BRG Look Back Study

November 30, 2015
General Focus

Review the GLX Project, determine what has happened, and provide an understanding of the current status.
BRG Look Back Study

• Fully Independent, No Prior GLX History, No Conflicts

• Document Review and Analysis

• Interviews and Site Visit
  – MassDOT/MBTA
  – HDR/Gilbane (PM/CM)
  – Hatch Mott MacDonald/Patrick Engineering (OR)
  – Stanton (ICE)
  – AECOM/HNTB (Designer)
  – WSK (CM/GC)
  – ARUP
  – Nossaman
  – FTA/PMOC
  – CIM & ACE/MA
Look Back Study Objectives:

- Independent Assessment of Management Effectiveness & Clarity of Professional Services Providers and MassDOT/MBTA Staff, Including Staffing and Training Decisions

- Independent Assessment of the Determination to use the CM/GC Methodology

- Independent Analysis of Project Cost Estimating and Risk Analysis

- *Independent Analysis of Cost Drivers that Contributed to Project Budget Overruns*
Look Back Study Findings:

What have we learned?

- No silver bullets
- Multiple problems
- Inter-connected
- Longstanding
GLX Project Story

Absence of a Reliable Project Budget

Flawed Structure & Application of CM/GC Project Delivery Model

Excessively Schedule Driven

Project Management
Excessively Schedule Driven
Look Back Study Findings:
Schedule-Driven Project

- Schedule - The Driving Force Behind Selection of CM/GC Delivery Method
  - GLX Project is a Legal Requirement Under State Implementation Plan with Mandated Deadlines
  - Schedule Minimization (Overlap of Design and Construction)
  - Federal Funding Considerations Related to Schedule Minimization
  - Flexibility to Address Project Uncertainties
Look Back Study Findings: Schedule-Driven Project

- Schedule Pressure Impacted the Ability to Successfully Implement CM/GC

- Schedule Pressure to Develop and Complete the Full Funding Grant Agreement by the End of CY 2014
Absence of a Reliable Project Budget
• A Reliable Project Budget is Defined as being within +10% and -5% of what it would Cost to Design and Construct the Project
A Reliable Project Budget was Achievable as Early as October 2012 when the Project’s Design was 30% Complete
Look Back Study Findings:
Analysis of Cost Estimating and Risk Analysis

- A Reliable Project Budget has not been Produced to Date
Flawed Structure & Application of CM/GC Project Delivery Model
What is CM/GC Procurement?

• Phases 2 through 4 of the project use a contract delivery method called Construction Manager/General Contractor (CM/GC). In this procurement method
  – A CM/GC contractor is procured through a qualifications- and fee-based selection process
  – A design team is procured under a separate contract
  – The MBTA, CM/GC and design team work together to develop designs which the CM/GC prices at a “Guaranteed Maximum Price” (GMP)

• The use of CM/GC on the GLX Project was approved as a pilot program by legislation signed on June 19, 2012

• The MBTA Board of Directors approved use of this approach on July 11, 2012
Another key piece of the CM/GC methodology is the Independent Cost Estimator (ICE). The ICE provides cost estimating services on individual GLX construction packages, which are used for comparison with the bids received from the CM/GC team on those packages.

Potential advantages of the CM/GC model are that it overlaps design and construction, thereby shortening overall program delivery time and providing a single point of responsibility.

A potential disadvantage of the CM/GC model is that CM/GC faces no competition.
The work associated with Phases 2-4 of the GLX Project was broken down into a series of guaranteed maximum price (GMP) contracts with the CM/GC.

- **July 2013**: WSK chosen as the CM/GC
- **October 2013**: Stanton hired by the MBTA as the ICE
- **Fall 2014**: 1st three GMP contracts were awarded to WSK
- **May - Aug 2015**: MBTA received bids from WSK for GMP 4 (contract which covers the remaining work on Phase 2 of the GLX project)
CM/GC Methodology Questions

- Is CM/GC a Reasonable Delivery Model?
  - Yes

- Was CM/GC the Right Model for the GLX Project?
  - Insufficient Information to Judge

- Was CM/GC Developed and Administered Effectively for GLX Project?
  - No

- Should the MBTA use CM/GC in the future?
  - Only with Open Book Cost Accounting and Current Best Practices
Look Back Study Findings: Assess the Determination to Use CM/GC

- **Justifications for Using CM/GC**
  - Schedule - The Driving Force Behind Selection

- Other Justifications - Not Realized Then or Not Important Now
  - Design Refinement with WSK Preconstruction Involvement
  - Cost Certainty with Construction Guaranteed Maximum Pricing
  - MBTA Maintained Control of the Design
  - Single Point of Responsibility for Construction
• **Flaws in the Structure and Application of the CM/GC Model**

  – Flawed CM/GC Proposal Evaluation – Fee-Based Criteria
  – Failure to Use Open Book Cost Accounting – No Visibility into Construction Costs Incurred and Contractually Specified 4.25% Fee Markup
  – Disconnect Between the ICE IGMP Estimating and HDR/Gilbane’s IGMP Budgets
  – WSK was Allowed to Qualify its IGMP Proposals – Effectively Shifting Project Risk back to the MBTA Negating Intended Cost Certainty Considered in the CM/GC Model
• **Flaws in the Structure and Application of the CM/GC Model**
  
