3. EXISTING AND FUTURE CONDITIONS

This section describes the existing and future conditions within the study area and environmentally significant areas/issues are also identified.

The resultant data are grouped into the following aspects of the environment:

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

The sections that are 'boxed' and in italics are excerpts from the EA Report 1997.

Study Area

Between Kitchener and Guelph, transportation demand has reached a level where various sections of Highway 7 are now operating near capacity. Since this problem relates directly to the highway, the limits of the study area were established using the existing Highway 7 corridor together with an adjacent zone of sufficient size to provide for flexibility in developing a broad range of alternatives.

The study area, as shown on Exhibit 3-1, extends from the Kitchener-Waterloo Expressway (KWE) in the Regional Municipality of Waterloo (RMW), easterly to the Hanlon Expressway (Highway 6) in the City of Guelph. Within the RMW, the study area extends north of the community of Bridgeport and Woolwich Road 68 to approximately 700 m south of the CN rail line. Within the County of Wellington, the study area extends north to a location mid-way between County Road 30 and Woodlawn Road, with the south limits paralleling approximately 700 m south of the CN rail line.

The original study area was considered to be appropriate for the MTO Review.

3.1 Socio-Economic Environment

The Socio-Economic Environment considers the human and built aspects of the environment. The existing conditions are described in terms of the municipalities, population and employment, communities and community facilities, land use, noise sensitive areas and heritage resources. Significant changes to the Socio-Economic Environment since the EA Report 1997 are identified.

3.1.1 Municipalities

a) Data Sources

Information pertinent to each municipality was obtained from a number of sources which included:

- The Regional Municipality of Waterloo;
- The City of Kitchener;
- The Township of Woolwich;
- The County of Wellington;
- The Township of Guelph /Eramosa; and
- The City of Guelph.

b) General Description

The study area is within both the Regional Municipality of Waterloo (RMW) and the County of Wellington. Within the RMW, the study area includes portions of the City of Kitchener and the Township of Woolwich. Within the County of Wellington, the study area includes portions of the Township of Guelph / Eramosa and the City of Guelph.

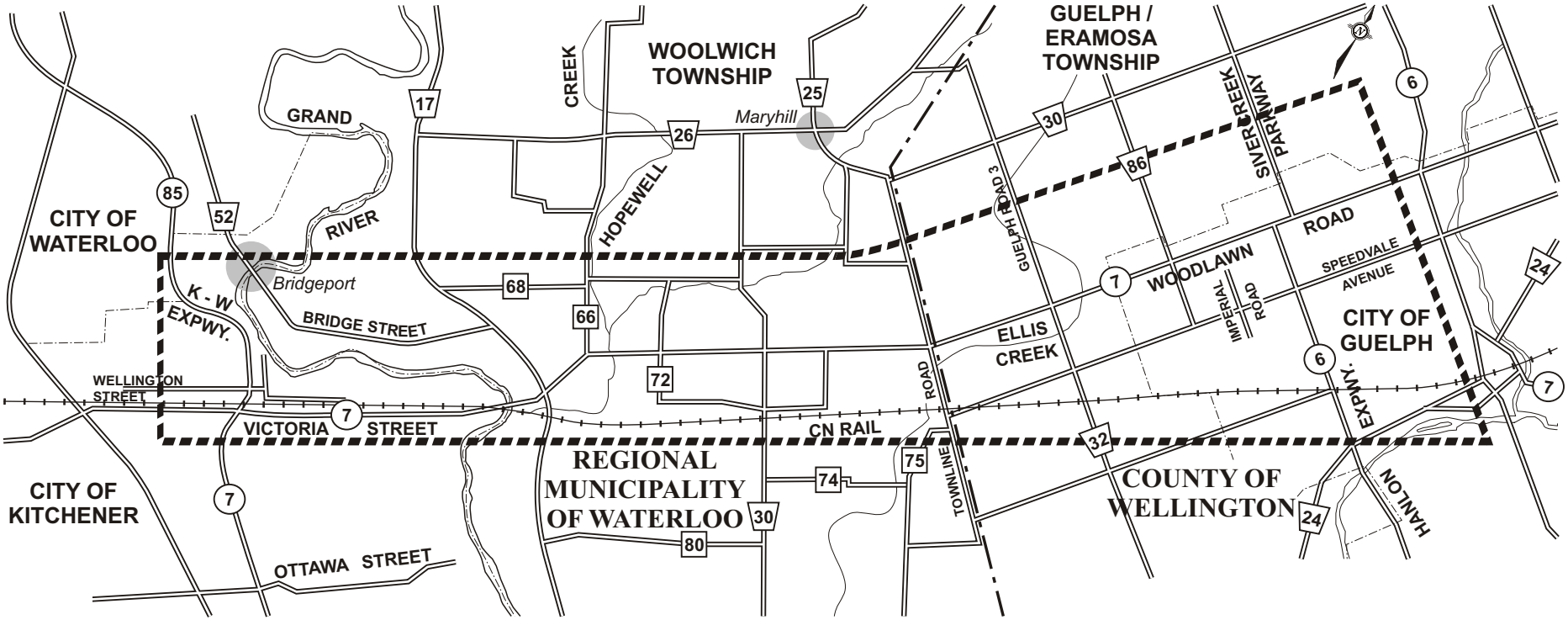
For the MTO Review population data was obtained from the Regional Municipality of Waterloo for 2016, Canadian Census Data for 2028. Projections for 2031 were obtained from the Office of the Greater Toronto Area (OGTA), which were used for comparison purposes only. The projected growth was obtained from each municipality based on respective Officials Plans. This was considered appropriate for the Original EA and was considered appropriate for the MTO Review.

The population for each municipality as reported in the 2002 Municipal Directory issued by the Ministry of Municipal Affairs and Housing, is as follows:

Regional Municipality of Waterloo[1]	417,932
City of Kitchener	177,858
Township of Woolwich	17,537
County of Wellington [2]	167,396
Township of Guelph/Eramosa	10,272
City of Guelph	94,201

1. Includes City of Kitchener population.
2. Includes City of Guelph population.

The population figures as shown above are based on the 2000 enumeration.



STUDY AREA

HIGHWAY 7 PLANNING STUDY KITCHENER TO GUELPH	STUDY AREA	EXHIBIT 3-1

The Regional Municipality of Waterloo, Planning and Culture Department Statistical Profile Population and Households (1998) provide the following populations for 2016.

• Regional Municipality of Waterloo	543,700
• City of Kitchener	234,500
• Township of Woolwich	24,600

The population predicted for 2028 was determined from the Canadian Census Data and is as follows:

Regional Municipality of Waterloo (including Kitchener)	606,100
County of Wellington	255,400
City of Guelph	138,498

Note the population does not have the same breakdown as the 2002 populations.

For year 2031 (Smart Growth) OGTA projects the following:

Regional Municipality of Waterloo	641,000
County of Wellington	284,000

c) Summary of Changes from EA Report 1997

New population data was available for the MTO Review. Although the breakdown by individual municipality is not part of the 2028 and 2031 information, the general growth trend can be used as a basis of forecasting future demand.

d) Significance

The Region of Waterloo and the County of Wellington are projected to grow by over 275,000 population from 2002 to 2028. The cities of Kitchener and Guelph together are projected to have an increase in population of over 100,000 in the same period. (Kitchener is forecast to grow by 56,600 by 2016 and Guelph is forecast to grow by 44,300 by 2028.)

Increases in population both recent and planned will result in increased travel demand between the cities of Guelph and Kitchener. Growth in travel demand in the corridor as a result of the increases in population and employment is forecast to double in the rural central section of Highway 7. (see Section 3.4).

The need to provide reasonable transportation infrastructure (capacity) to meet the expected growth in population (demand) has been identified as an Environmentally Significant Issue.

3.1.2 Communities/Land Use

a) Data Sources

Information regarding communities and land use within the study area was gathered through discussion with municipal staff and officials as well as the public. This was supplemented with reference to aerial mosaics of the study area, which were reviewed in conjunction with the municipalities' Official Plans.

b) *General Description*

Generalized existing and future land use plans showing the residential, industrial/commercial, and institutional areas within the study area are shown on Exhibit 3-2. Townline Road is the boundary between the RMW and the County of Wellington.

Within the study area there are generally four different types of land use:

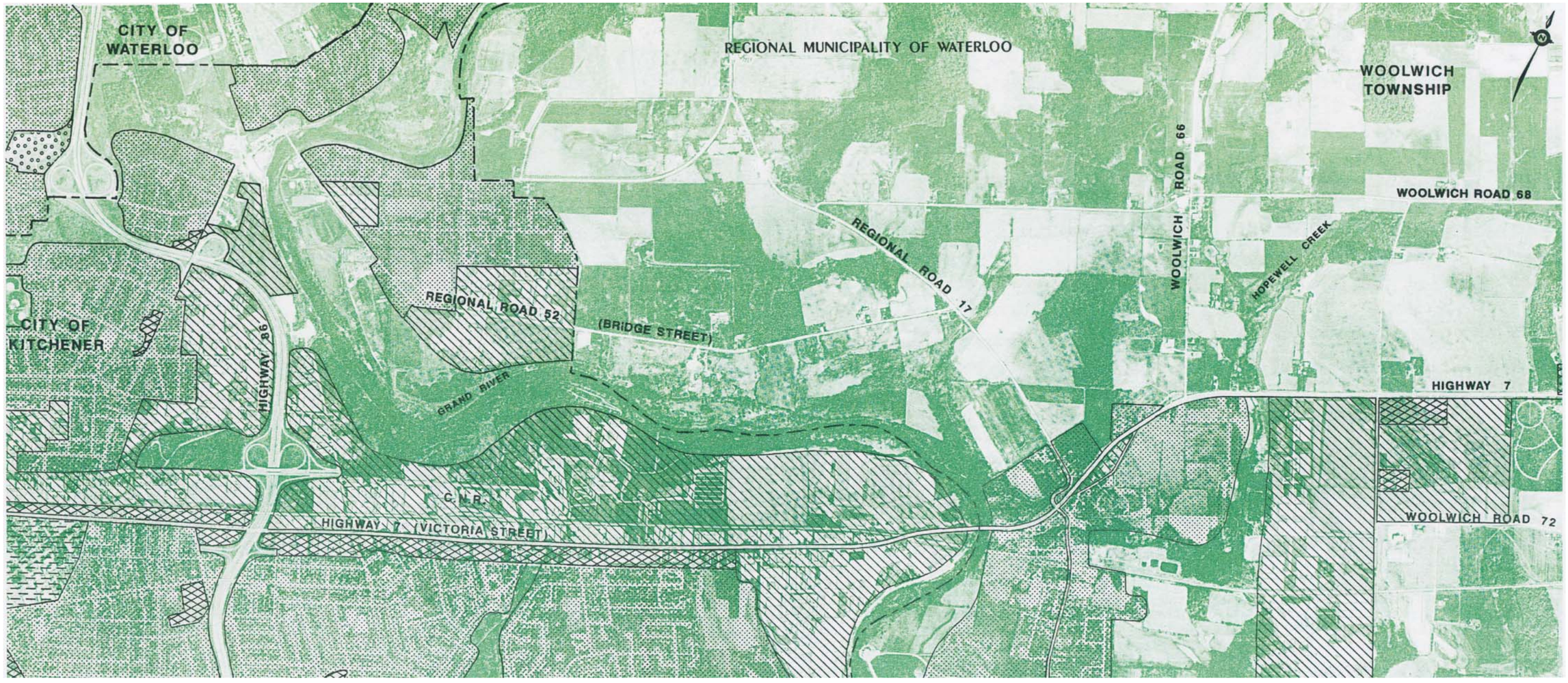
- *residential;*
- *industrial/commercial;*
- *institutional; and*
- *agricultural*

Residential

Residential communities are mostly rural and consist of properties scattered throughout the study area, however the study area includes an urban residential community south of Victoria Street in the City of Kitchener. The community of Breslau, within the Region of Waterloo is located south of existing Highway 7 and east of the Grand River. The Township of Woolwich has proposed development east of the Breslau community and south of Highway 7. Population projections range from approximately 6,560 (low density) to 14,400 (high density).

Shantz Station is the most visible rural community development in the study area located at the intersection of Highway 7 and Shantz Station Road (Regional Road 30). The community is a mix of residential, highway commercial, and agricultural land uses.

Within the City of Guelph and Guelph/Eramosa Township a residential community exists along Silvercreek Road, north of Woodlawn Road. The Official Plan designation of these lands within the City is industrial, however, these homes pre-date the Official Plan land use designation.



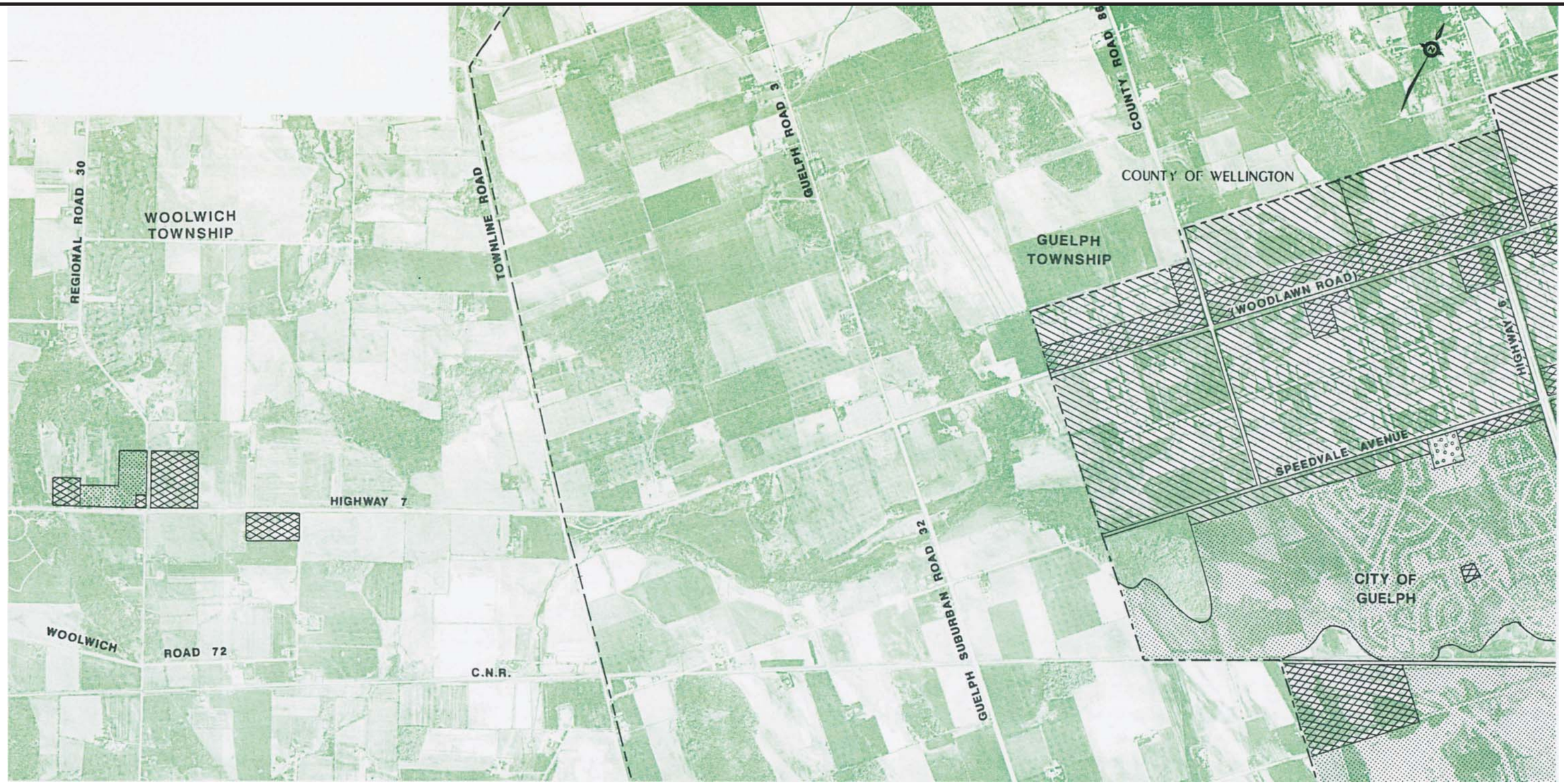
LEGEND

- SPECIAL STUDY AREA
- RESIDENTIAL
- COMMERCIAL
- INSTITUTIONAL
- INDUSTRIAL
- AGRICULTURAL / OPEN SPACE

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

EXISTING AND FUTURE LAND USE

EXHIBIT
3-2a



LEGEND

- SPECIAL STUDY AREA
- RESIDENTIAL
- COMMERCIAL
- INSTITUTIONAL
- INDUSTRIAL
- AGRICULTURAL / OPEN SPACE

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

EXISTING AND FUTURE LAND USE

EXHIBIT **3-2b**

Industrial/Commercial

Industrial/commercial communities are predominantly located in both Kitchener and Guelph. In Kitchener, industrial land uses are designated in two areas: Shirley Avenue/Riverbend Drive and Bridge Street (Bridgeport). The types of businesses vary from light service industrial to heavy manufacturing industrial. As noted earlier, the adjacent land uses along Victoria Street in the City of Kitchener are retail commercial with some industrial uses. In Guelph, the industrial/commercial land uses are bounded by Speedvale Avenue to the south, the west and north city limits to the west and north respectively.

The industrial land uses extend beyond the easterly limit of the study area. In addition, industrial land uses are designated south of existing Highway 7 between Ebycrest Road (Regional Road 17) and Greenhouse Road in the Breslau area. Although these lands are designated industrial, the use of the lands is currently being considered for other uses.

The land uses along the central rural section of Highway 7 are a mix of nurseries, residential, commercial and agriculture. There are three nursery operations fronting on Highway 7 and two others on sideroads close to Highway 7. During the MTO Review the existing central section of Highway 7 area became known as the 'Nursery Mall'.

Institutional

There are two private schools located in the rural part of the study area: Woodland Christian High School and St. John's Kilmarnock School. The Woodland Christian High School is located on Woolwich Road 66 north of Highway 7. St. John's Kilmarnock School is located on Regional Road 30 north of Highway 7.

One additional institutional site was identified in the MTO Review. The Brahmarishi Mission of Canada (Hindu Temple) is located on Bridge Street in Kitchener. An industrial site was converted to the Hindu Temple after the original study was completed in 1994.

Agricultural

Land use within the rural component of the study area is predominantly agricultural. Farms are a mixture of owner operated and tenant operated businesses. The agricultural community is discussed in Section 3.3.

The Regional Municipality of Waterloo Official Policies Plan (ROPP) designates the majority of the area in the rural part of the study area as Prime Agricultural Land. The ROPP states very clearly that non-farm uses in Prime Agricultural Lands are not permitted. The Township of Woolwich has developed rural land use policies as part of its Official Plan that preserve, protect and encourage the use of land for farming. The importance of retaining land for agricultural uses has been re-iterated by staff of both the RMW and the Township of Woolwich during the MTO Review.

c) Summary of Changes from EA Report 1997

In general, the land use in the study area has not changed since the 1997 report, with the exception of some specific site changes, the most notable being the Hindu Temple. The 'Nursery Mall' area was highlighted because of its uniqueness in the Guelph / Kitchener area.

d) Significance and Sensitivity

Loss or disruption of access to the upper tier road network is a major concern of businesses in the study area, particularly in the industrial areas of Kitchener and Guelph and has been identified as an Environmentally Significant Issue. Disruption to access during construction is also a concern to businesses. Access and disruption to the businesses has been identified as an Environmentally Significant Issue.

The disruption or displacement of households, both in the urban and rural areas has been identified as an Environmentally Significant Issue.

3.1.3 Noise

a) Data Sources

The Ministry of Transportation's approach to noise analysis is based on the Ministry of Transportation/Ministry of Environment and Energy Protocol entitled "A Protocol for Dealing with Noise Concerns During the Preparation and Evaluation of Provincial Highway Environmental Assessments", or simply "The Noise Protocol". The Noise Protocol is a formal policy agreement outlining how noise will be addressed during the preparation, review and evaluation of environmental assessments carried out for Provincial Highway undertakings.

The noise description used for roadway/highway noise is the equivalent of sound level, Leq. Leq is defined as the continuous sound level which has the same energy as a time-varying noise level over the period of time being considered. For Provincial Highway undertakings, the Leq is calculated on the basis of the 24 hour traffic volumes.

Noise levels are measured in decibels on an A-weighted scale (dBA) which best approximates noise levels as perceived by the human ear. It should be noted that because noise levels are measured by a logarithmic scale, an increase of 10 dBA would result in an approximate doubling of the loudness experienced. For example, 80 dBA is approximately twice as loud as 70 dBA. In a laboratory setting, an increase or decrease of 2 to 3 dBA is normally regarded as just perceivable to the average individual.

Noise sensitive areas (NSA) are those sites where the existing land use and zoning designation are for residential use. To qualify as an NSA, the site must have an outdoor living area (OLA) associated with the residential unit. Examples of NSA's include private homes, townhouses, multiple unit buildings, as well as hospitals and nursing homes where there are OLA's for the patients. For the purpose of new highway developments, NSA's would also include certain institutional uses and specific definitions of "residential areas" and "quiet areas" found in municipal noise control bylaws as approved by MOE under the Environmental Protection Act.

