7.0 Environmental Effects and Mitigation

This section of the report describes the anticipated environmental effects associated with the Recommended Plan and appropriate mitigation, at a preliminary design level.

7.1 Natural Environment

7.1.1 Ecology and Watershed

The Recommended Plan represents modifications to and widening of an existing highway facility. Although some additional habitat is affected, adverse effects at the larger watershed and ecosystem scale are not expected to be significantly greater as the landscape is currently dominated by forest and other forms of natural cover, which will not change due to the proposed works. Similarly, effects on broader landscape processes such as major species (i.e. bear, moose) movements will not be significant, despite local scale effects to certain species in the immediate vicinity of the four-lane highway.

One of the main mitigation objectives of the *Study Design* was the minimization of direct effects on the natural environment. To this end, and wherever possible, the realignment attempted to follow the existing Highway 69 corridor. By doing so, the amount of habitat loss for both plants and animals was kept to a minimum.

Mitigation is recommended elsewhere in this report to minimize fragmentation effects on wildlife movements.

Effects and mitigation to major components of the ecological system and watershed are described in the following sections.

7.1.2 Topography

The Recommended Plan is not expected to affect the topography in the general study area beyond the future highway right-of-way.

Within the right-of-way, a number of major rock cuts and fills are required to establish the vertical alignment for the future four-lane Highway 69, as described in Section 6.2. The rock cuts and fills in a natural area are unavoidable, as they are required to meet the freeway design standards for the future four-lane Highway 69.

Other potential effects to topography within the future right-of-way occur in low areas where the new highway profile results in fill (i.e. near watercourses, wetlands or in valleys). The most notable areas include the vicinity of Still River, Straight Lake, Highway 522 (Cranberry) and Clear Lake.

7.1.3 Groundwater

Potential effects on surficial soils and groundwater include:

- Increased soil erosion;
- Groundwater contamination from disturbance of contaminated soils, leaks and/or accidental spills;
- Changes in groundwater levels in aquifers and yields of wells due to dewatering, changed flow patterns that may disrupt the community or private groundwater supplies for drinking water, irrigation or commercial uses; and
- Damage to groundwater wells from blasting and vibration.

Highway construction may create instability in slopes and increase the rate of erosion along the route due to removal of vegetation or other construction activities on steep slopes. These potential effects are expected to be minor in sections of the study area that are relatively flat. Any increased erosion will be temporary and limited to the construction period. However, a greater risk of slope instability and increased erosion exists during construction in areas adjacent to waterbodies such as Magnetawan River, Still River, Straight Lake and Key River.

Well locations were identified through Ministry of Environment (MOE) well records during the Route Planning Study. A total of 798 water well records were reviewed for the region surrounding the North and South Section study areas. The well records were obtained from the MOE Water Well Records Department in Toronto, Ontario. Of the 798 water well records reviewed, 39 historical well records were identified as being located within 500 m of the North Section Preferred Route. The location of these wells is noted in the *Groundwater Study* in Appendix I. They are located at the houses and businesses along the existing highway and side roads where interchanges are proposed.

Overall, 10 percent (%) of the wells within the study area encountered water less than 15 m below ground surface (bgs), indicating the presence of high water table conditions in some areas. The main areas of high water table, as observed through well records are: Cranberry (Highway 69 at Highway 522), Still River, and the Magnetawan River (Highway 69 at Highway 529).

Most of the wells (~97%) draw water from the bedrock aquifer system, which is less prone to contamination from surface sources. The hydraulic connectivity between the bedrock aquifer and the overburden aquifer is expected to be good in areas where sand and gravel overly fractured bedrock. However, most wells installed within the study area encountered units of silt and clay that will reduce the hydraulic connectivity between the aquifer systems. Therefore, the likelihood

of interference with existing water supplies (both private and municipal) within the study area is expected to be low to moderate with any impacts remaining localized (and temporary).

The likelihood of interference with existing groundwater supply within the study area (due to construction activities) is expected to be low to moderate. Most wells have been installed deep in the bedrock aquifer, and are overlain by deposits of clay and silt mixed with sand. These materials will reduce hydraulic connectivity between overburden aquifers and the regional aquifer system.

During any phase of road construction activities, due care will be exercised in avoiding fuel, lubricants, and fluid spills. Spill and contamination prevention practices will be implemented to avoid potential environmental hazards, and clean-ups. Small spills and leaks during construction activities have the potential to affect groundwater quality in wetland areas, or where the water table is at or near the surface.

Environmental effects of spills on medium to fine-textured soils (i.e. clay and silt) are potentially most damaging to surface water quality due to run-off; whereas spills on more permeable overburden, as identified within the study area (i.e. sand and gravel), and bedrock (i.e. Precambrian) are potentially most damaging to groundwater due to infiltration.

The most common effects of spills and other releases of contaminants is a change in water colour, turbidity, taste, and odour. It should be noted that any release of contaminants has the potential to migrate into the groundwater system and impact water quality. However, given the depth at which most wells have been installed, and the material that they have been installed in (i.e. mostly bedrock), it is unlikely that significant temporary or permanent groundwater contamination will occur within the study area.

Overall, it is anticipated that so long as spills are avoided there will be minimal temporary and residual effects to the groundwater system resulting from construction activities within the study area.

Spill Prevention Plan

A Spill Prevention, Control and Countermeasures (SPCC) Plan will be prepared for all construction activities within the study area, by the Contractor. The Contractor will develop, implement, and maintain the SPCC Plan to ensure that construction activities do not increase the risk of a release of fuel, oils, or other hazardous materials to the environment, which could impact aquifer system. The SPCC Plan will describe the procedures and equipment in-place to minimize spills, leaks, or releases of hazardous materials. In addition, the plan will address the reporting and response procedures in the event of an incident.

Groundwater Monitoring Program

If adverse effects are anticipated, a groundwater monitoring program (GMP) will be developed for the study area (to commence prior to construction activities, and remain in effect until a specified time after construction has been completed). Characteristics of the GMP should include, but are not limited to the following:

- Installation of groundwater monitoring wells (monitoring wells) at various locations to collect baseline groundwater conditions (i.e. conductivity, temperature, pH, metals, oil and grease, etc.). Monitoring wells should be focused in areas considered to have a high sensitivity to groundwater impacts. Multiple water level measurements should be collected prior to construction activities;
- Monitoring wells should be installed in the shallow aquifer system to confirm whether or not cuts into the subsurface during construction might have an effect on well yield and supply;
- Sampling and measurements should be collected from local wells;
- Piezometers should be installed near watercourses to monitor water levels and base flow conditions, and wells should be installed to monitor groundwater quality; and
- Sampling methods, locations, and analytical parameters should remain constant during pre-construction, construction, and post-construction groundwater monitoring.

The details of the GMP will be developed in the subsequent Detail Design phases.

It should be noted that the *Ontario Water Resources Act* (OWRA) provides that all water users whose supplies are interrupted shall be provided an alternate source. The adverse effects of any temporary disruption in groundwater supply by construction related dewatering operations can be reduced through (a) advanced notification of potentially affected users and provision of alternate supply if needed, (b) rapid completion of construction activities, and (c) the application of effective erosion control at outfalls. Extraction of more than 50 m^3 (50,000 litres) per day will require a Permit to Take Water (PTTW) from the MOE.

7.1.4 Fisheries and Aquatic Habitat

Efforts were made to avoid waterbodies and watercourses, and particularly the larger lakes and rivers, during route selection wherever possible. However, as the majority of systems flow from east to west, and given the objective of minimizing overall natural environmental effects by twinning as much of the existing highway as possible, the Recommended Plan must still cross

many water features. As well, edge encroachment into some of the adjacent waterbodies could not be avoided.

The relative sensitivity of the fishery and the relative magnitude of potential construction and operational effects were considered for the overall aquatic habitat impact assessment. A summary table (Table 1) provided in the *Fisheries and Aquatic Ecosystems Technical Report* (Appendix H), gives details on how these rankings were established. Table 3, also found within the technical report, provides a summary of potential impacts and recommended mitigation measures for each watercourse/waterbody impacted along the Recommended Plan.

Portions of the Recommended Plan twin the existing highway. That is, additional lanes will be built on either the east or west sides of the existing highway. Along the twinned portions of the highway between the south studies limits to culverts (C) C153/C318 and between C197/C344 and the north study limit, a total of 22 new culverts are proposed. Of these, 13 will convey watercourses that were determined to support or have the potential to support direct fish habitat and 2 to convey drainage that supports indirect fish habitat (see general categories of fish use and potential based on habitat characterization- Section 2.4 of the *Fisheries and Aquatic Ecosystems Technical Report*). An extra crossing location requiring 2 culverts is proposed between existing C148 and C149 in addition to the above. This crossing was determined to have the potential to support direct fish habitat.

