THE Louis Berger Group, INC.

MDT

Assessing the Extent and Determinates of Induced Growth

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Training Course

Training Overview

1. Introduction to Indirect Land Use Effects
2. Research Methodology and Findings
3. Indirect Effects Screening Methodology
4. Screening Analysis Breakout Session
5. Indirect Effects Detailed Analysis Methodology
6. Implementation Recommendations

Typology of Effects Under NEPA

- **Direct**- caused by the action and occur at the same time and place

- **Indirect**- caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable

- **Cumulative**- the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Introduction to Indirect Land Use Effects

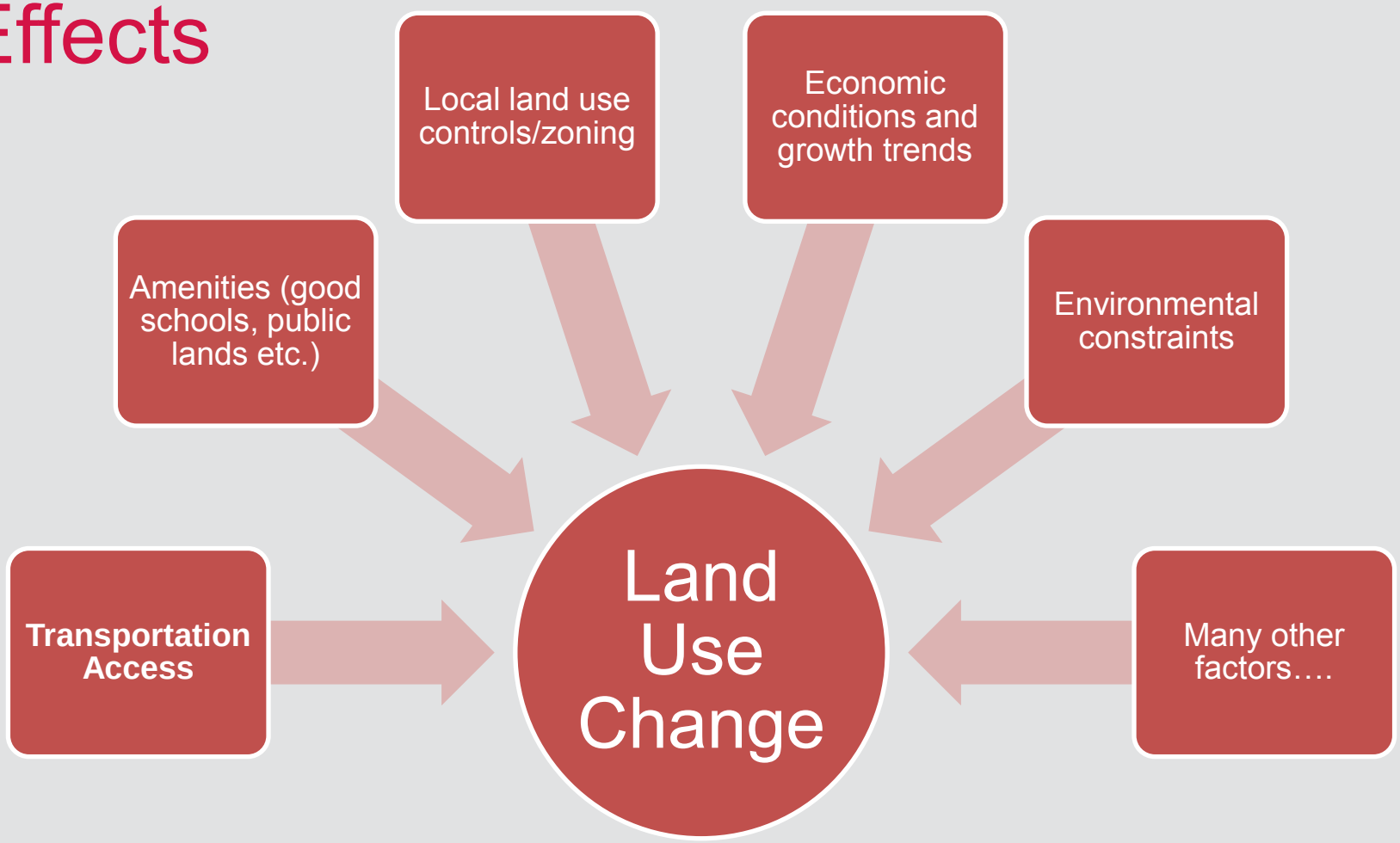
•Indirect effects “may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”(40 C.F.R. §1508.8(b)).

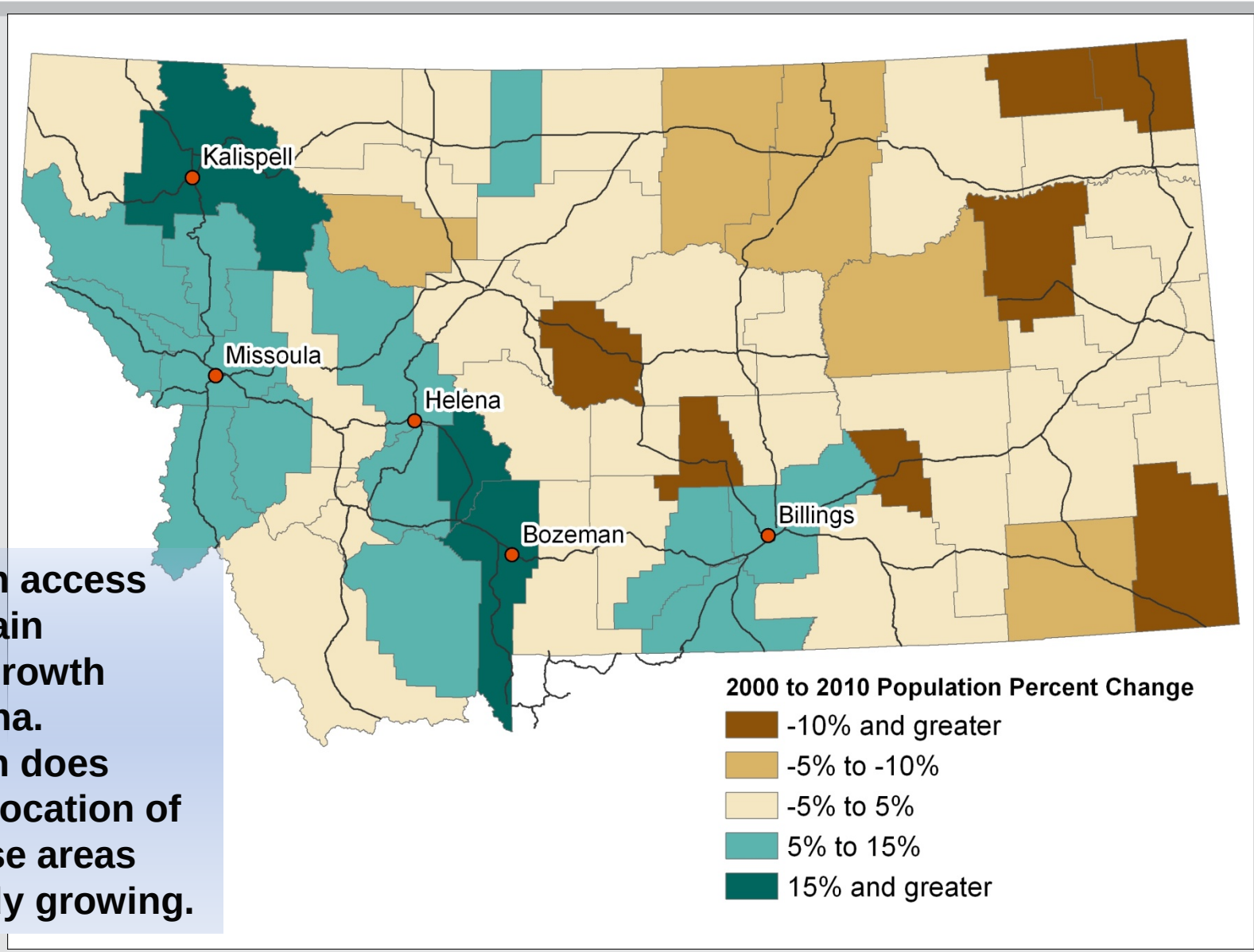
•Indirect effects (secondary impacts) are also addressed by MEPA and growth inducing effects are a factor in the MEPA significance determination.

