

# Environmental Analysis

## Social Environment – Land Use

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### OVERVIEW

An analysis of federal-aid project effects on the social environment will include the potential for land use effects. Land use plays a major role in determining a wide array of other reasonably foreseeable project effects to be discussed in National Environmental Policy Act (NEPA) documentation. Identifying trends with adjacent land use changes can help clarify how a project may or may not affect those trends and local planning goals. These insights support related steps to consider longer term, reasonably foreseeable effects the project could have on the social, natural, and physical environments.

The level of documentation will vary by the type of proposed transportation improvements and the nature of land use surrounding the project. Although discussion of land use is not generally required for Categorical Exclusions (CEs), it could be applicable where the proposed project has the potential to affect future land use plans. In those rare cases, specific scope for the CE should be confirmed with GDOT and FHWA. Documentation of land use effects is not required for state funded projects; however, research and coordination could be necessary to support special studies where induced land use changes could be reasonably foreseeable.

Land use effects or changes can be described as the conversion of land from existing or future uses into permanent transportation use. The relationship between land use and other resources is highlighted by FHWA:

*Land use changes are important to NEPA because they may result in impacts to the natural and human environment such as additional traffic, noise, air quality, water run-off, etc. Land use changes may be influenced by transportation projects, but many other factors also determine when (or whether) such effects will occur.*

## BACKGROUND RESEARCH

An effective starting point for land use is an online review of local planning or forecast documents. Among the useful sources available through public access, the following documents may apply to any given project depending on the geographic location in the state and size of the nearest community.

- > *Land Use Element of Comprehensive Plan:* Within the municipality, county, and region (planning commission), periodic updates of the comprehensive plan will be published (typically at five-year intervals). The Georgia Department of Community Affairs (DCA) is responsible for guiding the planning process statewide, including its database of all plans at the municipal, county, and regional commission levels. The land use element will include details of existing and future land use and may have separate data for public access such as PDF maps and GIS files. Rather than individual uses within a given parcel, the land use element will describe land use categories (LUC), zoning, and goals such as where to increase density and how to define local community development known as character areas.
- > *Regional Plan and Forecasts:* The applicable Regional Commission (DCA has divided the state into 12 regions) also will have a comprehensive plan and updates. In addition to or as part of this process, each region develops forecasts of population, employment, and other indicators of regional growth. The employment forecasts typically appear by county and for the region as a whole with a baseline and future year. Those years and any limitations on data should be noted to help explain why some data may appear in the NEPA document with differing existing or future years.
- > *District Overlays:* A local government may create special conditions for zoning and land use known as an overlay district. Conditions could affect land use such as development restrictions, types of desired structures, or density of future residential or commercial development within the overlay boundaries. While included in the Land Use element, an overlay is more specific and may have details beyond the summary in the element or may have been adopted after the comprehensive plan update. Simple online searches with local government web sites typically will identify any district overlays with a map of the land uses and restrictions.
- > *Developments of Regional Impact (DRI):* As the name implies, DRIs are proposed developments (typically involving residential, commercial, industrial, or institutional uses in some combination) that likely have some impact beyond their local government jurisdiction. The report will disclose the proposed site plan with specific development types and needed transportation/access mitigation.

This combined background research provides a good understanding of the local conditions prior to determining the follow-up research needed. Creating working versions of land use maps and data tables can help prepare for more detailed research as well as coordination with local planning officials. The research and analysis steps for land use are described in the following sections. These steps are appropriate for most federal-aid projects requiring an Environmental Assessment (EA). For federal-aid projects requiring an Environmental Impact Statement (EIS), the scoping process should inform and refine scope for land use and economic analysis based on available modeling tools, any project-specific forecasts, and the scale of likely land use changes within and adjacent to the project footprint. Confirming scope expectations and limitations on any data are important first steps so that the eventual documentation of findings will effectively support the EA or EIS. At the same time, a less complex project may warrant a more simplified approach. In any case, GDOT typically does not create new land use data and projections specifically for a project. Rather, the key is to apply readily available data in meaningful ways that are appropriate to the project conditions.

