

Regional Planning Case Study



Baseline Trends: Western Cuyahoga and Eastern Lorain Counties

Researched by: Jamar Doyle, Jonathan Feldman, Carla Regener

Table of Contents

Introduction..... 3

Study Area: Description..... 4

Study Area: Transportation..... 12

Study Area: Governance..... 16

Study Area: Retail..... 21

Methodology..... 23

Baseline Trends and Projections..... 25

Analysis..... 37

Baseline Scenario & Weighting Matrix..... 38

Appendix..... 40

Works Cited..... 41

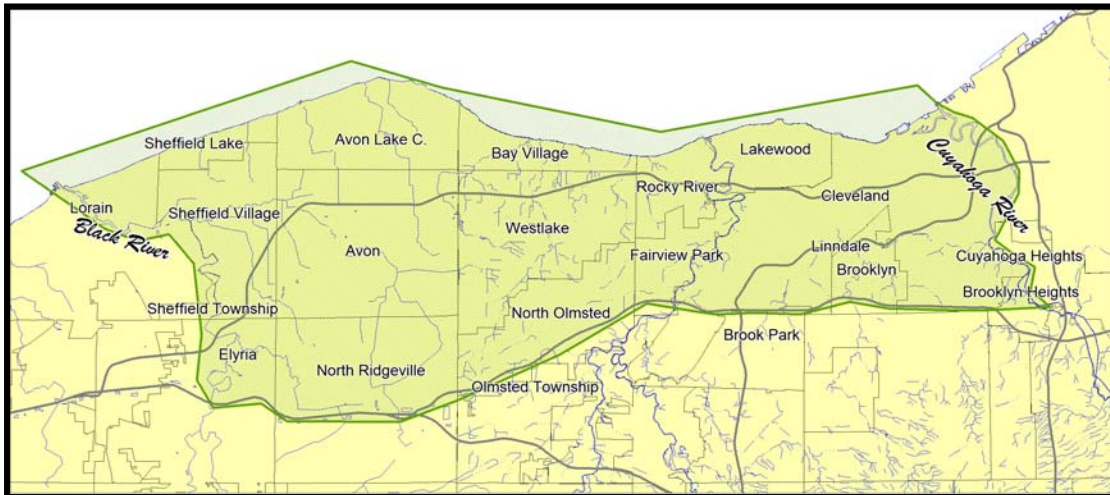
Baseline Trends: Western Cuyahoga and Eastern Lorain Counties

Introduction

We make thousands of decisions everyday: whether to get out of bed or sleep for five more minutes, what to eat for breakfast, what to wear, etc. We are effected by and can affect many things throughout the day sometimes based only on a single decision. In a somewhat similar way, our land use patterns reflect the complex decisions we make. Some of factors such as local zoning, park preservation, or population directly influence the landscape. In addition, there are numerous other decisions that indirectly influence landscape patterns. Some of these factors include: modes of transportation, financial progress, and/or new technologies. As our cities grow and expand, we begin to realize the value of land as well as the importance of our collective decisions.

Trends in Northeastern Ohio follow that across many in the mid-west. The central cities that were strong in the manufacturing era are now suffering as growth stagnates and more and more people move out of the urban core, developing greenfields and fueling urban sprawl.

Through this project, we hope to show the current trends in land use and highlight several factors that effect change in this landscape. Our study area is western Cuyahoga and eastern Lorain Counties from the Cuyahoga River to the Black River. This encompasses 21 communities including: Avon, Avon Lake, Bay Village, Brooklyn, Brooklyn Heights, Brook Park, Cleveland, Elyria, Fairview Park, Lakewood, Linndale, Lorain, North Olmsted, North Ridgeville, Olmsted Township, Rocky River, Sheffield Lake, Sheffield Township, Sheffield Village, Sheffield Lake, Sheffield Village, and Westlake. Below is a map of the study area.



MAP OF STUDY AREA – Includes 21 communities: over 98,000 acres, over 430,000 people

Study Area Description

Natural Resources

The study area contains an abundance of natural resources, from access to Lake Erie to parklands and wetlands, to prime agricultural fields. These assets are in various states of threat, as development continues to cover more and more territory. As a result, several efforts are aimed at protecting the areas natural resources.

Watershed Planning Efforts

Several watershed groups are forming in the study area. Many of these organizations have been the result of a reaction to flooding, erosion, potential property development, etc. In 1997, the Ohio EPA came out with a document called “A Guide to Developing Local Watershed Plans in Ohio.” This document provided the framework for the development of a watershed action plan. “Watershed action planning is a critical piece in Ohio’s overall efforts to address nonpoint source pollution. Planning provides numerous benefits including: 1) identifying locally-based water quality solutions; 2) linking financial resources to environmentally effective actions; 3) matching appropriate actions to known causes of NPS impairments”(OEPA Division of Surface Water Website). Planning at a watershed scale has become more common over the past five years as more communities realize the benefits of coordinating efforts.

Cuyahoga County Greenspace Plan

The Cuyahoga County Greenspace Plan proposes a broad strategy for making natural areas a more integral part of daily life. Natural features such as the lake shoreline, river corridors, and hillsides are the backbone for the plan. Basic elements of the plan include the creation of a system of natural corridors, a county-wide trail system, the preservation of scenic views, and the protection and restoration of critical natural areas. The involvement of the public through education and private property stewardship is also a key element (Cuyahoga County Planning Website).

NPDES Phase II Regulatory Requirements and Planning

As authorized by the Federal Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES Phase II program was designed to address pollutants associated with storm water runoff from urban areas. The Phase II program has six minimum control measures

- Public Education and Outreach – Distributing educational materials and performing outreach to inform citizens about the impacts polluted storm water runoff discharges can have on water quality.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

- Public Involvement and Participation – Providing opportunities for citizens to participate in program development and implementation.
- Illicit Discharge Detection and Elimination – Developing and implementing a plan to detect and eliminate illicit discharges to the storm sewer system.
- Construction Site Runoff Control – Developing, implementing and enforcing an erosion and sediment control program for construction activities that disturb 1 or more acres of land.
- Post Construction Runoff Control – Developing, implementing and enforcing a program to address discharges of post-construction storm water runoff from new development and redevelopment areas.
- Pollution Prevention and Good Housekeeping – Developing and implementing a program with the goal of preventing or reducing pollutant runoff from municipal operations. When all six elements are implanted, the expected results are significant reductions of pollutants discharged into receiving waterbodies.

This regulatory requirement has required communities to develop a Storm Water Management Plan for their jurisdiction. This process has caused many communities to begin to consider storm water in their planning and development process (USEPA Website).

Ohio Lake Erie Balance Growth Program

A voluntary, incentive-based program for balanced growth in the Ohio Lake Erie basin. It calls for the creation of a planning framework that includes:

- A new focus on land use and development planning in the major river tributary watersheds of Lake Erie. The goal is to begin to link land-use planning to the health of the watersheds.
- The creation of Watershed Planning Partnerships composed of local governments, planning agencies, nonprofit organizations, and other parties in each watershed. Participation in these partnerships would be voluntary but encouraged by incentives.
- The locally determined designation of Priority Conservation Areas and Priority Development Areas in each watershed.
- The development of suggested model regulations to help promote best local land use practices that minimize impacts on water quality.
- The alignment of state policies, incentives, and other resources to support watershed planning and implementation.

This program advocates that communities adopt model zoning and land use codes as well as develop a comprehensive plan.

The plan should:

1. Identify the potential for cooperation – address the plans of overlapping and surrounding jurisdictions and identify policy for cooperative efforts.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

2. Identify priority development areas – locally designated areas where growth and or redevelopment is to be promoted. (A local comprehensive map should show locations)
3. Identify priority conservation areas – locally designated areas for protection and restoration.
4. Plan for Open Space Protection – Set policy for different levels of open space protection and conservation.
5. Plan for Transfer of Development Rights – Identify sending and receiving zones for the potential transfer of development rights.
6. Examine Local Economics – Economic component that addresses projected tax revenue and the costs of services.
7. Plan for Brownfields – Address policy for facilitation of brownfields redevelopment.
8. Plan for Shorelines – Provisions for two miles lakeward to the shoreline.
9. Plan for Public Access – Provide for improved public access to the shoreline and other natural resources.
10. Plan for Agricultural Protection – Prioritize protection areas.
11. Plan of Public Participation – Process should incorporate meaningful public participation.
12. Plan for Incentives – Set policy for incentives to encourage desirable development.
13. Review Disincentives – Evaluate existing codes and regulations that are disincentives for desirable development.

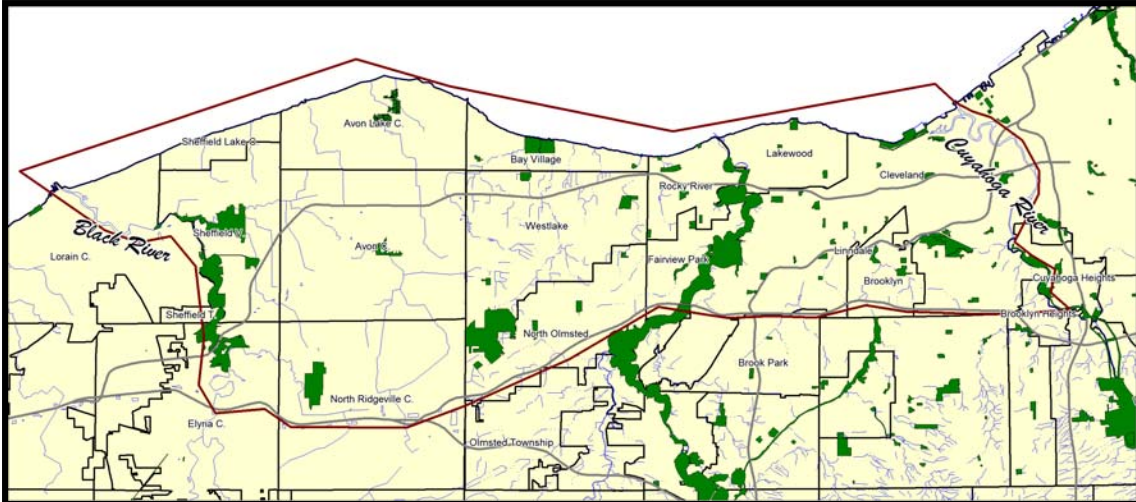
(Linking Land Use and Lake Erie: Best Local Land Use Practices, p.4-5)

[See APPENDIX for 10 Guiding Principles]

Incremental Preservation and Restoration

To date, preservation and restoration in the study area have been incremental. As a property is identified through either a local plan or via development pressures, there has been some effort by organizations (e.g. metroparks, Trust for Public Land, Western Reserve Land Conservancy, etc.) to preserve critical areas.

Once a project is identified for restoration or preservation through either a local plan or local organization, the next step is funding for the project. The National Recreation and Park Association (NPRA) has developed a general standard that a community provide between 6.25 and 10.5 acres of parkland per thousand residents.



PARK MAP – The study area has over 6,000 acres of parks

Urbanization

The manner in which communities develop has direct consequences on water resources, flooding, erosion and water quality. Some of the changes include:

- Increased runoff volumes as streams receive increased volumes at higher velocities.
- Increase flooding as frequency of floods increases with volume.
- Increased bank full flows as stream channels become exposed to higher velocities for longer period of time.
- Less Groundwater as more water runs off the land.
- Accelerated Changes in Stream Shape as streams widen and erode to compensate for an increased flow.
- Loss of Headwaters, leaving fewer miles of stream to handle increased volumes of runoff.
- Altered floodplains as streamside development limits the stream's access to its natural floodplain.
- Fragments riparian corridors, which removes important functions such as shading, refuge, runoff filtration, etc.
- Increase polluted runoff as excess sediments from hard surfaces run directly into the stream.
- Water stream temperatures as runoff from pavement absorbs heat. Warmer water holds less oxygen for aquatic life.

