

**Center for Applied Demography & Survey Research
University of Delaware**

**Economic Impact on Delaware's Economy:
The Development of Churchman's Crossing**

by

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Executive Summary

The Center for Applied Demography & Survey Research at the University of Delaware conducted this study to measure the potential economic impact developing the Churchman's Crossing area in Christiana, Delaware. The study was made possible by a grant from the Delaware Department of Transportation (DELDOT). The Center conducted the study independently and the authors are solely responsible for the design and execution of the study.

The Center employed the REMI PI+ model which is a dynamic economic simulation model. Since it is a structural model, it is capable of estimating causal relationships. It is a general equilibrium model with feedback. The REMI model is tailored to Delaware using data from the Bureau of Census, the Bureau of Economic Analysis, the Bureau of Labor Statistics and the Energy Information Administration among others.

Twenty-seven development projects are currently under consideration for the Churchman's Crossing area. The last of these projects is scheduled for completion by 2035. Overall, they have the potential to transform the area in two major ways. One transformation increases the operations at the Bank of America and J.P. Morgan headquarters. The other would transform the Christiana Mall and surrounding properties into an interstate hub of retail shopping. Other projects are also considered in the report, but their combined effect is relatively small. The general findings of the impact study are outlined below.

- By 2035, these projects potentially could directly facilitate 10,200 jobs and indirectly create another 14,400 jobs.
- State population could increase by 9,200 in 2025 and by 22,100 in 2035.
- GDP could potentially increase by \$2.2 billion in 2025 and by \$5 billion in 2035.¹
- Annual personal income could rise by \$1.0 billion in 2025 and by \$2.2 billion in 2035.

¹ All dollars are as of 2008, unless otherwise noted.

- Consumption could rise by \$0.7 billion in 2025 and by \$1.7 billion in 2035.
- The timing of development will impact the magnitude of economic benefits. The earlier investment begins, the greater will be the accumulated benefits.
- Most benefits in the construction sector are due to business development and the corresponding multiplier effect, not the initial investment spending. Spending on infrastructure could create up to 380 new jobs by 2012. However, construction alone could see as many as 1,600 new jobs by 2035.
- Annual state and local tax revenue for could be as high as \$4.5 million in 2015, \$71 million in 2025, and \$166 million by 2035. Most of this revenue comes in the form of personal income tax.
- Each residential project is expected to generate approximately 67 temporary jobs and \$5.5 million in GDP each it is under construction.
- Annual property taxes from residential projects could increase by \$686,000 (2008 \$) once the development is finished.
- Banking creates substantially more benefits for the economy than retail. Without the banking projects:
 - 5,100 direct jobs and 3,800 jobs indirect jobs are created.
 - GDP could increase by \$40 million in 2015 and \$1.4 billion in 2035.
 - Annual state and local tax revenue would be approximately 70% to 75% less, reaching a maximum of only \$50 million in 2035.

Introduction

This report estimates the economic benefit of developing the Churchman's Crossing area in New Castle County, Delaware. Data used in this report comes from the Delaware Department of Labor (DOL), the New Castle County Department of Land Use (NCCDLU), and the Delaware Department of Transportation (DELDOT). The analysis relies on a regional economic simulation model, REMI's PI+, to predict what would happen if the current proposals to develop Churchman's Crossing take place.

As of August 2009, the NCCDLU lists four residential and twenty-seven nonresidential development projects for the area.² The projects are scheduled for completion by 2035, and developers have committed to most of them. The four residential projects, listed in Table 1a, would build 247 workforce apartments, 218 townhomes, and 99 single family homes.

Table 1a - Descriptions of Current Residential Development Projects

Name	Description
Churchman's Meadows	247 Workforce Apartments
Patterson Lane	28 Townhouses
Traditions at Christiana	99 Active-Adult Single Family Houses
Hudson Village	190 Townhouse Condos

² Special thanks to Owen Robatino from the New Castle County's Department of Land Use for maintaining current development projects for this area.

Table 1b – Descriptions of Current Nonresidential Development Projects

Project Name	Description of Project	Existing Floor Space (sq ft)	Proposed Floor Space (sq ft)
Islamic Society of Delaware	Expands existing church footprint	7,400	6,600
Holiday Inn/Hampton Inn	Builds a new restaurant	122,300	8,000
Centurian Plaza / Catawba Property	Builds a new retail complex	84,300	12,000
Churchman Village / Metro Properties	Builds a new medical care center for nearby nursing homes.	135,800	16,700
Old Route 7 South	Expands warehouse and lumberyard	113,600	19,000
Christiana Medical Center / Faith City	Expands existing school facilities	65,200	21,200
Omega Professional Center Area	Expands the existing blood bank	253,300	27,300
Comfort Suites	Expands existing hotel capacity	32,000	33,400
Country Commerce Office Park	Builds new commercial office building	45,000	42,000
Christiana Corporate Center	Builds new commercial office building	278,000	43,200
Main Street Hotel	Builds new hotel	0	43,300
Sallie Mae/Nationwide/Provident Mutual	Builds a new wing on the existing commercial office building	159,000	50,000
Christiana Hospital	Builds new medical offices and miscellaneous buildings	2,150,900	80,900
Hotel/Restaurant Cluster	Builds a new hotel	134,600	89,200
Harmony Industrial Park	Builds a new light-Industrial / warehouse	1,170,800	90,600
Metro Business Park / SPCA	Builds new commercial office and warehouse buildings	12,800	175,900
Christiana Town Center (273 Mall)	Builds new retail stores	424,800	228,000
Industrial Rentals / Christiana Market Place	New commercial office, retail, and hotel buildings, & small restaurant	0	303,000
Christiana Mall*	Demolish and replace unused retail space and build new retail stores	1,182,900	327,200
Sears Eagle Run / Christiana Promenade*	Demolish existing warehouse / retail store and build new retail stores	286,500	446,900
J.P. Morgan Christiana Center	Expands commercial office space for a financial institution's corporate headquarters, and builds a new shopping center and daycare.	672,900	776,300
Bank of America /MBNA Christiana Center	New commercial office for a financial institution's corporate headquarters and some warehouse space	644,500	1,114,000
Christiana Fashion Center	Builds new retail stores	0	1,221,500
Total		7,976,600	5,176,200

* Existing floor space will decline as a result of demolishing current buildings

Table 1b provides a brief description of the nonresidential development projects. The third column lists the existing floor space for any existing buildings, and the fourth column lists the proposed expansion. Overall, 5 million additional square feet of floor space are planned for properties currently offering 8 million square feet. Approximately 90% of this additional space will be evenly divided between retail stores and commercial-office space. Light industry, warehouses, hotels, restaurants, medical offices, schools and churches make up the remaining 10% of additional floor space.

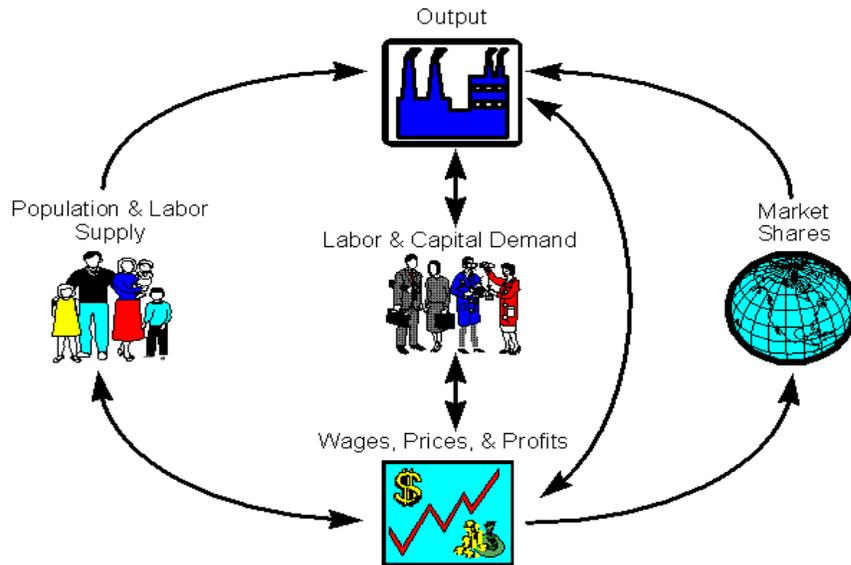
The report proceeds as follows. The first section presents an overview of the REMI model and how it will be used in this analysis. The economic impact of residential investment is analyzed in Section 2, and the nonresidential development is explored in Section 3. Section 4 addresses development's effect on state and local taxes. The final section summarizes the main findings of the report.