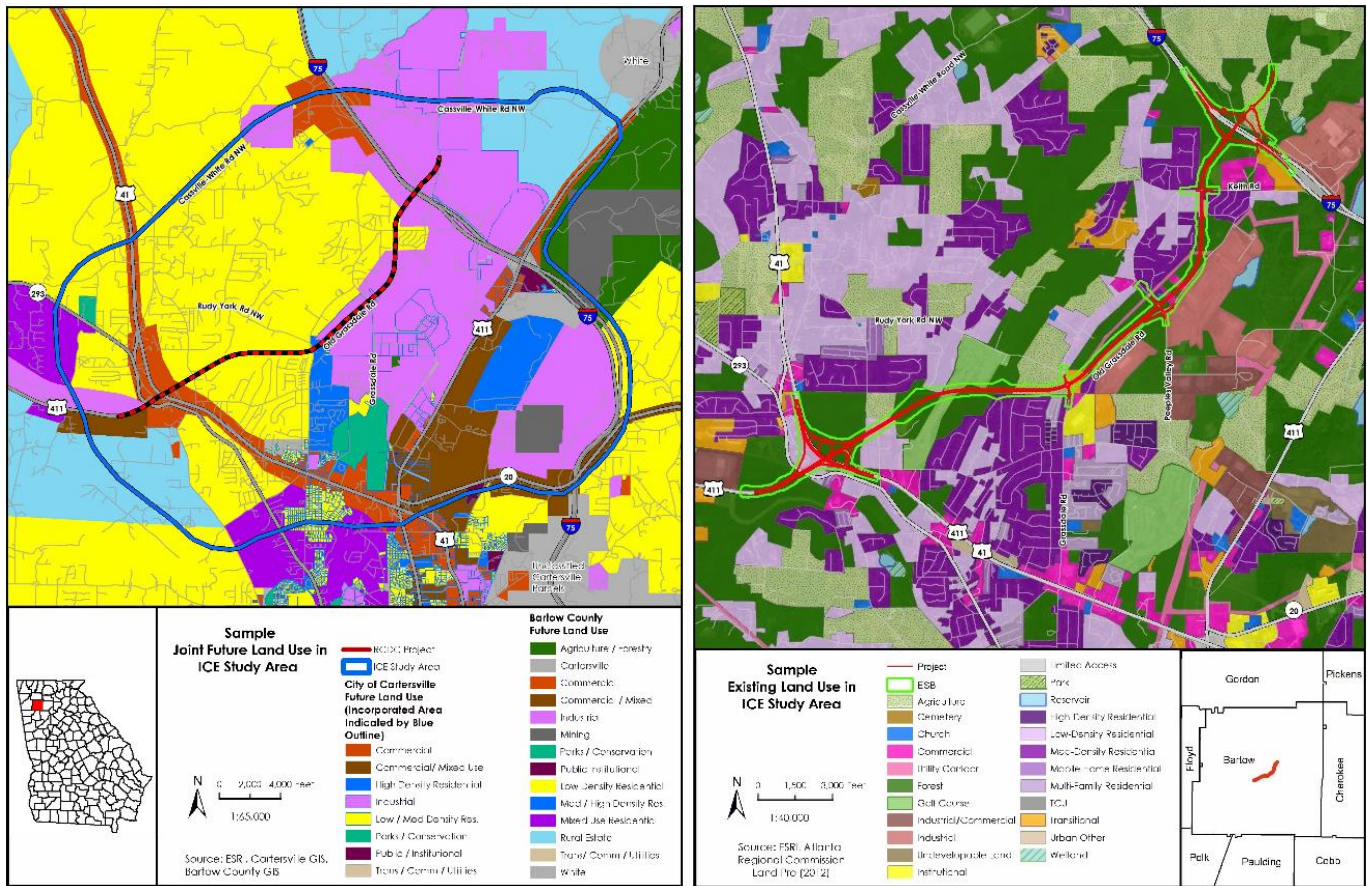
### EVALUATION

The Environmental Analyst will adapt the research to support project mapping, qualitative and quantitative analysis of the land use changes, and materials to support interviews with local planning officials about future land use. Prior to considering the potential for induced land use changes and their effects, the Environmental Analyst should coordinate with the project designer to estimate a preliminary version of right-of-way (ROW) limits to create a project footprint. The project footprint can be combined with existing land use data using Geographic Information System (GIS) tools. For most GDOT projects, the environmental scope will not include extensive field verification of land uses within individual parcels. The level of detail, availability of GIS files, and existing year of local land use maps will vary. Therefore, one useful step on smaller scale projects is to prepare the most current map of existing land uses and validate it as part of the socioeconomic/NEPA field surveys. For larger projects, the key is to use the most current and complete dataset available and note the years, coverage, and any data limitations.

One source for projects located within metro Atlanta counties is the Atlanta Regional Commission (ARC), which developed a database of land use within its 21-county planning area known as LandPro 2012 (see Figure 1). While based on research and mapping for a 2012, this open-source data has been updated extensively since then to reflect changes as proposed developments are approved and constructed. Many of the urbanized counties outside ARC also have GIS departments with access available to land use or other data for use on GDOT projects.

Open Data and Mapping Hub,  
Atlanta Regional Commission

Figure 1: Sample Land Use Maps with Project Area