There are 31 waterbody or drainage features crossed by the new highway (northbound and southbound lanes) off-corridor, including the 4 major waterbodies (Magnetawan River, Still River, Straight Lake and Key River). Of the 31 crossings; 2 are minor drainages draws or low areas that will convey future hwy drainage or provide wetland drainage equalization; 5 crossings are minor watercourses/drainage features that provide indirect fish habitat and 24 crossings were determined to support or have the potential to support direct fish use. Two of the crossings (OC7, C323) from the latter category are considered an isolated waterbodies that may support fish but are not technically considered “fish habitat” under the DFO definition. These features being small and located entirely within the proposed right-of-way, will be filled to accommodate the new highway lanes.

In general, crossings that would remove habitat due to the major infilling of open water habitat (e.g. OC9) or result in major realignments of the channel (e.g. C327) were assigned a relatively ‘high’ potential impact. A moderate to high degree of potential highway impact was placed on crossings where minor infilling of open water is required, coupled with the enclosure and/or minor realignment of a section of the channel or where major or minor infilling of beaver modified (shallow aquatic) habitat is required. A moderate degree of potential highway impact was considered to occur at crossings where the channel will be enclosed in a new culvert, however there is no need for realignment as the channel course runs perpendicular to the proposed route.

7.1.4.1 Direct Environmental Effects

Four Main Watercourse Crossings

Adverse effects to specialized aquatic habitat identified along the Recommended Plan will be avoided through a combination of siting and/or design of the bridge structures. In particular, the crossings of the Magnetawan River and Straight Lake avoid specialized habitat areas. Although Type 1 spawning/staging habitat (for Walleye) will be crossed on the Magnetawan River, the river will be spanned. A Rock Island (which once housed a pier of the previous bridge), will be utilized as a crossing location, instead of crossing the large ‘staging’ pool further downstream, where piers would have likely been required instream. Although instream piers will be required for the Straight Lake Bridge crossing, the siting avoids the large shallow aquatic reach (Type 1 habitat based on MNR’s classification system guidelines) located further downstream.

Although specialized habitat areas were not identified within the vicinity of the preferred crossing for the Still River, the river will be spanned and the bridge was sited to cross a linear reach further upstream to avoid the frequent stream meanders further downstream.

The Key River crossing was originally sited further east than currently proposed. Although the crossing further east (upstream) crossed a narrower reach, this reach supports Type 1 fish habitat. The proposed crossing at its existing location will avoid the majority of this habitat, however a small portion of the habitat remains within the footprint of the ROW. Therefore, localized footprint impacts are still required for instream piers, as discussed further below.

Lakes and Small Waterbodies

The proposed right-of-way for the Recommended Plan encroaches into the edges of two lakes (OC8 [lake adjacent to east side of CPR line] and OC9 [lake immediately east of CPR line]). The open water of OC8 will not be directly crossed, however, the marshy habitat associated with the lake is encroached by the proposed right-0f way and therefore this waterbody was included in the assessment. The edge of OC9, will however be crossed by the future alignment, and will likely require some infill of open water and marsh habitat for the southbound lanes.

The Recommended Plan will also encroach into the edges of several wetland areas (shallow aquatic/shallow marshes) along the preferred route that are located along watercourses that also contain some open water areas. Although many of these features are beaver modified, impacts of all are discussed in the *Fisheries and Aquatic Ecosystems Technical Report* (Appendix H).

Smaller Watercourses and Waterbodies

Direct effects are anticipated to occur at an additional 38 of the watercourses/ waterbodies/ wetlands that were determined to contain either direct or indirect fish habitat (according to the definitions outlined in Section 2.4 of the *Fisheries and Aquatic Ecosystems Technical Report*) along the Recommended Plan. Of these, direct fish use was confirmed at 16 locations, was determined to be probable at 9 locations and some potential was identified at 7 locations. At the remaining 6 locations, direct fish use is unlikely however indirect habitat contributions are likely based on identified connectivity to downstream habitats.

There are also several small lakes and other unnamed waterbodies that support known or likely fish habitat within the vicinity of the Recommended Plan, whose small tributaries that drain directly to these lakes are crossed along the Recommended Plan. As well, there are a number of wetland areas along the Recommended Plan that are located along watercourses, which also contain some open water areas, but are not discussed specifically as distinct waterbodies.

7.1.4.2 Potential Indirect/Construction-related Impacts

A range of potential indirect or secondary effects to watercourses and waterbodies can also occur during and/or following construction of the proposed highway works. These effects include erosion and potential sediment transfer if sediment and erosion measure are not properly implemented, culverts or structures are poorly installed, or inadequate restoration results in persistent or on-going instability. In addition to the direct effects on localized areas of stream habitat due to enclosure, the extension of existing culverts or construction of new culverts or structures, replacement of existing culverts or structures that require instream work can temporarily affect flow, as well as fish movement and life functions, depending on timing.

Other potential indirect effects include introduction of contaminants to the watercourse/waterbody as a result of leaks from poorly maintained equipment, or spills from poor construction practices (e.g. improper storage, re-fuelling, maintenance etc.).

In general, all of these potential indirect construction-related effects can be managed using appropriate mitigation and restoration measures.

Two other types of specific construction related effects that could cause indirect or secondary effects to adjacent habitat or fish include beaver dam removal and blasting. Nine of the crossings (C154/C319, C156/C321, C137/C303, C143/C308, C144/C309, C145/C310, C146/C311, C152/C317, C333b) will require the removal of beaver dams, based on the existing dam presence, which may change prior to construction. Although the removal of beaver dams can adversely affect fish and fish habitat, implementation of standard mitigation measures can avoid these negative impacts, as outlined in the mitigation section. With the implementation of these mitigation measures, the construction and operation of Highway 69 is not anticipated to result in any significant adverse environmental effects.

It is anticipated that blasting may be required adjacent to at least some of the watercourses and waterbodies along the Recommended Plan. There will likely be blasting required at the abutments for the Key River Bridge, and possibly at the piers and abutments of the Magnetawan River Bridge.

Potential indirect effects to fish and fish habitat include vibration-related impacts such as habitat siltation or substrate shifting or alteration, potential disruption to sensitive life cycle functions such as spawning and egg incubation, and potential stress or death of fish depending on the blast size and timing. These effects can be avoided with implementation of standard mitigation measures as outlined below and in accordance with DFO's (2005) Operational Statement.

7.1.4.3 Mitigation Measures

Overall, a specific effort was made to twin as much of the existing highway as possible in accommodating the proposed highway four-laning, similar to the approach utilized for the South Section. In this manner, the length of new culvert enclosure, number of new structures and extent of encroachment into adjacent waterbodies along the twinned sections have been minimized.

However, much of the Recommended Plan does not twin the existing highway. In these areas, the primary mitigation measure was to avoid sensitive habitat features where possible, and minimize encroachment and potential alignments that would require realignment of watercourses.

Planning/Siting

Mitigation measures encompass both planning/siting and design related measures to avoid or minimize adverse effects to aquatic features, as well as construction related best management practices and related measures. To achieve the intended objective of avoiding and minimizing adverse effects to watercourses and waterbodies, fisheries and habitat related information was incorporated into the process of selecting the Preferred Corridor, and then selecting and refining the Recommended Plan and interchange locations.

In general, large lakes and areas of specialized or highly sensitive habitat that could not be spanned were avoided. As highlighted above, a key principle in minimizing footprint effects was to twin the existing highway corridor as much as possible, thereby minimizing the incremental length of culvert or structure required and focusing the crossings in areas where water features were already somewhat disturbed. Although much of the highway could not be twinned adjacent to the existing highway, efforts were made to parallel existing disturbed linear corridors. Where this could not be achieved, rationale was provided in the route evaluation process documenting the trade-offs associated with route sections further away from the existing highway.

Design

A number of other general principles aimed at minimizing adverse effects to aquatic features were also integrated into the process of developing the preliminary design of the crossings along the Recommended Plan.

Given the considerable cost of large span structures, and the additional costs associated with the measures to minimize culvert length and steepen fill slopes (e.g. head and wing walls, guide rail, etc.) the degree of effort applied for these principles should consider the specific habitat and fishery at each crossing. That is, greater 'avoidance' mitigation efforts should be applied where known or potential specialized or more sensitive habitat and fisheries are present, than at crossings of more common, generalized habitats.

These design principles should be carried through the Detail Design of the crossings and encroachments.

Design-related mitigation measures include:

New Structures

- Construction of 'causeways' and associated filling into the large watercourse/waterbody crossings was not considered acceptable; new structures were designed with spans and associated piers.
- Wherever possible, in-water piers were avoided and the watercourse fully spanned (e.g. Magnetawan River, Still River).
- Where piers are required to construct the larger spans (e.g. Straight Lake, Key River), they were sited so as to minimize potential effects on more sensitive habitat (e.g. productive edge areas, riffles).
- Wherever possible, encroachment of fills for abutments at new crossing into the edges of waterbodies/watercourse was avoided, however where they could not be avoided, design measures should be incorporated to minimize the degree of encroachment.

New Culverts

- Particularly where sensitive habitat is present, the length of the culverts should be minimized by means of wing walls or head walls.
- The culverts have been sized to convey runoff from a design storm without overtopping the road. This sizing will facilitate re-instatement of more or less 'natural' flow, substrate and channel conditions through the new culverts.
- The length of the stream disrupted should be minimized.
- The period of disruption to install the culvert should be minimized to the extent feasible.
- New culverts should be aligned along the existing channel wherever possible to avoid or minimize realignment requirements.

