Time is Money

The Economic Benefits *of* Transit Investment

Chicago Metropolis 2020

One Region. One Future.

September, 2007

This Chicago Metropolis 2020 report – *Time is Money: The Economic Benefits of Transit Investment* – proves that new funding for transit is an excellent investment.

Using quantitative models, we calculated the long-term transportation and economic benefits that would result from implementing the RTA Strategic Plan, Moving Beyond Congestion. We wanted to know if the benefits of proposed new transit spending would outweigh the costs – would the public receive a positive return on its investment?

We used very conservative assumptions. We assumed that all of the region's road projects planned to be completed by 2020 would actually be built by then. And we did not consider impacts on property values or short-term economic boosts from construction employment.

This is what we found:

Investing in transit is worth it from a business standpoint. Even with our conservative assumptions, the RTA's proposed investments to maintain the system will yield a 21 percent annual return. If investments are made to enhance and expand the system as the RTA proposes, the return on investment would increase to 34percent. As business people know, these are excellent annual returns, which in the private sector would readily attract and justify new investment.

Better planning to connect land development and transit can yield huge economic benefits. Adopting transit-oriented development throughout the region, as proposed in the region's official comprehensive plan, would increase the return on investment to 61 percent. If new development is designed to enable more people to live or work near transit, it can produce $640 million more annually in economic benefits without spending beyond what the RTA has proposed.

Failure to maintain the transit system will do immediate and long-lasting harm to the region's commuters and the economy. If we don't adequately maintain transit service, it will cost the region's businesses and households over $2 billion annually. By 2020, transit ridership would decline by 11 percent, a loss of 187,000 rides every weekday. Most of those trips would shift to Chicago area roads, which already have the second most congested and longest (7.8 hours per day) "rush hours" in the nation.

We urge you to consider these findings in your deliberations over transit funding and reform. The economic consequences of inaction will be serious; there is no time to delay.

Sincerely,

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Chairman

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President and CEO

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www.chicagometropolis2020.org

Summary

Investing in transit is a good business deal for the citizens of the Chicago region.

For every additional dollar spent on operating and capital expenses planned by the Regional Transportation Authority (RTA), the Chicago area will get back an economic benefit of at least $1.21 and as much as $1.64.

If the public chooses to invest an additional $1.68 billion a year to effectively maintain the current level of transit service and keep the transit infrastructure sound, the regional economy will experience $2.04 billion in new annual economic benefits – yielding a 21 percent return on investment.

If the investment is increased to $2.4 billion per year, not only to maintain the system but to expand service for the growing region as the RTA has proposed, the economic benefits for the six-county economy would increase to $3.22 billion, providing a 34 percent rate of return.

And without spending beyond what the RTA has proposed, the benefits can jump to $3.86 billion, for a 61 percent return on investment, if new development is designed to enable more people to live or work near transit service. Connecting land development to transit, proposed in the region's official plan, would increase transit use and lessen traffic congestion.

These are the conclusions of research conducted by Chicago Metropolis 2020 of the economic impact of proposed transit spending. The substantial economic benefits are the result of allowing businesses and commuters and families to avoid wasting time and money on traffic congestion. Time is money.

At the same time, the research shows, continuing the current level of inadequate transit spending will cause the system to deteriorate so much that it will actually be a drag on the local economy. If we collectively pocket that $1.68 billion needed each year as a minimum investment in transit, the resulting increase in traffic congestion will cost the economy more than $2 billion per year. Skimping on transit is a false economy, an expensive mistake, a really bad deal.

Investing in transit allows our entire transportation system, including streets and highways, to be more efficient. We become more mobile. We travel faster. Businesses want to locate and grow here. We create jobs. We save time and expand our economy, and that means more money for all of us.

The research, detailed in the following pages, shows that the shared transit investment by Chicago area taxpayers will be generously rewarded by the boost to the region's economy. The investments are for the transit system, but the benefits are for the entire economy and everyone who lives here. Investing in transit is too good a deal for us to pass up.

Introduction

For more than a year, residents, editorial writers, political leaders and transportation experts have been debating the merits of raising taxes to support the Chicago region's transit system.

The arguments are complex. The issue is entangled with partisan politics, city vs. suburb debates, competition with other important needs like health care and school funding and much more. Still, the underlying question remains: Can the supporters of transit prove that spending more tax dollars is a good economic investment?

Arguments in favor of public support for transit generally fall into one or more of these five categories:

1. **Transit for those who have no alternatives.** Low-income and disabled people who cannot afford or use automobiles need alternatives. As a society we have a moral and social obligation to provide those alternatives. According to this argument, the investment should be considered an investment in a fairer society

2. **Transit as the key to community building.** A robust transit system gives us a major tool to improve our quality of life. It allows us to slow the pace of sprawl; create compact, walkable communities; revitalize our downtowns; preserve open space; locate employers and workers closer to each other; and reduce pollution and global warming.

3. **Transit spending stimulates the local economy.** Transit is a major business enterprise that employs a substantial number of people, that generates more jobs and economic activity through its capital projects – whose benefits are spread and multiplied across the region's economy. A key weakness of this argument is that other forms of public works spending also stimulate the economy.

4. **Transit as an element of global competitiveness.** Globalization has placed a premium on more densely populated urban work centers, which are seen as offering a nimble workforce and creativity. Such places can only be supported through transit. Evidence for this line of argument is often provided by comparing the transit here to cities around the world that are investing to improve systems already better than ours. Without transit that

lives up to the rising international standard, the region will not attract investment or be a first-tier world city. We can't afford not to invest, the argument goes, or we won't catch-up with our competitors.

5. **Transit saves money and boosts the economy by reducing traffic congestion.** When it's working, transit is a key component in a regional system of transportation and mobility that benefits businesses and individuals alike, which in turn is an integral part of a healthy, growing local economy, a common asset. This is often analyzed through transit's ability to help reduce wasteful traffic congestion and the attendant high costs of that congestion. It is a classic cost-benefit argument, of a kind frequently employed by private businesses seeking to evaluate major investments. The premise is that the costs of investing in transit are more than paid for by the benefits to the economy that result from reduced congestion.

All five arguments have merit. Some are easier to demonstrate than others. Each one generates counter-arguments.

This year, Chicago Metropolis 2020 initiated a major analysis of the last of these arguments – transit helps the economy by reducing traffic congestion. The analysis was done to evaluate the new transit spending proposed by the Regional Transportation Authority (RTA) in its current strategic plan, entitled "Moving Beyond Congestion."

Our research had two goals: to determine whether the benefits of new investments outweighed the costs, and to consider how the RTA's proposals could generate a higher return.

Research Methodology

Evaluating the costs and benefits of transit investments requires the use of two computer models. The first is a model of the transportation system in northeastern Illinois. Transportation models have been used for several decades and each year become more sophisticated, as computing power increases and new data is added.

A transportation model replicates the real world where people choose to get in a car or bus or train and take a trip to work or school or shopping or a movie. These trips are assigned to roads or train tracks, and if these become too congested, the trips are reassigned to alternate routes. Next, population, employment and land use are forecasted to a future date, and the computer calculates future transportation needs.

The model for our RTA research used forecasts to the year 2020. It assumes a 925,000 increase in population to a total of 9,144,000 by 2020, compared to 8,219,000 in 2007.

In making the forecasts for the year 2020, the model used the most recent population, employment and land use assumptions of the Chicago Metropolitan Agency for Planning (CMAP), the new regional agency responsible for planning. The model assumed that every highway and road construction project planned to be completed by 2020, as identified in the Regional Transportation Plan for 2030, would actually be completed on time. This conservative, and probably overly optimistic assumption may well overstate the capacity of the highway system in the year 2020. But the assumption was made to insure that the analysis was not biased against auto and truck travel in favor of transit investments.

Transportation models, like models used in business, finance, or the military, allow users to create alternative scenarios. Models can test the consequences of alternatives, such as doubling the investment in transit, increasing gas taxes, or building more tollways.
In particular the model used in this research was able to evaluate what happens on the region's highways when various assumptions are made about different levels of investment in the transit system. (For a more detailed description of the transportation model and the modeling results, please see Appendix I, "Transit and Transportation Modeling for Metropolitan Chicago," by Smart Mobility.)

The second model used in this analysis is an econometric model of the Chicago region. It replicates the flow of money into and out of the economy by sector. The economic model calculates the costs of time delays, the direct costs to drivers, the costs of accidents and the costs of air pollution that result from added congestion. The model is used to estimate the benefits to the region's economy that result from changes in the costs of congestion for each transportation scenario.

These cost summaries can then be compared to the proposed investments in the transit systems that were identified in the "Moving Beyond Congestion" plan. If the costs of congestion are reduced by an amount greater than the proposed investment in transit, then the investment makes economic sense. Alternatively, if the costs of congestion are reduced by an amount that is smaller than the proposed new investment, then the proposed tax increase does not make economic sense.

Cost-benefit analyses of this kind are common in the business community when trying to determine if a proposed investment in a new piece of machinery or a new product line makes economic sense. Similar analyses are used in the public sector when evaluating individual project proposals.

This kind of cost-benefit analysis is limited in scope. It does not, for example, take into account any of the other four arguments made in favor of transit investment. Even if the costs exceed the benefits, for example, one might still argue that more funding is needed to service the population that has no transportation alternative, to build better communities, to stimulate the economy through new construction or to demonstrate to the world that we are a global city. (For a more detailed analysis of the economic model see Appendix II, "Summary of Economic Impact Results of Alternative Transportation Scenarios", by Economic Development Research Group.)

Evaluating Alternatives

Using the methods described above, the research team evaluated the transportation and economic consequences, in the year 2020, of four different scenarios. The proposed scenarios are derived from the RTA's "Moving Beyond Congestion." The scenarios are:

- **Decline:** This scenario assumes that government will not provide any new operating or capital funds for transit, causing a slow but steady spiral of decline in service quality and ridership, which in turn will lead to higher fares and still greater declines in ridership. Fares in 2020 will increase 50 percent more than the rate of inflation. Frequency of transit service will decrease by 25 percent, rail speeds will drop by five miles per hour, and each transit stop will last 30 seconds longer.
- **Maintain:** This scenario assumes that $280 million in new operating funding and $1.4 billion in new capital funding is provided to continue existing service levels, meet the costs of inflation and to repair and replace aging assets. Fares would increase with inflation. The additional money is needed to maintain existing ridership levels.
- **Expand:** This scenario assumes that the quality, quantity and frequency of transit service would be increased and the system expanded to serve new customers and new geographies. The scenario combines two sections from the report "Moving Beyond Congestion" – called "Invest to Enhance" and "Invest to Expand." These sections call for a long list of equipment, technology, service, elimination of rail "slow zones,"new bus routes, new rail lines and construction investment. This expansion, of course, will require an even larger investment – $400 million for transit operations and $2 billion in capital funding beyond current spending levels. Fares would increase with inflation.
- **Expand and Plan:** This scenario makes the same assumptions as the **Expand** scenario but adds a new dimension. Instead of using projected auto-oriented, low-density land-use patterns, it employs land-use concepts from the CMAP "2040 Regional Framework Plan." These concepts assume that local governments implement land-use practices that

encourage transit-oriented development, giving better access to transit for homes and businesses. (For an analysis of the alternative land use scenarios see Appendix III, "Land Use Scenario Development," by Fregonese Associates.)

In addition, the transportation consequences of a fifth scenario were computed, but those were not fully evaluated in the economic modeling. This fifth scenario, **Higher Gas Prices,** effectively doubles the price of gasoline.

The first three scenarios vary the size of new investments in the transit system. The fourth adds a new variable, more thoughtful land-development practices. Each scenario was tested in the transportation model and compared with conditions in 2007. For the 2007 base and each of the scenarios, the transportation model generated the following information:

- Percent of all trips that are transit trips.
- Total number of transit trips.
- Total number of truck and auto trips.
- Total number of miles traveled per day by autos and trucks.
- Amount of time and miles that trucks and autos spend in congested traffic.
- Total hours of auto and truck travel for the entire day and for morning and evening rush hours.

This basic travel data is then used in the economic model to calculate direct cost savings that accrue to businesses and households as a result of improved traffic conditions. These savings may result from operational savings, travel time savings, or savings from fewer accidents. The model then categorizes the total savings among business sectors based on the mix of businesses in the region. Once the direct cost savings are calculated, they are used to estimate the resulting changes in economic activity.

In calculating the costs of investing in transit and comparing the economic benefits that would result from the investment, it is possible to calculate a cost-benefit ratio. All of the costs and benefits are calculated for the year 2020 and all the dollars are expressed in un-inflated 2007 dollars.

The costs of each scenario were derived from the RTA's "Moving Beyond Congestion" and are expressed in terms of the annual amount of incremental dollars for capital and operating expenses required to create the identified scenario.

The economic benefits consist of three pieces. The first is the increase in business production that results from lower levels of congestion and the way those savings are reinvested in the local economy. The second benefit calculated is the time savings to individuals as a result of reduced congestion that is in turn reinvested in the regional economy. Finally, the economic benefits of reduced pollution are calculated.

This is a conservative approach. This research does not calculate the additional economic benefits typically produced by transit investment, such as the following:

- Jobs generated by a healthier economy, and by the Chicago region's success in global competition for jobs and prosperity. The only job creation counted by this research is as a result of transportation and travel savings for businesses.
- Increased property values, especially in areas better served by the transportation system.
- Increased government revenue from property taxes, sales taxes and other sources responsive to economic improvement.
- The economic stimulus of major transportation construction projects and the jobs they generate.

Conclusions

The results of the research are summarized as follows:

A. Allowing the system to Decline would be a costly mistake.

When comparing the **Decline** scenario with the **Maintain** scenario, providing new tax dollars to maintain the system makes economic sense.

If the system is permitted to decline – that is, if no new money is provided to maintain it -- transit ridership will decrease by more than 11.3 percent, or 187,099 rides every weekday compared to what would happen in the **Maintain** scenario. Declining transit use will force more people to drive, so traffic congestion will worsen. Drivers will spend more than 48 million additional hours each year stuck in congested traffic conditions. It is these additional congested conditions that translate into dollar costs.

In addition, by 2020, only 4.4 percent of all trips in the region will be made by transit. This is a decline from the current share of 5.6 percent.

The incremental annual cost of the **Maintain** scenario relative to the **Decline** scenario is $1.68 billion. This is the estimated cost of operating and capital dollars needed just to maintain the system at current levels of service. The **Maintai**n scenario sustains ridership at 2007 levels.

The annual benefits that would result from the annual investment of $1.68 billion are calculated at $2.038 billion. The benefits include increased economic output of $1.42 billion (including 11,395 new jobs), plus $0.583 billion in household savings from reduced travel times and $0.035 billion in benefits from improved air quality.

Expressed another way, the direct taxes that would be paid to maintain the system are less than the hidden taxes caused by congestion – the costs imposed on users of the transportation system by being forced to waste time in congestion.

If the region considers the $1.68 billion as an investment, it would be receiving a 21 percent return on that investment every year. Put another way, the ratio of the benefit to the cost is 1.21 to 1. These are, of course, aggregate numbers for the region as a whole. How the costs and benefits fall on any given family depends on where they live, how much they drive, whether they use transit, and so on. However, the net benefits to the region of maintaining the system exceed the costs of new taxes. It is a good investment.

B. Investing more in the system to expand and enhance service generates an even better return on investment.

When you compare the **Expand** scenario to the **Decline** scenario, the cost-benefit ratio improves to 1.34 to 1, a 34 percent return on investment. In other words, if we make this even greater investment in transit to expand and enhance current services, the return on the investment is even more attractive.

The **Expand** scenario would cost $2.4 billion a year compared to the $1.68 billion it takes merely to maintain the system. However, the economic output and monetized social and environmental benefits that result from expanding the system total $3.22 billion a year (including 16,855 new jobs), compared to the benefits of $2.04 billion that are gained from maintaining the system. Ridership will be 282,000 transit trips per day more than in the **Decline** scenario.

A bigger investment in transit accelerates the rate of return. While the expenses needed to produce the **Expand** scenario increase by 42.9 percent over the **Maintain** scenario, the benefits increase by 57.8 percent. To put it another way, the additional investment of $.72 billion yields an additional benefit of $1.18 billion, or a return of 64 percent on the additional investment. Economic logic would argue in favor of spending more because the benefits are greater.

C. Smarter land-use planning generates even higher returns on investment.

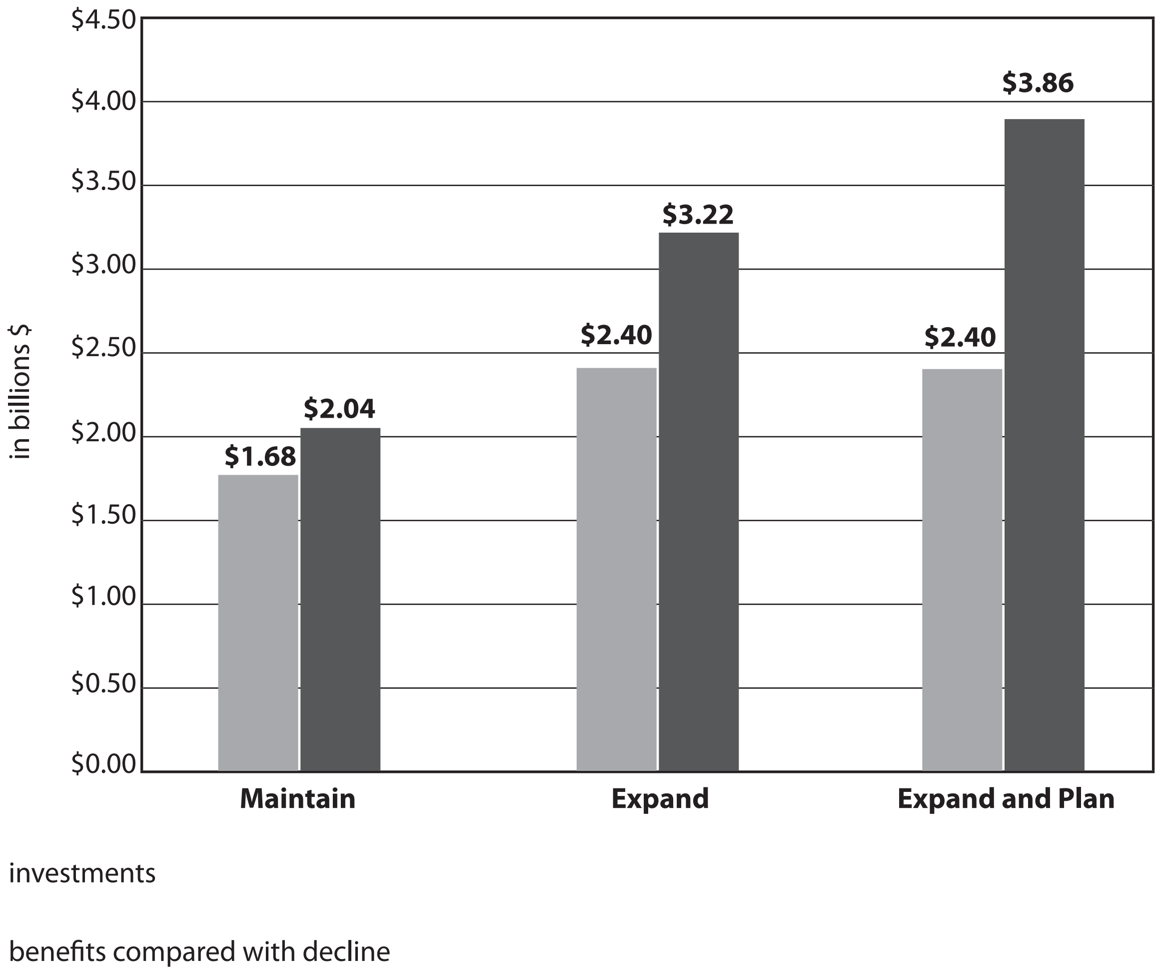
The **Expand and Plan** scenario assumes the same annual investment, $2.4 billion, as the **Expand** scenario. However, it also makes an assumption that new growth in the region will be at densities and in locations that support transit use and therefore generate greater transit ridership.

All of the scenarios assume that the population of the region will grow to 9,144,000 in 2020 from a base of 8,219,000 in 2007. According to CMAP's projections, most of the growth will be in the outer areas of the region in locations poorly served by existing transit systems and at densities that don't justify substantial transit investments.

Through modest changes in the practices of local and county governments and through commonly used incentive programs, the new development that is anticipated in 2020 could be channeled into more transit-oriented developments, along existing corridors, and in areas currently served by transit. The principles that result in more transit-friendly land-use patterns are described in CMAP's "2040 Regional Framework Plan." The process of evaluating land-use scenarios is described in Appendix III.

The cost-benefit ratio for this scenario is 1.61 to 1, or a rate of return of 61 percent, an even more effective investment even than the other scenarios. For an annual investment of $2.40 billion, and more thoughtful planning, the anticipated annual benefits are $3.86 billion (including 22,307 new jobs). The substantial economic benefits of better planning, as currently practiced in other metropolitan areas, were only calculated for one scenario but could be captured in any of them.

The More We Invest in Transit, the Greater the Region Benefits



D. Higher gas prices could make a big difference.

As part of the transportation modeling, the research team analyzed the effects of doubling gas prices on highway and transit usage. This **Higher Gas Price** scenario used the **Expand and Plan** scenario and then added the higher gas prices.

The effect of more expensive fuel was to add 153,000 more transit riders per day when compared to the **Expand and Plan** scenario by itself. Transit ridership in the **Higher Gas Price** scenario grew by 38.8 percent when compared to the **Decline** scenario, achieving a 6.2 percent share of all trips in the region, higher than in the other scenarios.