  – Excessive IGMP Negotiations Between HDR/Gilbane, the ICE, the MBTA and WSK - Occurred over Several Months and Allowed WSK to Secure Highest Price for its Work While Remaining within 110% of the ICE Estimate
  
  – Insufficient CM/GC Training for HDR/Gilbane and the MBTA
  
  – BRG Recommends that CM/GC Model not be Considered for Future Projects unless Open Book Cost Accounting can be used and the Project Team Receives Further CM/GC Training
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<thead>
<tr>
<th>Item</th>
<th>Best Practice</th>
<th>GLX Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing</td>
<td>• Pricing &amp; contract provisions and administration should be consistent</td>
<td>• Manual &amp; contract contemplate GMP, but lump sum used</td>
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<td>• Qualifications &amp; assumptions made regarding means &amp; methods should be included in the contract</td>
<td>• CM/GC qualifications were included in the IGMP Agreements</td>
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<td></td>
<td>• Unclear whether assumptions were included that would protect the MBTA</td>
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<td>Budgeting</td>
<td>• Establish strict budgeting protocols</td>
<td>• No reliable budgeting process adopted</td>
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<tr>
<td>Cost Accounting</td>
<td>• If a GMP contract, open book cost accounting should be used</td>
<td>• Not adopted</td>
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<tr>
<td>Item</td>
<td>Best Practice</td>
<td>GLX Experience</td>
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<tr>
<td>Cost Estimating</td>
<td>• Open book</td>
<td>• Open book cost estimation not adopted</td>
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<td></td>
<td>• Cost reconciliations at 60%, 90%, &amp; 100% design</td>
<td>• Cost reconciliations did not consistently occur at set design stages</td>
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<td>• No pre-defined ranges of acceptability</td>
<td>• 110% range of acceptability defined in the Manual &amp; the contract</td>
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<td>Multipliers and</td>
<td>• Clearly identify cost items included in multipliers and other mark-ups</td>
<td>• Multiplier is limited to profit &amp; HOH</td>
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<tr>
<td>Other Mark-ups</td>
<td>• Cap mark-ups</td>
<td>• Indirect costs are not capped</td>
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<tr>
<td>Subcontracting</td>
<td>• CM/GC is required to follow owner’s bidding practices</td>
<td>• CM/GC was required to obtain three bids</td>
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<td></td>
<td></td>
<td>• Three bids not always obtained</td>
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<td>Item</td>
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<td>Preconstruction Services</td>
<td>• Should be a highly collaborative &amp; open process</td>
<td>• Unclear how collaborative the relationships really were</td>
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<td>• End goal of identifying high-risk items &amp; mitigations</td>
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<tr>
<td>Value Engineering</td>
<td>• Be open to VE suggestions</td>
<td>• Many VE solutions were rejected</td>
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<td></td>
<td>• Incentivize parties to suggest VE solutions</td>
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<tr>
<td>Design Management</td>
<td>• Design should be managed in order to minimize scope creep and budget busts</td>
<td>• No “design to budget” requirements</td>
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<td>Item</td>
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| Minimize Construction Packages | • Minimum number of construction packages  
• An early works package may be used | • 7 IGMP packages                                |
| General Provisions        | • Based on design-bid-build contract documents  
• Appropriate risk shifts based on risk items & mitigations identified during preconstruction services | • Unclear whether risk items and mitigations were identified  
• Some risks were shifted back to the MBTA inappropriately |
Management Clarity and Effectiveness
Management Clarity & Effectiveness: Adequacy of MBTA Staffing

• MBTA Staffing Model
  – 4 FTEs from MBTA to Manage PM/CM, CM/GC, Designer and ICE
  – HDR/Gilbane Used as Additional MBTA Staff
    • QA/Audits
    • New Starts
    • Final Design Management
    • CM/GC Pre-Construction and Construction Oversight
  – Integration of HDR/Gilbane with MBTA Staff
  – Co-Location and Shared Understanding
  – Flexibility with Staffing Levels
Management Clarity & Effectiveness: Adequacy of MBTA Staffing

• Long Term Consequences
  – Missed Opportunity for Institutional Knowledge at MBTA
  – Increased Professional Service Costs on Projects
  – Reduced Staffing Decision Flexibility
  – Inability to Facilitate Greater Internal Focus on Progress, Performance and Risk
Management Clarity & Effectiveness: Areas for Improvement

• Review the Emphasis of Schedule on Decision-Making
• Develop Staff’s Core Competencies through Training
• Create Stronger Accountability for Project Cost Certainty
• Build Resilience Through Robust Mitigation Strategies
Appendix – BRG Background
• BRG: Global Consulting Firm – 878 Professionals
• Programmatic and Project-Specific Project Risk Management Consulting Services
• Claims Analysis and Expert Witness Testimony Experience
• Including Professionals with Extensive Cost Analysis and Infrastructure Construction Expertise
**Terry L. Yeager**

- Civil Engineer/MBA
- Over 20 Year’s Experience as a Heavy and Highway Contractor Including Mega Projects, Design Build Projects and PPP Projects
- Over 12 Year’s Experience as a Dispute Resolution and Project Risk Management Consultant
- Claims Analyst with Significant Expert Witness Testimony Experience
Terry Rodgers

- Finance/Ph.D. Management
- Over 30 Year’s Consulting with Public & Private Organizations and State & Federal Agencies
- Construction Industry Experience with Cost Analyses & Claims, Compliance Reviews, Management Oversight and Operational & Strategic Management Services