

## SPF Application Form Section A - Cover Page

Fill out this Cover Page and save it to your files for future reference before uploading it on the SPF website.

**Project Title** Mobile chicken coop renovations

**In one to three sentence(s), explain what your project is about:**

Our goal is to improve the heating and ventilation systems, build a rainwater collection system, and paint the inside of the mobile chicken coop on Macdonald campus.

**Indicate the McGill campus(es) where your project will be implemented:**

Macdonald  Downtown  Gault Reserve  Bellairs Research Institute  Other (Specify): \_\_\_\_\_

**Approximate Budget Requested to the SPF (\$):** \$5,000.00

**Approximate Total Project Budget (\$):** \$5,000.00  
(incl. other sources of funding if applicable)

**List 1 to 3 main item(s)/expense(s) for your project that SPF money will be used for** (incl. approx. % of total budget):

HEATING AND VENTILATION (50%); RAINWATER COLLECTION (30%); OTHER MATERIALS (20%)

**Indicate which of the following team members...**

... will be in charge of monitoring the project's budget (maximum 1 person):

Ociane Canadas

... will be the Project Lead (Project Lead will be the contact person for the SPF Staff):

Laura Kennedy

**The Project Lead stays for the entire duration of the project:**

Y  N

**If no, explain in a few sentences your leadership transition plan for one or both of the Project Lead for sustainable continuation of the project:**

When Laura graduates in December, the leadership of the remaining renovations will be passed to Ociane, Meghan, or another new student who is interested in engineering.

**PROJECT TEAM MEMBERS** (read details about [SPF Evaluation Criteria #5](#) for more information)

The SPF encourages your team to be inclusive of individuals who voluntarily self-identify as members of marginalized communities (e.g. women, Indigenous people, people of colour, LGTBTTQI, student parents, members of ethnic minorities, immigrants, people with disabilities).

**1. Project Team Member**

**First Name & Last Name** Laura Kennedy  
**Phone** (daytime; only put #) 5142246027  
**Email** laura.kennedy@mail.mcgill.ca

**Affiliation** Undergraduate  
**Specify if Other** \_\_\_\_\_  
**Faculty/Unit/Organization** FAES/ Bioresource Eng.  
**Campus** Macdonald

**2. Project Team Member**

**First Name & Last Name** Ociane Canadas  
**Phone** (daytime; only put #) 5107596295  
**Email** ociane.canadas@mail.mcgill.ca

**Affiliation** Undergraduate  
**Specify if Other** \_\_\_\_\_  
**Faculty/Unit/Organization** FAES/ Life Sciences  
**Campus** Macdonald

**3. Project Team Member**

**First Name & Last Name** Meghan Guysinger  
**Phone** (daytime; only put #) 8472190214  
**Email** meghan.guysinger@mail.mcgill.ca

**Affiliation** Undergraduate  
**Specify if Other** \_\_\_\_\_  
**Faculty/Unit/Organization** FAES/Nutrition  
**Campus** Macdonald

**4. Project Team Member**

**First Name & Last Name** \_\_\_\_\_  
**Phone** (daytime; only put #) \_\_\_\_\_  
**Email** \_\_\_\_\_

**Affiliation** Choose one.  
**Specify if Other** \_\_\_\_\_  
**Faculty/Unit/Organization** \_\_\_\_\_  
**Campus** Choose one.

