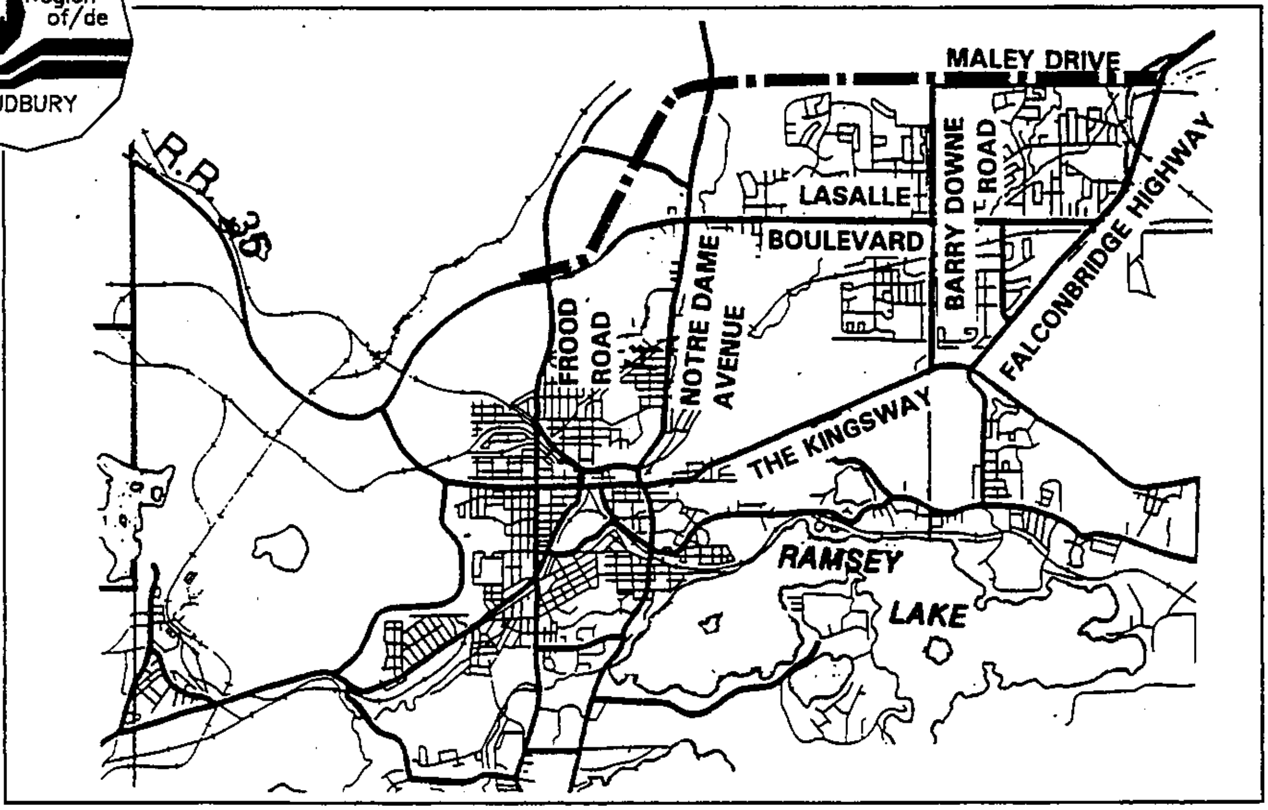
D. Belisle

MALEY DRIVE EXTENSION

CLASS ENVIRONMENTAL ASSESSMENT

REGIONAL MUNICIPALITY OF SUDBURY



October, 1995

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EXECUTIVE SUMMARY

This report documents the Environmental Assessment undertaken for the Maley Drive Extension, an arterial road located in the Regional Municipality of Sudbury. The undertaking includes two components: the reconstruction of the existing Maley Drive (Regional Road 73) between Falconbridge Highway and Barry Downe Road, and the extension of Maley Drive from Barry Downe Road westerly to the LaSalle Boulevard Extension. The Maley Drive Extension will include the reconstruction of LaSalle Boulevard from Frood Road in the west to the intersection of Maley Drive at LaSalle Boulevard.

The proponent of the project is the Regional Municipality of Sudbury.

This report has been prepared in accordance with the guidelines presented in the Municipal Engineers Association's Class Environmental Assessment for Municipal Road Projects document (June, 1993).

Project Background

The idea of a northern bypass of the developed area of the City of Sudbury arose from a number of sources in the latter part of the 1980's. These included:

- The mining and smelting industries, which saw potential benefits in terms of more efficient transportation of materials;
- The public, which had concerns with respect to the impacts of large trucks on LaSalle Boulevard and other streets in the Region; and,
- The Regional Municipality of Sudbury, which saw the need for additional east-west road capacity in the area north of Ramsey Lake. In this area, the Kingsway (Highway 17) and LaSalle Boulevard are the only two continuous east-west arterials. These two streets serve a number of heavy traffic demands, including inter-urban traffic, commercial traffic generated by adjacent commercial development and commuter traffic within the Region.

In 1991, an update of the Regional Transportation Plan was undertaken, with the twin objectives of developing a Trucking Action Plan and updating the Transportation Plan. The Trucking Action Plan recommended the Maley Drive Extension and upgrading of the existing Maley Drive as the preferred route for a northern truck bypass. The Transportation Plan recommended proceeding with the Environmental Assessment and construction of the Maley Drive Extension and upgrading of the existing Maley Drive.

Maley Drive will serve a number of traffic demands, including truck traffic, particularly large mining and smelting trucks, and through traffic.

A truck bypass is required for a number of reasons:

- To reduce conflicts between truck and auto traffic on LaSalle Boulevard and the Kingsway, each of which is a major commercial street;
- To improve traffic operations on LaSalle Boulevard and the Kingsway; and
- To minimize the degradation of the road structure, and to reduce the rate of pavement damage being incurred on LaSalle Boulevard as a result of truck traffic. This has the potential to create a safety hazard.

East-west traffic capacity is also required in this area, which is constrained by both topography and the absence of opportunity to add other roadways. All traffic crossing the northern section of the City is currently restricted to either LaSalle Boulevard or the Kingsway, the only two major through routes north of Ramsey Lake. Existing traffic demand exceeds the capacity of these two roads.

In addition, development has occurred and is expected to continue north of LaSalle Boulevard. At present, there is only one arterial access to these growing residential neighbourhoods, that being LaSalle Boulevard. This is not adequate from the standpoint of emergency access.

The analysis presented in this document shows that the Maley Drive Extension and the reconstruction of existing Maley Drive is the alternative which best meets these needs.

Public Participation

Notification of the study initiation was provided to all relevant agencies and property owners in the study corridor.

A public information centre was held in June of 1994 to obtain public input on the project. Most of the comments favoured the Maley Drive Extension, for reasons which include improvement in traffic flow on existing streets in the area, the need for additional traffic capacity, and reduction in noise impacts for residents. Three respondents were in favour of an accelerated construction timing to reduce the number of heavy trucks using LaSalle Boulevard. It was noted that the Maley Drive Extension would be likely to have a positive effect on businesses adjacent to Lasalle Boulevard.

Three residents expressed concern related to the noise impacts of the Maley Drive Extension. While not objecting to the undertaking, they expressed a desire to have noise mitigation methods employed.

One respondent expressed a concern regarding the natural environment. The concern is in regards to the woodland and watershed area in the vicinity of the proposed alignment of Maley Drive between Notre Dame Avenue and Barry Downe Road. This respondent also raised a concern with respect to the study process; it is believed that these concerns have been addressed. These are reviewed in the report.

Existing Conditions

Natural Environment

Existing natural environment conditions have been documented, including environmentally significant areas, physiography and topography, geotechnical conditions, water resources, vegetation, wetlands, fisheries and wildlife. Key points are as follows:

- **Environmentally Significant Areas**: No Environmentally Significant Areas, Areas of Natural and Scientific Interest or Provincially Significant Wetlands are located within the study corridor.

- **Physiography and Topography**: The physiography is dominated by the Canadian Shield. Bedrock is predominantly exposed and is composed of belts of greenstone and metamorphosed sediments. Glacial deposits composed of shallow, sandy tills are also present within the region. The surface topography is characterized by a rounded landscape of low hills and ridges. On-site geotechnical investigations have identified rock outcrops, low-lying wetlands, and areas with shallow overburden conditions.

- **Geotechnical Assessment**: A preliminary geotechnical assessment of the Maley Drive Extension corridor was carried out by Trow Consulting Engineers Ltd. (1994). This report is reproduced in Appendix B. Geotechnical investigations indicate that overburden and bedrock along the study corridor are suitable for road construction.

- **Water Resources**: Eight water crossings have been identified along the study corridor. Water crossings include watercourses and wetlands. Watercourses along the corridor are located within the Kelley Lake watershed. Three watercourses (Tributary A, Tributary B and the LaSalle Tributary) flow into the Nickledale Reservoir located immediately south of the proposed Maley Drive Extension. In general, they are small in scale and support, where present, degraded warmwater fish communities. Habitat degradation has occurred through transportation corridor construction and beaver activity.

- **Wetlands**: Most wetlands along the study corridor are riverine in character. Several small palustrine wetlands are also located along the corridor. Drainage and depressional storage along the alignment are largely controlled by the bedrock physiography of the surrounding area. Beaver activity along the watercourses has created and/or expanded riverine wetland systems in the area. A number of plant community types are associated with wetlands along the preferred alignment. These include beaver pond, shallow marsh, wet shrub thicket, riparian stream, and shrub-sedge meadow. Poplar-birch communities represent a transitional zone between wetlands and upland communities. Fisheries associated with these wetlands are typical of degraded warmwater fish communities.

- **Vegetation:** The vegetation is regenerating after the near total denudation of the landscape. The shallow soils and dry conditions in the upland and slope areas support a cover of mostly ericaceous shrubs with sparse tree cover, while the lowland areas have a more developed vegetation community with areas of full tree cover and a more diverse ground and understory cover. There are some pockets of relict vegetation which appear to have remained untouched by pollution impacts.

- **Fisheries:** Eight present and/or potential water crossings were identified within the study corridor. Field investigations were conducted to assess aquatic and terrestrial habitat along the watercourses. The fish community was qualitatively sampled using back-pack electrofishing equipment and dip nets. The species identified were indicative of degraded warmwater systems.

- **Wildlife:** Due to the degraded landscape within the study corridor the quality and diversity of wildlife habitat and community is considered low. The corridor provides habitat for **mammal species** which are associated with near urban environments but also supports species which are more typically associated with habitats of greater isolation from the human environment. A wide range of **bird species** occupy a number of habitats in the study corridor. With respect to **herpetofauna,** the shallow marsh community located immediately on the north side of the Maley Drive unopened road allowance, approximately 200 m west of Barry Downe Road, has a significant herpetofaunal association. It provides suitable habitat for all life stages of herpetofauna found along the study corridor.

- **Significant Species:** No significant plant or animal species were observed along the study corridor.

Social and Cultural Environment

- **Agricultural Resources:** No agricultural resources will be impacted through the project construction within the corridor.

- **Heritage and Archaeological Concerns**: Geotechnical and environmental investigations have not revealed any obvious remnant beaches along watercourses within the preferred route corridor. However, route specific archaeological surveys of the proposed alignment are recommended prior to construction.

- **Noise**: The existing noise levels were calculated using the computer program "Noise Barrier Cost Reduction Procedure - STAMINA 2.0/OPTIMA", designed for road traffic noise assessment. Eleven representative receiver locations were used. These receivers are representative of the most critical locations in terms of noise exposure to Maley Drive. All outdoor living area receivers between LaSalle Boulevard and Barry Downe Road had a noise level between 41 dBA and 54 dBA, while all outdoor living area receivers between Barry Downe Road and a point just east of Lansing Avenue have a noise level between 43 dBA and 59 dBA. All outdoor living area receivers from just east of Lansing Road to Falconbridge Highway had a noise level of 51 dBA to 57 dBA.

Needs Assessment

Traffic conditions have been projected for three horizons (1995, 2000 and 2010), based on a 1990 computer model of traffic volumes, and taking into account development proposals for the study area. The following summarizes the expected traffic conditions:

- Without the Maley Drive Extension, LaSalle Boulevard can be expected to continue to operate at an unsatisfactory Level of Service during the a.m. and p.m. peak hours. With the Maley Drive Extension in place, LaSalle Boulevard is projected to experience demands within its existing capacity;

- Without the Extension, Notre Dame Avenue is expected to continue to operate at an unsatisfactory Level of Service, north and south of LaSalle Boulevard;

- Maley Drive is projected to be well used. Irrespective of other road network additions, Maley Drive would attract between 800 and 900 vehicles in <u>each</u> direction during the a.m. peak hour, between Barry Downe Road and Notre Dame Avenue. From Barry Downe Road east to Falconbridge Highway, Maley Drive would attract more than 800 vehicles in the peak direction during the a.m. peak hour. West of Notre Dame Avenue, Maley Drive attracts more than 500 vehicles westbound during the a.m. peak hour. During the p.m. peak hour, projected volumes on Maley Drive are expected to be in the range of 1,100 trips.

The extension of Maley Drive from Barry Downe Road to the LaSalle Boulevard Extension and the reconstruction of the existing Maley Drive would form a northern bypass of the City of Sudbury. This is required for the following reasons:

1. Existing east-west road links north of downtown Sudbury are currently operating close to or at capacity. There is little or no opportunity to widen these roads;

2. Turning movements at intersections along LaSalle Boulevard, which is parallel to the proposed Maley Drive Extension, are also approaching or at capacity;

3. Trucking operations along LaSalle Boulevard add to the congestion level on that street, because of the lack of an alternate route. These represent an ongoing safety concern to drivers on LaSalle;

4. Trucks are accelerating the rate of pavement damage on LaSalle Boulevard;

5. Projected development in the northern section of the City of Sudbury and the outlying communities to the north of the City is expected to aggravate the traffic congestion problems on the links of LaSalle Boulevard, and at the intersections of LaSalle with Notre Dame Avenue, Barry Downe Road and Falconbridge Highway; and

6. There is the potential for mine haul truck traffic to increase on LaSalle Boulevard. This would add to the already high level of congestion.

The completed Maley Drive will form an efficient truck bypass of the City, allowing trucks to avoid the congested commercial section of LaSalle Boulevard. This will reduce conflicts with auto traffic, cyclists and pedestrians on LaSalle Boulevard, and also reduce the rate of pavement damage on LaSalle.

Alternatives to the Undertaking

Four alternatives to the undertaking have been considered:

- **Do nothing:** The "do-nothing" alternative would mean that LaSalle Boulevard and The Kingsway would continue to be the only continuous east-west arterial roads through the City of Sudbury, north of Ramsey Lake. These roads would have to accommodate growing volumes of through traffic, commuter traffic, industrial and mining traffic, and traffic generated by continuing development along these two streets.

- **Improvements to Existing Roads**: These include the widening of LaSalle Boulevard and the widening of The Kingsway, between Notre Dame Avenue and Falconbridge Highway.

- **Introduction of a New Road:** Three alternative alignments for a new road have been considered. These represent a reasonable spectrum of the potential alignments for a new road, given the existing road network configurations to the east and west of the study area. The alternatives are:

  - Alternative 1 - Maley Drive Extension plus reconstruction of the existing Maley Drive
  - Alternative 2 - the INCO Road proposal. This corridor lies two to six kilometres north of Sudbury's urban boundary, largely on land owned by INCO.
  - Alternative 3 - Maley Drive Extension plus new road. This corridor also lies north of the City's urban boundary to the east of Barry Downe Road. At the intersection of Barry Downe Road and Maley Drive, this corridor merges with the proposed extension of Maley Drive (Alternative 1).

- **Transit Services:** One alternative would be to implement some type of east-west transit service in the Study Area. This could take the form of a bus or Light Rail Transit (LRT) service on LaSalle Boulevard. An alternative of this type could be considered in terms of its ability to shift a portion of the travel demand on LaSalle Boulevard from auto to transit, which might then alleviate the need for a bypass of the City.

Evaluation of the Alternatives to the Undertaking

The alternatives have been assessed in terms of their impacts on transportation, and on the natural, social and economic environments:

- **Do Nothing:** the "do-nothing" alternative will result in a poor to unacceptable level of service for traffic operations on all major arterial roads across the northern section of the City of Sudbury. The projected levels of congestion on LaSalle Boulevard and The Kingsway resulting from the "do-nothing" alternative would have a negative effect on residential neighbourhoods in this vicinity.

- **Improvements to Existing Roads**: In the medium to long term, widening of existing roads could provide reasonably adequate transportation service to the northern portion of the City of Sudbury. Over a time horizon of 20 to 30 years, however, demand can be expected to exceed the capacity limits of the widened roads. This would limit development of the northern area of the City and adversely impact industrial and business activity.

- **Introduction of a New Road:** Alternative 1 would provide a direct, attractive northern bypass of the City of Sudbury. Alternatives 2 and 3 could also form this bypass, but they would be significantly longer and therefore more costly. This could also result in more extensive effects on the natural environment than would Alternative 1.

  Alternative 1 (Maley Drive Extension) represents the preferred route corridor from an environmental perspective. The corridor utilizes existing transportation infrastructure and the proposed extension passes along the northern fringe of the urban area. This corridor will have the least impact on area wildlife. Although watercourse and wetland crossings will be required to complete the project, proper siting and use of Best Management Practices construction techniques will minimize impacts to these ecosystems. Retrofitting of existing structures along Maley Drive will likely enhance fish habitat and wetland opportunities in the study area. Alternatives other than developing a new road ("do-nothing", widenings and transit services) would have lesser impacts on the natural environment, as no large natural areas would be impacted by these alternatives.

- **Transit Services:** Higher-order transit service would not be a viable transportation alternative in the study area. The planned population and employment densities in the Maley Drive corridor are not sufficient to support transit at a level which would preclude the need for additional east-west road capacity.

It was determined that Alternative 1 - The Maley Drive Extension plus Reconstruction of the Existing Maley Drive is the preferred alternative. This alternative will provide the transportation capacity required in a cost-effective and efficient manner, while having marginal impacts on the natural and social environments. This alternative is projected to result in economic benefits to the Regional Municipality of Sudbury, as well.

Design Alternatives

For the analysis of design alternatives, the route has been separated into the following four sections, moving from west to east:

Section I	LaSalle Boulevard from Frood Road to the proposed Maley Drive Extension;
Section II	LaSalle Boulevard to Barry Downe Road;
Section III	Barry Downe Road to Junction Creek; and
Section IV	Junction Creek to Falconbridge Highway.

Alternative options were considered within each section for horizontal and vertical alignments and intersection/interchange options. The assessment was undertaken using criteria which included transportation service, cost, environmental factors and noise impacts.

The Selected Alternative

The selected alternative consists of three components:

1. Reconstruction of the existing Maley Drive from Falconbridge Highway to Barry Downe Road, to upgrade this road to function as an arterial road;

2. Extension of Maley Drive westerly from its existing eastern terminus at Barry Downe Road to meet LaSalle Boulevard, west of Notre Dame Avenue; and

3. Widening LaSalle Boulevard from Maley Drive westerly to Frood Road.

The combined result of these project components will be the creation of a complete east-west arterial road link from LaSalle Boulevard in the west to Falconbridge Highway in the east. This will form a northern circulation and bypass route of the City of Sudbury.

The initial construction will include a two-lane pavement in the section from LaSalle Boulevard to the CN Rail line, and five lanes easterly from the CN Rail line to Falconbridge Highway. On the new section from LaSalle Boulevard to Barry Downe Road, the road cuts and fills are planned to be constructed to the ultimate four-lane divided cross-section. The two lane pavement will be constructed on the north side (future westbound lanes). This procedure is proposed in order to avoid the need for more costly future rock blasting and cut and fill operations when traffic is using the initial two lanes. It will also allow the south side of the road, particularly in the fill sections, to be landscaped as part of the initial construction, to improve the appearance of the new road when viewed from the residential areas to the south.

The preliminary design plans prepared for this report indicate the property and pavement requirements for the future four-lane construction.

The first phase of Maley Drive will be constructed initially as a roadway with one through lane in each direction. The second phase will involve expansion to two lanes per direction, in the future.

Exclusive turning lanes will be constructed as required at intersections. The intersection of Maley Drive at Notre Dame Avenue will be grade-separated, to accommodate the high turning movement volumes projected. The remainder of the intersections will be at-grade.

Construction of the undertaking is expected to begin in 1996, with completion projected for 1998. The timing of construction is dependent on the availability of funding.

Natural Environment Considerations

The impacts of the undertaking on the natural environment are expected to be as follows:

- Water crossings: negligible impacts - fish communities are typical of degraded warmwater communities;

- Vegetation: red oak-heath communities will be affected by the undertaking only within the right-of-way for construction; and

- Wetlands: the shallow marsh community located 200 metres west of Barry Downe Road will be subject to minor impacts by the undertaking. The beaver pond located one kilometre west of Barry Downe Road will be bisected by the undertaking. The road has been aligned to pass over the narrowest section of the pond, to minimize disturbance. A box culvert sized to accommodate Regional storm flows will be provided to permit continued water flow.

Social and Cultural Environment Considerations

- Noise: The noise level increases due to the extension and widening of Maley Drive are typically 5 decibels or less for the most critical receptor locations in the vicinity of the alignment. For the two receptor locations where the noise level increases will be slightly greater than 5 decibels, implementation of noise mitigation is not considered warranted for a number of reasons. The ultimate four/five-lane cross-section was employed in the noise assessment.

- Land Use and Development: It is expected that the undertaking will have positive effects on:

    - Commercial activity along LaSalle Boulevard. By removing truck traffic and some through traffic from LaSalle, the undertaking can be expected to result in business along this street being regarded as more accessible. This should make these businesses more viable economically;

    - Industry across northern Sudbury. The completed Maley Drive will provide a fast and effective bypass of the City of Sudbury. This will result in more efficient transportation operations for the mining and smelting industries, as well as other industries which rely on efficient transportation;

  - Access to residential communities north of LaSalle Boulevard. Maley Drive will provide a second east-west arterial access to these neighbourhoods. This will improve emergency response access, and provide additional options and flexibility for Sudbury Transit routings; and

  - Development north of LaSalle Boulevard, based on the increased accessibility of the area.

- Heritage and Archaeological Resources: It is known that a shoreline beach was present in the general area approximately 4,500 years ago. However, the geotechnical and environmental investigations undertaken for this project have not revealed any obvious remnant beaches in the preferred alignment. These facts would indicate that there is a low probability that heritage or archaeological resources could be impacted by the undertaking.

Preliminary Cost Estimates

The total construction cost in 1995 dollars, including contingency, but excluding property acquisition, for the two-lane Maley Drive on a four-lane roadbed, is approximately $ 12.145 million.

Construction Staging

The construction of Maley Drive is expected to be carried out over a number of construction seasons, with the intent to balance the rock/earth quantities within individual contracts. The work will also be performed in a manner which will allow maintenance of the existing portion of the roadway throughout the construction duration, and to respect the considerations with respect to the natural environment.

The construction sequence is envisaged as follows:

Year 1	Contract 1 - Falconbridge Highway to Junction Creek Contract 2 - Junction Creek to Barry Downe Road
Year 2	Contract 3, 4 and 5 - Barry Downe Road to Notre Dame Avenue
Year 3	Contract 6 - Notre Dame Avenue to LaSalle Boulevard

This phasing will however be dependent upon availability of project funding.

Summary of Environmental Effects and Mitigation Measures

- Construction: Erosion and sedimentation are potential construction impacts of road crossings of watercourses and wetlands. Erosion and sediment dispersal are potential effects in vegetated areas. Mitigation measures associated with construction at watercourse crossings, wetlands and vegetated areas are identified in the report. These are reflective of best management practices;

- Culvert Design at Water Crossings/Wetlands: The widening of the existing Maley Drive provides an opportunity to retrofit poorly placed and designed culverts, improving water flow and fish habitat in this area.

- Vegetation: Some vegetation removal will be required. Mitigation measures associated with removal of vegetation areas are identified in the report;

- Community Concerns: The community concerns relating to natural environmental impacts have been addressed both by the design process and through the identification of mitigating measures. Some minor loss of vegetation will occur as a result of the project, in the regenerating area between Notre Dame Avenue and Barry Downe Road. With respect to visual intrusion concerns north of Drummond Avenue, the design has been modified to minimize the impacts. Plantings of native trees will assist in reducing the visual intrusion to a minimal level.

Monitoring

No potential impacts of the project have been identified which are expected to require monitoring after completion of the undertaking.

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MALEY DRIVE EXTENSION

CLASS ENVIRONMENTAL ASSESSMENT

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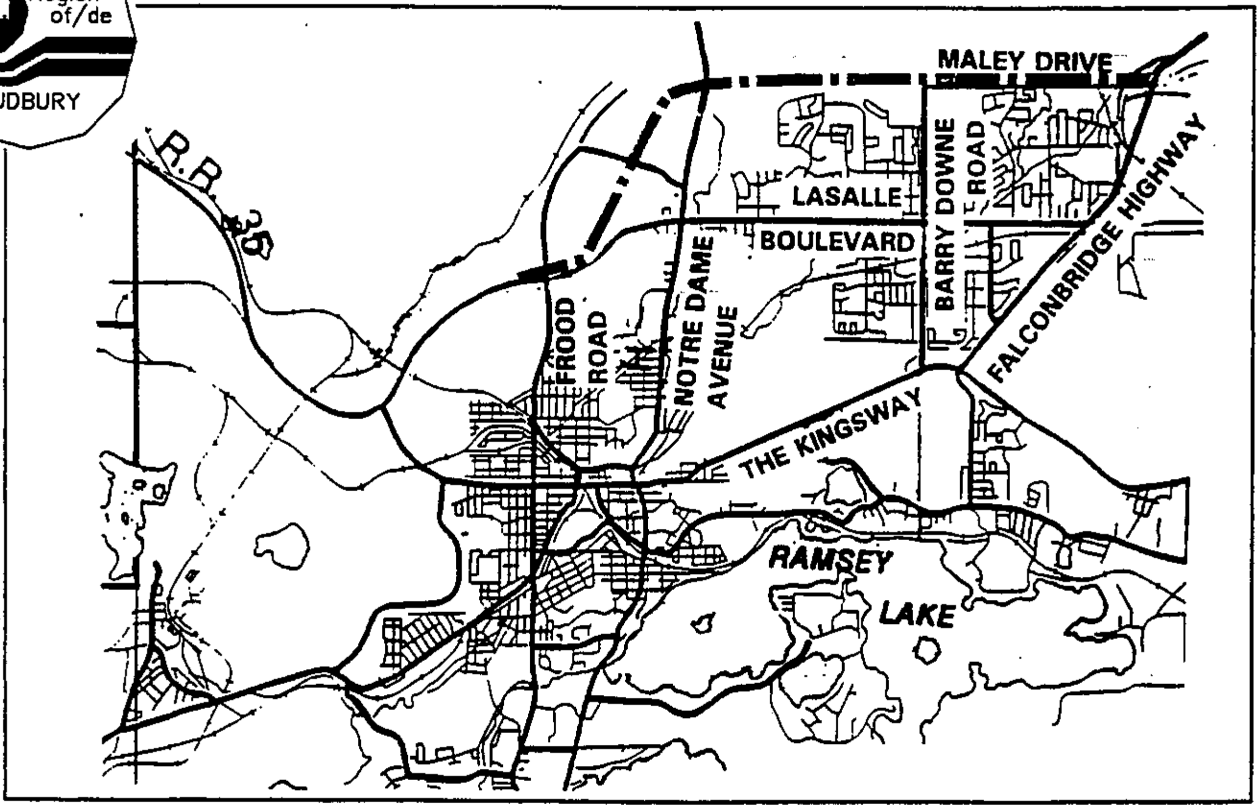

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1. INTRODUCTION AND BACKGROUND

1.1 Introduction

This report documents the Environmental Assessment undertaken for the Maley Drive Extension, an arterial road located in the Regional Municipality of Sudbury. The undertaking includes two components: the reconstruction of the existing Maley Drive (Regional Road 73) between Falconbridge Highway and Barry Downe Road, and the extension of Maley Drive from Barry Downe Road westward to the LaSalle Boulevard Extension. The Maley Drive Extension will include the reconstruction of LaSalle Boulevard from Frood Road in the west to the intersection of Maley Drive at LaSalle Boulevard.

The proponent of the project is the Regional Municipality of Sudbury.

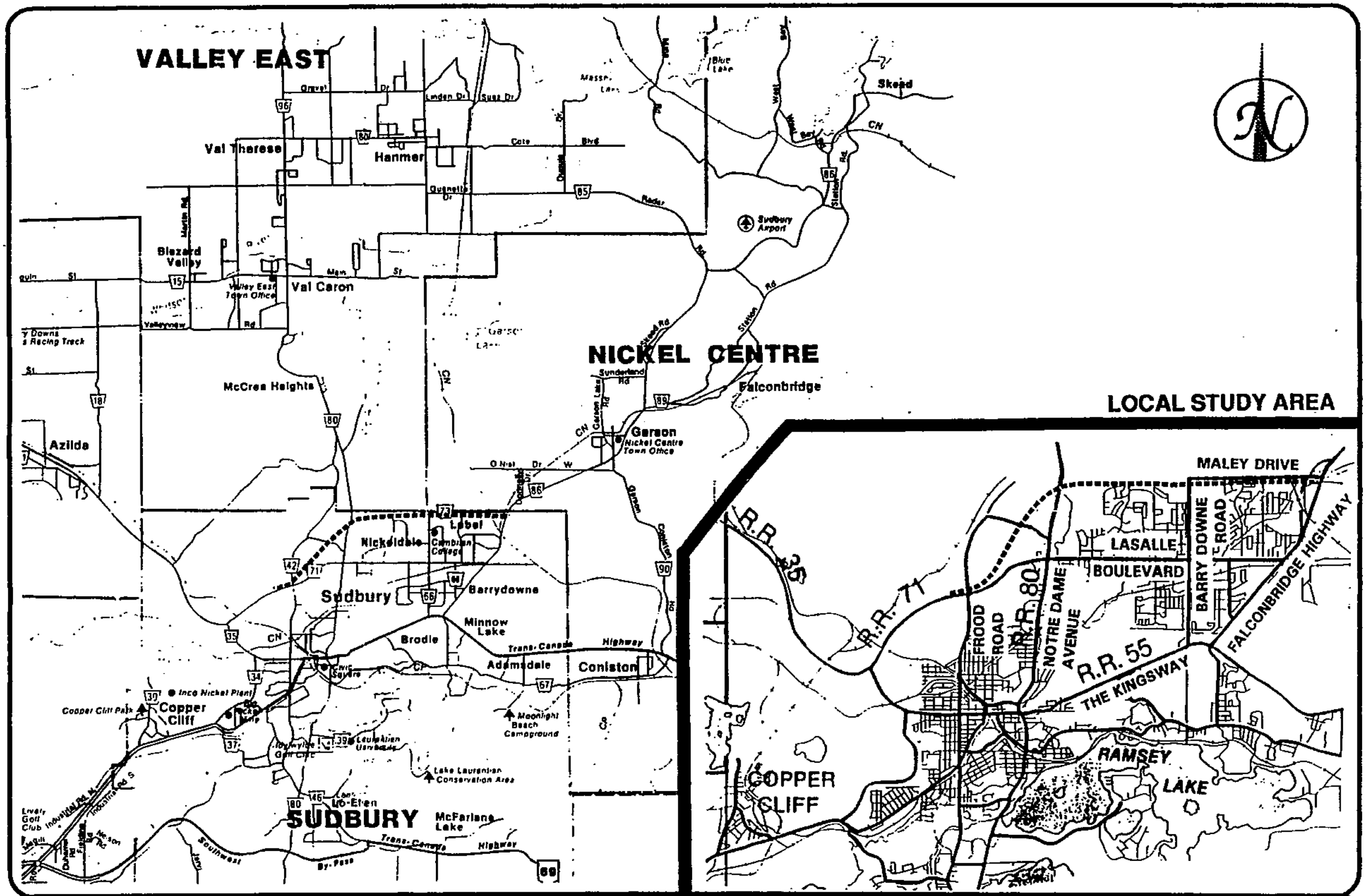
1.2 Project Location

Figure 1.1 illustrates the location of the project, in terms of its situation with respect to the road network and development, at both a Regional and City level. The existing Maley Drive is located along the northern boundary of the City of Sudbury, aligned in an east-west direction. At the eastern terminus of the existing section, Falconbridge Highway (Regional Road 86) provides access from the City of Sudbury to the adjacent municipalities of the Town of Nickel Centre, the Town of Valley East and the Town of Capreol. The outlying communities all contain extensive residential development, and the Town of Nickel Centre contains significant mining activity, as well.

The western terminus of the existing Maley Drive is Barry Downe Road, an arterial road which links Maley Drive to LaSalle Boulevard (Regional Road 71) and the Kingsway (Highway 17). Barry Downe Road also provides access to residential and commercial development, including the New Sudbury Shopping Centre and surrounding commercial uses at LaSalle Boulevard.

The area to the south of the project location is largely residential between Falconbridge Highway in the east and Notre Dame Avenue in the west. Notre Dame Avenue provides a four-lane arterial route from the City of Sudbury to the Town of Valley East, a major residential community.

The area to the west of Notre Dame Avenue is largely undeveloped, as is the area north of Maley Drive. LaSalle Boulevard connects to Regional Road 35, which provides access to the outlying municipalities of Rayside-Balfour and Onaping Falls.



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---------- PROPOSED MALEY DRIVE EXTENSION

FIGURE 1.1
PROJECT LOCATION

Maley Drive Extension Class Environmental Assessment

1.3 Environmental Study Report

The Environmental Study Report documents the planning and preliminary design phases of the Environmental Assessment process for the Maley Drive Extension. This report has been prepared in accordance with the guidelines presented in the Municipal Engineers Association's Class Environmental Assessment for Municipal Road Projects document (June, 1993).

The Environmental Study Report includes a discussion of:

- The purpose of the undertaking;
- The study approach;
- The existing natural and social environmental conditions in the study area;
- The planning alternatives and design options considered; and
- The selected design, including the construction requirements for the project.

1.4 Project Background and Previous Studies

The idea of a northern bypass of the developed area of the City of Sudbury arose from a number of sources in the latter part of the 1980's. These included:

- The mining and smelting industries, which saw potential benefits in terms of more efficient transportation of materials;

- The public, which had concerns with respect to the impacts of large trucks on LaSalle Boulevard and other streets in the Region; and,

- The Regional Municipality of Sudbury, which saw the need for additional east-west road capacity in the area north of Ramsey Lake. In this area, the Kingsway (Highway 17) and LaSalle Boulevard are the only two continuous east-west arterials. These two streets serve a number of heavy traffic demands, including inter-urban traffic, commercial traffic generated by adjacent commercial development and commuter traffic within the Region.

At the same time, it was decided that an update of the Regional Transportation Plan was needed. A study was undertaken with the twin objectives of developing a Trucking Action Plan and updating the Transportation Plan. This study (the Sudbury Regional Transportation Study) was undertaken by Marshall Macklin Monaghan Limited. Two reports were produced for that study:

1. Sudbury Regional Transportation Study Phase I: Trucking Issues (April, 1990); and,

2. Sudbury Regional Transportation Study Final Report: The Transportation Plan (March, 1992).

The Trucking Action Plan recommended the Maley Drive Extension and upgrading of the existing Maley Drive as the preferred route for a northern truck bypass.

The Transportation Plan recommended proceeding with the Environmental Assessment and construction of the Maley Drive Extension and upgrading of the existing Maley Drive before 1995, based on an analysis of projected transportation demand.

1.5 Related Projects

There are no related projects of environmental significance under way within the study area.

1.6 General Description of the Undertaking

The proposed undertaking is shown on Plates 8 to 33, located in Appendix E (Volume II of this report). The three primary components of the undertaking are:

1. The extension of Maley Drive westerly from its existing western terminus at Barry Downe Road to the LaSalle Boulevard Extension, west of Notre Dame Avenue. This segment would be constructed as a two-lane road; and,

2. The reconstruction of the existing Maley Drive east of Barry Downe Road, as a two-lane road, from Barry Downe Road to Old Falconbridge Road, and as a four-lane road from Old Falconbridge Road to Falconbridge Highway; and,

3. Widening of LaSalle Boulevard from 2 lanes to 4 lanes from Maley Drive to Frood Road.

Once the project is completed between Falconbridge Highway and the LaSalle Boulevard Extension, Maley Drive will provide a continuous arterial road connection across the entire northern developed area of the City of Sudbury. This road will serve as an effective bypass of the developed area and as an effective east-west arterial circulation route linking several north-south arterial roads.

Maley Drive is proposed to ultimately consist of a four-lane road from Falconbridge Highway to LaSalle Boulevard. Some sections may be prepared for this design during the initial (two-lane) construction.

Also included in the undertaking is the construction of the following intersections, including appropriate turning lanes, along the Maley Drive Extension:

1. Falconbridge Highway (reconstruction of the existing intersection);
2. Old Falconbridge Road;
3. Lansing Avenue (reconstruction of the existing intersection);
4. Barry Downe Road (reconstruction of the existing intersection to provide the western leg);
5. Montrose Avenue Extension;
6. Notre Dame Avenue (grade separated interchange); and,
7. LaSalle Boulevard Extension.

The new road will be grade-separated with no access to Turner Avenue.

1.7 Project Purpose and Justification

The primary purpose of the undertaking is provide new east-west arterial road along the northerly edge of the developed areas of the City of Sudbury lying north of Ramsey Lake. This road will serve a number of traffic demands. Key demand segments will be truck traffic, particularly large mining and smelting trucks, and through traffic.

A truck bypass is required for a number of reasons:

- To reduce conflicts between truck and auto traffic on LaSalle Boulevard and the Kingsway, each of which is a major commercial street;
- To improve traffic operations on LaSalle Boulevard and the Kingsway; and
- To minimize the degradation of the road structure, and to reduce the rate of pavement damage being incurred on LaSalle Boulevard as a result of truck traffic. This has the potential to create a safety hazard.

East-west traffic capacity is also required in this area, which is constrained by both topography and the absence of opportunity to add other roadways. All traffic crossing the northern section of the City is currently restricted to either LaSalle Boulevard or the Kingsway, the only two major through routes north of Ramsey Lake. Existing traffic demand exceeds the capacity of these two roads.

In addition, development has occurred and is expected to continue north of LaSalle Boulevard. At present, there is only one arterial access to these growing residential neighbourhoods, that being LaSalle Boulevard. This is not adequate from the standpoint of emergency access.

The analysis presented in this document shows that the proposed Maley Drive Extension and the reconstruction of the existing Maley Drive is the alternative which best meets these needs.

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2. PROJECT APPROACH

2.1 Class Environmental Assessment Process

The Maley Drive Extension has been analyzed as a Class Environmental Assessment. The study process has been conducted in accordance with the guidelines set out in the June, 1993 edition of the Municipal Engineers Association's Class Environmental Assessment for Municipal Road Projects. According to this document, the main purposes of an Environmental Assessment are the undertaking of an environmental inventory, determination of need, identification of environmental effects of the undertaking, and the identification of any mitigating measures required to minimize negative environmental effects associated with the undertaking.

Phases

The Environmental Assessment has been undertaken in the following phases:

Phase 1	Confirmation of the Project Classification
Phase 2	Needs Assessment (largely completed as part of the Sudbury Regional Transportation Study (1991)
Phase 3	Public Notification of Study Initiation
Phase 4	Environmental Inventory and Determination of Effects on the Environment ► Data Collection and Agency Consultation ► Data Consolidation and Analysis ► Refinements to the Design ► Identification of Mitigating Measures and Net Effects ► Review Meetings with Regional Staff
Phase 5	Public Information Centre
Phase 6	Preparation of Class Environmental Assessment Report.

Environmental Inventory

The following environmental components were assessed as part of Phase 4, the Environmental Inventory:

- Natural Environment:
  - Climate
  - Vegetation
  - Water Resources
  - Fisheries and Wildlife
  - Designated Environmentally Sensitive Areas
  - Wetlands
- Social Environment:
  - Communities
  - Noise
  - Heritage Resources
- Economic Environment:
  - Population and Employment
  - Land use
  - Economic development strategy
- Transportation
  - Access
  - Traffic Impacts
- Utilities.

2.2 Study Organization

Figure 2.1 illustrates the study organization. The study has been conducted under the direction of the Public Works Department of the Regional Municipality of Sudbury, the proponent. The study has been undertaken by Marshall Macklin Monaghan Limited. The project team included the following key members:

Mr. Robert Falcioni, P.Eng.	Roads and Drainage Engineer Regional Municipality of Sudbury
Mr. Robert Wanless, P.Eng.	Vice President, Transportation Planning Marshall Macklin Monaghan
Mr. Jim Gough, P.Eng.	Project Manager, Transportation Planning Marshall Macklin Monaghan

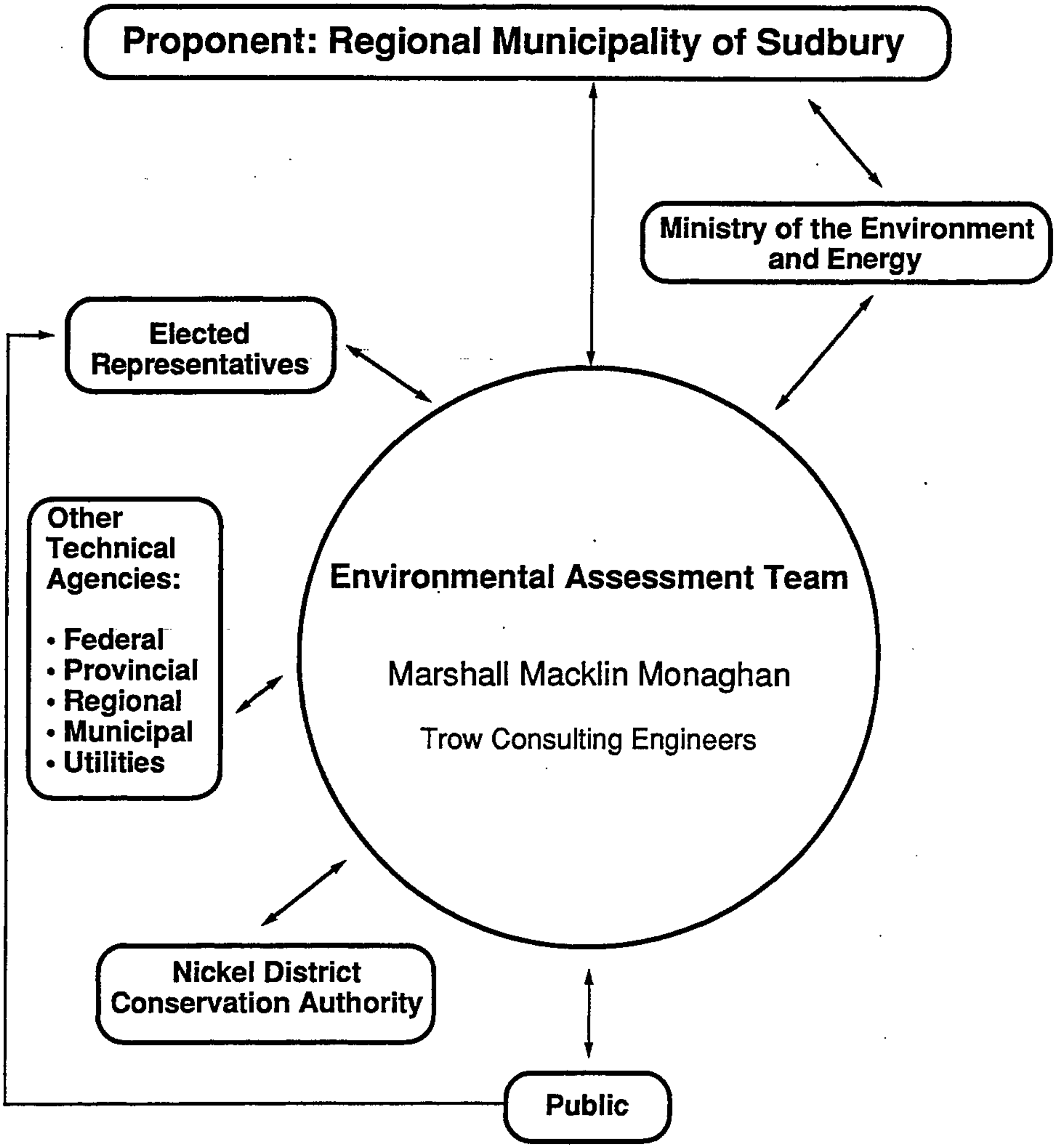

FIGURE 2.1
PROJECT ORGANIZATION

■ Mr. Kim Gurney, C.E.T.	Senior Project Manager, Transportation Engineering Marshall Macklin Monaghan
■ Mr. Robert Burdett, B.Sc.	Manager, Environmental Planning Marshall Macklin Monaghan
■ Mr. Jeff Warren, B.Sc.	Senior Biologist Marshall Macklin Monaghan
■ Mr. I.W. Gore, P.Eng.	Vice President Trow Consulting Engineers

2.3 External Participation

Input was solicited by correspondence from the following groups of agencies:

- Provincial ministries;
- Area municipalities;
- Landowners;
- Nickel District Conservation Authority; and
- Utilities.

A copy of the letter sent to these agencies is provided in Appendix A.

The extent to which these external agencies were involved in the study process is summarized in Table 2.1. The following sections provide details with respect to the agencies contacted and actions taken to consult with these agencies over the course of the study.

2.3.1 Provincial Ministries

The provincial Ministry of Natural Resources (MNR) was contacted at the project initiation, in order to obtain data relevant to the Study Area, and to receive their input with respect to areas of concern.

The Ministry of the Environment and Energy (MOEE) was also contacted at the project initiation. In addition to the comments provided at that time, MOEE provided comments following the Public Information Centre, in response to questions raised by a local resident.

TABLE 2.1
SUMMARY OF RESPONSES TO INITIAL PUBLIC NOTIFICATION

Responding Agency	Addressee	Respondent	Response rec'd by	Level of Interest	Specific Comments
Provincial Ministries/Agencies					
Agriculture and Food	J. Anderson				
Community and Social Services	J. Rabeau				
Culture, Tourism & Recreation	J. Cruickshank	P. Merrit	MMM	To be kept informed	No comments at present time
Culture, Tourism & Recreation	P. Carruthers				
Economic Development and Trade	R. Sawchuk				
Environment and Energy (Sudbury Regional/District Office)	C. LaFrance	M. DelMonte	MMM	To be kept informed	- Ministry has policy to protect sensitive land uses (i.e. residential areas, hospitals, nursing homes) from undesirable air quality and excessive noise. Planning of Maley Drive should account for increased noise from construction and traffic. Noise guidelines should be followed. - If drilling and blasting is to take place, measures must be proposed to control drilling dust collection and disposal and blasting noise/vibration limits. - Regarding siltation and erosion, control measures should be proposed to protect/enhance pre-construction hydrologic and water quality regimes. - Best Management Practices should be proposed to prevent inadvertent spills to the ground.
Environment and Energy (Energy Branch)	J. Pritchard-Scott	J. Pritchard-Scott	MMM	No Concerns	Withdraw Energy Branch from mailing list
Management Board Secretariat	R. M. Farewell				
Municipal Affairs	R. Brown	C. Healey	MMM	No Concerns	Proposed extension identified as future road alignment in Section 5.4.1.c)vi) and on Map E of City of Sudbury Secondary Plan. Do not require any further documents for review.
Natural Resources	P.R. Wyatt	M. Hall	MMM	To be kept informed	Comments will be forthcoming
Northern Development and Mines	D. Ignacy	P. Botelho	MMM	To be kept informed	No comments at present time
Solicitor General	D. Home				
Solicitor General	C.A. Brittan				
Transportation	D. Armatage	B.D. Roberts	MMM	To be kept informed	Address all future correspondence to G. Todd
Transportation	F. Patterson	F. Patterson	MMM	To be kept informed	No comments at present time
Regional Municipality					
Sudbury	C. Salazar				
Other Regional Agencies					
Sudbury Regional Fire Department	Chief D. McLean	Chief D. McLean	MMM	To be kept informed	No comments at present time
Sudbury Regional Police	Chief R. Zannibi	Sgt. Brian Insley	MMM	To be kept informed	No comments at present time
Local Municipality					
Sudbury	* R.K. Hinton	R.K. Hinton	MMM	To be kept informed	No comments at present time
Nickel Centre	S. Olson	S. Olson	MMM	To be kept informed	No comments at present time
Valley East	R.O. Chenier				
Other Local Agencies					
Sudbury Transit	G. Valiquette	G. Valiquette	MMM	To be kept informed	No comments at present time
Sudbury and District Health Unit	Dr. R. Bolton	Dr. R. Bolton	MMM	To be kept informed	No comments at present time

* Recipient of 'Utilities' letter as well

TABLE 2.1
SUMMARY OF RESPONSES TO INITIAL PUBLIC NOTIFICATION

Responding Agency	Addressee	Respondent	Response rec'd by	Level of Interest	Specific Comments
<u>Fronting Property Owners</u>					
510524 Ontario Ltd.	Attn: V. Taillefer				
Nickel District Conservation Authority	A. Bonnis	P.N. Sajatovic	MMM	To participate	The Authority is in the process of proceeding with a major development in proximity to Maley Drive, a development which the Region of Sudbury is aware of.
Resident	Mssrs. Dellelce				
Resident	K. Narozanski				
Resident	M. Gravelle				
Resident	M. Taillefer				
Inco Limited	Attn: Tax Department				
Ontario Hydro	Assessment & Tax Unit				
Dalron Construction Limited					
Cambrian College	Board of Governors	D.F. Mantle	MMM	To be kept informed	The College plans to expand and develop the northern portion of the campus over the long term next to Maley Drive, including planning activity for ingress, egress and/or service routes from Maley Drive.
Bonaventure Dev't Co. Ltd.					
Oasis Co-operative Homes Inc.					
Resident	Mr. & Mrs. F. Parcher				
Resident	Mr. & Mrs. J-P Dion				
Resident	Mr. & Mrs. G. Chartrand				
Resident	H.E. Bertrand				
Resident	Mr. & Mrs. L.E. Doggett				
Resident	Mr. & Mrs. R.W. Belanger				
Resident	H.M. Mansbridge				
Resident	S.T. Narduzzi				
Resident	J.S. Lindquist				
Resident	J. & J. Morrison				
Resident	Mssrs. Tonelli				
Resident	Mr. & Mrs. W. Cayden				
Resident	Mr. & Mrs. G.J. Falcioni				
Resident	Mr. & Mrs. B.E. Martin				
Resident	Mr. & Mrs. L.E. Johnson				
Resident	R. Alary				
Resident	Mr. & Mrs. S.M. Tremblay				
Resident	D. Doucet				
Resident	Mr. & Mrs. S. Chiasson				
Resident	Mr. & Mrs. A.P. Chmilar				
Resident	Mr. & Mrs. R.J. Wylie				
Resident	Mr. & Mrs. J-L Gagnon				
Resident	Mr. & Mrs. J.J. Frescura				
Resident	Mr. & Mrs. D. Coulombe				
Resident	Mr. & Mrs. M.C. Giroux				
Resident	Mr. & Mrs. H.A. Charette				
Resident	Mr. & Mrs. J.M. Marcoux				
Resident	Mr. & Mrs. A.S. Sandhu				
Resident	Mr. & Mrs. U. Oza				
Resident	Mr. & Mrs. Normand D. Bodson				
Resident	Mr. & Mrs. D.M. Duffy				
Resident	Mr. & Mrs. A. Morin				
City of Sudbury					
Resident	Mr. & Mrs. W. Boyle				
Resident	A.F. LaChance				
Resident	Mssrs. Brisebois & Anglehart				

* Recipient of 'Utilities' letter as well

TABLE 2.1
SUMMARY OF RESPONSES TO INITIAL PUBLIC NOTIFICATION

Responding Agency	Addressee	Respondent	Response rec'd by	Level of Interest	Specific Comments
Mervin J. McNamara Inc.					
Rainbow Concrete Investments					
Superior Propane Inc.					
Crothers Properties Ltd.	Attn: N. Getson				
Resident	Mr. & Mrs. J. Pancel				
Resident	Mr. & Mrs. S. McGregor				
Resident	Mr. & Mrs. C. Seguin				
484649 Ontario Ltd.					
Resident	Mr. & Mrs. G. Laurin				
Resident	G. Dubien				
485191 Ontario Ltd.	c/o H. Reise				
Resident	R. Burns				
Resident	R. Valentino				
Resident	C. Linamaa				
Resident	P. Varpio				
Resident	S. Fournier				
Resident	J. Barbeau				
Resident	F. Wilson				
Resident	W. Cutler				
Resident	K. and G. Jones				
Resident	D. Bolton				
Resident	A. Nault				
Resident	E. Chartrand				
Resident	P. Menard				
Resident	R.J. Brisebois				
Resident	V. Green				
Resident	Mr. & Mrs. R. Rochon				
Resident	R. Martel				
Resident	P. Pharand				
Resident	D. Coulombe				
Resident	M. Cayden				
Resident	D. Klein				
Resident	R. Kirkland				
Resident	P. Kennedy				
Resident	J. McLellan				
Resident	J. Armitage				
Ogilvie Holder Gossling Inc.	Attn: S. Gossling				
Resident	J. McInnis				
Resident	A. Savard				
Resident	K. Wagner				
Resident	Mrs. E. Decker				
Adam & Eve Garden Centre	c/o Armand Morin				
Resident	D. Labreche				
Resident	T. Morin				
Resident	J. Dupuis				
Resident	G. Smith				
Resident	R. Gauvreau				
Resident	C.L. Fraser				
Resident	L. McLaughlin				
Resident	S. Huneault				
Resident	P. Figurka				
Resident	H. Beaudry				
Resident	L. Diotte				
Resident	D. Bazinet				

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* Recipient of 'Utilities' letter as well

TABLE 2.1
SUMMARY OF RESPONSES TO INITIAL PUBLIC NOTIFICATION

Responding Agency	Addressee	Respondent	Response rec'd by	Level of Interest	Specific Comments
Resident	H. Uljalehto				
Resident	O. Clouthier				
Resident	A. Lalande				
Resident	G. Waldick				
Resident	M.C. Longlade				
Resident	Mr. & Mrs. B. Charette				
Resident	D. McIntosh				
Resident	Mr. & Mrs. J. Korobu				
Resident	S. Martineau				
Resident	D.A. Dolson				
Resident	G. Plante				
Resident	M. Throssell				
Resident	A. MacInnis				
Resident	R. Monk				
Resident	D. Listmeyer				
Imperial Oil	Attn: J.H. Lodge				
Resident	M. Lavoie				
<u>Others</u>					
Ontario Hydro - H17E22	• R.V. Malvern				
Ontario Hydro	• E. Davidson				
Ontario Hydro	N. Eady				
Sudbury Hydro	• D. Scott	B. Pozza	MMM	To be kept informed	Sudbury Hydro has plant facilities within proposed Maley Drive upgrading and proposed Maley Drive Extension Requests for Sudbury Hydro plant relocation should be directed to their office.
TransCanada Pipelines	• B. Waldon				
Centra Gas Ontario Inc.	• D. Van Dale	P.R. Deredin	MMM	To be kept informed	Any blasting operations require notification to Centra Gas. Two specific pipelines near Turner Ave. and the LaSalle Extension that "we are requesting at this time that the Maley Drive extension design does not force the relocation these transmission lines". 100% of relocation costs borne by road owner. Cannot allow heavy equipment to travel over pipelines in area mentioned above. Earliest that Centra Gas could do relocation work is 1996.
Bell Canada	• G. MacFarlane	G. Flanagan	MMM	To be kept informed	No comments at present time
Northern Cable Holdings Ltd.	• N. Bradley	P. Jokinen	MMM	To be kept informed	No comments at present time
MPP, Sudbury	S. Murdock				
MPP, Sudbury East	S. Martel				
Canadian National Railway	• D. Wilfong	D.A. Reynolds	MMM	To be kept informed	No comments at present time
Canadian National Railway		D. Sutherland	MMM	To be kept informed	- Request that they be provided with further notification and be requested to give input into E.A. Document if railway property could be impacted, and if CN operations could be impacted/have impact on study. - CN Rail expects proponent to identify impacts that may influence railway operation, land or facilities. - Want to be kept appraised of potential impacts on access points accross rail corridor (i.e. additional crossings, etc.)
Inco Ltd.	• B. Jackson	M.J. Decorby	MMM	To be kept informed	Proposal H1: no objections, however requesting deletion of areas from Class E.A. Study. Proposal H2: objections based on violation of reserve area. Proposal H3: no objections, request deletion of areas from Class E.A. Study. Proposal H4: serious concerns re rehab work being within areas requested for deletion from study.
D.B.C. Aggregates	R. Walker				
Unitel Communications Inc.	• H. Nowak				
Cambrian College	• G. Crombie				
Trimac Transportation System		J. Morton	Region of Sudbury		

• Recipient of 'Utilities' letter as well

2.3.2 Area Municipalities

The project team maintained frequent contact with staff of the Engineering Department of the Regional Municipality of Sudbury, to review technical details relating to the assessment of the alternatives and the roadway design.

2.3.3 Nickel District Conservation Authority

The Nickel District Conservation Authority (NDCA) was contacted at the project initiation, in order to obtain data with respect to the Study Area, and to receive NDCA's input with respect to areas of concern.

Environmental data provided by NDCA and MNR was supplemented by information provided by Professor Rod Sein of Laurentian University.

2.3.4 Utilities

A letter providing notification of the study initiation was sent to the utilities. This letter requested the utilities to mark the locations of their infrastructure on an enclosed map.

2.4 Public Participation

2.4.1 Public Notification of Study Initiation

The public was notified of the study initiation by means of an advertisement placed in the Sudbury Star, the local newspaper of record, during the week of December 20, 1993. A copy of the advertisement is shown in Appendix A.

In addition, property owners were notified of the study by correspondence. A copy of the letter is shown in Appendix A.

2.4.2 Public Information Centre

The Public Information Centre was held on Monday, June 27, 1994, from 4:00 p.m. to 8:30 p.m. at the LaSalle Secondary School amphitheatre. The notification for the information session was placed in the Sudbury Star one week before the date of the meeting. The handout which was provided at the meeting, summarizing the display boards, is provided in Appendix A.

Approximately 50 residents attended the information session.

2.4.3 Public Comments

Sixteen comment sheets were received at or following the Public Information Centre. Copies of the comment sheets are included in Appendix A.

A summary of the comments received is presented in Table 2.2. Overall, most of the comments were in favour of the Maley Drive Extension, for reasons which include improvement in traffic flow on existing streets in the area, the need for additional traffic capacity, and reduction in noise impacts for residents.

One resident expressed a concern related to the noise impacts of the increased traffic on Maley Drive near the existing intersection with Lansing Avenue. Two respondents noted that the current noise levels resulting from trucks "up-shifting" and "down-shifting" is very aggravating at late hours. Even though these residents do not object to the Maley Drive Extension, they do wish to see noise mitigation methods employed.

Only one of the respondents expressed a concern regarding the natural environment. The concern is in regards to the woodland and watershed area in the vicinity of the proposed alignment of Maley Drive between Notre Dame Avenue and Barry Downe Road. This respondent also raised a concern with respect to the study process. The complete correspondence relating to this issue is provided in Appendix A.

Three .of the respondents were in favour of an accelerated construction timing to help reduce the number of heavy trucks using LaSalle Boulevard. It was noted that the Maley Drive Extension would be likely to have a positive effect on the businesses adjacent to Lasalle Boulevard.

One additional issue brought forward by a resident is the need to preserve access to the existing snowmobile trails leading from Drummond Avenue to the "Sudbury Trails Plan". The Sudbury Trails Plan is a set of trails under the management of an association of eight clubs in the Sudbury region. This association manages approximately 1,200 kilometres of groomed and signed inter-city snowmobile trails that connect Sudbury to Temagami, North Bay, Sault Ste. Marie, French River and Timmins.

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TABLE 2.2
INPUT RECEIVED AT THE PUBLIC INFORMATION CENTRE

RESPONDENT (Association)	COMMENTS/CONCERNS								
	SUPPORTS THE MALEY DRIVE EXTENSION	MINIMAL OR NO CONCERNS RE: THE NATURAL ENVIRONMENT	CONCERNS RE: THE NATURAL ENVIRONMENT	REDUCES NOISE ON EXISTING ROADS	CONCERNS RE: NOISE IMPACTS ON RESIDENTIAL AREAS	IMPROVES OVERALL TRAFFIC FLOW	PREFERRED OPTION IMPROVES CONDITIONS ON LASALLE BLVD AND OTHER STREETS	ACCELERATED CONSTRUCTION TIMING REQUESTED	OTHER COMMENTS
A	✓	✓				✓		✓	
B									• Request for further information
C	✓	✓							• Stage construction to maximize available road use • Extension will have no effect on existing communities • Suggests restricting trucks on Lasalle Blvd until construction is complete
D									• Concern: proposed further widening of Barry Downe Rd may impact on land owner's privacy berm
E		✓		✓		✓			• Noise and traffic will be redistributed • Study should look at an extension option of Barry Downe Rd northerly to Hanmer • Would like to see improved access to communities from Lasalle Blvd
F	✓							✓	• Businesses on Lasalle Blvd suffer due to traffic congestion now • Slurry trucks impacted on Lasalle Blvd now
G									• Concern: snowmobile links from north New Sudbury to the Sudbury Trail Plan
H	✓			✓		✓	✓		• Woodbine is currently used to by-pass signals on Lasalle Blvd; concern re: speeding and traffic infiltration • Suggests some land be reserved for a park along Maley Drive • Outlying communities (Skead and Garson) and Falconbridge should share costs
I	✓	✓		✓		✓		✓	• Preferred option may reduce heavy truck volumes on Lasalle Blvd • Preserve natural habitats

TABLE 2.2
INPUT RECEIVED AT THE PUBLIC INFORMATION CENTRE

RESPONDENT (Association)	COMMENTS/CONCERNS								
	SUPPORTS THE MALEY DRIVE EXTENSION	MINIMAL OR NO CONCERNS RE: THE NATURAL ENVIRONMENT	CONCERNS RE: THE NATURAL ENVIRONMENT	REDUCES NOISE ON EXISTING ROADS	CONCERNS RE: NOISE IMPACTS ON RESIDENTIAL AREAS	IMPROVES OVERALL TRAFFIC FLOW	PREFERRED OPTION IMPROVES CONDITIONS ON LASALLE BLVD AND OTHER STREETS	ACCELERATED CONSTRUCTION TIMING REQUESTED	OTHER COMMENTS
J	✓	✓							• Outlying communities (Skead and Garson) and Falconbridge should share costs • Suggests some land north of Maley Drive to be reserved for a park
K	✓	✓				✓	✓		• Costs should be shared with Falconbridge • Minimize destruction of natural environment and streams • Maley will reduce traffic on Woodbine Ave and Grandview Ave (speed enforcement needed now)
L					✓				• Suggests implementation of noise mitigation measures
M					✓				• Traffic will increase in the area resulting in greater risk to children • Suggests implementation of noise mitigation measures
N					✓	✓	✓		• Suggests minimizing number of signalized intersections • Suggests incorporating bicycle paths
O (NDCA) *	✓								• No adverse impacts to Maley and Nickeldale Reservoirs
P			✓		✓				• Concern re: natural environment south of Hydro corridor (trees and watershed) • Concern re: traffic projections • Alternatives preferred: more northerly bypass and a road south of LaSalle • Concern re: study process - format of public information centre - assessment of alternatives to the undertaking

* Nickel District Conservation Authority

3. EXISTING CONDITIONS

This chapter documents the existing environmental conditions in the study area. Components of the environment which are addressed include the natural, social and cultural environments. Other topics which are also addressed include noise and transportation conditions. The **needs assessment** for the project is documented in Section 3.3, together with the discussion of transportation conditions.

3.1 Natural Environment

Existing natural environment conditions have been documented, including environmentally significant areas, physiography and topography, geotechnical conditions, water resources, vegetation, wetlands, fisheries and wildlife. Definitions of technical terms are provided in Appendix D - Glossary.

3.1.1 - Environmentally Significant Areas

No Environmentally Significant Areas, Areas of Natural and Scientific Interest or Provincially Significant Wetlands are located within the study corridor. However, wetlands and watercourses along the route should be considered as areas sensitive to proposed development.

3.1.2 - Physiography and Topography

The physiography of the Sudbury area is dominated by the Canadian Shield. Generally, the area is approximately 300 m above mean sea level. Bedrock is predominantly exposed and is composed of belts of greenstone and metamorphosed sediments. Glacial deposits composed of shallow, sandy tills are also present within the region (Geological Survey of Canada, 1989).

The surface topography is characterized by a rounded landscape of low hills and ridges. On-site geotechnical investigations have identified rock outcrops, low-lying wetlands, and areas with shallow overburden conditions (Trow Consulting Engineers Ltd., 1994).

3.1.3 - Geotechnical Assessment

A preliminary geotechnical assessment of the Maley Drive Extension corridor was carried out by Trow Consulting Engineers Ltd. (1994). This report is reproduced in Appendix B. Initial field investigations identified several terrain features along the study corridor. Several borehole locations were then selected to provide additional data on the geotechnical conditions.

Along the existing Maley Drive road allowance, the soil profile consists of an upper thin layer of compact, brown, sandy silt overlying a stiff, brown, silty clay deposit. Bedrock may be found within 4 m of grade. Surficial peat deposits may also be found in localized areas.

The proposed western extension of Maley Drive would be constructed, for the most part, on metamorphosed sedimentary bedrock. Areas of overburden are present, particularly at the east end of the extension, adjacent to Barry Downe Road. This overburden consists of stiff, brown, silty clay. Surficial peat deposits may be found in localized, poorly drained areas.

Geotechnical investigations indicate that overburden and bedrock along the study corridor are suitable for road construction.

3.1.4 - Water Resources

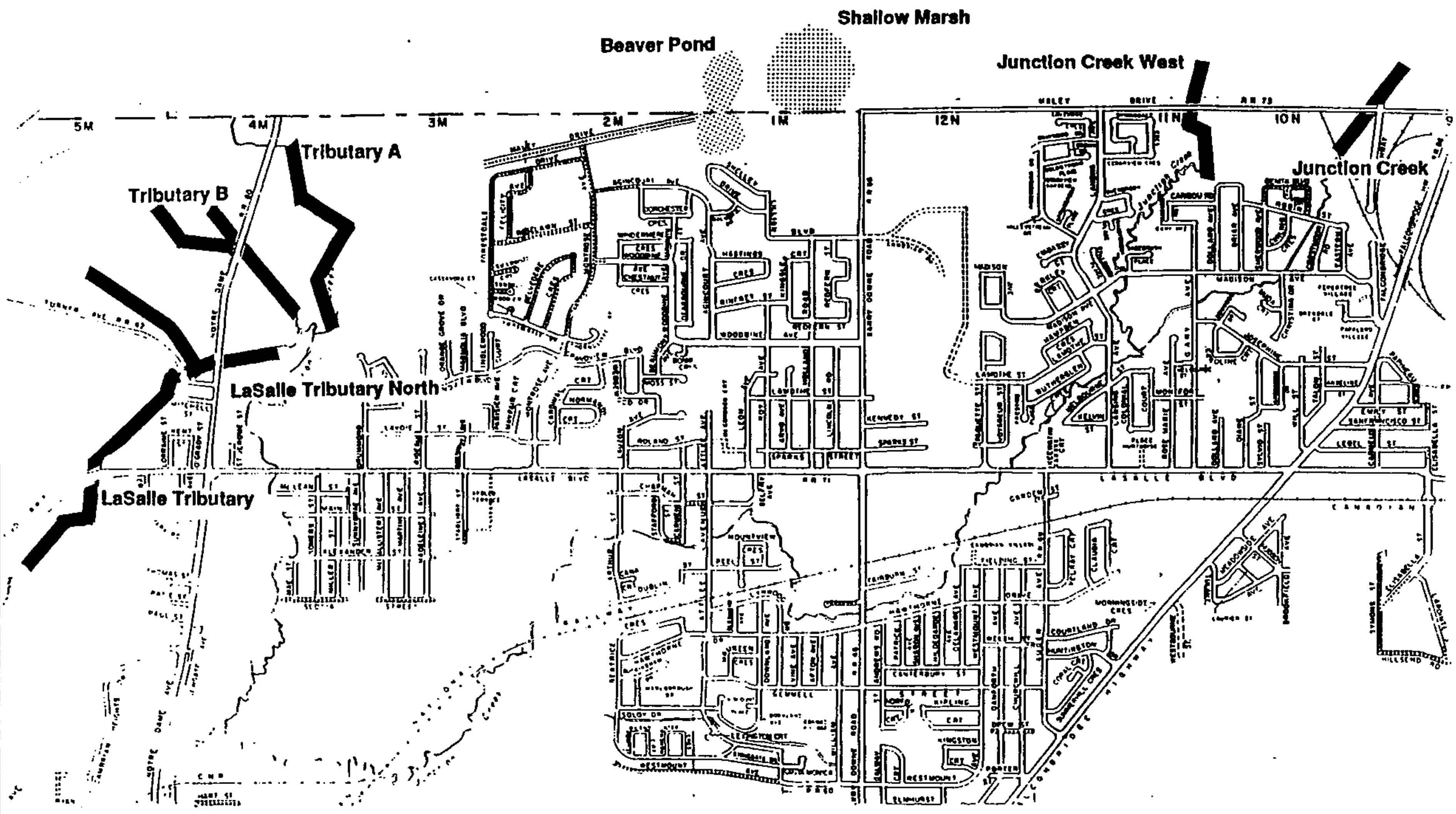
Eight water crossings have been identified along the study corridor. Water crossings include watercourses and wetlands.

Watercourses along the corridor are located within the Kelley Lake watershed, as shown in Figure 3.1, and in Plates F1 through F6, located in Appendix F (Volume II of the report). These exhibit a variety of morphological characteristics (see Section 3.1.7). Three watercourses (Tributary A, Tributary B and the LaSalle Tributary) flow into the Nickledale Reservoir located immediately south of the proposed Maley Drive Extension. In general, they are small in scale and support, where present, degraded warmwater fish communities. Habitat degradation has occurred through transportation corridor construction and beaver activity.

Most wetlands along the study corridor are riverine in character. Beaver activity along watercourses has created and/or expanded riverine wetland systems in the area. Several small palustrine wetlands are also located within, and adjacent to, the corridor.

3.1.5 - Vegetation

As is typical of much of the Sudbury area, the vegetation is presently regenerating after the near total denudation of the landscape. The vegetation found in the study area is controlled by the surrounding topography, depth of soil and drainage. The shallow soils and dry conditions in the upland and slope areas support a cover of mostly ericaceous shrubs with sparse tree cover, while the lowland areas have a more developed vegetation community with areas of full tree cover and a more diverse ground and understory cover. There are some pockets of relict vegetation which appear to have remained untouched by pollution impacts.



Marshall
Macklin
Monaghan

CONSULTING ENGINEERS • SURVEYORS • PLANNERS

FIGURE 3.1
WATER CROSSINGS

Maley Drive Extension Class Environmental Assessment

The following is a description of the plant communities found in the study area.

The inventory was based on a vegetation survey was carried out during the week of May 30 to June 3, 1994. The locations of the plant communities are shown in Plates F1 through F6, which are located in Appendix F.

Beaver Pond Marsh

This community is located approximately one kilometre west of Barry Downe Road at the end of the Maley Drive unopened road allowance. The community is an extensive shallow water marsh which contains a limited cover of wetland vegetation in the shallows and along the shoreline.

The pond is maintained by a series of beaver dams along the length of the depression, and is controlled overall by the shallow underlying bedrock surrounding the pond. A newly created dam (1994) at the south end will increase the areal extent of open water in the near future.

This community contained a border of bebb's willow (*Salix bebbiana*) and short white birch (*Betula papyrifera*). Sporadic, low shrub cover of sheep's laurel (*Kalmia angustifolia*), Labrador tea (*Ledum groenlandicum*) and velvet-leaved blueberry (*Vaccinium myrtilloides*) is found. Herbaceous ground cover is limited due to the dominant rock surface (berm and outcrop) surrounding the pond.

Sweet flag (*Calla palustris*) and fowl manna grass (*Glyceria striata*) provides the shallow shoreline vegetation.

Shallow Marsh

The shallow marsh community is located immediately on the north side of the Maley Drive unopened road allowance approximately 200 m west of Barry Downe Road. This wetland community is a depressional area between the road allowance and the high ridge immediately to the north.

Vegetation in this community includes the shoreline cover of bebb's willow, slender willow (*Salix petiolaris*) and speckled alder (*Alnus rugosa*). A dense cover of sedge (*Carex* cf. *aquatilis*) was emerging throughout the marsh during the visit. It is likely that this habitat becomes dry during the year.

Riparian Stream

The riparian stream community is a narrow band of hydric vegetation located on the bank and water's edge of the small, upland watercourses that are bedrock controlled.

The dominant vegetation is a low shrub cover of dwarf birch (*Betula pumila*), sheep laurel, velvet-leaved blueberry, lowbush blueberry (*Vaccinium angustifolium*), leatherleaf (*Chamaedaphne calyculata*) and tufted hairgrass (*Deschampsia Cespitosa*) located at the top of the streambank. Species such as sedge (*C. aquatilis*) and horsetail (*Equisetum palustre*) are found in the streambed. Where the gradient is flat and the watercourse widens, pockets of emergent common cattail (*Typha latifolia*) and bluejoint (*Calamagrostis canadensis*) are sometimes found.

