Kontzamanis Graumann
Smith MacMillan Inc.
3rd Floor - 865 Waverley St
Winnipeg, MB R3T 5P4

P 204-896-1209
F 204-896-0754
kgsgroup.com

May 26, 2022

HyLife Foods LP
623 Main St E
Neepawa, Manitoba R0J 1H0

Attention: Mr. Sheldon Stott
Senior Director of Corporate Sustainability

Re: HyLife Neepawa Lagoon Dewatering System
Conceptual Design Report

Dear Mr. Stott:

1.0 INTRODUCTION

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by HyLife Foods LP to provide Engineering consulting services for the Conceptual Design of a wastewater dewatering system at the HyLife pork processing facility within Neepawa, Manitoba. The goal of the dewatering system is to provide functionality to transfer the wastewater currently stored within the existing lagoons to the onsite industrial wastewater treatment facility (IWWTF). The Conceptual Design scope of work was carried out in accordance with the Engineering Services Agreement for Consulting Services dated January 18th, 2022.

2.0 BACKGROUND

HyLife Foods LP (HyLife) operates a pork processing facility located in Neepawa, Manitoba, as well as the associated industrial wastewater treatment facility (IWWTF) referred to as R3 Innovations. The IWWTF was constructed in 2009/2010, upgraded in 2018, and is currently undergoing further upgrades. Based on discussions with HyLife, it is KGS Group's understanding that the existing south-most lagoon (Cell #1) and north-most lagoon (Cell #3) on the site are used to store wastewater from the pork processing facility during emergency events, subject to restrictions in HyLife's environmental license. Cells #2A, #2B and #2C are empty, inactive, and not used to store wastewater on site. Refer to Appendix A which includes a drawing showing the routing of the existing piping system to discharge raw wastewater into the Cells #1 and #3. All of the existing lagoons do not have the functionality or infrastructure to transfer the wastewater within each lagoon to the R3 Innovations for

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treatment. As a result, this conceptual design memorandum focuses on the proposed infrastructure to transfer the wastewater from Cell #1 to the R3 Innovations facility. HyLife advises that the wastewater within the Cell 3 lagoon would be transferred periodically to Cell #1 through temporary rental diesel/gas engine driven pump skids. The goal of the proposed infrastructure would be to provide functionality to transfer a minimum of 100m³ per week of wastewater from Cell #1 to the R3 Innovation facility for treatment.

3.0 METHODOLOGY: LAGOON WASTEWATER TRANSFER

After discussions with HyLife, the following is KGS Group's understanding of the proposed methodology to transfer the lagoon wastewater. The key infrastructure would involve provisions for a permanent pump house structure to be built at the base of Cell #1's berm. The structure is proposed to be located on the west side of the Cell #1 and house a pump capability of transferring wastewater from Cell #1 to the R3 Innovations facility for treatment. Buried infrastructure between the pump house and R3 Innovations would include mechanical and electrical services. In addition, permanent overland intake piping with submerged intake within Cell #1 would be required. Refer to Section 4 for further details on the infrastructure.

Wastewater from the remaining lagoon cells is proposed to be transferred to Cell #1 through diesel or gas engine driven pump skids with flexible hoses on a temporary basis. Based on the current infrastructure, only Cell #1 and Cell #3 have provisions to receive wastewater from the production facility during an emergency scenario. The remaining cells do not have provisions to receive wastewater directly from the production facility. No permanent infrastructure to transfer wastewater to R3 Innovations is planned for Cell #3 or any of the remaining cells.

HyLife has requested that the pumphouse be designed to accommodate a minimum wastewater transfer rate of 100 m³ per week from Cell #1. Currently the R3 Innovations facility is approved to receive and treat 1,911 m³ of wastewater per day from the production facility. After the refurbishment is complete the R3 innovations facility will be approved to receive and treat 1,960 m³ of wastewater per day. The additional wastewater of 100 m³ per week (17 m³ per day) will not put additional strain on the plant and will fit well into the approved future capacity of 1,960 m³ per day. The proposed pump would have a flow range between 1 to 9 L/sec, which based on an operation of 1 hr per day would result in a range of 25 m³ to 227 m³ wastewater being transferred per week. Average normal flow rate operation is assumed to be 4.5 L/sec to achieve the minimum 100 m³ target per week.