•Prior research identified three types of indirect effects: encroachment-alteration, induced growth and induced growth-related.

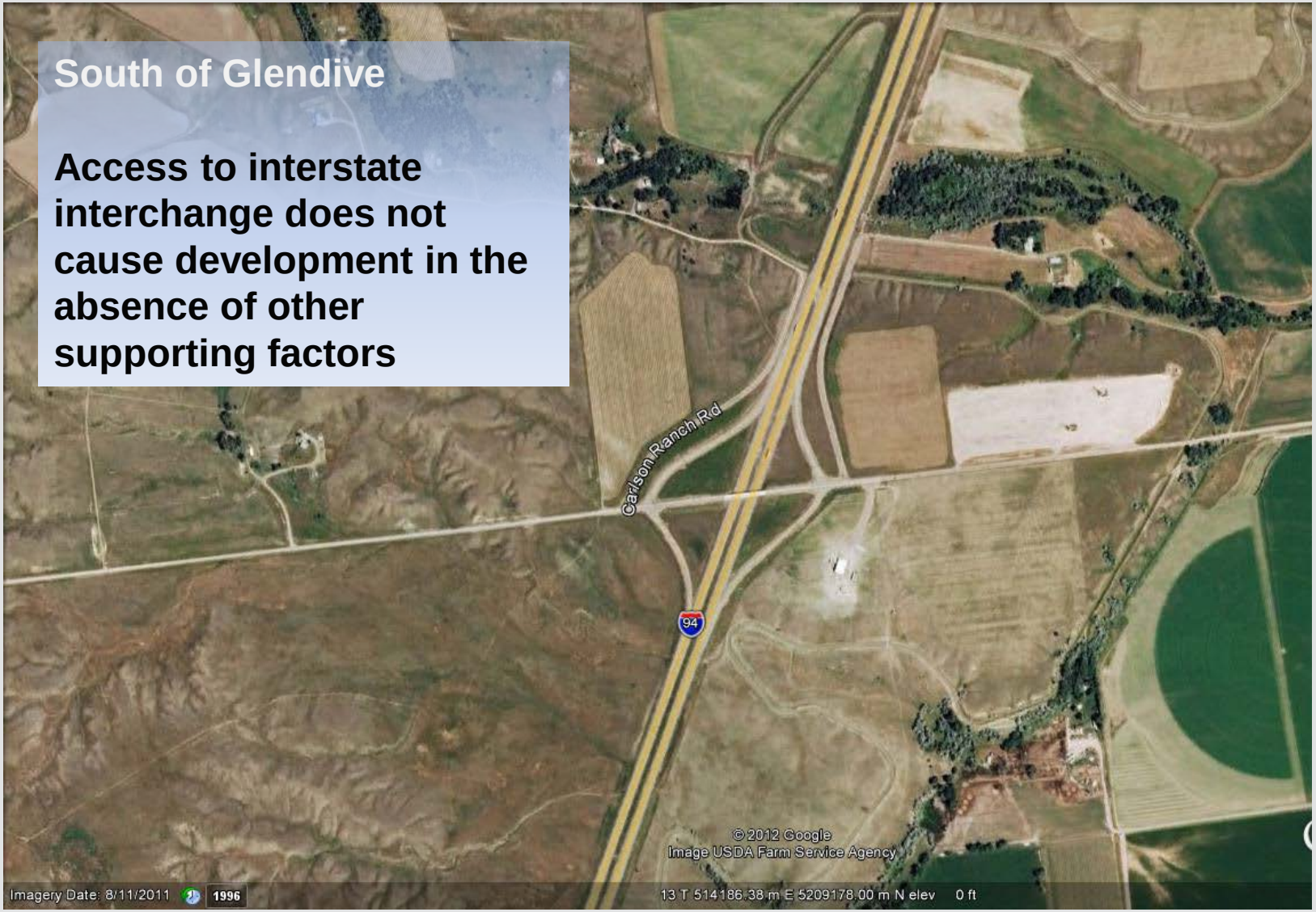
•Induced growth/indirect land use effects of transportation projects occur as a result of a change in accessibility. Accessibility refers to “the number of opportunities available within a certain distance or travel time”.

Introduction to Indirect Land Use Effects





Transportation access does not explain variations in growth across Montana. Transportation does influence the location of growth in those areas that are already growing.


South of Glendive
Access to interstate interchange does not cause development in the absence of other supporting factors
Carlson Ranch Rd
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© 2012 Google
Image USDA Farm Service Agency
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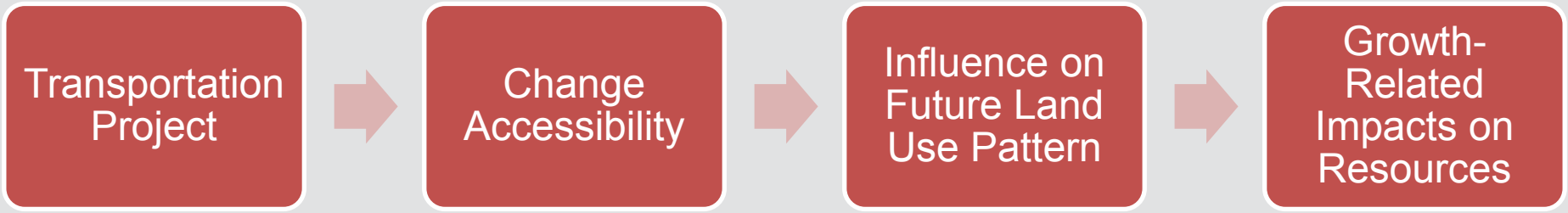
Introduction to Indirect Land Use Effects

- Follow the chain of causality



- Influence on transportation on land use could be- growth that would not of had occurred otherwise, growth occurring faster than it would have otherwise, growth being redistributed.

- Even though we cannot predict the future with certainty and future land development is very uncertain, NEPA requires a “hard look” (not a specific prediction) into “reasonably foreseeable” indirect effects.

Research Project Objectives

- **Process improvements-** enhance existing functional process to make indirect effects assessment easier and faster.
- **Indirect land use effects assessment guidance-** including the development of screening criteria and recommended methodologies for detailed analysis. These materials may be included in MDT's Environmental Manual. Guidance tailored to unique Montana conditions—large state with very low population density.
- **Adaptive management plan-** to ensure the guidance remains up-to-date with the latest data, legal and regulatory information.

