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Section 7.3.1 - Provincial Drainage Infrastructure and Management (source: Manitoba Water Stewardship - Regional Operations)

Regional Operations History:

Drainage, designed to remove excess rainfall from cropland during the growing season, is based on the productive capability of the soil and on technical, economic, and environmental factors. Drainage, and the lack of resources dedicated to the maintenance and reconstruction of existing works, has long been an issue throughout agricultural areas. Land drainage is a partnership between landowners, municipalities, Conservation Districts and the Province. Direct provincial responsibility lies with Manitoba Water Stewardship (Conservation) for the Provincial Waterway system and with Transportation and Government Services for the drains and ditches paralleling Provincial Trunk Highways and Provincial Roads.

Basic agricultural land drainage works in the province were completed in the early 1900's, under the jurisdictions of various municipally-based entities known as Drainage Districts. In the 1930's and 1940's provisions were made for the maintenance of the drains through the establishment of Drainage Maintenance Districts, again established on municipal boundaries. In 1965 Manitoba took a proactive approach to resolving inter-municipal drainage issues by being the first of all surrounding jurisdictions to take on the responsibility for Provincial Waterways (the major drains) based on a watershed systems approach. In general, Municipalities became responsible for those components of the tributary system which outlet into the Provincial Waterways.

During the 1960's and the period between the late 1970's and the mid 1980's, a number of cost sharing programs between federal, provincial and municipal jurisdictions resulted in significant temporary boosts to drainage system reconstruction and development. The dryer cycle in regional weather of the late 1980's, resulted in drainage issues becoming less prominent. A commensurate loss of federal support saw provincial technical and financial resources dedicated to drainage significantly reduced.

In 1989 the provincial government held a series of public consultations which resulted in the publication of *Manitoba's Water Policies*. Drainage was raised as a significant issue. Drainage priorities delineated were as follows: maintenance of the existing system -first priority, reconstruction -second priority, and new construction -third priority. The policies further stated that drainage should be undertaken on a watershed basis in order to encompass issues related to water retention, control and timing of runoff.

During the 1990's, a wetter than normal cycle predominated, revealing the effects of the deteriorated drainage infrastructure across the province, i.e. attendant crop and other flooding related damages. The increased profile of drainage issues also highlighted regulatory shortcomings. The Province responded by transferring staff to regional postings so that drainage regulation could be administered at the local level. Enforcement of *The Water Rights Act* was actively pursued for the first time. The result of these changes was quicker action on enforcement and a shorter turn around time on licensing. There was also a significant increase in drainage license applications.

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In 1997/98, a public review panel on land drainage clearly heard that the Province should maintain ultimate jurisdiction and authority over drainage and drainage licensing. The main recommendations were to fund capital projects, maintain and improve drainage works, further improve drainage licensing administration and enforcement of the act. Two reviews of *The Water Rights Act* were conducted and although drainage was only one portion of the act, the majority of the comments received were on drainage issues. As a result of legal challenges, amendments were made to *The Water Rights Act* to clarify provincial jurisdiction over drainage.

Since 1965, when the province took responsibility for provincial waterways, the program budgets for land drainage have been inconsistent, with an overall trend to decreasing the effective funding aimed at maintenance. This has occurred despite the fact that many higher value crops are more sensitive to excess water and require higher drainage standards, and that construction, design, and maintenance costs have increased.

Current Status:

More recently, excessive spring and summer rainfall in 1999, 2000, 2002, and 2004 has again resulted in significant crop losses and property damage. Drainage issues have been on the agenda at Association of Manitoba Municipalities (AMM) and Keystone Agricultural Producers (KAP) meetings for the last several years. Many municipalities continue to petition the Province to increase funding to achieve appropriate levels of maintenance and reconstruction on the Provincial Waterway system. Manitoba Water Stewardship (Conservation) has committed to developing long term funding plans for drainage and to sharing these with interested municipal Councils. To date however, no comprehensive plans have been approved for distribution and discussion.

The continuing decline in technical staffing for design services, inadequate construction and maintenance funding, and a coincident thrust to address drainage problems through regulatory means, i.e. the prohibition of drainage as opposed to development of cooperative solutions to drainage problems, has produced a significant increase in litigation against the Province, both in terms of challenges to legislation and claims for damages as a result of the failure to maintain Provincial Waterways. Solutions to drainage issues have also been hindered by increased environmental scrutiny wherein a lack of clear guidelines and policy have frustrated local governments, individual producers and others who have taken matters into their own hands.

