

The University of Michigan Research Seminar in Quantitative Economics
The W.E. Upjohn Institute for Employment Research

June 6, 2019

**An Economic and Fiscal
Impact Assessment of the
Transformational Brownfield
Plan Submitted by Paper City
Development, LLC**

Vicksburg Paper Mill Redevelopment Project

Contents

Executive Summary..... 4

Analytical Focus 5

 Background of the Paper City Transformational Brownfield Plan 5

Summary of Michigan’s Transformational Brownfield Program 7

 What is a brownfield? 7

 What is a Transformational Brownfield Plan? 7

 Outline of Tax Incentives for Developers..... 8

 How is a TBP approved?..... 8

Methodology for Economic Impact Analysis 10

 Background: Substitution, Multipliers, and Net New Economic Activity 10

 Estimating Economic Substitution 11

 Estimating Local Economic Multipliers 12

 Basis for Assumptions and Projections 14

 Construction Impacts 14

 Soft Construction Costs..... 14

 Hard Construction Costs 15

 Tenant Improvements 15

 Producer Durables 16

 Capital Stock..... 16

 Operations Impacts..... 17

 Employment Impacts 17

 Avoiding Double Counting of Investment..... 22

 Tourism Impacts..... 22

 Amenity and Migration Impacts from Residential Construction 23

 Should We Account for the High Expected Incomes of Net New Residents? 24

 Accounting for Economic Impacts of Tax Incentives 24

 Adverse Scenario..... 25

Methodology for Fiscal Impact Analysis 27

 Definition of Net Fiscal Benefit 27

 Costs and Benefits Considered 27

 Measurement Period 27

 Discounting Cash Flows..... 27

Estimating the Increase in Tax Revenues Generated by the Proposed TBP	28
Business Taxes	29
Personal Income Taxes	29
Sales and Use Taxes	29
Gambling Taxes	30
State Property Taxes	30
All Other State Taxes.....	30
Computational Details	30
Results of Economic Impact Analysis.....	32
Adverse Scenario Impacts.....	37
Results of Fiscal Impact Analysis.....	39
Adverse Scenario Results	41
Limitations of the Analysis.....	43
References	45
Appendices.....	47

About This Series

The Transformational Brownfield Plan Assessment Series is a joint effort by the University of Michigan Research Seminar in Quantitative Economics (RSQE) and the W.E. Upjohn Institute for Employment Research to analyze fiscal and economic effects of Transformational Brownfield Plans, or TBPs. Michigan defines TBPs as brownfield plans that have a transformational impact on local economic and community revitalization while also having an overall positive fiscal impact on the state. State law requires economic and fiscal impact analyses for TBPs that request rewards of at least \$1.5 million. RSQE, in consultation with the Upjohn Institute, will produce up to 25 such analyses, five per year, for the Michigan Economic Development Corporation.

To ensure that each analysis can be read as a stand-alone report, some background material concerning the TBP program and analytical approach is repeated across this series of reports.

Executive Summary

This report presents an economic and fiscal impact analysis of the Transformational Brownfield Redevelopment Plan for the former Vicksburg Paper Mill in Vicksburg, MI proposed by Paper City Development, LLC (the proposed TBP). The analysis was conducted by a team of researchers from the University of Michigan Research Seminar in Quantitative Economics (RSQE) and the W.E. Upjohn Institute for Employment Research (Upjohn Institute).

We estimate that the proposed TBP will produce a net fiscal benefit of \$11.4 million to the state of Michigan on a net present value basis, measured in 2018 dollars. The estimated increase in state tax revenues generated by the proposed TBP through the end of our analysis period in 2053 is \$60.5 million, with a present value of \$19.9 million. The total estimated cost of the tax incentives for the developer is \$20.9 million, with a present value of \$8.6 million. We estimate that the increase in state tax revenues generated by the proposed TBP will be larger than the cost of the tax incentives in each year of the analysis period. The ratio of the present value of the increase in projected tax revenues to the present value of the total tax incentives is estimated to be 2.3 to 1.

We project that the proposed TBP will generate 220 jobs directly at the TBP site from 2024 to 2053, after the construction period of the project is complete and occupancy has stabilized. We estimate that the proposed TBP will create or support an annual average of 239 “net new” job additions statewide in that time. We further project that the proposed TBP will lead to an increase of nearly 480 new residents in Michigan by 2053, and an average increase in real statewide personal income of \$17.3 million per year, in 2009 dollars, over the entire analysis period 2018 to 2053.¹ The increase in real wage and salary income per net job addition averages \$41,200 per year over that period, reflecting the high proportion of net job additions in service industries.

We consider the assumptions in our baseline analysis to be conservative, but we also considered an adverse scenario with less favorable assumptions. In that scenario, the proposed TBP creates or supports an average of 187 net job additions statewide in the post-construction period. The estimated increase in state tax revenues generated by the proposed TBP through the end of our analysis period in 2053 is \$45.8 million, with a present value of \$15.6 million. The cost of the tax incentives also falls in this scenario, as there is less employee personal income tax withholding that can be captured; we estimate that the total cost of the tax incentives is \$19.9 million in the adverse scenario, with a present value of \$8.2 million. The proposed TBP generates a net fiscal benefit to the state of \$7.4 million in present value terms, and the benefit-cost ratio is estimated to be 1.9 to 1. Therefore, we conclude that the proposed TBP will produce a net fiscal benefit to the state of Michigan under a wide range of assumptions and economic circumstances.

¹ Throughout the report, income and wage results are generally reported in terms of 2009 dollars. This convention avoids conflating changes in income levels with changes in the local price level. We sometimes refer to these estimates as being “inflation-adjusted.” See the “Computational Details” section on page 30 for an additional discussion.

Analytical Focus

This document provides estimates of the economic and fiscal impacts on the state of Michigan of the Transformational Brownfield Plan (TBP) for the former Vicksburg Mill Redevelopment Project in Vicksburg, MI, submitted by Paper City Development, LLC to the Michigan Economic Development Corporation (MEDC).

The report was prepared by the University of Michigan Research Seminar in Quantitative Economics (RSQE), in consultation with the W.E. Upjohn Institute for Employment Research (the Upjohn Institute).² RSQE is the third-party contractor with the MEDC for the economic and fiscal impact analysis required by statute for Transformational Brownfield Plans that request to use more than \$1.5 million in any year from the combination of withholding tax capture revenues and income tax capture revenues.³

The Paper City TBP does not meet this threshold requirement, and the decision to use RSQE for third-party analysis of the economic and fiscal impacts was a discretionary decision made by MEDC, as permitted by the legislation.

The conclusions in this report are the sole responsibility of the report's authors. While conducting the analysis, we have made substantial reliance on data and projections provided by the developer of the proposed TBP, Paper City Development, LLC. We have attempted to verify the appropriateness of those key projections, but ultimately, we must rely on information provided by the developer regarding many key pieces of information to conduct the analysis. Material deviations of the actual development from the projections we have analyzed may cause the economic and fiscal impact on the state to be materially different than we project. Similarly, a materially different national or local business environment than we currently anticipate may also cause the economic and fiscal impact on the state to be materially different than we project.

Background of the Paper City Transformational Brownfield Plan

The proposed TBP that we assess in this report is the "Act 381 Combined Transformational Brownfield Plan" for "The Mill at Vicksburg" prepared by Phillips Environmental Consulting Services, Inc. and dated November 2, 2018. The developer for this project is Paper City Development, LLC (Paper City).⁴

The plan covers the redevelopment of "The Mill at Vicksburg," the site and buildings associated with a former paper mill in Vicksburg, MI, which began operation in 1905 with Lee Paper Company. The mill went through several ownership changes until it closed in January 2001 at a time when it was owned by the Fox River Paper Company. Although some of the warehousing and office sections of the property were used between 2005 and 2010, most of the property has remained vacant since the closing in 2001.

As the site of a former paper mill, it is not surprising that the property requires environmental remediation along several dimensions. The presence of soil, groundwater, and streambed sediment contamination by a host of pollutants makes the property a true brownfield in need of restoration. A

² RSQE and Upjohn received feedback on the analysis methodology from a panel of economic development experts for a previous TBP analysis. The methodology followed in the current analysis has not changed in a substantive way.

³ See section 14c(7) of State of Michigan Public Act 46 of 2017

⁴ A version of the official TBP document, Phillips (2018), approved by the Kalamazoo County Brownfield Redevelopment Authority is available here: <https://kalcountybrownfield.com/brownfield-plans/>.

component of Paper City's proposed TBP includes a full environmental remediation that will bring the property into compliance with state and federal environmental regulations.

Paper City's TBP envisions a mixed-use development with highlights that include:

- A new production site for Old Stove Brewery, a craft brewery located in Seattle, Washington that will be expanding its operations for the first time into Michigan;
- A Brewery Innovation Cluster that will serve as an incubator for up to fourteen start-up microbreweries;
- Taproom, beer garden, and other restaurant space;
- Nearly 100,000 square feet (SF) of indoor event space and 15,000 SF of office space;
- A boutique 40-room hotel;
- 34 one-bedroom apartments at 575 SF and 6 two-bedroom apartments at 2,000 SF for full-time residential tenants;
- A museum for the history of American brewing;
- Outdoor amenities that include event space, light agricultural production, and conservation areas protecting on-site wetland and woodland features.

The TBP submitted by Paper City calls for a total of \$20,894,110 in captured tax revenues based on its own estimates and projections.⁵ That total consists of 51 percent from the capture of property taxes; 7 percent from construction period sales and use tax exemptions; 4 percent from the capture of construction period income tax; 27 percent from withholding tax capture revenues of future employees at the site; and 11 percent from income tax capture from future residents at the site.⁶

Paper City estimates that the total investment costs for the project will come to \$80.8 million. Therefore, Paper City is projecting to offset approximately 26 percent of the investment costs with captured tax revenues, although the timing of the offsets will differ materially from the timing of the investments.

⁵ See Tables 1A–5 beginning on page 143 of the TBP. The estimate of total capture that we present in this report is slightly lower than the number in the publicly available TBP, linked in footnote 4, due to recent revisions. We are using the most up-to-date estimates as of May 2019.

⁶ The property tax capture represents reimbursements for the State Education Tax and the School Operating Tax.

Summary of Michigan’s Transformational Brownfield Program

In 2017, legislation was enacted to establish the Transformational Brownfield Plan (TBP) program in Michigan.⁷ The purpose of the legislation was to provide a new economic tool to motivate developers and businesses to renovate, rehabilitate, and more generally *transform* existing brownfields into local hubs of economic development and community revitalization. The program is directed at larger projects that not only provide modernized workspaces but also raise the amenity value of a place, helping to make Michigan more attractive for both current and prospective residents of the state.⁸ Under the program, developers with an approved TBP are able to capture a share of incremental tax revenue generated by the project for a specified period. We describe the program specifics briefly below. For a more detailed summary, see Michigan Economic Development Corporation (2019).

What is a brownfield?

A “brownfield” is typically defined as a property with either real or potential environmental contamination that restricts the property’s future uses. Under the TBP program, the term brownfield is expanded to include blighted, functionally obsolete, historic, and transit-oriented properties, as well as undeveloped properties that have previously been identified as brownfield-eligible under the existing brownfield program.⁹

What is a Transformational Brownfield Plan?

A TBP is defined as a brownfield plan that “will have a transformational impact on local economic development and community revitalization based on the extent of brownfield redevelopment and growth in population, commercial activity, and employment that will result from the plan.”¹⁰ The development of the brownfield must be for a mixed-use project that involves some combination of residential, office, retail, and hotel uses, and satisfies a minimum threshold of capital investment that varies by the population of the community containing the brownfield site, as shown in Table 1.

Table 1: Minimum Capital Investments by Community Population

Community Population	Minimum Capital Investment
Greater than or equal to 600,000	\$500,000,000
150,000 to 599,999	\$100,000,000
100,000 to 149,000	\$75,000,000
50,000 to 99,999	\$50,000,000
25,000 to 49,999	\$25,000,000
Less than 25,000	\$15,000,000

⁷ The TBP legislation consists of Michigan Public Acts 46–50 of 2017, which collectively amend the existing Brownfield Redevelopment Financing Act (Act 381 of 1996).

⁸ See State Fiscal Agency (2018), miplace.org, and MEDC (2019).

⁹ MEDC (2019).

¹⁰ Michigan Public Act 46 of 2017, MCL 125.2652 (vv).

Outline of Tax Incentives for Developers

A developer with an approved TBP can capture shares of specific incremental tax revenues that are generated by the project up to the amount specified by the TBP or for a defined number of years, whichever comes first. Incremental tax revenue is defined as the projected tax revenue generated by the site or sites of the proposed TBP minus the amount of tax revenue generated by the site(s) at the time that the TBP is adopted (i.e., before the project breaks ground). Before the TBP program was established, developers and localities could capture incremental *property* tax revenues, generally under the Brownfield Redevelopment Financing Act of 1996 (PA 381), for up to 30 years. That has not changed and remains one type of tax revenue that can be captured under an approved TBP. However, under Public Acts 46, 48, and 49 of 2017, the TBP program also allows developers to capture

- **Construction Period Income Tax Revenues:** 100 percent of the amount of state income tax levied and imposed in a calendar year upon wages paid to individuals physically present and working within the eligible property for the construction, renovation, or other improvement of eligible property that is an eligible activity within a transformational brownfield plan.
- **Construction Period Sales and Use Tax Exemptions:** Sales and use tax exemptions for all the purchase or acquisition of tangible personal property that will be affixed and made a structural part of the real property or infrastructure improvements included within the plan.
- **Income Tax Revenues:** 50 percent of the incremental income tax from individuals domiciled within the eligible property.
- **Withholding Tax Revenues:** 50 percent of incremental income tax withheld from individuals employed within the eligible property.

The captured revenues can be used to finance TBP eligible activities, which include “demolition, construction, restoration, alteration, renovation, or improvement of buildings or site improvements on eligible property, including infrastructure improvements that directly benefit eligible property” as well as activities typically associated with brownfield development, such as lead, asbestos, or mold abatement.¹¹

There are some limits to revenue capture by the developer. First, the tax revenue available to be captured will be limited to an amount that is necessary to make the project economically viable. In other words, the project would not be able to proceed as planned without the tax capture. In addition, while property tax can be captured for up to 30 years, the construction, income, and withholding tax revenues can be captured for up to 20 years.

The legislation sets other limits on total revenue captures across all TBPs over the life of the program. Income and withholding tax capture revenue is limited to a total of \$800 million across all projects, while construction period captures are limited to a total of \$200 million. Furthermore, the program sets an annual limit of \$40 million on nonconstruction income and withholding captures across all approved projects.

How is a TBP approved?

To approve a TBP, the developer must first receive approval from both the Brownfield Redevelopment Authority and the local unit of government where the project will be located. Next, the developer must

¹¹ See Michigan Public Act 46 of 2017, MCL 125.2652 (o) for a complete definition of eligible activities.

receive approval from the Michigan Strategic Fund (MSF), the agency responsible for overseeing the state’s economic development strategies. There are two key thresholds that must be satisfied to obtain MSF approval:

1. The TBP must be expected to result in an overall positive fiscal impact to the state net of tax capture. In other words, total state revenue collected because of the TBP, not including local taxes or other fees, must be expected to exceed the amount of tax captured by the developer.¹²
2. There must be a demonstrated gap in financing; that is, the TBP would not be executed as planned without the tax capture by the developer.