Noise levels for the Highway 7 project were predicted using the STAMSON (Versions 3.0 and 4.1) and STAMINA 2.0 computer models.

b) General Description

Future noise levels from the proposed undertaking are based on traffic projections 10 years after completion of the undertaking. To determine impact, a comparison is made between the "Do Nothing" alternative 10 years in the future and noise levels with the undertaking at that same date. In both cases, future traffic volumes are used. The significance of the noise impact is calculated by comparing these two noise levels.

Where a new highway adjacent to an NSA will result in a noise level increase of 5 dBA or less, 10 years after completion, there is no requirement to implement noise control measures as the impact is considered to be slight. Where the new highway will result in a noise level increase greater than 5 dBA, 10 years after completion, the Ministry is required to investigate the application of noise control measures within the highway right-of-way. Noise control measures, where applied, should achieve future noise levels close to or lower than the objective level of 55 dBA. In addition, to warrant construction, the measure should also achieve a minimum attenuation of 5 dBA on average.

During the Highway 7 study, two levels of analysis for noise effects were carried out. The first of these can be considered as the planning level of analysis, while the second represents the preliminary design level. The analyses were conducted for all identified NSA's affected by the proposed alignment.

For the planning level of analysis, the STAMSON 3.0 noise prediction model was used to compare the different roadway alternatives. Noise levels were calculated for the 'Do Nothing' condition using future traffic volumes. This provided the basis of comparison for all other alternatives.

Within the Highway 7 study area, the only types of noise sensitive areas subject to noise level increases were single family homes. Although other types of NSA's exist within the study area, none are adjacent to the proposed alternatives as outlined in Chapter 4.

For each alternative, a count was made of the number of houses that would be subject to noise level increases. Totals were grouped into three ranges: 0 to 5 dBA; 5 dBA to 10 dBA; and more than 10 dBA. The actual number of houses within each range is documented in Section 4.3.

The preliminary design level of analysis made use of the STAMINA 2.0 model to determine the specific effects of the recommended alternative. For preliminary design purposes, an assessment was undertaken for each residence that would be subject to a noise level increase due to the recommended alternative. The assessment also considered the results of the planning phase of the study, as well as comments from members of the public who were concerned that their homes might be subject to noise level increases.

Calculations were then carried out for individual locations using future traffic volumes. The calculations were completed for two different scenarios: a) no new roadway (the "Do Nothing" alternative), and b) construction of the recommended alternative.

The specific noise level changes at each site were then assessed by comparing the 'Do Nothing' alternative to the recommended alternative. As indicated in the requirements of the Noise Protocol, the comparison was based on forecasted traffic conditions ten years after construction. This assessment provided the basis for establishing the 'future without' the undertaking and the 'future with' the undertaking.

Where noise level increases were predicted to be less than 5 dBA, mitigation measures would not be warranted. Where increases were predicted to be greater than 5 dBA, noise mitigation measures within the right-of-way were investigated using the STAMSON 4.1 computer model.

The preliminary design level of analysis followed the same process as outlined in the EA Report 1997. The STAMINA 2.0 model was used to determine the specific effects of the alternatives being considered.

Where noise mitigation measures are technically, economically and administratively feasible, they are designed to achieve future noise levels close to or lower than the objective level of 55 dBA. Also, noise mitigation measures must achieve a minimum attenuation of 5 dBA to warrant construction.

c) Summary of Changes from EA Report 1997

There were no differences in the way in which noise levels were measured. Impacts to specific NSAs may be different based on distance from Recommended Plan (1997) versus Recommended Route (2002).

d) Significance and Sensitivity

The construction and operation of a new highway has the potential to increase noise levels for noise sensitive land uses adjacent to the alignment. Therefore, an increase in noise level has been identified as an Environmentally Significant Issue for noise sensitive areas within the study area.

3.1.4 Heritage Resources

a) Data Sources

Information on built environment heritage resources was obtained from the City of Kitchener, City of Guelph, the Townships of Woolwich and Guelph and the County of Wellington.

The Woolwich Township Local Architectural Conservation Advisory Committee (LACAC) provided a list identifying properties within the Township that contain buildings designated under the Ontario Heritage Act (Martin Binkley, personal communication, 1990).

An archaeological survey was carried out by the Regional Archaeologist for the Ministry of Transportation.

Archaeological investigations undertaken by the Ministry of Transportation (MTO) follow the process set out in A Protocol for Dealing with Archaeological Concerns on

Ministry of Transportation Undertakings. This document, herein referred to as the Archaeological Protocol, clarifies the legislative requirements of the Ontario Heritage Act and the Environmental Assessment Act as they pertain to the role of MTO in archaeological matters, and defines general archaeological requirements to be applied to all MTO undertakings.

To determine archaeological potential of the study area, a search of the Database of the Ministry of Citizenship, Culture and Recreation (then Citizenship and Culture) was undertaken in March, 1991. Sites located within the study area were plotted on 1:25,000 scale topographic maps. These maps were updated in April, 1995.

In response to questions and concerns raised by government agencies during the presubmission review of this report in 1997, additional background information was gathered for heritage resources in the study area and incorporated in this final EA document. Updating this material has enabled the MTO to further define the potential net effects of the Recommended Plan and any proposed mitigation measures to be considered in detail design. Thus, the approved Region of Waterloo Official Policies Plan (ROPP) was also reviewed in the context of the Region's Heritage Conservation framework identified in Section 6.4 of the ROPP.

b) Description

Within the City of Kitchener in the Highway 7 study area, fourteen buildings are designated under the Ontario Heritage Act (OHA) as listed in the City of Kitchener's Index of Buildings Designated Under the Ontario Heritage Act (1993). The list of buildings is included in Appendix C of the EA Report 1997.

All of the heritage buildings listed by Woolwich Township are outside of the study area, and therefore none will be affected by the proposed undertaking. Similarly, in the Township of Guelph/Eramosa, there are no designated buildings within the areas being considered for alternative alignments.

Within the study area in the City of Guelph, eighteen properties are identified in Designated Buildings of Architectural and Historical Significance in the City of Guelph (1993) as per the OHA. These buildings are also listed in Appendix C of the EA Report 1997.

Throughout the study area, there are a number of non-designated buildings which could be considered heritage features. Most of these sites are associated with the early development of the agricultural community and include farmstead buildings as well as a rural schoolhouse.

Potential for the recovery of archaeological remains within the study area is high. The Grand River, Hopewell Creek and Ellis Creek traverse the study area. In addition to serving as travel routes, these watercourses and associated wetlands would have contained abundant wildlife and served as rich sources of food.

A search of the site data base compiled by the Ministry of Citizenship, Culture and Recreation indicated that there are six archaeological sites within the boundaries of the Highway 7 study area. Two of these, AiHc-59 and AiHc-60, are historic sites and

contain building foundations which relate to 20th century occupations. The Schweitzer cemetery (AiHc-16), located close to the western end of the project, is a Glacial Kame burial ground that was disturbed during construction of a housing subdivision. The three remaining prehistoric sites, Entwhistle (AjHb-2), Good (AiHc-28) and County Line (AjHc-2) are multi-component. The Good site is located on a terrace of the Grand River and contains artifacts relating to Archaic and Princess Point occupations. The County Line site is located on a knoll next to Ellis Creek and contains artifacts relating to Late Archaic and Early Woodland occupations. The location of the Entwhistle site, which contains Middle and Late Archaic point types, is unknown.

In addition to these registered sites, there are reports of three unregistered sites within the study area. However, information concerning these sites is limited. Artifacts associated with these sites could not be recovered, and neither age nor cultural affiliation could be determined.

Based on the archaeological sites previously registered within the study area, it is assumed that campsites may be located within the right-of-way of the Recommended Route (2002). The Grand River tableland has high potential for the recovery of Woodland villages. However, most of the tableland of the Grand River in the area of the proposed alignment has been impacted by previous aggregate extraction activities. The Grand River flood plain terraces are preferred locations for Princess Point sites.

Previous Work

MTO undertook an archaeological assessment (Dodd 1996) of the Recommended Plan (1997) as identified in the EA Report 1997. Although the route has changed since that time, there is some overlap in the area previously assessed and what is required for the current Recommended Route (2002), primarily in the eastern and western portions of the study area.

During the Original EA, MTO archaeologists found fifteen sites, located within the Recommended Plan (1997) right-of-way. Of these sites, seven were determined to be isolated findspots that required no further work. As well, an isolated bone fragment was located on the south bank of the Grand River (Dodd 1996:5).

Of the remaining nine sites that are located within the Recommended Route (2002), MTO archaeologists conducted the Stage 3 test excavation of two. Of these two, one (the Trail site) was completely excavated (Dodd 1997) and the second (the Little Trail site) was determined to be insignificant based on the results of the Stage 3 testing (Dodd 1996: 3-4). Seven untested sites still remain within the proposed corridor. Of these, six will require testing and the seventh, a late 19th century historic site, was deemed too recent to require further work. The Stage 3 site testing remains to be completed.

Current Work

New Directions Archaeology Ltd. undertook the assessment of the remainder of the Recommended Route (2002) in late spring 2003. A total of 187.7 hectares of land within the proposed Highway 7 Recommended Route (2002) right-of-way has been assessed for this report. The remaining 30.7 hectares of land still requires Stage 2 archaeological

assessment on the Highway 7 corridor. This land was not assessed because permission to enter was denied or permission to plough active crops was denied.

During the Stage 2 assessment in 2003, a total of 53 sites or finds were discovered, containing a total of 186 artifacts. Two sites, Challenger and PS 33A-E (AiHc-294), have had extra Stage 2 surface investigation recommended. Significant archaeological remains were discovered at 16 locations for which Stage 3 site testing has been recommended. Mitigation measures and further work is discussed in Section 6.2.4.1.

Grand River Corridor

The Grand River is an important natural and cultural heritage feature in terms of both its biophysical and social features and how they function in the southern Ontario setting. This recognition led to the development of the Grand River Corridor Conservation Plan Discussion Paper by the Region of Waterloo in 1992, and the subsequent designation of the Grand River as a Canadian Heritage River in 1994.

Cultural Heritage

The topography of the area includes the rolling Guelph Drumlin fields with intervening low grounds. For the most part the lands in the study area have been in agricultural use throughout the 19th and 20th centuries. Scattered farm complexes, both former and present, with associated fields patterns dot the landscape. Local roads both gravel and paved cross the study area. Along the existing Highway 7 the land use has evolved more recently from rural to highway commercial land use with some rural residential development and adjacent agricultural lands.

The cultural heritage landscapes and built heritage features within the study area include roadscapes, active and abandoned farm complexes, a waterscape and a former or abandoned road right-of-way. Within the farm complexes individual built heritage features are found such as farmhouses, barns, and outbuildings set in agricultural lands. The majority of the residential (former farmhouse) buildings are of masonry construction.

Unterman McPhail Associates undertook a cultural heritage assessment of the built heritage features and cultural heritage landscapes for the Recommended Route (2002), plus any specified access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction of the highway. An inventory of the built heritage features and cultural landscapes along the Recommended Route (2002) was undertaken in April 2003.

The built heritage features and cultural heritage landscapes identified during the roadside survey are listed in Tables 3-1 and 3-2. The former and present agricultural landscape is found throughout the length of the study corridor and is not listed as an individual cultural heritage landscape in Table 3-2.

TABLE 3-1: Built heritage features (BHF) within the Recommended Route (2002)

Reference	Resource type	Description	Location
1	BHF	Residence (detached)	No. 297 Woodlawn Road (Highway 7) at the north end of Hanlon Parkway (Highway 6), Guelph.
2	BHF	Farmhouse (former)	No. 5390 Guelph Township Road 3, Guelph-Eramosa Township.
3	BHF	Silo (ruin)	No. 3014 Highway 7, north side, Woolwich Township.

TABLE 3-2: Cultural Landscape Units (CLU) within the Recommended Route (2002)

Reference	Resource Type	Description	Location
1	CLU	Farm complex (former)	No. 5420 Silvercreek Parkway (Wellington County Road 39), Guelph-Eramosa Township.
2	CLU	Farm complex	No. 5415 Elmira Road (Wellington County Road 86), Guelph-Eramosa Township.
3	CLU	Farm complex	No. 5432 Elmira Road (Wellington County Road 86), Guelph-Eramosa Township.
4	CLU	Farm complex	No. 5441 Elmira Road (Wellington County Road 86), Guelph-Eramosa Township.
5	CLU	Roadscape	Guelph Township Road 3, Guelph-Eramosa Township
6	CLU	Farm complex	No. 5413 Guelph Township Road 3, Guelph-Eramosa Township
7	CLU	Farm complex	No. 5395 Townline Road, Guelph-Eramosa Township
8	CLU	Roadscape	Townline Road, Guelph-Eramosa/Woolwich Township.
9	CLU	Farm complex	No. 2114 Shantz Station Road (Regional Road 30), Woolwich Township.
10	CLU	Roadscape	Greenhouse Road (Woolwich Road 72), Woolwich Township.
11	CLU	Roadscape (former)	Highway 7, west of Spitzig Road (Regional Road 66) to Breslau, Woolwich Township.
12	CLU	Farm complex	No. 1000 Bridge Street East at Regional Road 17, Woolwich Township.
13	CLU	Farm complex	No. 858 Bridge Street East, Woolwich Township.
14	CLU	Farm complex	No. 800 Bridge Street East, Woolwich Township.
15	CLU	Waterscape	Grand River crossing.

c) Summary of Changes from the EA Report 1997

Heritage features within the study area have remained the same since the 1997 Report. However, additional work has been carried that has identified historical buildings and cultural landscapes. The Recommended Route (2002) has been assessed by New Directions Archaeology to a Stage 2 level of detail.

d) Significance and Sensitivity

The loss of heritage features, including archaeological sites, has been identified as an Environmentally Significant Issue. Although no designated heritage features would be affected by the alternative alignments, there is a potential for effects on non-designated built heritage features and cultural landscape units within the study area. Both the heritage and conservation of the Grand River Corridor is an Environmentally Significant Issue.

3.2 Natural Environment

The Highway 7 Environmental Assessment (EA) was initiated in 1989. An extensive study process ensued that encompassed information collection (field and background), agency liaison, data evaluation, generation and evaluation of alternative alignments, and impact/mitigation review of the Recommended Plan (1997). There was extensive public, municipal and agency consultation throughout the study process.

The environmental policy field as well as the status of the wetland evaluation process changed considerably during the course of the study. The status of wetlands changed during the course of the study and policy changes occurred with the issuing of the Wetlands Policy Statement in 1992 and Provincial Policy Statement (1996). In some cases, wetlands that were initially identified as having no special status or that were locally significant (LSW) were upgraded to provincially significant status (PSW). These changes in wetland policy and wetland status occurred after data collection and the evaluation process was completed (as documented in the EA Report 1997). Decisions throughout the study were made in consideration of balancing social/economic, natural environment, and agricultural considerations.

At the completion of the formal review of the EA Report 1997 in 1998, concerns were raised by interest groups and municipal councils about the extent of wetland impact associated with the Recommended Plan (1997).

Early in the MTO Review (February 1999), a joint meeting was held with MTO staff, the consulting team, staff of the Ministry of Natural Resources (MNR) and the Grand River Conservation Authority (GRCA). The purpose of the meeting was to review current agency resource priorities in the study area to guide the review of the EA Report 1997.

A joint MNR/GRCA letter was prepared dated April 6, 1999 that identified key environmental areas in descending order of priority along the study route for further review.

As a result of public concerns raised in January 1999 and the MNR/GRCA letter, the following tasks were identified to be carried out as part of the natural environment component of the MTO Review:

- Update and add to the natural environmental database for these areas;
- Verify or modify conclusions concerning habitat quality and sensitivity;
- Provide input in the re-visiting of the EA alignment in the context of both natural environmental as well as other factors (Socio-Economic, Agriculture, Transportation, Cost) and;
- Provide input to mitigation, salvage, and enhancement opportunities.

The study approach has been iterative in nature and responsive to further extensive agency, municipal and public consultation that has occurred between January 1999 and the present. This approach has included the following activities:

- *Updating Background Information*

- *Identifying Priority Areas for Further Review*
- *Additional Detailed Field Work*

The *Biophysical Resources Assessment Highway 7 Planning Study Kitchener to Guelph* was prepared by Ecoplans Limited and incorporated as Appendix C in the EA Report 1997. The biophysical report provided a detailed review of biophysical resources in the study area. The work carried out during the MTO Review updates the earlier work and analyses the information based on current policy.

3.2.1 Geology and Physiography

a) Data Sources

Information on the geological and physiographic character of the study was obtained from published maps and reports, including Karrow, 1971; Hewitt, 1972; MNR, 1989; Presant et al., 1971; and Chapman and Putman, 1984. General characteristics of the site topography and near surface geology were also recorded during field assessments.

b) General Description

The bedrock formations underlying the study area are of marine origin, formed approximately 400 and 435 million years before present (BP), during the Silurian Period (Karrow, 1971).

The western third of the study area is underlain by the Salina Formation (upper Silurian), an interbedded brown dolomite and grey shale. The remainder of the study area is underlain by the Guelph Formation (middle and lower Silurian), a cream to buff dolomite which, to the east, forms the caprock of the Niagara Escarpment. The Guelph formation is a high purity dolomite which is quarried for building stone, crushed stone, concrete aggregate, flux stone and dolomitic lime production (Hewitt, 1972). The bedrock foundation of the study area dips gently to the southwest. Bedrock is found at depth throughout much of the west end of the study area and shallower in the east.

Glaciation was the main force responsible for shaping the character of the study area. The last glacial retreat and exposure of features occurred in the period between 25,000 and 13,000 years BP. Drumlins, outwash features, till sheets and moraines were formed during this period and are responsible for shaping the topographic character of the area.

Topography in the study area varies from depressional to flat to rolling; some steeply sloping areas are also present. Elevations range from 292 m to 350 m above sea level. The level and depressional topography scattered throughout the study area is generally associated with outwash and lacustrine deposits. Outwash plains at the terminus of glaciers formed the expansive flat plains dotted by kettle depressions. Similarly, lacustrine deposits form large, flat areas characterized by low relief.

Till plains, deposited as ground or recessional moraines are manifest as the hummocky topography which predominates throughout the study corridor. Drumlins form the smooth, elongated hills which are concentrated in Guelph Township and the eastern part of Waterloo County. Size of the drumlins is variable, between 10 and 20 m in height.

The most dramatic relief in the area is associated with the Grand River valley and the Breslau Moraine. The Breslau Moraine runs from Breslau to Maryhill, between Grand River and Hopewell Creek. The Grand River valley has cut through the Breslau Moraine producing a deep valley with steep, somewhat unstable slopes. A maximum valley depth of 49 m is attained just north of the present Highway 7 Grand River crossing. Terraces within the valley were formed by variations in the location and size of the glacial streams passing through the spillway.

The predominant surficial material found in the area is glacial till, a poorly-sorted, unstratified mixture of clay, silt, sand and gravel. While till deposits normally do not contain economically valuable aggregate materials, a loam till deposit situated along a tributary to Hopewell Creek has been identified as a potential source of excellent to good quality fill material (MNR, 1989; Presant et al., 1971).

Outwash and lacustrine deposits also make up a significant proportion of the surficial materials in the study area. Meltwater streams carried outwash materials through the glacial spillway systems which wound their way southward. The Grand River lies within one of these broadly meandering glacial spillways. Outwash deposits straddle the river, providing economically valuable, good to excellent quality aggregate material. Currently there are no active pits in the study area

In the RMW Official Plan, a large proportion of the lands between the eastern city limits of Kitchener and Regional Road 17 are designated as Mineral Aggregate Resource Policy Area A. Another pocket is identified along Regional Road 30, between Regional Road 72 and Hopewell Creek. Policy Area A lands are those areas where known deposits of high quality or quantities of gravel or stone exist. The Region favours extraction of mineral resources in these areas before alternative land uses are put in place. Selected Mineral Aggregate Resource Areas, as identified by the Wellington County Official Plan, are not present in the study area.

Organic deposits represent a small portion of the surficial materials found in the area; their significance lies in the engineering implications associated with them. Kettle depressions and other topographic depressions, in combination with impermeable layers of clayey materials, have provided conditions suitable for the accumulation of peat and muck leading to the formation of organic soils. An organic deposit found along Regional Road 30 at Highway 7 is an example of a kettle depression in which organics have accumulated. Similarly, drumlins have the effect of impeding drainage around them and promoting the formation of organic soils. In the lowland woodlot situated in the northwest corner of Highway 7 at Townline Road, there is an example of this type of organic deposit.

The reference to organic deposits in the vicinity of Shantz Station Road and Highway 7 relates to previous peat extraction farming that has utilized the organic resource.

c) Summary of Changes from EA Report 1997

The above description remains current in the present review.

d) Significance and Sensitivity

Bedrock is at depth throughout the study area and does not pose a constraint to the proposed undertaking.

Topography is variable including level areas, rolling hills in the form of drumlins, and steep valley slopes. Areas with steep slopes include parts of the Hopewell Creek valley, Rosendale Creek valley, and the Grand River valley. Consideration of slope topography has always been identified in the route planning and review.

