

I PRO 317

Spring 2010



Nana:

A Sustainable Restaurant Development

FINAL REPORT

1.0 Executive Summary

For the Spring 10' semester, IPRO 317 is collaborating with Nana, a family owned organic restaurant to provide Nana with unique and innovative ideas relating to their environmental impact, sustainability of the restaurant as well as reaching out to the external community for both business and environmental education. Nana organic is located at 3267 S. Halsted in the culturally diverse city of Bridgeport, Chicago. Nana is open currently for breakfast and lunch offering both vegetarian and meat dishes. Nana opened in August, 2009 receiving resounding positive media attention leading to continual growth and the need for future expansion. The owners of Nana organic, Omar and Christian Solis, exhibit genuine concern for the customer's well being through their friendly social interaction with the customers while providing them with the healthy benefits of organic food. Our team has been in frequent contact with the owners providing us undergraduate college students with an invaluable opportunity to participate with a client in a real world business endeavor.

Nana has a rich family history behind its existence. The building in which the restaurant is located is owned by the Solis family, and was once their home. As former residents of Bridgeport, Omar and Christian are focused on engaging the Bridgeport community. Nana highlights Bridgeport within its establishment by displaying art from local artists. Every month, a different piece of art is selected to be displayed to refresh the ambiance of the restaurant. The organic food that Nana offers is unique, affordable, healthy, great tasting and well worth the trip as seen through the numerous customers that travel long distances just to get the Nana organic 'fix'. Omar Solis has a large market to target ranging from children to senior citizens, from the middle to upper class from both the local community of Bridgeport as well as customers from all walks of Chicago. The main problem that Nana faces is its inability to accommodate large crowds due to the limiting size of the restaurant, requiring restaurant expansions. The owners of Nana are concerned with the benefits of organic food as well as becoming an environmentally friendly and sustainable business development.

Our vision is to conduct innovative, effective marketing within at least a 1 mile radius of Nana, increasing awareness to the general public while becoming environmentally friendly, sustainable and eventually significantly increasing the number of customers to enjoy the distinct Nana organic experience.

Our IPRO team consists of a total of sixteen individuals separated into three subgroups, namely the business, environmental and building subgroups. The building subgroup focuses externally on energy efficient systems such as wind turbines, solar collectors but also on the aesthetics of an outdoor patio expansion including shading, seating arrangement, and vertical green wall planters. The environmental group has concentrated their efforts on a biodiesel tank for the company car, vertical green wall planters, composting and environmentally friendly cleaners. The business subgroup has concentrated on student coupons, radio and newspaper advertising, social networking, surveys, text messaging alerts, business expansions and the financial implications as well as an on campus presentation/seminar. The building and environmental groups are more closely related than the business group; however, all three relate when the economic concerns of the projects are considered, when the project benefits the restaurant, and when these projects can be used to market and advertise the restaurant. Our team has met frequently at Nana organic restaurant after hours to discuss our ideas with the owners. Otherwise, we meet every

Tuesday to present each respective subgroup's ideas to the entire IPRO team and focus as independent subgroups on Thursdays to complete our assignments.

Nana organic provides the customer with a unique, organic experience focused on the history and culture of the local community creating a comfortable family atmosphere to eat delicious food. The owners of Nana are extremely passionate about the health benefits of organic food while also being genuinely concerned about the environment and sustainability of the restaurant for their customers. Our team has completed extensive research and developed creative ideas for the owners to implement throughout all three subgroups while obtaining real world experience through participation in an extraordinary business.

2.0 Purpose and Objectives

Business Subgroup

Purpose

Nana is a family owned organic restaurant offering vegetarian dishes as well as meat dishes for breakfast, lunch and soon dinner with a relaxing, cozy dining atmosphere. The owners of Nana are family oriented with their vision focused on reaching out to the community which they have been a part of throughout their lives. Connecting Nana to the community is extremely important for the client. The business subgroup is responsible for building this bridge between Nana and the local community. The major goals are to engage the community about the organic experience and what it has to offer, advertise and market to the surrounding community, implement the constructive criticisms stated in online reviews to improve the dining experience at Nana and potential funding for the organic restaurant.

The business subgroup provides Nana owners with effective and innovative forms of reaching out to the local community, thereby increasing awareness and interest in the organic experience. By researching the demographics of the area, we gain an understanding of how to advertise Nana to the surrounding residents of Bridgeport. The main consumers to target are students around the Bridgeport area (IIT, UIC etc.), residents in the Bridgeport area and those outside the local Bridgeport area, while targeting people of all ages, from children to senior citizens.

Finally, the business group is in charge of unifying the three subgroups and compiling the material together in a smooth, presentable manner.

Objectives

Within the Business subgroup there are numerous goals to complete throughout the semester long project. The team's overall vision is to engage the community while effectively advertising within a one-mile or larger radius of the restaurant. We will be working on increasing awareness to the general public and eventually significantly increasing the number of customers to enjoy the distinctive organic experience that Nana has to offer.

As a result of increasing numbers of customers, it is important to offer these customers with reasonable options to reduce the hassle of waiting for a table. Our team will research various services that allow for customers to receive notification when their table is ready. We will compile information about each service and present it to the client so that he may choose which option best suits the needs of Nana.

The business team will also create a feasibility report with respect to the seating and dinner expansion projects that the client wishes to complete. By using our business knowledge, we will create a business plan to estimate the cash flow resulting from these projects.

Finally, we will further extend Nana's reach across the internet. We will make them better known throughout social networking websites, such as Facebook and Twitter. Also, we will research various online restaurant directories and incorporate Nana into the appropriate ones. Online reviews play an integral role in offering the best quality by meeting the specific needs that customers have. Feedback is essential for a restaurant's success since you are serving the customer and must accommodate to their desires. The business team will search various review pages, such as Yelp and Metromix Chicago, to compile information about what previous customers of Nana feel the restaurant was lacking or could improve.

Building Subgroup

Purpose

There are numerous 'green' strategies implemented in architecture and engineering, as green initiatives are becoming part of the taught curriculum and a requirement of building and energy codes. Our client, Nana organic, has been faced with an intriguing challenge. Unlike most new construction which is built to meet current ecological and energy requirements, the client's building is a 100-year-old brick construction in a low-rise, residential area and situated to face Southwest, with maximum heat gain in the summer. By working with both the business and environmental subgroups of our IPRO, the building team was able to synthesize and implement 'green' solutions for the client and his business. There were several issues that the client faced: (1) maximum heat gain due to the building's Southwest orientation, (2) heat loss due to lack of insulation within the brick walls (esp. on the Southwest side of the building), (3) a budding clientele basis, but little advertisement, and (4) left over and used cooking oil. The client also expressed a desire to grow certain plants, such as herbs, on site, in or about the restaurant.

The purpose of the building team was to satisfy the client's desires for an environmentally-conscious business and propose solutions for the aforementioned problems that would work in social, economic, and ecological cohesion.

Objectives

Throughout the semester, the building team's role became that of coordinator and synthesizer of information, proposals, and analysis presented by the environmental subgroup and turning them into applicable, real-world solutions – all the while keeping 'green' technologies in mind.

Early on, the building team proposed an outdoor seating scheme to the client, where a vertical garden would be implemented to further establish the advertisement of the business through the visual cue of an outdoor café. As a team, we resolved to implement 'green' solutions for the building by reducing its aforementioned problem factors and even using them to our benefit. (One such instance is the proposal of solar panels for the building that would generate light and heat to the outdoor dining area – potentially extending the outdoor season in spring and fall).

The building team resolved to: (1) insulate the walls and absorb solar heat via a year-round, vertical garden attached to the façade of the wall, (2) propose an outdoor seating café in order to

advertise Nana's Organic to passers-by, as well as maximize profits, (3) install solar panels on the building's upper façade in order to provide light to the outdoor seating area and heat, for cooler spring and fall months, (4) create tables with umbrella structures for outdoor seating, and (5) install oil pumping stations along the 33rd street in order to reuse the client's cooking oil.

The final product of the building team will be a visual summary of the IPRO's effort; that is, all of the systems and subgroup solutions illustrated working together in a built environment form. This is the reason why an aesthetic coherence has to be maintained in the final deliverable, as well as a respect and regard for the building's history and context.

