PRAIRIE VIEW MUNICIPALITY

BIRTLE WATER SUPPLY AND WASTEWATER SYSTEM UPGRADES

Presented by

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March 13, 2017

The Manitoba Water Services Board

Manitoba Water Services Board

- Crown Corporation – 1959
- The Manitoba Water Services Board Act – 1972
- Governed by Board of 5 Directors
  1. Deputy Minister Indigenous & Municipal Relations (Chairperson)
  2. Deputy Minister of Sustainable Development
  3. Deputy Minister of Infrastructure
  4. Vice President of AMM
  5. Executive Director of AMM
- Brandon office - staff of 30 people
- Service entire Province
  - Excluding Winnipeg and Federal owned lands

Manitoba Water Services Board

- Project Management Services
  - Feasibility Studies
  - Design & Tendering
  - Construction
- Engineering Services
  - MWSB and Consultants
- Operations
  - 6 Water Co-ops
  - 5 Individual WTPs
  - Maintenance Staff

Manitoba Water Services Board

- Mandate
  - Assist municipalities with the development of sustainable water & wastewater works
- Financial Assistance
  - Tier 1 - Health or Environmental problems - 50% grant
    Economic Benefits - 50% grant
  - Tier 2 - Local Improvement in nature - 30% grant
  - Rural Water Development Program – 33.3% (1/3) grant
- Budget = $16.8M ⟹ $35M worth of construction

Other Funding Programs

- New Building Canada Fund Programs
  - 33.3% Federal
  - 33.3% Provincial
  - 33.3% Local
- Clean Water & Wastewater Fund Program
  - 50% Federal
  - 25% Provincial
  - 25% Local

Manitoba Water Services Board

- MWSB 2015-2016 Fiscal Statistics

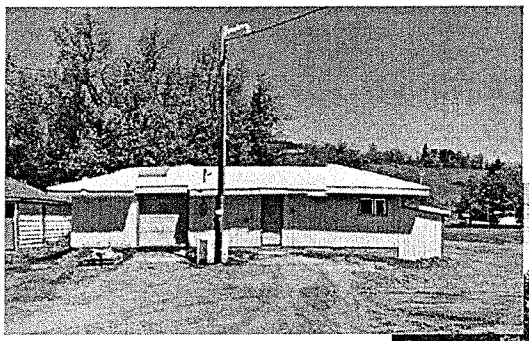
  Initiated or completed $155.6M worth of projects

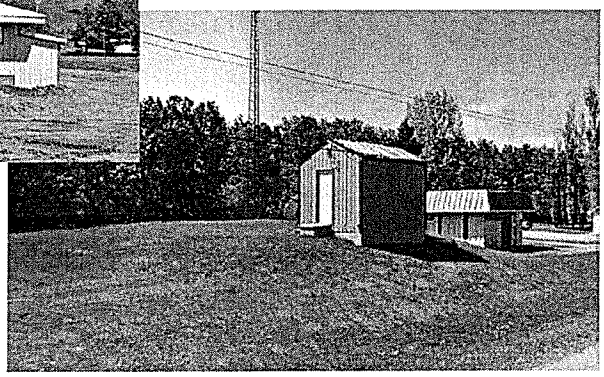
23 substantially completed municipal projects	$37.5M
57 initiated new municipal projects	$96.1M
16 initiated/completed Provincial Parks projects	$19.1M
2 initiated Indigenous Relations projects	$2.9M
	$155.6M

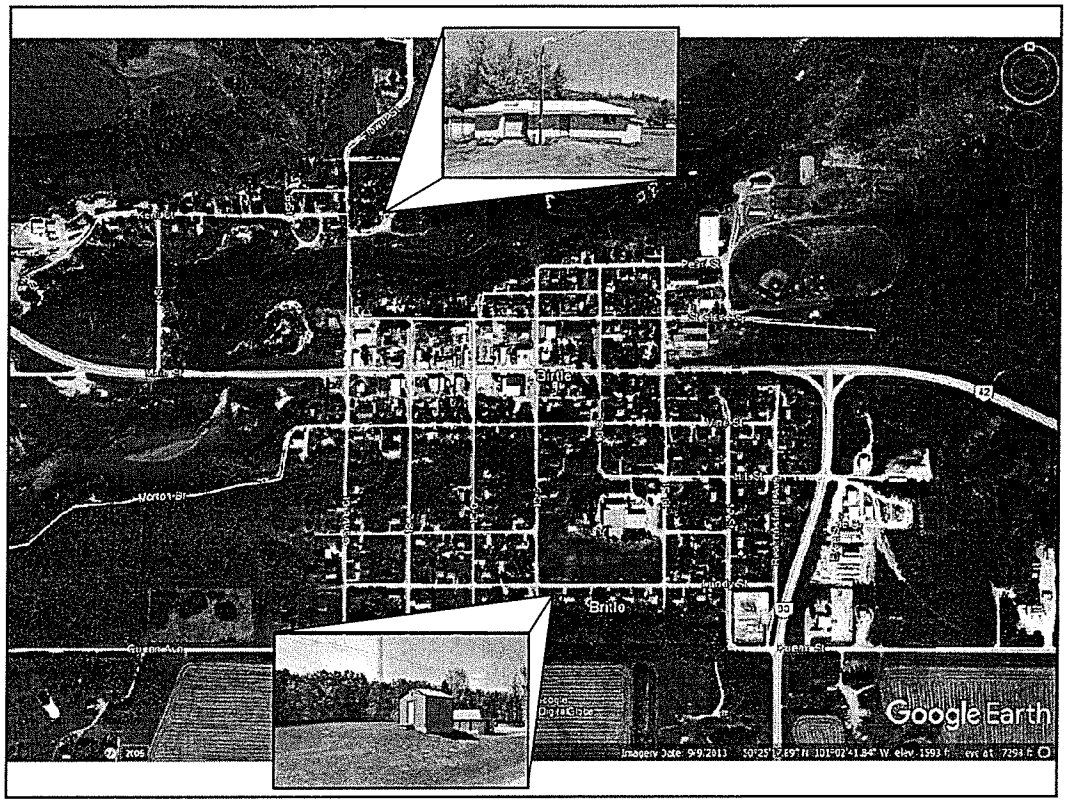
Local Capital Projects (2016-2017)

- Municipality of Russell-Binscarth
  - New Russell Water Treatment Plant
    - Membrane treatment to soften supply
  - Pipelines to communities of Rossburn and Binscarth.
    - $13M budget CWWF project
    - All works tendered and under budget by $1.0M
- Rural Municipality of Yellowhead
  - New Groundwater Wells
  - New Water Treatment Plant c/w membranes for softening
    - $4M budget CWWF project
    - Tender closed March 3rd.

