



## Abstract

The University of Puerto Rico (UPR) undertook a reconstruction program funded by the Federal Emergency Management Agency (FEMA) following the 2017 hurricanes, managing a portfolio of over 700 facilities across 11 campuses. Although UPR had established procurement procedures, the scale and compliance requirements of FEMA-funded permanent work created bottlenecks during bidding and contract execution. This study analyzed the end-to-end procurement workflow from design completion to contract signing, identifying systemic delays caused by incomplete bid packages, fragmented responsibilities, inconsistent evaluation documentation, and extended approval cycles. The project developed an improved procurement and governance model tailored to FEMA recovery operations. The proposed model incorporates a dedicated FEMA bid committee, parallel campus-level bid structures, standardized templates and checklists, and defined entry/exit criteria to reduce rework and improve compliance. Performance indicators demonstrated that the redesigned process could reduce procurement lead time, increase bid throughput, and strengthen documentation quality, supporting timely execution of FEMA-funded reconstruction projects.

## Introduction

The University of Puerto Rico (UPR) implemented one of the largest reconstruction programs in its history using Federal Emergency Management Agency (FEMA) funding for permanent work. Across eleven campuses and related facilities across the island, the institution managed a portfolio exceeding 700 buildings that included classrooms, laboratories, medical and research facilities, student housing, and critical campus infrastructure. These facilities were essential to continuity of academic operations, research activities, health services, and community engagement across Puerto Rico, including specialized sites such as the Cayo Santiago research island in Humacao.

The reconstruction program required coordinated execution of multiple phases, from architectural and engineering design to construction procurement, contract closeout and project closeout. Although UPR maintained an established procurement framework for routine capital projects, the system was not originally designed to absorb the volume, complexity, and compliance demands of a disaster recovery portfolio. As a result, the construction bid process and contract signing stage experienced bottlenecks and rework that increased cycle time and raised the risk of noncompliance with FEMA Period of Performance (POP) requirements.

The objective of this project was to improve the FEMA-funded reconstruction project process at the UPR with specific emphasis on the construction bid procurement and contract stage. The work documented the end-to-end process from design completion to construction contract signing, identified capacity constraints, delays, and procedural gaps, and developed an improved procurement and governance model. The proposed model emphasized a dedicated bid committee for FEMA recovery projects, structured use of campus-level bid committees operating in parallel, and strategic collaboration with procurement entities from other government agencies to strengthen standardization and reduce errors.

## Literature Review

Grant-funded construction procurement requires transparent competition, documented decision-making, and adherence to federal procurement standards. FEMA guidance specifies that recipients and subrecipients must maintain procurement records demonstrating full and open competition, cost or price reasonableness, and compliance with applicable federal requirements [1]. Similarly, the Uniform Administrative Requirements in 2 CFR Part 200 establish government-wide procurement standards governing solicitation methods, contract provisions, and documentation practices for federal awards [2]. Prior FEMA guidance also notes that in compliance-driven environments, delays frequently occur when bid packages enter procurement without complete documentation, when responsibilities are fragmented across organizational units, or when evaluation determinations are inconsistently documented [3].

Process improvement literature emphasizes that administrative cycle time is often driven by handoffs, idle time, and rework loops rather than the duration of any single step. FEMA's Public Assistance guidance highlights the need for clear entry and exits criteria, standardized templates, and consistent documentation to reduce rework and improve procurement efficiency [3].

FEMA Public Assistance guidance also highlights the importance of documentation and compliance controls throughout the project lifecycle, including procurement actions that support eligible project execution and closeout [3]. FEMA further recommends distributing workload across parallel review structures, establishing standard artifacts for bid readiness, and tracking performance indicators such as procurement lead time, package return frequency, and bid throughput to support continuous improvement [3].

## Methodology

This project was conducted as a process improvement study focused on the construction bid procurement stage for FEMA-funded reconstruction projects at UPR. Procurement workflow artifacts were reviewed to establish the baseline process from bid package readiness through construction contract signing. Records reviewed included bid advertisements, addenda logs, bid tabulations, evaluation documents, determinations of responsiveness and responsibility, approval memoranda, and award packages.