Wet Shrub Thicket

This community is found in the wet depressional areas in flat gradient areas. It has the greatest cover immediately east and west of Barry Downe Road, south of Maley Drive. The community is dominated by a dense shrub cover of willow and speckled alder. Reed canary grass (*Phalaris arundinacea*) and sedge (*C. aquatilis*) provides complete ground cover.

Shrub-Sedge Meadow

This community is found adjacent to the two main watercourses in the study corridor: Junction Creek and the Lasalle Tributary. This community is found in the floodplain of the watercourse and does receive local surface runoff which keeps the site moist to wet, supporting wetland type vegetation.

The shrub cover ranges from 10 percent to 30 percent cover. It includes speckled alder, bebb's willow, pussy willow (*Salix discolor*), and slender willow. Ground cover is mostly sedge and tussock grass cover with limited cover of common cattail. Herbaceous ground cover was not observed at the time of the survey.

Poplar-Birch Woodland

This community consists of developing forest cover, found in gently sloping valleyland habitats. The woodland is young (10 to 20 years old) and the canopy cover ranges from 40 percent to 70 percent closed. Species richness is positively correlated with extent of canopy cover.

Canopy species are trembling aspen (*Populus tremuloides*) and white birch, with a small percentage of balsam poplar (*Populus balsamifera*) and red maple (*Acer rubrum*). Shrub cover includes young trembling aspen and white birch, red raspberry (*Rubus idaeus*), fly honeysuckle (*Diervilla lonicera*), blueberry (*V. angustifolium, myrtilloides*) and red-berried elder (*Sambucus pubens*). Dominant ground cover consists of large-leaved aster

(*Aster macrophyllus*), wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), dwarf raspberry (*Rubus pubescens*) and common trillium (*Trillium grandiflorum*).

Poplar-Field

The poplar-field community is found primarily in upland sites along Maley Drive where cleared land has been abandoned and the dominant field habitat is being colonized by poplar saplings. Common species of open dry habitats are found in this community and include species such as dandelion (*Taraxacum officinale*), bluegrass (*Poa* sp.), brome grass (*Bromus inermis*) and Queen Anne's lace (*Daucus carota*).

Dry Shrub Thicket

The dry shrub thicket is found at the northeast quadrant of the intersection of Barry Downe Road at Maley Drive. It is dominated by an open canopy, dense cover of 2 m to 3 m tall balsam poplar, trembling aspen and white birch saplings. Bebb's willow, reticulate willow (*Salix reticulata*), sheep laurel, blueberry and buffaloberry (*Shepherdia canadensis*) are the woody plants found in the understory. Ground cover is limited to less than 20 percent cover, and includes species such as common strawberry (*Fragaria virginiana*) and trailing arbutus (*Epigaea repens*).

White Birch Heathland

The white birch heathland is the dominant plant community which covers approximately 50 percent of the study corridor. The community is found in gently sloping areas throughout but is also invading the bedrock outcrop areas and lowland depressional sites.

Canopy cover is open and is dominated by white birch. A dense, low cover of ericaceous shrubs is also typical of this community. The shrub cover is mostly sheep laurel but also includes the two blueberry species (previously mentioned), leatherleaf, dwarf birch, Labrador tea and sweet-fern (*Comptonia peregrina*). The ground cover is limited due to the dominant shrub cover. However, this community has a dominant ground cover of the haircap moss (*Polytrichum commune*), bracken (*Pteridium aquilinum*) and trailing arbutus.

Red Oak-Heath Woodland

This community is found along the slopes of many of the outcrops within the study corridor. The largest areal coverage of this community was found toward the west end of the corridor north of LaSalle Boulevard and west of Notre Dame Avenue. It is also found in small local pockets throughout the corridor.

Generally, the forest canopy ranges from 50 percent to 75 percent closed under a canopy height of 3 m to 5 m. Red maple, trembling aspen and white birch are also present. Shrub cover ranges from 5 percent to 15 percent, and includes pussy willow, blueberry, sweet-fern and Labrador tea. Ground cover is sporadic and ranges from 10 percent to 25 percent. Some of the common species include bracken fern, bluegrass, haircap moss and tufted hairgrass.

Heath Barrens

A heath barrens community is identical to the white birch heathland community, but without the white birch or other sapling cover. Cover and composition of shrubs and herbs are similar. This community is found in only one location in the corridor.

Rock Barrens

The rock barrens community contains a significant cover of exposed bedrock. This community is found primarily toward the north edge of the corridor but is found locally throughout. Vegetation cover is found in the voids between the outcrops where soil has developed. Sapling cover is uncommon and shrub cover ranges from 0 percent to 20 percent and is dominated by the blueberry species. Due to the dry soil conditions, ground cover is reduced to clumps of haircap moss and *Deschampsia.*

Man-Centred Vegetation

This community represents the vegetative cover associated with the residential/commercial/industrial land use within the corridor. The main vegetation cover is managed grass embankments and planted trees and shrubs along the road right-of-ways and hydro transmission corridors.

3.1.6 - Wetlands

Most wetlands along the study corridor are riverine in character. Several small palustrine wetlands are also located along the corridor. Drainage and depressional storage along the alignment are largely controlled by the bedrock physiography of the surrounding area. Beaver activity along the watercourses has created and/or expanded riverine wetland systems in the area.

A number of plant community types are associated with wetlands along the preferred alignment. These include: beaver pond, shallow marsh, wet shrub thicket, riparian stream, and shrub-sedge meadow. Poplar-birch communities represent a transitional zone between wetlands and upland communities.

Fisheries associated with these wetlands are typical of degraded warmwater fish communities. Habitat degradation has occurred due to transportation corridor construction and beaver activity.

Wetlands along the study corridor provide important breeding, nursery, and adult habitat for herpetofaunal species in the area.

The larger watercourses (Junction Creek/Junction Creek east tributary), beaver pond and shallow marsh provide habitat for a number of bird species, including: common yellowthroat, bank swallow, belted kingfisher, red-winged blackbird, common snipe, mallard and American bittern.

Beavers exert a strong control over the areal extent of wetlands along the preferred alignment. Active dams create large, marshy wetland areas. As food supplies dwindle, beavers vacate the area, moving to areas of greater forage availability. As the dams fall into disrepair, their associated impoundments begin to drain, and wetlands convert to a drier, meadow community.

3.1.7 - Fisheries

3.1.7.1 - Methodology

Eight present and/or potential water crossings were identified within the study corridor from base maps. These are shown in Figure 3.1. At each site, field investigations were conducted to assess aquatic and terrestrial habitat along the watercourses. The fish community, where present, was qualitatively sampled using back-pack electrofishing equipment and dip nets. A scientific collection permit was obtained from the Ontario Ministry of Natural Resources (OMNR) prior to sampling. Photographic documentation was included as a component of the assessment.

Fish habitat and fish community surveys were conducted during the week of May 30 to June 3, 1994.

3.1.7.2 - Existing Fish Habitat and Fish Communities

Junction Creek

Junction Creek represents the eastern limit of water crossings within the study corridor. It crosses the existing Maley Drive allowance east of National Street. The creek passes under the existing road through a double culvert (1 m X 0.85 m). Stream habitat was assessed in the stretch extending 200 m downstream and 50 m upstream of the culvert.

Junction Creek is characterized by a meandering channel, which varies in wet width from 2 to 3 m. Morphology is generally dominated by a series of flats, indicating low gradient. Immediately below the culvert, however, gradient is moderately high due to channel alteration, and riffle sequences predominate. Bankfull width varies from 2 to 7.8 m with lateral wetlands present along the watercourse. Average stream depth is approximately 22 cm. A maximum depth of 62 cm was recorded in one pool. Bank erosion is generally moderate, where present. The substrate immediately below the culvert consists of gravel washed down from the road allowance. Otherwise, the substrate is composed of organic muck with a thin overlay of silt. Aquatic vegetation is generally absent; however, near the downstream limit of the stretch, pondweed (*Potamogeton pectinatus*) provides instream cover. Backflooding is indicated upstream of the railway culvert at the downstream boundary of the study reach.

Riparian vegetation provides little overhead cover, consisting of grasses, sedge (*Carex rostrata*), impatiens, jewelweed and field herbs as well as small pockets of cattails (*Typha* sp.). Copses of poplar and willow are located well back from the watercourse. Evidence of historical beaver activity was observed. There are small, scattered side channels entering the system from seepage and from adjacent developments.

The following fish species were collected through electrofishing: white suckers (*Catostomus commersoni*), central mudminnows (*Umbra limi*), common shiners (*Notropis cornutus*), and brook sticklebacks (*Culaea inconstans*). This species assemblage is indicative of a degraded warmwater system.

Junction Creek West

Junction Creek West crosses the existing Maley Drive west of the Ontario Hydro Martindale transformer station. The creek passes under the existing road through a large box culvert (2.4 m X 3.6 m). Stream habitat was assessed in the stretch extending 200 m downstream and 100 m upstream of the box culvert.

Junction Creek West has been impacted by historical beaver activity. A network of abandoned beaver dams, lodges and woody debris lines the watercourse downstream of Maley Drive. Bank erosion is moderate to severe with extensive bank slumping and exposed banks.

The gradient is generally low, with the channel exhibiting a deep flat/run/pool morphology. Seepage and side channels provide additional flow to the system. A water taking pump and hose operation is located 50 m downstream of Maley Road. The substrate is composed of a mix of sandy clay, gravel and detritus. Bladderwort (*Utricularia vulgaris*) and milfoil (*Myriophyllum exalbescens*) are present in small quantities throughout the watercourse.

Average wet width and bankfull width are approximately 3.3 m and 6.3 m respectively. Average depth is approximately 60 cm with a depth over 1.5 m observed in one pool.

Upstream of the road allowance, the watercourse has been altered by historical beaver activity. Large areas have been flooded with significant die-off of willows, alders and other ground cover. Grasses and sedges have invaded these areas. A recent breach in the dam (now inactive) has lowered water levels, exposing clay flats.

An open white birch heath lies to the east of the water crossing. Riparian habitat downstream of the culvert is characterized by Labrador tea (*Ledum groenlandicum*), sheep laurel (*Kalmia angustifolia*), and lowbush blueberry (*V. angustifolium*). Localized areas of grass and exposed peat are also present.

The following fish species were collected through electrofishing: central mudminnows, northern redbelly dace (*Phoxinus eos*), and brook sticklebacks. This species assemblage is indicative of a degraded warmwater system.

Beaver Pond

This active beaver pond complex crosses the proposed Maley Drive allowance west of Barry Downe Road. The south end of the pond was assessed.

The pond is relatively large, containing a beaver lodge replete with a pair of active beavers. Shoreline substrate is composed of sand with some areas of rock and organic debris. Bedrock outcrops and shattered rock provides fish habitat within the pond complex. Aquatic vegetation is composed of sedges. A white birch/trembling aspen scrub system forms the riparian zone.

The following fish species were collected through electrofishing: fathead minnows (*Pimephales notatus*), lake chub (*Couesius plumbeus*), and one central mudminnow (*Umbra limi*). This species assemblage is indicative of a degraded warmwater system.

Tributary A

Tributary A crosses the proposed Maley Drive allowance before flowing into the reservoir. Stream habitat was assessed from the reservoir to a point 200 m upstream.

The upstream portion of the study area is characterized by low gradient and a run/riffle channel morphology. Substrate is dominated by clay. Woody debris and cobbles are common in riffle areas. Downstream, stream gradient increases markedly with the watercourse falling in a series of short steps toward the reservoir. In this section, bedrock and boulders dominate the substrate. Moderate bank erosion was observed along portions of the streambank unprotected by bedrock. Gradient gradually decreases toward the reservoir with clay again predominating as substrate.

Average wet width is approximately 4.1 m. Average depth is approximately 25 cm with a depth over 44 cm observed in one pool.

Trembling aspen, white birch and Labrador Tea are found scattered throughout the riparian zone, however, much of the area is relatively barren. Sedges and horsetail are found within the stream channel.

No fish species were observed during the field investigation.

Tributary B

Tributary B runs parallel to the west of Tributary A before flowing into the reservoir. It crosses the existing Notre Dame Avenue road allowance 500 m north-east of Turner Street. The tributary flows through a small concrete culvert (120 cm X 110 cm) at Notre Dame Avenue. The watercourse was assessed from a point 200 m downstream of the proposed Maley Drive alignment upstream to where it abuts the mine tailing escarpment.

The creek channel lacks definition from the tailing escarpment to a point 150 m upstream of the present road crossing. Substrate is composed of leaf litter and macrophyte root systems. Channel definition emerges as a minor tributary enters the creek from the west. A red stain was evident within this tributary. Below the confluence, substrate composition changes to cobbles and gravel with a silt overlay. Sedges and horsetail were observed within the watercourse. Upstream of the culvert, a debris jam hinders waterflow.

The watercourse drops sharply (4 to 6 m) downstream of the culvert. Waterflow runs beneath a mass of boulders before re-emerging as a channel with riffle/pool morphology. Substrate is primarily composed of bedrock within 100 m downstream of the culvert. The riparian zone is generally barren rock with the exception of some hardy shrubs. Downstream, sand and silt become predominant as substrate. At this point, white birch approach the watercourse, providing overhead cover and shading. As the creek approaches the reservoir, gradient drops and channel morphology is typified by shallow flats and clay substrate.

No fish species were observed during the field investigations.

LaSalle Tributary (upstream)

This portion of the LaSalle tributary was assessed from the stream crossing at LaSalle

Boulevard upstream past the remnants of an old beaver dam. The total length of the assessed stretch was approximately 200 m.

Above the remnants of the beaver dam, the watercourse exhibits a low gradient, flat morphology with channel widths of 2 to 3 m. Average depth is approximately 25 cm with substrate composed of a clay/organic mix. Woody debris from former beaver activity is present within the channel. A minor tributary enters the watercourse in this area. A large bulrush/sedge area dominates the riparian zone. Surrounding upland areas are vegetated with alders, aspen and birch interspersed with bedrock outcrops.

An increase in gradient was observed below the beaver dam with the watercourse assuming a riffle/run morphology. Channel form averages 50 cm in width and 18 cm in depth. Substrate is composed of hard clay. Sedges dominate the riparian zone adjacent to the creek.

Immediately upstream of LaSalle Boulevard, stream gradient decreases and stream form is dominated by flats. Within the watercourse, channel width averages 2 m and an average depth of 43 cm was observed. Substrate is organic in nature with intrusive sedge root systems also present. The riparian zone is dominated by sedges.

No fish species were observed during the field investigation.

LaSalle Tributary (downstream)

The downstream section of the LaSalle tributary was assessed from LaSalle Boulevard downstream to a point 60 m below Notre Dame Avenue, where the tributary flows into the reservoir. The total length of the assessed stretch was approximately 450 m.

The upstream portion of the watercourse is characterized by a narrow channel of moderate depth. Flooded sedges were observed along the banks of the tributary. Substrate is composed of dark clay with a thick overlay of detritus. Gradient is low.

An increase in gradient was observed in the middle portion of the stretch with runs and riffles typifying the stream morphology. The substrate is composed of cobbles and large gravel.

Downstream, toward the reservoir, the stream gradient decreases slightly and channel widths increase. Concomitant with these physical changes, the substrate becomes finer, dominated by smaller gravels and coarse sand. The remnants of illegal dumping were observed on either side of the Notre Dame Avenue culvert.

No fish species were observed during the field investigation.

LaSalle Tributary North

This watercourse enters the LaSalle tributary from the north-west, flowing between Turner Street and Notre Dame Avenue. It crosses the proposed Maley Drive allowance before entering the Lasalle tributary.

The stream exhibits a relatively high gradient throughout its length. Stream morphology consists of riffle/deep pool sequences over bedrock and downed trees. Riparian vegetation includes Labrador tea, shrubby birches, white birch and trembling aspen. Ground cover is made up of dry grasses and mosses. The downstream portion of tributary tends to be somewhat wider with sedges dominating the riparian zone.

No fish species were observed during the field investigation.

3.1.8 - Wildlife

Due to the degraded landscape within the study corridor the quality and diversity of wildlife habitat and community is considered low. With increased vegetative cover of the area, the quality of habitat would be expected to improve.

3.1.8.1 - Mammals

The study corridor provides habitat for mammal species which are associated with near urban environments but also supports species which are more typically associated with habitats of greater isolation from the human environment.

Some of the species recorded from the corridor included American black bear, eastern chipmunk, raccoon, porcupine, beaver, red fox and wolf. The black bear is found in close proximity to the urban area. The abundance of blueberry, a favoured food source, is likely an important attraction to this area. Porcupine are not abundant due to the limited tree cover, and in particular, the scarcity of coniferous tree cover.

3.1.8.2 - Birds

Bird species occupy a number of habitats in the study corridor.

The larger watercourses, beaver ponds and shallow marshes provide habitat for common yellowthroat, bank swallow, belted kingfisher, red-winged blackbird, common snipe, mallard and American bittern.

The upland, terrestrial sites support a wide variety of bird species. The mosaic of open woodland and poplar/birch copses provide habitat for the migrating warblers (black and white, chestnut-sided, nashville, Wilson's, American redstart), least flycatcher, American goldfinch, cowbird and cedar waxwing.

Closed canopy sites including the birch/poplar woodlands and red oak heathlands provide habitat for more secretive species and those that require a greater canopy cover. These species include red-eyed vireo, hermit thrush, veery, blue jay, whip-poor-will and ruffed grouse.

3.1.8.3 - Herpetofauna

The following herpetofaunal species were observed (sightings, vocalizations) along the study corridor: wood frog, leopard frog, green frog, spring peeper.

The shallow marsh community located immediately on the north side of the Maley Drive unopened road allowance, approximately 200 m west of Barry Downe Road, has a significant herpetofaunal association. It provides suitable habitat for all life stages of herpetofauna found along the study corridor.

3.1.9 - Significant Species

No significant plant or animal species were observed along the study corridor.

3.2 Social and Cultural Environment

3.2.1 - Agricultural Resources

Physiography, topography and drainage along the preferred alignment are not conducive to agricultural activities along the study corridor. No agricultural resources will be impacted through the project construction within the corridor.

3.2.2 - Community Concerns

Community concerns in the Study Area relate to three primary factors:

- Traffic conditions;
- Environmental impacts on the regenerating natural areas on the City's outskirts; and
- Noise impacts.

This assertion is based on input received during the public consultation processes for the Sudbury Regional Transportation Study and for the subject study.

Traffic concerns relate to operations on LaSalle Boulevard, particularly the impact of large trucks and the high volumes of autos and trucks which use LaSalle.

3.2.3 - Land Use and Development

The existing land use in the Study Area is shown in Figure 3.2.

Along the existing section of Maley Drive from Falconbridge Highway west to the Junction Creek floodplain, the land use is Light Industrial. To the west of the industrial area is land zoned "Conservation Area" around the east branch of Junction Creek. This is bordered on the west by residential development, the majority of which is low density. There is one pocket of high density residential development, west of Lansing Avenue. In the southeastern quadrant of the Maley Drive/Barry Downe Road intersection, the land is zoned Institutional; the Cambrian College campus is located here. North of Maley Drive, there is some industrial and residential development to the west of Falconbridge Highway. West of this area, the land is largely undeveloped. There are plans to develop a golf course along the north side of Maley Drive between Junction Creek and Barry Downe Road.

West of Barry Downe Road along the proposed Maley Drive corridor, the land is a mixture of open space and residentially-zoned land. Two Ontario Hydro corridors cross this area from southwest to northeast, meeting Notre Dame Avenue approximately halfway between LaSalle Boulevard and the City of Sudbury northern boundary.

The area between Maley Drive and LaSalle Boulevard, from Falconbridge Highway to Barry Downe Road, is primarily low density residential. The lands fronting on the north side of LaSalle Boulevard in this section are a mixture of mixed-use commercial and medium density residential. The south side of LaSalle Boulevard from Falconbridge Highway to the east branch of Junction Creek consists of mixed-use light industrial/service commercial development. West of Junction Creek, and bordering Barry Downe Road on the east and west, is a large General Commercial district: the western portion is the site of the New Sudbury Centre shopping mall.

The remainder of LaSalle Boulevard west to Notre Dame Avenue is generally fronted by Linear Mixed Use and medium density residential uses, with low density residential behind. There is one open space area just east of Notre Dame Avenue, on the north side, where the west branch of Junction Creek crosses LaSalle.

West of the Notre Dame Avenue intersection, the development along LaSalle consists of a small amount of low density residential, bordered on the west by open space. There is one institutional block on the south side, the site of LaSalle Secondary School. North of the Hydro corridor is a large area zoned for Mining: this is the Frood Mine site.

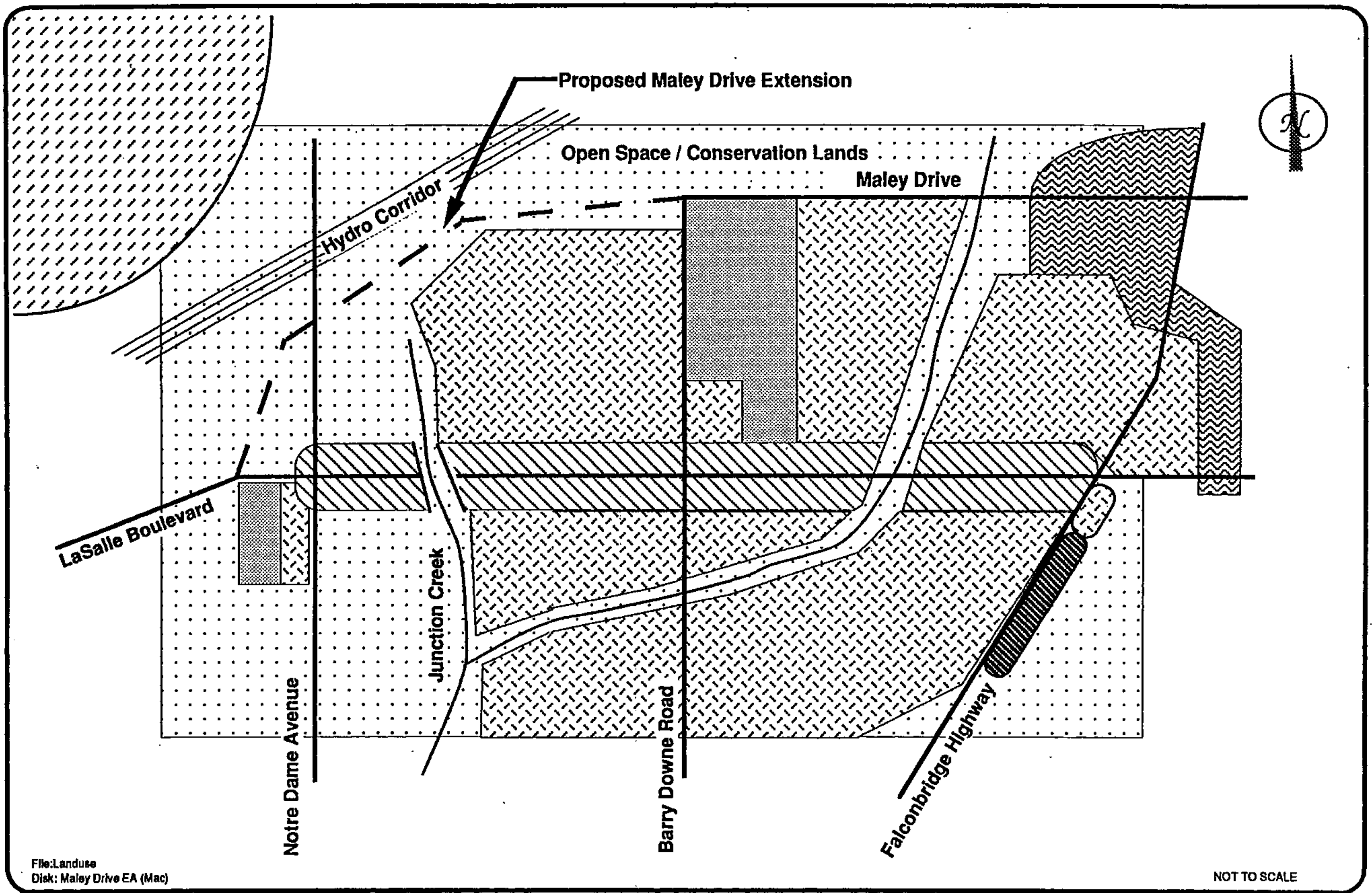


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FIGURE 3.2
EXISTING LAND USE PLAN

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3.2.4 - Utilities

Several utility companies were contacted and requested to identify their existing plants on the plans provided. The following utilities had plants located in the study area.

INCO

There is a 69 KV INCO transmission line running from the abandoned CN spur line between Falconbridge Highway and Old Falconbridge Road, westerly along the north side of existing Maley Drive and beyond the study area. This transmission line is scheduled to be replaced in the next several years and will be relocated to the north side of proposed Maley Drive 60 m right of way.

Centra Gas

There are 200 mm and 300 mm transmission pipelines located near Turner Avenue and the LaSalle Extension and are not to be relocated. These pipelines are illustrated on Plates 1 through 3. Centra Gas stipulates the following:

- Notification prior to any blasting operations in vicinity of their plant;
- Heavy equipment cannot travel over the above noted pipelines; and
- If the proposed Maley Drive intersects any of the pipelines mentioned above, these pipelines must be realigned to intersect the new road at 90 degrees and encased with a steel sleeve.

Ontario Hydro

High and low intensity transmission lines/towers are located on the high rock ridge north of LaSalle Boulevard easterly to Notre Dame Avenue, continuing northeast to beyond the study area. These transmission lines are illustrated on plates 1-4.

Also, Ontario hydro shares their pole lines with Sudbury Hydro on the south side of existing Maley Drive from Barry Downe Road to Falconbridge Highway. Martindale transformer station is located on the south side of existing Maley Drive just west of National Street. There are one, two and three pole lines running from the Martindale transformer station, crossing existing Maley Drive and running easterly. These transmission lines are illustrated on plates 5-7.

CN North America

There is currently one north south line with an at grade crossing at existing Maley Drive just west of National Street.

Bell Canada

There are fibre optic cables, aerial lines, and underground Bell ducts on the south side of existing Maley Drive between Barry Downe Road and Falconbridge Highway. Bell has no plans to relocate these lines.

3.2.5 - Heritage and Archaeological Concerns

Discussions with Doctor Ken Buchanan (Sociology and Anthropology Department, Laurentian University) indicate that no heritage or archaeological surveys have been carried out in the Maley Drive Extension corridor.

Approximately 4,500 years ago, a shoreline beach was present in the general area. Artifacts may be present, particularly in areas adjacent to watercourses in combination with beach remnant sand overburden.

Geotechnical and environmental investigations have not revealed any obvious remnant beaches along watercourses within the preferred route corridor. However, route specific archaeological surveys of the proposed alignment are recommended prior to construction.

3.2.6 - Noise

The Study Area and Surrounding Land Uses

The study area is 7.3 kilometres long, including the existing section of Maley Drive between Barry Downe Road and Falconbridge Highway, and the Maley Drive right-of-way west of Barry Downe Road, extending to the LaSalle Boulevard Extension.

The land uses along the Maley Drive study corridor typically consist of residential lands, with a number of commercial uses located between Old Falconbridge Highway and Falconbridge Highway.

Ten single family residential dwelling units were identified as being potential worst case noise sensitive areas (NSA's) along the existing and proposed Maley Drive alignment. These have been used to represent the remaining units.

Noise Sources

The following six existing noise sources were used to assess the existing noise conditions:

1. **Maley Drive** (Regional Road 73) is an existing two lane arterial road oriented in an east-west direction. It is an asphalt-surfaced road with an existing 50 kilometre per hour speed limit;

2. **Turner Avenue** is an existing two lane collector road. It is an asphalt-surfaced road with an existing 50 kilometre per hour speed limit in the vicinity of the study area. Turner Drive is a dead-end road, oriented in an east-west direction, west of Notre Dame Avenue;

3. **Notre Dame Avenue** (Regional Road 80) is an existing four lane arterial road. It is an asphalt-surfaced road with an existing 50 to 80 kilometre per hour speed limit in the vicinity of the study area. Notre Dame Avenue is oriented in a north-south direction;

4. **Barry Downe Road** (Regional Road 66) is an existing two lane arterial road immediately south of Maley Drive. It is an asphalt-surfaced road with an existing 50 kilometre per hour speed limit in the vicinity of the study area, oriented in a north-south direction;

5. **Lansing Avenue** is an existing two lane collector road. It is an asphalt-surfaced road with a 50 kilometre per hour speed limit, oriented in a north-south direction in the vicinity of the study area;

6. **Falconbridge Highway** (Regional Road 86) is an existing four lane arterial road. It is an asphalt-surfaced road with an 80 kilometre per hour speed limit, oriented in a northeast-southwest direction in the vicinity of the study area.

Noise Estimation Procedures

The existing noise levels were calculated using the United States Department of Transportation Federal Highway Administration computer modelling program "Noise Barrier Cost Reduction Procedure - STAMINA 2.0/OPTIMA", which is designed for road traffic noise assessment.

Receiver Locations, Setbacks, Elevations and Heights

Eleven representative receiver locations were selected for the Maley Drive noise source. These receivers are representative of the most critical locations in terms of noise exposure to Maley Drive. These critical locations were selected because they typically are the nearest and have the greatest exposure to Maley Drive, and thus would be most impacted by the road traffic noise.

The receiver locations are listed below:

1. Turner Avenue west of Notre Dame Avenue;
2. Drummond Avenue;
3. Cassandra Court;
4. Agincourt Avenue;
5. Shelley Drive;
6. Covewood Crescent;
7. Springdale Crescent;
8. Dollard Avenue;
9. Maley Drive at National Street (south side);
10. Maley Drive at National Street (north side); and
11. Covewood Crescent.

Receivers 2 through 5 were located between Notre Dame Avenue and Barry Downe Road. Receivers 6 through 8 and 11 were located between Barry Downe Road and a location just east of Lansing Avenue, and receivers 9 and 10 were between Lansing Avenue and Falconbridge Highway.

The noise assessment was based on actual site grades, and on existing and proposed road elevations. The outdoor living area receivers are located at a height of 1.5 metres above the existing grade.

Existing Outdoor Noise Levels

The existing noise level calculations were based on the 1993 Average Annual Daily Traffic (AADT) volumes, existing truck percentages, and the posted speed limit. Shielding provided by the existing houses and landforms was accounted for in this noise assessment.

All outdoor living area receivers between LaSalle Boulevard and Barry Downe Road had a noise level between 41 dBA and 54 dBA, while all outdoor living area receivers between Barry Downe Road and a point just east of Lansing Avenue have a noise level between 43 dBA and 59 dBA. All outdoor living area receivers from just east of Lansing Road to Falconbridge Highway had a noise level of 51 dBA to 57 dBA.

3.2.7 - Visual Access

Within the segment of the study corridor west of Notre Dame Avenue, there are few residences with a view of the potential road alignment, because the area north of LaSalle Boulevard is primarily composed of open, undeveloped lands. There are a few residences immediately west Notre Dame Avenue.

In the area between Notre Dame Avenue and Barry Downe Road, residents on the northern edge of the existing neighbourhoods south of the City limits have visual access to the regenerating natural areas described in Section 3.1, and some residences are also within sight of the Ontario Hydro corridor, which lies in a southwest-northeast orientation.

East of Barry Downe Road to Falconbridge Highway, residents of the neighbourhoods along the existing Maley Drive are afforded a relatively open vista across Maley Drive. The Hydro corridor parallels the road alignment, north of Maley Drive.

3.2.8 - Waste Management

No waste management concerns have been identified along the study corridor.

3.3 Transportation Conditions and Needs Assessment

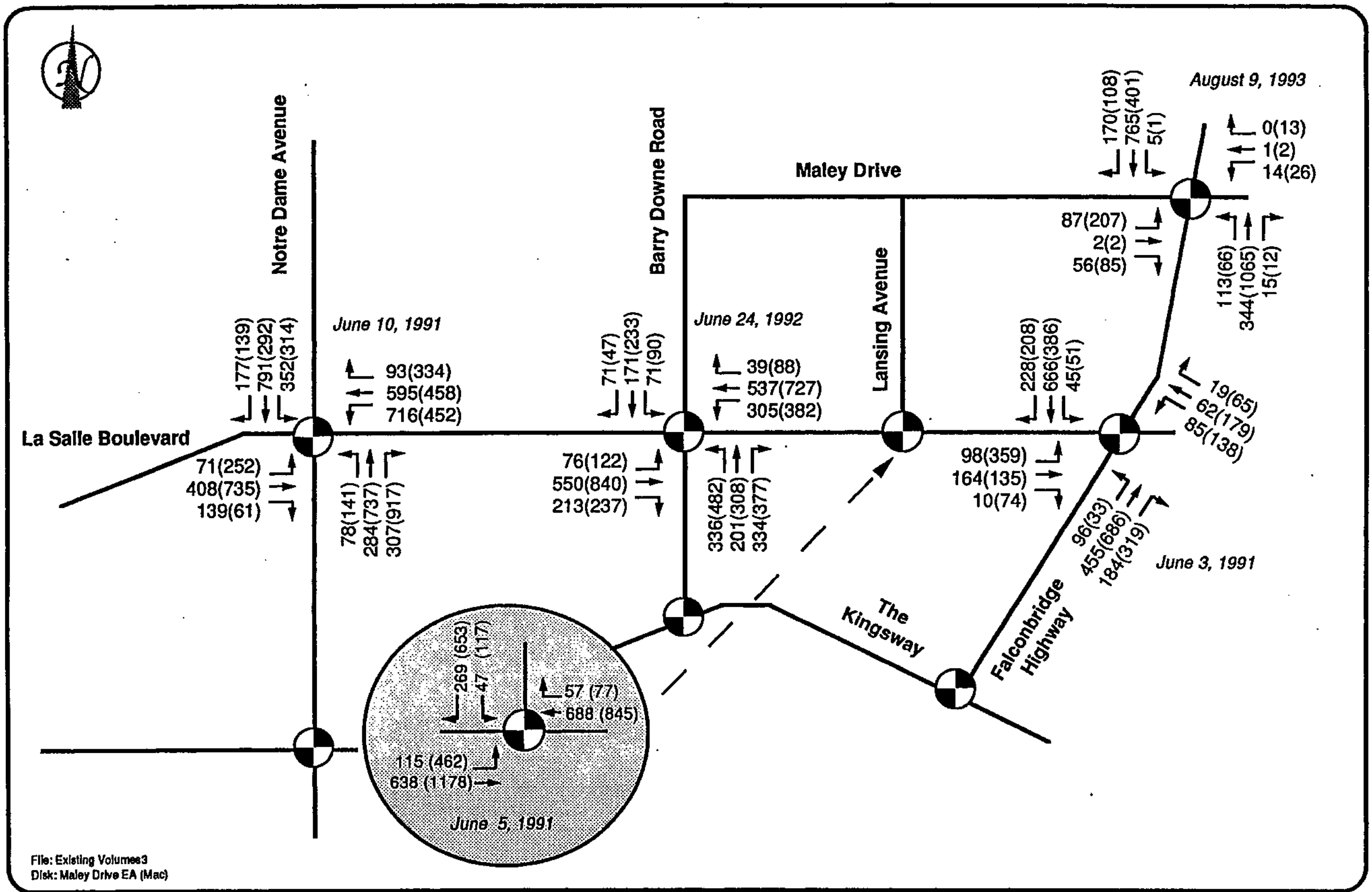
3.3.1 - Existing Conditions

Existing transportation conditions are addressed from four perspectives: traffic operations, trucking, safety and pavement condition. Each is discussed below.

Traffic Operations

In the area north of downtown Sudbury, there are only two arterial roads oriented in an east-west direction: LaSalle Boulevard and the Kingsway. These two roads currently carry Average Annual Daily Traffic (AADT) volumes of approximately 30,000 and 40,000, respectively. These roads are operating close to or at their design capacity during peak periods. Additional capacity is required in the east-west direction to accommodate the existing volumes at an acceptable level of service.

Existing peak hour traffic volumes are illustrated in Figure 3.3. Table 3.1 summarizes the existing Level of Service at the intersections. From Table 3.1, it can be seen that the section of LaSalle Boulevard from Notre Dame Avenue to Barry Downe Road is experiencing demands which are close to capacity in the a.m. peak hour, and which are



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100(123): A.M. Peak Hour(P.M. Peak Hour)

◐ Signalized Intersection

June 9, 1992 : Date of Count

FIGURE 3.3
EXISTING PEAK HOUR VOLUMES

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effectively at capacity during the p.m. peak hour. The intersection of LaSalle Boulevard at Falconbridge Highway is also approaching an unsatisfactory Level of Service.

TABLE 3.1
PEAK HOUR LEVEL OF SERVICE AT SIGNALIZED INTERSECTIONS EXISTING CONDITIONS

INTERSECTION	DATE OF COUNT	PEAK HOUR LEVEL OF SERVICE (V/C RATIO)	
		A.M.	P.M.
Notre Dame Avenue @ LaSalle Boulevard	1991	D (0.88)	F (1.38)
Barry Downe Road @ LaSalle Boulevard	1992	C (0.70)	E (0.93)
Falconbridge Highway @ LaSalle Boulevard	1991	A (0.55)	D (0.86)
Maley Drive @ Falconbridge Highway	1993	A (0.38)	A (0.55)

Trucking

LaSalle Boulevard is an important commercial street, with a range of retail and service establishments serving both local and regional markets. There are numerous commercial driveways along this road. It is important to maintain an adequate level of service on this road, in order to permit continued adequacy of access for the local businesses, and for the economy of the City and the Region.

LaSalle Boulevard also provides the most direct connection between the mining and industrial areas east and west of the City. Transportation of material between these areas is essential. The only alternates to LaSalle Boulevard are The Kingsway and Regional Road 80. However, The Kingsway is also designated both as provincial Highway 17 and as a part of the TransCanada Highway, and it already carries traffic volumes equal to its design capacity. Regional Road 80 is not an effective alternate, as the east-west portion of this road is located approximately 18 kilometres north of LaSalle Boulevard. The existing situation requires mining and other large industrial trucks to traverse LaSalle Boulevard.

Hence trucking activity is a major concern with respect to existing traffic operations on

LaSalle Boulevard. Table 3.2 illustrates data collected for the Regional Transportation Study, with respect to existing truck volumes on roadways in the vicinity of LaSalle Boulevard.

TABLE 3.2
TRUCK TRAFFIC VOLUMES

LOCATION	JUNE, 1989		FEBRUARY, 1990	
	NO. OF HEAVY TRUCKS *	% OF HEAVY TRUCKS	% OF HEAVY TRUCKS	% OF MINE HAUL TRUCKS
LaSalle Boulevard, east of Notre Dame Avenue	340	1.5 %	1.7 %	0.3 %
Notre Dame Avenue, north of LaSalle Boulevard	n/a	n/a	2.7 %	0.6 %
Falconbridge Highway, north of LaSalle Boulevard	680	7.0 %	3.5 %	0.9 %
LaSalle Boulevard, west of Falconbridge Highway	n/a	n/a	2.8 %	0.5 %

* Eight hour count data: 7:30 a.m. to 9:30 a.m., 11:00 a.m. to 2:00 p.m, 3 p.m. to 6 p.m.

The volume of heavy trucks on LaSalle Boulevard is lower than on many streets in Sudbury. However, the size of mine haul trucks in particular results in effects which are disproportionate to their number. Overall, the percentage of heavy trucks across the City is consistent with that found in most medium to large urban areas.

<u>Future Trucking Operations</u>

Currently, approximately 340 trucks per day travel on LaSalle Boulevard. In future, there is the potential for additional mine haul truck traffic. This is outlined as follows:

- All mine haul truck traffic related to the smelter and mine at Falconbridge and the Garson sand pit must use LaSalle Boulevard. This represents 175 truckloads per day, or 350 truck trips;
- The re-opening of the Garson mine would generate an additional 75 truckloads of ore per day, or 150 truck trips; and

- A large proportion of the estimated 425 daily truckloads (850 truck trips) from road aggregate operations near the airport and from the Rainbow plants would use LaSalle Boulevard.

In summary, there is the potential for the number of daily truck trips on LaSalle Boulevard to increase from 340 to 1,300 (350 plus 150 plus an estimated 800 from the aggregate operations) or more. This is a potential increase of 380 percent.

Safety

As part of the Sudbury Regional Transportation Study, Marshall Macklin Monaghan undertook a review of the available data with respect to transportation safety, as it related to mine haul trucks. It was found that from 1987 through 1989, there were 47 fatal collisions on the Regional road network. Of these, four involved slurry or ore trucks, and one involved another large truck. In the majority of fatal collisions involving trucks, the collision was not caused by the truck.

Pavement Conditions

Pavement conditions are also a concern on LaSalle Boulevard and on the existing section of Maley Drive.

On LaSalle Boulevard, rutting and other signs of pavement deterioration have appeared prematurely, indicating that the road is experiencing heavier loads and a greater frequency of loading than were forecast when the road was designed.

The pavement of the existing section of Maley Drive is also in poor condition. This roadway was constructed to a fairly low design specification, which is in keeping with its current role. The pavement is uneven and of poor quality in places. To correct this problem, and to ensure adequate structural capacity, this section requires reconstruction.

3.3.2 - Projected Traffic Conditions

In order to assess traffic operations at future horizon years, traffic assignments were undertaken using the computer model of the Sudbury road network. This model was developed for the Sudbury Regional Transportation Study. The software utilized for the model is EMME/2, a recognized world leader in the field of regional traffic flow modelling. The model was initially calibrated to represent existing (1990) conditions, and validated against a comprehensive database of observed screenline, link and intersection volumes. Traffic conditions have been modelled for the a.m. peak hour; this is standard practice in the travel forecasting field. The projected p.m. peak hour volumes have been derived on the basis of ratios of existing p.m. peak hour volumes to existing a.m. peak hour volumes. For example, the eastbound p.m. volumes were derived using a ratio of the existing eastbound p.m. peak hour volumes to the westbound a.m. peak hour volumes.

However, this ratio does not factor in the effect of p.m. peak hour traffic congestion on LaSalle Boulevard. Maley Drive will be a more attractive alternate to LaSalle during the p.m. period than it would in the a.m. period, because of this congestion. To take this factor into account, two adjustments were made.

First, the eastbound-to-northbound left turns and southbound-to-westbound right turns were subtracted from the ratio totals, as an approximation of the minimum number of vehicles which could be expected to use Maley Drive. This left only the LaSalle traffic in the ratio.

Secondly, a percentage of the projected p.m. volumes were shifted from LaSalle to Maley, to represent the shift due to congestion on LaSalle in the p.m., and the growth in development along Maley which is expected.

Traffic projections have been generated for three Development Levels:

- **Low**, expected to occur by approximately the year 1995;
- **Medium**, expected by 2000; and
- **High**, anticipated to be achieved by 2010.

For the Low and Medium Development horizons (1995 and 2000), 25 percent of the trips were shifted. For the Ultimate Development horizon (2010), 30 percent were shifted. The increase from 25 to 30 reflects the increase in development in the Maley corridor.

3.3.2.1 - Development

Table 3.3 summarizes the expected growth in population and employment, for the areas of the City north of the Kingsway, and for the outlying municipalities of Nickel Centre, Valley East, Rayside-Balfour, and Onaping Falls. These are the outlying municipalities which range across the northern end of the Regional Municipality of Sudbury, north of the Maley Drive area. Growth in these municipalities can be expected to affect travel demand on Maley Drive.

Population and employment projections were generated for the three Development Levels by the Planning and Development Department of the Regional Municipality of Sudbury, with assistance from Marshall Macklin Monaghan.

Figures 3.4 through 3.6 illustrate the distribution of new employment and population

TABLE 3.3
POPULATION AND EMPLOYMENT PROJECTIONS

AREA	EXISTING (1990)		LOW DEVELOPMENT LEVEL (1995)				MEDIUM DEVELOPMENT LEVEL (2000)				ULTIMATE DEVELOPMENT LEVEL (2001)			
			POPULATION		EMPLOYMENT		POPULATION		EMPLOYMENT		POPULATION		EMPLOYMENT	
	POPULATION	EMPLOYMENT	*Value*	*Growth* (%) *	*Value*	*Growth* (%) *	*Value*	*Growth* (%) *	*Value*	*Growth* (%) *	*Value*	*Growth* (%) *	*Value*	*Growth* (%) *
City of Sudbury North of Kingsway	92,944	49,191	96,695	4%	52,338	6%	99,131	7%	60,642	23%	104,866	13%	70,778	44%
Nickel Centre	11,430	2,182	11,778	3%	2,241	3%	12,065	6%	2,323	6%	12,718	11%	2,413	11%
Valley East	19,757	2,951	20,317	3%	3,031	3%	20,809	5%	3,141	6%	21,925	11%	3,263	11%
Rayside-Balfour	14,266	2,047	14,677	3%	2,102	3%	15,049	5%	2,179	6%	15,843	11%	2,264	11%
Onaping Falls	5,324	1,775	5,369	1%	1,823	3%	5,414	2%	1,889	6%	5,468	3%	1,963	11%
TOTAL	**143,721**	**58,146**	**148,836**	**4%**	**61,535**	**6%**	**152,468**	**6%**	**70,174**	**21%**	**160,820**	**12%**	**80,681**	**39%**

* Growth (%): Percentage is equal to the 2010, 2000 or 1995 value minus the 1990 value, divided by the 1990 value.

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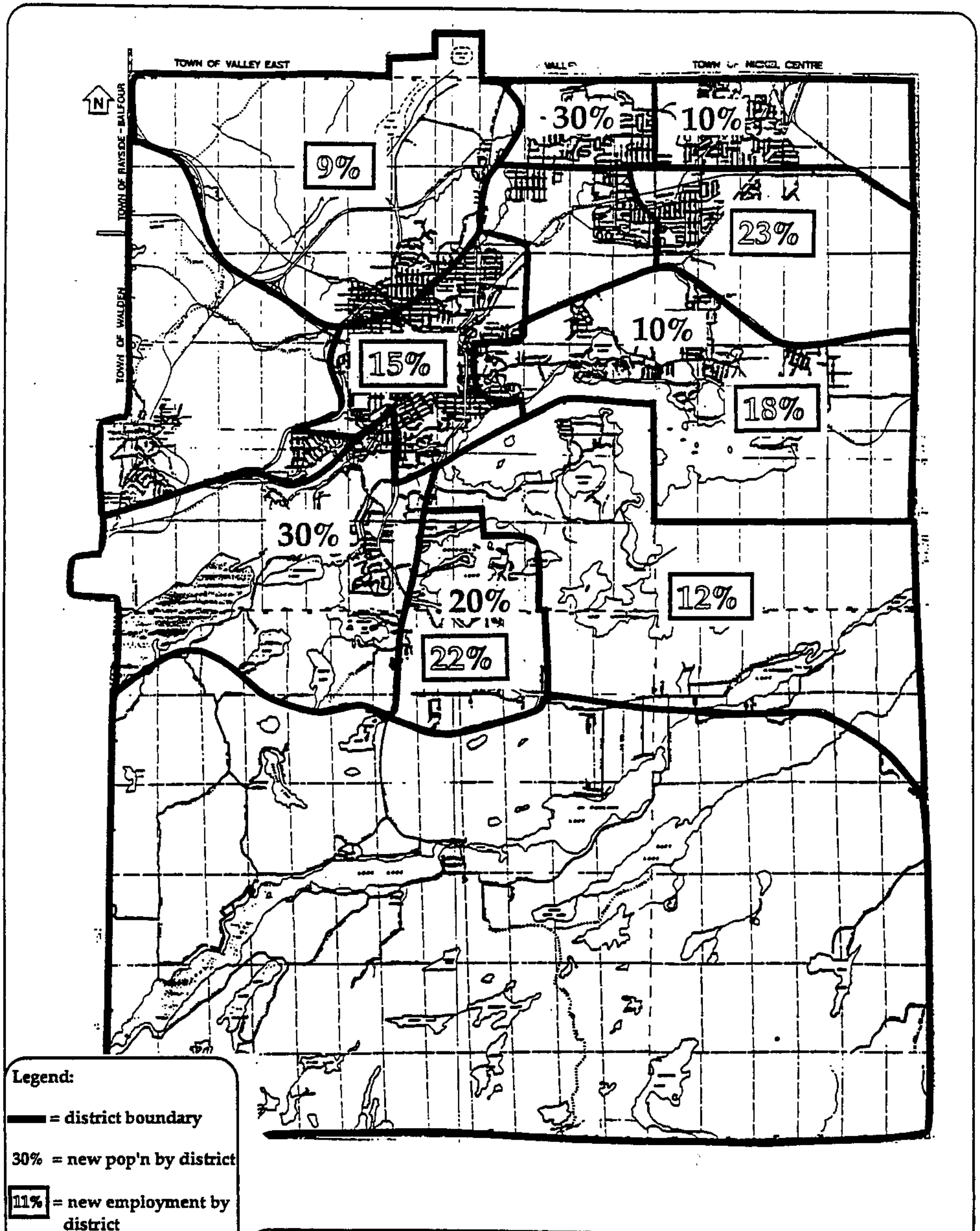
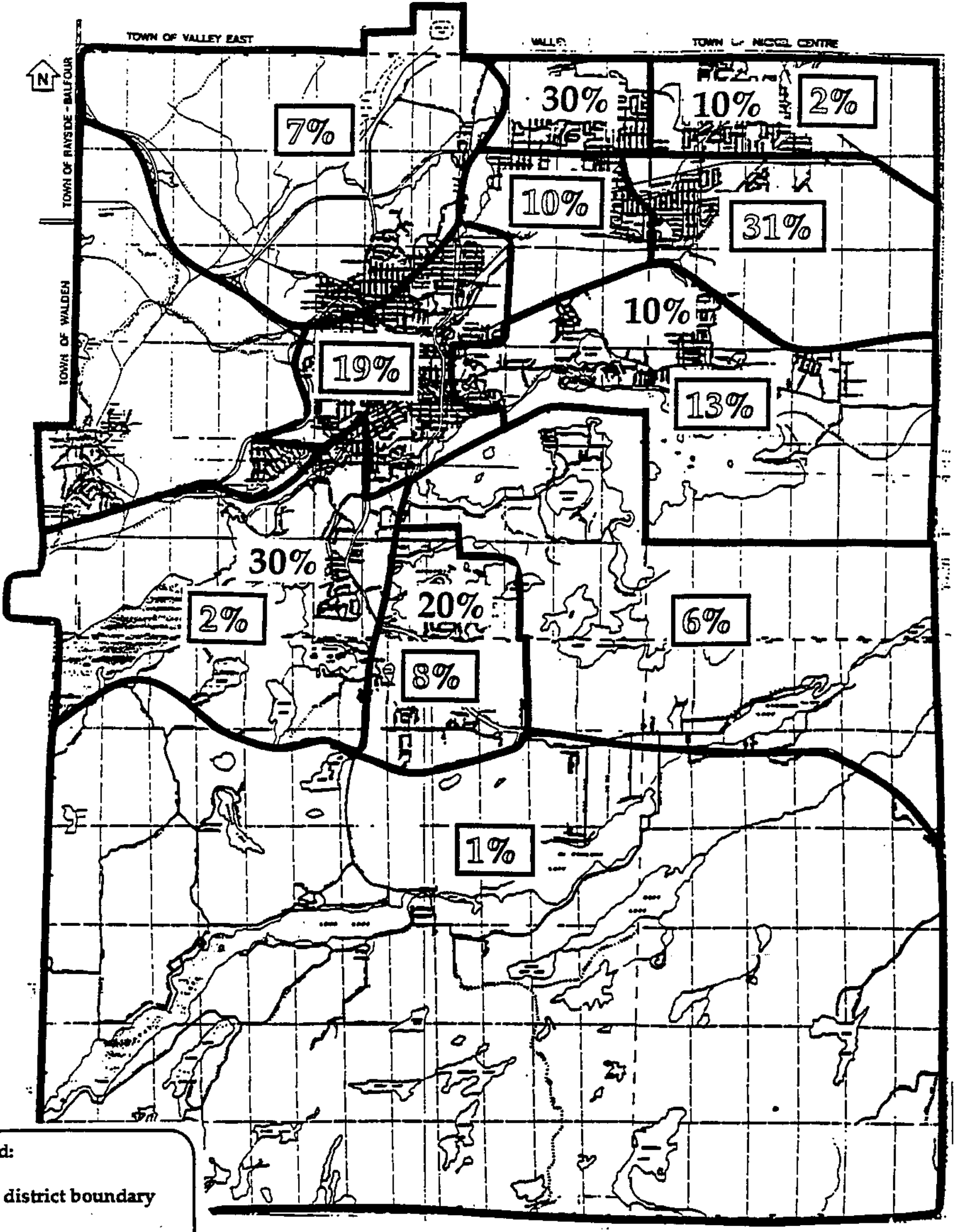


FIGURE 3.4
DISTRIBUTION OF NEW POPULATION AND EMPLOYMENT
(LOW DEVELOPMENT LEVEL - 1995)



end:

= district boundary

= new pop'n by district

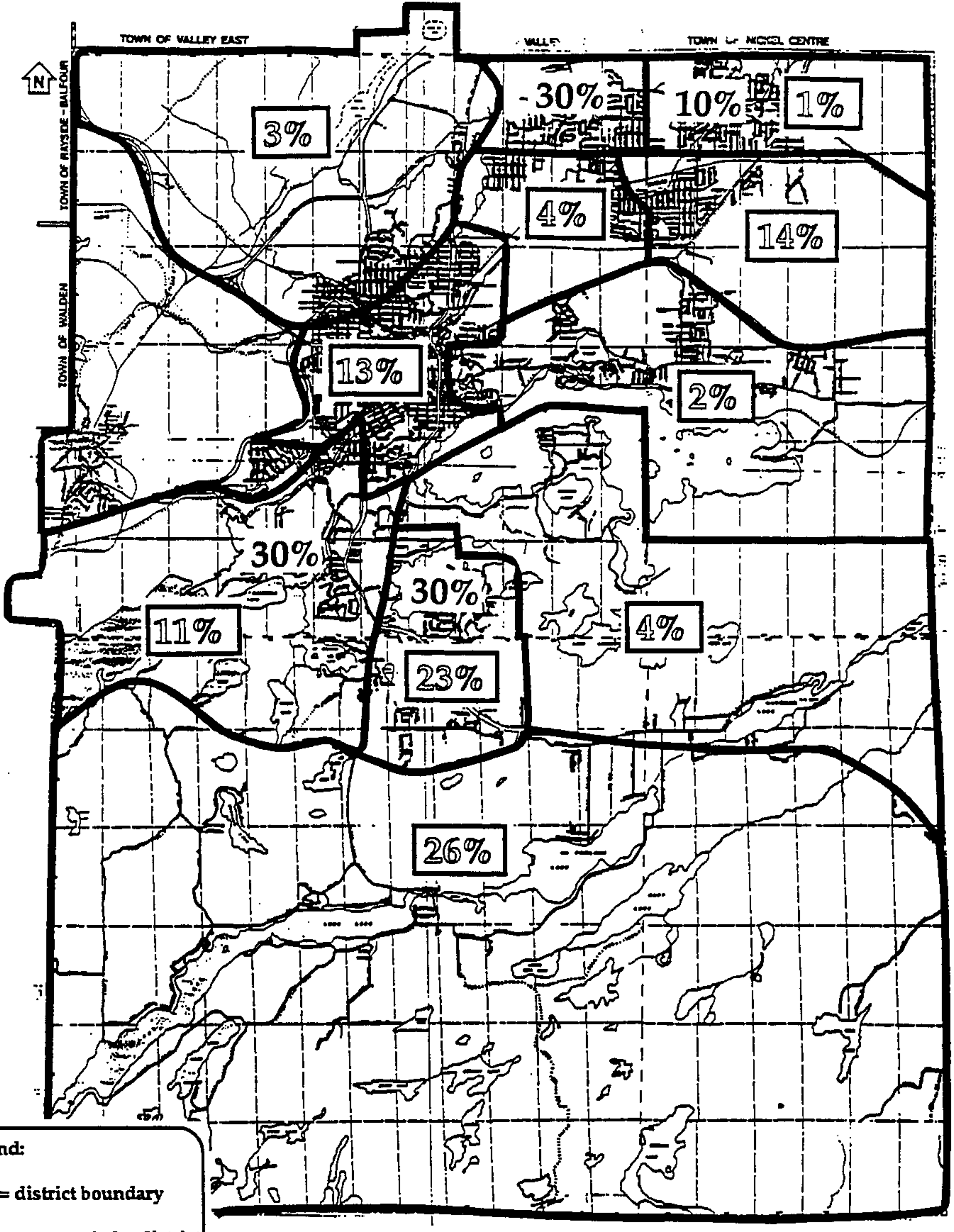
11% = new employment by district

Notes:

1. new population = 2600

ew employment = 8300

FIGURE 3.5
DISTRIBUTION OF NEW POPULATION AND EMPLOYMENT
(MEDIUM DEVELOPMENT LEVEL - 2000)



Legend:

▬ = district boundary

30% = new pop'n by district

11% = new employment by district

Notes:
1. new population = 5500
2. new employment = 10100

FIGURE 3.6
DISTRIBUTION OF NEW POPULATION AND EMPLOYMENT
(ULTIMATE DEVELOPMENT LEVEL - 2010)

expected to be added in the interval between the existing conditions and the three projected development levels.

Over the estimated twenty-year planning horizon, the City's growth in population north of the Kingsway is expected to be 13 percent. A 44 percent growth in employment is projected to occur in this area over this period. This growth can be expected to have an impact on traffic operations on roads throughout the north end of the City of Sudbury.

The impact of this growth in development has been taken into account in the analysis of future traffic conditions. The traffic conditions are documented below.

3.3.2.2 - Road Network Scenarios

The Sudbury Regional Transportation Study outlined recommendations for road network additions for each of the three Development Levels. These included a recommendation to construct the Maley Drive Extension west from the intersection of Barry Downe Road to the LaSalle Boulevard Extension, by the time that the Low Development Level was reached in the Region. However, there is likely some uncertainty with respect to the configuration of the network that will actually be in place at these horizons. This reflects such factors as Regional priorities, funding, and workable construction schedules.

The "do-nothing" case has been assessed as a base case for the three future horizons. Road network improvement scenarios have also been analyzed, to represent the range of expected conditions. The road network scenario components are listed in Table 3.4, and the improvements are shown in Figure 3.7.

The traffic projections for the do-nothing case and the road network improvement scenarios are discussed in the following section. The resulting traffic operations are summarized from the perspective of links and intersections.

3.3.2.3 - Traffic Projections: Low Development Level (1995)

Traffic projections at the Low Development Level are summarized in terms of a figure illustrating the volumes on Maley Drive (Figure 3.8) and a table which lists the volumes projected on all key study area roadways (Table 3.5). This table also summarizes the projected ratios of volume to capacity (v/c ratio) for these links. Table 3.6 summarizes the projected intersection Levels of Service at this Level.

TABLE 3.4
ROAD NETWORK SCENARIOS

DEVELOPMENT LEVEL (PROJECTED YEAR)	SCENARIO NUMBER	ROAD NETWORK IMPROVEMENT					
		Maley Drive Extension	Notre Dame Widening Kathleen to Montrose	Notre Dame Widening Montrose to Lasalle	Westmount Avenue Extension	Montrose Avenue Extension	LaSalle/Maley Extension East
Low	L1						
(1995)	L2	X					
Medium	M1	X	X				
(2000)	M2		X				
	M3		X			X	
High	H1			X			
(2010)	H2			X	X	X	
	H3			X			X
	H4			X	X	X	X
	H5	X		X			
	H6	X		X	X	X	
	H7	X		X			X
	H8	X		X	X	X	X
Recommended Implementation Time Frame (Sudbury Regional Transportation Study)		1990 - 1995	1995 - 2000	2000 - 2010	2000 - 2010	1995 - 2000	Traffic Study to Be Undertaken Prior to approval

An 'X' indicates that the road link or widening has been completed for a given scenario and time frame

Note: The location of each road network improvement is shown in Figure 3.8

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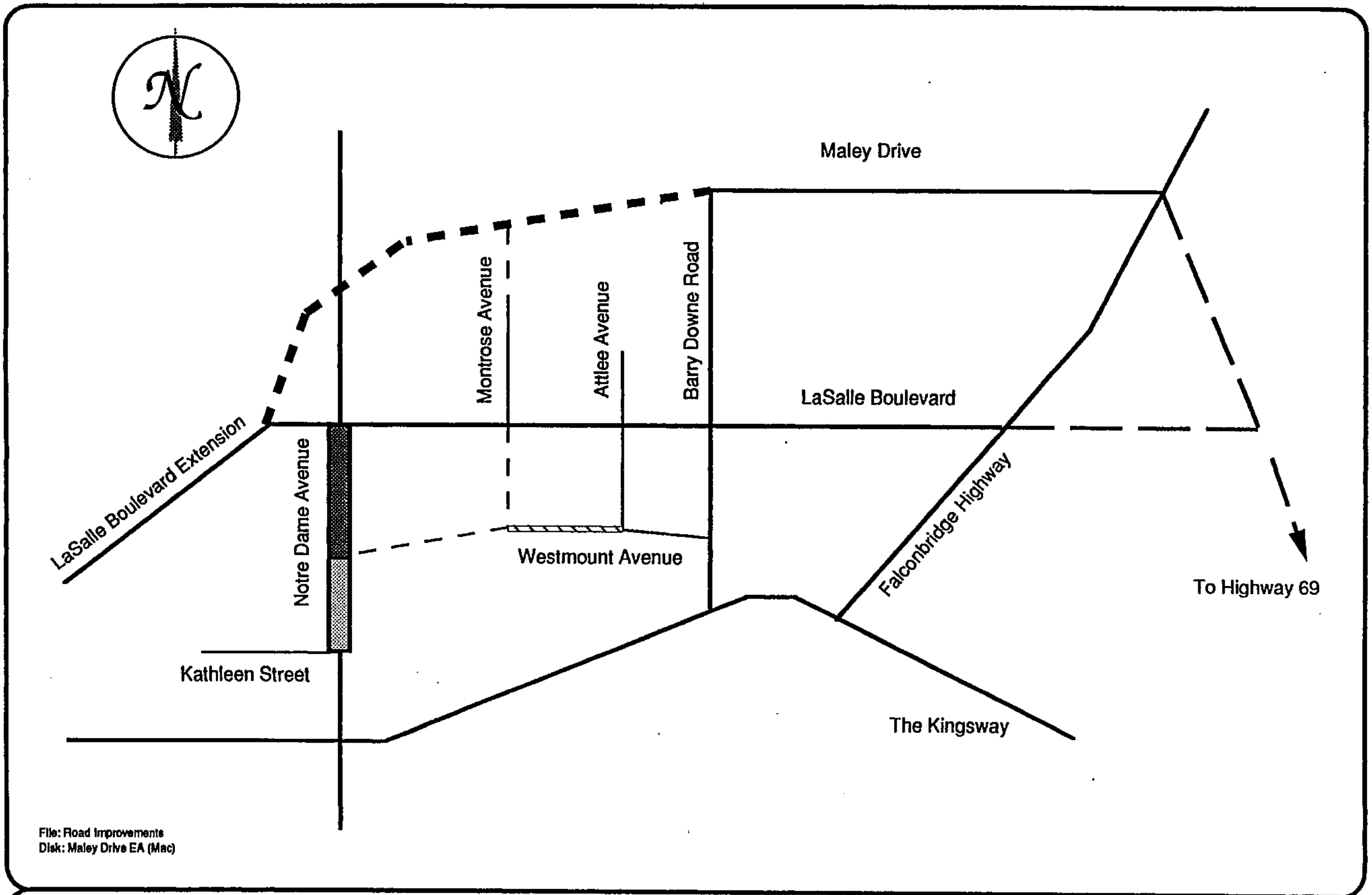

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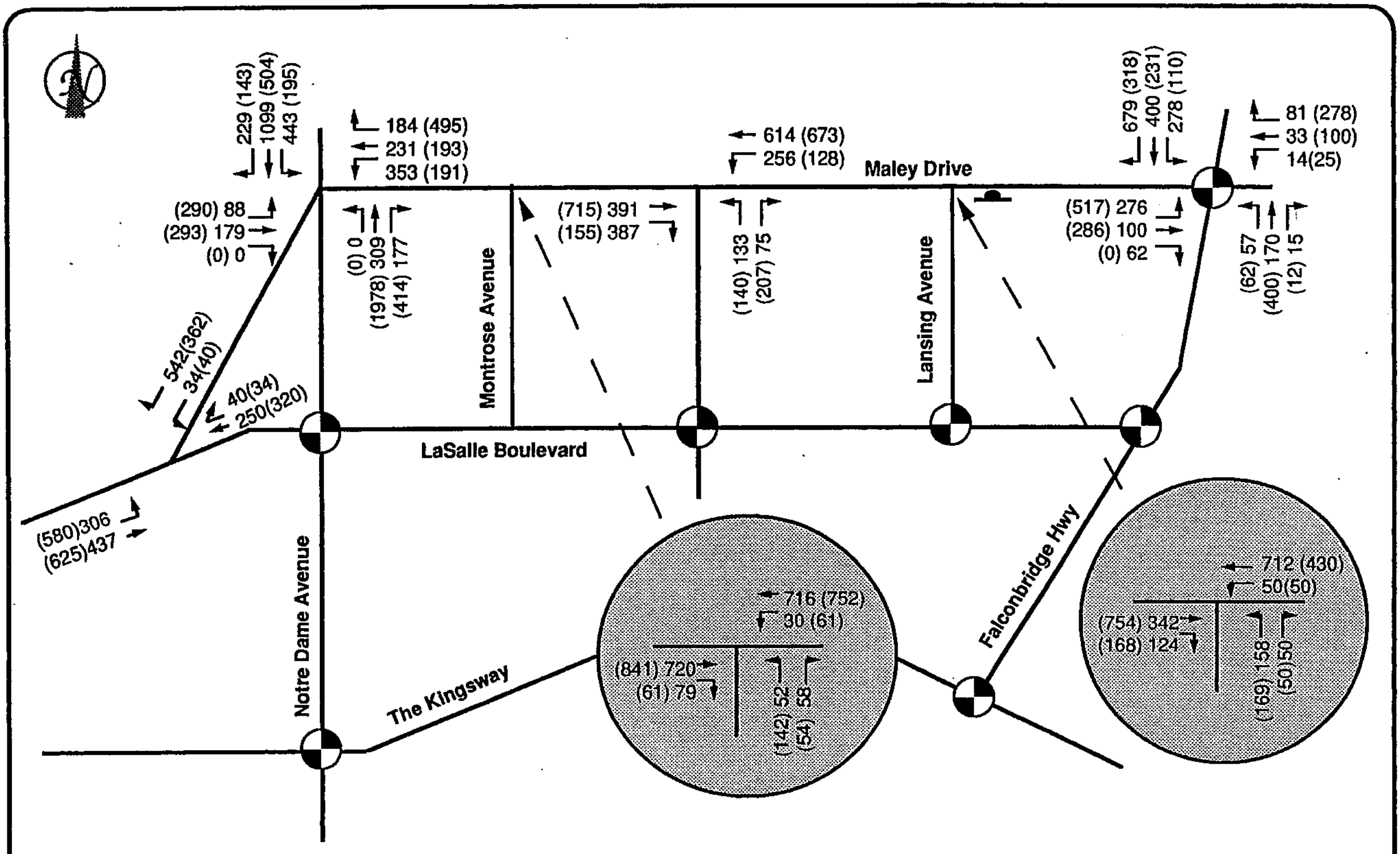
FIGURE 3.7 NETWORK IMPROVEMENTS

Maley Drive Extension Class Environmental Assessment



File: 1995-With Maley / With Ext. to Kingsway
Disk: Maley Drive EA (Mac)

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◐ Signalized Intersection

100(200) AM PK Hr Volume (PM Pk Hr Volume)

Note: Notre Dame Widened to LaSalle; No Westmount/Montrose Extension

FIGURE 3.8
PROJECTED LOW DEVELOPMENT LEVEL (1995) PEAK HOUR VOLUMES

January 5, 1995

TABLE 3.5
PEAK HOUR LINK VOLUMES
LOW DEVELOPMENT LEVEL (1995)

Road Link		Capacity (vph)	Scenario L1: No Maley Drive Extension				Scenario L2: With Maley Drive Extension			
			A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
			Volume	V/C Ratio	Volume	V/C Ratio	Volume	V/C Ratio	Volume	V/C Ratio
Falconbridge Highway										
North of Maley Drive	NB	1800	503	0.28	1361	0.76	527	0.29	1493	0.83
	SB	1800	1237	0.69	553	0.31	1357	0.75	580	0.32
South of Maley Drive	NB	1800	472	0.26	919	0.51	242	0.13	524	0.29
	SB	1800	835	0.46	519	0.29	476	0.26	266	0.15
Maley Drive										
East of Barry Downe	EB	900	216	0.24	726	0.81	466	0.52	1088	1.21
	WB	900	581	0.65	270	0.30	870	0.97	583	0.65
Barry Downe to Notre Dame	EB	900	n/a	0.00	0	0.00	799	0.89	960	1.07
	WB	900	n/a	0.00	0	0.00	768	0.85	999	1.11
West of Notre Dame	EB	900	n/a	0.00	0	0.00	267	0.30	575	0.64
	WB	900	n/a	0.00	0	0.00	460	0.51	334	0.37
LaSalle Boulevard										
East of Barry Downe	EB	1800	955	0.53	1125	0.63	276	0.15	440	0.24
	WB	1800	900	0.50	1194	0.66	352	0.20	345	0.19
Barry Downe to Notre Dame	EB	1800	1339	0.74	2088	1.16	814	0.45	1361	0.76
	WB	1800	1670	0.93	1674	0.93	1089	0.61	1018	0.57
West of Notre Dame	EB	950	682	0.72	886	0.93	422	0.44	300	0.32
	WB	950	805	0.85	750	0.79	273	0.29	464	0.49
Notre Dame Avenue										
North of LaSalle	NB	1800	633	0.35	1880	1.04	519	0.29	1351	0.75
	SB	1800	1709	0.95	696	0.39	1228	0.68	571	0.32
South of LaSalle	NB	1800	844	0.47	2464	1.37	861	0.48	2493	1.38
	SB	1800	1971	1.10	1055	0.59	1994	1.11	1076	0.60
Barry Downe Road										
North of LaSalle	NB	1800	533	0.30	760	0.42	397	0.22	722	0.40
	SB	1800	691	0.38	586	0.33	656	0.36	437	0.24
South of LaSalle	NB	1800	967	0.54	1563	0.87	511	0.28	1325	0.74
	SB	1800	1250	0.69	1209	0.67	1060	0.59	639	0.35
Montrose Avenue										
North of LaSalle	NB	750	63	0.08	154	0.21	56	0.07	151	0.20
	SB	750	140	0.19	69	0.09	137	0.18	62	0.08
Westmount Avenue										
Existing Section	EB	750	319	0.43	329	0.44	343	0.46	342	0.46
	WB	750	299	0.40	351	0.47	311	0.41	377	0.50

NB = northbound; EB = eastbound; SB = southbound; WB = westbound.   *V/C Ratio = volume to capacity ratio*

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P.M. Peak hour trips calculated from a.m. volumes using historic ratios of p.m. to a.m. volumes:

Commercial streets (e.g. LaSalle):	*1.25*
Non-commercial streets (e.g. Montrose):	*1.10*

TABLE 3.6
PROJECTED LEVEL OF SERVICE AT SIGNALIZED INTERSECTIONS LOW DEVELOPMENT LEVEL (1995)

INTERSECTION	A.M. PEAK HOUR LEVEL OF SERVICE (V/C RATIO)	
	SCENARIO L1: NO MALEY DRIVE EXTENSION	SCENARIO L2: WITH MALEY DRIVE EXTENSION
Notre Dame Avenue @ LaSalle Boulevard	F (1.19)	C (0.79)
Barry Downe Road @ LaSalle Boulevard	D (0.83)	C (0.71)
Falconbridge Highway @ LaSalle Boulevard	C (0.76)	B (0.64)
Maley Drive @ Falconbridge Highway	A (0.51)	A (0.56)

The following points summarize the expected traffic conditions:

- Without the Maley Drive Extension, LaSalle Boulevard can be expected to continue to operate at an unsatisfactory Level of Service during the a.m. and p.m. peak hours. With the Maley Drive Extension in place, LaSalle Boulevard is projected to experience demands within its existing capacity;

- Further, without the Maley Drive Extension, Notre Dame Avenue is expected to continue to operate at an unsatisfactory Level of Service, both north and south of LaSalle Boulevard. However, even with the Maley Drive Extension, Notre Dame Avenue would still be operating at capacity south of LaSalle Boulevard. These statements would apply to both the a.m. and p.m. peak hours;

- Maley Drive is projected to be well used at the Low Development Level. Demand in the peak hours is expected to be in the range of 700 to 1,100 trips in the peak direction.

- Intersection Level of Service: without the Maley Drive Extension, the key intersection of Notre Dame Avenue at LaSalle Boulevard can be expected to experience demands in the a.m. peak hour which significantly exceed its capacity. To accommodate these volumes, improvements such as double left turn lanes or grade separation would have to be considered. Assuming that the p.m. peak hour volumes remain at a level above the a.m. volumes (as would be projected for a commercial area), the p.m. peak hour Level of Service at this intersection could be expected to also exceed capacity.

The introduction of the Maley Drive Extension would alleviate the projected problem at the Notre Dame/ LaSalle intersection by diverting traffic north. The Maley Drive Extension would also assist in maintaining an adequate Level of Service at the Barry Downe Road/LaSalle Boulevard intersection.