The culverts will be sized, and should be sited and aligned so as to avoid and minimize effects to stream flow or velocity, and thereby avoid creation of bank erosion, channel migration upstream or downstream, and deposition/creation of instream bars. For example, the outfalls should not be directed at a bend immediately downstream.

Where watercourses support potential direct fish use up and downstream of the highway and fish passage is a potential concern:

- A median opening should be provided rather than one continuous culvert crossing, wherever feasible.
- Culverts should be embedded (a minimum of 10%) and substrate placed through the culvert. The embedment should be sufficient such that substrate can be sized to stay in place under storm flows, and not affect the required conveyance capacity. The substrate will provide habitat opportunities. Embedment will also prevent undermining and potential future creation of a barrier to movement.
- A low flow channel should be formed within the substrate to avoid creation of a barrier to fish movement under low flow conditions.
- In no case should a barrier to movement be created (i.e. culvert should not be perched or steeply inclined and should maintain water depths and velocities under most conditions that do not prevent fish from moving through them). This should include proper installation such that creation of future barriers to movement is precluded.
- Careful attention should be paid to transitions from the culvert inlet and particularly the culvert outfall to avoid creation of erosive conditions.
- Outlet pools and inlet pools where relevant, should be created to provide potential refuge habitat as well as for energy dissipation.

Where a section of watercourse channel meanders within the right-of-way, all reasonable efforts to avoid encroachment into the channel should be taken (e.g. steepen embankment slopes, add wing walls or headwalls to minimize culvert length), as discussed further below. For instance, these mitigation measures have been outlined for C325 and C327, both of which meander through the right-of-way.

Watercourse Realignment

Realignment of sections of the watercourse will likely be required at C325, C327, C329, C333, C333a, C335 and C338. In most cases, these realignments are required because of the meandering nature of the stream reaches that will be enclosed in the new culverts. Refer to Appendix H for a larger scale view of these crossings.

The lengths of the channel sections that require realignment should be minimized to the extent possible by incorporation of all reasonable measures to reduce the fill footprint (e.g. steepening embankment slopes), properly align culverts, and minimize their length during Detail Design. As well:

- The realigned sections of the channel should be reconstructed using naturalized principles. The naturalized channel design should integrate all relevant morphological, substrate, and instream and overhead cover considerations to ensure existing habitat conditions are maintained and enhanced.
- 'Hard engineering' approaches should be avoided.
- The realigned channel should be of similar length to the existing channel, in order to maintain channel slope, velocity and related habitat and movement functions.
- Channel dimensions and channel type should also be maintained along the new sections.
- Design input from a hydrologist and/or fluvial specialist should be integrated.
- Careful attention should be paid to transitions with the existing channel.

Infilling of Aquatic and Wetland Habitat

At 19 crossing locations the infilling of some portion of the aquatic habitat is likely to be required, due to the over-widened, spreading nature of many of the beaver-modified and wetland based features. Although this type of habitat is very common habitat and does not limit the productivity of fish communities in the area generally, all reasonable efforts to minimize the degree of encroachment should be implemented. Refer to Appendix H for a larger scale view of representative crossings requiring infill.

Greater emphasis should be placed on minimizing encroachment into those habitats identified as relatively more sensitive (e.g. OC9). The extent of effects predicted during the Preliminary Design stage is based on the right-of-way width, and the actual extent of encroachment for the highway can be reduced in most cases. In some cases additional field work is required to confirm potential sensitivity and connectivity.

Minimizing the extent of fill placement and encroachment should consider all reasonable means, including:

- use of larger culverts;
- use of head or wingwalls; and
- steepening embankment slopes of the highway and ramps.

7.1.5 Vegetation and Wetlands

The proposed highway alignment will result in direct and indirect effects to vegetation resources in the study area. Direct effects are associated mainly with the construction of the highway and related infrastructure. Where the preferred alignment twins the existing highway, the effects will be limited to removal of the edges of communities that are already disturbed to some degree. These adverse effects are unavoidable for the construction of the highway. However, where the alignment swings away from the existing highway and where interchanges will be constructed, more additional effects will occur.

The assessment of direct effects assumes that the entire 110m right-0f-way will be cleared for the construction of the highway, resulting in direct removal of the natural habitats within this right-of-way. A total of 337 ha will be removed for the clearing of the new right-of-way (excluding the existing highway footprint).

Of the 261 vegetation units identified within the general study corridor, portions of 108 are located within the Recommended Plan right-of-way and will experience direct impacts. Of the 108 units impacted, 65 units experience edge impacts only, 43 are fragmented and no vegetation units are entirely are removed. The majority of the communities impacted are given a sensitivity rating of 'low' (58 communities) or 'moderate' (48 communities). Only 9 of the communities affected are given a 'high' sensitivity rating.

Indirect effects are less quantifiable but may include unintentional effects to adjacent habitat during construction, operation and maintenance. Indirect effects may include: damage beyond the working area, invasive species introductions, spills of contaminants and salt spray. These and other indirect effects are documented more fully below and in the *Vegetation and Wildlife Resources Technical Report* (Appendix H).

7.1.5.1 Direct Environmental Effects

Terrestrial Vegetation

Approximately 259 ha of terrestrial habitat will be directly effected (removed) by the clearing of the ROW. A large proportion (84%) of the communities impacted are rock barrens and mixed forests, the two most common community types in the study corridor.

Terrestrial vegetation communities dominate the study corridor and are likewise well-represented in the surrounding landscape. Therefore they have been given a 'low sensitivity' rating. The direct removal of approximately 259 ha of terrestrial vegetation that is common and widespread in the surrounding landscape and which does not support any identified significant or sensitive flora, is therefore considered a relatively minor effect. This is particularly true where the preferred alignment twins the existing alignment and the habitat removed is already disturbed to some degree by edge effects.

Edge Impacts versus Fragmentation - Terrestrial

For the most part, the communities that experience these more significant 'fragmentation' and 'removal' effects are common communities that are well-represented in the study corridor and surrounding landscape generally (e.g. mixed forests, coniferous forests and rock barrens). However, deciduous forests are less common communities, as noted in the existing conditions section (Section 3.2.1.1) of the *Vegetation and Wildlife Resources Report* (Appendix H), therefore impacts to these communities will experience additional adverse effects. One of the three deciduous forest units identified within the study corridor will be fragmented (Z4).

Of the five coniferous forest communities identified, four units will be fragmented. Three of the impacted communities are White Pine – Red Pine forest (ES11) and one is a Jack Pine – White Pine – Red Pine (ES13) forest. The one that is classified as ES13 is Unit K2D-11. This unit occupies a large area and is currently experiencing a fairly substantial amount of logging activity. Thus the impacts of fragmentation of this unit are not considered noteworthy within the study corridor.

Wetlands and Aquatic Communities

Approximately 51 ha of wetland habitat will be directly affected (removed) by the clearing of the right-of-way (including the interchanges). This constitutes a removal of 7% of the wetland area identified within the study corridor. Most (32 ha) of the area affected is represented by thicket swamp and marsh communities. Coniferous swamps, deciduous swamps and shrub fens experience less direct removal (19 ha).

Thicket swamps and marshes are often associated with small watercourses and beaver ponds and are considered common communities within the study area. Also, many of these communities are already disturbed by to some degree by edge impacts. Therefore, the loss of 32 ha of marsh and thicket swamp is a relatively minor effect in relation to the representation on the broader landscape

Deciduous swamps, coniferous swamps and shrub fens are less common wetland types within the study corridor. These communities comprise 3.9%, 1.1%, 0.9% and 0.2% of the study corridor, respectively. These communities are more sensitive to disturbances, particularly those that may alter the specific hydrological conditions required to sustain them. In addition, deciduous and coniferous swamps are sensitive to canopy opening and edge effects (e.g. sunscald and windthrow). Deciduous swamps, coniferous swamps and shrub fens have been given a 'high sensitivity' rating for these reasons. Therefore, the loss of 19 ha of deciduous swamp, coniferous swamp and shrub fen communities is considered a moderately significant impact overall.

Approximately 10 ha of aquatic communities will be directly affected by the new alignment. This constitutes a removal of 19% of the aquatic habitat area affected within the study corridor. These numbers will overestimate the areas that will be impacted since the larger watercourse crossings will be spanned by large structures and the aquatic habitat below will be retained.

Although by area (ha) shallow aquatic and open water aquatic communities comprise only 4.9% of the study corridor, they are well-represented in the surrounding landscape generally. Selection of the Preferred Corridor and subsequently the Recommended Plan emphasized avoidance of watercourses and waterbodies where possible, as reflected by the relatively lower abundance within the Recommended Plan relative to their prevalence in the broader landscape context generally. Therefore the direct loss of less than 7 ha of aquatic habitat through the introduction of rock fill, realignments of watercourses and the construction of culverts is a relatively minor effect from a vegetation resource perspective. Impacts from a fish habitat perspective is assessed further under a separate cover – *Fisheries and Aquatic Ecosystems Technical Report* (Appendix H).

