In an August 31, 2006 letter to INDOT and FHWA, Kenneth Westlake of USEPA Region 5 requested that additional impact information be provided in Tier 2 FEIS documents for this project. He requested, in addition to impacts for that individual section, that each Tier 2 FEIS provide a tally of impacts for all Tier 2 sections. The request asked that this tally include both direct and indirect impacts. This request explicitly assumed that a Tier 2 DEIS would be provided for all sections before any Tier 2 FEIS were provided.

The information in this technical memo is provided to address this request. It is provided in view of the following:

- This FEIS is published in advance of publication of a DEIS all other Tier 2 sections.
- To satisfy this request, estimates of impacts for all sections are provided using the most recently-published data in a NEPA document. These include:
    - ***Section 2.*** *Screening of Alternatives Report*, April 25, 2006.
    - ***Section 3.*** *Screening of Alternatives Report*, April 20, 2006.
    - ***Section 4.*** *Screening of Alternatives Report*, July 26, 2006 (most impacts); *Tier 1 Final Environmental Impact Statement*, December 2003 (total right-of-way impacts).
    - ***Section 5.*** *Screening of Alternatives Report*, May 2007.
    - ***Section 6.*** *Tier 1 Final Environmental Impact Statement*, December 2003.
- The only published section-level data for Section 6 remains what is published in the Tier 1 FEIS, Table 6-31. This table (and similar tables for Sections 1 – 5) provide section-level impact estimates, and include impacts to the following resources.
    - Total acres of new right-of-way.
    - Acres of farmland impacts.
    - Acres of forest impacts.
    - Acres of wetlands impacts.
    - Acres of floodplain impacts.
    - Residential relocations.
    - Business relocations.

  These are the resources for which impacts are provided in this document.
- Indirect impacts were not estimated on a section-by-section basis in the Tier 1 FEIS. In addition, the estimates of indirect impacts in Tier 2 EISs have a significant overlap with estimates provided in adjacent sections. Indirect impacts are analyzed at the Traffic Analysis Zone (TAZ) level, and a number of TAZs are included in the study areas for two sections. This is disclosed in each Tier 2 DEIS and FEIS. For example, TAZs near the city of Washington are part of the study area for the analysis of indirect impacts for both Section 2 and Section 3. No attempt is made to allocate impacts within an individual TAZ between adjacent sections. Rather, in order to fully disclose indirect impacts which can be associated with each Tier 2 section, the EISs of adjacent sections often show indirect impacts within the same TAZs. For this reason, the tally of impacts for all Tier 2 sections shows only direct impacts.

Table 1 provides a tally of estimated impacts to these resources for all Tier 2 sections, using the most current data published in a formal NEPA document. Tables 2 through 8 provide breakdowns by Tier 2 section for each of these impact estimates. A discussion regarding impacts

to each resource follows the table which gives the section-by-section breakdown for impacts to that resource.

Table 1 - Total Impact Estimates, Compared with Tier 1 FEIS Estimates					
Impact Category	Tier 1 FEIS Impacts	Updated Impacts		Change from Tier 1 Estimates	
		Low	High	Low	High
New Acres of ROW	5,860	6,139	6,233	279	373
Farmland Impacts (Acres)	4,470	3554	3928	(916)	(542)
Forest Impacts (Acres)	1,150	1,512	2,118	362	968
Wetland Impacts (Acres)	75	66	99	(9)	24
Floodplain Impacts (Acres)	830	404	447	(426)	(383)
Residential Impacts	390	354	390	(36)	0
Business Impacts	76	125	138	49	52