Overview of the REMI PI+ Model

REMI's PI+ software is a regional simulation of the Delaware economy. The model is tailored to Delaware using data from the Bureau of Census, the Bureau of Economic Analysis, the Bureau of Labor Statistics and the Energy Information Administration. The model is a regionalized version of a benchmarked national model. The region includes the three counties in Delaware, Cecil County MD, Delaware and Chester counties in PA combined, and the balance of the Delmarva Peninsula. There are thus six sub-regions in the model. The economic impacts are listed for the entire state, though most of the activity takes place in New Castle County.

Each county in Delaware is modeled as an independent, fully functioning economy that interacts with every other sub-region in the area and with the nation in general. Each economy is founded on conventional assumptions, like households maximize utility and firms maximize profits. Hundreds of equations have been developed over the last 25 years to mathematically describe an economy's structure. These equations can be organized into five major components: Output and Demand, Labor and Capital Demand, Population and Labor Force, Wages-Prices-Costs, and Market Shares. Figure 1 illustrates REMI's main structure and components.

Figure 1 - Illustration of the REMI PI+ model



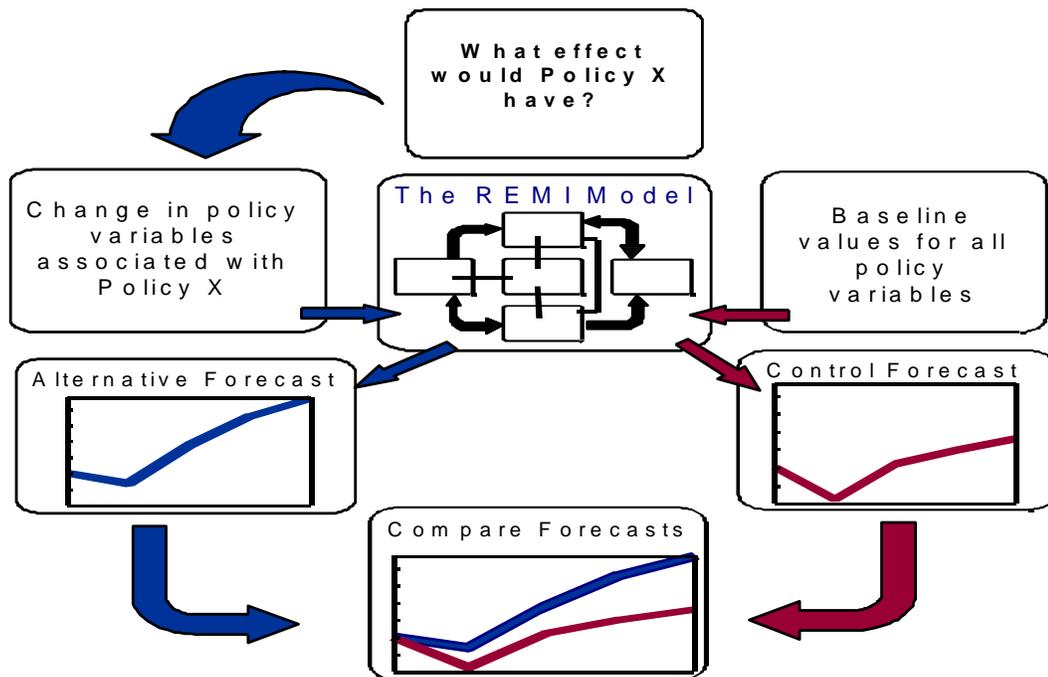
In the REMI model, businesses demand labor, capital, and fuel as inputs in order to supply goods and services as output. Households and some businesses supply the inputs of production markets and also generate the demand for goods and services. Wages, prices, and profits adjust to form equilibriums in each market, but the process might take time. High market shares can generate cluster effects that influence factor productivity and input prices.

The REMI PI+ model is a general equilibrium model with feedback. This means that the model describes the entire economy as it changes over time. For example, changes in population, demographics, and wages each influence the labor supply at any moment in time, but are themselves influenced in the future by the changes in the labor supply. These adjustments happen gradually, so the economy does not statically jump from one equilibrium to another. This is one main advantage of using the REMI model versus other economic simulation models (RIMS II, IMPLAN).

A second advantage of using a general equilibrium approach is that the model can capture a multiplier effect from other parts of the economy. In a sense, the multiplier effect can be described as the cumulative effect of demand generating additional demand. For example, one dollar of retail sales is expected to generate 0.28¢ sales in construction, 0.30¢ in fabricated metal product manufacturing, 1.1¢ in utilities, etc. As will be shown, the indirect effects from the multiplier effect can be quite large.

Figure 2 illustrates how REMI estimates the effects of a policy. First, the REMI model is calibrated and standard future scenario is predicted. This future scenario is called the control forecast. A policy is then proposed that will impact the economy. A modeler adapts this policy into REMI by changing appropriate input variables. A simulation is run on these new parameters, which creates an alternative forecast. The alternative forecast is compared to the control forecast and differences between the two are attributed to the policy. In the next section, REMI will be used to estimate the effects of residential development.

Figure 2 – Illustration of a Policy Forecast in REMI



The Impact of Residential Development

As indicated in Table 1a, the residential projects in this area will create 247 workforce apartments, 218 townhomes, and 99 single family homes. Before estimating their effects, a brief discussion will describe how these projects fit into the REMI framework.

The REMI model classifies houses and apartments as residential capital. Money spent on residential capital, considered an investment, mostly creates a demand for construction and professional services (i.e. engineers, architects, etc). In turn, these businesses demand intermediate goods from other businesses, such as lumber and metal. Higher compensation for workers raises their consumption and stimulates sales in retail and other sectors. When the money eventually stops recycling through the economy, the total effect is collectively referred to as the multiplier effect.

Residential capital investment affects the model in other ways. For example, increasing the supply of residential capital will drive down housing prices, which in turn lowers inflation. Lower inflation reduces the demand for labor, capital, and fuel as real prices edge upwards and affect the rest of the economy. Many other complicated relationships are captured in the REMI model.

The policy proposed here increases the level of residential capital investment over time. REMI requires that the size of this investment enter as an input variable during the years that investment occurs. Unfortunately, this information is not available and must be estimated.³

Investment expenditures for the Traditions at Christiana, Patterson Lane and Hudson Village subdivisions are assumed to be 90% of the properties' 2008 market value.⁴ This assumption is based on a 2005 report from the National Association of Home Builders that found the industry's average profit margins to be 10%. The market value of each property is created using data from New Castle County's tax assessment records.

The Traditions at Christiana is a subdivision of 99 active-adult single family homes. Only 20 lots remained unsold at the end of FY 2008. A linear regression and data from previous sales in this development predicted the 2008 market value for every home.⁵ The total 2008 market value was estimated at \$31,456,600. Assuming investment costs are approximately 90% of this figure, expenditure would be \$28.3 million.

The Hudson Village and Patterson Lane projects have not yet begun construction, so their market value was assumed to be the county average. The average value of a townhouse selling in 2008 was found to be \$192,600.⁶ Therefore, the market values for Hudson Village and Patterson Lane projects are forecasted to be \$36,594,000 and \$5,392,800 respectively. Investment expenditure is projected to be \$37.8 million.

³ Clearly, the developer's cost estimates would be more accurate than anything derived in this report, but unfortunately that information is not available. On the other hand, even if that data were available, there would always be great uncertainty using those estimates.

⁴ <http://www.nbnnews.com/NBN/issues/2005-11-21/Coast+to+Coast/index.html>

⁵ A linear regression predicted the sales price given the total assessed value and quarter in which the property sold. Unsold properties were assumed to have the average sales price, de-trended for 2008.

⁶ An assessment to sales ratio was generated for every townhome sale in the county. Outliers with assessment to sales ratios greater than five and less than one were removed. The average assessment value and average assessment to sales ratio was created for each quarter. Finally, the average assessed value of all townhomes selling since 2004 was multiplied by the average 2008 assessment to sales ratio.