Edge Impacts versus Fragmentation - Aquatic

For the most part, the communities that experience more significant 'fragmentation' and 'removal' effects are common communities that are well-represented in the study corridor and the surrounding landscape (e.g. thicket swamps and marshes). However, all wetlands are considered important and generally more sensitive than other types of vegetation systems; therefore these more substantial impacts are worth noting for all wetland communities and they are outlined below:

- Five of the 37 shallow marsh units identified in the study corridor (V9, V13, V26, AA12 and BB2) will be fragmented.
- Three of the 12 deciduous swamp units identified in the study corridor (AA5, AA11 and K2B-10) will be fragmented.

- One of the 6 mixed swamp units identified in the study corridor (V15) will be fragmented.
- One of the 8 shrub fen units identified in the study corridor (K2A-1) will be fragmented.

As previously noted, coniferous swamps , mixed swamps, deciduous swamps and shrub fens are less common and more sensitive communities. These forested swamp removals are considered the most notable effect to wetland vegetation, and vegetation generally, along the Recommended Plan. Edge effects to these communities as well as to shrub fens are also noteworthy and will require specific mitigation measures to minimize edge effects.

According to the GIS data, two open water communities (Units K2D-7 and AA25) will be 'fragmented'. The remaining aquatic communities will only experience edge effects. These adverse effects and associated mitigation measures are discussed in more detail in the *Fisheries and Aquatic Ecosystems Technical Report* (Appendix H).

7.1.5.2 Indirect Environmental Effects (all community types)

There is potential for localized additional indirect effects to terrestrial, wetland and aquatic communities to occur during and following the construction period. These potential indirect effects that may occur include: the release of construction-generated sediment into adjacent habitat; vegetation clearing/damage beyond the working area; spills of contaminants, fuels and other materials that may reach natural areas; canopy opening and new edge creation resulting in increased sunlight, wind, drying (microclimate changes), spread of invasive vegetation (to detriment of native vegetation), and greater risk of tree blow down from wind exposure (especially shallow-rooted trees); salt runoff and salt spray into vegetated areas causing loss of vegetation vigour and in extreme cases, vegetation dieback, and spread of salt tolerant flora (halophytes); damage to bordering natural vegetation from roadway and right-of-way maintenance activities such as salting and sanding, structure repairs, ditch cleanout, excessive or improper application of herbicides and pesticide for right-of-way maintenance requirements. Additional indirect impacts to aquatic communities are outlined in the *Fisheries and Aquatic Ecosystems Technical Report* (Appendix H).

The most common problem for terrestrial vegetation is diversion of surface drainage patterns to upland vegetation that does not tolerate prolonged periods of flooding. Increased or focused runoff can also result in adverse erosion effects on receiving vegetation.

Because of their direct dependency on water, either surface and /or groundwater, wetlands are more vulnerable to effects resulting from changes in the surface or subsurface drainage regimes than terrestrial vegetation and habitats. Their direct dependency on water means they are more vulnerable to influx of sediment laden flows from uncontrolled construction sites, and alteration of their drainage regimes through either obstruction of upgrading flows (with commensurate drying impacts) or impounding of downstream flow movement (with commensurate drowning impacts). Furthermore, some wetland types such as the shrub fens are specifically dependent on certain hydrologic regimes and associated water quality.

Mitigation Measures

- Implementation of all appropriate standard mitigation techniques is recommended to ensure that the adjacent vegetation communities and habitats are protected to the extent possible. Of primary importance is to minimize the extent of the required intrusion into natural forest and wetland communities, and to protect the main portions of the natural areas during the construction phase.
- Maintaining the existing drainage regime over the short and long term is also important to ensure the sustainability of wetland vegetation communities that are dependent on specific hydrological characteristics. This is particularly the case for the shrub fens.
- Recommended construction-related mitigation include the following general measures, which should be detailed further during the Detail Design phase as the design and construction aspects are specified further:
- Appropriate sedimentation and erosion control measures will be employed throughout the construction phase, including erection of silt fencing and maintenance of these until all disturbed surfaces that drain to natural areas are re-stabilized and vegetated.
- Appropriate clearing techniques should be used for all vegetation that must be removed. All vegetation cleared should be felled and removed away from the adjacent natural habitat.
- The existing hydrologic regimes through all natural areas should be maintained to the extent possible. That is, drainage should not be diverted or impounded. This aspect should be addressed in more detail during the Detail Design of the highway and interchanges.
- Any temporary dewatering that may be required during construction through the wetland areas should be properly addressed and managed, and discharge filtered prior to release back to the natural area to prevent potential erosion, siltation and/or temporary drawdown or flooding impacts.
- All construction-related debris should be appropriately disposed of following construction.

- An environmental inspector should be retained during construction to ensure all relevant mitigation measures are being properly applied throughout construction.

The following site-specific mitigation measures are relevant for the individual community types identified. These techniques will also be specified further at the Detail Design stage.

- Where appropriate, along the edges of the more sensitive natural features that are directly adjacent to the right-of-way (e.g. deciduous swamps, coniferous swamps and shrub fens), temporary protection fencing will be installed prior to grading. This fencing will be maintained throughout construction. In many cases, it may be appropriate to integrate additional sediment and erosion control fencing with construction barrier fencing.
- Similarly and where appropriate, specific edge management techniques may be applied in order to protect newly created edges of the more sensitive forested swamp communities. Techniques to be considered include native soil and seedbank retention (i.e. no root grubbing in a narrow transition zone to encourage rapid re-growth), and edge plantings. Edge management recommendations will be further specified at the Detail Design stage.
- Salvage of seedbanks for the small areas of sensitive wetland communities and communities supporting rare species affected by the alignment should be considered (e.g. shrub fens, forested swamps). Seedbank material can be re-instated in adjacent areas or temporarily disturbed areas that will be re-instated. These measures will be further specified at the Detail Design stage.

7.1.6 Wildlife and Significant Wildlife Habitat

Information from the background materials, field surveys and results of analyses detailed in both the *Vegetation and Wildlife Resources Technical Report* and *Natural Heritage Background Report* contained in Appendix H were integrated to develop general conclusions regarding the implications to wildlife populations of the proposed improvements to Highway 69. The relative status and varying sensitivities of different species to potential effects were considered. The general conclusions are outlined below:

- The study area forms part of one of the largest, least disturbed and least fragmented expanses of natural habitat remaining in south-central Ontario. Maintenance of the natural habitats within the study area (and the broader landscape generally) and the connectivity between them is important to the long-term viability of wildlife populations, particularly species at risk.
- Mammal and bird species known to occur in the study area are generally common and demonstrably secure in Ontario.
- The majority of the species at risk that occur in the study area are reptiles. These species are vulnerable to highway development because most have specific habitat requirements that necessitate their seasonal movement among different types of habitat. The distances between these habitats can be relatively long, and the overall activity range of many species can be relatively large (i.e. > 50 ha).
- The existing Highway 69 currently results in considerable mortality of large mammals; mortality of other species also occurs but is poorly documented. Wildlife-vehicle collision rates are not expected to change markedly along twinned portions of Highway 69, but will increase where the Recommended Plan diverges from the existing ROW and extends into previously undisturbed habitat. Reptiles and amphibians are expected to experience the greatest increase in road mortality in these areas (see below).
- Reptiles are particularly prone to road mortality because they are attracted to roads to bask and/or lay eggs, readily attempt to cross roads, are relatively small and not easily seen by drivers, and move slowly, increasing the risk of collision. Further, they tend to avoid the use of standard highway culverts as crossing structures, likely because they provide conditions (e.g. unsuitable interior temperatures, lack of cover) typically avoided by reptiles. Due to their inherent life history traits, even relatively low levels of additive mortality can result in declines in reptile populations.
- Species at risk reptiles are found on both sides of the existing Highway 69 corridor. The existing highway likely functions as a general barrier to the movement of non-avian species, particularly reptiles and amphibians, because few individuals of these species are likely to cross the highway successfully. Thus, at both an individual and a population level, the species at risk reptiles within the study area are more vulnerable than mammals or birds to the effects of road mortality and habitat fragmentation, suggesting that these species warrant consideration of dedicated highway crossing structures.
- Proposed improvements to Highway 69 will result in the direct removal of approximately 337 ha of natural vegetation. The effect of this removal to significant wildlife habitat has been minimized by twinning the existing highway to the extent possible and reducing its overall footprint, and by avoiding known or potentially more sensitive habitats. In general, the preferred route is expected to have negligible impacts on significant wildlife habitat because it avoids many known elements of significant wildlife habitat and affected habitat adjacent to the existing Highway 69 corridor is likely to be of poorer quality than previously undisturbed areas located off-corridor. Although relatively greater potential for impacts is recognized along the portions of the highway alignment that traverse the intact habitat to the east, the affected habitat types are generally common in the larger study area. No unique or potentially limiting habitats were identified.

