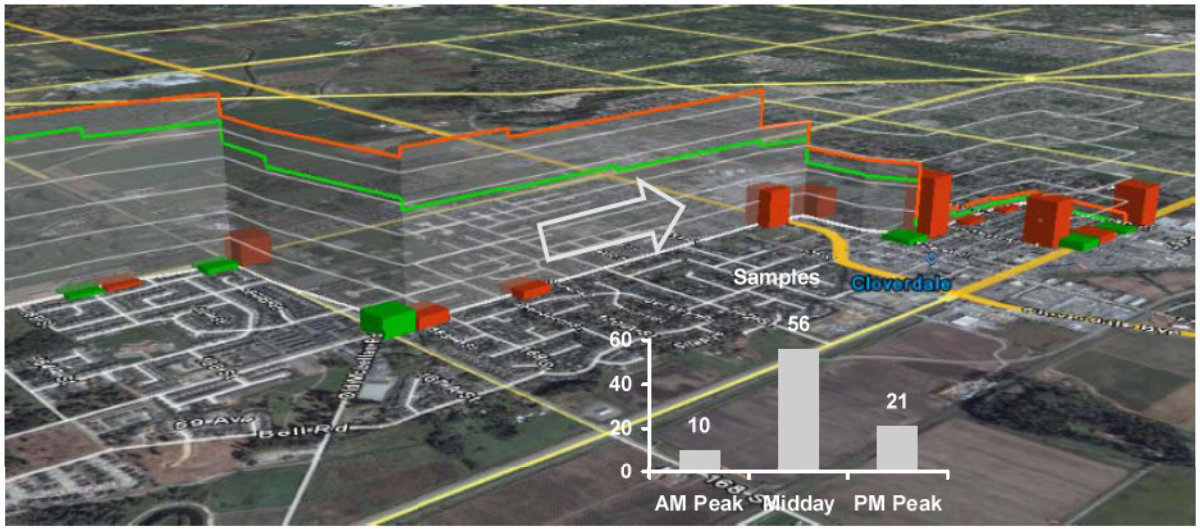


Figure 4. Westbound #340 Load Profiles with PM Peak Stop Activity

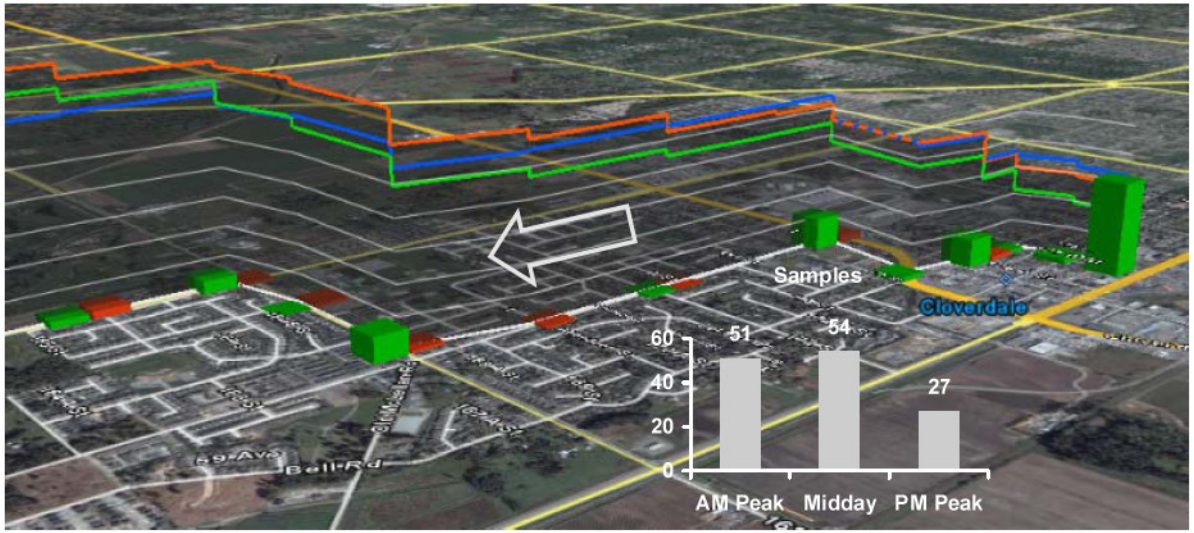


Figure 5. Eastbound #320 Load Profiles with AM Peak Stop Activity

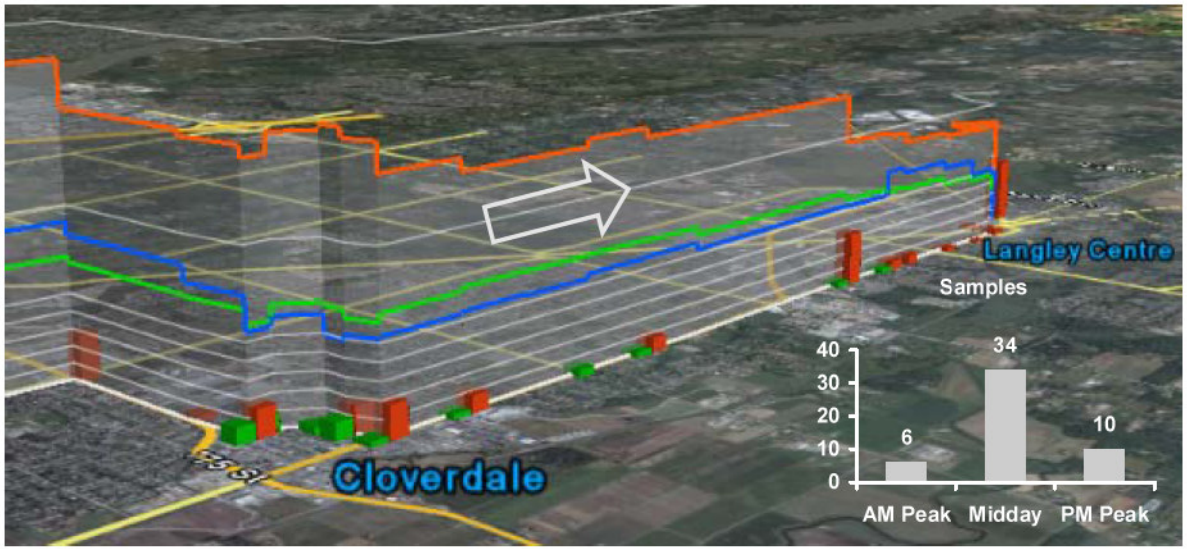
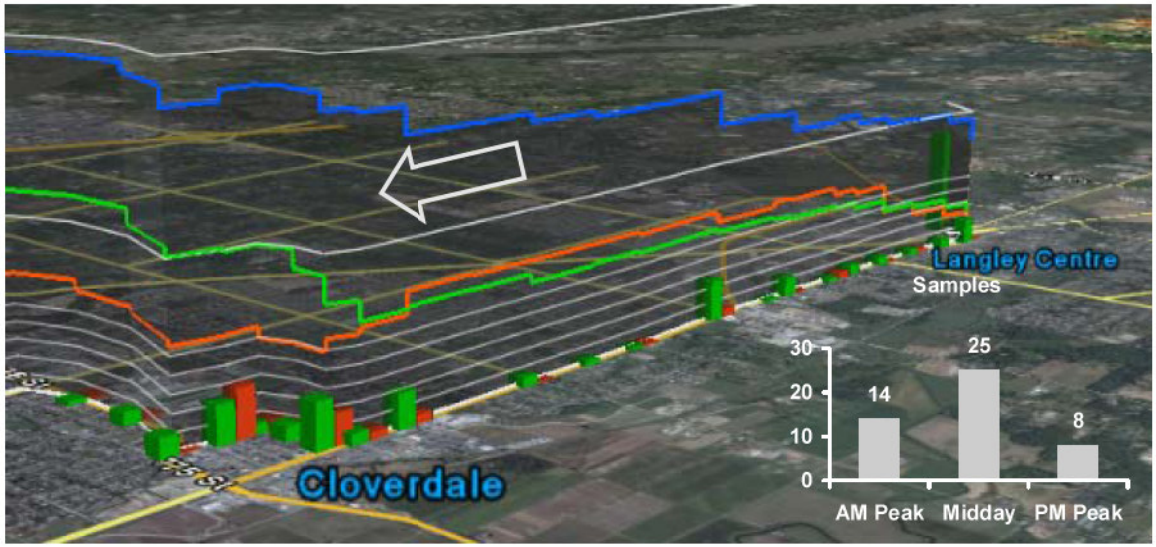


Figure 6. Westbound #320 Load Profiles with PM Peak Stop Activity



The load profile and stop activity data for the #340 data shows generally low demand with no strong directional peak. Loads to and from Cloverdale average 4 to 8 passengers throughout the entire day. Stop activity in Cloverdale is concentrated along 56th Ave, 177th St and 58th Ave.

Data for the #320 show that the dominant travel pattern for this route is eastbound to Langley in the AM Peak, and westbound to Surrey in the PM Peak. Absolute demand is moderate. It appears that a significant portion of the demand is for travel to and from Cloverdale, since the total boardings and alightings here comprise approximately one third of the load that passes through Cloverdale. It is possible that some of this stop activity in Cloverdale is generated by passengers who are transferring between the #320 and #340. This is discussed in greater detail under the following section.

#320 - #340 Transfer Activity

A close inspection of the stop activity reveals that some passengers may be making trips between southern Surrey and Langley via a combination of the #320 and #340. Figure 7 shows the stop activity for connecting AM Peak eastbound trips, and PM Peak westbound trips. If many passengers were making transfers between the two routes, we would expect to see high rates of alighting at certain stops within Cloverdale for one route, and corresponding high rates of boarding at the same stops for the other route.

Figure 7. #320 - #340 Transfer Activity Analysis

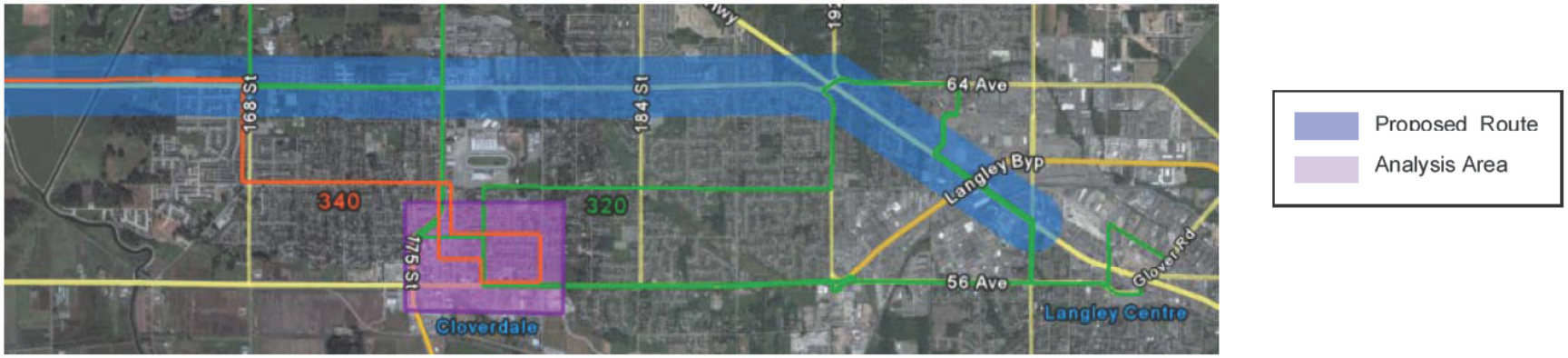


Figure 7 (Continued)

AM Peak Eastbound Transfers

Expected Results: High rates of alightings for #340 and corresponding high rates of boarding for the #320 at the same stops.

#340 (n = 10)

#320 (n = 6)

PM Peak Westbound Transfers

Expected Results: High rates of alightings for #320 and corresponding high rates of boarding for the #340 at the same stops.

#320 (n = 8)

#340 (n = 27)

Analysis Area

Possible Transfer Activity

This analysis suggests that some passengers may be making transfers between the #320 and #340, eastbound in the AM Peak and westbound in the PM Peak. It is impossible to distinguish between passengers who are making transfers in Cloverdale and passengers whose origin or final destination is Cloverdale, however the evidence does not preclude the possibility of transfers and suggests that latent demand for direct service between Langley and southern Surrey may exist. Improved service, provided by the proposed route FBN – E, would capture this latent demand. This suggests that if the proposed route is implemented, it should be well marketed to potential customers in order to realize its potential ridership. A gradual implementation of service on this route may also be warranted, in order to gauge actual potential demand.

It is important to note that the APC data for the #502 shows that Langley is a strong generator transit demand. The #502 experiences moderate demand between Surrey City Centre and Langley, in both directions, throughout the entire day (see analysis document for Fraser Highway Rapid Transit route for detailed analysis). This suggests that Langley is both an important origin and destination for transit customers.

Scott Rd. Demand

The proposed route will also serve passengers that on Scott Rd between 64th and 72nd. Figures 8 and 9 shows stop activity and load profiles for the #340 along this section of Scott Rd.

