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8.0 SOCIO-ECONOMIC ENVIRONMENT

8.1 INTRODUCTION

This chapter provides a **socio-economic impact assessment (SEIA)** for the proposed Floodway Expansion Project, reflecting Section 6.4 of the EIS Guidelines.

Socio-economic studies consider people, their lifestyles and their communities. In so doing, they take into account the myriad of interrelated factors that contribute to social and economic welfare for different groups of people. These factors include the ways people do things to survive and develop, how they interact with the natural environment, and how they use their built environment. Way of life, public health and safety and other health issues, culture and heritage, community organization and cohesion, plans for the future, spirituality and values are also important factors.

In the case of the Project, socio-economic studies have focused on components of the socio-economic environment identified in the EIS Guidelines:

- Resource Use: Use of land and resources (such as fish, wildlife, vegetation and water) by people for commercial, domestic, sport and recreational uses. This also includes land and resources used by Aboriginal communities for traditional purposes.
- Economy: Economic activities in communities and regions affected by the Project, including employment and business sectors.
- Infrastructure and Services: Infrastructure and services in communities and regions affected by the Project.
- Personal, Family and Community Life: Personal, family and community life in communities and regions affected by the Project. This environment presents a broad picture of individual, family and community well-being and brings together many of the interrelated aspects that contribute to social and economic welfare. Specifically, it presents a population and demographic profile, outdoor recreation and travel, aesthetics, health status and health issues, way of life, culture and spirituality, and community cohesion and organization.

The SEIA identifies and, where possible, quantifies predicted effects of the Project for each of the above components of the socio-economic environment. To do this requires understanding of the current socio-economic environment, as well as possible future states with and without the proposed Project. Each of the components of the socio-economic environment constitutes a “type” of effect on people – and often the same people experience effects under more than one of these topics. Within the scope of the EIS Guidelines, the SEIA topics in this assessment reflect stakeholder interests that have been confirmed by comments and concerns noted during the Public Consultation and Involvement process (see Chapter 3).

The SEIA focuses on people and communities affected by the proposed Project, including (in accordance with the EIS Guidelines which focus on the *CEAA* definition of “environmental effects”) socio-economic

effects arising from the biophysical effects associated with the Project. For each component of the socio-economic environment, only those geographic areas that are likely to experience effects are scoped into in the initial assessment. For those people who are affected, it is also recognized that how socio-economic effects are experienced by them differs with the degree to which they are connected to the direct or indirect pathways of change from the Project. It is also understood that socio-economic effects can be affected by personal, family and community perspectives about their current situation, their goals and aspirations and how they see the Project affecting their vision for the future.

Section 8.2 provides an overview of the Approach and Methodology used to assemble the SEIA. Sections 8.3 through 8.6 each address effects on a key component of the socio-economic environment (i.e., resource use, economy, infrastructure and services, and personal, family and community life). In accordance with the EIS Guidelines and the overall EIA approach described in Chapter 2, the discussion of effects on each component of the socio-economic environment includes:

- Approach and methodology: including categories of assessment, sources of effects, scoping of geographic and temporal assessment boundaries, and overview of other specific methods of approach. Depending on the scope of effects, not all geographic areas within the Flood Study Region are included in the assessments for each socio-economic component.
- Existing environment: addressing baseline analysis and including review of current and evolving future socio-economic environments as affected by the Existing Floodway without the Project and other actions that have been and will be carried out. In accordance with the EIS Guidelines, each existing environment is described in sufficient detail to predict the effect of the Project.
- Socio-economic effects and mitigation: describing quantitatively and qualitatively both positive and negative effects likely to result from the Project (including cumulative effects) after consideration of proposed mitigation measures. These effects are described separately for two distinct phases of the Project, as set out in Chapter 2:
  - the Construction phase
  - the Operation phase (including both the inactive Operation phase once Project construction is completed and active Operation phases during a range of different flood events).
- Residual effects: including assessment of their significance using the approach set out in Chapter 2 (Section 2.3).
- Monitoring and follow-up: including implementation of impact management measures.

8.2 APPROACH AND METHODOLOGY

The SEIA focuses on people likely to be affected by the Project. In addition to addressing "expected effects" on such people, it also addresses planning and decision-making to mitigate adverse effects, enhance beneficial effects, and help those likely to be affected to be prepared (including, where relevant, to minimize the possibility of unexpected effects occurring and to address the potential consequences of the anticipated outcomes).

Keeping this focus in mind, the SEIA in this EIS has involved several dimensions as well as interactions with different individuals, groups and communities:

- Socio-economic effects to be considered for each of the included components, and particularly for personal, family and community life, were identified for consideration based on their interest to stakeholders and perceived public concern.
- Possible effects on each of the included socio-economic environments and appropriate mitigation strategies have been identified in consultation with those who may be potentially affected by the Project.
- Residual effects (those remaining following implementation of mitigation measures) have been assessed for their significance, taking into consideration possible cumulative effects from past, present and future projects.
- Flexible monitoring and follow-up measures have been proposed to provide the ability to respond to uncertain, as well as unexpected, effects in a way that reduces the potential for adverse effects.

8.2.1 Pathways and Sources of Effect

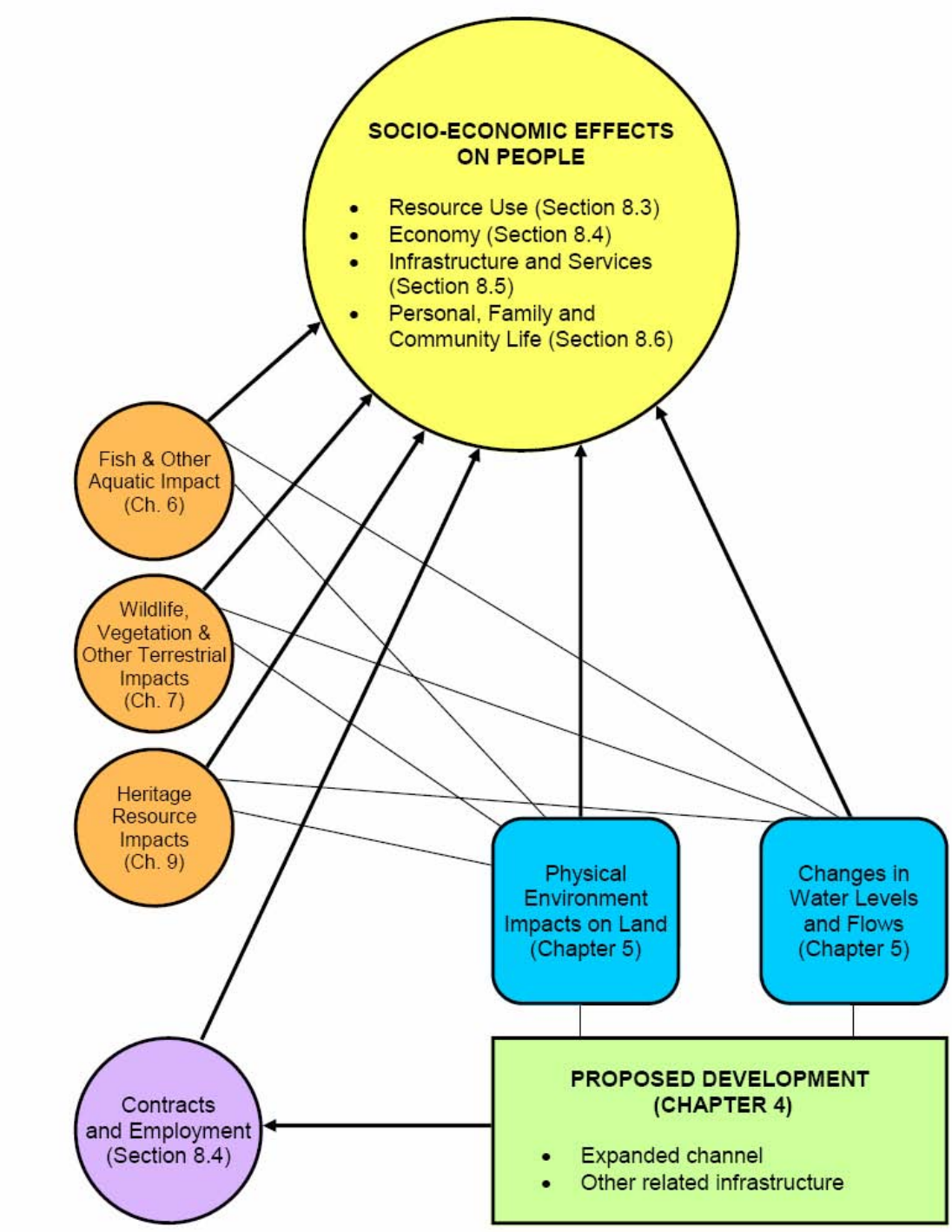
Effects on people accumulate directly from the Project (such as direct employment and expenditures) and indirectly through changes in the biophysical environment[1] in which people live, on which they sometimes depend for income and which sustains their way of life and culture. As such, the SEIA in many instances relies upon results set out in other chapters of the EIS (see Figure 8.2-1).

As reviewed in Chapter 2, it is relevant for the purpose of tests applied under *CEAA* to distinguish between two different types of socio-economic effects pathways to the Project:

- Socio-economic effects: caused by a change in the biophysical environment which, in turn, are caused by the Project (such as change in resource use caused by loss of fish habitat).
- Other socio-economic effects: socio-economic effects caused by something else related to the Project (such as an increase in job opportunities caused directly by Project construction).

Both types of socio-economic linkages to the Project are addressed in the description of effects of the Project. However, as reviewed in Chapter 2, only the first type of effect is an "environmental effect" as defined in *CEAA*. Accordingly, a socio-economic effect of the second type cannot be an "adverse environmental effect" within the meaning of *CEAA,* and is therefore not relevant for consideration in the EIS as a residual effect.

[1] For this SEIA, "biophysical environment" includes the land, water, and air environments and associated aquatic life and terrestrial life, e.g., wildlife.



Source: InterGroup Consultants Ltd.

Figure 8.2-1
How Socio-Economic Studies Relate to Other Parts of the EIS

"Sources of effect" in the SEIA are elements of the Project that have the potential to affect the socio-economic environment of one or more of the geographic regions under consideration (see Section 8.2.2). For various reasons (e.g., distance from the Project site) not all sources of effect associated with the Project will affect each of the regions under consideration. As outlined in Figure 8.2-1, there are three main sources of effect associated with the Project as regards SEIA:

- Project-related changes to land and associated physical and biophysical changes: These consist of changes to land (for location of physical infrastructure such as the Floodway Inlet, Outlet and Channel, Channel crossings and the West Dyke, as well the potential zone of influence for any groundwater regime changes related to the Project), aggregate (for construction of physical infrastructure) and associated biophysical changes during construction and operation of the Project under inactive (non-flood) conditions.
- Project-related changes in water levels and flows during flood events: Project-related changes in water levels and flows along portions of the Red River are predicted as a result of operating the Project during a flood event.
- Project expenditures (employment, purchases, planning): These consist primarily of employment and purchases generated during construction of the Project. These activities are a source of effect for all regions under consideration, but are expected to be felt the most in the Flood Study Region.

More detailed descriptions of the sources of effect for each socio-economic component are provided in Sections 8.3 through 8.6.

8.2.2 Geographic Area of Effect

The Project's effects on people depend largely on proximity to and level of involvement in the Project and land and resources affected by the Project. For this reason, the analysis for each type of effect has been broken down into two broad geographic regions (see Figure 8.2-2 re: Flood Study Region within context of southern Manitoba region):

1. Flood Study Region (as defined in Chapter 2)
2. Manitoba and Canada.

As defined, the Flood Study Region meets the following criteria:

- The Flood Study Region sets out the potential and perceived extent of direct physical effects related to the Construction and Operation phases of the Project, including both Operation-Inactive of the Project and Operation-Active during a flood event.
- Where the extent of physical effects was unclear, boundaries were chosen that were considered to be generous based on currently available information.
- In order to facilitate data collection and mapping, wherever possible study area boundaries were defined using municipal borders, highways or other generally linear boundaries.
- Study region definition also considered public concerns and perspectives on the nature and extent of potential effects of the Project.

It should be noted that, due to the specific requirements for assessing the potential socio-economic effects of the Project, the study areas used in the SEIA go beyond those used for the purposes of the biophysical effects assessment. The geographic regions used in the SEIA are described below.

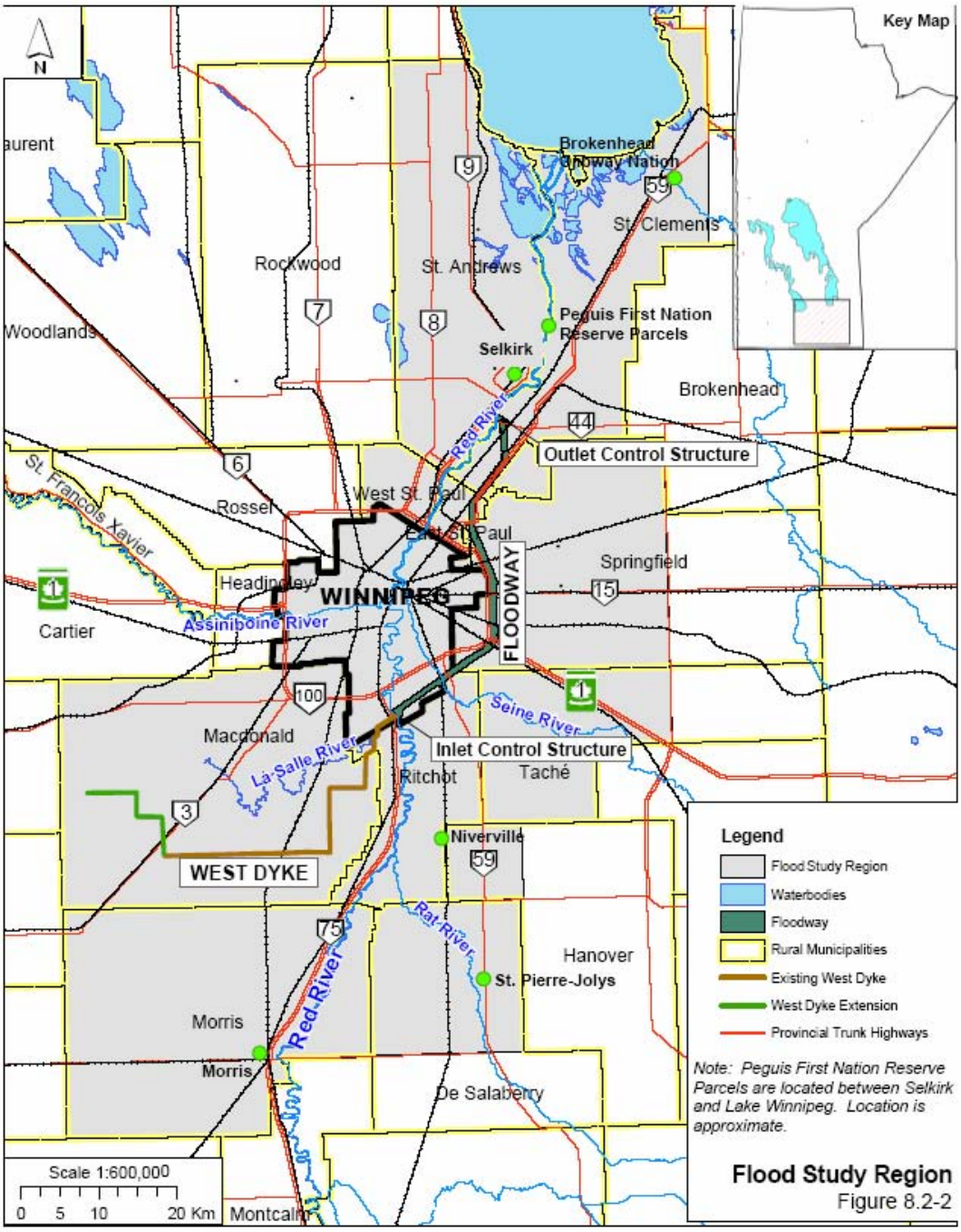


Figure 8.2-2
Flood Study Region in Context of Southern Manitoba

8.2.2.1 Flood Study Region

The Flood Study Region as defined in Chapter 2 includes:

- The Floodway Channel and associated right-of-way – including any potential land requirements for spoil disposal.
- The Floodway Inlet and Outlet Structures and associated right-of-way.
- The West Dyke, associated right-of-way and any potential land acquisition areas.
- Other areas involving direct physical works required by the project (for example erosion control works such as rip-rapping on the West side of the Red River across from the Outlet Structure).
- Other areas that might be disturbed during the Construction phase of the Project.
- The potential zone of influence of groundwater effects.
- The geographic extent to which the operation of the Project may influence water levels and flows during a flood event.

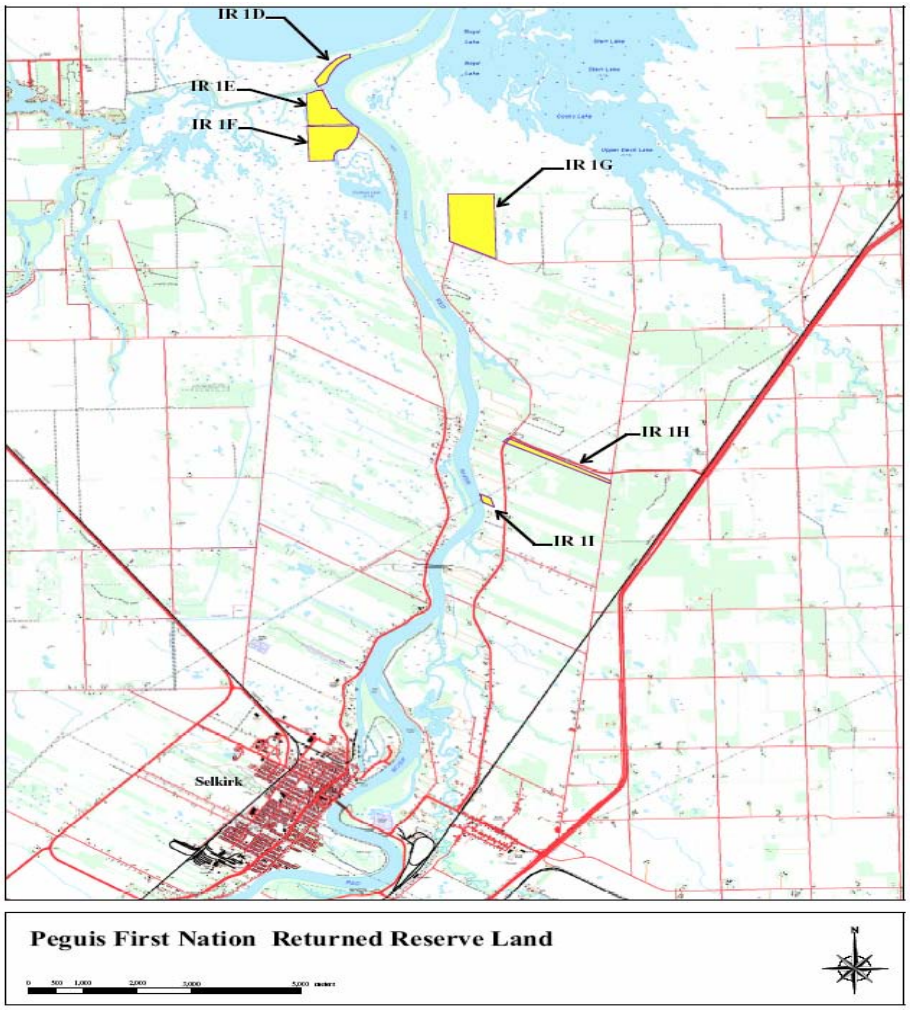
The Flood Study Region includes all or portions of the Rural Municipalities of Morris, De Salaberry, Hanover, Macdonald, Ritchot, Taché, Springfield, East St. Paul, West St. Paul, St. Clements, St. Andrews and the City of Winnipeg, City of Selkirk, Town of Morris, Town of Niverville, Village of St. Pierre-Jolys, Brokenhead Ojibway Nation and Peguis First Nation.

The northern extent of the Flood Study Region was defined by the northern boundary of the RM of St. Andrews and RM of St. Clements (both end at Lake Winnipeg). The eastern boundary of the Flood Study Region area was defined largely by the potential extent of groundwater related effects. The southern boundary of the Flood Study Region was generally defined by the extent to which there is a discernible change in the backwater effect associated with the operation of the Floodway Expansion relative to the Existing Floodway during extreme flood events. The southern boundary of the Flood Study Region was extended to the Town of Morris. The western boundary of the Flood Study Region was defined to the southwest to include the latest optimization of the West Dyke expansion in the RM of Macdonald. The City of Winnipeg, RM of West St. Paul and RM of St. Andrews were used to define the Northwestern boundary.

For purposes of conducting the SEIA in accordance with EIS Guidelines, potential effects of the Project on Aboriginal communities[2] (including lands and resources used for traditional purposes by such communities) are considered. Accordingly, the Peguis First Nation has been included in the Flood Study Region even though the Peguis First Nation community, where the on-reserve population resides, is located in the Interlake and is not geographically located in the Flood Study Region. No direct physical effects of the Project are anticipated on the Peguis First Nation community in the Interlake. However, Peguis has several uninhabited Reserve parcels located adjacent to or near the Red River between the

[2] An "Aboriginal community" is defined in this SEIA, in response to EIS Guidelines requirements, as a community where most of the residents are Aboriginal (i.e., Indian, Métis, Inuit or other Aboriginal Peoples) and that has a separate form of government, provides some level of service to its residents, and has clear community boundaries. MFEA and MMF have met to discuss the Project and plan future joint dialogue with MMF members to identify and address issues and concerns related to the Project.

City of Selkirk and Lake Winnipeg. These Reserve parcels are shown in Figure 8.2-3. As these Reserve parcels are located in the Flood Study Region, key socio-economic data tables used throughout the document, such as those indicating population and demographic characteristics, include Peguis First Nation[3]. Other communities in the Flood Study Region, such as Selkirk, are home to a substantial number of off-reserve Peguis First Nation members.



Source: Peguis First Nation. Used with permission.

Figure 8.2-3
Map of Peguis First Nation Reserve Parcels in the Flood Study Region

[3] Peguis is generally excluded from other socio-economic Tables that require infrastructure, services or other similar information specific to the Peguis community in the Interlake, such as housing values.

8.2.2.2 Manitoba and Canada

The Project may also have an economic effect on both Manitoba and Canada. Economic effects from the Project will include contributions to Gross Domestic Product (GDP) as a result of project expenditures for products, services and labour, project employment, and government revenues earned through income and sales taxes.

8.2.3 Time Period of Effect

There are two distinct time periods during which Project SEIA effects accrue:

- Construction phase: This phase consists of the estimated four years required to complete the channel excavation and the work on the Floodway Inlet, Outlet, West Dyke, Bridges and other crossings (assumed to extend from 2005 through 2008). During this phase, emergency summer operation of the Floodway could occur[4].
- Operation phase: This phase will see the operation of the Floodway Expansion and will extend from the end of construction throughout the life of the Project. Within the Operation Phase, there are two broad operating modes for the Project. The Operation-Inactive mode describes periods following construction when the Floodway gates are not engaged and the Floodway Channel is not being used to pass floodwater. This is the operating mode that will persist throughout the majority of the life of the Project. The Operation-Active mode describes periods following construction when the Floodway gates are engaged and the Floodway Channel is being used to pass floodwater (as noted in Chapter 2, four different flood events are considered for the purposes of this EIS in this regard ranging in frequency from 1:100 year return to 1:700 year return).

8.2.4 Approach to Assessment

The approach used in this study is based on: the EIS Guidelines developed by the regulators; studies and literature developed following the 1997 Red River Flood; and SEIA literature. While greater detail on the specific methodology used to assess effects for each topic area is provided in the relevant sections, the general approach for assessing socio-economic effects followed the overall assessment approach described in Chapter 2.

The SEIA began with a scoping step which was designed to identify the potential nature of effects on people, which pathways could be present between the Project and people, who could be affected (e.g., people in what geographic area) and when (e.g., during what phase and for how long). The scoping step began with a “blank slate”, considering potential effects where and when they may occur.

[4] Emergency conditions during summer in 2002 and 2004, reflecting high levels of the Red River in Winnipeg and the threat of severe thunderstorms, resulted in summer operation of the Existing Floodway. During construction of the Project, operation of the Floodway during summer has the potential to cause serious disruption in construction activities resulting in material delays and costs. Accordingly, prior to construction of the Project, Manitoba/MFEA plan to define conditions under which emergency summer operation of the Floodway could reasonably occur during construction, after due consideration of effects on construction schedules and tender documents.

For purposes of the SEIA, the scoping step helped to define:

- the areas and communities potentially affected – who would need to be included in the study program
- the nature of potential effects and pathways of effect – what kinds of pathways between the Project and people could be discerned, particularly focusing on adverse effects and on pathways via the physical and biophysical environment; this helped to identify who should be approached and the types of questions to ask in order to inform the EA Study Team (recognizing that public involvement would also need to offer general opportunities for people to identify perceived pathways beyond those scoped); the potential pathways of effect also provided a focus for the information about the existing environment that needed to be collected.

Table 8.2-1 sets out the anticipated effects components by study region after considering these pathways of effect.

Table 8.2-1
Main Socio-Economic Topics Discernible by Study Region

Study Area	Resource Use	Economy	Infrastructure and Services	Personal, Family and Community Life
Flood Study Region[1]	X	X	X	X
Manitoba/Canada		X		

Note:
1. Geographic extent of some effects within the Flood Study Region is expected to vary; some effects are anticipated to be confined to the immediate vicinity of the Floodway Channel and West Dyke, while others will extend considerably further.

The scoping process relied on a number of sources, including:

- SEIA guidelines.
- Stakeholder workshops, meetings with municipalities and public open houses conducted as part of the PIP (see Chapter 3).
- Review of literature and studies conducted with respect to the 1997 Red River Flood and flood protection.
- Reviews of SEIA literature, previous SEIAs and experience, especially with respect to large-scale projects located in Western Canada.
- Project description information.

Preliminary setting data for the existing baseline environment was obtained from published sources. More detailed information particularly for communities in the Flood Study Region was collected. In addition to describing historical and current situations for the regions under consideration, an assessment was made of what the situation would be like in the future without the proposed Project. Information was also obtained from key person interviews, the PIP consultation, available reports and statistical sources. In most cases statistical data was collected and organized at the municipal level. Although in some cases only portions of some municipalities are in the Flood Study Region, throughout the document statistical data was presented for the entire municipality.

Reviews of 1997 Red River Flood literature, SEIA literature, previous SEIAs and experience of other relevant projects, particularly other large scale projects in Western Canada, were used for three purposes:

- To assist in determining the major sources of effect on the socio-economic environment;
- To assist in identifying or determining the nature or extent of effects. 1997 Red River Flood literature, SEIA literature, previous SEIAs and SEIA experience were all used to assess effects related to construction, flood effects, emergency response employment, and personal, family and community life in the Flood Study Region; and
- To identify possible monitoring and impact management strategies based on those that have proven effective on other, similar projects.

Key literature and SEIAs considered as part of this review included the following:

- *Living with the Red* – Report of the International Joint Commission to the Governments of Canada and the United States on Reducing Flood Impacts in the Red River Basin (2000).
- Flood Protection Studies for Winnipeg – KGS Group report (2001).
- Report to Government on Public Meetings: Flood Protection Studies for Winnipeg – Manitoba Clean Environment Commission report (2002).
- Reports and studies from the Flood Research Partnership.
- Flood Control for East Grand Forks, Minnesota and Grand Forks, North Dakota – Final Environmental Impact Statement (1998) U.S. Army Corps of Engineers – St. Paul District.
- Voisey's Bay Mine/Mill Project – review of the Environmental Impact Statement (1997) and the Monitoring and Follow-up Program (1998).
- Cigar Lake Project – experience with and review of the socio-economic assessment included as part of the Environment Impact Assessment (1995).
- Diavik Diamond Mine – review of the Socio-economic Monitoring Agreement (1999).
- Wuskwatim Projects - review of the socio-economic assessments for the Wuskwatim Generation and Transmission Projects (2003).

8.3 RESOURCE USE

8.3.1 Approach and Methodology

This section considers potential effects of the Project on resource use including commercial resource use, residential land use, and Aboriginal land and traditional resource use. It addresses socio-economic components set out in Section 6.4.1 of the EIS Guidelines:

> *"The Environmental Impact Statement shall describe…sufficient detail regarding domestic, commercial and recreational use of resources, including fish, clams, wildlife, vegetation and water shall be provided to predict project related effects; and lands and resources uses for traditional purposes by Aboriginal communities."*

Resource use is integral to the economic fabric and well-being of many communities, and is part of the day-to-day lives of many individuals and families. Beyond choices made by individuals, particularly with respect to private land, to varying degrees these uses can be subject to land use and development controls at the municipal level, as well as regulatory and management involvement of provincial (and to some extent federal) governments. Land and resource uses shape the development of communities and regions. Municipal development plans are a key vehicle through which communities plan for the future and express their vision for the way that they wish to see their communities develop. Planning for various land and resource uses can also involve a range of other parties, including provincial and federal governments, conservation districts, and special initiatives, such as the Capital Region Review.

This section addresses the following land and resource uses, considering both current developments and, where available and relevant, plans for future developments[5]:

- Commercial resource uses (particularly focusing on agriculture).
- Residential land use.
- Aboriginal land and traditional resource use (focuses on such uses by "Aboriginal communities" as defined in this EIS)[6].

[5] Sport fishing, sport hunting and other recreation uses of the Flood Study Region (with emphasis on those in proximity to the floodway) are addressed in Section 8.6 Recreation and Travel (regarding outdoor recreation activities such as hiking, cross-country and downhill skiing) and Section 8.5 Infrastructure and Services (regarding community-based indoor recreation facilities). Use of water resources is addressed in Section 8.5 Infrastructure and Services (water supply).

[6] See Section 8.2.2.1. An "Aboriginal community" is defined in this SEIA, in response to EIS Guidelines requirements, as a community where most of the residents are Aboriginal (i.e., Indian, Métis, Inuit or other Aboriginal Peoples) and that has a separate form of government, provides some level of service to its residents, and has clear community boundaries. Traditional land and resource uses by Aboriginal communities occur on **reserve land** (held by the federal Crown for individual First Nations) and on provincial Crown land. Treaty Land Entitlement (TLE) lands are also in the process of being selected by some First Nations in Manitoba. MFEA and MMF have met to discuss the Project and plan future joint dialogue with MMF members to identify and address issues and concerns related to the Project.

An initial scoping step was undertaken to identify the potential pathways and sources of effect, including pathways through physical and biophysical effects, whereby the proposed Project could affect the above land and resource uses during the construction and Operation phases (see Section 8.3.1.2).

8.3.1.1 Sources of Information

Sources of information used for assessing land and resource use effects included the following:

- Review of Existing Data Sources: This included a review of published and unpublished sources of information that could characterize existing land and resource uses, such as relevant Census data, available mapping, and Crown land lease agreements. Available municipal development plans and reports produced by the Capital Region Review were reviewed to help understand both current issues and future goals and plans. Literature related to the effects of flooding in the Red River Valley were also reviewed, in particular the IJC report "Living with the Red" and related studies.
- Key Person Interviews with Elected Municipal Leaders and Staff and Provincial Planners: a key person interview program was undertaken with all but one municipality in the Flood Study Region (27 people in total were interviewed, a list of those interviewed and sample question guides appear in Appendix 8A) to review current land and resource uses as well as future plans and issues relevant to understanding potential effects of the Project (as well as an array of other topics). Interviews reviewed the experience of the 1997 Flood and its effects. Results of these interviews supplemented information collected from other data sources.
- Key Person Interviews with Staff of Manitoba Agriculture: Six interviews were conducted with representatives from Manitoba Agriculture with experience in communities in the Flood Study Region. Current trends and issues in agriculture in the region were discussed as well as implications of flooding (particularly related to the 1996 and 1997 Floods) for agricultural operations.
- Other Key Person Interviews: Eight people were interviewed at two interview sessions that focussed on current and historical Aboriginal resource and land use, culture, heritage and experience with flooding in the Red River Valley[7].
- Results of Project Engineering Studies and Physical and Biophysical Impact Assessment Studies: Project description information, other engineering studies and results of physical and biophysical studies were analysed to develop an understanding of the nature and magnitude of potential effects of the Project via the pathways set out at the beginning of the process. Results of analyses of the effects of the Project on physical and biophysical environments were reviewed to determine whether and how these changes may affect the environment that is used by people. This information was then assessed in the context of the information obtained during interviews and from other data sources to develop an assessment of the potential effects of the Project on land and resource uses for commercial, residential, and traditional domestic (by Aboriginal communities) purposes.

[7] Not all of those who attended these sessions were Peguis First Nation members.

8.3.1.2 Sources of Effect

Except for flood-related sources of effect, Project-related pathways and sources of effect on land and resource use focus on the areas within the Flood Study Region in close proximity to the Floodway Expansion site. These sources of effect differ for each stage of the Project and area in proximity to the Project, and include:

- Disruption due to Construction Activity, Traffic and Access Issues (predominantly Construction phase): It is expected that there will be some traffic, access and disturbance issues (i.e., noise, dust, temporary land disruption) in areas in close proximity to the Project site during the Project Construction phase. These may temporarily affect the ability of people to access some areas and the availability of land for agriculture or other resource use.
- Land Acquisition (predominantly Operation-Inactive phase): It is anticipated that there will be some land acquisition required for the Project for right-of-way related to the Floodway Channel crossings and the West Dyke. This will affect land and resource use for the acquired land.
- Land Use (Construction phase and possibly Operation-Inactive phase): There may be effects on Crown land in the Existing Floodway right-of-way that is currently leased for haying or cropping. These land uses may be temporarily disrupted during construction or may be permanently affected by the development of recreation opportunities or by revegetation of the Floodway Channel and West Dyke with native plant species.
- Drainage (predominantly Operation-Inactive phase): It is anticipated that there will be some improvements to local drainage structures in close proximity to the Existing Floodway site as part of the Project. This may result in improved drainage during some spring and summer flood and rainfall events.
- Changes to water regimes (levels and flows) during flood events and subsequent impacts on infrastructure and services and resources used for business or economic purposes (Operation-Active phase – effects may extend to Operation-Inactive phase): The Project is expected to result in changes to the water levels and flows experienced during large flood events in the Flood Study Region. This may result in changes to flood damages experienced (e.g., agricultural damages experienced during a flood event). Further, a change in the perceived flood risk profile of a region may affect future land and resource use patterns in a community beyond the flood event time period. The changes to **water regimes** during a flood event may be either positive (i.e., a reduction in flood risk) or negative (i.e., an increase in flood risk).