- A landscape-level characterization of the habitat of species at risk is constrained by limited knowledge of their distribution, life history requirements and specific characteristics of the microhabitat features required for their survival. Although specialized habitat components of individual species at risk are unevenly distributed across the study area, in general, this habitat likely occurs throughout the study area.
- Although they are likely to be a small subset of those available in the study area and the broader landscape, it is likely that some specialized habitat components of species at risk reptiles such as hibernation, gestation/oviposition sites and foraging habitat are located in or adjacent to the Recommended Plan. Complete avoidance of such habitats is not possible.

Mitigation Measures

The potential impacts of the proposed improvements to Highway 69 on wildlife have been minimized by twinning the existing highway to the extent possible, but complete avoidance of effects is not possible. The greatest effects are expected to be increased road mortality and population fragmentation/isolation along the short sections that are not directly adjacent to the existing highway. In both cases, species at risk reptiles are expected to be particularly affected. Given this, mitigation efforts are focused on discouraging wildlife crossing of the highway surface to reduce road mortality and using crossing structures to increase the permeability of the highway generally for wildlife and particularly for species at risk reptiles.

General crossing structure considerations include the following:

- Smaller, more numerous crossing structures should be installed across the length of the highway, rather than focusing on a several larger, more expensive, 'dedicated' structures. However, it may be appropriate to focus greater effort, particularly for species at risk reptiles, on sections of 'new' highway alignment that will fragment areas of undisturbed habitat.
- Major valley/watercourse systems in the study area are likely used by wildlife as movement corridors. However, if wildlife cannot readily descend to the valley floor (e.g. steep slopes) these systems may function as barriers to the north-south movements of species with large activity ranges, such as large mammals, directing their movements east-west along the top of the valley rather than along the valley floor, and potentially across the existing highway. New crossing structures large enough to allow wildlife to cross under the preferred route are proposed at six locations: Magnetawan River, Still River, Straight Lake, Key River, the CP Rail line at Straight Lake and the CN Rail line at Highway 522. These crossings are spaced somewhat unevenly along the length of the preferred route.
- There are numerous smaller watercourses conveyed under the existing highway through smaller structures or culverts. Some of these existing structures could provide crossing opportunities for some smaller species of wildlife. Where existing culverts are maintained for the new highway, design modifications could be added to enhance movement opportunities in some cases. The design of new culverts could incorporate specific design elements to facilitate small animal movement.
- The distribution of these smaller watercourse crossings and drainage culverts generally provides sufficient wildlife crossing opportunities, although some additional culverts are needed to fill gaps and minimize the degree of out of way movement.
- A specific emphasis should be placed on providing wildlife crossing opportunities along certain segments of the preferred route, particularly along the section between the Magnetawan River and the Little Still River. This section of the preferred route diverges from the existing Highway 69 corridor and fragments a relatively large area of previously undisturbed habitat where several SAR reptiles (Five-lined Skink, Blandings Turtle) have been recorded and where several others (Spotted Turtle, Eastern Hognose Snake) are possibly present. In this area, the addition of dedicated culverts specifically designed to encourage movement of Eastern Massasauga Rattlesnake and other species at risk herpetofauna should be considered.
- Dedicated crossing structures specifically designed to facilitate the movement of species at risk reptiles may also be appropriate along the segment of the preferred route between the Little Still River and Straight Lake. For much of its length, this segment of the preferred route extends through lands subject to agricultural or logging activities and/or in close proximity to existing transportation corridors, including the CP Rail line and Old Still River Road. It therefore fragments a relatively smaller area of previously undisturbed habitat. Although no species at risk reptiles have been recorded from the lands between the existing Highway 69 corridor and the preferred route, Eastern Hognose Snake, Five-lined Skink and Blandings Turtle have all been found within 2km and may be present in the area.
- Multi-use requirements for drainage conveyance, and specifically the existing flooding/submergence aspect, should be specifically considered in the design of culverts so that they can provide movement opportunities as well.
- A minimum culvert diameter/width for 'dedicated' small mammal movement is generally considered to be 1.0-1.2m; virtually all of the retained culverts and all of the new and replacement culverts will be this minimum size. Round culverts can be used although the invert should be embedded to provide a wider surface for movement. However, for some animals such as turtles, box culverts may be

preferable because they provide an angled edge to guide movement (i.e. some 'disorientation' of turtles has been reported within round culverts, although this is not a widespread observation).

- There have been relatively few attempts to provide crossing structures specifically to reduce road mortality in reptiles, and the effectiveness of such measures has rarely been evaluated. To the extent possible, the design of crossing structures dedicated specifically to facilitate highway crossing by Eastern Massasauga Rattlesnake and other species at risk reptiles should consider temperature, visibility, substrate and cover.
- Many animals attempt to cross the surface of roadways rather than pass through a structure or culvert. This tendency necessitates the use of fencing to 'funnel' individuals away from a road's surface and into a crossing structure.
- Extensive out-of way travel is not desirable when funnelling wildlife to crossing structures. It is possible to direct large mammals 2 to 5 km to crossing structures. For herpetofauna, particularly amphibians and turtles, funnel fencing is typically extended only a short distance (approximately 50m) on either side of a crossing structure located at a known crossing zone.
- A specific emphasis should be placed on providing fencing along the segment of the preferred route north of the proposed Highway 522 interchange where the four lane highway will diverge from the existing Highway 69 corridor and extend through areas where Eastern Massasauga Rattlesnake and Eastern Massasauga Rattlesnake habitat have been confirmed. The addition of a dedicated barrier along the western edge of the preferred route that abuts vegetation units BB3, BB5, BB6 and BB9 specifically designed to prevent Eastern Massasauga Rattlesnake and other species at risk herpetofauna from accessing the new roadway should be considered.
- Since the factors that influence the use of crossing structures/culverts by wildlife and particularly by reptiles are not well understood, a variety of different crossing structure design configurations (e.g. size, shape, fencing, cover) should be employed and monitored for their effectiveness.

In addition to crossing structures a number of additional measures to mitigate the potential effects to wildlife of proposed improvements to Highway 69 are recommended. These include the following:

- The relocation or creation of replacement or additional specialized habitat components used by some of the species at risk reptiles (e.g. Eastern Massasauga Rattlesnake gestation sites, turtle nesting habitat) should be considered. This may reduce potential adverse effects by limiting competition for remaining habitat features and reducing mortality associated with crossing attempts.
- To reduce wildlife-vehicle collisions (particularly with White-tailed Deer and Moose) clear lines of visibility should be maintained for drivers along the Recommended Plan. Different types of warning signage (e.g. mobile/seasonal signage, indicate target wildlife group) should be considered to increase driver awareness and minimize driver habituation.
- Standard wildlife protection measures are recommended during construction. In addition, a training program for the contract administrator, environmental inspector, and contractor staff should be conducted in consultation with MNR specifically to address the identification and management (e.g. relocation from the construction zone) of species of conservation concern.
- Greenways and Open Space Linkages
- Potential effects of a new highway facility to greenways and open space linkages relates to potential severing of these areas.
- Greenways and open space linkages in the study area include wildlife corridors, Crown Land areas, accessible to people for recreational activities such as bird watching, hunting, fishing etc.
- The open space linkages that correspond with major watercourses in the study area will remain intact. They include Magnetawan River, Still River, Straight Lake and the Key River. These linkages will be spanned by bridges to allow for connectivity within these valley systems.

Connectivity of wildlife is being maintained by eco-passages at all the major watercrossings as well as a number of other opportunities for crossing the highway in an east to west direction. Other connections under the four-lane highway include culverts that will be provided for drainage purposes and for small mammals and reptiles, grade separations at sideroads and a snowmobile trail crossing on the south side of the Magnetawan River. The sum of all the crossing opportunities provides a reasonable number of opportunities for maintaining greenways and open space linkages.

7.1.7 Surface Water

Potential effects to surface water include increased upstream/downstream flood levels and erosion, potential increase of pollutants to receiving watercourses, or potential increase in surface erosion to receiving watercourses.

The Recommended Plan includes a drainage design as described in Section 6.12. The analysis and design of watercourse crossings (i.e. culverts and bridges) is being carried out in accordance with Ministry standards, policies and directives to minimize flood risk and erosion.

A Stormwater Management Study will be carried out during Detail Design to identify water quantity facilities to control peak flow and runoff. Recommendations of the study will be incorporated into the design package. The Detail Design phase will also confirm locations that require erosion protection.

Appropriate measures (as described in Section 6.12) will be included in the final design package for construction. Erosion and sediment control measures will be used at all sensitive areas including Magnetawan River and other areas with sensitive fisheries habitat where the disturbance of construction must be contained within the construction site, and not permitted to impact downstream resources.

The Stormwater Management Study will also identify stormwater best management practices.

7.1.8 Erosion and Sediment Control

Construction near surface water resources has the potential to effect water quality and habitat quality through erosion or discharge of materials. The potential erosion effects from the project include the likelihood of soil to erode and enter streams and wetlands during, and immediately after construction.

Timing of construction activities will therefore occur primarily during low runoff periods. As well, equipment operation will be minimized when ground conditions are such that extensive compaction and pooling occurs, and ruts from vehicle traffic are evident.