HyLife has proposed that operators would introduce the wastewater from Cell #1 into R3 Innovations by turning the new pump on or off during low wastewater generation rates from the production facility. These periods were noted to be flexible due to the installation of the pre-attenuation tanks, which acts a buffer prior to the treatment at the R3 Innovations facility. Wastewater being transferred from Cell #1 would be measured through a new inline magnetic flow meter installed on the new 80mm (3") discharge line from the proposed pump house. This flow meter in combination with the existing inline meter on the 250 mm (10") inlet line would provide totalization for raw wastewater entering the R3 Innovations.

Additional review of the proposed pump flow range and wastewater transfer rate of 100m³ will be completed during detailed design.

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The following table summarizes information on the existing lagoons on site and HyLife's proposed operations.

TABLE 1 – HYLIFE R3 LAGOON CELLS

Cell	Description	Status	Estimated Max Volume	Comments
#1	Southern Lagoon (Lined)	Active for Emergency Wastewater Scenarios	6,669 m^3 (Note 1)	Provide permanent wastewater transfer function to R3 Innovations
#2A	Cell 2A	Inactive	5,290 m^3	Inactive, so no provisions included as part of the conceptual design.
#2B	Cell 2B	Inactive	5,270 m^3	Inactive, so no provisions included as part of the conceptual design.
#2C	Cell 2C	Inactive	887 m^3	Inactive, so no provisions included as part of the conceptual design.
#3	Northern Lagoon Clay Liner	Back-up for Cell #1	59,600 m^3	Transfer to Cell #1 through portable equipment.

Note 1: This volume is based on information provided by HyLife after modifications to the existing Cell #1.

Refer to Appendix A for a site plan of the existing lagoons and the proposed wastewater transfer system.

4.0 PROPOSED INFRASTRUCTURE

4.1 Site

Infrastructure modifications that would affect the site primarily involve buried mechanical and electrical services between the proposed pump house and the R3 Innovations facility. The buried mechanical services would involve an 80mm (3") HDPE pipe that is proposed to be directionally drilled at an elevation below the frost level. Where directionally drilling or open excavation trenching results in the buried pipe to be within the ground frost layer, the pipe is recommended to be heat traced and insulated or provided with an adequate insulation box to prevent the pipe from freezing. Buried electrical services would involve an electrical feeder and control cables originating at the PT1 building electrical room and terminating at the proposed pump house. These cables can be installed by either directional drilling or open excavation. Existing buried mechanical and electrical systems

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would have to be located to avoid interferences. In addition, local excavation near the PT1 building for mechanical and electrical services would be required when transitioning from buried to above grade systems that would penetrate the existing building exterior wall.

Site preparations for the proposed pump house building are also required to provide an adequate surface to prepare the building foundation. Similarly open excavation near the proposed pumphouse would be required for mechanical and electrical connections to the buried services.

It is not anticipated at this stage of the conceptual design that potable water or utility water would be required in the proposed pump house.

Refer to Appendix A for details.

4.2 Mechanical

PROCESS MECHANICAL

The process mechanical systems would primarily be located within the proposed pump house and also include the suction piping and intake within Cell #1. Mechanical systems within the pump house would be kept minimal and include a centrifugal suction lift pump with self priming and solids handling features. This pump would be sized to provide a flow range of 1 to 9 L/sec through the distribution piping between the pump house and PT1 building at the R3 Innovations facility. Piping material within the pump house is proposed to be PVC or stainless steel. Associated drain/sampling points and combination air relief/vacuum breaker/anti-siphon would be provided within the facility. In addition, a small recirculation line would be provided off the discharge of the pump that would be directed back to the intake screen to self clean (ie: back flush) the screen during operation. The intake side of the pump would consist of an exterior 80 mm (3”) HDPE pipe routed above grade and fully supported with permanent pipe supports on both side of the berm and within Cell #1. Within Cell #1 an intake screen with connection for a recirculation line would be provided. Installation of intake piping within Cell #1 is expected to require pump down of Cell #1 into Cell #3 during construction.

