CAC Carbon Offset Program

Project Title	*Community Action Center of Northfield, Food Waste Reduction Process*
Date Submitted	*May 5, 2023*
College or University	*Carleton College*
Prepared by	*The Carleton College Center for Community and Civic Engagement and the Carleton College Sustainability Office*
Contact	*Telephone, email address, website for office, physical address etc.*

Method of Project Review	*Peer verification via the offset network*

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1. Introduction

We wish to thank Second Nature for its continued support of our proposal. Since our original submission in March 2022, we have refined our methodology and received new data from the Northfield Community Action Center food shelf (see Project Summary below for context). This proposal is being written by Carleton College undergraduate students who are members of student government (Carleton Student Association, or CSA), and student fellows from the Center for Community and Civic Engagement (CCCE) and Sustainability Offices. We have discussed this project extensively with the Community Action Center (CAC). To our knowledge, this project is the first of its kind within the field of higher education carbon offsets as a methane avoidance protocol. We are eager to receive feedback as we finish certifying this project. Thank you very much for your feedback, we deeply appreciate it.

Project Summary

In 2018 the Community Action Center of Northfield, the City of Northfield, and Carleton College embarked on a project to transform the food shelf into a Supershelf model. The resulting focus on fresh food and food choice led to an increase in local food recovery. In 2019 the transformation was complete, and the CAC now annually collects approximately 300,000 pounds of food from local retailers and colleges each year. All of the food they collect either goes to feed people, a local pig farmer, or to compost. A goal of this project is to follow the EPA food waste hierarchy and reduce methane emissions by repurposing food that would go to landfills. The carbon offsets will be calculated based on methods identified for each of the three streams of methane avoidance: feeding people, pigs or composting. Carleton College has expressed interest in purchasing these carbon offsets from the CAC. Our goal is to verify the CAC's food shelf food rescue program as an accredited carbon offset program for Carleton to purchase offsets from the CAC in order to move toward our goal of net zero carbon emissions. We would also like to create a model for more

Image of the Rice County Landfill, borrowed from Southernminn.com

1.1 Site Details

Supershelf is a new innovative approach to help make the healthiest choice the easiest choice and the CAC of Northfield used that model in 2017 to expand their food recovery network. The increased offerings of fresh foods come from foods rescued at local grocery stores, colleges, and farms. We think that looking at food recovery from a community-wide standpoint is unique, and that by bringing together the entities already recovering food we can improve organic waste handling on a community scale. Carleton College is home to the first Food Recovery Network chapter in Minnesota, students recover food from two dining halls six days a week with a team of over 70 student volunteers delivering food to six community partners. They provide retail rescue to the CAC two days a week.

Carleton students Alyssa Malik (‘19) and Christof Zweifel (‘21) rescuing food from local retailer.

Former Carleton Campus Energy Manager Martha Larson’s son Gus helping out with rescue.

Carleton student James McGehee ‘22 weighing one day’s worth of pig boxes.

One week’s worth of compost weighed in at 60 pounds; pigs do not eat citrus or pitted fruits.

1.2 GHG Impact

Provide a description of the following:

(1) The ways the project will impact GHG emissions: include those Sources, Sinks, and Reservoirs (SSRs) of GHG emissions that are anticipated to represent larger than a 3% (de minimis) contribution to the project impact and will be included in the GHG Assertion calculation. (2) The technologies or measures of behavior changes to be employed by the project.

Over time, food waste that is placed in landfills decomposes to release methane gas, a harmful greenhouse gas. In light of this, methane emissions can be reduced by diverting food that would go to landfills to alternative paths. The source of methane we are encountering here is food waste decomposing in landfills. There are three proposed sinks consisting of human consumption, compost, and pigs. Though these all produce emissions as either methane or carbon dioxide, there is a significant decrease in methane released into the atmosphere when these food pathways are used. We are able to calculate the amount of carbon released through these alternative pathways in order to account for leakage. This project utilized the EPA WARM carbon calculator in order to calculate offset methane emissions.

1.3 GHG Assertion

Please include an estimate of total emissions reductions/sequestration expected in tCO2e per year and the time frame over which these reductions are expected. Accuracy is not the highest priority,

and may be more difficult to identify for biological sequestration projects - nonetheless please provide an estimate and identify your confidence in the estimation.

This timeline demonstrates the process for Carleton's involvement with the CAC in reducing greenhouse gas emissions:

- Pre-Carleton engagement - No walk-in cooler or freezer (~200,000 pounds rescued per year, but with a higher percentage going to pigs or landfill because of lack of refrigeration infrastructure).
- Carleton assists with SuperShelf transformation and cooler installation. This resulted in a 50% increase in food shelf usage (see Appendix #3).
- Northfield Composting donates 2 buckets for the citrus and pitted fruits.
- Post-Carleton engagement - (~300,000 pounds rescued per year).

Given Carleton's contributions to the project through partnerships and volunteer engagement, we intend to take greenhouse gas emissions credit based on the following approach based on 2021 data (specific numbers are subject to change on an annual basis) based on 2021 data (specific numbers are subject to change on an annual basis):

- Break down the 276,000 pounds (276,000 rescued - 104,000 going to pigs - 3,000 composted = 169,000 going home with shoppers).
- 169,000 going home with shoppers - 35,490 (31% wasted at home) = 133,510 kept

out of the landfill.

- 104,000 pigs + 3,000 compost + 133,510 people = 240,510 pounds kept out of local landfills.

1.4 Program Inclusion

Identify the GHG program that the project will be submitted and registered with (The Offset Network).

The Offset Network methane gas emissions project

Indicate the protocol which this GHG will follow. Provide rationale for the choice of the GHG program and the protocol.

Our proposal was originally informed by the Approved VCS Methodology VM0018: Energy Efficiency and Solid Waste Diversion Activities within a Sustainable Community. This protocol was selected because of its applicability to methane emissions reductions from organic waste (see AM0025 and AM0039 in the "Relationship to Approved or Pending Methodologies" section of the protocol). By helping fund and providing volunteers at the Northfield Community Action Center, Carleton finds itself in a similar position to the

protocol's mention of a Sustainable Community Service Provider (SCSP). Additionally, this protocol is tailored to emissions reductions below 5,000 tons of CO_2 equivalent per year. Our estimates of approximately 292.62 MTCDE offset make us confident that the project falls well within this parameter. In the multiple iterations of feedback we have received from Second Nature and affiliated experts, we have made several changes that may not be reflected in the aforementioned protocol. But, because our approach has been periodically reviewed by Second Nature, we believe we are still well within the scope of best practices for GHG programs.

Provide the following details about the methodology used: name, version, registry or developer, and applicable URL (or, if URL is unavailable, include the methodology as an appendix)

Name: Approved VCS Methodology VM0018: Energy Efficiency and Solid Waste Diversion Activities within a Sustainable Community.
Version: 1.0
Registry or Developer: Verified Carbon Standard
URL: https://verra.org/wp-content/uploads/2017/10/VM0018v1.0.pdf

1.5 Roles & Responsibilities

List the key project participants and describe their roles; include the offset project funder, project

owners, project developers, project implementers, technology providers, etc.

All participants: Northfield Community Action Center (CAC), Carleton Community Center for Civic Engagement (CCCE), Food Recovery Network (FRN) Carleton Student Association's Sustainability Working Group (SWG), and the Carleton Sustainability Office (Sustainability Office). By proxy of the CCCE, SWG, FRN, and the Sustainability Office, Carleton College is involved in the program.

Offset project funder: Carleton College

Project owners: CAC owns the project facilities and Carleton College will own carbon credits from the project.

Project developers: The CCCE works as project developers and employs student workers to help with operations at the CAC, particularly through an annual summer internship at the CAC. The SWG serves as student advocates at Carleton College and aids with project plan development.

Project implementers: The CAC acts as the main distribution and collection center for food waste (project implementers). Volunteers and paid summer interns from the CCCE, as well as volunteers from the broader Northfield community, can be considered implementers,

to the extent that they help with operations at the CAC by sorting the food waste into its three streams: to feed people, feed pigs or go to compost. The FRN acts as an agent of the CCCE to rescue food from Carleton dining halls and local grocery stores, and delivers it to the CAC food shelf.