An additional requirement regards third-party analysis. For TBPs that propose to use more than \$1.5 million in withholding and income tax capture revenues in any single year, independent third-party analysis must be conducted on both key threshold questions above. In that case, the state treasurer must also agree with the conclusions of the third-party analysis before MSF can provide approval. For projects that do not meet the \$1.5 million threshold, the legislation permits the MEDC to use third-party analysis on a discretionary basis.

¹² The legislation does not provide a specific definition of the overall fiscal impact to the state. For the purposes of this report, it is defined based on state net revenues and does not include local taxes and user fees. See the section “Definition of Net Fiscal Benefit” below for additional detail.

Methodology for Economic Impact Analysis

The Michigan Economic Development Corporation (MEDC) stipulated in its Request for Proposals to conduct the TBP Economic and Fiscal Impact analysis that the analysis must be conducted using the REMI PI+ model (REMI model) developed by Regional Economic Models, Inc., or REMI. A description of the model and associated documentation is available at <http://www.remi.com/model/pi/>. The version of the model used for this analysis is the same version that the MEDC uses for its internal economic impact assessments; it contains 70 economic sectors and 83 geographical regions, one for each county in Michigan.

The economic impacts of a TBP will generally differ depending on its geographical location, reflecting different areas' industrial compositions and patterns of trade. To most accurately estimate those economic impacts, the model inputs are constructed and the model is run at the county level. The legislation establishing the TBP program, however, specifies that the relevant economic and fiscal impact for the evaluation of a TBP is at the state level. Therefore, the economic and fiscal impacts of the TBP have been aggregated to the state level for reporting purposes.

The economic impacts of a Transformational Brownfield Plan can typically be divided into several separate components. The analysis of this project is divided into four parts: (1) impacts from construction activity; (2) impacts from operations activity; (3) the amenity and migration impacts that result from the development; and (4) the economic effects of accounting for the cost of the tax incentives. Each is discussed below, after providing background related to the mechanics of the REMI model and the basis for the projections and assumptions underlying the impact assessment.

Background: Substitution, Multipliers, and Net New Economic Activity

Estimating a proposed TBP's net fiscal effect on the state of Michigan requires first estimating its impact on net new economic activity in Michigan. Net new economic activity is the increase in economic activity within the state of Michigan that would not have occurred without the development of the proposed TBP. It is conceptually distinct from the amount of economic activity that is projected to occur directly at the developed TBP sites, which is used for the calculation of the TBP developer's eligibility for tax incentives under the TBP legislation.

Quantifying the amount of net new economic activity in Michigan generated by a TBP requires accounting for two competing forces: substitution of economic activity and local economic multipliers. Economic substitution refers to the tendency of new economic development in an area to compete with and displace economic activity that already existed (or would have existed in the absence of the TBP) in the same geography. For instance, the opening of a retail store is likely to capture some sales that would otherwise have occurred at other stores nearby; it is therefore incorrect to treat all sales at the new store as net new economic activity in the area. Economic multipliers refer to the tendency of new economic activity to drive additional activity in the area. For instance, a new manufacturing plant will tend to purchase parts from the local area, creating jobs at local suppliers (jobs created at suppliers of a new project are often called indirect jobs). Additionally, the workers at the new plant will spend some of their new income on local goods and services, supporting additional employment in the area (jobs created by this increased spending in the broader economy are often called "induced jobs").

Economic substitution will tend to reduce the amount of net new economic activity within a geography generated by a TBP relative to the direct activity at the development site itself, but local economic

multipliers will generally increase the amount of net new activity. Therefore, the number of net new jobs in Michigan generated by a TBP can be either higher or lower than the number of direct jobs at the TBP sites. In contrast to the economic activity projected to occur at the proposed TBP sites, which the state can measure directly over time, the amount of net new economic activity generated by a TBP is not directly measurable and must be estimated using an economic model, even retrospectively. As noted, we have used the REMI PI+ model for the analysis, as stipulated in the MEDC's Request for Proposals.

Estimating Economic Substitution

The REMI model contains estimates of the share of new economic activity in an area that is expected to be exported or to reduce existing imports using data on gross trade flows between counties by industry. The gross trade flow estimates account for variance in trade between areas based upon the scale of supply and demand, distance, and industrial composition.¹³ Only the share of new activity in an area that is expected to be exported or to reduce imports is counted as the net new portion of the direct economic activity generated by the TBP.

It is important to note that although REMI's trade flows are estimated at the county level, the trade equations account for economic substitution across counties as well (for instance, a new development in Wayne County, Michigan could displace some economic activity in Oakland County, Michigan or vice versa). For the purposes of this analysis, all results are aggregated to the state level, so that the focus is on net new activity to the state of Michigan as a whole, rather than for any single county or group of counties.

An example should help to clarify the trade flow estimation in the REMI model. In 2016, the REMI model (v2.1) estimates that Wayne County will *produce* \$1.15 billion (2009 dollars) in manufactured food products and will *consume* \$2.79 billion of food products. Because Wayne County has relatively little food manufacturing, the REMI model estimates that a relatively high share of local production will be consumed within the county (\$0.59 billion, or 50.9 percent) and only 49.1 percent (\$0.57 billion) of production will be exported. Ottawa County Michigan, on the other hand, is expected to produce more food than it consumes (\$1.90 billion vs. \$0.83 billion). Consequently, Ottawa County consumes \$0.39 billion of its local production (20.4 percent) and exports the balance of its production (\$1.52 billion, or 79.6 percent). Based on the trade flow equations, Ottawa County will send \$18.3 million (2009 dollars) of manufactured food products to Wayne County. In contrast, Wayne County will only send \$680,000 (2009 dollars) of manufactured food products to Ottawa. Wayne County ships much of its food product exports to Oakland County (\$110.7 million) because Oakland County is relatively large, is geographically nearby, and, like Wayne County, has a high propensity to import food products.

The REMI model estimates that if a generic new firm entered Ottawa County and started producing \$100 million in manufactured food products, 78.8 percent of the production would be exported. The share of new production used to reduce imports would be negligible; in fact, manufactured food imports overall would increase slightly because the increase in local income would outweigh the import substitution effect. If that firm had instead located in Wayne County, only 48.4 percent of the

¹³ Technically, the REMI model uses estimated "gravity equations." The REMI trade flow equations are shown on pages 53 and 54 of http://www.remi.com/wp-content/uploads/2018/06/Model-Equations-v2_2.pdf.

production would be exported, and 24.4 percent of the production would reduce imports. In that case, Ottawa County's manufactured food exports to Wayne would decline by \$240,000.

The REMI model also incorporates the wide variation in the ease of exporting and importing different goods and services. Manufactured goods are relatively easy to trade between areas, whereas some services, such as retail trade, tend to be more difficult to trade. In the REMI model, the difficulty in trading retail trade services is reflected in a relatively high distance decay parameter governing trade between different areas, whereas food manufacturing has a relatively low distance decay parameter. Thus, retail trade activity in the REMI model primarily serves the local community.¹⁴

In some cases, it would be inappropriate to use the REMI model's default estimates of the share of economic activity that is net new. Those estimates are based on industry-wide averages and may not accurately reflect the specifics of the proposed TBP development. For instance, if a TBP developer proposes to add employees of a national firm that does the majority of its business outside of Michigan at the TBP sites, using the REMI average shares of activity that serve the local economy will be incorrect. In that case, it is possible to explicitly define the share of relevant direct employment at the project sites that is net new to Michigan.¹⁵

Estimating Local Economic Multipliers

The use of local economic multipliers, also known as input-output (I-O) multipliers, is well established in the regional economics literature. For instance, the Bureau of Economic Analysis (BEA) produces a set of regional I-O multipliers, known as the Regional Input-Output Modeling System or RIMS II, which are described as follows (Bureau of Economic Analysis, 2013, p. 1–2):

Regional I-O multipliers are based on a detailed set of industry accounts that measure the goods and services produced by each industry and the use of these goods and services by industries and final users. This detail allows for estimates of the impact of an initial change in economic activity on industries in a region. I-O models do not account for price changes that may result from increased competition for scarce resources.

The fact that the I-O multipliers in RIMS II do not account for price changes that may result from increased competition for scarce resources is equivalent to the assumption that factor supply is perfectly elastic across areas. In particular, this assumption implies that the supply of labor is unlimited at current market wages. Such assumptions are much more likely to be accurate in the long run than in the short run. Therefore, these multipliers are most appropriate for studying the long-run impact of an economic change, omitting an explicit time dimension.¹⁶

Local economic multipliers in the REMI model are based on a similar set of industry I-O tables, but the REMI model relaxes many of the assumptions imposed in the RIMS-II model. The REMI model also does not assume that factor supply, particularly labor supply, is perfectly elastic in the short run. Instead, in the REMI model, an increase in demand for labor generates an equilibrating response in local wages, prices, and population migration to ensure "closure" of the local labor market. The REMI model's

¹⁴ The expansion of e-commerce has facilitated trade between different geographic areas. Tourism and cross-county shopping also generate retail trade "export" sales.

¹⁵ Using the REMI model's standard assumptions about the share of activity that is net new is done with the model's "firm policy variables." Treating activity as net new is called entering the activity "exogenously."

¹⁶ Another widely used economic impact model, the IMPLAN model, also does not include a time dimension.

inclusion of an explicit time dimension makes it well suited to studying projects for which the timing of benefits and costs is potentially important.

To illustrate the concept of economic multipliers, we continue with the example from the section on economic substitution: a new generic food manufacturing firm begins operations in Wayne County in 2016, employing one hundred workers. The REMI model estimates that nine of those jobs would simply replace activity at other food manufacturers in Wayne County, so that this activity would generate ninety-one net new jobs in the food manufacturing industry in Wayne County. Total employment in Wayne County is estimated to increase by 169 jobs, however, including four jobs in state and local government and seventy-four jobs in the private sector outside of food manufacturing.¹⁷ These seventy-four jobs include both intermediate goods and services activity (suppliers or indirect jobs), and activity generated by the spending out of the incomes arising from the new direct and indirect economic activity (induced jobs). For instance, they include six jobs in wholesale trade and four jobs in trucking (mostly intermediate supplier activity), and seven jobs in retail trade and four jobs in restaurants and bars (income-induced activity). They also include nine jobs in construction, due partly to the increased need for facilities to house the new economic activity. Therefore, a generic food manufacturing company in Wayne County would have a county-wide jobs multiplier of 1.69, or 169 total new jobs divided by 100 direct jobs.

Statewide, total employment in the food manufacturing industry would increase by eighty-four jobs, fewer than would be gained in Wayne County alone. This is because of the greater scope for economic displacement at the state level versus the county level: Some food manufacturers elsewhere in Michigan would lose sales to the new food manufacturing firm in Wayne County.

Nonetheless, the new food manufacturing activity would generate a total of 226 jobs statewide. The overall impact on net new activity is larger statewide than at the county level, despite the smaller direct impact, because the increased economic activity in Wayne County stimulates job creation elsewhere in the state. For example, statewide the number of jobs in wholesale trade increases by nine, in trucking by five, in retail trade by sixteen, and in restaurants and bars by seven, all significantly higher than the number of jobs created in Wayne County alone. Thus, on a statewide basis, a generic food manufacturing company in Wayne County would have a jobs multiplier of 2.26, or 226 total new jobs statewide divided by 100 direct jobs.

If the new firm in the example had definite plans to export all or nearly all its product outside of the state of Michigan, then the new firm would create one hundred net new food manufacturing export jobs in Wayne County (and in the state overall) in 2016. The key characteristic of such an export firm is that it does not significantly displace any current or future sales of existing local firms. In Wayne County, such a new food manufacturing export firm would generate a total of 194 jobs, for a local employment multiplier of 1.94 (194 divided by 100). Statewide, this new firm would create 283 jobs for a state-to-county jobs multiplier of 2.83 (283 divided by 100).

¹⁷ These job estimates apply only to 2016. The number of net new job additions will change over time as the model's equilibrating properties come to bear. Also note that the REMI model's input-output matrix, as is standard in the field, does not include the farm sector. Thus, these estimates do not include any count of net new jobs created in farming due to an expansion of food manufacturing.

Although the local multipliers for food manufacturing are well above one, for some industries the local multiplier will be below one. For instance, if a new generic local restaurant were to open with one hundred employees in Wayne County, then the REMI model estimates that this restaurant would create only thirty-five net new jobs in the county, including twenty-nine net new jobs in the restaurant industry. Most of the activity (71 percent) at this restaurant would simply displace sales at other restaurants in Wayne County. Consequently, the county jobs multiplier at this generic restaurant is only 0.35 (35 divided by 100). The number of net new jobs created statewide is even lower because the new restaurant displaces jobs in restaurants in other counties in the state as well as in Wayne County. The REMI model estimates that the one hundred direct employees at the new restaurant will produce only nine net new restaurant jobs in the state of Michigan. That net new restaurant activity will support a total of six additional indirect and induced jobs in Michigan, so that the total net increase in employment in the state is fifteen, for an employment multiplier of 0.15 (15 divided by 100).

Basis for Assumptions and Projections

Modelling the TBP economic impacts entails making several decisions regarding the modelling approach and assumptions regarding relevant quantities. Our general approach to forming these projections was to attempt to validate the projections provided by the developer independently or with the assistance of MEDC, if practical.¹⁸ Because the developer has the most detailed knowledge regarding its plans for the proposed TBP, the developer's projections were used if we determined them to be reasonable or conservative. If the developer did not provide a projection for a particular input, or if we determined the developer's projection to be aggressive, we used our own best projection of the input values.

Our assumptions are described in more detail in the following sections.

Construction Impacts

The construction of a new brownfield redevelopment property inevitably has a substantial construction component. This activity will usually involve five sets of inputs into the REMI model: a) soft construction costs, b) hard construction costs, c) tenant improvements, d) producer durables purchases by tenants, and e) increases in the value of the capital stock. The soft and hard construction activity occurs during the initial phase of the project, while tenant improvements and producer durables purchases occur both at the end of the construction phase and in subsequent years due to the need to "refresh" those goods and services.

Soft Construction Costs

The Paper City TBP application packet to MEDC includes a proforma that provides data on total expected soft and hard construction costs for the project. The soft costs are broken out into subcomponents, such as "Architecture & Engineering," "Environmental Studies/Soiling Testing," "Construction Insurance," and a host of other fees paid to different project interests. These data allow soft costs to be divided into separate industries and entered into the REMI model.

One difficulty is that the input-output portion of the REMI model allocates a portion of hard cost construction inputs to soft costs. We have separate data on the expected soft costs, which we enter in addition to the expected hard costs. Therefore, to ensure that the full amount of hard and soft cost

¹⁸ There were some input projections that did not have a substantial impact on the analysis and were difficult to validate independently. In those cases, we accepted the developer's projections.

spending is accurately allocated in the model, we allocate part of the soft cost expenditure to the hard cost policy variables in REMI. An additional complexity involves the timing of this expenditure. Much soft cost expenditure occurs prior to the physical construction of the buildings. To solve these problems, we directly entered one-half of the soft costs in the first year of construction activity at each site into the REMI model.¹⁹ The soft costs were divided between professional and technical services, insurance, and real estate services using the REMI model's "demand" variables to allow for the possibility that some of the soft costs services would be provided by firms located outside of Kalamazoo County. The other half of the soft costs were added to the hard cost construction variables in proportion to hard cost spending by industry beginning in the second year of construction.