Sedimentation and erosion into wetlands can be reduced through measures taken before, during and after construction. Prior to construction, control measures such as straw bale flow checks, rock flow checks, erosion control blankets and silt fence barriers will be utilized on slopes and in the vicinity of watercourses to reduce the potential for erosion. Such erosion control methods must be installed prior to stripping of soils, and adjusted as grading proceeds. During construction, these systems will be inspected daily and repaired as necessary.

After grading, exposed soils will be stabilized and re-vegetated. Seeding of temporarily disturbed areas will incorporate appropriate mixes of locally adapted native plant species to accelerate the re-vegetation of such areas. Any temporary roads will be removed and restored to pre-existing conditions, including the break-up of compacted soils.

Erosion can be minimized by:

- Modifying the slope, to flatten it or bench it;
- Using retaining walls;
- Using the least erodible fill materials in highly sensitive locations;
- Implementing a landscape plan; and
- Controlling run-off.

7.1.9 Aggregates

Aggregates are a vital construction material required in large quantities on MTO undertakings. In order to address environmental concerns associated with these operations, the MTO follows the requirements of the *Aggregates Act* and reviews concerns expressed by agencies, local municipalities and the public.

MNR has indicated that due to the strong demand and limited resources, it is extremely important to minimize the sterilization of mineral aggregate resources as much as possible. Protection of aggregate resources would also benefit the MTO as aggregate resources are needed in the initial construction of the highway and for any future maintenance of the highway.

Applications for new pit operations will be considered by MTO on an individual basis and the Recommended Plan does not preclude new aggregate operations provided access requirements are addressed.

7.1.10 Management of Excess Materials

The Recommended Plan will result in the generation of excess materials that require disposal. Excess materials will be managed according to OPSS 180, an Ontario Provincial Standard Specification for dealing with construction waste materials in an environmentally responsible manner.

During construction and maintenance of the four-lane Highway 69, stockpiles of excavated materials, equipment storage and parking will be managed in designated areas to avoid further degradation to adjacent habitat. Trash and other items generated by construction and maintenance activities will be contained and removed.

MNR has indicated an interest in identifying appropriate locations for the disposal of excess materials prior to the commencement of construction activities.

7.1.11 Potential Contamination

No actual site contamination was identified within the study area; however, sources of potential contamination were identified within the study area at several locations.

Preliminary Site Screenings will be completed for all properties slated for acquisition. Environmental Site Assessments will be carried out at the properties that currently may have contamination issues.

Findings of the investigations will determine remediation requirements for the properties. Special measures may be required, for removal of soil excavated from these areas.

The details of the sites recommended for further investigation during Detail Design are contained in the *Site Contamination Study* in Appendix M.

An active waste disposal site is located on the west side of Highway 69, 75 m south of the communications tower (near Cranberry). If waste deposition is identified to have occurred on the portion of the site to be impacted by the preferred route (access road) and CNR re-alignment, appropriate mitigation may include:

- Removal of waste and contaminated soil.
- Containment or relocation of waste and associated revisions to regulatory approvals, as necessary.

7.2 Social / Economic Environment

This section describes how potential effects to elements of the social and economic environment will be minimized.

7.2.1 Land Use

Land use designations in the study area (i.e. “rural”) are not expected to change.

Future development is promoted near interchange locations, where access to the highway in all directions is provided. Opportunities for future development will also be available along the existing highway and on other service roads once the new four-lane Highway 69 is constructed.

7.2.2 Community Structure – Residential

Consideration has been given to minimizing adverse effects and disruptions to the social fabric of the communities that will be affected. Ultimately any change to the existing highway is disruptive to the residents who live within the area. Only one residence will be displaced in the North Section. As part of the mitigation for these displacements, fair compensation for the lands and buildings will be expected as well as sufficient advance notice of upcoming land acquisition to ease the changes that these residents will face.

With regard to the First Nation communities, the Recommended Plan minimizes the direct effects on lands within the First Nation communities to the extent possible, however some lands will be required, and there will be the impact of removing direct access for the commercial operations within the Magnetawan First Nation community. Additional signage, marketing and promotion, and consideration of possible relocation will be required to improve the viability of this operation.

The preferred route will serve to improve travel times and make the route safer for those accessing the area. This will be a benefit to residents, visitors and tourists alike in the region.

7.2.3 Businesses

Two businesses will be displaced because their properties are required for the Recommended Plan.

Additional properties with commercial activities may be required if it is not possible to provide access.

Property negotiations with business/property owners will be carried out in accordance with standard MTO Property purchasing processes.

Many of the businesses within the study area depend heavily on the traveling public for a large portion of their sales. With proposed four-laning of Highway 69, businesses that rely heavily on the traveling public will be most affected.

Fuel Sales

Many businesses within the study area rely on fuel sales as their primary source of revenue, followed by food and beverage, and lastly accommodation. Those uses that tend to be most sensitive to the highway reconstruction and limited access are those associated with fuel, followed by food and beverage, and lastly accommodation. This is also reflected by the business survey (Appendix 2 of the *Socio-Economic and Land Use Report* [Appendix J]) in that their business revenue depends largely on the traveling public, first and foremost, the seasonal tourists and the local residents.

Given that there are few opportunities to obtain fuel along other sections of the highway and considering this is one of the last sections of the Highway 69 to be four-laned, it is expected that there will continue to be a need for obtaining fuel in the study area. Depending on the staging of

the highway construction there will likely be a short-term benefit to existing fuel retailers in the study area. However, once the entire route is four-laned, total fuel sales will most likely decline.

In order for these businesses to sustain themselves they will need to redirect their business and assess the services and products which they deliver. It will be necessary for these businesses to offer more or varied services than would be generally offered by a convenience/fuel stop. They may need to reposition themselves to offer a destination stop experience, one that provides a product or service that will have a drawing power off the highway regardless of the interchange location.

Some business owners may choose to relocate to another location, perhaps at one of the proposed interchanges if private property is available or if Crown land can be allocated. Other businesses however will fail to survive and will choose to close their operations.

Food and Beverage

Food and beverage establishments, as well, generally rely on the traveling public for income. The restaurants that are currently located in the study area are all smaller family operated establishments, or are combined uses within accommodation facilities. Owners indicated that food and beverage uses are marginally viable and they struggle to maintain their business operations. Most have been established for many years and have had limited recent investment into their operations. Any changes to the current highway access will have adverse effects on their operations.

These small local owner-operated food and beverage establishments currently compete with the much larger nationally branded restaurants in Parry Sound and Nobel. Travelers are more likely to patronize the nationally branded restaurants due to certainty of cost, product and service. As a result it is more difficult to draw in customers unless a unique product and/or service is provided.

To mitigate the effect of the recent chain restaurant development in Parry Sound there is a need for existing food and beverage operations to adapt to more of a destination focus providing a unique dining experience that cannot be replicated with the chain restaurants. Britt has already had success with this approach.

The owners of these operations will have several alternatives. If they choose not to change their operations, it is likely that they will lose sufficient revenues to render their business unviable. Existing operations should plan for change and modify their operations to become more destination oriented operations rather than locations of convenience. Alternatively they could modify the use of their operations, by changing to a use entirely less dependent on the transient or traveling public.

Accommodation

The accommodation uses located within the study area are similar to the food and beverage establishments, in that they generally show little recent investment in their land and buildings. Most are not able to provide the range of amenities that visitors come to expect from motel/hotel locations. None are nationally branded motel/hotel chains yet the cost of stay is not significantly less than the branded hotel. The visitors who frequent the accommodations are those who stay primarily out of convenience or because they are familiar with the location from previous visits. Accommodation available in the study area is generally not of the destination location variety.

It is anticipated that the accommodation sector will be adversely affected by the four-laning of Highway 69, in terms of the exposure and access that is currently afforded to them. In order to mitigate the effect of the new highway these operations will need to modify their operations to become primarily destination operations rather than locations of convenience. Improved highway signage opportunities, marketing and promotion with tourist agencies will also mitigate adverse effects.

For those businesses that choose to change their use there is an opportunity to modify their facility to offer a different product or service. Several operations south of the study area have changed from restaurants or motels to light industrial or residential uses.

7.2.4 Forest Management

At a meeting held with Westwind Forest Stewardship (Westwind) as the current Sustainable Forest Licensee in May 2005, the four-laning of Highway 69 was presented for discussion. Of key concern was the retention of access to logging areas once the four-laning is completed and controlled access prohibits highway access along the corridor except at interchanges.

In response to the interest of the logging industry to retain access to already accessed lands as highlighted in Section 2.2.8, it is proposed that the following access be provided. It has been clearly indicated by MTO that forest access roads will be proposed in this study to the extent necessary to provide suitable access to an area but that extension of that access through that area will be the responsibility of Westwind. These access provisions are shown in the plates in Part 2 of this report. The access proposed for logging purposes will be:

- The area east of the existing highway between Bekanon Road and Still River will be crossed by the new four-laning and future forest access will be provided using the Bekanon Road interchange.
- A new access road is proposed which can be accessed off the Highway 522 interchange and will run parallel to the new four-laning on the west side. Forest

access west of the existing Highway 69 north of Highway 522 can access though this proposed roadway.

