4. ALTERNATIVES: ANALYSIS AND EVALUATION

This chapter describes the identification, analysis and evaluation of alternative alignments for Highway 7 from the Kitchener-Waterloo Expressway (KWE) in Kitchener to Highway 6 (Hanlon Expressway) in Guelph. The starting point for the development of alternatives was the Recommended Plan as presented in the EA Report 1997. The 1997 Recommended Plan is shown on Exhibit 4-1.

The first Section (4.1) describes the Alternatives to the Undertaking including the "Do Nothing" alternative, which is considered to be the benchmark against which all other alternatives are compared. The role of transit, both on its own and combined with roadway improvement alternatives was an issue raised by a number of individuals and groups during the review.

Section 4.2 describes the alternatives that were developed during the review. The alternatives considered included New Route alternatives and Combined alternatives. The Combined alternatives were those alternatives that included sections of New Routes and sections of Existing Highway 7. Alternatives on Existing Highway 7 included cross section alternatives such as Controlled Access, Right-In Right-Out and 5-Lane.

Section 4.3 describes the analysis process, including the effects of the four sets of alternatives on the environment. It also describes the staged evaluation process that was carried out. Following the evaluation process is the discussion of the Alternative Preliminary Design Features considered for the Recommended Alternative.

4.1 Alternatives to the Undertaking

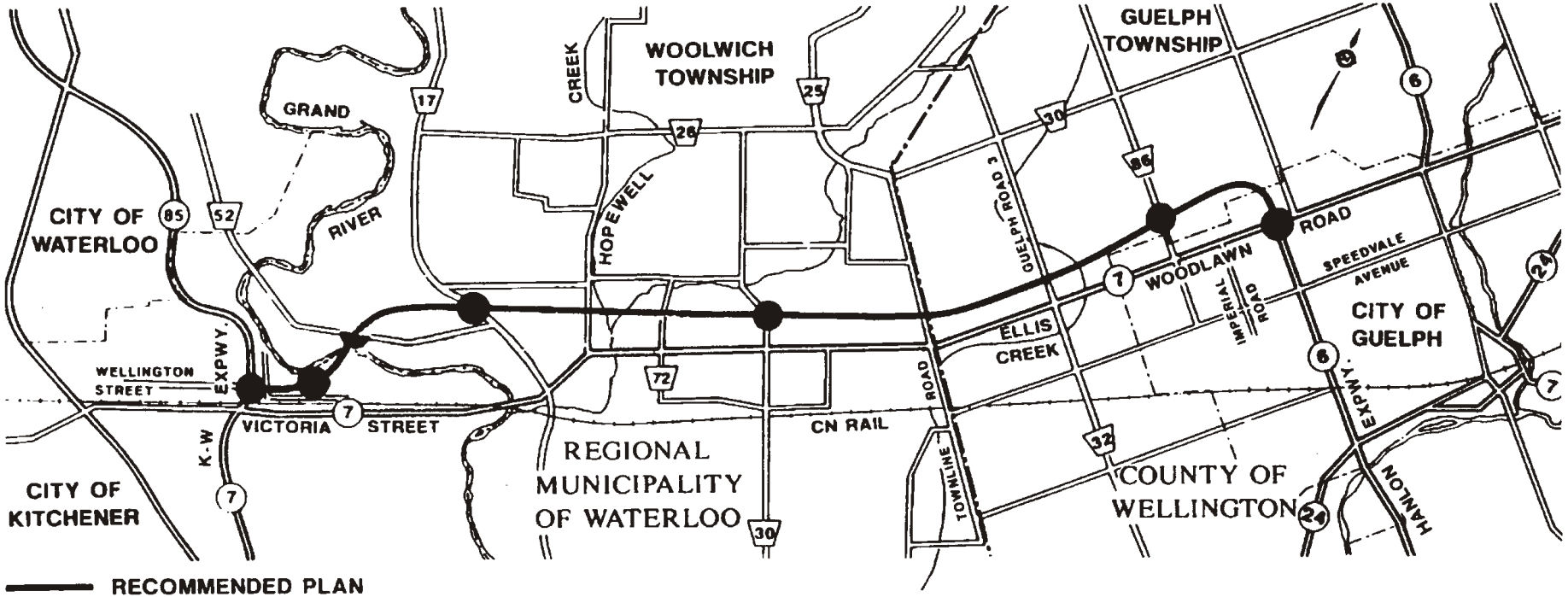
In the EA Report 1997, the Alternatives to the Undertaking included Do Nothing, Transit (Rail and Bus), and Roadway Improvements. In the EA Report 1997, the Do Nothing and Transit alternatives were set aside, as neither would have addressed the forecast deficiencies in the corridor.

In the MTO Review, a number of questions were asked regarding the viability of transit, both on its own and in combination with road improvements. In addition, questions were raised about the possibility of using the existing road network to address the transportation deficiencies. The following is a discussion of these 'Alternatives To the Undertaking'.

4.1.1 Transit

In general, inter-regional transit systems operate effectively when there are many people travelling between common points. The origin-destination survey undertaken in 1989 for the Highway 7 Planning Study determined that the majority of possible transit users have diverse origins and destinations within the Kitchener/Waterloo and Guelph areas. Although the origin-destination survey was carried out in 1989, the development that has occurred since then has not significantly altered the travel patterns within the corridor.

The percentage of transit users is a function of convenience, time and cost, where convenience would be measured by ease of access, including number of transfers and comfort, time would be measured by total travel time (absolute and perceived) and cost measured in fares and/or parking. In large urban centres, transit is very competitive



HIGHWAY 7 PLANNING STUDY

KITCHENER TO GUELPH

1997 RECOMMENDED PLAN

EXHIBIT

4-1

because parking is limited in supply and high in cost, and travel times by transit are comparable to or better than travel times by car. In smaller urban centres where central core densities are considerably lower, travel times by transit are not competitive with travel times by car, and abundant parking is available at little or no cost. In addition, workplace destinations are often very diverse in smaller centres, making it more difficult to provide an effective transit system.

The transit modal split is the percentage of trips (typically person trips) that would be 'attracted' to transit. The transit modal split **between** urban centres is less than the transit modal split within a single urban centre. The target for transit modal split within the City of Guelph is in the range of 5 to 6%. The Region of Waterloo's target for transit modal split (and general reduction of trips) is higher than Guelph's, approximately 8%, however on an inter-regional basis the target would not exceed 5%. In order to predict the benefit of transit as a solution in the Highway 7 corridor, it is necessary to establish a hypothetical modal split. A reasonable transit modal split between Kitchener and Guelph would be in the range of 3 to 5% (for all transit modes, rail, bus, etc.).

Assuming that a 3 to 5% transit modal split can be achieved, as described above, the 2028 demand would be reduced from 2,600 to 2,470 vehicle trips per hour in the peak direction (vphpd). With a more aggressive transit modal split, a greater reduction could be achieved. For example, at 10%, the demand would be 2,340 vphpd. It should be noted that a 10% transit modal split would be extremely aggressive for a corridor between Kitchener and Guelph. (The GO Transit transit modal split across the Toronto boundary is approximately 10%.) With the exception of the large cities in Ontario, the transit modal split in the a.m. peak period is in the 3 to 5% range. In either case, the remaining travel demand (2,340 vphpd) would exceed the threshold for LOS 'E' for a five-lane undivided highway. In making an investment in a highway improvement, MTO would seek to achieve at least LOS 'D', which would be 1,940 vphpd for a five-lane highway alternative. In order to achieve this number by transit alone, the transit modal split would have to be unrealistically high, in the range of 20 to 25%.

A 3% to 5% transit modal split would represent a ridership demand in the range of 100 to 170 person trips.

4.1.1.1 Rail Transit

VIA Rail provides existing train service between Kitchener and Guelph as part of the Toronto/London/Sarnia route. The train departs westbound from Guelph five times per day and eastbound from Kitchener four times per day.

Heavy rail transit is considered to be the highest order of transit service. Examples of heavy rail transit service in Ontario are the GO Transit system and TTC subway in Toronto. These transit systems are best supported by high density residential and high density commercial / industrial land uses. Without these higher densities, the feeder bus system and parking availability at stations must provide reasonable convenience and travel time in order to attract ridership. Access to rail requires integrated bus service and parking at stations. The need to transfer from car or bus to train increases the trip time relative to automobile trips and decreases the convenience, as at least two transfers are required. Total home to work travel times will vary based on an individual's home and

work locations, but unless both locations are close to the train station, the total travel trip time will be longer than by personal automobile.

The cost to provide full commuter service between Kitchener and Guelph, as discussed in the EA Report 1997, would be in the range of $140 to 160 million. This cost assumes that two new tracks would be required for the entire 24 km length. This assumption is based on experience with adding passenger rail service in a corridor with only one track with freight as a priority. This is consistent with the assumption that a service between Kitchener / Waterloo and Guelph would be part of a bigger system.

If the assumption is modified to one train set operating as a 'shuttle' service, only one additional track would be required. The operation could be on a 60 to 80 minute cycle (i.e., 30 to 40 minute trip each way). The capital cost for this alternative, excluding the train set, would be in the range of $75 to 85 million.

The future demand (2028) in the corridor is in the 2,350 to 2,600 vphpd range, or 2,800 to 3,100 person trips per hour per direction. A full rail service with a minimum upgrading of the Highway 7 corridor would not address the future demand. The Minimum Upgrade alternative was considered in the EA Report 1997 and was the widening of Victoria Street to six lanes, Highway 7 (Central Section) to four lanes and Woodlawn Road to five lanes. With full rail service there would be a need to upgrade the Highway 7 corridor to a roadway with a capacity greater than a five lane undivided highway. Therefore the rail transit alternative, either alone or in combination with a minimum upgrade to Highway 7 would not fully address the future demand.

4.1.1.2 Bus Transit

Greyhound operates a frequent bus service between Kitchener and Guelph. Sufficient ridership is needed to make bus service financially and operationally viable.

The range of demand for bus service would be in the same range as rail transit provided that there is the infrastructure in place to be convenient, to have competitive travel times and to be cost effective. In the absence of a new highway, bus transit would continue to use the existing highway. With buses travelling along the same congested road as cars, it would be difficult to attract commuters since there would be an overall loss of convenience and an increase in travel time.

There are opportunities to promote transit and other non-auto trips. However, as described in Section 4.1.1.1, a combination of a five-lane alternative with aggressive transit initiatives would not meet the forecast growth in the corridor.

There are a number of initiatives that the local municipalities could support that would promote transit or alternate travel modes. These include car pooling, ride share, and increased bus service between Kitchener and Guelph. The Highway 7 corridor provides the opportunity to implement any of these initiatives with reasonable infrastructure.

The RMW prepared a Regional Transportation Master Plan (RTMP) in April 1999. The plan has objectives for both the 'near term' and 'long term', which focus on increasing opportunities for residents to use transit, pedestrian and bicycle facilities away from auto reliance. The RTMP states: '*The RTMP incorporates an auto reduction strategy which emphasizes maximizing use of the existing transportation system; and, assuming a more*

than doubling in transit use, targets a 7% reduction in total auto trips by the year 2016. This auto reduction target is considered to be aggressive and will be accomplished through Transportation Demand Management (TDM) strategies focusing on public transit enhancements, bicycling and pedestrian facilities and TDM supportive land uses.'

TDM initiatives, bus transit and other efforts to decrease dependency on single occupant auto trips will contribute to an overall reduction in auto trips, however for these initiatives to be successful the appropriate infrastructure must be in place. Bus transit would require the road improvement in the corridor beyond the Minimum Upgrade solution to address the future demand.

4.1.1.3 Transit Alternatives Summary

Given current expectations of transit usage, neither bus nor rail transit would resolve the capacity situation for Highway 7, Kitchener to Guelph. Although transit alone may not be a suitable alternative to this undertaking, it is recognized that transit may make a contribution to the overall solution in this corridor.

The province recognizes the important role that transit plays in a balanced and integrated transportation system. In September 2001, the provincial government announced a 10-year, $9 billion Transit Investment Plan. This plan incorporates $3.25 billion from the provincial government in investments to renew and expand transit.

The Golden Horseshoe Transit Investment Partnerships (GTIP) will provide for up to $1.25 billion to support the expansion of inter-regional transit infrastructure such as commuter rail in the Golden Horseshoe. The Transit Investment Partnerships (TIP) will provide for up to $250 million to support transit expansion in cities outside the Golden Horseshoe.

In December 2001, municipalities, transit providers and the private sector were given the opportunity to submit expressions of interest to be considered for funding under GTIP. In August 2002, the province announced a number of short-term transit improvement projects to be funded under GTIP. Included in this announcement was provincial support of up to $5.3 million for projects in Waterloo Region. These projects include expanded bus service and improvements to facilities and technologies.

On January 1, 2002, the province assumed responsibility for the operation and base capital funding for GO Transit. The province has also announced support for funding one-third of the first 3 years of GO Transit's 10-year capital plan.

With the Ontario Transit Renewal Program (OTRP) announced on February 20, 2002, the province has created a new partnership that will assist municipalities in replacing and refurbishing their existing transit fleets. OTRP will provide up to $100 million in 2002 to municipalities and transit agencies across the province. This program reduces municipalities' share of the capital investment in transit fleets by sharing up to one-third of the eligible costs of on-going vehicle replacement.

In the fall of 2002, MTO commenced a study of Transit Potential on Provincial Highways. The Transit Opportunities Study is looking at future opportunities for transit facilities or services on existing and new provincial highways in Central Ontario, including highways in the Regional Municipality of Waterloo and the County of

Wellington. The draft findings of the Transit Opportunities Study will be incorporated into the GTA Transportation Strategy which should be completed in fall 2004.

4.1.2 Road Improvements

Road Improvements as Alternatives to the Undertaking were included in the EA Report 1997. The discussion in the EA Report 1997 included the way in which road improvements would meet (or exceed) the forecast demand to 2011. Road improvement alternatives include any alternative that would increase the capacity of the existing road network between Kitchener and Guelph.

The forecast demand to 2028 would be in the range of 2,350 to 2,600 vehicles per hour per direction (vphpd). This demand can be addressed through road improvements. As an activity in the MTO Review, actual traffic counts in the corridor were compared with the forecasts carried out in the Original EA. The corridor is represented as three distinct areas: west (City of Kitchener), central (rural two-lane section) and east (City of Guelph).

During the MTO Review each of the three sections was reviewed to compare forecast traffic counts in 1989 with actual counts in 1999 / 2000. In the west section actual counts confirmed that the forecast for 2011 was reasonable. It was noted in the west section that infiltration onto parallel roads is occurring, likely because Victoria Street (Highway 7) is at or near its practical capacity. Year 1999 and 2000 traffic counts in the central two-lane section were in the same range as the traffic forecasts for that same period. In the east section the increase in traffic volumes on Woodlawn Road was less than the forecast volumes for the period (2001), however the volumes on Speedvale Road were double (10,200 vs. 5,000). It was concluded that traffic in the east section is moving from Woodlawn Road to the parallel roads likely because of congestion. Additional traffic forecasting was carried out and is described in Section 3.4.

Similar to the EA Report 1997, one of the alternatives presented as part of the public consultation was an alternative that would upgrade adjacent roads to address the future forecast demand. The concept would use the adjacent roads immediately north and south as well as the existing Highway 7. Modifications would be necessary to the adjacent east – west roads, as roads have not been constructed to arterial or rural highway standards. To the north, the existing roads would be Regional Road 26 and Wellington County Road 30, this route is reasonably direct, however it would pass through Maryhill and Bridgeport. On the south side of existing Highway 7 the road network is not as direct; the route would be a combination of Speedvale Avenue, Woolwich Roads 74, 75 and 80, and Ottawa Street. There would be considerable cost in developing the south side route because a new crossing of the Grand River would be required. The three two-lane roads would have a total peak hour capacity of approximately 2,100 vphpd. As noted earlier, the forecast demand would be in the 2,350 to 2,600 vphpd range and the parallel route concept would not meet the demand. The concept is shown conceptually on Exhibit 4-2.

There would be other constraints with a parallel road alternative, the most significant would be that there are not appropriate crossings of the Grand River and neither of the existing parallel corridors is continuous between Kitchener and Guelph. There is an existing concern with residents and farmers that the traffic that is avoiding the congestion on existing Highway 7 is using other parallel routes at speeds that are in excess of the

posted speed and the function of the road. A parallel route alternative would also further constrain the farmers from safely moving equipment between fields.

Road improvements that could address the existing and projected transportation demand would either involve widening within the existing corridor, or construction of a new route. The MTO Review included a review of updated traffic data and this data indicates that the demand in the corridor will exceed the capacity of a five-lane road, even with travel demand initiatives. Therefore, the alternatives that are developed will not include a five lane alternative on existing Highway 7.

4.1.3 Rationale for Selecting Road Improvement Alternatives

The EA Report 1997 addressed and discarded the 'Do Nothing' alternative and therefore the Do Nothing alternative is not a consideration as part of the MTO Review. Increased traffic demand in the corridor has occurred as anticipated and is expected to grow based on population and employment forecasts to beyond 2028.

Bus and rail service exists in the corridor and has not significantly contributed to a reduction of trips in the last 10 years. For transit, it was determined that while increased transit ridership would benefit the level of transportation service, it could not, on its own, eliminate the need for increased road capacity to address future growth. Thus, to meet future demand, the expansion of Highway 7 would be required whether or not transit initiatives were introduced.

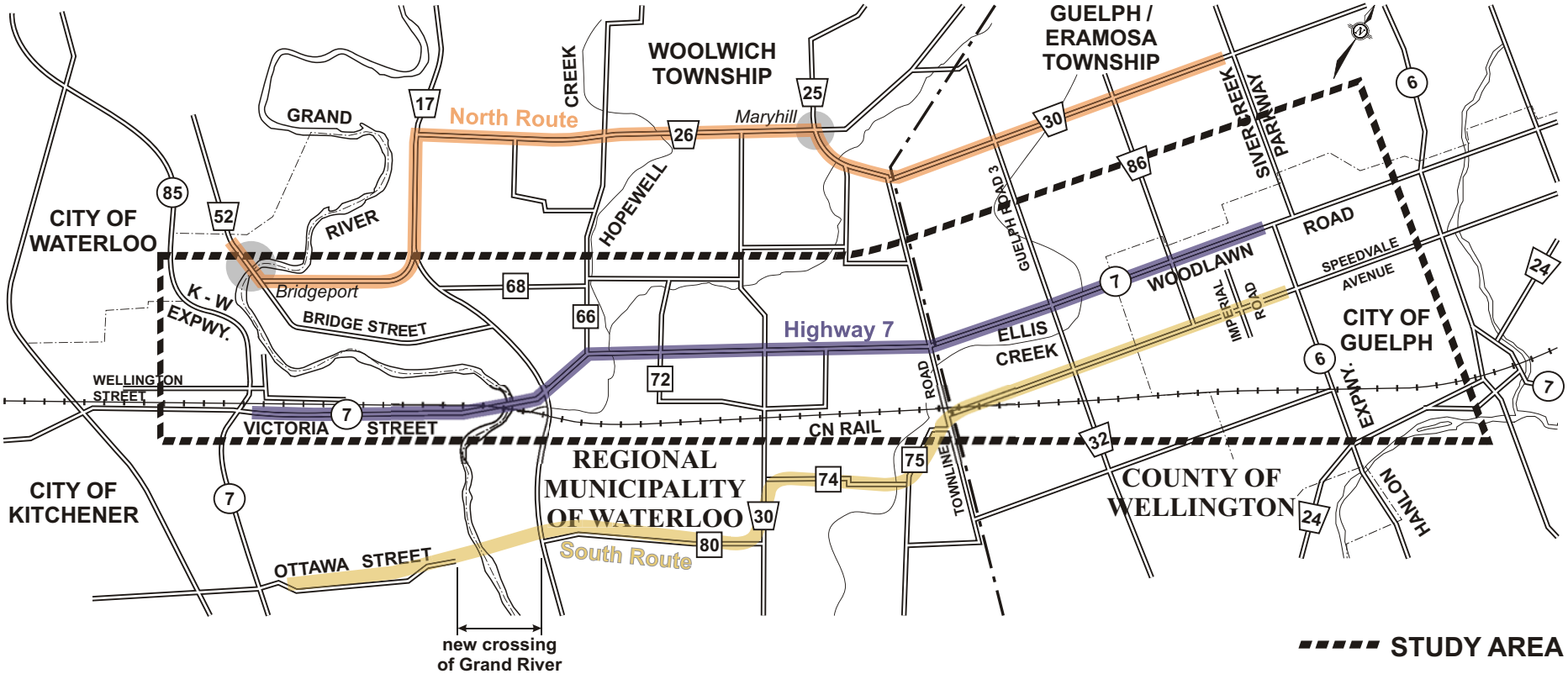
Rail transit, with expected modal splits of less than 5%, would not address the future forecast demand, either alone, or in conjunction with a minimal upgrade (5-lane) in the central section of Highway 7. Similarly, bus transit would not address the future forecast demand.

Road improvements including widening in the existing corridor or a new alignment would address the transportation deficiencies in the corridor and address the future travel demand. Road improvement alternatives would not preclude the future use of additional transit or TDM initiatives.

In general, the rationale for the selected alternative to the undertaking is consistent with the work carried out in the original study. The concept of a nominal widening in the Central Section to four or five lanes and a supplement of transit and travel demand management (i.e. ride share, car-pooling, and corporate van) would not address the forecast growth in the Highway 7 corridor in the planning time frame. Based on the analysis of alternatives, it was determined that roadway improvements, other than those types previously dismissed in Section 4.1.2, would be the most reasonable alternative to address the existing transportation deficiencies and future travel demand.

4.2 Alternative Methods of Carrying Out the Undertaking

In the EA Report 1997 there were numerous alternatives developed, analysed and evaluated, resulting in the identification of the Recommended Plan (1997). The starting point for the MTO Review was the Recommended Plan (1997). The alternatives that were considered in the review can be defined by the following characteristics that would make each alternative unique, including:



HIGHWAY 7 PLANNING STUDY

KITCHENER TO GUELPH

ROAD IMPROVEMENTS ALTERNATIVE

EXHIBIT

4-2

- location - on an existing right-of-way, new route or a combination
  - located west, centrally or east in the study area
- cross-section - number of lanes
  - divided or undivided roadway
- classification - arterial or controlled access (freeway)

Two types of alternatives were identified:

- new route alternatives
- combined alternatives

The development of alternatives proceeded in three phases, described as follows:

Phase 1: Minor Alignment Shifts to the Recommended Plan (1997)
(February 1999 – March 2000)

Phase 2: New Alignment Alternatives (April 2000 – February 2001)

Phase 3: Central Section Alternatives (February 2001 – March 2002)

Towards the end of each phase Public Information Centres were held, to present the work carried out during the phase. Each of the phases are described briefly below, followed by a more detailed discussion in Sections 4.2.1 through 4.2.3.

Phase 1 – Minor Alignment Shifts to the Recommended Plan (1997)

The MTO Review was initiated by a commitment from the Minister of Transportation in January 1999 to review some of the aspects of the study. The intent of the review was not to start over, but was to take a 'second look' at some of the issues. The areas of review included:

- comparison of actual traffic volumes existing in 1999 / 2000 with demand forecasts prepared in 1989 / 1990.
- further consideration of the role of transit.
- consideration of the option of widening existing Highway 7
- modifications to the Recommended Plan (1997) to reduce impacts on wetlands

The modifications to the Recommended Plan (1997) involved minor shifts in alignment, in an effort to reduce the impact of the highway on wetlands. Section 4.2.1 describes these modifications in more detail.

In March 2000, Public Information Centres were held to review the results of the fieldwork and analysis carried out in 1999. Comments received during the public consultation process resulted in further action to be taken. The work identified was carried out as Phase 2.

Phase 2: New Alignment Alternatives

The work carried out in Phase 2 included:

- Revisit the KW Expressway interchange including traffic movements between the KW Expressway and Highway 7, movements to Victoria Street, and traffic patterns in the area bounded by King Street, Wellington Street, KW Expressway and Ottawa Street.

- Reconsider the evaluation criteria and weighting.

- Analyze and evaluate three western alternatives between the KW Expressway and Shantz Station Road:

    1. Modified EA alignment (RW1);
    2. New Route crossing Grand River and maintaining an alignment south of Bridge Street to Ebycrest Road. Continues north to tie into RW1 at Weiland Tract woodlot. (RW2);
    3. New Route crossing Grand River and maintaining an alignment south of Bridge Street to Ebycrest Road. Continues to Shantz Station to the north of Existing Highway 7 (RW3);
    4. Alternative proposed by Interest Group HALT7 (RW4).

- Develop, analyze and evaluate three eastern alternatives between Shantz Station Road and the Hanlon Expressway:

    1. Modified EA alignment (RE1);
    2. 300m shift above Ellis alignment (RE2);
    3. New alignment North of Marden South/Ellis wetlands (RE3).

- Develop, analyze and evaluate alternatives for upgrading existing Highway 7 in the central rural section of the study area.

- Compare the preferred New Route Alternative with a Combined Alternative, which consists of a controlled access highway (CAH) on existing Highway 7 in the central rural section of the study area, and new alignment sections to the east and west.

In February 2001, Public Information Centres were held to review the results of Phase 2, including the identification of a Technically Preferred Alternative. Comments received during the public consultation process resulted in further action to be taken. Section 4.2.2 describes the New Alignment Alternatives in more detail. Section 4.3 describes the analysis and evaluation process followed. The work identified was carried out as Phase 3.

Phase 3: Revised Central Section Alternatives

There was overwhelming opposition to the Technically Preferred Alternative that was presented to the public in February 2001. The concern centred on the central rural section of Highway 7. Therefore the only new alternatives identified in Phase 3 were located in the central section. The alternatives considered during this phase were located between the ‘New Route’ alternative and the ‘Combined’ (Technically Preferred) alternative that

were presented to the public as the third stage evaluation in Phase 2. Section 4.2.3 describes the Revised Central Section Alternatives in more detail.

At the end of Phase 3 the Recommended Route (2002) was identified and is discussed in Chapters 5 and 6.

4.2.1 Review Phase 1: Minor Alignment Shifts to the Recommended Plan (1997)

Phase 1 of the MTO Review looked at minor modifications to the Recommended Plan (1997) and included a review of widening alternatives as presented in the EA Report (1997) on the existing Highway 7 right-of-way in the central rural section of the corridor.

The modifications to the Recommended Plan (1997) involved specific shifts in the horizontal alignment at the wetland locations. The modifications are described as follows:

Bloomingdale-Rosendale Wetland

The Bloomingdale-Rosendale wetland is classified as a locally significant wetland complex (Section 3.2.5). The proposed alignment modification shifted approximately 60 m north of the Recommended Plan (1997) at the intersection with Ebycrest Road. The alignment shift eliminated direct impacts to major portions of the wetland complex. Both alignments are shown on Exhibit 4-3.

The potential for a bridge rather than a culvert crossing of Rosendale Creek would allow people and wildlife to cross beneath the highway, reduce impacts to the creek valley and facilitate protection of associated aquatic habitat and maintenance of coldwater contributions to the Grand River.

The interchange was modified to a Parclo B from a Parclo A, with traffic control signals where the ramps intersect Ebycrest Road. The interchange design would enable a portion of woodland to be retained within the northeast quadrant of the interchange.

The modified alignment, like the Recommended Plan (1997) would result in a major fragmentation of a large beef operation, separating the northern leased property (pasture and pond) from the main property block south of the proposed right-of-way. The modified alignment would require 42.4 ha of land with high capability to produce common field crops and the Recommended Plan (1997) would require 31.6 ha.

Hopewell Creek Riparian Woodland/Wetland

The alignment modification shifted south from the Recommended Plan (1997) approximately 50 m at Shantz Station Road. This modification allows the retention of the larger block of higher quality northern portions of Hopewell Creek Riparian Woodland/Wetland by a 20 to 30 metre shift south.

The Shantz Station Road woodlands/wetlands form part of the recently re-evaluated locally significant Hopewell Creek Riparian Wetland Complex (MNR 1998). The southern portion of the wetland comprises highly altered Silver/Hybrid Maple swamp and mixed conifer-deciduous swamp. The watercourse is a channelized agricultural drain located along the western limit of the woodland. The Recommended Plan (1997) would fragment the western lobe of the Hopewell Creek wetland and would remove 2.4 ha of

mixed swamp (moderate quality/sensitivity). With the modified alignment less total wetland area (1.8 ha) would be required. (Section 3.2.5).

Both the Recommended Plan (1997) and the modified alignment would displace six houses and one business. The modified alignment would cause an increase in noise levels of greater than 10 dBA at two houses. Both alignments are shown on Exhibit 4-4.

Townline West Wetland

The alignment modification shifted south from the Recommended Plan (1997) approximately 130m at the existing property line. This modification allows the sensitive core wetland and interior habitat to be retained. At the time that the work was carried out in 1999, Townline Road West was an unevaluated wetland/woodland draining north to Hopewell Creek. As a result of the work carried out by Ecoplans, the wetland was designated as a Provincially Significant Wetland (PSW), (Section 3.2.5). Both alignments are shown on Exhibit 4-4.

The Recommended Plan (1997) would fragment Townline West wetland, removing 4.35 ha of wetland and causing significant impact on core wetland and interior habitat. With the modified alignment 1.47 ha of open thicket swamp and wetland edge (moderate sensitivity) at south end of block would be impacted.

Ellis Creek Wetland

The Ellis Creek Wetland Complex is designated Provincially Significant by MNR. The portion of the wetland complex in the alignment area supports a significant breeding bird community based on 1999 surveys (Section 3.2.5)

The modified alignment shifted approximately 35 m to the north of the Recommended Plan (1997). Both alignments are shown on Exhibit 4-5. The shift would retain a slightly larger wetland block to the south of the right-of-way extending to existing Highway 7. With the alignment modification 1.9 ha of wetland would be directly impacted whereas the Recommended Plan (1997) would impact 2.5 ha. There would still be reduction of habitat for some of the species, and some reduction in habitat quality in the balance of this wetland block (secondary effects) may be experienced.

With the alignment modification two houses would be displaced and only one would be displaced with the Recommended Plan (1997). With the shift of the alignment there would be no noise level increases greater than 10 dBA.

Both the Recommended Plan (1997) and the modified alignment would have similar traffic operations and impacts to agriculture.

Marden South Wetland

The Marden South wetland is one of several individual wetlands classified by MNR as part of the Provincially Significant Marden Wetland complex. The central portion of the wetland is the least disturbed and has the better quality habitat (for birds and flora) in the block (Section 3.2.5)

The modified alignment shifted approximately 65 m north of the Recommended Plan (1997). The Recommended Plan (1997) currently fragments the wetland and traverses

LEGEND

WETLAND

MODIFIED ALIGNMENT

1997 ALIGNMENT

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

BLOOMINGDALE - ROSENDALE WETLAND

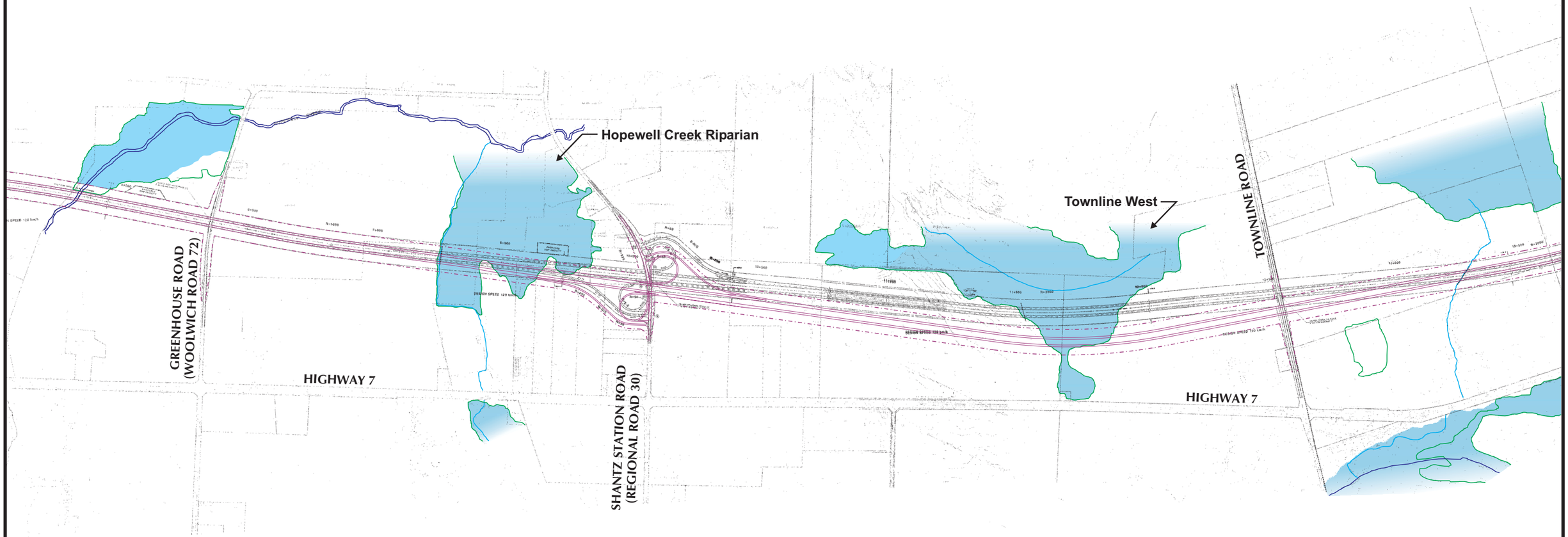
EXHIBIT
4-3

LEGEND

WETLAND

MODIFIED ALIGNMENT

1997 ALIGNMENT



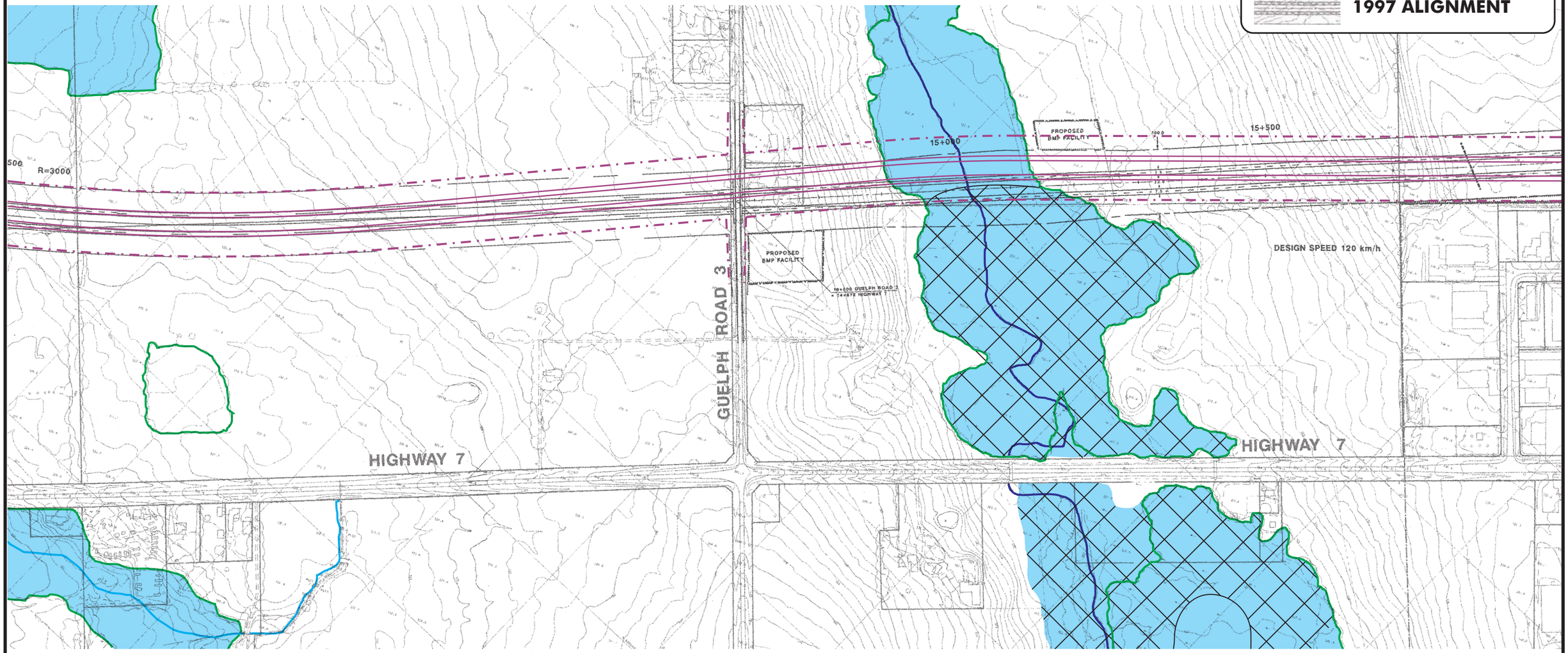
HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

HOPEWELL CREEK RIPARIAN / TOWNLINE ROAD WEST WOODLANDS / WETLANDS

EXHIBIT
4-4

LEGEND

- WETLAND
- WATERFOWL AREA
- MODIFIED ALIGNMENT
- 1997 ALIGNMENT



HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

ELLIS CREEK WETLAND

EXHIBIT
4-5

the higher quality central wetland section and would directly impact 3.3 ha of high quality wetland. Both alignments are shown on Exhibit 4-6. The modified alignment would traverse the more disturbed heavily cut wetland to the north, leaving a larger intact wetland block to the south.

