



HYLIFETM
FOODS

Box 10000, 623 Main Street, Neepawa, Manitoba R0J 1H0
p: 1.204.476.3393 f: 1.204.476.3791 www.hyllife.com

March 15, 2021
File: 111440368

Manitoba Conservation and Climate Client File No. 2755.20

Attention: Ms. Shannon Kohler
Director, Environmental Approvals Branch
Manitoba Conservation and Climate
1007 Century Street
Winnipeg, MB R3H 0W4

Dear Ms. Kohler,

Reference: NOA Request – Licence 2870 RRR R3 Innovations Inc./Town of Neepawa IWWTF, Neepawa, MB

In accordance with Section 14(1) of *The Environment Act*, HyLife Foods LP and the Town of Neepawa, by way of this letter and supporting information, provides notice to the Director of a proposed alteration to the R3 Innovations Inc./Town of Neepawa Industrial Wastewater Treatment Facility in Neepawa, Manitoba.

R3 Innovations Inc. and the Town of Neepawa are proposing to accommodate an increase in processing at the pork processing plant (to 42,260 hogs/week) that will generate additional wastewater to be treated at the R3 IWWTF prior to discharge to the Whitemud River. An increase in the R3 IWWTF licensed effluent discharge to 1,911 m³/d is proposed as an interim limit to facilitate the higher processing rate at the pork plant. A process engineering evaluation has concluded that the anticipated increased influent flows and loads can be accommodated at the R3 IWWTF, while continuing to achieve license effluent quality limits, in its current configuration. No increase in the R3 IWWTF size or changes to the treatment processes are proposed as part of the subject alteration request.

On the basis of the studies undertaken, and information available to date as presented in the attached report, the adverse environmental effects of the proposed alteration are expected to be not significant. Accordingly, a \$500 application fee has been submitted from R3 Innovations in support of the two hard copies and one electronic copy of the submission.

Should you require any additional information or clarification please do not hesitate to contact Mr. Sheldon Stott, P.Ag., Senior Director of Corporate Sustainability, HyLife Foods LP, or Mr. Stephen Biswanger, P.Eng., Stantec Consulting Ltd.

Regards,


Sheldon Stott, P.Ag. Senior Director of Corporate Sustainability

Attachment: Two NOA Forms and Supporting Information
Two hard copies and one electronic copy of NOA

c. Colleen Synchyshyn, CAO Town of Neepawa
Stephen Biswanger, Stantec



Platinum
member



**R3 Innovations Inc. Discharge
Increase: Request for Notice of
Alteration**

Final

March 8, 2021

Prepared for:

HyLife Foods Ltd./R3 Innovations Inc.

Prepared by:

Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB R3B 2B9

Project Number: 111440368

Limitations and Sign-off

This document entitled R3 Innovations Inc. Discharge Increase: Request for Notice of Alteration was prepared by Stantec Consulting Ltd. ("Stantec") for the account of HyLife Foods Ltd./R3 Innovations Inc. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by

[Redacted Signature]

(signature)

Bill Krawchuk, M.N.R.M., MCIP, RPP

[Redacted Signature]

Reviewed by

[Redacted Signature]

(signature)

Stephen Biswanger, P.Eng.

Approved by

[Redacted Signature]

(signature)

Carmen Anseeuw, M.Env.



Executive Summary

R3 Innovations Inc. and the Town of Neepawa operate the R3 Innovations Industrial Wastewater Treatment Facility (R3 IWWTF) that exclusively serves the HyLife Foods pork processing plant in the Town of Neepawa, Manitoba. The R3 IWWTF has been in operation at this location since it was constructed in 2009. Licence 2870 RRR, originally dated December 18, 2014, is the current *Environment Act* Licence for the facility.

An increase in processing at the pork processing plant (to 8,200 hogs/day, 42,260 hogs/week) is proposed (see separate Pork Processing Plant Processing Increase Request for Notice of Alteration) that will generate additional wastewater to be treated at the R3 IWWTF prior to discharge to the Whitemud River. R3 Innovations has already received conditional approval to proceed with refurbishment of equipment at the R3 IWWTF; included in the conditional approval was an increase in the hydraulic discharge limit of the R3 IWWTF from 1,570 m³/day to 1,960 m³/day. The refurbishment of the facility is currently in process, however the immediate increase at the pork processing plant is expected to generate additional wastewater prior to completion of the refurbishment project. An increase in the R3 IWWTF licensed effluent discharge to 1,911 m³/d is proposed as an interim limit to facilitate the higher processing rate at the pork processing plant until the R3 IWWTF refurbishment is complete.

A process engineering evaluation (The Stover Group) concluded that the anticipated interim increase in influent flows and loads can be accommodated at the R3 IWWTF while continuing to achieve licence effluent quality limits in the existing configuration. No increase in the R3 IWWTF size or changes to the treatment processes are proposed as part of the subject alteration request.

The operation of the R3 IWWTF will provide continued high quality wastewater treatment and mitigation of water quality effects on the Whitemud River while accommodating increased flows from the HyLife Foods pork processing plant. The potential incremental environmental effects of the alteration are limited to the operation phase, considered negligible, and are expected to be not significant.



Table of Contents

EXECUTIVE SUMMARY	I
NOTICE OF ALTERATION FORM.....	III
1.0 INTRODUCTION.....	1
1.1 PROJECT OVERVIEW	1
1.2 THE PROPONENTS.....	1
1.3 LAND OWNERSHIP AND PROPERTY RIGHTS	2
1.4 PREVIOUS ALTERATIONS/STUDIES.....	2
1.5 PUBLIC ENGAGEMENT.....	2
1.6 FUNDING.....	2
2.0 PROJECT DESCRIPTION.....	3
2.1 EXISTING LICENSED DEVELOPMENT	3
2.2 PROPOSED ALTERATION	3
2.3 PROJECT SCHEDULE.....	3
3.0 SCOPE OF THE ASSESSMENT	4
3.1 SPATIAL AND TEMPORAL BOUNDARIES	4
3.2 ASSESSMENT APPROACH	4
3.2.1 Selection of Interactions and Valued Components	4
4.0 ENVIRONMENTAL EFFECTS AND MITIGATION	6
4.1 ASSESSMENT OF ENVIRONMENTAL EFFECTS	6
4.1.1 Surface Water.....	6
4.1.2 Infrastructure and Services.....	6
4.1.3 Summary of Mitigation Measures.....	7
5.0 CONCLUSION	8
6.0 REFERENCES.....	9

LIST OF APPENDICES

APPENDIX A	FIGURES.....	A.1
APPENDIX B	LICENCE AND CORRESPONDENCE	B.1
APPENDIX C	CERTIFICATES OF TITLE	C.1
APPENDIX D	PROCESS ENGINEERING EVALUATION	D.1



R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

Introduction
March 8, 2021

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

R3 Innovations Inc./Town of Neepawa (co-proponents) operates an Industrial Wastewater Treatment Facility (R3 IWWTF) located along Provincial Trunk Highway (PTH) 16 in the Town of Neepawa in southwestern Manitoba (Figure 1-1 in Appendix A). The R3 IWWTF has been in operation since it was constructed in 2009, exclusively serving the HyLife Foods pork processing plant.

A proposed 5% increase in processing at the HyLife Foods plant will increase the wastewater conveyed to the R3 IWWTF from the current 1,820 m³/day to approximately 1,911 m³/day for treatment and discharge to the Whitemud River. A parallel request for Notice of Alteration (NOA) is submitted separately for the proposed production capacity increase at the separately licensed pork processing plant (Stantec 2021).

R3 Innovations has received conditional approval (subject to acceptance of a revised licence) from Manitoba Conservation and Climate to proceed with refurbishment of equipment at the R3 IWWTF; included in the conditional approval was an increase in the hydraulic discharge limit to 1,960 m³/day from 1,570 m³/day (see correspondence in Appendix B) The refurbishment project is presently in process, however the immediate production increase at the pork processing plant is expected to generate additional wastewater prior to completion of the refurbishment project. An increase in the R3 IWWTF licensed effluent discharge to 1,911 m³/day is proposed as an interim limit to facilitate the higher processing rate at the pork plant until the R3 IWWTF refurbishment is complete (anticipated to be February 2022).

Section 14(1) of *The Environment Act* requires a proponent to notify the Director if the proponent intends to alter a licensed development so that it no longer conforms to licence conditions or has the potential to change the environmental effects (Manitoba Sustainable Development [MSD] 2016). The existing treatment facility is considered a Class 2 Development under the Classes of Development Regulation (MR 164/88) and presently holds *Environment Act* Licence No. 2870 RRR (Appendix B).

This report has been prepared by Stantec Consulting Ltd. (Stantec) on behalf of R3 Innovations Inc./Town of Neepawa (the proponents) and is submitted to Manitoba Conservation and Climate (MCC) in support of a request for Notice of Alteration to Licence 2870 RRR.

This report documents the proposed alteration, the potential environmental effects and planned mitigation measures associated with the proposed alteration and operation of the facility.

1.2 THE PROPONENTS

For the purposes of development licensing, the proponents are R3 Innovations Inc./Town of Neepawa (hereafter “R3 Innovations”). For further information regarding the R3 IWWTF, please contact Sheldon Stott, Senior Director of Corporate Sustainability, HyLife Foods at (204) 476-3393 (Sheldon.Stott@HyLife.com) or Colleen Sychyshyn, CAO Town of Neepawa at (204) 476-7603



R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

Introduction
March 8, 2021

(Neepawacao@wcgwave.ca), or for the NOA, Stephen Biswanger, P.Eng., Stantec Consulting Ltd. at (204) 924-7061 (Stephen.Biswanger@Stantec.com).

1.3 LAND OWNERSHIP AND PROPERTY RIGHTS

The existing R3 IWWTF currently occupies approximately 2.0 ha on property owned by R3 Innovations Inc. adjacent to the HyLife Foods pork processing plant in the Town of Neepawa along PTH 16. The legal description for the subject property in SW35-14-15WPM is described as Parcels A and B, Plan 48468 (NLTO). Current Certificates of Title for the property (the Site) are for R3 Innovations Inc., as noted in CT# 2421295 and CT# 2421294 (Appendix C). The property is appropriately zoned for heavy industrial land use (Neepawa & Area Planning District Board 2018; Town of Neepawa 2018).

1.4 PREVIOUS ALTERATIONS/STUDIES

Since 2008, R3 Innovations has progressively made modifications to the R3 IWWTF and the former Springhill Farms IWWTF (SH IWWTF). The alterations that have occurred at the R3 IWWTF and the SH IWWTF between 2008 and 2020 have been summarized in previous NOAs on file with MCC.

Recent conditionally approved additions to the existing R3 IWWTF as part of the refurbishment project, but not yet implemented, include: addition of a second primary treatment building annex and associated equipment; a second membrane treatment building annex and associated equipment; and a third aeration basin (Stantec 2020).

1.5 PUBLIC ENGAGEMENT

The R3 IWWTF has been operating at this location since construction in 2009. Anticipated public engagement is limited to the placement of the NOA on the Public Registry by MCC if required.

1.6 FUNDING

HyLife Foods/R3 Innovations will provide funding for all undertakings related to the Project.



