

Town of Bedford

Buildout Report



**CTAP
PROGRAM**



**BUILDOUT
METHODS**



**COMMUNITY
SCENARIOS**



**BUILDOUT
RESULTS**



INDICATORS



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Introduction

This Buildout Study conducted for the town of Bedford is based on the CTAP buildout studies that are part of a five-year initiative designed to assist communities that will be affected by the rebuilding of I-93. This buildout is designed to allow a community to assess their future needs and help them reduce any negative consequences from the increased development pressure caused by the widening of I-93.

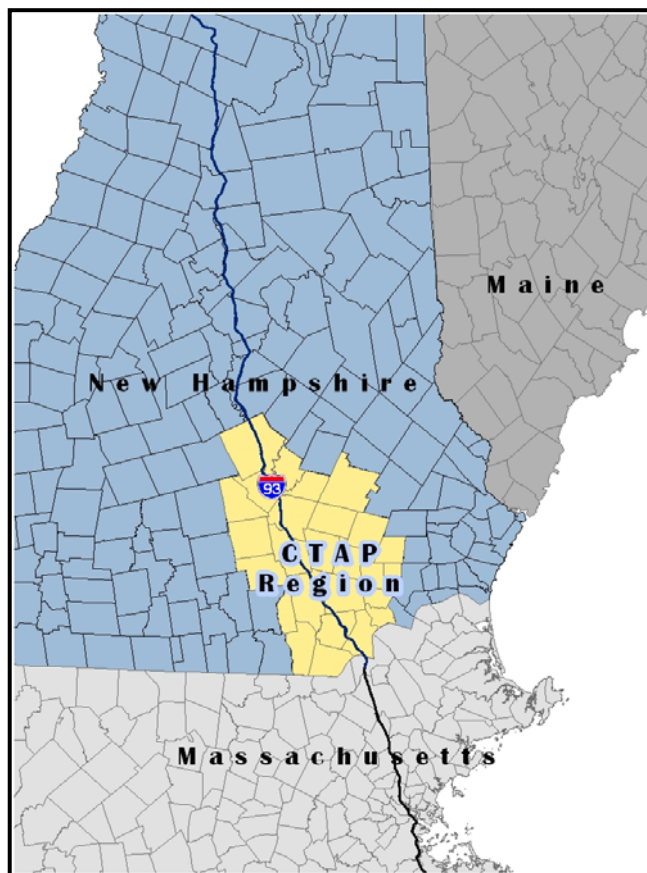
What is CTAP?

CTAP is a joint effort between the 26 communities in the corridor, state agencies, regional planning commissions, and several non-profit organizations. The purpose of CTAP is to promote beneficial growth patterns and development practices that minimize the negative effects of growth on community services, remaining open space, schools, traffic patterns, environmental quality, and existing residential and commercial development. The CTAP initiative consists of several projects, one of which is a buildout analysis. A standardized buildout analysis will be completed for each of the 26 CTAP communities.

What is a Buildout?

A buildout is a tool that allows planners to estimate future development based on different scenarios. This buildout is an analysis of existing adopted municipal policy. The buildout method allows for the potential testing of alternative land use regulation, open space planning and major development scenarios. A buildout consists of one or more scenarios. This buildout contains three scenarios: base, standard alternative, and community alternative. The process is designed with the capability for conducting future alternative scenario testing.

Comparing various scenarios allows planners to test the effects and consequences of new zoning ordinances. Changing setbacks, densities, and



building restrictions can significantly alter a buildout. The analysis of results allows planners to evaluate the effectiveness and viability of changes to the zoning code. Questions that can be answered by a buildout scenario testing include: Where do I want my community to be at buildout? How much open space will there be? What will the traffic patterns look like? What will the quality of our environmental resources be like? Where will people live and what will the development patterns look like? The purpose of CTAP is to promote beneficial answers to all of these questions. The CTAP program aims to achieve goals

The Buildout analysis shows the maximum growth that is likely to occur in a community under current land use regulations (zoning).

that cover four themes: community infrastructure, environment protection, land use, and open space, downtown/village centers and community vitality and the local economy. The buildout project is a community empowerment tool to help people make the best long-term planning decisions.

What a Buildout is not?

A Buildout is not a prediction of what will occur. It is a planning tool to allow community decision makers to understand the impacts of growth under a set of land use rules. In addition, the Community Specified scenarios in this report do not necessarily represent official policy goals or a plan for the community, but are merely a test of one alternative growth scenario.

Scenario Planning

Scenarios are an analysis about what might be. They are not predictions about what will happen but they are possible futures based on what already

exists, on current trends, and on the values and on the preferences of the town. The scenarios in this report are based on both standardized methods and a scenario where the details have been specified by members of the Master Plan Committee. The scenarios are built as a way to compare outcomes and learn about the potential effects of government policies over a long span of time. Because the analysis is quantitative, scenarios can be compared directly utilizing charts and maps. The point is to help discover which long-term growth scenarios are preferable and most closely match the goals and values of the community.

Report Template

The format of this report is based upon the template used for the CTAP project. Maps, charts and a few paragraphs of text will change for each community. This report presents only the results of the buildout scenarios. It does not attempt to be a planning analysis of those results.

Buildout questions:

- **Where do I want my community to be at buildout?**
- **How much open space will there be?**
- **What will the traffic patterns look like?**
- **What will the quality of our environmental resources be like?**
- **Where will people live and what will the development patterns look like?**



Methods

Tools and Data

Buildouts were conducted using Geographic Information systems (GIS) software. The application used for this project is developed by the mapping software company ESRI. ArcMap and CommunityViz are the core programs used in the analysis. The CommunityViz program is an extension that works with ArcMap and is used specifically to perform buildout analyses. CommunityViz was developed by the Orton Family Foundation in order to provide communities with an affordable tool to perform buildout studies.

The GIS data used in this study originates from several sources. The base shapefiles (road centerlines, conservation lands, wetlands, etc.) were provided by GRANIT, the official New Hampshire GIS data provider. The land use polygons were created through a prior CTAP project, using 2005 aerial images provided by the NH Department of Transportation. The classification applied to the land use polygons is very detailed, using over 50 land uses. The current building points were also determined using the 2005 aerial images.



CTAP Existing Land Use

- Multi Family Residential
- Single Family Residential
- Commerical
- Industrial
- Transportation & Utilities
- Mixed Use
- Outdoor & Other Uses
- Agricultural Land
- Brush & Transitional Forest
- Forest Lands
- Water
- Wetlands
- Barren Lands

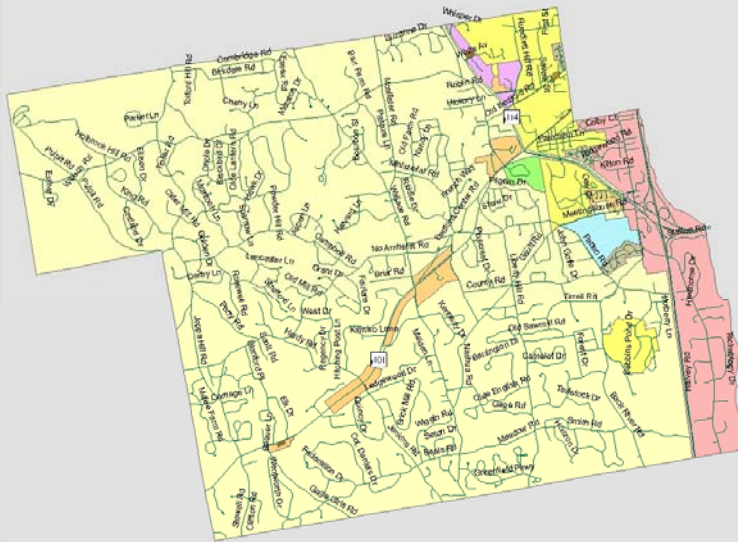




Bedford Zoning

Zoning

- Apartment Residential
- Civic/Institutional
- Commercial
- General Residential
- Highway Commercial
- Neighborhood Commercial
- Office
- Rt. 3 Performance Corridor
- Residential/Agricultural
- Service Industrial



Procedures

CommunityViz software uses the land use and zoning inputs with the constraint layers to create a buildable area GIS layer. First a numeric buildout is calculated using lot size and allowable density information. Next a spatial buildout is conducted. This process takes into account spatial restrictions (i.e. Setbacks from roads, distance between buildings). The spatial restrictions for the base buildout are determined using the current zoning ordinances. This produces a layer of new estimated buildings and places them as points on the map. Standard Alternative and Community Alternative Buildouts using the same process with adjustments to the land use rules (Zoning changes, allowable uses & allowable densities) that are specified in those scenarios.

Once the buildout is complete, a template, containing all assumptions, indicators and charts is applied. All indicators are calculated from the basic buildout results. Detailed input and output reports, produced directly from the CommunityViz software, are available in Appendix A.

Map layers used in the Buildout Analysis.

Land use inputs:

- CTAP Land Use - based on 2005 Aerial Imagery
- Zoning
- Current Building points - based on 2005 Aerial Imagery
- Community Centers - NHDES Sprawl Indicators data, NH GRANIT
- Road Centerlines - NHDOT, NH GRANIT
- Transit Stops - Derived from local data
- Sewer Service Areas - NHDES, NH GRANIT

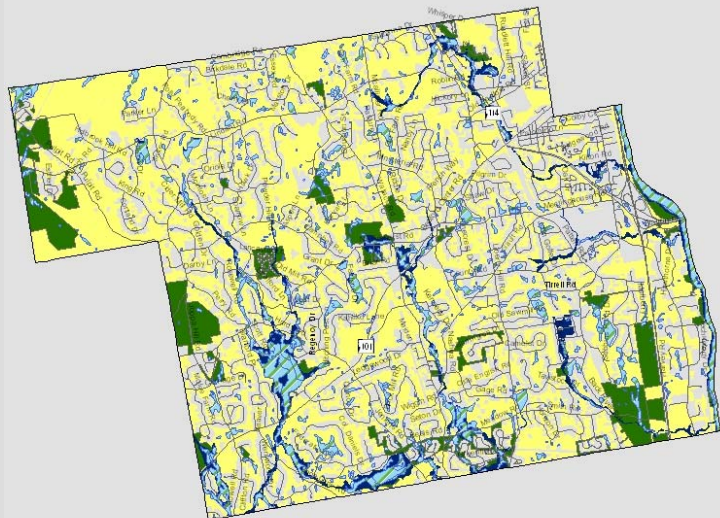
Constraint layers:

- Wetlands, National Wetland Inventory (NWI) - NH GRANIT
- 100-Year Floodplain - FEMA, NH GRANIT
- Conservation Lands - Local data & NH



Developable Lands & Constraints

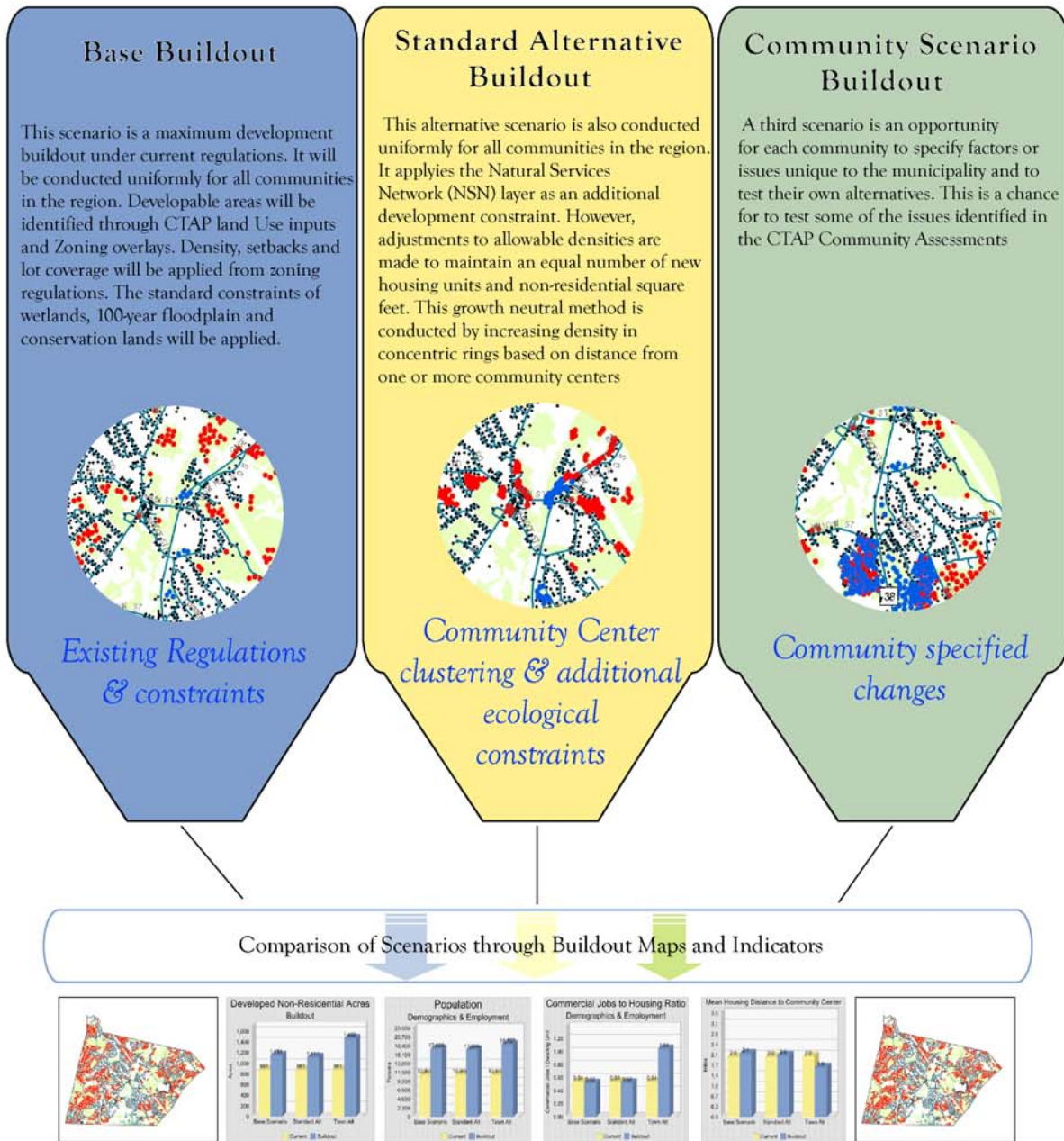
-  National Wetlands Inventory
-  100 Year Floodplain
-  Conservation Land
-  Developable Land





Buildout Scenarios

This report tests and compares three alternative scenarios for growth. Each scenario produces different land use patterns, different densities and different development totals. The mix of jobs and housing, available open space, traffic, schools, water and air quality and community character are all impacted in different ways. By comparing the maps and charts produced by each scenario, a community can analyze how that growth pattern will affect their city of town.



Base Scenario

The first scenario, conducted for all communities, is the Base Scenario. This scenario represents what buildout would look like following the current land use regulations. Density, setbacks and lot coverage is applied from the current zoning regulations. The standard development constraints of wetlands, 100-year floodplain and conservation lands are applied.

If current zoning is a blueprint for how the community should grow then this scenario is the culmination of the existing regulations. The indicators in this report are meant to portray a wide range of conditions at buildout. Development

growth means more than additional persons, houses or commercial buildings. It can have impacts on

If current zoning is a blueprint for how the community should grow then the Base Buildout Scenario is the culmination of the existing regulations.

finances, traffic, municipal services, environmental quality and sense of community or place. The land use pattern for how a community grows, where development will take place and in what densities, can also have a significant impact.



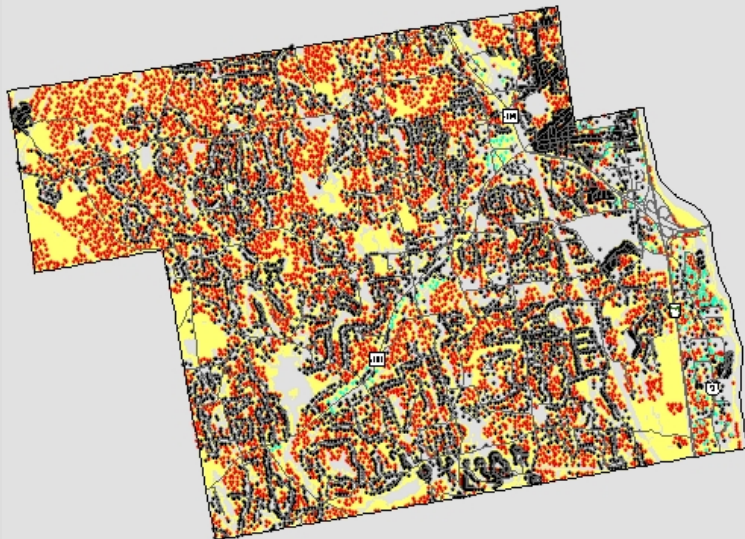
Base Buildout

- Existing Buildings

Developable Lands

Buildings

- Commercial
- Single Family Residential



Standard Alternative

The standard alternative scenario will also be conducted uniformly for all communities in the region. The scenario is different from the Base Scenario in a couple of key ways. First, it applies the Natural Services Network (NSN) layer as an additional development constraint. Second, adjustments to allowable densities will be made to maintain an equal number of new housing units and non-residential square feet. This growth neutral method will be conducted by increasing density in concentric rings based on distance from one or more community centers.

This scenario is focused on creating densely developed downtown areas, sparing important ecological areas identified in the Natural Services

network (NSN). The NSN is a co-occurrence analysis and includes four components: water supply lands, flood storage lands, productive soils, and important wildlife habitat.

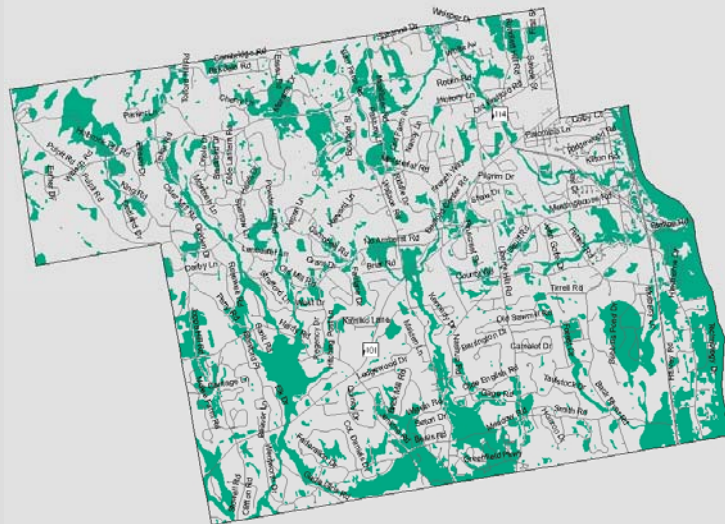
The Standard Alternative Scenario does not represent a policy proposal for the community. It is a standardized method to analyze an alternative growth scenario that can be applied uniformly to all CTAP communities.