Research Methodology

- **Review of existing MDT practice-** review of MDT environmental documents, interviews of MDT staff and a survey of resource agency staff.
- **Case law review-** precedent setting indirect effects cases under NEPA and MEPA
- **Literature review-** review national research and other state-level guidance documents for approaches applicable to Montana context.
- **Review of Montana State Statutes Regarding Land Use**

Review of Existing MDT Practice

- Review of 6 CEs, 7 EAs and 6 EISs revealed variations in level of detail- from well developed explanations to dismissal of the issue without providing a basis for the conclusion.
- The interviews identified a range of experience and beliefs related to indirect land use effects within MDT. However, nearly all MDT interview participants indicated the need and desire for a standardized process to analyze induced growth.

Case Law Review

The case law review demonstrated the importance of the following practices in indirect effects studies:

1. Use up-to-date data.
2. Document the basis for decisions made during the analysis, such as selection of study area boundaries, timeframe, analysis tools etc.
3. Disclose the limitations of the analysis methodologies selected to the public and decision-makers in the NEPA document.
4. Make an effort to analyze and explain impacts, even if the exact magnitude of the impacts is uncertain.
5. Ensure internal document consistency—between the purpose and need for the project and the indirect effects assessment, and between the indirect effects assessment and the population and employment levels assumed in estimating traffic, air quality and noise impacts.

Case Law Review- Montana Examples

•. Coalition for Canyon Preservation v. Bowers, 632 F.2d 774 (1980)- U.S. 2 widening on the approach to West Glacier. EIS included statement that "the possibility does exist that development along the highway may increase at a faster rate than it has in the past." Circuit Court found failure to analyze secondary effects violated NEPA.

•Friends of the Bitterroot v. USDOT (1999). Court found the review of growth-related impacts for the U.S. 93 Hamilton to Lolo expansion was adequate, noting that the "record reflects a reasoned and reasonable consideration of the causes of past and future growth in the valley."

Case Law Review- Other Examples

Internal Consistency- I-93 Improvements, New Hampshire (2007)

- Court required supplemental EIS because prior EIS used a population and employment projections prepared by a Delphi Panel to assess indirect effects on environmental resources, but failed to use the Delphi Panel estimates in traffic, air quality and noise analyses (relying instead on outdated census data in the travel demand model).

•Public Disclosure- Monroe Bypass, North Carolina (2012)

- In response to comments, NCDOT incorrectly stated that the proposed project did not influence the socioeconomic data used in the No Build scenario.
- The Circuit Court found that this mischaracterization of the data underlying the No Build scenario was contrary to the public disclosure and transparency requirements of NEPA.
- Case also highlights the importance of a "clean" No Build as the baseline for assessing indirect effects.

Literature Review

National research and guidance documents:

- NCHRP Reports 403 and 466
- NCHRP 25-25- Tasks 11, 22 and 43
- FHWA *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process.*
- FHWA *Interim Guidance on the Application of Travel and Land Use Forecasting in NEPA*
- AASHTO Center for Environmental Excellence Practitioner's Handbook 12

States with guidance documents for indirect effects analysis:

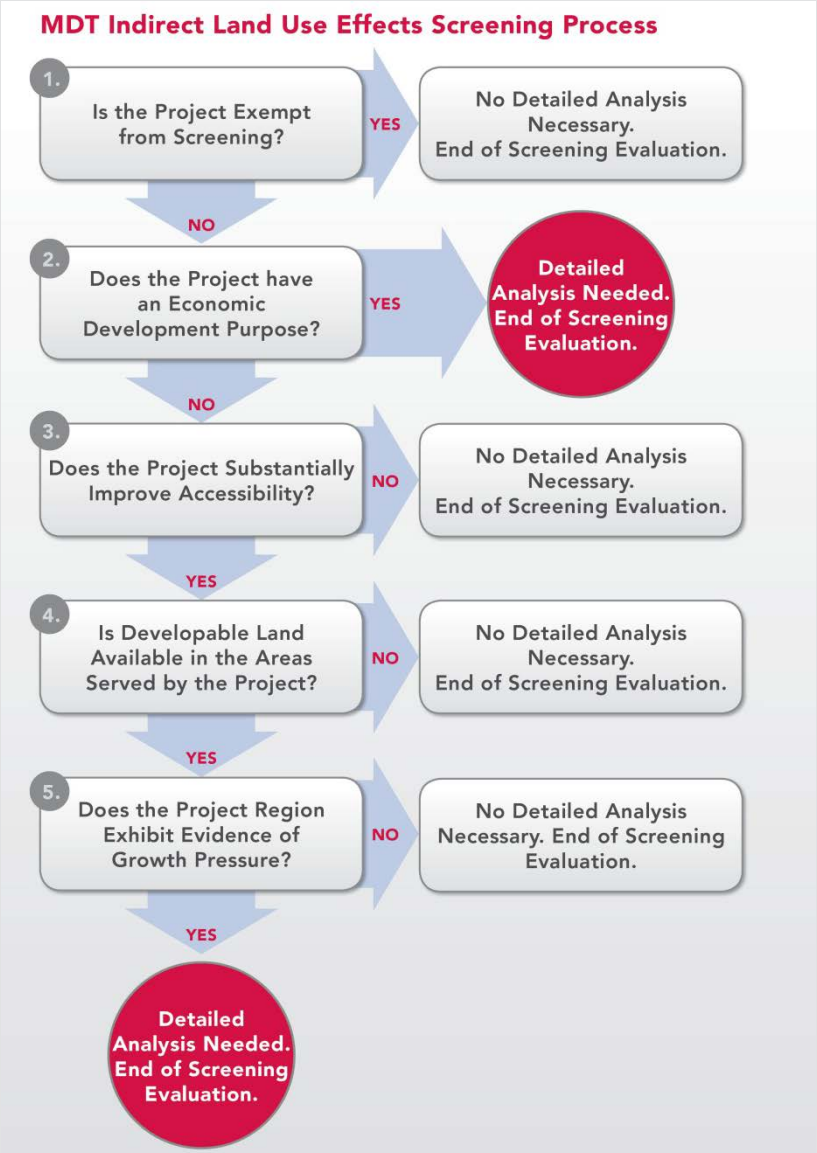
- North Carolina
- California
- Texas
- Wisconsin
- Oregon
- Maryland

Review of State Statutes Regarding Land Use

- Growth policies- optional, but required if local government wants to enact zoning. Not a regulatory document.
- Subdivision regulations are required for all cities, counties and towns. Subdivisions are also regulated by MDEQ with respect to water supply, wastewater treatment, and stormwater management.
- The likelihood of the growth patterns desired in the growth policy becoming reality depends on the strength of the enforceable zoning and subdivision regulations adopted consistent with the policy.

Indirect Effects Screening Methodology

- Standardized process to determine if further analysis needed.
- User friendly and minimal data requirements.
- The vast majority of MDT transportation projects will not require detailed analysis based on this methodology.



Step 1- Is the Project Exempt?

•List of projects developed that do not have the potential for indirect land use effects regardless of the context of where the project is located : includes 23 CFR 771.117 (c) list projects, resurfacing, reconstruction within ROW with no additional capacity, bridge replacements etc.

•Completing further steps of the screening process is not necessary for exempt projects—the evaluation ends with the determination that the project is exempt.

Step 2- Does the Project have an Economic Development Purpose?

•If long-term economic development (not just temporary construction jobs) is part of the purpose of the project or cited as a benefit, a detailed analysis of the level of economic development and associated impacts is needed.

•This is based on case law emphasizing the importance of a rigorous evaluation of the environmental consequences of induced growth if such growth is part of the purpose or touted as a benefit of the project.

Step 3- Does the Project Substantially Improve Accessibility?

•Accessibility improvement is the factor in land development that transportation can influence- no potential for indirect land use effects without accessibility improvement.