Hard Construction Costs

In general, Paper City's proforma gives hard cost spending totals that cover the entire project site. There is an exception to this rule for public infrastructure (e.g., roads, sidewalks, utilities), site improvements (walks, drives, landscaping, lighting), and environmental mitigation, for which costs are broken out. The proforma is also not explicit about the timing of spending. Paper City, however, provided us with a rough construction timeline for different wings of the original building. The "East Wing," which houses much of the non-hotel commercial activity and some of the brewery operations, is expected to be renovated from 2019–2020; the "Machine Room," which contains most of the brewery operations, is expected to be constructed between 2020–2022; and the residential and hotel build-out is expected from 2022 to 2024.

Ultimately, REMI requires that spending is entered over time separately for several categories of investment. For this TBP, we use the manufacturing, commercial structures, multi-family residential, and highways and streets categories. We use the highways and streets category to capture the public infrastructure and site improvement spending, which we divide equally over the entire construction period, 2019 to 2024. Brewery operations are considered to be "manufacturing" for REMI input, the residential apartment construction fits into "multi-family residential," and all other uses, such as event, office, hotel, and food/drink, fit into "commercial structures."

To allocate spending, we make use of data from the proforma on square footage by tenant type (e.g., breweries, event space, office space, residential, hotel). We distribute the hard cost spending proportionally based on square footage and then allot that spending over time based on the rough construction schedule described above. Spending on "stabilization and demolition" from the proforma, which includes lead and asbestos abatement, is distributed across all categories, including highways and streets, based on the relative shares of total hard cost spending.

The combined total of hard and soft costs that we model is \$76,834,940. We exclude land acquisition costs as well as "rent-up reserves" and "operating reserves," which are listed as costs on the proforma.

Tenant Improvements

Nonresidential

Following the initial construction period, tenant improvements are introduced into the REMI model using the nonresidential maintenance and repair detailed construction variable. The initial tenant improvements are included as hard costs in the data provided by the developer and are therefore

¹⁹ The expert panel that we consulted for RSQE's first TBP analysis approved of this treatment.

entered with the hard cost construction activity above. These amount to \$10.8 million during the construction period. Based upon consultations with private sector property developers with no involvement in the proposed TBP, the refresh rates for tenant improvements are introduced starting in the sixth year of operations activity, at a rate equal to 20 percent per year of the initial real dollar value of tenant improvements provided by the developer.

Residential

Based upon our consultations with private sector property developers, we determined that the refresh rate for the residential property development should be 5 percent of the residential rent payments annually, after accounting for vacancy rates. We introduced this value into the REMI model using the residential maintenance and repair detailed construction variable. Residential refresh spending was assumed to start in the first year of occupancy and continue every year. Annual rent and vacancy projections were provided by Paper City and assume an annual increase of 3 percent. We return to a discussion of these assumptions and whether they are valid when we discuss expected resident incomes below.

Producer Durables

For the Paper City development, one of the biggest components of producer durables is the beverage manufacturing equipment for the brewing operations. Brewery machinery manufacturing is classified in NAICS code 333241, Food Product Machinery Manufacturing. REMI, however, uses the Bureau of Economic Analysis' (BEA's) Private Fixed Investment in Equipment (PEQ) categories for the "Detailed Investment" policy variable. According to the BEA's PEQ bridge for 405 commodities, investment in brewery machinery manufacturing belongs with the PEQ category "special industry machinery, nec."²⁰

We did not receive guidance from Paper City on these exact costs, but according to personal communication with contacts in the brewing industry as well as local development officials, equipment costs for an aspiring regional brewer may start well over \$1 million. In addition, for smaller microbrews, a modest ten-barrel brewing system will cost around \$200,000 for a facility of 5,000 square feet.

Paper City is expecting its development to house a microbrew incubator, which is projected to occupy 62,000 square feet according to the proforma. The incubator will house fourteen startup microbrews (4,500 square feet each) with an assumed five full-time employees each. Following our correspondence above, we assume equipment costs of \$200,000 per microbrew in the incubator (\$2.8 million total) and a further \$1 million for the presumed larger system that will belong to Old Stove Brewing. This brings total equipment investment to \$3.8 million. We believe that this is a conservative estimate, with equipment costs that will likely be larger.

We assume the initial full investment will happen in 2022, when construction for the beverage manufacturing component of the property is complete. We then assume that 5 percent of the equipment is replaced every year. The producer durable spending was introduced into the REMI model using 2016 real dollar values.

Capital Stock

The total value of nonresidential and residential construction activity was added to the actual nonresidential and residential capital stocks in the project county in the final year of the construction

²⁰ The PEQ bridge is available at <https://www.bea.gov/industry/industry-underlying-estimates>

component of the project. The REMI model endogenously reduces construction activity in future years to account for the project’s fulfillment of capital demand in the area. In practice, therefore, not all the new construction will be treated as net new in the analysis.

Operations Impacts

The operations phase of the analysis incorporates the benefits from the commercial activity at the site after construction is complete.²¹ A portion of the commercial activity at the new development will substitute for activity already performed elsewhere in the county or state. The portion of economic activity that is net new to Michigan is the share that will either be exported or that will replace existing imports. This portion is determined endogenously within the REMI model, except where noted explicitly below.

Employment Impacts

The first task in estimating the operational benefits of a brownfield redevelopment project is to estimate total employment at the site by industry. The operational activities at the Paper City development are projected to involve five major industry groupings: 1) beverage manufacturing; 2) hotels; 3) restaurants and bars; 4) events and museum; and 5) office sector or “white collar” employment. The developer provided us with estimates of employment for the various tenant spaces at the site, which we aggregated to these five categories.²² Employment begins for most categories in 2020 and gradually increases to a stabilized estimate in 2024 that makes use of the entire square footage along with long-run vacancy assumptions. These stabilized estimates are shown in Table 2.

Table 2: Stabilized Employment Assumptions Provided by Paper City

	Total Employees in 2024	Square Footage per Employee
Beverage Manufacturing	87.5	1,017
Events and Museum	44.0	2,172
Hotel	15.5	929
Office	67.0	216
Restaurant and Bar	6.0	2,956

The developer expects a total of 220 jobs across the different industries by 2024. We have combined these data with SF estimates by general use in the company’s proforma to examine the implied SF/jobs ratios. The proforma-use categories did not line up perfectly with the employment estimates provided by the developer, so we consider the SF/job estimates in Table 2 to be approximations. In general, our conclusion is that these assumptions are reasonable.

Personal communication with contacts in the brewing industry suggest that 1,000 SF/job is an appropriate assumption for developing microbrews and regional brewers. The expected 216 SF/employee for office is also in line with industry averages. For example, Coldwell Banker Richard Ellis (CBRE, 2016) estimates an average of 171 SF of office space per employee in North America. A recent

²¹ The benefits from the brownfield remediation will be captured in the amenity effects portion of the economic impact analysis, described in the following section.

²² In REMI, the employment estimates are input using finer industry classifications, as discussed below, but these five categories are helpful for thinking about measures such as square footage per employee.

report by Cushman and Wakefield (2018) puts that number at 193.8 SF/job nationally in 2017. The estimate at the Paper City development is higher than these averages, which is expected for a less-urban environment.

When combined with the SF data from the proforma, the SF/job estimates are greater than 2,000 for both the Restaurant and Bar grouping as well as the Events and Museum grouping. This is partly due to the expansive nature of the development site as it pertains to leisure space. The estimate for the hotel operations is also high at 929 SF/job.

Because of the unique design and mixed-use nature of this project, we were unable to validate the employment assumptions independently for the Events and Museum, Restaurant and Bar, and Hotel functions. To assess the sensitivity of our results to the projected employment levels in those sectors, we performed a sensitivity analysis in which we set employment in those industries to zero. This causes a 30 percent reduction of total employment at the site, which is obviously an overly conservative assumption. Nonetheless, in terms of fiscal impact, the overall qualitative assessment of the project is unchanged. The net new revenue stream expected for the state falls by only 12 percent on a net present value basis, reflecting the high degree of within-state substitution and relatively low multipliers in these sectors, but is still expected to be more than double the present value stream of capture incentives. Because these assumptions did not materially affect the results of the analysis, we used the developer's projections in our baseline analysis.

With the exception of "Office," the industry categories in Table 2 line up well with the industries in the REMI model, allowing us to use the corresponding REMI "firm" employment variables.²³ In contrast, the Office industry sector encompasses six major NAICS industries: Information (two-digit NAICS code 51); Finance and Insurance (52); Real Estate and Related (53); Professional and Technical Services (54); Management of Companies (55); and Business Support Services (three-digit NAICS code 561). In our version of the REMI model, these six industries are disaggregated into thirteen industries that include the "firm" variable option. To be clear, in all REMI scenarios that we run for this TBP analysis, we use the "firm" variable option for all jobs, both office and non-office.

We have detailed descriptions from the developer for nearly half of the expected office jobs, allowing us to attribute those jobs to the corresponding disaggregated REMI sectors. For example, the developer expects 7.5 full-time-equivalent administrative positions for the brewery cluster, which we classify as "Administrative and support services" jobs in REMI. Since the exact industry distribution for the remaining half will not be known until the development is complete and tenants have moved in, we had to make additional assumptions about how to allocate the office employment to the thirteen REMI industries. To do so, we used annual data for 2017 from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) to compute the relative distribution of office jobs in Kalamazoo County. We then apply that distribution to the expected number of unattributed office employees per year, which reaches 35 employees in 2024.

The estimated shares of employment in the thirteen office sectors are presented in Table 3.

²³ For the Events and Museum category in REMI, we assign events jobs to "Performing arts, spectator sports, and related industries" and museum jobs to "Museums, historical sites, and similar institutions."

Table 3: Distribution of Office Activity by Sector in Kalamazoo County, 2017

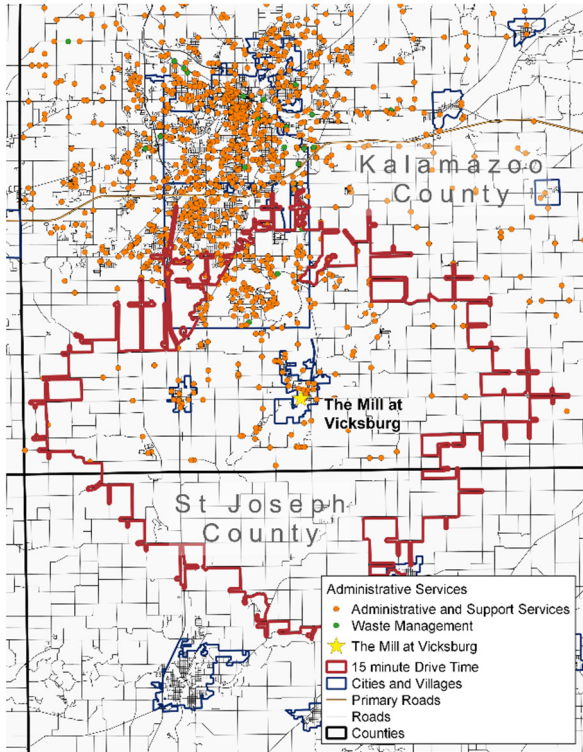
Sector	Share of Employment
Publishing industries, except Internet	1.1%
Motion picture and sound recording industries	0.4%
Data processing, hosting, and related service; other information services	0.2%
Broadcasting, except Internet	0.0%
Telecommunications	1.8%
Monetary authorities - central bank; credit intermediation and related activities	18.4%
Securities, commodity contracts, investments	3.4%
Insurance carriers and related activities	6.5%
Professional, scientific, and technical services	23.2%
Management of companies and enterprises	1.2%
Administrative and support services	34.8%
Real Estate	9.1%
Rental and leasing services; Lessors of nonfinancial intangible assets	0.0%

According to the U.S. Census Bureau’s American Community Survey (ACS), the population of the Village of Vicksburg was 3,113 in 2017. It is reasonable to question whether the distribution of office jobs for Kalamazoo County as a whole, with a population of 259,830 in 2017, is a good approximation for a development in Vicksburg. On the other hand, the distance from the center of Vicksburg to the center of Kalamazoo is only 14 miles, or about 25 minutes by car according to Google Maps, well within a reasonable commute.

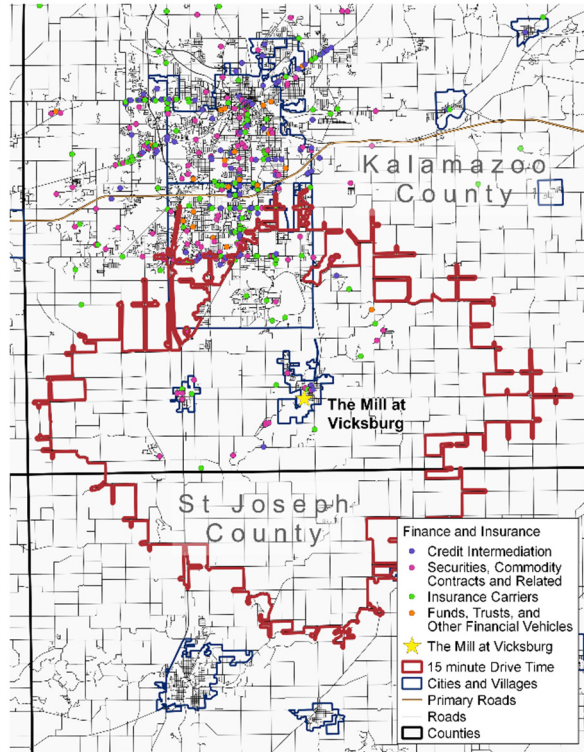
Figure 1 shows the distribution of office businesses in the Village of Vicksburg, the City of Kalamazoo, and the surrounding area using data from Avention.²⁴ Visual inspection suggests an approximate proportional relationship between the density of businesses in Vicksburg and the density of businesses in Kalamazoo. For example, the Administrative Services and Professional, Scientific, and Technical Services sectors both have a relatively high concentration of businesses in both Kalamazoo and Vicksburg, while the Finance and Insurance, Management, and Information sectors have fairly sparse concentrations. The concentration of businesses in the Real Estate sector falls somewhere in the middle for both locations. We conclude that using county averages for the distribution of office sector jobs is likely to provide a reasonable approximation for the Paper City development.

