of such a lane remains close to that of a mixed traffic lane – in the range of 1,150 passengers per hour for CLRV or 1,650 for ALRV. These capacities are based on a scheduled frequency of 4 minutes and traffic demands below capacity. When traffic volumes reach the available capacity, the transit system would break down. Adding more streetcars would not expand the capacity, because with increasing frequency in these conditions, transit becomes unreliable. Streetcar bunching and short-turns are common indicators of an unreliable transit service. While the TTC does operate routes with more frequent service and which carry more passengers across the peak load point than noted above, these routes are operating above their practical capacity, and provide very poor, unreliable customer service due to bunching, overcrowding and frequent short turns;

- Estimated cost is slightly higher than the base case replacement cost. Additional capital cost is in the range of $0.5 million to $0.75 million for signage and pavement markings, plus track replacement of $25 million and platform relocations to far-side of intersections ($5 million), for total cost of $31 million to $32 million. Additional costs may include traffic signal controller/transit signal priority upgrades, engineering costs, and road reconstruction. Enforcement costs would be in addition to this.

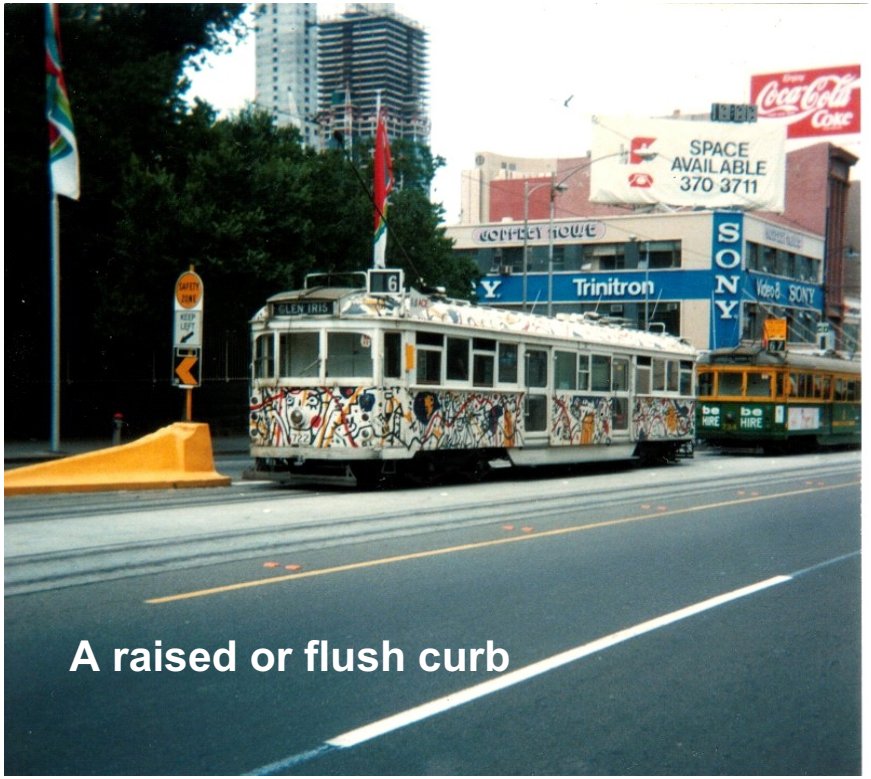
2) Physically Separated Lanes:

- Transit lanes would be separated from the traffic lanes by concrete curbs or bollards, landscaped medians, raising the streetcar lanes, textured pavement, or combination thereof. Examples of raised or flush curb, medians and bollards are shown in **Figure 7.4**;
- Person-carrying capacity of a physically separated dedicated streetcar lane is approximately 2,300 passengers per hour for CLRV streetcars and 3,000 persons per hour for ALRV streetcars;
- Estimated cost is higher than the base case replacement cost (depending on the specific design of the exclusive lanes). Additional capital cost is estimated in the range of $7 million to $10 million, plus track replacement and platform replacement cost of $30 million, for a total cost of $37 million to $40 million.

The Phase II cost estimates were later revised in Phase III.

Left turn vehicular movements to and from intersecting side streets would be prohibited, except at signalized intersections, under this alternative solution. Regularly spaced U-turn lanes provide neighbourhood access, as shown in **Figure 7.5**.