Natural Services Network Constraint



Natural Services Network (NSN)



The key to the Standard Alternative Scenario is to adjust allowable development densities so that an approximately equal amount of growth occurs as the Base Buildout despite the fact that more land has been set aside as un-buildable. This scenario is applying a standardized, uniform growth alternative to all communities in the CTAP region. It is not

limiting the amount of commercial and residential growth that might occur in the community, but it is managing it differently.

Standard Alternative Scenario:

- NSN added as additional development constraint.
- Greater density around community centers.
- Same amount of growth as base scenario

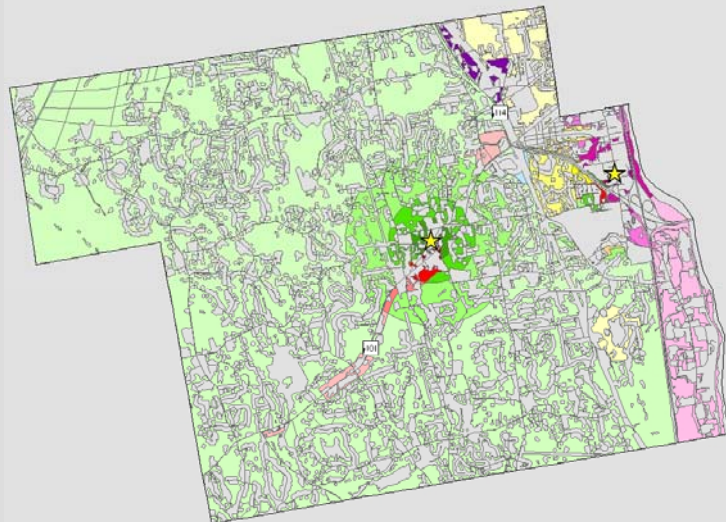


Standard Alternative Density Changes

★ Community Centers

Developable Lands

- Apartment Residential-Outside 1 Mile
- Apartment Residential-Within 1 Mile
- Apartment Residential-Within 1/2 Mile
- Commercial-Outside 1 Mile
- Commercial-Within 1 Mile
- Commercial-Within 1/2 Mile
- Commercial-Within 1/4 Mile
- General Residential--Outside 1 Mile
- General Residential--Within 1 Mile
- General Residential--Within 1/2 Mile
- Highway Commercial--Outside 1 Mile
- Office-Outside 1 Mile
- Office-Within 1 Mile
- Residential and Agricultural-Outside 1 Mile
- Residential and Agricultural-Within 1 Mile
- Residential and Agricultural-Within 1/2 Mile
- Residential and Agricultural-Within 1/4 Mile
- Route 3 Corridor Performance Zone-Outside 1 Mile
- Route 3 Corridor Performance Zone-Within 1 Mile
- Route 3 Corridor Performance Zone-Within 1/2 Mile
- Route 3 Corridor Performance Zone-Within 1/4 Mile
- Service Industrial-Outside 1 Mile



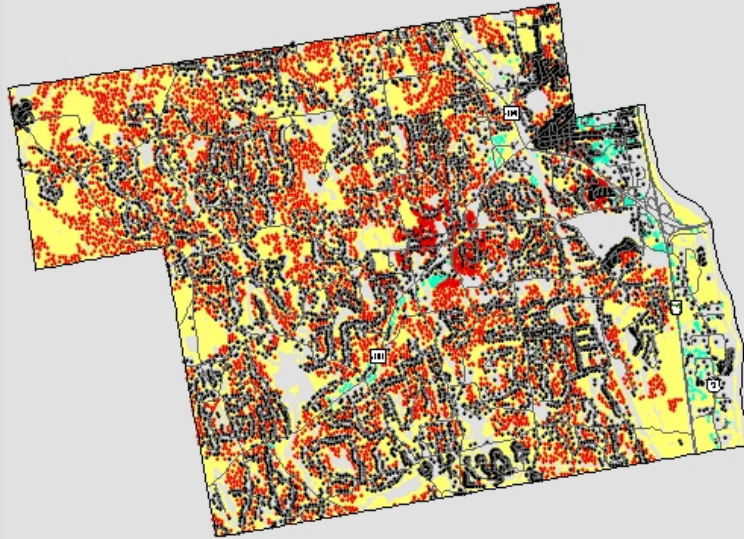


Standard Alternative Buildout

- Existing Buildings
- Developable Lands

Buildings

- Commercial
- Single Family Residential



Community Alternative

A third scenario was provided for each community to specify factors or issues unique to the municipality and to test their own alternatives. This scenario is known as the **community alternative**. This is a

The Community Alternative scenario is only a test of an alternative growth pattern. It is a planning tool conducted to see what changes might occur. It does not necessarily represent a policy plan for the community

chance for certain properties to be removed or added to the developable areas list or for particular regulation changes to be implemented. In order to

get the community's input for their scenario, meetings were conducted with local officials and volunteers. This was an opportunity for the community leaders to test what would occur if their Town or City were to grow in a different way. This is a chance to apply goals specified in Master Plan or other planning document, or to test the affects of purchasing large tracts of land for conservation.

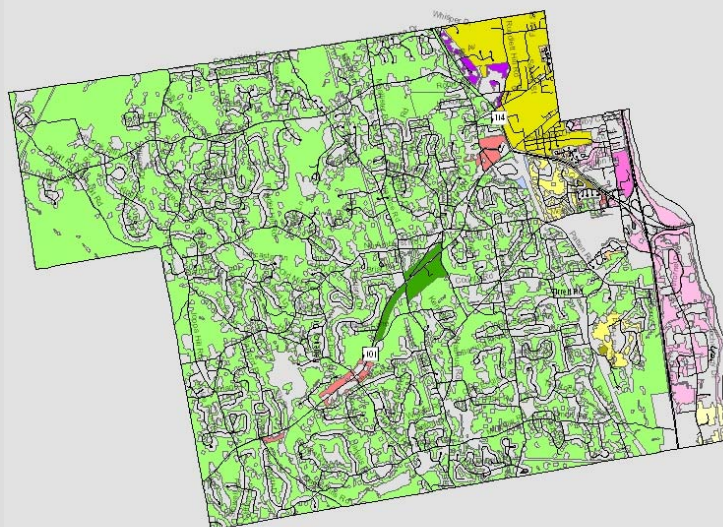
The Community Alternative scenario is only a test of an alternative growth pattern. It is a planning tool conducted to see what changes might occur. It does not necessarily represent a policy plan for the community. Unlike the Standard Alternative Scenario, the Community Scenario does not require growth to be the equal to the Base Buildout. Significantly lower or greater amounts of development are possible.



Town Alternative Scenario

Community Scenario Buildable Lands

- Residential with 1/2 mile of Future Transit Center
- Apartment Residential
- Commercial
- General Residential-
- General Residential-Water/Sewer
- Highway Commercial-
- Office
- Redevelopment Commercial Zone
- Redevelopment General Residential Zone
- Residential and Agricultural
- Route 3 Corridor Performance Zone
- Redevelopment Route 3 Performance Zone
- Service Industrial



The Bedford Community Scenario consists of areas of redevelopment to produce high density residential in mixed use villages of potential future development. An area of high density residential development (32 dwelling units per acre) was placed within a ½ mile buffer around the potential transit station where Macy's is currently located and near the future airport access road.

The area currently zoned general residential around Donald St. was designated for redevelopment with residential development consisting of 14 dwelling units per acre and mixed use villages with commercial and residential uses.

Another area of redevelopment was designated along Route 101 in areas currently zoned commercial that are serviced by municipal water and sewer.

Redevelopment of this area consisted of mixed use

villages with commercial development on the lower floors and residential development on the upper floors.

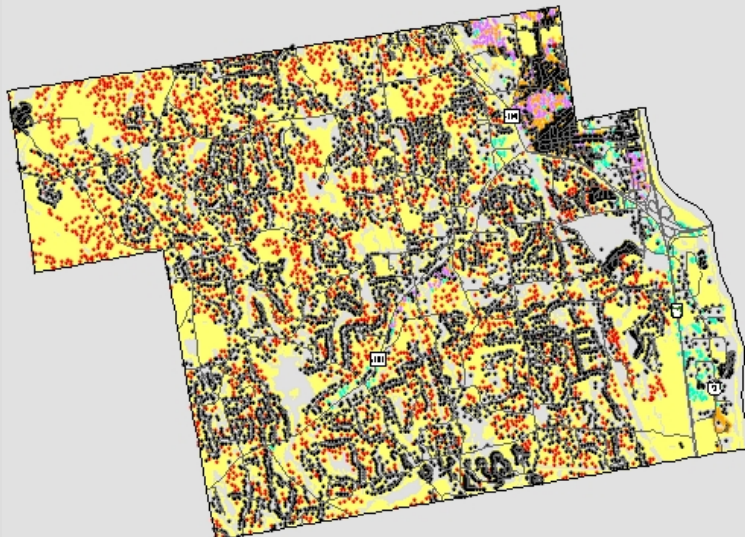
A mixed use village with both commercial and residential development consisting of 32 dwelling units per acre was created on the northern portion in the Route 3 performance zone between Upjohn Street and Park Drive.

A timescope is a tool used to determine the year a town will reach its buildout capacity based on growth rates. Based on housing data from the town, a linear growth rate of 45 houses built per year was chosen for this timescope. In 2020, the population is estimated to be 19,426. By 2060 the population is estimated to reach 24,034. The projected buildout dates would be 2137, 2139 and 2083 for the base, standard alternative and community alternative buildouts respectively.



Town Alternative Buildout

- Existing Buildings
- Developable Lands
- Buildout Buildings**
 - Commercial
 - Mixed Use
 - Multi-Family Residential
 - Single Family Residential

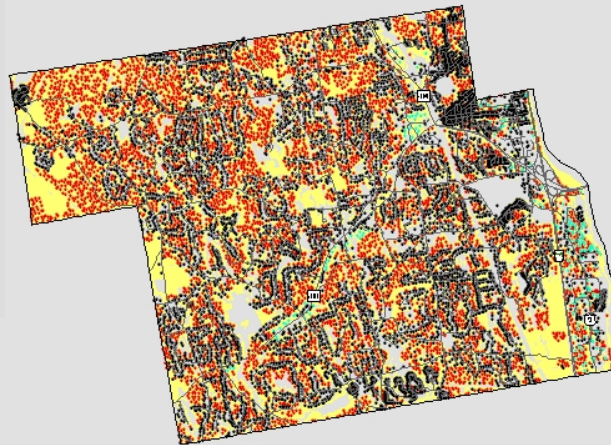




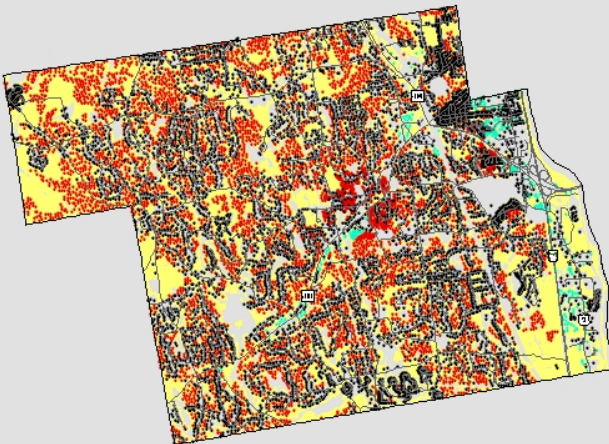
Buildout Scenario Comparison

- Existing Buildings
- Developable Lands
- Buildout Buildings**
 - Commercial
 - Mixed Use
 - Multi-Family Residential
 - Single Family Residential

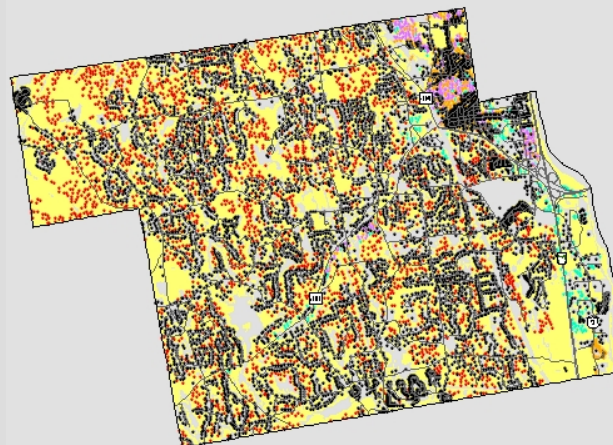
Base Buildout



Standard Alternative



Community Alternative





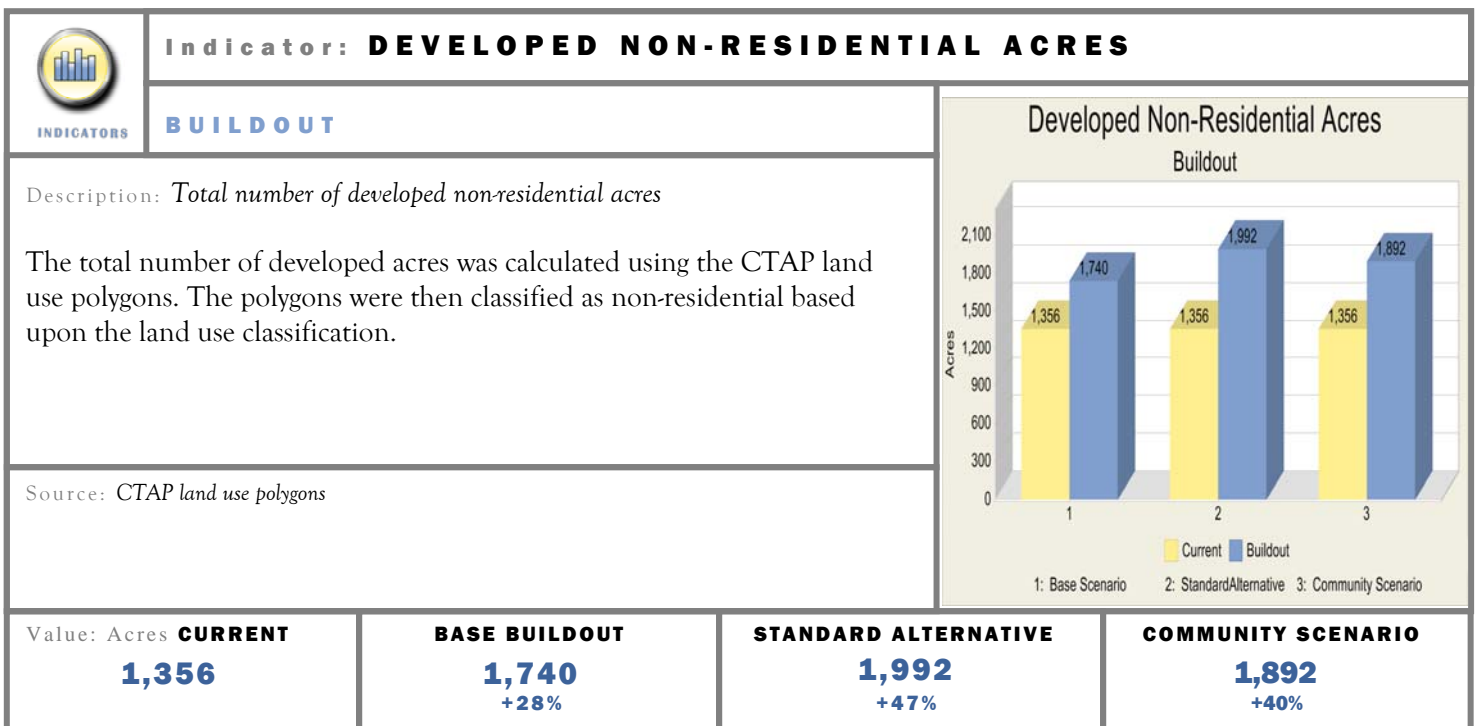
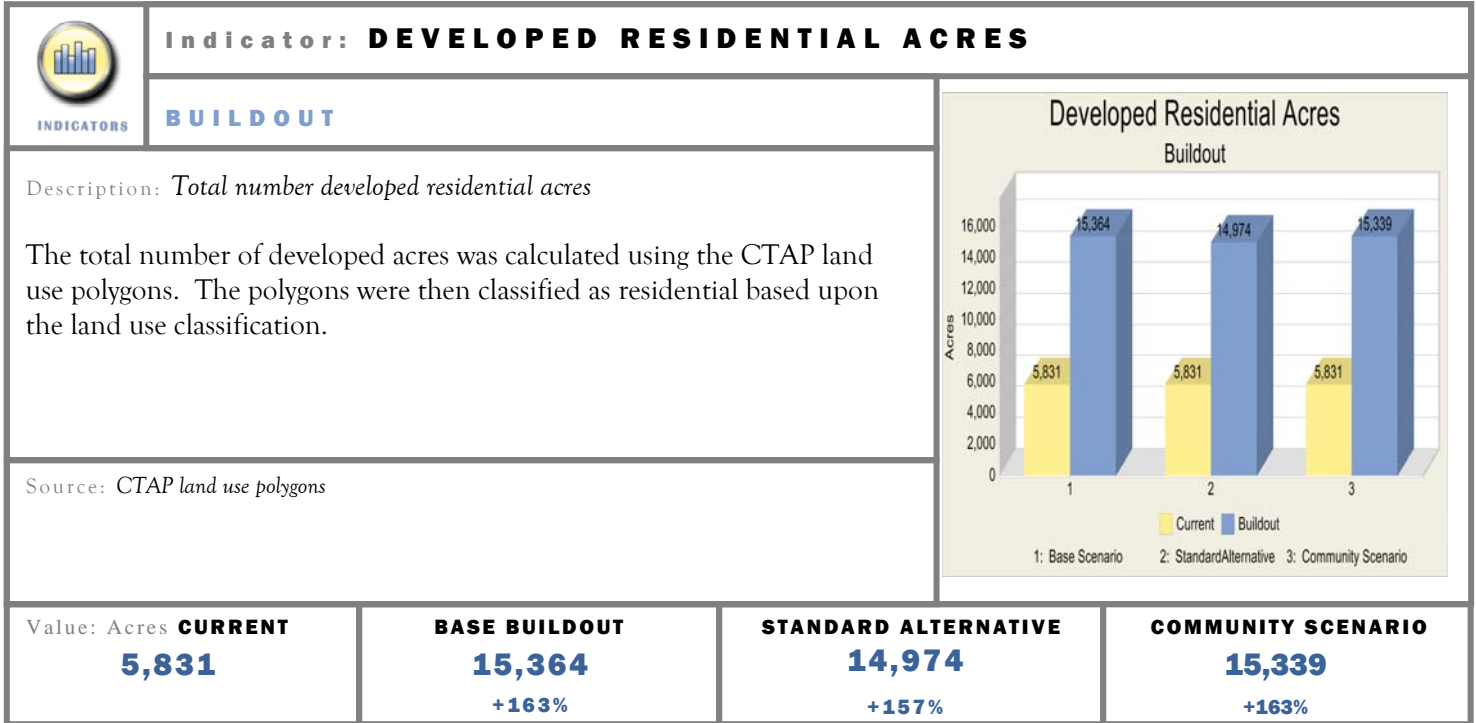
Indicators

Indicators are impact or performance measures that help people choose alternatives that best match their objectives or desired outcomes. An indicator is a calculated value that represents the impacts or outcomes of a scenario. An indicator might be used to evaluate costs, revenues, average household size, or total daily auto trips. The buildout indicators in this report are meant to provide a macro, overall picture of how a community could look at buildout.

