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## Economic Impact Study: Grand Rapids Public Museum Proposed Redesign and Expansion

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# Grand Rapids Public Museum Proposed Redesign and Expansion

An Economic Impact Study prepared by Grand Valley State University

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# EXECUTIVE SUMMARY

## Scope of work

The Grand Rapids Public Museum (GRPM) has formalized a proposal to renovate and expand the current building (built in 1994). The proposed redesign and expansion include:

- A \$39.8M addition to the south end of the building;
- Expanding rental space to accommodate larger groups and allow multiple events simultaneously;
- Different pricing strategies for each floor of the museum.

Grand Valley State University was retained to evaluate the economic impact on the local region caused by the redesign and expansion. The economic impact will include the construction phase and the annual benefit of operations. This analysis will also include a catalytic impact from GRPM.

COVID-19 disclaimer: This economic impact study does not factor in the economic or social impact of the COVID-19 pandemic.

## Methodology

This report focuses on the economic impact caused by the redesign and expansion of the Grand Rapids Public Museum. Economic impact is the amount of economic activity that GRPM generates within a defined region. For the purpose of this report, the local region is defined as Kent County. Displacement spending is excluded.

Data was collected from GRPM, a survey of past GRPM visitors, and a survey of non-visitors. The surveys were administered via email (to past visitors) and Facebook (to non-visitors).

The economic impact is estimated using the Regional Input-Output Modeling System (RIMS II). This modeling system uses multipliers developed by the U.S. Department of Commerce Bureau of Economic Analysis.<sup>1</sup> These multipliers provide a way to measure the complete economic impact that the initial change in demand has on the local economy. These secondary effects come in two forms:

- Indirect Effects**            Increase in sales by businesses that are suppliers to restaurants, hotels, retail stores, etc.
- Induced Effects:**            Increased economic activity by individuals in the area who received extra income due to the increase in direct spending.

The RIMS II multipliers report economic impact in three ways:

- Gross Output**            Gross output is the total economic activity, including the sum of intermediate inputs and the value they add to the final good or service. The intermediate inputs are the resources used in the production of final goods and services. It should be noted that gross output can be overstated if the intermediate inputs are used multiple times in the production of other goods and services.
- Earnings**                    Earnings measures the increases in wages, salaries and proprietors' income as a result of the initial change in demand. This can also be stated as an increase in household income for every \$1 change in demand.
- Employment**                Employment is the increase in jobs (full-time and part-time) for every \$1 million change in demand. This measurement does not distinguish between a full-time or part-time employee. It also does not account for employees who moved from one job to another within the defined economic region. Thus it does have a tendency to overstate the number of jobs created.

This report relied on information provided by GRPM. For specific methodology, see Appendix.

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<sup>1</sup> Please note that the BEA does not endorse any estimates or conclusions concerning the study presented here.

## Summary of Economic Impact

- Visitors to the museum generate \$32.2M in economic output, which supports 310 jobs.
- The expansion construction spending will lead to \$43.8M in economic output during the construction phase.
- There were 363,701 visitors to the museum in 2019. These visitors generated economic activity that, on averaged, exceeded one day of spending: 1.11 days to be precise.
- Visitors to the museum visited 2.29 times per year.
- 38.10% of those who have never visited the museum said they would visit after the expansion and redesign.
- Approximately 50% of those who have never visited the museum said they would visit multiple times after the expansion and redesign.
- 30% of past visitors said they would take advantage of access to updated outdoor spaces along the river front and Pearl Street.
- Survey respondents viewed experimental learning and technology integration as important approaches to learning.

## BACKGROUND

Founded in 1854, the Grand Rapids Public Museum's current facility opened on the west bank of the Grand River in 1994. In 2017, the River for All project launched, which focuses on ways to enhance access and recreational activities as part of an initiative to restore rapids to the Grand River. The Grand Rapids Public Museum was selected as an opportunity site in 2018.

With the museum selected as an opportunity site, and currently operating at capacity, the GRPM has formalized a proposal to renovate and expand the current building. The proposed redesign and expansion include:

- A \$39.8M addition to the south end of the building. This addition will include a new, larger café and a new entrance to the museum. The café will have a partnership with the Grand Rapids Community College (GRCC) culinary program.

- Expanding rental space to accommodate larger groups and allow multiple events simultaneously.
- Different pricing strategies for each floor of the museum.

The redesign and expansion will lead to more exhibits, updated outdoor space along the riverfront, more outdoor learning opportunities, expanded retail, and expanded community programming. The final determination of these items will be based on feedback from the visitor surveys.

## VISITOR SURVEY

The visitor survey was broken into two parts: Survey of past museum visitors and a survey of people who have never visited the museum. The visitor survey was delivered by email to people who visited GRPM within the previous twelve months. Due to the COVID-19 pandemic, the non-visitor survey was administered through social media (Facebook) through posts sponsored by the Economics Department of GVSU and targeted to people in various zip codes of Kent County. All survey respondents were asked to affirm that they were over the age of 18.

The survey of past visitors included questions on the planned redesign and expansion, the importance of certain activities, and spending patterns outside of the museum. There were 1,900 responses to the visitor survey.

The non-visitor survey focused on the redesign and expansion and also asked respondents to rank the importance of certain activities. This information was used to determine if the changes proposed would cause non-visitors to visit; measuring this change demonstrates the catalytic effect of the proposed redesign and expansion. It should be noted that due to a low response rate, the initial non-visitor survey was shortened. There were 33 responses to the initial non-visitor survey and 176 responses to the shortened survey.

The following are selected graphs from the visitor survey. Additional information can be found in [Appendix A: Survey of visitors](#).

Figure 1: What planned features of the Museum's expansion do you expect to take advantage of in the future?