Birtle's Drinking Water Supply System







Birtle's Water Infrastructure

- Treatment System
  - Single well constructed in 1986 (original well abandoned)
  - Treatment consists of oxidation, filtration and chlorine disinfection
  - Both raw and treated water quality are very poor
  - Aesthetic and health water quality issues
  - Not in compliance – no primary disinfection
  - Water treatment building constructed in 1959 with an 1986 addition. Condition is considered fair to poor.
  - Treatment system is showing corrosion due to poor ventilation and inadequate floor drainage

Birtle's Water Infrastructure

- Water Quality Issues (2013 & 2017 Results)

Parameter	Raw (mg/L)	Treated (mg/L)	Limit (mg/L)
Hardness	**865 – 925**	**893**	< 200
Ammonia	**2.47 – 2.55**	**2.40**	-
Arsenic	**0.026 – 0.024**	0.00094 – 0.00126	0.010 (ALARA)
Iron	**4.23 – 3.91**	0.018 – 0.159	≤ 0.3
Manganese	**0.475 – 0.493**	0.0139 – **0.145**	≤ 0.05
Sodium	**436 – 465**	**446 – 468**	≤ 200
Sulphate	**1200 – 1260**	**1220 – 1220**	≤ 500
TDS	**2450 – 2450**	**2460 – 2570**	≤ 500

Birtle's Water Infrastructure

- Water Distribution System
  - Distribution piping is a combination of original Cast Iron pipe constructed in 1960 and PVC pipe constructed in the 1980s
  - Old and newer service connection pipe is copper
  - Water use is high at approx 500 L/c/d (Litres/capita/day)
  - Residential meters account for only 45% of the water or 225 L/c/d
  - Over half of the water is unaccounted for
  - Loss is suspected from breaks, leaks, and abandoned water services
  - Significant elevation changes creates difficulty regulating flow and pressure throughout the Town
  - Recommend utilizing leak detection services

Birtle's Water Infrastructure

- Reservoir Storage
  - Consists of a single chamber underground concrete reservoir
  - Located south side of Lundy Street
  - Constructed in 1983 with a capacity of 454,600 litres
  - Meets minimum storage requirements

