ECONOMIC IMPACT

ASSESSMENT

HAMILTON-WENTWORTH RAPID TRANSIT PROJECT

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For Submission By:	Metro Canada Limited
To:	The Regional Municipality of Hamilton-Wentworth

MCL REPORT HW-1-21.2
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EXECUTIVE SUMMARY

In late August, 1981, Metro Canada Limited retained IBI Group to assess the potential economic impacts that would result from the construction and operation of an elevated Intermediate Capacity Transit System (ICTS) in the City of Hamilton. This assessment, which relates to Alignment "W", the preferred route, forms part of the environmental assessment component of a comprehensive pre-implementation study initiated by the Regional Municipality of Hamilton-Wentworth.

The study addresses four principal areas of economic impact:

1. Impacts on values of residential properties along the route.
2. Impacts on development potential in the CBD and on the Mountain.
3. Financial impact of construction expenditures on the City of Hamilton and the Region of Hamilton-Wentworth.
4. Regional economic impact (employment and income) of ICTS construction and operating expenditures.

These areas are discussed in turn in the full report. Highlights drawn from the full report are presented in this summary.

Employment in Hamilton-Wentworth

Exhibit 1 overleaf, provides employment estimates for the construction of the ICTS prepared by Metro Canada. The forecast for Hamilton-Wentworth assumes that contractors from the region are successful in securing all contracts for which they have the necessary expertise. The forecast thus represents the maximum employment impact on the Region.

Exhibit 1 only partially identifies multiplier effects, excluding part of the indirect and all of the induced employment. When allowance is

EXHIBIT 4.1

DIRECT AND INDIRECT EMPLOYMENT RELATED TO ICTS CAPITAL EXPENDITURES

	CAPITAL COST ($ M) (1981)	DIRECT					INDIRECT					TOTAL	
		HAMILTON-WENTWORTH	ONTARIO	CANADA	OTHER	TOTAL DIRECT	HAMILTON-WENTWORTH	ONTARIO	CANADA	OTHER	TOTAL INDIRECT	ALL REGIONS	HAMILTON-WENTWORTH
Guideway (incl. trackwork)	48.4	901	--	--	--	901	181-310	43-74	--	81-139	305-523	1206-1424	1082-1211
Stations	6.6	123	--	--	--	123	72-123	15-26	--	--	87-149	210-272	195-246
Utility Relocations	2.6	49	--	--	--	49	12-21	--	--	--	12-21	61-70	61-70
Maintenance Facility	9.2	172	--	--	--	172	26-44	7-12	--	9-16	42-72	214-244	198-216
Vehicles	9.5	11	43	--	--	54	30-51	32-55	2-4	3-6	67-116	121-170	41-62
Command and Control	8.0	--	82	--	21	103	5-9	6-11	--	28-48	39-68	142-171	5-9
Power Distribution	2.9	24	--	--	--	24	24-41	--	--	--	24-41	48-65	48-65
System Engineering	2.8	1	27	--	--	28	1-2	4-7	--	--	5-9	33-37	2-3
System Testing	2.5	1	23	--	--	24	1-2	3-6	--	--	4-8	28-32	2-3
Training	1.2	1	11	--	--	12	1	2-3	--	--	3-4	15-16	2
Final Design (A&E)	4.4	42	--	--	--	42	9-15	--	--	--	9-15	51-57	51-57
Projected Administration	7.0	93	--	--	--	93	13-23	--	--	--	13-23	106-116	106-116
Miscellaneous	6.0	--	--	--	--	--	--	--	--	--	--	--	--
	111.1	1418	186	--	21	1625	375-642	112-194	2-4	121-209	610-1049	2235-2674	1793-2060

SOURCE: Metro Canada Limited

made for contracts awarded outside the Region, and all multiplier effects are included it is estimated that total employment in Hamilton-Wentworth related to the construction of the ICTS would be approximately 2,400 person years.

Depending on whether stations were manned or not, the operation of the system would employ 22-42 persons plus up to 6 person-years related to services contracts. Including multiplier effects total employment related to ICTS operations would be in the range of 55-95 permanent jobs. No allowance is made for the effects of changes in level of usage of the system and supporting bus opeations in the future.

Impacts of Construction and Operations

Impacts will occur at locations immediately facing or backing onto the guideway; or within visual distance of the guideway, or within average radius of 1,000 feet of transit stations. It should be noted that a number of properties affected by the alignment are the subject of specific discussions/ negotiations between Metro Canada and the owners, and thus have not been dealt with in this report.

Construction Impacts

Construction impacts will have an effect along the route; but these are not generally rated as severe, and will be mitigated by the prefabricated form of construction. In general, impacts along the route will be no more severe than those of roadworks which are undertaken from time to time. The impact of station construction will be similar to that of a building construction project. Thus the impacts of station construction on the two plazas

(Miracle Mart Plaza and Mountain Mall Plaza) will be little different from those associated with the expansion of a plaza.

Impacts on the CBD

The Region and the City are attempting to foster the growth of the Hamilton CBD as a centre for the provision of high order services. In the CBD, which will be served by the ICTS loop, the City pursues an active downtown development program focussed on Lloyd D. Jackson Square. There are numerous developable sites. Zoning would permit over 10 times the space currently developed. These basic prerequisites of intensified development are already in place.

The City is thus in a position to respond to rapid growth in market demand, although interviews with the private sector do not suggest that a period of rapid growth is imminent. Notwithstanding this, developers recorded considerable interest in the routing and station location in the downtown loop. The view was expressed that the loop is too small. Concerns about the way in which construction would/could be integrated with existing and new development was identified. The need to connect directly into the proposed arena/trade centre was pointed out. The desirability of consultation in resolving these and similar issues was emphasized. Development opportunities, in terms of land and appropriate zoning, were identified in the areas directly to the north of King William Street, between McNab and Catharine Streets; and also to the north and west of the proposed arena/trade centre.

In summary, the CBD is well placed to benefit from intensification of land use should new growth forces emerge. However, the importance of developing a coordinated plan that involves the transit authority, municipal government, and the private sector is emphasized. The fact that the ICTS would

run on an elevated guideway reinforces the need to integrate the system, both functionally and in a design sense, with existing and planned development. In this regard integration of the ICTS with the planned downtown "Plus 15" pedestrian system would be an important step.

Miracle Mart Plaza and Mountain Mall Plaza

Impacts on the two plazas are regarded as potentially positive since:

1. Increased density of residential development in the vicinity of transit stations could lead to population increase, and hence increased spending and possible justification of additional space.

2. Providing that the operational arrangements of the system permit stopover on transfer from ICTS to bus, $500,000 to $1 million increased sales could result in the two plazas possibly justifying construction of 4,000-8,000 square feet of additional space.

In order to capitalize on the potential increased market it will be necessary for the appropriate approvals to be given, possibly making allowance for a reduced parking standard, on the basis of improved transit access. Since the stations are proposed on the car parks of the plazas, it will be seen that the station locations provide an excellent example of the need for integrated planning involving the transit authority, the City, and the private sector.

Residential Impacts

Once operations commence, experience elsewhere has shown that property values along the alignment, unexpectedly, would not be reduced. Were commercial zoning to be permitted values would be raised somewhat, but properties backing onto the commercial development would be adversely affected. Within 1,000 feet of stations, residential property values could rise as a result of the willingness of purchasers to pay a small premium (up to 10%) for proximity to a transit station. Potential for increases higher than this depends

on market conditions and availability of zoning for high density development. Increases could be reduced somewhat because of niusance from traffic generated by the transit station.

Effects on the eight apartment blocks along Hughson Street are expected to be limited to a loss in privacy for units on the first, second and third floors that face the guideway. Rental appreciation for such units is likely to be lower than that for other units in the blocks.

Financial Impact on the City of Hamilton

The capital cost of the proposed ICTS is estimated by Metro Canada Limited to be $111 million, expressed in first quarter 1981 dollars. The analysis of financial impact is based on the assumption that the local share of this cost would be 10 percent, or $11.1 million. Further, it has been assumed that although the financing of the $11.1 million would be undertaken by the Region, the City of Hamilton would actually bear the total cost burden, since the ICTS would be totally within the boundaries of the City. Operating costs have not been addressed on the understanding that the Province of Ontario has in place subsidy policies that will cover operating deficits of the ICTS over and above those that might otherwise have been incurred by an all bus system.

Two financing alternatives were analyzed:

1. a special levy which would raise $3.7 million in each of 3 years of ICTS construction (1983, 1984, 1985);

2. long term debentures, issued annually over 3 years (1983, 1984, 1985) for amounts of $3.7 million.

An assumption underlying the analysis of both alternatives is that taxable assessment in the City of Hamilton would increase at an annual rate

of 1 percent over the period 1980-1999. This assumption is taken from the City of Hamilton's 5-year capital budget program (1981-1985).

It should be noted that all analysis is based on the capital cost of the ICTS in 1981 dollars. To the extent that the cost rises due to inflation between 1981 and the time of construction, the actual dollar amounts paid by taxpayers would be higher than those given in the analysis.

3 Year Special Levy

Under the 3 year special levy alternative, the $3.7 million per year levy would require a taxpayer having a home assessed at $5,000 (approximately $46,500 market value in 1981) to pay a maximum of $1.65 per month or $19.80 per year. The $5,000 level is that currently used by the Region as an approximation of the typical City of Hamilton residential assessment.

Long Term Debentures

The long term debentures alternative was analyzed for several cases of interest rate and debenture period. Interest rates were 13.5%, 15%, 18%, and 20%, and debenture periods were 10 and 15 years. Based on September 1981 conditions the most likely case was judged to be the 10 year debenture at a rate of 18%, but the range is presented to take account of rate fluctuations. The monthly payment required of a taxpayer with a home assessed at $5,000 would be a maximum of $1.08 per month or $12.96 per year.

Conclusion

If inflation remains high, long term financing is attractive since the real value of the dollars repaid is far less. However, with very high interest rates, the 3 year levy becomes attractive especially if inflation is expected to decline markedly over the period of the debenture. Whichever

financing alternative is adopted annual payments will lie in the range of $1.08 to $1.65 per month based on 1981 costs, unless debenture term and interest rates improve markedly prior to 1983.

INTRODUCTION

In late August, 1981, Metro Canada Limited retained IBI Group to assess the potential economic impacts of an elevated Intermediate Capacity Transit System (ICTS) proposed for installation in the City of Hamilton. This report presents the results of that assessment.

The ICTS proposal originated in 1978 when the Government of Ontario suggested to the Federal Government that the two governments cooperate in funding an advanced rapid transit system in Hamilton. The system would be a major demonstration of the ICTS technology developed by the Urban Transportation Development Corporation.

The Regional Municipality of Hamilton-Wentworth subsequently initiated a one year pre-implementation study to provide the basis for a decision on whether or not to install the ICTS. The components of the study include a definition of requirements, alignment selection, public participation activities, and environmental assessment. Metro Canada Limited, through its Hamilton-Wentworth Rapid Transit Project Office, has assumed the role of prime consultant and has coordinated the work in each of these study elements. The services of various sub-consultants have been employed to provide Metro Canada Limited with information and analysis necessary to evaluate four potential ICTS routes.

On July 21, 1981, Hamilton-Wentworth Regional Council selected a preferred route for further study. This route, referred to as Alignment 'W', has since been the focus of more detailed examination by Metro Canada Limited and its sub-consultants.

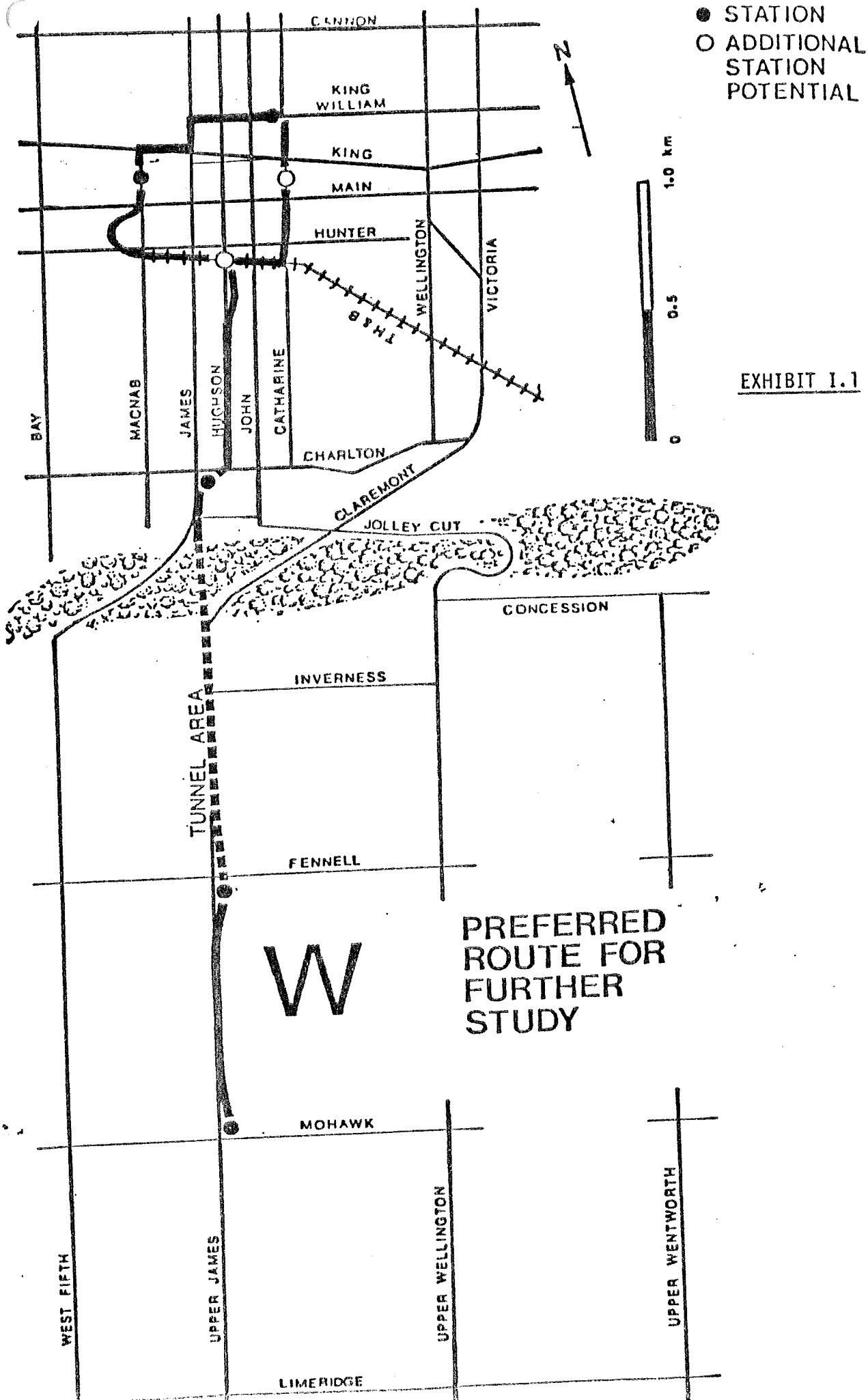
STATION
ADDITIONAL STATION POTENTIAL
CANNON
KING WILLIAM
KING
MAIN
HUNTER
TMSB
WELLINGTON
VICTORIA
BAY
MACNAB
JAMES
HUGHSON
JOHN
CATHARINE
CHARLTON
CLAREMONT
JOLLEY CUT
CONCESSION
INVERNESS
TUNNEL AREA
FENNELL
W
PREFERRED ROUTE FOR FURTHER STUDY
MOHAWK
WEST FIFTH
UPPER JAMES
UPPER WELLINGTON
UPPER WENTWORTH
LIMERIDGE
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EXHIBIT I.1

Alignment 'W', which is shown in Exhibit I.1 opposite, runs on an elevated guideway along Upper James Street from Mohawk Road to Fennell Avenue, and from there runs underground in a tunnel section which emerges from the escarpment near James Street South. The alignment then returns to an elevated guideway, running past St. Joseph's Hospital and along Hughson Street to the T, H and B railway right-of-way. This point is the base of a loop through the central business district along Catharine Street, King William Street, McNab Street, and the T, H and B right-of-way. A complete circuit of the route from Mohawk Road to downtown and back again is about 5 miles. The total length of guideway is approximately 3 miles.