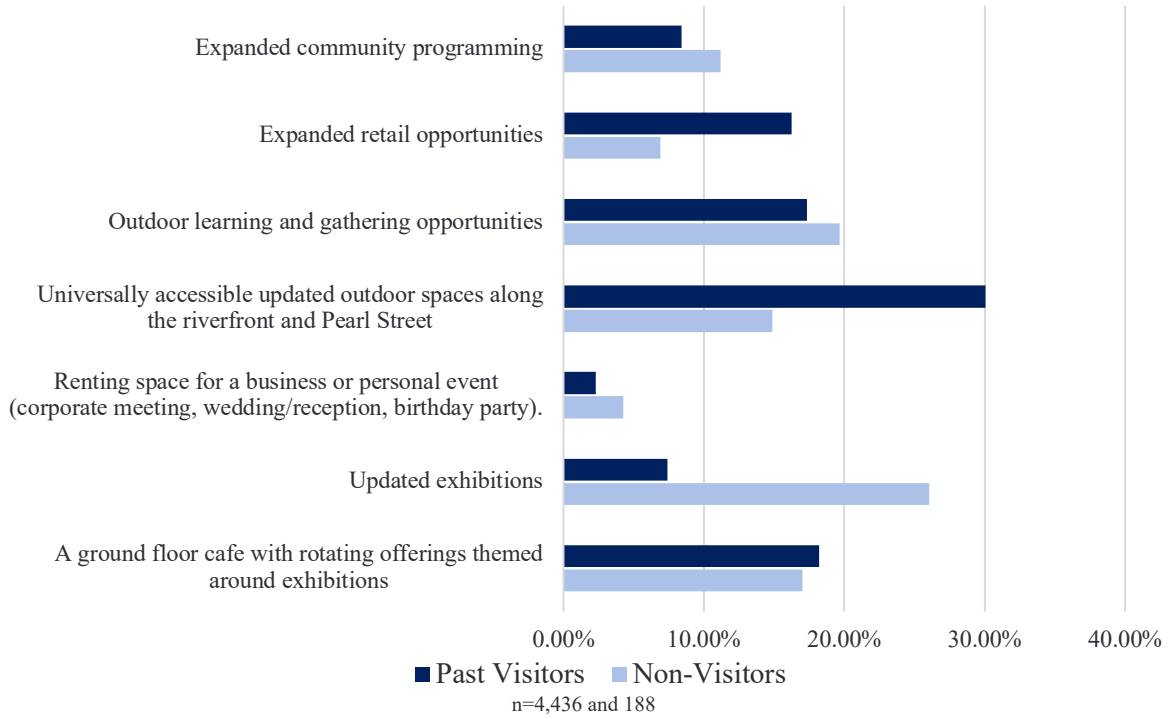


Figure 2: Visitor response: the importance of pricing

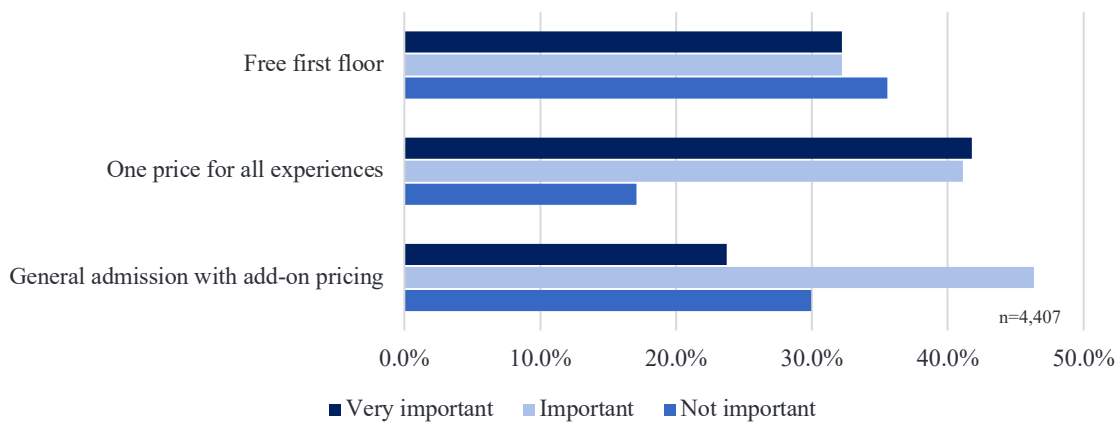




Figure 3: Museum visitors: importance of a proactive approach to learning.<sup>2</sup>