In the vicinity of both alignment options, wetland drainage is conveyed along the western edge of the wetland block and then south-east to a series of drains and roadside ditches eventually outletting to the Speed River. There are no aquatic features, which would distinguish the potential impacts of the Recommended Plan (1997) from the modified alignment.

In terms of socio-economic environment impacts, both the Recommended Plan (1997) and the modified alignment would have the same impacts. Both would displace one house and 27 houses would be subject to a noise level increase of less than 5dBA.

In terms of transportation both alignments would operate at a Level of Service B. The modified Parclo A design would be on a greater skew angle with County Road 86. Future expansion flexibility would be reduced for geometrics only.

Review of widening alternatives on Existing Highway 7

Existing Highway 7 alternatives were considered in the original Highway 7 EA study, and discussed in the EA Report 1997. The initial review of widening alternatives in Phase 1 included four alternatives:

1. 4 lane Right-In/ Right-Out highway
2. 5 lane undivided highway
3. Controlled access highway without continuous service roads
4. Controlled access highway with continuous service roads

The existing Highway 7 alternatives were presented at the January 2000 Workshop and at the March 2000 Public Information Centres. The alternatives were compared based on the information presented in the EA Report 1997. In conjunction with the update of the traffic counts and forecasts, it was concluded that a 5-lane alternative would not provide sufficient capacity to meet future demand. The other existing Highway 7 alternatives would have significant effects on the adjacent properties. The existing Highway 7 alternatives were carried forward to Phase 2 and are described in more detail in Section 4.2.2.3.

Summary of Phase 1

During 1999, the Project Team reviewed the Recommended Plan (1997) and identified minor shifts in the highway alignment, at each of the above wetland areas. These alignment shifts ranged from 20 to 130 metres. When compared to the Recommended Plan (1997) these shifts reduced the amount of direct impact to wetlands by about 48 % (approximately 10 hectares) and increased agricultural cropland removal by 17 % (approximately 20 hectares). The revised plan was presented to the agencies and municipalities, to a stakeholders workshop in January 2000, and to the general public at a set of Information Centres in March 2000. Comments received suggested that a more thorough review was required. In the spring of 2000, Phase 2 of the Review commenced.

4.2.2 Review Phase 2: New Alignment Alternatives

The MTO Review committed to have a second look at a number of issues, with impacts to wetlands and updated traffic data being two of the most significant issues. In January and March 2000, at the Workshop and Public Information Centres, external agencies and the public identified alternatives that would further avoid impacts to the wetland areas. The Project Team reviewed the comments and determined that the development of a further set of alternatives was warranted.

The modified alternative as developed in Phase 1 was identified as one of the New Route Alternatives. External agencies had identified the Ellis Creek and Marden wetlands as significant natural environmental features in the study area. Two other New Route Alternatives were identified that would fully or partly avoid impacts to these wetlands. All of the wetlands were considered when the Phase 2 set of alternatives was developed.

In the west part of the study area, alternatives were developed that would further avoid wetland features, woodlots and the Hindu Temple; one of the alternatives was suggested by members of an interest group.

In generating the alternatives it was recognized that the New Route Alternatives would all have a common section of approximately one kilometre immediately east of Shantz Station Road. This common section provided the opportunity to divide the New Route alternatives into east and west sections which would allow the analysis and evaluation to be manageable. Any east alternative could be matched with any west alternative at the common 'match point'. The match point is located on an existing property line approximately 670 m east of Shantz Station Road.

Another alternative concept put forward by the public was the use of the existing Highway 7 alignment in the rural central section. This alternative was suggested in conjunction with the perception that the growth in the corridor would not warrant a controlled access highway. The existing Highway 7 alternatives were developed with 'connectors' to the New Route alternatives at either end of the study area.

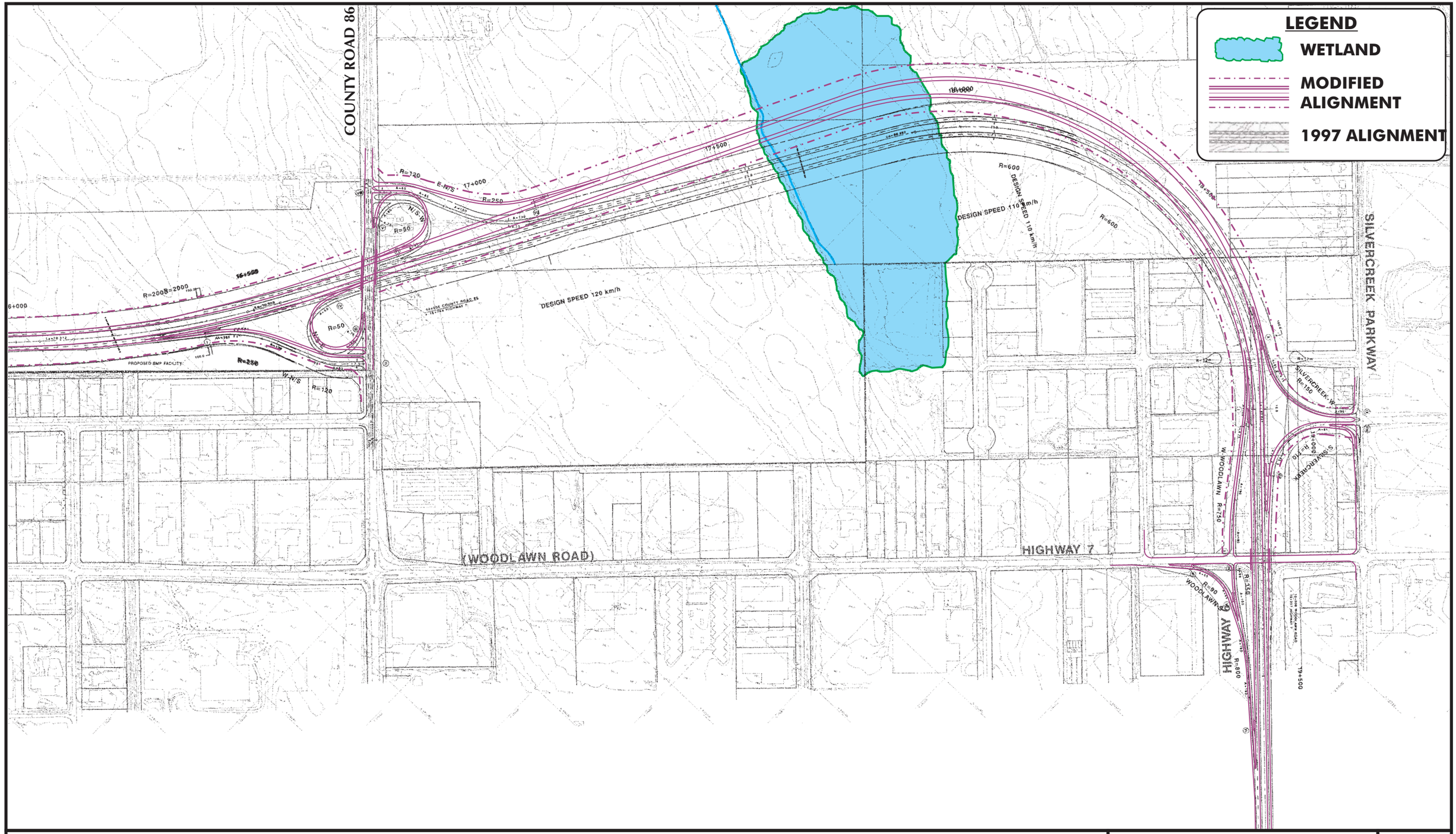
The following is a description of the alternatives developed for Phase 2 of the MTO Review.

4.2.2.1 Revised Easterly (RE) Alternatives

The Revised Easterly (RE) Alternatives are bounded on the west by a match point approximately 670m east of Shantz Station Road and on the east by the Hanlon Expressway (Highway 6) at Woodlawn Road (existing Highway 7) in the City of Guelph.

Three RE alternatives were developed - RE1, RE2 and RE3. Each of these alternatives is a controlled access highway, with access permitted only at interchanges. Each one provides an interchange with Highway 6, and with Wellington County Road 86.

Alternative RE1 is the most southerly of the three, while RE3 is the most northerly. As the distance north of existing Highway 7 increases, the avoidance of natural environmental features increases, but the impacts to agriculture increase. These alternatives are discussed briefly below, and are shown on Exhibit 4-7a.



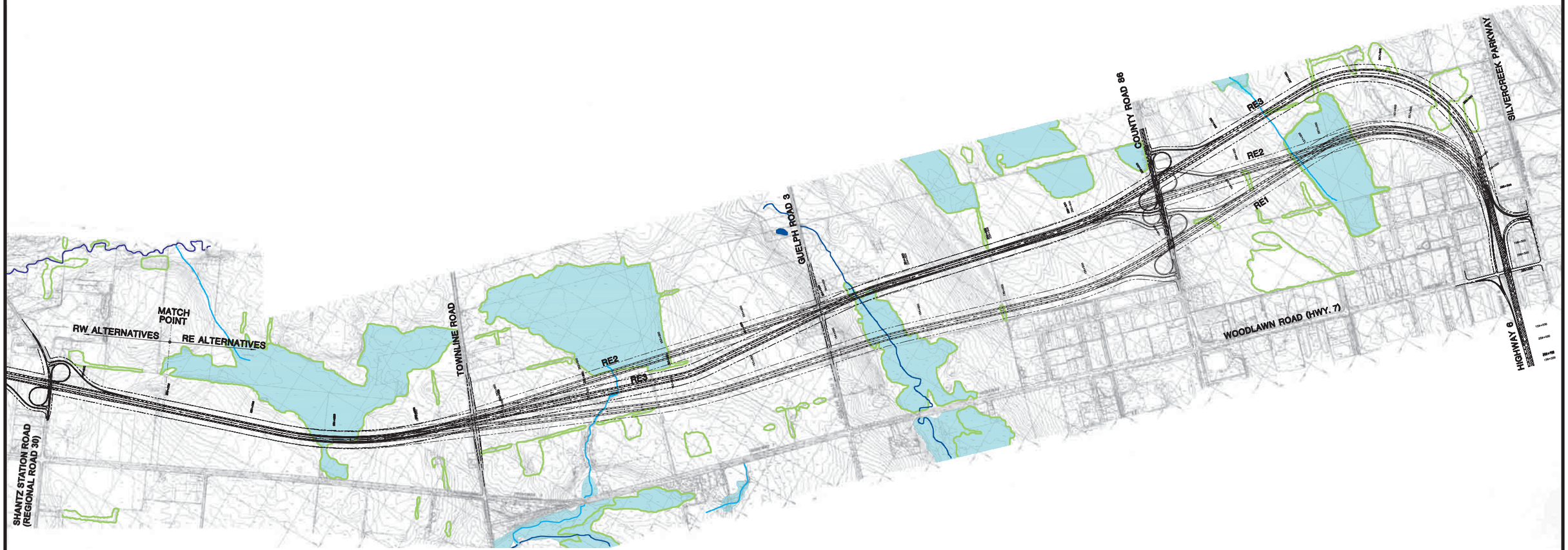
HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

MARDEN SOUTH WETLAND

EXHIBIT
4-6

LEGEND

WETLAND



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HIGHWAY 7 PLANNING STUDY **KITCHENER TO GUELPH**	**REVISED EASTERLY (RE) ALTERNATIVES**	**EXHIBIT** **4-7a**

Alternative RE1: The RE1 alternative is the eastern portion of the modified alignment alternative developed in Phase 1 of the MTO Review (See Section 4.2.1). At the match point, the alignment is approximately 490 metres north of existing Highway 7. To the east of County Road 86, this alternative is located approximately one kilometre north of the existing highway, before it curves to the south to connect with the Hanlon Expressway (Highway 6).

Alternative RE2: Alternative RE2 is similar to RE1 from the match point to a point just west of Townline Road. Alternative RE2 crosses Townline Road approximately 440 m north of existing Highway 7, crosses Guelph Road 3 approximately 740 m north of existing Highway 7, and crosses County Road 86 approximately 900 m north of Woodlawn Road. East of County Road 86 it curves to the south to connect with the Hanlon Expressway (Highway 6). RE2 is over 300 m north of the core of the Ellis Creek wetland and is in the northern part of the Marden wetland block.

Alternative RE3: The RE3 alignment avoids both the Marden and Ellis Creek wetlands however; RE3 causes a significant impact to the agricultural area because it is the most northerly alternative. Alternative RE3 is the same as RE2 from 670m east of Regional Road 30 to Townline Road, and from Guelph Road 3 to County Road 86. East of Townline Road, RE3 shifts to the south to avoid the Townline East Wetland. At County Road 86, this alternative shifts to the north, to avoid the Marden wetland before curving back to the south to connect with the Hanlon Expressway.

4.2.2.2 Revised Westerly (RW) Alternatives

The Revised Westerly (RW) Alternatives are bounded on the west by the Kitchener – Waterloo Expressway (KWE) and on the east by a match point approximately 670m east of Shantz Station Road.

Four RW alternatives were developed, RW1, RW2, RW3 and RW4. Each of these alternatives is a controlled access highway with access permitted only at interchanges. Three of the alternatives would cross the Grand River at the northwest end of Bingeman Park, while the other alternative would cross at the existing Highway 7 (Victoria Street) crossing. Each alternative provides an interchange with the Kitchener – Waterloo Expressway at the location of the existing Wellington Street interchange. Other interchanges for RW1, RW2 and RW3 are provided at Riverbend Drive, Bridge Street (partial), Ebycrest Road and Shantz Station Road. Interchanges for RW4 are provided at Riverbend Drive, Victoria Street (partial), Ebycrest Road and Shantz Station Road.

The RW alternatives are discussed briefly below, and are shown on Exhibit 4-7b.

Alternative RW1: Alternative RW1 is the western portion of the modified alignment developed in Phase 1 of the MTO Review (See Section 4.2.1.). It is the only alternative that crosses Bridge Street, and impacts the Hindu Temple and the Bloomingdale-Rosendale wetland. There are two crossings of the Hopewell Creek. The alignment crosses Greenhouse Road approximately 630 m north of existing Highway 7.

Alternative RW2: Alternative RW2 crosses the Grand River on an alignment similar to that proposed in 1972 for the Wellington Street extension. The alignment stays south of Bridge Street, crosses Ebycrest Road approximately 90 m south of Bridge Street, and

swings to the north to follow the RW1 alignment easterly to the match point. This alternative avoids the Bloomingdale-Rosendale wetland as well as the Hindu Temple on Bridge Street; and passes north of the Weiland woodlot.

Alternative RW3: Alternative RW3 matches Alternative RW2 from the Kitchener-Waterloo Expressway to a point approximately one kilometre west of Ebycrest Road. From this point, Alternative RW3 curves to the south to avoid the main block of the Weiland tract woodland and crosses Hopewell Creek approximately 180 m north of existing Highway 7. Alternative RW3 swings to the north to meet RW1/RW2 at a point west of Shantz Station Road and continues to the match point. This alternative shares the advantages of RW2, and has the added benefit of requiring only one crossing of Hopewell Creek.

Alternative RW4: The RW4 alignment was suggested by members of an interest group, 'HALT7'. The Project Team took the concept presented by HALT7, and developed it to best meet minimum engineering standards. In order to avoid significant property impacts on the east side of the Grand River, the existing horizontal curve of Highway 7 was maintained. This curve is less than the minimum standard for the other RW alternatives. The RW4 alignment crosses through the south end of Bingeman Park adjacent to the railway line. It continues adjacent to the rail line to existing Highway 7 and follows a widened Highway 7 right-of-way to Spitzig Road. From this point easterly, RW4 matches the RW3 alignment. Alternative RW4 requires a new crossing of the Grand River, adjacent to the existing Highway 7 crossing. This alternative causes a significant impact on the Breslau area as existing buildings with frontages on Highway 7 would lose their access and transportation access from the north into Breslau would be circuitous. There would be property impacts to existing and planned development in the vicinity of the interchange with Woolwich Street / Ebycrest Road (Regional Road 17). This alternative avoids the Bloomingdale – Rosendale wetland and the Hindu Temple, and would only have one crossing of the Hopewell Creek.

KWE Interchange: A number of KWE interchange alternatives were developed, analysed and evaluated in the Original EA work. The interchange included in the Recommended Plan (1997) addressed most of the issues, however there was some concern that westbound Highway 7 traffic would continue on Wellington Street and would infiltrate into the Mount Hope / Breithaupt neighbourhood.

During the MTO Review, business owners on the west side of the KWE / Wellington interchange approached the MTO to discuss concerns they had with the proposed changes to the existing Wellington Street interchange as proposed in the EA Report (1997). Their concern was that they would lose direct access to Wellington Street from northbound KWE.

An alternative was developed that would address all of the issues raised, including those raised in the Original EA. The new interchange alternative would have a freeway to freeway function and a separate local function that would maintain local access. The proposed interchange would also eliminate the direct connection from Highway 7 to Wellington Street. The disadvantages of this alternative are that it would require additional property and it would have a greater cost than the alternative proposed in the EA Report (1997).

LEGEND

WETLAND

N.T.S.

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

REVISED WESTERLY
(RW) ALTERNATIVES

EXHIBIT
4-7b

The alternative was reviewed with the Region of Waterloo and the City of Kitchener. Their only concern was the potential loss of the ramp from Edna Street to southbound KWE. There is an opportunity to maintain this ramp, however it would require widening through the Frederick Street structure.

The alternative was presented to the public at Information Centres in February 2001 and November 2001. The comments received regarding the interchange were predominantly related to cost and property concerns. The interchange was considered to be part of all of the RW and KC alternatives. The KWE interchange is discussed in more detail in Chapter 5.

4.2.2.3 Existing Highway 7 Alternatives

Existing Highway 7 alternatives were considered in the original Highway 7 EA study, and discussed in the EA Report 1997. In the original study, the controlled access alternatives on existing Highway 7 were screened out early because the effects to the adjacent properties were considered to be too severe.

During 1998 and 1999, MTO received many comments that supported expansion of the existing highway. Therefore, alternative methods of improving the existing highway were given a high priority during the MTO Review.

The option of widening existing Highway 7 to five lanes was suggested by various groups and individuals. As discussed in Section 3.4, a 5-lane alternative would not reasonably accommodate future demand beyond 2010. Therefore, the 5-lane alternative was set aside.

The Project Team investigated the possibility of other alternatives on the existing highway in the central rural portion of the study area, between Ebycrest Road and Guelph Township Road 3. In all cases, it was assumed that these alternatives would connect to new alignments in the east and west portions of the study area. (Expansion of Woodlawn Road in Guelph, and Victoria Street in Kitchener had been set aside in the original study because of their significant socio-economic effects. These options were not re-opened in the MTO Review.)

The two alternative cross sections that were developed for expansion of existing Highway 7 were the Right-In/Right-Out option, and the Controlled Access Highway (CAH) option. For the CAH cross section, two concepts were developed. One of these would have continuous service roads on both sides of Highway 7, while the other would have a discontinuous service road network.

Both the CAH and the RIRO options require “connectors” to the new alignment sections to the east and west. The connectors are described in Section 4.2.2.4 and Section 4.2.2.5.

Right In / Right Out (RIRO) Alternative: The Right In / Right Out (RIRO) alternative permits access to adjacent properties by way of right turns only. This alternative provides grade separations at all crossing roads, and a concrete median barrier to separate the opposing traffic. Access to the adjacent properties that would previously have required a left hand turn, would require the driver to exit at the ‘next’ interchange, cross the highway via a grade separation, re-enter the highway in the opposite direction and then make the right turn in to the property. Similar additional travel would be required

for drivers who wanted to turn left when leaving a property. The nominal right-of-way would be 45m wide.

Impacts on two of the five wetlands would be avoided. However, in the "connector" section east of Townline Road, there would be an impact on the Ellis Creek wetland. The extent of the impact would vary, depending which "connector" is chosen (see Section 4.2.2.4).

Movement of farm equipment to and from land with frontage only on Highway 7 would be difficult. Conflicts between farm equipment and through traffic would continue. There would be some fragmentation of farm land at interchanges, and between Ebycrest Road and Spitzig Road. Exhibit 4-8 shows the section of the RIRO alternative between Woolwich Road 66 and Townline Road.

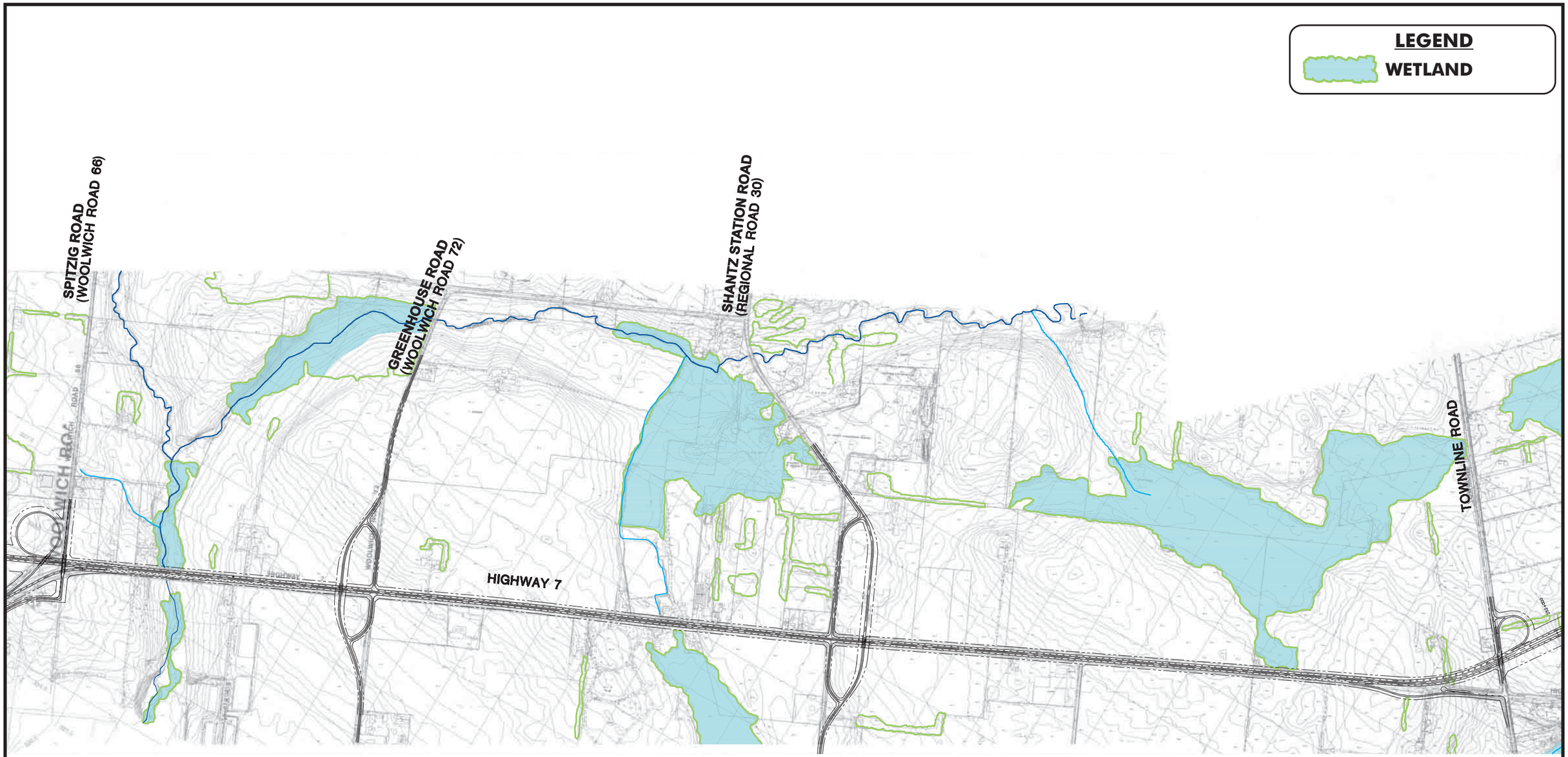
Controlled Access Highway (CAH) Alternatives: The Controlled Access Highway (CAH) alternatives only permit access to the highway at fully grade-separated interchanges. Access to adjacent properties would be via existing crossing roads and new service roads. These alternatives have a median barrier, either as a concrete barrier or a 15 metre wide grassed median. All crossing roads are grade separated with interchanges proposed at Highway 7 at Breslau, Regional Road 30 and Guelph Road 3. The highway right-of-way would be 70 metres and the service roads would be 20 metres each, for a total width of 110 metres.

Two types of CAH alternatives were developed, one with continuous service roads adjacent to both sides of the highway, and the other with discontinuous service roads. The CAH with discontinuous service roads, CAH(d), shown on Exhibit 4-9, was developed to address feedback from the public, workshop participants and municipal staff. Comments received during the public consultation process suggested that the CAH with continuous service roads, CAH(c), shown on Exhibit 4-10, appeared to significantly impact the adjacent properties. Therefore an effort was made to develop a service road concept which minimized property taking and provided access to adjacent properties.

Service roads would displace homes and buildings currently in close proximity to existing Highway 7, and cause potential impacts on an existing cemetery. Access to adjacent properties would be changed. With the CAH(c) alternative, properties adjacent to existing Highway 7 would be displaced. With the CAH(d) alternative access to the adjacent properties not displaced would be from the back of the properties. Exhibits 4-9 and 4-10, show the sections of the CAH (c) and CAH (d) alternatives between Woolwich Road 66 and Townline Road..

As with the RIRO alternatives, impacts on two of the five wetlands would be avoided. However, in the "connector" section east of Townline Road there would be an impact on the Ellis Creek wetland. The extent of the impact would vary, depending which "connector" is chosen (see Section 4.2.2.4).

Movement of farm equipment would not conflict with traffic on Highway 7 but would require out of way travel. There would be some fragmentation of farm land between Regional Road 17 and Woolwich Road 66.

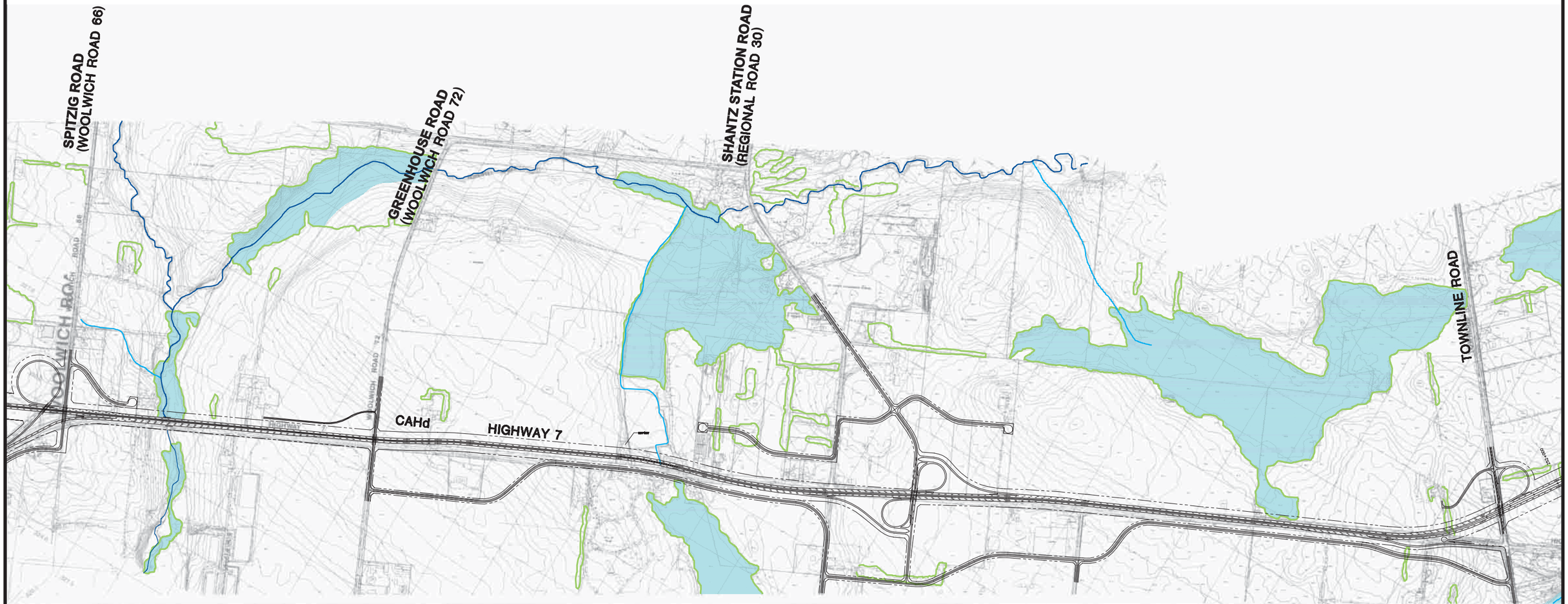


N.T.S.

HIGHWAY 7 PLANNING STUDY KITCHENER TO GUELPH	EXISTING HIGHWAY ALTERNATIVES- CENTRAL RURAL SECTIONS RIRO	EXHIBIT **4-8**

LEGEND

WETLAND



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HIGHWAY 7 PLANNING STUDY KITCHENER TO GUELPH	EXISTING HIGHWAY ALTERNATIVES- CENTRAL RURAL SECTIONS CAH(d)	EXHIBIT **4-9**

LEGEND

WETLAND

SPITZIG ROAD (WOOLWICH ROAD 66)

GREENHOUSE ROAD (WOOLWICH ROAD 72)

SHANTZ STATION ROAD (REGIONAL ROAD 30)

TOWNLINE ROAD

HIGHWAY 7

N.T.S.

HIGHWAY 7 PLANNING STUDY KITCHENER TO GUELPH	EXISTING HIGHWAY ALTERNATIVES- CENTRAL RURAL SECTIONS CAH(c)	EXHIBIT 4-10

4.2.2.4 Connectors – Kitchener

The Kitchener Connectors were developed in order to provide links between the RW Alternatives in the western (Kitchener) portion of the study area and the Existing Highway 7 Alternatives in the central rural portion of the study area.

Three alternatives were developed, KC1, KC2 and KC4. The various KC alternatives closely follow the same alignments as the RW alternatives; there is no KC3 alternative because the KC2 and KC3 alternatives would have been the same. A connection between RW2 and existing Highway 7 between Ebycrest Road and Spitzig Road was not considered, as it would not be practical to swing the alignment to the north and then immediately swing it to the south. In addition, it would have a significant impact on the core of the Weiland tract woodlot.

The KC alternatives are shown on Exhibit 4-11. Brief descriptions of the KC alternatives follow.

Alternative KC1: KC1 provides a connection between RW1 at Ebycrest Road and existing Highway 7 at Spitzig Road. At this location, a partial interchange with existing Highway 7 would be provided. The KC1 alignment crosses owner operated agricultural operations east of Ebycrest Road and the western portion of the Weiland tract woodlot.

Alternative KC2: KC2 provides a connection between RW2/RW3 west of Ebycrest Road and existing Highway 7 at Spitzig Road. Alternative KC2 essentially follows the RW3 alignment to Spitzig Road, limiting impacts on the larger agricultural operations to the north. This alternative provides a partial interchange at existing Highway 7.

Alternative KC4: KC4 follows the RW4 alignment from the KWE to the match point with Highway 7 at approximately Spitzig Road. It would have the same impacts on the Breslau area as RW4 with substantial effects to the adjacent properties on existing Highway 7 and the impacts to existing and future development in the vicinity of the Woolwich Street / Ebycrest Road (Regional Road 17) interchange. With this alternative there would be no alternative to the controlled access highway across the Grand River. The service road connections with this alternative would also be circuitous and would impact on approved future residential development south of Highway 7 between future Regional Road 17 and Hopewell Creek. This alternative avoids significant agricultural impacts.

4.2.2.5 Connectors – Guelph

The Guelph Connectors were developed in order to provide links between the RE Alternatives in the eastern (Guelph) portion of the study area and the Existing Highway 7 Alternatives in the central rural portion of the study area. Two alternatives were developed, GC1 and GC2. The GC alternatives are shown on Exhibit 4-12.

Alternative GC1: GC1 provides a connection between RE1 at County Road 86 and existing Highway 7 at Guelph Road 3. It provides a partial interchange at Guelph Road 3 and a full interchange at County Road 86. This alternative passes through the central core portion of the Ellis Creek Wetland (provincially significant).

Alternative GC2: GC2 provides a connection between RE1, RE2 or RE3 at County Road 86 and existing Highway 7 at Townline Road. It provides a full interchange at County Road 86, but unlike GC1, does not provide an interchange at Guelph Road 3. Alternative GC2 avoids the Ellis Creek wetland and follows existing lot lines to minimize impacts on large, owner operated agricultural operations.

Summary of Phase 2

During 2000, the analysis and evaluation of the RE, RW, existing Highway 7, and connectors was carried out, resulting in a Technically Preferred Alternative. This work was presented to municipalities and the public in January and February 2001. There was considerable public opposition to the Technically Preferred Alternative, specifically in the central rural portion of the study areas. In order to address the concerns, additional alternatives were developed, analyzed, and evaluated. (Phase 3). The analysis and evaluation process followed during Phases 2 and 3 is detailed in Section 4.3.3.

4.2.3 Review Phase 3: Revised Central Section Alternatives

The results of Phase 2 were presented at Public Information Centres in February 2001. The strong negative reaction to the service road concept presented at that time caused the Project Team to search for additional alternatives. Based on the work done during Phase 1 and Phase 2, it was evident that the only remaining options for the central rural portion of the study area would be between the New Route alternative identified in Phase 2, and the existing highway.

Two new alternatives for the central rural portion of the study were developed, with the intent of providing the following benefits:

- Avoid the Townline West and Hopewell Creek Riparian Wetland
- Reduce agricultural impacts.
- Maintain existing Highway 7 as a local road.

These Alternatives are shown on Exhibit 4-13 and are briefly described as follows:

Alternative RC1: Alternative RC1 is a further refinement of the new route alternative (RE2-RW3) developed in Phase 2. RC1 is located approximately 400 m north of existing Highway 7 at Greenhouse Road and approximately 300 m north of existing Highway 7 at Shantz Station Road. At the Townline West wetland the alignment is approximately 170 m north of existing Highway 7. The interchange at Shantz Station Road is Parclo on the north half and a diamond configuration on the south half to accommodate the proximity of the RC1 alignment to Highway 7. Alternative RC1 allows the community at Shantz Station to remain, avoids the interior of the Townline West and Hopewell Creek Riparian wetlands, and leaves existing Highway 7 in place for local traffic.

Alternative RC2: Alternative RC2 is a new alignment located immediately to the north of existing Highway 7. It provides an interchange at Shantz Station Road, with a configuration similar to the one proposed in RC1. RC2 requires longer structures, in order to carry crossing roads across both existing Highway 7 and the new highway. This alternative makes provision for connector roads, to allow continued access from existing

LEGEND

WETLAND

RW1/KC1

BRIDGE STREET

RW2/RW3/KC2

KC1

KC2

SPITZIG ROAD (WOOLWICH ROAD 66)

RW4/KC4

VICTORIA STREET (HWY. 7)

EBYCREST ROAD (REGIONAL ROAD 17)

N.T.S.