## SPF Application Form Section A - Cover Page

### PROJECT TEAM MEMBERS (CONT'D)

<p><b>5. Project Team Member</b></p> <p><b>First Name &amp; Last Name</b> _____</p> <p><b>Phone</b> (daytime; only put #) _____</p> <p><b>Email</b> _____</p>	<p><b>Affiliation</b> _____</p> <p><b>Specify if Other</b> _____</p> <p><b>Faculty/Unit/Organization</b> _____</p> <p><b>Campus</b> _____</p>	<p>Choose one. _____</p> <p>_____</p> <p>Choose one. _____</p>
<p><b>6. Project Team Member</b></p> <p><b>First Name &amp; Last Name</b> _____</p> <p><b>Phone</b> (daytime; only put #) _____</p> <p><b>Email</b> _____</p>	<p><b>Affiliation</b> _____</p> <p><b>Specify if Other</b> _____</p> <p><b>Faculty/Unit/Organization</b> _____</p> <p><b>Campus</b> _____</p>	<p>Choose one. _____</p> <p>_____</p> <p>Choose one. _____</p>
<p><b>7. Project Team Member</b></p> <p><b>First Name &amp; Last Name</b> _____</p> <p><b>Phone</b> (daytime; only put #) _____</p> <p><b>Email</b> _____</p>	<p><b>Affiliation</b> _____</p> <p><b>Specify if Other</b> _____</p> <p><b>Faculty/Unit/Organization</b> _____</p> <p><b>Campus</b> _____</p>	<p>Choose one. _____</p> <p>_____</p> <p>Choose one. _____</p>
<p><b>8. Project Team Member</b></p> <p><b>First Name &amp; Last Name</b> _____</p> <p><b>Phone</b> (daytime; only put #) _____</p> <p><b>Email</b> _____</p>	<p><b>Affiliation</b> _____</p> <p><b>Specify if Other</b> _____</p> <p><b>Faculty/Unit/Organization</b> _____</p> <p><b>Campus</b> _____</p>	<p>Choose one. _____</p> <p>_____</p> <p>Choose one. _____</p>

To list more members, fill a 2nd Cover Page form and save it separately. You may then e-mail it to [SPF Staff](#) directly, also specifying your project title.

Has any member on your team been part of an SPF project in the past?  Y  N

If yes, list all the projects they have been part of: \_\_\_\_\_

**OPTIONAL:**

If applicable, total number of team members voluntarily self-identifying as members of marginalized communities: \_\_\_\_\_

Represented marginalized communities: Choose one. Choose one. Choose one.

Specify if Other(s) and/or add more: \_\_\_\_\_

Relevant link(s): (to website(s) or social media) \_\_\_\_\_

If you plan to recruit volunteers to help implement your project, please indicate how many: \_\_\_\_\_

How did you learn about the SPF? Word of mouth \_\_\_\_\_ Specify if Other \_\_\_\_\_

**Please check the boxes to confirm that you have read and agree to the following information:**

- All of our project team members understand that the SPF is publicly funded and therefore, by default SPF projects are not confidential. We agree that if needed, the SPF Steward, the SPF Administrator and/or the SPF Working Group members read and/or share the application and/or communicate part of its content in the case where they would need to (e.g. to receive professional advice, connect our team to stakeholders, etc.).
- If our project is approved, all our project team members agree that their name, email, and phone number as well as their participation to the project be disclosed (e.g. for contact information or through our application and progress/final reports published on the SPF website). **If you do not check this box, the SPF staff will communicate with you to know whose information to remove before sharing your project online.**
- All of our project team members have read and understood the [SPF Terms & Conditions](#), and we confirm that we agree to respect them.  
**If any aspect of the [SPF Terms & Conditions](#) are unclear to you, contact the [SPF Staff](#) before you submit your application so that you can check this box in confidence. Also note that, if your project is approved, the Project Lead and the person monitoring the project's budget will have to confirm in writing (through email or signing the document) that they agree to the [SPF Terms & Conditions](#) before officially starting the project.**

Thank you! Save this form to your files for future reference and fill Section B 'Project Plan' of the SPF Application Form to complete the process.

## SPF Application Form Section B – Project Plan

Answer the following questions and save this form to your files for future reference before uploading it on the SPF website with Section A - Cover Page.

**Project Title** Mobile chicken coop renovations

**Project Lead** Laura Kennedy      **Phone** 5142246027      **Email** laura.kennedy@mail.mcgill.ca

**First & Last Name** \_\_\_\_\_ **(daytime)** \_\_\_\_\_

*Before you fill out this form, make sure you have consulted all related application documents online, including the [SPF Evaluation Criteria](#), the [SPF Glossary](#), the [SPF Project Flow Diagram](#), and the [SPF Sustainability Brief](#). Read all questions first before answering them. Answer **exactly** what is being asked: stay straight to the point, clear, and succinct. The character limit (including spaces) is indicated for each question.*

**Project Vision** A self-sustained, low-impact, student-run food system on Macdonald Campus.

*A vision depicts the ideal future that someone is hoping for. Thus, a vision is a dreamed aspiration that someone intends to lead or contribute to, and it does not necessarily need to seem realistic at this time. As such, tell us how you see McGill campuses in an ideal world once your project is completed successfully. The vision does not need to be completed within the timeline of the SPF funding.*

