

Economic Contributions of the Potential Amazon HQ2 in Maryland

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Submitted to:
The State of Maryland & Montgomery County, MD

February 2018

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Economic Contributions of HQ2 in Montgomery County, MD

Executive Summary

On January 18th, 2018, Amazon announced that Montgomery County was one of 20 finalists considered for HQ2. The State of Maryland and Montgomery County commissioned Sage Policy Group, Inc. (Sage) to analyze the economic and fiscal benefits associated with the development of Amazon's second headquarters (HQ2) within the County. It is important to note that any incentive packages associated with the development do not factor into this analysis.

Amazon intends to invest more than \$5 billion in support of HQ2, which is ultimately set to accommodate as many as 50,000 high paying direct jobs. In addition to Amazon's direct hiring and investment, construction and ongoing operation of Amazon's HQ2 is expected to create tens of thousands of additional jobs and tens of billions of dollars in additional investment in the surrounding community, including on housing.

This analysis endeavors to quantify both direct and secondary economic impacts prospectively flowing from the development and operations of HQ2. In order to produce externally and internally consistent estimates of economic impact, Sage used IMPLAN economic modeling software. IMPLAN has emerged as an industry standard for analyses of this type.

Economic impacts are presented in terms of jobs-created, related employee compensation, and output (business activity). Fiscal impacts were generated implicitly via IMPLAN and verified using effective tax rates calculated from data made available by the Maryland Comptroller's Certified Annual Financial Report. While there will be spillover effects into D.C. and Northern Virginia, the following analysis enumerates the employment, income, and business sales that will occur in Montgomery County, Anne Arundel County, Baltimore City, Baltimore County, Frederick County, Howard County, and Prince Georges County, otherwise known as the County Level impacts. Economic spillover is determined implicitly within the IMPLAN model.

Total economic impact may turn out to be far larger than the estimates in this analysis suggest due to shifting economic structure. Local entrepreneurship would presumably accelerate, local Port activity would blossom more rapidly, and there would be an expected expansion in international travel through BWI. All of this would translate into many more jobs – jobs not built into the estimates supplied in this report.

Key Analytical Findings

- Capital investments required to build HQ2 will support more than 50,000 jobs, nearly \$3 billion in employee compensation and nearly \$7.4 billion in augmented business sales in Maryland;
- Upon full build out HQ2 will annually support more than 101,000 jobs in Maryland, nearly \$7.7 billion in employee compensation, and more than \$17 billion in increased economic activity;
- The capital investment phase of HQ2 will create one time tax revenues in excess of \$110 million at the county level and more than \$190 million at the State level; and
- Ongoing, annual fiscal impacts will exceed \$280 million at the county level and \$482 million for the State.

Introduction

The State of Maryland and Montgomery County commissioned Sage Policy Group, Inc. (Sage) to analyze the economic and fiscal benefits associated with the potential development of Amazon's second headquarters (HQ2) within the county. On January 18th, 2018, Amazon announced that Montgomery County was one of 20 finalists being considered for HQ2. That shortlist represents a small fraction of the 238 communities that submitted proposals in response to Amazon's RFP.

According to a January 18th press release from the company, Amazon "plans to invest more than \$5 billion and grow this second headquarters to accommodate as many as 50,000 high paying jobs. In addition to Amazon's direct hiring and investment, construction and ongoing operation of Amazon HQ2 is expected to create tens of thousands of additional jobs and tens of billions of dollars in additional investment in its community."¹

The original RFP² specifies an initial three phases of capital investment. These initial phases will account for as much as 3 million square feet and up to \$2 billion in capital investments. While the final campus may exceed 8 million square feet and require more than \$5 billion in investments, phases IV and beyond are not as definitely planned as the initial phases.

This analysis endeavors to quantify additional jobs, compensation, and local business sales associated with both a partially and a fully built-out HQ2. Sage used IMPLAN economic modeling software³, an industry standard, to develop custom models capable of estimating economic and fiscal impacts stemming from the proposed investment.

Economic impacts are presented in terms of net new jobs created, associated employee compensation, and augmented output measured in terms of business sales. Impacts are presented for the initial three phases of capital investment and for the fully developed HQ2. Fiscal impacts are generated within our IMPLAN model and verified for accuracy by hand using effective tax rates calculated with data made available within the Maryland Comptroller's Certified Annual Financial Report.

