IPRO 314 Project Plan

Spring 2009

# Greening and Reuse of Queen of Peace High School Facilities

Advisors: Jim Braband & Nancy Governale-Hamill

## 1. Abstract

The problem posed at Queen of Peace High School is one of sustainability. The IPRO 314 team will focus on the reuse and greening of existing school facilities. Three major projects currently hold latent potential for the school: the communications center, the sustainability wall, and the overall greening of the facilities. If these projects are completed correctly, they will become a catalyst for positive change. We are proposing to create a transition from library to communication center because of its isolated state in the school. The sustainability wall is two-fold in terms of benefit. It will upgrade the current windows which are lacking and will create an interesting learning tool. Greening of the entire school is the third project and includes windows, roofing, etc. to improve efficiency. Through the use of all three proposals, IPRO 314 believes in the school promotion and what enrollment it could bring.

## 2. Background

A. Queen of Peace, a private, all-girl high school in the southern suburb of Burbank, has experienced a decline in enrollment in the past 3-5 years. Once at 15000 students, Peace is now comprised of only 650. Reasons for this decline include a competing school turning co-educational as well as many schools overlapping into Peace's drawing radius. Peace is excited about continuing working with an IPRO team to explore creative solutions in a variety of areas that can benefit the students at Queen of Peace in the years ahead. The overall goal of the project is to both increase revenue (enrollment and funding) and decrease costs at Peace within a five year window. Possible solutions include greening of school campus, facility space re-use, alternative funding, and social networking.

B. The IPRO 314 project is being supported with a generous donation by IIT Trustee, Ellen Jordan Reidy, an alumnus of IIT's Institute of Psychology and Stuart School of Business as well as Queen of Peace High School. Several Queen of Peace alums on the IIT campus also have an interest in this IPRO project, including Jackie Sokolowski and Lauren Joyce.

C. During an initial meeting with the principal of Queen of Peace, it was discovered that one of the identified structures for space reuse (convent/dormitory building) needs a minimum of 1.5 million dollars in renovations prior to use. However, after further research different cost-effective ways to renovate the convent/dormitory building were found. Additionally, the principal explained the existing plans for creating a social network for the school's alumni. A computer application has already been purchased and a team has been formed to develop the application. In order to avoid duplicating efforts, the IPRO team will only focus on the

greening, reuse and alternative funding solutions and leave the social networking aspect to the Peace team. A last outcome of the meeting was a request from the school's principal to research the integration of an international communication center into the school's current environment.

## 3. Methodology

A. To analyze the problem stated in the background section, research will have to be conducted in the several solution areas identified: reuse, greening and funding (further detail of the solutions areas are discussed in the objectives section of this document). When considering the reuse of building facilities, the needs of the school population and surrounding community will be considered. Research into these areas could dictate the form and function of the space. Research on green and passive technologies could also greatly benefit the image of the school as well as the overall structure of the school facilities. To organize the research effort, two sub-teams have been created: one to focus specifically on reuse of the communication center and another to focus on greening techniques to be applied to the school.

B. After research is complete, analysis of the collected data will be performed to tabulate the pros and cons of each possible solution. Each sub-team will be responsible for completing analysis for their individual team's proposed solutions. Analysis will include:

   I. A cost versus benefit analysis of each solution for the purpose of identifying the most cost-effective solutions for the school. The cost and benefit analysis will compare each solution's initial and residual costs to the solution's projected increase in revenue and reduction in institutional spend over the next five years.

   II. Identifying the projected non-fiscal benefit realization of each solution within a five year window (increase in school rapport with the community, decrease in carbon-footprint, etc.).

   III. The impact each solution will have on the student and faculty population as well as the surrounding community.

   IV. Testing the appeal of each solution by conducting surveys with the community, faculty and students.

C. After researching, analyzing, testing, and surveying, the sub-teams will meet to present their findings to the entire IPRO 314 group. The group as a whole will then be responsible for coming to a consensus on identifying specific solutions for implementation and execution within the school's environment. The executable solutions will be selected based on their projected return on investment over the five year window, improvement of institutional image, and appeal to the client.

D. A final proposal will be drafted by the group as a whole to present to the client. The proposal will include a description of the group's method for brainstorming, identifying, researching, analyzing, comparing and contrasting, and finally selecting the best solutions to address the client's problem statement. Further, the proposal will include a detailed plan to implement and execute the selected solutions in addition to a control plan to maintain the solutions ensuring maximum effectiveness over time. The presentation of the proposal to the client will be an open-feedback session and with enough advance time prior to IPRO day to allow for modifications to the proposal if necessary and a final proposal will be delivered back to the client upon completion of the class.

