Interior Office Fit-Out: Managing the Design of Low Voltage Security and Telecom Systems

Stacey E. Defilló Hernández
Advisor: Hector J. Cruzado, PhD
Graduate School

Abstract

This project examined the management and coordination processes involved in the interior fit-out of a fourth-floor office for the Massachusetts School Building Authority (MSBA) at 10 Post Office Square, Boston, MA. Conducted by BR+A Consulting Engineers with Dyer Brown and Lynnwell Associates. The project focused on integrating telecommunications, CCTV, and access control systems within a multi-tenant office space. It addressed the common challenge of delayed low-voltage design, which often causes spatial conflicts and schedule risks. The work followed a structured process through the Schematic Design (SD), Design Development (DD), and Construction Documentation (CD) phases using Revit 2024 and regular coordination meetings to ensure BICSI compliance. Early integration, consistent communication, and proactive oversight reduced rework and improved accuracy.

Introduction

This project applied structured project management methods to coordinate the low-voltage design process for the MSBA office fit-out ensuring scope, schedule, and quality control across all design phases. The project involved the interior fit-out of the 4th floor office for the Massachusetts School Building Authority (MSBA) at 10 Post Office Square, Boston. The project involved BR+A Consulting Engineers (design), Dyer Brown Architects (architecture), and Lynnwell Associates (construction) under the Massachusetts School Building Authority (client). The scope focused on telecommunications, CCTV, and access control systems integrated within the existing core and shell infrastructure. The team addressed challenges common in low-voltage design such as coordination with base building systems and limited riser access. Through early collaboration and adherence to BICSI standards, the project achieved a coordinated, construction-ready, and fully integrated system design.

Background

This project focused on the interior fit-out of a fourth-floor office for the Massachusetts School Building Authority (MSBA) at 10 Post Office Square in Boston, Massachusetts. BR+A Consulting Engineers led the design in collaboration with Dyer Brown Architects and Lynnwell Associates addressing the integration of telecommunications, CCTV, and access control systems within a multi-tenant office space. The work took place after the base building had been completed as a core and shell project, which required the design team to adapt to existing infrastructure while ensuring full compatibility with the building's security and communication systems.

The project arose from a recurring challenge in office fit-outs: the delayed inclusion of low-voltage systems in the design process. When these systems were introduced late, coordination issues, spatial conflicts, and schedule delays frequently followed. To prevent such problems, the design team implemented early coordination practices structured communication through Owner-Architect-Contractor (OAC) meetings, and adherence to BICSI standards. Digital tools like Revit 2024 were used to visualize system interactions and maintain alignment across disciplines. This proactive approach demonstrated how early integration and collaborative project management improved quality, reduced rework, and contributed to efficient delivery in modern office environments. Previous single-floor office fit-outs often experienced 10–15% schedule delays due to late-stage low-voltage integration. The objective was to develop a coordinated, construction-ready design framework through proactive planning, BIM integration, and structured stakeholder engagement.

Problem

Interior office fit-out projects frequently encountered coordination issues when low-voltage systems—such as telecommunications, CCTV, and access control—were added late in the design process. This lack of early planning led to design rework, schedule delays, and quality risks. The Massachusetts School Building Authority (MSBA) project illustrated how insufficient integration and stakeholder alignment could disrupt progress in multi-tenant environments. The core problem was the absence of structured project management practices to guide early coordination, communication, and risk control. Addressing this required a proactive framework ensuring timely integration, compliance, and alignment across all design and construction phases.

Methodology

The project followed a structured project management framework that divided the design process into three primary phases: schematic design (SD), design development (DD), and construction documentation (CD). Each phase served as a formal milestone that enabled the team to evaluate progress, control risks, and maintain alignment with project objectives and technical standards. This methodology placed equal emphasis on management efficiency and technical accuracy by integrating coordination, communication, and quality control measures throughout the process.

Figure 1 summarizes this framework presenting the Project Design and Coordination Flow by Phase, which outlines the sequence of planning, coordination, and validation activities carried out from SD through CD to ensure a controlled and collaborative design process. Figure 1 presents the Project Design and Coordination Flow illustrating the management progression from initiation and planning through execution and control

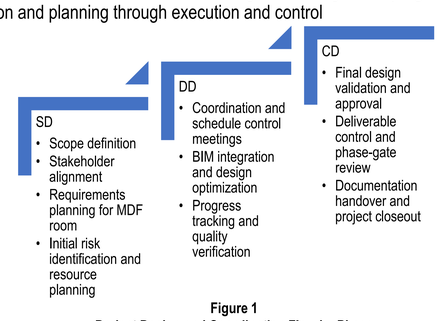

Figure 1
Project Design and Coordination Flow by Phase

During the schematic design (SD) phase, the engineering team established the spatial and technical requirements for the Main Distribution Frame (MDF) room ensuring adequate space, cooling, and infrastructure coordination. Early collaboration with the architect, client, and landlord helped identify base building constraints and align all systems with operational standards.

The design development (DD) phase refined layouts, specifications, and coordination details using Revit 2024 and Building Information Modeling (BIM). This digital process improved clash detection, visual accuracy, and interdisciplinary communication among BR+A Consulting Engineers, Dyer Brown Architects, Lynnwell Associates, and the client. Specifications and an Approved Manufacturer List (AML) standardized materials and installation methods to ensure consistency. Stakeholder alignment and communication management were central to maintaining scope and schedule control.