**Project Goal** Improvement of the mobile free-range chicken coop on Macdonald campus.  
(225 char. max. ~30 words)

*A goal is the overarching desired tangible realization (and thus change) to be achieved within the project's lifespan. The goal contributes to the project's vision in a palpable and realistic manner. The project's goal may last longer than the SPF funding period. In line with the SPF mandate, when achieved, your project's goal should result in a culture shift (e.g. change in ideas, habits, behavior).*

**1a. What is the specific sustainability-related issue/challenge that you see on McGill campus(es) that you want to address?**

**1b. What is your project idea and how will it help address this issue/challenge?** (3000 char. max. ~485 words)

Our project tackles two issues. The first is a lack of hands-on student experience in matters related to agriculture and environment. We spend hundreds of hours in class learning about alternative agro-environmental systems yet we rarely get a chance to actually participate in such systems. The second issue is the lack of options for locally grown food within Sainte Anne. Our town has only one grocery store with very few options for local produce and no options for local eggs. There are two vegetable farms on our campus, but neither sells eggs. This makes it very difficult for students in Sainte-Anne-de-Bellevue to support the kind of local food systems that we are taught to support.

The mobile chicken coop on Macdonald Campus has been producing free-range eggs for students and professors since its construction in 2014. Overall the project has been running very well for the past four years- it provides education for students, connectivity among the Macdonald community, and local free range eggs for many students and professors. However, this year we want to improve the chicken coop by installing passive solar heating, improved ventilation, rainwater collection and distribution, and by painting the inside of the coop to facilitate cleaning. Finally we want to buy 35 new hens in the spring and enough feed and bedding to last through the spring and summer. This will ensure the continued operation of the coop, and will make it a great example of sustainable building design for the Macdonald community.

2a. List 1 to 3 main impacts you expect/wish your project to have on McGill structures, processes and/or systems. These must relate to the Project Vision and Project Goal you mentioned above. Specify how those impacts will positively transform peoples' behaviors/perspectives/habits on McGill campus(es).

2b. How will this continue after funding is spent (i.e. how will you institutionalize the project)? (1550 char. max. ~250 words)

2a-i) Implementation and education about sustainable building design. The improvements to the mobile chicken coop will reduce energy and water requirements for egg production, improve the health of the chickens (thus increase egg production), and be a leading example of passive solar heating and rainwater collection for students on campus.

2a-ii) Continuation of student-run free-range egg production. This will teach students about alternative food production and empower them to engage in such systems outside of the university.

2a-iii) Continuation of egg sales to Macdonald Campus students and professors. This will improve the food system on Macdonald Campus as well as engage students and professors in an alternative food production system.

2b. The mobile chicken coop pays for itself, since the revenue from egg sales pays for the cost of feed and bedding.

3a. How do you intend to address social, environmental, and/or economic dimensions of sustainability in your project's objectives?

3b. Please also address how the project will be planned and managed/executed sustainably (e.g. material local sourcing, accessibility, etc.; see the [SPF Sustainability Brief](#)). (1045 char. max. ~165 words)

Social: the actual construction of the coop improvements will be designed and completed by students who want to gain practical skills in construction, engineering, and project management. The care and management of the animals will be carried out by students who want to learn about animal care and agri-food systems. Therefore education and practical experience is intrinsic to the project.

Environmental: the improvements to the mobile chicken coop include low-input building features i.e. passive solar heating and rainwater collection.

Economic: The planned improvements will reduce the coop's energy consumption and labour requirements.

Beside appear the five categories in which the McGill students, faculty, and staff think the University can make a positive difference within society. The [McGill Sustainability Strategy, Vision 2020](#), describes a specific vision and goals for each of these categories, as they were defined by the McGill direct stakeholders through a comprehensive consultation process.

4a. In the figure, check all the categories under which your project falls (Select only one if no other categories apply to your project).

4b. Among the categories that you checked, select the one that you think is most relevant to your project:

Dominant Category: Education

5. List 3 to 5 key stakeholders on/off McGill campus(es) that will be involved with and/or impacted by your project, and indicate their respective role in your project.

Stakeholder's Name(s)	Affiliation	Role in the Project	Confirmed Support
Paul Meldrum	Farm Manager	Will provide physical space for coop.	Yes
Scott Manktelow	Machine shop technician	Will provide construction help.	Yes
Grant Clark	Bioresource engineering prof.	Will provide engineering design help.	Yes
			Choose one.
			Choose one.

