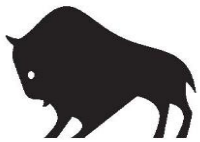


TECHNICAL REVIEW COMMITTEE

A TECHNICAL REVIEW REPORT PREPARED FOR

THE RURAL MUNICIPALITY OF

DUFFERIN

STREAMLINE DAIRY

NE¼ 24-6-7 WPM

TRC 12 – 044

August 1, 2018

A. INTRODUCTION – THE TEAM

The Technical Review Committee (TRC) is supported by the following department personnel:

- Agriculture (Ag); Livestock Environment, Nutrient Management and Business Development Specialists, Agricultural Engineer, and Veterinarians
- Municipal Relations (MR); Community Planners
- Infrastructure (MI); Development Review Technologists, Engineering and Operations Division; Development Review Officers, Water Management and Structures Division
- Sustainable Development (SD); Technical Review Officer, Soils Specialist, Environmental Engineer, Environment Officer, Habitat Mitigation Biologist, Regional Wildlife Manager, Groundwater Specialist, Water Rights Licensing Manager and Resource Planner

  and

- Any other specialist or department that may have an interest, which may be consulted during the process.

The Technical Review Coordinator, (Senior Planner, MR) chairs the committee.

THE REPORT (TRC Process Box 17)

<u>Prime Purpose of TRC Reports</u>

To provide objective, highly credible, technically-based assessments that:

a) Enable municipal councils to make informed Conditional Use Permit decisions;
b) Create a common stakeholder understanding of a livestock proposal, potential impacts and related regulatory requirements and safeguards;
c) Provide a vehicle/forum that enables the sharing of public concerns and proponent responses;
d) Offer recommendations to both municipal councils and proponents; and
e) Represents the fulfillment of the TRC's role as per 116(1)(b)(i) of *The Planning Act* – to determine, based on available information, that the

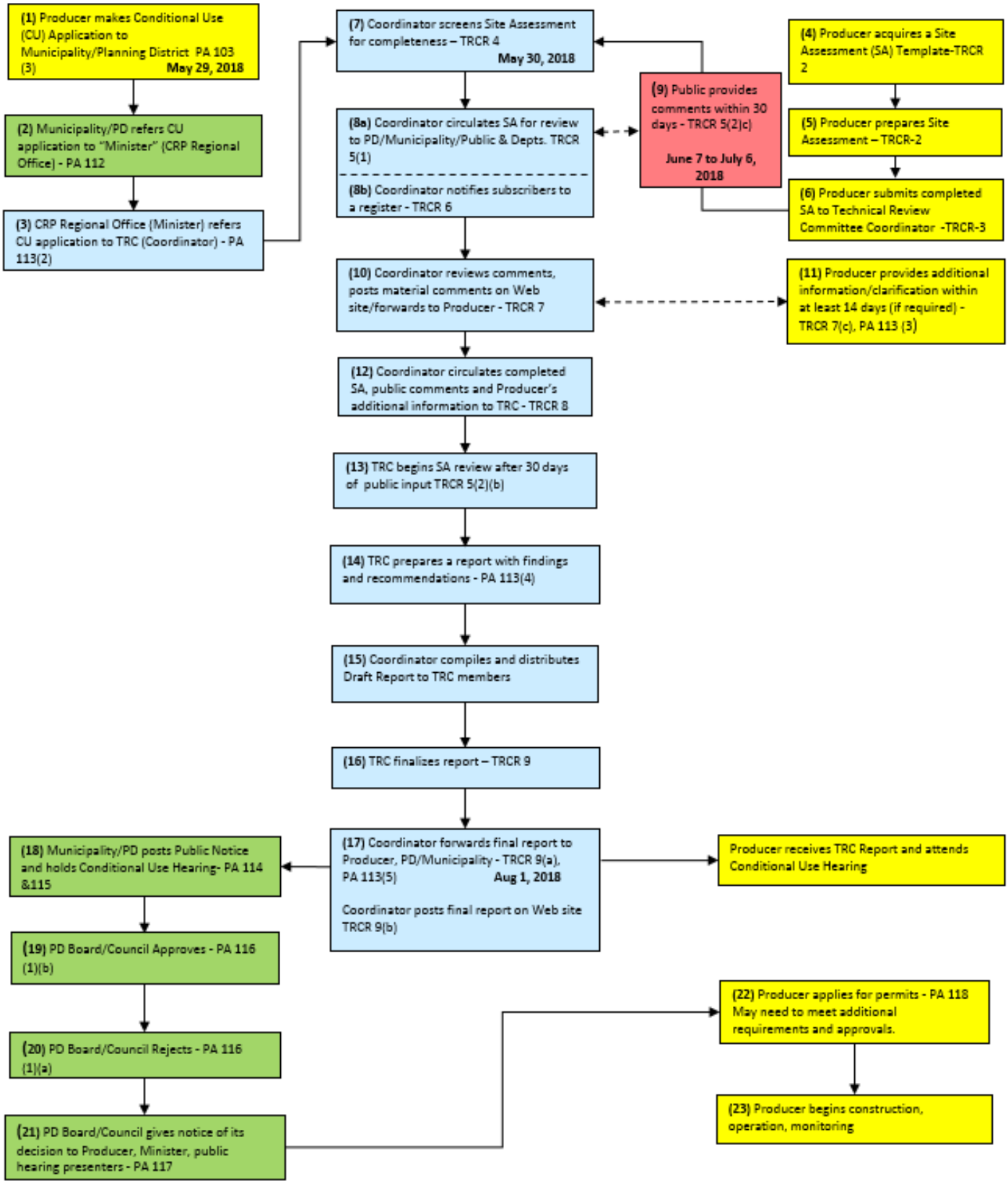
proposed operation will not create a risk to health, safety or the environment, or that any risk can be minimized through the use of appropriate practices, measures and safeguards

Should the Municipal Council provide conditional approval of the proposal, the project proponent may be required to obtain various permits and licenses from the Province to address in greater detail environmental aspects of the proposal.