Figure 8. Westbound #340 Load Profiles with AM Peak Stop Activity

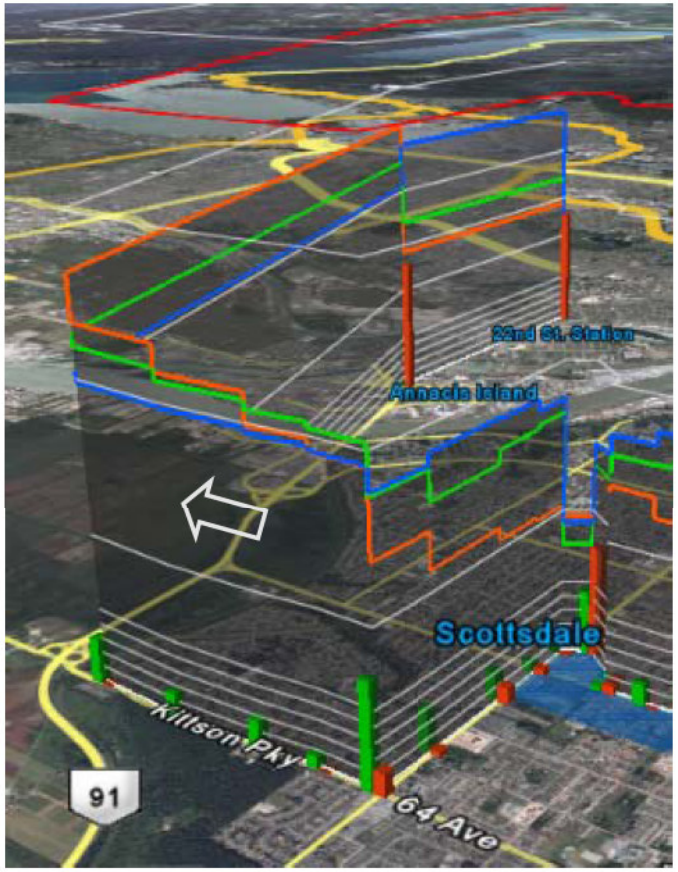
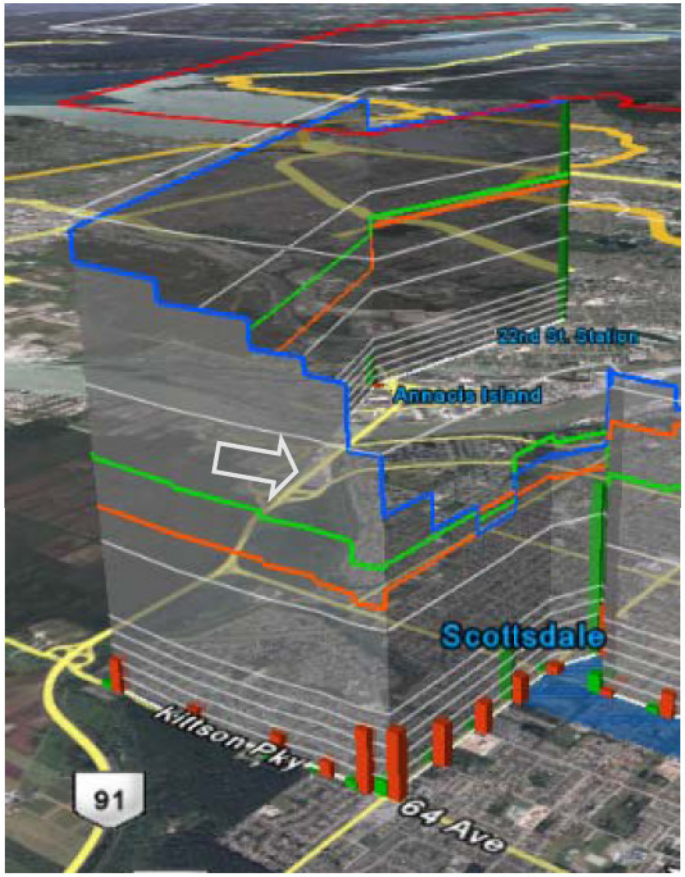


Figure 9. Westbound #340 Load Profiles with PM Peak Stop Activity



This data shows that a high demand exists along this section of Scott Rd for passengers travelling to Annacis Island and 22nd St SkyTrain station. There is a particularly high rate of stop activity at the intersection of Scott Rd. and 64th Ave. This is likely caused by transfers to and from the #C76 Community Shuttle from Ladner. Under the proposed network, the demand on Scott Rd. will be served by a combination of the proposed route FBN – E, and new local service to 22nd St Station and Annacis Island (Local – Q). This will introduce a transfer for some existing passengers who currently have direct service. Ladner residents will have direct service to Scottsdale via the proposed route Local - EE

The proposed 2031 network does not include any service along Kittson Parkway. The significant demand along here, as evident in the #340 data shown in Figures 7 and 8, indicates the need for neighbourhood bus service to serve the Strawberry Hills community.

Conclusion

It is difficult to estimate potential demand on the proposed route from the APC data because the existing service between Langley and Scottsdale is circuitous and infrequent. However, some demand for this route is evident from the #320 and #340 load profiles and stop activity data, and data for the #502 shows that Langley is a strong generator of transit demand. Regardless, the proposed route should be well marketed and introduced gradually in order to gauge actual demand.

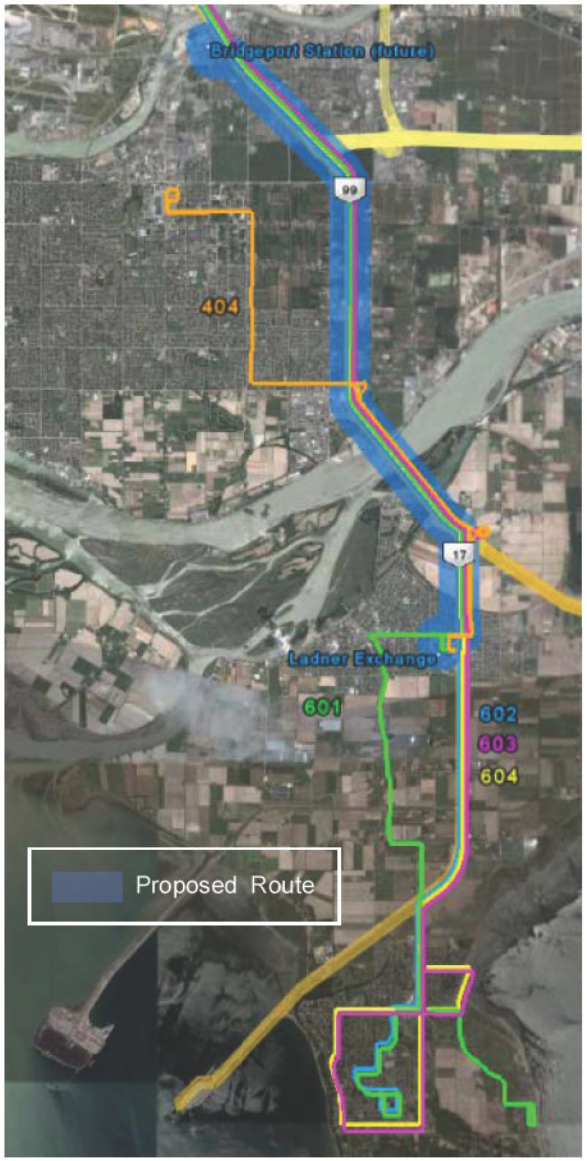
The proposed route will also serve an existing strong demand on Scott Rd. that is currently being served by the #340.

Proposed Route & Rational

Figure 1. Proposed Route and 2031 South of Fraser Network.

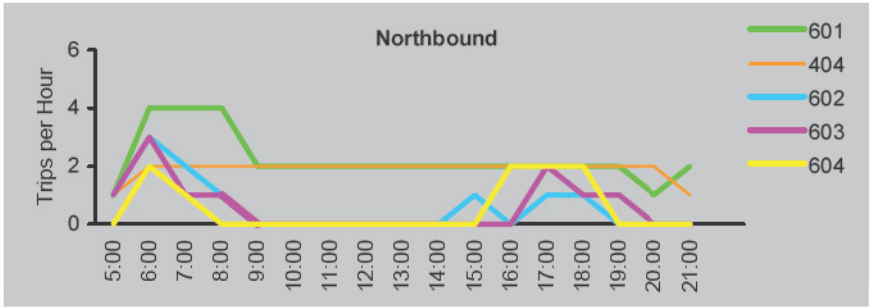
The proposed route will provide frequent and direct service between Ladner Exchange and the future Bridgeport Station, via Highway 17 and Highway 99. Figure 2 shows the proposed route and the existing routes that serve this corridor.

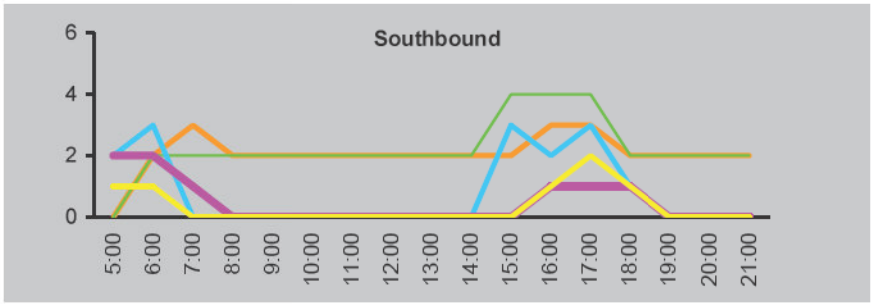
Figure 2. Proposed Route and Existing Routes and Frequencies



This route is currently served by the #601, #602, #603, #604, and the #404. The #601 provides service between Tsawwassen and Ladner via Arthur Dr., and between Ladner and downtown Vancouver. During the peak periods, the frequency of the #601 is greater between Ladner and Vancouver than between Tsawwassen and Ladner. The #602, #603 and #604 provide peak-only, peak direction service between Tsawwassen and downtown Vancouver via Hwy 17 and Hwy 99. The #404 provides service between Ladner and Richmond Centre. The proposed route would serve the existing demand on the 600-series routes, and it is expected that some demand from the #404 would shift to the proposed route.

Route Frequencies:



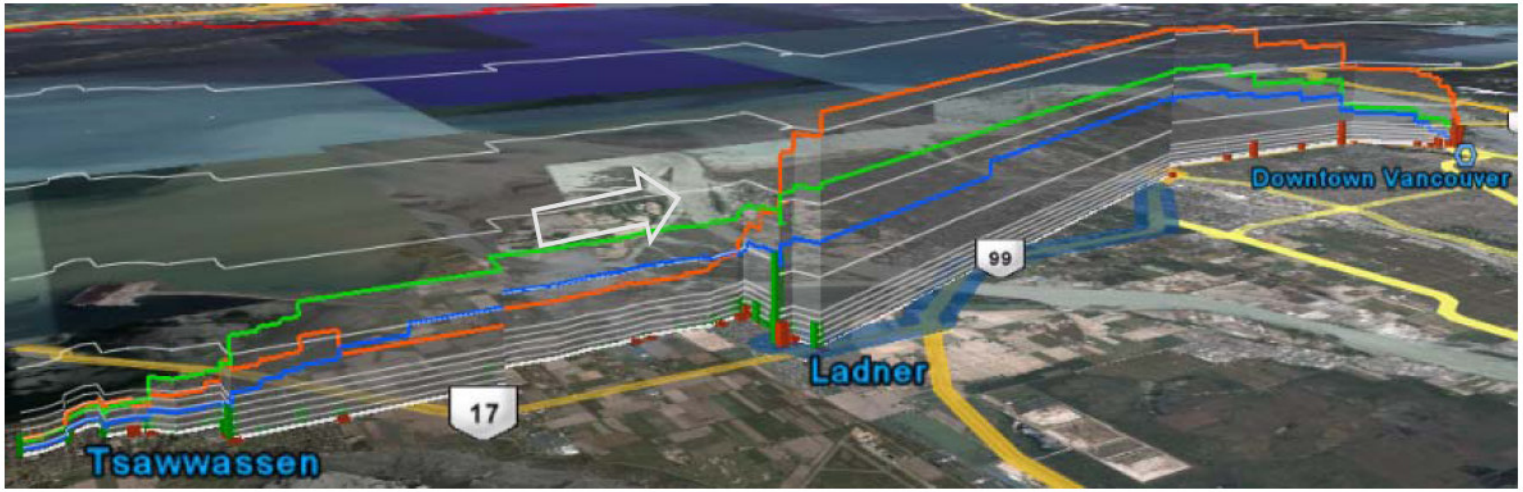


The #601 frequencies shown above are for trips between Ladner and downtown Vancouver. Service between Ladner and Tsawwassen is less frequent than what is shown here.

Note that reverse-peak trips of the #602, #603 and #604 (i.e. southbound in the AM Peak and northbound in the PM Peak) only travel between Steveston Highway in Richmond and Tsawwassen, or within Tsawwassen.

APC Analysis and Results

Figure 3. Northbound #601 Load Profiles with AM Peak Stop Activity.



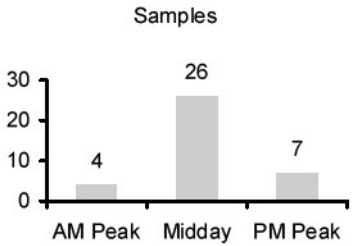
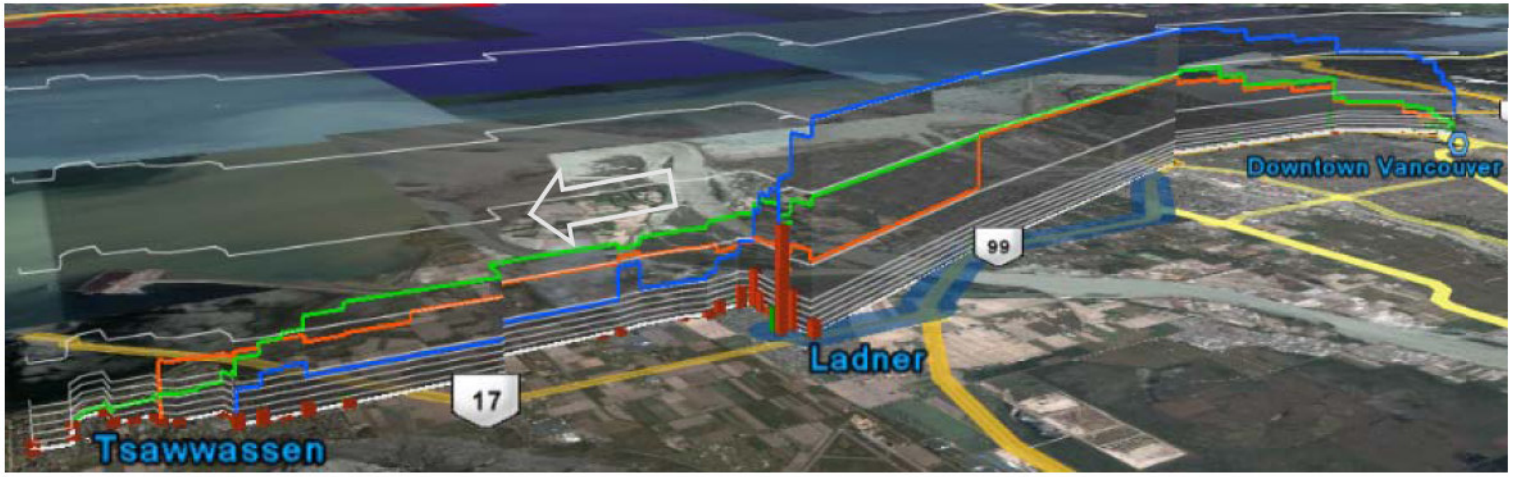
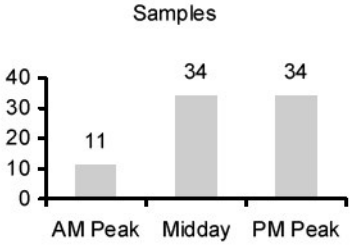


Figure 4. Southbound #601 Load Profiles with PM Peak Stop Activity.