²⁴ Avention is a business-to-business marketing database that reports establishments, including industry and location. <https://www.dnb.com/products/marketing-sales/sales-acceleration.html>

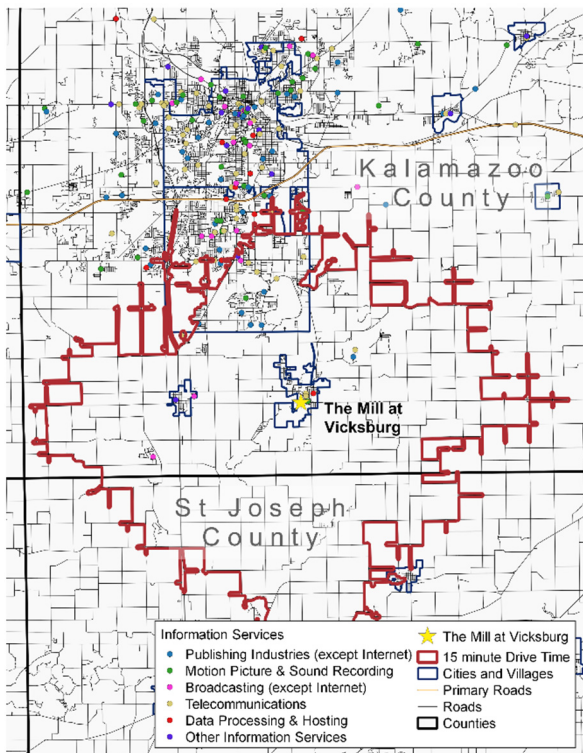
Figure 1: Office Business Locations in Vicksburg and Kalamazoo by Industry



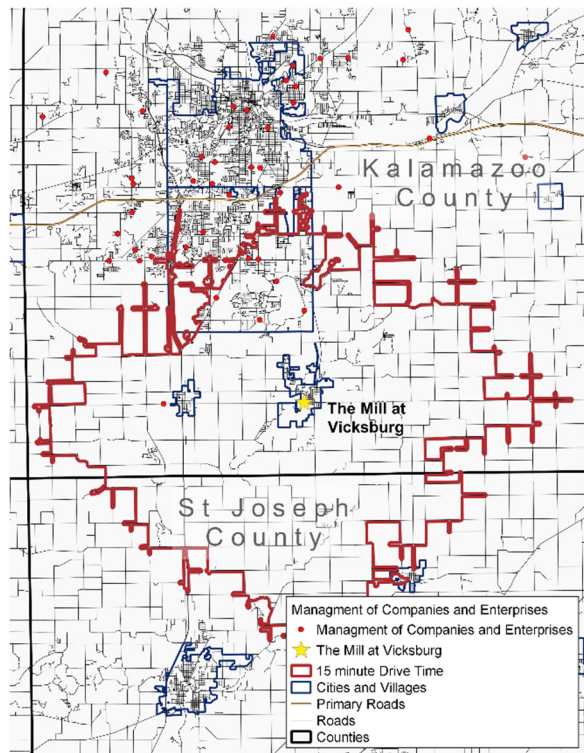
Administrative Services



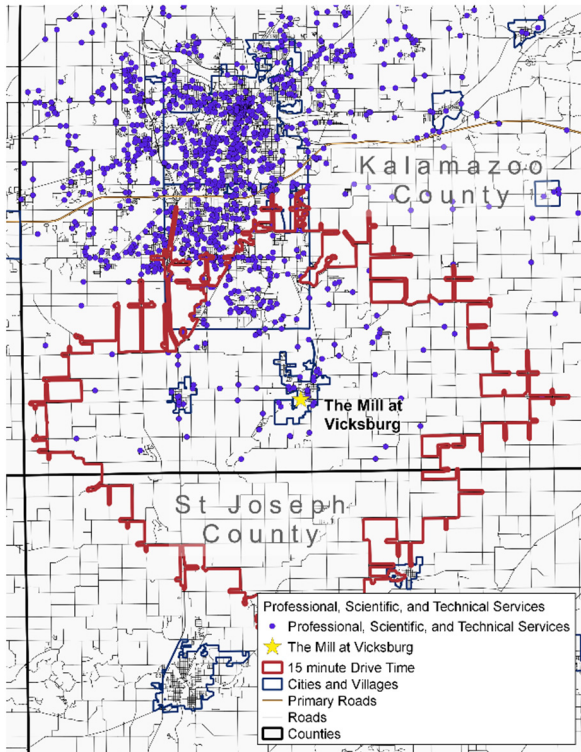
Finance and Insurance



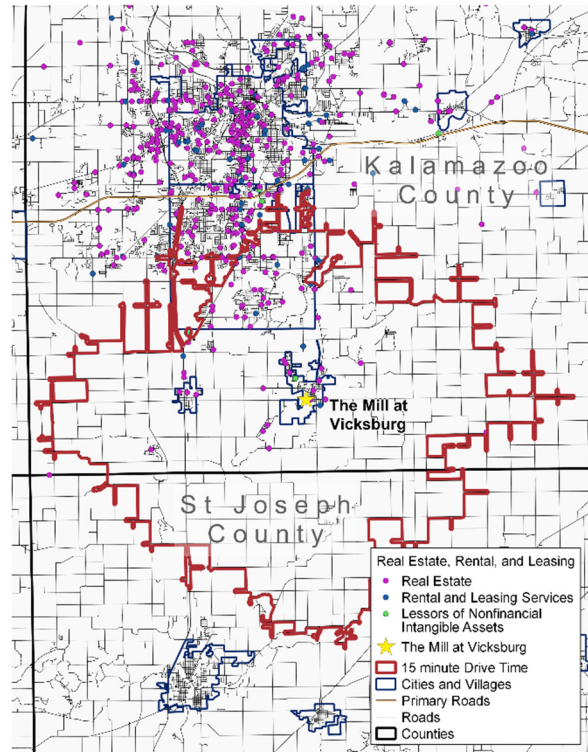
Information Services



Management of Companies and Enterprises



Professional, Scientific, and Technical Services



Real Estate and Related

Wage Levels

The next potential task in estimating the operational benefits from a brownfield redevelopment is to adjust the default wage rates in the REMI model to be consistent with the total wage bill generated by the jobs located directly at the TBP site. This makes sense if the jobs at the site are expected to have wages that are significantly above or below the average wage levels for the industry and location. The wage data built into the REMI model are based on employment data from the Bureau of Economic Analysis, which includes the self-employed. The inclusion of the self-employed will sometimes lower the wage bill relative to the total compensation that we would expect to be earned by establishment workers at the brownfield redevelopment site.

The developer, in this case, did not provide estimates of explicit wages by job, but we can infer an estimate of the total wage bill across all jobs for each year using the withholding capture estimates. We compared these numbers with the total estimated wage bill using the jobs input and the annual average wage rates in Kalamazoo County used in the REMI model.

In general, the developer's expectation of wages starts higher than the REMI averages, but has a lower assumed growth rate. In 2024, the TBP withholding capture estimate suggests a total wage bill that is 16 percent higher than the total using the REMI averages. This difference falls steadily over the forecast period, such that the two wage bills are equal in 2038, with the developer's estimate falling below the REMI averages for the final five years of capture through 2043.

Since the REMI sectors are somewhat coarse for this project, particularly for the brewery operations components, we do not find the wage difference to be objectionable. With the exception of the final

five years, the REMI estimates are more conservative, but the difference is still only 3 percent in 2043, and those years are highly discounted in the fiscal analysis. For these reasons, we do not adjust the REMI wages for this project.

Avoiding Double Counting of Investment

The REMI model endogenously incorporates investment in construction and producer durables when direct employment changes are introduced into the model. In our analysis of the proposed TBP, however, we directly introduce construction activity into the simulation. Consequently, to avoid double counting the construction effects, we must neutralize the REMI-estimated construction and producer-durables spending generated by the employment inputs.

For the “firm” versions of the REMI policy variables, only a portion of the introduced employment changes are new exogenous employment resulting from increased exports or import substitution. Therefore, we only neutralize the portion of the “firm” employment changes that is exported or substitutes for existing imports.

Tourism Impacts

The developer envisions that the proposed development will generate substantial tourist activity. To be net new activity in the state of Michigan, tourist activity must come from out-of-state visitors or in-state residents who replace out-of-state trips with visits to the proposed TBP site. We estimate tourist activity from overnight visitors at the hotel component of the development separately from day-trip visitors to the site. We took information on average spending by the two types of visitors from Longwoods International (2016).²⁵ Our estimate of the number of new overnight trips is based upon the REMI model’s estimate that one-third of new activity in the hotel industry will be net new to the state. The developer projects that when the forty-room hotel begins operations in 2024, it will generate 7,300 room-nights per year, which assumes an average annual vacancy rate of 50 percent. We expect that to result in approximately 2,230 net new room nights statewide. Using data from the Longwoods International (2016) report, we assume that each of these net new room nights will generate \$107.30 (in 2016 dollars) of spending on restaurants, retail, recreation, and transportation in Kalamazoo County.²⁶

We estimate the number of day-trip visitors by building on information in a previous economic impact assessment of the development, Shuman (2017), which was commissioned by the developer. After removing the portions for local resident and employee shopping, which are not considered to be net-new, these projections assume 15,900 visitors in the first year, 55,200 in the second year, and then an annual increase of 5 percent in every following year.²⁷ In the second year, that amounts to a daily average of 150 visitors.

The Longwoods International (2016) report estimates that 25 percent of Michigan day-trippers come from out of state. Some of these visitors, however, may have visited the state anyway (without the

²⁵ We consider these spending estimates to be conservative, because they come from a statewide estimate for all travelers. Out-of-state visitors to this development, especially overnight visitors, are likely to spend more than those average amounts.

²⁶ We account for the economic benefits from the spending on hotel accommodations in the direct operations estimates.

²⁷ At the time, it was thought that the first year of operations for the site would be in 2020. We take his visitor projections, but shift them by 4 years, so that his projection for 2020 is now used for 2024, etc.

development) and should not be considered net new. Still, it is likely that the net-new fraction for out-of-state day-trippers is higher than the fraction for overnighters. As a rough estimate, we double the overnight net-new assumption, using approximately 60 percent for the day-trip visitors. For a conservative estimate of net-new daily visitors, we begin with Michael Shuman's estimates, then multiply by 25 percent to get total out-of-state visitors, and finally multiply by the roughly 60 percent net-new assumption. We then translate those visits to spending using average day-trip spending totals from the Longwoods International (2016) report that amount to \$64 per person.

We do not calculate separate estimates for visitors that come for special events (e.g. weddings, parties, seasonal celebrations). This is partly to remain conservative and partly because some of those effects will be captured by the hotel component of the tourism analysis.

We consider our estimates of the net new tourism activity generated by the proposed TBP to be conservative. It is worth noting, however, that excluding these impacts from the analysis entirely has only a small effect on the overall results. The projected tourism impacts do not affect the conclusions of our analysis.

Amenity and Migration Impacts from Residential Construction

One of the key benefits of a brownfield redevelopment project is that it should remove a negative externality from the local community and replace it with a positive externality. The REMI model itself provides no guidance or structure regarding the magnitude of such effects, which will depend on the characteristics of each specific project. To quantify the relevant amenity effects, we conducted a thorough literature search of studies that have examined brownfield redevelopment projects.

The economic literature has tended to estimate the value of the change in the externality effect from brownfield redevelopment using hedonic property value analysis. The studies we reviewed found a wide range in the estimated change in property values resulting from brownfield redevelopments. The aggregate effects on property values ranged from 3 percent to over 15 percent in the vicinity of the brownfield, usually a one-to-three-mile radius, depending on the study.²⁸

In our judgment, Haninger, Ma, and Timmins (2017) is the most relevant study for the current project based on its recent publication and highly technical methodology. The authors use high-resolution, high-frequency housing data for a nationally representative sample of brownfields to establish the causal effect of brownfield cleanup on local property values, which ranges from 5 percent to 15 percent in their estimation for property within five kilometers of the site. To remain conservative, we use the estimate of 5 percent in the analysis of the Paper City development. We assume that the brownfield remediation benefits all housing property in Vicksburg, which corresponds to approximately 1 percent of total housing units in Kalamazoo County according to the 2017 ACS.²⁹

We did not assume any externality benefits from the office, hotel, manufacturing, parking, or restaurant activity associated with this development project. There is limited evidence regarding the externalities these activities will have on the local community. The development of office space appears to have no

²⁸ See, for example, Haninger et al. (2017), Kaufman and Cloutier (2006), De Sousa, Wu, and Westphal (2009), Simons, Quercia, and Maric (1998), and EPA (2015).

²⁹ Vicksburg has total area of 3.07 square miles according to Wikipedia, which would fit inside the five-kilometer buffer considered in Haninger et al. (2017). https://en.wikipedia.org/wiki/Vicksburg,_Michigan

effect on surrounding residential property values (Wiley, 2015). One would expect that restaurants, especially upscale restaurants, would have a positive effect on neighborhood property values (Brooker, 2015), but the academic research on this topic was too thin to support such a conclusion with confidence. Our assessment is that the literature cannot currently support the assumption of either positive or negative externalities from these activities in a reliably quantifiable manner.³⁰

We did not enter the residents living in the newly constructed residential units directly through a policy variable in the REMI model. Rather, the increase in population comes about endogenously in the model as a response to the increase in employment and amenity levels associated with the redevelopment process. In some cases, it is appropriate, however, to adjust the default assumptions in the REMI model to reflect higher- or lower-than-average incomes of the net new residents at the proposed site. We did not make any such adjustment for the Paper City development. We describe why in the following section.

Should We Account for the High Expected Incomes of Net New Residents?

The REMI model assumes that new residents to Kalamazoo County will have incomes equal to the county average. According to the ACS five-year estimates, Kalamazoo County had an average household income of \$72,473 in 2017. With a 2 percent annual rate of increase, that number would be \$83,249 by 2024.

Based on Paper City's TBP income tax capture estimates, the developer assumes a much higher average household income of \$114,832 in 2024, increasing by 2 percent every year after that. Such incomes are well into the upper quintile using current ACS data. On its face, it is not unreasonable to assume that households with higher-than-average incomes will be attracted to the new development. There is a potential discrepancy, however, with the assumed rental prices of the residential units.

Combining the developer's income assumption with expectations for rental prices from the proforma, the average rent-to-income ratio is just over 9 percent in 2024. Using the often recommended 30-percent rule, the rent for the one bedroom (\$633) would support incomes of about \$25,000 while the two bedrooms (\$2,200) would support incomes of \$88,000, for a weighted average of \$34,722 across all apartments. While there are limitations to the 30% rule, which may not apply in all situations, we believe that resident annual income capture may fall short of the developer's projections given these rental prices. The rental prices, themselves, are based on a 1.10 \$/SF calculation. Using data for March 2019 from Zillow, this matches exactly the rate for one-bedroom apartments in Kalamazoo County; two-bedroom apartments come in at exactly 1 \$/SF in the Zillow data. This suggests that Paper City's rents have been set at approximately market rates, which further reinforces our view that the income expectations are optimistic.

For these reasons and to maintain conservative assumptions, we do not adjust new resident incomes in the REMI model to match the developer's expectations.

Accounting for Economic Impacts of Tax Incentives

The REMI model endogenously generates an increase in state and local government activity when private sector economic activity expands. If that expansion of private sector activity is encouraged by tax

³⁰ In our first TBP analysis, we asked the Expert Panel to consider this issue carefully in its review of our proposed analytical methodology. The Expert Panel supported our assessment.

incentives, as in the brownfield redevelopment project that we are analyzing, then the REMI model's baseline estimates will tend to overstate the increase in government activity associated with the increase in private activity. In other words, because the REMI model does not endogenously enforce budget closure, analysts must manually account for the effects of any tax incentives in the model. Therefore, we reduced the REMI model's estimated increase in government spending resulting from the increase in economic activity by the cost of the incentive package.

We introduced this adjustment into the REMI model at the state government level using the estimated \$20.9 million in tax capture. The incentive cost borne by state government must be distributed across all counties in the state. We distributed the cost to state government based on the distribution of state government employment by county. The reduction in state government spending is relatively small in most counties and is largest in counties with a major state government presence, including public universities.

