



Date: June 30, 2021
To: Mayor and City Council
CC: Cynthia Guidry, Airport Director and Tom Modica, City Manager
From: Laura Doud, City Auditor
Subject: Long Beach Airport Construction Audit

Please find attached the final report for the Long Beach Airport Construction Performance Audit, which was conducted by PMA Consultants (“auditors”), a construction project management consulting firm, on behalf of the City Auditor’s Office (CAO). Given the significant level of capital improvements underway at the Long Beach Airport (LGB), the purpose of this audit was to independently review and assess the adequacy of the Long Beach Airport’s procurement process, as well as the management and oversight of construction projects.

I would like to thank the Airport staff for their assistance and participation in this audit. I am pleased that the Airport and City Manager’s Office agreed to and have started implementing the audit recommendations, as stated in the enclosed Management Response:

“We agree with the City Auditor’s recommendations and believe the implementation of these recommendations will further enhance management of key Airport projects. The Airport is already benefitting from the recommendations and several of the project management tools are being integrated.”

Background

The Airport - a self-supporting enterprise of the City of Long Beach which does not receive local tax dollars - is undertaking a multi-year, multi-phase modernization Airport Capital Improvement Plan (ACIP), which includes a Phase II scope to be completed by 2021, which was the Pre-COVID goal. The CIP includes a new ticketing lobby, consolidated baggage claim, and checked baggage system. At the time of the audit, the reported budget of the 5-year ACIP was \$105,643,571. The audit focused on 5 projects that started, were complete, or are still underway within the timeframe of FY 2016 through FY 2019, and totaled over \$45 million in estimated costs. These projects – chosen by the LGB Engineering Division for their varying contract delivery methods, complexity, and issues previously reported – are the following:

Construction Projects Reviewed by the Audit

Project Name	Estimate at Completion (EAC)
Improvements to Taxiway C	\$22,920,000
TSA Check Baggage Inspection Station	\$12,400,504
Lot A Structure Elevator and Entrance	\$7,161,784
Runway 12-30 Keel Section Rehab	\$1,766,315
Terminal Area – Wall Beautification	\$823,084

Summary of Key Findings and Issues

The auditors determined that LGB's procurement process is well documented and follows City procurement procedures; however, the auditors found improvements are needed in LGB's oversight and management procedures of the ACIP projects. The auditors stressed that LGB has not adopted project management best practices, including adequate project cost, quality and schedule data and documentation needed for effective oversight.

Relying on the Project Management Institute's (PMI's) Project Management Body of Knowledge (PMBOK) as guidelines and standards for assessing general construction project execution, the auditors identified these findings:

1. **Lack of Clear CIP Prioritization Process** – LGB lacks a vision/mission statement document, one that clearly describes LGB's strategic objectives and how the listing of the projects in the ACIP aligns with and supports those objectives. There is also no specific process with effective scoring and screening in place to identify and plan projects and reprioritize based on strategic objectives. Project prioritization is crucial to ensure that the right work is being done to stay aligned with the entity's strategic objective.
2. **No Tracking of Changes to the Plan** – The ACIP is submitted to the Federal Aviation Administration (FAA), listing all the anticipated projects and their funding sources. The ACIP is updated yearly; however, there is no evidence of a formal mechanism for change management with respect to the annual plan. Currently, there is no way of identifying projects that were not included in the original plan or how they have changed. Not having a transparent change management process makes it difficult to monitor true project-level performance or progress against the ACIP.
3. **Need for a Project Management Office (PMO)** – There is not a PMO that operates as a centralized function that ensures construction projects stay in alignment with LGB's mission and strategic objectives, and facilitates and enforces the delivery of those projects in adherence to a standard structure and processes. Currently, project managers (PMs) within the Engineering Division rely on their own level of experience and use different tools and methodologies for managing projects. There are no project management standard processes documented showing adherence or compliance to those standards.
4. **No Documented Risk Management Processes** – There are no documented risk management processes or standards used by all PMs consistently. PMs typically rely on progress meetings to discuss risks and issues. Risk registers to document and assess risks are not standardized or developed for all projects. For the 5 projects reviewed, only one maintained a risk register, and it appeared to be a qualitative analysis, which lists the likelihood and consequences of a risk occurrence. Quantitative analysis, which uses historical data to understand the risk impact, was not being documented or discussed. Cost and schedule impacts are also not being reported or incorporated into monthly project progress updates. Because project risk management is a core project management best practice, the impact of not identifying and documenting risks, starting early in the project life cycle, greatly increases the likelihood of project budget and schedule overruns.

5. **Project Contingency Is Not Driven by Risk** – Risk impacts or risk-mitigating activities are not incorporated into the schedule or project costs. Additionally, contingency setting is not tied to project risk. LGB has used a historical percentage of 25% for vertical projects (i.e., construction or remodeling of any building, structure, or other improvement that is predominantly vertical) and 10-15% for horizontal projects (heavy civil construction such as taxiways, airfields, and other structural projects) as a contingency, regardless of the project's complexity, size, or amount of risk identified. Due to the lack of data provided, the auditors could not determine if the historical percentages were sufficient to cover all risks for all projects. While the use of a standard contingency percentage may work for smaller, more repetitive projects, it is not ideal for larger, more complex projects. Best practice for larger, more complex projects is to base contingency on the risks for that given project, providing a better forecast for the project as it considers the unique risks that the project may face.
6. **Project Management Information System (PMIS) Is Not Fully Configured and Used Consistently** – The PMIS is not fully configured, nor is it comprehensively used to manage project lifecycle cost information. Additionally, not all projects are managed in the PMIS. Although budgets are entered in the PMIS, they are not updated in the PMIS on a regular basis to coincide with the yearly ACIP update. Change orders are not managed in the PMIS. Inconsistent use of the PMIS likely caused issues with data integrity and accuracy that were observed by the auditors. Further, there is limited standardization between the various reports, as well as consistency between how the data is gathered. There are no project delivery reports that management can use to compare ACIP budgeted, actual and forecasted costs, schedule, and quality metrics. Because all project cost information is not located in one central location, a comprehensive and clear picture of the project cost status and project cost performance is not provided.
7. **No Defined Standards for Cost Management and Reporting** – Adequate practices in cost management and control and cost reporting are not adopted. Comprehensive project budgets are not monitored; instead, only estimates of contract amounts. Revisions to project budgets are not reflected separately and tracked; monthly Estimate at Completion (EAC) forecasting is not prepared or reported on as part of the monthly project progress. Risks, trends, and change orders are not being incorporated into the EACs. Budget variances are also not being tracked and reported on monthly. No evidence of a documented process or standard for establishing and updating project budgets was found. Additionally, the current ACIP yearly update is not documented anywhere and does not provide transparency about the changes that occur as the project progresses. The lack of a standard process for establishing a project baseline budget, a monthly forecast/EAC, and protocols for measuring budget variances does not provide the PMs with the framework and the tools needed to manage and control project financials effectively and/or to provide management with a clear understanding of the financial health or status of a project.
8. **Lack of Change Order Logs** – Although there is a standard process for manual change order approval that seems to be in line with industry standard, there are gaps pertaining to tracking and reporting on changes throughout the life cycle of the project. Each PM uses their own tool (mostly Excel) to track cumulative construction changes on the project. Of the 5 projects reviewed, only 2 maintained change order logs. The data collected was not consistent or up to industry standards. Additionally, categories of change orders, if they are

being tracked, are not based on industry standards or best practice in cost control (e.g., unforeseen conditions, design error or omission, uncoordinated scope, etc.). This is specifically important when the errors and omission category is typically used as a metric to address any design quality issues. On one of the completed projects where changes were tracked, the percentage of change orders seemed on the high side (close to 25% of the original contract amount), and 80% of the changes were LGB-initiated as scope changes which is considered high and indicative of inefficient scope management.

9. **PMIS Invoice Module Is Not Consistently Utilized** – The invoice approval process seems to be in line with City and Department policy. However, not all invoices are processed in the PMIS, only some projects' construction invoices/progress payments. Only 1 of the 5 projects reviewed has their pay applications processed through the PMIS. It is very important for the comprehensiveness of cost on-time reporting to ensure that all invoices (e.g., from consultants and construction contractors) are entered upon receipt in the PMIS to capture "invoiced amount." The invoiced amount is used to calculate the monthly contract cost estimates (EACs), based on which the budget variance and or contract balance remaining is established.
10. **No Quality Management Policy and Plans** – There is no Quality Management Plan documenting LGB's approach to quality throughout the project life cycle (planning, design, and construction), or an established process to document and ensure compliance to standards. LGB projects appear to follow FAA specification standards and other quality oversight requirements for landside projects. Adherence to the standards is confirmed through design reviews and approvals conducted internally by Engineering staff. However, compliance and adherence to the process could not be confirmed, as it was not documented. Since the design review process and standards are not documented, it was difficult to determine the projects' adherence to the standards, and confirmation was mainly obtained orally through interviews with PMs. The lack of a standard quality management policy or plan used consistently on all projects may prevent LGB from achieving its mission and overall client satisfaction (FAA, airlines, or travelers) by not meeting their expectations for quality and service levels, and by possibly causing rework and increased project costs.
11. **No Formal Project Performance Reviews** – Project performance evaluation typically includes an assessment of the project's performance against a set budget, schedule and scope baseline, and the project's compliance with set standards of execution. Since there is a lack of documented standard processes, as well as summary-level portfolio reporting, performance reviews do not exist in a formal setting at LGB. The lack of project performance reviews to ensure that project execution is effective and efficient increases the chance of poor performance against budget, schedule and scope, and increases the risk of non-compliance to regulatory standards. This deficiency could also cause re-work, which would impact the overall cost of projects.

Conclusion

These audit findings are concerning as ACIP projects of significant cost and scope are occurring regularly at LGB. Furthermore, these deficiencies at LGB are consistent with the findings pertaining to contract and project management from other CAO audits, including the Job Order Contracting Audit, Parks Maintenance Audit, Queen Mary Financial Activities Audit, as well as

our current review of Queen Mary bond-funded critical repair projects. CAO audits over the years have highlighted the ongoing critical need for contract and project management best practices across the City to ensure that public dollars are spent wisely and as they were intended.