Potential economic impacts resulting from construction and operation of the ICTS along this alignment have been studied by IBI Group as part of the environmental assessment component of the pre-implementation study, and the results are presented in this report. The scope of work addressed four major issues, identified as the most significant and of the greatest interest:

1. Impacts on values of residential properties along the route.
2. Impacts on development potential in the Central Area and on the Mountain.
3. Financial impact of ICTS construction expenditures on the City of Hamilton and the Region of Hamilton-Wentworth.
4. Regional economic impact (employment and income) of ICTS construction and operating expenditures.

In this report these four issues are dealt with in Chapters 1-4. Chapter 1 is a review of literature on the impacts of other transit systems in North America, while Chapter 2 is an assessment of the impacts of the proposed Hamilton ICTS on residential property values and development potential. Chapters 3 and 4 address the financial and economic impacts of the system.

1. REVIEW AND EVIDENCE OF IMPACTS FROM OTHER SYSTEMS

A systematic study of rail transit systems was undertaken in order to achieve a better understanding of potential impacts of the proposed Hamilton ICTS system. It is important to note, however, that this represents a new form of transportation which has not been previously implemented on a large scale anywhere in the world. It is significantly different in terms of form and operating characteristics and hence the impacts, as noted in other systems, must be interpreted with care before relating them to the Hamilton ICTS. This section will discuss these differences as well as information regarding impacts before, during, and after the implementation of rail rapid transit systems.

Exhibit 1.1 overleaf, catalogues other urban rapid transit systems in North America. Although the information is not completely current, it can be clearly seen that those cities where rapid transit systems have been implemented are extremely large, and that the rapid transit systems themselves generally consist of more than 10 miles of track. The first phase of the Hamilton ICTS comprises only about 3 miles of guideway and serves a population of approximately 300,000 people in the City, with a further 100,000 in the Region. Also, the rapid transit operations in question are heavy rail systems of higher capacity than the proposed ICTS. These characteristics set the Hamilton system apart from others that have been implemented elsewhere in the world.

As noted in the literature, light rail systems have recently been or are being introduced in a number of other cities. Of particular relevance will be those in Calgary and Edmonton, cities more nearly comparable in size to Hamilton, although with vastly different growth characteristics. However,

EXHIBIT 1.1

SUMMARY OF RAIL RAPID TRANSIT SYSTEMS (1975)

	Route Miles	1970 Population Served (Millions)
N.Y. Region	263.1	8.9
Chicago	87.0	3.4
Boston	50.5	2.7
Toronto	25.7	2.3
Cleveland	19.3	2.0
Montreal	16.3	2.5
San Francisco	71.0	2.3
Philadelphia	no data from same source	

Source: Public Transportation and Land Use Policy

Boris Pushkarev, Jeffrey Zupan
Regional Plan Association, New York, 1977

insufficient time has elapsed since the commissioning of any of these systems for conclusive evidence as to impact to be available.

Some of the heavy rail systems, such as Montreal's Metro are entirely underground. Boston's Red & Green Lines as well as Toronto's subway system are both at and below grade, as are other systems found throughout North America. The Hamilton system on the other hand, is to be constructed primarily above grade although one section, the ascent/descent of the Mountain, is below grade. There are only two other recent systems which have characteristics similar to these. Portions of San Francisco's BART system is above grade through certain residential districts. In addition, Morgantown, West Virginia operates an elevated guideway system serving the University district of the City.

It will be clear from this brief discussion that the experience gained with other rapid transit systems in other cities must be interpreted and applied to the City of Hamilton with considerable care. It should also be noted that the studies of other systems are essentially based on data gathered in the pre-1979 timeframe. The extent to which gasoline shortages and rapidly escalating gasoline prices may, since that time, have influenced attitudes towards transit has yet to be established. The possibility that the current world oil glut has somewhat restored public confidence in the automobile also exists. However, what is certain is that over the next 5 years Canadians will be facing rapidly rising gasoline prices. Under these circumstances the economic influence of the rapid transit system is likely to be higher than would otherwise be the case.

It will thus be necessary in the sections that follow to take account of the similarities and differences of both systems and circumstances in arriving

EXHIBIT 1.2

REPORTS FROM OTHER CITIES

	Type of Land Use Impacts Studied		
	Residential	Retail	Office
Toronto	X	X	X
Montreal		X	
San Francisco	X	X	X
Washington	X	X	X
Philadelphia	X		X
Boston	X		X

at conclusions relevant to the Hamilton system. It is also necessary to remember that there is as yet no direct operating experience of such a system in a city environment, and that hence conclusions as to the impact are based on hypothesis rather than demonstrated fact.

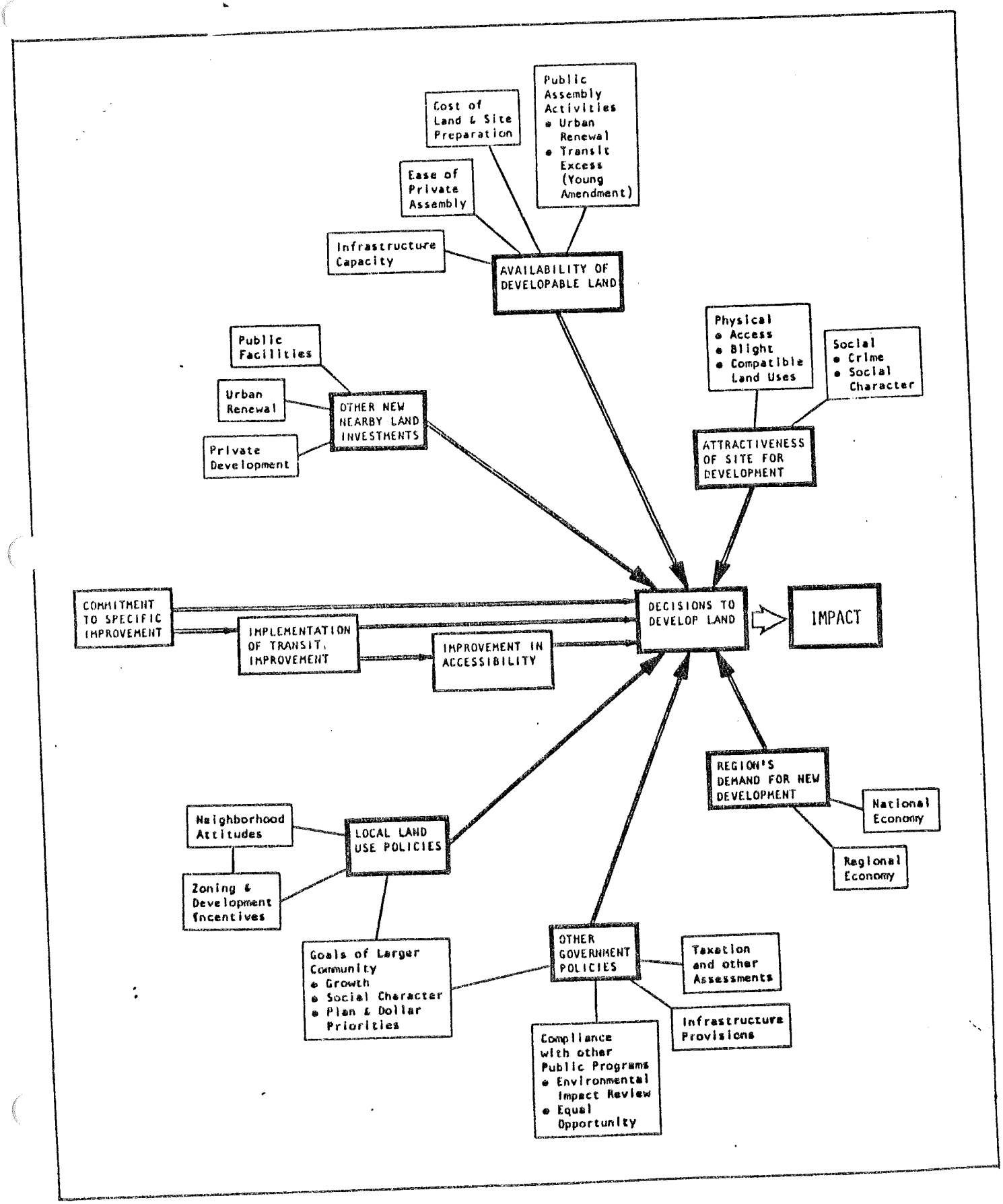
1.1 Sources of Data

Notwithstanding the growing interest in transit over the last decade, not all cities with transit systems have undertaken impact studies after the systems have been in operation for some time, and even where studies have been completed, these are frequently qualitative rather than quantitative in nature. Information was found for the Cities of Toronto, Montreal, San Francisco, Washington, Philadelphia, and Boston. The type of information that is available is summarized in Exhibit 1.2 opposite. Nearly all of the information that is available is of an anecdotal type, rather than containing definite figures as to the magnitudes of the impacts. In addition, much of the information is contradictory. For example, some cities report substantial impacts on the development of offices in their downtown areas as a result of transit developments; but in others it has been suggested that there has been no impact at all on office development in the central business districts.

A number of analytical studies have been undertaken, which attempt to model development effects in selected cities. Unfortunately, while these studies provide some insight into the rapid transit related urban development process, conclusions are not definitive. Finally, a group of studies attempts to synthesize information from several cities, and hence formulate suggestions as to appropriate capital investment strategies at the United States federal level. These again are largely qualitative, although some useful quantitative facts are reported.

EXHIBIT 1.3

INFLUENCES ON LAND USE IMPACT



Source: Knight and Trygg (1977)

The more important and relevant conclusions drawn from the review of literature are presented in the ensuing sections.

1.2 General Results Found in Studies of Other Systems

A study completed in 1977 by Knight & Trygg evaluated the land use impacts of major rapid transit improvements in North America. The modes considered included commuter rail, rail rapid transit, exclusive right-of-way for bus lanes, and light rail transit. The study analyzed the impact of transit improvements on:

- the overall growth of a metropolitan area relative to competing areas;
- land use patterns, and
- the strength of the central business districts.

The major findings of this study are as follows:

1. Recent major rapid transit improvements have been important inducements to intensified development near stations both in CBDs and in outlying areas, although only when supported by other favourable forces.

2. Some recent major commuter rail improvements were found to have led to significant land use intensification, but evidence on light rail and busways was inconclusive. In a more recent paper, Knight suggests that the recent light rail improvements available for study in the U.S. and Canada are inadequate to provide a proper indication of this mode's potential, since they have not been in operation long enough for impacts to emerge.

3. Recent experience provides no evidence that any rapid transit improvements have led to net new urban economic or population growth. However, the study notes that this conclusion is based on sparse evidence and more detailed research is needed.

4. The timing of land use impacts seems largely dependent on general economic conditions. Five years appears to be a minimum wait for substantial impacts; but the period can be much longer.

5. Local land use policy changes have often been instrumental in facilitating transit's land use impacts. Zoning near stations, in particular, must usually allow intensification of use if any significant impact is to occur. Other local policies concerning factors such as the provision of needed infrastructure to sites have also been important. When these policies work at cross purposes, a crucial source of impact encouragement is lost.

6. The transit improvement itself has often led to changes in land use policies. This indirect influence may be one of rapid transit's most powerful in generating land use impacts. It is not always positive, since fear of change sometimes results in down-zoning when transit stations are placed within established residential neighbourhoods.

This study summarized the author's findings with a diagram reproduced as Exhibit 1.3. From this it can be seen that the decision to develop land is made in consideration of the attractiveness of the site, the availability of developable land, the quality of other nearby investments, local land use policies, other government policies, and most important the region's demand for new development.

Other studies have come to similar conclusions. For example, Priest (1980), found that land use improvement and economic development could only occur if potential developers were encouraged to make investments near the new facility. Orski (1980) notes the need for public agencies to work closely with the private sector in planning development.

It is therefore possible to conclude that the economic impact of the implementation of a transit system is highly dependent on basic economic conditions within the community. High density development is encouraged by the successful integration of the transit line with existing and future development and by the appropriate public policy decisions which permit the system's potential impact on development to be fully realized.

1.3 Detailed Impacts on Residential Land Use

Information is available for several cities, although this deals almost exclusively with residential land use impacts near suburban stations of rapid transit lines.

1.3.1 The Boston Red Line

In Boston the extension of the Red Line south to Quincy and neighbouring Braintree resulted in some high density residential development. The Red Line is a heavy rail commuter line that is at grade in suburban areas but below grade in the downtown core. It services middle income suburbs up to 15 miles south of the City of Boston.

It has been found that residential land development in the City of Quincy appears to have been stimulated by the construction of the new extension of the rapid transit line. In fact, some developers began construction of new housing units before the line was completed.

Development that occurred in downtown Quincy, where a station was built, was obstructed by inappropriate zoning regulations. An initial change to high density zoning led to some development which replaced single- and two-family housing units, the types that are particularly vulnerable to rapid change if appropriate zoning regulations are in place. Subsequent community opposition led to the re-instatement of low density zoning, with consequent cessation of development activity.

Near other stations in Quincy many apartment units have been built in the last 10 years. It should be noted though, that these units were built on vacant land, and did not replace existing housing units. Finally, the most recent extension of the Red Line to Braintree has not resulted in any new development as yet. This is possibly because the land has not been zoned for high density residential development. Further, there is a sanitary landfill site on one side of the Braintree Red Line station. This is a particularly difficult type of site to develop and sell for residential land use.

This analysis which has been undertaken with respect to the Boston Red Line is in many ways typical. The system has been in operation for ten years or so. In some locations zoning regulations prevent appropriate development, so there is minimal physical and hence economic impact. In other locations development has taken place in the vicinity of transit stations. However, transit stations are frequently sited at strategic locations, which, given appropriate zoning, might have developed without the development of the transit line. It is therefore deemed impossible to establish a causal relationship between transit and increases in development, and hence to quantify the effect, if any, attributable to transit.

In relating this to the Hamilton system, it is important to note that both stations on the Mountain are located in shopping plazas at important road intersections. Land adjacent to retail facilities in such locations is frequently zoned for high and/or medium density residential development. The existence of an ICTS station would make such a zoning even more appropriate. Were zoning for apartments in place now, would these be constructed whether the ICTS is implemented or not? This question will be examined at greater length in a subsequent section.