R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

Project Description
March 8, 2021

2.0 PROJECT DESCRIPTION

2.1 EXISTING LICENSED DEVELOPMENT

The R3 Innovations IWWTF has been in operation since 2009, occupying approximately 2.0 ha of the site zoned “MH – Industrial Heavy” under the Town of Neepawa Zoning By-law No. 3184-18. A site plan showing the R3 IWWTF is provided as Figure 2-1 in Appendix A illustrating the present layout at the site. The existing R3 IWWTF area consists of a screening/pumping building, a treatment building, two aeration tanks, one anoxic tank, two post-anoxic tanks, a flow attenuation tank, and a cooling tower. Information on the existing treatment process can be found in a previous HyLife/R3 Innovations NOA submission (Stantec 2020).

The R3 IWWTF is licensed to discharge up to 1,960 m³/day (12 month daily average) to the Whitemud River as per correspondence from MCC in Environment Act Licence No. 2870 RRR (Appendix B), conditional upon completion of the refurbishment work (completion planned for February 2022). Over more than 10 years of operation, the facility’s effluent quality has consistently been better than licence limits. Regular monitoring, sampling, and reporting is completed in accordance with Clauses 50-54 of the Licence. Additionally, notification on each occasion related to the transfer and temporary storage of wastewater to/from the SH IWWTF (under exceptional circumstances) is provided to MCC as per the terms of Clause 33 of the Licence.

2.2 PROPOSED ALTERATION

The proposed alteration consists of an interim increase from the previous 1,570 m³/day (12 month average) licensed effluent discharge volume (Clause 25 of Licence No. 2870 RRR) to 1,911 m³/day. This would be in effect until the refurbishment project is completed when the conditionally approved 1,960 m³/day limit would apply. No changes in the licensed R3 IWWTF effluent quality limits are proposed.

As described in the Wastewater Treatment Plant Capacity Process Engineering Evaluation (The Stover Group 2021; Appendix D) the existing R3 IWWTF has sufficient capacity to treat the increased influent flows and loads from the pork processing plant. No alterations will be required to the existing R3 IWWTF treatment processes, although increased chemical usage (i.e., flocculants, polymer, etc.) and sludge production will occur generally proportional to the loading increase. The existing chemical storage and waste management systems will be sufficient with a slight increase in trucking frequency to accommodate the additional 5% sludge production and chemical usage (estimated to be an additional 1-2 trucks/day or less).

2.3 PROJECT SCHEDULE

The proposed change in ongoing operation (increase in wastewater treated) is expected to start as soon as possible in 2021 upon receiving approval for both the increase in production at the pork processing plant and this NOA request.



Scope of the Assessment
March 8, 2021

3.0 SCOPE OF THE ASSESSMENT

An assessment of potential effects of the alteration on human health and the environment is provided as supporting information to the request for NOA as described in the following subsections.

3.1 SPATIAL AND TEMPORAL BOUNDARIES

The R3 IWWTF is located immediately adjacent to the HyLife Foods pork processing facility, north of PTH 16 in the Town of Neepawa in southwestern Manitoba. For the purposes of this NOA, the Project Site (PS) (SW35-14-15W), Local Assessment Area (LAA) (up to 3 km radius), and Regional Assessment Area (RAA) (up to 16 km radius) are generally consistent with boundaries as defined in previous NOA submissions (including Stantec 2020). As no additional construction is proposed and no changes to the existing IWWTF are necessary, the temporal boundary for the assessment is limited to the ongoing operation of the facility until such time as the refurbishment work is completed (planned for February 2022).

3.2 ASSESSMENT APPROACH

This assessment was completed to meet the requirements of a request for NOA and includes assessing alteration-related environmental effects. The assessment focuses on valued components (VCs), which are environmental components of certain value or interest to regulators and other parties and are identified based on the potentially affected biophysical and socio-economic elements.

Alteration-related effects on VCs are assessed sequentially in the assessment. Residual effects are characterized using specific, predetermined criteria (i.e., direction [positive, neutral, negative], magnitude [negligible, low, moderate, high], geographical extent [PS, LAA, RAA], duration [short-, medium-, long-term], frequency [single event, multiple irregular, multiple regular, continuous], and reversibility [reversible, irreversible]).

3.2.1 Selection of Interactions and Valued Components

Biophysical and socio-economic VCs that could be affected through interactions of the environment and the alteration were identified to scope the assessment including:

- Air quality
- Greenhouse gas emissions
- Soils/terrain
- Surface water/groundwater
- Vegetation
- Wildlife and wildlife habitat
- Property and land use
- Infrastructure and services
- Employment and economy
- Heritage resources
- Aesthetics and noise
- Health and safety



R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

Scope of the Assessment

March 8, 2021

As there are no physical changes required at the R3 IWWTF to accommodate the additional wastewater, and the magnitude of the increase is small, the only VCs where there will be a Project-VC interaction and a potentially measurable effect relate to surface water and infrastructure and services. The R3 IWWTF itself is a utility service that provides treatment of wastewater from the processing plant prior to discharge to the Whitemud River. The proposed alteration will generate increases in traffic (related to increased chemical supply and sludge production/disposal) as well as an increase in effluent volume discharged. No changes are expected to other VCs.



4.0 ENVIRONMENTAL EFFECTS AND MITIGATION

This section outlines the assessment of environmental effects for those VCs identified in Section 3.2.1 as having potential project interactions. Components included in this assessment are surface water and infrastructure and services.

4.1 ASSESSMENT OF ENVIRONMENTAL EFFECTS

4.1.1 Surface Water

The proposed alteration at the pork processing plant will convey flows to the R3 IWWTF with minimal disruption to operations at both facilities. The proposed increase in processing at the pork processing plant will increase weekly wastewater flow to the R3 IWWTF by approximately 5% (12-month average) and increase effluent discharge to the Whitemud River proportionally by approximately 91 m³/day to approximately 1,911 m³/day as a 12-month daily average.

A process engineering evaluation of the R3 IWWTF (The Stover Group 2021) concluded that the anticipated increased loads and flows can be accommodated by the existing facility while continuing to meet existing licence effluent quality limits (Appendix D). No changes to effluent quality limits are proposed and no additional infrastructure is required to accommodate the increased wastewater volume from the pork processing plant. The resulting effects on surface water quality from the interim increase in effluent discharge will be negligible (effluent quality will continue to meet licence limits), short- to medium-term in duration, continuous for the ongoing operation period, and reversible.

4.1.2 Infrastructure and Services

The R3 IWWTF itself requires no infrastructure or process changes to continue to meet effluent quality limits while accommodating the proposed 5% (12-month average) increase in wastewater generated by the pork processing plant. Aside from the increase in wastewater treated, the operations of the R3 IWWTF will remain consistent with current operations.

Treatment of the increased wastewater volume will increase chemical usage (polymer flocculant, carbon source, etc.) at the facility proportional to the 5% increase in flow. Similarly, waste sludge generated by the treatment processes that is currently disposed of to landfill is predicted to increase commensurately. The existing storage facilities at the site are sufficient to accommodate the additional treatment and waste materials with an increase in delivery/hauling frequency of up to 1 to 2 trucks per day. The management of the additional waste sludge will be accommodated by existing disposal services with negligible effect.

Utility usage including water, electricity and natural gas will remain essentially the same with only negligible increases in usage that are within the capacity of the existing supply systems. The volumes of domestic waste and recyclables generated during operations are not anticipated to substantively change with the proposed R3 IWWTF alteration.



R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

Environmental Effects and Mitigation

March 8, 2021

The potential adverse residual effects on infrastructure and services related to the alteration are expected to be negligible, limited to the Local Assessment Area, short to medium-term in duration, regular in frequency over the period of operation, and reversible.

4.1.3 Summary of Mitigation Measures

Proposed mitigation measures incorporated as part of this NOA include those standard practices and procedures inherent to the current operations of the facility. Mitigation measures to be employed to avoid or mitigate adverse effects identified in the sections above include the following:

- Vehicle access will be limited to existing access points only.
- Solid waste generated on-site, including generated sludge, will be stored in secure bins or storage tanks and removed on a regular basis to licensed landfills.
- Proper procedures for storage and handling of hazardous materials (i.e., fuels, chemicals) in designated areas will be adhered to.
- An emergency response spill kit will be maintained and emergency response measures for spill clean-up and remediation will be implemented if necessary.
- The exterior of aboveground tanks will be regularly inspected and maintained to avoid leaks and failures as part of ongoing operations.



Conclusion
March 8, 2021

5.0 CONCLUSION

Potential interactions of the proposed alteration and the environment were evaluated with likely interactions examined to assess residual effects. Those interactions deemed to potentially generate adverse effects were described and evaluated with the assumption of typical mitigation measures representative of present operations at the site.

The proposed alteration for an interim 91 m³/day increase (from 1,820 m³/d to a 12-month average of 1,911 m³/d) in the previously licensed daily effluent discharge to the Whitemud River is not expected to create significant adverse effects to the biophysical and socio-economic environment. It is anticipated that the proposed alteration at the R3 IWWTF will be considered as a minor alteration to the licensed development.



R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

References
March 8, 2021

6.0 REFERENCES

Manitoba Sustainable Development (MSD). 2016. Information Bulletin – Alterations to Developments with Environment Act Licences. Available at:

http://www.gov.mb.ca/sd/eal/pubs/alteration_guidelines2016.pdf. Accessed December 12, 2019.

Neepawa & Area Planning District Board. 2018. Neepawa and Area Planning District Development Plan By-law No. 108. Prepared for the Neepawa & Area Planning District Board by WSP Canada. Neepawa, MB.

Stantec Consulting Ltd. 2021. HyLife Foods Processing Capacity Increase Request for Notice of Alteration. Prepared for HyLife Foods LP. February 2021. Winnipeg, MB.

Stantec Consulting Ltd. 2020. R3 Innovations Inc. IWWTF Refurbishment Notice of Alteration Final. Prepared for HyLife Foods Ltd./R3 Innovations Inc. June 2020. Winnipeg, MB.

The Stover Group. 2021. Wastewater Treatment Plant Capacity Process Engineering Evaluation Report. Prepared for HyLife Foods, Neepawa, Manitoba, Canada. January 15, 2021. Stillwater, OK.