THE PROCESS

TRC Process Chart with actual pertinent dates and brief overview:

The Technical Review Process: TRC-12-044 –Streamline Dairy



B. DESCRIPTION OF PROPOSED LIVESTOCK OPERATION

To view a detailed description, go to:

http://www.gov.mb.ca/mr/livestock/index.html

Applicant: Streamline Dairy

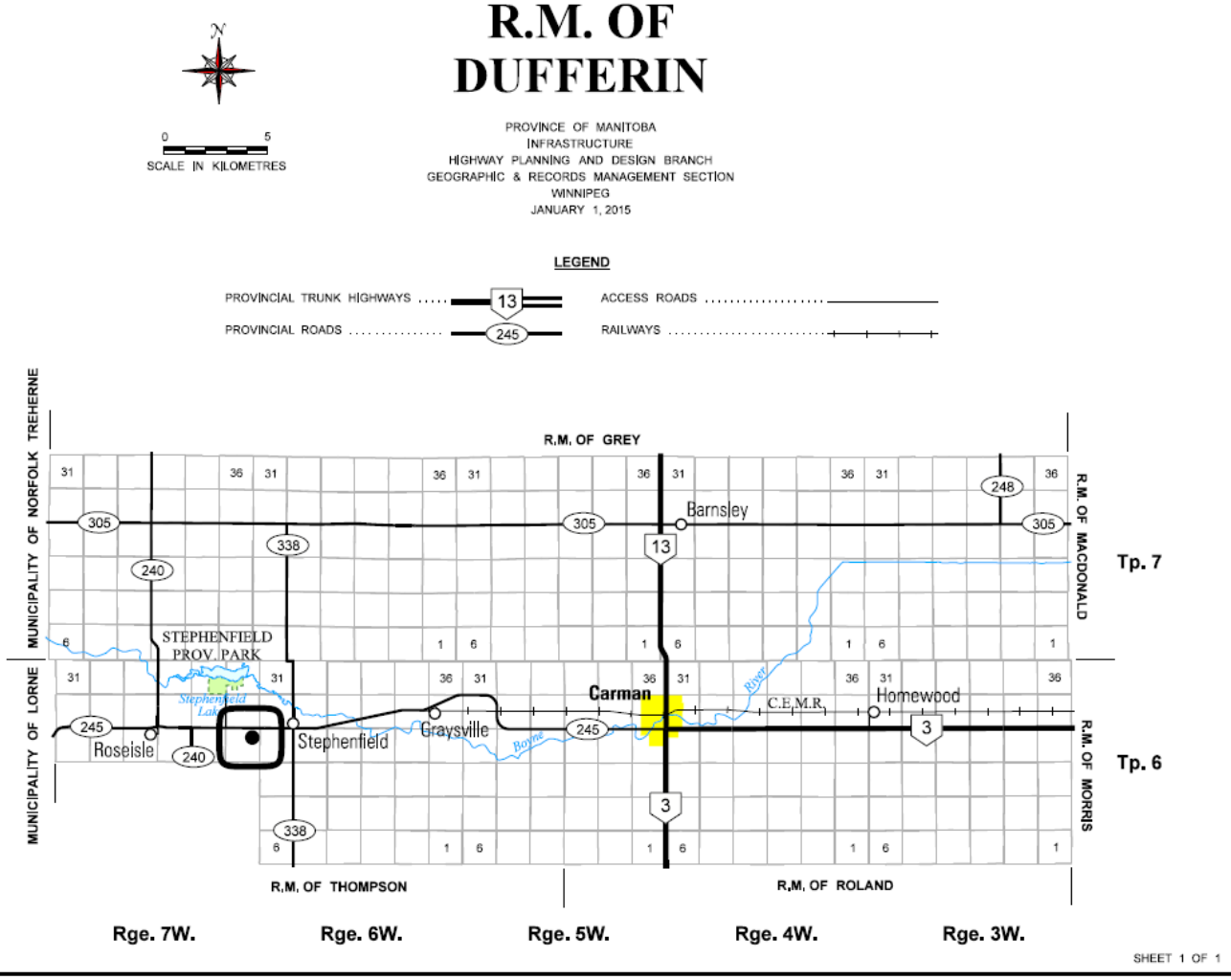
Site Location: NE ¼ 24-6-7 WPM - Approximately 1 mile (1.5 km) south west of the Community of Stephenfield, or 2.5 miles (4 km) east of the Community of Roseile, west of PR 338. Refer to map below.