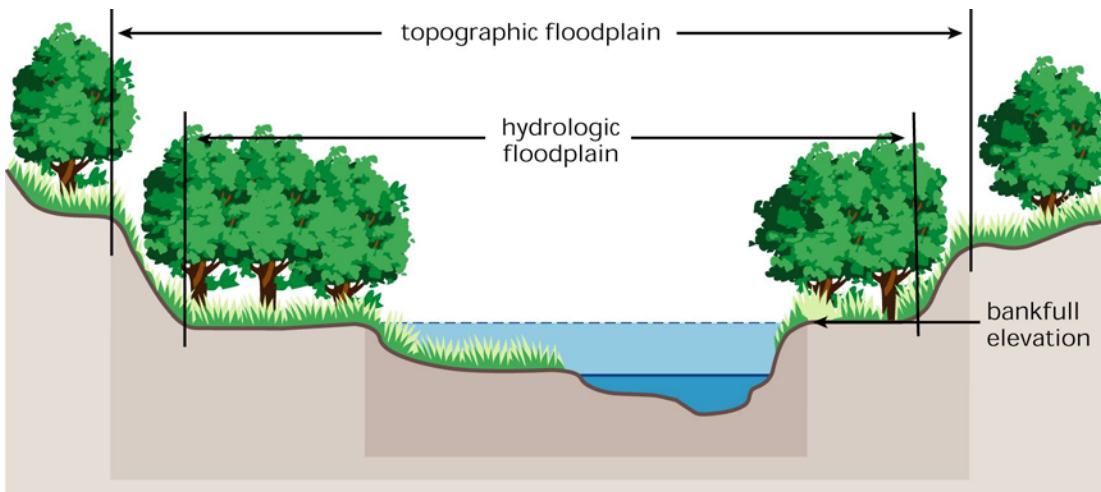
(Urbanization in the Cuyahoga Watershed, p. 1-4).

Floodplains

Floods are a natural process which helps maintain the health of the river. Just as fire is essential in a forest or prairie, flooding is essential to the river ecosystem. Natural

stream channels have an associated adjacent land area called a floodplain. These adjacent areas are periodically inundated by flood waters and serve a variety of functions.

- temporarily store water
- help to dissipate energy
- filter nutrients
- allow for infiltration
- provide important habitat
- create recreational opportunities



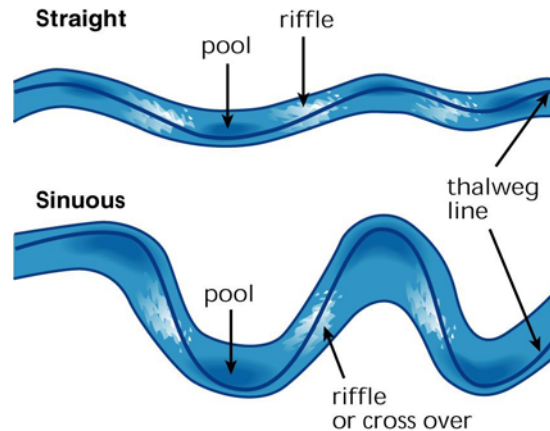
Source: Stream Corridor Restoration: Principles, Processes, and Practices, 1998 by the Federal Interagency Stream Restoration Working Group (FISRWG)

Studies have shown that floodplain size is directly related to the overall health of a stream. The Federal Emergency Management Agency (FEMA) has been involved in management efforts for many years and has mapped many floodplain areas. However, unmapped, headwater or intermittent streams have historically not been viewed as areas of importance. These areas are becoming increasingly more significant as a direct result of their elimination.

As more and more land is developed, building within the floodplain occurs more frequently, resulting in heavier flooding downstream. Healthy floodplain areas create a vegetated transition zone between rivers and upland habitats, providing shelter, food, and migration corridors for river wildlife.

Alterations to the Shape of the Stream

Often streams are moved and straightened as land is developed. This shortening of the stream length disrupts the hydrology and riffle-pool pattern critical for aquatic animal survival. In urban areas, these stream segments have largely been drained or filled and replaced by storm sewer connections.



Source: Stream Corridor Restoration: Principles, Processes, and Practices, 1998 by the Federal Interagency Stream Restoration Working Group (FISRWG)

Culverts

The area of the stream that is most effected by culverts is often the headwaters. Due to the small drainage area, intermittent flow, and shallow bed and banks, these headwater streams are easily altered. Culverts for roads, bridges, etc. are small in size and length; not a high cost item for the developer. Culverts have a negative impact on the stream corridor. They constrict the natural flow patterns and although they can be small impacts, have a cumulative effect that is extremely detrimental to the overall health of the stream.

Channelization

Walls, culverts, and gabions “hold the stream” in place, limiting the natural functions the stream can perform. In addition, the hydrology of the stream is also impacted. The “hard armoring” causes more energy in the stream system, more than the banks can hold, causing flooding and erosion downstream.

Wetlands

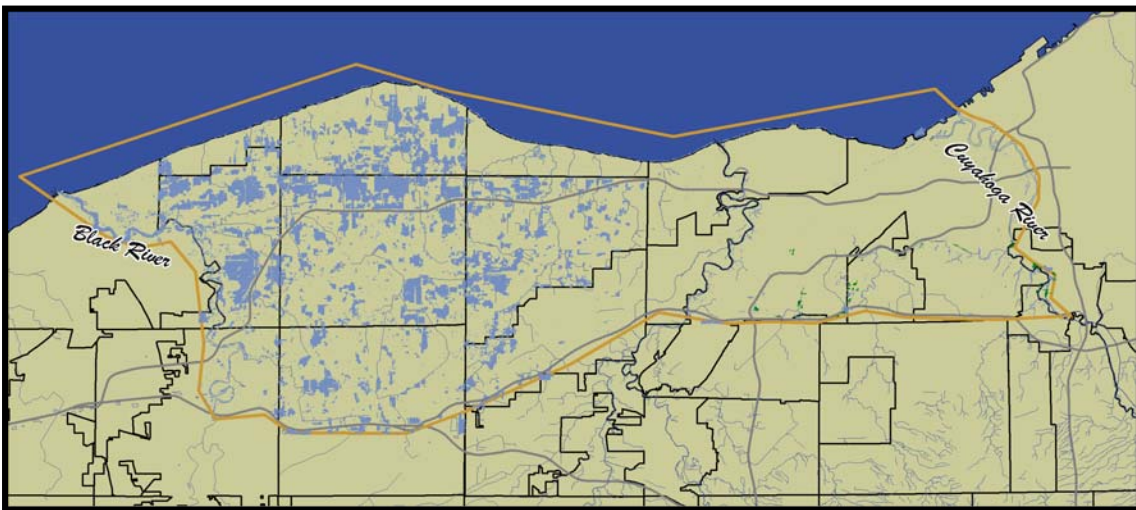
Wetland loss in Ohio has been extremely significant. It is estimated that since 1780, Ohio has lost 90% of the wetlands in once had. Wetland are often referred to as nature’s kidney because of their ability to filter excess nutrients from water. Wetlands also have many other functions.

- They manage the storm water volume by storing floodwaters.
- They dissipate storm water by slowing the flow and filtering the sediment load through their heavy vegetation.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

- They reduce storm water pollutants through nutrient uptake.
- They replenish groundwater by holding water on the land and allowing it to sink into the ground.
- They provide wildlife habitat.
- They provide opportunities for recreation.
- They improve property values.

Wetlands lost during development are required to be mitigated at the National and State Level. However, many of the wetlands that are being destroyed in Cuyahoga County and other urban areas, are being mitigated several counties away, where land values are much cheaper. This does nothing to help the watershed where the wetland is being destroyed (*Wetlands in the Cuyahoga River Watershed*, p. 1).



WETLANDS – The study area has over 13,000 acres of wetlands

Loss of Tree Cover

Trees provide numerous benefits that are often overlooked as development occurs. The loss of tree cover means a loss in a variety of services including:

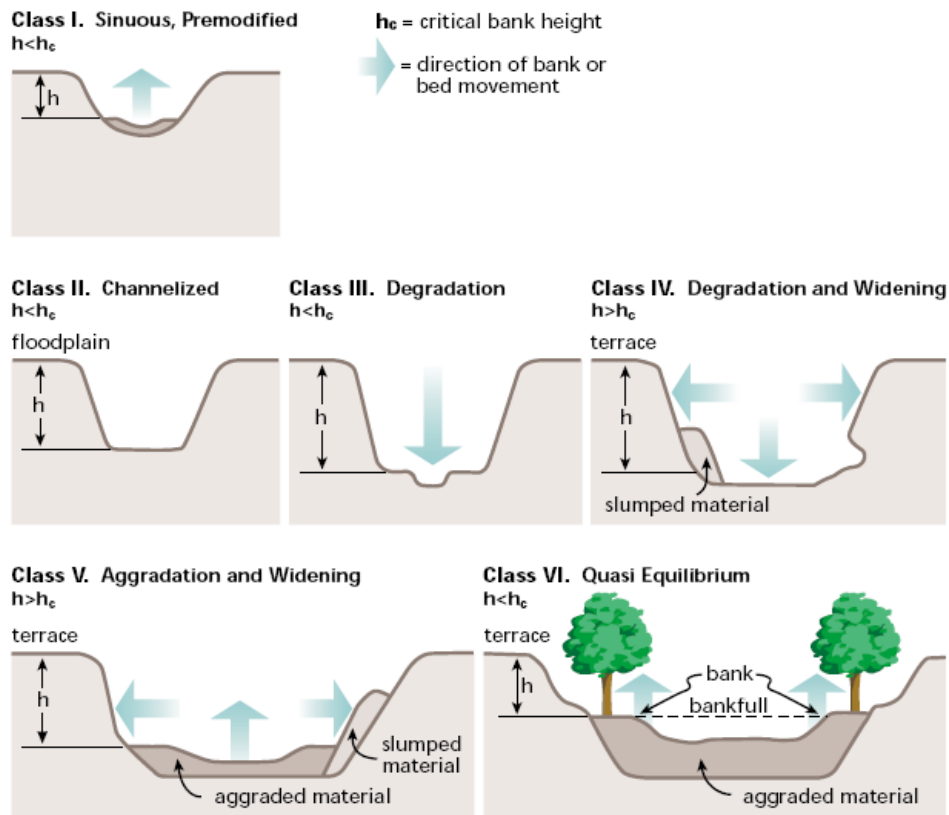
- Carbon sequestration, and thus the reduction in the greenhouse effect.
- Uptake of other air pollutants such as sulfur dioxide, ozone, nitrogen oxides and small particulates are also absorbed by trees.
- Reduce erosion, uptake pollutants, slow water runoff, and help to replenish groundwater.
- Provide a cooling effect that reduces the need for air conditioning.
- Increase property values and aesthetics, providing for a more sustainable economic base

Currently, the true value of trees is not considered in the local development process.

Impervious Cover

Increases in the hard landscape of rooftops, roads and parking lots leads to a change in they hydrology of the stream. The rate and volume of runoff delivered to streams increase as soil becomes compacted and hard surfaces replace the natural land cover.

One distinct change in the natural stream process is the downcutting and widening that occurs as the stream struggles to reach equilibrium. A relatively slow process in the natural environment, this process is often accelerated by the volume and flow coming from the altered landscapes. As the stream downcuts, it becomes disconnected from its floodplain and can no longer provide critical natural functions.



Source: Simon, Andrew, 1989. A Model of Channel Responses in Disturbed Alluvial Channels; Earth Processes and Land Forms, V.14.

Studies conducted by the Center for Watershed Protection depict a correlation between impervious cover and stream degradation. They have developed thresholds for stream function. Streams of high quality and stability correlate to approximately 0-10 % impervious cover. Degradation of streams, flows that alter the stream geometry and begin channel erosion, typically occurs with 11-25% impervious surface. Any imperviousness over 25% is correlated to an unstable, disconnected stream.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

Study Area Transportation

The study area is serviced by several modes of transportation, including highway access, seaports, airports and public transportation.

Highway Access

The study area is serviced by several limited access high speed roadways, including Interstates 90, 80, and 480, as well as a number of US Highways and State Routes. This abundant access has implications on the commuting habits of the residents in the area. According to the U.S. Census, in 2000, 8% of Cuyahoga County residents, and 93.75% of Lorain County residents, drove to work. The chart below details the drive to work percentages for our specific study area in 2000:

Township (MCD)	Number of people who drove to work, 2000	Percentage of population who drove to work
Avon city	5,189	95
Avon Lake city	8,551	94
Bay Village city	7,178	89
Brook Park city	9,582	94
Brooklyn city	4,899	97
Brooklyn Heights village	783	93
Cleveland city	142,840	81
Cuyahoga Heights village	243	90
Elyria city	24,861	94
Fairview Park city	7,990	90
Lakewood city	26,863	85
Linndale village	46	81
Lorain city	26,946	96
North Olmsted city	16,311	92
North Ridgeville city	11,775	96
Olmsted township	4,930	94
Rocky River city	8,639	89
Sheffield Lake city	4,715	96
Sheffield township	1,675	96
Sheffield village	1,423	95
Westlake city	14,401	93

Source: NEOCANDO

These high drive to work percentages are despite well developed transportation systems in both counties (see below) that includes busses and rails (Cuyahoga).