3.3.2.4 - Traffic Projections: Medium Development Level (2000)

The projected Medium Development Level a.m. peak hour link volumes, and the volume to capacity ratios for these links, are summarized in Table 3.7. Projected link and turning movement volumes for Maley Drive are illustrated in Figure 3.9.

Without the Maley Drive Extension, demand on LaSalle Boulevard can be expected to exceed the available capacity during the a.m. and p.m. peak hours, irrespective of any other road improvements made. Also, if the Maley Drive Extension is not constructed, Notre Dame Avenue, north and south of LaSalle Boulevard, is expected to continue to experience demands which exceed capacity, as described for the Low Development Level. The introduction of the Maley Drive Extension is expected to relieve the high demand on Notre Dame, north of LaSalle, by providing an alternate commuter and truck route.

Maley Drive is projected to be well used. Demand in the peak hours is expected to be in the range of 700 to 1,100 trips in the peak direction.

Table 3.8 summarizes the intersection Levels of Service projected for the Medium Development Level, and compares the Medium Development Level to the Low Development Level. From this table, it can be seen that the level and extent of congestion are projected to expand. The Falconbridge/LaSalle intersection is expected to join those operating at an unsatisfactory Level of Service.

TABLE 3.7
PEAK HOUR LINK VOLUMES
MEDIUM DEVELOPMENT LEVEL (2000)

Road Link		Capacity (vph)	Scenario M1: Maley Extension plus Notre Dame Widening				Scenario M2: No Maley Extension with Notre Dame Widening				Scenario M3: No Maley Extension with Montrose Avenue Extension			
			A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
			Volume	V/C Ratio	Volume	V/C Ratio	Volume	V/C Ratio	Volume	V/C Ratio	Volume	V/C Ratio	Volume	V/C Ratio
Falconbridge Highway														
North of Maley Drive	NB	1800	448	0.25	1529	0.85	434	0.24	1508	0.84	437	0.24	1514	0.84
	SB	1800	1390	0.77	493	0.27	1371	0.76	477	0.27	1376	0.76	481	0.27
South of Maley Drive	NB	1800	170	0.09	860	0.48	275	0.15	948	0.53	276	0.15	926	0.51
	SB	1800	782	0.43	187	0.10	862	0.48	303	0.17	842	0.47	304	0.17
Maley Drive														
East of Barry Downe	EB	900	432	0.48	970	1.08	170	0.19	668	0.74	172	0.19	696	0.77
	WB	900	776	0.86	540	0.60	534	0.59	213	0.24	557	0.62	215	0.24
Barry Downe to Notre Dame	EB	900	861	0.96	883	0.98	–	0.00	0	0.00	–	0.00	0	0.00
	WB	900	706	0.78	1076	1.20	–	0.00	0	0.00	–	0.00	0	0.00
West of Notre Dame	EB	900	290	0.32	659	0.73	–	0.00	0	0.00	–	0.00	0	0.00
	WB	900	527	0.59	363	0.40	–	0.00	0	0.00	–	0.00	0	0.00
LaSalle Boulevard														
East of Barry Downe	EB	1800	460	0.26	498	0.28	336	0.19	511	0.28	337	0.19	526	0.29
	WB	1800	398	0.22	575	0.32	409	0.23	420	0.23	421	0.23	421	0.23
Barry Downe to Notre Dame	EB	1800	1185	0.66	876	0.49	1646	0.91	1631	0.91	1669	0.93	1770	0.98
	WB	1800	701	0.39	1481	0.82	1305	0.73	2058	1.14	1416	0.79	2086	1.16
West of Notre Dame	EB	950	823	0.87	909	0.96	732	0.77	839	0.88	753	0.79	739	0.78
	WB	950	826	0.87	905	0.95	763	0.80	805	0.85	672	0.71	828	0.87
Notre Dame Avenue														
North of LaSalle	NB	1800	440	0.24	1436	0.80	552	0.31	1964	1.09	552	0.31	1978	1.10
	SB	1800	1305	0.73	484	0.27	1785	0.99	607	0.34	1798	1.00	607	0.34
South of LaSalle	NB	1800	941	0.52	2525	1.40	803	0.45	2520	1.40	539	0.30	2114	1.17
	SB	1800	2020	1.12	1176	0.65	2016	1.12	1004	0.56	1691	0.94	674	0.37
Barry Downe Road														
North of LaSalle	NB	1800	420	0.23	870	0.48	577	0.32	861	0.48	579	0.32	879	0.49
	SB	1800	791	0.44	462	0.26	783	0.44	635	0.35	799	0.44	637	0.35
South of LaSalle	NB	1800	462	0.26	1600	0.89	542	0.30	1606	0.89	566	0.31	1613	0.90
	SB	1800	1280	0.71	578	0.32	1285	0.71	678	0.38	1290	0.72	708	0.39
Montrose Avenue														
North of LaSalle	NB	750	51	0.07	257	0.34	176	0.23	276	0.37	187	0.25	281	0.37
	SB	750	234	0.31	56	0.07	251	0.33	194	0.26	255	0.34	206	0.27
South of LaSalle	NB	750	–	0.00	0	0.00	–	0.00	0	0.00	324	0.43	541	0.72
	SB	750	–	0.00	0	0.00	–	0.00	0	0.00	492	0.66	356	0.48
Westmount Avenue														
Existing Section	EB	750	358	0.48	391	0.52	339	0.45	395	0.53	324	0.43	389	0.52
	WB	750	355	0.47	394	0.53	359	0.48	373	0.50	354	0.47	356	0.48
Proposed Section	EB	750	–	0.00	0	0.00	–	0.00	0	0.00	286	0.38	615	0.82
	WB	750	–	0.00	0	0.00	–	0.00	0	0.00	559	0.75	315	0.42

NB = northbound; EB = eastbound; SB = southbound; WB = westbound. *V/C Ratio = volume to capacity ratio*

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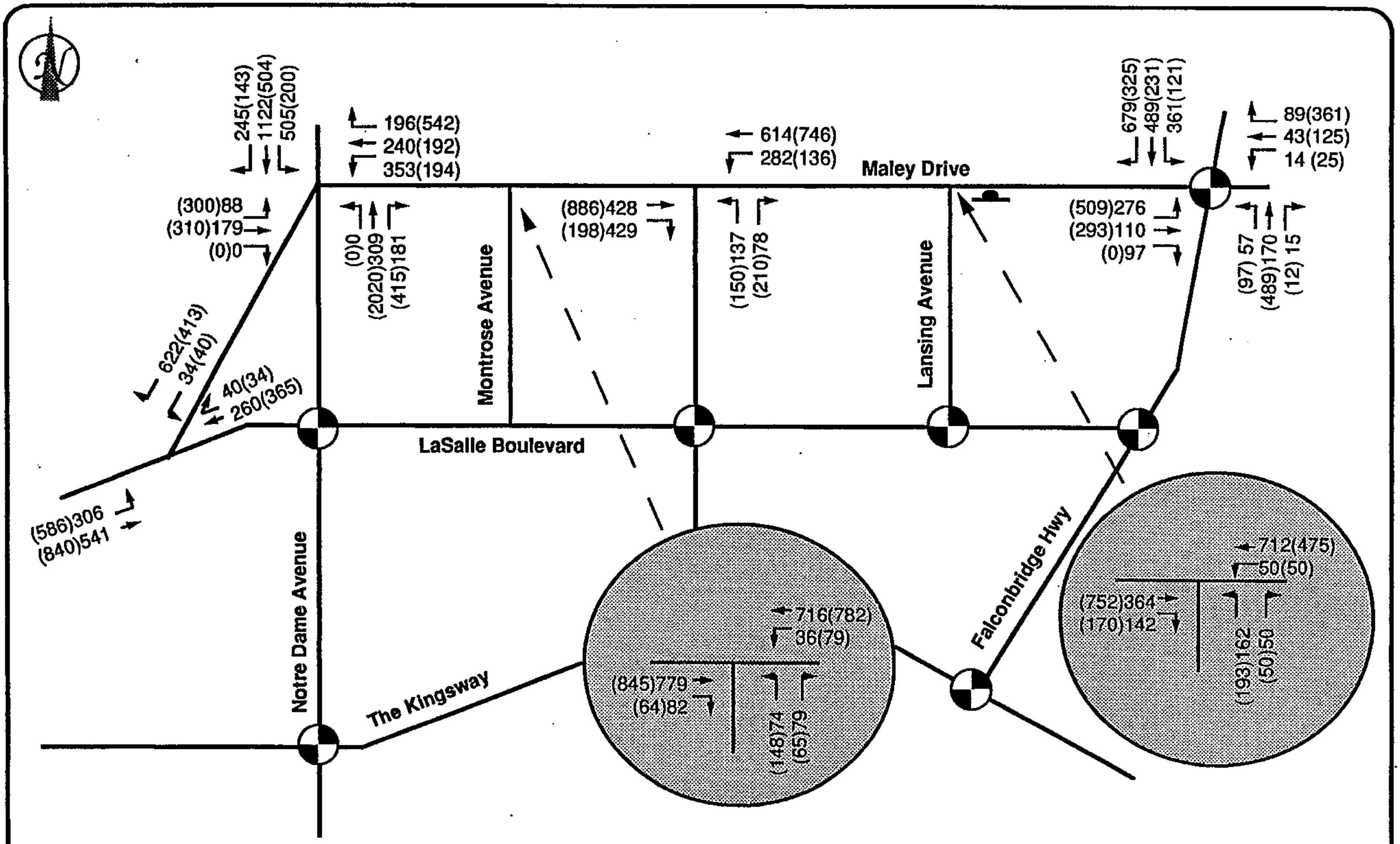
P.M. Peak hour trips calculated from a.m. volumes using historic ratios of p.m. to a.m. volumes:

Commercial streets (e.g. LaSalle): *1.25*
Non–commercial streets (e.g. Montrose): *1.10*



File: 2000-With Maley/With Ext. to Kingsway
Disk: Maley Drive EA (Mac)

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● Signalized Intersection

100(200) AM PK Hr Volume (PM Pk Hr Volume)

Note: Notre Dame Widened to LaSalle; No Westmount/Montrose Extension

FIGURE 3.9
PROJECTED MEDIUM DEVELOPMENT LEVEL (2000) PEAK HOUR VOLUMES

JANUARY 5, 1995

TABLE 3.8
PROJECTED LEVEL OF SERVICE AT SIGNALIZED INTERSECTIONS WITH NO MALEY DRIVE EXTENSION LOW AND MEDIUM DEVELOPMENT LEVELS

INTERSECTION	A.M. PEAK HOUR LEVEL OF SERVICE (V/C RATIO)	
	LOW DEVELOPMENT LEVEL	MEDIUM DEVELOPMENT LEVEL
Notre Dame Avenue @ LaSalle Boulevard	F (1.19)	F (1.33)
Barry Downe Road @ LaSalle Boulevard	D (0.83)	E (0.96)
Falconbridge Highway @ LaSalle Boulevard	C (0.76)	E (0.97)
Maley Drive @ Falconbridge Highway	A (0.51)	A (0.54)

3.3.2.5 - Traffic Projections: High Development Level (2010)

Table 3.9 summarizes the projected volumes on the links in the study area, and the volume-to-capacity ratio for these links. Figure 3.10 illustrates the projected turning movements on Maley Drive.

The following points summarize the projected traffic conditions at the High Development Level:

- Without the Maley Drive Extension, demand on LaSalle Boulevard is projected to remain equal to or greater than capacity in the section from Barry Downe Road to Notre Dame Avenue, during both the a.m. and p.m. peak hours. The introduction of Maley Drive would alleviate this problem, reducing the projected volume to less than 80 percent of capacity;

- Failure to extend Maley Drive would also result in demand on Notre Dame Avenue, north of LaSalle Boulevard, exceeding capacity in the peak direction. Constructing Maley Drive would reduce the volume-to-capacity ratio from over 1.0 to values in the range of 0.80 to 0.84 during the a.m. peak hour. This would represent an acceptable level of service;

- South of LaSalle Boulevard, demand on Notre Dame Avenue is expected to range from 80 to 91 percent of capacity, irrespective of whether Maley Drive is

TABLE 3.9
PEAK HOUR LINK VOLUMES
ULTIMATE DEVELOPMENT LEVEL (2010)

Road Link		Capacity (vph)	Without Maley Extension																With Maley Extension															
			H1: No Other Improvements				H2: Montrose/ Westmount Link				H3: Maley Extension				H4: Mont/Westmnt + Maley to Kingsway				H5: No Other Improvements				H6: Montrose/ Westmount Link				H7: Maley Extension				H8: Mont/Westmnt + Maley to Kingsway			
			A.M. Pk Hr		P.M. Pk Hr		A.M. Pk Hr		P.M. Pk Hr		A.M. Pk Hr		P.M. Pk Hr		A.M. Pk Hr		P.M: Pk Hr		A.M. Pk Hr		P.M. Pk Hr		A.M. Pk Hr		P.M. Pk Hr		A.M. Pk Hr		P.M. Pk Hr		A.M. Pk Hr		P.M. Pk Hr	
			Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C	Vol.	V/C
lconbridge Highway																																		
rth of Maley Drive	NB	1800	417	0.23	1497	0.83	423	0.24	1489	0.83	528	0.29	1785	0.99	530	0.29	1799	1.00	440	0.24	1476	0.82	439	0.24	1481	0.82	524	0.29	1759	0.98	523	0.29	1758	0.98
	SB	1800	1361	0.76	459	0.25	1354	0.75	465	0.26	1623	0.90	581	0.32	1635	0.91	583	0.32	1342	0.75	484	0.27	1346	0.75	483	0.27	1599	0.89	576	0.32	1598	0.89	575	0.32
South of Maley Drive	NB	1800	257	0.14	953	0.53	256	0.14	960	0.53	242	0.13	725	0.40	180	0.10	568	0.32	158	0.09	773	0.43	159	0.09	721	0.40	155	0.09	529	0.29	154	0.09	524	0.29
	SB	1800	866	0.48	283	0.16	873	0.49	282	0.16	659	0.37	266	0.15	516	0.29	198	0.11	703	0.39	174	0.10	655	0.36	175	0.10	481	0.27	171	0.09	476	0.26	169	0.09
ley Drive																																		
East of Barry Downe	EB	900	170	0.19	636	0.71	167	0.19	616	0.68	185	0.21	665	0.74	187	0.21	671	0.75	416	0.46	1000	1.11	411	0.46	1093	1.21	513	0.57	1049	1.17	512	0.57	1055	1.17
	WB	900	509	0.57	213	0.24	493	0.55	209	0.23	532	0.59	231	0.26	537	0.60	234	0.26	800	0.89	520	0.58	874	0.97	514	0.57	839	0.93	641	0.71	844	0.94	640	0.71
rry Downe to Notre Dame	EB	900	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	898	1.00	993	1.10	873	0.97	1059	1.18	896	1.00	1049	1.17	886	0.98	1055	1.17
	WB	900	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	794	0.88	1123	1.25	847	0.94	1091	1.21	839	0.93	1120	1.24	844	0.94	1108	1.23
West of Notre Dame	EB	900	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	253	0.28	683	0.76	242	0.27	695	0.77	272	0.30	681	0.76	267	0.30	685	0.76
	WB	900	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	–	0.00	0	0.00	546	0.61	316	0.35	556	0.62	303	0.34	545	0.61	340	0.38	548	0.61	334	0.37
Salle Boulevard																																		
ast of Barry Downe	EB	1800	465	0.26	356	0.20	470	0.26	491	0.27	471	0.26	503	0.28	472	0.26	486	0.27	467	0.26	528	0.29	464	0.26	513	0.28	464	0.26	518	0.29	456	0.25	514	0.29
	WB	1800	285	0.16	581	0.32	393	0.22	588	0.33	402	0.22	589	0.33	389	0.22	590	0.33	422	0.23	584	0.32	410	0.23	580	0.32	414	0.23	580	0.32	411	0.23	570	0.32
rry Downe to Notre Dame	EB	1800	1638	0.91	2298	1.28	1539	0.86	2123	1.18	1628	0.90	2278	1.27	1561	0.87	2181	1.21	1066	0.59	1629	0.90	1015	0.56	1484	0.82	1022	0.57	1631	0.91	963	0.54	1478	0.82
	WB	1800	1838	1.02	2048	1.14	1698	0.94	1924	1.07	1822	1.01	2035	1.13	1745	0.97	1951	1.08	1303	0.72	1333	0.74	1187	0.66	1269	0.70	1305	0.73	1278	0.71	1182	0.66	1204	0.67
West of Notre D[illegible]	EB	950	799	0.84	692	0.73	800	0.84	694	0.73	790	0.83	671	0.71	822	0.87	721	0.76	860	0.91	871	0.92	877	0.92	891	0.94	839	0.88	876	0.92	840	0.88	861	0.91
	WB	950	629	0.66	879	0.93	631	0.66	880	0.93	610	0.64	869	0.91	655	0.69	904	0.95	792	0.83	946	1.00	810	0.85	965	1.02	796	0.84	923	0.97	783	0.82	924	0.97
tre Dame Avenue																																		
rth of LaSalle	NB	1800	559	0.31	2060	1.14	565	0.31	2043	1.13	559	0.31	2059	1.14	558	0.31	2045	1.14	537	0.30	1631	0.91	528	0.29	1670	0.93	488	0.27	1608	0.89	497	0.28	1606	0.89
	SB	1800	1873	1.04	615	0.34	1857	1.03	622	0.35	1872	1.04	615	0.34	1859	1.03	614	0.34	1483	0.82	591	0.33	1518	0.84	581	0.32	1462	0.81	537	0.30	1460	0.81	547	0.30
South of LaSalle	NB	2700	901	0.33	3059	1.13	796	0.29	2853	1.06	882	0.33	3044	1.13	791	0.29	2884	1.07	1061	0.39	3079	1.14	976	0.36	2973	1.10	1016	0.38	3060	1.13	950	0.35	2913	1.08
	SB	2700	2447	0.91	1126	0.42	2282	0.85	995	0.37	2435	0.90	1103	0.41	2307	0.85	989	0.37	2463	0.91	1326	0.49	2378	0.88	1220	0.45	2448	0.91	1270	0.47	2330	0.86	1188	0.44
rry Downe Road																																		
North of LaSalle	NB	1800	590	0.33	871	0.48	590	0.33	859	0.48	551	0.31	835	0.46	554	0.31	836	0.46	371	0.21	856	0.48	374	0.21	860	0.48	363	0.20	762	0.42	365	0.20	768	0.43
	SB	1800	792	0.44	649	0.36	781	0.43	649	0.36	759	0.42	606	0.34	760	0.42	609	0.34	778	0.43	408	0.23	782	0.43	411	0.23	693	0.39	399	0.22	698	0.39	402	0.22
uth of LaSalle	NB	1800	549	0.31	1603	0.89	460	0.26	1510	0.84	534	0.30	1555	0.86	433	0.24	1393	0.77	501	0.28	1689	0.94	400	0.22	1643	0.91	464	0.26	1496	0.83	366	0.20	1408	0.78
	SB	1800	1282	0.71	686	0.38	1208	0.67	575	0.32	1244	0.69	668	0.37	1114	0.62	541	0.30	1351	0.75	626	0.35	1314	0.73	500	0.28	1197	0.67	580	0.32	1126	0.63	458	0.25
Montrose Avenue																																		
rth of LaSalle	NB	750	196	0.26	268	0.36	58	0.08	268	0.36	184	0.25	268	0.36	55	0.07	268	0.36	58	0.08	222	0.30	58	0.08	220	0.29	55	0.07	219	0.29	42	0.06	219	0.29
	SB	750	244	0.33	216	0.29	244	0.33	64	0.09	244	0.33	202	0.27	244	0.33	61	0.08	202	0.27	64	0.09	200	0.27	64	0.09	199	0.27	61	0.08	199	0.27	46	0.06
South of LaSalle	NB	750	–	0.00	0	0.00	65	0.09	39	0.05	–	0.00	0	0.00	65	0.09	39	0.05	–	0.00	0	0.00	65	0.09	39	0.05	–	0.00	0	0.00	65	0.09	39	0.05
	SB	750	–	0.00	0	0.00	35	0.05	72	0.10	–	0.00	0	0.00	35	0.05	72	0.10	–	0.00	0	0.00	35	0.05	72	0.10	–	0.00	0	0.00	35	0.05	72	0.10
stmount Avenue																																		
Existing Section	EB	750	164	0.22	195	0.26	230	0.31	248	0.33	164	0.22	195	0.26	229	0.31	244	0.33	164	0.22	195	0.26	214	0.29	243	0.32	164	0.22	195	0.26	252	0.34	240	0.32
	WB	750	177	0.24	180	0.24	225	0.30	253	0.34	177	0.24	180	0.24	222	0.30	252	0.34	177	0.24	180	0.24	221	0.29	235	0.31	177	0.24	180	0.24	218	0.29	277	0.37
posed Section	EB	750	–	0.00	0	0.00	358	0.48	359	0.48	–	0.00	0	0.00	388	0.52	406	0.54	–	0.00	0	0.00	207	0.28	276	0.37	–	0.00	0	0.00	216	0.29	211	0.28
	WB	750	–	0.00	0	0.00	326	0.43	394	0.53	–	0.00	0	0.00	369	0.49	427	0.57	–	0.00	0	0.00	251	0.33	228	0.30	–	0.00	0	0.00	192	0.26	238	0.32
Maley Ext. to the Kingsway																																		
North of LaSalle	NB	950	–	0.00	0	0.00	–	0.00	0	0.00	165	0.17	551	0.58	180	0.19	568	0.60	–	0.00	0	0.00	–	0.00	0	0.00	172	0.18	667	0.70	171	0.18	667	0.70
	SB	950	–	0.00	0	0.00	–	0.00	0	0.00	501	0.53	182	0.19	516	0.54	198	0.21	–	0.00	0	0.00	–	0.00	0	0.00	606	0.64	189	0.20	606	0.64	188	0.20
uth of LaSalle	NB	950	–	0.00	0	0.00	–	0.00	0	0.00	371	0.39	551	0.58	392	0.41	562	0.59	–	0.00	0	0.00	–	0.00	0	0.00	343	0.36	580	0.61	388	0.41	576	0.61
	SB	950	–	0.00	0	0.00	–	0.00	0	0.00	501	0.53	408	0.43	511	0.54	431	0.45	–	0.00	0	0.00	–	0.00	0	0.00	527	0.55	377	0.40	524	0.55	427	0.45

= northbound; EB = eastbound; SB = southbound; WB = westbound. *V/C Ratio = volume to capacity ratio*

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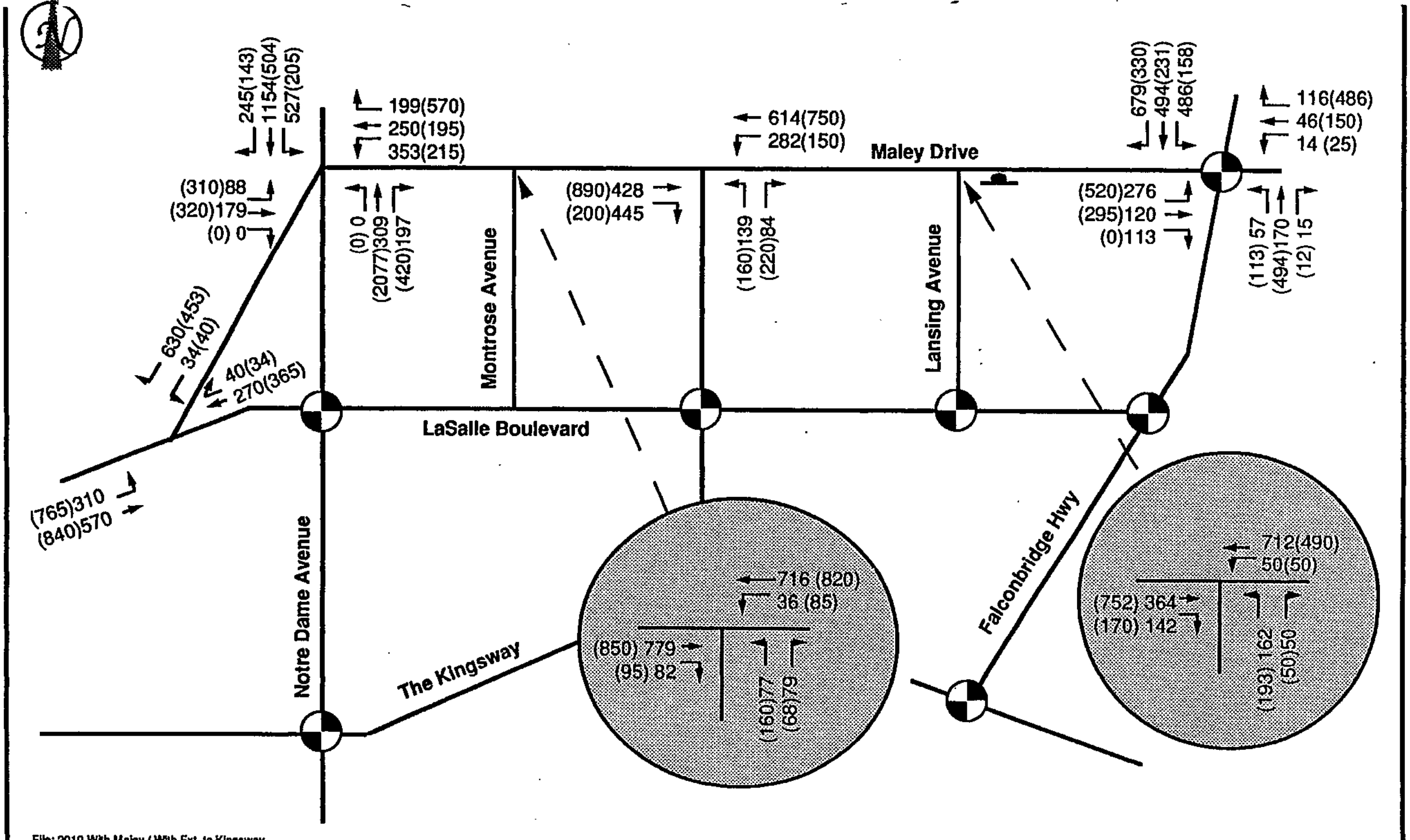
.M. Peak hour trips calculated from a.m. volumes using historic ratios of p.m. to a.m. volumes:

Commercial streets (e.g. LaSalle):	*1.25*
Non–commercial streets (e.g. Montrose):	*1.10*



File: 2010-With Maley / With Ext. to Kingsway
Disk: Maley Drive EA (Mac)

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◑ Signalized Intersection

100(200) AM PK Hr Volume (PM Pk Hr Volume)

Note: Notre Dame Widened to LaSalle; No Westmount/Montrose Extension

FIGURE 3.10
PROJECTED HIGH DEVELOPMENT LEVEL (2010) PEAK HOUR VOLUMES

JANUARY 5, 1995

constructed;

- Irrespective of other additions to the road network (such as the Westmount/Montrose Extensions), Maley Drive would attract between 800 and 900 vehicles in <u>each</u> direction during the a.m. peak hour, between Barry Downe Road and Notre Dame Avenue.

  From Barry Downe Road east to Falconbridge Highway, Maley Drive would attract more than 800 vehicles in the peak direction during the a.m. peak hour.

  West of Notre Dame Avenue, Maley Drive attracts more than 500 vehicles westbound during the a.m. peak hour.

  During the p.m. peak hour, maximum projected volumes on Maley Drive are expected to be in the range of 1,100 trips;

- A future extension of Maley Drive easterly, from Falconbridge Highway to the Kingsway, is expected to be well used, attracting between 500 and 600 trips in the peak direction. However, the presence of this link would not add a large number of trips to the sections of Maley Drive west of Falconbridge Highway;

- The Level of Service at signalized intersections at the High Level is summarized in Table 3.10, assuming that the Maley Drive Extension is not constructed. This table also compares the projected Level of Service at the Low and Medium Levels to that at the High Level. At the High Level, the intersections of LaSalle Boulevard at Falconbridge Highway, Barry Downe Road and Notre Dame Avenue are all projected to continue to operate at an unsatisfactory Level of Service.

3.3.3 - Conclusions

The extension of Maley Drive from Barry Downe Road to the LaSalle Boulevard Extension and the reconstruction of the existing Maley Drive would form a northern bypass of the City of Sudbury. This is required for the following reasons:

1. Existing east-west road links north of downtown Sudbury are currently operating close to or at capacity. There is little or no opportunity to widen these roads;

2. Turning movements at intersections along LaSalle Boulevard, which is parallel to the proposed Maley Drive Extension, are also approaching or at capacity;

TABLE 3.10
PROJECTED LEVEL OF SERVICE AT SIGNALIZED INTERSECTIONS WITH NO MALEY DRIVE EXTENSION LOW, MEDIUM AND HIGH DEVELOPMENT LEVELS

INTERSECTION	A.M. PEAK HOUR LEVEL OF SERVICE (V/C RATIO)		
	LOW DEVELOPMENT LEVEL	MEDIUM DEVELOPMENT LEVEL	HIGH DEVELOPMENT LEVEL
Notre Dame Avenue @ LaSalle Boulevard	F (1.19)	F (1.33)	F (1.35)
Barry Downe Road @ LaSalle Boulevard	D (0.83)	E (0.96)	E (0.97)
Falconbridge Highway @ LaSalle Boulevard	C (0.76)	E (0.97)	E (0.98)
Maley Drive @ Falconbridge Highway	A (0.51)	A (0.54)	A (0.58)

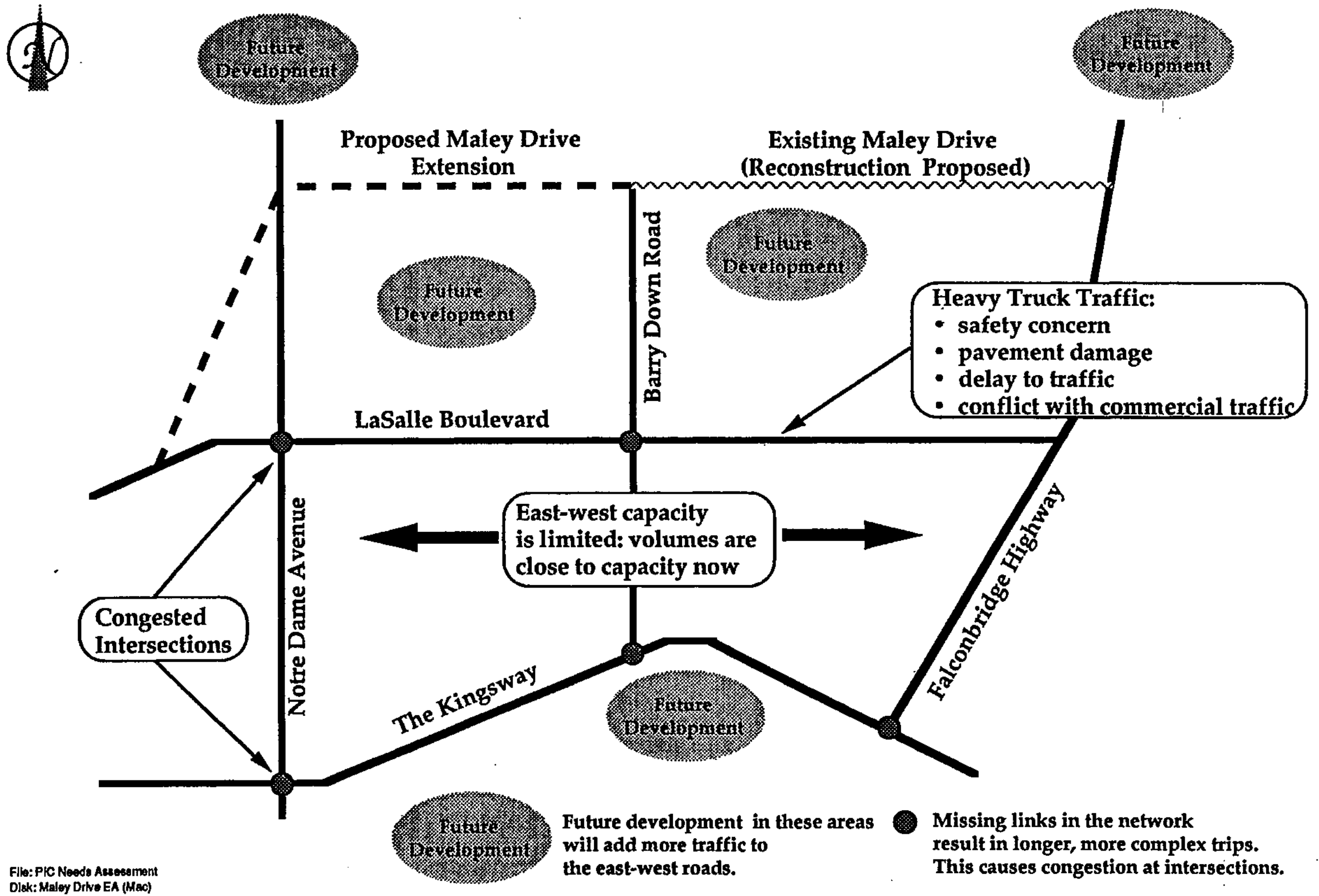
3. Trucking operations along LaSalle Boulevard add to the congestion level on that street, because of the lack of an alternate route. These represent an ongoing safety concern to drivers on LaSalle;

4. Trucks are accelerating the rate of pavement damage on LaSalle Boulevard;

5. Projected development in the northern section of the City of Sudbury and the outlying communities to the north of the City is expected to aggravate the traffic congestion problems on the links of LaSalle Boulevard, and at the intersections of LaSalle with Notre Dame Avenue, Barry Downe Road and Falconbridge Highway; and

6. There is the potential for mine haul truck traffic to increase on LaSalle Boulevard. This would add to the already high level of congestion.

These points are illustrated in Figure 3.11. They corroborate the conclusion of the Sudbury Regional Transportation Study, that the Maley Drive Extension from Barry Downe Road to the LaSalle Boulevard Extension is required by the time the Low Development Level is reached. Failure to build the Maley Drive Extension to accommodate that level of development was forecast to result in an unacceptable level



Heavy Truck Traffic:
- safety concern
- pavement damage
- delay to traffic
- conflict with commercial traffic

East-west capacity is limited: volumes are close to capacity now

Congested Intersections

Future development in these areas will add more traffic to the east-west roads.

● Missing links in the network result in longer, more complex trips. This causes congestion at intersections.

File: PIC Needs Assessment
Disk: Maley Drive EA (Mac)

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FIGURE 3.11
THE NEED FOR THE MALEY DRIVE EXTENSION

of traffic congestion across the north end of the City of Sudbury. This is expected to be due to the additional traffic generated as a result of the expected continued growth in employment and population.

The completed Maley Drive will also form an efficient truck bypass of the City for many truck movements, allowing trucks to avoid the congested commercial section of LaSalle Boulevard. This will reduce conflicts with auto traffic, cyclists and pedestrians on LaSalle Boulevard, and also reduce the rate of pavement damage on LaSalle.

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4. ALTERNATIVES TO THE UNDERTAKING, AND THEIR EVALUATION

This Chapter documents the alternatives to the undertaking. It also summarizes the evaluation of these alternatives.

4.1 Alternatives to the Undertaking

Four alternatives to the undertaking have been considered:

1. Do nothing;
2. Improvements to existing roads;
3. Introduction of a new road; and
4. Transit services.

4.1.1 - Do Nothing

The "do-nothing" alternative would mean that LaSalle Boulevard and The Kingsway would continue to be the only continuous east-west arterial roads through the City of Sudbury, north of Ramsey Lake. These roads would have to accommodate growing volumes of through traffic, commuter traffic, industrial and mining traffic, and traffic generated by continuing development along these two streets.

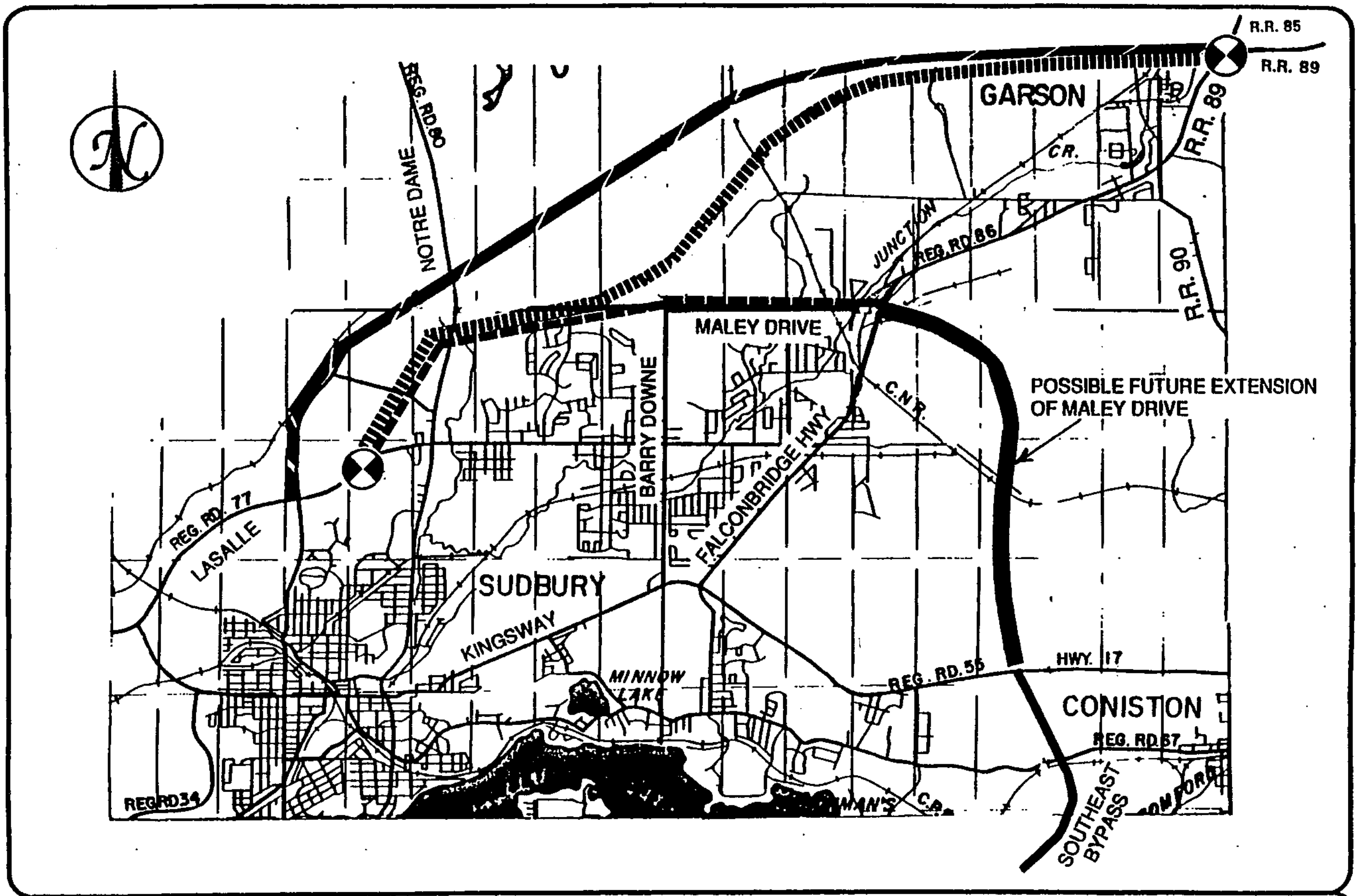
4.1.2 - Improvements to Existing Roads

Improvements to existing roads which have been considered are the widening of LaSalle Boulevard and the widening of The Kingsway, between Notre Dame Avenue and Falconbridge Highway.

4.1.3 - Introduction of a New Road

Three alternative alignments for a new road have been considered. These are shown in Figure 4.1. These represent a reasonable spectrum of the potential alignments for a new road, given the existing road network configurations to the east and west of the study area.

Alternative 1 (Maley Drive Extension plus reconstruction of the existing Maley Drive) follows the existing Maley Drive road allowance west from Falconbridge Highway to Barry Downe Road. A westerly extension of Maley Drive continues past Barry Downe Road, crossing Notre Dame Avenue before angling south to merge with LaSalle Boulevard. The corridor traverses the northern urban boundary of the City of Sudbury. The existing road allowance runs through low density residential and industrial/ commercial development. The proposed extension lies to the north of an



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- ▬ ▬ ▬ Alternative 1 : Maley Drive extension plus reconstruction of existing Maley Drive
- ▬▬ Alternative 2 : Inco Road
- ▮▮▮▮ Alternative 3 : Maley Drive Extension plus new road
- ⊗ Intersection Re-Alignment

FIGURE 4.1
ALTERNATIVES FOR NEW ROADS

existing residential development, passing over several streams and wetlands.

Alternative 2 (the INCO Road proposal) represents the northernmost route corridor, running northeast to southwest along an arc from Falconbridge Highway (Regional Road 86) in Garson to LaSalle Boulevard west of Notre Dame Avenue. The new road would join with the existing Frood Road adjacent to the Frood Mine complex, and would continue along Frood Road to its intersection with LaSalle Boulevard. The corridor lies two to six kilometres north of Sudbury's urban boundary, largely on land owned by INCO. INCO has not made any commitment to contribute to the cost of this road. The proposed corridor follows an upland route, passing adjacent to several mining operations. Although following an upland route, several streams and wetlands bisect the projected path of the corridor.

Alternative 3 (Maley Drive Extension plus new road) runs northeast to southwest, following a hydro corridor from Falconbridge Highway in Garson to the CNR tracks, north of the City's urban boundary. West of the CNR, the route continues southwest along an off-road extension of O'Neil Drive. At the intersection of Barry Downe Road and Maley Drive, this corridor merges with the proposed extension of Maley Drive (Alternative 1), continuing west past Barry Downe Road and crossing Notre Dame Avenue before angling south to merge with LaSalle Boulevard.

Cost Estimates

Cost estimates for these three alternatives were undertaken in 1990, as part of the Regional Transportation Study. The construction cost estimates (in 1990 dollars, excluding land costs) are as follows:

- Alternative 1: $ 13 million;
- Alternative 2: $ 30 million; and
- Alternative 3: $ 27 million.

4.1.4 - Transit Services

One possible alternative would be to implement some type of east-west transit service in the Study Area. This could take the form of a bus or Light Rail Transit (LRT) service on LaSalle Boulevard. An alternative of this type could be considered in terms of its ability to shift a portion of the travel demand on LaSalle Boulevard from auto to transit, which might then alleviate the need for a bypass of the City.

4.2 Evaluation of the Alternatives to the Undertaking

The alternatives have been assessed in terms of their impacts on transportation, and on the natural, social and economic environments.

4.2.1 - Transportation Impacts of the Alternatives

4.2.1.1 - Do Nothing

As discussed in Chapter 3, the "do-nothing" alternative would result in an unacceptably high level of congestion on The Kingsway and on LaSalle Boulevard during the a.m. and p.m. peak periods of the day. Doing nothing would also result in an unacceptable Level of Service at the intersections of LaSalle Boulevard at Notre Dame Avenue, Barry Downe Road and Falconbridge Highway. These intersections are key access points within the Regional Municipality of Sudbury for commuter, commercial/industrial and retail traffic.

This alternative would also result in continued conflicts between heavy industrial vehicles and private cars on LaSalle Boulevard. The heavy trucks would also continue to accelerate the deterioration of the pavement on LaSalle Boulevard. This may result in a need to reconstruct this road at a date earlier than would be the case if trucks used a more appropriate facility.

Long Range Perspectives

In the long term, the "do-nothing" alternative will result in a poor to unacceptable level of service for traffic operations on major arterial roads across the northern section of the City of Sudbury.

4.2.1.2 - Improvements to Existing Roads

Improvements to existing roads which have been considered are the widening of LaSalle Boulevard and the widening of The Kingsway, between Notre Dame Avenue and Falconbridge Highway.

Widening of The Kingsway

A widening of The Kingsway would have extensive impacts on adjacent commercial properties. Many of these are located in a very narrow valley, bordered on either side by high outcrops of bedrock. A widening could require the expropriation of a large number of properties, and it could leave the remaining properties with insufficient space for parking or driveways.

In addition, the right-of-way at the western end of The Kingsway approaching the central business district is very narrow. A widening through this section would require extensive blasting of rock, and possibly re-configuration of existing streets which intersect The Kingsway.

In summary, widening of The Kingsway would be both costly and difficult to implement from a design perspective.

Widening of LaSalle Boulevard

A widening of LaSalle Boulevard would have extensive impacts on adjacent commercial and residential properties. A widening could impact on the parking and accesses of a large number of properties.

In addition to the widening, extensive improvements would be required at the intersections of LaSalle at Falconbridge Highway, at Barry Downe Road and particularly at Notre Dame Avenue. At Notre Dame Avenue, the necessary improvements would likely include additional double left turn lanes and/or grade separation of turning movements. It should be noted that construction of the Westmount/Montrose link (discussed in Chapter 3) could alleviate the need to provide some improvements at the intersection of Notre Dame Avenue at LaSalle Boulevard.

In summary, a widening of LaSalle Boulevard could be undertaken. This would result in continued use of LaSalle Boulevard by mining and industrial truck traffic. It would not improve access to the existing and planned development areas north of LaSalle Boulevard.

Long Range Perspectives

In the medium to long term, widening of existing roads could provide reasonably adequate transportation service to the northern portion of the City of Sudbury. Over a time horizon of 20 to 30 years, however, demand can be expected to exceed the capacity limits of the widened roads. This would limit development of the northern area of the City and adversely impact industrial and business activity.

4.2.1.3 - Introduction of a New Road

Alternative 1 (Maley Drive Extension plus reconstruction of the existing Maley Drive) would provide a new arterial route and a bypass close to the developed area of the City of Sudbury. This road would be an attractive alternative to LaSalle Boulevard and The Kingsway. It would provide a direct and efficient link between the industrial and mining areas located to the northwest of the Region with the mining and smelting operations located on the east side of the Region. It would also provide a continuous east-west arterial route at an appropriate north-south spacing within the City.

Alternative 1 would provide the greatest relief to turning movement volumes at intersections of LaSalle Boulevard with north-south streets, from Notre Dame Avenue in the west to Falconbridge Highway in the east, by providing a continuous east-west route from the LaSalle Boulevard Extension to Falconbridge Highway.

Alternative 2 (INCO Road) is the most northerly of the alternative alignments. It would provide a bypass of the developed area of the City of Sudbury, but it would require drivers to travel approximately six kilometres farther north than would Alternative 1. This would reduce its attractiveness to both commuter traffic and industrial/mining traffic. This alternative would be attractive only to persons whose trips begin or end in Garson or points north of Garson. Under this Alternative, substantial truck and auto volumes would likely remain on LaSalle Boulevard.

Alternative 3 (Maley Drive Extension plus New Road) would provide a level of service similar to that of Alternative 2. The route would not be as attractive as Alternative 1 because of the distance between the eastern terminus of the road (in Garson) and the developed area of the City. Significant truck and auto volumes would likely remain on LaSalle Boulevard under this Alternative.

Alternatives 2 and 3 would provide some relief to turning movements at the LaSalle - Notre Dame intersection, but turning movements at the intersections of LaSalle Boulevard at Barry Downe Road and Falconbridge Highway would remain congested.

Long Range Perspectives

Alternative 1 would provide the initial links in a complete northern bypass of the City of Sudbury. This bypass eventually could be completed by extending Maley Drive easterly from Falconbridge Highway and south to meet The Kingsway (Highway 17) at the recently completed Southeast Bypass, as shown in Figure 4.1.

Alternatives 2 and 3 could also be extended to form this bypass, but the link to The Kingsway in the east would be significantly longer, and therefore more costly. This could result in more extensive effects on the natural environment than would result from the extension of Alternative 1.

4.2.1.4 - Transit Services

A review of existing conditions indicates that higher-order transit service would not be a viable transportation alternative in the study area. This conclusion is based on the following data:

1. Transit ridership data for the study area indicates that currently, the <u>daily</u> transit usage on the five Sudbury Transit routes which serve this area total approximately 5,150 person-trips. The primary function of these routes is to connect the residential areas of New Sudbury to downtown Sudbury. All of these five routes serve some portion of LaSalle Boulevard, as well as the residential and commercial areas adjacent to LaSalle. The current transit service on LaSalle Boulevard consists of the following routes: 141, 142, 301, 302 and 303. These are shown in Figure 4.2. During the peak hours, routes 301 and 302 each operate at a 30-minute headway. Routes 141 and 142 operate at a 60-minute headway during the peak hours. Route 303 consists of seven return trip runs from Garson to downtown Sudbury between 7:00 a.m. and 10:30 p.m. The daily ridership on the in-town routes is as follows:

    - Route 141 - 154 trips;
    - Route 142 - 66 trips;
    - Route 301 - 1,714 trips; and
    - Route 302 - 1,582 trips.

    There is an additional transit route (401) that serves the area, but does not travel on LaSalle Boulevard; the daily ridership on route 401 is 1,951 trips.

    These ridership levels can be accommodated on bus services in mixed traffic. They are not sufficient to warrant consideration of higher-order transit service;

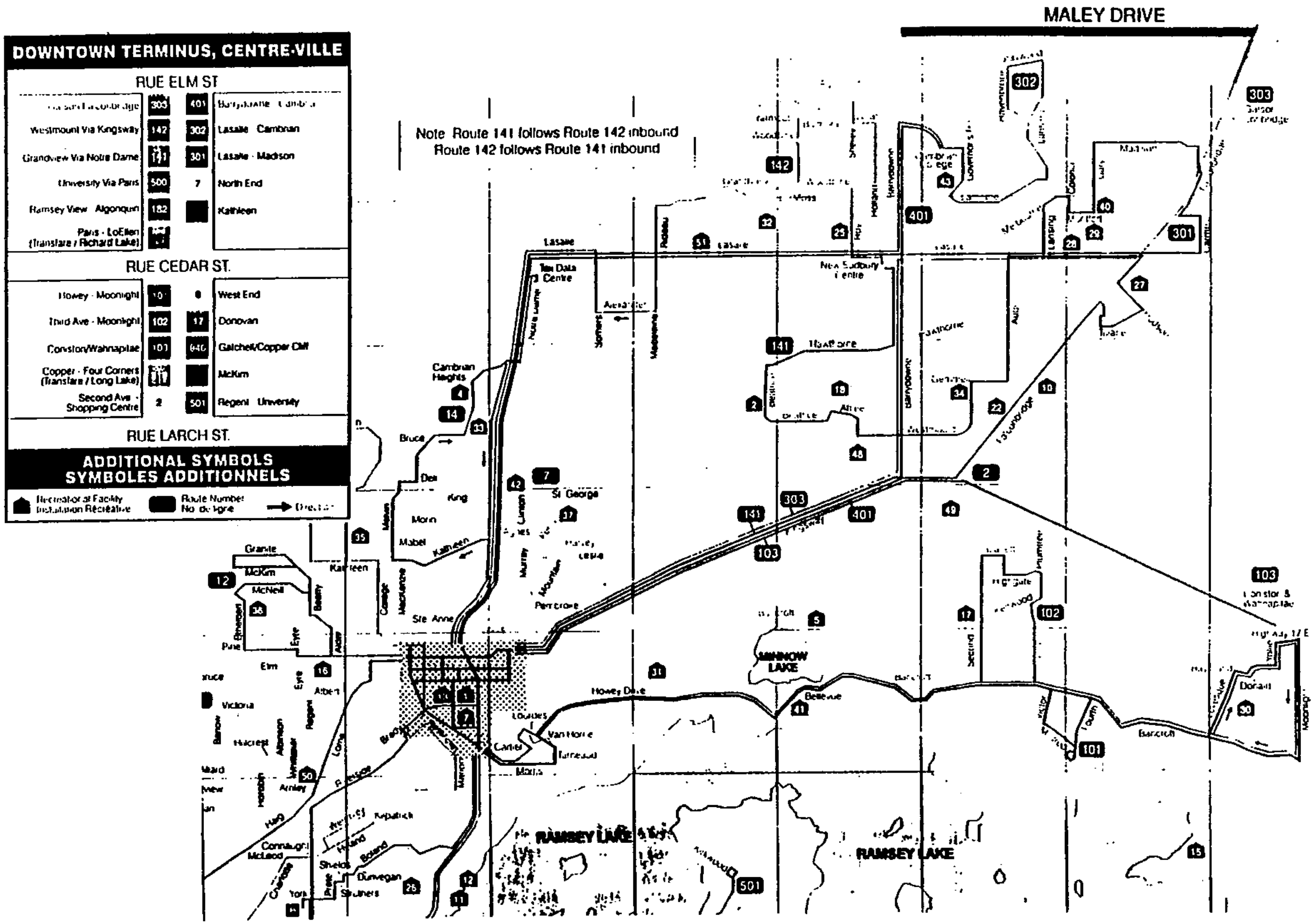
2. Trip origins and destinations are not present in sufficient density to support transit service along the LaSalle Boulevard corridor. In particular, employment is not concentrated in locations within the corridor such that transit would be a viable option for commuters. Mining/industrial employment locations tend to be widely dispersed in the areas around the northern perimeter of the City of Sudbury. Similarly, the planned population and employment density in the Maley Drive corridor is not sufficient to support transit at a level which would preclude the need for additional east-west road capacity; and

3. The long range plans of Sudbury Transit do not reflect the need for a higher-order transit service in any of the east-west corridors north of Ramsey Lake.

4.2.2 - Effects on the Natural Environment

Environmental investigations were carried out as part of the review of the three alternatives for a new road, as shown in Figure 4.1:

- Alternative 1 - Maley Drive Extension plus reconstruction of the existing Maley Drive;



▨ CENTRAL BUSINESS DISTRICT

Marshall Macklin Monaghan

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FIGURE 4.2
EXISTING TRANSIT SERVICES

Maley Drive Extension Class Environmental Assessment

- Alternative 2 - INCO Road; and
- Alternative 3 - Maley Drive Extension plus new road.

The other alternatives ("do-nothing" and transit services) would have lesser impacts on the natural environment, as no large natural areas would be impacted by these alternatives.

Methodology

Wetlands, terrestrial vegetation and fish and wildlife habitat were assessed and evaluated based on field observations. In addition, aerial photos were interpreted in support of field investigations of alternatives. Photographic documentation was included as a component of the assessment.

Field investigations were carried out on Alternative 1 in June 1994. Alternatives 2 and 3 were investigated in November 1994.

4.2.2.1 - Alternative 1: Maley Drive Extension

Alternative 1 runs east to west along the existing Maley Drive road allowance. A westerly extension of Maley Drive continues past Barry Downe Road, crossing Notre Dame Avenue before angling south to merge with LaSalle Boulevard.

Fisheries

Eight water crossings were identified within the study area from base maps.

Watercourses exhibited a range of morphologies within the study area. Low gradient areas consisted of flats with organic, silty substrates. High gradient watercourses consisted of riffles, pools and falls with bedrock substrate.

A mixture of riparian vegetation is found within the study area. Willows, alders, trembling aspen, poplar and white birch are the principal tree species associated with the riparian zone. Grasses, sedges and Labrador tea form the dominant ground cover.

Beaver activity, present and historical, was evident throughout the study area. Networks of dams, lodges and woody debris were present along several watercourses. Disturbances of the natural environment by man, in the form of transportation crossings and mining activities, were also apparent within the study area.

A review of background information (Ministry of Natural Resources, Laurentian University) indicated that degraded warmwater fish communities utilize watercourses within the study area watershed.

Wetlands

Approximately 25 percent of the study area is covered by wetlands which are most often associated with beaver activity in watercourses. Tree species common to these areas include willow, speckled alder, trembling aspen, balsam poplar and white birch. Grasses, sedges, Labrador tea, impatiens, jewelweed, field herbs and cattails provide ground cover in wetland areas.

Terrestrial Vegetation

Approximately 75 percent of the study area is covered by a developing white birch-heathland plant community. This community, in most cases, is sparsely treed. Field investigations did not identify any rare or significant terrestrial vegetation types along this corridor.

Wildlife

Mammals

Mammal species observed (based on sightings, scat, tracks) in the study area include American black bear, white-tailed deer, beaver, red squirrel, meadow jumping mouse, American porcupine and snowshoe hare.

Birds

Bird species observed within the study area include ravens, black-capped chickadees and woodpeckers (species unknown). Many other species utilize the area on a seasonal basis.

Herpetofauna

Herpetofauna observed (based on sightings and vocalizations) within the study area include wood frog, leopard frog, green frog and spring peepers.

4.2.2.2 - Alternative 2: INCO Road

Alternative 2 represents the northernmost route corridor, running northeast to southwest along an arc from Falconbridge Highway (Regional Road 86) in Garson to LaSalle Boulevard west of Notre Dame Avenue. The new road would merge with Frood Road adjacent to the Frood Mine complex, and continue along Frood Road to LaSalle Boulevard.

The corridor lies two to six kilometres north of Sudbury's urban boundary. The proposed corridor follows an upland route, passing adjacent to several mining operations. Although following an upland route, several streams and wetlands bisect the projected path of the corridor.

Fisheries

Nine water crossing were identified within the study area from base maps.

Watercourses exhibited a range of morphologies within the study area. Low gradient areas consisted of flats with organic, silty substrates. High gradient watercourses consisted of riffles, pools and falls with bedrock substrate.

A mixture of riparian vegetation is found within the study area. Willows, alders, trembling aspen, poplar and white birch are the principal tree species associated with the riparian zone. Grasses, sedges and Labrador tea form the dominant ground cover.

Beaver activity, present and historical, was evident throughout the study area. Networks of dams, lodges and woody debris were present along several watercourses. Anthropogenic disturbances, in the form of transportation s and mining activities, were also apparent within the study area.

Fish habitat along the corridor is similar to that observed in Alternative 1 (Maley Drive Extension). Degraded warmwater fish communities are present in the study area.

Wetlands

Approximately 10 percent of the study area is covered by wetlands which are most often associated with beaver activity in watercourses. Tree species common to these areas include willow, speckled alder, trembling aspen, black spruce, eastern white cedar, balsam fir and white birch. Grasses, sedges, Labrador tea, impatiens, jewelweed, field herbs and cattails provide ground cover in wetland areas.

A small balsam fir/cedar wetland is developing on a site located along the eastern portion of the corridor. This wetland type was not observed along the other corridors.

Terrestrial Vegetation

Approximately 90 percent of the study area is covered by a developing upland white birch-heathland plant community. Other tree species observed within the upland community include mountain maple, trembling aspen, large tooth aspen, eastern white cedar, red pine, jack pine and red oak.

This community, in most instances, is sparsely treed. Field investigations did not identify any rare or significant terrestrial vegetation types along this corridor.

Wildlife

Mammals

Mammal species observed on-site (based on sightings, scat, and tracks) include red squirrel, snowshoe hare, and gray wolf. Other species, including those referred to in Alternative 1 (Maley Drive Extension) are undoubtedly present but were not observed due to winter conditions at the time of field investigation.

Birds

Bird species observed within the study area include ravens, black-capped chickadees and woodpeckers (species unknown). Many other species utilize the area on a seasonal basis.

Herpetofauna

Herpetofauna were not observed within the study area due to winter conditions. However, herpetofaunal species including wood frog, leopard frog, green frog and spring peepers are likely present in the study area.

4.2.2.3 - Alternative 3: Maley Drive Extension plus New Road

Alternative 3 runs northeast to southwest, following a hydro corridor from Falconbridge Highway in Garson to the CNR tracks. West of the CNR, the route continues southwest along an off-road extension of O'Neil Drive. At the intersection of Barry Downe Road and Maley Drive, this corridor merges with the proposed extension of Maley Drive (Alternative 1), continuing past Barry Downe Road and crossing Notre Dame Avenue before angling south to merge with LaSalle Boulevard.

The eastern portion of the corridor follows an existing hydro corridor through a series of upland and lowland habitats. West of the CNR, the corridor follows a system of lowland wetlands. The proposed Maley Drive extension lies to the north of an existing residential development, passing over several streams and wetlands.

Fisheries

Ten water crossing were identified within the study from base maps.

Watercourses exhibited a range of morphologies within the study area. Low gradient areas consisted of flats with organic, silty substrates. High gradient watercourses consisted of riffles, pools and falls with bedrock substrate.

A mixture of riparian vegetation is found within the study area. Willows, alders, trembling aspen, poplar and white birch are the principal tree species associated with the riparian zone. Grasses, sedges and Labrador tea form the dominant ground cover.

Beaver activity, present and historical, was evident throughout the study area. Networks of dams, lodges and woody debris were present along several watercourses. Anthropogenic disturbances, in the form of transportation accesses and mining activities, were also apparent within the study area.

Fish habitat along the corridor is similar to that observed in Alternative 1 (Maley Drive Extension). Degraded warmwater fish communities are present in the study area.

Wetlands

Approximately 25 percent of the study area is covered by wetlands which are most often associated with beaver activity in watercourses. Tree species common to these areas include willow, speckled alder, trembling aspen, black spruce, eastern white cedar, balsam fir and white birch. Grasses, sedges, Labrador tea, impatiens, jewelweed, field herbs and cattails provide ground cover in wetland areas.

Terrestrial Vegetation

Approximately 75 percent of the study area is covered by a developing white birch-heathland plant community. Other tree species observed within the upland community include mountain maple, trembling aspen, large tooth aspen, eastern white cedar, red pine, white spruce and pin cherry.

This community, in most cases, is sparsely treed. Field investigations did not identify any rare or significant terrestrial vegetation types along this corridor.

Wildlife

<u>Mammals</u>

Mammal species observed on-site (sightings, scat, tracks) include gray wolf, moose, beaver, red squirrel, and snowshoe hare. Other species, including those referred to in Alternative 1 (Maley Drive Extension) are undoubtedly present but were not observed due to winter conditions at the time of field investigation.

Birds

Bird species observed within the study area include ravens, black-capped chickadees, woodpeckers (species unknown) and ruffed grouse. Many other species use the area on a seasonal basis.

Herpetofauna

Herpetofauna were not observed within the study area due to winter conditions. However, herpetofaunal species including wood frog, leopard frog, green frog and spring peepers are likely present in the study area.

4.2.2.4 - Summary of Environmental Features

Alternative 1: Maley Drive Extension plus Reconstruction of the Existing Maley Drive

Degraded warmwater fish communities inhabit stream systems within the study area. Mining activities, transportation crossings and beaver activity have impacted fish habitat within area watercourses. Poorly sited culverts along roads and railways have impacted watercourses, creating ponded conditions and barriers to fish migration. Mining operations to the north of Maley Drive have impacted fish habitat through degradation of water quality and quantity. Ponding, erosion, migration barriers and changes within vegetation communities are impacts associated with beaver activity.

The developing upland white birch - heathland community is somewhat tolerant to human disturbance. As the forest matures, this system will offer greater opportunities for wildlife habitat and correspondingly greater sensitivity to human impacts. Rare or significant terrestrial vegetation types were not observed along this corridor.

Wetlands within the study area are often associated with beaver activity within watercourses. In comparison to adjacent upland communities, wetlands are more significant natural features and display greater sensitivity to construction impacts.

A variety of transient and resident wildlife utilize the upland and wetland communities along the proposed corridor. The home ranges of several species (black bear, white-tailed deer, moose, wolf) likely lie to the north, in less disturbed areas.

Alternative 2: INCO Road

Degraded warmwater fish communities inhabit stream systems within the study area. Mining activities, transportation crossings and beaver activity have impacted fish habitat within area watercourses. Poorly sited culverts along roads and railways have impacted watercourses, creating ponded conditions and barriers to fish migration. Mining operations to the north of Maley Drive have impacted fish habitat through degradation of water quality and quantity. Ponding, erosion, migration barriers and changes within vegetation communities are impacts associated with beaver activity.

The developing upland white birch - heathland community is somewhat tolerant to human disturbance. As the forest matures, this system will offer greater opportunities for wildlife habitat and correspondingly greater sensitivity to human impacts. Rare or significant terrestrial vegetation types were not observed along this corridor.

Wetlands within the study area are often associated with beaver activity within watercourses. A small, developing balsam fir/white cedar wetland represents a distinctive form not observed along the other corridors. In comparison to adjacent upland communities, wetlands are more significant natural features and display greater sensitivity to construction impacts.

A variety of transient and resident wildlife utilize the upland and wetland communities along the proposed corridor. Relatively undisturbed, the area offers habitat to species exhibiting greater sensitivity to human disturbance (gray wolves, black bear, white-tailed deer, moose).

Alternative 3: Maley Drive Extension plus New Road

Degraded warmwater fish communities inhabit stream systems within the study area. Mining activities, transportation crossings and beaver activity have impacted fish habitat within area watercourses. Poorly sited culverts along roads and railways have impacted watercourses, creating ponded conditions and barriers to fish migration. Mining operations to the north of Maley Drive have impacted fish habitat through degradation of water quality and quantity. Ponding, erosion, migration barriers and changes within vegetation communities are impacts associated with beaver activity.

The developing upland white birch - heathland community is somewhat tolerant to human disturbance. As the forest matures, this system will offer greater opportunities for wildlife habitat and correspondingly greater sensitivity to human impacts. Rare or significant terrestrial vegetation types were not observed along this corridor.

Wetlands within the study area are often associated with beaver activity within watercourses. In comparison to adjacent upland communities, wetlands are more significant natural features and display greater sensitivity to construction impacts.

A variety of transient and resident wildlife utilize the upland and wetland communities along the proposed corridor. West of Barry Downe Road, the corridor lies adjacent to residential and commercial developments, exposing wildlife to human disturbance. East of Barry Downe Road, the area offers habitat to species exhibiting greater sensitivity to human disturbance (gray wolves, black bear, moose, white-tailed deer).

Summary

The comparative assessment may be summarized as follows:

- **Fish Habitat:** Fish habitat and fish communities are similar among the alternatives investigated. Fish communities are indicative of degraded warmwater fish habitat. Past and present impacts on fish habitat are also similar in source and scope. Water crossings range in number from eight in Alternative 1 (Maley Drive Extension) to ten in Alternative 3 (Maley Drive plus New Road);

- **Wetlands:** Wetlands adjacent to the alternatives are often associated with beaver activity along area watercourses. Alternative 2 follows an upland route and contains the smallest percentage of wetlands along its proposed corridor; however, it does contain a distinct balsam fir/white cedar wetland not found along the other corridors. Alternatives 1 and 3 are aligned through a greater proportion of wetland area;

- **Terrestrial Vegetation:** A developing upland white birch - heathland community is common to all alternatives. Upland habitat is greatest in extent along Alternative 2 (INCO Road). The white birch - heathland community is presently less sensitive to impacts associated with road construction, in comparison with wetland areas; and

- **Wildlife:** Mammalian wildlife is similar among the alternatives. However, wildlife species sensitive to human disturbance are more likely to be found in less disturbed areas to the north. Alternative 1, following an existing road allowance and cutting through the northern urban boundary of Sudbury, is a moderately disturbed site. Its development is unlikely to have significant detrimental impacts on wildlife populations. Alternative 2 would be constructed in an area with significantly less existing disturbance. Development of Alternative 2 may displace sensitive mammal populations and would definitely bisect home ranges, increasing the likelihood of wildlife/traffic encounters.

Alternative 3 (Maley Drive plus New Road) represents a moderate quality route alternative from an environmental perspective. Construction of a new road through a relatively undisturbed area will bisect wildlife habitat, displacing species sensitive to human contact and increasing the likelihood of wildlife/traffic encounters. The portion of the new road, along with the proposed Maley Drive extension, passes through a series of watercourses and wetlands. Construction will impact these relatively sensitive ecosystems.

Alternative 2 (INCO Road) also represents a moderate quality route alternative from an environmental perspective. Although a smaller area of watercourses and wetlands will be impacted in comparison to the other alternatives, a large expanse of highway will be constructed in a relatively undisturbed area. Wildlife displacement and increased likelihood of traffic/wildlife encounters will be the primary impacts associated with this alternative.

Alternative 1 (Maley Drive Extension plus Reconstruction of the Existing Maley Drive) represents a moderate-good quality route alternative from an environmental perspective. Passing along the fringe of the urban area, it represents an area of human disturbance and is less likely to displace wildlife habitat or increase traffic/wildlife encounters. Impacts to watercourses and wetlands will be similar to impacts associated with Alternative 3.

Conclusions: Preferred Route Corridor

Alternative 1 (Maley Drive Extension) represents the preferred route corridor from an environmental perspective. The corridor utilizes existing transportation infrastructure and the proposed extension passes along the northern fringe of the urban area. This corridor will have the least impact on area wildlife. Although watercourse and wetland crossings will be required to complete the project, proper siting and use of Best Management Practices construction techniques will minimize impacts to these ecosystems. Retrofitting of existing structures along Maley Drive will likely enhance fish habitat and wetland opportunities in the study area.

4.2.3 - Impacts on the Social and Economic Environments

4.2.3.1 - Do Nothing

The projected levels of congestion on LaSalle Boulevard and The Kingsway resulting from the "do-nothing" alternative would have a negative effect on the residential neighbourhoods in the vicinity of LaSalle Boulevard and The Kingsway. Traffic infiltration through residential neighbourhoods would increase, as drivers seek routes around the congestion points. This could result in volumes on residential streets which are above their design capacity. It could also increase the potential for conflicts between pedestrians and vehicles on local streets.

The projected levels of traffic congestion would also have an economic impact. Traffic congestion would discourage visits to the retail and other commercial establishments along The Kingsway and LaSalle Boulevard, potentially affecting their financial viability.

4.2.3.2 - Improvements to Existing Roads

Widening of The Kingsway and/or LaSalle Boulevard would disrupt the economic and community fabric along these streets, by requiring the acquisition of all or part of numerous properties. The continued high use of these commercial streets for heavy truck traffic could also have a negative impact on area businesses.

Merely widening one of these existing roads would also limit accessibility to development areas north of LaSalle Boulevard.

Forcing industries and mines to continue to use heavily congested commercial streets for truck travel could also have a negative impact on this sector of the economy.

4.2.3.3 - Introduction of a New Road

The northerly alternatives for a new road (Alternatives 2 and 3) would have little if any effect on existing communities, with two exceptions. The first would be the hamlet of Garson, which would be the eastern terminus point for these alternatives. Garson would therefore be subject to increased traffic volumes and noise effects. The additional traffic could be regarded as a negative effect on the existing community, but it could also be viewed as a positive effect in terms of fostering economic development in Garson. The second existing community which would be affected by this alternative would be the area bounded by Barry Downe Road and Falconbridge Highway, north of LaSalle Boulevard. This neighbourhood would be subject to increased traffic infiltration, as drivers seek to avoid the expected congestion on LaSalle Boulevard by utilizing local and collector roads for through travel.

Alternative 1 (Maley Drive Extension and reconstruction of the existing Maley Drive) would result in additional traffic near residents and businesses adjacent to the existing section of Maley Drive, and for the residents of existing neighbourhoods close to the proposed route, west of Barry Downe Road. However, it would also improve the accessibility of these neighbourhoods, permitting enhanced opportunities for access by emergency, transit and private vehicles, as well as for bicycles and pedestrians.

Alternative 1 will have the greatest economic benefit of any of the alternatives. The provision of a continuous road along the City's north urban boundary will encourage development of the area, and improve transportation access for mining and industrial activity. Relieving the congestion on LaSalle Boulevard and The Kingsway will be of benefit to businesses on these streets. Alternatives 2 and 3 would have fewer economic benefits, because they would not alleviate congestion on LaSalle Boulevard as effectively.

The estimated costs of Alternatives 2 and 3 are more than double that of Alternative 1.

4.2.3.4 - Transit Services

Introduction of improved or higher-order transit service in the LaSalle Boulevard corridor could disrupt the economic and community fabric along LaSalle, if a widening of the street was required to accommodate the transit service.

This alternative would increase the potential for conflicts between mining and industrial traffic and transit vehicles and pedestrians, because the mining/industrial traffic would be forced to remain on LaSalle due to the lack of alternate truck routes.

In the long term, an improved transit service could be of social and economic benefit, by making the businesses and residential areas along LaSalle Boulevard more accessible to the entire population, including those without private vehicles.

4.3 Recommended Undertaking

Based on a subjective assessment of the various factors associated with the alternatives to the undertaking, as outlined in Table 4.1, it was determined that Alternative 1 - The Maley Drive Extension plus Reconstruction of the Existing Maley Drive is the preferred alternative. This alternative will provide the transportation capacity required in a cost-effective and efficient manner, while having marginal impacts on the natural and social environments. This alternative is projected to result in economic benefits to the Regional Municipality of Sudbury, as well.