Identify the management structure of the project and how different groups will coordinate and manage respective responsibilities involved with the project. Additionally, identify the chain of custody of carbon offset credits; which project stakeholder(s) will possess the credits after verification?

All of the stakeholders listed above have been in coordination—and will continue to manage their respective responsibilities. The CCCE and the FRN will continue to organize student workers to collect the food to send to the CAC food shelf. The CAC will then weigh the food waste as well as distribute to various recipients, such as the pig farmers and private households. This data collected is used to calculate the carbon offset credits. The SWG, Sustainability Office, and CCCE can collaborate with other decision makers at Carleton College in purchasing the credits after verification.

These bullets detail the project's basic chain of custody:

● Offset project funder: Carleton College, and maintain responsibility for sustaining the project for the future name of institution/organization and how they will fulfill the role. ● Project owners: Carleton College and Northfield CAC (joint ownership). ● Project operator: Northfield CAC.

● Subcontractors: Carleton College CCCE.

Contact information: e-mail address and phone number:

Erica Zweifel; email: ezweifel@carleton.edu; phone (CCCE): (507) 222-4867

Use this space to describe the management structure of the project.

The CAC (including volunteers associated with other parties) is charged with recovering food, reporting the poundage of food, and monitoring where food is distributed. The CCCE will use a peer-verified food emissions calculator to calculate the number of organic emissions that have been offset. The SWG and FRN will work to foster student involvement in the project at Carleton College.

1.6 Relevant Stakeholder Outcomes & On-going Communication

Explain the anticipated outcomes of the project for each of the stakeholders identified in 1.5; are these outcomes related to learning objectives, sustainability goals, or something else? For example,

the project funder's anticipated outcome might be to reduce their carbon footprint while the project developer may hope to create a unique learning experience for students through project development. Provide an explanation as to how these parties will remain in contact throughout the course of the project, regarding project updates and other project-related tasks.

Use this space to describe the outcomes and methods of communication in narrative format; < 500 words.

An important aspect of this project is that the various stakeholders are local. This physical proximity has allowed Carleton College (and its subsidiary parties mentioned above) and the CAC to develop a close relationship. The CAC and CCCE already have a strong connection through the CCCE annual summer internship program, as well as a joint program with FRN that has been successfully managed on Carleton's end. The CCCE and SWG are in close collaboration, as one of the offices that have worked with the student government parent of SWG on various projects (CSA Senate). There is a liaison position in the CSA Senate that is filled every year whose primary role is communication between the department and student body. All of these relationships will be beneficial for the verification of the carbon credits as there will be streamlined communication between each stakeholder, especially with feedback

on how to improve upon the current methods.

1.7 Co-benefits

One of the goals of the Offset Network is to catalyze and support offset projects that provide educational and research opportunities for students, faculty, and staff. The Offset Network also aims to foster the development of local and small-scale projects with meaningful co-benefits. Please describe the anticipated co-benefits of this offset project, including any student involvement and academic research that may result.

The co-benefits of the project are rooted in the Northfield community that is involved in every aspect of the CAC. There is huge student involvement in the CAC from Carleton College, especially because of the collaboration with FRN and the summer internship program hosted by the CAC. Students carried out extensive research to create this proposal, a process that produced invaluable educational experiences. This offset project provides a learning opportunity for students to get to know the local Northfield community, since many Carleton students aren't from the area or even from Minnesota. Students gained awareness regarding the environmental impact of food waste and recovery. Students also learn how to do acts of public service and calculate emissions reduced. This program benefits individuals experiencing food insecurity in the Northfield area as the customers of the CAC are shopping for private households. In Carleton's goal to achieve carbon neutrality by 2050, scope 3 emissions, which encompasses travel, have been a challenge to overcome (see Appendix 5). This program would be a solution to reducing emissions that otherwise

would have been impossible to reduce without taking extreme action (like terminating student Off-Campus Studies programming).

This project meets several of Carleton College's learning outcomes, specifically; formulate and solve problems, communicate and argue effectively, and in their chosen field of study, conduct disciplinary and/or interdisciplinary research, and/or undertake independent work. This proposal also meets the CCCE vision to engage in inclusive, sustainable, reciprocal relationships that foster student learning and faculty development, fulfill community-identified needs, and promote an equitable and peaceful society.

1.8 Environmental Impact Assessment

The CAC is already distributing food to the Northfield community, local pig farmers, and composting. Although Carleton has contributed to increasing the CAC's capacity (see Section 2.2: Additionality), getting the project certified by Second Nature will not radically alter the type of work being done on the ground—just increase its scale. Since the CAC has not needed an environmental impact assessment to complete its work so far, we do not expect a future need.

1.9 Chronological Project Plan

Please include the actual or expected project commencement date, verification dates, and other key timeline components as much as is possible to estimate at this time.

Project Dates
(Actual or Expected)

Timing	Description
04/22	Verification of Project (and peer verification)
05/22	Train CAC staff and volunteers
09/22	Project Commences
09/22	Contract between Carleton and the CAC to purchase the carbon offsets
01/23	Progress update 1
03/23	Progress update 2
04/23	Final Verification and data recollection
06/23	Future suggestions and revisions

2. Project Eligibility

In determining the project eligibility to be included in the Offset Network program, the Peer Review Committee will review the proposed project's fulfillment of the eligibility requirements as stated within the specific project protocol and assess the additionality argument. These are the determinant factors for whether the project may possibly produce legitimate carbon offset credits, whereas the rest of the Project Plan informs other critical aspects that may impact project success.

2.1 Eligibility Requirements from the Protocol

List any eligibility requirements listed in the protocol and describe how the project meets those

requirements. Additionally, provide all information needed to validate the eligibility of the project.

Use this space to list the eligibility requirements and explain why the project is eligible; length will vary depending on eligibility requirements set forth in the protocol.

> As a starting point, it is worth briefly reiterating what has been said above. First, our selected protocol "is applicable for grouped projects for the quantification of direct and indirect reductions of GHG emissions arising from energy efficiency and waste management project activity instances at client facilities (project units)." Additionally, our project satisfies the ≤ 5,000 tCO_2e/year requirement.
>
> To expand upon these points, the protocol explicitly lists institutions as applicable entities. This protocol "is only applicable to quantify emission reductions associated with methane avoidance." Organic composting is listed as one of the prescribed applications of this approach, which the CAC already does. Although the protocol does not address redistributing food to families and to pig farmers, we address this in Section 3.5.

2.2 Additionality

Answer each question within this section, covering Legal Requirements, Project Finances, Project Context, Project History, Protocol-specific Additionality Questions, Relevant Literature, and how you performed your additionality assessment.

Legal Requirements Is any part of the proposed project required by law, regulation, court order, or other binding requirement?

> There are no additional legal requirements, other than proof of payment from Carleton College to the CAC for the purchase of carbon offsets in the form of a contract.

Project Finances Please discuss project financing. Describe any non-financial benefits of the project-to-project participants.

> The carbon offsets will be purchased by Carleton College but there will be a Minnesota Pollution Control Agency grant-funded paid position at the CAC to organize the additional needs of the project, such as weighing the food in accordance with emissions calculations. Non-financial benefits of the project include creating a positive environmental impact, progressing towards Carleton's goal of reaching carbon neutrality, providing learning opportunities to students, and battling food insecurity in the Northfield community.

Project Context Describe any technical (management plan, new technology adoption, etc.), economic/sectoral, social, or site-specific considerations that led to the project's development or might impact the project's outcome.

> The CAC is a locally owned food shelf and operates primarily from private donations. The food waste is collected from local retailers and local colleges, and distributed locally to farmers and private households. This allows impact to be centralized in a single community as well as ease of access for all the participants involved and keeps vehicle miles traveled low.

Project History Please describe the history of the development of the project from the project's first conception through the present, emphasizing the involvement of your campus and others involved from the offset industry in project planning, development, and implementation. E.g., when was the project first conceived? When did the campus and others from the offset industry get involved? What has been the extent of your involvement?