1.3.2 The BART System

In San Francisco, California, there have been residential land use impacts due to the implementation of the BART rapid transit system. The BART system is a major development of approximately 50 miles of elevated, at grade, and below grade rapid transit lines. Numerous studies have analyzed the land use impact of the BART system, most of which conclude that the impacts were not as great as were expected by urban and transportation planners. Nevertheless, there have been impacts and these will be described below.

A survey of recent movers showed that in making a choice of location access to BART was a decision factor for half of the households surveyed. Compared to other decision factors, locating near BART was a relatively minor consideration. Notwithstanding this overall conclusion, 1 in 5 of the movers surveyed expressed a willingness to pay $500-$5,000 more for housing in a location near BART.

The survey shows that BART has not created a stimulus for households to move out of older residential areas. In fact, the importance of access to BART appears to increase with commuting time from the central business district. It was noticed that long-distance commuters tended to be more affected by BART in their housing decisions. For many suburban commuters BART appears to represent a means of keeping their transportation options open should congestion reach intolerable levels or should gasoline prices and shortages curtail automobile use. This finding seems to have been supported by the findings showing that suburban home owners were more apt to seek a location near BART than did renters. This is particularly so since home purchase involves a considerable investment and therefore owners are more likely to adopt a long term perspective in their choice of residences.

BART has also affected the housing industry to a limited extent, but thus far the impacts have been different than what planners had expected. For example, no nodes of high density development have materialized even in station areas. Several explanations have been offered for the absence of new high density developments. Among them the most relevant are:

- there are zoning limitations on the intensity of new development in station areas;
- in some areas residents reacted against forecasts of BART induced growth and supported new zoning regulations that entirely barred high density land use changes;

- there has not been sufficient demand for high density residential development in some suburbs and continued reliance on the automobile and preference for single-family dwellings has not encouraged new development;
- it has been surmised that it takes a number of years after the implementation of a system before the full development impacts are realized. BART had only been operating for some 6 or 7 years at the time of the study and it is possible there has not been sufficient time to generate expected impacts.

Notwithstanding this, BART appears to have had impact on developers' decision-making processes. It was found that 2/3 of the 26 developers that were interviewed claimed that BART was a somewhat important factor in their decision-making. One-half stated that they would pay a premium for developable land near a BART station, but they did not say how large a premium they would pay. In addition, six large projects totalling 3,500 units were identified where location, timing and/or density had been specifically intended to take advantage of the BART service.

In pre-construction studies it was anticipated that proximity to BART tracks where these are either at-grade or elevated would have a negative effect on residential property values. It is important to note that this negative effect has not been identified up to the time of the publication of the BART studies in 1980. However, near stations where BART-induced traffic or parking create a nuisance, a negative impact on property values has been noted.

Noise from the BART line has been identified as a deterrent to new residential development. Relative to the total 71 mile length of the line, a 7 mile section of track has been identified where BART noise has exceeded normal community noise levels. On a two mile stretch of vacant land near this section of BART track no development has occurred. Interviews with developers indicate that part of their decision not to develop these lands

related to the noise impact from BART and the added cost associated with sound proofing that is required by California law.

1.3.3 Montreal Metro

Residential land use impacts have also been identified associated with the Montreal Metro. The Metro, which is totally below grade, travels to the CBD from several suburban locations both on and off the island of Montreal. Careful zoning near many stations has permitted only minimal high density residential development. Where zoning has permitted development this has occurred at high levels. One example is Longueil on the south side of the St. Lawrence River. The station was built on a totally open site and zoning permitted high density development to occur. This did occur and now the site is dotted with large apartment buildings, affording easy access for residents to the downtown core.

Although it is difficult to quantify, conversations with land owners in Montreal have indicated that there has been a definite increase in the value of property located immediately adjacent to suburban Metro stations. This may be due to the fact that authorities encourage joint development of the station areas and the land adjacent to them. This enables mixed land use including residential land use to be incorporated in the station structure during or after construction.

There has also been large scale high density development of residential apartment buildings in the downtown area immediately adjacent to subway stations. This development has occurred over a number of years, and appears to be on-going at this time. It is not certain whether this development would have occurred to these locations even if the Metro were not in place.

1.3.4 Metropolitan Toronto

The Toronto experience is such that there has been extremely high density residential land development at many suburban transit stations. Nearly all of the high density residential developments in Toronto are located in close proximity to transportation nodes. These include intersections of major highways, as well as subway stations. Once again the question arises, would the development in the vicinity of subway stations have occurred without the subway? However, perhaps equally relevant is the question, would the development at major highway intersections have taken place without the improvements to highways that have been made over the last two decades? In the case of Toronto the answer would seem to be that both transit and highway are critical elements in the transportation network, contributing in a major way to accessibility. This fact is recognized by governments and the development industry alike. Without either element the pattern of development would be greatly different.

1.3.5 Washington Metro

Some development impacts have also been noticed in association with the development of the Washington Metro system. No quantitative observations were available in the literature except for one analytical study of the changes in housing prices due to the implemetation of the Metro. This study by Dan and Lehrman indicates that there has been an increase in the value of land and in the value of real estate within 1,500' of Metro stations.

1.3.6 Conclusions: Residential Development

In the pre-construction studies expectations as to the impact of transit systems on residential developments ran high. Significant positive impacts were anticipated in the vicinity of transit stations, while negative impacts along surface or elevated rights-of-way were expected.

In the post-construction years it has become clear that there is a potential residential land use impact associated with the implementation of a rapid transit system. However, it has also become clear that the positive impacts will only occur if the economic conditions for growth are present. Further, apartment development will only occur if in addition to market demand zoning regulations to encourage, or at least permit, high density development are in place. Somewhat surprisingly, expected adverse impacts on the value of residences adjacent to rights-of-way have not materialized; but delays in new residential construction have occurred, primarily due to the added cost of sound insulation where this is required by law.

Summarizing the principal conclusions to be drawn from the BART and other studies:

1. A significant proportion of the homeowners (20%) and developers (50%) expressed themselves willing to pay more for property/land with rapid transit access.

2. Many homeowners who currently use automobile regarded rapid transit as an insurance against non-availability, or rapidly rising costs of gasoline.

3. Pressures for development of denser residential forms (e.g. apartments) are concentrated within 1,500 feet of stations, and development only occurs if there is demand in the marketplace and appropriate zoning is available.

4. Residential values along rights-of-way were not in practice depressed, although in cases where transit-induced traffic and parking caused nuisance, decline in values has occurred.

5. The development of new residential areas along rights-of-way has been delayed, apparently because of the added cost of sound insulation required to meet government standards.

6. Transit system impacts take a period of years to materialize.

To summarize, then, there is evidence in the literature of the economic/land use impact of rapid transit systems on residential development.

At least some of the reasons for this relate to concerns regarding the availability and cost of gasoline, factors likely to be of increasing rather than declining importance in the future. However, these effects only materialize if basic economic and market conditions pertain, i.e. the economy is sufficiently prosperous to support development, and government policies and zoning regulations are supportive of new investments.

1.4 Retail Land Use Impacts

There is not a great deal of evidence in the literature regarding the impact of rapid transit systems on retail land use. However, experience in Montreal and Toronto illustrates that these impacts do occur. A number of high density mixed-use developments have developed over the past decade near and adjacent to major transit stops.

An example of such development in Toronto is at Yonge and Sheppard where a large shopping centre has been developed adjacent to a major transit stop. In Montreal the entire "underground city" has been developed in association with the Metro stations. The Metro plays a crucial role in connecting all of the major downtown retail centres and their viability depends at least in part on these connections. However, the effects cannot be quantified since no studies of the relationship of sales to transit service have been undertaken in either Toronto or Montreal. Some data has been collected from the downtown Boston area.

1.4.1 Boston

In downtown Boston the system is such that the Orange, Red, and Green Lines of the subway all intersect in a dense network of transit routes focussed on the major retail shopping areas. Recently, this area has undergone considerable development and has been converted to a large auto-free zone.

Interviews conducted have shown that retailers find that area attractive both due to its own auto-free nature and due to the excellent transit access for potential customers. Surveys of customers have shown that a large percentage, up to 25%, come to the area by transit. This indicates that Boston's rapid transit system plays an important role in the viaiblity of its downtown retail core. In fact, Boston is one of the few American cities with an extremely viable downtown retail core and it is possible that this is due at least in part to the excellent rapid transit access.

1.4.2 Washington D.C.

There is also limited information relating to the impacts of the Washington Metro. One example is the positive effects caused by the subway on a major downtown store which negotiated for the rights to connect the store's mezzanine directly to a transit station. Less than two years after the line's opening, the store saw a 70% increase in customers and a 40% rise in sales. Today more than 50% of all its customers arrive at the store via Metro.

1.4.3 San Francisco

A survey of 500 shoppers indicated that BART may be causing a change in shopping patterns. One out of four shoppers interviewed who had increased their use of BART-served shopping areas since 1974 cited BART as the reason for the increase. However, while 18% of merchants questioned believed that BART had a positive effect on sales, analysis of retail sales were inconclusive as to the effects of being near a BART station.

1.4.4 Conclusions: Retail Land Use Impacts

Such quantitative evidence as exists supports the view that rapid transit has a positive impact on retail land use. This is supported by qualitative observation in cities such as Toronto and Montreal. While connection to a system can have extremely positive short term impacts as demonstrated

by the Washington example, in other instances where new construction is required impacts have taken considerably longer to materialize. As with residential development, the importance of market demand and appropriate zoning is paramount.

1.5 Impact on New Office Development

Impact studies examining the effect on office development resulting from the implementation of rapid transit in a number of communities suggest that rapid transit may have had a major effect on the urban structure by influencing the location of new development as well as effecting the direction of overall metropolitan growth. However, the available evidence does not show that recent American and Canadian rail rapid transit investments have had this effect independent of other economic forces. Review of the study material examining modern transit systems such as the San Francisco BART, the Toronto Subway, the Montreal Metro, the Philadelphia-Lindenwold Speed Line; and major new extension of older systems elsewhere, suggests that the generation of new commercial development activity once again requires that growth pressures exist in the local economy, and that availability of attractive land parcels for development within the immediate vicinity of transit stations, other nearby public investments, zoning incentives, and community support are all important factors.

1.5.1 San Francisco

In San Francisco the BART system has tended to reinforce the existing pattern of office development. In the downtown area development has been concentrated within a few blocks of the new transit stations. Employment in the San Francisco CBD has grown faster than in the nine-county Bay Area, a fairly unusual phenomenon in American cities in recent years. Most of the

new office buildings in the CBD have located within five blocks of a BART station. According to key informants, BART has influenced the location of seven major projects in San Francisco since 1965. This is notwithstanding the fact that San Francisco as a whole has suffered a slight decline in share of regional office construction over a 10 year period.

BART's role in this shift is considered to be indirect. First, BART gave impetus to a massive $35 million beautification scheme for Market Street, which contributed to the willingness of developers to locate new offices there. Second, BART engendered a study that gave rise to new zoning regulations, adopted in 1966, that granted bonuses in allowable floor area to buildings located within 750 feet of a BART station, or which provided direct underground access to such a station. These influences combined with other factors - constraints on development in other directions, access to other transportation, and the availabiltiy and low cost of land - to encourage new office construction in the Market and south of Market area. There is speculation that without BART a similar redirection would have occurred; but notwithstanding it is concluded that BART most likely caused the change to proceed more rapidly.

1.5.2 Oakland

Since BART began operation there has been a significant increase in the share of new office construction (dollar value) near two of the three downtown Oakland BART stations. Although small compared with San Francisco, this represented 60-80% of Oakland's total in the 1970s.

1.5.3 Other Communities Served by BART

In Walnut Creek office construction has shifted considerably toward the BART station. By 1977 a total of 10 new office buildings had been constructed within one-third of a mile of the station, and the share of the City's

office construction near the BART station had risen from 15% in the early 1960s to over 30% in the mid-1970s. However, the study notes that other factors, e.g. good highway access, vacant available land and zoning, may have influenced the shift.

In two other communities, Richmond and Berkeley, increased office construction was also experienced near BART stations, but the overall amount was small. Other communities have not experienced notable change although in one, San Francisco's Mission District, specific station redevelopment proposals resulted in community opposition and more restrictive zoning effectively precluded new office development.

1.5.4 BART's Effect on Property Prices and Office Rents

BART appears to have had a positive effect on property prices before the service began, reflecting anticipated BART benefits. These have largely disappeared since operations commenced. Anticipated negative influence of proximity to BART tracks has not proved to be statistically significant.

It should be noted that the effect of increased density permitted as a result of the new zoning regulations is not taken into account in the analysis. Increased permissible density raises property values. Increases in density reflect confidence on the part of the responsible government that long term accessibility is satisfactory. There is little doubt that the existence of BART is responsible, at least in part, for this long term confidence, and hence for at least some of the related property value increase.

Office rents show a positive impact at all sites studied, and there are some indications that this effect is growing stronger.

1.5.5 Washington

In Washington, D.C., although only 30% of the transit system is thus far completed, the economic impacts are judged to be very positive. More than $970 million of private development has been built or is under construction in the vicinity of existing or future metro stations, and the Federal City Council reports that nearly $5 billion more is contemplated. In the downtown, two major redevelopment projects have been announced within walking distance of new Metro stations in two older areas shunned by developers for years. Many new projects have been announced, including housing complexes, shopping centres and industrial parks in addition to office buildings in the vicinity of suburban stations. The 1979 Federal City Council Report notes that although in many cases the basic decision to invest did not necessarily depend totally on the Metro system, the construction of the Metro clearly affected the location, intensity and timing of development.

1.5.6 Metropolitan Toronto

Local governments have made a conscious effort to attract large scale developments around transit stations, with the help of incentive zoning. Between 1959 and 1969 about 90% of all office construction is reported to have occurred in the Yonge Street Corridor, much within a 5 minute walk of subway stations. New developments continue to be planned and implemented, including provision for high rise apartments and retail space. Metro Toronto is recognized as one of the prime examples of CBD office development, where the subway has enhanced accessibility and hence permitted the strong and effective demand to be realized.

1.5.7 Conclusions: Office Development

Impacts are most marked in downtown areas, but in some instances, most notably Toronto, significant office development has occurred at other

transit station locations. However, the primary factor is the existence of a strong market demand. Given that this exists, and that appropriate zoning is available, rapid transit improvements have been important inducements to intensified development.

Comments regarding effects on land values are sparse. However, where (as in San Francisco) density bonuses have been introduced, this must have a positive effect on land values since even if office rents are only slightly affected, the residual land value calculated from the intensified level of development will be greater. This is again an indirect effect; but must be attributed to some extent to the rapid transit system.

1.6 Overall Conclusions from the Review of Other Transit Systems

A review of second generation rail transit systems in the U.S. notes that "The recent light rail improvements available for study in the U.S. and Canada are inadequate to provide a proper indication of this mode's potential". We concur with this finding, and hence must base our conclusions on heavy rail systems that have been in operation over longer periods.