Streetcar platforms would generally be located at the far-side of the intersections. On-street parking would be available on both sides. Some on-street parking may be restricted alternately between the north and south sides of St. Clair Avenue during



A landscaped strip

Bollards/posts
(higher than these
for winter visibility)

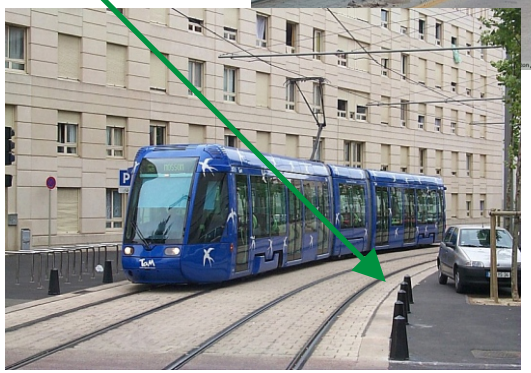


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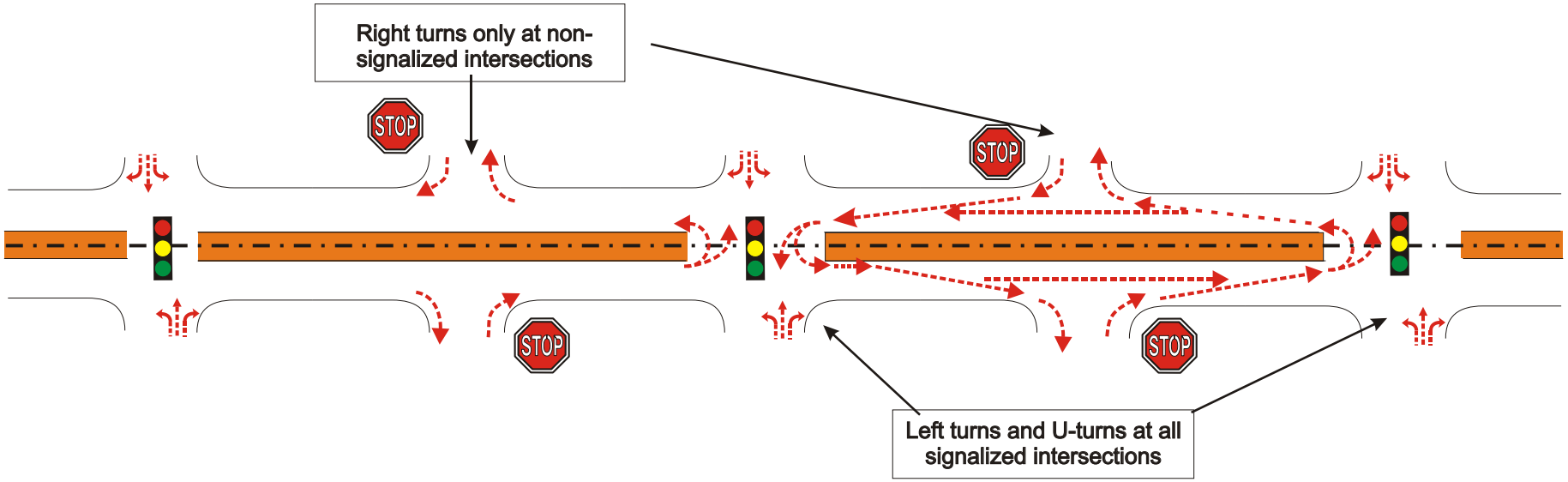
FIGURE 7.4
Options for Dedicated Streetcar Right-of-Way



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Driver's travel path

FIGURE 7.5
Alternative 6
Typical Traffic Movements

different peak periods to provide sufficient traffic capacity for the peak travel direction. All or most of the north side on-street parking would likely be restricted on selected road sections during the p.m. peak period, and conversely, south side parking would be prohibited during the morning peak period (as it is today).