LONG BEACH AIRPORT CONSTRUCTION PERFORMANCE AUDIT



By PMA Consultants

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March 11, 2021

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Executive Summary

The Long Beach City Auditor's Office engaged PMA Consultants (PMA) to provide an independent performance audit of the Long Beach Airport's (LGB) construction procurement and management practices. Generally Accepted Government Auditing Standards (GAGAS) defines a performance audit as:

“An objective, systematic examination of evidence to independently assess the performance of an organization, program, activity, or function. The purpose of a performance audit is to provide information to improve public accountability and facilitate decision-making. Performance audits encompass a wide variety of objectives, including those related to assessing program effectiveness and results; economy and efficiency; internal control; compliance with legal or other requirements; and objectives related to providing prospective analyses, guidance, or summary information.”

The purpose of this audit was to review and assess the adequacy of policies and procedures surrounding the procurement process, as well as the management and oversight of construction projects at LGB for the fiscal years (FY) 2016 through 2019. Five projects/contracts were selected for review.

When reviewing project or construction management processes and procedures, PMA usually relies on the knowledge/competency areas from the Project Management Institute's (PMI's) Project Management Body of Knowledge (PMBOK) as guidelines and standards for general construction project execution. Based on the objectives of this audit, we have identified the following eight knowledge areas that best ascertain if the project management processes are in line with industry best practices:

1. Capital Improvement Plan (CIP) Prioritization and Effectiveness
2. Risk Management
3. Project Management Information System (PMIS)
4. Cost Management
5. Change Management
6. Progress Payment
7. Procurement Process
8. Regulatory Compliance and Quality Management

PMA conducted a review of available documentation and interviewed available project team members in order to assess LGB's construction management performance and procurement process compliance with City rules and regulations. Due to a lack of LGB documentation, caused by internal control deficiencies and lack of project management best practice adoption, there was limited evidence associated with compliance with policy and process, which also contributed to the basis for audit findings. LGB stated they are in the process of creating and implementing new procedures related to project and contract

management. The Audit findings contained herein are based on a review of available documentation at the time of the audit.

Beyond reviewing construction and standards processes for efficiency and efficacy of execution, PMA attempted to assess the financial and schedule performance of five projects chosen by LGB. PMA could not determine nor judge the performance of these projects due to gaps in the data and the lack of standard and basic cost and schedule controls that are typically implemented on CIPs comparable to LGB's. Based on PMA's experience as project management/construction management practitioners, as well as our expertise providing performance audits to comparable entities, LGB appears to be lacking and behind the industry when it comes to basic project management and controls standard framework and processes.

PMA has found that even though LGB does have an Airport Capital Improvement Plan (ACIP), which identified a planned program of work every five years, there was no vision or mission statement along with the documented strategic goals and objectives that documented or helped make the prioritization process transparent, more organized, and effective. In the absence of a CIP prioritization process and a governance framework where changes to plan are monitored and reported, there is no easy way to demonstrate that LGB's CIP is being effectively managed (i.e., the right projects are being completed in alignment with the strategic objectives) and efficiently executed (i.e., the investments are maximized through operational efficiencies).

LGB does not have documented project management standards that Project Managers (PMs) were trained on and held accountable to adopt on all projects. Industry best practice is to have an official Project Delivery Framework with overarching governance and controls, that is governed by an official Project Management Office (PMO) who would implement and enforce standard project management practices. Our experience providing program management support services and performance audits for other peer agencies has proven this to be an important driver in helping large organizations successfully execute their CIP.

A PMIS – where standard reporting of leading metrics and Key Performance Indicators (KPIs) are established, and data is collected through streamlined and optimized workflows – is another success factor that enables project teams to highlight problem areas in the performance of a project with ample notice to address and correct them before they result in project failure. Although LGB does have a PMIS, called Orion, it is not fully configured to manage all aspects of a project life cycle, nor does it contain all active LGB projects. Because there is no single relational project-based database, there is no ability to mine the data to identify problems in projects early enough in the project stage to help mitigate or avoid them. Additionally, there is no ability to produce a report from one system that provides roll-up reporting of the overall CIP that identifies all the projects being managed at LGB. Although PMs have each developed their own reports to keep track of the budget and timelines of their respective projects, there is little standardization between the various reports and no consistency in how the data is gathered. Without standardized reporting at the project and program levels, it is impossible to highlight upcoming issues or

risks, and PMs are not afforded the advanced notice to address them in a timely fashion.

In this audit report, PMA provides several recommendations to help cover some of the gaps we found to help improve LGB’s construction management practices. They are listed along with the findings for each of the respective focus areas in the Findings and Recommendations section of this report.

Introduction and Background

LGB is in the process of undertaking a multi-year, multi-phase modernization plan, which includes a Phase II scope to be completed by 2021 (Pre-COVID), and which includes a new ticketing lobby, consolidated baggage claim, and checked baggage system. The current reported budget of the CIP is \$105,643,571. Construction projects are developed by LGB’s Engineering Department, which also oversees the overall project management with the support of third-party construction management consultants. LGB has recently centralized the procurement function within LGB’s Finance and Administration Bureau, and new procurement policies and procedures are in the process of being developed.

The audit focused on projects that started, were complete, or are still underway within the timeframe of FY 2016 through FY 2019. Per the City’s direction, the focus of the test work was on five projects/contracts chosen by the LGB Engineering Department, as listed below. The projects were chosen for their varying contract delivery methods, complexity, and issues previously reported.

Project Name	Estimate at Completion (EAC)
Terminal Area – Wall Beautification	\$823,084
TSA Check Baggage Inspection Station	\$12,400,504
Improvements to Taxiway C	\$22,920,000
Runway 12-30 Keel Section Rehab	\$1,766,315
Lot A Structure Elevator and Entrance	\$7,161,784

Based on the audit objectives, PMA believes that evidence provided by the LGB project team was sufficient to gain a general understanding and address the audit objectives but was limited in some areas specifically as it relates to project cost and schedule data. This lack of basic project data and documentation, caused by internal control deficiencies and lack of project management best practice adoption, provided limited evidence, which also contributed to the basis for audit findings. Gaps in evidence were cross-checked with testimonial evidence obtained during the one-on-one interviews with the project team which was used to interpret or corroborate documentary or physical information. PMA also used its professional judgment to determine the sufficiency and appropriateness of evidence taken as a whole, and in reporting the

results of the audit work.

Objective and Approach

Objective

PMA has completed an independent performance audit of LGB construction management processes. The objectives of the audit were to determine if construction projects are effectively managed during the construction phase (objectives 1-3) and determine the adequacy of policies and procedures surrounding the procurement process (objective 4) as follows:

1. To determine whether construction projects recently completed and/or are in progress, align with LGB's strategic goals.
2. To determine whether LGB has effective controls in place to ensure that construction projects are being managed appropriately:
 - Identify and mitigate the risks that may impact the projects budget and timeline,
 - Assess any information technology system and/or project management software used to manage construction projects, with a focus on whether the change order workflow is effectively integrated into the system and effectively utilized,
 - Ensure that costs are properly accounted for and supported by applicable documentation,
 - Ensure that construction projects are effective and are delivered efficiently. Ensure that vendor invoices and inspection reports are reviewed and approved in accordance with City and Department policy and general best practices, and
 - Review and evaluate the internal controls for processing and authorizing project change orders to ensure that technical specifications are accurate and that all modifications are adequately documented and supported.
3. To determine whether construction projects comply with various rules and regulations, and that completed projects have met project technical specifications.
4. To determine whether LGB's reorganization and newly created policies and procedures surrounding construction project procurement adequately describe the necessary steps to:
 - Ensure that qualified contractors are selected for each project and that there is documentation in support of the contractor selection process, and
 - Identify and assess fraud, waste, or abuse risks within the contracting process. Specifically, whether adequate controls are in place to ensure a fair and competitive bidding process absent of any conflicts of interest.

Approach

To meet the audit objectives, PMA relied on its expertise and hands-on experience managing and implementing project controls on large CIPs like LGB's. Additionally, when conducting performance audits, PMA typically utilizes PMI's standard knowledge areas as guidance when identifying criteria for best practices of construction project management. PMI's ten knowledge areas as listed in PMBOK's latest version are as follows:

1. Integration Management - The processes required to ensure that the various elements of the project are properly coordinated.
2. Scope Management - The processes required to ensure that the project includes all the work required and only the work required to complete the project successfully.
3. Time Management - The processes required to ensure the timely completion of the project.
4. Cost Management - The processes required to ensure the project is completed within the approved budget.
5. Quality Management - The processes required to ensure the project will satisfy the needs for which it was undertaken.
6. Human Resource Management - The processes required to make the most effective use of people involved with the project.
7. Communications Management - The processes required to ensure the timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project knowledge.
8. Risk Management - The processes concerned with identifying, analyzing, and responding to project risk.
9. Procurement Management - The processes required to acquire the goods and services from outside the performing organization.
10. Stakeholder Management - The processes that identify and develop relationships with the people and organizations impacted by the project, and which influence or determine how the team works.

To meet the objectives of the audit, we have narrowed down our focus to the eight knowledge areas in the table on the following page. For each of the knowledge areas, PMA developed audit performance criteria, which served as representative samples of appropriate practices, processes, and requirements. These criteria allowed for the evaluation of evidence and understanding of findings, recommendations, and conclusions included in this report.

