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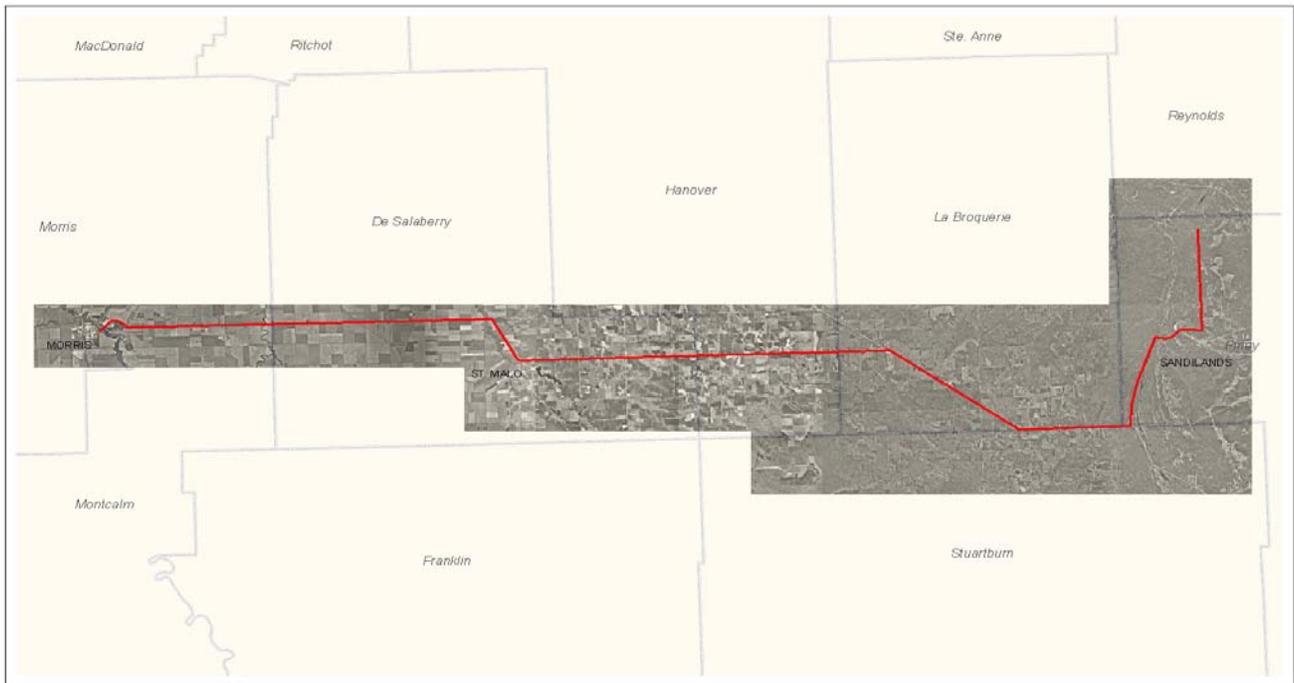
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# ENVIRONMENT ACT PROPOSAL

## PEMBINA VALLEY WATER COOPERATIVE SUPPLEMENTAL GROUND WATER SUPPLY PIPELINE

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Prepared for: Pembina Valley Water Cooperative

Project No: WE 05 124 00 WE

December, 2005



COCHRANE ENGINEERING LTD.

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## APPENDICES

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**Appendix A: Sandilands Water Supply Pipeline General Layout**

**Appendix B: PVWC Water Conservation Brochure**

**Appendix C: Sandilands Water Supply Pipeline Crossings**

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## 1.0 GENERAL PROPOSAL INFORMATION

### **Supplemental Ground Water Supply Pipeline**

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Name of development

### **Pembina Valley Water Cooperative Incorporated**

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Legal name of the proponent of the development

**Crown Lands within the Sandilands Provincial Forest (SE22-05-09E), PR 404 ROW in the R.M. of Piney, PTH 12 & PR 403 ROW in the R.M. of La Broquerie, PR 403 & HWY 59 ROW in the R.M. of Hanover, HWY 23 ROW in the R.M. of De Salaberry and the R.M. of Morris**

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Location of development

#### Contact Person for Proponent:

**Mr. Jeff O'Driscoll, P.Eng.**

Cochrane Engineering Ltd.

600 – 5 Donald Street

Winnipeg, Manitoba R3L 2T4

#### Contact Person for Environmental Assessment:

**Iain Pimlott, B.Sc., CET, CCEP**

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Proposal Contents:

Section of Environmental Act Proposal Form		Section Number in Report
DESCRIPTION OF DEVELOPMENT:		
(i)	Legal description and map of development	1.1
(ii)	Mineral rights	1.3
(iii)	Existing land use	1.4
(iv)	Land use designation	1.4
(v)	Previous studies	1.7
(vi)	Proposed development	2.0
(vii)	Storage of gasoline or associated products	1.8
(viii)	Potential impacts	3.0
(ix)	Proposed environmental management	4.0
SCHEDULE:		5.0
FUNDING:		6.0

**1.1 CERTIFICATE OF TITLE**

A Certificate of Title is not available, as the proposed development is located in a Provincial Forest and along Provincial Trunk Highways and Provincial Roads, designated as such under the Provincial Highway Act and Forest Act.