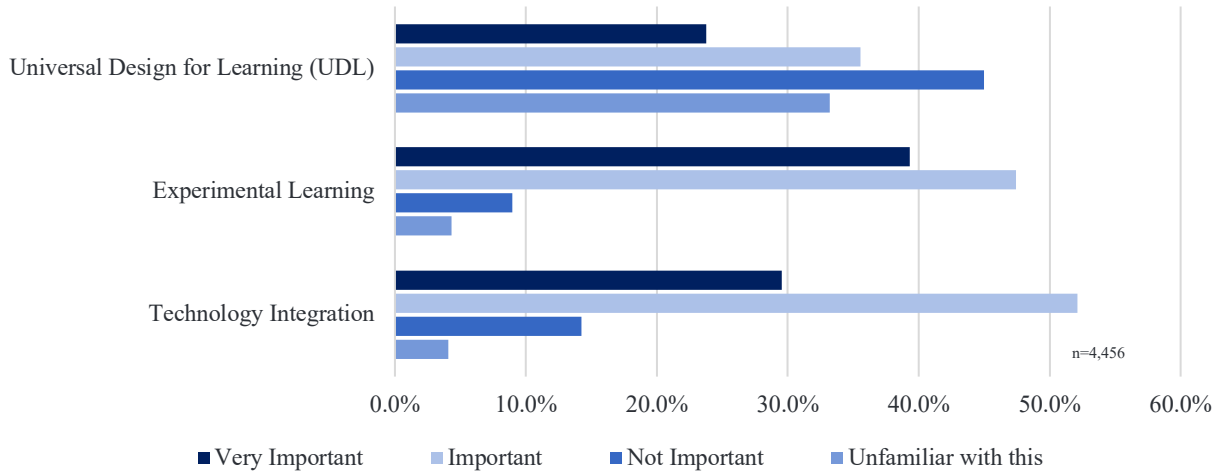
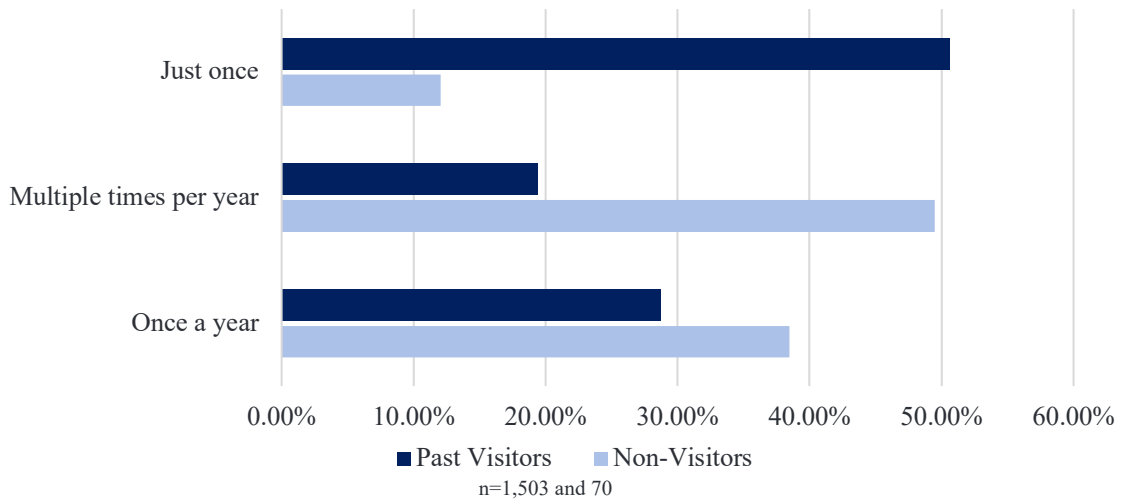


Figure 4: After the proposed Grand Rapids Public Museum expansion is completed, how frequently do you anticipate visiting?



<sup>2</sup> Non-visitors were asked in the long version, however there were not enough responses to be statistically significant.

## ECONOMIC EFFECTS

This section will estimate the economic impact of visitors to the museum, construction spending, GRPM operations, and the catalytic impact caused by the redesign and expansion.

### Economic impact of visitors to Grand Rapids Public Museum

The GRPM reported 363,701 visitors to the museum in 2019. This figure includes all ticketed admissions and group events (corporate, weddings, etc.). Per the survey of past visitors, 52.58% of these visitors originated from outside of Kent County. Table 1 shows total visitor counts for 2019.

Table 1: Total visitors to Grand Rapids Public Museum

Total visitors to GRPM	Local	Nonlocal
Percentage of visitors	47%	53%
Total local and nonlocal visitors	172,467	191,234
Total Visitors	363,701	

The survey asked respondents if the primary reason for visiting Kent County was the GRPM, how many days they visited, and how many times they visit the GRPM per year. This data is summarized in Table 2 and Figure 5 below.<sup>3</sup>

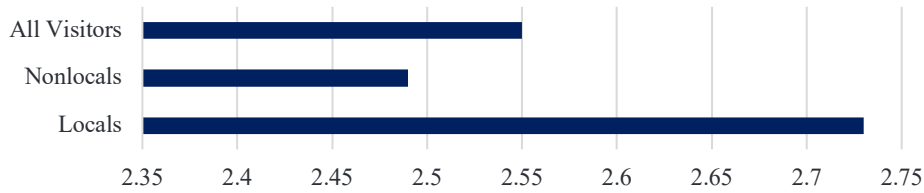
Table 2: Total visitor days based on the reason for their visit

	Local Primary	Nonlocal Primary	All Visitors <sup>4</sup>
Visitors to GRPM	30%	67%	100%
Total visitors	51,893	128,127	363,701
Number of days per visit	1.02	1.08	1.11
Total visitor days	52,931	138,377	403,708

<sup>3</sup> For additional spending data, broken out by visitor type, see [Appendix B-1: Visitor Days, Visitor spending and Economic Impact](#)

<sup>4</sup> This is all visitors regardless of reason for being in Kent County.

Figure 5: Annual visits by primary visitors



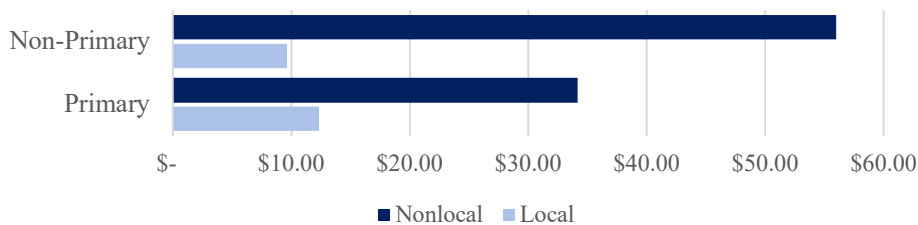
This economic analysis focuses on total visitors to GRPM regardless of whether or not the visit to the museum was their primary reason for being in Kent County. As reported earlier, there were 363,701 visitors to the museum in 2019. The survey data showed these visitors stayed 1.11 days per visit. Table 3 summarizes visitor days for all visitors to GRPM.