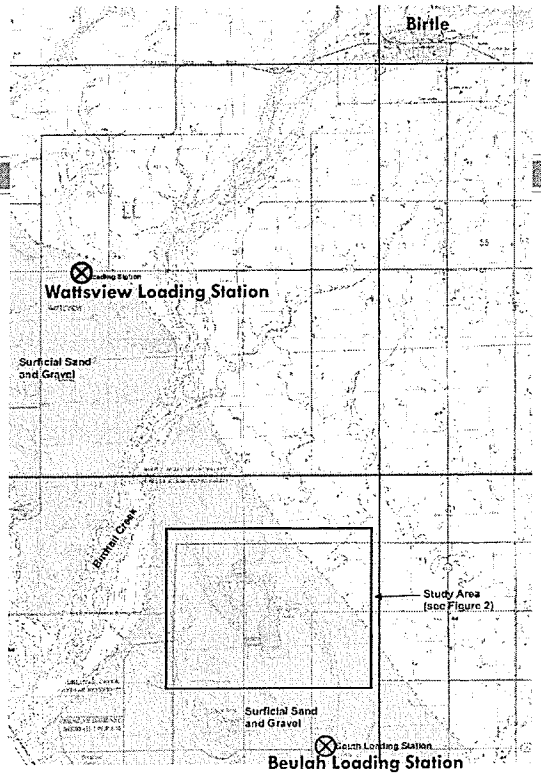
Groundwater Investigations

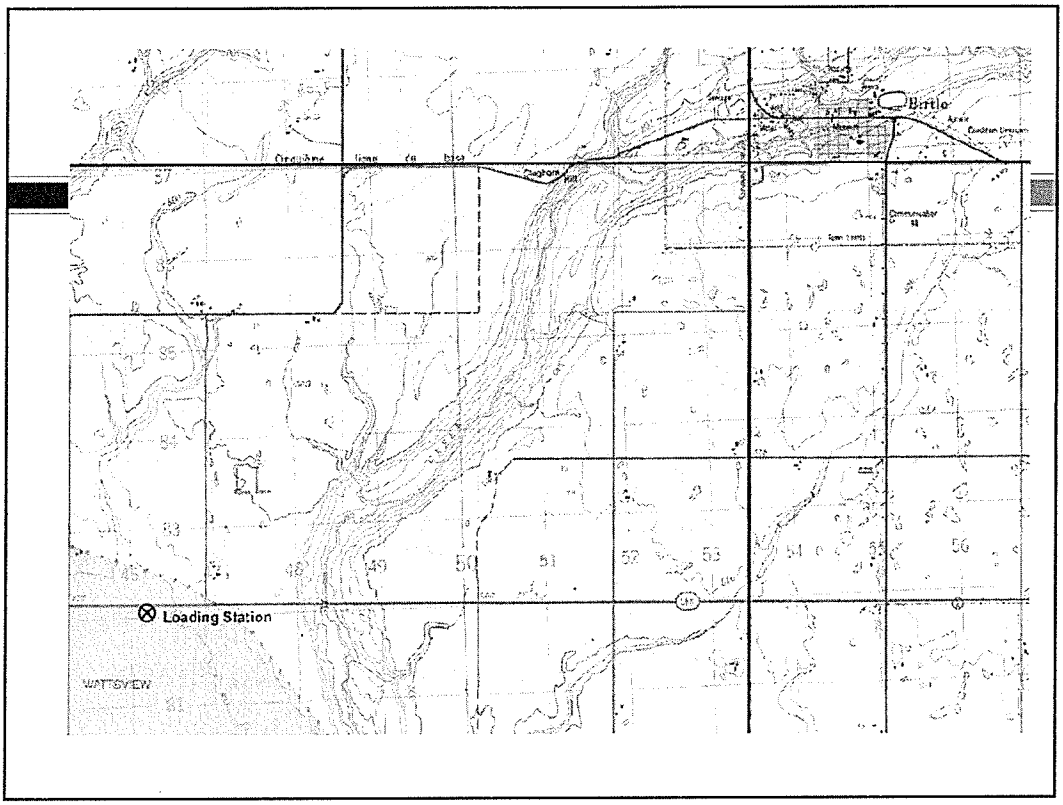
- MWSB entered into an agreement with the Municipality to undertake a water supply feasibility study.
- Retained services of a hydrogeologist to conduct groundwater investigations for a new water supply
- Part 1 consisted of desk-top hydrogeological assessment of potential to develop alternative groundwater sources
  - Identified potential sand and gravel aquifers at the community loading stations south and southwest of Town with good capacity and water quality.
  - Within Town or closer sites were identified as a priority due to the cost of piping water 14 to 19 km from the loading station aquifers.

Groundwater Investigations

- Part 2 consisted of groundwater exploration and water quality sampling focussing on the following areas:
  - Within Town limits - similar water quality to existing supply
  - Existing reservoir area – drilling showed no potential