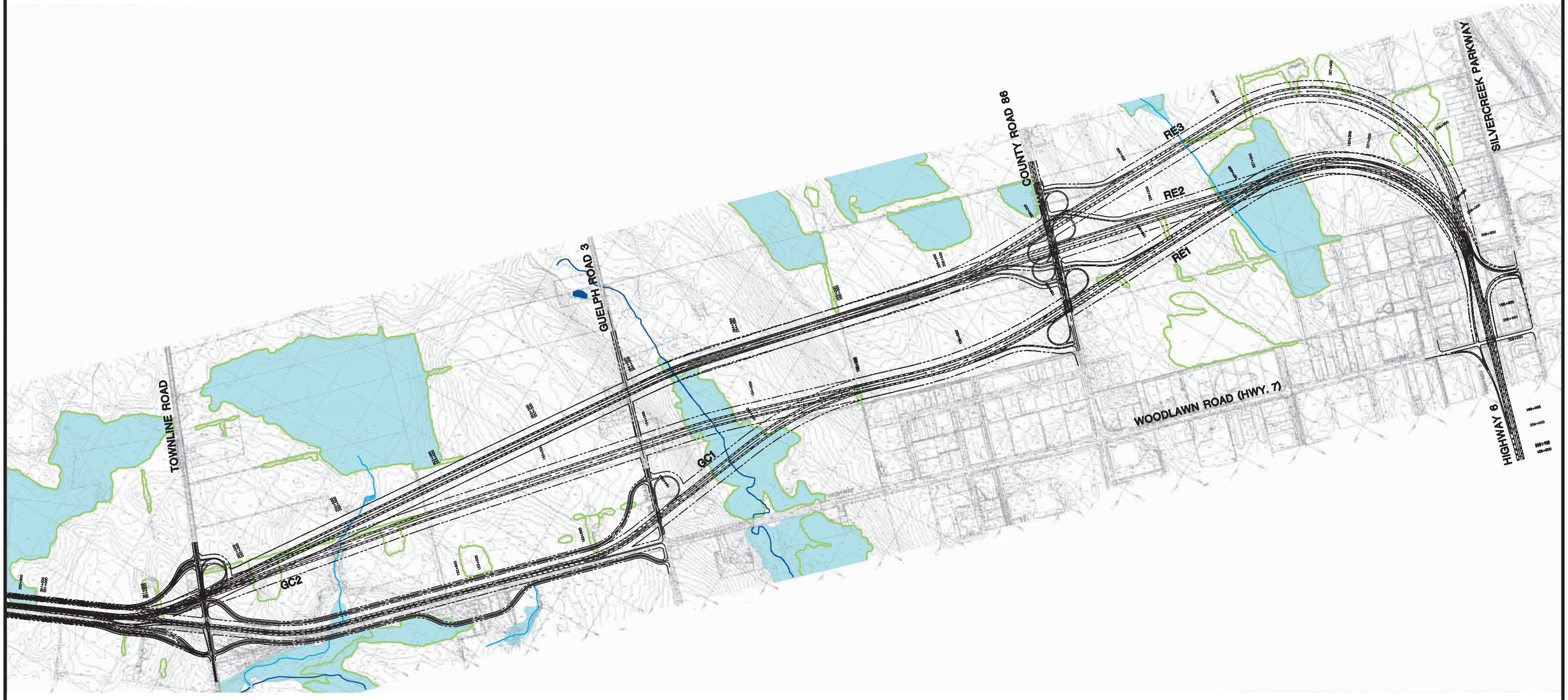
HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

KITCHENER CONNECTOR ALTERNATIVES

EXHIBIT 4-11

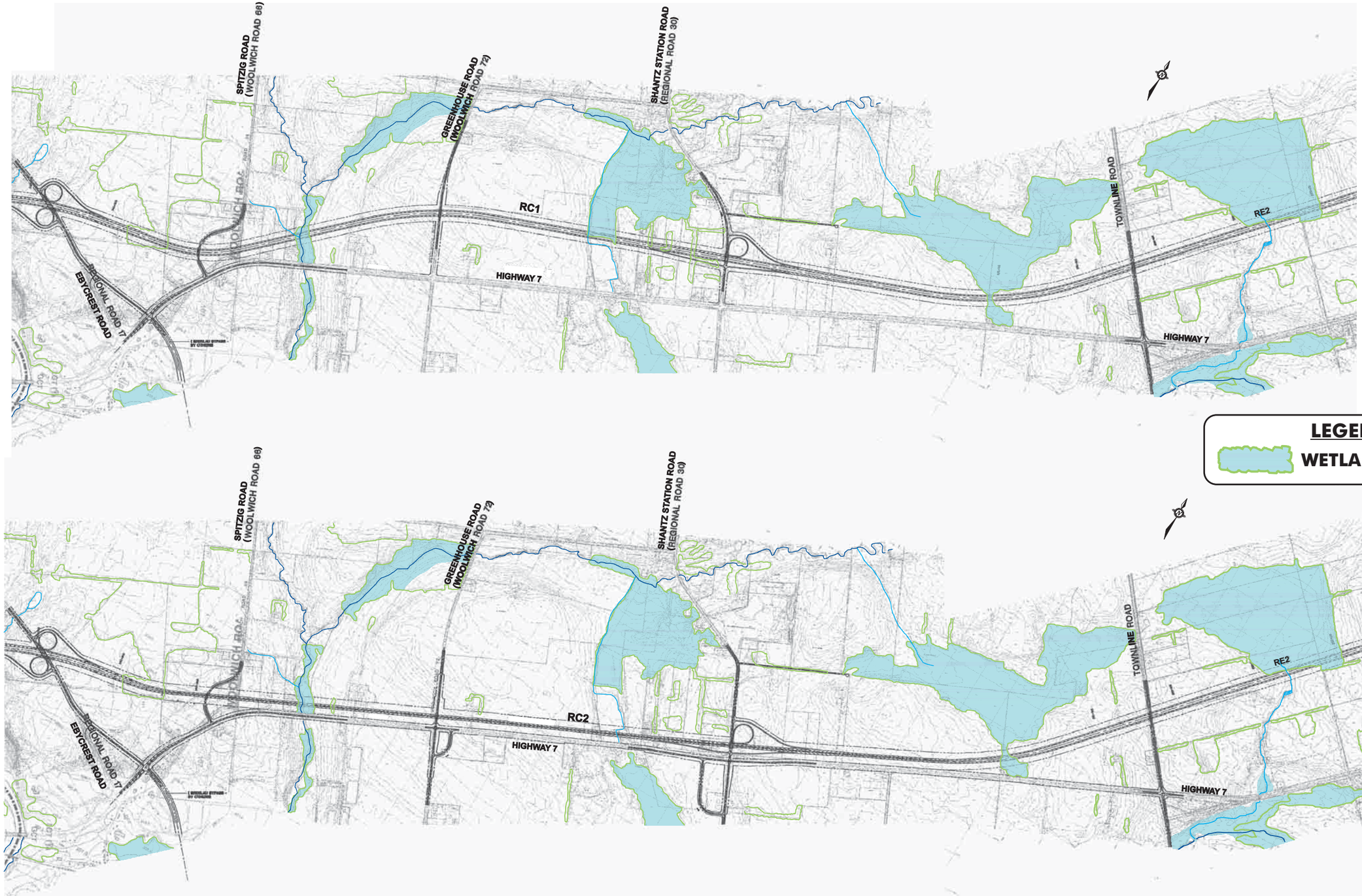
LEGEND

WETLAND



N.T.S.

HIGHWAY 7 PLANNING STUDY KITCHENER TO GUELPH	GUELPH CONNECTOR ALTERNATIVES	EXHIBIT 4-12



LEGEND

WETLAND

N.T.S.

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

REVISED CENTRAL ALTERNATIVES (RC-1 & RC-2)

EXHIBIT 4-13

Highway 7 to the crossing roads at Woolwich Road 72 and Regional Road 30, and vice versa. Alternative RC2 completely avoids the Townline West and Hopewell Creek Riparian wetlands, but requires removal of the community of Shantz Station. Existing Highway 7 remains in place for local traffic.

4.3 Analysis and Evaluation

4.3.1 Introduction

Exhibit 4-14 illustrates the analysis and evaluation process developed for Phases 2 and 3 of the MTO Review. (There was no formal evaluation process for Phase 1).

The groupings and factors to be used in the analysis were updated from the original study to reflect changes in policies and approaches since the previous evaluation was carried out in the Original EA. (see Section 4.3.2).

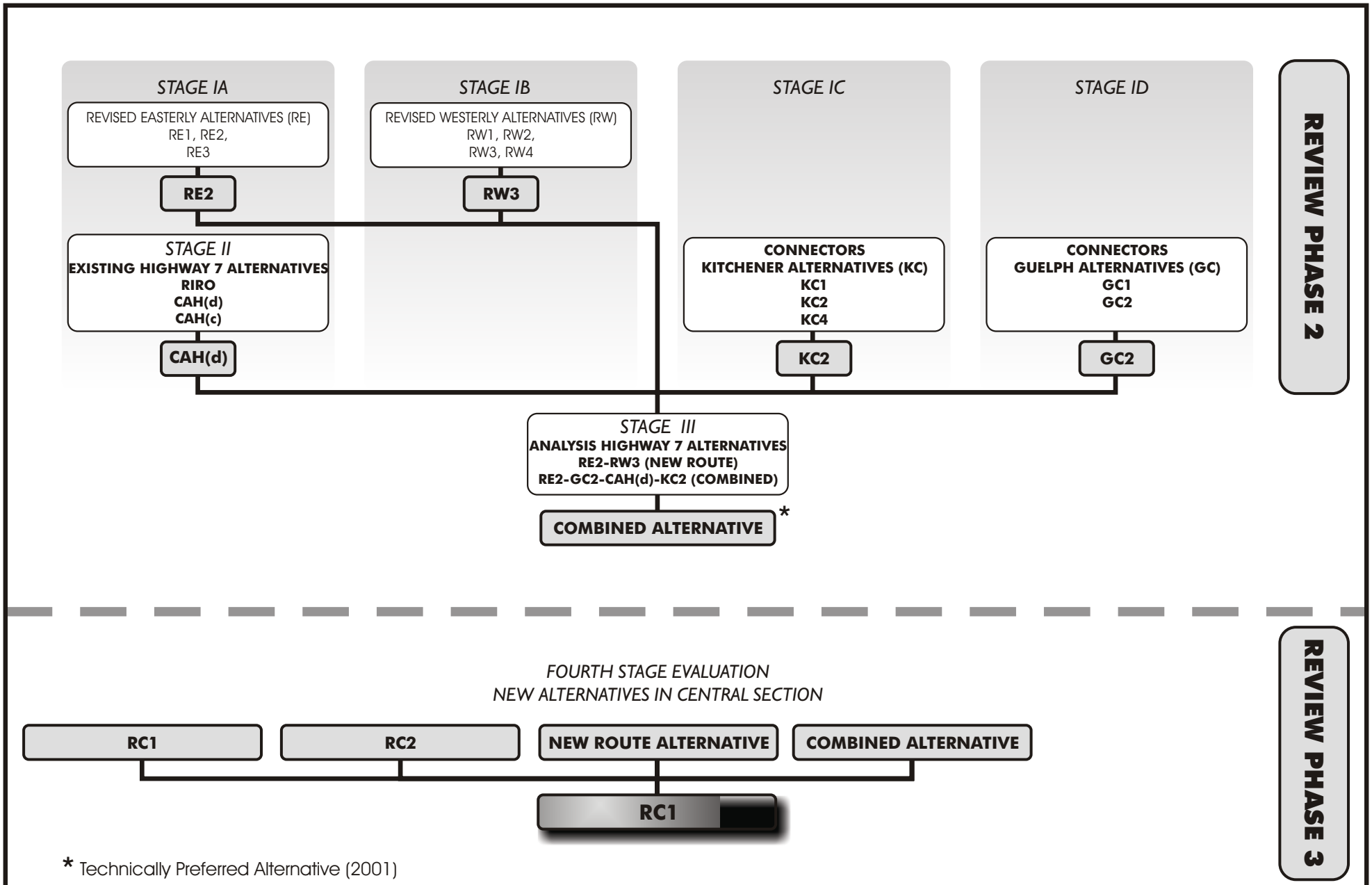
The analysis was conducted to determine the effects that each alternative would have in the various factor areas. The alternative which produced the best balance with the greatest overall benefit was identified as the best alternative. The analysis tables show the net effects of each alternative. Preparation of these tables included consideration and discussion of potential mitigation measures (for example, standard erosion control measures). The process described is consistent with the methodology used in the original study.

4.3.2 Groupings, Factors and Indicators

The Groupings, Factors and Indicators from the Original EA were reviewed and updated. The environmental effects of the alternatives need to be analysed using a defined set of groupings and factors. The groupings and factors to be used in the analysis of the alternatives were developed through the consideration of the following:

- The need to determine the manner in which the alternatives would address the transportation and planning issues within the study area.
- The type of factors that have been found to be of significance on highway projects carried out by the Ministry of Transportation over the past several years.
- The specifics of the study area that reflect the unique characteristics of this particular study as understood by the Project Team and expressed by interested groups and agencies through the Original EA study and the current MTO Review.

In preparation for the evaluation of Highway 7 alternative alignments in Phase 2 of the MTO Review, the environmental issues identified during the development of the Original EA were reviewed and updated to better reflect current polices and processes. In particular, the Natural Environment and the Agriculture Factors and Indicators were reviewed and modified. A comparison of the EA Report (1997) factors and the MTO Review factors is shown on Exhibit 4-15. Based on current information (background and additional field assessments), indicators were used to determine the relative merits of the alternative alignments and ultimately lead to the selection of a preferred solution. A combination of quantitative and qualitative measures was developed. The analysis factors



HIGHWAY 7 PLANNING STUDY

KITCHENER TO GUELPH

ANALYSIS AND EVALUATION REVIEW PROCESS

EXHIBIT

4-14

Highway 7 Planning Study Kitchener to Guelph
Comparison of Factors
EA Report 1997 and MTO Review

Grouping	EA Report 1997 Factor	MTO Review Factor
SOCIO – ECONOMIC ENVIRONMENT	Community Effects	Community Effects
	Noise	Noise
	Heritage Resource	Land Use
	Land Use	Air Quality
NATURAL ENVIRONMENT	Water	Fisheries and Aquatic Habitat
	Wildlife	Wildlife
	Wetlands	Wetlands
	Vegetation	Vegetation
	Soils	Groundwater
	Aggregate Resources	
AGRICULTURE	Agricultural Land Use	Agriculture
	Soil Capability	
	Individual Farm Effects	
	Farm Community	
TRANSPORTATION	Operations	Traffic Operations
	Staging Options	Safety
		Network Compatibility
COST	COST	Construction
		Property
		Total Cost
		Operation and Maintenance

and criteria were reviewed in detail with municipal staff external agencies at a meeting in June 2000.

The Environmentally Significant Issues identified in Chapter 3, along with the study objectives, form the basis for the broad groupings and seventeen factors identified as the framework for the analysis and evaluation of the alternatives. The groupings have been identified as:

- Socio-Economic Environment
- Natural Environment
- Agriculture
- Transportation
- Cost

Each of the seventeen factors was further defined by the use of indicators. Wherever possible, indicators were used which would provide a quantitative measure when used. If this was not possible, qualitative indicators were used. Qualitative indicators were labelled as subjective. The subjective rating (i.e. minor, moderate, and major) was based on a combination of technical facts and professional judgement. Seventy-three indicators were identified in all. A description of the factors and indicators by grouping is included in Appendix E.

The factors and indicators used in Phase 2 of the MTO Review are summarized on Exhibit 4-16. These factors and indicators were used in Phase 3 as well, with further modifications in the socio-economic area.

Exhibit 4-16: Factors and Indicators Developed in Phase 2

FACTOR/CRITERION	QUALITITATIVE/QUANTITIATIVE INDICATOR	UNIT OF MEASURE	METHOD OF MEASUREMENT
1. SOCIO-ECONOMIC ENVIRONMENT			
1.1 Community Effects	a) Community facilities affected (Schools, churches, parks, community centres, etc.)	Number; type of impact (removal, frontage, access) High, Moderate, Low Description	Assessment of number and type of community facilities affected. Assessment of facility impact, whether complete removal, frontage affected and how much, or access impacts; description of the facility impacted.
	b) Residences displaced	Number	Count of households displaced by each alternative, including residences on agricultural properties.
	c) Residential properties affected	Hectares, type of impact (removal, frontage, access)	Assessment of the number of residential properties impacted by each alternative and the amount of area required from each property. Assessment of property impact, whether complete removal, frontage affected and how much, or access impacts. Does not include residences on agricultural properties.
	d) Businesses displaced	Number (commercial, industrial)	Count of businesses displaced by each alternative.
	e) Commercial properties affected	Hectares, type of impact (removal, frontage, access)	Assessment of the number of commercial properties impacted by each alternative and the amount of area required from each property. Assessment of property impact, whether complete removal, frontage affected and how much, or access impacts.
	f) Industrial properties affected	Number; hectares	Count of number of industrial properties impacted and the area required from each property.

Exhibit 4-16: Factors and Indicators Developed in Phase 2

	g)			
	g)	Overall effect on emergency response routes	High, Moderate, Low	Assessment of each alternative's effect on emergency response time based on access to major routes and out-of-way travel as well as compliance with municipal bylaws.
	h)	Overall effect on existing communities	High, Moderate, Low	Assessment of each alternative's effect on existing communities including fragmentation or isolation of existing residential areas, discontinuity of the existing road network, and out-of-way travel required to access other areas of the existing community.
1.2 Noise	a)	Impacts to noise sensitive areas	Number; description; degree of impact	Assessment of the number of noise sensitive areas subject to increase of: 0-5 dBA, 5-10 dBA, >10 dBA based on year 2000 ambient noise levels.
1.3 Land Use	a)	Potential for induced development	Influence, No influence	Assessment of each alternatives potential to induce development.
	a)	Impact to approved development indicated in the Official Plans	Influence, No influence	Assessment of each alternative's impact to the approved development indicated in the Official plan of all Municipalities.
1.4 Air Quality	a)	Potential impacts on air quality	Good, Fair, Poor	Assessment of each alternative's impact on air quality standards in regards to health, plant and crop damage and property deterioration.
2. NATURAL ENVIRONMENT				

Exhibit 4-16: Factors and Indicators Developed in Phase 2

2.1 Fisheries and Aquatic Habitat	a) Water crossings or encroachments	Number; High Moderate, Low	Assessment of the number of watercourse crossings, modifications, relocations, channelization or paralleling within 30m for each alternative. Degree of significance of watercourse crossings or encroachments.
	b) Presence of species at risk	Present, Not present	Assessment of the presence of vulnerable, threatened or endangered species for each alternative.
	c) Areas of critical fish habitat	Number; High, Moderate, Low	Assessment of the number of fish habitat areas affected and degree of potential impact and mitigation opportunities.
	d) Presence of warmwater/coldwater communities	Number	Assessment of the number of times an alternative crosses, encroaches or parallels within 30m of a watercourse that has characteristics capable of supporting coldwater or warmwater species.
	e) Degree of interaction with groundwater	High, Moderate, Low	Assessment of the degree of potential impact to groundwater discharge zones with respect to fisheries and aquatic habitat.
2.2 Wildlife Habitat	a) Encroachment on or severance of forested vegetation or non-forested successional areas	Area (ha)	Assessment of the total potential impact to wildlife habitat for each alternative. (All vegetation communities are considered potential wildlife habitat for this indicator).
	b) Encroachment on or severance of greenways and open space linkages	High, Moderate, Low	Assessment of the potential disruption of wildlife movement along potential or identified corridors by fragmentation or removal of greenways or open space linkages.
	c) Encroachment on or severance of significant wildlife habitat	Area (ha); High, Moderate, Low	Assessment of the quantity of potentially significant wildlife habitat directly affected by each alternative or located within 50m of the right-of-way. Assessment of degree of severance, fragmentation or isolation of wildlife habitat for each alternative.

	d) Presence of species at risk	High, Moderate, Low	Assessment of impact of each alternative to required suitable habitat for the presence of vulnerable, threatened, endangered, regionally or provincially significant species.
2.3 Wetlands	a) Loss of function (biological, hydrological, special features) of all wetlands within or adjacent to study area	High, Moderate, Low	Assessment of the potential effect each alternative has directly or indirectly on wetland function as defined in the "Wetland Policy Statement". Loss of function was also considered in the context of the viability of fragmented wetland areas.
	b) Loss of wetland area of all wetlands within study area	Area (ha)	Assessment of the total wetland area impacted by each alternative for evaluated and unevaluated wetland areas.
	c) Degree of interaction of all wetlands with groundwater	High, Moderate, Low	Assessment of groundwater interception and potential wetland condition changes for each alternative.
	d) Encroachment on (within) or severance of Class 1-3 (Provincially Significant) wetlands (This indicator is part of 2.3.b)	Area (ha)	Assessment of the total area of provincially significant wetland encroached upon or severed by an alternative.
2.4 Vegetation	a) Encroachment on or severance of high quality forest stands	Area (ha)	Assessment of high quality or significant woodland community area impacted by each alternative. Edge effects are included if vegetation unit is within 50m of right-of-way.
	b) Presence of significant vegetation species at risk	High, Moderate, Low	Assessment of impact of each alternative to required suitable habitat for the presence of vulnerable, threatened, endangered, regionally or provincially significant species.
	c) Erosion potential/risk on slopes	High, Moderate, Low	Assessment of erosion potential and ability to mitigate erosion effects along each alternative.

	d) Nature of riparian habitat and potential impact	High, Moderate, Low	Assessment of the riparian functions and potential impact associated with watercourse crossings by each alternative.
2.5 Groundwater	a) Implications of roadway grading on groundwater movement / discharge	Number of anticipated cut zones	Count of the number of anticipated cut zones along an alternative in proximity (within 120 m) to dependent aquatic or wetland areas.
	b) Shallow groundwater wells (contaminant implications)	Number	Number of shallow (<15m in depth to aquifer) wells within 300 m of each alternative.
	c) Municipal / private water supply wells	Number	Assessment of the number of cuts required that could potentially impact groundwater recharge or discharge areas.
3. AGRICULTURE			
3.1 Agriculture	a) Land Used for Agricultural Production	Area affected (ha)	Assessment of the area of land used for agricultural production affected by each alternative.
	b) Specialty crop operations affected	Number; Area (ha)	Assessment of the number of individual specialty crop operations impacted by each alternative and the total hectares impacted or potentially lost from production.
	c) Loss of specialty crop soil (organics)	Area (ha)	Assessment of the quantity of organic material lost that may or may not be currently used for specialty crops.
	d) Dairy/livestock operations affected	Number; Area (ha)	Count of separate operations impacted by each alternative as well as land potentially impacted or lost from production.
	e) Field crop operations affected	Number; Area (ha)	Count of individual field crop operations impacted by each alternative as well as the area of land potentially impacted or lost from farming production.

	f)	Effect on future flexibility of farm operations	Number of properties with access changes High, Moderate, Low	Assessment of individual farm effects resulting from limitations of access or effect on farm operations.
	g)	Effect on farm woodlots	High, Moderate, Low	Assessment of woodlot fragmentation and accessibility to woodlots used for timber, fuel, fence posts of each alternative.
	h)	Effect on capital investment in agricultural operations	Number High, Moderate, Low	Assessment of the potential for effect on capital investment in agricultural operation for each alternative.
	i)	Significant farm operation severances	Number High, Moderate, Low	Assessment of the number of farm operations divided and the degree of fragmentation caused by each alternative.
	j)	Significance of detrimental effects to ongoing viability of farm operations	Number of Properties Number of Farm Buildings Affected Nature of Severed Parcels High, Moderate, Low	Assessment of each alternative's impact to inter-farm movement, fragmentation, access and farm viability. Operations are also considered affected if farm buildings are removed.
	k)	Significance of detrimental effects to ongoing viability of farm communities	High, Moderate, Low Also, ratio of owner-operated to tenant-operated farm parcels affected by each alternative	Assessment of each alternative's potential for farm community disruption based on travel route modification and characteristics of farm communities (existing well established farm settlements, urban pressures already in evidence, non-farm areas).
4. TRANSPORTATION				
4.1 Traffic Operations	a)	Level of Service	Level, description	Assessment of each alternative's traffic congestion based on MTO level of service A to F and a description of the service level.
	b)	Intersections / Entrances	Number, type of impact	Assessment of each alternative's impact to existing intersections. A description of the type of impact whether closure, realignment or interchange and out-of way travel associated with each alternative.

Exhibit 4-16: Factors and Indicators Developed in Phase 2

	c) Service Life	Year	Year at which facility reaches Level of Service 'F'.
4.2 Safety	a) Conflicts with Agricultural equipment	High, Moderate, Low	Assessment of the potential for slow moving agricultural equipment to conflict with higher speed vehicles.
	b) Conflicts with Intersections / Entrances on through lanes	Number of conflict points; High, Moderate, Low	Assessment of number of potential conflict points on through lanes, minor would be least, major would be most.
	c) Comparative Collision Rate	Collisions per vehicle kilometre	Provincial average collision rate for type of cross section.
4.3 Network Compatibility	a) Effect on traffic operations on parallel/crossing roads	High, Moderate, Minor, No Effect	Assessment of impact on traffic operations of each alternative due to potential for diversion of traffic to parallel route.
	b) Driver comfort and expectation	Good, Fair, Poor	Assessment of consistency of design of each alternative based on road type, interchange configuration, transition areas.
	c) Ability to stage implementation of the facility	Good, Fair, Poor	Assessment of ability to stage the construction of the facility and the associated impacts caused such as disruption to emergency vehicles, potential for business loss, out-of-way travel, impacts to residences, etc.
	d) Compatibility with existing network	Good, Fair, Poor	Assessment of 'connectivity' of provincial facility with existing regional / county and local road network. Assessment of significant changes in traffic patterns, both positive and negative.
	e) Compatibility with future network	Good, Fair, Poor	Assessment of 'connectivity' of provincial facility with future regional / county and local road network. Assessment of significant changes in traffic patterns, both positive and negative.

Exhibit 4-16: Factors and Indicators Developed in Phase 2

	f) Flexibility for future expansion	Good, Fair, Poor	Assessment of the ability to upgrade the facility with additional lanes, interchanges, etc as required due to future demands.
4.4 Ability to Accommodate Future Transit	a) Ability to accommodate future transit	Good, Fair, Poor	Assessment of transit corridor opportunities, both within and beyond R.O.W.
5. COST			
5.1 Construction (1999/2000 $)	a) Potential loss of business during construction	Low, Moderate, High	Assessment of the potential for loss of business due to construction whether access changes, closure, etc of each alternative.
	b) Construction	$ M	Assessment of the dollar value associated with the construction of each alternative.
	c) Staging	$ M	Assessment of the cost associated with the staging of construction.
5.2 Property	a) Residential property	$ M	Total cost of residential property required for each alternative.
	b) Commercial property	$ M	Total cost of commercial property required for each alternative.
	c) Industrial property	$ M	Total cost of industrial property required for each alternative.
	d) Agricultural property	$ M	Total cost of agricultural property required for each alternative.
	e) Other	$ M	Total cost of other property required for each alternative.
5.3 Operation and Maintenance	a) Operation and maintenance	$ M	Assessment of the cost associated with the operation and future maintenance of the facility for each alternative.

4.3.3 Analysis and Evaluation Process

This section describes the analysis and evaluation process that was followed during Phases 2 and 3 of the MTO Review.

4.3.3.1 Analysis

The analysis tables (Section 4.3.4), are based on the Factors and Indicators as described in the previous section and describe the net effects of each alternative on the environment.

The alternatives considered for the MTO Review are described in Section 4.2 and include new route and combined alternatives. The alternatives were analysed based on similar characteristics identified as:

Phase 2

- Revised Easterly Alternatives (RE)
- Revised Westerly Alternatives (RW)
- Connectors – Kitchener (KC)
- Connectors – Guelph (GC)
- Existing Highway 7 Alternatives

Phase 3

- Revised Central Alternatives (RC)

The analysis tables, which include the tabulation of data, are included in Section 4.3.4.

4.3.3.2 Evaluation Process

The initial work (Phase 1) that was carried out for the MTO Review attempted to make minor modifications to the Recommended Plan 1997. There was a review of the alternatives by the Project Team to determine if the modification provided a reduction to the impacts on the wetlands without significant increased impacts on the other major groupings.

Following the March 2000 Public Information Centres, new alternatives were developed and the factors and indicators were reviewed and updated. The formal evaluation was carried out in four stages. The first three stages were carried out in October 2000 (Phase 2), and the fourth stage was carried out in June 2001 (Phase 3). Stage I of the evaluation consisted of a comparison of the alternatives within each set:

- Revised Easterly Alternatives (RE)
- Revised Westerly Alternatives (RW)
- Connectors – Kitchener (KC)
- Connectors – Guelph (GC)

Stage II of the evaluation compared alternatives for the expansion of existing Highway 7, in the central rural portion of the study area.

The best alternatives were selected from each of the Stage I and Stage II evaluations and carried forward to the Stage III evaluation. This stage resulted in the identification of the Technically Preferred Alternative. There was significant negative response to the Technically Preferred Alternative at the Public Information Centres held in February 2001, particularly with the recommendation in the central rural section. After the February 2001 Public Information Centre additional alternatives were developed and analysed for the central rural portion of the study area. A fourth stage evaluation was carried out in June 2001, which resulted in the identification of the Recommended Route (2002).

At each stage the evaluation procedure was carried out as follows:

1. The Project Team compared the factors for each alternative and assigned 10 points to the best alternative(s) for each of the individual factors. All other alternatives received 0-10 points depending on how they compared with the best alternative for that particular factor.
2. The numerical evaluation was used to focus the thoughts of the Project Team members on the relative importance of the effects. Each team member then identified first and / or second choice and the reasons for these choices. It is important to note that this "stated preference" evaluation was carried out without completing the "numerical evaluation".
3. The results, which included the "stated preference" and rationale from the individual team members, were compared and discussed to identify a preferred route. The discussion of the alternatives included an understanding of the technical effects of the various alternatives, the ability to mitigate and the concerns of external agencies and the public that had been made known to the Project Team.

4.3.4 Analysis and Evaluation Procedure

This section describes the net effects of each of the alternatives on the environment. The information was organized by the factor groupings. Once the analysis tables were prepared (e.g. Exhibit 4-17), the evaluation of alternatives began.

The first stage evaluation was carried out in four parts: IA, IB, IC and ID as shown on Exhibit 4-14. Stages IA and IB of the process evaluated the Revised Easterly Alternatives (RE) and the Revised Westerly Alternatives (RW) in order that the "best" New Route Alternative could be identified. Stages IC and ID evaluated the Connectors – Kitchener (KC) and the Connectors – Guelph (GC) in order that these west and east connectors could be used as part of the Combined Alternatives in Stage III.

The Stage II evaluation compared the Existing Highway 7 Alternatives.

The analysis and evaluation of Stage IV is in a separate section.

4.3.4.1 Revised Easterly Alternatives (RE)

The analysis of the Revised Easterly Alternatives (RE) considered the three alignment alternatives described in Section 4.2.2.1 and shown on Exhibit 4-6. Each of the

alternatives would be within a 100 m right-of-way and would be designated as Controlled Access Highway. The analysis of this set of alternatives is bounded on the west by a match point approximately 670 m to the east of Shantz Station Road and on the east by the Hanlon Expressway at Woodlawn Road. The analysis table for the Revised Easterly Alternatives is shown on Exhibit 4-17. The significant differences amongst the alternatives are noted in the text below.

Socio-Economic Environment

For the three alternatives, the community effects were considered to be minor for RE1 and RE2 and significant for RE3. Four residences would be displaced with both RE1 and RE2 and six residences would be displaced by RE3.

Noise increases in excess of 5 dBA would occur at 22, 26 and 28 Noise Sensitive Areas (NSAs) for alternatives RE1, RE2 and RE3, respectively.

RE3 would have a moderate to high potential to induce development.

Natural Environment

With RE1 and RE2 there would be a moderate loss of function of all wetlands within or adjacent to the study area, whereas RE3 would have a low to moderate loss. RE1 would result in the loss of approximately 8.5 ha of wetland area at Marden, Ellis and Townline West. RE2 would result in the loss of approximately 11.2 ha of wetland area at Marden, Ellis, and Townline West and Townline East, and RE3 would require 3.9 ha from Ellis and Townline West. Although RE1 requires less wetland area than RE2 the impact would be considered higher because it crosses through the higher quality portions of the Marden and Ellis Creek wetlands.

RE1 would remove approximately 9.2 ha of wildlife habitat from forested vegetation or non-forested successional areas at Marden, Ellis and Townline West wetlands, which would result in moderate to high fragmentation of Marden and Ellis wetland and minor side affects at the Townline West wetland. Alternative RE2 would remove approximately 11.4 ha of wildlife habitat. With RE2 the core of the Ellis Creek wetland would be protected and at the Marden Wetland impacts would be to the less sensitive northerly limits. RE3 would remove 7.9 ha at Marden, Ellis and Townline East and Townline West wetlands and would not impact high quality areas.

Agriculture

Alternative RE1 would require approximately 89.8 ha of land used for agricultural purposes and RE2 and RE3 would require 84.8 ha and 85.2 ha respectively. Both Alternatives RE1 and RE3 would have high impacts to the future flexibility of farm operations and on capital investment in agricultural operations.

RE3 would result in eight major farm severances and RE2 and RE1 would result in six and five farm severances respectively.

Transportation

All of the alternatives would have similar traffic operations, safety considerations and transportation network compatibility.

Cost

RE2 would have the least total cost and RE3 would have the greatest total cost. The cost range is from $39.0 M to $42.7 M (2000 dollars), including an estimate for property.

External Agency Comments

The following summarizes the preferences and comments provided at the October 13, 2000 External / Municipal Team meeting:

- The City of Guelph indicated a preference for Alternative RE2.
- The County of Wellington and the Township of Guelph/Eramosa indicated a preference for Alternative RE1.
- The Ministry of Natural Resources indicated a preference for Alternative RE3 but would accept RE2. Both RE2 and RE3 were developed in response to comments from the Ministry of Natural Resources and Grand River Conservation Authority to avoid the major wetland blocks.
- OMAFRA indicated a preference for RE1.
- A specific preference was not recorded for the Region of Waterloo or the Township of Woolwich, as there are no differences between the eastern new route alternatives within these municipalities. In addition, this alternative set is not located within the City of Kitchener, therefore no preference was stated by the Kitchener representatives. The GRCA was not in attendance at this meeting.

4.3.4.2 Stage IA Evaluation: Revised Easterly Alternatives (RE)

This section provides the summary rationale for the identification of the 'best' alternative within this set of alternatives.

Alternative RE2 was preferred in this stage because it provides the best balance between the significant agricultural and socio-economic impacts of RE3 and the significant natural environment impacts of RE1. The key issues were:

- RE3, with a more northerly alignment would have a greater impact on the existing residential community on Silvercreek Parkway. The three alternatives are similar in terms of direct land impacts to commercial properties, while RE3 would have a higher direct impact on residential lands and RE1 would have a slightly higher impact on the back portion of existing industrial lands. RE1 would be located closest to the existing Guelph boundary, while RE2 and RE3 would also have the potential to induce development on existing agricultural and residential lands through pressure to extend the urban boundary to the south limit of the highway right-of-way.

- RE1 would have significant natural environment impacts because the alignment travels through the higher quality sections of the Marden and Ellis Creek wetlands, which are both classed as Provincially Significant. RE2 provides good protection for the core of the Ellis Creek Wetland and encroaches upon the less sensitive northerly limit of the Marden wetland and would therefore be a

STAGE IA: NEW ROUTE ALTERNATIVES – EASTERN (GUELPH) STUDY AREA
DETAILED ANALYSIS OF ALTERNATIVES

				RE1		RE2		RE3	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT	Community Effects	Community facilities affected	No.	0		0		0	
			Subjective	None		None		None	
		Residences displaced	No.	4	GT-2, GT-18, GT-19, GT-28	4	GT-14, GT-22, GT-23, GT-28	6	GT-2, GT-13, GT-14, GT-23, GT-26, GT-29
		Residential properties affected	ha. Type	1.1	• Full Removal: 2 (GT-18, GT-19) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 4 (GT-30, GT-31, GT-32, GT-34) • Other: 0	1.2	• Full Removal: 1 (GT-14) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 1 (GT-13) • Severance: 0 • Back Lot: 6 (GT-30, GT-31, GT-32, GT-33, GT-34, GT-35) • Other: 0	3.1	• Full Removal: 2 (GT-13, GT-14) • Frontage Only: • Access Only: 0 • Access + Frontage: • Severance: 0 • Back Lot: 7 (GT-30, GT-31, GT-32, GT-33, GT-34, GT-35, GT-36) • Other: 0
		Businesses displaced	No.	1	CG-19 displaced by ramp to Silvercreek.	1	CG-19 displaced by ramp to Silvercreek.	1	CG-19 displaced by ramp to Silvercreek.
		Commercial properties affected	ha. Type	0.3	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-19) • Back Lot: 0 • Other: 0	0.3	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-19) • Back Lot: 0 • Other: 0	0.3	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-19) • Back Lot: 0 • Other: 0
		Industrial properties affected	No.	4	• Full Removal: 0 • Frontage Only: 1 (CG-1) • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 2 (CG-27, CG-28) • Other: 0	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0
			ha.	0.8		0.5		0.5	
		Overall effect on emergency response routes	Subjective	Low	Access to be provided at all major crossing roads. No severance of any continuous road (requires closure of Curtis Road west of Silvercreek Pkwy - access via Woodlawn/Regal.)	Low	Access to be provided at all major crossing roads. No severance of any continuous road (requires closure of Curtis Road west of Silvercreek Pkwy - access via Woodlawn/Regal.)	Low	Access to be provided at all major crossing roads. No severance of any continuous road (requires closure of Curtis Road west of Silvercreek Pkwy – access via Woodlawn/Regal.)
		Overall effect on existing communities	Subjective	Minor	No anticipated impact.	Minor	No anticipated impact.	Moderate	Potential impact on Silvercreek community

Grouping	Factor/ Criterion	Indicator	Unit	RE1 Description		RE2 Description		RE3 Description	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Noise	Noise sensitive areas subject to increase of > 10dBA	No.	1		3		1	
		Noise sensitive areas subject to increase of 5 to 10dBA	No.	21		23		27	
		Noise sensitive areas subject to increase of 0 to 5dBA	No.	41		39		34	
		Noise sensitive areas subject to decrease	No.	37		37		37	
	Land Use	Potential for induced development	Subjective	Moderate	• Proximity to existing industrial/ commercial area in east end - improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end.	Moderate	• Proximity to existing industrial/ commercial area in east end - improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end.	Moderate-High	• Proximity to existing industrial/ commercial area in east end - improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end. • Potential to induce development beyond the study area.
		Impact to approved development in Official Plan	Influence No Influence	No Influence		No Influence		No Influence	
NATURAL ENVIRONMENT	Fisheries and Aquatic Habitat	Water crossings or encroachments (lakes, rivers/ streams and wetlands)	No.	4	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary from Townline East Wetland	4	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary from Townline East Wetland	4	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary from Townline East Wetland
			Subjective	Moderate	New crossings of intermittent streams, three of which have coldwater potential	Moderate	New crossings of intermittent streams, three of which have coldwater potential	Moderate	New crossings of intermittent streams, three of which have coldwater potential
		Significant Species	Presence	No		No		No	
		Areas of critical fish habitat	No.	2		2		2	
			Subjective	Moderate	**Ellis Creek:** limited groundwater baseflow in this part of the system but some coldwater contribution and baitfish potential. **Marden Drain**: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems.	Moderate	**Ellis Creek**: limited groundwater baseflow in this part of the system but some coldwater contribution potential. **Marden Drain**: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems.	Moderate	**Ellis Creek**: limited groundwater baseflow in this part of the system but some coldwater contribution potential. **Marden Drain**: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems.
		Warmwater/ coldwater communities	No.	1WW / 3 Pot CW	Townline East tributary to Ellis: WW, Ellis Creek and Marden Drain (2): potential CW	1WW / 3 pot. CW	Townline East tributary to Ellis: WW, Ellis Creek and Marden Drain (2): potential CW	1WW / 3 pot. CW	Townline East tributary to Ellis: WW, Ellis Creek and Marden Drain (2): potential CW
		Degree of interaction with groundwater	Subjective	Moderate	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.	Moderate	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.	Moderate	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.