Stakeholder	Role/Responsibility	Communication Channel	Frequency
MSBA (Client)	Owner/Decision-making	OAC Meetings, Emails	Weekly
Dyer Brown	Architect	Revit Coordination, PDF Background Updates	Weekly
BR+A	Engineer	BIM Models, Specs, Reviews	Continuous
Lynnwell Associates	Contractor	Ubmittals, Requests of Information (RFI), Field Coordinations	As Needed

Figure 2:
Stakeholder Communication and Responsibility Matrix

Regular Owner–Architect–Contractor (OAC) meetings served as checkpoints for reviewing progress, resolving issues, and maintaining accountability among all project stakeholders. Figure 2 shows the Stakeholder Communication and Responsibility Matrix, outlines the key roles, responsibilities, and communication channels that improved coordination between the owner, architect, engineer, and contractor. This structured framework strengthened collaboration, enhanced communication efficiency, supported timely decision-making, and ensured successful delivery of the coordinated design package.

Results and Discussion

The project successfully achieved its objective of delivering coordinated, construction-ready documentation for the telecommunications, CCTV, and access control systems of the Massachusetts School Building Authority's (MSBA) new office space. Through structured project management principles such as coordination tracking, schedule control, and risk monitoring the design team completed all three phases within the established scope and timeline. Early coordination during the schematic design (SD) phase proved essential as the engineering team established the spatial, electrical, and cooling requirements for the Main Distribution Frame (MDF) room and aligned them with architectural and base building constraints, minimizing conflicts and preventing schedule delays. The use of Building Information Modeling (BIM) during the design development (DD) phase enhanced interdisciplinary coordination and improved communication among BR+A Consulting Engineers, Dyer Brown Architects, Lynnwell Associates, and the client. BIM coordination reduced clash detection incidents by approximately 25% compared to similar fit-out projects.

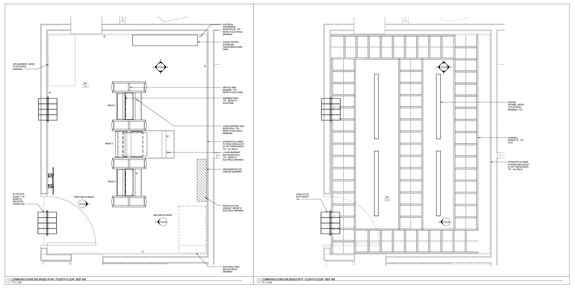

Figure 3
Completed Main Distribution Frame (MDF) Room Showing Coordinated System Installation

Figure 3 shows the fully fitted-out MDF room, illustrating how digital coordination and early design planning translated into a precise and functional low-voltage system installation.

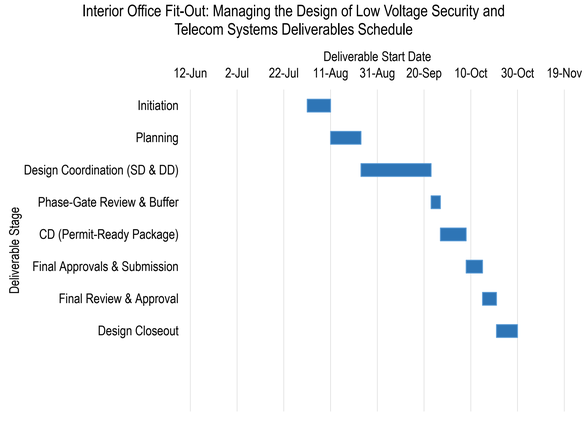

Figure 4
Final Project Gantt Chart Showing Phase Completion

Figure 4 presents the final project Gantt chart, which demonstrates the on-time completion of all design phases. The alignment between planned and actual durations reflects the effectiveness of the management framework, proactive communication, and structured design oversight.

Conclusions

The interior office fit-out for the Massachusetts School Building Authority (MSBA) achieved its goal of delivering coordinated, construction-ready documentation for telecommunications, CCTV, and access control systems. Through structured project management and the use of Building Information Modeling (BIM), all design phases (Schematic Design (SD), Design Development (DD), and Construction Documentation (CD)) were completed on time and in compliance with BICSI and landlord standards. Early integration of low-voltage systems minimized conflicts, reduced rework, and improved quality and constructability. Regular Owner–Architect–Contractor (OAC) meetings strengthened communication, accountability, and collaboration. The project demonstrated that proactive planning, digital coordination, and strong management strategies produce efficient, high-quality outcomes that enhance coordination, system integration, and overall performance in multi-tenant environments. Lessons from this project will influence future work. This project demonstrated that structured project management practices integrated with BIM can significantly improve design quality, efficiency, and interdisciplinary coordination in modern office fit-outs. These results establish a foundation for continued application of coordinated management methods in future design projects

Future Work

Future work will focus on expanding this project management framework to additional interior fit-out projects to assess its long-term effectiveness, adaptability, and scalability across different building types and sizes. The research team plans to incorporate more advanced Building Information Modeling (BIM) applications including 4D scheduling, automated clash detection, and cloud-based collaboration tools to enhance predictive coordination and design accuracy. Data collection from upcoming projects will aim to quantify measurable improvements in schedule performance, cost efficiency, stakeholder communication, and design quality achieved through early low-voltage system integration. These next steps will help validate the methodology, strengthen its practical relevance, and contribute to the continuous advancement of engineering management practices within complex, multi-tenant building environments.

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