Required drainage system capacity has been increasing due to greater planting levels in specialty crops, improved on-farm infrastructure and urban development into agricultural areas. A general increase in farm size and landowners' abilities to alter runoff has also aggravated the situation.

Planning of land drainage projects generally requires multi-year scheduling for surveys, design, environmental approvals, land acquisition and construction of the works. As part of a proactive approach, Manitoba Water Stewardship (Conservation) has been preparing 5-year Capital and Minor Infrastructure plans, which include the required drainage infrastructure improvements. For the last two years, Capital expenditure plans based on annual allotments of $2.5 million,

$4.5 million and unrestricted funding have been submitted for Treasury Board consideration. The plans necessarily include non-drainage-related infrastructure (i.e. flood control works, etc.) as highest priority, but include drainage project priorities as determined within the regions. For 2000/2001 to 2002/2003, the land drainage related component of the Capital infrastructure program has been limited to about $2.5 million. Maintenance has been relatively constant over the years at a present value of $3.1 – 3.7 million per annum. Maintenance and construction of drainage transportation crossings currently involves up to 50 percent of the provincial drainage budgets.

Currently, there are no discussions between the province and the federal government regarding cost sharing agreements specific to drainage infrastructure in the province. It is expected that through the input of interest groups, and cooperation from Conservation Districts and rural municipalities, processes will continue to evolve which will ensure watershed-based projects integrate all resources.

MANITOBA WATER STEWARDSHIP (CONSERVATION)
(and predecessor designations)
DRAINAGE EXPENDITURES
ON THE PROVINCIAL WATERWAY SYSTEM
CAPITAL & MAINTENANCE

Fiscal Year	($ M's) ~ Present Value, 2002
67/68	8.5
68/69	9.3
69/70	7.1
70/71	7.0
71/72	7.2
72/73	6.5
73/74	6.5
74/75	6.1
75/76	6.1
76/77	7.9
78/79	12.0
79/80	6.3
80/81	7.1
81/82	9.7
82/83	8.2
83/84	8.3
84/85	8.5
85/86	11.5
86/87	8.4
87/88	7.4
88/89	8.8
89/90	7.3
90/91	6.8

91/92	6.7
92/93	6.4
93/94	6.0
94/95	5.9
95/96	6.1
96/97	6.4
97/98	6.1
98/99	6.0
99/00	7.3
00/01	5.2
01/02	4.9
02/03	5.2
03/04	6.1
04/05	6.3

Notes:

- These figures also include the maintenance of water supply and, but exclude flood control works.
- Around 1990/91 the Administration of the day implemented the elimination of field and design services which removed $3.6 million from drainage services. These costs would be in addition to that shown above.
- The portion of the maintenance budget going to projects other than drainage maintenance has been increasing in the last 10 years.
- The portion of the capital budget going to crossing replacement is increasing.
- These expenditures include regional operation expenses and departmental salary costs related to waterway maintenance activities.

Drainage Discussion Paper

Brief History of Water Stewardship Regional Infrastructure and Operations:

The Department of Water Stewardship's Regional Infrastructure and Operations Department has existed in some form or another since the late 1950's. The provincial department was formed to undertake all forms of water resource development for the benefit of Manitoba. The scope of this work included the engineering, construction, design and administration services required for the constructions of dams, drainage ditches, flood control infrastructure, reservoirs, drinking and waste water systems as well as many other water related services required by rural Manitobans. At its peak Regional Operations had over 400 employees doing water resources work throughout the province. The current department has undergone several administrative changes and has been reduced to approximately 25% of its original size. The current focus of the department is to improve existing drainage and flood control infrastructure through reconstruction projects as well as the continued maintenance of existing infrastructure.

Existing Drainage System:

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The current drainage system servicing Manitoba has evolved significantly over the past 60 years. The original landscape consisted of swamps, natural streams and rivers which served as the primary drainage system for Manitoba. As population increased, so did the rural land base, and agricultural land use exploded. During this time of expansion the Red River valley was pockmarked with swamps and wetlands, and had very limited drainage. The soils in this area were determined to be some of the best agricultural suited soils in the world, and efforts were undertaken to maximize the productivity of this land. The increase in agricultural productivity and its importance to the Manitoba economy dictated that a comprehensive drainage network strategy had to be developed to maximize the potential of agricultural land production. In the late 50' and early 60's the province took on the role of water management and began a huge undertaking in developing one of the most comprehensive, intense and well developed drainage systems in Canada. The drainage design criteria and methodology developed by the Province has been adopted as an industry standard by private design consultants, the United States Army Core of Engineers and is used as a teaching tool in Universities and colleges across Canada.