Focus Area	High-Level Criteria/Good Practice
1. CIP Prioritization Process and Effectiveness	<p>Is the 5-year CIP executed as per plan?</p> <p>What is the process of prioritizing projects, and how do projects make it into the CIP?</p> <p>How effective is LGB in meeting its vision and strategic objectives?</p>
2. Risk Management	<p>Is there a documented Risk Management process, and is it being adopted for all projects?</p> <p>Is it sufficient to manage and mitigate risk (cost and schedule) on projects?</p>
3. Project Management Information System (PMIS)	<p>Is there a PMIS being used to manage project information?</p> <p>What kind of reporting exists to communicate project progress (budget, schedule, risk, change) on all projects?</p>
4. Cost Management	<p>Are there standard cost management procedures and comprehensive cost reporting on projects?</p>
5. Progress Payment and Quality Management	<p>Is there a formal invoice review process, and is it sufficient and auditable to validate work complete to date?</p> <p>Does backup exist to ascertain that review and approval were done?</p>
6. Change Management	<p>Is there a change order management process?</p> <p>What is the nature of change orders on projects, and are they within industry standards?</p> <p>Are there checks and balances within the organization?</p>
7. Regulatory Compliance/Quality Management	<p>Is there a quality management plan, and is it being adopted on all projects?</p> <p>Is LGB getting value for money spent?</p>
8. Procurement Process	<p>Is the City's public procurement process being followed?</p> <p>Is there transparency in the process?</p>

Findings and Recommendations

The audit was performed with available information provided by LGB. PMA believes that the evidence obtained from the review of documentation provided from the LGB project team and the one-on-one interviews provide a reasonable basis for the audit findings at this time.

By developing an interview questionnaire (Appendix B) that served as a representative cross sampling of industry best practices and subsequently auditing project documentation, and obtaining testimony through interviews, PMA is objectively able to demonstrate our findings associated with construction management performance. All findings are documented herein.

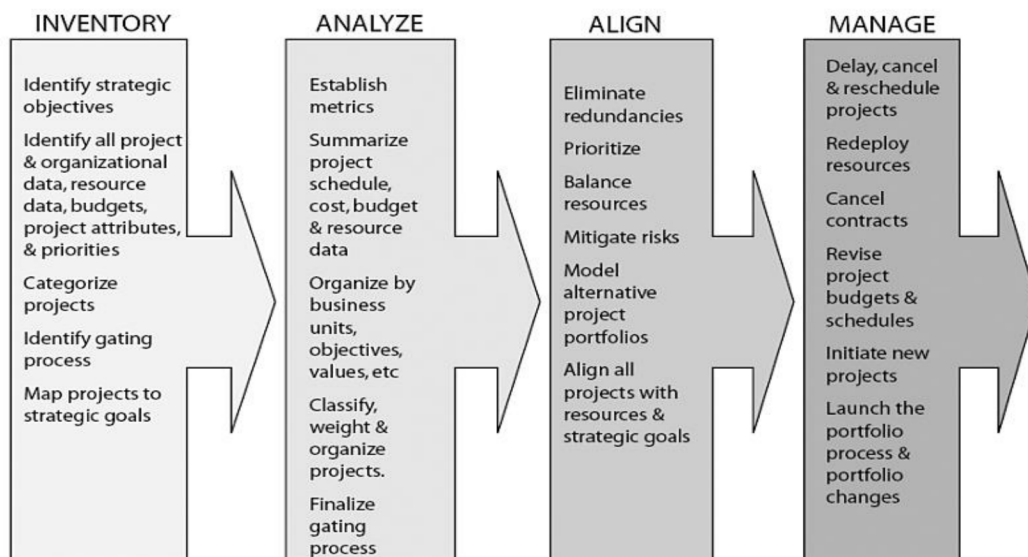
CIP PRIORITIZATION PROCESS AND EFFECTIVENESS

PMBOK defines Project Portfolio Management as,

“a set of interrelated techniques and/or activities, undertaken to maximize project investment decisions. This includes project demand management, project ranking/prioritization, portfolio balancing, enterprise resource planning, and master scheduling.”

Project prioritization is crucial to ensure that the right work is being done to stay aligned with the entity’s strategic objective. As a best practice, it is better to prioritize defining all management components from the strategic ones to the operational ones. This means first defining the organization’s vision and mission statements and then the strategic objectives and the program goals and project scopes. This can help make the prioritization process more organized and logical. Below is a sample of a proven and repeatable process for establishing and continuously improving project portfolio management.

Note: A mission statement focuses on today and what an organization does to achieve it. It is the “What”



an organization does and whom does it serve and what it will do to achieve it (Strategic Objectives). A vision statement focuses on tomorrow and what an organization wants to ultimately become. It also focuses on the “Why”. While companies commonly use mission and vision statements interchangeably, it’s important to have both as they are both vital in directing goals.

1. LACK OF CLEAR PRIORITIZATION PROCESS

Findings:

PMA did not find a vision/mission statement document for LGB, one that clearly describes the strategic objectives of the airport and how the listing of the projects in the CIP aligns with and supports those objectives. There is also no specific process with effective scoring and screening in place to identify and plan projects and reprioritize based on strategic objectives. Currently, while LGB’s Engineering Division usually prepares a Pavement Maintenance and Management System (PMMS) plan – a study that identifies and prioritizes the need of airfield projects based on the predicted condition of the pavement of LGB airfield – PMA did not find an equivalent prioritization process for terminal buildings and other airport projects.

Risk:

Without a vision/mission document that includes and summarizing strategic goals and objectives and having metrics to measure how LGB plans on meeting those objectives, there is not a clear way for LGB’s stakeholders to know if the right projects are being identified and completed in support of the vision/mission, nor how effectively they are meeting those objectives.

Recommendation:

PMA recommends LGB develops:

- A) an overarching vision/mission statement (the Why and the What) which would also identify clear goals and objectives (the How’s), and
- B) a transparent prioritization process, one based on criteria relevant to LGB (e.g., highest value, risk-prone, politically sensitive, poor performance, etc.), that supports their strategic objectives listed in the mission statement

2. NO TRACKING OF CHANGES TO THE PLAN

Findings:

Based on the Council-approved Airfield Geometry Study, LGB prepares a 5-year Airport Capital Improvement Plan (ACIP) that is submitted to the Federal Aviation Administration (FAA), listing all the anticipated projects and their funding sources. The ACIP is updated yearly; however, there is no evidence of a formal mechanism for change management with respect to the annual plan. Currently, there is no way of identifying projects that were not included in the original plan or how they have

changed.

Risk:

Not having a transparent change management process makes it difficult to monitor true project-level performance or progress against the plan through the 5-year CIP. Best practice includes the ability to revise the annual plan based on FAA approval, allowing for clarity into project performance while maintaining a change log to account for modifications.

Recommendation:

PMA recommends LGB to develop and implement a transparent process to allow for baselining the 5-year CIP and monitoring changes to approved projects listings, as well as tracking of budgets and timelines in a summary format. This will help confirm the effectiveness of LGB's execution of its CIP to stay in line with their mission.

3. NEED FOR A PMO

Findings:

Within LGB's organization, there is not a Project Management Office (PMO) that operates as a centralized function that ensures construction projects stay in alignment with LGB's mission and strategic objectives and facilitates and enforces the delivery of those projects in adherence to a standard structure and processes. Currently, PMs within the Engineering Department rely on their own level of experience and use different tools and methodologies for managing projects. There are no project management standard processes documented, let alone adhered to, nor compliance to those standards enforced. This typically is the function of a PMO.

Risk:

Among organizations surveyed in the recent PMI Pulse of the Profession survey that have a PMO, half report having an enterprise-wide project management office (EPMO). Those that align their EPMO to strategy reported that 38% more projects meet original goals and business intent, and that 33% fewer projects are deemed failures. Typical responsibilities of a PMO include:

- Facilitating project prioritization and authorization with a focus on alignment to vision/mission/strategy.
- Coordinating communications - including reporting.
- Identifying and helping develop methodologies, best practices, and standards.
- Benefit realization process and measurements.
- Managing policies, procedures, and templates - ensuring consistency/standardization.
- Coaching, mentoring, and training.
- Monitoring compliance with standards through periodic project performance audits.

Recommendation:

PMA recommends LGB conducts a brainstorming session internally with all its division leads, to establish the need and evaluate the type of PMO and organizational structure required to support project delivery at LGB. Based on the outcome of the first session, a follow-on workshop with an identified PMO lead is recommended, to develop the PMO mission statement and charter, as well as identify its goals and objectives. The established PMO should fulfill the intent of increasing efficiency and accountability. A description of potential types of PMO structures is included in Appendix C.

RISK MANAGEMENT

PMBOK defines risk as an uncertain event or condition, if it occurs, has a positive or negative effect on a project's objective. The risk management process deals with planning the risk management strategy; identifying risks; analyzing the risks (both qualitative and quantitative); planning responses to the risks; and monitoring and controlling risks. One of the key documents used to help manage risk for the project is the risk register. The register is used to track all risks and associated data for the project. Those risks are usually analyzed and ranked based on a qualitative or quantitative methodology. Qualitative risk analysis tends to be more subjective. The goal is to list the likelihood of the risk occurrence, and the severity should the risk occur.

Typical Risk	Qualitative		
	Likelihood (L)	Severity (S)	Risk Priority $P = L * S$

Quantitative risk analysis, on the other hand, is objective because it uses a more scientific data-driven approach and identifies impact (value) in monetary and schedule terms.

Typical Risk	Quantitative					Risk Owner	Action/Response
	Likelihood (%)	Impact		Expected Value			
		Cost Impact	Time Impact (Weeks)	Cost	Time		

When developing the response to risk, the project manager should create an action plan that lists what to do if the risk happens and how to monitor for events that might trigger the risk. This helps to identify risk occurrence as early as possible, as well as mitigate risks on projects.

While risks deal with events that potentially could occur and impact the project, issues are events that have already occurred. Since issues have already occurred, the project manager must decide how to deal with them immediately. Issues should be tracked separately than risks, usually on an issue log. The issue log should list the issue, issue owner, action plan for dealing with the issue, and timeframe for action. Best practice is to identify if an issue was listed on the risk register so that project managers can determine

what percentage of issues were previously identified. For those issues that were not identified as risks, project managers should try to analyze why they were not identified as risks. This will help better manage projects in the future.

4. NO DOCUMENTED RISK MANAGEMENT PROCESSES

Findings:

Currently, there are no documented risk management processes or standards being used by all PMs consistently. PMs typically rely on progress meetings to discuss risks and issues. There also seems to be a synonymous use of issues and risks. Risk registers are not standardized or developed for all projects. For the five projects reviewed, only one maintained a risk register, and it appeared to be a qualitative analysis, which lists the likelihood and consequences of a risk occurrence.