**1.2 NAME OF OWNER**

The Government of Manitoba owns the area of development.

**1.3 MINERAL RIGHTS**

The owner of the mineral rights is the Province of Manitoba.

**1.4 LAND USE DESIGNATION**

Under the Provincial Highway and Forests Acts, the land use designation is Provincial Forest and Highway Right-of-Ways.

**1.5 WATER RIGHTS LICENCE**

An application for a Water Rights Licence has been filed with the Water Branch and is currently under review.

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## **1.6 DESCRIPTION OF EXISTING LAND USE**

The proposed 95.3 kilometre route for the water pipeline, from the pumping well site to the water treatment plant in the town of Morris, will follow existing Provincial Road (PR) and Provincial Trunk Highway (PTH) right's-of-way (ROW) for its entire length, other than a short section north of the Town of Sandilands. These PR and PTH ROWs are previously disturbed and in most cases highly managed areas. A short section of new ROW required north of the Town of Sandilands occurs within a forested area that is highly fragmented due to numerous trail and road developments. Reference Appendix 'A' for the Supply Pipeline General Layout Drawing.

## **1.7 PREVIOUS STUDIES**

*March 2005 "Supplemental Groundwater Supply System Evaluation" prepared by UMA Engineering Ltd. for the Pembina Valley Water Cooperative Inc..*

*March 2005 "Supplemental Groundwater Supply System Preliminary Report on Pipelines and Facilities" prepared by Cochrane Engineering Ltd. Engineering for the Pembina Valley Water Cooperative Inc..*

*October 2005 "Pembina Valley Water Cooperative Groundwater Supply Project: Environment Setting report" prepared by North-South Consulting Inc. for the Pembina Valley Water Cooperative Inc..*

## **1.8 STORAGE OF GASOLINE AND ASSOCIATED PRODUCTS**

During construction and upgrading, the contractor will be required to ensure that all equipment is properly maintained to prevent leaks and spills of fuel and motor fluids. Refuelling of equipment will not be within 100 metres of a water body, stream or wetland. Storage and use of fuels, grease and lubricating oils during construction has the potential to impact the water quality of the surface water and shallow groundwater. All fuelling of equipment will take place at a designated area. The contractor will have a spill contingency plan in place prior to initiating construction. All spills will be reported to the appropriate authority and remediated in accordance with applicable regulations (Storage and Handling of Petroleum Products and Allied Products Regulation 188/2001).

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## **2.0 DESCRIPTION OF PROPOSED DEVELOPMENT AND METHOD OF OPERATION**

### **2.1 BACKGROUND**

The Pembina Valley Water Cooperative Inc (PVWC) currently operates a water system that supplies treated water to approximately 45,000 residents in the area primarily west of the Red River and south of the City of Winnipeg from water treatment plants on the Red River at Morris and Letellier, as well as from the Stephenfield Reservoir on the Boyne River. As part of their ongoing risk management strategy to ensure that the water supply is safe and secure, the PVWC has identified that the water supply is susceptible to periods of drought when it may not be possible to maintain the required flows from the surface water sources. The solution to this potential is to develop a supplemental water supply from an independent source that is capable of supplying at least emergency levels of water and is not susceptible to drought. The results of an initial evaluation of potential sources has identified groundwater within the Bedford Ridge area of the Sandilands Provincial Forest as a potential source.

The PVWC has indicated that, as a minimum, a supplemental water source capable of providing 50 litres per second (650 lpm) is required. However it is desirable that a supply source be chosen that could potentially provide a potential 20 year future need of up to 300 litres per second (3,950 lpm, depending on future growth trends). Assuming that the system is operated continuously at full flow, the initial annual water requirement would be 1,500 dam<sup>3</sup> per annum, with an ultimate potential annual water requirement of 9,500 dam<sup>3</sup> per annum. This proposal only addresses the initial emergency level requirement of 50 litres per second (650 lpm). Depending on future needs, approvals to expand the system would be applied for if and when they are needed.

Water conservation measures to be included or used in the system include:

- System metering to monitor unaccounted for water
- Customer metering and pricing
- Public awareness and education (Reference Appendix 'B' for Water Conservation Brochure, available in rural and urban user formats)

### **2.2 PIPELINE DETAILS**

The prevailing ground elevations of the well head is about 389 m ASL, while that at the WTP is 236 m ASL. This drop of 153 m over a distance of about 95.3 kilometers results in the theoretical availability of a hydraulic gradient of about 0.16%.

The pipeline will be controlled by a valve at the Morris WTP reservoir; the valve will close when water is no longer needed, and when flow stops, the static pressure in the pipeline at the WTP would exceed 1500 kPa, well beyond the safe limits for normal waterworks piping materials. As such, it is necessary to introduce pressure reducing valves (PRVs) in stations along the pipeline route to ensure that static and dynamic operating pressures remain controlled.

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In addition, there is an opportunity to provide treatment along the pipeline route as there is a potential to sell water to communities and rural municipalities along the way, particularly west of PTH #12. Therefore, it is suggested that a future Water Treatment Plant be located along PTH #12, assuring year-round accessibility and visibility for the facility. This proposal does not address requirements for existing or future water treatment facilities.