¹ Amazon.com, Inc., Press Release: Amazon Announces Candidates for HQ2, January 18th, 2018 <http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=2327285>

² Amazon.com, Inc., Amazon HQ2 RFP, September 7, 2017, https://images-na.ssl-images-amazon.com/images/G/01/Anything/test/images/usa/RFP_3._V516043504_.pdf

³ See Appendix A for additional detail on IMPLAN.

I. Methodology

IMPLAN-generated employment estimates are presented in the form of full-time equivalents (FTE), meaning that one job is the equivalent of one year of full-time employment. Labor income encompasses all forms of employment income including employee compensation (wages and benefits) and proprietor income (earnings of business owners). Output represents the sum of business sales (goods and services) that occur as a result of capital investments. Impacts associated with ensuing operations are covered later in this report and are organized similarly.

Economic impacts are presented in the form of **direct** and **secondary** impacts. Direct impacts quantify the immediate effects of Amazon’s capital investments within the study area, all of which is subsumed in Maryland. Secondary impacts can collectively be considered the multiplier effect, and can be segmented into two types of impacts—**indirect** and **induced**. Indirect benefits are generated through the expanded volume of business-to-business transactions attributable to a larger local economy. For instance, increased spending at restaurants due to an influx of construction laborers will likely lead to increased sales among local food distributors. These broader supply chain effects are captured in the category of indirect effects. Induced benefits are triggered when workers primarily or secondarily supported through enhanced economic activity spend their earnings in the study area.

Note that the study area specified within the model includes Montgomery County, Anne Arundel County, Baltimore City, Baltimore County, Frederick County, Howard County, and Prince Georges County. To the extent that expenditures by businesses or consumers take place beyond the study area’s boundaries, they are not considered in Sage’s impact estimates. Appendix A at the end of this report supplies additional detail regarding the inner workings and the outputs of the IMPLAN model.

II. Capital Investment Impacts: 50,000+ Jobs, \$2.9 Billion in Compensation

- Economic Impacts

Amazon expressed in its initial RFP plans to invest more than \$5 billion in capital investment over the first 15-17 years of HQ2. Approximately \$1.26-\$1.99 billion of that investment is anticipated to fall under the umbrella of the initial three development phases. To help stakeholders understand the ramifications of HQ2, this analysis supplies impacts by respective phase and for the total \$5 billion capital investment. Note that impacts pertaining to capital investments occur only once while impacts associated with operations are presumed to last into economic perpetuity.

The estimated \$600 million of direct investment in Phase I will support more than 4,000 direct jobs and more than 6,550 jobs once multiplier effects are fully considered. Those jobs will be associated with an estimated \$385 million in employee compensation and more than \$950 million in bolstered economic activity measured in terms of business sales.

The impacts associated with Phase II are slightly larger and will encompass more than 6,900 jobs, \$407 million in employee compensation, and more than \$1 billion in bolstered economic activity. Phase III will produce impacts of similar magnitude – 7,060 net new jobs, \$406 million in employee compensation, and nearly \$1.1 billion in augmented business sales.

Exhibit 1: Economic Impacts Generated by Capital Investments in Maryland (\$2017)

	Jobs (FTEs)	Employee Compensation	Business Sales
<i>Phase I</i>			
Direct effects	4,111	\$253,317,801	\$576,871,701
Indirect effects	774	\$49,522,294	\$136,293,692
Induced effects	1,668	\$82,434,267	\$241,697,637
Total	6,552	\$385,274,362	\$954,863,030
<i>Phase II</i>			
Direct effects	4,340	\$267,464,910	\$609,088,415
Indirect effects	817	\$52,287,979	\$143,905,323
Induced effects	1,761	\$87,037,996	\$255,195,792
Total	6,918	\$406,790,885	\$1,008,189,530
<i>Phase III</i>			
Direct effects	4,142	\$253,450,828	\$647,715,216
Indirect effects	1,161	\$65,769,732	\$188,136,490
Induced effects	1,756	\$86,799,405	\$254,496,337
Total	7,060	\$406,019,965	\$1,090,348,043
<i>Phase IV to Completion</i>			
Direct effects	18,627	\$1,147,904,471	\$2,614,082,402
Indirect effects	3,505	\$224,409,269	\$617,612,096
Induced effects	7,557	\$373,549,208	\$1,095,247,938
Total	29,689	\$1,745,862,948	\$4,326,942,436
<i>Total</i>			
Direct effects	31,220	\$1,922,138,009	\$4,447,757,734
Indirect effects	6,257	\$391,989,274	\$1,085,947,601
Induced effects	12,741	\$629,820,877	\$1,846,637,704
Total	50,218	\$2,943,948,160	\$7,380,343,039