The Churchman's Meadows apartment complex is the last residential property. It is difficult to ascribe a market value to work force apartments, so a different approach was used to estimate investment costs.⁷ Diagrams from a similar apartment complex in Newark were used to estimate the total square feet for 277 apartment complex.⁸ The RSMeans CostWorks' *Conceptual Estimator* was utilized to estimate construction costs of building each apartment building. The website estimated that apartments would cost approximately \$48.6 million.

Finally the timing of each investment project is discussed. Three of the four projects actually will be developed in the future. Because each one likely takes four years to complete, it would be wrong to spread the investment expenses out over the entire twenty year timeframe. Therefore, the residential projects will be viewed separately. That way, the benefit of each project may be viewed independently or with others in a group.

⁷ Apartment complexes are rarely bought and sold as a single unit. In addition, data is not readily available for the number of apartments within a complex. .

⁸ Each apartment is assumed to be 1060 sq. ft and 64 apartments can likely fit in a four level, 81,500 square foot apartment building.

Table 2 - Estimated Annual Impact of Residential Investment on Delaware's Economy, figures above REMI baseline

		<i>Delaware's Total Economy</i>						<i>Construction Sector</i>		
Year		Employment	Pop.	GDP, mil. (2008 \$)	GDP, pct	Disp. Pers. Income, mil. (nominal \$)	Consumption, mil. (2008 \$)	Employment	Output, mil. (2008 \$)	Wages and Salaries, mil. (nominal \$)
Churchman's Meadows	1	126	24	\$10.3	0.03%	\$4.62	\$3.81	75	\$9.3	\$3.5
	2	119	43	\$9.9	0.03%	\$4.98	\$3.80	71	\$9.0	\$3.6
	3	108	56	\$9.1	0.02%	\$5.07	\$3.69	66	\$8.4	\$3.5
	4	97	65	\$8.1	0.02%	\$4.97	\$3.50	59	\$7.7	\$3.3
Patterson Lane	1	14	3	\$1.1	0.00%	\$0.51	\$0.42	8	\$1.0	\$0.4
	2	13	5	\$1.1	0.00%	\$0.55	\$0.42	8	\$1.0	\$0.4
	3	12	6	\$1.0	0.00%	\$0.56	\$0.40	7	\$0.9	\$0.4
	4	11	7	\$0.9	0.00%	\$0.55	\$0.38	7	\$0.8	\$0.4
Traditions at Christiana	1	73	14	\$6.0	0.02%	\$2.68	\$2.21	43	\$5.4	\$2.1
	2	69	25	\$5.7	0.01%	\$2.90	\$2.21	42	\$5.3	\$2.1
	3	63	33	\$5.3	0.01%	\$2.95	\$2.15	38	\$4.9	\$2.0
	4	56	38	\$4.7	0.01%	\$2.89	\$2.03	35	\$4.5	\$2.0
Hudson Village	1	85	16	\$7.0	0.02%	\$3.12	\$2.57	51	\$6.3	\$2.4
	2	81	29	\$6.7	0.02%	\$3.38	\$2.57	48	\$6.1	\$2.4
	3	73	38	\$6.1	0.02%	\$3.43	\$2.50	45	\$5.7	\$2.4
	4	65	44	\$5.5	0.01%	\$3.37	\$2.37	40	\$5.2	\$2.3
Avg. Annual Impact per Project		67	28	\$5.5		\$2.91	\$2.19	40	\$5.1	\$2.1

Table 2 reports the economic impact of increasing residential capital investment by the estimated amounts. The Churchman's Meadows apartment complex had the highest expenditures, so it affected the economy more than the other projects. Each year that the apartment complex is under construction, annual employment could increase by up to 126 jobs. Patterson Lane has the smallest investment, and is expected to create between 11 and 14 jobs each year. Overall, REMI predicts that approximately 6 out of every 10 new jobs will be in construction.

The last row in Table 2 takes the average annual impact over each project. This row gives the expected impact of a policy maker randomly choosing one project to develop in a given year. On average, a random project generates 67 additional jobs and \$5.5 million (2008 \$) more in GDP each year. Similarly, consumption would rise by \$2.2 million and the population would increase by 28 people. Wage and salaries in the construction sector would increase by \$2.1 million.

Other than the benefit of having a larger stock of residential capital, most benefits from residential investment will be temporary. This should make intuitive sense, because once a house is built, no more significant economic activity takes place. For this and other reasons, the estimated economic benefits from residential development are quite small compared to the potential impact of the nonresidential development.

The Impact of Nonresidential Development

In this section, the economic impact of nonresidential development is estimated. There are two ways to view development, one way is driven by increases in supply and the other, by increases in both supply and demand. Either way can be modeled in REMI. To understand the difference, consider the following two scenarios.

In the first scenario, developers build retail stores and office buildings in anticipation of a demand that never materializes.⁹ In the short term, the construction workers, engineers, architects and others who build these buildings receive payment, and multiplier effect similar to residential investment is generated. Without the increase in demand, however, there would be no more economic gains once the investment money has finished cycling through the system. Instead, Churchmans Crossing would be left with too much nonresidential capital, reflected by falling commercial property prices, unused floor space, and increased deterioration.

In the second scenario, developers build retail stores and office buildings in anticipation of a demand that materializes. In other words, Christiana grows into a regional retail hub and banks continue to relocate their headquarters to the region. As new businesses occupy the buildings, they generate jobs and additional output for the economy. A much larger multiplier effect occurs due mostly to the new business activity. The multiplier effect could even be large enough to generate more development.

⁹Of course, most development would likely stop once developers realized they had misjudged demand. This point is ignored for the purposes of the thought experiment.

The difference between the two outcomes comes down to whether demand increases. REMI can analyze each scenario, but different input variables are used for each. The first situation is most appropriately modeled as an increase in nonresidential capital investment. REMI requires that the size of that investment enter as a policy variable. The second situation models increased demand through the businesses that occupy the buildings. REMI requires that the type of business and number of employees enter as policy variables.

Both approaches will be adopted in this report. The main advantage of using the first approach is that investments are modeled explicitly. Therefore the impact of infrastructure and nonresidential capital investment can be isolated from the larger effects of business growth. The main advantage of using the second approach is that it captures the entire potential benefit of developing the area.¹⁰

¹⁰ Investment does not enter explicitly into the policy variables when demand increases, because the multiplier effect includes, among other things, spending in construction and nonresidential capital.

The Timing of Nonresidential Development

As mentioned earlier, the nonresidential projects are expected to occur sometime between 2015 and 2035. However, the impact also depends on when the projects occur within this time period. The report uses two possible timelines for development. The first timeline assumes a constant, uniform growth rate and the second timeline assumes nonlinear growth that peaks in the middle of the time period.

Figure 3a illustrates both timelines by showing the flow of annual investment expenditures if total project investment is \$700 million. Investment spending is \$35 million each year in the timeline with constant growth. Under nonlinear growth, investment is relatively low early on at \$23 million a year. As development reaches its peak in 2025, expenditure rises to \$47 million. By the end of the timeline, development activity falls and the investment reverts back to \$23 million a year. In the event that investment spending is not \$700 million, either timelines can be scaled up or down.

Figure 3b shows how the two timeline assumptions affect the stock of new jobs (as a percent of potential employment). Under constant growth, employment increases uniformly until it is at full potential in 2035. Under nonlinear growth, the stock of new employment builds slowly at first. Low growth early on makes the employment stock in the nonlinear timeline lower than the employment stock in the constant timeline.