				RE1		RE2		RE3	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**
NATURAL ENVIRONMENT (CONT'D)	Wildlife	Encroachment on or severance of forested vegetation or non-forested successional areas	ha.	9.2	Habitat removal at Marden, Ellis and Townline West wetlands.	11.4	Incorporates habitat removal at Marden, Ellis, and Townline East and Townline West wetlands	7.9	Incorporates habitat removal at Ellis and Townline West wetlands
		Encroachment on or severance of greenways and open space linkages	Subjective	Moderate-High	Moderate - High fragmentation at Marden wetland and Ellis wetland and minor fragmentation at Townline West wetland.	Moderate	Fragments north end of Marden PSW, avoids main Ellis PSW core, and encroaches along south end of Townline East and Townline West habitat areas.	Low - Moderate	Avoids Marden block, avoids main Ellis PSW core, and crosses south end of Townline West. Shifted about 80 m south of Townline East heronry (improvement over RE2)
		Encroachment on or severance of significant wildlife habitat	ha.	8.5		11.2		3.9	
			Subjective	Moderate - High	See greenways comments above. Provides about 180 m separation of alignment from Townline East heronry.	Moderate	Moderate fragmentation of Marden PSW, avoids core Ellis Creek PSW habitat block, increased risk of disturbance to Townline East heronry, avoids core section of Townline West wetland.	Low - Moderate	Increased isolation of Marden block from other habitat blocks to the north. Secondary effects (some buffer reduction, increased noise) on Townline West wetland.
		Significant Species	Presence	Yes	**Townline West PSW** :Regionally Significant Bird Species (Brown Creeper, Veery, Winter Wren, Northern Waterthrush, Mourning Warbler), **Ellis PSW**: Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush) Louisiana Waterthrush (VUL) noted on one visit but no breeding evidence, **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush)	Yes	**Townline West PSW** :Regionally Significant Bird Species (Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler);**Townline East**: Winter Wren, Veery, Northern Waterthrush; **Ellis PSW:** Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence. **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush)	Yes	**Townline West PSW** :Regionally Significant Bird Species (Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler); **Ellis PSW**: Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence.
			Subjective	Moderate-High	Reflects degree of fragmentation or highway proximity to habitat supporting significant species.	Moderate	See previous wildlife habitat comments	Low-Moderate	See wildlife habitat comments above. Reduced habitat area removal relative to RE2.

				RE1		RE2		RE3	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
NATURAL ENVIRONMENT (CONT'D)	Wetlands	Loss of function of all wetlands within or adjacent to study area	Subjective	Moderate	Anticipated effect at Marden (M), Ellis (M-H), Townline West (M) swamp wetlands. No impact at Townline East wetland.	Moderate	See wildlife comments above. Anticipated effects at Marden (M), Ellis (L), Townline East (M), Townline West (M)	Low-Moderate	See wildlife comments above. Anticipated effects at Marden (L-M), Ellis (L), Townline East (L-M), Townline West (M)
		Loss of wetland area (total evaluated plus unevaluated	ha.	8.5	Removal at Marden, Ellis and Townline West	11.2	Ellis, Marden, Townline West, Townline East	3.9	Ellis and Townline West
		Degree of interaction of all wetlands with groundwater	Subjective	Moderate	Seasonally high water table at crossings, moderate interception potential, design consideration required.	Moderate	Moderate interception potential based on field observations.	Low - Moderate	Avoids main Marden block, structure design at Ellis to maintain groundwater interaction, located downgradient of Townline East, moderate potential for interaction at Townline West.
		Encroachment on or severance of Provincially Significant wetlands (Class 1-3)	ha.	8.5	Wetland area removal at combined Marden, Ellis and Townline West encroachments.	11.2	Ellis, Marden, Townline East and Townline West.	3.9	Townline West and Ellis PSW crossing
	Vegetation	Encroachment on or severance of high quality forest stands (not wetlands)	ha.	n/a		n/a		n/a	
		Significant Species	Presence	No	No significant botanical species recorded at or near crossings.	No	No significant botanical species recorded at or near crossings	No	No significant botanical species recorded at or near crossings
			Subjective	n/a		n/a		n/a	
		Erosion potential on slopes	Subjective	Moderate	Approach to Marden and Ellis Creek crossing	Moderate	Approach to Marden and Ellis Creek crossing	Low	Approach to Ellis Creek crossing
		Presence of riparian habitat	Subjective	Moderate	2 Marden Drain and 2 Ellis Creek crossings with open or early successional riparian cover.	Moderate	Two new crossing of Marden drains and 2 Ellis crossings with open or early successional riparian cover.	Moderate	2 Marden drain crossings and 2 Ellis crossings with open or early successional riparian cover.
	Groundwater	Implications of roadway grading on groundwater discharge	No. of Cuts	4	4 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	4	4 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	3	1 cut near Ellis, 2 cuts near Townline West that may require groundwater flow mitigation
		Shallow groundwater wells within 300 m of C/L	No.	n/a		1		1	
		Number of private or municipal wells within 300 m of C/L	#	19		27		39	
			Subjective	Low		Moderate		Moderate	

Grouping	Factor/ Criterion	Indicator	Unit	RE1 Description		RE2 Description		RE3 Description	
AGRICULTURE	Agriculture	Land currently used for agricultural production	ha.	89.8		84.8		85.2	
		Specialty crop operations affected	No.	1	Property #: WT81, CG11	1	Property #: WT81 (berries), CG-11	1	Property #WT81(berries), CG-11
			ha.	9.7		9.7		9.7	
		Loss of specialty crop soil (organics)	ha.	n/a		n/a		n/a	
		Dairy/livestock operations affected	No.	4	Property #'s: GT2, GT12, GT20, GT26	5	Property #'s: GT2, GT12, GT20, GT25, GT26	5	Property #'s: GT2, GT12, GT17/20, GT26, GT26N
			ha.	33.9		43.4		42.8	
		Field crop operations affected	No.	4	Property #'s: WT85, GT22, GT25, GT28	3	Property #'s:WT85, GT22/23, GT28	4	Property #'s: WT85, GT23, GT29, GT28
			ha.	43.9		30.1		31.9	
		Effect on future flexibility of farm operations	Subjective	High	No Access: WT81, GT25, GT28	Moderate	Access removed: WT81,GT28, New or limited access: GT23	High	Access restricted or removed on property #'s:WT81, GT2, GT12, GT23, GT26, GT29, GT28
		Effect on farm woodlots	Subjective	Moderate	Fragmentation of Ellis, Marden, Townline West but will remain accessible	Moderate	Four main woodlots are affected, but still accessible (Townline West, Townline East, Ellis, Marden)	Moderate	North edge effect at Ellis, south end fragmentation at Townline West, will remain accessible.
		Effect on capital investment in agricultural operations	Subjective	High	3 dairy operations (GT2, GT12, GT20), 2 specialty crop (WT81, CG-11)	High	Affects 4 Dairy operations: GT2, GT12, GT20, GT26 2 specialty crop (WT81, CG-11)	High	Affects 5 Dairy/Livestock operations: GT2, GT12, GT17/20, GT26, GT26N and 2 Specialty Crop: WT81, CG11
		Significant farm operation severances	Subjective	Moderate-High	5 Properties (WT81, WT85, GT2, GT25, GT28)	High	6 properties (WT81, WT85,GT2, GT12, GT23, GT28)	High	8 major severances (WT81,WT85, GT2, GT12, GT23, GT26, GT28, GT29)
		Significance of detrimental effects to ongoing viability of farm operations	Subjective	High	Property #'s: GT2 (small awkward severance), GT25 (isolated severed parcel), GT28, CG11 (All buildings removed, isolated severed parcel)	High	Buildings removed: GT12, GT23 (total), CG11 (total). Other: GT28 (isolated severed parcel)	High	All farm buildings removed: GT2, GT26, CG11 Some buildings removed: GT23, GT29, GT12 Other: GT28 and GT29 (isolated)
		Significance of detrimental effects to ongoing viability of farm communities	Subjective	Low-Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 4 : 6	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 5 : 4	Moderate - High	Study area already with urban influences Ratio of owner operated : leased properties - 7 : 2

Grouping	Factor/ Criterion	Indicator	Unit	RE1		RE2		RE3	
				Description		Description		Description	
TRANSPORTATION	Traffic Operations	Level of Service (2011, 2016)	Level	C		C		C	
		Conflicts with Existing Intersections/ entrances	No. Type	3	• Access relocations: CG-1, GT-22, GT-2 • Loss of access: None	2	• Access relocations: GT-21, GT-2 • Loss of access: None	2	• Access relocations: GT-2 • Loss of access: GT-28
		Service Life	Year	2030 +		2030 +		2030 +	
	Safety	Conflicts with Agricultural equipment	Subjective	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.
		Conflicts with Intersections/ Entrances on thru lanes	No. of Conflict Points	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.
			Subjective	None		None		None	
		Comparative Collision Rate	Collisions per million vehicle km	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.
	Network Compatibility	Effect on traffic operations on parallel/crossing roads	Subjective	Low	Minor impacts to crossing roads at interchange/grade separation locations. All existing main roads maintained (closure of Curtis Road west of Silvercreek)	Low	Minor impacts to crossing roads at interchange/grade separation locations. All existing main roads maintained (closure of Curtis Road west of Silvercreek)	Low	Minor impacts to crossing roads at interchange/grade separation locations. All existing main roads maintained (closure of Curtis Road west of Silvercreek)
		Driver comfort and expectation	Subjective	Good	Consistent highway function.	Good	Consistent highway function.	Good	Consistent highway function.
		Ability to stage implementation of the facility	Subjective	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.
		Compatibility with existing network	Subjective	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at County Road 86 and grade separations at Guelph Road 3 and Townline Road. Requires closure of Curtis Road in the Northwest Industrial Park, however access is available to the west side of Hwy 7 via Woodlawn Road/Regal Road.	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at County Road 86 and grade separations at Guelph Road 3 and Townline Road. Requires closure of Curtis Road in the Northwest Industrial Park, however access is available to the west side of Hwy 7 via Woodlawn Road/Regal Road.	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at County Road 86 and grade separations at Guelph Road 3 and Townline Road. Requires closure of Curtis Road in the Northwest Industrial Park, however access is available to the west side of Hwy 7 via Woodlawn Road/Regal Road.
		Compatibility with future network	Subjective	Good	Reasonable flexibility to accommodate future local roads (subject to approval).	Good	Reasonable flexibility to accommodate future local roads (subject to approval).	Good	Reasonable flexibility to accommodate future local roads (subject to approval).
		Flexibility for future expansion	Subjective	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW.
		Ability to accommodate future transit	Subjective	Good	• Opportunities for dedicated lanes or ROW within the 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within the 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within the100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.

				RE1		RE2		RE3	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
COST	Construction	Potential loss of business during construction	Subjective	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.
		Construction	$M	37.0		33.7		37.1	
		Staging	$M	0.0		0.0		0.0	
	Property	Residential	$M	0.2		0.3		0.3	
		Commercial	$M	0.03		0.03		0.03	
		Industrial	$M	0.08		0.05		0.05	
		Agricultural	$M	4.7		4.9		5.2	
		Other	$M	0.0		0.0		0.0	
		TOTAL PROPERTY	$M	5.1		5.3		5.6	
	TOTAL COST	Construction + Property	$M	42.1		39.0		42.7	
	Operation and Maintenance	Operation and maintenance	$M	0.2	39.2 lane-km x $4,300 per yr.	0.2	39.9 lane-km x 4,300 per yr.	0.2	41.5 lane-km x 4,300 per yr.

- significant improvement over RE1. RE3 would have the least impact on natural environment features.

- RE1 would have the least overall impact on agricultural operations, as it is located closest to the existing urban boundary. Many of the farm operations impacted by RE1 are leased, and are already subjected to pressure for development to non-agricultural uses. RE3 would have the greatest overall impact to agriculture, as it directly impacts or severs more owner-operated, long term viable operations. RE2 follows the existing lot lines in the eastern area, but would sever the farm buildings from two large operations at Guelph Road 3. This impact could be reduced by incorporating a southerly shift in the RE2 alignment to the RE3 alignment between Guelph Road 3 and Townline Road.

- There would be no significant difference in traffic operations, safety or transportation network compatibility between the three alternatives. All three alternatives would accommodate traffic demand at a good level of service to beyond 2028 with opportunities for further expansion and/or incorporation of transit.

Therefore, it was determined that RE1 (with significant natural impacts) and RE3 (with significant agricultural impacts) are not preferred. RE2 was considered to be a good compromise between these two alternatives. The natural environment impacts of RE2 are minimized by avoiding the core of the Ellis Creek wetland, although there is some encroachment into the Marden wetland area. While RE2 would have a significant impact on agricultural operations through the severance of two large operations at Guelph Road 3, this can be minimized by incorporating a minor southerly alignment shift in this area.

RE2 is therefore carried forward to the Stage III evaluation.

A graphical summary of the evaluation by factor grouping is shown on Exhibit 4-18. The dots are representative of the effects that each alternative would have on the groupings, with the biggest dot being 'most preferred' and the smallest dot being 'least preferred'. The dot sizes are relative for each evaluation.

4.3.4.3 Revised Westerly Alternatives (RW)

The Revised Westerly (RW) Alternatives are described in Section 4.2.2.2 and are shown on Exhibit 4-7. These alternatives are bounded on the west by the Kitchener-Waterloo Expressway (KWE) and on the east by a match point approximately 670 m east of Shantz Station Road. The analysis table for the Revised Westerly Alternatives is shown on Exhibit 4-19. The significant differences amongst the alternatives are noted in the text below.

	RE1	RE2	RE3
Socio-Economic Environment			
Natural Environment			
Agriculture			
Transportation			
Cost			

LEGEND

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

STAGE 1A EVALUATION
REVISED EASTERLY ALTERNATIVES

EXHIBIT
4-18

STAGE IB: NEW ROUTE ALTERNATIVES – WESTERN (KITCHENER) STUDY AREA
DETAILED ANALYSIS OF ALTERNATIVES

				RW1		RW2		RW3		RW4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
SOCIO-ECONOMIC ENVIRONMENT	Community Effects	Community facilities affected	No.	2	• K-46 Hindu temple (0.7 ha) removed • WT-74 school (0.1 ha) portion of SW corner - frontage to Reg. Rd. 30, no impact to access	1	WT-74 school (0.1 ha) portion of SW corner - frontage to Reg. Rd. 30, no impact to access	1	WT-74 school (0.1 ha) portion of SW corner - frontage to Reg. Rd. 30, no impact to access	3	• WT-35 school (0.2 ha) frontage for service road between Woolwich 66 and Reg. Rd. 17 • WT-74 school (0.1 ha) portion of SW corner - frontage to Reg. Rd. 30, no impact to access • KW habitat park bordering existing Highway 7 at Grand River (edge intrusion)
			Subjective	High		Low		Low		Moderate	
		Residences displaced	No.	5	WT-41; WT-64; WT-66; WT-72A, WT-79	7	WT-10, WT-17; WT-41; WT-64; WT-66; WT-72A; WT-79	6	WT-10, WT-43, WT-45, WT-64, WT-72A, WT-79	12	WT-103; WT-118B; WT-118C; WT-118D; WT-118E; WT-118F; WT-122; WT-43; WT-45; WT-64; WT-72A; WT-79
		Residential properties affected	ha. Type	10.8	• Full Removal: 5 (WT-41, WT-64, WT-66, WT-72A, WT-73) • Frontage Only: 1 (WT-68) • Access Only: 1 (WT-2) • Access + Frontage: 2 (WT-63, WT-67) • Severance: 0 • Back Lot: 0 • Other: 0	11.9	• Full Removal: 5 (WT-2, WT-41, WT-64, WT-72A, WT-73) • Frontage Only: 1 (WT-68) • Access Only: 0 • Access + Frontage: 2 (WT-63, WT-67) • Severance: 0 • Back Lot: 0 • Other: 0	13.1	• Full Removal: 5 (WT-2, WT-64, WT-66, WT-72A, WT-73) • Frontage Only: 2 (WT-37, WT-68) • Access Only: 0 • Access + Frontage: 2 (WT-63, WT-67) • Severance: 2 (WT-43, WT-45) • Back Lot: 0 • Other: 0	13.2	• Full Removal: 10 (WT-103, WT-118B, WT-118C, WT-118D, WT-118E, WT-118F, WT-64, WT-66, WT-72A, WT-73) • Frontage Only: 4 (WT-101, WT-111, WT-37, WT-68) • Access Only: 0 • Access + Frontage: 3 (WT-122, WT-63, WT-67) • Severance: 2 (WT-43, WT-45) • Back Lot: 0 • Other: 0
		Businesses displaced	No.	0		0		0		3	Loss of Access: WT-104, WT-105, WT-106
		Commercial properties affected	ha. Type	4.1	• Full Removal: 0 • Frontage Only: 2 (WT-1, WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 1 (K-42) • Other: 0	2.4	• Full Removal: 0 • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (WT-1) • Back Lot: 1 (K-42) • Other: 0	2.4	• Full Removal: 0 • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (WT-1) • Back Lot: 1 (K-42) • Other: 0	10.4	• Full Removal: 3 (WT-104, WT-105, WT-106) • Frontage Only: 3 (WT-108, WT-109, WT-72B) • Access Only: 0 • Access + Frontage: 1 (K-42) • Severance: 0 • Back Lot: 0 • Other: 0

Grouping	Factor/ Criterion	Indicator	Unit	RW1 Description	RW2 Description	RW3 Description	RW4 Description
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Community Effects (Cont'd)	Industrial properties affected	No.	1 • Full Removal: 0 • Frontage Only: 1 (K-45) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	0	0	12 • Full Removal: 9 (WT-110, WT-112, WT-113, WT-114, WT-115, W-116, WT-118A, WT-119, WT-120) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 2 (K-101, K-102) • Back Lot: 1 (K-23) • Other: 0
			ha.	0.7	0	0	15.2
		Overall effect on emergency response routes	Subjective	Low • Provides additional access to Bridgeport. • No severance of any existing road corridors. • Access to be provided at all existing roads.	Low • Provides additional access to Bridgeport. • No severance of any existing road corridors. • Access to be provided at all existing roads.	Low • Provides additional access to Bridgeport. • No severance of any existing road corridors. • Access to be provided at all existing roads.	Moderate-High • Realignment of Reg. Rd. 17 and new interchange at Hwy 7 result in circuitous travel between north and south sections of Breslau. • Sections of Woolwich Rd. N., Reg. Rd. 17, Pleasantview Dr. removed - new service road between Reg. Rd. 17 and Woolwich 66 will help to address this. • Does not improve access to Bridgeport.
		Overall effect on existing communities	Subjective	Low Improves access to Bridgeport.	Low Improves access to Bridgeport.	Low Improves access to Bridgeport.	Moderate-High • Breslau divided by CAH. • Circuitous access to developed areas, road links severed or closed. • Does not improve access to Bridgeport.
	Noise	Noise sensitive areas subject to increase of > 10dBA	No.	3	5	3	0
		Noise sensitive areas subject to increase of 5 to 10dBA	No.	13	11	9	2
		Noise sensitive areas subject to increase of 0 to 5dBA	No.	36	34	41	52
		Noise sensitive areas subject to decrease	No.	7	7	4	4

Grouping	Factor/ Criterion	Indicator	Unit	RW1 Description		RW2 Description		RW3 Description		RW4 Description	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Land Use	Potential for induced development	Influence No Influence	Low	• Significant agricultural use combined with sensitivity of Bloomingdale wetland in western portion of study area. • Primarily crosses lands designated for agricultural use east of Bridge Street.	Low-Moderate	• May result in parcels along Bridge Street and between Regional Road 17 and Woolwich 66 that are no longer suitable for agriculture. • Primarily crosses lands designated for agricultural use east of Woolwich 66.	Low-Moderate	• May result in parcels along Bridge Street and between Regional Road 17 and Woolwich 66 that are no longer suitable for agriculture. • Primarily crosses lands designated for agricultural use east of Woolwich 66.	Low-Moderate	• Some influence due to proximity to existing industrial area and commercial facilities along existing Highway 7.
		Impact to approved development in Official Plan	Subjective	None		None		None		Moderate	Fragments Bingeman Park property and future industrial lands west of the Grand River. Requires new access between Lackner area and the railway.
NATURAL ENVIRONMENT	Fisheries and Aquatic Habitat	Water crossings or encroachments (lakes, rivers/ streams and wetlands)	No.	8	1 river, 2 intermittent, 4 permanent, 1 pond (Grand River, Rosendale system, Hopewell system)	6	1 River, 1 intermittent stream, 2 permanent streams, 2 ponds (All new crossings)	8	1 River, 3 permanent streams, 3 intermittent, 1 pond	5	Crossing of the Grand River (2 bridges) at previously disturbed location, new crossings of 2 permanent systems (Hopewell Creek, Hopewell Drain) and 2 intermittent watercourses to Hopewell
			Subjective	High	New Grand River Crossing and new crossings of CW streams - Rosendale Creek, Hopewell Creek (double crossing)	High	New Grand River crossing and new crossings of CW streams - Rosendale Creek (less sensitive location than RW1) and double crossing of Hopewell Creek.	High	New Grand River crossing and new crossings of CW streams - Rosendale Creek (same location as RW2) and single crossing of Hopewell Creek (closer to Highway 7).	High	New Grand River crossing (adjacent to existing Highway 7 crossing along with additional ramp crossing) as well as single crossing of Hopewell Creek (same location as RW3).
		Significant Species	Presence	Yes	Greenside Darter - Grand River (throughout)	Yes	Greenside Darter (Grand River-throughout)	Yes	Greenside Darter - Grand River (throughout)	Yes	Greenside Darter - Grand River (throughout)
		Areas of critical fish habitat	No.	2		3		2		2	
			Subjective	Moderate-High	Grand River crossing (elevated strucutre). Crossing of Rosendale Creek (coldwater potential - mature valley site) and double crossing of Hopewell Creek	Moderate	Grand River Crossing (elevated structure). Crosses Rosendale Creek at downstream swale location. Two crossings of Hopewell Creek with potential cut implications.	Low-Moderate	Grand River crossing (elevated structure). Crosses Rosendale Creek at downstream swale location. Single crossing of Hopewell Creek closer to existing Highway 7.	Low - Moderate	Grand River crossing (elevated structure - adjacent to existing bridge crossing). Single crossing of Hopewell Creek closer to existing Highway 7.
		Warmwater/ coldwater communities	No.	4WW/ 3CW	4 warmwater (Grand River, 2 intermittent tributaries to Rosendale Creek, Hopewell drain), 3 coldwater or coolwater (Rosendale Creek, 2 Hopewell Creek)	3WW / 3CW	Grand River, Rosendale, 1 trib, 2 Hopewell, 1 Hopewell drain	6W/2C	6 warmwater, 1 coldwater, 1 coldwater potential	1WW, 4 Pot CW	WW: Grand River, CW or CW potential: all watercourses associated with Hopewell Creek (minor trib features)

Grouping	Factor/ Criterion	Indicator	Unit	RW1 Description		RW2 Description		RW3 Description		RW4 Description	
NATURAL ENVIRONMENT (CONT'D)	Fisheries and Aquatic Habitat (Cont'd)	Degree of interaction with groundwater	Subjective	Moderate-High	Grand River valley with localized seepage. Rosendale Creek valley crossing, double crossing of Hopewell Creek with some grading cut. Seepage present at Rosendale and Hopewell Creek.	Moderate	Grand River valley with localized seepage. Hopewell Creek crossings (2) with some cut. Crosses Rosendale Creek in open swale setting - localized seepage	Low-Moderate	Similar to RW3 but only single crossing of Hopewell Creek closer to Highway 7 where seepage is less evident and no cuts proposed.	Low-Moderate	Grand River valley crossing, seepage less evident. Same Hopewell Creek crossing location as RW3.
	Wildlife	Encroachment on or severance of forested vegetation or non-forested successional areas	ha.	23.7		19.2		22.4		12.7	
		Encroachment on or severance of greenways and open space linkages	Subjective	Moderate -High	Grand River valley, Rosendale Creek valley (structures to be provided). Double crossings of Hopewell Creek (structure / design considerations).	Moderate	Grand River Valley (elevated structure). Avoids crossing forested Rosendale Creek valley at core habitat area. Double crossing of Hopewell Creek (structure and design considerations).	Low-Moderate	Grand River Valley (elevated structure). Avoids crossing forested Rosendale Creek valley at core habitat area. Single crossing of Hopewell Creek closer to existing Highway 7.	Low	Grand River valley, single Hopewell Creek crossing nearer existing Highway 7
		Encroachment on or severance of significant wildlife habitat	ha.	12.3		11.2		15.6		11.1	
			Subjective	Moderate-High	Some fragmentation at Grand River valley (high level structure to be provided). Maintains, but further isolates Bloomingdale-Rosendale east-west habitat block. Double crossings of Hopewell Creek (sections pastured), south of main forest block. Crosses south edge of Hopewell LSW.	Moderate	Some fragmentation at Grand River valley (high level structure to be provided). Hopewell Creek crossing south of main forest block, south edge of Hopewell LSW. Avoids isolation of the main Bloomingdale - Rosendale east-west habitat block.	Low-Moderate	Some fragmentation at Grand River valley (high level structure to be provided). Avoids isolation of the main Bloomingdale-Rosendale east-west habitat block. Crosses south tip of Weiland Tract, single Hopewell Creek crossing closer to Highway 7, and south edge of Hopewell LSW.	Low-Moderate	Grand River valley crossing near existing crossing. Avoids isolation of the main Bloomingdale-Rosendale east-west habitat block. Crosses south tip of Weiland Tract, single Hopewell Creek crossing closer to Highway 7, and crosses south edge of Hopewell LSW. Edge intrusion into the constructed floodplain habitat area at the existing Grand River bridge.

				RW1		RW2		RW3		RW4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**		**Description**	
NATURAL ENVIRONMENT (CONT'D)	Wildlife (Cont'd)	Significant Species	Presence	Yes	**Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher**); Bloomingdale - Rosendale LSW**: Northern Waterthrush, Winter Wren, **Hopewell Creek Valley**: Regionally Significant Bird Species (Winter Wren, Northern Waterthrush, Red-breasted Nuthatch); **Hopewell LSW**: Regionally Significant Bird Species (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker)	Yes	**Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher); **Hopewell Creek Valley:** Regionally Significant Bird Species (Winter Wren, Northern Waterthrush, Red-breasted Nuthatch**); Hopewell LSW:** Regionally Significant Bird Species (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker)	Yes	**Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher); **Weiland Tract**: Regionally Significant Bird Species (Mourning Warbler, Scarlet Tanager**; Hopewell Creek Valley**: Northern Waterthrush, Winter Wren, Red-breasted Nuthatch, **Hopewell LSW**: Regionally Significant Bird Species (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker)	Yes	**Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher); **Weiland Tract**: Regionally Significant Bird Species (Mourning Warbler, Scarlet Tanager**; Hopewell Creek Valley:** Northern Waterthrush, Winter Wren, Red-breasted Nuthatch, **Hopewell LSW**: Regionally Significant Bird Species (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker)
			Subjective	Moderate-High	Some fragmentation at Grand River valley, Rosendale Creek valley, edge effects at Hopewell Creek and Hopewell LSW.	Moderate	Some fragmentation at Grand River valley, edge effects at Hopewell Creek crossing and Hopewell LSW.	Low-Moderate	Some fragmentation at Grand River valley, edge effects at Weiland Tract, Hopewell Creek crossing, and Hopewell LSW	Low-Moderate	Some fragmentation at Grand River valley, but at a disturbed location, edge effects at Weiland Tract, Hopewell Creek crossing, and Hopewell LSW
	Wetlands	Loss of function of all wetlands within or adjacent to study area	Subjective	Moderate	Small unevaluated floodplain wetland at Grand River crossing. Crosses more sensitive wooded swamp wetland at Rosendale Creek valley, removes south (partly disturbed) edge of Hopewell LSW	Low-Moderate	Small unevaluated floodplain wetland at Grand River crossing. Crossing of small Rosendale wetland meadow marsh swale (more tolerant wetland type), removes south (partly disturbed) edge of Hopewell LSW	Low-Moderate	Small unevaluated floodplain wetland at Grand River crossing. Crossing of small Rosendale wetland meadow marsh swale (more tolerant wetland type), removes south (partly disturbed) edge of Hopewell LSW	Low	Intrudes into small constructed wetland at Grand River crossing, and removes south edge (partly disturbed) of Hopewell LSW
		Loss of wetland area (total evaluated plus unevaluated)	ha.	6.6		5		5.4		3.6	
		Degree of interaction of all wetlands with groundwater	Subjective	Moderate-High	Crosses Rosendale Creek valley (some seepage), and south edge of Hopewell LSW. Alignment upgradient of core Bloomingdale-Rosendale wetland discharge area.	Moderate	Crosses south edge of Hopewell LSW. Alignment downgradient of core Bloomingdale-Rosendale LSW discharge area.	Moderate	Crosses south edge of Hopewell LSW. Alignment downgradient of core Bloomingdale-Rosendale wetland discharge area.	Low	Removes edge of constructed wetland area and crosses south edge of Hopewell LSW.
		Encroachment on or severance of Provincially Significant wetlands (Class 1-3)	ha.	n/a		n/a		n/a		n/a	
	Vegetation	Encroachment on or severance of high quality forest stands (not wetlands)	ha.	6.14	Mainly at Grand River valley approach and crossing.	8.8	Forest cover associated with Grand River crossing	11.2	Forest cover south of Grand River and south tip of Weiland Tract	8.5	Forest cover south of Grand River at interchange and south tip of Weiland Tract

Grouping	Factor/ Criterion	Indicator	Unit	RW1 Description		RW2 Description		RW3 Description		RW4 Description	
NATURAL ENVIRONMENT (CONT'D)	Vegetation (Cont'd)	Significant Species	Presence	No		No		No		No	
			Subjective	Moderate-High	Alignment avoids but is still close to the core east-west wetland block where significant plants associated with groundwater seepage were recorded. The alignment is upgradient of the groundwater seepage.	Low	Avoids Bloomingdale-Rosendale wetland where significant plant species recorded and is downgradient of the wetland seepage habitat.	Low	Avoids Bloomingdale-Rosendale wetland where significant plant species recorded and is downgradient of the wetland seepage habitat.		Avoids Bloomingdale-Rosendale wetland where significant plant species recorded and is downgradient of the wetland seepage habitat.
		Erosion potential on slopes	Subjective	Moderate-High	Crossing of Grand River valley, Rosendale Creek valley and Hopewell Creek valley with moderate to high erosion potential.	Moderate	Grand River and Hopewell Creek Valley	Moderate	Grand River and Hopewell Creek valley	Low - Moderate	Grand River (existing crossing location) and Hopewell Creek valley (new crossing)
		Presence of riparian habitat	Subjective	High	Grand River, Rosendale Creek and Hopewell Creek crossings with mid to late successional riparian cover.	Moderate	Grand River, and 2 Hopewell creek crossings with early to late successional cover. Crossing of Rosendale Creek and Hopewell drain, with early successional cover.	Moderate	Grand River, and Hopewell Creek crossings with mid to late successional cover. Crossing of Rosendale Creek and Hopewell drain, with early successional cover.	Low - Moderate	Hopewell Creek crossings with mid to late successional cover. Crossing of Grand River, and Hopewell drain, with early successional cover.
	Groundwater	Implications of roadway grading on groundwater discharge	No. of Cuts	7	7 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	7	7 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	5	Anticipated grading cuts in vicinity of Rosendale and Hopewell Creek crossings.	4	Anticipated grading cuts in vicinity of Hopewell Creek crossings.
		Shallow groundwater wells within 300 m of C/L	No.	2	Noted wells are downgradient of alternative	8	Majority of noted wells upgradient of alignment.	9	Majority of noted wells upgradient of alignment.	9	Higher proportion of shallow wells associated with Grand River and Breslau
		Number of private or municipal wells within 300 m of C/L	No. Subjective	19 Low		27 Moderate		35 Moderate		110 High	High concentration of wells associated with Breslau
AGRICULTURE	Agriculture	Land currently used for agricultural production	ha.	82		65		58.9		42.3	
		Specialty crop operations affected	No.	3	Property #'s: WT36: Research, WT53/54 (nursery), WT51 (vegetables)	3	Property #'s: WT36 (Research), WT51 Vegetables, WT53/54 (Nursery)	2	Property #'s: WT51 (vegetables), WT53/54 (Nursery)	2	Property #'s: WT51 (vegetables), WT53/54 (Nursery)
			ha.	6.7		6.6		3.4		3.4	
		Loss of specialty crop soil (organics)	ha.	1.7	Property #: WT51 (vegetables)	1.7	Property # : WT51 (vegetables)	1.7	Property #'s:WT51 (vegetables)	1.5	Property #'s:WT51 (vegetables)
		Dairy/livestock operations affected	No.	5	Property #'s:WT4/5, WT9, WT40, WT48, WT49	3	Property #'s: WT40, WT49, WT48	3	Property #'s: WT17S, WT48, WT49	3	Property #'s: WT17S, WT48, WT49
			ha.	32.8		15.6		10.8		10.8	

Grouping	Factor/ Criterion	Indicator	Unit	RW1	Description	RW2	Description	RW3	Description	RW4	Description
AGRICULTURE (CONT'D)	Agriculture (Cont'd)	Field crop operations affected	No.	6	Property #'s:WT29, WT30, WT28, WT31, WT47, WT79	5	Property #'s:WT11, WT17/28, WT31, WT47, WT79	5	Property #'s: WT11, WT17/28, WT27, WT47, WT79	5	Property #'s: WT11, WT17/28, WT27, WT47, WT79
			ha.	31.4		42.8 ha		44.6		44.6	
		Effect on future flexibility of farm operations	Subjective	High	No access: WT4, WT31, WT40, WT79 New or limited access: WT36	High	No access: WT31, WT40, WT79 Limited or new access: WT17 (2), WT49, WT36	High	No access: WT17, WT27, WT79 New access: WT 47	Moderate	No access: WT27, WT79 New access: WT 47
		Effect on farm woodlots	Subjective	High	Woodlot entirely removed on WT28, will not longer be functional on WT40, will no longer be accessible on WT51, WT53/54, will be fragmented but still accessible on WT5, WT9, WT47 & WT48	High	Hopewell Creek valley woodlands, and Hopewell Creek LSW: Will no longer be accessible or functional to WT40, WT51 & WT53/54; will be fragmented but still accessible to WT47, WT48	Moderate	Hopewell Creek LSW: Will no longer be accessible or functional to WT51 & WT53/54; will be fragmented but still accessible to WT47 Weiland Tract: edge effect but still accessible	Moderate	Hopewell Creek LSW: Will no longer be accessible or functional to WT51 & WT53/54; will be fragmented but still accessible to WT47 Weiland Tract: edge effect but still accessible
		Effect on capital investment in agricultural operations	Subjective	High	Alternative affects 8 high capital operations; Research (WT36), dairy (WT4/5, WT9, WT40, Wt49, WT48) and specialty crop (WT51, WT53/54)	High	2 Dairy (WT40, WT49), 3 Specialty Crop (WT48, WT51, WT53,54), 1 research (WT36)	Low	Edge effects to 4 operations (WT 53/54, WT48, WT49 and south of WT17)	Moderate	Edge effects to 5 operations (WT48, WT49 WT51, WT53/54 and south end of WT37)
		Significant farm operation severances	Subjective	High	Property #'s:, WT4/5, WT9, WT31, WT36, WT40, WT47, WT49, WT79	High	Property #'s:WT10, WT11, WT17, WT28, WT31, WT36, WT40, WT47,WT49, WT79	High	Property #'s: WT11, WT17, WT27, WT47, WT79	Moderate	Property #'s: WT-117, WT27, WT47, WT79
		Significance of detrimental effects to ongoing viability of farm operations	Subjective	High	Farm buildings removed: WT79 (total) Small or awkward shape:WT40, WT31	High	Removal of farm buildings: WT17, WT79 Small or awkward shape: WT11,WT40, WT79	Moderate	Remaining fragments too small: WT11, WT79 Farm buildings removed: WT79	High	Remaining fragments too small or awkward: WT-117, WT27, WT79, WT37 Farm buildings removed: WT79
		Significance of detrimental effects to ongoing viability of farm communities	Subjective	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 11 : 5	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 9 : 6	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 7 : 6	Low	Study area already with urban influences Ratio of owner operated : leased properties - 5 : 5
TRANSPORTATION	Traffic Operations	Level of Service (2011, 2016)	Level	C		C		C		C	
		Conflicts with Existing Intersections/ entrances	No. Type	11 ent.	• Access relocations: K43, K-44, K-45, WT-9, WT-18, WT-41, WT-62, WT-63, WT-65, WT-67 • Loss of access: WT-73	16 ent.	• Access relocations: WT-18, K-43, K-44, K-45, WT-1, WT-3, WT-10, WT-11, WT-17, WT-28, WT-41, WT-62, WT-63, WT-65, WT-67 • Loss of access: WT-73	17 ent.	• Access relocations: K-43, K-44, K-45, WT-1, WT-3, WT-10, WT-11, WT-17, WT-27A, WT-27B, WT-28, WT-35, WT-37, WT-38, WT-39, WT-47, WT-48 • Loss of access: None	5 roads 7 ent.	• Closure of 5 roadway links in Breslau due to new Hwy 7/ Reg. Rd. 17 interchange. • Access relocations: K-101, K-102, K-103, K-1020, K-1026, WT-47, WT-48 • Loss of access: None
		Service Life	Year	2030 +		2030 +		2030 +		2030 +	

				RW1		RW2		RW3		RW4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
TRANSPORTATION (CONT'D)	Safety	Conflicts with Agricultural equipment	Subjective	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH. Note: farm equipment will no longer be able to use existing Hwy 7 from west of the Grand River to east of Woolwich 66, therefore will have to find alternate routes on other local roads.
		Conflicts with Intersections/ Entrances on through lanes	No. of Conflict Points	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.
			Subjective	None		None		None		None	
		Comparative Collision Rate	Collisions per million vehicle km	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.
	Network Compatibility	Effect on traffic operations on parallel/crossing roads	Subjective	Low	• Interchanges provided at major crossing roads. • Provides improved access to Bridgeport.	Low	• Interchanges provided at major crossing roads. • Provides improved access to Bridgeport.	Low	• Interchanges provided at major crossing roads. • Provides improved access to Bridgeport.	Moderate-High	• Loss of a section of existing Hwy 7 from west of Grand River to Woolwich 66 from network. • Disruption of local road network in Breslau. • Does not improve access to Bridgeport.
		Driver comfort and expectation	Subjective	Good	Consistent highway function.	Good	Consistent highway function.	Good	Consistent highway function.	Fair	Transition from urban median with tall wall barrier to rural median at Woolwich 66. Minor change in highway design (reduced ROW).
		Ability to stage implementation of the facility	Subjective	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Fair	Staging required to minimize impacts/delays while upgrading existing Hwy 7 from west of the Grand River to Woolwich 66.