Table 3: Visitor days based on total visitors to the museum

Total visitors to GRPM	363,701
Number of days per visit	1.11
Total visitor days for all visitors	403,708 <sup>5</sup>

Visitors to the museum spent, on average, \$27.66 per person, per day. To avoid double counting of expenditures, this figure does not include any spending inside the museum. Spending within the museum is captured in GRPM operational spending (see [Economic Impact of Operational Spending](#)). Figure 6 below summarizes the average spending by visitor type.

Figure 6: Average per person, per day spending by visitor type



<sup>5</sup> In 2016, there were 348,798 visitor days

With 403,708 visitor days, this spending results in approximately \$10.2M in direct spending<sup>6</sup>. Using the BEA RIMS II multipliers, we can now estimate the economic impact from these visitors (see Table 4).<sup>7</sup>

Table 4: Estimated impact of all visitors to GRPM

Total direct spending	\$10.2M
Indirect and induced impact	\$5.5M
Total economic output	\$15.7M
Total earnings	\$4.7M
Total employment	154

We can use the survey data to itemize the “net new” money spent in Kent County. Net new money is based on spending by non-local visitors who visited Kent County for the primary purpose of visiting GRPM. The data shows that these visitors spent, on average, \$34.19 per person, per day. Nonlocal primary visitors generated 138,377 visitor days, resulting in total direct spending of \$4.3M. This direct spending generated \$6.6M in economic output and supported 65 jobs (see Table 5).<sup>8</sup>

Table 5: Economic impact from nonlocal visitors who visited primarily for GRPM

Total direct spending	\$4.3M
Indirect and induced impact	\$2.3M
Total economic output	\$6.6M
Total earnings	\$2.0M
Total employment	65

<sup>6</sup> In 2016, direct spending totaled \$6.6M.

<sup>7</sup> The total economic output in 2016 was \$11M. For additional spending data, broken-out by visitor type, see [Appendix B-1: Visitor Days, Visitor spending and Economic Impact](#)

<sup>8</sup> For additional spending data, broken-out by visitor type, see [Appendix B-1: Visitor spending and Economic Impact](#)

## Economic Impact of Construction Spending for Museum Redesign and Expansion

Total project cost of the proposed redesign and expansion is \$39.8M, with the assumption that 72% of those costs are spent within Kent County.<sup>9</sup> We will also assume that 90% of the construction cost is new money.<sup>10</sup> The construction phase will last from 2021 to Q1 2025. The economic impact figures presented in Table 6 represent the total impact over the entire construction phase.<sup>11</sup>

Table 6: Economic impact of construction costs

Net construction costs	\$25.8M
Indirect and induced impact	\$18.0M
Total economic output	\$43.8M
Total earnings	\$11.3M
Total employment	221

## Economic Impact of Operational Spending

The GRPM spends approximately \$8.4M a year, with \$1.2M used for exhibit construction. This spending results in additional economic output of \$12.5M and supports 177 jobs. Table 7 summarizes the annual economic impact based on GRPM annual spending.<sup>12</sup>

Table 7: Economic impact of operational spending

Total economic output	\$12.5M
Total earnings	\$4.1M
Total employment	117

<sup>9</sup> The 72% is an estimate based on other similar economic impact studies.

<sup>10</sup> The 90% is a transfer from other economic impact studies. We are assuming that 10% of the construction costs would occur in Kent County whether or not the museum was renovating or expanding.

<sup>11</sup> For complete methodology, see [Appendix B-2: Economic Impact of Construction Costs](#).

<sup>12</sup> In 2016, total economic output for operational spending was \$13M. For complete methodology, see [Appendix B-4: Economic Impact of Operational Spending](#).

## Catalytic Impact of GRPM Redesign and Expansion

We surveyed individuals who have never visited the GRPM to see if the planned redesign and expansion would cause them to visit and if so, how often. The results are presented in Figure 7 and Figure 8. These results are based on the percentage of survey respondents that answered the survey question, not based on all survey responses.

Figure 7: Do you anticipate visiting the Grand Rapids Public Museum because of the proposed redesign and expansion?

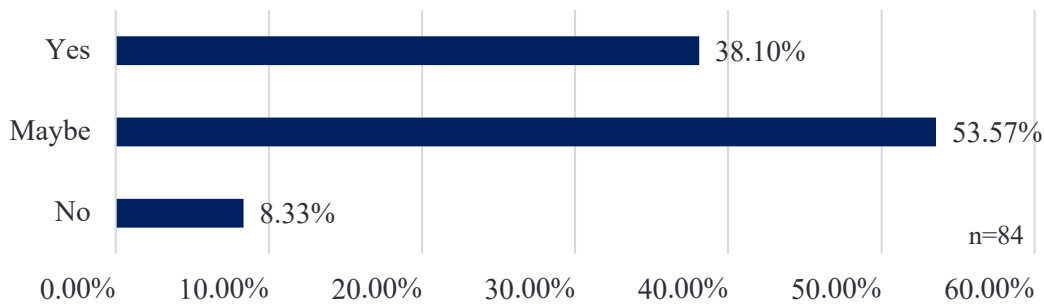
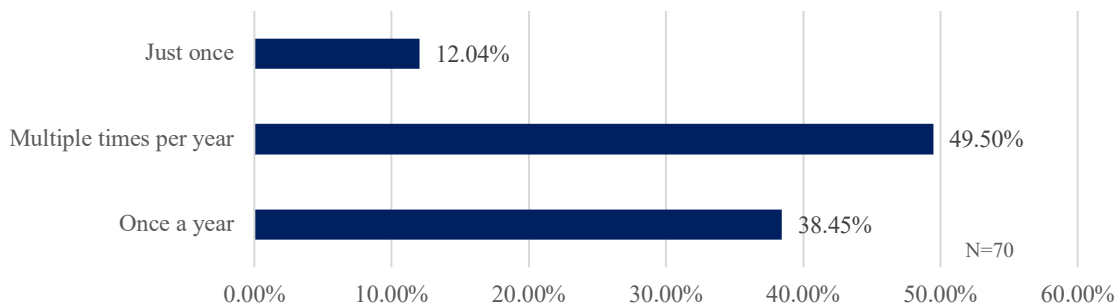


Figure 8: After the proposed Grand Rapids Public Museum expansion is completed, how frequently do you anticipate visiting?