  - Birtle West Area – previous drilling golf course/lagoon area shows good potential with moderately good water quality but contamination concerns due to lagoon proximity. Would require extensive investigation.
  - Birtle East Area – test drilling with conventional auger methods was unsuccessful due to presence of cobbles and boulders. Very expensive dual rotary mud drilling required to investigate further.
  - Hoopers Lake Area south of Birtle – Drilling activity indicated supply is limited & water quality poor

Loading Stations





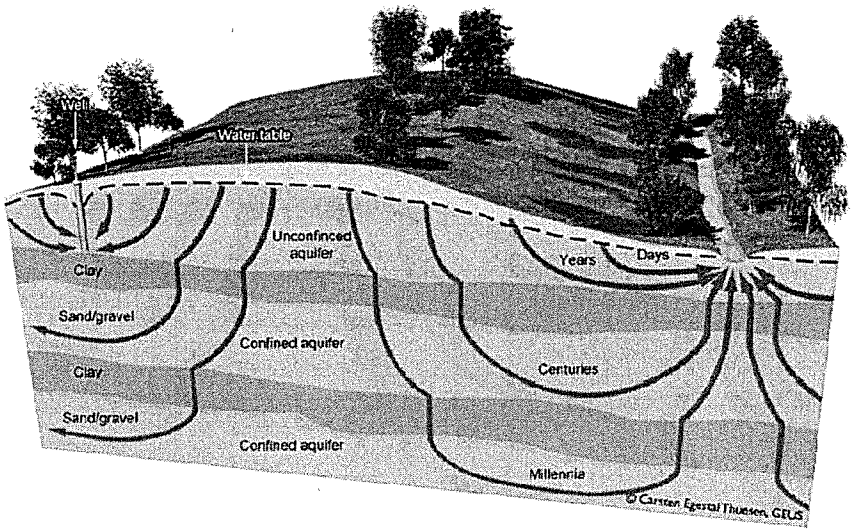
Loading Station Water Quality

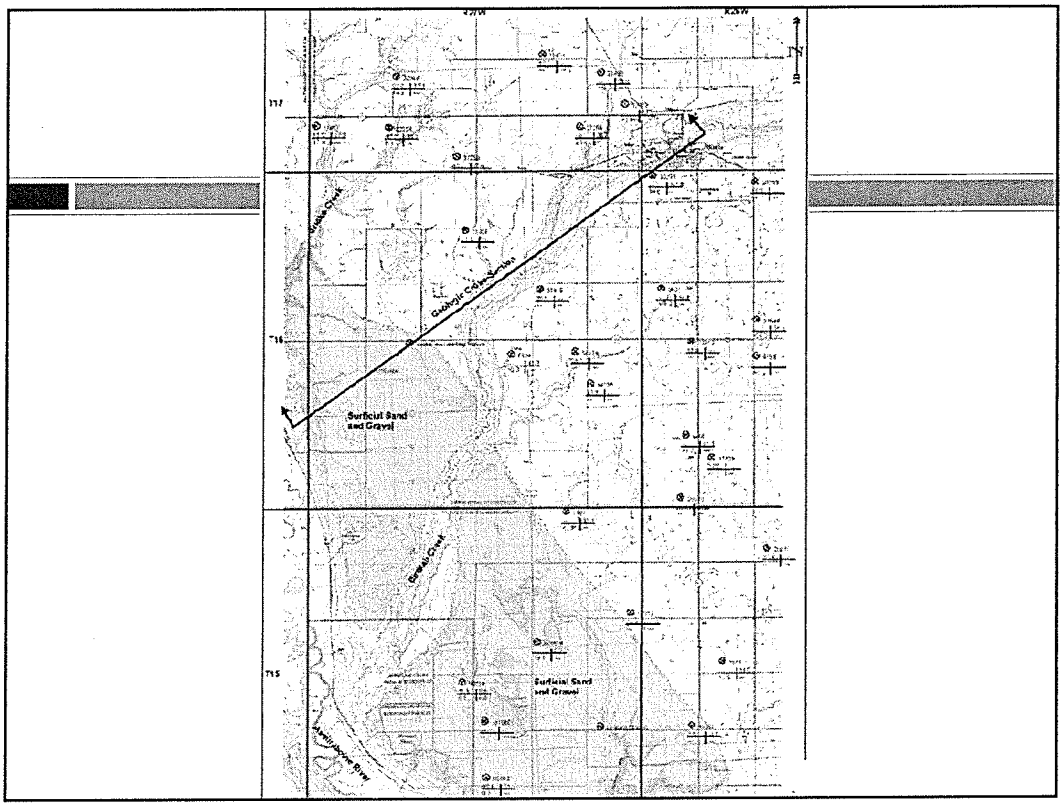
Parameter	Existing Birtle Raw (mg/L)	Wattsview Loading Stn (mg/L)	Beulah Loading Stn (mg/L)	GCDWQ Limit (mg/L)
Hardness	**865**	**325**	**310**	< 200
Ammonia	**2.47**	0.068	0.02	-
Arsenic	**0.026**	0.00154	0.00252	0.010
Iron	**4.23**	**0.669**	0.066	≤ 0.3
Manganese	**0.475**	**0.414**	**0.218**	≤ 0.05
Sodium	**436**	2.57	8.62	≤ 200
Sulphate	**1200**	63.5	26.7	≤ 500
TDS	**2450**	376	354	≤ 500