8.3.2 Existing Environment

Resource use in the Flood Study Region is diverse and encompasses a range of activities including commercial land and resource use, residential land use and traditional land and resource use by Aboriginal communities. This section of the report discusses current land and resource use in the Flood Study Region, with emphasis on land and resource uses in and near the Existing Floodway and the Project site area.

8.3.2.1 Commercial Resource Use

The Flood Study Region includes the most active commercial area of the province, including the City of Winnipeg and surrounding municipalities. Commercial land use in the Flood Study Region includes areas used for industrial production, manufacturing, construction services and retail commercial businesses. Most of these activities are concentrated in the City of Winnipeg and other urban centres in adjacent municipalities. This section focuses on resource use activities beyond urban centres.

The primary form of commercial resource use in the Flood Study Region is agriculture. Other commercial resource activities include aggregate extraction and forestry, though these occur to a much lesser extent.

8.3.2.1.1 Agriculture

Agriculture is an important activity throughout the Flood Study Region. Historically it has helped to shape the way of life and development of the region. During key person interviews with representatives from Manitoba Agriculture and Food, certain general trends were noted in agriculture in the Flood Study Region. These trends include:

- The number of producers in the area tends to be declining, while farm size tends to be increasing. This trend was often attributed, at least in part, to the smaller economic margins on farm operations and the need to operate a larger area to maintain profitability.
- Similarly, it was noted that there was a trend toward more diversification, both in terms of crop mixes, and also into other related industries (such as seed operations).
- A general trend toward more and larger livestock operations was observed.
- Management practices were noted to be changing, with trends toward precision agriculture and low-till or zero-till operations.

The balance of this section of the report discusses current agricultural activity in the Flood Study Region, as well as effects on agriculture from previous flood events.

Effects of Flooding and the Existing Floodway on Agriculture

Flooding is a key risk for many agricultural producers in the Red River Valley. Manitoba Agriculture and Food representatives interviewed during the study indicated that the 1997 Flood resulted in delayed seeding for many producers and that when seeding finally did take place, soils tended to be saturated and more at risk to adverse effects from larger summer rain events. Some of the Manitoba Agriculture and Food representatives interviewed during the study noted that decreased yields were a problem in some areas in 1997 – in particular flax and canola were cited as being among the hardest hit crops. (Kristjanson *pers. comm.* 2004). Similar effects were noted for areas north of the City of Winnipeg with respect to the 1996 Flood. (Sykes *pers. comm.* 2004). It was also noted that areas affected by flooding tended to have more weeds that had an effect on crop yields and herbicide costs for approximately five years following the flood event. (Robert *pers. comm.* 2004).

Past flooding was also noted to have a critical effect on access. This was a concern both for producers who were directly affected by flooding and those whose land was not directly flooded but who were affected by highway and road closures and evacuations. Livestock operations were noted to be

particularly sensitive to these access impacts. Dairy operations lost access to markets and many livestock operators had to move their animals (which posed transportation, shelter and other logistical problems, as well as potential for lower yields). Some high value livestock could not be moved and either needed to be accommodated on-site (by temporary dyking) or in some cases destroyed.

Several of the Agricultural and Municipal representatives interviewed during the study also noted that financial implications of the 1997 Flood continue to affect some producers in the Flood Study Region today. These effects manifested in some cases in a reduction in the number of operators, as some producers sold their operations. For example, it was noted that there was a reduction in the number of market gardeners along the Red River as land was either expropriated or sold following the 1997 Flood. (Robert *pers comm.* 2004).

The effect of the Existing Floodway and West Dyke on drainage was a concern expressed both during interviews with Agriculture Representatives and by producers during workshops and public open houses.

In areas upstream of the Floodway Inlet, it was expressed that operation of the Existing Floodway causes higher water levels. Effects identified during spring operation included longer flood duration and higher water levels, both of which could delay seeding and result in lower yields. Summer operation of the Existing Floodway, such as occurred in 2002 and 2004, was noted to generally affect a smaller area, but to have a larger effect on those areas because in most cases crops were already in the ground and flooding caused a complete loss of yield on the affected areas. Compensation was available for producers affected by summer operation in 2002, and the Province has indicated that similar compensation will be available for those affected by the 2004 summer operation. However, even with compensation, summer operation of the Existing Floodway was a key concern noted during public workshops and open houses by those producers who were affected in 2002.

In areas east of the Floodway Channel, it was noted that the construction of the Existing Floodway split some farm operations into two parts. This caused some access problems as equipment needed to be moved across one of the few crossings available. It was also noted that the natural flow of drainage in the area is generally toward the North-West and that the Existing Floodway creates a barrier to this drainage pattern. There were concerns expressed that both the size and number of drains in the Existing Floodway were inadequate. This was a particular concern for some areas of Springfield, where soils tend to be more clay-like. It was noted that drainage was a concern in this area both during spring run-off and in the summer following large rain events. There were also concerns expressed in these areas that improving or increasing recreation access to the Floodway Channel would result in land use conflicts with agriculture. Specifically there was concern that an increase in recreation access and traffic would result in vandalism or other damage to haying areas or private buildings (either out-buildings or private residences).

Drainage was also a key concern noted for agricultural producers near the West Dyke. Concerns were expressed that culverts and drains were closed too early and opened too late in 1997, and that some areas flooded due to these closures, rather than direct impacts from floodwaters. Ongoing problems with

agricultural yields in borrow areas used for the emergency raising of the West Dyke were also noted. (Dobrowolski *pers. comm.* 2004).

Field Crops

In 1996, 506,677 hectares, or approximately ten per cent, of the province's area dedicated to field crops was within the Flood Study Region[8]. The Rural Municipality (RM) of Macdonald had the largest area in field crops of any of the municipalities in the Flood Study Region, followed by the RMs of Morris and Springfield. The RM of East St. Paul had the smallest field crop area of any of the municipalities in the Flood Study Region, reflective of its small size overall and rural residential character. Wheat was the largest crop in terms of number of acres in the Flood Study Region followed by other grains and oil seeds.

In 2001, a total of 484,891 acres were used for field crops in the Flood Study Region. This represented a decrease of approximately four per cent in total area from 1996. This compares to an overall decrease in field crop area for Manitoba as a whole from 4,726,533 hectares in 1996 to 4,710,302 hectares in 2001, or less than one per cent.

In 2001, the RM of Macdonald had the largest area of field crops (107,316 hectares) followed by the RM of Morris (92,854 hectares), RM of Springfield (53,778 hectares), RM of Hanover (44,749 hectares), RM of De Salaberry (43,765 hectares) and the RM of St. Andrews (41,447 hectares). Wheat was the most common field crop in the Flood Study Region with 173,441 hectares planted, followed by oats (78,785 hectares), canola (71,081 hectares), alfalfa (39,449 hectares), barley (39,079 hectares) and flaxseed (28,256 hectares).

Livestock

In 2001, approximately 36 per cent of the province's livestock were located in the Flood Study Region[9]. The largest number of livestock were located in the RM of Hanover (2,741,192 animals) followed by the RM of De Salaberry (725,236 animals) and the RM of Taché (400,044 animals), RM of Morris (306,135 animals), RM of Ritchot (288,119 animals) and the RM of Springfield (110,345 animals). Hens and chickens (3,692,674) were the most common livestock found in the Flood Study Region, followed by pigs (714,980), turkeys (139,469) and cattle (80,781).

From 1996 to 2001, there has been an approximate 18 per cent increase in the total number of livestock in the Flood Study Region, which is in line with the approximate 20 per cent increase seen provincially (Statistics Canada 1996).

Vegetables

In 2001, 113 hectares representing approximately five per cent of the province's area used for growing vegetables was located in the Flood Study Region[10]. Vegetable farming land use in 2001 was recorded in five RMs (Ritchot (42 hectares), St. Andrews (32 hectares), St. Clements (17 hectares), Morris (15

[8] Appendix 8.B, Tables 8.B-1 and 8.B-2.
[9] Appendix 8B, Tables 8B-4 and 8B-5.
[10] Appendix 8B, Tables 8B-5 and 8B-6.

hectares) and Hanover (7 hectares)). From 1996 to 2001, there was an approximate 46 per cent decrease in the area used for vegetables in the Flood Study Region, with an accompanying decrease of 34 per cent for the number of farms growing vegetables in the Flood Study Region. Provincially, there has been an approximate five per cent increase in the area used for vegetables from 1996 to 2001; however, the number of farms growing vegetables has decreased by about 18 per cent.

Haying and Cropping on the Floodway Right-of-Way

Currently, some portions of the Existing Floodway Channel and West Dyke right-of-way are used for forage or cropping by local landowners. Forage and cropping on these Crown lands are handled by way of lease agreements between landowners and the Province. Table 8.3-1 summarizes the current extent of haying and cropping leases on the Existing Floodway and West Dyke.

Table 8.3-1
Forage and Cropping Leases on the Existing Floodway and West Dyke

	Forage Leases	Cropping Leases
Total Leases Existing Floodway	25	10
Total Leases – West Dyke	2	0
Total Lease Area -Existing Floodway and West Dyke (hectares)	2,318	254

Source: Dureault *pers. comm.* 2004.

Based on interviews conducted with Agriculture Representatives, forage leases tend to be primarily for haying and crop leases tend to be seeded primarily for grains in similar mixes as the surrounding area. It was indicated during a conversation with a representative from Crown Lands Branch that the areas under lease generally are not the primary land farmed by the leaseholder, but represent a smaller additional area farmed by the producer. Though this land is owned by the Crown, during interviews conducted for the study it was noted that the distinction between what is Crown land and what is privately held land is not always clear to local landowners or residents.

8.3.2.1.2 Other Commercial Resource Use

During interviews conducted for the study, participants were asked to describe other commercial resource activities taking place in the Flood Study Region. The RM of Springfield noted aggregate extraction as an important resource use activity in the municipality and as a valuable aspect of the municipal economy. Other municipalities also indicated some aggregate related activities (including St. Andrews, Hanover and Taché). Representatives of other municipalities also indicated some aggregate extraction activities (including RMs of St. Andrews, Hanover and Taché). Representatives from RM of Taché also noted some forestry and peat moss extraction, though it was indicated that these activities take place primarily in the eastern-most portion of the municipality (east of Highway 12).

Gypsum rosettes are harvested in the area in close proximity to the Existing Floodway site. Gypsum rosettes were first identified in the Existing Floodway Channel when it was being constructed. Commercial harvesting took place at two locations along the Existing Floodway in 1997 and 1998. (Chow et al. 1999).

8.3.2.1.3 Future Trends and Planning for Commercial Resource Uses

Planning for future resource use is the Flood Study Region is a complicated exercise. The presence of the City of Winnipeg and many other urban centres creates conflict for land and resource use between agriculture, other resource activities and residential land use. The Manitoba Capital Region report noted the extent to which planning for the Capital Region must be aware of these potential conflicts, stating:

> *"... in any debate on where further residential growth should take place, it is necessary to take into consideration not only concerns over local autonomy, freedom of choice, urban sprawl and efficient use of infrastructure. Consideration must also be given to the implications of removing agricultural land from that use, the impact that residential development can have on rural drainage systems, and the potential conflicts that can arise between agricultural operations and residential communities."* (Regional Planning Advisory Committee 2003).

The Capital Region Report noted a growing concern that too much high value agricultural land was being removed from production and recommended that development on agricultural land should proceed with caution. (Regional Planning Advisory Committee 2003).

The need to keep an eye on the long-term sustainability of the soil and water resources that support agriculture in the Flood Study Region is a concern that was expressed by several of those interviewed during the course of the study. Perhaps the primary pressure on the resources that support agriculture in the Flood Study Region is the competition for land from residential development.

Many of the Development Plans for municipalities in the Flood Study Region contain provisions intended to protect and retain agricultural resource uses within their borders. For example, the Macdonald-Ritchot Development Plan (David E. Lettner and Associates 2003) lists as an objective for rural policy areas "To maintain and enhance the significant role of agricultural activities within the Macdonald-Ritchot Planning District."[11] The Macdonald-Ritchot Plan also notes that agricultural land uses will be given priority in Rural Policy Areas. The Selkirk and District Plan (which includes the City of Selkirk and Rural Municipalities of St. Andrews, St. Clements and West St. Paul) recognizes agriculture as the dominant land use within the District and contains provisions to support and strengthen this character of the area.

Many of the Development Plans also provide either restrictions on the size of livestock operations that may be established in the municipality (often with a maximum Animal Unit (AU) designation) or allow for municipal zoning by-laws that may establish such AU criteria. For example, the Rural Municipality of Morris Development Plan (2003) establishes a limit on new or expanding livestock operations of 1200 AU[12] for certain agricultural zoning districts. The Macdonald-Ritchot Development Plant allows municipal zoning by-laws to establish AU limits in agricultural areas.

[11] Page 15, Macdonald-Ritchot Planning District Development Plan.
[12] Page 12, Rural Municipality of Morris Development Plan.

With respect to other commercial uses, some of the Development Plans contained provisions to protect or support other commercial resource uses. For example, the Selkirk and District Plan contain provisions to protect areas that can support high quality aggregate extraction and areas with quarry mineral potential. Similarly, the rural municipality of Springfield Development Plan contains objectives to allow for the orderly and optimum use of mineral aggregates while minimizing potential environmental, social and land use impacts.

Drainage was also a key planning concern noted during interviews conducted for the study. In particular, representatives from the RM of Macdonald and RM of Springfield noted that drainage is a key planning concern in those municipalities. The RM of Macdonald noted drainage as a planning concern in the context of the largely agricultural nature of those areas south of the West Dyke. The RM of Springfield noted drainage concerns due to the effect of the Existing Floodway on drainage patterns. In addition, it was noted during interviews that the predominant soil types in the RM of Springfield are more clay-like and that the area tends to suffer from having too much water on the land at times.

In general, it appears that many of the municipalities in the Flood Study Region have taken steps via municipal planning processes to identify important areas for agricultural and other commercial resource use. In many instances, planning policies are in place to protect agricultural and other commercial resource use areas from encroachment. These measures can help to ensure that agricultural land use is protected and sustained in the Flood Study Region in the future.

8.3.2.2 Residential Land Use

This section includes a discussion of current housing conditions in the Flood Study Region, as well as current plans and trends in residential land use planning.

Effects of Flooding and the Existing Floodway on Residential Land Use

The 1997 Red River Flood had a considerable impact on land and resource use in the Flood Study Region. Tait and Rahman (1997) noted that approximately 1,200 homes in seven municipalities south of Winnipeg (De Salaberry, Franklin, Macdonald, Montcalm, Morris, Rhineland, Ritchot) were directly affected by the 1997 Red River Flood, with the majority of these (approximately 800) being in Ritchot. The threat of flooding also resulted in the evacuation of over 28,000 Manitobans (Ernst & Young, 1998). Other recent floods have also had dramatic effects on residential land use, notably the 1996 Flood for residents downstream of the Floodway Outlet.

During interviews conducted for the study, many concerns were noted with respect to the effects of flooding and the Existing Floodway on residential land use, including:

- Damage of recent large floods (1996 and 1997 Floods in particular) to residences were not adequately compensated or mitigated by the disaster financial assistance that was available following those flood events.
- Flood risk lowers property values for those areas that were flooded during recent flood events and makes properties that were not damaged more difficult to sell.

- Flood risk and zoning requirements either makes further residential development in some areas more difficult or impossible because of zoning restrictions and flood proofing requirements. This limits the potential growth of some municipalities in the Flood Study Region.
- Floodway operation and the backwater effect that it creates during operation is a further detriment to housing values, the area is perceived as 'marginal' and not valuable.

These comments reflect concerns not only with how flooding and the Existing Floodway affect existing residential dwellings in the Flood Study Region, but also effects on residential planning. The following sections discuss current residential land use and planning in the Flood Study Region.

8.3.2.2.1 Housing Characteristics

In 1996, approximately 66 per cent of all the occupied private dwellings in Manitoba were located in one of the communities in the Flood Study Region[13]. The majority of these dwellings (approximately 89 per cent of the Flood Study Region total and 59 per cent of the Manitoba total) were located in the City of Winnipeg. Based on the Census data, the average number of bedrooms was approximately the same for the Flood Study Region and the Province of Manitoba as a whole. In 1996 a smaller percentage of homes were designated as requiring major repairs than the provincial average (9.0 per cent compared to 10.7 per cent).

The total number of occupied private dwellings in communities in the Flood Study Region increased by approximately 3 per cent between 1996 and 2001 (from 275,365 in 1996 to 284,315 in 2001). This was approximately the same increase experienced in Manitoba as a whole over the same period. In 2001, Winnipeg continued to have approximately 89 per cent of the private occupied dwellings in the Flood Study Region and 58 per cent of the total number of occupied private dwellings in Manitoba.

The number of owned dwellings in the Flood Study Region increased from 178,250 in 1996 to 188,630 in 2001 – an increase of approximately 5.8 per cent. This was approximately in line with the increase in owned private dwellings in Manitoba as a whole, which increased by approximately 5.4 per cent between 1996 and 2001 (from 278,385 in 1996 to 293,295 in 2001). Most communities in the Flood Study Region saw increases in the number of owned private dwellings with the exception of the RM of Ritchot –which was the municipality that was the most heavily impacted by the 1997 Red River Flood (where number of owned private dwellings decreased from 1,505 to 1,420) and the RM of Morris which decreased slightly from 895 owned private dwellings to 870[14].

Housing values in the Flood Study Region tend to be higher on average than for Manitoba as a whole. Average dwelling values in 1996 were approximately 8.3 per cent higher than for Manitoba as a whole ($97,047 compared to $89,540). In 1996 the municipalities with the highest average private dwelling

[13] Appendix 8B, Tables 8B-7, 8B-8, and 8B-9. Caution should be used when interpreting the data as it is based on a 20 per cent sample.

[14] Table 8B-9 also indicates that the number of private owned dwellings in the Village of St. Pierre-Jolys decreased from 345 to 340, though is within the range of rounding for Census data.

values were the R.M of East St. Paul ($175,360), the RM of West St. Paul ($168,429) and the RM of Macdonald ($130,449).

Average private dwelling values continued to be higher on average in the Flood Study Region in 2001, approximately 5.7 per cent, than the provincial average. Most municipalities in the Flood Study Region also experienced increases in average private dwelling values, the only exceptions being the RM of De Salaberry and the RM of West St. Paul. The Village of St. Pierre-Jolys (28.0 per cent), the Town of Morris (26.7 per cent) and the RM of Taché (19.5 per cent) saw the largest relative increases in average housing values between 1996 and 2001.

8.3.2.2.2 Future Trends and Planning for Residential Land Use

As part of the review of the existing environment for residential land and resource use, a review of planning documents for communities in the Flood Study Region and interviews with planners and chief administrative officers was undertaken to understand future trends in residential land use, plans for future residential development, and the degree to which residential land use planning is affected by flooding considerations.

During interviews with representatives from the municipalities in the Flood Study Region, many of those interviewed noted plans for further residential development in the near term.

For regions in the northern portion of the Flood Study Region, the RM of St. Andrews noted plans for several housing projects in the southern portion of the RM. The RM of East St. Paul indicated that residential development was very important to the municipality and that growth of about 100 homes per year is a general target for the municipality. Representatives from East St. Paul also noted a ten year development with Pritchard Farms as well as other smaller developments.

For regions in the eastern portion of the Flood Study Region, the RM of Springfield noted plans for sub-division in Oakbank and Dugald (approximately 100 homes in approval stage in Oakbank and another 130 homes in Oakbank and Dugald).

During interviews with regional planners and representatives from Ritchot it was noted that the RM of Ritchot is currently having difficulty getting provincial approval even for residential in-fills in the northern portion of the municipality. Other communities in the southern portion of the Flood Study Region noted plans for increased residential development. The Town of Morris indicated plans for an approximately 50 lot low cost housing area. The Town of Niverville indicated plans for three new residential housing subdivisions. The RM of Macdonald indicated that residential development was primarily limited to urban areas within the RM (such as Sanford, La Salle and Oak Bluff) and that access to water service was the primary factor that limited residential development in other areas of the municipality.

The City of Winnipeg has an Action Area plan for the St. Vital Perimeter South area that was first passed in 1979 and last updated in 1995. (City of Winnipeg, 1995). The St. Vital Perimeter South Action Area is bounded at the north by the Perimeter Highway, to the West by the Red River, to the east by PTH 59 and to the south to include all of St. Vital lying south of the Red River Floodway. The primary land use

designations for this area are medium to low density rural residential (two to five acre lots) and agriculture.

Flooding and flood control also play a major role in the residential land use planning in the Flood Study Region. The City of Winnipeg Action Area plan for South St. Vital includes planning measures to minimize the risk of property damage and loss of life due to flooding and requires that all new buildings and structures be protected from the 160 year flood if situated north of the Red River Floodway and the 100 year flood if situated south of the Red River Floodway.

The Macdonald-Ritchot Planning District Development Plan notes that "The Designated Flood Area within the planning district encompasses almost all the lands within the RM of Ritchot, excepting a narrow band along the eastern portion of the municipality, and significant areas within the RM of Macdonald generally located south of PR 305 and east of PR 330"[15]. The plan also notes that the subdivision of land especially within the PTH 75 to PR 200 corridor north of PR 210 will be restricted to flood protected areas within existing urban centres, agricultural operations and limited commercial and industrial developments. The plan also notes that any buildings within the designated flood area are required to meet all provincial flood-proofing criteria.

The Rural Municipality of Morris Development Plan notes that a portion of the municipality lies within the Red River Valley Designated Flood Area and that dyke upgrades have been put in place to protect urban development in the municipality[16]. The development plan also notes that development will be directed away from hazard lands, including those subject to flooding by the 100 year flood or by a recorded flood exceeding the 100 year flood.

8.3.2.3 Aboriginal Land and Traditional Resource Use

The Flood Study Region and in particular the Red River Valley have historically been important locations for Aboriginal communities and resource use. During the course of the study, three Aboriginal peoples were identified that could have either land or resource interests in the Flood Study Region:

- Brokenhead Ojibway Nation. The Brokenhead Ojibway Nation reserve is located near Lake Winnipeg, in the Northeastern most portion of the Flood Study Region. Preliminary conversations with a representative from the Brokenhead Ojibway Nation have not identified any particular concerns with respect to how the Project may affect the community's land or traditional resource use. Further communication with the Brokenhead Ojibway Nation will continue past the filing of the EIS to identify, where possible, any potential effects and to ensure that any potential effects on the Brokenhead Ojibway Nation are not significant.
- Métis Nation. Although there is no specific Aboriginal community in or near the Flood Study Region with clear community boundaries that can be identified as a Métis Aboriginal community (in the way that there are specific Aboriginal communities, in accordance with this EIS's definition of an "Aboriginal community"', for the Peguis First Nation and the Brokenhead Ojibway Nation), the Métis Nation are an Aboriginal peoples with a long, historic

[15] Page 6, Macdonald-Ritchot Planning District Development Plan.
[16] Page 4, Rural Municipality of Morris Development Plan.

connection to land and resource use in the Red River Valley. In order to understand any current land and resource use for traditional purposes by Métis in the Flood Study Region that may be affected by the Project, and to understand any other potential effects of the Project on Métis people, MFEA and MMF are planning further joint dialogue with MMF members in summer 2004. The purpose of these discussions is to identify and address issues and concerns of MMF members with respect to the Project. Findings from these sessions will be filed as supplementary materials when these sessions are completed.

- Peguis First Nation. Although the Peguis First Nation Aboriginal community is located outside the Flood Study Region[17], the Peguis First Nation has an historical connection to the Red River Valley and currently has several Reserve parcels and land claims in the Flood Study Region. In addition, many Peguis First Nation members reside in the Red River Valley, particularly in the area downstream of the Floodway Outlet. A key person interview program was developed and undertaken to understand current land and resource use by Peguis First Nation members in the Flood Study Region. The following section summarizes the results of the key person interview program to date. Further interviews are planned for the summer of 2004 and the results of these interviews will be filed as supplementary materials as soon as possible after the completion of the interview program.

8.3.2.3.1 Peguis First Nation

The Peguis First Nation currently has a primary reserve area in the Manitoba Interlake, situated around the Fisher River where the current First Nation on-reserve population resides. Peguis has a strong historical connection to the Red River Valley. Since the early 1800s the First Nation was associated with and inhabited the area known as the Parish of St. Peter's, just north of the City of Selkirk. Peguis currently has a claim under Canada's Specific Claims Policy asserting that its original Reserve in the area near the present day City of Selkirk (known as the St. Peter's Indian Reserve) was illegally taken by Canada in 1907. The Peguis First Nation is currently engaged in negotiations with Canada respecting settlement for the taking of the St. Peter's Reserve. These negotiations are outside the **Treaty Land Entitlement (TLE)** framework agreement[18]. (Peguis First Nation, 2004).

Peguis also has several parcels of land in the area along the Red River between Selkirk and Lake Winnipeg. Though the parcels are currently uninhabited, they have considerable cultural and historical significance to Peguis and at least one of the parcels is currently used as a ceremonial site.

Lil' Peguis Ceremonial Grounds

The Lil' Peguis ceremonial grounds are located at Peguis IR 1G (approximately 140 acres) on the East side of the Red River, North of the City of Selkirk. (See Figure 8.3-1) The site is located in a historically important area near Netley Marsh. The site has been used for ceremonial purposes since 1984. There is a use agreement between the ceremonial site users and Peguis First Nation that allows the site to be used

[17] The Peguis First Nation community is located in the Interlake (see Section 8.2.2.1).

[18] Peguis First Nation is also currently in the process of identifying lands as part of its Treaty Land Entitlement (TLE). Some of the lands identified by Peguis include areas that were formerly part of the St. Peter's Reserve, north of the City of Selkirk. Peguis has also expressed an interest in acquiring other lands in the Red River Valley in the future through purchase agreements with a willing seller.

for ceremonial purposes but does not allow for the construction of permanent structures. Currently the ceremonial site is used year round, and visited by people from all over the world. The site is used by people from Cree, Ojibway and Sioux First Nations. Nine different sweat lodge keepers use the site. During interviews with Peguis First Nation members, it was noted that current uses of the site include teaching lodges, children and youth ceremonies, women's ceremonies and Sun Dances. Medicine collecting also takes place on some portions of the ceremonial grounds.

It was noted during interviews that the Lil' Peguis site flooded as recently as spring 2004. The worst flood remembered in recent times on the site was the 1996 Flood. Flooding was noted to be due primarily to ice jams. Generally, ice jam flooding was recognized as a natural feature of the environment and was not a cause for concern in and of itself. However, there was concern expressed about operation of the Existing Floodway, and the effect that it had on water levels. Some of those interviewed suggested that perhaps the site could be dyked to protect it from flooding and that this would be seen as a positive mitigation action.

Flooding was also noted to occur due to wind set up. Some of those present noted that at times during the summer (for example, with water levels as high as in mid-June 2004), several days of North winds could cause wind set-up, back-up some of the creeks in the area and cause flooding of the ceremonial site due to those creeks backing-up (Mink Creek and Devil's Creek in particular were noted).

St. Peter's Oldstone Church

St. Peter's Oldstone Church (also known at St. Peter's Dynevor Church) is located in the Rural Municipality of St. Clements, just north of the community of East Selkirk, slightly upstream of the junction of Cook's Creek and the Red River. The Church sits on a river lot on the East side of the Red River. The fenced in area that makes up the churchyard is approximately 5 hectares (12 acres). The site also includes a house and yard, as well as a picnic area.

The Church's foundation was laid in 1852, the corner stone was set in 1853 and the Church had its first communion in November, 1854. The site for the Church was selected by Archdeacon William Cockran. The existing Church replaced another former Church located somewhat south of the existing site. The Church is designated as a Manitoba Provincial Heritage Site and is awaiting designation as a National Heritage Site. The Church has been in continuous use since 1854. Currently, the Church is used for weekly services from approximately June through October. However, burials occur at the site throughout the year, and certain special services are held at other times throughout the year (including weddings and an Advent carol service).

Source: InterGroup Consultants Ltd. (June 12, 2004)

Figure 8.3-1
Entrance to Lil' Peguis Ceremonial Gounds

It was noted during interviews conducted for the study that during the early part of the 20th Century the congregation of the Church consisted of approximately 500 families. However, when the St. Peter's Reserve was surrendered in approximately 1907, most of the members of the Peguis First Nation were relocated to the current Peguis First Nation community near the Fisher River and the congregation of the Church was considerably diminished.

The Church and the yard have considerable historical and cultural significance for the Peguis First Nation. The churchyard has approximately 600 marked gravesites and it is estimated that there are several thousand unmarked graves on the site. Chief Peguis is buried at the site and there is a marker near the front of the Church. Many artifacts have been found on the site including arrowheads, pottery shards and evidence of ash and fire pits.

Flooding has affected the churchyard on many occasions. The most recent large flood event that affected the site was in the spring of 1996. Floodwaters in 1996 reached the flagpole in front of the Church (see Figure 8.3-2), but did not affect the building itself or the house, which is approximately the same

elevation as the Church. In 1996 Flood waters affected the Church's yard, the road and covered several grave sites and markers. Access to the site by the municipal road was lost for a period during the 1996 Flood. It was noted during interviews conducted for the study that the Church building itself has not been directly damaged by past flood events.

Source: InterGroup Consultants Ltd. (taken June 16, 2004).

Figure 8.3-2
St. Peter's Oldstone Church

Peguis Members Land and Traditional Resource Use

During interviews with Peguis First Nation members conducted for the study it was noted that the entire area around Selkirk and between Selkirk and Lake Winnipeg was of cultural and historical importance to

the Peguis First Nation. Some interviewees recalled that people from Peguis First Nation used to live in the area near Goldeye Lake and the areas including Peguis IR 1E and Peguis IR 1F. It was also noted that there were other areas where ceremonies and Sun Dances used to be held on the East side of the Red River, somewhat downstream of the current Lil' Peguis ceremonial grounds.

Many types of traditional resource use activities were noted to be important and to take place in the Flood Study Region between the City of Selkirk and Lake Winnipeg. Types of resource use activities noted to occur included:

- Collecting plants and medicine.
- Hunting (particularly deer and waterfowl)
- Fishing (domestic fishing as well as commercial fishing on Lake Winnipeg)
- The area was also noted to be important habitat for wildlife in general; in particular the presence and sighting of raccoons, bears and eagles.

During conversations with Peguis First Nation Members, certain resource use issues and observations were noted with respect to resource use today compared to the recent past including:

- More difficulty finding some traditional plants and medicines, presence of strange plants (in particular purple loosestrife was noted to be a problem, choking out some areas where plants and medicines used to be collected).
- Changes in fish populations. In particular it was noted that there are fewer female walleye caught in the lake and those that are caught are smaller than they once were. Some of those interviewed also thought there were more catfish than there used to be and that those being caught were larger than they remembered in the past.
- More debris in the lake, particularly large trees, making boating difficult in some places and causing damage to commercial fishing nets.
- Changes in surface water quality, in 2004 in particular, water is higher, dirtier, with more silt than normal.
- Fewer boats in the river, some of those present indicated that increased sedimentation and debris were making the river harder to navigate, particularly causing problems for some smaller boats.

8.3.3 Effects and Mitigation

The Project is expected to have both positive and negative effects on resource use in parts of the Flood Study Region. The Project will have the most pronounced effect on resource use activities occurring near the physical footprint of the Project. Resource use activities in portions of the Flood Study Region that are further removed from the Project site are expected to experience project-related effects primarily only during rare, extreme flood events (i.e., floods similar to the 1997 Flood or larger).

Effects of the Project on resource use in the Flood Study Region are expected to combine with effects of potential summer operation of the Floodway Expansion. Effects of the Project on resource use are not expected to combine with effects related to the City of Winnipeg Infrastructure Improvements, Red River

Dredging Program or the City of Winnipeg Waste Treatment Facility, mainly because the effects of those projects are not expected to overlap with areas of commercial resource use.

8.3.3.1 Commercial Resource Use

This section discusses potential effects of the Project on commercial resource use activities including agriculture and other commercial resource use activities.

Construction

It is expected that there will be some temporary, site-specific traffic flow disruptions near the Floodway Channel and the West Dyke. Depending upon the timing of this construction, there could be adverse effects for some agricultural operations as transportation access is restricted. During key person interviews conducted for the study it was noted that agricultural operations would be particularly sensitive to this transportation disruption during seeding (generally April and May) and harvest (generally late August through October). It was also noted during interviews that some livestock operations, particularly dairy operations, in the vicinity of the West Dyke expansion might be sensitive to restricted transportation access regardless of when it occurs (i.e., need for daily milk deliveries). In order to mitigate these effects, construction of the new Floodway Channel bridges will take place while the existing bridges are still in service so that transportation restrictions are minimized. The construction scheduling for the West Dyke will also take into account the seasonal sensitivity of agricultural operations during seeding and harvest and will minimize disruptions during these periods as much as possible.

During construction of the Project there will also be disruptions to haying and cropping leases on the Floodway Channel and the West Dyke. It is anticipated that these areas will not be available for haying or cropping during portions of the Construction phase of the Project. This will affect all of the current leaseholders (37 leases in total). However, the magnitude of the effect is anticipated to be small, as the total lease area affected is small (approximately 2,500 hectares in total) and the lease area generally represents a small portion of each producer's operation, rather than the main area operated by the producer. In order to mitigate the effect of this disruption, current leaseholders have been notified about the possibility of disruption during Project construction. The areas will also be revegetated following construction so that it should be possible to return them to agricultural uses shortly after construction and revegetation is completed.

Excavation during construction for the Floodway Channel may also expose deposits of gypsum rosettes. This could be a potential benefit to rock collectors and it is possible that a new deposit with commercial potential could be discovered. The likelihood of this is uncertain but is expected to be quite small.

Operation-Inactive

Based on the engineering pre-design for the Floodway Channel, construction of the Floodway Channel is not expected to require any land acquisition, though this may change somewhat during Final Design. Some land acquisition will be required for bridge and road works in the vicinity of the Channel crossings. Though the exact location and amount of land required for these purposes will continue to be revised throughout the final engineering design, it is currently estimated that land acquisition for the Floodway Channel crossings would consist of a total of approximately 10 hectares (approximately 25 acres) in the City of Winnipeg, Rural Municipality of Springfield and Rural Municipality of St. Clements. It is also

expected that the construction of the West Dyke will require the acquisition of approximately 165 hectares in the RM of Macdonald. Table 8.3-2 summarizes the current estimates for private land acquisition required for bridges and roadways and the West Dyke associated with the Project. It should be noted that the current land use in the areas to be acquired includes both land currently zoned for agricultural uses (for example RM of Macdonald) and land zoned for rural residential uses (for example City of Winnipeg, RM of Springfield and RM of St. Clements). The amount of land to be acquired is quite small (less than 0.2 per cent of the total land area in each community).