When we factor in all survey responses (n=196), approximately 16.33% would visit after the expansion. We assumed those who answered “maybe” were a no. Based on this data, we project, with 95% confidence, an increase of 58,471 visits as a result of the redesign and expansion. This represents a 16.08% increase in visits to GRPM (compared to 2019 data). Table 8 summarizes this information.<sup>13</sup>

Table 8: Projected increase in visits to GRPM

Percentage that would visit after the expansion	16.33%
Confidence interval (based on 95%)	7%
Low projected increase (95% confidence)	58,471
Projected % change in visits over 2019	16.08%

Assuming the same spending patterns as all visitors, we can project the redesign and expansion will generate an additional \$2.3M in economic output, supporting 22 jobs. These impact figures are presented in Table 9.<sup>14</sup>

Table 9: Increase in economic impact from redesign and expansion

Increase in direct spending	\$1.5M
Indirect and induced impact	\$802,000
Total economic output	\$2.3M
Total earnings	\$683,000
Total employment	22

<sup>13</sup> For a more detailed methodology, see [Appendix B-3: Catalytic Effect](#)

<sup>14</sup> For a more detailed methodology, see [Appendix B-3: Catalytic Effect](#)

## Summary of Total Economic Impact

The economic impact of GRPM is driven by four factors: Visitors to the museum, annual spending on operations, redesign and expansion construction spending, and the catalytic effect from the redesign and expansion. The economic impact of the redesign and expansion will occur during the construction phase. The other three factors are annual economic impacts based on current data. Table 10 and table 11 summarize the economic impact of GRPM. It should be noted a measure of the economic impact of the GRPM excludes long-term economic, cultural, and educational impacts.

Table 10: Economic impact of construction costs

Net construction costs	\$25.8M
Indirect and induced impact	\$18.0M
Total economic output	\$43.8M
Total earnings	\$11.3M
Total employment	221

Table 11: Annual economic impact of all visitors, GRPM operations, and the catalytic effect

Total direct spending	\$19.2M
Indirect and induced impact	\$11.3M
Total economic output	\$30.5M
Total earnings	\$9.5M
Total employment	293

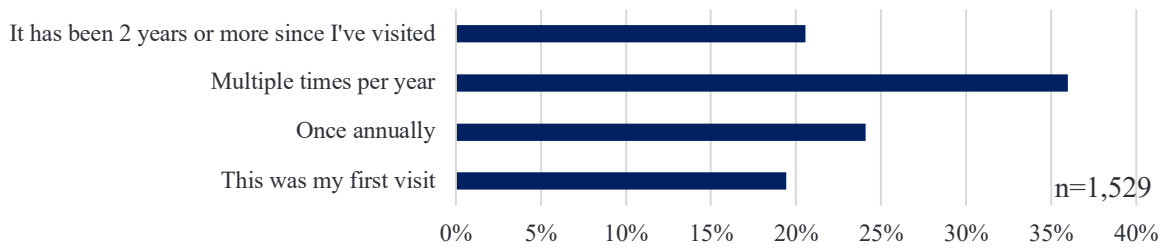


# APPENDIX

## A-1: Survey of Visitors

The remaining survey results are illustrated below.

Figure A-1a: Visitor frequency



The average party size was 3.37 adults with 2.25 children under 17. A more detailed break-out is presented in Figure A-1b below.

