



South Mountain Transportation Corridor Study

Citizens Advisory Team
Draft Technical Report Summary

Cumulative and Secondary Impacts

What are cumulative and secondary impacts?

Federal guidance defines cumulative impacts as “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” (40 CFR 1508.7). In more basic terms, cumulative impacts occur where several actions in an area combine to create an impact on a given resource greater than any one individual activity. An example of this is when individual cars added together in one general location lead to a traffic jam. Cumulative impacts result from spatial (geographic) and temporal (time) crowding of environmental impacts. The effects of human activities would accumulate when a second impact occurs at a site or in a region before the environmental system can fully rebound from the effect of the first impact.

Secondary impacts (sometimes referred to as indirect impacts) are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. 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” (40 CFR 1508.8). An example of this is when a new highway interchange is constructed, a cross street can attract development, such as a gas station.

The draft technical report follows two principles outlined by the Council of Environmental Quality (CEQ) guidance (1997) in considering secondary and cumulative analyses: (1) focus only on the effects and resources within the context of the proposed action; and (2) present a concise list of issues that have relevance to the anticipated effects of the proposed action or eventual decision.

Why study cumulative and secondary impacts in the Environmental Impact Statement (EIS)?

The Phoenix metropolitan area is growing rapidly and has been since the 1950s. The Valley has gone from a set of small agricultural towns to a major metropolitan area over the last 100 years. The rapid growth is expected to continue well into the future, which would result in cumulative effects on natural resources in the area, communities, residents, infrastructure and economic conditions. Evaluating cumulative impacts from the proposed action and other activities on various resources provides an understanding of the overall health, or condition, of each resource and the proposed action’s contribution to effects on the resource. The proposed action may also result in impacts which occur elsewhere or later in time; therefore, secondary impacts are evaluated to identify if such effects are occurring.

The primary purpose of presenting these types of impacts in an EIS is specifically for public disclosure—to inform the public through this process the health of resources affected, the contribution of the action’s impacts on the resources, and what other non-project related impacts are affecting the resources.



South Mountain Transportation Corridor Study

Citizens Advisory Team Draft Technical Report Summary

Cumulative and Secondary Impacts

What other activities are considered in evaluating cumulative impacts?

The definition of cumulative impacts requires consideration of past, present and reasonably foreseeable changes that could result in cumulative impacts when combined with the environmental effects of the proposed action. Specifically, activities are identified when, in combination with the potential impacts of the proposed action, they could result in substantial cumulative impacts. In accordance with precedence set by court cases, other projects deemed reasonably foreseeable were limited to those that are planned and/or funded. The following types of activities that could result in cumulative impacts were reviewed:

- Other highway projects
- Planned mass transit projects in the Study Area
- Major utility projects in the Study Area
- Other general development patterns

Other proposed transportation projects in the proximity to the Study Area include light rail on Interstate 10 (I-10), the I-10 Median and Outside Widening projects (State Route [SR] 303L to SR 101L [Agua Fria Freeway]), the I-10 Outside Widening project (SR 101L [Agua Fria Freeway] to I-17), the SR 801 project, the I-10 Corridor Improvement Study (SR 51 to SR 202L [Santan Freeway]) (local and express roads), and the Avenida Rio Salado project. No major utility projects were identified aside from local distribution system extensions to service existing growth.

What kind of impacts would occur from the proposed action?

Critical resources warranting secondary impact analysis are presented in this section. To address the potential impact severity, classifications in accordance with Federal Highway Administration (FHWA) guidance are presented in Table 1.

Table 1. Secondary and Cumulative Impact Severity Classification

Impact Category	Impact Classification	Description
Type^a	Neutral or negative	Compares the final condition of a given resource with its existing condition (assumes that the expected impact occurs).
Severity	Minor, moderate or substantial	Considers the relative contribution of the proposed action to a given impact.
Duration	Temporary or permanent	Permanent is assumed unless otherwise noted.
^a The project can have positive impacts		

Tables 2 and 3 summarize anticipated secondary and cumulative impacts, respectively, that can be reasonably foreseeable as they relate to the proposed action.



