Hespler Enterprises ltd.

Proposed Reservoir Expansion

ENVIRONMENT ACT PROPOSAL

May 2013

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Executive Summary

Hespler Enterprises Ltd would like to expand an existing reservoir at SW 5-5-5 from approximately 45 cubic decameters (40 ac/ft) to 135 cubic decameters (120 ac/ft) to increase irrigation capabilities. Irrigation has been occurring on some of the land base presented since the 2001 cropping year from the existing reservoir. The additional crop land and soil being considered is good for irrigation. The producer uses Best Management Practices to control and mitigate risk. Review and study of potential impact to vegetation, wildlife, fisheries, historic resources and soils has been completed. Based on this review and assessment, the proposed Hespler Enterprises reservoir expansion is not anticipated to have significant adverse impact on environmental resources.

1.0 INTRODUCTION

1.1 BACKGROUND

Hespler Enterprises Ltd. would like to expand an existing reservoir to increase irrigation capabilities. The purpose of this report is to obtain an Environmental Act License from Manitoba Conservation for Hespler Enterprises Ltd.

The reservoir is located at SW5-5-5W in the Rural Municipality of Thompson along the Graham Creek Tributary. There is a current Water Rights License (No 2006-108)(Appendices 2) in place to divert and store water at that site for the use of irrigation. The irrigation water is diverted from the Graham Creek Tributary during spring runoff. The current licence allows for 36.48 acre feet (45 cubic decameters) to be withdrawn per year. This reservoir services 250 acres with approximately 80 acres irrigated on an annual basis.

Hespler Enterprises Ltd. would like to increase the irrigation capacity in the area of the existing reservoir and would like to expand the reservoir by approximately 80 acre feet (99 cubic decameters) to a total requirement at this stage of 120 acre-ft (Figure 2). This expansion would allow irrigation on a total land base of 750 acres with approximately 250 acres to be irrigated on an annual basis. The reservoir would supply one pivot and one travelling gun at a combined rate of 1250 US gpm. The land to be included in this irrigation project is shown in Figure 1.

1.2 PREVIOUS WORK

Engineered Reservoir Drawings for existing reservoir- PFRA/ARAP- P.B. Shewfelt, 10/08/2000 (Appendices 1)

Water Rights License to divert and use more water from Graham Creek for irrigation purposes (Appendices 2)

Manitoba Infrastructure and Transportation Authorization to Permit to build expansion (Appendices 3)

2.0 PROJECT DESCRIPTION

2.1 SYSTEM OWNERSHIP/MANAGEMENT

The irrigation project includes a total land base of approximately 780 acres; Hespler Enterprises owns 250 acres and rents the remainder. The proposed expansion will occur on the existing reservoir at the SW5-5-5W site. A Water Right's License has been issued for the existing storage (Licence No.: 2006-

108). An authorization permit to expand the reservoir by 80 Acre/ft from Manitoba Conservation and Water Stewardship dated April 13, 2012 has also been received.

Hespler Enterprises (Wayne Derksen, Richard Heide and Nick Heide) will retain ownership of the land and on-farm irrigation systems.

2.2 LAND DESCRIPTION AND USE

The legal land locations for the irrigation project are shown in Figure 1. A request was made to Manitoba Justice Land Titles Department to obtain ownership information for each land title. The results are included in Table 2, which outlines the current land owners.

The majority of the land use within the study area is classified as agricultural with a small portion of grassland. A small marsh area is present on SE 36-4-6W and NW 1-5-6. All land that is to be irrigated is existing cultivated crop land. The expansion of the reservoir is also on currently cropped land.

2.3 CROP ROTATION

The producers will follow a three year crop rotation on land in which potatoes, the inteneded crop to be irrigated, are grown. Crops to be grown in rotation with potato crops include cereals, oilseeds, corn and soybeans. Therefore, approximately 250 acres will be irrigated per year.

2.4 IRRIGATION EQUIPMENT

The proposed Hespler Enterprises Irrigation system will include pump station, pipelines and proposed expansion of storage reservoir is shown in figure 1. The system will be designed by Victor R. Klassen, P.Eng., VRK Consulting Inc. The proposed expansion of the reservoir is to be completed in 2013 with pump station in 2014. Buried pipelines to follow in subsequent years.

The proposal is to expand the existing reservoir that is located in the Southwest Quarter of Section 5, in Township 5 and Range 5, West of the Principal Meridian in Manitoba. The current licence allows for the diversion of 36.48 Acre Feet into the reservoir from the Graham Creek Tributary. We are proposing to expand the reservoir by 80 Acre Feet to 116.48 Acre Feet. A Water Rights Licence has been applied for to divert and use more water from the Graham Creek Tributary. Three phase power is being considered to as the power supply at the pump at the reservoir.

Buried pipeline will be located on cultivated land except where it is necessary to cross roadways. Some portions of the pipeline may be located just off the cultivated land on the edge of municipal road allowance if allowed. Approximately 4 miles of pipeline is planned to distribute the irrigation supply.

2.5 WATER REQUIREMENTS

Hespler Farms Ltd., our working company has an average water deficit for potatoes of 79mm to 89 mm (3.1 to 3.5 inches) per year. See Figure 3. An average water deficit means that 1 out of 2 years the water deficit to maturity for potatoes would be expected to exceed 3.1 to 3.5 inches. A 10% risk indicates that in 1 out of every 10 years, the crop water deficit will exceed the reported values. The 10% water deficit is 140mm to 152 mm (5.6 to 6 inches) per year (Manitoba Agriculture and Food, 2001). Assuming a 10% water deficit of 5.6 inches, 250 Acres would require approximately 116 Acre feet of water.

2.6 WATER SOURCE

The source of water for the project is proposed from snowmelt surface water. The current licence allows for the diversion of 36.48 Acre Feet into the reservoir from the Graham Creek Tributary. We are proposing to expand the reservoir by 80 Acre Feet to 120 Acre Feet. A Water Rights Licence has been applied for and granted to divert and use more water from the Graham Creek Tributary. Pumping from the Graham Creek tributary will last approximately two weeks.

3.0 PHYSICAL ENVIRONMENT

3.1 LOCATION

3.1.1 Physiographic Setting and Climate

The project area is located in Southwestern Manitoba approximately 12 miles north of Morden and 6 miles east of Miami. It is 1 mile south of the village of Rosebank, in the Municipality of Thompson. The study area includes the land described as SW 5-5-5, NW 5-5-5, SW 1-5-6, NW 1-5-6, NE 36-4-6, NW 36-4-6. See Figure 1.

The study area lies within the Prairie Climate Region (Environment Canada, 1993). The nearest weather station data is from Graysville. Mean annual temperature is 2.7 Celsius; mean annual precipitation is 538.7 mm; average frost free period is 166 days and growing degree days above 5 Celsius are 1647.

The study area is located in the Aspen Parkland Ecoregion. The till plain throughout the region was vegetated by tall prairie grasses. Manitoba maple, green ash, willow, oak and other tree groves occasionally lined the creek banks.

Wildlife throughout the region consists of white-tailed deer, coyote, red fox, ground squirrel, cotton tailed rabbit, hare, striped skunk, red back vole and deer mice. Many bird species inhabit the area that include hawks, red tailed hawks, mourning doves, blacked billed magpies, red winged blackbirds, killdeer and meadowlarks. Garter snakes and various frogs are also common.

3.2 GEOLOGY

3.2.1 Regional Geology

The RM of Thompson contains portions of four physiographic regions, Pembina Hills, Pembina Escarpment, Red River Valley and Lower Assiniboine Delta. A bedrock-controlled, hummocky glacial moraine landscape (Pembina Hills) occurs in the western portion of the Municipality. The northeast corner of the RM is a portion of the Red River Valley. This is a level to very gently sloping, lacustrine plain characterized by nearly level fluvial lacustrine loams and clays. Elevation ranges from 305 m.a.s.l. in the western portion to a low of 260 m.a.s.l. in the east. Low relief and medium to fine texture deposits at or near the surface have resulted in imperfect drainage over much of this area. These soils in the area can be described by two general groupings based on surface texture. Areas where the dominant surface texture is clayey which are developed on fine textured shaly alluvium, and black chernozem soils developed on well to imperfectly drained coarse loamy to fine loamy fluvial lacustrine deposits . The latter are the soils of the area being proposed and are commonly mapped as the Eigenhoff, Edenburg, Gnadenthal, Graysville, Neuenberg, Neuhorst and Rignold series. Soils with a coarser surface texture have improved drainage and are generally rated as class 1 and 2 for agricultural capability and good for irrigation suitability.

3.3 HYDROLOGY

The proposed area is located within the Central Midland watershed region which includes the Tobacco Creek Watershed which eventually drains into the Red River. The additional 80 Acre ft reservoir expansion will be built at the existing reservoir site on agricultural cultivated land that is currently being used as forage grass.