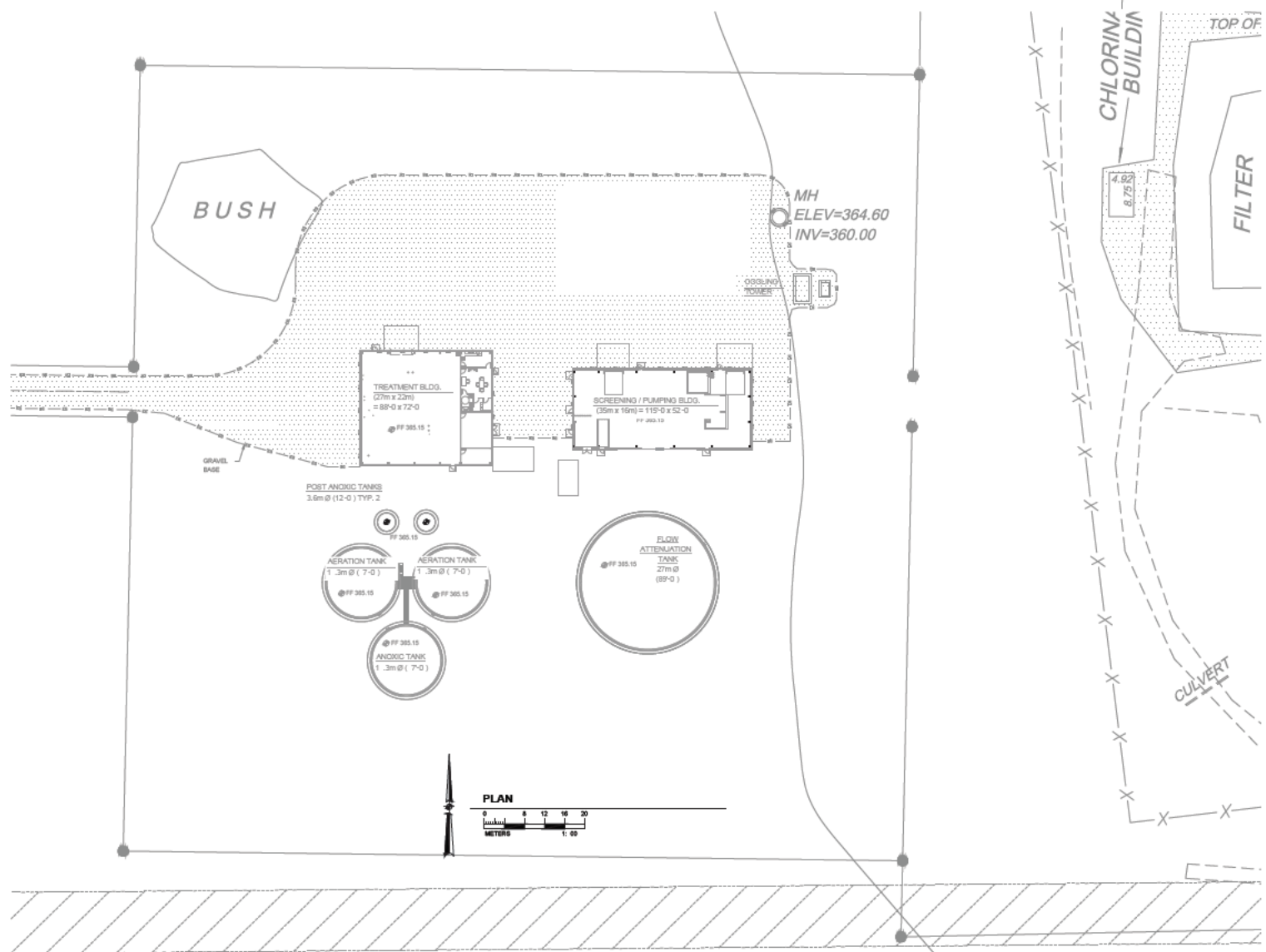
The Town of Neepawa. 2018. Town of Neepawa Zoning By-law No. 3184-18, Part 6 Zoning Map. Prepared for the Neepawa and Area Planning District by WSP. November 2018. Neepawa, MB.



Appendix A Figures
March 8, 2021

Appendix A FIGURES





Source: The Stover Group; Existing WWTP Location Plan;
 Drawing C1.0, REV C, June 2017., Stantec 2020

Project Location 111440328
 Town of Neepawa
 Manitoba
 Prepared by AC on 2020-03-02
 Technical Review by BK on 2020-03-02

Client/Project
 R3 Innovations Inc.
 IWWTF
 Notice of Alteration
 Figure No.
 2-1
 Title
 R3 IWWTF Site Plan



Appendix B Licence and Correspondence
March 8, 2021

Appendix B LICENCE AND CORRESPONDENCE





Sustainable Development

Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street, Winnipeg, Manitoba R3H 0W4
T 204 945-8321 F 204-945-5229
www.gov.mb.ca/sd

File: 2755.20

July 12, 2019

Sheldon Stott
R3 Innovations Inc.
Box 100
La Broquerie, MB R0A 0W0

Dear Mr. Stott:

Re: R3 Innovations Inc./Town of Neepawa IWWTF –Environment Act Licence No. 2870 RRR

Please find enclosed Environment Act Licence No. 2870 RRR issued to R3 Innovations Inc. and the Town of Neepawa for the operation of the Development being a wastewater collection system and 1570 m³/day hydraulic capacity industrial wastewater treatment facility (IWWTF) located at SW 35-14-15WPM in the Town of Neepawa.

Environment Act Licence No. 2870 RR has been rescinded; the revised licence amends Clause 25 to reflect the annual average of the hydraulic loading.

If you have any questions, please contact Jennifer Winsor, P.Eng. at 204-945-7012.

Yours sincerely,

“original signed by”

Cordella Friesen
Director
The Environment Act

- c. Scott Davies, A/Director, Environmental Compliance and Enforcement
Yvonne Hawryliuk – Environmental Compliance and Enforcement

LICENCE

Licence No./Licence n°	<u>2870 RRR</u>
Issue Date/Date de délivrance	<u>December 18, 2014</u>
Revised / Révisé	<u>May 31, 2019</u> <u>July 12, 2019</u>

In accordance with The Environment Act (C.C.S.M. c. E125)/
Conformément à la Loi sur l'environnement (C.P.L.M. c. E125)

Pursuant to Sections 11(1) /Conformément au Paragraphes 11(1)

THIS LICENCE IS ISSUED TO:/CETTE LICENCE EST DONNÉE À:

R3 INNOVATIONS INC.
AND
THE TOWN OF NEEPAWA;
“the Licencees”

for the operation of the Development, being a wastewater collection system and 1570 m³/day hydraulic capacity industrial wastewater treatment facility (IWWTF) located at SW 35-14-15WPM in the Town of Neepawa with discharge of treated effluent to the effluent outfall pipeline with final discharge to the Whitemud River in accordance with the Proposal dated June 12, 2013 and subsequent information provided on November 25, 2013 and a May 3, 2019 notice of alteration and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

“**accredited laboratory**” means an analytical facility accredited by the Standard Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation and Water Stewardship to be equivalent to the SCC, or be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

“**acute lethality**” means a toxic effect resulting in death produced in an organism by a substance or mixture of substances within a short exposure period (usually 96 hours or less);

“**affected area**” means a geographical area, excluding the property of the Development;

“**approved**” means approved by the Director or assigned Environment Officer in writing;

“**biosolids**” means accumulated organic solids, resulting from wastewater treatment processes. that have received adequate treatment to permit the material to be recycled;

“**calibrate**” means to determine, check, or rectify the graduation of any instrument giving quantitative measurement;

“**composite sample**” means a quantity of undiluted effluent composed of a minimum of 24 sequential series of discrete equal volumes of effluent collected at a rate proportionate to the flow rate of the effluent over a period of 24 consecutive hours;

“**day**” or “**daily**” means any period of 24 consecutive hours;

“**Director**” means an employee so designated pursuant to The Environment Act;

“**effluent**” means treated wastewater flowing or pumped out of the wastewater treatment facility;

“**Environmental Management System (EMS)**” means the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy;

“**Environment Officer**” means an employee so appointed pursuant to The Environment Act;

“**Escherichia coli (*E.coli*)**” means the species of bacteria in the fecal coliform group found in large numbers in the gastrointestinal tract and feces of warm-blooded animals and man, whose presence is considered indicative of fresh fecal contamination, and is used as an indicator organism for the presence of less easily detected pathogenic bacteria;

“**fecal coliform**” means aerobic and facultative, Gram-negative, nonspore-forming, rod-shaped bacteria capable of growth at 44.5° C, and associated with fecal matter of warm blooded animals;

“**final discharge point**” means the effluent monitoring location past the UV disinfection facility of the wastewater treatment plant, or the actual end-of-pipe outfall location for the effluent following the wastewater treatment plant at or near the banks of the Whitemud River, unless otherwise re-designated in writing by the Director;

“**five-day biochemical oxygen demand (BOD₅)**” means that part of the oxygen demand usually associated with biochemical oxidation of organic matter within five days at a temperature of 20°C;

“five-day carbonaceous biochemical oxygen demand (CBOD₅)” means that part of the oxygen demand usually associated with biochemical oxidation of carbonaceous organic matter within five days at a temperature of 20°C, excluding the oxygen demand usually associated with the biochemical oxidation of nitrogenous organic matter;

“flow proportional composite sample” means a combination of not less than ten individual samples of equal volumes of wastewater taken at equal increments of wastewater flow over a specified period of time;

“grab sample” means a quantity of wastewater taken at a given place and time;

“hog processing facility” means the HyLife Foods LP hog processing facility operating under Environment Act Licence No. 1102 RRR or subsequent revised licence and all the supporting facilities located on that same property;

“Industrial Services Agreement” means a signed and legally binding agreement, arrived at between the Licencees and HyLife Foods LP which outlines clear limits respecting the maximum daily and maximum weekly flow rates, as well as maximum daily and maximum weekly loading limits on such physical, chemical and biological parameters as may be requested by the Licencees or HyLife Foods LP;

“influent” means all the untreated hog processing wastewater and sanitary sewage from the hog processing facility and the associated truck wash facility, being directed into the wet well prior to the fine screening stage;

“IWWTF” means the industrial wastewater treatment facility which includes the wastewater collection system, the wastewater treatment plant and the wastewater treatment lagoons;

“kg/d” means kilograms per day;

“mg/L” means milligrams per litre;

“MPN index” means the most probable number of coliform organisms in a given volume of wastewater or effluent which, in accordance with statistical theory, would yield the observed test result with the greatest frequency;

“noise nuisance” means an unwanted sound, in an affected area, which is annoying, troublesome, or disagreeable to a person:

- a) residing in an affected area;
- b) working in an affected area; or
- c) present at a location in an affected area which is normally open to members of the public;

if the unwanted sound

- d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director and within a 90-day period, from 5 different persons falling within clauses a), b) or c), who do not live in the same household; or
- e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses a), b) or c) and the Director is of the opinion that if the unwanted sound had occurred in a more densely

populated area there would have been at least 5 written complaints received within a 90-day period, from 5 different persons who do not live in the same household;

“odour nuisance” means a continuous or repeated odour, smell or aroma, in an affected area, which is offensive, obnoxious, troublesome, annoying, unpleasant or disagreeable to a person:

- a) residing in an affected area;
- b) working in an affected area; or
- c) present at a location in an affected area which is normally open to members of the public;

if the odour, smell or aroma

- d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director and within a 90-day period, from 5 different persons falling within clauses a), b) or c) who do not live in the same household; or
- e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses a), b) or c) and the Director is of the opinion that if the odour, smell or aroma had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90-day period, from 5 different persons who do not live in the same household;

“Operator” means a person certified to operate the IWWTF and employed by the Licencees to manage the functional day-to-day operation of the IWWTF within the constraints of this Licence;

“pollutant” means a pollutant as defined in The Environment Act;

“process wastewater” means all wastewater from the hog processing facility, including sanitary sewage and wastewater from the associated truck wash facility;

“record drawings” means engineering drawings complete with all dimensions which indicate all features of the Development as it has actually been built;

“sludge” means accumulated solid material containing large amounts of entrained water, which has separated from wastewater during processing;

“Standard Methods for the Examination of Water and Wastewater” means the most recent edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Waterworks Association and the Water Environment Federation;

“thirty-day rolling average” means the arithmetic average of any daily reported data and the preceding 29 consecutive days of reported data;

“undiluted” means free of extraneous sources of water which could feasibly be prevented from mixing with effluent streams prior to their discharge at their designated final discharge point(s), and not having water added for the purposes of meeting any effluent quality limits specified in this Licence;

“UV disinfection” means a disinfection process for treating wastewater using ultraviolet radiation;

"**UV germicidal dose**" means the unit of intensity of ultra violet light that is required to kill bacteria and viruses present in the wastewater effluent;

"**wastewater**" means the spent or used water of a community or industry which contains dissolved and suspended matter;

"**wastewater collection system**" means the sewer and pumping system used for the collection and conveyance of domestic, commercial and industrial wastewater;

"**wastewater treatment lagoon**" means the component of this development which consists of an impoundment into which wastewater is discharged for treatment and storage;

"**wastewater treatment plant**" means the central facility of wastewater treatment facilities which contains all treatment processes exclusive of the collection system;

"**week**" or "**weekly**" means any period of 7 consecutive days; and

"**WHMIS**" means Workplace Hazardous Materials Information System.