### Vision 2020 Categories





**6. List the 4 most important objectives of your project and at least one key related activity that you need to conduct to reach each of these and your project impacts. Make your objectives and activities as S.M.A.R.T. as possible. Also indicate at least one output and a key success indicator per activity. (read instructions below; you can also refer to the [Sample Project Plan <5K](#) for guidance)**

*Of your 4 S.M.A.R.T. objectives, a minimum of one should relate to “monitoring” your project’s progress and effectiveness. Another objective should relate to “outreach” (e.g. raising awareness about your project’s topic, promoting your project in the McGill Community and/or calling for individuals’ participation), and two should be more specific to your project, i.e. “other” objectives. The nature of these “other” objectives is for you to decide and tailor to your project.*

*For each of your 4 objectives, you should indicate at least one key **activity**.*

*The bottom of the table is for you to list four additional activities that you think are crucial to the success of your project. As such, depending on what you think is important to having the impact(s) you envision, you may end up having three activities in total that relate to your monitoring objective (e.g. developing a survey, any other activity that will help you and other stakeholders learn through your project) or to outreach (e.g. producing and sharing a video about the project). In any case, since you have limited space, only indicate the objectives and activities that relate best to the impacts you listed under Question 2, and thus to sustainability at McGill.*

*For each objective/activity, specify a key **success indicator** that you think should be used to assess its degree of achievement/completion. Your indicators can be qualitative or quantitative (e.g. number of participants, participant testimonials, website analytics, quantity of energy saved, etc.). See the document [Sample Indicators](#) for inspiration. Also indicate the **output(s)** that will be created as a result of each activity and objective, such as a deliverable (e.g. video, report), training, website, network, design plan, or any other output adding value to the project and helping reach its objectives/impacts.*

Type of Objective/ Activity		Main S.M.A.R.T. Objectives / Activities (125 char. max. ~20 words)	Resulting Output(s) (15 char. Max.)	Responsible Team Member(s) and Time (initials + if paid, estimated # of hours to complete objective/activity) (35 char. max.)	Start Date (MM-DD-YY)	End Date (MM-DD-YY)	Related Key Success Indicator – do not forget to include targeted numbers for each (ignore the check boxes for now) (75 char. max. ~10 words)	
Objective #1	Other	Before building, pressure wash and paint the inside of the coop.	painted coop	Meghan Guysinger	11-04-17	11-05-17	Photos.	<input type="checkbox"/>
Related Activity	Other	Pressure washing the coop, buying paint, and painting the coop.	painted coop	Meghan Guysinger	11-30-17	11-05-17	Photos + receipts.	<input checked="" type="checkbox"/>
Objective #2	Other	Improve heating and ventilation to meet ASABE standards.	heat and fresh air	Laura Kennedy	11-06-17	11-26-17	Temperature log inside coop. Minimum 10C at all times and 60% humidity..	<input type="checkbox"/>
Related Activity	Other	Design and build new heating and ventilation systems.	heat & fresh air	Laura Kennedy	06-17-11	11-26-17	Temperature log inside coop. Minimum 10C at all times and 60% humidity.	<input checked="" type="checkbox"/>
Objective #3	Outreach	Increase student involvement.	education	Ociane Canadas	11-17-04	09-18-01	Positive feedback from students.	<input type="checkbox"/>
Related Activity	Outreach	Organize events and recruit/train new students for daily animal care.	new members	Ociane Canadas and Meghan Guysinger	11-17-04	09-18-02	Minimum membership of 15 students.	<input checked="" type="checkbox"/>
Objective #4	Monitoring	Ensure that we meet our timeline and objectives.	project success	Laura Kennedy	11-17-04	09-18-01	Meeting the timelines listed in this document.	<input type="checkbox"/>
Related Activity	Monitoring	Regular meetings between coordinators.	meeting minutes	Laura Kennedy and Ociane Canadas	11-17-04	09-18-01	Meeting minutes.	<input type="checkbox"/>
Addt'l Activity	Choose an item.							<input type="checkbox"/>
Addt'l Activity	Choose an item.	Design and build rainwater collection system.	water supply	Laura, Ociane and Meghan	12-17-01	04-18-28	50% less dependence on tapwater	<input type="checkbox"/>
Addt'l Activity	Choose an item.	Ensure technology transfer to new users of the chicken coop.	user guide	Laura Kennedy	12-01-17	12-24-17	User guide available inside the coop.	<input type="checkbox"/>
Addt'l Activity	Choose an item.							<input type="checkbox"/>