At the connection within the PT1 building of the R3 Innovations facility, the 80 mm (3”) pump discharge piping would connect to the 250 mm (10”) inlet pipe to the existing rotating drum screen equipment. This piping would be PVC or stainless steel and include a local isolation valve suitable for wastewater applications and a dedicated inline magnetic flow meter. This flow meter, in conjunction with a VFD for the pump, would provide speed control functionality and also allow the wastewater from the Cell #1 to be measured separately from wastewater directly associated with the production facility. Combined flow from the quantity 2 infeed flow meter would be totalized in the plant SCADA system. Associated drain/sampling points and combination air relief/vacuum breaker would be provided within the facility.

BUILDING MECHANICAL

Building mechanical systems associated to the pump house would consist of a unit heater to maintain the space above freezing during winter months. In addition, an exhaust fan with passive intake damper would be provided to ventilate and cool the space during summer months. Operation of the exhaust fan would be passed on space

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temperature or through an occupancy sensor within the room once personnel enter the space. No potable water or utility water is planned for within the building at this stage of the conceptual design.

Refer to Appendix A, B and C for details.

4.3 Electrical

POWER DISTRIBUTION

A feeder breaker would be installed in an available section within the PT1 MCC (PM-100) to power a 600 V distribution panel located within the lagoon pumphouse. The 600 V distribution panel would feed the lagoon pump (P-4010) and associated VFD along with a 15 kVA, 600:120 V, 1Ø transformer and associated panel for pumphouse lighting, receptacles, unit heater, and exhaust fan. Power cables would be installed underground between the PT1 electrical room and the lagoon pumphouse. The lagoon pumphouse environment with respect to suitable electrical equipment enclosures would be determined during detailed design.

Refer to Appendix A for details.

CONTROLS

The lagoon pump (P-4010) would be speed controlled by a VFD to maintain a flow setpoint as measured by FE-4011. The flow setpoint would be user adjustable via the plant SCADA system. The following control and indication signals would be wired to the PT1 PLC (PT-PLC) and implemented into the plant control and SCADA system:

- FI-4011 Lagoon Flow Indication (AI)
- SI-4010 Lagoon Pump Speed Feedback (AI)
- SC-4010 Lagoon Pump Speed Command (AO)
- MN-4010 Lagoon Pump Start/Stop Command (DO)
- HI-4010 Lagoon Pump in Auto (DI)
- XA-4010 Lagoon Pump Fault (DI)
- MM-4010 Lagoon Pump Running (DI)

Flow totalization of this new meter along with the existing meter would provide the total raw wastewater infeed to the R3 Innovations facility.

Leak detection within the proposed pump house would also be provided to monitor whether a leak has developed within the pumphouse or a scenario where the Cell #1 wastewater is siphoned into the pump station. The leak detection would include alarms and interlocks to the proposed pump to shut down pump operation.

Control cables would be installed underground between the lagoon pumphouse and the PT1 electrical room.

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LIGHTING

Lagoon pumphouse lighting would be LED and manually controlled by a switch located near the entrance.

HEAT TRACE

If it is determined that heat tracing is required for the piping from the pump house connecting to Cell #1 lagoon and PT1, power would be taken from either the PT1 electrical room or the lagoon pumphouse depending on where the heat tracing is required.

GROUNDING

A #2/0 copper ground conductor would be installed with the buried power cables to connect the PT1 ground grid with the lagoon pumphouse ground grid. The lagoon pumphouse ground grid would consist of a single ground rod for connection to pumphouse equipment enclosures and non-current carrying metal parts. Details of grounding requirements would be reviewed during detailed design.

4.4 Building

The proposed pump house would be an insulated, timber construction building with peaked pre-engineered timber roof trusses. Exterior finishes include pre-finished metal cladding for the walls and a metal standing seam roof. Interior finishes would include painted plywood. A single enlarged man door would be provided to facilitate transport of equipment into the space. The overall proposed building dimensions include a footprint of 4.8 m by 4.8 m with a height of 3.0 m to the underside of the trusses.

Refer to Appendix B for details.

5.0 CONCLUSIONS

The following are key conclusions summarizing the proposed conceptual design.