3.4 SOIL CHARACTERIZATION

According to the Agricultural Resources section Soils and Crops Branch Manitoba Agriculture and Food, approximately 32% of the land base was considered excellent for irrigation, approximately 67% was considered good and approximately 1 % was considered fair or poor. (Figure 4 and Figure 8)

The soils are classified as well drained on approximately 32% of the study area, 67% imperfectly drained and the remaining 1% poorly drained. (Figure 5)

All of the land bases in the study area are in the slope class of 0-2%. (Figure 6)

Approximately 33% of the soils are composed of medium textured soils with remaining67-% listed as fine textured. (Figure 7)

3.5 AGRONOMIC PRACTICES

The crop rotation is generally over a three year period, one year of corn, followed by an oilseed or cereal and then potato. After potato rotations, depending on the variety of potato and the amount of trash present, Hespler Farms uses a cover crop to prevent erosion of soils. Hespler Farms has an Environmental Farm Plan and a Food Safety Program in which we are audited annually and a Health

Place Work and Safety program, a Sustainability Plan and a Biosecurity plan in place and uses Best Management Practices.

3.5.1 Nutrient Management

A balanced nutrient management plan is required for sustainable land management, particularly under intensively managed, high input crops such as potatoes. Hespler Farms nutrient management plan includes veris mapping, annual soil tests and in season soil test and petiole tests during the year the fields are in potato production. Accounting for the nutrients in the soil and tailoring nutrient application rates and timing are used to achieve target yields. Zones are made for variable rate application of nutrients. Split applications of nitration are made in potato crops. Where lateral or pivots are used, Nitrogen is applied as needed with low upfront applications. Only recommended nutrient rates as supplied by consultants for best management practices are used. Records are maintained and held for 7+ years. This will help insure that excess nutrients are not applied and will mitigate risks associated with nutrient losses via leaching and runoff. Generally, medium and coarse loamy soils are located on the proposed fields to be irrigated. Fields are rated as low to moderate Potential Environmental Impact. Fall application of Nitrogen does not occur at Hespler Farms.

3.5.2 Pesticide Management

Crop diseases, insect and weed infestations can all decrease crop yield potential and crop quality. A wide variety of crop pesticides, fungicides, insecticides and herbicides are used by producers to protect their crop yield and quality. Improper use of pesticides can lead to a wide variety of environmental and food safety concerns including impacts to ground water, surface water and pesticide residue on soil and crops. As per pesticide application, Hespler Farms applies the majority of pesticides by ground with a calibrated high clearance sprayer with trained and experienced staff. Aerial application is only considered when conditions are two wet for the ground sprayer. Best Management Practices are used that includes threshold levels before pesticides are used.

3.5.3 Irrigation Management and Scheduling

The soils in the proposed land are uniform in texture and range from medium to coarse loam with medium available water holding capacity. The area has an average water deficit for potatoes of 3.1-3.5 inches per year. An average water deficit means that in 1 out of 2 years the moisture deficit to maturity for potatoes would be expected to exceed 3.1-3.5 inches (Climatic Information for Potatoes/Manitoba Agriculture and Food)(Figure 3). The 10% water deficit is 5.6-6 inches. Producers generally estimate a slightly lower net water use, with an average of 2-3 inches and a maximum of 6 inches. Individual irrigation applications would be ½ to 1 inch, recognizing the excellent moisture holding capacity of the project soils.

Precipitation events, soil water holding capacities and potential evapotranspiration are the main factors that affect irrigation scheduling. More rain events during the season will lessen the irrigation requirements. Higher temperatures, low humidity and increased wind speed impact the daily water requirements of the plants. Cognizant awareness of weather data will reduce irrigation requirements.

Hespler Farms uses Best Management Practices (BMP's) in order to conserve water, improve crop response to water applied and help maintain soil and ground water quality. These include the "feel" method, daily evapotranspiration rates, weather data and agricultural consultants. Some soil moisture monitors are also used. Reservoir tillage is used to maximize water retention.

4.0 POTENTIAL ENVIRONEMTAL IMPACTS AND MITIGATION PLAN

4.1 LAND AND AGRONOMIC ASSESSMENT

Description of Individual Quarter Sections

NW 5-5-5

This quarter mostly consists of the imperfectly drained , coarse loamy Reinland soil series, nearly level (RLD/xxxx), non-eroded, non-stoney, non-saline which is rated as good for irrigation with a potential impact of Irrigation listed as moderate. The Agricultural Capability is listed as Class 2 for the entire quarter. In the SE corner there is a clayey soil series, Blumenort (BUM/xxxx) which is not in potato production and is listed as poor for irrigation with a moderate potential impact risk for irrigation and is not being considered for irrigation by Hespler Farms. The Reinland series of soils on this quarter are currently serviced by the existing reservoir and irrigated with a travelling gun. After the proposed expansion occurs, it will be irrigated with a lateral. (Figures 4-13)

SW 5-5-5

This quarter also consists of the imperfectly drained, coarse loamy Reinland soil series (RLD/xxxx) , nearly level, non-eroded, non-stoney, non-saline which is rated good for irrigation with a potential impact of irrigation listed as moderate. As well, the lower portion of the quarter contains the Gnadenthal soil series (GDH/xxxx) which is imperfectly drained, non-eroded, non-stoney, non-saline, loamy soil which is rated as good for irrigation with a potential impact of irrigation listed as low. In addition, a clayey soil series, Blumengart (BMG/xxxx) is located in the west side of the quarter and the clayey Gretna soil series (GRA/xxxx) is located in the far SE and far SW corners. The SW portion of this quarter is where the existing reservoir is located. The Graham Creek runs through the lower SE portion of the quarter. Both the Blumengart and the Gretna soil series are not being considered for potato production or irrigation. The Reinland series of soils and the Gnadenthal soil series on this quarter are currently serviced by the existing reservoir and irrigated with a travelling gun and will be irrigated with a lateral in the future. The middle portion of this quarter has an Agricultural rating as Class 1, with the top of the quarter listed as Class 2, the lower portion and west wide is listed as Class 3. There is a narrow band of Class 4 in which the creek is located. Just the Class 1 and 2 areas are to be irrigated because they coincide with the Reinland and Gnadenthal soil series. (Figure 4-13)

NW 1-5-6

This quarter mostly consists of Jasset Series soils (JST/xxxx) and the Gnadenthal Series soils (GDH/xxxx). The Jasset series of soils consist of imperfectly drained, coarse loamy soil that is non-eroded, non-stoney, non-saline soil that is rated as good for irrigation with the potential impact of irrigation listed as moderate. The Gnadenthal soil series (GDH/xxxx) which is imperfectly drained, non-eroded, non-stoney, non-saline, loamy soil which is rated as good for irrigation with a potential impact of irrigation listed as low. There is a narrow band of the Graysville series soil (GVY/xxxx), that runs at an angle on from NE to the SE side of the quarter, which is imperfectly drained, loamy soil that is non-

eroded, non-stoney, non-saline and has a potential impact of irrigation listed as low. In the far NE corner of the quarter there is a small spot of Gretna soil series (GRA/xxxu) that is clayey, non-eroded, non-stoney, saline soil that will not be irrigated and is not suitable for potato production. The vast majority of the quarter has an Agricultural Capability rating as Class 1 with the far NE corner. A lateral is considered for this quarter. (Figure 4-13)

SW 1-5-6

This quarter consists of the Gnadenthal soil series (GDH/xxxx) in the North half of the quarter with a small square in the SE corner. The Gnadenthal soil series consists of an imperfectly drained, non-eroded, non-stoney, non-saline, loamy soil which is rated as good for irrigation with a potential impact of irrigation listed as low. The SW square of the quarter consists of the Rosengart soil series (RSG/xxxx) which is a coarse loamy, non-eroded, non-stoney, non- saline, moderately well drained soil that is listed as excellent for irrigation and a potential impact of irrigation listed as moderate. A small thin band of loamy, Loewen series soil (LEW/xxxx) is located near the south end of the quarter. It is non-eroded, non-stoney, non-saline with poor drainage and poor irrigation suitability which a potential impact of irrigation listed as high. Loewen soil series is not suitable for potato production so it will not be irrigated. The balance or the quarter will mainly be done with a travelling gun. (Figure 4-13)

NE 36-4-6

This quarter consists of the the Gnadenthal soil series (GDH/xxxx) with a band of the Rosengart soil series (RSG/xxxx) in the west side of the quarter and a band of the Reinfeld soil series on the south side of the quarter. The Gnadenthal soil series consists of an imperfectly drained, non-eroded, non-stoney, non-saline, loamy soil which is rated as good for irrigation with a potential impact of irrigation listed as low. The bottom portion of the quarter consists of the Reinfeld soil series (RFD/xxxx) which is a loamy, non-eroded, non-stoney, non- saline, moderately well drained soil that is listed as excellent for irrigation and a potential impact of irrigation listed as low. This quarter will be irrigated by a lateral or pivot. (Figure 4-13)

SE 36-4-6

This quarter mostly consists of the Reinfeld soil series. The Graham Creek runs through the middle of the quarter from west to east. The Reinfeld soil series (RFD/xxxx) which is a loamy, non-eroded, non-stoney, non- saline, moderately well drained soil that is listed as excellent for irrigation and a potential impact of irrigation listed as low. There is a small spot of the Rosengart soil series in the far SE corner of the quarter. The Rosengart soil series (RSG/xcxx) which is a coarse loamy, non-eroded, gently sloping, non-stoney, non- saline, moderately well drained soil that is listed as good for irrigation and a potential impact of irrigation listed as moderate. The field south of the creek will be irrigated with a travelling gun with the area north of the creek to be irrigated with lateral or pivot. (Figure 4-13)

4.1.1 Agronomic Recommendations

4.1.1.1 Integrated Soil Erosion Management Recommendations

The land to be developed is not at a high risk for water erosion (Figure 10). To minimize the risk for water erosion a dammer dikker (reservoir tillage) will be used. To minimize the risk of wind erosion, Hespler Farms will:

- Ensure all the crop residues are shredded and spread to facilitate minimum fall tillage. The objective of fall tillage is to maintain at least 65% ground cover. Potato fields should not be tilled after harvest but lightly run over with a coulter to anchor crop residue on all russet varieties. On short season varieties, a cereal cover crop will be planted.
- Continue to reduce as much tillage operations as is feasible, particularly in the fall.
- The CMIA, CMRM Best management practices manual will be followed regarding soil quality protection.