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TABLE 4.1
ASSESSMENT OF ALTERNATIVES TO THE UNDERTAKING

GROUPING	FACTOR	INDICATOR	ALTERNATIVES 1. MALEY DRIVE EXTENSION	2. INCO ROAD	3. MALEY DRIVE + NEW ROAD	4. 'DO-NOTHING'	5. PUBLIC TRANSIT
Transportation	Ability to serve demand	Level of service (volume/capacity ratio) on links	Sufficient traffic demand to justify construction ■	Projected traffic demand too low to justify construction ☐	Projected traffic demand too low to justify construction on new section ☐	East - West links over capacity ☐	East - West links over capacity ☐
	Relief of congestion on LaSalle Boulevard	Level of service on LaSalle Blvd links	Relief results in satisfactory traffic operations on LaSalle Blvd. ■	LaSalle Blvd. will remain over capacity ☐	Relief results in satisfactory traffic operation on LaSalle Blvd ■	LaSalle Blvd. will remain over capacity ☐	LaSalle Blvd. will remain over capacity ☐
	Safety	Ability to attract truck traffic away from LaSalle Blvd	Attracts significant truck traffic from LaSalle Blvd. ■	Attracts some truck traffic from LaSalle Blvd. ☐	Attracts significant truck traffic from LaSalle Blvd. ■	No reduction in truck traffic on LaSalle Blvd. ☐	No reduction in truck traffic on LaSalle Blvd. ☐
	Ability to respond to future growth in demand	Capability for road widening	Can be widened ■	Can be widened ■	Can be widened ■	Little or no capability for expansion ☐	N/A ■
Socio-Economic	Cost	Capital costs (shown in 1991 $)	$ 13 M ■	$27 M ☐	$ 20 M ☐	No direct capital costs -compensatory improvements on LaSalle and Kingsway would have cost ■	Unknown ☐
	Land use	Support for Development	Improved access to development areas ■	Too far removed from development areas ☐	Improved access to development west of Barry Downe Road ☐	Congestion will hinder development and efficiency of existing business and industry ☐	Congestion will hinder development and efficiency of existing business and industry ☐
		Property required	Some property required east of Barry Downe Road ☐	Some property may be required at the intersection of RR89 at RR92 (Garson) ☐	Some property may be required at the intersection of RR89 at RR92 (Garson) ☐	Extensive property expected to be required to accommodate traffic on other roads (eg. LaSalle) ☐	Extensive property expected to be required to accommodate traffic on other roads (eg. LaSalle) ☐
		Contribution to development objectives of the Region	Relieves congestion and provides additional east-west arterial at appropriate spacing ■	Too far removed from the City to be effective alternative to LaSalle ☐	Partial alternative route to LaSalle Blvd ☐	Remaining congestion on LaSalle Blvd. will hinder development and efficiency of existing business and industry ☐	Remaining congestion on LaSalle Blvd. will hinder development and efficiency of existing business and industry ☐
	Communities	Effect on views for existing communities	Some residents will see new road ■	Removed from communities ■	Some residents will see new road ☐	N/A ■	N/A ■
		Traffic volume change on neighborhood streets	High quality alternative to LaSalle will accommodate through traffic ■	Some traffic may seek alternative routes through communities to avoid congestion on LaSalle Blvd. ☐	Maley Dr. Extension will accommodate through traffic west of Barry Downe Road. Existing Maley Drive will continue to be used by some arterial traffic ☐	Some traffic may seek alternative routes through communities to avoid congestion on LaSalle Blvd. ☐	Some traffic may seek alternative routes through communities to avoid congestion on LaSalle Blvd. ☐
		Improvement in emergency of access to communities	New access from the north ■	No new access to communities ☐	New access from the north ■	No new access to communities ☐	No new access to communities ☐
	Economic Development	Contribution to economic development strategies of the City, Region and Province	Good support for business and industry by improving traffic conditions ■	Some trucks removed from LaSalle, but little improvement in traffic conditions ☐	Good support for business and industry by improving traffic conditions ■	No relief for traffic congestion; no additional arterial roadway capacity ☐	No relief for traffic congestion; no additional arterial roadway capacity ☐
Natural Environment	Fisheries	Number of water crossings	8 crossings ■	9 crossings ■	10 crossings ■	Not considered ■	Not considered ■
	Vegetation	Coverage;	75 % coverage ■	90 % coverage ☐	75 % coverage ■	Not considered ■	Not considered ■
		Presence of significant species	No rare or significant species ■	No rare or significant species ■	No rare or significant species ■	Not considered ■	Not considered ■
	Wildlife	Presence of significant species	No rare or significant species ■	No rare or significant species ■	No rare or significant species ■	Not considered ■	Not considered ■
	Birds	Presence of significant species	No rare or significant species ■	No rare or significant species ■	No rare or significant species ■	Not considered ■	Not considered ■
	Herpetofauna	Presence of significant species	No rare or significant species ■	No rare or significant species ■	No rare or significant species ■	Not considered ■	Not considered ■
	Wetlands	Coverage; Unique Features	25 % coverage; No unique features present ⊡	10% Coverage; Balsam Fir / Cedar wetland present (not found in other two corridors) ☐	25 % coverage No unique features present ☐	Not considered ■	Not considered ■
SUMMARY		Minimal Impacts = 1	17 X ■	7 X ■	11 X ■	9 X ■	9 X ■
		Moderate Impacts = 2	2 X ⊡	3 X ⊡	7 X ☐	0 X ⊡	0 X ■
		Significant Impacts = 3	0 X ☐	9 X ☐	1 X ☐	10 X ☐	10 X ☐
		Overall Rating	21	40	28	39	39
		RANKING	1	4	2	3	3

5. DESIGN ALTERNATIVES AND EVALUATION

This Chapter documents the development of the alternative methods of carrying out the undertaking, and the evaluation of these alternatives.

5.1 IDENTIFICATION AND DEVELOPMENT OF DESIGN ALTERNATIVES

5.1.1 - Introduction

Based on its overall benefits to the Regional Municipality of Sudbury in terms of transportation, accessibility and economic development, and the relatively minor impacts on the natural, social and economic environments, Alternative 1 (Maley Drive Extension plus reconstruction of existing Maley Drive) has been selected as the preferred undertaking.

This chapter builds on this decision in terms of assessing various road alignments and typical sections within the defined corridor, in order to establish the specific details of the recommended concept.

For the purposes of discussion, the route has been separated into the following four sections, moving from west to east:

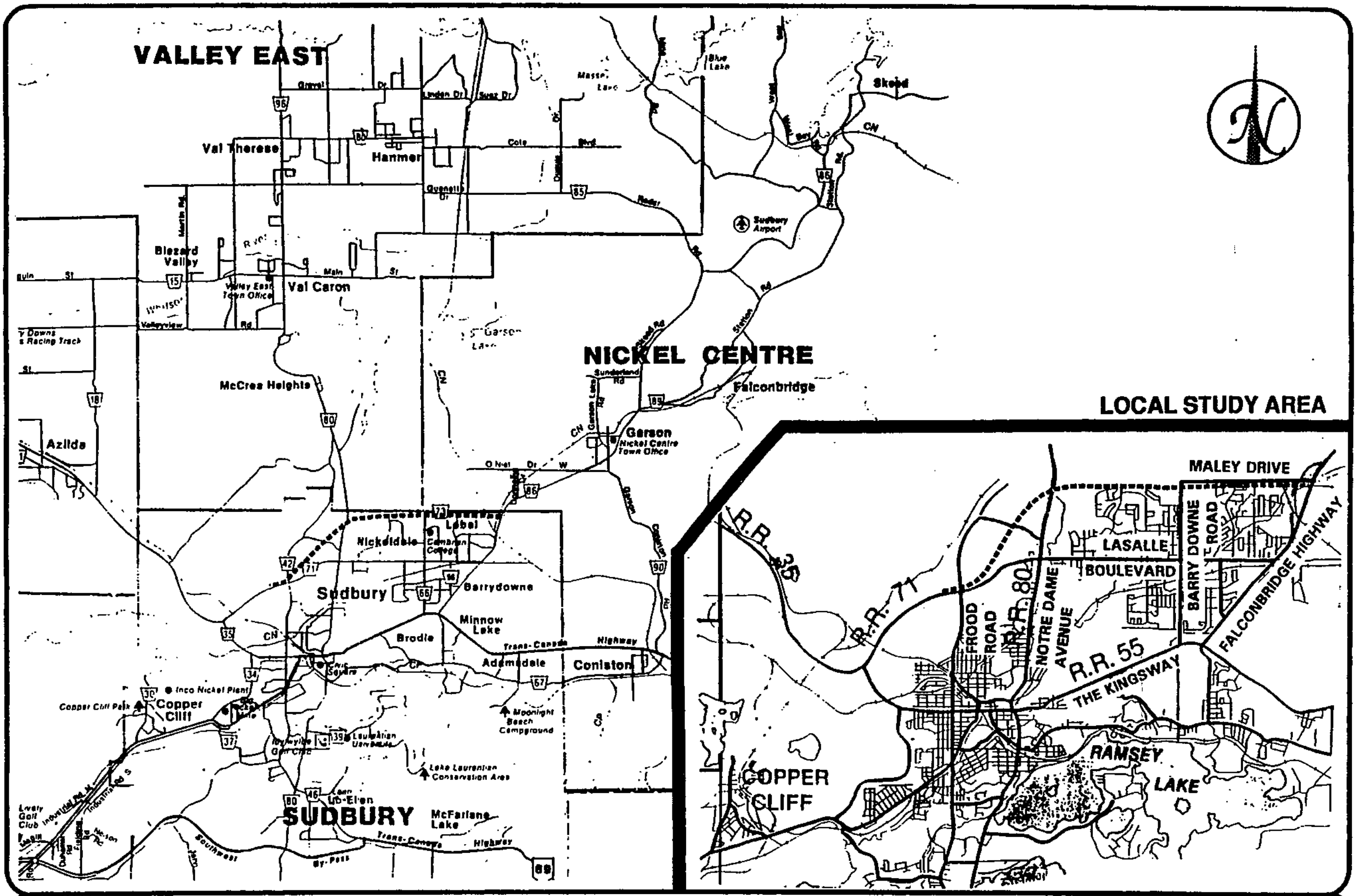
- Section I LaSalle Boulevard from Frood Road to the proposed Maley Drive Extension;
- Section II LaSalle Boulevard to Barry Downe Road;
- Section III Barry Downe Road to Junction Creek; and
- Section IV Junction Creek to Falconbridge Highway.

The extent of the proposed undertaking is illustrated in Figure 5.1.

5.1.2 - Design Criteria

Alternative designs have been analyzed based on the minimum geometric design standards dictated by the Ministry of Transportation of Ontario (MTO) combined with design criteria used for the North-West Arterial link.

Table 5.1 outlines the basis for all Alternative Route development and evaluation, in terms of the design criteria.



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•••••••••• PROPOSED MALEY DRIVE EXTENSION

FIGURE 5.1

EXTENT OF PROPOSED UNDERTAKING

Maley Drive Extension Class Environmental Assessment

5. DESIGN ALTERNATIVES AND EVALUATION

This Chapter documents the development of the alternative methods of carrying out the undertaking, and the evaluation of these alternatives.

5.1 IDENTIFICATION AND DEVELOPMENT OF DESIGN ALTERNATIVES

5.1.1 - Introduction

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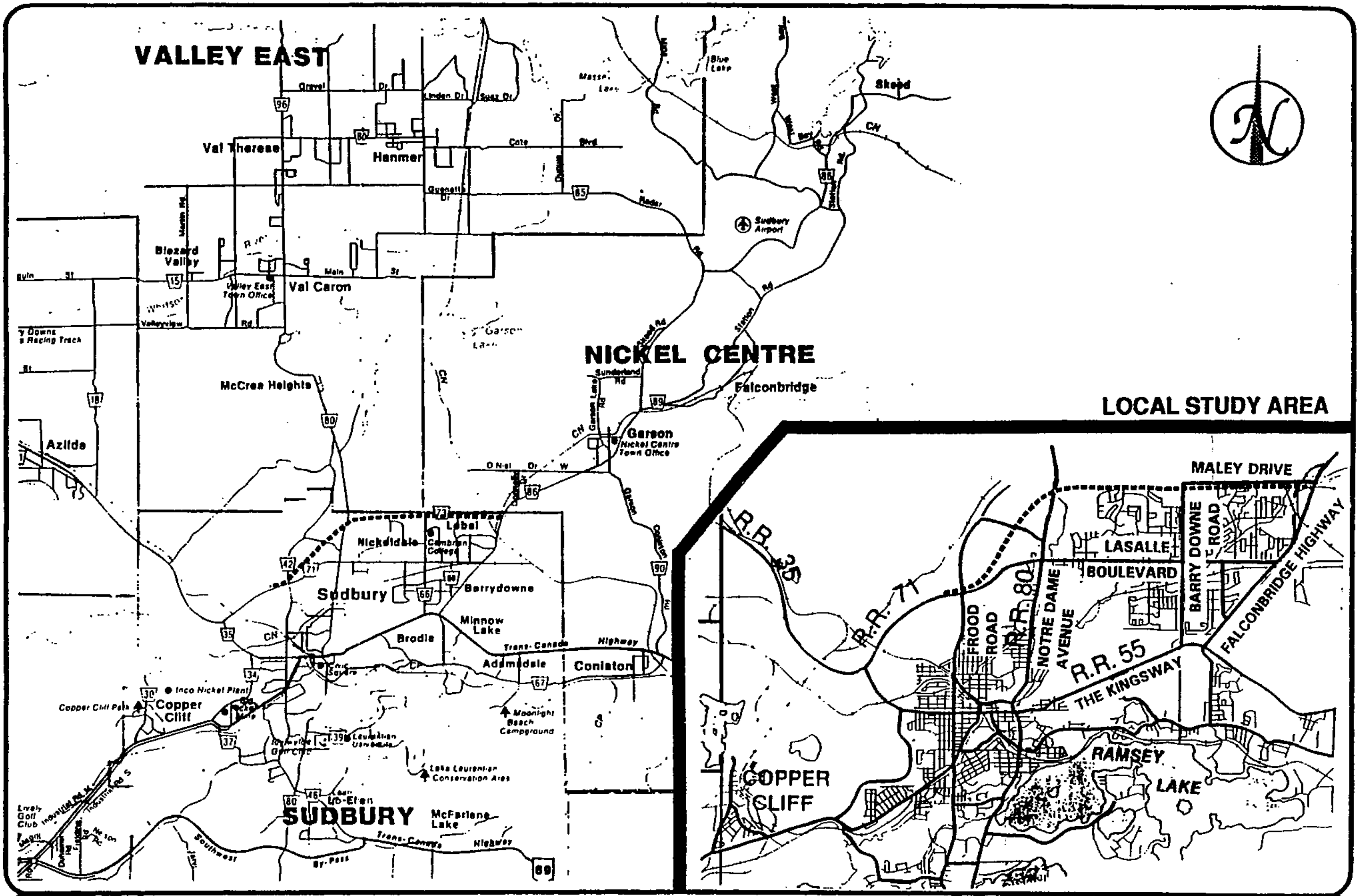

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---------- PROPOSED MALEY DRIVE EXTENSION

FIGURE 5.1

EXTENT OF PROPOSED UNDERTAKING

TABLE 5.1
DESIGN CRITERIA

CHARACTERISTICS	MTO DESIGN STANDARDS	MALEY DRIVE PROPOSED STANDARDS
GEOMETRICS		
HIGHWAY CLASSIFICATION	RAU100	RAU100
MINIMUM STOPPING SIGHT DISTANCE	185 m	185 m
MINIMUM RADIUS	420 m	420 m
MINIMUM K (CREST)	70	70
MINIMUM K (SAG) (headlight control)	45	45
MINIMUM GRADE	0%	0.5% (1)
MAXIMUM GRADE	6% - 8%	6%
RIGHT OF WAY WIDTH	n/a	Varies (2)
THROUGH LANE WIDTH	3.5 m	3.75 m (2)
TURN LANE WIDTH	3.0 - 3.5 m	3.0 - 3.5 m (2)
SINGLE LANE RAMP WIDTH	4.75 m	4.75 m
CENTRE LEFT TURN LANE WIDTH	5.0 m	5.0 m
SHOULDER WIDTH	2.0 m	2.5 m
ROUNDING	0.5 m	1.0 m
POSTED SPEED	80 km/h	80 km/h
MAXIMUM AT GRADE INTERSECTION SKEW ANGLE	70	70
GRADE SEPARATION VERTICAL CLEARANCE (ROAD TO ROAD)	4.65 m	4.65 m
TRAFFIC		
% TRUCKS	max. - 20%	7%
CAPACITY AADT (1 LANE EACH WAY)	1,000 - 20,000	24,000
AADT-PROJECTED 2011	N/A	15,000
PEAK HOUR CAPACITY (PER LANE)	1,400	1,200
PEAK HOUR PROJECTED TRAFFIC-2011 (PER LANE)	N/A	900

(1) Minimal slope for urban cross-section as per Region of Sudbury.
(2) As requested by Region of Sudbury.

While the traffic projections suggest that a two lane cross section would be sufficient for the foreseeable future, as a result of discussions with the Regional Municipality of Sudbury, the route has been developed based on protecting a four lane cross section with ultimate potential for six lanes. This will provide adequate capacity for both auto and truck traffic, including heavy mining trucks.

5.2 ALTERNATIVE ALIGNMENTS

5.2.1 - Section I: LaSalle Boulevard - Frood Road to Proposed Maley Drive Extension

This section of the route extends within the existing LaSalle Boulevard right-of-way from Frood Road (representing the west limit of the study area) ± 900 m easterly to the proposed Maley Drive Extension.

LaSalle Boulevard is a two lane rural road positioned within a 60 m right-of-way throughout this segment. The north half of this road is located in rock cut while the south part is positioned on substantial fill embankment.

Since this portion of the undertaking is an existing roadway (LaSalle Boulevard) in good condition with acceptable vertical alignment geometrics, options in this section were limited to the provision of horizontal alignment adjustments to accommodate a 4-lane rural facility as warranted by the traffic assessment.

Due to the ruggedness of the surrounding terrain combined with the need to match into the existing Frood Road intersection, this segment was evaluated with an undivided cross section only.

Horizontal Alignments

Three optional alignments were developed for this section of the route. They are illustrated on Plate 1.

Option H-1.1 - Widening About Centreline

This option involved widening ± 4.0 m each side of the existing roadway centreline to create the necessary 4-lane surface. Construction would involve rock blasting of the north west slope plus fill placement on the south east side to create the additional platform width needed to support the extra lane.

Option H-1.2 - Widening One Side

In order to minimize impacts on the existing roadway during construction, the option of placing all ±8.0 m of widening on either one side or the other was also evaluated.

Vertical Alignments

Since the existing profile of LaSalle Boulevard meets all proposed design criteria in this section, the existing vertical alignment was retained.

Cross Sections

With the need to match into the existing Frood Road intersection, only undivided 4-lane cross sections were considered in this section.

5.2.2 - Section II: Maley Drive Extension - LaSalle Boulevard to Barry Downe Road

This section of Maley Drive extends from LaSalle Boulevard easterly within a new corridor some 4,700 m to Barry Downe Road. The existing topography in this section of the study area is varied. This section of the route is characterized by alternating high rock ridges and low swampy terrain, with elevation differentials of over 40 m, and with very little development present in the vicinity of the alignment. Borehole samples taken between LaSalle Boulevard and Barry Downe Road indicate that the water table is close to the surface.

The corridor intersects several roads, including LaSalle Boulevard, Turner Avenue, Notre Dame Avenue, the proposed extension of Montrose Avenue, and Barry Downe Road.

This section crosses properties that are primarily owned by the Nickel District Conservation Authority (NDCA), INCO and Ontario Hydro. Approximately 500 m east of Notre Dame Avenue and south of the Ontario Hydro corridor, a portion of land is owned by a developer - Dalron Construction Limited.

There are two stormwater management facilities located within this section of the route. The Nickeldale Reservoir, a wet storage pond, is located north of Lasalle Boulevard and east of Notre Dame Avenue. It is designed to control the Regional storm flows, with a top of dam elevation of 274.3 m. The Maley Reservoir, located just southwest of the intersection of Maley Drive at Barry Downe Road, consists of a backwater dam with a flood line elevation of 272.8 m. Discussions with the Nickel District Conservation Authority indicated that the proposed elevations for the Maley Drive extension should be higher than these flood line elevations, in order to ensure that the road is not submerged during a Regional storm event.

Another design constraint found in this section of the route is the hydro corridor which runs high on the rock ridge north of LaSalle Boulevard and easterly across Notre Dame Avenue. This corridor consists of high voltage wires on towers as well as lower voltage cables on wooden hydro poles. Additionally, there are two pressurized gas mains (200 mm and 300 mm) which may be affected by any proposed alignment option.

Approximately 200 m north of Turner Avenue and west of Notre Dame Avenue, there is an area subject to an environmental assessment by INCO. There is the possibility that the soil in this area is contaminated with INCO tailings.

Furthermore, it was requested by the Regional Municipality of Sudbury that where possible, the road base be placed entirely on rock in order to guarantee the stability of the road foundation.

Horizontal Alignment

Initially, nine horizontal alignment options were identified within this section. These potential alignments are illustrated on Plates 1 to 5.

Alignments which either did not conform to minimum geometric requirements, were not fully located on a rock foundation, were too high on the rock ridge, or interfered with existing stormwater ponds were considered as not meeting the mandatory requirements and hence were eliminated from further evaluation. The evaluation of these alternatives is illustrated in Table 5.2.

The five remaining horizontal alignments which met the mandatory requirements were further analyzed on the basis of planning, engineering, operational and natural environment factors. These five alignments included the following:

Option H2.1

Option H2.1 maintains a 100 km/h design speed throughout its length. This option allows for an at grade intersection with Notre Dame Avenue (70 degree skew angle). Minor encroachment into the Nickeldale Reservoir just east of Notre Dame Avenue may necessitate minimal filling into the water.

Since option H2.1 is located between the hydro corridors, no power line crossings are involved. However, this alignment crosses a 300 mm gas main twice and a 200 mm gas main once.

Option H2.2

Option H2.2 maintains a 100 km/h design speed throughout its length. This option requires a total of five curves between LaSalle Boulevard and Barry Downe Road. It is set high on the rock ridge. The at grade intersection at Notre Dame has a 80 degree skew angle.

This option crosses the hydro corridor twice. Relocation of some poles would be necessary. This option also crosses a 300 mm gas main twice and a 200 mm gas main once.

Option H2.3 (A or B)

Option H2.3 permits use of geometric criteria suitable for a 100 km/h design. It contains three curves between LaSalle Boulevard and Barry Downe Road. Because the skew angle at Notre Dame Avenue is less than 70 degrees, this option will require either realignment of the crossing road (A) or provision of a grade separation (B) if

TABLE 5.2
REJECTED ALTERNATIVES ANALYSIS
SECTION II - LASALLE BOULEVARD to BARRY DOWNE ROAD

ENVIRONMENTAL COMPONENTS		ALTERNATIVE			
GROUPING	FACTOR	H6	H7	H8	H9
Land use	INCO Mine Rock Embankment	Encroaches into INCO mine rock embankment *	Encroaches into INCO mine rock embankment *		
Natural Environment (2)	Floodplain			Alignment crosses stormwater storage pond for Nickel dam north of LaSalle and east of Notre Dame *	
	Wetlands	Alignment crosses swamp at Turner Avenue *			
Cost	Ground Conditions	Significant rock excavation of Austin platform and south of Turner Avenue *	Significant rock excavation between LaSalle and Notre Dame *		Alignment crosses wetland at LaSalle Boulevard *
	Road Length	Parallels Notre Dame for significant length *	Parallels Notre Dame for significant length *		
	Vertical Alignment	Significant section of road with max grade; truck climbing lane required *	Significant section of road with max. grade; truck climbing lane required *		
Utilities	Effect on provision of services		Crosses hydro corridor three times *		

* Does not comply with mandatory criteria

H2.3B is chosen the vertical profile will be also necessitate grade separation at Turner Street.

This option is located between the hydro corridors, and therefore no power line crossings are involved. However, this route crosses a 300 mm gas main twice and a 200 mm gas main once.

Option H2.4 (A or B)

Option H2.4 requires a total of three horizontal curves between LaSalle Boulevard and Barry Downe Road. The at grade intersection with Notre Dame crosses at a 75 degree skew angle. Optional at grade and grade separated options (A or B) were considered with this horizontal alignment.

This option crosses the hydro corridor twice, and would require relocation of some poles. It also crosses a 300 mm gas main twice and a 200 mm gas main once.

Option H2.5

Option H2.5, the "hybrid alignment", is a combination of previously mentioned options.

It is located between the hydro corridors, and therefore no power line crossings are involved with this alignment. This option however crosses a 300 mm gas main twice and a 200 mm gas main once.

Vertical Alignment

Based on the five horizontal alignments described above, a number of vertical profiles were also examined. Numerous factors governed the selection of the "optimum" vertical alignment for each horizontal configuration. They included:

- Design speed;
- Existing topography;
- At-grade versus grade-separated intersections/interchanges;
- A preference for remaining high on the rock ridges;
- Flood line elevations;
- Optimizing the cut/fill balance; and
- A preference for eliminating the necessity for truck climbing lanes (in the first phase).

All vertical alignments were established on the basis of the design criteria outlined in Section 5.1.2. In order to accommodate existing roads, the vertical alignment was either lowered to meet the existing crossing road or raised to ensure sufficient clearance for the structure if a grade separated option was warranted.

Additionally, the profile in the vicinity of the two reservoirs was set to be at least 1.0 m above the maximum floodline elevation.

The maximum grade was set at 6 percent. However, in order to eliminate the need for truck climbing lanes, grade reductions to suit truck performance criteria were also considered.

Based on these factors, road profiles were established in an attempt to balance the cut/fill requirements and hence provide the most economical design.

Cross Sections

Initially, several different cross-sectional options were examined in order to establish the most cost effective alternative. They include:

- T1: 2 lane rural undivided from LaSalle Boulevard to Barry Downe Road;
- T2: 4 lane rural undivided from LaSalle Boulevard to Notre Dame Avenue, and 2-lane undivided from Notre Dame Avenue to Barry Downe Road;
- T3: 4 lane rural undivided from LaSalle Boulevard to Barry Downe Road;
- T4: 4 lane rural divided from LaSalle Boulevard to Barry Downe Road; and
- T5: 4 lane rural divided from LaSalle Boulevard to Barry Downe Road with a 2-lane paved, and 4-lane graded section from LaSalle Boulevard to Barry Downe Road.

Table 5.3 summarizes the comparative cost per kilometre for each cross sectional alternative.

TABLE 5.3

COST COMPARISON OF CROSS SECTION ALTERNATIVES
LASALLE BOULEVARD TO BARRY DOWNE ROAD
(1995 $)

Cross Section Alternative	Estimated Cost per Kilometre
Typical Section T1	$ 1,990,000
Typical Section T2	$ 2,016,000
Typical Section T3	$ 2,160,000
Typical Section T4	$ 2,655,000
Typical Section T5	$ 2,385,000

Intersection/Interchange Options

The proposed Maley Drive Extension will intersect five crossing roads within this route segment. They include LaSalle Boulevard, Turner Avenue, Notre Dame Avenue, the proposed extension of Montrose Avenue, and Barry Downe Road. In order to accurately assess the impact on these crossings, the following issues were considered:

- Through/turning traffic volumes;
- Safety;

- Road geometrics;
- Topography; and
- Land use and property.

Based on these issues, a number of intersection/interchange options were developed and evaluated.

The following discussion outlines the issues and constraints involved at each intersection.

LaSalle Boulevard at Maley Drive

The LaSalle Boulevard intersection will form the western terminus of Maley Drive. As such, the movements which must be accommodated are:

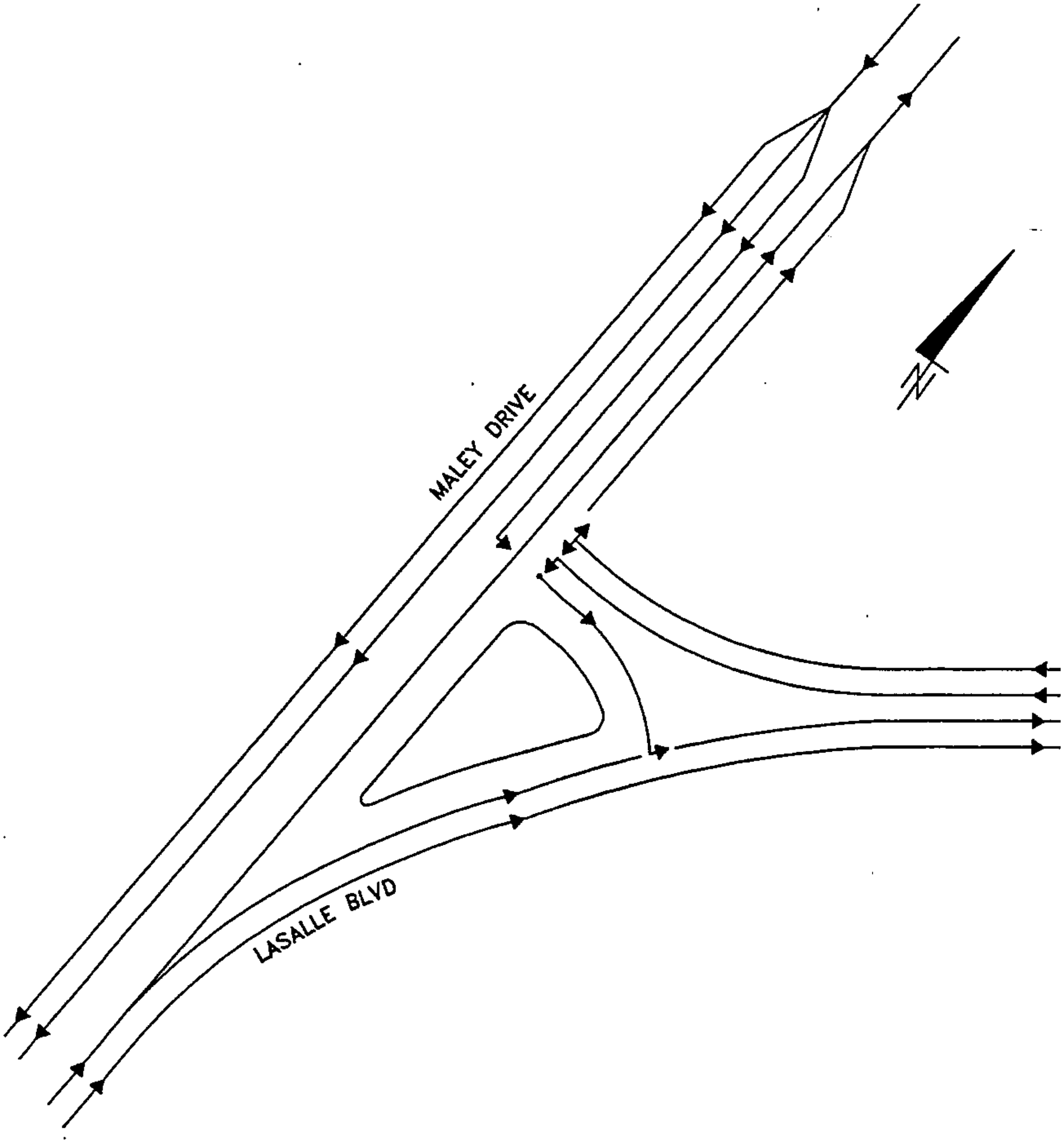
- Northbound from LaSalle Boulevard to Maley Drive;
- Eastbound and westbound on LaSalle Boulevard; and
- Southbound on Maley Drive to LaSalle Boulevard westbound.

Both at grade and grade separated options were examined at the LaSalle Boulevard/Maley Drive crossing. The following constraints were considered:

Criterion	Description
Property Constraints	Proposed College Boreal, and an existing high school on the south side of LaSalle Boulevard (MacDonald-Cartier).
Utility Constraints	Centra Gas Regulating station on the north side of LaSalle Boulevard. Hydro tower line on the rock ridge northwest of LaSalle Boulevard and running along the low ground just north of LaSalle.
Geometrics	420R curve on existing LaSalle Boulevard just west of the high school(sight distance)

Figures 5.2 to 5.6 outline the various intersection configurations evaluated for this crossing.

The design process for this intersection has encompassed a review of both the relative magnitude of each turning movement, and the projected growth in the turning movements over time. Initially, an at-grade intersection is expected to provide adequate capacity for the turning movements. The preferred design for this intersection is shown in Figure 5.2. This design would require traffic signal control. The projected growth

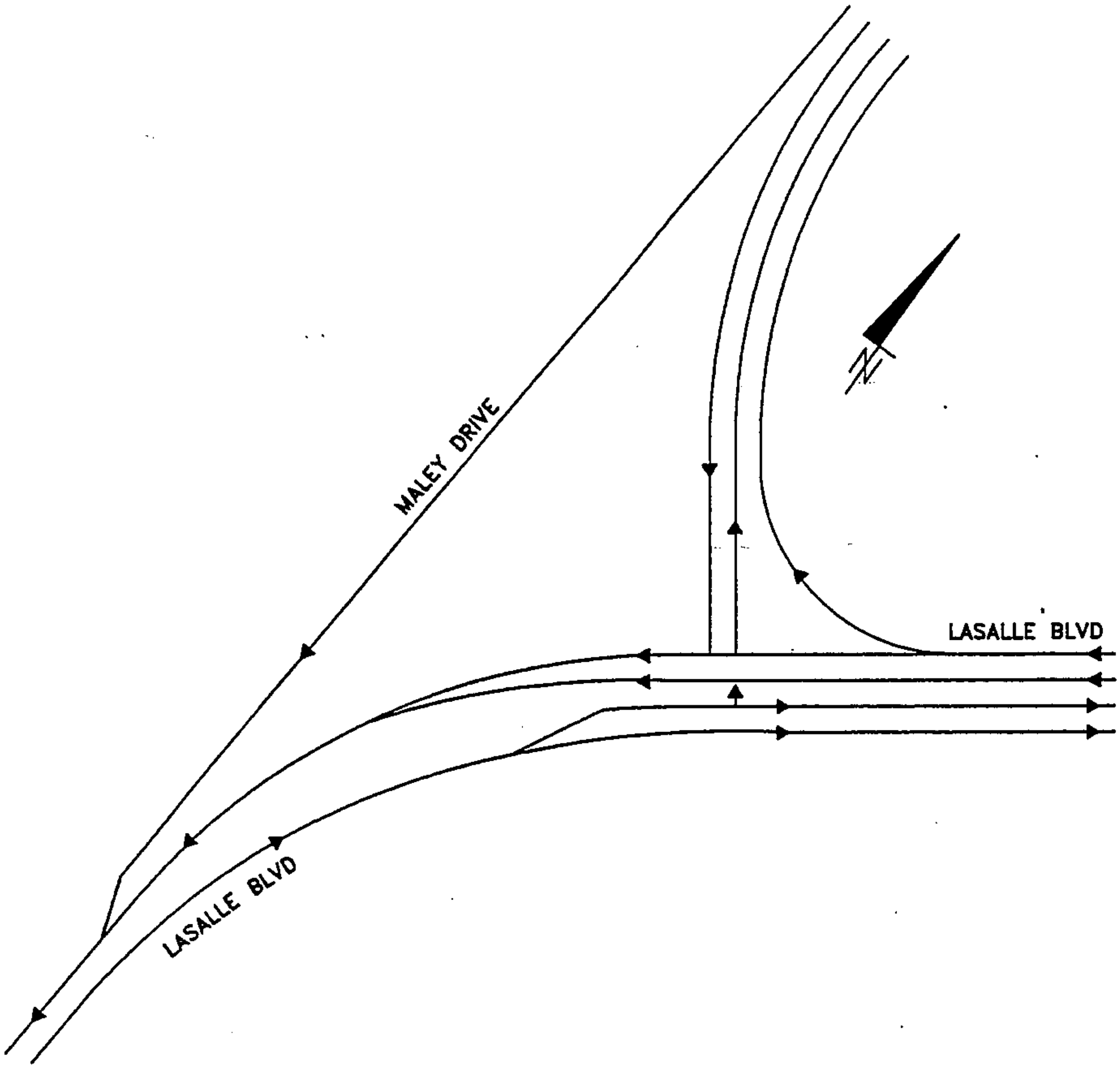


RECOMMENDED AT-GRADE
CONFIGURATION

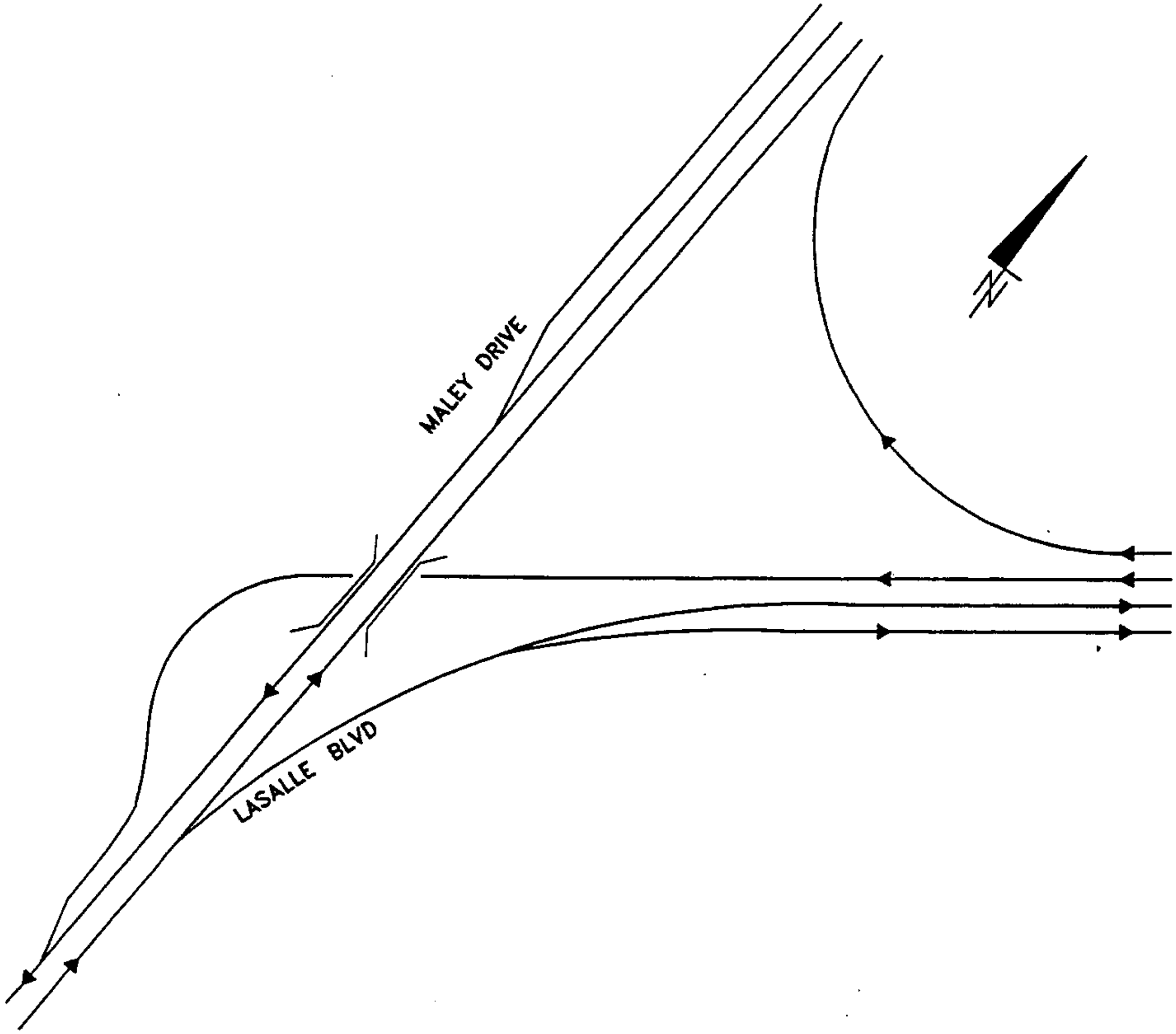
LASALLE BLVD/MALEY DRIVE
INTERSECTION CONFIGURATION

OPTION 1

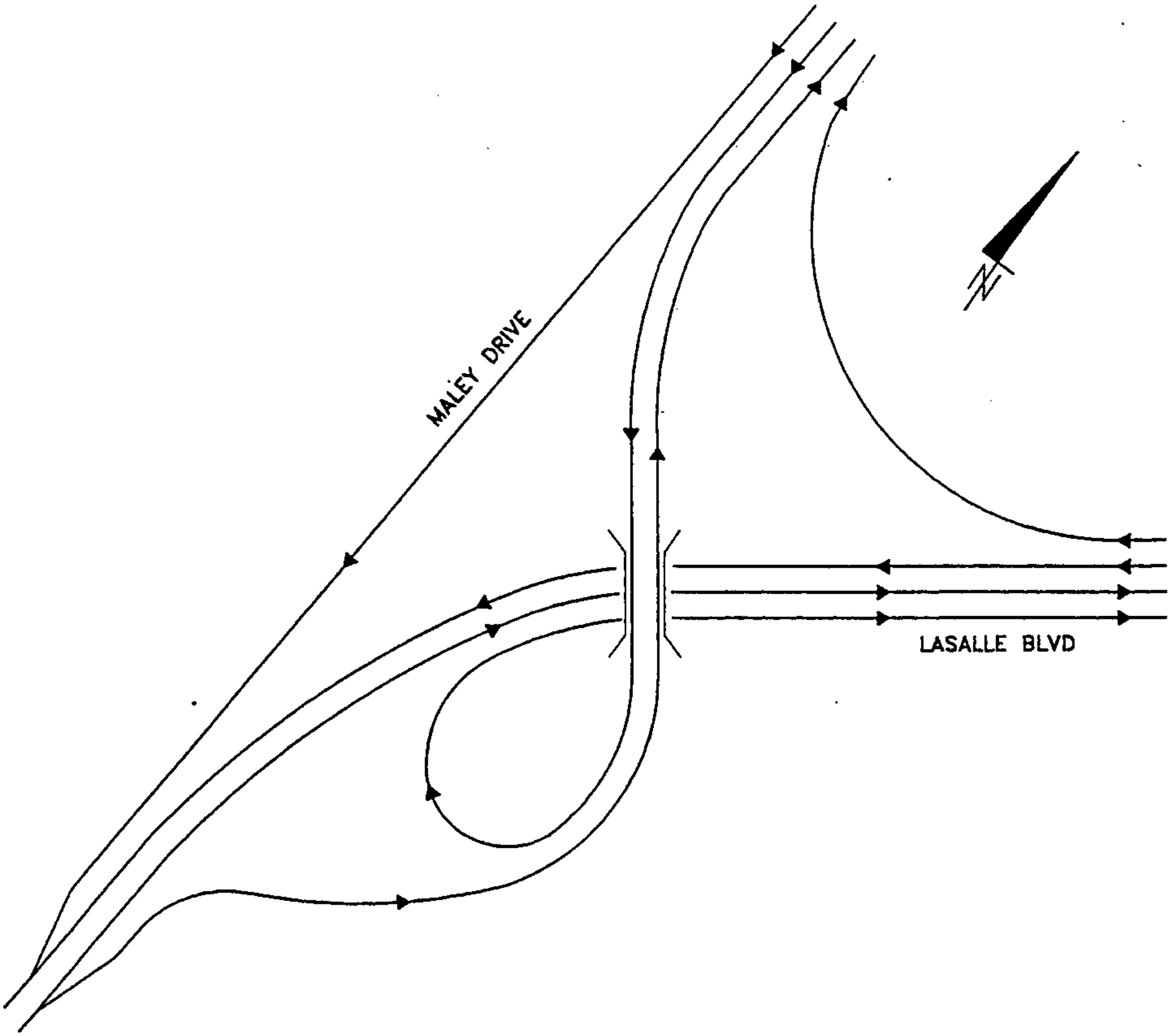
Figure 5.2



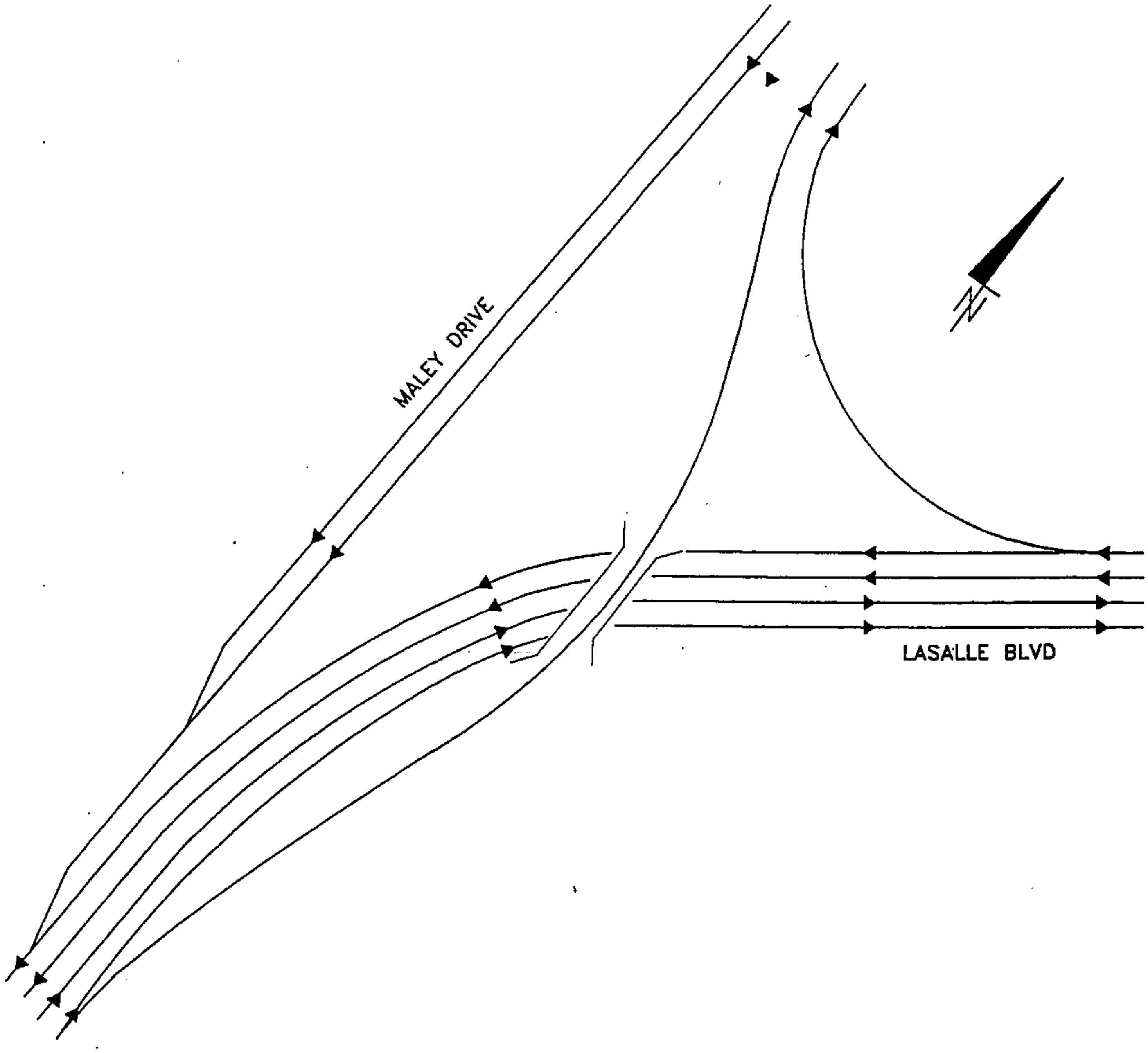
LASALLE BLVD/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 2
Figure 5.3



LASALLE BLVD/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 3
Figure 5.4



LASALLE BLVD/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 4
Figure 5.5



RECOMMENDED ULTIMATE INTERCHANGE CONFIGURATION

LASALLE BLVD/MALEY DRIVE INTERSECTION CONFIGURATION

OPTION 5

Figure 5.6

in turning movement volumes over the study horizon of twenty years is expected to result in the need for grade-separation of the intersection. The preferred grade-separated interchange is illustrated in Figure 5.6, and on Plate 39.

The preferred options provide adequate capacity for both the turning movements between the roadways of concern, and for access to and from the existing MacDonald-Cartier Secondary School, the proposed College Boreal (to be located immediately west of the secondary school), and the Terry Fox Recreation Centre.

The preferred long-term grade-separated option will not provide for the turning movement from Maley Drive southbound to LaSalle Boulevard eastbound. However, there is only a low volume for this movement at present, which is not expected to grow significantly, given the lack of development planned for this area. This movement can be accommodated via Notre Dame Avenue and LaSalle Boulevard.

Turner Avenue at Maley Drive

Currently, Turner Avenue intersects Notre Dame Avenue at an unsignalized T-intersection, then proceeds westerly to connect to Frood Road. The proposed Maley Drive will cross Turner Avenue just west of Notre Dame Avenue, and west of the housing development at the corner of Notre Dame Avenue and Turner Avenue. Specific issues relating to this intersection include:

Criterion	Description
Existing Features	Turner Avenue crossing is in close proximity to the Notre Dame Avenue crossing. Turner Avenue connects to Notre Dame Avenue immediately south of the proposed Maley Drive crossing.

Notre Dame Avenue at Maley Drive

The intersection of Notre Dame Avenue at Maley Drive is expected to attract heavy turning movement volumes. Notre Dame Avenue (Regional Road 80) serves a high-volume commuter demand in the a.m. and p.m. peak periods, and Maley Drive is expected to provide relief to the extremely congested intersection of Notre Dame at LaSalle Boulevard. The volumes projected for this intersection indicate that it should be constructed as a grade-separated interchange as part of the initial road design.

The key turning movements which must be accommodated at this interchange are:

- Southbound Notre Dame Avenue to eastbound and westbound Maley Drive;
- Northbound Notre Dame Avenue to eastbound Maley Drive; and
- Westbound Maley Drive to northbound and southbound Notre Dame Avenue.

Specific issues requiring consideration included:

Criterion	Description
Topography	Notre Dame Avenue is in a deep rock cut.
Traffic Volumes	High volumes on this 4-lane facility are currently experienced.
Geometrics	Intersection skew angles between Maley Drive and Notre Dame Avenue will result in a need for right turn islands.

An extensive range of options has been considered for this interchange. These are illustrated in Figures 5.7 to 5.14. The preferred option is shown in Figure 5.14. This option provides adequate capacity for the required turning movements in a safe and efficient manner, while imposing only one traffic signal on the through volumes on Maley Drive. The heavier through traffic volume on Notre Dame Avenue would be uninterrupted.

Montrose Avenue at Maley Drive

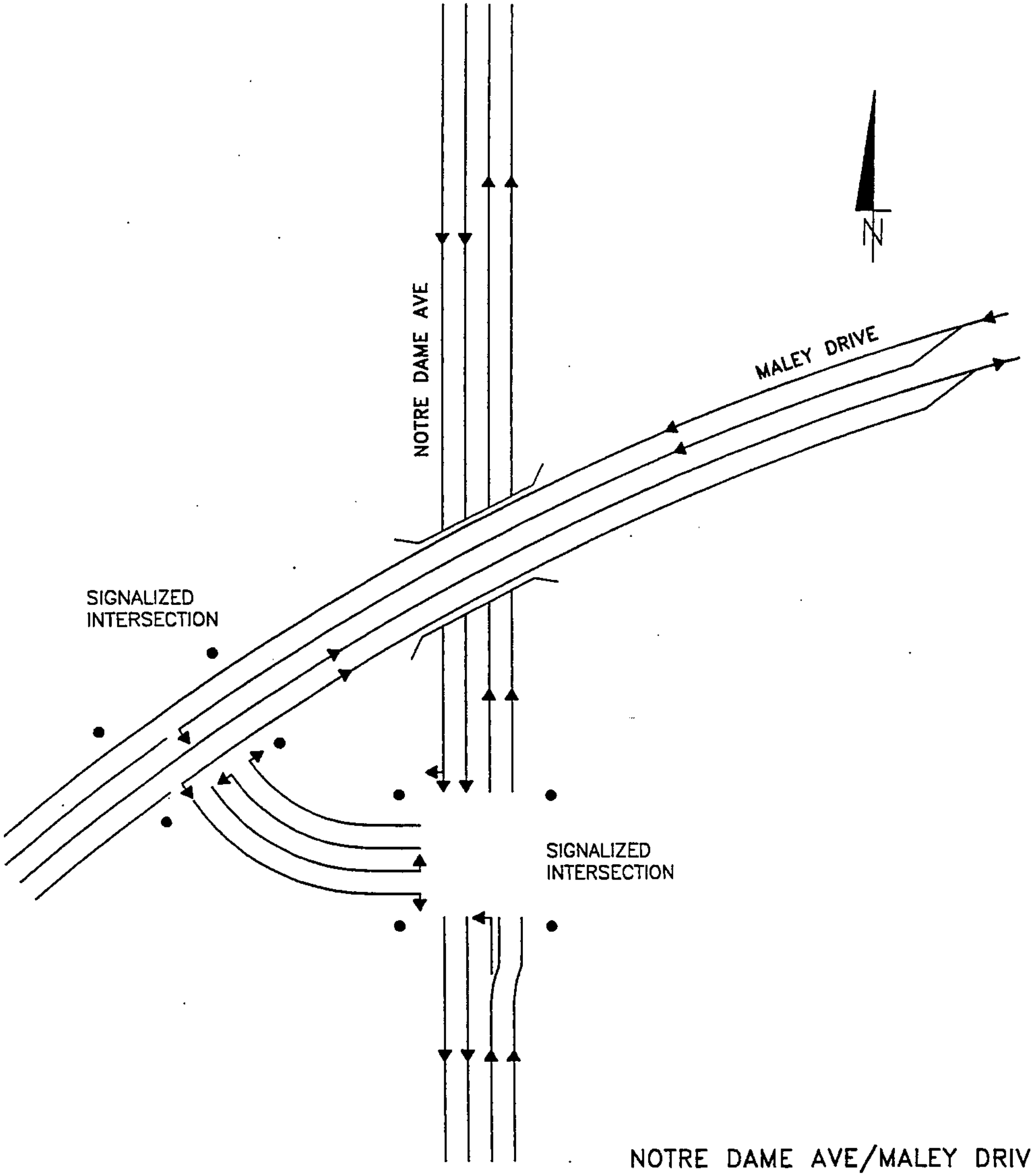
Both at grade and grade separated intersection treatments were examined at this crossing road.

An at-grade intersection for the proposed extension of Montrose Avenue at Maley Drive is expected to provide adequate capacity for the projected turning movements. The preferred design for this intersection is shown in Figure 5.15. The traffic on the Montrose Avenue approach will be stop-controlled. The projected growth in turning movement volumes over the study horizon of twenty years is not expected to result in the need for grade-separation of the intersection.

Montrose would connect into Maley Drive at approximately 90 degrees on the inside of a long flat curve.

Barry Downe Road at Maley Drive

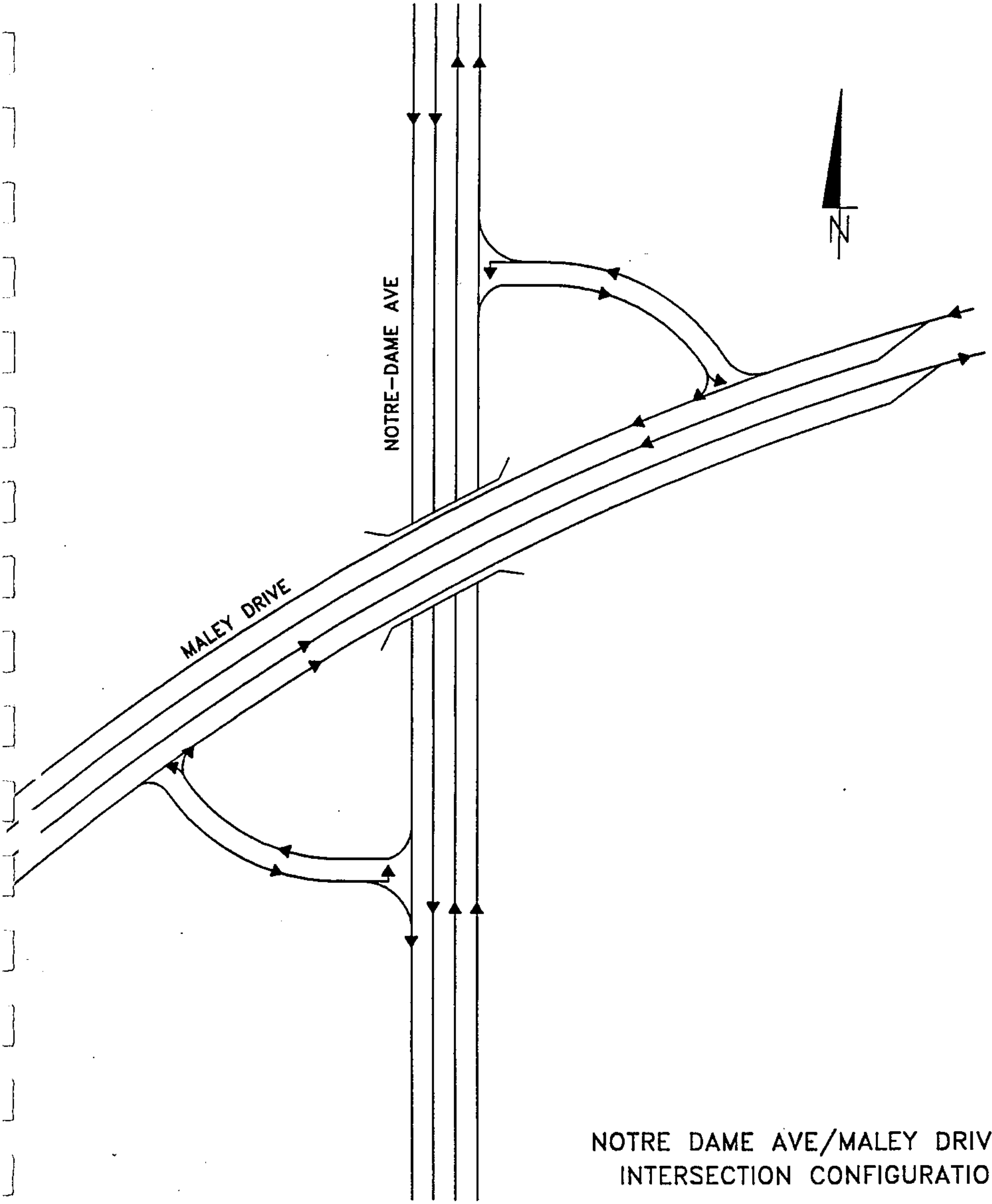
At the intersection of Barry Downe Road and Maley Drive, a signalized at-grade intersection is expected to provide adequate capacity for the projected turning movements. The preferred design for this intersection is shown in Figure 5.16. The projected growth in turning movement volumes over the study horizon of twenty years is not expected to result in the need for grade-separation of the intersection. However, if Barry Downe Road is extended as an arterial route, an interchange may be required.



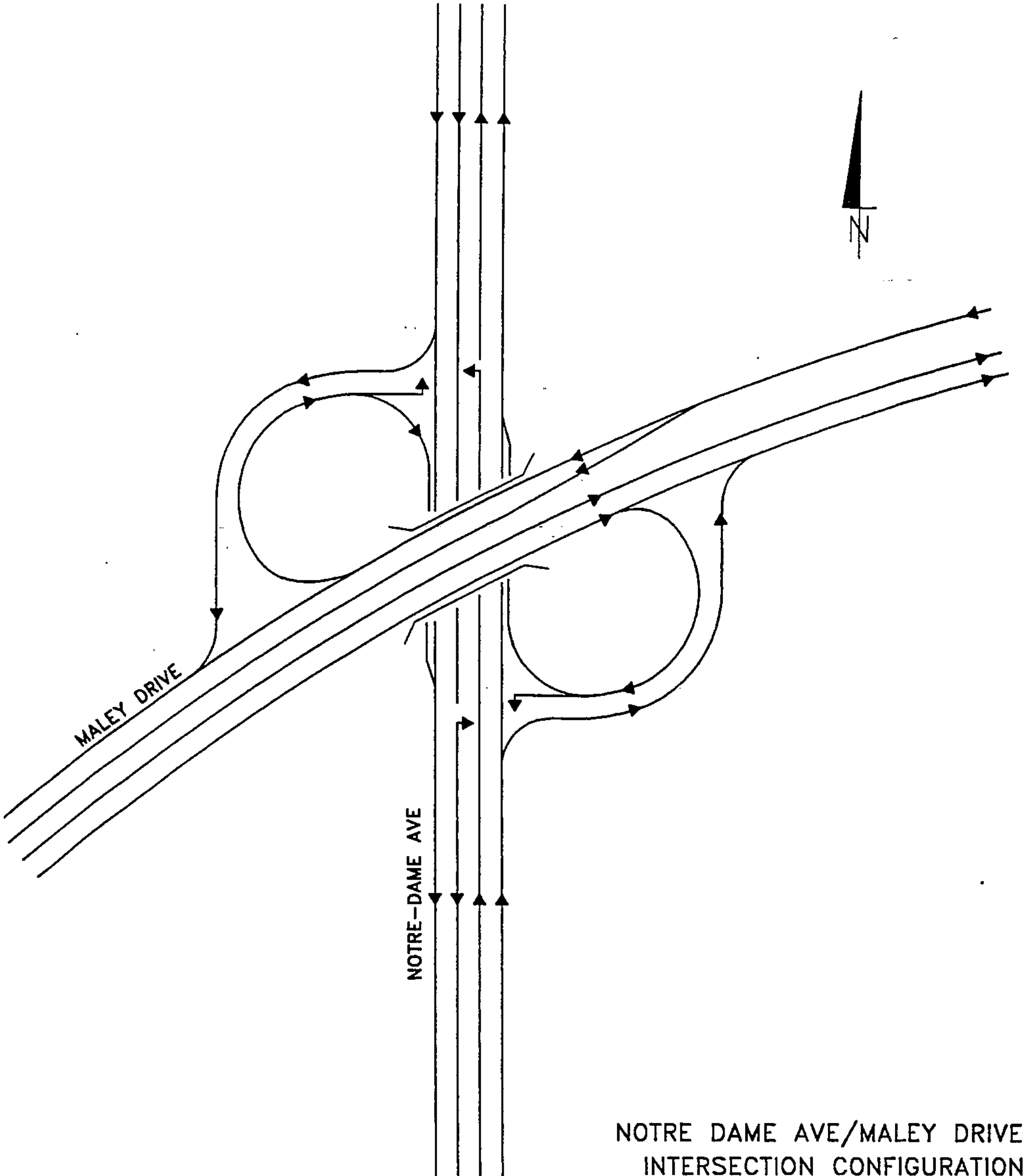
NOTRE DAME AVE/MALEY DRIVE
INTERSECTION CONFIGURATION

OPTION 1

Figure 5.7



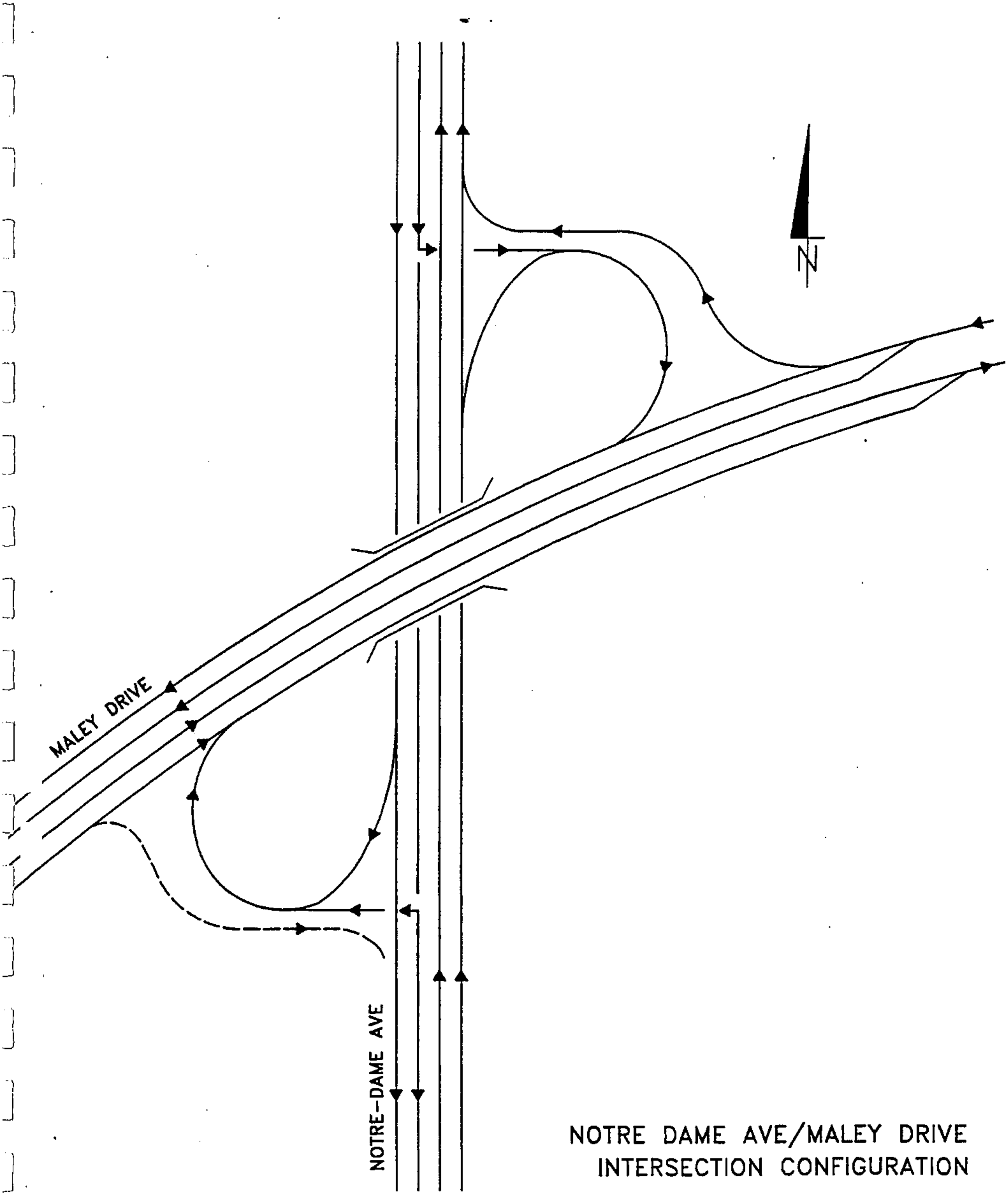
NOTRE DAME AVE/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 2
Figure 5.8



NOTRE DAME AVE/MALEY DRIVE INTERSECTION CONFIGURATION

OPTION 3

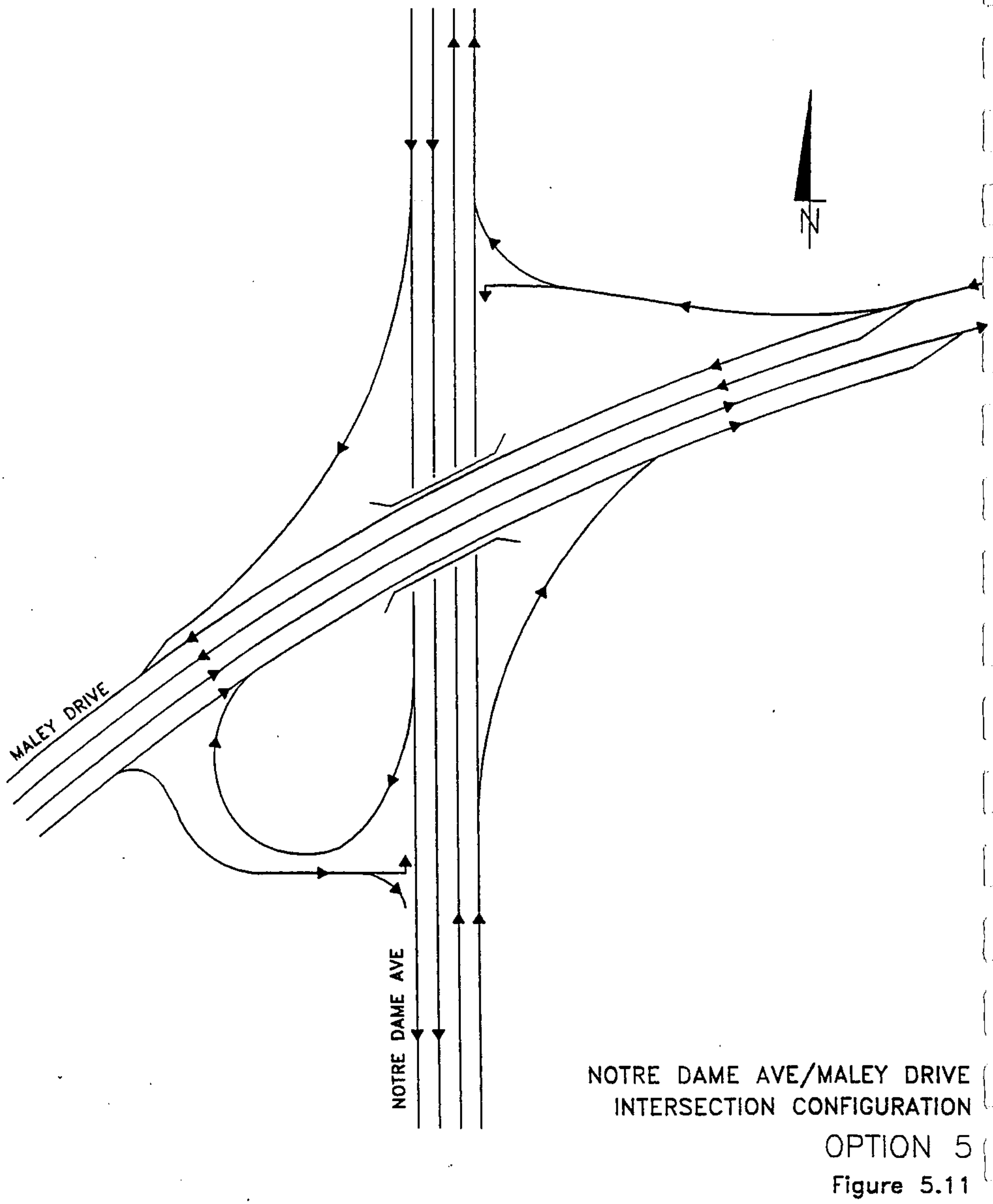
Figure 5.9



NOTRE DAME AVE/MALEY DRIVE
INTERSECTION CONFIGURATION

OPTION 4

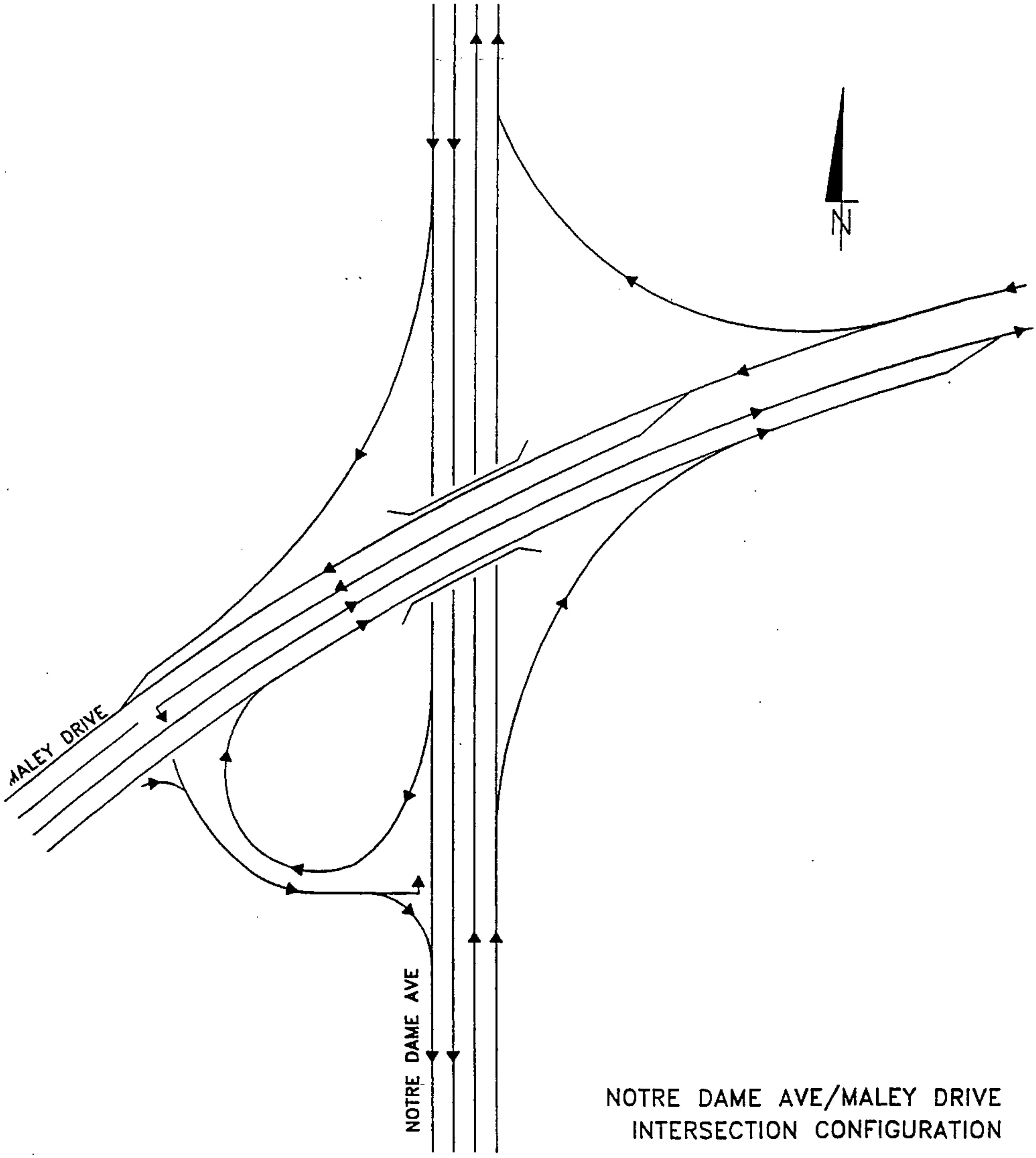
Figure 5.10



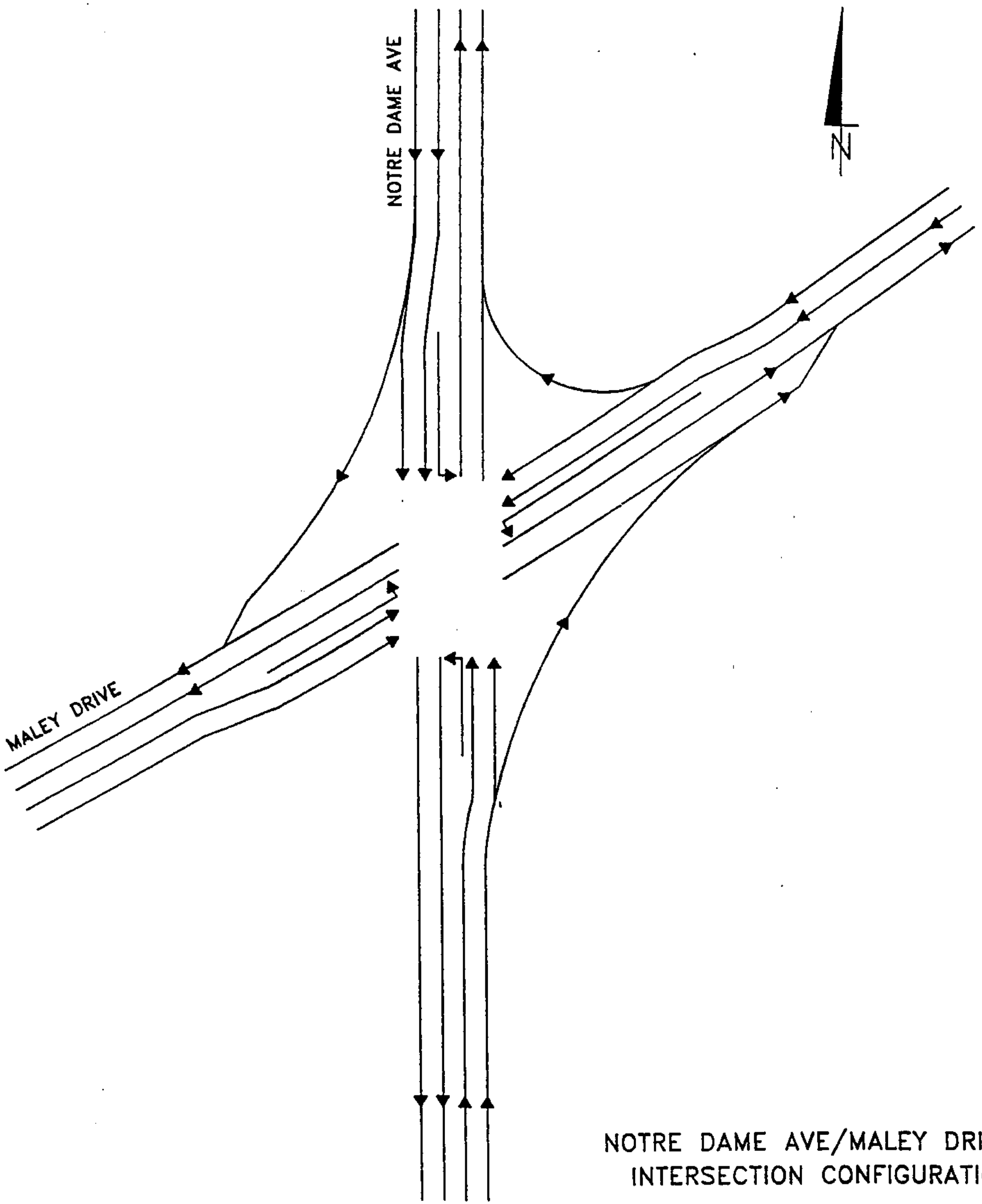
NOTRE DAME AVE/MALEY DRIVE
INTERSECTION CONFIGURATION

OPTION 5

Figure 5.11



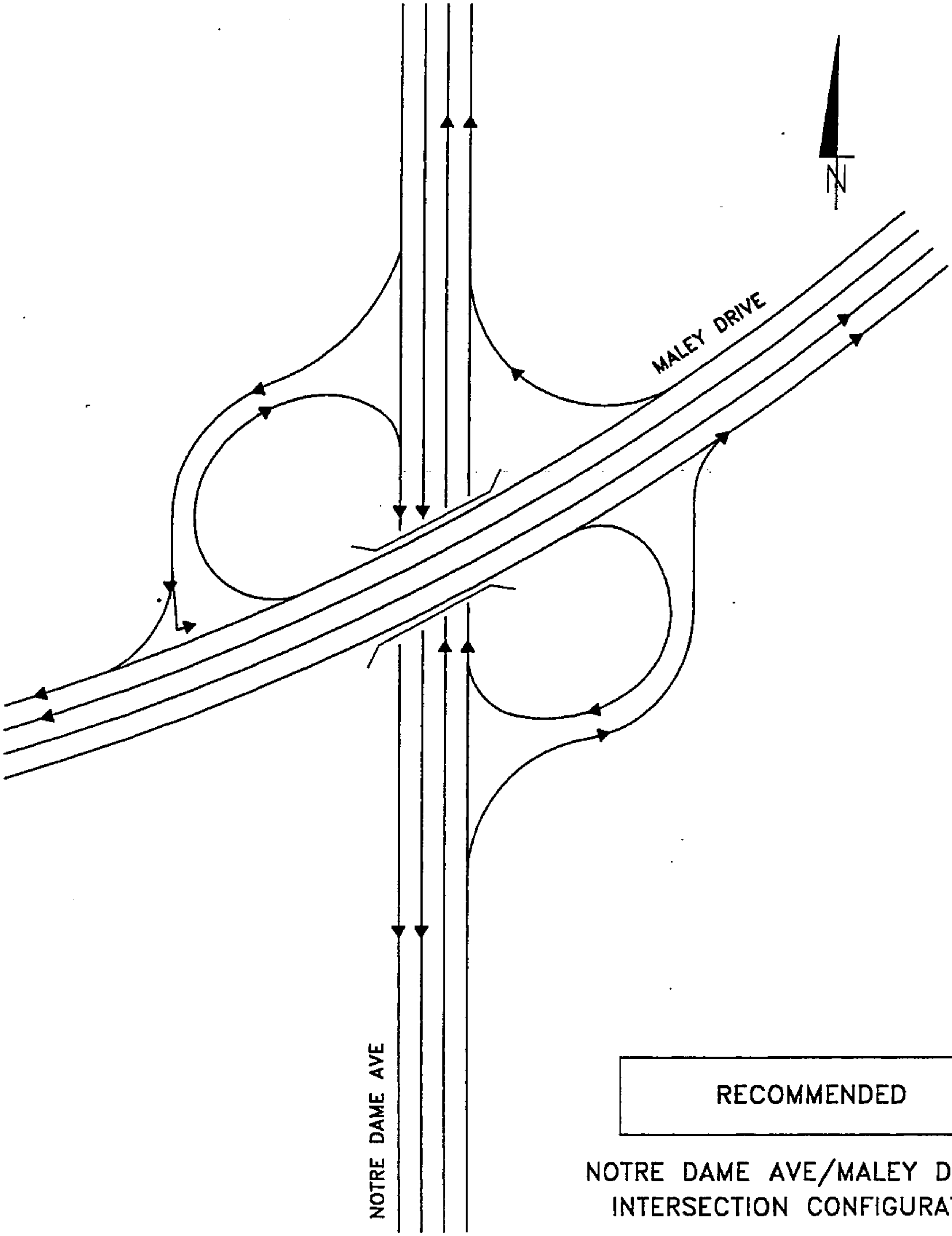
NOTRE DAME AVE/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 6
Figure 5.12