> The beginning of our project involved a group of Carleton students, staff, and faculty recognizing the carbon offset potential of methane avoidance associated with landfill diversion. The CAC has been dedicated to addressing food insecurity for decades, and throughout that time, Carleton has partnered with them on various projects like the FRN and an annual summer internship. Annual data from the CAC is available to our team at Carleton. We use these data to calculate emissions savings based on the weight of food that would have been landfilled. Estimates on the carbon emissions from the food recovered, which substitutes the production of methane in a landfill to at most CO2 from compost, showed it would make sense to pursue this project in order to offset scope 3 emissions at Carleton. We recently received expert review from Second Nature and adjusted our

> protocols accordingly, this is our second official submission to the Second Nature carbon offset network.

Protocol-specific Additionality Questions Please list and respond to any additionality questions specified in the protocol, either by answering them in this space, or referring to answers in 2.1.

> Referred to in 2.1.

Relevant Literature Please list, and describe the relevance of, any peer-reviewed articles documenting the additionality and effectiveness of the proposed offset project type on emissions. If the peer reviewed literature documents the environmental quality of the proposed project type, including review of how additionality, leakage, and permanence are accounted for in the protocol, this may be sufficient to demonstrate the additionality of the project.

> Notable sources include the definition of additionality on page 32 of the protocol VM0018 document as well as the EPA's WARM tool and Dou et al. (2018) that have been used for emissions calculations for each weight and food diversion source (families in need, pig farm, or compost).

How did you perform your additionality assessment? Please discuss who was interviewed, what documents were consulted, and/or what analyses were performed.

> The additionality assessment was reviewed by Erica Zweifel at the CCCE, Beck Woollen at the Sustainability Office, and Chloe Truebenbach at the CCCE.

2.3 Additionality Checkbox

Fill in the below check boxes to identify your confidence in the additionality of the project. Check all that apply (please check at least one box from each of the two sections below).

Section 1:

I cannot think of a reasonable scenario in which the project would have happened without the offset project. [CHECK]

I can think of one or several scenarios in which the project is non-additional, but none seem likely.

I can easily think of one or several scenarios in which the project is non-additional.

It seems that the project would most likely have occurred without the assistance of the offset project.

Section 2:

I am very confident that the project is additional. [CHECK]

It is highly likely that the project is additional.

It is clear that the offset program helped make the project happen, but I am not confident that the offset credits were necessary for the project to go forward.

The additionality of the project is questionable.

The additionality of the project is unlikely.

Please provide a detailed description for the reasons for your answers.

The CAC's food recovery process has offset carbon from landfill diversion without official designation or certification. Current-scale food diversions with the CAC have been occurring for the past few years without carbon offset funding playing a huge role in its operation. Increased funding through purchased offsets will enhance the CAC's ability to process current volumes of rescued food and help the CAC further expand. Carleton observed the potential for offset certification, contributed to the ideation and articulation of how the landfill diversion process results in carbon offsets, and progressed the project in various ways. In this way, carbon offset additionality is a result of the CAC's food recovery process as well as the work that Carleton and the CAC have done together to improve and expand that process. The main purpose of this proposal is to certify the CAC's food recovery process as a project worthy of carbon offset certification and create a model for more protocols or projects related to food shelf food recovery.

The CAC is exceptionally good at redistributing food waste to feed people. Each day, volunteers hand-sort hundreds of pounds of recovered food and place it into three streams: food for human consumption, food for pigs, and compost. It is their role as a food shelf that ideally positions the CAC to deal with food waste in a way that keeps food waste near the top of the EPA Food Waste Hierarchy and out of landfills and to collect the data necessary to calculate the offsets of the three streams. If this proposal is successful in certifying this methane avoidance offset, the CAC is prepared to work with a statewide coalition of food shelves to promote methane avoidance of food waste and the valuation of food waste methane avoidance as a funding source for food shelves. We have broken down our methods by food waste stream to allow for food shelves utilizing one or more of the streams to follow

this protocol.

With Carleton's support of staffing and resources, the CAC is creating infrastructure for monitoring and monetizing their carbon offsets. This partnership has not only streamlined the organization's operational capacity but also allowed for the growth of actual carbon offset capabilities. The most recent example of this is the Prevention of Food Wasted and Food Rescue grant awarded by the Minnesota Pollution Control Agency (MPCA) that allows for better infrastructure for the NCEC satellite food shelf, expanding the retail rescue program to Faribault locations, and continuing to build on the carbon offset model. Carleton students aided in writing this grant, and Carleton students and resources are a key part of the grant's expectations for reaching their goals.

Please provide summary lists that identifies those factors supporting the additionality of the project and the factors pointing to the possibility that the project is not additional.

Below, create a summary list identifying the factors supporting the additionality of the project and those that point to the possibility that the project is not additional. For the purposes of proving additionality, brainstorm reasons that someone may propose that a similar project would have been done without this carbon offset project.

Supports Additionality	**Does Not Support Additionality**
Methane emissions savings associated with all food waste diverted by the CAC	Project would continue without certification, but would be limited in resources.
Increased retail rescue after Carleton partnership	
Data collection (CCCE office at Carleton College has provided resources for calculators for emissions offset with food recovery based on food type and weight). Aid of student workers from Carleton College (Carleton College hosts an annual internship during the summer for students to volunteer at the CAC).	

MPCA Grant for the cooler/freezer section that allows for fresh food to be recovered as well was the first to be administered in Minnesota and has now opened up a grant pool for food shelves. Increased engagement with a larger part of Northfield, which is encompassed by Carleton College
Food Recovery Network collaboration, where Carleton College and St. Olaf recover dining hall food, as well as the backing of the larger Food Recovery Network organization aside from the Carleton charter

Grant for staffing that allows for better capacity and infrastructure for the NCEC satellite food shelf, expanding the retail rescue program to Faribault locations, and continuing to build on the carbon offset model.

Use this space to provide several scenarios in which a similar project would have happened without this carbon offset project's intervention.

> A better composting system could be implemented in Northfield where food wouldn't be recovered but instead composted, emitting a less harmful greenhouse gas than methane, which is produced at landfills.

3. Emissions Reduction Data, Methods, and Calculations

Please follow the protocol in filling out this section. This will help to ensure understanding of the records that need to be kept, the monitoring approach, the assessment of the project impact calculation, and that you are applying the protocol methodology to the proposed project in a way that will receive a positive verification.

Many of the below sections may request information that is not yet available from the project and

will become available once the project is implemented. Should this be the case, at a minimum, please provide written answers, to the best of your ability, under each heading in this section outlining how you intend to identify and determine this information through project development. Provide a brief narrative if specific details are not available.

3.1 Project Sources, Sinks, and Reservoirs

Baseline

List of included emissions sources:

The primary source of baseline emissions is landfill-based food waste. In our baseline scenario, we assume 100% of diverted food waste diverted by the CAC would go to the landfill; this baseline scenario was recommended by Second Nature.

List of excluded emissions sources:

In our baseline scenario, transportation of food waste to landfill, the production

and processing of food, and the disposable packaging of the initial food bought from the supplier are excluded from emissions calculations because there is little to no public data available on these emissions.

List of sinks and reservoirs:

In the baseline scenario, sinks and reservoirs are not applicable as all food waste goes to landfills.

Project

List of included emissions sources:

The source of emissions that is included in the scope of this project is the reduced emissions produced from landfill-bound food that is discarded by individuals who receive it from the CAC.

List of excluded emissions sources:

Transportation of food waste to landfill, the transportation of rescued food to the CAC, the production and processing of food, and the disposable packaging of the initial food bought from the supplier.

List of sinks and reservoirs:

Project sinks and reservoirs include compost, one weekly pick up of two 5-gallon containers at 30 lbs. of food each for a 60 lbs. weekly total; people [276,000 lbs. minus food waste diverted to pigs (104,000 lbs.) and compost (3,000 lbs.)]=172,000 lbs. of food; and more specific distribution of recovered food going to pigs, Thursday Pig Boxes (603 lbs.), Friday pig boxes (387 lbs.), Monday pig boxes, Tuesday pig boxes. Moreover, the CAC's food shelf is closed on Wednesday.