Proper irrigation management and scheduling will be used to mitigate the risks associated with runoff.

4.1.1.2 Nutrient Management Recommendations

Nutrient management recommendations for the project consist of the following:

- Annual soil testing will be conducted for all crops in rotation, with application rates specific to the available levels and expected crop yields. Petiole testing can be used to determine nitrogen requirements for potatoes, especially split applications of fertigation or other foliar application methods (e.g. Crop spraying).
- For the irrigated potato crop, leaching of nitrogen applied in the spring can occur with heavy rainfall. Thus, nitrogen fertilizer should be added as split applications during the growing season:
    - Approximately 30 to 40% of the recommended (based on soil tests) nitrogen requirements should be added at the time of planting, or shortly after planting.
    - The remainder can be added at the time of hilling or tuberization. More splits can be performed particularly if fertigation is used. This will only be practiced with pivots or laterals. Fertigation is not recommended with guns because of poor uniformity of application.
- Split applications also offer the advantage of reducing or increasing nitrogen fertilizer rates during the growing season based on yield potential as reflected by growing season, weather parameters and other factors.
- Hespler Farms will maintain records of soil tests, annual fertilizer applications and crop yields for each field.

4.1.1.3 Pesticide Management Recommendation

When applying pesticides to field crops, Hespler Farms will consider the following beneficial best management practices:

- Assess economic thresholds – then only apply as needed.

- Pesticides must be used according to label specifications with respect to application rate, methods, times, and restrictions.
- Minimize off target pesticide loss – apply under suitable conditions, leave buffer zones around sensitive areas, avoid irrigating soon after application (see label) and calibrate equipment.
- Reduce spray drift – only apply under suitable conditions, use well maintained equipment and calibrated equipment.
- The Best Management Practice Manual (BMPN) lists the properties or various chemicals. This list can be utilized to assist in minimizing the potential for off-site movement of pesticides, either by leaching or runoff.
- Hespler Farms will maintain records of pesticide application locations, rates, timing, crop stage and conditions at time of application.
- Application of any pesticides will be according to the product label.

4.1.1.4 Irrigation Management and Scheduling Recommendations

The soil moisture will be monitored regularly during the growing season to determine when to apply water to the crop. To maximize yield and quality, the root zone will be maintained above 65% of available water holding capacity.

The goal of irrigation management is to maintain soil moisture level in the crop root zone in a range where yield and quality are not reduced due to insufficient or excess moisture, while minimizing the risk of leaching of soil moisture and nutrients below the root zone. Proper scheduling will be accomplished by more frequent, smaller applications of water (0.75 -1.0 inch) resulting in a higher yield, better crop quality and reduction in potential for nitrogen leaching.

4.2 IMPACTS ON GROUNDWATER

4.2.1 Groundwater Quality and Quantity

Groundwater monitoring from drain tile will be routinely conducted to monitor the impacts on quality and quantity and to notify the producer of any adverse conditions before they develop.

4.3 IMPACTS ON SURFACE WATER

4.3.1 Surface Water Quality

Potential impacts to the existing stream and ditches are possible in light of the close proximity of the irrigation project to local Graham creek tributaries. Impacts on the surface water quality can include herbicide/pesticide and fertilizer runoff, sedimentation and fuel contamination. The use of Best Management Practices for the herbicide/pesticide and fertilizer applications will help mitigate the runoff potential. No trenching is occurring in the water ways so impact to fish or fish habitat will be mitigated. To control erosion and sediment, minimal tillage and cover crops measures will be used on appropriate years.

Construction equipment and equipment required for the installation and removal of pump equipment should be refueled at distances greater than 100m from existing waterways and ditches. Equipment should be inspected to ensure no leaks are present which could lead to hydrocarbon

contamination. Hespler Farms wants to use hydroelectric power if feasible and therefore, fuel storage at the pump site should not be required.

4.3.2 Surface Water Quantity

Pumping from the Graham Creek Tributary would occur during the spring runoff period. Pumping will be governed by maintaining a minimum in stream flow rate 0.09m3/s(3.1783 ft3/s) as outlined in the water rights license. (Appendices 2)

4.4 IMPACTS ON HABITAT AND VEGETATION

4.4.1 Vegetation

The study area is located within the Manitou Ecodistrict of the Aspen Parkland Ecoregion. Cultivated fields have replaced much of the natural vegetation of the ecodistrict. The till plain throughout the region was vegetated with aspen groves, tall prairie grasses and herbs. The valley bottom in the vicinity of the study consists of white elm, Manitoba maple, green ash, white birch, balsam poplar and willow. The banks of the valley support aspen and bur oak with a variety of shrubs and herbs.

Manitoba conservation was contacted to request a list of species of concern for the study area. (Table 3) An email was also received from Manitoba Conservation Data Centre stating that it was unlikely that any of the species listed would occur in that area (Appendices 4).

A small area will be disturbed to expand the existing reservoir. It is currently land that is under cultivation. The land to be irrigated has been under cultivation for agricultural use for many years. Therefore, impacts to natural vegetation are not expected to be significant.

4.4.2 Wildlife Habitat

Wildlife throughout the Aspen Parkland Ecoregion consists of white-tailed deer, coyote, red fox, ground squirrel, cottontail rabbit, hare striped skunk, redback vole and deer mice. Many bird species are also present which include ferriyuous hawk, sparrow hawk, red-tailed hawk, mourning dove, black-billed magpie, red-winged blackbird, killdeer and the meadowlark. Garter snakes and various frogs are also common. A list of Endangered species was received (Table 3). All of the land for the irrigation project has been previously cultivated. The area is used for agricultural purposes and as such, most native animals do not use the area. Therefore, the proposed irrigation project is unlikely to have significant impacts on wildlife and current wildlife habitat.

4.5 IMPACTS ON FIHSERIES

Hespler Farms proposes to irrigate land using water from the Graham Creek Tributary during the spring runoff period. A pump station is currently used at SW 5-5-5 to fill the existing reservoir at the approved rate and volume of the existing water license agreement. An additional proposed pump site in the ditch on the North Side of NW 5-5-5 will be used to divert the additional water proposed. Pumping from the sites will be conducted during the spring runoff. Both sites pump from streams/ditches that

have intermittent flow, usually just in spring but can occasional run from sufficient rainfall. Fish habitat is therefore, not significantly impacted by the pump sites or removal of water.

4.5.1 Fuel handling and Storage impacts

The producer hopes to use hydroelectric power at the reservoir site, and tractors to fill the reservoir. Therefore, fuel storage at the site will not be required. However, if it is not possible to have hydroelectric power at the reservoir, a fuel site will be built to provide fuel for the pump at the reservoir only. It will be built far enough away to prevent any contamination in the streams or in the reservoir. Fuel storage will just occur during the months in which irrigation is used. It will be emptied for the remainder of the year. Daily inspections for leaks will occur. Tractors will be refueled away from surface water bodies and inspected prior to uses to ensure leaks are not present that could lead to hydrocarbon contamination**.**

4.5.2 Assurance of Minimum Instream Flows

Licenses issued in Manitoba for the development and operation of irrigation works require that provisions be put in place to ensure that water withdrawal will not significantly degrade fish habitat or negatively impact pre-existing and high priority users.

The project will not include dams or other alterations to the stream or ditch channel other than some minor deepening at the pumping station if needed.

Pumping will cease when minimum instream flows are less than 0.09 decameters per second (3.1783 feet per second), as per the previous Water License agreement (Appendices 2) Therefore, if the minimum instream flows are maintained at this rate, there should be minimal impact to any existing fish habitat.

4.6 IMPACTS ON HERITAGE RESOURCES

The expansion of the current reservoir will take place on currently cultivated agricultural crop land. Therefore, there is low potential to impact significant heritage resources. In an event that heritage resources are discovered, construction will cease immediately and Historic Resources Branch of Manitoba Culture, Heritage and Tourism will be notified immediately. If this occurs, construction will occur as directed by Historic Resources Branch of Manitoba Culture, Heritage and Tourism.

4.7 IMPACTS ON PARKS

The proposed irrigation project is not located within 1 mile of a park or campground. The nearest such area is 6 miles west in the town of Miami. Therefore, the proposed project is unlikely to have any impacts on nearby parks. (Figure 1)

5.0 MONITORING

Hespler Farms will keep records for each calendar year, with copies of the following submitted to Manitoba Water Stewardship:

1) Daily and annual volumes of water diverted into the off channel reservoir.
2) The rate that the water was diverted into the reservoir.

3) Daily and annual volumes of water used for irrigation purposes.

Yearly records of soil tests and nutrient applications, cropping plans, and herbicide/pesticide applications will be kept for a minimum of seven years. Veris mapping to track soil salinity has occurred and will be retested in 5 year intervals to monitor soil salinity changes.

