

Phase 1, Environmental Impact Assessment Registration Document Solargram Farms, Renauds Mills Road

Renauds Mills, New Brunswick Project: 20.03.090 Prepared for:

Captiva Verde Land Corporation 350 Coverdale Road Riverview, New Brunswick E1B 3J4

Phase 1, Environmental Impact Assessment Registration Document Solargram Farms, Renauds Mills Road Renauds Mills, New Brunswick

Project: 20.03.090

May 13, 2020



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NB Department of Environment and Local Government

Marysville Place P.O. Box 6000 Fredericton, New Brunswick E3B 5H1

Attention: Mr. Shawn Hamilton, P. Eng.

Re: Phase 1, Environmental Impact Assessment Registration Document Solargram Farms, Renauds Mills Road, Renauds Mills, New Brunswick

At the request of our client, Captiva Verde Land Corporation, Hive Engineering Limited has prepared the following Phase 1, EIA Registration Document for the proposed construction of an outdoor cannabis farm (Solargram Farms) located in Renauds Mills, New Brunswick.

Do not hesitate to contact the undersigned with any questions regarding the information presented herein.

Sincerely,

Andrea Kalafut, M.Sc.E., P.Eng. Associate and Senior Environmental Engineer Hive Engineering Limited

cc: Captiva Verde Land Corporation

Glossary of Terms

Abbreviation	Definition
EIA	Environmental Impact Assessment
МТВЕ	Methyl Tertiary Butyl Ether
NBDELG	New Brunswick Department of Environment and Local Government
OWLS	Online Well Log System
PID	Parcel Identifier
PHC(s)	Petroleum Hydrocarbon(s)
SNB	Service New Brunswick
TRC	Technical Review Committee
WSSA	Water Supply Source Assessment



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1.0 INTRODUCTION

Hive Engineering Limited (herein "Hive") was retained by Captiva Verde Land Corporation (herein the "Proponent") to prepare an Environmental Impact Assessment (EIA) Registration Document for the construction of a Cannabis farm (Solargram Farms) in Renauds Mills, New Brunswick. This registration document is required under the New Brunswick *Environmental Impact Assessment Regulation 87-83* of the *Clean Environment Act*.

Based on correspondence from the New Brunswick Department of Environment and Local Government (NBDELG), it is our understanding that this EIA registration is solely required based on the farm requiring the extraction of groundwater at a capacity of greater than 50m³ per day (as per Item (S) of Schedule "A" of "A Guide to Environmental Impact Assessment in New Brunswick").

Therefore, a Water Supply Source Assessment (WSSA) will need to be completed prior to issuance of the determination. We further understand that due to the COVID-19 pandemic, assessment of other environmental features is not required at this time. However, there may be requirements for future assessment, study or consultation issued as part of the determination. This Phase 1 registration document provides the NBDELG with a proposed methodology for the WSSA to generate a file number to expedite the determination given the impending grow season.



2.0 THE PROPONENT

The Proponent details for this registration document are as follows:

Name of Undertaking:	Solargram Farm Facility, Renauds Mills, New Brunswick		
Name of Proponent:	Captiva Verde Land Corporation		
Address of Proponent:	350 Coverdale Road, Riverview, New Brunswick E1B 3J4		
Principal Proponent Contact:	: Mr. Len Wood		
	Email: len@bachmanwood.ca		
Principal Contact for EIA:	Hive Engineering Limited		
	Ms. Andrea Kalafut, M.Sc.E., P.Eng., President and CEO		
	155 Cornhill Street, Moncton, New Brunswick		
	Cell Phone: 506.232.1036		
	Email: andrea.kalafut@hiveeng.ca		
Property Ownership:	Captiva Verde Land Corporation		

3.0 PROJECT DESCRIPTION

3.1 Project Name

Solargram Farm Facility, Renauds Mills, New Brunswick (herein referred to as the "Project")

3.2 Project Overview

The Project includes the construction of an outdoor Cannabis farm. Once harvested, the plants will be taken off-site for extraction of cannabidiol (CBD) and tetrahydrocannabinol (THC) oils. The farm will be situated on four PIDs located in Renauds Mills, New Brunswick. The PIDs are identified as 25060062, 25426081, 25060021 and 25469834, which collectively occupy approximately 40.4 hectares of land (herein referred to as the "Site"). All four land parcels are currently registered to Captiva Verde Land Corp. (the Proponent).