•For screening purposes, answer to this question is always yes for capacity expansion projects- new roads, adding travel lanes to existing roads, new interchanges etc.

•Judgment based on project-specific conditions is required to determine if turning lanes or climbing lanes substantially improve accessibility.

•Support conclusion with quantitative information when possible- effect of project on travel times, LOS, traffic volumes/trips.

Step 4- Is Developable Land Available?

•Even if a project increases accessibility, it will not result in land use change if the area of influence around the project does not contain developable land.

•Consider environmental constraints, steep slopes, land ownership constraints (federal lands, conserved lands), land committed to other uses, and local land use controls (growth policy and zoning).

•Unlike prior steps of screening, Step 4 requires delineation of study area boundaries

Step 5- Does the Project Area Exhibit Evidence of Growth Pressure?

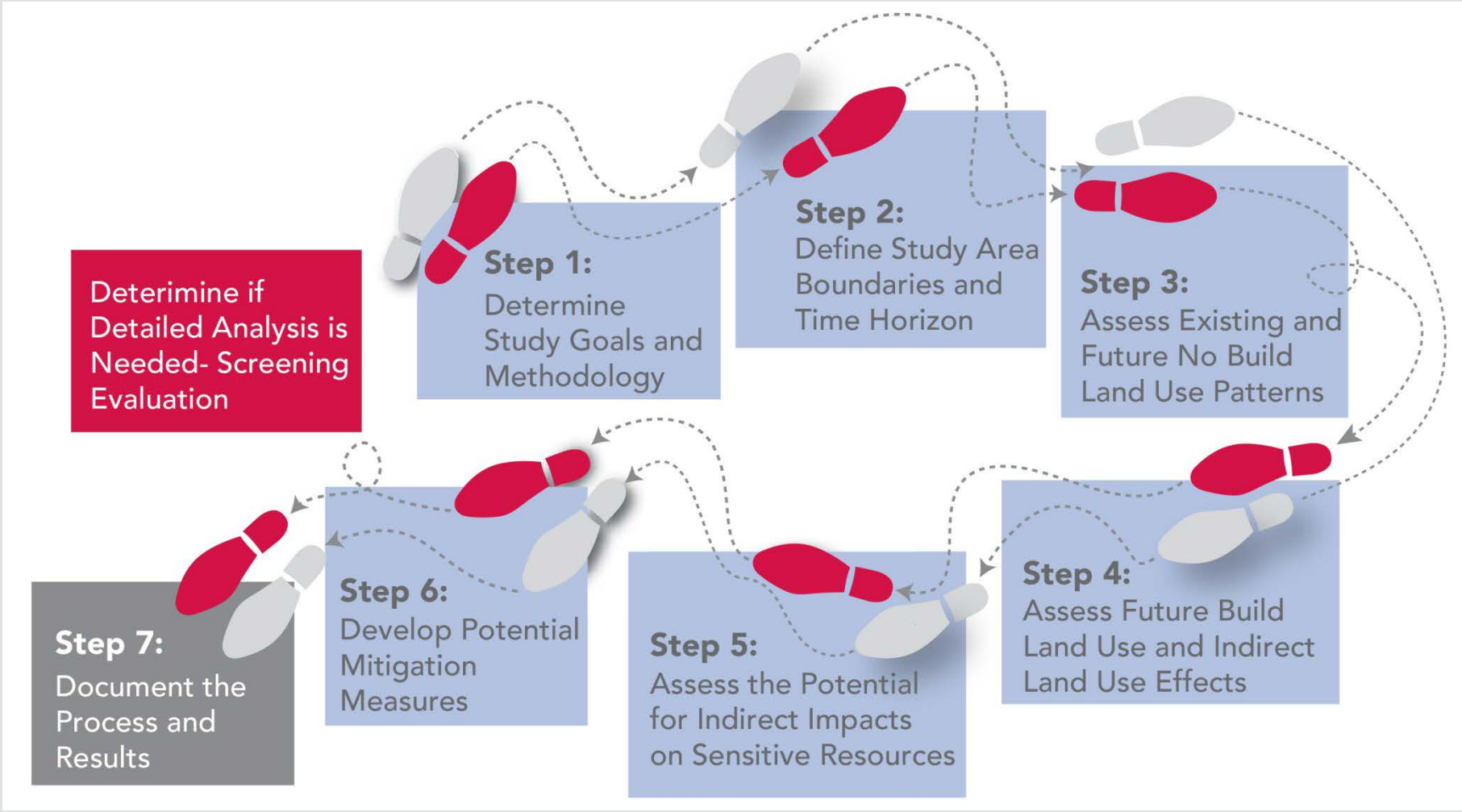
•Even with ample land available and excellent accessibility, no development (induced or otherwise) will occur without a supportive economic climate.

•Answer to this question can be supported by examining population/employment growth rates and projections, growth indicators such as building permits or septic system applications, and the location of the project with respect to growing city centers or natural amenities that attract rural residential development, such as a National Park.

•A “yes” answer to this final question indicates detailed analysis is needed (the project improves accessibility, there is developable land present and the area is undergoing growth).

Breakout Session- Applying Screening Process to Four Example Projects

Indirect Effects Detailed Analysis Methodology



Step 1- Determine Study Goals and Methodology

•The objective of Step 1 is to “right-size” the indirect effects analysis by: (1) determining the goals and objectives for the study (e.g., the questions the study should answer) and (2) choosing an analysis approach and the appropriate tools to meet the goals of the study.

•Study goals can be identified based on results of screening-level analysis, public and agency outreach, and scoping for other environmental topics.

- There is no single standard method for analyzing indirect effects. Rather, there are a large range of qualitative and quantitative analysis methods that are considered acceptable. The selection of a method or methods for application is done on a case-by-case basis considering factors specific to individual projects.

Factors in Selecting Methodology for Detailed Analysis

- Magnitude of potential induced-growth effects.
- Strengths and limitations of each available tool in the context of the specific project.
- Relationship to other analyses in NEPA process
- Agency and public expectations
- Cost and schedule constraints.
- Necessary output to meet needs of study/address environmental impacts
- Geographic scope considerations, such as the applicability of the method to a study area of a certain size or the minimum level of geographic detail needed in the results.
- The availability of appropriate staff (e.g., a methodology using a travel demand model may require a transportation modeling expert).

Recommended Methodologies for Detailed Analysis in Montana

- A variety approaches were evaluated, taking into account applicability to Montana, cost and expertise requirements, and general advantages/disadvantages associated with each methodology.

- The recommended methodology for detailed indirect effects analysis in Montana is a combination of “collaborative judgment” (to determine No Build vs. Build incremental change in land use) and “allocation models” (to determine the allocation of growth predicted through collaborative judgment to specific sub areas). Planning judgment is required to structure the analysis.

- Four-step travel demand model based methods are potentially applicable within the Billings, Missoula, Great Falls, Bozeman, Butte, Helena, Belgrade, Laurel, and Kalispell areas. However, cost and specialized expertise required to use travel demand-model based methods limits their applicability.

Planning Judgment

- Planning judgment relies on the experience of the practitioner, the relevant planning literature, and on an assessment of local trends and forecasts to assess indirect land use impacts.
- Planning judgment is an essential component of all indirect land use effects studies.
- Advantages include low time and cost requirements, and flexible data requirements.
- Disadvantage when used as a standalone methodology—biases of the individual analyst (can be offset using collaborative judgment).

Collaborative Judgment

- Collaborative judgment incorporates input from other people knowledgeable of the study area (local experts) to inform conclusions about future land use conditions, whether through informal interviews or more formally through a Delphi panel.