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencees in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

Retain Copy of Licence

1. The Licencee shall at all times maintain a copy of this licence at the Development or at the premises from which the Development's operations are managed.

Future Sampling

2. In addition to any of the limits, terms and conditions specified in this Licence, the Licencees shall, upon the request of the Director:
 - a) sample, monitor, analyze and/or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such pollutants or ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, for such duration and at such frequencies as may be specified;
 - b) determine the environmental impact associated with the release of any pollutant(s) from the Development;
 - c) conduct specific investigations in response to the data gathered during environmental monitoring programs; or
 - d) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and analytical procedures being used,

bioassay data, flow rate measurements and such other information as may from time to time be requested.

3. The Licencees shall, unless otherwise specified in this Licence:
 - a) carry out all preservations and analyses on liquid samples in accordance with the methods prescribed in the most current edition of Standard Methods for the Examination of Water and Wastewater or in accordance with equivalent preservation and analytical methodologies approved by the Director;
 - b) carry out all sampling of, and preservation and analyses on, soil and air samples in accordance with methodologies approved by the Director;
 - c) have all analytical determinations undertaken by an accredited laboratory; and
 - d) report the results to the Director within 60 days of the samples being taken.
4. The Licencees shall actively participate in any future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for the Whitemud River and/or associated waterways and watersheds.

Reporting Format

5. The Licencees shall submit all information required to be provided to the Director or Environment Officer under this Licence, in writing, in such form (including number of copies) and of such content as may be required by the Director or Environment Officer, and each submission shall be clearly labeled with the Licence Number and Client File Number associated with this Licence.

Equipment Breakdown

6. The Licencees shall, in the case of physical or mechanical equipment breakdown or process upset where such breakdown or process upset results or may result in the release of a pollutant in an amount or concentration, or at a level or rate of release, that causes or may cause a significant adverse effect, immediately report the event by calling 204-944-4888 (toll-free 1-855-944-4888). The report shall indicate the nature of the event, the time and estimated duration of the event and the reason for the event.
7. The Licencees shall, following the reporting of an event pursuant to Clause 6,
 - a) identify the repairs required to the mechanical equipment;
 - b) undertake all repairs to minimize unauthorized discharges of a pollutant;
 - c) complete the repairs in accordance with any written instructions of the Director; and
 - d) submit a report to the Director about the causes of breakdown and measures taken, within one week of the repairs being done.

Safety and Security

8. The Licencees shall continually maintain an up-to-date inventory of any process and cleaning chemicals used and/or stored on-site that would be captured by any applicable federal/provincial WHMIS regulations and protocols, and make this information and applicable MSDS sheets available to an Environment Officer upon request.

9. The Licencees shall prepare, within 90 days of the date of issuance of this Licence, and maintain an emergency response contingency plan in accordance with the Canadian Centre for Occupational Health and Safety “Emergency Response Planning Guide” or other emergency planning guidelines acceptable to the Director.
10. The Licencees shall implement a high standard of equipment maintenance and good housekeeping and operational practices with respect to the Development, at all times.
11. The Licencees shall implement and continually maintain in current status, an Environmental Management System (EMS) for the Development which is acceptable to the Director.
12. The Licencees shall:
 - a) install or utilize existing security fencing, acceptable to the Director, to enclose the wastewater treatment plants or components thereof, that are not enclosed in a building with a security system acceptable to the Director; and
 - b) maintain the security system in a manner acceptable to the Director.

Certification

13. The Licencees shall obtain and maintain classification of the Development pursuant to Manitoba Regulation 77/2003 respecting Water and Wastewater Facility Operators or any future amendment thereof and maintain compliance with all requirements of the regulation including, but not limited to, the preparation and maintenance of a Table of Organization, Emergency Response Plan and Standard Operating Procedures.
14. The Licencees shall carry out the operation of the Development with individuals properly certified to do so pursuant to Manitoba Regulation 77/2003 respecting Water and Wastewater Facility Operators or any future amendment thereof.

Industrial Services Agreement

15. The Licencees shall:
 - a) prepare and execute a current comprehensive and enforceable Industrial Services Agreement, which is acceptable to the Director, for the purposes of defining maximum daily and maximum weekly influent limits respecting volume and pollutant loading rates which would protect the operational integrity of the IWWTF in terms of the design capability and/or in consideration of the actual performance of the IWWTF relative to the effluent quality limits as specified in this Licence, or any revision thereof;
 - b) provide the Director with a copy of the Industrial Services Agreement upon being signed by all parties; and
 - c) provide the Director with a copy of any future revised Industrial Services Agreement.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Respecting Construction

16. The Licencees shall notify the assigned Environment Officer not less than two weeks prior to beginning construction at the Development. The notification shall include the intended starting date of construction and the name of the contractor and contact person responsible for the construction.
17. The Licencees shall obtain all necessary federal, provincial and/or municipal licences, authorizations, permits and/or approvals for construction of relevant components of the Development prior to commencement of construction.
18. The Licencees shall dispose of non-reusable construction debris from the Development at a waste disposal ground operating under the authority of a permit issued pursuant to Manitoba Regulation 150/91 respecting Waste Disposal Grounds, or any future amendment thereof, or a Licence issued pursuant to The Environment Act.
19. The Licencees shall locate fuel storage and equipment servicing areas established for the construction and operation of the Development a minimum distance of 100 metres from any waterbody, and shall comply with the requirements of Manitoba Regulation 188/2001 respecting Storage and Handling of Petroleum Products and Allied Products or any future amendment thereof.
20. The Licencees shall, during construction of the Development, operate, maintain and store all materials and equipment in a manner that prevents any deleterious substances (fuel, oil, grease, hydraulic fluids, coolant, paint, uncured concrete and concrete wash water, etc.) from entering the discharge route and associated watercourses, and have an emergency spill kit for in-water use available on site during construction.
21. The Licencees shall not permit any pollutants to be directed into, or transported by, any surface drainage route leading off the property of the Development.
22. The Licencees shall pressure test the integrity of the connections of any new underground piping of the Development, which is intended to transport wastewater under pressure, before such pipe connections are backfilled with earth and make repairs as required.
23. The Licencees shall:
 - a) clearly mark all those existing groundwater monitoring wells located on the property of the Development which have the potential to be disturbed by any construction activity involving the expansion and modification of the Development; and
 - b) decommission any existing groundwater monitoring well(s) which are planned to be terminated or relocated (in the course of the construction activities) in a manner consistent with any applicable guidelines or requirements administered by the Manitoba Conservation and Water Stewardship.

Respecting Operation of the Development

24. The Licencees shall not accept wastewater, liquid sludge or manure into the IWWTF from any source other than the HyLife Foods hog processing facility and truck wash facility, except for seed as may be required by the IWWTF upon the start-up of the IWWTF modifications or to recover from a treatment process upset.
25. The Licencees shall operate and maintain the IWWTF in such a manner that, when measured immediately following the flow attenuation tank:
 - a) the hydraulic loading does not exceed 1,570 cubic metres over any 24-hour period based on an annual average; and
 - b) the organic loading does not exceed 6,023 kilograms of five-day biochemical oxygen demand over any 24-hour period.
26. The Licencees shall:
 - a) stage the ramp-up of the operation of the IWWTF in accordance with the written instructions of the Operator of the IWWTF;
 - b) limit the wastewater being directed into the IWWTF to only that wastewater which is generated at the HyLife Foods hog processing plant and truck wash facility while operating at a hog processing rate not exceeding 40,000 hogs per week averaged over any 12 month period; and
 - c) continually monitor and manage the quality and quantity of the raw wastewater streams from the HyLife Foods hog processing facility and truck wash facility relative to the design limitations of the IWWTF and consistent with maintaining ongoing compliance with the limits, terms and conditions set out in this Licence.
27. The Operator of the IWWTF shall:
 - a) provide written instructions to HyLife Foods, when necessary, with respect to managing the quality and quantity of any wastewater streams being directed from the hog processing facility and the truck wash facility to the IWWTF, clearly indicating the necessity for the instruction(s) and any critical timing associated with executing the instruction(s); and
 - b) copy the Director on any written authorizations or instruction provided to HyLife Foods concerning the commissioning of the altered IWWTF and the ongoing management of the quality and quantity of any influent wastewater streams being directed into the wet well at the front of the IWWTF.
28. The Licencees shall install and maintain adequate instrumentation to provide constant monitoring of the UV process to ensure compliance with the disinfection requirements. Such instrumentation shall include but not be limited to the following:
 - a) a UV sensor to monitor lamp intensity;
 - b) an appropriate alarm;
 - c) a lamp monitoring system to identify the location of individual lamp failures;
 - d) an hour meter which cannot be reset to display actual hours of UV lamp operation; and
 - e) protective circuits for overcurrent and ground current leakage detection.
29. The Licencees shall utilize UV lamps that have a rated output of at least 254 nanometres (nm) capable of delivering a UV germicidal dose in excess of 30,000 microwatt seconds/sq cm.

30. The Licencees shall operate and maintain the UV units to give a germicidal dose of 80% or more of the design germicidal dose, at the end of the lamp life.
31. The Licencee shall submit, to the Director for approval within 90 days of issuance of this Licence, an operational plan for the existing wastewater treatment lagoon, including plans to seal and/or decommission the discharge outlet from the facility.
32. The Licencees shall maintain a 1.0 metre freeboard at the existing wastewater treatment lagoon cells at all times.
33. The Licencees shall:
 - a) transfer wastewater to the existing wastewater treatment lagoon at the Development, only under exceptional circumstances, for temporary wastewater storage purposes only;
 - b) transfer the stored wastewater from the existing wastewater treatment lagoon to the wastewater treatment plant for treatment and discharge only through the final discharge point; and
 - c) notify the Environment Officer on each occasion when the transfer of wastewater to the existing wastewater treatment lagoon occurs and keep a record of each transfer.