Time spent traveling in autos is considerably lower in the **Gas Price** scenario due to a combination of 1) people getting out of cars and taking transit, 2) people traveling shorter distances to save money, and 3) less congestion as a result of the other two effects. Weekday travel time is 21.8 percent quicker than in the **Decline** scenario. The transportation effects of higher gas prices are extremely favorable, both for auto and truck travel and transit usage.

Summary of Transportation and Economic Benefit in 2020 for each Scenario Relative to Decline

	Decline	Maintain	Expand	Expand and Plan	Higher Gas Prices
		Relative to Decline			
Daily ridership change	(187,099)	186,616	282,121	414,332	567,620
Change in # of transit trips	-11%	12.8%	19.3%	28.3%	38.8%
Transit share*	4.4%	5%	5.3%	5.7%	6.2%
Daily vehicle hours saved		154,597	280,197	345,105	1,586,636
Additional jobs in 2020		11,395	16,855	22,307	**
Increased output in 2020 ($ billions)		$1.420	$2.105	$2.795	**
Household time saved in 2020 ($ billions)		$0.538	$0.774	$1.026	**
Annual emission benefit in 2020 ($ billions)		$0.035	$0.067	$0.115	**
Total benefit in 2020 ($ billions)		$2.04	$3.22	$3.86	**
Annual RTA cost ($ billions)		$1.68	$2.40	$2.40	**
Benefit/Cost ratio		1.21	1.34	1.61	**
Return or investment		21%	34%	61%	**

*2007 overall transit share is 5.6%

**Additional analysis of various higher gas price scenarios is needed

The economic effects of the **Higher Gas Price** scenario are more difficult to calculate and depend on the way the gas prices are increased. If the increase is the result of market forces only, such as higher prices charged by producers, then the positive effects of reduced congestion are offset by the fact that consumers have less money to spend on other goods and services and because so much of the gas money leaves the region and benefits petroleum-producing and refining states or foreign nations. However, if the increase in gas prices is the result of imposed taxes that are subsequently redistributed back into the local economy through rebates or investments in improved transportation and transit systems, the effects would be more positive.

E. We need to do more

Five years ago, Chicago Metropolis 2020 proposed doubling the percentage of daily rides that are provided by transit, from 6 to 12 percent. We still think that is achievable, and essential.

The proposals in the RTA's "Moving Beyond Congestion" plan are positive and clearly generate beneficial economic results for the region. However, based on the conservative assumptions in our research, they do not actually reduce congestion below present levels or significantly change the percentage of total trips that are taken by transit. They do, however, prevent worse congestion from building in the future.

At best, the proposals keep our current state of congestion and transit ridership share from getting worse.

In a sense, the benefits of transit investment measured by our research can be seen as the value of avoiding the costs of wasteful congestion that would otherwise increase dramatically.

Put another way, the most aggressive transit investments proposed by the RTA allow the Chicago region's economy, population and car ownership to continue increasing without making congestion worse than it is today.

Our research shows that each day during 2007, cars and trucks travel nearly 218 million miles on the region's roads. Of that total, 22.1 percent of the miles are traveled under congested conditions, meaning that drivers cannot travel at the posted speed limits. This is the congestion that leads to loss of time, higher energy consumption and higher levels of pollution compared to travel in un-congested conditions.

In the year 2020, even under the most optimistic scenario, **Expand and Plan,** the percentage of travel in congested conditions goes up by 0.1percent to 22.2 percent of the total miles traveled. The daily miles traveled increases to 236 million per day. What is happening is that between now and 2020 we are adding 925,000 people to the region's population. And, those people are generally being added in areas poorly served by transit. As a result, the proposed RTA expansion plans are barely keeping up with the region's forecasted growth.

We can draw the same conclusion by examining the ride data, which show transit's percentage share of all trips in the region. In the base year of 2007, 5.6 percent of all trips in the six county region are taken by transit. Under the most ambitious of the scenarios, **Expand and Plan,** the percentage of transit riders goes to 5.7 percent in 2020. The biggest gain comes when we look at the **Higher Gas Price** scenario. In that case, the transit ridership increases to 6.2 percent in 2020. It is important to remember that the number of trips for a larger population 13 years from now will increase significantly, so that transit use will naturally increase just to maintain the same percentage share.

The RTA proposals are economically sound, a set of good investments, but even more must be done to move the needle in terms of reductions in congestion or percentage increases in transit usage.

An improved, stronger, more accountable RTA is needed to move beyond its current strategic plan, with the capability to coordinate the transit system and plan and direct capital investments to achieve optimum benefits for transit users and the region's economy.

The region can gain great returns from better planning for development that enables more people to live and work near transit and conveniently use transit. The region should make sure that transit-oriented development is the rule rather than the exception.

Substantial travel benefits could result from higher gas taxes and value pricing on our region's roadways – less congestion, better air, more transit use. The initial findings in this report suggest that the region should adopt value pricing and increase gas taxes to improve transportation efficiency and provide a reliable source for transportation funding.

The RTA and CMAP should carefully evaluate the direct transportation benefits that will result from currently proposed projects. Some projects may not yield a positive return, which would merit a re-evaluation. The RTA should direct planning for the region's transit capital program and employ modeling and reasonable criteria to evaluate projects for consideration in its capital plan.

APPENDIX I

Transit and Transportation Modeling for Metropolitan Chicago

By Smart Mobility, Inc. 2007

Smart Mobility, Inc. was established in 2001 as a consulting firm based in Norwich, Vermont /that integrates transportation and land use modeling, engineering, and planning. The firm was founded by Norman Marshall, Brian Grady, and Lucinda Gibson, who together represent 40 years of experience in transportation modeling, engineering, design and planning. Norm and Brian specialize in developing advanced tools and techniques for travel demand modeling, regional air quality modeling, and analysis of land use/ transportation systems, with a goal of developing more meaningful indicators from regional transportation models. Lucy Gibson, P.E. has gained experience as a consultant and as a regional transportation planner, and specializes in sustainable transportation planning and project development that is responsive to environmental concerns, land use goals and current transportation policies and programs.

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EXECUTIVE SUMMARY

An enhanced version of the Metropolis Transportation Model has been used to evaluate four 2020 transit service scenarios in the Chicago region:

- Deteriorate
- Maintain,
- Expand and Enhance, and
- Expand and Enhance plus Land Use.

In the 2020 Deteriorate scenario, transit trips are estimated to decline 11.3 percent below current levels, due to slower, less frequent service with higher fares. Compared with the 2020 Deteriorate scenario, it is estimated that there would be 12.8 percent more transit trips in the 2020 Maintain scenario, 19.3 percent more in the 2020 Expand and Enhance scenario, and 28.3 percent more in the 2020 Expand and Enhance plus Land Use scenario. While these results are expressed precisely, there is significant uncertainty, and the modeling results are conservative. There are factors that could make the ridership decline steeper in the 2020 Deteriorate scenario, and other factors that could make the ridership gains greater in the 2020 Expand and Enhance scenarios.

With more transit trips, residents of the Chicago region would spend less time in cars. This is partly due to the direct effects on those riding transit, but also due to indirect effects where the roads are less congested and those remaining in cars can travel more quickly. For a weekday in 2020, the differences in auto vehicle travel time from the 2020 Deteriorate scenario are: 2000 Maintain 150,000 hours, 2000 Expand and Enhance 280,000 hours, and 2020 Expand and Enhance plus Land Use 350,000 hours. The economic modeling builds on these results by calculating the economic benefits of these travel time savings.

OVERVIEW OF THE METROPOLIS TRANSPORTATION MODEL

This section provides an overview of the Metropolis Transportation Model (MTM) used for these analyses.

Past Work

The original Metropolis Transportation Model was developed for modeling scenarios for the *Metropolis Plan: Choices for the Chicago Region*.[1] Compared to most other regional transportation models, the MTM is noteworthy because it includes features that make the model more sensitive to urban form. In the MTM, auto ownership depends, in part, on residential density and transit service. The MTM includes a walk trip model that is sensitive to residential density, employment density and the balance between jobs and housing. The MTM's mode choice model (auto versus transit) is sensitive to urban form variables.[2]

Enhanced freight modeling capability was added when the MTM was used in developing the *Metropolis Freight Plan*.[3] Enhancements in this stage included:

- splitting weekday travel into four modeling periods, and
- modeling cars and trucks separately using a multi-class assignment process.

The separate model time periods provide better estimates of traffic conditions under congested morning and afternoon peak period conditions. This model structure also supports congestion pricing analyses.

Modeling cars and trucks separately supports modeling roadways where trucks are prohibited and also truck-only roadways. It also supports different toll structures for trucks and cars.

Model Enhancements for this Project

All of the features of the earlier models have been kept, but this transit modeling project has included several significant new enhancements. These include:

- income stratification in work trips,
- improved transit travel times, and

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[1] See http://www.metropolisplan.org for *Metropolis Plan* report and technical modeling appendix.

[2] For a discussion of the land use variables in the MTM and similar models for the Baltimore and Austin regions, see: Marshall, Norm and Brian Grady. "Travel Demand Modeling for Regional Visioning and Scenario Analysis", *Transportation Research Record*, No. 1921, *Travel Demand 2005*, p. 44-52. Washington, DC: Transportation Research Board, 2005.

[3] See http://www.chicagometropolis2020.org/10_40.htm for *Metropolis Freight Plan* and technical report.

- new mode choice coefficients for improved sensitivity to transit service variables.

The MTM models several trip types. Trips between home and work are particularly important for weekday transit trips and peak congestion. This version of the MTM improves the accuracy of modeling work trips by segmenting workers and jobs into four income segments. This accounts for areas where there are mismatches, e.g. an excess of high-income jobs in the Loop which may not be available to a large share of inner city residents, or an excess of low-income service jobs in high-income suburbs.

In the earlier MTM, it was assumed that there was a single speed for each rail and bus line, and that this speed would not change between the present and the future. In the enhanced MTM, transit travel times are calculated based on a running speed and a "dwell time" for each stop. This properly causes express services with fewer stops to have shorter travel times than local services. The travel speed for buses is based on the congested travel speed for cars, so that bus travel times may be longer in the future than they are today. This structure also has supported modeling CTA rail "slow zones", and to consider further declines in rail speeds in the future if maintenance is not done.

The earlier versions of the MTM were estimated from the Chicago Area Transportation Study (CATS) household travel survey data collected in the early 1990s. The mode choice model coefficients for work trips in this enhanced MTM have been estimated from 2000 Census data. The estimated model incorporates the urban form variables used in earlier the earlier MTM versions, but places equal emphasis on sensitivity to transit service, particularly transit travel times and fares.

Uncertainty in Modeling

The original Metropolis Transportation Model was very complex and sophisticated. The newest MTM includes many advanced features absent from most models. These features are intended to make the model especially sensitive to factors that affect transit usage including transit service, urban form, congestion and pricing. Nevertheless, there remains substantial uncertainty about the future.

One of the most important areas of uncertainty concerns the locations and form of future land development. This project addresses this issue by considering two alternative future land use scenarios. Use of scenario planning in transportation planning is becoming increasingly common. This is especially true in the area of transportation/land use interactions where Keith Bartholomew has documented 80 scenario planning projects in 50 metropolitan areas in a report sponsored by FHWA.[4] FHWA's website on scenario planning states:

> Scenario planning is an analytical tool that can help transportation professionals prepare for what lies ahead. Scenario planning provides a framework for developing a shared vision for the future by analyzing various forces (e.g., health, transportation, economic, environmental, land use, etc.) that affect growth. Scenario planning, which can be done at the statewide

[4]Bartholomew, Keith. Integrating Land Use Issues into Transportation Planning: Scenario Planning, http://content.lib.utah.edu/cgi-bin/showfile.exe?CISOROOT=/ir-main&CISOPTR=99&filename=189.pdf. Prepared for the Federal Highway Administration, 2005.

> level or for metropolitan regions, tests various future alternatives that meet state and community needs. A defining characteristic of successful public sector scenario planning is that it actively involves the public, the business community, and elected officials on a broad scale, educating them about growth trends and trade-offs, and incorporating their values and feedback into future plans.[5]

There are significant other unknowns that will affect future traffic volumes and transit ridership. These include:

- the general level of future economic activity,
- future energy pricing,
- future greenhouse gas regulation,
- technological change, and
- social change (e.g. much more widespread telecommuting).

Given the limited time and budget for this project, it was not possible to explore the possible ramifications of all possible futures. However, the uncertainty concerning these factors should be kept in mind when considering the model outputs, particularly if results are extrapolated past 2020.

Transit ridership modeling is based on probabilistic models based on past behavior. For example, the model might estimate that given auto and transit travel times and costs, 20 percent of potential customers traveling between a particular home area and work area would use transit, and the other 80 percent would use auto. If we improve transit service, the modeled transit share would increase incrementally.

However, this incremental modeling does not tell the whole story. There may be "tipping points" where there are greater changes in ridership. Service cutbacks could make transit less attractive to the point where people stop considering it a viable alternative and ridership would fall precipitously. Alternatively, with excellent transit service and a stronger environmental ethos, transit could become the first choice for a large share of the population, and ridership could rise steeply.

The model results that follow are expressed precisely because the model calculates specific numbers, but it is important to remember that numerical precision does not equal certainty.

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[5] http://www.fhwa.dot.gov/planning/scenplan/index.htm

Modeling Results

This section provides an overview of the transportation modeling results. A technical appendix provides more detailed tables.

Alternatives Modeled

Modeling was done for 2007 and several 2020 alternatives, including:

- Deteriorate
- Maintain,
- Expand and Enhance, and
- Expand and Enhance plus Land Use.

The road network used in all of the 2020 scenarios includes all of the future road projects that were modeled for 2020 in the adopted Regional Transportation Plan and conformity analyses. The transit network for the 2020 Deteriorate scenario is based on the 2007 network. The transit networks used for the other 2020 scenarios are all based on the 2020 transit network used in the adopted Regional Transportation Plan and conformity analyses. The modeling assumptions for the alternatives are summarized in Table 1.

Table 1: Modeling Alternatives and Assumptions

Alternative	2007	2020 Deteriorate	2020 Maintain	2020 Expand & Enhance	2020 Expand & Enhance & Land Use
Land use	CMAP 2007	CMAP 2020	CMAP 2020	CMAP 2020	Fregonese Calthorpe Associates alternative
Road network	CMAP 2007	CMAP 2020	CMAP 2020	CMAP 2020	CMAP 2020
Transit network	CMAP 2007	CMAP 2007	CMAP 2007	CMAP 2020	CMAP 2020
Service assumptions	CMAP 2007 Enhanced transit operations coding with running speeds and dwell times	2007 except 25% reduction in frequency 5 mph decline in rail speeds 30 second increase in dwell time at stops	Same as 2007	2007 plus New routes & frequency changes Elimination of CTA rail slow zones	2007 plus New routes & frequency changes Elimination of CTA rail slow zones
Fare assumptions	Existing 2007	50% increase in real terms	Existing 2007 in real terms	Existing 2007 in real terms	Existing 2007 in real terms

Notes: CMAP is the Chicago Metropolitan Agency for Planning. All of the modeling is based on CMAP's Transportation Analysis Zones, including 1690 zones in core 6-county region.

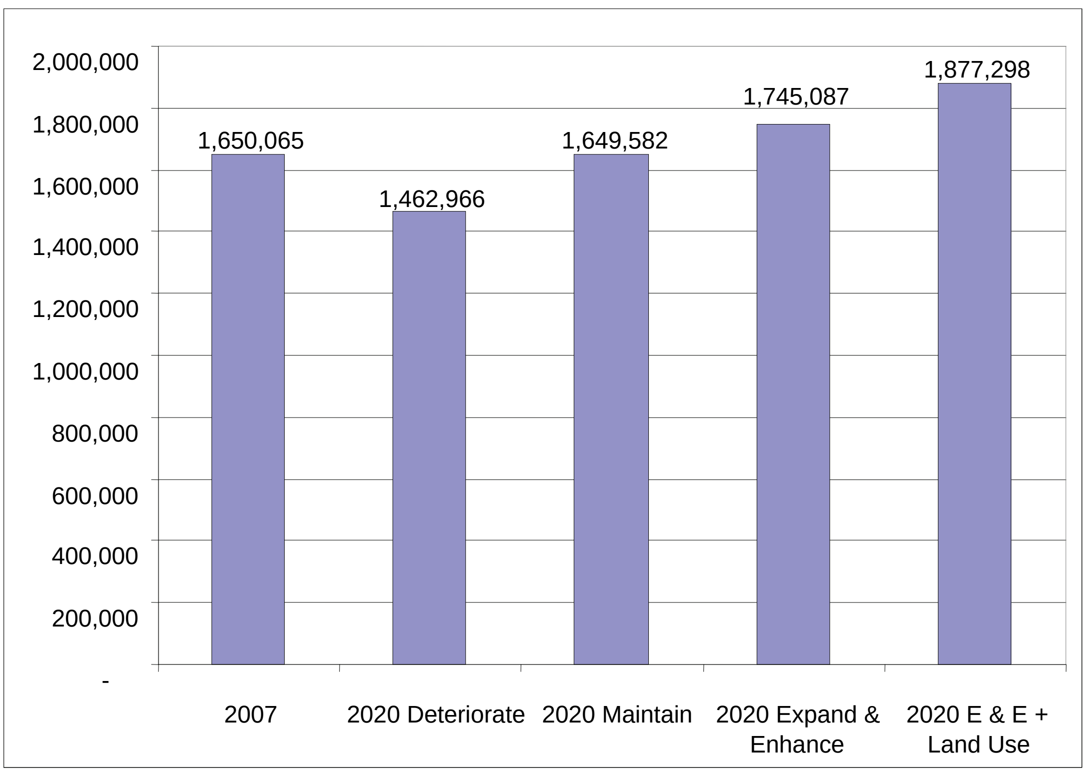
Transit Ridership

Transit ridership can be counted either as *unlinked* trips or *linked* trips. An unlinked trip is counted each time a rider boards a transit vehicle. When transfers are involved, riders make multiple unlinked trips as part of a single one-way trip. For example, if a one-way trip from home to work involves boarding a bus and then transferring to a train, this counts as two unlinked trips. In contrast, the same one-way trip is counted as one linked trip.

Transit ridership is most commonly presented in terms of unlinked trips, partly because this is the easiest way to count. Modeling is based on linked trips because it is at this level that transit competes with auto. CTA estimates that on average there are about 1.6 unlinked trips per linked trips on its system. There are currently somewhat over 2 million unlinked transit trips on a weekday in the Chicago region. The linked trip numbers presented in this report are substantially lower. Estimated transit ridership for the scenarios is shown in Figure 1.

The effects of the rail service declines varies by the type of service and the route – for a Metra route the reduction might be from 50 m.p.h. to 45 m.p.h. where the reduction might be from 30 m.p.h. to 25 m.p.h. for a CTA rail route. For local services, the added dwell time at stops can be more significant than the additional running time.

Figure 1: Weekday Daily Transit Ridership by Scenario (Linked Trips)



In the 2020 Deteriorate scenario, weekday transit trips are estimated to decline 11.3 percent below current levels, due to slower, less frequent service with higher fares. It is likely that the actual decline could be even greater because the model accounts for the effects of crowding on travel time but not for the effects of crowding on the desirability of riding transit.

In the 2020 Maintain scenario, the number of current weekday transit trips is maintained so that weekday transit trips are 12.8 percent higher than for the 2020 Deteriorate scenario. With the same service levels, the transit system would maintain mode shares in existing markets. However, the overall transit mode share at the regional level would decline as travel patterns continue to shift towards suburban markets that are not well served by the current transit system.

In the 2020 Expand and Enhance scenario, weekday transit trips increase by 19.3 percent compared with 2020 Deteriorate scenario, a difference of 280,000 unlinked trips per weekday. The estimated increases are conservative because the modeled expanded services are not fully planned yet, and it may be possible to better match expanded services with transit markets.

Shifting future land development closer to transit can dramatically increase future weekday transit trips. The 2020 Expand and Enhance plus Land Use combines the transit assumptions in the previous scenario with an alternative 2020 land use scenario oriented around transit stops. This results in an 28.3 percent increase in weekday trips over the 2020 Deteriorate scenario, a difference of 410,000 transit trips per weekday. Coordinating land use development with transit investments greatly increases the return on the investments.

Transit mode shares for the core six-county area are shown in Table 2.

Table 2: Six-County Transit Mode Shares (of motorized trips) by Scenario

Alternative	2007	2020 Deteriorate	2020 Maintain	2020 Expand & Enhance	2020 Expand & Enhance
Work	12.5%	10.2%	11.4%	12.2%	13.0%
Non-Work	4.3%	3.3%	3.8%	4.0%	4.3%
Total	5.6%	4.4%	5.0%	5.3%	5.7%

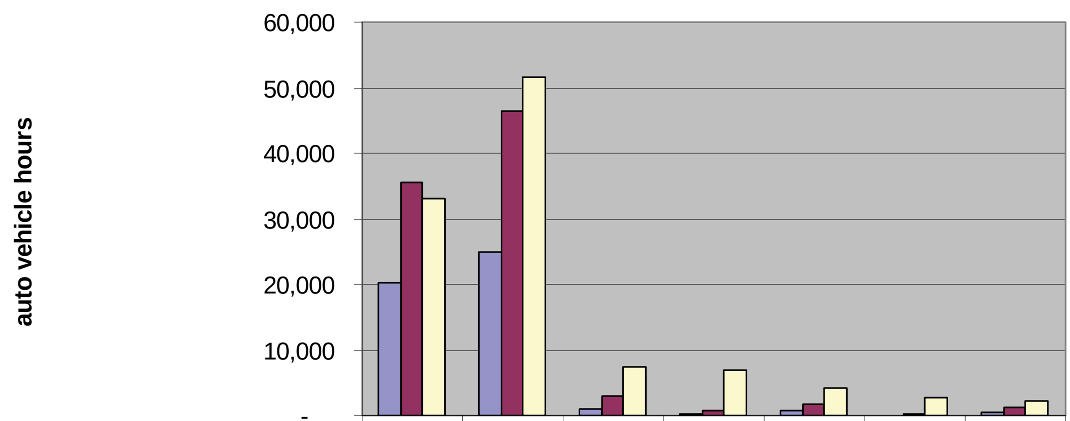
Travel Times

The Metropolis Transportation Model divides the weekday into four time periods – morning peak period (6 a.m. – 9 .am.), afternoon peak period (3 p.m. – 7 p.m.), a mid-day period between the peaks, and an overnight period. Most of the congestion delay occurs within the morning and afternoon peak periods. Congestion is most severe in the 2020 Deterioration scenario. Figures 2 and 3 show peak period 2020 travel time savings compared to the Deterioration scenario. Table 3 shows total weekday auto vehicle hours for all four modeled time periods.