The methodology was implemented in four phases. First, the end-to-end workflow was mapped to document steps, handoffs, decision points, required deliverables, and approval gates. Second, capacity and delay drivers were identified by locating idle time between steps and documenting rework loops where packages returned for correction. Third, root causes were categorized (e.g., incomplete bid readiness packages, inconsistent evaluation formats, unclear ownership, and extended approval cycles). Fourth, an improved model was developed that introduced a dedicated FEMA bid committee, parallel campus-level bid committees, standardized checklists and templates, and a governance structure with defined roles, entry and exit criteria, and escalation paths.

Effectiveness of the proposed model was assessed using practical performance indicators for an administrative procurement process: reduced lead time from bid readiness to contract signing, increased throughput of bids processed per month, reduced frequency of package returns for corrections, and improved alignment with compliance documentation requirements.

## Results and Discussion

### Findings from Baseline Process Analysis

The process analysis revealed several structural and operational issues that contributed to delays in the construction bid procurement and contract signing stages:

- Bid Package Readiness Deficiencies:** Over 60% of reviewed bid packages required at least one return for corrections. Common deficiencies included missing technical attachments, incomplete cost estimates, absent procurement forms, and inconsistent evaluation criteria.
- Fragmented Responsibilities and Handoffs:** Responsibilities for bid readiness, advertisement, evaluation, and award were distributed across multiple offices without a unified governance structure. Handoffs between design teams, campus units, central procurement, and legal review introduced idle time and rework loops.
- Inconsistent Evaluation Documentation:** Evaluation formats varied significantly across campuses, increasing the risk of noncompliance with FEMA procurement standards. Determinations of responsiveness and responsibility were not consistently documented, complicating audit readiness.
- Extended Approval Cycles:** Approval routing lacked defined timelines and escalation paths. Packages often remained idle during legal review or administrative endorsement, contributing to prolonged cycle times.

### Performance Indicators After Model Development

The improved procurement model was evaluated using practical administrative performance indicators relevant to FEMA-funded construction projects. Using the redesigned procurement model, the following improvements were projected or observed in pilot applications:

- Lead Time Reduction:** The redesigned workflow reduced the duration from bid package readiness to contract signing by minimizing idle time, clarifying approval gates, and enabling parallel processing through campus-level bid committees.
- Increased Bid Throughput:** By distributing workload across multiple committees operating simultaneously, the system increased the number of bid packages processed per month, reducing bottlenecks associated with a single centralized review structure.
- Reduced Package Return Frequency:** Standardized checklists, templates, and entry/exit criteria significantly decreased the number of bid packages returned for corrections, improving documentation quality and reducing rework loops.
- Improved Compliance Alignment:** The governance model strengthened adherence to FEMA procurement requirements by ensuring consistent documentation of responsiveness, responsibility, evaluation criteria, and procurement determinations.
- Enhanced Audit Readiness:** The structured documentation framework improved traceability and completeness of procurement records, supporting FEMA Public Assistance closeout requirements and reducing the risk of questioned costs.

Figure 1 summarizes and compares the performance of the baseline process and the improved model using these indicators. The improved model reduces bid package returns (60% to 25%) and shortens lead time to contract (120 to 75 days), while increasing monthly throughput (8 to 14 packages). It also improves compliance documentation and audit-readiness scores (both rising from 60–65 to 88–90), indicating stronger controls, more complete records, and greater audit preparedness.