Respecting Effluent Releases from the Development

34. The Licencees shall release effluent from the Development only through the final discharge point which leads to the Whitemud River.
35. The Licencees shall not release any effluent from the Development if the quality of the effluent is such that:
 - a) the organic content in the effluent, as indicated by the five-day carbonaceous biochemical oxygen demand, is in excess of 25 mg/L, as determined from any composite sample of the effluent;
 - b) the total suspended solids content in the effluent, is in excess of 25 mg/L, as determined from any composite sample of the effluent;
 - c) the fecal coliform content in the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of sample, as determined by the monthly geometric mean of 1 grab sample collected at equal time intervals on each of a minimum of 3 consecutive days per week;
 - d) the E. coli content in the effluent, as indicated by the MPN index, is in excess of 200 per 100 millilitres of sample, as determined by the monthly geometric mean of 1 grab sample collected at equal time intervals on each of a minimum of 3 consecutive days per week;
 - e) the concentration of total nitrogen in the effluent on any day is in excess of 15.0 milligrams per litre, as determined by the 30-day rolling average;
 - f) the concentration of total phosphorus in the effluent on any day is in excess of 1.0 milligrams per litre, as determined by the 30-day rolling average; or
 - g) the total ammonia is in excess of the concentration specified in Schedule 1 of this Licence, as determined by the pH of the effluent.
36. The Licencees shall not, on any day, release a quality of effluent from the Development which:
 - a) causes, or contributes to, the mixing zone for the effluent in the Whitemud River being acutely lethal to aquatic life passing through the mixing zone; or

- b) which can be demonstrated to be acutely lethal to fish within the mixing zone for the effluent in the Whitemud River using a 96-hour static acute lethality test which results in mortality to more than 50 percent of the test fish exposed to 100 percent strength effluent, with the test carried out in accordance with the protocol outlined in Environment Canada's "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout: EPS/1/RM/13 Second Edition – December 2000", or any future amendment thereof, or by another toxicity testing method approved by the Director.

37. The Licencees shall not direct wastewater to the Town of Neepawa municipal wastewater treatment lagoon.

Respecting Groundwater Protection

38. The Licencees shall:

- a) develop and submit to the Director, for approval, a Groundwater Monitoring Program to encompass all groundwater zones that could potentially be impacted at the site of the Development by losses of untreated or partially treated wastewater or any spilled liquid chemicals or petroleum fuel; and
- b) submit an annual report to the Director each year on the findings of the approved Groundwater Monitoring Program.

39. The Licencees shall, upon learning that the approved Groundwater Monitoring Program has identified evidence of probable or certain groundwater contamination;

- a) file an action plan with the Director, as soon as possible, to identify and isolate the source(s) of the groundwater contamination; and
- b) implement remediation measures, to the satisfaction of the Director, and to the extent necessary to restore the impacted groundwater.

40. The Licencees shall, upon the suspicion or detection of any leaking or ruptured wastewater collection pipe or forcemain, immediately undertake an investigation, and upon confirmation of a leak or rupture, terminate or otherwise re-route all inputs to the pipe or forcemain until the necessary repair has been completed.

Respecting Air Emissions

41. The Licencees shall not cause or permit an odour nuisance to be created as a result of the construction, operation or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate an odour nuisance.

42. The Licencees shall not cause or permit a noise nuisance to be created as a result of the construction, operation or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate a noise nuisance.

43. The Licencees shall prepare and maintain and make available to an Environment Officer upon request:
- a) an updated greenhouse gas inventory respecting the Development, by addressing carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride emissions; and
 - b) a greenhouse gas management plan for the Development, including reduction strategies and targets.

Respecting Solid Wastes

44. The Licencees shall not undertake any on-site burning of solid waste.
45. The Licencees shall reduce the production and dissemination of wastes by initiating and maintaining waste reduction and waste recycling programs.
46. The Licencees shall not deposit solid waste into the environment except into a waste disposal ground operating under the authority of an Environment Act Licence or a permit issued pursuant to Manitoba Regulation 150/91 or any future amendment thereof, where the operator of that facility has agreed to accept the solid waste.

Respecting the Management of Sludge and Biosolids

47. The Licencees shall transport all of the dewatered sludge and biosolids from the development:
- a) to an approved facility operating under a valid Environment Act Licence or permit; and
 - b) in containers in such a manner to prevent the loss of sludge and biosolids or entrained fluids to the satisfaction of an Environment Officer.
48. The Licencees shall return all centrate resulting from the dewatering of the sludge and biosolids by centrifuges to the flow attenuation tank for treatment.

Respecting the Effluent Monitoring Station

49. The Licencees shall:
- a) construct and make available for use by an Environment Officer, at locations acceptable to the Director, secured and heated monitoring stations with direct access to:
 - i) the IWWTF wastewater influent pipelines; and
 - ii) the IWWTF wastewater effluent pipeline; and
 - b) make the monitoring stations accessible to an Environment Officer at all times;
 - c) install and maintain a continuous flow measuring devices, equipped with an interface compatible with departmentally owned ISCO sampler, at the monitoring stations or at a location acceptable to the Director which is capable of measuring the volume of effluent with an accuracy of ± 2 percent;
 - d) have the flow measuring device re-calibrated every two years or on the request of an Environment Officer;
 - e) submit to the Director a certificate of calibration, signed by a person qualified to calibrate the flow measuring device, for each flow measuring device within two weeks of the completion of

each calibration, identifying the plus or minus percent error associated with each calibrated flow measuring device; and

- f) equip the monitoring stations with a flow-proportional sampling device equipped to function with the flow measuring device and have the sampling device available on request for use by an Environment Officer.

Respecting Monitoring, Record Keeping and Reporting of Effluent Releases

50. The Licencees shall:

- a) continuously measure and record the daily and total monthly volume (cubic metres) of effluent released from the final discharge point of the Development to an accuracy within ± 2 percent;
- b) once every week, on a full production day, collect a composite sample of the effluent at the final discharge point of the Development, and analyze it for:
 - i) pH;
 - ii) temperature (field);
 - iii) suspended solids (mg/L);
 - iv) five-day carbonaceous biochemical oxygen demand (mg/L); and
 - v) ammonia nitrogen (expressed as mg/L of N); and
- c) once each day collect a composite sample of the effluent from the Development and analyze it for:
 - i) total nitrogen (as N); and
 - ii) total phosphorus (as P);
- d) once each day at equal time intervals for a minimum of three (3) consecutive days per week, collect a grab sample of the effluent from the final discharge point of the Development and analyze it for:
 - i) fecal coliform (expressed as MPN per 100 millilitres of sample); and
 - ii) E. coli (expressed as MPN per 100 millilitres of sample); anddetermine and record the monthly geometric mean for each of the fecal coliform and the E. coli counts based on all the data collected during each month for each coliform type;
- e) determine and record the loadings of:
 - i) ammonia nitrogen (as kg/d of N);
 - ii) total nitrogen (as kg/d of N); and
 - iii) total phosphorus (as kg/d of P);released to the Whitemud River on each sampling date; and
- f) once every six months, collect a grab sample of the effluent at the final discharge point and have the sample analyzed by means of appropriate analytical methodologies to identify and quantify the presence of:
 - i) Cryptosporidium;
 - ii) Giardia;
 - iii) heavy metals;
 - iv) organochlorines;
 - v) active pharmaceutical ingredients (particularly suspected endocrine disrupting compounds) which may be associated with pork processing operations; and
 - vi) such other parameter(s) as may be requested by the Director; until or unless otherwise specified by the Director.

51. The Licencees shall:
- a) take two flow proportional composite samples of effluent from the wastewater treatment plant over a 24 hour period every three months each year with a minimum separation time of 90 days between samples;
 - b) have one bioassay sample of the effluent analyzed at 100 percent concentration for acute lethality in accordance with the protocol outlined in Environment Canada's "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout: EPS 1/RM/13 Second Edition – December 2000", or any future amendment thereof; and
 - c) report the results to the Director within 30 days of the end of the month during which the samples were taken.
52. The Licencees shall submit monthly reports on applicable analytical values and information determined and recorded pursuant to Clauses 50 and 51 of this Licence, to the Director, in writing and in an electronic format acceptable to the Director, no later than 30 days after the end of the month during which the information was collected or compiled.
53. The Licencees shall during each year maintain the following records and retain them for a minimum period of five calendar years:
- a) wastewater sample dates;
 - b) original copies of laboratory analytical results of the sampled wastewater;
 - c) a summary of laboratory analytical results;
 - d) monthly effluent discharge volumes;
 - e) maintenance and repairs; and
 - f) a summary of any sanitary sewer overflows / combined sewer overflows.
54. The Licencees shall submit an annual report to the Environment Officer by February 28 of the following year including all records required by Clause 33 and Clause 53 of this Licence.

Record Drawings

55. The Licencees shall:
- a) prepare updated "record drawings" for the Development and shall label the drawings "Record Drawings"; and
 - b) provide to the Director, within six months from the date of this Environment Act Licence, two electronic copies of the "record drawings".

REVIEW OR REVOCATION

- A. This Licence replaces Environment Act Licence No. 2870 RR which is hereby rescinded.
- B. If, in the opinion of the Director, the Licencees have failed or are failing to comply with any of the specifications, limits, terms or conditions set out herein, the Director may, temporarily or permanently, revoke this Licence.

- C. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of The Environment Act.

“original signed by”

Cordella Friesen
Director
The Environment Act

File: 2755.20

Schedule 1 to Environment Act Licence No. 2870 RR

Maximum Total Ammonia - Acute Toxicity Limits pursuant to Clause 35 (g)

Effluent pH	Total Ammonia (mg/L)
6.50	48.83
6.60	46.84
6.70	44.57
6.80	42.00
6.90	39.16
7.00	36.09
7.10	32.86
7.20	29.54
7.30	26.21
7.40	22.97
7.50	19.89
7.60	17.03
7.70	14.44
7.80	12.14
7.90	10.13
8.00	8.41
8.10	6.95
8.20	5.73
8.30	4.71
8.40	3.88
8.50	3.20
8.60	2.65
8.70	2.20
8.80	1.84
8.90	1.56
9.00	1.32

File No.: 2755.20

October 19, 2020

Sheldon Stott
R3 Innovations Inc.
Box 1000
623 Main Street
Neepawa MB R3C 1A5

Dear Sheldon Stott:

Re: R3 Innovations Inc. – Environment Act Licence No. 2870 RRR – Notice of Alteration

Receipt of your July 21, 2020 submission is acknowledged as a Notice of Alteration in accordance with Section 14 of The Environment Act.

The requested change to the Development as Licensed is the expansion and refurbishment of the R3 Innovations Inc. industrial wastewater treatment facility to better manage wastewater flows from the HyLife Foods meat processing facility and an increase to the wastewater effluent discharge rate by 390 m³/day to 1,960 m³/day as an annual daily average.

Specifically, the request is for the construction of a new primary treatment annex building, a new primary dissolved air flotation (DAF) unit, a new aeration basin, sludge storage tank, an expansion to the membrane treatment building with a new membrane treatment train, aeration system blowers and an additional UV disinfection system.

The information provided states that the increase of wastewater treatment capacity to 1960 m³/day will accommodate the higher process wastewater flows generated at HyLife Foods, the temporarily stored wastewater at the former industrial wastewater lagoons and a forecasted increase in utility water use (50 m³/day) at the Development. The information provided states that the wastewater effluent quality will continue to meet Environment Act Licence limits.

The potential environmental effect of the requested changes to the Development as Licensed is insignificant and considered to be a minor alteration in accordance with Section 14(2) of The Environment Act. Approval is hereby granted for the expansion and operation of the Development as described in your July 21, 2020 submission. This approval is conditional upon the acceptance of a revised Environment Act Licence for the R3 Innovations Inc. industrial wastewater treatment facility, which will be provided at a later date.