South Mountain Transportation Corridor Study

Citizens Advisory Team Draft Technical Report Summary

Cumulative and Secondary Impacts

Table 2. Secondary Impacts

Resource	Proposed Action Impact	Reasonably Foreseeable Impact	Impact Classification
Biological resources	Habitat loss from direct conversion to transportation use	Habitat loss from urban development	Neg/Mod
	Vehicle-animal collisions	Wildlife population reduction	Neg/Mod
	Loss of native vegetation	Increased rate of land conversion	Neg/Mod
Water resources	Loss and/or alteration of natural drainage features	Loss from urban development	Neg/Min
	Modification of groundwater tables from pumping to drain a depressed facility; eventual impact on the water table by removing this water from use	Groundwater drawdown from continued development	Neg/Mod
Air quality	Particulate matter due to construction activities	Reduced air quality from construction activities related to continued rapid urban growth in the region	To be included with air quality report summary
Cultural resources	Disturbance to known historic and prehistoric sites	Loss due to enhanced access to undisturbed land	Neg/Min
Land use	Conversion of agricultural land to other uses	Conversion from ongoing urban development	Neg/Min
	Land use ownership conversions	Conversion of zoned parcels to more intensive land uses	Neu/Min
	Alteration of community character	Change in character from ongoing urban development and its effect on community character	Neu/Min
Economic conditions	Enhanced movement of goods, materials, and services	Projected growth in land values and economic activity in study area	Neu/Min
Neu = neutral; Neg = negative; Min = minor; Mod = moderate; Sht-Trm = short-term			



South Mountain Transportation Corridor Study

Citizens Advisory Team Draft Technical Report Summary

Cumulative and Secondary Impacts

Table 3. Cumulative Impacts

Resource	Proposed Action Impact	Reasonably Foreseeable Impact	Impact Classification
Biological resources	Habitat loss from direct conversion to transportation use	Habitat loss from urban and transportation development	Neg/Mod
	Habitat isolation and fragmentation	Habitat loss and isolation from urban and transportation development	Neg/Mod
	Vehicle-animal collisions	Wildlife population reduction	Neg/Mod
	Loss of native vegetation	Future construction of residential, industrial, commercial and transportation projects	Neg/Mod
	Introduction of noxious weeds	Future nonfederal and nonstate-funded projects' contributions to the spread of invasive species; federally funded and state-funded projects' reductions in this spreading	Neu/Min
Water resources	Increased runoff and flushed contaminants from impervious surfaces	Increased runoff volumes from other projects and higher potential for pollutant discharges into receiving water bodies	Neg/Min
	Loss and/or alteration of natural drainage features	Loss from urban development	Neg/Min
	Modification of groundwater tables from pumping to drain a depressed facility	Future construction of residential, industrial, commercial and transportation projects	Neg/Min
	Increased demand on water availability	Ongoing development in the region	Neg/Min
Air quality	All predictable measures below federal and state standards; mobile source air toxics (MSATs) being evaluated	Reductions in on-highway emissions of air toxics due to attainment requirements and source emission requirements as established by air quality programs implemented by such agencies as the Maricopa Association of Governments and the Environmental Protection Agency	To be included with air quality report summary
Cultural resources	Disturbance to known historic and prehistoric sites	Enhanced access to undisturbed land; permanent loss due to proposed action and ongoing urban growth; preservation of some cultural resources in place as a result of the proposed freeway	Neu/Min



South Mountain Transportation Corridor Study

Citizens Advisory Team Draft Technical Report Summary

Cumulative and Secondary Impacts

Table 3. Cumulative Impacts

Resource	Proposed Action Impact	Reasonably Foreseeable Impact	Impact Classification
Land use	Conversion of agricultural land to a transportation use	Conversion from ongoing urban development	Neg/Min
Land use (continued)	Loss of recreational lands	Ongoing residential, industrial and commercial development and other transportation and public infrastructure projects	Neg/Min
	Residential and business displacements	Proposed project and other transportation and public infrastructure projects' contribution to displacements	Neg/Min
	Land use ownership conversions	Ongoing residential, industrial and commercial development and other transportation and public infrastructure projects	Neu/Min
	Alteration to community character and cohesion		Neg/Min
Neu = neutral; Neg = negative; Min = minor; Mod = moderate			

How do the alternatives differ in cumulative and secondary impacts?

The action alternatives would have comparable effects. The various activities affecting resources and people in the Study Area and the proposed action can have localized variations at a project level, depending on the specific location of a given effect. However, applying a broader view to the cumulative and indirect effects on affected resource, each action alternative has comparable effects.