7.7 Alternative 7 – Change Transit Technology

This alternative consists of replacing the existing streetcar operation with other types of transit vehicles. Sub-options include:

1) Buses in Mixed Traffic:

- Replacing streetcars with buses;
- Person-carrying capacity would be reduced to 850 persons/hour assuming a local bus service. Increasing bus service frequencies in order to increase capacity would create the same instability and unreliable service described for streetcar operations in mixed traffic. However, buses would be able to pass each other, which would reduce the impact on customers;
- The cost is high, for purchase of additional buses and supporting infrastructure (signal systems, bus storage facility, etc). Cost of buses would be in the range of $18 million to $25 million, depending on the type. Cost for a storage/maintenance facility, apportioned for the number of new buses for St. Clair Avenue, would be in the range of $8 million. Rebuilding the road without streetcar tracks would cost $13 million. Therefore, the total capital cost would be in the range of $39 million to $46 million.

2) Reserved Bus Lanes (RBL):

- Buses would replace streetcars, operating in reserved lanes, either at the curb (displacing parking) or in the median in High Occupancy Vehicles lanes (HOV lanes would be needed because buses in mixed traffic would not provide sufficient capacity to meet existing or future demands);
- Person-carrying capacity of such a lane would be between 850 and 1,700 persons/hour, depending on the compliance level of the reserved lanes. Similar to signed dedicated streetcar lanes, reserved bus lanes are difficult to enforce and have shown negligible compliance in the past. As such, the practical capacity of such a lane remains close to that of a mixed traffic lane. The capacity is not improved with more frequent bus service, because of the unreliability, bunching and short-turning problems which would result;
- Cost is moderate to high, as the purchase of new buses and supporting infrastructure is required.

3) Articulated Light Rail Vehicle (ALRV):
   - Articulated streetcars could theoretically supplement the existing use of conventional streetcars on this route;
   - Capacity of ALRV is 108 passengers/vehicle, compared to 74 passengers/vehicle on conventional streetcars;
   - Cost is moderate/high, as purchase of the ALRVs would be required. However, in reality, this option is not feasible, as additional ALRVs cannot be economically purchased if one is proposing to buy only a small number of custom-built vehicles. It is estimated that new ALRV streetcars would cost at least $5 million each, though this may vary due to market conditions.

It should be noted that subway technology was not identified for further consideration because projected future passenger demand does not warrant it. Typically, a minimum demand of 10,000 to 15,000 passengers per hour is needed to justify the high cost of subway technology. The projected demand on St. Clair Avenue is far below this value.

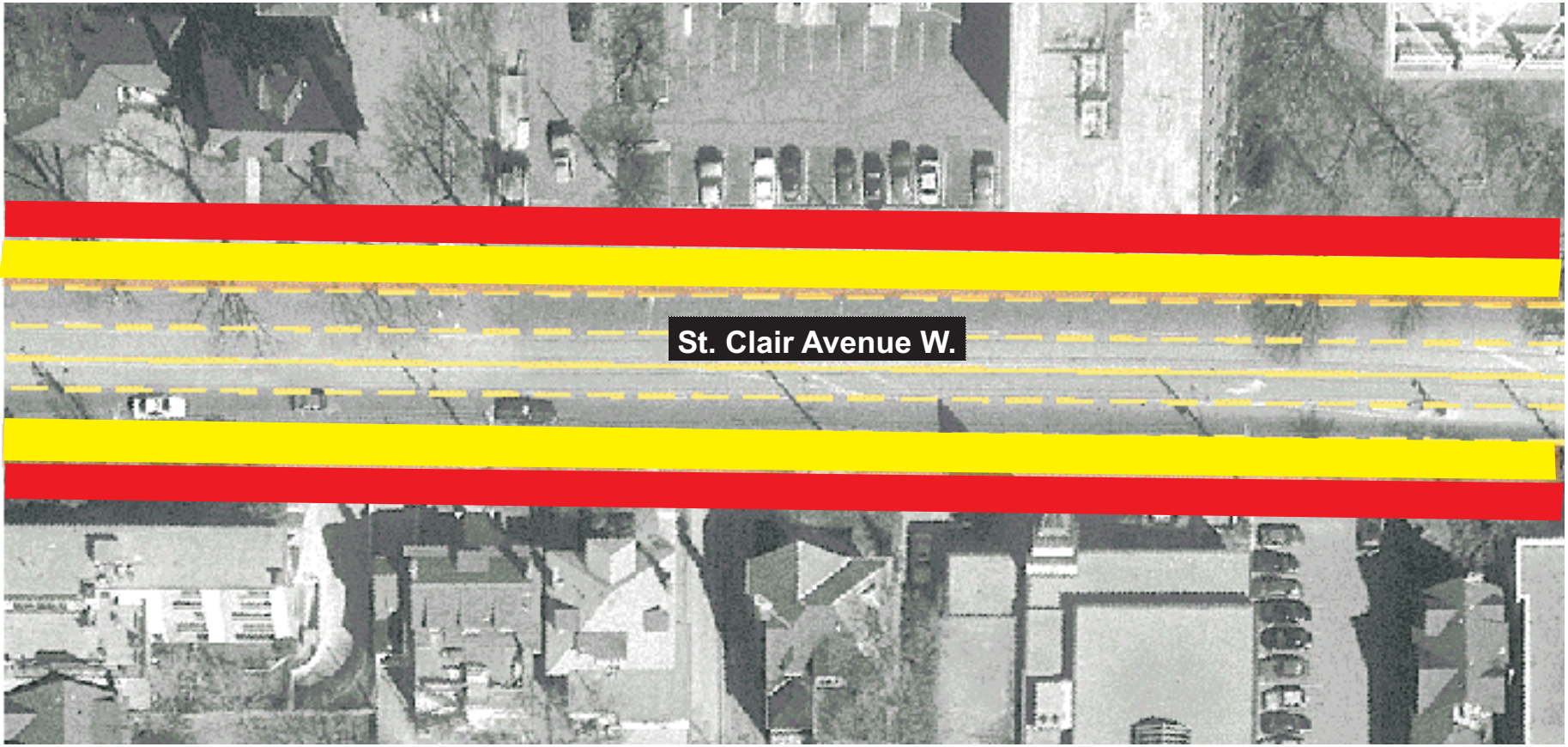
7.8 Alternative 8 – Road Widening: St. Clair Avenue or Nearby Parallel Roads