Table 8.3-2
Estimated Private Land Acquisition Requirements for Floodway Channel Crossings and the West Dyke

Project Component	Estimated Private Land Area Required (hectares)	Municipality	Total Municipality Area (hectares)[3]
St. Mary's Road Bridge	3.75[1]	City of Winnipeg	46,516
Trans-Canada Highway #1 East Bridge	4.35[1]	RM of Springfield	110,334
PTH 15 Bridge	1.00[1]	RM of Springfield and City of Winnipeg	156,850
PTH 44 Bridge	0.55[1]	RM of St. Clements	73,004
West Dyke	165.00[2]	RM of Macdonald	115,662

Sources:
1. Dillon Consulting Limited/ND Lea Engineers & Planners Inc. 2004. Appendix A: Bridges and Transportation Pre-Design.
2. Pantel, Personal Communication.
3. Statistics Canada: 2001 Census of Canada.
Note:
Estimates are based on engineering Pre-Design. Actual land acquisition will vary from these figures.

It is currently expected that any land acquisition required by the project will be undertaken by Manitoba Land Management Services by either negotiated purchase or expropriation. Principles will be developed with the intent that landowners are treated equally regardless of when they are dealt with in the land acquisition process.

Construction of the Floodway Channel will require that most of the drainage structures be modified or replaced[19]. The hydraulic capacity of these structures will be either be maintained at existing levels or increased (i.e., to accommodate the 1 in 100 year event). Where drainage infrastructure is replaced, the invert of the drop structure will be built lower and the depth of the drain channel within the **Floodway right-of-way** increased in order to accommodate potential future drain upgrades outside the Floodway right-of-way. With respect to the West Dyke, borrow material is expected to be taken from the existing ditches which will deepen the ditches and improve capacity. A new gated culvert will also be installed near La Barrier Park. These changes are expected to result in some improvements to local drainage in the vicinity of the Floodway Channel and the West Dyke.

[19] Refer to Section 4.9 for a discussion of the modifications to drainage structures required by the Project and to Section 5.6 for a discussion of expected effects of the Project on local drainage.

Based on the current engineering pre-design, native grasses, rather than a brome/alfalfa mix, are recommended for revegetation of the upland area and the Floodway Channel side slopes following construction. There have been concerns noted that the selection of native grasses for the revegetation of these areas will result in the area being unattractive to current forage leaseholders. (KGS/UMA/Acres 2004b). The final species mix for revegetation will be evaluated as part of the Final Design, and will include a consideration of input from interested stakeholders. If a native plant revegetation strategy were selected, native grasses can be harvested later in the year than other grasses and it may be possible to devise a harvest schedule appropriate to a native plant vegetation strategy (KGS/UMA/Acres 2004b). However, concerns were expressed during the PIP process (see Chapter 3) and during interviews that increased recreational traffic in the area may also make the area unattractive for forage or cropping, even without a native plant revegetation strategy.

Even if the native plant revegetation results in all current leaseholders abandoning harvest of the forage area, it would represent at most a loss of 2,572 hectares (the total lease area reported for both haying and cropping for both the West Dyke and the Floodway Channel by Crown Lands Branch – figures could not be broken down by forage versus crop area) out of 39,449 hectares reported in alfalfa and 10,595 in tame hay/fodder (total of 50,044 hectares) in the Flood Study Region in the 2001 Census, or approximately five per cent.

Operation-Active

During spring operation of the Floodway Expansion, it is expected that water levels upstream of the Floodway Inlet in any specific flood scenario will be either equal to or lower than water levels that would be experienced with the Existing Floodway. During spring operation of the Floodway Expansion water levels are also expected under some flood scenarios to be somewhat higher in some locations downstream of the Floodway Outlet[20]. Overall, adverse changes in water levels due to the operation of the Floodway Expansion are expected to be rare (i.e., evident only in floods larger than the 1997 Flood), small (increases in water levels of less than 0.3 metres even in a flood event with a return of 1:700 years)[21], and of short duration. Further, spring operation of the Floodway Expansion would generally occur before seeding had taken place and therefore minimize disruption to agricultural crops. To the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project.

Summer operation of the Existing Floodway results in more frequent summer flooding for some agricultural land upstream of the Floodway Inlet, and in reduced damages in Winnipeg related to sewer backup and flooding of recreation infrastructure. Summer flooding for these operations often causes more damage than spring flooding as it is more likely to result in the loss of a crop or growing season on the affected land. It is expected that agricultural operations affected by flooding as a result of summer operation of the Floodway Expansion would be eligible for compensation similar to that provided in 2002. The effects of future summer operation, however, will not be modified to any discernable magnitude as a result of the Floodway Expansion Project.

[20] See Chapter 5 for a more detailed description of water regime effects during Project operation.
[21] Refer to Table 5.3-2 for more information on the estimated differences in maximum water elevations with the Project.

8.3.3.2 Residential Land Use

Construction

During the Construction phase of the Project there are expected to be access disruptions, particularly in the vicinity of the Floodway Channel, bridges and the West Dyke. However these disruptions are expected to be minor (access will be maintained to existing bridges during construction of new bridges) and short-term. Construction effects related to the Project are not expected to have any long-term implications for residential land use.

Operation-Inactive

Some of the private land to be acquired in the current engineering pre-design includes residential dwellings. In the vicinity of the St. Mary's Road bridge there are a few (2 to 3) houses that may need to be expropriated. Expropriation of those properties, if required in the final design, would follow the same expropriation policies and guidelines as for agricultural properties. The effects from land acquisition will persist throughout the operational life of the Project.

Operation-Active

During the Operation-Active phase of the Project, the Floodway Expansion will have an effect on the water levels and flows experienced during flood events. These effects vary according to the size of the flood event and the location within the Flood Study Region. For those areas protected by the Floodway Expansion, water levels and flows will be the same or lower in all flood scenarios.

For areas upstream of the Floodway Inlet, water levels are expected to be the same or lower for all flood scenarios considered. Lower water levels are expected immediately upstream of the Floodway Inlet (approximately 0.3 meters lower at the Floodway Inlet during a 1 in 100 year flood and approximately 1.1 meters lower during a 1 in 225 year flood, compared to the Existing Floodway) (Acres, 2004a)[22]. These lower water levels are expected to taper out further upstream of the Floodway Inlet such that no change in water levels is expected approximately 30 km upstream of the Floodway Inlet (near Aubigny) in any flood scenario.

For areas downstream of the Floodway Outlet, operation of the Project will result in somewhat higher water levels under some flood conditions in some areas. Changes in water levels and flows are discussed in detail in Chapter 5: Physical Environment. An assessment was prepared by Acres Manitoba Ltd. (Acres, 2004a) that estimates (for areas from the North Perimeter Highway to the Netley Creek confluence) the difference in number of buildings flooded and flood damages for the Existing Floodway compared to the Floodway Expansion for three flood scenarios. Table 8.3-3 compares the number of flooded buildings for the Existing Floodway and the Floodway Expansion in three flood scenarios.

Table 8.3-3 indicates that for the 1:120 year flood and the 1:225 year flood, the number of inundated buildings remains the same for all areas with and without the Floodway Expansion. Table 8.3-3 also indicates the following changes with the Floodway Expansion for the 1 in 700 year flood:

- In the area between the North Perimeter Highway and the Floodway Outlet, 125 fewer residential buildings, 6 fewer commercial buildings, 3 fewer agricultural buildings and 1 less institutional building would be flooded with the Floodway Expansion for the 1 in 700 year flood.
- In the area from the Floodway Outlet to the City of Selkirk, and in the City of Selkirk, no change would occur to the number of inundated buildings comparing the Existing Floodway to the Floodway Expansion.
- In the area North of Selkirk to Netley Creek, 2 additional residential buildings in East Selkirk and 5 additional residential buildings and 1 additional Agricultural building north of Selkirk to Netley Creek would be flooded with the Floodway Expansion for the 1 in 700 year flood.

Table 8.3-4 provides estimates of the change in population experiencing residential flooding during the 1 in 700 year flood, based on Statistics Canada average population per dwelling information from the 2001 Census of Canada:

- An estimated 364 fewer people living between the North Perimeter and the Floodway Outlet experience residential flooding with the Floodway Expansion in the 1 in 700 year flood.
- An estimated 6 additional people in East Selkirk and 14 additional people in the area from North of the City of Selkirk to Netley Creek experience flooding with the operation of the Floodway Expansion in the 1 in 700 year flood.

[22] Refer to Table 5.3-2 in Chapter 5 for more information on estimated water levels with the Project.

Table 8.3-3
Comparison of Estimated Number of Inundated Buildings by Flood Scenario for the Existing Floodway and the Floodway Expansion for Areas between the North Perimeter Highway and Netley Creek

Area	Building Type	1 in 120 Year Flood			1 in 225 Year Flood			1 in 700 Year Flood		
		Existing Floodway	Floodway Expansion	Change	Existing Floodway	Floodway Expansion	Change	Existing Floodway	Floodway Expansion	Change
North Perimeter Highway to Floodway Outlet	Residential	124	124	0	143	143	0	364	239	-125
	Commercial	8	8	0	10	10	0	17	11	-6
	Agricultural	1	1	0	1	1	0	6	3	-3
	Institutional	1	1	0	1	1	0	2	1	-1
	SUB-TOTAL	**134**	**134**	**0**	**155**	**155**	**0**	**389**	**254**	**-135**
Floodway Outlet to Southern Boundary of Selkirk	Residential	7	7	0	8	8	0	8	8	0
	Commercial	0	0	0	0	0	0	0	0	0
	Agricultural	0	0	0	0	0	0	0	0	0
	Institutional	0	0	0	0	0	0	0	0	0
	SUB-TOTAL	**7**	**7**	**0**	**8**	**8**	**0**	**8**	**8**	**0**
City of Selkirk	Residential	0	0	0	3	3	0	10	10	0
	Commercial	3	3	0	5	5	0	8	8	0
	Agricultural	0	0	0	0	0	0	0	0	0
	Institutional	4	4	0	4	4	0	5	5	0
	SUB-TOTAL	**7**	**7**	**0**	**12**	**12**	**0**	**23**	**23**	**0**
East Selkirk	Residential	7	7	0	10	10	0	25	27	+2
	Commercial	0	0	0	0	0	0	1	1	0
	Agricultural	1	1	0	1	1	0	2	2	0
	Institutional	0	0	0	0	0	0	0	0	0
	SUB-TOTAL	**8**	**8**	**0**	**11**	**11**	**0**	**28**	**30**	**+2**
Northern Boundary of Selkirk to Netley Creek Confluence	Residential	59	59	0	65	65	0	124	129	+5
	Commercial	2	2	0	2	2	0	5	5	0
	Agricultural	1	1	0	1	1	0	13	14	+1
	Institutional	0	0	0	0	0	0	2	2	0
	SUB-TOTAL	**62**	**62**	**0**	**68**	**68**	**0**	**144**	**150**	**+6**
TOTALS		**218**	**218**		**254**	**254**		**592**	**465**	

Source: Acres Manitoba Ltd. 2004a.

Table 8.3-4
Estimated Change in Population Experiencing Residential Flooding with Floodway Expansion in 1 in 700 year flood event.

Area	Estimated Number of Flood Inundated Residential Buildings			Estimated Population Change
	Existing Floodway	Floodway Expansion	Change	
North Perimeter Highway to Floodway Outlet	364	239	-125	-364
Floodway Outlet to Southern Boundary of Selkirk	8	8	0	0
City of Selkirk	10	10	0	0
East Selkirk	25	27	+2	+6
Northern Boundary of Selkirk to Netley Creek Confluence	124	129	+5	+14

Notes:
Estimated Number of Flood Inundated Residential Buildings Provided by Acres Manitoba Ltd. 2004.
Population Estimates are based on 2001 Census of Canada average population per dwelling.
Population estimates assume residential buildings are single family dwellings, consistent with Acres Manitoba Ltd.'s approach to damage estimation.
Estimates are presented for comparison purposes only and should not be construed as forecasts or projections for actual flood events.

In addition to changing the number of buildings experiencing flooding, changes in water levels and flows during operation of the Floodway Expansion can have incremental effects on the amount of damage sustained during a flood event. Acres Manitoba Ltd. prepared an estimate of the change in the dollar value of flood damage for areas near the Floodway Outlet based on 2004 property assessment values. The estimates, which are summarized in Table 8.3-5, indicate the following:

- For the 1 in 120 year flood, the overall expected flood damages for the area from the North Perimeter Highway to the Netley Creek Confluence are approximately four per cent higher with the Floodway Expansion (approximately $15.52 million with the Existing Floodway compared to approximately $16.09 million with the Floodway Expansion).
- Expected flood damages in this same area for the 1 in 225 year flood are approximately one per cent higher with the Floodway Expansion than with the Existing Floodway (approximately $21.26 million with the Existing Floodway compared to approximately $21.50 million with the Floodway Expansion).
- For the 1 in 700 year flood, a 44 per cent reduction in expected flood damages is estimated for the area from the North Perimeter to the Floodway Outlet with the Floodway Expansion (approximately $54.21 million with the Existing Floodway compared to approximately $30.43 million with the Floodway Expansion).
- For the 1 in 700 year flood, the expected flood damages for area from the Floodway Outlet to Netley Creek are approximately ten per cent higher with the Floodway Expansion (approximately $16.31 million with the Existing Floodway compared to approximately $17.88 million with the Floodway Expansion).

Acres Manitoba Ltd. also prepared an assessment of the estimated average annual damages for scenarios with the Existing Floodway compared to the Floodway Expansion. The analysis indicated that for the area from the North Perimeter Highway to the Floodway Outlet, the average annual dollar value of damage is approximately $35,000 lower with the Floodway Expansion, compared to the Existing Floodway (i.e a benefit of the Project). For areas from the Floodway Outlet to the Netley Creek confluence, the average annual dollar value of damage is approximately $3,000 higher with the Floodway Expansion compared to the Existing Floodway (i.e., an adverse effect of the Project). Acres further estimated that the net present value of these average annual damages was approximately $73,000[23]. (Acres, 2004a).

To the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project.

[23] The net present value analysis assumed an average expenditure of $3,000 per year with a project life of 100 years and an effective discount rate of 4%.

Table 8.3-5

Comparison of Estimated Damage ($) to Inundated Buildings By Flood Scenario for the Existing Floodway and the Floodway Expansion For Areas Between the North Perimeter Highway and Netley Creek

Area	Building Type	1 in 120 Year Flood			1 in 225 Year Flood			1 in 700 Year Flood		
		Existing Floodway	Floodway Expansion	Change	Existing Floodway	Floodway Expansion	Change	Existing Floodway	Floodway Expansion	Change
North Perimeter Highway to Floodway Outlet	Residential	8,258,079	8,603,635	345,556	10,539,574	10,639,397	99,823	43,833,278	24,713,366	-19,119,912
	Commercial	359,080	368,352	9,272	450,444	453,094	2,650	1,230,769	598,666	-632,103
	Agricultural	294	304	10	315	318	3	68,871	27,102	-41,769
	Institutional	8,648	8,955	307	9,273	9,355	82	46,050	22,620	-23,430
	Other	1,725,220	1,796,249	71,029	2,199,921	2,220,433	20,512	9,035,794	5,072,351	-3,963,443
	SUB-TOTAL	**10,351,321**	**10,777,495**	**426,174**	**13,199,527**	**13,322,597**	**123,070**	**54,214,762**	**30,434,105**	**-23,780,657**
Floodway Outlet to Southern Boundary of Selkirk	Residential	488,613	528,495	39,882	770,817	794,183	23,366	1,183,398	1,245,618	62,220
	Commercial	0	0	0	0	0	0	0	0	0
	Agricultural	0	0	0	0	0	0	0	0	0
	Institutional	0	0	0	0	0	0	0	0	0
	Other	97,723	105,699	7,976	154,163	158,837	4,674	236,680	249,124	12,444
	SUB-TOTAL	**586,336**	**634,194**	**47,858**	**924,980**	**953,020**	**28,040**	**1,420,078**	**1,494,742**	**74,664**
City of Selkirk	Residential	0	0	0	1,378,274	1,396,523	18,249	2,933,274	3,506,226	572,952
	Commercial	58,293	60,556	2,263	105,258	108,349	3,091	364,101	392,915	28,814
	Agricultural	0	0	0	0	0	0	0	0	0
	Institutional	1,335,680	1,353,104	17,424	1,473,894	1,484,544	10,650	2,630,456	2,732,037	101,581
	Other	278,795	282,732	3,937	591,485	597,883	6,398	1,185,566	1,326,236	140,670
	SUB-TOTAL	**1,672,768**	**1,696,392**	**23,624**	**3,548,911**	**3,587,299**	**38,388**	**7,113,397**	**7,957,414**	**844,017**
East Selkirk	Residential	712,591	727,509	14,918	825,232	831,545	6,313	1,463,789	1,623,479	159,690
	Commercial	0	0	0	0	0	0	6,875	7,192	317
	Agricultural	2,355	2,417	62	2,968	3,008	40	7,043	7,355	312
	Institutional	0	0	0	0	0	0	0	0	0
	Other	142,989	145,985	2,996	165,640	166,911	1,271	295,542	327,605	32,063
	SUB-TOTAL	**857,935**	**875,911**	**17,976**	**993,840**	**1,001,464**	**7,624**	**1,773,249**	**1,965,631**	**192,382**
Northern Boundary of Selkirk to Netley Creek Confluence	Residential	1,675,087	1,721,167	46,080	2,124,298	2,156,084	31,786	4,141,286	4,434,917	293,631
	Commercial	30,728	31,491	763	33,089	33,452	363	80,742	83,933	3,191
	Agricultural	5,089	5,171	82	5,550	5,550	0	44,254	47,939	3,685
	Institutional	0	0	0	0	0	0	737,144	815,702	78,558
	Other	342,181	351,566	9,385	432,587	439,017	6,430	1,000,685	1,076,498	75,813
	SUB-TOTAL	**2,053,085**	**2,109,395**	**56,310**	**2,595,524**	**2,634,103**	**38,579**	**6,004,111**	**6,458,989**	**454,878**
TOTALS		**15,521,445**	**16,093,387**	**571,942**	**21,262,782**	**21,498,483**	**235,701**	**70,525,597**	**48,310,881**	**-22,214,716**

Source: Acres Manitoba Ltd. 2004a

During interviews conducted for the study and public involvement sessions, there was frequent concern expressed that the presence of the Project and changes to flood risk would have adverse effects on property values for communities in the Flood Study Region.

Property values are influenced by a complicated array of variables and characteristics. Individual perspectives of prospective buyers also play a role in determining the value of a particular property to an individual. Often times a feature that may be desirable to one potential buyer, for example, proximity to a major road or thoroughfare, may be viewed as a disamenity to another potential buyer. In addition, some property features that are generally viewed as positive characteristics, such as a river view, tend to coincide with features that are generally viewed as negative characteristics, such as increased flood risk. The evaluations of the particular suite of characteristics that make up the value of a property are often very specific to both the property and the individual making the assessment. This makes it a difficult task to determine the effect that a change in one characteristic will have on the value of the property.

A review of the economic literature on the effects of flooding and flood proofing measures (both structural, such as dyking and non-structural, such as zoning regulations) revealed a few clear trends or observations on the effect of flooding and flood proofing on property values. Holoway and Burby (1990) note that flood risk can be modelled as a site disamenity but that the valuation of this disamenity depends on a consumer's perception of the flood risk which is a function of:

- Individual experience with flooding;
- The history of flooding in the community;
- The level of risk that actually exists on the parcel; and
- Individual responses to risk (risk taking versus risk averse).

In the Red River Valley, Fridgen and Shultz (1999) investigated the effect of flood risk on housing prices in Fargo, North Dakota and Moorhead, Minnesota following the 1997 Red River Flood. The authors observed that housing values were lower for residences in the 100 year floodplain than for those outside the 100 year floodplain following the 1997 Flood and attributed this observation to the heightened awareness of flood risk. However, the authors also noted that much of the observed difference in housing prices could likely be attributed to the requirement for flood insurance premiums. Further, the authors noted that flood-related variables investigated in the study seemed to have less of an influence on housing values than structural characteristics of the property.

Chao et al. (Institute for Water Studies 1998) reviewed 13 previous studies on property values in floodplains in an attempt to determine if empirical evidence was available that suggested whether or not flood damage (or the expectation of potential flood damages) was capitalized into the fair market value of floodplain properties. This review found that many previous studies had investigated whether location in the 100 year floodplain affected property values. The 100 year floodplain is commonly selected for review in such studies because it is often easily identifiable through zoning or planning documents. The authors noted that about half of the studies reviewed indicated a discount for location in the 100 year floodplain while the other half did not indicate the presence of such a discount. The authors attributed these findings to the fact that flood risk is not uniform across the 100 year floodplain. The authors did find evidence in four studies that discounts for flood insurance premiums are capitalized in property values. The authors also noted that three of the thirteen studies investigated property values in the

period following a flood and that none of these studies observed a discount in price over the long-term, although one study observed a drop in prices immediately after the flood event, followed by recovery.

The review of the literature did not indicate any clear trends on how changes in flood risk might impact housing prices. However, it appears reasonable to consider that the pathway to a change in property value must occur through an actual change in flood risk. With respect to the Project, flood risk changes occur in proportion to the frequency and magnitude of water levels and flow changes that would occur with the operation of the Project.

For those areas protected by the Floodway Expansion, water levels and flows will be the same or lower in all flood scenarios considered which reduces flood risk. Any changes to property values as a direct result of this change in flood risk, if observed, would be expected to be positive.

The area upstream of the Floodway Inlet is also expected to experience water levels that are either the same or lower with the Floodway Expansion compared to the Existing Floodway. These lower water levels reflect a somewhat reduced flood risk for these areas, though this reduction is quite small compared to the reduction for areas inside the Floodway. Based on the very small reduction to flood risk (both in terms of magnitude of water levels (less than one meter), and the very small frequency of floods for which this change in risk manifests as reduction in water levels (approximately the 1 in 100 year flood or larger)), it is not expected that there will be any changes in property values observed as a result of changes to flood risk for areas upstream of the Floodway Inlet. However, if any changes are observed, they would be expected to be slightly positive, as the area will experience slightly reduced flood risk.

For the area in the vicinity of the Floodway Outlet, there are some small increases in water levels and flows and estimated flood damages with the Floodway Expansion compared to the Existing Floodway. However, these changes in flood risk are evident only for very large floods (beginning with approximately the 1 in 120 year flood, which is larger than the 1997 Flood) and represent a small (i.e., ten per cent or less) estimated increase in flood damages[24]. Based on a review of the available literature it does not appear likely that this change in flood risk would be sufficient to cause a discernible, long-term change in property values in the area near the Floodway Outlet.

8.3.3.3 Aboriginal Land and Traditional Resource Use

This section discusses potential effects of the Project on Aboriginal land and traditional resource use. As noted earlier, current understandings of specific effects relate only to land and resource use for the Peguis First Nation and are preliminary as the interview program has not been completed. Further, in accordance with the EIS Guidelines, the EIA focuses on estimated effects to land and resource use for traditional and other purposes by this Aboriginal community and does not attempt to describe or define effects on any specific Aboriginal or Treaty rights.

Construction

During the Construction phase of the Project, there are not expected to be any effects on Peguis First Nation land or resource use. Based on current understandings, these lands and activities are removed

[24] In the area between the North Perimeter Highway and the Floodway Outlet, expected flood damage is estimated to be materially reduced (by 44%) for a 1 in 700 year flood with the Floodway Expansion. See Table 8.3-5.

from the construction area of the Project. Potential effects on heritage resources that may relate to the Peguis First Nation are addressed in Chapter 9: Heritage Resources.

Operation-Inactive

During the Operations phase, it is possible that land either currently held by the Peguis First Nation, used by Peguis First Nation members for resource harvesting or that may potentially be acquired by the Peguis First Nation either through the TLE process or private purchase may be affected by somewhat higher water levels during large flood events (i.e., those larger than the 1996 or 1997 Floods). No effects are expected during other Operation phase situations (including periods of inactive floodway operation)[25].

Based on the analysis conducted by Acres Manitoba Ltd (2004), water levels in the vicinity of the PTH 4 Bridge to Breezy Point are estimated to be at most 0.1 meters higher (during a 1 in 700 year flood event) with the Floodway Expansion than with the Existing Floodway. These changes in water levels are not expected to have any effect on Aboriginal resource use for fishing or plant collecting beyond those which would occur with a large flood. Further discussion of Project effects on fish, plants and wildlife is presented in Chapters 6 and 7.

8.3.4 Residual Effects and Significance

This section presents the estimated residual effects of the Project on resource use in the Flood Study Region. The analysis of residual effects incorporates, to the extent possible, a consideration of mitigation and enhancement measures outlined in previous sections and potential cumulative effects of other projects. Based on the criteria outlined in Chapter 2, the significance of these effects are assessed and summarized in Table 8.3-6.

[25] Peguis First Nation and MMF will continue to be informed through ongoing consultation activities. Any additional concerns or potential effects raised during these consultations will be addressed as part of a supplementary filing.

Table 8.3-6
Summary of Residual Effects and Significance on Resource Use

Topic and Project Phase	Residual Effects Including Mitigation	Mitigation	Significance
Commercial Resource Use			
Construction	Traffic disruptions at Floodway Channel crossings and the West Dyke that may affect commercial resource use.	Reasonable access will be maintained at crossings and the West Dyke.	Short-term, site specific. **Minor (-)** **Not significant**
	Disruption of haying and cropping leases on Crown land in the Floodway Channel and West Dyke right-of-way.	Advance notice to affected leaseholders.	Short-term, site specific. **Minor (-)** **Not significant**
	Possible uncovering of gypsum rosette deposits during excavation.	None.	Very small, site specific. **Negligible (+)** **Not significant**
Operation-Inactive	Land acquisition (approx. 175 hectares) for Floodway bridges/West Dyke in Winnipeg, St. Clements, Springfield and Macdonald.	None.	Small, site specific. **Minor (-)** **Not significant**
	Improved local drainage as a result of replaced drains and drop structures.	None.	Small, site specific. **Minor (+)** **Not significant**
Operation-Active	Higher water levels at and downstream of the Floodway Outlet during large flood events.	Compensation to those adversely affected by incremental Project flooding (if other mitigation not effective).	Rare (i.e., discernible only in floods larger than 1997) and small (i.e., 0.3 metres or less) **Minor (-)** **Not significant**
Residential Land Use			
Construction phase	Traffic and other construction disruptions near Floodway Channel and West Dyke.	Reasonable access will be maintained at crossings and the West Dyke.	Short term, site specific. **Minor (-)** **Not significant**
Operation- Inactive	Land acquisition is expected to be small (2 or 3 residences).	None.	Small, site specific. **Minor (-)** **Not significant**
	Effect on property values of increased flood risk in the vicinity of the Outlet Structure.	None.	Rare and very small (no discernible effect on values). **Negligible (-)** **Not significant**
Operation-Active	Increased flood damages in the vicinity of the Floodway Outlet during floods greater than 1996 or 1997 Flood. Less than ten additional residential buildings affected (East Selkirk and downstream), and less than ten per cent increase in flood damage.	Compensation to those adversely affected from incremental Project flooding (if other mitigation not effective).	Rare, short-term, small (after mitigation). **Minor (-)** **Not significant**
Land and Resource Use for Traditional Purposes by Aboriginal People			
Construction	No adverse effects expected.	None.	**Negligible (no effect)** **Nnot significant**
Operation- Inactive	No adverse effects expected.	None.	**Negligible (no effect)** **Not significant**
Operation- Active	Higher water levels (0.1 metres or less change) during large flood events (i.e., 1997 Flood or greater) may adversely affect land currently held by Peguis First Nation[26].	None.	Rare, and small **Minor (-)** **Not significant**

[26] Liaison between MFEA and Peguis First Nation and MMF is continuing to identify any further potential effects and, if further effects are identified, to assess mitigation and significance related to such residual effects.

During the Construction phase of the Project, it is expected that there will be some short-term disruptions to traffic flow and other construction inconveniences that result in residual adverse effects to commercial land and resource use, particularly agriculture. These effects will be mitigated by maintaining access to most of the Floodway bridges during construction, by sequencing construction so that access is provided on adjacent bridges even if they are under construction simultaneously and by providing reasonable access during construction of the West Dyke (for example for moving farm equipment). These effects are expected to be minor (not significant).

During the Construction phase of the Project there will also be a residual adverse effect caused by temporary suspension or disruption of haying and cropping leases on the Crown land on the West Dyke and the Floodway Channel. This disruption is expected to be short-term and affect a small number of producers (37 leases in total are affected, with some producers holding more than one lease). Further, the effect of this disruption is expected to be small in magnitude as the lands accessed by lease generally represent a small portion of the total area farmed by each producer. Mitigation measures include notifying leaseholders in advance and scheduling construction so that the duration of disruption is limited. Because the effect is both short-term, and affects a small number of leaseholders, the effect is expected to be minor (not significant).

During the Construction phase of the Project, it is also possible that construction of the Floodway Expansion will uncover additional deposits of gypsum rosettes. This would be a positive residual effect, but the effect is expected to be negligible (not significant).

During the Operation-Inactive phase of the Project, it is expected that there will be residual adverse effects on commercial resource use as a result of land acquisition required for the Project. The magnitude of this effect is expected to be small as it will affect only a small amount of land (approximately 175 hectares in total). This effect is expected to be minor (not significant). It is also expected that there will be residual positive effects related to improved drainage infrastructure, though this effect is expected to be minor (not significant).

During the Operation-Active phase of the Project, it is expected that there will be residual adverse effects on commercial resource use as a result of somewhat higher water levels downstream of the Floodway Outlet Structure. These adverse effects are expected to be small (increases in water levels are expected to be less than 0.3 meters) and rare (i.e., occurring only in flood events larger than the 1997 Flood), and of short duration (the duration of the flood event and subsequent period needed for recovery). To the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project. Due to the rare nature of these effects, the small change in water levels and the availability of compensation, it is expected that this adverse effect will be minor (not significant).

During the Construction phase of the Project, it is expected that there will be some short-term disruptions to traffic flow and other construction inconveniences that result in residual adverse effects to residential land use. These effects will be mitigated by maintaining access to the existing bridges during construction of the new bridges. These effects are expected to be minor (not significant).

During the Operation-Inactive phase of the Project, there will be residual adverse effects related to the acquisition of land required by the Project. This effect is expected to be small (affecting two to three residences in the vicinity of the St. Mary's bridge). This effect is therefore expected to be minor (not significant).

With regard to the Operation-Inactive phase of the Project, concern was expressed during interviews and public open houses that changes to flood risk would result in lower property values. Flood risk for areas protected by the Floodway Expansion and upstream of the Floodway Inlet structure are expected to be the same or lower, therefore no adverse effect on property values in these areas is expected. For areas downstream of the Floodway Outlet Structure, flood water levels may be somewhat higher with the Floodway Expansion than for the same flood with the Existing Floodway. However, this effect is expected to be rare (i.e., occurring only in flood events larger than the 1997 Flood) and small (less than 0.3 meters increase in water levels). Based on a review of the available literature on the effect of rare but large flooding on property values, it does not appear that any discernible changes to property values are likely. Therefore this effect is expected to be negligible (not significant).

During the Operation-Active phase of the Project, it is expected that there will be some residual adverse effects on damage to residential property downstream of the Floodway Outlet. These effects are expected to be rare (i.e., discernible only in flood events larger than the 1997 Flood) and small (resulting in a small number of additional residential buildings being flooded i.e., less than ten, and resulting in estimated increases in flood damages of ten per cent or less). To the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project. Therefore this residual effect is expected to be minor (not significant).

During the operation-active phase of the Project, it is expected that there will be some residual adverse effects on water levels during a flood event on lands currently held by the Peguis First Nation. These effects are expected to be rare (i.e., discernible only in flood events larger than the 1996 or 1997 Flood) and small (approximately 0.1 metres or lower)[27]. Therefore this residual effect is expected to be minor (not significant).

8.3.5 Monitoring and Follow-Up

After major floods (of similar magnitude to those used to assess effects in this section), it is expected that the Province of Manitoba will engage the Manitoba Water Commission or another similar agency to independently study effects of the flood and action taken during the flood. The agency is expected to have a mandate to determine the extent of unnatural upstream and downstream flooding, to determine whether the Project had any significant effect on water levels, and recommend appropriate compensation for incremental damage downstream due to this effect.

[27] MFEA continues to dialogue with Peguis First Nation to identify any further potential effects and, if further effects are identified, to assess mitigation and significance related to such residual effects.

8.4 ECONOMY

8.4.1 Approach and Methodology

This section considers potential effects of the Project on economic activities including employment and business. It addresses the socio-economic components set out in Section 6.4.2 of the EIS Guidelines:

> *"a general description of the economic base of communities potentially affected by the Project shall be provided including the state of the labour force, employment, unemployment, and a profile of existing economic sectors; and sufficient detail regarding the existing economy of the region shall be provided in order to predict the effect of the Project on the economy of affected communities."*

Economic activity is important to the well-being and quality of life for individuals and communities. Income levels affect access to basic human needs, housing, food and clothing, and can be linked to the health of people and communities. Employment can be a defining feature in the way of life of individuals and an influence on their quality of life. For communities as a whole, economic considerations are often a key consideration in planning and decision making. Changes in economic opportunities at the community level can affect population, the tax base, and affect the ability of a community to provide public facilities and services (including education, recreation and emergency services).

This section reviews the existing economic environment (considering both current developments and plans for future developments where relevant and available) and the potential effects of the Project on the economies of communities in the Flood Study Region and Manitoba and Canada. Effects are examined with respect to the following elements of the economy:

- Overall benefit effects on the economy from improved flood protection.
- Employment.
- Business.
- Gross Domestic Product and Government revenues (when dealing with the overall Manitoba and Canada regions).

An initial scoping step was undertaken to identify the potential pathways and sources of effect, including pathways through physical and biophysical effects, whereby the proposed Project could affect the economy during the Construction and Operation phases (see Section 8.4.1.2). Scoping indicated that employment and business effects primarily related to construction expenditures.

8.4.1.1 Sources of Information

Published sources of information were the main source of information to describe the existing economy, including experience from the 1997 Flood. Key person interviews and information from the PIP program also provided information. Factors that affect the employment effects include:

- Master Project Agreement: Provisions in the Master Project Agreement for pre-project training, hiring preferences and labour force requirements can have an effect on eligibility

for contracts for the Project. As such, these provisions in the Master Project Agreement must be considered in estimating potential employment effects of the Project.

