Analysis of the Boston 2024 Proposed Summer Olympic Plans

Executive Summary

PREPARED FOR

Commonwealth of Massachusetts Office of the Governor, President of the Senate, and Speaker of the House

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I. Introduction

We were asked by the Commonwealth of Massachusetts Office of the Governor, President of the Senate, and Speaker of the House to evaluate Boston's bid to host the 2024 Summer Olympic and Paralympic Games (collectively "Olympic Games"). Specifically, we were asked to evaluate the financial details contained in the Boston 2024 Partnership's ("Boston 2024") June 29, 2015 bid ("Bid 2.0"), as well as the potential risks to the Commonwealth of Massachusetts ("Commonwealth"), including to taxpayers, from hosting the Olympic Games in 2024. In our analysis detailed in this Report, we describe the components of Bid 2.0, test its assumptions to examine potential risks, evaluate who would have borne the responsibility if any adverse risks had been realized, and estimate the potential economic impacts of the Olympic Games on the Commonwealth.

Our assignment was not to provide an opinion or recommendation as to whether or not Boston should host the 2024 Olympic Games, but rather to provide objective analyses for evaluators to consider. We recognize that Boston 2024's ultimate bid to host the 2024 Summer Olympic Games would have evolved and that it would likely have continued to attempt to reduce the risks inherent in hosting an Olympic Games.

In carrying out our assignment, we reviewed documents related to Bid 2.0. Representatives from Boston 2024 were very responsive and met with us to answer any questions we had, including providing us with additional information detailing their financial projections. In addition, Boston 2024 facilitated discussions with its consultants on a range of topics that we analyzed.

We spoke with representatives from the following organizations: No Boston Olympics; Metropolitan Area Planning Council; Massachusetts Smart Growth Alliance; Transportation for Massachusetts; and the Massachusetts Department of Transportation and Massachusetts Bay Transportation Authority ("MBTA"). Our research has been informed by our own prior research as well as academic literature on the potential economic benefits and costs associated with hosting Olympic Games and other mega-sporting events.[1] Finally, our work has benefited from discussions with Professor Edward Glaeser at Harvard University.

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1 Researchers on these topics include Robert Baade, Dennis Coates, Stefan Kesenne, Wolfgang Maennig, Victor Matheson, Philip Porter, Holger Preuss, Stefan Szymanski, and Andrew Zimbalist.

On July 27, 2015, Boston withdrew from consideration as the U.S. host city for the 2024 Olympic Games. Nevertheless, we have completed the Report as originally conceptualized. A number of issues we address and projects that are included in our evaluation of Bid 2.0 may be of interest to various parties independent of Bid 2.0. Some of the ideas generated in Bid 2.0—such as those regarding housing, transportations, and additional park land—are concepts that are worthy of future discussion, independent of Bid 2.0. An evaluation of those, or other legacy projects is beyond the scope of this Report.

II. Executive Summary

On January 8, 2015, the United States Olympic Committee ("USOC") announced Boston was selected as the U.S. candidate city to host the 2024 Summer Olympic and Paralympic Games (collectively "Olympic Games") based on the bid that was submitted in December 2014 by Boston 2024. Between January and June 2015, Boston 2024 developed specific details of its plan, and on June 29, 2015, issued what it described as "Bid 2.0." On July 27, 2015, however, Boston 2024 and the USOC jointly agreed to pull Boston's bid from consideration. Nevertheless, we have completed our study.

This Report focuses on Boston 2024's proposal to become a Host City for the Olympic Games, the dynamics of the International Olympic Committee ("IOC") bidding process, and the risks to Local and State government if Boston had hosted the 2024 Olympic Games. It is organized as follows: In Section III, we present an overview of Boston 2024's Bid 2.0, detailing Boston 2024's vision of how Boston would have hosted the 2024 Summer Olympic Games. In Section IV, we review the budget contained in Bid 2.0 and test the sensitivity of the overall budget to potential increases or decreases in the revenues and costs. In Section V, we explain and analyze the risks to the Commonwealth and its taxpayers from hosting the Olympic Games. We describe the parties involved in the bidding process and the financial and other guarantees that a host city is required to sign. Financial guarantees require a host city to ensure that the venues and other necessary infrastructure will be built, in the event that costs exceed projections. We then describe how Boston 2024 expected to mitigate taxpayer risk through a comprehensive insurance plan that it would purchase and require contractors to purchase. In Section VI, we detail and evaluate the infrastructure investments that would have been needed to host the Olympic Games. Lastly, in Section VII, we estimate the economic impacts of hosting the Olympic Games, as described in Bid 2.0. All amounts in the Report are in 2016 U.S. dollars, unless otherwise specified.