This alternative consists of widening of St. Clair Avenue or parallel roads such as Eglinton Avenue, Rogers Road, Davenport Road, or Dupont Street to increase capacity. Widening might occur on one or both sides of the street, depending on the roadway and land use features (as shown in **Figure 7.6**). A sub-option could be the removal of all on-street parking on St. Clair Avenue at all times or during peak periods, to increase capacity. This option would still include track and platform replacement on St. Clair Avenue. A new traffic lane would add capacity for about 700 vehicles/hour, equal to about 800 persons/hour.

The estimated cost associated with this option is high - over $10 million from Gunns Road to Yonge Street for the road work, but not including property acquisition. The track and platform replacement costs would be in addition to this. If parking were prohibited, without widening, some additional road capacity could be gained without road widening, at relatively low cost.

7.9 Alternative 9 – Combination of Some of the Alternatives

This alternative consists of a combination of some of the above alternatives by section, to reflect the opportunities and constraints of the distinct communities along St. Clair Avenue. Components that were considered in Alternative 9 were:



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Potential Widening Area

On-Street Parking Lane

FIGURE 7.6
Conceptual Illustration of Widening on St. Clair Avenue

- Alternative 2 – Minor Transportation Improvements: Intersection improvements at problematic intersections where traffic is constrained, such as the intersection of St. Clair Avenue at Keele Street, Old Weston Road, and Bathurst Street;

- Alternative 3 – Transit Priority Improvements: Transit signal priority can be added at two more signalized intersections. The remainder of the intersections already have this technology implemented;

