

Executive Summary

The following report presents several analyses of various systems of the Bucks County Justice Center (BCJC) which is a 273,000 SF courthouse located in eastern Pennsylvania. This report has five major sections: a lighting depth, an electrical depth, an acoustical breadth, an MAE acoustical breadth, and a mechanical breadth.

The lighting depth of this report details the lighting redesign for four unique spaces in the BCJC. The criteria for these designs included qualitative criteria as well as illuminance values and ratios from the IES Handbook and control and LPD requirements from ASHRAE. All of the spaces met the control requirements, all of the spaces have LPD's that are significantly below the maximum, and all of the spaces are within reasonable conformance with the illuminance value and ratio targets.

The electrical depth analyzed the effects of the lighting depth on the electrical distribution system, studied the fault current available at various locations throughout the building, and gives an analysis of the feasibility of a DC distribution system being used to increase electrical efficiency.

The acoustical breadth of this report gives an analysis of the RT of Ceremonial Courtroom 4100, establishes a target RT, and makes recommendations to bring the RT into closer conformity with the target.

The MAE acoustical breadth gives an analysis of the influence of the sound reinforcement system in Ceremonial Courtroom 4100 on speech intelligibility. This analysis looks at both SPL and STI to determine the effects of the system. The system greatly improves the SPL distribution as well as greatly increasing STI, but STI still only has a value that is on the low end of "good".

Finally, the mechanical breadth examines the practicality of a CHP system being used for this building. This analysis revealed that the building does not have a high enough consistent thermal load to make a CHP system feasible. Because of this the payback period is much longer than is acceptable to most investors.