Aggregate resource areas are located north of the Grand River at the City of Kitchener / Township of Woolwich boundary and in the vicinity of Shantz Station Road. The loss of potential aggregate resources has been identified as an Environmentally Significant Issue. Any resource areas crossed by the alignment should be utilized in alignment construction wherever feasible.

3.2.2 Soils

a) Data Sources

A review of existing published literature was completed (Hoffman et al, 1963 and Presant and Wickland, 1971). Other geological and physiographical data were used as a cross-reference to the agricultural soils maps.

Soil observations were also made during the course of updated field work during the MTO Review. Relevant information is included in the wetland and vegetation sections of the report.

b) General Description

Thirty soil series [1] are identified in the study area, representing 14 soil catenas [2]. The soils have developed on parent materials which range in texture from clay to gravel. The majority of the soils in the area are developed on surface deposits which have a glacial origin, specifically, till, outwash and glaciolacustrine deposits.

Glacial tills have the widest distribution across the study area. They have given rise to loam (Guelph, London, Woolwich, Conestogo and Maryhill), sandy loam (Guelph, Freeport and Kossuth) and silty clay loam (St. Clements) soils. Woolwich, Conestogo and Maryhill loams, and Freeport and Kossuth sandy loam have developed from alluvial and lacustrine deposits.

A significant proportion of the soils in the area are developed on lacustrine (lake-related) deposits. Within the study area, Waterloo and Heidelberg fine sandy loam, and Tuscola and Colwood loam, have developed from lacustrine parent materials.

Outwash sands and gravels are the parent materials of the Fox, Donnybrook, Brady,

Granby, Lisbon, Caledon and Camilla sandy loams, Gilford and St. Jacobs Loams, and Burford gravely loam. In the study area, these soils occur on the outwash terraces of the Grand River and Speed River valleys. These valleys were formed during the last glaciation and functioned as spillways for meltwater.

Soils developed on parent materials with non-glacial origin are also found in the study area. Elmira, Macton, Donald and Martin loams are developed on recent alluvial (stream-related) deposits. These soils are found in the flood plains of the main rivers and streams.

Pockets of organic soils are scattered throughout the study area. These soils have developed mainly from organic deposits that remain water-saturated for most of the year and contain 30% or more organic material. Soils are mapped as organic if they have a surface layer of such material which is at least 0.3 m thick. If less, they are described as having an organic phase.

In terms of erodibility, according to the soils reports reviewed, six soils found in the study area are moderately to highly erodible:

- *Guelph - moderately high erodibility*
- *London - moderately high erodibility*
- *Tuscola - relatively high erodibility*
- *Woolwich - relatively high erodibility*
- *St. Clements - high erodibility*
- *Organic - if drained and cleared, wind erosion may present problems*

The erodible character of these soils is a concern where potential alignments cross steep slopes and where these soils would be exposed during the construction phase

1. A soil body that has a relatively uniform profile development.
2. Soils that have developed on similar parent materials but differ in soil profile characteristics resulting from drainage differences.

Table 1 in Appendix B provides a summary of the soils characteristics in the study area. The soils were mapped in the EA Report 1997 and are shown on Figure 5 in Appendix B. The table provides the map symbol, soil series, surface texture characteristics, parent material, drainage, capability class, and highlights general soil features relevant to highway construction. Some of the soils have characteristics that may require special attention during design and construction. From an engineering perspective some of these characteristics include frost susceptibility, seasonally high water table, seepage zones, bearing or settlement problems, sloughing of surface materials, and/or difficult to compact soils.

c) Summary of Changes from EA Report 1997

Soils characteristics develop over a long period of time and do not change rapidly. The soils descriptions and characteristics (including soils with moderate to high erodibility) remain current, as does the emphasis on erosion protection in route planning and design.

d) Significance and Sensitivity

Potential effects on the environment are associated with the erosion of soils. Some of the soils in the area have a high or medium erodibility. Uncontrolled soil erosion can affect water quality, fish habitat, and vegetation/wetland areas. Soils having a high or medium erosion potential have been identified and methods of preventing soil erosion are discussed in Section 6.0 using standard OPSS and related practices. Erosion control measures in roadway design and construction projects are standard practice. Proper implementation and supervision of such measures is the key to successful sediment control.

3.2.3 Water Quality and Quantity

a) Data Sources

A review of existing published literature was carried out, including water well records and groundwater data in the study area. Information was also collected through discussions with landowners at information centres, and through field review. Aerial mosaics and topographic mapping were reviewed to assess surface drainage patterns.

Observations of groundwater seepage were updated during the current (1999-2002) field review period. These observations included seepage associated with valley slopes or ravines, and evidence of perched water table conditions or groundwater seepage conditions within the various wetland areas that were re-visited during this period. Watercourse features and conditions were also reviewed during the current update. These are discussed further in Section 3.2.4 (Aquatic Resources and Fisheries).

b) General Description

i) Groundwater

According to Ministry of Environment and Energy (MOEE) water well records, the depth at which groundwater is found across the study area varies considerably, from 1.5 m to 65.8 m below the ground surface. The average depth at which water was found when wells were drilled was 34 m. The static water level varies from flowing (artesian) wells to 36.5 m. Generally speaking, the static water level is higher on the east side of the study area (average 7.7 m - Guelph Township) than on the west side (average 13.3 m - Woolwich Township).

Drilled wells across the eastern two-thirds of the study area obtain water from the Guelph-Amabel Aquifer, which consists of dolomite of the Guelph and Lockport-Amabel formations. It is a high capacity aquifer and most wells provide high yields. In general, the aquifer is highly permeable, a function of the chemical dissolution of dolomite which occurs along fractures and bedding planes. The aquifer is most permeable in the top 6 m and most wells obtain water within this depth. However, the depth at which the aquifer is located throughout the majority of the study area is beyond that of expected construction impacts.

In the western third of the study area, the Salina formation composed of interbedded dolomite and shale, overlies the Guelph formation. Most drilled wells in this area draw

water from the Salina formation.

Shallow sands and gravels often form localized aquifers. While most of the wells in the study area terminate in rock, a significant number draw from these sand and gravel aquifers, usually at depths exceeding 30 m. A few of the wells drawing from the sand and gravel aquifers are shallow, dug wells.

Due to the variable nature of the overburden and bedrock in the study area, susceptibility of groundwater to contamination is highly variable. In general, the spillway sand and gravel deposits and fractured dolomite bedrock are more permeable and therefore more likely to conduct and less likely to attenuate contaminants than the glacial till deposits and shale bedrock.

In order to facilitate drainage and improve agricultural productivity, extensive tile drainage systems have been installed and municipal drains established, particularly in the western portion of the study area.

Localized groundwater seepage or inferred discharge was identified in the EA Report 1997document in locations such as the Grand River valley and in association with some of the wetland areas and tributaries. These conditions were confirmed during the current MTO review. During the review seepage/discharge conditions were noted in the following areas within the study area (from west to east):

- Wooded slopes along the Grand River valley (typical for this valley system – slope seepage has been observed by Ecoplans Limited in numerous locations along the valley outside the study area as well);
- Extensive groundwater discharge occurs within the Bloomingdale-Rosendale creek valley and linear swamp wetland system north of Bridge Street. Further visits during the course of the 1999 – 2002 review confirmed this discharge condition to a greater extent than earlier visits;
- Pockets of discharge occur in the Grand River tableland to the south of Bridge Street. This area is characterized by sandy and gravel soils as well as loam till with sand lenses – conditions suitable for surface expression of shallow groundwater. Portions of this area have been disturbed by earth scraping. Discharge flow is evident into a lowland willow floodplain bordering the Grand River about 300 m south of Bridge Street;
- There is intermittent groundwater seepage from small cattail ponds just north of Ebycrest Road – this intermittent discharge coupled with surface runoff follows a channel south of Woolwich Street to the Grand River;
- Localized discharge occurs in the Hopewell Creek system upstream of the confluence of the main branch and the west tributary;
- Groundwater seepage and high water table conditions characterize the Townline West wetland core area located about 300 m north of existing Highway 7. These seepage conditions contribute to intermittent flow (no defined channel) in a northwest direction to Hopewell Creek;

- Seasonal high water table conditions and intermittent seepage occur in the Ellis Creek wetland system which straddles existing Highway 7 and extends well to the south;
- Tile drain discharge also contributes groundwater (short-circuited) to the wetlands and tributaries in the study area.

Beyond the wetland and tributary areas, where ground elevations rise, the water table is generally at depth (about 30 m) with static water levels averaging about 18 m.

ii) Surface Water

The surface water drainage system in the study area is represented by a dendritic network of streams and their tributaries, numerous wetland pockets, and several ponds. The largest watercourse in the study area is the Grand River which meanders southward through a glacial spillway along the eastern boundary of the City of Kitchener. All other streams in the study area are part of the Grand River watershed. In the study area, Hopewell Creek is a third order[3] stream which flows directly into the Grand River. Ellis Creek has components of a second and third order stream and is a tributary of the Speed River in Guelph which subsequently flows into the Grand River at Cambridge. A series of small creeks (perennial and intermittent) and municipal drains also feed the network. The general flow pattern is north to south through the study area.

The greatest topographic relief associated with the stream network is formed by the Grand River valley. Slopes of the Grand River valley spillway rise upwards of 49 m with slope angles of up to 90°. High slopes are also associated with parts of Hopewell and Ellis creeks. These high slopes occur where the creeks meander alongside or between drumlins; slope steepness is in the range of 45° along both Hopewell Creek and Ellis Creek.

The few ponds in the study area are generally man-made features, such as reservoirs behind streamflow control structures, irrigation ponds, inundated gravel pits, and landscaping features such as the ponds at the Memorial Gardens cemetery.

The MOE has identified the following surface water quality management goal in its July 1994 document Water Management Policies Guidelines Provincial Water Quality Objectives of the Ministry of Environment and Energy:

> ***To ensure that the surface waters of the province are of a quality which is satisfactory for aquatic life and recreation.***

Policies are provided in the document to deal with two situations: a) where water quality is better than the Provincial Water Quality Objectives; and b) where water quality presently does not meet objectives. Policy 1 states "*In areas which have water quality*

[3] Stream order - a number assigned to stream indicating its relative importance in the drainage basin. The lowest order streams are the most minor tributaries, the highest order, the main trunk river. Where two segments of equal magnitude join the stream order is increased by 1 (e.g. 2 first-order stream segments join to form a second-order stream segment.)

better than Provincial Water Quality Objectives, water quality shall be maintained at or above the Objectives. " Policy 2 states "*Water quality which presently does not meet the Provincial Water Quality Objectives shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the Objectives.*"

Except for perhaps phosphorous and nitrogen levels in agricultural drains, most of the watercourse features in the study area should exhibit water quality that at least meets, or in the best case is better than the objectives. The deciding factor in whether Policy 1 or Policy 2 conditions are met is the nature of land uses and land stewardship (particularly agricultural stewardship) occurring within the watershed/drainage areas of each watercourse. Infrastructure facilities such as roads play a role in the water quality of receiving streams, but watershed activities overall have a major influence. A collaborative approach to water quality (land stewardship, maximizing runoff quality from development areas and roadways) is required to achieve policy objectives.

An updated review of the various watercourse features was completed in 1999. Highlights of that review are provided in Section 3.2.4 Aquatic Resources and Fisheries with detailed information provided in Appendix C.

c) Summary of Changes from EA Report 1997

In general, groundwater and surface water conditions described during the EA Report 1997 were confirmed during the MTO Review. Further field review between 1999 and 2002 at the linear Bloomingdale-Rosendale wetland (LSW) north of Bridge Street confirmed extensive discharge associated with this wetland feature.

Further field updating of the tableland and floodplain was also undertaken south of Bridge Street as additional route alternatives were re-visited. This area has experienced / sustained a variety of activities over the years (historical clearing, agriculture, earth scraping). Soils are characterized by sandy and gravel soils as well as loam till with sand lenses. Not surprisingly, shallow groundwater periodically emerges, particularly in earth scrape areas. Vegetation communities associated with these wet sites are typical for the site conditions. Discharge flow is evident into a lowland willow floodplain bordering the Grand River approximately 300 m south of Bridge Street.

A change in land ownership occurred adjacent to Hopewell Creek north of Highway 7, during the course of the current MTO review. There has been some riparian management associated with the farm operation for livestock grazing and drinking.

d) Significance and Sensitivity

i) Groundwater

Groundwater is the sole source of supply for most residents within the rural, central portion of the study area. Interference with existing supplies is not likely to occur unless the chosen alignment is depressed well below existing ground surface and passes near shallow wells. The loss or contamination of private wells and water sources has been identified as an Environmentally Significant Issue.

ii) Surface Water

Several streams drain the study area. Any alternative would require the crossings of three significant watercourses (Grand River, Hopewell Creek and Ellis Creek) and several minor tributaries. Issues of concern related to highway construction and operation are primarily: short-term water quality, long-term water quality, and changes in flow patterns/potential for increased highway runoff inflow. Highway planning and design must consider these potential condition changes. For these reasons, any significant degradation of surface water features has been identified as an Environmentally Significant Issue in the context of MOE water management policies and guidelines.

3.2.4 Aquatic Resources and Fisheries

a) Data Sources

Background information on fisheries for watercourses crossed by the study area was obtained from MNR files and other unpublished reports, (Gartner Lee and Associates, 1987, and Ecologistics Ltd., 1987). Other data sources included MNR 1:50,000 resource mapping, contacts with MNR and GRCA staff as well as a reconnaissance level review of the habitat conditions (March 1990).

Additional fisheries work was undertaken to update information during the MTO Review. Aquatic habitat reviews were undertaken with a two person field team in September, 1999 at the following locations: Grand River, Rosendale Creek and tributaries, Hopewell Creek and tributaries, Ellis Creek and tributaries, and Marden Drain. The surveys utilized electrofishing to characterize fish species presence, and described aquatic habitat conditions in a 0.2 km zone straddling the original EA alignment. Habitat notes for watercourse areas farther upstream and downstream of the survey zone were also made. Survey work was guided by the MNR/MTO fisheries protocol for provincial highway undertakings.

Aquatic survey zones are shown on the Biophysical Features Exhibit 3-3 located in Section 3.2.5 (Vegetation and Wetlands).

b) General Description

A brief overview is provided below for each watercourse feature, from west to east, followed by Table 3-3, which provides the results of the 1999 aquatic habitat work.

Grand River

Within the study area, the Grand River supports a warmwater sport fishery, including Smallmouth Bass and Northern Pike. Habitat for Smallmouth Bass is generally distributed through the study area as well as much of the mid to upper reaches of the river. Northern Pike spawn in slower moving, vegetated backwater areas and floodplain margins which are inundated during spring flooding. The Grand River also supports populations of Walleye and Largemouth Bass, although these species have not been recorded in the vicinity of the study corridor (Gartner Lee, 1987).

A variety of other fish species inhabit the Grand River including Yellow Perch, Rock Bass, Carp, Brown Bullhead, Pumpkinseed, and a variety of baitfish species.

During the 1999 assessment, a number of baitfish, forage, and gamefish species were captured. Darter and shiner species dominated the capture samples. Greenside Darter, identified as Vulnerable by COSEWIC, was one of the predominant species captured in the survey. This species is likely present throughout the Grand River within the Regional Municipality of Waterloo based on input from MNR.

Rosendale Creek

Rosendale Creek drains the Bloomingdale-Rosendale Wetland north of Bridge Street. The main creek and its eastern tributary traverse the wetland area and creek valley. The main channel continues south under Bridge Street to connect with the Grand River. The eastern tributary also extends upstream of Regional Road 17. Portions of the channel have experienced impact from livestock access. The creek exhibits coldwater potential based on observed discharge and wetland conditions. Baitfish were recorded by Ecoplans Limited during previous EA work.

During the 1999 assessment, Creek Chub, Blacknose Dace, and Brook Stickleback were captured in the creek.

Hopewell Creek

Hopewell Creek is considered "coldwater" by MNR based on the presence of Mottled Sculpin, a species which prefers smaller streams with areas of swift flow and cool water temperatures (see MNR/GRCA correspondence in Appendix C). The stream supports a forage fishery consisting of numerous baitfish species, White Sucker and Rock Bass. Stretches of good substrates (coarse gravel, rubble) occur through the study area and may support a relatively productive forage fishery.

The west and east branches of the creek join about 400 metres north of existing Highway 7. Both branches have been subjected to impacts associated with livestock grazing and agricultural activity. However, the east branch maintains a well established riparian zone extending downstream of the confluence of the two branches.

To date, a cumulative total of 27 fish species has been recorded in the creek which provides good quality habitat capable of supporting a high density of cyprinid species. Greenside Darter, a small darter species considered Vulnerable by COSEWIC, was recorded in the creek during the Breslau Transportation Study (1996).

During the 1999 assessment, a good diversity of baitfish species was recorded, and Mottled Sculpin was also confirmed. No Greenside Darters were captured during the survey. Baitfish captured were Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Common Shiner, Creek Chub, Fantail Darter, Horneyhead Chub, Longnose Dace, Johnny Darter, and Rainbow Darter.

Tillich Drain

This is an agricultural drain that is tributary to Hopewell Creek. The drain borders the west side of the Hopewell Riparian Woodland/Wetland complex, just west of Regional Road 30. The drain is characterized by relatively dense instream vegetation, slow flats, and generally shallow water conditions. A single baitfish was recorded by Ecoplans Limited in 1994. No fish were observed in 1999. The drain likely provides seasonal baitfish use.

Tributary to Ellis Creek

This watercourse flows south from the Townline East Wetland and joins the main branch of Ellis Creek south of Highway 7. Riparian cover consists of a mix of grasses and shrubs in an agricultural setting, with channelized and natural sections. Flows are likely intermittent (dry during 1999 assessment). No fish were observed in 1994 or 1999, but the channel is expected to support seasonal baitfish use.

Ellis Creek

Ellis Creek originates north of Highway 7 and meanders for several km south of Highway 7 through agricultural fields and wetlands (portions of the Ellis Creek PSW complex).

MNR and GRCA consider Ellis Creek as supporting potential coldwater habitat, based on cool water temperatures and the presence of a remnant Brook Trout fishery in a tributary well south of the study area (Timmerman, Murray, pers. comm., Baldwin, 1991). Ellis Creek also supports a variety of other fish species including Pumpkinseed, Rock Bass, White Sucker and several baitfish species. Brook stickleback, which tend to prefer small, cold headwater streams are present in the upper reaches (Baldwin, 1991). Several wetland pocket components of the Ellis Creek Swamp contribute groundwater discharge to the upper reaches of Ellis Creek.

The section of Ellis Creek within the wetland north of Highway 7 exhibits intermittent flow that becomes very diffuse through the wetland. Consequently, fish presence/persistence in this zone is expected to be limited. There was no flow within the wetland north of Highway 7 during the 1999 assessment, and no fish were observed. However, Central Mudminnow, Common White Sucker, and Brook Stickleback were recorded at Guelph Road 3 in 1999 where some flow was present. Baitfish were observed by Ecoplans Limited in the vicinity of the original EA alignment in June 1994.

Marden Drain

The Marden Drain is tributary to the Speed River. The channel follows the west side of one of the Marden South Wetland blocks (PSW) and receives a mix of tile drainage and some wetland discharge. Additional cross drains present in the wetland connect with the main drain. Baitfish were observed by Ecoplans Limited in 1994. No fish were observed in 1999 (no flow at time of survey). However, seasonal baitfish use is likely (at a minimum) in this part of the drain.

Table 3-3 presents the 1999 aquatic survey findings for the above watercourse features.

c) Summary of Changes from EA Report 1997

For the most part, watercourse conditions and features noted in 1999 were similar to conditions documented in the EA Report 1997. The 1999 aquatic assessment updated the site condition information in additional detail. The abundance of Greenside Darter in the Grand River sampling suggests that this species may occur more frequently in the watershed than previously expected. Its absence during Hopewell Creek sampling does not mean it is not present in the creek. The 1999 work at Hopewell Creek confirmed its good aquatic habitat quality, as well as good restoration potential.

d) Significance and Sensitivity

The three main watercourses within the study area support warmwater fisheries. The Grand River supports a warmwater sport fishery. Hopewell Creek supports a baitfish community, and is considered by MNR to support potential coldwater habitat in terms of discharge conditions and restoration potential. Ellis Creek currently supports a warmwater fishery and, according to MNR and GRCA, may have the potential for rehabilitation to coldwater habitat. Protection of these fish/aquatic habitats has been identified as an Environmentally Significant Issue. The other minor tributary features have varying degrees of baitfish habitat or potential. Overall, any significant degradation of surface water features has been identified as an Environmentally Significant Issue.