Taxiway C Risk Register

Date	FB #	CO #	Phase	Description	Detailed	Plan Sheets	Cost?	Cost Estimate
12/16/2019			Mobilization	Lakewood Driveway	- Install #5/#6 dowels @ 24" spacing. Use 24" length with 6" non-epoxy embedment into existing PCC bus pad - Use 3250 psi concrete - Widen driveway opening by shifting Northern section 5' north for safety		No	

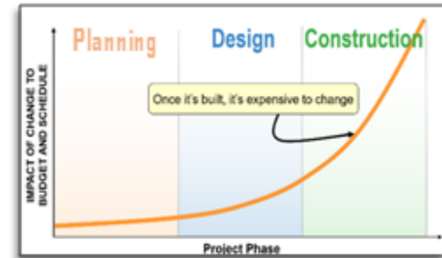
Quantitative analysis, which uses historical data to understand the risk impact, was not being documented or discussed. Cost and schedule impacts are also not being reported or incorporated into monthly project progress updates.

Long Beach Airport Phase 2 Program - Risk Register - Meeting Items - DRAFT January 27, 2019

Status	Risk ID	Project Name & No.	Category	Department	Risk Statement	Notes/Actions	Owner Name	Risk Assessment				Risk Response	Notes
								Risk Probability	Cost Impact	Time Impact	Risk Value		
Active	1	1A-CBIS	Construction	General Contractor	Weather impact to schedule	Monitor weather delays and recovery plans		Medium	Low	Low	Medium	Monitor weekly and 3 week schedule	Contract dates -
Active	2	2-Ticketing	Construction	General Contractor	Walkway/Overhead canopy between the TSA check point and Historical Building. Night work.	Work will be done at night to minimize impacts to Airport operation and the passengers. Temporary scaffold walkway will be installed to provide a covered walkway corridor to the SSCP.		Medium	Medium	Low	Medium	Contractor ASR phasing plan addressed risk for egress to the SSCP entrance. Will be monitored daily from SB Safety/Field CM team.	
Active	3	2-Ticketing	Construction	General Contractor	Electrical and utilities on top of the breezeway canopy. Still investigating for take down. Night work item	The process of taking the material down is key. Scaffolding and weather resistant canopy for passenger protection will be needed once the existing canopy is removed.		Medium	Medium	Medium	Medium	Night work item - Scaffold canopy will be installed for safe walkway passage. Daily SB Safety/Field CM team	
Active	4	1B-New Baggage Claim	Construction	General Contractor/CM	AOA entrance for materials. High management area.	GC will monitor daily deliveries with the approved time periods		Medium	Low	Medium	Medium	See no. 8	
Active	5	1A, 1B, & 2	Construction	General Contractor	One door open at TSA entrance at Phase 3 of Project 1, 1B, 2. Passenger back-up could occur.	Oversee and observe. Be more flexible if this becomes a major issue. Determine what is going to be built and what isn't. What is the new scope of the project.		Medium	Medium	Medium	Medium	Operations to monitor and notify Airport Project team	
Active	6	ALL	Contract	LGB	What's in and out of scope.			Low	Low	Low	Low	GMP to LGB City Council in February. Scope defined	LGB team can advise stakeholders.

Risk:

Project risk management is a well-accepted core project management knowledge area and industry best practice. The impact of not identifying and documenting risks, starting early in the project life cycle, greatly increases the likelihood of project budget and schedule overruns. While qualitative analysis can be good, it is more subjective in nature and should be used in conjunction with quantitative analysis, which is more objective, to get a better understanding of the risks a project faces and to measure impact in terms of cost and time.



Recommendation:

PMA recommends implementing a department-wide risk management procedure that is scoped and addresses project size and complexity. Below is an example of some chapters that may be included in a typical Risk Management Guidance Manual:

1. Introduction
 - 1.1 Objectives
 - 1.2 Definitions
2. Risk and Program Management
 - 2.1 Overview
 - 2.2 Risk Assessment Guidelines
 - 2.3 Roles & Responsibilities
3. Risk Assessment Process
 - 3.1 Overview
 - 3.2 Risk Planning
 - 3.3 Risk Identification and Analysis
 - 3.4 Risk Response
 - 3.5 Supplemental Treatment Plan
 - 3.6 Quantitative Risk Assessment Tools
4. Managing the Plan (Monitoring and Control)
 - 4.1 Introduction
 - 4.2 Using the Plan for Decision-Making & Keeping Management Informed
 - 4.3 Manage & Update the Risk Register
 - 4.4 Monitor the "Watch List" - list where high priority risks are tracked.

5. PROJECT CONTINGENCY NOT DRIVEN BY RISK

According to PMI, "Contingency planning involves defining action steps to be taken if an identified risk event should occur". Best practice prescribes contingency planning as typically an outgrowth of the

risk assessment process. PMs typically use project contingency to respond to the “known unknowns” (PMI, 2013), which are risks in the risk register that have planned responses. Developing and establishing a contingency reserve is useful for communicating risks, addressing them, and improving the predictability of a project's outcome. The contingency reserve is an allocation of time and/or money to address identified risks. Many quantitative analysis tools exist to calculate contingency reserve, including the Monte Carlo method. The Monte Carlo method works by running projected schedule and cost data over thousands of simulations of a project and reporting the most probable results. This approach is useful to provide a more realistic estimate of budget and schedule completion based on incorporated project risks.

Findings:

No evidence could be found that risk impacts or mitigating activities are incorporated into schedule or project cost (via a projected EAC). Additionally, contingency setting is not tied to project risk. LGB has used a historically based percentage of 25% for vertical projects (i.e., construction or remodeling of any building, structure, or other improvement that is predominantly vertical) and 10-15% for horizontal projects (heavy civil construction such as taxiways, airfields, and other structural projects) as a contingency, regardless of the complexity, size, or amount of risk identified on the project. Due to the lack of evidence provided, we were not able to determine if the historical percentage was sufficient to cover all risks for all projects. While the use of a standard percentage for contingency may work for smaller, more repetitive projects, it is not ideal for larger, more complex projects. Best practice for larger, more complex projects is to base contingency of the project on the risks for that given project. This helps provide a better forecast for the project as it considers the unique risks that the project may face.

Risk:

Developing and establishing a contingency disconnected from the risk assessment may increase the probability of a project cost and schedule being derailed. Having a project cost contingency connected to a valuable risk response strategy helps ensure the project against debilitating time and monetary costs. This is especially true of large and risky projects.

Recommendation:

PMA recommends LGB implement a process for large and/or risky projects that includes risk and contingency assessment using the Monte Carlo method (described above in this section), where ranges are determined using probability distributions. It is further recommended that this approach to risk also be developed for scheduling, particularly for large or risky projects.

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

PMBOK defines a PMIS as an information system consisting of the tools and techniques used to gather,

integrate, and disseminate the outputs of project management processes. Recent industry studies have shown that there exists a consensus between PMs that an effective PMIS is crucial to meeting their project objectives. However, they also showed that PMs have concerns about how the software is implemented and deployed. Some of the benefits of using a PMIS are speed, capacity, efficiency, and accuracy. Another key benefit of a centralized PMIS is that once all data is collected, various reports can be configured and run to help manage the project.

Presently, LGB uses the City of Long Beach financial and accounting system MUNIS to track project expenses and actual costs. Additionally, LGB is in the process of having a PMIS configured (Orion) to manage their projects budget and commitments and tracking changes to both in the system.

6. CURRENT PMIS, ORION, IS NOT FULLY CONFIGURED OR USED CONSISTENTLY

Findings:

Orion, which was a Public Works initiated system, is not fully configured, nor is it comprehensively used to manage project life cycle cost information. Additionally, not all projects are being managed in Orion. For the two of the five projects reviewed, only the construction phase is being managed in Orion, and not comprehensively. Although budgets are entered in Orion, they do not seem to be updated in the system on a regular basis to coincide with the yearly ACIP update. We also found that commitments are being consistently entered in Orion; however, change orders are not being managed in the system. There are some issues with data integrity and accuracy, but they appear to be caused by the inconsistent use of the system. As noted previously in this report, each group has developed their own reporting system to report on the status of their projects. There is little standardization between the various reports and no consistency between how the data is gathered. There are no project delivery reports that LGB management can use to compare ACIP budgeted, actual and forecasted costs, schedule, and quality metrics, nor are there any summary management “dashboard” reports.

Risk:

Not having all the project cost information in one central location does not provide a complete comprehensive picture of the project cost status, nor does it identify a clear picture of the project cost performance. Not being able to account for the project cost comprehensively in one location and monitor the project cost throughout the life cycle of the project hinders the PM’s ability to control cost on a project. Additionally, the inconsistent use of Orion does not afford management the ability to manage the approved ACIP or get a sense on a monthly basis, of the progress on their portfolio of projects. Not being able to have that transparency to monitor the performance of the ACIP creates a risk for LGB’s not meeting their overall strategic objectives.

Recommendation:

PMA recommends that at a minimum, all the cost modules within Orion be configured and deployed to manage:

- Budget and budget revisions
- Funding authorization
- Work Authorization
- Commitments
- Forecasts/Estimate at Completion (EAC)
- Invoices and Pay applications
- Paid (Actuals) – integration nightly from MUNIS, the City’s financial system
- Change Orders throughout the project life cycle

Part of this recommendation includes that all projects use Orion consistently throughout the project life cycle. This will enable a roll-up summary cost report of all active CIP projects. Also, standard and best practice cost reporting templates should be developed and rolled out to help PMs manage and control their cost and changes on their projects, and provide management with the confidence that projects are being managed to the established and approved budgets. PMA also recommends using dashboard reports as an effective and efficient tool for management to keep abreast of their ACIP performance progress.

COST MANAGEMENT

The project management triangle is a model of the constraints of project management. It consists of three sides – Cost, Schedule, and Scope – that constrain the quality of a project. In order to effectively manage the project, a PM must work to balance these three elements. Cost Management includes the processes that are required to maintain financial control of projects. This is broken down into the following functions: Cost Estimating, Budgeting, Monitoring and Controlling (which includes analyzing, reporting, forecasting, and taking the necessary corrective actions). Cost Estimating is the process of assembling and predicting the costs of a project over its life cycle. Cost Budgeting is the establishing of a budget against which the performance of the project can be measured and managed. The Cost Monitoring and Controlling process starts with the project cost baseline and continues through the rest of the project. It helps to identify deviation to the budget and possible corrective action to minimize threats or capitalize on opportunities. Cost Forecasting is the process of developing the future trends along with the assessment of probabilities, uncertainties, and inflation that could occur during the project.