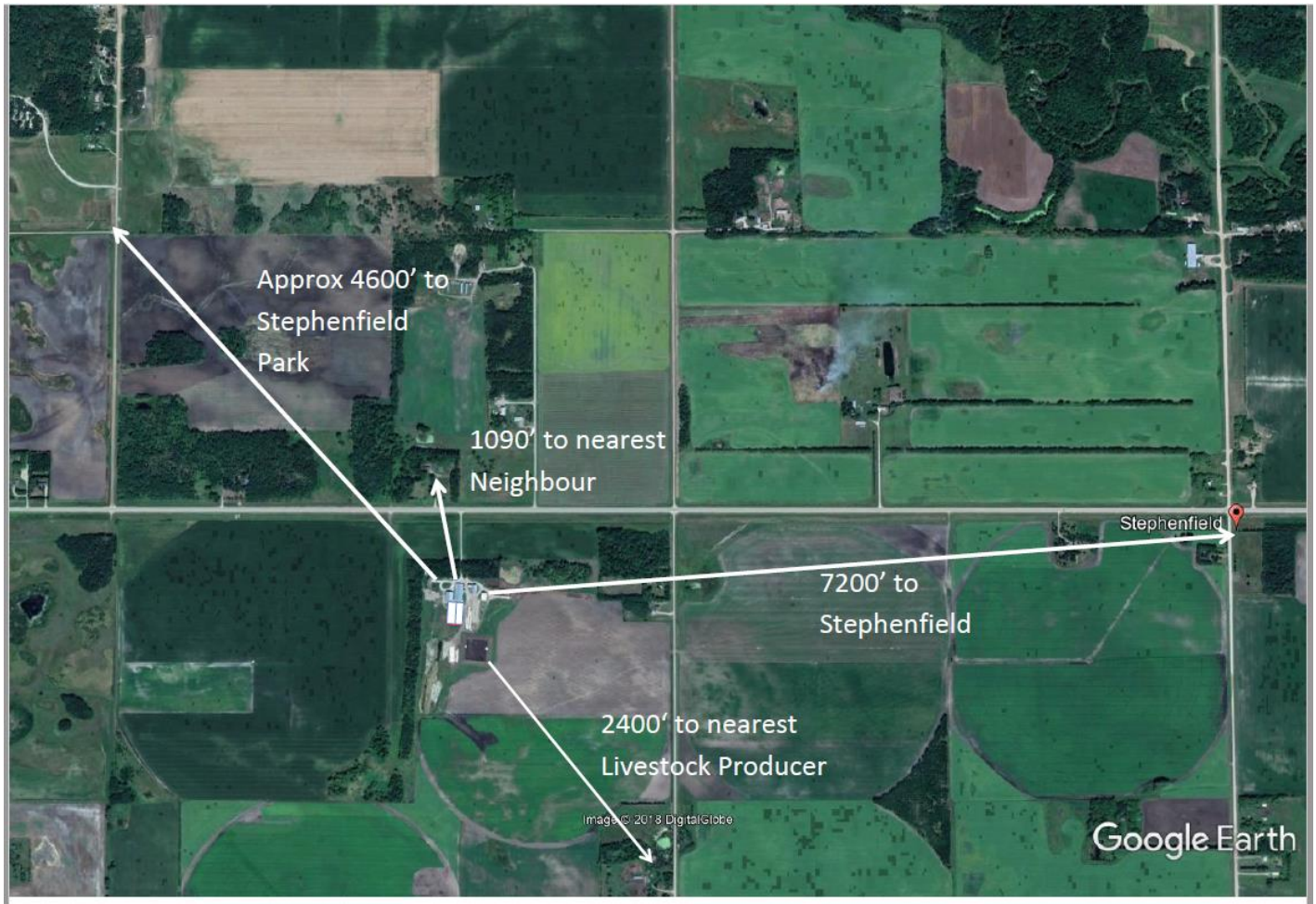
Proposal: To expand a current dairy operation from 150 animals (300 AU) to 235 animals (470 AU) within a confined livestock area and an animal confinement facility.

This will involve the following:

- Construction of a new building (192 feet x 130 feet)
- No existing buildings to be demolished
- Current herd heifers are within outside corrals
- Use of existing earthen manure storage facility and existing field storage
- Consuming 7848 imperial gallons of water per day (from a public pipeline)
- Composting mortalities
- Using the truck haul routes as shown in maps below