3.2 Data Sources

Use this space to write a brief summary of how you expect project data will be collected, calculated, and managed.

Data on the per-pound amount of food that has been rescued from going to landfills will be provided by the Northfield CAC, which is responsible for redistributing the food to pigs, people that use the CAC for food supplies, and general compost. Using the EPA's WARM tool, pounds of food will be translated into carbon emissions. A baseline and alternative management scenario will be calculated depending on the pounds rescued and redistributed. Data collection will be jointly conducted and managed by the Northfield CAC's Operations Manager, Nat Wilson, and Carleton College, specifically the CCCE and Sustainability Offices.

In addition to the EPA WARM tool, which was straightforward to use for human consumption and composted food, we also used Dou et al. (2018) to estimate emissions savings from pig feed. More specifically, this paper posits that each ton of landfilled food waste emits 1,010 kg CO2-eq, whereas diverting the food to pig feed emits just 61 kg

CO2-eq; hence, we save 949 kg CO2-eq per ton of food waste that the CAC distributes to our partner pig farmer—or 0.0004745 metric tons/lb. Unfortunately, using the WARM tool requires us to account for all nodes of emissions simultaneously; because the numbers provided by Dou et al. are external to WARM, we are in the process of finding a time to meet with a contact from EPA about modifying the WARM tool.

3.3 Determination of the Baseline Scenario

Describe the baseline scenario and how that scenario was determined. Explain what alternative baseline scenarios were considered and why they were eventually excluded.

The CAC assumes 100% of the food waste they divert would have otherwise ended up in a landfill. In addition to that, Carleton College and the CAC have a long-standing relationship, with Carleton academic courses and co-curricular activities supporting their food shelves. In 2018 Carleton College supported a Minnesota Pollution Control Agency grant to add a walk-in cooler and freezer to the food shelf. The addition of this infrastructure significantly increased their capacity to hold and distribute donated food waste. Although the CAC rescued about 200,000 pounds annually, the vast majority of it was either given to pigs or landfilled, due to a lack of infrastructure. Fast-forwarding to today, the infrastructure Carleton has helped install has led to a total amount rescued of around 300,000 pounds per year—with much less food waste traveling to the landfill. Now, 169,000 pounds of rescued food go home with CAC shoppers. If we assumed that 31% of food is wasted at home (see Section 3.5), then we would subtract 52390 pounds from this value. Thus, shoppers keep 116,610 pounds of food out of landfill. With the most recent poundage values for pig feed and compost (104,000 and 3,000 pounds, respectively), we find a total of 223,610 pounds of

food are now kept out of the landfill.

3.4 Estimation of Emissions Reductions/Sequestration

Please follow the methodology used in the protocol to estimate the impact of the project on emissions and carbon storage. Also, provide information regarding the confidence in your estimation.

Using data collected by the CAC and analysis through the EPA's WARM tool, we found that the carbon reduction from feeding people is 242.35 metric tons. Data collected by the CAC included weight for retail recovery and donations. From this total, we subtracted the weight of food that did not go to feed people (i.e., food that fed pigs and food that went to the compost). The total number was 169,000 lbs. In addition to the CAC's data, we assumed that leakage for the average home food was about 31%. This average came from the USDA's food waste estimation. This brought the total weight of food waste to 116,610 lbs.

Based on preliminary calculations associated with our food recovery using the EPA WARM calculator, we estimate that 500 metric tons of carbon dioxide equivalent will be reduced annually from food waste diversion. After regularly weighing the boxes of pig feed for a period of several months, we estimated that 110,000 pounds of food are sent to the pig farmer every year. Using the conversion factor provided by the Dou et al. (2018) study, we calculate an estimate of 49.38 metric tons of carbon dioxide equivalent avoided annually from the diversion of food waste to pigs. In total, we estimate that the work done by the CAC avoids around 292.62 metric tons of carbon dioxide equivalent per year.

Compost is the smallest of the three food diversion streams used by the CAC. Compost primarily contains citrus and expired fruits, which are inedible for pigs and people. Northfield Curbside Compost donated two 5-gallon compost buckets to the CAC, which account for the entirety of this waste stream. As such, compost in a typical week is approximately 60 lbs. Using the WARM tool, we found that the CAC's compost reduces carbon emissions by 0.92 metric tons per year.

The spreadsheet used to determine this result is attached in the Appendix. Thanks to subject matter expert feedback and the EPA WARM tool, our confidence interval is now moderate. Our current emissions savings estimates do not fully incorporate pig farm details, though, so before producing an exact number, we will need to expand upon or modify the EPA WARM tool. Once this is complete, we will have no trouble generating a 95% confidence interval, as stipulated by our chosen protocol.

3.5 Explanation of Methodological Choices and Protocol Deviations

Identify the chosen protocol. What, if any, alterations do you anticipate making to the protocol? These can include any proposed changes from the protocol reporting, monitoring, and verification requirements to accommodate the peer review process. Include the rationale for changes.

Minor changes can be approved through the peer review process. Major changes may require going through the Protocol Development Pathway to get a revised protocol approved through expert review.

Use this space to write a summary of the methodological choices you made and the reason for them; ~300 words

We intend to modify the Applicability Conditions of this project to account for methane reductions associated with food being redistributed from the CAC to local families, local pig farmers, and compost. Our understanding is that, without the CAC, this rescued food would all go to the landfill—thereby emitting methane. The CAC's redistribution of this food

prevents those emissions in large part. We cannot assume in good faith that every last bit of redistributed food is eaten; however, we are keen to constantly refine our methodology for how much less food may be wasted via family distribution, pig farming, and compost.

For calculating emissions saved from people being fed, our sources included data from the CAC about how much food waste they receive from retail recovery and donations. From this data (total weight of food donated), we subtracted 31% due to leakage. This assumption about leakage is based on the USDA's food waste estimation. We then subtracted the weight of food that went to the pig farm and compost. Our subject matter expert reviewer from Second Nature suggested the use of the EPA's WARM tool, so we utilized this tool to estimate the emissions saved in comparison to the baseline scenario where all of this food would end up in the landfill (See Appendix 6). This process was repeated for the food waste that was composted. Food shelves typically have detailed information on how much food they are taking in, but less typical is calculating how much food doesn't end up feeding people. Carleton assisted in weighing food that went to the pig farm or to the compost.

The donations of food waste that were not suitable for consumption were put in boxes for the pig farm. These boxes were stored on pallets, so Carleton students and staff were able to weigh the food using a pallet jack with a scale. We made the assumption that the pigs eat everything, so our leakage for this stream of emissions was 0%. Past literature supports a higher leakage percentage point, but we did not have the logistical support or resources to calculate the industrial pig feed being produced in the baseline scenario compared to what was diverted through this process. We used the conversion factor in Dou et al. (2018) to calculate the emissions diverted through the pig farm.

For food redistributed to families, we would like to use a peer-reviewed national average for

the percentage of food wasted in American households. For example, since we referenced the USDA to find an average of 31% of food is wasted, we will subtract 31% from our methane emissions for this sector of the project. We feel more confident that pigs eat the overwhelming majority of the food they are given; although this is the case, their methane emissions may be of note. We similarly plan to subtract a percentage of our pig-redirected food from overall methane emissions reductions.

4. Risk Assessment & Future Consideration

Please describe how your project meets each of these quality standards. The purpose of this section is to make sure that you have thought through each of these quality criteria when designing the project.

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4.1 Double Counting

Double counting is considered to have occurred if the reductions achieved by the project are claimed twice, either by more than one entity, or twice by one entity. Double counting can also occur if the same emissions reductions are sold as carbon credits to two different buyers. Double counting may result, if an entity that has implemented a project within its emissions inventory boundaries, for example: an energy efficiency project for an entity-owned building, that both counts this improvement in its emissions inventory as well as selling carbon credits from that same project.

Submitting a project to the Offset Network requires a signed attestation against double counting whereby the project implementer agrees that any credits generated by the project will not be sold, and that the credits will be counted once and only once against the funding institution's carbon footprint.