Once constructed, the grow area will encompass approximately 28 acres (113,300 square metres) with 12,000 plants in hoop houses and 8,000 plants exposed to open air for a total of 20,000 plants. The preliminary schematics for the design are presented in Appendix A.



The property currently has security fencing and video surveillance installed around the perimeter of the facility. Water for the plants is intended to be supplied by two groundwater wells that will be drilled in May of 2020. Back-up water will be supplied (provided the water meets quality standards) by an existing pond located near the southwestern corner of the Site.

3.3 Purpose/Rationale/Need for Undertaking

According to BDS Analytics and Arcview Market Research, the leading cannabis researchers, the CBD Market will surpass 20\$ billon dollars (US) by 2024. According to the Proponent, this farm will create approximately 200 jobs during the growing season. The Project will produce crop to facilitate consumer demand and also create jobs in New Brunswick to enhance the local economy.

3.4 Project Location

The Site is 40.4-hectares in area (PIDs 25060062, 25426081, 25060021 and 25469834). The approximate coordinate for the centre of the Site is Lat: 46°22′49″N and Long: 64°43′49.34″W. The civic address for PID 25060021 is 198 chemin Yvon a Fred in Renauds Mills located in the Parish of Wellington in Kent County. PIDs 25060062 and 25426081 do not have civic addresses but are situated on chemin Yvon a Fred in the Parish of Wellington in Kent County. PID 25469834 is located on Highway 115 in Renauds Mills in the Parish of Wellington in Kent County.

4.0 PROPOSAL FOR COMPLETION OF WSSA

Section 4 of this report details the methodology for the completion of the WSSA including the selection of the drill targets, options for alternate water supply sources, the hydrogeology as it relates to project requirements, the hydrogeological testing and work schedule, potential for pollution or chemical hazards within 500 metres of the proposed drill targets and a discussion of nearby surface water features. The scope of the work was completed in conjunction with the guidance of EXP.

4.1 Location of Drill Targets and Purpose of the Water Supply

Captiva Verde Land Corporation intends to develop a Cannabis farm (Solargram Farms) on approximately 40 hectares of land located in Renauds Mills, New Brunswick. The Cannabis grown and harvested by this facility will be utilized to produce pharmaceutical grade THC and CBD oils.

We understand that Captiva Verde Land Corporation wishes to develop a groundwater supply source to meet the Project water requirements in lieu of the existing 6M US gallon surface water



pond located on the southwestern portion of the Site. It is our understanding that the water treatment components required to utilize the surface water source are currently not readily available. The groundwater supply source will be for irrigation purposes only; the developed source will not be used to supply potable water. We have assumed that once developed, the groundwater supply source will continue to be utilized by Solargram Farms for subsequent growing seasons.

Based on the required project water demand, a review of the study area, NBDELG water well records and regional hydrogeological conditions, there is a reasonable expectation that one or two groundwater production wells will be required. The two proposed target drilling locations (TH20-01 and TH20-02 as depicted on Figure 1 located in Appendix B) are situated at the western end of the Site; the targets are setback a considerable distance from existing developments (i.e. existing wells, etc.). The targets are situated on the 9.6-ha parcel of land identified as PID 25060062. To our knowledge, the nearest existing well is situated approximately 1 km southeast of the proposed test hole locations along the west side of Renauds Mills Road.

4.2 Required Water Quantity and/or Required Pumping Rate

Captiva Verde Land Corporation has indicated that they require a groundwater supply source capable of meeting a water demand of 60,000 US gallons/day to 80,000 US gallons/day (i.e. 35 Igpm to 47 Igpm) for irrigation purposes during the growing season (assumed to be June to September). The required pumping rate would need to be proportionally increased if the volume of water required was extracted from the wells over a period of time less than 24 hours per day. For example, if the wells are permitted to pump only 18 hours in a 24-hr period (i.e. 75% of the time), this would equate to a required pumping rate of 80,000 US gallons/day (47 Igpm) to 108,000 US gallons/day (63 Igpm). It is noted that the recommended pumping schedule (i.e. permitted number of pumping hours over a 24-hr period) will be included in the production well safe yield assessment provided in the Step 2 Water Supply Source Assessment (WSSA) report.