Seaports, Airports and Rail

The study area is serviced by two operating seaports, the Port of Cleveland and the Port of Lorain. Both ports connect the region to the global economy, offering industry in the area access to Great Lakes shipping channels. The Port of Cleveland, just to the east of our study area, is the largest port on Lake Erie and one of the largest ports on the Great Lakes. Recently, the Cleveland-Cuyahoga Port Authority has approved the expansion of the port from its current 88 acres to 200 acres on a new land created by Cuyahoga River dredging. This expansion is expected to allow the port to enter the container shipping business for the first time.

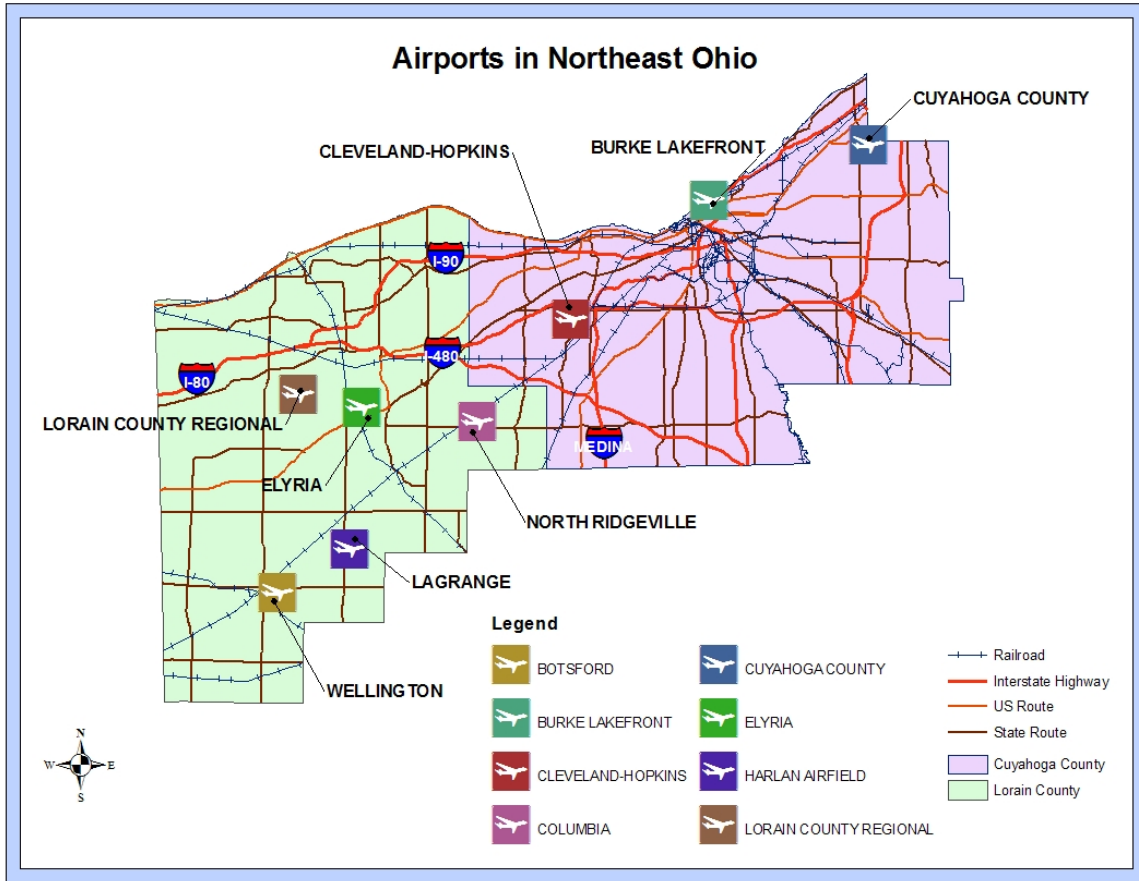
Numerous rail lines are present in the area, servicing both Amtrak passenger rail and freight. The Port of Cleveland and Port of Lorain are both near major nexuses of rail lines, creating multimodal transportation nodes for commercial freight and shipping. This is critical to the economic health of our study area and the Greater Cleveland region as a whole.

Several airports are located just outside of the study area, servicing the residents and businesses of western Cuyahoga and eastern Lorain counties. Burke Lakefront Airport in downtown Cleveland is just east of the eastern boundary of the study area. The facility mainly services the corporate commuter interest of the executives in downtown Cleveland. The airport is also a reliever airport for Hopkins International, as well as a general aviation facility.

Cleveland Hopkins International Airport (in Cuyahoga), Lorain County Regional Airport, Elyria Airport, and Columbia Airport (both in Lorain) are all just south of I-480, just out of our study area. The Lorain County, Elyria, and Columbia airports are small, general aviation airports. Cleveland Hopkins International Airport is the region's main air facility. It is served by all major domestic airlines and several international and charter airlines. In 2006, the airport served just over 11 million passengers on over 600 daily flights. Continental Airlines, the nation's fifth largest carrier, operates a hub at the facility (Source: www.clevelandairport.com). As with the seaports, Hopkins Airport is a major economic driver for area industries, connecting them to the global economy, and the airport's location adjacent to our study area is a clear benefit to the businesses within this area.

Below is a map of the location of airports in both Cuyahoga and Lorain Counties:

Baseline Trends: Western Cuyahoga and Eastern Lorain Counties



Public Transit

Two public transit agencies service the study area, the Greater Cleveland Regional Transit Authority (RTA) in Cuyahoga County and Lorain County Transit (LTC) in Lorain. RTA operates an extensive bus network and one heavy rail line through the study area, which connects downtown Cleveland with Cleveland Hopkins International Airport.



RTA western rail line connecting downtown Cleveland with Hopkins International Airport

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

Denser communities and areas closer to Cleveland have higher percentages of persons commuting to work via public transit. In 2000, highest usage percentages were in Cleveland (12.0%) and Lakewood (7.8%), while the lowest percentages were in Lorain (0.71%) and Sheffield Village (0.0%).

Study Area Governance

There are 21 governments in the region, voters decided not to join other municipalities to receive the best local services even though they pay more for services. Sometimes people pay less for the same services. This is not sustainable because each person is crowding out the existing capacity.

There are 21 different local laws (parking at night, property tax rates) showing that home rule works, or people would centralize where they live and are moving to. In the region everyone likes home rule. Of our speakers, none suggested abolishing home rule. There was a consensus that there need to be some regional agreements but no one either wants to or no one can overturn home rule.

Each of the 21 municipalities that employ their own public safety services (police, fire, EMS) asks “Why should I support my neighbors public safety, they have their own?” if they were unsatisfied with any municipal services they should either protest their council people or move. With in that context, all of the politicians mentioned mutual aid to all of their neighbors in the surveys. Mutual aid is where the nearest emergency service personal arrives to the emergency scene first and handle the emergency. The emergency could be a car crash or a fire, and whoever arrives first deals with the situation, as they deem necessary.

Each of the 21 municipalities has its own elected officials, paid for by municipal taxes; to manage the municipality the most effectively. This is more evidence that people want an equity situation where everyone has their own system of government and a low ratio of population to elected official. Giving the elected officials more time to focus on their job, council people often have day jobs and only some mayors are required to be a full time mayor. In keeping with the low ratio of people who use public services and those who provide them, there are 13 different school districts, in the region.

Master Planning

Not all municipalities have planning because it is seen as communist. Other than those municipalities, there very little planning outside of a municipalities borders; Avon Commons, Crocker Park and the new Avon Center will all be within 2 miles apart and there is not the population to support the three centers, some municipalities (and their taxpayers) will win (residents pay fewer taxes and get same service levels) while others lose (property values and services drop and/or taxes rise)

Lots of new housing is created amidst a credit crunch and foreclosure crisis. The region is anticipating massive population growth especially in places with high median prices, but there is no growth in the region, only a shift of the population to the west in the region.

Local Zoning

There is some regional zoning, but like the planning there is almost none done outside the borders. The zoning maps are very seldom updated, for example: in Cleveland, by far the first with a zoning map, it is 60 years old.

Mostly 21 independent zoning maps

Voters approved 21 different zoning maps, with no concept of regionalization. The zoning maps have very little multifamily housing, outside of the central city. Subsidized housing is another zone that the maps have very little of. The amount of parklands varies on a two tier system, Cuyahoga County has about 4 times the parkland that Lorain County does. The vast majority of zoning is for large lots and commercial, the two things that give city's the most tax revenue. Neither the large lots or the strictly commercial zoning is sustainable; how far can the office building maintenance staff afford to drive to work? What about with gas approaching \$4 per gallon? This system is not sustainable; there will be a situation like Hudson, where most of the downtown retail has difficulty finding employees because very few people working for that pay can afford to drive to work.

Local City Services

The 21 municipalities offer varying amounts of snow plowing, a service that nonresidents rely on during their commutes. There is no plan to share the cost of plowing among the municipalities, to allow residents who heavily commute to have consistent service on their commutes. The region also needs more snowplowing in areas where people work, on freeways. Generally larger cities need more because they have more employees, their roads are used more and they have more roads for commuters to use. Other than mutual aid and snow services, there are 21 different agencies that pick up trash, recycling there are also several sewer and water districts. Having 21 trash pick up agencies makes it easier for a dissatisfied resident to throw their trash on their councilpersons lawn when it does not get picked up on time. The region has 8 sewer districts and 6 drinking water agencies. With so much inefficiency, there is no economy of scale with the notable exceptions of NEORSD and the Cleveland Department of Water; this again shows that voters want their own water, sewer and more independence from other municipalities. Most importantly the over reproduction of services shows that the residents are willing and able to pay for it. In the dual hubs of the region, Cleveland and Lorain, there is an economy of scale, resulting in lower service prices better service. The next section is about fixing these many inefficiencies, city mergers.

City mergers

The outlook of the regions population on mergers is a very bad one. Mergers are perceived in a very poor light because mergers largely destroy home rule, local government independence, they also move the community center and the municipal center away from more people. Mergers also drop the number of elected officials; while

the large municipalities have more elected officials, as a proportion to the total population, they have far fewer elected officials. Mergers cause residents to lose autonomy over their sewage plant, parkland, water treatment plant, schools, utility companies, etc. Mergers can cause taxes to drop, because there are more taxpayers paying the same amount of public service employees.

Current State and Local Policies

State Policies

Currently there are several programs and policies in place at the state level that affect land use patterns. First, there are disproportionate spending levels across agencies. For example, “the annual state budget to build, expand and enhance the road infrastructure, to provide water and sewer upgrades, and to stimulate economic development on an annual basis is about \$6, 855,425,580. Each of these programs has a direct or indirect affect that increases the land area available for urbanization. This is more than 22 times greater than the \$305,433,729 annual budget spent and transferred to conserve land, protect farmland, and manage wildlife and habitat areas. These programs, directly or indirectly, tend to remove land available for urbanization” (Kellogg, Chadbourne, et. al., p. 12).

Second, there are redundant programs that provide opportunities for collaboration. “Several agencies have funding streams targeting the infrastructure and incentives to support economic development, either through infrastructure, business technical assistance, bonds, or lower interest rates on loans” (Kellogg, Chadbourne, et. al., p. 13). Typically, these programs are not coordinated across state agencies, and could thus be working against the others efforts and/or combined for efficiency.

Third, the decision-making criteria for state agencies are not uniform across disciplines. The decisions made by one agency is usually isolated, and there is a general lack of coordination between offices. Thus, opportunities for comprehensive decision making are extremely limited (Kellogg, Chadbourne, et. al., p. 13).

Finally, some state programs have an explicit geographic bias. Funding explicitly states the use for one sole purpose e.g. small community, rural areas, highway spending , etc. There often could be a complementary use that is being overlooked because the funding has such a direct purpose. (Kellogg, Chadbourne, et. al., p. 13)

Home Rule

At the local level, home rule adds another dimension of complexity to the process of land development as standards vary from jurisdiction to jurisdiction. Article XVIII § 3 of the Ohio Constitution grants municipalities the power of “home rule,” namely, the power to adopt and exercise regulations promoting the health and welfare (10 Oh. Jur. 3d Buildings § 79). Each municipality that adopts home rule will have the authority to exercise all powers of local self-government. One of the rights granted by home rule

gives a municipality the power to adopt and enforce zoning [*Hausmann & Johnson, Inc. v. Berea Bd. of Bldg. Code Appeals*, 40 Ohio App. 2d 432, 320 N.E.2d 685 (8th Dist. 1974)].

Transportation Infrastructure Policies

“The academic and professional engineering literature are quite clear that there is a close causal relationship between the location, type, and capacity of transportation infrastructure and landscape change. Provision of infrastructure is both a stimulus to development itself and directs the location of development and its density as a function of the transportation mode and capacity” (Kellogg, et. al, p. 16). This means decisions at the Ohio Department of Transportation directly affect the type of growth in Ohio.