- Given the uncertainty involved in estimating indirect land use effects, collaborative judgment approaches offer a robust way of incorporating multiple viewpoints into the impact assessment process.

- Potential disadvantage- findings of panel can be difficult to explain/draw conclusions from if there is wide disagreement between the members on the effect of the project.

- Example- 2003 I-15 Corridor Montana City to Lincoln Road EIS

Allocation Models

- In conjunction with planning judgment or collaborative judgment, allocation models can allow the analyst to distribute a defined amount of indirect land use change at a disaggregate level (e.g., to Traffic Analysis Zones).

- Allocation models are best for addressing the question of where growth will occur at the local level. The question of how much growth will occur with vs. without the project will likely need to be estimated with other methods—planning judgment, collaborative judgment, or output of travel demand models.

- Relies on GIS data and simple spreadsheet calculations to determine allocation of population and households to specific areas, considering development constraints, zoning and other factors (see NCHRP 25-25 Task 22).
    - Determine the Supply of Buildable Land
    - Allocate Population and Population Growth to Sub-Areas
    - Determine Site Requirements
    - Convert Population and Employment to Land Use

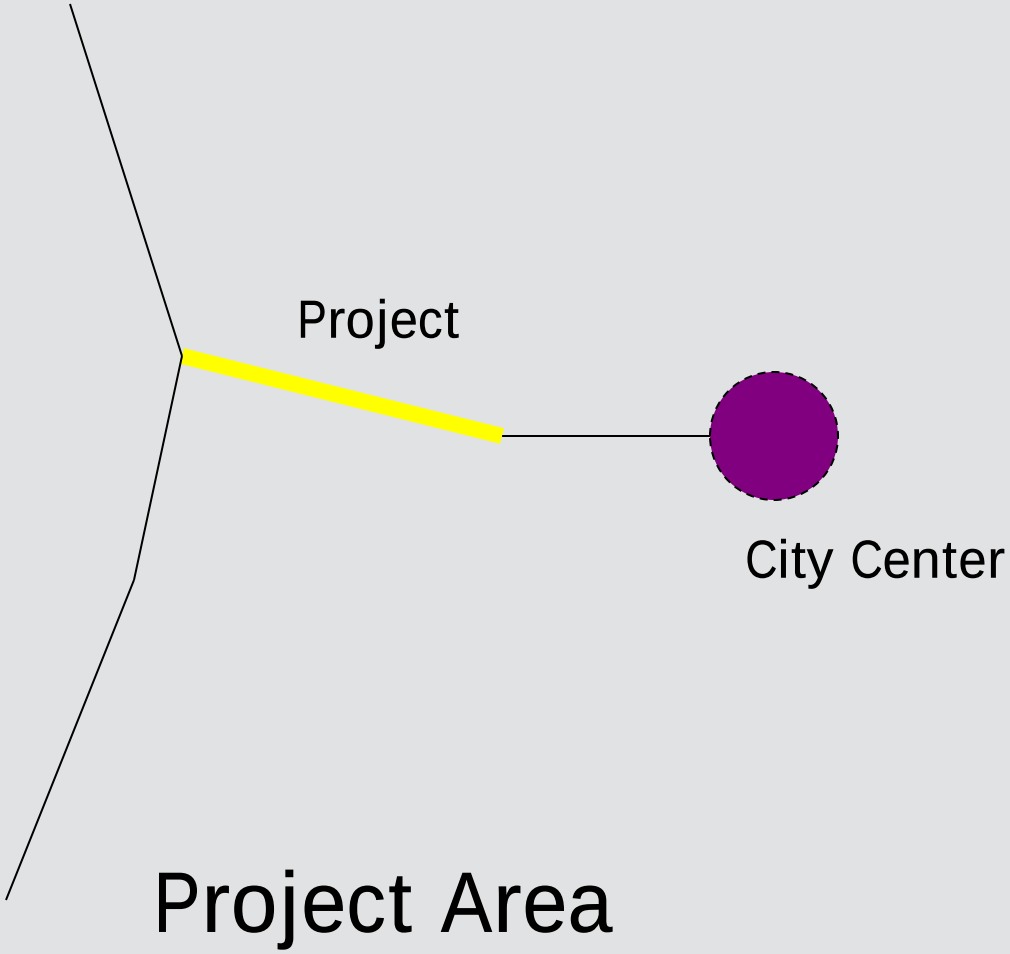
Step 2- Define Study Area Boundaries and Time Horizon

•Extent of study area tied to scale/influence of project—smaller when only localized effects are expected, larger for major new capacity projects altering travel times regionally.

- Considerations in setting study area boundaries can include:
  - Political/geographic boundaries
  - Commuteshed of city or other attraction
  - Growth areas/growth polices
  - Watershed and habitat boundaries
  - Interviews and public involvement.

•Land use changes occur gradually over time, and may not be apparent for many years after construction of a project is completed. For this reason, the time horizon for a detailed analysis of indirect land use effects should be at least 20 years.

Study Area Techniques



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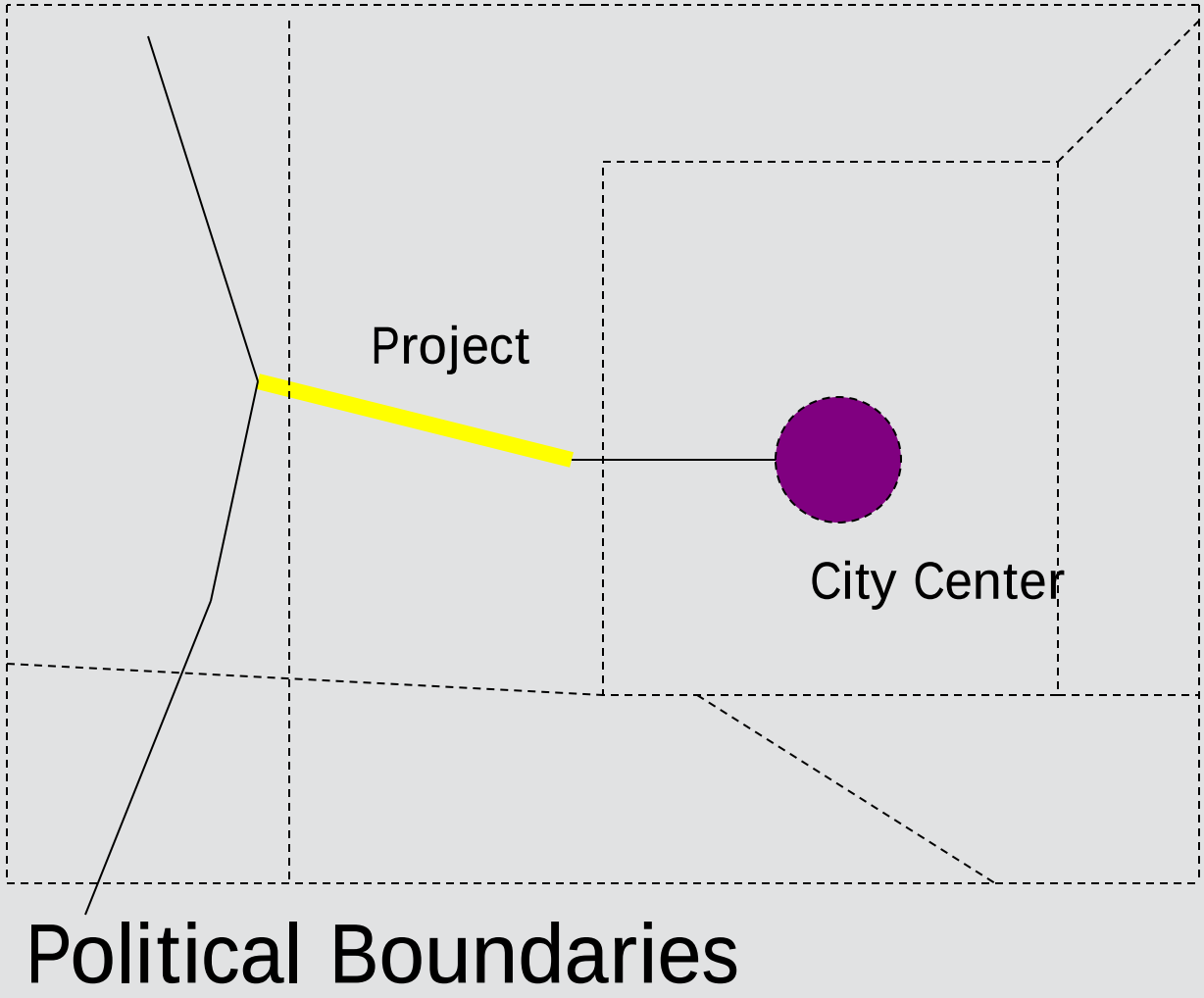