A. Overview of Boston 2024's Bid 2.0

Boston 2024's Bid 2.0 envisioned a plan for a largely privately-funded Olympic Games, which was projected to run a surplus and be a catalyst for long-lasting commercial and residential development and infrastructure improvements. Boston 2024 believed it could have leveraged many existing facilities instead of constructing new venues, consistent with the IOC's recent adoption of its Agenda 2020—a series of 40 reforms to the Olympic movement designed to reduce the cost of the bidding process, improve the sustainability of the Olympic Games, reduce the cost of Olympic Games management, and foster gender equality, among others. Boston 2024 also believed it could have created partnerships with private real estate developers for the construction of the Olympic Stadium and Athletes' Village, historically two of the most expensive Olympic projects.

Bid 2.0 proposed a temporary Olympic Stadium to be located on an elevated platform in Widett Circle, an area Boston 2024 called "Midtown." Midtown would have been privately developed by an entity that would have been responsible for the project (except the Olympic Stadium itself) at an expected cost of $1.2 billion (or $1.0 billion in 2016 dollars); in return, the private developer would have received real estate tax incentives, rights to develop the land for permanent uses, and option agreements to acquire the land from current private owners, the City of Boston, and the Commonwealth.

Bid 2.0 proposed an Athletes' Village in the Columbia Point/UMass Precinct. Like Midtown, a private developer was expected to finance and develop the $2.9 billion project (or $2.4 billion in 2016 dollars) in exchange for similar real estate tax incentives and development rights. Following the Olympic Games, the Athletes' Village would have been converted into rental apartments, student housing, senior housing, and other retail and restaurant space. Further, Bid 2.0 proposed certain public infrastructure investments as part of the Midtown and Athletes' Village development projects.

To mitigate certain risks associated with hosting the Olympic Games, Bid 2.0 proposed a comprehensive insurance plan similar to policies used for typical mega-infrastructure projects and mega-events. This insurance plan would have added a layer of protection for Massachusetts taxpayers against potential revenue shortfalls or cost overruns. Although insurance would not have been able to eliminate all risks, Boston 2024 proposed a detailed plan to mitigate some of the risks outside of its control.

B. Financial Evaluation

At a high level, hosting the Olympic Games would have created four broad categories of risk: risks associated with revenue shortfalls; with increased operating costs; with relying on private developers; and with infrastructure investments needed to host the Olympic Games. As discussed below, the risk associated with revenue shortfalls was relatively low and, in fact, Bid

2.0 identified sources for additional revenue. Bid 2.0 did contain risks associated with operating costs being higher than those projected. The biggest sources of risk, however, were related to securing commitments from private developers to construct the Midtown area and the Athletes' Village, and those related to the necessary infrastructure investments. In particular, uncertainties related to using the land under the platform needed to be resolved in order for the Midtown project to have been feasible.

In Bid 2.0, Boston 2024 expected revenues from hosting the Olympic Games to more than offset its estimated $4.6 billion local organizing committee cost, generating a $210 million budget surplus. If expectations were realized, neither the City of Boston nor the Commonwealth of Massachusetts, as *de-facto* financial guarantors of the Olympic Games, would have borne any of the costs for venues or operating the Olympic Games (although the Commonwealth and the City of Boston would have borne most of the costs of public infrastructure projects as well as opportunity costs from tax incentives).

We evaluate the projections and underlying assumptions contained in the Bid 2.0 budget, and, where appropriate, test the sensitivity of the budget projections to deviations in projected revenues and costs. It is important to note that Bid 2.0 projected financial information through the year 2024; as a result, it was necessarily subject to uncertainties associated with forecasting over such a long time horizon.