E. In preparation for IPRO day, the team will use the final proposal document to create abstracts, brochures, posters, and any other tools used during the presentation to the client (illustration boards, models, etc.) to be used during the presentation to the IPRO community. The presentation should be a thorough and cohesive explanation of the team's process, findings, client satisfaction, and lessons learned.

## 4. Objectives

A. Reuse Sub-team

I. To draw up a formal proposal of possible alternative space reuse techniques including, but not limited to, the following solutions.

a. Converting the library space into an international communications center, as well as an area with study rooms and classrooms to be utilized by the students. This media center will allow classes to learn new ideas and interact with other schools around the world by means of watching classes, lectures, experiments, etc. as well as serve the community by allowing students opportunities to communicate with military family members serving overseas.

Figure 1: Current library space

b. Renovation of the convent building at Queen of Peace High School and the construction of a new community center. The benefit of the community center to the school will be realized through new revenue streams and increased visibility and use by the community.

   i. A portion of this new facility will be open to the students during school hours and the other portion will be open to the public.

   ii. The new facility will be available, whether for profit and non-profit purposes, for use by Burbank's residents, surrounding schools and churches.

   iii. With the schools laptop program, the library is no longer used by students. The books currently housed in the library will be moved to the new center and will be open to the public.

c. Perform a campus wide redesign of the existing courtyards in order to implement eco-friendly solutions that will allow them to be used more frequently and serve a greater purpose.

Figure 2: Sample of a current courtyard

B. Greening Sub-team

I. To draw up a formal proposal of possible greening techniques including, but not limited to, the following solutions.

   a. Solutions aimed at increasing efficiency of existing school facilities:

      i. Replacement of inefficient machinery for the purpose of reducing utility costs.

      ii. Replacement or improvement of existing windows for the purpose of lowering utility costs by reducing heating and cooling loss.

Figure 3: Sample existing window to improve

iii. Redesign of the roof areas to better implement possible greening solutions like solar panels or a water collection system.

iv. Installation of reflective roofing technology for the purpose of reducing utility costs by introducing alternative energy sources.

v. Installation of a water collection system for the purpose of gathering rain water into a collection pool and channeling to gardens and playgrounds to reduce water usage.

vi. Improvement of current lighting efficiency for the purpose of reducing utility costs by introducing energy-saving lighting systems.

b. Solutions aimed at increasing efficiency of the new community center replacing the old dormitory space:

i. Construction of an earth-friendly facility for the purpose of creating a cost-friendly building and reducing the school's carbon footprint.

c. Solutions aimed at increasing the education of greening techniques to school population:

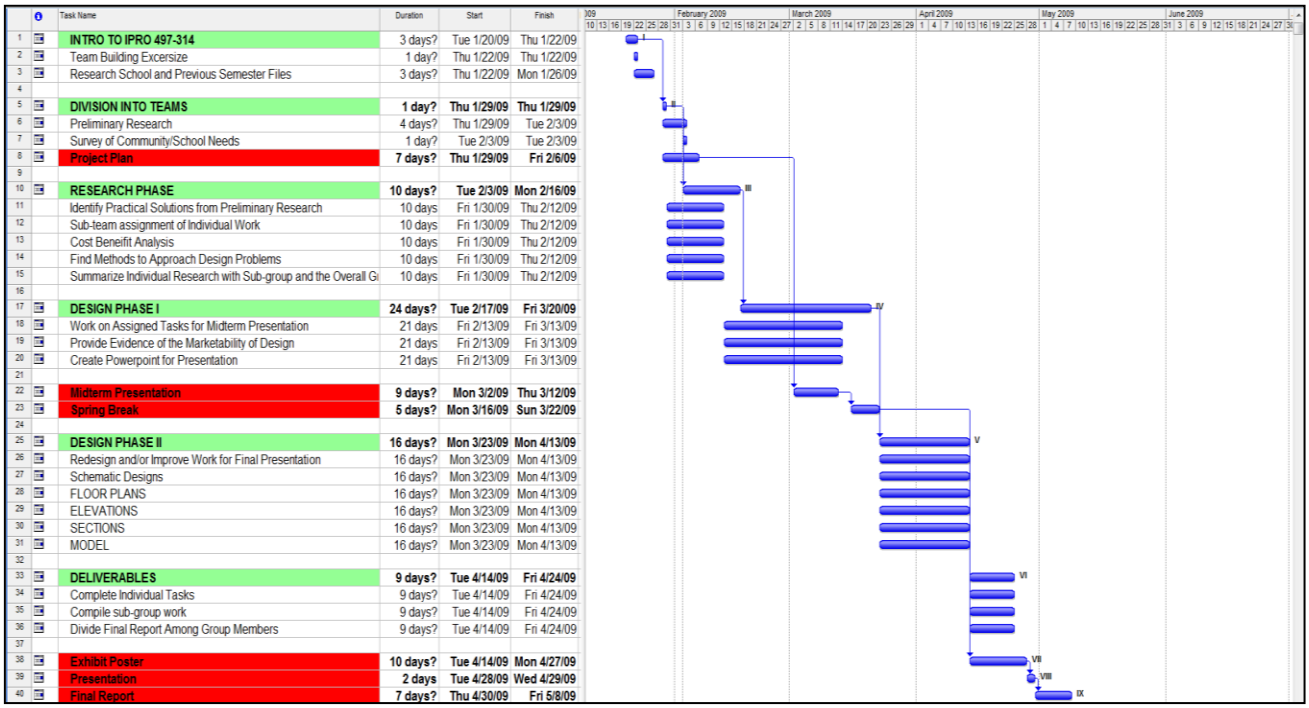
i. Education of faculty and students on how to reduce waste inside the school environment.