R.M. OF DUFFERIN

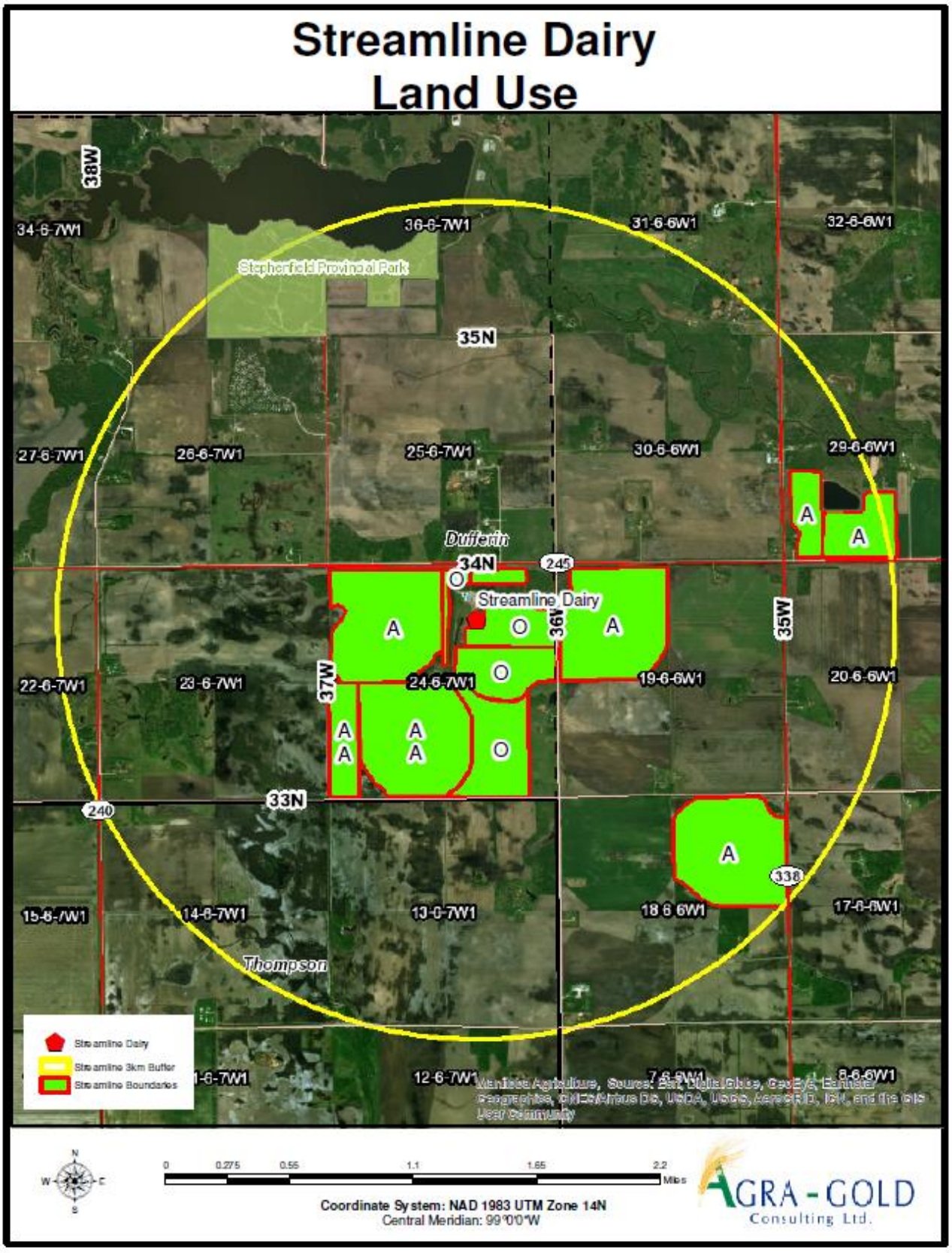




Streamline Dairy Site Location

Streamline Dairy Site Plan

Truck Route


Streamline Dairy
Land Use
38W
34-6-7W1
36-6-7W1
31-6-6W1
32-6-6W1
Stephenfield Provincial Park
35N
27-6-7W1
26-6-7W1
25-6-7W1
30-6-6W1
29-6-6W1
A
A
Dufferin
34N
245
O
Streamline Dairy
A
O
36W
A
35W
37W
22-6-7W1
23-6-7W1
24-6-7W1
19-6-6W1
20-6-6W1
O
A
A
A
A
O
33N
240
A
338
15-6-7W1
14-6-7W1
13-6-7W1
18-6-6W1
17-6-6W1
Thompson
Streamline Dairy
Streamline 3km Buffer
Streamline Boundaries
1-6-7W1
12-6-7W1
7-6-6W1
8-6-6W1
Manitoba Agriculture, Source: Esri, DeLorme, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
N
W
E
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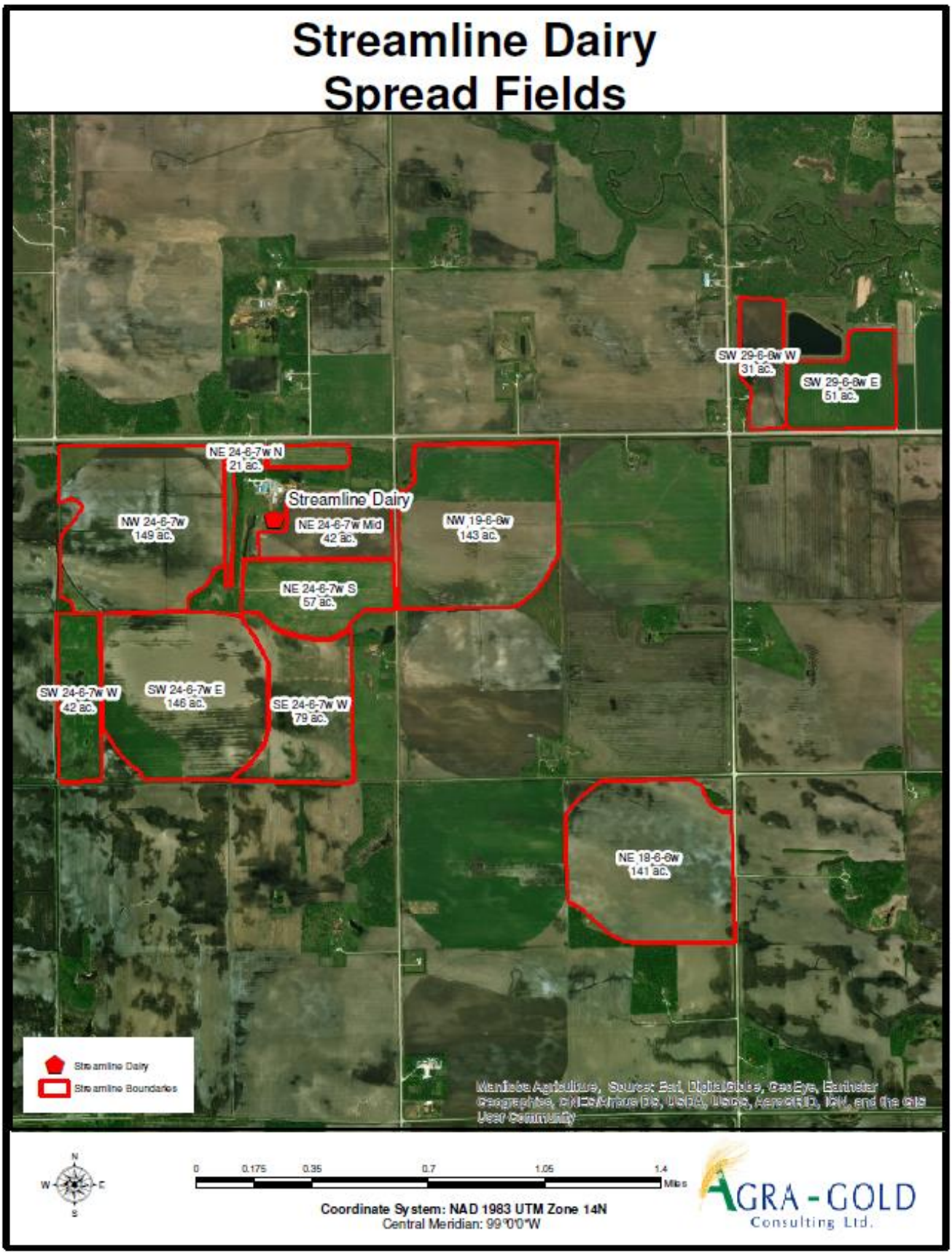
0
0.275
0.55
1.1
1.65
2.2
Miles
Coordinate System: NAD 1983 UTM Zone 14N
Central Meridian: 99°0'0"W
AGRA - GOLD
Consulting Ltd.