Figure A-1b: Average party size

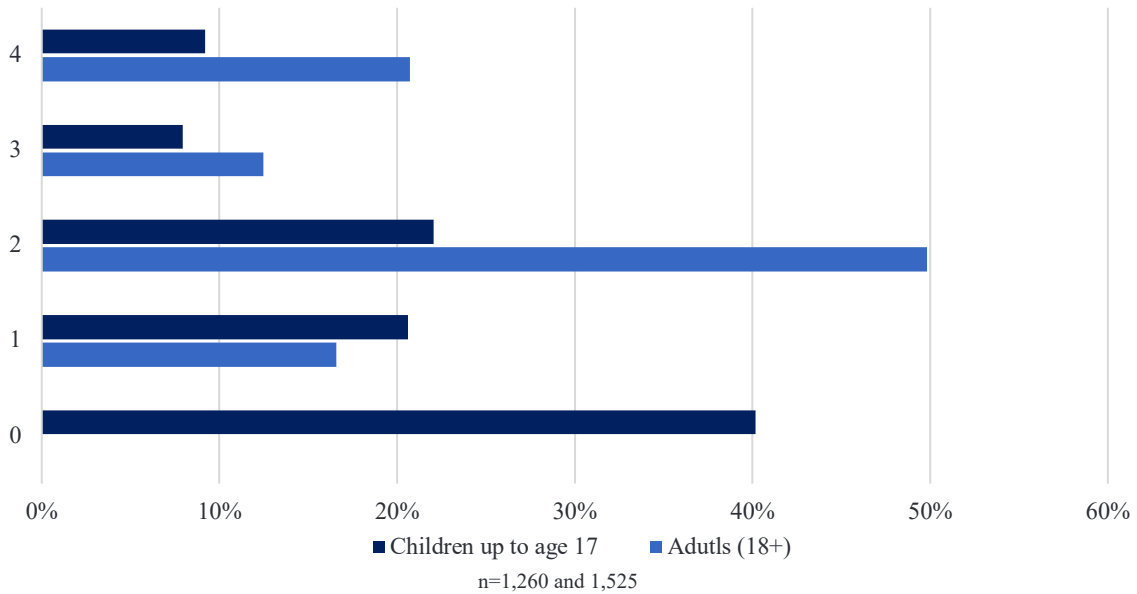


Figure A-1c: Visits by month

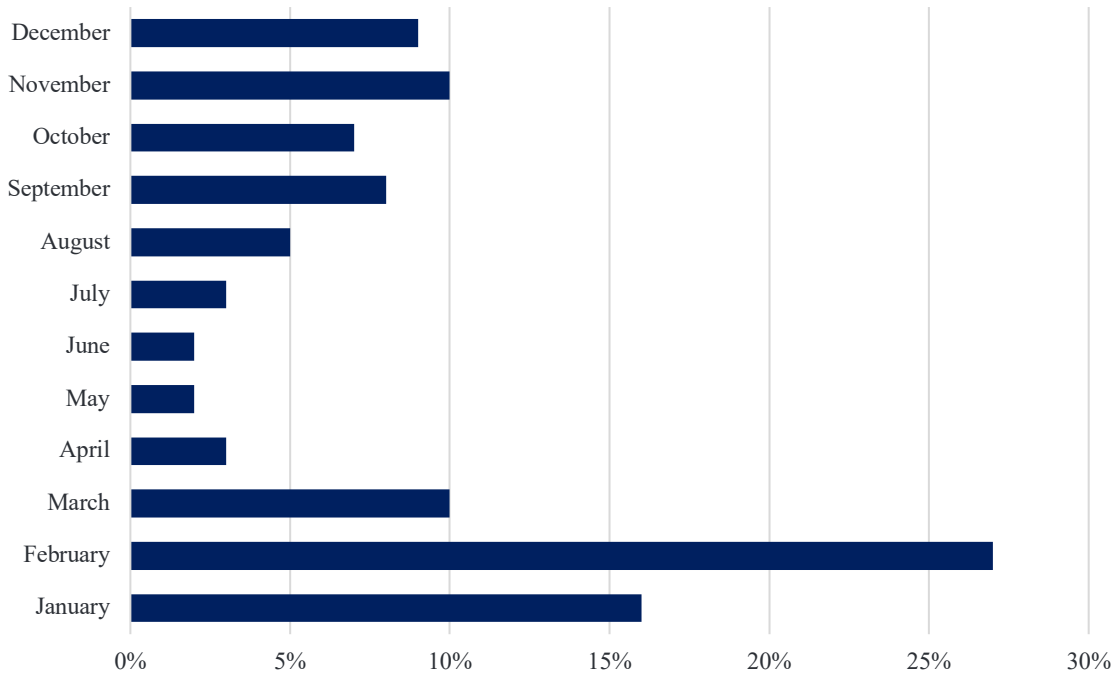


Figure A-1d: Visitor age distribution

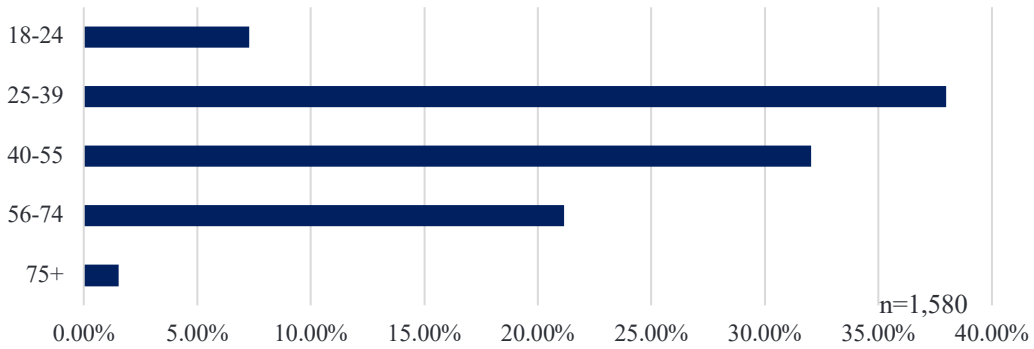
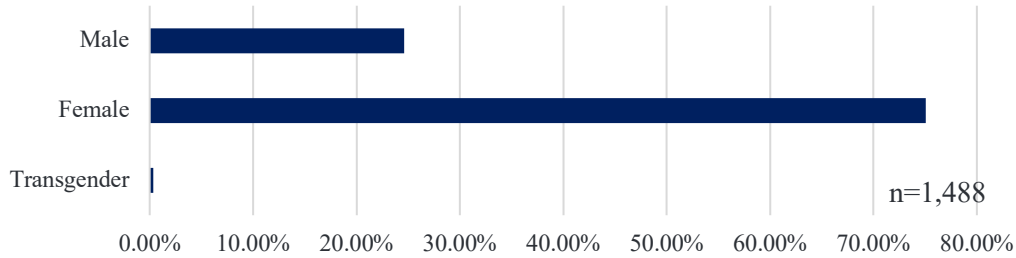


Figure A-1e: Visitor gender distribution



## B-1: Visitor Days, Visitor Spending, and Economic Impact

### Visitor Days

Table B-1a shows the methodology for total visitor days, which was used for [Table 3](#) in the main report. Table B-1b breaks this data down into visitor origination and reason for visit. This data is for informational purposes and was not used in the main report (the main report used all visitors regardless of origination). A nonlocal resident is one who lives outside the defined economic region (Kent County). A primary visitor is one who visited Kent County for the primary purpose of visiting the museum.