1. Assessment of Organizing Committee Revenues

According to Bid 2.0, the Organizing Committee for the Olympic Games' ("OCOG") projected revenues to have come from four major sources: ticket sales; IOC contributed broadcast rights and global sponsorship revenues; domestic sponsorship; and licensing and similar sources. Boston 2024 derived its $1.25 billion ticket revenue estimate from the experience of the 2012 London Summer Olympic Games, which had the highest percentage of ticket sales of recent Olympic Games. Boston 2024 envisioned using a regional model for early rounds of certain sports and dynamic ticketing, which could have generated revenue beyond its projection.

Bid 2.0 projected that the IOC would have contributed $1.5 billion to the Boston OCOG from broadcast rights and global Olympic sponsors such as Coca-Cola, McDonald's, and Visa. This figure was subject to both upside and downside risks. Experience of past Olympic Games suggests that a host city has typically received approximately 12 percent more than its original estimated IOC contributions. If Boston experienced a similar outcome, it would have collected approximately $180 million in additional revenue. However, the IOC contributed $1.05 billion to the London Olympic Games (after adjusting for inflation), suggesting that Boston 2024 might have already anticipated the additional revenue.

Boston 2024 projected that it would have generated $1.52 billion from domestic sponsors, with the potential for additional revenue. In addition, projections suggest that Rio de Janeiro ("Rio") and Tokyo will exceed their original sponsorship projections. To generate $1.52 billion in revenue would have required OCOG to secure $100 million in commitments per sponsor from about ten domestic sponsors, plus smaller commitments from additional sponsors. The experience of the 2012 London Olympic Games suggests it is possible that the Boston Olympic Games would have been at risk of generating over $300 million less than projected.

Bid 2.0 projected $535 million in revenue from other sources, such as a torch relay, coin and stamp revenue, licensing, hospitality packages, and other sources. Bid 2.0 did not provide sufficient detail on these estimates to allow us to evaluate the risks associated with them.

2. Assessment of Organizing Committee Costs

Bid 2.0 estimated that the Olympic venues would cost $918 million to construct and prepare for development post-Olympic Games. As a whole, Boston 2024 estimated significantly lower costs for these venues than other past Olympic Games. For example, Bid 2.0 proposed building a temporary 69,000-seat stadium for $175.5 million, an Aquatics Center for $69.5 million, a Velodrome for $64.1 million, and an international broadcast and main press center ("IBC/MPC") for $50.5 million. These figures are significantly lower than the costs incurred by London for the 2012 Olympic Games. For example, the $50.5 million proposed media center is 90 percent lower than London's actual cost for its media center.

It is our understanding that the Olympic Stadium would have been the largest such temporary stadium, making it difficult to evaluate the cost estimate that was in Bid 2.0. Similarly, Bid 2.0 had not fully developed its proposals for the Aquatics Center, the Velodrome, or the media center to allow a proper evaluation of the cost. However, past experience suggests that Boston 2024 would have been unlikely to meet those cost estimates, and a more reasonable cost estimate would have been over $970 million higher than reported in Bid 2.0. In addition, the contingencies included in Bid 2.0 are considerably lower than those typically used in the construction industry for projects at such an early stage of development. If Boston 2024 had used a more typical contingency, its projected cost would have been at least $100 million higher.

Boston 2024 estimated lower Games-related operating costs than those experienced by past Olympic Games. Bid 2.0 projected that it would have been able to achieve 25 percent cost savings over London's estimated costs. If Boston 2024 would not have been able to achieve those cost savings, its actual cost would have been nearly $750 million higher than projected in Bid 2.0.

Bid 2.0 anticipated that more than 60 percent of the full cost of hosting the Olympic Games would have been funded by outside sources, including private developers for the Midtown and Athletes' Village developments, the Commonwealth for public infrastructure projects, and the Federal government for security.