Source: Sage, IMPLAN

Phase IV and any additional phases of capital investment needed to bring HQ2 to full build out will support nearly 30,000 additional jobs, more than \$1.7 billion in employee compensation, and more than \$4.3 billion in net new economic activity. In total, HQ2 development will support approximately 50,200 jobs (FTEs), more than \$2.9 billion in employee compensation, and nearly

\$7.4 billion in augmented business sales in Maryland. **These 50,000 jobs should not be confused with the permanent, ongoing jobs that Amazon expects to create once a fully developed HQ2 is fully operational.** Jobs described in this section relate only to HQ2 development.

Moreover, jobs supported outside of the study area, including in the District of Columbia and in Northern Virginia have not been estimated and are not included in our findings.

Among those 50,000 jobs created during the capital investment phase, more than half will fall into the sector *construction of other new nonresidential buildings*. While Amazon itself may be associated with high-paying jobs that typically require a college degree or more, a majority of the jobs created during the capital investment phase of HQ2 will be accessible to a broad swath of Marylanders. See Exhibit 2 for additional summary detail.

Exhibit 2: Capital Investment Phase Jobs by Sector

Sector	Jobs (FTEs)
Construction of other new nonresidential builds	27,077
Maintenance and repair construction services	4,241
Wholesale trade	1,097
Real estate	818
Hospitals	679
Full-service restaurants	675
Limited-service restaurants	672
Architectural, engineering, and related services	555
Other	14,404
Total	50,218

Source: Sage, IMPLAN

- **Fiscal Impacts**

Capital investments required to develop Amazon’s HQ2 in Montgomery County will also create a set of one time, nonrecurring fiscal impacts. These impacts, which will occur at both the State and local levels, stem from both direct and indirect economic effects. Note that in this section of the report these impacts correspond only to capital investments required to build the headquarters and do not represent operational-related impacts. These are discussed later. Furthermore, county-level impacts pertain to all seven jurisdictions included within the study area, although the majority of the impacts will occur within Montgomery County.

Complete development of Amazon’s HQ2 will create approximately \$112 million in augmented tax revenue at the County level. The bulk of this will flow to Montgomery County through direct income and property tax effects, though indirect and induced activities will also augment local tax

revenues as far north within Maryland as Frederick and Baltimore Counties. This tally includes approximately \$64 million in property taxes and nearly \$34 million in income taxes.

At the State level, tax receipts will increase by an estimated \$190 million over the duration of development, including roughly \$84 million in sales tax revenues, \$62 million in income tax revenue, and more than \$10 million in nontax revenues (e.g., fees, and permits).

Exhibit 3: Fiscal Impacts Generated by Capital Investments (\$2017)

Line Item	Tax Receipts
<i>County Level</i>	
Income Tax	\$32,678,164
Nontax (Fines & Fees)	\$2,280,362
Property Tax	\$63,849,748
Other	\$13,042,075
Total	\$111,850,349
<i>State Level</i>	
Income Tax	\$61,623,132
Motor Vehicle Licensing Fees	\$2,437,715
Nontax (Fines & Fees)	\$10,496,619
Property Tax	\$7,128,013
Sales Tax	\$83,888,928
Other	\$24,645,026
Total	\$190,219,433

Source: Sage, IMPLAN

III. Operational Impacts: 100,000+ Jobs, \$7.7 Billion in Annual Compensation

- Economic Impacts

Sage used the following assumptions to model the annual, repeating impacts that will occur as the result of HQ2's operations in Montgomery County.

1. HQ2 reaches the stated goal of 50,000 employees earning an average of \$100,000;
2. HQ2 matches the Seattle Headquarters total number of annual hotel nights by visitors (233,000 in 2016) and those guests pay the 2016 average room rate for the Washington area;⁴
3. The amount paid into the region's public transportation system through employees' transportation benefits matches that of the Seattle Headquarters (\$43 million from 2010 to 2017, or \$6.1 million per annum).