Based on information provided by the Proponent, water will be required for irrigation purposes over a 24-hr period each day during the growing season and it will not be used for potable purposes.



4.3 Alternate Water Supply Sources in the Area

According to provincial records the Site is not located with a watershed or wellfield protected area; there are no municipal groundwater supply systems in close proximity to the proposed development.

Properties in the study area rely upon individual groundwater wells for potable water supply. Although there is a 6M US gallon surface water pond situated west of the proposed target drilling locations, the water treatment equipment required to utilize this water source could not be procured within the time required to meet key operational deadlines (i.e. latest date for planting the crop). It is understood that at a minimum, the surface water would need to be subjected to microbiological treatment and temperature adjustment prior to its utilization as a source of irrigation water for the cannabis oil development. An assessment of the suitability of the surface water as a supplementary source of irrigation water is not going to be completed as part of the scope of work of the WSSA.

4.4 Area Hydrogeology as it Relates to the Project Requirements

A review of regional scale geological mapping indicates that the study area is underlain by a 0.5 m to 3 m thick blanket of loamy lodgment till, minor ablation till, silt, sand, gravel, and rubble (Rampton et al., 1984).

The regional bedrock underlying the relatively thick surficial deposits in the study area is comprised of carboniferous red to grey sandstone, siltstone and conglomerate (Potter et al., 1968).

Regarding hydrogeology, the Bouctouche River (approximately 8 km northwest of the Site) would be expected to serve as a regional groundwater flow divide and discharge zone. As such, the direction of regional groundwater flow would be expected to be northwest towards the Bouctouche River and coincide with local topographic conditions.

Superimposed on this regional flow system would be intermediate and shallow groundwater flow systems whose character would be a function of topography, soil/bedrock type and geologic structure. Based upon existing topographic conditions in the vicinity of the proposed target drilling locations, it is expected that the direction of shallow groundwater flow would also typically be northwest towards Smelt Brook. Smelt Brook is situated about 280 metres northwest of the target drilling locations and forms the northwestern boundary of PID 25060062 flowing



northeast and northwest before ultimately discharging to the Little Bouctouche River in McKees Mills, New Brunswick.

Based upon local geological conditions, it is expected that the underlying fractured bedrock would form the primary groundwater supply aquifer in the study area. Based upon a review of the regional bedrock geology, it is expected that the underlying sandstone units would have the greatest aquifer potential followed by the conglomerate units. Although a few shallow dug wells are reportedly located along the Renauds Mills Road, it is expected that these would have very low yields based on the generally low permeability of the underlying glacial till.

To assist with the assessment of local hydrogeological conditions, water well records for 12 wells located within approximately 1.5 km of the Site were obtained from the NBDELG Online Well Log System (OWLS). The depth of these wells ranged from 15 metres to 55 metres with an average of 30 metres. Similarly, the recorded casing depth for these wells ranged from 7 metres to 43 metres with an average of 18 metres. Well yields estimated by the air lift method ranged from 33 m³/day (5 Igpm) to 491 m³/day (75 Igpm) with an average of 170 m³/day (26 Igpm).

With regards to the well yields, the well records obtained from the provincial water well database search are expected to primarily represent residential water wells, since residential land use is predominant in the study area. This hypothesis is supported by the relatively shallow average depth calculated for the above noted wells. As such, there is a reasonable expectation that higher well yields will generally be encountered at greater depths.

4.5 Proposed Hydrogeological Testing and Work Schedule

All test wells proposed in Phase 1 of the WSSA will be 150 mm in diameter. The WSSA field program will start with the drilling of initial test well TH20-01 (Figure 1 located in Appendix B). TH20-01 will then be subjected to an air lift test. If the well yield as estimated by the air lift test (TH20-01) is deemed to be insufficient to meet the project water requirements, TH20-02 (Figure 1 located in Appendix B) will be drilled and subjected to air lift testing. Assuming that the estimated/interpreted combined yield of these two wells is deemed to be sufficient, a third well (OW20-01) will be drilled in close proximity (within 15 m) to one of the test wells to serve as a water level observation well during the pump testing program. The observation well will be established at roughly 90 degrees from the imaginary line connecting test wells TH20-01 and TH20-02.