Environmental Subgroup

The purpose of the environmental subgroup is to utilize environmentally friendly solutions to help Nana restaurant become more organic and eco-friendly in the process. The objectives for the environmental subgroup are the reuse and recycling of cardboard waste, to turn Nana's vegetable oil into a usable bio-fuel for the company vehicle, locate organic cleansers that have the same cleaning ability as what is readily available on the market, to produce a vertical gardening system, and to identify and execute homemade energy efficiency solutions. As the owners of Nana seek to embrace more environmentally-friendly approaches to all aspects of their restaurant, we will work to provide the most beneficial and cost-effective solutions. To do so, we will need to determine the specific building codes and permits required for cleaners, composting and conversion of vegetable oil into bio- fuel.

One goal of the environmental subgroup is to provide an opportunity for Nana restaurant to create a compost pile in order to take their food waste and make it reusable rather than creating more trash, thus reducing their environmental impact. Composting is the natural process in which bacteria and other decomposers break down organic matter into a form which can be absorbed by plants. A similar goal, with regard to environmental impact, is the research and implementation of environmentally-friendly cleansers. Many cleansers today are full of harsh chemicals that can damage the environment. Those chemicals can get carried into the air through evaporation or into groundwater as it is flushed down the drain. Nana restaurant has expressed an interest in limiting their use of such harsh chemicals.

3.0 Organization and Approach

Business Subgroup

In order for the business group to achieve our main objectives, we would begin by working collectively to define individual tasks that would need to be completed. We would begin the semester with a series of meetings with the client so we could gain a better understanding of what needed to be accomplished and how to better go about our tasks.

Each of the four business team members would be responsible to research and report creative marketing ideas that would be appropriate for Nana. This would be done throughout the semester to ensure that we would have a large amount of ideas to analyze and recommend to the client. From this general research, we would divide tasks among team members to conduct more in depth research. We would conduct individual research of the local demographics, feasibility of a student coupon to be distributed on campus, and creating a survey to find out local (and student) preferences and needs. We would meet as a group once per week to discuss our latest findings so that the entire business group could contribute their suggestions and improve our items. From this research we would compile suggestions for Nana as a group and present them to the client.

Along with our marketing research, we would conduct other individual research. One member volunteered to create a business report which would consider the impact of expanding the restaurant's services to include dinner on the weekend. This report would be developed along with the client. Along with researching the business implications of dinner expansion, one member discovered ways the restaurant could cope with an increased patronage to improve their dining experience. Other members would look into local organizations that would be possible connections between Nana and the community.

The group's final tasks would pertain to organizing an on-campus lunchtime presentation by the client, who would provide organic food catered by Nana Restaurant. These tasks include: finding possible locations to host the event, ways of advertising the event, contacting possible speakers, developing the overall theme of the presentation, contacting the school about third-party catering, estimating audience size, and possible dates for the presentation.

Building Subgroup

The building group will focus on research, developing designs and schematics for different green building methods to improve the existing restaurant. In order to manage a large group (8 of 16 team members) the building group is further divided into four smaller groups: Green garden, Outdoor seating café, Solar panel and the Shading device/ oil pumping to improve the building's design as a green project.

At the start of the semester, we gathered as a building group and discussed what each small group will focus on accomplishing for the project. The smaller groups met weekly to focus on the specific projects assigned. After gathering the work, these ideas were presented to rest of the building group as well as the business and environmental groups in order to obtain necessary feedback. Our organization

will require great concentration on team work and communication, particularly between the architecture and engineering students, in order to achieve the required result. It is reasonable to believe that all of these major tasks and requirements will be met in the allotted time frame.

In the beginning of the semester we started with a site analysis to better understand the surrounding of the Nana establishment. Based on the site analysis and the problems that were to be solved, the building group conducted research and studied case studies relating to the each small group's topic. Based on the research, a design which best fit the existing site and building was proposed.

Environmental Subgroup

Initially, the environmental subgroup met with the client to discuss his goals for his restaurant. The subgroup then divided into two smaller subgroups; one researching the conversion of the company car to run on vegetable oil and the recycling of cardboard, and the other group researching the use of environmentally friendly cleansers and the creation of a vertical garden to grow organic herbs. After researching the wide variety of possibilities for our tasks, the groups presented the options to the client. Taking the client's feedback, the models were revised and presented to the client.

4.0 Analysis and Findings

Business Subgroup

The business subgroup focused on researching innovative methods for marketing and advertising. The traditional methods include radio and newspaper advertising. In the Chicago land area, the number one tuned in radio station is WBBM news radio 780. This radio station has more than 3 million page views, with approximately 370,000 unique visitors. The average streaming listening time for this radio station is 33 minutes and has more than 27,000 email addresses in its email blast database. The average cost of a 30 second ad, not including seasonal factors, is \$362. Although radio advertising reaches a broad audience, advertising for a local restaurant on such a large scale may turn out to be unprofitable. Radio advertising is a significant investment for such a short plug which is incapable of being tracked for its effectiveness. Newspaper advertising is more practical since a large audience is targeted with concrete information however it is still difficult to determine how beneficial this advertising will prove to be for the restaurant. For instance, advertising in the Bridgeport News directly targets individuals living in the Bridgeport neighborhood. Additionally, an advertisement in TechNews will target IIT students specifically to increase awareness of Nana on campus. In TechNews, a quarter page advertisement costs \$72 and a half page advertisement costs \$144. Both radio and newspaper advertising have a relatively large initial cost for a small business owner where it is difficult to determine the benefits or return of the investment.

A student coupon was developed to be placed into newspapers and be handed out at certain IIT events. The coupon offered a 10% discount for college students who present their ID at Nana. The coupon was set to be valid only on Mondays and Tuesdays since the owners of Nana stated these were the slow days compared to the rest of the week. This advertisement technique could easily be tracked through a simple log system of how many customers presented the coupon over a certain period of time. The coupon project did not make it to the public since the client was satisfied with his current flow of customers.

Another approach to marketing and advertising is through social networking sites such as Facebook and Twitter. In the past couple of years, several companies have been looking towards social networking sites to effectively reach out to their audience. With Facebook, the Pay Per Click and Pay Per Impression systems have been the most popular means of advertisement. In Facebook Pay Per Click, an advertisement appears on the side of the page geared to snatch the attention of users. In Facebook Pay Per Impression, the cost is based on per thousand impressions. Since these mechanisms have been proven to be effective on a large scale, different features on Facebook can be used on a smaller scale to market Nana. There is an existing Fan Page for Nana, which allows for interaction with users by letting them comment and share their opinions. The fan page can be used to track the number of Facebook users viewing the page and becoming fans through tracking resources. Also, since Facebook allows for sending mass event invitations, if Nana were to have a special event, invitations can be sent to all fans, making it easier to spread the word. Facebook may also be used for a creative means of marketing. For instance, the feature which allows an individual to upload albums may be used to display food items that Nana serves. If Nana were looking for a way to draw customers to the restaurant, they can host a

weekend special in which the first person to tag themselves to a picture of a food item on the menu, wins food in the picture. Twitter, a tool for posting short updates, comments, or thoughts, may also be used for a means of marketing. Twitter can be used for keeping in touch with bloggers and the media, announcing daily specials, and updates on events and any interesting restaurant news. Since Nana does not have a Twitter account, making an account may help to stay connected with their customers.

Since Nana's business is developing rapidly, long lines with an estimated wait time of about 40 minutes is expected. With the upcoming outdoor patio expansion, Nana will have seating for an additional 40 people. However, this does not ensure that the estimated wait time issue will be alleviated. In order to increase customer satisfaction, the wait time difficulty must be addressed, and can be done by introducing a text messaging service. This would allow the owner to keep track of reservations and wait list and send a customizable text to the guest when a table is ready. Text messages can also be used for marketing: returning customers can be targeted for promotions and special offers. The text messaging service is in replacement to the current paging system, which most restaurants use to address long waiting lines. However, with the pager system, an individual cannot leave outside the paging range. With the text messaging service, an individual is free to roam anywhere instead of standing in line holding an extremely non-hygienic, restricting pager. Furthermore, the pager systems are rather costly. They may cost up to \$4000 for installation with a \$150 monthly charge, and require frequent maintenance. Batteries need to be replaced frequently, and pagers are often lost and need to be replaced.