Bid 2.0 relied on private developers to fund over $4 billion ($3.4 billion in 2016 dollars) for the projects at Midtown and Columbia Point in return for the development rights to those areas. This feature of the Bid was contingent on Boston 2024 securing tax agreements with the City of Boston, entitlements, and option agreements with property owners prior to garnering developer interest. As such, the Midtown and Columbia Point projects were subject to significant risks as to whether private developers would have committed to providing the funding. The financial returns to the private developers projected in Bid 2.0 might have been lower than necessary to cause developers to take on the risks.

Even if Boston 2024 could have found developers for those projects, the contingencies it applied to those projects were significantly lower than those typically applied to developments at such a preliminary stage. This was particularly true for the Midtown development, considering the cost and technical risks associated with building the platform, particularly given the platform would have had to be completed in time for other pre-Olympic development and, therefore, subject to an "Olympic Premium."

Boston 2024 assumed that the Federal government would have funded expenses related to providing security and expenses related to the Paralympic Games. It was reasonable to assume that the Federal government would have covered the security costs. However, if the Federal government would not have covered the costs associated with the Paralympics, the costs to the OCOG of those Olympics would have been significantly higher.

In summary, the budget surplus that Boston 2024 projected was sensitive to the revenue and cost assumptions that had been built into it. Whereas the revenue projections did not appear to contain significant risk and had upside potential, reasonable deviations from those assumptions could have caused that surplus to become a deficit. However, it is important to note that Boston

2024 had estimated cash flows over a nine-year period, which were necessarily subject to uncertainty.

C. Risk to Taxpayers and Potential for Mitigation

1. The Parties Involved

The parties involved in hosting an Olympic Games—the IOC, the National Olympic Committees ("NOCs"), the local organizing committee, and State and Local government—have different incentives and different abilities to bear and shift risk.

The IOC's principal objective is to promote the Olympic Movement. The IOC does not need to, and does not, bear any financial risk, given potential hosts compete to win the right to host the Games based on promised spending for high quality venues and infrastructure and financial guarantees.

The NOCs are responsible for sending participants to the Games and endorsing potential future Olympic host cities within their countries. The USOC oversees the process by which U.S. cities bid to host the Olympic Games and operates specialized facilities for athletes, among other responsibilities.

A local organizing committee, such as Boston 2024, represents the city in bidding for the Olympic Games. The local organizing committee must secure sufficient funding to support an attractive bid while garnering support from Local and State government, local residents, and other stakeholders. Once a city is chosen to host the Olympic Games, the local organizing committee forms a joint venture with the NOC to form the official OCOG.

Local and State governments play a crucial role in any Olympic Games to be held in their city and state in that the IOC requires Letters of Guarantee from government authorities that all cost overruns and revenue shortfalls will be paid.

2. The Bid Process

Until recently, bidding to host the Olympic Games was a three-phase process. In the *Invitation Phase*, interested NOCs and their selected Host Cities were invited to formally commit to the bid process; this phase would have ended on September 15, 2015. In the *Applicant Phase*, cities developed their vision and concept for the Olympic Games. During the *Candidate Phase*, a shortlist of selected cities provided a blueprint for the Olympic Games, including required *Letters* *of Guarantee* from government authorities and others. Under the new procedures adopted in August 2015, the IOC announced that all cities that declare intent to bid for the 2024 Olympic Games by September 15, 2015 will become Candidate Cities and remain in the race until September 2017, when a host city is selected. This change will leave the IOC with more Candidate Cities to consider in 2017, avoiding situations such as the recent competition to host the 2022 Winter Olympic Games, where only two Candidate Cities remained in the race at the end.

3. Financial Guarantees

Only one host city—Los Angeles in 1984—has ever been awarded the Olympic Games without providing Letters of Guarantee, and that occurred when no other city was competing to host the Olympic Games that year. This does not appear to be the case for the 2024 Summer Olympic Games.