### **2.3 DESIGN CONSIDERATIONS**

The following items shall be incorporated and addressed as needed :

- Gate valves and manual air releases (maximum spacing – 3 to 5 km.)
- Flushouts (maximum spacing - 6.5 km.)
- Additional valves at tees, crosses, and high population areas
- Pressure reducing stations to maintain desired piping pressures
- Automatic air releases at major elevation changes
- Creek crossings to have topographic surveys to determine special requirements
- PTH and PR. crossings to have encasement pipes
- cursory review of groundwater conditions for trench dewatering
- Meet with Authorities (Highways, etc.) to review pipeline routing, alignment, and restoration
- Manitoba Water Services Board specifications and approved material listings will be generally applied to this project. All water pipelines shall generally meet the MWSB Specification Section 02706 – 2.01 Pipe.

The pipelines will be designed for working pressures between 140 kPa and 525 kPa. Higher pressure sections may develop based on the high static pressure in the pipeline. Piping with a higher pressure rating may be used in these areas.

### **2.4 PIPELINE CONSTRUCTION**

The method of pipeline construction will be decided partly on the basis of the type of pipe chosen by the contractor. Both PVC and HDPE alternatives will be provided in the specifications, for most of the pipeline route. Alternative construction methodologies include conventional backhoe trench excavation; chain trencher; or directional drilling.

Specific sensitive areas will require use of directional drilling: creek crossings; railway crossings; highway crossings; natural gas pipeline crossings; other sensitive areas as identified in the environmental setting report. Highway, railway and gas transmission pipeline crossings must be installed in liner pipes.

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### **3.0 DESCRIPTION OF POTENTIAL IMPACTS**

Water will be distributed from the well site to the Morris water treatment facility via a 30 cm diameter pipeline. The pipeline will be installed for the vast majority of the route, within the existing municipal and provincial road ROWs using the direct plough or trench technique. A short section of new ROW will be acquired north of the Town of Sandilands, where clearing of existing forest cover will be required. Water bodies will be crossed using horizontal directional drilling (HDD). Pipeline construction will begin in early summer 2006 and be complete by fall 2006.

#### **3.1 IMPACTS ON WILDLIFE**

The majority of the pipeline route occurs within existing road ROWs, which generally provide poor quality wildlife habitat. Further details are available in the Pembina Valley Water Cooperative Inc. Environmental Setting Report (Mazur et al. 2005). Construction of the pipeline will result in a temporary disturbance to ground cover within the ROW, with disturbed vegetation expected to recover to its current state within one year of disturbance. Construction activities within the road ROW will cause a temporary disturbance to wildlife, primarily from machinery noise and the presence of people and equipment.

Although the ROWs are previously disturbed and regularly maintained areas, some wildlife species likely make use of these areas. Notably, wetland habitat occurs immediately adjacent to and within the ROW adjacent to stream crossing PVWC-6 along PR 403 for approximately 500 m, and adjacent to stream crossing PVWC-11 along PTH 59 for approximately 600 m. Construction of the pipeline in early summer has the potential to disturb some wildlife species, including nesting migratory birds. However, construction later in the summer and into fall will occur outside the breeding period for most wildlife species that may make use of the ROW, and therefore have a lesser impact. These impacts will be short-term in duration and restricted to the site and therefore are not expected to impact regional wildlife populations.

The section of new ROW required north of the Town of Sandilands occurs within a forested landscape. This forested area is currently highly fragmented due to numerous recreational trails and forestry roads. During the summer of 2005, parts of the Sandilands Provincial Forest (including part of the new ROW) experienced blow down from a wind storm. Forest within the blow down areas will be salvaged and therefore clearing of parts of the new ROW may not be required. However, as the new ROW will be maintained free of trees, the impacts on wildlife within the new ROW north of Sandilands will present a long-term loss of forest habitat, and a short-term disturbance during construction and maintenance. The development of the new ROW will result in an incremental addition to current level of forest fragmentation. Forest clearing may improve habitat for some species such as moose, snowshoe hare and ruffed grouse, but present a negative effect to species that require large contiguous tracts of habitat or small species whose home range is entirely superimposed by the ROW. Considering the small size of the clearing and the proximity to highly disturbed areas, regional wildlife populations are unlikely to be affected.

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Potential impacts to wildlife from the operation of the pipeline are restricted to routine maintenance of the ROW, and potential repair of the pipeline. As the pipeline follows existing Provincial Road and Trunk Highway ROWs for the vast majority of the route, maintenance is conducted by Manitoba Transportation and Government Services. Maintenance of the new section of ROW, near the Town of Sandilands, will present a short-term disturbance due to the mechanical control of vegetation. This disturbance will be similar to that of standard road side ditch mowing, and is not considered to be a significant negative impact to wildlife.