Streamline Dairy
Spread Fields



C. SITE ASSESSMENT OVERVIEW

Assessment Overview Table

Provincial Technical Overview of TRC 12-044- Streamline Dairy			
Items Provided by Project Proponent	**Confirmed**	**Related Existing Provincial Safeguards**	**Dept**
1. Submitted complete Site Assessment	X	The proposal is consistent with the Provincial requirements for a Livestock Operation.	MR
2. Clearly defined the project as an Animal Confinement Facility and a Confined Livestock Area	X	Any barn is in excess of 6,458 sq. ft. each will require a building permit from the Office of the Fire Commissioner. The proposal indicates that all of the mature cows will be housed in barns and the heifers will be outside in corrals. Corrals are outdoor confined livestock areas. Manitoba Sustainable Development should be contacted regarding the regulatory requirements for confined livestock areas.	MR
3. Proposed Project Site Physical Suitability	X	Streamline Dairy was established in 2007. Detailed soil survey indicates that the proposed dairy operation, including all of the spread fields, is located on land that is agriculture capability Class 3 to 5.	Ag
4. Proposed Project Site Flood Risk Potential	X	Water Management, Planning and Standards is not aware of any major, overland flood hazard at this location.	MI
5. Identified 7,848 imperial gallons/day required for proposed operation	X	Depending on the volume of groundwater extracted, a Water Use License may be needed. More information may be found at http://www.gov.mb.ca/sd/waterstewardship/licensing/wlb/obtaining.html. The proponent is advised to contact the Water Use Licensing Section at wateruse@gov.mb/ca or 204-945-3983.	SD
6. Proposed measures to meet storage and application regulations for manure	X	Annual submissions under the Livestock Manure and Mortalities Management Regulation would be processed by Environmental Approvals Branch of Sustainable Development. The proponent has identified the latest monitoring well submission for the operation's manure storage facility was in 2016. Annual submissions of analytical results are a requirement of the Livestock Manure and Mortalities Management Regulation. The proposed operation is required to register annual manure management plans. Manure management	SD

Provincial Technical Overview of TRC 12-044- Streamline Dairy			
Items Provided by Project Proponent	**Confirmed**	**Related Existing Provincial Safeguards**	**Dept**
		plans are reviewed by Branch staff for regulatory compliance at the time of submission. Soil analysis reports are included in the manure management plans. Additional details on the required information for manure management plans, including mandatory sampling depth, soil analysis and completing the form are provided at: http://www.gov.mb.ca/sd/envprograms/livestock	
7. Proposed Project Site with suitable mortalities disposal methods (composting)	X	Information on disposal is provided in section 9 of the site assessment, which requires the proponent to select from 4 acceptable methods of disposal. More specific information is included in the Livestock Manure and Mortalities Management Regulation and at http://www.gov.mb.ca/sd/envprograms/livestock	SD
8. Proposed Project Site with acceptable odour control measures	X	The proponent has indicated that there is an existing shelterbelt and that some of the manure will be injected. Injection or immediate incorporation will reduce odour from land application. As well, a crust typically forms on the surface of stored dairy manure that greatly reduces odour from the manure storage. Should odour become a problem for neighbouring residents, there is a complaints process under *The Farm Practices Protection Act*. A person who is disturbed by any odour, noise, dust, smoke or other disturbance resulting from an agricultural operation may make a complaint, in writing, to the Manitoba Farm Industry Board. The Act is intended to provide for a quicker, less expensive and more effective way than lawsuits to resolve nuisance complaints about farm practices. It may create an understanding of the nature and circumstances of an agricultural operation, as well as bring about changes to the mutual benefit of all concerned.	Ag
9. Proposed Project Site that meets development plan and zoning by-law requirements	X	The proposed project meets the intent of the Carman-Dufferin Development Plan, "**General Agricultural Policy Area**" Designation, By-law No. 3/2014. The proposal complies with Development Plan Policies pertaining to Livestock (Policies 3.1.13-3.1.22). The proposed project meets the minimum parcel size requirements of the "**AG**" **Agricultural General Zone**, By-law No. 3/2014 (Table 4.2-2: Agricultural Bulk Use Requirements).	MR