Compared to the 2020 Deterioration scenario, the 2020 Maintain scenario results in savings across the 6-county region of about 50,000 auto vehicle hours per day in the morning peak period and about 60,000 auto vehicle hours per day in the afternoon peak period.

The auto travel time savings in the 2020 Expand and Enhance scenario over the 2020 Deteriorate scenario are almost twice as high – 90,000 auto vehicle hours per weekday in the morning peak period, and 110,000 hours in the afternoon peak period. As discussed above, the estimated modeling is conservative because the modeled expanded services are not fully planned yet, and it may be possible to better match expansions to markets. Another factor that is limiting the auto travel time savings is that adding suburb-to-suburb transit services makes suburb-to-suburb trips more attractive, resulting in slightly longer average trip lengths in the model.

Figure 2: Weekday Morning Peak Period (6 a.m. – 9 a.m.) – 2020 Auto Travel Time Savings (auto vehicle hours per weekday) Relative to Deterioration Case

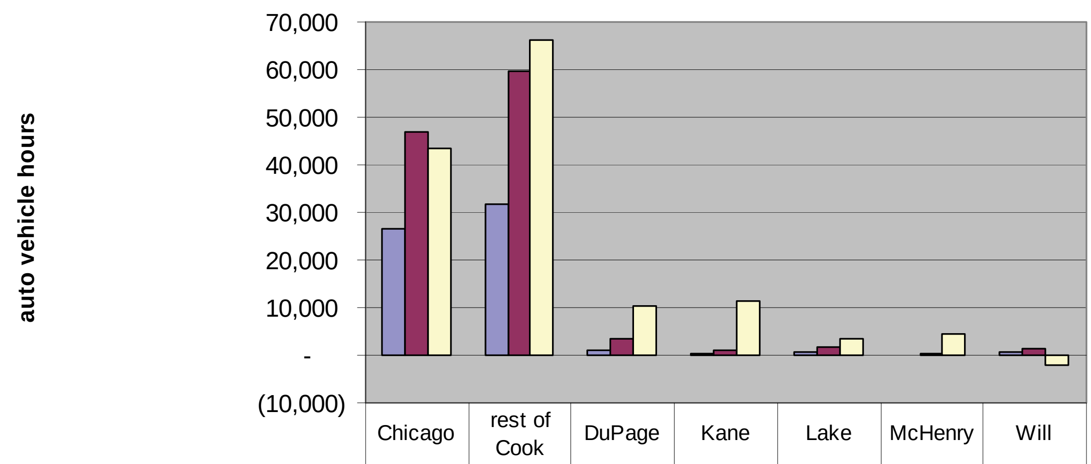


	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will
2020 Maintain total 47,581 hr.	20,176	24,883	1,059	152	663	64	584
2020 Expand & Enhance total 89,038 hr.	35,626	46,361	2,970	757	1,812	199	1,314
2020 E & E + Land Use total 108,102 hr.	33,013	51,692	7,364	6,803	4,206	2,680	2,343

The 2020 Expand and Enhance plus Land Use offers the greatest auto time savings – 110,000 auto vehicle hours per weekday in the morning peak period, and 140,000 hours in the afternoon peak period. However, it is not the top performer in the economic modeling analysis because the increased weekday transit trips do not translate into large enough reductions in auto time. It is likely that total auto time in this scenario could be reduced through making relatively small changes in the land use scenario and/or the roadway network. In pairing a concentrated land development scenario with a road network designed for less concentrated development, the modeling shows pockets of congestion around development centers. This congestion can be reduced in the model by moving some of the land use and/or increasing the capacity of the local street network.

Over the entire weekday, the differences in auto vehicle travel time from the 2020 Deteriorate scenario are: 2000 Maintain 150,000 hours, 2000 Expand and Enhance 280,000 hours, and 2020 Expand and Enhance plus Land Use 350,000 hours.

Figure 3: Weekday Afternoon Peak Period (3 p.m. – 7 p.m.) – 2020 Auto Travel Time Savings (auto vehicle hours per weekday) Relative to Deterioration Case



	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will
2020 Maintain total 60,776 hr.	26,699	31,590	1,117	272	533	45	519
2020 Expand & Enhance total 114,311 hr.	46,836	59,739	3,347	978	1,752	267	1,391
2020 E & E + Land Use total 137,271 hr.	43,367	66,157	10,345	11,478	3,373	4,502	(1,951)

Table 3: Auto Travel for the Six-County Area (auto vehicle hours per weekday)

	a.m. peak	mid-day	p.m. peak	overnight	total
2007	1,525,868	2,412,551	2,389,921	754,646	7,082,985
2020 Deteriorate	1,687,027	2,718,979	2,642,857	840,284	7,889,147
2020 Maintain	1,639,445	2,680,976	2,582,081	832,048	7,734,550
2020 Expand & Enhance	1,597,989	2,654,617	2,528,546	827,798	7,608,950
2020 E & E + Land Use	1,578,925	2,640,770	2,505,585	818,762	7,544,042

Outputs Used in Economic Analyses

As discussed above, modeling results can be extracted by time period and by county. For the economic analyses, modeling outputs were also stratified for cars vs. trucks and for work trips (which generally are considered higher-value trips) and non-work trips. This information is tabulated in a technical appendix.

Gas Price Sensitivity Analysis

One of the greatest areas of uncertainty regards future gasoline price. Prices could continue to rise due to global oil supply and demand. Prices also could rise if proposals for “carbon taxes” are adopted to address global warming. Or prices could increase from a combination of these two factors.

Actual and perceived costs of driving vary considerably. The IRS 2007 rate of $.485 per mile is intended to cover operating costs and capital costs. AAA estimates full capital and operating costs that are higher than the IRS rates, except for small sedans. Of the other hand, drivers seldom behave as if the costs of driving are this high. Instead, they appear to equate the cost of driving as much more closely related to the cost of gasoline. At 20 miles per gallon and $3.00 per gallon gasoline, the gasoline costs $.15 per mile.

Travel demand models must use perceived costs rather than actual because they model behavior. For example, the model considers how travelers weight the cost of driving vs. the cost of transit fares when considering which mode to take for a potential trip. The Metropolis Transportation Model uses an estimate of perceived auto cost $.20 per mile, which is on the order of, but somewhat higher than, the cost of gasoline alone. For the gas price sensitivity analysis, the perceived cost rises to $.40 per mile. This could result from an actual doubling of gasoline prices, but it also could result from a lesser price increase combined with greater awareness of the true cost of driving.

The higher perceived driving cost was added to the 2020 Enhance and Expand plus Land Use scenario as a test of potential high transit ridership. Compared to that scenario with the base perceived operating cost, there are an additional 150,000 transit trips per weekday. Compared to the 2020 Deteriorate scenario, there are 38.8 percent more transit trips.

Auto vehicle travel time is considerably lower in this test scenario due to a combination of 1) people getting out of cars and taking transit, 2) people traveling shorter distances to save money, and 3) less congestion due to the other two effects. Weekday auto travel time is 21.8 percent lower than in the 2020 Deterioration scenario. Thus, the effects on the transportation system are generally positive. However, the full impacts of this scenario would depend on the economic impacts. If large amounts of additional money were leaving the region to pay for fuel, that would be strongly negative. On the other hand, if money were collected in taxes and distributed in some way, the overall effects could be positive.

The Metropolis Transportation Model can be used to test other pricing scenarios, including peak period pricing on certain roadways. In any such scenario there will be transportation effects and economic effects, where the economic effects will depend on where the money collected ultimately goes.

Smart Mobility Transit Modeling Results

Weekday linked transit trips	2007	2020 deteriorate	2020 maintain	2020 expand & enhance	2020 expand & enhance + land use	2020 expand & exhance + land use & gas price
walk access work transit trips	458,629	421,587	467,616	485,607	509,734	545,713
walk access non-work transit trips	994,036	869,048	982,061	1,023,548	1,103,233	1,176,675
drive access work transit trips	131,249	118,226	136,161	158,296	175,363	208,430
drive access non-work transit trips	66,152	54,106	63,744	77,636	88,967	99,768
total linkedtransit trips	1,650,065	1,462,966	1,649,582	1,745,087	1,877,298	2,030,586
change from 2020 Deteriorate			12.8%	19.3%	28.3%	38.8%
work vehicle trips	4,728,812	5,286,939	5,286,939	5,286,939	5,251,354	5,251,354
non-work vehicle trips	24,899,577	27,799,588	27,799,588	27,799,588	27,594,896	27,594,896
work transit share	12.5%	10.2%	11.4%	12.2%	13.0%	14.4%
non-work transit	4.3%	3.3%	3.8%	4.0%	4.3%	4.6%
overall transit share	5.6%	4.4%	5.0%	5.3%	5.7%	6.2%
HBW fare ($/day)		$ 1,658,727	$ 1,261,224	$ 1,342,156	$ 1,426,285	$ 1,558,221
HBNW fare ($/day)		$ 2,593,364	$ 1,981,407	$ 2,089,765	$ 2,263,073	$ 2,411,619
HBW time (hr/day)		541,254	556,460	571,280	610,316	680,559
HBNW time (hr/day)		754,289	774,377	774,592	840,015	887,648
HBW fare ($/trip)		$ 3.07	$ 2.09	$ 2.08	$ 2.08	$ 2.07
HBNW fare ($/trip)		$ 2.81	$ 1.89	$ 1.90	$ 1.90	$ 1.89
HBW time (min/trip)		60.2	55.3	53.2	53.5	54.1
HBNW time (min/trip)		49.0	44.4	42.2	42.3	41.7

Smart Mobility Transportation Modeling Results

2007 - Cars

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	345,433	702,600	138,513	49,601	94,286	33,230	73,832	1,437,496
mid-day (9 am - 3 pm)	516,913	1,052,833	205,577	79,213	140,691	52,514	113,618	2,161,359
overnight (7 pm - 6 am)	144,925	314,842	69,535	27,915	47,428	18,500	39,253	662,398
p.m. peak (3 pm - 7 pm)	549,521	1,114,813	214,327	79,022	144,304	51,662	112,930	2,266,577
total daily	1,556,791	3,185,088	627,953	235,751	426,708	155,905	339,633	6,527,830

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	21.8	26.4	33.0	39.8	34.8	42.1	41.3	28.1
mid-day (9 am - 3 pm)	26.5	30.3	35.7	40.9	38.0	44.0	43.8	31.8
overnight (7 pm - 6 am)	37.1	39.4	43.0	45.1	44.6	48.7	48.3	40.7
p.m. peak (3 pm - 7 pm)	22.0	26.2	32.3	38.7	34.8	41.3	41.1	27.8
average daily	24.9	28.9	34.7	40.4	37.0	43.2	42.9	30.5

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,538,539	18,559,830	4,570,103	1,974,796	3,283,553	1,397,990	3,046,368	40,371,179
mid-day (9 am - 3 pm)	13,683,228	31,914,915	7,338,608	3,238,460	5,348,604	2,309,788	4,980,665	68,814,269
overnight (7 pm - 6 am)	5,375,371	12,407,668	2,991,569	1,257,634	2,114,401	900,059	1,896,996	26,943,699
p.m. peak (3 pm - 7 pm)	12,100,659	29,164,747	6,920,135	3,057,304	5,024,233	2,132,214	4,646,767	63,046,060
total daily	38,697,798	92,047,161	21,820,415	9,528,194	15,770,792	6,740,051	14,570,796	199,175,206

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,640,255	7,060,047	1,222,318	218,763	939,039	161,424	375,339	13,617,185
mid-day (9 am - 3 pm)	2,510,644	4,266,438	648,836	57,040	467,297	61,459	126,199	8,137,913
overnight (7 pm - 6 am)	80,509	83,649	5,048	-	23,958	-	-	193,165
p.m. peak (3 pm - 7 pm)	6,884,262	12,748,654	2,059,761	425,530	1,281,347	253,292	463,315	24,116,161
total daily	13,115,670	24,158,788	3,935,963	701,333	2,711,641	476,175	964,853	46,064,424

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	48.3%	38.0%	26.7%	11.1%	28.6%	11.5%	12.3%	33.7%
mid-day (9 am - 3 pm)	18.3%	13.4%	8.8%	1.8%	8.7%	2.7%	2.5%	11.8%
overnight (7 pm - 6 am)	1.5%	0.7%	0.2%	0.0%	1.1%	0.0%	0.0%	0.7%
p.m. peak (3 pm - 7 pm)	56.9%	43.7%	29.8%	13.9%	25.5%	11.9%	10.0%	38.3%
total daily	33.9%	26.2%	18.0%	7.4%	17.2%	7.1%	6.6%	23.1%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	597,827	1,225,787	243,553	90,968	165,714	60,385	131,877	2,516,110
on the clock	151,861	310,698	61,257	23,191	41,710	15,350	33,358	637,425
other	807,103	1,648,603	323,144	121,592	219,284	80,171	174,397	3,374,294
total daily	1,556,791	3,185,088	627,953	235,751	426,708	155,905	339,633	6,527,830

Smart Mobility Transportation Modeling Results

2007 Trucks

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	18,501	42,076	10,345	3,808	5,488	2,443	5,711	88,372
mid-day (9 am - 3 pm)	52,340	119,940	29,255	11,001	15,334	7,109	16,215	251,192
overnight (7 pm - 6 am)	18,430	43,039	11,129	4,479	5,900	2,946	6,325	92,248
p.m. peak (3 pm - 7 pm)	26,102	59,193	14,374	5,187	7,464	3,330	7,694	123,343
total daily	115,372	264,248	65,103	24,474	34,187	15,827	35,945	555,155

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	25.8	29.4	33.3	44.2	36.4	46.4	45.9	31.7
mid-day (9 am - 3 pm)	26.3	31.0	35.5	45.1	38.9	47.3	47.9	33.2
overnight (7 pm - 6 am)	35.2	38.4	42.7	48.4	45.3	50.8	51.6	40.5
p.m. peak (3 pm - 7 pm)	23.8	27.9	32.0	43.5	35.7	45.5	45.7	30.2
average daily	27.1	31.3	35.6	45.2	38.9	47.4	47.7	33.5

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	477,784	1,237,271	344,500	168,487	199,929	113,253	262,215	2,803,439
mid-day (9 am - 3 pm)	1,376,931	3,717,072	1,038,112	496,318	595,779	336,426	775,958	8,336,597
overnight (7 pm - 6 am)	649,159	1,653,200	475,185	216,788	267,388	149,535	326,359	3,737,614
p.m. peak (3 pm - 7 pm)	620,493	1,651,105	460,631	225,496	266,844	151,611	351,610	3,727,790
total daily	3,124,368	8,258,648	2,318,428	1,107,090	1,329,940	750,824	1,716,141	18,605,440

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	134,540	301,221	74,936	10,538	45,352	7040.87	18,324	591,953
mid-day (9 am - 3 pm)	128,818	249,339	48,332	4,894	30,918	2926.07	6,782	472,009
overnight (7 pm - 6 am)	9,534	10,794	636	-	1,821	-	-	22,786
p.m. peak (3 pm - 7 pm)	262,942	557,597	124,858	18,002	62,817	10959.06	19,400	1,056,575
total daily	535,834	1,118,952	248,762	33,433	140,908	20926.00	44,507	2,143,323

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	28.2%	24.3%	21.8%	6.3%	22.7%	6.2%	7.0%	21.1%
mid-day (9 am - 3 pm)	9.4%	6.7%	4.7%	1.0%	5.2%	0.9%	0.9%	5.7%
overnight (7 pm - 6 am)	1.5%	0.7%	0.1%	0.0%	0.7%	0.0%	0.0%	0.6%
p.m. peak (3 pm - 7 pm)	42.4%	33.8%	27.1%	8.0%	23.5%	7.2%	5.5%	28.3%
total daily	17.2%	13.5%	10.7%	3.0%	10.6%	2.8%	2.6%	11.5%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting								
on the clock	115,372	264,248	65,103	24,474	34,187	15,827	35,945	555,155
other								
total daily	115,372	264,248	65,103	24,474	34,187	15,827	35,945	555,155

Smart Mobility Transportation Modeling Results

2007 Total

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	363,934	744,677	148,859	53,409	99,774	35,672	79,543	1,525,868
mid-day (9 am - 3 pm)	569,252	1,172,773	234,832	90,214	156,024	59,623	129,832	2,412,551
overnight (7 pm - 6 am)	163,354	357,881	80,664	32,394	53,328	21,446	45,578	754,646
p.m. peak (3 pm - 7 pm)	575,623	1,174,006	228,701	84,208	151,768	54,992	120,623	2,389,921
total daily	1,672,164	3,449,336	693,056	260,225	460,895	171,732	375,577	7,082,985
average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	22.0	26.6	33.0	40.1	34.9	42.4	41.6	28.3
mid-day (9 am - 3 pm)	26.5	30.4	35.7	41.4	38.1	44.4	44.3	32.0
overnight (7 pm - 6 am)	36.9	39.3	43.0	45.5	44.7	48.9	48.8	40.7
p.m. peak (3 pm - 7 pm)	22.1	26.2	32.3	39.0	34.9	41.5	41.4	27.9
average daily	25.0	29.1	34.8	40.9	37.1	43.6	43.4	30.7
vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	8,016,324	19,797,101	4,914,602	2,143,283	3,483,482	1,511,242	3,308,583	43,174,618
mid-day (9 am - 3 pm)	15,060,159	35,631,988	8,376,721	3,734,778	5,944,383	2,646,214	5,756,622	77,150,866
overnight (7 pm - 6 am)	6,024,530	14,060,868	3,466,753	1,474,423	2,381,789	1,049,594	2,223,355	30,681,313
p.m. peak (3 pm - 7 pm)	12,721,153	30,815,852	7,380,766	3,282,800	5,291,077	2,283,825	4,998,377	66,773,850
total daily	41,822,166	100,305,809	24,138,842	10,635,284	17,100,732	7,490,876	16,286,937	217,780,646
congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,774,796	7,361,268	1,297,254	229,301	984,391	168,464	393,663	14,209,138
mid-day (9 am - 3 pm)	2,639,461	4,515,777	697,167	61,935	498,215	64,385	132,982	8,609,922
overnight (7 pm - 6 am)	90,043	94,444	5,684	-	25,780	-	-	215,951
p.m. peak (3 pm - 7 pm)	7,147,203	13,306,252	2,184,619	443,531	1,344,163	264,251	482,715	25,172,736
total daily	13,651,504	25,277,740	4,184,725	734,767	2,852,549	497,101	1,009,360	48,207,746
% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	47.1%	37.2%	26.4%	10.7%	28.3%	11.1%	11.9%	32.9%
mid-day (9 am - 3 pm)	17.5%	12.7%	8.3%	1.7%	8.4%	2.4%	2.3%	11.2%
overnight (7 pm - 6 am)	1.5%	0.7%	0.2%	0.0%	1.1%	0.0%	0.0%	0.7%
p.m. peak (3 pm - 7 pm)	56.2%	43.2%	29.6%	13.5%	25.4%	11.6%	9.7%	37.7%
total daily	32.6%	25.2%	17.3%	6.9%	16.7%	6.6%	6.2%	22.1%
VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	597,827	1,225,787	243,553	90,968	165,714	60,385	131,877	2,516,110
on the clock	267,234	574,946	126,360	47,665	75,897	31,177	69,303	1,192,581
other	807,103	1,648,603	323,144	121,592	219,284	80,171	174,397	3,374,294
total daily	1,672,164	3,449,336	693,056	260,225	460,895	171,732	375,577	7,082,985

Smart Mobility Transportation Modeling Results

2020 Deteriorate - Cars

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	350,691	732,518	152,201	70,065	104,816	43,310	105,996	1,559,597
mid-day (9 am - 3 pm)	528,097	1,103,213	225,197	108,952	155,733	67,610	165,054	2,353,858
overnight (7 pm - 6 am)	144,974	324,296	74,075	36,348	51,265	22,929	56,476	710,363
p.m. peak (3 pm - 7 pm)	560,683	1,165,564	234,792	111,324	159,182	67,392	164,536	2,463,472
total daily	1,584,444	3,325,591	686,265	326,690	470,996	201,241	492,062	7,087,290

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	21.7	26.4	32.5	37.8	34.2	41.0	40.5	28.3
mid-day (9 am - 3 pm)	25.9	29.8	34.8	39.6	36.9	42.9	42.8	31.6
overnight (7 pm - 6 am)	36.8	39.4	42.8	46.0	44.4	49.2	48.3	41.0
p.m. peak (3 pm - 7 pm)	21.7	25.9	31.8	36.7	34.1	40.0	40.1	27.9
average daily	24.5	28.6	34.1	38.9	36.1	42.2	42.0	30.5