By far the most extensive studies of impacts have been made in relation to the BART system. As noted in the commentary in earlier sections, the conclusions stated in these studies sometimes seem to be at odds with the points made in the analytical sections. However, the overall conclusion of the BART studies is that BART has influenced land use and urban development in the Bay Area both directly and indirectly. The effects are judged to have been small relative to expectations, but not inconsequential. Some commentators, in reviewing the studies, identify specific effects which are judged to be significant, e.g. "land use impacts of new full scale systems in Toronto,

Montreal and San Francisco have tended to be substantial in facilitating downtown high rise office development". However, there seems to be agreement that the wider regional impact of BART has thus far been small - attributed by some to lack of regional demand, community opposition and physcial constraints, and by others to "planning errors". Notwithstanding this, another interpretation is possible. BART was designed largely to serve existing development, and by improving accessibility has reinforced centres, e.g. the CBD of San Francisco. The measure of success is the very lack of change which, it is suggested, illustrates lack of impact. For example, the motivation to decentralize could have been considerably greater if accessibility to existing CBDs had not increased. The share of regional office development in San Francisco would have declined even more but for the outstanding performance of the CBD.

While the positive impacts of BART have been less than hoped, the forecast negative effects on land values of proximity to those sections of the track which are elevated or are at grade have also failed to materialize. However, near stations where BART-related automobile traffic and parking has become a nuisance, negative effects on land values have occurred.

In contrast, there seems to be general agreement on the positive development impact of the new rail system in Washington, D.C., although the extent to which that impact extends outside the CBD is in question. One paper suggests that except in Toronto, where strong support for development is provided by zoning incentives, and historic and social forces, impacts outside the CBD along transit lines have generally been small. However, the same paper notes that some smaller systems, e.g. Philadelphia's Lindenwold Line and Boston's Red Line extension to Quincy, have been accompanied by substantial

transit related intensification of development.

While it is generally accepted that transit related impacts will only emerge over a period of a decade or longer, this view appears to be contradicted by experience in Washington, D.C. The particularly impressive gain in retail sales over a two year period experienced by a store that connected directly to a transit station (70% increase in customers, 40% increase in sales), suggests that benefits may, in the right circumstances, be significant in the short term. It could also be argued that experience over the longer terms in Washington, D.C. will be less positive than current experience would suggest.

Perhaps the most significant factor that is identified with respect to transit is that the primary influence behind intensification of land use in areas served by rapid transit is the existence of a strong and effective demand for new office, retail and residential, especially apartment, development. Given this demand major rapid transit improvements have been important inducement to intensified development near stations both in CBD's and in outlying areas.

Given that a strong market demand exists, there is ample evidence that the transit system will focus development provided that appropriate zoning is available, and the system is properly planned. Community pressures can result and frequently have resulted in zoning that effectively precludes intensive development, be this for residential or commercial purposes. As has been demonstrated by BART, inconvenient, poorly accessible stations will fail to attract significant development. In this connections Orski states:

> "A classic example of how not to link transit and land use can be found at the Washington National Aiprort. For reasons that have remained murky, the transit station ended up on an elevated structure several hundred feet from the airport terminal - a monument to inept planning".

Thus critical to maximizing economic impact is the functional integration of the system with existing and future land use. Of key importance is the early establishment of contact and working relationships between the transit development authorities and major existing and potential private investors. Again to quote Orski"

> "If transit is to have a beneficial impact on land use, joint development and other developmental opportunities must be designed into the system at its very conception rather than as an afterthrought".

This is especially important given the Hamilton ICTS elevated system, for it will be necessary to ensure that the system is integrated in design as well as functional terms if maximum benefits are to be achieved. In this regard integration of the ICTS with the planned downtown "Plus 15" pedestrian system would be an important step.

From this it will be clear that the economic impact of a transit development is a function of a number of factors. Market demand for development is an essential; but although the transit system will not generate demand where none exists, it has the potential to reinforce and focus development activity. Whether this potential is realized or not depends on the policies and the regulatory (zoning) actions of the local government on one hand, and the functional (and design) integration of the system with existing and potential new uses on the other. Given that rapid transit is currently perceived by the development industry, in all but the downtowns of the largest cities, as providing only marginal increases in accessibility, absence of any one of these factors can produce the less than expected results noted in a number of transit systems.

While it is not possible to be definitive in determining the extent to which the experience gained in the transit systems examined will translate

to an intermediate capacity system, it is considered that the same basic principles will apply. An important difference in favour of the ICTS is the superior noise characteristics as compared to BART, where this runs on the surface or on elevated tracks. Impacts associated with noise will thus be reduced. With special reference to the CBD, the fact that the system is elevated lays special emphasis on the need to integrate the system, both functionally and in a design sense, with existing and planned development. This emphasizes the need for consultation with development interests in the detailed planning stage.

2. POTENTIAL IMPACTS: THE HAMILTON CASE

In this section of the report, possible impacts of the ICTS on residential real estate values of properties located along Upper James Street between Fennell Avenue and South Bend Road are examined. In addition, an assessment of the possible impacts on the development potential of the Hamilton Central Area, and commercial areas located on the Hamilton mountain along the proposed elevated portion of the route on Upper James Street is made.

The assessment of impacts deals with properties and development opportunities located in those zones where the proposed ICTS will be most likely to affect the surrounding area. More specifically, based on our experience and on review of information from analytical studies conducted in other cities in North America with rapid transit systems, the areas exhibiting the highest sensitivity to the inception of rail rapid transit systems have been identified as:

- within an average radius of 1,000' of a station location;
- locations immediately facing or backing onto the proposed alignment;
- other areas within immediate visual distance of the proposed ICTS alignment.

It should be noted that a number of properties would be affected physically by the construction of the guideway and/or transit stations. Since these are the subject of specific discussions/negotiations between Metro Canada and the owners they have not been examined in this analysis. The exceptions are Miracle Mart Plaza, and Mountain Plaza Mall, where the anticipated impact on commercial operations is assessed.

2.1 Impact on Residential Property

The assessment of residential property value impact examines the

following impact conditions:

1. value impacts during the construction period;

2. post construction impact

   a) assuming there is a significant demand for housing accommodation within the economy, coupled with local public policy which encourages high density development at and/or near transit stations;

   b) assuming there is a slow growth of demand for housing accommodation in the economy.

2.1.1 Construction Period Impact on Residential Properties

Along the proposed ICTS alignment there are two main areas where construction of the system could generate impact on residential properties:

- residential apartment blocks located along Hughson Street South between Young Street and Charleton Avenue East;
- along Upper James Street between Fennell Avenue and South Bend Road.

Overall, the conclusions regarding construction period impact on residential property values do not indicate property value depreciation of any significance in other cities in North America during the construction period. However, it is our opinion that during the construction period those residential properties directly facing the proposed alignment south of Fennell Avenue along Upper James Street will not be viewed in the marketplace as favourably in terms of saleability as would properties in the area not directly affected by the construction noise and dust which will undoubtedly be generated during the development period.

Since, due to the prefabricated nature of the guideway, construction moves at a rate of 1 bay per day, the impact on specific properties will be reduced. Overall, impact will be comparable to normal road reconstruction operations.

The apartment blocks located on Hughson Street South should not be impacted by the construction activity in the same manner since the automotive access to parking garages for those apartment blocks does not face Hughson Street. Construction will therefore not hinder access to the buildings themselves, notwithstanding the noise and dust factors which will also be present at this location.

The heaviest construction impact is likely to result from the construction of the below grade sections, from trucks removing excavated material and bringing construction materials to the site. Impact will be concentrated, we understand, in the vicinity of the lower portal, and traffic would likely flow out onto James Street. Volumes of movements, destinations etc. are not available.

2.1.2 Post-Construction Period Impacts

Residential post-construction period impacts are possible in the following locations:

- within an average radius of approximately 1,000' of a station location;
- in locations immediately facing or backing on to the proposed alignment;
- other areas within immediate visual distance from the proposed systems alignment.

Impacts will be examined under two scenarios:

- assuming significant demand in growth for housing accommodation;
- assuming slow growth in demand for housing accommodation.

Significant Growth in Demand

Within 1,000' of Transit Station Location South of Fennell Avenue

Implementation of the ICTS could affect property values and develop-

ment as follows:

1. Early speculative market activity could be created in anticipation of possible public policy and zoning regulations being put in place to encourage higher density nodes in the vicinity of the transit stations.

2. As has been noted in the literature review, it is desirable that the ICTS system and associated land use changes should be planned as a package. If this is done, it is anticipated that proposals for increasing zoning density would be announced at the same time as the system were approved. In that this would decrease the risk to a potential developer, property values would be further enhanced.

3. With the passing of the new zoning by-law, the risk would be further reduced, and values further enhanced.

However, it should be noted that early speculation sometimes overstates the value that is actually justifiable when the new zoning by-law is passed, resulting in a speculative loss.

Increases in values would reflect the density permitted. In that little suitable vacant land exists, it would be necessary to purchase existing single family dwellings to assemble land for high density development. Purchase price could amount to in excess of $500,000 per net residential acre at current market values. In order to support this or even higher land value it would be necessary to permit substantial increases in density. Thus, even at 50 units per acre, the land component would amount to at least $10,000 per apartment unit. Experience in the area served by the BART system suggests that moderate increases in density, i.e. to 20 units per acre, would be ineffective in achieving change where existing single family units must be purchased to permit redevelopment.

Residential developers are currently not interested in constructing rental accommodation. Current high interest rates not only mean that construction of condominium apartments would be extremely expensive, but also the associated

high mortgage rates reduce demand from potential purchasers. Prognostications that high interest rates will continue for several years have reduced market confidence. It is therefore likely that, even assuming a zoning by-law which would permit high density development were in place, the increase in property values would be relatively modest. However, it must be emphasized that the situation is extremely volatile and could change over a comparatively short period.

As experienced elsewhere, it is possible that community opposition would resist the zoning change, especially since the increment in value is likely to be modest in the short term. In this circumstance property owners could anticipate a modest increase in land value, associated with the fact that potential purchasers would be prepared to pay more for housing within walking distance of the transit station. It is probable that such property value increases would not exceed 10%, declining to zero at approximately 1,000' from the transit station.

It is proposed that the transit stations be serviced by feeder bus routes. No provision is being made for park and ride, although there will presumably be provision for commuter drop off in the vicinity of the station. Bearing this in mind, and taking account of the fact that traffic volumes are substantially less than those envisaged by the BART system, it is unlikely that traffic and parking nuisance in the vicinity of the stations will be such as to materially affect property values. It is therefore not envisaged that a negative impact will result. At the worst, the anticipated increase in property values referred to above would be somewhat reduced.

Properties Fronting Upper James Street
Outside the Area of Transit Station Influence

Experience in San Francisco has shown that, contrary to expectations, property values adjacent to the elevated sections of BART track have not been adversely affected, notwithstanding the noise problem associated with the BART operation. Since the ICTS is extremely quiet, it is even more likely that no negative impact will be felt.

In the integrated planning of transit system and land use which has been recommended, consideration should be given to rezoning those properties facing the route for development for the purpose of retail/commercial uses. One or two properties are already being used for such purposes. These and others fronting on Upper James Street would benefit from the visual exposure to the ICTS system, as well as the frontage on Upper James Street itself. It is our understanding that most recent resale prices for residential properties located along the west frontage of Upper James Street between Fennell Avenue and South Bend Road have been averaging approximately $50,000 for properties on lots averaging some 4,000 sq. ft. This represents a value of $12.50 per sq. ft. By comparison, a recent sale of land zoned for community shopping and commercial uses (H Zoning) located at the southwest corner of Mowhak Road and Upper James Street sold for $17.00 per sq. ft. Should zoning changes to permit similar uses be implemented, it could be anticipated that property values would rise to somewhat less than the $17.00 per sq. ft. recorded at the intersection.

However, it should be noted that the zoning change would probably have a negative effect on the value of residential properties abutting the rear yards of those which were rezoned.

Low Residential Demand

Land Within 1,000' of Transit Station

Under the scenario of low residential demand, there would be little pressure to increase densities. Even if rezoning were implemented, the market would probably not be willing to pay the prices necessary to assemble parcels large enough for high density development. Under this scenario existing residential property owners may still expect the same kind of property value increase that is associated with a willingness to pay a premium for housing within approximately 1,000' of a transit station.

Residential Properties Fronting Upper James Street Beyond the Influence of Transit Stations

Impacts are likely to be similar to those experienced under the significant demand scenario.

Residential Properties Located Along The Proposed Alignment Below the Escarpment

In this section of the report the impact of residential property values north of the escarpment area is examined.

On examination of the area along the proposed rapid transit route alignment south of the escarpment, only one residential zone was identified within a 1,500 ft. radius of the route. This area centered along Hughson Street South and bounded by:

- Yonge Street - to the north;
- Charleton Avenue West and East - to the south;
- James Street south - to the west;
- John Street south - to the east.

Residential properties in this area are primarily high density in nature and characterized by some eight apartment blocks including approximately 650-700 apartment residential units in total.

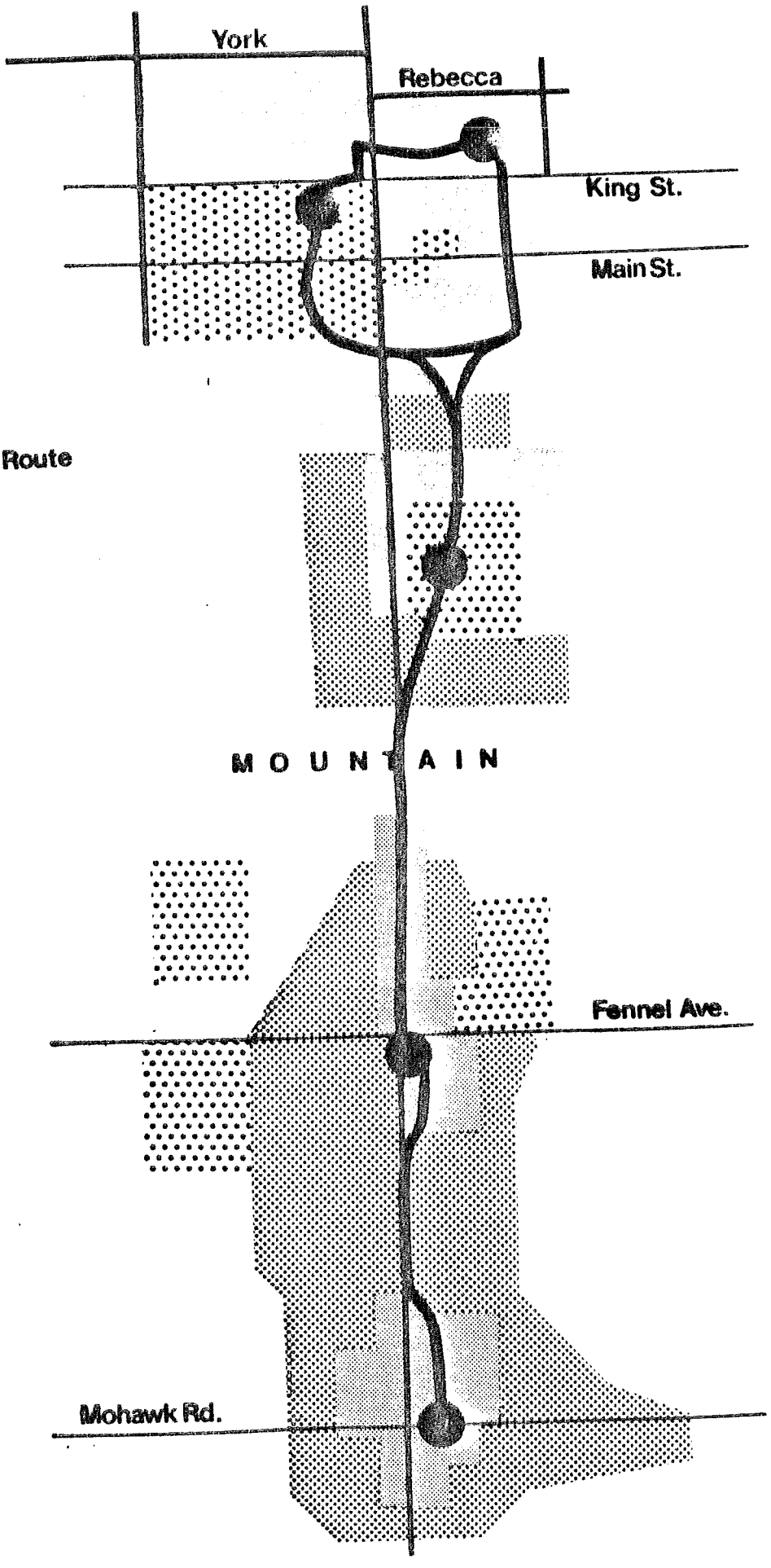
Evidence from the BART system suggests no impact on rental rates of residential properties near elevated sections of track. However, this conclusion does not relate to high rise projects. In Hamilton the effect of the operation of cars on the elevated guideway aligned directly adjacent to the four highrise blocks along Hughson Street must be to reduce privacy in apartment units on the first three floors facing Hughson Street. Relative to the other units available in the apartment blocks these units will be the least desirable, and their marketability at normal rental levels will be affected. It is therefore expected that rental level appreciation for these units will not be at the same rate as other units within the apartment blocks.