ii. Introduction of school sponsored fundraisers to teach the community “how to live green”.

d. Solutions aimed at promotion of the school:

i. Promotion of the schools greening efforts to the community, corporate sponsors and government for the purpose of acquiring donations, sponsorships and grants.

Gantt Chart



| | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | INTRO TO IPRO 497-314 | 3 days? | Tue 1/20/09 | Thu 1/22/09 |
| 2 | Team Building Excersize | 1 day? | Thu 1/22/09 | Thu 1/22/09 |
| 3 | Research School and Previous Semester Files | 3 days? | Thu 1/22/09 | Mon 1/26/09 |
| 4 | | | | |
| 5 | DIVISION INTO TEAMS | 1 day? | Thu 1/29/09 | Thu 1/29/09 |
| 6 | Preliminary Research | 4 days? | Thu 1/29/09 | Tue 2/3/09 |
| 7 | Survey of Community/School Needs | 1 day? | Tue 2/3/09 | Tue 2/3/09 |
| 8 | Project Plan | 7 days? | Thu 1/29/09 | Fri 2/6/09 |
| 9 | | | | |
| 10 | RESEARCH PHASE | 10 days? | Tue 2/3/09 | Mon 2/16/09 |
| 11 | Identify Practical Solutions from Preliminary Research | 10 days | Fri 1/30/09 | Thu 2/12/09 |
| 12 | Sub-team assignment of Individual Work | 10 days | Fri 1/30/09 | Thu 2/12/09 |
| 13 | Cost Beneifit Analysis | 10 days | Fri 1/30/09 | Thu 2/12/09 |
| 14 | Find Methods to Approach Design Problems | 10 days | Fri 1/30/09 | Thu 2/12/09 |
| 15 | Summarize Individual Research with Sub-group and the Overall G | 10 days | Fri 1/30/09 | Thu 2/12/09 |
| 16 | | | | |
| 17 | DESIGN PHASE I | 24 days? | Tue 2/17/09 | Fri 3/20/09 |
| 18 | Work on Assigned Tasks for Midterm Presentation | 21 days | Fri 2/13/09 | Fri 3/13/09 |
| 19 | Provide Evidence of the Marketability of Design | 21 days | Fri 2/13/09 | Fri 3/13/09 |
| 20 | Create Powerpoint for Presentation | 21 days | Fri 2/13/09 | Fri 3/13/09 |
| 21 | | | | |
| 22 | Midterm Presentation | 9 days? | Mon 3/2/09 | Thu 3/12/09 |
| 23 | Spring Break | 5 days? | Mon 3/16/09 | Sun 3/22/09 |
| 24 | | | | |
| 25 | DESIGN PHASE II | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 26 | Redesign and/or Improve Work for Final Presentation | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 27 | Schematic Designs | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 28 | FLOOR PLANS | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 29 | ELEVATIONS | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 30 | SECTIONS | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 31 | MODEL | 16 days? | Mon 3/23/09 | Mon 4/13/09 |
| 32 | | | | |
| 33 | DELIVERABLES | 9 days? | Tue 4/14/09 | Fri 4/24/09 |
| 34 | Complete Individual Tasks | 9 days? | Tue 4/14/09 | Fri 4/24/09 |
| 35 | Compile sub-group work | 9 days? | Tue 4/14/09 | Fri 4/24/09 |
| 36 | Divide Final Report Among Group Members | 9 days? | Tue 4/14/09 | Fri 4/24/09 |
| 37 | | | | |
| 38 | Exhibit Poster | 10 days? | Tue 4/14/09 | Mon 4/27/09 |
| 39 | Presentation | 2 days | Tue 4/28/09 | Wed 4/29/09 |
| 40 | Final Report | 7 days? | Thu 4/30/09 | Fri 5/8/09 |