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,625,746	19,332,471	4,953,934	2,650,719	3,582,226	1,774,059	4,294,745	44,213,901
mid-day (9 am - 3 pm)	13,652,450	32,893,784	7,828,518	4,314,751	5,740,022	2,900,809	7,067,627	74,397,960
overnight (7 pm - 6 am)	5,339,301	12,791,112	3,171,775	1,673,575	2,275,464	1,127,094	2,727,701	29,106,022
p.m. peak (3 pm - 7 pm)	12,180,322	30,207,940	7,465,603	4,084,084	5,424,332	2,695,864	6,599,860	68,658,003
total daily	38,797,819	95,225,307	23,419,830	12,723,128	17,022,044	8,497,826	20,689,933	216,375,886

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,773,112	7,622,191	1,497,485	552,747	1,008,460	271,336	801,219	15,526,549
mid-day (9 am - 3 pm)	2,864,636	5,062,939	935,131	308,963	643,324	149,440	261,724	10,226,156
overnight (7 pm - 6 am)	79,146	86,082	9,321	-	25,292	-	2,209	202,050
p.m. peak (3 pm - 7 pm)	7,254,452	13,970,326	2,466,739	1,035,022	1,592,865	489,295	951,627	27,760,326
total daily	13,971,346	26,741,538	4,908,676	1,896,731	3,269,940	910,071	2,016,779	53,715,080

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	49.5%	39.4%	30.2%	20.9%	28.2%	15.3%	18.7%	35.1%
mid-day (9 am - 3 pm)	21.0%	15.4%	11.9%	7.2%	11.2%	5.2%	3.7%	13.7%
overnight (7 pm - 6 am)	1.5%	0.7%	0.3%	0.0%	1.1%	0.0%	0.1%	0.7%
p.m. peak (3 pm - 7 pm)	59.6%	46.2%	33.0%	25.3%	29.4%	18.1%	14.4%	40.4%
total daily	36.0%	28.1%	21.0%	14.9%	19.2%	10.7%	9.7%	24.8%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	607,504	1,278,466	266,080	125,977	183,008	77,866	190,530	2,729,431
on the clock	154,662	324,621	66,949	32,026	46,054	19,780	48,353	692,445
other	822,278	1,722,504	353,235	168,687	241,934	103,595	253,179	3,665,414
total daily	1,584,444	3,325,591	686,265	326,690	470,996	201,241	492,062	7,087,290

Smart Mobility Transportation Modeling Results

2020 Deteriorate - Trucks

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	24,694	57,363	15,819	6,105	9,528	3,982	9,938	127,430
mid-day (9 am - 3 pm)	70,962	165,118	44,702	17,465	26,817	11,580	28,477	365,121
overnight (7 pm - 6 am)	24,078	57,269	16,507	6,690	9,970	4,519	10,888	129,921
p.m. peak (3 pm - 7 pm)	35,381	81,559	21,930	8,451	13,046	5,495	13,521	179,384
total daily	155,115	361,308	98,957	38,711	59,362	25,577	62,825	801,856

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	25.6	29.2	32.8	40.0	35.4	43.6	43.1	31.5
mid-day (9 am - 3 pm)	25.8	30.6	34.8	41.3	37.5	44.7	45.1	32.8
overnight (7 pm - 6 am)	35.8	38.9	42.9	47.3	45.1	50.2	50.3	41.1
p.m. peak (3 pm - 7 pm)	23.3	27.6	31.7	38.7	34.6	42.4	42.7	29.8
average daily	26.7	31.0	35.1	41.6	37.8	45.0	45.2	33.3

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	631,165	1,677,619	518,753	244,404	337,242	173,506	428,319	4,011,007
mid-day (9 am - 3 pm)	1,828,282	5,049,847	1,557,013	721,948	1,004,843	517,218	1,284,530	11,963,681
overnight (7 pm - 6 am)	861,986	2,230,478	707,365	316,753	449,234	226,646	548,135	5,340,598
p.m. peak (3 pm - 7 pm)	823,329	2,247,449	694,822	327,391	450,761	233,017	577,106	5,353,875
total daily	4,144,762	11,205,394	3,477,953	1,610,496	2,242,080	1,150,386	2,838,090	26,669,161

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	203,010	459,093	130,888	35,951	81,886	16939.69	57,165	984,933
mid-day (9 am - 3 pm)	211,270	408,111	105,209	27,493	67,591	13008.73	24,062	856,744
overnight (7 pm - 6 am)	13,001	14,519	1,535	-	3,776	-	324	33,155
p.m. peak (3 pm - 7 pm)	388,752	847,441	225,945	65,066	128,964	31001.58	62,677	1,749,847
total daily	816,033	1,729,164	463,576	128,510	282,217	60949.99	144,229	3,624,679

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	32.2%	27.4%	25.2%	14.7%	24.3%	9.8%	13.3%	24.6%
mid-day (9 am - 3 pm)	11.6%	8.1%	6.8%	3.8%	6.7%	2.5%	1.9%	7.2%
overnight (7 pm - 6 am)	1.5%	0.7%	0.2%	0.0%	0.8%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	47.2%	37.7%	32.5%	19.9%	28.6%	13.3%	10.9%	32.7%
total daily	19.7%	15.4%	13.3%	8.0%	12.6%	5.3%	5.1%	13.6%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting								
on the clock	155,115	361,308	98,957	38,711	59,362	25,577	62,825	801,856
other								
total daily	155,115	361,308	98,957	38,711	59,362	25,577	62,825	801,856

Smart Mobility Transportation Modeling Results

2020 Deteriorate - Total

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	375,385	789,881	168,020	76,171	114,344	47,293	115,934	1,687,027
mid-day (9 am - 3 pm)	599,059	1,268,331	269,899	126,417	182,551	79,190	193,532	2,718,979
overnight (7 pm - 6 am)	169,052	381,565	90,583	43,038	61,235	27,448	67,364	840,284
p.m. peak (3 pm - 7 pm)	596,064	1,247,123	256,722	119,775	172,228	72,888	178,057	2,642,857
total daily	1,739,560	3,686,900	785,223	365,401	530,358	226,819	554,887	7,889,147

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	22.0	26.6	32.6	38.0	34.3	41.2	40.7	28.6
mid-day (9 am - 3 pm)	25.8	29.9	34.8	39.8	36.9	43.2	43.2	31.8
overnight (7 pm - 6 am)	36.7	39.4	42.8	46.2	44.5	49.3	48.6	41.0
p.m. peak (3 pm - 7 pm)	21.8	26.0	31.8	36.8	34.1	40.2	40.3	28.0
average daily	24.7	28.9	34.3	39.2	36.3	42.5	42.4	30.8

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	8,256,911	21,010,090	5,472,687	2,895,123	3,919,468	1,947,565	4,723,064	48,224,907
mid-day (9 am - 3 pm)	15,480,732	37,943,631	9,385,531	5,036,699	6,744,865	3,418,027	8,352,157	86,361,641
overnight (7 pm - 6 am)	6,201,288	15,021,590	3,879,140	1,990,328	2,724,698	1,353,740	3,275,837	34,446,621
p.m. peak (3 pm - 7 pm)	13,003,651	32,455,389	8,160,425	4,411,475	5,875,092	2,928,880	7,176,966	74,011,878
total daily	42,942,582	106,430,700	26,897,783	14,333,624	19,264,124	9,648,212	23,528,023	243,045,047

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,976,122	8,081,284	1,628,373	588,697	1,090,346	288,276	858,384	16,511,481
mid-day (9 am - 3 pm)	3,075,906	5,471,049	1,040,339	336,456	710,914	162,449	285,786	11,082,900
overnight (7 pm - 6 am)	92,147	100,601	10,856	-	29,068	-	2,533	235,205
p.m. peak (3 pm - 7 pm)	7,643,204	14,817,767	2,692,684	1,100,088	1,721,829	520,296	1,014,304	29,510,173
total daily	14,787,378	28,470,702	5,372,252	2,025,241	3,552,157	971,021	2,161,008	57,339,759

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	48.2%	38.5%	29.8%	20.3%	27.8%	14.8%	18.2%	34.2%
mid-day (9 am - 3 pm)	19.9%	14.4%	11.1%	6.7%	10.5%	4.8%	3.4%	12.8%
overnight (7 pm - 6 am)	1.5%	0.7%	0.3%	0.0%	1.1%	0.0%	0.1%	0.7%
p.m. peak (3 pm - 7 pm)	58.8%	45.7%	33.0%	24.9%	29.3%	17.8%	14.1%	39.9%
total daily	34.4%	26.8%	20.0%	14.1%	18.4%	10.1%	9.2%	23.6%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	607,504	1,278,466	266,080	125,977	183,008	77,866	190,530	2,729,431
on the clock	309,777	685,929	165,907	70,737	105,416	45,358	111,178	1,494,302
other	822,278	1,722,504	353,235	168,687	241,934	103,595	253,179	3,665,414
total daily	1,739,560	3,686,900	785,223	365,401	530,358	226,819	554,887	7,889,147

Smart Mobility Transportation Modeling Results

2020 Maintain - Cars

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	330,860	708,128	151,173	69,915	104,168	43,248	105,440	1,512,931
mid-day (9 am - 3 pm)	511,249	1,084,619	224,523	108,935	155,375	67,573	164,815	2,317,090
overnight (7 pm - 6 am)	141,363	320,153	73,924	36,295	51,113	22,915	56,419	702,182
p.m. peak (3 pm - 7 pm)	534,545	1,134,710	233,720	111,061	158,665	67,348	164,052	2,404,099
total daily	1,518,016	3,247,609	683,340	326,206	469,321	201,084	490,725	6,936,302

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	22.4	26.9	32.6	37.8	34.2	41.0	40.6	28.9
mid-day (9 am - 3 pm)	26.2	30.1	34.8	39.6	36.9	42.9	42.9	31.9
overnight (7 pm - 6 am)	36.9	39.5	42.8	46.0	44.4	49.1	48.3	41.0
p.m. peak (3 pm - 7 pm)	22.3	26.3	31.8	36.7	34.1	40.0	40.2	28.3
average daily	25.0	29.0	34.2	39.0	36.2	42.2	42.1	30.9

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,426,957	19,053,959	4,934,452	2,645,458	3,567,620	1,771,714	4,283,999	43,684,159
mid-day (9 am - 3 pm)	13,414,369	32,623,584	7,808,816	4,312,238	5,729,858	2,899,179	7,064,628	73,852,673
overnight (7 pm - 6 am)	5,213,249	12,643,726	3,164,761	1,671,120	2,269,755	1,126,207	2,725,537	28,814,355
p.m. peak (3 pm - 7 pm)	11,913,967	29,858,237	7,441,195	4,077,226	5,409,338	2,693,244	6,589,378	67,982,585
total daily	37,968,542	94,179,506	23,349,223	12,706,042	16,976,571	8,490,345	20,663,543	214,333,772

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,588,287	7,385,826	1,512,262	551,709	998,834	268,253	783,273	15,088,445
mid-day (9 am - 3 pm)	2,735,445	4,940,680	906,706	299,864	636,705	144,411	248,816	9,912,628
overnight (7 pm - 6 am)	73,303	80,254	7,947	-	25,047	-	2,196	188,747
p.m. peak (3 pm - 7 pm)	6,871,381	13,518,006	2,456,061	1,036,371	1,596,636	488,544	914,196	26,881,195
total daily	13,268,417	25,924,767	4,882,976	1,887,944	3,257,222	901,208	1,948,481	52,071,015

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	48.3%	38.8%	30.6%	20.9%	28.0%	15.1%	18.3%	34.5%
mid-day (9 am - 3 pm)	20.4%	15.1%	11.6%	7.0%	11.1%	5.0%	3.5%	13.4%
overnight (7 pm - 6 am)	1.4%	0.6%	0.3%	0.0%	1.1%	0.0%	0.1%	0.7%
p.m. peak (3 pm - 7 pm)	57.7%	45.3%	33.0%	25.4%	29.5%	18.1%	13.9%	39.5%
total daily	34.9%	27.5%	20.9%	14.9%	19.2%	10.6%	9.4%	24.3%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	580,730	1,246,635	264,836	125,781	182,251	77,794	189,929	2,667,955
on the clock	148,638	317,642	66,689	31,990	45,906	19,766	48,240	678,870
other	788,649	1,683,333	351,815	168,435	241,164	103,524	252,556	3,589,476
total daily	1,518,016	3,247,609	683,340	326,206	469,321	201,084	490,725	6,936,302

Smart Mobility Transportation Modeling Results

2020 Maintain - Trucks

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	24,350	56,870	15,788	6,103	9,513	3,980	9,910	126,514
mid-day (9 am - 3 pm)	70,524	164,448	44,656	17,470	26,775	11,573	28,441	363,887
overnight (7 pm - 6 am)	24,056	57,238	16,508	6,691	9,966	4,519	10,887	129,866
p.m. peak (3 pm - 7 pm)	34,820	80,824	21,885	8,442	13,030	5,495	13,486	177,982
total daily	153,749	359,381	98,836	38,708	59,283	25,567	62,724	798,248
								(902,007)

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	25.9	29.5	32.9	40.0	35.4	43.6	43.2	31.7
mid-day (9 am - 3 pm)	25.9	30.7	34.8	41.3	37.5	44.7	45.1	32.9
overnight (7 pm - 6 am)	35.8	39.0	42.8	47.4	45.1	50.1	50.3	41.1
p.m. peak (3 pm - 7 pm)	23.6	27.8	31.7	38.8	34.6	42.4	42.7	30.1
average daily	27.0	31.2	35.2	41.6	37.8	45.0	45.2	33.4

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	630,872	1,676,424	518,696	244,325	337,206	173,535	427,874	4,008,933
mid-day (9 am - 3 pm)	1,829,571	5,045,526	1,555,691	721,775	1,003,903	516,979	1,283,586	11,957,031
overnight (7 pm - 6 am)	862,175	2,230,382	707,228	316,839	449,196	226,637	548,082	5,340,539
p.m. peak (3 pm - 7 pm)	822,164	2,245,133	694,523	327,165	450,694	232,940	576,448	5,349,067
total daily	4,144,782	11,197,464	3,476,139	1,610,104	2,240,999	1,150,091	2,835,991	26,655,569

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	197,064	450,082	132,072	35,713	81,828	16,683	55,050	968,494
mid-day (9 am - 3 pm)	205,783	403,908	102,606	26,985	66,965	12,738	23,834	842,819
overnight (7 pm - 6 am)	11,261	12,782	1,382	-	3,771	-	325	29,521
p.m. peak (3 pm - 7 pm)	377,676	833,442	223,739	65,431	129,344	31,162	59,824	1,720,618
total daily	791,783	1,700,215	459,799	128,130	281,909	60,583	139,034	3,561,452

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	31.2%	26.8%	25.5%	14.6%	24.3%	9.6%	12.9%	24.2%
mid-day (9 am - 3 pm)	11.2%	8.0%	6.6%	3.7%	6.7%	2.5%	1.9%	7.0%
overnight (7 pm - 6 am)	1.3%	0.6%	0.2%	0.0%	0.8%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	45.9%	37.1%	32.2%	20.0%	28.7%	13.4%	10.4%	32.2%
total daily	19.1%	15.2%	13.2%	8.0%	12.6%	5.3%	4.9%	13.4%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting								
on the clock	153,749	359,381	98,836	38,708	59,283	25,567	62,724	798,248
other								
total daily	153,749	359,381	98,836	38,708	59,283	25,567	62,724	798,248

Smart Mobility Transportation Modeling Results

2020 Maintain - Total

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	355,209	764,998	166,961	76,018	113,681	47,229	115,350	1,639,445
mid-day (9 am - 3 pm)	581,773	1,249,067	269,179	126,406	182,150	79,146	193,255	2,680,976
overnight (7 pm - 6 am)	165,419	377,391	90,432	42,987	61,079	27,434	67,306	832,048
p.m. peak (3 pm - 7 pm)	569,365	1,215,533	255,605	119,503	171,695	72,843	177,538	2,582,081
total daily	1,671,766	3,606,990	782,177	364,914	528,604	226,652	553,449	7,734,550

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	22.7	27.1	32.7	38.0	34.3	41.2	40.8	29.1
mid-day (9 am - 3 pm)	26.2	30.2	34.8	39.8	37.0	43.2	43.2	32.0
overnight (7 pm - 6 am)	36.7	39.4	42.8	46.2	44.5	49.3	48.6	41.0
p.m. peak (3 pm - 7 pm)	22.4	26.4	31.8	36.9	34.1	40.2	40.4	28.4
average daily	25.2	29.2	34.3	39.2	36.4	42.5	42.5	31.2

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	8,057,829	20,730,382	5,453,148	2,889,783	3,904,827	1,945,250	4,711,873	47,693,092
mid-day (9 am - 3 pm)	15,243,940	37,669,109	9,364,507	5,034,013	6,733,761	3,416,158	8,348,215	85,809,704
overnight (7 pm - 6 am)	6,075,424	14,874,108	3,871,989	1,987,959	2,718,951	1,352,844	3,273,619	34,154,894
p.m. peak (3 pm - 7 pm)	12,736,131	32,103,370	8,135,718	4,404,391	5,860,031	2,926,184	7,165,826	73,331,651
total daily	42,113,324	105,376,969	26,825,362	14,316,146	19,217,570	9,640,436	23,499,533	240,989,341

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,785,351	7,835,909	1,644,335	587,423	1,080,662	284,936	838,323	16,056,939
mid-day (9 am - 3 pm)	2,941,228	5,344,589	1,009,312	326,849	703,670	157,149	272,650	10,755,447
overnight (7 pm - 6 am)	84,564	93,036	9,328	-	28,818	-	2,522	218,268
p.m. peak (3 pm - 7 pm)	7,249,057	14,351,448	2,679,800	1,101,802	1,725,980	519,706	974,020	28,601,812
total daily	14,060,200	27,624,982	5,342,775	2,016,074	3,539,130	961,791	2,087,514	55,632,467

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	47.0%	37.8%	30.2%	20.3%	27.7%	14.6%	17.8%	33.7%
mid-day (9 am - 3 pm)	19.3%	14.2%	10.8%	6.5%	10.4%	4.6%	3.3%	12.5%
overnight (7 pm - 6 am)	1.4%	0.6%	0.2%	0.0%	1.1%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	56.9%	44.7%	32.9%	25.0%	29.5%	17.8%	13.6%	39.0%
total daily	33.4%	26.2%	19.9%	14.1%	18.4%	10.0%	8.9%	23.1%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	580,730	1,246,635	264,836	125,781	182,251	77,794	189,929	2,667,955
on the clock	302,387	677,023	165,526	70,697	105,189	45,333	110,963	1,477,119
other	788,649	1,683,333	351,815	168,435	241,164	103,524	252,556	3,589,476
total daily	1,671,766	3,606,990	782,177	364,913	528,604	226,652	553,449	7,734,550

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance - Cars

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	315,906	687,346	149,362	69,328	103,070	43,119	104,722	1,472,852
mid-day (9 am - 3 pm)	502,020	1,072,210	223,675	108,560	154,920	67,508	164,243	2,293,136
overnight (7 pm - 6 am)	139,911	318,069	73,682	36,191	50,926	22,959	56,214	697,951
p.m. peak (3 pm - 7 pm)	515,319	1,107,827	231,605	110,383	157,485	67,134	163,184	2,352,937
total daily	1,473,156	3,185,452	678,324	324,461	466,401	200,719	488,363	6,816,876

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	23.1	27.4	32.8	38.0	34.4	41.0	40.7	29.3
mid-day (9 am - 3 pm)	26.4	30.2	34.8	39.6	36.9	42.9	42.9	32.0
overnight (7 pm - 6 am)	36.8	39.5	42.8	46.1	44.4	48.9	48.3	41.0
p.m. peak (3 pm - 7 pm)	22.8	26.7	31.9	36.8	34.2	40.0	40.2	28.6
average daily	25.4	29.3	34.3	39.0	36.2	42.2	42.1	31.2

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,292,726	18,823,985	4,897,440	2,631,497	3,545,147	1,766,335	4,263,520	43,220,650
mid-day (9 am - 3 pm)	13,264,954	32,408,405	7,787,095	4,299,729	5,711,972	2,893,885	7,040,602	73,406,643
overnight (7 pm - 6 am)	5,150,624	12,554,556	3,152,202	1,666,642	2,260,270	1,123,363	2,714,012	28,621,669
p.m. peak (3 pm - 7 pm)	11,724,865	29,548,394	7,398,095	4,059,898	5,381,854	2,686,484	6,562,773	67,362,363
total daily	37,433,170	93,335,341	23,234,831	12,657,766	16,899,244	8,470,067	20,580,907	212,611,325

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,377,638	7,085,957	1,427,616	522,480	987,789	275,792	789,038	14,466,311
mid-day (9 am - 3 pm)	2,615,776	4,768,356	892,744	294,337	616,493	147,301	251,190	9,586,198
overnight (7 pm - 6 am)	67,512	74,511	7,919	-	25,434	-	2,179	177,554
p.m. peak (3 pm - 7 pm)	6,550,078	13,068,158	2,373,630	1,011,359	1,556,518	499,927	916,548	25,976,218
total daily	12,611,004	24,996,982	4,701,910	1,828,175	3,186,235	923,021	1,958,955	50,206,281

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	46.3%	37.6%	29.2%	19.9%	27.9%	15.6%	18.5%	33.5%
mid-day (9 am - 3 pm)	19.7%	14.7%	11.5%	6.8%	10.8%	5.1%	3.6%	13.1%
overnight (7 pm - 6 am)	1.3%	0.6%	0.3%	0.0%	1.1%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	55.9%	44.2%	32.1%	24.9%	28.9%	18.6%	14.0%	38.6%
total daily	33.7%	26.8%	20.2%	14.4%	18.9%	10.9%	9.5%	23.6%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	562,364	1,221,171	262,710	125,049	180,983	77,657	188,952	2,618,886
on the clock	144,758	312,295	66,268	31,837	45,662	19,736	48,026	668,582
other	766,034	1,651,986	349,347	167,575	239,755	103,326	251,385	3,529,408
total daily	1,473,156	3,185,452	678,324	324,461	466,401	200,719	488,363	6,816,876