TABLE 3-3 SUMMARY OF 1999 AQUATIC HABITAT ASSESSMENTS HIGHWAY 7 EA STUDY CORRIDOR

Reach or Station Location	Species	Fish Habitat Description	Comments
Grand River 200 m survey zone at EA Report 1997crossing area as well as upstream and downstream zones.	Blackside Darter (*Percina maculata*)++ Common Shiner (*Luxilus cornutus*)++ Fantail Darter (*Etheostoma flabellare*) * Greenside Darter (*Etheostoma blennioides*)++ Golden Redhorse (*Moxostoma erythrurum*) Rock Bass (*Ambloplites rupestris*) Rainbow Darter (*Etheostoma caeruleum*) Smallmouth Bass (*Microterus dolomieui*), - young of year Stonecat (*Noturus flavus*) White Sucker (*Catostomus commersoni*) * status Vulnerable (COSEWIC)	**Survey Zone (200 m)** [1] Channel width approximately 80 m, depth 0.25 to 1.0 m. Bank heights approximately 2.0 m. Flow velocity low to medium. Substrate: gravel 65%, rubble 25%, boulders 5%, silt 5%. Instream vegetation: Milfoil, pondweed spp. and Common Waterweed. Bank vegetation: woody and herbaceous species- Black Willow, Buckthorn, Red-osier Dogwood, Goldenrod, aster spp., grasses. Moderate instream cover includes instream vegetation and rubble/boulders. Morphology is a flat. Low overhead shading. No defined seepage channels noted. **General Habitat Description: Upstream of Survey Zone** Similar habitat as survey zone **General Habitat Description: Downstream of Survey Zone** Similar habitat as survey zone	Greenside Darter one of predominant species captured in survey. Species is likely present throughout Grand River within Region of Waterloo based on discussions with MNR. Darter species (Blackside, Greenside) and Shiner dominated sample.
Rosendale Creek Bridge St. extending north to Reg. Rd. 17	Creek Chub (*Semotilus atromaculatus*) Blacknose Dace (*Rhinichthys atratulus*)++ Brook Stickleback (*Culaea inconstans*)	**Survey Zone (200 m)** Channel width approximately 0.5 m to 1.5 m, depth 5 cm to 20 cm. Bank height approximately 0.25 m. Flow velocity: low to medium. Substrate: sand 60%, rubble 20%, gravel 20%. No instream vegetation. Bank vegetation: deciduous forest (Maple, Ash, Elm) with Cedar and Red-osier Dogwood along stream, and herbaceous species including: Jewelweed, Sensitive Fern. Low to moderate instream cover including some woody debris. Morphology: mostly riffles with a few flats and minor pooling. High overhead shading with one open area. No defined seepage channels were observed within survey zone however, ill-defined seepage zones and pond outlet noted. **General Habitat Conditions: Upstream of Survey Zone (to Reg. Rd. 17)** Straightened channel width approximately 1.0 m to 1.5 m, depth 5 cm to 10 cm. Bank height approximately 0.5 m to 1.5 m (channelized). Flow velocity low to medium. Substrate: silt/sand 80%, gravel 20%. Instream vegetation mostly Reed Canary Grass. Bank vegetation mostly herbaceous species (open area) including: Jewelweed, Goldenrod, Teasel, aster spp., Purple Loosestrife, nettle spp. Moderate instream cover (overhanging vegetation). Morphology: mostly flats with a few riffles. Low to moderate overhead shading. No defined seepage channels observed. Three separate culverts in reach. **Downstream of Survey Zone (to Reg .Rd. 52)** Channel width approximately 1.5 m to 3.0 m, depth 5 cm to 20 cm. Bank height approximately 0.25 m. Flow velocity: low to medium. Substrate: rubble 45%, sand 40%, gravel 10%, boulders 5%. No	Moderate number of baitfish captured with low species diversity. Dominated by Blacknose Dace. Valley is generally undisturbed in survey zone. Water quality has likely been impacted by cattle pond outlet and upstream pasture areas. Local coldwater potential based on discharge and wetland habitat.

TABLE 3-3 SUMMARY OF 1999 AQUATIC HABITAT ASSESSMENTS HIGHWAY 7 EA STUDY CORRIDOR			
Reach or Station Location	**Species**	**Fish Habitat Description**	**Comments**
		instream vegetation. Bank vegetation: deciduous forest (Maple, Ash, Elm) with Cedar and Red-osier Dogwood along stream, and herbaceous species including: Jewelweed, Sensitive Fern. Moderate instream cover mostly overhanging vegetation. Morphology: mostly riffles with some flats and minor pooling. One defined seepage channel observed on east side.	
East Tributary of Rosendale Creek (from confluence east to Regional Rd 17)	Blacknose Dace	Channel width: 0.25 m to 1.5 m, depth 2 cm to 10 cm. Bank heights: 0.25 m. Flow velocity: low to medium. Substrate: rubble 50%, silt/sand 30%, gravel 10%, boulders 10% (lower reach) and sand 60%, gravel 20%, rubble 20% (upper reach). No instream vegetation. Bank vegetation: deciduous forest (Maple, Ash, Elm) in downstream area, and Cedar swamp (upstream area) with Cedar and Red-osier Dogwood along stream, and herbaceous species including: Jewelweed, Sensitive Fern. Moderate instream cover including some woody debris, stumps, rubble. Morphology: mostly riffles with a few flats in the lower reach and mostly flats in the upper reach. High overhead shading. Two tile drains observed. Heavy cattle use in reach (banks trampled, high turbidity) Defined seepage channels observed as well ill-defined seepage zones.	Banks trampled in many areas due to cattle access, highly turbid. Lower numbers of baitfish captured compared to main channel and low species diversity likely due to cattle impacts. Local coldwater potential based on discharge and wetland habitat. High potential for restoration opportunities.
East Tributary of Rosendale Creek (upstream of Regional Road 17)	Dry on day of 1999 evaluation, however, baitfish were observed during 1994 studies.	Drain channel width approximately 2.0 m to 3.0 m. Possible tile drainage at upstream end (pile of rubble). Dry on day of evaluation but wetland discharge evident. Substrate is organic muck and silt. Instream vegetation: Reed Canary Grass, Cattail, Duckweed. Bank vegetation mainly herbaceous species including: Goldenrod, aster spp., Reed Canary Grass, Elderberry, Raspberry and grasses. Mixed swamp with dense thicket including Sumac, Red-osier Dogwood, and Buckthorn. Instream cover includes overhanging herbaceous vegetation. Low overhead shading.	Baitfish observed in previous studies. Part of Bloomingdale – Rosendale wetland complex.

TABLE 3-3 SUMMARY OF 1999 AQUATIC HABITAT ASSESSMENTS HIGHWAY 7 EA STUDY CORRIDOR			
Reach or Station Location	**Species**	**Fish Habitat Description**	**Comments**
West Tributary of Hopewell Creek North of Existing Highway 7	Blacknose Dace++ Brook Stickleback Common Shiner++ Creek Chub Horneyhead Chub (*Nocomis biguttatus*)+ Longnose Dace (*Rhinichthys cataractae*) Johnny Darter (*Etheostoma nigrum*)+ Rainbow Darter White Sucker+	**Survey Zone (200 m)** Channel width approximately 1.0 to 2.5 m, depth 0.2 m to 0.75 m. Bank heights approximately 0.3 m. Flow velocity: medium (stormwater contribution). Substrate includes rubble 75%, gravel 10%, silt 10%, boulders 5%. Instream vegetation: large patches of Watercress and sedge spp. Bank vegetation: Goldenrod, Reed Canary Grass, Spotted Joe-Pye-weed, nettle spp., mint, grasses, and a small cattail marsh west of tributary. Moderate instream cover: fallen trees, overhanging vegetation and undercut banks. Morphology: flat with one pool in lower half of reach and a riffle zone in the upstream section. Low overhead shading. No defined seepage channels observed, however large patches of watercress would indicate groundwater discharge throughout most of the channel. **Upstream of Survey Zone** Similar habitat as survey zone however less bank vegetation cover and heavier siltation due to unrestricted cattle access and bank trampling. **Downstream of Survey Zone** Similar habitat as survey zone however less bank vegetation cover and heavier siltation due to active pasture and trampled banks. Additional species: Rock Bass - collected downstream of survey zone.	Channel is located within horse pasture. Upstream and downstream is occupied by cattle pasture both with unrestricted stream access. High numbers of baitfish captured with high species diversity. Blacknose Dace and Common Shiner were most abundant species noted in electro fishing sample. Potential coldwater habitat based on discharge and presence of coldwater indicators (Mottled Sculpin collected by MNR). High restoration potential.
Hopewell Creek West tributary confluence to Existing Highway 7	Blacknose Dace++ Bluntnose Minnow (*Pimephales notatus*) Brook Stickleback Common Shiner++ Creek Chub Fantail Darter Horneyhead Chub++ Longnose Dace Mottled Sculpin (*Cottus bairdi*) Johnny Darter Rainbow Darter++ White Sucker	**Survey Zone (200 m)** Channel width approximately 8 m, depth 0.1 m to 0.5 m. Bank heights approximately 0.3 m. Flow velocity: low to medium. Substrate: gravel 45%, rubble 25%, silt 20% (covers substrate), boulders 5%, sand 5%. Instream vegetation includes small amounts of watercress. Bank vegetation : woody and herbaceous species: Black Willow, Buckthorn, Basswood, Red-osier Dogwood, Cedar (upstream section), Sensitive Fern, Jewelweed, nettle spp., grasses. Low instream cover includes woody debris and boulders. Moderate to high overhead shading. Morphology: flat with one riffle in upstream section. Minor defined seepage channels observed, however large patches of watercress would indicate groundwater discharge throughout most of the channel. **Upstream of Survey Zone** Habitat improves with more changes in morphology (ie. riffles, flats, pools) and less silt covering substrate. **Downstream of Survey Zone** Similar habitat as survey zone, less bank vegetation cover further downstream (pastured). Additional	Moderate numbers of baitfish captured with high species diversity. Higher numbers captured downstream of site (wooded area). Mottled Sculpin (cold water indicator) also captured. High restoration potential.

TABLE 3-3 SUMMARY OF 1999 AQUATIC HABITAT ASSESSMENTS HIGHWAY 7 EA STUDY CORRIDOR			
Reach or Station Location	**Species**	**Fish Habitat Description**	**Comments**
		species: Largemouth Bass (*Micropterus salmoides*) and Stonecat (*Noturus flavus*) captured downstream of survey zone.	
Hopewell Creek Riparian Wetland Complex Agricultural Drain (Tillich Drain)	No fish observed in drain (choked).	**Survey Zone (200 m)** Drain channel width approximately 2.5 m, depth to 0.1 m. Bank height approximately 1.0 to 1.5 m. Flow stagnant. Substrate muck/organic 100%. Instream vegetation: Reed Canary Grass, Cattail, Duckweed. Bank vegetation: woody and herbaceous species: shrub willow, Sumac, Trembling Aspen, Buckthorn, Goldenrod, aster spp., Burdock, grasses. High density of instream vegetation. Low to moderate overhead shading. Morphology: flat throughout. No defined seepage channels observed. **Upstream of Survey Zone** Similar habitat as survey zone. **Downstream of Survey Zone** Similar habitat as survey zone. Drain divides and flows around agricultural field. East branch flows into a deep irrigation pond (no fish observed).	Agricultural drain with dense instream vegetation, low fishery habitat potential. No fish observed during 1999 investigations. A single baitfish observed in 1994 field study (likely seasonal colonization).
Headwater Tributary of Ellis Creek (Townline East swamp south to Highway 7)	NA - dry on day of evaluation	**Survey Zone (200 m)** Channel width 1.5 m, dry on day of evaluation. Bank height approximately 0.5 to 1.0 m. Substrate: mineral soil. Instream vegetation: dense grasses. Bank vegetation: Goldenrod, aster spp., Burdock, grasses, Silver Maple, shrub willow, Buckthorn. Low instream cover composed mainly of woody debris. Moderate overhead shading. No defined seepage channels observed. **Upstream of Survey Zone** Similar habitat as survey zone, channelized section, drains upper woodlot and surrounding agricultural fields. **Downstream of Survey Zone** Similar habitat as survey zone.	No fish observed in either 1999 or 1994 assessment, although may provide seasonal baitfish habitat.
Ellis Creek (Guelph Road 3 to Highway 7)	NA - dry on day of evaluation **1.5 km upstream of site at roadside** Central Mudminnow (*Umbra limi*)++ Common White Sucker Brook Stickleback	**Survey Zone (200 m)** Channel width 1.0 to 2.0 m, dry on day of evaluation. Bank heights approximately 0.2 m. Substrate muck/organic 100%. Instream vegetation includes Jewelweed and Forget-me-not in open areas. Bank vegetation : Jewelweed, Elderberry and Silver Maple (swamp). Instream cover is composed mainly of woody debris. High overhead shading from forest canopy. Many small seepage channels throughout wetland block. **Upstream of Survey Zone**	Drains main block of Ellis Creek Wetland Complex (PSW). Coldwater potential based on wetland discharge. No fish observed in 1999

TABLE 3-3 SUMMARY OF 1999 AQUATIC HABITAT ASSESSMENTS HIGHWAY 7 EA STUDY CORRIDOR			
Reach or Station Location	**Species**	**Fish Habitat Description**	**Comments**
		Similar habitat as survey zone however the forest canopy opens up resulting in more herbaceous growth. Standing water further upstream (more disturbed – possible damming for cattle drinking). Central Mudminnow, Common White Sucker, and Brook Stickleback captured at Guelph Rd. 3. **Downstream of Survey Zone** Similar habitat as survey zone. Open marsh wetland near Highway 7.	investigation, however baitfish were observed during 1994 field studies.
Marden Drain Main drain along west side of PSW	NA - dry on day of evaluation	**Survey Zone (200 m)** Channel width 1.0 m to 1.5 m, dry on day of evaluation. Bank heights approximately 0.25 m. Substrate muck/organic 100%. No instream vegetation. Flows through Silver Maple swamp with bank vegetation also including Ash, Jewelweed, Sensitive Fern, Spotted Joe-Pye-weed. Little instream cover, some woody debris. High overhead shading. No defined seepage channels observed. **Upstream of Survey Zone** Similar habitat as survey zone. **Downstream of Survey Zone** Similar habitat as survey zone. Channel disappears south of woodlot (Guelph City Limits) due to recent grading.	No fish observed during 1999 evaluation, however, baitfish were observed during 1994 field studies. Extensive drainage alteration surrounding and within wetland block.

+, ++ represents relative abundance of fish species collected during electrofishing surveys

1 Survey area locations and scope of study was developed to address joint MNR/GRCA correspondence (April 6, 1999) identifying priorities for the updated review of potential alignment revisions in areas of high environmental sensitivity. Field survey procedures were conducted in accordance with the study requirements of both the 'Evaluation of Alternatives' and 'Preliminary Design' stages of Provincial Highway undertakings, outlined in MTO/MNR's 'A Fisheries Protocol' (1993). Field surveys were completed on September 9,21,22,27 and October 3, 1999. In general, a fisheries inventory and aquatic habitat assessment was completed for a 200 metre reach of each watercourse that encompassed, and extended beyond, the original EA alignment. General observations of upstream and downstream habitat were also noted.

3.2.5 Vegetation and Wetlands

a) Data Sources

Vegetation

Site reconnaissance of vegetation features within the study corridor was completed in March/April 1990. Vegetation features within the study corridor were delineated on a 1:5,000 scale photo mosaic (1989) and are described on the basis of community type, species, composition, age structure, canopy closure, biological health and sensitivity. Additional field assessments were conducted in December 1992, July and August 1994.

The following background reports and mapping were also reviewed as part of the natural inventory and analysis:

- *Forest Resource Inventory (FRI), (MNR, 1978)*
- *Forest Resource Mapping (MNR, 1980)*
- *Wetland Data Records and Mapping (MNR, Cambridge District, 1984-1992)*
- *Wetlands*

Data sources included a review of published literature related to wetland policies, guidelines, and wetland designations in the study area, as well as documents prepared by the Ministry of Natural Resources (MNR) - Cambridge District, and the Grand River Conservation Authority (GRCA). Meetings were also held with both MNR and GRCA during the study to discuss related concerns. Data were collected through field surveys augmented by the review of maps and aerial photographs.

In response to questions and concerns raised by government agencies during the presubmission review of the EA Report 1997, additional background information was gathered for the natural environmental conditions in the study area and incorporated in this final EA document. This included information provided by MNR/GRCA, and information contained in the Breslau Transportation Study Environmental Study Report.

At the start of the MTO Review in 1999, there was consultation with MNR and GRCA staff concerning priority areas for further review in the context of the EA alignment. These areas were identified in the joint MNR/GRCA correspondence of April 6, 1999 (Appendix A) and consisted of the following in relative order of protection priority (highest to lowest, based on MNR/GRCA assessment of extent of impact, mitigation potential and restoration opportunities):

1. Rosendale Creek and Bloomingdale-Rosendale Wetland Complex (LSW);
2. Hopewell Creek;
3. Hopewell Riparian Woodland/Wetland Complex (LSW);
4. Townline Wetland West (unevaluated in 1999);
5. Ellis Creek Wetland (PSW);
6. Marden South Wetland (PSW); and
7. Grand River crossing.

Additional detailed field work was completed in the above areas during several field visits completed between February 1999 and March 2002. The additional field work encompassed vegetation/flora reviews, aquatic habitat surveys, breeding bird surveys, and additional wildlife work.

Updated vegetation, wetland and flora reviews were undertaken during field visits in February, May, June, July August, September and November 1999, January and November 2000, and March, April, September 2001. Field visits were completed by a one or two person field team. Vegetation communities were characterized using a modified version of the Ecological Land Classification (E.L.C.) for Southern Ontario (Lee et al., 1998).

Visits in the priority wetland areas occurred in the summer of 1999, with additional visits made to these and other areas (such as Grand River and adjacent tablelands) during other survey dates.

Information on additional significant botanical species that was provided by the University of Waterloo in 2000 was subsequently field checked and verified by Ecoplans Limited at that time.

b) General Description

Vegetation/Woodlands

The study area is located in a transitional zone between the Deciduous Forest Region to the south and the Great Lakes - St. Lawrence Forest Region to the north (Rowe, 1977). Typical climax forest associations within the transitional zones are dominated by sugar maple and American beech with a minor component of basswood, black cherry, white ash, red maple, red oak, white oak, and red ash.

The study area is a mosaic of active agricultural lands interspersed with broadleaf upland forest, broadleaf/mixed/coniferous forest swamps, field border hedgerows, floodplain woods and old field succession habitats.

Forest composition within the study area ranges from sugar maple, white ash, black cherry, basswood, American beech dominated communities on upland (mesic) sites to eastern white cedar, eastern hemlock, yellow birch, silver maple, green/black ash dominated communities on lowland (moist) sites.

Hedgerow features within the study area are dominated by a mixture of early successional trees and shrubs (e.g. buckthorn, hawthorn, black cherry, white elm, white ash), tolerant hardwoods (sugar maple, green ash, basswood) and conifer species (Norway spruce, eastern white cedar). Small areas of plantation conifers are also present.

Woodlands within the study area range from small, isolated stands of less than 0.4 ha in size, to large contiguous blocks of up to 40-50 ha. The majority of woodland units within the study corridor exhibit some level of disturbance including periodic selective tree harvesting, livestock grazing and altered drainage due to ditch construction. Blowdown of trees is evident in most of the poorly drained lowland sites.

According to Ministry of Natural Resources (MNR) Forest Resource Inventory (FRI) mapping, all forest productivity classes are represented in the area: upland hardwood - high productivity, upland hardwood - potentially high productivity, lowland hardwood - high productivity, plantation, and low productivity cover types (upland and lowland).

Wetlands

It is important to note that the environmental policy field as well as the status of the wetland evaluation process changed considerably during the course of the study, which spanned several years.

Significant policy changes occurred with the issuing of the *Wetlands Policy Statement* in 1992 and the passing of Bill 20 in 1996. In Bill 20, the protection of wetlands was addressed through the "Provincial Policy Statement" which sets out priorities for natural heritage and environmental protection, including wetlands.

Changes in wetland status and designations (such as from locally to provincially significant) during the course of the study reflected the application of these wetland policy changes.

The Implementation/Interpretation section of the 1996 Provincial Policy Statement recognizes that new infrastructure is authorized through the *Environmental Assessment Act* which includes a planning process to consider alternatives, avoid significant features and environmental impacts wherever possible, and employ construction and mitigation measures for minimizing impacts where avoidance is not possible.

Changes in wetland status also occurred during the course of the current MTO Review. The previously unevaluated Townline West and East Wetland blocks were amalgamated by MNR in April 2000 into the Townline Wetland PSW based on information provided by both Ecoplans Limited and the Kitchener Waterloo Field Naturalists in the course of the 1999 field studies. The MNR report on the Townline PSW is provided in Appendix C.

All of this updated information was integrated during the current MTO Review, and was considered in the review and re-visiting of alignment alternatives as reviewed in Section 4.0.

Additional Wetland Review

Vegetation inventory tables and mapping as well as wetland mapping provided in the EA Report 1997document are located in Appendix C.

Additional vegetation and wetland field work was completed at the following priority wetland areas during the current MTO review (from west to east):

- Bloomingdale-Rosendale Wetland (locally significant)
- Hopewell Creek Riparian Woodland/Wetland (locally significant)
- Townline West Wetland (now provincially significant)
- Ellis Creek Wetland (provincially significant)

- Marden South Wetland (provincially significant)

The locations of these wetland areas are shown on Exhibit 3-3. Detailed air photo mapping for each wetland is provided in Appendix C. This mapping shows the various wetland (and upland) communities, vegetation sensitivity ratings (updated in 1999), vegetation, drainage and wildlife notes, and adjacent agricultural land uses. Vegetation community and detailed feature information for each wetland area is also provided in Appendix C, as is a working list of plant species recorded during the additional field work. Summaries for each wetland area are provided below.