Adverse Scenario

We believe our baseline analysis, described above, represents a conservative analysis of the proposed TBP's economic impacts on the state of Michigan. To assess the robustness of our conclusions to a wide range of assumptions and future economic conditions, however, we have also performed the analysis using a more adverse set of assumptions, which we call the adverse scenario. This scenario allows for the possibility that non-residential tenant demand for space at the new development will be weaker than expected, or that some of the impacts we project from the proposed TBP might not materialize.

The adverse scenario assumes that the construction phase will proceed as expected under the baseline analysis, but we adjust the assumptions regarding the operational phase of the project in the following ways:

- Vacancy rates increase by 10 percentage points across all non-residential uses at the site with a corresponding 10 percent decrease in employment for all industries and years. For manufacturing and administrative activities related to the microbrew cluster, we assume that vacancy increases by 50 percent and employment decreases by 50 percent.
- The now vacant microbrew cluster space is instead used as event space, with events-based jobs added to match the new SF/job calculation after the 10 percent reduction above.
- Given that we believe expected withholding capture has been set appropriately in relation to average wages in the base case, we also reduce withholding capture by 18.2 percent in this scenario, which matches the overall drop in employment.
- We cut the expected brownfield cleanup effect by 50 percent. In other words, the effect on local property values is 2.5 percent instead of 5 percent.
- We increase the hotel vacancy assumption by 10 percentage points for an annual average of 60 percent.
- We reduce the expected daily visitors by 10 percent in all years, and we decrease the net new assumption for day-trip visitors to match overnight visitors.

The largest adjustment that we make is the 50 percent reduction in employment related to the microbrew cluster. This results in a loss of thirty-five beverage manufacturing jobs and 3.75 administrative jobs, and reflects a scenario in which there is not enough demand to fill the originally planned space. We believe, however, that in such a scenario, the developers would repurpose the space

to recoup some of the losses. Although we assume that events-based jobs would fill the vacant space, the results are identical if we instead assume increased restaurant and bar usage.

For this project, we believe that the capture estimates for employee withholding should also be revised downward in the adverse scenario to reflect the lower employment at the site. This follows from our analysis above that average expected wage levels for employees at the Paper City site appear to have been set at reasonable levels. This reduces the negative impact on the final fiscal impact estimates for the adverse scenario.

Methodology for Fiscal Impact Analysis

Definition of Net Fiscal Benefit

The TBP program guidelines specify that the Michigan Strategic Fund may not approve any TBP plan unless it determines that the plan will result in an overall positive fiscal impact to the state. Approval of TBPs that propose to use above a certain threshold of tax capture revenues require that the state treasurer concurs with the third party fiscal and economic analysis determination, which we provide in this report, of an overall positive fiscal impact. In consideration of the potential ambiguity associated with the definition of the overall fiscal impact to the state, we have consulted with the Michigan Economic Development Corporation and Michigan Department of Treasury to develop a definition.

We concluded that the most appropriate definition of the overall fiscal impact to the state is the net present value of the projected gross increase in state tax revenues generated by the proposed TBP, minus the present value of the expected cost of state tax incentives associated with the proposed TBP.

Costs and Benefits Considered

Our definition of the overall fiscal impact to the state excludes potential fiscal impacts on local governments and instead focuses on the proposed TBP's net impact on state tax revenues. Therefore, it excludes non-tax revenue impacts that may be associated with federal funds connected to new residents, as well as potential costs of providing public services to new residents of the state.

Measurement Period

The legislation establishing the TBP program allows capture of property tax revenue for up to thirty years after the completion of the projects, while the construction phase may take up to five years. For this project, we consider costs and benefits for thirty-five calendar years beginning with the first year of capture, which is 2019 for this project, and ending with the last year of capture, 2053.

Discounting Cash Flows

We used standard discounted cash flow analysis to calculate a net present value, as of 2018, of the fiscal benefits and costs to the state projected to be generated by the TBP in each year. In principle, it could be appropriate to discount the increased tax revenues associated with the TBP at a different rate than the tax incentives captured by the developer. Because the tax captures are tied directly to the amount of economic activity at the TBP site, however, we judge that the fiscal benefits to the state are likely to be generally correlated with the costs to the state in most scenarios. Therefore, we apply a single discount rate to the net cash flows to the state in each year in our net present value analysis.

We applied a 6 percent annual discount rate to the cash flows, consistent with our previous analysis of the TBP submitted by Bedrock Management Services, LLC for the Hudson's Block, Monroe Blocks, One Campus Martius Expansion, and Book Building and Book Tower Redevelopment Project (the Bedrock TBP). Although interest rates on long-term government securities have declined since we performed that analysis, we judge that the present project is more concentrated in specific economic sectors and is likely to carry more idiosyncratic risk than the Bedrock TBP, which would warrant a higher interest rate in a market setting. We judge that those two factors approximately counterbalance each other, so that the same 6 percent discount rate we applied previously remains appropriate. In our judgment, the proposed TBP differs enough from other comparable projects that using observed interest rates for loans on similar projects would not be a reliable approach.

Estimating the Increase in Tax Revenues Generated by the Proposed TBP

The MEDC has conducted impact studies to estimate the economic effects and state revenue generated by various projects and programs it has considered in the recent past. The methodology for those studies included a process to estimate state government tax revenue generated by the economic activity predicted for a particular project or program. In turn, the revenue calculator allows development of return-on-investment measures for various incentive programs. Project staff at RSQE played a role in developing the revenue calculator in conjunction with the MEDC, and we have adapted the methodology for the fiscal impact analysis of TBPs.

More specifically, the economic effects of a proposed project over time were estimated by entering relevant project inputs into the REMI PI+ model and having the model process the results. Because the REMI PI+ model does not provide estimates of the state government tax revenue associated with the resulting economic activity, a post-processing approach is required to translate the economic results into revenue impacts. As part of the Transformational Brownfield Redevelopment project, we have updated and revised the process used to estimate state government revenue resulting from any proposed project.

The previous revenue calculator generates only an aggregate measure of state government revenue. One of the major revisions to the approach for this project was to generate estimates for six categories of state government revenue: 1) business taxes; 2) personal income taxes; 3) sales and use taxes; 4) gambling taxes; 5) state property taxes; and 6) all other state tax revenues.

The fundamental approach to estimating these component revenue sources was the same as the methodology for the aggregate measure. First, we identified the historical dollar value of tax revenue using information from the Michigan Department of Treasury.³¹ Second, we divided this value by the relevant taxable income (derived from components of BEA-published personal income series and generated by the REMI model) to determine the historical effective tax rate. The taxable income used varied by tax category. Third, we multiplied this rate by the estimated change in taxable income generated by the project under consideration to generate estimates of the tax revenue expected to be generated by the project.

Each of the six tax revenue calculations is described below. The effective tax rates calculated for each category appear to be fairly stable over time. They should provide reasonable estimates of the tax revenues generated by future brownfield redevelopment projects, provided state government tax policy does not change substantially over the course of the analysis period.

The data we used to calculate the taxable income for each tax category came from the BEA November 2017 data file. The annual BEA data were converted to Michigan fiscal years by summing 25 percent of the annual value in the preceding year and 75 percent of the annual value in the calendar year that corresponds to the fiscal year. For example, in calculating the taxable income base for fiscal year 2013, we summed one-fourth the annual value in calendar year 2012 and three-fourths the annual value for 2013.

³¹ RSQE maintains a database of state revenue collections from various sources that is compiled from several decades of monthly and annual revenue reports provided by the Michigan Department of Treasury. That database is the source of the historical tax revenue data in the calculations that follow.

Business Taxes

The Michigan Department of Treasury reports that business taxes, net of the cost of previous tax incentives, generated between \$1.29 billion and \$1.43 billion in revenue annually between fiscal years 2013 and 2016. The taxable income base that we used to determine the tax rate for this source of state government revenue was private sector earnings. Dividing business tax revenue by the corresponding fiscal-year private-sector earnings generates estimates of the effective business tax rate of between 0.501 percent and 0.577 percent for fiscal years 2013 through 2016. In our calculation of business tax revenue, we used the average effective tax rate over this period of 0.557 percent of private sector earnings.

Personal Income Taxes

The Michigan Department of Treasury reports that personal income taxes generated between \$8.01 billion and \$9.37 billion in revenue annually between fiscal years 2013 and 2016. The taxable income base that we used to determine the tax rate for this source of state government revenue was the sum of wage and salary income, total proprietor's income, and our estimate of capital income that is subject to Michigan's personal income tax.

Estimating the capital income of Michigan residents that is subject to the state income tax is complicated. Some components of capital income that are subject to Michigan's personal income tax, such as capital gains, are not reported in the BEA personal income data. Other components of personal income include both taxable and non-taxable income, such as dividend and interest income earned by retirement funds. Thus, our challenge was to estimate capital income in Michigan that is subject to the Michigan personal income tax and to link it to dividend and interest income reported by the BEA.

To do this we used tax return data from the Internal Revenue Service. These data show dividend, interest, and capital gains income that is subject to the federal personal income tax. For example, according to the IRS tax return data for 2015, capital gains income in Michigan was \$11.12 billion, taxable interest income was \$2.11 billion, and dividend income was \$6.03 billion. The IRS reports that taxable capital income in Michigan was equal to between 84.2 percent and 88.6 percent of BEA-reported dividend and interest income between 2013 and 2015. In our estimation of future taxable capital income in Michigan, we used the average over this period of 86.5 percent of dividend and interest income.

Dividing personal income tax revenue by the corresponding fiscal year taxable income base (the sum of wages and salaries, proprietors' income, and taxable capital income) generates estimates of the effective personal income tax rate of between 2.87 percent and 3.12 percent for fiscal years 2013 through 2016. In our calculation of personal income tax revenue, we used the average effective tax rate over this period of 3.04 percent.

Sales and Use Taxes

The Michigan Department of Treasury reports that sales and use taxes generated between \$8.42 billion and \$8.81 billion in revenue annually between fiscal years 2013 and 2016. The taxable income base that we used to determine the tax rate for this source of state government revenue was the sum of wages and salaries, proprietors' income, taxable capital income, and the cash income portion of personal transfer payment income, minus employee contributions for social insurance and personal tax payments. The cash income portion of transfer payments includes the following categories of personal

income: retirement and disability benefits; Supplemental Security Income (SSI); Earned Income Tax Credit (EITC); other income maintenance payments; unemployment insurance compensation; veterans' benefits; other transfer receipts of individuals from government; and transfer receipts of individuals from businesses. Dividing sales and use tax revenue by the estimates of the tax base generates effective tax rates of between 3.17 percent and 3.34 percent between 2013 and 2016. In our calculations of sales and use tax revenue, we used the average effective tax rate over this period of 3.26 percent.

Gambling Taxes

The Michigan Department of Treasury reports that gambling taxes generated between \$0.84 billion and \$1.00 billion in revenue annually between fiscal years 2013 and 2016. The taxable income base that we used to determine the tax rate for this source of state government revenue was the same as for the sales and use tax.

Dividing gambling tax revenue by the estimates of the tax base generates effective tax rates of between 0.32 percent and 0.36 percent between 2013 and 2016. In our calculation of gambling tax revenue, we used the average effective tax rate over this period of 0.34 percent.

State Property Taxes

The Michigan Department of Treasury reports that the state property tax generated between \$1.77 billion and \$1.90 billion in revenue annually between fiscal years 2013 and 2016. The taxable income base that we used to determine the tax rate for this source of state government revenue was the sum of the taxable income base used in the sales and use tax calculation and rental income. Note that rental income is not used in any other taxable income base calculation, because it predominately reflects an imputed estimate of the rental income of owner-occupied property.

Dividing property tax revenue by the estimates of the tax base generates effective tax rates of between 0.65 percent and 0.67 percent between 2013 and 2016. In our calculation of state property tax revenue, we used the average effective tax rate over this period of 0.66 percent.

All Other State Taxes

The Michigan Department of Treasury reports that all other taxes generated between \$1.40 billion and \$1.54 billion in revenue annually between fiscal years 2013 and 2016. The taxable income base that we used to determine the tax rate for this source of state government revenue was the same as for the sales and use tax.

Dividing all other tax revenue by the estimates of the tax base generates effective tax rates of between 0.53 percent and 0.56 percent between 2013 and 2016. In our calculation of all other tax revenue, we used the average effective tax rate over this period of 0.55 percent.

Computational Details

The REMI model generates all personal income components necessary to calculate the taxable income tax base for each tax revenue category. However, to avoid any change in the personal income categories caused by changes in the local price level, we converted the simulation estimates of the nominal personal income values into inflation-adjusted 2009 dollars. We then compared these values to the control simulation personal income values, also expressed in 2009 dollars. We next converted the differences in personal income in real terms into a difference in personal income in nominal terms using the price deflator from the control forecast. Finally, we applied the appropriate effective tax rates to the

appropriate income tax bases to produce estimates of the nominal state government tax revenue generated by the project.

Results of Economic Impact Analysis

Figure 1 displays projected employment at the proposed TBP grouped into the Beverage Manufacturing; Office; Arts, Entertainment, and Recreation; Accommodation and Food Services; and Construction sectors. The Office sector includes several sectors in the REMI model: Information; Finance and Insurance; Real Estate and Rental and Leasing; Professional, Scientific, and Technical Services; Management of Companies and Enterprises; and Administrative and Waste Management Services. The projected job counts for the categories other than Construction are entered directly into the REMI model as inputs. The job additions in the Construction sector are estimated by the REMI model primarily as a function of the construction spending associated with the project.³²

The estimated employment impact ramps up through 2024, as the development is completed and comes into operation. The increase in Construction sector employment peaks at 157 jobs in 2020, before falling to the 80 to 95 range for 2021 and 2022 and then to between 30 to 40 jobs in 2023 and 2024 (the employment totals for each category cannot be read directly from the figure because the categories are stacked). The job counts associated with the operations phase of the project stabilize in 2024, at 88 Beverage Manufacturing jobs, 67 Office sector jobs, 44 jobs in Arts, Entertainment, and Recreation, and 22 jobs in Accommodation and Food Services. The total projected increase in direct employment at the Paper City development in 2024 is 220 jobs.³³

³² We report the Construction sector job counts as projected employment at the TBP site through the end of the construction phase of the project in 2024. The construction jobs that result from the project in later years are primarily indirect jobs, so we do not report them in the direct job counts. This reporting convention does not affect the analysis or results.

³³ The reported direct job counts outside of the Construction sector come from our calculations based on data provided by the developer and are used as inputs into the REMI model. The direct jobs in the Construction sector are outputs of the REMI model, driven primarily by the hard and soft construction spending associated with the project.