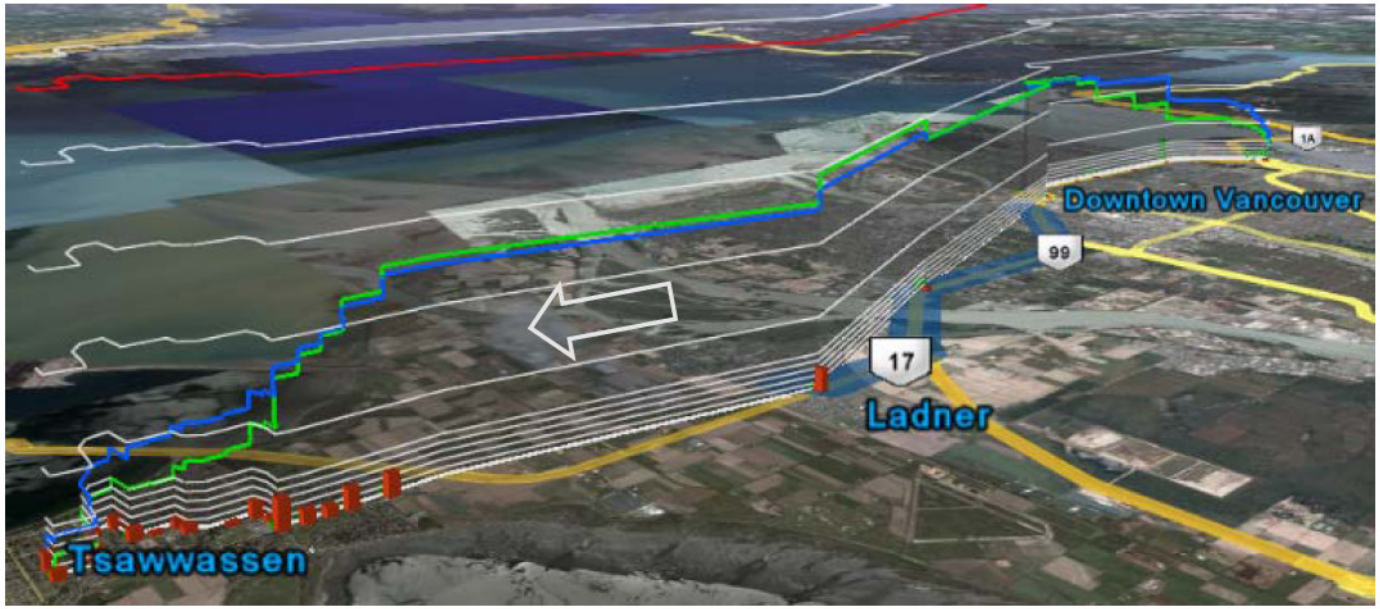




Only some peak-period trips of the #601 travel to and from Tsawwassen; during the peak periods, the frequency of service between Ladner and downtown Vancouver is greater than that between Tsawwassen and Ladner.

Figure 5. AM Peak Northbound #602 Load Profiles and Stop Activity (n = 10)

Figure 6. PM Peak and Midday Southbound #602 Load Profiles with PM Peak Stop Activity



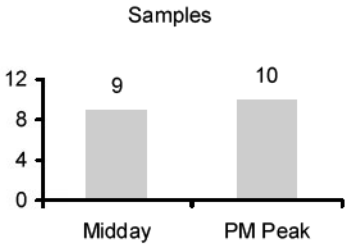


Figure 7. AM Peak Northbound #603 Load Profile and Stop Activity (n = 20)

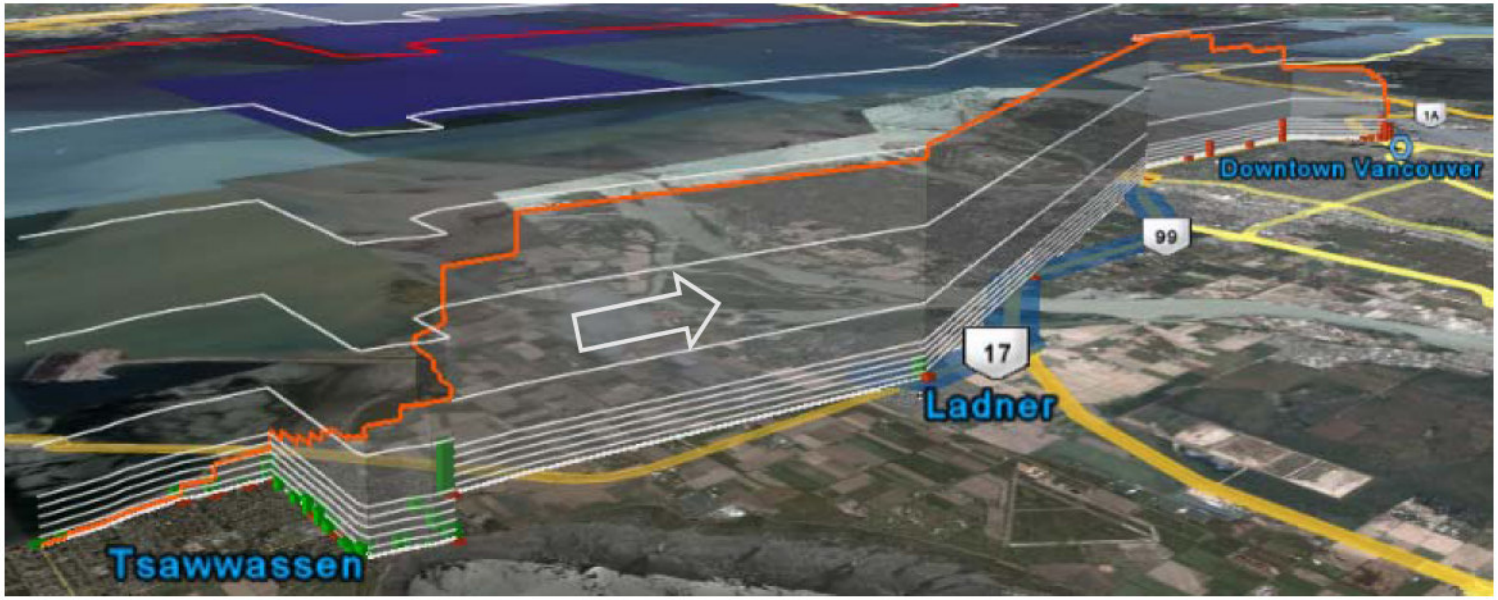


Figure 8. PM Peak Southbound #603 Load Profile and Stop Activity (n = 7)

Figure 9. AM Peak Northbound #604 Load Profile and Stop Activity (n = 10)

Figure 10. PM Peak Southbound #604 Load Profile and Stop Activity (n = 19)

Figure 11. Northbound #404 Load Profiles

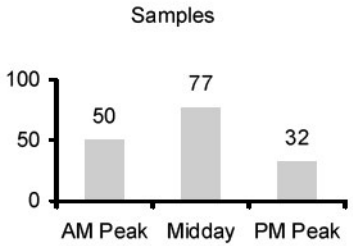
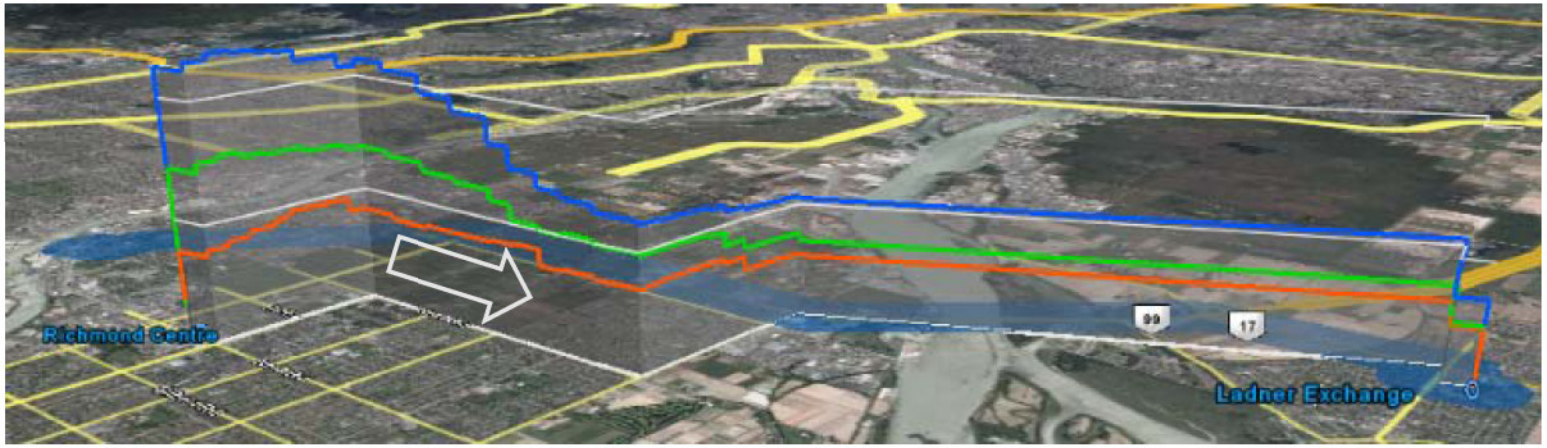
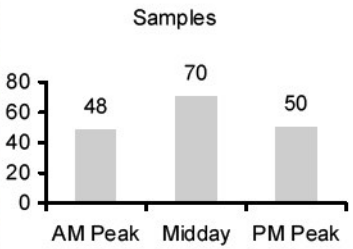


Figure 12. Southbound #404 Load Profiles





The APC data shows that demand between Ladner and downtown Vancouver, and between Tsawwassen and downtown Vancouver is high. All routes except the #404, and the southern portion of the #601, show averages peak loads greater than 20 passengers. This is despite high peak-period service frequency on these routes: the peak period frequency of the #601 runs is 15 minutes, and the combined frequency of the #602, #603, and #604 is 10 to 20 minutes. The lower loads on the #601 south of Ladner, and the high loads of the #602, #603, and #604 suggest that there is a greater demand for travel from Tsawwassen to downtown Vancouver than from Tsawwassen to Ladner.

It is significant that demand from Tsawwassen to downtown Vancouver is high, as shown by load profiles for the #602, #603 and #604. The proposed route terminates at Ladner, and does not provide service to Tsawwassen. Without direct Tsawwassen to Richmond service, current customers who currently have direction, no-transfer service to downtown Vancouver will be forced to make 2 transfers, after the introduction of the proposed route and the Canada Line. This could be addressed by the addition of direct Tsawwassen to Richmond service to the proposed network.

Some of the demand for the #404 can be expected to shift to the proposed Frequency Bus route. Most of the AM Peak northbound passengers are destined for Richmond Centre. It is difficult to determine whether Richmond Centre is these passengers' final destination, or if they are transferring here to another route. If most passengers are transferring, and travelling to destinations north of Richmond Centre, then it would be expected that most of the demand for the #404 would shift to the proposed Frequent Bus route, since the new service will provide a more direct service. However, if Richmond Centre is most passengers' final destination, then the #404 may provide the best service for passengers originating from Ladner. Demand for the #404 should be monitored after the introduction of the proposed Frequent Bus route.

Conclusion

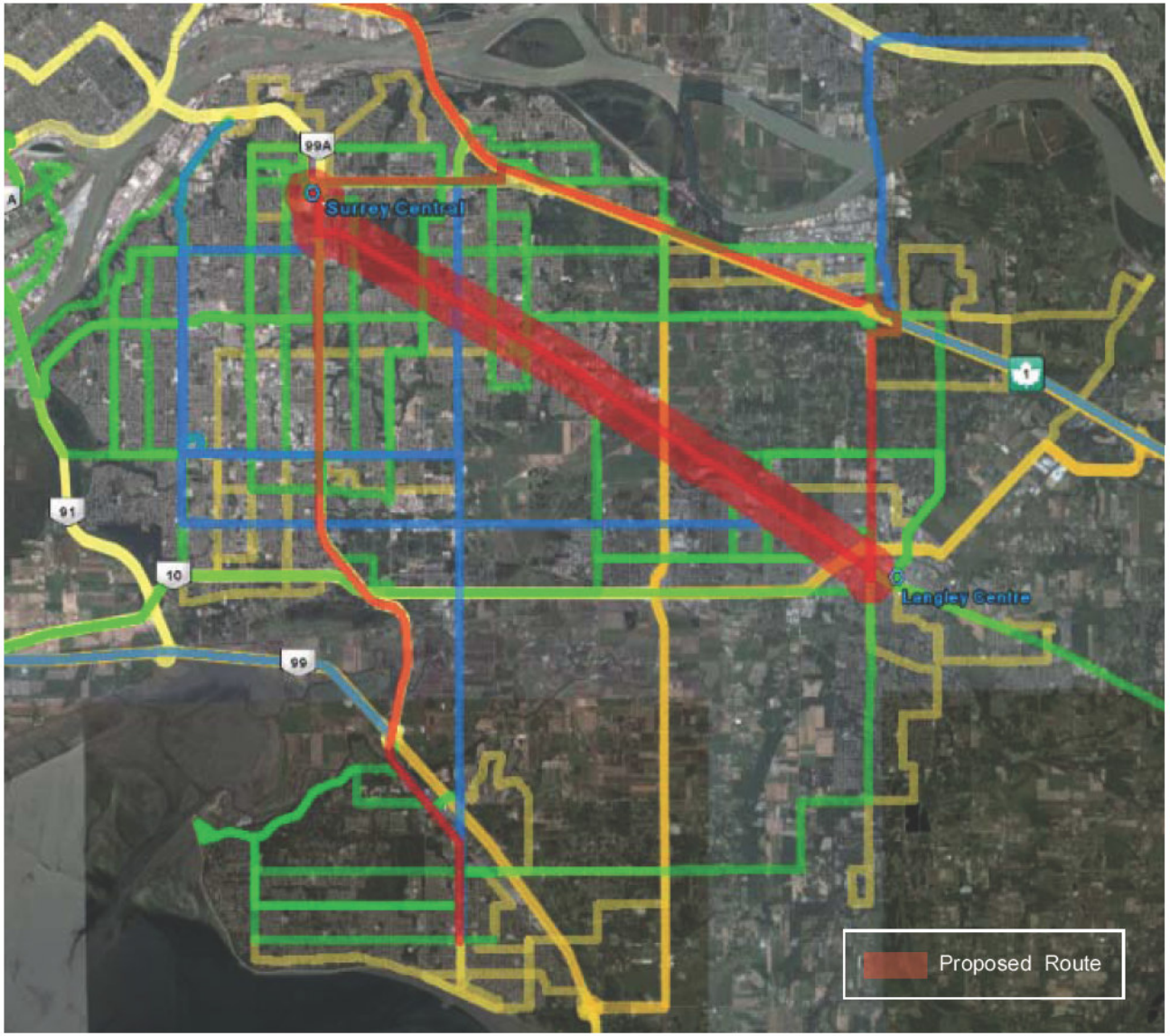
It is expected that demand for the proposed Frequent Bus route will be high. High demand exists for the routes that currently provide service between Ladner and downtown Vancouver, and between Tsawwassen and downtown Vancouver.

Demand for direct service between Tsawwassen and downtown Vancouver is high. Many customers use the direct, zero-transfer service from Tsawwassen to downtown Vancouver. The introduction of the proposed Frequent Bus route, and the Canada Line would force 2 new transfers for these passengers. This could be alleviated by the addition of a direct Tsawwassen to Bridgeport Station route.