Once a phone number directory is formed, it can be used for text message blasting rather than email blasting. EAText offers 1000 texts, provides an easy method to take reservations, and includes reports and a history to track number of customers and waiting time trends. This service charges \$95 monthly. VictoryText charges \$99.99 a month for 500 outgoing texts and unlimited incoming texts as well as emailing/http forwarding, statistics, reports, and three top level keywords. QLess, another restaurant text messaging service, charges for installation, has a monthly fee, and also includes a per customer usage fee. In addition to the services mentioned previously, this service also learns and recognizes patterns of wait times to forecast future wait times using statistical techniques. Google Voice can also be adapted for these services. Voice includes unlimited texting as well as phone calls. This service can be used for more than just text messages. It contains many benefits for business purposes such as call routing, voicemail transcriptions, advanced call screening, and custom greetings. Google Voice is a free service for Google members.

Financial Analysis of Restaurant Expansions

As a result of the rapid development and popularity of Nana, the restaurant must expand in order to facilitate the large crowds experienced on a day to day basis. The text messaging idea is a secondary solution to help alleviate this problem whereas expansions will be the primary solution. The future expansions that are currently being developed include expanding the restaurant to serve dinner since Nana is currently only open for breakfast and lunch, expanding the internal restaurant seating to the vacant room and expanding externally via an outdoor café patio expansion for Spring and Summer months.

- Dinner Expansion
- Vacant Room Expansion (40 + additional seats inside)
- Outdoor Patio Expansion (40 + additional seats outside)

Overall Assumptions used for economic analysis of expansions

- For a basic analysis, ignore income taxes as well as inflation from year to year. Reason being that we are unable to obtain a valid estimate of Nana's annual income in order to determine the tax bracket that they would reside. Also, by neglecting the inflation rate, the analysis is much easier to obtain a general idea of the before tax and before inflation cash flows of the investment.
- NOTE: Since the interest rate is not known, the internal rate of return decision model, IRR, is used for the financial analysis as opposed to the net present worth or equivalent uniform cash flow analysis

1. Outdoor Patio Expansion

Nana has a sufficient amount of land outside of the restaurant extending from the building to the street. This land is ideal to place an outdoor café to alleviate the long wait time experienced by customers at Nana. The initial cost that must be considered for this expansion first and foremost is the permit required from the City of Chicago to allow for the outdoor café expansion. This permit must be renewed annually. Another initial cost to consider is the physical seating of the outdoor expansion including the vertical wall/free standing planter developed by the building subgroup (see Figure 7 below). This expansion may or may not require a loan however since we do not have the necessary information we will assume that the restaurant is able to pay for the expansion (investment). It must be understood that this is not an exact financial analysis since numerous assumptions are required since our team is not the owner.

Assumptions:

- Daily net income of ~\$800 (267 people/day @ \$3 profit/person)
- Worker costs: 3 waiters @ \$5/hr
- Permit Cost: ~\$1000-\$2000 varies with size and location: [sidewalk cafe program City of Chicago outdoor cafe requirements](#)

Outdoor Patio Expansion Initial Costs:	
Permit (annually)	\$2,000
Seating Arrangements	\$8,000
Additional Expenses	\$2,000
Initial Investment Total	\$12,000

Table 1- Initial Investment of Outdoor Patio Expansion

Outdoor Expansion Income Benefits	
Outdoor Café hours of operation	8
People in seating arrangement per 1 shift	25
Sales price per plate (\$/plate)	\$10
Average Cost of Plate (\$/plate)	\$9
Net Income per plate (\$/plate)	\$1
Average Eating Time per shift (min/shift)	45
Shifts per day	10.67
People per day	267
Daily Net Income	\$267
Weekly Net Income	\$1,867
Monthly Net Income	\$7,467
Annual Income	\$89,600

Table 2- Determine the annual income from the expansion

In Table 2, the annual income determined in year 1 is a trial year. The following net income cash flows vary due to the inevitability with a business operation; success in terms of profit vary annually. These cash flows once again do not change as a result of inflation.

Worker Costs	
Period	Waiter Costs (3 waiters @ \$5/hr)
Daily	120
Weekly	\$840
Monthly	\$3,360
Annually	\$40,320
Total Worker Costs	\$40,320

Table 3-Determine the worker costs

Final Results	
Annual Income	\$89,600
Annual Worker Costs	\$40,320
Annual Business Expenses	\$2,000
Annual Permit Costs	\$2,000
Projected NET Annual Income	\$45,280
Analysis period n (years)	5
IRR	341%

Table 4- Cash Flows outdoor café for the analysis period chosen (5 years)

Annual Benefits/Costs	Outdoor Café/ Patio Cash Flows					
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Income	-	\$89,600	\$80,000	\$85,000	\$81,000	\$75,000
Worker Costs	-	(\$40,320)	(\$42,000)	(\$45,000)	(\$40,000)	(\$40,320)
Additional Business Expenses	-	(\$2,000)	(\$10,000)	(\$12,000)	(\$8,000)	(\$9,500)
Permit costs	-	(\$2,000)	(\$2,000)	(\$2,000)	(\$2,000)	(\$2,000)
Net Sum =	(\$12,000)	\$45,280	\$26,000	\$26,000	\$31,000	\$23,180

Table 5- Internal Rate of Return on initial investment for outdoor patio

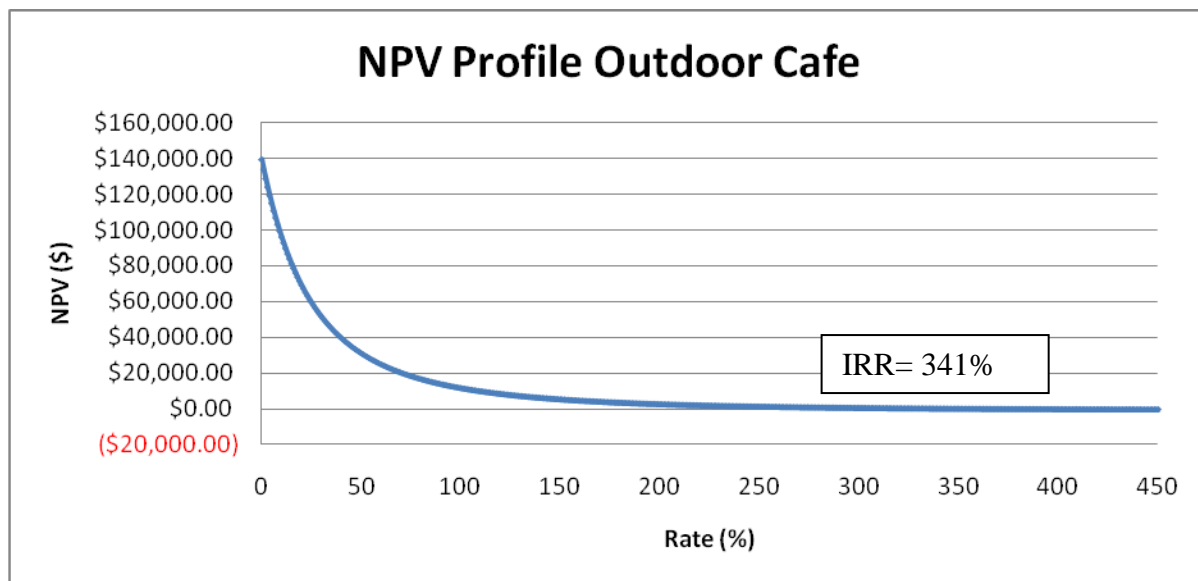


Figure 1- Net Present Value Profile: Outdoor Patio Expansion

From the Net Present Value (NPV) decision model, a project is accepted when the NPV ≥ 0 . The outdoor patio expansion is compared to the 'DO NOTHING' alternative and therefore there is no need for an incremental analysis between two mutually exclusive alternatives. From Figure 1, the outdoor patio expansion investment is expected to provide a 341% (internal rate of return IRR) return on investment

(\$12,000) from the assumptions made. The internal rate of return is the interest rate that makes the NPV of a project equal to 0. Therefore, Nana owners should accept the project since they are sure to receive a minimum acceptable rate of return (MARR) less than the 341% IRR, resulting in a positive net present value. Note, the MARR is synonymous with discount rate, hurdle rate, interest rate, cost of capital, required rate of return etc. described in financial literature.