Figure 4: Greening Team Gantt Chart

## 5. Project Budget

A. Itemized list of Proposed Spending

| Item | Unit Price | Quantity | Price | Purpose |
|---|---|---|---|---|
| Transportation to school facilities | $12.00 | 8 | $96.00 | Site visits for facility research, interview of client, presentation to client, etc. |
| Meeting Expenses | $100.00 | 1 | $100.00 | Meeting and presentation materials for client visits |
| Modeling Materials | $200.00 | 1 | $200.00 | Model construction |
| Testing and Analysis | $500.00 | 1 | $500.00 | Testing, retail, etc. |
| Team Building Exercise | $75.00 | 1 | $75.00 | Pizza & Drinks |
| | | **Total:** | **$971.00** | |

Figure 5: IPRO 314 Project Budget

## 6. Team Structure and Assignments

A. List of all team members including their educational background/majors and other skills, strengths, experience and/or academic interests.

| Name | Major/ Year | Skills/ Strengths | Experience and Academic Interests | Team |
|---|---|---|---|---|
| Alvarez, Matthew | Mechanical Engineer Senior | AutoCAD, Bentley Microstation, Pro Engineering, Solidworks, and familiar with MatLab | Familiar with HVAC systems and job cost estimating | Green |
| Muyco, Michael | Architectural Engineering Junior | AutoCAD, Matlab, Microsoft Office and is very organized | Worked in construction and is interested in getting into Housing law | Information Commons |
| Dralle, Kyle | Architecture Senior | AutoCad, Sketchup, Illustrator, Photoshop, and able to work with a large group of people | an interactive team who develops a sustainable and adaptive facility that compliments existing features. | **Leader** Information Commons |
| Duke, Kyle | Architecture Freshman | AutoCAD, 3dsMax, Viz, Photoshop | 2 years experience as a residential counselor @ an eating disorder center | Green |
| Grande, Gina | Applied Mathematics Junior | Familiar with Java, Maple, very organized and good with Microsoft Office | worked closely with a contracting company while designing own recreation center | Green |
| Hernandez, Leonel | Mechanical Engineering Senior | Familiar with Autocad, LabView, Java, Photoshop, good with Microsoft office, hard worker, works well in group and is bilingual | Research in Solid State Physics, have worked in several schools, and would like to work in the automobile performance industry | Information Commons |
| Lipski, Brian | Architecture Senior | AutoCAD, Photoshop, 3ds Max Design, Sketchup, Illustrator, very organized | McDonalds US Restaurant design | Information Commons |
| Semenova, Svetlana | Architectural Engineering Junior | AutoCad, Sketchup, very organized and can work with people or alone | 2 years work experience in Mechanical Engineering | Green |
| Weyhe, Randall | Architecture Senior | 3ds,Rhino,AutoCAD, and shop drawings | 2 years work experience in Architecture office | Green |
| Zakir, Naima | Political Science Sophmore | Written Communication, stock trading, Accounting | Entreprenuer and stock trading experience and interested in Economics, Commercial Studies, Trade and Communication | Information Commons |
| Horabik, David | Architecture 5th year Senior | AutoCAD, 3ds, Photoshop, Illustrator, and microsoft office | Worked in multiple firms, shop drawings | **Leader** Green |

Figure 6: IPRO 314 Team Structure and Assignments

## B. Master Schedule: Green Shading Indicates Availability

| Monday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |
| Tuesday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |
| Wednesday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |
| Thursday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |

| Friday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |
| Saturday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |
| Sunday | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00 | 18:00 | 19:00 | 20:00 | 21:00 |
| Alvarez, Matthew | | | | | | | | | | | | | | |
| Dralle, Kyle | | | | | | | | | | | | | | |
| Duke, Kyle | | | | | | | | | | | | | | |
| Grande, Gina | | | | | | | | | | | | | | |
| Hernandez, Leonel | | | | | | | | | | | | | | |
| Horabik, David | | | | | | | | | | | | | | |
| Lipski, Brian | | | | | | | | | | | | | | |
| Muyco, Michael | | | | | | | | | | | | | | |
| Semenova, Svetlana | | | | | | | | | | | | | | |
| Weyhe, Randall | | | | | | | | | | | | | | |
| Zakir, Naima | | | | | | | | | | | | | | |