Figure 3a – Timeline Assumptions for the Annual Flow of Nonresidential Investment Spending

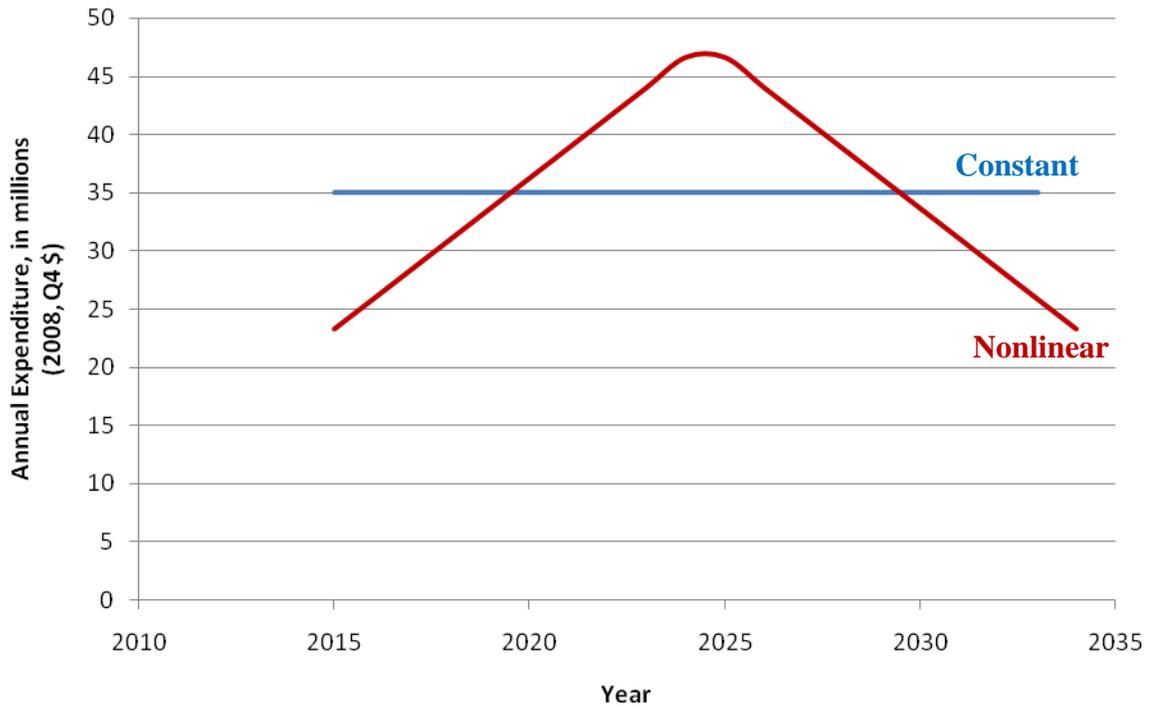
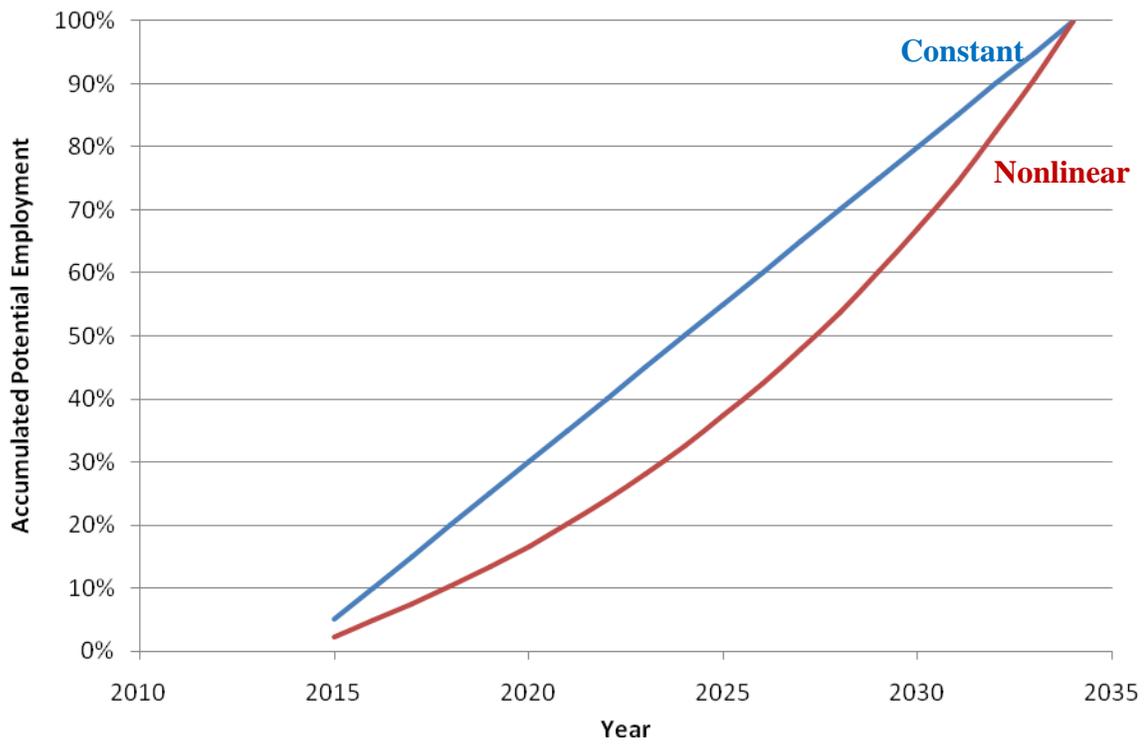


Figure 3b - Timeline Assumptions for the Accumulated Stock of of Potential Employment (in percent)



The Impact of Supply Driven Nonresidential Development

This section analyzes the effects of development without the demand of new businesses. Benefits found in this section are entirely attributed to infrastructure improvements and investment spending. Two policy variables in REMI capture these “supply-side” effects. Exogenous construction demand captures the effect of federal spending on infrastructure, and nonresidential capital investment captures the effects of developers building new stores and offices.

Spending on infrastructure has already been determined by DELDOT. DELDOT forecasts expenditures in Churchman's Crossing to be \$170 million (nominal). This money is projected to be spent with the following timeline.

- **2010:** \$6.9 million
- **2011:** \$31.6 million
- **2012:** \$45.3 million
- **2013:** \$45.3 million
- **2014:** \$40.9 million

Investment in nonresidential capital is not predetermined, so the project costs must be estimated. The *Conceptual Estimator* from the “Means Cost Works” website was utilized once again.¹¹ Information on the type and size of each project entered as inputs into the *Conceptual Estimator* and it provided a cost estimate for each nonresidential structure¹² Total costs per project are listed in Table 3.

¹¹ <http://www.meanscostworks.com/MySquareFoot/MySFEstimate.aspx?InvokedFrom=MyEstimateHome>

¹²Using floor space, zoning information, and preliminary information about the type of buildings, cost estimates can be derived from the total floor area of each building. The estimates were obtained assuming 25% contractor fees, union labor, between 6-11% architectural fees, no user fees, and average input prices for Newark, Delaware as of the fourth quarter of 2008. These predictions are admittedly imprecise.

Table 3 – Estimated Nonresidential Construction Costs, (2008 \$)

Project Name	Expansion (sq. ft.)	Costs (per sq. ft.)	Total Costs
Islamic Society of Delaware	6,600	\$209.77	\$1,384,500
Holiday Inn/Hampton Inn	8,000	\$177.30	\$1,418,500
Centurian Plaza / Catawba Property	12,000	\$102.33	\$1,228,000
Churchman Village / Metro Properties	16,700	\$169.82	\$2,836,000
Old Route 7 South	19,000	\$96.15	\$1,827,000
Christiana Medical Center / Faith City	21,200	\$173.11	\$3,670,000
Omega Professional Center Area	27,300	\$183.66	\$5,014,000
Comfort Suites	33,400	\$189.98	\$6,345,500
County Commerce Office Park	42,000	\$170.68	\$7,168,500
Christiana Corporate Center	43,200	\$169.49	\$7,322,000
Main Street Hotel	43,300	\$185.79	\$8,044,500
Sallie Mae/Nationwide/Provident Mutual	50,000	\$169.54	\$8,477,000
Christiana Hospital	80,900	\$280.57	\$22,698,500
Hotel/Restaurant Cluster	89,200	\$168.81	\$15,058,000
Harmony Industrial Park	90,600	\$89.09	\$8,072,000
Metro Business Park / SPCA	175,900	\$114.21	\$20,091,000
Christiana Town Center (273 Mall)	228,000	\$111.89	\$25,510,000
Industrial Rentals / Market Place at Christiana	303,000	\$134.68	\$39,838,000
Christiana Mall	327,200	\$134.87	\$44,129,500
Sears Eagle Run / Christiana Promenade	446,900	\$120.30	\$53,762,000
Christiana Fashion Center	1,221,500	\$115.23	\$140,758,000
J.P. Morgan Christiana Center	776,300	\$148.58	\$110,970,500
Bank of America/MBNA Christiana Center	1,114,000	\$148.80	\$165,760,000
Total		\$136.59	\$701,383,000

The estimated cost of the 23 projects is approximately \$700 million (2008 \$). Of course, the entire amount will not be spent in one year, but will be spread over time. Both constant and nonlinear growth timelines are analyzed. Spending on infrastructure is assumed to be \$170 million (nominal) spread over 2010 and 2014 as specified on the previous page.