⁴ Hotels.com Hotel Price Index™ 2016. The average rate for the Washington Area was \$226 per night.

In total, HQ2 will support more than 101,000 annual jobs within the study area. This tally includes both direct and secondary jobs (see Exhibit 4). Those jobs will be associated with approximately \$7.7 billion in employee compensation and more than \$17 billion in augmented Maryland business sales. As with estimates pertaining to development phase impacts, these estimates exclude any spillover impacts in the District of Columbia and in Northern Virginia.

Exhibit 4: Economic Impacts Generated by HQ2 Operations (\$2017)

	Jobs (FTEs)	Employee Compensation	Business Sales
Direct effects	52,651	\$4,967,987,245	\$10,224,555,370
Indirect effects	19,681	\$1,315,481,612	\$3,432,980,851
Induced effects	28,983	\$1,407,175,957	\$4,158,163,853
Total	101,314	\$7,690,644,814	\$17,815,700,074

Source: Sage, IMPLAN

- Fiscal Impacts

The operation of HQ2 upon full build-out will support a set of annual, ongoing fiscal impacts. Again note that county level impacts occur across all seven municipalities included in the study area, though the bulk of the impacts take place in Montgomery County. County level tax receipts within the study area will increase by approximately \$280 million per annum, including nearly \$73 million in annual income tax collections. At the State level, tax receipts will increase by nearly \$483 million per annum. Bolstered income tax revenues will total more than \$138 million while annual sales tax revenues are estimated above \$219 million. Exhibit 5 supplies relevant summary detail.

Exhibit 5: Fiscal Impacts Created by HQ2 Operations (\$2017)

Line Item	Tax Receipts
<i>County Level</i>	
Income Tax	\$73,555,088
Nontax (Fines & Fees)	\$5,132,854
Property Tax	\$169,307,442
Other	\$32,154,109
Total	\$280,149,493
<i>State Level</i>	
Corporate Tax	\$39,653,567
Income Tax	\$138,707,152
Nontax (Fines & Fees)	\$23,626,776
Property Tax	\$18,689,454
Sales Tax	\$219,954,464
Other Taxes	\$41,948,635
Total	\$482,580,048

Source: Sage, IMPLAN

Conclusion

If Amazon selects Montgomery County, it will be because of the county's combination of astonishing institutional strength, phenomenal schools, diverse and highly educated population, and proximity to the nation's capital. Other Maryland communities stand to be large beneficiaries, with Amazon's presence ultimately expected to support more than 101,000 net new positions and nearly \$7.7 billion in annual employee compensation in the study area. State of Maryland tax revenues will be enhanced by nearly \$500 million/annum.

Conceivably, total economic impact may turn out to be far larger than these estimates suggest. Sage's estimates represent an analysis of what would occur if Amazon's HQ2 were situated in Maryland as it is presently structured. But the presence of Amazon would likely transform key aspects of the state's economy. Entrepreneurship related directly or indirectly to e-commerce, cyber-security, big data analysis, and other segments would accelerate. Activity at the Port of Baltimore and at Tradepoint Atlantic (itself a port facility) may also accelerate, which would presumably translate into more aggressive investment in structures to support logistics in Baltimore, Cecil County, Washington County, and elsewhere in Maryland.

The presence of HQ2 would also likely induce more foreign visitors to Maryland, perhaps helping to fuel more international flights to and from BWI. This enhanced interaction would also have the potential to advance Maryland's engagement with the balance of the world, potentially stimulating exports and inviting in more global investment. All of this would translate into many more jobs – jobs not built into the estimates supplied in this report.

Appendix A – IMPLAN

IMPLAN is an economic impact assessment software system. The system was originally developed and is now maintained by the Minnesota IMPLAN Group (MIG). It combines a set of extensive databases concerning economic factors, multipliers and demographic statistics with a highly refined and detailed system of modeling software. IMPLAN allows the user to develop local-level input-output models that can estimate the economic impact of new firms moving into an area as well as the impacts of professional sports teams, recreation and tourism, and residential development. The model accomplishes this by identifying direct impacts by sector, then developing a set of indirect and induced impacts by sector through the use of industry-specific multipliers, local purchase coefficients, income-to-output ratios, and other factors and relationships.