**7. Now, about the check boxes: Select a total of 3 success indicators that you wish to track and report on during your project. These 3 indicators should be the most relevant to your goal and to creating a culture of sustainability at McGill. They should also be relatively easy to monitor.**

*When selecting your indicators, make sure that you will have/plan the time and resources you will need to allocate to monitor them throughout the course of your project. Before you start your project, the SPF may ask you to change a chosen indicator for another that seems more pertinent to the SPF or to the University sustainability reporting. Note that, in addition to these three indicators, you will be asked to track four other generic ones that will be specified in the Award Letter.*

*You will be required to indicate progress towards your final 7 indicators in your progress and final reports to the SPF. Because the SPF values the experiences and learning that occurs during your project (not only results), these reports will also gather related information through open-ended questions.*

We have selected the 3 Success Indicators that we wish to monitor during the project:

**- BUDGET -**

Please refer to the [SPF Guide to Budgeting](#) to complete your project's budget.

**REVENUES**

Indicate any funding you will receive or anticipate receiving to complete your project, including funds from McGill Departments and Units.

Reminder: If your project is approved, any financial contributions from McGill department/unit will need to be confirmed with a letter or email from its Financial/Budget Officer at the beginning and end of the project.

	(A) Funding Source(s)	(B) Amount	(C) Status
1.	Sustainability Projects Fund (SPF)	\$5,000.00	Unconfirmed
2.			Choose one.
3.			Choose one.
4.			Choose one.
<b>REVENUES GRAND TOTAL - add all (B)</b>		<b>\$5,000.00</b>	

**EXPENSES**

**1. Salaries & Wages** (only if applicable)

If applicable, indicate the job position(s) under your project and the associated costs. See the [SPF Guide to Budgeting](#) for further instructions.

(A) Position Title	(B) ~# of Hours per Week	(C) ~# of Week	(D) Hourly Wage* (\$)	(E) Subtotal (\$) (B x C x D)	(F) 20% Benefits	(G) Total Cost (\$) (E x F)	(H) Funding Sources**
			\$0.00	\$ 0.00	1.2	\$ 0.00	
			\$0.00	\$ 0.00	1.2	\$ 0.00	
			\$0.00	\$ 0.00	1.2	\$ 0.00	
			\$0.00	\$ 0.00	1.2	\$ 0.00	
<b>Expenses Subtotal 1 - add all (G)</b>						<b>\$ 0.00</b>	

Do you already have a specific person in mind for filling the above position(s)?  Y  N

Do you have a personal and/or professional affiliation with the above position(s)?  Y  N

If you answered 'Y' to one or both of the above questions, please disclose:

**2. Other Expenses**

Indicate all of the expenses associated with your project; think back to all of your project's activities and all of the items that you need to complete them. It may be beneficial to group by category (not required); if you do so, please use the following categories: Materials-Supplies, Equipment, Printing, Events, Transportation, One-time Profess. Fees, and Misc.

(A) Item Description (inputs)	(B) # of Units	(C) Unit Cost (\$)	(D) Total Cost (\$) (B x C)	(E) Funding Sources**	(A) Item Description (inputs)	(B) # of Units	(C) Unit Cost (\$)	(D) Total Cost (\$) (B x C)	(E) Funding Sources**	
Heating/ventilation	1	\$2,500.00	\$2,500.00	1			\$0.00	\$ 0.00		
Rainwater collection	1	\$1,500.00	\$1,500.00	1			\$0.00	\$ 0.00		
Painting materials	1	\$180.00	\$ 180.00	1			\$0.00	\$ 0.00		
Laying hens	35	\$12.00	\$ 420.00	1			\$0.00	\$ 0.00		
Feed	8	\$13.00	\$ 104.00	1			\$0.00	\$ 0.00		
Bedding	12	\$5.00	\$ 60.00	1			\$0.00	\$ 0.00		
New wood/insulation	1	\$200.00	\$ 200.00	1			\$0.00	\$ 0.00		
		\$0.00	\$ 0.00				\$0.00	\$ 0.00		
		\$0.00	\$ 0.00				\$0.00	\$ 0.00		
<b>Expenses Subtotal 2 - add all (D)</b>				<b>\$4,964.00</b>	<b>Expenses Subtotal 3 - add all (D)</b>				<b>\$ 0.00</b>	

<b>EXPENSES GRAND TOTAL (Subtotals 1 + 2 + 3)</b>								<b>\$4,964.00</b>
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\* See the [SPF Guide to Budgeting](#) for the conditions and Hourly Wages applicable to hiring under the SPF.