The development of the highway system on a national level has not only made us car dependent, but also has fueled suburbanization and urban sprawl. “Anticipated access tends to raise expectation of increase land costs, making real estate development attractive in a given market area. Transportation projects at the fringe of urban areas reduce the “accessibility premium” of the center of a metropolitan area, reducing property values there.” (Kellogg, et. al, p. 4) Thus, “increased expansion of infrastructure in undeveloped areas will tend to promote lower-density land use patterns (in the absence of appropriate zoning requirements) because that land is relatively less expensive.”

The large budget of the Ohio Department of Transportation allows this department to exert great influence. This affords them the ability to complete projects that affect multiple stakeholders. The respect and that they have causes many communities to look favorably on their projects.

Water and Sewer Infrastructure Policies

Similar to roads, water and sewer infrastructure shapes land development. “The provision of water and sewer infrastructure shapes land use at the fringe and allows “leap-frogged” development. Where the infrastructure is extended along a rural road, new subdivisions, significantly separate from existing settlements can be developed. The market responds to the presence of these infrastructures, much as it does to roads. At times, seeking compliance with federal Clean Water Act standards, communities upgraded waste water treatment plants, which provided increased capacity and allowed for more development in rural areas” (Kellogg, et. al., p. 5)

Economic Development Policies

“Economic Development programs and their policies are carried out by state and local governments to alter private market decisions and direct local population and economic growth. The location of investments through economic development programs will shift other public and in turn, private investments into a given location.” In addition, “state

government decisions about where to invest will pull new business development in a specific community and not into another.”

“Economic development programs are often undertaken without assessment of impacts to land urbanization. Older suburbs in metropolitan areas tend to received less assistance, and subsidies to industrial parks and distribution centers, which are seen as positive investments, tend to shift economic development away from urban areas to more rural areas.” This is not an efficient way to use state monies to develop land. For example, ”Compact and higher density land development patterns reduce the costs of public infrastructure and improved the region’s economic performance, largely due to agglomeration efficiencies, knowledge spillovers, and better access to labor” (Kellogg, et. al. p. 5)

Tax Policies and Fiscal Conditions

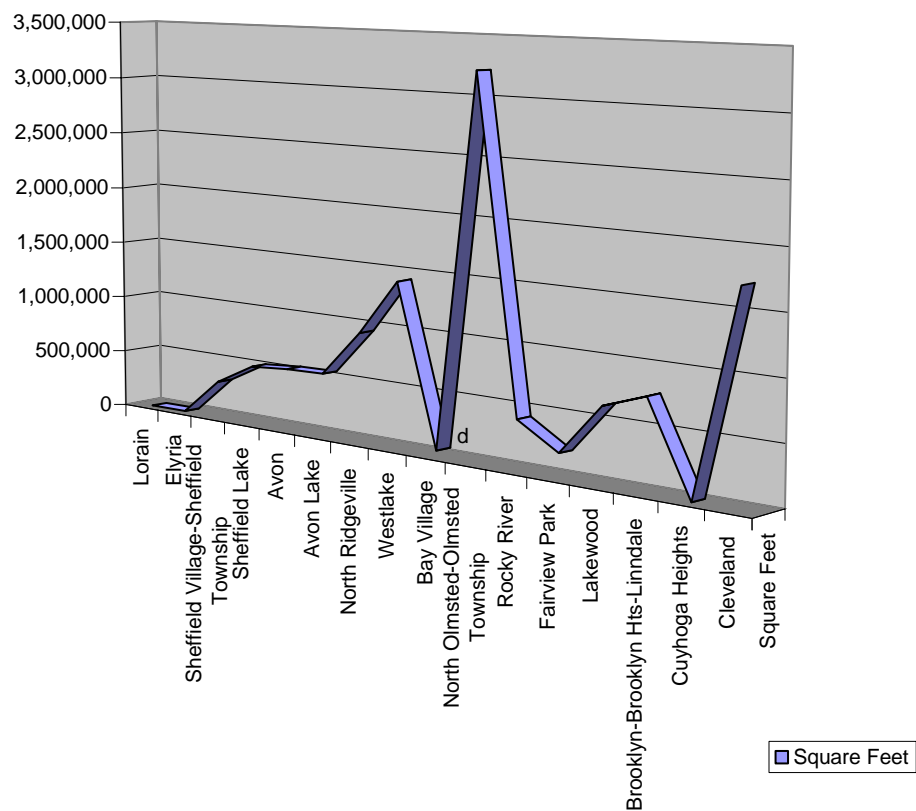
“Tax policies can intentionally or unintentionally shape land development and conservation practices. Local fiscal conditions influence tax policies and property tax rates” as communities need for local revenue increases with rising public expenditures (Kellogg, Chadbourne, et. al., p. 7).

Ohio’s system of “categorizing state routes results in an anti-urban bias in funding from the state and federal gas tax revenue disbursement because the routes are maintained by the state in unincorporated areas of the state, but must be maintained by incorporated municipalities and villages when state routes pass through these settlements. Further, state gas tax revenues cannot be used to maintain the sate routes by local jurisdictions, which must instead raise alternative monies.” In addition, “state spending on schools is less than needed, thus “school quality is shaped by local revenue streams.” “Thus state spending requires increases in local taxes, which stimulates high-end residential development. As a result, the real estate market is tilted toward large homes at the fringe” (Kellogg, Chadbourne, et. al., p. 7).

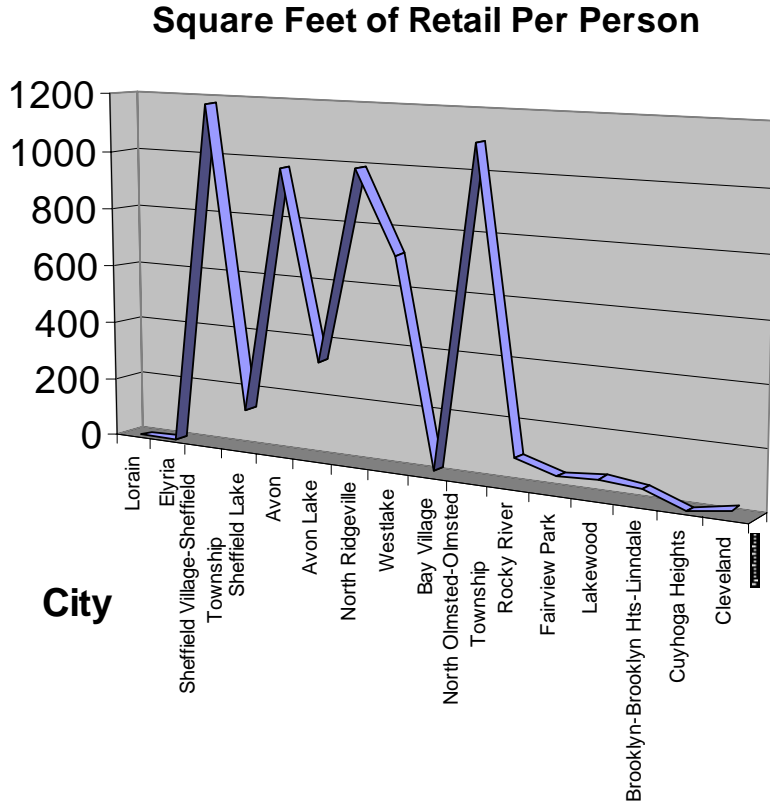
The Study Area: Retail

The past 30 years have seen an explosion in the number of retail establishments, particularly large malls and shopping centers, throughout the Greater Cleveland region, and our study area is no exception. Presently, there are 6 major shopping areas in the study area: Westgate, Crocker Park, Avon Commons, Westfield Town Center, Steelyard Commons, and Midway Mall. These centers are in addition to numerous neighborhood retail areas that are in various states of decline and rebirth, in large part due to the spatial patterns of the larger regional centers mentioned earlier. The chart below details total square feet of retail space in our study area by community.

Total Square Feet of Retail Space in Studied Communities (Organized Spatially from West to East)



Clearly in the chart above North Olmsted has the most square feet of retail, followed by Westlake and Cleveland. North Olmsted, however, does not have the largest population in the region. When adjusted by population, it is clear that retail in Cleveland and the inner ring areas are declining as retail moves to more affluent, and less densely populated, areas in outlying areas. The chart below adjusts the square footage information by population:



The chart above shows that while Cleveland may have over a million square feet of retail, it is very low on the number of retail square feet per person, as are the densely populated urbanized areas of Lakewood, Lorain and Elyria. By contrast, the more suburban communities between Cleveland and Lorain have vastly more retail square feet per person, a phenomenon that shows that the explosion in retail does not follow an explosion in population growth, allowing for infill uses in mass quantities, but rather shifts retail from declining areas and redistributes it to growth areas.

Methodology: The Weighting Matrix

The weights were based off the surveys. There were three surveys, a residential, a politician (elected official), and a developer survey. The developer surveys were not used in the weighting; the developer surveys were used by each of the three groups to see what their scenario looks like. After the residential surveys were brought together on one spreadsheet, the answers that were on a Likart scale were tallied. People who took the interview rated nine quality of life issues on a five point Likart scale. They also rated what they thought those issues would look like with more regional controls. The nine issues are:

- Highway access
- Parks
- Neighborhood quality
- City recreation center
- Municipal income tax
- Property tax bill
- Water and sewer rates and service
- Public transit and
- Building code

The surveys were asked on a -2 to 2 scale, to use any kind of weight system, the numbers all have to be positive, so 3 was added to each of the Likart scale answers, to have a 5-point, 1 to 5 scale. With two rankings for the residential survey done, there needed to be two comparisons of the answers. Finding the difference between the results of the regionalization and the results without regional controls, gives a third weight. Finally the mean of the weights is added to normalize the data more, for example if there are two issues that are very close, 3.8125 and 3.8034 they will be better represented if the mean is a factor in the weights.

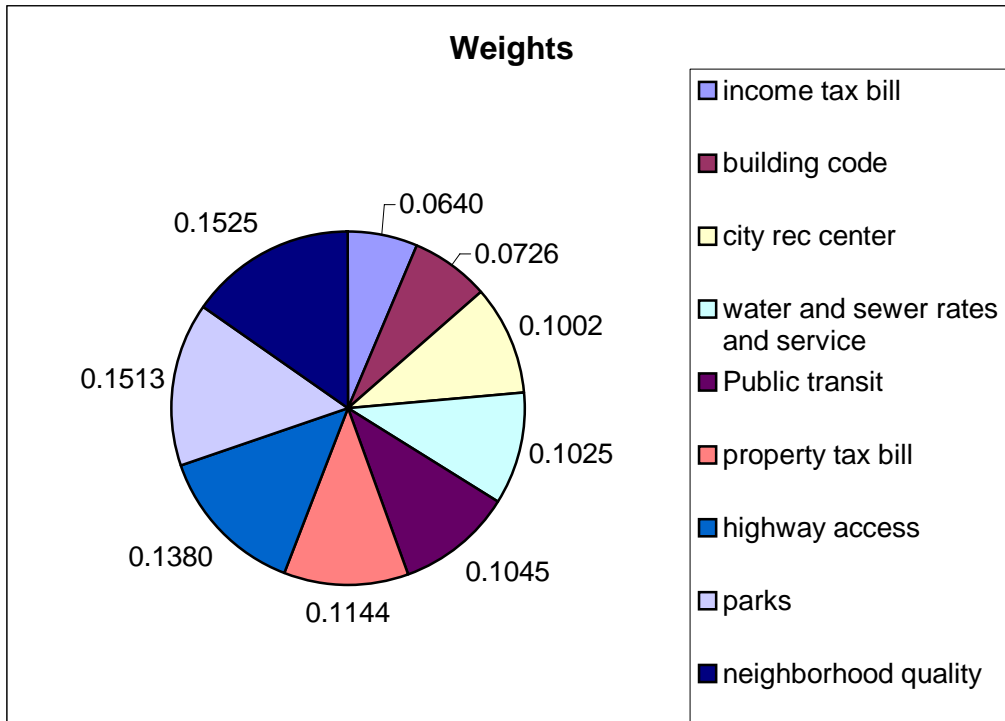
To get to the residential half of the weights, all measures had a cardinal score, and an ordinal score. A cardinal and ordinal score is, respectively: issues ranking divided by the total ranking for on that scale, and a one to nine ranking of the issues compared to the other issues, also on that scale. The sum of each issue is divided by the total sum of all rankings (in the table the total sum is called the RES sum) is used to find the proportion of the total weights. See table I for the results as applied.