### **3.2 IMPACTS ON FISHERIES**

Watercourse crossings on the pipeline route were assessed for fish habitat value (according to DFO criteria) and sensitivity to disturbance (Mazur et al. 2005). None of the crossings was considered “critical” according to the DFO criteria and, consequently, it was unnecessary to relocate any crossings. Important fish habitat was identified at five crossings, including the Red, Marsh and Rat rivers, Joubert Creek and an unnamed creek; marginal fish habitat was identified at nine crossings, and no fish habitat was assessed at the remaining two crossings. The majority of the crossing sites (14) were assessed to be of low sensitivity to disturbance and the remaining two sites were considered moderately sensitive to disturbance. Further details are available in the Environmental Setting Report (Mazur et al. 2005).

The greatest potential impacts relate to instream construction, where the stream banks and streambed would be disturbed. However, all streams will be crossed using “trenchless” construction techniques that reduce the potential effects to the aquatic environment. Trenchless stream crossing, such as horizontal directional drilling, can potentially result in the following disturbances/disruptions to the fish community and fish habitat:

- Introduction of sediments into watercourses as a result of mechanical disturbance to stream banks and resulting erosion;
- Introduction of drilling wastes and cuttings into the river as a result of inappropriate disposal sites; and
- Introduction of drilling fluids and cuttings into watercourses as a result of a hydro-geological fracture (frac-out).

Such disturbances to fish bearing water courses may result in negative impacts to fish and fish habitat; in particular if these types of disturbances occur during critical spawning periods. Some water courses along the pipeline route support spring and summer and spawning fish species, but not fall spawning species. Therefore critical timing windows, as defined by Fisheries and Oceans Canada (DFO), are April 1 – June 15 for spring spawning species and May 1 – June 30 for summer spawning species.

Fisheries and Oceans Canada has issued an Operational Statement (OS) for stream crossings in Manitoba where High-Pressure Directional Drilling (HPDD) is employed. Conditions outlined in this OS will be adhered to at all stream crossings and, therefore, no impacts to fish or fish habitat are expected.

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Construction equipment lubricants and fuels may be introduced into the environment during construction of the Project. The likelihood of a major spill is low and mitigation measures will be in place to limit the extent of a spill and facilitate clean up.

### **3.3 IMPACTS ON SURFACE WATER AND GROUND WATER**

#### **3.3.1 Ground Water Quality**

There will be no changes to groundwater quality within the Project area. Therefore, there are no predicted impacts to groundwater quality as a result of the Project activities.

#### **3.3.2 Surface Water Quality**

Surface water collected in the road and highway ditches will be of the same quality as previously collected within the Project area. Therefore, there are no predicted impacts to surface water quality as a result of the Project activities.

### **3.4 IMPACTS ON FORESTRY AND VEGETATION**

Impacts on vegetation will be minimal along the Pipeline route, as the route is along a highly managed environment due to the existing land use designation and normal periodic ROW maintenance programs. Construction of the pipeline will result in a temporary disturbance to ground cover within the ROW, with disturbed vegetation expected to recover to its current state within one year of disturbance.

The section of new ROW required north of the Town of Sandilands occurs within a forested area that is highly fragmented due to numerous trail and road developments. Impacts to vegetation along this short section of new ROW include the alteration of forest successional stage, and damage of understory species. Maintenance (regular clearing or mowing) will perpetuate these impacts. The development of the new ROW will result in the long-term loss of approximately 1.5 ha of existing forest (much of which has been impacted this year). Considering the small size of the area to be cleared, the impacts are viewed as insignificant in a regional perspective, but will add to the existing level of forest fragmentation in the area.

### **3.5 IMPACTS ON SPECIES AT RISK**

There are no known occurrences of species listed as Threatened or Endangered under either the Manitoba *Endangered Species Act* (MESA), or the federal *Species at Risk Act* (SARA) along the pipeline route (Mazur et al. 2005). The likelihood of species listed as Threatened or Endangered occurring within the road ROW is considered low and, therefore, there are no expected impacts to species considered Threatened or Endangered. Although currently not listed under SARA, lake sturgeon has been recommended for listing under SARA as Endangered and is known to occur in the Red River. Potential impacts to this species will be offset by the use of HDD for the Red River crossing.

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In addition to Threatened or Endangered Species, seven species considered to be of Special Concern under SARA are known to occur, or potentially occur, along the proposed pipeline route. Potential impacts to the two fish species, silver chub and bigmouth buffalo will be offset through the use of HDD as the stream crossing method.

Although the ROWs are previously disturbed and regularly maintained areas, the remaining five Special Concern species, monarch butterfly, northern leopard frog, short-eared owl, yellow rail and red-headed woodpecker may make use of portions of the proposed route. The timing of construction, early summer through to fall, avoids the majority of the breeding period for these species, and therefore impacts to these species' habitats would present a temporary disturbance and the areas are expected to return to their current state within one year of disturbance. Furthermore, the use of HDD at stream crossings will avoid major wetland habitats along the proposed pipeline route.

### **3.6 IMPACTS ON HERITAGE RESOURCES**

C. Gordon Hill, Impact Assessment Archaeologist, at the Manitoba Heritage Resources Branch, informed Cochrane Engineering that this project shall be reviewed during the Environment Act licence application process, and project location details are provided.

### **3.7 SOCIO-ECONOMIC IMPACTS**

#### **3.7.1 Population Demography**

No changes to population demography were identified within the Project area. Therefore, there are no predicted impacts to population demography as a result of the Project activities.