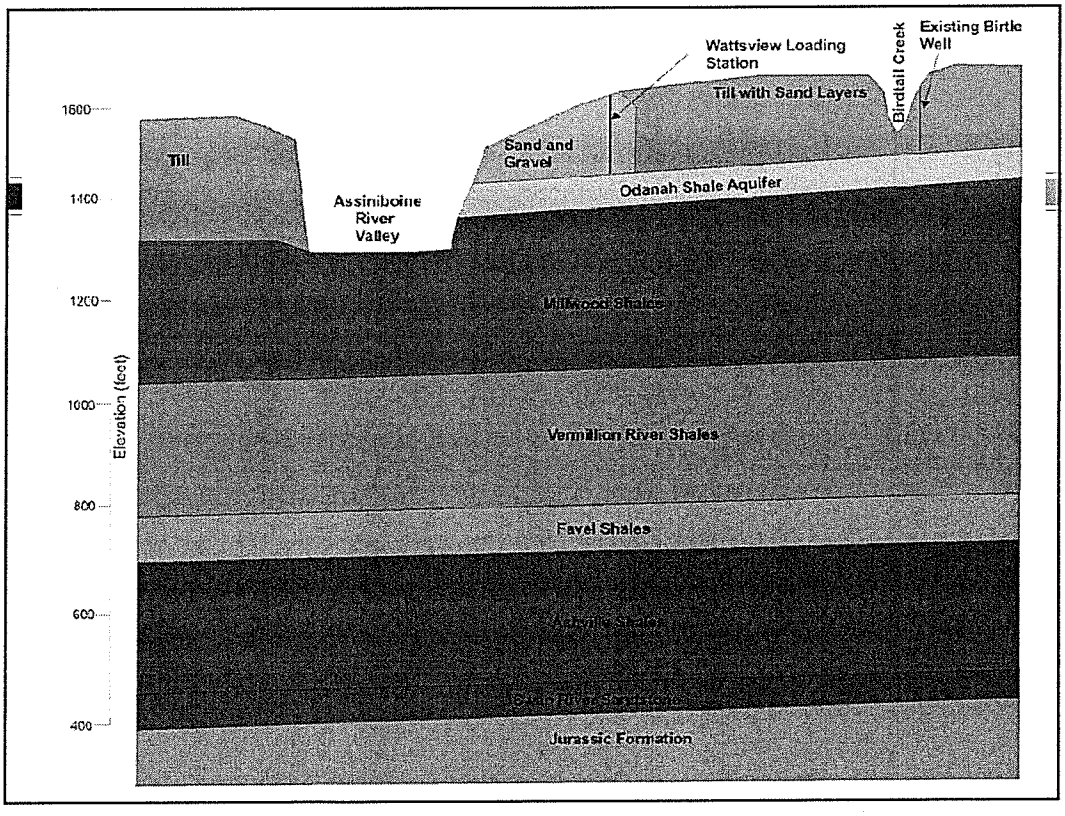
Next Steps

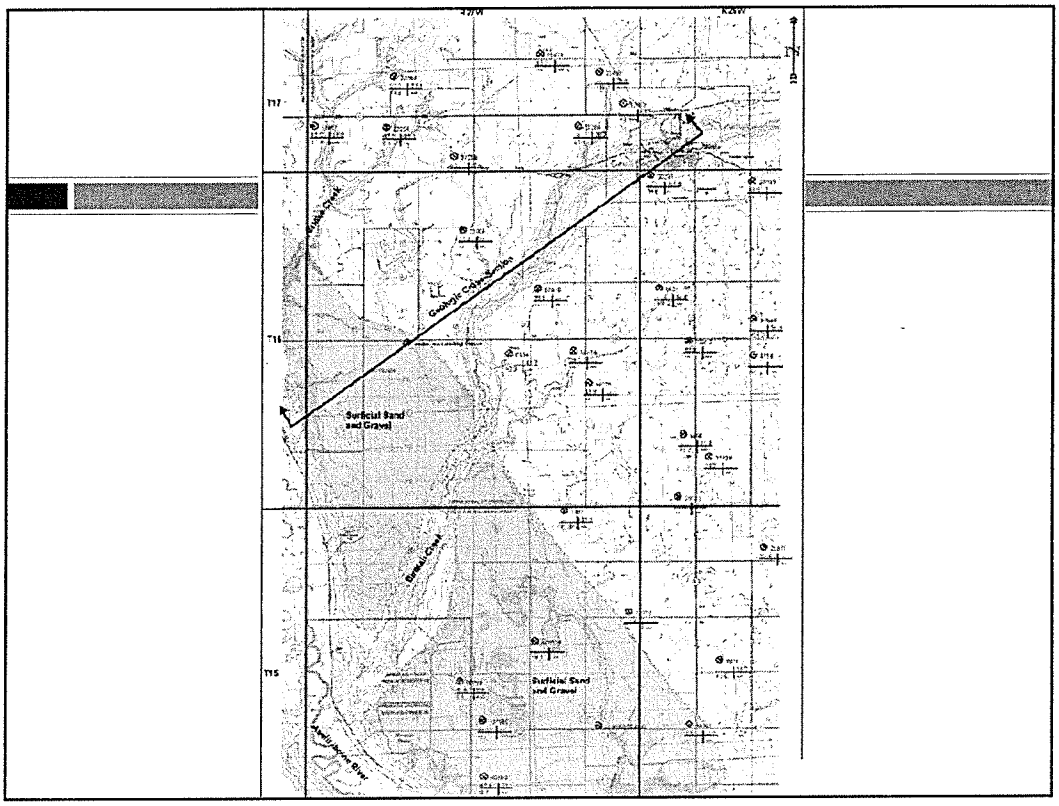
- Government and Local Funding
- Wattsview Loading Station Aquifer Investigation
  - Test Drilling and Test Well Installation
  - Pumping Capacity Testing
  - Installation of Two Production Wells
- Pipeline and Well Mechanization Designs
- Water Treatment Plant Designs and Upgrades
- Tender and Construction in Two Phases

Groundwater Investigation



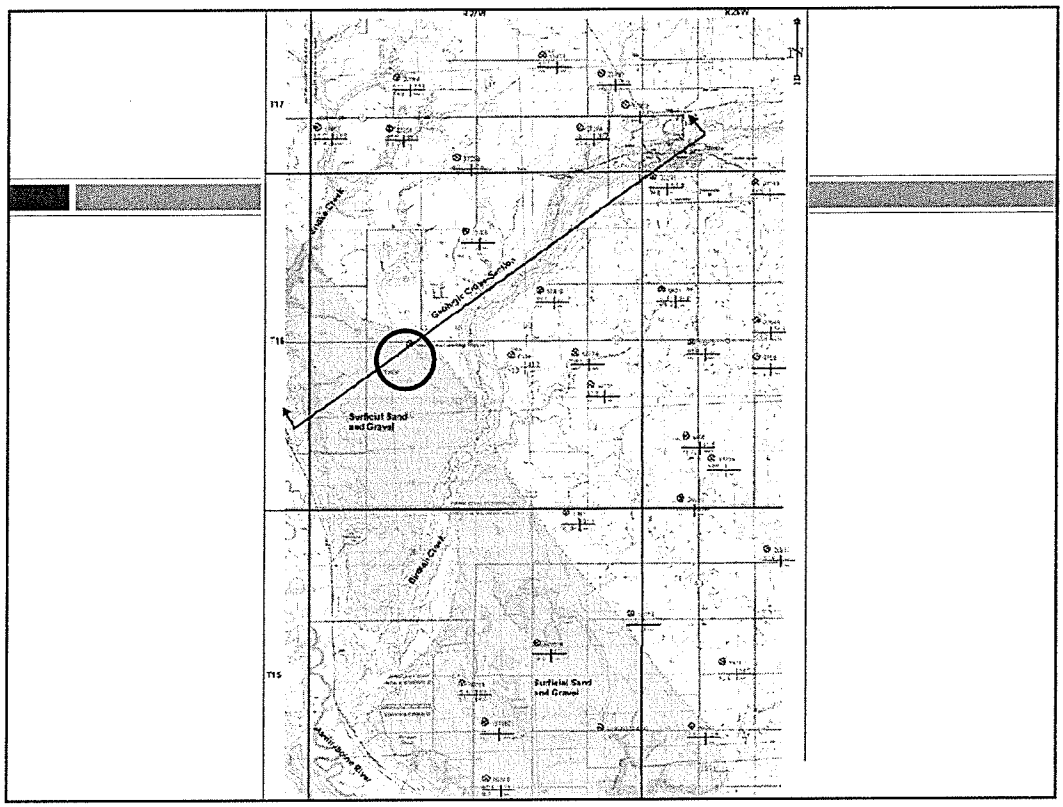

Surficial Sand and Gravel
Surficial Sand and Gravel


Wattsview Loading Station
Birdtail Creek
Existing Birtle Well
Till with Sand Layers
Till
Sand and Gravel
Odanah Shale Aquifer
Assiniboine River Valley
Millwood Shales
Vermilion River Shales
Favel Shales
Jurassic Formation
Elevation (feet)
1600
1400
1200
1000
800
600
400