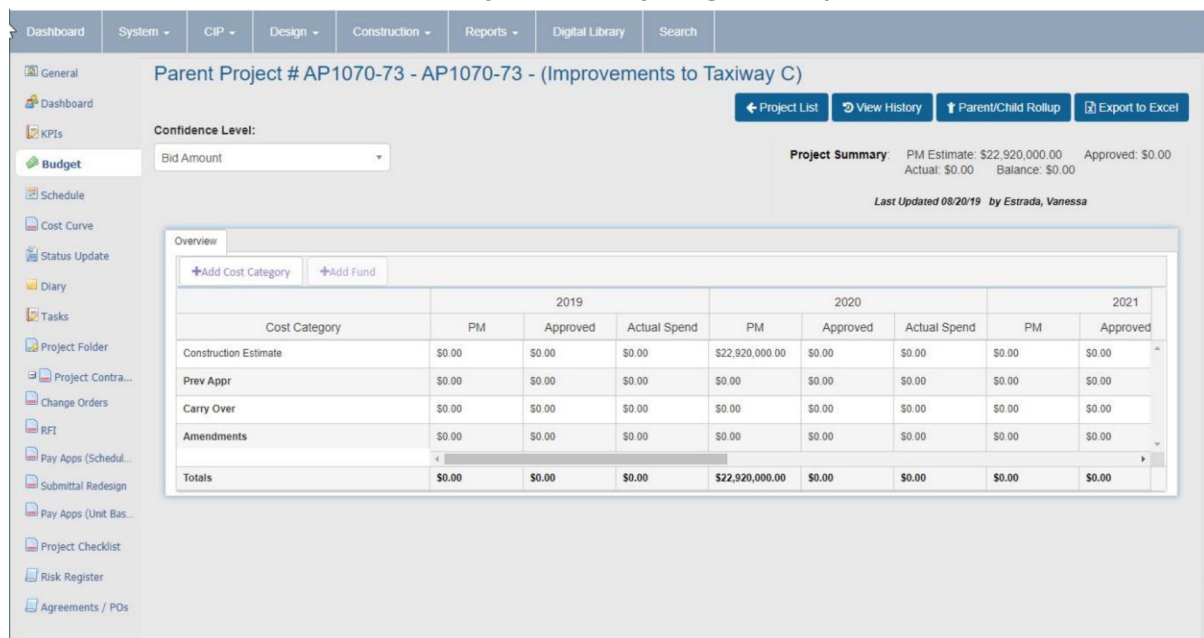
7. NO DEFINED STANDARDS FOR COST MANAGEMENT AND REPORTING

Findings:

Reasonable practices in cost management and control and cost reporting are not implemented or

being adopted. To start, a standard nomenclature relating to budget and budget management, that is PMBOK or industry-based, is missing. Comprehensive project budgets are not tracked and monitored, instead only estimates of contract amounts. Please see the screenshot, on the following page, of a budget report from Orion where “PM Estimate” is used to denote the contract budget amount.

Screen Shot from Orion of budget tab report



Parent Project # AP1070-73 - AP1070-73 - (Improvements to Taxiway C)

Confidence Level: Bid Amount

Project Summary: PM Estimate: \$22,920,000.00 Approved: \$0.00
 Actual: \$0.00 Balance: \$0.00

Last Updated 08/20/19 by Estrada, Vanessa

Cost Category	2019			2020			2021	
	PM	Approved	Actual Spend	PM	Approved	Actual Spend	PM	Approved
Construction Estimate	\$0.00	\$0.00	\$0.00	\$22,920,000.00	\$0.00	\$0.00	\$0.00	\$0.00
Prev Appr	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Carry Over	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Amendments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Totals	\$0.00	\$0.00	\$0.00	\$22,920,000.00	\$0.00	\$0.00	\$0.00	\$0.00

Revisions to project budgets are not reflected separately and tracked; monthly forecasting or Estimate at Completions (EACs) are not prepared or reported on as part of the monthly project progress. Risks, trends, and change orders are not being incorporated into the EACs. Budget variances are also not being tracked and reported on monthly. PMA found no evidence or documented process or standard for establishing and updating project budgets. Additionally, the current ACIP yearly update is not documented anywhere and does not provide transparency about the changes that occur as the

project progresses. There is no comprehensive summary cost report roll up that monitors against ACIPs yearly performance because cost is not being managed in one central location.

A standard budget and EAC report would provide the following information for each project:

	Baseline Budget [A]	Approved Changes [B]	Current Budget [C] = A+B	Trends (Risks & Potential Changes) [D]	Estimate At Completion (EAC) [E] = C+D	Budget Variance [F] = C-E
Design						
Construction						
CM						
Contingency						
Project total						

Risk:

Not having a standard process for establishing a project baseline budget, a monthly forecast/EAC, and measuring budget variances does not provide the PMs the framework and the tools needed to manage and control project financials effectively and/or provide management the transparency needed on the financial health or status of a project. Not having a monthly forecast that incorporates and reports on potential change orders and trends and their impact to the overall project budget deprives the PM of the ability to proactively manage their project and take corrective actions in a timely manner to avoid budget overruns on their projects. This also eliminates the transparency for management to see the status of the whole CIP and make timely and accurate decisions based upon the most current overall CIP cost data.

Recommendation:

PMA recommends the following changes be made:

- A standardized nomenclature for budget management that is representative of industry standards be adopted.
- Establishing a standard process around instituting a budget baseline at an agreed upon stage of the project life cycle along with budget updating and documenting the process along with guidelines.
- A monthly EAC (aligned with industry standard) be prepared by the PMs and budget variance reporting on a monthly basis to be included in the project progress report.
- Training be provided to all LGB PMs and CMs on the new standard process and guidelines, and if needed, on the fundamentals of cost management and control.

CHANGE MANAGEMENT

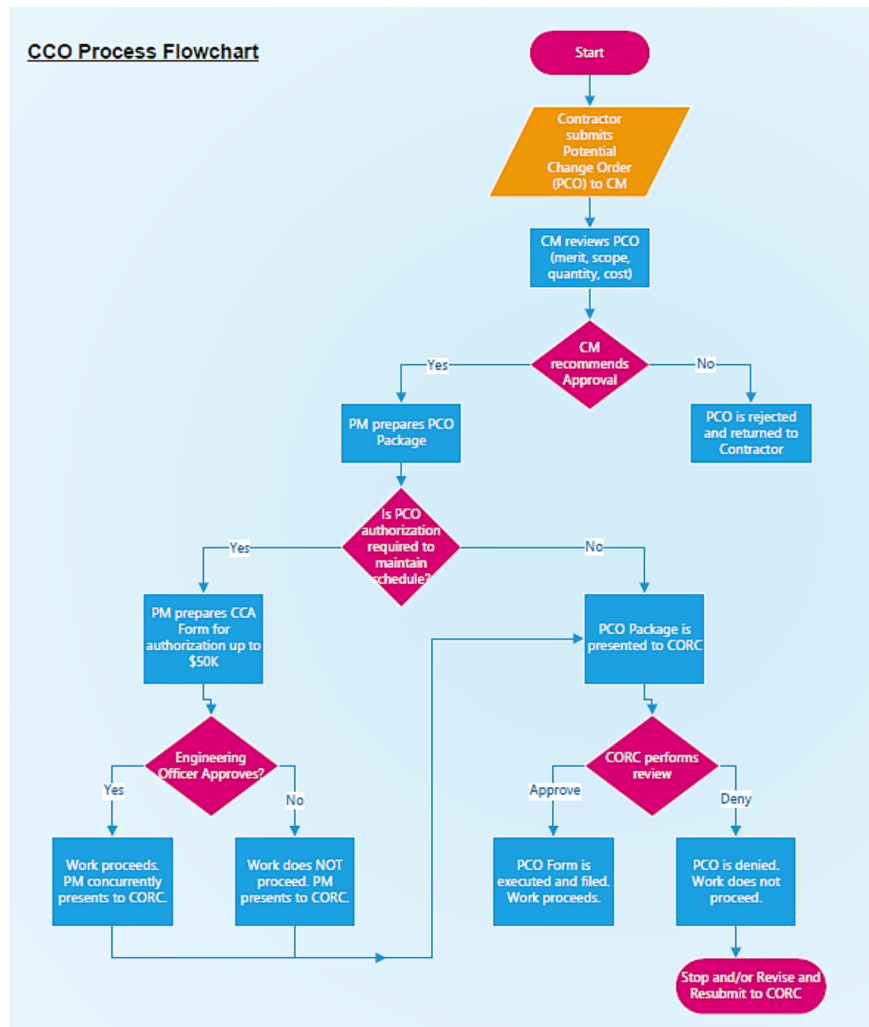
Change Management refers to the tools and processes used to manage change within a project or a

program. Change Management starts with the budget that is set forth for the projects and seeks to track all the events that caused the project to change scope, schedule, or cost.

8. LACK OF CHANGE ORDER LOGS

Findings:

Although there is a standard process for manual change order approval that seems to be in line with industry standard (see LGB’s Construction Change Order (CCO) Workflow process below), there is a gap when it comes to tracking and reporting on changes throughout the life cycle of the project.



Each PM uses their own tool (mostly Excel) to track cumulative construction changes on the project. Of the five projects reviewed, only two maintained change order logs, related only to the construction contracts, and the data collected was not consistent or up to industry standards. Additionally, categories of change orders, if they are being tracked, are not based on industry standards or best practice in cost control (e.g., unforeseen conditions, designer error or omission, uncoordinated scope,

etc.) This is specifically important when the errors and omission category is typically used as a metric to address any design quality issues. On one of the completed projects where changes were tracked in an Excel spreadsheet (pre-Orion), the percentage of change orders seemed on the high side (close to 25% of the original contract amount), and 80% of the changes were LGB initiated as scope changes which is considered high and indicative of inefficient scope management.