#### **3.7.2 Economic**

There will be a temporary increase in economic opportunities for the Project area residents during Project construction activities. Therefore, there will be a short-term positive impact to the socio-economic environment within the area as a result of the Project activities.

#### **3.7.3 Land Use**

A potential environmental effect of the project on landuse is the periodic delays and inconvenience to individuals utilising the area during construction. The effects will be mitigated by the incorporation of site access for vehicles, which will be coordinated with local traffic patterns to minimise delays in vehicle movement. No other impacts on landuse were identified within the Project area.

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## 4.0 PROPOSED ENVIRONMENTAL MITIGATION/MANAGEMENT PRACTICES

The impact assessment of the Project focused on an evaluation of the factors that may affect existing environmental conditions within the Project area, and includes mitigation measures to prevent or minimise potential effects. Implementing responsible construction and operation practices can mitigate most potential environmental impacts. The impact assessment is based on Cochrane Engineering's understanding of the Project at this time; predicted issues and associated effects may change as construction plans are finalised.

### 4.1 WILDLIFE AND HABITAT

To minimize the impacts to wildlife and wildlife habitat, an adequate buffer zone will be maintained around dens and nests (30 m minimum, up to 100 m). The federal *Migratory Birds Convention Act* prohibits the destruction of active bird nests, eggs or young. Therefore clearing of the new ROW required north of Sandilands will not occur from April 1 – July 31 to avoid the destruction of active bird nests. Environmental protection measures incorporated at stream crossings, such as set back disturbance beyond the high water mark and construction timing, will avoid potential impacts to wildlife associated with riparian areas.

### 4.2 FISHERIES

All legislation and regulations will be adhered to including the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Fisheries & Oceans Canada and Manitoba Natural Resources, 1996). Of particular importance are sections 35 and 36 of the *Fisheries Act* which prohibit the harmful alteration, disruption, or destruction of fish habitat and the deposit of any substance deleterious to fish habitat, respectively. All streams will be crossed using horizontal directional drilling, and will meet the conditions outlined in the Fisheries and Oceans Canada Manitoba Operational Statement for High-Pressure Directional Drilling.

Mitigative measures to reduce potential impacts at stream crossings will include but are not limited to the following:

- Where the right-of-way intersects a waterbody, an erosion control/buffer zone will clearly be marked, within which only trees that endanger construction workers will be removed. The erosion control/buffer zone will have a width of at least 10 m plus 1.5 times the slope gradient, where the slope gradient is 5% or greater;
- Right-of-way clearing will be conducted by hand within all erosion control/buffer zones;
- Use of appropriate measures to control erosion on all slopes that require clearing;
- Existing vehicle crossing sites will be used wherever possible;
- All cut slash will be kept out of streams and where appropriate removed from the buffer zone;
- Staging and work areas will be clearly marked to ensure all work activities are restricted to designated areas;
- Slopes and crossings along the Project route will be monitored during construction and maintenance to ensure prompt identification of problem areas;
- Where banks have been destabilized measures will be taken immediately to control and minimize erosion;

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- Any pump intakes will be screened according to the Fisheries and Oceans Canada, Freshwater Intake End-of-pipe Fish Screen Guideline (1995); and
  - Construction will take place in summer and fall, outside of critical spring and summer spawning periods for fish species found in streams along the pipeline route.

The proposed pipeline route primarily occurs within roadside ditches, and these ditches drain into various water courses. Depending on the time of year and water levels, receiving water courses may back flood into roadside ditches. HDD entry and exit holes will be set back far enough from the water course being crossed to avoid any back flooded areas, and sediment control (i.e., silt fences) will be in place to ensure sediment and drilling mud from entry and exit holes does not enter the water course. Stream crossings with notable back flooding include Joubert Creek (PVWC-3), Rat River (PVWC-12), and Marsh River (PVWC-15) and special attention will be paid to the setback distance at these sites (Reference Appendix 'C' for crossing locations). In addition, two small creeks along the proposed pipeline route are situated within broad wetlands that occur within the ROW. The unnamed creek at stream crossing PVWC-6 lies within a willow and sedge wetland that extends along PR 403 for approximately 500 m and the unnamed creek at stream crossing PVWC-11 is situated within a broad cattail wetland that extends along PTH 59 for approximately 600 m. Construction under dry or frozen conditions would reduce rutting and sedimentation of the wetlands and potentially the streams. If construction is to take place when wetlands contain water, HDD entry and exit holes will be set back beyond the wetlands to avoid rutting of soil and the introduction of sediments to the wetlands and the streams.

Fuel, lubricants, and other potentially hazardous materials will be sorted and handled within dedicated areas at work camps and marshalling yards in full compliance with regulatory requirements. Temporary fuel storage at remote sites will be located a minimum of 100 m from a water body or waterway. A Spill Response procedure will be in place and will be initiated in the event of a major spill.