Proposed Route & Rationale

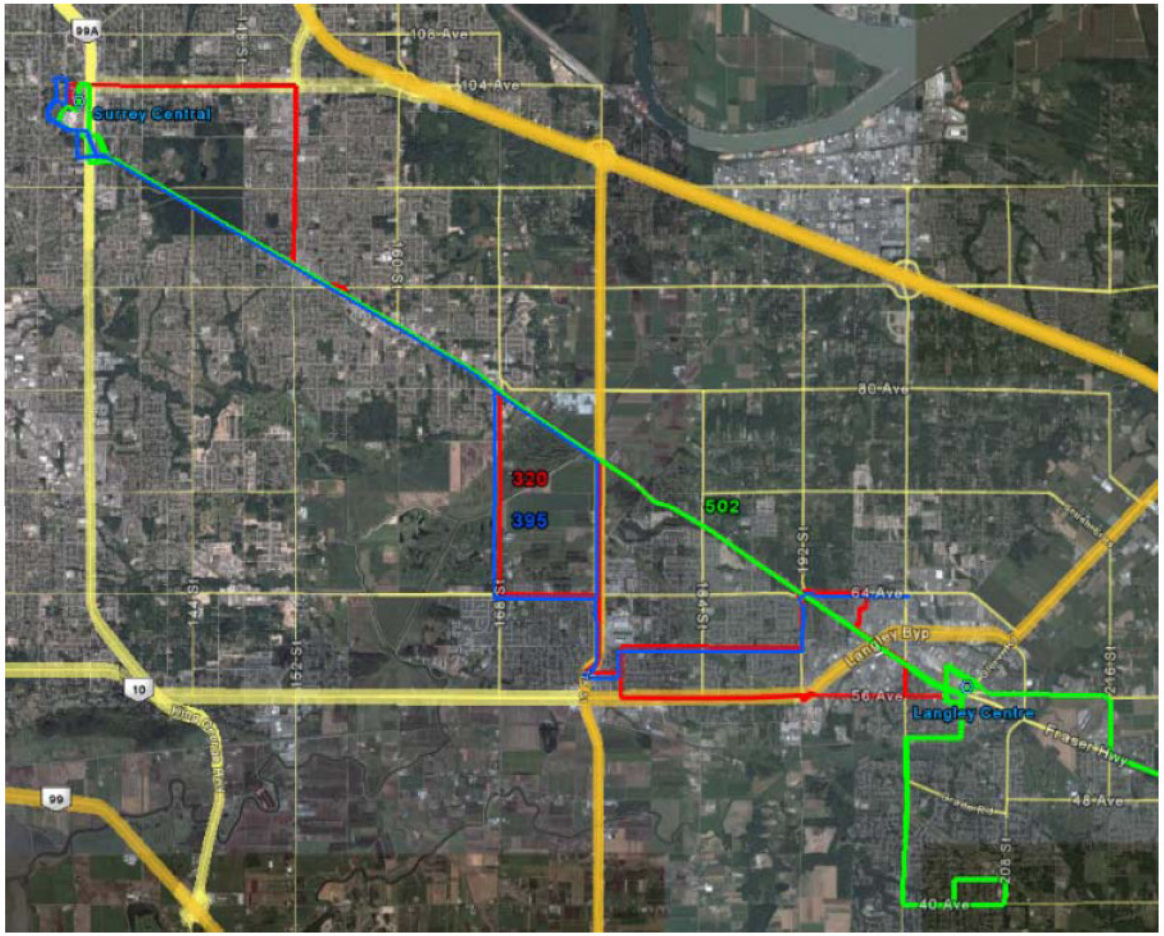
The proposed route will provide direct service between Langley and Surrey Central, via Fraser Highway. The route will provide a direct connection between these Town Centres, and intersect many existing and proposed rapid transit services at Surrey Central and Langley Centre.

Figure 1. Proposed Route and 2031 Network.

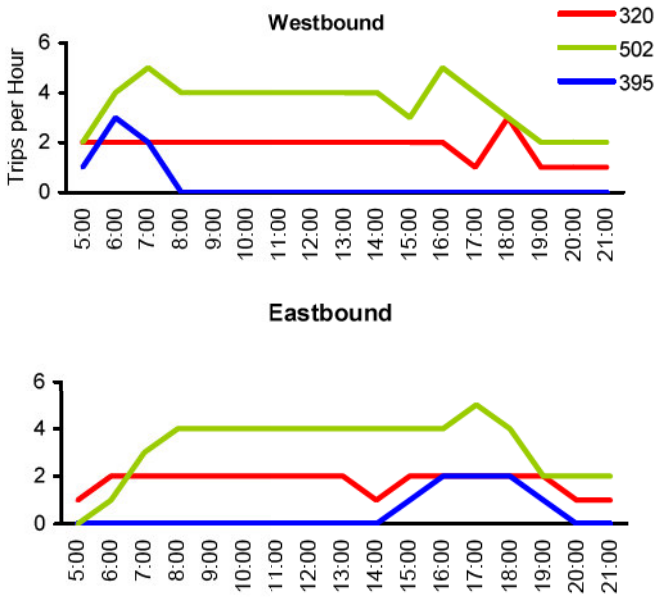


The #502 currently provides the most frequent and direct service between Langley and Surrey Central. The route runs at 15 minute frequency through most of the day, in both directions. The #320 and #395 also run on Fraser Highway, but they have more circuitous alignment. These routes are proposed to be replaced by a single Local Route, with a slightly modified alignment. The expected demand for the proposed route can therefore be estimated by evaluating existing demand for the #502.

Figure 2. Existing Routes and Frequencies.



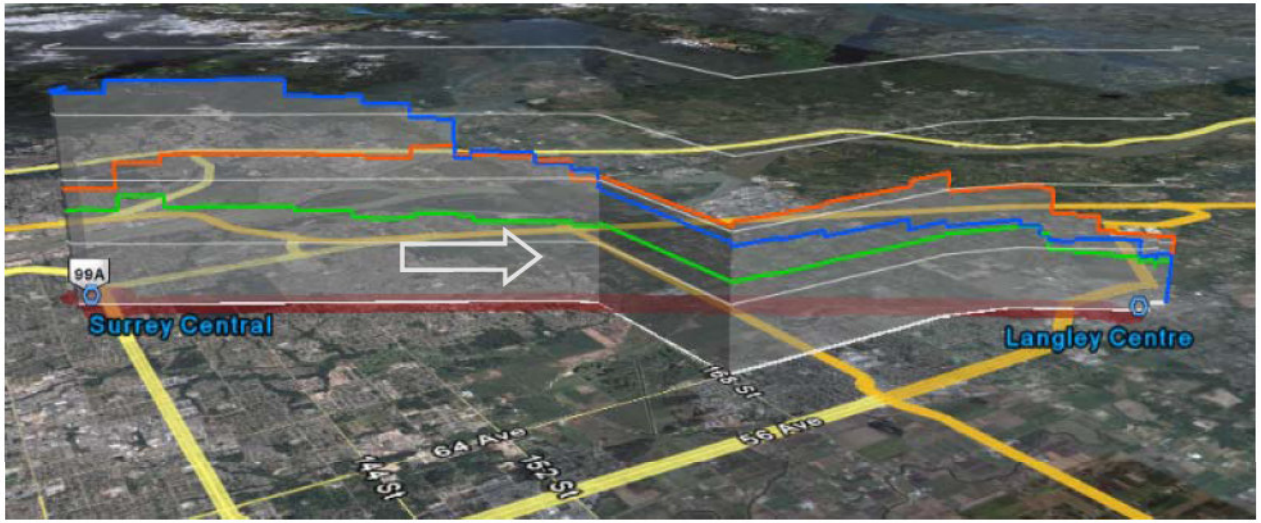
Route Frequencies:



APC Analysis and Results

The samples used to derive the load profiles and stop activity information shown here were taken from manual ride check counts, rather than APC data. Sample sizes for these data are therefore much lower than for data derived from the APC counts. These counts were conducted during a construction-related reroute of the #502 via 168th St and 64th Ave.

Figure 3. Eastbound #502 Load Profiles.



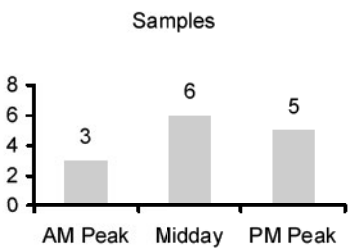
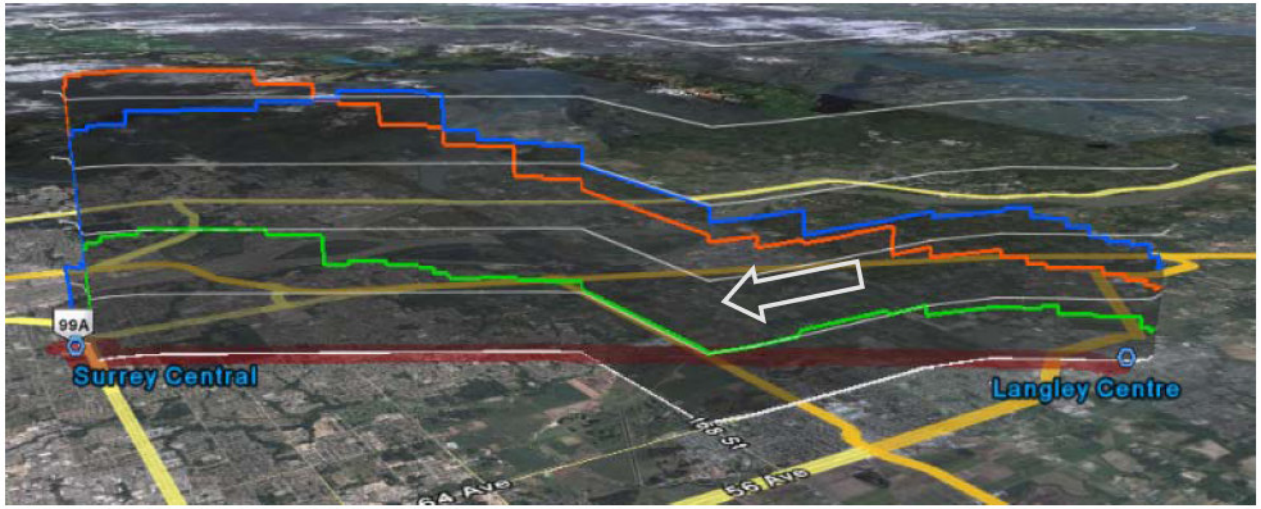


Figure 4. Westbound #502 Load Profiles.



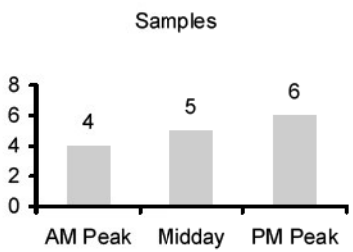


Figure 4. AM Peak Westbound #502 Stop Activity (n = 4)

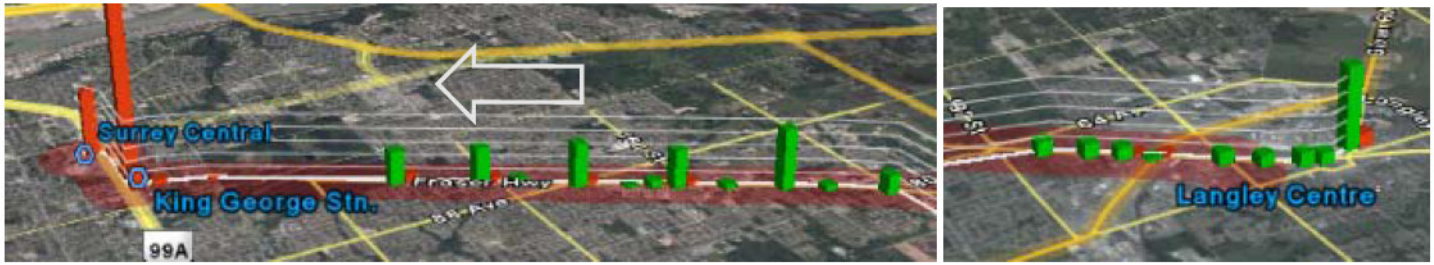


Figure 5. PM Peak Westbound #502 Stop Activity (n = 6)

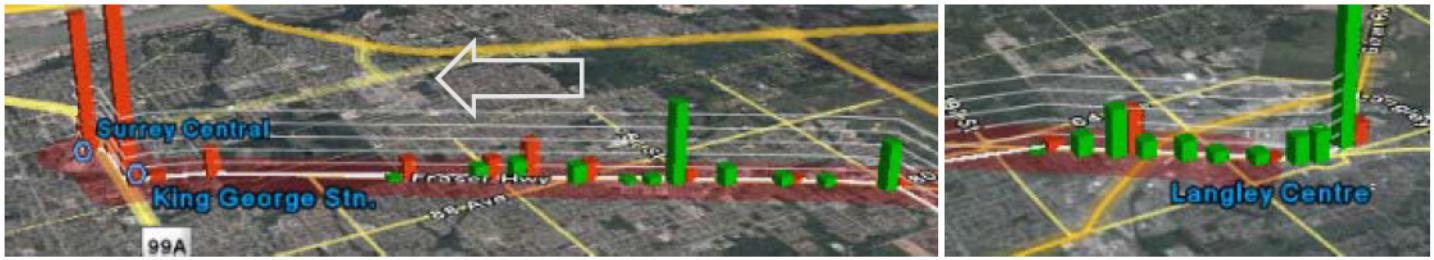


Figure 6. AM Peak Eastbound #502 Stop Activity (n = 3)

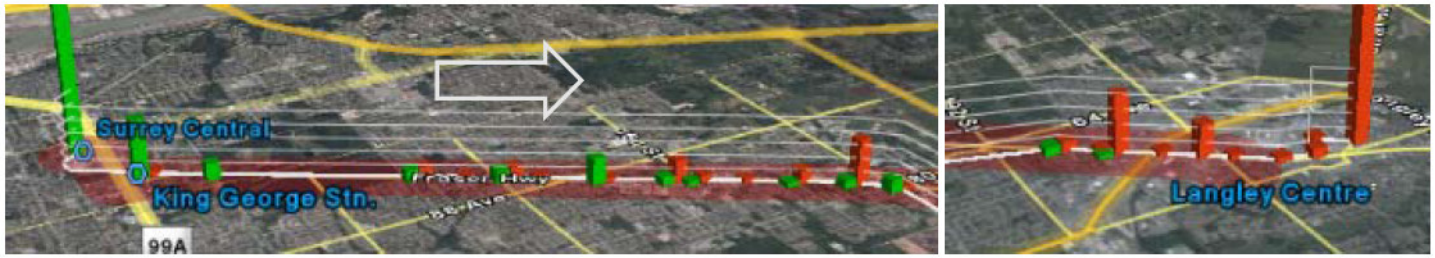
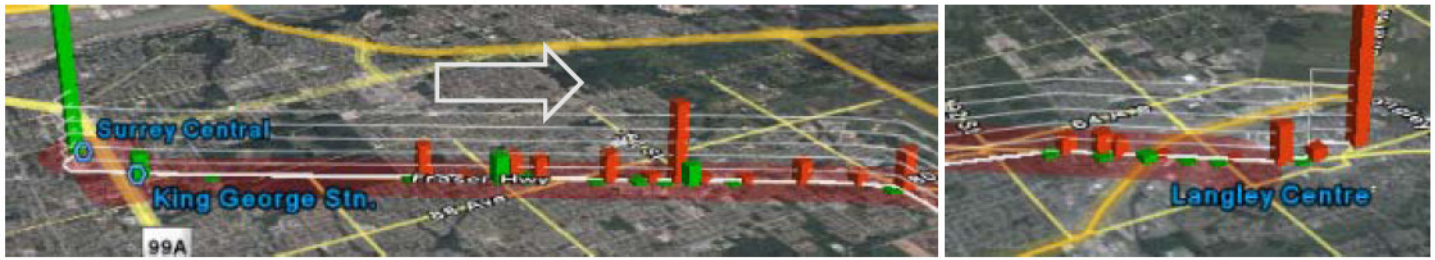


Figure 7. PM Peak Eastbound #502 Stop Activity (n = 5)



The load profiles and stop activity suggest a high demand for the #502. The dominant travel pattern is to Surrey Central in AM Peak and from Surrey Central in the PM Peak. The data also shows significant demand for the opposite pattern (to Langley in the AM Peak and from Langley in the PM Peak).