2. Indoor Dining Vacant Room Expansion

Currently, within the internal structure of Nana, there exists a large vacant room used to store tools, personal belongings, and restaurant necessities among other things. This room has potential to provide a large return on investment to the owners of Nana. Currently, Nana is choosing the 'Do Nothing' Alternative in regards to the vacant room foregoing the opportunity to use the space for additional restaurant seating. From an economics standpoint, the opportunity cost of not utilizing the room for restaurant seating results in a significant opportunistic economic loss to the owners. Eventually the owners realized this fact and have focused on remodeling this room to provide an additional 40 seats to the restaurant.

Assumptions/ Explanations

- Since the outdoor café and the indoor dining room expansion add 40 seats to the restaurant respectively, the aforementioned annual income remains the same for this expansion for trial year
- Worker costs: remain the same as for the outdoor patio/café
- Permit Cost: ~\$1000-\$2000 varies with size and location
- Operating & Maintenance Costs are not relevant in the economic analysis since regardless of the expansion the restaurant will be required to pay the same amount
- Rent will remain the same whether the owners decide to expand or not

Indoor Vacant Room Expansion Initial Costs:	
Initial Permit	\$5,000
Seating Arrangements	\$5,000
Flooring	\$5,000
Lighting/Ambiance/Aesthetics	\$7,500
Additional Expenses	\$5,000
Initial Investment Total	\$27,500

Table 6- Indoor Vacant Room Expansion Initial Costs

Annual Benefits/Costs	Indoor Dining Expansion Cash Flows					
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Income	-	\$89,600	\$80,000	\$75,000	\$65,000	\$85,000
Worker Costs	-	(\$26,880)	(\$25,000)	(\$22,500)	(\$27,500)	(\$30,000)
Additional Business Expenses	-	(\$10,000)	(\$12,000)	(\$10,000)	(\$15,000)	(\$8,000)
Net Sum =	(\$27,500)	\$52,720	\$43,000	\$42,500	\$22,500	\$47,000

Table 7- Determined the cash flows for the vacant room expansion for analysis period (5 years)

Final Results	
Annual Income	\$89,600
Annual Worker Costs	\$26,880
Annual Business Expenses	\$10,000
Projected NET Annual Income	\$52,720
Analysis period n (years)	5
IRR	175.64%

Table 8- Determine Internal Rate of Return (IRR) for the indoor vacant room expansion

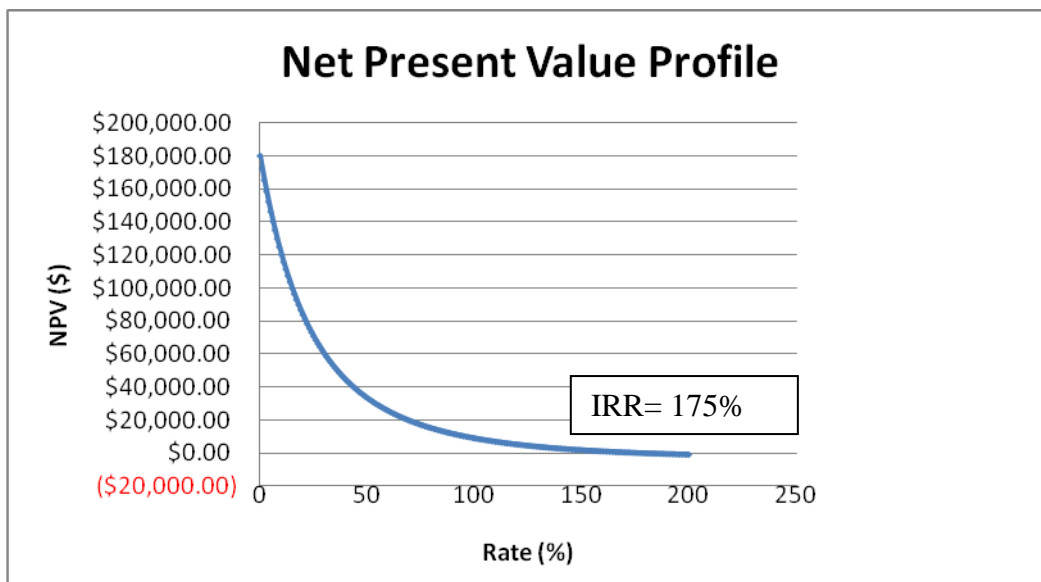


Figure 2- Net Present Value Profile: Vacant Room Expansion

Subsequently, since the IRR for the vacant room expansion is larger than the expected MARR, the owners of Nana should make this investment since the project will result in 175% rate of return (IRR). The rate of return provides the most intuitive understanding of a project in comparison to the net present value or equivalent uniform cash flow models. However, the goal is to maximize the return NOT the rate of return. Simply, any business person would much rather have an 80% rate of return on a \$50,000 investment when compared to a 100% rate of return on a dime. Therefore, from the economic analysis, the outdoor café is expected hypothetically to have a rate of return of 341% on \$12,000, and the vacant room expansion is expected to have a rate of return of 175% on \$27,500. These expansions have been determined to be extremely worthwhile economic investments as opposed to the current 'DO NOTHING' alternative.

Building Subgroup

Vertical Garden/Wall Insulation

The vertical garden and wall insulation group worked on building a hand-made planter wall to Nana Restaurant focusing on the aesthetic value along with the existing brick wall of its restaurant year around. The typical modular green wall system has a steel frame exposed in winter that has an unpleasant look unless it has plants growing on it. Additionally, this green wall system is extremely costly. For the sake of our hand-made planter wall, the modular parts resemble puzzle pieces, mating together. Each module has 9 circles punched with 6" diameter of which some have drawers containing plants. Puzzle modules have various thicknesses that range from 6" to 1', and modules of 1' thick will be placed at the bottom for stability. The types of plants grown in the drawers will include herbs, strawberries and lily which grow to a maximum of 6" in height.

(Please refer to the figure below)



Figure 3- Vertical Garden/Wall Insulation

Energy: Solar Panels/Wind power

The main purpose of the solar panels is to implement green energy and actually show customers of the organic restaurant that they are using a green technology in the building. The owner of the building and our group believe that it would work as an advertisement for the restaurant and will attract more people in the business. Since Nana is planning to expand the business, the energy gathered from the solar panels will produce light to the outdoor café area in the dinner time. Instead of locating the solar panels on the roof, the solar panels will be structurally hung on the top of the south façade to be visible to restaurant customers.

(Please refer to the figures below)

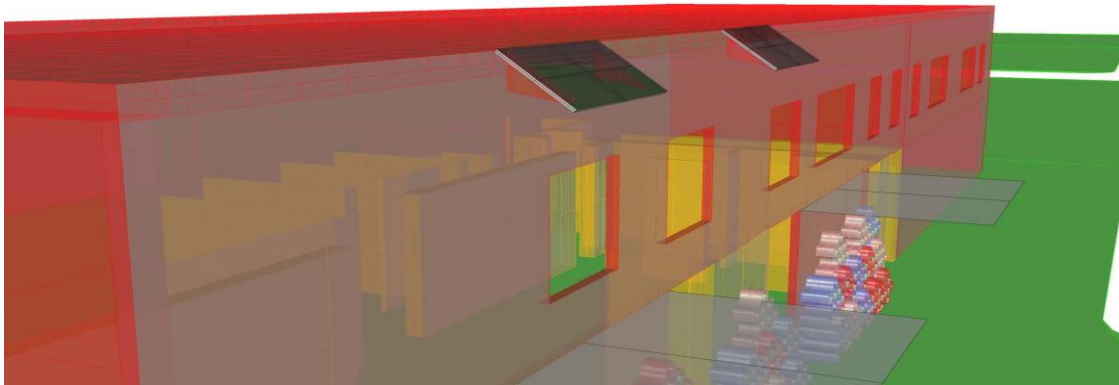


Figure 4- Solar Panel Design

Outdoor Seating

The solution for an outdoor seating café was introduced to the client by the building team early on as a strategy to maximize profit during the summer months. The proposed site would be ideal, in many ways, as it is located off of a small street – with just enough exposure to the public without being overbearing with traffic noise and pollution. The proposal was based on, economic reasons, expanding the restaurant's seating capacity by an additional 40 seats and providing additional (free) exposure to the client. This solution would also serve to alleviate waiting time for a table at the restaurant, provide a pleasant atmosphere in which to dine – crucial for customer reoccurrence – and, finally, implement a vertical garden strategy. Our team had to research building codes to gauge how and where an outdoor seating café could feasibly be placed. According to the Chicago Building code, a 6'-0" clearance has to be implemented wherever there is an opportunity for two-way pedestrian traffic (i.e. a sidewalk). (See figure below). Finally, neither seating nor any partitioning systems could be made permanent on the city-owned sidewalk(s) – i.e. bolting methods could not be implemented in order to steady any proposed structure.