If you have any questions, please contact Jennifer Winsor, P.Eng., Environmental Engineer, Manitoba Conservation and Climate at Jennifer.Winsor@gov.mb.ca.

Sincerely,

Original Signed By

Shannon Kohler, Director
Environment Act

cc. Kristal Harman, Yvonne Hawryliuk – Environmental Compliance and Enforcement
Siobhan Burland Ross, Jennifer Winsor – Environmental Approvals
Public Registries

R3 INNOVATIONS INC. DISCHARGE INCREASE: REQUEST FOR NOTICE OF ALTERATION

Appendix C Certificates of Title
March 8, 2021

Appendix C CERTIFICATES OF TITLE



STATUS OF TITLE

Title Number **2421295/5**
Title Status **Accepted**
Client File **general**

The Property Registry
A Service Provider for the Province of Manitoba



1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

R3 INNOVATIONS INC.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON IN THE FOLLOWING DESCRIBED LAND:

PARCEL "A" PLAN 48468 NLTO
IN SW 1/4 35-14-15 WPM

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act*.

2. ACTIVE INSTRUMENTS

Instrument Type: **Caveat**
Registration Number: **30550/5**
Instrument Status: **Accepted**

Registration Date: 1952-08-01
From/By: CROWN TRUST COMPANY
To:

Amount:
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **86-1191/5**
Instrument Status: **Accepted**

Registration Date: 1986-03-21
From/By: THE TOWN OF NEEPAWA
To:

Amount:
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **86-2833/5**
Instrument Status: **Accepted**

Registration Date: 1986-06-24
From/By: THE RM OF LANGFORD
To:

Amount:
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **86-5122/5**
Instrument Status: **Accepted**

Registration Date: 1986-11-14
From/By: MANITOBA HYDRO-ELECTRIC BOARD
To:

Amount:
Notes: No notes
Description: No description

3. ADDRESSES FOR SERVICE

R3 INNOVATIONS INC.
BOX 10000, 623 MAIN ST. EAST
NEEPAWA MB
R0J 1H0

4. TITLE NOTES

No title notes

5. LAND TITLES DISTRICT

Neepawa

6. DUPLICATE TITLE INFORMATION

Duplicate not produced

7. FROM TITLE NUMBERS

2357476/5 All

8. REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS

No real property application or grant information

9. ORIGINATING INSTRUMENTS

Instrument Type: **Transfer Of Land**
Registration Number: **1076408/5**

Registration Date: 2009-12-17
From/By: SPRINGHILL FARMS INC.
To: R3 INNOVATIONS INC.
Consideration: \$1.00

10. LAND INDEX

Lot A Plan 48468
IN SW 35-14-15W

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE
SYSTEM OF TITLE NUMBER 2421295/5

STATUS OF TITLE

Title Number **2421294/5**
Title Status **Accepted**
Client File **general**

The Property Registry

A Service Provider for the Province of Manitoba



1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

R3 INNOVATIONS INC.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON IN THE FOLLOWING DESCRIBED LAND:

PARCEL "B" PLAN 48468 NLTO
IN SW 1/4 35-14-15 WPM

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act*.

2. ACTIVE INSTRUMENTS

Instrument Type: **Caveat**
Registration Number: **30550/5**
Instrument Status: **Accepted**

Registration Date: 1952-08-01
From/By: CROWN TRUST COMPANY
To:

Amount:
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **86-1191/5**
Instrument Status: **Accepted**

Registration Date: 1986-03-21
From/By: THE TOWN OF NEEPAWA
To:

Amount:
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **86-2833/5**
Instrument Status: **Accepted**

Registration Date: 1986-06-24
From/By: THE RM OF LANGFORD
To:

Amount:
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **86-5122/5**
Instrument Status: **Accepted**

Registration Date: 1986-11-14
From/By: MANITOBA HYDRO-ELECTRIC BOARD
To:

Amount:
Notes: No notes
Description: No description

3. ADDRESSES FOR SERVICE

R3 INNOVATIONS INC.
BOX 10000, 623 MAIN ST. EAST
NEEPAWA MB
R0J 1H0

4. TITLE NOTES

No title notes

5. LAND TITLES DISTRICT

Neepawa

6. DUPLICATE TITLE INFORMATION

Duplicate not produced

7. FROM TITLE NUMBERS

2357477/5 All

8. REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS

No real property application or grant information

9. ORIGINATING INSTRUMENTS

Instrument Type: **Transfer Of Land**
Registration Number: **1076409/5**

Registration Date: 2009-12-17
From/By: SPRINGHILL FARMS INC.
To: R3 INNOVATIONS INC.
Consideration: \$1.00

10. LAND INDEX

Lot B Plan 48468
IN SW 35-14-15W

**CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE
SYSTEM OF TITLE NUMBER 2421294/5**

Appendix D Process Engineering Evaluation
March 8, 2021

Appendix D PROCESS ENGINEERING EVALUATION





WASTEWATER TREATMENT PLANT CAPACITY PROCESS ENGINEERING EVALUATION REPORT

Prepared For:

HyLife Foods
Neepawa, Manitoba, Canada

Prepared By:

THE STOVER GROUP
P.O. Box 2056
Stillwater, OK 74076

January 15, 2021

TABLE OF CONTENTS

<u>Section</u>	<u>Page Number</u>
INTRODUCTION	1
IWWTF PROCESS DESIGN BASIS	2
Current Operating Conditions	2
Capacity Assessment Process Evaluation Basis	3
Primary Treatment Removal Efficiencies	4
Discharge Limits	5
PROCESS ENGINEERING EVALUATIONS	6
Primary Treatment	6
Secondary Treatment	6
FUNCTIONAL OPERATION CAPACITY EVALUATION	11
New Raw Influent Lift Station	11
New Rotary Screen	12
Pre-Attenuation Tank	12
Raw Influent and Screening	12
Screened Water Lift Station	12
Primary Treatment – First Stage DAF	12
Flow Attenuation Tank	12
Primary Treatment – Second Stage DAF	13
Activated Sludge/MBR System	13
Disinfection	14
Sludge Processing	14
CONCLUSIONS	15

LIST OF TABLES

<u>Table</u>	<u>Page Number</u>
TABLE 1 HyLife Foods Raw Wastewater Production Summary February 2017 – July 2019	3
TABLE 2 HyLife Foods Hog Unit Wastewater Production Summary February 2017 – July 2019	3
TABLE 3 HyLife Foods Design Basis – 8,200 Hog Wastewater Summary per Production Day	4
TABLE 4 HyLife Foods Design Basis – 8,200 Hog Attenuated Wastewater Summary ⁽¹⁾	4
TABLE 5 R3 Innovations IWWTF Design Basis – 8,200 Hog Primary Treatment Effluent – Wastewater Summary ⁽¹⁾	5
TABLE 6 R3 Innovations IWWTF Effluent Discharge Criteria	5
TABLE 7 R3 Innovations IWWTF Total Flows and Loads to Biological Treatment System with the addition to 8,200 Hogs	6
TABLE 8 R3 Innovations IWWTF Current and Capacity Increase Operating Conditions Summary (Attenuation Tank Effluent)	8

INTRODUCTION

The HyLife Foods (HyLife) pork processing facility located in Neepawa, Manitoba has been operating with an industrial wastewater treatment facility (IWWTF) referred to as R3 Innovations. The facility was designed in 2008/2009 and constructed in 2009/2010. Biological system startup occurred in June 2010. The facility was expanded/upgraded in 2018. The facility has operated successfully throughout this entire time period. Based on the current production rate and the expanded capacity/capability of the current IWWTF, THE STOVER GROUP (TSG) previously evaluated the current functional operational process design capacity of the expanded/upgraded IWWTF. The rated capacity of the IWWTF was presented in the February 2019 report entitled “WASTEWATER TREATMENT PLANT CAPACITY EVALUATION”. The process engineering analysis presented in that report concluded that the current capacity of the IWWTF provides a kill rate capacity of at least 8,000 hogs per day over a five-to-six-day production period. The IWWTF currently operates successfully between about 7,500 to 8,000 hogs kill rate per day.

HyLife has continued to increase production over the years such that additional process engineering evaluations need to be performed to determine if the IWWTF can reliably treat additional flows and loads for increased production rates. Therefore, due to current production demands, HyLife has retained THE STOVER GROUP (TSG) to perform additional process engineering evaluations using the current IWWTF operations/performance data base to determine if the current facilities can reliably treat the projected flows and loads from a production rate of 8,200 hogs/day over a five-to-six-day production period.

HyLife is currently considering additional increased production capacity changes to 8,200 hogs per day, over a five-to-six-day production period, that will again affect the flows and loads to the IWWTF; therefore, HyLife requested TSG to provide a process engineering evaluation for these anticipated increased production rates. Evaluations of both the primary and secondary biological treatment systems were reviewed for operations/performance at this production rate. The results from this process engineering study are presented in this report.

IWWTF PROCESS DESIGN BASIS

The IWWTF treats wastewater flows from the HyLife pork processing facility at Neepawa, Manitoba. Process wastewater is combined with truck wash, holding area (barn) wastes, and sanitary wastewater prior to initial screening and pumping.

The treatment facility (IWWTF) was designed to treat the weekly production flow, with typically five or six days of production, over a seven-day period. Combined raw influent wastewater is screened and pretreated in a dissolved air flotation (DAF) system prior to being pumped to a flow-attenuation tank. The attenuation tank fills during the week and drains over the course of the weekend to the secondary biological membrane biological reactor (MBR) treatment system.

Manitoba Conservation requires nitrogen and phosphorus removal for wastewater treatment facilities in Manitoba. Table 6 later in this report lists the current effluent discharge permit limits.

Proposed increased production changes at the production facility to 8,200 hogs/day kill rate will increase flows and loads to the IWWTF over the normal five to six-day work week. Production and clean-up will be over the same schedules while increasing both the throughput and process wastewater flows and loads.

Current Operating Conditions

Recent processing facility production expansion conditions have increased the flows and loads to the IWWTF over the normal five to six-day work week. Production and clean-up operations are still performed over the same schedules while increasing both the throughput and process wastewater flows and loads. Production currently occurs during 16 hours per day followed by a clean-up period up to six hours in duration. Periodically production extends into six days per week. Operations of the IWWTF consist of one 10-hour shift and one 8-hour shift from Monday through Friday for 17.5 hours per day coverage, with one 10-hour per day shift coverage over the weekend; unless production continues into Saturday, at which time the Saturday coverage is the same as weekday coverage. Total operations coverage is provided by seven (7) full time personnel.

The current wastewater production prior to the primary treatment system is shown in Table 1 which summarizes flow and loads generated by the production facility from February 2017 to July 2019.

TABLE 1
HyLife Foods
Raw Wastewater Production Summary
February 2017 – July 2019

Condition	Hogs/ day	Hogs/ Week	Flow (m ³ /d)	TSS (kg/d)	COD (kg/d)	TN (kg/d)	TP (kg/d)
Average Day	7,048	37,143	1,650	1,660	5,100	272	21
Max Month	7,646	38,249	1,890	2,731	8,320	406	29
Max Week	7,711	38,433	1,950	3,985	10,770	464	43
Max Day	7,828	41,524	2,250	10,680	19,620	1,192	89

Using the data in Table 1, unit wastewater production values were calculated on a per hog basis as shown in Table 2.