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance - Trucks

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	23,853	56,175	15,688	6,086	9,462	3,975	9,899	125,137
mid-day (9 am - 3 pm)	69,559	163,138	44,560	17,462	26,758	11,562	28,443	361,481
overnight (7 pm - 6 am)	24,045	57,223	16,510	6,689	9,964	4,524	10,890	129,847
p.m. peak (3 pm - 7 pm)	33,909	79,556	21,770	8,415	12,991	5,487	13,482	175,609
total daily	151,366	356,092	98,527	38,652	59,175	25,548	62,714	792,075
								(2,445,485)

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	26.2	29.7	33.0	40.1	35.6	43.6	43.2	31.9
mid-day (9 am - 3 pm)	26.1	30.8	34.9	41.3	37.5	44.7	45.1	33.0
overnight (7 pm - 6 am)	35.8	38.9	42.8	47.4	45.1	50.1	50.3	41.1
p.m. peak (3 pm - 7 pm)	24.0	28.1	31.8	38.8	34.7	42.4	42.8	30.3
average daily	27.2	31.3	35.2	41.6	37.9	45.0	45.2	33.6

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	625,280	1,669,708	517,336	244,040	336,680	173,342	427,809	3,994,195
mid-day (9 am - 3 pm)	1,817,768	5,027,142	1,553,871	721,729	1,004,021	516,597	1,283,781	11,924,909
overnight (7 pm - 6 am)	860,111	2,228,279	707,155	316,742	449,080	226,584	548,108	5,336,059
p.m. peak (3 pm - 7 pm)	814,949	2,234,285	692,896	326,804	450,139	232,923	576,776	5,328,773
total daily	4,118,109	11,159,414	3,471,258	1,609,316	2,239,920	1,149,446	2,836,474	26,583,937

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	186,860	435,742	125,867	34,453	80,851	17,166	56,797	937,736
mid-day (9 am - 3 pm)	198,975	393,257	100,167	26,621	66,074	12,838	23,815	821,747
overnight (7 pm - 6 am)	10,461	11,989	1,380	-	3,767	-	326	27,923
p.m. peak (3 pm - 7 pm)	362,491	811,954	213,945	63,633	128,243	31,365	60,694	1,672,326
total daily	758,787	1,652,943	441,359	124,707	278,935	61,369	141,633	3,459,733

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	29.9%	26.1%	24.3%	14.1%	24.0%	9.9%	13.3%	23.5%
mid-day (9 am - 3 pm)	10.9%	7.8%	6.4%	3.7%	6.6%	2.5%	1.9%	6.9%
overnight (7 pm - 6 am)	1.2%	0.5%	0.2%	0.0%	0.8%	0.0%	0.1%	0.5%
p.m. peak (3 pm - 7 pm)	44.5%	36.3%	30.9%	19.5%	28.5%	13.5%	10.5%	31.4%
total daily	18.4%	14.8%	12.7%	7.7%	12.5%	5.3%	5.0%	13.0%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting								
on the clock	151,366	356,092	98,527	38,652	59,175	25,548	62,714	792,075
other								
total daily	151,366	356,092	98,527	38,652	59,175	25,548	62,714	792,075

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance - Total

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	339,759	743,520	165,050	75,413	112,532	47,094	114,621	1,597,989
mid-day (9 am - 3 pm)	571,580	1,235,348	268,235	126,022	181,678	79,070	192,686	2,654,617
overnight (7 pm - 6 am)	163,956	375,292	90,192	42,880	60,890	27,483	67,105	827,798
p.m. peak (3 pm - 7 pm)	549,228	1,187,384	253,375	118,798	170,476	72,621	176,666	2,528,546
total daily	1,624,522	3,541,544	776,851	363,113	525,576	226,268	551,077	7,608,950

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	23.3	27.6	32.8	38.1	34.5	41.2	40.9	29.5
mid-day (9 am - 3 pm)	26.4	30.3	34.8	39.8	37.0	43.1	43.2	32.1
overnight (7 pm - 6 am)	36.7	39.4	42.8	46.3	44.5	49.1	48.6	41.0
p.m. peak (3 pm - 7 pm)	22.8	26.8	31.9	36.9	34.2	40.2	40.4	28.7
average daily	25.6	29.5	34.4	39.3	36.4	42.5	42.5	31.4

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,918,007	20,493,694	5,414,775	2,875,537	3,881,828	1,939,677	4,691,329	47,214,846
mid-day (9 am - 3 pm)	15,082,722	37,435,548	9,340,966	5,021,458	6,715,993	3,410,482	8,324,383	85,331,552
overnight (7 pm - 6 am)	6,010,735	14,782,835	3,859,357	1,983,384	2,709,349	1,349,947	3,262,120	33,957,727
p.m. peak (3 pm - 7 pm)	12,539,815	31,782,679	8,090,991	4,386,702	5,831,993	2,919,407	7,139,550	72,691,136
total daily	41,551,279	104,494,755	26,706,088	14,267,082	19,139,164	9,619,512	23,417,381	239,195,261

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,564,497	7,521,699	1,553,484	556,933	1,068,640	292,958	845,835	15,404,047
mid-day (9 am - 3 pm)	2,814,751	5,161,613	992,911	320,958	682,567	160,140	275,005	10,407,945
overnight (7 pm - 6 am)	77,973	86,500	9,299	-	29,200	-	2,505	205,478
p.m. peak (3 pm - 7 pm)	6,912,569	13,880,112	2,587,575	1,074,992	1,684,762	531,292	977,242	27,648,544
total daily	13,369,791	26,649,925	5,143,269	1,952,882	3,465,169	984,390	2,100,588	53,666,014

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	45.0%	36.7%	28.7%	19.4%	27.5%	15.1%	18.0%	32.6%
mid-day (9 am - 3 pm)	18.7%	13.8%	10.6%	6.4%	10.2%	4.7%	3.3%	12.2%
overnight (7 pm - 6 am)	1.3%	0.6%	0.2%	0.0%	1.1%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	55.1%	43.7%	32.0%	24.5%	28.9%	18.2%	13.7%	38.0%
total daily	32.2%	25.5%	19.3%	13.7%	18.1%	10.2%	9.0%	22.4%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	562,364	1,221,171	262,710	125,049	180,983	77,657	188,952	2,618,886
on the clock	296,125	668,387	164,795	70,488	104,837	45,285	110,740	1,460,657
other	766,034	1,651,986	349,347	167,575	239,755	103,326	251,385	3,529,408
total daily	1,624,522	3,541,544	776,851	363,113	525,576	226,268	551,077	7,608,950

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance, Land Use - Cars

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	318,533	682,137	145,108	63,396	100,729	40,703	103,652	1,454,256
mid-day (9 am - 3 pm)	507,505	1,069,848	218,570	99,489	153,920	63,698	166,178	2,279,208
overnight (7 pm - 6 am)	140,121	315,366	72,049	33,703	50,490	21,854	55,352	688,934
p.m. peak (3 pm - 7 pm)	518,831	1,101,478	224,788	100,088	155,905	63,007	166,398	2,330,495
total daily	1,484,990	3,168,828	660,514	296,676	461,044	189,262	491,579	6,752,893
								63,983

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	23.0	27.4	33.1	38.8	34.6	41.2	40.0	29.3
mid-day (9 am - 3 pm)	26.4	30.1	34.9	39.9	36.8	42.9	41.7	31.8
overnight (7 pm - 6 am)	36.9	39.5	42.7	45.6	44.2	48.7	48.0	40.9
p.m. peak (3 pm - 7 pm)	22.7	26.6	32.2	37.5	34.1	40.2	38.7	28.5
average daily	25.4	29.3	34.5	39.5	36.2	42.3	41.0	31.1

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,318,110	18,669,014	4,809,180	2,458,177	3,483,234	1,675,613	4,142,497	42,555,825
mid-day (9 am - 3 pm)	13,377,740	32,243,158	7,635,751	3,969,283	5,658,459	2,733,787	6,935,641	72,553,819
overnight (7 pm - 6 am)	5,174,827	12,455,940	3,075,908	1,535,808	2,233,133	1,063,906	2,655,892	28,195,415
p.m. peak (3 pm - 7 pm)	11,780,699	29,336,573	7,244,735	3,753,762	5,316,110	2,535,823	6,436,958	66,404,659
total daily	37,651,375	92,704,685	22,765,574	11,717,030	16,690,935	8,009,129	20,170,988	209,709,717

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,338,662	6,862,587	1,427,616	422,885	927,018	227,726	704,793	13,911,288
mid-day (9 am - 3 pm)	2,638,025	4,763,804	892,744	224,607	620,770	131,092	316,672	9,587,714
overnight (7 pm - 6 am)	70,413	77,891	7,919	1,875	29,186	-	2,979	190,263
p.m. peak (3 pm - 7 pm)	6,522,287	12,815,032	2,373,630	760,698	1,541,704	430,600	1,022,166	25,466,118
total daily	12,569,388	24,519,314	4,701,910	1,410,066	3,118,678	789,418	2,046,609	49,155,382

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	45.6%	36.8%	29.7%	17.2%	26.6%	13.6%	17.0%	32.7%
mid-day (9 am - 3 pm)	19.7%	14.8%	11.7%	5.7%	11.0%	4.8%	4.6%	13.2%
overnight (7 pm - 6 am)	1.4%	0.6%	0.3%	0.1%	1.3%	0.0%	0.1%	0.7%
p.m. peak (3 pm - 7 pm)	55.4%	43.7%	32.8%	20.3%	29.0%	17.0%	15.9%	38.3%
total daily	33.4%	26.4%	20.7%	12.0%	18.7%	9.9%	10.1%	23.4%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	566,799	1,214,019	255,804	114,532	178,461	73,307	189,089	2,592,010
on the clock	146,019	310,897	64,595	29,142	45,199	18,618	48,378	662,847
other	772,172	1,643,912	340,115	153,003	237,384	97,337	254,113	3,498,036
total daily	1,484,990	3,168,828	660,514	296,676	461,044	189,262	491,579	6,752,893

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance, Land Use - Trucks

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	23,839	56,052	15,548	5,971	9,409	3,910	9,940	124,669
mid-day (9 am - 3 pm)	69,677	163,381	44,450	17,184	26,754	11,429	28,687	361,562
overnight (7 pm - 6 am)	24,049	57,224	16,488	6,670	9,971	4,519	10,907	129,827
p.m. peak (3 pm - 7 pm)	33,866	79,488	21,588	8,209	12,950	5,379	13,610	175,091
total daily	151,431	356,145	98,074	38,034	59,084	25,237	63,144	791,149
								(2,676,867)

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	26.2	29.8	33.3	40.9	35.8	44.0	43.3	32.1
mid-day (9 am - 3 pm)	26.1	30.8	35.0	42.0	37.5	45.0	44.8	33.0
overnight (7 pm - 6 am)	35.7	38.9	42.9	47.4	45.0	50.1	50.3	41.1
p.m. peak (3 pm - 7 pm)	24.0	28.1	32.2	39.8	34.8	43.0	42.4	30.4
average daily	27.2	31.4	35.5	42.3	37.9	45.3	45.0	33.6

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	624,928	1,670,982	518,112	244,488	336,746	172,138	429,907	3,997,302
mid-day (9 am - 3 pm)	1,817,558	5,033,507	1,557,568	721,979	1,004,203	514,160	1,285,236	11,934,211
overnight (7 pm - 6 am)	859,507	2,228,471	707,454	316,409	448,940	226,343	548,616	5,335,740
p.m. peak (3 pm - 7 pm)	814,093	2,236,199	694,407	326,880	450,318	231,018	577,487	5,330,402
total daily	4,116,087	11,169,158	3,477,541	1,609,756	2,240,207	1,143,658	2,841,246	26,597,654

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	181,989	423,556	120,441	30,230	77,426	14,964	54,871	903,477
mid-day (9 am - 3 pm)	198,374	393,917	98,777	21,189	65,123	11,825	27,701	816,905
overnight (7 pm - 6 am)	10,411	11,943	1,413	219	4,662	-	90	28,737
p.m. peak (3 pm - 7 pm)	356,214	799,780	215,074	51,719	125,407	27,875	67,264	1,643,333
total daily	746,988	1,629,196	435,705	103,356	272,618	54,663	149,926	3,392,453

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	29.1%	25.3%	23.2%	12.4%	23.0%	8.7%	12.8%	22.6%
mid-day (9 am - 3 pm)	10.9%	7.8%	6.3%	2.9%	6.5%	2.3%	2.2%	6.8%
overnight (7 pm - 6 am)	1.2%	0.5%	0.2%	0.1%	1.0%	0.0%	0.0%	0.5%
p.m. peak (3 pm - 7 pm)	43.8%	35.8%	31.0%	15.8%	27.8%	12.1%	11.6%	30.8%
total daily	18.1%	14.6%	12.5%	6.4%	12.2%	4.8%	5.3%	12.8%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting								
on the clock	151,431	356,145	98,074	38,034	59,084	25,237	63,144	791,149
other								
total daily	151,431	356,145	98,074	38,034	59,084	25,237	63,144	791,149

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance, Land Use - Total

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	342,372	738,189	160,655	69,367	110,137	44,613	113,591	1,578,925
mid-day (9 am - 3 pm)	577,181	1,233,228	263,020	116,673	180,675	75,127	194,866	2,640,770
overnight (7 pm - 6 am)	164,170	372,589	88,536	40,373	60,461	26,373	66,259	818,762
p.m. peak (3 pm - 7 pm)	552,697	1,180,966	246,376	108,298	168,855	68,386	180,008	2,505,585
total daily	1,636,421	3,524,973	758,588	334,710	520,128	214,499	554,723	7,544,042

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	23.2	27.6	33.2	39.0	34.7	41.4	40.3	29.5
mid-day (9 am - 3 pm)	26.3	30.2	35.0	40.2	36.9	43.2	42.2	32.0
overnight (7 pm - 6 am)	36.8	39.4	42.7	45.9	44.4	48.9	48.4	41.0
p.m. peak (3 pm - 7 pm)	22.8	26.7	32.2	37.7	34.2	40.5	39.0	28.6
average daily	25.5	29.5	34.6	39.8	36.4	42.7	41.5	31.3

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,943,038	20,339,996	5,327,292	2,702,665	3,819,980	1,847,751	4,572,404	46,553,127
mid-day (9 am - 3 pm)	15,195,298	37,276,664	9,193,318	4,691,262	6,662,662	3,247,947	8,220,877	84,488,029
overnight (7 pm - 6 am)	6,034,334	14,684,411	3,783,362	1,852,217	2,682,073	1,290,249	3,204,509	33,531,154
p.m. peak (3 pm - 7 pm)	12,594,792	31,572,772	7,939,142	4,080,642	5,766,428	2,766,840	7,014,445	71,735,060
total daily	41,767,461	103,873,843	26,243,115	13,326,787	18,931,142	9,152,787	23,012,235	236,307,371

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	3,520,651	7,286,143	1,548,057	453,115	1,004,445	242,690	759,664	14,814,765
mid-day (9 am - 3 pm)	2,836,400	5,157,720	991,522	245,796	685,892	142,916	344,373	10,404,619
overnight (7 pm - 6 am)	80,824	89,834	9,332	2,094	33,848	-	3,069	219,000
p.m. peak (3 pm - 7 pm)	6,878,501	13,614,812	2,588,704	812,417	1,667,111	458,475	1,089,430	27,109,451
total daily	13,316,376	26,148,510	5,137,615	1,513,422	3,391,296	844,081	2,196,536	52,547,835

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	44.3%	35.8%	29.1%	16.8%	26.3%	13.1%	16.6%	31.8%
mid-day (9 am - 3 pm)	18.7%	13.8%	10.8%	5.2%	10.3%	4.4%	4.2%	12.3%
overnight (7 pm - 6 am)	1.3%	0.6%	0.2%	0.1%	1.3%	0.0%	0.1%	0.7%
p.m. peak (3 pm - 7 pm)	54.6%	43.1%	32.6%	19.9%	28.9%	16.6%	15.5%	37.8%
total daily	31.9%	25.2%	19.6%	11.4%	17.9%	9.2%	9.5%	22.2%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	566,799	1,214,019	255,804	114,532	178,461	73,307	189,089	2,592,010
on the clock	297,449	667,042	162,669	67,176	104,284	43,855	111,522	1,453,996
other	772,172	1,643,912	340,115	153,003	237,384	97,337	254,113	3,498,036
total daily	1,636,421	3,524,973	758,588	334,710	520,128	214,499	554,723	7,544,042

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance, Land Use & Gas Price - Cars

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	259,897	559,544	118,914	49,315	83,311	30,673	79,262	1,180,916
mid-day (9 am - 3 pm)	428,659	901,310	179,952	77,488	127,930	47,496	128,319	1,891,154
overnight (7 pm - 6 am)	123,265	275,983	61,304	27,280	43,029	16,969	43,823	591,654
p.m. peak (3 pm - 7 pm)	420,714	897,808	181,890	76,445	127,244	46,268	126,557	1,876,926
total daily	1,232,536	2,634,645	542,061	230,528	381,514	141,406	377,961	5,540,650
								78.2%

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	24.6	28.7	34.3	39.6	35.5	42.2	41.0	30.5
mid-day (9 am - 3 pm)	27.5	30.9	35.6	40.4	37.4	44.0	42.0	32.5
overnight (7 pm - 6 am)	36.5	39.0	42.4	45.0	44.2	48.5	47.3	40.4
p.m. peak (3 pm - 7 pm)	24.6	28.2	33.6	38.7	35.4	42.1	39.7	29.9
average daily	26.8	30.4	35.4	40.2	37.1	43.5	41.6	32.0

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	6,400,281	16,059,732	4,078,237	1,953,716	2,960,639	1,295,689	3,247,046	35,995,340
mid-day (9 am - 3 pm)	11,771,740	27,855,956	6,404,061	3,129,670	4,780,463	2,092,045	5,386,372	61,420,307
overnight (7 pm - 6 am)	4,495,434	10,766,982	2,601,352	1,226,439	1,903,762	822,282	2,071,574	23,887,825
p.m. peak (3 pm - 7 pm)	10,359,388	25,316,441	6,104,803	2,960,354	4,498,946	1,946,115	5,023,634	56,209,681
total daily	33,026,843	79,999,112	19,188,453	9,270,180	14,143,809	6,156,130	15,728,626	177,513,154

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	2,406,526	4,820,343	871,439	215,979	720,351	124,691	292,288	9,451,617
mid-day (9 am - 3 pm)	1,699,938	3,142,068	490,561	92,155	441,037	71,835	193,187	6,130,781
overnight (7 pm - 6 am)	50,790	57,220	5,255	-	21,011	-	2,747	137,024
p.m. peak (3 pm - 7 pm)	4,466,074	8,789,126	1,462,501	387,982	1,040,620	204,665	527,336	16,878,304
total daily	8,623,327	16,808,758	2,829,755	696,116	2,223,020	401,191	1,015,559	32,597,725

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	37.6%	30.0%	21.4%	11.1%	24.3%	9.6%	9.0%	26.3%
mid-day (9 am - 3 pm)	14.4%	11.3%	7.7%	2.9%	9.2%	3.4%	3.6%	10.0%
overnight (7 pm - 6 am)	1.1%	0.5%	0.2%	0.0%	1.1%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	43.1%	34.7%	24.0%	13.1%	23.1%	10.5%	10.5%	30.0%
total daily	26.1%	21.0%	14.7%	7.5%	15.7%	6.5%	6.5%	18.4%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	470,876	1,010,579	210,500	89,339	148,051	55,065	145,576	2,129,987
on the clock	121,928	259,709	53,104	22,683	37,475	13,918	37,266	546,082
other	639,732	1,364,356	278,456	118,506	195,988	72,424	195,119	2,864,581
total daily	1,232,536	2,634,645	542,061	230,528	381,514	141,406	377,961	5,540,650

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance, Land Use & Gas Price - Trucks

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	22,649	53,239	14,775	5,710	9,002	3,766	9,468	118,610
mid-day (9 am - 3 pm)	67,579	157,460	42,815	16,657	25,934	11,061	27,784	349,290
overnight (7 pm - 6 am)	23,912	56,997	16,429	6,662	9,877	4,513	10,862	129,252
p.m. peak (3 pm - 7 pm)	31,847	74,473	20,348	7,763	12,268	5,101	12,909	164,709
total daily	145,987	342,169	94,367	36,793	57,080	24,442	61,024	761,861
average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	27.7	31.4	35.1	42.6	37.3	45.6	45.6	33.7
mid-day (9 am - 3 pm)	27.3	32.0	36.4	43.3	38.6	46.5	46.5	34.3
overnight (7 pm - 6 am)	35.9	39.1	43.1	47.6	45.4	50.3	50.4	41.3
p.m. peak (3 pm - 7 pm)	25.7	30.0	34.2	41.9	36.5	45.2	45.2	32.4
average daily	28.5	32.6	36.9	43.7	39.1	46.8	46.8	35.0
vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	626,558	1,671,381	518,730	243,155	336,049	171,921	431,875	3,999,668
mid-day (9 am - 3 pm)	1,848,233	5,039,015	1,557,554	721,773	1,001,570	514,194	1,292,463	11,974,800
overnight (7 pm - 6 am)	858,870	2,227,621	708,561	316,998	448,366	226,794	547,884	5,335,094
p.m. peak (3 pm - 7 pm)	820,002	2,233,303	695,253	325,621	448,232	230,325	583,837	5,336,574
total daily	4,153,663	11,171,320	3,480,098	1,607,547	2,234,217	1,143,233	2,856,058	26,646,136
congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	140,461	308,841	88,754	18,559	65,281	9,962	19,733	651,591
mid-day (9 am - 3 pm)	149,748	295,570	64,249	11,719	54,933	6,789	19,691	602,698
overnight (7 pm - 6 am)	9,213	9,882	1,173	-	3,350	-	88	23,708
p.m. peak (3 pm - 7 pm)	274,881	589,353	151,400	30,297	102,593	17,071	32,006	1,197,601
total daily	574,303	1,203,647	305,576	60,576	226,158	33,822	71,517	2,475,598
% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	22.4%	18.5%	17.1%	7.6%	19.4%	5.8%	4.6%	16.3%
mid-day (9 am - 3 pm)	8.1%	5.9%	4.1%	1.6%	5.5%	1.3%	1.5%	5.0%
overnight (7 pm - 6 am)	1.1%	0.4%	0.2%	0.0%	0.7%	0.0%	0.0%	0.4%
p.m. peak (3 pm - 7 pm)	33.5%	26.4%	21.8%	9.3%	22.9%	7.4%	5.5%	22.4%
total daily	13.8%	10.8%	8.8%	3.8%	10.1%	3.0%	2.5%	9.3%
VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting								
on the clock	145,987	342,169	94,367	36,793	57,080	24,442	61,024	761,861
other								
total daily	145,987	342,169	94,367	36,793	57,080	24,442	61,024	761,861