6.0 SUMMARY AND CONCLUSIONS

Based on a review and assessment of the proposed Hespler Enterprises reservoir expansion, the development is not anticipated to have significant adverse impacts on environmental resources.

1. According to the Agricultural Resources section Soils and Crops Branch Manitoba Agriculture, approximately 32% of the land base was considered excellent for irrigation, approximately 67% was considered good and approximately 1 % was considered fair or poor.
2. The study area is comprised of loamy soils that are low to moderate risk soils for leaching and erosion. The producer uses reduced tillage practices and cover crops to prevent erosion during dry, windy conditions and Dammer Dikes to prevent erosion from water. Crop rotation is practiced to further minimize the possibility of erosion.
3. The producer will follow best management practices which include:
    a. Split applications of nitrogen during the growing season.
    b. Apply pesticides according to product label and apply under suitable conditions to minimize off target pesticide losses.
    c. Apply more frequent smaller amounts of water to maximize yield and minimize nitrogen leaching.
    d. No fall application of nitrogen
    e. Potato varieties that have minimal residue will be seeded with a cover crop to protect the field until it is established the following spring.
4. Water will be withdrawn from the Graham Creek Tributary during the spring run off period and minimum instream flow rate of 0.09m3/s will be maintained to ensure downstream users are not impacted.
5. No adverse impacts are expected on vegetation, wildlife, fisheries, historic resources or parks due to the irrigation project or the storage reservoir.
6. Irrigation has been occurring on some of the land base presented since the 2001 cropping year from the existing reservoir with no significant adverse impact on environmental resources.
7. Groundwater monitoring from drain tile will be routinely conducted. Any negative impacts on quality and quantity will be relayed to the producer and dealt with promptly.

7.0 REFERENCES

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Manitoba Water Stewardship, Water Rights Act License 2006-108.

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TABLES

TABLE 1 – STUDY AREAS

LEAGAL LOCATION	ACRES(approximate)
NW 1/4 5-5-5	120
SW 1/4 5-5-5	160
NW 1/4 1-5-6	155
SW 1/4 1-5-6	130
NE 1/4 36-4-6	160
SE 1/4 36-4-6	150

TABLE 2 – LEGAL LAND DESCRIPTION

LAND LOCATION	TITLE NUMBER	REGISTERED LAND OWNER
NW 1/4 5-5-5	1655957	HESPLER ENTERPRISES LTD.
SW 1/4 5-5-5	1655957	HESPLER ENTERPRISES LTD.
NW 1/4 1-5-6	2169600	LAYCOCK FARMS LTD.
SW 1/4 1-5-6	1804845	WILLIAM WAYNE AND LINDA DUNCAN
NE 1/4 36-4-6	2482024	LAYCOCK FARMS LTD.
SE 1/4 36-4-6	2482024	LAYCOCK FARMS LTD.

Land title information provided by the Morden Land Title Office

TABLE 3 – SPECIES AT RISK

Animals
Endangered:
Baird's Sparrow (*Ammodramus bairdii*)
Burrowing Owl (*Athene cunicularia*)
Canada Warbler *(Wilsonia canadensis)*
Chestnut-collared Longspur *(Calcarius ornatus)*
Dusky Dune Moth *(Copablepharon longipenne)*
Eskimo Curlew (*Numenius borealis*)
Ferruginous Hawk (*Buteo regalis*)
Gold-edged Gem *(Schinia avemensis)*
Ivory Gull *(Pagophila eburnea)*
Least Bittern *(Ixobrychus exilis)*
Loggerhead Shrike

(*Lanius ludovicianus*)
Mapleleaf Mussel *(Quadrula quadrula)*
Pale Yellow Dune Moth *(Copablepharon grandis)*
Peregrine Falcon (*Falco peregrinus*)
Piping Plover (*Charadrius melodus*)
Poweshiek Skipperling *(Oarisma poweshiek)*
Prairie Skink *(Eumeces septentrionalis)*
Red Knot rufa subspecies (Calidris canutus rufa)
Ross's Gull (*Rhodostethia rosea*)
Trumpeter Swan *(Cygnus buccinator)*
Whooping Crane (*Grus americana*)
Uncas Skipper (*Hesperia uncas*)
Verna's Flower Moth *(Schinia verna)*
White Flower Moth *(Schinia bimatris)*
Threatened:
Boreal Woodland Caribou (*Rangifer tarandus caribou*)
Chimney Swift *(Chaetura pelagic)*
Common Nighthawk *(Chordeiles minor)*
Dakota Skipper *(Hesperia dacotae)*
Golden-winged Warble *(Vermivora chrysoptera)*
Great Plains Toad (*Bufo cognatus*)
Mule Deer (*Odocoileus hemionus*)
Ottoe Skipper *(Hesperia ottoe)*
Polar Bear (*Ursus maritimus*)
Red-headed Woodpecker *(Melanerpes erythrocephalus)*
Sprague's Pipit (*Anthus spragueii*)
Short-eared Owl *(Asio flammeus)*
Whip-poor-will *(Caprimulgus vociferus)*

Western Hognose Snake *(Heterodon nasicus)*
Extirpated:
Greater Prairie-Chicken (*Tympanuchus cupido*)
Grizzly Or Brown Bear (*Ursus arctos*)
Kit or Swift Fox (*Vulpes velox*)
Long-Billed Curlew (*Numenius americanus*)
Muskox (*Ovibos moschatus*)
Plains Bison *(Bison bison bison)*
Pronghorn (*Antilocapra americana*)
Riding's Satyr (*Neominois ridingsii*)
Plants
Endangered:
Gattinger's Agalinis *(Agalinis gattingeri)*
Great Plains Ladies'-Tresses (*Spiranthes magnicamporum*)
Rough Agalinis *(Agalinis aspera)*
Smooth Goosefoot *(Chenopodium subglabrum)*
Small White Lady's-slipper (*Cypripedium candidum*)
Western Ironweed *(Vernonia fasciculata)*
Western Prairie Fringed-orchid (*Platanthera praeclara*)
Threatened:
Buffalograss (*Buchloë dactyloides*)
Culver's-root *(Veronicastrum virginicum)*
Hackberry (*Celtis occidentalis*)
Hairy Prairie-Clover (*Dalea villosa*)
Riddell's Goldenrod (*Solidago riddellii)*
Western Silvery Aster (*Symphyotrichum sericeum*)
Western Spiderwort (*Tradescantia occidentalis*)