Table B-1a: Total visitor days

# of survey observations	1,527
Total visitors (provided by GRPM)	363,701
Number of days per visit	1.11
Total visitor days	403,708 <sup>15</sup>

<sup>15</sup> In 2016, there were 332,189 visitors who stayed on average 1.05 days for total visitor days of 348,798.

Table B-1b: Total visitor days based on origination and reason for visit

	Local			Nonlocal		
	Yes	No	Total	Yes	No	Total
# of survey observations	204	477	681	562	284	846
Primary reason for visit was GRPM	30.09%	69.91%	100%	67%	33%	100%
Total visitors	51,893	120,574	172,467	128,127	63,107	191,234
Number of days per visit	1.02	1	1.01	1.08	1.37	1.21
Number of visits per year	2.73	1.9	2.09	2.49	1.46	2.04
Total visitor days	52,931	120,574	174,192	138,377	86,457	231,393

### Visitor Spending

Data in table B-1c and B-1d was used to calculate the economic impact figures as presented in the main report (Table 4). All visitors include those that visited primarily for GRPM and those that did not.

Table B-1c: Spending per person, per day by all visitors

Meals	\$12.77
Transportation	\$3.94
Shopping	\$4.87
Lodging	\$5.43
Other	\$1.15
Total spending	\$27.66

Table B-1d: Direct spending for all visitors

Meals	\$4,953,498.51
Transportation	\$1,590,609.95
Shopping <sup>16</sup>	\$983,029.25
Lodging	\$2,192,135.04
Other	\$464,264.33
Total spending	\$10,183,537.07

This data breaks out spending by visitor origination (local vs. nonlocal) and purpose of visit (primary vs. nonprimary). A nonlocal resident is one who lives outside the defined economic region (Kent County). A primary visitor is one who visited Kent County for the primary purpose of visiting the museum. The nonlocal, primary spending data was used for [Table 5](#) in the main report.

Table B-1e: Spending per person, per day by visitor origination and purpose

	Local		Nonlocal		All visitors	
	Primary	Nonprimary	Primary	Nonprimary	Primary	Nonprimary
Meals	\$7.04	\$5.33	\$16.29	\$19.71	\$13.83	\$10.70
Transportation	\$2.07	\$1.27	\$5.98	\$5.75	\$4.94	\$2.94
Shopping	\$2.24	\$1.96	\$6.71	\$8.01	\$5.52	\$4.22
Lodging	\$0.31	\$0.64	\$4.05	\$19.90	\$3.06	\$7.83
Other	\$0.67	\$0.46	\$1.16	\$2.63	\$1.03	\$1.27
Total spending	\$12.33	\$9.66	\$34.19	\$56.00	\$28.38	\$26.96

<sup>16</sup> Assumed retail margin of 50%

Table B-1f: Direct spending by visitor origination and purpose

	Local		Nonlocal	
	Primary	Nonprimary	Primary	Nonprimary
Meals	\$372,631.37	\$642,660.89	\$2,254,159.90	\$1,704,065.20
Transportation	\$109,566.33	\$153,129.33	\$827,493.93	\$497,127.09
Shopping <sup>17</sup>	\$59,282.26	\$118,162.79	\$464,254.54	\$346,259.82
Lodging	\$16,408.48	\$77,167.54	\$560,426.49	\$1,720,492.01
Other	\$35,463.50	\$55,464.17	\$160,517.22	\$227,381.61
<b>Total spending</b>	<b>\$593,351.94</b>	<b>\$1,046,584.72</b>	<b>\$4,266,852.09</b>	<b>\$4,495,325.73</b>

Economic Impact

Table B-1g is the economic impact of visitors based on visitor orientation and reason for their visit. A nonlocal resident is one who lives outside the defined economic region (Kent County). A primary visitor is one who visited Kent County for the primary purpose of visiting the museum. The nonlocal, primary spending data was used for [Table 5](#) in the main report.

Table B-1g: Economic impact based on origination and reason for visit

	Local			Nonlocal		
	Primary	Nonprimary	Total	Primary	Nonprimary	Total
Economic output	\$916,000	\$1.6M	\$2.5M	\$6.6M	\$6.9M	\$13.6M
Earnings	\$275,000	\$484,000	\$766,000	\$2.0M	\$2.1M	\$4.1M
Employment	9	16	25	65	68	133

<sup>17</sup> Assumed retail margin of 50%

## B-2: Economic Impact of Construction Spending

Total construction costs are \$39.8M. We need to account for money that will be spent outside of Kent County and factor in displacement spending. To account for money spent outside Kent County, we used 72%, which is a percentage used in other economic impact studies and is based on contractor provided information. To account for displacement spending, we discount the construction costs by 10%. This is a conservative estimation transferred from other impact studies. Table B-2 presents the methodology that was used for the economic impact presented in [Table 6](#) of the main report.

Table B-2: Construction spending

Total construction costs (provided by GRPM)	\$39,800,000
Percentage spent locally	72%
Total locally spent construction costs	\$28,656,000
Percentage considered 'new' spending	90%
Net total construction costs	\$25,790,400

## B-3: Catalytic Effect

The catalytic effect measures the increase in attendance and economic impact due to the redesign and expansion. To measure the catalytic effect, we surveyed individuals who have never visited the GRPM to see if the planned redesign and expansion would cause them to visit and if so, how often. The survey was initially distributed with additional questions on the museum, however due to a low response rate, the survey was shortened. The ideal sample size for a 5% confidence interval is 384 usable surveys<sup>18</sup>. We received 196 usable surveys, which increased the confidence interval to 7%. Table B-3a shows the survey response breakdown.

<sup>18</sup> The confidence interval is also called the margin of error.