Figure 1: Projected Employment at the TBP Site

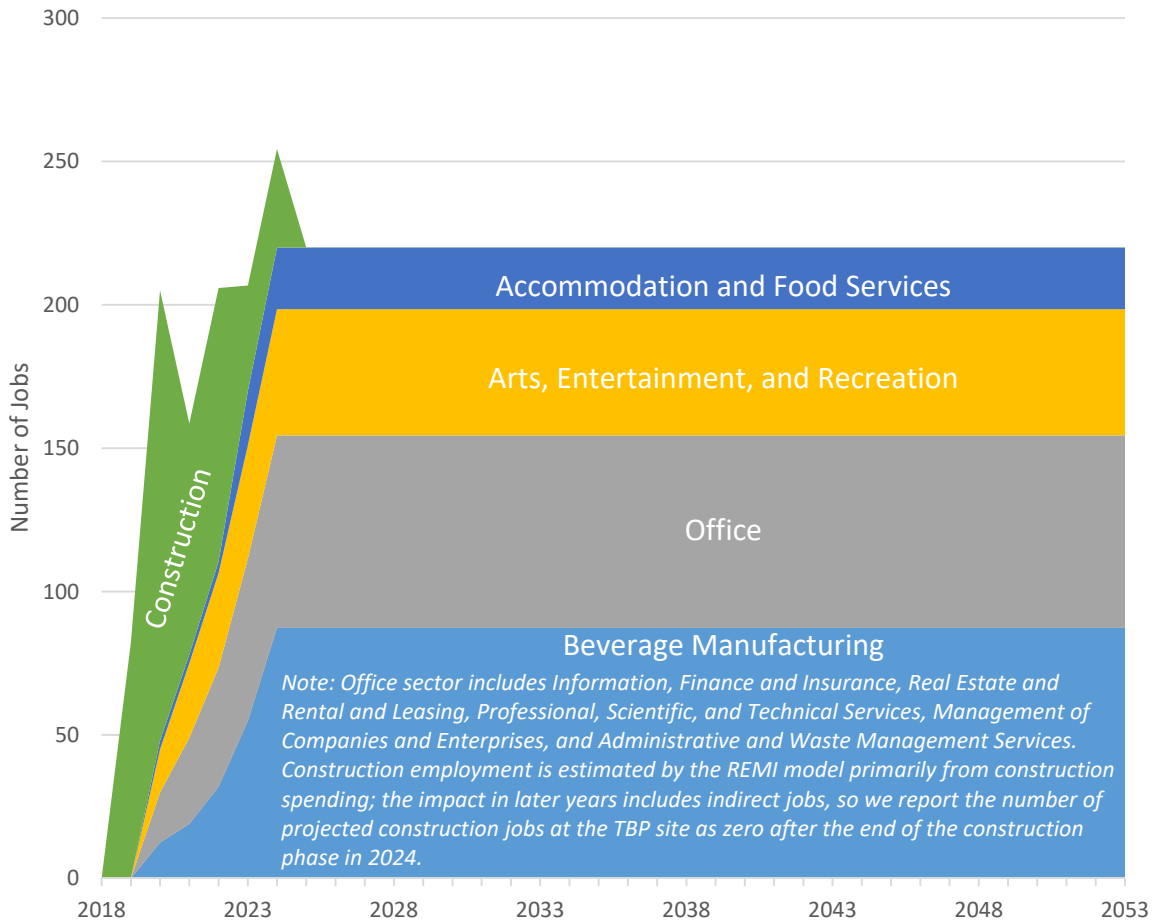
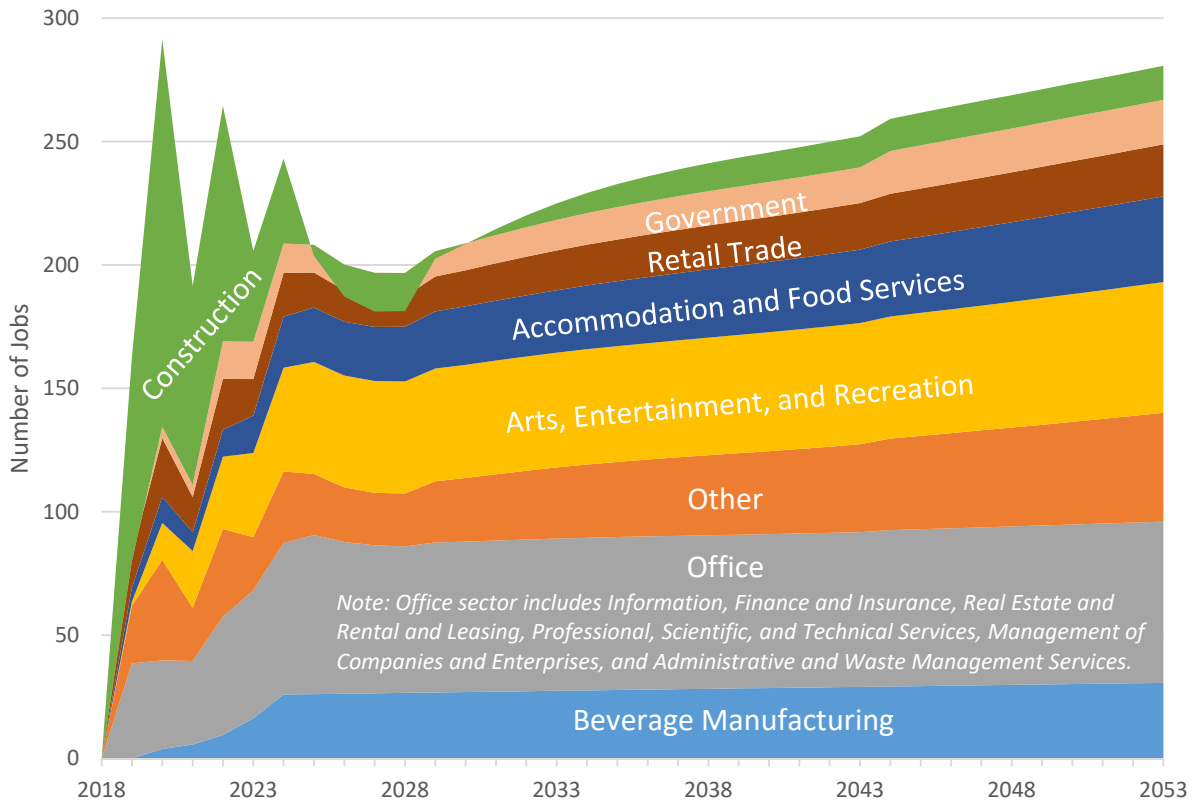


Figure 2 displays our estimates of the proposed TBP’s effect on net jobs in the state of Michigan. The projected job additions are again split out by sector, with additional breakouts for the Retail Trade, Government, and Other sectors.³⁴ The estimated job impact peaks at 291 net job additions in 2020, with the large number of added construction jobs. After the construction period finishes, the total job additions gradually fall to 181 net new jobs in 2027 to 2028, and then grow slowly, reaching 281 new jobs by 2053.

³⁴ The Other sector comprises Forestry, Fishing, and Related Activities; Mining; Utilities; Manufacturing, other than Beverage Manufacturing; Wholesale Trade; Transportation and Warehousing; Private Educational Services; Health Care and Social Assistance; and Other Services, except Public Administration.

Figure 2: Statewide Net Job Additions



Some of the direct jobs created at the TBP site displace other jobs in the state and some of the direct jobs are net new. As discussed in the methodology section, the input-output estimates in the REMI model will treat a certain fraction of direct jobs in each sector as net new. We believe that our baseline approach is conservative relative to the fraction of jobs at the site that are likely to have a strong export and/or import substitution orientation, such as the beverage manufacturing jobs associated with Old Stove Brewery.

Table 4 shows that in 2036, roughly halfway through our analysis period, employment in the beverage manufacturing sector accounts for 28, or 11.9 percent, of the 236 total statewide net job additions, despite representing nearly 40 percent of the direct job additions with 88 total jobs at the site. This difference in direct versus net new jobs for the beverage manufacturing sector reflects its relatively high rate of substitution, or displacement within the state, in the REMI model. On the other hand, net new jobs in the other sectors with direct jobs at the site are all close to or greater than their direct input counterparts. Office jobs account for 62 statewide net job additions, or 26.3 percent of the total, while Arts, Entertainment, and Recreation add 47 net jobs statewide, 20 percent of the total; Accommodation and Food Services contribute 27 jobs, or 11.3 percent of the total. The Construction sector adds 10 jobs statewide, Retail Trade adds 17 jobs, Government adds 13 jobs, and all other industries add 31 net new jobs to the state. The job additions in these sectors in 2036 are entirely multiplier jobs.

Overall, the statewide employment multiplier in 2036 is just under 1.1. The overall employment multiplier drops to 0.82 in 2027, several years after the construction phase of the project concludes. It

grows slowly over the analysis period, reaching 1.28 by the end of the analysis period in 2053. The overall employment multiplier balances the relatively high economic displacement associated with the direct job additions in the beverage manufacturing sectors in combination with the relatively lower displacement and higher induced jobs associated with the direct job additions in the Office and other sectors.

Table 4: Direct Jobs vs Net Increase in Statewide Employment by Sector, 2036

	Direct Jobs	Net Increase in Employment
Beverage Manufacturing	88	28
Office	67	62
Arts, Entertainment, and Recreation	44	47
Accommodation and Food Services	22	27
Construction	0	10
Retail Trade	0	17
Government	0	13
Other	0	48
Total*	220	236

*Totals do not match the sum of the rows due to rounding.

Figure 3 displays our estimate of the increase in Michigan’s population as a result of the proposed Transformational Brownfield Plan. The state adds residents at its fastest rate during the construction years and the ramp up in direct employment at the site, reaching 245 new residents by 2024. The increase in the state’s population continues to rise over time, albeit at a slower rate, driven by the amenity benefits of the proposed development and natural population growth (e.g., births minus deaths) from new residents. We estimate that the proposed TBP will increase the state’s population by 479 residents by the end of our analysis period in 2053.

Figure 3: Increase in State Population

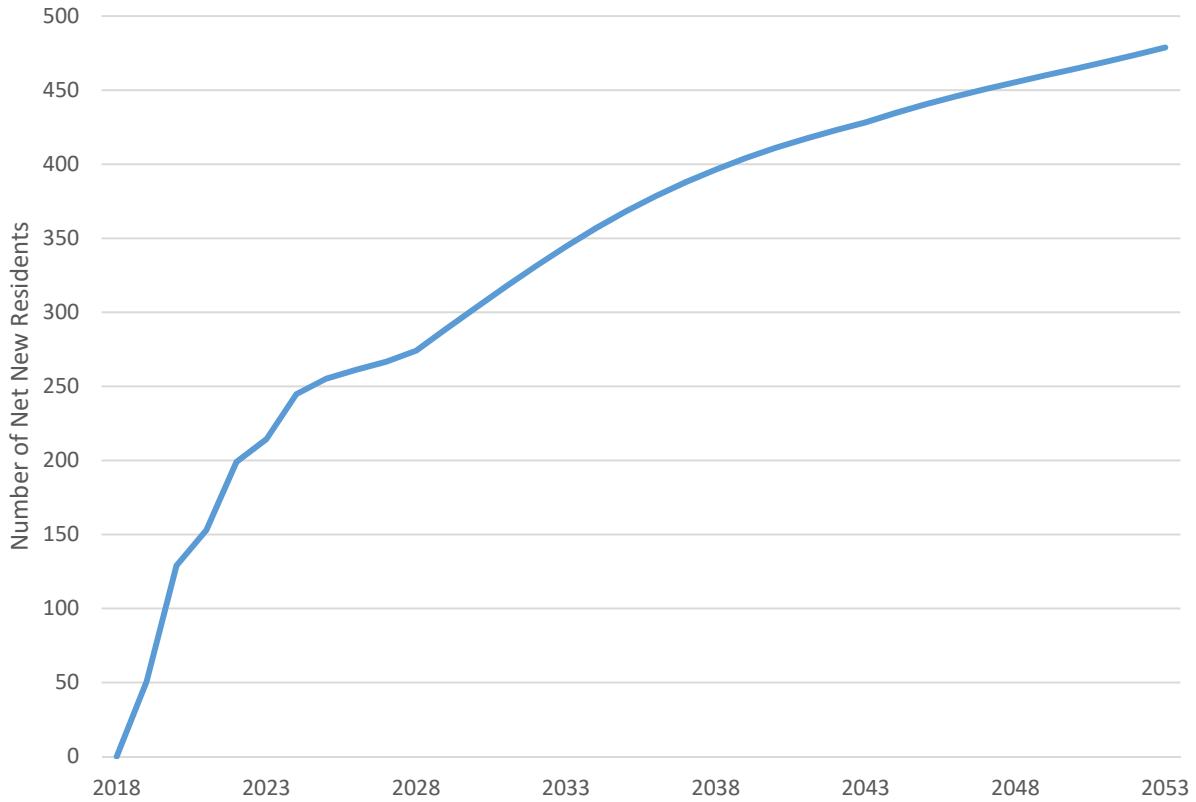
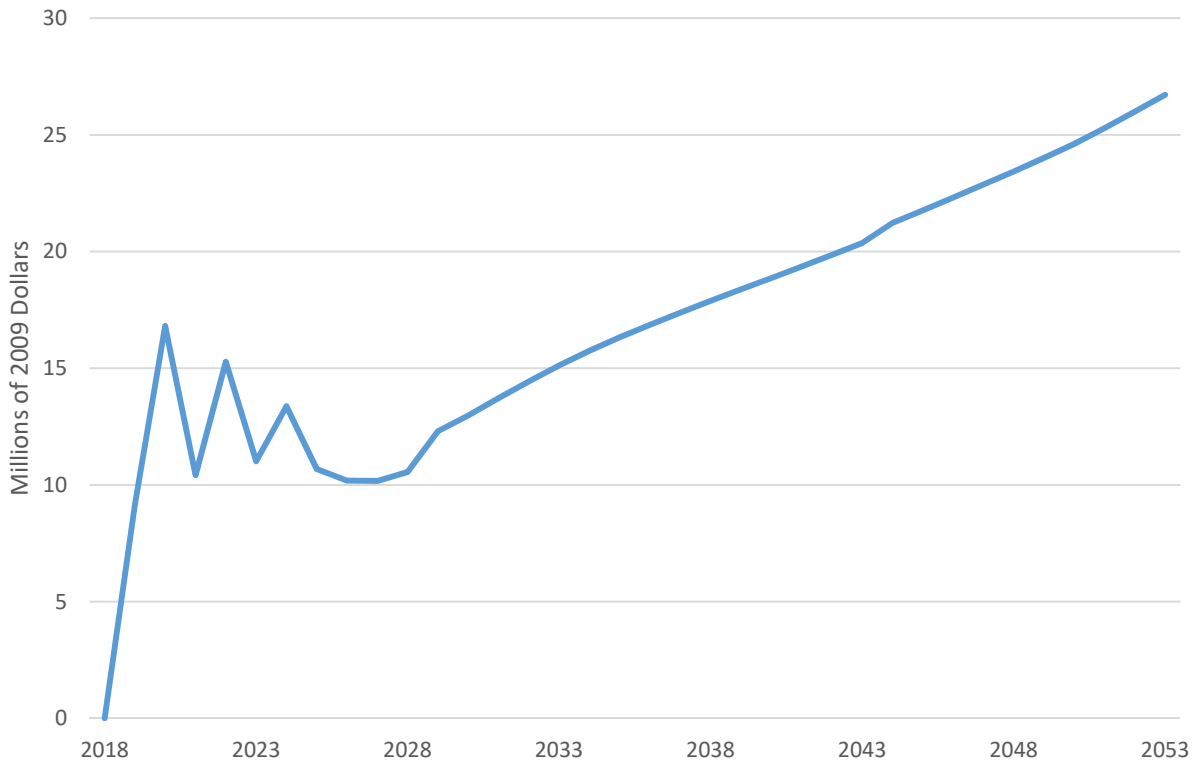


Figure 4 displays our estimate of the increase in Michigan real personal income generated by the proposed TBP, measured in inflation-adjusted 2009 dollars. The increase in personal income reaches \$16.8 million in 2020, during the high-spending construction period of the project. Personal income gains then average \$11.5 million between 2021 and 2028 as employment at the site ramps up. Wage and salary income accounts for an average of \$7.7 million during this time, or 67 percent of the total increase in personal income. Given the total statewide increase in employment of 204 jobs in 2025, the average salary of the net new jobs generated by the proposed TBP is projected to be \$35,276 that year. That relatively low average salary reflects the large proportion of jobs generated in the combination of the Accommodation and Food Services, Retail Trade, and Arts, Entertainment, and Recreation sectors. The increase in real personal income generated by the proposed TBP then rises over the remainder of the analysis period, with the projected increase in real incomes reaching \$26.7 million in 2053.