- Labour Force Composition: The current make-up of the labour force in Manitoba and the labour force requirements for potentially concurrent development projects may influence the employment effects of the Projects. Therefore the analysis of employment effects has been developed considering this context.

Business effects from the Project will primarily be felt during the Construction phase. However, the potential for recreation business developments separate from, but related to, the Project may result in some additional cumulative business opportunities during the Operation phase of the Project. Limited information is available on the effects of these related opportunities, though the possible nature and extent of these business opportunities were considered during the effects assessment using input from the Public Involvement Program and results of the Request for Proposals for development of recreation opportunities issued by MFEA. Finally, literature related to the 1997 Red River Flood and interviews conducted as part of the Environmental Assessment were used to inform the EA Study Team of estimates of how changes in flood water levels and flows might lead to business effects during a flood event.

Effects on Gross Domestic Product (GDP) and government revenues are expected to be felt primarily during the Construction phase of the Project. An estimate of the potential effects of the Project on GDP and government revenues was undertaken by the Manitoba Bureau of Statistics (MBS) based on budget estimates for the Project produced in the report Flood Protection Studies for Winnipeg (KGS Group 2001). Though the engineering design and project budget have been refined since that time, the results of the MBS analysis are still considered relevant for indicating the coarse level of effects that may be expected.

8.4.1.2 Sources of Effect

Project-related pathways and sources of effect on the economy differ for each stage of the Project and for each socio-economic region and include:

- Changes to water regimes (levels and flows) during flood events and subsequent impacts on infrastructure and services and resources used for business or economic purposes (predominantly Operation-Active flood events; effects may extend to Operation-Inactive time periods): The Project is expected to result in changes to the water levels and flows experienced during a large flood event in the Flood Study Region. This may result in changes to flood damages experienced (i.e., direct damage to infrastructure, land or resources or business interruption losses during flood events). Further, a change in the perceived flood risk profile of a community as a result of the Project may affect the ability of a community to retain existing businesses or attract new business opportunities. The changes to water regimes during a flood event may be either positive (i.e., reductions in flood risk) or negative (i.e., an increase in flood risk).
- Employment opportunities associated with the Project (predominantly Construction phase): It is expected that there will be large labour requirements, particularly for heavy equipment operators, during the planned four year Construction phase of the Project. Distribution of employment effects will depend to some extent on conditions of the Master Project

Agreement (including any provisions for pre-project training, hiring preferences and labour organization membership). Labour requirements during the Operation phase of the Project will be much lower.

- Business participation in the Project (predominantly Construction phase): It is anticipated that there will be participation by qualifying Manitoba and Canadian businesses in the Project construction.
- Purchasing and employment income associated with the Project (predominantly Construction phase): The purchasing and employment income experienced as a result of the Project will have flow-through effects on the economies of Manitoba and Canada. It is expected that this will result in both changes to provincial and national GDP and income tax revenues.

8.4.2 Existing Environment

The economy of the Flood Study Region is diverse and encompasses a range of economic sectors and industries. The Flood Study Region includes the City of Winnipeg and much of the Capital Region of Manitoba. This section discusses current and evolving labour force characteristics and business sectors in the Flood Study Region, and to a lesser degree, Manitoba and Canada. Effects of the 1997 Flood are reviewed at the outset to help set context and describe local knowledge and available experience.

Economic Effects of the 1997 Red River Flood

The 1997 Red River Flood was a substantial economic event in Manitoba. Many homes and businesses were lost or damaged. Families and business owners were displaced and disrupted for months after the floodwaters receded. The economic damages of the 1997 Flood have been estimated to be up to $5 billion US in the Red River Valley in the U.S. and Canada (IJC 2000). For many businesses in the Flood Study Region the economic recovery continues to this day and the flood has made a permanent impact on businesses and communities in the region.

During the course of the study, many of those interviewed had personal stories about the economic damage of the 1997 Red River Flood. Many cited local businesses that never recovered from the flood and others that struggled for years after the flood. Some of those interviewed noted that the disaster assistance and business loan programs were not adequate, and in particular, having one year terms on the loan payback imposed a hardship on many businesses during the most important phase of the recovery.

Many of those interviewed during the course of the study indicated that flooding and flood protection have a very tangible effect on the shape of the economy in the region. Several interviewees indicated that flood risk is a consideration that many businesses take into account when choosing where to locate. Some interviewees stated that developments that are seen to improve the flood risk of a community tend to make the area more attractive for business and economic development while developments that are perceived to increase the flood risk of a community make it more difficult for a community to attract new development. Some of those interviewed echoed the words of the IJC that “There is no easy way to assign an economic benefit to the value of knowing one is relatively safe from future floods or the economic cost of the trauma of knowing that you may once again be flooded.” (IJC 2000:36).

8.4.2.1 Employment and Labour Force Characteristics

Employment, Participation and Unemployment Rates

In order to provide an overview of the current labour force, characteristics of the labour force of the communities in the Flood Study Region were compared to those of the Province of Manitoba as a whole.

Statistics Canada defines the potential labour force as the number of residents of working age, i.e., 15 years of age and over. The potential labour force increased from 1996 to 2001 for both the Flood Study Region (from 556,570 in 1996 to 566,525 in 2001) and the Province of Manitoba as a whole (from 855,880 in 1996 to 869,315 in 2001)[28]. In both years, the potential labour force of the Flood Study Region comprised approximately 65 per cent of the potential labour force of the Province of Manitoba as a whole (556,570 of 855,880 in 1996 and 566,525 of 869,315 in 2001). For communities within the Flood Study Region, the City of Winnipeg accounted for the largest portion of the potential labour force in both 1996 (488,465 or 88 per cent of the Flood Study Region total) and 2001 (493,735 or 87 per cent of the Flood Study Region total).

Active labour force and participation rate are also important indicators of the state of the labour force in a region. The active labour force is defined by Statistics Canada as the number of people in the potential labour force who were either employed or unemployed and looking for work in the week prior to the Census day. Typically, those not considered to be part of the active labour force include full-time students, homemakers, retired workers, seasonal workers in an "off-season" who are not looking for work and individuals with disabilities or illnesses that preclude them from being able to work. Participation rate is the ratio of those in the active labour force to those in the potential labour force in a particular region.

A majority of communities in the Flood Study Region experienced an increase in **labour force participation** rates from 1996 to 2001[29]. However, the Village of St. Pierre-Jolys, the RM of Taché, the RM of East St. Paul, the RM of Hanover and Peguis First Nation had decreasing participation rates from 1996 to 2001. The total participation rate for the Flood Study Region increased from 67.3 per cent to 68.7 per cent from 1996 to 2001. This was somewhat higher than the total participation rate for the Province of Manitoba as a whole during the same period (66.3 per cent for 1996 and 67.3 per cent in 2001). Participation rates for males were higher than those for females in all of the communities in the Flood Study Region.

Other important indicators of the state of the labour force in a region include **employment rate** and **unemployment rate**. Statistics Canada defines the employment rate as the number of persons employed in the week prior to Census Day, expressed as a percentage of the total population 15 years of age and over. Unemployment rate refers to the number of unemployed expressed as a percentage of the labour force in the week prior to Census Day.

Generally, total employment rates for the communities in the Flood Study Region increased from 1996 to 2001, with the exception of the Village of St. Pierre-Jolys, the RM of Taché, the RM of Hanover and

[28] Appendix 8C, Table 8C-1.

[29] Appendix 8C, Table 8C-2. Caution in interpreting the results because the data are based on a 20 per cent sample.

Peguis First Nation, where total employment rates decreased[30]. The total employment rates for the Province of Manitoba were 61.1 per cent in 1996 and 63.3 per cent in 2001. Male employment rates were higher than female employment rates for both 1996 and 2001 at the provincial level. Overall, employment rates in the Flood Study Region were somewhat higher than those for Manitoba in both 1996 (62.0 per cent for the Flood Study Region compared to 61.1 per cent for Manitoba) and 2001 (64.9 per cent for the Flood Study Region compared to 63.3 per cent for Manitoba).

The unemployment rate is the percentage of unemployed workers in the active labour force. Overall, the unemployment rate for the Flood Study Region was approximately the same as that of the province as a whole in 1996 (7.9 per cent) and somewhat lower than the province as a whole in 2001 (5.5 per cent for the Flood Study Region and 6.1 per cent for Manitoba)[31]. Unemployment rates for communities in the Flood Study Region and for Manitoba as a whole were lower in 2001 than in 1996, with the exception of the Village of St. Pierre-Jolys and Peguis First Nation. In both 1996 and 2001, the unemployment rates for the City of Winnipeg, City of Selkirk, Town of Morris, Brokenhead Ojibway Nation and Peguis First Nation were somewhat higher than the average for the Flood Study Region. The unemployment rates for the Town of Niverville and the rural municipalities in the Flood Study Region were lower than the average for Manitoba in both 1996 and 2001, with the exception of the rural municipality of St. Clements in 2001, where the unemployment rate was 5.9 per cent compared to the Flood Study Region average of 5.5 per cent.

Education Level

Education is an indicator of the state of the labour force and the economic health in a region. Education level can also be an indicator of the ability of a region to respond to business and employment opportunities that may be created by the Project. Statistics are reported on the highest level of schooling for communities in the Flood Study Region and Manitoba in 1996 and 2001[32]. For the Flood Study Region, the per cent of population in all major "highest level of schooling" categories decreased from 1996 to 2001 except for the trades certificate or diplomas category which increased from 3.2 per cent in 1996 to 11.5 per cent in 2001, and bachelors degree or higher category which increased from 14.3 per cent to 17.5 per cent. Similarly, for the Province of Manitoba, all major categories decreased or were unchanged from 1996 to 2001 except for the trades certificate or diplomas category which increased from 3.3 per cent in 1996 to 11.7 per cent in 2001, and bachelors degree or higher category which increased from 11.6 per cent to 14.3 per cent.

Income Levels

Income is another important indicator of economic activity. Income statistics provide an indication of the resources available to individuals and families to meet basic human needs and can be linked to quality of life and well-being. Three measures of income are reported for communities in the Flood Study Region and Manitoba for 1996 and 2001[33]:

[30] Appendix 8C, Table 8C-3.

[31] Appendix 8C, Table 8C-4. Caution in interpreting the results because the data are based on a 20 per cent sample.

[32] Appendix 8C, Table 8C-5. It is noted that between 1996 and 2001 the reporting age changed from highest level of schooling for those 15 years of age and older to highest level of schooling for those 20 years of age and older which accounts, in part, for the proportionately greater population with higher levels of education in 2001 compared to 1996. The data should also be viewed with caution as they are based on 20 per cent sample data.

[33] Appendix 8C, Table 8C-6. The data should be viewed with caution as they are based on 20 per cent sample data.

- Average Personal Income - income from all sources.
- Average Family Income - total income from all sources for family living in the household.
- Average Household Income - total income from all sources for everyone living in the household.

Average personal income increased in all communities in the Flood Study Region and Manitoba as a whole from 1996 to 2001. In the Flood Study Region the average personal income increased from $24,044 in 1996 to $28,305 in 2001. In both years, average personal income was somewhat higher than for Manitoba as a whole ($22,667 in 1996 and $26,416 in 2001). The RM of East St. Paul had the highest average personal income of $34,165 in 1996 whereas the RM of West St. Paul had the highest average personal income of $40,236 in 2001.

The average family income also increased in all communities in the Flood Study Region and in Manitoba as a whole. Average family income in the Flood Study Region increased from $53,490 in 1996 to $63,850 in 2001. In both years these were somewhat higher than for Manitoba as a whole ($50,236 in 1996 and $59,005 in 2001). The RM of East St. Paul had the highest average family income of $81,453 in 1996 whereas the RM of West St. Paul had the highest average family income of $97,781 in 2001.

The average household income increased from 1996 to 2001 for all communities in the Flood Study Region and Manitoba as a whole. The average household income in the Flood Study Region increased from $45,672 in 1996 to $54,058 in 2001. During the same time period the average household income in the Province of Manitoba increased from $43,404 to $50,756. The RM of East St. Paul had the highest average household income of $78,048 in 1996 and the highest average household income of $92,299 in 2001.

8.4.2.2 Business and Industry

There are a variety of businesses and industries operating in the Flood Study Region. Economic diversity across different industrial sectors is important to the robustness and resilience of a community and a region. This section provides an overview of the business and industry sectors in the Flood Study Region.

Employment by Sector and Occupation

One important indicator of the economic diversity of a region is employment by economic sector or industry type[34].

The top employers by industry type for the City of Winnipeg in 1996 were manufacturing (13.3%), retail trade (12.1%), and health and social services (12.0%). Manufacturing, retail trade and health and social services were also the top employers by industry type for the Flood Study Region excluding Winnipeg.

[34] Appendix 8C, Table 8C-7 and 8C-8. The industry type refers to the general nature of the business carried out in the establishment where a person worked, as indicated by the name of the employer and the kind of business, industry or service. Data are for persons 15 years of age and over, excluding institutional residents. The 1996 industry data are produced according to the 1980 Standard Industrial Classification; this classification consists of a systematic and comprehensive arrangement of industries structured into 18 divisions, 75 major groups and 296 sub-groups. These industrial groups are based on the general nature of the establishment's business, industry or service. The categories used for 2001 are somewhat different than those used by the 1996 census. The 2001 industry data are produced according to the 1997 North American Industry Classification System (NAICS). This classification system consists of a comprehensive arrangement of industries structured into 20 sectors, 99 sub-sectors and 300 industry groups.

Agricultural and related service industries (9.7%) was also an important source of employment in these communities. Manufacturing, retail trade and health and social services were the top employers by industry type for the total Flood Study Region and the Province of Manitoba as a whole.

In 2001, the top employers by industry sector for the City of Winnipeg and the Flood Study Region were manufacturing, health care and social assistance and retail trade. Agriculture, forestry, fishing and hunting were also important industry sectors for employment in the Flood Study Region excluding Winnipeg. Manitoba's top industry divisions for employment were health care and social assistance (12.4%), manufacturing (11.8%), retail trade (10.5%), and educational service industries (7.4%).

The City of Winnipeg is the largest city in Manitoba and is often described as the economic engine of the province. The City has approximately 19,000 acres zoned for industrial use. (UMA Engineering Ltd. 2002). From 1996 to 2000 the GDP at factor cost of the City of Winnipeg showed modest, steady growth, increasing from $15.3 billion in 1996 to $17.3 billion in 2000 (1992 $CAN) (UMA 2002). Finance, Insurance and Real Estate and Manufacturing were the largest contributors to the City of Winnipeg's GDP at Factor Cost during this period. During a conversation with a City of Winnipeg planner, it was noted that there is currently a secondary plan being developed for the industrial region North of Dugald Road in an area that may be affected by changes in access or infrastructure near the Highway 15 bridge. (Wintrup, *pers. comm.* 2004).

For areas in the Northern part of the Flood Study Region, both the rural municipality of St. Andrews and the rural municipality of St. Clements characterized the southern portion of the municipalities as having a number of smaller home based businesses. The economy of the central or more northern portions of the municipalities were characterized as being a mix of agriculture and recreation (including hunting and fishing guides and supplies) or cottage country related businesses near Lake Winnipeg (Matlock area in St. Andrews and the beaches in St. Clements). The City of Selkirk was characterized as having a diversified economy with some industry (particularly Manitoba Rolling Mills – which is partially in St. Andrews and partially in Selkirk), government services and a trend toward becoming more of a commercial service centre. East St. Paul was characterized as being largely a bedroom community, with some local commercial services and a small industrial area near the Existing Floodway.

For the eastern region of the Flood Study Region, the economy of the rural municipality of Springfield was characterized as being diverse, with no single firm being notable as the most important employer. Notable segments of the economy in Springfield include agriculture (predominantly grain, although there are some hog and dairy operations) aggregate and an industrial area in the portion of Springfield west of the Existing Floodway. The rural municipality of Taché indicated that agriculture (primarily grain and feed mill operations) are the most important sector of the local economy, with medical services also being important to the community.

Communities in the southern portion of the Flood Study Region generally indicated that agriculture, agricultural services and manufacturing were important parts of the local economy. The economy of the rural municipality of Ritchot was characterized as being predominantly related to residence based businesses and service industries. Agriculture and the TransCanada Pipeline compressor station at Ile des Chenes were also noted as important contributors to the local economy. The economy of the Village of St. Pierre-Jolys was characterized as largely service oriented; the Village is an important service

provider for the French community. The Town of Morris indicated that agriculture and agricultural services were the most important sector of the Town's economy with service industries also being important to the Town. The Town of Niverville indicated that agricultural and manufacturing businesses were major elements of the local economy. The rural municipalities of Morris and Macdonald indicated that agriculture, both grain and livestock, were particularly important to the economy of the municipalities. The RM of Macdonald has an industrial area that abuts the City of Winnipeg near McGillivray Boulevard and Brady Road.

Many of the communities in the Flood Study Region indicated that access to transportation routes was critical to business in their region. Agriculture and Manufacturing businesses, in particular, ship products throughout North America and when access to major transportation routes is disrupted it has a negative influence on local businesses. Some of those interviewed also expressed a concern that communities in the Red River Valley have a competitive disadvantage over other regions in Canada because the area and major access points (such as Highway 75) are viewed as being flood prone.

When asked to consider possible future or longer term economic developments or trends, many of those interviewed expected the trend of people living in the City of Winnipeg but working in nearby municipalities (particularly Niverville, Hanover, Taché and Springfield) to continue and perhaps increase in the next few years. Several municipalities indicated there were plans to develop new industrial parks to attract industrial development (Selkirk, Hanover, Niverville, Town of Morris).

Construction Industry in the Flood Study Region and Manitoba

As many of the employment opportunities created by the Project will be in the construction industry, it is important to understand the size of the construction industry in the Flood Study Region currently. Table 8.4-1, presents 2001 Census construction industry employment figures for the Flood Study Region and Manitoba[35].

In 2001, approximately 61 per cent of workers in Manitoba, classified as belonging to the construction industry according to the North American Industry Classification System (NAICS), lived in one of the communities in the Flood Study Region. Employment in the construction industry accounted for approximately 4.6 per cent of total employment in the Flood Study Region compared to 5.0 per cent for the province of Manitoba as a whole.

[35] The 2001 Census industry data are produced according to the 1997 North American Industry Classification System (NAICS). This classification system consists of a systematic and comprehensive arrangement of industries structured into 20 sectors, 99 subsectors and 300 industry groups. The criteria used to create these categories are similarity of input structures, labour skills or production processes used by the establishment. It should be noted that the data are based on a 20 per cent sample and that the figures exclude institutional residents.

Table 8.4-1
Total Workers and Construction Industry Workers using NAICS categories by Community in the Flood Study Region: 2001

Community	Total Workers – All Industries	Construction Industry Workers	Construction Industry Workers As Per Cent Of All Workers
City of Winnipeg	331,880	13,640	4.1%
City of Selkirk	4,590	200	4.4%
Town of Niverville	965	100	10.4%
Town of Morris	880	80	9.1%
Village of St. Pierre-Jolys	440	35	8.0%
RM of De Salaberry	1,740	90	5.2%
RM of Taché	4,800	440	9.2%
RM of Ritchot	3,020	365	12.1%
RM of Morris	1,450	110	7.6%
RM of Macdonald	3,130	220	7.0%
RM of Springfield	7,450	505	6.8%
RM of East St. Paul	4,525	275	6.1%
RM of West St. Paul	2,255	135	6.0%
RM of St. Andrews	6,200	480	7.7%
RM of St. Clements	5,215	475	9.1%
RM of Hanover	5,360	470	8.8%
Brokenhead Ojibway Nation	155	15	9.7%
Peguis First Nation	825	125	15.2%
Flood Study Region	384,880	17,760	4.6%
Manitoba	577,340	28,670	5.0%

Source: Statistics Canada: 2001 Census of Canada.
Note: 20 per cent sample size; Totals exclude institutional residents.

Table 8.4-2 summarizes employment in 2001 according to the 2001 National Occupational Classification for Statistics (NOC-S 2001)[36]. In 2001, there were approximately 7,760 people employed in the study area in the Construction Trades sub-category and approximately 6,890 in the Trades Helpers and Labourers sub-category.

During interviews conducted for the study, representatives from many of the municipalities indicated that there were construction firms located in their municipality that have the equipment and resources to undertake the kind of construction work that would be required by the Project. However, many of those interviewed also indicated that the details of the Master Project Agreement for the Project would influence whether or not local construction firms would be able to participate in the Project. Of particular concern were any requirements for unionization and the size of the contracts related to the Projects. Unionization requirements and large contracts were often cited as potential barriers for local firms to be able to participate in the Project.

[36] NOC-S 2001: There are 10 broad occupational categories containing 47 major groups that are further subdivided into 140 minor groups. At the most detailed level, there are 520 occupation unit groups. Occupation unit groups are formed on the basis of the education, training, or skill level required to enter the job, as well as the kind of work performed, as determined by the tasks, duties and responsibilities of the occupation. Then 2001 data in Table 8.4-2 are based on a 20 per cent sample.

It was also noted during interviews conducted for the study, and in other engineering studies, that the construction of the Project is likely to take place during a period when there are several other large construction projects occurring in Manitoba[37]. As a result, Project construction costs may be influenced by a relatively high demand for construction labour, materials and related services.

[37] These may include such projects as a hydro-electric generating station in Northern Manitoba, the Winnipeg airport terminal, Manitoba Hydro's office complex and a City of Winnipeg water treatment plant, among others.

Table 8.4-2
Employment by NOC-S Category for Communities in the Flood Study Region and Manitoba: 2001

Community	Contractors and Supervisors	Construction Trades	Electrical Trades and Tele-Communications	Machinists	Mechanics	Other Trades	Heavy Equipment Operators	Transportation Equipment Operators	Trades Helpers and Labourers	Totals
City of Winnipeg	2,600	6,160	2,870	4,530	7,245	3,235	1,110	10,110	5,675	**43,535**
City of Selkirk	45	65	80	75	175	35	40	140	145	**800**
Town of Niverville	0	45	10	20	45	15	10	70	15	**230**
Town of Morris	0	25	15	15	45	0	20	40	35	**195**
Village of St-Pierre-Jolys	0	20	0	0	10	10	0	20	20	**80**
RM of De Salaberry	20	50	15	10	50	10	15	115	25	**310**
RM of Taché	95	145	45	95	275	15	50	290	115	**1,125**
RM of Ritchot	90	115	30	50	120	35	40	120	65	**665**
RM of Morris	10	50	15	10	35	0	15	75	25	**235**
RM of Macdonald	20	85	60	20	55	15	40	135	55	**485**
RM of Springfield	110	140	120	120	350	60	35	285	155	**1,375**
RM of East St. Paul	80	80	75	10	75	45	20	90	40	**515**
RM of West St. Paul	20	40	15	60	80	25	15	70	60	**385**
RM of St. Andrews	70	215	115	140	280	20	100	260	105	**1,305**
RM of St. Clements	80	245	110	105	255	35	35	260	110	**1,235**
RM of Hanover	45	210	40	60	130	50	65	420	135	**1,155**
Brokenhead Ojibway Nation	0	10	0	0	0	0	0	10	15	**35**
Peguis First Nation	10	60	10	0	10	0	15	35	95	**235**
Flood Study Region	**3,295**	**7,760**	**3,625**	**5,320**	**9,235**	**3,605**	**1,625**	**12,545**	**6,890**	**53,900**
Manitoba	**4,920**	**12,645**	**6,075**	**7,185**	**14,270**	**4,710**	**4,180**	**20,795**	**10,865**	**85,645**

Source: Statistics Canada: 2001 Census of Canada.

Notes:

20 per cent sample size; Totals exclude institutional residents.

Totals may not add due to rounding.

8.4.3 Effects and Mitigation

The Project is expected to have predominantly positive effects on the economy in the Flood Study Region with the possibility for some negative effects that will need to be managed. Most of the employment, business, GDP and other economy-related effects of the Project are expected to occur during the Construction phase. Other, largely positive, effects are expected to occur during rare, large flood events when the Floodway Expansion Project is in operation.

Effects of the Project on the economy in the Flood Study Region are expected to combine with effects of potential future summer operation of the Floodway Expansion. Summer operation of the Existing Floodway will result in more frequent summer flooding for some agricultural land upstream of the Floodway Inlet, and is intended to reduce damages in Winnipeg related to city infrastructure. The effects of future summer operation on resource use or on the economy will not be modified to any discernable magnitude as a result of the Floodway Expansion Project.

8.4.3.1 Changes in Flood Protection

Operation-Inactive and Operation-Active

Floods of all sizes have had a large impact on the economy in the Red River Valley. A large flood can be a major economic event in a region, and can dramatically impact economic trends and development. The IJC estimated that the economic damages of the 1997 Flood were up to $5 billion US in the Red River Valley in the U.S. and Canada (IJC 2000). Similarly, investment in appropriate flood protection measures can avoid considerable damage and result in large economic benefits to a region. MFEA estimates that the Existing Floodway has avoided damage to the City of Winnipeg of over $8 billion.

It is difficult to estimate the economic benefits of increased flood protection, as the benefits are a function of both the frequency of flooding and the investment and development in an area subject to flooding. The economic benefits of a flood protection development are often determined by estimating the damages that would be avoided during a flood event. In 1999 KGS Group investigated the potential future costs to the City of Winnipeg of a series of flood events. In that study it was estimated that a 250,000 cfs flood would incur damages of over $10 billion (1999 $CAN) and a 295,000 cfs flood[38] would incur damages of over $17 billion (1999 $CAN)(KGS Group 1999). In 2001, a KGS Group study estimated that the net present value of benefits of the 1 in 700 year Floodway Expansion, taking into consideration expected flood frequency, would be over $1.6 billion (2001 $CAN) compared to net present value of costs of approximately $700 million (2001 $CAN). The net present value of net benefits (i.e., net present value of benefits less net present value of costs) of the 1 in 700 year Floodway Expansion was estimated at over $900 million (2001 $CAN) (KGS Group 2001)[39].

During the interviews conducted for this study, representatives from municipalities outside the area protected by the Floodway Expansion expressed concern that changes in flood risk may have an adverse effect on the economy in their municipality. There are two pathways by which flood risk outside of the protected area could potentially cause adverse changes as a result of the Project:

[38] The 250,000 cfs flood is approximately a 1 in 500 year flood and the 295,000 cfs flood is approximately a 1 in 1000 year flood.

[39] It should be noted that improved flood protection provides other socio-economic benefits, including benefits to emergency services and health and well-being for the estimated 450,000 residents protected by the Floodway Expansion during a large flood. These benefits are discussed further in Section 8.5 and Section 8.6.

- effects from increased flooding in certain areas outside the protected area; or
- effects from changes in relative flood protection as between different areas.

The first pathway addresses the extent to which operation of the Project causes an increase in water levels and flows outside the protected area during certain flood events. As noted in Chapter 5 – Physical Environment, any such changes in water levels as a result of the Project are expected to occur only downstream of the Project and to be rare (i.e., less than a one per cent chance of happening in any one year), small (i.e., less than one foot even in a 1:700 year flood) and of short duration during any one spring flood event. In addition, to the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project.

The second pathway by which flood risk changes as a result of the Project is the relative level of flood protection afforded to different communities in the Flood Study Region. Presently, most communities and residences in the Flood Study Region are protected to a standard of 1997 water levels plus two feet (in most cases approximately the 1 in 100 year flood). Accordingly, regardless as to any changes in water levels in these areas directly resulting from the Floodway Expansion, all such areas would see a decrease in relative flood protection compared to the protected area within the Flood Study Region. Several of those interviewed during the course of the study indicated they were concerned that increasing the level of protection to the City of Winnipeg (to approximately the 1 in 700 year level) without similarly increasing the level of flood protection afforded to other communities would make these communities appear to be more at risk for flooding and therefore less desirable locations for new economic developments. In assessing this effect, it can be noted that flood risk (let alone relative flood risk) is only one of a suite of issues that must be considered by someone making such investment decisions. Further, available experience also indicates that effects of such rare flood events do not tend to have significant long-term effects on personal or business location decisions[40]. The issue of different levels of flood protection would presumably be of most concern if the lower level of flood protection for communities outside of the area protected by the Floodway Expansion was viewed as 'inadequate'. A possible mitigation measure for this concern would be for the Province to communicate that flood protection in the Red River Valley is a priority and has already been implemented to a very high standard.

8.4.3.2 Employment

Construction

It is expected that there will be a large requirement for labour during the Construction phase of the Project. Construction employment is expected to include a number of different positions, including:

- Heavy Equipment Operators
- Mechanics
- Truck Drivers
- Construction Managers

The number of positions and sequencing of construction employment has not yet been determined by the engineering studies.

[40] Effects on location decisions might be expected to occur during a short-term period, perhaps over several years, immediately after a rare and major flood event, (See also Section 8.6).

In order to help ensure there is a qualified labour pool available to fill these positions, MFEA is including provisions in the Master Project Agreement (MPA) to support job training. In particular, MFEA has indicated that the job training provisions of the MPA will target the involvement of Aboriginal and Métis workers, women and youth. MFEA has also indicated that the MPA will include provisions to maximize local hiring, enhance workplace safety and ensure that the Project construction proceeds in an orderly and efficient fashion. These provisions will help to enhance the project employment benefits. Completion of the negotiation of the MPA with interested stakeholders is required prior to the commencement of construction activities currently scheduled to begin in 2005. The Project design phase has and will continue to enhance local capacity in technical professions.

Operation-Inactive

Labour requirements for the Floodway Expansion during the Operation phase are not expected to be materially different than labour requirements for the Existing Floodway. There is a possibility that some extra employment opportunities may be created as a result of recreation developments associated with the Floodway Expansion. These opportunities have not yet been defined, and therefore no assessment of these effects can be made at this time. It is expected that any employment effects related to recreation developments associated with the Floodway Expansion would be both small and positive.

8.4.3.3 Business Participation in the Project

Construction

In addition to project employment, it is expected that there will be participation in the Project by some local construction, engineering and related service firms. The extent to which local firms participate will be somewhat dependent on the final content of the MPA and the size of the contracts that would be tendered. During conversations with representatives from municipalities in the Flood Study Region, most indicated that there were firms located in their municipality with the human and equipment resources and experience required to participate in a large excavation and construction project. However, many municipalities indicated that the requirement for very large contracts would be a barrier to participation for some local firms. As the MPA has not been finalized, it is not possible to estimate the effect on local businesses, though any effects are expected to be positive.

Operation-Inactive

There is the potential for the creation of new recreation businesses or opportunities as a result of the development of recreation opportunities associated with the Floodway Expansion. These opportunities have not yet been defined and as such it is not possible to undertake an analysis of this effect at this time. However, any potential effects related to the development of recreation based business opportunities are expected to be positive.

8.4.3.4 Effects on Provincial and National GDP and Government Revenues

Construction

The Project is expected to have the most pronounced effect on Provincial and National GDP and government revenues during the Construction phase. In 2002, Manitoba Bureau of Statistics (MBS) was requested to do an initial Economic Impact Assessment of the proposed Project based on forecast cost information available at the time. The MBS study is attached as Appendix 8B. Though the distribution of costs has changed since the figures that formed the basis of the MBS initial assessment, the study has been provided as a broad estimate of GDP and government revenue impacts of the Project. The MBS

estimates are presented only as an illustration of the types of economic effects that could be expected and should not be relied on as absolutes. Table 8.4-3 summarises the initial impact estimates provided by MBS.

Table 8.4-3
Initial Economic Impact Estimates (2002 $CAN Millions)

	Manitoba Impacts	Rest of Canada	Canada Impacts
Total Direct Expenditures[1]	610.4	31.8	642.2
Gross Expenditures[2]	1,048.6	502.0	1,550.5
GDP at Market Price[3]	501.5	312.8	814.3
GDP at Factor Cost[4]	459.0	270.4	729.4

Source: Manitoba Bureau of Statistics 2002.

Notes:

1. Total project cost has been adjusted to remove $15.5 million included to represent real cost of the Project.
2. Gross Expenditures include estimate of additional expenditures by businesses and people levered by direct expenditures of the Project.
3. GDP at Market Price removes double counting of expenditures and leakages included in Gross Expenditures.
4. GDP at Factor Cost removes the effects of indirect taxes and subsidies from the GDP at Market Price figure.

Totals may not add due to rounding.

Based on the estimates provided from MBS's initial economic impact study, each dollar in direct expenditure for the Project is expected to result in $1.27 of impact to Canada's GDP. Approximately 62 per cent of this effect is expected to occur in the Province of Manitoba, with the remainder being dispersed through the rest of Canada.

The Project is also expected to have effects on government revenues through labour income taxes and taxes on goods and services. MBS also provided an initial estimate of the Total Tax Revenue impact. These figures are summarised in Table 8.4-4.

Table 8.4-4
Initial Government Revenue Impact Estimates (2002 $CAN Millions)

	Manitoba Impacts	Rest of Canada	Canada Impacts
Total Provincial Taxes	50.0	30.3	80.3
Local Taxes	8.5	7.6	16.1
Federal Taxes	65.4	39.9	105.3
Total Taxes Collected	123.9	77.8	201.7

Source: Manitoba Bureau of Statistics 2002.

In summary, it appears likely that the Project will have a positive effect both on provincial and national GDP. No mitigation measures are necessary.

Operation-Inactive

There is the potential for the creation of new recreation business opportunities associated with the Floodway Expansion. These opportunities have not yet been defined and as such it is not possible to undertake an analysis of their effect on provincial or national GDP at this time. However, any potential effects related to the development of recreation based business opportunities are expected to be small and positive.

8.4.4 Residual Effects and Significance

This section presents the estimated residual effects of the Project on the Economy in the Flood Study Region. The analysis of residual effects incorporates, to the extent possible, a consideration of mitigation and enhancement measures outlined in previous sections and potential cumulative effects of other projects. Based on the criteria outlined in Chapter 2, the significance of these effects are assessed and summarized in Table 8.4-5. It should be noted that many of the economic effects of the Project are not environmental effects (as defined in the EIS Guidelines), and therefore a determination of significance has not been made for these effects[41].