What if the project were not constructed?

If the South Mountain Freeway were not implemented, the incremental effects contributed solely by the proposed action would not occur. However, no action would not preclude other activities from affecting resources in a similar manner. Most cumulative impacts would result from ongoing conversion of land to more intensive human-based development. These effects, such as the permanent loss of cultural resources and the permanent loss of agricultural lands would occur without the proposed action in place.

Secondary effects would not occur as such effects must be tied directly to the proposed action.

What could be done to reduce cumulative or secondary impacts?

Disclosure of secondary and cumulative impacts does not require the project proponent to propose and implement mitigation to address such impacts. Project-specific mitigation as proposed to mitigate direct impacts inherently addresses reductions in reported cumulative impacts. However, impact disclosure primarily is for informative purposes. By disclosing these



South Mountain Transportation Corridor Study

Citizens Advisory Team
Draft Technical Report Summary

Cumulative and Secondary Impacts

types of impacts, those concerned are provided a mechanism to contact responsible parties either contributing to such impacts or having regulatory authority pertaining to such matters. For example, the Environmental Protection Agency has enacted rules to reduce vehicle emissions at the national and regional levels. Local jurisdictions governing land development have enacted local zoning ordinances to control and regulate development.

Will the proposed action induce additional travel to occur?

Induced travel is a phrase often used to describe observed traffic volume increases occurring on a new highway after it is opened to traffic. The observation is prominent in areas where congestion is already evident (the Phoenix metropolitan area is a prime example) for the reasons summarized below.

The proposed action would be constructed where existing traffic congestion has already decreased travel speeds throughout much of the regional freeway system and the major arterial network. To avoid the congestion, over time, some travelers have diverted to alternative routes, changed the time they make their trips, switched to different travel modes, traveled to other destinations or decided not to make a particular trip at all. Because the proposed action would carry substantially more traffic before it would become congested, many of these travelers may switch to the new facility when opened to take advantage of decreased travel times. Some travelers using transit as a choice may also switch and further, some may choose to travel to a different (more distant) destinations (e.g., for shopping) or take a trip that they previously avoided altogether, because it was previously "too much trouble" to make. The behavior driving this switch is often associated with drivers' perception in resulting decreases in the generalized cost of travel, including both travel-time and out-of-pocket costs. However, it is commonly recognized the cause of this 'switch' is more complex; involving various travel behavior responses, evolving individual needs, residential and business location decisions and changes in regional population and economic growth.

Some induced travel would represent 'new trips' or 'induced demand.' However, most of the increase in traffic caused by induced travel is expected to come from trips already being made before the proposed action were put into operation (predictable traveler behavior accounted for in the travel demand forecasts conducted for the proposed action). The resulting traffic increase on the South Mountain Freeway is also expected to be largely offset by decreases in traffic volumes on parallel routes and at other times of the day. It is fully expected the net effect on daily vehicle miles of travel in the Valley as a result would be minimal. Examples in the Valley where this phenomenon has been experienced include the recent openings of the Pima Freeway in Scottsdale and Red Mountain Freeway in Mesa. Studies by the cities of Scottsdale and Mesa found substantial reductions in traffic volumes on parallel arterials within two miles of the freeways.

The results of both studies provide insight to general driver behavior. At the time of opening, both freeways represented to drivers a savings in time and/or cost in travel. Consequently, drivers moved from the arterial network to the freeway system. Over the course of time, it would be expected that some drivers would return to the arterial network as more vehicles traveled on the freeways. For the South Mountain Freeway project, a net reduction on the arterial network is



South Mountain Transportation Corridor Study

Citizens Advisory Team
Draft Technical Report Summary

Cumulative and Secondary Impacts

anticipated through the design year 2030 as projected traffic volumes on the arterial network are projected to be less with the proposed action in place than without the proposed action.

For the proposed action, the minimal contribution to overall traffic use by induced travel is expected to have both positive and negative consequences (positive effects on the neighboring roadway network have been previously addressed). Changes in driving behavior leading to the use of the proposed action would be the result of perceived benefits which could include reduced total daily travel time and cost or an increased value associated with a new destination (e.g., a previously 'inaccessible' shopping area with more variety or lower costs).