Financial Guarantees cover all aspects of the Olympic Games, including construction of venues, accommodations for the IOC and its affiliated organizations, local transportation infrastructure, and media coverage. Certain Letters of Guarantee, such as the general guarantee for support and commitment, must come from national, state, and local government authorities. Others may be required from local business owners where their involvement is considered pertinent. On the one hand, *Economic Shortfall Guarantees* apply to potential economic shortfalls, cost overruns, or other unexpected expenses, and are generally signed by a combination of national, regional, and local government authorities. For example, London's bid for the 2012 Olympic Games guaranteed national government support for any shortfall, in addition to the promised $5.5 billion in public funding, and Chicago's 2016 bid contained a $500 million guarantee and indemnity by the City of Chicago, as well as private insurance coverage. On the other hand, *Endeavor-Specific Guarantees* refer to tasks or activities, such as financing venue construction or infrastructure improvements. They require a commitment from a competent body or authority and can be full commitments to ensure performance, regardless of cost.

4. Potential Risks

a. Revenue Shortfall

The primary sources of proposed operating revenues to fund the OCOG portion of the Boston 2024 bid are ticketing, The Olympic Partner ("TOP") Programme sponsors, domestic sponsors, and broadcasting.

Ticket sale revenues in prior Summer Olympic Games since 1996 have all generated more revenue than initially estimated. However, ticket sales can be negatively impacted by safety and security concerns or by politically-motivated boycotts of the Olympic Games. *Broadcasting revenue* is set through 2032, so there is only limited risk surrounding this component of the IOC contribution. *Sponsorship revenue* shortfalls may arise if an OCOG is unable to secure sponsors and/or if the sponsors do not fulfill their obligations. Boston 2024 proposed mitigating the risk or sponsorship revenue shortfalls through insurance policies and careful selection of sponsors.

b. Cost Overruns

Cost overruns refer to outcomes where the actual cost of constructing Olympic Games venues or other capital projects and Olympic Games operations exceeds the spending specified in the bid. Some cost overruns may be attributed to the difficulty of accurately forecasting costs and revenues nearly a decade in the future. Other overruns may be anticipated, such as increases in local demand for construction workers leading to higher construction industry wages. Overruns can also occur because of changes in scope. As the Olympic Games approach, organizers may realize that some proposed venues may be too small, or may not contain adequate features for either the Olympic Games or for their intended use after the Olympic Games. Pressures from special-interest groups can also lead to scope creep because OCOGs must maintain broad-based support.

Research indicates that between 1960 and 2012, the Olympic Games experienced average cost overruns of 179 percent. We examined the experiences of select Host Cities:

- London's 2004 bid for the 2012 Summer Games estimated the total cost at $18.3 billion, of which $5.5 billion was to be funded by the U.K. government. As of December 2012, the U.K. Government had spent approximately $14 billion. These cost overruns were due to underestimates of the construction costs, the loss of private developer funding, and poor planning for security needs.

- Vancouver's 2002 bid for the 2010 Winter Games was $1.8 billion. Total public funding was set at approximately $470 million, but actually turned out to be $1.5 billion. As in the case of London, cost overruns were largely due to higher than expected construction costs, loss of private financing, and higher-than-expected security costs.

While final costs are not yet available for the 2016 Rio and 2020 Tokyo Games, construction cost overruns are already significant. For the Rio Games, costs are currently estimated to be almost 40 percent higher than the initial bid of $14.4 billion. And Tokyo has experienced such extreme cost overruns on the Olympic Stadium that the current design has been abandoned completely.

c. *Security Risks*

Security for Olympic Games is both costly and a source of great uncertainty. Previous incidents at prior Games (1972 Munich and 1996 Atlanta Games) as well as 9/11 and the 2013 Boston Marathon bombing have continued to ratchet up security concerns. The Summer Olympic Games in London had total security costs of $1.4 billion.

Bid 2.0 expected the Olympic Games to be designated as a National Special Security Event, meaning the Federal government would have provided security funding and support. Nevertheless, significant participation by state and local public safety agencies would also have been necessary. Boston 2024 proposed $1 billion in security costs, most of which would have been spent for preparatory and preventative efforts.

5. Analysis of Risk Bearing

The *IOC* does not bear *any* of the financial risks associated with the Olympic Games.

The *USOC* has limited ability to bear risk, and does not provide any financial guarantees.