Consider answering the following questions in your narrative to describe how your project actively avoids double counting:

- Who will own the credits?

  Carleton College will purchase the credits from the CAC.

- Have attestations against double counting been signed?

  Yes. Since the CAC will collect data for the project, we deemed it prudent to obtain a signature from Michael Pursell, the Food Access Program Director at the CAC. The CAC has also hired an employee to track data for the offset project (Nat Wilson).

- Was the project implemented within your organization's emissions inventory boundaries?

  Yes. If this project at any point appears outside the emissions inventory boundaries of Carleton, it will be discontinued.

4.2 Leakage

There is one main form of leakage to address from this program: food that goes to families but is later sent to landfills from the households themselves. Given that this is an inevitable form of leakage, we have found ways to accommodate this in our calculations to exclude it from the amount of carbon reduced. We will use the average amount of food waste produced annually by individual households in the United States to calculate the amount of food that will likely end up in landfills anyways. We will attempt to reduce leakage by getting as much food as possible to homes rather than landfills.

Our project does not influence the production of any given product. The CAC collects food from local retailers that is extra and in no way influences their production systems. Profit from the carbon offset purchases will help the CAC operate more efficiently and recover

more food. In addition, it will allow the CAC to pay staff for their time working on this project. It is unlikely that future maintenance will be needed to support this project.

4.3 Permanence

Permanence is a concern for carbon storage projects, like forestry and soil carbon projects, because of the risk that the carbon will be released back into the atmosphere. The project has climate benefits only for as long as the carbon remains stored; to the extent that carbon sequestered by a project is released back into the atmosphere, the project has no benefit to the climate. Please detail the possible risks of project reversal; consider answering the following questions in your narrative to describe the possible risks of project reversal, and how these risk factors will be mitigated and accounted for:

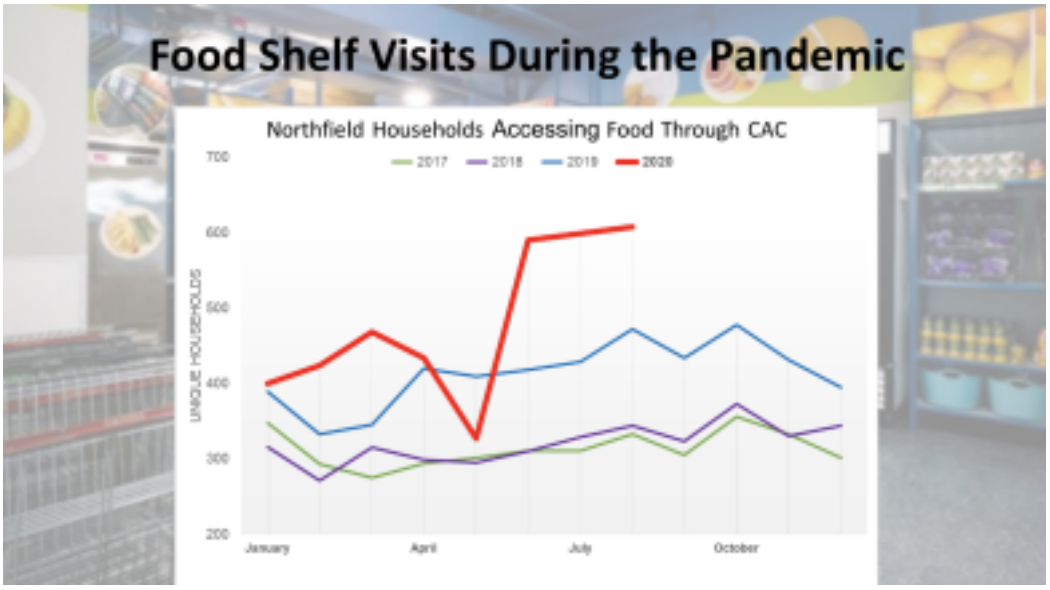
- How will unintentional risks to permanence, such as fire, flood, and geologic events, be accounted for and minimized?

  We expect that our project will be better insulated from these issues than certain other carbon offset projects, which may be more vulnerable to events like a forest fire or flood. The Northfield area has been victim to multiple 'once in five hundred years' floods in the past decade. Food rescue and redistribution will occur when practicable under these events. Any temporary decreases in capacity will be subtracted from the annual offset total that Carleton obtains.

- How will intentional risks, such as the discontinuation of the project, be minimized?

  The current consensus among stakeholders is that this project is meant to be implemented over a long timeframe. The CAC and Carleton have a long-standing, positive relationship. Since Carleton helped install a larger 'SuperShelf' at the CAC to store more food in 2017, CAC visits have risen considerably: 50% by 2019. Similarly, the number of households accessing the CAC has increased considerably since the pandemic (see the image below). Carleton is proud to have contributed to the CAC's success and looks forward to continuing

this partnership. We view this offset project as a great means to do that.



Food shelf visits to the CAC every year since 2017.

- If carbon storage is reversed, what will be done to mitigate the effects?

Not explored/not determined as applicable at this time.

4.4 Additional Risks

Provide information regarding any additional risks that may impact the project. Some risks that might impact the project include discontinued funding from Carleton in purchasing the carbon offsets at the CAC if the project as a whole is terminated by the next or current administration at Carleton, and if there is a CAC closure due to a lack of donations or labor shortage.

5. Project Monitoring Plan

Every day, the CAC weighs the food entering and leaving the food shelf. The CAC will also plan to quarterly weigh the pig boxes for representative weeks in order to get a representative number for the year. Carleton as the project funder will check in with the CAC quarterly to make sure all food is properly accounted for and that best practices are being used.

6. Project Verification

If you are planning to pursue Peer Verification, please specify an institution that has been identified to possibly perform validation and verification, or which institutions may act as verifiers.

Other Carleton offices, St. Olaf College (a neighboring institution), and another carbon offset company would all be able to pursue peer verification.

7. Additional Information

Please provide any additional information you think will be useful in reviewing program eligibility concerning the Project Plan.

The project would specifically be offsetting student travel, but depending on the scope and magnitude of food recovery, there is a possibility for the project to offset a greater portion of the Scope 3 emissions at Carleton. Additionally, since the protocol is made separate from this proposal from an external source, it doesn't line up exactly with the program but is the most similar and works reliably enough.

8. Document Author(s) & Contact

Please add the name of the document author and any other relevant contact(s) and provide their contact information. The below table may be copied if necessary.

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9. Appendix

Please use appendices for supporting information. If no appendix is required, please delete this appendix, including the title and instructions.

Appendix 1: Spreadsheet containing sample food recovery. With any trouble accessing this document, please contact Erica Zweifel.

Appendix 2: Net carbon dioxide equivalent savings from each component of the offset project.

Community Action Center of Northfield
SuperShelf Grand Reopenning
THANK YOU MPCA

Northfield's Results

Figure 1

Figure 2

Figure 1:
30% increase in food shelf visits post cooler installation and SuperShelf transformation

Figure 2:
Reduced amounts of fresh food purchases necessary post cooler, due to increased storage capacity for rescued food, and now purchases of frozen foods