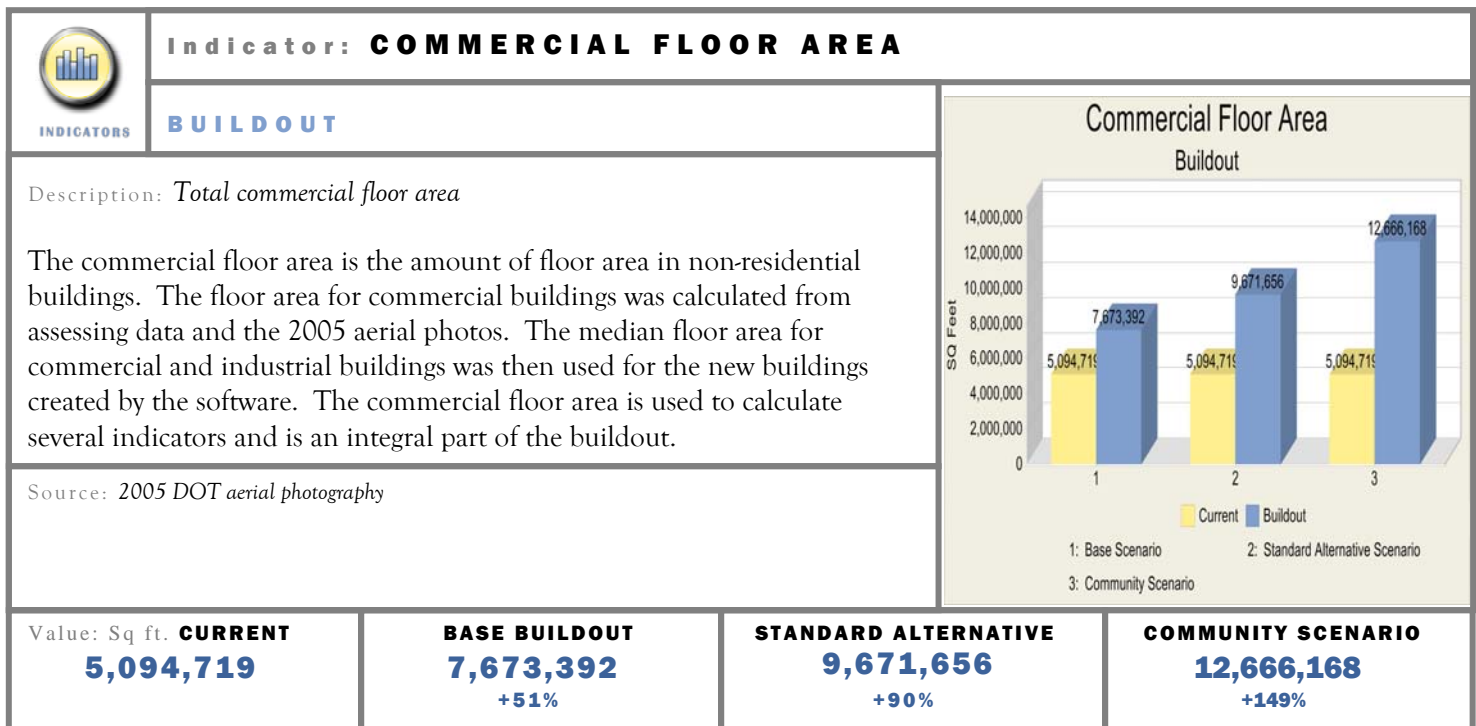
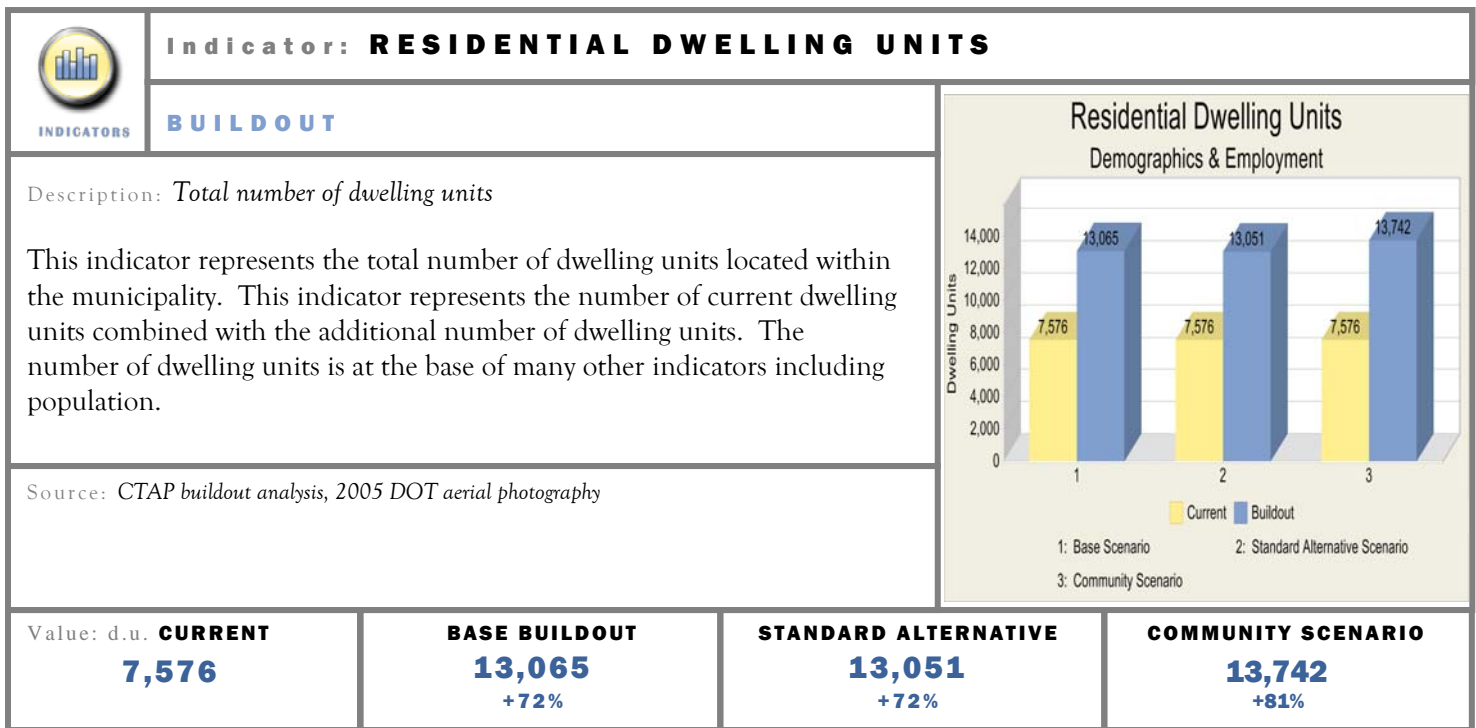
Comparing indicators by the different buildout scenarios provides an assessment of the effects different development patterns may have. There are 40 indicators arranged in seven categories: Buildout, Demographics & Employment, Environmental & Open Space, Land Use Characteristics, Municipal Demands, Water & Energy Use & Transportation. The following pages explain what each indicator means and chart the differences by scenario.

Category	Indicator	Units	Current	Base Buildout	Percent Change	Standard Alternative Scenario	Percent Change	Town Scenario	Percent Change
Buildout	Developed Residential Acres	Acres	5,831	15,364	163%	14,974	157%	15,339	163%
	Developed Non-Residential Acres	Acres	1,356	1,740	28%	1,992	47%	1,892	40%
	Residential Dwelling Units	d.u.'s	7,576	13,065	72%	13,051	72%	13,742	81%
	Commercial Floor Area	sq. ft	5,094,719	7,673,392	51%	9,671,656	90%	12,666,168	149%
Demographics & Employment	Population	Persons	18,274	32,325	77%	32,290	77%	34,059	86%
	School Kids Population	School Kids	4,424	7,080	60%	7,073	60%	7,407	67%
	Labor Force Population	Workers	7,472	13,218	77%	13,203	77%	13,927	86%
	Commercial Jobs	Jobs	6,190	9,324	51%	11,752	90%	15,390	149%
	Jobs to Housing Ratio	Jobs/d.u.	0.82	0.71	-13%	0.9	10%	1.12	37%
Environmental & Open Space	Open Space Supply	Acres	15,708	5,791	-63%	5,930	-62%	5,664	-64%
	Impervious Surfaces	Percent	6.6	14.3	117%	14.5	120%	14.6	121%
Land Use Characteristics	Total Density	Persons/mi²	484	857	77%	856	77%	903	87%
	Residential Housing Density	d.u./Acre	1.3	0.85	-35%	0.87	-33%	0.9	-31%
	Residential Development Footprint	Acres/d.u.	0.77	1.18	53%	1.15	49%	1.12	45%
	Recreation Density	Ft²/person	521	295	-43%	295	-43%	280	-46%
	Housing Proximity to Recreation	Miles	0.78	0.87	12%	0.86	10%	0.64	-18%
	Housing Proximity to Community Centers	Miles	2.2	2.2	0%	2.1	-5%	2.2	0%
	Housing Proximity to Amenities	Miles	0.86	0.93	8%	0.91	6%	0.9	5%
	Walkability	Percent	3.86	3.31	-14%	6.63	72%	8.78	127%
	Housing Proximity to Transit	Miles	2.71	2.94	8%	2.94	8%	2.79	3%
Municipal Demands	Fire & Ambulance Service	Calls/Years	1,462	2,586	77%	2,583	77%	2,725	86%
	Police Service	Calls/Years	23,027	41,053	78%	41,008	78%	43,254	88%
	Solid Waste Demand	Annual Tons	9,868	17,456	77%	17,436	77%	18,392	86%
Water & Energy Use	Total Energy Use	mbtu/hh/yr	1,376,693	2,259,387	64%	2,392,110	74%	2,414,576	75%
	Residential Energy Use	mbtu/hh/yr	871,240	1,493,583	71%	1,426,879	64%	1,150,492	32%
	Commercial Energy Use	mbtu/hh/yr	508,453	765,804	51%	965,231	90%	1,264,084	149%
	Residential Water Use	mgals	892	1,670	87%	1,629	83%	1,534	72%
Transportation	Vehicles	Vehicles	13,940	24,040	72%	24,014	72%	25,285	81%
	Vehicle Trips per Day	Trips/Day	67,587	119,827	77%	117,575	74%	114,262	69%
	Annual CO Auto Emissions	Grams/Yr	10,079,400	18,217,585	81%	17,655,799	75%	15,886,496	58%
	Annual CO2 Auto Emissions	Tons/Yr	208	376	81%	365	75%	328	58%
	Annual NOx Auto Emissions	Grams/Yr	631,918	1,142,134	81%	1,106,918	75%	995,988	58%
	Annual Hydrocarbon Auto Emissions	Grams/Yr	1,273,138	2,301,080	81%	2,230,120	75%	2,006,638	58%

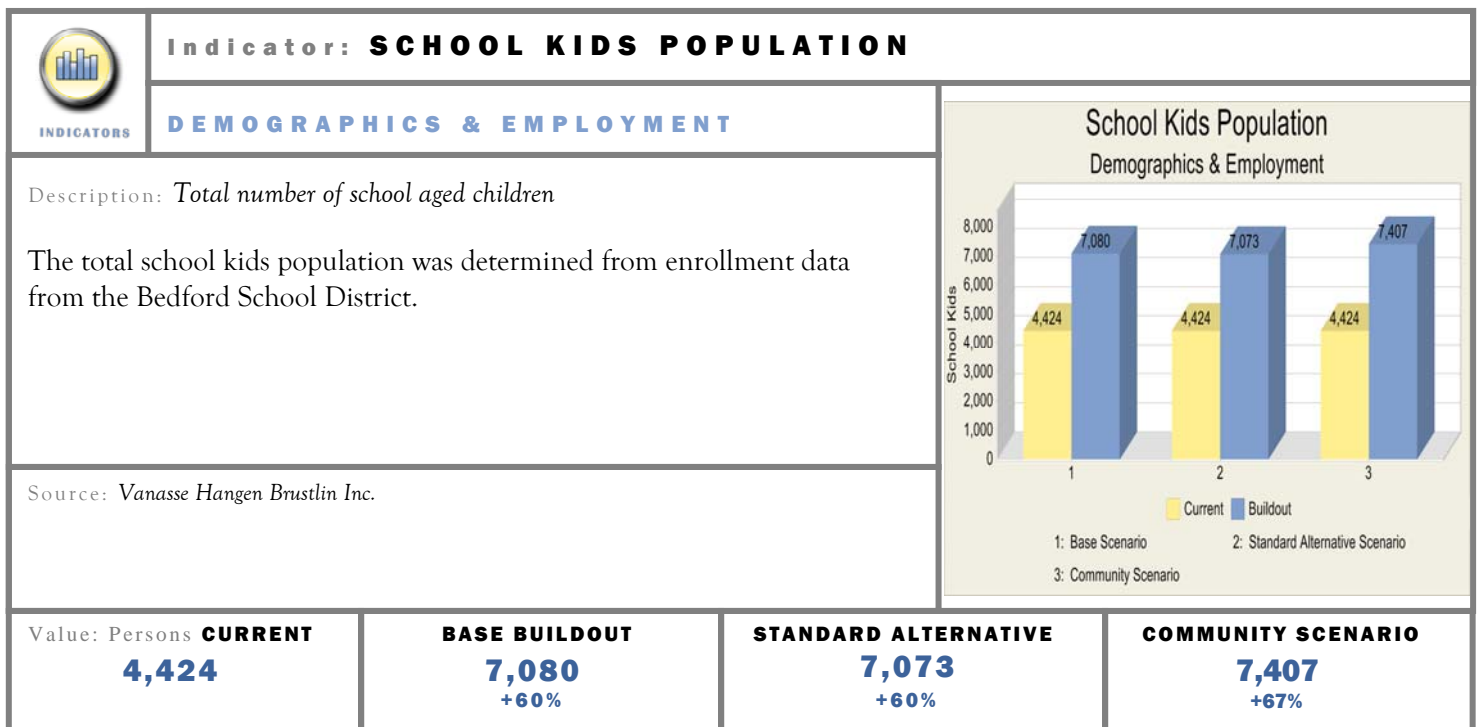
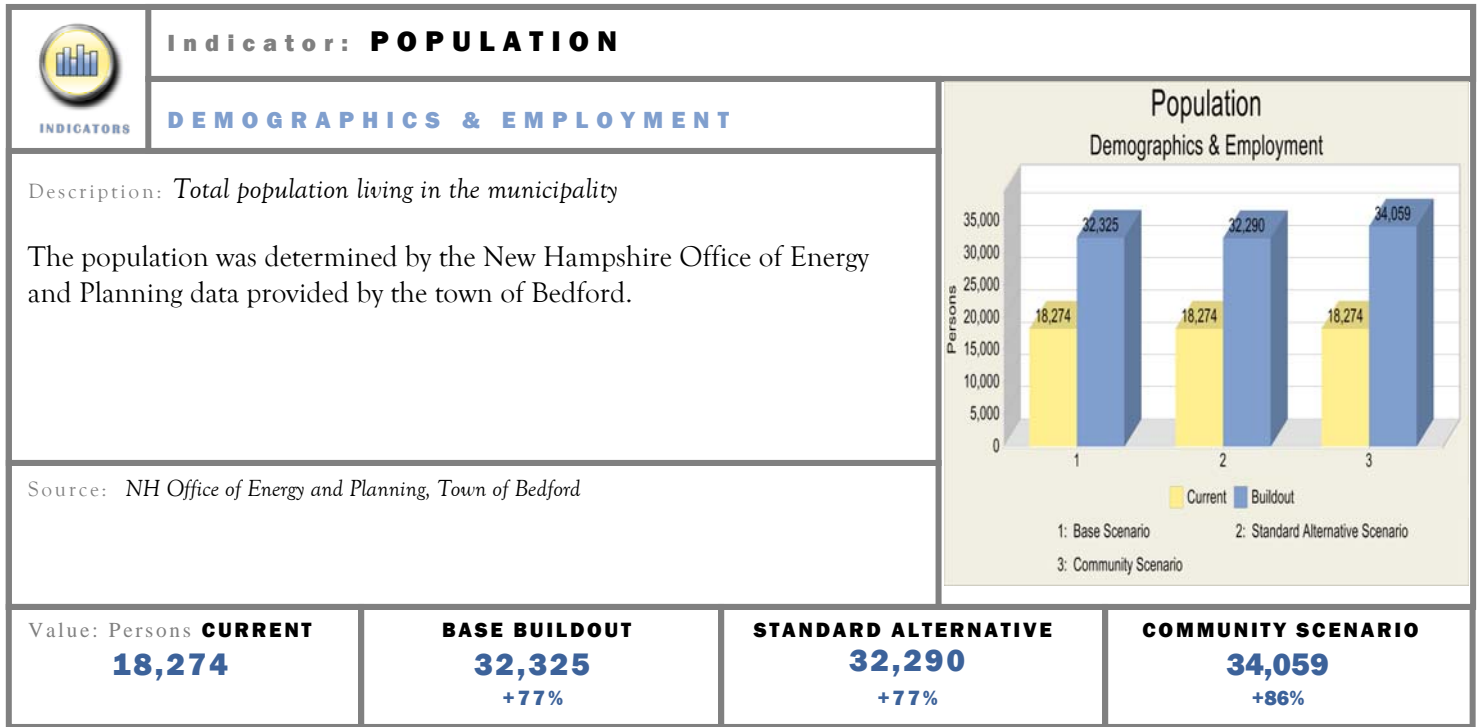
Indicators - BUILDOUT