By comparing the existing land use map and project footprint, the Environmental Analyst can calculate and display an overview of land use changes. The analysis will involve estimating the types and area of land uses with the project footprint, ideally using GIS measurement tools. Although the LUCs may differ across jurisdictions, most existing land use data will show between five and ten types, including residential, commercial, industrial, institutional, parklands/natural systems, transportation, forested/undeveloped, and agricultural. If the project area crosses jurisdictions (e.g., partially within both a city and unincorporated county limits), the Environmental Analyst may need to combine categories into a single map to cover the entire project area.

The land use analysis and documentation should be coordinated across community and other NEPA resource topics. As the Environmental Analyst evaluations potential for land use effects on parcels within and adjacent to the project ROW, the specific resources on the parcels will be subject of other analysis categories within the NEPA document, including

**Table 1 – Land Use and Correlating Resource Topics in Environmental Documentation**

Land Use Classification*	Programmatic Categorical Exclusion (PCE) Discussions	Categorical Exclusion (CE) Template Sections	Environ. Assessment (EA) and Environmental Impact Statement (EIS) Sections**
Residential	- Community Impacts - Relocations Not Applicable***	- Community Impacts - Relocation Potential	- Community Impacts - Land Use - Relocations
Agricultural/Farming	- Farmland	- Farmland	- Farmland
Institutional/Education	- Churches and Institutions	- Churches and Institutions	- Churches and Institutions
Parklands/Natural Areas/Forests	- Section 4(f) - Ecological Resources	- Parks, Rec Areas, and Wildlife Refuges - Natural Environment	- Parks, Rec Areas, and Wildlife Refuges - Natural Environment
Commercial/Industrial	- Relocations Not Applicable**	- Relocations - Economic Impacts	- Relocations - Economic Impacts

\*Land Use Changes discussed within CE Land Use and EA/EIS Land Use including induced land use changes

\*\*EA and EIS templates are flexible, and the section headings and numbers may change as needed.