Bloomingdale-Rosendale Wetland

- This is a locally significant wetland (LSW) which extends well north of the study area. The area of influence for this project is predominately north of Bridge Street and west of Ebycrest Road. The wetland area between Bridge Street and Ebycrest Road is a linear wetland and creek valley system comprising wooded swamp and meadow marsh communities, steep wooded valley slopes, and extensive groundwater discharge. As a result there is a good diversity of vegetation and wetland communities despite some historical disturbances associated with agricultural activities. A more tolerant riparian meadow marsh and lowland floodplain component is located south of Bridge Street extending to the Grand River;
- Rosendale Creek and its tributary flow through the wetland with the main creek continuing south under Bridge Street to the Grand River.
- There is an upland submature deciduous forest stand bordering the east side of Ebycrest Road opposite the wetland block. The forest stand has been high-graded and disturbed, exhibits limited understory in the northwest section, and was assigned a moderate sensitivity rating;
- The wetland block north of Bridge Street was identified by MNR and GRCA as a high priority area for further consideration during the MTO Review.

Hopewell Creek Riparian Woodland/Wetland

- This is a locally significant wetland (LSW) associated with Hopewell Creek and associated woodlands. The wetland complex is located in the northwest quadrant of Highway 7 and Shantz Station Road and continues to the northeast along Hopewell Creek. The main riparian woodland block north of existing Highway 7 contains mixed swamp and drier forest and a local trail network. An agricultural drain along the west side carries drainage north to Hopewell Creek. The swamp system is typically wettest during the spring period, and then experiences a cycle of drying as the water table level drops during the summer/early fall period;
- There has been past land alteration at the south end of the wetland associated with vegetation clearing, irrigation pond construction, granular borrow, and spoil pile storage. The irrigation pond provides a water source for the nursery operation bordering the south side of the wetland;

- The wetland has been assigned moderate to high sensitivity in the main (core) block (reflecting less disturbed wetland and deciduous forest cover). The narrow south lobe of the wetland is rated moderate in sensitivity, reflecting past disturbance, some drain work, narrower width (more edge in nature) and younger growth associated with colonization of dieback openings.

Townline Woodland/Wetland

- This large wetland block is located north of Highway 7 and west of Townline Road. Vegetation associations encompass thicket and wooded swamp, cedar forest, shrub thicket and meadow marsh. The wetland block is somewhat triangular in nature with the narrow and relatively more disturbed section at the south (closest to existing Highway 7) and the broader, less disturbed section to the north.
- The south neck is a disturbed thicket/meadow unit that conveys seasonal drainage northerly and that is bordered by a small deciduous forest stand to the south (abuts Highway 7). The south neck or lobe is typically dry throughout the summer, has a heavy Common Buckthorn component, and is younger and more tolerant than the mature wetland associations to the north;
- Discharge conditions, deeper organics, less disturbance, and greater diversity characterize the larger wetland section to the north. For these reasons, this part of the wetland rates a moderate-high to high sensitivity rating. The discharge contributes to base flow in the poorly defined tributary that traverses the main wetland block (east to west drainage gradient) and that carries the drainage to Hopewell Creek to the northwest;
- A second relatively large woodland/wetland block is present just east of Townline Road (approximately 650 metres north of existing Highway 7). This block is characterized by Soft Maple swamp with poorly drained mineral soils (shallow organic layer) and a transitional mix of hardwood, aspen growth and shrub thicket growth around the margins. Intermittent drainage from the wetland flows south in a grass/thicket swale that connects with Ellis Creek just south of existing Highway 7. This wetland was named Townline East during the course of the current MTO Review.
- Both wetland components were complexed by MNR in 2000 as the Townline Wetland (provincially significant).

Ellis Creek Wetland

- The Ellis Creek Wetland is a large wetland complex that extends both north and south of existing Highway 7 near Guelph Road 3 associated with the Ellis Creek system. The area reviewed during the MTO Review was north of existing Highway 7 and east of Guelph Road 3. This wetland block is characterized by a mosaic of wooded and thicket swamp and meadow marsh/shallow marsh. Ellis Creek flows southerly through the wetland as a diffuse poorly defined channel network. Backwater ponding at existing Highway 7 has resulted in open thicket swamp with standing water on the north side of existing Highway 7.

- Towards the north end of the forested block the wetland becomes a more open willow floodplain swamp. Beyond the forest limit, the wetland is an open, pastured floodplain system extending to Guelph Road 3.
- Overall, the forested wetland components exhibit both perched and discharge (seepage) conditions, varying depth of organic material, and flat to hummocky topography. The best quality and more sensitive sections are associated with the central and south core of the wetland area north of existing Highway 7. Wetland quality and sensitivity is somewhat lower through the transition from floodplain swamp to pastured wetland. This part of the Ellis Creek Wetland was complexed with the provincially significant lower Ellis Creek Swamp in 1992.

Marden South Wetland

- This wetland block is located north of existing Highway 7 approximately midway between County Road 86 and Silvercreek Parkway. The wetland block is one of nine wetland areas comprising the provincially significant Marden South Wetland complex. The south end of the wetland block has been cleared and graded within the Guelph Industrial Park limits. The balance of this block to the north is deciduous and mixed treed swamp;
- The treed swamp has sustained differing levels of management. The northwest portion of the stand has been managed for fuelwood cutting over the years, resulting in an even-aged stand of predominately soft maple. A network of drainage ditches carries drainage from this area to the main drain located along the west side of the wetland block. The other sections of the wetland that have not sustained ongoing fuelwood management exhibit moderate to high species diversity and moderate to high sensitivity. All sections of the wetland block exhibit flat to hummocky topography, poor drainage, and organic materials.
- The wetland block was identified by MNR as part of a deer wintering area (1 of 9 wetlands comprising the overall wetland complex). In this particular block, conifer cover that would provide some winter shelter is generally limited to the mixed swamp in the southeast zone where conifers are interspersed with deciduous trees. Existing industrial development in the City of Guelph borders this area to the south.

Other Vegetation Areas (See Exhibit 3-4)

Grand River Crossing Area

The Recommended Plan (1997) incorporated a crossing of the Grand River that was located at the west boundary of Bingemans on the south side of the river, and approximately at the Kitchener/Woolwich boundary on the north side. Alternative crossing locations were considered during the MTO Review. The vegetation associations that may be affected by possible Grand River crossings are discussed below.

<u>South Side</u>

- Tableland cultural meadow;

- Upland White Cedar slope forest with ash and maple and localized slope seepage (EA Unit W1c);
- Mixed slope forest and floodplain forest with past cutting and localized seepage (EA Unit W1b);
- Cultural thicket (dense Hawthorn and Common Buckthorn), interface between cultural meadow to the south, and floodplain forest to the north;
- Deciduous slope and floodplain forest (part of EA Unit W1a) with localized seepage on the slope section (bordering Bingemans Water Park). The forest is characterized by a mixed age association of White Ash, Sugar Maple, Black Cherry, American Beech, and Basswood;
- Floodplain lowland forest (swamp - part of EA Unit W1b) located about 250 metres west of the Bingemans Water Park). The west portion of the swamp is dominated by soft maple and Crack Willow, exhibits level topography, and is seasonally ponded following spring runoff and during flood events. The east portion of the swamp exhibits a more hummocky character, mixed age profile, and contains a mix of Yellow Birch, Eastern Hemlock, and soft maple. This east portion is botanically more diverse and of higher quality than the west section.

North Side

- Typical Grand River floodplain riparian growth of Manitoba Maple and Crack Willow varying in continuity and width along the broad floodplain zones;
- Cultural meadow and scattered tree clusters;
- The shoreline opposite the Bingemans Trailer Park camping area is a steep wooded slope with limited floodplain. The wooded slope (EA Unit W2) is characterized by a mix of Sugar Maple, Red Oak, and Black Cherry with localized seepage typical of the Grand River valley slopes.

Woodland Vegetation
PSW - Provincially Significant Wetland (MNR) - limits approximate only
LSW - Locally Significant Wetland (MNR) - limits approximate only
1999 Fish Survey Zones (see section 3.2.4 for details)
① Calling Frog Survey Station (May 2000) - See Section 3.2.6 for details
observed seepage (see Appendix C for additional notes)
seasonal drainage/drains (flashy or intermittent flows)
other drainage/tributaries
other wetland (not evaluated by MNR) - approximate limits

WOOLWICH TOWNSHIP

CITY OF KITCHENER

BRESLAU

B-R Complex (in part)

Rosendale Woods ESPA 74 (part)

Bloomingdale - Rosendale (B-R) Wetland (LSW) - Extensive Seepage - See Appendix C for details

Mineral Aggregate Resource Area (RMOW)

Pond / Shallow Marsh Pockets

Weiland Forest (see Exhibit 3-4)

Hopewell Riparian Woodland/Wetland (LSW - see Appendix C for details)

Rosendale Creek

Steep Slope

Steep Slope

Steep Slope

Steep Slope

See Exhibit 3-4 for further detail in this area

Hopewell Creek Valley (See Exhibit 3-4)

Drain

Lowland Willow Forest and Swamp

Shallow Marsh

Mixed Swamp Pocket

Mineral Aggregate Resource Area (RMOW)

Ditched Drain

Deciduous Swamp Forest

Constructed Wetland Habitat Area

Breslau Wetland PSW (in part)

ESPA 21 (Breslau Heronry - no longer active)

GRAND RIVER

KITCHENER-WATERLOO EXPRESSWAY

BRIDGE STREET

EBYCREST ROAD (REGIONAL ROAD 17)

SPITZIG ROAD (WOOLWICH ROAD 66)

WOOLWICH ROAD 68

GREENHOUSE ROAD (WOOLWICH ROAD 72)

Hopewell Creek

SHANTZ STATION ROAD (REGIONAL ROAD 30)

HIGHWAY 7

VICTORIA STREET (HWY 7)

CNR

Hopewell Creek

Grand River

Scale = 1:25,000
250m 0 500m

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

BIOPHYSICAL FEATURES OVERVIEW - WEST SECTION

EXHIBIT 3-3a

Woodland Vegetation
PSW - Provincially Significant Wetland (MNR) - limits approximate only
LSW - Locally Significant Wetland (MNR) - limits approximate only
1999 Fish Survey Zones (see section 3.2.4 for details)
⑦ Calling Frog Survey Station (May 2000) - See Section 3.2.6 for details
observed seepage (see Appendix C for additional notes)
seasonal drainage/drains (flashy or intermittent flows)
other drainage/tributaries
other wetland (not evaluated by MNR) - approximate limits

REGIONAL MUNICIPALITY OF WATERLOO

GUELPH TOWNSHIP

CITY OF GUELPH

Marden South Wetland PSW Complex (deer winter use)

Marden South Wetland PSW Complex

Extractive Industrial Zoning

Marden South Wetland PSW
- Seepage and ditch drain network
- One of several wetlands in extensive complex
- See Appendix C for details

Part of Townline PSW complex (with Heronry)

Townline Wetland PSW
- Groundwater seepage
- Good wildlife area
- See Appendix C for details

Ellis Creek Wetland PSW
- Groundwater seepage
- Good Wildlife area
- See Appendix C for details

Silver/Red Maple Swamp

Ellis Creek Tributary

No defined channel or flow (June 1999)

Ellis Creek Wetland PSW

Hazard Lands

Waterfoul use/potential (MNR resource mapping)

Hopewell Creek

Ellis Creek

SHANTZ STATION ROAD (REGIONAL ROAD 30)

TOWNLINE ROAD

GUELPH ROAD 3

COUNTY ROAD 86

SILVERCREEK PARKWAY

HIGHWAY 6

WOODLAWN ROAD (HIGHWAY 7)

HIGHWAY 7

CNR

⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

Scale = 1:25,000
250m 0 500m

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

BIOPHYSICAL FEATURES OVERVIEW - EAST SECTION

EXHIBIT
3-3b

1 Cultural Meadow and Ditch
2 Cultural Meadow, Meadow Marsh and Cultural Woodland
3 Disturbed Cultural Meadow, Meadow Marsh, Shallow Marsh
4 Cultural Meadow, Lowland Forest, Pond
5 Floodplain Lowland Forest and Plantation
6/7 Deciduous Forest-Valley Slope
8 Cultural Meadow with Meadow Marsh Pockets
9 Rosendale Creek Valley (Cultural Meadow and Thicket)
10 Tributary Valley - Cultural Meadow, Thicket, Marsh
11 Tributary Valley - Deciduous Forest, Cultural Meadow and Thicket

Note: Units 1-11 See Appendix C4 (Table C4) for further details.

WOOLWICH TOWNSHIP

CITY OF KITCHENER

BRESLAU

Bloomingdale - Rosendale Wetland (See Exhibit 3-3a and Appendix C)

Hopewell Creek - West Branch

Meadow Marsh with Cedar, Willow, Dogwood

Pond, Shallow Marsh, Thicket Swamp

Weiland Forest (Maple, Beach, Ash, Cherry, Hickory) - see section 3.2.5

Pond/ Marsh

Maple, Oak, Cherry Slope Forest (EA Unit W2)

Cedar Stand and Pond

Rosendale Creek

Mixed Slope / Floodplain Forest (EA Unit WIB) - local seepage

Manitoba Maple/Crack Willow

Localized seepage

Thicket

Cultural Meadow

Upland Cedar, Ash, Maple (EA Unit WIC)

Floodplain swamp - Maple, Willow, Yellow Birch, Hemlock (see section 3.2.5)

Deciduous Forest (Ash, Maple, Cherry, Beech, Basswood) - EA Unit WIA - Localized Discharge

Bingemans Park, Camping and Conference Centre

Steep wooded slope

Constructed Wetland Habitat Area

Deciduous Swamp (see section 3.2.5)

Meadow Marsh/ Reed Canary Grass

Mixed Riparian Willow, Elm, Cedar, Dogwood

Planted Spruce, Pine, Walnut

Mixed Cedar, Willow, Ash, Locust

Floodplain Shallow Marsh

Riparian Willow, Cedar, Ash

Breslau Wetland PSW - see Exhibit 3-3a

GRAND RIVER

BRIDGE STREET

VICTORIA STREET (HWY 7)

WOOLWICH ROAD 68

HIGHWAY 7

SPITZIG ROAD (WOOLWICH ROAD 66)

GREENHOUSE ROAD (WOOLWICH ROAD 72)

EBYCREST ROAD (REGIONAL ROAD 17)

LACKNER BOULEVARD

KITCHENER-WATERLOO EXPRESSWAY

Hopewell Creek

Grand River

CNR

Pit

Scale = 1:25,000
250m 0 500m

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

OTHER VEGETATION AREAS (Grand River Valley, Weiland Forest, Hopewell Creek Valley)

EXHIBIT 3-4

South of Bridge Street West of Ebycrest Road

Further review of this area was undertaken during a site review on April 10, 2001, and during subsequent additional review on September 17, 2001. These reviews updated and added to the information for this area, and characterized the vegetation associations using ELC categories.

Highlights of the vegetation associations are provided below. A detailed review of the vegetation communities coupled with opportunistic wildlife observations is provided in Appendix C. The vegetation associations are also mapped on Exhibit 3-4.

- Much of the area within 200 to 300 metres of Bridge Street is open and dominated by Cultural Meadow. A zone east of Rosendale Creek has been used for granular borrow and spoil pile storage. There are occasional small wet pockets scattered throughout this cultural meadow/borrow setting – these pockets have developed in response to localized shallow groundwater emergence (sand lenses) and/or depressions due to earth scraping;
- There is a flood berm that has been colonized by Common Buckthorn. The floodplain below this berm is part of the Bloomingdale-Rosendale Wetland (LSW – located approximately 300 metres south of Bridge Street). This floodplain is characterized by cultural meadow, meadow marsh, and cultural woodland. Shallow groundwater emerges in the vicinity of the berm and flows to the floodplain. A mixed plantation of White Spruce and Black Walnut, with scattered Black Walnut regeneration, is also present in the floodplain. To the west of the floodplain there is a small stand of White Cedar, a residence, and a small spring-fed pond;
- There is a steep wooded valley slope between Rosendale Creek and Ebycrest Road located approximately 250 metres south of Bridge Street. The slope is part of the Grand River valley. An intermittent tributary emerges from wetland ponds east of Ebycrest Road, flows westerly through cultural meadow and thicket, and then follows a steep incised channel through the wooded slope to the Grand River. The wooded slope is dominated by Sugar Maple in the east section, with Hackberry and Bitternut Hickory co-dominate in the west section. There is a reasonably good regeneration layer, the stand is mid-aged, and there is moderate to abundant regeneration of Common Buckthorn in the understory and ground layer;
- Black Walnut and Hackberry are listed as regionally significant (Region of Waterloo, 1999) if demonstrably indigenous – a strong possibility given their location in the Grand River corridor which provides good seed dispersal opportunities.

Weiland Forest Tract (EA Unit W5a and W5b)

- This is an irregularly shaped deciduous upland wet-mesic forest of Sugar Maple, White Ash, Beech, Black Cherry and Bitternut Hickory with imperfectly to well drained soils, hummocky topography, trees 15 to 50 cm dbh (diameter at breast height), and canopy closure up to 80%;

- The forest stand is broadest in the north and central section, than narrows considerably at the south end (narrow south lobe);
- There is deciduous swamp present within the central (core) section. The swamp is imperfectly to poorly drained, on hummocky topography, seasonally ponded, and supports Bur Oak, Green Ash, Silver Maple, and White Elm with up to 50% canopy closure (trees 15 to 50 cm dbh).

Hopewell Creek Channel – Riparian Vegetation

- Riparian vegetation along the main creek channel is a mix of Crack Willow, Manitoba Maple, White Elm, White Cedar and Red-osier Dogwood with a variable canopy closure and trees ranging from 10 to 50 cm dbh. The groundcover is dominated by typical floodplain grasses and herbs. These riparian conditions are also prevalent south of existing Highway 7. Localized pockets of planted White Pine, Black Walnut, and White Spruce also occur;
- Riparian vegetation along the west tributary channel is predominantly meadow marsh (Reed Canary Grass), with occasional White Cedar, willow, and Red-osier Dogwood, and cultural meadow vegetation on the valley slopes;
- South of the confluence of the east and west branches there has been localized riparian disturbance associated with livestock grazing and watering.

Significant Flora

Regionally (or delisted) plant species were recorded during the previous EA review and the current MTO review.

Carex stricta (Tussock Sedge) was noted throughout the Hopewell Creek floodplain. This species is no longer considered rare in Waterloo Region.

Carex alopecoida (Foxtail Sedge) was noted throughout the Ellis Creek floodplain woods and wetland north of existing Highway 7. This species is probably under collected. It is probably more overlooked than rare because of its similarity to *Carex stipata*. Its rare status in Waterloo Region is under review as additional records are noted.

Carex tuckermanii (Tuckerman's Sedge) was recorded scattered throughout the lowland floodplain woods at the Grand River, west of the Grand River crossing location. This species remains on the Region of Waterloo significant plant list.

Two regionally significant species (Waterloo) were recorded during the current MTO review within the Bloomingdale-Rosendale wetland north of Bridge Street. These were *Pilea fontana* (Spring Clearweed) and *Carex scabrata*. Both species were recorded in conifer swamp habitat in areas with extensive groundwater discharge.

Two additional regionally significant species were recorded by other botanists in the core B-R wetland block north of Bridge Street in October 2000 during a recreational outing. This information was provided to MTO and its consultants. Ecoplans Limited field checked and confirmed the presence of these two species, which are briefly highlighted below:

- *Polystichum lonchitis* (Northern Holly Fern) is associated with calcareous groundwater seeps in forested areas, particularly cliff environments. The last collection of this species in Waterloo Region was in 1892 at the "footbridge" south of Galt, Cambridge. The closest more northern population is 90 km to the north. This disjunct observation is therefore considered noteworthy.
- *Polymnia canadensis* (Small-flowered Leaf cup) is most commonly found on scree slopes or rubble at spring seepage areas along the base of the southern portion of the Niagara Escarpment and its outliers, in forested habitat. Other than one collection in the early 1990s in Conestoga, the last record of this species was also in 1892 at the "footbridge south of Galt, Cambridge. Consequently, the present population in the B-R wetland is noteworthy.

Following this discovery, further searches were made by Ecoplans Limited south of Bridge Street for these species. Neither species was noted south of Bridge Street – this was not surprising because suitable habitat conditions were not noted south of Bridge Street.

c) Summary of Changes from EA Report 1997

The main changes/updates since the EA Report 1997consist of the following:

- More detailed field assessment was undertaken at the priority wetland areas;
- The Townline Wetland was subsequently upgraded by MNR to PSW status in 2000 based on information provided by both Ecoplans Limited and the KWFN;
- Information on significant flora species was updated;
- Floodplain wetland information was collected at the Grand River crossing, as requested by GRCA.

d) Significance and Sensitivity

The additional work completed during the current MTO review has confirmed and in some cases elevated the quality and significance of some of the priority vegetation/wetland areas. Overall, the Grand River valley, Bloomingdale-Rosendale Wetland (LSW), Hopewell Creek, Hopewell Riparian Woodland/Wetland (LSW), Townline Wetland (now PSW), Ellis Creek Wetland (PSW), and Marden South Wetland (PSW) are confirmed as Environmentally Significant issues in the study area. These areas warrant attention in updated route planning and evaluation, and priority in mitigation where avoidance is not possible. The Weiland Tract, a good quality forest stand, also merits similar consideration.