Elected officials were asked about they felt their municipality is faring now and how it would change with more regional government. When asked about how many regional controls would be implemented, Minneapolis, Minnesota was often cited as a successful example that could be brought to the region. The elected officials surveys were very different from the residential surveys, but the two groups of survey results need to be summed up into one with nine weights. Due to this requirement, the conversion of the elected official into the residential is on the table below, with residential answers on the left and politician answers on the right:

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

Income tax bill	How would you rate the economy in Northeast Ohio
City recreation center	How do you rate the economy in your Municipality
Property tax bill	How would you rate the long range economy of your municipality?
Parks	On a scale of 1 to 5 with 1 being Not Important and 5 being Highly Important How important are parks, and green space to your community?
Water and sewer rates and service	How much does your municipalities' economy depend on the economy of the core city?
Neighborhood quality	New Urbanism
Highway access	Smart Growth
Building code	What is your attitude towards living in or near affordable housing?
Public transit	What is your opinion of REGIONAL land use regulations?

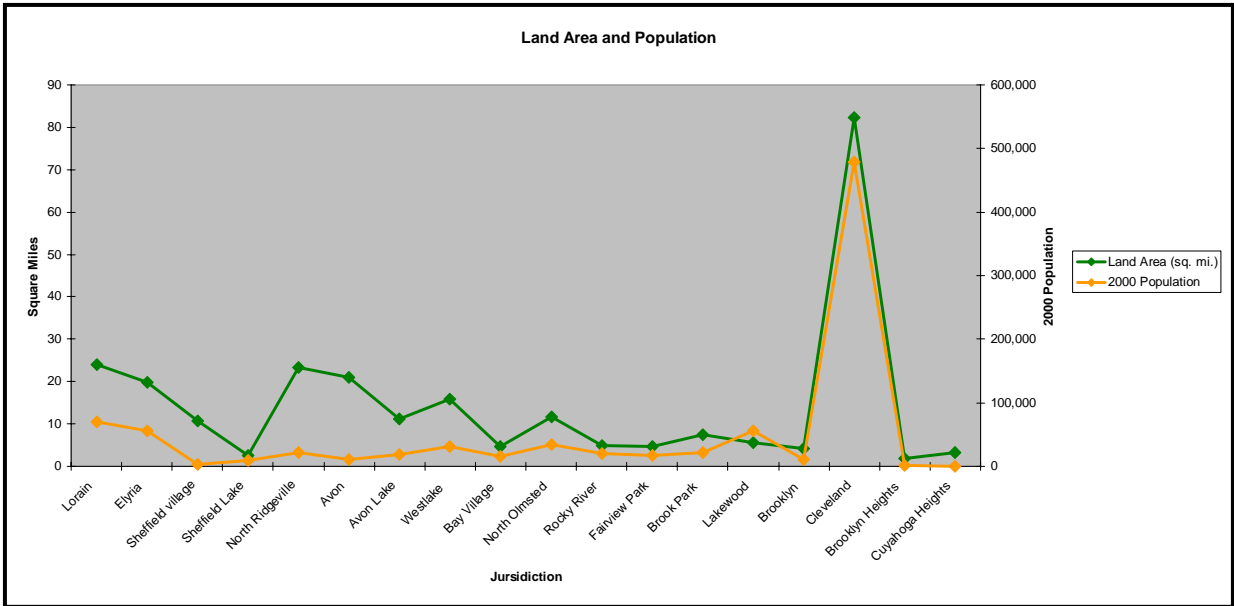
With the surveys matched up, the next task is to put the elected official surveys in an ordinal ranking and add that ranking to their total. Once that is done, the elected official surveys are added in with the residential surveys, giving each category half of the total weight. New weights are formed because the residential surveys and the politician surveys have some discrepancies in what respondents found important. The averages of the new totals are the weights for the issues.



Baseline Trends

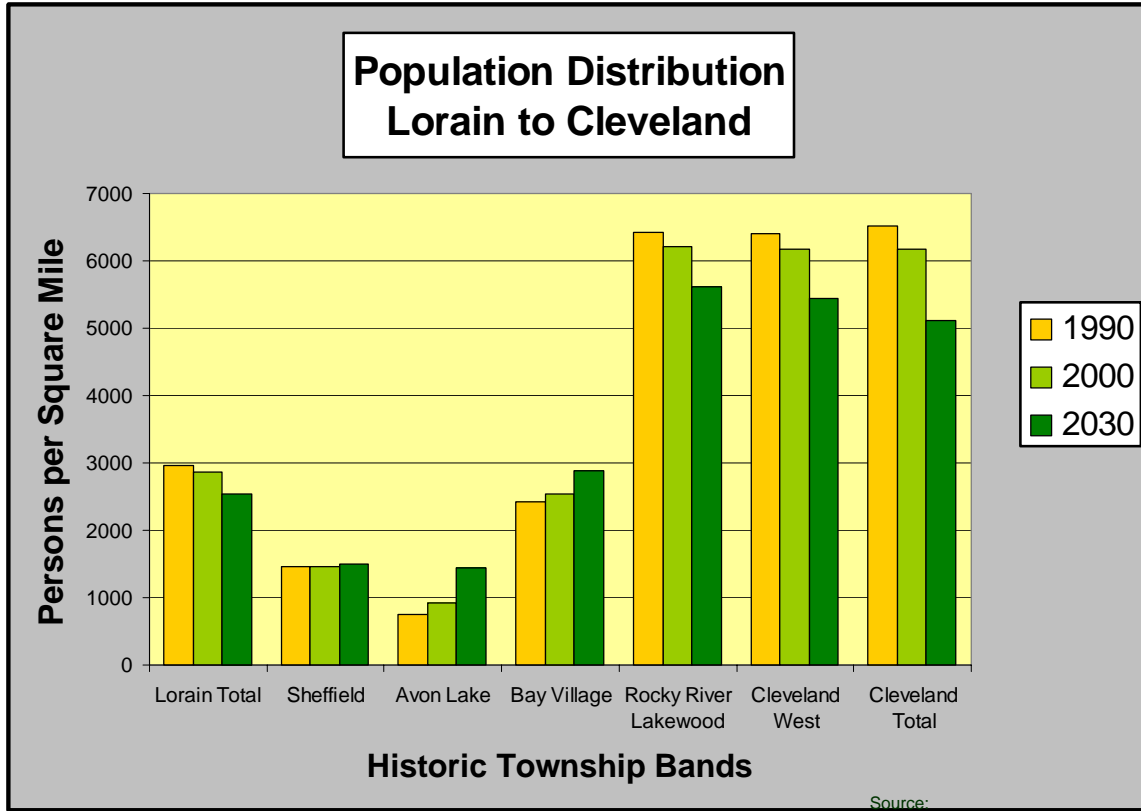
Below is a summary of the baseline trends seen in our study area.

Population



LAND AREA VS POPULATION

This graph shows the relationship between land area and population. The general trend being that the large land area, primarily in Lorain County, has a lower population. However, looking at the trends in population from 1990 and 2000 census data as well as our population projections for 2030, one can see the movement of people is toward these low-density areas. The graph below shows historic 5-mile township bands for our study area. It shows urban sprawl and the movement of people from Cleveland and Lorain to the undeveloped lands in between.



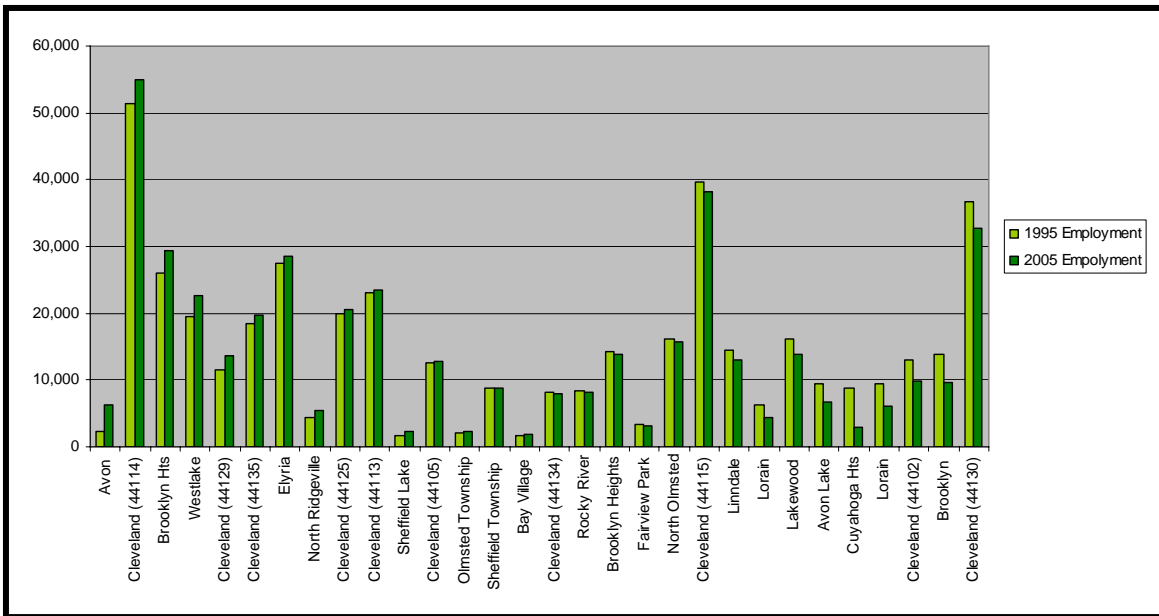
POPULATION TRENDS

For our population projections, we utilized the Northeast Ohio Area Wide Coordinating Agency (NOACA) projections for 2030. These projects show a decrease in population from 460,000 in the 2000 census to 430,000 in our study area.

Total Employment

The graph below shows the trend in total employment between 1995 and 2005 based on zip codes for the study area. The left hand side of the graph show increases in employment over this time period and the right hand side shows decreases.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties



TOTAL EMPLOYMENT – 1995 VS 2005

The following two tables show the top increase and decreases from 1995 versus 2005.

City	1995	2005	Change
Avon	2,310	6,360	4,050
Cleveland (44114)	51,308	55,052	3,744
Brooklyn Heights	26,035	29,337	3,302
Westlake	19,550	22,728	3,178

TOTAL EMPLOYMENT INCREASES

This table shows increase in Avon, Cleveland (44114), Brooklyn Heights, and Westlake. The Cleveland zip code of 44114 includes public square, thus the increase in total employment. In addition, the zip code for Brooklyn Heights also includes other outlying suburbs not part of our study area, thus the reason for their totals despite their size.

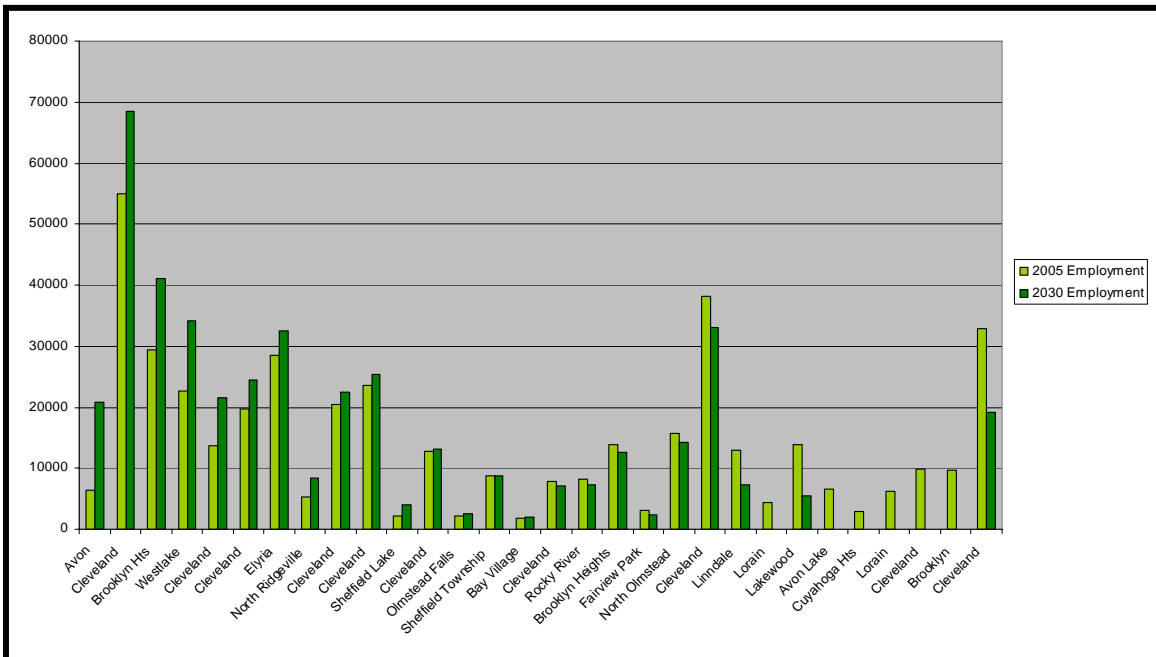
Baseline Trends: Western Cuyahoga and Easter Lorain Counties