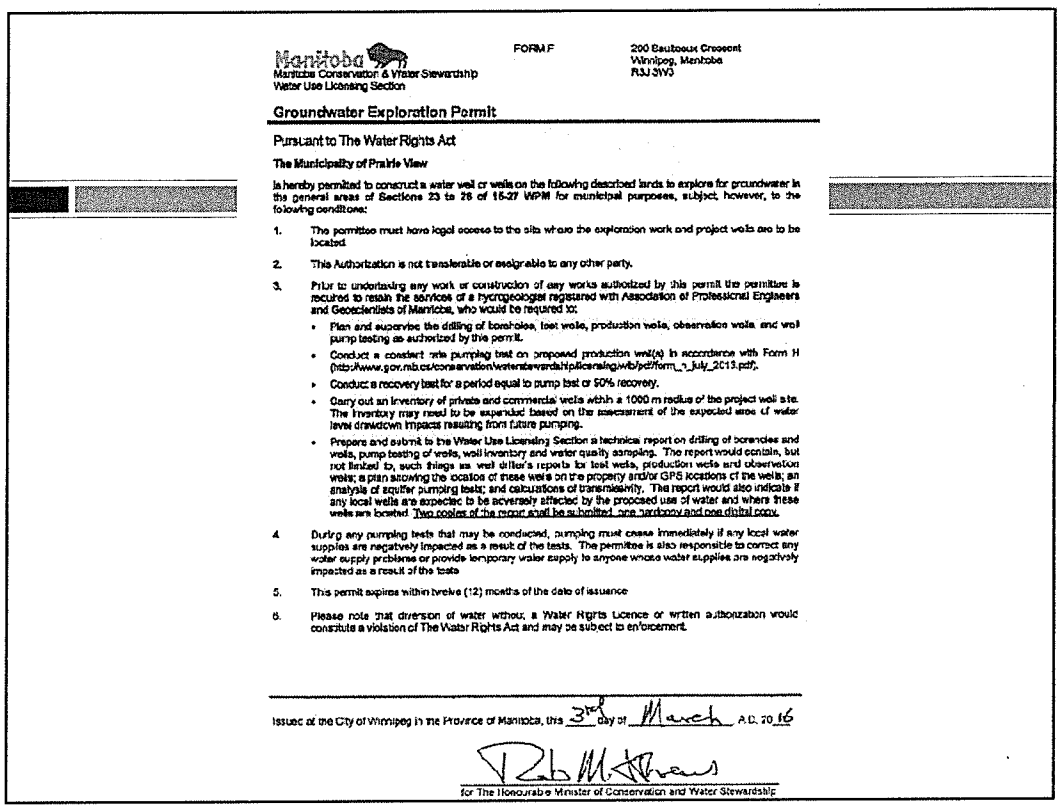
Groundwater Recharge

- Average Annual Precipitation = 20 inches
  - Environment Canada – Binscarth Station 1981 to 2010
- Recharge Rate = 5 to 6 inches
  - A. Cherry, 2000
- Area of Aquifer = Approx. 10 square miles
- Annual Recharge = 3840 cubic decameters(845 million gallons)
- One Section of Land = 1 square mile
- Recharge to 1 section of land = 384 cubic decam.
- Birtle Requirement – 240 cubic decameters



MB Water Rights Law

- Groundwater is the property of the Crown (ie: Province of Manitoba)
- Water Rights Licenses are issued on a "First in Time, First in Right" basis
  - Pre-existing groundwater users have senior rights
  - Domestic groundwater use has the highest priority and most senior rights.
- Groundwater Exploration Permit



Manitoba
Manitoba Conservation & Water Stewardship
Water Use Licensing Section

FORM F

200 Saulteaux Crescent
Winnipeg, Manitoba
R3J 3W3

Groundwater Exploration Permit

Pursuant to The Water Rights Act

The Municipality of Prairie View

is hereby permitted to construct a water well or wells on the following described lands to explore for groundwater in the general areas of Sections 23 to 26 of 15-27 WPM for municipal purposes, subject, however, to the following conditions:

1. The permittee must have legal access to the site where the exploration work and project wells are to be located.
2. This Authorization is not transferable or assignable to any other party.
3. Prior to undertaking any work or construction of any works authorized by this permit the permittee is required to retain the services of a hydrogeologist registered with Association of Professional Engineers and Geoscientists of Manitoba, who would be required to:
   - Plan and supervise the drilling of boreholes, test wells, production wells, observation wells, and well pump testing as authorized by this permit.
   - Conduct a constant rate pumping test on proposed production well(s) in accordance with Form H (http://www.gov.mb.ca/conservation/waterstewardship/licensing/wb/pdf/form_h_july_2013.pdf).
   - Conduct a recovery test for a period equal to pump test or 50% recovery.
   - Carry out an inventory of private and commercial wells within a 1000 m radius of the project well site. The inventory may need to be expanded based on the assessment of the expected area of water level drawdown impacts resulting from future pumping.
   - Prepare and submit to the Water Use Licensing Section a technical report on drilling of boreholes and wells, pump testing of wells, well inventory and water quality sampling. The report would contain, but not limited to, such things as well driller's reports for test wells, production wells and observation wells; a plan showing the locations of these wells on the property and/or GPS locations of the wells; an analysis of aquifer pumping tests; and calculations of transmissivity. The report would also indicate if any local wells are expected to be adversely affected by the proposed use of water and where these wells are located. Two copies of the report shall be submitted, one hardcopy and one digital copy.
4. During any pumping tests that may be conducted, pumping must cease immediately if any local water supplies are negatively impacted as a result of the tests. The permittee is also responsible to correct any water supply problems or provide temporary water supply to anyone whose water supplies are negatively impacted as a result of the tests.
5. This permit expires within twelve (12) months of the date of issuance.
6. Please note that diversion of water without a Water Rights Licence or written authorization would constitute a violation of The Water Rights Act and may be subject to enforcement.

Issued at the City of Winnipeg in the Province of Manitoba, this 3rd day of March A.D. 20 16

for The Honourable Minister of Conservation and Water Stewardship

Groundwater Exploration Permit

- Retain the services of a hydrogeologist registered with the Association of Professional Engineers and Geoscientists of Manitoba
- Plan and supervise the drilling of boreholes, test wells, production wells, observation wells, and well pump testing
- Constant Rate Pumping Tests/Recovery Test

Groundwater Exploration Permit

- Carry out an inventory of private and commercial wells within a 1000 m radius of the project well site. The inventory may be expanded based on the assessment of the expected area of water level drawdown impacts resulting from future pumping.