- New infrastructure to transfer wastewater is only proposed for Cell #1.
  - Wastewater within Cell #3is proposed to be transferred to Cell #1 through temporary rental diesel/gas engine driven pump skids.
- Connection point of the transferred wastewater is within the existing pre-treatment building (PT1) of the R3 Innovations facility. This connection point would be upstream of the rotary drum screen and downstream of the existing flow meter.
- A new dedicated flow meter FE-4011 is proposed to provide tracking of the wastewater from the Cell #1 and allow speed control of the pump with the use of a VFD.
- A new pump house with associated buried infrastructure is required west of the Cell #1 at the base of the berm.
  - Buried infrastructure would include mechanical piping and electrical cables.
  - Leak detection would be provided within the pump house.

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Winnipeg, MB R3T 5P4

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- A new permanent intake piping system is proposed within Cell #1.
- The minimum weekly transfer rate of wastewater from Cell #1 is proposed to be 100 m^3, as per discussions with HyLife.
  - Currently the R3 Innovations Facility is approved to treat 1,911 m^3 daily from the production facility.
  - Once upgrades to the R3 Innovations Facility are complete, the approved wastewater treatment capacity is increased to 1,960 m^3 per day which is adequate to treat the additional minimum weekly rate.
- The proposed pump would have a flow rate of 1 to 9 L/sec, which provides a range of weekly wastewater transfer rates depending on the operating duration of the pump.
  - An average flow rate of 4.5 L/sec would be required assuming the proposed pump only operates for 1 hr. per day over the week to achieve the 100 m^3 weekly minimum.

Prepared By:

[redacted]

Robin Chen, P.Eng.
Mechanical Engineer

Approved By:

[redacted]

Ashley Dent, P.Eng.
Assistant Industrial Mechanical Department Head

RCC/TB/hi

KGS GROUP

Kontzamanis Graumann
Smith MacMillan Inc.
3rd Floor - 865 Waverley St
Winnipeg, MB R3T 5P4

P 204-896-1209
F 204-896-0754
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STATEMENT OF LIMITATIONS AND CONDITIONS

Limitations

This report has been prepared for HyLife Foods LP in accordance with the agreement between KGS Group and HyLife Foods LP (the "Agreement"). This report represents KGS Group's professional judgment and exercising due care consistent with the preparation of similar reports. The information, data, recommendations and conclusions in this report are subject to the constraints and limitations in the Agreement and the qualifications in this report. This report must be read as a whole and sections or parts should not be read out of context.

This report is based on information made available to KGS Group by HyLife Foods LP and unless stated otherwise, KGS Group has not verified the accuracy, completeness or validity of such information, makes no representation regarding its accuracy and hereby disclaims any liability in connection therewith. KGS Group shall not be responsible for conditions/issues it was not authorized or able to investigate or which were beyond the scope of its work. The information and conclusions provided in this report apply only as they existed at the time of KGS Group's work.

Third Party Use of Report

Any use a third party makes of this report or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