The *local organizing committee* can nominally take on risk, but has limited ability to bear risk. It does not provide the required financial guarantees. It can, however, partially mitigate risks borne by others by exerting control over some costs and revenue streams, as well as through insurance, as suggested by Boston 2024 in Bid 2.0.

The *Federal government* would be responsible for security costs and Paralympics.

The *State and Local governments,* while having only limited ability to influence and shape the bid, would bear significant financial risks as the ultimate guarantors under the financial Letters of Guarantee. All of the risks associated with public infrastructure spending would fall completely on the Commonwealth. *The taxpayers of the Commonwealth of Massachusetts would be the ultimate risk bearers.*

D. Additional Key Responsibilities, Risks, and Costs to the Commonwealth

In addition to the financial guarantees, discussed above, other aspects of hosting the Olympic Games would have involved additional responsibilities, risks, and costs to the Commonwealth. These include IOC requirements beyond strictly financial guarantees and issues such as lost property tax revenues, and increased overtime for Commonwealth personnel.

1. Additional IOC Requirements

In addition to letters of financial guarantees, the IOC imposes other requirements for hosting the Olympic Games. These include, among others: (1) advertising space which must be devoted to the Olympic Games; (2) lost tax revenues due to required exemptions on Olympics-related earnings; (3) special treatment for the "Olympic Family;" and (4) dedicated Olympic Lanes on local roadways.

Few, if any, Olympic host cities have been able to obtain the degree of control over *advertising space* required by the IOC. Most have been able to ensure that a majority of the advertising space is available to the Olympic Games organizers and corporate sponsors. Moreover, Host Cities may actually benefit from increased spending on advertising during the Games; London witnessed 30 percent higher spending during the period of the 2012 Games.

Required tax exemptions on a wide range of Olympic Games-related payments could have been substantial. Lost taxes due to tax concessions during the London Olympic Games were estimated to be tens of millions of pounds. This required tax treatment would have also required amendments to existing tax laws. If this economic activity were generated from some other mega-sporting event, such as the NFL Super Bowl or NCAA Final Four, taxes would be collected.

Historically, special treatment of the *"Olympic Family"* has created some concerns for Candidate and Host Cities. Dedicated *Olympic Lanes*, for instance, could have generated significant non-monetary costs for local residents and commuters and increased travel time throughout the Boston area.

2. Additional Risks to Taxpayers and the Commonwealth

Additional risks include lost property tax revenues and increased overtime costs. As mentioned above, to attract private developers, the City of Boston would have had to provide *tax incentives*. Based on Boston 2024's projections, increased future tax revenues would have more than offset the cost of these incentives and the loss of existing property taxes.

Local and state government agencies would have experienced *increased overtime costs* related to planning and organizing the Games. Short-term increased demand for certain employees, such as first responders, would also have increased overtime costs.

E. Evaluation of Infrastructure Investments

Bid 2.0 identified infrastructure investments related to Olympic Games venues and public infrastructure that would be needed to host the Olympic Games. We have evaluated the potential costs and identified benefits and risks associated with these investments.

1. Venues

The cost of the 69,000-seat temporary *Olympic Stadium* was estimated at $175.5 million. This estimate is much lower than the costs of other Olympic Stadiums, in part because past stadiums were built as permanent structures. Moreover, construction of the temporary stadium would have also entailed operational risks, related to the construction of the underlying platform and relocation of existing facilities, increasing the risk of cost overruns.

Estimates for the *Aquatic Center* and *Velodrome* totaled $133.6 million. These estimates were also low relative to other Olympic Games, and were complicated by uncertainty as to location and whether the venues would be permanent or temporary.

The cost of the *IBC/MPC* was estimated to be $50.5 million, including post-Olympic legacy conversion costs. These construction costs are 90 percent lower than those of the IBC/MPC for the London Olympic Games, and the contingency provision appears low by industry standards.

Boston 2024 also envisioned using 31 other venues to host the Olympic events, some permanent, some temporary, and some of which would have been pre-existing facilities, requiring upgrades. The cost for these facilities was estimated to be $558.4 million, although the contingency provisions in the estimates for all venues were low by industry standards. This number was derived from estimates of direct construction costs plus 10 to 15 percent more for indirect costs and an additional five percent contingency provision for unforeseen circumstances.