Groundwater Exploration Permit

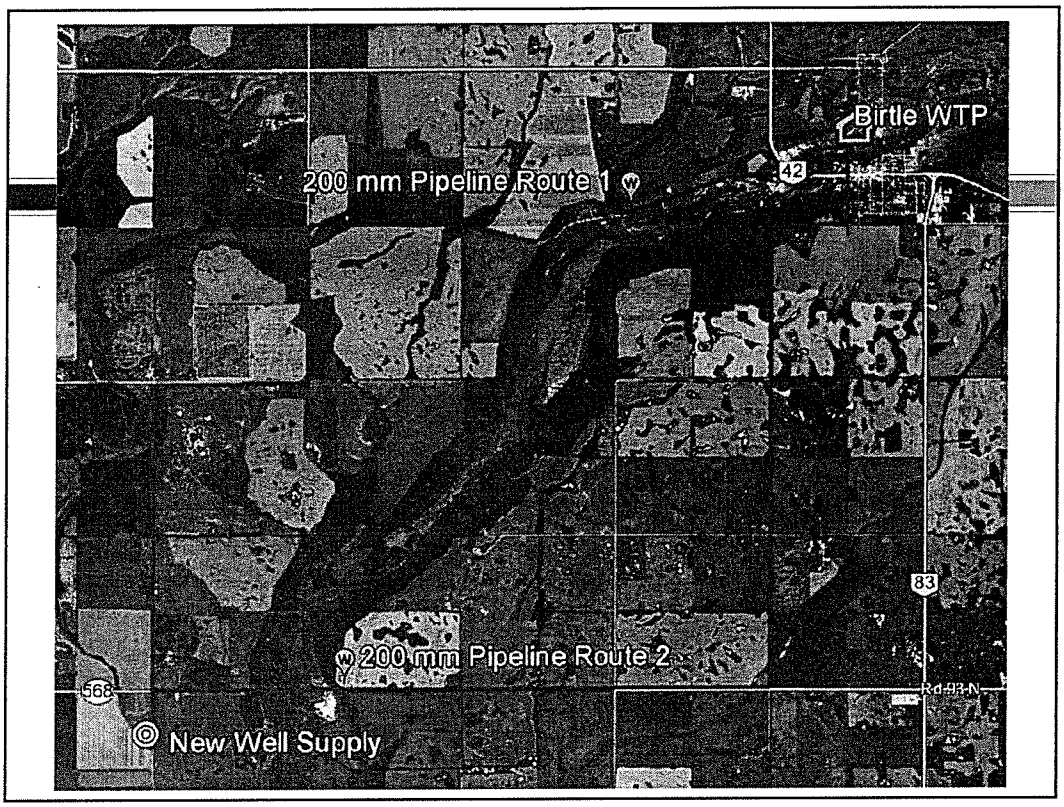
- Prepare and submit to the Water Use Licensing Section a technical report.
- The report will indicate if any local wells are expected to be adversely affected by the proposed use of water and where these wells are located.
- Groundwater Interference Complaint Response Plan

Groundwater Exploration Permit

- The plan outlines the procedures to be followed if a report of groundwater interference is received.
- Two step process
  - Initial Investigation
  - Mitigation of the Problem
    - Lowering the Well Pump
    - Redevelop the well to improve capacity
    - Install a new higher capacity well
    - Provide an alternate source of water
    - Curtail or stop pumping of Town wells and find an alternate source

Water System Upgrades

- Phase 1
  - Two new wells
  - Approximately 15.5 km of 200 mm dia. pipeline to existing WTP and existing reservoir site
  - Repairs to existing WTP
- Phase 2
  - New building over new multi-chamber in-ground concrete reservoir connected to existing reservoir
  - Membrane softening treatment system
  - Generator – Power back-up system



Cost Estimates

PHASE 1	Estimate
2 Wells Mechanized & Hydro	$400,000.00
200 mm Pipeline to Birtle	$2,000,000.00
Water Treatment Plant Upgrades	$500,000.00
Sub-Total	$2,900,000.00
Contingencies (10%)	$290,000.00
Engineering and Financing (20%)	$580,000.00
Sub-Total	$870,000.00
Total	**$3,770,000.00**

Cost Estimates

PHASE 2	Estimate
Reservoir and Pumphouse Building	$1,100,000.00
Membrane Treatment System	$600,000.00
Mechanical & Electrical Works	$950,000.00
Generator & Misc. Works	$300,000.00
Sub-Total	$2,950,000.00
Contingencies (10%)	$295,000.00
Engineering and Financing (20%)	$590,000.00
Sub-Total	$885,000.00
Total	**$3,835,000.00**



Financial Position of Birtle Utility

- Current Cash Position $402,000
- Basic Operating Costs of $225,000
- Revenue is collected quarterly on Meter System
- Interim rate increase in July 2015
- Utility must be able to sustain its own operations

Rates of Birtle Utility Fund

Rates as per Bylaw 2015-16

Commodity Rates per 1,000 gallons:

	Water	Sewer	Water & Sewer
Effective July 1, 2015	$17.19	$2.91	$20.10

Effective July 1, 2015

Meter Size	Water Included Thousands of Gallons	Customer Service Charge	Water Commodity Charge	Sewer Commodity Charge	Water & Sewer Quarterly Minimum
5/8 inch	3,000	$16.45	$51.57	$8.73	$76.75
3/4 inch	6,000	$16.45	$103.14	$17.46	$137.05
1 inch	12,000	$16.45	$206.28	$34.92	$257.65
1 1/4 inch	21,000	$16.45	$360.99	$61.11	$438.55
1 1/2 inch	30,000	$16.45	$515.70	$87.30	$619.45
2 inch	75,000	$16.45	$1,289.25	$218.25	$1,523.95
3 inch	135,000	$16.45	$2,320.65	$392.85	$2,729.95

Steps to Impose Local Improvement Borrowing

For the Municipality to proceed with the Large Capital Project the following must happen:

1. *The Municipality must consult with the users (customers) of the System*
2. *The Municipality must prepare a borrowing bylaw called a Local Improvement*
3. *The Municipality must hold a public hearing on the Borrowing*
4. *The Municipality after the public hearing process and depending on objections received, does 1st reading on the Borrowing Bylaw*
5. *Apply to the Municipal Board for approval of the Borrowing, prior to 2nd and 3rd reading*
6. *Start the project, upon completion start an Amending Bylaw to activate the Debenture*
7. *Give 30 days Notice to Users to provide option to pay up-front lump sum payment*
8. *After 30 days, complete bylaw and borrow the balance of the funds on the Debenture*
9. *Annually any properties* that did not pay upfront, a fee will be applied on their Property Tax *Bill for term of Debenture*

Proposed Local Improvement

PHASE 1

- Develop an alternate source of water that has the capacity to meet the future supply requirement for Birtle and to provide better quality water
- New water supply will need less treatment
- Provide safer water
- Lower operating costs due to the reduced treatment requirements
- Plan includes drill two wells, one primary and one backup, and implement the water pipeline to bring the water to the Birtle Water Treatment Plant
- Upgrades and repairs made to the Plant to become compliant with the Canadian Drinking Water Guidelines.