City	1995	2005	Change
Brooklyn	13,722	9,601	- 4,171
Cleveland (44130)	36,625	32,823	- 3,802
Lorain	9,533	6,176	- 3,357

TOTAL EMPLOYMENT DECREASES

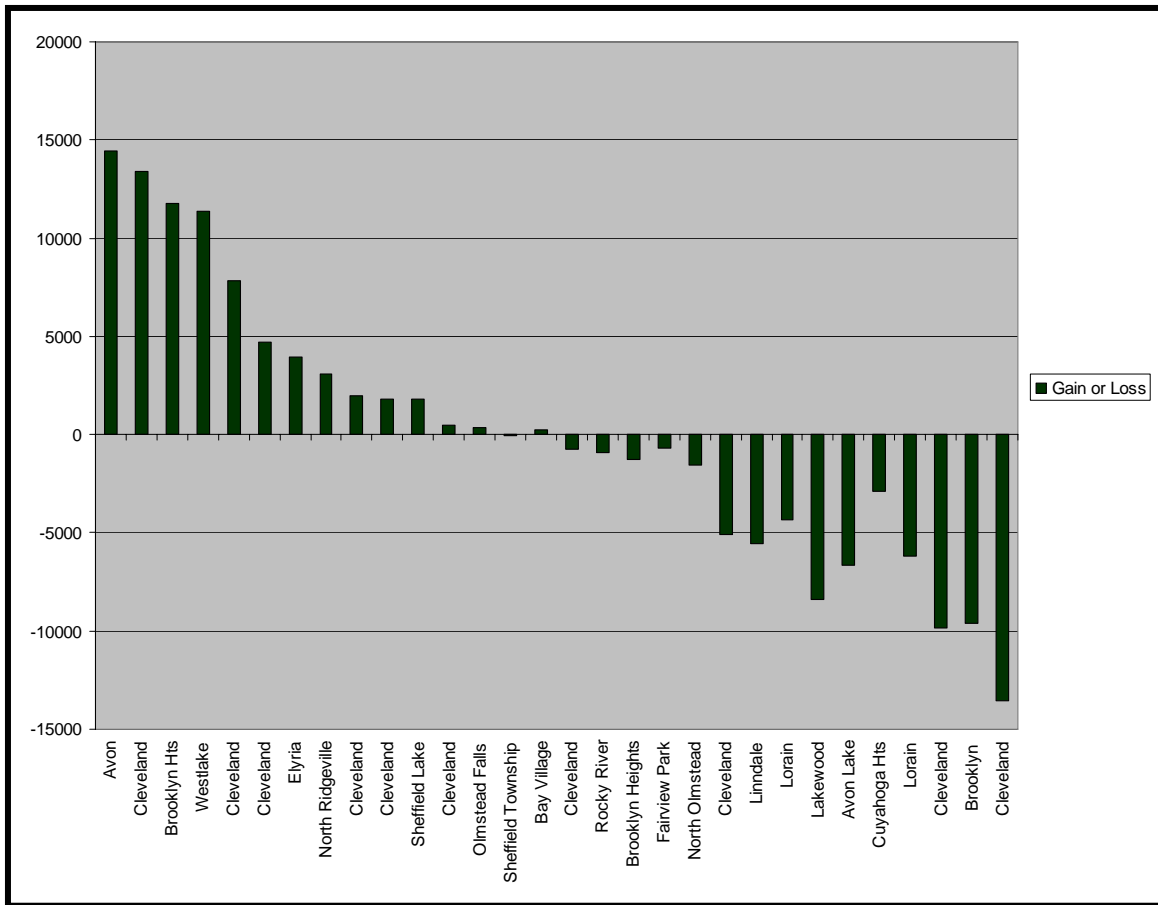
This table shows the decreases in total employment from the developed areas of Brooklyn, Cleveland, and Lorain. Again, this shows the trend in movement out of the urban core.

The graph below shows total employment from 2005 to our projected 2030. This graph shows that if everything remains constant, the areas that are currently gaining will continue to grow and the areas that are losing will continue to decline.



TOTAL EMPLOYMENT – 2005 VS 2030

Baseline Trends: Western Cuyahoga and Easter Lorain Counties



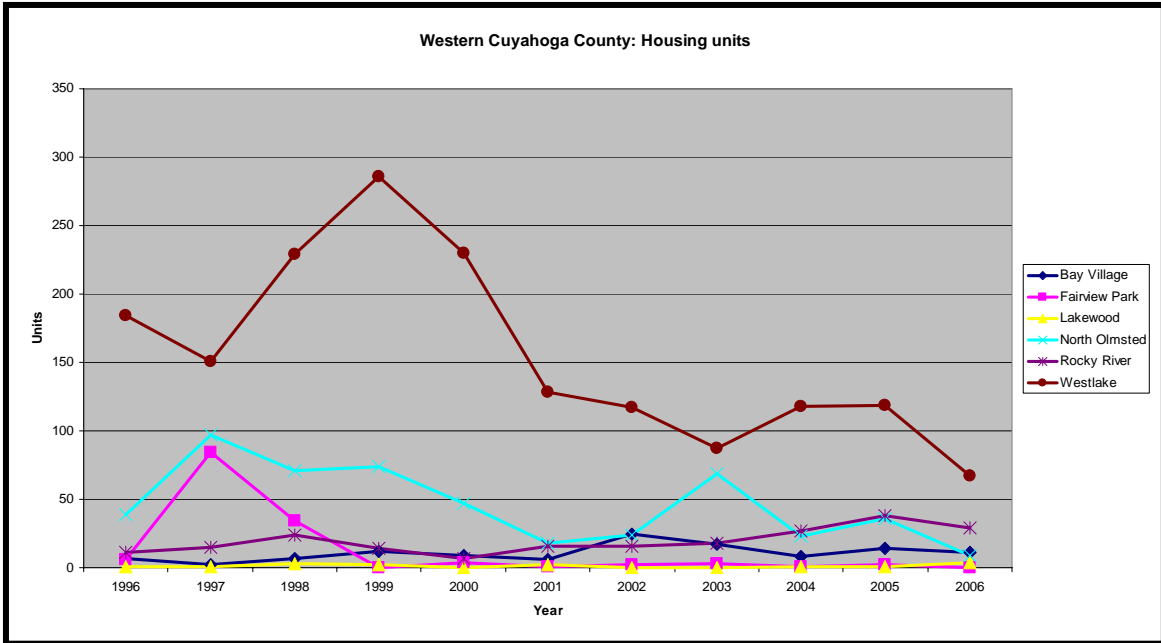
TOTAL EMPLOYMENT – GAIN OR LOSS

The graph above shows the gain and loss across the study area over the 2005 to 2030 time period. It seems that the loss from Cleveland is almost equal to the gains in Avon. In addition, our 2030 projections conclude that at the current pace, Avon will gain 11,350 employees and Cleveland will loose 13,579 employees.

Housing

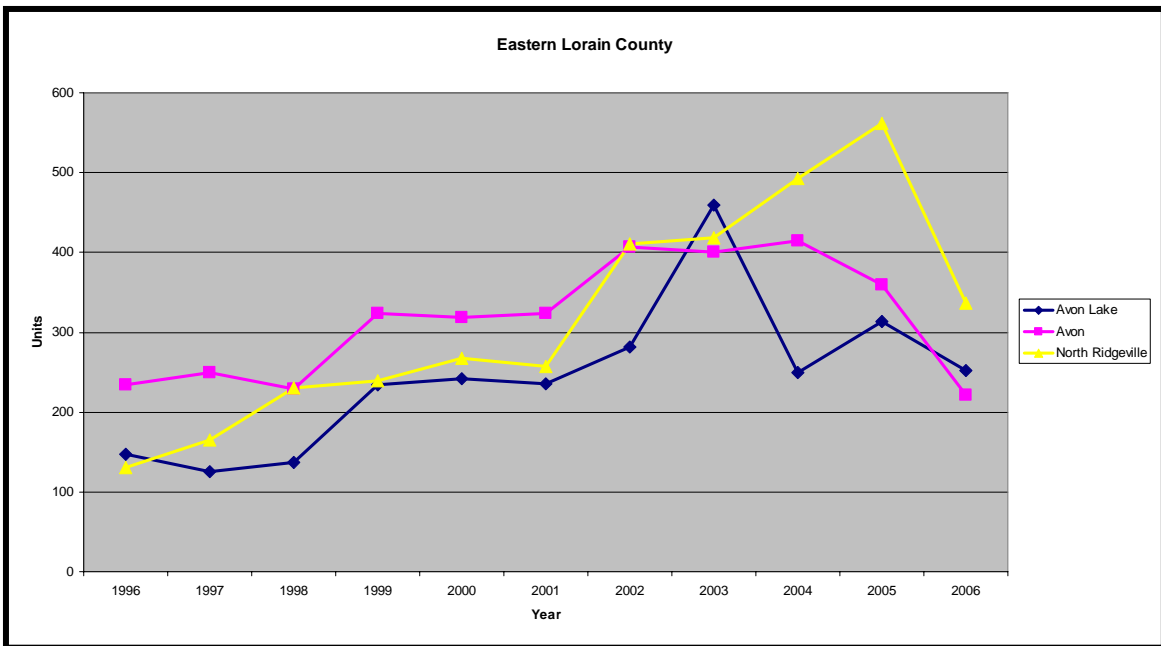
The graph below shows the current housing trends in Western Cuyahoga County. The trend shows a general decrease in housing units from 1996 to 2005.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties



HOUSING TRENDS – WESTERN CUYAHOGA

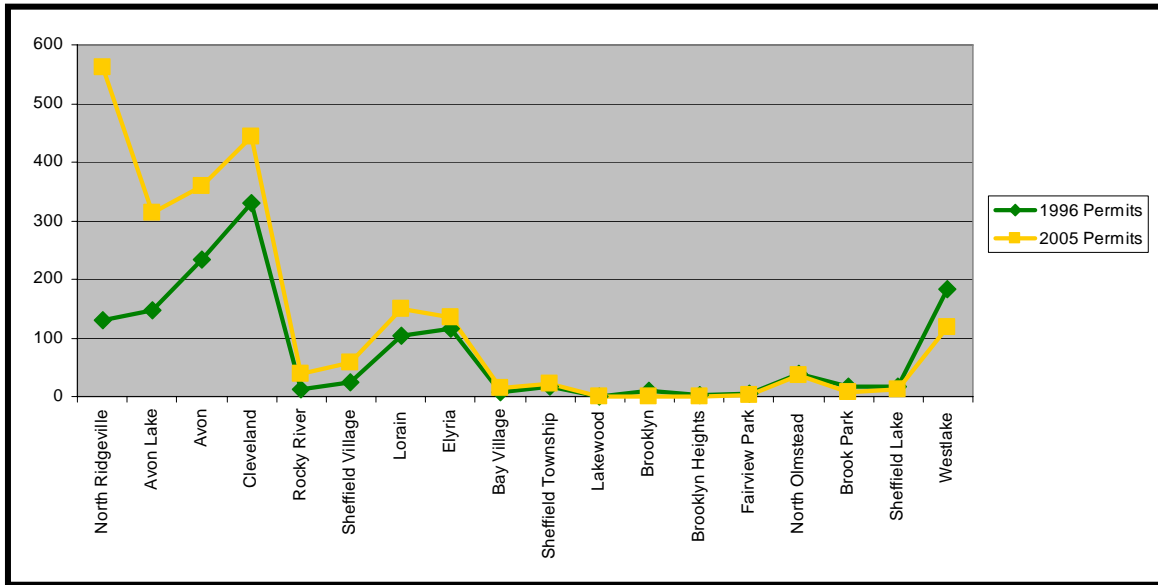
In addition, the graph below shows the current housing trends in Eastern Lorain County. The trend shows a general increase in housing units from 1996 to 2005.



HOUSING TRENDS – EASTERN LORAIN

Baseline Trends: Western Cuyahoga and Eastern Lorain Counties

The graph below shows the housing trends from 1996 versus 2005 within our study area. The trends reflect that of movement from Western Cuyahoga County communities to Eastern Lorain County.