The stop activity data shows that demand for this route is concentrated at particular stops. In Surrey, stop activity is concentrated at the major cross-streets (148th, 152nd, 156th, 160th, 164th, and 168th Streets), suggesting that these would be appropriate locations for Rapid Transit stations. The demand at other stops is significant, and will be served by proposed Local Bus services. Establishing a Rapid Transit station at 148th will be particularly important, because the proposed Local Bus service does not intersect this cross street. Stop activity in Langley is less concentrated, however 196th St and Langley Centre both show high demand.

Conclusion

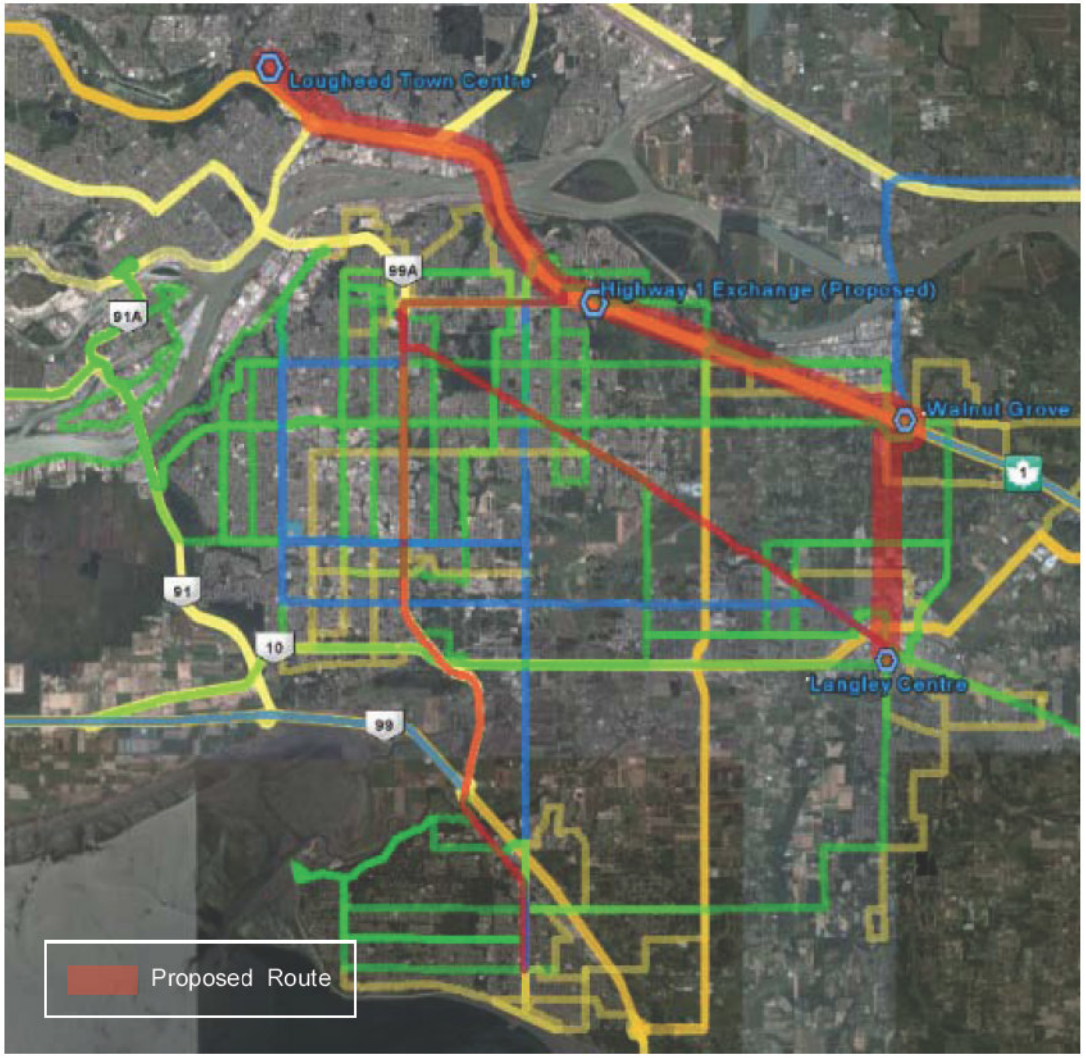
The demand for travel between Surrey Central and Langley Centre is high, and would support the proposed Rapid Transit service. While the dominant demand is for travel towards Surrey Central in the AM Peak, there also exists AM Peak demand to Langley Centre. This bidirectional demand is well-suited to Rapid Transit service, which runs at high frequency in both directions throughout the entire day.

The stop activity data can be used to help determine optimal locations for Rapid Transit stations. In Surrey, the data shows concentrated demand at the major cross-streets (148th, 152nd, 156th, 160th, 164th, and 168th Streets). In Langley the stop activity is less concentrated, however activity at 196th St and Langley Centre is high.

Proposed Route & Rationale

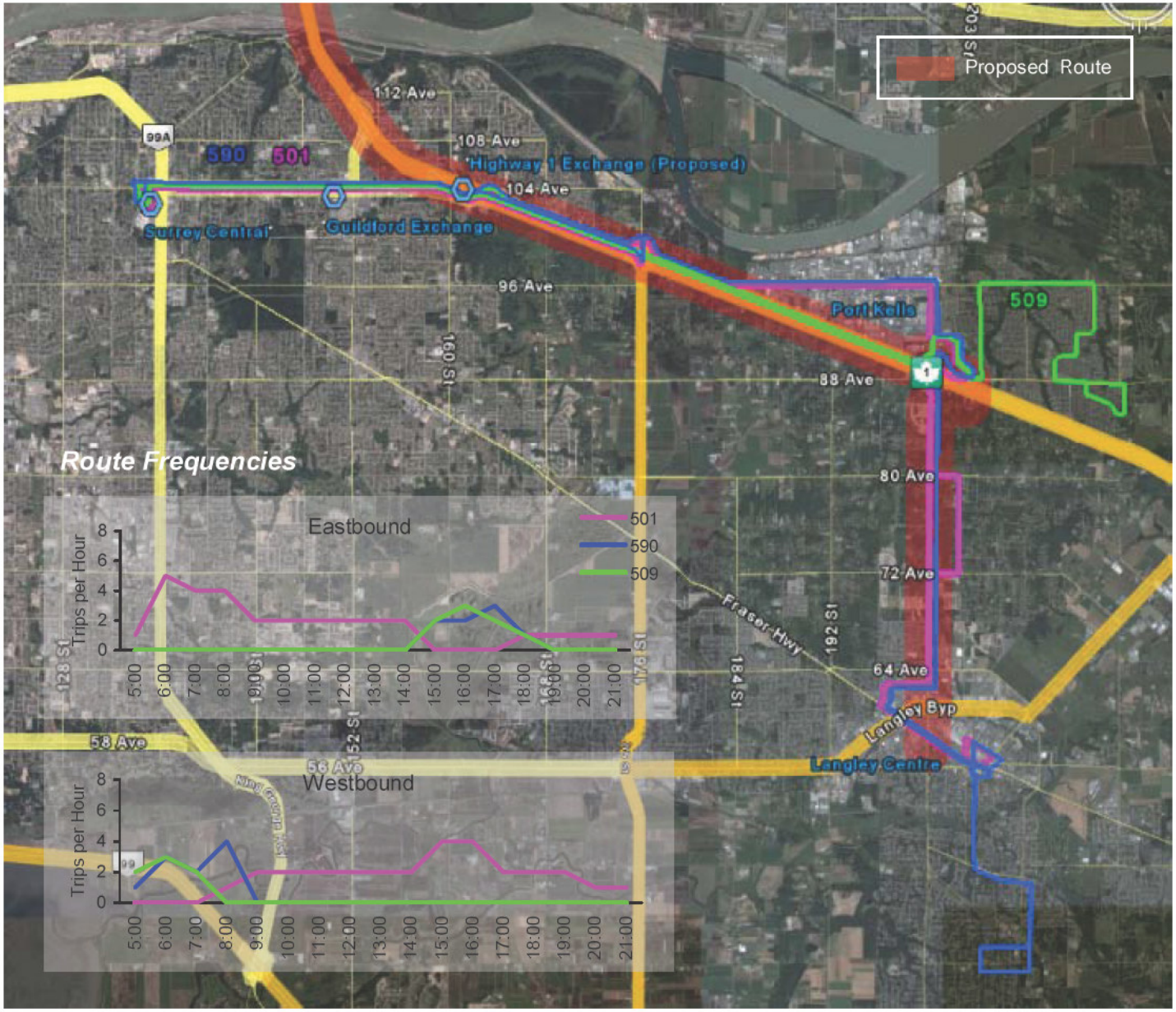
The proposed route will provide Rapid Transit service between Langley Centre and Lougheed Town Centre, via 200th St. and Highway 1, intersecting Walnut Grove and the proposed exchange at 104th Ave and Highway 1. This route will serve commuters travelling between Langley and points north of the Fraser River, and provide convenient and fast service between Surrey City Centre, Walnut Grove, and Langley. Figure 1 shows the proposed route.

Figure 1. Proposed Route and 2031 Network.



Existing routes that serve the proposed corridor include the #501, #590 and #509. The #501 and #590 have complementary schedules, and are in effect a single route. The combination of the #501/#590 operates at 15 to 30 minute frequency, and the #509 runs at 20 to 30 minute frequency in the peak direction during the peak period.

Figure 2. Existing Routes.



APC Analysis and Results

The load profiles and stop activity for the #501/#590 are shown here. Figures 3 and 4 show the data for travel to Surrey Central in the AM Peak, and to Langley Centre in the PM Peak. Figures 5 and 6 show the data for travel to Langley Centre in the AM Peak, and to Surrey Central in the PM Peak.

Figure 3. Westbound AM Peak #590 Load Profile and Stop Activity (n = 19)

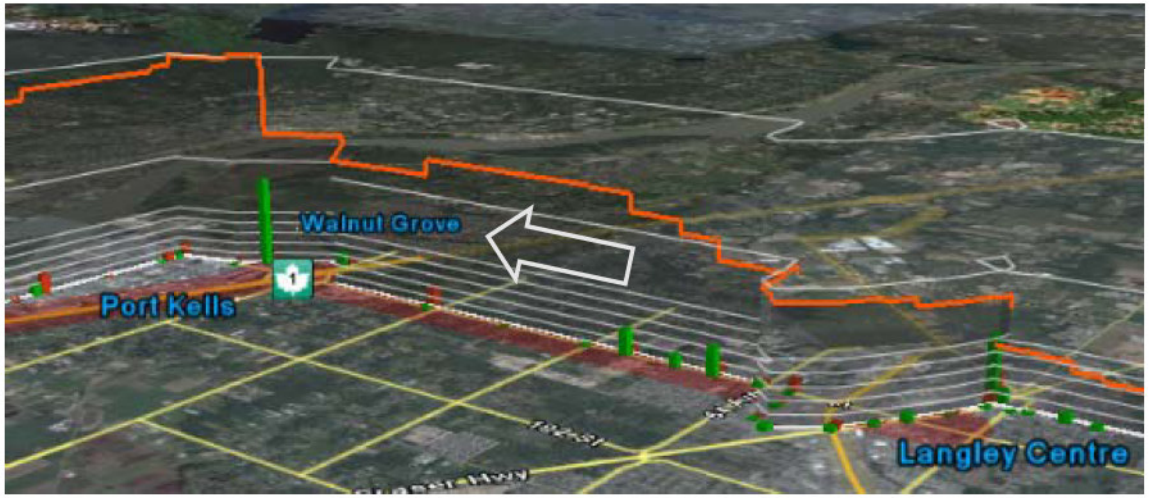


Figure 4. Eastbound PM Peak #590 Load Profile and Stop Activity (n = 24)

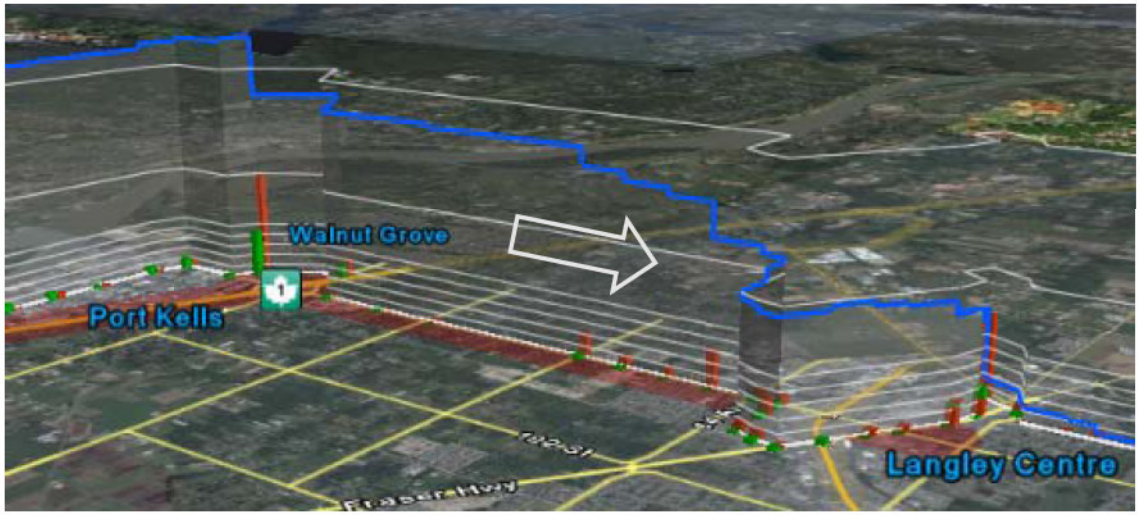


Figure 5. Eastbound AM Peak #501 Load Profile and Stop Activity (n = 54)