In developing a Provincial network of drains the natural watersheds of Manitoba had to be established, and a classification system of existing drains on the landscape had to be developed. Provincial Surveyors and Engineers were sent out physically note all natural and man made waterways and drains on the landscape. The survey information was used to establish watershed boundaries and document drainage systems existing on the landscape. All of this information was combined to develop Provincial Designation of Drain Maps. Drains are classified in terms of **order**. Drains range in size from 1rst order to 7^{th} order – the higher the number being the largest size of drain. Examples of first to third order drains include small swales, depressions or man made ditches in which water runs only in spring or after heavy rains – this may include ditches along municipal roads. Third Order to 7^{th} order streams are typically larger in size, many have been man made including municipal and highway road drains, and have significant measurable flows of surface water runoff during spring and after heavy rains. Fifth order and higher streams typically have year round flows, and are physically large waterways such as the Assiniboine, Souris and Red Rivers.

Jurisdiction Over Waterways:

All property in, and all rights to the use, diversion or control of all water in the province in vested in the Crown in right of Manitoba. All drainage works (other than those owned by the Province) in the province are subject to the jurisdiction of the Water Rights Act.

Rural Municipalities are local drainage authorities, responsible for the construction and maintenance of municipal drainage infrastructure. This typically includes smaller natural waterways as well as municipal road ditches. All municipal drainage works are subject to regulation under the Water Rights Act which is administered by the Province of Manitoba.

In some areas, Conservation Districts have authority over the waterways contained within their district. These are specific districts that have special agreements in place with the Province to maintain and operate these waterways. The Conservation Districts drainage activity is still regulated by the province under the jurisdiction of the Water Rights Act.

The Province is an important owner/operator of Provincial waterways. These waterways were designed and constructed by the province and are currently maintained and operated by Regional

Operations. These drains are formally designated as being under Provincial jurisdiction through Orders-in-Council. There are approximately 2700 miles (4500 km's) of Provincial Waterways in Manitoba incorporating 600 bridges and 1500 major multiple culvert crossings. Existing provincial waterway infrastructure has a current replacement value of $1 billion dollars.

Drain Design Process:

Once the Province recognized the agricultural capability of the Red River Valley and areas of the Interlake and northern Manitoba a strategy was developed to help maximize the potential of farm land. Drainage of these areas was identified as the major component needed to ensure the land base would become and remain suitable for profitable agricultural production. Water Stewardship, with help from other government departments such as Agriculture developed a drain design formula that would ensure the size and type of drains constructed would reflect the type and value of the land the drain was servicing. All drain surveying, drafting, design, administration and construction supervision was done in house. Drains were designed using complex engineering techniques and formulas developed by Water Stewardship. Due to the different land types throughout the province, different standards were developed for construction to ensure that the "best" land received the highest standard of drainage. Four standards were developed, each designed to remove a predetermined size rainfall event within a given timeframe. Specialty crops (beans, potatoes) had rainfall removed with a few hours, cereal crops (canola, wheat) within 36 hours, forage crops (hay land) within 4 days, pioneer land within 10 days. These standards were developed with input from agricultural experts at the time, and based on the crop types and land use in the 60's and 70's. The timeline criteria were combined with other design elements which help to dictate drain size and type. The main criteria used to asses and design a potential drain are soil type, existing topography (slope of land) and a cost benefit formula using the potential crop value to "tweak" a drain design to maximize crop potential. Soil type is a key design element. The soil characteristics determine how much runoff is coming from the landscape (eg. Clay soils have less water infiltrating downward than do sandy soils) so if one soil type is predominant it will affect the runoff rate and therefore drain capacity. Soil type combines with slope of the land determines if the speed of water in the drain needs to be controlled. Through a series of comprehensive tests allowable drain slopes and in channel velocities were established and incorporated into all drain designs. Added to these specific engineering criteria is a cost benefit value which reflects the value of the land and crop type that the potential drain will service. Drains were designed specifically for the area they service. This same design process is used currently by Regional Operations when undertaking drain reconstruction projects.