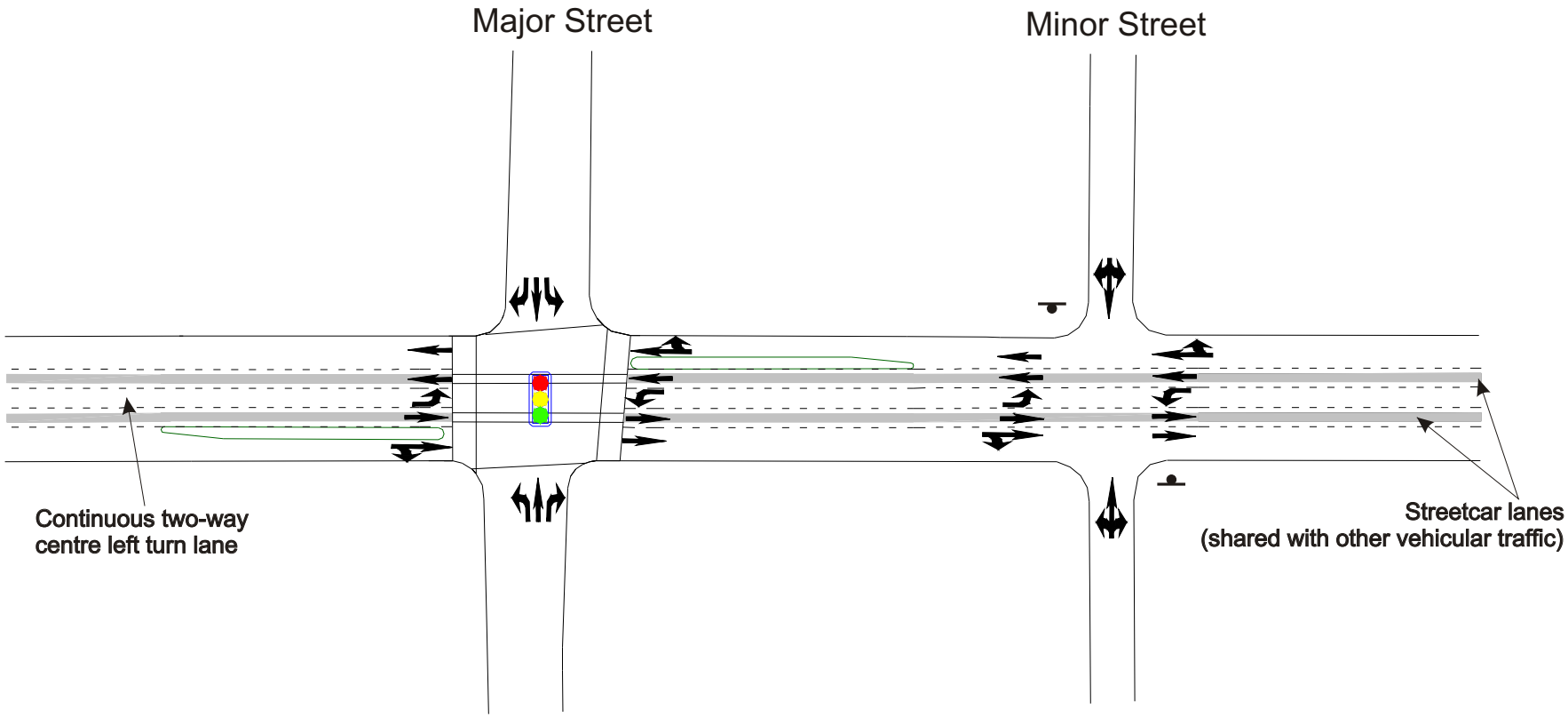
- Alternative 6 – Exclusive Transit Lanes on some sections of St. Clair Avenue.

After investigating a range of sub-options with traffic models and analyses, combinations of different alternatives were considered and merged into the Alternative 9 option assessed to be the most viable. It would have the following characteristics:

- Centre two-way left-turn lane between tracks in most locations, to facilitate left turn access and separate left-turning vehicles from the lanes used by streetcars;
- Most left turn prohibitions would be removed, and left turns would be permitted at all times at signalized and unsignalized intersections;
- Streetcar tracks shared with through vehicular traffic;
- At least two through traffic lanes along St. Clair Avenue per direction;
- Streetcars operate in a mixed traffic lane;
- Streetcar stops at the near side of intersections;
- Transit signal priority added where applicable (2 more intersections);
- Parking on both sides;
- Parking available at all times;
- Sidewalks widened adjacent to parking bays.

(The development of this alternative is discussed further in Chapter 9.)

Differences to reflect the various communities along St. Clair Avenue can be reflected through the urban design plan. The basic intersection lane configuration of this alternative is illustrated in **Figure 7.7**. The cost associated with this alternative would be similar to or higher than the cost for Alternative 6. A detailed cost was not presented to the public in this Phase; it was subsequently estimated and presented in Phase III, when the concept had been developed. The need to excavate and construct two separate track beds for the spread-apart tracks would account for the large increase in the cost of this concept. Another factor would be the cost of re-locating underground utilities which would be expected to occur as a result of spread-apart track beds.



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Signalized Intersection

Unsignalized Intersection

FIGURE 7.7
Alternative 9
Typical Lane Configurations