2.2 Impacts on Commercial Property

The analysis of economic impact associated with the implementation of the proposed ICTS examines the land development implications associated with commercial properties located in close proximity to the proposed route alignment.

In the course of the analysis the statements of possible impacts are based on a review of relevant information, described in previous sections of this study, as well as on the views of six representatives of local and national corporations involved in land development or involved in the local economy in other industries. Accordingly, the impact evaluation is structured on the basis of the following considerations:

MAJOR LAND USES IN ZONES OF POSSIBLE IMPACT



Key

- Proposed ICTS Route
- Station
- Commercial
- Residential
- Institutional

EXHIBIT 8.1

- Impact studies relating findings in other cities in North America concur in concluding that although rapid transit may have had a major effect on urban structure in influencing the location of new development as well as affecting the direction of overall metropolitan growth, new commercial development activity and generation thereof must be combined and coordinated with other economic forces such as expansion of the local economy, availability of attractive land parcels for development within the immediate vicinity of transit stations, other nearby public investments, zoning incentives and community support. Further, the literature emphasizes the importance of planning the transit system and land use in a coordinated fashion, involving not only the local governments which are affected; but also the principal landowners who will be affected.

- absence of any one of these factors can result in greatly reduced impacts. Indeed there are many examples where, even after a considerable period of time, no impacts at all are discernable.

- It is therefore assumed that in the detailed planning stage these issues will be addressed and that a program which takes account of the concerns of all affected parties will be developed.

- Impacts associated with system implementation can be expected to occur during the system's construction as well as post system implementations and will therefore be examined at these two points in time.

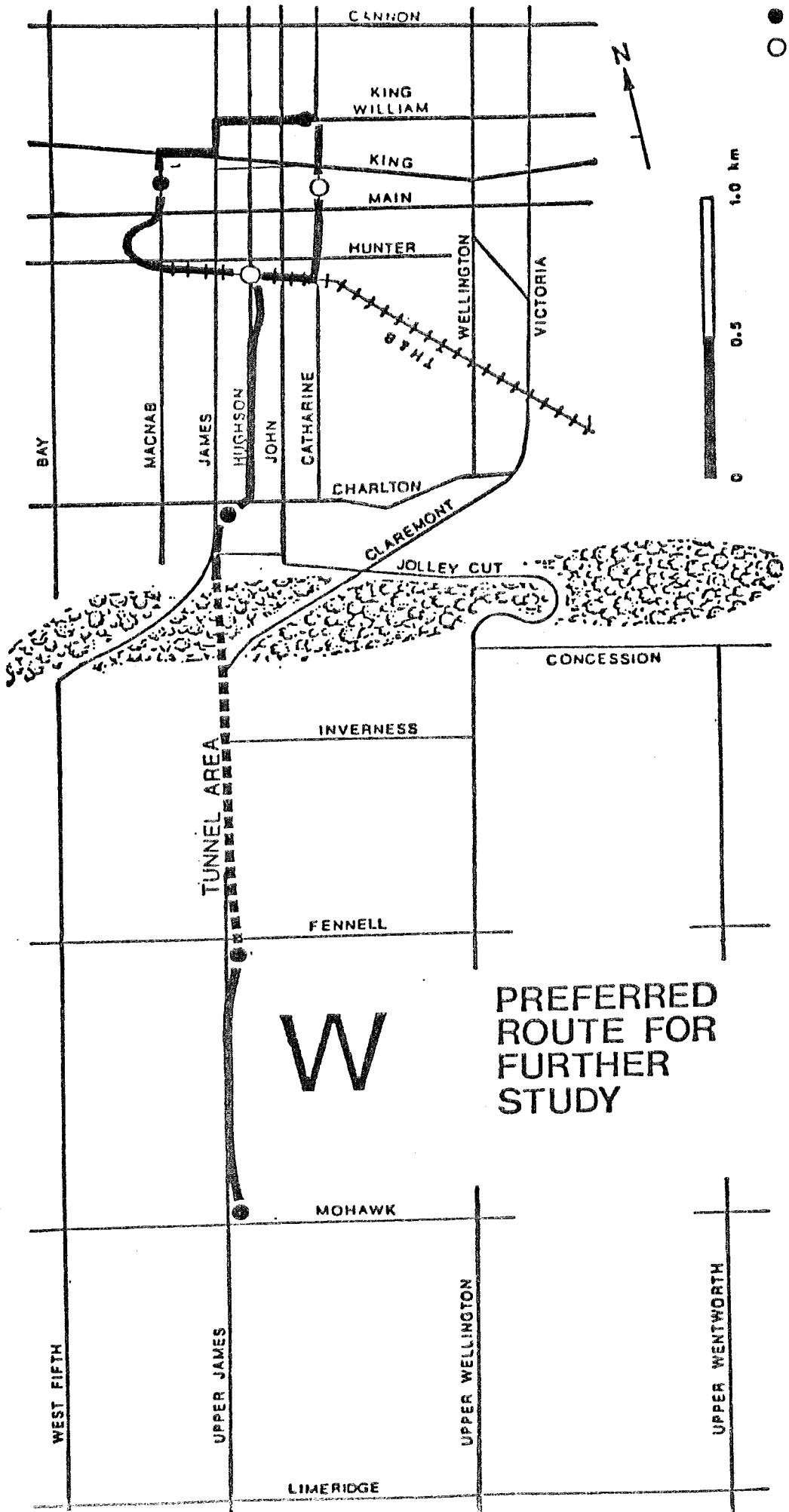
- As shown in Exhibit 2.1, there are three main zones of impact on commercial land uses along the proposed alignment:

  - south of the escarpment area - centred on the intersection of Upper James Street and Fennell Avenue, and; centred on the intersection of Upper James Street and Mohawk Road;

  - north of the escarpment - centred to the west and south of the St. Joseph's Hospital proposed station along James Street South and the north side of Charleton Avenue East, and; within the vicinity of the proposed alignment's central area loop which is bounded by McNab Street South, King William Street, Catharine Street South and Hunter Street.

2.2.1 Impact on Commercial Properties During Construction

The construction phase of the proposed ICTS is likely to create some disruption of traffic and pedestrian movements in areas directly exposed to the proposed alignment route. However, the most disruptive period over which the construction will be undertaken is estimated to comprise some 220 days excluding station development, which will be in addition to the guideway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UPPER JAMES
UPPER WELLINGTON
UPPER WENTWORTH
LIMERIDGE

EXHIBIT 2.2

construction, with any one area being affected over an average of 30 days at locations other than stations, where construction will be for longer periods.

Construction Impact in the Vicinity of
Mountain Plaza Mall and Miracle Mart Plaza

As shown in Exhibit 2.2, which maps out the proposed alignment of the transit route, transit stations and bus stations are proposed for the Mountain Plaza Mall and at the Miracle Mart Plaza. In addition, a narrow band along the frontage of these two properties, presently utilized for service parking to the two shopping plazas would be appropriated for the alignment. Accordingly, as experienced during the construction period of other systems, disruptions to normal commercial operations can be expected. However, since information on directly comparable site construction disruptions in other systems is not available in the relevant literature, the construction impacts can only be surmised with respect to the Hamilton case.

Some reduction in commercial activity can be reasonably expected to occur at both Mountain Mall Plaza and the Miracle Mart Plaza, during the construction period. In addition, since system stations are planned for both of these locations and since on review of the geographical location of these two commercial sites there does not appear to be any other site for storage and maintenance of construction materials and equipment it is reasonable to expect that sustained periods of disruption which will undoubtedly affect the volume of normal trade will occur at these sites. These construction impacts will be further aggravated by the fact that the proposed route alignment removes from use a number of parking spaces on the site of these shopping centres, albeit the number of parking spots lost is relatively small in comparison to the total number available at this time. It should be noted that some of the parking spaces will be permanently lost.

The nature of the disruption to trade that might be expected would be similar to that experienced when an existing plaza is expanded. The fact that both affected plazas serve a market which is largely captive, would tend to reduce the extent of the loss. To minimize loss there is a clear need to keep the construction period to a minimum.

Worthy of note are the conclusions of injurious affection suits launched in connection with the disruption of normal commercial activity in San Francisco during the period of BART construciton. In this case, it has been reported that at least six lawsuits were filed or threatened against BART, claiming that construction activities had detrimentally affected retail sales and business. The resulting settlement by judicial proceedings decreed that BART was not liable to the affected merchants because such damages are non-compensible when attributable to the reasonable actions of a public agency causing temporary inconvenience or disturbance to private individuals or businesses. While this ruling is not directly applicable in Canada, we understand that no legal liability for compensation for business loss associated with the construction of the Yonge Street subway extension was established.

Construction Impact in the Vicinity of the Proposed ICTS Loop in the Core Area and the Southbound Alignment Along Hughson Street South and James Street South to Tunnel Entry Point at the Escarpment

Examination of the proposed alignment north of the escarpment, suggests that construction will affect normal commercial activity and construction impacts can be expected as follows:

- transit access and normal flow of workers and shoppers to the immediate vicinity of the McNab Street South terminus and therefore access to Jackson Square, Hamilton Place, Municipal offices and businesses in the immediate vicinity of the McNab transportation terminal, will be affected.

- significantly lower disturbances are expected to occur at the King William Street GO and HSR proposed transit station. However, since the proposed alignment is planned to travel along the south sidewalk of King William Street east of James Street North to John Street North, potentially significant disruptions to the operations of the Kresge store located on King William at the intersection of Hughson Street and the restaurant and office building located at the intersection of King William and John Street North may be expected since this commercial establishment's main entry points are located on King William Street.

- insignificant levels of impact on commercial activity are expected as a result of system construction near the proposed station on the block bounded by John Street North to the west; King William Street to the south; Rebecca Street to the north; and Catherine Street South to the east, where minimal development is presently evident as the area is primarily characterized by the presence of parking lots.

- along the proposed alignment travelling on the west sidewalk of Catherine Street South from King William Street south to Hunter Street East, only one area of significant disruptions is expected. This disruption is most likely to occur during the construction period on the block bounded by King Street East to the north and Main Street East to the south along Catherine Street South, where the proposed guideway is intended to travel through the parking lot serving the Royal Connaught Hotel which, according to the City of Hamilton Real Estate Department Director, is at present substantially under-served relative to the hotel's requirements for parking.

- commercial/retail impacts can be expected, to a lesser degree, in the vicinity of the commercial/retail district located on the west side of James Street South between Charlton Avenue West and St. Joseph's Drive where the station is proposed on the lands of the St. Joseph Hospital. However, construction impacts are expected to be substantially lower than those identified on King William street and on Catherine Street south since station location is proposed to be off James Street South as well as the fact that James Street South is a four-lane right-of-way at that point rather than a two-lane right-of-way at the other locations.

Although disruption of normal traffic and accessibility to commercial sites can be expected to occur during the system contruction, our review of the available studies examining the impacts of other transportation systems suggests that the impact on retailing commercial activity would probably be relatively insignificant and not sufficient to create great hardship to businesses located in zones of direct contact with the contruction process.

2.2.2 Post-Construction Impact on Commercial Properties

Post system implementation impacts on commercial development opportunities are discussed in this section in light of the review of relevant impact studies examining other systems in North America as well as the opinions of Hamilton-based members of the business and real estate industry community and two national scale developers with considerable Hamilton knowledge.

More specifically, interviews were carried out with the following:

- Realtors - Mr. T. Glen Chambers; Mr. William S. Vanengen; Mr. Bruce S. Law; Mr. Mark B. Boyak; Mr. Warren Dakin.
- Landowners - Mr. Ernie Geisel; Mrs. G. Donnought of Yale Properties/Jackson Square, Mr. I. Zukker.
- Developers - Mr. D. Newman of Carma Developers; Mr. G. Jones of Bramalea Limited.
- Industry - Mr. D. Craig of Dofasco Metals & Foundry.

Commercial Land Impact Along Proposed Alignment; South of Fennell Avenue to Mohawk Road

Interviews with the City of Hamilton Planning Department, Real Estate Department and with local realtors suggest that along the proposed alignment on Upper James Street there exists few additional commercial development opportunities, particularly in light of the existing application for expansion of retail space at the Dominion Plaza located at the northeast corner of Upper James Street and Mohawk Road.

In addition, local realtors interviewed indicated that aside from the non-availability of plans for commercial development, there does not appear to be an underlying demand for more retail space within the trade area served by the existing commercial/retail establishments located along this portion of the alignment. In the absence of retail market analyses related to the

two plazas it is not possible to be more precise as to their present market situation.

The ICTS could impact on the demand picture in two ways:

1. Increased density of residential development in the vicinity of the transit stations could lead to population increase, and hence increased spending and possible justification of additional space. As was noted in the analysis of potential residential impacts this effect will either be non-existent or substantial, since a modest increase in density would not justify the purchase price of existing dwellings. However, any estimate of magnitude would be highly speculative.

2. Increased patronage of the affected shopping plazas by passengers making purchases at journey termination, transfer to bus, or transfer to automobile. The ability to make purchases on transfer would be contingent on appropriate transfer arrangements being established. Maximization of purchases would involve the careful functional integration of transit station; bus station and retail faciltiies.

In the survey of Hamilton-Wentworth residents undertaken in September, 1981, related to the ICTS system questions were asked about possible changes in expenditure habits on introduction of the ICTS, assuming appropriate transfer arrangements to be in place. This showed that up to 30% of those who may shop at the plazas would make additional expenditures over and above any made today. An estimate of total impact at opening date has been made by applying the survey results to the forecast passenger volume; discounting by 75%, a figure that takes account of the likelihood of future expressed intentions actually being realized; and estimating appropriate sales levels per capita. Added expenditures are estimated to lie in the range of $500,000 to $1 million per annum. This would translate into approximately 4,000-8,000 square feet of space, assuming that present space just meets market needs.

