

## Executive Summary

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This document includes a comprehensive analysis of current industry issues and construction methods involved with the sustainable and energy efficient design of GrandView at Annapolis Towne Centre at Parole. Three areas of interest are analyzed in addition to the project information and general background. The overlying goal of this document is to research and carry out calculations that deal with sustainable design and constructability, centered on absorbing and reflecting energy from the sun.

The critical industry issue explored deals with the current economic situation with high energy costs and how the construction industry is implementing solar power into infrastructure through constructability. This examination of solar panel constructability and its place in current building design shows that in order to make this renewable energy resource a mainstream competitor to existing energy suppliers, advancement in efficiency and integration into building materials needs to be improved. Ultimately, the overall cost of implementing such a system needs to be reduced either by cheaper panels and quicker installation processes, or by larger government incentives that drastically reduces the payback period of the system.

The first and second analyses both deal with how utilizing and blocking the sun can have great impacts in energy savings of the building. The key issue here is implementing a PV solar array and high thermally rated windows with a low solar gain in such a way as to not have a drastic impact on the construction schedule. The overall construction cost and environmental impact that each system has is also determined. In the first analysis, it is determined that the addition of a 40Kw solar array on the roof of GrandView saves an annual \$6,797.10 and reduces greenhouse gas emissions by 39.3 tons all while having little impact on the overall length of the construction schedule.

The second analysis maintains current schedule length while implementing a more energy efficient window design. Ultimately, the addition of better glazing reduces solar heat gain and saves \$61,783.00 annually on cooling costs and prevents 1197 tons of CO<sub>2</sub> from entering the atmosphere. When paired with the efficient Henry air/moisture skin of the envelope along with a Magic-Pak AHU system, moisture is reduced and better scheduling coordination due to less partition and floor penetrations is achieved.