\*\* To indicate the one or many Funding Source(s) that will pay for the expenses, use their respective number as you listed under Revenues (e.g. SPF = 1).

Thank you! After you save a copy of your file, you can now upload this form and Section A - Cover Page on the SPF website to complete the application process. The SPF staff will contact your team within two weeks to provide feedback. Congratulations on applying to the SPF!



**Faculty of Agricultural and  
Environmental Sciences**

McGill University  
Macdonald Campus

Dept. of Bioresource Engineering  
Tel.: (514) 398-7773

[www.mcgill.ca/bioeng/](http://www.mcgill.ca/bioeng/)

Université McGill  
Campus Macdonald

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Fax: (514) 398-8387

21,111 Lakeshore  
Ste-Anne-de-Bellevue  
QC, Canada, H9X 3V9

Wednesday, October-18-17

**Re: Letter of support for Mobile Chicken Coop renovations**

To Whom It May Concern:

The Mobile Chicken Coop Project is an excellent student-run project on Macdonald Campus: it contributes to a healthy food system by the production of local, free-range eggs. It also provides experiential learning opportunities for students who are interested in animal science, agri-food systems, bioresource engineering, project management, and community engagement. The renovations proposed this year by Laura Kennedy, Ociane Canadas, and Meghan Guysinger will provide an experiential learning opportunity for them and for any other students involved, and will help to enhance the benefits that our campus receives from the Mobile Chicken Coop.

The Mobile Chicken Coop is, for the Bioresource Engineering Department, an example of sustainable agri-food buildings design, thus combining several important components of our academic curriculum. The continual improvement of the coop will also provide topics for engineering capstone design projects and independent student projects in the future.

Beyond the academic value of the project, I would personally love to see the initiative develop into a larger community project, using the Mobile Chicken Coop to raise small flocks of heritage chicken breeds. The modern poultry industry mass produces very few breeds of chickens that are selected for high meat yield or egg production. As with all livestock in industrialized nations, this trend has dramatically reduced the genetic diversity of chickens, putting at risk a long and valuable heritage of biodiversity and potentially making the industry fragile in the case of disease outbreaks or unexpected changes. The maintenance of small flocks of traditional breeds of chickens by individuals or institutions across the country is a kind of insurance policy against this trend, and can be a very engaging community outreach project (e.g. University of Alberta).

As a professional engineer, Associate Professor in the Bioresource Engineering Department, and chicken enthusiast, I happily agree to act as a mentor for this project and provide advice for engineering aspects of the proposed renovations: specifically the heating, ventilation, and watering systems.

Sincerely,

A handwritten signature in blue ink that reads "O. Grant Clark".

O. Grant Clark, Ph.D., P.Eng.

Associate Professor

Eml: [grant.clark@mcgill.ca](mailto:grant.clark@mcgill.ca) | Skype: ogclark | Tel.: 1-514-398-7784 | Cel.: 1-514-475-3975



19<sup>th</sup> October 2017

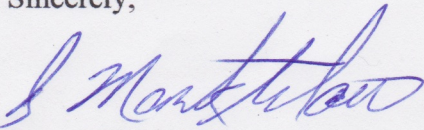
**Re: Letter of support for mobile chicken coop renovations**

To whom it may concern:

Hands-on design and construction is an important way for students to learn new skills and apply knowledge gained in their courses. The design and construction of heating, ventilation and water systems on the mobile chicken coop at Macdonald Campus will be an excellent learning opportunity for Laura Kennedy, Ociane Canadas, and Meghan Guysinger.

As Laboratory Superintendent in the Bioresource Engineering machine shop, I happily agree to act as a mentor for this project and help these students with the design and construction of the renovations they have planned for their mobile chicken coop.