Table 2 - New Acres of Right-of-Way Impacts, Compared with Tier 1 FEIS Estimates						
			Updated Impacts		Change from Tier 1 Estimates	
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Low	High	Low	High
1	Tier 2 Final EIS, Table 5.3-1	550	720	720	170	170
2	Tier 2 Screening of Alternatives Package, Table 7	1,300	1,414	1,486	114	186
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	1,100	1,273	1,288	173	188
4	Tier 1 Final EIS, Table 6-29	1,560	1,560	1,560	0	0
5	Tier 2 Screening of Alternatives Package, Table 7	585	567	574	(18)	(11)
6	Tier 1 Final EIS, Table 6-31	605	605	605	0	0
	Total	5,700	6,139	6,233	439	533

Generally, right-of-way impacts are about 10% higher in Tier 2. The primary reason is that right-of-way associated with access roads is outside of the typical section for the mainline alternative. In Tier 1, access roads were assumed in some locations, but only as part of the typical section of the I-69 mainline. In Tier 2, detailed impact and engineering studies have identified a number of locations where local access roads separate from the mainline typical section are needed. Such locations would not have been identified in any Tier 1 alternative selected for Tier 2 studies.

Local access roads are used to provide a roadway entrance to properties whose existing access would be removed as part of I-69 project. If such access were not provided, such properties typically would need to be acquired by INDOT, further increasing the cost and impacts of the project.

In Tier 1, the footprint associated with each interchange was assumed to be 10 acres outside of the mainline right-of-way. This was consistent with a typical rural diamond interchange whose ramps are separated by approximately 800 feet (e.g., the northbound exit and southbound entrance ramps are 800 feet apart). In Tier 2 studies, INDOT directed that many interchanges be larger, with ramp spacing increased by 50% (to 1,200 feet). This would allow for future “loop” ramps to be built, should traffic increases in future years require them. This increases the acres of right-of-way required for interchanges.

In addition, INDOT has determined that both Sections 3 and 6 would each have a rest area. However, neither the estimates for Section 3 or Section 6 include the impacts for this rest area. The impacts associated with rest areas will not be estimated until the Tier 2 DEIS is published for these sections. These impacts were not allocated to specific Tier 2 sections in the Tier 1 FEIS estimates, and are not included in Table 2’s Tier 1 FEIS Impacts.

Table 3 - Acres of Farmland Impacts, Compared with Tier 1 FEIS Estimates						
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Updated Impacts		Change from Tier 1 Estimates	
			Low	High	Low	High
1	Tier 2 Final EIS, Table 5.3-1	540	630	630	90	90
2	Tier 2 Screening of Alternatives Package, Table 7	1,180	961	1,072	(219)	(108)
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	1,070	1,124	1,133	54	63
4	Tier 2 Screening of Alternatives Package, Tables 4 – 11	670	252	486	(418)	(184)
5	Tier 2 Screening of Alternatives Package, Table 7	385	122	142	(263)	(243)
6	Tier 1 Final EIS, Table 6-31	465	465	465	0	0
	Total	4,310	3,554	3,928	(756)	(382)

Farmland impacts are trending somewhat downward from those published in the Tier 1 FEIS. This trend is most noticeable in Sections 4 and 5, where farmland impacts are approximately one-half those shown in the Tier 1 FEIS.

As noted in the previous section, INDOT has determined that both Sections 3 and 6 will each have a rest area The impacts associated with rest areas were included in the project-wide farmland impact estimates shown in Table 1. While the impacts associated with rest areas will include a significant amount of farmland, these impacts will not be estimated until the Tier 2 DEIS is published for these sections. Farmland impacts attributable to rest areas were not allocated to specific Tier 2 sections in the Tier 1 FEIS estimates, and are not included in Table 3's Tier 1 FEIS impacts.