#### **4.3 SPECIES AT RISK**

Potential impacts to species at risk have been, or will be reduced or eliminated through the selection of the route (primarily existing ROWs), the timing of construction (occurring outside the major breeding period of animal species), and through the use of trenchless construction at stream crossings and adherence to the DFO OS for High-Pressure Directional Drilling. Environmental protection measures incorporated at stream crossings, such as set back disturbance beyond the high water mark and construction timing, will avoid potential impacts to aquatic and semi-aquatic species at risk.

#### **4.4 CLIMATE**

There are no predicted impacts to climate as a result of the Project activities.

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## **4.5 AIR QUALITY**

During the construction phase of the project there will be several sources of air emissions, including:

- earthworks;
- exhaust from stationary and mobile construction vehicles, and;
- dust from exposed surfaces.

These emissions add to the contributions from the local sources and cause a temporary, localised effect on the air quality. The mobile and stationary construction equipment should be required to meet appropriate Federal emission standards. Dust controls should be in place to reduce dust emissions from construction activities, such as earthworks and from areas where soils are exposed and susceptible to erosion/transport by the wind. Mitigation measures such as minimising exposed areas and removal of soil from vehicle tires as they leave the site should be implemented during construction. Once construction is completed, the Project is not expected to result in any changes from existing air quality conditions.

## **4.6 NOISE**

During the construction phase of the Project, there will be several sources of sound emissions including equipment used for construction. The types of noises heard due to construction are dominated by equipment engines; however, miscellaneous short-term impact noises (e.g. dump truck gates, backhoe bucket impacts, etc.) are often heard. Construction noise is expected to be audible at nearby residences. The activity with greatest impact on noise levels will be equipment operations, including engine and impact noises. The noise received at sensitive locations will be in addition to regular community and highway activities.

Scheduling of various site activities can minimise the impact of noise on neighbouring properties. For example, construction activities should be planned during day-time hours to avoid sleep disturbances and the disruption of evening domestic activities. All equipment used on site should be fitted with appropriate mufflers and be well maintained in order to minimise noise levels off the site. Once construction is completed, the Project is not expected to result in any changes from existing sound levels, since there will be no changes in roadway orientation or traffic patterns. Noise effects due to construction would be temporary and short-term.

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## **5.0 SCHEDULE**

Construction of the pipeline supply system will occur in the summer of 2006, pending receipt of the necessary regulatory approvals. Operation of the system will begin immediately following construction and will continue indefinitely. At this time, there are no plans to abandon or decommission the system at any point in the future.

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## **6.0 FUNDING**

The construction and operation of this supply pipeline will be privately funded by the Pembina Valley Water Cooperative Inc, a non-profit corporation owned by the cities, towns and rural municipalities within the Pembina Valley area. The funding for this project has been secured, pending receipt of the necessary regulatory approvals.

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## 7.0 REFERENCES

Wiecek, S.J, 2005. Supplemental Groundwater Supply System Evaluation. A Report prepared for the Pembina Valley Water Cooperative Inc .by UMA Engineering Ltd., March 2005.

O'Driscoll, J.P. and W.H. Brant, 2005. Supplemental Groundwater Supply System Preliminary Report on Pipelines and Facilities. A report prepared for the Pembina Valley Water Cooperative Inc. by Cochrane Engineering Ltd., March 2005.

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Mazur, K., J. Krindle, D. Hudd, and A. Heese. 2005. Pembina Valley Water Cooperative Inc. Supplemental Groundwater Supply Project: Environmental Setting Report. A report prepared for UMA Engineering Ltd. by North/South Consultants Inc. and Calyx Consulting, November 2005.

Fisheries & Oceans Canada and Manitoba Natural Resources. 1996. Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat. 49 pp + appendices.

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## 8.0 CLOSURE

This report has been prepared by Cochrane Engineering Ltd. (CEL) for the benefit of the client to whom it is addressed. The findings and recommendations provided in this report were prepared in accordance with generally accepted professional engineering principles and practices. The information and data contained herein represent CEL's best professional judgement in light of the knowledge and information available to CEL at the time of preparation. Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by client, its officers and employees. Cochrane denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this report or any of its contents without the express written consent of Cochrane Engineering Ltd. (CEL) and the client.

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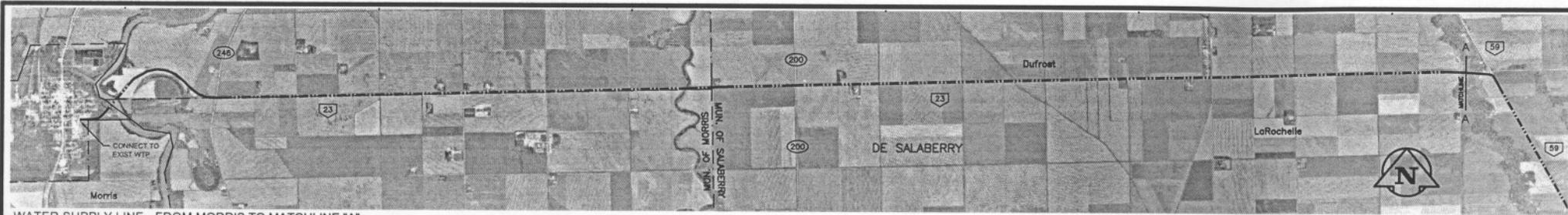
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Manager, Water Technology Group