3.2.6 Wildlife Resources

a) Data Sources

The EA Report 1997documented wildlife resources and potential throughout the study area based on a combination of secondary source information, agency liaison, review of the Breslau Transportation Study document (1996), and opportunistic field observations.

During the current MTO review, more detailed in-season wildlife surveys were undertaken in the priority habitat areas identified by MNR/GRCA as part of the updating and re-visiting of the Recommended Plan (1997). This more detailed work consisted of the following activities:

- Breeding bird surveys of the priority areas were undertaken by Ecoplans Limited during four survey visits in June 1999 and two visits in July 1999, utilizing a one or two person survey team. Surveys were completed in the early morning (typically between 4:30 a.m. and 11:00 a.m.) under suitable weather conditions (generally clear with limited or light winds). Wandering transects were completed through the habitat blocks to obtain as complete a coverage as possible and to assist in evaluating breeding habitat quality. On two occasions a representative of the Kitchener Waterloo Field Naturalists accompanied Ecoplans Limited staff during the breeding bird surveys;
- The KWFN and Guelph Field Naturalists (GFN) also completed independent breeding bird surveys of the priority areas in 1999. Findings from both surveys were mutually exchanged, and were of assistance in further reviewing alignment revisions;
- During the course of field visits ponded conditions were noted in the Townline West and Ellis Creek wetland blocks. These areas were field checked in April 2000 for the presence of salamander egg masses. A calling frog survey was undertaken in May 2000 at 13 stops bordering priority woodland/wetland areas in the study corridor. The survey was completed following the Environment Canada Backyard and Road Call Count Amphibian survey protocol.
- Opportunistic wildlife observations were also made in the course of other field visits.

b) General Description

Breeding Bird Work – 1999

Introduction and Methods

Wildlife surveys focusing primarily on breeding birds were completed along the Highway 7 study corridor between Kitchener and Guelph during the month of June and in early July 1999 (June 13th, 18th, 19th, 21st, July 1st and 4th). Surveys were completed in the early morning (between 4:30 a.m. and 11:00 a.m.) under suitable weather conditions (generally clear with no to only light winds).

The field surveys were focused on five Specific Areas of Agency Interest, with incidental observations from other areas being recorded in an opportunistic manner. These five specific areas were:

- Bloomingdale – Rosendale Wetland
- Hopewell Creek Riparian Woodland/Wetland (Reg. Road 30)
- Townline Road West – Woodland / Wetland
- Ellis Creek Wetland
- Marden South Wetland

Some additional survey time was also spent in the shrub-thicket and woodland habitats on the west (south) side of the Grand River.

All birds observed or heard were recorded, with additional time being spent to determine the breeding status of significant species (Regional or Provincial level).

This report also makes reference to Conservation Priority Level (CP Level) for birds of southern Ontario. This is a relatively recent joint initiative of MNR, Bird Studies Canada, and Environment Canada documented in a report entitled *Conservation Priorities for the Birds of Southern Ontario* (1999). The bird species list for a particular municipality identifies a broad group of species that represent a priority for conservation based on the three components that make up the evaluation approach (Jurisdictional Responsibility, Preservation Responsibility, and/or Area Sensitivity). The list is not intended to identify only rare species or species under immediate threat or in need of population restoration. The list is also not intended to identify species that are indicators of ecosystem health or integrity. The list is sorted in descending order by level of conservation priority: Level 1 (highest) to Level 4 (lowest). The information is provided as a planning tool for municipalities when considering land use planning decisions.

Parallel breeding bird work was also undertaken by the Kitchener Waterloo Field Naturalists and the Guelph Field Naturalists in the same areas, over a similar time frame. The results of that work are provided in Appendix C along with the Ecoplans Limited breeding bird data. Key findings are integrated in the review below where relevant.

Results

A total of 70 bird species was observed during the Ecoplans Limited surveys. Of this number 52 species were recorded as possible breeders within the Specific Areas as outlined above. (Possible breeding evidence was defined as a species observed or singing males present in suitable nesting habitat during the breeding season.) The remaining 18 species were observed flying over the Specific Areas, or recorded in adjacent areas. Within the Specific Areas additional breeding evidence was observed for some species (adults carrying fecal sacs or food, nests, fledged young etc.) but a concerted effort to obtain definitive breeding evidence for all species was not undertaken.

The majority of the species observed are common in rural and urbanizing areas throughout southern Ontario. Several species have now been assigned CP Status for planning consideration. A number of regionally significant species were observed (CP level in parentheses where assigned) including nesting Great Blue Herons, Green Heron (CP4), Wood Duck (CP4), Least Flycatcher (CP3), Brown Creeper (CP2), Winter Wren

(CP3), Blue-gray Gnatcatcher (CP4), Veery (CP2), Brown Thrasher (CP1), American Redstart (CP2), Northern Waterthrush (CP2), Louisiana Waterthrush (CP1), Mourning Warbler (CP2), Vesper Sparrow (CP2), and White-throated Sparrow (CP1). The Louisiana Waterthrush is also designated as provincially and nationally vulnerable. Details outlining the locations and nature of these sightings are provided in Appendix C, and in the following text.

During the course of the surveys, a recently established heronry (Great Blue Heron) was brought to the attention of the Project Team by the Kitchener Waterloo Field Naturalists. The heronry is located within the Townline Wetland PSW. Apparently, the heronry has become established over the last three years, and may reflect the relocation of the Breslau Heronry (ESPA 21) that was abandoned. Great Blue Heron colonies typically utilize deciduous swamps as nesting areas, and remain at such sites until carrying capacity is reached, nest trees decline (from urea enriched droppings and nest weight), or both. The heronry is thought by the landowner to contain up to 100 nests. No attempt was made by Ecoplans Limited to confirm this number at the time of the visit (June 18, 1999) because of the risk of disturbing young birds that were present in the elevated nests. Other noteworthy bird species that were recorded when the heronry was visited were Winter Wren, Veery, and Northern Waterthrush.

Specific Areas of Interest

Grand River

The mosaic of tableland and slope forest, cultural meadow/thicket, and floodplain forest provides a variety of habitat conditions. During the visits, no unusual species were recorded, with most being habitat generalists. There is some potential for regionally significant species (Northern Waterthrush) in the forested habitats along the river, but the amount of habitat is limited in terms of areal extent.

Both the Kitchener Waterloo and Guelph Field Naturalists (KWFN / GFN) surveys spent additional time in this area. Northern Waterthrush was observed. Two other regionally significant species, Brown Thrasher and Alder Flycatcher, were also observed. The Brown Thrasher utilizes predominantly early successional upland habitats. The Alder Flycatcher frequents alder and willow areas bordering lakes and streams. Suitable conditions occur along much of the Grand River where willow is abundant.

Bloomingdale – Rosendale Wetland

The most noteworthy species recorded in the forest and wetland block was a Winter Wren. This was also confirmed in the KWFN/GFN surveys. Other typical forest species such as Eastern Wood-Peewee (CP3) and Red-eyed Vireo were also present. To the west of this block, a Brown Thrasher (regionally significant) was recorded along a hedgerow.

Weiland Forest Tract (Reviewed by KWFN/GFN)

The KWFN/GFN survey yielded an expected mix of forest dependant and edge species in this tract. Noteworthy observations were Mourning Warbler (CP2) and Scarlet Tanager (CP2), both of which are also regionally significant.

Hopewell Creek Valley-Riparian (Reviewed by KWFN/GFN)

The KWFN/GFN survey recorded an expected mix of edge and forest dependant species. The riparian forest component is broadest along the main channel about 700 metres north of existing Highway 7. The balance of the forested creek valley to the south extending to Highway 7 is much narrower (no greater than 100 metres wide, frequently less), and more suitable for forest generalist and edge species. Noteworthy species recorded by KWFN/GFN were Northern Waterthrush (CP2), Winter Wren (CP3), and Red-breasted Nuthatch (CP3).

Hopewell Creek Riparian Woodland/Wetland (Shantz Station Road)

A fairly typical breeding bird community was recorded in this area that was reflected in the species diversity (see Appendix C). A Green Heron (CP4, in flight) was recorded to the north of the forest block. The KWFN/GFN also recorded the following regionally significant species – Pileated Woodpecker (CP2), Mourning Warbler (CP2), Brown Creeper (CP2), and Northern Waterthrush (CP2).

Townline Road West – Woodland / Wetland

This area contained one of the more significant breeding bird communities in the study area. Noteworthy species that were present in the core woodland and wetland area included the regionally significant Brown Creeper (CP2 - at least two territories), Veery (CP2), Northern Waterthrush (CP2 - 4 possibly 5 territories), and Mourning Warbler (CP2). Wood Thrush (CP4) was also heard. A singing Vesper Sparrow (CP2, also regionally significant) was also recorded in the agricultural fields to the south and east of the forested block.

The KWFN/GFN survey work also noted the presence of Northern Waterthrush, Winter Wren, and Mourning Warbler in this area.

Ellis Creek Wetland

This area exhibited high breeding bird habitat quality with the highest number of species recorded. Noteworthy species that were recorded at this site were Wood Duck (CP4), Least Flycatcher (CP3), Brown Creeper (CP2), Winter Wren (CP3), Blue-gray Gnatcatcher (CP4), Veery (CP2), American Redstart (CP2), Northern Waterthrush (CP2), Louisiana Waterthrush (CP1), and White-throated Sparrow (CP1). The majority of these observations were clustered in the forested habitats immediately north of the meadow marsh that has been created by back-flooding associated with the existing Highway 7. These habitats comprise the central and southern portion of this habitat block that comprises part of the larger Ellis Creek wetland complex. Of note was the presence of territorial Northern Waterthrush within less than 50 metres of the existing highway (southwest corner).

On June 18, 1999 a Louisiana Waterthrush was recorded at this site. This species is identified as of special concern by COSEWIC and vulnerable by MNR. (COSEWIC is Committee on the Status of Endangered Wildlife in Canada.) It was first identified by sound and then confirmed by sight. It was observed for about 1.5 hours, during which time no additional breeding evidence was recorded (i.e., no food carrying, or other parental activities). Northern Waterthrushes within the same area were actively feeding

recently fledged young. The Louisiana Waterthrush was also observed for over an hour on June 19th. Once again, no additional breeding evidence was recorded. Both observations were made in the south-central portion of the wetland block.

The KWFN/GFN work also confirmed the presence of Northern Waterthrush, Winter Wren, and Veery in the wetland. Additional noteworthy species recorded were Least Flycatcher and White-throated Sparrow.

Marden South Wetland

This was a relatively quiet woodlot, in terms of singing activity, with a low density of most bird species noted during the surveys. Most of the expected bird species were recorded on site during the field visits. Similar findings were made by KWFN/GFN, although Northern Waterthrush was also recorded by them on site.

Other Wildlife Notes

Additional wildlife notes (mammals, reptiles/amphibians, butterflies) as well as breeding bird highlights are noted on the wetland air photo figures in Appendix C.

As part of the Breslau Transportation Study, 3 amphibian, 3 reptile, 40 bird and 6 mammal species were recorded during a field review on July 5, 1995. The Breslau pond, pools along Hopewell Creek, and the Breslau Wetland Complex south of existing Highway 7 were identified as key habitats in that study. All recorded wildlife species were considered common to abundant in the province and region. All species were identified as habitat generalists, inhabiting open or edge areas - no forest interior species were documented.

Waterfowl habitat is provided throughout the Grand River system in terms of spring and fall staging for a variety of waterfowl species, feeding areas, and opportunities for waterfowl nesting for abundant species such as Mallard. This species will utilize a wide variety of water areas such as watercourses, drains, and even ponded field areas for resting and feeding. The Ellis Creek Wetland block north of Highway 7 also provides waterfowl habitat, particularly in the backwater ponded areas immediately upstream of Highway 7. Open floodplain areas provide nesting opportunities for species such as Mallard. Similar opportunities are available throughout the wetland and floodplain sections of the Ellis Creek system south of Highway 7.

Wintering Bald Eagles have been documented in portions of the Grand River watershed, with the majority of sightings in the Blair area along the Grand River south of Highway 401. The MNR (2001) has compiled a listing of sightings since 1988 in the Grand River valley. The compiled list does not indicate any sightings in the valley section within the study corridor. No eagles were observed during a field check of the proposed crossing area on March 14, 2002. That field timing was appropriate because Ecoplans Limited observed a juvenile Bald Eagle in the Cambridge area south of Highway 401 on March 12, 2002.

Calling Frog Survey

A calling frog survey was undertaken on May 25, 2000 at 13 stops bordering priority woodland/wetland areas in the study corridor (between 9:00 p.m. and 11:00 p.m.).

Temperatures were about 11^{o} C with occasionally brisk winds. The survey was completed following the Environment Canada Backyard and Road Call Count Amphibian survey protocol. Although it is recognized that the timing of the survey was later in the season for earliest calling species, Spring Peepers were vigorously calling in the Laurel Creek Conservation Area (Waterloo) at 9:00 p.m. when the Highway 7 survey was initiated. (Level 1 is defined as individual calls can be counted with no overlap, Level 2 – some calls can be counted, some overlap, and Level 3 – calls continuous and overlapping individuals not distinguishable.)

Findings of the calling frog survey were as follows:

- Spring Peepers calling (Level 1) at Weiland Tract and Marden Wetland;
- Green Frogs calling (Level 1) at Hopewell Riparian Woodland/Wetland, near Shantz Station Road , and at Ellis Creek Wetland (Highway 7).

Cooling temperatures and occasionally brisk winds may have been a factor in calling frog activity. The wildlife notes on Figures A to E in Appendix C reference the potential for amphibian presence based on site conditions even if calling frogs were not recorded.

Amphibian Egg Mass Survey

During the course of field visits ponded conditions were noted in the Townline West and Ellis Creek wetland blocks. These areas were field checked in April 2000 for the presence of salamander egg masses (such as Spotted Salamander (*Ambystoma maculatum)*, Blue-spotted Salamander (*Ambystoma laterale)* and Jefferson Salamander (*Ambystoma jeffersonianum* – rare in Ontario, COSEWIC threatened – Canada). Searches of these ponded wetland areas did not detect discernable egg masses of these species.

Wildlife Movement Opportunities

The strength and extent of wildlife movement opportunities is expected to vary in the study setting. Features such as the Grand River, Hopewell Creek, and Ellis Creek and associated riparian habitat would be key wildlife movement areas in this setting, albeit criss-crossed by existing road networks. Other features such as the larger wetland and woodland blocks provide habitat nodes for the most mobile wildlife groups (birds and some mammals), and may function as linkage features to varying degrees for less mobile species (such as amphibians/reptiles) that are able to disperse across open fields. Linkage continuity is affected in this setting by a network of east-west and north-south roads. Existing culverts and bridges maintain linkage opportunities to varying degrees.

c) Summary of Changes from 1997 EA

The main changes/updates since the EA Report 1997consist of the following:

- More detailed breeding bird assessment was undertaken at the priority wetland areas;
- The Townline Wetland was subsequently upgraded by MNR to PSW status in 2000 based in part on breeding bird information provided by both Ecoplans Limited and the KWFN;
- Additional amphibian information was collected and assessed.

d) Significance and Sensitivity

The results of the additional wildlife work (particularly breeding bird surveys) both updated and documented the role of the priority wetland areas in providing habitat conditions suitable for a variety of bird species ranging from wetland dependant to upland dependant neotropical migrants. The quality and diversity of the breeding bird communities varied among wetland areas, and was highest in the Townline and Ellis Creek wetlands, but all wetland areas were confirmed as supporting forest dependant birds of various guilds.

The priority wetland areas either support, or have potential to support, use by expected amphibian and reptile species as well as a variety of open country mammal species.

In terms of landscape connectivity, focal corridor areas are the Grand River, Hopewell Creek, and Ellis Creek. The various wetland and forest blocks occur as nodes with varying degrees of connectedness with these corridors, either through drainage connections, or functional connections (proximity).

Overall, the additional work undertaken has highlighted the importance of maximizing integrity and minimizing intrusion within the wetland areas, to the extent possible, while balancing other competing resource interests. This is identified as an Environmentally Significant Issue in the current MTO review. Maintaining wildlife movement opportunities in the design, and maximizing habitat retention in the design of the Grand River crossing, are also Environmentally Significant Issues.

3.2.7 Environmentally Sensitive Areas

a) Data Sources

Environmentally Sensitive Areas were identified through review of municipal, regional and provincial documentation and updated in 1997 in response to questions and concerns raised by government agencies during the presubmission review of the EA Report 1997.

Continued liaison was maintained with the Region of Waterloo during the course of the current MTO review to determine if additional areas were being designated.

Two ESPAs occur northwest of the study area. Bloomingdale Woods ESPA 20 is located about 4 km north of existing Highway 7 near the hamlet of Bloomingdale. Rosendale Woods ESPA 74 is part of the Bloomingdale-Rosendale Wetland (LSW). This core-forested block is located about 1.5 km north of Highway 7, to the northeast of Rosendale.

As of August 2002, no new ESPAs have been designated by the Region within the study area.

The additional information collected during this MTO review has assisted in confirming or upgrading the quality of some of the wetland areas in the study area. This information has been utilized by MNR in evaluating the Townline Wetland as provincially significant. This information is also available to the Region in considering any future ESPA

designations (subject to landowner cooperation and public review). The Region of Waterloo is considering the possibility of designating the Townline Wetland as an ESPA.

c) Summary of Changes from EA Report 1997

The main change has been the abandonment of the Breslau heronry, with the (likely) relocation of the birds to the Townline Wetland (see Section 3.2.6). In addition, the more detailed information collected during the current MTO review has led to the upgrading of the Townline Wetland by MNR to PSW status.

d) Significance and Sensitivity

Loss of any portion of an Environmentally Sensitive Area (ESA) has been identified as an Environmentally Significant Issue. However, both Stanley Park Conservation Area (ESPA 23) and Breslau Heronry (ESPA 21) are outside of the area being considered for alternative alignments. The Townline East heronry is now part of a PSW complex (Townline Wetland PSW). The Region of Waterloo is considering the possibility of designating the Townline Wetland PSW as an ESPA.

3.3 Agriculture

During the course of the MTO Review information on agricultural land uses was updated through additional area reconnaissance, observations made during other field activities, and information provided by landowners. This information was summarized on study area mapping and presented during the consultation phases of the project.

3.3.1 Soil Capability

a) Data Sources

Soils were classified for their potential agricultural capability based on the Soil Capability for Agriculture system developed as part of the Canada Land Inventory (Environment Canada, 1972). The Foodland Guidelines (1978) were originally referenced and later updated by the Agricultural Land Use Policies of the MMA Provincial Policy Statements in 1995 and 1996. Published soil surveys (Hoffman et al., 1963 and Presant & Wicklund, 1971), aerial mosaics and topographic mapping as well as general field reconnaissance were additional data sources

b) General Description

The majority of soils in the study area are Class 1 (no significant limitations) to Class 4 (severe limitations) for the production of common field crops. Under policy 2.1 of the Provincial Policy Statement (MMA, 1996), Class 1 to 4 and specialty crop lands are considered to be prime agricultural lands. As a result, any new alignment or upgrade of the existing facility will have an impact on high priority agricultural lands. The factors limiting the agricultural productivity of high capability soils in the study area include erosion potential, low fertility, inundation by streams or lakes, moisture limitations, adverse soil characteristics, topography and excess water.

A very small proportion of the study area is rated lower than Class 4. Two soil types in the study area are rated as Class 5 and 6. Donnybrook sandy loam soils are rated as Class 6 (60%) and Class 4 (40%) when they are very stoney. These soils are found on

kames and eskers; the hilly topography, steep slopes and coarse materials with which they are associated adversely affect their agricultural capability. Granby sandy loams are rated as Class 5W. Granby soils occupy depressional areas and therefore are water-saturated for the greater part of the year. This soil capability classification is not applied to organic soils. They are designated by the letter O alone.

Within the study area Fox and Organic soils are considered to have a high suitability for the production of specialty crops. The Fox soils are developed on well-drained, mainly medium and coarse calcareous sands which were deposited as glacial outwash. Internal drainage is very rapid because of the open nature of the sandy materials; sprinkle irrigation is often required to provide supplemental moisture. The majority of organic soils remain in natural vegetation cover, however, they are suitable for the production of commercial vegetables. Some of the organic soils in the study area are being used by nursery operations.

The above assessment remains current under the current review. The capability ratings of each soil type found in the study area are presented in Exhibit 3-4 in Appendix D.

c) Summary of Changes from EA Report 1997

No changes in soil capability have been identified.

d) Significance and Sensitivity

The majority of land in the study is classified as prime agricultural land. The loss of Class 1 to 4 agricultural land has been identified as an Environmentally Significant Issue. However, almost all alignments would have similar impact on priority agricultural soils.