There are two major components to IMPLAN: data files and software. An impact analysis using IMPLAN starts by identifying expenditures in terms of the sectoring scheme for the model. Each spending category becomes a "group" of "events" in IMPLAN, where each event specifies the portion of activity allocated to a specific IMPLAN sector. Groups of events can then be used to run impact analysis individually or can be combined into a project consisting of several groups. Once the direct economic impacts have been identified, IMPLAN can calculate the indirect and induced impacts based on a set of multipliers and additional factors.

Economic benefits principally take the form of new employment opportunities, associated income and augmented business revenues. These economic benefits include both direct benefits, which are closely associated with the activities that will take place in and around HQ2 and secondary benefits that are associated with foreseeable and calculable multiplier effects.

Secondary benefits can be segmented into two types of impacts, indirect and induced. Indirect benefits are related to the business-to-business transactions that take place due to increased demand for goods and services that accompanies augmented investment and business operations. Impacted businesses sell everything from office furniture and copiers to computer and graphic design services. Induced benefits are created when workers directly or indirectly supported by increased economic activity spend their earnings in the local economy. Indirect and induced benefits together comprise total multiplier effects.

The hallmark of IMPLAN is the specificity of its economic datasets. The database includes information for five-hundred-and-twenty-eight different industries (generally at the three or four digit Standard Industrial Classification level), and twenty-one different economic variables. Along with these data files, national input-output structural matrices detail the interrelationships between and among these sectors. The database also contains a full schedule of Social Accounting Matrix (SAM) data. All of this data is available at the national, state, and county level.

Another strength of the IMPLAN system is its flexibility. It allows the user to augment any of the data or algorithmic relationships within each model in order to more precisely account for regional relationships. This includes inputting different output-to-income ratios for a given industry,

different wage rates, and different multipliers where appropriate. IMPLAN also provides the user with a choice of trade-flow assumptions, including the modification of regional purchase coefficients, which determine the mix of goods and services purchased locally with each dollar in each sector. Moreover, the system also allows the user to create custom impact analyses by entering changes in final demand. This flexibility is a critically important feature in terms of the Sage proposed approach. Sage is uniquely qualified to develop data and factors tailored to this project, and, where appropriate, overwrite the default data contained in the IMPLAN database.

A final advantage of IMPLAN is its credibility and acceptance within the profession. There are over five hundred active users of IMPLAN databases and software within the federal and state governments, universities, and among private sector consultants. The following list provides a sampling of IMPLAN users.

Sample of IMPLAN Users:

Academic Institutions

Alabama A&M University
 Albany State University
 Auburn University
 Cornell University
 Duke University
 Iowa State University
 Michigan Tech University
 Ohio State
 Penn State University
 Portland State University
 Purdue University
 Stanford University
 Texas A&M University
 University of California – Berkeley
 University of Wisconsin
 University of Minnesota
 Virginia Tech
 West Virginia University
 Marshall University/College of Business

Federal Government Agencies

Argonne National Lab
 Fed. Emergency Man. Agency (FEMA)
 US Dep't of Agriculture, Forest Service
 US Dep't of Ag., Econ Research Service
 US Dep't of Int., Bureau of Land Mgmt.
 US Dep't of Int., Fish and Wildlife Serv.
 US Dep't of Int., National Parks Service
 US Army Corps of Engineers

State Government Agencies

MD Dep't of Natural Resources
 Missouri Department of Economic Development
 California Energy Commission
 Florida Division of Forestry
 Illinois Dep't of Natural Resources
 New Mexico Department of Tourism
 South Carolina Employment Security
 Utah Department of Natural Resources
 Wisconsin Department of Transportation

Private Consulting Firms

Coopers & Lybrand
 Batelle Pacific NW Laboratories
 Boise Cascade Corporation
 Charles River Associates
 CIC Research
 BTG/Delta Research Division
 Crestar Bank
 Deloitte & Touche
 Ernst & Young
 Jack Faucett Associates
 KPMG Peat Marwick
 Price Waterhouse LLP
 Sage Policy Group, Inc.
 Economic Research Associates
 American Economics Group, Inc.
 L.E. Peabody Associates, Inc.
 The Kalorama Consulting Group
 West Virginia Research League