Newly constructed facilities that become permanent venues may generate *operating deficits* beyond their legacy benefits, for which taxpayers would be ultimately responsible, if they are underutilized after the Olympic Games. For example, many of the venues in Athens have fallen into disrepair since the 2004 Olympic Games. It is also possible for a host city to turn newly-built Olympic facilities into profitable venues, as Barcelona was able to do with its Palau Sant Jordi.

2. Public Infrastructure Investments

The largest category of public infrastructure investments was related to transportation projects; Bid 2.0 identified 17 such projects: 11 that would have needed to be completed by 2023 to support the Olympic Games and an additional six to support post-Olympic development.

We consulted with the Massachusetts Department of Transportation and the MBTA (collectively, "MassDOT") to evaluate the estimated costs and benefits of the Bid 2.0 projects. MassDOT's review, however, is necessarily preliminary because each project was still at a conceptual, or even pre-conceptual, stage and lacked the level of detail needed for a full assessment.

Several of the transportation projects identified by Boston 2024 have previously been identified by MassDOT as priorities; some are even currently underway. Others, however, are not viewed as high priorities. If undertaken to support the Olympic Games, these projects could have displaced other projects that might otherwise have been a higher priority to the Commonwealth.

Moreover, Bid 2.0 appeared to assume that the projects could have been completed in time for the Olympic Games; an accelerated timetable may have driven the costs higher than estimated because of such factors as increased overtime and prices for materials. Even if cost were not an issue, the projects would still have required attention from MassDOT, which could have displaced other priorities.

a. MBTA Investment Projects

Boston 2024 identified 11 MBTA-specific projects necessary for the Olympic Games or to support post-Olympic legacy development with an estimated total cost of $2.76 billion, $167 million of which would have been funded by private developers. Three of these projects that Boston 2024 estimated would have cost nearly $1.66 billion have already been funded and are underway. To complete these projects in time for the Olympic Games, the Commonwealth would have had to fund the MBTA at a higher level and at an earlier time than is currently projected.

The projects that were identified as required to support the Olympic Games (as well as to provide long-term benefits) primarily related to (1) vehicle procurement, (2) power and signal upgrades to rail lines, and (3) relocation of the Cabot Bus Facility.

- *Vehicle Procurement:* The MBTA has already funded three of the projects identified in the bid, and they are already underway. The cost of those projects was over $220 million less than estimated in Bid 2.0. However, MassDOT has stated that these vehicle procurements would not have achieved the capacity that Boston 2024 envisioned, and to do so could have increased costs by $60 to $100 million. Overall, however, these projects are estimated to cost between $50 and $90 million less than Boston 2024's estimate.
- *Power and Signal Upgrades:* The MBTA believes that Boston 2024 had not taken account of various considerations, which could have increased the costs by approximately $1.1 to $1.3 billion, if they were able to be completed at all prior to 2023.
- *Cabot Yards Relocation*: Boston 2024 estimated the incremental cost for fitting out the new location of the bus facility to be $61 million. The MBTA believed that significant factors not considered could have increased the cost by $140 to $240 million. *Indeed, if potential problems with relocating the facility could not have been resolved, the entire Midtown development project could have become infeasible.*

Boston 2024 identified three additional MBTA projects with an estimated total cost of $256 million that would have provided legacy benefits for post-Olympic development, but that were not necessary for hosting the Olympic Games. The MBTA believed that those projects would have cost an additional $40 million to $50 million beyond the Boston 2024 estimate, not including increased operation and maintenance costs.

b. Road Investment Projects

Bid 2.0 identified six road investment projects that either would have been necessary for the Olympic Games or that would have supported post-Olympic legacy development for a total cost of $220 million to $320 million: $120 million to $220 million from the Commonwealth of Massachusetts and $100 million from the private developers. Based on its preliminary assessments, MassDOT estimated at least $70 million more in additional costs for these projects. MassDOT also expressed concern as to whether the projects could be completed prior to the

Olympic Games, and noted the inconvenience to residents and local businesses during construction. A number of the projects had too little information to even make a conceptual cost estimate.