If only one test well is required to meet the project water requirements, the observation well will be drilled a short distance (within 15 m) away from the pumping well to increase the likelihood of obtaining a good hydraulic connection between the pumping and observation well. Regardless, TH20-02 will still be drilled and pump tested (i.e. even if it is anticipated that the project water requirements could be met by TH20-01 based on air lift testing) so that it can be utilized as a back-up water supply well.

For the hydrogeological pump testing program, manual water level readings will be supplemented with data obtained from electronic water level dataloggers.

Prior to initiating the 72-hr constant rate test, step-drawdown testing will be completed on the proposed production wells. The step-testing will consist of three pumping rate steps of 30 to 60 minutes in duration. The step-drawdown testing will be conducted on both wells concurrently, as and if practical. The results of the step-drawdown testing will be utilized to select the pumping rate for the 72-hr constant rate test on the production wells.

A 72-hr constant rate pumping test will be completed on the production wells following the completion of the step-drawdown testing. The constant rate testing will be conducted concurrently on TH20-01 and TH20-02. The concurrent pumping of both wells is required to evaluate capacity of wells if both wells are to be pumped concurrently during operations. If only one well is required to meet the project water demand, it is intended that both wells would still be pump tested concurrently due to the tight project schedule.

Water samples will be collected from the pumping wells during the test at approximate pumping times of 24 hrs, 48 hrs and 72 hrs; the samples will be submitted to an accredited laboratory for analysis of bacteriological parameters (i.e. total and fecal coliforms and E. coli), general chemistry, trace metals and/or petroleum hydrocarbons (PHCs) and MtBE.

Following the cessation of pumping, water level recovery measurements will be obtained for the lesser of the time required for 100% recovery or 36 hrs as per the provincial WSSA requirements.

Concerning the schedule, it is proposed that the well drilling will be completed as soon as possible following the receipt of approval from NBDELG. It is expected that two to three days will be required for the drilling program. The hydrogeological pump testing program would then be completed as soon as the drilling program is complete. It is generally preferred to initiate the pump testing program at the beginning of a week to minimize the potential for requiring the analytical laboratories to receive samples during the weekend (if possible). Given the very tight



overall project schedule (i.e. the Proponent desires to commence operations in mid-June at the latest), rush turnaround times (TATs) will be requested for all laboratory analytical services.

4.6 Pollution or Contamination Hazards within a Minimum Radius of 500 m from the Proposed Drill Targets

The Land Gazette feature of the Service New Brunswick (SNB) website was used to screen the Site and adjoining properties for the presence of any environmental related notices to assist with the assessment of potential sources of contamination in the study area. Based on this screening exercise, no environmental notices (e.g. NBDELG petroleum storage database; NBDELG remediation database; former dumpsites; etc.) were identified on the Site or immediate adjoining properties.

A 500 m radius from each of the proposed test well locations TH20-01 and TH20-02 is shown on Figure 1 in Appendix B. As indicated on this figure, no potential sources of water supply contamination were identified within 500 m of the proposed drilling targets.

4.7 Limited Land Use Review

The western section of the Site (PID 25060062) was historically utilized as a cranberry growing operation. The existing irrigation pond and two (2) former cranberry beds are observed on aerial imagery available on GeoNB map viewer. Furthermore, it is understood that the two existing commercial buildings situated along the west side of Renauds Mills Road were formerly utilized as office and warehouse space by a used furniture sales company (i.e. Bernard's Used Furniture).

Existing land use in the vicinity of the Site is interpreted to be predominately residential or undeveloped woodland. It is noted that a gun club is situated on the east side of the Renauds Mills Road, approximately 240 metres southeast of the Site and an auto salvage yard (Yvon Cormier Auto Salvage) is situated on the east side of NB Route 115 at a distance of 665 metres west and downgradient of the Site.

4.8 Groundwater Use Problems in the Area

There are no known groundwater use problems (quality or quantity) in the area. Based on the review of data in the NBDELG Water Well Database for twelve (12) wells located within 1.5 km of the Site, the average well yield was 170 m³/day (26 Igpm), which is more than adequate quantity for residential developments. However, there is no water quality information for any of the above noted wells in the provincial water well database.



According to a representative of NBDELG, there are reports of elevated levels of iron, manganese and turbidity in well water samples collected in the area. Total coliforms were also identified in a single groundwater sample in the study area. There were no elevated levels of arsenic or uranium in the samples. This information represents data collected from four water wells located in the study area and may not represent overall water quality in the area.