Provincial Technical Overview of TRC 12-044- Streamline Dairy			
Items Provided by Project Proponent	**Confirmed**	**Related Existing Provincial Safeguards**	**Dept**
10. Proposed Project Site that is a sufficient distance from native prairie, Wildlife Managements Areas and Crown Land.	X	Distances to these features is provided in section 10.5 of the site assessment. Where the distances exceed 1 mile, the department generally has no objection.	SD
11. Proposed Spread fields that are sufficient, and suitable for manure spreading	X	All of the manure generated by Streamline Dairy will be applied as a fertilizer for crop production. Streamline Dairy has exceeded the land required for the manure from 235 mature dairy cows and associated livestock in the RM of Dufferin. A detailed explanation of the land assessment can be found in Appendix A. The proponent has indicated that a commercial manure applicator may be used to apply the manure. Commercial manure applicators must be trained and licensed in Manitoba. The training is delivered by the Assiniboine Community College and licensing is through Manitoba Agriculture.	Ag
12. Proposed Spreadfields with sufficient minimum setbacks on Spreadfields from natural features (water sources etc.)	X	The proponent is required to demonstrate minimum setback distances listed in section 10.6 of the site assessment. Section 8.7 requires the proponent to indicate if all setbacks have been observed from and excluded from land base calculations. See Appendix B.	SD
13. Proposed Spreadfields that have been secured by spread agreements	X	The proposal indicates that the land available for manure application is owned and under agreement	Ag
14. Proposed Spreadfields that meet development plan and zoning by-law requirements	X	The spread fields meet the intent of the Carman-Dufferin Planning District Development Plan "**General Agricultural Policy Area**" Designation, By-law No. 3/2014. The proposal is in compliance with Development Plan Policies pertaining to Livestock (Policies 3.1.13-3.1.22). The project site will require variances to vary: the minimum separation distance requirement from a residence to an earthen manure storage facility from	MR

Provincial Technical Overview of TRC 12-044- Streamline Dairy			
Items Provided by Project Proponent	**Confirmed**	**Related Existing Provincial Safeguards**	**Dept**
		1640 ft to 1090 ft, and the minimum separation distance requirement from a designated area (Stephenfield Park) from 6561 ft to 4600 ft (Table 4.2-3: Livestock Separation Distances)	
15. Proposed trucking routes and access points that may impact Provincial Roads or Provincial Trunk Highways	X	The proposed truck route will utilize an existing access connection onto PR 245. We don't anticipate a significant increase in usage. Manure spreading: please note that any structures placed within the controlled areas of PR 240, PR 245 and PR 338 (125 feet from the edge of the right-of-way) requires a permit from our office. The contact is Sheena del Rosario at (204) 945-3457. The placement of temporary draglines or any other temporary machinery/equipment for manure application within the right-of-way of PR 240, PR 245, and PR 338 requires permission from our regional office in Portage. Please contact the Regional Planning Technologist (Denise Stairs) at (204) 871-2239. In addition, please notify the Regional Planning Technologist for the placement of temporary draglines or other temporary equipment for manure application within the controlled areas of PR 240, PR 245 and PR 338 (125 feet from the edge of the right-of-way).	MI
16. Proposed trucking routes – local roads	X	The proposed development is accessed by government road allowances and has frontage onto PR 305. Under The Planning Act, municipalities as a condition of approval may require Streamline Dairy to enter into a Development Agreement regarding the condition and upkeep of local roads used as truck haul routes	MR
17. Declared Provincial Waterways	X	The proposal will not impact any Provincial Waterways.	MI

Provincial Departments

- Ag – Agriculture
- MR –Municipal Relations
- MI – Infrastructure
- SD – Sustainable Development

D. PUBLIC COMMENTS & DISPOSITIONS

Public Comment Summary	
1. Wayne Remple **President /CEO** **Kroeker Farms**	- Kroeker Farms fully supports this expansion. - Kroeker Farms would also encourage the Municipality of Dufferin and the Province of Manitoba to fully support it as well. - This Expansion is in an ideal area and will be a benefit to local residents. - The soils surrounding this farm badly need the organic matter that will be generated as manure from this farm.
2. Terry Sandulak **SW ¼ 30-06-06** **Stephenfield, MB**	- Expansion of any dairy operation with close proximity to Stephenfield Lake and the Boyne River drainage basin should receive very strong scrutiny. - The area has soil permeability that is moderately rapid and as such any manure management should be closely studied. - Surrounding farmland has been extensively tiled and irrigated for potato production and run off makes its way into the drainage basin. - Stephenfield Lake is a source of drinking water and recreation for the population of the surrounding area. - Stephenfield Provincial Park is also closely situated to the dairy operation and some consideration of the increased usage of the park as well as the added private camp ground facilities should be studied in relation to changes in area farm practices.
3. Brad and Faye Harms **Stephenfield, MB**	- With the increase in animal units, our main concern is that there is adequate land base for spreading manure. - We have observed that most of the land the manure is being spread on has been tiled for drainage. This causes concern as the tiled fields pump water directly into the ditch which then flows directly into the Boyne River. 1. The Boyne River is water supply for Carman/RM of Dufferin. 2. How will the runoff water be monitored for nitrate levels? 3. If nitrate levels are too high, then is the run off stopped? 4. How is the manure storage lagoon lined and how often monitored for leakage?

A full copy of the public comments as well as the proponent's response may be viewed on the public registry at the following link

http://www.gov.mb.ca/mr/livestock/index.html

See Appendix C for the proponent's response to the public comments.

E. CONCLUSIONS & RECOMMENDATIONS

Overall Conclusion

The information contained in the Site Assessment submitted by the proponent generally meets Provincial requirements. In addition, based on available information it has been determined that the proposed operation will not create a risk to health, safety or the environment, or that any risk can be minimized through the use of appropriate practices, measures and safeguards.