Grouping	Factor/ Criterion	Indicator	Unit	RW1	RW1 Description	RW2	RW2 Description	RW3	RW3 Description	RW4	RW4 Description
TRANSPORTATION (CONT'D)	Network Compatibility (Cont'd)	Compatibility with existing network	Subjective	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at Bridge St, Reg. Rd. 17, Reg. Rd. 30 and grade separations at Woolwich 66 and Woolwich 72. • Existing road network maintained (no closures required).	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at Bridge St, Reg. Rd. 17, Reg. Rd. 30 and grade separations at Woolwich 66 and Woolwich 72. • Existing road network maintained (no closures required).	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at Bridge St, Reg. Rd. 17, Reg. Rd. 30 and grade separations at Woolwich 66 and Woolwich 72. • Existing road network maintained (no closures required).	Poor	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at existing Hwy 7/ Victoria St. (partial), Reg. Rd. 17, existing Hwy 7 at Woolwich 66, Reg. Rd. 30, and grade separations at Woolwich 66 and Woolwich 72. No interchange at Woolwich 66 due to proximity to Reg. Rd. 17, but service road provided. • Removes a portion of existing Hwy 7 (from west of the Grand River to east of Woolwich 66) from existing full access. • Removes sections of Reg. Rd. 17, Woolwich Rd. N., Brohman Rd. Pleasantview Dr. in Breslau due to new Hwy 7/RR17 interchange.
		Compatibility with future network	Subjective	Good		Good		Good		Fair	• Shirley Avenue extension shifted to accommodate RW4. • Creates new impacts as a result of providing new and/or improvements to access to Breslau from Reg. Rd. 17 south of Hwy 7.
		Flexibility for future expansion	Subjective	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW.	Poor	70 m right-of-way west of Reg. Rd. 17 with urban median (tall wall barrier) restricts future expansion without significant property and road network impacts (particularly in Breslau).

Grouping	Factor/ Criterion	Indicator	Unit	RW1 Description		RW2 Description		RW3 Description		RW4 Description	
TRANSPORTATION (CONT'D)	Network Compatibility (Cont'd)	Ability to accommodate future transit	Subjective	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Fair	• Limited to buses operating in mixed flow west of Woolwich 66 due to 70 m ROW (urban median with tall wall barrier) • Opportunities for dedicated lanes or ROW within 100 m corridor east of Woolwich 66. • Reduced flow on Hwy 7 (except through twinning section in Breslau) provides opportunity for additional/improved transit service within the corridor, however lack of continuity of full access to Hwy 7 may limit efficiency of use by transit in this area.
COST	Construction	Potential loss of business during construction	Subjective	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.
		Construction	$M	84.7		92.2		83.9		75.9	
		Staging	$M	0		0		0		1.8	
	Property	Residential	$M	3.2		3.5		2.9		3.0	
		Commercial	$M	0.4		0.2		0.2		1.2	
		Industrial	$M	.07		0		0		2.4	
		Agricultural	$M	3.3		3.6		2.2		1.8	
		Other	$M	0.3		0.01		0.01		0.03	
		TOTAL PROPERTY	$M	7.3		7.3		5.3		8.4	
	TOTAL COST	Construction + Property	$M	92.0		99.5		89.2		84.3	
	Operation and Maintenance	Operation and maintenance	$M	0.3	65.4 lane-km X 4,300	0.2	53.5 lane-km X 4,300	0.2	52.9 lane-km X 4,300	0.2	53.2 lane-km X 4,300

Socio-Economic Environment

Both alternatives RW1 and RW4 would have high community effects. RW1 would remove one community facility (Hindu Temple) and would require frontage from another. RW1 would result in the full removal of five residential properties. Alternative RW4 would displace twelve residential properties and three commercial properties. Nine industrial properties would also be fully removed.

RW2 would displace seven residences and RW3 would displace six residences.

RW4 would have the least impact on NSAs.

Natural Environment

The significant difference between the alternatives in terms of the natural environment would be the impacts to wetlands and wildlife.

All of the alternatives would have a high number of crossings and or encroachments to water because of new crossings at the Grand River, Rosendale Creek and Hopewell Creek all of which are considered to be areas of critical fish habitat. RW4 would not cross Rosendale Creek. RW1 would have the greatest loss of function for the wetlands within or adjacent to the study area. For RW2 and RW3 the loss of function would be low to moderate. With RW4 the loss of wetland function would be considered low.

Alternative RW1 would have a moderate to high impact to wildlife. A moderate impact to wildlife would result from RW2, and RW3 would have a moderate to low impact. With RW4 the least area would be required and the impact to wildlife would be considered low.

Agriculture

RW1 would require approximately 82 ha of land currently used for agricultural production and RW2 would require 65 ha. RW3 and RW4 would require 58.9 ha and 42.3 ha of agricultural land respectively. Over 6.6 ha of specialty crop operations would be affected by both RW1 and RW2. RW3 and RW4 would require 3.4 ha from specialty crop operations.

The flexibility of future farm operations would be highly affected by alternatives RW1, RW2 and RW3, which would create significant severances of farm operations. RW4 would only have moderate effects on the flexibility of future farm operations. Significant detrimental effects to ongoing farm operations would also result from RW1, RW2 and RW4 because of farm building removal and fragmentation of land. This affect would be moderate for RW3.

Transportation

All of the alternatives would operate at a Level of Service C (2016). Five roadway links would require closure in Breslau due to the New Highway 7 / Regional Road 17 interchange with RW4.

RW4 would have moderate to high effects on traffic operations because of the loss of a section of existing Highway 7 from west of the Grand River to Spitzig Road, disruption

of the local road network in Breslau and no improvement in the access to Bridgeport. This alternative would also have poor flexibility for future road expansion because of the 70 m right-of-way west of Regional Road 17, which would also limit the ability to accommodate transit.

Cost

RW4 would have the least total cost and RW2 would have the greatest total cost overall. The cost range is from $84.3 M to $99.5 M (2000 dollars) including an estimate for property.

External Agency Comments

The following summarizes the preferences and comments provided at the October 13, 2000 External / Municipal Team meeting:

- The Region of Waterloo and City of Kitchener prefer RW2 or RW3.
- The Township of Woolwich slightly prefers RW3 over RW2.
- MNR prefers RW4 but would accept RW2 or RW3 (RW3 slightly preferred over RW2).
- OMAFRA wishes to defer comment until a more detailed review of the information package has been completed.
- A specific preference was not recorded for the City of Guelph, County of Wellington or Township of Guelph/Eramosa, as this set of alternatives is not located within these municipalities.

4.3.4.4 Stage IB Evaluation: Revised Westerly Alternatives (RW)

This section provides the summary rationale for the identification of the 'best' alternative within this set of alternatives.

Alternative RW3 was preferred in this stage because it provides the best balance between the significant agricultural, natural environment and socio-economic impacts of RW1 and the significant transportation and socio-economic impacts of RW4. The key issues are:

- RW1 and RW4 both have significant impacts to the existing communities in this part of the study area. RW1 would remove the Hindu Temple on Bridge Street. RW4 would remove 7 residences and 13 commercial/industrial operations in Breslau and would result in extensive temporary impacts to others during construction. RW4 would require closure of several local roads in Breslau to accommodate the widening of existing Highway 7 and a new interchange at a realigned Regional Road 17, leading to the fragmentation/isolation of the existing community, potentially affecting emergency response in this area. A partial interchange at Bridge Street would be included with the RW1, RW2 and RW3 alternatives, which would provide a second access into Bridgeport. This was identified by the City of Kitchener as a key consideration.
-
- RW4 would have the least impact to the natural environment, as it is located within areas previously disturbed west of Woolwich Road 66. RW1 would

impact the forested core of the Bloomingdale – Rosendale wetland, which would not be impacted by the other alternatives. While RW1, RW2 and RW3 would each require a new crossing of the Grand River, RW4 would cross on a new structure adjacent to the existing Highway 7 bridge. RW2 and RW3 stay north and south, respectively, of the Weiland Tract, an extensive woodlot. RW1 and RW2 cross two branches of the Hopewell Creek, whereas RW3 and RW4 require only one crossing.

-
- RW1 and RW2 would have the greatest overall impact on agriculture as they directly impact or sever larger, owner-operated, viable operations in the northern portion of the study area. RW1 requires significantly more agricultural land than the other alternatives, and affects more high capital investment operations. RW3 would have less of an overall impact than RW1 and RW2 because of reduced effects on some high capital investment operations and reduced severances. RW4 would have the least overall impact on agriculture; however, it would still have some significant operation implications on four farm properties.
-
- There would be no significant difference in traffic operations, safety or transportation network compatibility between RW1, RW2 and RW3. Each of these three alternatives would provide improved access to Bridgeport, and reasonable linkage with the existing municipal road network through interchanges at major crossing roads. All four alternatives would accommodate traffic demand at a good level of service to beyond 2028 with opportunities for further expansion and/or incorporation of transit, although these opportunities would be limited by the 70m right-of-way for RW4. RW4 would have a severe impact on traffic movement through the Breslau area by removing existing Highway 7 and several municipal roads from the local transportation network. RW1, RW3 and RW4 would have similar costs, while RW2 would have slightly higher cost.

Therefore, it was determined that RW1 (with significant natural environment, socio-economic and agricultural impacts) and RW4 (with significant socio-economic and transportation impacts) are not preferred. In comparing RW2 and RW3, the most significant difference is the double crossing of Hopewell Creek for RW2, and only a single crossing for RW3.

RW3 is therefore carried forward to the Stage III evaluation.

A graphical summary of the evaluation by factor grouping is shown on Exhibit 4-20.

4.3.4.5 Analysis of the Kitchener Connector (KC) Alternatives

The Kitchener Connector (KC) Alternatives are described in Section 4.2.2.4 and shown on Exhibit 4-11. The analysis of this set of alternatives extends from the KWE in Kitchener, easterly to Spitzig Road in the Township of Woolwich. Exhibit 4-21 shows the analysis table for the Kitchener Connector (KC) Alternatives.

	RW1	RW2	RW3	RW4
Socio-Economic Environment				
Natural Environment				
Agriculture				
Transportation				
Cost				

LEGEND

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

STAGE 1B EVALUATION
REVISED WESTERLY ALTERNATIVES

EXHIBIT
4-20

STAGE IC: KITCHENER CONNECTORS
DETAILED ANALYSIS OF ALTERNATIVES

Note: KC1 AND KC2 ASSUME A PARTIAL INTERCHANGE WITH EXISTING HWY 7 AT WOOLWICH RD. 66; KC4 ASSUMES TIE IN WITH EXISTING HWY 7 WITH NO PARTIAL INTERCHANGE)

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT	Community Effects	Community facilities affected	No.	1	K-46 Hindu temple removed (0.7 ha)	0		0	
			Subjective	High		None		None	
		Residences displaced	No.	0		1	WT-10	6	WT-103, WT-118B, WT-118C, WT-118D, WT-118E, WT-118F
		Residential properties affected	ha. Type	0.8	• Full Removal: 0 • Frontage Only: 1 (WT-122) • Access Only: 0 • Access + Frontage: 1 (WT-2) • Severance: 0 • Back Lot: 0 • Other: 0	1.1	• Full Removal: 1 (WT-2) • Frontage Only: 1 (WT-122) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	3.1	• Full Removal: 6 (WT-103, WT-118B, WT-118C, WT-118D, WT-118E, WT-118F) • Frontage Only: 2 (WT-101, WT-111) • Access Only: 0 • Access + Frontage: 1 (WT-122) • Severance: 0 • Back Lot: 0 • Other: 0
		Businesses displaced	No.	0	None	1	WT-1	3	WT-104, WT-105, WT-106
		Commercial properties affected	ha. Type	4.0	• Full Removal: 0 • Frontage Only: 1 (WT-1) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 1 (K-42) • Other: 0	2.3	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (WT-1) • Back Lot: 1 (K-42) • Other: 0	10.7	• Full Removal: 3 (WT-104, WT-105, WT-106) • Frontage Only: 2 (WT-108, WT-109) • Access Only: 0 • Access + Frontage: 1 (K-42) • Severance: 0 • Back Lot: 0 • Other: 0
		Industrial properties affected	No.	1	• Full Removal: 0 • Frontage Only: 1 (K-45) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	0	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	12	• Full Removal: 9 (WT-110, WT-112, WT-113, WT-114, WT-115, WT-116, WT-118A, Wt-119, WT-120) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 2 (K-101, K-102) • Back Lot: 1 (K-23) • Other: 0
			ha.	0.7		0		14.7	

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Community Effects (Cont'd)	Overall effect on emergency response routes	Subjective	Low	• Provides additional access to Bridgeport. • No severance of any existing road corridors. • Access to be provided at all existing roads.	Low	• Provides additional access to Bridgeport. • No severance of any existing road corridors. • Access to be provided at all existing roads.	Moderate-High	• Realignment of Reg. Rd. 17 and new interchange at Hwy 7 result in circuitous travel between north and south sections of Breslau. • Sections of Woolwich Rd. N., Reg. Rd. 17, Pleasantview Dr. removed - new service road between Reg. Rd. 17 and Woolwich 66 will help to address this. • Does not improve access to Bridgeport.
		Overall effect on existing communities	Subjective	Low	Improves access to Bridgeport.	Low	Improves access to Bridgeport.	Moderate-High	• Breslau divided by CAH. • Circuitous access to developed areas, road links severed or closed. • Does not improve access to Bridgeport.
	Noise	Noise sensitive areas subject to increase of > 10dBA	No.	1		1		0	
		Noise sensitive areas subject to increase of 5 to 10dBA	No.	12		4		1	
		Noise sensitive areas subject to increase of 0 to 5dBA	No.	22		24		31	
		Noise sensitive areas subject to decrease	No.	0		0		0	
	Land Use	Potential for induced development	Subjective	Low	Significant agricultural use combined with sensitivity of Bloomingdale wetland area. Primarily crosses lands designated for agricultural use east of Bridge Street.	Low	May result in parcels along Bridge St. and between Reg. Rd. 17 and Woolwich 66 that are no longer suitable for agriculture.	Low-Moderate	Some influence due to proximity to existing industrial area and commercial facilities along existing Highway 7.
		Impact to approved development in Official Plan	Influence No Influence	None		None		Moderate	Fragments Bingeman Park property and future industrial lands west of the Grand River. Requires new access between Lackner area and the railway.

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
NATURAL ENVIRONMENT	Fisheries and Aquatic Habitat	Water crossings or encroachments (lakes, rivers/ streams and wetlands)	No.	4	1 River crossing (Grand). 1 crossing of Rosendale Creek (permanent), 2 intermittent tributaries of Rosendale Creek (1 ditched)	3	1 River, 1 permanent stream, 1 intermittent,	1	Crossing of the Grand River (2 structures) at previously disturbed location
			Subjective	High	New River crossing and new disturbances to CW system	High	New river crossing and new disturbance to CW system (less sensitive location)	Moderate	River Crossing at disturbed area
		Significant Species	Presence	Yes	Greenside Darter - Grand River (throughout)	Yes	Greenside Darter - Grand River (throughout)	Yes	Greenside Darter
		Areas of critical fish habitat	No.	2		2		1	
			Subjective	Moderate	Crosses wooded Rosendale Creek valley, creek with coldwater potential	Low	Rosendale Creek, crosses at downstream swale location, coldwater contribution	Low	Rosendale Creek not affected.
		Warmwater/ coldwater communities	No.	3WW/ 1CW	WW: Grand River and 2 intermittent tributaries of Rosendale Creek (1 ditched). CW potential: Rosendale Creek	2WW /1CW	2 warmwater, 1 coldwater potential (Rosendale Creek)	1 WW	Grand River: warmwater
		Degree of interaction with groundwater	Subjective	Moderate	Rosendale Creek valley crossing: seepage occurs along valley	Low-Moderate	Crosses Rosendale Creek downstream of wooded seepage valley.	Low	Some interaction with groundwater expected within Grand River floodplain
	Wildlife	Encroachment on or severance of forested vegetation or non-forested successional areas	ha.	23.5		17		6.9	
		Encroachment on or severance of greenways and open space linkages	Subjective	Moderate	Grand River valley, Rosendale Creek valley - structure design considerations. Edge removal (2 locations) of Weiland Tract.	Moderate	Grand River valley (future bridge span)	Low	Grand River valleylands - crossing at previously disturbed location, interchange effects - common to all alternatives
		Encroachment on or severance of significant wildlife habitat	ha.	13.9		12.9		6.9	
			Subjective	Moderate-High	Some fragmentation at Grand River valley crossing, Rosendale Creek valley crossing - structure will be provided. Edge removal (2 locations at Weiland Tract. Maintains, but further isolates Bloomingdale Rosendale east-west habitat block.	Moderate	Vegetation associated with Grand River valley crossing, and crossing of south tip of Weiland Tract (core habitat potential maintained). Avoids main east-west core Bloomindale-Rosendale wetland block.	Low	See greenway comments above re: Grand River valley. Avoids main core east-west Bloomingdale-Rosendale wetland block.

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
NATURAL ENVIRONMENT (CONT'D)	Wildlife (Cont'd)	Significant Species	Presence	Yes	**Grand River:** Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher); **Bloomingdale - Rosendale LSW**: Northern Waterthrush, Winter Wren**. Weiland Tract:** Mourning Warbler and Scarlet Tanager.	Yes	**Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher); **Weiland Tract**: Regionally Significant Bird Species (Mourning Warbler, Scarlet Tanager)	Yes	**Grand River:** Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher)
			Subjective	Moderate-High	See wildlife comments above.	Moderate	See wildlife comments above.	Low to Moderate	See comments above re: Grand River valleylands
	Wetlands	Loss of function of all wetlands within or adjacent to study area	Subjective	Moderate	Small unevaluated floodplain wetland at Grand River crossing. Crosses wooded swamp wetland at Rosendale valley crossing. Alignment is close to and upgradient of groundwater discharge zone throughout Bloomingdale wetland.	Low	Small unevaluated floodplain wetland at Grand River crossing. Crosses small Rosendale wetland meadow marsh swale (tolerant wetland type) and avoids the main east-west Bloomingdale wetland core area.	Low	Edge intrusion into small constructed wetland habitat feature located at the Grand River floodplain. Avoids the main east-west Bloomingdale wetland core area.
		Loss of wetland area (total evaluated plus unevaluated	ha.	3.6		2.0		0.4	
		Degree of interaction of all wetlands with groundwater	Subjective	Moderate	Crosses Rosendale Creek valley (some seepage) - structure /design considerations for groundwater protection.	Low	Limited - crossing of Rosendale Creek meadow marsh swale downstream of wooded seepage valley.	Low	Some groundwater interaction in constructed wetland feature is likely, but effects mitigatable
		Encroachment on or severance of Provincially Significant wetlands (Class 1-3)	ha.	n/a		n/a		n/a	
	Vegetation	Encroachment on or severance of high quality forest stands (not wetlands)	ha.	7.3	Grand River valley approach and crossing and west edges of Weiland Tract.	11.2	Vegetation associated with Grand River valley crossing and crossing of south tip of Weiland Tract.	5.8	Majority of effect associated with interchange at west limit within Grand River valleylands.
		Significant Species	Presence	No		No		No	
			Subjective	Low - Moderate	Alignment avoids but is still close to the core east-west wetland block where significant plants associated with groundwater seepage were recorded. The alignment is upgradient of the groundwater seepage.	Low	Avoids Bloomingdale-Rosendale wetland where significant plant species recorded and is downgradient of the wetland seepage habitat.		Avoids Bloomingdale-Rosendale wetland where significant plant species recorded and is downgradient of the wetland seepage habitat.
		Erosion potential on slopes	Subjective	Moderate-High	Crossing of Grand River valley and Rosendale Creek valley	Moderate	Grand River valley.	Low	Grand River valley - existing crossing
		Presence of riparian habitat	Subjective	Moderate	Grand River and Rosendale Creek crossings with mid to late successional riparian cover.	Moderate	Relatively dense cover (mid to late successional) at Grand River crossing.	Low	Crossing of the Grand River at previously disturbed location

Grouping	Factor/ Criterion	Indicator	Unit	KC1 Description		KC2 Description		KC4 Description	
NATURAL ENVIRONMENT (CONT'D)	Groundwater	Implications of roadway grading on groundwater discharge	No. of Cuts	3	3 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	2	Rosendale	1	1 zone of potential cut associated Grand River valley
		Shallow groundwater wells within 300 m of C/L	No.	3		9	Shallow wells along Bridge Street	9	Shallow wells associated with Grand River and Breslau
		Number of private or municipal wells within 300 m of C/L	#	10		19		91	High concentration of wells associated with Breslau along existing right-of-way
			Subjective	Low		Low		High	
AGRICULTURE	Agriculture	Land currently used for agricultural production	ha.	52.2		30.6		5.6	
		Specialty crop operations affected	No.	0		0		0	
			ha.	n/a		0		n/a	
		Loss of specialty crop soil (organics)	ha.	n/a		n/a		n/a	
		Dairy/livestock operations affected	No.	2	Property #'s: WT4/5, WT9	1	Property # WT17S:	0	
			ha.	25.8		2.1		n/a	
		Field crop operations affected	No.	6	Property #'s: WT27, WT28, WT29, WT30, WT31, WT-117	4	Property #'s: WT10, WT11, WT17/28, WT27	2	WT-117 (Ebycrest), WT27
			ha.	26.4		28.5		5.6	
		Effect on future flexibility of farm operations	Subjective	Moderate	No access to small fragments: WT4, WT31, WT28 Limited or new access: WT27	High	No access: WT10, WT11, WT17, WT27	Low	Fragments WT-117, topography may limit use of fragment
		Effect on farm woodlots	Subjective	Moderate-High	Woodlot removed:WT28, Woodlot affected but still accessible: WT8,9 & WT27	Low	Weiland Tract: will remain accessible	n/a	
		Effect on capital investment in agricultural operations	Subjective	Moderate	Property #'s: WT4, WT9 (Dairy)	Low	Edge effects only, property south of WT17	n/a	
		Significant farm operation severances	Subjective	Moderate	Property #'s: WT9, WT27, WT28	Moderate	Property #'s: WT10, WT11, WT17, WT27	Low	Property #: WT-117
		Significance of detrimental effects to ongoing viability of farm operations	Subjective	Low	WT9 - Parcel may no longer be viable alone, no buildings are removed	Moderate - High	Property #'s: WT10, WT11, WT27 (isolated parcels)	Low	Property #: WT-117: Remaining fragment too small or awkward.
		Significance of detrimental effects to ongoing viability of farm communities	Subjective	Moderate	Study area already urbanized. Ratio of owner operated : leased properties - 5 : 2	Moderate	Study area already urbanized. Ratio of owner operated : leased properties - 4 : 2	Low	Study area already urbanized. Ratio of owner operated : leased properties - 1 : 1

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
TRANSPORTATION	Traffic Operations	Level of Service (2011, 2016)	Level	C		C		C	
		Conflicts with Existing Intersections/ entrances	No. Type	6 ent.	• Access relocations: K-43, K-44, K-45, WT-9, WT-18, WT-35 • Loss of access: None	12 ent.	• Access relocations: K-43, K-44, K-45, WT-1, WT-3, WT-10, WT-11, WT-17, WT-27A, WT-27B, WT-28, WT-35 • Loss of access: None	5 roads 5 ent.	• Closure of 5 roadway links in Breslau due to new Hwy 7/ Reg. Rd. 17 interchange. • Access relocations: K-101, K-102, K-103, WT-117, WT122 • Loss of access: None
		Service Life	Year	2030 +		2030 +		2030 +	
	Safety	Conflicts with Agricultural equipment	Subjective	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH. Note: farm equipment will no longer be able to use existing Hwy 7 from west of the Grand to east of Woolwich 66, therefore will have to find alternate routes.
		Conflicts with Intersections/ Entrances on thru lanes	No. of Conflict Points	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.
			Subjective	None		None		None	
		Comparative Collision Rate	Collisions per million vehicle km	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.
	Network Compatibility	Effect on traffic operations on parallel/crossing roads	Subjective	Low	• Interchanges provided at major crossing roads. • Provides improved access to Bridgeport	Low	• Interchanges provided at major crossing roads.. • Provides improved access to Bridgeport	Moderate-High	• Loss of a section of existing Hwy 7 from west of Grand River to Woolwich 66 from network. • Disruption of local road network in Breslau. • Does not improve access to Bridgeport.
		Driver comfort and expectation	Subjective	Good	Consistent highway function.	Good	Consistent highway function.	Good	Consistent highway function (median barrier, 70 m ROW).
		Ability to stage implementation of the facility	Subjective	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Fair	Staging required to minimize impacts/delays while upgrading existing Hwy 7 from west of the Grand River to Woolwich 66.

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
TRANSPORTATION (CONT'D)	Network Compatibility (Cont'd)	Compatibility with existing network	Subjective	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at Bridge St, Reg. Rd. 17and partial interchange with existing Hwy 7 at Woolwich 66. • Existing road network maintained (no closures required).	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at Bridge St and Reg. Rd. 17and partial interchange with existing Hwy 7 at Woolwich 66. • Existing road network maintained (no closures required).	Poor	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchanges at existing Hwy 7/Victoria St. (partial) and Reg. Rd. 17. No interchange at Woolwich 66 due to proximity to Reg. Rd. 17, but service road provided. • Removes a portion of existing Hwy 7 (from west of the Grand River to east of Woolwich 66) from existing full access. • Removes sections of Reg. Rd. 17, Woolwich Rd. N., Brohman Rd., Pleasantview Dr. in Breslau due to new Hwy 7/RR17 interchange.
		Compatibility with future network	Subjective	Good		Good		Fair	• Shirley Avenue extension shifted to accommodate KC4. • Creates new impacts as a result of providing new and/or improvements to access to Breslau from Reg. Rd. 17 south of Hwy 7.
		Flexibility for future expansion	Subjective	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW.	Poor	70 m right-of-way west of Reg. Rd. 17 with urban median (tall wall barrier) restricts future expansion without significant property and road network impacts (particularly in Breslau).
		Ability to accommodate future transit	Subjective	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/improved transit service within the corridor.	Fair	• Limited to buses operating in mixed flow due to 70 m ROW (urban median with tall wall barrier) • Reduced flow on Hwy 7 (except through twinning section in Breslau) provides opportunity for additional/improved transit service within the corridor, however lack of continuity of full access to Hwy 7 may limit efficiency of use by transit in this area.

				KC1		KC2		KC4	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
COST	Construction	Potential loss of business during construction	Subjective	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.
		Construction	$M	66.7		72.6		63.1	
		Staging	$M	0		0		1.8	
	Property	Residential	$M	0.02		0.02		0.3	
		Commercial	$M	0.4		0.2		1.2	
		Industrial	$M	0.07		0		2.1	
		Agricultural	$M	0.5		0.6		0.06	
		Other	$M	0.2		0		0	
		TOTAL PROPERTY	$M	1.2		0.8		3.7	
	TOTAL COST	Construction + Property	$M	67.9		73.4		68.6	
	Operation and Maintenance	Operation and maintenance	$M	0.2	52.9 lane-km x 4,300	0.2	52.5 lane-km x 4,300	0.2	49.9 lane-km x 4,300

These alternatives are similar to the Revised Westerly Alternatives between the KWE and Spitzig Road, (as presented in Section 4.3.4.4), with the exception that each of the alternatives connects with the existing Highway 7 alternatives.

The significant differences amongst the alternatives are noted in the following text.

Socio-Economic Environment

The most significant difference between the alternatives for the socio-economic environment would be the community effects. Alternative KC1 would not displace any residences, however the Hindu Temple would be removed. With KC2, one residential property and one commercial property would be displaced. For KC4 six residential properties would be displaced, and would require the full removal of three businesses. From the twelve industrial properties impacted by KC4 nine would be fully removed by the alignment.

The overall effect on emergency response routes and the existing communities for both KC1 and KC2 would be considered low because additional access would be provided to Bridgeport. KC4 would have a moderate to high effect on the existing community and the emergency response routes because of the interchange at Regional Road 17.

Natural Environment

The significant difference between the alternatives in terms of the natural environment would be the impacts to wetlands and wildlife.

All of the alternatives would have a high number of crossings and or encroachments to water because of new crossings at the Grand River. KC1 and KC2 would cross Rosendale Creek. KC1 would have the greatest loss of function for the wetlands within or adjacent to the study area. For KC2 and KC4 the loss of function would be low.

Alternative KC1 would have a moderate to high impact to wildlife. A moderate impact to wildlife would result from KC2. With KC4 the least area would be required and the impact to wildlife would be considered low.

Agriculture

KC1 would require approximately 52.2 ha of land currently used for agricultural production, and KC2 and KC4 would require 30.6 ha and 5.6 ha respectively.

The flexibility of future farm operations would be highly affected by alternative KC2 because no access could be provided to four of the properties impacted. KC1 would have moderate affects because the loss of access would be for small fragments of land. For KC4 the affect would be low with only one small fragmentation.

The effects to the ongoing viability of farm operations would be considered low for both KC1 and KC4, and moderate to high for KC2 because of the isolated parcels created by the alignment.

Transportation

All of the alternatives would operate at a Level of Service C (2016). Five roadway links would require closure in Breslau due to the new Highway 7 / Regional Road 17 interchange associated with KC4.

Both KC1 and KC2 would have low effects on traffic operations because interchanges would be provided at major crossing roads and access to Bridgeport would be improved. Alternative KC4 would have moderate to high effects on traffic operations because of the loss of a section of existing Highway 7 from west of the Grand River to Spitzig Road, disruption to the local road network in Breslau, and no improvement in the access to Bridgeport. KC4 would also have poor flexibility for future road expansion because of the 70 m right of way west of Regional Road 17, which would also limit the ability to accommodate transit.

Cost

KC1 would have the least total cost and alternative KC2 would have the highest total cost. The costs range from $67.9 M to $73.4 M (2000 dollars) including an estimate for property.

External Agency Comments

There was general agreement from the agencies that the analysis of the KC alternatives is similar to the associated RW alternatives. As a result, it was agreed that KC2 would be preferred in the west end.

4.3.4.6 Stage IC Evaluation: Kitchener Connectors (KC) Alternatives

This section provides the summary rationale for the identification of the 'best' alternative within this set of alternatives.

The KC alternatives follow the corresponding RW alternatives west of Regional Road 17, connecting to the central rural portion of existing Highway 7 at Woolwich Road 66. Therefore, the associated benefits and impacts with these alternatives would be similar to the RW alternatives, and KC2 would be preferred for the reasons stated in the Stage 1B evaluation.

KC 2 is therefore carried forward to the Stage III evaluation.

4.3.4.7 Guelph Connector (GC) Alternatives – Analysis and Evaluation

The Guelph Connector (GC) Alternatives are described in Section 4.2.2.5 and are shown on Exhibit 4-12. Only two possible connectors were developed for this portion of the study area.

Formal evaluation was not conducted for these alternatives. Based on the analysis and evaluation carried out for the RE alternatives, it was evident that GC1 would cause unacceptable impacts on the Ellis Creek wetland. Therefore, this alternative was rejected, and GC2 was preferred.

GC2 is therefore carried forward to the Stage III evaluation.

4.3.4.8 Analysis of Existing Highway 7 Alternatives

Three alternatives were evaluated for Existing Highway 7: RIRO, CAH(c) and CAH(d). These alternatives are described in Section 4.2.2.4 and illustrated in Exhibits 4-8, 4-9 and 4-10.

For the purposes of analysis and evaluation, the existing Highway 7 alternatives were combined with RE2-GC2. Therefore, the analysis tables for this stage extends from Spitzig Road (Woolwich Road 66) in the west to the Hanlon Expressway at Woodlawn Road in the east.

As noted in Section 4.2.2.4, the Project Team initially identified alternatives in the existing Highway 7 corridor between Ebycrest Road and Guelph Township Road 3. However, as discussed in Section 4.3.4.7, RE1-GC1 was found to have unacceptable impacts on the Ellis Creek Wetland. Since GC2 joins existing Highway 7 in the vicinity of Townline Road, the "Existing Highway 7 Alternatives" would utilize the existing highway corridor only from Spitzig Road (Woolwich Road 66) to Townline Road. Exhibit 4-22 shows the analysis table for the existing Highway 7 Alternatives.

The significant differences amongst the alternatives are noted in the text below.

Socio-Economic Environment

Overall the three alternatives would be considered to have similar effects on the socio-economic environment. The most significant difference between the alternatives would be the difference in community effects for residential and commercial property impacts.

CAH(c) would displace eleven residences and one business. With this alignment the overall impact to the existing communities and emergency response routes would be low because the alignment has continuous service roads and access would be provided at all major crossing roads.

Alternative CAH(d) would displace ten residences and one business. The impact to emergency response routes would be moderate because of the discontinuous service roads, which may require some out of way travel on existing Highway 7.

Alternative RIRO would displace five residences and one business. The impact to emergency response routes would be high because of significant out of way travel on existing Highway 7. The provision of service roads and interchange ramps would cause significant property impacts at each crossing road.

Natural Environment

The difference between the alternatives in terms of natural environment effects is not considered significant.

Agriculture

All of the alternatives would be considered to have a high effect on capital investment in agricultural operations.