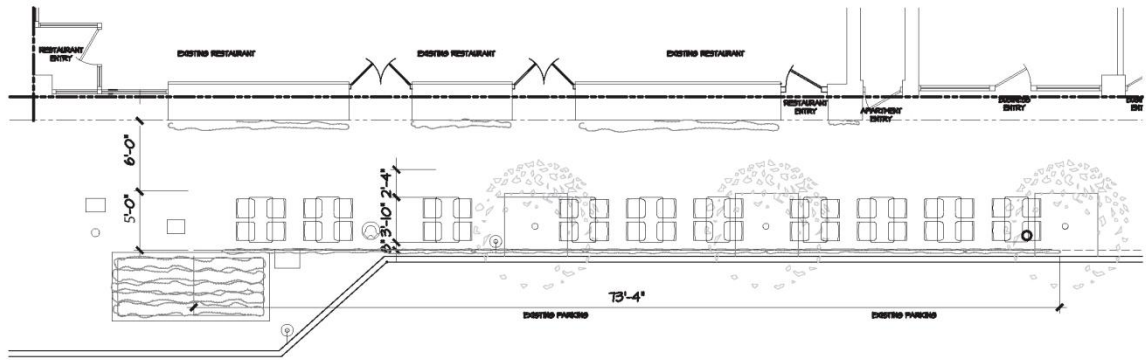


Figure 5- Outdoor Seating Plan

Free-standing Partitions

Due to the exposure of café tables to the street and parking, as the most economical scheme – fitting 40 additional seats – is located adjacent to the street, a partitioning buffer system had to be introduced. Though originally the partition system started as a free-standing vertical garden scheme, it has developed into a free-standing shading and noise buffer screen with an aesthetic quality that works closely with the vertical garden wall set against the building’s façade. The partition system is not fixed into the ground and can be easily moved, stored, and manipulated into different configurations depending on the owner’s desire.

(Please refer to the figures below).

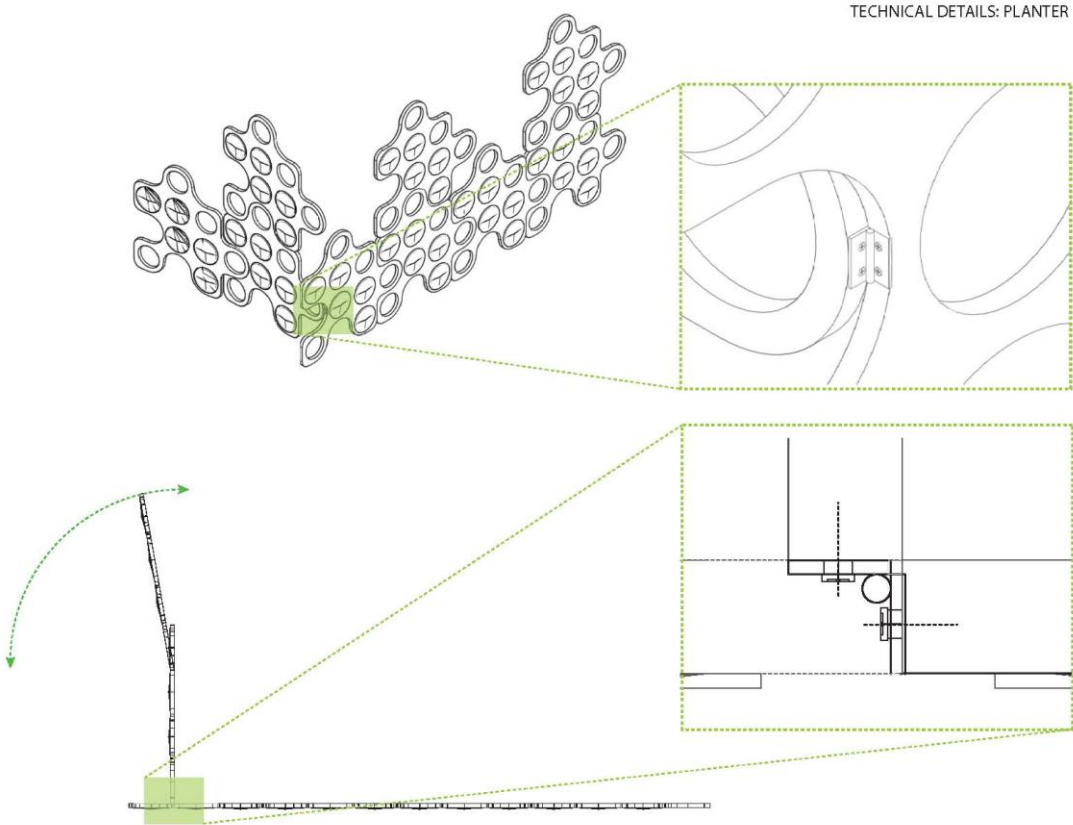
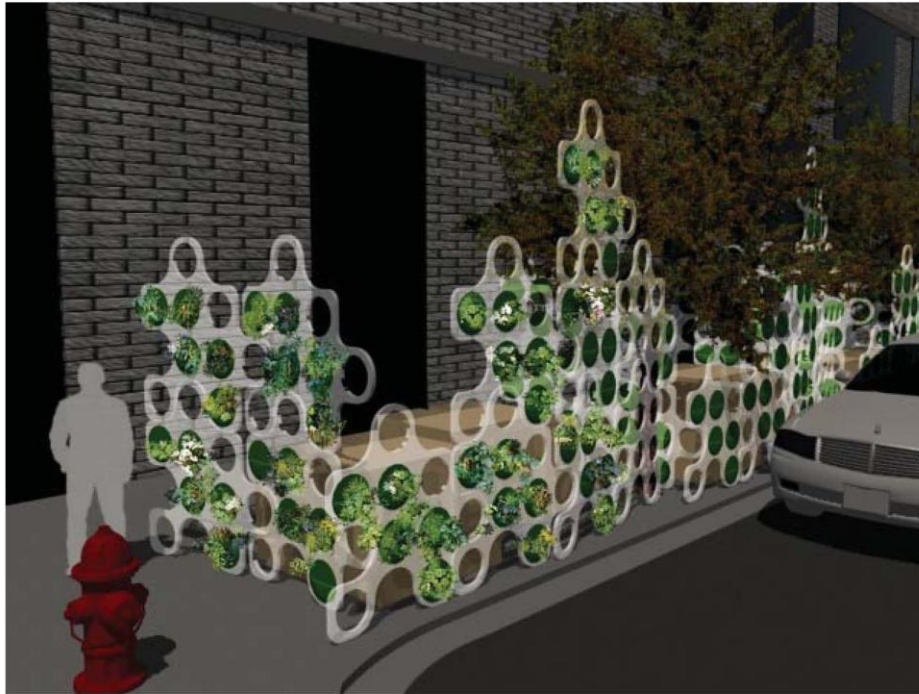


Figure 6- Free Standing Partitions

FINAL SCHEME FOR FREE STANDING PLANTER



THIS PARTICULAR SCHEME WORKS LIKE A SCREEN, WITH HELT POCKETS COVERING ALTERNTE OPENINGS, FILLED WITH PLANTS.

Figure 7- Free Standing Planter

Shading/Oil Pumps:

Electric refueling stations are one of the features that are required to get LEED approval. Through the research, the private installation of the electric refueling station at the south side of Chicago will be the first attempt in the Chicago area, putting a large marketable value to the restaurant. Coulumb Company has a few options about these stations. These service machines work either by the RFID card that is borrowed from the store when food is purchased or a simple credit card.

5.0 Conclusions and Recommendations

Since the IPRO will be continuing for an additional semester, our group recommends that they continue our structure of three subgroups: environmental, business and building groups. This breakdown into the three groups proved to be rather efficient and diverse. We met together weekly to provide the entire group with updates for the respective subgroup. This allowed for the entire team to understand what each subgroup was working on and allowed for the understanding of how all three groups interrelated. The recommendations for the following IPRO will be broken down in terms of the three subgroups that we have constructed this semester with the intention that this structure will remain. The environmental group can actually build the vertical garden partitions that were designed this semester. Additionally, the environmental group can also install the WVO conversion system to the company car, if Nana desires, investigate and provide a feasibility study for Nana with a benefit/cost analysis of upgrading appliances/systems as well as develop energy efficient solutions to be installed during the upcoming semester.