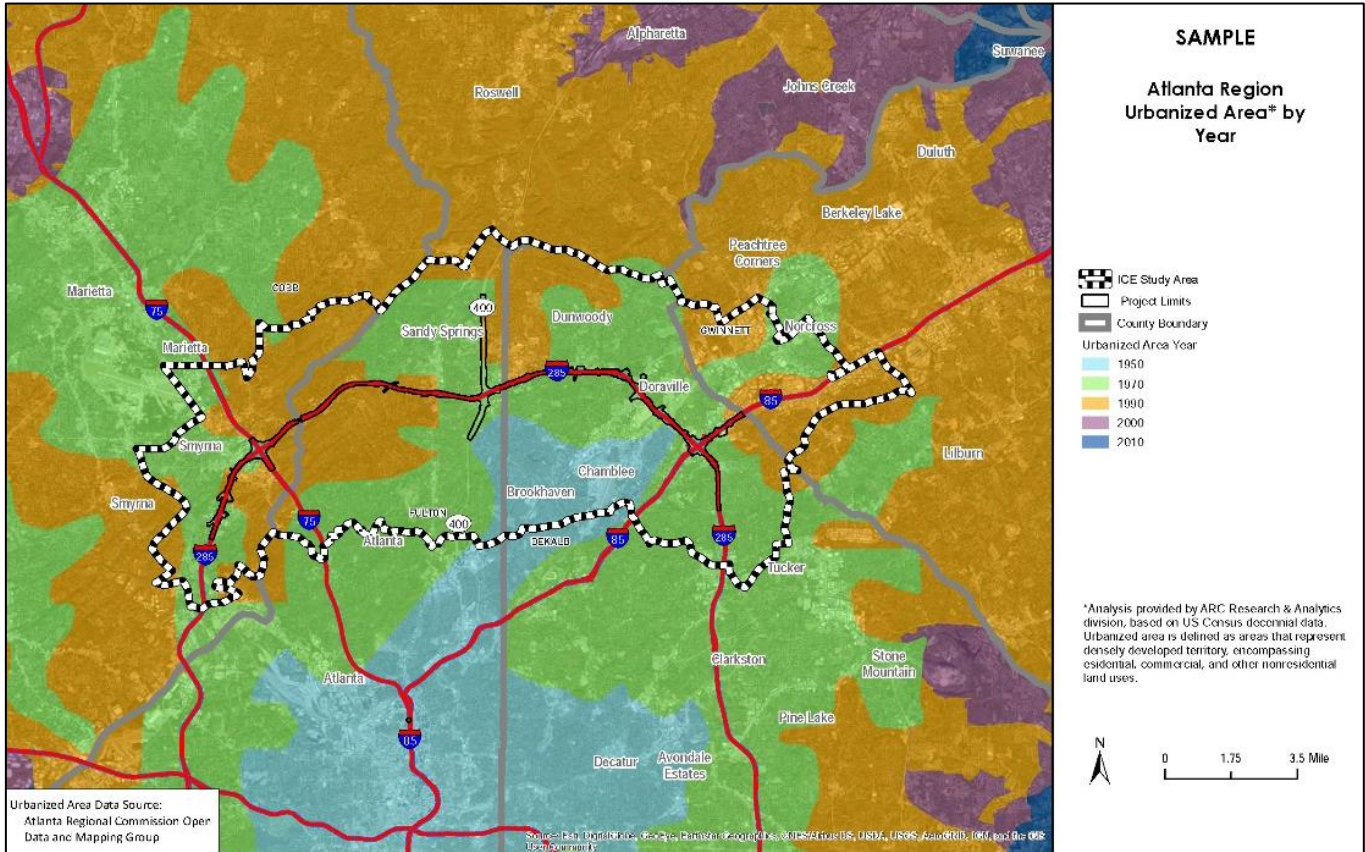
\*\*\*A project cannot be processed with a PCE if relocations are needed.

Given this interrelationship of resource topics, the land use research and mapping may inform the other disciplines for the assessment of resource impacts. The land use component itself will focus on documenting the process and the past, present, and future changes in land use identified in the project area.

As part of NEPA fieldwork, the area within the environmental survey boundary (ESB) or at least within preliminary ROW limits should be checked for any major development recently completed or underway. The associated parcels can then be updated in mapping if it differs from the more generalized existing land use data. To help confirm development patterns, two useful tools are readily available depending on the project location and scale:

- > *Historical aerial review:* Using free software such as Google Earth, an online or downloadable series of historical aerials can show patterns or recent past and current development. The Google Earth app has a historical view slider that allows scrolling through previous years of aerial coverage at a given location.
- > *Comparison of land development data:* Within ARC counties, an option is available to show development trends over time with one of its open data map sources. The land development trends appear as urbanization over a series of decades. This scale is helpful for a larger project within the 21-county planning area of ARC.