None of the changes we found seem to be incorporated into a monthly forecast since they are not being tracked. Additionally, Orion is not currently configured to manage all project changes and amendments (only construction change orders) nor any of the metrics associated with change management performance.

Screen shot of Change Order Log report from Orion



CITY OF LONG BEACH		CHANGE ORDER LOG REPORT							
CO Number	CO Title	Status	Days Granted	SC Date	FC Date	BOW Approval Date	Replenished Allowance	Change In Contract Price	New Contract Price

A change management tool should capture not only the progression of a change order from RFI through approval but also important metrics about a project or individual’s performance within said categories (i.e., timeline associated with review and approval, negotiations, etc.)

At the time of the audit, PMA learned that a new process is being implemented for change order management with a newly formed Change Order Committee. The Change Order Committee is to provide oversight on the new process, but as of the writing of this report, no documentation of the process has been completed. Currently, the oversight is being addressed during the Engineering Division’s monthly meeting.

Risk:

Not being able to track and monitor changes on a project or reporting on the impact of the changes through the EAC does not provide the PMs the transparency they need to manage change proactively, and ultimately reduce liability and risk on a project. Additionally, a good measure of effective contract management, scope management, and even quality design is the percentage of change orders to total contract budget. The absence of accurate record-keeping reduces the level of accountability and dilutes the measure of an organization’s risk as it relates to change orders.

Recommendation:

PMA recommends, at a minimum, that a standard change management process be developed and implemented on all projects. All projects should maintain, at the very least, a change order log that tracks the submission and processing of change orders and amendments throughout the project life

cycle. The format for the change order log should be standard across all projects and consistent with industry best practice. At a minimum, it should contain the following:

1. Referenced RFI
2. Referenced CORC or CRC (or potential CO)
3. Description of Change
4. Justification of Change
5. Category (Error and Omission, Unforeseen conditions, Owner requested change, etc.)
6. Submitted \$, date
7. Negotiated \$, date
8. Final \$
9. Status (pending vs. approved)
10. Days outstanding

PMA also recommends that LGB uses the PMIS to manage all contracts and corresponding changes on all projects. Having the change cost information in the same centralized place as budgets and commitment is very important to maintaining transparency, pushing accountability to the project managers, and controlling cost in general.

The governance that is in place during the monthly meeting could be implemented via a workflow approval in Orion. That approval could be based on CO amount threshold and sign offs will be required and automated in the system accordingly.

PROGRESS PAYMENT

Progress billings are a construction contractor's invoice used to bill incrementally as the project is in progress for work that has been verified to be completed. Payments should be based on a verified percentage of project/task completion and should include:

- The total amount of the contract that is due for the project.
- Any approved changes as well as the adjusted amount owed.
- The total amount billed up to that point.
- The current completion percentage for the project.
- The remaining balance owed at the completion of the project.

Typically, the percentage of work complete is verified by an inspector who visually checks the work onsite for accurate quantity surveying, then reviewed by the PM for contract adherence of accurate wages and billing rates, and allocation of funding. In municipality cases, specific cost codes related to "type of work" are associated to the amount paid. It is best practice to enter invoices/progress payments as soon as they are received into a PMIS so that the "Actuals" based on approved invoiced amounts are incorporated into the contract management reports on a monthly basis and the status of remaining budget/funds is known. In many cases, contractors are provided direct access to enter their progress payment directly into the

PMIS to streamline the whole approval and review process and ensure that expenditures are captured and reported on immediately.

9. INVOICE MODULE OF ORION IS NOT BEING CONSISTENTLY UTILIZED

Findings:

The invoice approval process at LGB is as follows:

1. Invoices are reviewed by inspectors who oversee the work in the field and PMs for quantities and percent completion for each of the project scope line items.
2. The PM approves and verifies pencil sheets for work completed, completes the data on the approved stamp, which ensures the right cost code is allocated for proper payment.
3. The PM then emails the invoice to Public Works where it is red stamped.

The process seems to be in line with the City and Department policy. Even though no documentation was found that contained the process and approval threshold for progress payments, invoices are being reviewed and work, quantities, and rates confirmed by inspectors, third party construction managers, and LGB project managers as per the City's and Department's guidelines and procedures. However, none of the sample invoices reviewed had the standard stamp identifying Vendor#, PO#, and Sub-object code filled out.

Additionally, not all invoices are processed in the PMIS, only some projects construction invoices/progress payments. Only one project of the five reviewed has their pay apps processed through Orion.

Risk:

It is very important for the comprehensiveness of cost on-time reporting that all invoices (e.g., consultants and construction contractors) are entered upon receipt in the PMIS to capture "invoiced amount". The invoiced amount is used to calculate the monthly contract EAC based on which the budget variance and or contract balance remaining is established. Although the "Paid to Date" amount is pulled from MUNIS on a daily basis, that amount typically includes a gap in the time it takes to process those invoices and pay the amount out to the vendor. That gap may present issues in the calculation of accruals, as well as in the accurate reporting of progress as a percent complete as well as the calculation of cash flow.

Recommendation:

PMA recommends that all invoices for consultants and contractors are processed upon receipt in Orion to address this gap in Actuals. Additionally, a comprehensive review of how Actuals are being integrated into Orion from MUNIS and how they are used in the cost reports and project forecasts as opposed to invoiced should be completed.

REGULATORY COMPLIANCE AND QUALITY MANAGEMENT

Regulatory compliance includes conforming to a rule, such as a specification, policy or established standards. Due to the increasing number of regulations and need for operational transparency, organizations adopt the use of consolidated sets of compliance controls to ensure that all necessary governance requirements can be met without the unnecessary duplication of effort and activity from resources.

Such established regulations could be specialty specs or procedures that typically, governmental entities must adhere to. To ensure adherence to such specifications and policies/standards, large organizations similar to LGB have a documented quality management policy establishing a minimum requirement for quality assurance throughout the project lifecycle, which may include minimum design drawing content requirements and checklists, value engineering, and constructability reviews requirements during design, and a standard QA/QC plan by the CM during construction.

Performance reviews refers to an independent examination of a program, function, operation, or the management systems and procedures to assess whether the entity is achieving economy, efficiency, and effectiveness in the utilization of available resources. This is typically conducted in large organizations, by the PMO, to ensure process improvements and the streamlining of project execution.

PMBOK defines the Quality Management function as the process of ensuring that all aspects of a project and its results fully meet the needs and expectations of the project's client, participants, and shareholders — both internal (i.e., relating to the project's system of development) and external (i.e., relating to the project's performance or service). The primary components of the quality management function are:

- Overall Quality Philosophy - The involvement of all project participants in ensuring that project goals, requirements, and performance standards follow the expectations of both the client and the project team.
- Quality Assurance (QA)/Conformance to Requirements - The managerial processes and procedures necessary to ensure that the organization, design, objectives, and resources are in line to conform to the requirements of the project team and stakeholders and all the relevant legal, regulatory, and standards requirements.
- Quality Control (QC)/Conformance to Specifications - The technical processes that examine, analyze, and report the project's progress and conformance to the specifications.

10. NO QUALITY MANAGEMENT POLICY AND PLANS

Findings:

PMA did not find a Quality Management Plan documenting LGB's approach to quality throughout the project life cycle (planning, design, and construction). Projects at LGB appear to follow FAA specification standards and other quality oversight requirements typically issued via an FAA Advisory Circular for airfield or FAA funded projects and the Greenbook (which includes standard specifications

for public works construction) for landside projects. Adherence to the standards is confirmed through design reviews and approvals conducted internally by LGB's Engineering staff. However, PMA could not confirm compliance and adherence to the process as it was not documented. Since the design review process and standards are not documented, it was hard to establish if the projects reviewed adhered to the standard, and confirmation was mainly obtained orally through interviews with PMs.

Additionally, although design and peer reviews are completed in house, they seem to be a judgment call based on the design reviewer's experience and expertise. There is no design quality management plan that references FAA and Greenbook standards and includes guidelines and/or checklists for review process or design content requirements at major design completion milestones. There was some evidence of a high number of RFIs on one of the five projects reviewed related to the cost of construction. This could point to a lack of design quality. PMA did review quality control plans for two of the five projects reviewed, but those seemed to be limited to the construction phase of the project. Additionally, there is no policy to ensure all projects follow a standard process of having a quality management plan throughout the full project life-cycle, nor an established process to document and ensure adherence or compliance.

Risk:

Not having a standard quality management policy or plan consistently on all projects may prevent LGB from achieving its mission and overall client satisfaction, whether it be the airlines, FAA, or the travelers, by not meeting their expectations for standards and services and may cause rework hence increasing the overall budget of projects.

Recommendation:

PMA recommends establishing a quality management policy to include a quality management manual covering the life cycle of a project at LGB. The quality management plan template could be flexible, and project size relative and could include:

1. Standard template for a quality management plan covering all phases of a project along with corrective or mitigating action if quality does not meet the established standards.
2. Design quality manual formalizing design reviews. This would include design content requirements at the standard design completion milestones (30%, 60%, and 90%) and checklists for conducting design reviews at these milestones.
3. Minimum requirements for a QA/QC plan to be conformed to by third party CMs which covers the construction phase of the project.

11. NO FORMAL PROJECT PERFORMANCE REVIEWS

Findings:

There is no current practice for project performance reviews. Project performance evaluation typically includes an assessment of how the project is performing against a set budget, schedule, and scope

baseline as well as if the project is in compliance with the set standards of execution. Since there is a lack of documented standard processes, as well as summary level portfolio reporting, it's only natural that performance reviews do not exist in a formal setting.

Risk:

The non-existence of project performance reviews to ensure that project execution is effective and efficient increases the chances of poor performance against budget, schedule, and scope and increases the risk of LGB of non-compliance to regulatory standards. This also causes re-work, which would impact the overall cost of projects.

Recommendation:

PMA recommends developing and implementing a formal performance review process at key stages of project execution (please see the figure on the following page), to include processes, tools, roles, and responsibilities. These gateway reviews should also address the status/performance of the project related to budget, schedule, scope, and risk.



PROCUREMENT PROCESS

The procurement process at LGB is well documented and follows the City's procurement procedures. PMA reviewed LGB's procurement guidelines and procedures for preparing vendor instructions and managing the flow of information to vendors; soliciting vendor proposals and bids; and evaluating vendor proposals. We also reviewed LGB's procedures for interviewing the shortlists as well as the criteria established for rating.