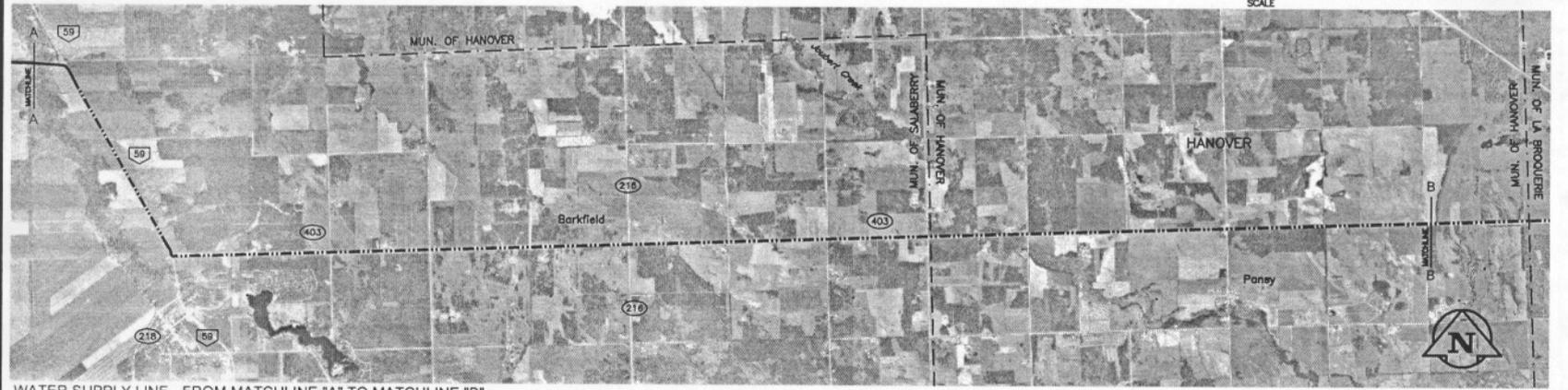
**APPENDIX A**

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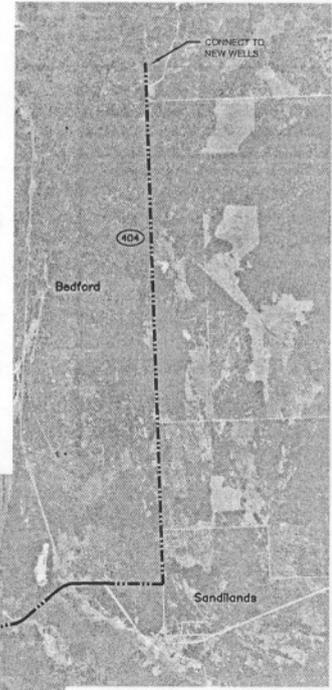
**Sandilands Water Supply Pipeline General Layout**



WATER SUPPLY LINE - FROM MORRIS TO MATCHLINE "A"



WATER SUPPLY LINE - FROM MATCHLINE "A" TO MATCHLINE "B"



WATER SUPPLY LINE - FROM MATCHLINE "B" TO SANDILANDS

<b>COCHRANE ENGINEERING LTD.</b> <small>8809 - 9 DONALD STREET          WINNIPEG, MANITOBA, R3L 2T4          TEL: (204) 477-8800          FAX: (204) 474-2884</small>			
<b>COCHRANE</b> <small>ENGINEERING</small>			
ENGINEERS • PLANNERS • SCIENTISTS • PROJECT MANAGERS WINNIPEG, CALGARY, REGINA, SASKATOON, WINNIPEG, BURLINGTON, TORONTO			
<b>PEMBINA VALLEY WATER COOPERATIVE - SANDILANDS SUPPLY PIPELINE E. A. P.</b> MANITOBA			
<b>CIVIL</b>			
<b>WATER SUPPLY PIPELINE GENERAL LAYOUT</b>			
DESIGNED	M.P.N.	APPROVED	J.P.O.
DRAWN	R.M.N.	SCALE	1:40000
CHECKED	J.P.O.	DATE	05/10/27
PROJECT NO.	WE05124	DRAWING NO.	C00
		REV	0

**APPENDIX B**

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**PVWC Water Conservation Brochure**

# What You Can Do

## *In the bathroom...*

- Never use your toilet as a wastebasket.
- Don't let the water run while shaving or brushing your teeth.
- Take short showers instead of tub baths.
- Turn off the water flow while soaping or shampooing.
- Before pouring water down the drain, consider other uses for it, such as watering a plant or garden.