Information provided by Manitoba Wildlife and Ecosystem Protection

FIGURES

FIGURE 1 – SATILLITE IMAGE

Image from Google maps, Fields drawn by Mark Derksen

FIGURE 2 – PROPOSED RESERVOUR DRAFT

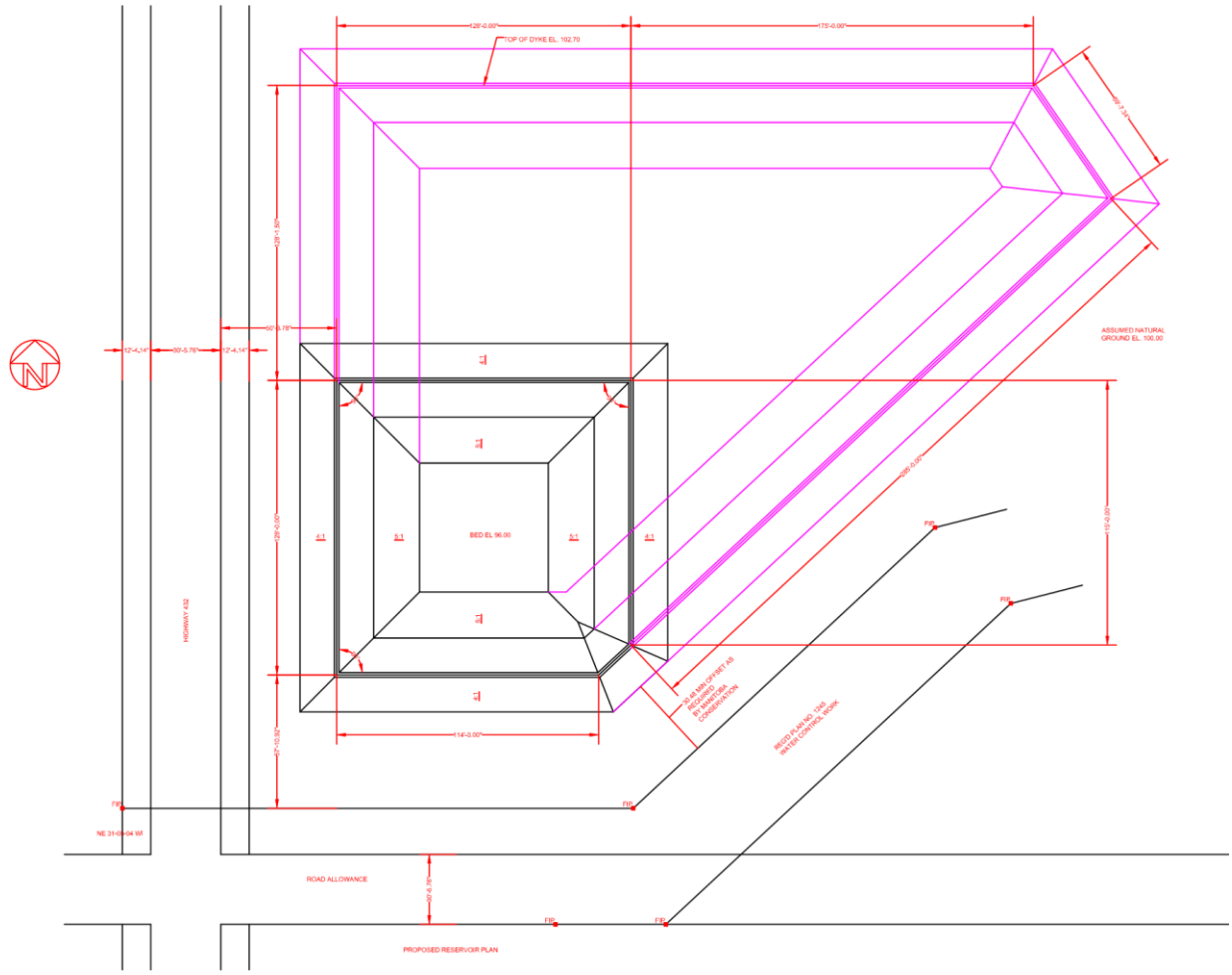

Image provided by Adam Wiebe

—— **Existing**

—— **Proposed Expansion**

FIGURE 3 - AVERAGE WATER DEFICITE TO MATURITY FOR POTATOES

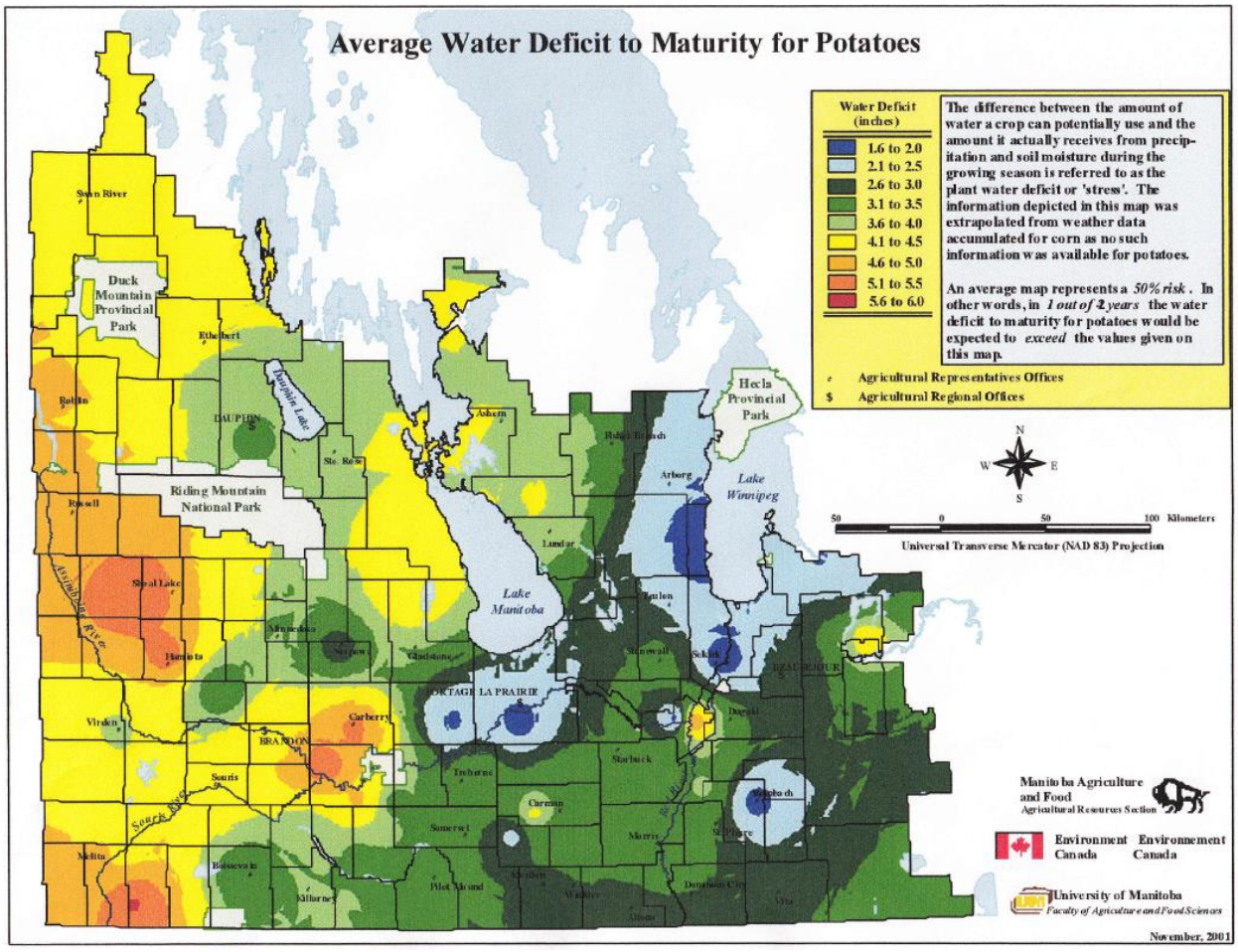

FIGURE 4 – IRRIGATION SUITABILITY MAP

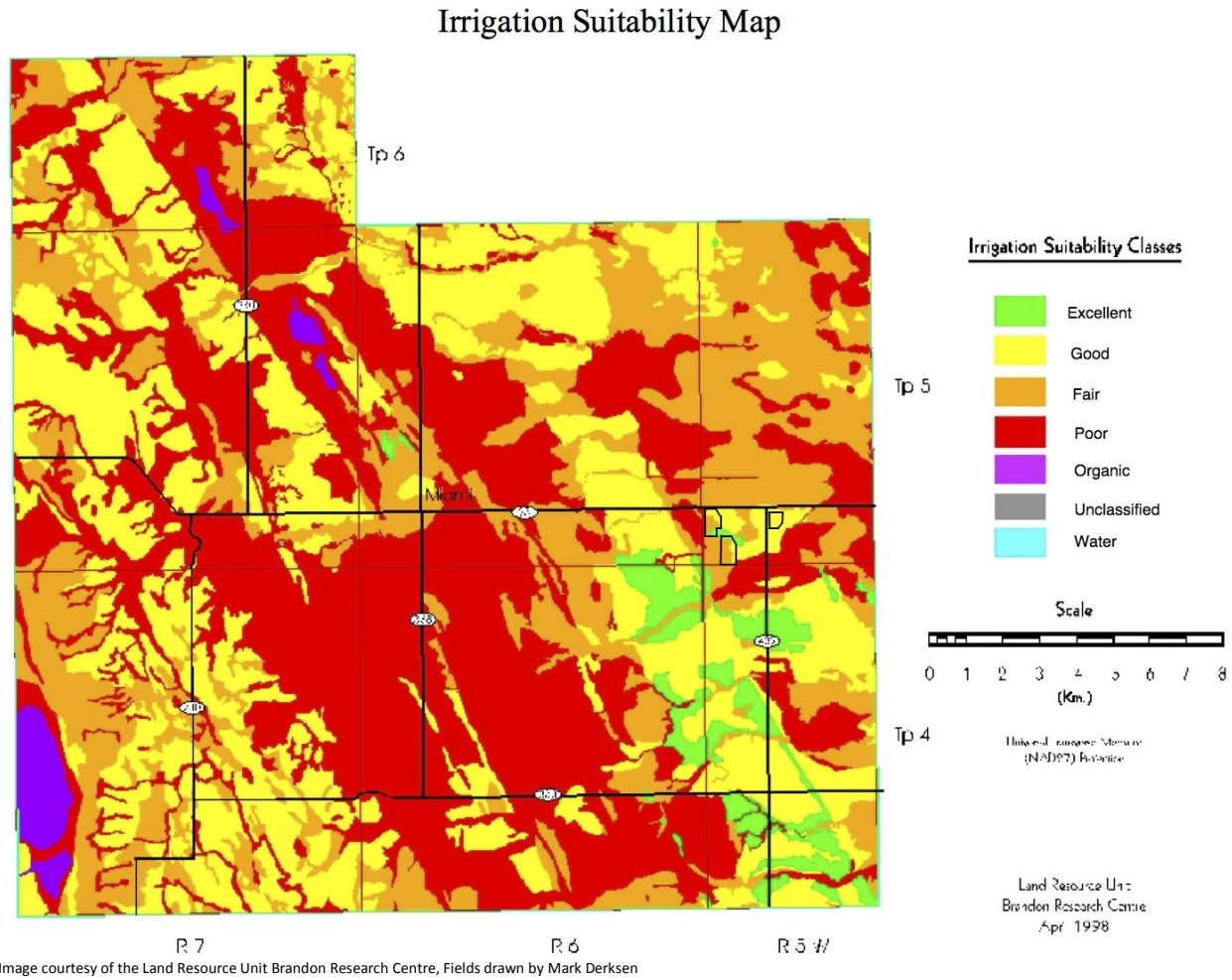

Image courtesy of the Land Resource Unit Brandon Research Centre, Fields drawn by Mark Derksen