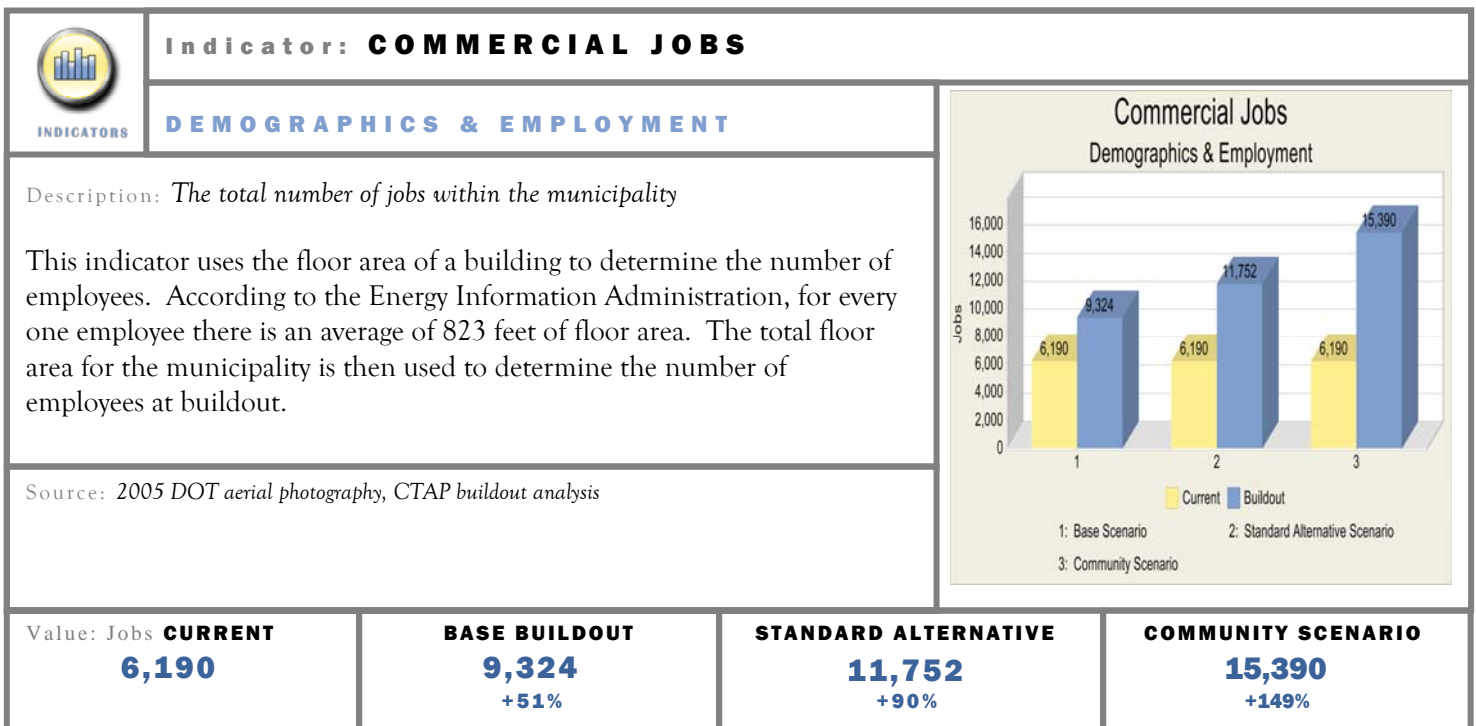
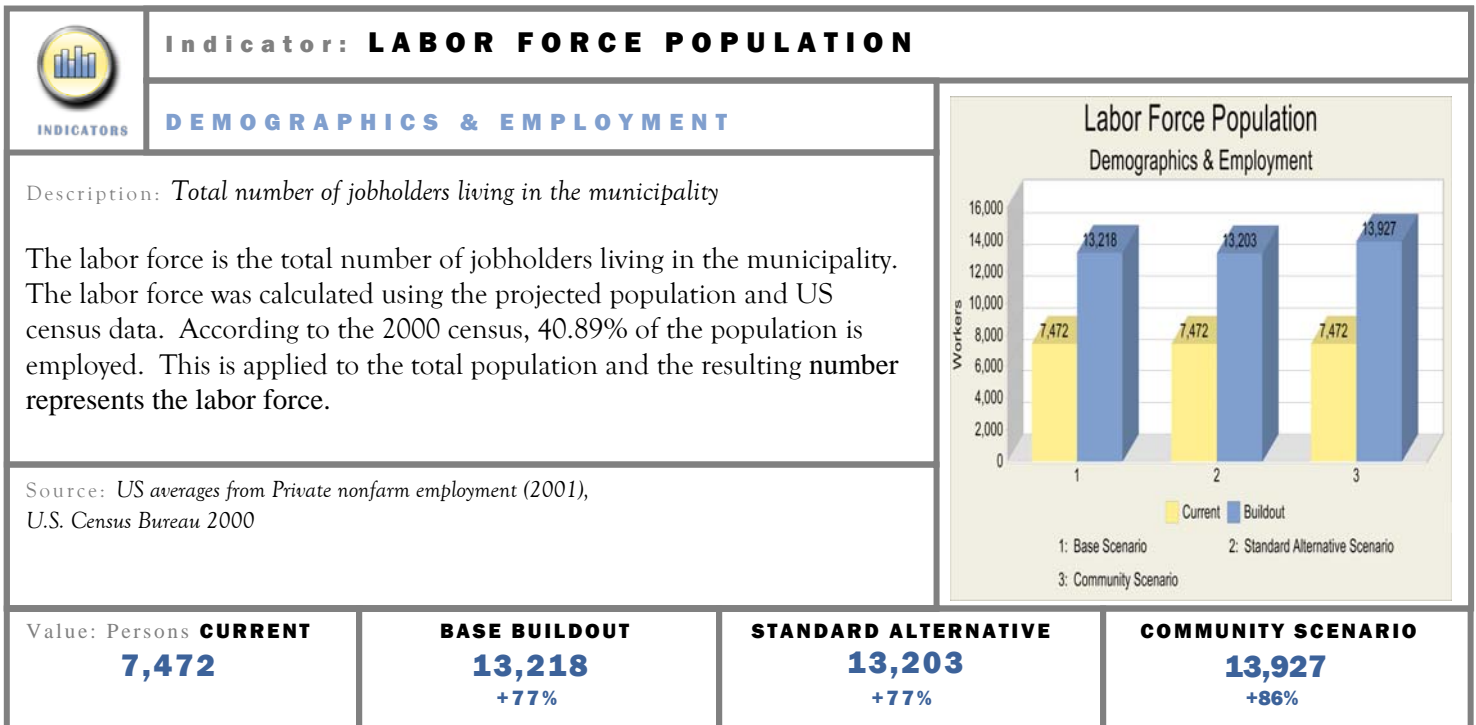
Indicators - BUILDOUT cont.



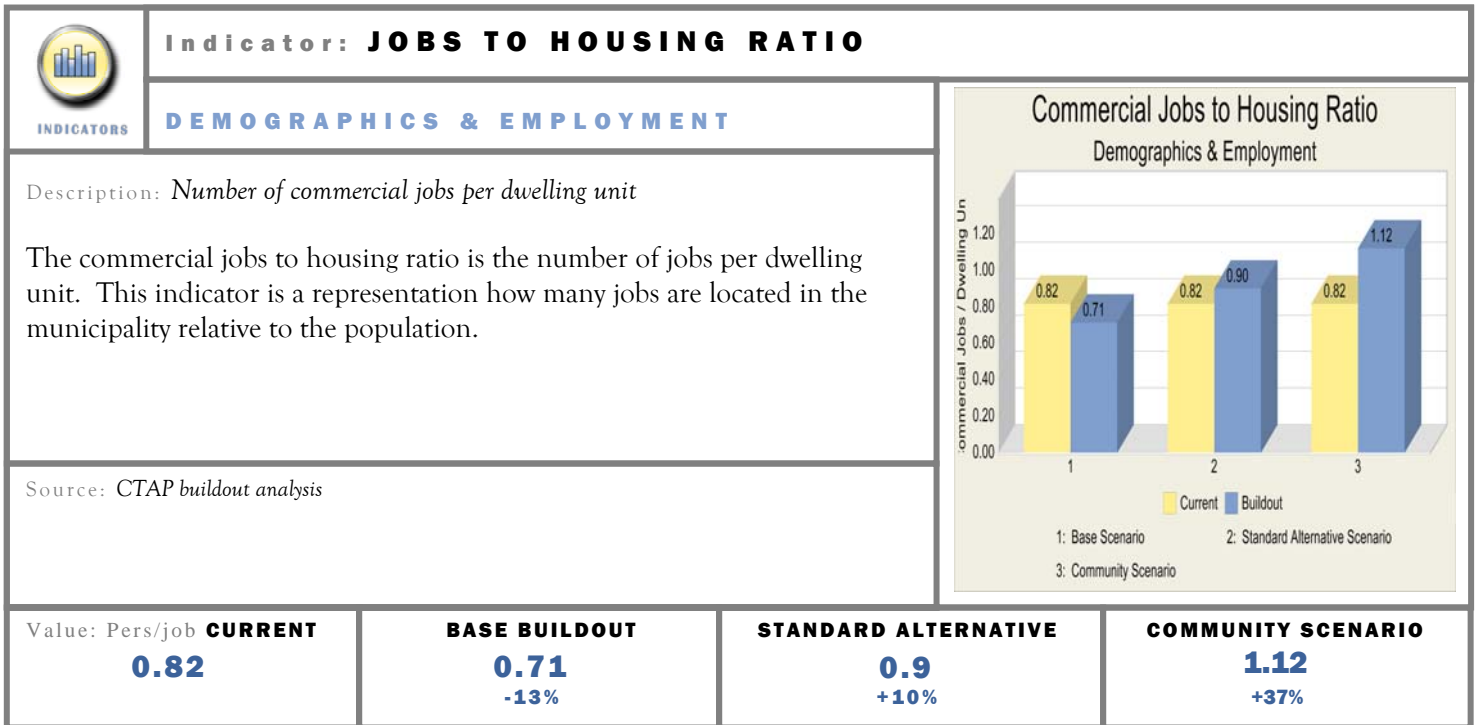
Indicators - DEMOGRAPHICS & EMPLOYMENT



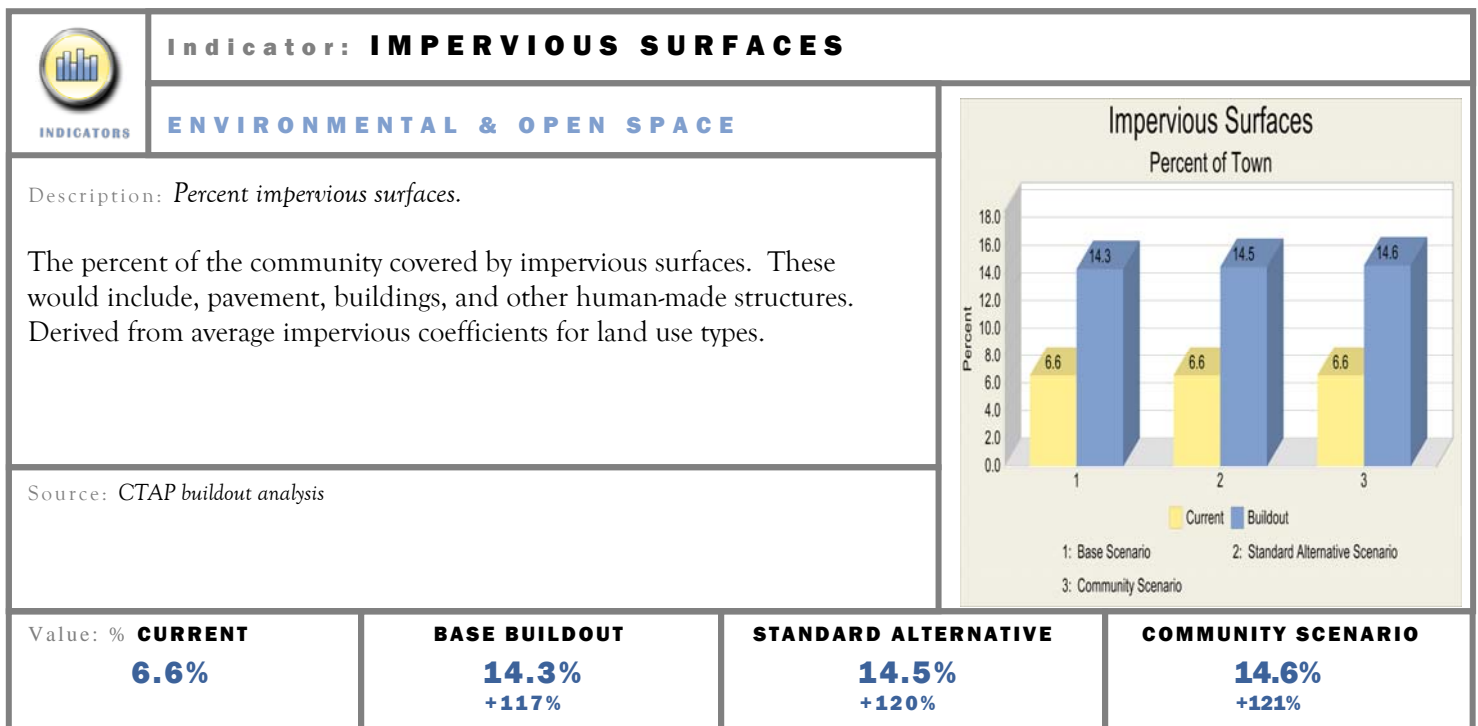
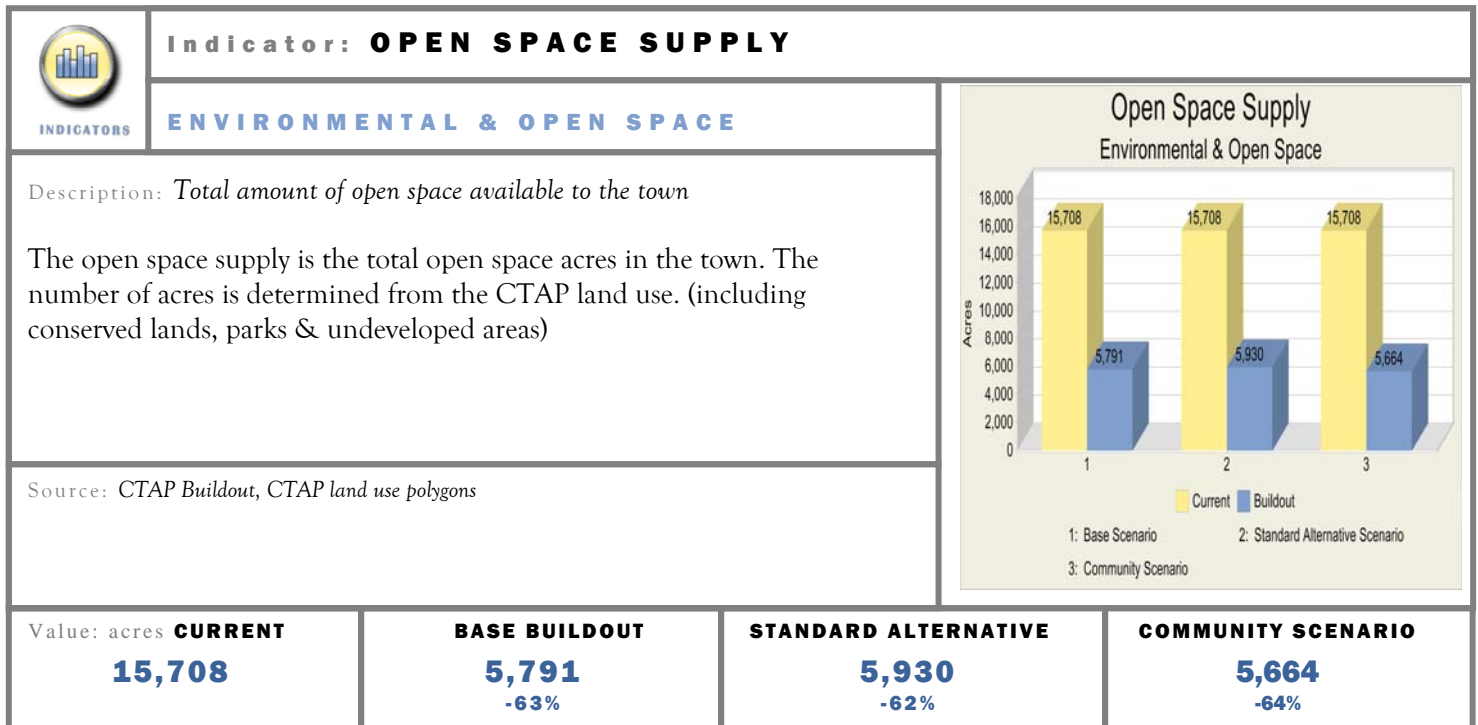
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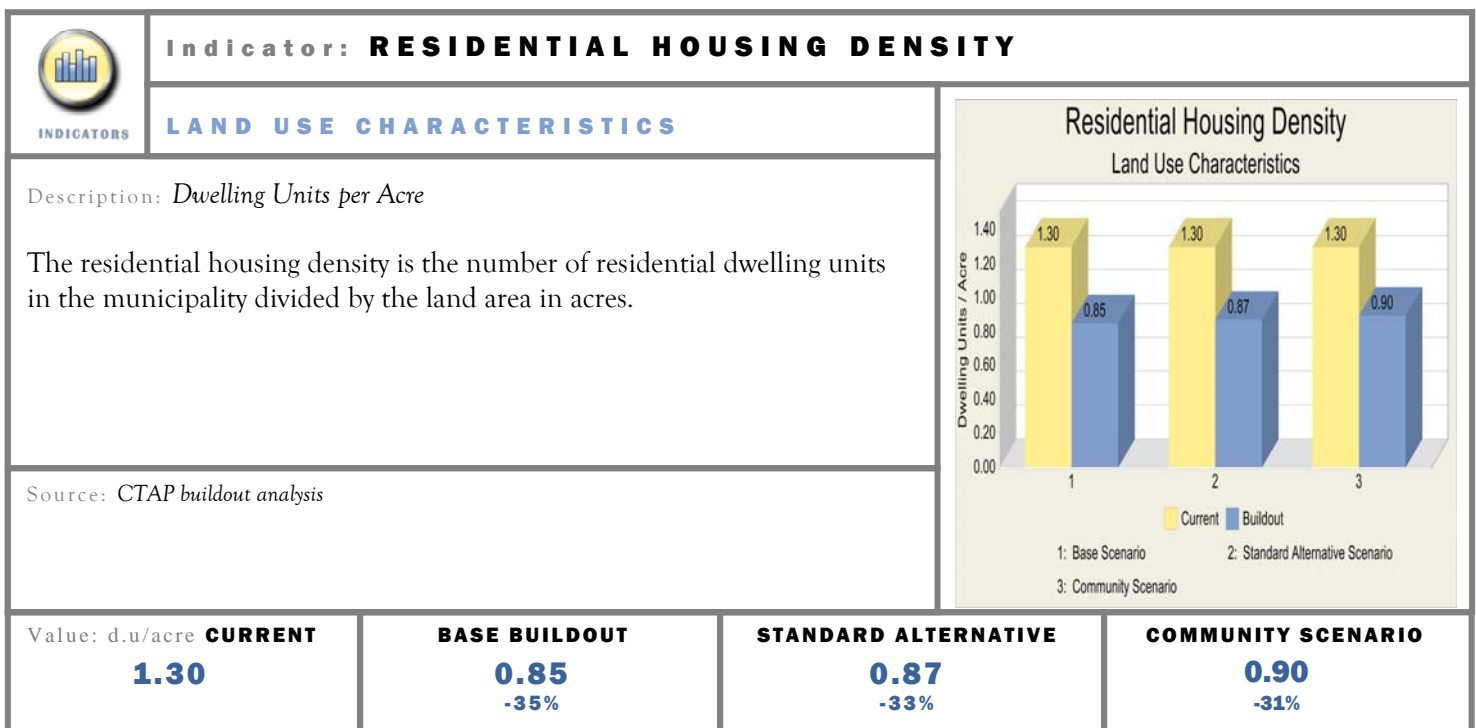
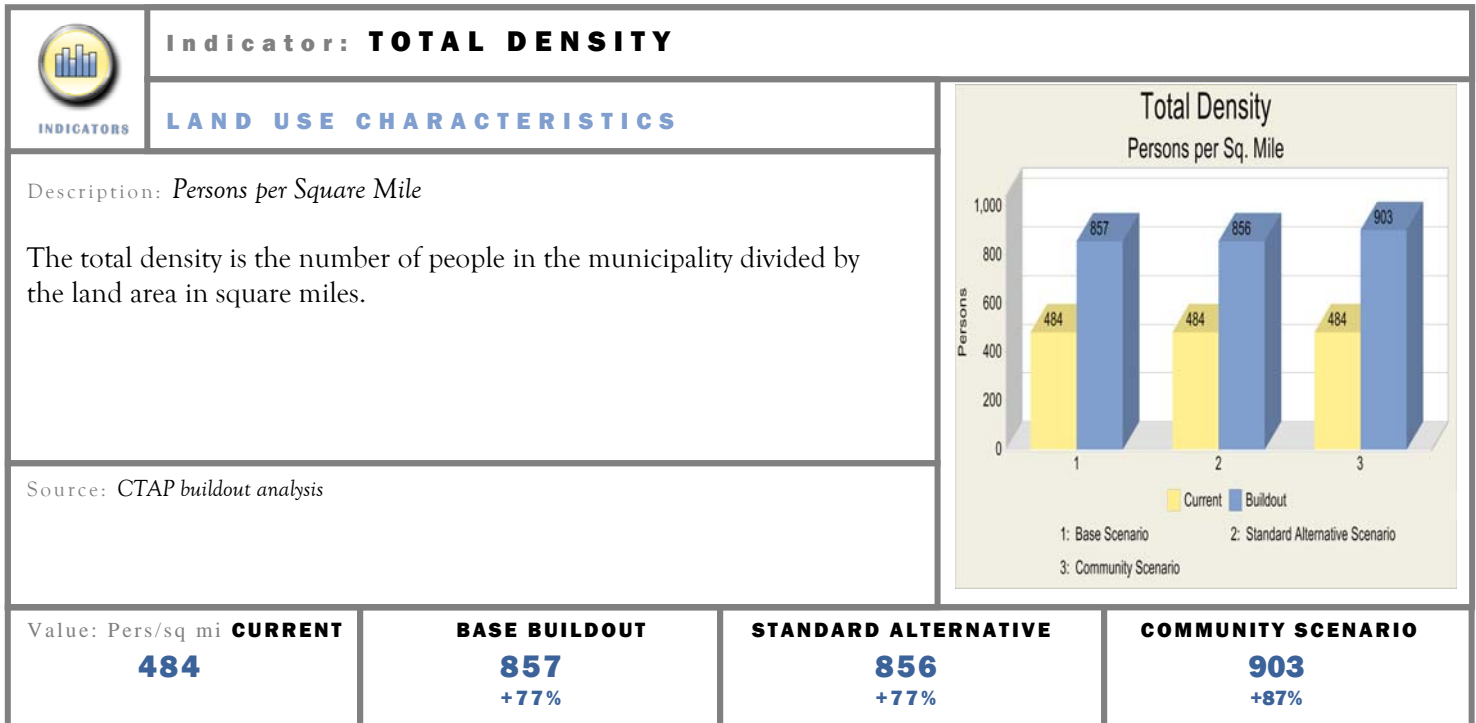
Indicators - DEMOGRAPHICS & EMPLOYMENT cont.