F. The Economic Impacts of Bid 2.0

We also performed an analysis of the potential economic impacts of hosting the 2024 Olympic Games. It is important to note that measuring the economic impacts associated hosting the Olympic Games is not necessarily the same as measuring the net benefits. We did not endeavor to estimate the net benefits.

Based on estimates of Olympic Games-related expenditures, adjusted to account for spending source and the proportion of services provided locally, we estimate that Pre-Olympic Games expenditures would have generated approximately 29,250 job-years and $5.67 billion of output over the six years leading up to the Olympic Games; and during-Olympic Games expenditures would have generated approximately 30,300 job-years and $4.63 billion of output during the year of the Olympic Games. To put these figures into perspective, the number of jobs would have been less than one percent of Massachusetts residents employed as of June 2015, and the contribution of the Olympic Games to Commonwealth GDP would also have been less than one percent.

Our estimates measured only *incremental* Olympics and infrastructure projects; thus, our estimates do not reflect the impact of projects currently part of any long-term development plan.

Our results are necessarily sensitive to key input assumptions, such as the share of jobs filled by local firms and the local labor pool, and local versus non-local funding. The model provides estimates for 50 to 75 percent of new dollars being paid to Massachusetts firms. To the extent a lower share would have been paid to in-state firms, the total job-years created would have been less. Alternative assumptions as to output and employment multipliers would also affect the estimate of economic impact.

About The Brattle Group

The Brattle Group ("Brattle") is a global consultancy specializing in economics, finance, and regulation. We work with corporations, law firms, and governments around the world to answer complex economic and financial questions in litigation and regulation, develop strategies for changing markets, and make critical business decisions.

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Our corporate headquarters is based in Cambridge, MA and we also have offices in New York, San Francisco, Washington, Toronto, London, Madrid, and Rome. With eight offices and more than 250 staff around the world, we provide local support and a global perspective.

About Allen R. Sanderson

Professor Sanderson is a senior lecturer in economics at the University of Chicago. He has previously served eight years as associate provost of the University of Chicago; and has also been a senior research scientist at NORC. He is an oft-cited authority on sports economics issues, a contributor to op-ed pages on sports and non-sports topics in newspapers around the country and a frequent guest on national and Chicago-area television and radio programs. His recent professional journal articles and book chapters are on the economic impact of colleges and universities on their communities; the political economy of Chicago's unsuccessful bid to host the 2016 Olympic Games; and an article in the Winter 2015 *Journal of Economic Perspectives* on "The Case for Paying College Athletes." Professor Sanderson has also evaluated and consulted on matters involving the economics of sports infrastructure, such as the 2004 New York Jets proposed stadium in the Hudson Woods area on Manhattan; the 2016 Chicago bid; and the 2015 NFL Draft on Chicago.

About Brad Humphreys

Professor Humphreys is a professor in the College of Business and Economics, Department of Economics at West Virginia University. He holds a Ph.D. in economics from the Johns Hopkins University. He previously held positions at the University of Illinois at Urbana-Champaign and the University of Alberta. His research on the economics and financing of professional sports, the economics of gambling, and the economics of higher education has been published in academic journals in economics and policy analysis, including the Journal of Urban Economics, the Journal of Monetary Economics, the Journal of Policy Analysis and Management, the Journal of Economic Behavior and Organization, Empirical Economics, Public Finance Review, and Regional Science and Urban Economics. He has published more than 80 papers in peer-reviewed journals in economics and public policy. He twice testified before the United States Congress on the economic impact of professional sports teams and facilities.

About Floyd Advisory

Floyd Advisory LLC ("Floyd") has offices in Boston and New York. Founded in 2009, Floyd is a consulting firm providing financial and accounting expertise in business strategy, valuation, SEC reporting, and transaction analysis. The firm consists of approximately 25 professionals, including Certified Public Accountants, financial analysts, and transaction and valuation experts. Floyd's clients include law firms, private equity firms, Fortune 500 companies, SEC Registrants, boards of directors, corporate officers and closely held companies.

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