Smart Mobility Transportation Modeling Results

2020 Expand & Enhance, Land Use & Gas Price - Total

vehicle hours of travel (VHT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	282,546	612,783	133,689	55,026	92,313	34,439	88,730	1,299,527
mid-day (9 am - 3 pm)	496,238	1,058,770	222,767	94,145	153,863	58,557	156,103	2,240,444
overnight (7 pm - 6 am)	147,177	332,980	77,733	33,941	52,907	21,482	54,685	720,906
p.m. peak (3 pm - 7 pm)	452,561	972,281	202,238	84,208	139,511	51,369	139,466	2,041,635
total daily	1,378,523	2,976,813	636,427	267,320	438,594	165,848	438,985	6,302,511

average speed (m.p.h.)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	24.9	28.9	34.4	39.9	35.7	42.6	41.5	30.8
mid-day (9 am - 3 pm)	27.4	31.1	35.7	40.9	37.6	44.5	42.8	32.8
overnight (7 pm - 6 am)	36.4	39.0	42.6	45.5	44.5	48.8	47.9	40.5
p.m. peak (3 pm - 7 pm)	24.7	28.3	33.6	39.0	35.5	42.4	40.2	30.1
average daily	27.0	30.6	35.6	40.7	37.3	44.0	42.3	32.4

vehicle miles traveled (VMT)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	7,026,840	17,731,113	4,596,967	2,196,871	3,296,688	1,467,610	3,678,921	39,995,009
mid-day (9 am - 3 pm)	13,619,973	32,894,971	7,961,615	3,851,443	5,782,032	2,606,239	6,678,834	73,395,107
overnight (7 pm - 6 am)	5,354,304	12,994,603	3,309,913	1,543,437	2,352,128	1,049,075	2,619,458	29,222,919
p.m. peak (3 pm - 7 pm)	11,179,390	27,549,745	6,800,056	3,285,975	4,947,178	2,176,440	5,607,471	61,546,255
total daily	37,180,506	91,170,432	22,668,551	10,877,726	16,378,026	7,299,363	18,584,685	204,159,289

congested VMT (volume/capacity >= 0.9)	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	2,546,987	5,129,185	960,193	234,538	785,632	134,653	312,021	10,103,208
mid-day (9 am - 3 pm)	1,849,685	3,437,638	554,810	103,875	495,969	78,624	212,878	6,733,479
overnight (7 pm - 6 am)	60,003	67,103	6,428	-	24,362	-	2,836	160,732
p.m. peak (3 pm - 7 pm)	4,740,954	9,378,479	1,613,901	418,279	1,143,214	221,736	559,342	18,075,905
total daily	9,197,630	18,012,405	3,135,332	756,691	2,449,177	435,013	1,087,076	35,073,323

% congested VMT	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
a.m. peak (6 am - 9 am)	36.2%	28.9%	20.9%	10.7%	23.8%	9.2%	8.5%	25.3%
mid-day (9 am - 3 pm)	13.6%	10.5%	7.0%	2.7%	8.6%	3.0%	3.2%	9.2%
overnight (7 pm - 6 am)	1.1%	0.5%	0.2%	0.0%	1.0%	0.0%	0.1%	0.6%
p.m. peak (3 pm - 7 pm)	42.4%	34.0%	23.7%	12.7%	23.1%	10.2%	10.0%	29.4%
total daily	24.7%	19.8%	13.8%	7.0%	15.0%	6.0%	5.8%	17.2%

VHT by type	Chicago	rest of Cook	DuPage	Kane	Lake	McHenry	Will	Total 6 counties
commuting	470,876	1,010,579	210,500	89,339	148,051	55,065	145,576	2,129,987
on the clock	267,915	601,878	147,471	59,475	94,555	38,359	98,290	1,307,943
other	639,732	1,364,356	278,456	118,506	195,988	72,424	195,119	2,864,581
total daily	1,378,523	2,976,813	636,427	267,320	438,594	165,848	438,985	6,302,511

APPENDIX II

Summary of Economic Impact Results of Alternative Transportation Scenarios

By Economic Development Research Group, 2007

Economic Development Research Group, Inc. (EDR Group) is an independent consulting firm focusing specifically on applying state-of-the-art tools and techniques for evaluating economic development performance, impacts and opportunities.

From the outset, EDR Group was set up with three goals: (1) to conduct research that furthers the state-of-the-art of economic development evaluation and impact analysis, (2) to extend these analysis methods for practical applications, serving clients throughout North America and internationally, and (3) to advance understanding and use of economic evaluation and impact methods by freely disseminating our articles and reports to the extent possible.

The firm's work assignments are organized into four key practice areas: (1) economic development targeting and strategy analysis, (2) transportation and infrastructure impacts, (3) energy, technology and industry studies, and (4) visitor attractions and tourism impacts.

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Summary of Preliminary Economic Impact Results based on SmartMobility Runs

- Results are for 2020 – with a focus on six-county aggregate Metro-area economy (Cook, DuPage, Kane, Lake, Will & McHenry)
- Based on SmartMobility's rendering of RTA futures in highway network and transit models for 2020. The scenarios for 2020 are as follows: *deteriorate* (base case), *maintain, enhance & expand, enhance & expand & projected land-use*. The base case and the latter alternative were also considered under *a high gas price* future and are shown in the Appendix to this document.
- They provided projected daily VMT (*vehicle miles of travel)* for *auto* by 3-trip purposes (commute, on-the-clock, and personal) and for *truck* and VHT (*vehicle hours of travel*) for *auto* by 3-trip purposes, for *truck*, and *transit.*
- We annualize, consider *locally relevant* (involving a metro business or household) trips, and portion of VMT that occur under congested conditions. Mode specific performance (or *reliability*) reflects the *value of delay time* incurred on that mode, *e.g.* auto delay is valued slightly higher than the same delay incurred on transit. This assumes the transit rider can still make use of time during delay.
- We assess accident costs for Passenger Vehicle and Truck Modes. Assumptions on accident rates and per-accident costs are taken from PB Conslut's (PB) report for the RTA.
- We assess air quality impacts. Unit costs taken from PB.
- We include value of time impacts of transit users. These include wait-times and in-vehicle travel times.
- We include out-of-pocket (fare) costs to transit users.

Origin-Destination Trip Composition

Network Trip Composition (2030)	Auto	Truck
Pass-Through	5.5%	3.3%
One-End	21.3%	12.0%
Internal	73.2%	84.7%
Overall % Local	**83.85%**	**90.7%**

%Congested Vehicle Miles Traveled

Mode/Trip Type	Deteriorate Scenario	Maintain Scenario
Auto (on-the-clock)	21.1%	20.6%
Auto (commute)	24.2%	23.8%
Auto (personal)	26.0%	25.4%
Truck (all)	13.6%	13.4%

- Direct local portion of travel benefits reflects (a) VMT change and the change in congestion, (b) associated change in vehicle operating costs and out-of-pocket costs for transit riders, and (c) the VHT change *adjusted for* % congested <u>and</u> travel-reliability, restated in terms of the value of time impacts for TRUCK, Auto or TRANSIT-*commute* and AUTO-*OTC*

  Note: time saved for TRANSIT - *personal*, AUTO-*other* & one-half *commute trips* by AUTO or TRANSIT is social benefit. Savings associated with commute trips (regardless of mode) confer a shared savings, with 50 percent attributed to the employer as a labor cost previously capitalized into competitive wages, and the remainder awarded to the household.

2020 Annual Travel Benefits (*miles* and *hours*) - Maintain vs Deteriorate

Savings or Reduction in	Pass Car	Truck	Rail-Bus Transit	Total
Gross VMT	**-638,890,085**	**-4,252,338**	**0**	**-643,142,423**
Net Local VMT	**-535,709,336**	**-3,856,871**	**0**	**-539,566,207**
Miles saved per Household [1]	**-158**			
Gross VHT	**-47,237,740**	**-1,128,798**	**11,042,107**	**-37,324,431**
commute	*-18,139,292*		*4,615,601*	
personal	*-24,469,149*		*6,426,506*	
on-the-clock	*-4,629,299*		*na*	
Gross VHT w/reliability adj	**-62,802,063**	**-1,492,698**	**-16,343,456**	**-80,638,217**
Net Local VHT w/reliability adj.	**-52,659,530**	**-1,353,877**	**-16,343,456**	**-70,356,863**
as % of Base local VHT incl. of congested conditions	-2.4%	-0.6%	-3.7%	-2.5%
as Hours saved per Household	**-16**		**-5**	

[1]Based on CMAP 2020 projection of households in the six-county metro area, households expected to reach 3,393,107.

2020 Annual Travel Benefits (*miles* and *hours*) - Enhance & Expand vs Deteriorate

Savings or Reduction in	Pass Car	Truck	Rail-Bus Transit	Total
Gross VMT	**-1,177,769,985**	**-26,663,018**	**0**	**-1,204,433,003**
Net Local VMT	**-987,560,132**	**-24,183,357**	**0**	**-1,011,743,490**
Miles saved per Household	**-291**			
Gross VHT	**-84,601,089**	**-3,060,350**	**15,745,691**	**-71,915,748**
commute	*-32,486,818*		*6,581,699*	
personal	*-43,823,364*		*9,163,992*	
on-the-clock	*-8,290,907*		*na*	
Gross VHT w/reliability adj	**-115,868,441**	**-3,986,939**	**-24,816,747**	**-144,672,127**
Net Local VHT w/reliability adj.	**-97,155,688**	**-3,616,153**	**-24,816,747**	**-125,588,588**
as % of Base local VHT incl. of congested conditions	-4.5%	-1.5%	-5.5%	-4.4%
Hours saved per Household	**-29**		**-7**	

2020 Annual Travel Benefits (*miles* and *hours*) - Enhance & Expand *w/* Land-Use vs Deteriorate

Savings or Reduction in	Pass Car	Truck	Rail-Bus Transit	Total
Gross VMT	**-2,085,558,793**	**-22,371,422**	**0**	**-2,107,930,215**
Net Local VMT	**-1,748,741,048**	**-20,290,880**	**0**	**-1,769,031,928**
Miles saved per Household	**-515**			
Gross VHT	**-104,618,565**	**-3,349,908**	**48,426,590**	**-59,541,883**
commute	*-40,173,529*		*20,242,315*	
personal	*-54,192,417*		*28,184,275*	
on-the-clock	*-10,252,619*		*na*	
Gross VHT w/reliability adj	**-141,465,769**	**-4,617,104**	**8,845,709**	**-137,237,164**
Net Local VHT w/reliability adj.	**-118,619,047**	**-4,187,713**	**8,845,709**	**-113,961,051**
as % of Base local VHT incl. of congested conditions	-5.5%	-1.7%	2.0%	-4.0%
Hours saved per Household	**-35**		**3**	

Interpreting the Travel Benefits to Metro-Area Households and Business

What the prior three exhibits portray from the travel modeling is that metro-area households save increasing hours annually on the local highway network (from 16 to 29 to 35 hours fewer) when the transit system is maintained , or enhanced and expanded and land-use policy affects the pattern of trip generation by mode. Since transit improvements lessen the highway system's volume (vis a vis household mode-switching) the experience of the highway trip for remaining users becomes more reliable due to reduced congestion. This compounded effect[1] atop reduced *vehicle-miles-of travel* awards a further benefit of amplifying that (VHT) reduction since congestion is abated.

The travel time implications (vis a vis VHT changes) for transit users under various RTA funding levels are also beneficial but a bit more dynamic to unravel. Under

[1] Mode-specific congestion (*CONG*) and trip-specific reliability (RVF) conditions affect VHT as follows: *adjusted* VHT = (VHT)*[1 + (CONG)(RVF)]. CONG equals the % of VMT occurring under congested conditions and RVF that's on values in the TREDIS model of 0.67 (auto & passenger transit trips) and 0.5 (truck trips).

the *maintain* and the *enhance & expand* funding schemes the change in VHT increases over the (deteriorating transit service) base case as a result of attracting more transit riders. However the quality of the transit service has also improved such that the change in VHT can be restated to reflect the *reliability* improvement. For both these funding scenarios, the VHT change *with* reliability factored shows a change in sign from the *Gross VHT* reported in the exhibits (*e.g.* for *maintain* the annual Gross VHT impact on Transit equals 11,042,107 more hours but after the improved reliability (from investment in the system) is taken into account the annual VHT impact is less time spent and more riders, -16,343,456 hours.) For *maintain* then, a metro-area household will save approximately 5 hours in 2020 related to transit use, and 7 hours saved with transit under the *enhanced & expanded* funding scenario.

However when a projected land-use configuration is also considered with the *enhance & expand* funding future, the impact on transit *gross VHT* is 3-fold that in the *enhance & expand* funded scheme. And while there is the same level of reliability improvement realized for this third scenario as in the *enhance & expand* scenario, this 3-fold growth in the transit ridership response (transit *gross VHT impact* equals 48,426,590 compared to 15,745,691) predominates despite reliability gains (the sign does not reverse on the VHT impact *with* reliability considered). After reliability is considered, transit use in 2020 will require 8,845,709 additional hours among its pool of riders. That is approximately 3 added hours per metro-area household. Further along in this memo we will see a similar dynamic for transit time impact under this same scenario but with *high-gas prices* underlying both the deteriorate *base case* and scenario to invest.

What do Annual Travel-Benefits Mean to the Economy?

The conversion of the local portion of the above *direct travel benefits* into dollars saved (2007$) is shown in the next three exhibits. The interpretation of the mode-specific monetized benefit impacts follows from the above discussion on the pattern of travel benefit impacts across the various RTA funding scenarios. For the highway-mode the monetized travel benefit impact for the Autos and Trucks increase progressing from the *maintain,* to the *enhance & expand,* and finally to the *enhance & expand with land-use policy* scenarios. The pronounced impacts on Autos relative to Trucks in the prior exhibits and the current exhibits points towards autos being the largest component of vehicular traffic on the local network, with almost 52 percent of auto trips as *personal*, 38 percent for *commute*, and the balance for *on-the-clock* auto traffic. This profile of Auto traffic has implications on just how much of the monetized benefit is eligible to circulate through the metro-area economy. As the three exhibits to follow will show, the value-of-time saved to households (a significant portion of the overall direct benefits from RTA funding scenarios) from *personal* trips and one-half of the *commute* trips are *social benefits* and do not trigger economic transactions. However, households' out-of-pocket savings from reduced VMT under each scenario do present an opportunity for households to redirect monies that would be spent on vehicle operating costs into other types of purchases in the local economy. Truck trips account for 2.4 percent of the adjusted local VHT reduction, and 0.07 percent of the local VMT reduction benefit.

The monetized benefits impact for the Transit mode increases from the *maintain* scenario to the *enhance & expand* scenario. For the *enhance & expand with land-use policy* scenario, the transit users' monetized benefit impact is still a positive but it is slightly less than one-fifth the value realized under *enhance & expand* scenario. Overall, highway accident savings in any of the scenarios account for a significant share of the Auto-related out-of-pocket savings tied to vehicle use (less so for Trucks). Given these mode-specific distinctions in direct monetized benefits, the three exhibits do show that progressing through the scenarios towards greater transit investment and land-use policy bring s about increasing positive impacts in terms of monetized benefit – from $1.6 billion under *maintain*, to $2.7 billion under *enhance & expand*, and $3.1 billion under *enhance & expand with land-use*.

Direct Travel Savings (in dollars) – Summary: Maintain .vs. Deteriorate

	Auto	Truck	Rail-Bus Transit	Total
Total Savings to Industry	346,828,048	23,898,506	92,965,317	463,691,870
Cost Savings to Vehicle Operator	0	30,260,277	0	30,260,277
accident savings component		*408,332*		
Household Out-of-Pocket Cost Savings	263,054,633	0	268,092,911	531,147,545
accident savings component	*56,716,209*			
Household Value of Time Benefit	447,916,955	0	135,317,767	583,234,722
Societal Environmental Benefit	33,974,686	733,809	0	34,708,494
Region Total	1,091,774,322	54,892,591	496,375,994	1,643,042,908

Direct Travel Savings (in dollars) – Summary: Enhance & Expand .vs. Deteriorate

	Auto	Truck	Rail-Bus Transit	Total
Total Savings to Industry	639,156,817	63,831,977	79,033,391	782,022,186
Cost Savings to Vehicle Operator	0	96,568,373	0	96,568,373
accident savings component		*2,560,321*		
Household Out-of-Pocket Cost Savings	490,371,640	0	218,878,539	709,250,179
accident savings component	*104,554,210*			
Household Value of Time Benefit	826,129,281	0	220,146,490	1,046,275,771
Societal Environmental Benefit	62,631,064	4,601,125	0	67,232,189
Region Total	2,018,288,802	165,001,476	518,058,420	2,701,348,698

Direct Travel Savings (in dollars) – Summary: Enhance & Expand *w/* Land-Use .vs. Deteriorate

	Auto	Truck	Rail-Bus Transit	Total
Total Savings to Industry	889,944,121	73,921,097	1,777,766	965,642,985
Cost Savings to Vehicle Operator	0	104,505,193	0	104,505,193
accident savings component		*2,148,220*		
Household Out-of-Pocket Cost Savings	852,153,498	0	147,657,007	999,810,506
accident savings component	*185,141,373*			
Household Value of Time Benefit	1,004,718,585	0	-51,327,388	953,391,196
Societal Environmental Benefit	110,905,157	3,860,542	0	114,765,700
Region Total	2,857,721,362	182,286,832	98,107,385	3,138,115,579

EDR Group's TREDIS (transportation economic development impact system) model –an evolved web-based form of the analysis used in 2003 for CM2020's *Freight Mobility Plan* –allocates the above mode-specific monetized direct local benefits to metro-area businesses & households (the latter - their out-of-pocket spending changes related to vehicle operating expenses and transit fares). Businesses have unique cost response factors that translate their freight-related savings, auto-OTC savings and a portion of their employees' commute cost changes (by transit or auto) into a lower cost-of-doing business in the metro-area and expands their level of economic activity (i.e. sales). Additional background information on the TREDIS model is provided following the summary of economic impacts.

Summary of Economic Impacts

The next exhibit shows the total economic impact results for each scenario relative to the Deteriorate base case in the year 2020. These impacts are reported in terms of business sales (output), the dollars of value-added tied to the sales impact, the change in jobs, and the change in the associated labor income. All dollar impacts are stated in 2007 $. These results reflect (a) how the metro-economy experiences the portion of the monetized direct travel benefit that poses an opportunity to redirect how money flows (whether by a household or a business), and (b) economic multiplier effects.

The portion of the monetized direct travel benefit suitable for economic impact consideration (termed the direct economic benefit) is shown in the exhibit below at the far left for each scenario. For example, the maintain scenario produced a total monetized benefit of $1.6 billion (shown above) but excluding the value-of-time savings accrued to area households and the emissions reduction, the amounts of direct economic benefit is $1.025 billion. The interpretation of the economic impacts is as follows: the direct economic benefit –reflects both households' freed up vehicle operating expenditures and transportation cost savings to area businesses (an average of 50:50 across the scenarios). The former effect is simply a redirected consumption demand by households (away from purchases of gas, automotive parts & services and into other consumer goods/services) and the latter moves by a mechanism of improved regional competitiveness for metro-area businesses that now have lower costs of doing businesses. Each industry that experiences part of the direct economic benefit will have a unique response in terms of how much more competitive (through growth in sales) they can be based in Chicago with a better functioning transportation system.

The exhibit also shows the value of the two societal benefits that result from the different transit funding scenarios but do not enter into the economic impact generation.

Note: for purposes of providing some scale, the 2004 metro-area economic parameters are also shown[2]. All dollar-based concepts in the exhibit are

[2] Source:IMPLAN data, Stillwater, MN.

consistently shown in 2007$. The TREDIS analysis system does not include underlying economic projections (levels) since its prime purpose is to evaluate how projected transportation system changes create economic changes for a specified horizon year. For additional context to understanding the estimated economic impact one should use the value of the metric for that same horizon year under the base case.