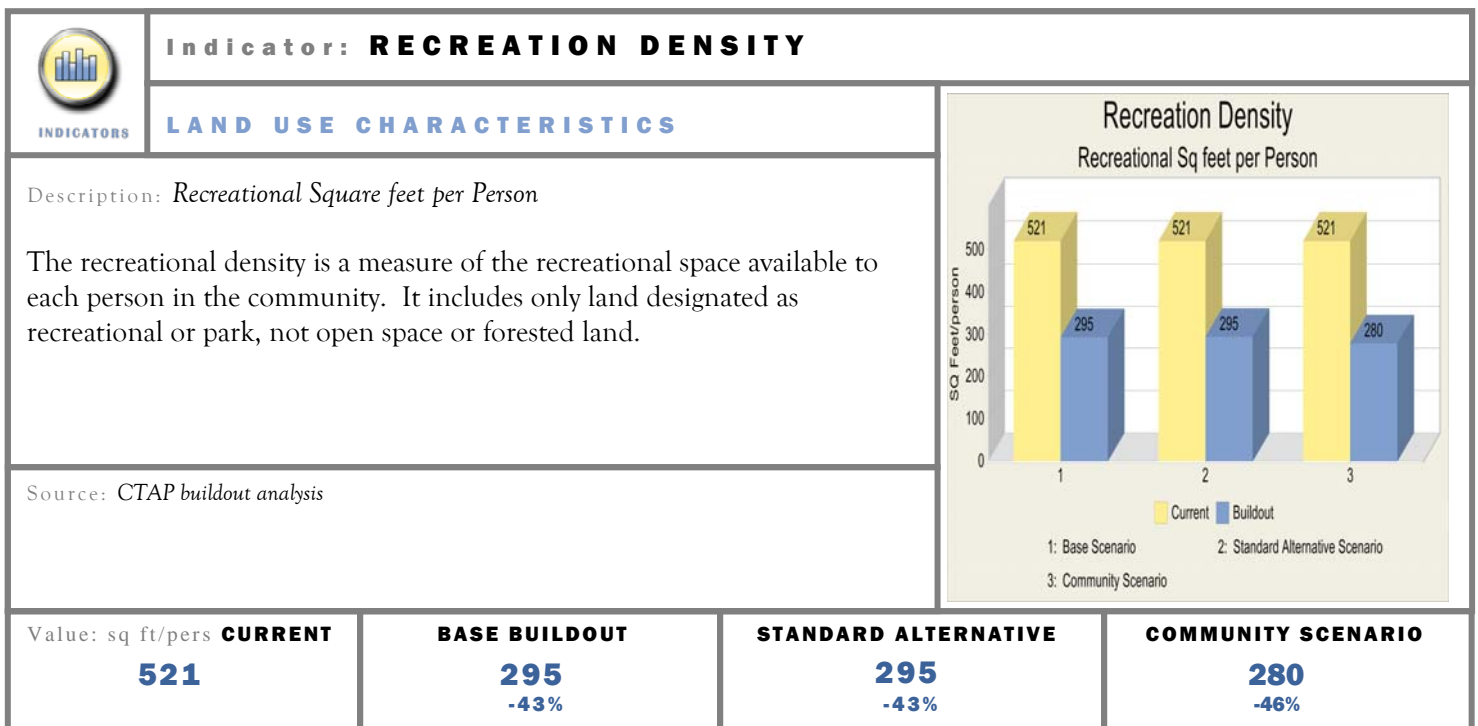
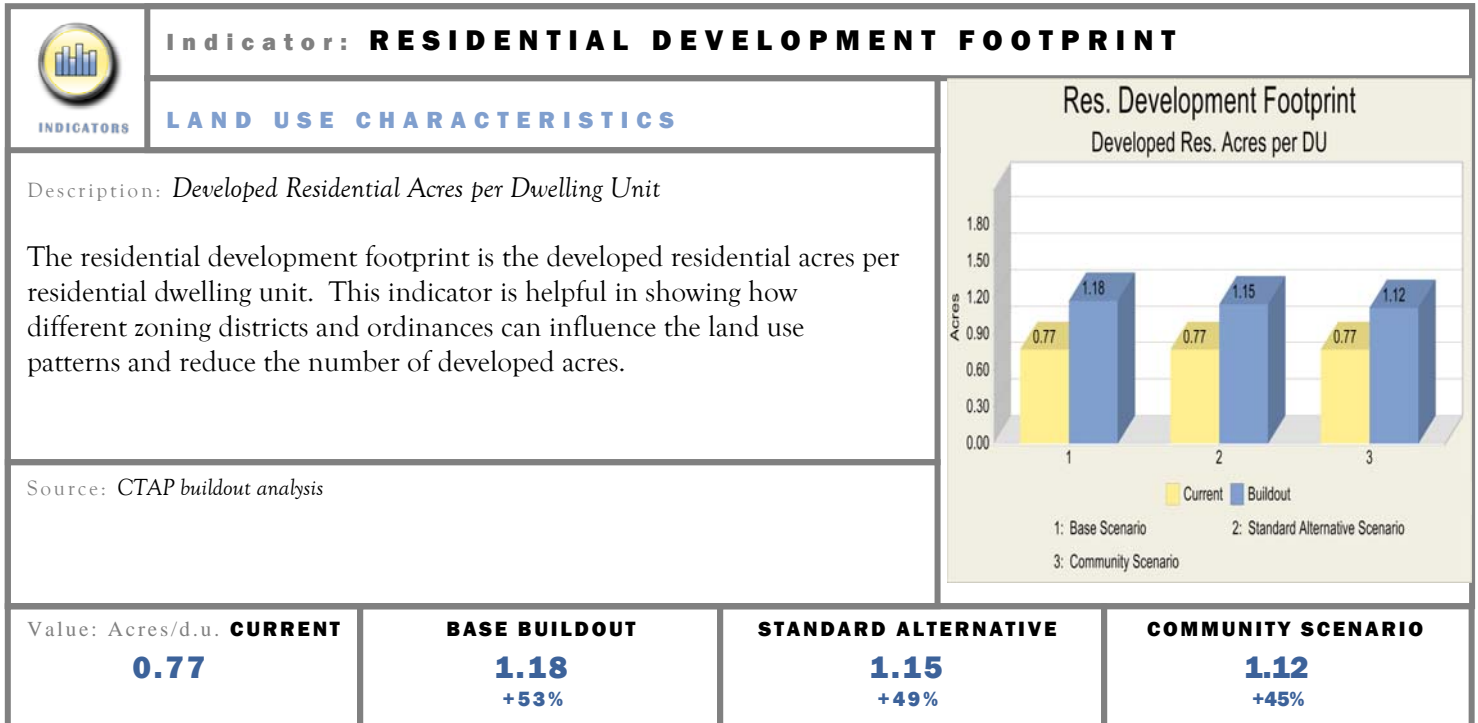
Indicators - ENVIRONMENTAL & OPEN SPACE



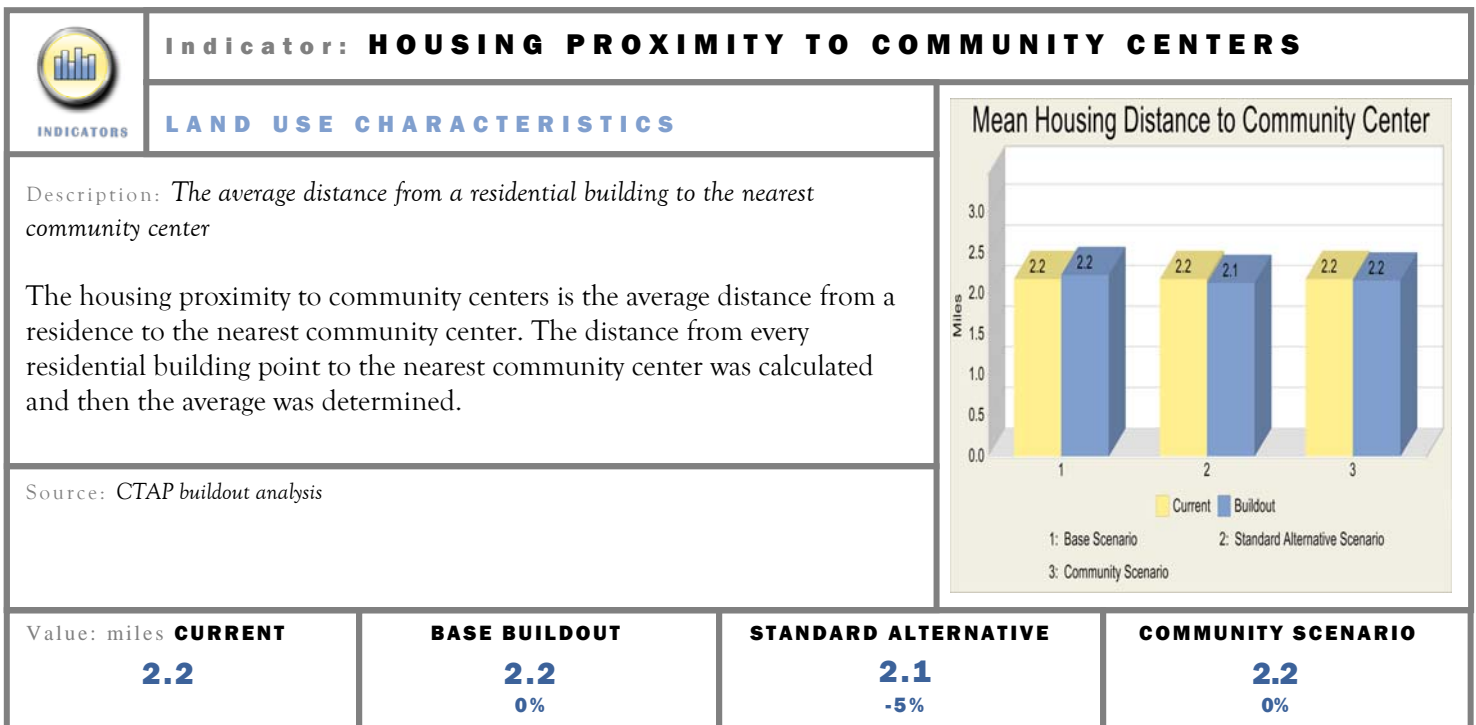
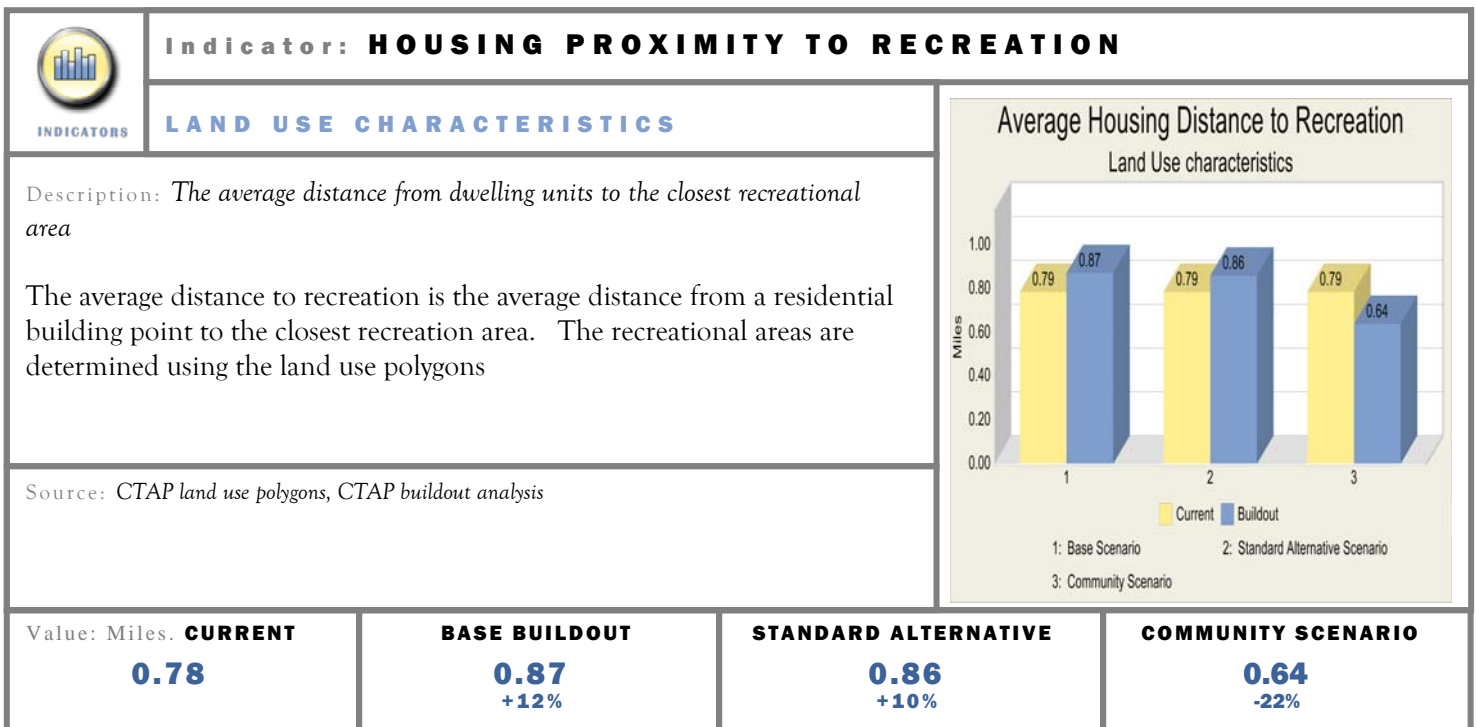
Indicators - LAND USE CHARACTERISTICS