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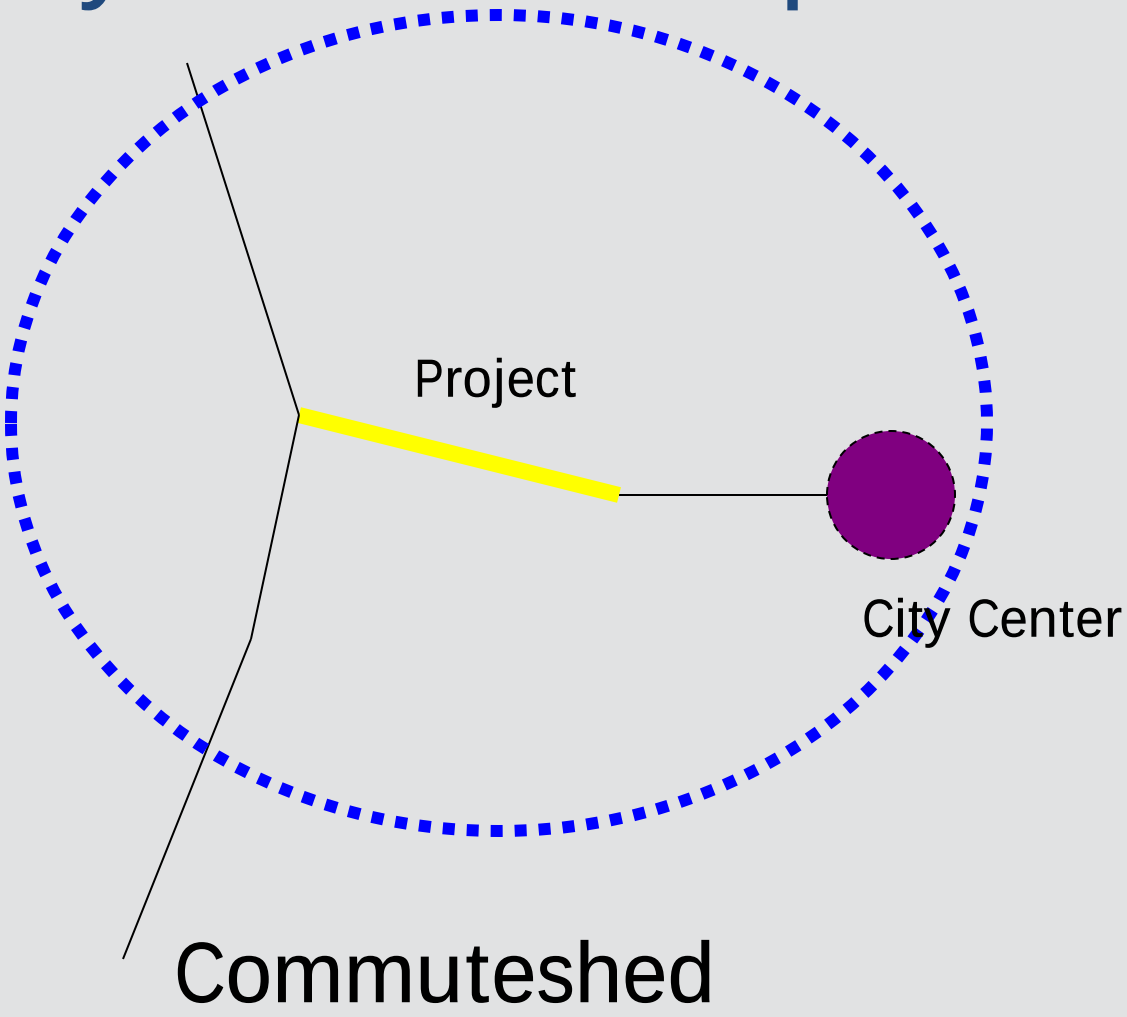