Figure 4a plots the increase in GDP that is directly attributable to investment spending. Figure 4b plots a similar graph for employment. The impact between 2010 and 2014 reflect the impact of DELDOT's expenditures. The figures reflect relatively large and immediate short term benefits. Between 2010 and 2014, infrastructure spending is forecasted to create up to 380 jobs each year and raise the state's GDP by a maximum of \$29 million.

Table 4 provides a better description of the economic impact. The initial five years give the expected impact of DELDOT's expenditures. The remaining rows show annual snapshots of the economy effects every five years. The trends in Disposable Personal Income, consumption, and population are very similar to that of GDP and employment. Under constant growth these figures fall initially, but gradually rise or stay constant over time. Under nonlinear growth, these figures fall faster immediately after infrastructure spending is complete, but rise rather quickly by 2025. These "supply-side" investments would raise the state's GDP between 0.02% and 0.06% each year.

Figure4a - Forecasted Difference in GDP (from baseline) Caused by Investment Spending (Supply Effects)

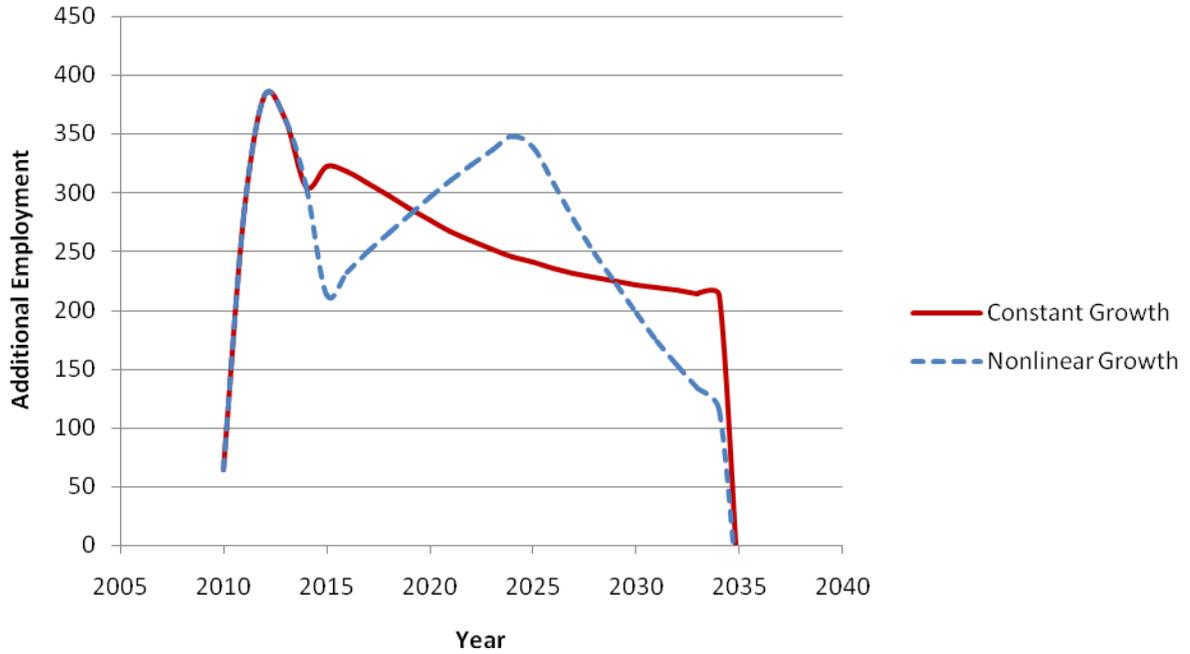


Figure 4b – Forecasted Difference in Employment (from baseline) Caused by Investment Spending (Supply Effects)

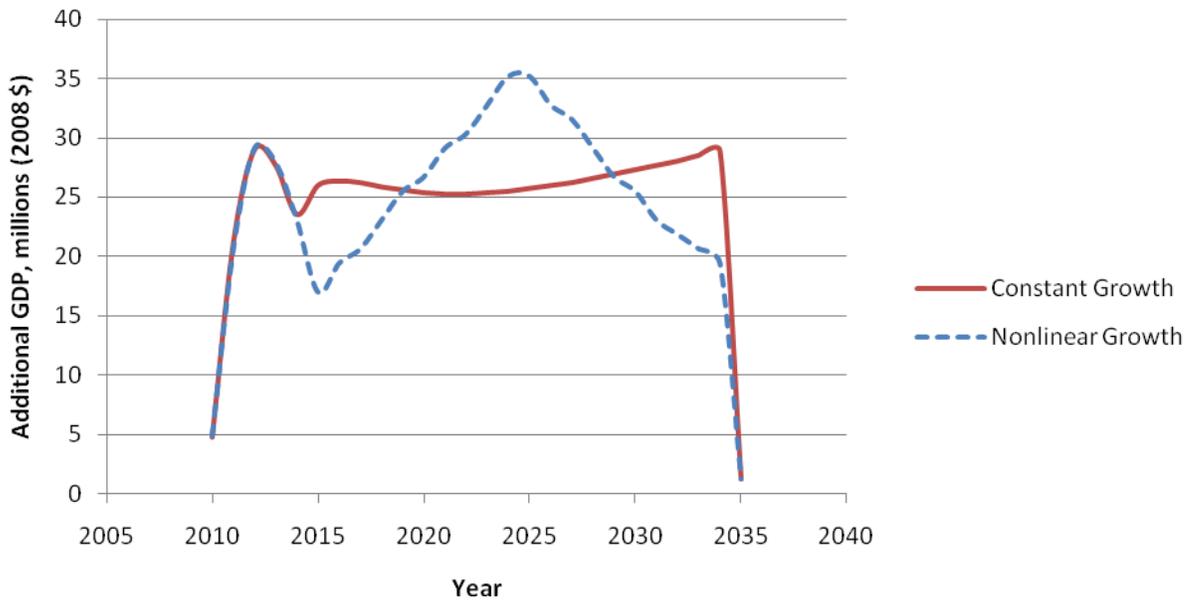


Table 4 - Estimated Impact due to DELDOT and Private Land Developers

		<i>Delaware's Total Economy</i>					<i>Construction Sector</i>			
Units		Total Employment	Population	GDP, mils. (2008 \$)	GDP (% of state)	Disposable Personal Income (nominal \$)	Consumption, mil. (2008 \$)	Employment	Wage and Salaries, mil. (nominal \$)	Output, mil (2008 \$)
Constant Development	2010	64	13	\$4.7	0.01%	\$2	\$1.9	41.4	\$5	\$1.9
	2011	281	65	\$21.1	0.04%	\$11	\$8.7	181.5	\$23	\$8.6
	2012	382	127	\$29.0	0.06%	\$16	\$12.5	248.5	\$31	\$12.4
	2013	361	174	\$27.7	0.05%	\$17	\$12.5	237.1	\$30	\$12.6
	2014	305	205	\$23.6	0.04%	\$16	\$11.3	203	\$26	\$11.4
	2015	322	234	\$26.0	0.05%	\$18	\$12.3	208.3	\$27	\$12.4
	2020	276	316	\$25.4	0.04%	\$21	\$13.0	146.9	\$21	\$11.5
	2025	241	329	\$25.7	0.03%	\$24	\$13.6	99.9	\$15	\$10.1
	2030	222	317	\$27.3	0.03%	\$29	\$14.7	72.8	\$11	\$9.6
	2034	213	299	\$28.9	0.03%	\$35	\$15.7	59.6	\$10	\$9.7
Nonlinear Development	2010	64	12	\$4.9	0.01%	\$2	\$2.4	41	\$5	\$2.0
	2011	281	65	\$20.6	0.04%	\$11	\$8.5	182	\$23	\$9.0
	2012	382	127	\$29.1	0.06%	\$16	\$12.1	249	\$32	\$12.0
	2013	361	174	\$27.9	0.05%	\$17	\$12.1	237	\$30	\$13.0
	2014	305	204	\$23.1	0.04%	\$16	\$10.9	203	\$27	\$11.0
	2015	213	214	\$17.0	0.03%	\$13	\$8.5	140	\$18	\$8.0
	2020	296	290	\$26.7	0.04%	\$22	\$13.4	163	\$23	\$13.0
	2025	339	369	\$35.2	0.05%	\$32	\$18.2	161	\$24	\$16.0
	2030	197	342	\$25.5	0.03%	\$26	\$13.4	54	\$8	\$7.0
	2034	115	272	\$19.4	0.02%	\$21	\$10.9	-2	\$0	\$0.0