Estimated Cost Local Improvement

Phase 1

Estimated Cost of Local Improvement

Upgrades to Water Treatment Plant	$ 500,000
Material Costs including Land	2,495,000
Studies, Consulting, Engineering & Contingencies	1,187,500
Legal & Subdivision	16,500
Local Improvement Hearing & Fees	4,000
TOTAL COSTS	**$4,203,000**
Grants (MWSB & CWWF)	$3,035,000
Municipal Contribution – Town of Birtle Reserve	473,000
Municipal Contribution – Birtle Sewer Reserve & Utility Funds	100,000
Municipal Contribution – PVM General Reserve	235,000
NET COST of Local Improvement	**$ 360,000**

Who Pays?

- **Identification of Potential Taxpayers Under the Plan**

  All the taxpayers with buildings that are currently accessing the water

- **Method and Rate of Calculating Local Improvement Tax**

  Flat property tax levied

  (1) **Cash Cost - $1,132.08**

  (2) **Financed - $106.86** **levied annual for 20 years**

  Based on $360,000 divided by 318 water customers

Public Hearing

- Monday, April 10, 2017 Birtle Community Hall at 7:30 pm
- Local Improvement Plan in mail to each customers end of week
- Written objection can be filed at Office prior to hearing
- Register for presentation at Hearing

Phase 2 Estimates

New Treatment Plant	$2,955,000
Permits, Borrowing fees	5,750
Proposal to North Hill add Reservoir	300,000
Engineering & Contingences	885,000
Total Cost	$4,140,000
Grants Proposed	$2,067,500

Phase 2 Impacts

Internal Resources	$ 529,000
Potential Borrowing	$1,550,000

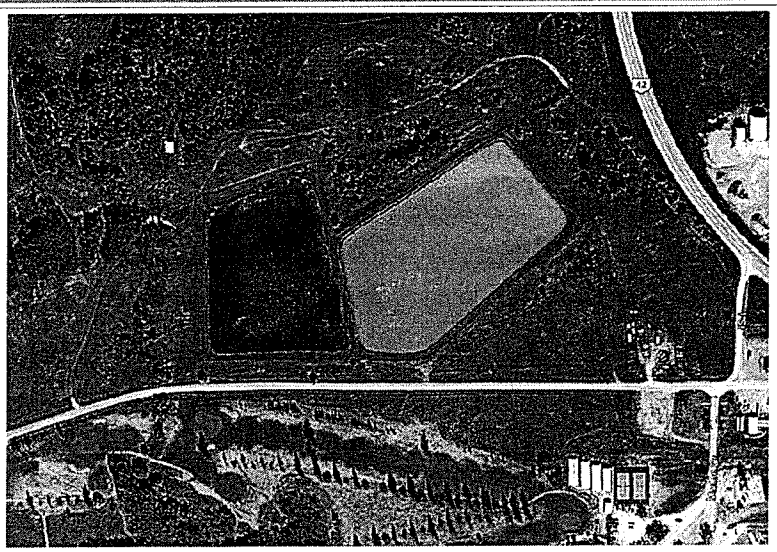
Flat property tax levied

(1) **Cash Cost - $4,874.21**

(2) **Financed - $ 460.09** **levied annual for 20 years**

Based on $1,550,000 divided by 318 water customers

Birtle's Wastewater Collection and Treatment Systems



Wastewater Issues

- Aging Infrastructure includes:
  - Two–cell lagoon
  - Vitrified Clay Pipe Gravity Sewer Collection System
  - Sewage Lift Station
- Hydraulic overloading lagoon in recent years resulted in emergency discharges
- As a result, an Environmental Order was issued to the municipality to conduct an engineering study.

Wastewater Study

- MWSB entered into an agreement with the Municipality to undertake a wastewater feasibility study.
- MWSB retained services of Stantec Consulting Ltd.
- Results of Study:
  - Approximately 720 L/c/d pumped to the lagoon
  - Typical should be less than 300 L/c/d
    - Indicates significant Infiltration problem
  - Lagoon undersized with only capacity for 174 L/c/d
    - Indicates significant leakage

Wastewater Recommendations

- Undertaking CCTV analysis for entire collection system including manhole inspections
  - 7500 m of sewer pipeline
  - 66 manholes
  - Cost estimates - sewer replacement program in phases
  - Budget $175,000
- Conduct Collection System Upgrades (in phases)
  - Budget unknown

Wastewater Recommendations

- Lagoon Expansion Planning
  - Undertake geotechnical for existing and new lagoon cell
  - Complete Environment Act Proposal for new licence
  - Budget $50,000
- Lagoon Expansion Design, Tendering, and Construction
  - Preliminary Estimate $5.1M - 6.7M
  - Estimate depends on availability of suitable clay for lining
  - Contingent on upgrades to sewer collection system to reduce infiltration down to 475 L/c/d

Bylaw to Divert Wastewater

- Self-Assessment Forms by March 17, 2017
- Identify your private sewer systems now
- Bylaw enforcement will impose fees in future
- Recommend to fix leaking fixtures
- Water consumption reduction
- Leak detection will continue

QUESTIONS?