In addition to the above, it has been advised that access fees that are currently paid by Westwind to access Highway 69 may be waived since direct access will be from secondary highways and local roads. Also, it will be acceptable for Westwind to gate the access roads since access to the forest roads that access Crown land would be limited to approved users. At the proposed cul de sacs that are intended for the Highway 69 four-laning, suitable grading will be provided to accommodate connection to adjoining forest access roads by tractor-trailer type vehicles.

It has been highlighted by Westwind that they have a preference to not have snowmobiles on the forest access roads due to the potential for incidents with trucks involved with winter harvest in some areas. If both groups show interest in the same road corridor, provisions can be made in the same road right-of-way for snowmobiles but avoiding the road platform.

Forest access roads as proposed by MTO will be constructed to MNR forest access road structural standards.

7.2.5 Recreational

The Recommended Plan minimizes effects to the Key Marina at the Key River will have access from the West Service Road (former Highway 69).

No at-grade crossings of snowmobile trails will be permitted on the four-lane highway.

A dedicated snowmobile crossing is proposed between the Magnetawan River interchange and the Magnetawan River to retain access within Magnetawan First Nation lands.

Trail connections to new crossing locations are the responsibility of the snowmobile clubs (MTO Policy B21). Additional consultation is still required towards determining appropriate snowmobile trail crossings along Highway 69. Additional consultation with the French River Snow Voyageurs will occur during Detail Design. A trail connect to maintain access to the Still River community from east of the four-lane highway will also be address via consultation during Detail Design and may include a crossing at either Magnetawan River or Straight Lake.

Access to recreational lodges, cottages and areas utilized for hunting and fishing will be maintained from interchanges and the service roads.

Access to recreational activities at the Grundy Lake Provincial Park is provided from Highway 522.

7.2.6 Industry

Overall, industry in the area will be better served through improved access and reduced travel times for the delivery of goods and services.

7.2.7 Noise

A noise study was carried out, in accordance with the MTO/MOE Noise Protocol, on the Recommended Plan. The report is contained in Appendix K. Noise modeling was carried out for the following scenarios:

- Future noise levels – with existing Highway 69 (e.g. future ambient)
- Future noise levels – with preferred Highway 69 four-laning

The effects of highway noise are summarized below.

The projected noise level changes indicate that 21 receiver locations are predicted to experience a reduction in noise levels given that the new highway alignment will be further away from these locations.

Nine receiver locations are predicted to experience noise level increase ranging from +0.3 dBA to +3.0 dBA. Since the projected changes in noise levels for these receivers are less than 5 dBA the consideration of noise mitigation is not required.

Four receiver locations are predicted to experience noise level increase ranging from +5.7 dBA to +11.6dBA. Since the projected changes in noise levels for these receivers are greater than 5 dBA the consideration was given to potential noise mitigation. Noise modeling was carried out to determine the potential noise level reduction of potential noise walls. Details regarding this noise modeling are provided in the *Noise Report* in Appendix K. It was concluded that noise walls are not technically and/or economically feasible. However, should there be excess material available from construction of the highway, it is recommended that consideration be given to providing berms made from excess material within the future Highway 69 right-of-way adjacent to those receiver locations that are calculated to experience noise level increases of 5 dBA or greater, as those berms may provide some noise attenuation. It is noted that it is not technically feasible to provide berms on the proposed Key River structures, which would diminish the potential attenuation from providing berms for three receivers.

7.2.8 Air Quality

Over the long-term, the construction of a new highway could potentially result in adverse effects to air quality. This includes health effects, plant and crop damage or the deterioration of property cleanliness.

The Recommended Plan does not represent a new highway facility, as it involves four-laning the existing Highway 69. Throughout much of the study area, the four-lane highway is within the existing highway corridor.

As noted in Section 2.2.10, an air quality assessment study was carried out by RWDI Air Inc. during this study to assess the potential impacts on local air quality due to traffic on Highway 69. Details of this assessment are included in Appendix L. Based on the results of this assessment the four-laning of Highway 69 is not expected to have significant effects to air quality in the study area.

The modelling results indicate that local air quality effects attributable to vehicular emissions from future traffic volumes along Highway 69 are less than their respective Ambient Air Quality Guidelines (MOE) for all modelled pollutants. There are infrequent periods when measured ambient particulate concentrations may alone exceed their respective guidelines, which is common to many cities in Northern Ontario. Therefore, although, the predicted contribution for vehicular emissions is low, ambient pollutant concentrations in the vicinity of the Highway 69 expansion may be elevated during these episodes.

Future increases in traffic volumes and truck travel as described in other sections of the report, are not caused by the proposed improvements, but rather, are the result of normal growth and travel patterns projected for the Toronto (or Parry Sound) to Sudbury travel corridor. Because there are no alternative routes in this travel corridor, the traffic volumes will increase with or without the four-laning of Highway 69. The purpose of the four-lane highway is to accommodate the traffic increase and provide a safe facility for the travelling public, including truck traffic.

The MTO does not anticipate air quality to experience notable adverse effects. The project will increase the width of the highway to provide a four-lane median separated facility, replacing an existing two-lane highway. Traffic volume will not instantaneously increase as a result of these improvements, but rather will experience gradual growth. MTO is also aware of air quality issues related to particulate matter and National Ambient Air Quality objectives. However, the study area is primarily rural with few adjacent receptors that would experience or be sensitive to changes in air quality. MTO will apply standard measures during construction to control dust and minimize adverse air quality effects associated with construction activities.

Initiatives such as the recently adopted Canadian “Sulphur in Gasoline Reduction” will have highly beneficial effects on transportation related vehicle emissions and ambient air quality. By 2008 the sulphur content of gasoline will be reduced from approximately 350 part per million (ppm) to 30 ppm under federal regulation. Such a major reduction in sulphur dioxide will result in reduced particulate emissions as well as significant reductions in carbon monoxide (CO), oxides of nitrogen (NOx) and hydrocarbon emissions. Reductions in NOx emissions will have the benefit of reducing ozone levels in the atmosphere.

Regulations came into effect in January 2004 under the *Canadian Environmental Protection Act* (CEPA) to align Canadian regulations with U.S. “Tier 2” emissions standards. This is in line with the on-going policy of US-Canadian vehicle standards harmonization, which will reduce vehicle emissions further. Heavy-duty diesel trucks will also emit much less due to the stricter federal emission standards for NOx and particulate matter. The net effect of these mandated improvements is expected to be a reduction of total vehicle emissions. Current vehicles are on average, 20 to 30 percent cleaner than 1990’s vehicles due to stricter emissions standards and the gradual turnover of the fleet.

The proposed improvements are expected to result in less congestion, especially in peak summer periods and improvements to traffic flow that reduce the amount of slowing down or stopping at intersections with side roads.

Short-term effects to air quality include dust created by construction activities. Standard dust suppressants will be used to minimize adverse effects.

7.2.9 Vistas and Aesthetics

The construction of the Recommended Plan of Highway 69 will potentially have a notable effect on the general visual environment of the roadway due to changes in the form of the roadway. The potential specific effects, however, can be mitigated by a variety of measures including minimizing vegetation removal, signage and entry features.

This *Landscape Composition Technical Report* included in Appendix P includes an inventory and environmental effect analysis of visual and landscape resources in the Recommended Plan of Highway 69. It is intended to provide a focus for landscape architecture at the Detail Design phase. It is recommended that in the Detail Design phase that landscape architecture include elements such as edge vegetation management; aesthetic vegetation management; fisheries habitat restoration and compensation plantings; median rock retention, rock face enhancement, signage design; gateway feature design; architectural input into bridge design; and grading design. These elements will assist in address effects related to fisheries, wetlands, vegetation and wildlife.

Key recommendations to enhance the visual and aesthetic elements of the new Highway include the following:

- Retain vegetation at the edge of the right-of-way (beyond the clear zone), which can reduce the perceived width of the highway corridor and can provide some aesthetic variation in the landscape. This provides edge management functions for sensitive natural areas that may be disturbed by the project;
- Retain as many rock outcrops as possible for visual interest (within the median and adjacent to the outside edge of the traveled highway); and

- Minimize the removal of vegetation as a result of the construction of access ramps & structures.

The profile and alignment in the Recommended Plan will have more variation than in the existing alignment. This will add to the visual interest and drama of the highway and can be seen as a positive visual effect with no requirements for mitigation.

The following receptor points were identified as having the most sensitive and notable views. They are landmarks within the study area which provide an opportunity to enhance existing views.

- Magnetawan River;
- Stillness Farm;
- Still River Community;
- Straight Lake;
- Key River; and
- Clear Lake.

The mitigation recommendations include minimizing the extent of removed vegetation to provide forested edge. Proposed bridge structures should be designed to be aesthetically compatible with the landscape. Additional holistic mitigation strategies are discussed in the *Landscape Composition Technical Report* (Appendix P).

7.2.10 Landscape

The natural topography, combined with soil conditions and climate in the study area are not favourable to landscaping designs with non-native species. The rock associated with the Canadian Shield does not offer very many planting opportunities, the soil conditions are relatively poor and the winters are harsh. Therefore landscaping opportunities within the future highway right-of-way are scarce.