NOTRE DAME AVE/MALEY DRIV
INTERSECTION CONFIGURATIO

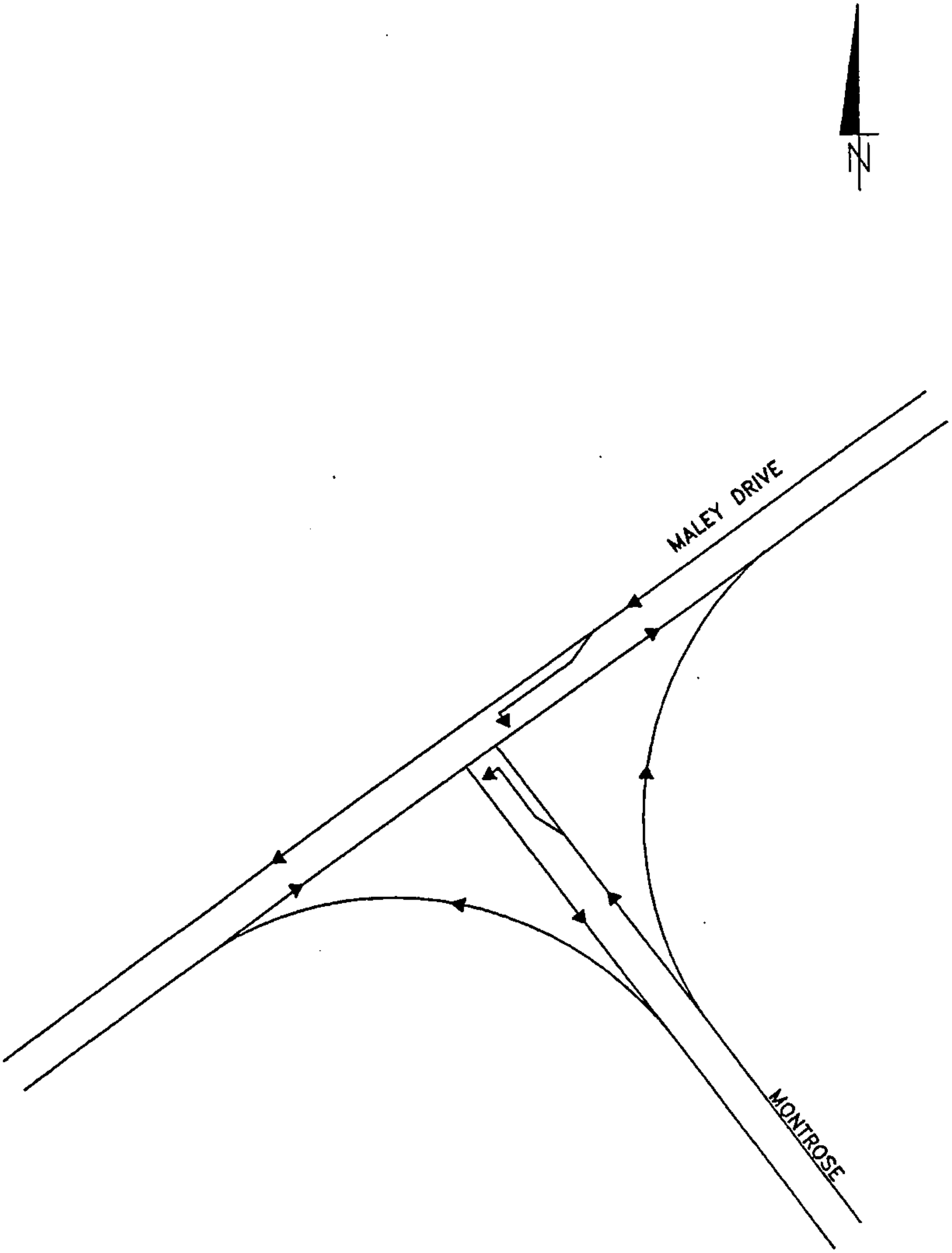
OPTION

Figure 5.1



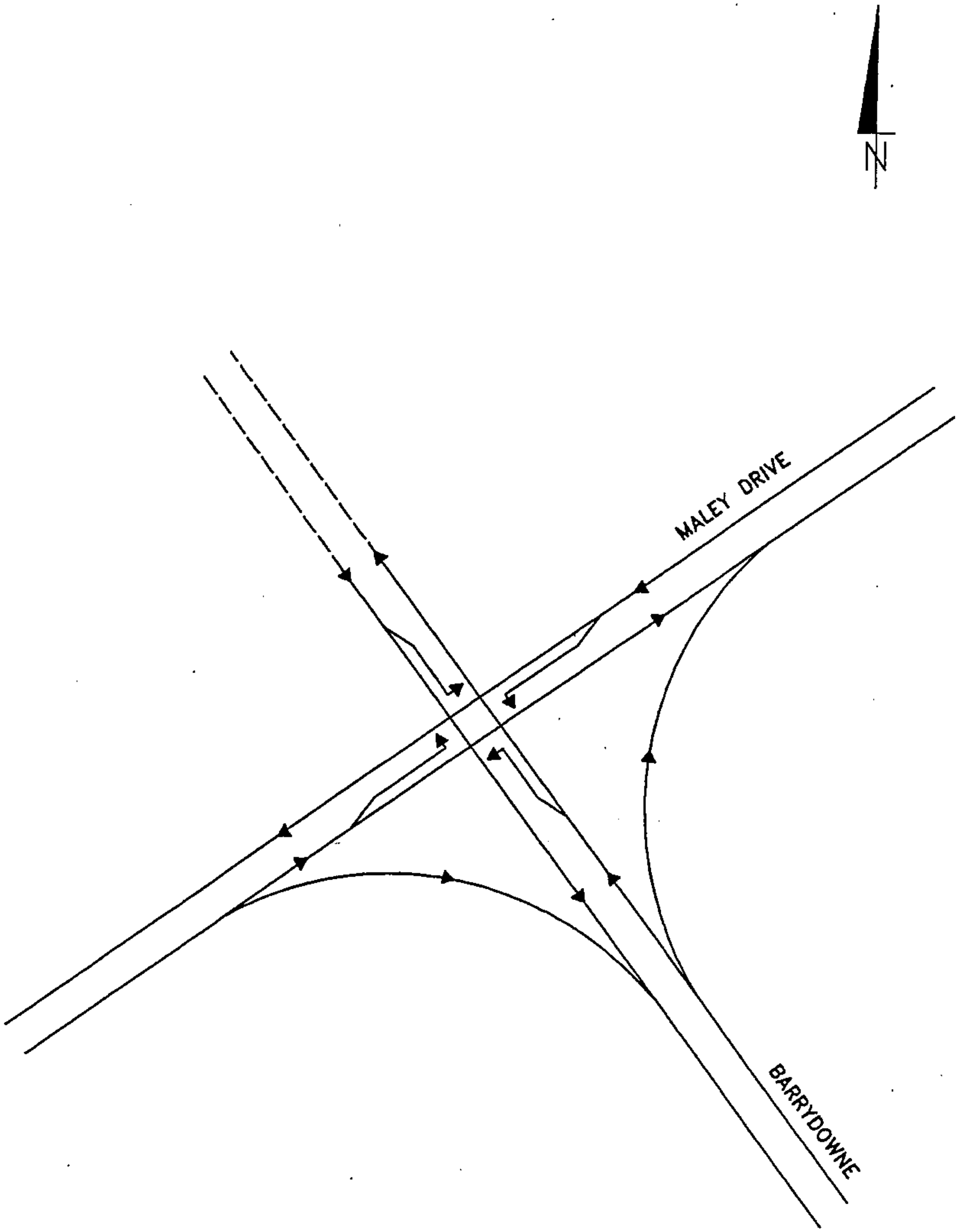
RECOMMENDED

NOTRE DAME AVE/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 8
Figure 5.14



MONTROSE/MALEY DR
INTERSECTION CONFIGURATIO
OPTION

Figure 5.1



BARRYDOWNE/MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 10
Figure 5.16

Specific constraints associated with this layout included:

Criterion	Description
Property Constraints	Proposed college on the south side of Maley Drive, east of Barry Downe Road
Utility Constraints	INCO Hydro line north of existing Maley Drive Sudbury Hydro south of existing Maley Drive

5.2.3 - Section III: Maley Drive - Barry Downe Road to Junction Creek

This section of the proposed route extends from Barry Downe Road easterly to Junction Creek, a distance of ±1,550 m. Within this section, the existing Maley Drive is a two-lane rural section located in the centre of an existing 20 m right-of-way and providing access to a few commercial and residential properties.

The design constraints associated with development of alternative alignments within this section of the study area included:

- Property;
- Flood protection;
- Utility impacts; and
- Existing features.

As noted with respect to Section II, there is a backwater dam located southwest of the Barry Downe Road intersection with a maximum flood water elevation of 272.8 m. The proposed Maley Drive in this section should be built at least 1.0 m above this elevation in order to ensure that there is no flooding of the road during major storm events. Also, There is one stream crossing (Junction Creek East Branch) which passes under Maley Drive in a 1.2 m × 0.6 m concrete box culvert.

A few existing commercial and residential buildings have direct access to Maley Drive in this section, although most of the development is reverse-frontage low density residential on the south side east and west of Lansing Avenue. At the southeast corner of the Maley Drive and Barry Downe Road intersection, there is a proposed Cambrian College site. Additionally, on the north side of Maley Drive, across from Lansing Avenue, an eighteen hole golf course is proposed on property owned by NDCA.

An INCO hydro line located on the north side of Maley Drive within the existing 20 m right-of-way is planned to be relocated in the near future. Additionally, Sudbury Hydro lines are located on the south side of Maley Drive within the existing 20 m right-of-way.

The results of the soil samples taken indicate that there is no bedrock along this section of the route. However, based on an earlier study, some bedrock was encountered at a depth of approximately 4.0 m at the intersection of Lansing Avenue and Maley Drive.

Horizontal Alignment

In this section, the following horizontal alignments were examined:

a) Option H3.1 Widening about existing Maley Drive centreline.
b) Option H3.2 Construction on new alignment ±20.0 m north of the existing centreline.

These design alternatives are illustrated in Plates 5 and 6.

Vertical Alignment

Based on the two horizontal alignment options, vertical alignment options were developed. Factors governing the selection of the most appropriate profile included:

- Design speed;
- Existing topography/road grades/driveway grades;
- At grade versus grade separated intersections/interchanges; and
- Floodline elevations.

In order to minimize the impact on adjacent properties and driveways, only minor variations to the existing profile were considered. However, due to the existing substandard crest and sag curves, design standards were implemented and modifications were made to reflect minimum a 100 km/h design speed.

Cross Sectional Elements

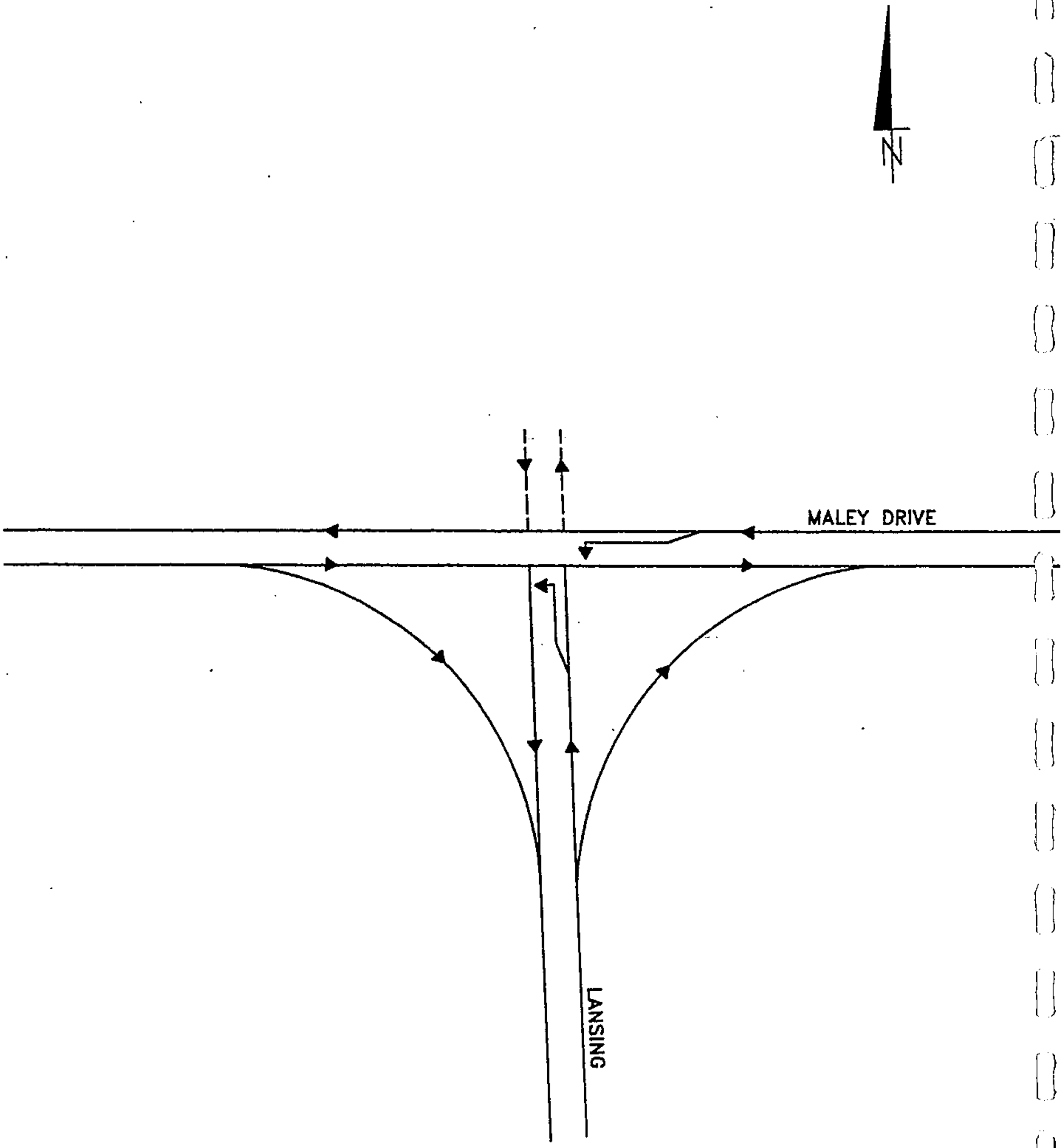
Present and future traffic projections indicate that a two-lane rural section will be sufficient for at least 10 years in this area. However, for overall route continuity, protection for a future four lane section was considered as part of this assessment. The road classification of this section of the proposed Maley Drive can be defined as a rural arterial undivided section (RAU100). The cross section for this section of Maley Drive is illustrated on Plate 37.

For the northerly alignment option, the two lane rural section could be located such that it was centred in the 60 m right-of-way, or offset from the existing roadway to allow for a minimum 15 m grassed median. These two options are illustrated on Plate 36.

Intersection Options

Lansing Avenue at Maley Drive

An at-grade intersection at Lansing Avenue is expected to provide adequate capacity for the turning movements. The preferred design for this intersection is shown in Figure 5.17. Stop control will be provided on the Lansing Avenue approach. The projected growth in turning movement volumes over the study horizon of twenty years is not expected to result in the need for grade-separation of the intersection.



LANSING/MALEY DRI
INTERSECTION CONFIGURAT
OPTION
Figure 5

5.2.4 - Section IV: Maley Drive - Junction Creek to Falconbridge Highway

The final section of the study area extends from Junction Creek easterly ±1200 m to Falconbridge Highway. This area is characterized by a high concentration of commercial/industrial/residential frontages, and several utility crossings. Through this area, the existing Maley Drive has a two lane rural cross-section.

The major design constraints requiring consideration in this section of the study area included:

- Utility impacts;
- Property impacts;
- Retention of existing features;
- Possible future easterly extension beyond Falconbridge Highway; and
- Provision for possible future grade separation at the CN Rail line.

There are several potential utility constraints within this section. The Martindale Transformer Station (T.S.) is located just west of CN Rail on the south side of existing Maley Drive. Several hydro tower lines cross the existing corridor at this point. North of the existing corridor, and east of National Street there are several aerial hydro lines including single, double and triple pole lines.

In addition to the hydro crossing, there is an operational Canadian National Rail crossing located east of Junction Creek with a single main track plus an adjacent service track leading into the Martindale T.S.

Horizontal Alignment

A number of horizontal alignment options were examined within this section. These alignment options are illustrated on Plates 6 and 7. All options conform to MTO geometric design standards for a 100 km/h design speed.

Four horizontal alignments were evaluated. These are outlined below.

Alternative H4.1

The route consists of maintaining Maley Drive on its existing centreline.

Alternative H4.2

This option involves routing the roadway north of and parallel to Maley Drive, intersecting Falconbridge Highway ±100 m north of the existing intersection. The intersection between Old Falconbridge Road and Maley Drive would have a severe skew angle necessitating sideroad realignment or possible grade separation.

Alternative H4.3

This route positions the roadway further north to avoid the extensive hydro corridor which parallels Maley Drive. It would intersect Falconbridge Highway 200 m north of existing Maley Drive. Its crossing with Old Falconbridge Road also results in a significant intersection skew angle.

Alternative H4.4

This is a variation to the northerly realignment (H4.3). It involves a northerly shift to provide a new crossing of the CN railway, then returns to the existing Maley Drive alignment at the existing Old Falconbridge Road intersection.

Vertical Alignment

All vertical alignments were established on the basis of a design speed of 100 km/h with minimum K values of 45 and 70 sag and crest curves respectively. However, due to the proximity of the various crossing roads, the vertical alignment was controlled by the need to either meet the existing crossing road or be raised sufficiently to maintain minimum vertical clearance for grade separating the CN track.

Cross Sections

Several 4-lane cross sectional options were considered in this section of the study area including:

- Rural cross section with an open ditch;
- Urban cross section with closed drainage;
- Undivided with 5 m painted median lane; and
- Divided with 15 m grassed median.

Intersection/Interchange Options

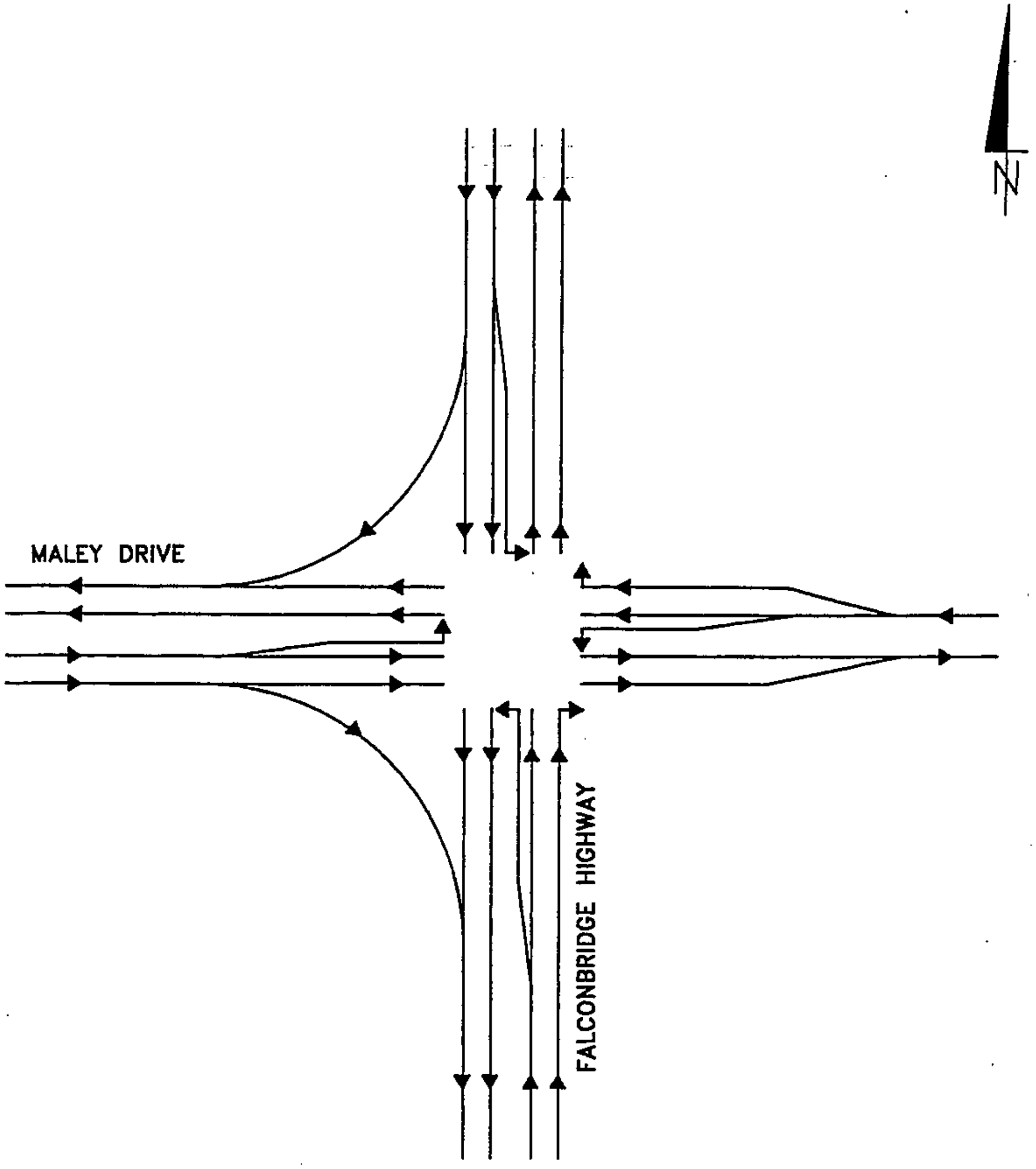
Within the section, several roads intersect with Maley Drive including Old Falconbridge Road, National Street and Falconbridge Highway.

Old Falconbridge Road at Maley Drive

The existing intersection of Old Falconbridge Road at Maley Drive will be maintained, with stop control on the Old Falconbridge Road approaches. Grade separation is not expected to be required.

Falconbridge Highway at Maley Drive

The existing intersection of Falconbridge Highway at Maley Drive will remain an at-grade intersection, with signalized traffic control. The preferred configuration is shown in Figure 5.18. Grade separation is not expected to be required within the study planning horizon.



RECOMMENDED

FALCONBRIDGE HIGHWAY/
MALEY DRIVE
INTERSECTION CONFIGURATION
OPTION 12
Figure 5.18

5.3 EVALUATION OF DESIGN ALTERNATIVES

5.3.1 - Selection Criteria

In order to determine the preferred alternatives from the various available options, a set of factor-specific evaluation criteria was established under the following groupings:

- Social Environment;
- Land Use;
- Natural Environment;
- Transportation;
- Utilities; and
- Capital Costs.

5.3.2 - Assessment and Evaluation of Alternatives

A relative comparison of all feasible options within each of the four corridor sections was conducted based upon the above criteria.

The following charts summarize the subjective evaluation of the design alternatives within each section:

Section I	Frood Road to LaSalle Boulevard	Table 5.4
Section II	LaSalle Boulevard to Barry Downe Road	Table 5.5
Section III	Barry Downe Road to Junction Creek	Table 5.6
Section IV	Junction Creek to Falconbridge Highway	Table 5.7

Each horizontal and vertical alignment option was assessed under the above-mentioned six main groupings, each reflecting factor-specific impacts. The options were then individually rated, based on a three level scale for each factor (minimum impact, moderate impact and significant impact). Each factor was provided with equal weighting. Based on the ratings system of 1 for minimum impact, 2 for moderate impact and 3 for significant impact, the ratings for all options were then summed and the one with the lowest total score was considered as being the preferred alternative.

The following sections outline the selection of the preferred alternative, along with the associated rationale.

5.3.2.1 - Section I: Frood Road to LaSalle Boulevard

Alignments

Two alignment options were considered, both of which will effectively address the long term traffic requirements associated with this section of the Maley Drive Extension. Since a portion of the existing roadway is constructed under side hill conditions and some concerns have been expressed regarding the stability of the high fill embankment, it is recommended that Option H1.2 (widening on one side) be implemented. This option will be slightly less expensive to construct because less rock excavation is

T 5.

ASSESSMENT OF ALTERNATIVE DESIGNS

SECTION I - FROOD ROAD TO LASALLE BOULEVARD

ENVIRONMENTAL COMPONENTS			ALTERNATIVE	
GROUPING	FACTOR (1)	INDICATOR	H1.1	H1.2
Social	Emergency access	Change in the number of road accesses	No change ■	No change ■
	Historic and human interest features	Effect on human interest areas and resources	No known effect ■	No known effect ■
		Effect on archaeological resources	No known effect	No known effect
	Noise	Noise level increases (as per MOE guidelines)	No residential properties in section ■	No residential properties in section ■
	Services	Effect on recreational services	No known effect ■	No known effect ■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	No change ■	No change ■
Cost	Capital cost	Capital cost for the undertaking - 4 lane divided	$ 0.55m ▒	$ 0.4m ■
	Property cost	Residential property costs	Nil ■	Nil ■
		Industrial property costs - land and access	Nil	Nil
Land use	Number of properties required	Number of complete acquisitions	Nil ■	Nil ■
		Number of partial acquisitions		
	Effect of property access	Number of properties affected by: -Access relocation	▒ Terry Fox Centre Access Road to be relocated to accomodate new LaSalle Blvd / Maley Dr. intersection.	▒ Terry Fox Centre Access Road to be relocated to accomodate new LaSalle Blvd / Maley Dr. intersection.
	Effect on pace and nature of development	Does the alternative alter the pace and/or nature of expected development in the corridor	No change ■	No change ■
	Effect on business	Number of businesses displaced	None ■	None ■
		Number of businesses with severe impact by property taking	None	None

TABLE 5.4
ASSESSMENT OF ALTERNATIVE DESIGNS
SECTION I - FROOD ROAD TO LASALLE BOULEVARD

ENVIRONMENTAL COMPONENTS			ALTERNATIVE			
GROUPING	FACTOR (1)	INDICATOR	H1.1		H1.2	
Natural Environment (2)	Fisheries	Extent of habitat affected	No known impacts	■	No known impacts	■
		Effect on bank stability and potential erosion sites during construction	Existing south embankment may require slope flattening if only small widening was undertaken		No impact	
	Vegetation	Effect on rare or endangered species	No known impact	■	No known impact	■
		Area of loss of vegetation	No significant loss		No significant loss	
		Effect on revegetation program	No impact		No impact	
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	No known impact	■	No known impact	■
	Wetlands	Area of encroachment	None	■	None	■
		Severance	None		None	
		Loss of function	None		None	
Transportation	Ability to respond to future growth in traffic demand	Potential for staged widening	N/A	■	N/A	■
	Geometric design	Maximum grades	Meets design citeria for 100km/h	■	Meets design citeria for 100km/h	■
	Staging opportunities	Traffic impact during construction	Construction activity on both sides	■	All construction retained on one side	■
Utilities	Effect on provision of services	Relocations	Protection of gasmain required	▨	Protection of gasmain required	▨

SUMMARY	MINIMAL IMPACTS	16X ■	17X ■
	MODERATE IMPACTS	3X ▨	2X ▨
	SIGNIFICANT IMPACTS	☐	☐
	OVERALL RATING (3)	22	21
	RANKING	2	1

Notes:

1. A number of additional factors were considered, the impacts of which did not vary between alternatives. These included : surface water, ground water, visual impacts, air quality and pedestrian/bicycle linkages.
2. There are no Environmentally Sensitive Areas within the study area
3. Minimal impact has a rating of 1;moderate impact has a rating of 2; and significant impact has a rating of 3.

TABLE 5.5
ASSESSMENT OF ALTERNATIVE DESIGNS
SECTION II - LASALLE BOULEVARD TO BARRY DOWNE ROAD

ENVIRONMENTAL COMPONENTS			ALTERNATIVE						
GROUPING	FACTOR (1)	INDICATOR	H2.1	H2.2	H2.3 A	H2.3 B	H2.4	H2.5 A	H2.5 B
Social	Emergency access	Change in the number of road accesses	Access at LaSalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at LaSalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at LaSalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at LaSalle, Notre Dame, Montrose & Barry Downe No access at Turner ■	Access at LaSalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at LaSalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at LaSalle, Notre Dame, Montrose & Barry Downe No access at Turner ■
	Historic and human interest features	Effect on human interest areas and resources	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■
		Effect on archaeological resources	No effect	No effect	No effect	No effect	No effect	No effect	No effect
	Noise	Number of noise sensitive areas (residences) affected by a noticeable noise increase (as per MOE guidelines)	None ■	None ■	None ■	None ■	None ■	None ■	None ■
	Services	Effect on recreational services	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	Re-distribution of neighbourhood traffic with less traffic oriented to LaSalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to LaSalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to LaSalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to LaSalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to LaSalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to LaSalle Blvd ■
Cost	Capital cost	Pavement	10.4 m ☐	13.0 m ☐	9.4 m ☐	9.6 m ☐	8.7 m ■	8.7 m ▨	8.9 m ▨
		Structures						0.76 m	0.75 m
		Interchange ramps			0.75 m	0.78 m		0.35 m	0.35 m
		Signals	0.40 m	0.40 m	0.35 m	0.35 m	0.40 m	0.40 m	0.40 m
		Utilities	0.35 m	0.35 m	0.40 m	0.50 m	0.35 m	0.35	0.35 m
		Total	$11.15 m	$13.75 m	11.40 m	$11.60 m	$9.45 m	$10.55 m	$10.80 m
		Maintenance (length of road)	3.9 km	4.7 km	4.1 km	4.1 km	3.9 km	3.7 km	3.7 km
	Property cost	Residential property costs	■	■	■	■	■	■	■
		Industrial property costs							
Land use	Number of properties required	Number of complete acquisitions	Takings from INCO, NDCA, two private owners ■	Partial takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■
		Number of partial acquisitions							
	Effect of Property access	Number of restrictions of access - partial	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■
		Number of restrictions of access - complete							
	Effect on pace and nature of development	Number of access relocations required	Severance of proposed residential development near Montrose ☐	Severance of proposed residential development near Montrose ☐	Severance of proposed residential development near Montrose ■	Severance of proposed residential development near Montrose ■	Severance of proposed residential development near Montrose ▨	Severance of proposed residential development near Montrose ■	Severance of proposed residential development near Montrose ■
		Does the alternative alter the pace and/or nature of expected development in the corridor							
Natural Environment (2)	Fisheries	Watercrossing habitat affected	Local effect. No effect on downstream fisheries ■	Local effect. No effect on downstream fisheries ■	Local effect. No effect on downstream fisheries ■	Local effect. No effect on downstream fisheries ■	Loss of stream and riparian habitat. May affect drainage ■	Loss of stream and riparian habitat ■	Loss of stream and riparian habitat ■
		Effect on bank stability and potential erosion sites during construction	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■
	Vegetation	Effect on rare or endangered species	None ▨	None ■	None ■	None ■	None ■	None ▨	None ▨
		Area of loss of vegetation	Loss of Oak-heath woodland and at at west end of alignment (650 m through area)	No loss of significant community vegetation. Through 24(m oak-heath woodland	Alignment through greater length of rock barrens (less sensitive)	Alignment through greater length of rock barrens (less sensitive)	Loss of portion of Oak-heath woodland at west end of alignment. Alignment through 360 m of Oak-heath woodland	Loss of portion Oak-heath woodland at west end of alignment and small central site of some vegetation community	Loss of portion Oak-heath woodland at west end of alignment and small central site of some vegetation community
		Effect on revegetation program							
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	Impact to Oak-heath woodland Traverses 25m of beaver wetland ▨	Traverses 65m of beaver wetland (mostly open water) ▨	Traverses 20 m of beaver wetland ■	Traverses 20 m of beaver wetland ■	Traverses 20 m of beaver wetland Traverses 400 m Oak-heath woodland Traverses 360 m Poplar Pine forest ▨	Impact of Oak-heath woodland habitat, Traverses 20 m of beaver wetland ▨	Impact of Oak-heath woodland habitat, Traverses 20 m of beaver wetland ▨

TABLE 5.5
ASSESSMENT OF ALTERNATIVE DESIGNS
SECTION II - LASALLE BOULEVARD TO BARRY DOWNE ROAD

ENVIRONMENTAL COMPONENTS			ALTERNATIVE						
GROUPING	FACTOR (1)	INDICATOR	H2.1	H2.2	H2.3 A	H2.3 B	H2.4	H2.5 A	H2.5 B
	Wetlands	Area of encroachment	Encroaches on 4 wetlands 2 wetlands areas will be reduced in size 30 50% ☐	Encroaches on 3 wetlands ▨	Encroaches on 2 wetlands ▨	Encroaches on 2 wetlands ▨	Encroaches on 3 wetland habitats ▨	Encroaches on beaver wetland 3 riparian watercourse wetland habitats ■	Encroaches on beaver wetland 3 riparian watercourse wetland habitats ■
		Severance	Sever 2 small wetland habitats	Greater loss of wetland area	Crosses narrow area bisecting beaver wetland	Crosses narrow area bisecting beaver wetland	Adjacent to shrub meadow		
		Loss of function	No potential loss of function	No potential loss of function			Runs through 160 m wetland riparian area of tributary of West Junction Creek		
Transportation	Ability to respond to future growth in traffic demand	Potential for widening to four lanes	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■
		Potential for grade separation of intersections	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe ☐	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe ☐	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe ▨	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe Less traffic disruption in the future ■	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe ☐	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe ▨	Accomodates interchanges at LaSalle, Notre Dame, Montrose & Barry Downe Less traffic disruption in the future ■
	Geometric design	Maximum grades	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3% Curvilinear alignment ☐	Horizontal & vertical meets 100 km/h design speed Maximum Grade 4% ☐	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 4% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 2.5% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3.5% ■
		Proximity of adjacent intersections	Turner to Notre Dame 350 m ☐	Turner to Notre Dame 250 m ☐	Turner to Notre Dame 500 m ▨	Turner to Notre Dame Turner grade separated ■	Turner to Notre Dame 650 m ▨	Notre Dame grade-separated ☐	Turner grade-separated ■
		Intersection geometrics traffic safety	Curvilinear alignment to Notre Dame ▨	Curvilinear approach to Notre Dame Vertical grade on approach to LaSalle ▨	Curvilinear approach to Notre Dame ▨	Curvilinear approach to Turner ■	Interchange at Notre Dame Grade separated at Turner ▨	Curvilinear approach to Turner ▨	Interchange at Notre Dame grade separated at Turner ■
		Ground conditions	40% of alignment on earth soils ☐	60% of alignment on earth soils ☐	Alignment predominantly on rock ■	Alignment predominantly on rock ■	40% of alignment on earth soils ☐	Alignment predominantly on rock ■	Alignment predominantly on rock ■
	Staging opportunities	Traffic impact during construction	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■
		Westerly Extension	Accomodates 4 laning of LaSalle westerly ■	Accomodates 4 laning of LaSalle westerly ■	Accomodates 4 laning of LaSalle westerly ■	Accomodates 4 laning of LaSalle westerly ■	Accomodates 4 laning of LaSalle westerly ■	Accomodates 4 laning of LaSalle westerly ■	Accomodates 4 laning of LaSalle westerly ■
Utilities	Effect on provision of services	Length of relocation	9 Ontario Hydro poles on Notre Dame ■	9 Ontario Hydro poles on Notre Dame ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■
		Number of crossings affected	Gas Line crossing Alignment encroaches onto Hydro corridor in two locations ☐	Gas Line crossing Alignment encroaches onto Hydro corridor in two locations ☐	Gas Line crossing Protection of two hydro towers Alignment crosses into Hydro corridor ☐	Gas Line crossing Protection of two hydro towers Alignment crosses into Hydro corridor ☐	Gas Line crossing Protection of two hydro towers Alignment encroaches onto Hydro corridor in two locations ☐	Gas Line crossing Protection of two hydro towers No encroachment in Hydro corridor ■	Gas Line crossing Protection of two hydro towers Some encroachment in Hydro corridor at Notre Dame interchange ■
SUMMARY		MINIMUM IMPACTS	13X ■	14X ■	18X ■	22X ■	16X ■	18X ■	22X ■
		MODERATE IMPACTS	4X ▨	5X ▨	5X ▨	1X ▨	6X ▨	6X ▨	3X ▨
		SIGNIFICANT IMPACTS	8X ☐	6X ☐	2X ☐	2X ☐	3X ☐	1X ☐	0X ☐
		OVERALL RATING	46	42	34	30	37	33	28
		RANKING	7	6	4	2	5	3	1

NOTES
1 A number of additional factors were considered the impacts of which did not vary between alternatives. These included Surface Water, Groundwater, Visual impacts, Air quality and Pedestrian/bicycle linkages
2 There are no Environmentally Sensitive Areas within the Study Area
3 Minimal impact has rating of 1, moderate impact has a rating of 2 and significant impact has a rating of 3

5.6

ASSESSMENT OF ALTERNATIVE DESIGNS
SECTION III - BARRY DOWNE ROAD TO JUNCTION CREEK

ENVIRONMENTAL COMPONENTS			ALTERNATIVE			
GROUPING	FACTOR (1)	INDICATOR	H 3.1		H 3.2	
Social	Emergency access	Change in the number of road accesses	No change	■	No change	■
	Historic and Human Interest Features	Effect on human interest areas and resources Effect on archaeological resources	None None	■	None None	■
	Noise	Noise level increases (as per MOE guidelines)	Greater noise level increases in the short term	▨	Lower noise level increases in the short term	■
	Services	Effect on recreational services	No impact on golf course	■	No impact on golf course	■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	No changes	■	No changes	■
Cost	Capital cost	Capital cost for the undertaking Short Term Long Term	$1.70 M $2.00 M	■	$2.00 M $1.70 M	■
	Property cost	Residential property costs Short Term Industrial property costs Long Term	$ 0 M $ 0.3 M	■	$ 0.3 M $ 0 M	■
Land use	Number of properties required	Number of complete acquisitions Number of partial acquisitions Short Term Long Term	Property required from NDCA Cambrian College and CP Rail at Barry Downe Property required from NDCA, Barry Downe to Lansing One private residential property and NDCA property required east of Junction Creek No property required for 2 lanes; no additional property required for 4 lanes	■	Property required from NDCA Cambrian College and CP Rail at Barry Downe Property required from NDCA, Barry Downe to Lansing One private residential property and NDCA property required east of Junction Creek Two partial takings and one complete taking for 2 lanes; no additional property required for 4 lanes	▨
	Effect on property access	Number of restrictions of access Number of access relocations required	Direct access to Coop maintained Combined access to Lansing and proposed golf course via intersection	■	Direct access to Coop maintained Combined access to Lansing and proposed golf course via intersection	■
	Effect on pace and nature of development	Does the alternative alter the pace and/or nature of expected development in the corridor	No change	■	No change	■
	Effect on business	Number of businesses displaced	Direct access to Garden Centre maintained; no displacement of businesses	■	Direct access to Garden Centre maintained; no displacement of businesses	■

TABLE 5.6
ASSESSMENT OF ALTERNATIVE DESIGNS
SECTION III - BARRY DOWNE ROAD TO JUNCTION CREEK

ENVIRONMENTAL COMPONENTS			ALTERNATIVE	
GROUPING	FACTOR (1)	INDICATOR	H 3.1	H 3.2
Natural Environment (2)	Fisheries	Extent of habitat affected	Loss of habitat from watercourse 1 and 2 ▨	Loss of fish habitat for watercourse 1 and 2 through culvert placement ▨
		Effect on bank stability and potential erosion sites during construction	None	None
	Vegetation	Effect on rare or endangered species	None ■	None ■
		Area of loss of vegetation	Insignificant loss	Loss of area of wet shrub thicket and white birch - heathland (not significant)
		Effect on revegetation program	None	None
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	No impact; limited habitat affected ■	No impact; limited habitat affected ■
	Wetlands	Area of encroachment	Encroaches on 2 wetland habitats ■	Encroaches on 2 watercourse riperian (wetland) habitats ■
		Severance	Negligible loss of wetland habitat	Negligible loss of wetland habitat
		Potential loss of function	No potential loss of function	No potential loss of function
Transportation	Ability to respond to future growth in traffic demand	Future growth to four lanes	Future undivided or divided 4 lanes can be accomodated Property acquisition from NDCA, CP and residential required ■	Future undivided or divided 4 lanes can be accomodated No further property required than that for 2 lanes (ie 2001 ROW) ■
		Potential for grade separation of intersections	Barry Downe and Maley Drive grade separation can be accomodated with additional property acquisition	Barry Downe and Maley Drive grade separation can be accomodated with additional property acquisition
		Geometric design	Horizontal and Vertical meets 100km/h design speed with maximum 2% grade	Horizontal and Vertical meets 100km/h design speed with maximum 2% grade
	Staging opportunities	Construction staging complications	Traffic disruption during construction ☐	Minimal traffic disruption during construction ■
		Future expansion	widening or twinning can occur to the north of the alignment with 15 metre or 16.5 metre median or undivided	Widening or twinning can occur to the south of the alignment either on new line (15 m median or undivided) or on existing Maley
Utilities	Effect on provision of services	Relocations	22 Ontario Hydro poles potentially to be relocated with reconstruction ☐ 14 INCO poles to be relocated but upgrading of line to be done by INCO	8 Ontario Hydro poles potentially to be relocated ■ No INCO poles to be relocated but upgrading of line to be done by INCO
SUMMARY		MINIMAL IMPACTS	14 X ■	16 X ■
		MODERATE IMPACTS	2 X ▨	2 X ▨
		SIGNIFICANT IMPACTS	2 X ☐	0 X ☐
		OVERALL RATING (3)	24	20
		RANKING	2	1

NOTES:

1 A number of additional factors were considered, the impacts of which did not vary between alternatives . These included. Surface Water; Groundwater; Visual impacts; Air quality, and Pedestrian/bicycle linkages.
2. There are no Environmentally Sensitive Areas within the Study Area
3. Minimal impact haqs a rating of 1; moderate impact has a rating of 2; and significant impact has a rating of 3.

TABLE 5.7
ASSESSMENT OF ALTERNATIVE DESIGNS
SECTION IV - JUNCTION CREEK EAST BRANCH TO FALCONBRIDGE HIGHWAY

ENVIRONMENTAL COMPONENTS			ALTERNATIVE			
GROUPING	FACTOR (1)	INDICATOR	H4.1	H4.2	H4.3	H4.4
Social	Emergency access	Change in the number of road accesses	National St. connects to Old Falconbridge Hwy north of Maley Drive ■	New access to National St. via Old Falconbridge Highway; new access to Old Falconbridge Hwy. and Falconbridge Hwy. ▨	New access from National Street to existing Maley Dr. via CN grade separation new access to Old Falconbridge Hwy and Falconbridge Hwy. ▨	New access to National St. via Old Falconbridge Hwy.; existing access to Old Falconbridge Hwy. and Falconbridge Hwy. maintained ▨
	Historic and human interest features	Effect on human interest areas and resources	No effect ■	No effect ■	No effect ■	No effect ■
		Effect on archaeological resources	No effect	No effect	No effect	No effect
	Noise	Noise level increases (as per MOE guidelines)	Minimal noise impacts ■	Some noise impact due to proximity to existing residential uses ▨	Some noise impact due to proximity to existing residential uses ▨	Minimal noise impacts ■
	Services	Effect on recreational services	No effect ■	No effect ■	No effect ■	No effect ■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	No effect ■	More traffic at Old Falconbridge Hwy /Maley Drive intersection closer to residential development ▨	No effect ■	No effect ■
Cost	Capital cost	Capital cost for the undertaking - 4 lane divided	$5.95 M ■	$7.4 M ☐	$6.4 M ▨	$6.5 M ▨
	Property cost	Residential property costs Industrial property costs - land and access	$1.3 M ▨	$1.2 M ▨	$2.25 M ☐	$1.25 M ▨
Land use	Number of properties required	Number of complete acquisitions Number of partial acquisitions	Partial taking of Ontario Hydro and CN property at CN crossing; complete taking of property from two owners east of CN tracks; complete taking from Superior Additional property required for Falconbridge Hwy. grade separation ▨	Partial taking of Ontario Hydro and CN Rail; complete taking from 4 private owners; additional property required for Falconbridge Hwy. grade separation Additional property required for relocation of 230 kV Hydro line ▨	Partial taking from NDCA, Ontario Hydro CN; complete takings from three industrial properties and three residential units Additional property required for Falconbridge Hwy. grade separation ☐	Partial taking from NDCA, Ontario Hydro CN and one private owner; complete takings from three private owners and Superior Additional property required for Falconbridge Hwy. grade separation ▨
	Effect of property access	Number of properties affected by: - Primary access to Maley Dr. restricted to right-in/right-out only - New secondary areas via rear service road - New alternative secondary access -Access relocation	New service road connecting National to Old Falconbridge north of Maley Drive ▨ New access for Ontario Hydro substation New service road north of Maley Drive east of Old Falconbridge Hwy.	No effect on direct property access to Maley Drive; access to National Street from new connection to Falconbridge ▨ Hwy.; traffic signal at new Maley Drive/ Falconbridge Hwy. necessitates the elimination of north/south left turn from existing Maley Drive None	No effect on direct property access to Maley Drive Access to National St. from new connection ■ under CN bridge None	No effect on direct property access to Maley Drive; reconfiguration of National St./Maley Drive intersection ■
	Effect on pace and nature of development	Does the alternative alter the pace and/or nature of expected development in the corridor	Access to development adjacent to Maley Drive maintained; redevelopment can occur utilizing service road and Old Falconbridge Hwy. ■	redevelopment of frontage along existing Maley Drive can occur ▨	redevelopment of frontage along existing Maley Drive can occur ▨	Frontage along Maley Drive retains direct access ▨
	Effect on business	Number of businesses displaced Number of businesses with severe impact by property taking	One business requires buyout ▨	Realignment of National Street access but no displacement of business Major impact on Hydro lines will necessitate relocation of businesses ☐	Three businesses require buyout ☐	Access to National St. via new connection to Old F.H.; access to Ont. Hydro substation from new connection to M.D. west of substation; no displacement of businesses ▨

TABLE 5.7

ASSESSMENT OF ALTERNATIVE DESIGNS

SECTION IV - JUNCTION CREEK EAST BRANCH TO FALCONBRIDGE HIGHWAY

ENVIRONMENTAL COMPONENTS			ALTERNATIVE			
GROUPING	FACTOR (1)	INDICATOR	H4.1	H4.2	H4.3	H4.4
Natural Environment (2)	Fisheries	Extent of habitat affected Effect on bank stability and potential erosion sites during construction	Increased loss of habitat from watercourse 1 and 2 No significant impact Extends exisitng culverts ■	Loss of fish habitat from watercourse 1 and 2 through culvert placement No significant impact New culvert crossing at Junction Creek East branch ▨	Loss of fish habitat from watercourse 1 and 2 through culvert placement No significant impact New culvert crossing at Junction Creek East branch ▨	Loss of fish habitat from watercourse 1 and 2 through culvert placement No significant impact New culvert crossing at Junction Creek East branch ▨
	Vegetation	Effect on rare or endangered species Area of loss of vegetation Effect on revegetation program	None ■ Insignificant loss None	None ▨ Loss of area of wet shrub thicket and white birch - heathland (not significant) None	None ▨ Loss of area of wet shrub thicket and white birch - heathland (not significant) None	None ▨ Loss of area of wet shrub thicket and white birch - heathland (not significant) None
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	No impact; limited habitat affected ■	No impact; limited habitat affected ■	No impact; limited habitat affected ■	No impact; limited habitat affected ■
	Wetlands	Area of encroachment Severance Loss of function	Encroaches on two wetland habitats ■ Negligible loss of wetland habitat No potential loss of function	Encroaches on two watercourse riperian wetland habitat ■ Negligible loss of wetland habitat No potential loss of function	Encroaches on two watercourse riperian wetland habitat ■ Negligible loss of wetland habitat No potential loss of function	Encroaches on two watercourse riperian wetland habitat ■ Negligible loss of wetland habitat No potential loss of function
Transportation	Ability to respond to future growth in traffic demand	Potential for staged widening and upgrading Potential for future grade separation at Falconbridge Hwy	Can widen to 4 lanes with additional property requirements ■ Opportunity for grade separation at Falconbridge Hwy/ Maley Dr. maintained Construction of grade separation to south minimized traffic disruption and impacts on Hydro facilities	Widening to 4 lanes can be accomodated undivided or divided with 15 metre median Reduced median width (7.5m) is required to reduce utility impacts ☐ Accomodation of traffic signals at Old Falconbridge Hwy. and grade separation and grade separation at Falconbridge Hwy.; option for rightin/rightout can be accomodated at Old Falconbridge Hwy /realigned National Street	Widening to four lanes can be accommodated divided or undivided with 15 metre median ▨ Can accommodate grade separation at Old Falconbridge Hwy.; displacement of one business requied; Hydro towers to be raised/ relocated	Expansion to 4 lanes can be accomodated (undivided only east of CN crossing); retain direct frontage access from CN to Falconbridge Hwy. ▨ Can accomodate grade separation at Falconbridge Highway; displacement of two businesses required to construct grade separation; service road required for remaining businesses N/S of Maley
	Geometric design	Maximum grades	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade ■	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade Future interchange with Falconbridge Hwy.on curve ☐	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade Future interchange with Falconbridge Hwy.on curve ☐	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade Curvilinear alignment from CN to Old Falconbridge ▨
	Staging opportunities	Traffic impact during construction	Significant traffic disruption during construction - detour of Maley Drive at CN likely ☐	All traffic on existing Maley Drive during construction min. impact; alignments compatible with east. exten. of N By-Pass ■	All traffic on existing Maley Drive during construction min. impact; alignments compatible with east. exten. of N By-Pass ■	Significant impact to traffic on M.D. and at M.D./F.H. intersection; alignment compatible with east. exten. of N By-Pass ☐
Utilities	Effect on provision of services	Relocations	Aerial Bell relocation, 30 Ontario Hydro pole relocations ■ Ontario Hydro tower extensions required for CN grade separation	9 Ontario Hydro poles to be relocated 230 kV Hydro line to be relocated; two 230 kV Hydro lines affected by future Maley Drive/Falconbridge Hwy. grade separation Ontario Hydro towers to be extended ☐	230 kV Hydro lines affected by future Maley Drive/Falconbridge Hwy. grade separation Ontario Hydro towers to be raised at CN crossing ■	Bell relocation (aerial); 24 Ontario Hydro poles Ontario Hydro tower extensions required at CN crossing (230 kV) ▨

SUMMARY	MINIMAL IMPACTS	14 X ■	5 X ■	8 X ■	7 X ■
	MODERATE IMPACTS	4 X ▨	8 X ▨	7 X ▨	11 X ▨
	SIGNIFICANT IMPACTS	1 X ☐	5 X ☐	4 X ☐	1 X ☐
	OVERALL RATING	25	38	34	32
	RANKING	1	4	3	2

Notes:

1. A number of additional factors were considered, the impacts of which did not vary between alternatives. These included : surface water, ground water, visual impacts, air quality and pedestrian/bicycle linkages.
2. There are no Environmentally Sensitive Areas within the study area
3. Minimal impact has a rating of 1;moderate impact has a rating of 2; and significant impact has a rating of 3.

because less rock excavation is needed, and the widening of the existing fill embankment by ±7.5 m will allow any stability problems associated with the existing embankment to be addressed. The final alignment may change to deal with the 250 mm high pressure gas main along the toe of the existing slope in some areas.

Cross Sections

The cross section proposed for this section of the road is a 4-lane rural undivided facility. This treatment is recommended over a divided roadway cross section due to its lower capital cost and property requirements, especially in this area where the topography is rugged.

Intersections

The existing Frood Road intersection configuration will be retained. Centre median islands on the east and west legs are proposed to allow installation of the secondary traffic signal head in the optimum location.

Noise

Since there are no noise sensitive areas located adjacent to this section, either alignment is acceptable from a noise perspective.

5.3.2.2 - Section II: LaSalle Boulevard to Barry Downe Road

Alignments

Nine alignment options were considered (H2.1 through H2.9), as shown on Plates 2, 3 and 4. Of the nine alignments evaluated, Option H2.5 is considered the preferred solution. This alignment is positioned high up on the rock ridge and just south of the hydro corridor. This option will allow the majority of the section to be built in either rock cut or fill thereby providing a very stable subgrade. Also, this route has minimal utility impacts.

The preferred alignment option includes a grade-separated crossing of Turner Avenue (sub-option H2.5B). This sub-option was preferred over sub-option H2.5A, which included an at-grade crossing of Turner Avenue.

Cross Section

A number of different cross sectional configurations were evaluated as detailed in Section 5.2.2. While current traffic projections do not warrant a 4-lane cross section within the next ten years, provisions for such an arrangement were considered necessary in the overall planning process such that once necessary, the additional lanes could be implemented.

Based on this consideration, both 4-lane divided and 4-lane undivided cross sections were evaluated. The preferred alternative is the 4-lane divided concept. This has been chosen for the following reasons:

1) 15.0 m median width is the minimum rural width allowable;

2) Since the roadway is generally located in an undeveloped area with no access except the intersecting roadways, an ultimate cross section providing a physical separation between opposing lanes offers a safe operating environment; and

3) Future flexibility for additional widening to six lanes with the rural median avoiding the need for significant alterations to the intersecting roadways.

It is also recommended that within the rock cut and fill sections, the full 4-lane divided cross section be built to subgrade level. This will avoid the need to pay a premium for rock blasting of the opposing set of lanes in the future due to existing traffic operations. Also, it will generate sufficient fill material to provide a consistent subgrade within the entire area where rock is encountered. This will also allow stabilization of the ultimate southerly embankment slope with vegetation to avoid aesthetic concerns expressed as part of the public consultation process.

Intersections

This section of Maley Drive intersects with five roadways:

- LaSalle Boulevard;
- Turner Avenue;
- Notre Dame Avenue;
- Montrose Avenue Extension; and
- Barry Downe Road.

A number of intersection configurations were evaluated for each crossing road, based on the projected traffic volumes. At the major future interchange locations (LaSalle Boulevard and Notre Dame Avenue), optional configurations were developed as detailed in Section 5.2.2.

The intent of this exercise was to establish the most optimum arrangement which would address the short term 2-lane Maley Drive traffic requirements, while being suitable for future upgrading without the need for elaborate staging scenarios or removal of significant portions of the previously constructed intersections. The preferred interchange arrangement for LaSalle Boulevard is Option 5 (Figure 5.6). It allows for the construction of an at-grade intersection in the short term, which will provide convenient eastbound access to either LaSalle Boulevard or Maley Drive, while retaining the reverse movement, albeit accommodating a smaller volume and hence a less direct layout.

Once the traffic volumes dictate the requirement for the grade separated configuration, the additional lanes and bridge can be constructed without interfering with existing traffic, resulting in a free flow condition for all traffic movements.

At Notre Dame Avenue, the combination of topography and traffic volumes has resulted in the decision to implement Option 8 (Figure 5.14). The preferred A2 concept will allow free flow traffic conditions during the short term, while necessitating minimal interchange loop revisions once the four-lane divided facility is warranted. In order to accommodate the grade separated intersection, Turner Avenue, located ±300 m westerly, will also require a grade separation. The proximity of the two intersections precludes the need or justification for providing access ramps from/to Turner Avenue.

At the remaining intersections (Montrose Avenue and Barry Downe Road), an at-grade layout is recommended. These include separate left and right turn lanes to address safety issues.

Noise

Of the five alignments options, the preferred alignment option H2.5B was assessed in detail. This alignment option did not provide any noise constraints and did not require noise mitigation measures to be implemented.

Between LaSalle Boulevard and Notre Dame Avenue, the alignment option H2.5B represented the worst case scenario due to its close proximity to the residential noise sensitive areas. The remaining alignments are located farther from these residential areas than the preferred alignment. Even so, the preferred alignment did not have any noise impacts or require mitigation measures between LaSalle Boulevard and Notre Dame.

Between Notre Dame Avenue and Barry Downe Road, the preferred alignment option H2.5 and alignment option H2.3 had similar setbacks, farther from the residential noise sensitive areas than all the other alignments. The larger the distance is between the noise source and the noise sensitive area, the more preferred the option is from a noise impact perspective. The preferred alignment option for this section did not provide any noise constraints and did not require noise mitigation measures to be implemented. Therefore, alignment option H2.5 is an acceptable solution. (Alignment option H2.3, located a similar distance away from the noise sensitive area, would also be satisfactory from a noise perspective.)

5.3.2.3 - Section III: Barry Downe Road to Junction Creek

Alignments

Two options were considered: H3.1 (southerly) and H3.2 (northerly); these are shown on Plates 5 and 6. Of the two options, Option H3.2 is considered as the preferred solution. It involves construction of the initial 2-lane roadway on a new alignment offset to the north of existing Maley Drive. Once the four-lane configuration is warranted, sufficient room will be available to reconstruct the existing roadway while maintaining the 15.0 m rural median as recommended in Section II. The central alignment through this section generally corresponds to the existing roadway, while taking into consideration the minimum flood levels at Junction Creek. Minimal utility relocation will be required with this option.

Cross Section

To maintain continuity with the adjacent section, the new facility will be positioned such that the future 15.0 m rural median can be provided between the opposing lanes.

Intersections

The existing Lansing Avenue will be reconstructed to provide a full moves intersection, with dedicated left and right turn lanes on Maley Drive. Provisions for future access to the north, servicing a proposed golf course, has also been included.

Noise

The existing road alignment was assessed in detail. This is represented by alignment option H3.1. This alignment option does not provide any noise constraints, and did not require noise mitigation measures to be implemented. Alignment option H3.2 is located further north, providing a greater setback than alignment option H3.1 from the noise sensitive areas on Maley Drive. Although alignment option H3.1 is feasible from a noise impact perspective, alignment option H3.2 would be preferred over option H3.1 due to its greater setback from the noise sensitive areas.

5.3.2.4 - Section IV: Junction Creek to Falconbridge Highway

Alignments

Four alternative alignment options were developed; these are shown on Plates 6 and 7. Option H4.1 is considered as the most appropriate. This alignment generally follows the existing Maley Drive centreline. While the other options may have resulted in less direct impacts on the abutting owners, the existing Maley Drive would have needed to be maintained for local access in any event. The new connections to Old Falconbridge Road and Falconbridge Highway would have created minimal spacing between the existing Maley and new Maley intersections on these north-south roadways and would also necessitate their realignment in order to provide acceptable roadway geometrics.

Alternatives were also evaluated for grade separating the CN Rail line. At this time the low exposure index (trains × vehicles crossing) does not warrant its implementation.

As a result of numerous commercial entrances in this section of Maley Drive, the vertical profile will match the existing layout with the exception of minor refinements to meet the minimum design standards as detailed in Table 5.1.

Cross Section

The presence of numerous entrances within this section of Maley Drive will result in a potential degradation of traffic operations unless additional laning is provided.

With the need for a five-lane intersection at the two north-south crossing roads, combined with the significant traffic volumes entering/exiting Maley Drive from the adjacent development, it is recommended that a 5-lane urban cross section be provided throughout this section. The fifth (centre) lane will be used as a dedicated left turn lane at National Street, Old Falconbridge Road and Falconbridge Highway. Between these intersections, it will be signed and marked as a wide (5.0 m) two-way centre left turn lane allowing safe refuge for vehicles waiting to turn into the commercial entrances or upon exiting to merge with through traffic without negatively impacting the overall operation of the roadway.

Intersections

The intersections at Old Falconbridge Road and Falconbridge Highway will be reconfigured to provide separate left and right turn lanes, including centre islands for traffic signal control devices. At National Street, an east to north left turn lane will be provided through the use of pavement markings.

Noise

Alignment option H4.1, which represents the existing road alignment, was assessed in detail. This alignment did not provide any noise constraints and did not require noise mitigation measures to be implemented. The other alignments are located further north of Maley Drive and are closer to the residentially sensitive areas located adjacent to Old Falconbridge Road. Therefore, these other options would result in a greater noise impact than alignment option H4.1 due to their closer proximity to the adjacent noise sensitive areas. Accordingly, alignment option H4.1 would be the preferred alignment option from a noise perspective.

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6. THE SELECTED DESIGN ALTERNATIVE

6.1 THE SELECTED ALTERNATIVE

The selected alternative consists of three components:

1. Reconstruction of the existing Maley Drive from Falconbridge Highway to Barry Downe Road, to upgrade this road to function as an arterial road;
2. Extension of Maley Drive westerly from its existing eastern terminus at Barry Downe Road to meet LaSalle Boulevard, west of Notre Dame Avenue; and
3. Widening LaSalle Boulevard from Maley Drive westerly to Frood Road.

The combined result of these project components will be the creation of a complete east-west arterial road link from LaSalle Boulevard in the west to Falconbridge Highway in the east. This will form a northern circulation and bypass route of the City of Sudbury.

Preliminary design plans for the selected alternative are displayed on Plates 8 to 33. Plates 34 to 38 provide added information on the proposed typical sections recommended in each section of the route. These plates outline the salient features of the recommended concept, including: proposed right-of-way limits, horizontal and vertical alignments, and general intersection/ interchange details including lane and taper dimensions plus driveway treatments.

The future four lane divided roadway configuration, including the LaSalle Boulevard/ Maley Drive interchange layout, is also depicted.

A detailed description of the selected design follows, together with a description of the associated impacts. The description is divided into the sections previously identified.

Maley Drive will be constructed initially as a roadway with one through lane in each direction, with provision to expand to two lanes per direction in future. Exclusive turning lanes will be constructed as required at the intersections noted above.

Construction of the undertaking is expected to begin in 1996, with completion projected for 1998. The timing of construction is dependent on the availability of funding.

6.2 TRANSPORTATION AND CROSS-SECTIONAL REQUIREMENTS

6.2.1 - Section I: LaSalle Boulevard - Frood Road to Proposed Maley Drive Extension

The road classification through this section of LaSalle Boulevard is defined as a Rural Undivided (RAU 100) incorporating a 4 lane pavement width of 15.0 m plus a 2.5 m shoulder. Widening to accommodate an additional left turn lane at the relocated Terry

Fox Recreation Centre/College Boreal access road plus the installation of centre islands at Frood Road have been included.

The proposed horizontal and vertical alignments match the existing configuration throughout this section, since the existing alignments meet the recommended geometric standards and the existing pavement is worthy of salvage.

6.2.2 - Section II: LaSalle Boulevard to Barry Downe Road

This section has been provided based on a RAU 100 design standard incorporating a 2-lane cross-section. However, it includes provision to allow future widening to a 4-lane divided roadway incorporating a 15.0 m rural median.

From the westerly limit of this section, the 4-lane roadway has been developed to allow one dedicated lane for eastbound motorists destined to LaSalle Boulevard, with the inside lane being an either/or layout to facilitate vehicle movement onto the new Maley Drive Extension.

Similarly, from east of the new LaSalle Boulevard/Maley Drive intersection, a two lane westbound configuration is developed to facilitate westbound Maley to eastbound LaSalle traffic movement. These two lanes are continued westerly to join into the proposed layout at the section limit.

It should be noted that once increased traffic demand warrants a more elaborate intersection, a grade separated interchange which will provide free flow traffic operations for all vehicle movements in this area can be accomplished without the need for either major modifications to the intersection layout or diversions during construction.

Proceeding easterly, Maley Drive will be grade separated over Turner Avenue and over Notre Dame Avenue. No access will be provided to or from Turner Avenue. At Notre Dame Avenue, the Parclo A4 design will permit unrestricted free flow movements for all ramps with the exception of the north to east-west loop ramp, which will be controlled by a stop condition.

Once the 4-lane divided roadway is implemented, alteration to the interchange will be limited to the southeast quadrant only.

From this point easterly, Maley Drive continues as a 2-lane rural facility until it intersects the extension of Montrose Avenue. This tee intersection includes channelized right turn islands plus a westbound left turn lane. The new Montrose Avenue connection extends southerly to match into existing Montrose located ± 500 m to the south of Maley Drive.

East of this intersection, Maley will cross the Maley Reservoir. Sufficiently sized culverts will be provided to allow the peak flow volumes as dictated by the Nickel District Conservation Authority to pass under Maley Drive without incurring any further backwater impacts.

Within the limits of this section of the corridor, a vertical alignment which optimizes the cut and fill balance while respecting the minimum vertical clearances required for road grade separation has been provided. From a point immediately east of Turner Avenue to ± 900 m west of Barry Downe Road, the roadway will be excavated for the full 4-lane divided configuration in order to avoid the costly premium required to blast rock adjacent to active 2-lane traffic flows once the 4-lane section is warranted.

At Barry Downe Road, a full 4-leg at-grade intersection is proposed. It includes the provision of channelized right turn lanes (to and from the south) combined with a central opposing left turn lane on Maley Drive. The north and south intersection approaches will incorporate a two lane approach in either direction.

6.2.3 - Section III: Barry Downe Road to Junction Creek

Through this section of the corridor, the new Maley Drive road has been offset to the north of the existing roadway such that once warranted the additional two lanes can be constructed along with the 15.0 m median over the existing roadway. The new road can be constructed in this area with minimal interference with existing traffic. In the interim period, driveway access from the south will be extended to connect into the new Maley Drive facility and the existing roadway will be removed from service.

Within this section, Maley Drive intersects Lansing Avenue. As part of the improvements proposed, this intersection will be upgraded to include the provision of right turn channelization islands (to and from the south) and the addition of the northern leg of the intersection to accommodate future golf course development. Maley Drive will include one through lane plus a central opposing left turn lane.

Upon approaching Junction Creek the new roadway will be aligned to connect into existing Maley Drive. This will form the terminus of the future 4-lane divided portion of the roadway. At the west limit of this section, the property limit will be reduced from 60.0 m to 36.0 m.

At Junction Creek, a new culvert capable of accommodating the design flows as dictated by the Nickel District Conservation Authority will be provided. Other existing culverts will in general be extended in kind.

The vertical alignment throughout this section generally follows the contour of the surrounding topography with minor variations to maintain minimum 100 km/h design standards. The vertical alignment has also been set, respecting the existing Maley Drive profile and the implications associated with its future reconstruction once the demand for a 4 lane facility is established.