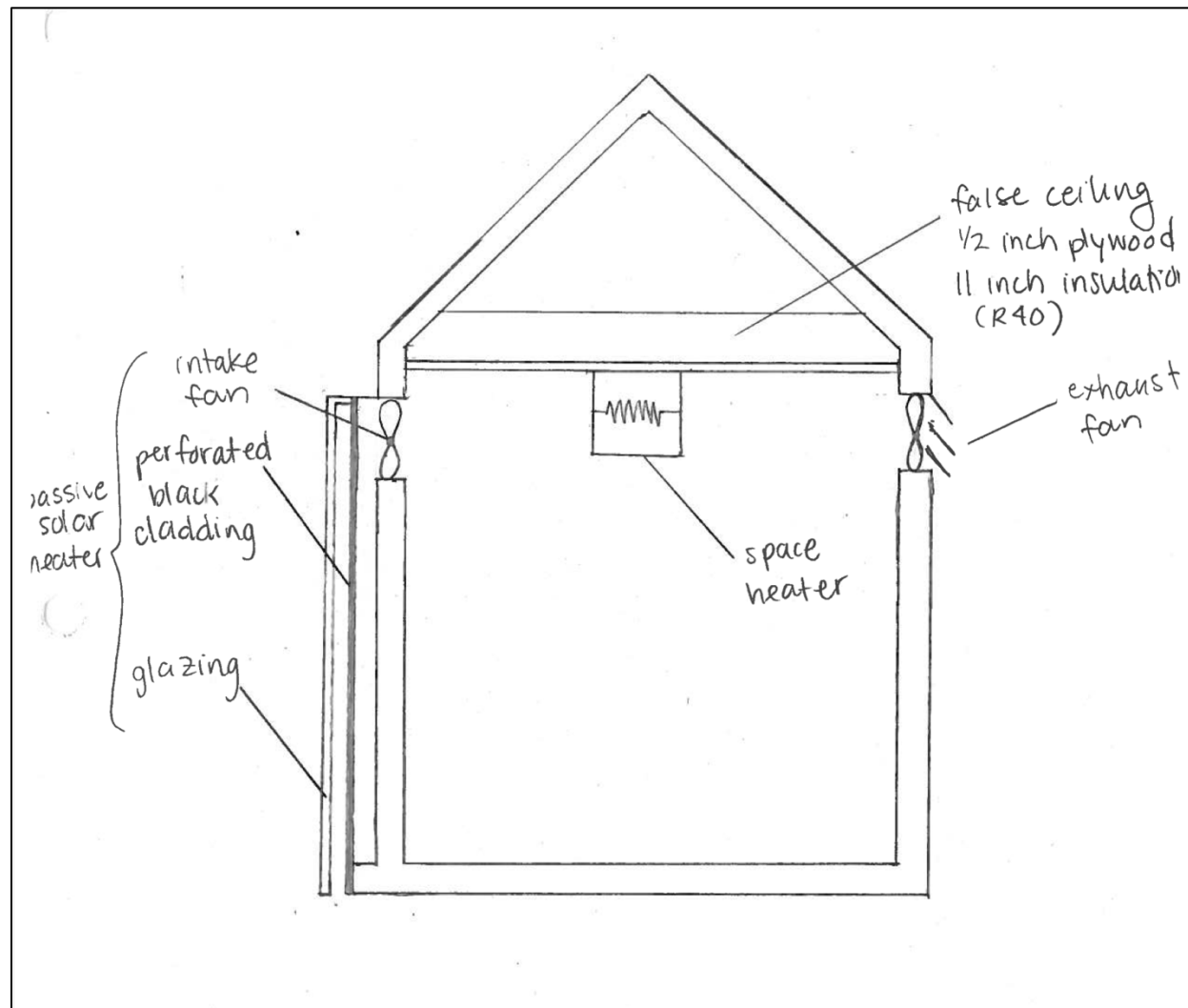
Sincerely,



Scott Manktelow  
Laboratory Superintendent  
Bioresource Engineering Department  
Email: [scott.manktelow@mcgill.ca](mailto:scott.manktelow@mcgill.ca)  
Phone: 514-398-7788



Draft Design



Design schematic for heating and ventilation of mobile chicken coop. Drawing is not to scale.