STAGE II: EXISTING HIGHWAY ALTERNATIVES – CENTRAL RURAL SECTION
DETAILED ANALYSIS OF ALTERNATIVES

				RE2GC2-CAHc		RE2GC2-CAHd		RE2GC2-RIRO	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT	Community Effects	Community facilities affected	No.	3	• WT-127 Cemetery (0.1 ha) frontage, access from new service road (continuous) • WT-130 Croatian Centre (0.1 ha) frontage on Reg. Rd. 30 • WT-74 School (0.01) frontage on Reg. Rd. 30	2	• WT-127 Cemetery (0.1 ha) frontage, access via new service road. Could provide either continuous service road across property (higher property impact) and use existing entrance, or stop service road at west property line and construct new entrance. • WT-74 School (0.1) frontage on Reg. Rd. 30	2	• WT-127 Cemetery (0.1 ha) frontage, access change from full to RIRO only. • WT-74 School (0.1) frontage on Reg. Rd. 30, minor impact.
			Subjective	Low		Low		Low	
		Residences displaced	No.	11	WT-43, WT-50A, WT-51, WT-128, WT-84, WT-86, GT-13, GT-14, GT-22, GT-23, GT-28	10	WT-43, WT-50A, WT-51, WT-84, WT-86, GT-13, GT-14, GT-22, GT-23, GT-28	5	GT-13, GT-14, GT-22, GT-23, GT-28 (Note: None along existing Hwy 7)
		Residential properties affected	ha. Type	5.4	• Full Removal: 5 (WT-50A, WT-128, WT-84, GT-13, GT-14,) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 2 (WT-37, WT-72A) • Back Lot: 5 (GT-32, GT-31, GT-30, GT-33, GT-34) • Other: 0	5.1	• Full Removal: 4 (WT-50A, WT-84, GT-13, GT-14) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 3 (WT-45, WT-128, WT-73) • Severance: 3 (WT-37, WT-43, WT-72A) • Back Lot: 6 (WT-61, GT-32, GT-31, GT-30, GT-33, GT-34) • Other: 0	4.1	• Full Removal: 2 (GT-13, GT-14) • Frontage Only: 4 (WT-37, WT-43, WT-45, WT-128) • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (WT-72A) • Back Lot: 6 (GT-30, GT-31, GT-32, GT-33, GT-34, GT-35) • Other: 0
		Businesses displaced	No.	1	CG-19 displaced by ramp to Silvercreek Parkway.	1	CG-19 displaced by ramp to Silvercreek Parkway.	1	CG-19 displaced by ramp to Silvercreek Parkway.
		Commercial properties affected	ha. Type	1.5	• Full Removal: 1 (CG-19) • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	1.3	• Full Removal: 1 (CG-19) • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	4.3	• Full Removal: 1 (CG-19) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (WT-72B) • Back Lot: 0 • Other: 0
		Industrial properties affected	No.	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0
			ha.	0.5		0.5		0.5	

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Community Effects (Cont'd)	Overall effect on emergency response routes	Subjective	Low	• Access to be provided at all major crossing roads. Requires closure of Curtis Road west of Silvercreek Pkwy - access via Woodlawn/Regal. Requires closure of east junction of Woolwich 72 at Hwy 7. • Continuous service roads will provide access to properties fronting existing Hwy 7.	Moderate	• Access to be provided at all major crossing roads. Requires closure of Curtis Road west of Silvercreek Pkwy - access via Woodlawn/Regal. Requires closure of east junction of Woolwich 72 at Hwy 7. • Discontinuous service roads on existing Hwy 7 may require some out-of-way travel.	High	• Access to be provided at all major crossing roads. Requires closure of Curtis Road west of Silvercreek Pkwy – access via Woodlawn/Regal. Requires closure of east junction of Woolwich 72 at Hwy 7. • RIRO access to existing Hwy 7 may result in some additional travel time (max. distance is approx. 1.7 km each way = 2 minutes +/- at 70 km/h).
		Overall effect on existing communities	Subjective	Low	Access to Shantz Station provided via interchange at Reg. Rd. 30 and continuous service road network.	Low-Moderate	Access to Shantz Station provided via interchange at Reg. Rd. 30 and service roads. Discontinuous service road on north side will provide access to all properties in this area except WT-50A (buyout), access will be from Reg. Rd. 30 only. Discontinuous service roads may negatively impact access to existing businesses in central section.	Low-Moderate	Access to Shantz Station provided via RIRO to existing properties along Hwy 7, and to/from/across Hwy 7 at the RIRO with Reg. Rd. 30. Affects the ability to move efficiently within the community, both for residents and business customers.
	Noise	Noise sensitive areas subject to increase of > 10dBA	No.	3		3		3	
		Noise sensitive areas subject to increase of 5 to 10dBA	No.	24		24		23	
		Noise sensitive areas subject to increase of 0 to 5dBA	No.	68		68		75	
		Noise sensitive areas subject to decrease	No.	40		40		43	
	Land Use	Potential for induced development	Subjective	Moderate-High	• May encourage new development at Shantz Station (designated future commercial). Potential for induced development at other interchanges will be dependent on interchange design and municipal development policy. • Proximity to existing industrial/commercial area in east end Improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end (less potential compared to RE1).	Moderate-High	• May encourage new development at Shantz Station (designated future commercial). Potential for induced development at other interchanges will be dependent on interchange design and municipal development policy. • Proximity to existing industrial/commercial area in east end Improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end (less potential compared to RE1).	Low-Moderate	• Eastern section- M; Central section - L • May encourage new development along existing Hwy 7 with increased level of service. RIRO access only may discourage high volume commercial or industrial uses. • Proximity to existing industrial/commercial area in east end - improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end (less potential compared to RE1).

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Land Use (Cont'd)	Impact to approved development in Official Plan	Influence No Influence	No Influence	Compatible with identified land uses.	No Influence	Compatible with identified land uses.	No Influence	Compatible with identified land uses.
NATURAL ENVIRONMENT	Fisheries and Aquatic Habitat	Water crossings or encroachments (lakes, rivers/ streams and wetlands)	No.	7	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary. Widening of existing right-of-way at Hopewell Creek, Hopewell Creek tributary and removal of cemetery pond.	6	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary. Widening of existing right-of-way at Hopewell Creek, Hopewell Creek tributary	7	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary. Widening of existing right-of-way at Hopewell Creek, Hopewell Creek tributary and cemetery pond.
			Subjective	Moderate	New crossings of intermittent streams, three of which have coldwater potential. Hopewell Creek crossing at existing crossing location.	Moderate	New crossings of four intermittent streams, three of which have coldwater potential, two crossings are widenings of existing crossings (already disturbed). Widening at main Hopewell Creek branch is reduced compared to continuous service road option.	Moderate	New crossings of intermittent streams, three of which have coldwater potential. Hopewell Creek crossing at existing crossing location.
		Significant Species	Presence	No		No		No	
		Areas of critical fish habitat	No.	4		4		4	
			Subjective	Moderate	**Ellis Creek**: limited groundwater baseflow in this part of the system but some coldwater contribution and baitfish potential, plus new crossing of trib @ GT1. **Marden Drain**: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems. **Hopewell:** Widening at Hopewell Creek main branch at existing crossing location (may require new bridge structure adjacent to existing)	Moderate	**Ellis Creek**: limited groundwater baseflow in this part of the system but some coldwater contribution and baitfish potential, plus new crossing of trib @ GT1. **Marden Drain**: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems. **Hopewell**: Widening at Hopewell Creek main branch at existing crossing location (may require new bridge structure adjacent to existing)	Moderate	**Ellis Creek**: limited groundwater baseflow in his part of the system but some coldwater contribution and baitfish potential. **Marden Drain**: altered at crossing, but some coldwater contribution and baitfish potential. Road widening at existing **Hopewell** Creek Crossing on Highway 7 - may or may not require raised road profile/bridge associated with the widening.
		Warmwater/ coldwater communities	No.	3WW / 4CW	WW: Ellis tributary, Hopewell tributary and cemetery pond CW: Ellis Creek and Marden Drain (2) and Hopewell main branch	3WW / 4CW	WW: Ellis tributary, Hopewell tributary, cemetery pond CW: Ellis Creek and Marden Drain (2) and Hopewell main branch	3WW / 4CW	WW: Ellis tributary, Hopewell tributary and cemetery pond CW: Ellis Creek and Marden Drain (2) and Hopewell main branch
		Degree of interaction with groundwater	Subjective	Moderate	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.	Moderate	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.	Moderate	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.
	Wildlife	Encroachment on or severance of forested vegetation or non-forested successional areas	ha.	10.3	Incorporates habitat removal at Marden wetland, Ellis (north end of core block) and Townline West (south end - deciduous forest edge)	9.5	Incorporates habitat removal at Marden wetland, Ellis (north end of core block) and Townline West (south end - deciduous forest edge but less intrusion than CAHc)	9.5	Incorporates habitat removal at Marden wetland, Ellis (north end of core block) and Townline West (south end - deciduous forest edge but less intrusion than CAHc)

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc		RE2GC2-CAHd		RE2GC2-RIRO	
				Description		Description		Description	
NATURAL ENVIRONMENT (CONT'D)	Wildlife (Cont'd)	Encroachment on or severance of greenways and open space linkages	Subjective	Low-Moderate	Fragments north edge of Marden Wetland, avoids main Ellis wetland core, avoids Townline East and West Wetlands, crosses tolerant roadside floodplain marsh (Reed Canary Grass) at north edge of Breslau wetland complex (south side of Highway 7)	Low-Moderate	Fragments north edge of Marden Wetland, avoids main Ellis wetland core, avoids Townline East and West Wetlands.	Low-Moderate	Fragments north edge of Marden Wetland, avoids main Ellis wetland core, avoids Townline East and West Wetlands.
		Encroachment on or severance of significant wildlife habitat	ha.	6.7		6.7		6.7	
			Subjective	Low-Moderate	Moderate fragmentation of Marden Wetland, avoids core Ellis Creek Wetland habitat block, avoids Townline West Wetland. Alignment shifted 150 to 200 m south of the Townline East heronry.	Low-Moderate	Moderate fragmentation of Marden Wetland, avoids core Ellis Creek Wetland habitat block, avoids Townline West Wetland. Alignment shifted 150 to 200 m south of the Townline East heronry.	Low-Moderate	Moderate fragmentation of Marden Wetland, avoids core Ellis Creek Wetland habitat block, avoids Townline West Wetland. Alignment shifted 150 to 200 m south of the Townline East heronry.
		Significant Species	Presence	Yes	**Ellis PSW**: Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence. **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush)	Yes	**Ellis PSW**: Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence. **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush)	Yes	**Ellis PSW**: Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence. **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush)
			Subjective	Low-Moderate	See wildlife habitat comments	Low-Moderate	See wildlife habitat comments	Low-Moderate	See wildlife habitat comments
	Wetlands	Loss of function of all wetlands within or adjacent to study area	Subjective	Low - Moderate	See wildlife habitat comments above. Anticipated effects at Marden (Moderate) and Ellis (Low)	Low-Moderate	See wildlife habitat comments above. Anticipated effects at Marden (Moderate) and Ellis (Low)	Low-Moderate	See wildlife habitat comments above. Anticipated effects at Marden (Moderate) and Ellis (Low)
		Loss of wetland area (total evaluated plus unevaluated	ha.	7.49	Removal at WT-51, WT-126, WT-124, Marden and Ellis. Avoids Townline West wetland (Only edge of small roadside upland forest lobe affected)	7.06	Removal at WT-51, WT-126, WT-124, Marden and Ellis. Avoids Townline West wetland ((Only edge of small roadside upland forest lobe affected - reduced intrusion relative to CAHc)	5.6	Removal at WT-124, Marden and Ellis. Avoids Townline West wetland ((Only edge of small roadside upland forest lobe affected - reduced intrusion relative to CAHc)
		Degree of interaction of all wetlands with groundwater	Subjective	Low-Moderate	Low-Moderate interception potential with alignment potential.	Low-Moderate	Low-moderate interception potential with alignment potential.	Low-Moderate	Low-moderate interception potential with alignment potential.
		Encroachment on or severance of Provincially Significant wetlands (Class 1-3)	ha.	5.75	Ellis, Marden, and north (roadside) edge of Breslau wetland (dominated by Reed Canary Grass floodplain meadow marsh)	5.58	Ellis, and Marden, edge of Breslau complex.	5.1	Ellis, Marden
	Vegetation	Encroachment on or severance of high quality forest stands (not wetlands)	ha.	0.9	Small roadside upland forest lobe at south end of Townline West block - edge intrusion into forest lobe	0.1	Small roadside upland forest lobe at south end of Townline West block - edge intrusion into forest lobe. Less intrusion than CAHc	0.1	Small roadside upland forest lobe at south end of Townline West block - edge intrusion into forest lobe. Less intrusion than CAHc
		Significant Species	Presence	No	No significant botanical species at or near the crossings	No	No significant botanical species at or near the crossings	No	No significant botanical species at or near the crossings

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
NATURAL ENVIRONMENT (CONT'D)	Vegetation (Cont'd)	Erosion potential on steep slopes	Subjective	Moderate	Approach to Ellis Creek, Marden Creek and Hopewell Creek crossings.	Moderate	Approach to Ellis Creek and Marden Creek and Hopewell Creek crossings.	Moderate	Approach to Ellis Creek, Marden Creek and Hopewell Creek crossings
		Presence of riparian habitat	Subjective	Moderate	2 Marden Drain and 2 Ellis Creek crossings with open or early successional riparian cover. Other crossings are located at existing crossing locations with open to early successional riparian cover.	Moderate	2 Marden Drain and 2 Ellis Creek crossings with open or early successional riparian cover. Other crossings are located at existing crossings with open to early successional riparian cover.	Moderate	Marden Drain (2) and 2 Ellis Creek crossings with open or early successionial riparian cover. Other crossings (Ellis trib, Hopewell trib and Hopewell main) at existing disturbed crossing locations
	Groundwater	Implications of roadway grading on groundwater discharge	No. of Cuts	2	2 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse. No additional cuts considered on existing right-of-way.	2	2 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse. For purposes of evaluation it was assumed that there were no cuts required on alternatives along existing right-of-way.	2	2 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse. For purposes of evaluation it was assumed that there were no cuts required on alternatives along existing right-of-way.
		Shallow groundwater wells within 300 m of C/L	No.	2		2		2	
		Number of private or municipal wells within 300 m of C/L	#	69		69		69	
			Subjective	High		High		High	
AGRICULTURE	Agriculture	Land currently used for agricultural production	ha.	119.87		107.14		85.6	
		Specialty crop operations affected	No.	4	WT-136, WT81, WT53/54, WT51	3	WT-136, WT-81, WT-53/54, WT-51	2	WT-134, WT-136
			ha.	8.13		6.2		1.5	Edge effects only
		Loss of specialty crop soil (organics)	ha.	n/a	Removal along existing right-of-way, not within active crop area based on organic soils	n/a	Removal along existing right-of-way, not within active crop area based on organic soils	n/a	Removal along existing right-of-way, not within active crop area based on organic soils
		Dairy/livestock operations affected	No.	7	Property #'s: GT1/2, GT12, GT17/20, GT25, GT26, WT48, WT37	7	Property #'s: GT1/2, GT12, GT17/20, GT25, GT26, WT48, WT37	7	Property #'s: GT1/2, GT12, GT17/20, GT25, GT26, WT48, WT37
			ha.	55.04		53.85		48.1	
		Field crop operations affected	No.	12	Property #'s:WT85, GT22/23, GT28,WT-136, WT-135, WT-131, WT79, WT-129, WT-126, WT-124, WT47, WT-123	12	Property #'s:WT85, GT22/23, GT28,WT-136, WT-135, WT-131, WT79, WT-129, WT-126, WT-124, WT47, WT-123, WT-46	10	Property #'s:WT85, GT22/23, GT28, WT-136, WT-135, WT-131, WT-129, WT-124, WT47,WT-123
			ha.	56.7		47.09		36	
		Effect on future flexibility of farm operations	Subjective		Access removed: GT28, GT23 New or limited access: WT85, WT-131	Moderate	Access removed: GT28, GT23 New or limited access: WT85, WT-131	High	Access removed: GT28 New or limited access: WT85, GT23. More constrained in terms of flexibility of farm equipment movements-
		Effect on farm woodlots	Subjective	Moderate	Three main woodlots are affected, but still accessible (Townline West, Ellis, Marden)	Moderate	Three main woodlots are affected, but still accessible (Townline West, Ellis, Marden)	Moderate	Three main woodlots are affected, but still accessible (Townline West, Ellis, Marden)

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc		RE2GC2-CAHd		RE2GC2-RIRO	
					Description		Description		Description
AGRICULTURE (CONT'D)	Agriculture (Cont'd)	Effect on capital investment in agricultural operations	Subjective	High	Affects 7 livestock operations: GT2, GT12, GT20,GT25, GT26,WT48 and WT37; 3 spec crop WT-136, WT81, WT51 and 1 nursery WT53/54	High	Affects 7 livestock operations: GT2, GT12, GT20,GT25, GT26,edge of WT37 and edge of WT48; 2 spec crop WT-136, WT51 and 1 nursery WT53/54	High	Fragments 6 livestock operations: GT2, GT12, GT20,GT25, GT26 and edge of WT37
		Significant farm operation severances	Subjective	High	Property #'s: GT12, GT23, GT28, WT-131, WT79, WT53/54, WT55, WT56, GT17/20, WT37	High	Property #'s: GT12, GT23, GT28, WT-131, WT79, WT53/54, WT55, WT56, GT17/20, WT37	High	Property #'s: GT12, GT23, GT28, GT20, GT1, GT2and corner of WT47
		Significance of detrimental effects to ongoing viability of farm operations	Subjective	High	Buildings removed: GT23, GT28, WT51 Awkward shape: WT-131. Service roads provide opportunity for safe farm equipment movement but also increase amount of agricultural land removed compared with RIRO.	High	Buildings removed: GT23, GT28, WT51 Awkward shape: WT-131. Discontinuous service roads provide opportunity for safe farm equipment movement while also increasing area of agricultural land removed compared with RIRO.	Moderate	Buildings removed: GT23, GT28. Lack of service roads and interval between highway crossings adds to circuitous travel and barrier for farm vehicles that would cross the highway
		Significance of detrimental effects to ongoing viability of farm communities	Subjective	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 11 :11. Interfarm movement is provided by service roads	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 11 : 10. Inter-farm movement is provided with service roads	Moderate	Study area already with urban influences Ratio of owner operated : leased properties - 7 : 9. Agricultural equipment required to use RIRO between Woolwich Road 66 and Townline - requires movement along shoulder with safety concerns. Would require construction of service roads in selected locations to mitigate this risk.

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
TRANSPORTATION	Traffic Operations	Level of Service (2011, 2016)	Level	C		C		D	D or better
		Conflicts with Existing Intersections/ entrances	No. Type	2 roads 43 ent.	• Road closings: Woolwich 72 east junction (access via service road), Curtis Drive west of Silvercreek (access via Woodlawn Rd./Regal Rd.) • Access change from existing Hwy 7 to service road: WT-37, WT-43, WT-44, WT-45, WT-46, WT-47, WT-48, WT-51, WT-53, WT-54, WT-55, WT-56, WT-57, WT-58, WT-59, WT-60, WT-72B, WT-77, WT-78, WT-79, WT-81, WT-85, WT-123, WT-124, WT-125, WT-126, WT-127, WT-129, WT-131, WT-134, WT-135, WT-136 • Access change due to interchange or grade separation: WT-72A, GT-12, GT-20, GT-22, GT-23, GT-25, CG-11, CG-9, CG-22 • Loss of access/landlocked: GT-28, CG-19	2 roads 43 ent.	• Road closings: Woolwich 72 east junction (access via service road), Curtis Drive west of Silvercreek (access via Woodlawn Rd./Regal Rd.) • Access change from existing Hwy 7 to service road: WT-37, WT-43, WT-44, WT-45, WT-46, WT-47, WT-48, WT-51, WT-53, WT-54, WT-55, WT-56, WT-57, WT-58, WT-59, WT-60, WT-72B, WT-77, WT-78, WT-79, WT-81, WT-85, WT-123, WT-124, WT-125, WT-126, WT-127, WT-128, WT-129, WT-134, WT-135, WT-136 • Access change due to interchange or grade separation: WT-72A, GT-12, GT-20, GT-22, GT-23, GT-25, CG-11, CG-9, CG-22 • Loss of access/landlocked: GT-28, CG-19	2 roads 44 ent.	• Access change from full to RIRO with grade separation at Woolwich 72, Reg. Rd. 30. All other major crossing roads have interchanges. • Road closings: 2 (Woolwich 72 east junction - cul-de-sac, Curtis Drive west of Silvercreek - access via Woodlawn Rd./Regal Rd.) • Access change from full to RIRO only: 31 (WT-37, WT-44, WT-45, WT-46, WT-47, WT-48, WT-50A, WT-51, WT-53, WT-54, WT-55, WT-56, WT-57, WT-58, WT-59, WT-60, WT-72B, WT-77, WT-78, WT-79, WT-81, WT-84, WT-85, WT-125, WT-126, WT-127, WT-128, WT-129, WT-134, WT-135, WT-136) • Access change due to interchange or grade separation: 10 (WT-37, WT-72A, GT-12, GT-20, GT-22, GT-23, GT-25, CG-11, CG-9, CG-22) • Loss of access/landlocked: 3 (WT-43, GT-28, CG-19)
		Service Life	Year	2030 +		2030 +		2030 +	With access control
	Safety	Conflicts with Agricultural equipment	Subjective	Low	Agricultural equipment will not be permitted on the CAH.	Low	Agricultural equipment will not be permitted on the CAH.	High	Agricultural equipment will be restricted to RIRO only between Woolwich 66 and Townline, and will not be permitted on the CAH section east of Guelph Rd. 3. High potential for conflict with ag equipment travelling on shoulder of RIRO section (may be mitigated by constructing service roads in selected locations).
		Conflicts with Intersections/ Entrances on thru lanes	No. of Conflict Points	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	2 roads 31 ent.	• RIRO access at Reg. Rd. 30, Woolwich 72. Several driveway access points within the central section. • No intersections/entrances on CAH section.
			Subjective	None		None		Moderate	
		Comparative Collision Rate	Collisions per million vehicle km	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.6	Based on a weighted average (by AADT) of collision rates on RIRO sections of Hwy 11 and Hwy 35/115 in 1991.

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
TRANSPORTATION (CONT'D)	Network Compatibility	Effect on traffic operations on parallel/crossing roads	Subjective	Minor	• Interchanges provided at major crossing roads. • Continuous service roads provide reasonable access to properties adjacent to Hwy 7. • Improved access to Silvercreek Parkway/Woodlawn Road area (Northwest Industrial Park).	Moderate	• Interchanges provided at major crossing roads. • Service roads provide access to properties adjacent to Hwy 7 however discontinuity will result in some out-of-way travel. • Improved access to Silvercreek Parkway/Woodlawn Road area (Northwest Industrial Park).	Moderate-High	• Interchanges provided at major crossing roads within CAH section. • RIRO access provided at major crossing roads along existing Hwy 7, may result in some out-of-way travel (max distance approx. 1.7 km). • Improved access to Silvercreek Parkway/Woodlawn Road area (Northwest Industrial Park).
		Driver comfort and expectation	Subjective	Fair	Consistent highway function. Median barrier will introduce minor "side friction" component.	Fair	Consistent highway function. Median barrier will introduce minor "side friction" component.	Poor	• Inconsistency in highway function (CAH to RIRO to CAH). • Numerous access points in RIRO section (potentially unexpected after travelling on CAH section). • Median barrier will introduce minor "side friction" component.
		Ability to stage implementation of the facility	Subjective	Fair	• Major impact to traffic while existing Hwy 7 is upgraded. May be mitigated by constructing service roads in initial stage. • Minor impacts to crossing roads at interchange/grade separation locations.	Poor	• Major impact to traffic while existing Hwy 7 is upgraded. May be mitigated by constructing service roads in initial stage. Discontinuity of service roads will require more complex staging. • Minor impacts to crossing roads at interchange/grade separation locations.	Poor	• Major impact to traffic while existing Hwy 7 is upgraded with complex staging to maintain through traffic (likely reduced capacity) over a long period. • Minor impacts to crossing roads and/or entrances at interchange/RIRO/grade separation locations.
		Compatibility with existing network	Subjective	Good	• Full compatibility with higher tier network. • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads (the east junction of Woolwich 72 at existing Hwy 7 will be closed, with access via service road). The continuous service roads along existing Hwy 7 in the central section maintain the road network in the east/west direction. Requires closure of Curtis Drive just west of Silvercreek (access via Woodlawn/Regal).	Fair	• Full compatibility with higher tier network. • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads (the east junction of Woolwich 72 at existing Hwy 7 will be closed, with access via service road). however, discontinuity of service roads along existing Hwy 7 in the central section will result in circuitous travel between interchanges in the east/west direction. Requires closure of Curtis Drive west of Silvercreek (access via Woodlawn/Regal).	Fair	• Full compatibility with higher tier network. • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads in the CAH section, and grade separations with RIRO access at crossing roads in the existing Hwy 7 RIRO section (the east junction of Woolwich 72 at existing Hwy 7 will be closed, with access via service road). In the east/west direction, RIRO access only will be available on existing Hwy 7 within the central section limits of upgrading resulting in some out-of-way travel. Requires closure of Curtis Drive west of Silvercreek (access via Woodlawn/Regal).

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
TRANSPORTATION (CONT'D)	Network Compatibility (Cont'd)	Compatibility with future network	Subjective	Good		Fair		Fair	
		Flexibility for future expansion	Subjective	Fair	• Expansion between Woolwich 66 and Townline 3 is limited by the 70 m ROW and urban median (tall wall barrier) - future expansion would require significant property and road network impacts. • East of Townline, reasonable flexibility for expansion exists within the 100 m ROW.	Fair	• Expansion between Woolwich 66 and Townline 3 is limited by the 70 m ROW - future expansion would require significant property and road network impacts. • East of Townline, reasonable flexibility for expansion exists within the 100 m ROW.	Poor	• Further expansion beyond 4 lanes would require controlled access with interchanges for full length. • Limited flexibility for expansion between Woolwich 66 and Townline due to 70 m ROW - future expansion would require significant property and road network impacts along existing Hwy 7 or a new route. • East of Townline, reasonable flexibility for expansion exists within the 100 m ROW.
		Ability to accommodate future transit	Subjective	Fair	• Between Woolwich 66 and Townline, transit would be limited to bus technology operating within mixed flow (no opportunity for dedicated lanes with urban median and tall wall barrier). Station stops would be limited to interchange locations. Use of the continuous service road network along existing Hwy 7 by buses is also possible. • East of Townline, opportunity exists for dedicated transit lanes within the 100 m ROW, or buses may travel along existing Hwy 7/Woodlawn Road (reduced volume) to Guelph.	Fair	• Between Woolwich 66 and Townline, transit would be limited to bus technology operating within mixed flow (no opportunity for dedicated lanes with urban median and tall wall barrier). Station stops would be limited to interchange locations. Discontinuity in service roads will limit the efficiency of use by transit. • East of Townline, opportunity exists for dedicated transit lanes within the 100 m ROW, or buses may travel along existing Hwy 7/Woodlawn Road (reduced volume) to Guelph.	Fair	• Between Woolwich 66 and Guelph Rd. 3, transit would be limited to bus technology operating within mixed flow (no opportunity for dedicated lanes with urban median and tall wall barrier). Station stops would be limited to crossing road RIRO/grade separation locations. Additional opportunities for stops may exist along existing Hwy 7 RIRO section due to wider shoulders (to accommodate agricultural vehicles). Issue would be movement of passengers after disembarking. • East of Townline, opportunity exists for dedicated transit lanes within the 100 m ROW, or buses may travel along existing Hwy 7/Woodlawn Road (reduced volume) to Guelph.

Grouping	Factor/ Criterion	Indicator	Unit	RE2GC2-CAHc Description		RE2GC2-CAHd Description		RE2GC2-RIRO Description	
COST	Construction	Potential loss of business during construction	Subjective	Low	Minor disruption at project limits. Staging of central section through initial construction of service road to maintain movement during construction.	Low-Moderate	Minor disruption at project limits. Staging of central section through initial construction of service road to maintain movement during construction.	Moderate	Minor disruption at project limits. Access to be maintained to all businesses through the construction zone.
		Construction	$M	56.1		53.4		48.5	
		Staging	$M	3.4		2.9		2.2	
	Property	Residential	$M	0.5		0.5		0.3	
		Commercial	$M	0.2		0.2		0.5	
		Industrial	$M	0.05		0.05		0.05	
		Agricultural	$M	5.5		4.5		2.1	
		Other	$M	0.02		0.02		0.02	
		TOTAL PROPERTY	$M	6.3		5.3		3.0	
	TOTAL COST	Construction + Property	$M	65.8		61.6		53.7	
	Operation and Maintenance	Operation and maintenance	$M	0.3	75.1 lane-km x $4,300 per yr.	0.3	65.3 lane-km x $4,300 per yr.	0.2	53.7 lane-km x $4,300 per yr.

Alternative RIRO would have high effects on the flexibility of farm operations because there would be more constraints on movement of farm equipment. With this alternative access to one property would be lost and two would be relocated.

Both CAH(c) and CAH(d) would have highly detrimental effects to the ongoing viability of farm operations. These alternatives would result in the removal of buildings on three properties as well creating an awkwardly shaped property. The service roads associated with these alternatives would improve safety for the movement of farm equipment by separating highway traffic from local traffic. However, these service roads also increase the area of agricultural land removed when compared with RIRO. For alternative RIRO the effects to the ongoing viability of farm operations would be considered moderate. With this alternative two buildings would be removed and the lack of service roads and interval between crossing roads would add to the circuitous travel.

Transportation

Alternatives CAH(c) and CAH(d) would operate at a Level of Service C (2016) and RIRO would operate at a lower Level of Service D (2016).

Alternative RIRO is less favourable than the CAH alternatives from a safety standpoint. First, Alternative RIRO fails to resolve the existing conflict between agricultural equipment and through traffic. With Alternative RIRO, agricultural equipment would have to use the highway between Spitzig Road (Woolwich Road66) and Townline Road. In addition, there would be 31 entrances to private property within this section of Alternative RIRO. Conversely, with Alternatives CAH (c) and CAH (d) agricultural equipment would be separated from the through traffic, and the private entrances would exist on the service roads, not on the highway.

For CAH(c) the effect on traffic operations on parallel / crossing roads would be minor because interchanges would be provided at major crossing roads. Continuous service roads provide reasonable access to properties adjacent to Highway 7.

Alternative CAH(d) would have a moderate effect on traffic operations because interchanges would be provided at the major crossing roads, and service roads would provide access to properties adjacent to Highway 7. With this alternative the ability to stage construction would be poor. During construction there would be major impacts to traffic while existing Highway 7 was upgraded and the discontinuity of service roads would require more complex staging.

Alternative RIRO would have a moderate to high effect on traffic operations on parallel / crossing roads because access would be provided only at major crossing roads along existing Highway 7, which may result in some out-of-way travel.

In terms of highway function RIRO would be considered inconsistent because of the numerous access points in the RIRO section after travelling on the CAH section. During staging there would be major impacts to traffic while existing Highway 7 is upgraded with complex staging to maintain through traffic over a long period. RIRO would have fair compatibility with the existing network as well as the future network. The flexibility for future expansion would be considered poor beyond the four lanes.

Cost

RIRO would have the least total cost and CAH(c) would have the highest total. The cost range is from $53.7 M to $65.8 (2000 dollars) including an estimate property.

4.3.4.9 Stage II Evaluation Highway 7 Alternatives

This section provides the summary rationale for the identification of the 'best' alternative within this set of alternatives.

The CAH(d) alternative was preferred in this stage. The key issues were:

- The CAH(c) alternative would have the greatest impact to the adjacent properties, although it would provide the most direct access for emergency response vehicles. The RIRO alternative would potentially provide the least direct access for emergency vehicles. The RIRO alternative would also have the least potential for induced development through the limitations to access associated with the right-in/right-out only configuration. Overall, however, the effects of each of the alternatives on the socio-economic environment are considered to be similar.
- Edge effects on natural environment features bordering existing Highway 7 would be slightly reduced with the RIRO alternative because of the absence of service roads and the slightly narrower right-of-way. The relative differences between the alternatives would not be substantial in terms of the natural environment.
- The CAH(c) alternative would provide the greatest movement flexibility for farm equipment along the service roads but also increases the amount of agricultural land required. The RIRO alternative would reduce agricultural land removal when compared to the CAH alternatives, but would also introduce circuitous travel and safety issues for inter-farm movement of equipment in an east-west direction within the corridor. The CAH(d) alternative would provide the best balance between farm land area required and facilitation of farm equipment movement.

The RIRO alternative would provide a lower level of transportation service and safety, as a result of vehicles entering and exiting the highway at numerous access points and the potential for conflicts with agricultural equipment. The CAH(c) alternative would provide the best linkage with the local road network through the provision of a full service road network within the central portion of the study area, and the CAH(d) alternative would maintain access to most adjacent properties from the nearest crossing road. While the RIRO alternative would maintain direct access to adjacent properties, this configuration would require some out-of-way travel within the corridor. Consistency of driver expectation would be lower with the RIRO alternative as the road characteristics would change for a relatively short section of the overall highway.

The costs would be lowest for the RIRO alternative and highest for the CAH(c) alternative.

The impacts on flexibility for farm operations as a result of the RIRO alternative outweigh the slight reduction in natural environmental impacts. In addition, the lower level of transportation service and potential for safety concerns with numerous access points and agricultural equipment using the corridor make the RIRO alternative less

preferred. The CAH(d) alternative is slightly preferred over the CAH(c) alternative in terms of reduced natural environmental impacts, agricultural land impacts and cost.

CAH(d) is therefore carried forward to the Stage III evaluation.

A graphical summary of the evaluation for all of the factor groupings is shown on Exhibit 4-23.

4.3.4.10 Analysis of Stage III Evaluation Alternatives

The alternatives considered during Stage III were RE2-RW3 (New Route Alternative) and RE2-GC2-CAH(d)-KC2 (Combined Alternative). The New Route Alternative resulted from Stage I, while the Combined Alternative resulted from Stage II. The analysis of this set of alternatives extends from the KWE in the west, to the Hanlon Expressway at Woodlawn Road in the east. These alternatives are shown on Exhibit 4-24. The analysis tables are included as Exhibit 4-25.

Socio-Economic Environment

The differences in community effects between the New Route Alternative and the Combined Alternative would not be significant. The greatest difference between the alternatives would be the total area of residential property required. The New Route Alternative would impact 19 residential properties and would displace 10 of the residences. The Combined Alternative would impact 18 residential properties and displace 11 residences. Both of the alternatives would displace one business. Both would also require frontage from community facilities.

The overall anticipated impact of the New Route Alternative on the community and emergency response routes would be low. With this alternative the access to Bridgeport would be improved, there would be no severance of any existing roads and access would be provided at all major crossing roads. For the Combined Alternative the overall effect on emergency services routes and the existing community would be low to moderate. With the Combined Alternative access would be provided at all major crossing roads, access to Bridgeport would be provided, and access to Shantz Station would be provided via the interchange at Shantz Station Road. This alternative would also result in out of way travel and negative impacts to the access to existing businesses in the central section because of discontinuous service roads.

Natural Environment

There would be twelve water crossings with the New Route Alternative. The new crossings would result in disturbances to the coldwater system. For the Combined Alternative there would be nine water crossings or encroachments.

The loss of wetland function for the New Route Alternative would be considered moderate and effects would be anticipated at Marden, Ellis, Townline East, Townline West, the small unevaluated wetland at the Grand River crossing, small Rosendale wetland meadow marsh swale and the south edge of the Hopewell LSW. The loss of wetland area would be 16.6 ha. The loss of Provincially Significant Wetland would be 11.2 ha and would be from Ellis, Marden, Townline East, and Townline West.

	CAH(c)	CAH(d)	RIRO
Socio-Economic Environment			
Natural Environment			
Agriculture			
Transportation			
Cost			

LEGEND

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

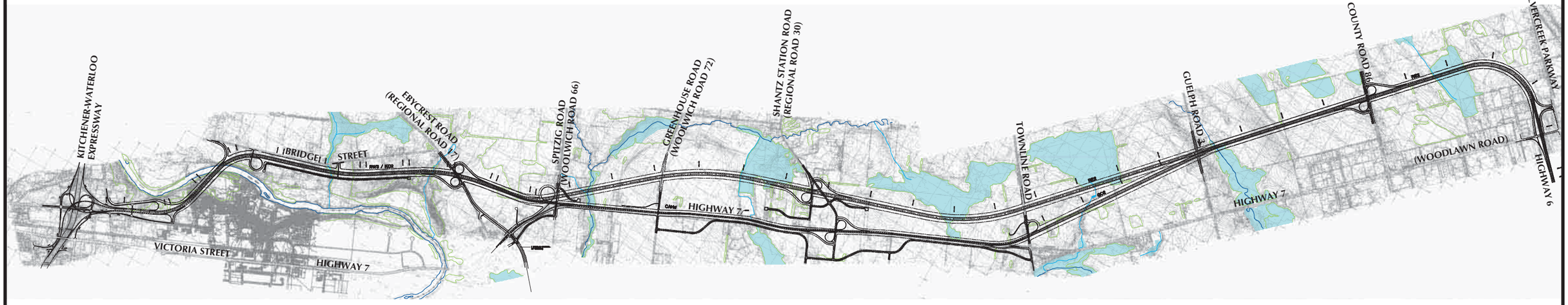
STAGE II EVALUATION
EXISTING HIGHWAY 7 ALTERNATIVES

EXHIBIT
4-23

	RE2-RW3 (New Route Alternative)	KC2 – RE2GC2 – CAHd (Combined Alternative)
West of Spitzig Road	■ Full interchange at Riverbend Drive / Shirley Avenue ■ Partial interchange at Bridge Street ■ Full interchange at Ebycrest Road	
Spitzig Road to Guelph Road 3	■ Full interchange at Shantz ■ Station Road	■ Partial interchange at Spitzig Road ■ Full interchange at Shantz Station Road ■ Partial interchange at Townline Road
Guelph Road 3 to Woodlawn Road	■ Full interchange at County Road 86 ■ Full interchange at Woodlawn Road	

LEGEND

WETLAND



N.T.S.