6.2.4 - Section IV: Junction Creek to Falconbridge Highway

Beginning immediately west of Junction Creek, the new Maley Drive will be realigned through a transition curve from the northerly alignment to meet the existing alignment from the Creek to Falconbridge Highway. Throughout this section the vertical alignment will generally conform to the existing Maley Drive profile.

From the west limit of this section to the Martindale Transformer Station, a two lane rural cross-section is recommended. Future expansion to 4 lanes would be completed by widening on the north side only. Within this area the proposed property limits involve retaining the existing southerly boundary and acquiring additional land on the north side to provide a 36.0 m minimum width. From this point easterly, the presence of numerous entrances has resulted in the recommendation to provide a five lane urban cross-section encompassing four 3.75-metre lanes plus a 5.0-metre centre left turn lane positioned within a widened right-of-way (36.0 m). While a number of existing commercial properties will be impacted by the 8.0 metre property widening required on either side, all existing businesses will be retained.

New intersection configurations will be provided at National Street, Old Falconbridge Road and Falconbridge Highway. At National Street, an eastbound left turn lane has been provided on Maley Drive. This lane will be developed by pavement markings within the 5.0 m centre left lane.

At Old Falconbridge Road, the new intersection will incorporate two through lanes on Maley Drive, plus opposing left turn lanes including median islands. The north and south legs will be constructed as a three lane configuration, comprising opposing left turn lanes plus a single through/right lane in each direction.

The connection into the existing Falconbridge Highway involves the provision of right turn channelized lanes for vehicles destined southbound to westbound and eastbound to southbound. In the east-west direction, it also includes two through and opposing left turn lanes, including islands.

Minor widening on Falconbridge Highway is also proposed, in order to facilitate the addition of centre islands and a southbound left turn lane opposite the existing northbound left turn lane.

Most of the existing commercial entrances within this segment of Maley Drive will require minor realignment to fit into the new facilities.

Due to the proximity of the Superior Propane building to the new right-of-way, driveway and parking lot revisions will be necessary. These will be addressed further during the detailed design process.

The existing Rainbow Concrete entrance, located immediately west of Falconbridge Highway, will be seriously impacted by the increased traffic volumes on Maley Drive, and the proposed Maley/Falconbridge intersection improvements. Heavy eastbound to northbound left turn volumes are anticipated on Maley Drive at Falconbridge Highway, which may eventually require a double left turn movement. The left turn queues will extend well beyond the existing Rainbow Concrete entrance, and will require a centre island on Maley Drive which would restrict the entrance to in-right/out-right only, at best. Furthermore, any vehicles exiting out-right to Maley, but destined to turn left to southbound Falconbridge Highway would have difficulty merging into the left turn queue on Maley Drive. To address these concerns, a new driveway to Maley Drive located west of Superior Propane is proposed.

6.3 NATURAL ENVIRONMENT CONSIDERATIONS

Alternatives H2.1 to H2.5 have been assessed with regard to natural environment considerations. These alternatives are shown in Plates 1 to 7. Through the overall evaluation process of Class Environmental Assessment, Alignment Alternative H2.5 was assessed as the preferred alignment option for this project.

The effects on the natural environment are addressed below from the perspectives of water crossings (in terms of fish habitat), vegetation, wetlands and the potential effects of construction activities. These are summarized in Table 6.1.

Water Crossings

Water crossings associated with all of these alternatives have been assessed as having negligible impacts on fish habitat, with proper mitigation. No rare or endangered species were identified along the preferred corridor. Watercourses along the preferred alignment are generally small order streams with gradients strongly controlled by the surrounding bedrock topography. Fish populations, where present, are typical of degraded warmwater fish communities.

Vegetation

Alternatives H2.2, H2.3 and H2.4 were deemed to be preferable alignments with respect to loss of significant vegetation. Loss of locally significant red oak-heath woodlands and associated wildlife habitat was identified as resulting from Alternatives H2.1 and H2.5. Impacts to wildlife habitat are associated with Alternative H2.2, due to bisection of beaver pond habitat, and with Alternative H2.4 due to cumulative loss of significant vegetation habitat.

Red oak-heath communities are found along the slopes of many of the outcrops within the study corridor. The largest areal coverage of this community was found toward the west end of the corridor north of LaSalle Boulevard and west of Notre Dame Avenue. It is also found in small local pockets throughout the corridor.

Along the preferred H2.5 alignment, the forest canopy ranges from 50 percent to 75 percent closed under a canopy height of 3 m to 5 m. The relatively large extent of canopy closure available within this community offers habitat for several bird species not found elsewhere along the preferred alignment. Although absent from other communities along the alignment, the species of birds observed in the red oak heath are not considered significant from a broader ecological perspective.

With the exception of the mature red oak-heath community, other upland communities along the preferred alignment are regenerating after a period of intense disturbance. Over time, these communities will mature and provide a wealth of wildlife habitat. At this time, these communities are still immature and are less significant than other communities found along the alignment. Where possible, the alignment tends to follow these less sensitive upland communities.

TABLE 6.1
SUMMARY OF NET ENVIRONMENTAL EFFECTS

FACTOR	AREA	POTENTIAL EFFECTS	ACTIONS/MITIGATING MEASURES	NET EFFECTS
Water Crossings	Tributary A Tributary B LaSalle Tributary Junction Creek Junction Creek West	Erosion and sedimentation due to soil removal	Use of silt fencing and check dams Immediate restoration of native vegetation plantings	Minimal degradation of water quality during construction phase only
		Water Level	In general, existing culverts will be extended in kind (one new culvert required at Junction Creek) Proper culvert placement and sizing so not to interfere with the natural gradient of the watercourse Improvement to existing culverts where replacement is required	Negligible impacts
		Oil/grease/fuel contamination by construction equipment Increase in suspended sediment due to disturbance of stream beds	Environmentally sound construction techniques	Negligible impacts

TABLE 6.1
SUMMARY OF NET ENVIRONMENTAL EFFECTS
(Continued)

FACTOR	AREA	POTENTIAL EFFECTS	ACTIONS/MITIGATING MEASURES	NET EFFECTS
Wetlands	Shallow Marsh (north side of Maley Drive alignment approximately 200 m west of Barry Downe Road)	Erosion and sedimentation due to soil removal	Use of silt fencing and check dams Immediate restoration of native vegetation plantings	Minimal negative effects anticipated
		Fish movement	Proper culvert placement and sizing so not to interfere with the natural gradient of the watercourse	No long term effects to fish stocks; movement may be improved
		Oil/grease/fuel contamination by construction equipment	Environmentally sound construction techniques	Negligible impacts
	Beaver Pond (1 kilometre west of Barry Downe Road on the Maley Drive alignment)	Erosion and sedimentation due to soil removal	Use of silt fencing and check dams Immediate restoration of native vegetation plantings	Minimal negative effects anticipated
		Movement of wildlife and fish	Culvert sized to accommodate Regional storm	Marginal impact on wildlife movement; pond size reduced
		Oil/grease/fuel contamination by construction equipment	Environmentally sound construction techniques	Negligible impacts

TABLE 6.1
SUMMARY OF NET ENVIRONMENTAL EFFECTS
(Continued)

FACTOR	AREA	POTENTIAL EFFECTS	ACTIONS/MITIGATING MEASURES	NET EFFECTS
Vegetation	Red Oak Heath (largest areal coverage found north of LaSalle Boulevard and west of Notre Dame Avenue) Upland Communities (areal coverage scattered within road alignment)	Erosion and sedimentation due to soil removal Vegetation Removal *Note: upland communities are currently regenerating; therefore still maturing and less significant than other communities*	Use of silt fencing and check dams Immediate restoration of native vegetation plantings Construction in sensitive manner within predetermined boundaries (i.e. right-of-way) to minimize the impacts	Marginal effect anticipated
Fisheries	Tributary A Tributary B LaSalle Tributary Junction Creek Junction Creek West	Erosion and sedimentation due to soil removal	Use of silt fencing and check dams Immediate restoration of native vegetation plantings	Minimal negative impacts anticipated
		Fish movement	Proper culvert placement and sizing so not to interfere with the natural gradient of the watercourse Improvements to existing culverts where replacement is required	Potential improvements to habitat where culverts are replaced
		Oil/grease/fuel contamination by construction equipment	Environmentally sound construction techniques	Negligible impacts

TABLE 6.1
SUMMARY OF NET ENVIRONMENTAL EFFECTS
(Continued)

FACTOR	AREA	POTENTIAL EFFECTS	ACTIONS/MITIGATING MEASURES	NET EFFECTS
Wildlife		Division of habitat Wildlife/vehicular collisions		Marginal impacts; no significant species observed
Agriculture Resources		No agricultural resources impacted within the corridor		None
Land Use and Development	Maley Drive Preferred Alignment - zoned as open space and low density residential			Support for increased development
	Existing Maley Drive - light industrial east of Junction Creek, primarily low density residential west of Junction Creek	Reduction in accessibility	Design reviewed to ensure adequate access. Driveways relocated for selected properties	Adequate access maintained
	LaSalle Boulevard - Commercial Area	Removal of truck activity		Improved access to business
	LaSalle Boulevard - Residential Area	Changes in access and emergency response time		Improvement in access and response time
Heritage and Archaeological Concerns	Preferred Alignment	Shoreline beach was present in the area 4,500 years ago	Route specific archaeological surveys recommended prior to construction	Dependent on location of shoreline beach, if present in the Maley alignment

TABLE 6.1
SUMMARY OF NET ENVIRONMENTAL EFFECTS
(Continued)

FACTOR	AREA	POTENTIAL EFFECTS	ACTIONS/MITIGATING MEASURES	NET EFFECTS
Noise	Maley Drive (LaSalle to Notre Dame)	Higher noise levels due to increased traffic	Projected noise levels are within MOEE/MTO protocol guidelines; no mitigation required	Negligible impacts
	Maley Drive (Notre Dame to Barry Downe)			
	Maley Drive (Barry Downe to Lansing)			
	Maley Drive (Lansing to Falconbridge)			

Some removal of vegetation will be required during construction. A portion of this vegetation will be removed permanently from the site within the road allowance. Vegetation removal will be limited to the width required for construction equipment and right-of-way.

Wetlands

Increased levels of wetland encroachment were associated with alignment alternatives H2.1, H2.2, H2.3 and H2.4. Encroachment on corridor wetlands was assessed as minor along Alignments H2.5 (A and B).

A **shallow marsh community** is located immediately on the north side of the preferred Maley Drive alignment, approximately 200 metres west of Barry Downe Road. This wetland community is a depressional area between the road allowance and the high ridge immediately to the north. Field investigations indicate that herpetofaunal association with this marsh is significant. Suitable habitat is available for all life stages of herpetofauna found along the preferred alignment.

A **beaver pond** is located approximately 1 kilometre west of Barry Downe Road at the end of the preferred Maley Drive alignment. The community is an extensive deep water marsh which contains a limited cover of wetland vegetation in the shallows and along the shoreline. A warmwater fish community consisting of fathead minnows, lake chub and central mudminnows inhabits the pond. The pond is maintained by a series of beaver dams along the length of the depression and controlled overall by the shallow underlying bedrock surrounding the pond. A newly created dam (1994) at the south end will increase the areal extent of open water in the near future.

Construction Activities

Construction activities associated with the Maley Drive bypass will have short term and long term impacts on the environment. Short term impacts may include construction noise, vegetation removal, disruption of drainage and possible movement of sediment to watercourses.

Summary

The impacts of the preferred H2.5 alignment on the natural environment are expected to be as follows:

- Water crossings: negligible impacts - fish communities are typical of degraded warmwater communities;

- Vegetation: red oak-heath communities will be affected by the undertaking only within the right-of-way for construction;

- Wetlands: the shallow marsh community located approximately 200 metres west of Barry Downe Road will be subject to minor impacts by the undertaking. The beaver pond located approximately one kilometre west of Barry Downe Road will be bisected by the undertaking. The road has been aligned to pass over the narrowest section of the pond, to minimize disturbance. A box culvert sized to accommodate Regional storm flows will be provided to permit continued water flow.

Waste Management

No waste management concerns have been identified along the study corridor. A waste management plan will be designed and implemented as part of the project's construction.

References

1. Fulton, R.J. (ed.). 1989. **Quaternary Geology of Canada and Greenland.** Geological Survey of Canada.

2. Trow Consulting Engineers Ltd. 1994. **Preliminary Geotechnical Assessment. Maley Drive Extension.** Prepared for the Regional Municipality of Sudbury.

6.4 SOCIAL AND CULTURAL ENVIRONMENT CONSIDERATIONS

This section documents the projected effects of the undertaking on the social and cultural environments. Given that the inventory of agricultural resources indicated that there are no resources of this type in the preferred alignment corridor, agricultural impacts are not considered.

6.4.1 - Community Concerns

The concerns raised by the community through the public consultation program generally appear to fairly minor. The prevailing attitude toward the undertaking appears to be positive; this is indicated by the public comments summarized in Table 2.2, which included several requests that the construction timing be accelerated, and comments indicating that traffic conditions on LaSalle Boulevard are expected to be greatly improved by the undertaking.

Concerns raised by the public relate to visual intrusion, access to trails north of the City, effects on the regenerating natural environment and noise impacts. These concerns relate primarily to the section of Maley Drive between Notre Dame Avenue and Barry Downe Road. The issues and response to each are outlined below:

- **Visual intrusion:** one respondent at the public information centre cited a concern with respect to visual intrusion. This concern related to the area north of Drummond Avenue, between Notre Dame Avenue and Barry Downe Road. Efforts to minimize the visual intrusion have been included in the design process for the preferred alignment, in terms of the alignment and plantings to screen the road;

- **Access to trails:** the concern related to access to snowmobile trails north of the City, between Notre Dame Avenue and Barry Downe Road. This introduction of Maley Drive in this area is not expected to be a significant impediment to access. Maley Drive may actually improve access to the trails, by providing an arterial access, which is preferable to the current access via a local road (Drummond Avenue).

- **Natural environment:** one respondent cited a concern with respect to the natural environment. The specific area of concern was the regenerating area between Notre Dame Avenue and Barry Downe Road, and the effect the undertaking could have on vegetation and wildlife. The assessment of impacts on the natural environment indicates that this concern is valid with respect to the red oak-heath community along the Maley Drive alignment.

  Six of the 16 comment sheets noted that the respondents do not have concerns with respect to the natural environment.

Noise

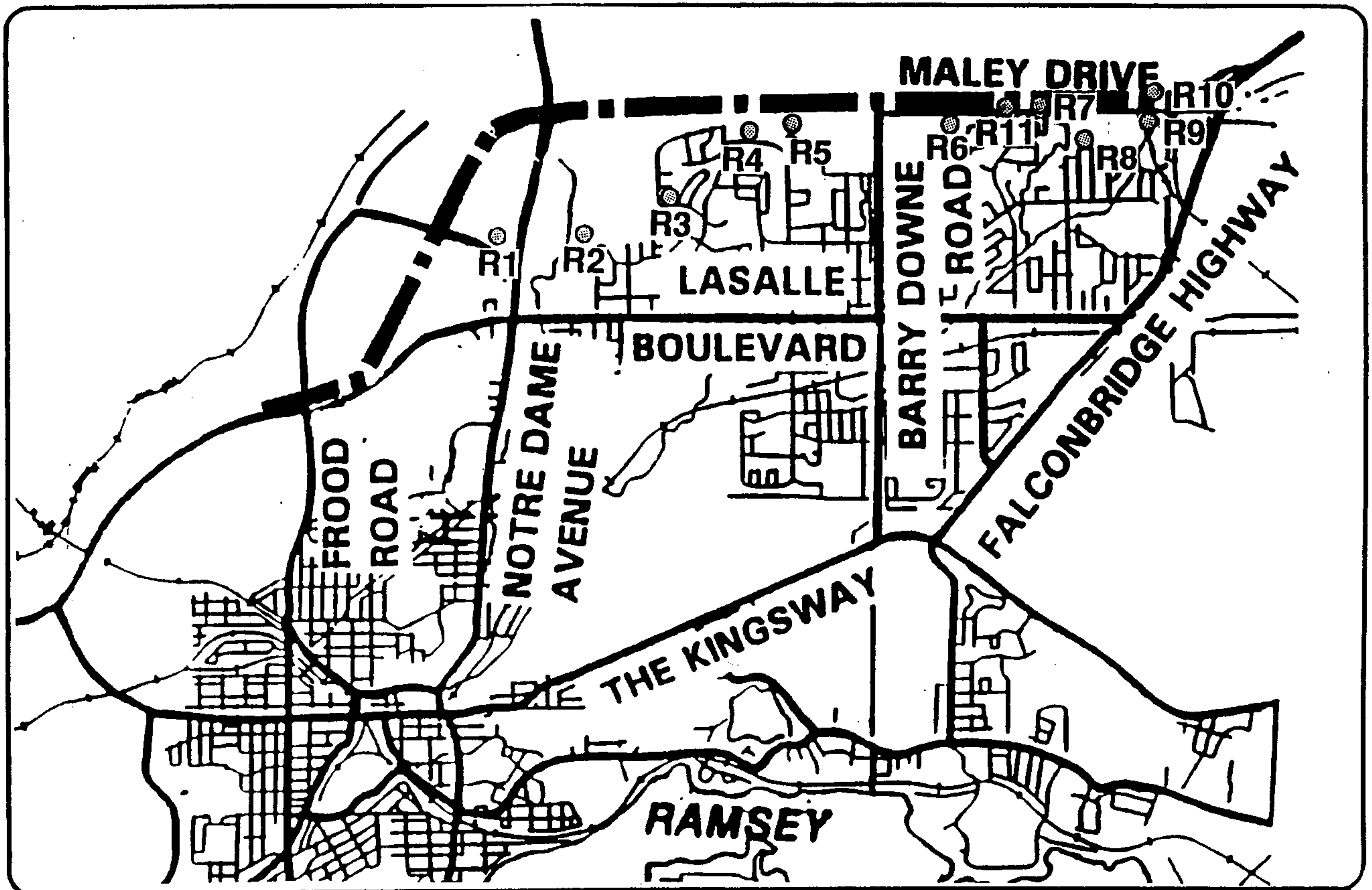
Three respondents at the Public Information Centre indicated that they see the undertaking as beneficial in terms of reducing noise on LaSalle Boulevard or other existing roads. Four respondents cited concerns with respect to noise impacts on residential areas as a result of the undertaking.

Noise has been addressed in accordance with the Ministry of the Environment and Energy (MOEE) / Ministry of Transportation (MTO) noise protocol. The noise levels have been based on the projected traffic data and the recommended design for the Maley Drive construction, as described in Table 5.1. The full noise impact assessment is presented in Appendix C.

The projected Year 2010 daytime noise levels for the outdoor living areas of the critical residential dwelling units located along Maley Drive are presented in Table 6.2. The receptor locations are shown in Figure 6.1.

The noise level increases due to the extension and widening of Maley Drive are typically 5 decibels or less for the most critical receptor locations in the vicinity of the alignment. For the two receptor locations where the noise level increases will be slightly greater than 5 decibels, implementation of noise mitigation is not considered warranted for a number of reasons.

The future noise levels projected at the Cassandra Court dwellings (Receptor R3) did <u>not</u> include the mitigative effect of future planned development in the area north of these dwellings. Consequently, the future noise levels will likely be lower than the noise levels projected in this noise assessment.



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○ NOISE RECEPTOR

FIGURE 6.1
NOISE RECEPTOR LOCATIONS

TABLE 6.2
PROJECTED 2010 DAYTIME OUTDOOR SOUND LEVELS (L_{eq} 16 Hour) AT KEY RECEPTOR LOCATIONS (dBA)

RECEPTOR NUMBER	RECEPTOR LOCATION (on Maley Drive at :)	DAYTIME OUTDOOR SOUND LEVELS (dBA)	
		Existing Values	Projected 2010 Values
Receptor 1	Notre Dame/Turner	54	57
Receptor 2	Drummond Avenue	46	51
Receptor 3	Cassandra Court	43	50
Receptor 4	Agincourt Avenue	41	46
Receptor 5	Shelley Drive	41	47
Receptor 6	Oasis Co-op, Covewood Crescent	59	63
Receptor 7	Springdale Crescent	56	57
Receptor 8	Dollard Avenue	43	48
Receptor 9	Maley Drive, South Side, South of National Street	51	55
Receptor 10	Maley Drive, North Side, East of National Street	57	60
Receptor 11	Covewood Crescent	57	59

Note: Includes noise attenuation provided by intervening dwelling units.

The future noise levels projected at the Shelley Drive dwellings (Receptor R5) just exceed the threshold for consideration of noise mitigation. However, given that the future noise levels in this area will be at least 8 decibels below the 55 decibel objective noise level referenced in the MOEE/MTO Noise Protocol, and that this future noise level is representative of typical quiet rural or suburban areas, implementation of noise mitigation for Maley Drive is not considered feasible for the reasons noted earlier in Section 5.3.2. A key reason why the future Maley Drive noise levels are so low is the substantial setback of the alignment from existing residential areas.

Therefore, it can be concluded that specific noise mitigation measures are not warranted for the extension and widening of Maley Drive between LaSalle Boulevard and the Falconbridge Highway.

6.4.2 - Land Use and Development

It is expected that the undertaking will have a number of positive effects in terms of land use and development. These include:

- A positive effect on commercial activity along LaSalle Boulevard. By removing truck traffic and some through traffic from LaSalle, the undertaking can be expected to result in business along this street being regarded as more accessible. This should make these businesses more viable economically;

- A positive effect on industry across northern Sudbury. The completed Maley Drive will provide a fast and effective bypass of the City of Sudbury. This will result in more efficient transportation operations for the mining and smelting industries, as well as other industries which rely on efficient transportation;

- A positive effect in terms of improving access to residential communities north of LaSalle Boulevard. Maley Drive will provide a second east-west arterial access to these neighbourhoods. This will improve emergency response access, and provide additional options and flexibility for Sudbury Transit routings; and

- A positive effect on development north of LaSalle Boulevard, based on the increased accessibility of the area.

Maley Drive can also be regarded as an important "city building" project. It will define a northern edge to the City of Sudbury, permitting completion of the northern limits of development in the City. It will provide east-west arterial access at an appropriate spacing for urban development.

6.4.3 - Heritage and Archaeological Resources

No heritage or archaeological surveys have been carried out in the corridor. It is known that a shoreline beach was present in the general area approximately 4,500 years ago. However, the geotechnical and environmental investigations undertaken for this project have not revealed any obvious remnant beaches in the preferred alignment.

These facts would indicate that there is a low probability that heritage or archaeological resources could be impacted by the undertaking.

6.5 PRELIMINARY COST ESTIMATES

A breakdown of the preliminary costs for the construction of the Maley Drive Extension, as a two-lane road on a two-lane roadbed and including associated intersection/interchange improvements, is outlined in Table 6.3. The total construction cost in 1995 dollars, including contingency, but excluding property acquisition is approximately $ 9.646 M. If the section of Maley Drive which is to be reconstructed on the existing alignment were fully excavated, instead of merely widened, this expanded activity would add an estimated $ 130,000 to the total construction cost. This would result in a total cost estimate off $ 9.776 M.

TABLE 6.3
PRELIMINARY COST ESTIMATES
($1995)

ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
Grading				
Earth Excavation	m^3	10,000	4.00	40,000
Rock Excavation	m^3	305,000	8.00	2,440,000
Granular 'A'	tonne	42,000	15.00	630,000
Granular 'B'	tonne	138,000	12.00	1,656,000
Hot Mix Asphaltic Concrete	tonne	16,000	55.00	880,000
Drainage				
Environmental Mitigation	lump sum			400,000
Structures	lump sum			1,500,000
Miscellaneous Items	lump sum			1,100,000
Utilities				
Miscellaneous (±20%)	lump sum			1,000,000
	TOTAL CONSTRUCTION COST $9.646 M			

6.6 CONSTRUCTION STAGING

The construction of Maley Drive is expected to be carried out over a number of construction seasons, with the intent to balance the rock/earth quantities within individual contracts. The work will also be performed in a manner which will allow maintenance of the existing portion of the roadway throughout the construction duration, and to respect the considerations with respect to the natural environment.

In order to keep within the budgetary constraints of the Regional Municipality of Sudbury and provide early relief to the existing portions of Maley Drive, it is anticipated that construction will commence at the east limit of the study area and progress westerly in a 3 to 4 year program. The sequence is envisaged as follows:

Year 1	Contract 1 - Falconbridge Highway to Junction Creek Contract 2 - Junction Creek to Barry Downe Road
Year 2	Contract 3, 4 and 5 - Barry Downe Road to Notre Dame Avenue
Year 3	Contract 6 - Notre Dame Avenue to LaSalle Boulevard

This phasing will however be dependent upon availability of project funding.

6.7 SUMMARY OF IDENTIFIED ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

6.7.1 - Significant Natural Features

The following recommendations for mitigation address the relevant environmental impacts, which relate to water crossings, vegetation, wetlands and the impacts of the construction process. The effects of the undertaking on the natural environment relate largely to the construction process; these are addressed first. Any effects not relating to construction are addressed in the subsequent paragraphs.

Construction

Erosion and sedimentation are potential construction impacts of road crossings of watercourses and wetlands. Erosion and sediment dispersal are potential effects in vegetated areas. Mitigation measures associated with construction at watercourse crossings, wetlands and vegetated areas are as follows:

1. Soil exposure will be minimized, and silt fencing and check dams will be used to control erosion and sediment dispersal on-site;

2. All machinery will be maintained, stored and refuelled in a manner consistent with the prevention of accidental contamination of riparian soils or water;

3. All areas disturbed by construction activities will be immediately restored and stabilized using native vegetation plantings; and

4. Construction timing: road construction at water crossings and wetlands should be scheduled from July 1 to March 31, to avoid habitat disturbance during the spring spawning period.

Several potential project impacts can be mitigated using proper siting and construction guidelines. Wetland and water crossings should be avoided wherever possible. Where crossings must occur, proper sizing and positioning of bridges and culverts will maintain existing habitat and flow regimes. Retrofitting poorly constructed structures will enhance wetlands and fisheries opportunities along the route. Use of best management erosion and sediment control practices are recommended to avoid sediment impacts to watercourses.

Culvert Design at Water Crossings/Wetlands

Poorly placed and designed culverts act as barriers to fish movement. Culverts should be designed to provide for fish movement under a variety of flow conditions.

Flow depth and velocity must not be limiting to fish movement. Culvert placement should not interfere with the natural gradient of the watercourse.

Drops at culvert outlets are barriers to fish movement and, as such, are contrary to the Federal Fisheries Act which provides for no net loss of fish habitat. The widening of the existing Maley Drive provides an opportunity to retrofit poorly placed and designed culverts, improving water flow and fish habitat in this area.

Vegetation

Some vegetation removal will be required. Mitigation measures associated with removal of vegetation areas include:

1. Removal will be conducted in a sensitive manner within predetermined boundaries to minimize impacts to wildlife, vegetation and soils; and

2. Trees which are to be preserved during construction will be tagged and snow fenced at the drip line to prevent root damage through soil compaction and excavation.

6.7.2 - Community Concerns

The minor community concerns relating to natural environmental impacts have been addressed both by the design process and through the identification of mitigating measures, noted above. Some minor loss of vegetation will occur as a result of the project, in the regenerating area between Notre Dame Avenue and Barry Downe Road.

With respect to visual intrusion concerns north of Drummond Avenue, the design has been modified to minimize the impacts. Plantings of native trees will assist in reducing the visual intrusion to a minimal level.

The noise level is addressed below.

6.7.3 - Noise

A summary of the noise assessment findings pertaining to the impacts of the Maley Drive Extension and reconstruction is provided below.

Maley Drive Between LaSalle Boulevard and Notre Dame Avenue

Receptor R1 (Notre Dame/Turner)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor will be 3 decibels greater than the current noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation is not warranted for Maley Drive in this vicinity.

Maley Drive Between Notre Dame Avenue and Barry Downe Road

Receptor R2 (Drummond Avenue)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor is 5 decibels greater than the current noise level. Furthermore, the future noise level will only be 51 decibels, due to the almost 500 metre setback from the Maley Drive Extension. This future noise level will be noticeably lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

Receptor R3 (Cassandra Court)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor is 7 decibels greater than the current noise level. However, the future noise level will still only be 50 decibels, due to the 600 metre setback from the Maley Drive Extension. Furthermore, this future noise level will be noticeably lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Although there will be a noticeable increase in noise levels due to the Maley Drive Extension, the future noise level will still be substantially below 55 decibels.

It should also be noted that future development is planned on some of the lands located between Cassandra Court and the Maley Drive Extension. Once built, this intervening development will provide some shielding to the existing houses in this area. Consequently, the future noise levels for the Cassandra Court homes will decrease from the projected 50 decibels noted in Table 5.4. This will result in the ultimate future noise level increase being 5 decibels or less, when compared to the existing ambient noise level.

Although the guidelines outlined in the MOEE/MTO Noise Protocol recommend that noise mitigation measures be investigated when the noise level increases are greater than 5 decibels, it can be concluded that noise mitigation will not be warranted for Maley Drive in this vicinity since ultimately the future noise level increases will not exceed 5 decibels due to the mitigating effect provided by the future planned development in this area.

Assuming that the future intervening development will consist of residential uses, the development will have to comply with MOEE Noise Policy related to new residential subdivisions and if the MOEE daytime objective noise level of 55 decibels for new residential uses cannot be attained, then the development must include any necessary noise mitigation measures.

Receptor R4 (Agincourt Avenue)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor is 5 decibels greater than the current noise level. However, due to the 300 metre setback from the Maley Drive Extension along with shielding provided by natural landforms in this vicinity the future noise level will only be 46 decibels, which is significantly lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

Receptor R5 (Shelley Drive)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor is 6 decibels greater than the current noise level. However, the future noise level will still only be 47 decibels which is significantly lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. A daytime noise level of 47 decibels can be considered quite typical of rural or suburban areas where there are no dominant noise sources such as arterial roads. Furthermore, a 47 decibel daytime noise level can be considered representative of quiet outdoor conditions.

The MOEE/MTO Noise Protocol indicates that when noise increases above the ambient exceed 5 dBA, then noise control measures should be investigated. Measures could include reducing the speed limit on the Maley Drive Extension, using a low-noise pavement, changing the alignment of Maley Drive, or constructing noise barriers. However, none of these possible mitigation measures are considered feasible for a variety of reasons as seen below.

Reducing the future speed limit on Maley Drive from the proposed 80 km/h to 70 km/h could theoretically reduce the noise level increase to less than 5 dBA, assuming drivers complied with the posted speed limit. However, based on current observations, drivers are not complying with the current low speed limits, and this leads to the conclusion that drivers on this new well-designed road would not comply with an artificially lower speed limit, unless there was permanent police enforcement. Therefore, it is concluded that this is not an administratively feasible or practical noise mitigation measure.

The second measure noted above is the use of a low noise pavement, such as an open-graded friction course. This type of pavement can reduce tire-pavement noise by approximately 2.5 decibels compared to typical pavement. However, use of this type of pavement is neither practical or cost-effective since the substantial freeze-thaw cycles in this area would result in more rapid deterioration of the pavement, as compared to standard asphalt pavement. Therefore, it can be concluded that this is not an economically or technically feasible noise mitigation measure.

Another option noted above was to move the extension farther away from the Shelley Drive houses. However, this has already been done, since the Maley Drive Extension is located approximately 250 metres away from these houses. A number of large hills are located immediately to the north of the alignment, thus precluding the shifting of the alignment any further north. Therefore, it can be concluded that this is not a technically feasible mitigation measure.

The final option noted was the construction of noise barriers along the Maley Drive road allowance. Although this would be technically possible, it is not considered to be a practical or economically feasible solution, since (a): it would require approximately one kilometre of noise wall, which would be very expensive; and (b): due to the large setback of the houses from the road, the noise barriers would likely not be able to reduce the noise levels by the minimum 5 dBA noted in the MOEE/MTO protocol. Noise barriers are much more effective when the dwellings are located close to the road.

Furthermore, only the most northerly houses on Shelley Drive would experience a noise level increase of 6 decibels. As Shelley Drive angles away from Maley Drive, the noise level increases become lower. The noise level increase at the easterly houses would not exceed 5 dBA, thereby precluding the need for any noise mitigation. At most only 10 houses on Shelley Drive would experience a 6 decibel noise level increase. Furthermore, the future noise level after the construction would only be 47 decibels which is 8 decibels lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol.

Therefore, it must be concluded that implementation of noise mitigation in the area of Shelley Drive cannot be justified on the basis of economic and technical feasibility, and on the basis of practicality, since the noise level increases are just marginally above the threshold for investigation of noise mitigation, and the future noise levels after the construction of Maley Drive will still be representative of a quiet rural or suburban area. Again, this is due to the substantial setback of Maley Drive from the Shelley Drive residences.

Maley Drive Between Barry Downe Road and Lansing Avenue

<u>Receptor R6 (Oasis Co-op, Covewood Crescent)</u>

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor will be 4 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation is <u>not</u> warranted for the widening of Maley Drive in this vicinity.

<u>Receptor R11 (Covewood Crescent)</u>

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor will only be 1 decibel greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation is <u>not</u> warranted for the widening of Maley Drive in this vicinity.

Maley Drive Between Lansing Avenue and Falconbridge Highway

<u>Receptor R7 (Springdale Crescent)</u>

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor will only be 1 decibel greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation is <u>not</u> warranted for the widening of Maley Drive in this vicinity.

Receptor R8 (Dollard Avenue)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level at this receptor will be 4 decibels greater than the current ambient noise level. Furthermore, the future noise level will only be 48 decibels, due to the more than 300 metre setback from Maley Drive. This future noise level will be noticeably lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

Receptor R9 (Maley Drive South Side, south of National Street)

As seen in Table 6.2 the future Year 2010 16-hour daytime noise level in the rear yard outdoor amenity area at this receptor will be 4 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation is not warranted for this dwelling due to the widening of Maley Drive in this vicinity.

Receptor R10 (Maley Drive North Side, east of National Street)

As seen in Table 6.2, the future Year 2010 16-hour daytime noise level in the rear yard outdoor amenity area at this receptor will be 3 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation is not warranted for this dwelling due to the widening of Maley Drive in this vicinity.

Construction Noise

With respect to the noise impacts during reconstruction of the existing Maley Drive, the following mitigating measures should be specified during the preparation of detailed design drawings and adhered to during construction:

1. Noise sensitive areas will be identified;

2. The Contractor will be required to comply with the appropriate municipal or regional by-laws regarding noise emission standards for construction equipment that may be in place at the time of construction;

3. General noise control measures (not sound level criteria) will be referred to, or placed into the contract documents;

4. Any initial complaint from the public will require verification by the Regional Municipality of Sudbury to determine if the general noise control measures agreed to are in effect. The Regional Municipality of Sudbury will investigate any noise concerns, warn the Contractor of any problems and enforce its contract;

5. A persistent complaint will require the Contractor to comply with the Ministry of the Environment and Energy's sound level criteria for construction equipment contained in the MOEE Model Municipal Noise Control By-law; and

6. In selecting the appropriate construction noise control mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.

6.8 MONITORING

No potential impacts of the project have been identified which are expected to require monitoring after completion of the undertaking.

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MALEY DRIVE EXTENSION

CLASS ENVIRONMENTAL ASSESSMENT

Region of/de SUDBURY

REGIONAL MUNICIPALITY OF SUDBURY

APPENDIX A

PUBLIC CONSULTATION

October, 1995

Marshall
Macklin
Monaghan
CONSULTING ENGINEERS SURVEYORS PLANNERS

January 31, 1994
File No. 16-93079-01-T01

Dear Sir/Madam

RE: Maley Drive Extension
Regional Municipality of Sudbury
Utility Mark-up

A Class Environmental Assessment Study is being initiated for the extension of Maley Drive, in the Regional Municipality of Sudbury. The proposed undertaking includes the extension of Maley Drive westerly from Barry Downe Road to the LaSalle Boulevard Extension, west of Notre Dame Avenue (Regional Road 80). The project also includes the reconstruction of the existing Maley Drive from Falconbridge Highway to Barry Downe Road. The proposed undertaking is illustrated in the attached figure.

Utility issues and potential impacts are considered to be an important element of this project.

To assist in the development of options for the Maley Drive Reconstruction and Extension we would appreciate if you would, at your earliest convenience, indicate the following utility information on the enclosed base mapping (1:2000 scale).

- location and size of plant within the study area identified;
- any existing and/or planned projects within the area which the project could reasonably affect;
- any special areas or issues which you feel will be of significance to your utility (e.g. allowable vertical clearances above roadways);
- if possible, an indication of costs for relocation would assist in project estimating and costing of comparative options.

... /2

Following development of preliminary design options and completion of field investigations, a Public Information Centre will be held to present the alternatives.

In the meantime, if you have any questions or require further information, please contact Mr. Leslie Martin at (905) 882-1100. Further information may also be obtained from Mr. Robert Falcioni, P.Eng., at the Regional Municipality of Sudbury (telephone (705) 673-2171 Ext. 235).

Yours very truly

MARSHALL MACKLIN MONAGHAN LIMITED

Robert K. Wanless, P.Eng.
Vice President
Transportation Planning

c.c. Mr. R. Falcioni, P.Eng., Regional Municipality of Sudbury

Attachment

RKW:w/p:16092b

October 17, 1995
File No. 16-93079-01-T012

1~

Dear Sir/Madam

RE: Notification of Project Initiation
Class Environmental Assessment
Maley Drive Extension
Regional Municipality of Sudbury

A Class Environmental Assessment Study is being initiated for the extension of Maley Drive, in the Regional Municipality of Sudbury. The proposed undertaking includes the extension of Maley Drive westerly from Barry Downe Road to the LaSalle Boulevard Extension, west of Notre Dame Avenue (Regional Road 80). The project also includes the reconstruction of the existing Maley Drive from Falconbridge Highway to Barry Downe Road. The proposed undertaking is illustrated in the attached figure. The project is being undertaken in the manner prescribed in the Municipal Engineers' Association *Class Environmental Assessment Document for Municipal Road Projects* (June, 1993).

The study will build upon earlier work undertaken during the Sudbury Regional Transportation Study including the Trucking Action Plan. Traffic congestion along LaSalle Boulevard and the need for increased east-west traffic capacity were identified in the Transportation Study.

Provision of a widened and improved Maley Drive from LaSalle Boulevard in the west to Falconbridge Highway, suitable for truck and bypass traffic, would relieve congestion on LaSalle Boulevard. This road could eventually be extended to connect to Highway 17, completing a northern bypass.

The study will consider a range of planning, engineering, operational, natural and social environmental factors in examining suitable options for the Maley Drive Extension.

.../2

Once the alternative solutions have been identified and a preliminary impact assessment completed, a Public Information Centre (PIC) will be held to allow the public to review and comment on the alternatives. You will receive further notice prior to the PIC, should you indicate your wish to remain on the mailing list.

We are interested in hearing any comments or concerns you may have, in addition to learning of any relevant information/information sources that will help us in our identification and assessment of alternatives. Your prompt response to this letter will assist us in identifying key issues at an early stage in the process. If you do not have any comments at this time, but would like to remain on the project mailing list, please indicate this on the attached form. Only those agencies which express interest in this project will be contacted in future.

Questions regarding the project may be addressed either to the undersigned, or to Mr. Robert Falcioni, P.Eng., of the Regional Municipality of Sudbury (telephone (705) 673-2171 Ext. 235).

Yours very truly

MARSHALL MACKLIN MONAGHAN LIMITED

Robert K. Wanless, P.Eng.
Vice President
Transportation Planning

c.c. Mr. R. Falcioni, P.Eng., Regional Municipality of Sudbury

Attachment

RKW:w/p:16092a

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Please complete boxes, and blank lines and return by
Friday, February 18, 1994

Mr. Robert K. Wanless, P.Eng.
Vice President
Transportation Planning

Marshall, Macklin, Monaghan
80 Commerce Valley Dr. East
Thornhill, Ontario
L3T 7N4

RE: CLASS ENVIRONMENTAL ASSESSMENT
MALEY DRIVE EXTENSION
REGIONAL MUNICIPALITY OF SUDBURY

Please indicate your preferred level of interest by marking the appropriate box:

☒ We wish to be kept informed and would like to remain on the project mailing list. We have comments to provide and they are attached.

☐ We wish to be kept informed and would like to remain on the project mailing list. At the present time, we have no significant concerns/comments to provide.

☐ We do not have any significant concerns regarding the above-noted project. Please withdraw our name/agency from the project mailing list.

Agency (if applicable)

Telephone No.

Contact

Fax No.

Address

Date

Signed

June 20, 1994
File No. 16-93079-01-T01

1~

Dear 2~:

Re: Notice of Public Information Centre

Class Environmental Assessment
Maley Drive Extension & Upgrading

Please be advised that a Public Information Centre has been scheduled for **Monday, June 27, 1994, between 4:00 and 8:30 p.m. in the amphitheatre at Lasalle Secondary School, 1545 Kennedy Street, Sudbury**. The purpose of the public information centre is to provide the public with the opportunity to review the preferred route, outlining intersection and access locations and provide input on the problem and the solution being considered.

Attached is the Public Meeting Notice that will appear in local newspapers for a few days in advance of the meeting.

Your comments are welcome at the meeting or until July 12, 1994, as indicated in the attached notice.

Yours truly,

MARSHALL MACKLIN MONAGHAN LIMITED

Robert K. Wanless, P. Eng.
Vice President
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CLASS ENVIRONMENTAL ASSESSMENT

MALEY DRIVE EXTENSION & UPGRADING

HAND OUT OF DISPLAY BOARDS PRESENTED AT THE PUBLIC INFORMATION CENTRE

June 27, 1994

Lasalle Secondary School

Marshall
Macklin
Monaghan
CONSULTING ENGINEERS • SURVEYORS • PLANNERS

REGIONAL MUNICIPALITY OF SUDBURY

WELCOME

TO THE

PUBLIC INFORMATION CENTRE

FOR THE

CLASS ENVIRONMENTAL ASSESSMENT MALEY DRIVE EXTENSION & UPGRADING

The Regional Municipality of Sudbury is currently undertaking an environmental assessment of reconstructing the existing segment of Maley Drive and extending it west from its current terminus at Barry Downe Road to Lasalle Boulevard.

You are welcome to review our work to date. This includes the alternative designs and the assessment of environmental effects.

Please complete a comment sheet after reviewing the displays. Members of the study team would be pleased to answer any questions you may have.

THANK YOU FOR YOUR INTEREST IN THIS STUDY

PLEASE SIGN IN HERE

REGIONAL MUNICIPALITY OF SUDBURY

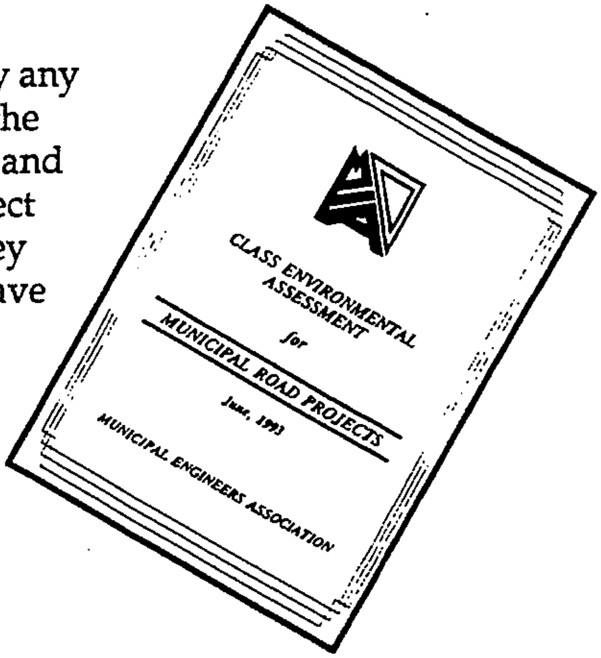
WHAT IS AN ENVIRONMENTAL ASSESSMENT ?

The Environmental Assessment Act ensures that environmental considerations, including the natural and social environments, are taken into account during the planning, construction and operation of new or upgraded facilities, such as new roads.

The process requires that the environmental effects of all solutions to the problem be examined and that the public be informed of the proposal at a time before any significant decisions have been made.

This project falls under the Municipal Engineers Association's Class Environmental Assessment for Municipal Road Projects (June, 1993).

A request can be made by any member of the public to the Minister of Environment and Energy to make this project subject to a hearing, if they feel that their concerns have not been adequately addressed through the Class Environmental Assessment process.



CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The process for a Class E.A. involves several key stages:

Need

The 1991 Regional Transportation Study documented the need for a new east-west arterial road north of Lasalle Boulevard.

Alternatives to the Undertaking

Alternatives including "Do Nothing" were considered during the 1991 Transportation Planning Study. The map showing the alternatives, and the details of the assessment of the alternatives are included in this display.

Alternative Design Concepts for the Undertaking

The Information concerning alternative alignments and design details considered for the project, and the assessment of the alternatives is presented here.

Public Consultation

Public Consultation is a key element. Public reviews were held during the 1991 Transportation Study to review the need and the alternative solutions. We are now seeking public comment on the alternative design concepts.

Environmental Study Report

Will be completed and placed on the public record for a 30 - day review period.

HISTORY OF THE PROJECT

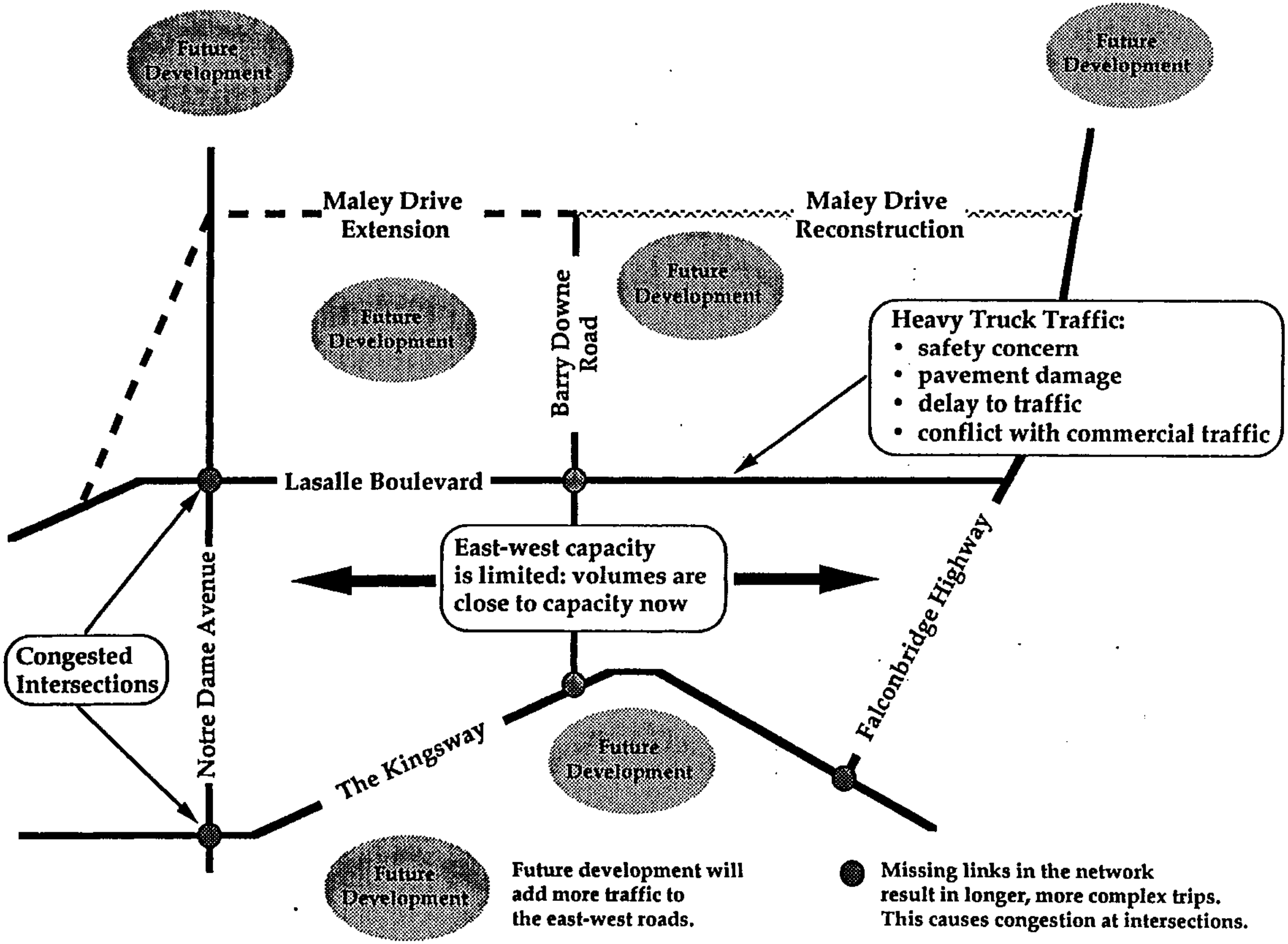
The idea of a northern bypass of the developed area of the City of Sudbury arose from a number of sources in the latter part of the 1980's. These included:

- The public, which had concerns with respect to the impacts of large trucks on Lasalle Boulevard and other streets;
- Business and industry, which saw benefits in terms of more efficient transportation; and,
- The Regional Municipality of Sudbury, which saw the need for additional east-west road capacity in the area north of Ramsey Lake.

The Region's 1990 Trucking Action Plan recommended the Maley Drive Extension and upgrading of the existing Maley Drive as the preferred option for a northern truck bypass.

The 1991 Transportation Plan also recommended proceeding with the Environmental Assessment in order to construct the Maley Drive Extension and upgrade the existing Maley Drive before 1995.

THE NEED FOR THE MALEY DRIVE EXTENSION



Heavy Truck Traffic:
- safety concern
- pavement damage
- delay to traffic
- conflict with commercial traffic

East-west capacity is limited: volumes are close to capacity now

Congested Intersections

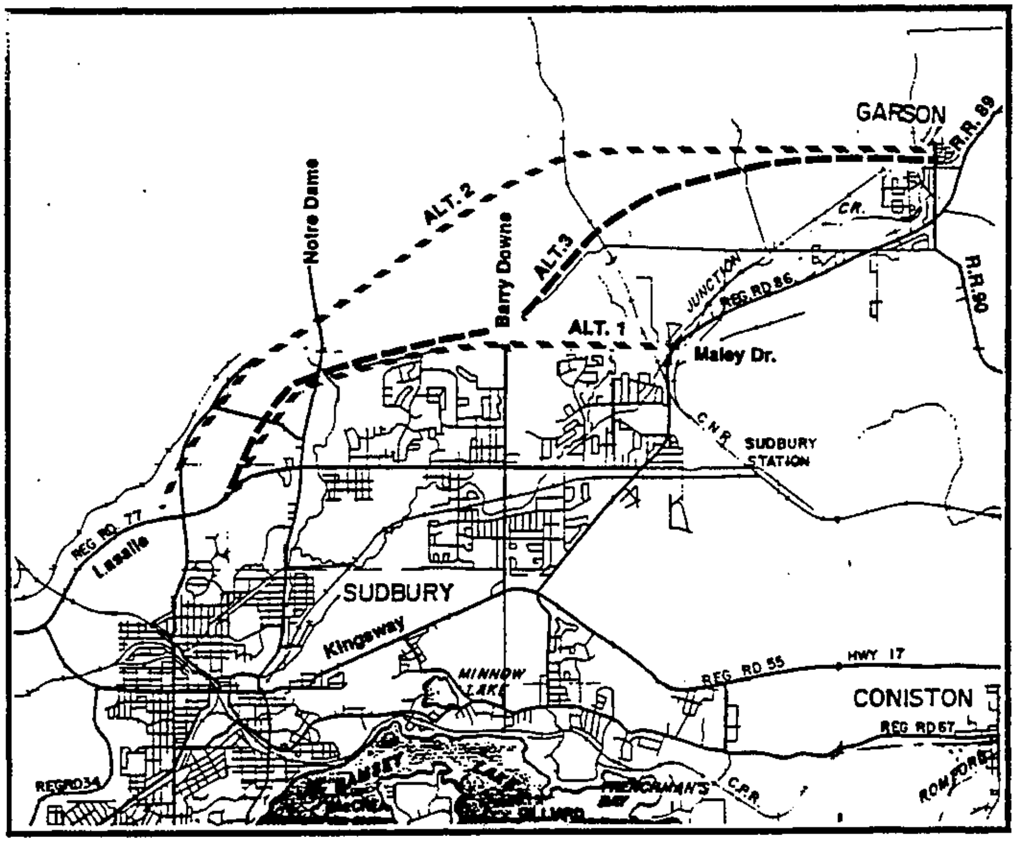
Future development will add more traffic to the east-west roads.

Missing links in the network result in longer, more complex trips. This causes congestion at intersections.

ALTERNATIVES TO THE UNDERTAKING

Four alternatives for a northern bypass of the City of Sudbury were analyzed as part of the Sudbury Regional Transportation Study.

One of the four alternatives was to "Do Nothing", while the remaining three alternatives are shown below.



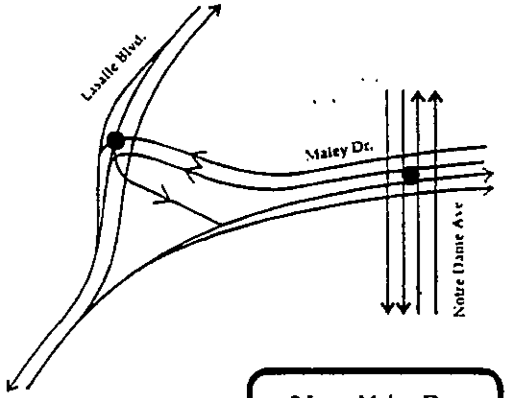
GROUPING	FACTOR	INDICATOR	ALTERNATIVES 1. MALEY DRIVE EXTENSION	2. INCO ROAD	3. MALEY DRIVE + NEW ROAD	4. 'DO-NOTHING'
Transportation	**Ability to serve demand**	**Level of service (volume/capacity ratio) on links**	Sufficient traffic demand to justify construction ■	Projected traffic demand too low to justify construction ☐	Projected traffic demand too low to justify construction on new section ☐	N/A ■
	Relief of congestion on Lasalle Boulevard	**Level of service on Lasalle Blvd links**	Relief results in satisfactory traffic operations on Lasalle Blvd. ■	Lasalle Blvd. will remain over capacity ☐	Relief results in satisfactory traffic operation on Lasalle Blvd ■	Lasalle Blvd. will remain over capacity ☐
	Safety	**Ability to attract truck traffic away from Lasalle Blvd**	Attracts significant truck traffic from Lasalle Blvd. ■	Attracts some truck traffic from Lasalle Blvd. ▨	Attracts significant truck traffic from Lasalle Blvd. ■	No reduction in truck traffic on Lasalle Blvd. ☐
	Ability to respond to future growth in demand	**Capability for road widening**	Can be widened ■	Can be widened ■	Can be widened ■	Little or no capability for expansion ☐
Socio-Economic	**Cost**	**Capital costs (shown in 1991 $)**	$ 13 M ■	$27 M ☐	$ 20 M ▨	No direct capital costs -compensatory improvements on Lasalle and Kingsway would have cost ■
	Land use	**Support for Development**	Improved access to development areas ■	Too far removed from development areas ☐	Improved access to development west of Barry Downe Road ▨	Congestion will hinder development and efficiency of existing business and industry ☐
		Property required	Some property required east of Barry Downe Road ▨	Some property may be required at the intersection of RR89 at RR92 (Garson) ▨	Some property may be required at the intersection of RR89 at RR92 (Garson) ▨	Extensive property expected to be required to accomodate traffic on other roads (eg. Lasalle) ☐
		Contribution to development objectives of the Region	Relieves congestion and provides additional east-west arterial at appropriate spacing ■	Too far removed from the City to be effective alternative to Lasalle ☐	Partial alternative route to Lasalle Blvd ▨	Remaining congestion on Lasalle Blvd. will hinder development and efficency of existing business and industry ☐
	Communities	**Effect on views for existing communities**	Some residents will see new road ■	Removed from communities ■	Some residents will see new road ▨	N/A ■
		Traffic volume change on neighbourhood streets	High quality alternative to Lasalle will accomodate through traffic ■	Some traffic may seek alternative routes through communities to avoid congestion on Lasalle Blvd. ☐	Maley Dr. Extension will accomodate through traffic west of Barry Downe Road. Existing Maley Drive will continue to be used by some arterial traffic ▨	Some traffic may seek alternative routes through communities to avoid congestion on Lasalle Blvd. ☐
		Improvement in emergency of access to communities	New access from the north ■	No new access to communities ☐	New access from the north ■	No new access to communities ☐
	Economic Development	**Contribution to economic development strategies of the City, Region and Province**	Good support for business and industry by improving traffic conditions ■	Some trucks removed from Lasalle, but little improvement in traffic conditions ☐	Good support for business and industry by improving traffic conditions ■	No relief for traffic congestion; no additional arterial roadway capacity ☐
Natural Environment	***Not considered at this stage***					

KEY: ☐ Poor Effects ▨ Fair Effects ■ Good Effects

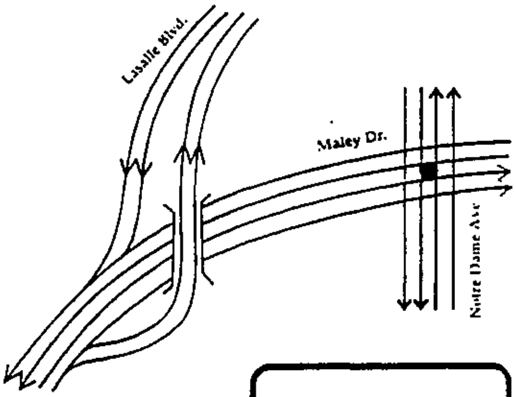
		1. MALEY DRIVE EXTENSION	2. INCO ROAD	3. MALEY DRIVE + NEW ROAD	4. 'DO-NOTHING'
SUMMARY	GOOD	10 X ■	2 X ■	5 X ■	3 X ■
	FAIR	2 X ▨	2 X ▨	6 X ▨	0 X ▨
	POOR	0 X ☐	8 X ☐	1 X ☐	9 X ☐
	OVERALL	■	☐	▨	☐

MALEY DR. / LASALLE BLVD. OPTIONS

PREFERRED OPTIONS:

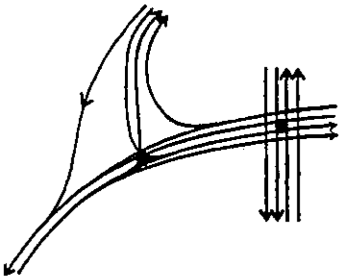


2 Lane Maley Dr.
Traffic Signals
(Maley Through)

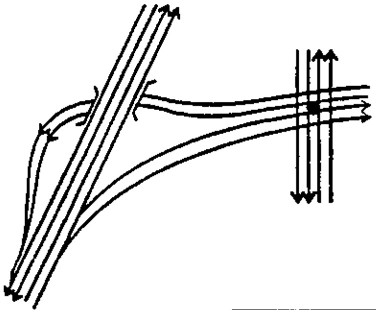


Future 4 Lane Maley Dr.
Grade Separated

OTHER OPTIONS:



2 Lane Maley Dr.
Traffic Signals
(Lasalle Blvd. Through)

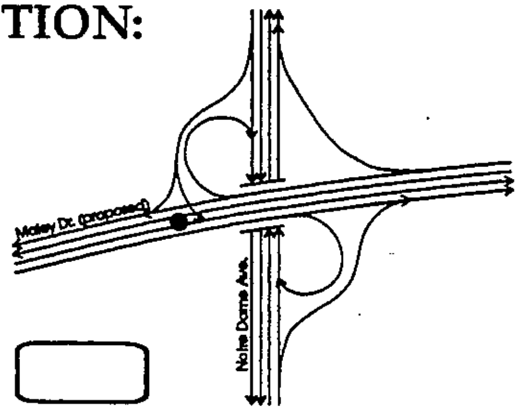


Future 4 Lane Maley Dr.
Grade Separated

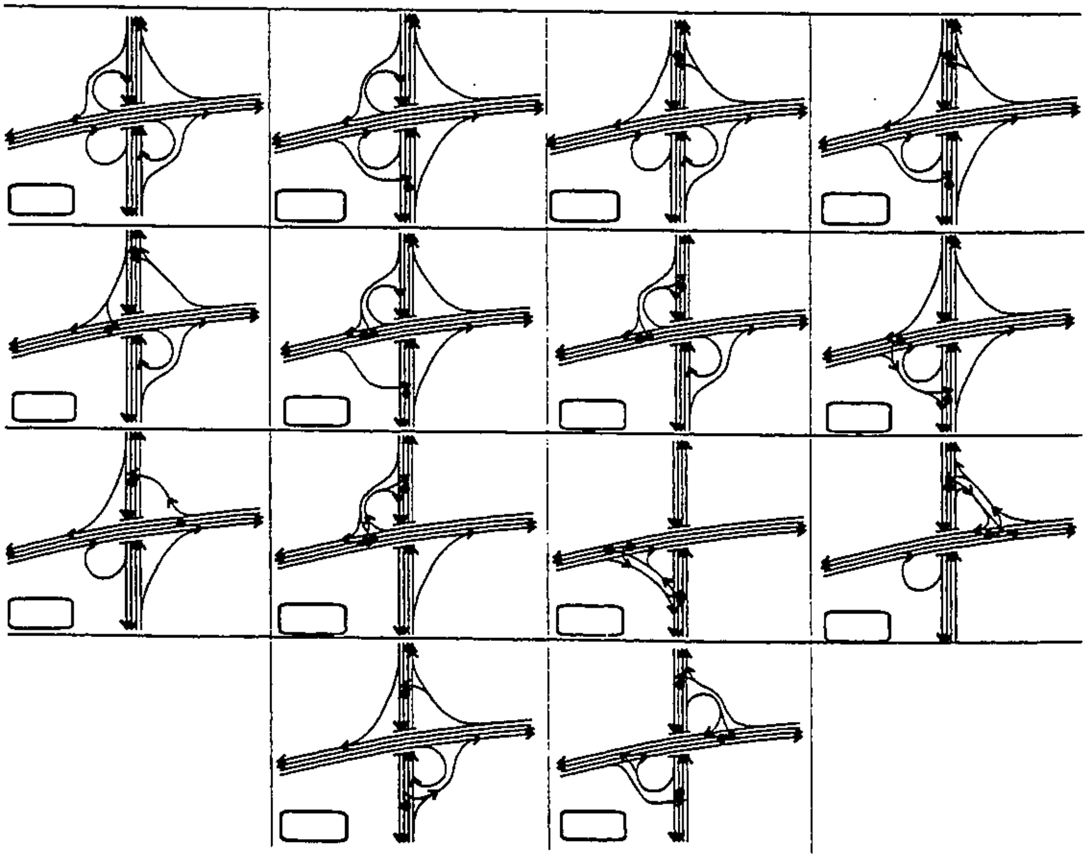
REGIONAL MUNICIPALITY OF SUDBURY

INTERCHANGE OPTIONS
MALEY DR. AT NOTRE DAME AVE.

PREFERRED OPTION:



OTHER OPTIONS CONSIDERED:



REGIONAL MUNICIPALITY OF SUDBURY

PRELIMINARY SCREENING

Alternatives H6 to H9 were eliminated from further consideration after a preliminary screening because they did not satisfy desirable criteria as shown on the table below.

Alternatives H1 to H5 were carried forward for detailed assessment

MALEY DRIVE CLASS ENVIRONMENT ASSESSMENT

Lasalle Boulevard to Barry Downe

		ALTERNATIVES			
GROUPING	FACTOR	H6	H7	H8	H9
Land use	INCO Tailing	Encroaches into INCO mine rock embankment *	Encroaches into INCO mine rock embankment *		
Natural Environment (2)	Floodplain			Alignment crosses stormwater storage pond for Nickel dam north of Lasalle and east of Notre Dame *	
	Wetlands	Alignment crosses swamp at Turner Street *			
Cost	Ground Conditions	Significant rock excavation of Austin platform and south of Turner Street *	Significant rock excavation between Lasalle and Notre Dame *		Alignment crosses wetland at Lasalle Boulevard *
	Road Length	Parallels Notre Dame for significant length *	Parallels Notre Dame for significant length *		
	Vertical Alignment	Significant section of road with max. grade; truck climbing lane required *	Significant section of road with max. grade; truck climbing lane required *		
Utilities	Effect on provision of services		Crosses hydro corridor three times *		

* Does not comply with desirable criteria

ALTERNATIVE E1
NORTH OR SOUTH SIDE OPTIONS

Alternative E1 follows existing Maley Drive between the CN Rail corridor and Falconbridge Highway.

The ultimate design for Maley Drive will incorporate:

- An interchange at Falconbridge Highway
- Protection for a future easterly extension of Maley Drive to meet Hwy. 17 at the southeast bypass near Coniston
- Realignment and widening of Maley Drive west of Falconbridge Highway
- Much wider road allowance than the short-term design.

Two options were identified for this section:

- E1-N: Widen on north side
- E1- S: Widen on south side.

The preferred option is E1-S - widen to south side. The major differences are highlighted in the comparison table.

MALEY DRIVE CLASS ENVIRONMENTAL ASSESSMENT

ASSESSMENT OF ALTERNATIVE DESIGNS
OLD FALCONBRIDGE HIGHWAY TO FALCONBRIDGE HIGHWAY

ENVIRONMENTAL COMPONENTS			ALTERNATIVES			
GROUPING	FACTOR (1)	INDICATOR	E1 South		E1 North	
Land use	Number of properties required	Number of complete acquisitions Number of partial acquisitions	1 acquisition 3 partial takings	■	3 acquisitions 2 partial takings	☐
	Effect on Property access	Number of properties affected by: - New secondary access via rear service road -Access relocation	Secondary access accommodated in Hydro Corridor to service 7 remaining businesses Access to front of businesses can be maintained New access to Rainbow Concrete via Falconbridge Hwy.	▨	Secondary access to 4 remaining businesses via Hydro corridor Re-orientation of access to rear or sides of buildings New access to Rainbow Concrete via Falconbridge Hwy.	▨
	Effect on business	Number of businesses displaced in ultimate scheme Number of businesses with severe impact by property taking	1 2	■	3 4	☐
Transportation	Staging opportunities	Short term	Can accommodate road improvements without disruption to business	▨	Immediate impact on businesses	☐
		Traffic impact during construction of Falconbridge Hwy./Maley Drive grade separation	Falconbridge Hwy./Maley Drive interchange construction to south of existing intersection Disruption to 4 driveways	▨	Significant traffic disruption during construction of interchange if constructed on existing alignment	▨
Utilities	Effect on the provision of services	Effect on Ontario Hydro power distribution lines	Potential raising of Hydro towers to accommodate Falconbridge Hwy./Maley Drive Interchange	▨	Two 230 kV Hydro lines to be relocated due to Falconbridge Hwy./ Maley Drive Interchange	☐

SUMMARY	GOOD	2X ■	0X ■
	FAIR	4X ▨	1X ▨
	POOR	0X ☐	4X ☐
	OVERALL	▨	☐

WHAT HAPPENS AFTER THE PUBLIC INFORMATION CENTRE ?

- Your comments will be incorporated into the Environmental Assessment
- Any issues arising from the Information Centre will be analyzed
- The Environmental Study Report (ESR) will then be completed
- The ESR will then be available for 30 days for public review and comment

THANK YOU FOR ATTENDING!