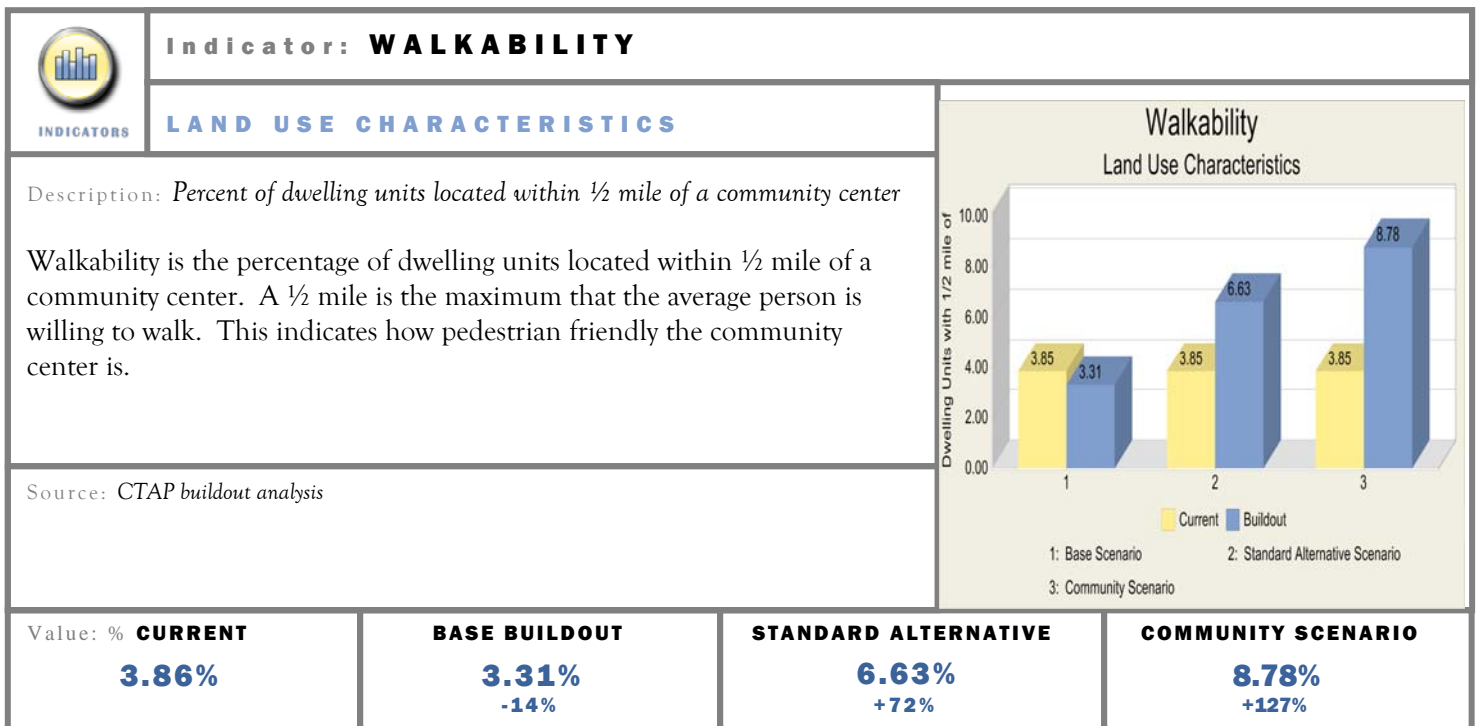
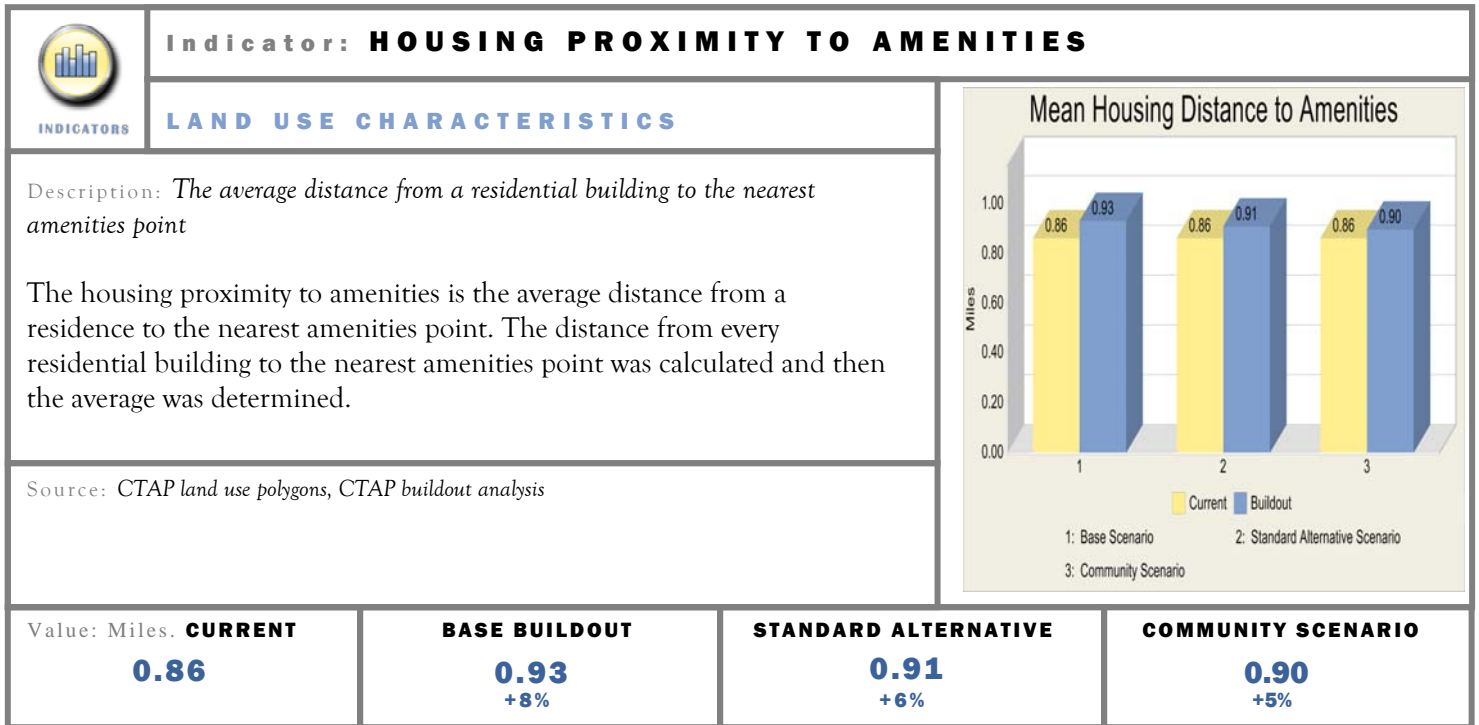
Indicators - LAND USE CHARACTERISTICS cont.



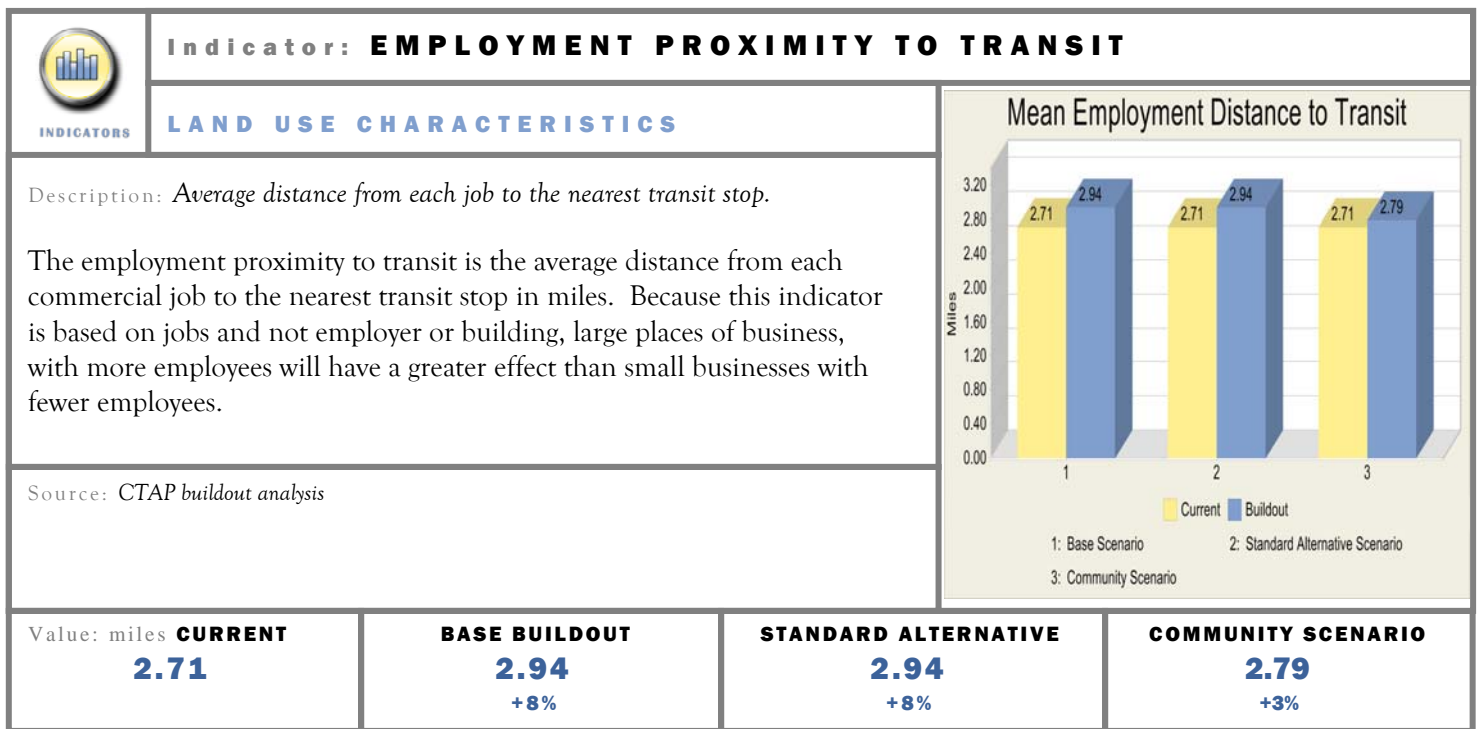
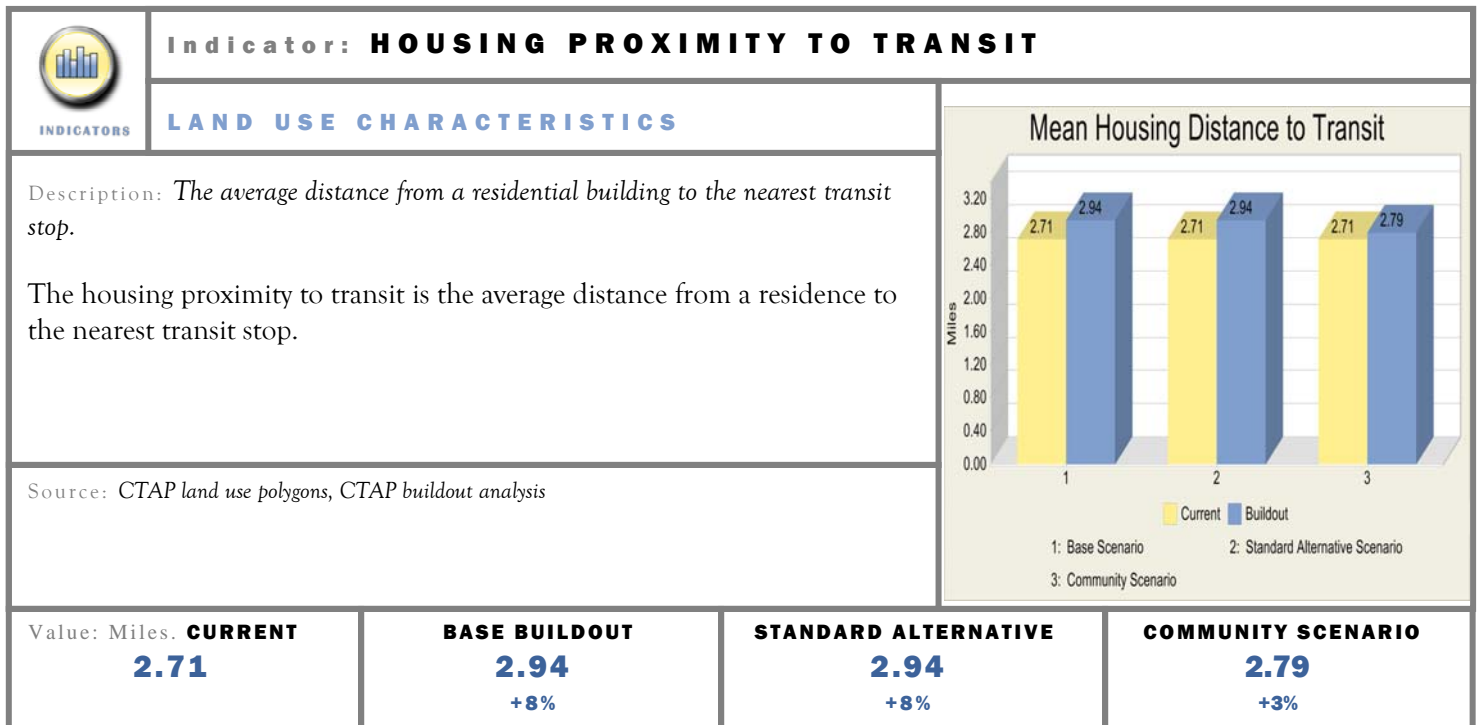
Indicators - LAND USE CHARACTERISTICS cont.



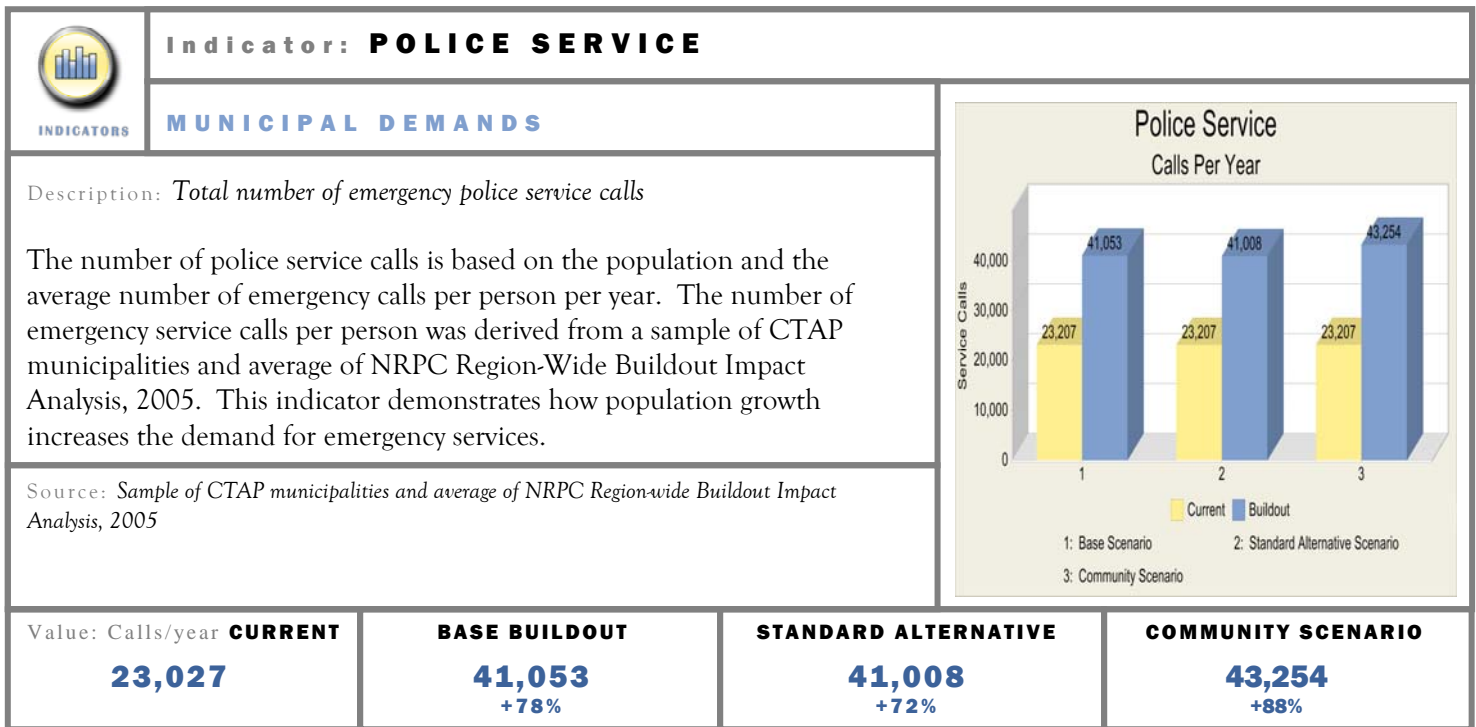
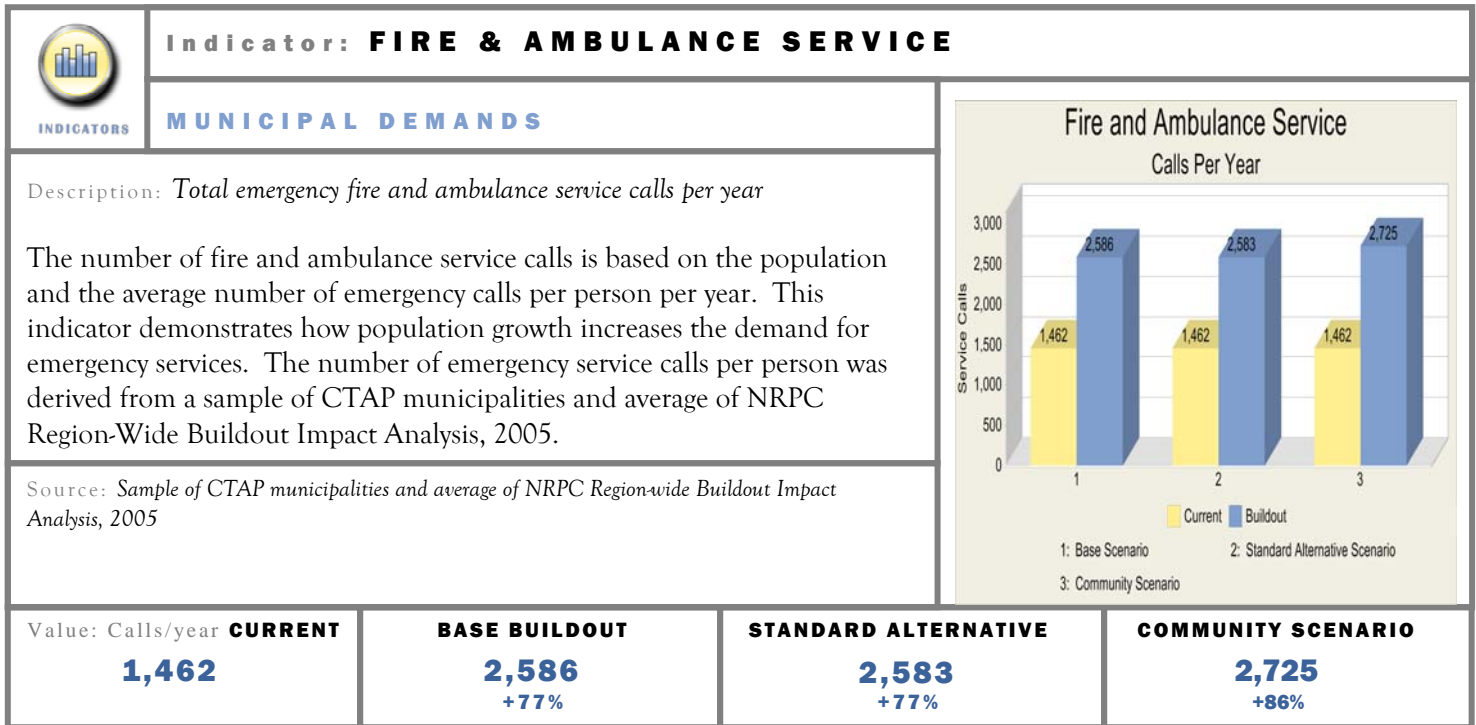
Indicators - LAND USE CHARACTERISTICS cont.