FIGURE 5 – SOIL DRAINAGE

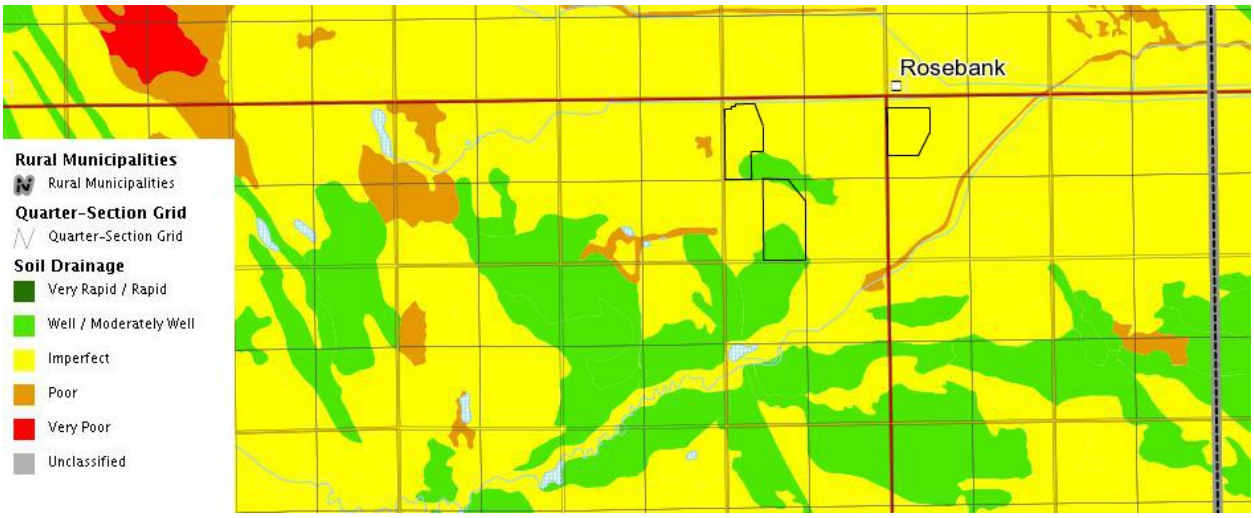

Image provided by Agri-maps website, Fields drawn by Mark Derksen

FIGURE 6 – SLOPE

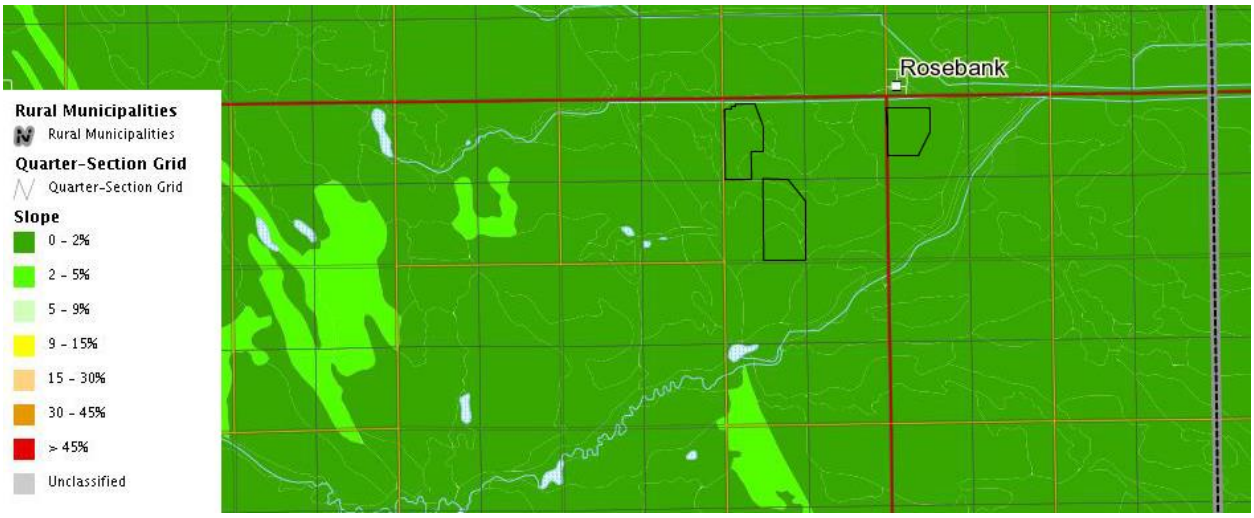

Image provided by Agri-maps website, Fields drawn by Mark Derksen

FIGURE 7 – SURFACE TEXTURE

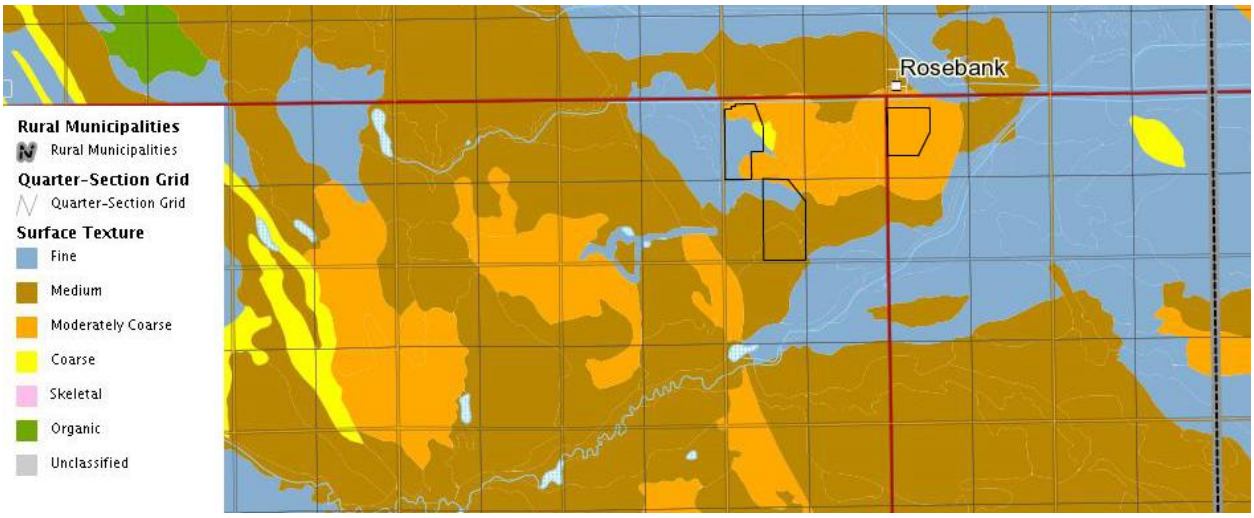