PLEASE DEPOSIT YOUR COMPLETED COMMENT SHEET HERE

↓

IALEY DRIVE CLASS ENVIRONMENTAL ASSESSMENT

SSESSMENT OF ALTERNATIVE DESIGNS
INCTION CREEK EAST BRANCH TO FALCONBRIDGE HIGHWAY

NVIRONMENTAL COMPONENTS			ALTERNATIVES			
GROUPING	FACTOR (1)	INDICATOR	E1	E2	E3	E4
ommunities	Emergency access	Change in the number of road accesses	National St. connects to Old Falconbridge Hwy north of Maley Drive ■	New access to National St. via Old Falconbridge Highway; new access to Old Falconbridge Hwy. and Falconbridge Hwy. ▨	New access to National St. via Old Falconbridge Hwy.; existing access to Old Falconbridge Hwy. and Falconbridge Hwy. maintained ▨	New access from National Street to existing Maley Dr. via CN grade separation new access to Old Falconbridge Hwy and Falconbridge Hwy. ▨
	Historic and Human Interest Features	Effect on human interest areas and resources	No effect ■	No effect ■	No effect ■	No effect ■
		Effect on archaeological resources	No effect	No effect	No effect	No effect
	Noise	Noise level increases (as per MOE guidelines)	Minimal noise impacts ■	Some noise impact due to proximity to existing residential uses ▨	Minimal noise impacts ■	Some noise impact due to proximity to existing residential uses ▨
	Services	Effect on recreational services	No effect ■	No effect ■	No effect ■	No effect ■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	No effect ■	More traffic at Old Falconbridge Hwy./Maley Drive intersection closer to residential development ▨	No effect ■	No effect ■
osl	Capital cost	Capital cost for the undertaking 4 lane divided	$5 95 M ■	$7 4 M ☐	$6 5 M ▨	$6 4 M ▨
	Property cost	Residential property costs Industrial property costs - land and access	$1 3 M ▨	$1 2 M ▨	$1 25 M ▨	$2 25 M ☐
and use	Number of properties required	Number of complete acquisitions Number of partial acquisitions	Partial taking of Ontario Hydro and CN property at CN crossing; complete taking of property from two owners east of CN tracks, complete taking from Ssuperior Additional property required for Falconbridge Hwy. grade separation ▨	Partial taking of Ontario Hydro and CN Rail; complete taking from 4 private owners; additional property required for Falconbridge Hwy. grade separation Additional property required for relocation of 230 kV Hydro line ▨	Partial taking from NDCA, Ontario Hydro CN and one private owner; complete takings from three private owners and Superior Additional property required for Falconbridge Hwy. grade separation ▨	Partial taking from NDCA, Ontario Hydro CN; complete takings from three industrial properties and three residential units Additional property required for Falconbridge Hwy. grade separation ☐
	Effect of Property access	Number of properties affected by - Primary access to Maley Dr restricted to right-in/right-out only - New secondary areas via rear service road - New alternative secondary access -Access relocation	New service road connecting National to Old Falconbridge north of Maley Drive New access for Ontario Hydro substation New service road north of Maley Drive east of Old Falconbridge Hwy ▨	No effect on direct property access to Maley Drive; access to National Street from new connection to Falconbridge Hwy.; traffic signal at new Maley Drive/ Falconbridge Hwy. necessitates the elimination of north/south left turn from existing Maley Drive None ▨	No effect on direct property access to Maley Drive; reconfiguration of National St/Maley Drive intersection ■	No effect on direct property access to Maley Drive Access to National St. from new connection under CN bridge None ■
	Effect on pace and nature of development	Does the alternative alter the pace and/or nature of expected development in the corridor	Access to development adjacent to Maley Drive maintained; redevelopment can occur utilizing service road and Old Falconbridge Hwy ■	redevelopment of frontage along existing Maley Drive can occur ▨	Frontage along Maley Drive retains direct access ▨	redevelopment of frontage along existing Maley Drive can occur ▨
	Effect on business	Number of businesses displaced Number of businesses with severe impact by property taking	One business requires buyout ▨	Realignment of National Street access but no displacement of business Major impact on Hydro lines will necessitate relocation of businesses ☐	Access to National St. via new connection to Old F.H.; access to Ont. Hydro substation from new connection to M D. west of substation; no displacement of businesses ▨	Three businesses require buyout ☐
latural nvironment (2)	Fisheries	Extent of habitat affected Effect on bank stability and potential erosion sites during construction	Increased loss of habitat from watercourse 1 and 2 No significant impact Extends existing culverts ■	Loss of fish habitat from watercourse 1 and 2 through culvert placement No significant impact New culvert crossing at Junction Creek East branch ▨	Loss of fish habitat from watercourse 1 and 2 through culvert placement No significant impact New culvert crossing at Junction Creek East branch ▨	Loss of fish habitat from watercourse 1 and 2 through culvert placement No significant impact New culvert crossing at Junction Creek East branch ▨
	Vegetation	Effect on rare or endangered species	None ■	None ▨	None ▨	None ▨
		Area of loss of vegetation	Insignificant loss	Loss of area of wet shrub thicket and white birch - heathland (not significant)	Loss of area of wet shrub thicket and white birch - heathland (not significant)	Loss of area of wet shrub thicket and white birch - heathland (not significant)
		Effect on revegetation program	None	None	None	None
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	No impact; limited habitat affected ■	No impact; limited habitat affected ■	No impact; limited habitat affected ■	No impact; limited habitat affected ■
	Wetlands	Area of encroachment Severance Loss of function	Encroaches on two wetland habitats Negligible loss of wetland habitat No potential loss of function ■	Encroaches on two watercourse riperian wetland habitat Negligible loss of wetland habitat No potential loss of function ■	Encroaches on two watercourse riperian wetland habitat Negligible loss of wetland habitat No potential loss of function ■	Encroaches on two watercourse riperian wetland habitat Negligible loss of wetland habitat No potential loss of function ■
ansportation	Ability to respond to future growth in traffic demand	Potential for staged widening and upgrading Potential for future grade separation at Falconbridge Hwy	Can widen to 4 lanes with additional property requirements Opportunity for grade separation at Falconbridge Hwy/ Maley Dr. maintained Construction of grade separation to south minimized traffic disruption and impacts on Hydro facilities ■	Widening to 4 lanes can be accomodated undivided or divided with 15 metre median Reduced median width (7.5m) is required to reduce utility impacts Accomodation of traffic signals at Old Falconbridge Hwy. and grade separation and grade separation at Falconbridge Hwy.; option for right-in/right-out can be accomodated at Old Falconbridge Hwy./realigned National Street ☐	Expansion to 4 lanes can be accomodated (undivided only east of CN crossing); retain direct frontage access from CN to Falconbridge Hwy. Can accomodate grade separation at Falconbridge Highway; displacement of two businesses required to construct grade separation; service road required for remaining businesses N/S of Maley ▨	Widening to four lanes can be accommodated divided or undivided with 15 metre median Can accommodate grade separation at Old Falconbridge Hwy.; displacement of one business required; Hydro towers to be raised/ relocated ▨
	Geometric design	Maximum grades	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade ■	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade Future interchange with Falconbridge Hwy on curve ☐	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade Curvilinear alignment from CN to Old Falconbridge ▨	Horizontal and vertical meets 100km/h design speed with a maximum 4 % grade Future interchange with Falconbridge Hwy on curve ☐
	Staging opportunities	Traffic impact during construction	Significant traffic disruption during construction - detour of Maley Drive at CN likely ☐	All traffic on existing Maley Drive during construction min. impact; alignments compatible with east exten. of N By-Pass ■	Significant impact to traffic on M.D. and at M.D./F.H. intersection; alignment compatible with east. exten. of N By-Pass ☐	All traffic on existing Maley Drive during construction min. impact; alignments compatible with east. exten. of N By-Pass ■
ilities	Effect on provision of services	Relocations	Aerial Bell relocation, 30 Ontario Hydro pole relocations Ontario Hydro tower extensions required for CN grade separation ■	8 Ontario Hydro poles to be relocated 230 kV Hydro line to be relocated; two 230 kV Hydro lines affected by future Maley Drive/Falconbridge Hwy. grade separation Ontario Hydro towers to be extended at CN crossing ☐	Bell relocation (aerial); 24 Ontario Hydro poles Ontario Hydro tower extensions required at CN crossing (230 kV) ▨	230 kV Hydro lines affected by future Maley Drive/Falconbridge Hwy. grade separation Ontario Hydro towers to be raised at CN crossing ■

		E1	E2	E3	E4
IMMARY	GOOD	14 X ■	5 X ■	7 X ■	8 X ■
	FAIR	4 X ▨	9 X ▨	11 X ▨	7 X ▨
	POOR	1 X ☐	5 X ☐	1 X ☐	4 X ☐
	OVERALL	■	▨	▨	▨

1 A number of additional factors were considered, the impacts of which did not vary between alternatives. These included : surface water, ground water, visual impacts, air quality and pedestrian/bicycle linkages

2 There are no Environmentally Sensitive Areas within the study area

IALEY DRIVE CLASS ENVIRONMENTAL ASSESSMENT

SSESSMENT OF ALTERNATIVE DESIGNS
EST OF BARRY DOWNE ROAD

NVIRONMENTAL COMPONENTS			ALTERNATIVES						
ROUPING	FACTOR (1)	INDICATOR	H1	H2	H3 A	H3 B	H4	H5 A	H5 B
ommunities	Emergency access	Change in the number of road accesses	Access at Lasalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at Lasalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at Lasalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at Lasalle, Notre Dame, Montrose & Barry Downe No access at Turner ■	Access at Lasalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at Lasalle, Notre Dame, Montrose & Barry Downe Access at Turner ▨	Access at Lasalle, Notre Dame, Montrose & Barry Downe No access at Turner ■
	Historic and Human Human Interest features	Effect on human interest areas and resources	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■
		Effect on archaeological resources	No effect	No effect	No effect	No effect	No effect	No effect	No effect
	Noise	Number of noise sensitive areas (residences) affected by a noticeable noise increase (as per MOE guidelines)	None ■	None ■	None ■	None ■	None ■	None ■	None ■
	Services	Effect on recreational services	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd. ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd. ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd. ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd. ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd. ■	Re-distribution of neighbourhood traffic with less traffic oriented to Lasalle Blvd. ■
ost	Capital cost	Pavement Structures Interchange ramps Signals Utilities Total	10.4 m 0.40 m 0.35 m $ 11.15 m ☐	13.0 m 0.40 m 0.35 m $ 13.75 m ☐	9.4 m 0.78 m 0.36 m 0.40 m 11.40 m ☐	9.6 m 0.78 m 0.36 m 0.90 m $ 11.60 m ☐	8.7 m 0.40 m 0.36 m $ 9.46 m ■	8.7 m 0.78 m 0.36 m 0.40 m 0.36 $ 10.66 m ▨	8.9 m 0.78 m 0.36 m 0.40 m 0.36 m $ 10.80 m ▨
		Maintenance (length of road)	3.9 km	4.7 km	4.1 km	4.1 km	3.9 km	3.7 km	3.7 km
	Property cost	Residential property costs Industrial property costs	■	■	■	■	■	■	■
and use	Number of properties required	Number of complete acquisitions Number of partial acquisitions	Takings from INCO, NDCA, two private owners ■	Partial takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■	Takings from INCO, NDCA, two private owners ■
	Effect of Property access	Number of restrictions of access: partial Number of restrictions of access: complete	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■	No effect ■
	Effect on pace and nature of development	Number of access relocations required Does the alternative alter the pace and/ or nature of expected development in the corridor	Severance of proposed residential development near Montrose ☐	Severance of proposed residential development near Montrose ☐	Severance of proposed residential development near Montrose ■	Severance of proposed residential development near Montrose ■	Severance of proposed residential development near Montrose ▨	Severance of proposed residential development near Montrose ■	Severance of proposed residential development near Montrose ■
atural nvironment)	Fisheries	Watercrossing habitat affected	Local effect; No effect on downstream fisheries ■	Local effect. No effect on downstream fisheries ■	Local effect: No effect on downstream fisheries ■	Local effect: No effect on downstream fisheries ■	Loss of stream and riparian habitat: May affect drainage ■	Loss of stream and riparian habitat ■	Loss of stream and riparian habitat ■
		Effect on bank stability and potential erosion sites during construction	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■	No significant impact ■
	Vegetation	Effect on rare or endangered species	None ▨	None ■	None ■	None ■	None ■	None ▨	None ▨
		Area of loss of vegetation	Loss of Oak heath woodland at at west end of alignment (650 m through area)	No loss of significant community vegetation; Through 240 m oak heath woodland	Alignment through greater length of rock barrens (less sensitive)	Alignment through greater length of rock barrens (less sensitive)	Loss of portion of Oak heath woodland at west end of alignment: Alignment through 360 m of Oak heath woodland	Loss of portion Oak heath woodland at west end of alignment and small central site of some vegetation community	Loss of portion Oak heath woodland at west end of alignment and small central site of some vegetation community
		Effect on revegetation program							
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	Impact to Oak heath woodland Through 25m beaver wetland ▨	Through 65 m beaver wetland (mostly open water) ▨	Through 20 m of beaver wetland ■	Through 20 m of beaver wetland ■	Through 20 m of beaver wetland Through 400 m Oak heath woodland Through 360 m Poplar Pine forest ▨	Impact of Oak heath woodland habitat; Through 20 m beaver wetland ▨	Impact of Oak heath woodland habitat; Through 20 m beaver wetland ▨
	Wetlands	Area of encroachment	Encroaches on 4 wetlands 2 wetlands areas will be reduced in size 30 50% ☐	Encroaches on 3 wetlands ▨	Encroaches on 2 wetlands ▨	Encroaches on 2 wetlands ▨	Encroaches on 3 wetland habitats ▨	Encroaches on beaver wetland: 3 riparian watercourse wetland habitats ■	Encroaches on beaver wetland: 3 riparian watercourse wetland habitats ■
		Severance	Sever 2 small wetland habitats	Greater loss of wetland area	Crosses narrow area bisecting beaver wetland	Crosses narrow area bisecting beaver wetland	Adjacent to shrub meadow		
		Loss of function	No potential loss of function	No potential loss of function			Runs through 160 m wetland riparian area of tributary of West Junction Creek		
ansportation	Ability to respond to future growth in traffic demand	Potential for widening to four lanes	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■	Accomodates widening to four lanes (divided or undivided) ■
		Potential for grade separation of intersections	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe ☐	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe ☐	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe ▨	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe Less traffic disruption in the future ■	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe ☐	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe ▨	Accomodates interchanges at Lasalle, Notre Dame, Montrose & Barry Downe Less traffic disruption in the future ■
	Geometric design	Maximum grades	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3% Curvilinear alignment ☐	Horizontal & vertical meets 100 km/h design speed Maximum Grade 4% ☐	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 4% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 2.5% ■	Horizontal & vertical meets 100 km/h design speed Maximum Grade 3.5% ■
		Proximity of adjacent intersections	Turner to Notre Dame 360 m ☐	Turner to Notre Dame 750 m ▨	Turner to Notre Dame 800 m ▨	Turner to Notre Dame Turner grade-seperated. ■	Turner to Notre Dame 660 m ▨	Notre Dame grade-separated ☐	Turner grade-separated ■
		Intersection geometrics traffic safety	Curvilinear alignment to Notre Dame ▨	Curvilinear approach to Notre Dame Vertical grade on approach to Lasalle ▨	Curvilinear approach to Notre Dame ▨	Curvilinear approach to Turner ■	Interchange at Notre Dame Grade separated at Turner ▨	Curvilinear approach to Turner ▨	Interchange at Notre Dame grade separated at Turner ■
		Ground conditions	40% of alignment on softer soils ☐	60% of alignment on softer soils ☐	Alignment predominantly on rock ■	Alignment predominantly on rock ■	40% of alignment on softer soils ☐	Alignment predominantly on rock ■	Alignment predominantly on rock ■
	Staging opportunities	Traffic impact during construction/	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■	Minimal impact on existing traffic ■
		Westerly Extension	Accomodates 4 laning of Lasalle westerly ■	Accomodates 4 laning of Lasalle westerly ■	Accomodates 4 laning of Lasalle westerly ■	Accomodates 4 laning of Lasalle westerly ■	Accomodates 4 laning of Lasalle westerly ■	Accomodates 4 laning of Lasalle westerly ■	Accomodates 4 laning of Lasalle westerly ■
ilities	Effect on provision of services	Length of relocation	9 Ontario Hydro poles on Notre Dame ■	9 Ontario Hydro poles on Notre Dame ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■	9 Ontario Hydro poles on Notre Dame Protection of gas at two locations ■
		Number of crossings affected	Gas Line crossing Alignment encroaches onto Hydro corridor in two locations ☐	Gas Line crossing Alignment encroaches onto Hydro corridor in two locations ☐	Gas Line crossing Protection of two hydro towers Alignment crosses into Hydro corridor ☐	Gas Line crossing Protection of two hydro towers Alignment crosses into Hydro corridor ☐	Gas Line crossing Protection of two hydro towers Alignment encroaches onto Hydro corridor in two locations ☐	Gas Line crossing Protection of two hydro towers No encroachment in Hydro corridor ■	Gas Line crossing Protection of two hydro towers Some encroachment in Hydro corridor at Notre Dame Interchange ■
MMARY		GOOD	13X ■	14X ■	18X ■	22X ■	16X ■	18X ■	22X ■
		FAIR	4X ▨	5X ▨	5X ▨	1X ▨	6X ▨	6X ▨	3X ▨
		POOR	8X ☐	6X ☐	2X ☐	2X ☐	3X ☐	1X ☐	0X ☐
		OVERALL	☐	☐	▨	▨	☐	▨	■

ES 1 A number of additional factors were considered, the impacts of which did not vary between alternatives. These included: Surface Water; Groundwater; Visual impacts; Air quality, and Pedestrian/bicycle linkages

2 There are no Environmentally Sensitive Areas within the Study Area

MALEY DRIVE CLASS ENVIRONMENTAL ASSESSMENT

ASSESSMENT OF ALTERNATIVE DESIGNS
BARRYDOWNE ROAD TO JUNCTION CREEK EAST BRANCH

ENVIRONMENTAL COMPONENTS			ALTERNATIVES	
GROUPING	FACTOR (1)	INDICATOR	C1	C2
Communities	Emergency access	Change in the number of road accesses	No change ■	No change ■
	Historic and Human Interest Features	Effect on human interest areas and resources	None ■	None ■
		Effect on archaeological resources	None	None
	Noise	Noise level increases (as per MOE guidelines)	Greater noise level increases in the short term ▨	Lower noise level increases in the short term ■
	Services	Effect on recreational services	No impact on golf course ■	No impact on golf course ■
	Traffic impact on neighbourhoods	Volume changes on neighbourhood streets	No changes ■	No changes ■
Cost	Capital cost	Capital cost for the undertaking Short Term Long Term	$1.70 M $2.00 M ■	$2.00 M $1.70 M ■
	Property cost	Residential property costs Short Term Industrial property costs Long Term	$ 0 M $ 0.3 M ■	$ 0.3 M $ 0 M ■
Land use	Number of properties required	Number of complete acquisitions Number of partial acquisitions Short Term Long Term	Property required from NDCA Cambrian College and CP Rail at Barry Downe Property required from NDCA, Barry Downe to Lansing One private residential property and NDCA property required east of Junction Creek No property required for 2 lanes; no additional property required for 4 lanes ■	Property required from NDCA Cambrian College and CP Rail at Barry Downe Property required from NDCA, Barry Downe to Lansing One private residential property and NDCA property required east of Junction Creek Two partial takings and one complete taking for 2 lanes; no additional property required for 4 lanes ▨
	Effect on Property access	Number of restrictions of access	Direct access to Coop maintained ■	Direct access to Coop maintained ■
		Number of access relocations required	Combined access to Lansing and proposed golf course via intersection	Combined access to Lansing and proposed golf course via intersection
	Effect on pace and nature of development	Does the alternative alter the pace and/or nature of expected development in the corridor	No change ■	No change ■
	Effect on business	Number of businesses displaced	Direct access to Garden Centre maintained; no displacement of businesses ■	Direct access to Garden Centre maintained; no displacement of businesses ■
Natural Environment (2)	Fisheries	Extent of habitat affected	Loss of habitat from watercourse 1 and 2 ▨	Loss of fish habitat for watercourse 1 and 2 through culvert placement ▨
		Effect on bank stability and potential erosion sites during construction	None	None
	Vegetation	Effect on rare or endangered species	None ■	None ■
		Area of loss of vegetation	Insignificant loss	Loss of area of wet shrub thicket and white birch - heathland (not significant)
		Effect on revegetation program	None	None
	Wildlife	Effect on habitat and species (mammals, birds and herpetofauna)	No impact; limited habitat affected ■	No impact; limited habitat affected ■
	Wetlands	Area of encroachment	Encroaches on 2 wetland habitats ■	Encroaches on 2 watercourse riperian (wetland) habitats ■
		Severance	Negligible loss of wetland habitat	Negligible loss of wetland habitat
		Potential loss of function	No potential loss of function	No potential loss of function
Transportation	Ability to respond to future growth in traffic demand	Future growth to four lanes	Future undivided or divided 4 lanes can be accomodated Property acquisition from NDCA, CP and residential required ■	Future undivided or divided 4 lanes can be accomodated No further property required than that for 2 lanes (ie 2001 ROW) ■
		Potential for grade separation of intersections	Barry Downe and Maley Drive grade separation can be accomodated with additional property acquisition	Barry Downe and Maley Drive grade separation can be accomodated with additional property acquisition
		Geometric Design	Horizontal and Vertical meets 100km/h design speed with maximum 2% grade	Horizontal and Vertical meets 100km/h design speed with maximum 2% grade
	Staging Opportunities	Construction Staging Complications	Traffic disruption during construction ☐	Minimal traffic disruption during construction ■
		Future expansion	widening or twinning can occur to the north of the alignment with 15 metre or 18.5 metre median or undivided	Widening or twinning can occur to the south of the alignment either on new line (15 m median or undivided) or on existing Maley
Utilities	Effect on provision of services	Relocations	22 Ontario Hydro poles potentially to be relocated with reconstruction ☐ 14 INCO poles to be relocated but upgrading of line to be done by INCO	8 Ontario Hydro poles potentially to be relocated ■ no INCO poles to be relocated but upgrading of line to be done by INCO

SUMMARY	GOOD	14 X ■	16 X ■
	FAIR	2 X ▨	2 X ▨
	POOR	2 X ☐	0 X ☐
	OVERALL	▨	■

NOTES:

1. A number of additional factors were considered, the impacts of which did not vary between alternatives . These included: Surface Water; Groundwater; Visual impacts; Air quality, and Pedestrian/bicycle linkages.
2. There are no Environmentally Sensitive Areas within the Study Area

Public Notice

Region of/de Sudbury

00 Brady Street, Sudbury, Ontario P3A 5P3 (705) 673-2171

CLASS ENVIRONMENTAL ASSESSMENT MALEY DRIVE EXTENSION & UPGRADING

NOTICE OF PUBLIC INFORMATION CENTRE

The Regional Municipality of Sudbury is undertaking this project to study possible alternate routes for the Maley Drive Extension from Falconbridge Highway to the Lasalle Boulevard Extension. This undertaking is being conducted as a Schedule "C" activity, in accordance with the requirements of the Class Environmental Assessment (Class EA) for Municipal Road Projects. Marshall, Macklin, Monaghan, Ltd. is conducting the engineering and environmental assessment work for this project.

The study will build upon earlier work undertaken during the Sudbury Regional Transportation Study including the Trucking Action Plan. Traffic congestion along Lasalle Boulevard, and the need for increased east-west traffic capacity were identified in the Transportation Study.

Provision of a widened and improved Maley Drive from Lasalle Boulevard in the west to Falconbridge Highway, suitable for truck and bypass traffic, would relieve congestion on Lasalle Boulevard. This road could eventually be extended to connect to Highway 17 East, completing a northern bypass.

There will be a Public Information Centre for the public to review the preferred route outlining ntersection and access locations and provide input on the problem and the solution being considered, on:

Date:	Monday, June 27 1994
Time:	4:00 - 8:30 p.m.
Location:	Lasalle Secondary School - Amphitheatre 1545 Kennedy St., Sudbury

ollowing the meeting further comments are invited for incorporation into the planning and design of this project and will be received until Tuesday, July 12, 1994.

For further information contact:

Mr. Robert Falcioni
egional Roads and Drainage Engineer
Regional Municipality of Sudbury
00 Brady Street
g 3700, Station A
Sudbury, Ontario
A 5W5

Phone: (705) 673-2171, Ext. 235
x: (705) 673-2960

Mr. Robert Wanless
Vice President
Marshall, Macklin, Monaghan
80 Commerce Valley Dr. East
Thornhill, Ontario
L3T 7N4

Phone: (905) 882-1100
Fax: (905) 882-0055

A

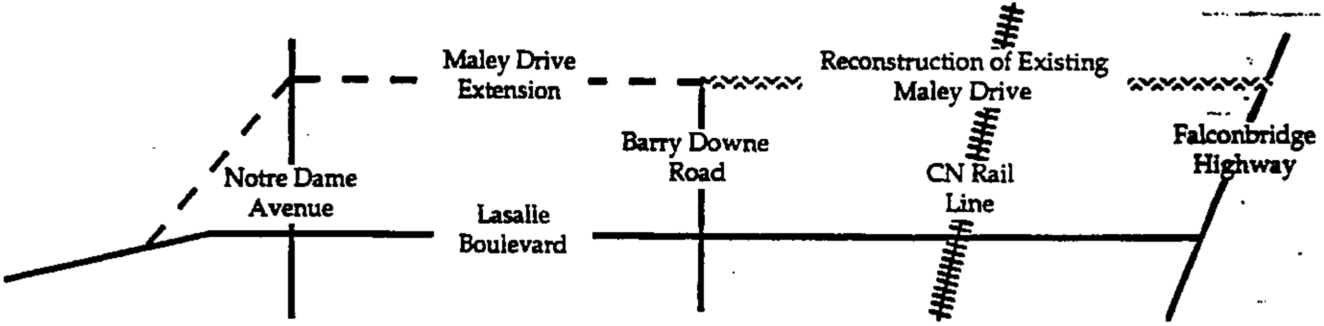
COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

In case further explanation of your concerns is required, could we please request your name and address:

Name [redacted]
Address [redacted]
Telephone [redacted]

This map shows the sections of the proposed Maley Drive Extension.



Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

It appears that all the alternatives have been well thought out! I'm impressed.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

NEGLIGIBLE

- Communities

- Land Use

- Noise

- Transportation

IT CAN ONLY BRING IMPROVEMENT TO THE PRESENT TRAFFIC FLOW. IT CAN'T HAPPEN TOO SOON!

Please use the following space to add any additional comments

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

B

COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

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Address [redacted]
Telephone [redacted] [redacted]

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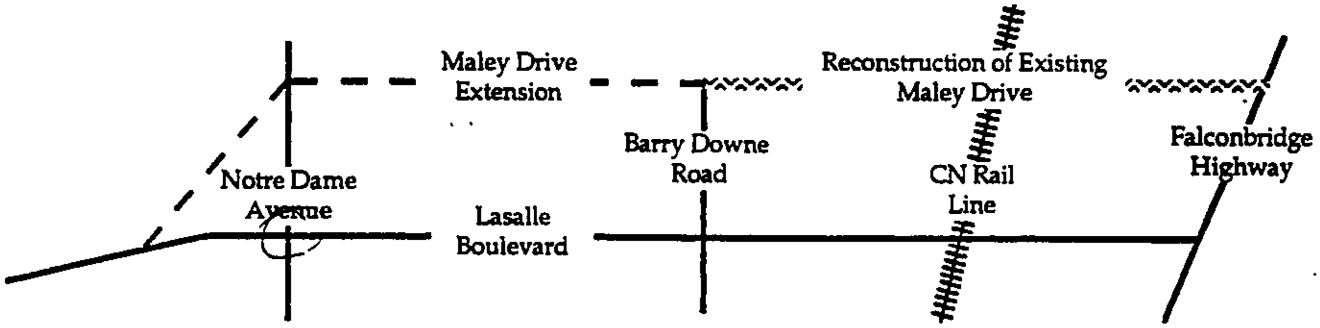

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

} for any of these sections ?

PROJECTED TRAFFIC COUNTS & FLOWS FOR
EAST/WEST LASALLE BLVD AT NOTRE DAME
AND NORTH SOUTH NOTRE DAME AT LASALLE.
ONCE BYPASS IS COMPLETED.
WE OWN PROPERTY AT THE N.W. CORNER OF
THE INTERSECTION).
THANK YOU.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

- **Communities**

- **Land Use**

- **Noise**

- **Transportation**

Please use the following space to add any additional comments

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Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

C

COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

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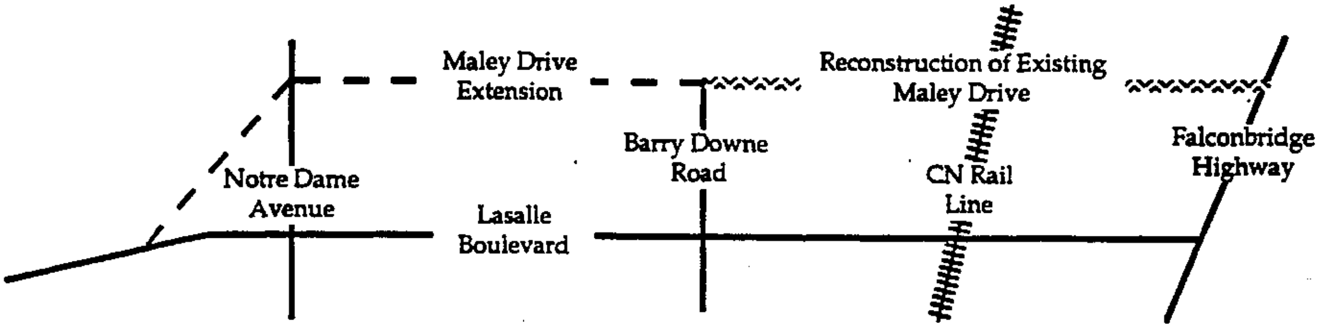

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

} for any of these sections ? NO

GET STARTED SOON ON "ULTIMATE" BEST OPTION. FORGET BRADY ST. AS IT GOES NOWHERE. HAVE ROADWORK FINISHED BEFORE GRADE SEPARATIONS SO THAT THE ROAD COULD BE USED EARLIER.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

NO

- Communities

- THIS WOULD NOT AFFECT EXISTING AREAS.

- Land Use

- Noise

- Transportation

MAKE EXISTING ROUTE OFF LASALLE AS "NO HEAVY TRUCKS" UNTIL THIS ROUTE IS COMPLETED.

Please use the following space to add any additional comments

I APPRECIATE THE OPPORTUNITY TO SEE WHAT IS BEING CONSIDERED.

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

D

COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

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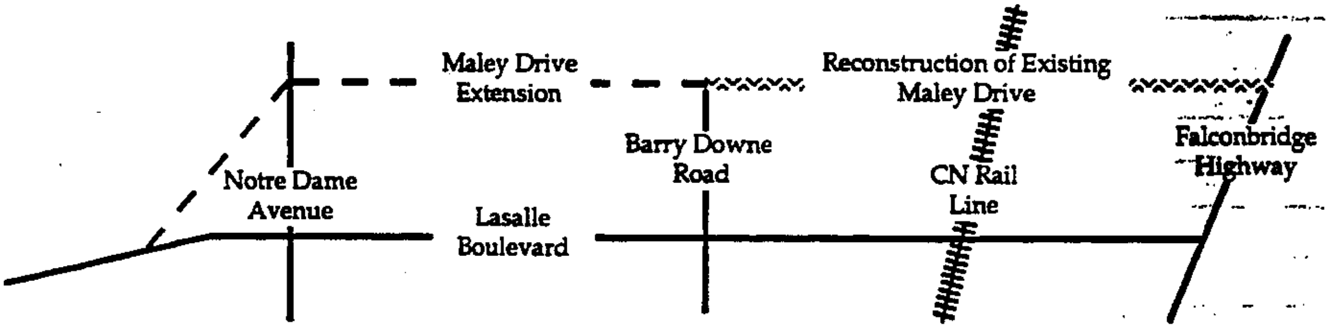

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

My lot, Lot 19, backs onto Barrydowne Road. Bob Falcioni has told me that further widening of Barrydowne Road is planned for the future. Presently at the rear of my lot is a stone & grass ~~ber~~ berm. This provides us with a substantial amount of privacy. I am asking that consideration be given to leaving this berm in place during road construction.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

- Communities

- Land Use

- Noise

- Transportation

Please use the following space to add any additional comments

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

E

COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

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Telephone ____________________

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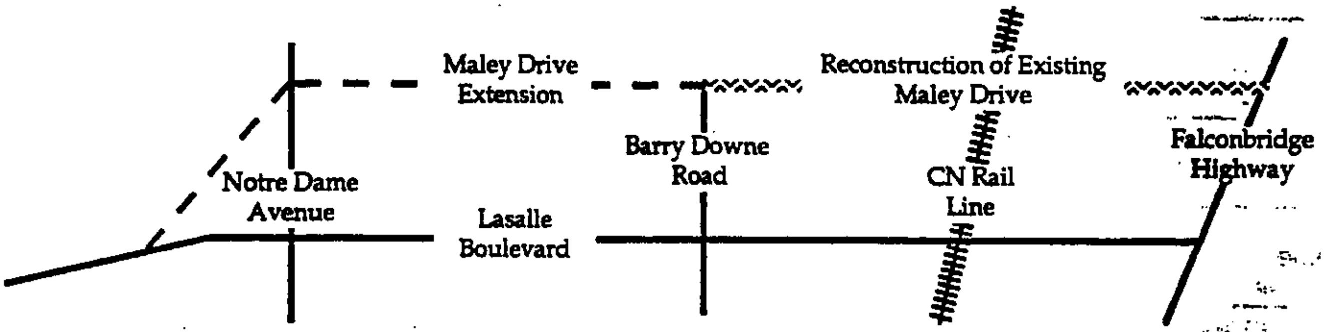

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

} for any of these sections ?

This study has not investigated an extension North from Barrydown Rd to Hanmer. – Why not ?

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

  - minimal effect.

- Communities

- Land Use

- Noise

  - It will be redistributed

- Transportation

  - provide better access to the communities off Blvd - Lasalle [illegible].
  - It will be redistributed.

Please use the following space to add any additional comments

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Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

f

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MALEY DRIVE EXTENSION
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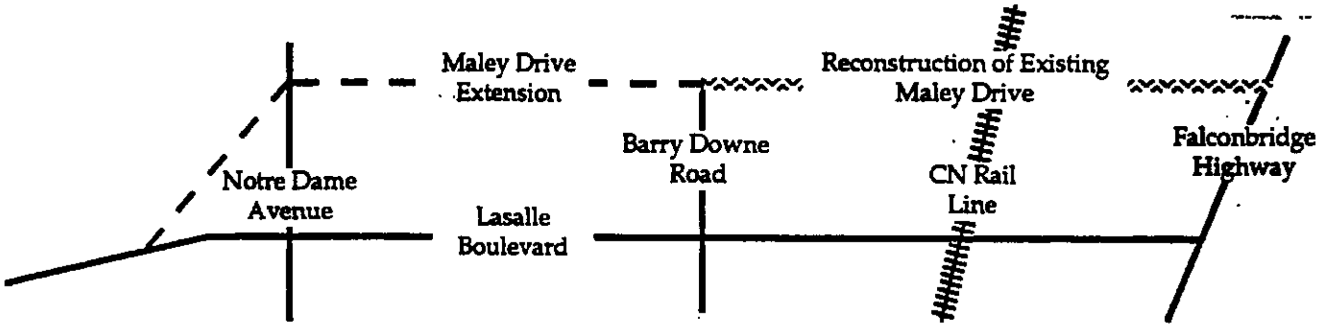

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

We are pleased to have the opportunity to comment.
The display is very informait and well illustrated.
We anxious to have the Maley Drive Extension become a fact. It is long overdue.
The businesses on Lasalle Blvd suffer because of the congestion on Lasalle.
The slurry trucks are hindered by the excess traffic

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

- Communities

- Land Use

- Noise

- Transportation

Please use the following space to add any additional comments

Thank you for attending the Information Centre, and for completing this comment sheet.

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Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

6

COMMENT SHEET

MALEY DRIVE EXTENSION CLASS ENVIRONMENTAL ASSESSMENT

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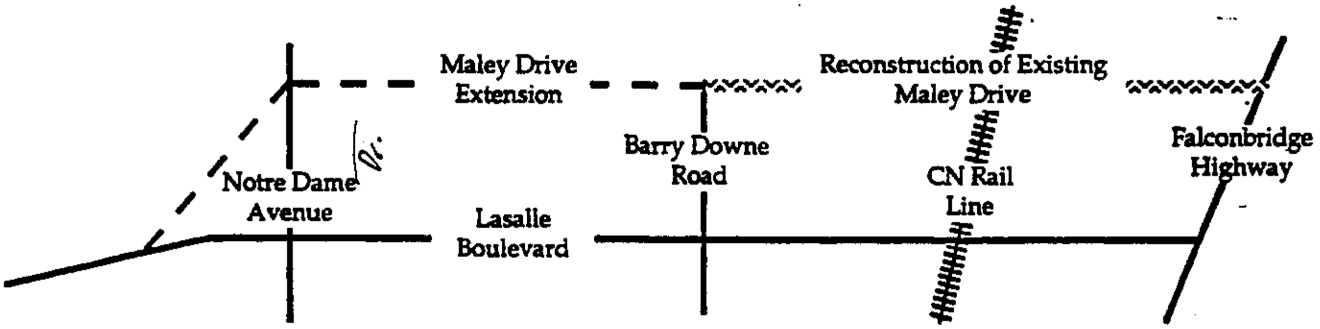

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

} for any of these sections ?

PLS SEND SCALED MAP OF NOTRE DAME AVE / MALEY DRIVE EXTENSION INTERSECTION, WITH REFERENCE TO DRUMMOND AVENUE.

HAVE ANY CONSIDERATIONS BEEN MADE TO THE SNOWMOBILE TRAILS LEADING FROM NORTH NEW SUDBURY TO THE SUDBURY TRAIL PLAN? THE MAJOR CROSSING WOULD BE APPROXIMATLY DUE NORTH OF THE END OF DRUMMOND AVE, NEAR WHERE THE TRIPLE POWERLINE DIVIDES INTO TWO LINES

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)
- Communities
- Land Use
- Noise
- Transportation

Please use the following space to add any additional comments

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

H

COMMENT SHEET

MALEY DRIVE EXTENSION CLASS ENVIRONMENTAL ASSESSMENT

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Telephone [redacted]

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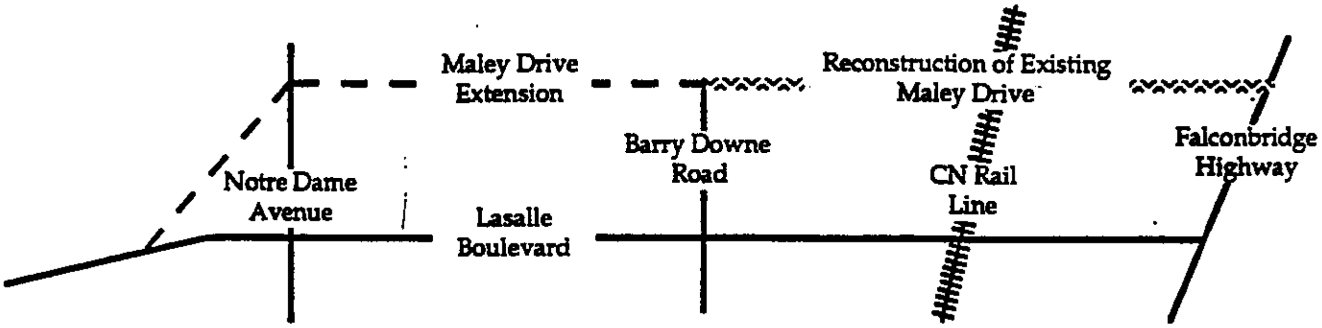

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

Hopefully -
Shell Garson & Falconbridge.
will be paying a portion of this
job - they have so much to gain

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

- Communities

- Land Use
a Park for travellers to rest would be nice

- Noise
Will stop all the wild driving on Woodbine
late at night. Seems so many try to avoid
LaSalle.

- Transportation
Should help areas north of LaSalle
from Barrydowne to Montrose.
Many speeding in residential area

Please use the following space to add any additional comments

We feel this new road is a necessity. as
traffic travels Woodbine Ave as a way
to avoid lights & traffic on Lasalle.
Presently, Woodbine is a raceway from
4 pm to 7 pm when people are rushing home from
The street is dangerous, now work

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

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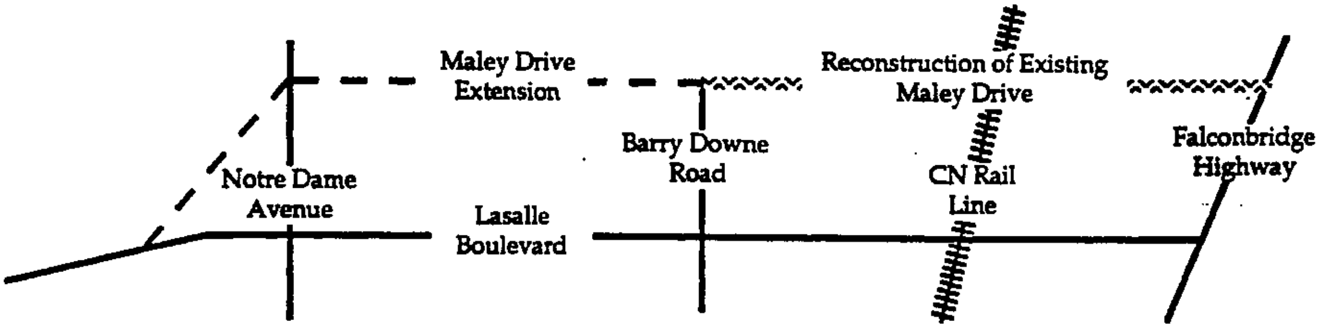

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

To be built with preserving as much of the natural habitant as possible

- Communities

- Land Use

- Noise

This plan will lower the traffic noise level on Woodbine

- Transportation

This plan will, I hope keep the large trucks off Lasalle Blv.

Please use the following space to add any additional comments

I agree fully with the proposed Maley Ext. The sooner the better so as to return Woodbine to the normal neighborhood street it once was.

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

J

COMMENT SHEET

MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT

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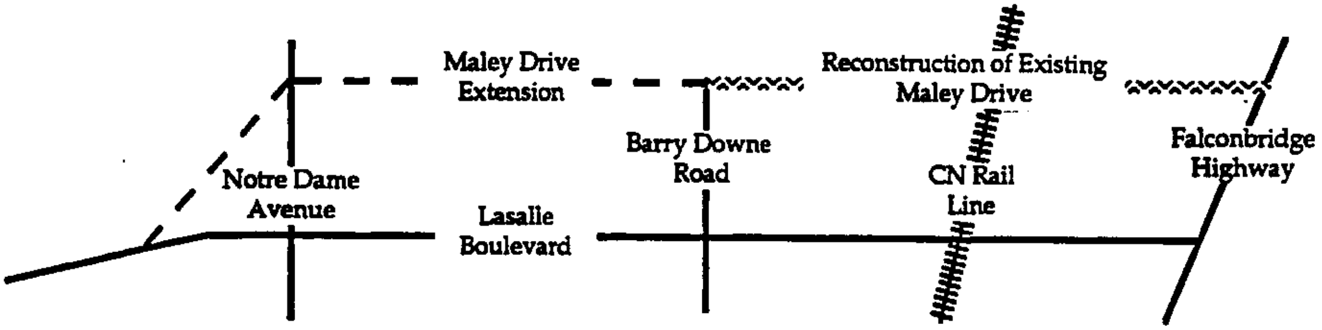

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

Good idea to proceed with the extension of the present Maley Drive to Notre Dame ave. with lights at proper intervals & traffic lights at Lansing, Barry Downe Notre Dame etc. Also merging lanes at these locations.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

Nil

- Communities

Falconbridge Garson Skead to share cost with Sudbury

- Land Use

Parts of land north of Maley Drive to be set aside for future park area

- Noise

Nil

- Transportation

Please use the following space to add any additional comments

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

K

COMMENT SHEET

**MALEY DRIVE EXTENSION
CLASS ENVIRONMENTAL ASSESSMENT**

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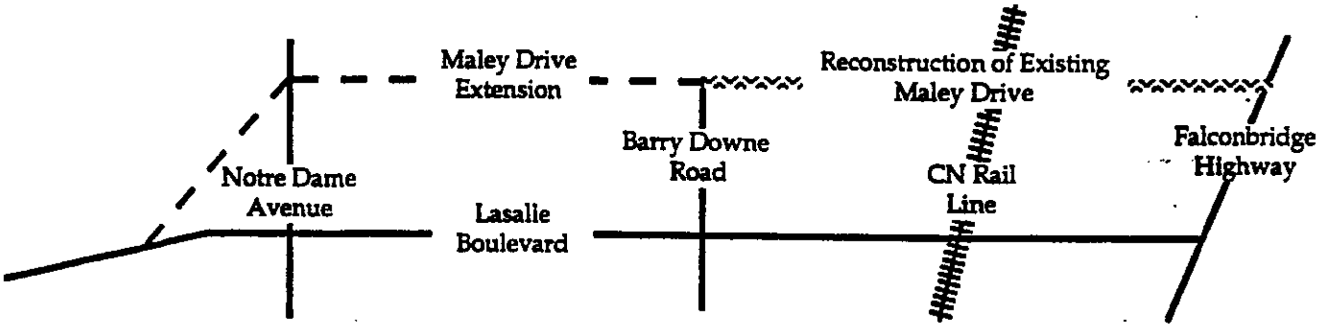

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

} for any of these sections ?

Completeley in favour of Alternate #1
The completion of the Maley Drive to the other side of Notre Dame Ave. will considerab Reduce Traffic on LaSalle Blvd and more importantly the use of Woodbine Ave and [illegible] ave as alternative route to get across New Sudbury to the downtown core and the West End. For the past few years traffic has considerably increased on Woodbine Ave. so it is now unsafe to cross the street due to the volume of cars and especially speeders. A Radar unit should be set up periodically near Agincourt to nab the speeders.

Costs should be shared by Falconbridge as it will get the big trucks off LaSalle Blvd.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

Efforts should be directed to limit destruction of environment and streams

- Communities

- Land Use

- Noise

- Transportation

Please use the following space to add any additional comments

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

(L)

56 3
57 2

COMMENT SHEET

MALEY DRIVE EXTENSION CLASS ENVIRONMENTAL ASSESSMENT

RECEIVED
JUL 7 1994
REGIONAL ENGINEERING DEPT.

In case further explanation of your concerns is required, could we please request your name, d address:

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Address [redacted]
Telephone [redacted]

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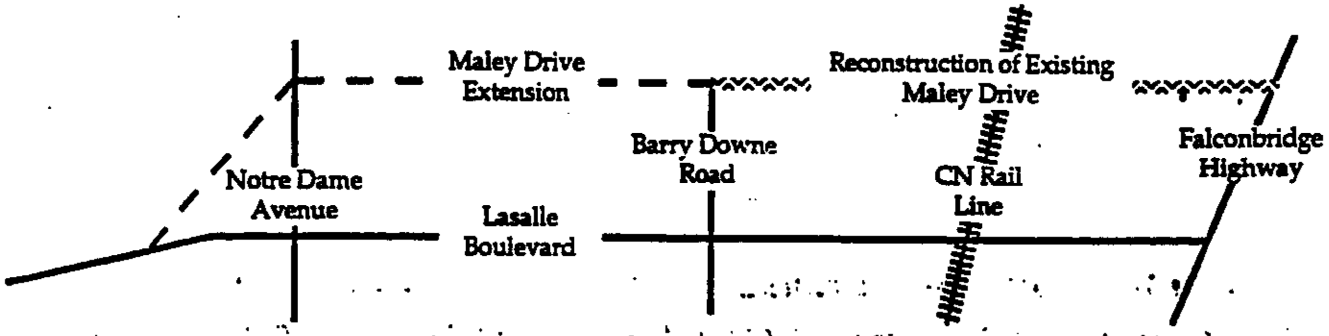

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

} for any of these sections ?

① ROAD ALIGNMENT

• SINCE LAND TO THE NORTH OF THE EXISTING ROADWAY S UNDER GOVERNMENT TUTORSHIP IE: SUDBURY DISTRICT CONSERVATION UTHORITY

• SINCE ONLY ONE SECTION APPEARS TO BE N EXISTING RESIDENTIAL AREA

• SINCE VERY FEW AREAS ON THE EXTENSION WILL END THEMSELVES TO RESIDENTIAL DEVELOPMENT.

I WOULD RECOMMEND THAT THE PLANS PLACE MORE EMPHASIS ON THE IMPACT SUCH AN EXTENSION WILL HAVE ON IE EXISTING RESIDENTIAL AREAS NEAR THE LANSING INTERSECTION. RESIDENTS WOULD PREFER A LARGER ISTANCE BETWEEN THE EXISTING ROAD WAY + THE PLANNED OADWAY - THE PLANNED 33 METRES ARE INSUFICIENT TO PROTECT RESIDENTS FROM INCREASES IN NOISE LEVELS - 100 METRES + NO USE OF EXISTING ROADWAY IN FUTURE IS MORE ACCEPTABLE.

Please see over →

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

THE EXTENSION SHOULD BE PLANNED AS TO REDUCE TO AS LOW AN IMPACT ON THE WETLANDS IN THE PROPOSED AREA OF EXTENSION.

- Communities

- Land Use

- Noise

— THE NOISE LEVELS WILL INCREASE — DISTANCE, SOUND BARRIERS + BERMS SHOULD BE ERECTED TO REDUCE IMPACT ON EXISTING RESIDENTIAL AREAS.

- Transportation

Please use the following space to add any additional comments

I AM NOT OPPOSED TO THE THE EXTENSION - I ONLY RECOMMEND CHANGES WHICH WOULD REDUCE THE IMPACT ON EXISTING RESIDENTIAL AREAS.

PLEASE TAKE THESE COMMENTS AS SIGNS OF SINCERE INTEREST. THEY WILL BE FOLLOWED UP ON — TO ENSURE THAT SOME OF THE ISSUES ADDRESSED ARE BROUGHT FORWARD

[redacted]

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to:

940707

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

you have any comments on the effects of the Maley Drive Extension on...

he Natural Environment (wildlife, fisheries, etc.)

I assume guidelines (environmental) will be followed

ommunities

Increased traffic poses a greater risk for children in the area.

and Use

Noise

ise of traffic now (especially night) is aggravating. There will be a substantial increase in traffic & noise level will go up. en if the rise is minimal it will be above a level that is unaccepta ce. The contracted firm is not recommending any form of sound barrier, but I strongly state that is a mistake

ransportation

se use the following space to add any additional comments

Both "hazards" mentioned above are reasons for erecting or planting a sound barrier

Look at the highways down South - sound barriers re the rule not the exception.

I would be interested in knowing if the levels of noise ~~[illegible]~~ used as acceptable guidelines were for a residential area or urban area.

nk you for attending the Information Centre, and for completing this comment sheet.

se leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

RECEIVE
JUL 7 1994
REGIONAL ENGINEERING

N

COMMENT SHEET

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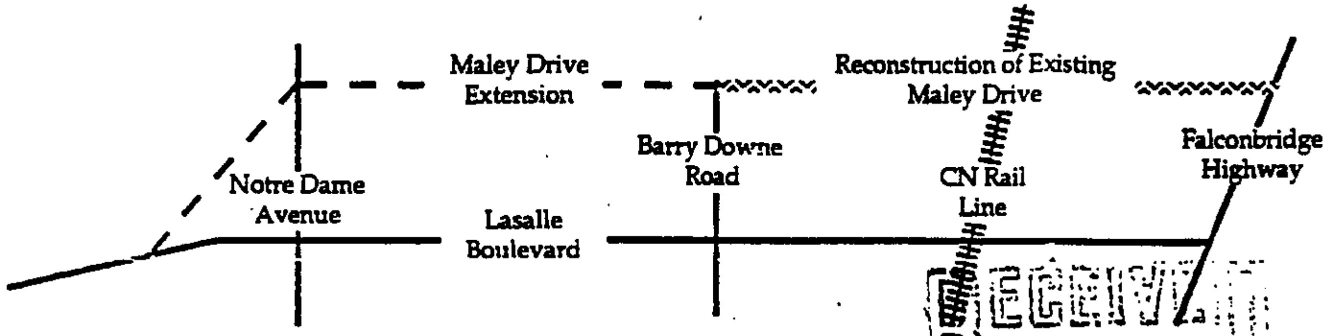


RECEIVED
JUL 13 1994
REGIONAL ENGINEERING DEPT.

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

ROUTING — VERY GOOD.

INTERSECTION DESIGN - IT IS CRITICAL TO MINIMIZE THE NUMBER OF TRAFFIC LIGHTS ALONG THE ROUTE. TRUCKS TRAVELLING AT 80 KPH HAVE A TENDANCY TO RUN RED LIGHTS. (POWER ST & HWY 17W INTERSECTION IN COPPER CLIFF IS A PRIME EXAMPLE OF TRUCKERS NOT OBEYING TRAFFIC LIGHTS) IN 80kph ZONE

OTHER FEATURES: BICYCLE PATHS SHOULD BE INCORPORATED INTO THE NEW ROAD. WITH THE AMOUNT OF LAND INVOLVED IN THE ROAD CONSTRUCTION ZONE THIS SHOULD BE EASY.

AT THE VERY LEAST, A 1.6 METRE WIDE PAVED LANE SHOULD BE INCLUDED ADJOINING THE OUTER LANE IN EACH DIRECTION. A PAINTED LINE WOULD SEPARATE MOTORIZED VEHICLE TRAFFIC FROM BICYCLE TRAFFIC.

Please see over →

ɿu have any comments on the effects of the Maley Drive Extension on...

ſhe Natural Environment (wildlife, fisheries, etc.)

ommunities

ıd Use

I THINK THE LOCATION OF ROUTE IS NATURALLY
SUITED TO THIS TYPE OF DEVELOPMENT

ise

FEEL RESIDENTS IN LANSING ST AREA WILL
GET A LOT OF NOISE FROM LARGE TRUCKS
IPSHIFTING & DOWNSHIFTING AT NEARBY INTERSECTIONS

ransportation

EAT FOR LARGE TRUCKS & OTHERS - WILL REDUCE LASALLE TRAFFIC
OOD OPPORTUNITY TO PROVIDE A TRANSPORTATION ROUTE
OR CYCLISTS SINCE BIKE TRAVEL IS INCREASING RAPIDLY.

ıse use the following space to add any additional comments

ınk you for attending the Information Centre, and for completing this comment sheet.

ıe leave your comment sheet in the box at the end of the display, or send to:

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

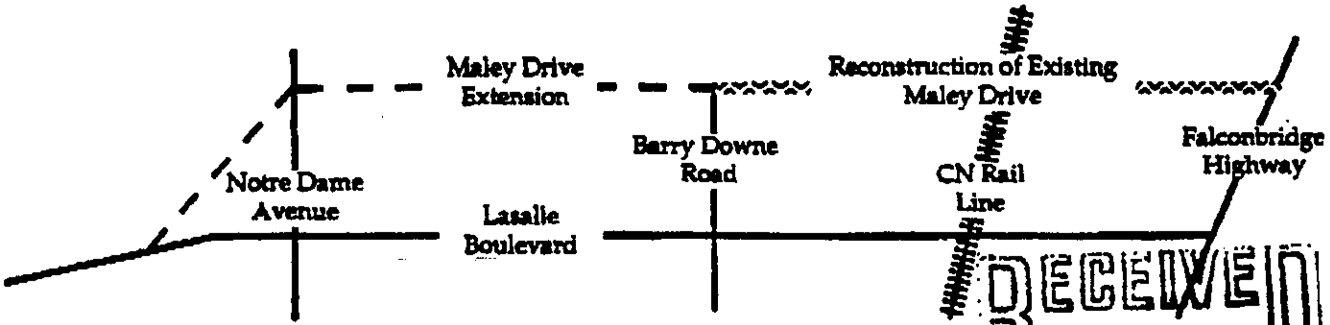
COMMENT SHEET

MALEY DRIVE EXTENSION CLASS ENVIRONMENTAL ASSESSMENT

In case further explanation of your concerns is required, could we please request your name and address:

Name [redacted]
Address [redacted]
Telephone [redacted]

This map shows the sections of the proposed Maley Drive Extension.



RECEIVED
JUN 29 1994
REGIONAL ENGINEERING DEPT.

Do you have any comments on the....

- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

A) Maley Drive Extension to Lasalle Blvd.
— does not adversely impact Maley Reservoir west of Barrydowne Road
— does not adversely impact Nickeldale Reservoir + the preferred alternative route recommended has considered the N.D.C.A.'s requirements.

B) Reconstruction of Existing Maley Drive (Barrydowne Road east to Junction Creek crossing)

— N.D.C.A. is satisfied with 60 metre wide maximum corridor and the fact that the proposed route corridor alternative does not require more than the 135' of N.D.C.A. property already blocked out from future use (i.e. golf course)
— as previously agreed, the N.D.C.A. continues to understand that the hydro pole line required by Inco will be accommodated within the 60 metre corridor and will not require additional NDCA. land

Please see over →

— the Lansing Avenue / Maley Drive intersection improvements will benefit the golf course development in the long-term, even

F

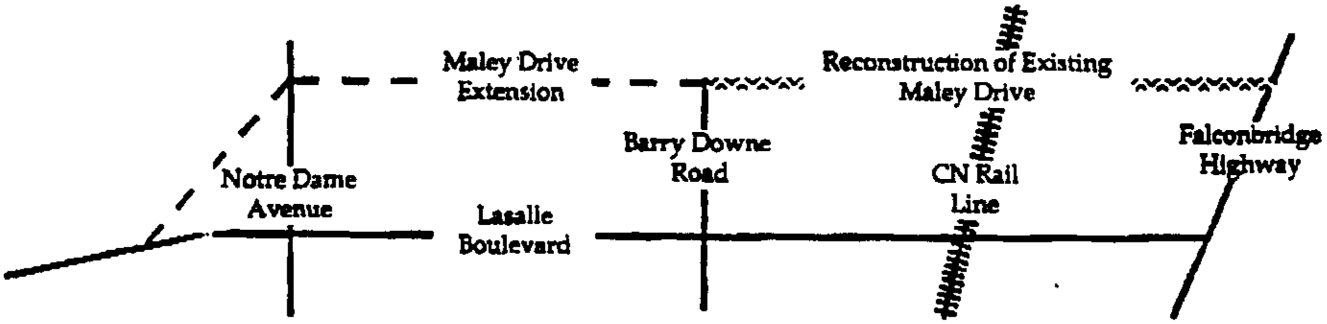
COMMENT SHEET

MALEY DRIVE EXTENSION CLASS ENVIRONMENTAL ASSESSMENT

In case further explanation of your concerns is required, could we please request your name and address:

Name
Address
Telephone

This map shows the sections of the proposed Maley Drive Extension.



Do you have any comments on the....

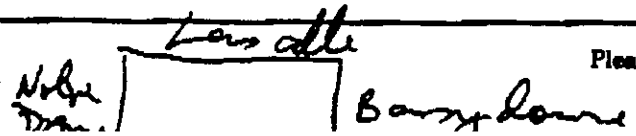
- Road Alignment
- Intersection Design
- Other features

for any of these sections ?

The alignment impacts substantially on the now environmentally improving area south of the hydro corridor.

E

I find the credibility of the flow of traffic numbers very poor. I agree Lasalle is busy ut find the projections are not consistent with projected City growth. The option to hook up he areas between The Kingsway and Lasalle ~~to~~ treat the rectangular loop will do a ot more. If we need a northern Bypass uild it out of town so as not to restrict the City. Barrydowne and Notre Dame are lso busy hence the need for roads within the



Please see over

Do you have any comments on the effects of the Maley Drive Extension on...

- The Natural Environment (wildlife, fisheries, etc.)

The road will have maximum impact on the Watershed where trees have finally come back ~~The~~ The hydro corridor ridge is barren rock.

- Communities

- Land Use

- Noise

Its too close to residential part. The dBA study shows significant increase in all areas.

- Transportation

See Front comments. The problem is not a bypass

Please use the following space to add any additional comments

① The meeting at Lasalle Sec was Not an environmental impact review as advertised. Only cursory information was available.

② The Environmental Study must be done independent from the road study. For one engineer to do both is a conflict of interest, which was clear from those at the meeting they were road Engineers. The biologists were not there. Please advise me on this.

Thank you for attending the Information Centre, and for completing this comment sheet.

Please leave your comment sheet in the box at the end of the display, or send to

Mr. Robert Falcioni, P.Eng.
Regional Municipality of Sudbury
200 Brady Street
Sudbury, Ontario, P3A 5K3

Sudbury
Ont
P3A 4Y9.
Jul 5th,

RECEIVED
JUL 11 1994
REGIONAL ENGINEERING DEPT.

Dear Sir/Madame, In addition to the attached I am most concerned that the Environmental Process is not being followed. I called Mr Demonte of Ministry of Environment who tells me this is a preliminary look at options. Mr L. Martin of Marshall, Macklin, Monaghan told me it is the best option and should start in 1996 with 5 years to build.

Please clarify this, Mr Demonte informs me he will review this also.

Marshall
Macklin
Monaghan
CONSULTING ENGINEERS • SURVEYORS • PLANNERS

80 COMMERCE VALLEY DR. EAST
THORNHILL, ONTARIO L3T 7N4
TELEPHONE (905) 882-1100
FAX (905) 882-0055

August 5, 1994
16-93079

Mr. [redacted]
[redacted]
Sudbury, Ontario
P3A 4Y9

Dear Mr. [redacted]

Subject: **Maley Drive Extension Class Environmental Assessment**

Thank you for your comments with respect to the Maley Drive Extension Class Environmental Assessment. At the request of Mr. Robert Falcioni of the Regional Municipality of Sudbury, we have reviewed your comments, and our response to each is provided below. Excerpts from your comments are briefly quoted in italics, followed by our response to each.

1. *"The alignment impacts substantially on the now environmentally improving area south of the Hydro corridor"*: Approximately 75 percent of the study area in which the alternative alignments are located is covered by a developing birch-heathland plant community. In most cases, this community is sparsely treed. Marshall Macklin Monaghan's biological survey work did not identify any rare or significant species, plant or animal, in this community, and more specifically, along the preferred alignment. We believe the birch-heathland community is less sensitive to change than other natural communities in the study area. Wetlands and areas of more mature woodland cover are more significant and sensitive to change, and it is those habitats that we would prefer to avoid.

   It would be preferable to construct a road through this type of vegetation community at this time rather than in the future, when the majority of this area might be closer to becoming a regenerated forest habitat, in which case impacts on wildlife habitat would be significantly greater. In discussions, the Ministry of Natural Resources (MNR) has not indicated concerns regarding the removal of vegetation. Therefore, this is not viewed as a significant impact;

2. a. *"....the (traffic) projections are not consistent with projected <u>City</u> growth"*: the growth projections are those employed in the Sudbury Regional Transportation Study. These land use growth projections were undertaken by Regional planning staff, on a detailed geographic basis for the City and the surrounding municipalities. A great deal of effort has gone into the development of an accurate model for projecting traffic volumes on the basis of these land use projections. The model has been calibrated to project traffic flows on the roads of the Region;

   b. *"If we need a northern bypass build it out of town so as not to restrict the City"*: our transportation analysis indicated that more northerly alternatives would not attract sufficient traffic volumes to warrant the cost of construction. The Maley Drive Extension will not "restrict the City" in any way; rather, it will provide access for development along the northern edge of the City;

   c. *"Barry Downe and Notre Dame are also busy hence the need for roads within the ...(diagram showing the area south of LaSalle Boulevard, between Notre Dame Avenue and Barry Downe Road)"*: the Region is planning for the construction of an additional east-west roadway south of LaSalle Boulevard. This link is comprised of a westerly extension of Westmount Avenue and/or a southwestern extension of Montrose Avenue to Notre Dame Avenue. Such a link will improve local traffic circulation within this "box" by providing a new collector road link. The Maley Drive extension will provide a missing link in the major arterial road network grid of the City and the Region. Our transportation analysis showed that the collector road link and the Maley Drive Extension are both needed, but that the Maley Drive Extension was needed on a more urgent basis;

3. *"The road will have maximum impact on the watershed where trees have finally come back. The Hydro ridge is barren rock"*: A substantial length of the roadway between LaSalle Boulevard and Barry Downe Road is located on the rock shelf. Any impacts that would arise from the construction of the preferred alignment can be expected to be contained within a short distance of the actual area of construction. In terms of the larger scale watershed and potential downstream effects, agencies such as the Ministry of the Environment and Energy, MNR, and the Nickel District Conservation Authority have strict requirements for protecting water quality and fish habitat. Construction will occur only when these requirements are met to the satisfaction of the review agencies.

   With regard to the potential effects on the developing tree cover within the watershed, I refer to our response to point number 1.

4. Re: noise *"It's too close to residential (areas) ... study shows significant increases in all areas"*: our noise impact assessment for Drummond Avenue shows that the expected noise levels meet the criteria of the provincial Ministry of the Environment and Energy in terms of both the marginal increase in noise and the ambient noise level with the road in place. As the project meets the provincial criteria across the length of the Maley Drive Extension and the existing section of Maley Drive, noise mitigation is not expected to be required;

5. *"The meeting at LaSalle (Secondary School) was not an environmental impact review as advertised"*: we have reviewed the Public Notice with respect to the Information Centre, which was prepared by the Regional Municipality of Sudbury, and believe that it accurately portrays the type of event which was undertaken. The Municipal Engineers Association's Class Environmental Assessment Document for Municipal Road Projects notes that this point of contact should be an opportunity for "the proponent to inform the public of the nature of the problem and of the need for the project, of the planning and design details formulated to date, of the inventories of the natural, social and economic environments, and would provide a forum to discuss potential impacts and local sensitivities." We believe that adequate information was presented at the Centre with respect to the various components of the environment. Seven of the display boards dealt with the natural environment, either in part or in total;

6. *"The Environmental Study must be done separately from the road study....the biologists were not there (at the Information Centre)"*: Marshall Macklin Monaghan Limited was retained by the Regional Municipality of Sudbury to undertake an independent, unbiased assessment of the Maley Drive Extension and alternatives to this proposal. Our firm has undertaken numerous Environmental Assessment studies across the province, and is well acquainted with the requirements of the Environmental Assessment Act. The use of one multi-disciplinary firm is a standard procedure for such projects. In addition, Regional staff have reviewed Marshall Macklin Monaghan's work on this project to ensure that the correct process is being followed.

   The environmental staff who worked on the project were not present at the Public Information Centre because the relatively low magnitude of the impacts on the natural environment indicated that these could be explained adequately by the project managers. As this is a transportation project, the project managers are transportation engineers;

7. Regarding the letter which was attached to your comment sheet, we believe that the appropriate Environmental Assessment process is being followed for this project. As part of the 1991 Sudbury Regional Transportation Study, two rounds of public information centres and a public meeting were held. The information presented included specific descriptions of the alternatives to the undertaking, which were three route alternatives for a new arterial road in the general vicinity of Maley Drive. At these forums, little if any concern was expressed regarding the potential impacts on the natural environment of the Maley Drive Extension.

These alternatives were also displayed at the recent public information centre. The analysis undertaken as part of the Regional Transportation Study was a screening of alternatives to determine which alternative could best satisfy the identified transportation needs. The screening clearly identified that the alternative which includes upgrading the existing Maley Drive, together with an extension of Maley Drive westerly from Barry Downe Road to LaSalle Boulevard, would provide the maximum benefit for both truck traffic and for all traffic. This is a major concern in the Region, where the topography has severely limited the road network to only three east-west arterial roads. An additional road need identified as part of that study was the longer term need for an extension of Maley Drive southeasterly from Falconbridge Highway to the Kingsway (Highway 17) at the new Southeast Bypass. This would provide a new arterial route to serve the northerly area of Sudbury. The other alternatives to the undertaking could not serve these objectives as well as this route is expected to, and they would also involve significantly more cost.

The three alternatives to the undertaking were not considered to vary significantly in terms of their impacts on either the social or natural environment. It was considered that the current study would be sufficient to identify and mitigate any environmental impacts. We still believe that to be the case.

To clarify the status of the project as described to you by Mr. Leslie Martin of our firm, the option presented at the Centre was the technically preferred alternative. Public input can still affect the design at this stage, as the work to date has not yet been approved by Council. We would note that there was not significant concern expressed at the Information Centre with respect to the impacts of the project on either the natural or social environments.

We trust that this addresses your concerns. If you have any further questions, please do not hesitate to contact me. Thank you again for attending the Information Centre, and for sharing your comments.

Yours truly,

MARSHALL MACKLIN MONAGHAN LIMITED

Robert Wanless, P.Eng.
Vice President
Transportation Planning

cc: Mr. R. Falcioni, Regional Municipality of Sudbury
Mr. M. del Monte, MOEE

c:\suddata\thr.let

16-93072

COPY

SEP 14 1994

Ontario

Ministry of
Environment
and Energy

Ministère de
l'Environnement
et de l'Énergie

199 Larch Street
Sudbury ON P3E 5P9
(705) 670-3239

199, rue Larch
Sudbury ON P3E 5P9
1-800-890-8516

8 September 1994

Mr. [redacted]
[redacted]
Sudbury, Ontario
P3A 4Y9

Dear [redacted]

Re: Maley Drive Extension Class Environmental Assessment

Thankyou for bringing your environmental concerns regarding the Maley Drive extension to our attention.

I have reviewed the information presented at the public meeting and conclude based on the information provided, that the natural environmental factors do not appear to have been considered at the assessment of alternatives *to* the undertaking stage. One principle of successful planning under the *Environmental Assessment Act* includes identification and consideration of the affects of each alternative (including alternative routes), on all aspects of the environment (pg. 16, Class EA for Municipal Road Projects). The level of detail will vary depending on the significance of the effect and the stage of the study. This is at the discretion of the proponent.

Pre-submission consultation is an iterative process, through which the proponent determines the effectiveness and thoroughness of their evaluation with input from the public. Mr. Wanless of Marshall Macklin Monaghan, indicated in his Aug. 5, 1994 letter to you that natural environmental factors were considered.

Based on discussions with Mr. Falcioni, RMOS, we expect that these considerations and the decision making processes will be clearly outlined in the Environmental Study Report (ESR) which is completed in Phase 4 of the planning process. After notification of completion of the ESR there is a 30 day public review period. If during this time, you feel that your environmental concerns still have not been adequately addressed you may request a bump-up through the Minister of Environment and Energy. MOEE staff will also be reviewing the ESR for this issue.

A bump-up request in the current stage of planning would be considered premature. By copy of this letter, I will be informing the Regional Municipality of Sudbury that natural environmental impacts should be assessed for alternative routes and that this information should be included in the ESR.

I hope that you continue to work with the Region to resolve your concerns. If you have any questions please contact myself or Mark Del Monte.

Sincerely,

Peggy Gale

Peggy Gale
EA Planner

cc. R. Falcioni, RMOS
R. Wanless, Marshall Macklin Monaghan Ltd.

Marshall
Macklin
Monaghan
CONSULTING ENGINEERS • SURVEYORS • PLANNERS

80 COMMERCE VALLEY DR. EAST
THORNHILL, ONTARIO L3T 7N4
TELEPHONE (905) 882-1100
FAX (905) 882-0055

February 28, 1995
16-93079

Mr. [redacted]
[redacted]
Sudbury, Ontario
P3A 4Y9

Dear [redacted]

Subject: **Maley Drive Extension Class EA**
Noise Study

We have prepared this letter to respond to the issues and questions raised during our telephone conversation of January 13, 1995. We understand that there are two issues pertaining to the noise measurements that you requested clarification on, and these are as follows:

- When were the noise measurements performed and how many were taken?
- On the days the noise measurements were taken, what was the average 16 hour noise level for the day? What is the projected 16 hour noise level after Maley Drive is constructed?

Our responses to your questions are noted below.

Noise measurements were undertaken at five (5) locations on Friday May 27 and Saturday May 28, 1994. Additional noise measurements were undertaken at three (3) additional locations on Tuesday June 14, 1994. The noise measurement at each location was performed for a 20 minute period, as per the requirements of the MOEE document NPC-103 (Procedure for Measurement of Varying Sounds), Section 4 (f) (ii). One receptor location was situated in the vicinity of your rear yard. This measurement was performed on Saturday May 28, 1994, between 10:15 and 10:35 a.m. The 20 minute L_{eq} noise level was **48.3 dBA**, with Notre Dame Avenue traffic being the major noise source.

It must be emphasized that the measured noise levels obtained from these noise surveys **were <u>not</u>** used as the 16 hour daytime noise levels. The 16 hour daytime noise levels for all receptor locations assessed in the Noise Study, were determined by using the FHWA STAMINA 2.0 Noise Prediction Computer Model.

It is recommended practice to determine existing ambient noise levels through the use of a noise prediction model such as STAMINA, since individual noise measurements are not as reliable as predictions in determining average noise levels. Instead, noise measurements produce a "snapshot" at one point in time and can vary substantially due to a variety of factors (weather conditions, extraneous noises, changes in traffic volumes, etc.).

...continued on next page

It is our normal practice when performing a site visit and inventory, to also take "spot" noise measurements during non-peak times. We have found from experience that noise levels during these periods are similar to the predicted average daily noise level. This way, if there is a substantial difference between the predicted noise level and the sample measured noise level, we can investigate the assumptions used in the noise model prediction, to determine whether adjustment factors are needed. In such cases we will perform a more comprehensive noise measurement and record the traffic volumes and other relevant noise model data at the same time.

Accordingly, in the case of the noise measurements adjacent your property, we found that our noise measurement sample was similar to the predicted existing average daily (ie. 7:00 a.m. to 11:00 p.m.) noise level (ie. a 2 decibel difference which is considered to be an almost inaudible difference to the human ear). Although the key noise source at this location is traffic noise on Notre Dame Avenue, there is still some additional noise generated by the overall urban environment, and this background noise is not included in the noise prediction model.

Therefore, we concluded that there was no reason to preclude using the noise prediction model, nor was there any need for applying any site specific noise adjustment factors. Furthermore, it should be noted that if the higher measured noise value was used in the assessment, predicted noise impacts would be **lower**, since the qualification of noise impact is based on the increase in sound levels compared to the existing levels.

Based on the average annual daily traffic volumes (AADT's), truck percentages, speed limits, and gradients on Notre Dame Avenue, and accounting for the terrain and topographical conditions in this vicinity, the existing daytime 16 hour L_{eq} noise level in the vicinity of your rear yard was determined to be **46.3 dBA**. This then became the base noise level for determining the future noise impact of the Maley Drive Extension.

Our study found that after the completion of the Maley Drive Extension, the noise level in the vicinity of your rear yard would increase by **4.9 decibels** to a future noise level of **51.2 dBA**. The noise assessment of the other receptor locations analyzed in the Maley Drive corridor was performed in a similar manner.

We trust we have satisfactorily addressed your questions. However, if you find you require further clarification or have additional questions about our noise assessment, please contact the undersigned at your convenience.

Yours very truly

MARSHALL MACKLIN MONAGHAN LIMITED

C. Alan Mihalj, P.Eng.
Project Manager
Transportation Planning

CAM:<lm7\maley\throssell>

cc. R. Falcioni, Regional Municipality of Sudbury

Inter-Office Memo

Date	March 3, 1995	File No.	16-93079
To	File	Copies to	Rob Wanless
From	Alan Mihalj		

Subject **Telephone Conversation with Mr. [redacted]**
Maley Drive Noise Study

I talked to Mr.[redacted]yesterday to discuss his comments about my February 28 letter to him (responding to his January 13, 1995 comments).

There were an number of areas in my letter that he had comments on:

1. He felt that noise measurements are preferable to predicting noise from a computer model. He thought we should have measured the noise behind his yard for the full 16 hours during a weekday, rather than our sample 20 minute measurement on a Saturday.

   I reiterated the points I noted in my February 28 letter, namely that it is recommended practice to determine existing ambient traffic noise levels by modelling it with the existing traffic data rather than measuring the noise, since the noise measurement is still a "snapshot" of only that particular time. Even a 16 hour noise measurement can be affected by the current environmental conditions of that day, or traffic conditions of that particular day may vary from the average daily conditions.

   I also noted that we did not have to measure the noise at all, but we did because it is our normal practice to do so. If a substantial difference between the predicted level and the sample measurement does occur, then we can re-examine the input parameters used in the model.

   In fact this is what happened on Maley, near Lansing. Our predicted existing noise levels differed substantially from our sample measurement. Therefore, we did a more detailed noise measurement along with a traffic count to confirm all input parameters. What we found was that vehicles were driving substantially faster than the posted speed limit, and the poor pavement surface is also noisier than typical asphalt pavement. Using the noise information from this second set of measurements, we were able to adjust our model to account for this difference.

   However, in the vicinity of Mr. [redacted] house, the measured noise levels were similar to the modelled levels. Therefore, we were satisfied with the STAMINA model and thus there was no need to undertake further measurements at this location.

2. Mr. [redacted] also noted that our modelled existing noise levels didn't take into account other noise sources, and he felt this would have been taken into account other noises. I confirmed that our ambient noise level prediction only takes into account traffic noise on Notre Dame Avenue, which is the dominant noise source, and thus other noises are not included.

However, this results in a conservative noise assessment, since the existing ambient becomes the objective noise level to which future noise levels are compared against. If we did include other noises such as dogs barking, birds chirping, leaves rustling, children playing, gardening activities, cars driving on local streets and other neighbourhood activities, our existing ambient noise level would increase. Therefore, the change between the future noise level and the existing ambient noise level would then become smaller and thus there would even be <u>less</u> noise impact from the Maley extension than we predicted. Consequently, this results in a built-in factor of safety for our noise assessment.

3. Mr. [redacted] also indicated his disagreement in how noise analysis is performed, namely the use of a 16 hour L_{eq} descriptor instead of using a peak hour noise level descriptor. However, he acknowledged that this is what is required by the MOEE and thus we have to follow it and comply with it in our noise assessment. I explained the rationale about why the MOEE uses this noise level descriptor and acknowledged that it may not be perfect, but is considered the best there is for assessing transportation noise. All other provinces in Canada assess transportation noise in a similar manner.

4. Mr. [redacted] also indicated his disappointment that no MMM environmental staff attended the Open House. He also felt he was somewhat mislead when the noise study results were summarized, since he thought it was stated that existing ambient noise levels were based on measurements, and not derived from a noise prediction model. I responded that at the time it was not anticipated that the noise analysis would be a major issue. Since there are a large number of specialists on the Study Team, it is not normal practice to have all Study Team members attend unless it is known that a specific issue will be of significant concern.

5. Mr. [redacted] asked me whether I had performed a noise analysis on any alternative Maley Drive alignments. I responded that I did not perform any detailed noise assessment for any alternative alignments, but that I recall providing some cursory input to our road design team about possible implications with regard to noise for alternative alignments. I noted that there would not be a significant difference in the noise impact for alternative alignments in this vicinity, since the setbacks from the existing residential areas are quite substantial.