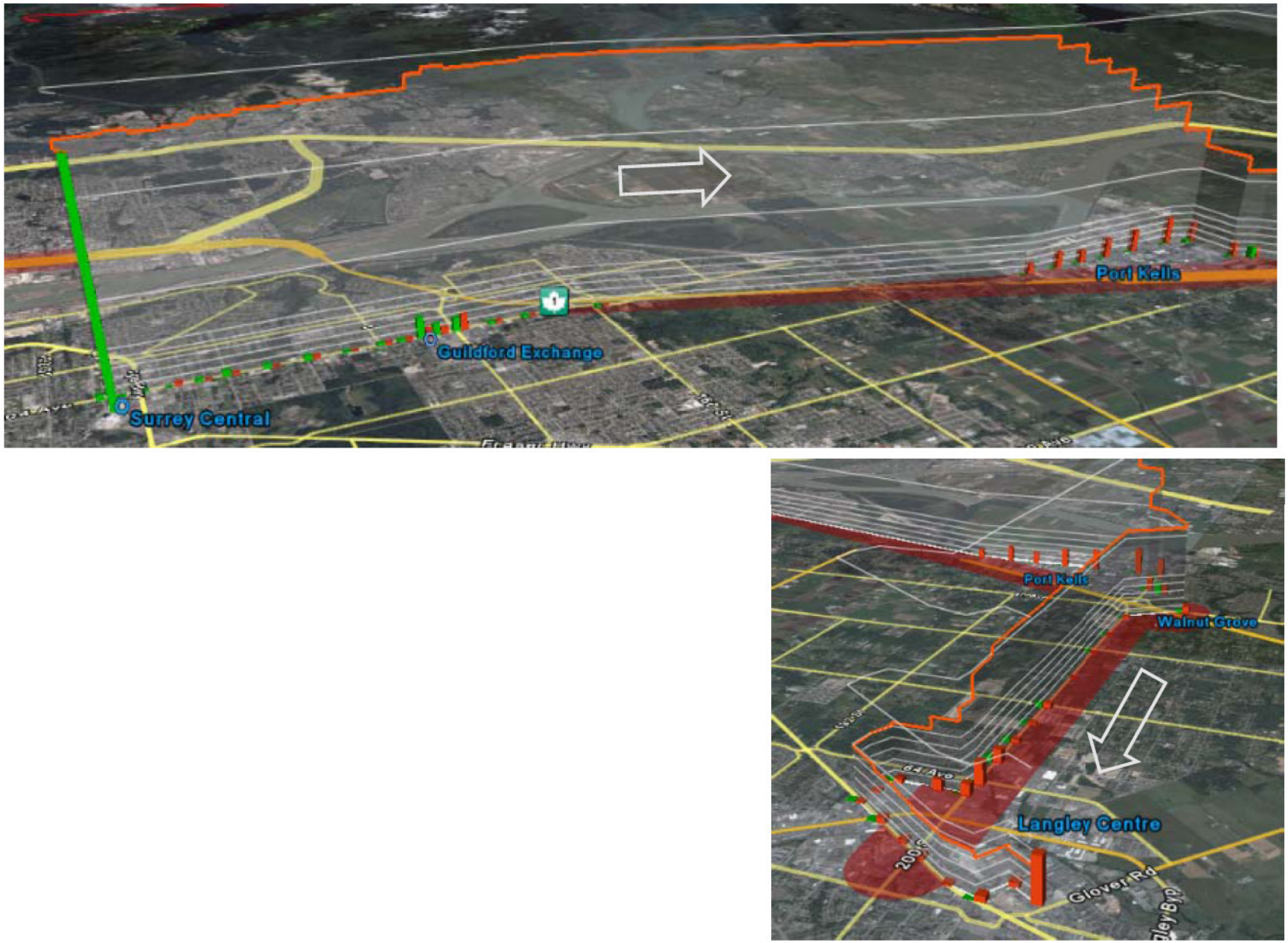
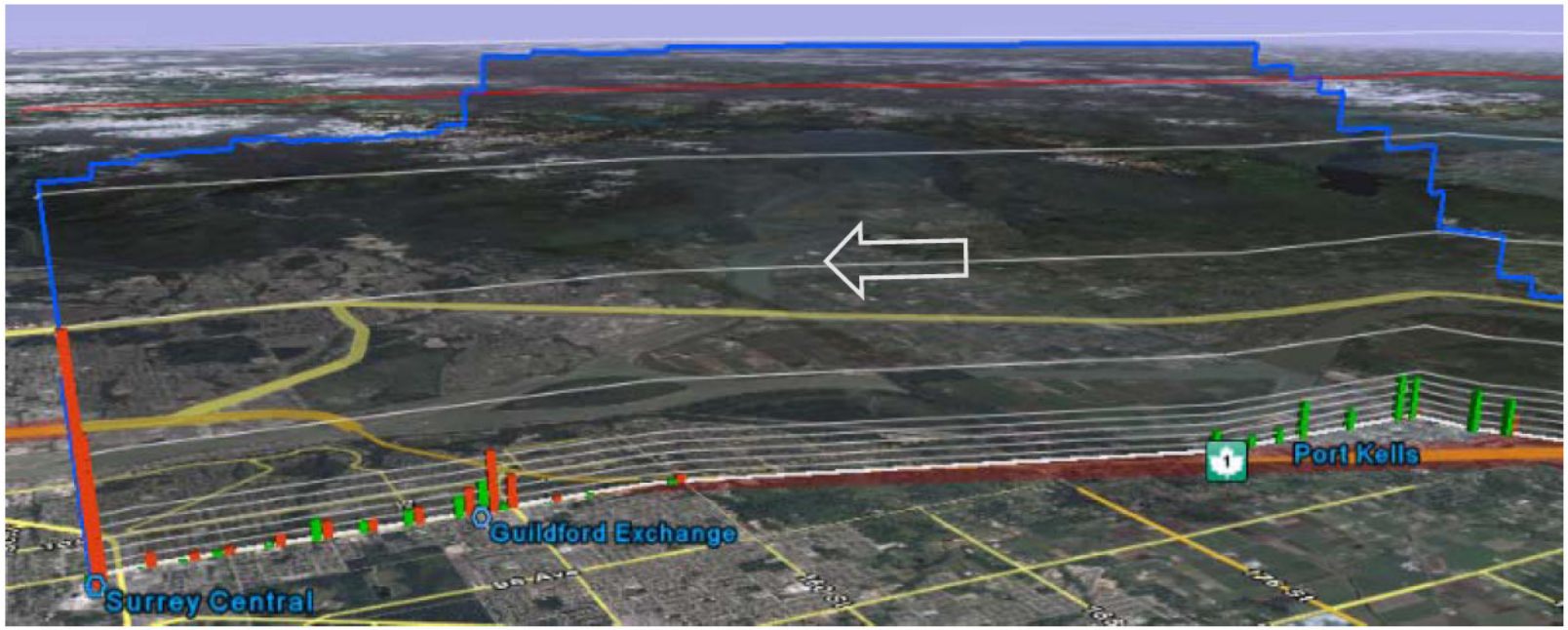
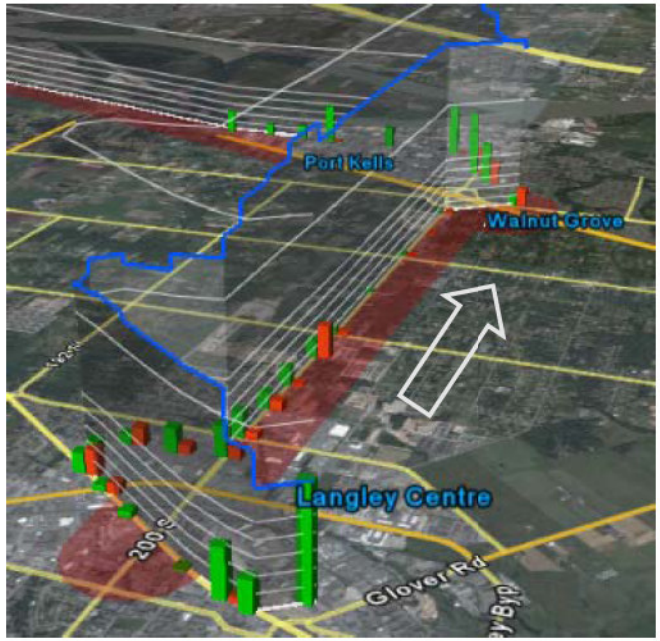


Figure 6. Westbound PM Peak #501 Load Profile and Stop Activity (n = 16).





The dominant travel pattern for the #501/#590 is for travel from Surrey Central to Port Kells, in the AM Peak and return travel to Surrey Central in the PM Peak, shown in Figures 5 and 6. The proposed route will not serve this demand; other services will provide service to Port Kells. The eastbound AM Peak demand on the proposed route will therefore consist of demand between Guildford, Walnut Grove, and Langley centre. This demand, shown in Figures 5 and 6 is low to moderate. The local demand south of 72nd Ave in Langley will be served by the proposed Frequent Bus service between Langley Centre and Maple Ridge.

The demand for the reverse travel pattern (to Surrey Central in the AM Peak, and to Langley Centre in the PM Peak) shows less dependence on Port Kells. In the AM Peak, the majority of demand is for travel to Surrey Central, though some demand exists for travel to Walnut Grove. In general, demand for this travel pattern is moderate.

Figures 7 and 8 show load profiles and stop activity for the #509, westbound in the AM Peak, and eastbound in the PM Peak, respectively.

Figure 7. Westbound AM Peak #509 Load Profile and Stop Activity (n = 19)

Figure 8. Eastbound PM Peak #509 Load Profile and Stop Activity (n = 24)

The #509 data shows moderate to high demand for travel from Walnut Grove to Surrey City Centre.

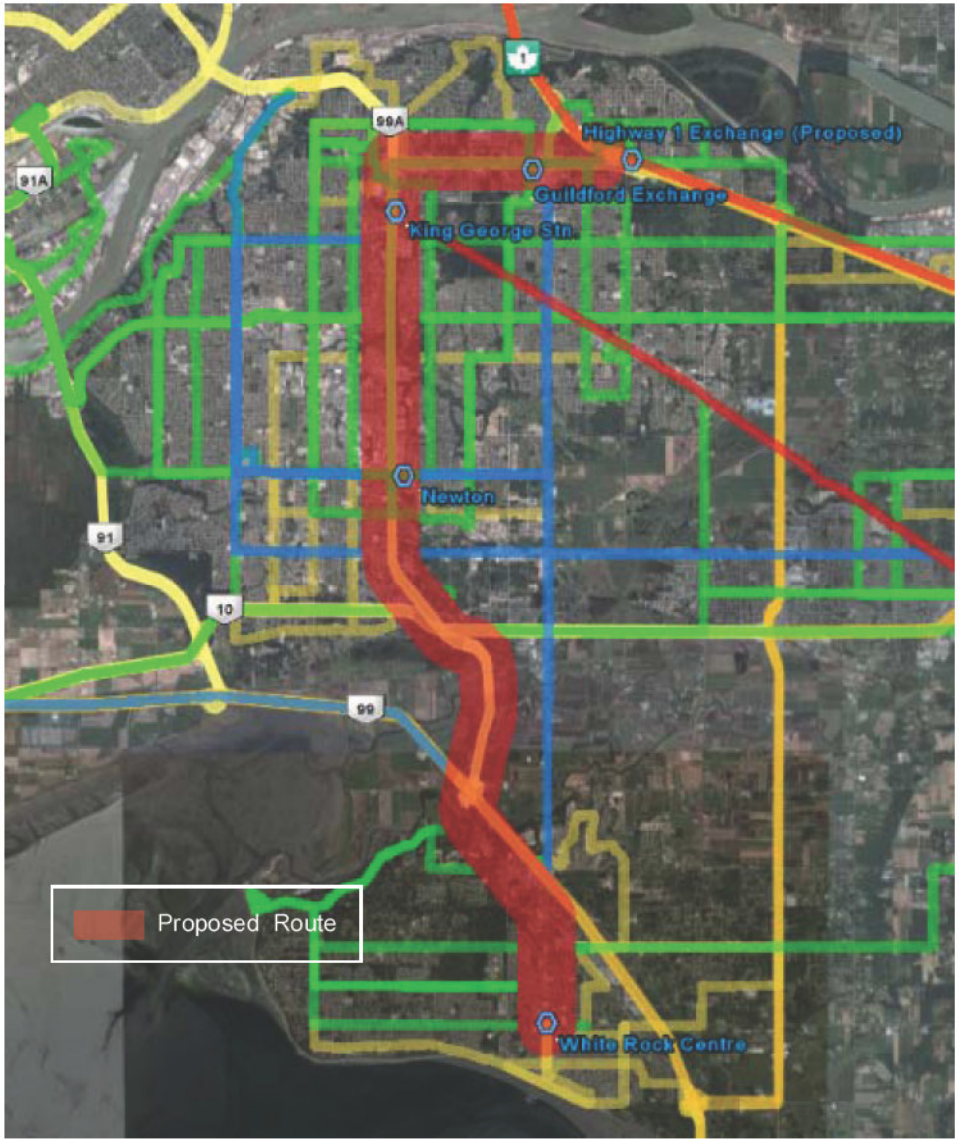
Conclusion

The routes that currently serve the alignment of the proposed Rapid Transit service show moderate demand. However, increased development east of 200th St, between Langley Centre and Walnut Grove, and the extension of services across the Port Mann Bridge, can be expected to generate increased demand along the 200th St and Highway 1 corridors.

The alignment of the proposed Rapid Transit network necessitates splitting some existing routes. Passengers travelling through East Guildford who currently use the #501/#590 or the #509 will now be required to transfer at that station. Given that Rapid Transit is also proposed along Highway 1 across the Port Mann Bridge, the alternative design would be to provide continuous service between Langley and North Surrey, and to force a transfer for passengers travelling north across the Fraser River. However, it is expected that there is a greater demand for travel to destinations north of the Fraser River than to Surrey City Centre. Therefore fewer passengers would be inconvenienced by the proposed configuration. Regardless, overall service for all passengers from Langley and Walnut Grove will be greatly improved as a result of the introduction of the proposed Rapid Transit service.

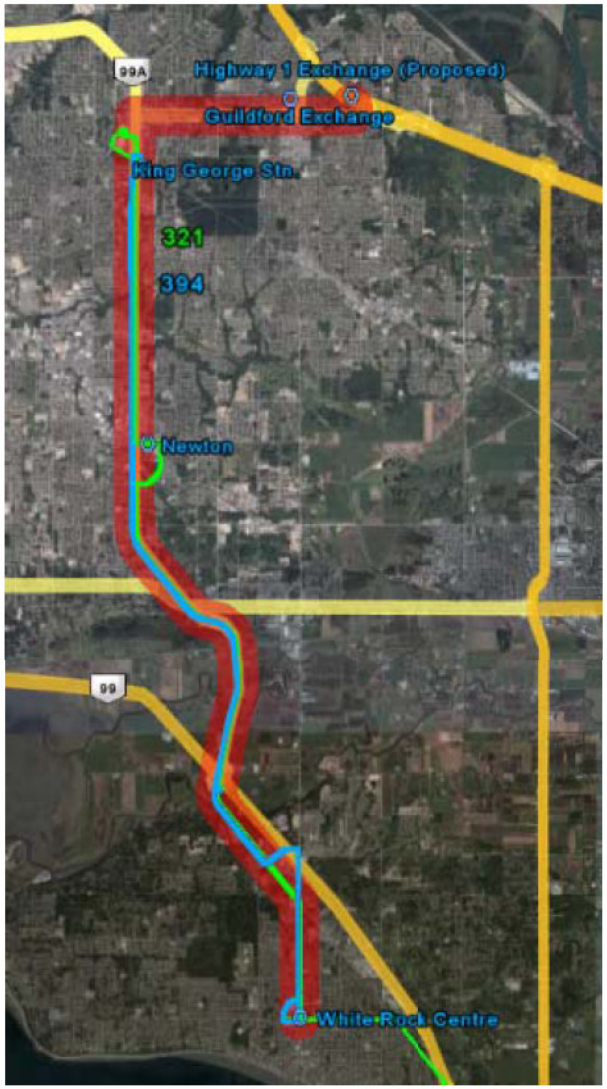
Proposed Route & Rationale

Figure 1. Proposed Route and 2031 Network.