APPENDIX A

Conceptual Design – Site Plan

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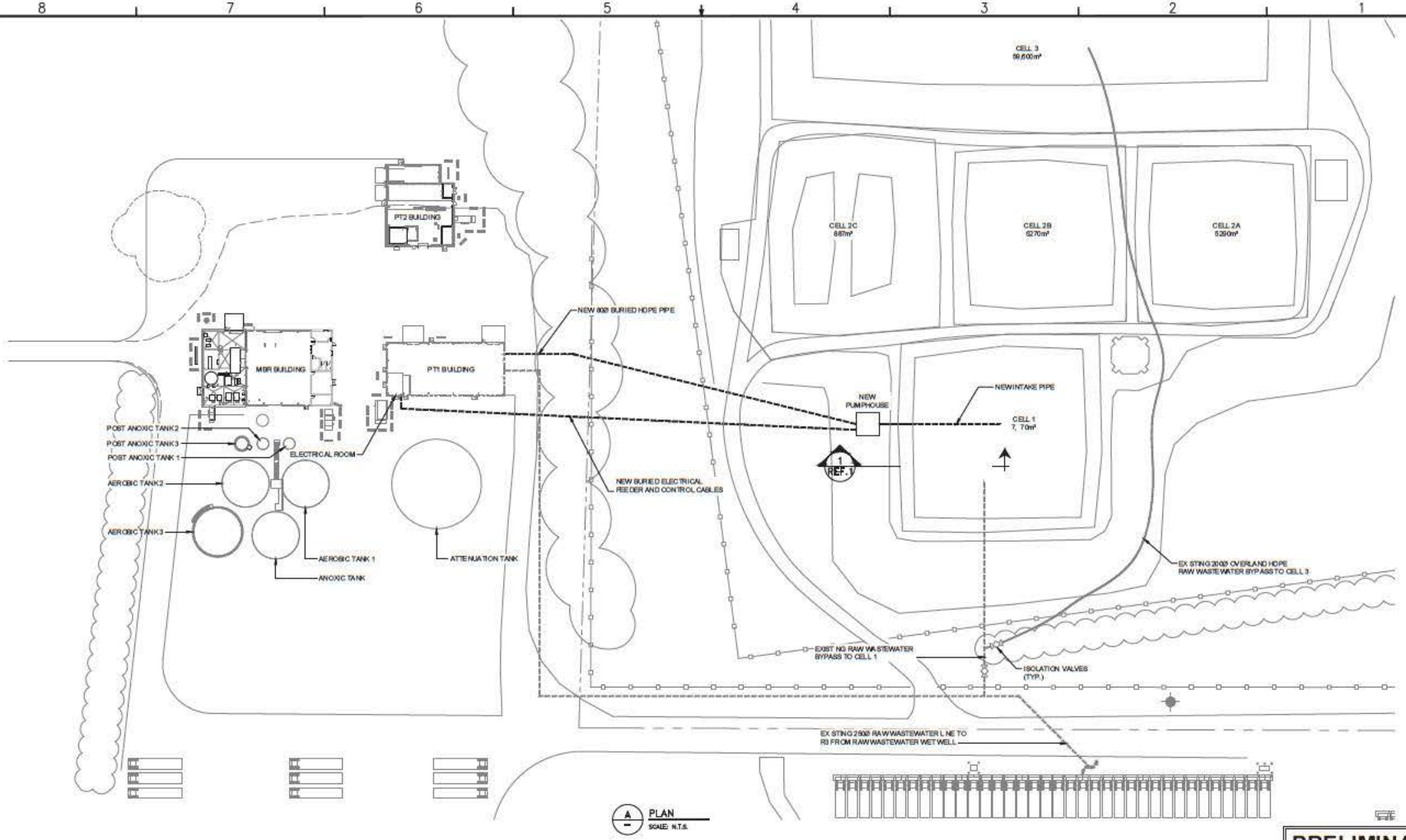