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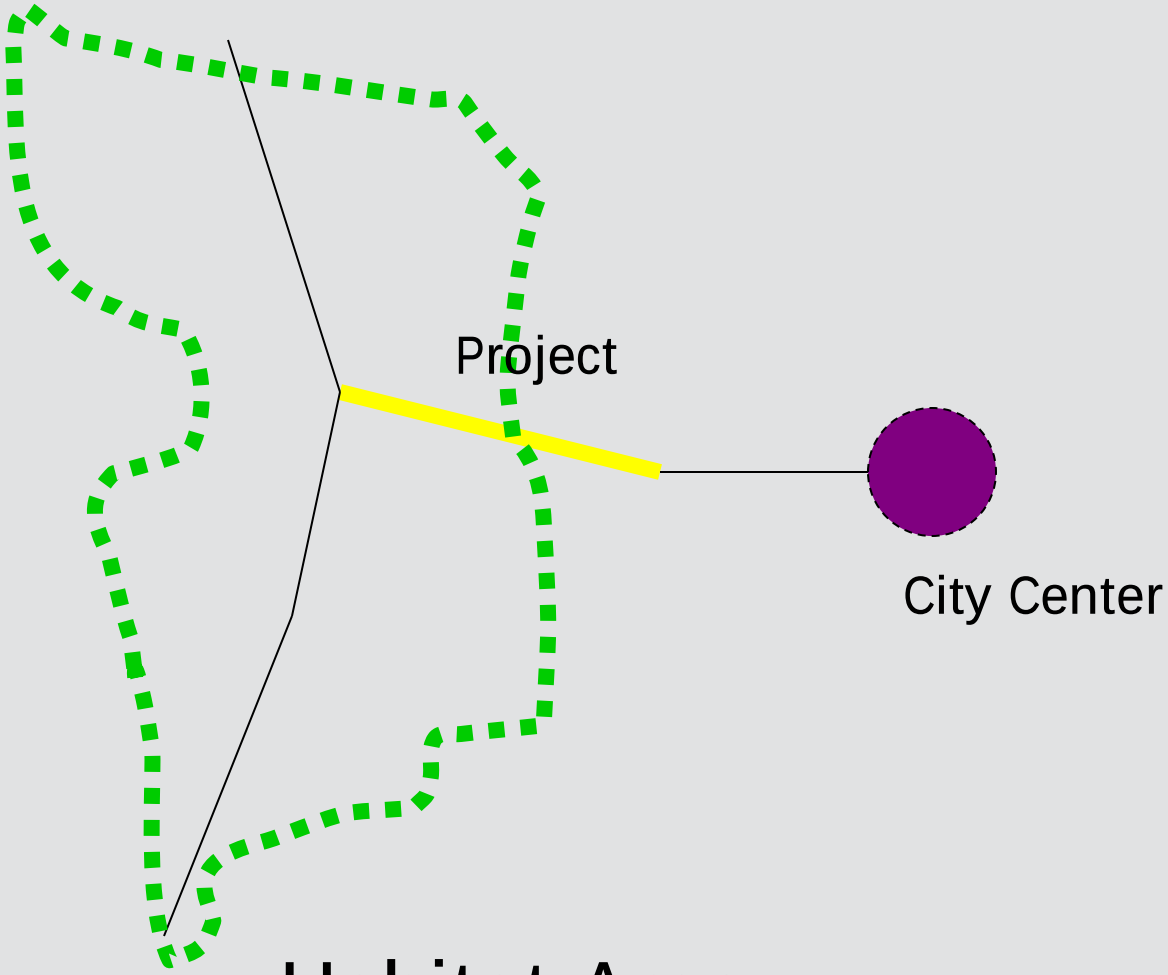
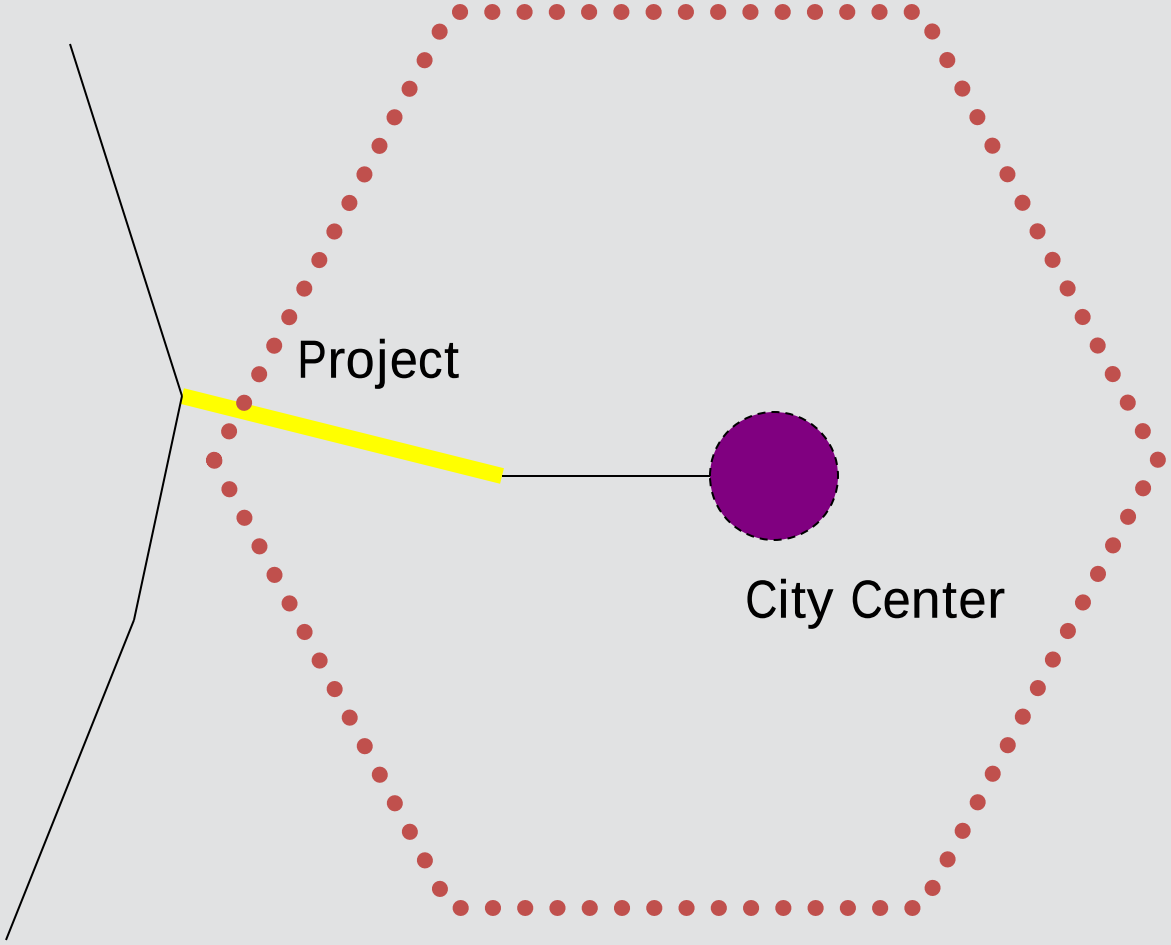
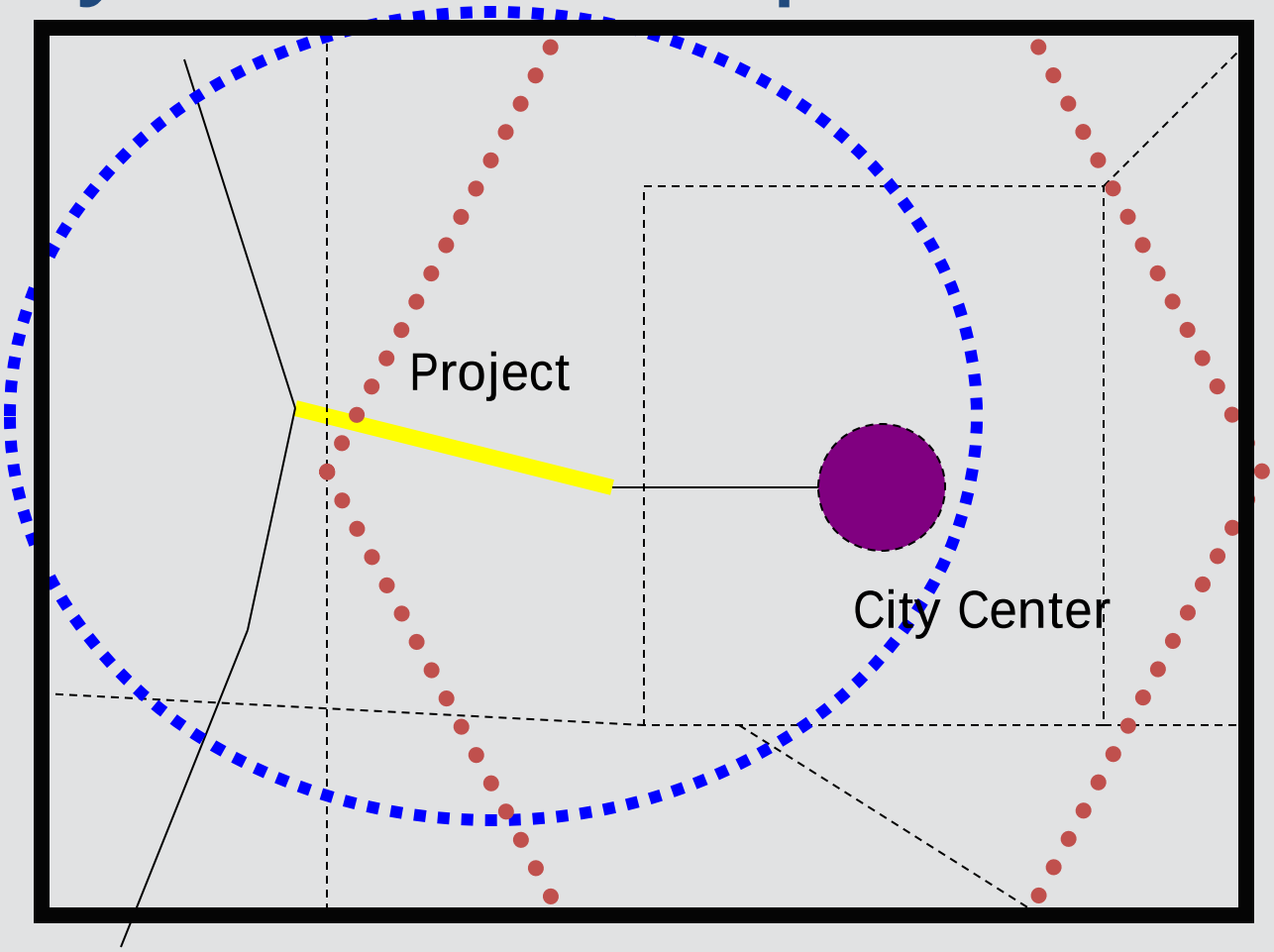