Table 8.4-5
Summary of Residual Effects and Significance on Economy

Topic and Project Phase	Residual Effects Including Mitigation	Mitigation	Significance
Changes in Flood Protection			
Operation-Inactive and Operation-Active	Considerable improvement to long-term flood protection in the City of Winnipeg region and areas within the Floodway. Estimated to have a net present value of net benefits of approximately $900 million (2001 $CAN).	None.	Large, long-term and regional **Major (+) Significant**
	Concerns expressed by some municipalities that building a higher flood protection standard for the City of Winnipeg will make less protected areas appear less desirable for future development. On balance, given the improvements in flood protection since the 1997 Flood, any disparity in flood protection between the City of Winnipeg and other communities is expected at most to have a small adverse residual effect on the developability of areas outside those protected by the Floodway Expansion Project.	Suggest Province communicate that flood protection in the valley is a priority and has already been implemented to a high degree.	**(-) Not an environmental effect**
Employment			
Construction	Employment during construction involving a variety of trades including Heavy Equipment Operators, Mechanics, Truck Drivers as well as engineering and construction support services.	None.	**(+) Not an environmental effect**
Operation–Inactive	Potential for increased employment due to recreation developments associated with the Project.	None.	**(+) Not an environmental effect**
Business			
Construction	Potential for local construction and related service companies to obtain contracts as part of construction of Project.	None.	**(+) Not an environmental effect**
Operation-Inactive	Potential for increased business development opportunities employment due to recreation developments associated with the Project.	None.	**(+) Not an environmental effect**
Provincial and National GDP			
Construction	Construction of the Project is anticipated to have a net positive effect on both Provincial and National GDP and government revenues.	None.	**(+) Not an environmental effect**

[41] See Section 2.3 for a discussion of socio-economic effects that are not environmental effects.

During the Operation phase, positive residual effects on flood protection for the City of Winnipeg are expected to be major (significant). Improving the level of flood protection for the City of Winnipeg is expected to avoid considerable flood damage in the future and have a significant, positive effect on the economy.

The remaining economic effects discussed in this section do not flow from Project related biophysical effects. Therefore, while residual effects are described to assist the understanding of possible effects, no determination of significance for these effects has been made.

During interviews conducted for the study concern was expressed that raising the level of flood protection for the City of Winnipeg without similarly raising the level of flood protection for other communities in the Red River Valley would put those other communities at a competitive disadvantage for development. While flood protection is certainly one consideration those making investment and development decisions must consider, there are many other factors that also need to be considered, and each potential developer will have different perspectives on the relative importance of each factor. On balance, given the considerable improvements in flood protection throughout the Red River Valley since the 1997 Flood and ongoing mitigation measures to communicate the high standard of prevailing flood protection in these areas, any disparity in flood protection between the City of Winnipeg and other communities in the Flood Study Region is expected at most to have a small adverse residual effect on the developability of areas outside those protected by the Floodway Expansion Project.

During the Construction phase of the Project, positive residual effects on employment in the Flood Study Region are expected. During the Operation phase, there are not expected to be any material changes in the labour requirements from the operation and maintenance requirements for the Existing Floodway. There is some potential for increased employment related to the development of some recreation opportunities associated with the Project, but these are not certain to occur.

During the Construction phase of the Project, positive residual effects on local businesses are expected. It was noted during interviews conducted for the Project that smaller construction contracts would allow for more involvement by local construction companies. During the Operation phase, there is the possibility that some existing recreation based businesses may expand their operations or new recreation business opportunities may be developed. These business effects cannot be quantified at this time but are expected to be very small positive effects if they do occur.

During the Construction phase positive residual effects on Provincial and National GDP are expected. The employment and purchasing requirements of the Project will have some flow-through effects on the Provincial and National economies. During the Operation phase, there are not expected to be any discernable residual effects on Provincial or National GDP (other than during major flood events).

8.4.5 Monitoring and Follow-Up

MFEA has committed to producing regular progress reports on the performance of the Master Project Agreement throughout the Construction phase of the Project. These progress reports will be made public as they are completed. Monitoring of other economic effects was not considered to be required.

8.5 INFRASTRUCTURE AND SERVICES

8.5.1 Approach and Methodology

This section addresses the Infrastructure and Services socio-economic component of the environment set out as follows in Section 6.4.3 of the EIS Guidelines:

> *"A general description of the infrastructure and services of communities affected by the Project under all operating conditions shall be provided in sufficient detail to predict the effect of the Project on infrastructure and services of affected communities, including road networks and utilities."*

Infrastructure and services available to people living in Southern Manitoba, and elsewhere in the province, are critical to meeting a wide range of human needs. They include: public infrastructure to provide potable water, waste handling, roads, electricity and other needs; and, public facilities to provide health care, recreation, social services and other government services.

This section reviews the existing infrastructure and services environment (considering both current developments and plans for future developments where relevant and available) and the potential effects of the Project on the infrastructure and services of communities in the Flood Study Region. Peguis First Nation is not included in this section as the primary community is located in the Interlake, and not geographically in the Flood Study Region, and the Pequis community infrastructure and services will not be affected by the Project[42]. Effects are examined with respect to the following infrastructure and service elements:

- Transportation and Roads
- Water Supply
- Utilities
- Police, Fire, Emergency Services
- Other Community Services (including indoor and outdoor community facilities and regional health centres)

An initial scoping step was undertaken to identify the potential pathways and sources of effect, including pathways through physical and biophysical effects, whereby the proposed Project could affect the infrastructure and services during the Construction and Operation phases (see Section 8.5.1.2). Scoping indicated that effects typically related to Construction phase and areas in close proximity to the Project site.

8.5.1.1 Sources of Information

The following sources of information were used for this section:

- Review of Existing Data Sources: This included a review of relevant Community Profile and Health Profile data provided by the Province of Manitoba and development plans available

[42] To the extent that Peguis First Nation develops infrastructure on current reserve parcels or TLE lands in the Red River Valley in the future, it is anticipated that these would be protected by flood proofing or other measures.

for each of the municipalities in the Flood Study Region. These data sources were used to develop an understanding of the existing infrastructure and services environment, to provide an indication of development goals and objectives in the future, and to understand how potential ecological effects of the Project may influence or affect these plans.

- Interviews with Municipalities and Planners: In addition to the review of existing data sources, an interview program was undertaken with municipalities and planners in the Flood Study Region. These interviews were used to supplement the existing environment information collected from other data sources and to develop an understanding of how the Project might affect current and future infrastructure and services.
- Results of Project Engineering Studies: Project description information and other engineering studies were analysed to develop an understanding of the nature and magnitude of potential effects of the Project. This information was then assessed in the context of the information obtained during interviews and from other data sources to develop an assessment of the potential effects of the Project.

8.5.1.2 Sources of Effect

Project-related pathways and sources of effect on infrastructure and services differ for each stage of the Project and include:

- Traffic Activity and Access Disruptions (predominantly during Construction phase): It is expected that there will be some traffic and access issues during the Project Construction phase. These may occur at highway and rail crossings, and Dunning Crossing. As well, there may be disruptions during construction for sections of roads in the RM of Macdonald in relation to the West Dyke Extension. During operations, the same or better levels of traffic service is expected because most redesigned bridges will have some degree of roadway improvements (such as sight lines and access, and higher levels that will not be underwater during a flood event), the West Dyke extension will improve the adjacent road quality, and Highway 15 may be twinned leading to a decrease in traffic congestion and improved safety at this location.
- Land Use Changes (during Operation-Inactive phase): During the Operation-Inactive phase, the Floodway Expansion may facilitate related development of recreational activities in the site area. Associated increases in the number of people and traffic in the area may lead to some drain on emergency resources and capacity for the RM of Springfield.
- Land Acquisition (predominately Operation-Inactive phase): Land acquisition for the Project for right-of-way related to the Floodway channel, West Dyke, bridges and roads could result in effects with regards to local RM of Springfield funding for Police, Fire and Emergency services. This effect could arise when an RM experiences a reduction in available property tax area and thus has a reduced level of tax capacity. The Province of Manitoba will own acquired land and does not pay property taxes to municipal governments.
- Changes to Groundwater Levels / Water Quality (predominantly during Construction phase): Changes to groundwater levels and water quality in some areas near the Project site are expected results of the Project during construction related to localized dewatering and the potential for heavy equipment small fuel spills, a local and temporary reduction in groundwater levels in the vicinity of some bridge crossings and aqueducts, and the possibility of minor reductions in water levels of wells. These effects may be a result of Floodway widening for the RM of East St. Paul which is located close to the Floodway.

- Changes to Water Regimes (levels and flows) during Flood Events (predominantly Operation-Active phase; effects may extend to Operation-Inactive time periods): The Project is expected to result in changes to the surface water levels and flows experienced during a large flood event in the Flood Study Region. Surface water quality effects are lessened with the Project during all but the most extreme flood events. Due to widening, surface water levels will be lower in the Floodway and immediately upstream during flood events. The City of Winnipeg is expected to have better emergency response due to lower water levels during extreme flood events.

8.5.2 Existing Environment

The baseline against which the Project effects are measured is the socio-economic situation, as it would likely evolve in the absence of the Project. This is not a static snap shot of the socio-economic situation in the Flood Study Region in the summer of 2004, but a dynamic picture as it is expected to develop over time.

This section provides an overview of community- based infrastructure and services, including:

- Effects of the 1997 Flood on Infrastructure and Services
- Transportation and Roads
- Water Supply
- Utilities
- Police, Fire, Ambulance and Emergency Services
- Other Community Services

8.5.2.1 Effects of the 1997 Red River Flood on Infrastructure and Services

In 1998, Ernst & Young prepared a Post-Emergency report. In the report Ernst & Young noted that the "...1997 Flood was unquestionably the largest provincial emergency in the past several decades". (Ernst & Young, 1998:15). The effects consisted first and foremost of greatly increased demand for emergency services in municipalities throughout the Red River Valley. The Town of Morris noted that even though the Town was largely protected from the 1997 Flood by a community ring dyke, the Town normally provides emergency services to other communities in the area and this ability was constrained both by access and the emergency response requirements of the Town itself. The 1997 Red River Flood also affected transportation and roads, water supply and other community facilities.

Many major provincial highways and municipal roads were closed during the 1997 Flood, including Highways 210, 207, 59 and 75. Representatives from the RM of Ritchot and the Town of Morris noted that when Highway 75 is underwater more traffic pressure is put on other major roads. The Town of Morris also noted that Highway 23 is the last evacuation route for the Town when highway 75 was flooded. Highway 44, connecting Lockport in the RM of St. Andrews with Garson, located in the RM of St. Clements, was also closed. Many of those interviewed during the course of this study indicated that road improvements are necessary to ensure that transportation routes remain open.

The RM of Macdonald and the RM of Ritchot noted water supply issues related to the 1997 Flood. In Macdonald the concern was keeping the water supply system pressurized to prevent contamination of the water supply by flood waters and also to maintain water service to residences that were not directly

threatened by flooding. In Ritchot and Macdonald there were concerns about contamination of abandoned wells by floodwaters[43]. (Stefaniuk *pers. comm.* 2004; Dobrowolski *pers. comm*. 2004).

Since 1997, steps have been taken to improve emergency flood preparedness. Many interviewees stated that emergency services have been improved since the 1997 Flood and felt that they were better prepared to respond to similar flood events in the future.

8.5.2.2 Transportation and Roads

This section provides an overview of the major transportation infrastructure in the Flood Study Region. Infrastructure described in this section include major highways and bridge crossings at the Existing Floodway and provincial and municipal roads that form part of the West Dyke.

Provincial Trunk Highway 75

Provincial Trunk Highway 75 (PTH 75) extends from Winnipeg to the U.S. border at Emerson. PTH 75 and is a major trade and transportation route that allows movement of goods and people between major population centres in the Flood Study Region. During key person interviews it was frequently noted that PTH 75 is important to people, businesses and emergency service providers. Closure of PTH 75 during flood events has serious effects on people and businesses throughout the Red River Valley.

Existing Floodway Highway Bridges

There are six highway bridges that span the Existing Floodway. Highway Crossings on the Existing Floodway include:

[43] It was noted during interviews with representatives from Ritchot that a remediation program undertaken following the 1997 Flood and the development of new water supply infrastructure has improved water supply in the municipality.

- St. Mary's Road Bridge (see Figure 8.5-1): This highway bridge connects St. Vital to the north with the unincorporated urban centre of St. Adolphe to the south. The Public Road (PR) 200 Bridge crossing of the Floodway along St. Mary's Road is classified as a Collector "A" roadway, and is currently a two-lane undivided roadway.

Source: InterGroup Consultants Ltd. (June 9, 2004).
Note: Photograph taken from the north side of St. Mary's Bridge, facing south.

Figure 8.5-1
St. Mary's Road Bridge

- Provincial Trunk Highway (PTH) 59 Southbound (S/B) Structure (see Figure 8.5-2): This highway bridge connects the City of Winnipeg to the north with the RM of Ritchot to the south. Provincial Trunk Highway (PTH) 59 South is classified as an Expressway and is currently a four-lane divided roadway.

Source: InterGroup Consultants Ltd. (June 9, 2004).
Note: Photograph of Highway 59 South Bridge taken from Prairie Grove Road Offramp facing west.

Figure 8.5-2
Highway 59 South Bridge

- Trans-Canada Highway (TCH) No. 1 East (see Figure 8.5-3): This highway bridge is located in the southwestern corner of the RM of Springfield. The TCH No. 1 East Bridge crossing of the Floodway is classified as an Expressway, and is currently a four-lane divided roadway.

Source: InterGroup Consultants Ltd. (June 9, 2004).
Note: Photograph taken from the west bank of the Trans Canada Highway Bridge facing east.

Figure 8.5-3
Trans Canada Highway Bridge

- Provincial Trunk Highway (PTH) 15 (see Figure 8.5-4): This highway bridge is located in the RM of Springfield and it connects Transcona to the west with the unincorporated urban centre of Dugald to the east. The PTH 15 bridge is classified as a Primary Arterial and is currently a two-lane undivided roadway.

Source: InterGroup Consultants Ltd. (June 9, 2004)
Note: Photograph taken from the east side facing west looking at the Highway 15 Bridge.

Figure 8.5-4
Highway 15 Bridge

- Provincial Trunk Highway (PTH) 59 North (see Figure 8.5-5): This highway bridge is located in the RM of Springfield and it connects East St. Paul to the south with the RM of Springfield and the RM of St. Clements to the Northeast. PTH 59 North is classified as an Expressway, and is currently a four-lane divided roadway.

Source: InterGroup Consultants Ltd. (June 9, 2004).
Note: Photograph taken from the west side of the Highway 59 North Bridge, facing east.

Figure 8.5-5
Highway 59 North Bridge

- Provincial Trunk Highway (PTH) 44 (see Figure 8.5-6): This highway bridge is located in the RM of St. Clements and connects Lockport to the west with Garson to the east. The PTH 44 bridge is classified as an Expressway and is currently a two-lane undivided roadway.

Source: InterGroup Consultants Ltd. (June 12, 2004).
Note: Photograph taken from east side of highway 44 Bridge facing west.

Figure 8.5-6
Highway 44 Bridge

Table 8.5-1
Project Site Area Highway Bridges

Bridge Name	Average Annual Daily Traffic 2003 (vehicles per day)	1996-2001 Collision Rate (Collisions per million vehicle kilometers)	Level of Service
St. Mary's Road	4,300	1.48	B
PTH 59 South	10,275	0.26	A
TCH No. 1 East	17,250	0.69	B
PTH 15	10,930	3.29	D
PTH 59 North	17,870	1.18	B
PTH 44	2,570	0	A

Source: University of Manitoba Transportation Information Group 2004.

In 2003, traffic volumes on the Floodway highway bridges ranged from an average of 2,570 vehicles per day on the PTH 44 bridge to 17,870 vehicles per day on the PTH 59 North bridge[44]. For the period from 1996 to 2001, the collision rate[45] ranged from zero on the PTH 44 Bridge to 3.29 on the PTH 15 Bridge. The Level of Service (LOS)[46] for the six highway bridges ranged from a rating of "D" (for the PTH 15 bridge) to "A" (for the PTH 44 and PTH 59 South bridges).

Railway Bridges

There are six currently used railway bridges that span the existing Floodway[47]:

- Canadian Pacific Railway (CPR) Emerson
- Canadian National Railway (CNR) Sprague
- GWWD (Greater Winnipeg Water District) Railway
- CNR Redditt
- CPR Keewatin
- CEMR (Central Manitoba Railway) Pine Falls

Dillon Consulting Limited/ND Lea Engineers & Planners Inc. (2004) conducted an evaluation of the railway bridges that span the Floodway. Figure 8.5-7 is an example of one of the rail bridges that cross the Floodway Channel. Each bridge's general operating condition, signs of deterioration, upgrading needs and rehabilitation needs were investigated. The results of the investigation indicated that there is no significant deterioration on any of the existing rail bridges.

[44] See Table 8.5.1.

[45] Defined as the number of collisions per million-vehicle kilometers.

[46] Level of Service is a qualitative measure of a road user's comfort level, ranging from LOS "A" (best condition) to LOS "F" (worst condition).

[47] A seventh rail bridge, the CPR Lac Du Bonnet bridge has been removed.

Source: InterGroup Consultants Ltd. (June 12, 2004).
Note: Photograph taken facing southeast from the West Bank of the Trans Canada Highway Bridge.

Figure 8.5-7
CNR Redditt Rail Bridge Crossing Floodway Channel

West Dyke Extension Road Network

The West Dyke extension involves some raising of the existing structure as well as raising or modifying portions of certain roads in the Rural Municipality of Macdonald, including:

- Highway 305 from the existing West Dyke to approximately one mile east of the community of Brunkild.
- Turning North between sections 29-7-1W and 28-7-1W and continuing for approximately three miles.
- Turning West between sections 5-8-1W and 8-8-1W and continuing for approximately two miles.
- Turning North between sections 12-8-2W and 7-8-1W and continuing for approximately two miles.
- Turning West on Highway 247 and continuing for approximately four miles.

Dunning Road Crossing

The Dunning Road Crossing is a low-level crossing located in the RM of St. Clements. The RM of St. Clements has a Use Agreement for the Crossing with the Crown Lands Branch of the Province of Manitoba and the municipality is responsible for maintaining the crossing. The principal purpose of the Dunning Road Crossing is to provide access for emergency vehicles between the fire hall on the west side of the Floodway Channel and the Pine Ridge Trailer Park on the east side of the Floodway Channel. There is also local use of the crossing. The Dunning Crossing is closed whenever there is flow in the Floodway Channel for example during spring runoff or operation of the Floodway or sometimes following significant summer precipitation events[48]. When access is restricted, emergency service to the trailer park from the RM of St. Clements may be substituted by emergency service from East Selkirk Fire Hall.

Source: InterGroup Consultants Ltd. (June 12, 2004).
Note:
Water in channel due to emergency summer operation.
Photograph taken from the east side facing west toward Dunning Crossing, which is underwater as existing Floodway is in Operation.

Figure 8.5-8
Dunning Crossing

[48] See Figure 8.5-8.

8.5.2.3 Water Supply

This section presents an overview of the water supply and sewage systems for communities in the Flood Study Region. Information included in this section has been compiled from existing sources including the Government of Manitoba Community Profiles, First Nations Community Profiles, and information from key person interviews[49].

Most areas within the City of Winnipeg are covered by the municipal water system[50]. The major source of water is Shoal Lake. The estimated percentage of population increase that could be served from the current system is 1,000 per cent (Manitoba Intergovernmental Affairs 2004). The owner of the water system is the City of Winnipeg. The remaining capacity of the existing sewage system at the current growth rate is 40 years. The type of service for the sewage system in the City of Winnipeg is a gravity system with pumping stations.

The City of Selkirk is served by a municipal water system. The major source of water in the City of Selkirk is groundwater. The estimated percentage of population increase that could be served from the current system is 10 per cent. The owner of the water system is the City of Selkirk. All developed areas within the City of Selkirk are covered by a sewage system. The remaining capacity of existing sewage system is 20 years, at the current growth rate. The type of service for the sewage system in the City of Selkirk is a gravity system.

All urban areas within the RM of Macdonald are covered by the municipal water system[51]. The source of water is from the La Salle River. The estimated percentage of population increase that could be served from the current system is 20 per cent. The owner of the water system is the RM of Macdonald. The water treatment facility is located in Sanford. All urban areas within the RM of Macdonald are covered by a sewage system. The type of service for urban areas is low pressure or gravity system in River Ridge (La Salle) as well as a septic field or septic ejector alternative for rural areas over 10 acres[52].

In the RM of Ritchot, Ste. Agathe, the Red River Drive area and some rural areas are supplied by a municipal water system. The other major source of water for the RM is artesian well. The estimated percentage of population increase that could be served from the current system is 25 per cent. The owner of the water system is the RM of Ritchot. The areas within the RM of Ritchot covered by the sewage system are Ste. Agathe, St. Adolphe, and Ile-des-Chenes. Service is supplied by a full gravity system.

In the RM of Springfield, the areas covered by the municipal water system are the U.U.C of Dugald and the area located near the Heatherdale and Hazelridge Roads. Within the municipality individual wells are generally used. The water supply in Oakbank consists of individual wells. The estimated percentage of population increase that could be served from the current system is 20 per cent. The owner of the water system is the RM of Springfield. The areas covered by the sewage system are the communities of Dugald and Oakbank. The remaining capacity of the existing sewage system at current growth rate is 2 years.

[49] Tables 8D-1 and 8D-2 in Appendix 8D summarize water and sewer system information for municipalities in the Flood Study Region.

[50] For some residents of the City of Winnipeg, such as some areas of the South St. Vital planning area, municipal water service is not available.

[51] (i.e., Sanford, La Salle, Domain, Starbuck, Oak Bluff and Brunkild.)

[52] (http://www.rmofMacdonald.com/Wp200.htm).

All developed areas within the RM of East St. Paul are covered by the municipal water system. The water system is a local system serving only the RM. The major source of water is the Bird's Hill sand and gravel aquifer and the municipal wells are located adjacent to the Floodway. The estimated percentage of population increase that could be served from the current system on the west side of Oasis road is 2 per cent. The owner of the water system is the RM of East St. Paul and the quality of the groundwater is rated as good. The areas covered by the sewage system are the developed parts of the municipality. The remaining capacity of the existing sewage system at current growth rate is 2 years. The sewage system in the RM of East St. Paul is a gravity system.

The water system in the RM of St. Clements is almost entirely supplied by groundwater using private wells. The sewage system is comprised of lagoons for urban areas and private systems for rural areas[53].

It was noted during some key person interviews that construction of the Existing Floodway caused the water table to drop producing well failures in the RM of Springfield, RM of St. Clements, and RM of East St. Paul. This drop in the water table was mitigated at the time.

8.5.2.4 Utilities

Manitoba Hydro serves all Flood Study Region communities with electricity. Manitoba Hydro's subsidiary, Centra Gas, is the major natural gas distributor in Manitoba and Centra delivers natural gas to most urban Flood Study Region communities. MTS provides telecommunications services to residential customers in all Flood Study Region communities. Utilities that cross the Floodway include transmission and distribution lines, oil and gas pipelines, telecommunication lines and municipal water lines. Each of the utility service providers have identified utility crossings that may be affected or need to be replaced during the Project[54].

8.5.2.5 Police, Fire and Ambulance Services

All communities in the Flood Study Region have access to and are served by ambulance, fire and police services[55]. Ambulance service is generally provided out of one or two urban centres in each of the municipalities. Fire Hall service includes both professional and volunteer fire departments. Police service is provided either by municipal police forces or by RCMP service. In some communities, RCMP service is supplemented by a municipal safety officer who enforces municipal by-laws.

8.5.2.6 Emergency Response

Under the provisions of *The Emergency Measures Act*, every local authority is responsible for developing an emergency preparedness, response and recovery plan to ensure protection of people, property and the environment within their municipal boundary. The Manitoba Emergency Measures Organization (EMO) assists with the preparation, review and enhancement of emergency preparedness programs, training exercises and resource development for municipalities, school divisions, government departments and agencies, and the private sector.

[53] (http://www.granite.mb.ca/erdc/st.clements/).

[54] Utilities crossing or running adjacent to the Floodway are discussed in Section 4.10.

[55] Table 8D-3 in Appendix 8D summarizes police, fire and ambulance services for municipalities in the Flood Study Region.

The community emergency plan should be based on a hazard and risk analysis that will assist in the identification of resources that may be required to respond to an emergency event. The emergency plan shall include:

- contact numbers for emergency responders;
- identification of accommodations for people that may need to be evacuated;
- a registration and inquiry capability;
- transportation routes in the event of evacuation;
- a media strategy to ensure the general public is informed of activities relating to the emergency event;
- technical communication capabilities; and
- guidelines for the emergency responders to apply in specific situations.

8.5.2.7 Other Community Facilities

This section presents an overview of Other Community Facilities, both indoor and outdoor, and of health services and associated centres and facilities in the Flood Study Region. Information included in this section has been compiled from existing sources including Government of Manitoba Community Profiles website, the Manitoba Health InfoHealth Guide and the Local Regional Health Authorities of Manitoba website, the Government of Manitoba community profiles from March 3, 2004 and the Manitoba Centre for Health Policy (Martens, P. & Black, C., June 2003).

Most of the municipalities in the Flood Study Region have access to indoor facilities such as an arena, community hall and curling rinks[56]. Most of the indoor facilities are located in urban settings within the rural municipalities. Most of the municipalities in the Flood Study Region also have access to outdoor facilities such as baseball diamonds, golf courses, public boat launches and playgrounds.

During key person interviews some concern was noted about the potential flooding of outdoor recreation facilities. Golf courses were frequently cited as areas of concern. Other areas of concern included the Selkirk Marine Museum and the St. Norbert Heritage Park. Many interviewees noted that a number of outdoor recreation facilities are subject to spring run-off and occasional flooding.

Health Centres

Health services in Manitoba are provided by a number of organizations, but for the most part fall under the jurisdiction of local regional health authorities (RHAs), each with responsibility for administering health services in specified geographical areas (2004, Regionalization of Health Services in Manitoba). As of 1999, Manitoba was divided into 12 RHAs, and later in 2002, two RHAs were amalgamated resulting in the 11 current RHAs. The communities within the Flood Study Region are dispersed among five RHAs: Winnipeg Regional Health Authority (WRHA), South Eastman Regional Health Authority (SE-HA), Interlake Regional Health Authority (IRHA), Regional Health Authority – Central Manitoba Inc. (RHA – Central), and the North Eastman Regional Health Authority (NE-HA)[57].

The health services provided through the RHAs include: physician care, hospital care, prenatal care (the midwifery program), public health care including environmental health and other prevention and health

[56] Tables 8D-4 and 8D-5 in Appendix D summarize indoor and outdoor community facilities for municipalities in the Flood Study Region.

[57] See Section 4.1 of Appendix 8E for an overview of the RHAs in the Flood Study Region.

education based programs, mental health, home care, personal care home, cancer and other special medical treatment services and addiction support. Manitoba Health also provides limited support through pharmacare and other health professionals such as dentists, optometrists, and chiropractors. More information on current health status in the Flood Study Region is provided in Section 8.6: Personal, Family and Community Life.

Table 8.5-2
Flood Study Region Communities by Regional Health Authority (RHA)

Regional Health Authority	Flood Study Region Communities
Regional Health Authority - Central Manitoba Inc. (RHA - Central)	• RM of Macdonald • RM of Morris • Town of Morris
South Eastman Regional Health Authority (SE-HA)	• RM of Hanover • RM of Ritchot • RM of De Salaberry • Village of St. Pierre-Jolys • Town of Niverville • RM of Taché
Winnipeg Regional Health Authority (WRHA)	• City of Winnipeg • RM of East St. Paul • RM of West St. Paul
North Eastman Regional Health Authority (NEHA)	• RM of Springfield
Interlake Regional Health Authority (IRHA)	• RM of St. Andrews • RM of St. Clements • City of Selkirk • Brokenhead Ojibway Nation

Source: Manitoba Health Population Report 2002.

Most communities receive regular, non-emergency health services through local Community Health centres within each of the RHAs. However, for many rural communities, emergency and specialty services are accessible only through one of three major health service centres at Winnipeg, Steinbach or Selkirk, which provide full range services. Many of the surrounding rural communities utilize the services available at these three major health service centres primarily for emergency or specialty services that are not provided through their local doctors, health centres, hospitals and personal care homes[58].

8.5.3 Effects and Mitigation

This section outlines the anticipated Project related effects and mitigation on infrastructure and services in the Flood Study Region. It is expected that most effect will be felt during the Project's Construction phase; where relevant, effects are noted during the Operation phase. Where deemed necessary, mitigation measures are also presented.

Other future projects and activities potentially relevant to the consideration of cumulative effects of the Project on Infrastructure and Services include the potential summer operation of the Floodway Expansion and the City of Winnipeg Flood Protection System improvements.

- Summer Operation of the Floodway Expansion: Summer operation of the Existing Floodway Expansion results in more frequent summer flooding for some agricultural land upstream of

[58] Table 8D-6 summarizes Health Care Facilities in the Flood Study Region.

the Floodway Inlet, and is intended to reduce damages in Winnipeg related to city infrastructure. There are no reported effects on infrastructure and services outside of the City of Winnipeg as a result of summer operation of the Existing Floodway. The effects of future summer operation will not be modified to any discernable magnitude as a result of the Floodway Expansion Project.

- City of Winnipeg Infrastructure Improvements: The City of Winnipeg Dyking and other infrastructure improvement projects would offer benefits by increasing reliability of the City's protection system and reducing the potential risk of flood damage as a result of using temporary works. There are not expected to be effects on Infrastructure and Services outside of the City of Winnipeg as a result of the City of Winnipeg dyking and other infrastructure improvements.

8.5.3.1 Transportation and Roads

Construction

During the Construction phase, six highway bridges (the St. Mary's, TCH No.1 East, PTH 15, PTH 59 North and PTH 44 bridges) are to be replaced. It is expected that there will be traffic disruption during the construction of these highway crossings. However, the existing bridges will remain operational during the construction of the new bridge in order to mitigate traffic disruptions. The PTH 59 S Bridge improvements will be conducted on one bridge at a time with the other bridge remaining open.

During the Construction phase, five railway bridges (CNR Sprague, GWWD, CNR Redditt, CPR Keewatin and CEMR Pine Falls bridges) will be modified and one bridge (CPR Emerson) will be replaced with a new bridge. During the construction of the new CPR Emerson Bridge the existing bridge is to remain in service until construction of the new bridge is complete. Roadwork on existing roads is needed at this site including work on Prairie Grove Road and Hallama Drive. The CNR Sprague, CNR Redditt and the CPR Keewatin bridges will have temporary detour structures constructed to enable railway operations to proceed without interruption. The GWWD and CEMR Pine Falls Bridges will be closed for approximately four months during their modification. The CEMR Pine Falls has associated roadwork involving the raising of the existing PR 202. It is expected that there will be minor traffic disruptions during the construction of these railway bridge crossings and associated roadworks. However, MFEA has undertaken consultations with each of the rail operators prior to construction and will undertake to schedule the construction to minimize service interruptions.

The Dunning Road Crossing will be removed during the Construction phase of that area of the channel. It is anticipated that Dunning Road Crossing will be out of service due to the Project for no more than thirty days. This will affect the ability of the RM of St. Clements to respond to emergency events on the east side of the floodway while the Dunning Crossing is closed. Possible mitigation measures include coordinating with the RM of East St. Paul to provide emergency service to that portion of St. Clements on a temporary basis during construction.

There will be effects on transportation during the extension of the West Dyke which will involve raising roads in the RM of Macdonald. Mitigation measures include construction scheduling so as to provide reasonable access during construction for the movement of farm equipment and emergency services.

Operation-Inactive

During the Operation-Inactive phase, the effects on transportation and roads will be neutral or positive. The pre-design for the PTH 15 Bridge includes a twinned bridge which would decrease congestion and improve safety.

Operation-Active

During flood events, highway and railway bridges will be higher as a result of the Project and thus less prone to flooding. There are also expected to be some changes to water levels during operation of the Floodway Expansion both upstream (possibly lowered water levels during some events) and downstream (possibly higher water levels during some events). This could lead to changes in flooded area, and flooded roads and railways that are either positive or negative, depending on the area. However these effects are expected to occur only rarely (i.e., in floods larger than the 1997 Flood), to be small in magnitude (flood levels are expected to increase at most by 0.3 meters at the Floodway Outlet during a 1 in 700 year event) and to be short term.

There were also concerns expressed by the RM of St. Andrews respecting erosion affecting roads near the Red River and the Floodway Outlet, particularly during flood events. Mitigation measures for these effects include the design of the outlet, which has been undertaken to reduce outlet flow velocities, and the installation of rip-rap or other erosion control measures along the bank opposite the Floodway Outlet.

8.5.3.2 Water Supply

Construction

During the Construction phase, dewatering may be required at some locations so that construction of piers for new bridges can occur. The dewatering may produce a temporary lowering of the water table in the vicinity of some of the bridge crossings and the City of Winnipeg Aqueduct[59].

Mitigation measures related to water supply effects during construction include notifying all potentially affected property owners prior to construction and an assessment of their wells would be carried out to determine if their water supply would be affected. Where lowering temporarily impedes access to well water, measures will be taken to remedy the situation so there is no disruption of water supply during dewatering. Possible mitigation measures include lowering the pump, deepening the existing well, installing a new well or providing delivered water until water levels are restored. Affected property owners will be included and involved in determining mitigation.

As with any major construction project, there is the potential for small fuel or other chemical spills from heavy equipment operation related to the construction of the Project. There will be an environmental management plan in place for the project to reduce the possibility of spills occurring as well as a contingency plan for cleaning up fuel spills should they occur.

Operation-Inactive

During the Operation-Inactive phase, there will be no permanent, widespread, noticeable reduction in groundwater levels due to Floodway Expansion if there is no deepening of the channel. Without deepening, presence of the Floodway Expansion will not noticeably lower water levels of wells on either side of the Floodway. There is however, the possibility that some local deepening of the Floodway will be

[59] Refer to Section 5.4.3.2.1 for more information on construction dewatering

required. There may therefore be some minor reductions in water levels of wells located close to the Floodway. Mitigation measures will be in place to ensure access to drinking water is maintained[60].

8.5.3.3 Utilities

Construction

Construction will involve altering or moving electrical crossings, gas pipelines, oil pipelines, communication crossings, City of Winnipeg Aqueduct and other municipal crossings. Construction is not expected to result in service interruptions. Mitigation measures include scheduling the construction for periods of low use volumes (particularly related to the City of Winnipeg Aqueduct) and undertaking the construction in stages.

8.5.3.4 Police, Fire and Emergency Services

Construction

Traffic disruptions near the Floodway bridge crossings could affect access for emergency services during construction. In particular, there is concern that the temporary removal of the Dunning Crossing could adversely affect the ability of emergency vehicles at the RM of St. Clements south firehall to access the Pine Ridge Trailer Park during the Construction phase. Mitigation measures include notifications to emergency service providers of construction schedules and detours. With respect to the temporary closing of the Dunning Crossing, it may be possible to have emergency services provided to the Pine Ridge Trailer Park by the Rural Municipality of East St. Paul on a temporary basis.

There will be effects on transportation during the extension of the West Dyke which will involve raising roads in the RM of Macdonald. Mitigation measures include construction scheduling so as to provide reasonable access during construction for emergency services.

Operation-Inactive

During the Operation-Inactive phase, effects include improved bridges with better access that will support somewhat improved emergency access for municipalities near the Floodway Channel.