The proposed route will provide Rapid Transit service between White Rock Centre and Guildford Exchange, via 152nd St, King George Highway and 104 Ave. Several important destinations are located along these corridors, including White Rock Centre, South Surrey Park & Ride, Newton Exchange, King George Station, Surrey Central, and Guildford. At its northern terminus, Rapid Transit B will also provide a connection to the future Highway 1 Rapid Transit route between Langley and Lougheed Station in Burnaby.

Figure 2. Existing Routes – King George Highway



Route Frequencies

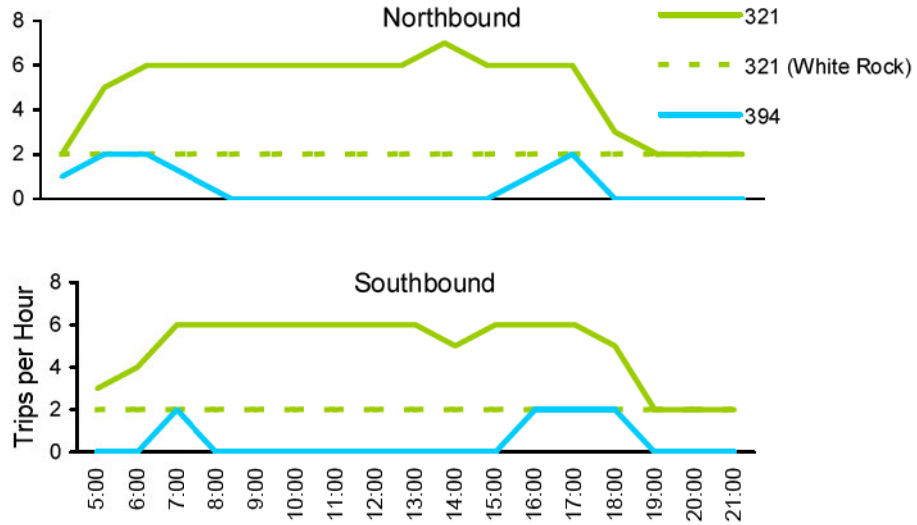
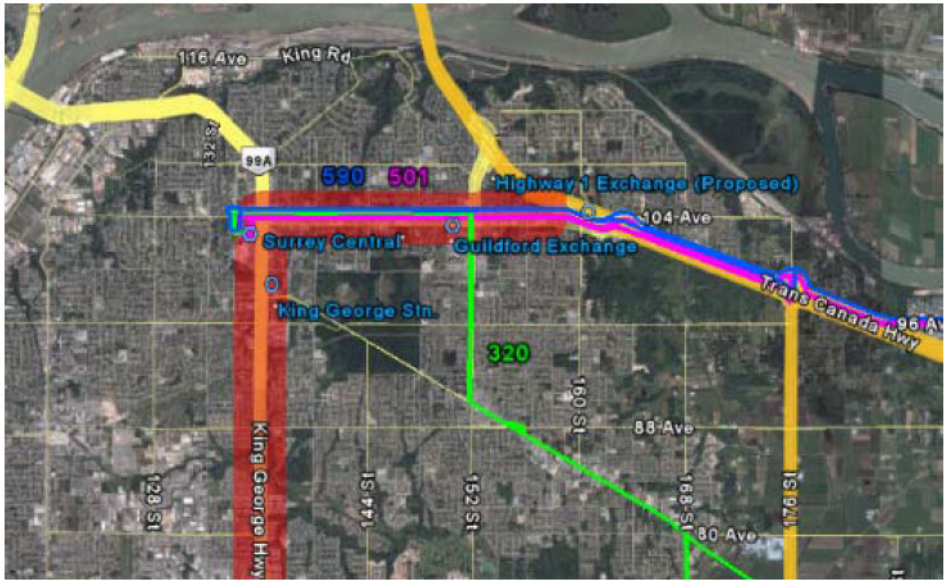


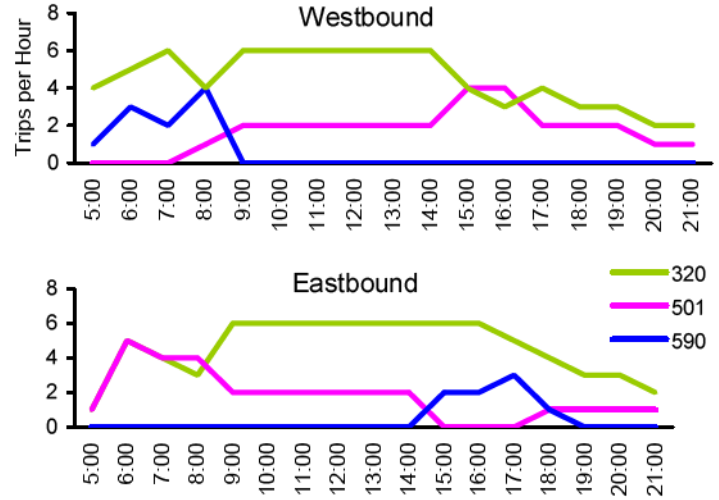
Figure 2 shows the proposed route and the existing routes that serve the King George Highway portion of the corridor. These routes include the #321 and #394. During daytime hours, the #321 provides 10 minute service between Newton Exchange and Surrey Central Station, and 30 minute service to and from White Rock. The #394 provides limited-stop service during the peaks at 30 minute frequency.

Figure 3 shows the proposed route and the existing routes that serve the 104th Ave portion of the corridor. These routes include the #501, #590, #320, and the C74 Community Shuttle. The #501 and #590 have complementary schedules, and are in effect a single route. The combination of the #501/#590 operates at 15 to 30 minute frequency, the #320 operates at 10 to 20 minute frequency, and the C74 Community Shuttle runs at 12 to 30 minute frequency. The #509 also runs on this corridor, but with very limited frequency.

Figure 3. Existing Routes – 104th Ave.



Route Frequencies



APC Analysis and Results

Load profile data for existing routes shows very high demand for travel along the proposed corridor. Figures 4 and 5 show load profiles for the #321, for trips that travel between White Rock and Surrey Central Station.

Figure 4. Northbound #321 Load Profiles (White Rock Patterns only)

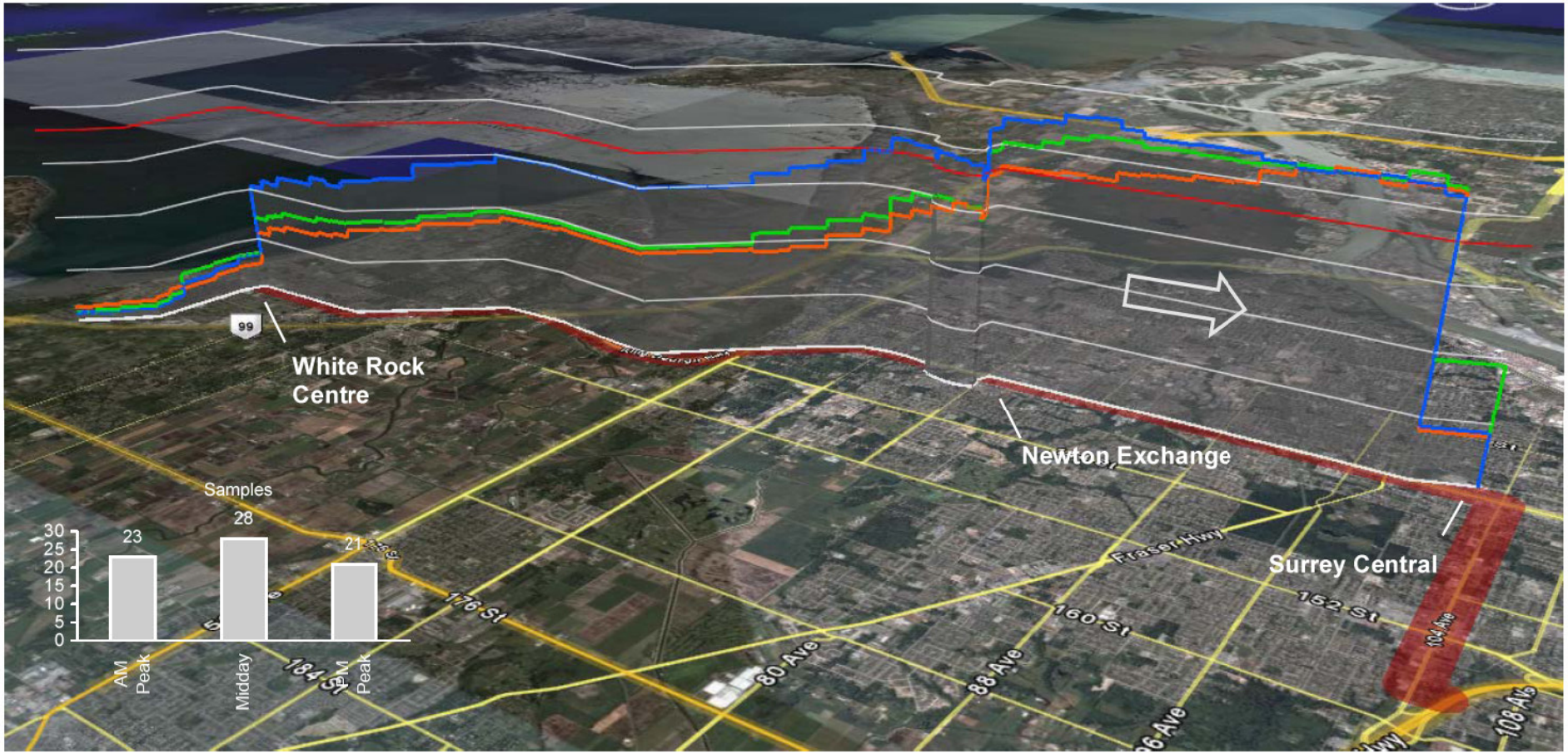
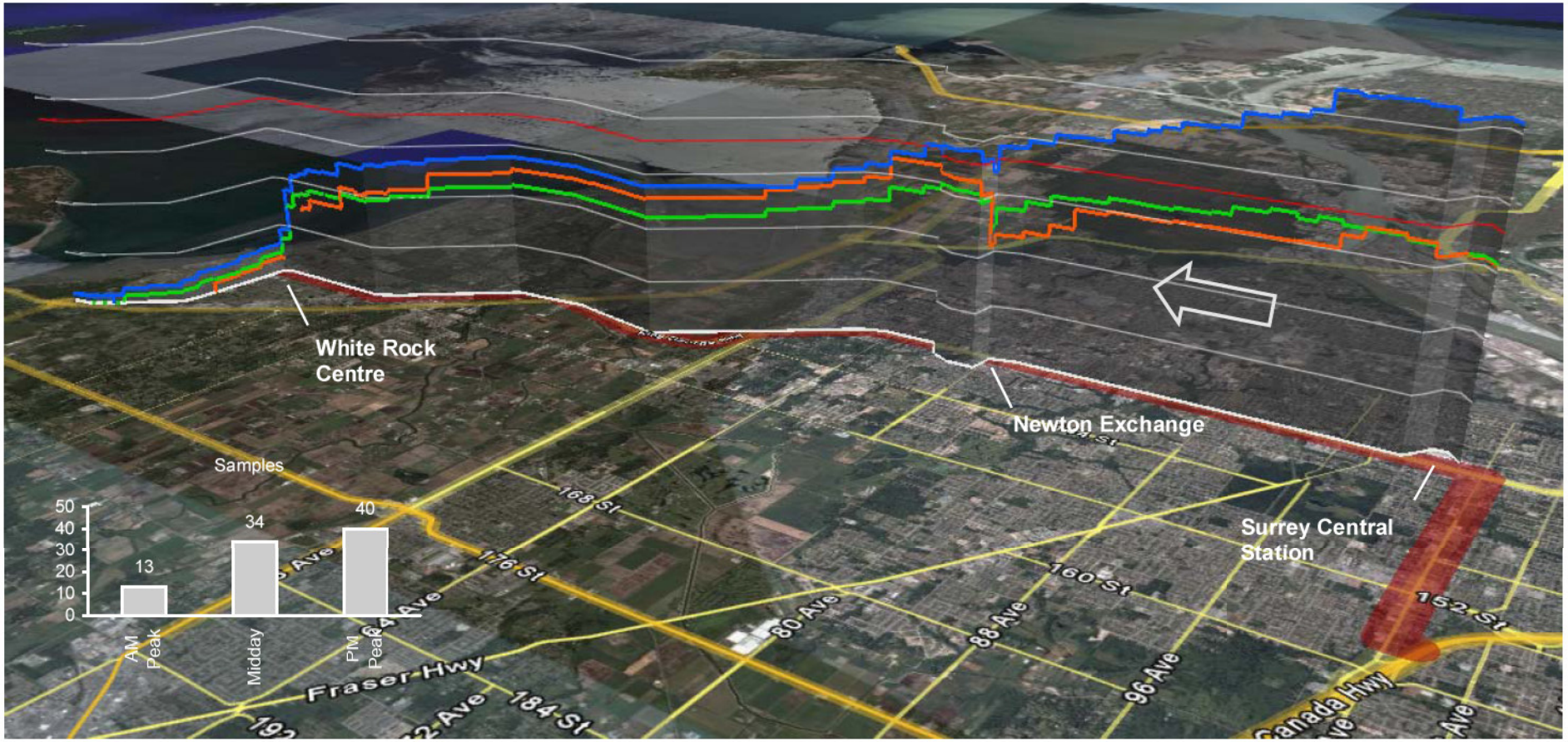


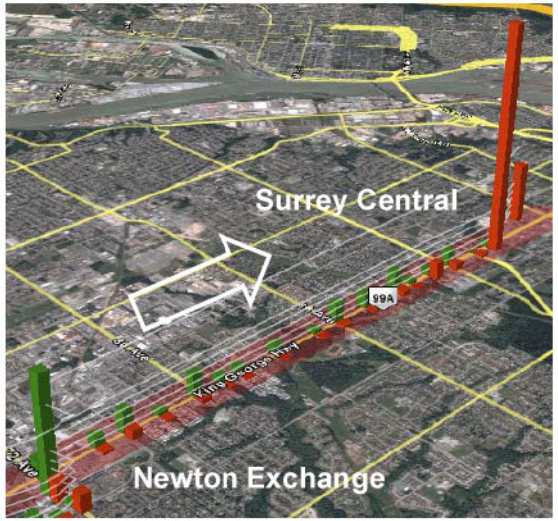
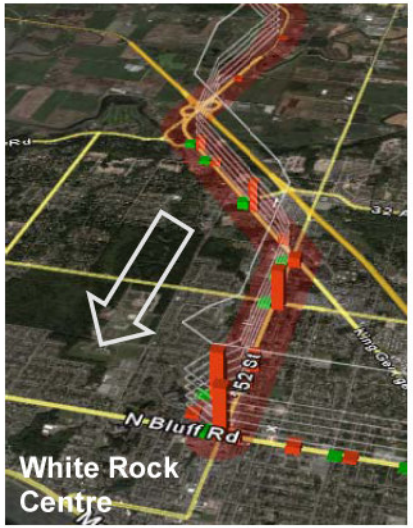
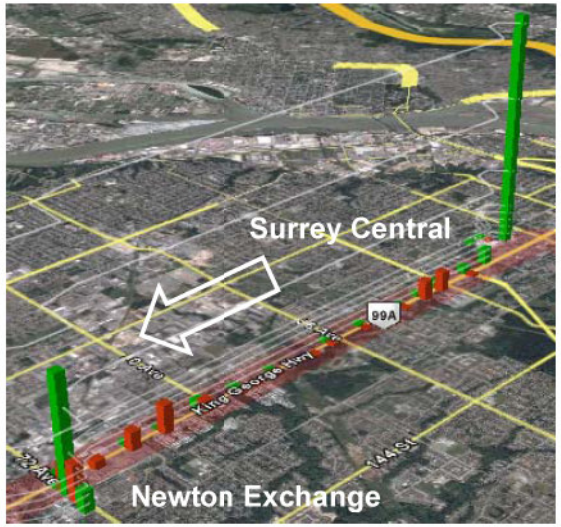
Figure 4. Southbound #321 Load Profiles (White Rock patterns only)



These profiles show consistently high loads in both directions of travel throughout the day. It is significant that loads are the highest between Newton Exchange and Surrey Central Station, despite that portion of the corridor having service at 10 minute frequency for most of the day. It is also important to note that average loads are near or exceeding seated capacity for significant portions of the route, likely leading to passenger discomfort and pass-ups. Load profiles for the #394 express are slightly lower, ranging between 20 and 30 passengers during the peaks.