The business group can reanalyze the old business plan and compare it to a current plan. They can analyze the current marketing schemes, including website design/analysis, as well as research organic competitors and identify the pros and cons that these restaurants have in their business plan/aesthetics. The business group can conduct the on campus presentation to increase organic awareness as well as get Nana's name and image onto the IIT campus. Since Nana has only been in existence for a little over half a year, with the current rapid increase in popularity it is safe to assume that this growth will continue. Therefore, as stated previously, the main problem that Nana faces is its inability to accommodate large crowds due to the limited restaurant size. The research conducted on text messaging as a form of alert that one's table is ready can be implemented (as opposed to pagers) and may prove to be an effective solution to this major logistical problem. As well, the survey results can be analyzed with the results presented to the client to better understand a wide range of customer perspectives and hopefully accommodate to their preferences and overall thought process. With the foundation set for numerous projects and expansions to be implemented for the restaurant, a capable business team must be formed to conduct extensive financial analysis of the expansions and feasibility of the projects, cost/benefit analysis, and return on investment.

The building group can reanalyze the roof solutions that the current semester has come up with as well as a structural feasibility study of how costly the roof will be. Also, the solar panel design can be carried through to implementation, the vertical garden/wall insulation, and the free standing planters/partitions. They can plan additional spaces to comply with code requirements that result from those changes. The building subgroup has a large range of flexibility with ideas to present to the client. Therefore, the overall recommendation for the upcoming building group would be to take a look at the designs and research conducted this semester, potentially implement some of the ideas as well as continually developing innovative ideas for the client to get that 'WOW' factor from Omar and Christian, the owners of Nana.

6.0 Appendices

Appendix A:	Team Roster
Appendix B:	Budget
Appendix C:	Subgroup Organization Charts
Appendix D:	Business Survey
Appendix E:	Student Coupon
Appendix F:	'Green' Cleaning Products
Appendix G:	Cardboard Recycling Options
Appendix H:	Waste Vegetable Oil
Appendix I:	Sustainable Gardening Information
Appendix J:	On Campus Presentation Details
Appendix K:	Contacts

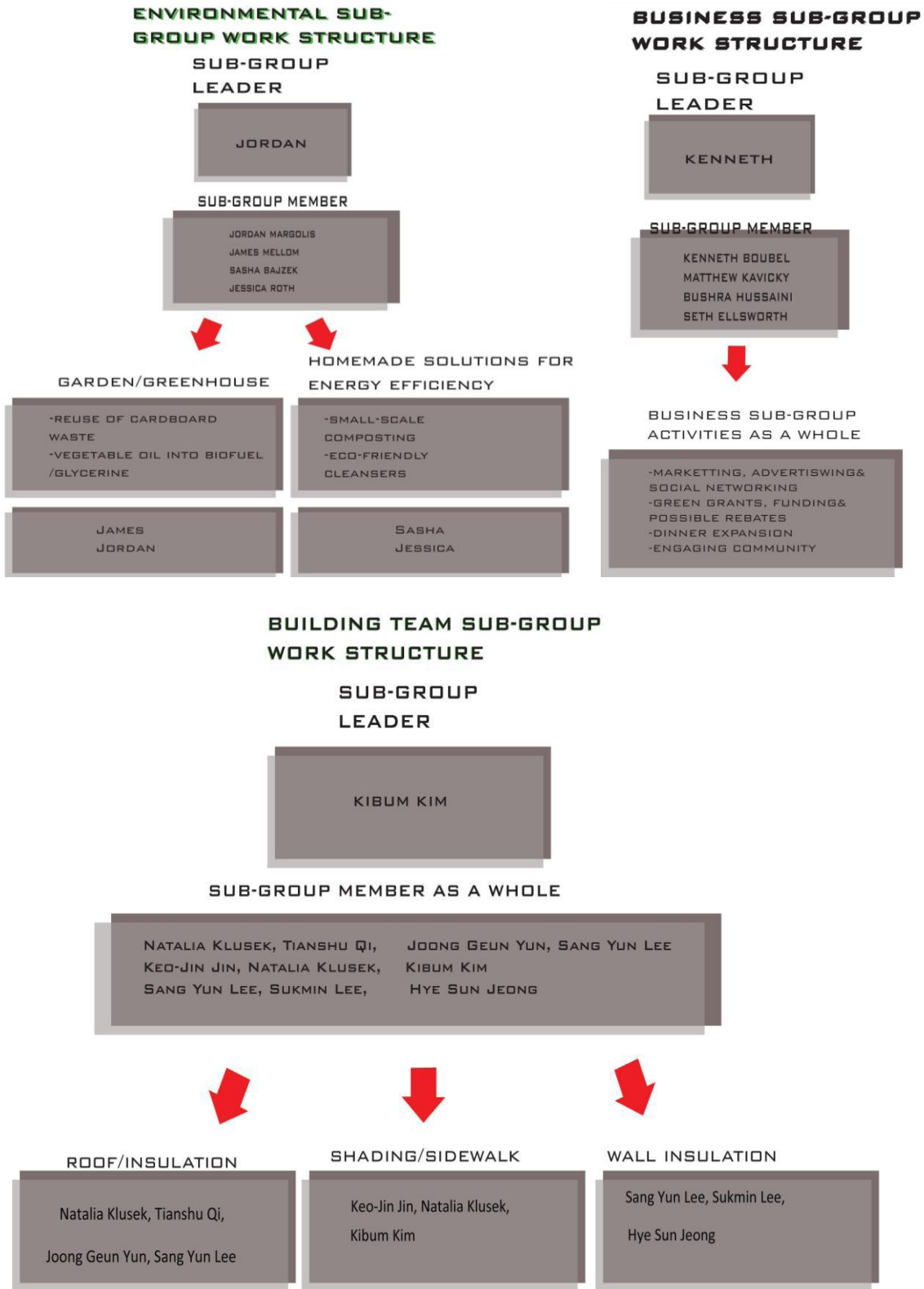
Appendix A: Team Roster

IPRO 317 Roster				
	Team Member	Major	E-mail	Phone Number
1	Ken Boubel	Mechanical Engineering	kboubel@iit.edu	██████████
2	Jordan Margolis	Architecture Engineering	jmargol1@iit.edu	██████████
3	Seth Ellsworth	Architecture Engineering	ellsset@iit.edu	██████████
4	James Mellom	Architecture Engineering	jmellom@iit.edu	██████████
5	Sasha Bajzek	Civil Engineering	sbajzek@iit.edu	██████████
6	Jessica Roth	Civil Engineering	jroth3@iit.edu	██████████
7	Natalia Klusek	Architecture Engineering	klusnat@iit.edu	██████████
8	Bushra Hussaini	Biochemistry Engineering	bhussai2@iit.edu	██████████
9	Kibum Kim	Architecture Engineering	kkim38@iit.edu	██████████
10	Keo-Jin Jin	Architecture Engineering	kjin@iit.edu	██████████
11	Sang Yun Lee	Architecture Engineering	sang1203@gmail.com	██████████
12	Sukmin Lee	Architecture Engineering	slee22@iit.edu	██████████
13	Joong Geun Yun	Architecture Engineering	jyun6@iit.edu	██████████
14	Hye Sun Jeong	Architecture Engineering	hjeong2@iit.edu	██████████
15	Tianshu Qi	Civil Engineering	tqi2@iit.edu	██████████
16	Matthew Kavicky	Applied Mathematics	mkavicky@iit.edu	██████████

Appendix B: IPRO Budget

Activity		Cost	Description	
Focus Groups	Business	Coupon Production	\$50	Printing cost
		Advertising Cost	\$50	Printing cost for sample advertising options
	Environment	Vertical Garden Prototype	\$100	Model production cost
	Building	Shading Mock-up model	\$100	Model production cost
		Eco Tech Training	\$200	Presentation/Workshop
		Appliance Sample study	\$50	Window Film Sample
Field Trip		\$250	Round Trip for the Green Roof Garden example Assume 10 mile trip @ 50 cents/mile plus sample food	
Printing/ Supplies		\$50	Finishing cost for printing final IPRO deliverables	
Total		\$750		

Appendix C: Subgroup Organization



Appendix D: Business Survey and Results

[in progress]

To be completed if the IPRO is continuing into the Fall 2010 semester

Appendix E: Student Coupon

College Coupon — 10% Off!