The Impact of Demand Driven Nonresidential Development

In this section, the total potential economic benefit of nonresidential development is estimated. This section differs from the previous because the growth attributed to the businesses that move into the area, rather than the new buildings and improved roadways. Although they are not explicitly modeled with a policy variable, this construction and investment spending is contained in the multiplier effect. However, the multiplier effect also includes any resources used by the businesses, so it is substantially higher than the previous section. Of course it is impossible to know how much demand will actually move to the area, so this section will focus on the *potential* demand which these projects could facilitate.

The relevant policy variables in the REMI model include the type of businesses that move to the area and the number of employees each one hires. To create these input variables, the basic methodology is as follows. First, projects are sorted into nine different classifications based on their building types. Businesses in the Churchman's Crossing area with the same classification are used to predict the likely employees per square foot of floor space. Then, each project is scaled by the appropriate ratio to estimate the potential number of employees in each business. Finally, the estimated number of employees are sorted into their probable industry sector.

Table 5 - Employment per Square Foot of Floor Space in the Reference Set, by Business Type

Category	Reference Set	Avg. Employees per sq. ft.
Retail	Businesses in the Christiana Town Center and the anchor stores of the Christiana Mall, Concord Mall, and Prices Corner Shopping Center	0.0015382
Office Commercial (no bank)	Businesses in the 273 Office Plaza and the Continental Executive Center	0.0023380
Office Commercial (with bank)	Businesses in the 273 Office Plaza, the Continental Executive Center and J.P. Morgan Christiana Center	0.0028252
Light Industry / Warehouse	Businesses in Harmony Industrial Park	0.0010706
Hotels	Comfort Suites and Red Roof Inn	0.0004561
Restaurants	Houlihans, Don Pablos, Bugaboo Creek, Michael's Restaurant, Cheeseburger in Paradise, Border Café, Applebees, Chilis, Bertuccis, and Famous Dave's BBQ	0.0121612
Medical Offices	Businesses in the Omega Medical Complex	0.0016484
Schools	Christiana High School, Kirk Middle School, and Smith Elementary School	0.0008676
Churches	Data not available for religious institutions	0

The first column of Table 5 lists the nine different building classifications. The categories are: retail stores, commercial office space for companies other than banks, commercial office space for companies including banks, light industry/warehouse, hotels, restaurants, medical offices, schools and churches. The second column lists which companies from the area make up the reference set. The third column lists the average number of employees per square foot of floor space for the reference set.¹³

¹³ Floor area for the reference set was obtained by the New Castle County government's website. Employment information was obtained from the Delaware Department of Labor for the fourth quarter of 2008.

Employment per square foot varies considerably across the building types. Restaurants generate the most employees per square foot of floor space, while hotels generate the fewest. Commercial office space was particularly sensitive to the type of businesses using the building.¹⁴ Corporate banking headquarters have an employment density nearly twice as large as other businesses in the reference set. Therefore, two categories of office space were created. One ratio excludes the banking operations from the reference set, and the other assumed that a third of total office space would be devoted to financial activities. The latter ratio is approximately 17% larger than the former ratio.

Next, the appropriate employment ratio was multiplied by each projects proposed addition to floor space. The appropriate ratio was straightforward for simple projects. More complex projects, such as the Market Place at Christiana, have multiple building types. In these projects, the appropriate ratio is a weighted average of the original ratios. The relevant weights are listed in the second column of Table 6. Multiplying the employment ratios by the additional floor space yields a forecast of each project's potential new employment.

¹⁴ Moreover, a blueprint of businesses in a professional office complex was not available, so the floor space of each business within a given building had to be estimated.

Table 6 - Projections of Sustained Annual Wages (2008 \$) and Employment Directly Attributable to Development

Project Name	Assumed Project Composition	Potential Employment
Islamic Society of Delaware	Church (100%)	0
Comfort Suites	Hotel (100%)	15
Centurian Plaza / Catawba Property	Retail (100%)	18
Christiana Medical Center / Faith City	School (100%)	18
Old Route 7 South	Light Industrial-Warehouse (100%)	20
Main Street Hotel	Hotel (100%)	20
Churchman Village / Metro Properties	Medical Office (100%)	28
Hotel/Restaurant Cluster	Hotel (100%)	41
Omega Professional Center Area	Medical Office (100%)	45
Holiday Inn/Hampton Inn	Restaurant (100%)	97
Harmony Industrial Park	Light Industrial-Warehouse (100%)	97
County Commerce Office Park	Office Commercial, no bank (100%)	98
Christiana Corporate Center	Office Commercial, no bank (100%)	101
Sallie Mae/Nationwide/Provident Mutual	Office Commercial, no bank (100%)	117
Christiana Hospital	Medical Office (100%)	133
Metro Business Park / SPCA	Light Industrial-Warehouse (75%) / Office Commercial, no bank (25%)	244
Christiana Town Center (273 Mall)	Retail (100%)	351
Industrial Rentals / Market Place at Christiana	Office Commercial, no bank (5%) / Retail (72%) / Hotel (22%) / School (1%)	455
Christiana Mall	Retail (100%)	503
Sears Eagle Run / Christiana Promenade	Retail (100%)	687
Christiana Fashion Center	Retail (99%) / Restaurant (1%)	1,975
Subtotal w/o corporate bank projects		5,064
J.P. Morgan Christiana Center	Office Commercial, with bank (81%) / Retail (17%) / School (2%)	1,998
Bank of America/MBNA Christiana Center	Office Commercial, with bank (100%)	3,147
Total, with corporate bank projects		10,209

The analysis has predicted that the new buildings could facilitate approximately 10,200 jobs. The majority of these jobs come from the two corporate banking projects. If Bank of America and J. P. Morgan do not follow through with their plans to expand their corporate headquarters, the remaining projects would directly generate approximately 5,000 jobs. The full impact of this scenario will also be modeled with REMI.

Finally, the new employment must be separated into the industry sector. For example, the employment generated from a department store must be associated with employment from the retail trade sector. Unfortunately, this is not always so straightforward. Consider commercial office space and light industrial buildings. Many white collar sectors use offices and many blue collar sectors use industrial buildings. Table 7 lists the assumptions regarding industry type and employment for the different building types.

Table 7 list the expected employment by sector that could be directly sustained from the current projects. Most of the direct employment will either be in retail trade or financial services. However, a long tail of employment will be attributed to other sectors as well, including restaurants, hospitals, and hotels. REMI assumes that the stock of these jobs accumulate gradually over time until the full potential is reached by 2035 (see Figure 3).

Table 7 –Industry Classification for the Direct Potential Employment

Building Type	Industry	Employment
Retail	Retail trade	3960
Office Commercial (with bank)	Monetary authorities - central bank; Credit intermediation and related activities; Funds, trusts, & other financial vehicles	4934
Office Commercial (no bank)	Securities, commodity contracts, investments	65
Office Commercial (no bank)	Insurance carriers and related activities	65
Office Commercial (no bank)	Real estate	65
Office Commercial (no bank)	Rental and leasing services; Lessors of nonfinancial intangible assets	65
Office Commercial (no bank)	Professional and technical services	65
Office Commercial (no bank)	Management of companies and enterprises	65
Office Commercial (no bank)	Administrative and support services	65
Hotels	Accommodation	107
Restuarants	Food services and drinking places	257
Schools	Educational services	31
Light industry / Warehouse	Wood product manufacturing	20
Light industry / Warehouse	Computer and electronic product manufacturing	40
Light industry / Warehouse	Electrical equipment and appliance manufacturing	40
Light industry / Warehouse	Other transportation equipment manufacturing	40
Light industry / Warehouse	Furniture and related product manufacturing	40
Light industry / Warehouse	Miscellaneous manufacturing	40
Light industry / Warehouse	Warehousing and storage	40
Medical Offices	Ambulatory health care services	45
Medical Offices	Hospitals	133
Medical Offices	Nursing and residential care facilities	28

Table 8 summarizes REMI's forecast. Recall that the figures estimate the total potential impact of increased demand. This includes the short run impact of nonresidential capital investment and road construction and the long run impact from the businesses themselves.