Recommended Actions to Council

- As per Section 114(1) of *The Planning Act*, Council must set a date for a Conditional Use hearing.
- As per Section 114(2) of *The Planning Act*, at least 14 days before the date of the hearing, Council must:

  a) send notice of the hearing to
     (1) the applicant,
     (2) the Minister, (c/o the Morden Community & Regional Planning Office)
     (3) all adjacent planning districts and municipalities, and
     (4) every owner of property located within three kilometres of the site of the proposed livestock operation, even if the property is located outside the boundaries of the planning district or municipality;

  b) publish the notice of hearing in one issue of a newspaper with a general circulation in the planning district or municipality; and

  c) post a copy of the notice of hearing on the affected property in accordance with Section 170 of *The Planning Act*.

- The project site will require variances to vary: the minimum separation distance requirement from a residence to an earthen manure storage facility from 3280 ft. to 1650 ft. the minimum separation distance requirement from a residence to an animal confinement facility from 1640 ft. to 1090 ft. and the minimum separation distance requirement from a designated area (non-agricultural) from 6561 ft. to 5150 ft.
- As per Section 169(4)(b) of *The Planning Act,* a copy of the notice of hearing to vary the separation distance involving a livestock operation must be sent to every owner of property located within the separation distance that is proposed to be varied.

- Posting requirements should be followed as per Section 170 of *The Planning Act*.

- As per Section 174(1) of *The Planning Act*, Council may hold a combined Conditional Use and Variation hearing. It is recommended that the Conditional Use Hearing be held first followed by the Variation hearing.

- Council should specify the type(s) of operation, legal land location, number of animals in each livestock category and total animal units in its Conditional Use Order.

- As per Section 117 of *The Planning Act*, Council must send a copy of its (Conditional Use Order) to
    a) the applicant;
    b) the minister (c/o the Morden Community & Regional Planning Office); and
    c) every person who made representation at the hearing.

Council is welcome to contact Manitoba Sustainable Development's Technical Review Officer with Environmental Approvals Branch, as well as Regional Environmental Compliance and Enforcement staff to discuss environmental compliance issues, if applicable, with respect to the Livestock Manure and Mortalities Management Regulation (M.R.42/98).

Recommended Actions to Proponent

That any additional measures identified through subsequent municipal or provincial permitting and licensing in order to minimize any identified risks to health, safety and the environment be undertaken.

F. TECHNICAL REVIEW COMMITTEE MEMBERS

Name	Department	Title	Telephone
Don Malinowski Chair	Municipal Relations	Senior Planner Community & Regional Planning Branch	945-8353
Petra Loro	Agriculture	Livestock Environment Specialist Agri-Resource Branch	945-3869
Andrea Bergman	Sustainable Development	Environment Officer Environmental Approvals Branch	945-4384
Jeff DiNella	Infrastructure	Senior Development Review Technologist Highway Planning and Design Branch	945-2664

Appendix A

Manitoba Agriculture

Details of Land Assessment

In areas of lower livestock intensity such as the RM of Dufferin, it is currently the Province of Manitoba's policy to require sufficient suitable land for all of the nitrogen and half of the phosphorus generated by the livestock. This policy assumes that more land is available and could be brought into the Streamline Dairy manure management plan to balance phosphorus with crop removal, should it be necessary in the future.

In order to determine the land requirements for Streamline Dairy, nitrogen and phosphorus excretion by 235 mature cows and their associated livestock is compared to nitrogen utilization and phosphorus removal by the proposed crops to be grown. The calculation takes into consideration typical, modern feeding practices for dairy production and realistic, long-term crop yields from the Manitoba Agricultural Services Corporation (MASC) for the RM of Dufferin.

Land suitability is determined using soil testing for phosphorus and soil survey to establish the agriculture capability. All of the lands with soil tests were below 60 ppm Olsen P, as required to be considered suitable. The agriculture capability of the land included in the proposal includes Class 3 to 5. The limitations include moisture or droughtiness (M) on deeper sandy soils and wetness (W) in depressional areas. Class 1 to 5 soils are considered suitable for manure application.

Streamline Dairy is required to demonstrate that they have access to at least 407 acres of suitable land for manure application. Streamline Dairy has exceeded the land requirement with the 902 suitable acres for manure application provided and demonstrated that the operation has access to sufficient suitable land for all of the manure nitrogen and phosphorus generated by the cattle.

Appendix B

Staff in the Water Science and Watershed Management Branch have reviewed the site assessment for Streamline Dairy in the RM of Dufferin and have the following comments:

- Proper nutrient management applications that avoid excess loss of nutrients to surface waters are needed on lands receiving manure in southern Manitoba because long-term trend analysis of total phosphorus and total nitrogen has shown significant increases in these nutrients in the Assiniboine and Red rivers (Jones and Armstrong 2002).

- The proponent plans to inject liquid manure but does not indicate how the solid manure will be land applied. Injection of manure at appropriate rates poses lower environmental risk than other manure application. Application of liquid and solid manure to alfalfa/hay/pasture is surface broadcast without incorporation due to the perennial nature of the crop. To reduce the risk of runoff losses, application should not occur to saturated, frozen or snow covered soils or when heavy rainfall is expected within 24 hours. Surface applications of manure are most susceptible to runoff losses of nutrients when runoff events occur within the first week or two after application. Applications to frozen soil or to soil shortly before the soil freezes are therefore much more likely to result in nutrient losses during spring snowmelt – ideally late fall surface applications should occur well ahead of the soil freezing.

- Manure tends to have an excess of phosphorus (P) compared to nitrogen (N) and as a result, for most crops, application at N-based rates causes a buildup of soil P. Practices that minimize N losses from the manure improve the N:P ratio in the manure and help reduce P buildup when manure is applied at N-based rates.

- The proponent has acknowledged the setback areas for all water features have been observed and excluded from land base calculations. Setbacks should be clearly communicated to and observed by those involved in manure application to minimize the risk of nutrients entering surface waters.