Figure 3:
The addition of the cooler allowed for bulk egg donations

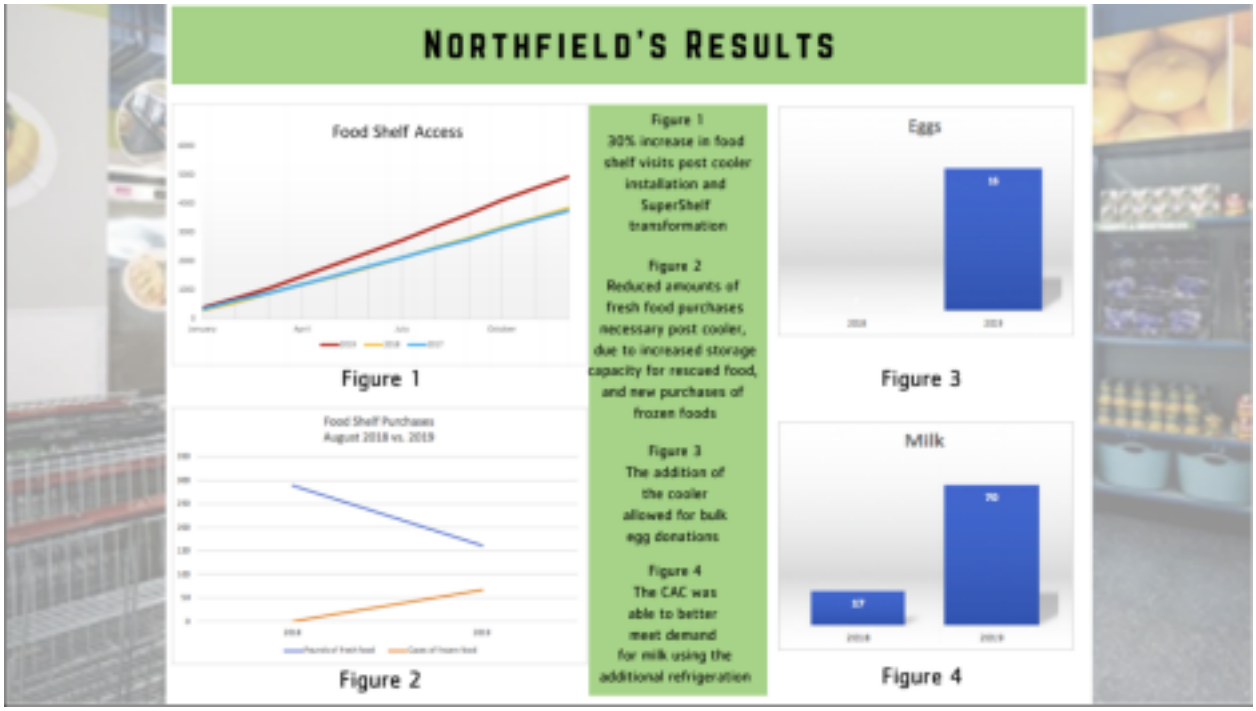
Figure 4:
The CAC was able to better meet demand for milk using the additional refrigeration

Figure 3

Figure 4

Carleton's Food Recovery Network Chapter

Videos shown on campus to raise food waste awareness
Just Eat It
Wasted
A Place at the Table


NORTHFIELD'S RESULTS
Food Shelf Access
Figure 1
Food Shelf Purchases
August 2018 vs. 2019
Figure 2
Figure 1
30% increase in food shelf visits post cooler installation and SuperShelf transformation
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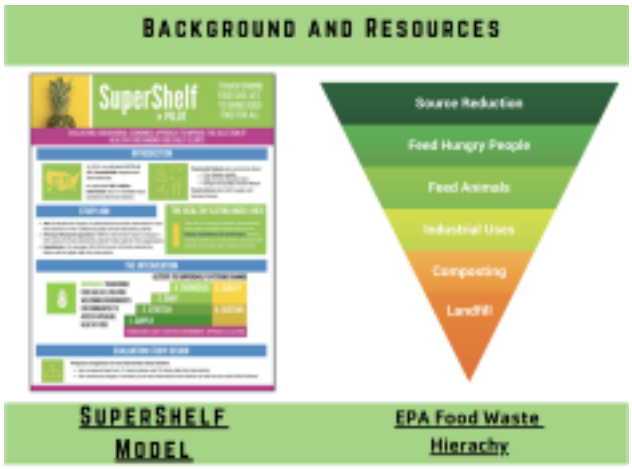
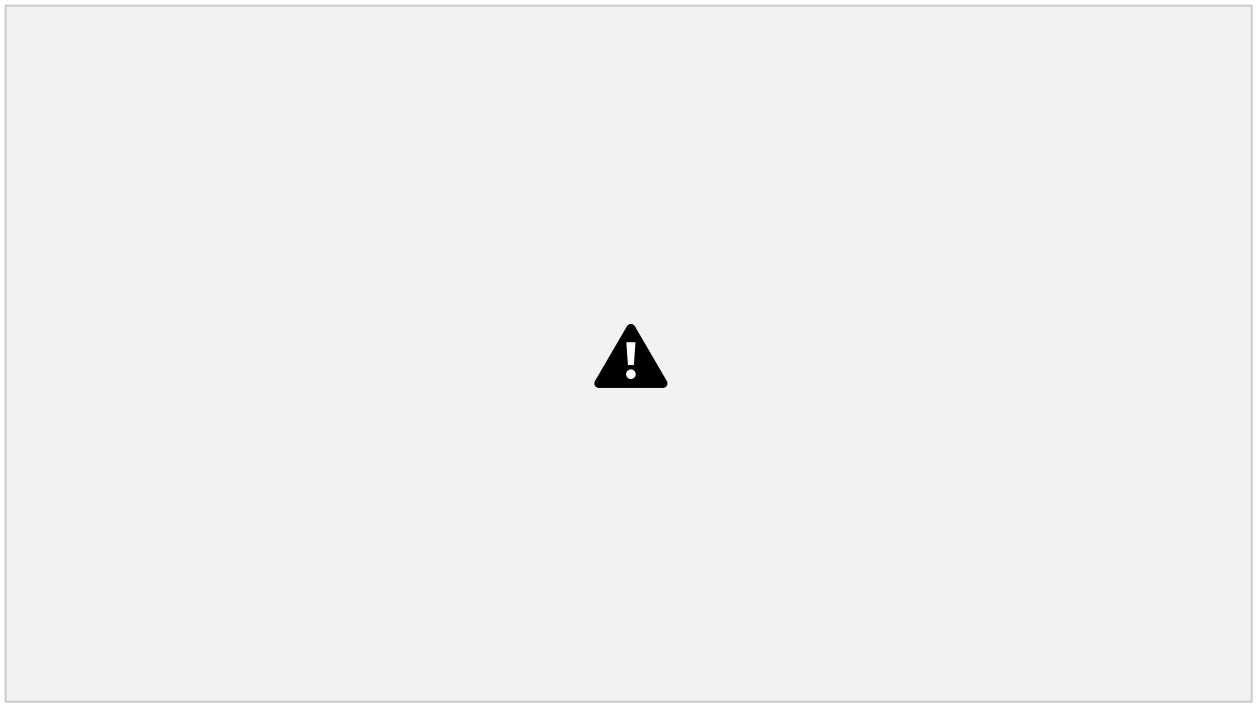
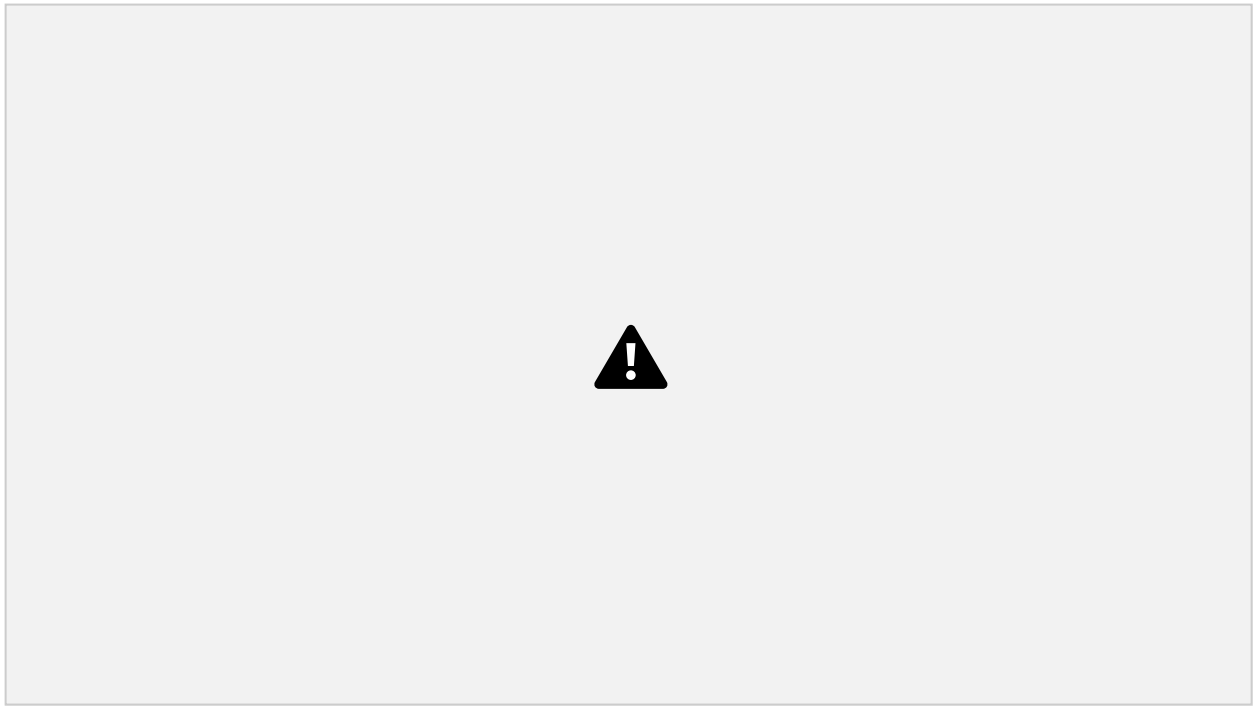
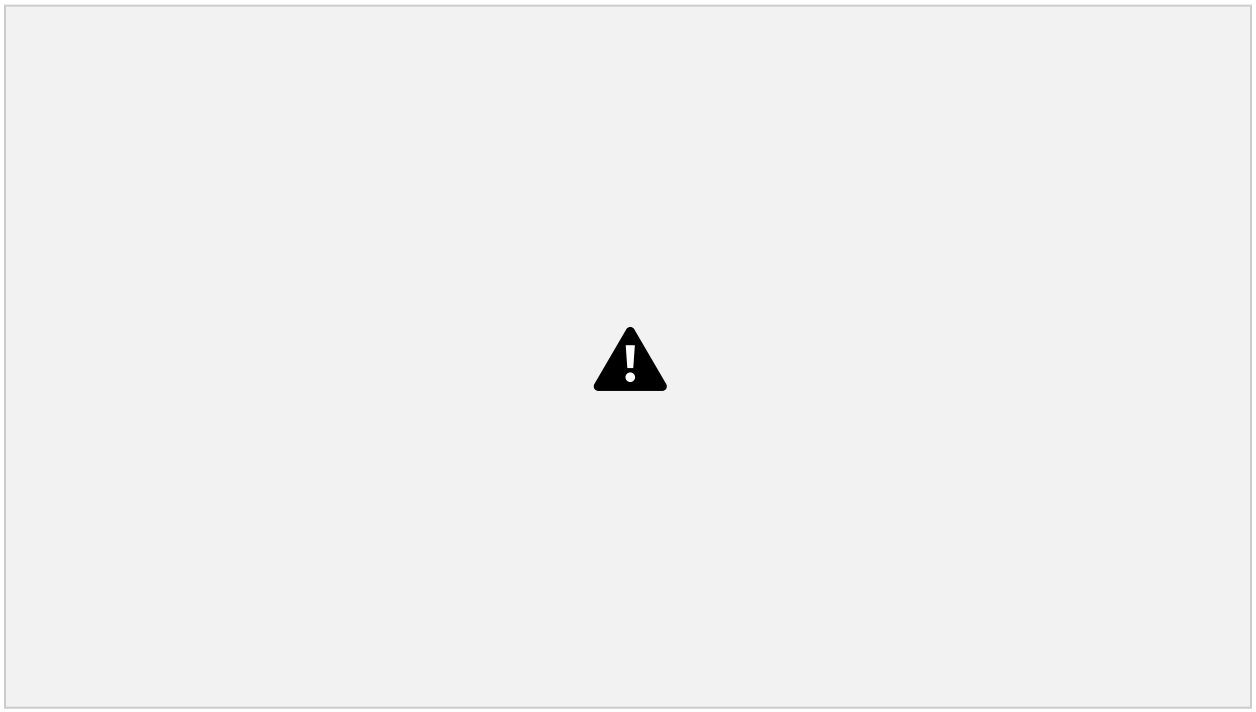
Reduced amounts of fresh food purchases necessary post cooler, due to increased storage capacity for rescued food, and new purchases of frozen foods
Figure 3
The addition of the cooler allowed for bulk egg donations
Figure 4
The CAC was able to better meet demand for milk using the additional refrigeration
Eggs
Figure 3
Milk
Figure 4