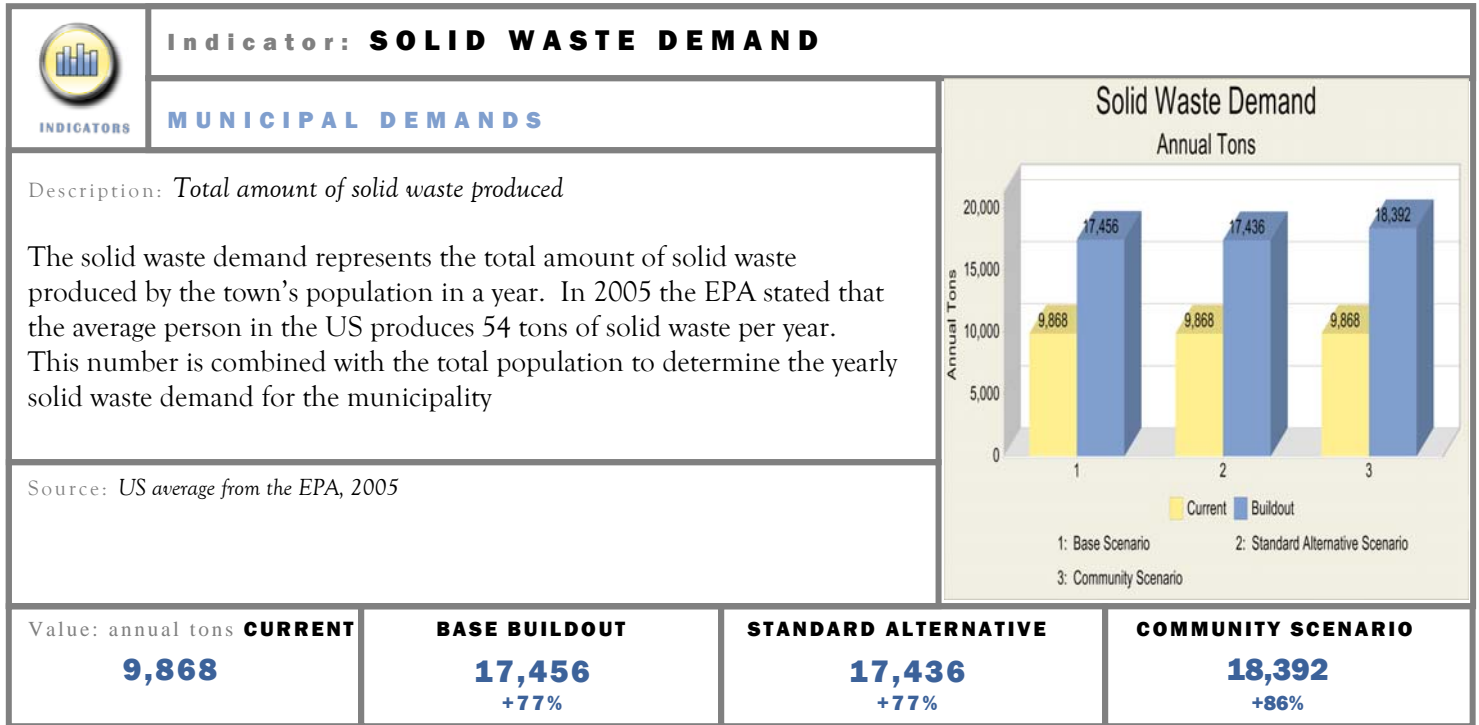
Indicators - LAND USE CHARACTERISTICS cont.



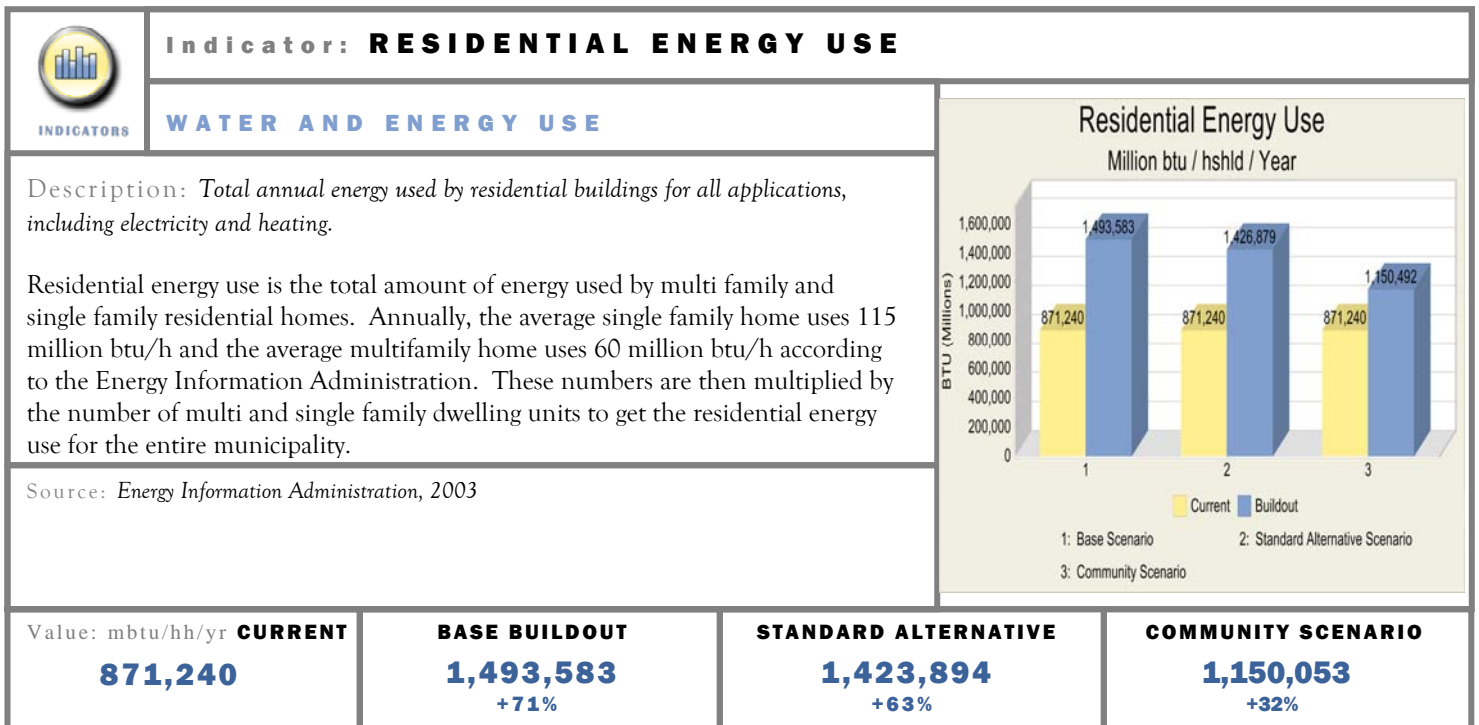
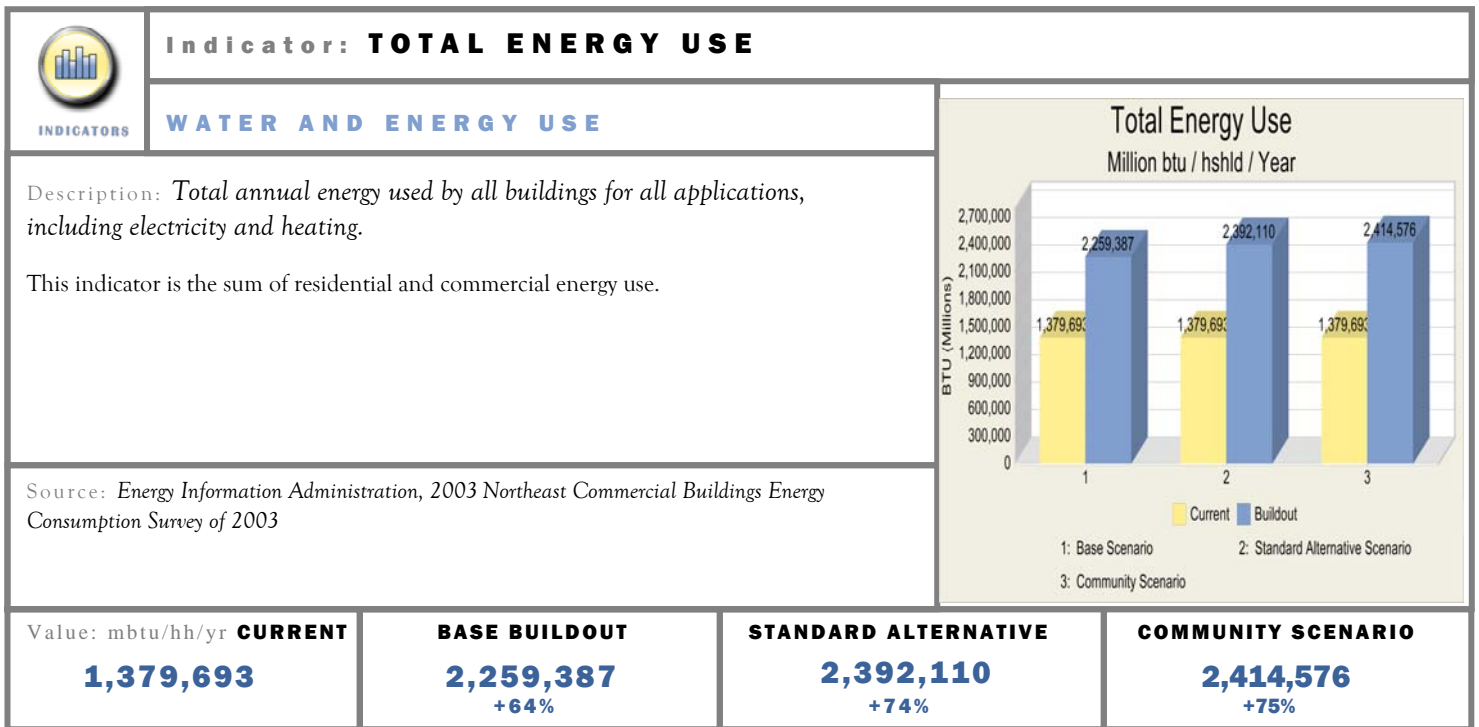
Indicators - MUNICIPAL DEMANDS



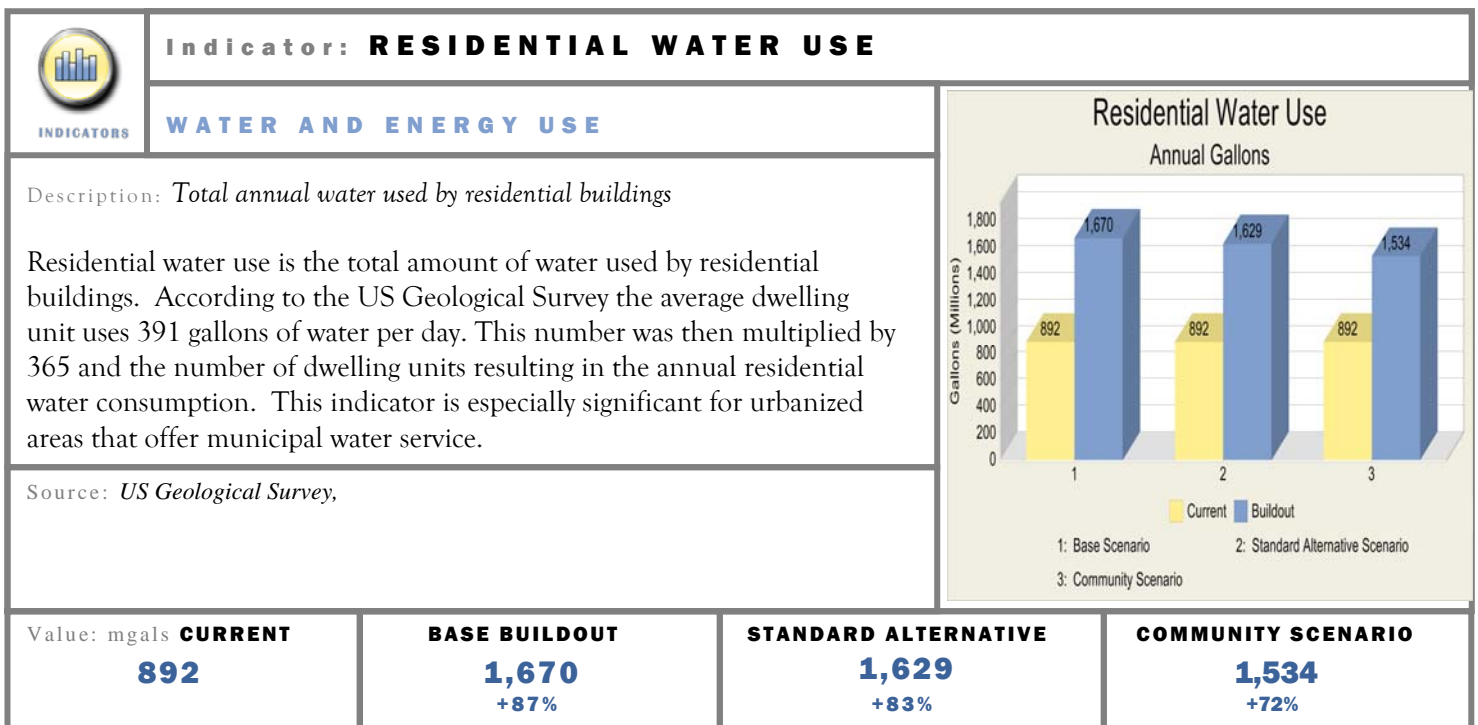
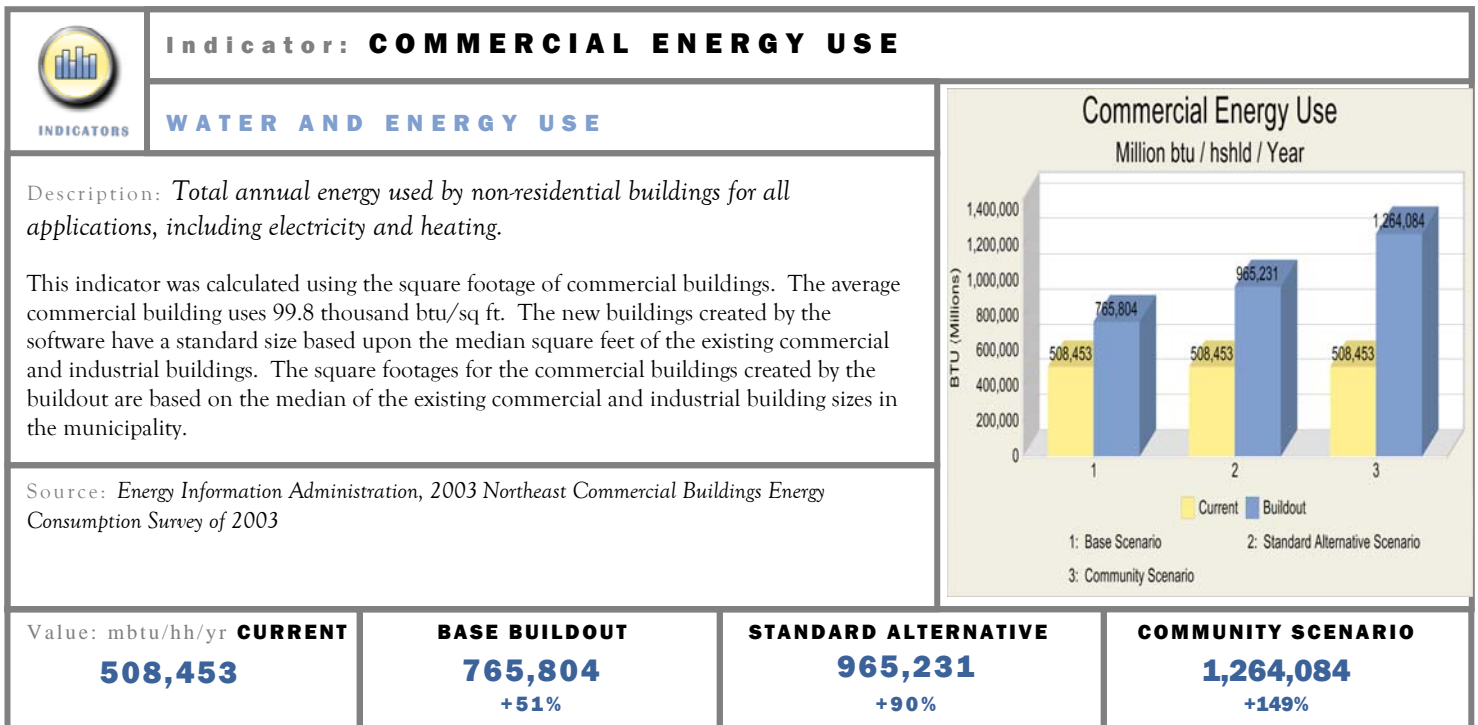
Indicators - MUNICIPAL DEMANDS cont.