The stop activity pattern for the #321 is shown in Table 1.

Table 1. #321 AM Peak Stop Activity

Northbound			
	White Rock (n = 23)	South Surrey (n = 23)	North Surrey (n = 23)
Southbound			
	White Rock (n = 13)	South Surrey (n = 13)	North Surrey (n = 13)

This data shows concentrated stop activity at a few specific locations, including White Rock Centre, Newton Exchange, King George Station, and Surrey Central Station (only data for the AM Peak is shown, however other time periods show similar patterns). Significant stop activity also exists at stops between these major destinations, indicating the need for continued underlying local service, between Highway 10 and Surrey Central.

Figure 6 and 7 show load profiles for the #320 along 104 Ave, and Figures 8, 9 and 10 show stop activity.

Figure 6. Westbound #320 Load Profiles

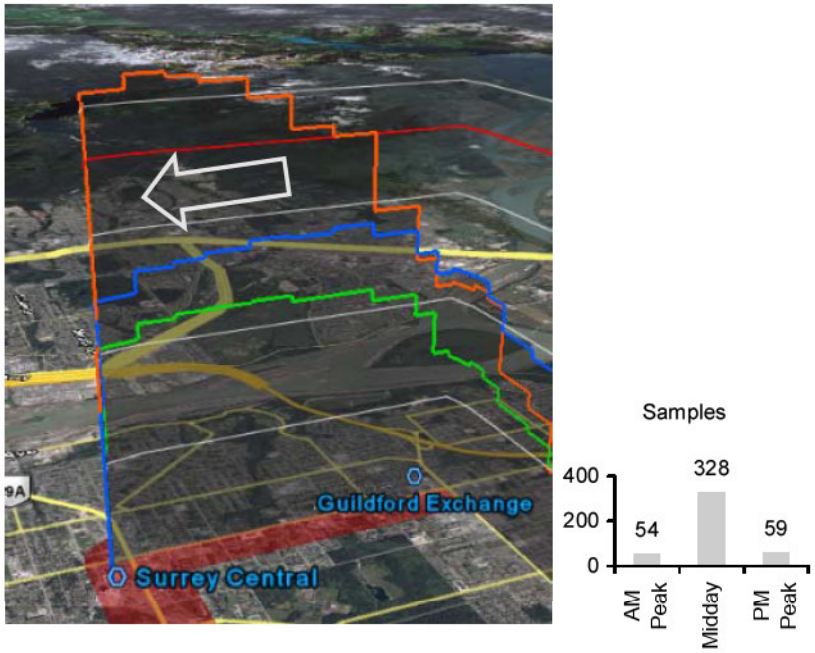


Figure 7. Eastbound #320 Load Profiles

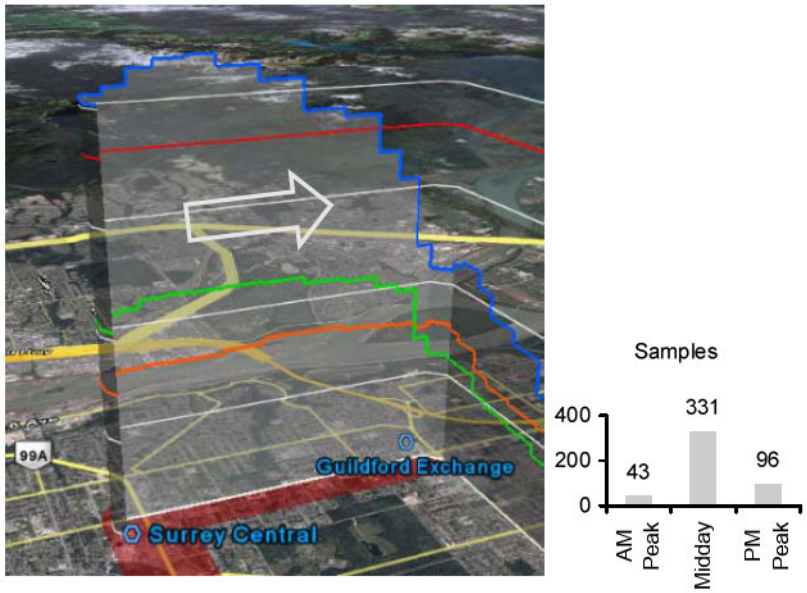


Figure 8. AM Peak Eastbound #320 Stop Activity (n = 43)

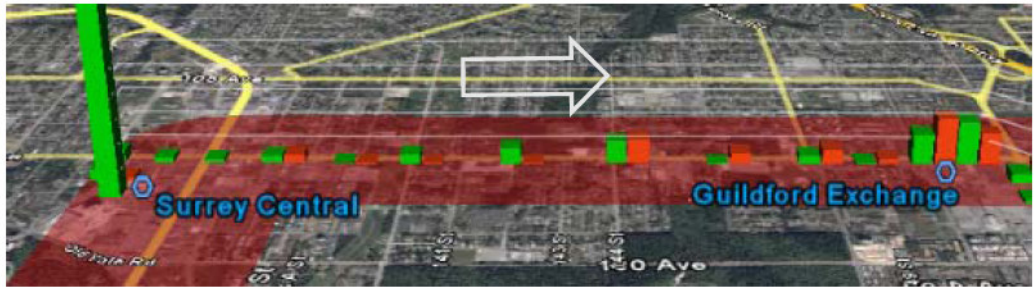


Figure 9. Midday Eastbound #320 Stop Activity (n = 331)

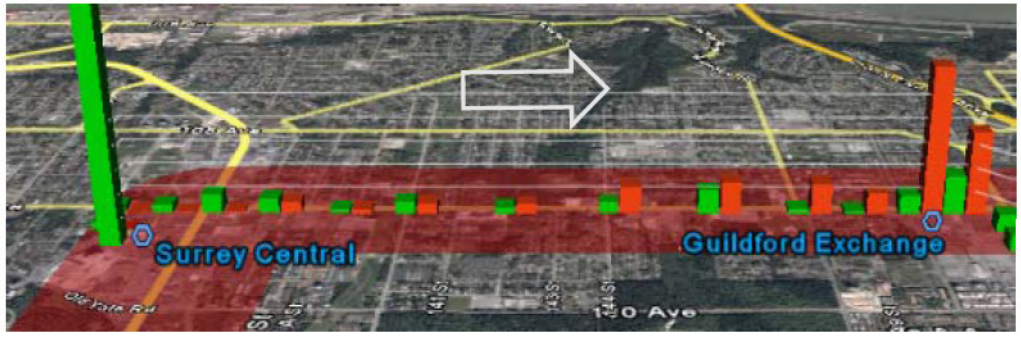
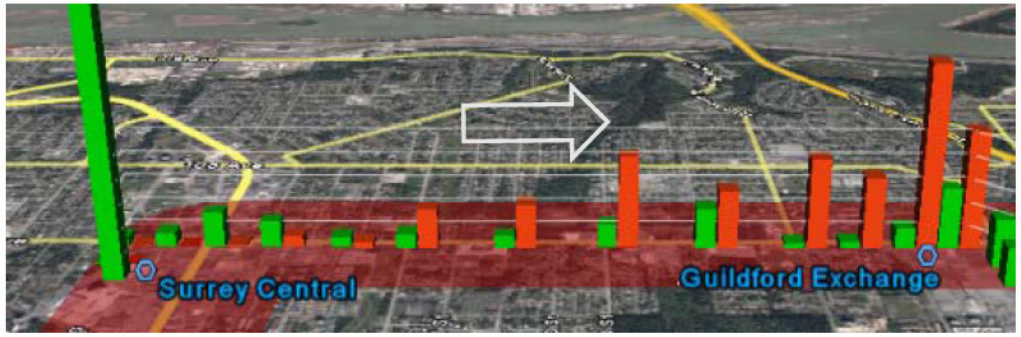


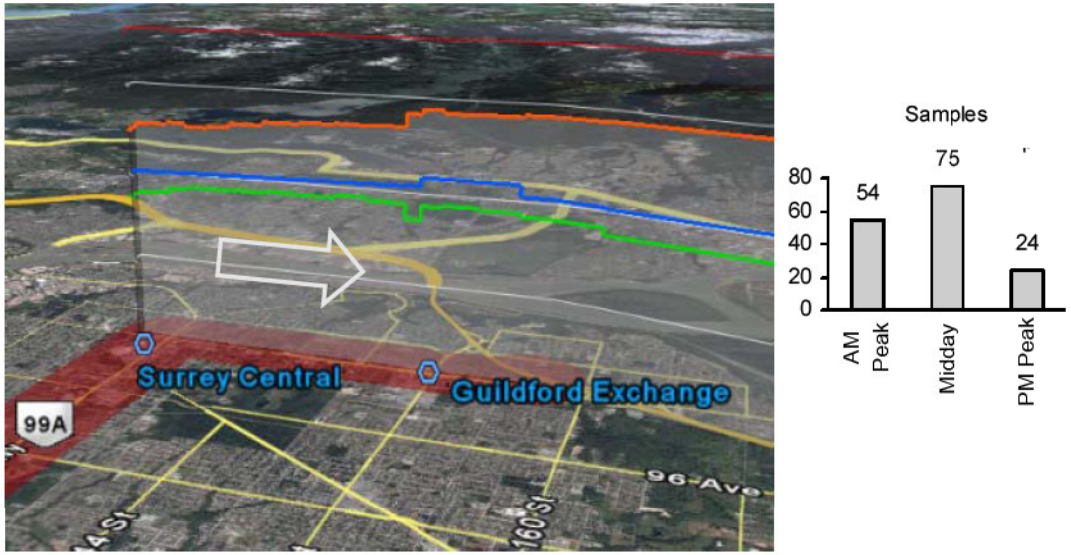
Figure 10. PM Peak Eastbound #320 Stop Activity (n = 96)



The load profile and stop activity data for the #320 show very high demand on this corridor. While stop activity is concentrated at Surrey Central and Guildford Exchange, demand is high at many stops along 104th Ave, indicating the need for underlying local service.

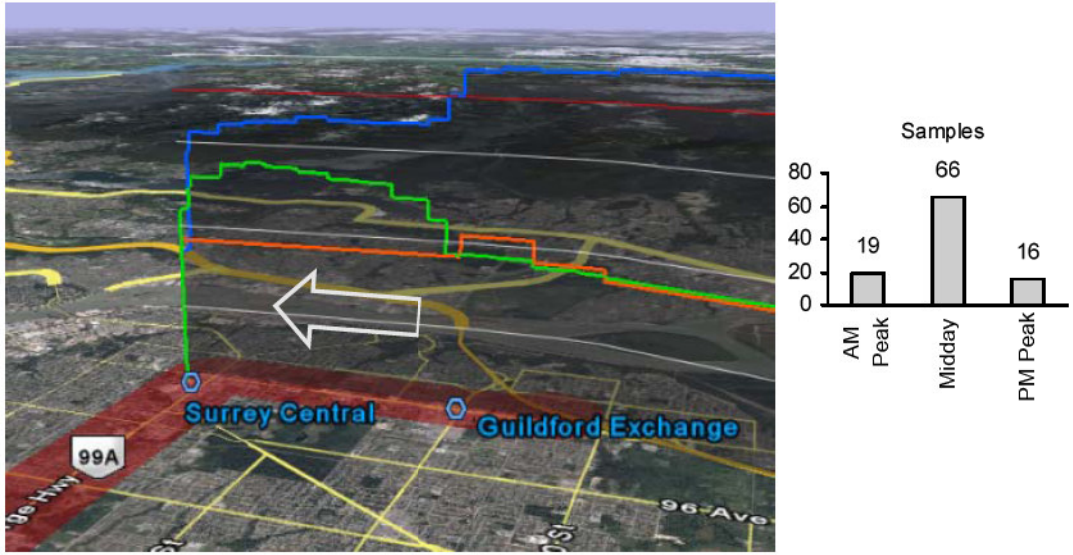
Figures 11 and 12 show load profiles for the #501 and #590 along 104 Ave.

Figure 11. Eastbound #501 and #590 Load Profiles (PM Peak profile based on #590)



The #501/#590 shows the opposite travel pattern to the #320. This is likely because this route serves commuter demand to the Port Kells industrial area, and because the #501 is the preferred route for passengers commuting between Surrey Central and Langley Centre (see analysis document for "Rapid Transit – 200th St. & Highway 1" for a full analysis of the #501/#590 demand). Regardless, the #501/#590 exhibits moderate demand along the 104th Ave corridor. The loads along 104th Ave. are less than the peak period loads for the #320 because the #590 is a limited-stop service during peak periods in the peak direction.

Figure 12. Westbound #501 and #590 Load Profiles (AM Peak profile based on #590)



Conclusion

The high loads and stop activity on King George Highway and 104th Ave show that these corridors have a very high demand, and support the proposal for Rapid Transit service. Buses are often crowded, particularly during the peak periods. This leads to passenger discomfort and the potential for pass-ups. Rapid Transit service will increase service frequency and thereby alleviate these problems.

The concentrated stop activity suggests that many passengers are making long trips between major origins and destinations. Limited-stop Rapid Transit service would benefit these passengers by reducing travel times. It is important to note that stop activity at stops between these major destinations is still significant; Local service should be maintained along this route, particularly between White Rock Centre and the King George Hwy / Hwy 99 interchange, and between Hwy 10 and Guildford.

The alignment of the proposed Rapid Transit network necessitates splitting some existing routes. Passengers travelling through East Guildford who currently use the #320, #501/#590, or the #509 would now be required to transfer at that station. Due to the fact that three Rapid Transit corridors intersect at this station, transfers here are inevitable. The alternative design would be to provide continuous service between Langley and North Surrey, and to force a transfer for passengers travelling north across the Fraser River. However, it is expected that there is a greater demand for travel to destinations north of the Fraser River than to Surrey City Centre. Therefore fewer passengers would be inconvenienced by the proposed configuration. Regardless, overall service for all passengers from Langley and Walnut Grove will be greatly improved as a result of the introduction of the proposed Rapid Transit service.