Land acquisition will be required for the West Dyke and for Floodway Channel crossings. The land acquisition is expected to take place primarily in Winnipeg, RM of Macdonald, RM of Springfield and RM of St. Clements[61]. There was some concern expressed during interviews and public meetings that this land acquisition will reduce the tax base in these municipalities and result in lowered municipal revenues that will affect the ability of the municipality to fund emergency services. However, the area of land to be acquired is quite small compared to the total assessment area for these municipalities.

Operation-Active

While the Floodway Expansion is operating, there will be changes to water levels and flows compared to the existing condition. This will result in a large benefit to emergency services provision in the City of

[60] A more detailed discussion of potential effects on groundwater is located in Section 5.4.3. There will be no noticeable changes in water levels in the regional bedrock aquifer, or sand and gravel Birds Hill Aquifer. Mitigation measures will be implemented to avoid potential water level reduction in Birds Hill Aquifer such as the construction of a subsurface cutoff wall next to the Floodway. During a flood, Floodway width expansion due to the Project lessens the potential for effects on groundwater levels and water quality in the Floodway during all but the most extreme flood events.

[61] Please refer to Section 8.3.4 Resource Use for a detailed description of the private land area to be acquired during the Project.

Winnipeg and areas protected by the Floodway where water levels will be reduced, leading to less flooding and therefore fewer requirements for emergency services and response during a flood event. For areas upstream of the Floodway Inlet, water levels will either be the same or lower as in the existing condition for all flood scenarios up to the 1 in 700 year flood event. This will result in either no change to the demand for emergency services in these areas or a small reduction in the demand for these services as the impact of the flood is smaller due to lower water levels.

For areas downstream of the Floodway, there is the possibility that water levels will be higher (estimated to be no more than 0.3 meters at the Floodway Outlet Structure during a 1 in 700 year flood event) which may increase the demand for emergency services during rare, severe flood events (i.e., floods greater than the 1997 Flood). It should be noted that regardless of whether or not the Floodway Expansion goes forward, there will be a heavy demand for emergency services and emergency response throughout the Flood Study Region. However, during interviews conducted for the study, most of the municipalities consulted felt that they were better prepared to respond to flood events similar to the 1996 or 1997 Floods in the future due to improved flood protection infrastructure (such as community ring dykes and raised houses), improved flood forecasting and improved and updated emergency plans.

8.5.3.5 Other Community Facilities

Construction

During the Construction phase, there are not expected to be any direct effects on community facilities, as there are none located at the Floodway Channel or West Dyke sites. There is the possibility that access to some of these facilities will be impaired due to general construction disruption but any access disruption is expected to be temporary and minor.

Operation-Active

During the Operation-Active phase, outdoor community facilities (such as golf courses and baseball diamonds) located in flood prone areas upstream or south of the inlet structure will observe similar or lower water levels during moderate flood events compared to the existing condition. This will reduce the impact of flood waters on these facilities. During rare, extreme flood events there will be small increases in water levels near the Floodway Outlet (estimated to be no more than 0.3 meters at the Floodway Outlet Structure during a 1 in 700 year flood event) which may contribute to increased damages to some indoor and outdoor community facilities. However, these effects are expected to be small compared to the magnitude of flood effects due to natural flooding.

8.5.4 Residual Effects and Significance

This section presents the estimated residual effects of the Project on infrastructure and services in the Flood Study Region, primarily in areas close to the Project site. Residual effects consider the effect of impact management measures that are planned. Based on criteria outlined in Chapter two, the significance of these effects within the Flood Study Region are assessed and summarized in Table 8.5-3 along with the general direction of change (positive, negative or elements of both).

Table 8.5-3
Residual Effects and Significance on Infrastructure and Services

Topic and Project Phase	Residual Effects Including Mitigation	Mitigation	Significance
Transportation and Roads			
Construction	Construction related traffic disruption and on Floodway crossings and in the vicinity of the West Dyke. Also potentially increased traffic flow on alternate traffic routes during construction.	Reasonable access will be maintained at crossings and the West Dyke.	Temporary, small. **Minor (-) Not significant**
Operation-Inactive	Improved traffic flow on redesigned and upgraded floodway crossings.	None.	**Minor (+) (Not significant)**
Operation-Active	Higher bridge decks and improved capacity of Floodway Channel will mean less frequent closures of floodway crossings during flood events.	None.	**Minor (+) Not significant**
Water Supply			
Construction	Construction dewatering required at some construction locations may result in groundwater level changes.	Advanced notice to potentially affected residents, monitoring of groundwater quantity and quality and mitigation as necessary to maintain access to drinking water.	Short-term and not discernible following mitigation. **Negligible (-) Not significant**
	Potential for construction related fuel or other chemical spills during construction in the Floodway Channel and West Dyke area.	As required and appropriate, managed by EPP.	**Negligible (-) Not significant**
Operation-Inactive	Potential for effects on groundwater levels due to channel deepening.	Engineering Pre-Design has been developed with goal of no deepening of channel. Deepening, if it occurs, will be small (less than two feet) and very localized. Well monitoring programs and mitigation measures will be taken to ensure there is no residual effect or interruption in water supply.	Local, and not discernible following mitigation. **Negligible (-) Not significant**
Utilities			
Construction & Operation	No residual effects are expected.	Construction scheduling (particularly for Winnipeg Aqueduct).	**No definable effect Not significant**
Police, Fire, Ambulance and Emergency Services			
Construction	Increased traffic and access issues on Floodway crossings which may impair emergency vehicle access during construction.	Advance notice provided to emergency service providers. Reasonable access will be maintained at Floodway crossings and the West Dyke during construction. With respect to the Dunning Crossing, possible mitigation measure is to have East St. Paul provide temporary emergency response services to the Pine Ridge Trailer Park.	Short-term, Small. **Minor (-) Not significant**
Operation-Inactive	Improved bridges may improve emergency service access.	None.	**Minor (+) Not significant**
	Land acquisition will reduce tax base.	None.	Small. **Minor (-) Not significant**
Operation-Active	Raised bridge decks and increased channel capacity mean less chance of closure during flood events.	None.	**Minor (+) Not significant**
	During rare, extreme flood events, operation of the Floodway Expansion will provide benefits to the City of Winnipeg by reducing water levels in the City and thereby reducing demand for emergency services during these flood events.	None.	Short-term, major and regional. **Moderate (+) Significant**

Topic and Project Phase	Residual Effects Including Mitigation	Mitigation	Significance
Operation-Active	Lower water levels upstream of the Inlet Structure could reduce demand for emergency services during some flood events, though it should be noted that during flood events there will always be high demand for emergency response and emergency services.	None.	**Negligible (+)** **Not significant**
	These changes in water levels near Outlet Structure could increase the demand for emergency services in these areas to respond to the additional flood levels. It should be noted that during flood events there will always be high demand for emergency response and emergency services.	None.	Rare, short-term, small **Minor (-)** **Not significant**
Other Community Facilities			
Construction	Potentially reduced access to some community facilities as a result of construction disruption.	None.	**Negligible (-)** **Not significant**
Operation-Active	Operation of the Floodway Expansion could result in changes in water levels (i.e., small lowering of water levels upstream and small increases in water levels downstream). This could result in small benefits to community facilities upstream of the Floodway and potentially small adverse effects downstream.	To the extent flood protection mitigation is not fully effective during the flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project.	Small, Rare **Minor (+/-)** **Not significant**

During the Construction phase of the Project, adverse residual effects on transportation and roads are expected to be minor (not significant). The increased traffic on alternate routes as a result of bridge construction and traffic detours may affect travel time at some points but will be short-term and localized to points near bridge construction. Favorable residual effects on transportation and roads during both the Operation-Inactive and Operation-Active phase are expected to be minor (not significant).

During the Construction phase of the Project, adverse residual effects on water supply due to construction dewatering are not expected to be discernible following mitigation and therefore are expected to be negligible (not significant). Potential groundwater effects due to fuel or chemical spills during construction will be managed in accordance with the **EPP** and are expected to be negligible (not significant). During the Operation-Inactive phase, any potential effects on groundwater levels due to channel deepening (which, if it occurs is expected to be small – i.e., less than two feet, and very localized) will be mitigated. Following mitigation, it is expected there will be no discernible effect on water supply and therefore this effect is expected to be negligible (not significant)[62].

No residual effects are expected on utilities during Construction or Operation phases of the Project.

During the Construction phase, adverse residual effects on Police, Fire and Emergency Services are projected to be minor (not significant). The increased traffic on alternate routes as a result of bridge construction may affect travel time at some points but will be short-term and localized to points near bridge construction.

[62] Refer to Chapter 5: Physical Environment for more information on anticipated effects of the Project on groundwater.

During the Operation-Inactive phase, a positive residual effect on Police, Fire and Emergency Services in areas close to the Project site is projected to be minor (not significant) as a result of improved access and traffic flow on the modified bridge crossings. An adverse residual effect on Police, Fire and Emergency Service due to land acquisition (and therefore a smaller municipal tax base) for the City of Winnipeg, RM of Springfield, RM of Macdonald and the RM of St. Clements is anticipated to be minor (not significant) as the amount of land potentially acquired by the Province is quite small.

During rare, extreme flood events, operation of the Floodway Expansion will result in lower water levels in the City of Winnipeg, which is expected to have a moderate (significant) positive effect on emergency response as a result of reduced demand for emergency services. Water levels upstream of the Floodway during rare, extreme events are expected to be either the same or lower, resulting in a potential positive residual effect, though this is expected to be negligible compared to the normally high demand for emergency services during these flood events. Water levels near the Outlet Structure may be somewhat elevated during rare, extreme flood events. However, since these incremental effects are expected to be rare, short-term and small (less than 0.3 meters or one foot at most) any related effects on emergency services are considered to be minor (not significant).

During the Construction phase of the Project, access to some community facilities may be impaired due to construction disruption, but these effects are expected to be very localized and short-term, and therefore negligible (not significant). During some flood events, operation of the Floodway Expansion could result in changes in water levels (i.e., small lowering of water levels upstream and small increases in water levels downstream). This could result in small benefits to community facilities upstream of the Floodway and potentially small adverse effects downstream. However, these changes in water levels are expected to be rare and small and therefore minor (not significant).

8.5.5 Monitoring and Follow-Up

Monitoring and follow-up measures are only considered to be necessary for groundwater issues. Groundwater levels and quality will be monitored during construction dewatering and following construction to ensure that any necessary mitigation measures (for example lowering wells, digging new wells or providing access to alternative water supplies) can be implemented to ensure there is no residual effect on access to drinking water.

8.6 PERSONAL, FAMILY AND COMMUNITY LIFE

8.6.1 Approach and Methodology

This section considers effects on people's personal, family and community life. It addresses the socio-economic components set out in Section 6.4.4 of the EIS Guidelines for the Floodway Expansion Project:

> *"A general description of the personal, family and community life of communities potentially affected by the Project shall be provided, including a population and demographic profile, outdoor recreation and travel, aesthetics, health status and health issues, way of life, culture and spirituality and community cohesion and organization;*

A general description of the personal, family and community life of Aboriginal communities potentially affected [by] the project; and

Sufficient detail on the noted items shall be provided to predict the effect of the Project on personal, family and community life."

The lives of individuals, families, and communities as a whole are shaped by many factors. There are many ways of looking at these factors[63]. What these approaches have in common is an understanding that many things contribute to the quality of people's lives and experiences and that interplay among these factors affects human health and social development. Although defined somewhat differently in each case, they generally include indicators of economic well-being (e.g., income and employment to meet basic human needs for shelter, food and clothing), physical well-being (e.g., personal and public health and safety), social well-being (e.g., social supports, family stability) and the environment.

Communities typically plan for improvements in economic activity and standard of living, infrastructure and services, community health and the well-being of residents. Community goals and plans for the future are measures against which communities' judge whether the effects of proposals are considered to be positive or adverse – i.e., do proposals support or work against a community's vision for their future.

Personal, family and community life can be affected by the accumulated impacts of many different project-related effects, and the experience of these changes can vary for individuals, for families and for communities as a whole. Experiences may vary, for example, depending on where people are located in relation to Project effects. Winnipeg is likely to experience the most positive impact from the Project's flood protection, while other communities in the Flood Study Region will experience a myriad of different effects (positive and adverse) due to construction, revegetation and development of the Floodway right-of-way, presence of the Floodway (when inactive) and changes to water levels and flows when the floodway is operating during a flood event. Also, as another example, the Peguis First Nation community (which is located outside the Flood Study Region) has interests in lands and cultural sites within the Flood Study Region.

This section reviews the personal, family and community life environment (considering both current developments and plans for future developments where relevant and available) and the potential effects of the Project on this environment in the Flood Study Region. Effects are examined with respect to the following elements of personal, family and community life[64]:

- Population and Demographics
- Recreation and Travel
- Aesthetics
- Health Status
- Way of Life, Culture and Spirituality
- Community Cohesion and Organization

[63] Examples range from social indicators of community well-being (City of Calgary, 2000-2002) and quality of life and human health (Manitoba Round Table for Sustainable Development, 2001; Quality of Life Research Unit, University of Toronto, 2004; Mukherjee, 1989; Shookner, 1997) to a population health approach (Frankish et al., 1996; Hancock et. al., 1999; Health Canada, 1999).

[64] The selected topics reflect the EIS Guidelines, experience from previous studies undertaken on Flood protection for Winnipeg and Manitoba, and consideration of issues raised by the public during the PIP program.

An initial scoping step was undertaken to identify the potential pathways and sources of effect, including pathways through physical and biophysical effects, whereby the proposed Project could affect the economy during the Construction and Operation phases (see Section 8.6.1.2). Scoping indicated that employment and business effects primarily related to construction expenditures.

8.6.1.1 Sources of Information

Sources of information for the analysis of effects on personal, family and community life included:

- Key Person Interviews: A program of key person interviews (individual and group interviews) was undertaken with residents, health care personnel and community leaders of each of the Flood Study Region communities and municipalities. The purpose of these interviews was to establish an understanding of the existing environment (now and in the future without the Project); to identify issues potentially affected by Project effects; and to discuss potential means to enhance positive effects or mitigate adverse effects. In addition to these topics, collection of Traditional Knowledge as it may relate to assessment of Project effects was the focus of interviews conducted with Aboriginal communities[65].
- Community Workshops and Open Houses: As part of the public involvement activities, initial findings of the environmental impact assessment, including results described in this section, were discussed with Flood Study Region communities in workshops. Input from residents in attendance was received via this public involvement process and where relevant was incorporated into the analysis of this section.
- Available Reference Material: Where available, reference material relevant to the Flood Study Region (e.g., community profiles, Traditional Knowledge documentation, historical records) was used to profile the existing environment. In addition, available reference material with respect to key issues and experience was used in the analysis of effects, potential enhancement/mitigation measures and monitoring (e.g., The IJC (2000), results from the CURA Flood Research Partnership (2004), materials developed by the 1997 Flood Trauma Team, and other independent research on effects of the 1997 Flood).
- Input from other Analysis in the EIS: Conclusions from other key analyses in the EIS provided inputs to assessment of effects on personal, family and community life. Since effects on people "accumulate" from a number of sources of change with which people may come into contact, relevant conclusions from assessment of effects on the physical environment (e.g., water changes, excavation of land), the biological environment (e.g., changes in aquatic and terrestrial resources used by people as they affect changes in health, recreation and way of life) and built environment and community services (e.g., expropriation of land, flood protection, changes in provision of community and emergency services and other effects on social well-being and health) are relevant to this section.

8.6.1.2 Sources of Effect

Personal, family and community life for the Flood Study Region communities can be affected by the accumulated effects of a broad range of direct and indirect Project-related effects. Many of these effects flow indirectly through physical, biological, and to a limited degree, economic changes.

[65] The interviews with Aboriginal communities are ongoing. Please refer to Section 8.3 Resource Use for a description of the work completed to date and the work remaining.

Project-related pathways and sources of effect on the personal, family and community life differ for each stage of the project and include:

- Traffic Activity and Access Disruptions, Changes to Landscape, and Economy Effects of Project (predominantly during Construction phase): Physical changes to the landscape and footprint of the Floodway right-of-way will occur as a result of construction sites and clearing and construction of the bridges, West Dyke and widening of the Floodway Channel and other associated works. Construction-related traffic, safety, and, to a limited extent, participation in construction employment and business opportunities are the resulting primary effects. Even with the proposed mitigation measures, there will be potential for some short term effects on residents who commute to Winnipeg or other urban centres in the areas close to the Project site, which may affect patterns of work and family life and may have an effect on public and worker health and safety. Physical presence of construction sites and related excavation of land and earth will temporarily, and to a very limited extent, permanently change the way things look.
- Changes in Groundwater Levels/Water Quality (primarily during Construction phase): Some short term changes may occur in groundwater levels and quality near the Project site during construction.
- Land Acquisition (predominantly Operation-Inactive phase): Additional land may need to be acquired to accommodate physical changes for the Floodway Expansion.
- Changes to water regimes (levels and flows) during flood events and subsequent effects on perceptions and way of life (during Operations Active; effects may extend to Operation-Inactive): Communities and residents protected by the Project during a flood event will experience positive effects on personal and community health and well-being. Communities outside of the area protected by the Project may experience somewhat higher water levels during some flood events and, therefore, have adverse effects on personal and community well-being. In addition, there have been concerns noted by some community leaders and residents that affording a higher standard of flood protection for some communities (i.e., the City of Winnipeg) than for other communities in the Red River Valley has adverse effects on personal and community feelings of self-worth.

8.6.2 Existing Environment

The following sections characterize personal, family and community life in the Flood Study Region, as it is now and expected to be in the future without the Project. This includes consideration of the Existing Floodway and other existing projects and activities as well as other relevant future actions that will be carried out in the Flood Study Region (see Assessment Approach as described in Chapter 2).

8.6.2.1 Population and Demographic Characteristics

The Flood Study Region as defined for the EIS includes fifteen municipalities and two First Nations ranging in size from about 200 – 300 residents (Brokenhead Ojibway Nation) to the City of Winnipeg with about 620 – 640,000 residents. Métis residents are included in the total population figures for the Flood Study Region. The total population of the Flood Study Region in 2001, including the Peguis First Nation

reserve community in the Interlake[66], is estimated to be between 716,000 (Statistics Canada 2001) and 734,000 (Manitoba Health 2001) residents accounting for about 64 per cent of Manitoba's overall population (see Table 8.6-1)[67].

Table 8.6-1
Population of Flood Study Region Municipalities and First Nations Compared to Manitoba: 2001

Population	Statistics Canada[1] 2001	Manitoba Health Population Report 2001
City of Winnipeg	619,544	642,175
City of Selkirk	9,752	9,874
Town of Niverville	1,921	2,150
Town of Morris	1,673	1,701
Village of St. Pierre-Jolys	893	1,115
RM of De Salaberry	3,227	2,477
RM of Taché	8,578	7,474
RM of Ritchot	4,958	4,927
RM of Morris	2,723	2,926
RM of Macdonald	5,320	5,429
RM of Springfield	12,602	11,967
RM of East St. Paul	7,677	7,508
RM of West St. Paul	4,085	4,045
RM of St. Andrews	10,695	12,666
RM of St. Clements	9,115	6,052
RM of Hanover	10,789	9,368
Brokenhead Ojibway Nation [2]	372	211
Peguis First Nation [2]	2,515	2,051
Flood Study Region Total	**716,439**	**734,116**
Manitoba Total	**1,119,583**	**1,152,982**
Flood Study Region as Per Cent of Manitoba Total	**64.0**	**63.7**

Sources:

Statistics Canada, 2001 Census Data. (Residents as of May 15, 2001)

Manitoba Health, 2001 Manitoba Health Population Report. (Residents registered as of June 1, 2001.)

Notes:

1. Statistics Canada has changed their methodology in collecting data for populations on reserve, including their definition of an Aboriginal person and inclusion of Bill C-31 reinstatements of Aboriginal Status between 1991 and 1996. As a result there has been an average of 30 per cent more people found on-reserve in 1996 than in 1991 (Province of Manitoba, Aboriginal People in Manitoba (2000) online at http://www.gov.mb.ca/ana/apm2000/1/g.html).
2. First Nation populations on reserve. Pequis First Nation reserve is in the InterLake, north of the Flood Study Region.

Overall population change in the Flood Study Region between 1991 and 2001 (2.4 per cent) is comparable with change in the Manitoba population as a whole (2.5 per cent)[68]. However, there is

[66] As explained in Section 8.2.2.1, the Peguis First Nation reserve community is not geographically located in the Flood Study Region; however, because land and resources used for traditional and other purposes by this Aboriginal community may be affected by the Project, Pequis First Nation is included in the demographic and other SEIA analysis for this EIS where relevant.

[67] Population data for communities in the Flood Study Region were available from Statistics Canada Census of Canada, Manitoba Health Population Reports, and Indian and Northern Affairs (First Nation populations only). Wherever possible, more than one source has been cited because of differences in collection methods; actual population levels are expected to be somewhere within the range shown.

[68] Appendix 8E, Table 8E.1-1 presents population change over the decade and for the two five-year periods 1991-96 and 1996-2001.

substantial variation in growth rates among municipalities. Four municipalities showed population decline over the decade (City of Selkirk, Village of St. Pierre-Jolys, RM of Ritchot and RM of Morris). Two indicated growth of up to 10 per cent (Town of Morris and RM of De Salaberry). The remaining nine municipalities outside of the City of Winnipeg indicated growth of between 12 and 32 per cent. The City of Winnipeg grew by just under one per cent. First Nation populations showed the largest growth.

Looking at experience related to the 1997 Flood, a noticeable decline occurred in the population of the RM of Ritchot between 1996 and 2001 compared to modest growth between the 1991-1996 Census years (just under 1 per cent). A key person interview with officials from the RM of Ritchot indicated that the 1997 Flood event lead to some depopulation in Ritchot (decline from 5,300 to 4,900 people). The primary reason for this depopulation was felt to be the result of out-migration, particularly for older residents who lost homes and did not want to start over again in same location. It is felt that the population of Ritchot has since recovered to some extent and is now on a path of slow growth as of 2004.

Flood Study Region Population Age-Sex Characteristics

As expected, the Flood Study Region and Winnipeg have similar age and sex structures to Manitoba as a whole[69]. That age-sex structure is reflective of an aging population, with declining population in age groups below 30 years of age; the largest age groups are between 35 and 54 years. When Winnipeg is excluded from the Flood Study Region, the age-sex structure shows a somewhat younger population.

In contrast, the age-sex structures of the Peguis First Nation and Brokenhead Ojibway Nation are reflective of generally younger populations. More than 50 per cent of both populations were under 29 years of age in 2001.

Aboriginal Populations in the Flood Study Region

In 2001, Statistics Canada gathered data regarding Aboriginal identity. Within the Flood Study Region population (including the Pequis First Nation reserve community), approximately 62,000 people in total identified themselves as Aboriginal, with the vast majority of this population (approximately 85 per cent) residing in the City of Winnipeg[70]. Of this group, about 34,000 people identified themselves as "Métis"[71] and 26,000 people identified themselves as "Indian"[72].

First Nation populations as reported in the Census look only at reserve community populations. Other sources provide total First Nation populations (on and off reserve):[73]

- In 2001, the on-reserve population of the Brokenhead Ojibway Nation was estimated to be between 211 and 372 persons (depending on the source of the information). Total on-reserve and off-reserve population was estimated by INAC at 1,371 members in 2001.

[69] See Appendix 8E, Section 1.1.

[70] See Appendix 8E, Section 1.2, Table 8E.1-6.

[71] Self-identification with the "Métis" population is one element of a three-part definition of "Métis" for the purpose of assessing certain constitutional rights, according to the 2003 Powley decision by the Supreme Court of Canada. Other aspects of the definition (identification with a post-contact/pre-control population and acceptance of the individual by that population) cannot be determined from these data.

[72] Self-identification with the "Indian" population (term used by Statistics Canada) does not necessarily mean that they are members of a First Nation; some people in this group may be "non-status" Aboriginal people, with no membership in a First Nation.

[73] See Appendix 8E, Section 1.2, Table 8E.1-5.

- In 2001, the on-reserve population of Peguis First Nation was estimated to be between 2,051 and 3,123 persons (depending on the source of the information). Total on-reserve and off-reserve population was estimated by INAC to be 7,124 members. Off-reserve members of the Peguis First Nation live in several locations, including Selkirk and other areas in the lower Red River Valley.

Population Projections for Communities within the Flood Study Region

There is considerable uncertainty as to population projections over the next few decades for communities within the Flood Study Region, as demonstrated by two different recent projections noted below. No attempt is made for the EIS to develop a specific population projection related to the Flood Study Region or any of its communities.

Manitoba Bureau of Statistics population projections for Manitoba, prepared in 1999 for the period from 2001 to 2021, included projections for six "Economic Regions" that have communities in the Flood Study Region[74]. Aside from the Winnipeg Region, however, only from 3 to 50 per cent of population in each of these "Economic Regions" in 2001 was part of the Flood Study Region. Overall, these Manitoba Bureau of Statistics projections showed population growth in rural regions included in (or part of) the Flood Study Region and a decrease in population for the City of Winnipeg over the same period[75].

In contrast, population projections based on Conference Board of Canada data included in the City of Winnipeg's *Plan Winnipeg 2020 Vision* showed a population increase from 1999 (628,100) to 2020 (715,000). The *Plan Winnipeg* document noted that seniors, migrants and Aboriginal populations are projected to have the greatest influence on demographic changes over the next two decades. In particular, it was noted that the Aboriginal population of Winnipeg was expected to grow "... at a rate of about four times that of the non-Aboriginal population" (City of Winnipeg, 2000).

Both of the above projections were prepared before the 2001 Census. As noted earlier (Table 8.6-1), the 2001 Census population estimate for the City of Winnipeg was 619,544 while the Manitoba Health population estimate for 2001 was 642,175.

8.6.2.2 Recreation and Travel

There are a number of recreational opportunities in the areas along the Red River and Floodway. This section provides an overview of these recreational opportunities during both the summer and winter seasons, focusing on the areas that would be directly physically impacted by the proposed Project construction activities. These include the areas immediately adjacent to the Floodway channel, Inlet and Outlet Structures, the West Dyke and the Red River. Additional background information is provided in Appendix 8E, Section 2.

Sport Fishing

The Red River is the largest sport fishery in Manitoba. In 2000, the Red River, from the Emerson border to Lake Winnipeg, accounted for an estimated 16 per cent (or 428,000 days) of all the angling days in

[74] See Appendix 8E, Section 1.3, Table 8E.1-7. The population for the City of Winnipeg was projected at 628,000 in 2001 and 599,800 in 2021. Flood Study Region population was no more than 50% of the 2001 population in each Economic Region studied, and typically far less than this share (e.g., 3%, 8%, 11% and 30% for the four other Economic Regions with any Flood Study Region populations).

[75] The Manitoba Bureau of Statistics report indicated that this projected population decrease is due to a projected annual interprovincial and intraprovincial migration outflow offset somewhat by a projected annual international migration inflow.

Manitoba. More than eight per cent (or 1.2 million fish) of Manitoba's total fish catches (13.9 million) came from the Red River (Manitoba Conservation, 2000)[76]. About $29 million in direct expenditures are made annually for fishing along the Red River (Wall *pers. comm.* 2004). The fishing season in this region opens May 11th [77].

During the summer, there are numerous access points and popular fishing locations along the Red River. Some of the most active fishing areas include:

- St. Norbert Floodway Inlet Gates
- Maple Grove Park
- Junction of the Seine River and the Red River
- The Forks
- North perimeter boat launch site
- Lockport
- Netley Creek

In the winter, there is much less fishing activity along the Red River. The most active ice fishing area is from Lockport to past Netley Creek. There is very little ice-fishing within the City of Winnipeg due to drawdown of water levels during the winter season (Wall *pers. comm.* 2004).

Sport Hunting

There is hunting both north and south of the City of Winnipeg in the Red River Valley on Crown land and on private land (with permission). Areas south of the City in the Red River Valley are particularly active with hunting for deer and small game, mostly grouse and rabbits (Rebizant *pers. comm.* 2004). In a 2002 survey, hunters surveyed reported harvesting approximately 4,900 deer in Game Hunting Areas (GHAs) located partially or entirely in the Flood Study Region, out of approximately 26,000 reported harvested in the entire province[78]. (Knudsen, *pers. comm.*) There may be additional hunting activity and harvest that was not reported.

Along the Existing Floodway, hunting opportunities are quite restricted due to the proximity to the City. There is thought to be some coyote hunting along the Existing Floodway, but it is rather limited (Rebizant *pers. comm.* 2004). Most of the municipalities adjacent to portions of the Existing Floodway either currently have municipal by-laws that restrict firearm use in areas near the Existing Floodway (such as the RM of East St. Paul) or are in the process of developing such by-laws (such as the RM of St. Clements).

Both the City of Winnipeg and Birds Hill Provincial Park are designated "No Hunting Zones" (Manitoba Conservation 2003b). The South Interlake Goose Management Area extends east of the Red River from the northern edge of the City of Winnipeg to the southern shore of Lake Winnipeg. There is also a Game Bird Refuge at the estuary of the Red River as it enters Lake Winnipeg (Manitoba Conservation 2003b).

[76] See Appendix 8E, Section 2, Table 8E.2-1.

[77] See Appendix 8E, Section 2 for further information on fishing regulations and on an urban angling partnership that promotes the quality and accessibility of the sport fishery within the City of Winnipeg.

[78] Much of the Red River Valley is contained in Game Hunting Areas (GHA) 33, 34A, 34B, 34C and 35A (see Appendix 8E, Section 2, Figure 8E.2-1).

Other Winter Recreation and Travel

Other winter recreation in the Flood Study Region potentially affected by the Project (i.e., in the area of the Floodway facilities) include cross-country skiing, downhill skiing, tobogganing and snowmobiling[79]:

- Cross-country skiing: The Cross Country Ski Association of Manitoba has no organized cross-country ski trails or activities along the Existing Floodway, although some Association members perform uphill training at Springhill Winter Park located at the north end of the Existing Floodway in the RM of Springfield (McSherry *pers. comm.* 2004).
- Downhill skiing: Springhill Winter Park is located 11 kilometers north of Winnipeg on Highway 59 North (at the Existing Floodway) in the RM of Springfield. During the winter, it operates Tuesday to Friday (6:30 p.m. to 9:30 p.m.) as well as Saturday and Sunday (9 a.m. to 4 p.m.). On average, this park has 30,000 visitors over the three month winter downhill skiing season.
- Tobogganing: Tobogganing is a popular winter family pastime, and numerous areas along the Existing Floodway and Red River Valley are frequently used for this activity (including parts of the Floodway adjacent to Springhill Winter Park).
- Snowmobiling: The Floodway is not part of the paths groomed by Snowmobilers of Manitoba Inc. (Snoman). There is, however, still a substantial amount of use made of the Existing Floodway by snowmobiles. There are approximately 25,000 registered snowmobiles in Manitoba, and it is estimated that approximately 500 to 1,000 snowmobilers use the Floodway each year.
- Other recreation and travel activities: Many other recreational activities are known to occur, typically informally, along the Existing Floodway. These include dogsledding and sail-boarders.

Other Summer Recreation and Travel

Other summer recreation in the Flood Study Region potentially affected by the Project (i.e., in the area of the Floodway facilities and any areas affected by changes to flooding during major flood events) include canoeing and paddling, rowing, motorized boating, trail-walking as well as other activities.

- Canoeing and paddling, rowing, motorized boating: No known use is made of the Existing Floodway for these activities. These activities do occur along the Red River, particularly in the Winnipeg area.
- Trail-walking: There are a number of trails and riverbank parks located along the Red River and its tributaries. The Trans-Canada Trail (TCT) also runs north of Winnipeg along the west side of the Existing Floodway, crossing the Red River at the Lockport Bridge, and continuing north via River Road; south of the City. The TCT is planned to cross the Existing Floodway and continue along the Existing Floodway for about two kilometers. The Duff Roblin Park Reserve is situated just off Winnipeg's north perimeter highway, on the **west embankment of the Existing Floodway**, about two kilometers east of PTH 59; currently, there are no effects on the Park Reserve during Floodway operation (Wilson *pers. comm*. 2004).
- Other recreation and travel activities: Many other recreational activities are known to occur, typically informally, along the Existing Floodway. These include: all-terrain vehicles, motor

[79] See Appendix 8E, Section 2 for more background information.

bikes and off-road vehicles, hiking and mountain-biking, rock collecting and horseback riding (especially in areas adjacent to Birds Hill Park).

8.6.2.3 Aesthetics

The Flood Study Region is located in the Red River Valley characterized as the glacial Lake Agassiz area and also includes the Birds Hill Esker ridges. Most of the Flood Study Region can be described as relatively flat agricultural land (and wetlands toward Lake Winnipeg) with urban communities and exurban development present throughout. The aesthetic character of the Existing Floodway can be seen by people from several roads/bridges which cross the Existing Floodway, by residents who work and live within sight of the facility and by residents who make use of the Existing Floodway at various locations (e.g., where recreational uses occur, such as at Springhill Winter Park). Key features include[80]:

- Existing Floodway Channel (and the **East Dyke** which is incorporated into the embankment created by the Existing Floodway Channel excavation, and extends parallel to the Existing Floodway): This feature includes 13 bridge structures, of which six are frequently traveled highway bridges[81]. These bridges are locations from which the Existing Floodway Channel is most visible to the public, including both those who live locally as well as those who commute between Winnipeg and locations east and north of Winnipeg.
- Floodway Inlet Control Structure: There are a number of homes from which this structure is visible.
- West Dyke: The West Dyke is about 70 km in length with grassed slopes typically located adjacent to agricultural lands and small local roads. It is made of clay, typically stands 3 metres (10 feet) above the landscape, with substantial coverage of grass.
- Floodway Outlet Structure: The Structure is designed to reduce the velocity of water as it exits the Floodway Channel. However, during interviews there were concerns raised about the amount of erosion on the West Bank of the river during Floodway Operations. In the winter, many individuals have fishing shacks in and around this structure. There is partial access via a gravel road and footpath down to the Floodway Outlet Structure.

8.6.2.4 Health and Well-being

This section provides an overview of the current status of health for the Flood Study Region[82]. In addition, the 1997 Flood experience is reviewed to assess the role that the Existing Floodway and flooding in general (including the example of the 1997 Flood) have played in health of residents.

8.6.2.4.1 Overview of Health Status in Flood Study Region

Health services in Manitoba are provided through regional health authorities (RHAs) that have the responsibility for administering health services in specified geographical areas[83]. Staff from each of the RHAs were included in the key person interview program. Data used in this section are presented by RHA and not on a community-by-community basis.