Come to Nana for 10% off one breakfast or lunch item! For menu and additional information, visit www.nanaorganic.com.

To receive discount, please turn in this coupon and present school ID.

**Valid on Mondays and Tuesdays 9:00 A.M. to 3:00 P.M.
Street Address: 3267 S. Halsted (Halsted St. at 33rd St)
Phone Number: 312-929-2486
Expires 3/30/2010**



Appendix F: 'Green' Cleaning Products

Restaurant Cleaners

Regular restaurant cleaners, such as those used for the both the tables and the food preparation area, carry a large proportion of chemicals, which are harmful to the environment. When inspecting restaurants, Health Inspectors generally look for items containing bleach, quaternary ammonium, and iodine, all of which are very harmful chemicals. Their strong cleaning ability is the main reason for their recommended, and often required, use as industrial and institutional cleaners.

In wanting to become more environmentally friendly, Nana Organic has recognized the need to find cleaners, which do not contain these harmful chemicals and can be labeled environmentally friendly. The Environmental Media Association has developed the Green Seal program, which has created numerous environmental standards in order to determine the labeling of various products. When determining the environmental impact of various cleaners, the Green Seal Standards, looking primarily at GS-37 Industrial and Institutional Cleaners, identify several areas. Products must be both designed and manufactured in an environmentally friendly manner, as well as perform effectively against a nationally known cleaner of the same category. Also, the products are not allowed to create skin irritation, which is common among cleaners containing harmful chemicals, and cannot be toxic to aquatic life.

Using these labels, as well as research regarding the cost and shipping for each item, several options for cleaners could be found and recommended to the client (see Appendix F). Not only are these researched cleaners far less harmful for the environment, they have also been found to be less expensive, with the owners of Nana Organic citing spending savings of approximately fifty percent for their cleaning products.

- Environmentally Friendly Cleaners

Cleaner Genre	Current Cleaner	Cost/ oz.	Recommended Cleaner	Cost/ oz.
All-Purpose	Ecolab G.P. Liquid	\$0.15	Sunshine Makers Simple Green Concentrate ¹	\$0.07
Bathroom	Ecolab Kemsan	\$0.26	Canberra Corp. Husky 325 ¹	\$0.10
Degreaser	Ecolab Degreaser	\$0.30	The Clean Environment Co. PH Neutral	\$0.11
Floor	Ecolab Wash 'N Walk	\$0.40	Amrep Misty Neutra Clean	\$0.10
Oven	Ecolab Husky	\$0.40	The Clean Environment Co. Non-Toxic Cleaner	\$0.18
Toilet Bowl	Palmolive Disinfectant Bowl Cleaner	\$0.16	The Clean Environment Co. No-Dye Cleaner	\$0.14
Window	Ecolab Windex	\$0.26	Rochester Midland Corp. Enviro Care ¹	\$0.10

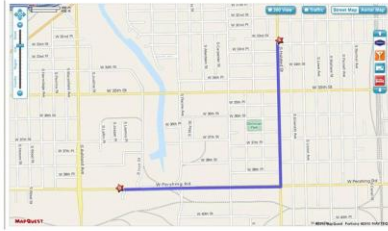
¹GS-37 Industrial and Institutional Cleaners



Appendix G: Cardboard Recycling Options

Within the City of Chicago there are numerous recycling facilities that allow Nana to drop off their waste cardboard instead of disposing of it with actual garbage. There are companies that will come and not only pick up the cardboard, but will pay Nana for it; however they require all cardboard to be organized by like boxes and a minimum of 13 “skids” that are 48” wide x 40” deep and 50” tall, roughly half of a 53’ semi-trailer.

LOCAL CARDBOARD RECYLING FACILITY-1
1424 West Pershing (7days a week, daylight hours)
1.59 miles away (south on halsted to pershing,
right on pershing)



IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT



LOCAL CARDBOARD RECYLING FACILITY-2
• 1752 South Clark St. 2.1 miles away (north on
halsted, right on archer, left on clark)



IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT



PLAN-B



- Called, waiting to hear back from lindsey in purchasing to see if we can work with a local business that they purchase from because we will not have enough cardboard to make it worth their time. They require ½ 53’ semi-trailer as a minimum pickup for purchase. This is roughly 13 skids, that are 48” wide X 40” deep X 50” high.

- <http://www.unitedcontainer.com/recycle/?gclid=COHOv6vdvaACFdBM5wodsH2EUg>



IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT

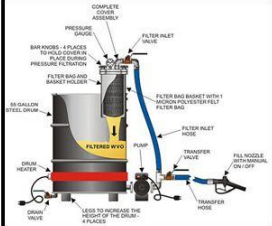


Appendix H: Waste Vegetable Oil

To the environmental subgroup's advantage, the company vehicle (2010 Volkswagen Jetta, Turbo-Diesel-Intercooled) happened to be user friendly for a waste vegetable oil conversion. Working off the assumptions that they use on average 14.5 gallons of diesel fuel a week, and purchase that fuel for roughly \$2.89/gallon we were able to extrapolate that and come up with a formal feasibility study for the cost and time of repayment. The total upfront cost comes out to \$2,245.95 with a 5% contingency, which gets repaid in 54 weeks (just over a year) with a savings of \$2112.69 in year two.

• Process: **WVO- waste vegetable oil**

- -WVO must be settled (1-2 weeks)
- -Processed to remove contaminants.
- -Vehicle must be converted in order to properly burn WVO. (conversion kit)




Elsbett 1 tank system vs. 2 tank system

1 Tank system:

- Utilizes 1 fuel tank
- Can operate on just WVO
- During sub-zero months regular diesel fuel may be necessary. (not in subject vehicle)

2 Tank system:

- Switches between diesel tank and WVO tank.
- Necessary during long periods of engine Idling.



IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT

-Subject Vehicle: 2010 Volkswagen Jetta Wagon, TDI

-14.5 Gallon Fuel Tank, Automatic Transmission

-Economy 2010 VW Jetta: 30 MPG-City, 42 MPG-Highway, 34 MPG-Combined



-Local Diesel Fuel Price (2-17-10, 3400 Milwaukee Ave, Gas Depot): \$2.89/gallon

UPFRONT COSTS	TIME OF REPAYMENT
-Conversion Kit \$1,139.00	-Gallons of Diesel Fuel Used Weekly 14.5gal
-Install (8hrs at \$95) \$760.00	-14.5 gallons at \$2.89
-Filtration (drum/unit) \$240.00	\$41.91
TOTAL UPFRONT COST \$2,139.00	-Savings- YEAR 1 (52 weeks) \$-66.63
5% Contingency \$106.95	-Savings- YEAR 2 (104 weeks) \$2112.69
TOTAL WITH CONTINGENCY \$2,245.95	

Conclusion:
 Converting the used vegetable oil to fuel the company vehicle is a feasible option that will be repaid in 54 weeks (just over one year). This saved money can be used for new marketing strategies such as a car wrap with company logo, which would be paid off before the end of year two.