As a negative consequence, each user of the proposed action would contribute to increased congestion on the freeway. As congestion grows on the new facility, the benefit attributable to potential travel time savings would be expected to decline. Congestion-related impacts (e.g., reduced air quality) would also increase over time. However, it is important to note the overall contribution to projected traffic volumes on the proposed action is anticipated to be minimal (some of which is accounted for in regional traffic models).

It is important to consider that improvements proposed for any type of transportation system (e.g., a new bus route, rail transit line or commuter rail service) would likely lead to changes in travel behavior, which in turn would lead to increased use of the particular system. It is the purpose of 'improvements' made to a given transportation system—to attract new users to the improvement. If this were not a primary goal, the improvement would not be effective nor warranted. For the proposed action, a goal is to attract users of other segments of the regional freeway system and the local arterial network, now and in the future, to the project to optimize, in part, the entire regional transportation system. Further, it is important to consider that as improvements are made to all transportation systems, cyclical benefits and impacts would occur. For example, as auto trips are diverted to transit (either due to direct improvements or increased congestion), traffic congestion on parallel highway facilities may lessen, at least temporarily. The resulting reduction in highway traffic congestion may, in turn, attract additional highway trips, similar to an increase in highway capacity.

The FHWA's current position relative to induced travel is consistent with the consensus of the transportation planning and travel behavior research community—induced travel is neither more nor less than the cumulative result of individual traveler choices and land development decisions made in response to an improved level of transportation service. Many of the travel choice decisions are accounted for in current travel forecasting models or land use transportation interaction models.

Will the proposed action lead to unplanned growth?

Unplanned growth is often termed urban sprawl. Generally, the reference is made in the context of the rapid and uncontrolled urban growth onto previously undeveloped land—usually on the outskirts of an existing urban area. Construction of projects like the proposed action is pointed to as a major contributor to urban sprawl. Freeway projects are often cited as making land at the urban fringe more accessible and therefore more attractive for development.

But as with issues surrounding induced growth, the relationship between transportation improvements and land development is complex. Land accessibility in a particular area as a



South Mountain Transportation Corridor Study

Citizens Advisory Team
Draft Technical Report Summary

Cumulative and Secondary Impacts

result of a freeway project may make land more attractive for development, but other factors such as utility infrastructure, quality of public services, land acquisition and development costs, economic conditions and entitlement costs contribute major roles in determining where and how development would occur. And in fact, in many cases, new development being attracted to one part of a metropolitan region often represents development that has been redirected from other parts of the region.

The proposed action would occur in an already quickly urbanizing area (most noticeably in the Western Section of the Study Area). As such, the proposed action would not provide new or substantially improved access to a large undeveloped geographic area. The proposed action would occur in an area planned for urban growth as established in local jurisdiction land use planning activities for as much as the last 20 years. The purpose of the project is not to promote economic development but to respond to a growing need for additional transportation capacity as a result of Valley growth occurring now and as projected into the future.

Are the conclusions presented in this summary final?

Findings relative to impacts could change. Potential changes would be based on outcomes related to the following issues and will be presented to the public as part of publication of the Draft EIS, Final EIS and, if an action alternative were selected, in the final design process. The issues include:

- refinement in design features through the design process
- updated aerial photography as it relates to rapid growth in the Western Section of the Study Area
- ongoing communications with the City of Phoenix, Gila River Indian Community (GRIC) and other stakeholders to finalize measures to minimize harm to the South Mountains
- ongoing communications with the GRIC regarding granting permission to study action alternatives on GRIC land
- ongoing consideration of public comments
- potential updates to traffic forecasts as regularly revised by the Maricopa Association of Governments
- New previously unavailable data, studies, or analytical methods that would provide further insight to impact analysis and add value to the decision making element of the EIS process
- potential changes regarding updated census data
- regularly updated cost estimates for construction, right-of-way acquisition, relocation and mitigation

Even with these factors possibly affecting findings, the study team anticipates effects would be equal among the alternatives and, consequently, impacts would be roughly comparable. This assumption would be confirmed if, and when, such changes were to occur.



South Mountain Transportation Corridor Study

Citizens Advisory Team
Draft Technical Report Summary

Cumulative and Secondary Impacts

As a member of the Citizens Advisory Team, how can you review the entire technical report?

The complete technical report is available for review by making an appointment with Mike Bruder at 602-712-6836 or Mark Hollowell at 602-712-6819.