## *In the kitchen...*

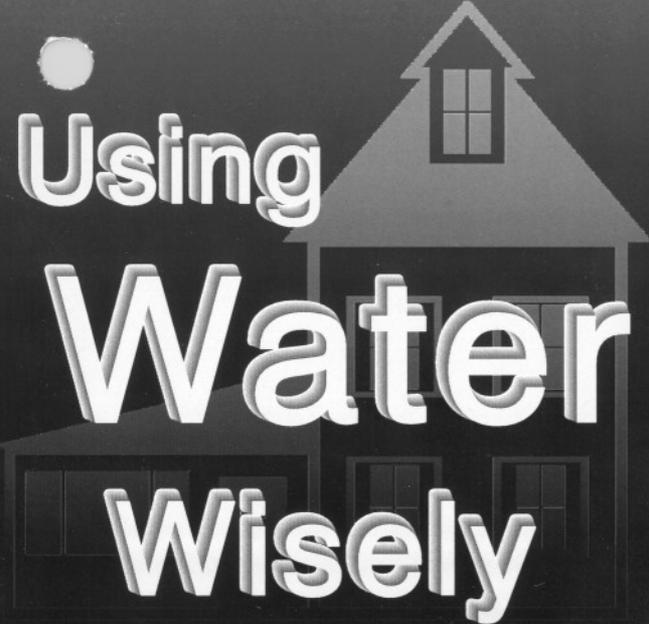
- Keep drinking water in the refrigerator instead of letting the faucet run until the water is cool.
- Wash fruits and vegetables in a basin.
- Use a vegetable brush to clean produce.
- Do not use water to defrost frozen foods; thaw them in the refrigerator overnight.
- Use a dishpan for washing and rinsing dishes.
- Add food wastes to your compost pile instead of using the garbage disposal and running water.
- Operate the dishwasher only when completely full.

## *In the laundry...*

- Use the appropriate water level or load size selection on the washing machine.
- Wash full loads whenever possible.

## *Outdoors...*

- Sweep driveways, sidewalks, and steps rather than hosing them off.
- Wash the car from a bucket, or consider using a commercial car wash that recycles water.
- When using a hose, control the flow with an automatic shutoff nozzle.
- Avoid purchasing water toys that require a constant stream of water.
- If you have one, lower the water level in your pool to reduce the amount of water splashed out.
- Use a pool cover to reduce evaporation when the pool is not in use.



Using  
Water  
Wisely



PEMBINA VALLEY  
WATER COOPERATIVE INC.

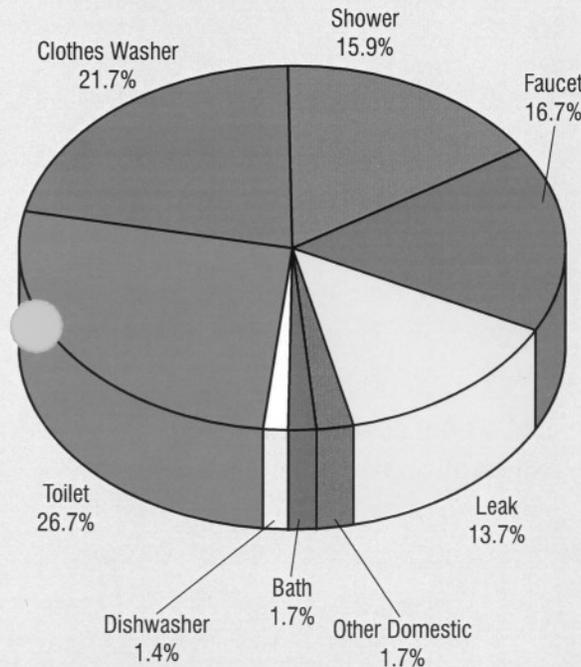
## Here are some facts, tips and suggestions to help you use your water wisely and to save both water and money.

### Did you know?

- A leak of one drop per second wastes 10,000 litres of water per year.
- Fixing a toilet that silently leaks can save you up to 500 gallons of water per day.
- Installing high efficiency plumbing fixtures and appliances can help a typical family of four reduce indoor water use by one-third.
- A new Ultra Low Flow toilet uses six litres per flush while the older flush toilets use 18 litres.
- A partially filled tub uses less water than a long shower; a short shower uses less than a full tub.
- Replace your 20 litre per minute shower head with a low flow nine and a half litre per minute shower head and you will use less than half the water.
- Heating water accounts for 19 per cent of home energy use.
- Homes and farms that institute broad water efficiency programs have been able to reduce overall water use by up to 20 per cent, not only conserving water supplies and reducing water pollution but also cutting costs for new water treatment facilities.

### How much water do we use?

Some water use varies considerably depending on household size, water use practices, the type of plumbing fixtures and appliances and other factors. The two largest water users are toilets and clothes washers. Note that nearly 14 per cent of the water the typical homeowner pays for is never used. It leaks down the drain, wasting a precious resource and adding stress to your sewage system.



## Top Five Ways to Save

**S**top leaks. Check all water using appliances, equipment and other devices for leaks.

**T**oilets are the biggest user of water in your home. Reduce unnecessary flushes and replace the toilet with an ultra low flow toilet when possible.

**W**ashers are the second largest water user in your home. If your clothes washer is getting older you should consider purchasing a model that provides you with both energy savings and reduces your water usage by 35 to 50 per cent.

**C**hange the shower heads. It is a simple and inexpensive measure that can generate real savings.

**H**elp your water supply system manage morning and supper hour peak demands every day, but especially in the spring and summer months — avoid increases in the cost of your water.

**APPENDIX C**

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**Sandilands Water Supply Pipeline Crossings**

# PVWC Proposed Pipeline Stream Crossings



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