HIGHWAY 7 PLANNING STUDY **KITCHENER TO GUELPH**	**HIGHWAY 7 ALTERNATIVES** **NEW ROUTE ALTERNATIVE** **COMBINED ALTERNATIVE**	**EXHIBIT** **4-24**

STAGE III: FINAL EVALUATION – PREFERRED NEW ROUTE ALTERNATIVES AND PREFERRED COMBINED ALTERNATIVE

				RE2 - RW3		KC2 - RE2GC2-CAHd	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**
SOCIO-ECONOMIC ENVIRONMENT	Community Effects	Community facilities affected	No.	1	WT-47 St. John Kilmarnock school (0.1 ha) portion of SW corner - frontage to Reg. Rd. 30, no impact to access	2	• WT-127 Cemetery (0.1 ha) frontage, access via new service road. Could provide either continuous service road across property (higher property impact) and use existing entrance, or stop service road at west property line and construct new entrance. • WT-74 School (0.1) frontage on Reg. Rd. 30
			Subjective	Low		Low	
		Residences displaced	No.	10	WT-41; WT-64; WT-66; WT-72A, WT-79, GT-14, GT-22, GT-23, GT-28	11	WT-10, WT-43, WT-50A, WT-51, WT-84, WT-86, GT-13, GT-14, GT-22, GT-23, GT-28
		Residential properties affected	ha. Type	14.3	• Full Removal: 6 (GT-14, WT-2, WT-64, WT-66, WT-72A, WT-73) • Frontage Only: 2 (WT-37, WT-68) • Access Only: 0 • Access + Frontage: 2 (WT-63, WT-67, GT-13) • Severance: 2 (WT-43, WT-45) • Back Lot: 7 (GT-30, GT-31, GT-32, GT-33, GT-34, GT-35) • Other: 0	6.2	• Full Removal: 5 (WT-50A, WT-84, GT-13, GT-14, WT-2) • Frontage Only: 1 (WT-122) • Access Only: 0 • Access + Frontage: 3 (WT-45, WT-128, WT-73) • Severance: 3 (WT-37, WT-43, WT-72A) • Back Lot: 6 (WT-61, GT-32, GT-31, GT-30, GT-33, GT-34) • Other: 0
		Businesses displaced	No.	1	CG-19 displaced by ramp to Silvercreek	1	CG-19 displaced by ramp to Silvercreek
		Commercial properties affected	ha. Type	2.7	• Full Removal: 0 • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 2 (WT-1, CG-19) • Back Lot: 1 (K-42) • Other: 0	3.6	• Full Removal: 1 (CG-19) • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (WT-1) • Back Lot: 1 (K-42) • Other: 0
		Industrial properties affected	No.	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0	1	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 1 (CG-16) • Back Lot: 0 • Other: 0
			ha.	0.5		0.5	

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3	Description	KC2 - RE2GC2-CAHd	Description
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Community Effects (Cont'd)	Overall effect on emergency response routes	Subjective	Low	• Access to be provided at all major crossing roads. No severance of any continuous road (requires closure of Curtis Road west of Silvercreek Pkwy - access via Woodlawn/Regal.). • Provides additional access to Bridgeport. • No severance of any existing road corridors.	Low-Mod	• Access to be provided at all major crossing roads. Requires closure of Curtis Road west of Silvercreek Pkwy - access via Woodlawn/Regal. Requires closure of east junction of Woolwich 72 at Hwy 7. • Discontinuous service roads on existing Hwy 7 may require some out-of-way travel. • Provides additional access to Bridgeport.
		Overall effect on existing communities	Subjective	Low	No anticipated impact and improves access to Bridgeport.	Low-Mod	• Access to Shantz Station provided via interchange at Reg. Rd. 30 and service roads. Discontinuous service road on north side will provide access to all properties in this area except WT-50A (buyout), access will be from Reg. Rd. 30 only. Discontinuous service roads may negatively impact access to existing businesses in central section. • Improves access to Bridgeport.
	Noise	Noise sensitive areas subject to increase of > 10dBA	No.	6		4	
		Noise sensitive areas subject to increase of 5 to 10dBA	No.	32		28	
		Noise sensitive areas subject to increase of 0 to 5dBA	No.	80		81	
		Noise sensitive areas subject to decrease	No.	41		40	
	Land Use	Potential for induced development	Subjective	Low-Mod	• May result in parcels along Bridge Street and between Regional Road 17 and Woolwich 66 that are no longer suitable for agriculture. • Primarily crosses lands designated for agricultural use east of Woolwich 66. • Proximity to existing industrial/ commercial area in east end - improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end.	Low-Mod	• May result in parcels along Bridge St. and between Reg. Rd. 17 and Woolwich 66 that are no longer suitable for agriculture. • May encourage new development at Shantz Station (designated future commercial). Potential for induced development at other interchanges will be dependent on interchange design and municipal development policy. • Proximity to existing industrial/commercial area in east end - improved service to Northwest Industrial Park. • May influence the future municipal boundary in the east end.
		Impact to approved development in Official Plan	Influence No Influence	No Influence		No Influence	
NATURAL ENVIRONMENT	Fisheries and Aquatic Habitat	Water crossings or encroachments (lakes, rivers/ streams and wetlands)	No.	12	New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary from Townline East Wetland, 1 River, 3 permanent streams, 3 intermittent, 1 pond	9	For RE: New crossings of 4 intermittent watercourses - Marden Drain (2), Ellis Creek and Ellis Creek tributary. Widening of existing right-of-way at Hopewell Creek, Hopewell Creek tributary. For KC: 1 River, 1 permanent stream, 1 intermittent,

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3 Description		KC2 - RE2GC2-CAHd Description	
NATURAL ENVIRONMENT (CONT'D)	Fisheries and Aquatic Habitat (Cont'd)	Water crossings or encroachments (lakes, rivers/ streams and wetlands) (Cont'd)	Subjective	Mod-High	Crosses Rosendale Creek at downstream swale location. Single crossing of Hopewell Creek closer to existing Highway 7. New river crossing and new disturbances to CW systems (2).	Mod (RE)	New crossings of four intermittent streams, three of which have coldwater potential, two crossings are widenings of existing crossings (already disturbed). Widening at main Hopewell Creek branch is reduced compared to continuous service road option.
						High (KC)	New Grand River crossing. Crosses Rosendale Creek (CW pot) at same less sensitive downstream swale location.
		Significant Species	Presence	Yes	Greenside Darter - Grand River (throughout)	Yes	For KC: Greenside Darter - Grand River (throughout)
		Areas of critical fish habitat	No.	4		6	
			Subjective	Mod	Ellis Creek: limited groundwater baseflow in this part of the system but some coldwater contribution potential. Marden Drain: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems. Crosses Rosendale Creek at downstream swale location. Single crossing of Hopewell Creek closer to existing Highway 7.	Mod (RE)	**Ellis Creek:** limited groundwater baseflow in this part of the system but some coldwater contribution and baitfish potential, plus new crossing of trib at GT1. **Marden Drain**: 2 crossings of agricultural ditches within wetland block, some coldwater contribution and baitfish potential but highly altered systems. **Hopewell:** Widening of Hopewell Creek main branch at existing crossing location
						Low (KC)	Rosendale Creek, crosses at downstream swale location, coldwater contribution. Grand River crossing (elevated structure - same location).
		Warmwater/ coldwater communities	No.	7WW / 3 CW	7warmwater, 1 coldwater, 1 coldwater potential	2WW / 4CW (RE)	WW: Ellis tributary, Hopewell tributary. CW: Ellis Creek and Marden Drain (2) and Hopewell main branch
						2WW /1CW (KC)	2 warmwater, 1 coldwater potential (Rosendale Creek)
		Degree of interaction with groundwater	Subjective	Mod	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow. Single crossing of Hopewell Creek. Discharge may be present but no cut proposed	Mod (RE)	Groundwater not identified as significant component of aquatic crossings. Structure design will address groundwater flow.
						Low- Mod (KC)	Crosses Rosendale Creek downstream of wooded seepage valley.
	Wildlife	Encroachment on or severance of forested vegetation or non-forested successional areas	ha.	33.8	Incorporates habitat removal at Marden, Ellis, Townline, Hopewell Creek and Grand River valley areas	27.3	Incorporates habitat removal at Ellis (north end) and Townline West (south end - deciduous forest edge), Marden and Grand River valley. Avoids core Townline and Hopewell riparian wetland habitat areas

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3		KC2 - RE2GC2-CAHd	
					Description		Description
NATURAL ENVIRONMENT (CONT'D)	Wildlife (Cont'd)	Encroachment on or severance of greenways and open space linkages	Subjective	Mod	Fragments north end of Marden PSW, avoids main Ellis PSW core, and encroaches along south end of Townline East and Townline West wetlands. Grand River valley, single Hopewell Creek crossing nearer existing Highway 7	Low-Mod (RE) Mod (KC)	Fragments north edge of Marden Wetland, avoids main Ellis wetland core, avoids Townline East and West Wetlands, edge effects at Breslau complex Grand River valley (future bridge span)
		Encroachment on or severance of significant wildlife habitat	ha.	26.8		19.6	
			Subjective	Mod	Moderate fragmentation of Marden PSW, avoids core Ellis Creek PSW habitat block, increased risk of disturbance to Townline East heronry, avoids core section of Townline West wetland. Grand River valley (crossing), south tip of Weiland Tract, single Hopewell Creek crossing closer to Highway 7, and south edge of Hopewell LSW.	Low-Mod (RE) Mod (KC)	Moderate fragmentation of Marden Wetland, avoids core Ellis Creek Wetland habitat block, avoids Townline West Wetland. Alignment shifted 150 to 200 m south of the Townline East heronry. Vegetation associated with Grand River valley crossing, and crossing of south tip of Weiland Tract (core habitat potential maintained).
		Significant Species	Presence	Yes	**Townline West PSW** :Regionally Significant Bird Species (Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler);**Townline East**: Winter Wren, Veery, Northern Waterthrush; **Ellis PSW**: Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence. **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush), **Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher); **Weiland Tract: Regionally Significant Bird Species** (Mourning Warbler, Scarlet Tanager; Hopewell Creek Valley: Northern Waterthrush, Winter Wren, Red-breasted Nuthatch, **Hopewell LSW**: Regionally Significant Bird Species (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker)	Yes	**Ellis PSW:** Regionally Significant Bird Species (Wood Duck, Least Flycatcher, Brown Creeper, Winter Wren, Veery, White-throated Sparrow, Northern Waterthrush). Louisiana Waterthrush (VUL) also observed but no breeding evidence. **Marden PSW**: Regionally Significant Bird Species (Northern Waterthrush), **Weiland Tract:** Regionally Significant Bird Species (Mourning Warbler, Scarlet Tanager; **Grand River**: Regionally Significant Bird Species (Brown Thrasher, Northern Waterthrush, Alder Flycatcher)
			Subjective	Mod	Some fragmentation of Grand River valley, edge effects at Weiland Tract, Hopewell Creek crossing, and Hopewell LSW and see previous wildlife habitat comments	Low-Mod (RE) Mod-High (KC)	Alignment pulled out of Townline Wetlands, Hopewell riparian wetlands, avoids double crossing of Hopewell Creek and associated forested habitat. Some removal of habitat in vicinity of Grand River valley crossing.

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3 Description		KC2 - RE2GC2-CAHd Description	
NATURAL ENVIRONMENT (CONT'D)	Wetlands	Loss of function of all wetlands within or adjacent to study area	Subjective	Mod	See wildlife comments above. Anticipated effects at Marden (M), Ellis (L), Townline East (M), Townline West (M), Small unevaluated wetland at Grand River crossing, crossing of small Rosendale wetland meadow marsh swale (more tolerant wetland type, and removes south edge (partly disturbed) of Hopewell LSW	Low-Mod (RE) Low (KC)	See wildlife habitat comments above. Anticipated effects at Marden (Mod) and Ellis (Low). Avoids Townline and Hopewell riparian wetland areas. Small unevaluated floodplain wetland at Grand River crossing, crossing of small Rosendale wetland meadow marsh swale
		Loss of wetland area (total evaluated plus unevaluated	ha.	16.6	Wetland effects at above areas.	9.06	Removal at Marden and Ellis. Avoids Townline West wetland (i.e.. only upland component affected)
		Degree of interaction of all wetlands with groundwater	Subjective	Mod	Moderate interception potential based on field observations. Crosses south edge of Hopewell LSW. Alignment downgradient of Bloomingdale-Rosendale wetland discharge area.	Low-Mod (RE) Low (KC)	Low-moderate interception potential with alignment potential. Limited - crossing of Rosendale Creek meadow marsh swale downstream of wooded seepage valley.
		Encroachment on or severance of Provincially Significant wetlands (Class 1-3)	ha.	11.2	Ellis, Marden, Townline East and Townline West	5.58	Ellis, and Marden n/a for KC2
	Vegetation	Encroachment on or severance of high quality forest stands (not wetlands)	ha.	11.2	Forest cover south of Grand River and south tip of Weiland Tract	12.1	For RE: Upland forest block at southern end of Townline West For KC: Vegetation associated with Grand River valley crossing and crossing of south tip of Weiland Tract.
		Significant Species	Presence	No	Avoids Bloomingdale - Rosendale LSW where significant plant species recorded	No	No significant botanical species at or near the crossings
		Erosion potential on steep slopes	Subjective	Mod	Approach to Marden , Ellis Creek , Grand River and Hopewell Creek valley	Mod (RE) Mod (KC)	Approach to Ellis Creek and Marden Creek and Hopewell Creek crossings. Grand River valley.
		Presence of riparian habitat	Subjective	Mod	2 Marden drain crossings , 2 Ellis crossings, Rosendale Creek and Hopewell drain, with open or early successional riparian cover. Grand river, and Hopewell Creek crossings with mid to late successional cover.	Mod (RE) Mod (KC)	2 Marden Drain and 2 Ellis Creek crossings with open or early successional riparian cover. Other crossings are located at existing crossings with open to early successional riparian cover. Relatively dense cover at Grand River crossing.

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3	Description	KC2 - RE2GC2-CAHd	Description
NATURAL ENVIRONMENT (CONT'D)	Groundwater	Implications of roadway grading on groundwater discharge	No. of Cuts	9	9 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	5	2 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse (Rosendale Creek, Hopewell Creek). For purposes of evaluation it was assumed that there were no cuts required on alternatives along existing right-of-way.
		Shallow groundwater wells within 300 m of C/L	No.	10	Majority of noted wells upgradient of alignment.	11	Shallow wells along Bridge Street
		Number of private or municipal wells within 300 m of C/L	#	62		69 (RE)	
			Subjective	High		High	
						19 (KC)	
						Low	
AGRICULTURE	Agriculture	Land currently used for agricultural production	ha.	143.7		137.7	
		Specialty crop operations affected	No.	3	Property # s: WT81(berries), CG-11, WT51 (vegetables), WT53/54 (Nursery)	4	Property #s: WT-136, CG11 WT53/54, WT51
			ha.	13.1		6.2	
		Loss of specialty crop soil (organics)	ha.	1.7	Property #'s:WT51 (vegetables)	n/a	Removal along existing right-of-way, not within active crop area based on organic soils
		Dairy/livestock operations affected	No.	8	Property #'s: GT2, GT12, GT20, GT26, WT17S, WT37,WT48, WT49	8	Property #'s: GT1/2, GT12, GT17/20, GT26, WT48, WT37, WT17S
			ha.	54.2		55.95	
		Field crop operations affected	No.	8	Property #'s:WT85, GT22/23, GT28, WT11, WT17/28, WT27, WT47, WT79	16	Property #'s:WT85, GT22/23, GT28,WT-136, WT-135, WT-131, WT79, WT-129, WT-126, WT-124, WT47, WT-123, WT10, WT11, WT17/28, WT27
			ha.	74.7		75.59	
		Effect on future flexibility of farm operations	Subjective	Mod-High	Access removed: WT81, GT28, T10, WT11, WT17, WT27, WT79 New or limited access: GT23, WT 47	Mod (RE)	Access removed: GT28, GT23 New or limited access: WT85, WT-131
						High (KC)	No access: WT10, WT11, WT17, WT27
		Effect on farm woodlots	Subjective	Mod	Six main woodlots are affected, five are still accessible (Townline West, Townline East, Ellis, Marden, Weiland) Hopewell Creek LSW: Will no longer be accessible or functional to WT51 & WT53/54; will be fragmented but still accessible to WT47	Mod (RE)	Three main woodlots are affected, but still accessible (Townline West, Ellis, Marden)
						Low (KC)	Weiland Tract: will remain accessible
		Effect on capital investment in agricultural operations	Subjective	High	Affects 5 Dairy operations: GT2, GT12, GT20, GT25, GT26, plus edge effects to 4 operations (WT5, WT48, WT49 and south of WT17) 2 specialty crop (WT81, CG-11). Possible loss of water source (WT53/54)	High (RE)	Affects 7 Dairy operations: GT2, GT12, GT20,GT25, GT26,WT48 3 spec crop WT-136, WT81, WT51 and 1 nursery WT53/54
						Low (KC)	Edge effects only, property south of WT17

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3 Description		KC2 - RE2GC2-CAHd Description	
AGRICULTURE (CONT'D)	Agriculture (Cont'd)	Significant farm operation severances	Subjective	High	Property #'s: WT81, WT85, GT2, GT12, GT23, GT28, CG-11, WT11, WT17, WT27, WT47, WT79. Significant difference in severance impacts on farms between Woolwich Road 66 and Guelph Road 3 compared with CAHd alignment.	High (RE) Mod (KC)	Property #'s: GT12, GT23, GT28, WT-131, WT79, WT53/54, WT55, WT56, GT17/20, WT37 Property #'s: WT10, WT11, WT17, WT27
		Significance of detrimental effects to ongoing viability of farm operations	Subjective	Mod-High	Buildings removed: GT2 (partial), GT23 (total), GT28, CG11 (total), WT79. Remaining fragments too small: WT11, WT79	High (RE) Mod - High (KC)	Buildings removed: GT23, GT28, WT51 Awkward shape: WT-131 Property #'s: WT10, WT11, WT27 (isolated parcels)
		Significance of detrimental effects to ongoing viability of farm communities	Subjective	Mod	Study area already with urban influences Ratio of owner operated : leased properties - 12:10	Mod (RE) Mod (KC)	Study area already with urban influences Ratio of owner operated : leased properties - 12 : 9 Study area already urbanized. Ratio of owner operated : leased properties - 4 : 2
TRANSPORTATION	Traffic Operations	Level of Service (2011, 2016)	Level	C		C	
		Conflicts with Existing Intersections/ entrances	No. Type	19 ent.	• Access relocations: GT-21, GT-2,K-43, K-44, K-45, WT-1, WT-3, WT-10, WT-11, WT-17, WT-27A, WT-27B, WT-28, WT-35, WT-37, WT-38, WT-39, WT-47, WT-48 • Loss of access: None	2 roads 54 ent.	• Road closings: Woolwich 72 east junction (access via service road), Curtis Drive west of Silvercreek (access via Woodlawn Rd./Regal Rd.) • Access change from existing Hwy 7 to service road: WT-37, WT-43, WT-44, WT-45, WT-46, WT-47, WT-48, WT-51, WT-53, WT-54, WT-55, WT-56, WT-57, WT-58, WT-59, WT-60, WT-72B, WT-77, WT-78, WT-79, WT-81, WT-85, WT-123, WT-124, WT-125, WT-126, WT-127, WT-128, WT-129, WT-134, WT-135, WT-136 • Access relocation: K-43, K-44, K-45, WT-1, WT-3, WT-10, WT-11, WT-17, WT-27A, WT-27B, WT-28, WT-35, WT-72A, GT-12, GT-20, GT-22, GT-23, GT-25, CG-11, CG-9, CG-22 • Loss of access/landlocked: GT-28, CG-19
		Service Life	Year	2030 +		2030 +	
	Safety	Conflicts with Agricultural equipment	Subjective	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.
		Conflicts with Intersections/ Entrances on thru lanes	No. of Conflict Points	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.
			Subjective	None		None	

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3 Description		KC2 - RE2GC2-CAHd Description	
TRANSPORTATION (CONT'D)	Safety (Cont'd)	Comparative Collision Rate	Collisions per million vehicle km	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.
	Network Compatibility	Effect on traffic operations on parallel/crossing roads	Subjective	Low	• Minor impacts to crossing roads at interchange/grade separation locations. All existing main roads being maintained (closure of Curtis Road west of Silvercreek), interchanges provided at major crossing roads. • Provides improved access to Bridgeport.	Low-Mod	• Interchanges provided at major crossing roads. • Service roads provide access to properties adjacent to Hwy 7 however discontinuity will result in some out-of-way travel. • Improved access to Silvercreek Parkway/Woodlawn Road area (Northwest Industrial Park).
		Driver comfort and expectation	Subjective	Good	Consistent highway function.	Fair	Consistent highway function. Median barrier will introduce minor "side friction" component.
		Ability to stage implementation of the facility	Subjective	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Fair	• Major impact to traffic in central section while existing Hwy 7 is widened. May be mitigated by constructing service roads in the initial stages. Discontinuity of service roads will require more complex staging. • Minor impacts to crossing roads at interchange/grade separation locations.
		Compatibility with existing network	Subjective	Good	• Full compatibility with higher tier network • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads. Requires closure of Curtis Drive west of Silvercreek (access via Woodlawn/Regal).	Fair	• Full compatibility with higher tier network. • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads (the east junction of Woolwich 72 at existing Hwy 7 will be closed, with access via service road). however, discontinuity of service roads along existing Hwy 7 will result in circuitous travel between interchanges in the east/west direction. Requires closure of Curtis Drive west of Silvercreek (access via Woodlawn/Regal).
		Compatibility with future network	Subjective	Good	Reasonable flexibility to accommodate future local roads (subject to approval).	Good	Reasonable flexibility to accommodate future local roads (subject to approval).
		Flexibility for future expansion	Subjective	Good	Reasonable flexibility with the 100 m ROW.	Fair	• Expansion within the central section (Woolwich 66 to Townline) is limited by the 70 m ROW - future expansion may require additional property and road network impacts. • Within the new route section, reasonable flexibility for expansion exists within the 100 m ROW.

Grouping	Factor/ Criterion	Indicator	Unit	RE2 - RW3 Description		KC2 - RE2GC2-CAHd Description	
TRANSPORTATION (CONT'D)	Network Compatibility (Cont'd)	Ability to accommodate future transit	Subjective	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/improved transit service within the corridor.	Fair	• Within the central section (Woolwich 66 to Townline), transit would be limited to bus technology operating within mixed flow. Station stops would be limited to interchange locations. Discontinuity in service roads will limit the efficiency of use by transit. • Within the new route sections, opportunity exists for dedicated transit lanes within the 100 m ROW, and reduced flow on existing Hwy 7 provides opportunity for additional/improved transit service within the corridor.
COST	Construction	Potential loss of business during construction	Subjective	Low	Minor disruption at project limits. Access maintained through staging.	Low	Minor disruption at project limits/crossing roads. Staging of central section (through initial construction of service roads) to maintain movement during construction.
		Construction	$M	117.6		126.0	
		Staging	$M	0.0		2.9	
	Property	Residential	$M	3.2		0.52	
		Commercial	$M	0.23		0.4	
		Industrial	$M	0.05		0.05	
		Agricultural	$M	7.1		5.1	
		Other	$M	0.01		0.02	
		TOTAL PROPERTY	$M	10.6		6.1	
	TOTAL COST	Construction + Property	$M	128.5		135.0	
	Operation and Maintenance	Operation and maintenance	$M	0.4	92.8 lane-km x $4,300 per yr.	0.5	117.8 lane-km x $4,300 per yr.

The loss of wetland function for the Combined Alternative would be considered low to moderate (9.06 ha). The anticipated impact at the Marden wetland would be moderate. At Ellis, the small unevaluated wetland at the Grand River and the small Rosendale wetland meadow marsh swale the impact would be considered low. This alternative would avoid the Townline West wetland. The area of Provincially significant wetland required would be 5.58 ha.

The encroachment or severance of forested vegetation or non-forested successional areas would be 33.8 ha for the New Route Alternative and 27.3 ha for the Combined Alternative. Both alternatives would fragment the north end of the Marden PSW, avoid the main core of the Ellis PSW, encroach along the south end of Townline East and Townline West wetlands, and cross the Grand River valley and Hopewell Creek.

Agriculture

The New Route Alternative would require approximately 143.7 ha of land currently used for agricultural production and the Combined Alternative would require 137.4 ha. Three specialty crop operations (13.1 ha) would be impacted by the New Route Alternative, and four specialty crop operations (6.2 ha) would be impacted by the Combined Alternative. There is no loss of specialty crop soil for the Combined Alternative. The New Route Alternative would require 1.7 ha of specialty crop soil. The property requirements would result in the severance of a number of farm properties. The New Route Alternative would sever eleven properties, and the Combined Alternative would sever fourteen properties.

Transportation

Both of the alternatives would operate at a Level of Service C (2016). For the New Route Alternative, 19 entrances would require relocation. The Combined Alternative would result in 2 road closures, the relocation of 52 entrances and the loss of access for three properties.

The Combined Alternative and the New Route Alternative would provide reasonable traffic operations. Both alternatives would provide interchanges at major crossing roads, all existing main roads would be maintained. The New Route Alternative would provide access to Bridgeport. The New Route Alternative would also have consistent highway function and a good ability to stage construction. The Combined Alternative would provide discontinuous service roads to access properties adjacent to Highway 7. The service roads would result in some out of way travel by traffic. The ability to stage construction would also be considered fair. During construction there would be major impacts to traffic while existing Highway 7 was upgraded and the discontinuity of service roads would require more complex staging. Curtis Road would be closed with both of the alternatives.

For the Combined Alternative expansion in the central section would be limited in the 70 m right of way between Spitzig Road and Townline Road.

Cost

The Combined Alternative would have the highest total cost ($135.0 M, 2000 dollars) and the New Route Alternative would have the least total cost ($128.2 M, 2000 dollars).

External Agency Comments

At the Municipal Team / External Team Meeting on January 12, 2001 concerns were raised by some members of the group, including County of Wellington and Township of Woolwich. The basis of the concerns related to the Combined Alternative being on the existing right-of-way and the extent of the service road network. The other concerns related to the KWE interchange and the wetland area at the Grand River.

4.3.4.11 Stage III Evaluation

The Combined Alternative was considered to be better than the New Route Alternative at this stage because it would have the least impact on the natural environment and agriculture, while providing a reasonable level of transportation service to beyond 2028. The key issues were:

- Both alternatives would impact a similar number of residential, commercial and industrial properties. The New Route Alternative would require more physical property than the Combined Alternative, however the Combined Alternative would result in disruption to more properties along existing Highway 7 through relocation of accesses to an adjacent crossing road or service road. The New Route Alternative would be slightly preferred over the Combined Alternative in terms of access for emergency vehicles, as existing Highway 7 would remain a fully accessible component of the local transportation network. This could be addressed in the Combined Alternative through the addition of a service road on the south side of Highway 7 between Woolwich Road 66 and Woolwich Road 72, thereby completing the service road network on the south side.

- The most significant benefits of the Combined Alternative would be avoidance of the Townline East, Townline West and Hopewell Creek Riparian wetlands, and the provision of a new crossing of Hopewell Creek at the existing Highway 7 crossing. In comparison, the New Route Alternative would not avoid the wetland, and would cross Hopewell Creek at a new location approximately 280 m north of existing Highway 7.

- The most significant difference in effects on agriculture between the alternatives would be the extent of farm severances between Woolwich Road 66 and Guelph Road 3 that are incurred with the New Route Alternative. The New Route Alternative would also affect more specialty crop and field crop lands. The Combined Alternative would affect movement flexibility for farm equipment as a result of the discontinuous service road network, introducing minor circuitous travel.

- Both alternatives would accommodate traffic demand at a good level of service to beyond 2028 with opportunities for further expansion and/or incorporation of transit, although these opportunities would be limited by the 70 metre right-of-way for the central section of the Combined Alternative. Both alternatives provide reasonable traffic operations and safety. The Combined Alternative would result in some out-of-way travel for vehicles as a result of the discontinuous service road network, however

this could also be addressed by providing a service road on the south side of Highway 7 west of Woolwich Road 72, thereby completing the local east-west road network parallel to existing Highway 7 through the central portion of the study area.

- There would be greater cost with the Combined Alternative than for the New Route Alternative.

Therefore, it was determined that the Combined Alternative would result in less overall impacts to the natural environment while providing a reasonable level of transportation service to beyond 2028. There would be some disruption to properties with the Combined Alternative, although fewer agricultural operations would be directly impacted. While the Combined Alternative would impact local traffic patterns and agricultural equipment movement within the central portion of the study as a result of upgrading the rural section of existing Highway 7 to controlled access, this impact may be reduced by the addition of a service road on the south side of Highway 7 between Woolwich Road 66 and Woolwich Road 72, thereby completing the local service road network on one side of the highway.

The Combined Alternative (RE2-GC2-CAH(d)-KC2) with the addition of a service road on the south side of Highway 7 between Woolwich 66 and Woolwich Road 72 was identified as the Technically Preferred Alternative.

A graphical summary of the evaluation for all of the factor groupings is on Exhibit 4-26.

4.3.4.12 Public response to the Technically Preferred Alternative (2001)

The results of Review Phase 2 were presented to the Municipal Team / External Team on January 12, 2001. There was a Property Owners meeting held on January 23, 2001 and there were presentations to the councils of each affected municipality prior to the Public Information Centres held February 7 and 8, 2001. The following is a summary of the public response.

There were a number of concerned property owners at the meeting held January 23, 2001. In general, the nursery operators were concerned that the indirect access to their businesses would be detrimental to their ongoing business viability. The owners formed an interest group to oppose the Technically Preferred Alternative. Representatives of the group attended all of the municipal council presentations prior to the Public Information Centres.

The intent of the council presentations was to update municipal councils on the status of the project. Councils were not asked for resolutions of support at this time.

The Public Information Centres held on February 7, 2001 (Kitchener) and February 8, 2001 (Guelph) were extremely well attended. Various interest groups including the Highway 7 Business and Landowner Group and HALT7 were in attendance representing their points of view.

There was overwhelming opposition to the Technically Preferred Alternative expressed in many ways, including more than 1,500 submissions to the Project Team.

	RE2-RW3	RE2-GC2-CAH(d)-KC2
Socio-Economic Environment		
Natural Environment		
Agriculture		
Transportation		
Cost		

LEGEND

HIGHWAY 7 PLANNING STUDY KITCHENER TO GUELPH	STAGE III EVALUATION	EXHIBIT **4-26**

The west and east sections of the Technically Preferred Alternative were generally accepted by the public. Minor refinements to these sections suggested during the consultation process were considered in Phase 3.

4.3.4.13 Analysis of Phase 3 (RC) Alternatives

In view of the strong opposition to the Technically Preferred Alternative, the Project Team recognized that further investigation would be necessary.

At a meeting with the nursery operators, suggestions were put forward. One of these was a further modification of the New Route Alternative, considered during Stage III. Previously, the Project Team had felt that this alternative would not be viable, but since it was now being put forward by an individual whose property would be most directly affected by it, Alternative RC1 was brought forward for consideration. Alternative RC1 is a further refinement of RE2-RW3 developed in Phase 2, and is shown on Exhibit 4-13.

Mindful that there was still support for an option that would utilize the existing Highway 7 corridor, the Project Team also developed an alignment (RC2) that was located immediately to the north of existing Highway 7. Alternative RC2 is also shown on Exhibit 4-13. With both Alternative RC1 and Alternative RC2, it is possible to retain existing Highway 7 as a service road.

The analysis and evaluation during Phase 3 considered four alternatives: RC1, RC2, the New Route Alternative from Phase 2 (Stage III), and the Combined Alternative from Phase 2 (Stage III). (The Stage III alternatives are shown on Exhibit 4-24.) The analysis of Phase 3 alternatives extends from Regional Road 17 (Ebycrest Road) to Townline Road, and is presented in Exhibit 4-27.

In response to the concerns expressed during the January-February 2001 consultation period, the Project Team also developed additional indicators. Three new indicators were identified: business accessibility, location/change in access, and level of visibility. These indicators were developed in order to better assess the socio-economic effects of the alternatives on the existing businesses in the central rural section.

The analysis of this set of alternatives extends from approximately Ebycrest Road to Townline Road. Exhibit 4-27 shows the analysis table for the Stage IV Evaluation Alternatives. The significant differences amongst the alternatives are noted in the text below.

Socio-Economic Environment

Alternative RC1 would displace seven residences, with RC2 nine residences would be displaced. Both the New Route Alternative and the Combined Alternative would displace four residential properties. RC2 would displace three businesses and RC1, the New Route and the Combined Alternative would not displace any businesses. The impact to business accessibility would be considered low for both RC1 and the New Route Alternative because existing access remains from Highway 7 and an interchange would be provided at Shantz Station Road. The impact with RC2 would be low to moderate because access remains from existing Highway 7 and would be via new connector roads for businesses on the side roads. For the Combined Alternative the impact would be

moderate to high because of indirect service roads that would develop radially from Shantz Station Road.

Noise increases at NSAs are similar for all of the alternatives. With RC1 and RC2 there would be seven NSAs subject to noise increases of greater than 10 dBA. The Combined alternative would have four NSAs subject to noise increases greater than 10 dBA. For all of the alternatives there would be between 28 and 32 NSAs with noise increases between 5 and 10 dBA.

For both RC1 and the New Route Alternative the overall effect on the existing community would be considered low because there would only be a moderate severance of the residential community at Shantz Station Road with the highway crossing. With RC2 the overall effect on the existing community would be considered low to moderate because of the major removal of homes and businesses on the north side of existing Highway 7, which would remove the Shantz Station community. For the Combined Alternative the overall effect on the existing community would be considered moderate because of discontinuous service roads at Shantz Station Road, which would maintain access to adjacent properties in Shantz Station. Some out way travel would be required.

The potential for induced development would be considered low to moderate for both RC1 and RC2. For the Combined Alternative the potential would be moderate to high because the service road network may open up areas for development in non-agricultural uses. With the New Route Alternative the potential would be low, because this alternative crosses agricultural land, and there would be no access to private property from the new highway.

Natural Environment

A significant difference between the alternatives would be the impact to wetlands. For Alternative RC1 and RC2 the area of wetland required would be approximately the same (4.1 ha and 4.0 ha, respectively). The Combined Alternative would require about 1.7 ha of wetland. The New Route Alternative would have the greatest area of wetland removal and would require 7.5 ha.

The impact to forested vegetation or non-forested succesional areas for the alternatives would be considered low to moderate for RC1 (7.4 ha) and RC2 (7.7 ha), moderate for the New Route Alternative (12.0 ha) and low for the Combined Alternative (6.7 ha).

Agriculture

Alternative RC1 and the Combined Alternative would each require approximately 65 ha of land used for agricultural production. RC2 and the New Route Alternative would each require 70 ha. Five field crop operations would be affected by the New Route Alternative (29.9 ha), twelve by the Combined Alternative (40.0 ha), five by RC1 (29.6 ha) and eight by RC2 (34.2 ha).

With the above noted requirements from the agricultural properties RC1, New Route Alternative and the Combined Alternative would have a high effect on capital investments in agricultural operations. RC2 would have a moderate effect on capital investment in agricultural operations.

NEW ROUTE ALTERNATIVES – REGIONAL ROAD 17 to EAST OF TOWNLINE ROAD
DETAILED ANALYSIS OF ALTERNATIVES

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT	Community Effects	Community facilities affected	No.	2	• WT-74 school (0.06 ha) portion of SW corner – frontage to Regional Road 30, no impact to access • WT- 35 school (0.05 ha) portion of SW corner – frontage to Woolwich Road 66	2	▪ WT – 130 Croatian Centre (0.33 ha) frontage to Regional Road 30. ▪ WT- 35 school (0.04 ha) portion of SW corner – frontage to Woolwich Road 66	1	WT-74 St. John Kilmarnock school (0.1 ha) portion of SW corner - frontage to Reg. Rd. 30, no impact to access	2	• WT-127 Cemetery (0.1 ha) frontage, access via new service road. Could provide either continuous service road across property (higher property impact) and use existing entrance, or stop service road at west property line and construct new entrance. • WT-74 School (0.01) frontage on Reg. Rd. 30
			Subjective	Low		Mod		Low		Low	
		Residences displaced (including homes on agricultural properties)	No.	7	WT-43, WT-45, WT-61, WT-62, WT-63, WT-64, WT-66	9	WT-43, WT-45, WT-48, WT-50A, WT-51, WT-55, WT-57, WT-58, WT-59	5	WT-43, WT-64; WT-66; WT-72A, WT-79	4	WT 43, WT 50A, WT 51, WT 84
		Residential properties affected	ha. Type	11.1	• Full Removal: 1 (WT-63) • Frontage Only: 2 (WT-67, WT-68) • Access Only: 0 • Access + Frontage: 6 (WT-37, WT-61, WT-62, WT, 64, WT-72A, WT-66) • Severance: 2 (WT-43, WT-45) • Back Lot: 0 • Other: 0	4.83	• Full Removal: 4 (WT-50A, WT-57, WT-58, WT-59) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 3 (WT-37, WT-43, WT-45) • Severance: 0 • Back Lot: 1 (WT-72a) • Other: 0	12.3	• Full Removal: 3 (WT-64, WT-66, WT-72A) • Frontage Only: 2 (WT-37, WT-68) • Access Only: 0 • Access + Frontage: 3 (WT-63, WT-67, WT 73) • Severance: 2 (WT-43, WT-45) • Back Lot: 0 • Other: 0	4.7	• Full Removal: 2 (WT-50A, WT-84) • Frontage Only: 1 (WT-122) • Access Only: 0 • Access + Frontage: 3 (WT-45, WT-128, WT-73) • Severance: 3 (WT-37, WT-43, WT-72A) • Back Lot: 1 (WT-61) • Other: 0
		Businesses displaced	No.	0		3	WT-60, WT-72b, WT53/54	0		0	

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Community Effects (Cont'd)	Commercial properties affected (does not include nurseries – considered specialty agricultural)	ha. Type	3.1	• Full Removal: 0 • Frontage Only: 1 (WT-60) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 1 (WT 72b) • Other: 0	6.26	• Full Removal: 1 (WT-60) • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 1 (WT-72b) (lower portion of property is gas station) • Severance: 0 • Back Lot: 0 • Other: 0	0.05	• Full Removal: 0 • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	1.06	• Full Removal: 0 • Frontage Only: 1 (WT-72B) • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0
		Industrial properties affected	No.	0	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	0	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	0	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0	0	• Full Removal: 0 • Frontage Only: 0 • Access Only: 0 • Access + Frontage: 0 • Severance: 0 • Back Lot: 0 • Other: 0
			ha.	0		0		0		0	
		Overall Effect of Business Accessibility	Subjective	Low	• Access remains from existing Highway 7, no change in accessibility to businesses on side roads. • Interchange at RR 30	Low-Mod	• Access remains from existing Highway 7, change in accessibility to businesses on side roads, via new connector roads • Interchange at RR 30	Low	• Access remains from existing Highway 7, no change in accessibility to businesses on side roads. • Interchange at RR 30	Mod-High	• Indirect access, via group of Service Roads developed 'radially' from RR 30 interchange
		Location of Access / Change in access	Subjective		• No Change		• No Change		• No Change		• 'Back Door' access to 3 nurseries, no change to 2.
		Level of Visibility	Subjective	Mod	• from new Highway 7: - no change: 3 of 5 • from existing Highway 7: - no change: 5 of 5	High	• from new Highway 7: - highly visible: 4 of 4 • from existing Highway 7: - no change: 4 of 4	Mod	• from new Highway 7: - no change: 1 of 5 • from existing Highway 7: - no change: 5 of 5	High	• from new Highway 7: - highly visible: 5 of 5
		Overall effect on emergency response routes	Subjective	Low	• Access to be provided at all major crossing roads. No severance of any continuous road • No severance of any existing road corridors.	Low	• Access to be provided at all major crossing roads. No severance of any continuous road • No severance of any existing road corridors.	Low	• Access to be provided at all major crossing roads. No severance of any continuous road • No severance of any existing road corridors.	Low - Mod	• Access to be provided at all major crossing roads. Requires closure of east junction of Woolwich 72 at Hwy 7. • Discontinuous service roads on existing Hwy 7 may require some out-of-way travel.