Figure 4: Increase in Michigan Real Personal Income

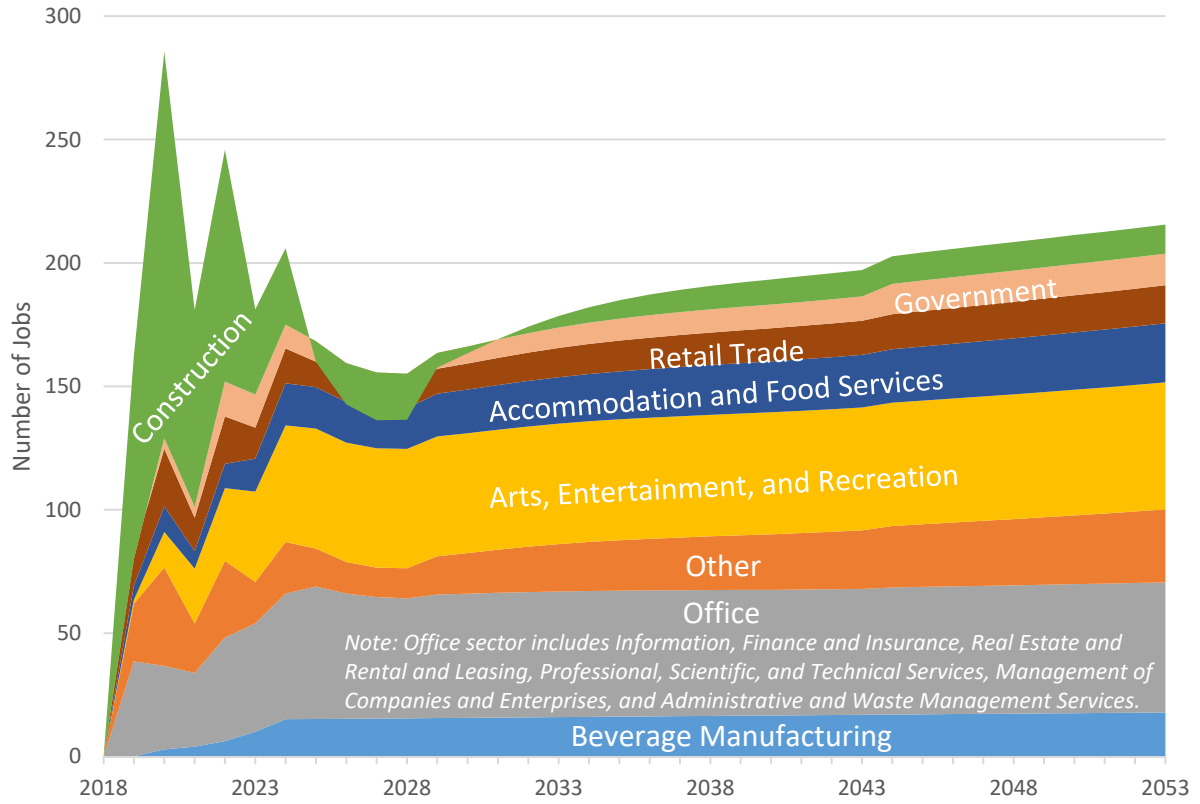


Adverse Scenario Impacts

The proposed TBP has smaller economic impacts on the state under the assumptions in the adverse scenario. The number of direct jobs at the Paper City development is 180 in the stabilized operations phase of the project, approximately 18 percent lower than in the baseline scenario. Figure 5 displays the projected statewide net job additions by sector in the adverse scenario. Similar to the baseline scenario, total statewide job additions peak in 2020 at 286 jobs due to construction at the site. Employment gains then slide to 136 in 2027 to 2028, the minimum over the forecast, before climbing steadily to a maximum of 218 new jobs in 2053. The net job additions in the adverse scenario range from 75 percent to 79 percent, as large as the additions in the baseline scenario from the end of the construction period to the end of the analysis period.

There is more variation in job gains by sector than overall due to the assumptions made for the adverse scenario. Jobs in beverage manufacturing show the greatest difference, reaching only 58 percent of the net gain in the baseline scenario. For the other sectors, the percentage of job gains in the adverse scenario relative to the baseline comes to 82 percent for the Office and Construction sectors, 74 percent for Accommodation and Food Services as well as Retail Trade, 68 percent for Government, and 67 percent for Other. Job additions in the Arts, Entertainment, and Recreation sector are 4 percent higher than the baseline in 2036. The effect of repurposing half of the microbrew cluster space for additional events-based space outweighs the assumed 10 percent decline in employment on a square footage basis.

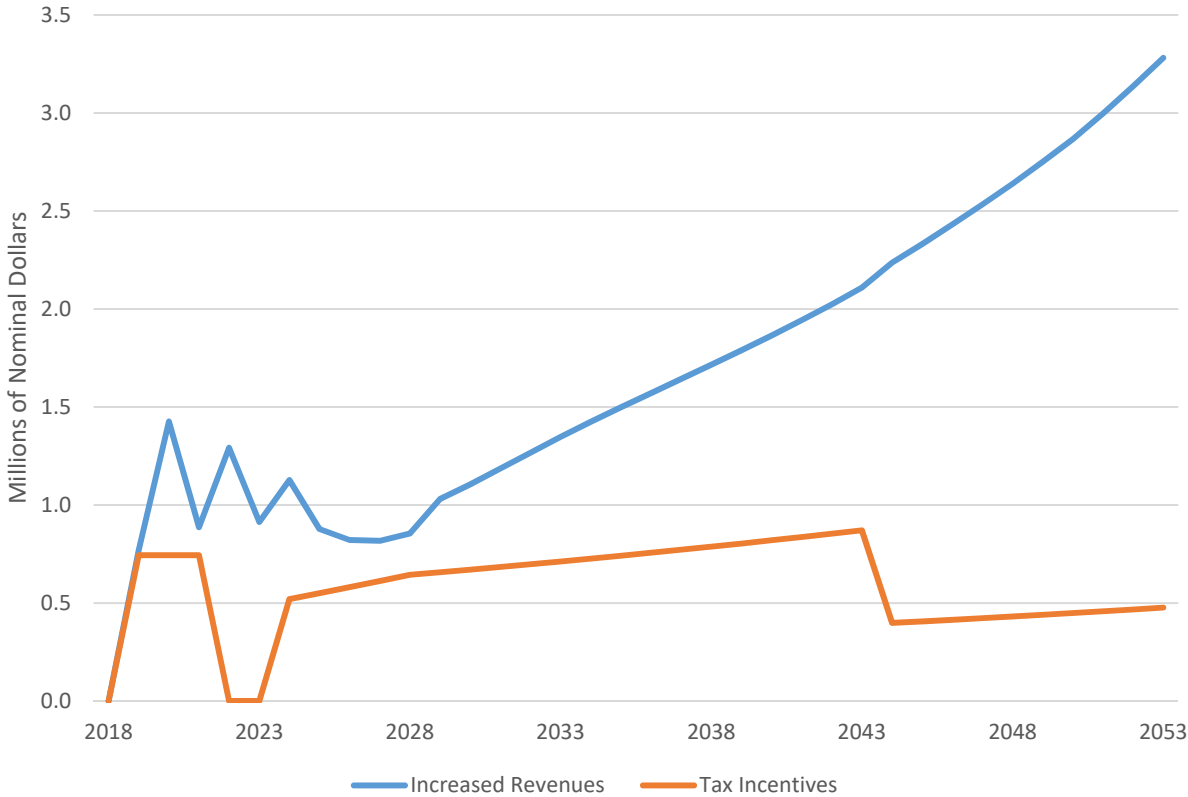
Figure 5: Statewide Net Job Additions - Adverse Scenario



Results of Fiscal Impact Analysis

Figure 6 displays our estimates of the total increase in state tax revenues generated by the proposed TBP alongside the cost of the estimated tax incentives. Both amounts are expressed in nominal dollars (unadjusted for inflation).³⁵ The value of the increased tax revenues is larger than the cost of the tax incentives in each year of the analysis period, although that difference is only \$25,000 in 2019. The increase in state tax revenues, however, reaches \$1.4 million in the next year, as the construction phase of the project expands, when the total tax incentives to the developer are projected to total \$0.7 million. The increase in revenues is projected to fall to \$0.9 million in 2021 after construction of the site’s East wing concludes, while the cost of tax incentives stays flat at \$0.7 million. The projected cost of the tax incentives then falls to \$0 during 2022 and 2023 before the developer resumes tax capture as the operational phase of the site begins in 2024. From that point on, the projected cost of the tax incentives is expected to grow gradually from \$0.5 million in 2024 to \$0.9 million in 2043 when eligibility for income tax and withholding capture expires. Meanwhile, as the construction phase winds down, the value of the increased tax revenues settles to about \$0.8 to 0.9 million per year through 2028. The additional tax revenue then begins to increase by an average of \$100,000 per year, reaching \$3.3 million in additional tax revenue for the state in 2053. This increase is driven by the growth of net new employment in Michigan, which rises by 100 jobs over the same period.

Figure 6: Michigan Tax Incentives and Increased Tax Revenues

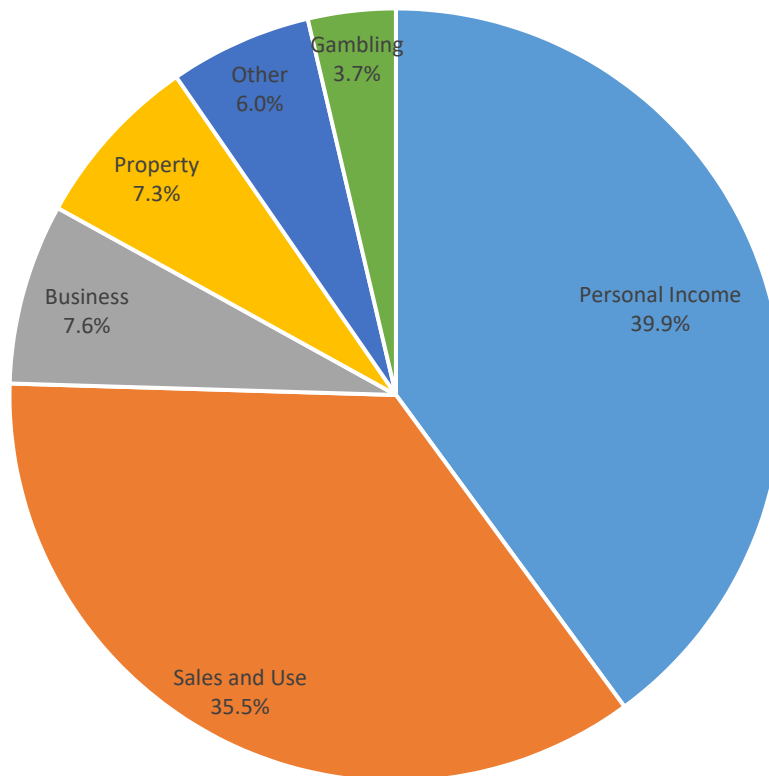


³⁵ Appendix II includes a table displaying the numerical values for each year.

Discounting both the value of the increased state tax revenues and the cost of the tax incentives at 6 percent per year, we project the present value as of 2018, expressed in 2018 dollars, of the increase in tax revenues to be \$19.9 million and the present value of the cost of the tax incentives to be \$8.6 million. Therefore, we project the net fiscal benefit to the state of the proposed TBP to be positive -- \$11.4 million with rounding. We estimate that the ratio of the increased tax revenues to the cost of the tax incentives generated by the proposed TBP to be 2.3 to 1.³⁶

Figure 7 displays the sources of the projected increase in state tax revenue generated by the proposed TBP, scaled by the proportion of the total increase in the present value of revenues from each source. The personal income tax accounts for the largest increase in state tax revenues, approximately 40 percent. Sales and use taxes account for an additional 36 percent of the increase, followed by business taxes at 8 percent, state property taxes at 7 percent, and gambling taxes at 4 percent. All other taxes account for 6 percent of the increase in state tax revenues.

Figure 7: Increased Michigan Tax Revenue by Tax, Present Value



³⁶ Because the increase in tax revenues is projected to be greater than the cost of the tax incentives in every year, the projection that the proposed TBP will generate a positive fiscal benefit to the state does not depend on the discount rate.

Adverse Scenario Results

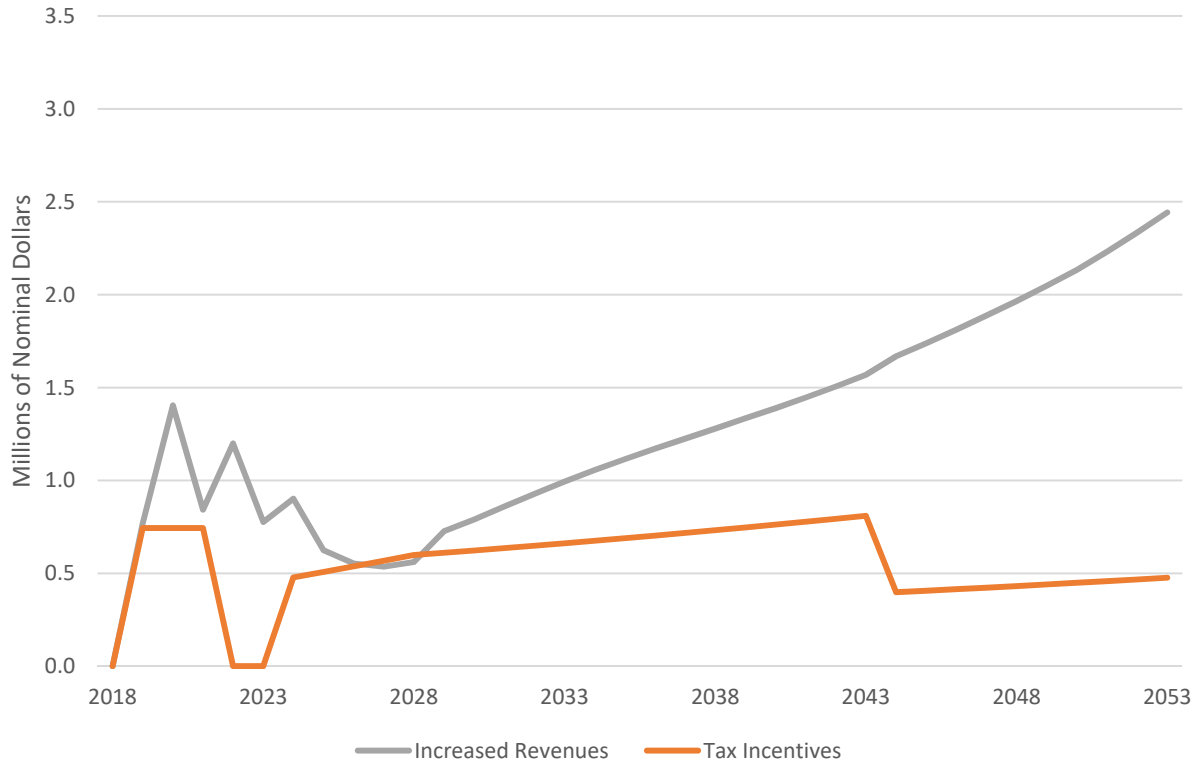
Figure 8 displays the results of the fiscal impact analysis under the assumptions in the adverse scenario. In this scenario, the projected cost of the tax incentives is slightly lower between 2024 to 2053 due to the lower assumed direct employment at the site and the corresponding reduction in employee withholding capture by the developer. We estimate the total cost of the capture to be \$19.9 million in nominal dollars from 2019 to 2053, \$1 million less than in the baseline scenario.

