Problem:
• Current rooftop is a largely vacant space, which could be utilized to develop a green roof

Requirements:
• Develop a green roof design for ETB which will result in economic, social and environmental benefits at the lowest possible cost
• The primary end user is McMaster University

Engineering Basis:
• Design considerations
  • Overall layout of green roof
  • Layers design
• Design aspects
  • Vegetation
  • Agriculture
  • Solar thermal heating system
• Focus was to maximize benefit, minimize costs

The proposed layout design, layers design and solar thermal system are shown in the figures below:

Conclusions/Implementation:
• Initial cost - $120,000, Annual economic benefit - $4,837, Payback time – 24 years
  • In addition, many important environmental and social benefits
• Implement green roof and ensure optimization of food production, monitoring of building energy consumption and stormwater management performance
• Maximize social impact by raising awareness and offering educational opportunities

• Vegetation is to be installed in modular units, which offer many advantages
• Multi-layered agricultural section to incorporate plastic tubing for snow-melting
• Solar thermal heating system aims to extend the growing season of agriculture