[80] See Appendix 8E for photos and additional descriptions

[81] These bridges are each reviewed at Section 8.5.2.2.

[82] Health data are not readily available on a community-specific basis, but rather on a regional health authority basis (where, with the exception of the Winnipeg Regional Health Authority, the data cover major portions of each health authority that are not included in the Flood Study Region. A full understanding of community health also requires consideration of the social, physical and economic environments of a population (Health Canada, 2002). These aspects of community health are presented in other sections (so have not been repeated here) and where applicable, have been highlighted along with local perspectives on community health.

[83] See Section 4 of Appendix 8E for specific information on each of the RHAs in the Flood Study Region.

Overall, when compared to the rest of Manitoba, health status indicators show that the population of the Flood Study Region is healthy with very few health or social issues that stand out as unique to this area. In the case of North Eastman Health Authority (NEHA), data illustrate a lower health status for the entire region in most indicators; however, Springfield has much better health, in general, than other communities in NEHA[84].

Perspectives from local health providers generally confirm that communities in the Flood Study Region are in good health and typically are healthier on the whole than the rest of Manitoba[85]. Despite these positive factors, health care providers indicated that the following issues create barriers to achieving better health within certain parts of the Flood Study Region:

- Mental Health: Mental health was a particular concern for some portions of the Flood Study Region, including increases in genetically linked mental health disease, sometimes associated with high social needs (e.g., schizophrenia). In South Eastman, especially in of the RMs of Ritchot and Taché, the Mental Health Program is fully utilized and has a caseload near capacity[86], with the majority of cases related to mood disorders, such as anxiety and chronic stress.
- Hypertension: In all regions (including communities within the Flood Study Region and beyond), hypertension rates have increased over the past ten years; however, concern among those interviewed for the Central Region felt that hypertension diagnosis was increasing at a higher rate in the Montcalm/Morris region than in other rural areas.
- Declining and Aging Populations: in the more rural/agricultural based communities.
- Rapid Growth in Ex-urban Bedroom Communities: with no increase in health care resources.
- Groundwater Quality: especially as it relates to personal, private wells and safe consumption of water. During key person interviews it was evident that, historically, groundwater quality was more of a concern than it is today as most bedroom communities are moving toward municipal water supplies. The key factor contributing to concern about safe water consumption was related to contamination of private and personal wells by either backwater flooding effects with contaminated water spilling into wells used for drinking water (in RMs of Ritchot, Taché) and the management of agriculture near communities, especially as it related to livestock manure seeping into the groundwater and contaminating wells.
- Other Environmental Conditions: Minor environmental concerns were mentioned occasionally during key person interviews, especially in the RMs of Morris, Macdonald and Springfield, related to agricultural activities in conflict with ex-urban community developments (i.e., field burning, livestock industry and related smell and contamination of water supply).

8.6.2.4.2 Perspectives about the 1997 Flood, Related Health Effects and Service Delivery

This section reviews the experience of individuals and communities from a health and social perspective during the 1997 Flood, and notes the differing ability of communities to respond locally to their health and social service needs in times of a major flood crisis.

[84] Appendix 8E, Section 4.1 reviews health status indicators for regional health authorities with populations in the Flood Study Region. The following indicators are reviewed – infant and maternal health, mortality, illness burden and hospital utilization. The health data presented in Appendix 8E are based on health status indicators developed and compiled in the report "The Manitoba RHA Indicators Atlas: Population-Based Comparisons of Health and Health Care Use" (Manitoba Centre for Health Policy 2003).

[85] See Appendix 8E, Section 4.2.

[86] The Mental Health Program services have "gate keeping" or screening in place therefore requiring residents in the SEHA region to utilize local services available before gaining access to Winnipeg services.

Although the 1997 Flood affected most of the Flood Study Region to some degree, generally the municipalities and communities to the south of the City of Winnipeg (within the area served by the Central and South Eastman Regional Health Authorities) were most severely affected by the 1997 Flood with much of those areas being evacuated. Communities not flooded in the Flood Study Region were involved in the crisis by acting as reception centers for the evacuees (e.g., St. Pierre Jolys). During interviews, key persons noted that most rural Regional Health Authorities had only been in operation for one month prior to the 1997 Flood event and were not yet at full capacity. As a result, health care officials felt there was a late, sometimes perceived as problematic, response of health services to the flood event in rural areas. For example, all flood relief was primarily orchestrated by other, non-local, levels of Flood Relief organizations (including The Manitoba Health Disaster Management Unit and MEMO). They felt this resulted in some disconnect in preparing community members for inevitable evacuations, perhaps adding to anxiety and confusion among residents. A prime example provided was the late-night evacuation of the Red River Valley Personal Care Home (Morris), which left most of its resident's distressed and taxed staff working to beyond their capacity.

On the other end of the spectrum, Winnipeg Regional Health Authority personnel indicated that the Winnipeg Trauma Team, which had been in operation since 1991, had significant capacity to respond to the needs of flood victims. This team had plans which could be deployed for any critical incident (examples provided included the Headingley Riot, 1997 Flood) that allowed for quick response by drawing upon existing resources in various roles in the WRHA to begin needs assessments, provide education, and provide supports to individuals in need. In the case of the 1997 Flood, the Winnipeg Trauma Team initially was responsible for supporting the evacuees in hotels and other reception centres hosted in Winnipeg. For the rest of rural southern Manitoba, the Manitoba Health Disaster Management Unit provided the initial point of flood response for health services (physical and mental health programming, pharmacy programs, education and awareness of risk, emergency medical services).

All of those interviewed in the South-Eastman and North-Eastman Regional Health Authorities, Central-Manitoba RHA and Winnipeg Regional Health Authority felt there was a disparity in the capacity for health services to meet the needs of local people affected by the 1997 Flood. Winnipeg was felt to have adequate resources and most of the capacity to manage flood relief response, while rural services had a difficult time "responding by the seat of their pants" and experienced a difficult recovery period resulting in their request for additional support from Winnipeg. The additional support from Winnipeg resulted in the development of the 1997 Flood Trauma Team, which was initiated three months after the Red River had crested and was in operation for a year after the flood had receded. The Flood Trauma Team was responsible for conducting a need assessment and developing a priorities plan for addressing the key gaps in services to flood victims dealing with the aftermath and damages the flood had caused.

The following levels of family stress were identified by Flood Trauma Team and RHA personnel:

- Acute stress, immediately after the flood: Families who were faced with severe damage or complete loss of their homes and businesses struggled to deal with their losses at the same time as trying to access the right information to help them survive and get back on their feet. This resulted in a period of acute stress; however, it was felt that individuals who experienced flood damage due to natural flooding and who had adequate community and personal resources were able to recover from this stress relatively quickly (often in less than a year, recovery tended to coincide with their homes and properties being repaired or

rebuilt). This experience was evident in interviews with persons employed with the Flood Trauma Team who indicated communities such as Morris or Rosenort requested the Flood Trauma Team be dissolved shortly after its eleventh month of activity in the communities (Heinrichs *pers. comm.* 2004). It was also reported in key person interviews that families who had minor damages or had difficulty watching their neighbours endure severe loss also experienced varying levels of anxiety and stress, of relatively short duration, depending on their resources and personal ability to cope with stressful situations.

- Chronic, long-term stress related to sense of unfairness: It was felt by Mental Health workers and 1997 Flood Trauma Team members interviewed that families experienced chronic, long-term stress for two primary reasons. The first of these reasons occurred if the family had a strong sense that the damage caused to their property and lives, or compensation they received, were unfair. This sense of unfairness was the result of families who experienced flood damage due to artificial flooding because of the operation of the Floodway; they tended to feel that, if the Floodway was operated differently, they would not have suffered such great losses. Often the post-flood recovery stage resulted in accumulated stresses, including a sense of unfair compensation and disaster assistance to rebuild and a lack of adequate involvement and meaningful consultation with governments regarding future compensation and flood management practices. In addition the level of support available to individual families, who experienced chronic long-term stress, for many years (four to seven years) after the flood damage occurred, varied among the different regions.
- Chronic, long-term stress related to vulnerability of families affected by the flood: The second reason for chronic stress identified by key persons was vulnerability in families affected by the flood – in other words, families who were experiencing other crisis situations during the flood (e.g., elderly parent being placed in a personal care home, terminally ill family member, marital troubles or a child or teenager with behavioural problems) were more likely to suffer long-term (three- to five-year) effects from the flood. Although these effects cannot be traced through indicators, health care workers felt that, if data had been maintained, they would show an increase in anxiety-related issues (hypertension, requests for Mental Health Supports etc.), marital separation and divorce and lowered school performance (and potentially high school drop-out rates for students who were doing poorly during the 1997 Flood and then had their classes disrupted).

All of the interviews conducted with the Regional Health Authorities noted an increased capacity to deal with a local or regional disaster since the 1997 Flood. There is a shared perspective that the ability to continue providing adequate health and public social services to individuals, families and communities during a crisis has been greatly improved through regional planning and coordination with municipal leaders. The primary reasons provided for this increased capacity and confidence in being able to effectively deal with a future flood event similar or greater than the 1997 Flood include:

- Improved protection of personal and public property through the 1997 Red River Valley Flood Proofing and Dyke Enhancement Program requiring and providing financial assistance for all homes and communities to be protected (through ring dykes or elevation of infrastructure) to the “1997 plus two-feet” level has brought a greater sense of security to many rural residents.
- Experience of the Regional Health Authorities in health care service delivery on a day-to-day basis is well established. RHAs have had more than six years to become organized and

established in the health care service delivery to their local communities. As a result, all have had the time to develop Emergency Preparedness Plans, many of which are in the process of being integrated with local municipal government plans.

- Lessons learned from the 1997 Flood have been applied. Many of the individuals currently in management positions were part of the health care personnel providing services during the 1997 Flood. As a result, they have substantial personal and professional experience that has helped to identify gaps and service delivery needs during a time of crisis in their communities. These lessons have been applied in revising or developing new Emergency Preparedness Plans at many organizational levels.
- Increased coordination between local municipalities and Regional Health Authority Emergency Response systems. All of the Regional Health Authorities have been involved in revising and developing emergency response plans for their Health Authorities. In addition, most commented on being involved in developing a regional emergency response plan with their local leadership. All Regional Health Authorities' have a Disaster Management Coordinator who is involved in a recently developed Disaster Management Advisory Committee under the auspice of the Manitoba Health Disaster Management Services to develop guidelines regarding evacuation plans and for overall management of health services during any disaster event. This committee includes Municipality Emergency Planning Directors, RHA Disaster Management Coordinators and representation from Manitoba Health's Disaster Management Services (Corriveau *pers. comm.* 2004).

8.6.2.5 Way of Life, Culture and Spirituality

The way of life and culture of communities in the Flood Study Region is described as the way in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of a community (City of Calgary 2001-2002)[87]. These include tangible and intangible aspects of everyday life such as the activities and patterns of daily living of families within a community as well as the culture (the norms, values and beliefs) that guide people's lives and daily decisions. Culture and way of life can be manifested in the way people do things and the way they think.

The cultural origins of the Flood Study Region are grounded in the rich Aboriginal history of trading, the buffalo hunt and seasonal travel as well as in the immigration of settlers from other countries during the mid to late 1800s and early 1900s. For thousands of years, Winnipeg was a popular summer spot for Aboriginal people to camp, celebrate and trade at the junction of the Assiniboine and Red Rivers (The Forks). The Forks became a fur-trading centre for the voyageurs and the Aboriginal people in the 1700s. From the mid to late 1800s settlers and immigrants developed permanent settlements and farmsteads in the region making the Red River Valley an agricultural and trading hub for Western Canada (Manitoba Community Profiles, City of Winnipeg, 2004). Since this time the Red River Valley has developed into a culturally diverse region with Aboriginal and immigrant communities pursuing lifestyles engrained in their history and in the geographic climate of the region (Manitoba Community Profiles, City of Winnipeg, 2004). People in this region today identify with a wide array of religious denominations, are ethnically diverse, and speak many different languages even though English is the language spoken most often[88].

[87] See also Manitoba Hydro and NCN: Wuskwatim Generation Project EIS: 2003, Vol. 1, Section 9.

[88] See Appendix 8E, Section 5 for review of recent Census data on religious denominations, ethnic backgrounds, and languages spoken.

Ways of life in municipalities adjacent to the City of Winnipeg and within the Red River Valley today generally fall into the following groupings of communities and residential lifestyles (Regional Planning Advisory Committee 2003; Morris-Oswald 2000):

- Rural Communities: These include communities generally located in areas beyond reasonable commuting distance from Winnipeg (approximately 45 minutes from the Perimeter Highway). In these communities, people tend to live and work in the same municipality (within towns/villages or on farms in the rural municipality). These communities are generally older and have stronger roots to the land and surrounding area, resulting in what has been described as a more cohesive community atmosphere. For example, persons interviewed felt Ste. Agathe was considered to be more cohesive, more distinctive and with more roots in the area (including long-standing family homesteads), whereas, St. Adolphe has a younger population and many "newcomers" (within last 20 to 30 years). Other rural communities, such as the RM and Town of Morris, have experienced some decline in their populations as the agricultural industry changes, with fewer farmers owning larger farms and the population aging. As a result, there is a movement into rural towns and communities in the area with new seniors living homes (Rosenort) and personal care homes (Morris).
- Bedroom Communities and Urban Areas: Many of these communities are located within reasonable commuting distance from Winnipeg. Most municipalities tend to focus new population growth in communities by offering large-lot developments and a "country lifestyle" close to the city. As a result, many of the residents live a commuting lifestyle with focus for work, servicing and to some extent recreation and entertainment on the City of Winnipeg. However, these communities are still considered to be more "close knit" than Winnipeg, with quality of life considered paramount. As a rural regional health care provider indicated, people moving into these bedroom communities are "not buying their average starter home and just beginning a family, but they have higher than average income and education and have moved to the area for the lifestyle they can afford" (North Eastman Regional Health Authority *pers. comm.* 2004).
- Rural Residential: These include the development of large lots in rural settings, similar to the above-mentioned bedroom communities, with the added elements of hobby farming in some cases and fewer neighbours.

Demographic changes over time illustrate a trend toward growth in the Flood Study Region occurring mainly in bedroom communities and rural residential areas surrounding Winnipeg. However, Winnipeg continues to be the hub of Manitoba's economy and service sector. In general, the City of Winnipeg plays a prominent role in the life of many residents of adjacent municipalities. Many ex-urban residents spend their workday in Winnipeg and commute daily to and from Winnipeg to their homes outside of the City. Key persons in some communities outside the City of Winnipeg also reported that many residents of Winnipeg commute to jobs in areas outside the City. Many residents of bedroom communities also use Winnipeg for much of their shopping and personal services.

One of the results of this ex-urban trend has been reported feeling of tension between the City of Winnipeg and adjacent municipalities. From City of Winnipeg Officials, there has been concern expressed about the dwindling property tax base in Winnipeg and implications it may have to continue providing adequate services to the Flood Study Region (Regional Planning Advisory Committee 2003, p.18). From other adjacent municipalities, many key persons interviewed reported that residents feel that residents in

the City of Winnipeg appear to be more valued than those in adjacent rural areas, particularly in terms of policy choices by provincial and City administrations which are felt to focus primarily on benefiting Winnipeg rather than all the Capital Region or Manitoba on whole.

8.6.2.5.1 Flooding and Way of Life in the Flood Study Region – Existing Floodway Effects

The way of life for Flood Study Region residents is shaped, at least in part, by living in the Red River Floodplain. The landscape is relatively flat and large areas are subject to repeated seasonal flooding (Manitoba Intergovernmental Affairs, 2004). The amount of damage experienced by this repeated flooding is related to the specific location and the amount of flood protection in place. As highlighted in the International Joint Commission Report: Living with the Red (2001), the risk of flooding is generally exacerbated by three main factors. First, the Red River flows north from the United States to Lake Winnipeg making the risk of ice jams greater at the northern end of the Red River since northern waters melt later. Second the topography of the Red River Floodplain is very flat, so waters that overflow the riverbanks generally extend for substantial distances. Third, the Flood Study Region is characterized by the relatively common occurrence of severe weather conditions (snow storms, spring rains), which contribute to the risk of potential flooding.

A long history of flooding in the Flood Study Region has contributed to the development of rich black clay soils providing much of the area surrounding Winnipeg with very fertile agricultural lands (Manitoba Intergovernmental Affairs, 2004). The agricultural land was very attractive to many immigrant settlers, and resulted in the development of thriving agricultural homesteads and communities, with Winnipeg as the "wholesale, administrative, and financial centre of Western Canada" (Manitoba Intergovernmental Affairs, 2004).

Flooding has had a profound effect on way of life for residents in the Flood Study Region, especially in terms of seasonal worry and preparations, such as staying up-to-date with flood forecasting in the spring and mentally preparing for the potential of personal property damage. The level of concern and anxiety regarding flood monitoring and preparation is largely dependent on where in the Flood Study Region someone lives. The City of Winnipeg has been protected by the Existing Floodway since the late 1960s and has relative security knowing they are safe from flood damage occurring from frequent to relatively rare floods (floods with return frequency of about 1 in 100 years up to at most 1 in 225 years). Nevertheless, the 1997 Flood (i.e., about 1 in 100 year likelihood) raised the issue of flood risk for residents of the City of Winnipeg.

Beyond Winnipeg, the presence and operation of the Existing Floodway and West Dyke have had an effect on way of life for the Flood Study Region, particularly in the RMs of Springfield, Macdonald, Ritchot, East St. Paul and St. Clements. The Western portion of the Rural Municipality of Springfield and a portion of East St. Paul experienced considerable effects from the construction and presence of the Existing Floodway Channel dividing portions of the municipalities, cutting patterns of access between farms and residents east and west of the Existing Floodway. At one time, Springfield included portions of the City of Winnipeg far to the west. Springfield now has remnant portions to the west of the Existing Floodway that are hard to service (for example for emergency services or recreation infrastructure and programming) and are generally "cut off" from the life of the municipality. In addition, during key person interviews and public consultation activities, residents from Springfield indicated that the construction of the Existing Floodway has also become a barrier to drainage in the municipality, with inadequate drop structures to take water from drains immediately east of the Existing Floodway. As a result, the area

struggles with water-related issues and overland sheet flooding with rains. A third issue faced by some residents of Springfield as the result of the construction of the Existing Floodway was a permanent drop in groundwater levels in parts of the municipality. This had an effect on water supply for many residents that required mitigation following the construction of the Existing Floodway.

In East St. Paul, the Existing Floodway divided a portion of the municipality, with approximately 500 residents on the east side of the Floodway and the remainder of the municipality protected within the Existing Floodway boundaries.

In St. Clements, the Existing Floodway divides a portion of the municipality from the balance of the municipality. During an interview with a representative from the municipality, it was noted that a large portion of the municipality's population lives in the area inside (i.e., south and west) the Existing Floodway.

Operation of the Existing Floodway has also had an effect on way of life for residents in the RM of Ritchot, which is located upstream of the Floodway Inlet Structure. Portions of the municipality are subject to artificial flooding when the Existing Floodway is operated at Rule 2. This exacerbates the feeling of flood risk and vulnerability for some residents of the municipality and can result in increased anxiety and worry, particularly during spring or large precipitation events (either snow or rain).

In recent years large flood events, like the 1996 Flood for communities downstream of the Floodway and the 1997 Flood for upstream communities, brought the reality of flooding home both to long-time residents and to those who moved to rural areas more recently. The 1997 Flood was a major flood event where the Existing Floodway played a major role in protecting Winnipeg and some of East St. Paul, West St. Paul and St. Clements from flood damage. However, residents of the RM of Ritchot experienced artificial flooding as a result of operation of the Existing Floodway, which exacerbated the feeling of being "sacrificed" for the benefit of Winnipeg residents. A similar experience was felt in the RM of Macdonald during the 1997 Flood, with the construction of an addition to the West Dyke. There was some concern and animosity between Macdonald residents living north and south of the Dyke as well as with Winnipeg. Hasty construction of the West Dyke extension meant that not as much care was taken with borrow areas, movement of topsoil and construction debris, resulting in adverse effects in some agricultural areas. Residents on the north side of the West Dyke were protected, whereas those on the south side were not. Those who were not protected were reported as "feeling like second-class citizens."

Major flood events can be characterized as having three stages as described by Grant and Colleagues (November 17, 1997):

- Pre-Flood/Preparatory Phase: The nature of flooding in the Red River Floodplain means that ample warning can be provided and residents and government agencies can be enabled to prepare for potential flood phase actions and damages.
- Flood Phase: This phase is where the majority of action is focused on preventing damages and danger to personal safety. During disaster level floods many levels of emergency response organizations are involved in relief and support.
- Post-Flood/Recovery and Resettlement Phase: This is a longer phase of flood assistance and supports provision for recovery and resettlement from damages that occur. (Including

compensation, re-building of homes and properties, improving flood protection and developing future flood preparedness policy and activities).

The after effects of the 1997 Flood have been the subject of much research and assessment, with key findings regarding how flooding has affected way of life for many in the Flood Study Region. Important to note, is that the 1996 Flood caused more distress and requirements for relief efforts in northern part of Floodplain in the RMs of St. Clements and St. Andrews than did the 1997 Flood; however research has typically focused only on the 1997 Flood. For those who were not protected they have shared many views, with researchers and through the key person interviews undertaken for this study, expressing how dramatic and upsetting different aspects of the 1997 Flood event were for many people, especially in the RMs of Ritchot, Taché, Macdonald and Morris:

- Diminished sense of safety in homes and communities: Individuals interviewed from the Flood Study Region talked about their lives "never being the same again" and having an increased sense of vulnerability and lack of safety "the potential for flooding is in the back of your mind all year and comes to the fore in spring"; "we can't enjoy a good snowstorm anymore – what is it doing to flood conditions?" Morris-Oswald, a researcher with the Flood Research Team found the most important values in rural communities are "safety and community development" and the 1997 Flood had tremendous effects on the perceptions of residents' safety and future developability of their community. Improved protection, since the 1997 Flood, such as town dykes have helped to decrease this sense of vulnerability (Morris-Oswald, 2004).
- Disparity among communities in flood response: Several key persons noted that there was an inequality in the ability for some local municipalities and responsible authorities to respond to the emergency. Some municipalities experienced greater levels of chaos, uncertainty and lack of communication/coordination among parties, which were felt to add to the feeling of lack of safety. Other communities felt their municipality's strong leadership resulted in flood responses that worked well. In addition, individual and family resources (economic, social, personal) were felt to be an important factor in determining how quickly and successfully individuals could respond to their own situations – and such differences sometimes contributed to views that supports available to people were inadequate (Heinrichs *pers. comm.. 2004;* RHA- Central *pers. comm.* 2004).
- Dissatisfaction with compensation: There was considerable dissatisfaction with the process of providing compensation offered through Disaster Financial Assistance (DFA). After the 1997 Flood, there were numerous amendments made to the DFA throughout the process of implementing flood damage compensation, resulting in frustration by some with the process. At the same time, many recognized that the amendments were, for the most part, improvements to make the post-flood period recovery easier for people. The process of post-flood recovery was considered to be positive in some locations (e.g., one-stop-shop approach in the RM of Ritchot to post-flood relief with MEMO, DFO and the Flood Trauma Team support all housed within the same location). However, satisfaction with compensation and the length of time it took to recover (psychologically) from the 1997 damages was felt, by those interviewed, to be in part based on whether residents perceived damage to their homes and property was the result of artificial or natural flooding. For example, many residents from the RM of Ritchot felt they were affected primarily by artificial flooding and as a result required longer post-flood recovery supports from the Flood Trauma Team than did

the RM of Morris, where residents largely perceived damages to their property in 1997 to be a result of natural flooding (Heinrichs *pers. comm.* 2004; Central-RHA *pers. comm.* 2004).

Sinclair and Morris-Oswald (2004) indicated that outstanding issues with lack of response and action taken to concerns and recommendations raised through public involvement processes since the 1997 Flood continue to affect levels of anxiety and mistrust with current flood management plans underway by the Province of Manitoba. This includes lack of action or implementation of plans to address concerns raised in the KGS Group report "Flood Protection Studies for Winnipeg" (2001) and the International Joint Commission recommendations, which specifically recommend that Manitoba and other municipalities consider additional flood protection. Specifically identified by the International Joint Commission was a recommendation that future processes "... take into account the full economic, social and human costs for other areas that would be affected by [flood protection for the City]. A transparent process of open consultation must be established to ensure that residents of such areas have an opportunity to be an integral part of any decision-making process" (International Joint Commission 2000 p. 31).

8.6.2.6 Community Cohesion and Organization

This section provides an overview of the existing community cohesion and organization in the Flood Study Region. Community cohesion and organization refers to the degree a community is able to meet a common vision and foster a sense of belonging and participation among residents (Community Cohesion Unit, Government of the United Kingdom, 2003). For the purposes of this report, community cohesion and organization deal with the way communities govern (political bodies organize both formal and informal structures to develop a relative sense of community) and includes the level of participation and volunteerism of local residents in their community life (Manitoba Round Table for Sustainable Development, 2001).

All municipalities in the Flood Study Region have active elected councils. The type of council, whether led by a Reeve, Mayor or Chief and the number of councillors are dependent on type and size of the community (i.e., cities and towns are governed by a Mayor and several Councillors, Rural Municipalities by a Reeve or Mayor and Councillors, Brokenhead Ojibway Nation and Peguis First Nation are governed by a Chief and Council). In addition, each municipality has a Chief Administrative Officer and various support staff to help administer and oversee public infrastructure and services. In general, information from key person interviews indicated residents were generally involved in local government and residents "know where to go with concerns or issues." In many instances community residents have formed interest groups to address issues of concern to the community. For example, in the RM of Springfield the Floodway East Drainage Association was developed to participate in any decision-making processes to improve drainage issues currently faced in the Flood Study Region. Also, the North Ritchot Action Committee is an organization made up of local volunteers to address issues since the 1997 Flood with respect to compensation, flood management and issues related to future floods. Other examples of community member organizations pulling together to address community needs include community groups that helped to develop new community health centres in the Town of Niverville and RM of Springfield (Oakbank). These are only a few of the many examples of how the residents of the Flood Study Region are generally proactive with their concerns and issues and organize groups to lobby for issues of importance to them.

Generally, local involvement in community activities and government is greater for areas beyond commuting distance from the City of Winnipeg. The City of Winnipeg plays a large role in services and

recreation for those residents living in bedroom communities just outside Winnipeg. Most rural municipalities surrounding the City of Winnipeg indicated that the further away a community is from the City the greater the likelihood that community cohesion is stronger, where residents are more likely to know their neighbours and get involved in local activities (e.g., Ste. Agathe, Anola, Morris).

The construction of the Existing Floodway in the late 1960s resulted in some physical division of the rural municipalities of Springfield, East St. Paul and St. Clements. Based on interview information, development of the original Floodway had a substantial effect on the western portion of the municipality of Springfield, essentially dividing it from the balance of the municipality. Historically, the entire Springfield area had many local roads which kept neighbours connected. The construction of the Existing Floodway resulted in many of these local roads being severed and restricted access between portions of the municipality. This was felt to have interrupted this day-to-day social contact (e.g., stopping in to see neighbours, or meeting at a local coffee shop) because the rural routes were disconnected, requiring residents on the West Side to travel further distances over one of the bridges crossing the Existing Floodway to get to their neighbours. As it is now, people on the western side of the Floodway relate more to Winnipeg than to Springfield (Nylen and Holland, *pers comm.* 2004). For example they are more likely to join recreation clubs and go to facilities within the City rather than Springfield.

The construction of the West Dyke has resulted in a divide in the RM of Macdonald. Residents on the south side of the West Dyke have expressed dissatisfaction with the West Dyke indicating that they feel as though they are sacrificed to save residents on the north side of the dyke and the City of Winnipeg (Raine and Dobrowolski, *pers comm.* 2004). This was also expressed as a concern about unfairness that parts of the municipality are unprotected by the West Dyke. Key persons reported that some residents south of the dyke continue to harbour resentment toward municipal and provincial officials regarding construction of the West dyke and compensation after the 1997 Flood.

Key person interviews from the municipalities affected by recent flooding (the 1997 Flood for residents upstream of the Floodway and the 1996 Flood for residents downstream of the Floodway) have indicated that in some cases the flood event had a positive effect on community cohesion, as neighbours and community residents pulled together in crisis.

8.6.3 Effects and Mitigation

The Project is expected to have both positive and adverse effects on the personal, family and community life of people in the Flood Study Region. The Project will have the most pronounced effect on the many people living in (and having various links with) the Winnipeg area by virtue of increased protection against severe biophysical and related personal, family and community life effects of flooding, allowing Manitoba's economy, services and way of life to continue to function and grow. Adverse effects on people via biophysical pathways in the remainder of the Flood Study Region are expected to be limited to short-term effects during construction, and in the instance of rare flood events (i.e., generally those larger than the 1997 Flood). During the Floodway Expansion Operation-Inactive stage there are also predicted to be some effects, in terms of recreation and land acquisitions for the Floodway bridges and the West Dyke right-of-way. Effects on personal, family and community life in the Flood Study Region also include effects via non-biophysical pathways such as employment and business opportunities as well as perceptions on various matters (e.g., concerns by some about the fairness of providing greater flood protection to Winnipeg than to certain other communities in the Flood Study Region).

Effects of the Project on personal, family and community life in the Flood Study Region are expected to combine with other relevant future actions that will be carried out in the Flood Study Region (see Assessment Approach as described in Chapter 2). Such other future projects and activities include compensation legislation and administration related to Floodway operation, the potential summer operation of the Floodway Expansion, City of Winnipeg Flood Protection Infrastructure Improvements, recreational developments related to Floodway Expansion, and the dredging of the Red River downstream of the Outlet Structure. Effects related to these other future activities have been noted where relevant for other socio-economic environments (Sections 8.3 through 8.5)[89].

Effects on personal, family and community life can be interpreted by people according to their outlook on past experience with flooding events and the Existing Floodway, as well as on their current circumstances and on the future circumstance for themselves, their families and their community (i.e., how these changes fit with their lives and feeling of community today and their goals and aspirations for improving their community tomorrow). The 1997 Flood experience, for example, has informed these EIA studies and the perspectives highlighted with respect to the Floodway Expansion Project by various participants.

The following outlines anticipated Project-related effects and mitigation on personal, family and community life in the Flood Study Region.

8.6.3.1 Population and Demographics

Construction

Effects on population overall, and within various communities, are unlikely to occur as a result of Project construction. In general, it is expected that the required workforce for the construction of the Floodway Expansion is already available within the communities in the Flood Study Region.

Operation-Inactive

Flood events, and changes in protection related to such events, potentially might change population through changes in migration. However, there are many uncertainties associated with projecting migration. The decision by an individual and/or family to move involves an array of factors, of which economic issues and perceived flood risk are only some of the elements considered. The Project as such also can potentially affect migration only to the extent that the Project creates a net change in flood effects (or any other effect that may influence migration).

Mitigation measures to address any concerns that may lead to out-migration from flood-affected areas include communication about the effects of the Project, flood risks and flood management plans, available financial assistance (Disaster Financial Assistance provides financial relief for flooding which occurs naturally in these areas), and compensation under *The Red River Floodway Act* (which provides financial assistance to those whose property is affected by artificial spring flooding, meaning spring

[89] Summer operation of the Existing Floodway, for example, results in more frequent summer flooding for some agricultural land upstream of the Floodway Inlet, and to reduced damages in Winnipeg related city infrastructure. More frequent flooding from summer operation of the Floodway has effects on personal, family and community life for those affected. However, as with other socio-economic components, the effects of future summer operation on personal, family and community life will not be modified to any discernable magnitude as a result of the Floodway Expansion Project. Similarly, City of Winnipeg flood infrastructure improvements and dredging of the Red River are examples of other future activities not contingent on (or affected by) the Floodway Expansion Project; such future activities would offer benefits for the areas directly served without being expected to have effects on people outside these areas.

flooding caused by operation of the Existing or Expanded Floodway)[90]. Improving the level of trust between residents in flood-affected areas and the provincial government is an important factor in allowing available mitigation measures to be effective in addressing concerns about effects related to the Existing Floodway and the Floodway Expansion.

There has been no evidence that the presence of the Floodway itself has had a noticeable influence on migration decisions. However, with respect to flood events and flood damage, experience from the 1997 Flood and from literature on flood events, show that there has been some population change and out-migration from flood damaged communities[91]. Communities affected by severe flooding are therefore likely to continue to experience some out-migration effects with the Floodway Expansion in the period immediately following severe flood events. There is no basis, however, for predicting or expecting measurable changes in such short-term migration immediately after any flood related to expected effects of the Project[92].

The extent to which the developability of land in flood-prone areas and population out-migration after a flood event is affected on a long-term basis is uncertain. Some of those interviewed suggested that many residents in the area damaged in 1997 would move out of the flood prone zone if the opportunity arose but there is a perception they are affected by lower property values and an inability to sell their homes since the 1997 Flood. (South Eastman Health Authority *Pers. Comm*. 2004; RHA- Central *Pers. Comm.* 2004). Others indicated the opposite, citing fewer "for sale" signs than expected right after the 1997 Flood (Stefaniuk *pers. comm.* 2004). There continue to be a number of applications for residential sub-divisions in the RM of Ritchot, which was cited as an indicator that the area continues to be desirable for residential development. On balance, this information suggests that effects on population are more closely linked to actual flood damage (i.e., once one's home is damaged there is a decision made about whether to stay and rebuild or to move) than to the desirability of moving out of a flood prone area. In addition, improved flood protection since 1997 (e.g., raising homes and improved dyking) and the expected reduced backwater effect of the proposed Floodway Expansion should reduce perceptions of risk and lower the potential for this population effect south of the Floodway Inlet Structure. The only area where the Project itself creates any increased flooding is North of the Outlet Control Structure[93]. Overall, there remains no basis for predicting or expecting measurable changes in long-term migration related to expected effects of the Project.

[90] Another measure mitigating the extent of these effects is provincial policy that has resulted in limiting growth in some areas (e.g., North Ritchot) particularly vulnerable to flooding. This measure, however, is not always welcomed by municipalities, which in some cases feel that the measure creates a barrier to growth and development in certain areas.

[91] A specific example of flood-related decline in population was seen in the Rural Municipality of Ritchot, which experienced a steady growth in population prior to 1997 and a decline in population after the 1997 Flood (Stefaniuk *pers. comm.* 2004). Population data available from Statistics Canada (Section 8.6.3.1), verifies there was a slight population increase from 1991 (4,146) to 1996 (5, 364) and a decline of 7.6 per cent (4,958) between 1996 and 2001. Population levels have since recovered at least some of the population decline (Stefaniuk *pers. Comm..,* 2004).