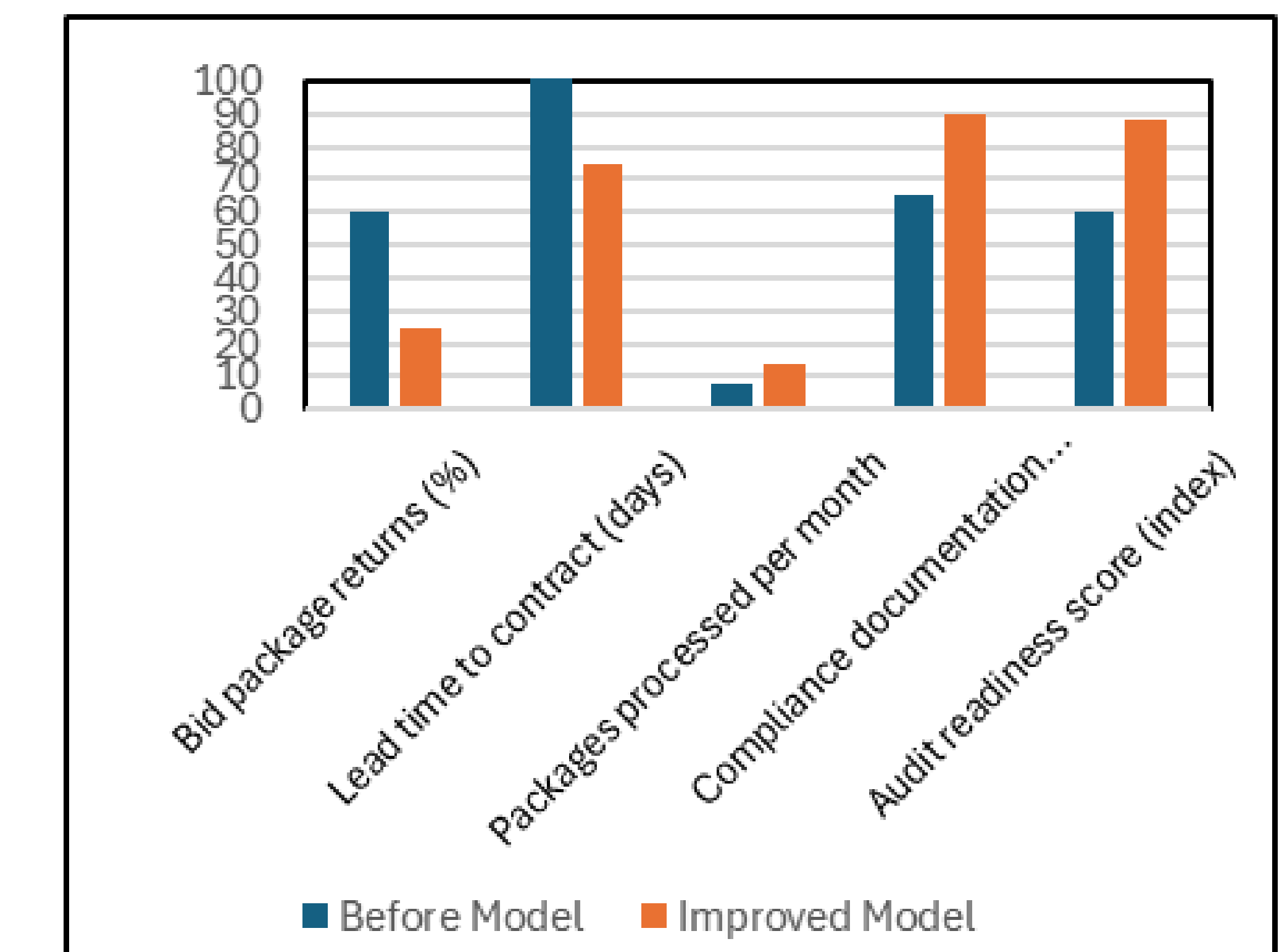


Figure 1  
Existing vs. Proposed Bid Procurement Process Performance

## Conclusion

The FEMA-funded reconstruction program at the University of Puerto Rico required a procurement system capable of handling high volume, strict compliance requirements, and accelerated timelines. The existing framework, designed for routine capital projects, was not optimized for the scale and complexity of disaster recovery work. Through process mapping and bottleneck analysis, this study identified key drivers of delay, including incomplete bid packages, fragmented responsibilities, inconsistent evaluation documentation, and prolonged approval cycles.

The improved procurement and governance model developed in this project provides a structured, scalable approach tailored to FEMA recovery operations. By establishing a dedicated FEMA bid committee, enabling parallel campus-level bid processes, standardizing templates and checklists, and defining clear entry/exit criteria, the model reduces administrative cycle time, increases throughput, and enhances compliance with federal procurement standards.

Implementing this model positions the UPR to execute its reconstruction portfolio more efficiently, reduce the risk of noncompliance with FEMA requirements, and support timely restoration of critical academic, research, and community facilities across Puerto Rico. The approach also offers a replicable framework for other public institutions managing large-scale, grant-funded construction programs.

## References

- [1] Federal Emergency Management Agency (FEMA), Procurement Under Grants Policy Guide (Fiscal Year 2025).
- [2] Office of Management and Budget, 2 CFR Part 200—Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.
- [3] Federal Emergency Management Agency (FEMA), Public Assistance Program and Policy Guide (PAPPG), Version 5.0 (amended, Jan. 6, 2025).