Table 4 - Acres of Forest Impacts, Compared with Tier 1 FEIS Estimates						
			Updated Impacts		Change from Tier 1 Estimates	
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Low	High	Low	High
1	Tier 2 Final EIS, Table 5.20-2	10	27	27	17	17
2	Tier 2 Screening of Alternatives Package, Table 7	100	279	339	179	239
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	30	84	90	54	60
4	Tier 2 Screening of Alternatives Package, Tables 4 - 11	890	808	1,315	(82)	425
5	Tier 2 Screening of Alternatives Package, Table 7	90	284	317	194	227
6	Tier 1 Final EIS, Table 6-31	30	30	30	0	0
	Total	1,150	1,512	2,118	362	968

Forest impacts are trending upward from those shown in the Tier 1 FEIS. The largest upward trends are observed in Sections 2 and 5, and perhaps Section 4. As may be seen by comparison with Tables 3 and 5, these upward trends in forest impacts largely are matched with downward trends in farmland impacts. This suggests that land identified in Tier 1 studies as farmland now is being identified as forested. Part of this is due to the more precise data available in Tier 2 studies for identifying forest.

The Tier 1 forest data used for comparing corridors was the best available data showing forest cover within the 26-county Tier 1 study area, and was suitable for comparing forest impacts for alternative corridors. It was provided by the United States Geological Survey, and is a subset of its National Land Cover Data set. It was derived by remote sensing photointerpretation techniques using satellite photography, with a nominal 30-meter (approximately 100 foot) resolution. The nominal date for this data was 1992.

The estimates for forest impacts in this Tier 2 study are based upon field surveys and 2003 aerial photographs, which identified forested areas that may not have been identified in the dataset used in Tier 1, and on more precise delineation of forest size. Forests are identified using United States Department of Agriculture (USDA) definitions. The greater forest impacts in Tier 2 may be attributable to two factors. First, smaller forested areas which were not identifiable from the USGS data set now are being identified by on-the-ground field surveys. Second, in some sections (particularly Sections 2 and 5) access roads outside of the mainline typical section tend to be located in forested areas.

It also is possible that there has been an overall increase in forest cover since 1992 (the nominal date for the data used in the Tier 1 study). Analysis of USDA Forest Service data confirms that forest cover has increased in the majority of counties crossed by the I-69 corridor between 1986 and 2004. A notable decline of forest cover in Daviess County through this time period is expected to have had little influence on I-69 impact numbers, as very little forest impact was identified in Daviess County in Tier 1.

Table 5 - Acres of Wetlands Impacts, Compared with Tier 1 FEIS Estimates						
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Updated Impacts		Change from Tier 1 Estimates	
			Low	High	Low	High
1	Tier 2 Draft EIS, Table 5.19-14	5	1	1	(4)	(4)
2	Tier 2 Screening of Alternatives Package, Table 7	35	31	51	(4)	16
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	5	12	13	7	8
4	Tier 2 Screening of Alternatives Package, Tables 4 - 11	20	6	14	(14)	(6)
5	Tier 2 Screening of Alternatives Package, Table 7	5	11	15	6	10
6	Tier 1 Final EIS, Table 6-31	5	5	5	0	0
	Total	75	66	99	(9)	24

Estimates of wetlands impacts range from below to above Tier 1 estimates. Tier 1 identified wetlands using National Wetland Inventory (NWI) mapping; data were not field-verified. In Tier 2, wetland identification relied on field studies; by the time that the FEIS is published in each section, all wetland impacts for the preferred alternative will be based upon field delineations in consultation with US Army Corps of Engineers. Avoiding impacts to wetlands and other important water-quality resources is a significant consideration in determining Tier 2 preferred alternatives.

Approximately one-half of the potential wetlands impacts for the entire project are in Section 2. Efforts continue in Section 2 to minimize water quality impacts for its preferred alternative and document those impacts in Section 2's DEIS. It is anticipated that Section 2's wetlands impacts will be toward the lower end of the range shown above. If that can be accomplished, the wetlands impacts for the entire project may be slightly less than the Tier 1 estimate of 75 acres (for a 140+ mile project).