BUILDING PERMITS – 1996 vs 2005 (RESIDENTIAL UNITS)

The following tables show the top increases and decreases between 1996 and 2005 for our study area. The top increases are solely in the Lorain County Communities of North Ridgeville, Avon Lake, and Avon. The top decreases are Sheffield Lake (a small Lorain County Community), Brook Park (a more urban area), and Westlake (an area that is in close proximity to Lorain County).

City	1996	2005	Change
North Ridgeville	131	531	430
Avon Lake	147	313	166
Avon	234	359	125

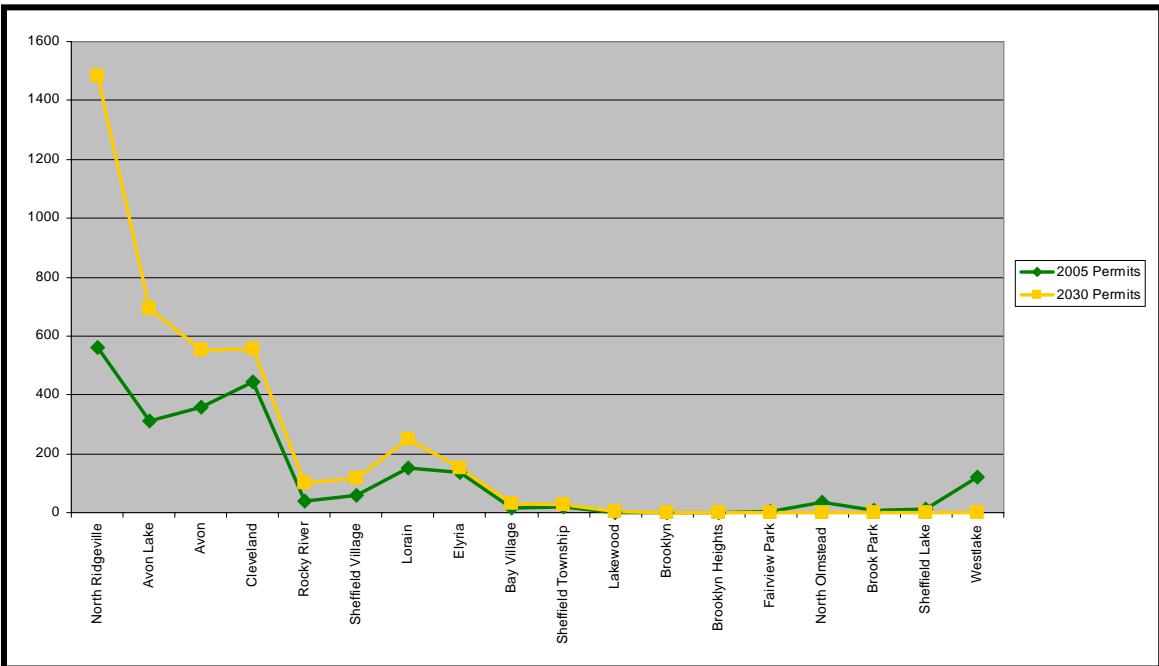
BUILDING PERMITS – INCREASE (RESIDENTIAL UNITS)

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

City	1996	2005	Change
Sheffield Lake	18	11	- 7
Brook Park	17	8	- 9
Westlake	184	119	- 65

BUILDING PERMITS – DECREASE (RESIDENTIAL UNITS)

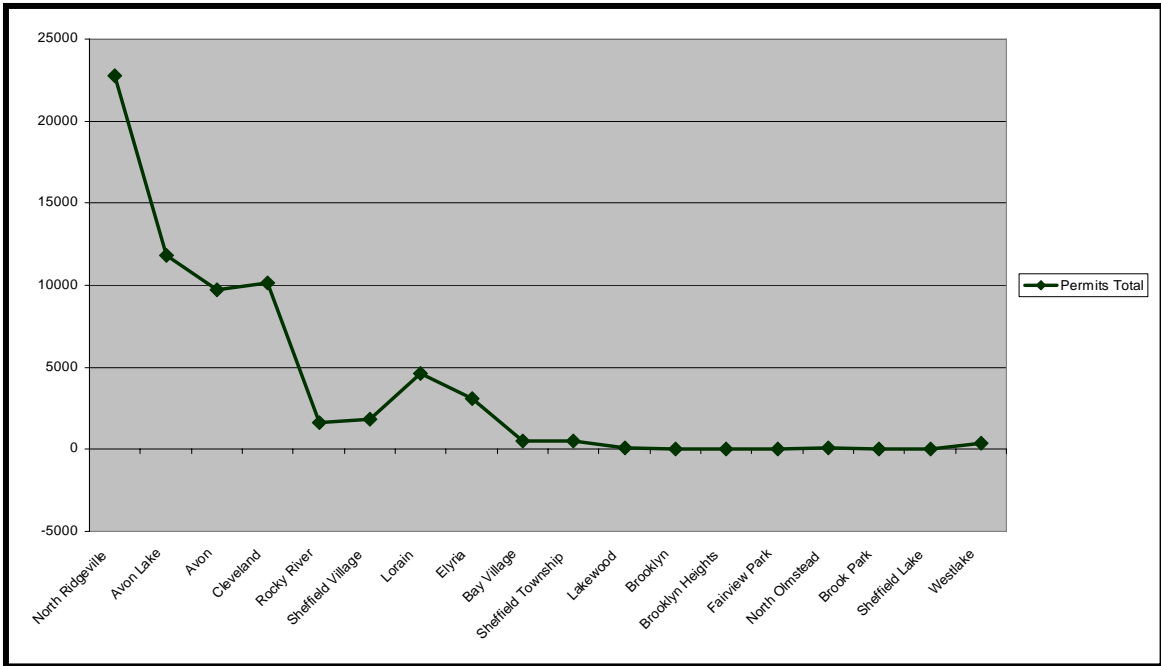
The graph below shows our projected building permits from 2005 and 2030. Again, the trend shows an increase in Lorain County jurisdictions.



BUILDING PERMITS – 2005 VS 2030 (RESIDENTIAL UNITS)

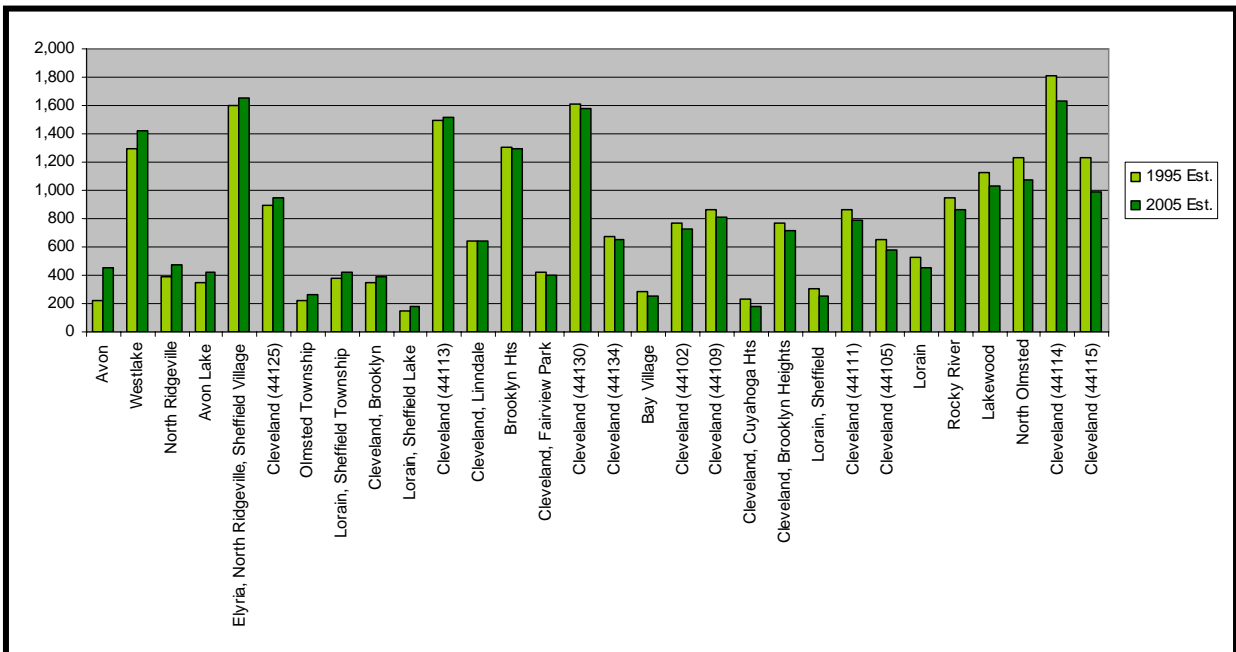
The graph below shows the projects building permits between 2007 and 2030. This project continues the current trends, showing an increase in Lorain County and a decrease in primarily the Western Cuyahoga County jurisdictions. Our predictions show North Ridgeville gaining 22,758 building permits by 2030. In addition, Brook Park and Sheffield Village have no more building permit by 2010.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties



BUILDING PERMITS – TOTAL 2007 to 2030 (RESIDENTIAL UNITS)

Total Establishments



TOTAL ESTABLISHMENTS – 1995 VS 2005

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

The graph above shows the current trend in total establishments (Industrial, Institutional, Commercial and Retail) from 1995 versus 2005. The trend is that the majority undeveloped areas of Lorain County jurisdictions (and Westlake in Cuyahoga County) increase total establishments, while the more developed communities of Western Cuyahoga County show a decrease in total establishments.

The table below shows the top increase between 1995 and 2005. The jurisdictions of Avon, Westlake, and North Ridgeville have primarily large areas that have yet to be developed.

City	1995	2005	Change
Avon	218	450	232
Westlake	1,290	1,426	136
North Ridgeville	394	478	84

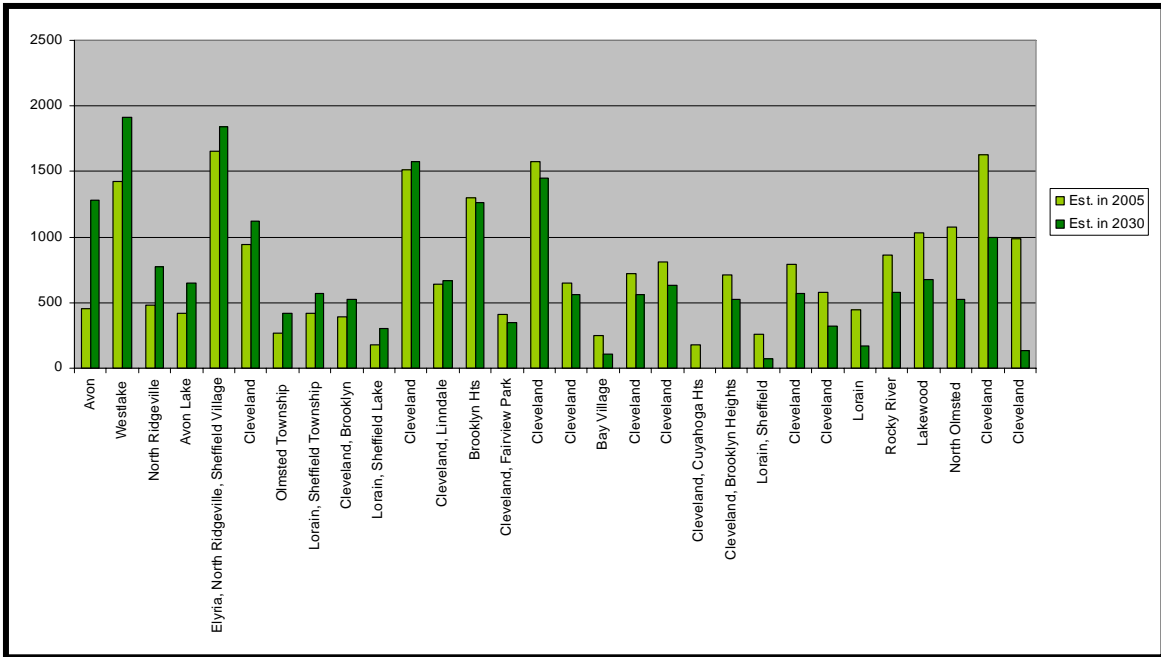
TOTAL ESTABLISHMENTS - INCREASE

The table below shows the top decrease in total establishments from 1995 to 2005. Two zip codes in Cleveland as well as North Olmsted are the jurisdictions that have had the most decline. This could be do the amount establishments in these areas. For example, Cleveland has a large portion of industrial development and North Olmsted has a large amount of commercial and retail.