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Community Effects (Cont'd)	Overall effect on existing communities	Subjective	Low	• Minor severance of residential community on RR 30 with highway crossing.	Mod	• Major removal of homes and businesses on north side of existing Highway 7 would fragment Shantz Station community.	Low	• Minor severance of residential community on RR 30 with highway crossing.	Low - Mod	• Access to Shantz Station provided via interchange at Reg. Rd. 30 and service roads. Discontinuous service road on north side will provide access to all properties in this area except WT-50A (buyout); access will be from Reg. Rd. 30 only. Discontinuous service roads may negatively impact access to existing businesses in central section.
	Noise	Noise sensitive areas subject to increase of > 10dBA	No.	7		7		6		4	
		Noise sensitive areas subject to increase of 5 to 10dBA	No.	31		30		32		28	
		Noise sensitive areas subject to increase of 0 to 5dBA	No.	84		77		80		81	
		Noise sensitive areas subject to decrease	No.	38		38		41		40	
	Land Use	Potential for induced development	Subjective	Low - Moderate	• would result in two parcels along Existing Highway 7 between Woolwich Road 66 and Townline Road that are no longer suitable for agriculture (that were previously in agricultural use) and would have reduced ability to operate on its own. • Primarily crosses lands designated for agricultural use. • High potential to Influence change in land use	Low	• Will not create parcels of land between Woolwich Road 66 and Townline Road for potential development. • Primarily crosses lands designated for agricultural use with ROW adjacent to existing Highway 7 ROW. • Low potential to Influence change in land use	Low	• Primarily crosses lands designated for agricultural use east of Woolwich 66. • Low -Moderate potential to Influence change in land use	Mod - High	• May encourage new development at Shantz Station (designated future commercial). Potential for induced development at other interchanges will be dependent on interchange design and municipal development policy. • High potential to Influence change in land use

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**		**Description**	
SOCIO-ECONOMIC ENVIRONMENT (CONT'D)	Land Use (Cont'd)	Impact to approved development in Official Plan	Subjective	None		None		None		None	
NATURAL ENVIRONMENT	Fisheries and Aquatic Habitat	Water crossings or encroachments (lakes, rivers/ streams and wetlands)	No.	3	New single crossing of Hopewell Creek (permanent), Hopewell Drain (intermittent) and Ellis Creek Tributary (intermittent)	3	New single crossing of Hopewell Creek (permanent), Hopewell Drain (intermittent) and Ellis Creek Tributary (intermittent). New Hopewell Creek crossing is to immediate north of existing Highway 7 crossing.	4	New crossings of 1 pond (Tillich pond). New single crossing of Hopewell Creek (permanent), Hopewell Drain (intermittent) and Ellis Creek Tributary (intermittent)	3	Widening of existing right-of-way at Hopewell Creek crossing. Edge intrusion at Memorial Gardens Ponds. New crossing of Ellis Creek tributary
			Subjective	Mod - High	Single crossing of Hopewell Creek about 150 metres north of existing Highway 7. Overall, new crossing of 3 watercourses (1 permanent, 1 drain, 1 intermittent tributary). Alignment very close to Tillich pond	Mod - High	Single crossing of Hopewell Creek to immediate north of existing Highway 7crossing. Overall, new crossing of 3 watercourses (1 permanent, 1 drain, 1 intermittent tributary).	Mod-High	Single crossing of Hopewell Creek about 150 metres north of existing Highway 7. Overall, new crossing of 3 watercourses (1 permanent, 1 drain, 1 intermittent tributary) and removal of Tlllich pond	Mod	Widening at existing Hopewell Creek crossing (coldwater). New crossing at intermittent watercourse (Ellis Creek Tributary). Edge effect on cemetery ponds.
		Significant Species	Presence	No	Hopewell creek is a high quality fishery and is a tributary of the Grand River which supports Greenside Darter.	No	Hopewell creek is a high quality fishery and is a tributary of the Grand River which supports Greenside Darter.	No	Hopewell Creek is a high quality fishery and is a tributary of the Grand River which supports Greenside Darter.	No	Hopewell creek is a high quality fishery and is a tributary of the Grand River which supports Greenside Darter.
		Areas of critical fish habitat	No.	1	Hopewell Creek – coldwater fishery	1	Hopewell Creek - coldwater fishery	1	Hopewell Creek - coldwater fishery	1	Hopewell creek coldwater fishery
			Subjective	Mod	Single crossing of Hopewell Creek with elevated structure - mitigation is feasible. (Same location as RE2-RW3).	Mod	Single crossing of Hopewell Creek with elevated structure - mitigation is feasible	Mod	Single crossing of Hopewell Creek with elevated structure - mitigation is feasible	Mod	Widening of existing Hopewell Creek crossing - elevated structure - Mitigation is feasible.
		Warmwater/ coldwater communities	No.	2 WW/ 1 CW	1 coldwater (Hopewell Creek), Hopewell Drain - low fish habitat potential, Ellis Creek tributary - bait fish habitat potential	1 WW/ 1 CW	1 coldwater (Hopewell Creek), Hopewell Drain - low fish habitat potential, Ellis Creek tributary - bait fish habitat potential	2 WW/ 1 CW	1 coldwater (Hopewell Creek), Hopewell Drain - low fish habitat potential, Ellis Creek tributary - bait fish habitat potential	1 WW/ 1 CW	1 coldwater (Hopewell Creek) Ellis Creek tributary with some baitfish potential.
		Degree of interaction with groundwater	Subjective	Low – Mod	Groundwater associated with Hopewell Creek - crossing will be elevated structure - groundwater maintenance is feasible - other crossings have limited or intermittent groundwater flow	Low – Mod	Groundwater associated with Hopewell Creek - crossing will be elevated structure - groundwater maintenance is feasible - other crossings have limited or intermittent groundwater flow	Low – Mod	Groundwater associated with Hopewell Creek - crossing will be elevated structure - groundwater maintenance is feasible - other crossings have limited or intermittent groundwater flow	Low – Mod	Groundwater associated with Hopewell creek. Crossing will be elevated structure (at existing Highway 7). Groundwater maintenance is feasible. Ellis creek tributary exhibits limited or intermittent flow.

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
NATURAL ENVIRONMENT (CONT'D)	Wildlife	Encroachment on or severance of forested vegetation or non-forested successional areas	ha.	7.4	Incorporates habitat removal at south tip of Weiland Tract (2.4 ha), new crossing of Hopewell Creek (0.9 ha), crossing of south edge of Hopewell LSW (0.6 ha), crosses southernmost narrow lobe of Townline West (0.4 ha), and crosses south edge of Townline East (3.1ha).	7.7	South tip of Weiland Tract (2.4 ha), new crossing of Hopewell Creek (0.9 ha), roadside wetland pocket opposite cemetery (0.6 ha). Crosses south end of Townline West forest lobe (0.7 ha) and crosses south end of Townline East (3.1 ha).	12.0	Incorporates habitat removal at south tip of Weiland Tract (2.4 ha), new crossing of Hopewell Creek (0.9 ha), crossing of south edge of Hopewell LSW and adjacent hedgerows (4.0 ha), crosses south edge of Townline West (1.6 ha), and crosses south edge of Townline East (3.1ha).	6.7	South tip of Weiland Tract (2.4 ha), expansion of existing Hopewell Creek crossing (0.4 ha) wetland edge intrusion (Belgian Nursery - 0.5 ha) and roadside wetland opposite cemetery (0.3 ha). Minor intrusion of upland forest lobe at Townline West (roadside - 0.9 ha). Fragments small woodlot/hedgerow unit just east of Townline Road (2.2 ha).
		Encroachment on or severance of greenways and open space linkages	Subjective	Low – Mod	Adds minor edge removal at Hopewell LSW, crosses narrow wetland neck at Townline West, and intrudes along south end of Townline East	Low – Mod	Avoids core habitat areas (Weiland - only south lobe affected), avoids Hopewell LSW. Crosses narrow wetland lobe and edge of roadside woods at Townline West and intrudes along south end of Townline East.	Mod	Adds edge intrusion at Hopewell LSW, and Townline West/East habitat blocks.	Low	Avoids core habitat areas (Weiland - only south lobe affected), avoids Hopewell LSW, Townline West and Townline East.
		Encroachment on or severance of significant wildlife habitat	ha.	7.4	South Lobe of Weiland Tract (2.4 ha), Hopewell Creek crossing (0.9 ha), Hopewell riparian LSW (0.6 ha), Townline West (0.4.ha), and Townline East (3.1 ha)	6.7	South lobe of Weiland Tract (2.4 ha), Hopewell Creek crossing (0.9 ha), Townline West wetland neck (0.3 ha) and Townline East edge (3.1 ha).	10.6	South Lobe of Weiland Tract (2.4 ha), Hopewell Creek crossing (0.9 ha), Hopewell riparian LSW (2.6 ha), Townline West (1.6 ha), and Townline East (3.1 ha)	3.7	South lobe of Weiland Tract (2.4 ha), Hopewell Creek crossing (0.4 ha) and south edge of upland woodland at Townline West (0.9 ha).
			Subjective	Low – Mod	Weiland Tract - south end (L), elevated bridge structure at Hopewell (L), crosses Hopewell riparian LSW very south edge (L). Encroaches along south end of Townline Wetland (west section - L: east section - M)	Low – Mod	Weiland Tract - south end (L). Elevated bridge structure at Hopewell Creek (L). Encroaches along south edge of Townline Wetland (west section - L; east section - M).	Mod	Weiland Tract - south end (L), elevated bridge structure at Hopewell (L), crosses Hopewell riparian LSW south edge (L-M). Encroaches along south end of Townline wetland (west and east sections) – M	Low	Edge effects at Weiland (south lobe), Townline West (very limited). Avoids Hopewell LSW. Alignment located at least 150 to 200 m south of the Townline East heronry.

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
NATURAL ENVIRONMENT (CONT'D)	Wildlife (Cont'd)	Significant Species	Presence	Yes	**Weiland Tract** (habitat for Mourning Warbler, Scarlet Tanager); **Hopewell Creek Valley**: Northern Waterthrush, Winter Wren, Red-breasted Nuthatch, **Hopewell LSW:** (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker); **Townline West PSW** :Regionally Significant Bird Species (Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler);**Townline East**: Winter Wren, Veery, Northern Waterthrush	Yes	**Weiland Tract** (habitat for Mourning Warbler, Scarlet Tanager). **Hopewell Creek Valley**: Northern Waterthrush, Winter Wren, Red-breasted Nuthatch. **Townline West PSW** (habitat for Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler). **Townline East**: Winter Wren, Veery, Northern Waterthrush	Yes	**Weiland Tract** (habitat for Mourning Warbler, Scarlet Tanager); Hopewell Creek Valley: Northern Waterthrush, Winter Wren, Red-breasted Nuthatch, **Hopewell LSW**: (Northern Waterthrush, Great Blue Heron, Brown Creeper, Mourning Warbler, Pileated Woodpecker); **Townline West PSW** :Regionally Significant Bird Species (Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler);**Townline East**: Winter Wren, Veery, Northern Waterthrush	Yes	**Weiland Tract** (habitat for Mourning Warbler, Scarlet Tanager). **Hopewell Creek Valley**: Northern Waterthrush, Winter Wren, Red-breasted Nuthatch,Avoids **Townline West PSW** (habitat for Brown Creeper, Veery, Winter Wren, Vesper Sparrow, Great Blue Heron, Northern Waterthrush, Mourning Warbler). Alignment located at least 150 to 250 m south of Townline East heronry.
			Subjective	Low – Mod	Shifts at Hopewell riparian wetland crossing and Townline West wetland crossing increase alignment separation from core habitat areas which provides some benefits for significant breeding bird species relative to RE2-RW3	Low – Mod	Avoids Hopewell riparian LSW. South shift at Townline West wetland relative to RE2 - RW3 increases alignment separation from core area which provides some benefit for significant breeding bird species.	Mod	No central habitat fragmentation, mainly edge effects. Can expect some reduction in breeding habitat quality in adjacent habitat zones. Alignment closer to Townline East heronry than CAH(d) and New Route (May 2001) alignments	Low	See wildlife habitat comments above. Alignment shifted about 150 to 200 m south of Townline East heronry.
	Wetlands	Loss of function of all wetlands within or adjacent to study area	Subjective	Low – Mod	See wildlife comments above. Reduced intrusion / increased buffering from Hopewell riparian LSW and from Townline West PSW. Moderate impact risk (M) for Townline East from edge removal.	Low – Mod	No intrusion into Breslau PSW at Hopewell Creek crossing, avoids Hopewell riparian LSW. Reduced intrusion/increased buffering from Townline West core PSW relative to RE2 - RW3. Moderate impact risk for Townline East from edge removal.	Mod	See wildlife comments above. Townline East (M), Townline West (M). Removes south edge (partly disturbed) of Hopewell LSW (L-M)	Low	Anticipated effect at Breslau PSW (edge - L), Belgian Nursery local wetland (edge L-M), Hopewell LSW (L). Avoids Townline wetland PSW.
		Loss of wetland area (total evaluated plus unevaluated)	ha.	4.1	Removal at Hopewell Riparian and Townline wetlands (edge removal). Southerly alignment shift reduces amount of wetland removal compared with RE2-RW3.	4.0	Removes 0.6 ha of isolated roadside wetland (not PSW) opposite cemetery. Removal of narrow wetland lobe at Townline West (0.3 ha) and south edge of Townline East (3.1 ha). Southerly alignment shift reduces amount of wetland removal compared with RE2 - RW3.	7.3	Removal at Hopewell Riparian and Townline wetlands (edge removal)	1.70	Avoids Townline West wetland (Only edge of small roadside upland forest lobe affected) and avoids Townline East wetland. Edge removal/isolation of unevaluated wetlands at WT-124, WT-126 and WT-51 (total of 1.5 ha). Edge removal at Breslau PSW (about 0.2 ha).

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
NATURAL ENVIRONMENT (CONT'D)	Wetlands (Cont'd)	Degree of interaction of all wetlands with groundwater	Subjective	Mod	Moderate interception potential based on field observations and review of expected grading changes (cuts). Impact mitigation is feasible.	Low – Mod	Low-moderate interception potential given elevated structure at Hopewell Creek crossing and review of expected grade cut across Townline Road. Impact mitigation is feasible.	Mod	Moderate interception potential based on field observations and review of expected grading changes (cuts). Impact mitigation is feasible.	Low – Mod	Low-moderate interception potential with elevated structure at Hopewell crossing. Downgradient of flow at WT-126.
		Encroachment on or severance of Provincially Significant wetlands (Class 1-3)	ha.	3.5	Encroachment along south ends of Townline West (0.4 ha) and Townline East (3.1 ha). Amount of intrusion is reduced relative to RE2-RW3	3.4	Encroachment along south ends of Townline West (0.3 ha) and Townline East (3.1 ha). Amount of intrusion is reduced relative to RE2-RW3	4.7	Encroachment along south ends of Townline West and Townline East	0.20	Edge of Breslau Complex (at existing Hopewell Creek crossing - Highway 7).
	Vegetation	Encroachment on or severance of high quality forest stands (not wetlands)	ha.	2.4	Removes south tip of Weiland Tract (2.4 ha).	2.8	Removes south tip of Weiland Tract (2.4 ha) and 0.4 ha of upland roadside forest (south lobe of Townline West block)	2.4	Removes south tip of Weiland Tract (2.4 ha).	3.3	Removes south tip of Weiland Tract 2.4 ha). Small roadside upland forest lobe at south end of Townline West block - edge intrusion into forest lobe (0.9 ha).
		Significant Species	Presence	No	No significant plant species recorded in this section to date.	No	No significant plant species recorded to date in this section.	No	No significant plant species recorded to date in this section	No	No significant plant species at or near the crossings recorded to date in this section.
		Erosion potential on slopes	Subjective	Low – Mod	Mainly associated with Hopewell Creek crossing	Low – Mod	Mainly associated with Hopewell Creek crossing	Low – Mod	Mainly associated with Hopewell Creek crossing	Low – Mod	Mainly associated with Hopewell Creek crossing.
		Presence of riparian habitat	Subjective	Low – Mod	One Hopewell Creek crossing with mid to late successional cover. Hopewell Drain and Ellis Creek tributary with open or early successional cover.	Low – Mod	One Hopewell Creek crossing with mid to late successional cover. Hopewell Drain and Ellis Creek tributary with open or early successional cover.	Low – Mod	One Hopewell Creek crossing with mid to late successional cover. Hopewell Drain and Ellis Creek tributary with open or early successional cover.	Low – Mod	One Hopewell Creek crossing (existing 7) with mid - late successional cover. Crossing of Ellis Creek tributary with open or early successional cover.
	Groundwater	Implications of roadway grading on groundwater discharge	No. of Cuts	4	4 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	1	Anticipated grading cut in Townline Road area.	4	4 zones along alignment where cuts might intercept groundwater movement towards wetland or watercourse.	0	No cuts anticipated - majority of alignment follows or parallells existing highway.
		Shallow groundwater wells within 300 m of C/L	No.	2		2		1		2	
		Number of private or municipal wells within 300 m of C/L	No. Subjective	37 Mod		46 Mod		30 Mod		49 Mod	
AGRICULTURE	Agriculture	Land currently used for agricultural production	ha.	64.0		68.1		66.0		70.0	

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
AGRICULTURE (CONT'D)	Agriculture (Cont'd)	Specialty crop operations affected	No.	3	WT-51 (vegetables). WT-53/54 (nursery), WT-81 (berries),	3	WT-81(berries), WT-51 (vegetables), WT-53/54 (Nursery)	3	WT-81(berries), WT-51 (vegetables), WT-53/54 (Nursery)	4	WT-136 (berries), WT-81 (berries), WT-53/54 (nursery), WT-51 (vegetables)
			ha.	13.1		12.7		13.1		6.20	
		Loss of specialty crop soil (organics)	ha.	1.7	WT-51 (vegetables).	1.8	WT-51 (vegetables)	1.7	WT-51 (vegetables)	n/a	Removal along existing right-of-way, not within active crop area based on organic soils
		Dairy/livestock operations affected	No.	4	WT-37, WT-48, WT-49, GT-2	3	WT-37, WT-48, GT-2	4	GT-2,WT-37,WT-48, WT-49	3	GT-1/2, WT-48, WT-37
			ha.	19.6		19.4		20.9		24.0	
		Field crop operations affected	No.	5	WT-27, WT-28, WT-47, WT-79, WT-85	8	WT-27, WT-28, WT-46, WT-47, WT-129, WT-79, WT-85, WT-131	5	WT-85, WT-28, WT-27, WT-47, WT-79	12	WT-85, WT-136, WT-135, WT-131, WT-79, WT-129, WT-126, WT-124, WT-47, WT-123, WT-27, WT-28
			ha.	29.6		34.2		29.9		40.0	
		Effect on future flexibility of farm operations	Subjective	Mod	Access removed: WT-27, WT-79, WT-81. New or limited access: WT-47, GT-2	Mod	Access removed for WT-27, WT-79. New access required and possible for WT-47, WT-48, WT-51, WT-53/54, WT-79, WT-81, WT-85, GT-2	Mod	Access removed: WT-81,WT-27, WT-79 New or limited access: WT-47, GT-2	Mod	Access removed: WT-27 New or limited access: WT-85, WT-131
		Effect on farm woodlots	Subjective	Mod	Some intrusion to Townline West, Townline East, Weiland forest blocks but still accessible. Hopewell Creek LSW: Will no longer be accessible to WT-51 & WT-53/54; Hopewell Creek woodland access is fragmented but still accessible to WT-47	Low – Mod	Minimal intrusion into farm woodlots. Access to Weiland Tract affected for WT-27. Some intrusion to Townline West, Townline East forest blocks but still accessible.	Mod	Some intrusion to Townline West, Townline East, Weiland forest blocks but still accessible. Hopewell Creek LSW: Will no longer be accessible to WT-51 & WT-53/54; Hopewell Creek woodland access is fragmented but still accessible to WT-47	Low – Mod	Mainly edge effects to farm woodlands - access still available.
		Effect on capital investment in agricultural operations	Subjective	High	Fragments Dairy operation (GT-2), livestock field (WT-37) with edge effect on WT-48 and very minor intrusion along WT-49. Possible loss of water source (WT-53/54). Fragments berry picking operation (WT-81).	Mod	Edge intrusion into WT-48, WT-81. Residual parcels exceed 10 ha and could be viable. Fragments dairy operation (GT-2) - south parcel > 10 ha and could be viable - north parcel with marginal viability. Loss of nursery operation.	High	Fragments Dairy operation (GT-2), livestock field (WT-37), with edge effects on operations at WT-48, WT-49. Possible loss of water source (WT-53/54). Fragments berry picking operation (WT-81). WT-79, WT-72A	High	Affects 3 livestock operations: GT-2, WT-37 and edge of WT-48; 2 specialty crop WT-136, WT-51 and 1 nursery WT-53/54
		Significant farm operation severances	Subjective	High	WT-81, WT-85,GT-2, WT-27, WT-37, WT-47, WT-79.	Mod	WT-27, GT-2, WT-125, WT-129 (partial).	High	WT-81, WT-85, G-T2, WT-27, WT-37, WT-47, WT-79.	High	WT-131, WT-79, WT-53/54, WT-55, WT-56, WT-37, WT-27, GT-2

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**	**Description**		**Description**		**Description**		**Description**	
AGRICULTURE (CONT'D)	Agriculture (Cont'd)	Significance of detrimental effects to ongoing viability of farm operations	Subjective	Mod	Buildings removed: GT-2 (partial). Remaining fragment in WT-79 too small for viable use.	Mod – High	Buildings removed - WT-53/54, GT-2 (partial). Major severance of WT-27, severance of WT-125, minor edge impact on WT-129. Major severance of GT-2.	Mod – High	Buildings removed: GT-2 (partial), WT-79. Remaining fragments too small: WT-79	Mod	Buildings removed: WT-51 Awkward shape: WT-131. Nurseries (WT-125 and WT-134) have service roads along rear of properties.
		Significance of detrimental effects to ongoing viability of farm communities	Subjective	Mod	• Study area already with urban influences. • Ratio of owner operated : Leased properties - 7:5	Mod	• Study area already with urban influences. • Ratio of owner operated: leased properties - 9:5	Mod	• Study area already with urban influences • Ratio of owner operated : leased properties - 7:5	Mod	• Study area already with urban influences • Ratio of owner operated : leased properties - 11 : 8. • Inter-farm movement is provided with service roads
TRANSPORTATION	Traffic Operations	Level of Service (2011, 2016)	Level	C		C		C		C	
		Conflicts with Existing Intersections/ entrances	No. Type	11 ent.	• Access relocations: WT-37, WT-43, WT-44, WT-61, WT-64, WT-72A, WT-79, WT-81, WT-27b, WT-27a • Loss of access: WT-62	17 ent.	• Access relocations: WT-37, WT-43, WT-44, WT-45, WT-46, WT-51, WT-53, WT-54, WT-55, WT-56, WT-79, WT-81, WT-85, WT-27b, WT-27a • Loss of access: WT-77, WT-78	8 ent.	• Access relocations: WT-27B, WT-35, WT-37, WT-38, WT-39, WT-47, WT-48, WT-27a • Loss of access: None	1 road 36 ent.	• Road closings: Woolwich 72 east junction (access via service road) • Access change from existing Hwy 7 to service road: WT-37, WT-43, WT-44, WT-45, WT-46, WT-47, WT-48, WT-51, WT-53, WT-54, WT-55, WT-56, WT-57, WT-58, WT-59, WT-60, WT-72B, WT-77, WT-78, WT-79, WT-81, WT-85, WT-123, WT-124, WT-125, WT-126, WT-127, WT-128, WT-129, WT-134, WT-135, WT-136, WT-27a • Access relocation: WT-27B, WT-35, WT-72A
		Service Life	Year	Beyond 2028		Beyond 2028		Beyond 2028		Beyond 2028	
	Safety	Conflicts with Agricultural equipment	Subjective	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.	None	Agricultural equipment will not be permitted on the CAH.
		Conflicts with Intersections/ Entrances on thru lanes	No. of Conflict Points	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.	0	No intersections/entrances on CAH.
			Subjective	None		None		None		None	

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
TRANSPORTATION (CONT'D)	Safety (Cont'd)	Comparative Collision Rate	Collisions per million vehicle km	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.	0.7	1992 Provincial Average for Freeways.
	Network Compatibility	Effect on traffic operations on parallel/crossing roads	Subjective	Low	• Interchanges provided at Reg. Rd 30 and RR 17. • Local road network maintained.	Low	• Interchanges provided at Reg. Rd 30 and RR 17. • Local road network maintained.	Low	• Interchanges provided at Reg. Rd 30 and RR 17. • Minor impacts to crossing roads at interchange/grade separation locations. All existing main roads being maintained with interchanges provided at major crossing roads.	Low - Mod	• Full Interchanges provided at RR17 and RR30, partial interchanges provided at Woolwich Road 66 and Townline Road. • Service roads provide access to properties adjacent to Hwy 7 however discontinuity will result in some out-of-way travel.
		Driver comfort and expectation	Subjective	Good	Consistent highway function.	Good	Consistent highway function.	Good	Consistent highway function.	Fair	Consistent highway function. Median barrier will introduce minor "side friction" component.
		Ability to stage implementation of the facility	Subjective	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Good	Minor impacts to crossing roads at interchange/grade separation locations.	Fair	• Major impact to traffic in central section while existing Hwy 7 is widened. May be mitigated by constructing service roads in the initial stages. Discontinuity of service roads will require more complex staging. • Minor impacts to crossing roads at interchange/grade separation locations.
		Compatibility with existing network	Subjective	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with an interchange at Reg. Rd. 30 and grade separations at Woolwich Road 66, Woolwich Road 72 and Townline Road. • Existing road network maintained (no closures required).	Good	• Full compatibility with higher tier network. • Provides reasonable linkage with lower tier network with interchange at Reg. Rd. 30 and grade separations at Woolwich Road 66, Woolwich Road72 and Townline Road. • Existing road network maintained (no closures required).	Good	• Full compatibility with higher tier network • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads.	Fair	• Full compatibility with higher tier network. • For lower tier network, the road network will be maintained in the north/south direction through interchanges or grade separations at major crossing roads (the east junction of Woolwich 72 at existing Hwy 7 will be closed, with access via service road). However, discontinuity of service roads along existing Hwy 7 will result in circuitous travel between interchanges in the east/west direction

				May 2001 – New Alternatives				February 2001 – Alternatives Carried Forward to Final Stage			
				RC1		RC2		RE2 – RW3 (Preferred New Route Alternative)		KC2 – RE2 GC2-CAHd (Preferred Combined Alternative)	
Grouping	**Factor/ Criterion**	**Indicator**	**Unit**		**Description**		**Description**		**Description**		**Description**
TRANSPORTATION (CONT'D)	Network Compatibility (Cont'd)	Compatibility with future network	Subjective	Good	Reasonable flexibility to accommodate future local roads (subject to approval).	Good	Reasonable flexibility to accommodate future local roads (subject to approval).	Good	Reasonable flexibility to accommodate future local roads (subject to approval).	Good	Reasonable flexibility to accommodate future local roads (subject to approval).
		Flexibility for future expansion	Subjective	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW.	Good	Reasonable flexibility with the 100 m ROW	Fair-Poor	Expansion within the central section (Woolwich 66 to Townline) is limited by the 70 m ROW - future expansion may require additional property and road network impacts.
		Ability to accommodate future transit	Subjective	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/ improved transit service within the corridor.	Good	• Opportunities for dedicated lanes or ROW within 100 m corridor. • Reduced flow on Hwy 7 provides opportunity for additional/improved transit service within the corridor.	Fair	• Within the central section (Woolwich 66 to Townline), transit would be limited to bus technology operating within mixed flow. Station stops would be limited to interchange locations. Discontinuity in service roads will limit the efficiency of use by transit. •
COST	Construction	Potential loss of business during construction	Subjective	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits/ crossing roads. Access maintained through staging.	Low	Minor disruption at project limits. Access maintained through staging.	Low	Minor disruption at project limits/crossing roads. Staging of central section (through initial construction of service roads) to maintain movement during construction.
		Construction	$M	28.0		33.6		29.0		37.4	
		Staging	$M	0		0		0		2.9	
	Property	Residential	$M	1.61		1.06		2.68		0.33	
		Commercial	$M	0.31		2.19		0.005		0.11	
		Industrial	$M	0		0		0		0	
		Agricultural	$M	1.27		2.41		1.48		1.20	
		Other	$M	0.12		0.11		0.20		0.06	
		TOTAL PROPERTY	$M	3.31		5.78		4.41		1.70	
	TOTAL COST	Construction + Property	$M	31.3		39.4		33.4		42.0	
	Operation and Maintenance	Operation and maintenance	$M	0.12	27.6 lane-km X 4,300	0.12	28.9 lane-km X 4,300	0.12	27.8 lane-km X 4,300	0.12	42.5 lane-km X 4,300 (13.6 lane-km of new service roads)

The effect to the ongoing viability of farm operations would be considered moderate for both RC1 and the Combined Alternative. With RC1 only one building would be removed and there would only be one fragment too small for viable use. For the Combined Alternative there would be the removal of one building and an awkward shape would be created for another property. With RC2 and the New Route Alternative the effects to the ongoing viability of farm operations would be considered moderate to high. With RC2 there would be buildings removed from two properties and a number of significant severances. The New Route Alternative would remove buildings from two properties and the remaining fragments from another property would be too small for viable use.

Transportation

The most significant difference between the alternatives in terms of traffic operations would be the conflicts with existing intersections/entrances. With RC1 there would be conflicts with eleven entrances, one of which would be lost and the others relocated. Alternative RC2 would conflict with seventeen entrances, two of which would be lost. The New Route Alternative would require the relocation of eight entrances. With the Combined Alternative 33 entrances would be changed so that they no longer provide access to Highway 7 but rather provide access to a service road. Three additional entrances would require relocation. The Combined Alternative would also result in the closure of Kramp Road (east junction of Woolwich Road 72) at Highway 7, although Kramp Road would connect to the new service road on the south side of Highway 7.

There would be no difference between the alternatives for safety.

For network compatibility, the ability to stage implementation of the facility would be considered good for RC1, RC2 and the New Route Alternative, with minor impacts to crossing roads at interchange/grade separation locations. The compatibility with the existing and future network would also be considered good for these alternatives. The flexibility for future expansion would be considered good within the 100 m right of way. There would also be a greater flexibility for transit in the future.

For the Combined Alternative the ability to stage implementation of the facility would be fair because of the major impact to traffic in the central section while existing Highway 7 is widened. Discontinuity of service roads would also require more complex staging. The compatibility with the existing network would also be considered fair because of the closure of Kramp Road (east junction of Woolwich 72) at existing Highway 7 and the discontinuity of service roads along existing Highway 7 that would result in circuitous travel between interchanges in the east/west direction. There would be reasonable flexibility to accommodate future local roads. The flexibility for future expansion would be fair because it would be limited by the 70 m right of way in the central section, and future expansion may require additional property and would result in road network impacts. The future flexibility for transit may be limited because of the 70 m right of way.

Cost

RC1 would have the least total cost ($31.3.0 M) and the Combined Alternative would have the highest total cost ($42.0 M) (2000 dollars) including an estimate for property.

4.3.4.14 Evaluation of Phase 3 (RC) Alternatives

When the four alternatives considered in Phase 3 were compared using the amended factors and indicators, Alternative RC1 was found to be equal to or better than the other alternatives for all major groupings, except for Natural Environment. However, Alternative RC1 would have less impact on the natural environment than the New Route Alternative considered in Phase 2, and far less impact than the Recommended Plan (1997).

Alternative RC2 was found to be better than Alternative RC1 and the New Route Alternative for Natural Environment. However, Alternative RC2 would be the least preferred alternative for Socio-Economic Environment, in particular because of the removal of the houses and businesses at Shantz Station.

Alternative RC1 is therefore considered to be the best of the four alternatives because it provides the best balance amongst the Factor Groupings for overall effect on the environment.

A graphical summary of the evaluation is shown on Exhibit 4-28.

Alternative RC1, combined with the east (RE2) and west (RW3) sections presented in February 2001 is identified as the Recommended Route (2002). The Recommended Route (2002) is shown on Exhibit 4-29. For comparison purposes, the Recommended Route (2002) is presented with the Recommended Plan (1997).

The Recommended Route (2002) was presented to the public in the Fall of 2001. A drop-in centre for Property Owners was held on September 11, 2001. This provided an opportunity for affected owners to review the alternatives prior to the Public Information Centres. Information packages were forwarded to the councillors in each municipality, prior to the November PICs.

The response from the public at the information centres held in November 2001 was much more favourable than the response received in February 2001. The majority of written comments received supported the Recommended Route (2002). However, there was continued negative response from groups and individuals who believed that a simple widening of Highway 7 in the central rural section would be sufficient, if more emphasis were placed on alternate modes of transportation.

The Recommended Route (2002), as shown on Exhibit 4-29 and described in Chapter 5, is the result of intensive technical analysis and evaluation and public consultation.

Alternative / Group	New Route Alternative (February 2001)	Combined Alternative (February 2001)	Alternative RC1	Alternative RC2
Socio-Economic Environment				
Natural Environment				
Agriculture				
Transportation				
Cost				

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

FOURTH STAGE EVALUATION
REVISED CENTRAL ALTERNATIVES

EXHIBIT
4-28

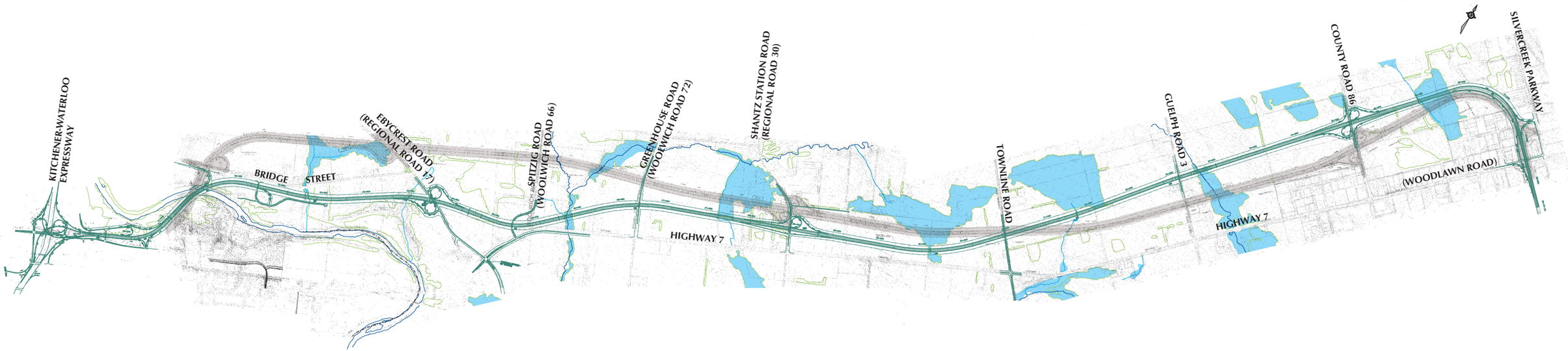
4.3.4.15 Analysis and Evaluation – Conclusion

After the Public Information Centres in November 2001, the Project Team reviewed the comments received and concluded that the best alternative to address the transportation needs in the corridor would be a Controlled Access Highway identified as the Recommended Route (2002).

Presentations were arranged with all of the municipalities in the Study Area and the GRCA Board. Council resolutions have been received from the following in support of the Recommended Route (2002):

- Regional Municipality of Waterloo
- County of Wellington
- City of Kitchener
- City of Guelph
- Township of Woolwich
- Township of Guelph Eramosa
- GRCA

The Recommended Route (2002) was also endorsed by the Wellington and Waterloo Chapters of the Federation of Agriculture.



LEGEND

- RECOMMENDED ROUTE (2002)
- RECOMMENDED PLAN (1997)

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

COMPARISON OF THE RECOMMENDED ROUTE (2002) WITH THE RECOMMENDED PLAN (1997)

EXHIBIT
4-29