Image provided by Agri-maps website, Fields drawn by Mark Derksen

FIGURE 8 – SOIL SUITABILITY FOR IRRIGATED POTATO PRODUCTION

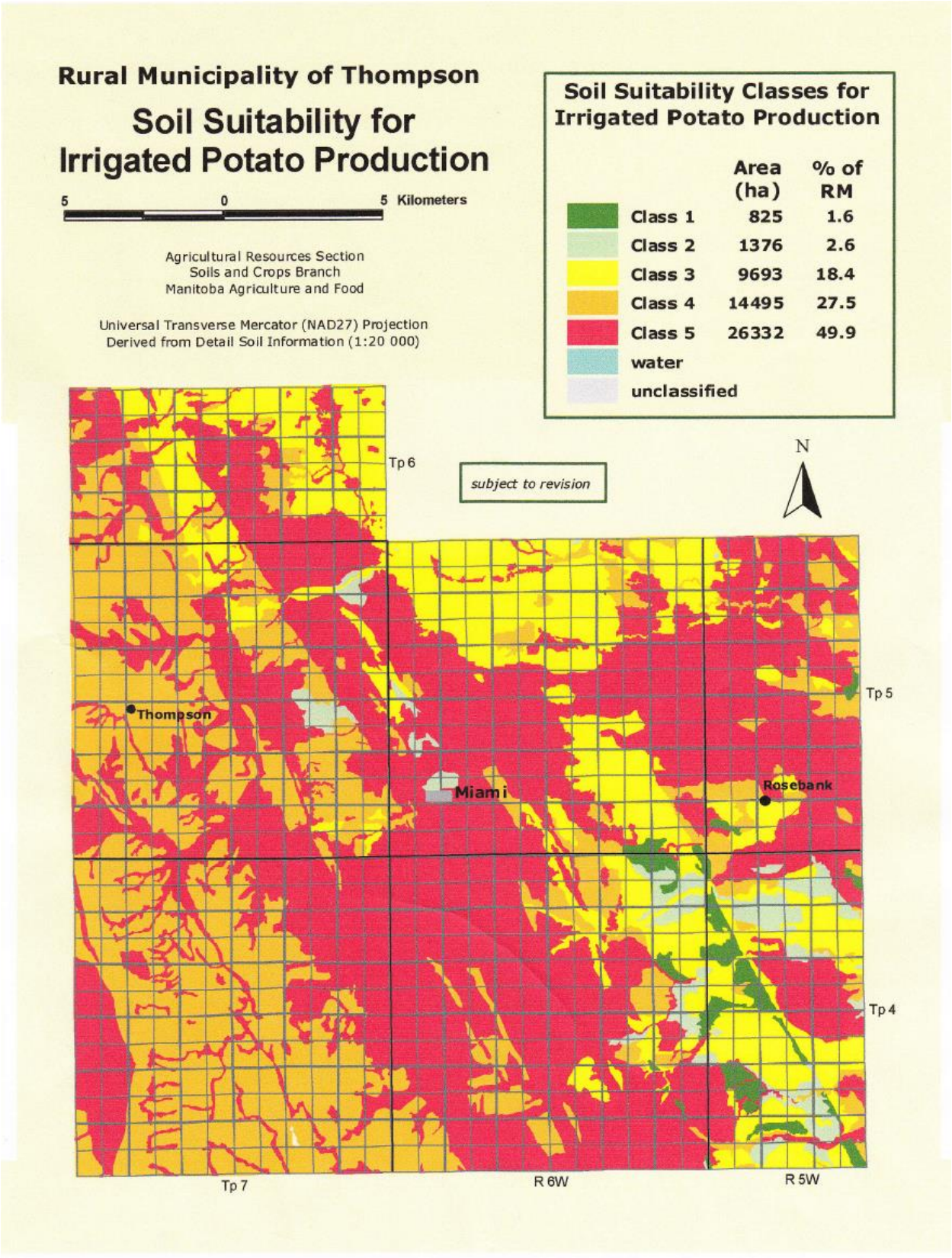

FIGURE 9 – POTENTIAL ENVIRONMENTAL IMPACT UNDER IRRIGATION

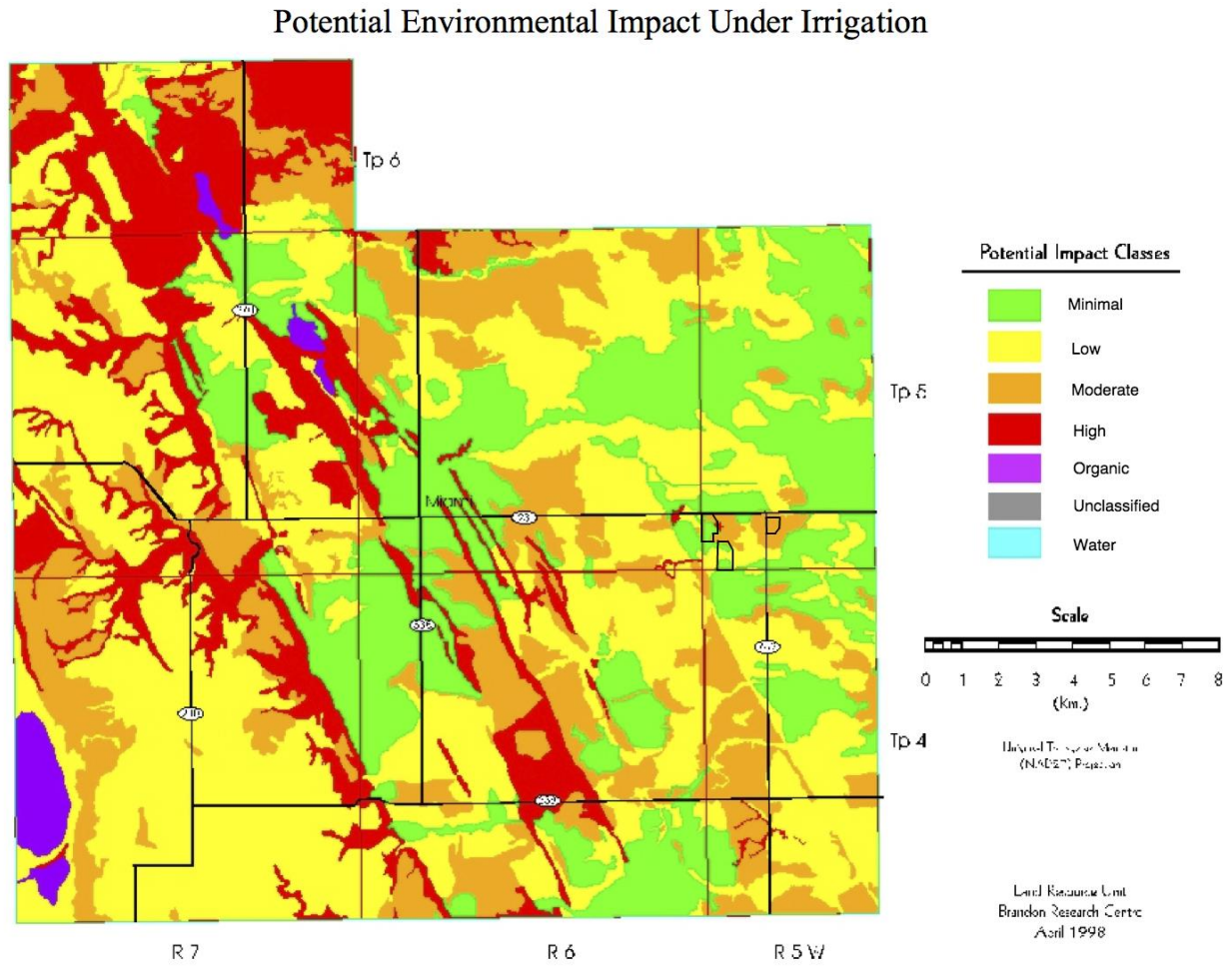

Image courtesy of the Land Resource Unit Brandon Research Centre, Fields drawn by Mark Derksen