City	1995	2005	Change
Cleveland (44115)	1,231	990	- 241
Cleveland (44114)	1,811	1,632	- 179
North Olmsted	1,233	1,078	- 155

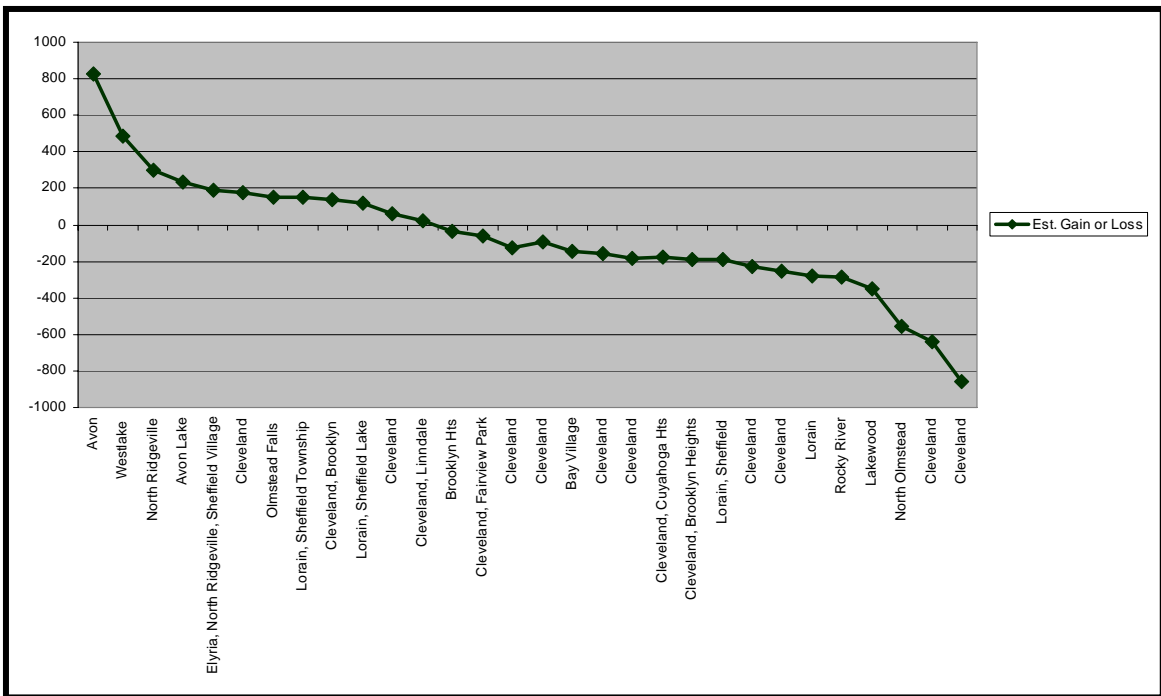
TOTAL ESTABLISHMENTS - DECREASE

Baseline Trends: Western Cuyahoga and Easter Lorain Counties



TOTAL ESTABLISHMENTS – 2005 VS 2030

This graph shows the trend from 2005 versus 2030. Again, the trend continues with increases in the undeveloped areas and decrease in those that are primarily developed.



TOTAL ESTABLISHMENTS – GAIN OR LOSS

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

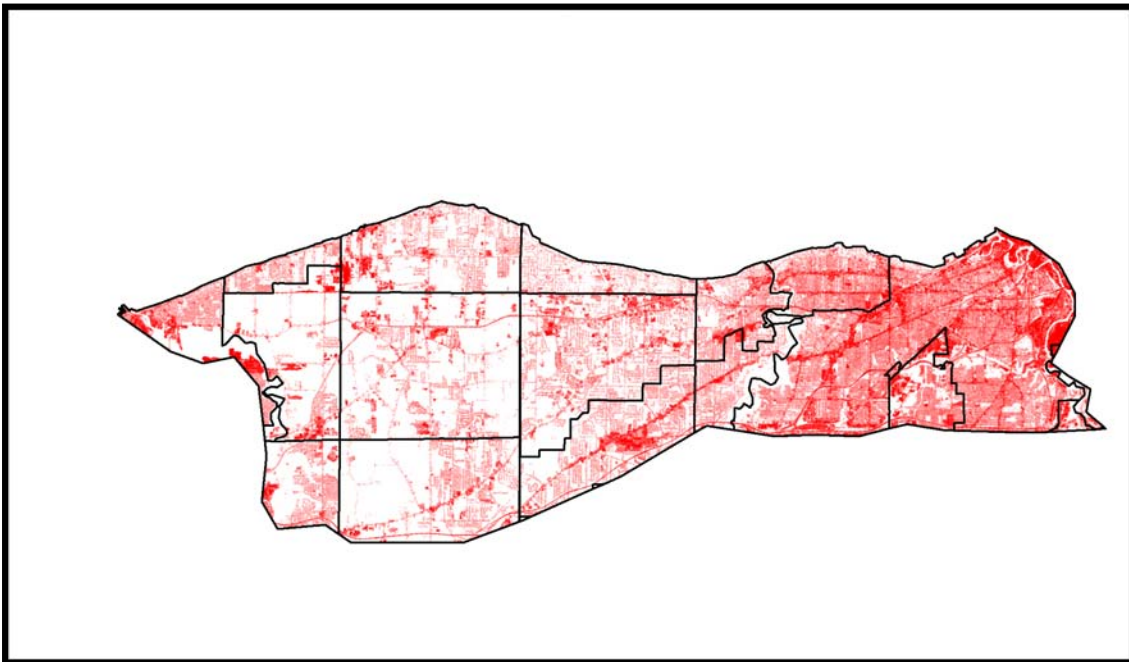
This graph above shows the gain or loss in total establishments from our study area over the 2005 to 2030 time period. From this graph, it appears that Avon gains almost as much as Cleveland loses. In addition, our projections for 2030 show that Avon gains 829 total establishments, while the Cleveland zip code of 44115 loses 861 total establishments.

Impervious Cover

Studies conducted by the Center for Watershed Protection depict a correlation between impervious cover and stream degradation. They have developed thresholds for stream function. Streams of high quality and stability correlate to approximately 0-10 % impervious cover. Degradation of streams, flows that alter the stream geometry and begin channel erosion, typically occurs with 11-30% impervious surface. Any imperviousness over 30% is correlated to an unstable, disconnected stream.

In our study area, the communities that have impervious cover of 10 percent or less are Olmsted Township, North Ridgeville, Avon and Sheffield Village. The communities with 30 percent or greater are Linndale, Cleveland, Cuyahoga Heights, Brooklyn, Lakewood and Brooklyn Heights.

These trends are showing in the corresponding map. The red areas indicate impervious surfaces from 2001 data.



IMPERVIOUS COVER

Our prediction for 2030 is that with increased urban sprawl, more and more hard surfaces will dot the landscape, contributing to an increase in impervious cover in the relatively undeveloped areas of Lorain County.

Analysis

We used nine factors for comparison with the other groups. Our results are as follows:

1. Coordinated Land Use Plan – We found that the current trend is that land use planning happens only on a local community basis.
2. Community Serviced by a Recreation Center – We found that the population in 14 communities currently has access to a recreation center. The majority of these communities are in Cuyahoga County with the exception of Lorain and Elyria.
3. Percent of Acres on Septic – We found that the total acres in our study area is 6859. All of these acres are in Lorain County.
4. Income Tax Rates – We found that primarily lower rates for income tax equate to the less developed jurisdictions in our study area.
5. Property Tax Rates – We found that the number of commercial establishment per acre was highest in the more developed jurisdictions of our study area.
6. Public Transportation – We found that the average percentage of people who use public transportation to commute to work was 2.8%.
7. Acres of Park Land – We found that currently there are 6,000 acres of park land within the study area.
8. Drive to Work – We found that the average percentage of people who drive to work is 91.9%.
9. Neighborhood Quality – We found that the current neighborhood quality is relatively low compared with the other two groups.

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

The Baseline Scenario and the Weighting Matrix

Below are the baseline results of the weighting matrix.

Survey Results		Scope of Impact Factors	Calculated Value
Weight	Sub-Weight	Descriptions	low
0.0721		building code	
	0.072	<i>coordinated land use plan</i>	no
0.0936		city rec center	
	0.094	<i>percent who have community center</i>	81.7%
0.1052		water and sewer rates and service	
	0.105	<i>acres on septic tanks, weighted rate</i>	236.65
0.1694		tax bill	
	0.064	<i>income tax, weighted rate</i>	1.72
	0.105	<i>acres per commercial establishment</i>	11.46
0.1108		public transit	
	0.111	<i>transit to work, weighted rate</i>	6.11
0.1489		parks	
	0.149	<i>acres of parkland</i>	441.46
0.1499		highway access	
	0.150	<i>drive to work</i>	86.2%
0.1501		neighborhood quality	
	0.150	<i>neighborhood sustainability</i>	1

The building code can be measured by if communities coordinate their land use plans. In the baseline, not all communities have land use plans and very few of those that do are somewhat coordinated with their neighbors. Because there is projected to be no change in this situation, the baseline score is a zero.

Currently most of the communities have a recreation center, which is open to all residents. This number is not projected to change, the newer communities in the region will not have the space to put a recreation center, there will be too much housing.

There are projected to be 236.65 acres of land on septic tanks in 2030. Development on those acres either means that minimum lot sizes will be two acres (the minimum lot size to accommodate septic tanks) or the people who move in pay for a new sewer system, when the population density is too big.

The tax bill is split into two uneven weights, weighted income tax, and acres per commercial establishment. The income tax measure is the current tax received by the divided by the 2030 population to get the 2030 income tax rate. Whichever group has the least taxes is the one that does best in income tax. Acres per commercial establishment

Baseline Trends: Western Cuyahoga and Easter Lorain Counties

are the 2030 projection of average acres used by each commercial establishment. Whichever group has the least acres per commercial establishment does the best, allowing for other uses on the limited land.

The Public transit was weighed by the amount of people per hundred who ride public transportation. For sundry reasons, more ridership for the public transportation system is better.

Freeway access was measured by number of people who drive to work. The fewer people who drive to work, the better that group ranked. Fewer people driving to work is rated better because the more sustainable the neighborhood is and more money people have to spend on goods not related to their cars.

Parks are measured by total acres of parkland expected in 2030. As parks make people want to live nearby more park acres is a better result for the scenarios, according to one of the speakers, housing that borders parkland costs the buyer double what that house would cost anywhere else.

Neighborhood quality is measured in terms of environmental and economic sustainability (neighborhood sustainability). Unlike any other measure, Neighborhood sustainability ranks the three groups one to three, reflecting how each group compares with the other two.

APPENDIX – Balanced Growth 10 Principles

10 Guiding Principles of the Balanced Growth Initiative

1. Maximize investment in existing core urban areas, transportation, and infrastructure networks to enhance the economic vitality of existing communities.
2. Minimize the conversion of green space and the loss of critical habitat areas, farmland, forest and open spaces.
3. Limit any net increase in the loading of pollutants or transfer of pollution leading from one medium to another.
4. To the extent feasible, protect and restore the natural hydrology of the watershed and flow characteristics of its streams, tributaries, and wetlands.
5. Restore the physical habitat and chemical water quality of the watershed to protect and restore diverse and thriving plant communities and preserve rare and endangered species.
6. Encourage the inclusion of all economic and environmental factors into cost/benefit accounting in land use and development decisions.
7. Avoid development decisions that shift economic benefits or environmental burdens from one location to another.
8. Establish and maintain a safe, efficient, and accessible transportation system that integrates highway, rail, air, transit, water, and pedestrian networks to foster economic growth and personal travel.
9. Encourage that all new development and redevelopment initiatives address the need to protect and preserve access to historic, cultural, and scenic routes.
10. Promote public access to and enjoyment of our natural resources for all Ohioans.

WORKS CITED

Linking Land Use and Lake Erie: Best Local Land Use Practices. Ohio Lake Erie Commission Document. 2005.

Urbanization in the Cuyahoga Watershed. Cuyahoga River Remedial Action Plan Brochure.

Wetlands in the Cuyahoga River Watershed. Cuyahoga River Remedial Action Plan Brochure.

Kellogg, Chadbourne, et. al., et. al. *The State Role in Guiding Land Use Change in the Ohio Lake Erie Basin: Key Policies, Programs and Incentives for the Ohio Balanced Growth Program.* 2007.

WEBSITES

Cleveland Hopkins International Airport <http://www.clevelandairport.com>

Colorado Tree Benefits http://www.coloradotrees.org/benefits.htm#Large_tree

Cuyahoga County Planning Commission <http://planning.co.cuyahoga.oh.us/green/>

Greater Cleveland Regional Transit Authority <http://www.gcrta.org>

NEOCANDO <http://neocando.case.edu/cando/index.jsp>

United States Environmental Protection Agency <http://cfpub.epa.gov/npdes/>