Study Area Techniques



Urban Growth Boundary

Study Area Techniques



Final Study Area Boundary

Step 3- Assess Existing and Future No Build Land Use Patterns

•Existing conditions data collection- population, households, employment trends, land use etc. Guidance on data sources provided in Desk Reference.

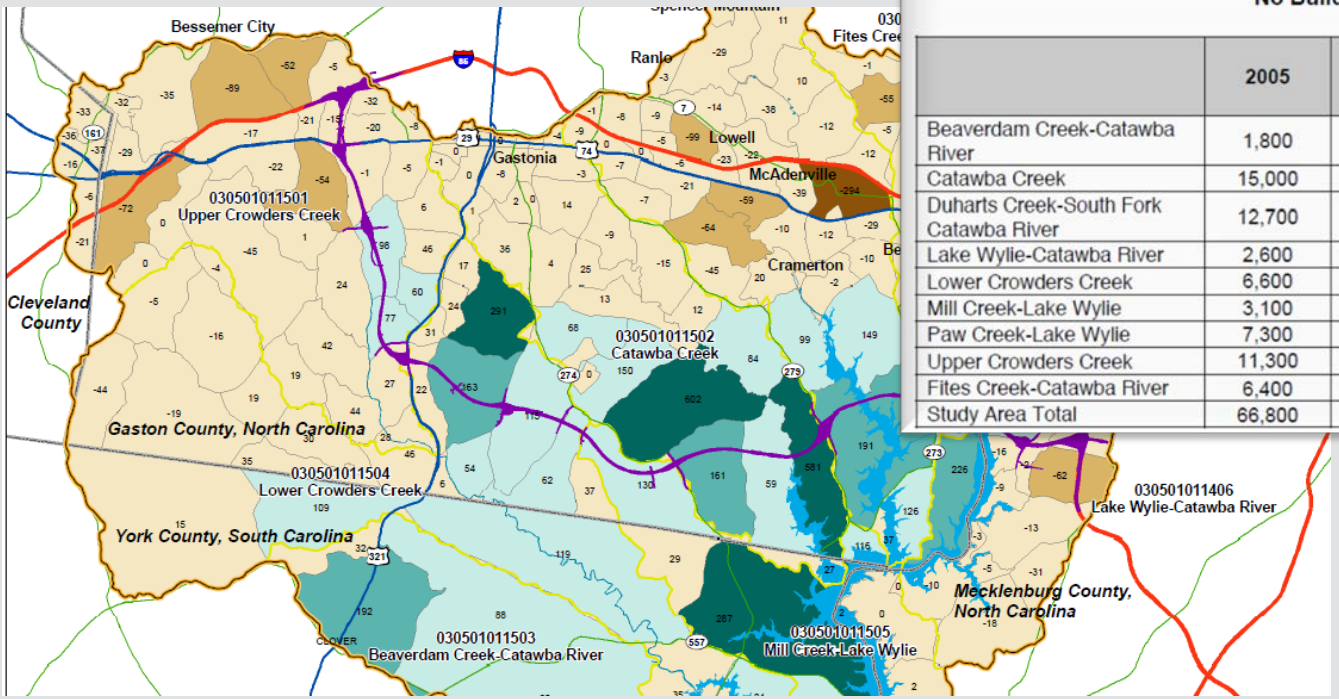
•Develop land use assumptions for the future No Build condition.

•No Build condition can be based on local plans/existing regional projections, **but first it is necessary to determine whether or not the existing forecasts already take the indirect land use effects of the project into account.**

- If the existing forecasts include effect of project, the existing forecasts may better represent Build condition and a separate No Build should be estimated.
- Review forecast documentation and consult with preparers (document consultation).

Step 4- Assess Future Build Land Use and Indirect Land Use Effects

- Assess indirect land use effects- the difference between No Build and Build land use scenarios using methodology selected in Step 1.



Gravity Model Estimated Change in Households by Watershed
No Build Compared to Build

	2005	2035 No Build	2035 Build	No Build to Build Difference	Percent Difference
Beaverdam Creek-Catawba River	1,800	2,700	3,100	400	14.8%
Catawba Creek	15,000	22,000	23,800	1,800	8.2%
Duharts Creek-South Fork Catawba River	12,700	22,700	22,700	-100	-0.4%
Lake Wylie-Catawba River	2,600	6,600	6,700	200	3.0%
Lower Crowders Creek	6,600	11,200	12,500	1,300	11.6%
Mill Creek-Lake Wylie	3,100	6,800	7,200	400	5.9%
Paw Creek-Lake Wylie	7,300	11,800	11,700	0	0.0%
Upper Crowders Creek	11,300	18,800	18,500	-300	-1.6%
Fites Creek-Catawba River	6,400	11,700	11,200	-400	-3.4%
Study Area Total	66,800	114,300	117,400	3,300	2.9%

Step 5- Assess the Indirect Effects on Sensitive Resources

- Identify resources for analysis.

- Characterize the existing condition of the resources– data sources and recommendations are provided in the Desk Reference.

- Based on the No Build and Build land use scenarios, estimate effects on the selected resources due to land use change.

Step 6- Develop Potential Mitigation Measures

•Discussion of mitigation is required if adverse impacts are identified.

•Mitigation under NEPA—encouraged to discuss mitigation measures that could be implemented by others in an EIS. Mitigation strategies typically discussed in indirect impact assessments include: access management, zoning and comprehensive planning, transfer of development rights, growth management regulations, resource management and preservation regulations, land acquisitions and conservation easements, and incentives for infill development.

•Mitigation under MEPA—must be enforceable by the project sponsor.

•MDT's "Transportation and Land Use Toolkit" provides a summary description of the available planning strategies for mitigating indirect land use effects available to local communities, including the advantages/disadvantages of each and implementation recommendations specific to Montana.

Step 7- Document the Process and Results

•The indirect effects assessment should be documented in a technical report organized around the steps of the analysis process. Under each step, explanation should be provided for what the analyst did and just as importantly, why they made particular decisions.

•Summarize technical report in environmental document and incorporate by reference.

Implementation Recommendations

- Incorporate the indirect effects guidance in the MDT Environmental Manual.
- Establish a technical review committee to evaluate feedback, review need for updates, and make decisions on changes.
- Implementation monitoring, including mechanisms for soliciting and tracking feedback from practitioners.
- Update data sources/references as new data and tools become available.