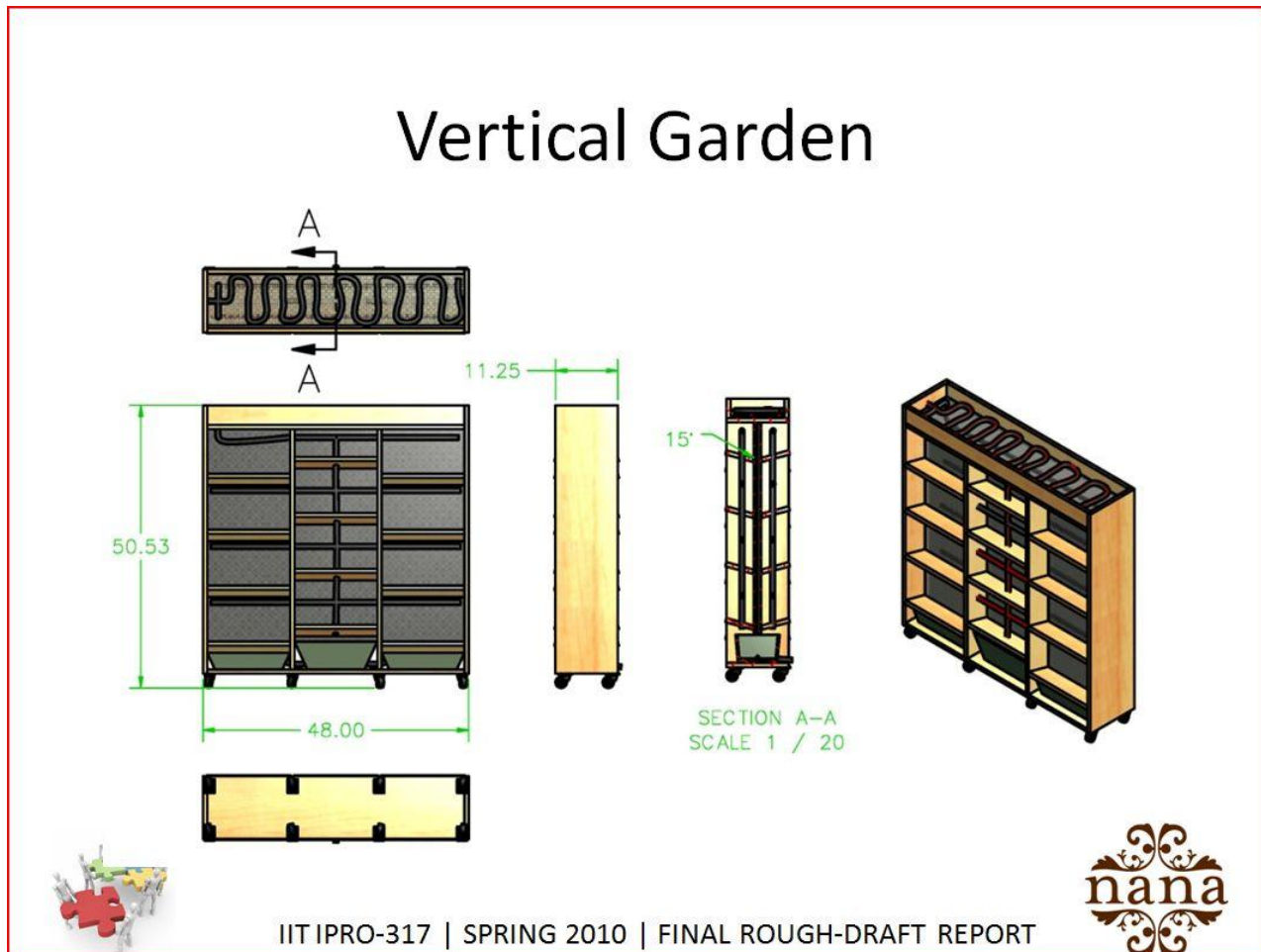
IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT

Appendix I: Sustainable Gardening Information

When conversing with our client about his goals for his restaurant and for this IPRO, he expressed his interest in growing his own herbs organically. Because of the urban setting and space restraints, creativity is required to fulfill his wish. Our first idea was to grow a roof garden, however the roof is very weak and was recently remodeled, so the client is not interested in building on the roof at this time. Therefore, the idea of a vertical garden was employed. Vertical gardening, also known as living walls or green walls, is the method of growing plants up a wall instead of horizontally. Benefits include natural beautification of the area, organically homegrown crops, and conservation of space.

Features:

Drip hose irrigation with mesh and rock backing for improved drainage. 2in castor wheels for mobility. The center of gravity of the empty unit was calculated using Inventor and it was within a fraction of an inch of the center of the unit. Dimensions: 6ft high, 4 ft wide, 1ft deep. Total cost including wood, mesh, plastic wood protection, paint, castor wheels, nails, drip hose tubing, soil, seeds, plant food, rocks, watering timer: about \$400.



Compost



- **Earthmaker 124 Gal. Composter**
-
- Continuous cycle composting
- Shelf system
- Add at top, take from bottom
- Easy to assemble
-
- 5.0/5.0 Average Customer Rating
- \$249.00
-
- Price Comparison: 124 gallon = 31 quarts and you keep adding more
- 31 quarts of MiracleGro Organic Plotting Mix is about \$17.00 plus tax (\$4.28 for 8QT)

Composting allows you to tap into a renewable source of energy for your plants and cut back on waste in landfills. We are currently looking into the city codes to make sure composting is allowed in your area.



IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT



Rain Catcher



- **Rain Catcher Barrel**
-
- 54 Gallons
- Built in hose
- Can connect to others with overflow hose or away from area
- UV-Stable polyethylene
-
- 4.8/5.0 Average Customer Rating
- \$139.00
-

Annual average precipitation for Chicago is 38.01 in. If you get about 10 in of rain over a spring and summer, an average 1,360 ft² roof would yield 8,160 gallons of rain water. This water can be used for the outdoor seating area's plants, cutting back on your water bill.



IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT



Woolly Pockets are flexible, breathable, and modular gardening containers. They can be used indoors and out since they have built-in moisture barriers to help protect furniture. Woolly Pockets are lightweight and can be folded flat, which makes them very easy to use, move, and store. They are 24" wide 15" tall and 20lb each when full.

Materials: Breathable felt layer made of 100% recycled plastic bottles and Built-in moisture barrier made of 60% recycled plastic bottles stitched together by UV resistant nylon thread.

Benefits: Allows soil to aerate naturally. Also, when the roots sense air, they air prune, naturally stopping their own growth when they sense they have reached the limits of space. This keeps roots healthy and stops plants from becoming root-bound.

Irrigation: Recommend a regular, timed drip irrigation system. The hose rests on top of the soil near the back. The felt helps to distribute the water

Pricing: One single pocket is \$49.00.

We also made 1:2 scale working models of the woolly pockets using green felt, vinyl backing and grommets. One concern with this design is the durability of the felt and if any smells with occur from the dampness. It is much cheaper than buying the Woolly Pockets found online. It cost about \$4.00 a pocket where the online one cost \$50.



Woolly Pockets



Woolly Pockets are flexible, breathable, and modular gardening containers. You can use Woolly Pockets both indoors and out; they have built-in moisture barriers to help protect furniture. Woolly Pockets are lightweight and can be folded flat, which makes them very easy to use, move, and store.

Materials: Breathable felt layer made of 100% recycled plastic bottles and Built-in moisture barrier made of 60% recycled plastic bottles stitched together by UV resistant nylon thread.

Benefits: Allows soil to aerate naturally and the roots to prune naturally.

Irrigation: Timed drip irrigation system and the felt evenly distributes water.



20lb each pocket when full

24" wide 15" tall

Price: One \$49, Three \$125, Five \$188

IIT IPRO-317 | SPRING 2010 | FINAL ROUGH-DRAFT REPORT



On Campus Presentation Details

Requirements/Logistics/Concerns

Presenter(s):

- Omar Solis of Nana Organic
- Organic Suppliers
- Nutritionist
- Sustainable/Green initiative Presenters

Content/Purpose:

- Presentation potentially focused on sustainability and green initiatives
- Nana's vision in terms of organics + sustainability
- Overall talk about organic food and the benefits
- Organic Food to eat catered from Nana for the audience

Advertising Event:

- Reach out to the Greek community (HUGE population @ IIT)
- Email to every student @ IIT (Jennifer Keplinger to email every student and faculty)
- Focus on Architecture students
- 'Day of' Paper Flyers
- On campus sustainable organization

Budget:

- Is the IPRO office going to pay for the catering of Nana organic food?
 - They need a rough estimate of the cost from Omar for catering
- Cost estimate based on audience size

Contacts

- Jennifer Keplinger (catering concerns on campus)
 - 6 weeks in advance notice to set up all the details
- Space reservation office in MTCC
- Contacting presenters for confirmation

Other IPRO collaboration

- IPRO 326 a greener IIT
- On campus sustainable organization

Basic Planning Concerns:

- Food: Catering, setting up, cleaning up, utensils, eating necessities, drinks, etc.
- Length: 30-45 minutes MAX
- Potential Dates:
- Audience size:
- Space for event: Wishnick, Outside, or **3440 S Dearborn Building**
- Open to IIT faculty and Students

ESSENTIAL to plan a date early and market the event effectively to the entire IIT campus

Appendix K: Contact List

Contact List	
Aspect Researched	References
Volkswagen Company Car	elsbett-www.elsbett.com
Chicago Recycling facility	1424 West Pershing (1.6 miles from Nana)
	1752 South Clark Street (2.1 miles from Nana)
Container	United Container Company- www.unitedcontainer.com