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1	R322.GSEC.001	GENERAL - SECTION VIEW - PUMP HOUSE AND CELL 1 BERM

REFERENCE DRAWINGS

NO	MM.DD	DESCRIPTION	DRAWN	DESIGN CHECK
A	22/0 /25	ISSUED FOR CONCEPTUAL DESIGN MEMORANDUM		

REVISIONS 1

NO	MM.DD	DESCRIPTION	DRAWN	DESIGN CHECK

REVISIONS 2

PERMIT STAMP

AUTHENTICATION FOR CURRENT REVISION

ENGINEER'S SEAL

HYLIFE

KGS

DESIGN	RCC	22/0 /26
DESIGN CHECK		
DRAWN	DLS	22/0 /21
DWG CHECK		

R3 LAGOON
DEWATERING SYSTEM

GENERAL
SITE PLAN
GENERAL ARRANGEMENT

PROJECT NO. 22-3007-001
DWG NO. R322.G.PLN.001
REV. A

APPENDIX B

Conceptual Design – Plan, Section and Iso Views

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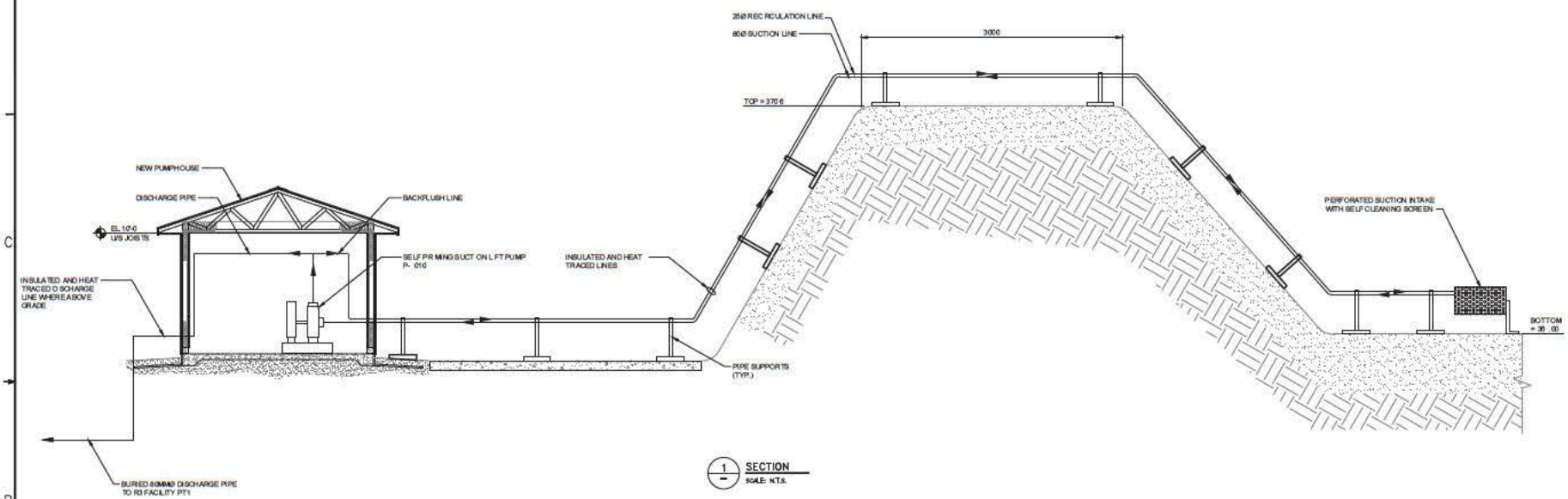