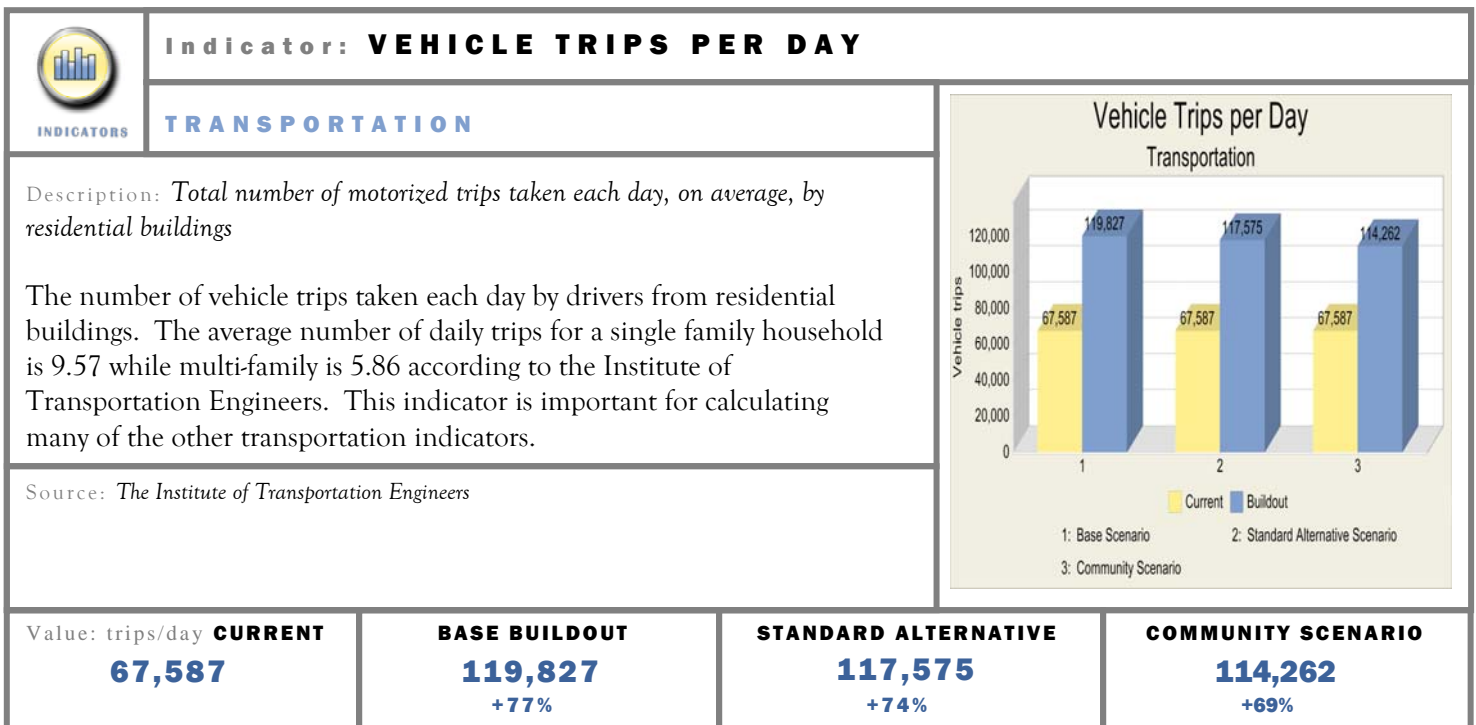
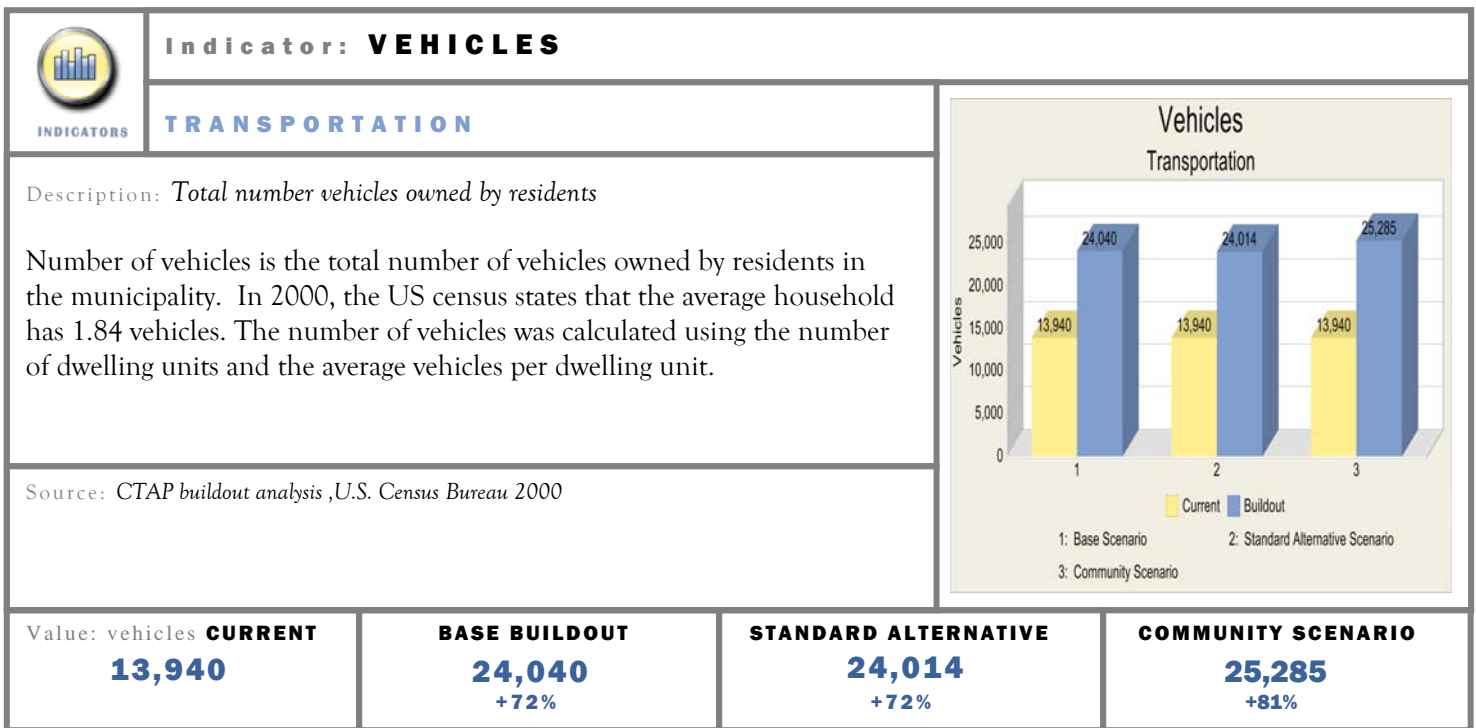
Indicators - WATER AND ENERGY USE



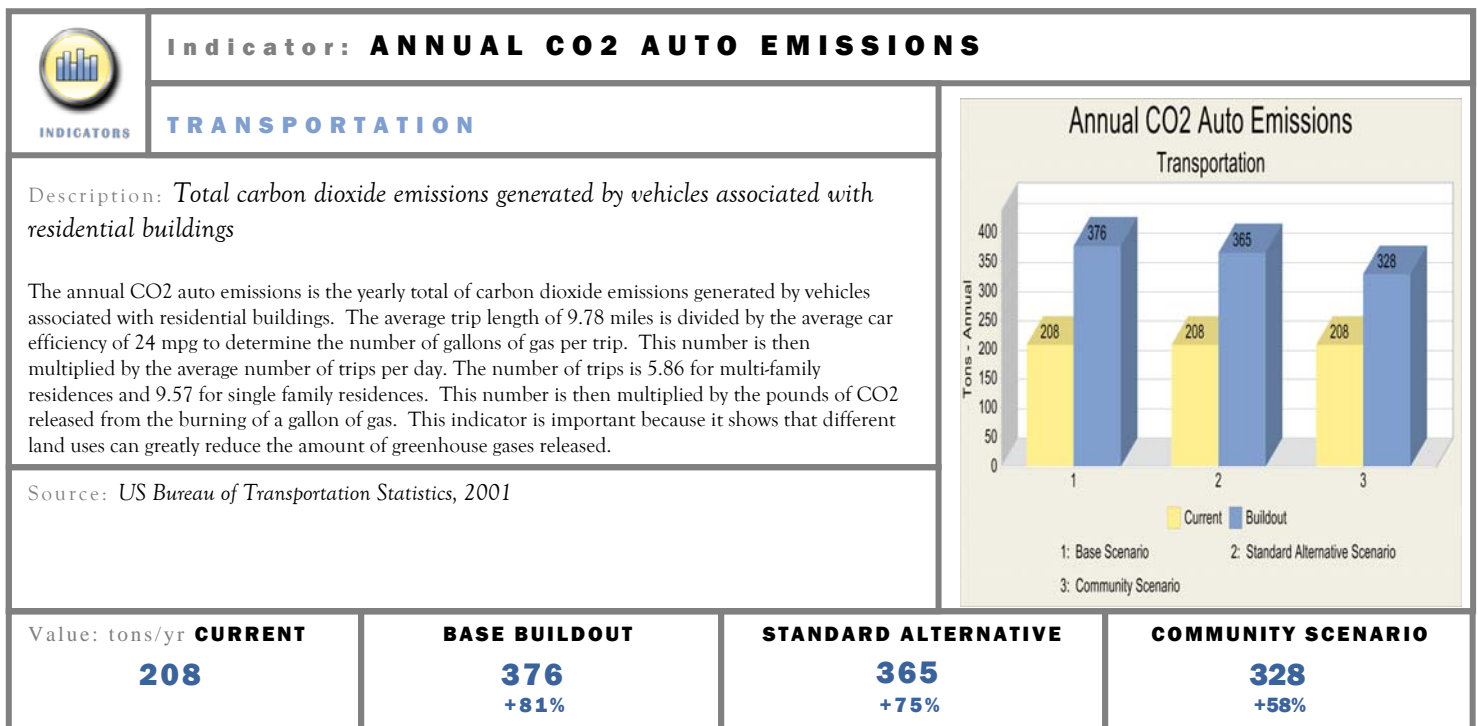
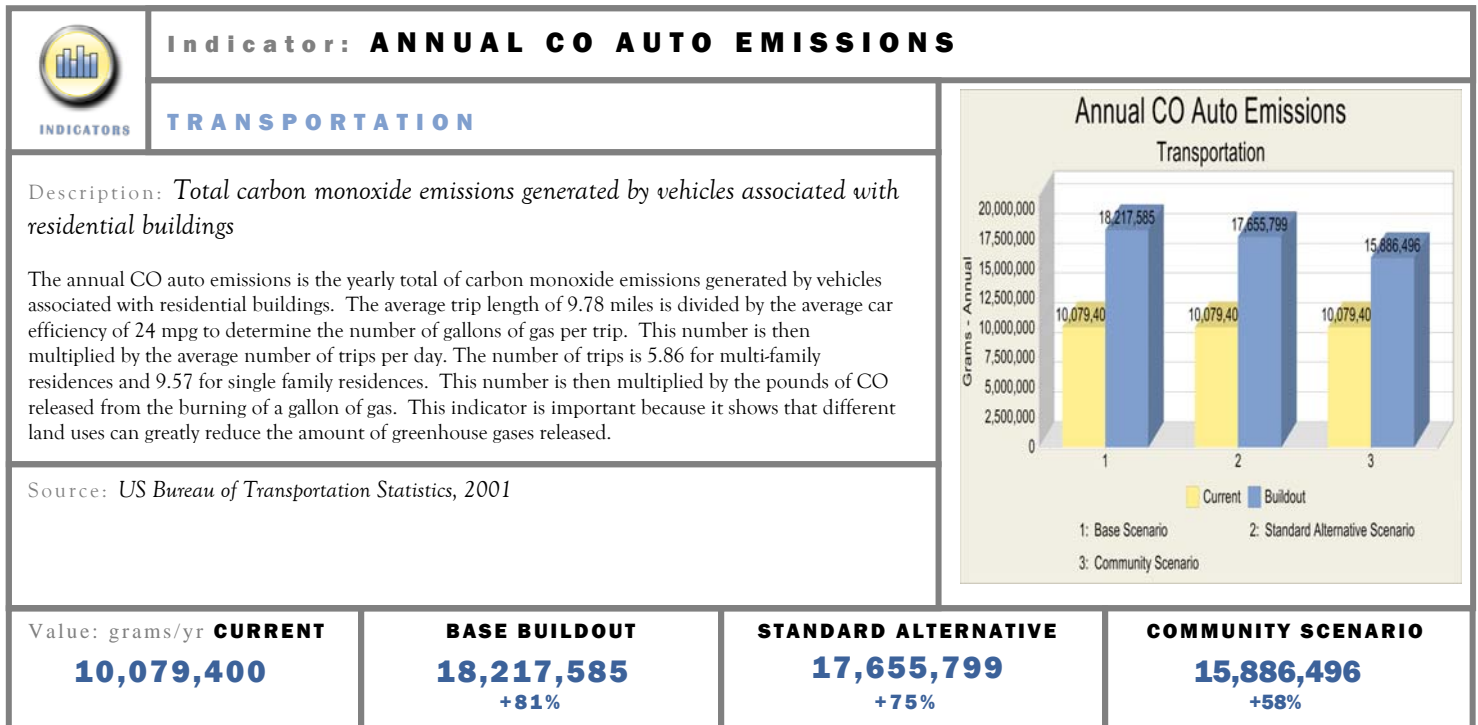
Indicators - WATER AND ENERGY USE cont.



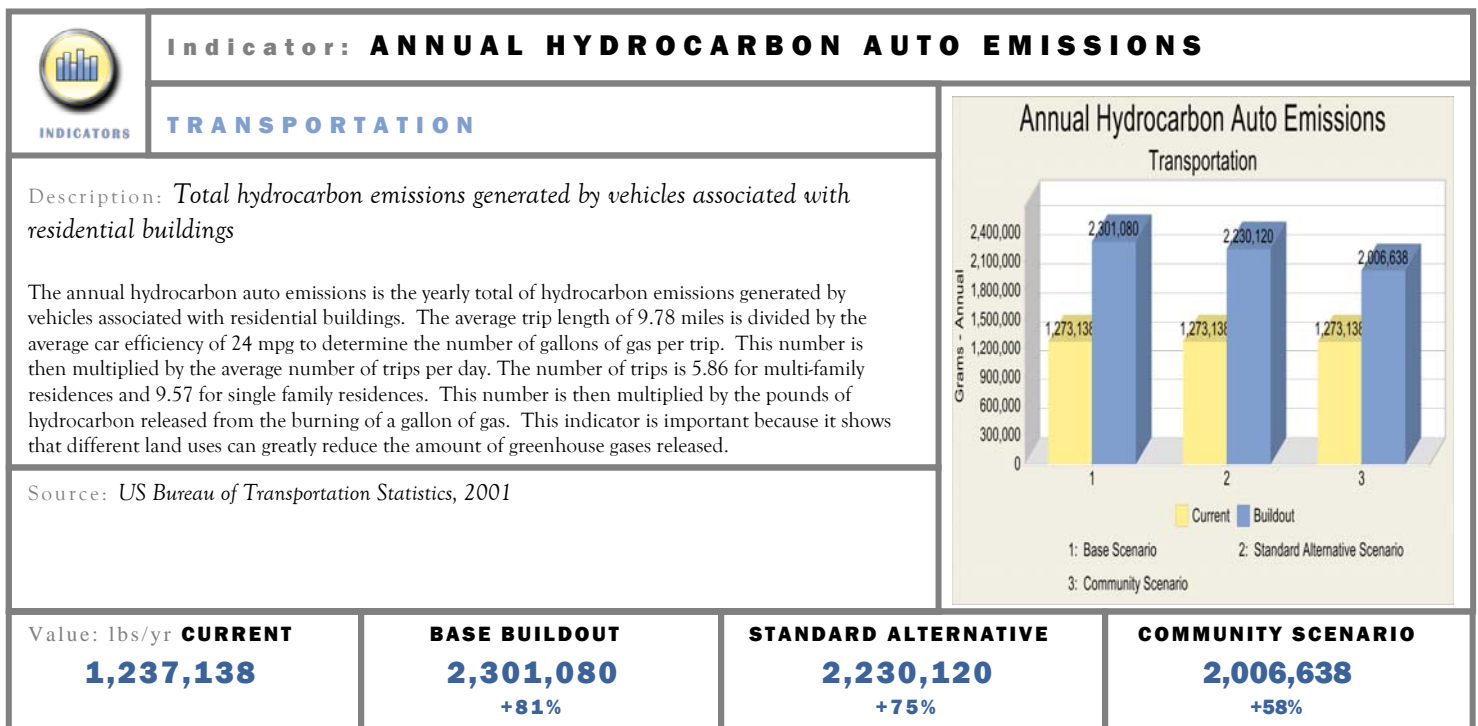
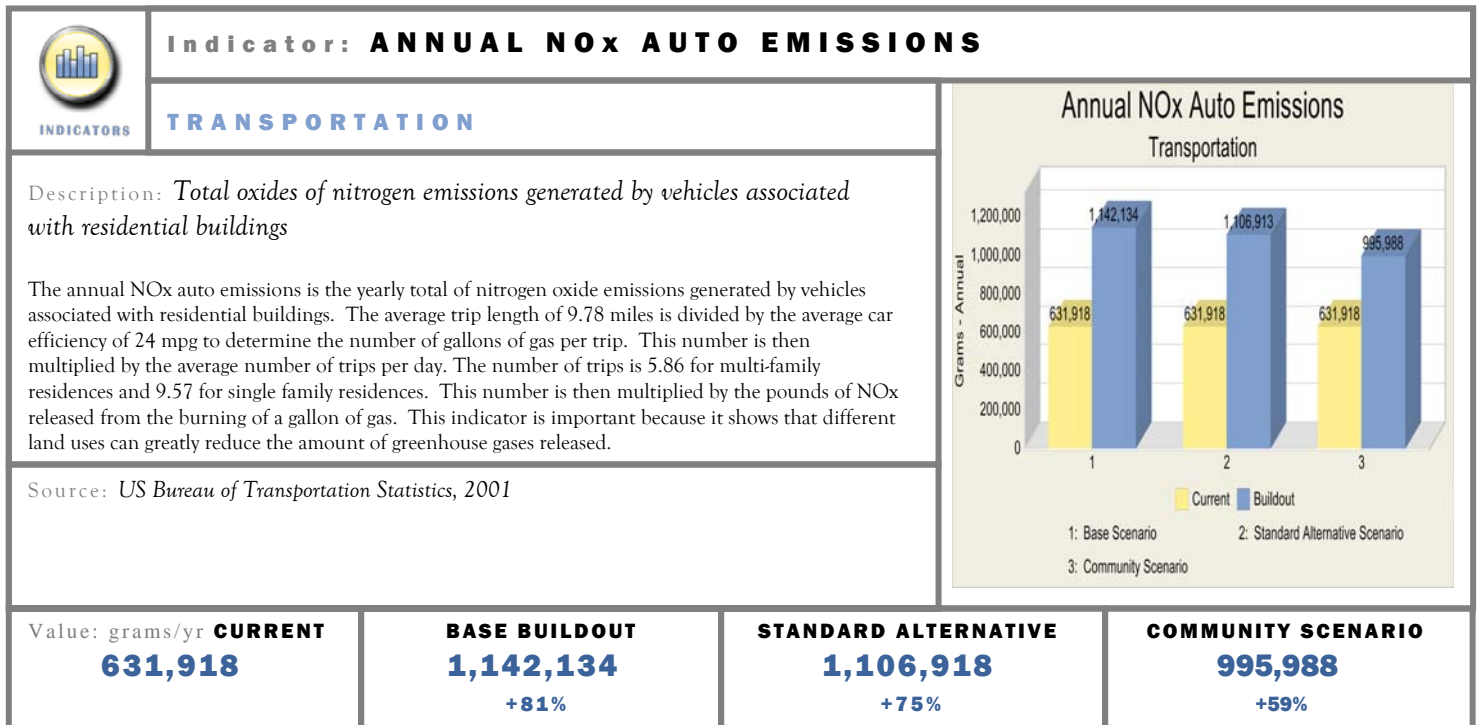
Indicators - TRANSPORTATION



Indicators - TRANSPORTATION cont.



Indicators - TRANSPORTATION cont.



A p p e n d i c e s

- A. Buildout Reports - Base & Standard Alternative & Community Scenarios