Figure 2: Sample Land Use Maps with Project Area



Whereas a separate relocation analysis will identify specific buildings such as residences and businesses, the land use calculation will focus on acres and percentages of the LUC within the project footprint. For example, the Conceptual Stage Study may identify that a residence is avoided. However, a 10-foot strip of frontage would still be required. In that case, the existing residential land use would be converted to transportation use, calculated as the strip of land within the parcel that is included within the required ROW limits. Rather than focus on a single parcel, the land use mapping is intended to look more broadly within the total ROW area. One helpful approach is to aggregate the smaller parcel level impacts into total acreage and percentage of land converted by LUC. Table 1 provides an example of calculating land uses from a project area.

**Table 1: Example of Existing Land Use by Category**

Land Use Types	Acres Converted to Transportation	Proportion of Total Required ROW
Commercial	38.52	48.49%
Residential	22.93	28.90%
Parks/Recreation	0.70	0.88%
Industrial	6.25	7.87%
Public/Institutional	6.00	7.56%
Undeveloped/Agricultural	5.00	6.30%
<b>Total</b>	<b>79.00</b>	<b>100.0%</b>

Note: GIS tools will calculate several decimal places; rounding is appropriate as long as amounts sum correctly.

The land use analysis shifts from land use conversions into the assessment of the project’s potential effects that would occur later in time from the proposed action. The steps to coordinate with local officials and identify induced land use changes are summarized herein as discussed further in the Environmental Assessment Template and NEPA Land Use Coordination Packet. The land use changes over time generally are divided into these categories for the assessment:

- > **Past Land Use:** Historical aerial imagery or USGS maps can provide efficient views of past land development to help confirm the baseline year.
- > **Existing Land Use:** Overlaying the project footprint and study area boundaries (including areas adjacent to meaningful changes in traffic for projects that have data available from travel demand models) will provide context for coordination and analysis.
- > **Future Land Use:** As with existing land use, the local jurisdiction will have a future land use map as part of its currently adopted comprehensive plan. Some plans include variations such as future zoning, areas for planned growth, and future land use categories.
- > **Past, Present, and Reasonably Foreseeable Development:** The independent development actions or areas of induced land use changes can be mapped on a single figure or a series depending on the complexity and scale of map needed. Approximate footprints of proposed transportation projects and parcel outlines for DRIs and other development at provide sufficient detail to consider land use changes. In addition to discussing these future changes, the Environmental Analyst must provide data to specialists (particularly cultural resources and ecology SMEs) so that any potential for additional induced effects can be identified.

The input received from local planning officials, through interviews and related follow-up coordination, provides valuable information used to determine the wide array of reasonably foreseeable project effects. The background research will enable an effective Land Use Coordination Packet to be shared in advance of local interviews. By

gaining insights directly from planning staff, the Environmental Analyst can build a discussion from local experts as the primary sources to confirm future land use changes and how the project fits within local zoning and future land use plans.

The land use changes (if any are identified) will fall into one of these categories:

- > Induced by the transportation project (the change would not occur “but for” the proposed transportation improvement)
- > Facilitated by the propose transportation improvement—accelerated in schedule compared to the same planned land use changes without the project
- > Currently underway (independent of project or being done in anticipation of project)
- > Reasonably foreseeable by future horizon independent of project
- > Not Reasonably Foreseeable by future horizon with or without the project

With this input received from local experts, the Environmental Analyst can confirm whether the project would have any induced development potential that could in turn have substantial impacts on resources in the study area. This finding is the key assumption needed by specialists, along with associated maps and other data to help them assess and describe other resources within their respective technical studies.

### DOCUMENTATION

As with the overall land use analysis, the documentation will vary by project type, location, and intensity of development in the project area. The Environmental Analyst has some leeway to develop the narrative and supporting graphics, while focusing on the primary steps and findings rather than the entire process in detail. The land use section generally will range in length from one to five pages, based on the CEQ and FHWA directives on the page limits for EA and EIS documents. One approach currently recommended by FHWA has been to include a summary level discussion in the main body of the NEPA document, with a limited number of the most relevant exhibits. This discussion would refer to the land use interview(s), land use coordination packets, and additional maps that are attached to the NEPA document as an appendix.



## *Guidebook Revision History*

Revision Description	Relevant Sections	Revision Date
Initial Publication	All	6/30/2021