4.9 Surface Water Features within 60 m of the Proposed Drill Targets

According to mapping on GeoNB map viewer, there are no watercourses or wetlands located within 60 metres of the proposed test well locations. The existing on-site irrigation pond is located approximately 112 metres southwest of TH20-02. The nearest watercourse is Smelt Brook, which is situated approximately 240 metres west of TH20-02. As previously indicated, the latter watercourse flows northeast and then northwest before discharging to the Little Bouctouche River in McKees Mills, New Brunswick.

4.10 Site Supervisory Personnel involved in the Source Development

The following persons will be involved in the supervision of the proposed groundwater supply investigation:

- Mr. Marc LeBlanc, Director of Operations, Solargram (506-988-0240)
- Ms. Andrea Kalafut, M.Sc.E., P.Eng., Project Manager, Hive Engineering (506-386-4897)
- Robert Gallagher, M.Sc.Eng., P.Eng., Project Hydrogeologist and Senior Engineer
 EXP Services Inc. (506-857-8889)
- Paul Caissie, Licensed Well Driller, Caissie Well Drilling Ltd. (506-852-3654)

4.11 Zoning Mapping

We were unable to locate zoning mapping on the Kent Regional Service Commission website for the study area. An overlay of the targets with recent aerial photography is presented in Figure 1 located in Appendix B.



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5.0 CLOSURE

This report has been prepared for the sole benefit of Captiva Verde Land Corporation. This report and any of its content cannot be relied upon by any other person or entity without the express written consent of Hive Engineering Limited and Captiva Verde Land Corporation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Hive Engineering Limited accepts no responsibility for damages incurred by any third party resulting from decisions or actions based on the content of this report.

The conclusions presented herein represent the best technical judgement of Hive Engineering personnel based on current engineering and scientific practices and environmental standards at the time the work was performed. The conclusions are based on the site conditions encountered at the time the work was performed at the locations presented in this report.



6.0 **REFERENCES**

New Brunswick Department of Environment and Local Government's "A Guide to Environmental Impact Assessment in New Brunswick" dated January 2018.

New Brunswick Department of Environment and Local Government, Watershed Protected Area Designation Order. Clean Water Act. November 2001.

New Brunswick Department of Environment, Wellfield Protection Area Designation Order. Clean Water Act. September 2000.

Service New Brunswick. Registry and Mapping Services. (www.planetsnb.ca)