6. In closing, Mr. [redacted] said he still has some questions to ask the MOEE about noise assessment procedures (such as my reference to MOEE document NPC-103, etc.). He also said he may borrow one of the noise meters he has at work and undertake some existing noise measurements to see if the noise levels in his rear yard are similar to both our sample measurements and our predictions of the existing levels. I told him if he has any more questions or wants additional clarification, to phone me at any time.

C. Alan Mihalj, P. Eng.
Project Manager
Transportation Planning

CAM:<lm7\maley\[redacted]>

MALEY DRIVE EXTENSION

CLASS ENVIRONMENTAL ASSESSMENT

Region of/de SUDBURY

REGIONAL MUNICIPALITY OF SUDBURY

APPENDIX B

GEOTECHNICAL ASSESSMENT

October, 1995

Marshall
Macklin
Monaghan
CONSULTING ENGINEERS SURVEYORS PLANNERS

PRELIMINARY GEOTECHNICAL ASSESSMENT
MALEY DRIVE EXTENSION
REGIONAL MUNICIPALITY OF SUDBURY

PREPARED FOR:

MARSHALL MACKLIN MONAGHAN LIMITED

TROW CONSULTING ENGINEERS LTD.
Brampton, Hamilton, Kitchener, London, Markham,
North Bay, Oshawa, Ottawa, Sudbury, Thunder Bay, Winnipeg

Project: SO5971G
Date: May 10, 1994

1074 Webbwood Drive
Sudbury, Ontario P3C 3B7
Phone: (705) 674-9681
Fax: (705) 674-8271

TABLE OF CONTENTS

DRAWINGS

Trow Sudbury Branch

Trow Consulting Engineers Ltd.
1074 Webbwood Drive
Sudbury, Ontario P3C 3B7
Telephone: (705) 674-9681
Facsimile: (705) 674-8271

SO5971G May 10, 1994

Marshall Macklin Monaghan Limited
80 Commerce Valley Drive, East
Thornhill, Ontario
L3T 7N4

ATTENTION: Mr. L.A. Martin, P.Eng.
Transportation Engineering

Dear Sirs:

PRELIMINARY GEOTECHNICAL ASSESSMENT
MALEY DRIVE EXTENSION
REGIONAL MUNICIPALITY OF SUDBURY

We have now completed boreholes and a preliminary geotechnical assessment for the above noted project. Our comments and findings are included in the following paragraphs.

1.0 INTRODUCTION AND OBJECT

In our initial proposal to you dated August 13, 1993, we suggested that the scope of work include 25 sampled boreholes along the route which, together with engineering, analysis and reporting, would cost in the order of $18,000.00. This scope was subsequently revised and, in your confirming letter of March 9, 1994, was reduced to about 18 boreholes at a cost of $8,000.00.

At this preliminary planning stage, the route has not been finalized, although along the easterly portion, i.e., from Falconbridge Highway to Barrydowne Road, it is likely to be constructed along the existing alignment of Maley Drive. However, there is still discussion as to the feasibility of "twinning" the road and providing additional new westerly bound traffic lanes, probably on the north side of the present road. West of

Barrydowne Road, i.e. to the LaSalle Boulevard Extension, a number of alignment alternatives are under review with a preference, at this stage, to constructing the road predominantly over outcropping bedrock areas.

The overall alignment scheme is illustrated on the attached Drawings 1 and 1A, where the potential road corridor is shown, i.e. an envelope incorporating the various potential alignments, with the preferred optimum route highlighted.

At this time, only preliminary information is required along the route on ground conditions to assist in the overall evaluation for alignment and preliminary estimating purposes.

2.0 FIELD WORK

Trow field staff initially walked the alignment and identified several terrain features, such as rock outcrops, low-lying "swampy" sections, and areas with shallow overburden conditions. Following this review, several borehole locations were then selected to provide additional data on the geotechnical conditions.

The initial site reconnaissance was performed along the existing portion of Maley Drive, i.e. east of Barrydowne Road, with a walk over. Along the undeveloped section, i.e. west of Barrydowne Road, data on the site conditions was obtained using an ATV and Skidoo. The boreholes were completed with a conventional soil testing rig equipped with standard flight augers and mounted on a Bombardier track vehicle. Access for this track mounted drill along the route, particularly on the westerly section, was difficult and time consuming.

In total, six boreholes (boreholes 1 to 6) were completed at optimum locations along the westerly section, and a further five boreholes (boreholes 1M to 5M) along the easterly section.

Details of the soil strata encountered in the boreholes are included on the attached logs, Drawings 3 to 13, inclusive. Drawing 2 provides additional data on soil descriptions. The approximate locations of the boreholes are shown on the two site plans, Drawings 1 and 1A.

3.0 GEOTECHNICAL CONDITIONS

Based on the results of the sampled boreholes, visual observations made during our site reconnaissance, as well as Trow's previous experience with other projects in the area, the anticipated geotechnical conditions are discussed below.

3.1 Easterly Section: (Boreholes 1M to 5M)

The general soil conditions in this section are expected to comprise an upper, thin layer of compact, brown, sandy silt overlying a stiff, brown, silty clay deposit. This clay deposit is likely to become weaker with depth, usually changing at around 4 m to 5 m below grade to a firm consistency and grey colour. The silty clay is also stratified with thin seams of silt.

No bedrock was observed along this particular section of the route; however, previous borings by Trow for adjacent housing projects in the vicinity of Lansing Avenue, intercepted bedrock within 4 m of grade. There may also be random areas where surficial peat deposits occur near the east end, i.e. between National Street and Old Falconbridge Highway. In previous borings by Trow in this area, up to 3 m of peat was encountered in some localized areas.

The upper silt stratum should not cause any abnormal problems with the construction and/or performance of a new road when used as the subgrade. It is expected to be reasonably competent, provided it is adequately drained with properly designed subdrains and/or ditching.

3.2 Westerly Section: (Boreholes 1 to 6)

Based on the available proposed alignment, it appears that the road will be constructed, for the most part, on bedrock (see Drawing 1). The rock is expected to comprise predominantly a metasedimentary bedrock, typically McKim pelites, which is generally a strong, sound rock with some bedding planes, limited jointing, and minimal weathering. It is possible that other sections consisting of Mafic Intrusive rock will be encountered, which is similarly a strong, sound rock with minimal weathering and jointing.

Some sections of overburden are present, particularly close to the east end (adjacent to Barrydowne Road) and at other intermittent locations between rock outcrops, especially if the route were to be located towards the south side of the broad road corridor. The overburden (boreholes 1 to 5) consist of reasonably competent, stiff, brown, silty clay. The clay is likely to change, however, to a grey colour and firm consistency at depths of say 4 m to 5 m below grade at the east end (near Barrydowne Road), and to silt at the west end (near Notre Dame Avenue).

There may be some localities where poorly drained, "swampy" sections occur (see Drawing 1); however, it is believed that the average thickness of any surficial organics (predominantly peat) should not exceed 2 m or so.

3.3 Road Interchange:

3.3.1 Notre Dame Avenue:

Most of the terrain within the proposed road corridor at the Notre Dame intersection would appear to be shallow and/or outcropping bedrock. Borehole 5 was located in an area where the overburden is anticipated to be thickest. The soil conditions at borehole 5 consist of some 2.5 m of stiff clay overlying compact silt, which extends down to assumed bedrock at approximately 7 m depth.

3.3.2 LaSalle Boulevard Extension:

Based on our visual observations, the terrain in the LaSalle Boulevard Extension consists predominantly of shallow and/or outcropping bedrock.

4.0 PRELIMINARY DESIGN COMMENTS

4.1 Road Design:

It is suggested that the proposed new road construction comprise the following preliminary "flexible" pavement design:

Asphalt	40 mm (surface) 50 mm (binder) 50 mm (binder) **140 mm (Total)**
Granular "A" Base	150 mm
Modified Granular "B" Subbase (imported sand & gravel, slag or on-site crushed rock)	600 mm

Materials must meet all appropriate Regional Municipality of Sudbury specifications.

It may be feasible to reduce the granular subbase from 600 mm to 150 mm through rock as well as in rock fill sections, however, appropriate transition tapers and proper drainage facilities must be incorporated between rock/rock fill and adjacent soil sections. We would also suggest that locally available crushed slag be substituted for all or at least the lower 300 mm of the sand and gravel subbase, assuming the slag can be produced economically within the same gradation requirements as Regional Municipality of Sudbury Modified granular "B". In our opinion, an initial subbase lift of crushed slag will enhance the overall performance of the road by providing increased supporting capacity and improving overall drainage conditions. The slag must, however, conform to the gradation requirement as mentioned above and, additionally, any slag must not be present within 1.5 m of any buried metal components (watermain connections, etc.).

A functional design life of about 15 years has been used to establish the pavement recommendation. This represents the number of years to the first rehabilitation, assuming regular maintenance and crack sealing is carried out. A more specific pavement structure will be established, based on specific laboratory testing and detailed boreholes, to determine frost susceptibility and strength characteristics of the subgrade soils, etc., for final design purposes.

The long term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures must be maintained to ensure that uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage provisions cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be sloped to provide effective drainage. Surface water should not be allowed to pond adjacent to the outside edges of the pavement area. Subdrains must be installed to intercept excess subsurface moisture and prevent seasonal subgrade softening. Drainage is particularly important at frost transition sections.

Additional comments on the construction of the pavement areas are as follows:

(a) Although not mandatory, a suitable geotextile fabric (i.e. Mirafi P500 or equivalent) could be incorporated over the subgrade, before placing the granular subbase. This cloth would act as a "separator" and provide additional reassurance that the subgrade "fines" will not migrate and contaminate the subbase granulars. Geotextile cloth is useful in this regard in "wet" conditions, particularly during construction.

(b) As part of the subgrade preparation, pavement areas should be stripped of all topsoil and any other objectionable material. Select subgrade fill required to raise the grade to design elevation should be compacted to 95 percent standard Proctor dry density. The subgrade must be properly shaped, crowned, and proof-rolled, and any soft or spongy areas should be subexcavated and properly replaced with approved select backfill.

(c) The most severe loading conditions on the subsoil could occur during construction. Consequently, special provisions may be required by the contractor such as additional subbase and restricted loadings. Provisions for temporary slag roads or rock fill could be required, especially if construction is carried out during wet weather conditions.

(d) It is normal to backfill service trenches with native soil, at least within the upper frost zone of about 2 m, to ensure compatibility and thus prevent yearly differential heaving problems. Backfill in rock trenches should comprise well graded sand and gravel.

4.2 Embankment Sections

No information is available at this preliminary planning stage as to potential embankment heights. Generally, the underlying subsoils, which are stiff to firm clays and/or compact silt, for the most part, should normally be able to support embankment heights of around 4 m to 5 m without experiencing serious stability and/or abnormal settlement problems. This assumption would, however, have to be confirmed for final design purposes.

4.3 Rock Cut(s)

Some rock excavations will likely be required along the new route, west of Barrydowne Road.

Although the Metasedimentary and/or Mafic Intrusive rocks are generally "strong", they contain undifferentiated fractures and joints. Any bedrock excavation will require drilling and blasting techniques. From previous experience, although the rock is "strong", it is expected to be brittle and hence it is often difficult to blast and excavate to "neat" lines using conventional drilling and blasting procedures, i.e. problems with "overbreak" are common. This potential problem may affect quantities claimed by the contractor for rock excavation, as well as the amount of imported fill (where required), to compensate for "overbreak". The contractor, therefore, should make adequate allowances for these conditions. Some consideration in critical areas may have to be given to controlled blasting techniques in order to reduce potential problems. Due consideration must also be given to pre-shearing of the rock in order to prevent potential damage to adjacent rock slopes and structures. Pre-blast surveys of adjacent properties are recommended.

4.4 Road Interchange:

4.4.1 Notre Dame Avenue:

It is understood that this road interchange will incorporate a bridge structure. Since bedrock is expected to either outcrop or occur at fairly shallow depths (probably less than 7 m below grade), it is anticipated that foundations will consist of spread and/or pier footings established on rock.

The bedrock, when cleaned of all loose debris and shatter, should be capable of supporting a net allowable bearing pressure at least 5.0 MPa.

4.4.2 LaSalle Boulevard Extension:

At this time, we understand that a bridge structure is not proposed and the interchange will be at grade. As noted previously, outcropping and/or shallow bedrock is anticipated in this area.

5.0 LIMITATIONS

The comments given in this report are provided solely for the design team to establish preliminary data on the ground and terrain conditions along the route.

The findings of this report must not be used for final design purposes. Additional detailed boreholes will, however, be required to establish the detailed parameters necessary for final design.

In the interim, if you have any questions, please do not hesitate to contact the undersigned at this office.

Yours truly,

TROW CONSULTING ENGINEERS LTD.

REGISTERED PROFESSIONAL ENGINEER
I. W. GORE
PROVINCE OF ONTARIO

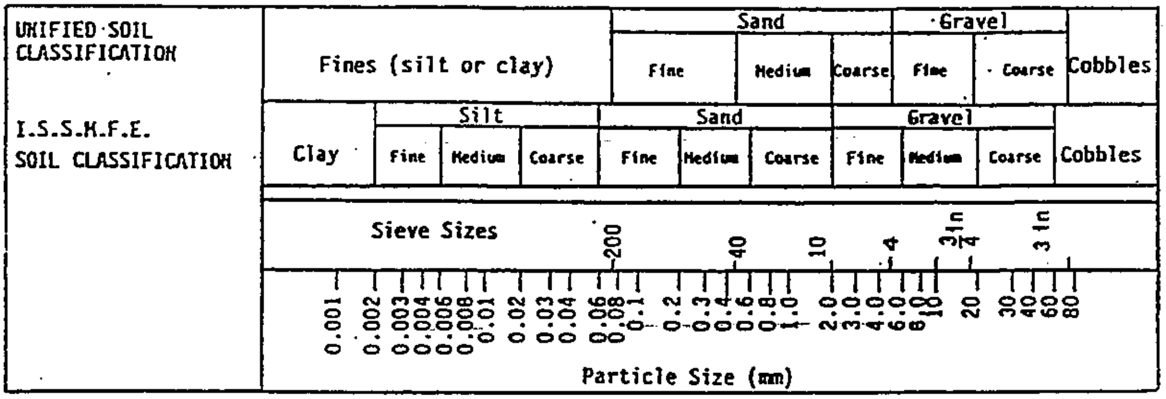
I.W. Gore, P.Eng.
Vice President

A.J. Schell, P.Eng.
Sr. Geotechnical Engineer

IWG:gmv27b
Encl.
Dist: Marshall Macklin Monaghan Limited (3)
Mr. L.A. Martin, P.Eng.
Transportation Engineering

NOTES ON SAMPLE DESCRIPTIONS

1. All descriptions included in this report follow the I.S.S.M.F.E. as suggested in the Canadian Foundation Manual. The laboratory grain-size analysis also follows this classification system. Others may designate the unified classification system as their source; a comparison of the two is shown for your information. Please note that, with the exception of those sample where the grain-size analysis has been carried out, all samples are classified visually and the accuracy of visual examination is not sufficient to differentiate between the classification systems or exact grain sizing.



2. **FILL:** Where fill is designated on the borehole log, it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of the site fill material. All fills should be expected to contain obstructions such as large concrete pieces of subsurface basements, floors, tanks, etc.; none of these may have been encountered in the borehole. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact and correct composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant on-going and future settlements. The fill at this site has been monitored for the presence of methane gas, and the results are recorded on the borehole log. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the potential for problem, if they exist, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic waste that renders it unacceptable for deposition in any but designated land fill sites. Unless specifically stated, the fill on this site has not been tested for contaminants that may be considered hazardous. This testing and a potential hazard study can be carried out if you so request. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common but are not detectable using conventional geotechnical procedures.

3. **TILL:** The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. As a result of this geological process, the till must be considered heterogeneous in composition and, as such, may contain pockets and/or seams of material such as sand, gravel silt or clay. As till often contains cobbles (60 to 200 mm) or boulders (over 200 mm), contractors may encounter them during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited area; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till material.

BOREHOLE LOG

JOB No. S05971G

BOREHOLE No. 1

DRAWING No. 3

PROJECT Proposed Road Extension

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	├─○
DYNAMIC CONE TEST	───	UNDRAINED TRIAXIAL AT	
SHELBY SAMPLE	■	OVERBURDEN PRESSURE	0 15 ⊕ 5 10
FIELD VANE TEST	+	% STRAIN AT FAILURE	
LAB VANE TEST	±	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
			G.L.	0			
▼	F F F	**Fill,** mostly sand and gravel with cobbles (frozen)	0.5 1.1	1			
		Silty Fine Sand, brown (frozen)	1.7				
		Silty Clay, brown, stratified with some silt seams (stiff)	3.05	2 3			
		END OF BOREHOLE					
		Notes: (1) Borehole advanced uncased using standard auger equipment on April 7, 1994. (2) Water level was at ±0.4 m and hole was open to ±1.6 m depth on completion.		4 5 6 7 8 9 10			

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G

BOREHOLE No. 2

DRAWING No. 4

PROJECT Proposed Road Extension

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	⊠	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	├—○
DYNAMIC CONE TEST	——	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE	0 15 ⊕ 5 10
SHELBY SAMPLE	█		
FIELD VANE TEST	+	% STRAIN AT FAILURE	
LAB VANE TEST	⍭	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	m DEPTH	N VALUE 20 40 60 80 / SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT kN/m
▼			G.L.	0			
═		**Topsoil,** ±200 mm over **Silty Fine Sand,** brown (frozen)	1.0				
		Silty Clay, brown, stratified with some silt seams (stiff)	3.05	1 2 3			
		END OF BOREHOLE		4 5 6 7 8 9 10			

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.

(2) Water level was at surface and hole was open to full depth on completion.

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G

BOREHOLE No. 3

DRAWING No. 5

PROJECT Proposed Road Extension

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	⊠	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	⊢—○
DYNAMIC CONE TEST	——	UNDRAINED TRIAXIAL AT	
SHELBY SAMPLE	█	OVERBURDEN PRESSURE	⊕
FIELD VANE TEST	+	% STRAIN AT FAILURE	0 / 5 / 10 / 15
LAB VANE TEST	±	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
▼			G.L.	0			
		Topsoil, ±280 mm over **Silty Sand**, brown (frozen)		1			
		Silty Clay, stratified with silt seams (stiff)	1.2	2			
		END OF BOREHOLE	3.05	3			
				4			
				5			
				6			
				7			
				8			
				9			
				10			

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.

(2) Water level was at surface and hole was open to ±2.8 m depth on completion.

OTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G BOREHOLE No. 4 DRAWING No. 6

PROJECT Proposed Road Extension

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	├─○
DYNAMIC CONE TEST	—	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE	⊕ 0 / 15 5 / 10
SHELBY SAMPLE	■	% STRAIN AT FAILURE	
FIELD VANE TEST	+	PENETROMETER	▲
LAB VANE TEST	+		

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
			G.L.	0			
▽		**Topsoil,** ±360 mm over **Silty Sand,** brown (frozen)	1.0	1			
		Silty Clay, brown, stratified with some silt seams (firm/stiff)	3.05	2 3			
		END OF BOREHOLE		4			

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.

(2) Water level was at surface and hole was open to full depth on completion.

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G

BOREHOLE No. 5

DRAWING No. 7

PROJECT Proposed Road Extension

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

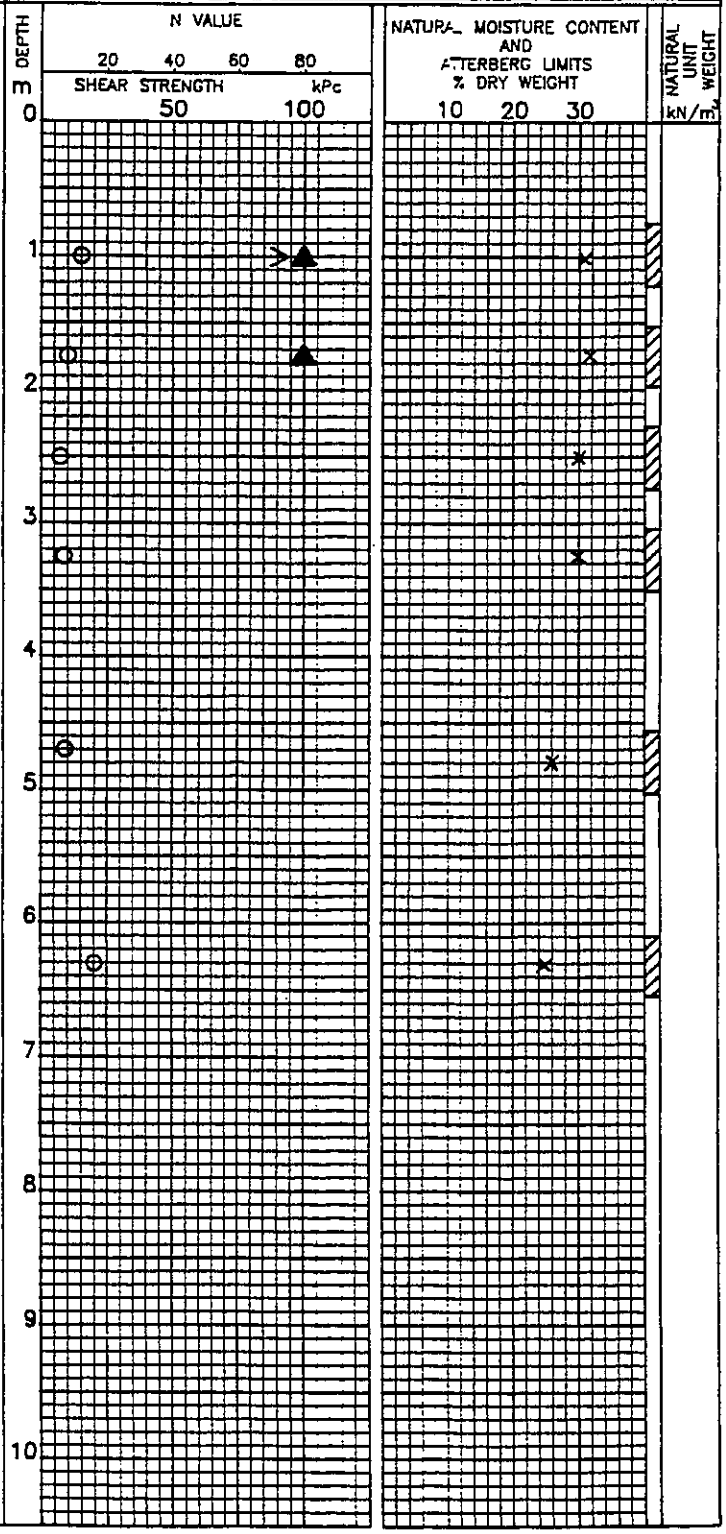
AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	⊢○
DYNAMIC CONE TEST	—	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE	⊕ 0 5 10 15
SHELBY SAMPLE	■	% STRAIN AT FAILURE	
FIELD VANE TEST	+		
LAB VANE TEST	+	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m
			G.L.
▽		**Topsoil,** ±100 mm over **Silty Clay,** stratified with silt seams, brown (stiff)	1.5 (est)
			2.5
		Silt, occasional thin clay seams, grey/brown changing to grey below ±5 m depth (compact)	
			6.87
		END OF BOREHOLE DUE TO REFUSAL TO AUGER ON BOULDER OR BEDROCK	

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 8, 1994.

(2) Water level was at 0.7 m and hole was open to ±2.6 m depth on completion.



IOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G

BOREHOLE No. 6

DRAWING No. 8

PROJECT Proposed Road Extension

LOCATION Maley Drive

Sudbury, Ontario.

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	⊢—○
DYNAMIC CONE TEST	—	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE % STRAIN AT FAILURE	0 15⊕5 10
SHELBY SAMPLE	■		
FIELD VANE TEST	+		
LAB VANE TEST	⨦	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
	F F F F F F F F	**Sand and Gravel Fill**, some rock fragments (frozen)	G.L.	0			
			0.8				
		END OF BOREHOLE DUE TO REFUSAL TO AUGERS ON BOULDER OR BEDROCK		1			
		Notes: (1) Borehole advanced uncased using standard auger equipment on April 8, 1994. (2) Hole dry and open on completion.		2			
				3			
				4			
				5			
				6			
				7			
				8			
				9			
				10			

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G **BOREHOLE No.** 1M **DRAWING No.** 9

PROJECT Proposed Road Reconstruction

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	⊢—○
DYNAMIC CONE TEST	—	UNDRAINED TRIAXIAL AT	0
SHELBY SAMPLE	■	OVERBURDEN PRESSURE	15⊕5
FIELD VANE TEST	+	% STRAIN AT FAILURE	10
LAB VANE TEST	⊹	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
			G.L.	0			
	F F F F F	**Fill,** mostly sand, gravel and slag (frozen)	0.5				
∇		**Silty Fine Sand,** black, organic inclusions (frozen)	1.0 (est) 1.2	1			
		Silty Clay, grey (frozen)	2.1	2			
		Clayey Silt, brown (stiff)	3.05	3			
		END OF BOREHOLE					
				4			
				5			
				6			
				7			
				8			
				9			
				10			

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.

(2) Borehole caved wet at ±1.9 m depth on completion.

OTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G

BOREHOLE No. 2M

DRAWING No. 10

PROJECT Proposed Road Reconstruction

LOCATION Maley Drive
Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	├—○
DYNAMIC CONE TEST	——	UNDRAINED TRIAXIAL AT	0
SHELBY SAMPLE	▮	OVERBURDEN PRESSURE	15 ⊕ 5
FIELD VANE TEST	+	% STRAIN AT FAILURE	10
LAB VANE TEST	±	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
			G.L.	0			
		Topsoil, ±75 mm over **Silt**, brown, moist (frozen)					
			1.0	1			
		Silty Clay, brown, stratified with some silt seams (stiff)		2			
			3.05	3			
		END OF BOREHOLE					
				4			
				5			
				6			
				7			
				8			
				9			
				10			

Notes:
(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.
(2) Borehole was dry & open to full depth on completion.

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G BOREHOLE No. 3M DRAWING No. 11

PROJECT Proposed Road Reconstruction

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	├──○
DYNAMIC CONE TEST	───	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE	⊕ (0, 5, 10, 15)
SHELBY SAMPLE	■	% STRAIN AT FAILURE	
FIELD VANE TEST	+	PENETROMETER	▲
LAB VANE TEST	±		

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	m DEPTH	N VALUE 20 40 60 80 / SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
			G.L.	0			
	F F F F F F F F F F F F F F F F F F F F	**Sand and Gravel Roadbase,** shoulder and culvert fill (frozen to ±1.5 m depth)		1 2			
			2.3				
		Silty Fine Sand, brown (compact)					
			3.05	3			
		END OF BOREHOLE		4 5 6 7 8 9 10			

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.

(2) Borehole caved dry at ±0.7 m depth on completion.

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G BOREHOLE No. 4M DRAWING No. 12

PROJECT Proposed Road Reconstruction

LOCATION Maley Drive

Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	⊢—○
DYNAMIC CONE TEST	—	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE	0 15 ⊕ 5 10
SHELBY SAMPLE	■		
FIELD VANE TEST	+	% STRAIN AT FAILURE	
LAB VANE TEST	±	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m G.L.	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
	F F F	**Sand and Gravel Roadbase Fill** (frozen)		0			
		Silt, brown, moist (frozen)	0.8	1			
▼		**Silty Clay**, brown, stratified with odd silt seams (stiff)	1.5	2			
		END OF BOREHOLE	3.05	3			

Notes:

(1) Borehole advanced uncased using standard auger equipment on April 7, 1994.

(2) Borehole caved wet at ±1.6 m depth on completion.

NOTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.

BOREHOLE LOG

JOB No. S05971G　　BOREHOLE No. 5M　　DRAWING No. 13

PROJECT Proposed Road Reconstruction

LOCATION Maley Drive

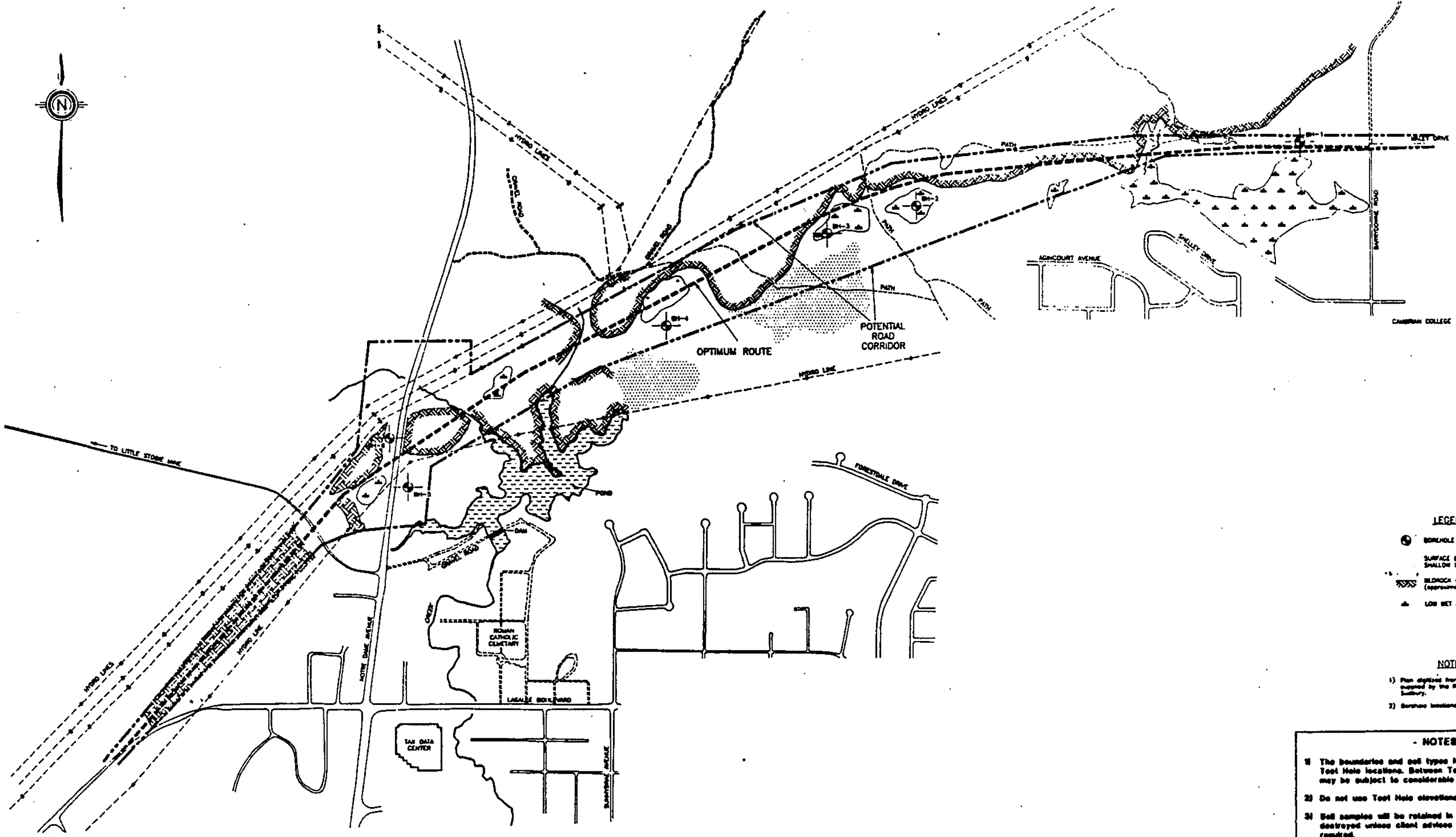
Sudbury, Ontario

HOLE LOCATION AND DATUM SEE DRAWING No. 1

AUGER SAMPLE	☒	NATURAL MOISTURE	×
SPT (N) VALUE	▨	PLASTIC AND LIQUID LIMIT	├─○
DYNAMIC CONE TEST	—	UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE % STRAIN AT FAILURE	0 15 ⊕ 5 10
SHELBY SAMPLE	▮		
FIELD VANE TEST	+		
LAB VANE TEST	±	PENETROMETER	▲

GWL	SYMBOL	SOIL DESCRIPTION	Depth m	DEPTH m	N VALUE 20 40 60 80 SHEAR STRENGTH kPa 50 100	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT 10 20 30	NATURAL UNIT WEIGHT kN/m³
			G.L.	0			
	F F F	**Sand and Gravel Roadbase Fill** (frozen)	0.8				
▽		**Silty Fine Sand**, brown, moist/wet (frozen)	1.5 (est) 1.8	1			
		Silty Clay, brown, with odd silt seams (stiff)	3.05	2 3			
		END OF BOREHOLE					
		Notes: (1) Borehole advanced uncased using standard auger equipment on April 7, 1994. (2) Borehole caved wet at ±1.6 m depth on completion.		4 5 6 7 8 9 10			

OTE – BOREHOLE DATA REQUIRES INTERPRETATION ASSISTANCE FROM TROW BEFORE USE BY OTHERS.



PLAN

SCALE 1:3000

LEGEND

● BOREHOLE

SURFACE BEDROCK OR SHALLOW OVERBURDEN

▨ BEDROCK OUTCROP (approximate)

▲ LOW WET AREA

NOTES

1) Plan digitized from topographical maps supplied by the Regional Municipality of Sudbury.

2) Borehole locations are approximate

- NOTES -

1) The boundaries and soil types have been established only at Test Hole locations. Between Test Holes they are assumed and may be subject to considerable error.

2) Do not use Test Hole elevations for design purposes.

3) Soil samples will be retained in storage for 3 months and then destroyed unless client advises that an extended time period is required.

4) Quantities should not be established from the information provided at the Test Hole locations.

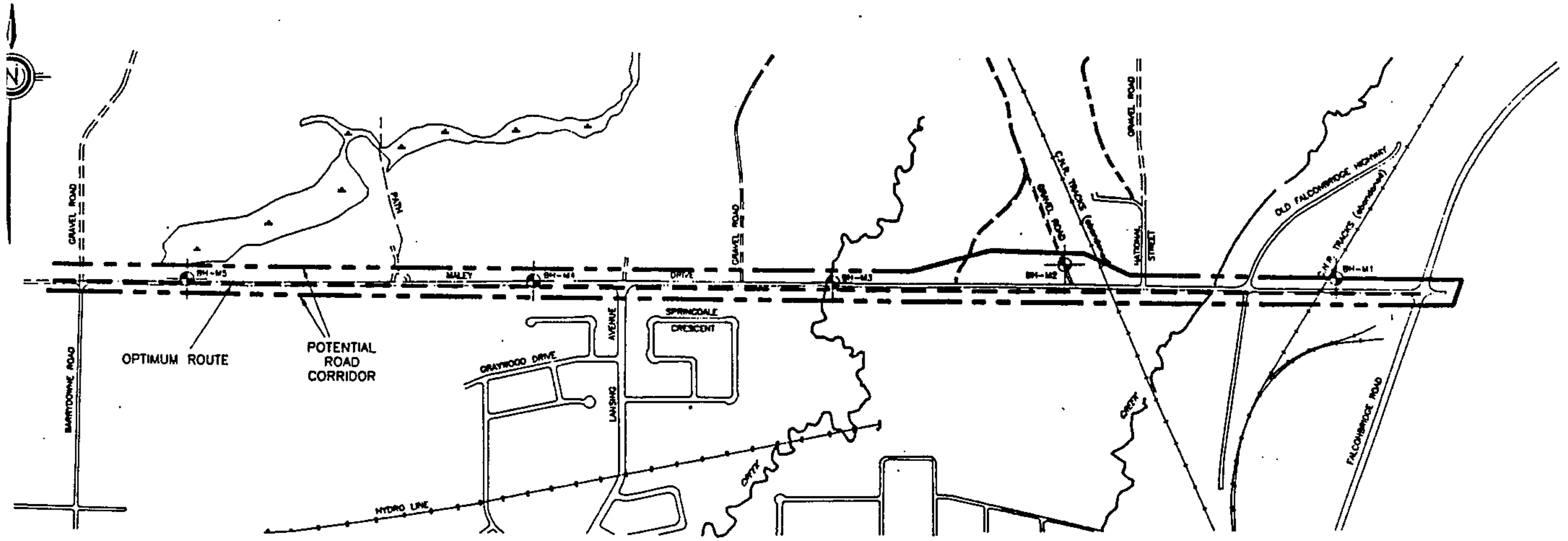
5) This drawing forms part of the report, project number as referenced, and should be used only in conjunction with this report.

Trow

GEOTECHNICAL EVALUATION

PROPOSED ROAD EXTENSION
MALEY DRIVE
SUDBURY, ONTARIO

PROJ. No. S05971G	DATE: MAY 1994	DWG. No. 1



PLAN

SCALE 1:3000

LEGEND

●	BOREHOLE
⩡	LOW WET AREA

NOTES

1) Plan digitized from topographical maps supplied by the Regional Municipality of Sudbury.

2) Borehole locations are approximate.

- NOTES -

1) The boundaries and soil types have been established only at Test Hole locations. Between Test Holes they are assumed and may be subject to considerable error.

2) Do not use Test Hole elevations for design purposes.

3) Soil samples will be retained in storage for 3 months and then destroyed unless client advises that an extended time period is required.

4) Quantities should not be established from the information provided at the Test Hole locations.

5) This drawing forms part of the report, project number as referenced, and should be used only in conjunction with this report.

Trow

GEOTECHNICAL EVALUATION

PROPOSED ROAD RECONSTRUCTION
MALEY DRIVE
SUDBURY, ONTARIO

PROJ. No. S05971G | DATE: MAY 1994 | DWG. No. 1A

MALEY DRIVE EXTENSION

CLASS ENVIRONMENTAL ASSESSMENT

REGIONAL MUNICIPALITY OF SUDBURY

APPENDIX C

NOISE ASSESSMENT

October, 1995

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TABLE OF CONTENTS

1. SUMMARY

An Environmental Study Report (ESR) has been prepared for the Regional Municipality of Sudbury for the widening of Maley Drive between Falconbridge Road and Barry Downe Road and the extension of Maley Drive from Barry Downe Road to Lasalle Boulevard in the City of Sudbury. The scope of this noise study addresses the potential impact of the widening and extension on any noise sensitive land uses adjacent to Maley Drive and whether noise mitigation measures are warranted in conjunction with this proposed undertaking.

Existing traffic information was obtained from the Regional Municipality of Sudbury Transportation Division. Future traffic projections were obtained from the traffic assessment component of this Environmental Assessment Study. Noise levels were calculated using the U.S. Department of Transportation Federal Highway Administration "Noise Barrier Cost Reduction Procedure STAMINA 2.0/OPTIMA" computer modelling program for road traffic noise assessment.

The study found that the extension and widening of Maley Drive will not have a significant noise impact on any noise sensitive land uses situated in proximity to the corridor. For most existing residential areas located along this corridor, the 16 hour daytime noise level increases will generally be 5 decibels or less. In accordance with the guidelines documented in the MOEE/MTO "Protocol for Dealing with Noise Concerns during Preparation, Review and Evaluation of Provincial Highway Environmental Assessments", noise mitigation will not be warranted for these areas since the noise level increases are not considered to be significant.

A few residential dwellings along the corridor (on Cassandra Court and Shelley Drive) will experience noise level increases slightly greater than the 5 decibel increase threshold level. However, these two streets are located approximately 600 and 250 metres, respectively, from the proposed Maley Drive extension. Furthermore, the future noise levels at these two streets, will be significantly lower than the 55 decibel objective noise level referenced in the MOEE/MTO Noise Protocol. Additionally, the future noise levels ranging between 47 and 50 decibels, are considered to be quite representative of typical quiet rural or suburban conditions. Finally, it was determined that it was not technically or economically feasible, nor practical, to implement noise mitigation along Maley Drive in these two areas.

Therefore, it is concluded that specific noise mitigation measures will not be warranted in conjunction with the extension and widening of Maley Drive between Lasalle Boulevard and the Falconbridge Highway. It is also recommended that the construction noise control program noted in Section 6 of this report be adhered to during the construction of the widening and extension.

2. INTRODUCTION

Marshall Macklin Monaghan Limited was retained by the Regional Municipality of Sudbury to undertake a Class Environmental Assessment for the proposed construction of the Maley Drive extension and widening from Falconbridge Road to Lasalle Boulevard in the Regional Municipality of Sudbury. This project follows the planning and design process outlined in the Class Environmental Assessment for Municipal Road Projects.

A noise study was undertaken as part of this Class Environmental Assessment study. The scope of this noise study addresses the potential noise impact due to the extension and widening of Maley Drive, on any noise sensitive land uses adjacent to the new road alignment.

Accordingly, the main objectives of the noise study were to determine the increase in noise levels and associated noise impact of the proposed road construction; whether noise mitigation measures would be warranted; and if warranted, to indicate the extent of such measures. The findings, conclusions and recommendations of this noise assessment are presented in the subsequent chapters of this report.

This study outlines the nature of the noise source, predictions of noise levels expected from the noise source and recommendations to ensure that outdoor transportation noise levels are within levels considered acceptable by the Ministry of the Environment and Energy and the Regional Municipality of Sudbury.

3. THE STUDY AREA AND SURROUNDING LAND USES

For the purposes of this noise evaluation, the study area is the 6.5 kilometre long section of Maley Drive between Lasalle Boulevard and Falconbridge Road, along with the residential area located south and north of the Maley Drive road allowance. The surrounding land uses along the Maley Drive corridor are described in the Environmental Study Report.

The land uses along the Maley Drive corridor include open space and residential developments, along with a number of commercial uses located between Old Falconbridge Road and Falconbridge Road. There are some residential developments located in the vicinity of Lansing Avenue, which either abut or are situated in close proximity to the existing section of Maley Drive. There are also a number of individual houses fronting on Maley Drive. To the west, there are a number of residential subdivisions that are located less than 0.5 kilometres from the proposed Maley Drive Extension.

Residential uses were the prime concern of this study since they are considered to be noise sensitive areas (NSA's). The houses considered to be most affected by the proposed undertaking are those which are located adjacent to Maley Drive and have side yards or rear yards located adjacent to the road.

4. NOISE GUIDELINES

When examining the noise impacts of road improvements on existing residential areas, the Ministry of the Environment and Energy's approach for the assessment of noise impacts is documented in "A Protocol for Dealing with Noise Concerns during Preparation, Review and Evaluation of Provincial Highway Environmental Assessments", February 1986, prepared by the Ontario Ministries of Transportation, and Environment and Energy.

It is stated in this protocol that "the objective for outdoor sound levels is the higher of the L_{eq} 55 dBA or the ambient. The significance of a noise impact will be quantified by using this objective in addition to the change in noise level above the ambient. Where noise increases above the ambient do not exceed 5 dBA, no mitigation is required". What this means is as follows:

- If the L_{eq} 16 hour daytime traffic sound levels in the outdoor living areas of the adjacent dwelling units are less than or equal to 55 dBA and the impact is **less than or equal to 5 dBA** (over ambient noise levels), noise mitigation measures **will not be required.**

- If the L_{eq} 16 hour daytime traffic sound levels in the outdoor living areas of the adjacent dwelling units are **greater than 55 dBA** and the impact is **less than or equal to 5 dBA** (over ambient), attenuation measures will **not normally** be required.

- For the cases noted above, if the noise impact **exceeds 5 dBA** (over ambient), noise control measures should be investigated within the right-of-way and if mitigation is warranted, attempts should be made to reduce the noise impacts as much as possible, **within the constraints of administrative, aesthetic, economic and technical feasibility.**

5. NOISE ANALYSIS

5.1 Assumptions and Basis of Analysis

5.1.1 Noise Sources

As noted in Section 2, the scope of the study is limited to the road noise sources only. Maley Drive is an existing two lane arterial road. It is an asphalt-surfaced road with a posted 50 kilometre per hour speed limit.

The widening of Maley Drive will consist of an ultimate five lane pavement cross-section between Falconbridge Highway and Junction Creek and a four lane pavement cross-section between Junction Creek and Barry Downe Road. The Maley Drive Extension will consist of an ultimate four lane pavement cross-section between Lasalle Boulevard and Barry Downe Road. The future posted speed limit will be 80 kilometres per hour.

Existing AADT volumes were obtained from the Regional Municipality of Sudbury Transportation Division, while truck data and future peak hour traffic volumes were obtained from the traffic component of the Environmental Assessment study. A traffic growth factor was determined by examining the increase in a.m. and p.m. peak hour traffic volumes between 1993 and Year 2010. This growth factor was then applied to the existing AADT volumes to determine the future Year 2010 AADT volumes.

The projected traffic information for the Maley Drive Extension is summarized in **Table 5.1**, while the projected traffic information for all of the intersecting roads is summarized in **Table 5.2**.

TABLE 5.1
FUTURE TRAFFIC INFORMATION FOR MALEY DRIVE WIDENING AND EXTENSION

	Segment 1	Segment 2	Segment 3	Segment 4
Existing AADT (1993)	--	--	4000 veh.	6200 veh.
Projected AADT (2010)	4415 veh.	9026 veh.	11290 veh.	14399 veh.
Posted Speed Limit	80 km/h	80 km/h	80 km/h	80 km/h
Truck Percentage	5.5 %	5.5 %	5.5 %	5.5 %
Med./Hvy. Truck Ratio	3.0/2.5	3.0/2.5	3.0/2.5	3.0/2.5
Day/Night Split	90/10	90/10	90/10	90/10

Note: *Segment 1 - Lasalle Boulevard to Notre Dame Avenue*
Segment 2 - Notre Dame Avenue to Barry Downe Road
Segment 3 - Barry Downe Road to Lansing Avenue
Segment 4 - Lansing Avenue to Falconbridge Highway

TABLE 5.2
TRAFFIC INFORMATION FOR INTERSECTING ROADS

	Turner Avenue	Notre Dame Avenue (1)	Notre Dame Avenue (2)	Barry Downe Rd.	Lansing Avenue	Falconbridge Highway (3)	Falconbridge Highway (4)
Existing AADT (1993)	1600 veh.	17000 veh.	4000 veh.	8000 veh.	2000 veh.	18500 veh.	20000 veh.
Projected AADT (2010)	1600 veh.	23770 veh.	11290 veh.	9580 veh.	2861 veh.	25098 veh.	22257 veh.
Posted Speed Limit	50 km/h	80 km/h	50 km/h	50 km/h	50 km/h	80 km/h	80 km/h
Truck Percentage	5.5 %	5.5 %	5.5 %	5.5 %	5.5 %	5.5 %	5.5 %
Med./Hvy. Truck Ratio	3.0/2.5	3.0/2.5	3.0/2.5	3.0/2.5	3.0/2.5	3.0/2.5	3.0/2.5
Day/Night Split	90/10	90/10	90/10	90/10	90/10	90/10	90/10

(1) *Notre Dame Avenue north of Turner Avenue*
(2) *Notre Dame Avenue south of Turner Avenue*
(3) *Falconbridge Highway north of Maley Drive*
(4) *Falconbridge Highway south of Maley Drive*

5.1.2 Estimation Procedures

Noise levels were calculated using the U.S. Department of Transportation Federal Highway Administration "Noise Barrier Cost Reduction Procedure STAMINA 2.0/OPTIMA" computer modelling program for road traffic noise assessment.

5.1.3 Setbacks, Elevations and Receptor Heights

Eleven (11) representative receptor locations were selected for the Maley Drive noise source. These receptors are representative of the most critical locations in terms of noise exposure to Maley Drive. These critical locations were selected since they typically are the nearest and have the greatest exposure to Maley Drive and thus would be most impacted by the road traffic noise. The locations of the eleven receptors are illustrated in **Figure 5.1**.

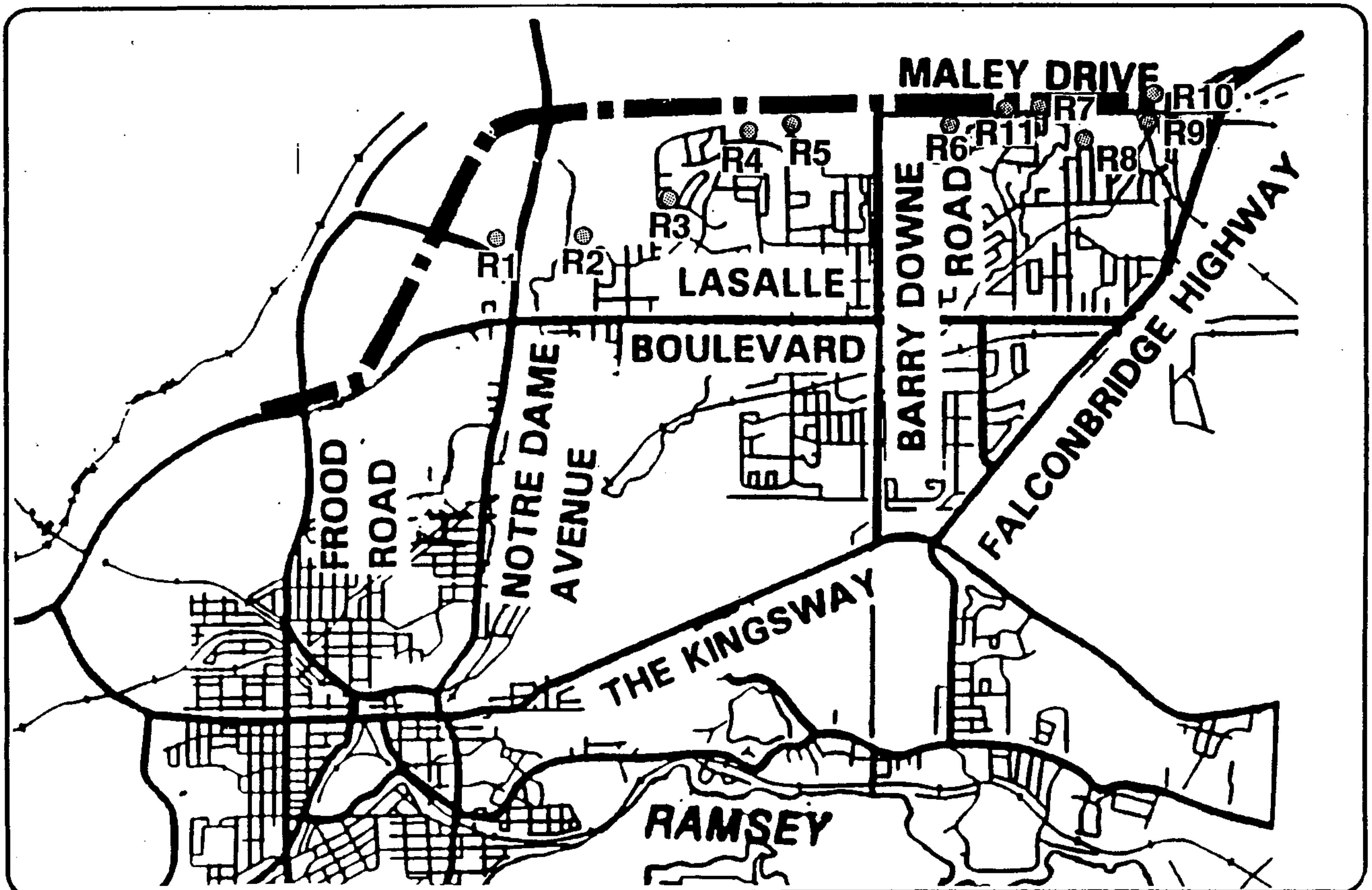
The noise assessment was based on actual site grades and existing/proposed road elevations. The outdoor living area receptors are located in the rear yard outdoor living areas at a height of 1.5 metres above the existing grade.

5.2 Existing Outdoor Ambient Noise Levels

Existing ambient outdoor sound levels at all receptor locations were calculated using the FHWA STAMINA 2.0 Noise Prediction Computer Model. This is based on the assumption that the main noise source at the receptor location is one of the existing arterial roads in the vicinity (eg. Notre Dame Avenue, Maley Drive, Barry Downe Road, etc.).

There are a number of variables which must be input into the STAMINA model for each receptor. This includes the 16 hour daily traffic volume on the road(s) making up the noise source, the breakdown between cars, medium trucks and heavy trucks, the posted speed limit, the distance from the roadway(s), the type of ground between the receptor and the road(s), shielding provided by intervening buildings and/or topographical features, and roadway elevations and gradients.

In addition to the above, a number of spot noise measurements were performed at eight locations along the Maley Drive corridor. The sound levels were measured with a Larson-Davis Model 700 Sound Level Meter. These noise measurements were conducted in accordance with the methodology outlined in MOEE document NPC-103 (Procedure for Measurement of Varying Sounds), Section 4 (f) (ii). A noise measurement of at least 20 minutes was performed at each of these locations.



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○ NOISE RECEPTOR

FIGURE 5.1
NOISE RECEPTOR LOCATIONS

These spot measurements which were undertaken in non-rush hour periods, provide an approximate indication of the daily sound level. If they are noticeably different from the sound levels estimated by the STAMINA model, this could indicate that some of the input parameters may need to be adjusted to account for site-specific acoustical conditions.

These noise measurements were performed in the vicinity of Receptors R1 (near Notre Dame/Turner intersection), R2 (Drummond Drive), R3 (Cassandra Court), R4 (Agincourt Avenue), R5 (Shelley Drive), R6 (Oasis Co-op on Covewood Court), R7 (Springdale Crescent), and R11 (Covewood Court). The noise measurements were performed on Friday May 27, Saturday May 28, and Tuesday June 14, 1994. Weather conditions on all three days were sunny or partially sunny, warm, no precipitation, acceptable relative humidity and minimal wind. **Table 5.3** summarizes the ambient noise measurements and includes the sound level predicted by STAMINA at the same location.

TABLE 5.3
AMBIENT NOISE MEASUREMENTS

Location	**Date and Time of Survey**	**Measured L_{eq} Noise Level (dBA)**	**Predicted L_{eq} Noise Level (dBA)**	**Difference (Meas.- Pred.) (dBA)**
Near Receptor 1 (Notre Dame/ Turner)	Fri. May 27/94 (12:40 - 1:00 p.m.)	52.4	53.8	-1.4
Near Receptor 2 (Drummond)	Sat. May 28/94 (10:15 - 10:35 a.m.)	48.3	46.3	+2.0
Near Receptor 3 (Cassandra)	Fri. May 27/94 (1:55 - 2:15 p.m.)	43.4	42.6	+0.8
Near Receptor 4 (Agincourt)	Fri. May 27/94 (2:30 - 2:50 p.m.)	42.2	36.5	+5.7
Near Receptor 5 (Shelley)	Fri. May 27/94 (3:10 - 3:30 p.m.)	40.9	33.6	+7.3
Near Receptor 6 (Oasis Co-op)	Tues. June 14/94 (2:05 - 2:35 p.m.)	63.4	60.6	+2.8
Near Receptor 7 (Springdale)	Tues. June 14/94 (1:10 - 1:40 p.m.)	65.0	62.1	+2.9
Near Receptor 11 (Covewood)	Tues. June 14/94 (11:40 - 12:20 p.m.)	62.8	57.8	+5.0

The results of **Table 5.3** are discussed below for each of the individual receptors.

Receptor R1

As seen in **Table 5.3**, the sample sound level measurement is similar to the STAMINA calculated existing ambient 16 hour sound level. Therefore, it is concluded that STAMINA provides a satisfactory determination of the sound level in this vicinity and there is no need for any site-specific adjustment factors.

Receptor R2

As seen in **Table 5.3**, the sample sound level measurement is similar to, although slightly higher, than the STAMINA calculated existing ambient 16 hour sound level. The STAMINA model assumes that the only noise source is Notre Dame Avenue traffic. However, Drummond Drive is substantially setback from Notre Dame Avenue, and although the traffic noise is the dominant source in this vicinity, there are other noise sources in this area (eg. local street traffic, neighbourhood activities, etc.) which contribute slightly to the overall sound level.

This explains why the sampled value is slightly higher than the STAMINA noise level, although the difference is still considered minimal. Therefore, it is concluded that STAMINA provides a satisfactory determination of the sound level in this vicinity and there is no need for any site-specific adjustment factors. Since the STAMINA value is lower, this will result in a more conservative noise assessment, as the objective sound level used in this assessment is the ambient sound level.

Receptor R3

As seen in **Table 5.3**, the sample sound level measurement is similar to the STAMINA calculated existing ambient 16 hour sound level. Therefore, it is concluded that STAMINA provides a satisfactory determination of the sound level in this vicinity and there is no need for any site-specific adjustment factors.

Receptors R4 and R5

As seen in **Table 5.3**, the sample sound level measurements obtained in the vicinity of both of these receptors, are significantly higher than the level predicted by STAMINA (5.7 to 7.3 decibels higher).

The reason for the large difference in sound levels is as follows. The two nearest major roads are Notre Dame Avenue and Barry Downe Road. However, Notre Dame is almost 2 kilometres away, while Barry Downe Road has very low traffic volumes in this vicinity. Consequently, neither of these two roads are dominant noise sources.

This was confirmed by our observer who found that arterial road traffic noise was not audible at this location. Instead, the ambient sound levels in the vicinity of these two receptors are produced mainly by sources such as cars travelling on the local streets, children playing, dogs barking, property maintenance (eg. grass-cutting), birds chirping, rustling of leaves, etc.

In areas where there is no dominant noise source, the MTO Environmental Office Manual (Technical Areas Noise) uses as a guideline a daytime ambient sound level of 45 dBA for rural areas and 50 dBA for suburban areas. However, our sample noise measurements are even lower.

Therefore, it is concluded that a daytime ambient sound level of **41 dBA** is a reasonable estimate of ambient sound in this area, since it is as low or lower than all sample noise measurements, and is also lower than the typical ambient sound level guidelines suggested in the MTO Environmental Office Manual (Technical Areas Noise). It should be noted that the sound level calculations for future conditions with the Maley Drive extension, can be satisfactorily performed using STAMINA, since Maley Drive will be near enough to be an audible noise source.

Receptors R6, R7 and R11

As seen in **Table 5.3**, the sample sound level measurements obtained in the vicinity of these receptors are somewhat higher than the level predicted by STAMINA (2.8 to 5.0 decibels higher), which was based on the actual traffic volumes and vehicle breakdown occurring during the noise measurement period. Since these measurements were performed adjacent to Maley Drive, road traffic noise was the dominant source.

Since there is a notable difference between the measured and predicted noise levels, it can be concluded that one of the input parameters is not representative of the actual conditions at the measurement location. Further examination of the area confirmed that Maley Drive traffic travels at speeds significantly greater than the posted speed limit of 50 km/h (typical speeds of 80 km/h and higher were observed). Furthermore, the pavement surface of Maley Drive is in extremely poor condition and resulting in noticeable tire-pavement noise.

To compensate for these local site specific conditions, an adjustment factor was included in the STAMINA sound level calculations for each of these three locations to correlate the existing measurements to the modelled values. An adjustment factor of **+2.8 dBA** was used for the STAMINA existing ambient noise calculations at **Receptor R6**, **+2.9 dBA** at **Receptor R7**, and **+5.0 dBA** at **Receptor R11**.

The sixteen hour daytime sound levels (L_{eq} 16 hr) in the rear yard outdoor living areas (OLA's) of the selected residential dwelling units were calculated using STAMINA, with two exceptions. A daytime ambient noise level of **41 decibels** was used at **Receptors R4 and R5** (on Agincourt Avenue and Shelley Drive, respectively), as per the reasons noted above.

Shielding provided by the existing houses and topography was accounted for in this noise assessment. The existing ambient noise levels for the critical outdoor living areas of these dwelling units are noted in **Table 5.4**.

TABLE 5.4
EXISTING DAYTIME (L_{eq}16h) OUTDOOR NOISE LEVELS

Receptor Location	Noise Level L_{eq} (16 hr) (dBA)
Receptor 1 Rear Yard OLA	54
Receptor 2 Rear Yard OLA	46
Receptor 3 Rear Yard OLA	43
Receptor 4 Rear Yard OLA	41
Receptor 5 Rear Yard OLA	41
Receptor 6 Rear Yard OLA	59
Receptor 7 Rear Yard OLA	56
Receptor 8 Rear Yard OLA	43
Receptor 9 Rear Yard OLA	51
Receptor 10 Rear Yard OLA	57
Receptor 11 Rear Yard OLA	57

5.3 Future Outdoor Noise Levels for Year 2010

Presented in **Table 5.5** are the projected Year 2010 daytime noise levels for the outdoor living areas of the critical residential dwelling units located along Maley Drive. These noise levels are based on the projected traffic data noted in **Tables 5.1 and 5.2**, along with the recommended design for the Maley Drive.

TABLE 5.5
YEAR 2010 DAYTIME (L_{eq} 16 Hour) OUTDOOR SOUND LEVELS AFTER MALEY DRIVE WIDENING AND EXTENSION [1]

Receptor Location	Noise Level L_{eq} (16 hr) (dBA)		Change from Existing Noise Level (dBA)
	Existing	Year 2010	
Receptor 1	54	57	+3
Receptor 2	46	51	+5
Receptor 3	43	50	+7
Receptor 4	41	46	+5
Receptor 5	41	47	+6
Receptor 6	59	63	+4
Receptor 7	56	57	+1
Receptor 8	43	48	+5
Receptor 9	51	55	+4
Receptor 10	57	60	+3
Receptor 11	57	59	+2

[1] *Includes noise attenuation provided by the intervening dwelling unit.*

As seen from the results noted in **Table 5.5**, the increase in the noise levels due to the widening of Maley Drive, will range from 1 to 7 decibels based on ultimate Year 2010 conditions. Noted below is a summary of the noise assessment findings as they pertain to the noise impact of the Maley Drive Extension and Widening on each of the representative receptors.

5.3.1 Maley Drive (Lasalle Boulevard to Notre Dame Avenue)

Receptor R1 (Notre Dame/Turner)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 3 decibels greater than the current noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

5.3.2 Maley Drive (Notre Dame Avenue to Barry Downe Road)

Receptor R2 (Drummond Drive)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 5 decibels greater than the current noise level. Furthermore, the future noise level will only be 51 decibels, due to the almost 500 metre setback from the Maley Drive Extension. This future noise level will be noticeably lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Therefore, based on the guidelines outlined in the Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

Receptor R3 (Cassandra Court)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 7 decibels greater than the current noise level. However, the future noise level will still only be 50 decibels, due to the 600 metre setback from the Maley Drive Extension. Furthermore, this future noise level will be noticeably lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Although there will be a noticeable increase in noise levels due to the Maley Drive Extension, the future noise levels will still be substantially below 55 decibels.

It should also be noted that future development is planned on some of the lands located between Cassandra Court and the Maley Drive Extension. Once built, this intervening development will provide some shielding to the existing houses in this area. Consequently, the future noise levels for the Cassandra Court homes will decrease from the projected 50 decibels noted in **Table 5.5**. This will result in the ultimate future noise levels being 5 decibels or less, when compared to the existing ambient noise level.

Although the guidelines outlined in the MOEE/MTO Noise Protocol recommend that noise mitigation measures be investigated when the noise level increases are greater than 5 decibels, it can be concluded that noise mitigation will not be warranted for Maley Drive in this vicinity since ultimately the future noise level increases will not exceed 5 decibels due to the mitigating effect provided by the future planned development in this area.

Assuming that the future intervening development will consist of residential uses, the development will have to comply with MOEE Noise Policy related to new residential subdivisions and if the MOEE daytime objective noise level of 55 decibels for new residential uses cannot be attained, then the development must include any necessary noise mitigation measures.

Receptor R4 (Agincourt Avenue)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 5 decibels greater than the current noise level. Furthermore, the future noise level will only be 46 decibels, due to the 300 metre setback from the Maley Drive Extension along with shielding provided by natural landforms in this vicinity. Furthermore, this future noise level will be significantly lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

Receptor R5 (Shelley Drive)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 6 decibels greater than the current noise level. However, the future noise level will still only be 47 decibels which is significantly lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol.

A daytime noise level of 47 decibels can be considered quite typical of rural or suburban areas where there are no dominant noise sources such as arterial roads. Furthermore, a 47 decibel daytime noise level can be considered representative of quiet outdoor conditions.

The MOEE/MTO Noise Protocol indicates that when noise increases above the ambient exceed 5 dBA, then noise control measures should be investigated. Measures could include reducing the speed limit on the Maley Drive Extension, using a low-noise pavement, changing the alignment of Maley Drive, or constructing noise barriers. However, none of these possible mitigation measures are considered feasible for a variety of reasons as seen below.

Reducing the future speed limit on Maley Drive from the proposed 80 km/h to 70 km/h could theoretically reduce the noise level increase to less than 5 dBA, assuming drivers complied with the posted speed limit. However, based on current observations, drivers are not complying with the current low speed limits. This leads to the conclusion that drivers on the new road, which will be designed to high geometric standards, would not comply with an artificially lower speed limit, unless there was permanent police enforcement. Therefore, it is concluded that this is not an administratively feasible or practical noise mitigation measure.

The second measure noted above is the use of a low noise pavement, such as an open-graded friction course. This type of pavement can reduce tire-pavement noise by approximately 2.5 decibels compared to typical pavement. However, use of this type of pavement is neither practical nor cost-effective since the substantial freeze-thaw cycles in this area would result in more rapid deterioration of the pavement, as compared to standard asphalt pavement. Therefore, it can be concluded that this is not an economically or technically feasible noise mitigation measure.

The third option noted above was to move the extension further away from the Shelley Drive houses. However, this has already been done, since the Maley Drive Extension is located approximately 250 metres away from these houses. A number of large hills are located immediately to the north of the alignment, thus precluding the shifting of the alignment any further north. Therefore, it can be concluded that this is not a technically feasible mitigation measure.

The final option noted above was the construction of noise barriers along the Maley Drive road allowance. Although this would be technically possible, it is not considered to be a practical or economically feasible solution, since (a): it would require approximately one kilometre of noise wall, which would be very expensive; and (b): due to the large setback of the houses from the road, the noise barriers would likely not be able to reduce the noise levels by the minimum 5 dBA noted in the MOEE/MTO protocol. Noise barriers are much more effective when the dwellings are located close to the road.

Furthermore, only the most northerly houses on Shelley Drive would experience a noise level increase of 6 decibels. As Shelley Drive angles away from Maley Drive, the noise level increases become lower. The noise level increase at the easterly houses would not exceed 5 dBA, thereby precluding the need for any noise mitigation. At most, only 10 houses on Shelley Drive would experience a 6 decibel noise level increase. Furthermore, the future noise level after the construction would only be 47 decibels which is 8 decibels lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol.

Therefore, it must be concluded that implementation of noise mitigation in the area of Shelley Drive <u>cannot</u> be justified on the basis of economic and technical feasibility, nor on the basis of practicality, since the noise level increases are just marginally about the threshold for investigation of noise mitigation, and the future noise levels after the construction of Maley Drive will still be representative of a quiet rural or suburban area. Again, this is due to the substantial setback of Maley Drive from the Shelley Drive residences.

5.3.3 Maley Drive (Barry Downe Road to Lansing Avenue)

<u>Receptor R6 (Oasis Co-op, Covewood Crescent)</u>

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 4 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will <u>not</u> be warranted for the widening of Maley Drive in this vicinity.

<u>Receptor R11 (Covewood Crescent)</u>

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will only be 2 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will <u>not</u> be warranted for the widening of Maley Drive in this vicinity.

5.3.4 Maley Drive (Lansing Avenue to Falconbridge Highway)

Receptor R7 (Springdale Crescent)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will only be 1 decibel greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for the widening of Maley Drive in this vicinity.

Receptor R8 (Dollard Avenue)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level at this receptor will be 5 decibels greater than the current ambient noise level. Furthermore, the future noise level will only be 48 decibels, due to the more than 300 metre setback from Maley Drive. This future noise level will be noticeably lower than the 55 decibel noise level objective referred to in the MOEE/MTO Noise Protocol. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for Maley Drive in this vicinity.

Receptor R9 (Maley Drive South Side, south of National Street)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level in the rear yard outdoor amenity area at this receptor will be 4 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for this dwelling due to the widening of Maley Drive in this vicinity.

Receptor R10 (Maley Drive North Side, east of National Street)

As seen in **Table 5.5**, the future Year 2010 16 hour daytime noise level in the rear yard outdoor amenity area at this receptor will be 3 decibels greater than the current ambient noise level. Therefore, based on the guidelines outlined in the MOEE/MTO Noise Protocol, noise mitigation will not be warranted for this dwelling due to the widening of Maley Drive in this vicinity.

5.3.5 *Summary of Noise Assessment Findings*

The noise level increases due to extension and widening of Maley Drive are typically 5 decibels or less for the most critical locations in the vicinity of the alignment. For the two receptor locations where noise level increases will be slightly greater than 5 decibels, implementation of noise mitigation is not considered warranted for a number of reasons.

The future noise levels projected at the Cassandra Court dwellings (Receptor R3) did not include the mitigative effect of future planned development in the area north of these dwellings. Consequently, the future noise levels will likely be lower than the noise levels projected in this noise assessment.

The future noise levels projected at the Shelley Drive dwellings (Receptor R5) just exceed the threshold for consideration of noise mitigation. However, given that the future noise levels in this area will be at least 8 decibels below the 55 decibel objective noise level referenced in the MOEE/MTO Noise Protocol, and that this future noise level is representative of typical quiet rural or suburban areas, implementation of noise mitigation for Maley Drive is not considered feasible for the reasons noted earlier in Section 5.3.2. A key reason why the future Maley Drive noise levels are so low is the substantial setback of the alignment from existing residential areas.

Therefore, it can be concluded that specific noise mitigation measures are not warranted for the extension and widening of Maley Drive between Lasalle Boulevard and the Falconbridge Highway.

6. CONSTRUCTION NOISE

With respect to the noise impacts during construction of the widening of Maley Drive, the following should be specified during the preparation of detailed design drawings and adhered to during construction:

- Noise sensitive areas will be identified.
- The Contractor will be required to comply with the appropriate municipal or regional bylaws regarding noise emission standards for construction equipment that may be in place at the time of construction.
- General noise control measures (not sound level criteria) will be referred to, or placed into the contract documents.
- Any initial complaint from the public will require verification by the Regional Municipality of Sudbury to determine if the general noise control measures agreed to, are in effect. The Regional Municipality of Sudbury will investigate any noise concerns, warn the Contractor of any problems and enforce its contract.
- A persistent complaint will require the Contractor to comply with the Ministry of the Environment and Energy's sound level criteria for construction equipment contained in the MOEE Model Municipal Noise Control By-law.
- In selecting the appropriate construction noise control mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Existing ambient noise levels along the Maley Drive corridor can be characterized as being low. Existing residential areas between Notre Dame Avenue and Barry Downe Road where Maley Drive is proposed to be extended, experience 16 hour daytime noise levels in the low-to-mid 40 decibel range. In the area between Barry Downe Road and the Falconbridge Highway where Maley Drive is proposed to be widened, daytime 16 hour noise levels for the critical residences are typically in the 51 to 59 decibel range, depending on the proximity to Maley Drive.

The 16 hour daytime noise level increases due to the extension and widening of Maley Drive are typically 5 decibels or less for the critical receptor locations, when compared to existing ambient noise levels.

Between Notre Dame Avenue and Barry Downe Road where Maley Drive is proposed to be extended, the future daytime 16 hour noise levels in the existing residential areas located to the south will be significantly lower than the 55 decibel objective noise level referenced in the MOEE/MTO Noise Protocol. This is due to the mitigative effect of situating Maley Drive as far as is reasonably possible from existing residential areas (ie. 250 to 600 metres away).

Two areas will experience noise level increases of slightly more than 5 decibels, namely some of the dwellings on Cassandra Court and Shelley Drive. However, noise mitigation measures are not considered warranted for the Maley Drive Extension in the vicinity of these two areas, since the future noise levels will only just exceed the threshold for consideration of noise mitigation, and the future noise levels in these areas will still be significantly below the 55 decibel noise level objective referenced in the MOEE/MTO Noise Protocol. Consequently, the future noise levels in these two areas will be similar to noise levels in quiet rural and suburban areas. Furthermore, under ultimate conditions, it is expected that the Cassandra Court dwellings will experience some mitigation provided by proposed intervening development.

Noise mitigation measures are not warranted for any of the other areas between Lasalle Boulevard and Barry Downe Road since the future noise level increases due to the Maley Drive Extension will not exceed 5 decibels and the noise levels will typically be lower than the 55 decibel objective level referenced in the MOEE/MTO Noise Protocol.

Between Barry Downe Road and the Falconbridge Highway, the noise impact of the widening of Maley Drive will not be significant since future daytime 16 hour noise level increases will be within 5 decibels of existing ambient noise levels. Therefore, noise mitigation measures will not be warranted for the widening of Maley Drive in this area.

It can therefore be concluded that specific noise mitigation measures are not warranted for the extension and widening of Maley Drive between Lasalle Boulevard and the Falconbridge Highway.

7.2 Recommendations

- It is recommended that the preferred design of the extension and widening of Maley Drive be constructed as proposed, since this design will not have a significant noise impact on existing noise sensitive areas located in proximity to the alignment.

- It is recommended that the construction noise control program noted in Section 6 of this report be adhered to during the construction of the Maley Drive Extension and Widening.

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MALEY DRIVE EXTENSION

CLASS ENVIRONMENTAL ASSESSMENT

Region of/de SUDBURY

REGIONAL MUNICIPALITY OF SUDBURY

APPENDIX D

GLOSSARY

October, 1995

Marshall
Macklin
Monaghan

CONSULTING ENGINEERS SURVEYORS PLANNERS

GLOSSARY OF TERMS

Term	Definition
Ericaceous	Leathery-leaved, low-growing shrubs associated with nutrient-poor environments such as bogs, and acidic soil types
Palustrine	Associated with headwater areas
Relict	A persistent remnant feature
Riparian	Located along the bank of a watercourse
Riverine	Associated with river and stream systems

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