Current Operation of Drainage System:

The existing drainage infrastructure on the landscape was designed and constructed to service an agricultural land base and practices established in the late 60's and early 70's. As technology and agricultural research has advanced, so has the capability of the agricultural land base to handle increasingly specialized crops. Land previously classified as marginal or non-productive has now become some of the most profitable and expensive land in agro-Manitoba. An example of this in the sandy soils in south central Manitoba. In the late 60's this land was determined to be non-profitable and was deemed inadequate for cereal crop production, it was seen as not being important (by local government and producers) to service via a complex drainage network. Today this land is ideally suited for specialty potato production, and is classified as the most

valuable agricultural land in Manitoba with sale prices being in excess of $3500 per acre. This example is specific to this land type, but different scales of this increase in land value and productivity is common throughout agro Manitoba. Simply put the drainage standard that the Provincial network of drains was designed and constructed to does not exist anymore. Land once considered marginal is no longer so, and the opening up of previously undeveloped land has increased the area draining into Provincial Infrastructure substantially. Previously marginal land is now some of the most valuable land in the province – but at the time of original construction the servicing of this land by a drainage network was not considered, or any existing drain was designed to service the land value of the day.

Prioritizing of Work –Maintenance and Reconstruction:

Reconstruction of Existing Infrastructure:

The increase in land values and changing land use practices have made most of our provincial drainage network obsolete. Our drains are now simply not large enough to service the current land base adequately, and redesign and reconstruction of these waterways is required. The redesign and reconstruction of waterways is undertaken and administered by Water Stewardship. Individual farmers, farm lobby groups as well as municipalities lobby Water Stewardship to improve our existing infrastructure to reflect current land values. This lobbying is not limited to one particular area, but is spread out across the province. Due to the system wide degradation of our drainage system Water Stewardship has to prioritize its work to address areas of highest concern. In order to prioritize, Water Stewardship incorporates current land values, existing infrastructure condition and public demand to determine which waterways require immediate improvement. In order to ensure priorities are acted upon, and that the worst problems are being addressed 5-year plans are developed to address infrastructure priorities. An annual budget of approximately 1.9million dollars is provided to undertake reconstruction projects throughout the province. For simple reference, the average cost of reconstruction of a provincial drain is $200 - 250 000 dollars per mile. A number of other factors can drive this cost up considerably. The demands for improvements far outweigh our current ability to deliver. A map showing the last 5 years of reconstruction projects has been provided.

Maintenance:

Water Stewardship is continually undergoing maintenance on its waterways. This activity includes bridge reconstruction, culvert replacement, vegetation removal and other related activities. Our maintenance activities are mainly fixing broken or damaged infrastructure, and responding to complaints by municipalities or landowners being serviced by our infrastructure. Annual maintenance budget for the entire province is $ 2.0 million dollars out of which all departmental maintenance employees are paid Bridges and crossing receive their own budget of $ 1.3 million annually, but the cost to replace one bridge crossing a provincial waterway can be $350 000 dollars. With 600 bridge crossings and 1500 culvert crossings repair and replacement activities are limited.

Provincial Drainage Infrastructure within the La Salle Redboine Conservation District:

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The agricultural land base within the LRCD is substantial and is serviced by approx 470 miles of provincial waterways constructed with 102 bridges and 83 culverts. These waterways are supplemented by a municipal drainage network which is subject to licensing under the Water Rights Act. Drainage Licensing will be discussed separately further into this report.

Portage Diversion:

The LRCD contains one of the Province's most important pieces of flood protection infrastructure – the Portage Diversion.

The Portage Diversion is similar in nature to the floodway in terms of design and principle. The Portage Diversion structure is located approximately 1 mile southwest of Portage La Prairie on the Assiniboine River. There are two separate structures. They are described as follows:

1. **The Assiniboine River Control Structure (Spillway**) – this structure is imbedded in the river and consists of two hydraulic gates that rest on the bed of the Assiniboine River which can be raised and lowered to manipulate the amount of flow in the Assiniboine River that flows to Winnipeg. It is not typically recognized that the control of water levels on the Assiniboine River is critical to controlling floodwater elevations within the City of Winnipeg
2. **Portage Diversion Inlet Structure and Channel** – when the gates of the river control structure are raised, to flows in the Assiniboine River are diverted down the Portage Diversion channel through the Inlet structure. The inlet structure has gates which are also manipulated to control water levels down the diversion channel into Lake Manitoba.

This flood protection infrastructure is used to control water levels on the Assiniboine River – and is integral in the protection of Winnipeg from flood waters.

Water Rights (Drainage) Licensing:

Water Stewardship's Regional Operations is responsible for administering and enforcing the Water Rights Act. The Water Rights Act is used to govern drainage and water diversion or control activities on the landscape. Typically proponents of drainage related projects apply to Water Stewardship for approval of their projects. Water Stewardship staff inspect the proposed project and either approve the project as applied for, approve with conditions and changes, reject the proposal. The role of the province in regulation is to ensure that any proposed project does not have a negative impact on upstream or downstream water users without the confines of jurisdictional boundaries.