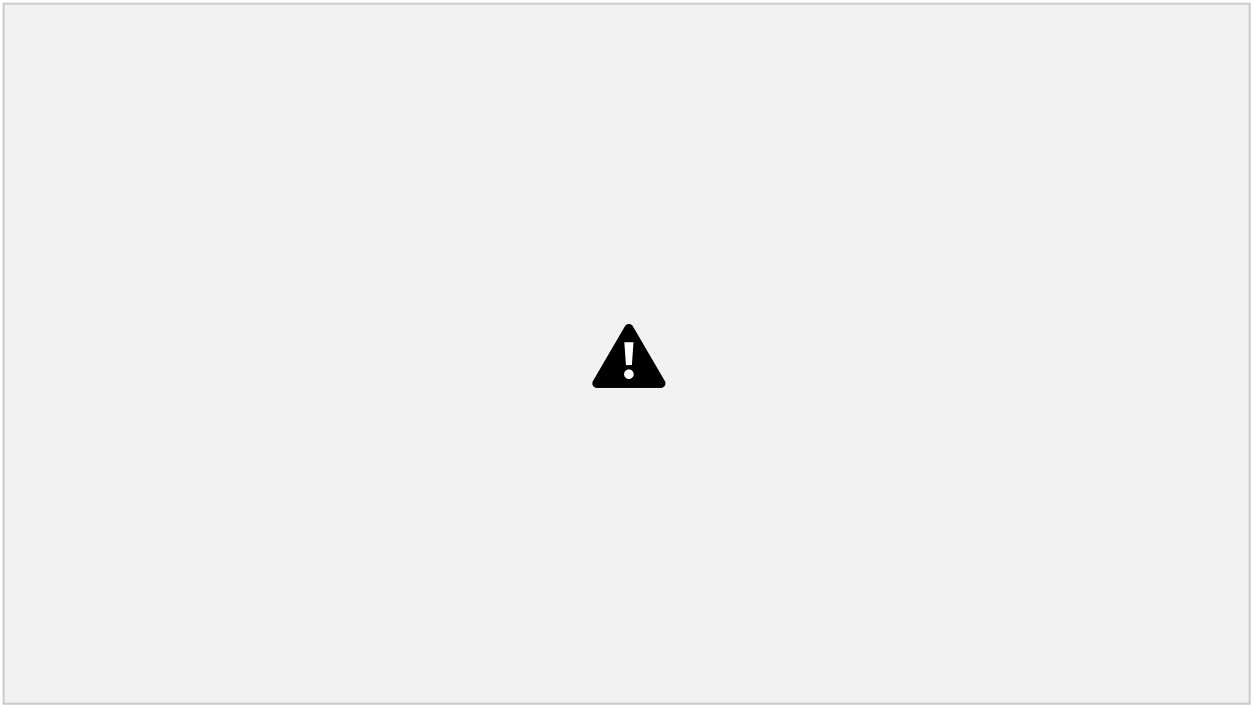

BACKGROUND AND RESOURCES
SuperShelf
Source Reduction
Feed Hungry People
Feed Animals
Industrial Uses
Composting
Landfill
SUPERSHELF MODEL
EPA Food Waste Hierarchy