On the negative side, each of the two affected plazas will suffer the permanent loss of parking spaces. The amount of this loss is uncertain pending finalization of plans, but could amount to as much as 270 spaces at

the Miracle Mart and 118 spaces at Mountain Plaza Mall. Further, in order for each plaza to capitalize on any potential increased market it will be necessary for the appropriate approvals to be given, possibly making allowance for a reduced parking standard justified on the basis of improved transit access. This provides an excellent illustration of the need for integrated planning, involving the transit authority, the City, and the private sector.

There is thus little doubt that the potential for positive impact exists. The extent to which this is realized will depend not only on the functional integration of transit services and the plazas; but also on the mode of operation permitting stopovers for shopping purposes.

Commercial Impact: Central Business District

The literature suggests that rapid transit is a potentially important inducement to intensified development near stations in the CBD. Other factors contribute to the intensification, notably availablity of developable sites; availability of suitable zoning; and investments by local government. Paramount in the realization of any development is, however, the level of market demand. Further, the importance of a coordinated plan that involves the transit authority, the local government, and the private sector is emphasized.

In the CBD of Hamilton, which will be served by the transit loop, there are numerous developable sites, currently occupied by parking lots or older low rise buildings. Zoning would permit over ten times the space that is currently developed. The City continues to pursue an active downtown investment and development program focussed on Lloyd D. Jackson Square. Thus, many of the basic prerequisites of intensified development are already in place.

The question of demand is more difficult to address. The Regional Official Plan designates Downtown Hamilton as the Regional Centre and contains policies that promote its development as the most important multi-functional office employment area and retail centre in the Region. Forecasts have suggested as many as 37,000 new service jobs may be created in the CBD by 2001, implying the development of as much as 10 million square feet of office and retail space. Recent Regional population forecasts are more pessimistic than those adopted in 1976, but there is no information as to the employment that would be associated with the reduced population levels. However, because of changing age structure in the population, and increasing female participation it is likely that employment will grow at a more rapid rate than projected population. The new CBD employment forecasts might lie in the range of 15,000-25,000. This would imply a space requirement in the range of 4-6 million square feet by 2001.

The actual level of demand could vary widely from these estimates. The Region and the City are attempting to foster the growth of the CBD as a regional source of high order services, and are expending considerable effort and money to achieve this end. Once an initial threshold level is crossed, growth in demand can be rapid. It is usually not possible, even with detailed study, to determine if and when such a threshold level will be crossed, unless very specific growth forces (e.g. as apply in Calgary or Edmonton) are at work. This is not currently the case in the Region of Hamilton-Wentworth or the City of Hamilton.

Interviews with the private sector do not suggest that a period of rapid growth is imminent. There was a general concensus that the ICTS would do little to improve overall accessibility to the wider region. As

a result both local and national concerns expressed a reluctance to associate the ICTS with added impetus for new commercial/retail/service industry development in the central area. The views expressed coincide very closely with one of the conclusions of the BART studies regarding the way developers view transportation facilities in their location decisions:

> "Lack of commuter accessibility can serve to disqualify a site from consideration, but once accessibility is satisfactory, the increased accessibility provided by a new transit system is only a "plus", not a factor important enough to overcome market considerations".

Notwithstanding this, developers will take advantage of the "plus" if it is available, and some recorded considerable interest in the routing and station location in the downtown loop. The view was expressed that the loop was too small. Concerns about the way in which the elevated construction would/could be integrated with existing and new development were identified. The need to connect directly into the proposed arena/trade centre was pointed out. The desirability of consultation with the private sector in resolving these and similar issues was emphasized.

The interview program provided ample support for the literature's view that a coordinated planning effort involving the private sector is essential. The intensification of development referred to in the literature is the private sector response to market demand. In cases, such as Hamilton, where market demand could be highly variable, the importance of the involvement at an early stage of those who will make investment decisions is clear.

More specifically, local interests pointed to development opportunities available, both in terms of land and appropriate zoning in the areas directly to the north of King William Street between McNab and Catherine Streets. In addition, development opportunities to the north and west of the proposed arena/trade centre, west of Bay Street and north of King Street, were identified as the most desirable development locations.

Impact of the Proposed Rapid Transit Line Alignment on Commercial/Development Opportunities in Other Areas of the System

Surveys of local and national development interests identified no other locations along the proposed alignment where commercial development opportunities might exist. However, on site survey of the proposed alignment, it was identified that along the proposed route between Buckley Street and Augusta Avenue substantial re-development of older homes was occurring. This re-development of residential properties for office and other commercial uses appears to be taking place notwithstanding present economic conditions. Accordingly, on the basis of local realtors commentary, there seems to be a demand for such uses. ICTS stations are planned within reasonable access distance to this area and therefore, the system's impact is judged to be supportive of this trend.

3. FINANCIAL IMPACT

3.1 Introduction

We have been advised by Metro Canada that the total capital cost of the Hamilton ICTS will be approximately $111 million, based on first quarter 1981 dollars. The federal and provincial governments would be responsible for 90% of the cost and the remaining 10%, or $11.1 million, would be the responsibility of Hamilton-Wentworth. Although the financing of the $11.1 million would be undertaken by the Region, present policy indicates that since the ICTS falls within the boundaries of the City of Hamilton, the City is ultimately responsible for the financial burden. Operating costs have not been addressed on the understanding that the Province of Ontario has in place subsidy policies that will cover operating deficits of the ICTS over and above those that might otherwise have been incurred by an all bus system.

Because the ICTS could eventually lead to some reorganization of feeder bus networks servicing communities outside the City and could contribute to improved service, there is a possibility of cost sharing arrangements with the City and the Region. However, at this time it is not possible to determine if there will be such sharing and consequently, this analysis proceeds with the assumption that the City of Hamilton will bear the entire cost. Given this assumption, the $11.1 million represents the maximum that the City of Hamilton would have to pay.

At this early stage in the ICTS development project, there are a variety of items that have not been fully resolved. At the moment, it is anticipated that if the decision to proceed with the ICTS moves on schedule, construction will begin by mid 1983. The opening of the ICTS would be at some point during the summer of 1986. For the purpose of analyzing the

financial impacts of the three year project, it is assumed that financial committments will begin in 1983 and will last for three years. It is further assumed that the financial burden will be divided equally during the three years producing a yearly committment of 3.7 million dollars. While these assumptions clearly simplify the eventual financial arrangements, they are currently the best approximations available.

It should be noted further, that this analysis does not take into consideration certain factors which could have the effect of reducing the financial burden on individual taxpayers. It is difficult to quantify the amount and timing of development of commercial enterprises that might arise in the vicinity of the proposed ICTS route (as discussed in previous chapters), since this will depend both on market demand and the integration of public and private sector activities with the ICTS system. To the extent that development is increased or the timing advanced the City's taxable assessment could be increased, thereby reducing the burden on individual taxpayers. Consequently, the scenarios developed here can be considered as conservative.

3.2 Financial Alternatives

There are 3 basic alternatives for financing the ICTS project: (1) financing all or part of the project from current revenues; (2) a special three year levy; and (3) issuing debentures.

Current Revenues

Financing from current revenues would mean that other projects, possibly including some of those already incorporated in the five year capital program, would be replaced or delayed, so as to accommodate the required ICTS expenditures. Given the variety and timing of the various municipal and regional projects, it is not possible to be specific as to possible alternatives for current revenue financing. Any proposals to adjust the priorities

EXHIBIT 3.1

PROJECTED TAXABLE ASSESSMENT TO 1999

	TAXABLE ASSESSMENT ($ 000's)			BLENDED TAX YIELD (COMMERCIAL, INDUSTRIAL + .85 RESIDENTIAL) ($)
	RESIDENTIAL AND FARM	COMMERCIAL/ INDUSTRIAL AND BUSINESS	TOTAL	
1980 (actual)	477,763	366,133	843,896	772,232*
1981	482,541	369,794	852,335	779,955
1982	487,366	373,492	860,858	787,754
1983	492,240	377,227	869,467	795,632
1984	497,162	380,999	878,162	803,588
1985	502,134	384,809	886,943	811,624
1986	507,155	388,658	895,813	819,741
1987	512,227	392,544	904,771	827,938
1988	517,349	396,469	913,818	836,217
1989	522,522	400,435	922,957	844,579
1990	527,748	404,439	932,186	853,025
1991	533,025	408,483	941,508	861,555
1992	538,355	412,568	950,923	870,171
1993	543,739	416,693	960,432	878,872
1994	549,176	420,861	970,037	887,661
1995	554,668	425,069	979,737	896,538
1996	560,215	429,319	989,534	905,689
1997	565,817	433,613	999,430	914,558
1998	571,475	437,949	1,009,424	923,704
1999	577,190	442,328	1,019,518	932,941

Assumes 1%/Year increase in taxable assessment.

* 477,763 X .85 + 366,133 = 772,232

of selected projects in order to accomodate the ICTS would have to be approved by the Regional and Municipal Councils. Consequently, this analysis will only focus specifically on the last two alternatives, i.e. the special three year levy and the issuing of debentures.

Special Three Year Levy

The second alternative, a special three year levy, follows the assumption that the financial obligations for the 11.1 million dollars will be incurred over three years at a cost of 3.7 million dollars per year. This yearly obligation would be met by a special levy which would be the specific responsibility of City of Hamilton taxpayers.

Long Term Debentures

The third option for financing of the project would be through the issuing of long term debentures. Again, under the various timeframe and interest rates scenarios, this alternative assumes that there will be three individual debenture issues during 1983, 1984 and 1985,each for the amount of 3.7 million dollars.

3.3 Financial Analysis

Before proceeding with the analysis of the impact on mill rates under the special levy and debenture alternatives, it is first necessary to identify the taxable assessment that will be available for the years requiring municipal funding. Exhibit 3.1, opposite, indicates the taxable assessment that would be provided each year from 1980 to 1999. This timeframe for the assessment projections has been selected since the financing period under the most extended alternative (the fifteen year debenture issue) would require 17 years. The three $3,7 million debentures would be issued from 1983 to 1985, and after the fifteen year terms, the issues would be retired during 1997 to 1999.

Using the basic assumption employed in the City of Hamilton 5 year capital budget program (1981-1985), taxable assessment will increase at the rate of 1% per year. The amounts identified in Exhibit 3.1 are in constant "assessment" dollars and reflect a projected real increase in the assessment base for the City of Hamilton. Assessment is divided into two major categories; (1) residential and farm, and (2) commercial/industrial and business. These two major categories have been treated separately because it is necessary to identify the financial burden that would be borne by individual homeowners and also because it is necessary to establish mill rates so as to retain the relationship between the two categories (i.e. the residential and farm rate is 85% of the rate for commercial/industrial and business).

As Exhibit 3.1 indicates, actual 1980 taxable assessment totaled approximately $844 million dollars of which $478 million was generated by residential and $366 million was generated by commercial/industrial. It is anticipated that by 1999 total taxable assessment will reach $1,019 million of which $577 million will come from residential and farm assessment and $442 million from commercial/industrial.

For the purpose of calculating the appropriate mill rates for each major category and maintaining the residential rate at 85% of the commercial/industrial, it is necessary to establish a blended yield which weights the two assessments in their appropriate proportions. The figures in the right hand column of Exhibit 3.1, represent the number of dollars produced by one mill commercial/industrial levy, and .85 mills residential levy. These figures will be used in the following analysis of the two financing alternatives under consideration. It should be noted that all analysis is based on the capital cost of the ICTS in 1981 dollars. To the extent that the cost rises due to inflation between 1981 and the time of construction, the actual amounts paid by taxpayers would be higher than those given in this analysis.

EXHIBIT 3.2

COMMERCIAL/INDUSTRIAL AND RESIDENTIAL
MILL RATES FOR SPECIAL THREE YEAR LEVY

	1983	1984	1985
Commercial/Industrial	4.6504*	4.6043	4.5588
RESIDENTIAL	3.9528**	3.9137	3.8749

Assumes that $3.7 million is required for each year.

* $\frac{3,700,000}{795,632} = 4.6504$
(Per Exhibit 3.1)

** 4.6504 X .85 = 3.9528

Special Three Year Levy

It is assumed that for a special three year levy the City of Hamilton taxpayers would be required to support a cost of 3.7 million dollars per year over the 1983 - 1985 period. Exhibit 3.2, opposite, indicates the commercial/industrial and residential mill rates that would be required to support 3.7 million dollars for each of the three years. As indicated, in 1983 approximately 4.7 mills for commercial/industrial and approximately 4 mills for residential would be required. In 1984 and 1985 the mill rate requirements for commercial/industrial and residential would be 4.60 and 3.91 mills, and 4.56 and 3.87 mills. These decreasing rates are the results of the increase in the real taxable assessment base as indicated in Exhibit 3.1

The implications of these mill rates on individual homeowners are identified in Exhibit 3.3, overleaf, which establishes the monthly payment which would be required based on a range of different house prices. To take one example, the monthly payments which would be required of a taxpayer with a $5,000 assessment (i.e. a house of approximately $46,500 at 1981 market value) would be $1.65 in 1983, $1.63 in 1984, and $1.61 in 1985. The $5,000 level is that which is currently used by the Region as an approximation of the typical City of Hamilton residential assessment.

Issuing of Long Term Debentures

Although the City of Hamilton capital budget program indicates that the term of debentures should be evaluated in etiher 10 or 20 year periods, current market conditions have reduced the feasibility of longer terms for debentures. Consequently, for this financing alternative 10 and 15 year terms are used for the two basic scenarios. Interest assumptions

EXHIBIT 3.3

MONTHLY PAYMENTS BY HOUSING VALUE

FOR SPECIAL THREE YEAR LEVY

ASSESSMENT (10.75 EQUALIZATION FACTOR)	1983	1984	1985
$2,791	$0.92	$0.91	$0.90
3,721	1.23	1.21	1.20
4,651	1.53	1.52	1.50
5,000*	1.65	1.63	1.61
5,581	1.84	1.82	1.80
6,512	2.15	2.12	2.10
7,442	2.45	2.43	2.40
8,372	2.76	2.73	2.70
9,302	3.06	3.03	3.00
11,628	3.83	3.79	3.75
13,953	4.60	4.55	4.51
16,279	5.36	5.31	5.26
18,604	6.13	6.07	6.01
23,256	7.66	7.58	7.51

* TYPICAL HAMILTON ASSESSMENT.

Note; To determine approximate market value multiply assessment by a factor of 9.3.