LGB follows a documented City of Long Beach procurement process, and the projects reviewed appear to adhere to the City's Public Works Department procurement process and procedures intended to ensure fair and open competition. The use of Public Works Annual contracts or Job Order Contracts (JOCs) is prevalent mostly for cost and time efficiencies. LGB seems to benefit from the economy of scale Public Works acquires through these types of contracts. For three of the five projects reviewed evidence suggests LGB followed procedures intended to encourage competition, including:

- Advertising contracting opportunities on PlanetBids.

- Preparing written solicitation documents that describe the scope clearly.
- Providing opportunities for potential vendors to ask questions and obtain clarification.
- Establishing procedures for evaluating solicitation responses.

The other two projects used a JOC and yearly Public Works existing contracts.

No recommendations are suggested for this process.

APPENDICES

The appendices include the following items:

- A. List of projects Audited
- B. Interview Questionnaire (Best Practice/Criteria)
- C. Types and Structures of a PMO

Project Name	Budget	PM/POC	Status
Terminal Area – Wall Beautification	\$823,084	Hugo Liu	Completed
TSA Check Baggage Inspection Station	\$12,400,504	Stephan Lum	In construction
Improvements to Taxiway C	\$22,920,000	Vanessa Estrada	In construction
Runway 12-30 Keel Section Rehab	\$1,766,315	Henry Monfiero	Completed
Lot A Structure Elevator and Entrance	\$7,161,784	Stephanie Gunawan-Piraner	Completed

Topic/Focus Area	Category	Best Practices/Criteria
PMIS	Standard Framework	Is there a standard project life-cycle delivery framework for construction projects? Are there approval gateways incorporated in the PMIS?
	Budgets and costs	Is there a standard WBS structure for the financial information? Are all projects cost information tracked in PMIS? How and at which point is a project initiated and tracked in the system? Are commitments tracked in the PMIS? Is contract execution tracked in PMIS? Are invoices and contractor pay apps tracked and processed in PMIS? Are Paid out somehow integrated back into the PMIS? Is PMIS integrated to the financial system? Is PMIS integrated to the scheduling system? Is EAC report produced from PMIS? Is project progress reported in PMIS?
	Change Management	Is there a workflow for the change management business process? Are change orders and amendment approvals processed in the system? Is the progression of change order life-cycle transparent in the PMIS? (ie. RFI>Change Requests>PCO>Pending>Change Order) Are all construction documentation tracked in PMIS
	Reporting	What cost reporting is provided by PMIS

Topic/Focus Area	Category	Best Practices/Criteria
Governance	Leadership Engagement	Are processes established for level of management/executive and escalation based on risk factors?
		Is there a system for establishing project criticality for added Leadership oversight and engagement?
		Do critical (large, risk prone, politically sensitive, etc.) projects have a steering committee?
		Are all effected stakeholders and disciplines engaged in the workshops/planning sessions?
	PMO	Does your organization have a PMO as part of the organization structure?
		Does the PMO provides standards, templates, and tools to all stakeholders/departments?
		Is the PMO engaged in project reviews?
		Does the PMO conducts project audits?
		Does the PMO report to the Executive, Department, or Project Level?
	Contract Compliance	Is there a standard process for conducting compliance audits at specific, key project intervals?
		Is there a process with defined authority levels for managing change?
	Decisions / Reporting	Is there a RACI matrix established for decisions and reporting?
		Do you have an enterprise-wide platform that allows for standardized reporting associated with organizational objectives, and dynamic (slice and dice) adhoc reporting?
		Are all key stakeholders provided project reports?
		Is there a system to flag underperforming projects requiring additional support and oversight?
		Do reports include appropriate information per industry best practices?
Are there periodic reviews, monthly at a minimum, of the project status with a defined leadership committee?		

Topic/Focus Area	Category	Best Practices/Criteria
Risk Management		Is there a documented risk management process?
		Do all projects have risk registers, if not what threshold is used?
		Are risk register qualitative and quantitative?
		Is a probabilistic analysis used on large projects?
		Do risk register have a mitigation strategy?
		Are risk registers updated monthly throughout the project life-cycle?
		Is contingency set and tied to the risk?
		Is there risk reporting at a portfolio level?

Topic/Focus Area	Category	Best Practices/Criteria
Procurement	Bid Process	Did any bidders help with the RFP?
		Was procurement limited to specific manufacturers?
		Were potential contractors excluded from bidding?
		Is adequate bidding time scheduled (including addenda)?
		Was the scoring system outlined in the RFP used?
		Was there a pre-qualified list maintained?
		Was a pre-bid conference held?
		Was the RFP publicity announced?
		Did the RFP identify the evaluation process?
		RFP instruct on how to organize proposals?
		Did the RFP process opening as scheduled?
		Is there a process to handle conflicts of interest?
		Is a qualification process used?
	Bid Analysis	Was a scoring system used?
		Do recommendations include description of the evaluation process?
		Does the recommendation reflect the evaluation scores?
		Were any proposals corrected or withdrawn without proper authorization?
		Were proposals open to public inspection after contract award?
		Were there indications of prohibited contacts with procuring agency?
		Does documentation explain why a prospective bid is not responsible
		Does documentation explain partial or total bid rejections
		Were Evaluation Factors Weighed?
		Are bids compared according to a standard structure (for apples-to-apples comparison)?

Topic/Focus Area	Category	Best Practices/Criteria
Cost Management and Progress Payment	Estimating	Is the cost estimate approach and methodology defined?
		Are project characteristics clearly established for: Technology, procurement, equipment, performance, quantities, labor rates and availability?
		Is the cost estimate structured to allow for review of specific categories and cost/schedule drivers - use of Work Breakdown Structure (WBS), WBS Dictionary, Cost and Schedule Drivers?
		Are estimate assumptions, constraints, and exclusions clearly identified, including: Base Year, Escalation/Inflation, Market Conditions, Budget/Schedule Constraints, Technology and Equipment.
		Are estimating data sources cited, and regularly verified/updated for reliability?
		Is historical data/information used?
		Is estimating software used?
		Are Independent Cost Estimators (ICE) used?
		Is there an established procedure for updating estimates?
		Are approved changes incorporated into estimate updates?
		Are constructability reviews and value engineering reviews conducted?
		Is contingency developed using qualitative and quantitative risk process (schedule and cost)?
		Level of contingency appropriate for project completion
	Establishing and updating budgets	Are baseline budgets developed and updated?
	Is budget updated throughout the lifecycle at established gateways?	
	Is there an approval process for budget changes?	
	Are spending authorizations tracked and monitored against?	
	What is the process for Spending authorization approval?	
	Monitoring and control	What is the CBS used or cost of accounts used?
	Are EACs developed on a monthly basis?	
	Is budget variance reported on monthly?	
	How is budget variance addressed?	
	Is a monthly project progress report submitted on all projects?	
	Change Management	What is your change management and approval process?
	Do you track different categories of change?	
	How are changes tracked in the schedule?	
	How are changes tracked on invoices and pay apps?	
	What is the process for reviewing and negotiating change order claims?	
	Progress payment	How are progress payment reviewed and by whom?
	What is the approval process?	
	How is progress established? Is % complete verified?	
	Is the schedule of values reviewed for front end loading?	
	Are all required backup and documentation included?	
How do you ensure cost is allocated to the correct project/phase/cost of accounts?		

Topic/Focus Area	Category	Best Practices/Criteria
<p style="text-align: center;">Regulatory Compliance/ Quality Management</p>		What is LGB using as far as best practices for value verification?
		Are there any standard specs that LGB is using?
		Are projects review conducted and how regularly?
		Are there design delivery check lists that LGB uses to ensure content at each design milestone is adhered to?
		Have there been non-conformance issues and what is the process for addressing those?
		Are there any QA/QC procedures at LGB?
		Is quality management plan required from consultants?
		Are quality control plans required from all contractors?
		Where are projects warranty docs kept?
		What is the percentage of E&O type change orders on projects?

Appendix C – PMO Types and Structures

PMI in PMBOK defines a Project Management Office (PMO) as a “management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques.” A PMO often acts as a liaison between corporate measurement systems and project delivery. According to PMI, there are several types of PMO structures with varying degrees of control as depicted below:

Characteristics and Level of Control by PMO Type

PMO Type	Level of Control	Main Characteristics
Supportive	Low	Providing a consultative role for projects as part of the provision of documentation, templates, project management best practice, training, access to project information in addition to lessons learned from other projects. Acting as a knowledge repository for organizational project management.
Controlling	Moderate	Supporting and crucially ensuring compliance of projects according to a range of control levers, namely through the adoption of appropriate project management standards, using a specific template, documents, forms, or via conformance to required governance arrangements implemented by the organization. Acting as a control mechanism to ensure standardization of projects.
Directive	High	Providing direct control of projects through the provision of project management services to enable the delivery of projects. This is accomplished by systems and processes to ensure compliance with project management standards and organizational protocols. Acting as a central project management resource for the organization.

The positioning of a PMO within an organization can vary considerably, ranging from a dedicated staff function at a high enterprise level to a distributed network of people throughout the organization. Recent PMO benchmarking research found a variety of structures can be successful subject to their responsibilities. General positioning options for the PMO are summarized below:

PMO Organization Structures

Organization Structure	Main Characteristics
Enterprise PMO	The highest-level PMO in organizations having one, this PMO is often responsible for the alignment of project and program work to corporate strategy, establishing and ensuring appropriate enterprise governance, and performing portfolio management functions to ensure strategy alignment and benefits
Divisional/ Departmental PMO	Provides project-related services to support a business unit or division within an organization including, but not limited to, portfolio management, governance, operational project support, and human resources utilization.
Project-Specific PMO	Provides project-related services as a temporary entity established to support a specific project or program. May include supporting data management, coordination of governance and reporting, and administrative activities to support the project or program team.

Date: April 26, 2021

To: Laura Doud, City Auditor

From: Thomas B. Modica, City Manager 

Subject: **Audit of Airport Construction Management Practices**

Thank you for the opportunity to comment on the Performance Audit of the Airport's Construction Management Practices, as well as for the additional time afforded to us to respond due to the COVID-19 crisis. Our Management Response and Action Plan is attached.