Table 6 - Acres of Floodplain Impacts, Compared with Tier 1 FEIS Estimates						
			Updated Impacts		Change from Tier 1 Estimates	
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Low	High	Low	High
1	Tier 2 Draft EIS, Table 5.19-14	30	36	36	6	6
2	Tier 2 Screening of Alternatives Package, Table 7	420	168	183	(252)	(237)
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	65	19	22	(46)	(43)
4	Tier 2 Screening of Alternatives Package, Tables 4 - 11	130	28	52	(102)	(78)
5	Tier 2 Screening of Alternatives Package, Table 7	100	68	69	(32)	(31)
6	Tier 1 Final EIS, Table 6-31	85	85	85	0	0
	Total	830	404	447	(426)	(383)

As Tier 2 studies progress, estimated floodplain impacts are consistently smaller than those estimated in Tier 1. In Tier 1, floodplain impacts were estimated by digitizing data from a figure in “The Indiana Water Resource Availability, Uses and Needs" (1980). This data is very general. This was the best available source for use in Tier 1 to identify and compare floodplain impacts across a 26-county study area.

In Tier 2, floodplains are identified using county-level mapping from the Digital Flood Rate Insurance Maps (DFIRM) (2004). These data shows floodplains identified by Federal Emergency Management Agency (FEMA) Flood Rate Insurance Maps (FIRM). The FIRM is the basis for floodplain management, mitigation, and insurance activities for the National Flood Insurance Program (NFIP). In addition, more detailed Tier 2 engineering studies avoided floodplains as part of overall avoidance of water resource impacts. For example, the reduction in floodplain impacts are more pronounced in Sections 2 through 4 (which are on new alignment) than in Section 5 (for which the alignment is constrained to use the right-of-way of existing SR 37).

The significantly lower floodplain impacts in Tier 2 are due to a combination of Tier 2 avoidance activities, as well as use of more precise floodplain data. It should be noted the most land shown as floodplain also would be classified as farmland or forested land.

Table 7 - Number of Residential Relocations, Compared with Tier 1 FEIS Estimates						
			Updated Impacts		Change from Tier 1 Estimates	
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Low	High	Low	High
1	Tier 2 Final EIS, Table 5.2-3	24	18	18	(6)	(6)
2	Tier 2 Screening of Alternatives Package, Table 7	37	29	39	(8)	2
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	23	15	17	(8)	(6)
4	Tier 2 Screening of Alternatives Package, Tables 4 - 11	33	28	50	(5)	17
5	Tier 2 Screening of Alternatives Package, Table 7	146	137	139	(9)	(7)
6	Tier 1 Final EIS, Table 6-31	127	127	127	0	0
	Total	390	354	390	(36)	0

Tier 2 estimates of residential relocations range from somewhat less to the same as those estimated in the Tier 1 FEIS. This is consistent from section to section.

Table 8 - Number of Business Relocations, Compared with Tier 1 FEIS Estimates						
Section	Source of Updated Impacts	Tier 1 FEIS Impacts	Updated Impacts		Change from Tier 1 Estimates	
			Low	High	Low	High
1	Tier 2 Final EIS, Table 5.2-3	2	2	2	0	0
2	Tier 1 Final EIS, Table 6-27	1	1	1	0	0
3	Tier 2 Screening of Alternatives Package, Tables 2 - 6	0	8	9	8	9
4	Tier 2 Screening of Alternatives Package, Tables 4 - 11	1	1	1	0	0
5	Tier 2 Screening of Alternatives Package, Table 7	22	63	65	41	43
6	Tier 1 Final EIS, Table 6-31	50	50	50	0	0
	Total	76	125	128	49	52

Business relocations are somewhat higher than Tier 1 estimates. Business relocations are minimal for new alignment sections of I-69. The Tier 1 FEIS estimated a total of 4 impacts in the first four sections, and current Tier 2 estimates show an estimated 12 – 13 business relocations. Section 5's estimates of business relocations are about three times those estimated in Tier 1. Many of these added business impacts are due to loss of local road access. Loss of access to individual businesses could not be clearly identified in Tier 1. In addition, there have been increases in numbers of businesses along SR 37 in Section 5.