EXHIBIT 3.4

PRINCIPAL AND INTEREST CHARGES
FOR 10 YEAR DEBENTURES*
($000's)

	1983	1984	1985-1992	1993	1994
13.5%	695.6	1,391.1	2,086.7	1,391.1	695.6
15%	737.2	1,474.5	2,211.7	1,474.5	737.2
18%	823.3	1,646.6	2,469.9	1,646.6	823.3
20%	882.5	1,765.1	2,647.6	1,765.1	882.5

* Assumes three debenture issues of $3.7 million in 1983, 1984, 1985

EXHIBIT 3.5

PRINCIPAL AND INTEREST CHARGES
FOR 15 YEAR DEBENTURES
($000's)

	1983	1984	1985-1997	1998	1999
13.5%	587.4	1,174.8	1,762.2	1,174.8	587.4
15%	632.8	1,265.5	1,898.3	1,265.5	632.8
18%	726.7	1,453.4	2,180.0	1,453.4	726.7
20%	791.4	1,582.7	2,374.1	1,582.7	791.4

Assumes three debenture issues of $3.7 million in 1983, 1984, 1985.

have been based on 13.5%, 15%, 18% and 20%. The 13.5% assumption is included in the analysis for purposes of comparison since it is the basic assumption for the interest rate level in the City of Hamilton capital budget program. It is further assumed that the phasing of debenture issues would take place over three years with 3.7 million dollar debentures being issued in each year of 1983, 1984 and 1985.

Exhibit 3.4, opposite, indicates the principal and interest charges that will be required for 10 year debentures under the varying interest assumptions. At this point in time, the rate available to the Region for such financing is approximately 18%. At this rate, charges in 1983 for the first 3.7 million dollar issue would be approximately $832,000. In 1984, when the second issue comes on stream, charges would be approximately $1,647,000. From 1985 to 1992 when the three issues are in effect, total yearly charges would be approximately $2,470,000. In 1993 and 1994 as the first and second issues are paid off charges would be $1,647,000 and $823,000 respectively.

Exhibit 3.5, overleaf, illustrates the principal and interest charges for 15 year debentures. Again looking at the 18% interest assumption, charges in 1983 would be approximately $727,000. By the time all three debentures were in effect, total charges (1985-1987) would be $2,180,000. As the first two debentures were paid off, charges in 1998 and 1999 would reduce to $1,453,000. and $727,000.

The mill rates required to support the principal and interest charges for the two debenture assumptions, are illustrated in Exhibits 3.6 and 3.7. Under the 18% interest assumption, in 1983 approximately 1.03 mills

EXHIBIT 3.6

COMMERCIAL/INDUSTRIAL AND RESIDENTIAL

MILL RATES FOR 10 YEAR DEBENTURES

	13.5%		15%		18%		20%	
	C/I	R	C/I	R	C/I	R	C/I	R
1983	.8743	.7432	.9266	.7876	1.0348	.8796	1.1092	.9428
1984	1.7311	1.4714	1.8349	1.5597	2.0491	1.7417	2.1965	1.8070
1985	2.5710	2.1834	2.7250	2.3163	3.0432	2.5867	3.2621	2.7728
1986	2.5456	2.1638	2.6980	2.2933	3.0130	2.5611	3.2298	2.7453
1987	2.5204	2.1423	2.6713	2.2706	2.9832	2.5357	3.1978	2.7182
1988	2.4954	2.1211	2.6449	2.2482	2.9537	2.5106	3.1662	2.6913
1989	2.4707	2.1001	2.6187	2.2259	2.9244	2.4857	3.1348	2.6646
1990	2.4462	2.0793	2.5928	2.2039	2.8955	2.4612	3.1038	2.6382
1991	2.4220	2.0587	2.5671	2.1820	2.8668	2.4368	3.0730	2.6121
1992	2.3980	2.0383	2.5417	2.1604	2.8384	2.4126	3.0426	2.5862
1993	1.5828	1.3454	1.6778	1.4261	1.8735	1.5925	2.0084	1.7071
1994	.7836	.6661	.8305	.7059	.9275	.7884	.9942	.8451

EXHIBIT 3.7

COMMERCIAL/INDUSTRIAL AND RESIDENTIAL

MILL RATES FOR 15 YEAR DEBENTURES

	13.5%		15%		18%		20%	
	C/I	R	C/I	R	C/I	R	C/I	R
1983	.7383	.6275	.7953	.6760	..9134	.7764	.9947	.8455
1984	1.4619	1.2427	1.5748	1.3386	1.8086	1.5373	1.9695	1.6741
1985	2,1712	1.8455	2.3389	1.9881	2.6860	2.2831	2.9251	2.4863
1986	2.1497	1.8272	2.3157	1.9683	2.6594	2.2605	2.8962	2.4618
1987	2.1284	1.8091	2.2928	1.9489	2.6330	2.2381	2.8675	2.4374
1988	2.1073	1.7912	2.2701	1.9296	2.6070	2.2160	2.8391	2.4132
1989	2.0865	1.7735	2.2476	1.9105	2.5812	2.1940	2.8110	2.3894
1990	2.0658	1.7559	2.2254	1.8916	2.5556	2.1723	2.7832	2.3657
1991	2.0454	1.7386	2.2033	1.8728	2.5303	2.1508	2.7556	2.3423
1992	2.0251	1.7213	2.1815	1.8543	2.5053	2.1295	2.7283	2.3191
1993	2.0051	1.7043	2.1599	1.8359	2.4805	2.1084	2.7013	2.2961
1994	1.9852	1.6874	2.1385	1.8177	2.4559	2.0875	2.6746	2.2734
1995	1.9656	1.6708	2.1174	1.7998	2.4316	2.0669	2.6481	2.2509
1996	1.9457	1.6538	2.0960	1.7816	2.4070	2.0460	2.6213	2.2281
1997	1.9268	1.6378	2.0756	1.7643	2.3837	2.0261	2.5959	2.2065
1998	2.2718	1.0810	1.3700	1.1645	1.5734	1.3374	1.7134	1.4564
1999	.6296	.5352	.6783	.5766	.7789	.6621	.8483	.7210

EXHIBIT 3.8

MONTHLY PAYMENT BY HOUSING VALUE

FOR 10 YEAR DEBENTURE AT 18%

Note: Approximate 1981 Market Value is the Assessment multiplied by a factor of 9.3.

ASSESSMENT	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
$ 2,791	$ .20	$ .40	$ .60	$ .59	$ .59	$ .58	$ .58	$ .57	$ .57	$ .56	$ .37	$ .18
3,721	.27	.54	.80	.79	.79	.78	.77	.76	.76	.75	.49	.24
4,651	.34	.67	1.00	.99	.98	.97	.96	.95	.95	.94	.62	.31
5,000*	.37	.73	1.08	1.07	1.06	1.05	1.04	1.03	1.02	1.01	.66	.33
5,581	.41	.81	1.20	1.19	1.18	1.17	1.16	1.14	1.13	1.12	.74	.37
6,512	.48	.94	1.40	1.39	1.38	1.36	1.35	1.34	1.32	1.31	.86	.43
7,442	.56	1.08	1.60	1.59	1.57	1.57	1.54	1.53	1.51	1.50	.99	.49
8,372	.61	1.21	1.80	1.78	1.77	1.75	1.73	1.72	1.70	1.68	1.11	.55
9,302	.68	1.35	2.00	1.98	1.97	1.96	1.93	1.91	1.89	1.87	1.23	.61
11,628	.85	1.69	2.50	2.48	2.46	2.43	2.41	2.38	2.36	2.34	1.54	.76
13,953	1.02	2.02	3.00	2.97	2.95	2.92	2.89	2.86	2.83	2.81	1.85	.92
16,279	1.19	2.36	3.50	3.47	3.44	3.41	3.37	3.34	3.31	3.27	2.16	1.07
18,604	1.36	2.70	4.00	3.96	3.93	3.90	3.85	3.82	3.78	3.74	2.47	1.22
23,256	1.70	3.37	5.00	4.95	4.91	4.87	4.82	4.77	4.72	4.68	3.09	1.53

* TYPICAL HAMILTON ASSESSMENT.

for commercial/industrial and .88 mills for residential would be required for a 10 year debenture. These mill rates would reach peaks in 1985 of 3.04 and 2.59 when the third 3.7 million dollar debenture was issued. These mill rates would gradually decrease through to 1992 as the City's assessment base grew and would fall off rapidly in 1993 and 1994 as the first and second debentures were paid off.

For 15 year debentures at 18%, mill rates in 1983 for commercial/industrial and residential would be approximately .91 and .78. These would reach a peak in 1985 of 2.69 and 2.28 and would gradually decrease to 2.38 and 2.03 in 1997. In 1998 and 1999 as the first two debentures are paid off the rates would decrease dramatically to 1.57 and 1.34 mills, and .78 and .66 mills.

The implications of the debenture issues for individual homeowners under one of the scenarios are illustrated in Exhibit 3.8, opposite. As mentioned, 18% is the currently attainable rate; as well, it is most likely at this point in time that the available term for the debenture would be 10 years. Consequently, this Exhibit identifies the monthly payments required by individual taxpayers for a 10 year debenture at 18%. For a $5,000. assessment, monthly payments in 1983 would be approximately $0.37. This would increase to $0.73 in 1984 and reach a peak of $1.08 in 1985 as the third 3.7 million dollar debenture came on stream. With the increase in the assessment base, this monthly rate would gradually decrease to $1.01 in 1992 and would fall off sharply in 1993 and 1994 to $0.66 and $0.33 per month.

3.4 Conclusion

Under the three year special levy alternative the $3.7 million per year levy would require the typical residential taxpayers (based on $5,000. assessment) to pay a maximum of $1.65 per month or $19.80 per year. This compares with the 10 year debenture alternative which would require at most $1.08 per month or $13.00 per year during 1985 when the financial burden is the greatest.

In terms of monthly payments, the debenture alternative is attractive, since by spreading costs over a longer period, the immediate burden on the taxpayer is reduced. As well, once the rates and terms of the debentures were struck, the real monthly payments would decrease more dramatically than the indicated nominal decrease, due to the effect of inflation. Although inflation and inflationary expectations are in part built into the interest rate, it is important to emphasize that the real monthly payments (i.e. the value of the actual future dollars paid, expressed in 1981 dollars) would be lower once inflation is taken into account. Assuming an inflation rate of 15%, by the last year of the 10 year debenture in 1984, payments would be in 10 cent dollars, based on constant 1981 dollar amounts.

However, these advantages must be weighed against those of the special levy alternative. Although monthly payments are higher for the special levy, under current interest rates (18%) the payment for debentures is approximately two thirds of that required for the special levy financing which would be completed in three years. This is an important consideration since if interest rates continue to rise, the spread between the total payments under the two alternatives will increase in favour of the special levy. Under this assumption, it might be more advantageous to

discharge the debt over the shorter three year period. This would especially be the case if inflation were expected to decline markedly over the period of the debenture, for the value of future payments in 1981 dollars would thus be higher. In other words, if debenture interest rates decline, or if debenture interest rates and inflation both remain high it is relatively more attractive to debenture expenditures. If interest rates are high, but inflation is expected to decline appreciably after the date of debenture, the 3 year levy becomes relatively more attractive.

4. IMPACT ON LOCAL INCOME AND EMPLOYMENT

4.1 Introduction

This chapter describes the local income and employment impacts of expenditures on the proposed Hamilton-Wentworth ICTS. Impacts are discussed separately for two categories of expenditures:

- Capital Expenditures
- Operations Expenditures.

Impacts of capital expenditures would be temporary and short term, about 3 years in the case of the proposed ICTS. Operations expenditures would generate income and employment on a continuing basis.

Expenditures on construction and operation of the ICTS would flow directly to many businesses. The resulting business income, employment, and wages and salaries are referred to as direct impacts. Direct impacts constitute only part of the total effect of an expenditure on the local economy. A contract awarded to a local company for construction of a transit station would create a direct impact in terms of income to the company and employment and wages in the construction industry. But the construction company would have to make purchases of machinery, equipment, and other supplies in order to carry out the work. The equipment suppliers would, in turn, have to make purchases from other companies such as steel producers and foundries. Each supplier in turn creates demands on other suppliers, generating further income and employment as the original expenditure ripples through the economy.

The income and employment generated in industries which would support those businesses affected directly by ICTS expenditures are referred to as indirect impacts.

There is still a further component of the total economic impact. Employees in the industries directly and indirectly affected by the original expenditure (the transit station construction contract) would spend their wages on various consumer goods and investment, thereby creating further jobs and income in other businesses. This last category is referred to as induced impacts.

Total income and employment impacts (the sum of direct, indirect and induced impacts) of particular expenditures are often estimated by means of income and employment multipliers. The product of direct income or direct employment times the appropriate multiplier gives the sum of direct, indirect, and induced impacts in terms of total income in dollars or total employment in person-years. Multipliers have been calculated for various sectors of the Ontario economy and, to a limited extent, for specific regions of the Province[1].

This particular analysis attempts to address the impact of a specific project (the proposed ICTS) on the economy of a single region of the province (Hamiton-Wentworth). The income and employment multipliers which are available for use in the analysis of capital expenditures have been calculated for general industrial categories on a province-wide basis, and consequently include indirect and induced impacts which would occur in other parts of the Province as a result of ICTS related expenditures. The provincially based multipliers thus overstate the regional impacts, since the Regional Municipality of Hamilton-Wentworth would "import" a proportion of its input and consumer goods from the rest of the Province. This is sometimes expressed by saying that there is a "leakage" of expenditures from the local economy to the provincial economy.

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1 See for example, A.A. Kubursi and R.H. Frank, "Sectoral characteristics of the Ontario Structure of Production", Ontario Economic Review, March 1972, special supplement, or A.A. Kubursi, The Economic Impact of Tourism in Ontario and Regions, 1976, Ontario Ministry of Industry and Tourism, December, 1978.

EXHIBIT 4.1

CAPITAL COSTS OF THE PROPOSED HAMILTON ICTS

ITEMS	MILLIONS OF DOLLARS (1st Quarter 1981 Dollars)
GUIDEWAY (INCLUDES TRACKWORK)	48.4
STATIONS	6.6
UTILITY RELOCATIONS	2.6
MAINTENANCE FACILITY	9.2
VEHICLES (10)	9.5
COMMAND, CONTROL AND COMMUNICATIONS	8.0
POWER DISTRIBUTION	2.9
SYSTEMS ENGINEERING	2.8
SYSTEMS INTEGRATION AND TESTS	2.5
TRAINING	1.2
FINAL DESIGN (A & E)	4.4
PROJECT ADMINISTRATION	7.0
MISCELLANEOUS	6.0
TOTAL ESTIMATE	$111.1

SOURCE: Metro Canada Limited

In the case of operations expenditures there are relevant regional multipliers for income and employment. These multipliers were calculated to measure the impact of tourism expenditures in the public transportation sector (plane, bus, train, and boat) on the regional economy in the Counties of Wentworth, Lincoln, Brant, Haldimand, and Welland.

There will also be a variation in the total impacts generated by different expenditures which fall within the same industrial category, This will occur regardless of whether provincial or regional multipliers are used. One type of expenditure might generate more indirect and induced income than another type, which means a higher income multiplier should be applied to the direct income figure. The multipliers calculated for the various industrial categories represent average values based on many types of activity falling within each category. Therefore the multipliers for a general category will not necessarily be accurate predictors of the impacts of a specific project or activity which is included in that category.

Consequently, multipliers are used in this analysis only for the purpose of giving some indication of the potential magnitude of total income and employment impacts in Hamilton-Wentworth. The resulting estimates should not be regarded as accurate predictions.

4.2 Impacts of Capital Expenditures

Estimated capital costs for the preferred ICTS alignment, Route "W", are shown in Exhibit 4.1, opposite. These costs are based on the costs given in MCL report, Estimate of System Capital and Operating Cost, Report HW-1-19.3.