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REVISIONS 1

NO	MM DD	DESCRIPTION	DRAWN	CHECKED

REVISIONS 2

PERMIT STAMP

AUTHENTICATION FOR CURRENT REVISION

ENGINEER'S SEAL

HYLIFE

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DWG CHECK		DA E

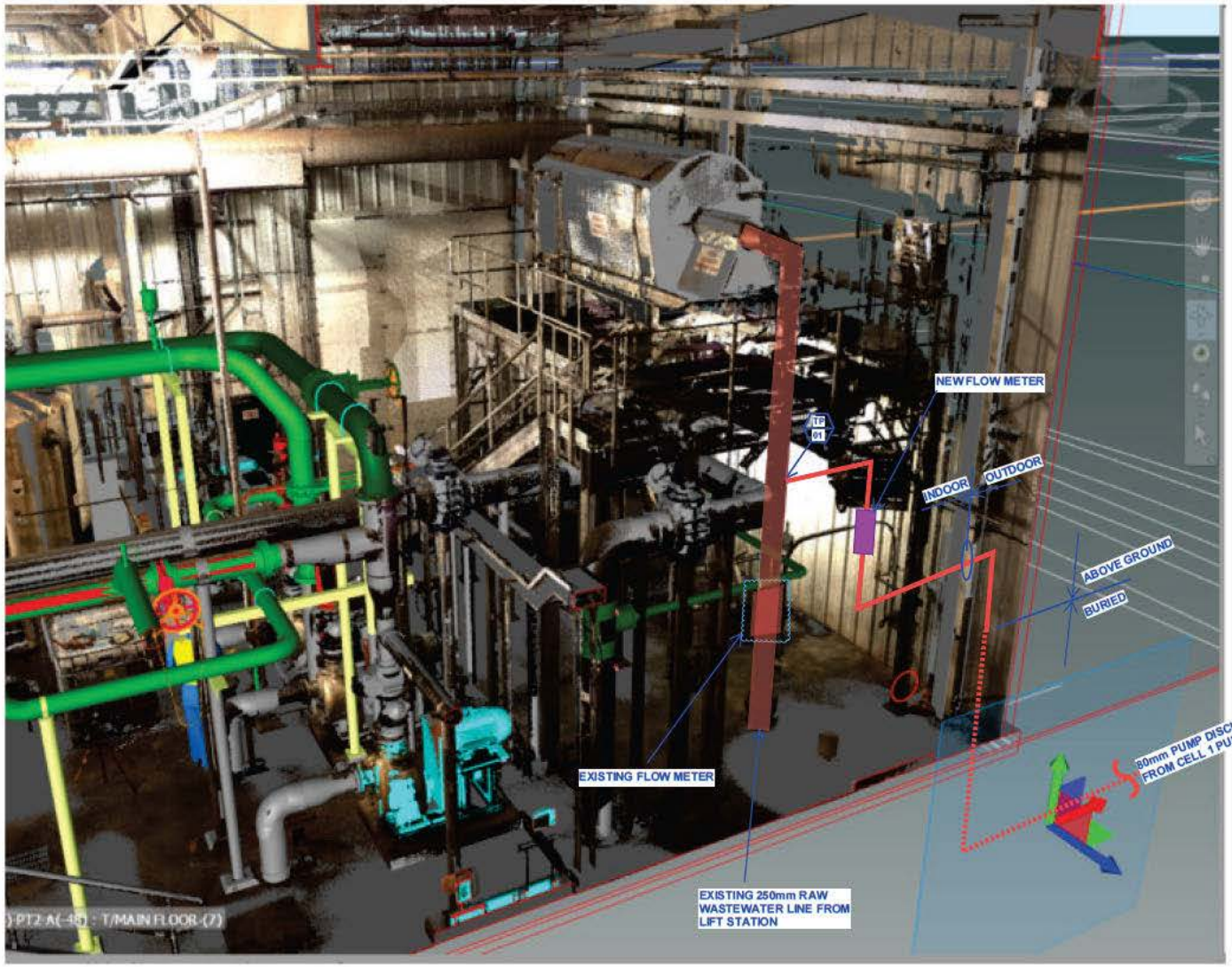
R3 LAGOON
DEWATERING SYSTEM

GENERAL
SECTION VIEW
PUMP HOUSE AND CELL 1 BERM

PROJECT NO 22-3007-001

DRAWING NO R322.G.SEC.001

REV A



HYLIFE - LAGOON DEWATERING
CONCEPTUAL DESIGN
TIE-IN POINT AT PT1

APPENDIX C

Conceptual Design – Process Schematic

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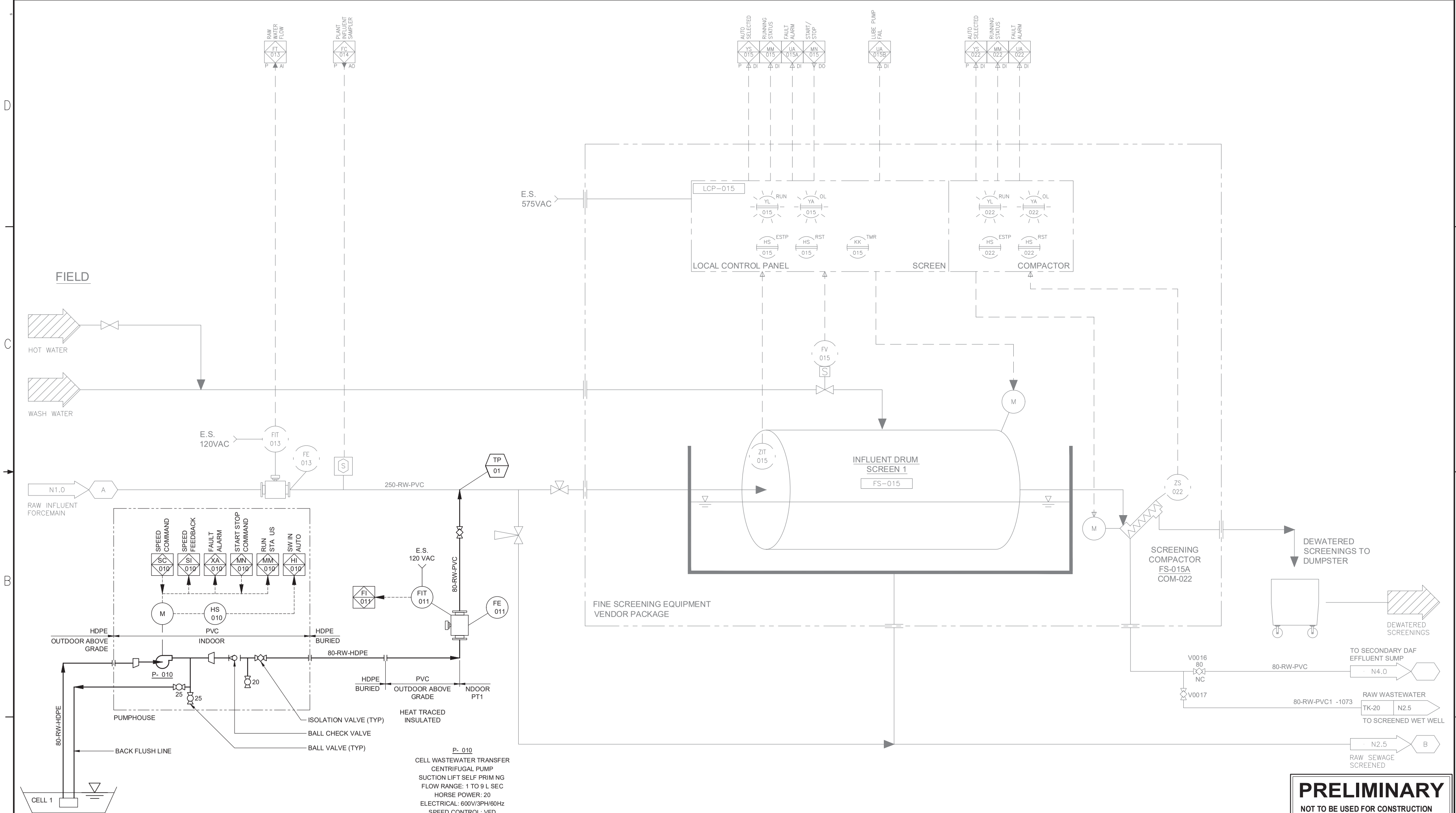
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AUTO SELECTED
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START/ STOP
LUBE PUMP FAIL
E.S. 575VAC
LCP-015
LOCAL CONTROL PANEL
SCREEN
COMPACTOR
RUN
OL
ESTP
RST
TMR
E.S. 120VAC
FIT 013
FE 013
N1.0
RAW INFLUENT FORCEMAIN
250-RW-PVC
TP 01
FV 015
INFLUENT DRUM SCREEN 1
FS-015
ZIT 015
ZS 022
SCREENING COMPACTOR FS-015A COM-022
DEWATERED SCREENINGS TO DUMPSTER
DEWATERED SCREENINGS
FINE SCREENING EQUIPMENT VENDOR PACKAGE
SPEED COMMAND
SPEED FEEDBACK
FAULT ALARM
START STOP COMMAND
RUN STA US