We agree with the City Auditor's recommendations and believe the implementation of these recommendations will further enhance management of key Airport projects. The Airport is already benefitting from the recommendations and several of the project management tools are being integrated. Please note that some of the recommendations may not be implementable for a period of time. The Airport's current fiscal situation may not allow us to immediately devote full resources to the Plan and several recommendations require multi-departmental support.

I would like to thank the City Auditor and her staff for working with us in a collaborative and professional manner. We are always open to suggestions for improvement.

If you have any questions, please contact me at (562) 570-5091.

ATTACHMENTS

CC: CHARLES PARKIN, CITY ATTORNEY
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LINDA F. TATUM, ASSISTANT CITY MANAGER
KEVIN JACKSON, DEPUTY CITY MANAGER
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MANAGEMENT RESPONSE AND ACTION PLAN

Airport Airport Construction Audit

No.	Recommendation	Priority (H, M, L)	Page #	Agree or Disagree	Responsible Party	Action Plan / Explanation for Disagreement	Target Date for Implementation
1A	Develop an overarching vision/mission statement (the Why and the What) which would also identify clear goals and objectives (the How's).	M	10	Agree	LGB Executive team	External resources have been procured to facilitate this process. Draft Vision/Mission/mission/goals and objectives by Q2. Complete review by stakeholders/Mgmt by Q3. Finalize and distribute plan by Q4.	April 2022
1B	Develop a transparent prioritization process, one based on criteria relevant to LGB (i.e. highest value, risk-prone, politically sensitive, poor performance, etc.), that supports their strategic objectives listed in the mission statement.	H	10	Agree	LGB Engineering & Executive team	Prioritization is often discussed with management orally. Formal document highlighting the criteria and trigger event will be create that supports with objectives and mission statement as defined in Recommendation 1A.	April 2022
2	Develop and implement a transparent process to allow for baselining the 5-year CIP and monitoring changes to approved projects listings, as well as tracking of budgets and timelines in a summary format. This will help confirm the effectiveness of LGB's execution of its CIP to stay in line with their mission.	H	11	Agree	LGB Engineering & Finance	A monthly capital program and project summary report with budget, schedule and scope currently provided to Airport management will be refined by Q2. Airport will memorialize a process and protocols document by Q3.	December 2021
3	Conduct a brainstorming session internally with all its division leads, to establish the need and evaluate the type of PMO and organizational structure required to support project delivery at LGB. Based on the outcome of the first session, a follow-on workshop with an identified PMO lead is recommended, to develop the PMO mission statement and charter, as well as identify its goals and objectives. A description of potential types of PMO structures is included in Appendix D of the audit report.	H	11	Agree	LGB Engineering & Executive team	Strategize and define PMO needs and organizational structure by Q2. Identification of PMO lead (potential procurement of external services may be required) by Q4. PMO lead to prepare and complete program requirements, KPI's, standardization documents and training project managers by Q6.	October 2022
4	Implement a department-wide risk management procedure that is scoped and addresses project size and complexity.	H	14	Agree	LGB Engineering	Airport will formalize risk management process in addition to the current practice of holding risk workshops and managing risk register. Airport will develop a department-wide risk management procedure as recommended by Q3. Airport will document procedure and train applicable teams by Q4.	April 2022

MANAGEMENT RESPONSE AND ACTION PLAN

Airport

Airport Construction Audit

No.	Recommendation	Priority (H, M, L)	Page #	Agree or Disagree	Responsible Party	Action Plan / Explanation for Disagreement	Target Date for Implementation
5	Implement a process for large and/or risky projects that includes risk and contingency assessment using Monte Carlo method (described within the report), where ranges are determined using probability distributions. It is further recommended that this approach to risk also be developed for scheduling, particularly for large or risky projects.	M	15	Agree	LGB Engineering	Airport will research, contact and survey applicable public Agencies/Departments using Monte Carlo for education and best practices by Q2. Develop and draft proposed goals and implementation needs for Airport high risk projects by Q3. Coordinate with City Technology Department on system improvements and training needed for Airport projects by Q5. Testing period for method by Q6 and apply to all applicable projects by Q8.	April 2023
6	All the cost modules within Orion be configured and deployed to manage: <ul style="list-style-type: none"> Budget and budget revisions Funding authorization Work Authorization Commitments Forecasts / Estimate at Completion (EAC) Invoices and Pay applications Paid (Actuals) – integration nightly from MUNIS, the City's financial system Change Orders throughout the project life cycle Part of this recommendation includes that all projects use Orion consistently throughout the project life cycle. This will enable a roll-up summary cost report of all active CIP projects. Also, standard and best practice cost reporting templates should be developed and rolled out to help PMs manage and control their cost and changes on their projects and does provide management with the confidence that projects are being managed to the established and approved budgets. Utilize dashboard reports as an effective and efficient tool for management to keep abreast of ACIP performance progress.	H	16	Agree	LGB Engineering & LGB Finance, City Technology Information	Airport project dashboard report that is currently created outside of ORION will be modified and once reconfigured within ORION. Airport will coordinate and identify with Technology Information and Financial Management Department configuration requirements within ORION to address recommended entry fields by Q3. Engineering and Finance to work together on developing templates for cost management to ensure consistency by Q4. Initiate pilot program of new reporting system by Q5. Full migration of all projects by Q6.	October 2022

MANAGEMENT RESPONSE AND ACTION PLAN

Airport

Airport Construction Audit

No.	Recommendation	Priority (H, M, L)	Page #	Agree or Disagree	Responsible Party	Action Plan / Explanation for Disagreement	Target Date for Implementation
7	<p>Implement the following changes be made:</p> <ul style="list-style-type: none"> Utilize a standardized nomenclature for budget management that is representative of industry standards shall be adopted. Establish a standard process around instituting a budget baseline at an agreed upon stage of the project life cycle along with budget updating and documenting the process along with guidelines. A monthly EAC (aligned with industry standard) shall be prepared by the PMs and budget variance reporting on a monthly basis to be included in the project progress report. Training shall be provided to all LGB PMs and CMs on the new standard process and guidelines, and if needed, on the fundamentals of cost management and control. 	H	19	Agree	LGB Engineering & LGB Finance	Develop goals/objectives, research industry best practices and develop standard process by Q3. Develop monthly EAC by Q4. Train staff by Q6.	October 2022
8A	<p>Implement a standard change management process be developed and implemented on all projects. All projects should maintain at least a change order log tracking the submission and processing of change orders and amendments throughout the project life cycle. The format for the change order log should be standard across all projects and consistent with industry best practice.</p>	H	21	Agree	LGB Engineering & LGB Finance	Change management process has been developed and ORION has been configured to track change order logs.	N/A
8B	<p>Utilize the PMIS to manage all contracts and corresponding changes on all projects. Having the change cost information in the same centralized place as budgets and commitment is very important to maintaining transparency, pushing accountability to the project managers, and controlling cost in general.</p>	M	22	Agree	LGB Engineering & LGB Finance, City Financial Management and Technology Information	ORION has been consistently used to manage CIP's upon implementation. Actuals are pending MUNIS integration. Both ORION and MUNIS require reconfiguration to share data. Departments will need to determine feasibility, connectivity and compatibility needs by Q5. If criteria can be met, funding plan will be developed by Q7, begin implementation by Q8. In the event that ORION and MUNIS are unable to share data, we will manually upload change cost data directly into ORION	April 2023
9A	<p>All invoices for consultants and contractors shall be processed upon receipt in Orion to address the gap in Actuals.</p>	M	23	Agree	LGB Engineering & LGB Finance	ORION can produce progress payment and include approvals from project team. However, per City policy, processing of invoices shall be done through MUNIS. ORION will reflect actuals from MUNIS. However, we will upload approved invoices to ORION to address the gap as recommended by Q4.	April 2022

MANAGEMENT RESPONSE AND ACTION PLAN

Airport

Airport Construction Audit

No.	Recommendation	Priority (H, M, L)	Page #	Agree or Disagree	Responsible Party	Action Plan / Explanation for Disagreement	Target Date for Implementation
9B	Perform a comprehensive review of how Actuals are being integrated into Orion from MUNIS and how they are used in the cost reports and project forecasts as opposed to Invoiced should be completed.	H	23	Agree	LGB Engineering & LGB Finance, City Public Works and Technology Information	Airport is currently coordinating a review with City Public Works on this item.	On going.
10	Establish a Quality Management policy to include a quality management manual covering the life cycle of a project at LGB. The Quality Management plan template could be flexible, and project size relative and could include: 1.Standard template for a Quality Management plan covering all phases of a project along with corrective or mitigating action if quality does not meet the established standards. 2.Design quality manual formalizing design reviews. This would include design content requirements at the standard design completion milestones (30%, 60%, and 90%), checklists for conducting design reviews at these milestones. 3.Minimum requirements for a QA/QC plan to be conformed to by third party CMs which covers the construction phase of the project.	M	25	Agree	LGB Engineering	Airport will develop proposed goals, objectives and criteria by Q2. Develop a design quality manual by Q6 and develop a 3rd party reviews by Q8.	April 2023
11	Develop and implement a formal performance review process at key stages of project execution, to include processes, tools, and roles and responsibilities. These gateway reviews should also address the status/performance of the project related to budget, schedule, scope and risk.	H	25	Agree	LGB Executive team, Engineering	Airport will develop a Project Performance Review process as recommended. Will identify criteria, key milestones or stages by Q3. Applicable areas for Project Managers and Executive Reviews, meeting schedules, etc. based on project type by Q6.	October 2022

Priority

H – High Priority - The recommendation pertains to a serious or materially significant audit finding or control weakness. Due to the seriousness or significance of the matter, immediate management attention and appropriate corrective action is warranted.

M – Medium Priority - The recommendation pertains to a moderately significant or potentially serious audit finding or control weakness. Reasonably prompt corrective action should be taken by management to address the matter. Recommendation should be implemented no later than six months.

L – Low Priority - The recommendation pertains to an audit finding or control weakness of relatively minor significance or concern. The timing of any corrective action is left to management's discretion.