2020 Impacts on Metro Area

		2020					
		Total Economic Impacts ($2007)				Social Benefits ($2007)	
direct **Economic** *Benefit*	*relative to deteriorate*	Output (mil.$)	Value-added (mil.$)	Jobs	Wages (mil.$)	HH time saved (mil.$)	Emission Benefit (mil.$)
$1,025.5	Maintain	$1,420	$794	11,395	$521	$583	$3
$1,588.4	Enhance & Expand	$2,105	$1,175	16,855	$774	$1,047	$6
$2,070.7	E&E&Land-use	$2,795	$1,562	22,307	$1,026	$954	$115
Chicago Metro Economy_2004 (*levels*)		$760,148	$436,751	5,391,370	$247,694	na	na

Summary of Economic and Societal Benefits in 2020

(prepared by Chicago Metropolis 2020 based on EDRG analysis)

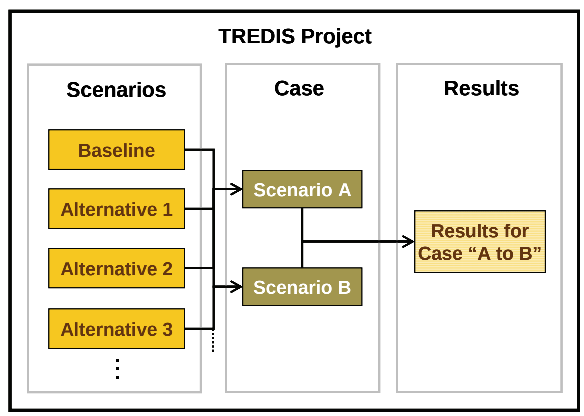
relative to deteriorate	Output (mil $)	HH time saved (mil $)	Emission Benefit (mil $)	Total Benefits	Cost	Benefit/Cost
Maintain	**$1,420**	**$583**	**$35**	**$2.04**	**$1.68**	**1.2**
Enhance & Expand	**$2,105**	**$1,047**	**$67**	**$3.22**	**$2.40**	**1.3**
E&E&Land-use	**$2,795**	**$954**	**$115**	**$3.86**	**$2.40**	**1.6**

What is TREDIS?

TREDIS® (Transportation Economic Development Impact System) is a web-based transportation analysis and impact tool. It is designed to span the interests of, on the one hand, those involved with transportation facility/system management and planning (including passenger and freight modes), and on the other hand, those interested in economic development at local, regional, and state levels. TREDIS can be used to:

- estimate the economic impact of constructing a transportation terminal or facility
- examine different strategies for managing a transportation corridor
- perform a comprehensive freight performance evaluation
- weigh the benefits and costs of alternative transportation investment strategies or policies
- estimate the impact of congestion on households and industries (by sector), based on their usage of different modes
- systematically evaluate the economic benefit of improving multimodal access to consumer, producer, and labor markets.

For the RTA funding scenarios TREDIS was used to highlight bullet items 2 and 5.



What Does It Do?

TREDIS uses information describing two or more transportation "Scenarios" to estimate the economic impact of implementing one scenario vs. another (see diagram). Projects can be defined using a wide variety of variables, *but the vast majority of inputs in TREDIS are optional.* The minimum inputs required are (1) a study area, (2) a "base" level of VMT for a particular mode, and (3) levels for an "alternative" scenario. Regardless of the project complexity, results are calculated based on the differences of input variables between "base" and "alternate" scenarios, as well as a range of pre-loaded factors relating to properties of modes, industries, and the chosen study region. Each TREDIS scenario is defined by five data concepts:

- *Startup cost components* – Construction costs including property acquisition, earthwork, construction of buildings, vehicles, structures, etc.
- *Ongoing (annual) maintenance and operation costs* – Costs for road or bridge repair, intelligent transportation system costs, etc.
- *Mode access patterns* – Multimodal accessibility patterns to consumer, producer, and labor markets.
- *Accident data* – accident rates (per VMT) by mode
- *Travel demand characteristics* – VMT, VHT, Trips, percent of travel subject to

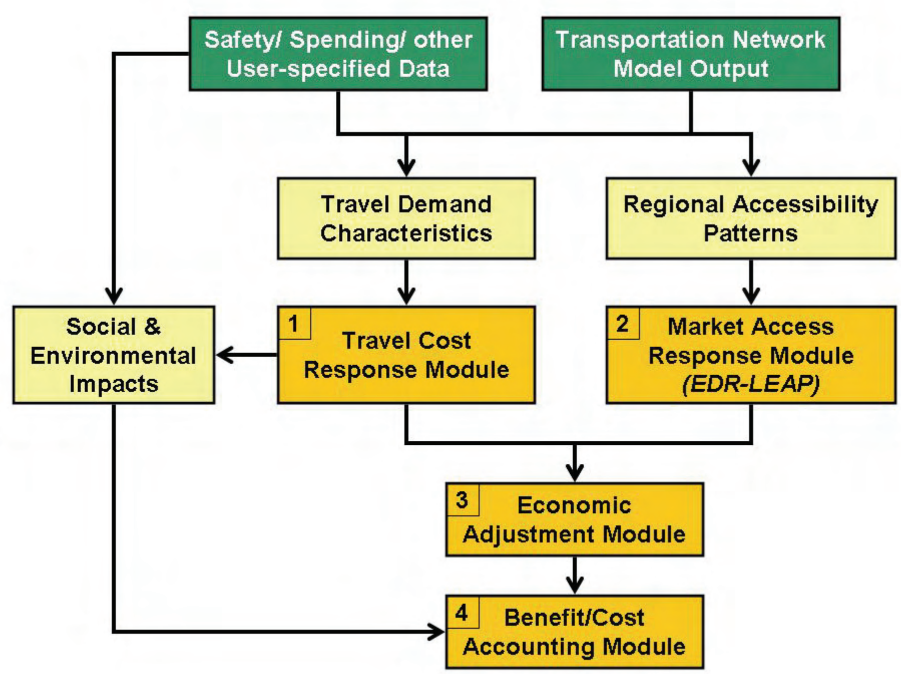
congestion, vehicle occupancy, etc.

Only in the last category (travel demand characteristics) are input values actually required, and the bare minimum to run an analysis is only VMT or VHT for a single mode. Other variables are used to add detail to the project (and results) as needed by the user. For the RTA funding scenario analyses the first three bullet items are not considered per the study's scope definition. Emission (pollution abatement) data were included in the analyses. Projects may be built around any combination of seven travel modes. Those modes not being modeled may be ignored. In addition, modes can be customized to the precise needs of the user (for example, "Passenger Rail" may be adapted to "High Speed Rail"). Standard available modes are:

- Passenger Car/ Light Truck
- Freight Truck
- Bus
- Freight Rail
- Passenger Rail
- Air
- Water

How Does It Work?

TREDIS is comprised of four interdependent "modules" (shown in gold, below) that work together to determine the full economic impact of transportation projects. Any single module or combination of



modules may be used independently of the others. For the RTA funding analyses *modules* 1 and 3 were used per the study scope definition.

- *Travel Cost Response Module.* The first module translates travel demand concepts such as VMT and VHT (among others) into direct cost savings that accrue to households and businesses. These may result from operational cost savings, travel time savings, or accident cost savings. The module then segments the total business savings among industrial sectors based on the mix of businesses in the region.

- *Market Access Response Module.* The second module translates changes in regional accessibility into direct economic impacts using EDR Group's *Local Economic Assessment Package* (LEAP) tool. This tool draws on "economic geography" research to estimate how changes in access to inter-modal terminals, international trade borders, ports, specialized labor markets, suppliers, and customer markets, can lead to additional productivity and business growth over time. ***Note:*** not used for this analysis.

- *Economic Adjustment Module.* Together, the first two modules determine the direct effects of transportation projects. The third module then uses the direct effects to estimate secondary economic activity – indirect effects generated through regional business-to-business linkages, and induced effects generated by the recirculation of wages into the local economy. For this set of analyses the CRIO-IMPLAN version of TREDIS was used to estimate the additional economic impacts (indirect and induced effects) from the direct economic effect that emanate from differences in how the RTA funded in the future . More information describing the CRIO-IMPLAN economic adjustment module is available in the TREDIS User Manual.

- *Impact/Benefit-Cost Accounting Module.* The final module provides an impact or benefit/cost analysis of the project. It gathers information from the first three modules and organizes them in terms of various economic impact and economic benefit measures. It separates elements of travel efficiency, cost savings, productivity and social benefit measures, and presents them from the differing perspectives of federal, state and local agencies. It also separates impacts on income and business sales from the economic value of other social benefits that do not directly affect the flow of dollars in the economy. ***Note:*** not used for this analysis.

APPENDIX: Introduction of High Gas Price

What-If it's a High-Gas Price World

The next two exhibits show the travel model's 2020 impacts on direct travel benefits and the translation of those into monetized savings (2007 $) when both the *deteriorate* base case and the scenario to *enhance & expand transit with land-use policy intervention* are exerted to a doubling of gas prices by 2020. Gasoline prices are one of several pricing mechanisms that affect vehicle operating costs and mode choice decisions. That being said, it would be overly simplistic, if not erroneous, to construe the economic impacts emanating from transportation system changes induced by changes in gas prices as the same effect if we were examining other pricing mechanisms (*e.g.* tolling, cordon pricing, variable pricing) implemented to better distribute a region's trips between highway and transit. The reason for this is that each type of price mechanism that affects vehicle operating costs may be avoidable (by seeking a different routing) to some degree or not, each will have a unique mode-shift response, and each represent an economic transfer from the auto user to a different recipient which embodies a different amount of economic leakage (*e.g.* gasoline purchases are a majority imported content whereas a tolling authority is local and would typically reinvest toll collections into the local system.)

The envisioned existence of high gas prices in the *deteriorate* base case means that highway trips switch to transit even though transit is in an under-funded state. The value of funding transit to *enhance & expand* it and implement *land-use policy* under a high gas-price regime shows the largest impact on transit *gross VHT* (an added annual 69,470,612 hours) when compared to the *deteriorate base case with high gas prices*. The reliability improvement for transit services exists but is swamped by the level of ridership so that the pool of transit rider in the metro-area tally 51,969,337 more transit hours traveled (almost a 12% increase in VHT over the base case) in 2020, or 15 more hours per metro-area household.

2020 Annual Travel Benefits (*miles* and *hours*) - Enhance & Expand *w/Land-Use* vs Deteriorate with a High Gas Price Setting

Savings or Reduction in	Pass Car	Truck	Rail-Bus Transit	Total
Gross VMT	-1,816,001,940	-15,955,761	0	-1,831,957,701
Net Local VMT	-1,522,717,627	-14,471,875	0	-1,537,189,502
Miles saved per Household	-449			
Gross VHT	-71,451,100	-2,108,598	69,470,612	-4,089,086
commute	*-27,437,222*		*29,038,716*	
personal	*-37,011,670*		*40,431,896*	
on-the-clock	*-7,002,208*		*na*	
Gross VHT w/reliability adj	-94,432,111	-3,000,068	51,969,337	-45,462,842
Net Local VHT w/reliability adj.	-79,181,325	-2,721,062	51,969,337	-29,933,050
as % of Base local VHT incl. of congested conditions	-4.6%	-1.2%	11.8%	-1.3%
Hours saved per Household	-23		15	

Direct Travel Savings (in dollars) – Summary under High-Gas Setting: Enhance & Expand *w/* Land-Use .vs. Deteriorate

	Auto	Truck	Rail-Bus Transit	Total
Total Savings to Industry	741,768,558	48,031,908	-84,015,400	705,785,066
Cost Savings to Vehicle Operator	0	82,592,144	0	82,592,144
accident savings component		*1,532,155*		
Household Out-of-Pocket Cost Savings	900,384,753	0	213,883,734	1,114,268,487
accident savings component	*161,211,994*			
Household Value of Time Benefit	665,129,651	0	-377,010,420	288,119,231
Societal Environmental Benefit	96,570,752	2,753,419	0	99,324,171
Region Total	2,403,853,714	133,377,471	-247,142,085	2,290,089,100

The results are as follows:

2020 Impacts on Metro Area

(in High Gas Price scenario)

		2020 High-Gas					
		Total Economic Impacts ($2007)				Social Benefits ($2007)	
direct **Economic** *Benefit*	*relative to deteriorate*	Output (mil.$)	Value-added (mil.$)	Jobs	Wages (mil.$)	HH time saved (mil.$)	Emission Benefit (mil.$)
$1,903.4	E&E&Land-use	$2,724.9	$1,523.5	21,550	$993.5	$288.1	$99.4
Chicago Metro Economy_2004 (*levels*)		$760,148	$436,751	5,391,370	$247,694	na	na

APPENDIX III

Land Use Scenario Development

by Fregonese Associates, 2007

Fregonese Associates is a full-service Oregon based land-use planning firm with a strong track record of helping make better cities and regions. Our dynamic, multi-disciplinary team provides innovative solutions and technical expertise that help communities shape when, where and how they grow. We specialize in comprehensive planning, Geographic Information System (GIS) analysis, visualizations, land-use ordinances, implementation strategies, and innovative public involvement programs and materials. We work with leaders and their constituents to develop approaches to solving problems, addressing future growth, and engaging citizens in meaningful discussions about what they want for their future. We believe in creating plans that can be implemented, taking into account market realities and political considerations.

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NOTE: Charts, Graphs and Pictures contained in Appendix III may be printed in color from our website at www.chicagometropolis2020.org

2020 AND 2030 LAND USE SCENARIO DEVELOPMENT

Background

This effort built upon an earlier scenario crafted for the 2020 Metropolis plan. The purpose of this project is to take the 2020 Metropolis land use allocation and convert it to reflect both the desired land use pattern associated with the Chicago Metropolitan Agency for Planning (CMAP) 2040 Regional Framework Plan ("2040 RFP"). The 2040 land use concept is based on a regionally coordinated planning effort headed by the Northeast Illinois Planning Commission (NIPC now part of CMAP) through the "Common Ground" planning process. The 2040 Regional Framework Plan (RFP) includes a conceptual map that illustrates where concentrations of new growth in employment and housing should be located and where green areas should be preserved and enhanced. These areas are summarized into three main categories - centers, corridors and green areas. The land use allocation for Metropolis was adjusted to better reflect the principles of the 2040 RFP. For this analysis we developed two scenarios – one reflecting 2007-2020 forecasts and the other reflecting 2007-2030 forecasts.
(RTA Service Area)

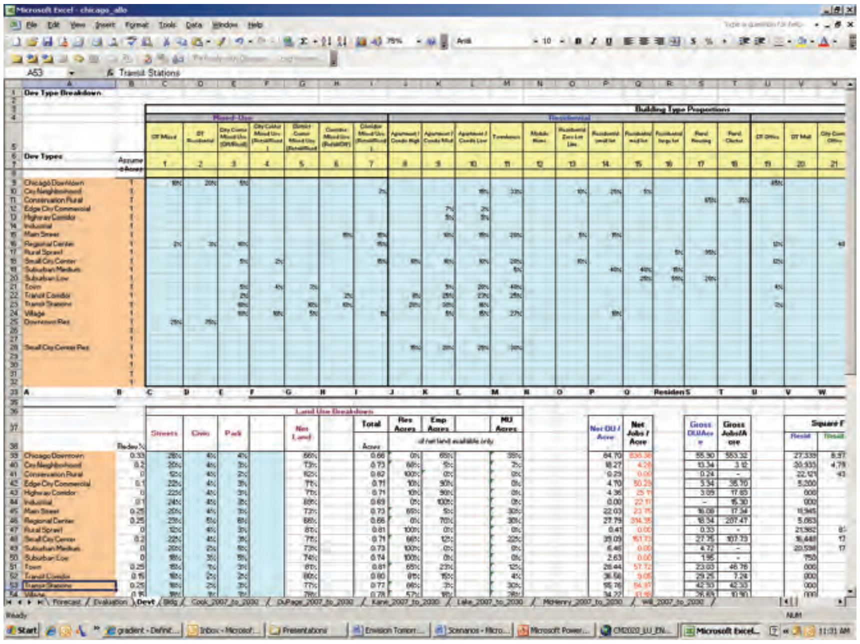
This document describes the methodology applied to convert the Metropolis land use allocation to the two 2040 RFP scenarios described above. This round of scenario building utilized Envision Tomorrow, a plug-in application developed by Fregonese Associates for use within ESRI ArcMap. Envision Tomorrow allows the user to "paint" using a palette of development types on the canvas of a shapefile. The study area in question covers each of the six counties (Cook, Lake, DuPage, Kane, Will and McHenry) that make up the RTA Service Area. For each county a grid shapefile was created and the allocation was conducted using CMAP control totals by County. Each individual grid cell covers approximately 5.5 acres and is attributed with values for vacant and redevelopable acreage according to the 1995 land use inventory.

Data

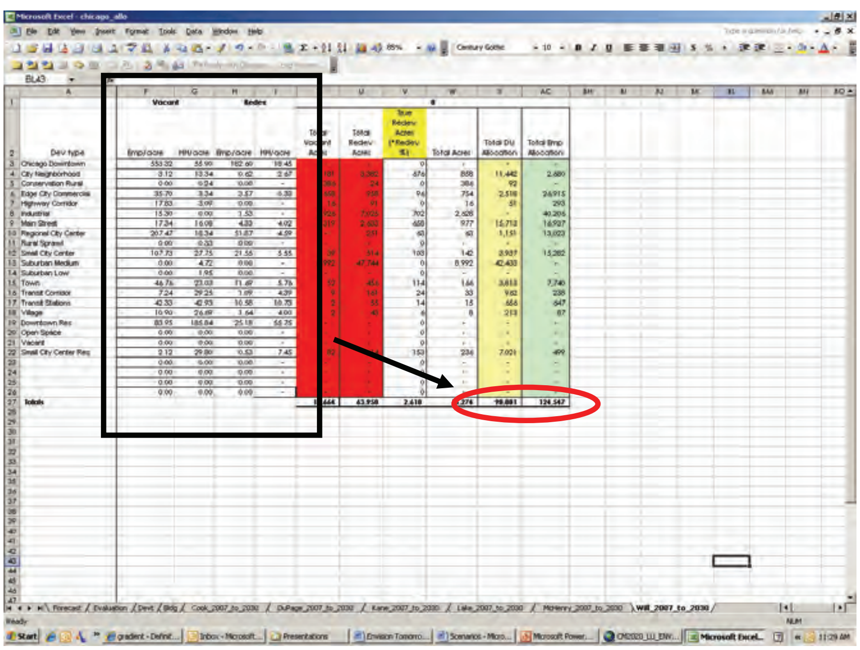
The process of building the scenarios was informed by data provided by CMAP and the Regional Transportation Authority (RTA). These data layers included transportation networks (existing, 2020, 2030), 2001 land uses, household and employment density gradients reflecting the Common Ground Scenario, and the 2040 Common Ground Regional Framework Map.

Envision Tomorrow

Envision Tomorrow operates in conjunction with a spreadsheet containing information regarding the composition of the development types being applied.

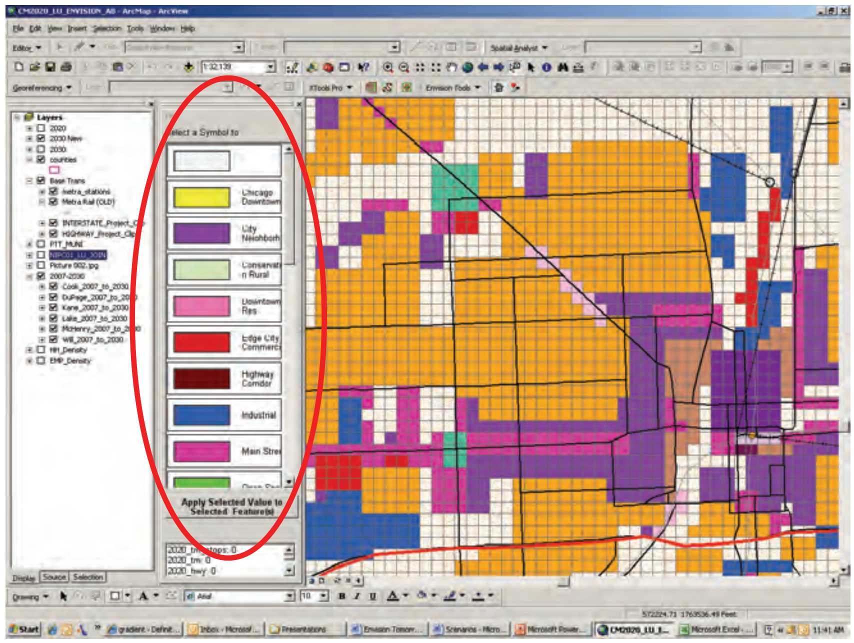


Each time the user performs an update, Envision Tomorrow calculates the total vacant and redevelopable acreages attributed with each development type, then applies the corresponding densities to arrive at household and employment totals.

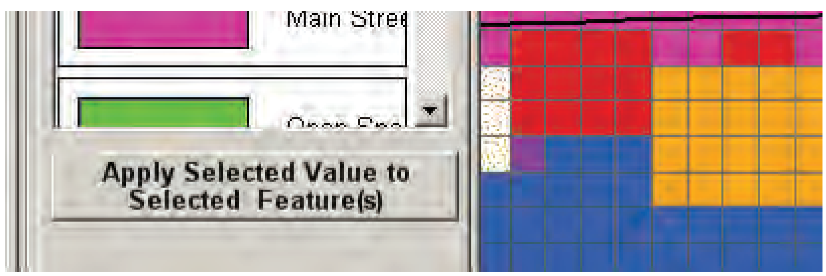


In this manner, the user is able to ensure that the scenarios reflect the appropriate county-level and region-wide forecasts.

In order to allocate the various development types throughout the region, the user begins by populating the Attribute Buttons Tool with a layer file representing the palette of development types.