During the construction phase, the estimated increase in tax revenue is identical with the base case for 2019 but declines steadily to about 80 percent of the baseline increase due to the lower amount of direct employment at the development.³⁷ After the end of the construction period, the increase in tax revenues under the adverse scenario ranges from 66 percent to 75 percent, as large as in the baseline scenario. On a present value basis, the increase in state tax revenues generated by the proposed TBP is \$15.6 million, implying a net fiscal benefit to the state of \$7.4 million when compared with the present value of the cost of the incentives of \$8.2 million.³⁸ The ratio of the present value of increased tax revenues to the present value of the cost of the tax incentives is 1.9 in the adverse scenario. That ratio is lower than the 2.3 ratio in the baseline scenario, but still implies that the increase in revenues in the adverse scenario is almost twice as large as the cost of the tax incentives. Therefore, we conclude that the proposed TBP is likely to produce a net fiscal benefit to the state even under a set of assumptions that we believe is substantially more conservative than our baseline expectations for the project.

³⁷ 2024 is the first year that the site reaches full employment and also the first year that the developer plans to capture employee withholding. The site, however, slowly begins adding jobs in 2020, but at lower levels in the adverse scenario, which accounts for the difference in tax revenue between the two scenarios.

³⁸ The expected increase in tax revenue for the state is lower than the expected cost of the incentives in 2027 and 2028. The increase in tax revenue in the years before and after, however, is expected to be large enough relative to the cost of the tax incentives that any discount rate between 0 and 100 percent still results in a clear net fiscal benefit to the state.

Figure 8: Michigan Tax Incentives and Increased Tax Revenues - Adverse Scenario



Limitations of the Analysis

The analysis in this report is subject to several potential limitations, some of which may lead the analysis to overstate the benefits of the proposed TBP to the state of Michigan, and others that may lead the analysis to understate those benefits. In the interest of transparency and to help readers to assess the likely effects of those limitations, we discuss them briefly in this section.

Some limitations that could lead the analysis to overstate the benefits to the state of Michigan are:

- The analysis does not consider the potential increase in the cost of providing government services to the additional residents and businesses who will reside in the state as a result of the TBP. Those costs were excluded from the analysis under guidance from the MEDC and Michigan Department of Treasury due to the difficulty in reliably quantifying their magnitude. Several features of the proposed TBP suggest that the marginal costs of providing such government services are likely to be lower than Michigan’s current average per capita cost of providing government services, however:
 - Some government costs do not scale directly with the population, so they may not increase with additional residents.
 - Federal transfers for certain programs will increase with the state’s population, defraying some costs associated with new residents.
 - New state residents by expanded employment opportunities may be more likely than average to be employed and may therefore require less than average social and other programmatic assistance.
- Consistent with current Michigan law, the analysis does not consider the possibility that some companies that locate in the proposed TBP development may receive tax incentives apart from the incentives given to the TBP developer. The provision of any additional tax incentives would reduce the incremental tax revenues the proposed TBP is projected to generate. We consider this possibility to be of limited relevance to this proposed TBP.
- Consistent with the spirit of legislation that established the Transformational Brownfield Plan program in Michigan, the analysis uses a “but for” approach that assumes the developer would not engage in any redevelopment of the TBP site in the absence of tax incentives. It is possible that the developer would engage in some redevelopment of the site so that the “but for” assumption in this analysis overstates the TBP’s likely benefits to the state. The “but for” assumption is likely to be more realistic in this case than in many others given the environmental contamination and longstanding lack of use at the site.
- Some elements of the proposed development appear more speculative than in the previous TBP implemented under the legislation. In particular, the office space associated with the development contains some unusual features and faces challenges to successful leasing that could limit the TBP’s economic and fiscal impact more substantially than we have assumed.

Conversely, some limitations that could lead the analysis to understate the benefits to the state of Michigan are:

- Consistent with the spirit of the legislation that established the Transformational Brownfield Plan program in Michigan, the fiscal impact analysis does not consider any increase in local tax revenues that might result from the proposed TBP. The REMI model does endogenously

increase local government employment in response to an increase in local population, which implicitly reflects the expectation of higher revenues. In our judgment, the REMI model's default response is likely to underestimate the true local revenue impacts of the proposed TBP.

- The period for the analysis encompasses thirty-five years of tax capture between 2019 and 2053. The economic and fiscal benefits to the state could continue beyond that period, however.
- We believe that the assumptions we have used in the analysis are generally conservative. In particular, none of the employment associated with Old Stove Brewing was treated as "exogenous," although it arguably is aimed primarily at the export market and would not be expected to locate in Michigan absent the planned development.
- The TBP is located in a relatively depressed economic area in Vicksburg, Michigan. Therefore, the project could provide an indirect fiscal benefit to the state by supporting other economic development goals on which the state would otherwise spend resources.

References

- Brooker, Nathan, 2015. "Does living near a Michelin-starred restaurant affect housing prices?" *Financial Times*, June 5, 2015. <https://www.ft.com/content/f72f5962-0522-11e5-8612-00144feabdc0>
- Bureau of Economic Analysis, 2013. *RIMS II. An essential tool for regional developers and planners*. Retrieved from: https://www.bea.gov/regional/pdf/rims/rimsii_user_guide.pdf.
- CBRE, 2016. *North America Fit-Out Cost Guide, Occupier Projects 2016/17 Edition*.
- Cushman and Wakefield, 2018. *Space Matters: Key Office Trends and Metrics for U.S. Occupiers*. Retrieved from: <http://www.cushmanwakefield.com/en/research-and-insight/2018/space-matters>
- De Sousa, Christopher A., Changshan Wu, and Lynne M. Westphal, 2009. "Assessing the Effect of Publicly Assisted Brownfield Redevelopment on Surrounding Property Values" *Economic Development Quarterly*, 23(2): 95-110.
- Haninger, Kevin, Lala Ma, and Christopher Timmins, 2017. "The Value of Brownfield Remediation" *Journal of the Association of Environmental and Resource Economists*, 4(1): 197-241.
- Internal Revenue Service, 2017. *SOI Tax Stats – Migration Data – 2015-2016*. Retrieved from: <https://www.irs.gov/statistics/soi-tax-stats-migration-data-2015-2016>.
- Kaufman, Dennis A and Norman R Cloutier, 2006. "The Impact of Small Brownfields and Greenspaces on Residential Property Values" *The Journal of Real Estate Finance and Economics*, 33(1): 19-30.
- Longwoods International, 2016. *Michigan 2016 Visitor Research*. Retrieved from: <https://www.michigan.org/industry/research>.
- Michigan Economic Development Corporation (MEDC), 2019. *Transformational Brownfield Plan Program Guidelines*. Retrieved from: <https://www.miplace.org/499762/globalassets/documents/tbp/tbp-guidelines.pdf>
- Phillips Environmental Consulting Services, Inc. (Phillips), 2018. *Act 381 Combined Transformational Brownfield Plan*. November 2, 2018.
- Shuman, Michael H., 2017. *The Economic Impact of the Vicksburg Mill Redevelopment*.
- Senate Fiscal Agency (SFA), 2018. *Bill Analysis: Senate Bills 111 through 115 (as enacted)*. Date completed: January 3, 2018. Retrieved from Michigan Legislature website: <http://www.legislature.mi.gov/documents/2017-2018/billanalysis/Senate/pdf/2017-SFA-0111-N.pdf>
- Simons, Robert A, Roberto G Quercia, and Ivan Maric, 1998. "The Value Impact of New Residential Construction and neighborhood disinvestment on Residential Sales Price" *The Journal of Real Estate Research* 15(2): 147-161.
- United States Environmental Protection Agency (EPA), 2015. *The EPA Brownfield Program Produces Widespread Environmental and Economic Benefits*.

Wiley, Jonathan A, 2015. "The Impact of Commercial Development on Surrounding Residential Property Values" <https://www.gamlis.com/images/jonwiley.pdf>

Appendices

- I. Biographical Sketches
 - a. Report Authors
 - b. Expert Panel Members
- II. Numerical Values of Annual Estimates of Increased Tax Revenues and Cost of Tax Incentives

Appendix I: Biographical Sketches

Report Authors

Dr. **Gabriel Ehrlich** received his Ph.D. in economics from the University of Michigan. He is the director of the University's Research Seminar in Quantitative Economics (RSQE), an economic forecasting and policy evaluation unit within the Economics Department. His research focuses on several areas of housing and land economics as well as the effects of wage rigidity on labor market outcomes. His work has been discussed in *The Economist*, *The Financial Times*, and *The Washington Post*, and his recent article, *Economic Effects of Medicaid Expansion in Michigan*, was published in the *New England Journal of Medicine*.

Prior to joining RSQE, Dr. Ehrlich worked in the Financial Analysis Division at the Congressional Budget Office (CBO), where he forecasted interest rates and conducted analysis on monetary policy and the mortgage finance system. He has also worked as a financial analyst in the mortgage banking industry. He earned his undergraduate degrees in finance and economics at the University of Maryland, where he was chosen by the faculty as the outstanding graduate in finance during his senior year.

Dr. Ehrlich testifies twice per year to the state legislature on Michigan's fiscal and economic prospects, which the state uses as a guide to determining expected future revenues. He is a coauthor recently of *The U.S. Economic Outlook for 2019–2020* and *The Michigan Economic Outlook for 2019–2020*.

Donald Grimes received his Master's Degree in economics from the University of Michigan. He is a senior research area specialist at RSQE. His primary research interests are in labor economics and economic forecasting. For more than 30 years, he has been engaged in economic forecasting for state and local governments and is frequently called upon for policy advice. He has worked for many years with the Michigan departments of Transportation and Treasury and the Michigan Economic Development Corporation on policy analysis and evaluating economic strategies. He is co-director of a project to generate long-term economic and demographic projections for all the counties of Michigan. His past research includes a study looking at Michigan's industrial structure with a view to identifying sectors that will promote economic growth in the future.

He has been involved in research projects sponsored by the U.S. Department of Commerce, the U.S. Department of Labor, the Federal Reserve Bank of Chicago, and the Robert Wood Johnson Foundation. His recent publications include *The Michigan Economic Outlook for 2019–2020*; *Stabilizing and Sustaining: The Economic and Demographic Outlook for Southeast Michigan through 2045*; *Exploring Wage Determination by Education Level: A U.S. Metropolitan Statistical Area Analysis from 2005 to 2012*, published in *Economic Development Quarterly*; and *Economic Effects of Medicaid Expansion in Michigan*, published in the *New England Journal of Medicine*.

Dr. **Michael McWilliams** received his Ph.D. in economics from the University of Michigan. He is a Michigan forecasting specialist at RSQE. His research focuses on a range of topics in environmental and natural resource economics, including land use change and its causes and environmental consequences, regulation of light-duty vehicles, and the impact of the ethanol mandates. His work has been published in the *Proceedings of the National Academy of Sciences* and *Energy Policy*.

Dr. McWilliams assists with RSQE's forecasts of the Michigan economy and tax revenues four times per year, and is a coauthor recently of *The Michigan Economic Outlook for 2019–2020*.

Dr. Jim Robey is the Director of Regional Economic Planning Services at the W.E. Upjohn Institute for Employment Research. Dr. Robey's research and technical assistance on economic issues and in economic and workforce development has assisted corporate, nonprofit, and economic and workforce development entities in problem resolution and strategic decision making, from the local to the national levels. Spanning more than three decades, his expertise includes industry studies, applied occupational analysis, economic impact modeling and analysis, economic and workforce development research and analysis, and site selection assistance. His research focuses on regional economic, education, economic development, and workforce development issues across Michigan and the nation. He prepares annual employment forecasts for southwest Michigan's metropolitan areas, directs the production of Business Outlook for West Michigan, and provides economic insights for regional economic development across northwest Ohio, and the states of Ohio, Pennsylvania, West Virginia, Maryland, New York, and New Jersey. He has additionally coauthored research on a variety of national and regional issues. He received his Ph.D. in Urban Studies (1997), with an emphasis on Economic Development, and his Master's degree in Public Administration (1993) from the Levin College of Urban Affairs, Cleveland State University. He earned his Bachelor's degree in Sociology (1979) from Edinboro State College.

Appendix II: Numerical Values of Annual Estimates of Increased Tax Revenues and Cost of Tax Incentives

Table A.1: Annual Estimates of Increased Tax Revenues and Cost of Tax Incentives
Generated by Proposed TBP (Millions of Nominal Dollars)

	Baseline Scenario		Adverse Scenario	
	Increased Tax Revenues	Tax Incentives	Increased Tax Revenues	Tax Incentives
2018	0.0	0.0	0.0	0.0
2019	0.8	0.7	0.8	0.7
2020	1.4	0.7	1.4	0.7
2021	0.9	0.7	0.8	0.7
2022	1.3	0.0	1.2	0.0
2023	0.9	0.0	0.8	0.0
2024	1.1	0.5	0.9	0.5
2025	0.9	0.6	0.6	0.5
2026	0.8	0.6	0.6	0.5
2027	0.8	0.6	0.5	0.6
2028	0.9	0.6	0.6	0.6
2029	1.0	0.7	0.7	0.6
2030	1.1	0.7	0.8	0.6
2031	1.2	0.7	0.9	0.6
2032	1.3	0.7	0.9	0.6
2033	1.3	0.7	1.0	0.7
2034	1.4	0.7	1.1	0.7
2035	1.5	0.7	1.1	0.7
2036	1.6	0.8	1.2	0.7
2037	1.6	0.8	1.2	0.7
2038	1.7	0.8	1.3	0.7
2039	1.8	0.8	1.3	0.7
2040	1.9	0.8	1.4	0.8
2041	1.9	0.8	1.4	0.8
2042	2.0	0.9	1.5	0.8
2043	2.1	0.9	1.6	0.8
2044	2.2	0.4	1.7	0.4
2045	2.3	0.4	1.7	0.4
2046	2.4	0.4	1.8	0.4
2047	2.5	0.4	1.9	0.4
2048	2.6	0.4	2.0	0.4
2049	2.8	0.4	2.0	0.4
2050	2.9	0.4	2.1	0.4
2051	3.0	0.5	2.2	0.5
2052	3.1	0.5	2.3	0.5
2053	3.3	0.5	2.4	0.5