Table 8 shows snapshots of the economy every five years in each of four possible future scenarios. The first scenario assumes that all projects are realized and development occurs uniformly over time. The second scenario assumes that all projects are realized, but growth occurs nonlinearly. In the third scenario, banks choose not to concentrate their operations in the area, but the remaining growth is still constant over time. The banks do not concentrate their operations in the fourth scenario as well and the remaining development is nonlinear. The first is the best-case scenario over these four possibilities, and the fourth is the worst.

In the first scenario, the first year of development will create 1,163 additional jobs, increase the state's population by 224 people, and raise GDP by \$159 million (2008 \$). Consumption is projected increase by \$46 million, and total disposable income would rise \$65 million (nominal \$). As time passes, these figures grow steadily. The cumulative effects of 20 years of land development and job growth would be a GDP that is \$5 billion higher than it otherwise would be and an additional 24,600 jobs.

In the second scenario, most development activity does not occur until 2025. In 2015, only 527 jobs are created and GDP rises by \$73 million. This is less than half of the benefit as linear growth. However, the benefits increase with the rate of development so that the first two scenarios are quite similar by 2035.

Table 8 - Total Estimated Impact to Delaware's Economy, figures above REMI baseline

		<i>Delaware's Total Economy</i>					<i>Construction Sector</i>			
	Year	Employment	Pop.	GDP, mil. (2008 \$)	GDP, pct	Disp. Pers. Income, mil. (nominal \$)	Consumption, mil. (2008 \$)	Employment	Output, mil. (2008 \$)	Wages and Salaries, mil. (nominal \$)
Constant Growth with bank offices	2015	1,163	224	\$159.0	0.28%	\$65	\$46.1	66	\$8.5	\$4
	2020	7,105	3,602	\$1,070.7	1.61%	\$570	\$331.4	559	\$77.7	\$48
	2025	13,057	9,211	\$2,187.6	2.89%	\$1,390	\$710.2	974	\$142.0	\$109
	2030	19,302	16,052	\$3,591.0	4.13%	\$2,676	\$1,210.4	1304	\$201.5	\$189
	2034	24,614	22,113	\$4,966.5	5.09%	\$4,204	\$1,720.2	1541	\$248.9	\$275
Nonlinear Growth with bank offices	2015	527	97	\$72.8	0.13%	\$29	\$20.6	29	\$3.6	\$2
	2020	3,882	1,793	\$588.8	0.89%	\$303	\$177.2	295	\$41.3	\$26
	2025	8,738	5,366	\$1,475.0	1.96%	\$903	\$461.3	641	\$94.7	\$73
	2030	15,944	11,127	\$2,990.1	3.46%	\$2,145	\$961.5	1098	\$171.2	\$163
	2034	24,185	17,803	\$4,925.2	5.09%	\$4,007	\$1,617.0	1591	\$259.8	\$290
Constant Growth w/o bank offices	2015	418	69	\$38.8	0.07%	\$16	\$10.9	30	\$3.6	\$2
	2020	2,634	1,135	\$273.2	0.41%	\$156	\$87.4	274	\$38.8	\$24
	2025	4,827	2,887	\$569.4	0.76%	\$383	\$190.6	475	\$70.4	\$54
	2030	7,057	4,971	\$955.4	1.11%	\$736	\$325.4	618	\$97.1	\$91
	2034	8,893	6,766	\$1,346.3	1.39%	\$1,150	\$461.3	701	\$115.3	\$128
Nonlinear Growth w/o bank offices	2015	191	32	\$17.0	0.03%	\$7	\$4.9	14	\$2.4	\$1
	2020	1,460	599	\$151.8	0.23%	\$86	\$48.6	150	\$20.6	\$13
	2025	3,283	1,791	\$388.5	0.52%	\$258	\$127.5	324	\$47.3	\$37
	2030	5,944	3,683	\$804.9	0.93%	\$612	\$268.3	540	\$83.8	\$80
	2034	8,935	5,840	\$1,352.4	1.40%	\$1,139	\$450.4	756	\$123.8	\$139

The bank headquarters do not occur in the third scenario, so most of the growth remains in retail trade. This has large consequences. For example, initially only 418 jobs are created in 2015 (64% less) and \$38.8 million of GDP is created (75% less). The overall benefits increase at a much smaller rate as well. By the end of the period, the economy has only 25% to 35% of the benefits that would have occurred with the banks.

The importance of the banking projects can also be understood by analyzing the multiplier effect. If banks locate to the region, potential employment directly facilitated by the new buildings is 10,209, but 24,614 jobs are actually created. Thus, each potential job creates 1.41 indirect jobs. Without the banks, only 0.76 indirect jobs are created. The difference between these two effects reveals that business type is almost as important as the number of new jobs. REMI clearly predicts that financial activities create much more benefits to the economy than retail.

The fourth scenario also assumes that banks forego their projects and that development begins slowly. This is not too different from the third scenario, except that the figures start lower and mostly catch up by 2035.

The final comment about these results regards construction. Recall that when investment spending was evaluated directly (Table 4 and Figures 4a and 4b), 380 jobs came from infrastructure spending and no more than 350 jobs each year after that from spending on nonresidential capital. The numbers in Table 8 easily surpass such limits owing to the much larger multiplier effect of new businesses. In fact, construction jobs will remain after the initial investment has been exhausted.

Effects on State and Local Tax Revenue

In this section, the impact on state and county taxes are addressed. Three taxes are estimated, the corporate income tax, the personal income tax, and the property tax. Delaware's corporate income tax rate is 8.7%, its personal income rate varies between 2.2% and 5.95%, and for the Christiana area, property owners must pay \$2.409 for every \$100 of assessment value (assessed values as of 1983).¹⁵

The BEA estimated that corporate profits are approximately 10.3% of GDP in 2008.¹⁶ If Delaware is similar, the increase in corporate income tax revenue for Delaware is simply $8.7\% \times 10.3\% \times \Delta\text{GDP}$. Similarly, Delaware's marginal tax rates usually imply an average tax rate of 4.8%. Given the changes in the personal income, an estimate for personal income tax revenue is $4.8\% \times \Delta\text{Personal Income}$. The estimate for property taxes is more complex.

The 2008 assessment to sales ratio for the Churchman's Marsh area is 0.2032 for businesses and 0.2629 for residences. Therefore for every \$100 of assessed value, the expected business property is worth \$492 and residence is worth an \$380. Because all properties must pay \$2.409 per \$100 of assessed value, the property tax for businesses is implicitly a 0.49% tax on market value. Residential property tax is implicitly 0.63% of market value. REMI's estimates of for residential and nonresidential capital are used to derive property taxes. Tables 9 and 10 report the estimated annual tax revenues for residential and nonresidential development.

¹⁵ <http://www2.nccde.org/redevelopment/Pages/Tax%20Information.aspx>
http://dedo.delaware.gov/pdfs/main_root/publications/2008-2009_Property_Tax_Report.pdf

¹⁶ Corporate profits are highly variable over time.