EXHIBIT 4.2

DIRECT AND INDIRECT EMPLOYMENT RELATED TO ICTS CAPITAL EXPENDITURES

	CAPITAL COST ($ M) (1981)	DIRECT					INDIRECT					TOTAL	
		HAMILTON-WENTWORTH	ONTARIO	CANADA	OTHER	TOTAL DIRECT	HAMILTON-WENTWORTH	ONTARIO	CANADA	OTHER	TOTAL INDIRECT	ALL REGIONS	HAMILTON-WENTWORTH
Guideway (incl. trackwork)	48.4	901	--	--	--	901	181-310	43-74	--	81-139	305-523	1206-1424	1082-1211
Stations	6.6	123	--	--	--	123	72-123	15-26	--	--	87-149	210-272	195-246
Utility Relocations	2.6	49	--	--	--	49	12-21	--	--	--	12-21	61-70	61-70
Maintenance Facility	9.2	172	--	--	--	172	26-44	7-12	--	9-16	42-72	214-244	198-216
Vehicles	9.5	11	43	--	--	54	30-51	32-55	2-4	3-6	67-116	121-170	41-62
Command and Control	8.0	--	82	--	21	103	5-9	6-11	--	28-48	39-68	142-171	5-9
Power Distribution	2.9	24	--	--	--	24	24-41	--	--	--	24-41	48-65	48-65
System Engineering	2.8	1	27	--	--	28	1-2	4-7	--	--	5-9	33-37	2-3
System Testing	2.5	1	23	--	--	24	1-2	3-6	--	--	4-8	28-32	2-3
Training	1.2	1	11	--	--	12	1	2-3	--	--	3-4	15-16	2
Final Design (A&E)	4.4	42	--	--	--	42	9-15	--	--	--	9-15	51-57	51-57
Projected Administration	7.0	93	--	--	--	93	13-23	--	--	--	13-23	106-116	106-116
Miscellaneous	6.0	--	--	--	--	--	--	--	--	--	--	--	--
	111.1	1418	186	--	21	1625	375-642	112-194	2-4	121-209	610-1049	2235-2674	1793-2060

SOURCE: Metro Canada Limited

Direct Impacts

Implementation of the ICTS would genetate direct employment in several construction trades; in the manufacture of vehicles and control systems; in engineering and architecture; and in project administration. Metro Canada Limited staff have prepared estimates of the number of person-years of direct employment in each capital expenditure category. These estimates, which are given in Exhibit 4.2, opposite, indicate the distribution of employment between Hamilton-Wentworth, other parts of Ontario, other provinces, and other countries, These are based on the following assumptions:

- architectural and engineering contractors will be Hamilton-Wentworth based;
- construction contractors will be Hamilton-Wentworth based;
- suppliers of pre-cast concrete sections will base their operations in Hamilton-Wentworth.

The basis for the employment estimates in each capital expenditure category is as follows:

Guideway

Based on ABAM and Metro Canada detailed labour and material estimates for the construction of foundations, columns, and beams.

The labour rates used are consistent with the 1981 "Dodge Manual".

Trackwork

Based on ABAM and Metro Canada quantity take offs for running rails and LIM rails. Estimate takes into account the manufacture of the running rails, LIM rail and all required fastening devices.

Stations

Based on Metro Canada and Cole Sherman quantity take offs for station equipment. Construction labour/material split as per the 1981 "Dodge Manual".

Total employment in the construction industry in Hamilton currently ranges between 4,500 and 5,000 persons. The ICTS project, therefore, has the potential to increase construction employment by slightly less than 10 percent. Statistics provided by Employment and Immigration Canada suggest that the current pool of unemployed construction workers (as measured by registrations at the Hamilton Canada Manpower Centre) would probably be adequate to meet the overall demands of this project, although no detailed investigation was made of the possibility of shortages in particular trades.

While the employment estimates for Hamilton-Wentworth are based on reasonable assumptions about local capability and labour availability, it is possible that direct employment of Hamilton-Wentworth residents would be less than the amount indicated, due to contractors from outside the Region being awarded contracts or local contractors using labour from outside the Region. Therefore the employment estimates for Hamilton-Wentworth should be regarded as the maximum amount of work available to local residents.

In addition to employment impacts, construction of the ICTS would directly generate $111.1 million in income to contractors, manufacturers, and professional services firms. Using the same assumptions as in the direct employment estimates i.e. all capital expenditures would be made with Hamilton-Wentworth firms with the following exceptions:

- command & control - $8.0 million
- engineering & testing - $5.3 million
- vehicles - $6.9 million

total local income could exceed $91 million. Based on an assumed average labour cost of $32,000 per person-year and 1,418 person-years of employment,

EXHIBIT 4.3

VEHICLE PARTS THAT COULD BE SUPPLIED BY HAMILTON-WENTWORTH COMPANIES

Wire Harnesses.

Batteries/Monitor/Box

Train Line Junction Boxes

37.5 V Distribution Panel

600 V DC Distribution Panel

Door Seals and Brushes

Door Slides

End Caps

Windows

Heating and Ventilation Systems

Linear Induction Motors

Steerable Trucks (assembly)

Fire Detection

Hydraulic Brakes

Track Brakes

Steering Linkage

Supervision

28% of Vehicle Cost ($2.6 million)

Source: Metro Canada Limited

about $45.5 million of this amount would be spent on wages and salaries and other employment benefits. As in the case of employment, however, this should be regarded as a maximum amount available to Hamilton-Wentworth, and could be considerably less if contractors from outside the Region are successful in winning contracts.

Indirect and Induced Impacts

In the construction phase the respending of direct capital expenditures would create indirect employment and income. A contractor responsible for construction of a station would have to purchase concrete from a concrete supplier and reinforcing rods from a steel products company. The concrete supplier would in turn purchase gravel and cement from other suppliers. Employment and income generated by these transactions between businesses which play a supporting role in the actual construction are the indirect impacts.

Induced impacts are created by the consumer and investment expenditures of employees who earn income from the companies directly and indirectly affected by the capital expenditures on the ICTS system.

The employment and income multipliers for the construction industry in Ontario as a whole are 2.94 and 2.07[1], respectively. In other words, for every person-years of employment are created in the construction industry, an additional 1.94 person-years of employment are created in various other sectors of the Ontario economy through indirect and induced impacts. In the same way, every dollar of expenditure in the construction industry generates a total of $1.07 additional income to other businesses in the Province through indirect and induced effects.

The corresponding multipliers for Hamilton-Wentworth alone would

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1 A.A. Kubursi, The Economic Impact of Tourism in Ontario and Regions, 1976. Ontario Ministry of Industry and Toruism, December, 1978.

be lower because of "leakage" from the Regional economy to the Provincial economy. For example, a construction worker living in Hamilton-Wentworth who spends part of his earnings on entertainment in Toronto is not thereby creating any induced income or employment in Hamilton-Wentworth, although he does create impacts in the Ontario economy.

The estimates of total local income and employment impacts are thus subject to uncertainty in two areas. In the discussion of direct impacts it was explained that the proportion of the $111.1 million capital cost which could be classified as direct income to Hamilton-Wentworth businesses depends on the selection of contractors for construction and the supply of certain components, which will occur at a later date. Therefore, the size of direct local income impacts is uncertain, although a maximum level has been indicated. Secondly, the magnitudes of the income and employment mulitpliers appropriate for this project in this region of the Province are not known. In fact, the size of the multipliers could be influenced by such decisions as choosing a steel guideway over a concrete guideway, since the value of locally supplied materials would probably be different for the two types of structures. Using 4,500 tons of structural steel in the guideway would likely generate greater local indirect impacts than the concrete guideway (which would, for example, use cement manufactured outside the region).

Some assistance in estimating indirect employment impacts without resort to an employment mulitplier has been provided by Metro Canada Limited, as shown in Exhibit 4.2. Indirect employment in Hamilton-Wentworth is indicated as ranging from 375-642 person-years. There are 3 points pertaining to this estimate which must be stated:

1. the estimate covers only a portion of total indirect employment as defined in the discussion above; it covers only labour employed by the immediate suppliers to the contractors, e.g. labour involved in producing reinforcing rods is included, but not the labour required to produce the steel from which the rods are made;

2. induced employment is not included;

3. it is assumed that all materials for which there are potential Hamilton-Wentworth suppliers would in fact be purchased from the local suppliers, e.g. Exhibit 4.3 opposite lists ICTS vehicle components valued at $2.6 million which are assumed to come from Hamilton-Wentworth suppliers.

The first and second of these factors means that the estimates in Exhibit 4.2 understate total employment impacts, while the third factor may overstate a portion of indirect employment because of the assumption that local suppliers would in all cases win out over suppliers from outside the Region.

If it were to be assumed that 40-60% of the indirect and induced employment indicated by the provincial multiplier of 2.94 would be located within Hamilton-Wentworth (on the basis that it is a well developed region, but is located within a broader geographic region which is also intensively developed), then indirect and induced employment from the capital expenditures would range from 1,110 to 1,650 person-years (direct employment x 1.94 x 0.4 and 0.6). This is substantially higher than the 375-642 person-years estimated by Metro Canada Limited for a portion of the indirect impacts. This latter range, as stated above, is subject to factors both of overstatement and understatement, while the former range is based on a crude estimate of the appropriate multiplier. Resolving all the uncertainties would be virtually impossible, yet it might reasonably be speculated that actual indirect and induced employment in Hamilton-Wentworth would fall somewhere in between the two ranges of 375-642 and 1,110-1,650 person-years. If indirect and induced employment

amounted to 1,000 person-years, then total employment related to the project would be approximately 2,400 person-years. To illustrate how this total employment might be achieved, it is equivalent to 90% of the 1,418 person-years direct employment being located in Hamilton-Wentworth together with 40% of the provincial employment multiplier effect. It is also equivalent to 60% of the direct employment being located in Hamilton-Wentworth together with 60% of the provincial employment multiplier effect.

The maximum potential total direct local income was earlier estimated at $91.0 million. If it is again assumed that 40-60% of the indirect and induced income calculated by the provincial construction industry multiplier would occur in Hamilton-Wentworth, then indirect and induced income in the Region would be about $39-58 million ($91.0 million x 1.07 x 0.4 and 0.6). This is, however, only an approximation.

4.3 Operational Expenditures

Direct Impacts

Estimates of the direct impacts of ICTS operating expenditures are based on information supplied by Metro Canada Limited. Direct employment involved in operating and maintaining the system would vary depending on whether stations were or were not manned. TThe fully automated system would have no station fare collectors or train drivers; manned station system would have station fare collectors. Exhibit 4.4, opposite, shows employment ranging from 22 persons earning about $646,000 (1981 dollars) in wages and salaries for the fully automated system to 42 persons earning about $1,129,000 in the manned station system. Overhead related to these levels of employment could range from about $646,000 to $1,129,000, which would cover the cost of all employee fringe benefits, building rent or mortgage payments, office supplies, and other related items.

EXHIBIT 4.4

ICTS OPERATING EXPENDITURES AND EMPLOYMENT

Function	Number of Employees Fully Automated	Number of Employees Manned Stations	Wages, Salaries, and Contracts Fully Automated	Wages, Salaries, and Contracts Manned Stations
Management & Administration	2	2	$ 83,000	83,000
Operations Labour	10	30	301,000	784,000
Maintenance Labour	10	10	262,000	262,000
TOTAL	22	42	$ 646,000	$ 1,129,000
Overhead			$ 646,000	$ 1,129,000
Services Contracts:				
Fare Collection and Substation Computer Maintenance			$ 75,000	$ 75,000
Escalator Maintenance			76,650	76,650
Solid Waste			12,700	12,700
Housekeeping			47,000	47,000
Maintenance Materials			138,400	138,400
Energy			218,000	218,000
TOTAL DIRECT EXPENDITURE[1]			$ 1,860,000	$ 2,826,000

1 Rounded to nearest $000

SOURCE: Metro Canada Limited

Metro Canada Limited expects that operating employment on the existing Hamilton Street Railway system would not decrease as a result of implementation of the ICTS. At least initially then, the ICTS would increase transit system employment by 22-42 jobs, depending on the ICTS', mode of operation. No allowance is made for the effects of changes in level of usage of the system and supporting bus operations in the future.

In addition to the direct expenditures on wages and salaries, the ICTS would generate services contracts for housekeeping, solid waste removal, and maintenance with a total value of $211,350 per year. Employment related to these contracts would be about 5-6 person-years.

The annual cost of electrical energy to operate the ICTS is estimated to be about $218,000. The cost of electricity used would be paid directly to Ontario Hydro and as a result would probably have minimal impact on total local income. Another major cost item which would probably have relatively greater impact on local income is maintenance supplies, estimated to amount to $138,000 per year.

Indirect and Induced Impacts

As stated previously, income and employment multipliers have been calculated for the public transportation sector in the Hamilton-Wentworth/Niagara/Haldimand/Brant region of Ontario[1]. Nevertheless, these multipliers must be used with the same caution as the provincially-based multipliers. The ICTS system represents only one component of the public transportation sector, which comprises bus, train, plane, and boat, and therefore the multipliers for the entire sector may not be directly applicable to this particular system. Also, Hamilton-Wentworth is only one part of the region for which

1 A.A. Kubursi, The Economic Impact of Tourism in Ontario and Regions, 1976, Ontario Ministry of Industry and Tourism, 1978.

the multipliers were calculated. It is suggested that the multipliers be regarded only as giving an approximate indication of the potential magnitude of total impacts.

The regional income and employment multipliers calculated for the public transportation sector are 1.11 and 2.02, respectively. In other words, total local income (the sum of direct, indirect, and induced income) would probably be only marginally larger than the direct income given in Exhibit 4.4 (not including the energy costs which would probably have a minimal impact on local income). Total employment could be in the range of twice the direct employment estimated in Exhibit 4.4, meaning each transit system job would be matched by another person-year of employment in other sectors of the economy. It is impossible at this point, however, to predict whether this level of indirect and induced employment would actually be realized in Hamilton-Wentworth.

4.4 Total Impact Versus Net Impact

This analysis has discussed the income and employment impacts of the total estimated capital and operating expenditures of the proposed ICTS. The capital expenditures are to be funded 90 percent by the Governments of Ontario and Canada and the remaining 10 percent by local funds raised through the Regional Municipality of Hamlton-Wentworth. Operating deficits are to be covered for at least the first several years of operation by the Government of Ontario through a special subsidy agreement.

If it is assumed that the total capital and operating expenditures are amounts that would not otherwise be spent in Hamilton-Wentworth, then the net income and employment impacts of the ICTS project would equal the total impacts. However, it is probable that some portion of the total expenditures, perhaps the 10 percent local share of capital costs, would be spent

in some way in the local economy regardless of the ICTS project. The net impacts of the project would thus equal the total impacts less the impacts of alternative forms of expenditure. It would not necessarily be correct, however, to say that this would reduce the impacts of the ICTS by 10 percent, since the multipliers associated with the alternative expenditure could be smaller or larger than the multipliers for the ICTS expenditure.

Of the funds provided by the Governments of Canada and Ontario, part would originate in taxes paid by residents and businesses in the region. However, elimination of the Hamilton-Wentworth project would not necessarily lower expenditures of these levels of Government - rather it is likely that funding would be diverted to other projects elsewhere in the province (or in the case of the Federal Government, possibly elsewhere in Canada). No adjustment is thus made for this factor.