[92] As a result of the Floodway Expansion Project, flooding during extreme flood events is expected to be reduced south of the Floodway Inlet Structure. North of the Floodway Outlet Structure, effects of flooding from extreme flood events are expected to be somewhat greater under some flood scenarios. Such changes due to the Project, however, are small in magnitude, very rare in occurrence, and short in duration when they do occur. See Chapter 5 and Section 8.3.

[93] Section 8.3 reviews in greater detail the residential land use patterns for the Flood Study Region and Section 8.3.3.2 presents details on effects and mitigation of residential land use for the Project.

8.6.3.2 Recreation and Travel

Construction

Current recreation activities in the Existing Floodway Channel and right-of-way will be disrupted for a short period of time during construction. Excavation of the Floodway Channel and the creation of new disposal pile areas will result in a suspension of formal and informal recreation use for affected areas during the construction period. It is expected that these activities will be able to resume following the revegetation of the Floodway Channel. Mitigation measures primarily include sequencing of construction in such a way as to limit site-specific disruptions to one or two seasons in any one segment of the Project.

Construction of bridges crossing the Floodway Channel will result in temporary traffic delays and have effects on commuters and emergency vehicle access. Mitigation measures include maintaining access to existing bridges while the new bridges are being constructed. These effects will be short-term.

Depending upon the timing of this construction, there could be adverse effects for some sport resource use activities, particularly fishing, due to either temporary disturbances of fish populations or impeded access to fishing locations. No effects on hunting are expected because hunting generally does not take place near the Floodway construction site and West Dyke area. During key person interviews conducted for the study it was also noted that there may be a concern about the potential for noise and disturbance of the pelican rookery near Lockport, a common wildlife viewing activity in the area. Areas of special concern include effects on safety of boating and road travel during construction (i.e., bank stabilization/erosion control work along the River near the Floodway Outlet and River Rd) due to restriction to local access (i.e., restrictions to Dunning Crossing) downstream of the Floodway in the RMs of St. Andrews and St. Clements (Poirier *pers. comm.* 2004; Spicer *pers. comm.* 2004). In addition, replacement of the bridge near the Springhill Ski Park may cause some disruption to use of that facility. These construction effects are expected to be temporary and short-term.

Operation-Inactive

Continued recreation use of the Floodway Channel is expected to remain relatively unchanged. The location and general configuration will remain unchanged (e.g., slopes and vegetation are most likely to be similar to what they are now).There is potential for enhancements of existing recreation opportunities including further development and rehabilitation of the Springhill Ski Park.

No effects on sport fishing or hunting are expected as a result of Operation-Active or Operation-Inactive of the Floodway Expansion during extreme flood events. Conclusions, effects and mitigation with respect to species of importance to hunting and fishing in the Flood Study Region are provided in detail in Chapter 6 and 7 of this document.

Currently, MFEA is exploring recreation improvement options and has completed a Public Request for Proposals for recreation projects along the Floodway Channel and right-of-way that are compatible with the flood protection function of the Floodway Channel. If and when additional recreation opportunities are created, they are likely to increase visitors to the area which is seen as a positive effect on recreation for the Flood Study Region but a potential nuisance and cost to residents and municipalities located next to the Floodway Channel. The number of people and type of activities will depend on the final terms of the recreation developments selected. Residents in the vicinity of these recreational activities, primarily in

the RM of Springfield, have raised concerns about the effect that increased use of these areas will have on demand for municipal emergency services (e.g., Springfield ambulances are called to recreation sites to attend to accidents; however the municipality does not receive additional funds for use of these services by visiting recreationists not living in the municipality). Concerns were also raised regarding increased traffic, safety of children and others in the vicinity of drains, vandalism to dwellings and crops adjacent to the Floodway Channel and deterioration of the environment (both agricultural and natural landscape). In order to mitigate these concerns MFEA has committed to public consultation regarding proposed recreation enhancements, including identified stakeholder groups to ensure these concerns are addressed.

The expansion of the West Dyke is not expected to have any effect on recreational opportunities. Based on interviews conducted for the study it is understood that there are few, if any, formal or informal recreation uses of the existing West Dyke.

Operation-Active

The potential summer operation of the Floodway with or without the Floodway Expansion may improve the consistency in availability and quality of water-based recreation opportunities in the Winnipeg area. This may result in an additional limited benefit to Winnipeg area recreationists, especially in and around The Forks area, where walkways and the local water-based businesses can be adversely affected by summer flooding. In addition, the potential Red River Dredging Program will have a slight potential for positive effect on recreational boaters who use the area between Lockport and Lake Winnipeg, as this channel has often been filled with sludge and silt resulting in waters too shallow to boat across. The Project will not have any additional effect (beyond those noted above) related to such future activities, each of which can occur without the Project.

8.6.3.3 Aesthetics

Construction

During construction, there will be aesthetic changes to the Floodway Channel, West Dyke and associated construction staging areas and disposal piles. For residents in the Flood Study Region there will be short-term adverse effects on the aesthetic quality of the area while construction is underway and until revegetation of the area is complete. The Floodway Inlet and Outlet Control Structures that currently exist will be modified slightly and the general configuration and location of the Floodway Channel and associated bridges will remain relatively similar, so long-term changes will not be evident. Expansion of the West Dyke is expected to follow municipal roads. No specific mitigation measures for aesthetics are considered to be necessary during Project construction.

Operation-Inactive

There are expected to be no appreciable adverse effects on the aesthetic quality of the area, as the general construction and revegetation of the Floodway Expansion Project will retain similar appearances to the Existing Floodway (e.g., smoothness and revegetation of slopes). Expansion of the West Dyke is expected to follow existing municipal roads. No concerns regarding changes in aesthetics were identified through key person interviews or the public involvement process. However, the way people are affected by the way things look is very personal and “in the eye of the beholder” and there may be individuals who live near the Floodway Channel or West Dyke area with concerns about changes in aesthetics (e.g., higher berms).

Operation-Active

During a flood event, the aesthetics of the Project will remain unchanged. However, the potential summer water operation of either the Existing Floodway or the Floodway Expansion Project may have a small effect on aesthetics in the City of Winnipeg, particularly the ability to keep the Red River Heritage Walkway open, as well as in any upstream areas experiencing increased flooding during such operations. The Project, however, does not contribute in any material way to such summer operation effects. No specific mitigation measures for aesthetics are considered necessary during the Project Operation phase.

8.6.3.4 Health and Well-being

Potential changes in the direct health of individuals and changes in the "determinants" of community health (or factors indirectly affecting health) as a result of the Project were examined to the extent possible. Population health models identify a broad range of physical, social and individual factors that interact and work as a whole to affect the health of individuals (Frankish *et al* 1996, Health Canada 1999). Potential direct effects on public health and safety are expected to be limited to drinking water quantity and quality during construction and operations and emergency response during a flood event. Potential indirect effects are expected to be limited to traffic issues during construction. An additional potential indirect effect on public health may be changes in stress and anxiety due to concerns about the Floodway Expansion Project, including such changes arising from concerns about differences in flood protection standards between those benefiting from the Project and others not benefiting from the Project.

The ability to draw firm conclusions with any precision about effects of the Project on human health is very limited. Several sources of weakness are associated with any such assessment, including:

- Health is affected by many factors beyond those that may be connected to the Project making it very difficult, if not impossible, to isolate the specific effects (if any) related to the Project.
- Some influences may be positive and others adverse, so the "net" effect overall may be difficult to discern.
- For the purpose of the EIA, environmental effects are defined *(based on CEAA)* to include only those socio-economic effects that are caused by changes in the biophysical environment that are due to the Project. Some of the health concerns noted with regard to stress and anxiety relate to perceptions and/or concerns about fairness, and as such are not environmental effects arising from expected biophysical changes.

Despite the above limitations, the analysis is useful as input to flood protection planning and in helping to identify monitoring of changes in order to quickly take steps to manage changes if they should occur.

Construction

Changes in water levels that may affect public health are expected to be limited to local, temporary reductions in groundwater levels during construction in the vicinity of some bridge crossings and the aqueduct. Although the affected areas have not yet been identified, any effects on personal wells would last for less than three months for one summer season. Potentially affected property owners would be notified prior to construction, including inspection of their wells to determine if their water supply would be affected. Where temporary de-watering is expected to adversely affect quality or quantity of well

water, mitigation will be taken to remedy the situation so there is no disruption of water supply during dewatering.

Indirect effects of the Project on public health, safety and well-being primarily stem from local service providers' and residents' concern regarding construction-related interruptions to traffic and re-routing of traffic. Specifically, traffic delays due to construction of bridges may result in some temporary stress for commuters who use these bridges on a regular basis; effects on managing their daily work/family balance is expected to be limited due to efforts to maintain access as much as possible throughout the Construction phase. Public Health officials from the Winnipeg Regional Health Authority and North Eastman Regional Health Authority indicated there was potential for temporary increased stress and anxiety related to these short-term changes in commuting patterns. One of the primary concerns expressed by representatives of one municipality was that disruption of access at Dunning Crossing impairs the ability of the municipality to provide emergency services to the trailer park on the east side of the Existing Floodway. Mitigation measures will include adequate provision of information and advanced notice to emergency services and municipalities regarding construction sequence and any re-routing of daily traffic.

Operation-Inactive

In general, no changes in quantity or quality of drinking water are expected in the Flood Study Region due to the Floodway Channel being deepened (if at all) or when the Floodway is inactive. Communities in the area (e.g., East St. Paul) have had prior quality issues with their drinking water and have had 'boil water' advisories; these existing water quality issues would not be changed with the operation of the Floodway Expansion (Winnipeg Regional Health Authority *pers. comm.* May 2004). There is potential for limited change to quality of water in areas where water consumed by people comes from wells affected by changes in the groundwater table due to widening of the Floodway Channel[94]. There are expected to be no permanent, widespread, noticeable reductions in groundwater levels due to the Floodway Expansion. The issue is still under study; however monitoring and mitigation plans are being developed to deal with any unanticipated problems, especially as they relate to potential interruption or changes in quantity or quality of drinking water, should they arise.

Operation-Active

The Floodway Expansion generates benefits to health by raising the level of flood protection for the majority of Winnipeg residents and reduces potential risk to their safety and health. In the event of a large, rare flood the Expanded Floodway will generate a sizeable benefit in flood protection for approximately 450,000 residents inside the Floodway and will considerably reduce potential damage to properties[95]. Protecting Winnipeg during a flood enables the hub of Manitoba's services to continue to function. This benefits the way of life of many Manitobans, including residents who live in the surrounding municipalities. Improved emergency preparedness standards should improve responses at a local level during flood evacuations and crisis; however, Winnipeg services are likely to still be needed in terms of evacuation reception sites and human resource supports that may be deployed out to other communities. Senior staff from the Winnipeg Regional Health Authority and South Eastman Regional

[94] Widespread public concern and input received during the pre-design of the Project resulted in changes to the planned deepening of the Floodway Channel. As a result, there has been a decision to widen rather than deepen the Floodway Channel to the extent possible.

[95] The report titled "Flood Protection Studies for Winnipeg" (KGS Group, 2001) estimated that in a 1 in 500 year flood, the Floodway Expansion would protect approximately 450,000 residents from flooding, compared to the Existing Floodway. It is expected that in a 1 in 700 year flood, this figure would be somewhat higher.

Health Authority (who have experienced first hand the support of the WRHA through the 1997 disaster) noted the importance that improved protection of Winnipeg has to surrounding areas because, if they were not protected, they would be faced with an insurmountable task of managing disaster relief affecting the estimated 450,000 people protected by the Floodway in addition to the others outside the Floodway protection area.

With respect to communities outside of the protected area, the operation of the Floodway Expansion either results in no change to flood water levels, small benefits in terms of reduced water levels upstream of the Floodway, or small increases in water levels downstream of the Floodway Outlet Structure[96]. As a result, there are expected to be no appreciable incremental adverse effects on human health and safety as the result of the operation of the Floodway Expansion Project, beyond those that occur now with the Existing Floodway during an extreme flood event (naturally or as a result of artificial flooding). The proposed City of Winnipeg flood protection infrastructure projects will have the potential, with or without the Floodway Expansion Project, to provide additional protection to the City of Winnipeg residents and therefore decrease the need for emergency response within the city limits due to flooding. This has been noted by Winnipeg Regional Health Authority officials as a benefit to their ability to provide human resource support and coordination functions to other regions in Manitoba during times of crisis.

There are other concerns related to stress and anxiety associated with the Project that are not environmental effects since they do not flow from direct biophysical effects of the Project. Public and Mental Health Workers interviewed regarding their experience with responding to the 1997 Flood, and who currently work in rural communities in the Flood Study Region, suggest that the Floodway Expansion Project is compounding the levels of concern and worry in local residents outside the protected zone. Several communities outside of Winnipeg that have been recently affected by flooding (notably the 1997 Flood for residents upstream of the Existing Floodway and the 1996 Flood for residents downstream of the Existing Floodway) have raised concerns about the Floodway Expansion as inequitable protection (i.e., residents of these areas want the same level of flood protection as Winnipeg), bringing to the forefront perceptions that their own personal safety is at risk. Associated with this issue are concerns about the compensation provisions under *The Red River Floodway Act* and concern that, should a rare flood event occur in the future, Emergency Response systems will be faced with increased non-compliance during flood evacuation orders because individuals will feel the need to attempt to protect their property if they will not be fully compensated for damage. If non-compliance with evacuation orders becomes a reality, there is a greater danger to emergency responders and the personal safety and well-being of residents. Mitigation related to these concerns requires communication and consultation about compensation provisions, the Floodway Expansion Project's effects on reducing upstream non-natural flooding, and the need to comply with evacuation orders.

8.6.3.5 Way of Life, Culture and Spirituality

Construction

During construction, the main effects of the Project on way of life and culture are limited to a potential short-term change in patterns of work and family life due to access disruption on roads and bridges subject to construction. This restriction in access is most likely to affect the Rural Municipalities of Macdonald (for those residents with fields along the road where the West Dyke is undergoing construction), Springfield, Ritchot, East St. Paul and to a limited extent St. Andrews and St. Clements (for

[96] See Chapter 5 and Section 8.3 for details of expected changes in different areas under different flood events.

those residents who commute to and from Winnipeg by traveling across the floodway on bridges that will undergo construction).

Regarding construction on the West Dyke, disrupting access along local agricultural roads during seeding and harvest raised some concern by the Rural Municipality of Macdonald. Mitigation measures have been discussed in terms of sequencing of construction to minimize effects by avoiding seeding and harvest times, when transportation of farm equipment along this roadway is vital to agricultural activity, as much as possible. In addition, construction of the West Dyke will result in some benefits to the local residents in terms of permanent drainage improvements along and through the West Dyke, including rehabilitation of affected ditches to include steepening of drain slopes and other enhancements that will improve local drainage.

The Rural Municipality of Springfield has experienced long-standing restriction of access due to the Existing Floodway. Where residents once were easily able to cross lands to nearby neighbours, the Existing Floodway has caused a division often requiring considerable detours to cross one of the three main bridges. Many of the residents in Springfield commute to and from work over the bridges and note concerns about congestion, particularly at PTH 15. A similar concern was raised for commuters in East St. Paul, St. Andrews (along River Road, during construction of bank stabilization and erosion control) and St. Clements (felt by municipal leaders in Selkirk and St. Clements to be more of a minor inconvenience). Public Health workers in South Eastman and North Eastman Region Health Authorities raised some concerns regarding the effects of additional delays in traffic, and potential for increased traffic accidents, on feelings of stress or anxiety in family life of commuters in the Springfield area and to a more limited extent for the Rural Municipality of Ritchot. Mitigation measures include keeping existing bridges open while replacement bridges are being constructed.

Operation–Inactive and Operation-Active

In general, beyond enhanced flood protection of the Winnipeg region and the potential for enhanced recreation opportunities, the Floodway Expansion Project operation is not expected to have discernable effects on way of life, culture or spirituality within the Flood Study Region.

Nevertheless, the Floodway Expansion Project has renewed and intensified a sense among many Red River Valley residents outside of Winnipeg that they are not being treated equitably in terms of flood protection. During Floodway operation as it is now, residents affected by artificial flooding (primarily those in Ritchot) feel they are being sacrificed for the benefit of Winnipeg, without being fairly compensated or involved in flood management processes. The Floodway Expansion Project has lead to re-iteration of these concerns and the introduction of other similar concerns[97].

[97] As an example of such concerns, the Floodway Expansion Project is felt by many residents outside of Winnipeg to be promoted as flood protection for Manitobans, when it is only protecting Manitobans within the City of Winnipeg. Compensation mechanisms under *The Red River Floodway Act* are said to be viewed with suspicion by some residents because the provincial government is responsible for artificial flooding and for administering compensation, including appeals. Part of the concern raised in public forums and during key person interviews was the speed at which consultation and planning steps for the Floodway Expansion Project and new compensation legislation are being undertaken, leaving the perception there is little time for stakeholders to feel like they can make meaningful inputs to public involvement processes. One individual interviewed from Ritchot commented that the authorities "need to find a way for people to get a sense of comfort about all this; there is so much changing at once that people can't take it all in."

Overall, there are three areas where the degree of mistrust in authorities and perceived changes in way of life by residents may see effects based on the current perceptions and feelings of some individuals as triggered by the Floodway Expansion process:

- The RM of Macdonald: This area will see the construction and lengthening of the West Dyke in their area. In general, however, officials and community planners feel that residents understand the need for the water to go somewhere and farmers are willing to hold the water on their fields provided they are fairly compensated for any damages or loss.
- The RM of Ritchot: This area has been substantially affected by flooding in the past, including artificial flooding due to operation of the Existing Floodway. Increased flood protection actions since 1997 will provide additional protection in this area and the actual threat of artificial flooding is likely to be reduced with the Floodway Expansion. However, the perceived risk continues to influence the way of life in flood-prone portions of this area, where feelings of unfairness due to unresolved compensation are likely to be exacerbated by the Expanded Floodway, despite reduction of flood risk. This concern is not an environmental effect of the Project since it does not flow from direct biophysical effects of the Project.
- North of the City of Winnipeg, in the RMs of St. Clements and St. Andrews and the Selkirk area: In this area there is a concern that flood risk will increase with the Floodway Expansion. This area is prone to periodic local flooding due to ice jamming, spring run-off or wind set up; however, there is concern that water will be moving through the Floodway Expansion Project in greater volumes than with the Existing Floodway and will create more flooding in downstream areas. This has increased the level of concern and mistrust in Manitoba's flood protection, and a sense of unfairness in the belief that the Project is providing flood protection for residents of the City of Winnipeg at the expense of Selkirk and surrounding municipalities. To the extent that this concern relates to likely increased flooding due to the Project, it is an environmental effect of the Project. However, any such effects on way of life, culture and spirituality are not expected to be measurable (based on the small magnitude of any added flood effects, their rare occurrence, and their short duration in the flood event).

Although beyond the scope of this EIS, local stakeholders and residents have suggested measures to address overall flood management issues and their effects on way of life for Red River Valley residents outside of Winnipeg. Suggestions include the development of a plan for flood protection throughout the Red River Valley and ongoing meaningful consultation with stakeholders who are affected by artificial flooding caused by Floodway operation to develop agreements as a compensation mechanism. In addition, it has been suggested to provide for an appeals process to an independent third party in the proposed compensation legislation.

The potential for future summer operation of the Floodway will likely exacerbate current feelings of inequality expressed by Red River Valley residents south of Winnipeg. In order to operate the Existing Floodway or the Floodway Expansion to control summer water levels in the City, potential flooding of market gardeners and others south of the City is likely. This effect, however, is not changed by the Project.

8.6.3.6 Community Cohesion and Organization

Construction

Effects on community cohesion and organization are unlikely to occur as a result of Project Construction. Timely and effective communication to leadership of municipal and local organizations will help to keep open communication regarding any short-term inconveniences in access or service interruption that may occur during the Construction phase.

Operation–Inactive and Operation-Active

In general, it is expected that community interest group activity and municipal interest in the Project will continue to focus on the provincial and federal response to overall flood management and compensation in the Red River Valley. The Project's Operation phase biophysical effects are not expected to have any discernable effect on community cohesion and organization.

Activities regarding the Floodway Expansion have and will most likely continue to act as a catalyst for interest group activity by residents outside of Winnipeg who have expressed feelings that they are not being treated equitably in terms of flood protection and are also not being fairly compensated for artificial flooding they experience during Existing or Expanded Floodway operation. It is also likely that potential future summer operation of the Floodway will exacerbate feelings of inequality and may result in increased concerns from interest groups outside of Winnipeg, such as the North Ritchot Action Committee. As noted earlier, these concerns associated with the Project are not environmental effects as defined for this EIA to the extent that they do not flow from direct biophysical effects of the Project. These concerns also relate to effects of the Existing Floodway that do not change materially as a result of the Floodway Expansion Project.

The expansion of the West Dyke will continue to divide the municipality of Macdonald, but the Project will not result in material changes in this regard. Efforts are being made to improve drainage along and through the West Dyke, including installation of a new-gated culvert.

8.6.4 Residual Effects and Significance

This section presents the estimated residual effects of the Floodway Expansion on personal, family and community life of residents in the Flood Study Region (Table 8.6-2). Residual effects incorporate to the extent possible, cumulative effects noted above and consider the effect of impact management measures that are planned. Based on the criteria outlined in Chapter 2 the significance of these effects for the Flood Study Region is assessed, along with the general direction of change (positive, negative or elements of both). There are no significant adverse socio-economic effects related to physical or biophysical pathways between the Project and personal, family and community life. There will be significant positive effects on personal, family and community life as a result of the Floodway Expansion in terms of raising the level of flood protection for the majority of residents in Winnipeg and residents north of the West Dyke in the RM of Macdonald.

Table 8.6-2
Summary of Residual Effects and Significance on Personal, Family and Community Life

Topic and Project Phase	Residual Effect Including Mitigation	Mitigation	Significance
Population			
Operation-Active	There may be decreased out-migration from flood damaged areas as a result of improvements in water levels upstream of the Floodway Inlet.	None.	Very small, rare, local, short-term **Negligible (+)** **Not significant**
	Changes to flood damages North of the Floodway Outlet Structure may change perceptions of residents in this area and result in some out-migration.	Compensation to those adversely affected from incremental flooding from the Project (if other mitigation not effective).	Very small, rare, local, short-term **Negligible (-)** **Not significant**
Recreation and Transportation			
Construction	Traffic delays during construction of bridges crossing the Floodway Channel and in vicinity of West Dyke.	Reasonable access to Floodway crossings and the West Dyke will be maintained throughout the Construction phase.	Temporary, small, local **Minor (-)** **Not significant**
	Cessation of recreation activities along the Floodway Channel due to construction or while revegetation of the landscape is being established.	Sequencing of construction will limit effects to one or two seasons in any one segment.	Temporary, small, site specific **Minor (-)** **Not significant**
Operation-Inactive	Additional recreation opportunities developed along the Floodway Channel.	None.	Small, site specific, long-term **Minor (+)** **Not significant**
	Additional recreation use by non-local recreationists, potentially raising local concern regarding increased vandalism, nuisance and cost to municipal emergency services.	Management of these effects will be addressed through a public consultation process on recreation options undertaken by MFEA.	Small, site specific , long-term **Minor (-)** **Not significant**
Aesthetics			
Construction	Negative change to aesthetic quality during constriction and at construction sites and disposal piles until vegetation is re-established.	None.	Small, site specific, short-term **Minor (-)** **Not significant**
Operation-Inactive	Potential for some individuals living near Floodway Expansion infrastructure (West Dyke /Floodway Channel) to be concerned about changes in aesthetics (e.g., higher berms).	None.	Small, site specific, long-term **Minor (-)** **Not significant**
Health and Well-being			
Construction	Small potential for change in quality or availability of drinking water due to de-watering at construction sites.	Mitigation has been committed to rectify any effects on quantity or quality of drinking water.	Not discernible following mitigation **Negligible (-)** **Not significant**
	Traffic delays due to construction of bridges may create small adverse effects on stress of managing work/family balance for commuters.	Reasonable access will be maintained at Floodway crossings and West Dyke during construction.	Temporary, small, local **Minor (-)** **Not significant**
	Potential for traffic congestion and re-routing to increase traffic accidents and need to re-route Emergency Medical Responders to accidents.	None.	Temporary, small, local **Minor (-)** **Not significant**

Topic and Project Phase	Residual Effect Including Mitigation	Mitigation	Significance
Health and Well-being (Continued...)			
Operation-Inactive	Small potential for changes in availability of groundwater.	Monitor for any change in quantity and quality of groundwater. Mitigation has been committed to rectify any effects on quantity or quality of drinking water.	Local and not discernible following mitigation **Negligible (-) Not significant**
Operation-Active	Concern for increased potential of non-compliance with evacuation orders during a rare flood event due to issues related to compensation for the Existing Floodway. Concern for safety of Emergency Responders and residents due to related non-compliance with evacuation orders.	Communication and consultation related to concerns about potential non-compliance with evacuation orders.	**Not an environmental effect (-)**
	The Floodway Expansion generates benefits to health during rare flood events by raising the level of flood protection for the majority of Winnipeg residents and reduces potential risk to their safety and health.	None.	Large, regional, short-term, rare **Moderate (+) Significant**
Way of Life, Culture and Spirituality			
Construction	Restriction in access to haying and cropping lease areas on the Floodway and West Dyke right-of-way.	Advance notice to leaseholders.	Short-term, small, site specific **Minor (-) Not significant**
	Traffic disruption on bridges over floodway causing disruption to travel times and daily routines for affected commuters.	Reasonable access will be maintained to Floodway crossings and West Dyke during construction.	Temporary, small, local **Minor (-) Not significant**
Operation-Inactive and Active	Continues to be concern by Red River Valley residents outside of Winnipeg about not being treated fairly in terms of receiving the same level of flood protection as Winnipeg or fair compensation for artificial flooding with the Existing Floodway.	Consultation related to the concerns of those affected by the Existing Floodway, and related to future flood protection planning in Red River Valley areas outside of Winnipeg.	**Not an environmental effect (-)**
Operation-Active	Potential for increased flood risk during rare, extreme flood events north of the City of Winnipeg to potentially affect personal properties and disrupting people's way of life.	Compensation to those adversely affected from incremental flooding from the Project (if other mitigation not effective).	Rare, small, short-term, local **Minor (-) Not significant**
Community Cohesion and Organization			
Operation-Inactive	Outstanding issues for Red River Valley residents outside of Winnipeg remain from the Existing Floodway, and the Floodway Expansion Project acts as a catalyst for people to express these concerns.	Consultation related to the concerns of those affected by the Existing Floodway.	**Not an environmental effect (-)**

During the Operation-Active phase of the Project in some rare extreme flood events (generally those between the 1 in 100 year flood to approximately the 1 in 225 year flood), it is expected that improvements in changes in water levels upstream will result in some decreases in artificial flooding and may reduce damages to personal property upstream of the Floodway. There is potential for some residual effects to result in decreased population out-migration due to decreased flood damage in the RM of Ritchot. These decreases in out-migration would be experienced only with rare extreme flood events (i.e., some floods larger than the 1997 Flood), for a short-term (immediately after a flood event during post-flood recovery stages) and affect only a small number of people within the area who experience artificial

flooding when the current Floodway is in Operation-Active phase. In addition, the decreases in artificial flooding may not be felt or noticed by individuals living in the region (reductions in water levels are expected to be approximately 1 meter at the Floodway Inlet in the 1 in 225 year flood, with changes being smaller for smaller floods and with increasing distance from the Floodway Inlet). Therefore, these positive effects are expected to be negligible (not significant).

During the Operation-Active phase of the Project in rare extreme flood events, it is expected that changes in water levels North of the Floodway Outlet Structure may result in some increases in flooding and may cause damage to properties in the vicinity of the Floodway Outlet, which may result in some increased population out-migration[98]. To the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project. Accordingly, residual effects (after mitigation) on population migration are expected to be negligible (not significant).

During the Construction phase of the Project, there will be a residual adverse effect on transportation caused by temporary disruption and delays in traffic over bridges crossing the Floodway Channel. These effects will be mitigated by maintaining access to most of the Floodway bridges during construction (see Section 8.3.4). These effects are expected to be minor (not significant).

During the Construction phase of the Project, there will be a residual adverse effect caused by temporary suspension or disruption of recreation activities along the Floodway Channel. This disruption in expected to be short-term. Mitigation measures include sequencing of construction to limit effects on recreation to one or two seasons in any one segment of the Floodway Channel. Therefore this effect is expected to be minor (not significant).

During the Operation-Inactive phase of the Project, there will be residual positive effects caused by development of additional recreation opportunities along the Floodway Channel. These positive effects will be felt by recreationists and businesses that benefit from these newly developed opportunities. Details of the type of recreational developments are currently unknown but the effects are expected to be minor (not significant).

During the Operation-Inactive phase of the Project, there will be residual adverse effects for a small number of residents near the Floodway Channel right-of-way who are concerned and could potentially be affected through increased vandalism of property and disruption by the use of additional recreation opportunities along the Floodway Channel by non-local recreationists. Mitigation measures include the involvement of local residents in public consultation regarding proposed recreation enhancements, including identified stakeholder groups to ensure these concerns are addressed. Therefore, the residual effect is expected to be minor (not significant).

During the Construction phase of the Project, there will be residual adverse effects on the way things look (aesthetics) at the construction sites and disposal piles until revegetation is established. The effects will most likely be felt by a small number of individuals who live within view of the construction activities and Floodway Structures and will be short-term in duration. This effect is expected to be minor (not significant).

[98] A more detailed explanation of estimated changes in water levels and damages is provided in Section 8.3 Resource Use.

During the Operation-Inactive phase of the Project, there may be residual adverse effects on the way things look (aesthetics) for residents whose property joins with the Floodway right-of-way of the West Dyke or Floodway Channel (e.g., higher berms). No concerns about the aesthetics of the Project during Operation-Inactive phase were raised during interviews or public involvement processes. There may still be a small number of people who perceive a change in the way things look. However, the effect is expected to be minor (not significant).

During the Construction phase of the Project, there is potential for some adverse effects on drinking water due to de-watering at construction sites. These effects are discussed in more detail in Chapter 5: Physical Environment. Following mitigation, these effects are expected to be negligible (not significant).

During the Construction phase of the Project, it is expected that short-term disruptions to traffic flow and other construction inconveniences will result in residual adverse effects on commuters in managing work/family balance by potentially increasing their travel time to and from work to home. The magnitude of effect this has on the stress of individuals or families is highly dependent on their own perceptions and abilities to cope. These effects are expected to be minor (not significant).

During the Construction phase of the Project, it is expected that short-term disruptions to traffic flow and other construction inconveniences will result in residual effects on Emergency Medical Response to accidents in the affected municipalities, specifically in Springfield and St. Clements. Effective communication and coordination with Emergency services will help mitigate any potential congestion and prepare for effective re-routing to minimize delays in Emergency Response. Therefore the effects are expected to be minor (not significant).

During the Operation-Inactive phase of the Project, there is a small potential for changes in availability of groundwater. These effects are discussed in more detail in Chapter 5: Physical Environment. There is a need to monitor and address changes in quantity and quality of drinking water due to changes in groundwater affecting personal wells and municipal water supply for RM of East St. Paul. Mitigation has been committed to rectify any effects on quantity or quality of drinking water, therefore it is expected that any effect will be negligible (not significant).

With regard to the Operation-Active phase of the Project, concern was expressed during interviews that perceptions about inadequate consultation, inadequate stakeholder involvement and inadequate compensation legislation would result in increased non-compliance with evacuation orders during a very rare flood event. Any non-compliance with evacuation orders was felt to increase potential risk to safety of Emergency Responders and individual residents. However, such non-compliance is expected to be rare (i.e., occurring only in flood events larger than the 1997 Flood) and only pertain to a small number of people. Moreover, such non-compliance would not relate to bio-physical effects of the Project and therefore would not be an environmental effect of the Project (as defined for this EIA).

The Floodway Expansion generates benefits to health by raising the level of flood protection for the majority of Winnipeg residents and reduces potential risk to their safety and health. In the event of a large, rare flood the Expanded Floodway will generate a sizeable benefit in flood protection for approximately 450,000 residents inside the Floodway. This positive effect is large, regional and short-term and is therefore expected to be moderate (significant).

During the Construction phase of the Project, there will be a residual adverse effect caused by temporary suspension of agricultural activity (haying and cropping) along the West Dyke and Floodway right-of-way. This disruption is expected to be short-term and affect only a small number of producers (see Section 8.3.4 for more details and mitigation measures) and may potentially have a small effect on their daily farming activities. This effect on way of life is expected to be minor (not significant).

During the Construction phase of the Project, short-term disruption to traffic on bridges over the Floodway Channel will have residual short-term adverse effects on daily routines and way of life for some local residents and commuters. These effects are expected to be small after considering mitigation measures outlined above (i.e., maintaining access to existing bridges during construction) and in Section 8.5: Infrastructure and Services. Therefore the effect is expected to be minor (not significant).

Several groups have raised concern about not being treated fairly in terms of receiving the same flood protection as Winnipeg or fair compensation for artificial flooding regarding the Existing Floodway. Such concerns are not caused by biophysical effects of the Floodway Expansion Project and therefore are not an environmental effect (as defined for this EIA).

During the Operation-Active phase of the Project, the increased potential for some artificial flooding (less than 0.3 meters) during rare, extreme flood events (occurring only in flood events larger than the 1996 or 1997 Flood) North of the City of Winnipeg may affect personal properties and disrupt people's way of life. To the extent flood protection mitigation was not fully effective during a flood event, MFEA is committed to ensuring that compensation be provided to those adversely affected from incremental flooding from the Project. Due to the rare nature of these effects, the small change in water levels, the relatively small number of people who would be affected and mitigation measures, it is expected that this adverse effect will be minor (not significant).

Outstanding issues for Red River Valley residents outside of Winnipeg remain from the Existing Floodway, and the Floodway Expansion acts as a catalyst for people to express these concerns. Though some of these issues are mitigated to some extent by the Floodway Expansion (for example improved road access and drainage, as well as reduced water levels from artificial flooding), it is likely there will continue to be some feelings of unequal treatment. However, such concerns are not caused by biophysical effects of the Floodway Expansion Project and therefore are not an environmental effect of the Project (as defined for this EIA).

8.6.5 Monitoring and Follow-Up

Monitoring will be undertaken in order to provide, in a timely way, information and response that will help to manage effects of the Project. Specific work plans for monitoring and following-up of topics in personal, family and community life will be developed between MFEA and key stakeholders in the Flood Study Region. Currently, monitoring and follow-up of de-watering and groundwater changes is committed to. In addition, meaningful consultation and provision of information to stakeholders will be a focus for follow-up. No specific monitoring or follow-up is required for population, aesthetics, community organization and cohesion.