TABLE 2
HyLife Foods
Hog Unit Wastewater Production Summary
February 2017 – July 2019

Condition	Flow (m ³ /d)	TSS (kg/d)	COD (kg/d)	TN (kg/d)	TP (kg/d)
Average Day	0.234	0.235	0.724	0.039	0.0030
Max Month	0.268	0.387	1.181	0.058	0.0041
Max Week	0.277	0.565	1.528	0.066	0.0061
Max Day	0.319	1.513	2.784	0.169	0.0127

Capacity Assessment Process Evaluation Basis

With the wastewater analysis completed for the period of February 2017 through July 2019 along with the hog unit wastewater production values, the following Tables 3 and 4 provide the estimated increased capacity changes in wastewater flow and loads per production day at the increased kill rate of 8,200 hogs/day, along with the anticipated attenuation in the existing attenuation/equalization tank. The flow and loading attenuations have been calculated using a 6-day production week since this is believed to be a frequent occurrence which must be accounted for in the operation of the treatment systems.

TABLE 3
 HyLife Foods
 Design Basis – 8,200 Hog
 Wastewater Summary per Production Day

Condition	Flow (m ³ /d) ⁽¹⁾	TSS (kg/d)	COD (kg/d)	TN (kg/d)	TP (kg/d)
Average Day	1,919	1,927	5,937	320	25
Max Month	2,198	3,173	9,684	476	34
Max Week	2,271	4,633	12,530	541	50
Max Day	2,616	12,407	22,829	1,386	104

Note: ⁽¹⁾ Includes 35 m³/d from additional truck wash

TABLE 4
 HyLife Foods
 Design Basis – 8,200 Hog
 Attenuated Wastewater Summary ⁽¹⁾

Condition	Flow (m ³ /d)	TSS (kg/d)	COD (kg/d)	TN (kg/d)	TP (kg/d)
Average Day	1,646	1,654	5,089	274	19
Max Month	1,879	2,719	8,299	402	26
Max Week	1,943	3,103	10,736	468	45
Max Day	2,238	10,630	19,566	1,185	91

Note: ⁽¹⁾ Based on six-day production week

Primary Treatment Removal Efficiencies

The primary treatment system has achieved the pollutant removal efficiencies as shown below based on the average day and max month conditions:

- COD Removal 40%
- TSS Removal 75%
- TN Removal 40%
- TP Removal 20%

Based on these pollutant removal efficiencies obtained with the primary treatment systems, the attenuated flow and loads for production of 8,200 hogs per day to be treated by the biological systems are provided in Table 5.

TABLE 5
R3 Innovations IWWTF
Design Basis – 8,200 Hog
Primary Treatment Effluent - Wastewater Summary ⁽¹⁾

Condition	Flow (m ³ /d)	TSS (kg/d)	COD (kg/d)	TN (kg/d)	TP (kg/d)
Average Day	1,646	410	3,050	160	15
Max Month	1,879	680	4,980	240	20
Max Week	1,943	780	6,440	280	36
Max Day	2,238	2,660	11,740	710	70

Note: ⁽¹⁾ Based on six-day production week

Discharge Limits

The plant permitted discharge limits have remained unchanged from current conditions and are as shown in Table 6. The IWWTF has consistently and reliably achieved the effluent permit treatment requirement since startup and throughout the current operating conditions after the IWWTF expansion in 2018.

TABLE 6
R3 Innovations IWWTF
Effluent Discharge Criteria

Parameter	Value
Carbonaceous five-day Biochemical Oxygen Demand	<30 mg/L (based on 30-day rolling avg.)
Total Suspended Solids	<30 mg/L (based on 30-day rolling avg.)
Total Nitrogen	<15 mg/L (based on 30-day rolling avg.)
Total Phosphorus	<1 mg/L (based on 30-day rolling avg.)
Fecal Coliform	<200/100 mL (based on 30-day geometric mean)
<i>Escherichia coli</i>	<200/100 mL (based on 30-day geometric mean)

PROCESS ENGINEERING EVALUATIONS

Primary Treatment

The existing primary treatment system includes fine screening, primary and secondary dissolved air flotation (DAF) units, chemical addition facilities, centrifuges, and several pumping systems all housed in a single building. The primary treatment system must be capable of handling the increased capacity flows and loads generated by the production facility as presented in Table 3, while the secondary DAF must handle the attenuated flows and loads presented in Table 4. With the production capacity increase to 8,200 hogs per day, the flow and loading rates to the IWWTF are anticipated to increase by only around 6% over the current flows and loads at around 7,700 hogs per day.

Secondary Treatment

Previous studies by TSG have shown that the current primary treatment and secondary biological treatment systems can handle the attenuated current flows and loads from the processing facility as long as the primary system is operated to effectively remove the pollutant loads, as previously discussed. With increased capacity to 8,200 hogs per day, performance of the primary treatment system will be critical for meeting the effluent discharge criteria. With the primary treatment levels being achieved, the increased flows and loads generated with the increased production capacity, will require the secondary biological MBR systems to handle the total flow and loads, as provided in Table 5.

The information provided in Table 7 represents the total attenuated and primary treated wastewater flows and loads for the processing of 8,200 hogs per day.

TABLE 7
R3 Innovations IWWTF
Total Flows and Loads to Biological Treatment System
with the addition to 8,200 Hogs

Condition	Flow (m ³ /d)	TSS (kg/d)	COD (kg/d)	TN (kg/d)	TP (kg/d)
Average Day	1,646	410	3,050	160	15
Max Month	1,879	680	4,980	240	20
Max Week	1,943	780	6,440	280	36
Max Day	2,238	2,660	11,740	710	70

A summary of the current operating (7,700 hogs/day) and the new projected operating conditions (8,200 hogs/day) for the increased production rate is presented in Table 8. The current operating conditions provided in Table 8 are the attenuation tank effluent without the second stage DAF online. Projected future operating conditions for 8,200 hogs/day are also presented with estimated attenuation tank effluent without the second stage DAF online.

The February 2017 through July 2019 plant data was used to develop the current and projected average day and maximum week operating conditions for the IWWTF presented in Table 8. The projected future operating conditions for the average day and maximum week capacity kill rates were calculated using straight-line correlations with the current average and maximum week values operating at around 7,700 hogs/day. The projected production kill rate of 8,200 hogs/day was determined for the current production demands.

TABLE 8
R3 Innovations IWWTF
Current and Capacity Increase Operating Conditions Summary (Attenuation Tank Effluent)

Parameter	Current Operating Conditions without Second Stage DAF Online (5/15/2018-11/23/2018)		Projected Operating Capacity without Second Stage DAF Online	
	Average	Max Week	Average	Max Week
Kill Rate, Hogs/day	7,700	7,700	8,200	8,200
Flow, m ³ /day (equalized)	1,415	1,668	1,646	1,943
COD, Kg/day – Attenuation Tank Eff	4,371	9,228	5,089	10,736
COD Removal at Primary Treatment, %	40	40	40	40
COD to Biological Treatment, Kg/day	2,623	5,537	3,053	6,441
cBOD ₅ , Kg/day – Attenuation Tank Eff	2,096	4,428	2,440	5,151
cBOD ₅ Removal at Primary Treatment, %	40	40	40	40
cBOD ₅ to Biological Treatment, Kg/day	1,258	2,657	1,464	3,091
TKN, Kg/day – Attenuation Tank Eff	233	401	274	468
TKN Removal at Primary Treatment, %	40	40	40	40
TKN to Biological Treatment, Kg/day	140	241	164	281
Total P, Kg/day – Attenuation Tank Eff	16	39	19	45
Total P Removal at Primary Treatment, %	20	20	20	20

TABLE 8 (Continued)
R3 Innovations IWWTF

Current and Capacity Increase Operating Conditions Summary (Attenuation Tank Effluent)

Parameter	Current Operating Conditions without Second Stage DAF Online (5/15/2018-11/23/2018)		Projected Operating Capacity without Second Stage DAF Online	
	Average	Max Week	Average	Max Week
	Total P to Biological Treatment, Kg/day	13	31	15
TSS, Kg/day – Attenuation Tank Eff	1,425	2,669	1,654	3,103
TSS Removal at Primary Treatment, %	75	75	75	75
Total TSS Removed, Kg/day	1,069	2,002	1,241	2,327
Observed Yield, Kg TSS/Kg BOD ₅	0.65	0.65	0.65	0.65
Biosolids Production, Kg/day	817	1,727	952	2,009
VSS at 70% of TSS, Kg/day	572	1,209	666	1,406
Total Sludge Production, Kg/day	1,886	3,728	2,192	4,336
F/M Ratio, Kg BOD ₅ /day/Kg MLVSS	0.052	0.110	0.060	0.128
MLVSS, mg/L	8,076	8,076	8,076	8,076
TKN in Biomass, %	5.5	5.5	5.5	5.5
TKN to Biomass Growth, Kg/day	45	95	52	110
Total P in Biomass, %	1.3	1.3	1.3	1.3
Total P to Biomass Growth, Kg/day	10.6	22.4	12.4	26.1

TABLE 8 (Continued)
R3 Innovations IWWTF
Current and Capacity Increase Operating Conditions Summary (Attenuation Tank Effluent)

Parameter	Current Operating Conditions without Second Stage DAF Online (5/15/2018-11/23/2018)		Projected Operating Capacity without Second Stage DAF Online	
	Average	Max Week	Average	Max Week
Oxygen Demand				
Carbonaceous Demand				
O ₂ /BOD ₅ Removed, Kg/Kg	1.5	1.5	1.5	1.5
O ₂ Required, Kg/day	1,886	3,985	2,196	4,636
Nitrification Demand				
O ₂ /NH ₃ -N Nitrified, Kg/Kg	4.57	4.57	4.57	4.57
O ₂ Required, Kg/day	639	1,100	752	1,283
Total O₂ Demand	2,525	5,085	2,947	5,919
Oxygen Transfer				
Alpha	0.5	0.5	0.5	0.5
SOTE, %	34	34	34	34
AOTR, Kg/hr	105	212	123	247
SOTR, Kg/hr	263	530	307	617
Air Requirements, SCFM	1,627	3,276	1,899	3,813
Blower Horsepower, HP	114	229	133	267

SOTE – Standard Oxygen Transfer Efficiency (1.4%/foot)
AOTR – Actual Oxygen Transfer Rate
SOTR – Standard Oxygen Transfer Rate

FUNCTIONAL OPERATION CAPACITY EVALUATION

As previously discussed, processing has gradually increased over the years with associated upgrades and expansions of the IWWTF, such that the current kill rate is between 7,700 to 8,000 head per day over a five to six day per week operation. Production currently occurs during 16 hours per day followed by a clean-up sanitation period up to four to six hours in duration. Periodically production extends into six days per week. Operations of the IWWTF consists of one 10-hour shift and one 8-hour shift from Monday through Friday for 17.5 hours per day (7:00 AM to 12:30 AM) coverage, with one 10 hour per day coverage over the weekend. During the Saturday kill days, the IWWTF is staffed from 7:00 AM to 12:30 AM. Current operations staffing consists of seven (7) full time personnel.