However, where the future four-lane highway crosses sensitive areas, as described in reference to fisheries and terrestrial resources (in previous sections), native species will be used to enhance the final design with the intent of reducing adverse effects to fisheries, vegetation, wetland and wildlife resources.

These are described in detail in Sections 7.1.4 to 7.1.6.

7.2.11 Traffic Interruptions and Delay During Construction

A traffic management and staging plan will be finalized during Detail Design and included in the contract packages.

During construction, traffic conditions will be monitored to ensure that unreasonable delays and backups are not occurring. Corrective action will be taken as required to remedy any potentially unsafe situations. The following measures may be used to maintain traffic flow during construction:

- Standard MTO construction signage, including the possible use of changeable message signs;
- Flag persons to regulate traffic movements, where appropriate; and
- Reduced speed limits (including working with the Ontario Provincial Police) through construction zones.

These measures are expected to keep traffic delays to the travelling public and commercial truck traffic to a minimum while maintaining safety.

Emergency response agencies will be notified of the construction schedule. The route as proposed will affect emergency response, however in most areas the proximity of the developed areas to the interchanges and the inclusion of a continuous service road through most of the study area will maintain or improve response times. Locating median cross-overs for emergency vehicle use at appropriate locations will be undertaken during detail design in consultation with emergency service providers for responding to incidents on the highway.

7.2.12 Construction Dust and Noise

Dust and noise resulting from construction activities such as drilling and blasting and heavy machinery may adversely affect residents and businesses located in proximity to the construction zone.

During construction of the improvements, the contractor will abide by the Contract Operational Constraints and municipal noise control by-laws. The Contractor will be required to keep idling of construction equipment to a minimum and to maintain equipment in good working order to reduce noise from construction activities.

Construction may occur outside of normal working hours and weekends for certain activities along Highway 69. Such work will be carried out in compliance with local noise by-laws and noise by-law exemptions.

If complaints regarding construction noise arise from construction, they will be investigated according to the provisions of the existing MTO / MOE Noise Protocol. The Protocol requires that any initial complaint from the public requires verification by MTO that the general noise control measures agreed to are in effect. If not, MTO will warn the contractor of any problems, and enforce its contract.

Given that blasting and pile driving may be required, the contractor will be required to conform to SP199F33 Noise Sensitive Areas to control construction noise. Blasting and pile driving activities will normally be restricted to the period of 0700 to 1900 hours daily. In addition, the contractor will be required to conform to OPSS 120, which specifies the requirements associated with the pre-blasting survey, trail blast and procedure during and after blasting.

Standard MTO special provisions will be included in the contract to mitigate dust.

7.3 Cultural Environment

7.3.1 Archaeology

A Stage 1-2 Archaeological Assessment was carried out (see Appendix O) of the Recommended Plan and interchanges as described in Section 2.3.1.

Standard provisions will be included the contract packages, in the event that either human remains or archaeological resources are discovered during construction. A special provision will be included to protect the burial (identified with a wooden marker) near the Key River.

During construction there is always the chance of encountering archaeological material. If this occurs, the Ministry of Culture Regional Archaeologist will be notified and work in the area will stop.

In the event that human remains are encountered during construction, the Contractor will immediately cease operations, notify the Contract Administrator and contact the Ontario Provincial Police, the Ministry of Culture Regional Archaeologist and the Registrar of the Ministry of Government Services Cemeteries Regulations Unit.

Local First Nation communities will also be notified in the event that either human remains or archaeological resources are discovered during construction.

7.3.2 Built and Cultural Heritage

This section provides a preliminary assessment of the potential adverse effects of the proposed four-laning of Highway 69. The conservation of cultural heritage resources in planning is considered to be a matter of public interest. Additional details are provided in the *Built and Cultural Heritage Report* (Appendix N).

Generally, road improvements and bridge improvements or replacement have the potential to adversely affect cultural heritage landscape units and built heritage features by displacement and/or disruption during, as well as after construction. Built heritage features and/or cultural heritage landscape units may experience displacement, i.e., removal, if they are located within the rights-of-way of the undertaking. There may also be potential for disruption, or indirect impacts, to cultural heritage resources by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with their character and, or setting.

The potential displacement and disruption effects of this undertaking are principally associated with the four-laning of Highway 69 and the effects to population centres and highway bridge structures located along the alternative routes and identified as part of the field survey (see Section 2.3.2).

The undertaking will displace one cultural heritage landscape (CHL), CHL 16, which consists of Highway 522 at the junction with Highway 69. The area is identified as Cranberry Station on twentieth century mapping relating to the nearby CNR. There does not appear to have been a settlement of any size at this location. A proposed interchange at Highway 522 will alter the junction significantly and result in the removal of the general store at the corner. No mitigation is recommended.

The proposed undertaking will also displace the original alignment of Highway 69 and remains of the 1936 bridge in the vicinity of the Magnetawan River. It is recommended that these features be documented photographically during Detail Design. If possible, the remains of the earlier bridge should be preserved and protected during construction activities.

Addition impacts to heritage resources are limited to indirect impacts such as the isolation of a cultural heritage landscape (i.e. CHL 9, CHL 15) or the disruption of the existing context of a built heritage feature (i.e. BHF 9, BHF 10, BHF 12). Mitigation measures to address indirect impacts are outlined in the *Built and Cultural Heritage Report* (Appendix N).

7.4 External Agency and Public Input on Recommended Plan

7.4.1 Public Information Centre #4 – June 2007

The fourth Public Information Centre (PIC) for recommended Highway 69 Route Planning Study (North Section) was held Tuesday, June 26, 2007 at the Britt Holy Family Church Hall and Wednesday, June 27, 2007 at Stage West All Suite Hotel in Mississauga.

The purpose of the PIC was to:

- Display the Recommended Plan; and
- Answer questions about the study.

There was general support for the preliminary design for the North Section and continued recognition for the need to improve Highway 69 from north to Harris Lake Road to north of Highway 522. Nonetheless, some people expressed concerns about community access and property impacts.

The most frequent comments that were provided from the PICs included the following:

- Concerned/commented about CPR rail crossing in the vicinity of the proposed Bekanon Road interchange.
- Concerned about potential impacts (e.g. property value, noise) and access to property.
- Concerned about impacts to wildlife and wildlife habitat.
- Requested a copy of a plan presented at the PIC.

Detailed comments received and the Project Team response included in Appendix F.

7.4.2 External Agency Input

A PIC preview session for invited External Agencies was held on June 26, 2007 at the Britt Holy Family Church Hall. The purpose of this session was to present the preliminary design and solicit input on the design. This event was attended by representatives from the Ministry of Natural Resources (Grundy Lake Provincial Park), Westwind Forest Stewardship Incorporated, Ontario Provincial Police (West Parry Sound), French River Snow Voyageurs and Smith Bay Ratepayers. Subsequent to this session additional follow-up consultation occurred with various agencies including a follow-up meeting on November 27, 2007 with members of local snowmobile associations. A copy of related correspondence and meeting minutes can be found in Appendix G.

7.4.3 Municipal Input

The Municipality of Killarney is located in the northern section of the study area. The remainder of the study area is contained within unorganized townships.

A letter was sent to the Municipality of Killarney to provide notification of the Public Information Centres and indicated that relocation of the CNR rail is proposed near Highway 522 and that any comments the municipality may have regarding this project would be greatly appreciated. The Deputy Mayor/Ward 2 Councillor attended the Public Information Centre in Britt to review the plans. A copy of the letter to the Municipality of Killarney is provided in Appendix G. There has been no formal response on the preliminary design from the municipality.

7.4.4 First Nation Input

Meetings were held with the two First Nation Councils to discuss the study results to date including the preliminary design and interchange locations for the North Section. The meetings were held as follows:

- Magnetawan First Nation on July 11, 2007; and
- Henvey Inlet First Nation on June 6, 2007.

At the meeting with Magnetawan First Nation Council there was support noted for the plan, however concern was expressed for a dedicated snowmobile crossing separate from the proposed road access under the south side of the Magnetawan River crossing. Subsequently provision was made in the design for a separate snowmobile crossing culvert between the Magnetawan River interchange and the Magnetawan River. A Magnetawan First Nation Community Information Session (CIS) was held on Wednesday, July 11, 2007 at the Magnetawan First Nation Community Hall (Band Office). As with the PICs, CIS attendees expressed general support for the preliminary design for the North Section and continued recognition for the need to improve Highway 69 from north of Harris Lake Road to north of Highway 522. Only one written submission was received following this CIS. The submission inquired about noise impacts associated with the new highway in the vicinity of Spirit Road and requested a larger scale plan of the Spirit Road area.

A Henvey Inlet CIS was proposed to occur in the summer of 2007; however, at the June 6, 2007 Council meeting it was decided that the Henvey Inlet CIS could not be scheduled until the Chief and Council had an opportunity to discuss the proposed preliminary design with members of the Henvey Inlet First Nation. The Henvey Inlet CIS was subsequently held on January 17, 2008.