SW IN AUTO
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SI 010
XA 010
MN 010
MM 010
HI 010
HS 010
E.S. 120 VAC
FIT 011
FI 011
FE 011
80-RW-PVC
HDPE
OUTDOOR ABOVE GRADE
PVC
INDOOR
HDPE BURIED
80-RW-HDPE
P- 010
HDPE BURIED
PVC OUTDOOR ABOVE GRADE
NDOOR PT1
HEAT TRACED INSULATED
PUMPHOUSE
ISOLATION VALVE (TYP)
BALL CHECK VALVE
BALL VALVE (TYP)
BACK FLUSH LINE
CELL 1
80-RW-HDPE
V0016 80 NC
V0017
80-RW-PVC
TO SECONDARY DAF EFFLUENT SUMP
N4.0
RAW WASTEWATER
80-RW-PVC1 -1073
TK-20
N2.5
TO SCREENED WET WELL
N2.5
RAW SEWAGE SCREENED

P- 010
CELL WASTEWATER TRANSFER
CENTRIFUGAL PUMP
SUCTION LIFT SELF PRIM NG
FLOW RANGE: 1 TO 9 L SEC
HORSE POWER: 20
ELECTRICAL: 600V/3PH/60Hz
SPEED CONTROL: VFD

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REVISIONS 1

REVISIONS 2

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ENGINEER'S SEAL

HYLIFE™

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DESIGN BY	RCC	DATE (MM DD)	22/0 /20
DESIGN CHECK		DATE	
DRAWN BY	DLS	DATE	22/0 /21
DWG CHECK		DATE	

R3 LAGOON
DEWATERING SYSTEM

MECHANICAL
PRE-TREATMENT INFLUENT
P&ID

PROJECT NO: 22-3007-001
DWG NO: R322 M.P D.001
REV: A

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