## Draft Design

### Design criteria:

The first step in the design of the heating and ventilation for the mobile chicken coop was to calculate the required ventilation and heating based on summer and winter outdoor temperatures, desired indoor temperature and humidity, current insulation of the building, and the number of hens that live in the coop. Using the ASAE EP270.5 design standard (Design of Ventilation Systems for Poultry and Livestock Shelters) and assuming 40 hens, 1.8kg/hen, winter outdoor design temperature of -21C and 75% RH, indoor design temperature of 10C and 60% RH, and insulation properties of the roof, walls, floor, windows and doors, the following values were calculated:

Minimum ventilation (winter) =  $86.7 \text{ m}^3/\text{hr} = 51 \text{ cfm}$

Maximum ventilation (summer) =  $350.4 \text{ m}^3/\text{hr} - 861 \text{ m}^3/\text{hr} = 206 \text{ cfm} - 506 \text{ cfm}$

Heating requirement (winter) = 1556 W

### Preliminary design specifications:

Many possible solutions for heating and ventilation were considered. Since we want our chicken coop to be as self-sustaining as possible, we propose a passive solar heater which converts solar energy into thermal energy (NOT electric energy!). The solar heating will be supplemented by an electric heater that will be activated if the temperature inside the coop falls below 10C. Various types of passive solar heating have been used in the past; for our coop we would like to use the “perforated solar collector” type, which is similar to the “SolarWall” designed by Canadian company Conserval Engineering and has shown solar efficiency up to 80% when used with a very high ventilation rate. We are looking at modifying the typical design and including a layer of glazing (i.e. clear acrylic sheet) in front of the wall, to enable efficient solar heating even at low ventilation rates. Also, we would like to build a false ceiling and increase the insulation in the ceiling of the coop, since the ceiling generally accounts for the most heat loss in a building, and our coop is only insulated with R12 insulation in the ceiling instead of the recommended R40. The following heating values were calculated:

Build false ceiling and insulate using R40 insulation: reduce heat loss by 126W and reduce volume of air to be heated

Average winter insolation on South wall of building = 1762 W

Solar heating capacity on South wall assuming 50% efficiency = 881W

Heating load for electric heater:  $1556\text{W} - 881\text{W} - 126\text{W} = 549 \text{ W}$

Draft Design

Cost Estimates				
Item	Quantity	Price/unit	Total cost	Source
Space heater, 4800W	1	184.37	184.37	<a href="https://www.homedepot.ca/en/home/p.4800w-240v-construction-heater-with-enclosed-motor-yellow.1000856020.html?autoSuggest=pip">https://www.homedepot.ca/en/home/p.4800w-240v-construction-heater-with-enclosed-motor-yellow.1000856020.html?autoSuggest=pip</a>
Exhaust fan, 600 cfm	2	150.58	301.16	<a href="https://www.amazon.ca/iLIVING-ILG8SF10V-Wall-Mounted-Variable-Shutter/dp/B01G8I7HVC/ref=sr_1_2?s=kitchen&amp;ie=UTF8&amp;qid=1508865721&amp;sr=1-2&amp;th=1">https://www.amazon.ca/iLIVING-ILG8SF10V-Wall-Mounted-Variable-Shutter/dp/B01G8I7HVC/ref=sr_1_2?s=kitchen&amp;ie=UTF8&amp;qid=1508865721&amp;sr=1-2&amp;th=1</a>
Acrylic sheet, 1/8 x 24 x 48 inch	16	84.99	1359.84	<a href="https://www.homedepot.ca/en/home/p.clear-acrylic-sheet---118-inch-x-24-inch-x-48-inch.1000126439.html">https://www.homedepot.ca/en/home/p.clear-acrylic-sheet---118-inch-x-24-inch-x-48-inch.1000126439.html</a>
Aluminum soffit, 17.5 x 120 inch	10	21.57	215.7	<a href="https://www.homedepot.ca/en/home/p.4-panel-vented-soffit-10-ft---brown.1000183431.html">https://www.homedepot.ca/en/home/p.4-panel-vented-soffit-10-ft---brown.1000183431.html</a>
Insulation, R40, 48 sq. ft	3	47.24	141.72	<a href="https://www.homedepot.ca/en/home/p.r-40-ecotouch-pink-fiberglas-insulation--24-inch-x-48-inch-x-11-inch-48-sq-feet.1000524955.html">https://www.homedepot.ca/en/home/p.r-40-ecotouch-pink-fiberglas-insulation--24-inch-x-48-inch-x-11-inch-48-sq-feet.1000524955.html</a>
<b>Total</b>			<b>2202.79</b>	