Table 9 - Annual Tax Revenues from Residential Development

		<i>Delaware's Total Economy, millions of 2008 \$</i>				<i>Annual Tax Revenues, thousands of 2008 \$</i>			
Year		GDP	Personal Income	Residential Capital Stock	Nonresidential Capital Stock	Corporate Income	Personal Income	Property	Total
Churchman's Meadows	2010	\$10.29	\$5.31	\$12.43	\$0.23	\$92.3	\$254.6	\$79.4	\$426.3
	2011	\$9.87	\$5.32	\$24.27	\$0.57	\$88.4	\$255.2	\$155.7	\$499.4
	2012	\$9.06	\$5.22	\$35.15	\$0.93	\$81.2	\$250.6	\$226.0	\$557.7
	2013	\$8.13	\$4.92	\$44.93	\$1.27	\$72.9	\$236.0	\$289.3	\$598.2
Patterson Lane	2010	\$1.14	\$0.58	\$1.38	\$0.02	\$10.2	\$28.0	\$8.8	\$47.0
	2011	\$1.09	\$0.59	\$2.70	\$0.06	\$9.8	\$28.6	\$17.3	\$55.6
	2012	\$1.00	\$0.55	\$3.90	\$0.11	\$8.9	\$26.2	\$25.1	\$60.2
	2013	\$0.89	\$0.51	\$4.98	\$0.15	\$7.9	\$24.5	\$32.1	\$64.5
Traditions at Christiana	2010	\$6.00	\$3.07	\$7.25	\$0.13	\$53.7	\$147.4	\$46.3	\$247.5
	2011	\$5.74	\$3.07	\$14.13	\$0.33	\$51.5	\$147.4	\$90.6	\$289.5
	2012	\$5.28	\$3.01	\$20.46	\$0.55	\$47.3	\$144.5	\$131.5	\$323.4
	2013	\$4.73	\$2.82	\$26.16	\$0.74	\$42.4	\$135.2	\$168.4	\$346.1
Hudson Village	2010	\$6.98	\$3.57	\$8.43	\$0.16	\$62.6	\$171.3	\$53.9	\$287.7
	2011	\$6.69	\$3.59	\$16.44	\$0.39	\$59.9	\$172.5	\$105.5	\$337.9
	2012	\$6.13	\$3.53	\$23.82	\$0.63	\$54.9	\$169.6	\$153.2	\$377.7
	2013	\$5.51	\$3.30	\$30.45	\$0.86	\$49.4	\$158.5	\$196.0	\$403.9
Avg. Annual Impact per Project		\$5.53	\$3.06	\$17.30	\$0.45	\$49.6	\$146.9	\$111.2	\$307.7

Table 10 - Annual Tax Revenues from Nonresidential Development

		<i>Delaware's Total Economy, millions of 2008 \$</i>				<i>Annual Tax Revenues, millions of 2008 \$</i>			
Year		GDP	Personal Income	Residential Capital Stock	Nonresidential Capital Stock	Corporate Income	Personal Income	Property	Total
Constant Growth with bank offices	2015	\$159	\$64	\$4	\$6	\$1.4	\$3.1	\$0.1	\$4.5
	2020	\$1,070	\$462	\$115	\$175	\$9.6	\$22.2	\$1.6	\$33.4
	2025	\$2,188	\$967	\$376	\$557	\$19.6	\$46.4	\$5.1	\$71.1
	2030	\$3,591	\$1,600	\$750	\$1,083	\$32.2	\$76.8	\$10.0	\$119.0
	2034	\$4,966	\$2,225	\$1,116	\$1,566	\$44.5	\$106.8	\$14.7	\$166.0
Nonlinear Growth with bank offices	2015	\$73	\$29	\$1	\$2	\$0.7	\$1.4	\$0.0	\$2.1
	2020	\$594	\$255	\$59	\$91	\$5.3	\$12.2	\$0.8	\$18.4
	2025	\$1,487	\$652	\$225	\$334	\$13.3	\$31.3	\$3.1	\$47.7
	2030	\$3,014	\$1,328	\$531	\$765	\$27.0	\$63.7	\$7.1	\$97.9
	2034	\$4,966	\$2,194	\$914	\$1,277	\$44.5	\$105.3	\$12.0	\$161.8
Constant Growth w/o bank offices	2015	\$39	\$16	\$1	\$4	\$0.3	\$0.8	\$0.0	\$1.1
	2020	\$276	\$129	\$32	\$126	\$2.5	\$6.2	\$0.8	\$9.5
	2025	\$575	\$271	\$104	\$403	\$5.2	\$13.0	\$2.6	\$20.8
	2030	\$965	\$448	\$210	\$785	\$8.6	\$21.5	\$5.2	\$35.3
	2034	\$1,360	\$622	\$312	\$1,136	\$12.2	\$29.8	\$7.5	\$49.6
Nonlinear Growth w/o bank offices	2015	\$18	\$7	\$0	\$2	\$0.2	\$0.3	\$0.0	\$0.5
	2020	\$153	\$70	\$16	\$66	\$1.4	\$3.4	\$0.4	\$5.2
	2025	\$392	\$183	\$63	\$240	\$3.5	\$8.8	\$1.6	\$13.9
	2030	\$813	\$373	\$148	\$554	\$7.3	\$17.9	\$3.6	\$28.8
	2034	\$1,366	\$614	\$256	\$924	\$12.2	\$29.5	\$6.1	\$47.9

The tax revenues stemming from the four residential projects will be substantially low relative to the total effect. The construction and investment spending creates most of the gains to personal income and corporate profit tax revenues. After construction is complete, only the property tax would remain. The long term tax receipts for the residential projects is estimated to be \$686,000 each year.¹⁷

In Table 10, annual local and state tax revenues are estimated for total development growth. In the best case scenario, Delaware tax revenues are \$4.5 million higher in 2015. Revenues continue to rise each year with development, eventually reaching \$166 million each year at the end of the forecast. In the worst case scenario, the first year's tax revenue is only \$500,000. By the time development peaks, tax revenues are forecasted to be \$13.9 million a year. This grows to \$47.9 million by the end of the sample. The striking difference between these two scenarios is a direct result of the size and wealth of corporate banks.

REMI consistently predicts that the personal income tax generates between 60 and 65% of tax revenue from the nonresidential investment. Of course, these estimates are based on current tax laws and economic conditions, which could change over time. Given the inherent uncertainty, these figures should be viewed as a "back of the envelope" estimate.

¹⁷ Property tax revenues at the end of the construction period are $\$289,300 + \$32,100 + \$168,400 + \$196,000 = \$685,800$. Presumably the assessed values will reflect their market value.

Summary and Conclusions

In summary, this report utilized REMI PI+, a regional economic forecasting software, to predict the outcome of developing the Churchman's Crossing area. The potential benefits are substantial, but sensitive to future demand. Therefore the benefits reflected in this paper represent what benefits are possible from development.

Before summarizing the findings this report, its limitations are discussed. First, this report focuses on specific economic indicators as the benefits of development. There are many other consequences of development, both benefits and costs. Policy makers should consider all factors when making their decision. Second, the projections in this report are admittedly rough, "ballpark" figures. However, such imprecision is always present when making any long term planning decisions. Finally, the analysis assumes development comes from an exogenous shock to demand. If the demand was internally created, the forecast could be different. These caveats should be kept in mind while reviewing the report.

In this project, the total effect of developing the Churchman's Marsh area was estimated. In the best case scenario, direct employment is expected to increase by 10,200 workers in 2035, resulting in 14,400 more workers through the multiplier effect. The strength of the multiplier effect is mostly due to the size and wealth of the corporate banks. In this future scenario, development attracts 22,100 additional people to the state, and GDP eventually rises by \$5 billion each year. In addition, state and local taxes increase by \$166 million more each year by 2035.

If the banks do not move to the area, most development in Christiana will be in retail trade. The projected economic benefits are substantially smaller. An increase of 8,900 total jobs and \$1.4 billion in GDP is forecasted by 2035. The timing development growth is also important. In general, the benefits are higher when growth is constant rather than nonlinear.

The results summarized above are long run effects that do not explicitly model short run construction spending. For example, DELDOT's \$170 million proposal is forecasted to generate 380 jobs and raise GDP by \$29 million in 2012. In turn, this would create \$367,000 in personal income tax and \$109,000 in the corporate profit tax for the state that year. However, construction spending is relatively small compared to the total potential investment. The major benefits of infrastructure investment come from accommodating private development.

The four residential projects also generate economic benefits, though on a much smaller scale than the nonresidential projects. On average, each project generates 67 jobs each year it is under development. Similarly, state GDP rises by \$5.5 million and consumption rises by \$2.2 million on average each year. Nearly 60% of the economic benefits from residential investment will be in construction.