3.3.2 Agricultural Land Use

a) Data Sources

Agricultural land use was based on the Ministry of Agriculture, Food and Rural Affairs Land Use Systems (1983) mapping, as well as aerial mosaics and general field reconnaissance.

During the course of the current MTO Review, information on agricultural land uses was updated through additional area reconnaissance, observations made during other field activities, and information provided by landowners. This information was summarized on study area mapping and presented during the consultation phases of the project.

b) General Description

Lands in the study area provide fertile, fine-textured soils which are very well suited for agricultural use. The study area supports a variety of agricultural activities; dairying and mixed farming are most common, but livestock production (beef cattle, swine, poultry) and the growing of cash crops are also common. Oats, barley, wheat and corn are among the field crops grown in the area, as feed and for sale as cash crops. The main agricultural community in the area is located north of existing Highway 7, particularly the east half of the study area. Most of the larger, full-time farm operations are situated there. Feed mills, sales barns and other agriculture related

businesses are scattered throughout the area.

Specialty cropping is carried out to a small extent in the study area. The specialty operations in the study area produce fruits and vegetables, nursery stock, and sod, and include several greenhouse operations. Most of these operations are located beside existing Highway 7.

Many owners of small holdings along existing Highway 7 have non-agriculture related jobs. Many of the larger holdings are owned by non-farming interests. The change in the significance and nature of farming in the area is strongly influenced by the close proximity of urban areas.

The updating of agricultural uses during the MTO Review provided further information on agricultural practices, investment, sensitivity and farm access. General agricultural patterns recorded in the EA continue to be reflected today. The agricultural land use along Highway 7 tends to be more transitional in nature with a mix of owner-operated and non-farm (leased) operations, sod operations, pick-your-own operations, cash crops, cemeteries and corporate/institutional uses. Major beef and dairy operations continue to characterize the landscape to the north along with extensive cash cropping and some forage.

The updated information is presented on Exhibit 3.5 (west section and east section) along with some natural environmental information to provide an overall resource context for the study area.

c) Summary of Changes from EA Report 1997

Overall, agricultural land use patterns reviewed in the EA Report 1997 continue to be reflected with variations that typically occur with crop rotations. One notable change has been the introduction of two sheep farms on the north side of existing Highway 7.

d) Significance and Sensitivity

The predominant land use in both the Townships of Woolwich and Guelph-Eramosa is agriculture. The description of agricultural land use indicates that there is a mix of leased and owner-operated operations, with a tendency toward transitional uses closer to existing Highway 7. Specialty crop and nursery/greenhouse operations are also clustered near existing Highway 7. Major beef and dairy operations occur further to the north and east. Agricultural Land Use is considered to be an Environmentally Significant Issue.

3.3.3 Farm Community

a) Data Sources

Interviews with farmers were conducted informally during public information centres in the fall of 1989 and June 1990 to develop an understanding of farming activities within the agricultural community. Information collected included farm boundaries, total area of land worked and travel patterns.

During the course of the MTO Review, information on the farm community was updated through additional area reconnaissance, observations made during other field activities, informal discussion with landowners and Federations of Agriculture input provided during the January 2000 workshop, and input provided by OMAFRA.

b) General Description

Agriculture is the predominant land use in the Townships of Woolwich and Guelph / Eramosa. Although much of the land adjacent to existing Highway 7 is in agricultural production, land uses are comprised of a mix of owner-operated parcels as well as parcels that are owned by non-farming interests and leased to local farm operators. To the north and south of Highway 7, agricultural lands are primarily owner-operated.

Within the study area, agricultural land use is interrupted by industrial and commercial development along the existing Highway 7 corridor, as well as in the vicinity of urban areas. Centres of agricultural activity, such as markets, suppliers and social/community centres, are widespread throughout the region. Existing Highway 7 provides an important east-west route for farmers moving supplies, equipment and produce.

Generally, the farming community is interested in understanding future land use proposals so that their operations can be planned accordingly. Many operators hope to see the area remain in agricultural use.

Economic security is a factor which affects the cohesiveness of the agricultural community. In general, there is a willingness to invest in land and building improvements if it is clear that the land will remain available for agricultural use. However, if this security of tenure appears to diminish, the willingness to invest in improvements may also be reduced. In the absence of a finalized proposal regarding Highway 7, the security of land tenure for agricultural use is not assured and owners are therefore concerned about the future of their holdings.

c) Summary of Changes from EA Report 1997

No significant changes in the farm community structure or farming attitudes were noted during the MTO Review. Concerns about farm equipment access and movement, security of tenure, and fragmentation of operations that were identified during the 1989 to 1994 EA work were reiterated by the farm community and farm representatives during the MTO Review.

legend

- Cash Crop / Field Crop
- Specialty Crops (fruits & vegetables)
- Forage
- Pasture
- Dairy Cattle
- Beef Cattle
- **G** — Other Livestock (Horses, Geese, Emu, Sheep)
- **17a)** — Agricultural Operation Units (owned by operator unless otherwise specified)

NOTE: Field observations / updates (1999-2001)

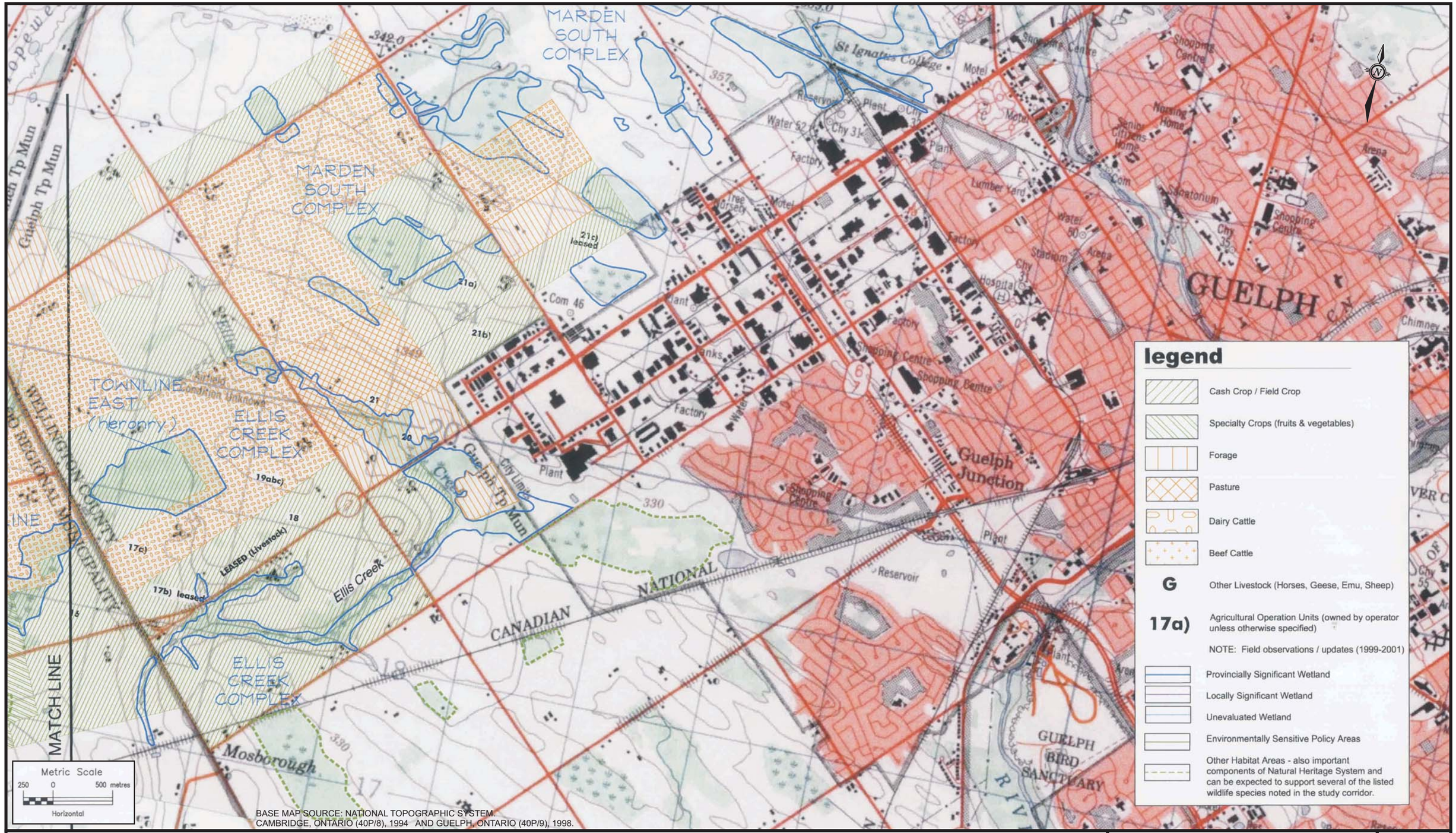
- Provincially Significant Wetland
- Locally Significant Wetland
- Unevaluated Wetland
- Environmentally Sensitive Policy Areas
- Other Habitat Areas - also important components of Natural Heritage System and can be expected to support several of the listed wildlife species noted in the study corridor.

BASE MAP SOURCE: NATIONAL TOPOGRAPHIC SYSTEM.
CAMBRIDGE, ONTARIO (40P/8), 1994 AND GUELPH, ONTARIO (40P/9), 1998.

HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

AGRICULTURAL SETTING
REGIONAL CONTEXT
WEST HALF

EXHIBIT
3-5a



legend

- Cash Crop / Field Crop
- Specialty Crops (fruits & vegetables)
- Forage
- Pasture
- Dairy Cattle
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- G — Other Livestock (Horses, Geese, Emu, Sheep)
- 17a) — Agricultural Operation Units (owned by operator unless otherwise specified)

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BASE MAP SOURCE: NATIONAL TOPOGRAPHIC SYSTEM
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HIGHWAY 7 PLANNING STUDY
KITCHENER TO GUELPH

AGRICULTURAL SETTING
REGIONAL CONTEXT
EAST HALF

EXHIBIT
3-5b

d) Significance and Sensitivity

Despite the transitional state of land use adjacent to the existing Highway 7 corridor, agriculture remains a prominent activity in the area. Disruption to the existing farm community has been identified as an Environmentally Significant Issue. As farming operations are planned for the long term (30 to 50 years) it is important to the farm community in the study area that severance of properties as a result of this EA will accommodate transportation network improvements for the long term. In this way, future land tenure in the vicinity of the highway would be secured for the agricultural community.

3.4 Transportation

The EA Report 1997 provides the data sources, description, and significance and sensitivity related to the range of alternatives that were considered at that time. The starting point for the MTO Review was to update the existing traffic data to reflect volumes on the road network within the corridor in 2000 / 2001. The review of traffic volumes also included an assessment of the capacity of three roadway types: Controlled Access Highway (CAH), Right In / Right Out (RIRO), and 5-lane. This section focuses on the data collected and the work carried out during the MTO Review.

3.4.1 Background Information from EA Report 1997

The original EA was initiated because there was a need to address Highway 7 traffic deficiencies, particularly on the existing two-lane rural section.

a) Data Sources

i) Data from three sources was used to establish an understanding of the existing travel patterns within the study area:

a) A computer model developed by the RMW which simulates vehicle travel demand on its road facility network on a local inter-regional basis;

b) Traffic and accident data provided by the MTO and the associated municipalities; and

c) A traffic survey to determine origins/destinations by recording licence plates was carried out in the City of Guelph for vehicles travelling westbound on Highway 7. The licence plates were recorded over a three day period, with the survey station located between the Hanlon Expressway and County Road 86.

General Description of Highway 7

When the study originally commenced in 1989, Highway 7 was an arterial highway with full access to adjacent properties. Each section was described in the EA Report 1997.

The Annual Average Daily Traffic (AADT) for the period 1989 to 1994 are summarized on Exhibit 3-6.

Exhibit 3-6 – Annual Average Daily Traffic (AADT)

	1988/89	1994
West –		
KWE to CN	22,600 – 32,000	31,500 – 35,300
CN to Regional Road 17	15,700	18,800 – 21,600
Central –		
Regional Road 17 to Guelph Road 3	15,700 – 18,200	20,500 – 21,700
East –		
Guelph Road 3 to Hanlon Expressway	17,600 – 22,500	18,500 – 24,000

The methodology used to develop the travel demand forecasts in the original EA included review of historical traffic counts for the corridor, a travel survey, and forecasting future traffic based on future growth assumptions. The following excerpt from the EA Report (1997) briefly describes the forecasting methodology:

> *Based on the analysis of existing travel patterns, future travel demand forecasts were developed by taking into consideration land use changes and growth expectations in the two centres and adding this growth to existing traffic data. All traffic projections along the Highway 7 corridor in the RMW were based on the provided travel demand model.*
>
> *Population and employment growth data provided by the City of Guelph and County of Wellington and the results from the traffic survey made it possible to carry out a manual trip assignment to determine future traffic within the County of Wellington. From this base data and the determined growth factor, AADT and p.m. peak volumes were projected to the years 2001 and 2011.*

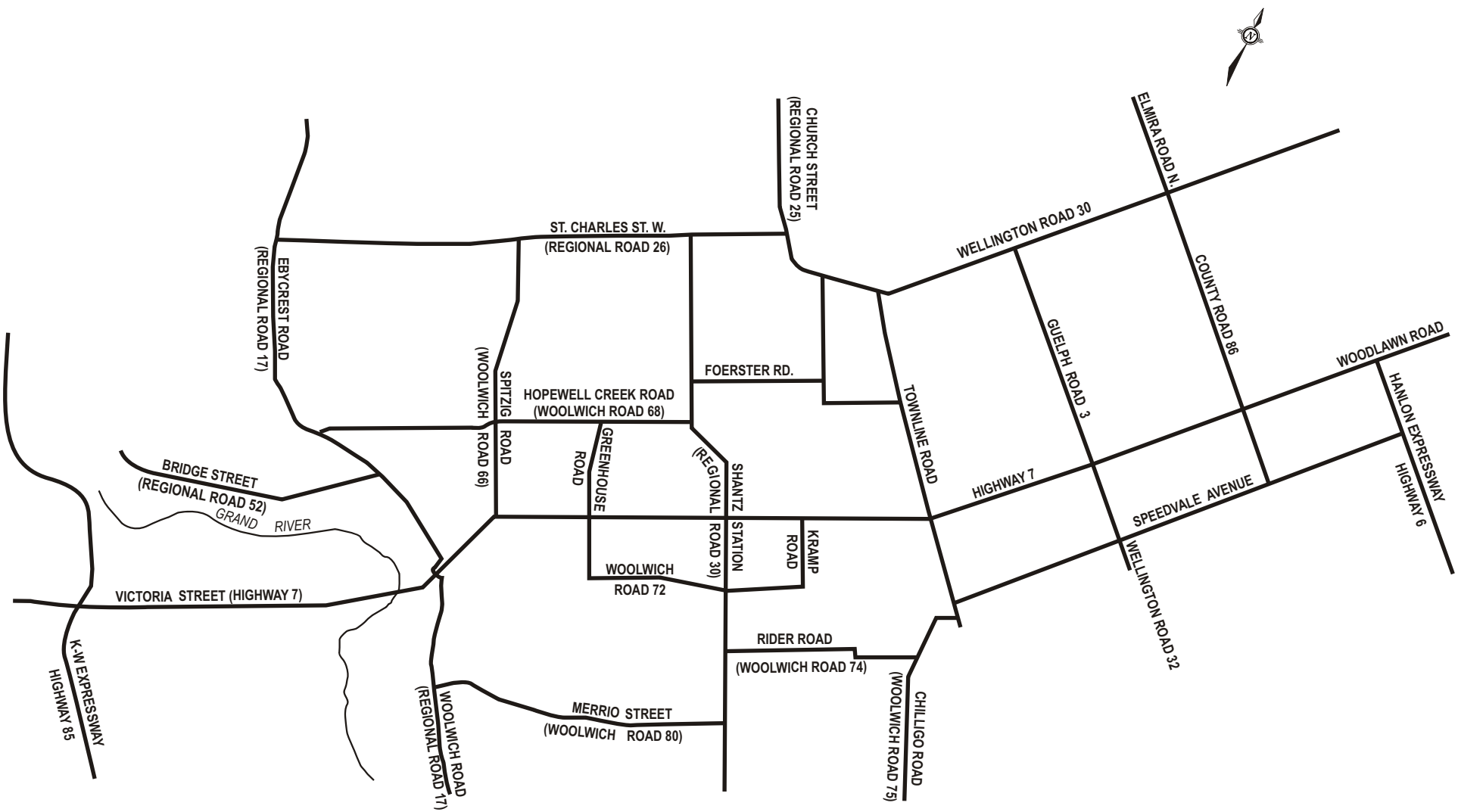
3.4.2 Existing Conditions During the MTO Review

The existing road network is shown on Exhibit 3-7. The RMW and the Township of Woolwich renamed most of the major roads in the rural area between 1997 and the start of the MTO Review. The road network on Exhibit 3-7 shows both the original name and the current name.

The highway characteristics are the same as those documented in the EA Report (1997). Victoria Street (Highway 7) in Kitchener remains an urban, five lane undivided roadway (four through lanes with a centre left turn lane) from the Kitchener-Waterloo Expressway (Highway 85) to just west of the CN railway bridge. This section of Highway 7 functions as an urban arterial roadway and is under the jurisdiction of the Regional Municipality of Waterloo. The adjacent land uses are still predominantly commercial and prestige industrial. The Annual Average Daily Traffic (AADT) for this section of highway ranges from 25,300-34,400 vehicles (1998). Between the CN Rail crossing and the Hopewell Creek crossing, the roadway still functions as a 4 lane arterial highway. The land uses along this stretch of the highway (approximately 2.5 km) are transitional from industrial/commercial to agricultural/open space. AADT for this section of highway is approximately 22,000 (1999).

Between the Hopewell Creek and the west limits of the City of Guelph, the roadway continues to function as a 2 lane rural arterial highway. The land use along this approximately 8.3 km long section is still predominantly agricultural with some scattered highway commercial and other land uses including a cemetery, service stations and garden centres as well as several large field nursery operations. AADT (1999) for this section of highway is approximately 22,000. The practical capacity of a 2-lane rural highway is in the range of 15,000 to 20,000 AADT.

The remaining section of Highway 7 (Woodlawn Road) between the west limits of Guelph and Highway 6 (Hanlon Expressway) continues to function as a 5 lane urban arterial roadway and is under the jurisdiction of the City of Guelph. The adjacent land



HIGHWAY 7 PLANNING STUDY

KITCHENER TO GUELPH

TRANSPORTATION NETWORK

EXHIBIT

3-7

uses are predominantly prestige industrial and commercial, including many car dealerships. AADT for this section of Highway 7 ranges from 20,500 to 26,100 (1999).

Highway 7 is intersected by three north-south rural arterial roads: Ebycrest Road (Regional Road 17), Shantz Station Road (Regional Road 30) and County Road 86. There are number of local road intersections with Highway 7 in both Kitchener and Guelph as well as in the central rural section. The local intersecting roads in the central rural section include Spitzig Road, Greenhouse Road, Kramp Road, Townline Road and Guelph Road 3 / Wellington County Road 32.

Transit

Greyhound provides a bus service between the City of Guelph and the City of Kitchener in the existing Highway 7 corridor. Buses depart westbound from Guelph on a regular schedule during the week with increased service on Fridays, weekends and holidays. The service departing eastbound from Kitchener is similar. The level of service provided is ten to twelve trips per direction per day. Most of the westbound trips terminate in Kitchener, all of the eastbound trips continue through to Toronto.

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.

3.4.3 Traffic Forecasts

In 1998, while the EA Report (1997) was undergoing the formal review process, the traffic forecasts were questioned. Therefore, a review of the earlier traffic forecasts was identified as an essential component of the MTO Review. This was especially important for the central rural portion of the study area, where some members of the public had suggested that a simple widening of the highway would be sufficient.

3.4.3.1 1989 / 1990 Traffic Forecasts

The EA Report 1997 presented traffic forecasts in Annual Average Daily Traffic (AADT). Using AADT provides an overview order of magnitude for comparison, however using peak period directional volumes provides a more detailed assessment. For all of the work carried out for the MTO Review, the traffic data is stated in vehicles per hour per direction (vphpd). The relationship between AADT and p.m. peak hour directional traffic volumes is a function of percentage of directional split and the relationship between one hour traffic volumes and all day traffic volumes. Directional split refers to the proportion of traffic in the two opposing directions, e.g. 50 / 50 would be an equal split with the same volume in each direction.

Peak hour volumes are typically in the range of 8% to 12% of the daily volume, with the average being 10%. The p.m. peak hour directional split in the Highway 7 corridor is typically in the range from 55 / 45 to 65 / 35. The 65 / 35 split would be the most conservative and would create a p.m. peak direction to two way p.m. peak factor of 1.54 (1/.65). When the daily volume / peak hour volume factor is combined with the two way peak hour factor, the conversion from p.m. peak hour peak direction to AADT would be in the range of 13 to 19, with 15.4 representing a 10% p.m. peak hour factor. For

example, the 1999 / 2000 actual counts of 22,000 to 23,000 AADT would be 1,430 to 1,495 vehicles per hour per direction (vphpd). (That is, 22,000 AADT x 10% (peak hour factor) / 1.54 (two way peak hour factor) = 1,430 vphpd).