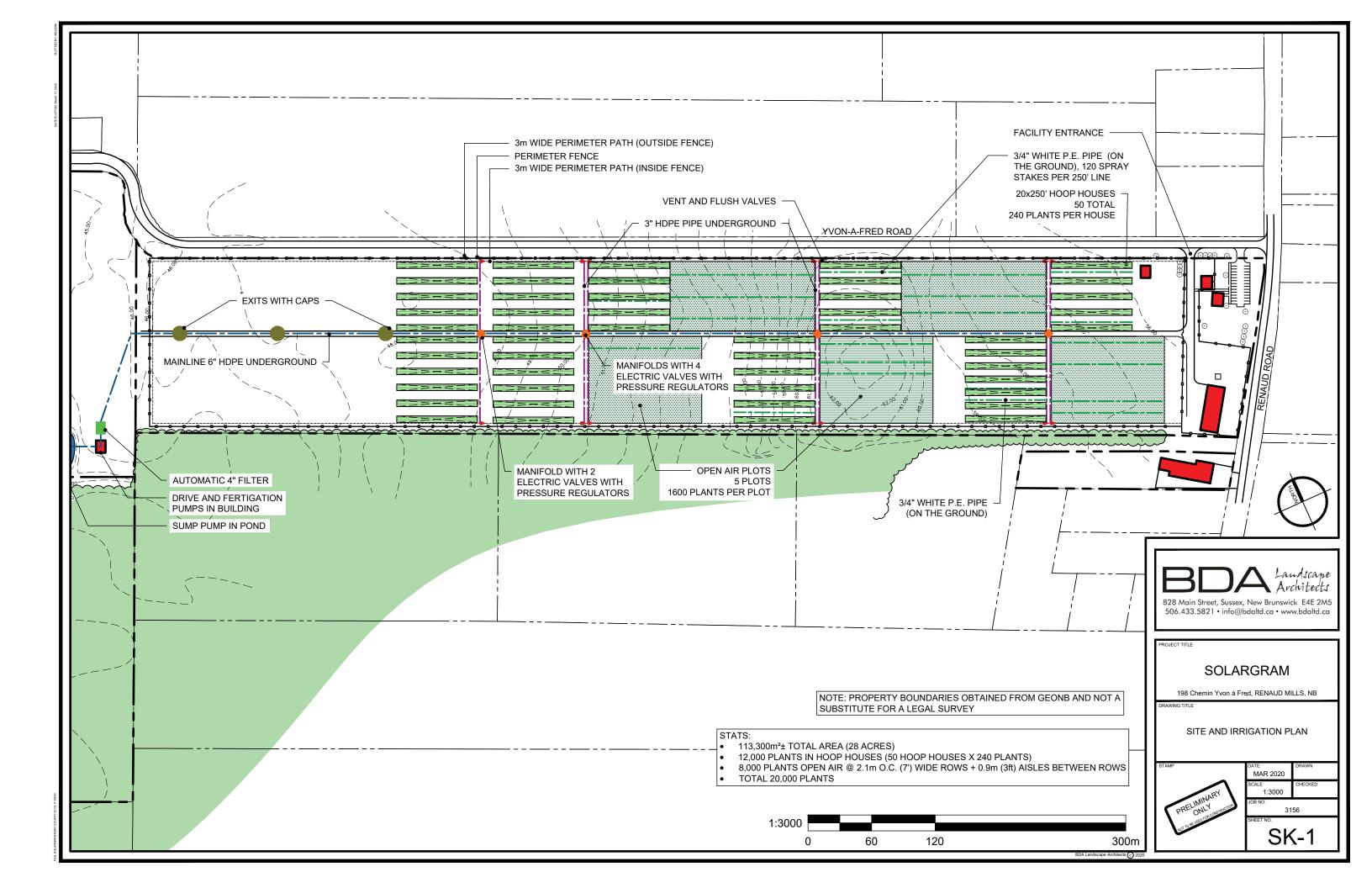


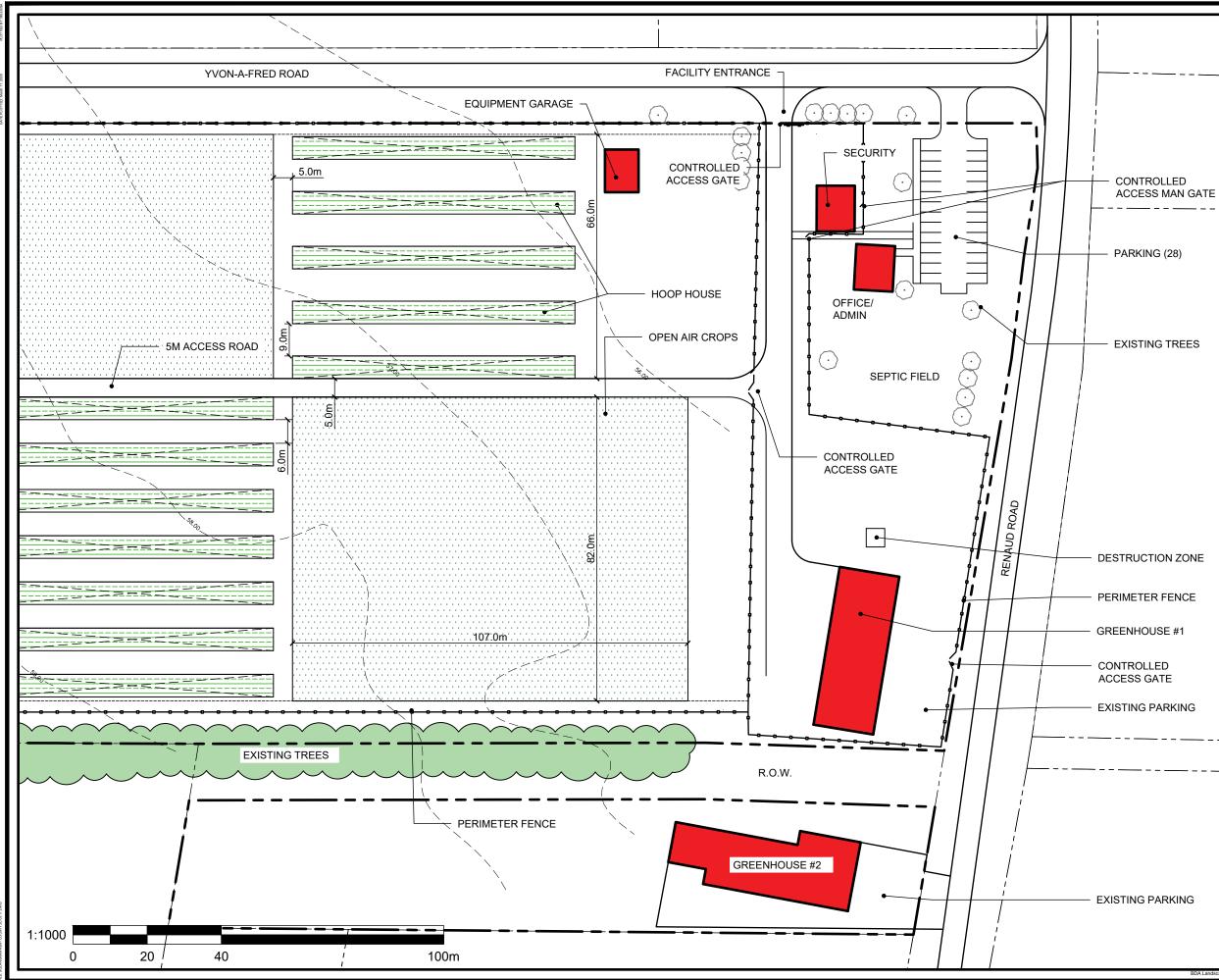


APPENDIX A

Preliminary Schematics







PROJECT TITLE



828 Main Street, Sussex, New Brunswick E4E 2M5 506.433.5821 • info@bdaltd.ca • www.bdaltd.ca

Landscape Architects

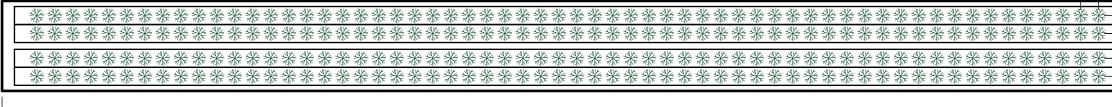
198 Chemin Yvon à Fred, RENAUD MILLS, NB

AWING TITLE

CENTRAL SITE LAYOUT

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PRELIMINARY ONLY	SHEET NO.	
	JOB NO. 3156	
UARY	scale 1:1000	CHECKED
_	MAR 2020	
AMP	DATE	DRAWN

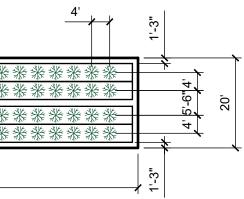
60X4 ROWS = 240 PLANTS PER HOOP HOUSE 5000 SQ.FT



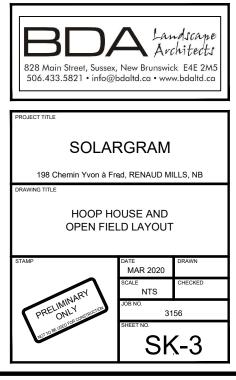
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	ī~	**************************************	14

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-0		***************************************	SOUTH O 32 ROWS PER ROW



I OPEN FIELDS VS, 50 PLANTS DW = 1600 PLANTS SQ.FT.

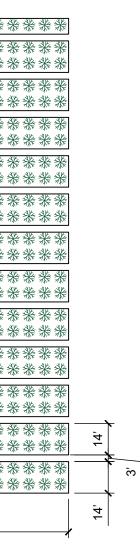


BDA Landscape Architects C 2020

2 7'

NORTH OPEN FIELDS 25 ROWS, 64 PLANTS PER ROW = 1600 PLANTS 94528 SQ.FT.

448'





PROJECT TITL

BDA Landscape Architects C 202

SOLARGRAM					
198 Chemin Yvon à Fre	198 Chemin Yvon à Fred, RENAUD MILLS, NB				
DRAWING TITLE HOOP HOUSE AND OPEN FIELD LAYOUT					
STAMP	MAR 2020	DRAWN			
UARY	SCALE NTS	CHECKED			
PRELIMINY	JOB NO. 3156				
PRELIMINARY ONLY Introduction	SK-4				



APPENDIX B

Proposed Well Locations