Table B-3a: Survey response breakdown

Number of responses to long survey	33
Number of responses to shortened survey	176
Total survey responses	209
Usable surveys for catalytic effect	196
Sample size needed for a 5% confidence interval	384
Actual confidence interval based on sample size	7%

The zip code distribution showed 87.3% of the usable surveys came from Kent County and 3.57% of the survey's came from Ottawa County. The remaining 9.1% were spread among various counties. Based on this zip code distribution, we used the population of Kent County and the population of Georgetown Township (Ottawa County). The rationale for using Georgetown Township is that it is the most populated area of Ottawa County and it is the closest to GRPM. If our sample size had been larger, we would have used all of Ottawa County. Table B-3b shows the population breakdown.

Table B-3b: Population breakdown

Kent County population <sup>19</sup>	656,955
Georgetown Township population <sup>20</sup>	52,637
Total population	709,592
Unique visitors to the museum <sup>21</sup>	82,520
Net population after removing unique visitors	627,072

<sup>19</sup> <https://www.census.gov/quickfacts/kentcountymichigan>

<sup>20</sup> <https://www.census.gov/quickfacts/georgetownchartertowsnipottawacountymichigan>

<sup>21</sup> There were 172,467 total local visitors to the museum. These visitors visited 2.09 times a year. This results in 82,520 unique visitors to the museum. To avoid double counting, these visitors are removed from the population count.



The survey results showed 16.33% of those surveyed would visit GRPM after the redesign and expansion (+/- 7%). Figure B-3a plots this percentage along with the error bars and Table B-3c summarizes the projected increase in visits based on the lower bound percentage (9.33% with 95% confidence).

Figure B-3c: Percentage that will visit GRPM after the redesign and expansion

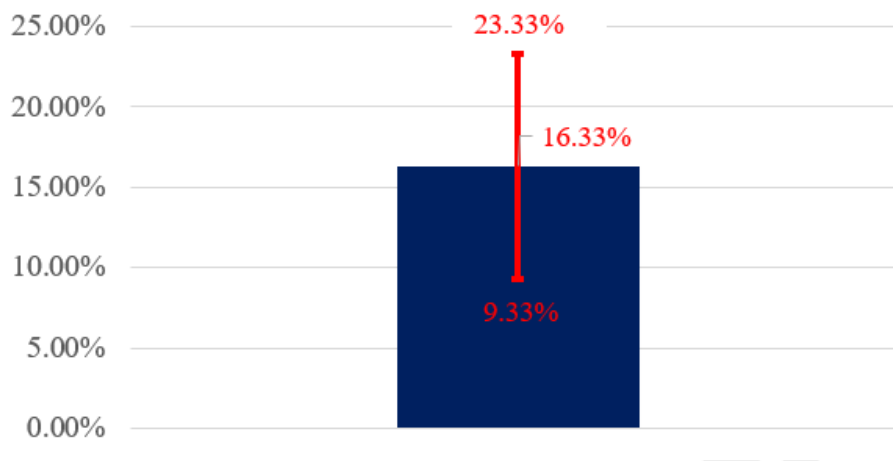


Table B-3c: Projected increase in visits

Net population after removing unique visitors	627,072
Lower bound percentage that would visit GRPM after redesign and expansion	9.33%
Projected increase in visits to GRPM after redesign and expansion (95% confidence) <sup>22</sup>	58,484
Percentage increase over 2019 total visitor count	16.08%

<sup>22</sup> If we assume the median percentage (16.33%), the projected increase in visits is 102,379, which represents a 28% increase over 2019 total visitor count (90% confidence).

Using the projected increase in visitors, we can estimate the increase in economic impact from the redesign and expansion. Assuming the same average spending patterns (\$27.66 per person, per day), the additional visitors will increase direct spending by \$1.6M, economic output by \$2.5M, earnings by \$749k, and will add 25 jobs. This data was used to create [Table 9](#) in the main report. Table B-3d summarizes the changes in economic activity.

Table B-3d: Economic impact from the catalytic effect

	Direct Spending	Economic Output	Earnings	Employment
Meals	\$717,599.32	\$1,107,471.04	\$332,176.73	10.86
Transportation	\$230,427.17	\$355,618.25	\$106,664.74	3.49
Shopping <sup>23</sup>	\$142,408.67	\$219,779.30	\$65,920.97	2.16
Lodging	\$317,568.40	\$490,103.32	\$147,002.41	4.81
Other	\$67,256.66	\$103,797.20	\$31,133.11	1.02
<b>Totals</b>	<b>\$1,475,260.22</b>	<b>\$2,276,769.10</b>	<b>\$682,897.96</b>	<b>22.33</b>

## B-4: GRPM Operations

Administrative and Support Services multipliers were used to determine the economic impact of operational spending. This data was used to create [Table 7](#) in the main report.

Table B-4a: Net operational spending

GRPM operations budget (2019)	\$8,400,000
Less: Annual exhibit construction budget	\$1,200,000
Net operations budget	\$7,200,000
Assume 90% is local	\$6,480,000

<sup>23</sup> Assumed a 50% retail margin

Table B-4b: Economic impact of operations

Economic output	\$10.7M
Earnings	\$3.7M
Jobs	107

## B-5: GRPM Annual Construction Spending

GRPM has an annual exhibit construction budget of approximately \$1.2M. To determine the economic impact, we assume 90% of that budget is spent locally. Unlike the expansion construction costs, we did not net out 72% for local construction employees because this annual spending occurs within the museum. This data was used to create [Table 7](#) in the main report.

Table B-5a: Net construction spending

GRPM annual construction budget (2019)	\$1,200,000
Assume 90% is local	\$1,080,000

Table B-5b: Economic impact of operations

Economic output	\$1.8M
Earnings	\$471,000
Jobs	9