- Manitoba has included phosphorus as a nutrient by which fertilizer application through manure, synthetic fertilizer, and municipal waste sludge to agricultural lands may be limited. To remain environmentally sustainable over a long-term planning horizon of 25 years or more, the proponent must be able to balance phosphorus inputs from applied manure and other nutrient sources such as commercial fertilizers with crop removal rates to avoid further build-up in soils. Consequently, sufficient land base must be available such that manure can be applied at no more than 1 times crop P removal rates. For long-term planning purposes, the proponent needs to have sufficient land available to ensure that manure can be applied at 1 times crop P removal. The proponent acknowledges that 815 acres may be required for the long term environmental sustainability of the operation with current crop choices and yield potential. The proponent has identified sufficient land (902 acres) to apply at 1 times crop P removal (407 acres required to apply at 2x crop P removal with current crop choices and yield

potentials) and to meet crop N requirements (373 acres) which meets regulatory requirements. It is important to rotate manure application across all spread fields so as to prevent excessive P buildup when applying at N uptake rates or 2x crop P removal rates.

- The provincial water well database indicates that there were three production wells and a number of test wells drilled on the NE of Section 24-06-07W. If there are unused water wells on the site or spread fields these shall be properly sealed. A sealed well report must be filed with the Groundwater Management Section of Sustainable Development for each well sealed. Information on well sealing and the sealed well report are available from Sustainable Development (204-945-6959) or: http://www.gov.mb.ca/sd/waterstewardship/water_quality/wells_groundwater/index.html. All but the most basic wells should be sealed by a well drilling professional. A list of currently licensed well drilling professionals can also be accessed from the above web page. All groundwater features, including water wells, should be given as a minimum, the buffer outlined in the regulations during manure application.

Appendix C

Applicant's Response to Public Comments

To: Livestock Technical Review Committee
Re: Concerns expressed – Streamline Dairy expansion, R.M. of Dufferin
July 12, 2018

I would like to acknowledge the concerns raised by the two area residents regarding our proposed Streamline Dairy expansion project in the RM of Dufferin. We want to assure them that we respect their opinions. I would also like to respond to issues raised in their letters.

Environmental issues that were raised are addressed in detail through a very rigorous approval process in Manitoba. Livestock producers are required to go through a provincial government approval process for developing or expanding operations. The process includes the preparation of a detailed site assessment, public review and a municipal conditional use hearing prior to receiving a permit to construct the facility. All aspects of the site assessment proposal including municipal siting requirements, manure management and potential environmental impacts are reviewed by the Provincial Government Technical Review Committee.

Manure Storage
An existing HDPE lined earthen manure storage (EMS) built in 2007 is proposed to contain the liquid manure from this operation.

Earthen manure storages have been regulated by the Province of Manitoba since 1995. A permit to construct an EMS requires a detailed geotechnical assessment of soils; a design prepared by a professional engineer; review of the design and all relevant information by Manitoba Sustainable Development prior to issuing the permit; site supervision of the construction by the responsible engineer; and finally certification of the storage by the engineer when the work is completed. This manure storage was built and certified as required in 2007.
Since this program originated, the Province annually conducts audits of manure storages. Any storages found to have experienced damage or deterioration are required to implement remedial repairs to ensure environmental safety. To date, no permitted storage in Manitoba has experienced an incident that has resulted in any significant environmental impact.

The above process is required for all manure storages constructed in Manitoba. Since the legislation was enacted in 1995 many hundreds of hog, poultry and dairy storages have been constructed. This program is among the strongest legislation in North America and has an excellent record of providing safe containment of livestock manures.

Water Quality
Surface and groundwater protection is provided through environmental regulations and through monitoring and enforcement. Manure storages must be designed by a professional engineer and approved by Manitoba Sustainable Development. Manure application is controlled by requiring manure management plans and soil, manure and source water testing. Monitoring wells located adjacent to the manure storages are sampled annually to determine if leakage from the storage is occurring. If an operation is over 300 animal units a manure management plan must be filed annually and approved by Manitoba Sustainable Development prior to manure application.

Streamline Dairy will have sufficient land (acres) to inject/spread the manure for the proposed expansion. Solid manure generated by this facility will be stored on site and applied to the land during the summer/fall. All fields used for solid manure application will be part of the manure management plan. Of the 902 acres submitted by Streamline Dairy for this technical review, 224 acres do not have any tile drainage and the remaining 678 acres do. Of these 678 acres that are tiled, 242 acres are in organic crop production, meaning that no conventional fertilizers are used on these acres, thus these acres would greatly benefit from the application of organic forms of nutrients. With this site assessment Streamline Dairy has provided more than 2 times the required land base for Nitrogen

and 2x crop removal of Phosphorus. As well, Kroeker Farms, the local producer who has offered the spread agreements, has a long history of experience in managing nutrient application on tiled land. They do not want to see any of these nutrients required for crop production leave the soil profile.

The management of potential release and drainage of nutrients can be accomplished in several ways with best management practices for manure application.

- Ensuring crop rotation matches nutrient application (aggressive, high nutrient usage and deep-rooted crops following manure application)
- Nutrient application rates that are targeted for specific crops (rate of applied manure nutrients to match crop uptake requirements)
- Timing of nutrient application (best season) that meets highest or peak nutrient demand in crop utilization.
- Using good manure application technology with appropriate rate and placement of the nutrients.
- Implementation of annual 0"-24" soil testing to monitor residual nutrient levels
- Rotation of manure application fields (using non-tiled fields during excessively wet seasons)

Streamline Dairy is committed to sustainable farming practices.

Martin Hamming
Streamline Dairy