The traffic forecasts as outlined in the EA Report 1997, indicated that the rural two lane section of Highway 7 would have a p.m. peak hour volume in the range of 2,400 to 2,460 vehicles /hour /direction (vphpd) in 2011. The 2001 forecasts for the same section were projected to be in the range of 1,650 to 1,870 vphpd.

The EA Report 1997 assessed four 'scenarios' to determine the type of road facility that would best serve the highway corridor to 2011. The results of the analysis recommended either a new route alternative or a combined alternative that would make use of the existing Highway 7 right-of-way in the rural section. However it was noted in the EA Report 1997 that the five lane alternative would only provide sufficient capacity to approximately 2011.

3.4.3.2 Initial Review of Traffic Forecasts

Exhibit 3-8 shows the traffic observed in 1989-1990 and in 1999-2000, compared to the traffic forecasts prepared in the early 1990s for the year 2001.

Exhibit 3-8: Actual Annual Average Daily Traffic (1989/1990 and 1999/2000)

Section	Actual (AADT)		Forecast
	1989 / 1990	1999 / 2000	2001
West (KWE to Regional Road 17)	22,600 – 32,000	25,300 – 34,400	38,200
Central (Regional Road 17 to Guelph Road 3)	15,700 – 18,200	22,000 – 23,000	21,000 – 26,800
East (Guelph Road 3 to Hanlon Expressway)	17,600 – 22,500	20,500 – 26,100	30,800

Each of the three sections identified in Exhibit 3-8 was reviewed to see whether traffic volumes observed in 1999-2000 were comparable to those predicted ten years earlier. In the west section, actual counts confirmed that the forecast for 2001 was reasonable. Infiltration onto parallel roads is occurring in this area, likely because Victoria Street within the City of Kitchener is at or near its practical capacity. In the central rural section, traffic counts were also within the range predicted for 2001. In the east section, the increase in traffic volumes on Woodlawn Road within the City of Guelph was less than predicted. However, the volumes on Speedvale Road, a parallel street to the south of Woodlawn Road, had more than doubled, going from 5,000 to 10,2000 AADT. It was concluded that traffic in the east section is moving from Woodlawn Road to the parallel roads, again likely because of congestion.

The first conclusion from the review of traffic data was that the travel demand forecast carried out in 1989 / 1990 in the Original EA was consistent the actual counts in 1999 /

2000. This information was presented to the public at the January 2000 Workshop and at the March 2000 Public Information Centres.

3.4.3.3 Independent Review of Future Demand

An independent review of traffic demand was carried out after the March 2000 Public Information Centres to address concerns raised by the public. A traffic engineer who had not had any previous involvement with the study conducted the review. The approach and methodology were developed based on current practices in assessing traffic impacts in Ontario.

Two alternative approaches were used to forecast future traffic requirements for Highway 7. Developing two approaches is typical of traffic forecasting because it provides a 'level of comfort' when the results of the two approaches are similar and have been determined independently. The first approach was a projection of past traffic growth trends into the future based on historical Annual Average Daily Traffic (AADT) volumes for the central rural section of Highway 7 between Spitzig Road and Guelph Road 3 from the MTO's database. The second approach was a projection of future population and the application of factors relating population to the number of peak-hour trips on Highway 7 to produce traffic volume estimates for future time periods. The two approaches are discussed further in the following sections.

Approach 1: Traffic Generation based on Historical Growth Rates (Forecast 1)

Based on historical traffic counts on Highway 7 since 1985, there has been an increase in traffic volumes. Although the traffic counts reflect economic conditions from year to year, the average growth rate from 1985 to the present (2001) is 2 to 3% per year. This rate is considered to be the baseline trend projection. A second rate of 3 to 4% per year was based on the period between 1992 and the present and is termed a 'high' projection. Trends can be established by discretely selecting any period of years and then applying this growth rate to future conditions. The most appropriate range of years to select when forecasting many years into the future would typically be those years that 'average out' the periods of high and low growth, (or negative growth). It was considered reasonable to select the trend projection that spans the greatest number of years as this would be consistent with long-term growth rates. From 1985 to the present there have been periods of both economic growth and recession. Therefore, the baseline trend projection would be considered to be the most reasonable and conservative growth rate to use for future traffic forecasting.

Approach 2: Traffic Generation from Future Population Forecasts (Forecast 2)

In July 2000, the Ministry of Finance released population projections for Ontario's municipalities up to the year 2028. These were used to generate baseline traffic forecasts. The Regional Municipality of Waterloo population and employment projections for the year 2021 were used as a comparison, being higher than the corresponding Ministry of Finance projections, they were used to generate a 'high' projection.

Assessment of Future Demand

Factors relating the number of all-purpose, auto-driver trips on Highway 7 by direction to the populations of Kitchener-Waterloo and Guelph were developed through an analysis of

1996 Transportation Tomorrow Survey (TTS) data. Analysis of the TTS data for 1996 indicated that the vast majority of trips on Highway 7 originate in or are destined to Kitchener-Waterloo and Guelph. This is consistent with the OD survey that was carried out for the Original EA in 1989.

The central section of Highway 7 has been classified as having a 'Commuter' traffic profile with relatively low variation from season to season. During peak periods the traffic is generally commuter traffic between Kitchener and Guelph. Additional traffic on existing Highway 7 is broken into three components. The first, peak-hour commercial traffic on the central section of Highway 7 is relatively modest at around 5% of total traffic. No specific factors were identified to suggest that this will change significantly in the future. The second is recreational and tourist traffic. Typically, summer volumes are only about 10% higher than average annual volumes. Again, no specific factors have been identified that might suggest significant future changes in this situation. The final component is traffic with either an origin or destination external to Kitchener-Waterloo or Guelph. The TTS data and comparison with observed traffic volumes suggests that this is a small part of the overall traffic flow and unlikely to exert a major influence on future volumes.

Exhibits 3-9 and 3-10 summarize the 'baseline' traffic projections at 5-year intervals developed using both approaches (Forecast 1 and Forecast 2) along with their 'high' variations. The 'high' methods are both for shorter time periods. Forecasts were generated for two sections of Highway 7, the 4-lane section between Ebycrest Road and Spitzig Road (Exhibit 3-9) which has the highest volumes among all of the rural sections, and the 2-lane section between the west portion of Greenhouse Road and Shantz Station Road (Exhibit 3-10), which has the highest peak-hour volume among the 2-lane sections of Highway 7 in this area.

Exhibit 3-9: Traffic forecasts for Highway 7 between Ebycrest Road and Spitzig Road.

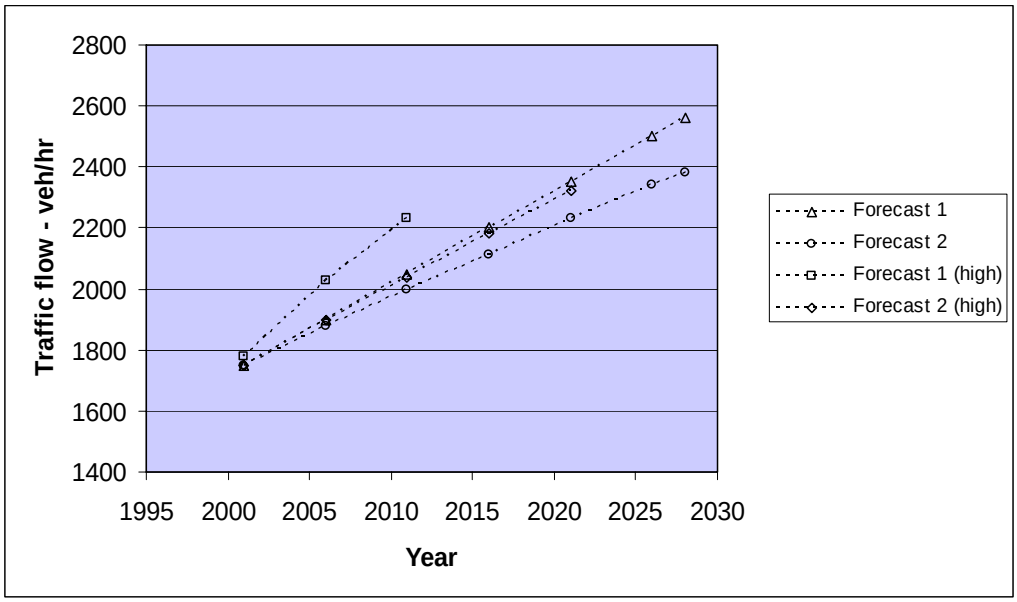
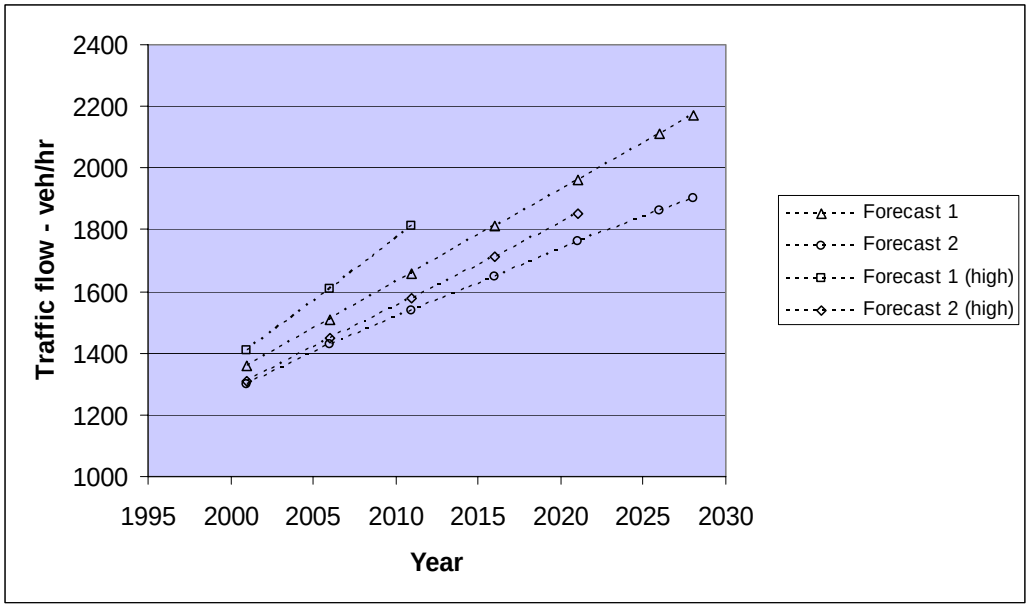


Exhibit 3-10: Traffic forecasts for Highway 7 between Greenhouse Road and Shantz Station Road



The review concluded that the demand forecasts previously developed for the year 2011 were valid and therefore become the basis for further work. The availability of new information during the MTO Review made it possible to extend these forecasts to the year 2028. The 2028 demand in the central rural section would be in the range of 2,350 to 2,600 vehicles per hour per direction.

Four roadway types (cross section), including the Do Nothing alternative, were analyzed to determine their effectiveness as a solution. This analysis was needed in order to determine which types of alternatives should be carried forward for analysis and evaluation (see Chapter 4). The four possible cross-sections were evaluated as follows:

5. **Existing two lane rural highway (DO Nothing)**. This cross section would be equivalent to the existing Highway 7 cross section in the central section. (100 km/h design speed, 80 km/h posted speed);
6. **Five lane highway**. This cross section would be a four lane undivided rural highway (permitting right and left turns) on the existing right-of-way (100 km/h design speed, 80 km/h posted speed);
7. **Right-In / Right-Out (RIRO)**. This cross section would be a four lane highway with a median barrier, access to and from adjacent lands by right turns only, and interchanges at intersecting roads; (110 km/h design speed, 90 km/h posted speed);
8. **Controlled Access Highway (CAH)**. This would be a four lane divided controlled access highway at interchanges, either on a new alignment or along the existing route. For the CAH along the existing Highway 7 alignment, some form of service road network would be required to provide access to the adjacent properties. (120 km/h design speed, 100 km/h posted speed).

The assessment of future demand was carried out using both Approach 1 and Approach 2. The 'baseline' traffic projections at 5-year intervals were developed using both approaches along with their 'high' variations. The 'high' methods are both for shorter time periods.

The roadway capacities / service volumes for the four alternative road cross-sections were calculated. Using the methods contained in the MTO's *Geometric Design Standards for Ontario Highways*, the values for peak-hour, peak-direction capacity and service volume at Level of Service 'D' were calculated as shown in Exhibit 3-11. Level of Service D is the target for future service. Capacity is generally expressed as the volume at which the roadway reaches Level of Service 'D'. Levels of Service (LOS)'A' through 'C' reflect acceptable traffic operating conditions with minimal delays, high operating speeds, and unconstrained vehicle flow. LOS 'D' is reflective of acceptable traffic operations with increasing levels of delay, decreasing operating speeds, and partially constrained traffic flow. LOS 'E' is reflective of a facility approaching capacity with congested operations, low operating speeds, and constrained traffic flow. LOS 'F' is reflective of a transportation facility operating at capacity with traffic demand at or beyond the capacity of the facility.

Exhibit 3-11: Capacity of Highway 7 Roadway Types

	Capacity/Service Volume	
	LOS 'D'	LOS 'E' (capacity)
Existing rural highway	680	1,200
Five lane undivided highway	1,940	2,400
RIRO	2,870	3,340
CAH	3,410	3,510

The values for the five lane undivided alternative have been modified to recognize the loss of about 25% of the basic capacity to traffic signals at major crossing roads. It is also important to note that the capacities and service volumes associated with the first three alternatives on the existing alignment would likely be reduced where side friction was present in the form of slow-moving farm machinery or access points to commercial activities. This would not affect the CAH alternative. It should also be noted that the construction of a CAH alternative in a new alignment would mean that the capacity of the existing Highway 7 would continue to be available.

The capacities described in the MTO Review are higher than the capacities described in the EA Report 1997. The previous work considered the existing central section to be a 'suburban roadside environment' as opposed to a 'rural roadside environment' in the current work. The difference between rural and suburban is the number of driveways / entrances per kilometre. The rural roadside environment would have fewer entrances. The central section of Highway 7 exhibits characteristics of both a 'rural' condition and a 'suburban' condition. The revised capacity calculation attempts to evaluate each factor based on these hybrid conditions.

From the analysis it was determined that widening existing Highway 7 to a five lane undivided highway would not reasonably accommodate future demand. Level of Service 'D' (1,940 vehicles per hour (vph)) would be reached before 2010.

The RIRO alternative would accommodate predicted traffic at a Level of Service 'C / D' to at least 2028 (assuming MTO exercises strict control over the number of new entrances), based on the demand of 2,350 to 2,600 vph.

A CAH alternative would accommodate predicted traffic at a LOS 'C' well beyond 2028.

Both the RIRO and the CAH would provide at least LOS 'C / D' up to 2028. The practical capacity of the RIRO alternative would be in the range of 2,850 vehicles per hour and the practical capacity of the CAH alternative would be in the range of 3,400 vehicles per hour.

c) Summary of Changes from EA Report 1997

The target year for the EA Report 1997 was 2011, a time 20 years from the date of the initial traffic study. At the start of the MTO Review in 1999, a new 20 year planning horizon was suggested. After the review began, it became evident that sufficient data was available to extend the forecast to 2028.

Traffic data was collected as part of the MTO Review. Traffic in the Highway 7 corridor has increased as forecast in 1989 / 1990. The recent counts have been incorporated into the traffic forecasts.

During the MTO Review, a new traffic assessment was carried out. This independent review was carried out using methodologies different from the one used in preparation of the EA Report 1997, together with the latest available information on traffic volumes, and population and employment forecasts. The revised traffic assessment concluded that the demand in 2028 would exceed the capacity of a five-lane undivided highway. Indeed, it would reach Level of Service 'D' before 2011. This contrasts with the traffic assessment presented in the EA Report 1997. The understanding at that time was that a five-lane alternative would have marginally addressed the demand to 2011.

The revised traffic assessment concluded that a Right-In / Right-Out option would address future demands to at least 2028, while the Controlled Access Highway option would address demands to well beyond 2028.

d) Significance and Sensitivity

The existing traffic data and the forecasted demand for the 2028 indicates that there is a deficiency on existing Highway 7 and that the deficiency will continue to worsen as traffic volumes increase.

Roadway safety is an important consideration in the study and has been identified as one of the study objectives. Slow-moving farm vehicles, entering, exiting, and crossing traffic are common on this section of Highway 7. At present, traffic consists primarily of commuters who are familiar with the road and have some level of expectation that they might encounter one of these situations. Roadway safety can be best achieved through separation of traffic conflicts such as left turns and opposing traffic flow. During the development of roadway alternatives in Chapter 4 it will be important to remember that roadway safety increases as the conflicts are removed, i.e. the roadway safety improves when the facility is divided, access controlled and grade separated at crossing roads.

The need to provide adequate capacity to handle the forecasted demand is one of the objectives of the Highway 7 Planning Study.

3.5 Summary of Environmentally Significant Issues

3.5.1 Introduction

1997 Original EA Study Process

During the Original EA Process culminating in the submission of the EA Report 1997, components of Socio-Economic Environment, Agriculture, and Natural Environment were all identified as Environmentally Significant Issues. Addressing Transportation deficiencies was one of the main objectives in the study.

Considerable changes in environmental policy and the status of wetlands occurred during the Original EA study process. Some wetlands were upgraded in status (to PSW), while other habitat blocks remained unevaluated (Townline West). During this time, values placed on wetlands were changing as policies were changing. Agriculture was an important resource issue. Minimizing fragmentation of farm parcels by following lot lines wherever possible was an objective during the study process. The EA recognized impact to wetlands (both evaluated and unevaluated) along the route as well as the tradeoffs between agriculture and wetlands. Areas where alignment shifts could be considered further at detailed design to reduce wetland effects were identified.

MTO Review (1999-2002)

During the MTO Review, Socio-Economic Environment, Agriculture and Natural Environment continue to be Environmentally Significant Issues for route planning. The need to provide adequate capacity to handle the forecasted demand is one of the objectives of the Highway 7 Planning Study.

Agriculture has continued to be an important consideration. During the course of the review, the significance of the "Nursery Mall" uses along the existing Highway 7 corridor was identified as Socio-Economic/Agriculture issues through the consultation process. Security of farm tenure, farm fragmentation, and disruption to the farm community continued to be important issues. Additional detailed in-season wetland and wildlife work was undertaken at the priority habitat areas within the study corridor. This information, coupled with information provided by Kitchener Waterloo Field Naturalists, was utilized by MNR in designating the Townline Wetland (Townline West and Townline East components) as a PSW in 2000. The findings of the additional work coupled with the Townline PSW designation placed a higher priority on examining revisions to the Recommended Plan (1997) to reduce impact on natural areas. Socio-Economic Environment and Agriculture have remained important and continue to be recognized as Environmentally Significant Issues in the study area as reviewed throughout Section 4.0.

Exhibit 3-12 provides a summary of the Environmentally Significant Issues identified for the Highway 7 Planning Study - Kitchener to Guelph.

Exhibit 3-12
Summary of Environmentally Significant Issues

Identified Environmentally Significant Areas / Issues	Identified by
Municipalities • The need to provide reasonable transportation infrastructure (capacity) to meet the expected growth in population (demand).	Local Municipalities
Communities / Land Use • Loss or disruption of access to the upper tier road network, particularly in the industrial areas of Kitchener and Guelph. • Disruption to access during construction. • Disruption or displacement of households, both in the urban and rural areas.	Local Businesses Local Businesses Local Residents
Noise • Increase in noise level for noise sensitive land uses adjacent to the alignment.	Local Residents
Heritage Resources • Loss of heritage features, including archaeological sites. • The heritage and conservation of the Grand River Corridor.	Area LACACs Ministry of Culture
Vegetation and Wetlands • The Grand River valley, Bloomingdale-Rosendale Wetland (LSW), Hopewell Creek, Hopewell Riparian Woodland/Wetland (LSW), Townline Wetland (now PSW), Ellis Creek Wetland (PSW), and Marden South Wetland (PSW).	MNR GRCA
Wildlife Resources • Maximizing integrity and minimizing intrusion within the wetland areas, to the extent possible, while balancing other competing resource interests. • Maintaining wildlife movement opportunities in the design, and maximizing habitat retention in the design of the Grand River crossing.	MNR GRCA Interest Groups
Aquatic Resources and Fisheries • Protection of fish/aquatic habitats in the Grand River, Hopewell Creek, and Ellis Creek • Significant degradation of surface water features	MNR GRCA
Water Quality and Quantity • Loss or contamination of private wells and water sources. • Significant degradation of surface water features.	Local Residents MOE GRCA
Geology and Physiology • Loss of potential aggregate resources.	
Environmentally Sensitive Areas • Loss of any portion of an Environmentally Sensitive Area (ESA).	Local Municipalities MNR
Soil Capability • Loss of Class 1 to 4 agricultural land.	OMAFRA
Agricultural Land Use • Agricultural Land Use.	Local Farmers OMAFRA
Farm Community • Disruption to the existing farm community.	Local Farmers OMAFRA