As a whole the geographical area of the LRCD has one of the lowest rates of drainage licensing in the province. Licenses are usually applied for by municipalities, with a smattering of individual landowners applying as well. A breakdown (approx.) of licenses applied for by municipality in the past 5 years is as follows:

- R.M. of Victoria – 5 application by municipality, 4 applications by individuals
- R.M. of South Norfolk – 10 applications by municipality, 6 applications by individuals

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- R.M. of Dufferin – 35 - 40 applications by municipality, 15 - 18 applications by individuals
- R.M. of Grey – 11-13 application by municipality, 5-7 applications by individuals
- R.M. of Portage La Prairie – 3 -5 applications by municipality, 10 – 14 applications by individuals
- R.M. of MacDonald – 3-5 applications by municipality, 4 applications by individuals
- R.M. of Cartier – 2-3 applications by municipality, 0 applications by individuals
- R.M. of Ritchot – 5-6 applications by municipality, 2 applications by individuals

This averages out to 26 total applications for the LRCD per year – average of 4 per municipality (including municipalities). If we remove the R.M. of Dufferin which is by far the most consistent municipality for applying for Water Rights Licenses the average per year drops to 14 total applications per year, or 3 per municipality (including individuals).

The number of applications and licenses are not reflective of the amount of drainage occurring on the landscape. It is recognized that some municipalities have bigger drainage budgets than others, and those with smaller budgets do not undertake much drainage work, and that is reflected in the number of applications. As well many municipalities are not undertaking new drainage works, and are simply maintaining an existing system. However, there are municipalities and individuals within the LRCD that are undertaking extensive, unlicensed drainage works. This does not necessarily mean that all unlicensed work is detrimental to the landscape, but some of the work is harmful and leads to the biggest issue facing drainage licensing – enforcement under the Water Rights Act.

Enforcement of Water Rights Act:

Historically enforcement under the Water Rights Act has been sporadic and largely ineffective partially due to process, but largely due to weakness in the Act and reluctance to prosecute.

Historically if a person or company performed illegal drainage works a drainage officer would investigate, and if a violation of the Water Rights Act had occurred a letter notifying the landowner or proponent of the work would be sent informing them of their violation. The letter would outline the actions required to mitigate the problem, be it closing in the works, modifying them to some degree, or altering the project entirely. The offender would then have a certain amount of time to comply with the letter. In some cases compliance was undertaken quickly, often as a result of the offender not being aware a licence was required etc. In some cases offenders undertook the remedial work reluctantly due to misinformation (meaning they were told no approval was required by an alternate party).

In most other cases the offender does not comply with the letter from Water Stewardship, and harsher measures are required. The next step in this process is the issuing of a Ministerial Order – which is an order signed by the Minister of Water Stewardship ordering the offending party to modify the illegal drainage works to the conditions outlined in the Order in a required amount of time. If the offender does not comply, the province can order a third party to undertake the required work, and all costs incurred are the responsibility of the offender to pay.

Previously under the Water Rights Act and offender could appeal this order to the Municipal Board, and any appeal stayed the order – meaning that until the matter was heard before the board the illegal works could remain open until found illegal. This has lead to further non-compliance, and ultimately litigation against the province for non-enforcement. The result is essentially a beauracratic nightmare which leaves the initial issue ultimately unresolved.

Enforcement under the Water Rights Act has been brought up repeatedly as a main issue of concern by entities such as AMM and the Conservation District Program. Recently a review of the Water Rights Act has been undertaken by Water Stewardship and Provincial Cabinet, resulting in the formation and passing of the Water Right Amendment Act. This Act is intended to give more enforcement powers to Water Stewardship staff and effectively deal with drainage offenses as they occur. The new legislation will give officers the ability to issue on the spot fines, enforcement notices, and in extreme cases allow for equipment seizure all with the legislative ability to legally support these actions. These changes have been welcomed by most municipalities and Conservation Districts. The changes in legislation require the appropriate training of Water Stewardship staff be undertaken. It is likely that enforcement ability will be available until the spring of 2007.

In conclusion the Role of Water Stewardship's Regional Operations within the LaSalle Redboine Conservation district is varied and quite complex. Historically the province has undertaken a large amount of work with the CD's geographical area, as this is one of the predominant agricultural areas in the Province. Being primarily agricultural this area is also ripe with drainage complaints arising form individual and municipal activities. Water Stewardship Regional Operations is a strong proponent of the IWMP as it will help address longstanding water issues throughout the CD. As well it will be a useful tool in the long and short term planning regarding potential drainage projects and their long term feasibility.