FIGURE 10 – RISK OF WATER EROSION

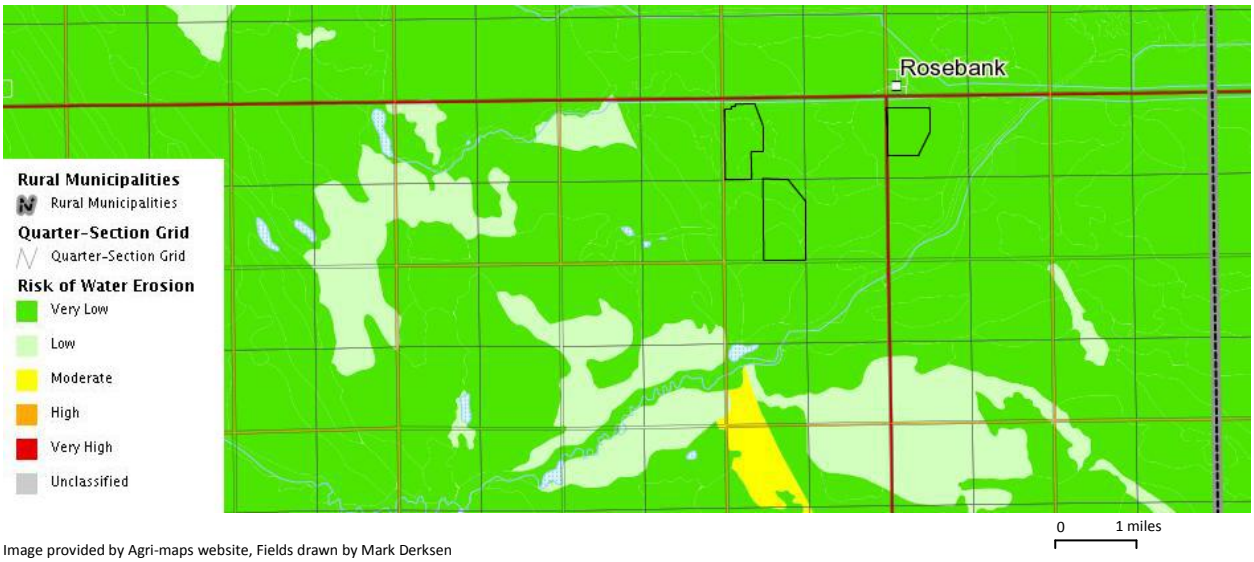

Image provided by Agri-maps website, Fields drawn by Mark Derksen

FIGURE 11 – SOIL CAPABILITY FOR AGRICULTURE

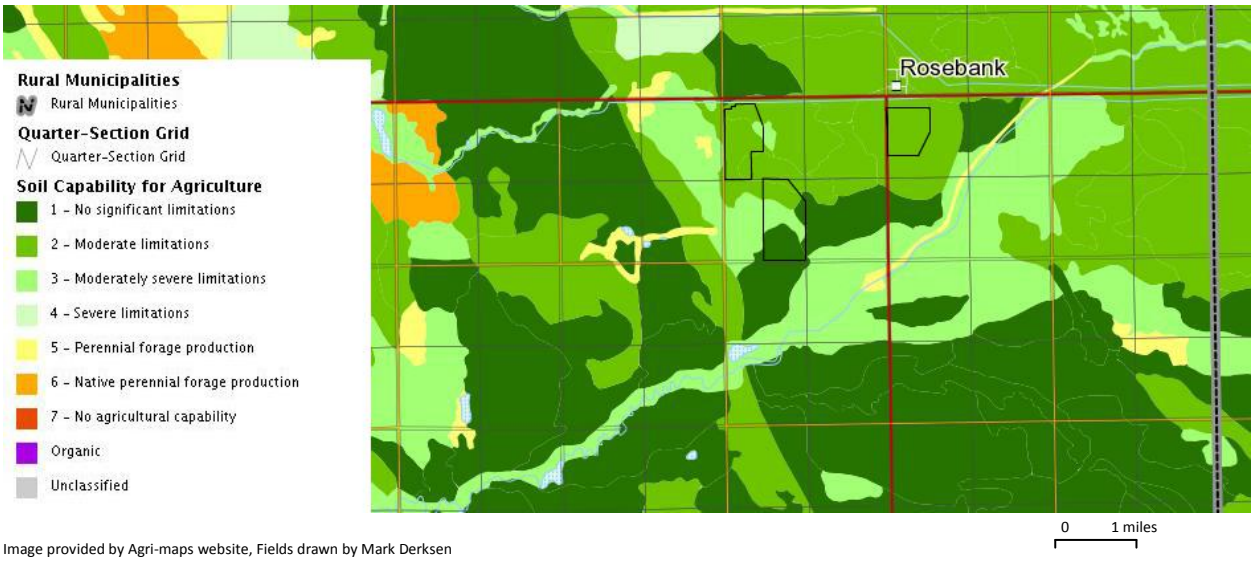

Image provided by Agri-maps website, Fields drawn by Mark Derksen

FIGURE 12 – SOIL SALINITY

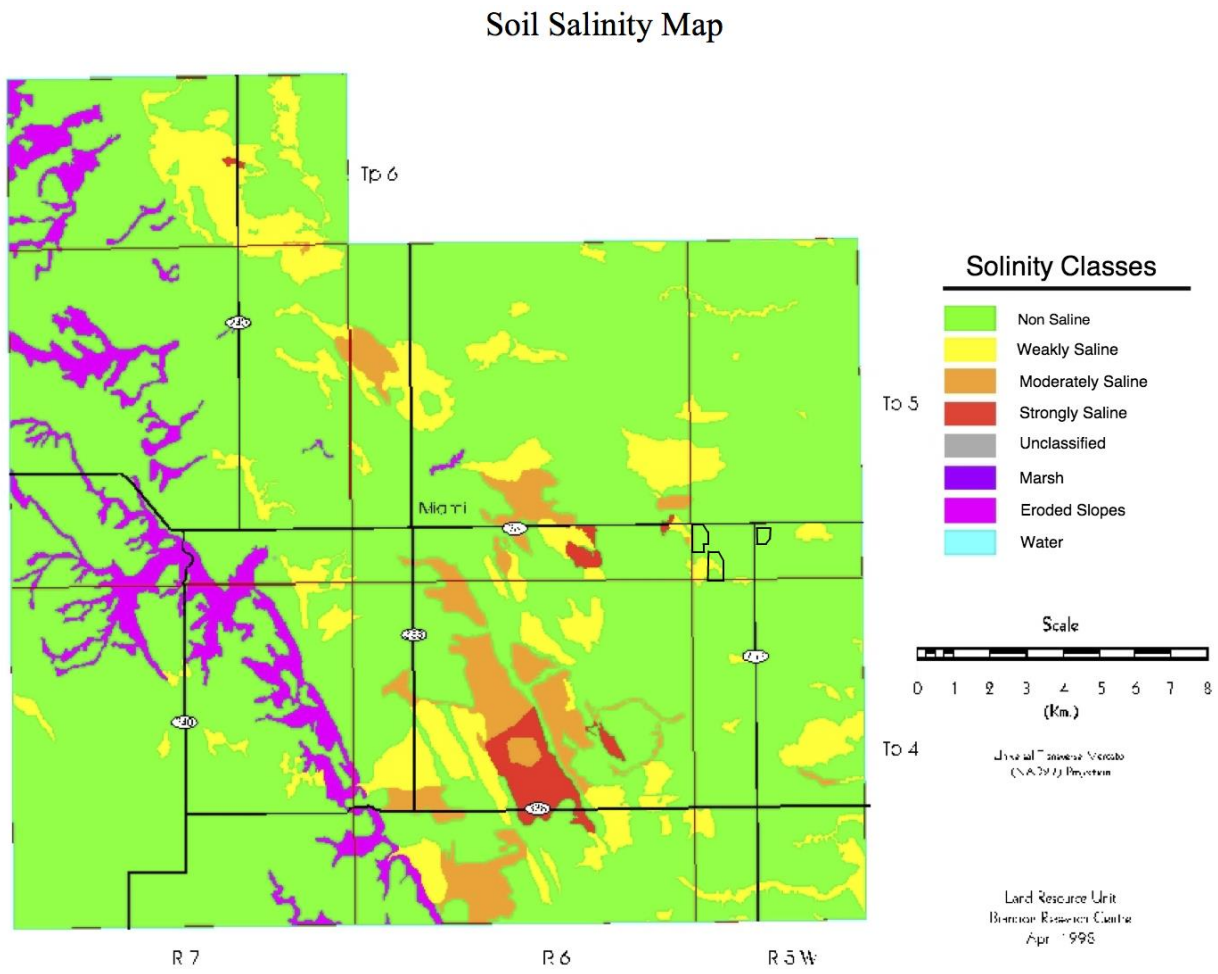

Image courtesy of the Land Resource Unit Brandon Research Centre, Fields drawn by Mark Derksen

FIGURE 13 – SOIL SURVEY (1 -5 - 6)

IMAGE FROM GOVERNMENT OF MANITOBA SOIL SURVAY, FIELD DRAWN BY MARK DERKSEN

FIGURE 14 – SOIL SURVAY (5 - 5 - 5)

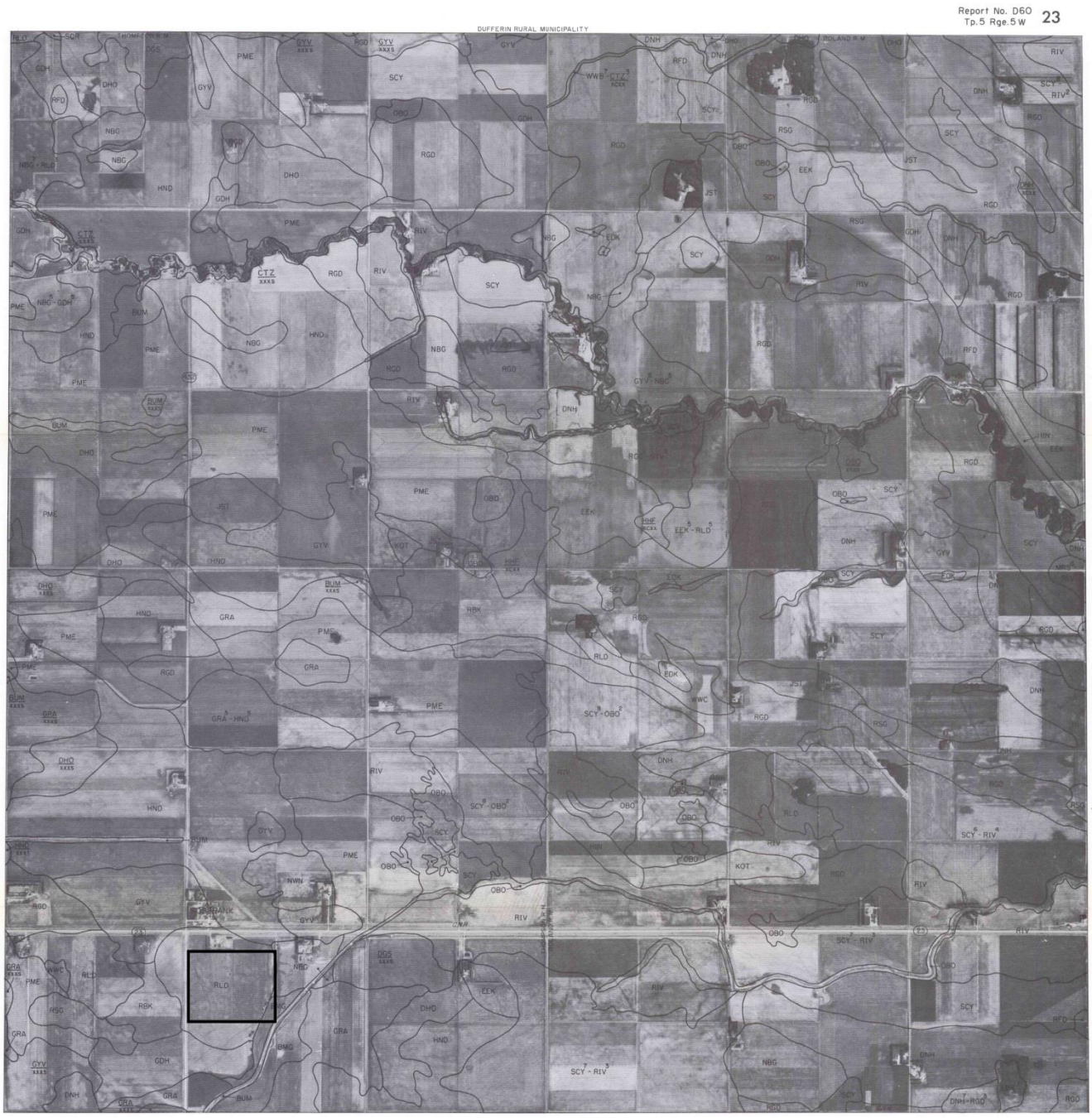

IMAGE FROM GOVERNMENT OF MANITOBA SOIL SURVAY, FIELD DRAWN BY MARK DERKSEN

FIGURE 15 – SOIL SURVAY (36 - 4 - 6)

IMAGE FROM GOVERNMENT OF MANITOBA SOIL SURVAY, FIELD DRAWN BY MARK DERKSEN