For nitrification, 4.57 lbs O₂/lb NH₃-N nitrified was used to estimate nitrification oxygen demand. Nitrification also consumes about 7.0 lbs alkalinity/lb NH₃-N nitrified. Denitrification of the nitrate-nitrogen (NO₃-N) produces about 2.8 lbs O₂ equivalent per lb NO₃-N denitrified and about 3.5 lbs alkalinity per lb NO₃-N denitrified. The process design analysis presented in Table 8 did not take credit for denitrification in the design of the aeration equipment, therefore providing for a conservative oxygen transfer system design evaluation.

Oxygen transfer requirements were calculated assuming 1.5 lbs O₂/lb cBOD₅ removed and 4.57 lbs O₂/lb NH₃-N nitrified. The oxygen transfer horsepower requirements for the current average day and maximum week operating conditions are about 114 Hp and 229 Hp; respectively, as indicated in Table 8. These horsepower requirements can be met with the existing three 100 Hp (each) blowers, with two or three blowers operating. The oxygen transfer horsepower requirements for the projected average day and maximum week operating conditions at the 8,200 hogs/day production rate are 133 Hp and 267 Hp, respectively, as indicated in Table 8. Again, these horsepower estimates do not allow for the COD removal by the denitrification occurring in the anoxic basin which provides significant oxygen transfer equivalence. The current aeration basin operating dissolved oxygen concentrations have been in acceptable ranges at the current operating conditions. Therefore, the oxygen transfer horsepower requirements at the proposed 8,200 hogs/day production rate can be met with the existing three 100 Hp (each) blowers, with two or three blowers operating.

Therefore, the process design information provided in Table 8 indicates that the current IWWTF can reliably process and treat the flows and loads from the proposed production rate of 8,200 hogs/day. The following paragraphs present a brief description of each treatment process component and the corresponding treatment capacities.

New Raw Influent Lift Station

The recent expansion at the IWWTF included a new raw influent lift station with two new 70 L/sec pumps. This new lift station should be able to handle the future expansion and sanitation flows of over 100 L/sec up to an instantaneous peak flow of 150 L/sec during the same sanitation time period (typically four to six hours). The new influent lift station should be able to reliably handle the projected flows for the 8,200 hogs/day production rate.

New Rotary Screen

A new rotary screen, internally fed, 0.030 inches slot openings, was installed during the recent expansion at the IWWTF with a capacity of 140 L/sec. The new screen should be able to reliably handle the projected flows for the 8,200 hogs/day production rate.

Pre-Attenuation Tank

A new Pre-Attenuation Tank was also installed during the recent expansion at the production facility. The new Pre-Attenuation Tank was installed after the rotary screen with a capacity of 570 m³. A jet mixing system was provided to mix the tank contents with a recirculation pump capacity of 120 L/sec. The new pre-attenuation tank should be adequate for the projected flows for the 8,200 hogs/day production rate.

Raw Influent and Screening

Process wastewater flows (pre-attenuation tank effluent), sanitary sewer wastewater, barn waste, and truck wash flows are combined just outside the processing facility. The existing pump station lifts the combined wastewaters into a force main and conveys flows to the primary treatment building at the IWWTF.

These raw influent pumping and screening facilities process all flows that occur during the production schedule. Flows can vary widely during a production day. Most of the current wastewater flows occur during the 8-hour workday with additional wastewater coming as a result of cleaning flows after the production day. The raw influent pumping and screening facilities are sized for 75.6 L/sec. The influent screen size is 1.0 mm. The influent screening facility will be adequate for the projected operating conditions at the 8,200 hogs/day production rate.

Screened Water Lift Station

The existing screened water lift station was upgraded to handle the screened wastewater flow from the new cut floor and production facility with one new pump at 70 L/sec and replacing the two old 76 L/sec pumps with two new 70 L/sec pumps for a total of three 70 L/sec pumps. The existing screened water lift station will be adequate for the projected operating conditions at the 8,200 hogs/day production rate.

Primary Treatment – First Stage DAF

The first stage DAF has the hydraulic capacity and solids loading capacity to handle the projected conditions for the 8,200 hogs/day production rate. Also, the sanitation flows of over 100 L/sec up to an instantaneous peak flow of 150 L/sec during the same sanitation time period (typically four to six hours) can be handled by the first stage DAF since these flows will be fed from the new Pre-Attenuation Tank.

Flow Attenuation Tank

The recent production increase to 7,500 to 8,000 hogs/day provide a total estimated 340 m³/day recycle flow streams through the IWWTF. This tank was sized for 2.5 days at an equalized flow

of 1,520 m³/day. Assuming the same recycle streams of 340 m³/day for the 8,200 hogs/day production increase, the Attenuation tank will provide 2.1 days holding capacity at the average operating conditions and 1.7 days at the peak operating conditions. These new process design conditions should provide adequate holding capacity for the projected operating conditions at the 8,200 hogs/day production rate.

Primary Treatment – Second Stage DAF

The second stage DAF has not been operating for the last couple of years. It was recently placed online for a trial period and was operated without chemical conditioning and performed well with comparable design conditions relative to COD and TSS removal. The second stage DAF can be placed online if needed to reduce the loadings to the secondary biological MBR treatment system.

Activated Sludge/MBR System

The activated sludge system is currently operating at F/M ratios of 0.052 and 0.110 Kg BOD₅/day/Kg MLVSS at average day and maximum week operating conditions; respectively, with an average MLVSS of 8,076 mg/L. At the projected operating condition of 8,200 hogs/day production the F/M ratios will increase slightly to 0.060 and 0.128 Kg BOD₅/day/Kg MLVSS at average day and maximum week operating conditions; respectively, assuming the same MLVSS concentration of 8,076 mg/L.

The oxygen transfer horsepower requirements at the current average day and maximum week operating conditions can be provided with the existing aeration equipment and the three 100 Hp blowers. For the projected hog kill rate of 8,200 hogs/day, the oxygen transfer horsepower requirements can also be provided with two to three of the 100 Hp blowers in operation. The projected maximum oxygen transfer horsepower requirements at the 8,200 hogs/day kill rate operating condition is estimated to be less than the current blower capacity of 300 Hp. Also, as previously indicated, the process design analysis did not take credit for denitrification in the design evaluation; therefore, the actual projected maximum oxygen transfer capacity is conservative at the projected hog kill rate of 8,200 hogs/day.

Phosphorus removal occurs by both biological uptake of phosphorus and chemical precipitation with ferric chloride. The amount of phosphorus removal by biological uptake will increase at the 8,200 hogs per day production rate, and the ferric chloride dose rate will be adjusted to reliably achieve the effluent phosphorus permit limitation.

The empty cassette slots in each of the two membrane trains have been filled. One cassette with the 340 ft² membrane module was removed from one of the trains and installed in the other train. Then the second train was fully populated with the existing 340 ft² membrane module and two new 370 ft² membrane modules. This modification provided a 73% increase in membrane surface area from the previous membrane surface area; thus, providing significant increase in hydraulic throughput for the two membrane trains.

Disinfection

The MBR effluent has low effluent suspended solids and turbidity, and as such is easy to disinfect. A closed conduit ultraviolet disinfection system located inside the treatment building is used for disinfection.

Two units are provided, each sized with a capacity 22.1 L/sec. Both units will be required to be online with the proposed production increased operating condition of 8,200 hogs/day.

Sludge Processing

The projected sludge generation after the production increase to 8,200 hogs/day was estimated to be an average of 2,192 Kg/day (91 Kg/hr), with a maximum week value of 4,336 Kg/day (181 Kg/hr). A new centrifuge with a capacity of 635 Kg/hr was installed during the recent IWWTF expansion. The new centrifuge will be able to handle the projected sludge generation for the 8,200 hogs/day kill rate. Both of the two smaller centrifuges still remain online, providing backup dewatering capacity as well.

CONCLUSIONS

The process engineering analysis presented herein reviewed the R3 Innovations Industrial WWTP with anticipated increased flows and loads corresponding to up to a kill rate of 8,200 hogs per day over a five to six-day production period. The new flow Pre-Attenuation tank at the production plant significantly reduces the current flow rates after production expansion/upgrade to significantly lower flow rates through the IWWTF than the flow rates through the IWWTF before the expansion/upgrade. The findings from the process engineering analyses presented in this report follows:

- **Headworks.** New headworks facilities consisting of a new lift station, new rotary drum screen, and a new pre-attenuation tank were recently installed at the production facility, and the new headworks as designed will provide adequate capacity at the projected higher production flows and loads from the 8,200 hogs/day kill rate.
- **Raw Influent and Screening.** Process wastewater flows (pre-attenuation tank effluent), sanitary sewer wastewater, barn waste, and truck wash flows are combined just outside the processing facility. The existing pump station lifts the combined wastewaters into a force main and conveys flows to the primary treatment building at the IWWTF. With the installation of the new pre-attenuation tank, this lift station will be adequate for the projected design basis flows and loads from the 8,200 hogs/day kill rate.
- **Primary DAF.** Like the headworks equipment, the DAF unit will have sufficient hydraulic and solids loading capabilities. The largest increases are expected to occur in duration with the heavy wastewater flows. The result will be greater chemical use and more sludge production. Chemical use can be expected to increase proportionately with the flows and loads. The primary DAF will be adequate for the projected design basis flows and loads from the 8,200 hogs/day kill rate.
- **Attenuation Tank.** This tank was originally sized for 2.5 days at an equalized flow of 1,520 m³/day. The flows will be higher, but the downstream unit processes will be adequate for the anticipated operating conditions at the projected higher production flows and loads from the 8,200 hogs/day kill rate.
- **Secondary DAF.** The secondary DAF has largely been unused but is still appropriately sized for the anticipated operating conditions at the projected higher production flows and loads from the 8,200 hogs/day kill rate. The second stage DAF can be placed online if needed to reduce the loadings to the secondary biological MBR treatment system.
- **Activated Sludge.** The activated sludge system is composed of the anoxic tank, two aerobic tanks, post-anoxic tank, and ultrafilter membrane system from General Electric (now SUEZ) There is sufficient capacity in the tankage to accommodate the increase in organic capacity. The aeration system will have adequate capacity for the increase in load. There are three existing aeration blowers, two duty and one standby. The third blower may be required at the maximum week operating conditions. Phosphorus removal occurs by both biological uptake of phosphorus and chemical precipitation with ferric chloride. The amount of phosphorus removal by biological uptake will increase at

the 8,200 hogs per day production rate, and the ferric chloride dose rate will be adjusted to reliably achieve the effluent phosphorus permit limitation. The two membrane tanks have been expanded with new modules to provide maximum capacity and are now capable of treating the anticipated flows. The secondary biological MBR system will be adequate at the projected higher production flows and loads from the 8,200 hogs/day kill rate.

- **Sludge Handling.** A new centrifuge with a capacity of 635 Kg/hr was installed during the recent IWWTF expansion/upgrade. The new centrifuge will be able to handle the projected sludge generation for the 8,200 hogs/day capacity increase. Both of the two smaller centrifuges still remain online, providing backup dewatering capacity as well.

In summary, based on the process engineering evaluations provided in this report, the R3 Innovations Industrial WWTP will be able to reliably process and treat the anticipated flows and loads from a production kill rate of 8,200 hogs/day.