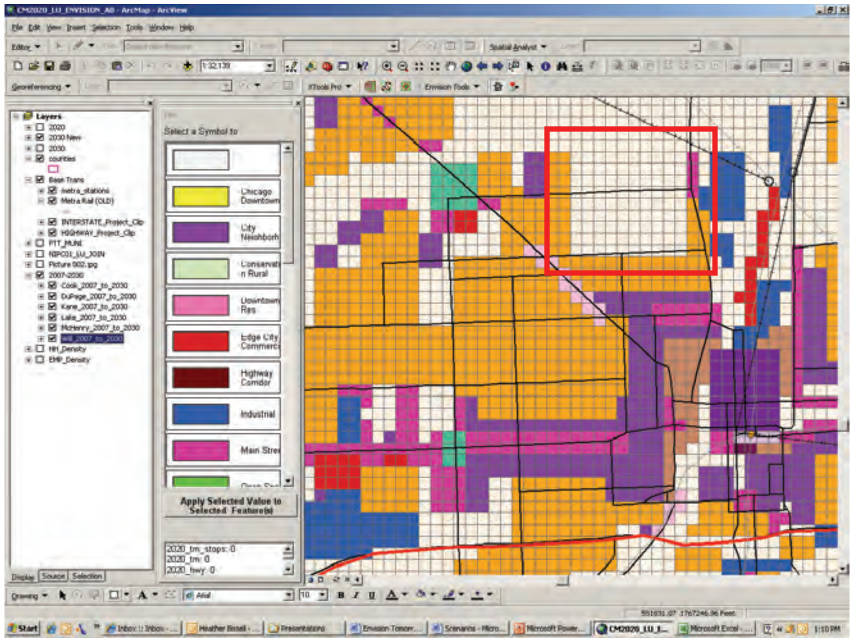


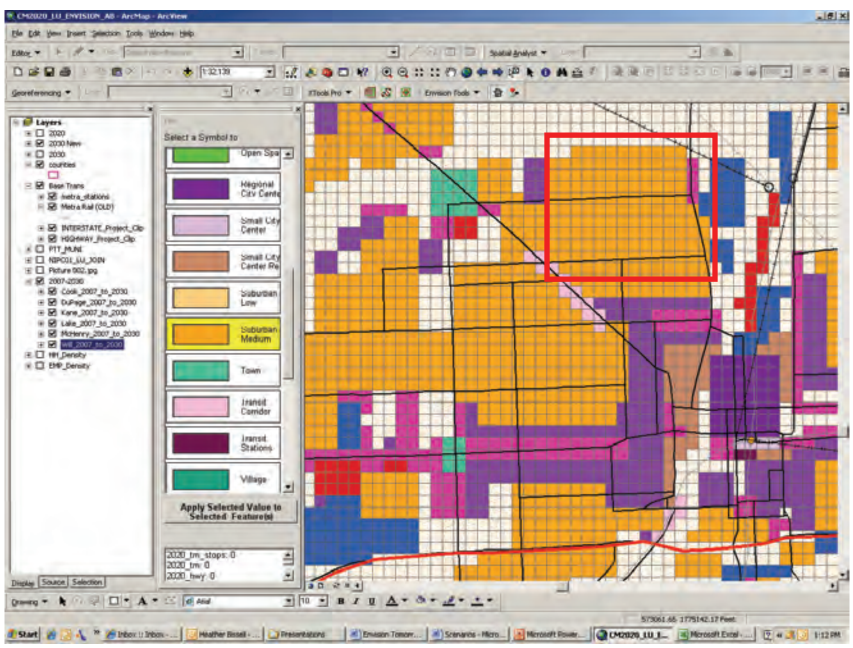
The next step involves establishing settings that stipulate the layer and field to be edited. Once these elements are in place, changes are made by selecting any number of cells, selecting a development type within the Attribute Buttons Tool, and then clicking a button near the bottom of the tool labeled "Apply Selected Value to Selected Feature(s)."



In order to track the changes being made, the user has a choice between automatic spreadsheet updates following each change or manual updates as desired.

The following images depict the allocation of the 'Suburban Medium' development type to 550 acres.





Scenario Development

Using the Metropolis Plan scenario as a point of departure, two scenarios were developed to reflect the 2040 RFP land use strategy that focuses development in corridors and centers. These scenarios represent the incremental growth between the 2007 forecast and those for 2020 and 2030, respectively.

<u>2030 Scenario</u>

Given that the Metropolis Plan scenario was built upon the 2000-2030 increment, the first step in developing the 2030 "corridors and centers" scenario involved controlling for 2007 as the new base year. This was accomplished primarily by removing development and decreasing intensity in "inner-ring" suburban areas, existing transit station areas, and downtown districts that have recently experienced substantial housing growth.

In addition to controlling for the new base year, the existing scenario was also refined to better portray the "corridors and centers" approach. This effort was largely three-pronged and included:

1. placing higher density, multi-family housing and locally-oriented employment activity in close proximity to transit station areas (primary development types included Transit Stations, Town, Village);
2. adding higher density, single-family and lower density, multi-family housing development and supporting mixed-use development near existing cities and towns (Suburban Medium, City Neighborhood, Main Street);
3. and placing lower density, single-family housing and large-scale commercial activity in high-mobility corridors with noteworthy transportation infrastructure (Suburban Low, Suburban Medium, Edge City Commercial, Highway Corridor).

This effort relied heavily on the 2040 Regional Framework Map, existing and future transit lines and stops, and the data layer containing 2001 land uses.

<u>2020 Scenario</u>

The next step was the development of a scenario representing the 2007-2020 increment, which was achieved through a combination of scaling back intensities and removing some development altogether from the 2007-2030 scenario. An important step in this process was to identify new transit stations projected to emerge between 2020 and 2030 and then reduce development intensity around them. This included the removal of peripheral suburban housing and modifications to existing mixed-use development types, such as converting: Transit Stations to Town, Village, Main Street; Town to Village, Main Street, City Neighborhood; and Village to City Neighborhood.

Additional areas targeted for lessened intensity or removal of development included peripheral areas not well served by transportation infrastructure and areas adjacent to large swaths of open space or land devoted to agricultural uses. In these cases, concentrations of commercial and industrial (Edge City Commercial, Highway Corridor, Industrial), as well as lower density single-family housing (Suburban Low, Suburban Medium), development types were reduced or removed.

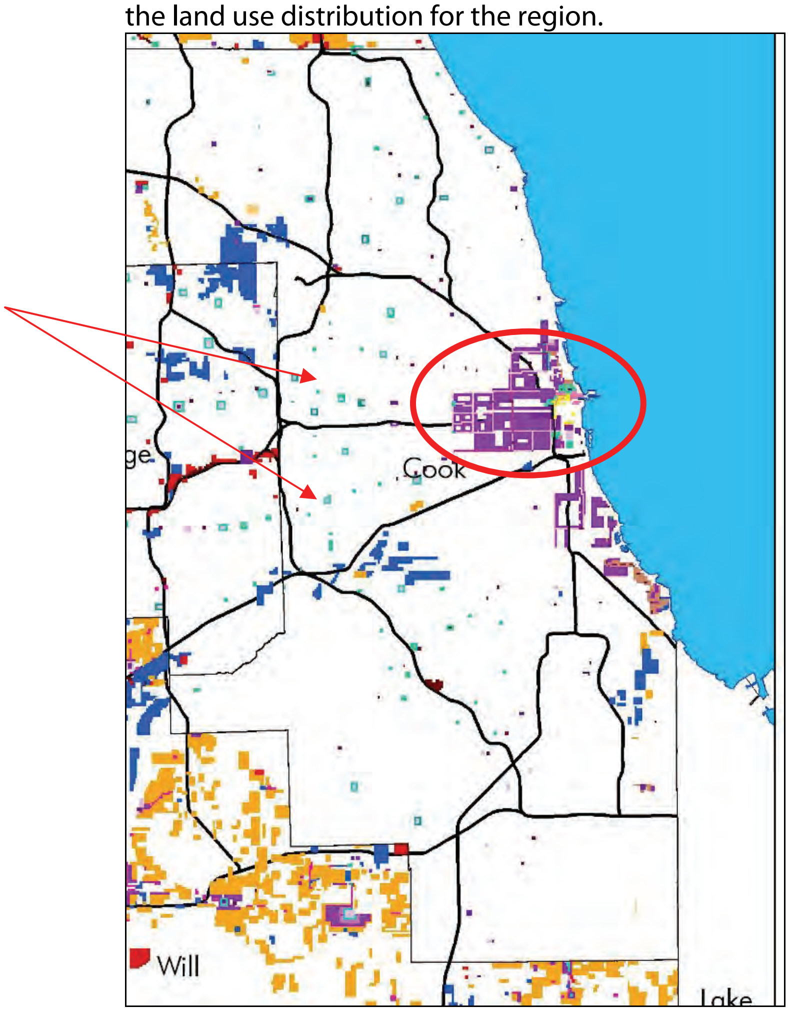
Results:

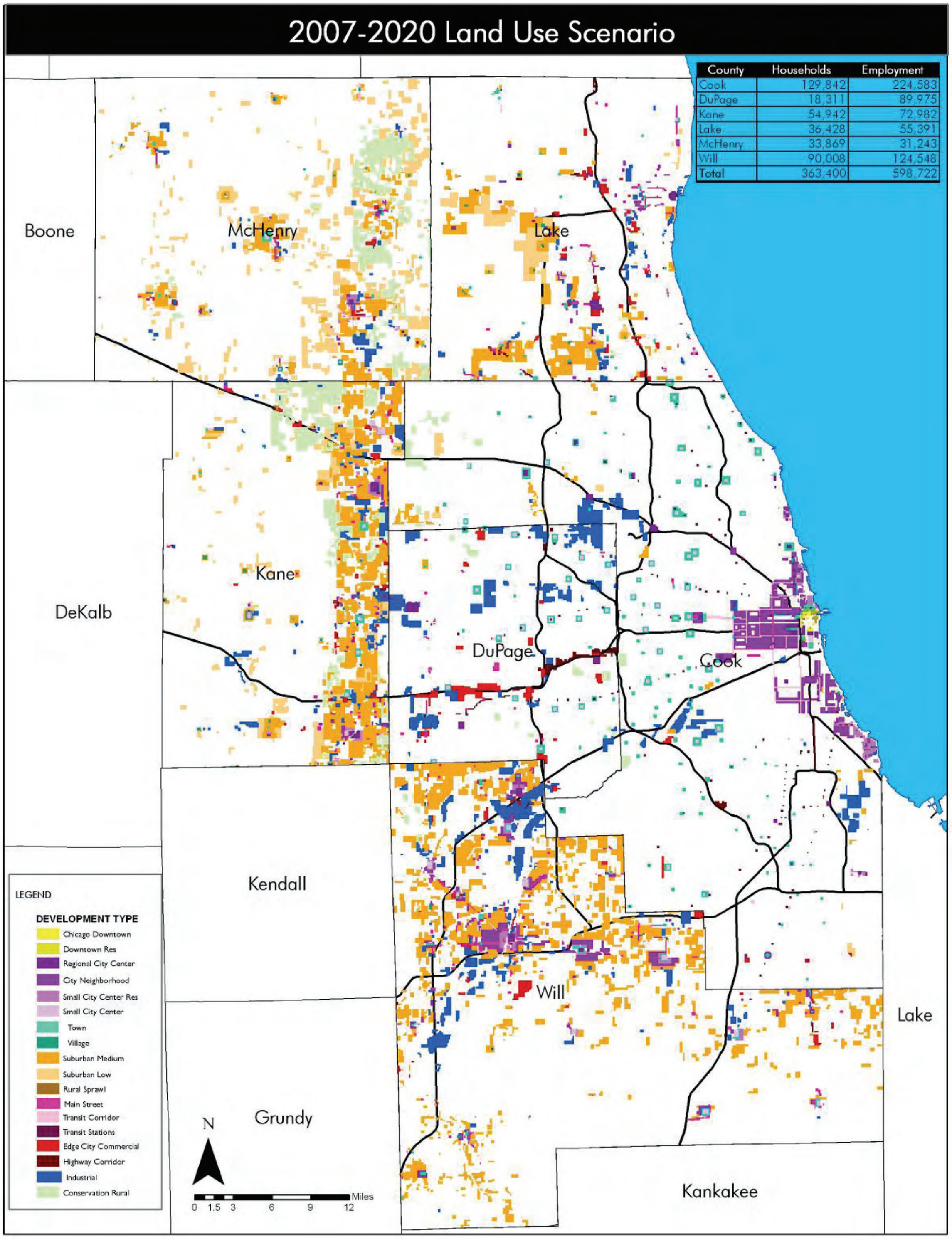
The following table shows the total households and employment figures for the 2007-2020 land use allocation:

Table 1. 2007-2020 Household and Employment Growth Increment

County	Households	Employment
Cook	129,842	224,583
DuPage	18,311	89,975
Kane	54,942	72,982
Lake	36,428	55,391
McHenry	33,869	31,243
Will	90,008	124,548
Total	363,400	598,723

For example, 129,842 new households and roughly a quarter of a million jobs were added to Cook County. These new jobs and households take the form of more compact housing development in the central city (area shown within red circle) and the addition of housing and service related employment near station areas. The land use distribution of housing and employment was focused on creating more compact development along corridors, near station areas and within urban, regional and town centers. Map 1 on the following page shows the land use distribution for the region.




2007-2020 Land Use Scenario
County Households Employment
Cook 129,842 224,583
DuPage 18,311 89,975
Kane 54,942 72,982
Lake 36,428 55,391
McHenry 33,869 31,243
Will 90,008 124,548
Total 363,400 598,722
Boone
McHenry
Lake
DeKalb
Kane
DuPage
Cook
Kendall
Will
Lake
Grundy
Kankakee
LEGEND
DEVELOPMENT TYPE
Chicago Downtown
Downtown Res
Regional City Center
City Neighborhood
Small City Center Res
Small City Center
Town
Village
Suburban Medium
Suburban Low
Rural Sprawl
Main Street
Transit Corridor
Transit Stations
Edge City Commercial
Highway Corridor
Industrial
Conservation Rural
N
Miles
0 1.5 3 6 9 12

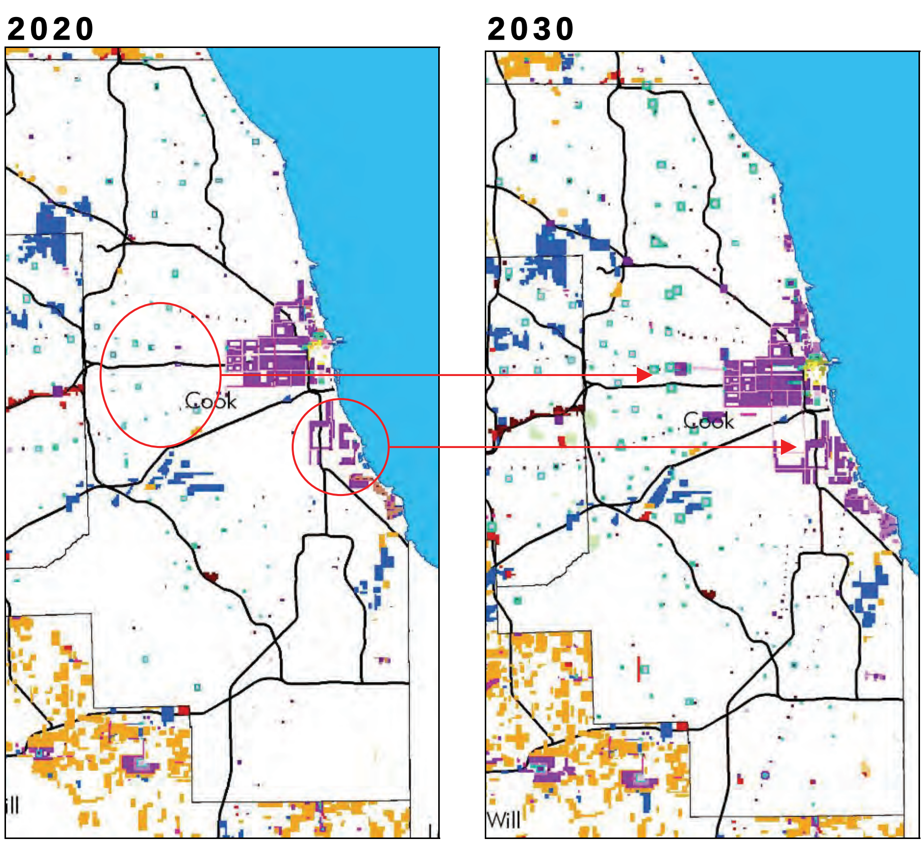
Map 1

The following table shows the total households and employment figures for the 2007-2030 land use allocation:

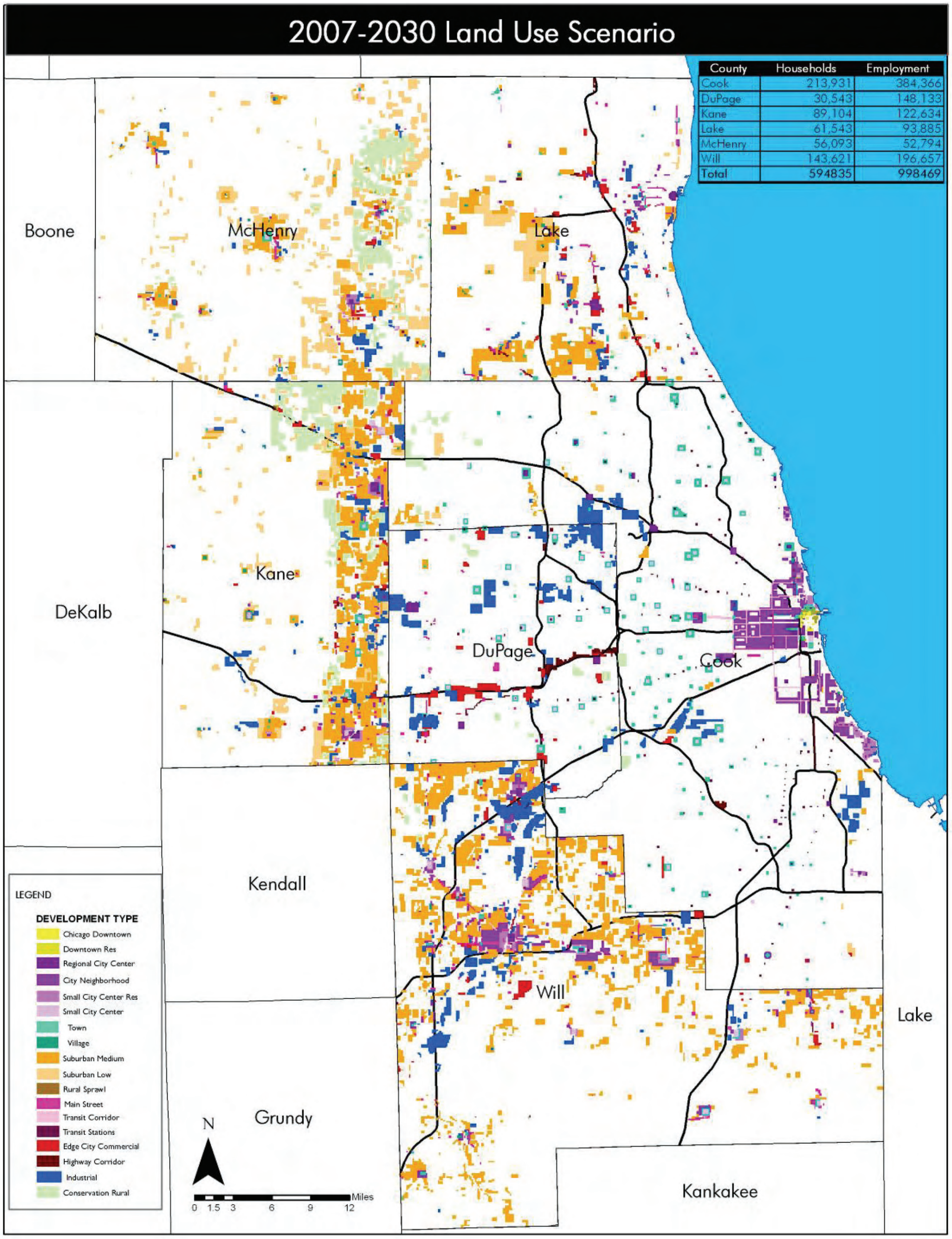
Table 2. 2007-2030 Household and Employment Growth Increment

County	Households	Employment
Cook	213,931	384,366
DuPage	30,543	148,133
Kane	89,104	122,634
Lake	61,543	93,885
McHenry	56,093	52,794
Will	143,621	196,657
Total	594,835	998,469

Looking again at Cook County, a total of 213,931 new households and 384,366 new jobs were added to Cook County between 2007-2030. This distribution builds off of the 2007-2020 land use scenario. This means, that an additional 84,000 households were added to Cook County between 2020 and 2030. These additional jobs and households follow a similar format as the 2007-2020 land use scenario with the form of more compact housing development in the central city (area shown within red circle) and the addition of housing and service related employment near station areas. The images below show the land use scenario for Cook County in 2020 compared to the land use scenario for 2030. For example, the additional 84,000 households were added to the south of the Central City and within station areas.



Map 2 below shows the land use scenario for the 6 county region.



Map 2

Acknowledgements

The research described in this report was designed and executed by the staff of Chicago Metropolis 2020, with the assistance of the three consultants identified in the appendices. We express our thanks and gratitude to the staff of the Regional Transportation Authority (RTA) and the Chicago Metropolitan Agency for Planning (CMAP) for providing essential data and advice for this report.

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The Executive Council of Chicago Metropolis 2020

About Chicago Metropolis 2020

Chicago Metropolis 2020 is a nonprofit civic organization created in 1999 by The Commercial Club of Chicago to promote long-term planning, better regional cooperation and smart investment in the Chicago region and its people.

Chicago Metropolis 2020 is concentrating on five major themes. They are:

- **Development and Transportation:** Reform the way the region plans and finances its transportation investments and the way it manages regional growth.
- **Housing:** Ensure that there is housing affordable and accessible for workers throughout the entire region.
- **Early Childhood Education:** Provide high quality education for all 3- and 4- year old children whose families want it.
- **Justice and Violence:** Create a larger employment pool and safer communities by breaking the cycle of incarceration and violence.
- **Regional Learning:** Provide information and education to opinion leaders, school kids and the general public so that they will understand the relationship between regional decision making and the health of the economy.

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