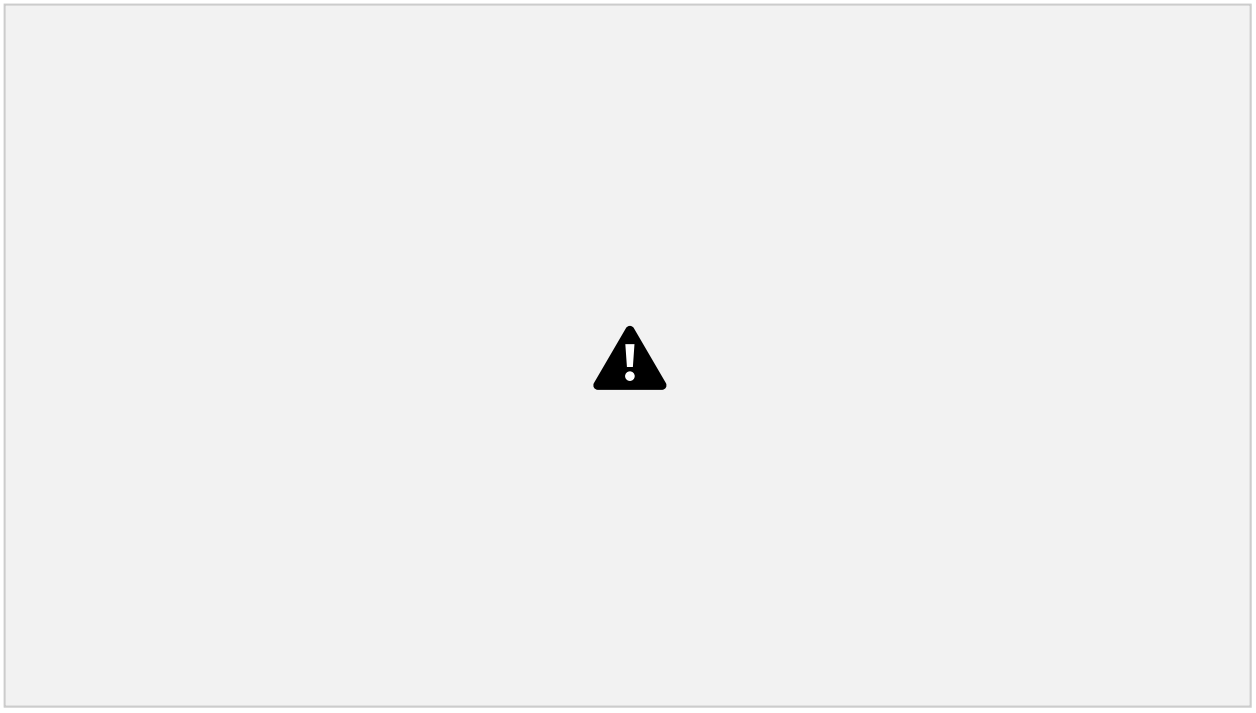




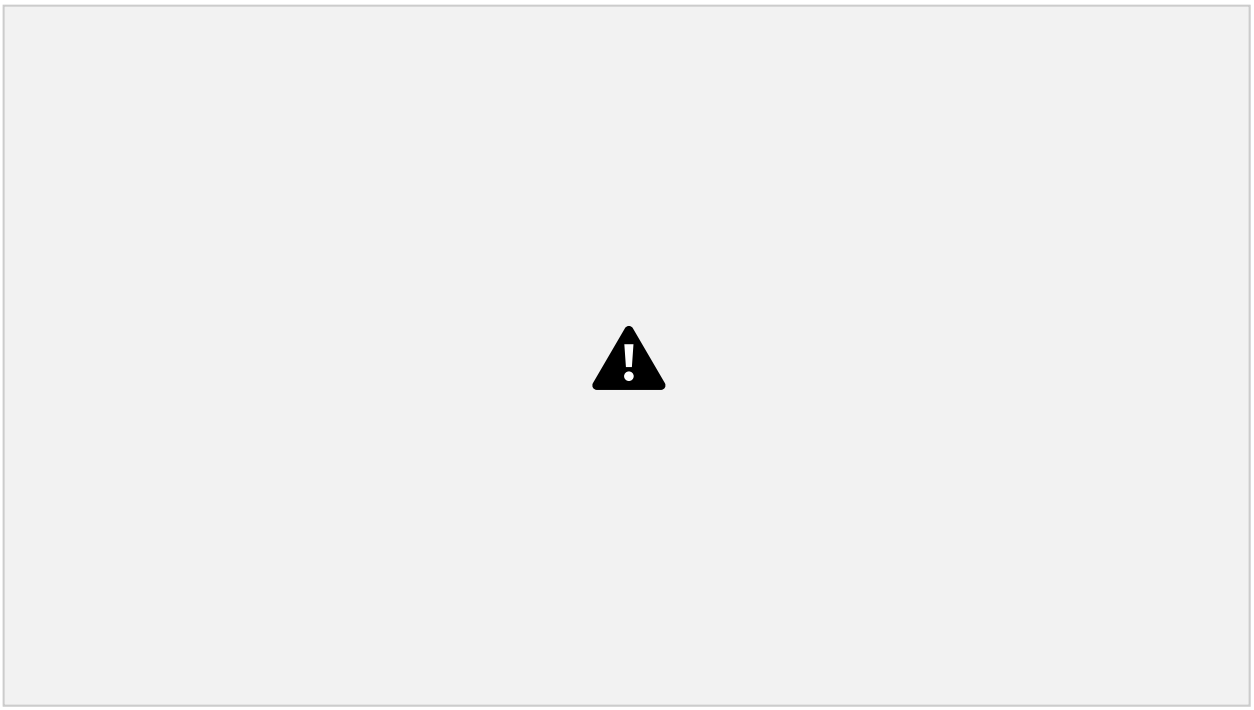


Appendix 3: Excerpts from an MPCA report prepared by the Northfield CAC.

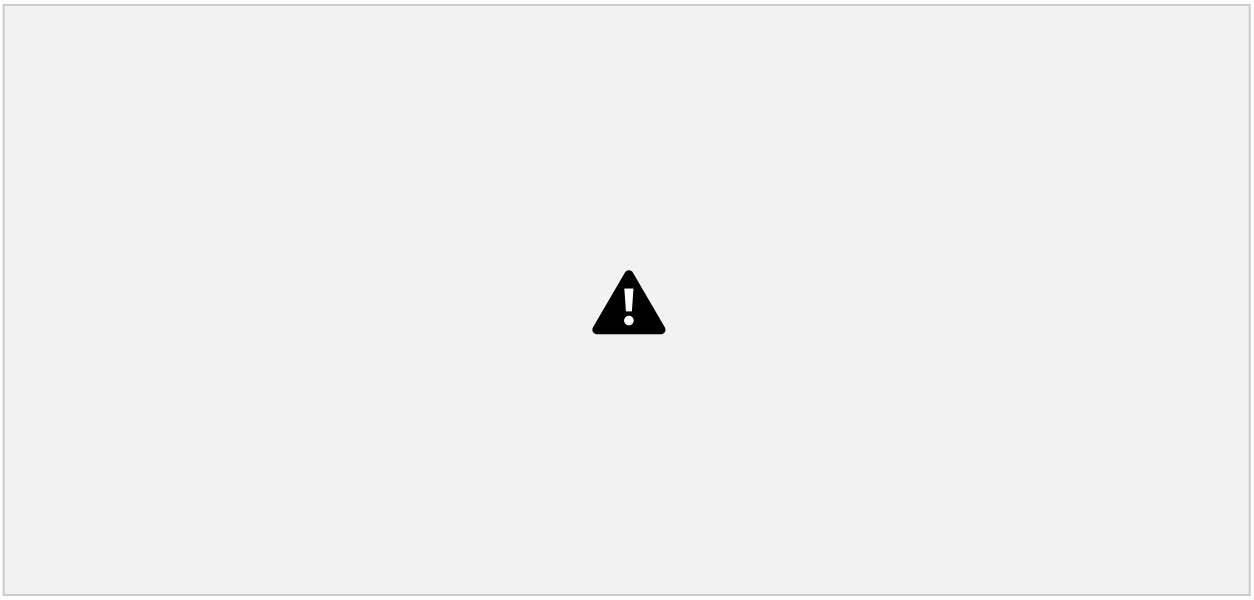




Appendix 4: Master Recycler Northfield Food Waste Prevention CAC and Carleton College



Appendix 5: Description of Carleton College's Scope 3 emissions in FY 2021.



A screenshot of inputs to the EPA Warm tool; all values have been converted from pounds to tons.

Appendix 6: Screenshots of the total emissions savings (243.19 MTCDE) from 2021.